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THE CANADIAN RADIO AMATEURS' JOURNAL

JUNE 1950
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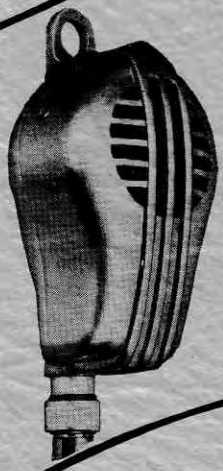

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AUTHORIZED AS SECOND CLASS MAIL POST OFFICE DEPARTMENT, OTTAWA

UNIVERSAL DRIVER TRANSFORMERS

Type	Watts	D.C. Per Wndg.	Weight	Mtg. Centres
1703	15	70 M.A.	6 lbs.	2½"x3"
1705	30	100 M.A.	10 lbs.	3"x3⅝"
1707	60	140 M.A.	16 lbs.	3⅝"x4½"

CONNECTION DATA

Ratio Pri. to ½ Sec.	Plate	B	Plate	Grid	Bias	Grid
1.25:1	8	9-10	11	1	3-4	6
1.57:1	2	3-4	5	7	9-10	12
1.97:1	1	3-4	6	7	9-10	12
2.04:1	7	9-10	12	1	3-4	6
2.55:1	7	9-10	12	2	3-4	5
2.66:1	2	3-4	5	8	9-10	11
3.2:1	1	3-4	6	8	9-10	11
4.1:1	2	3-4	5	7	8-11	12
5.1:1	1	3-4	6	7	8-11	12
6.3:1	8	9-10	11	1	2-5	6

PRACTICAL APPLICATION

Driver	Mod.	Ratio Pri. to ½ Sec.
PP6A3	PP809	2.1:1 for 100 W — 1.97:1 for 145 W
"	PP811	3.2:1 for 175 W — 2.66:1 for 220 W
"	PPTZ40	1.57:1 for 225 W — 1.57:1 for 250 W
"	PP805	1.57:1 for 300 W — 1.25:1 for 370 W
PPP6A3	PP810	1.57:1 for 590 W — 1.25:1 for 725 W
PP6L6	PP809	4.1:1 for 100 W — 3.2:1 for 145 W
"	PP811	4.1:1 for 175 W — 3.2:1 for 220 W
"	PPTZ40	2.04:1 for 225 W — 2.04:1 for 250 W
"	PP805	2.55:1 for 300 W — 2.04:1 for 370 W
"	PP810	1.57:1 for 590W — 1.25:1 for 725 W

500 Ohm line to Mod. Grids — Connect Line to 7 and 8 — join 7 and 11, 8 and 12 — connect grids to 2 and 5, join 3 and 4 for "C" bias.

Driver Plates to 500 ohm line — same connections except plates connect to 2 and 5.

Above ratios are correct only when driver transformer is used in the circuits and at the voltages shown in circuit in the next issue

Ratios may be computed for other modulator tubes by dividing required modulator peak grid to grid volts into voltage developed across pri. of universal Driver Transformer.

HAMMOND MANUFACTURING COMPANY LIMITED

GUELPH ONTARIO CANADA

SIDEBANDS

As this months' column is being written, the intense activity associated with the Field Day outing is just beginning to die down. From the sound of the various bands, however, this years' competition should chalk up an all-time high record for the number of stations involved. There wasn't a spare kilocycle unused most of the time, and the club representation was unusually good.

Every indication is that Field Day, 1950 was the greatest yet, and just what the Canadian participation from coast-to-coast in the various classes of entries, will soon be shown in the reports in QST.

Listening across the band brought to our attention comments by non-participants which questioned the usefullness of such a contest. It was their contention that the band was cluttered up with these FD stations - a situation which made a normal QSO almost impossible. The few who were so unhappy amplified their tales of woe by questioning the reason behind Field day operations and the system of points. If one club had a considerably greater powered transmitter, it was obviously a greater handicap for the low power units to compete on equal terms. True enough, but since the first recorded history of man, such an 'unfair situation' has existed and no system has yet been determined which would make it fair for all.

It was silly talk, admittedly, but it did make you stop to think about handicaps of another nature, involved in one phase of our hobby. For amateur radio, as in anything else gives a fraternity member a chance to make the most of his opportunities as they arise. It is of no consequence whether you operate high or low power, phone or CW, as long as you pitch in to build up our hobby, and not tear it down. Amateur radio is fair to everyone, and gives you a chance to do your best for the game. Don't pass it up. No other hobby can give you so much for so little time, energy, and cost.

Makes me think about some of our VE hams who operated under more of a handicap than you who have read this far on the page and who are making a very real contribution to the art. For those hams are among a very, very few in numbers who have been licensed by the Department of Transport to operate. The latest count of these VE's - now a few months old - showed that in the history of our hobby in Canada - going back a good many years to the first of them - only eleven of them have been licensed as hams.

These are the sightless operators, who in spite of perpetual darkness, had enough courage to turn their handicap to some use because they had something to shoot at.

Ever talk to any of these boys? Many of you have, in most cases without realizing the fact. There's 6CE, Alex Morrison out at Langford Park on Jasper Highway. Both he and his wife spend as much time on the bands as they can. And Dick Wanless of the city of Montreal - 2AKM - ham number eleven in his own field. There's another active sightless ham in Ottawa - a VE3, and any of the boys in the nations capitol can assure you of his enthusiasm. Doubtless, across Canada, there are others of whom we have not heard.

What's the point to all this? Well, there is a moral, if you may call it such, to this story. It's this! All of us, at one time or another, have had to slug to get that prized amateur operators license and station call. There was no cutting of any corners, and for some it was really tough. But we all got into this thing because we wanted to do so, and we'll quit, if we do, for the same reason. But in the meantime, let's not knock ourselves. If there's a contest on the bands you don't like, find something else to do while it's on. The fact there's activity would show that others don't feel exactly as you do.

Be a sportsman, and make ham radio even better. Give your best to the game and you'll learn there are no handicaps.

de VE3WO

SUPER-MODULATION

by

J.G.. (Sax) Bordeleau, VE2DD

How to build a High-Powered Super Modulated rig!!

For some considerable time past, the transmitter in use here has been a Super-Modulated type in which there has been a great interest. Using a pair of 813 tubes in the final, and with a simple modulator, this rig has given wonderful performance and results. The new final was built after the article on this subject which appeared in Radio News for October and November of 1948, and after preliminary tests early in the following year, has been in constant use since February, 1949.

Before constructing a final using the circuit for this article, please bear in mind that Super-Modulation uses new and advanced principles and thus requires new techniques of testing, tuning and operational procedure. You'll find it easy to handle and operate after certain key adjustments are fully understood, and while it is useful to understand the theory behind Super-M, it isn't necessary, as long as you follow carefully the tuning procedure outlined and take care to use properly, the available full, high, sideband talk power.

Operation of this transmitter involves the use of high voltages that can be fatal. As tuning up requires working on the final, be careful at all times. If the transmitter has high voltage applied to the power amplifier, it should not be operated unless it is fully loaded either by the antenna, or a dummy resistor load.

Allowing a phone 'Talk Power Level' of about the came as CW, it will be found that the Super-Modulated signal will be easily readable when the carrier signal strength is down in the noise or QRM. To illustrate how this can be - the transmitter to be described has been used on 10, 20 and 75 meters with a power input to the final of 400 watts, with an estimated power output of 245 watts of unmodulated carrier. With high level speech superimposed on this carrier, while using the Super Modulating principle, there is an audio sideband power at full modulation of an estimated *600 watts output!*

The transmitter can be either crystal or VFO controlled. The output load for maximum efficiency should be between 50 and 100 ohms. 300 ohm twin lead did NOT work well. The antenna system is most important, and care must be taken to avoid any standing waves. Be sure to spend some time on the antenna system to eliminate them completely.

The tube lineup for the complete transmitter is as follows: Oscillator, 6V6, Doubler or Buffer, 6L6, Buffer, 807, the Power Amplifier an 813, Positive Modulator also an 813, Speech Amplifier 6F5 into a 6SJ7, Final Audio Trigger a 6L6, High Voltage rectifiers, 2-872A's, low voltage rectifier a 5X3 and Bias Rectifier an 80. Four sub-panel mounted meters measure plate current of power amplifier stage, positive modulator, 807 stage and the 110 volt line.

The actual construction of the complete rig is quite straightforward, and if the basic chassis outline is followed, no trouble will be encountered in duplication of it. After construction has been completed from the accompanying diagram, follow the tuning procedure below, carefully.

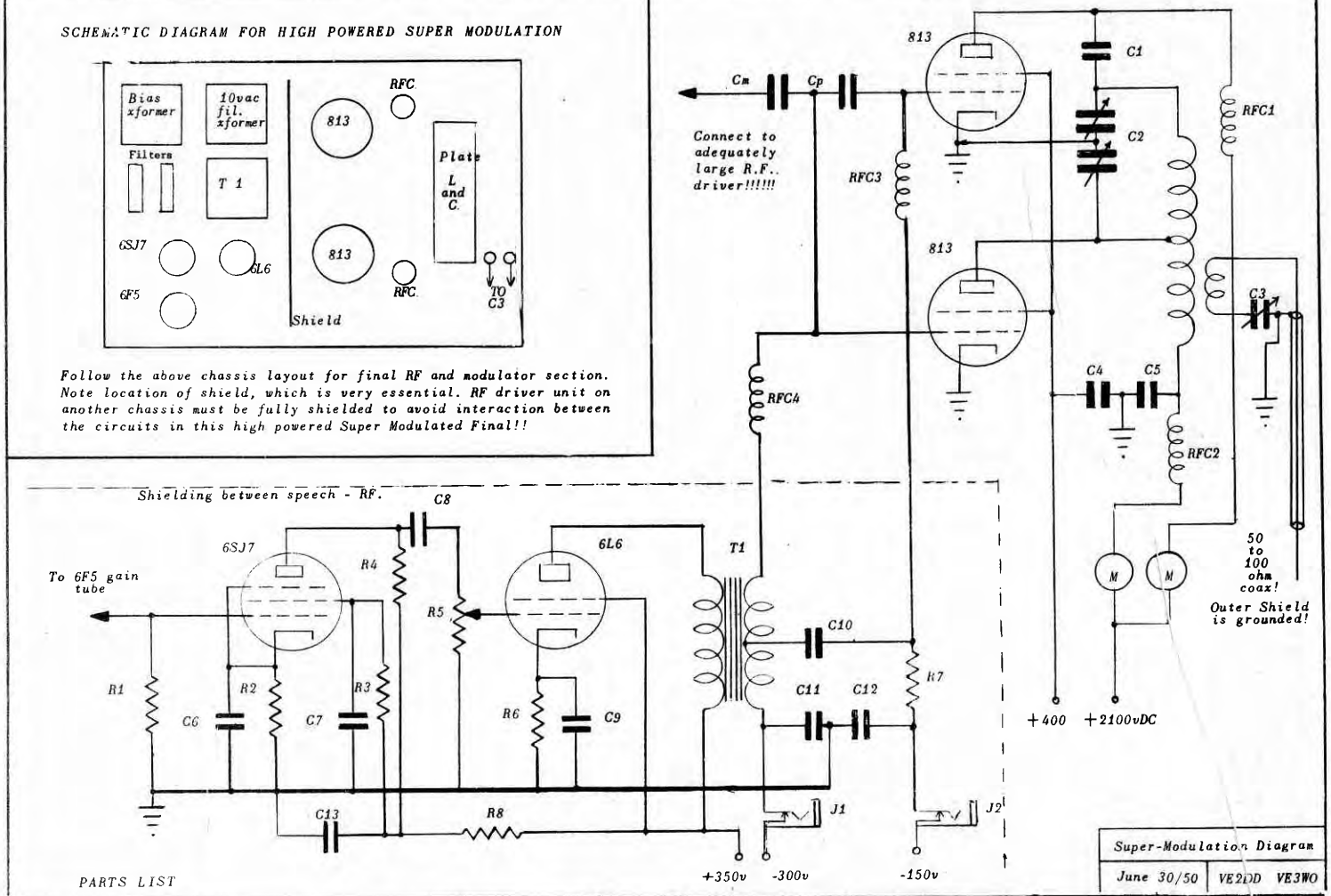
TUNING AND ADJUSTMENT CONTROLS!

Only four plate tuning front panel controls are needed. With the beam tubes used, neutralization is not required on any band, and no grid circuits are tuned. Shielding is essential between stages - and the reactance tuning condenser in the antenna circuit is a must. A heavy ground lead should also be connected to the various chassis used.

With the proper coils in place, and the dummy load connected, the high voltage is set at half the operating voltage. In my case, with 2100 normally used, 1000 volts DC was the voltage applied during tune-up. I might mention at this point that the final tank coils posed something of a problem at first. The 100 mmfd per section tuning condenser gives a high C and a good flywheel action in this circuit. However, it becomes necessary to use a 40 meter coil to operate on 80 meters, a 10 meter coil to operate on 20, and a special coil for ten meters.

SCHEMATIC DIAGRAM FOR HIGH POWERED SUPER MODULATION

Follow the above chassis layout for final RF and modulator section. Note location of shield, which is very essential. RF driver unit on another chassis must be fully shielded to avoid interaction between the circuits in this high powered Super Modulated Final!!



PARTS LIST

Super-Modulation Diagram	
June 30/50	VE2DD VE3WO

R1 - 2 megohms, 1 watt
R2 - 1,500 ohm, 1 watt
R3 - 1 megohm, 1 watt
R4 - 1 megohm, 1 watt
R5 - 500,000 ohm pot.
R6 - 300 ohms, 2 watt
R7 - 30,000 ohm, 5 watt
R8 - 50,000 ohm, 1 watt
Cm - .00025/600v, mica
Cp - .0001/600v, mica
C1 - .002/600vdc mica
C2 - 100mmf per section, Hammond - 9910
C3 - 50mmf. reactance condenser - air type.
C4 - .002/600v mica
C5 - .002/600v mica
C6 - 20mfd/25v by-pass
C7, C8 - .01/600v paper
C9 - 20mfd/50v by-pass
C10, C11, C12 - all are 2mfd/600vdc paper.
C13 - 8mfd/450 electrolytic
RFC-1 - National R-175
RFC-2 - 2.5 mh/500 ma.
RFC-3 - Hammond 1504
RFC-4 - Hammond 1504
T-1 - Hammond 1703 for Class B Driver stage.
J1, J2 - Closed Circuit jacks.
M - Plate meters 0-500ma.
Final tubes are 813's!
Final audio tube - 6L6

First, adjust output load coupling to be fully out, and without any high voltage on the final tubes, adjust the exciter for maximum grid drive to the final power amplifier tube, marked PA in diagram.

With the reduced high voltage applied to the final tubes, the power tube will be drawing anything from 50 to 225 milliamps, and the positive modulator tube (PM) from 20 to 60 milliampere. Now tune the power amplifier tuning condenser for a minimum on the PA meter. This meter will show a minimum of 75 to 100 ma. or so, as the circuit will be loaded slightly, even with the coupling coil all the way out. The next step is to rotate the reactance tuning condenser in the antenna circuit for maximum plate current of the power amplifier. This peak should be fairly sharp! By tuning the the reactance condenser for maximum power amplifier plate current, and at the same time keeping the plate tuning condenser in resonance or at minimum dip, output will start to show up in the dummy load,up to about 150 ma. Now you gradually increase the output coupling so that the power amplifier current is about 185 ma. The loading will be about one third of the way in. This must never be in more than halfway while tuning. A check of your tuning again now will show the power amplifier tube is still in resonance. During this procedure, the grid of the PA tube should be kept around 5 to 8 mils, and the grid current on the Positive Modulator tube would be about 1.5 to 2 ma.

Now the tuning and loading should be rechecked and after making sure that all the stages are properly tuned, the positive modulator tube should run at approximately 35 ma. idling current. Then the saturation gap should be checked. This is simply the difference between the in-resonance and the out of resonance points. As an example, with 1000 volts on the PA and PM tubes for tune-up, the loading and reactance tuning will be set so that we have 185 ma. PA plate current in resonance, and this will rise to 225 ma. approximately, off resonance.

The proper saturation gap then, at 1000 plate volts shows that the output load coupling is not too tight, and also that the RF drive is proper for both PA and PM tubes. The proper saturation gap should be about ten to twelve percent. The saturation gap of the PM tube during this test in resonance will be around 30 to 40 ma.. and as the power amplifier is detuned, the PM plate current should rise to about 60 ma.! Any great deviation from the saturation gap as described, with the proper voltages to grids, screens and plates of the final tubes means trouble, and must be corrected before the transmitter can be operated effectively in order to take full advantage of the Super Modulation Action. And after these tests are concluded, the transmitter should be checked with the full plate voltage applied to the final tubes, PA and PM.

It is very important that the transmission line or dummy load reactance condenser adjustment should be made with only the one thousand volts applied to the final tube as otherwise this would permit incorrect adjustments. The screen of the 813 is such that proper loading and reactance tuning cannot be determined with the full plate voltage applied. With the full power applied to the plates of the tubes, their saturation gap will decrease and be about as follows: Power Amplifier current, in resonance, 200 ma., and out of resonance at 230 ma.

After the above tests have been made, audio can be applied, and if everything is in order, with no hum or RF feedback, there will be no change of PM's plate current of 30 to 40 ma., until the microphone is spoken into. Then the dummy load will show a very substantial upward increase in its brilliancy, with the antenna ammeter also kicking upward. At full power operation, with the audio gain set about halfway, the PM plate current will kick up to 250 to 300 milliamps, while at the same time, the PA plate current will drop down to about 150 milliamps as the carrier is suppressed. When operated into the transmission line as a load, and with standing waves at a minimum, the line current should show an upward increase of about 30 to 35 percent. With higher levels of audio, the antenna current will rise to 50% above static level, under no modulation conditions.

The transmitter is now ready for a check with the transmission line feeding the antenna, rather than the dummy load. All tuning and tests should be made with 1000 volts on the final plates, the same as for dummy load operation. Remember - and this is very important - line coupling coil adjustment must be one third to one half in, but never over one half, Pruning of the

transmission line to somewhere near an even number of quarter wave multiples, minus the length necessary to accomodate the velocity factor for the type of line used, will help in bringing down the standing waves, and thus allowing a much better loading and matching at the transmitter end. While the reactance condenser does not correct the line in itself, it does balance out any undesired reactance and the transmitter has a fairly non-reactive load to work into.

For guidance of those who will be wondering if line current at their shack is right, working into a 52 ohm co-axial cable here, gives a line current of 2.2 amperes where no modulation is applied, kicking up under normal speech to between 3.0 and 3.2 amps.

As previously mentioned, it is well to keep the PM's plate current at below 50 ma under resting condition, in order to allow this tube to deliver power only during modulation and thus produce that extra sideband power.

Frequency stability of the transmitter is very good - just as good if not better than the average AM rig. As to bandwidth, there have been reports of 7 kc. with no splashing whatever when the transmitter is properly adjusted, and with proper matching of the load impedance, and low standing wave content. Several makes of AC-DC receivers were operated inside the metal cabinet housing the transmitter, with no trace of BCI at any point across the BC band. Some filters had been incorporated in the trans mitter line(AC) just as a precaution. A strong harmonic was detected around 100 megacycles, but this was cured by placing a small wave trap in the plate lead of the 807 buffer stage.

During the time the transmitter has been in operation, approximately half the contacts were made for test purposes, and the reports have shown that the carrier strength plus talk power, modulation percentage and speech quality were of a high order. This rig has been operated on 10,20 and 75 fone with equally good results, a surprisingly narrow bandwidth and a loudness far exceeding what might be expected fro signals of equal power inputs.

"...It's all I can get when that fellow starts his CallinCQTwennyMeterFone..."

Suppression of TVI

Treatment of the PA—Low-Pass Filter Design—Mains Filtering

PART II

By F. T. WILSON (G2XX)

In this concluding instalment, our contributor deals very fully with the PA stage, and factors affecting power supply and mains filtering. He also gives details of suitable low-pass RF filters and shows that by tackling the TVI problem along the lines suggested, a certain cure should be effected.—Ed.

NOW we come to the PA stage. Originally this was of open construction, the various components being mounted on two girders which run from the exciter chassis to the left-hand side of the cabinet. When the first modifications were made the 250TH was removed and a piece of perspex carrying the 35T's and the grid circuit was bolted to the girders. It was fairly obvious that it would be a waste of time attempting to filter this stage as it stood. The whole unit was therefore removed and rebuilt on to a large sheet of dural. The grid circuit was redesigned, the condenser being built into an aluminium screening box on the underside of the dural sheet and the grid coil (in a screening can) mounted on top. The valves, neutralising condensers and plate circuit are mounted above the dural sheet which effectively screens the RF circuits from the audio chassis immediately below. Filter circuits are on the outside of the screening and located at points where pick-up of stray radiation from the tank circuits is impossible. As an additional precaution RF chokes consisting of 20 turns each of 14 SWG enamelled wire were inserted in each filament lead to the 35T's and each side of each filament was by-passed right at the valveholder.

The final result is shown in Fig. 3 (p. 830) and has well repaid the time and care spent in its construction. With the PA working into a dummy load the level of the radiated harmonic does not increase when the final HT is switched on. As a matter of interest the reading obtained on the FS meter when coupled to the aerial link is only 3 μA.

It will be observed that no harmonic traps are employed in the plate circuits. Some illuminating facts about harmonic traps are given in the article by W2VLQ in the February, 1949, *QST* and have been borne out by experience here. It seems doubtful whether their effectiveness justifies the work entailed in their design. When tried in this particular PA they did reduce the 42 mc harmonic slightly, but on changing the frequency to 28 mc the PA went into oscillation and could not be neutralised. Removing the traps cured the trouble. Possibly thorough screening around the traps might have been effective but this was not tried.

In place of harmonic traps low-pass filters incorporating trap circuits are used in the co-axial leads between the 807 and PA grid and between the PA anode and aerial tuning unit. A photograph shows one of these units and the circuit is given in Fig. 4. For calculating the values required the formula given herewith is used.

50-ohm cable	C1	$= \frac{2120}{f}$
	C2	$= \frac{4770}{f}$
	L	$= \frac{12}{f}$
75-ohm cable	C1	$= \frac{1420}{f}$
	C2	$= \frac{3180}{f}$
	L	$= \frac{18}{f}$

Each unit is assembled in a cast aluminium box, 3-in. cube, and the co-axial cable is properly terminated to prevent harmonic currents flowing back along the braiding.

The actual effectiveness of such a filter between the 807 and the PA grid circuit is somewhat indeterminate. It certainly works in that it affords some slight reduction in the harmonic voltage passed to the PA grid, but the tuning is very flat and has no pronounced peak. This is most likely due to the damping of the tuned circuit by the input resistance of the PA valves. On the other hand the filter in the aerial lead tunes very sharply and resonance can be easily determined.

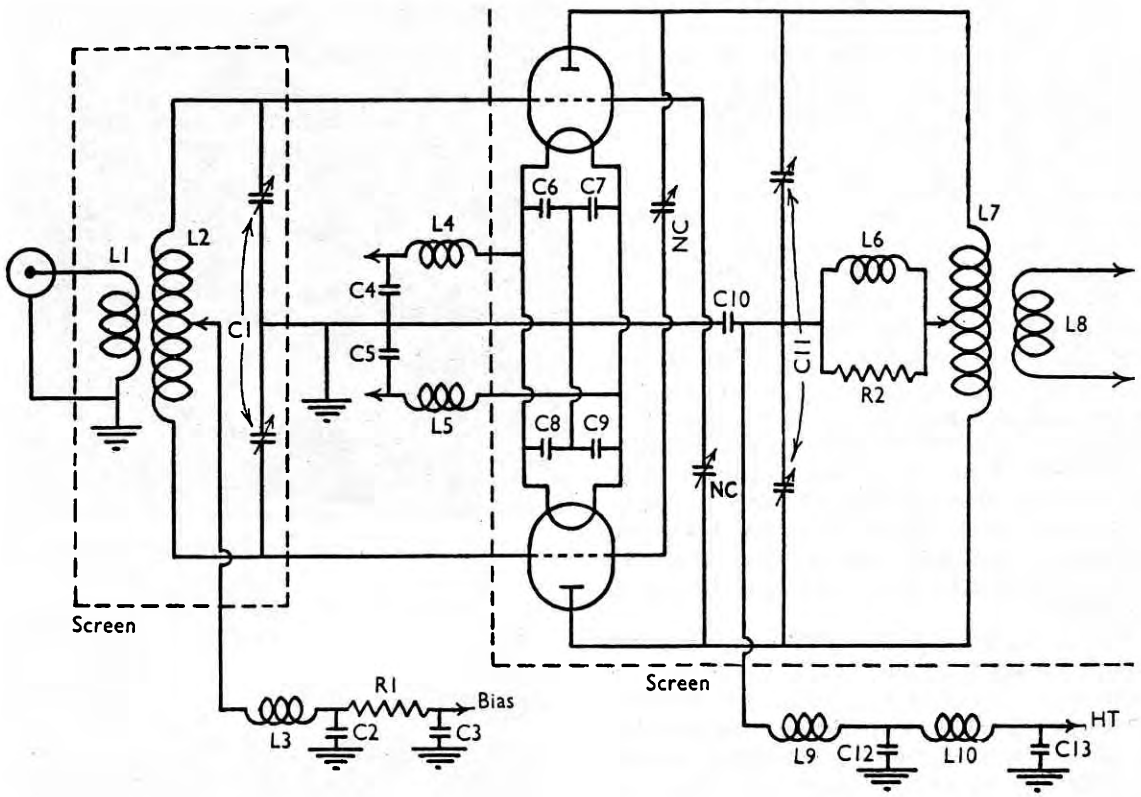


Fig. 3. A push-pull PA circuit with suitable TVI suppression.

Table of Values

Fig. 3. Push-Pull PA Incorporating TVI Filtering

C1 = 100 $\mu\mu$F per section (split stator)
C2, C3 = ·001 μF
C4, C5 = ·0005 μF
C6, C7 = ·05 μF
C8, C9 = ·005 μF
C10 = ·002 μF
C11 = 76 $\mu\mu$F per section (split st. tor)
C12 = ·001 μF
C13 = ·0005 μF
R1 = 220 ohms
R2 = 700 ohms
L1 = 2-turn link
L2 = 12 turns 16 SWG enam., 1-in. diam.
L3 = 2·5mH RF choke.
L4, L5 = 20 turns 14 SWG enam., ½-in. diam.
L6 = 2·5mH RF choke
L7 = B. & W. tank coil 8-11 mc
L8 = 1-turn link
L9 = RF choke, ex-TU7B unit
L10 = 30 turns 20 SWG enam., ¼-in. diam. rod

No measurements on the performance of the aerial filter have been made since the amount of harmonic reaching the aerial without the filter in circuit is very small, but there seems no reason to doubt the figures quoted in *QST* which show that an attenuation of 40 or 50 dB is possible.

To sum up the situation, the problem of TVI is not so complicated as it might at first appear. Harmonic radiation from leads can be entirely suppressed and it is surprising how limited the field from a tank circuit is. Generally speaking, low power stages using ordinary receiving valves seem to give relatively little trouble and it is only with the higher powered stages that any action is necessary. Beam tetrodes of the 807 class are the most difficult to deal with as they have a decided tendency to take off at VHF. The filament circuits seem to be the worst offenders as far as harmonic radiation is concerned and adequate filtering is essential both in the filament leads and around the transformer. Fig. 5 shows the filter used with the filament transformer in the HT4E.

Mains Suppression and Screening

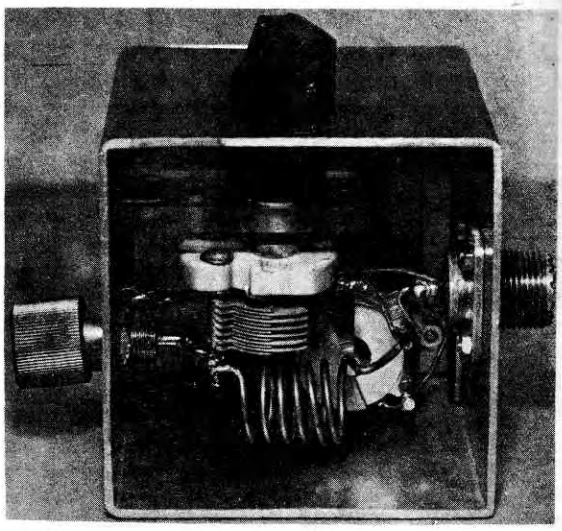
A good mains filter is another very necessary item. During some of the tests carried out here in the early stages of harmonic suppression a small amount of radiation was detected from the AC leads to the transmitter. This was so minute that it was assumed there was little prospect of it causing TVI. A check at the TV set showed, however, that the aerial feeder ran parallel to a mains lead for about 3 ft. and spaced 3-4 in. from it. The amount of harmonic picked up through this source was sufficient to block the sound channel completely. Re-routing the feeder cleared the interference, but to eliminate it entirely the mains filter shown in Fig. 6 was installed. It is built into an aluminium screening box mounted on the back of the transmitter. Condensers are not used on the input side of the RF chokes since they were found to make the filter ineffective, probably due to the harmonic flowing *via* the earth return and thus bypassing the chokes.

Where the TV signal is very low, complete and thorough screening of the transmitter is necessary. The ideal is a metal box with no openings whatever. For obvious reasons this is not practicable, but any screening should contain the minimum possible number of holes. A 3-in. meter opening will radiate quite a lot of harmonic !

Whatever type of aerial system is used an aerial tuner is indispensable since it can contribute greatly in preventing harmonics from reaching the aerial by eliminating capacity coupling. Of course, if the harmonic is transferred by inductive coupling little or no benefit will be obtained from the aerial tuner but experience has shown that most harmonic transfer takes place capacitively. Provided the Q of the aerial tuned circuit is not lower than that of the final tank and that link coupling between the two is employed, attenuation of harmonics up to 40 dB can easily be obtained.

Transmitter Adjustment

Unfortunately, it must be admitted that, even after carrying out the measures described, tuning up the transmitter for minimum harmonic output can be rather a critical procedure. First of all, the circuits are tuned to resonance in the normal manner. Then, observing the harmonic level on a suitable indicator (such as the S-meter of a fairly



The low-pass filter for coaxial line circuits, specially designed for the applications discussed in the article.

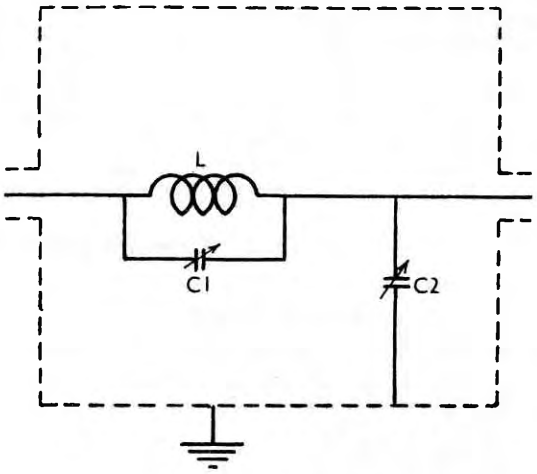


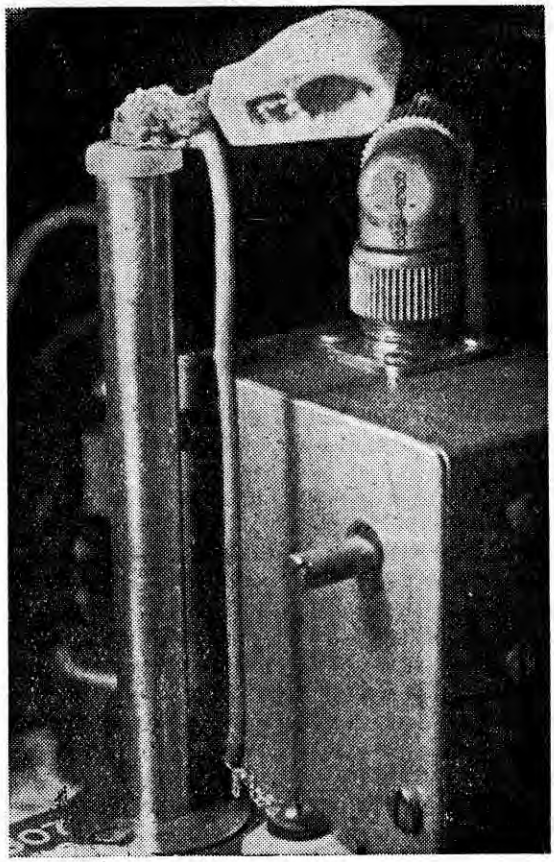
Fig. 4. Circuit of the low-pass filter, values for which are discussed in the text. (*See* photograph).

sensitive receiver) all circuits are retuned for minimum harmonic radiation. When this has been done the grid drive to the PA and the transmitter output should still be normal, because generally it will be found that minimum harmonic output occurs at or very near resonance in any Class-C stage. However, this is not an invariable rule and considerable further research into this problem is needed. The operating conditions of the stage, *e.g.* grid bias, LC ratio and electrode voltages, do not appear to have much effect. Any trouble from this source only arises where the drive is

limited. In the case of an 807, for example, where 10 mA of grid drive is available, it obviously does not matter if minimum harmonic occurs when the circuit is detuned from resonance until only 4 mA flows, which is enough for the 807. But when the drive is only just sufficient it is essential that minimum harmonic output and resonance at the fundamental should coincide. No difficulty has been experienced with the circuits in the HT4E.

Conclusion

The results achieved here have been very satisfactory and well worth the time and effort spent. Final tests show that the amount of harmonic radiated with 100 watts input on 14 mc will not produce any reading on the S-meter of the SX-28 with the TN16 converter on 42 mc. This test was made with the receiver 2 ft. from the transmitter. The minute amount of harmonic still finding its way out of the transmitter is sufficient to produce a small drop in the level of the audio signal on the TV set, no doubt due to the excessive bandwidth of this receiver. Probably RF by-pass condensers from plate to cathode in the PA stage would clear this small residual interference but has not been thought worth while in view of the imminent opening of the Sutton Coldfield station.



The RF by-pass arrangement for tank circuits.

During the period when the programme of work discussed here was being undertaken a receiver was running nearly every evening and most week-ends on 42-43 mc and harmonics of many of the local amateur stations were logged. The strongest signals were received from stations using single-ended final stages with beam tetrodes, whilst it was particularly noted that stations using VFO's had very weak harmonics. The possibilities of a harmonic-free VFO are now being investigated, since this seems to be one solution of stopping harmonics at the source and preventing amplification by subsequent stages. This would make easier the suppression of harmonics developed in the higher powered stages.

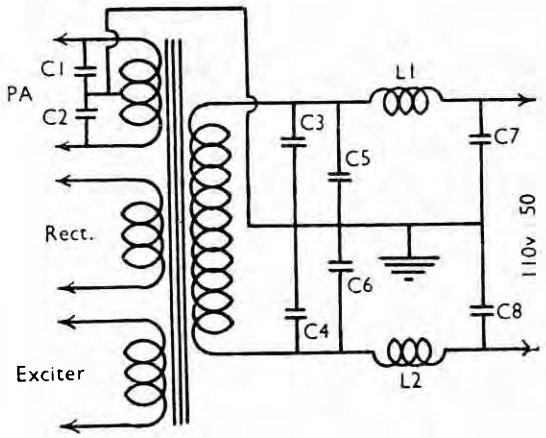


Fig. 5. TVI filter circuit for the transformer supplying LT to RF stages.

Fig. 5. Filter Circuit for LT Supply to RF Stages

C1, C2 = ·002 μF
C3, C4 = ·001 μF
C5, C6 = ·0005 μF
C7, C8 = ·001 μF
L1, L2 = RF chokes (taken from mains input of old S36C receiver)

NETHERLANDER G-II

By - *J.J. Zandbergen, PAØZY*

This story is true - an account of Dutch Underground work during the second World War. Our writer has been a noted, active amateur for many years. This is the concluding installment - Part Four of our story appearing in Skywire.

The search was on, and I knew that extreme caution and wakefulness on my part would be needed to keep me out of further trouble. For a couple of weeks nothing unusual happened, and the ceaseless stream of intelligence was flowing on. Then, one night while peacefully asleep after a full schedule, there was a series of persistent V knocks on the door of my room and there was Sister Manna to give the alarm that a German patrol had entered the hospital, searching for the man who had fled from them earlier, and who had been seen entering the engine room of the old building. Apparently I had been seen and not known it on the day I had escaped. You never knew who might be an informer in those days.

I had just a few moments to leap into my clothes, pack the transmitter and other radio gear into my trunk, hide the ashtray in my pocket, while the Sister made the bed and removed all other trace of masculine habitation in the room. Swiftly, with most of my belongings I headed for the Chapel tower, and, like a monkey, swarmed up the beams, disabling the electric light switch to the tower as I went, just in case the patrol wanted a checkup made there. I sat in the unheated belfrey for more than two cold and uncomfortable hours not daring to move lest any noise I might make could be heard by the Nazi patrol.

I was finally called down to the ground again by Sister Manna and was revived by a cup of hot tea.

The Germans had rummaged through the entire hospital, she told me, and not finding me had turned their kind attention to other matters - four stored automobiles belonging to the surgeons - and my precious thirty volt battery which I had been saving in case of power failure. Worse than this, I had left my little receiver out in sight, without thinking, while rushing to conceal my other equipment and the invaders had taken this too.

I offered to steal the cars back for the hospital, but the Mother felt it would serve to focus further attention on the place, and this was to be avoided at all cost. So I consoled myself by quietly raiding a German unit and stealing for my own use, another battery for emergency power, similar to the one they had taken from me. However, I felt the enemy would now be suspicious of the hospital, having found the receiver there, and would try to catch me red-handed in the act of moving traffic.

The secret fight was on more sharply than before. I doubled the guards on the area, and only left the hospital when urgent personal consultations with HQ became necessary. Telegrams and messages were brought to me by an orderly who strolled into the hospital during visiting hours when he was not as likely to be suspected. Our Headquarters in the meantime was searching the Zandaam area for another location for me in case the hospital did get too hot. You could feel the tension in the air! Perhaps my nerves were

getting the best of me but I got the awkward news the next day after the raid that G-10 had been found, and and that both operators found on the spot had paid with their lives. This was a tremendous blow, since it meant that our station would have to handle more traffic than ever. This would give the German radio cars - mobile direction finders - a better chance to find me. These cars were fitted with three way radio and were able to run down a fix very quickly, once a signal had been spotted. And the only way these cars could be recognized was by their slow driving, and their continual stopping while they were on the prowl.

For several days, G-11 was very busy handling all the traffic alone, our nerves screamingly on edge for what we knew would be inevitable trouble. We didn't have long to wait for the climax. It came about eleven oclock one morning, when one of the guards slipped into the hospital and warned the Mother Superior that one of the radio cars was making a search in our area. The Mother raced to my cell to warn me, and in the middle of passing some traffic along to my opposite number I had to break off and close down.

We found that one of the radio cars had entered the street on which the hospital was located and it was just the very excellent warning system which had saved us. Fortunately, I had stopped operating while the Nazi radio car was still several blocks down the road, and they knew only the general direction in which lay the station. Once again I had to hide my equipment, and with the guard who had given the warning, I slipped through the back door of the hospital and we headed for town.

Our transportation was a rusty old bicycle which had seen much better days. Since tires for bikes were out of the question in those war days, we had managed to make a couple of massive tires from an old auto casing. We bumped merrily along, arguing as to whether we should tackle the job of locating the home station of this car. After many words, I won, and we slipped along as close to where the car had been as we dared. We were just in time to see it start up once more, turn around and luckily away from the hospital and head North from the city.

We had planned to follow at a safe distance, and indeed we did, but the strain was almost too much for us. Our physical condition was not good due to the bad food and small quantity of it. For some fifteen miles we trailed that car, pushing hard, and wearing ourselves into a state of almost complete exhaustion trying to keep that car in sight.

We were lucky. The cars occupants were in no hurry and were cruising at a pace we could match by extreme effort. We were completely wet through with perspiration before we had gone half the distance, in spite of the fact the temperature was well below zero. Almost ready to give up, we saw the distant car turn off the road into what seemed to be a normal farmyard. We stopped there to catch our breath again - so winded that we would have been able to offer no resistance had it been necessary.

Eventually we did begin to feel better of course, and started forward again, pedalling slowly past the farm where the car had turned in. Close inspection revealed to the sharp eyes of my companion several circular aerials and masts among the camouflage on the farm buildings. This was very much a wonder and a feather in our cap, for here at last was the enemy radio station for which our underground had been looking for months and had not been able to locate. Now, if we could get our report back to our headquarters, it would be possible to have a raid made, and

put this thorn in our side out of business for some time to come.

We left the area as rapidly as was possible, took a very roundabout road back to Alkmaar, and I finally got back to cell 209, leaving my friend in the city.

I was too tired to attempt to set up the transmitter and receiver at this time - my real need was for a lot of sleep. I tumbled into bed and slept for fourteen hours. Then I decided that since the car had been so close to the hospital that they would be keeping a close watch on the building and I did not go on the air for another couple of days. I was able to intercept a number of messages which were intended for our group and these I was able to pass along to our headquarters. I derived considerable satisfaction from hearing of - and seeing myself - damage to enemy installations as a direct result of my message handling.

Finally, I ventured to transmit again and the first message I sent was to the British, giving them an accurate and complete description of the farm house in which the enemy direction finding station was quartered. If the R.A.F. had any appreciation for our G-11 station and the work being done then surely that DF plant was doomed. Sure enough, a few days after my intelligence had been sent, several of the R.A.F. planes appeared over the enemy location and thoroughly bombed and strafed it into a pile of rubble and dust. You can take my word for it, there was quite a celebration at our headquarters that night. It had been another freedom blow for us.

This was just about the last important episode in the rather short history of our clandestine station. The Allied armies were moving into our area in rapid fashion, and little by little the quantity of traffic to handle, dwindled day by day. Finally came the last message, telling us now we could close down for good. The victorious Allied Armies were so close that we were no longer needed. Good news!

The great strain of operating an underground station, with our lives in jeopardy constantly was no more. I would now be able to rejoin my family, and start settling back into what was left of my old life. Perhaps before long, my beloved ham radio would be available again, and I could get on the bands again for some fine old ragchews once more. In many ways I was lucky - luckier than many Dutch hams because I not only had my health, but a complete station - small as it was, but ready to go. The tiny transmitter and receiver, my constant companions, during the difficult months, could now be counted on to give me a start in ham radio again, and wonderfully fine contacts with many old friends. I am looking forward to hearing you soon.

PAØZY
J.J. Zandbergen

Editors' Note: This concludes the story of Dutch Underground radio work and the story you have read in the last three issues of Skywire was rewritten from a long and detailed letter received from Alkmaar soon after the ending of the European phase of the war. The original arrived in the form of an entreaty to Canadian hams to provide the Dutch counterparts with radio equipment no longer needed, with which the PA's could get a rig back on the air. Considerable equipment was forwarded to them at that time. In the past few weeks, we've heard from the Alkmaar club, asking if there are any VHF parts and tubes which we VE's could spare. If you have any which you don't need and would like to forward them, write Skywire for address.

HOW'S UR OBS IQ?

The American Radio Relay League

MORE OFFICIAL BULLETIN STATIONS ARE NEEDED NOW IN EVERY PROVINCE. SUPPORT ARRL BY BECOMING ONE. ASK YOUR SCM!!!

The following Official Bulletins are reprinted for your convenience. Some of the messages are outdated by the time it is possible to get them into print. Keep up to date on what is going on by tuning the Official Broadcasts in your own area and province. Listen regularly and stay ahead. Your SCM can provide schedules to you, or to your club executive!

Official Bulletin Nr 244, May 31st, 1950
The Voice of America is continuing its series of weekly fifteen minute programs devoted to amateur radio and prepared by A.R.R.L., but with a changed frequency schedule. The broadcasts to the Far East and Latin America are at 1345 GCT on Sundays on 9515, 9570, 9650, 11730, 15130 and 17830 kilocycles. This broadcast is relayed in the Far East by transmitters on 920, 11790, 11890, 15250, 15330, and 17780 kilocycles. The broadcast to Europe is at 1915 GCT on 15270, 17780 and 21500 kilocycles and is relayed in the European area by transmitters operating on 7200, 9700 and 15230 kilocycles.

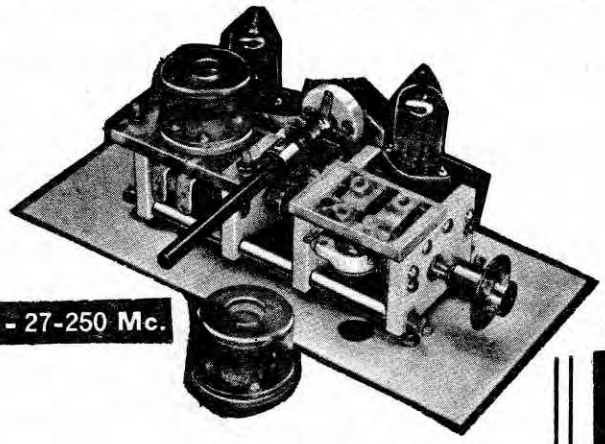
Official Bulletin Nr 245, June 7th, 1950
The MacMillan Expedition Schooner Bowdoin will leave Boothbay Harbor, Maine, in mid-June, for a three month trip in northern waters. As in the past, it will depend on radio amateurs for communications. Tom Hutchinson, W2OXE, will operate from the schooner, using his amateur call sign for maritime mobile work in the eighty, forty and twenty meter bands, under special FCC authorization. W2OXE/MM will be open for contact with amateurs on 3505, 3900, 7010, 14020 and 14210 kilocycles. W1AW will keep schedules for the Bowdoin for the exchange of traffic. Any additional details on operating schedules of W2OXE, maritime mobile, will be announced at a later date from W1AW.

Official Bulletin Nr 246, June 15th, 1950
A new record for two way work between fixed stations on 420 megacycles was set on June 13th, 1950, when W2QED, located at Seabrook, New Jersey, worked W1PBB, at Stratford, Connecticut, a distance of 160 miles. W2QED also worked W2BQK, W2QKW and W2AOD, all more than 115 mile contacts. Activity on 420 megacycles is now on the upgrade in many areas, and the average distance which is being covered is increasing as equipment and antennas are improved. If you have equipment for 420 megacycles, now is the time to be using it. Make tests on 420 when propagation appears favorable on 144 or 50 megacycles, and report your results to A.R.R.L.

Special Canadian Bulletin
In some of the more densely populated areas of Canada there is a very considerable amount of VHF activity. Several new records have been chalked up on 50 megacycles and above. It will encourage new VHF operators to occupy these bands, if they can see in print, what other VE's are doing up there. To promote greater activity on the higher frequencies, we will start a VHF column for Skywire readers where reports can be traded, if there's enough interest. Send reports in regularly.

National

HFT-1
FRONT END
ASSEMBLY



Frequency Range - 27-250 Mc.

FRONT END ASSEMBLY

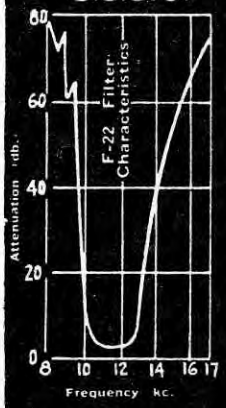
For the experimenter who likes to build his own receivers, HFT-1 is the complete "front end" for a VHF superheterodyne. This is the tuning assembly used in the National HFS Receiver-Converter described on Page 14—frequency coverage and coil sets available are the same. Output of the HFT-1 is at 10.7 megacycles and National IFM or IFN transformers are recommended for the i.f. channel.

The ideal oscillator-mixer unit for that FM broadcast receiver. Build your next VHF receiver around the HFT-1 and save tedious hours of coil pruning and tracking adjustments.

HFT-1 (with one set of coils—specify range)

Canadian Amateur Net Cost - $64.25

S.S.S.C.



THE F-22 SIDEBAND FILTER

The heart of a single sideband transmitter — a sharply attenuated filter — has built-in balanced input and output transformers —

Sole Distributors in Canada

CANADIAN MARCONI COMPANY

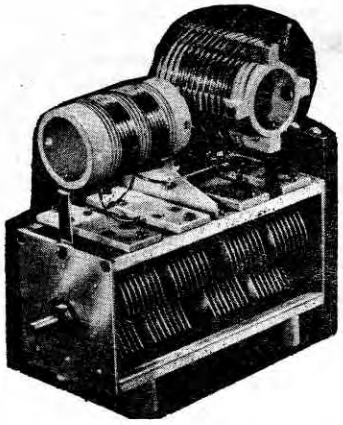
ESTABLISHED 1903

MARCONI BUILDING, - MONTREAL

VANCOUVER WINNIPEG TORONTO HALIFAX ST. JOHN'S, NFLD.

National

MB-150
MULTI-BAND
TANK CIRCUIT



MULTI-BAND TANK ASSEMBLY

Designed to meet amateur requirements for greater simplicity in multi-band transmitters, the unique MB-150 Multi-Band Tank illustrated below tunes all amateur bands from 80 through 10 meters with 180° rotation of the shaft; the coils are never changed. The unit is built around an essentially "multiple-tuned" circuit, i.e. a circuit which tunes to two harmonically unrelated frequencies at the same time. Thus, it becomes possible to cover a wide frequency range and yet maintain a reasonably constant L/C ratio. Three coils, four capacitors and an RF choke are combined to make up a compact tank 3" wide x 8¼" high (including the GS-10 standoffs) x 9" long overall including the ¼" dia. shaft and output terminals. Features of the MB-150 are as follows:

(1) For use as the all-band plate tank in push-pull or balanced single-ended stages running up to 150-watts input (1500 volts peak). It is ideal for a pair of 807s or 809s or a single 829B.

(2) Separate link coupling coil has special clips which adjust to match impedances up to 600 ohms directly. Output couples into a higher powered amplifier, an antenna or an antenna tuning network.

(3) Fast band changing is accomplished without handling coils, thus removing one of the danger points in the amateur station.

Canadian Amateur Net Cost - $30.50

Sole Distributors in Canada

CANADIAN MARCONI COMPANY

ESTABLISHED 1903

MARCONI BUILDING, - MONTREAL

VANCOUVER WINNIPEG TORONTO HALIFAX ST. JOHN'S, NFLD.

DX PREDICTIONS

Prepared by C.B. McKee, Engineering
Division, CBC International Service

On these pages are shown Skywire frequency predictions for amateur communications on various circuits, to almost any part of the world. Although these tables are confined to five major cities or areas here in Canada, any amateur operating at a point reasonably close to these centres will find the predictions quite adequate.

The figures shown directly below any time, and opposite any destination indicate the maximum useable frequency band in megacycles at that time.

Remember that the figures shown indicate maximum useable frequency via F layer, at any time, and do not consider the effect of Sporadic E, which may enable unexpected and unpredictable distance coverage on on frequencies higher than those indicated.

DX PREDICTIONS FOR MONTH OF JULY, 1950

SACKVILLE to	AST	01	03	05	07	09	11	13	15	17	19	21	23 Hrs.
													Mcs.
Europe		7	7	14	14	14	14	14	14	14	14	7	7
Africa		7	7	14	14	-	-	-	-	14	14	14	7
Caribbean		14	7	7	14	14	14	14	14	14	14	14	14
S. America		14	14	7	14	14	14	14	14	14	14	14	14
Australia		14	14	7	7	-	-	-	-	-	-	14	14
U.S.A. - West		14	14	7	14	14	14	14	14	14	14	14	14
U.S.A. - Central		14	14	7	14	14	14	14	14	14	14	14	14
U.S.A. - South		14	14	7	14	14	14	14	14	14	14	14	14
Vancouver		14	7	7	7	14	14	14	14	14	14	14	14
Watrous		14	7	7	14	14	14	14	14	14	14	14	14
Toronto		14	14	7	14	14	14	14	14	14	14	14	14
Montreal		7	7	7	7	14	14	14	14	14	14	14	14

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MONTREAL to	EST	00	02	04	06	08	10	12	14	16	18	20	22 Hrs.
													Mcs.
Europe		7	7	14	14	14	14	14	14	14	14	7	7
Africa		7	7	14	14	-	-	-	-	14	14	14	14
Caribbean		14	7	7	14	14	14	14	14	14	14	14	14
S. America		14	14	7	14	14	14	14	14	14	14	14	14
Australia		14	14	14	7	7	7	7	7	14	14	14	14
U.S.A. - West		14	14	14	14	14	14	14	14	14	14	14	14
U.S.A. - Central		14	7	7	7	7	14	14	14	14	14	14	14
U.S.A. - South		14	7	7	14	14	14	14	14	14	14	14	14
Vancouver		14	7	7	7	14	14	14	14	14	14	14	14
Watrous		7	7	7	7	7	14	14	14	14	14	14	14
Toronto		3	3	3	3	7	7	7	7	7	7	7	7
Sackville		7	7	7	7	14	14	14	14	14	14	14	14

(Continued on the next page)

DX PREDICTIONS FOR JULY, 1950

TORONTO to	EST	00	02	04	06	08	10	12	14	16	18	20	22	Hrs.
Europe		7	7	14	14	14	14	14	14	14	14	14	14	Mcs.
Africa		7	7	14	14	-	-	-	-	14	14	14	7	
Caribbean		14	7	7	14	14	14	14	14	14	14	14	14	
S. America		14	14	7	14	14	14	14	14	14	14	14	14	
Australia		14	14	14	7	-	-	-	-	-	-	14	14	
U.S.A.. - West		14	14	14	14	14	14	14	14	14	14	14	14	
U.S.A.. - Central		7	7	7	7	7	14	14	14	14	14	14	14	
U.S.A.. - South		14	14	7	14	14	14	14	14	14	14	14	14	
Vancouver		14	14	7	7	14	14	14	14	14	14	14	14	
Watrous		7	7	7	7	7	14	14	14	14	14	14	14	
Montreal		3	3	3	3	7	7	7	7	7	7	7	7	
Sackville		14	14	7	14	14	14	14	14	14	14	14	14	

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WATROUS to	MST	22	00	02	04	06	08	10	12	14	16	18	20	Hrs.
Europe		14	14	14	14	14	14	14	14	14	14	14	14	Mcs.
Africa		14	14	7	14	-	-	-	-	14	14	14	14	
Caribbean		14	14	14	14	14	14	14	14	14	14	14	14	
S. America		14	14	7	7	14	14	14	14	14	14	14	14	
Australia		14	14	14	14	-	-	-	-	-	14	14	14	
U.S.A.. - West		14	7	7	7	7	14	14	14	14	14	14	14	
U.S.A.. - Central		7	7	7	7	7	7	7	7	7	7	7	7	
U.S.A.. - South		14	14	14	14	14	14	14	14	14	14	14	14	
Vancouver		14	7	7	7	7	7	7	14	14	14	14	14	
Toronto		7	7	7	7	7	14	14	14	14	14	14	14	
Montreal		7	7	7	7	7	14	14	14	14	14	14	14	
Sackville		14	7	7	14	14	14	14	14	14	14	14	14	

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VANCOUVER to	PST	21	23	01	03	05	07	09	11	13	15	17	19	Hrs.
Europe		14	14	14	14	14	14	14	14	14	14	14	14	Mcs.
Africa		14	7	7	7	14	14	14	14	14	14	14	14	
Caribbean		14	14	14	14	14	14	14	14	14	14	14	14	
S. America		14	14	7	7	14	14	14	14	14	14	14	14	
Australia		14	14	14	14	7	7	7	-	-	-	-	-	
U.S.A. - West		14	14	14	14	14	14	14	14	14	14	14	14	
U.S.A. - Central		14	14	7	7	7	14	14	14	14	14	14	14	
U.S.A. - South		14	14	14	7	14	14	14	14	14	14	14	14	
Watrous		14	7	7	7	7	7	7	14	14	14	14	14	
Toronto		14	14	7	7	14	14	14	14	14	14	14	14	
Montreal		14	7	7	7	7	14	14	14	14	14	14	14	
Sackville		14	7	7	7	14	14	14	14	14	14	14	14	

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LADIES PRESENT

The burglar alarm makers, and the manufacturers of fire alarm systems, sprinklers and smoke and gas detectors have earned a lot of money in the last few years. But, the future is going to see a new robot watchman taking its place in the alarm business - a watchman used against atomic radiation.

There's nothing to worry about. For the present, nobody needs radiation alarm devices except workers in atomic energy plants, medical laboratories that use radium, or factories using radioactive chemicals - and prospectors looking for uranium ores. If such radiation alarms had been in general use twenty years ago, a number of workers in chemical plants might have been spared from serious injury and even death. You may remember the lawsuits filed against the manufacturers of luminous dial clocks and watches because of radioactive burns suffered by workers - burns that in some cases proved fatal. That sort of thing today has been pretty well stopped with new radiation alarms, and other protective devices.

Notice we said pretty well stopped? Not completely, because the atomic energy commission recently revealed that four or five scientists who had contributed much to the atomic energy program were going blind, suffering from severe radiation injuries.

And as time goes on and atomic energy finally begins to be used in industry, and perhaps transportation - and the use of radioactive isotopes increases in medicine, industry and farming - the field for the business of making and selling radiation alarms and protective shields against radiation will grow. As a matter of record, the atomic energy commission says more than twenty five atomic watchmen are already on the market, plus shielding devices and clothing to protect scientists and other workers from radiation.

Since many of the real facts about our atomic energy and radiation fields are hidden even from scientists, the true value and effectiveness against radiation of these safeguards, isn't completely known. The most common of them is the Geiger counter, which clicks like crazy when it picks up many varieties of emanations from radioactive matter. It is probably the most useful of all radiation guards, particularly since it is relatively cheap.

Actually, any ordinary radio receiver can be converted into a radiation alarm by the simple addition of a Geiger detector electronic tube. This tube can be encased in anything to make it an ornamental addition to the room and wired direct to the radio. Then, if the radio is turned on and harmful quantities of radiation are present in the house, the Geiger tube will cause the radio to click away like a telegraph sounder.

In the case of war with an enemy who might use atomic radiation, it is expected that millions of persons would equip their homes promptly with this tube. The device would go a long way toward avoiding panic if atomic bombs were dropped. People would know at once by listening for clicking on the radio speaker, if the air in their neighborhood were contaminated and by the frequency of the clicking, just how bad the situation was. Slow spaced beats would mean nothing to worry about, but a continuous stream of clicks would be the danger signal - get out!

A recent issue of the magazine Popular Science shows a picture of an atomic ore prospector wearing a protective suit and shoes, helmet, mask and goggles, and carrying a unit which looked like a wartime mine detector. But this detector is connected by cable to an electroscope carried in a box. This records faint radiations some distance before the prospector actually reaches the ore. Actually, the radiation from an ore deposit is usually quite weak. This special clothing looks more as if it had been designed for the air raid warden of the future - a replacement for the simple helmet and gask mas of their counterparts in the last war. The new air raid wardens biggest job might be searching out refugees not yet contaminated by atomic bomb radiation, where people could take shelter.

But there are other types of atomic watchmen besides the Geiger counter which are needed, for the Geiger counter will not detect neutron radiation, and this is very powerful and damaging. A photo-tube electronic tube that gives an indication of neutron radiation by a luminous glow has been developed, and the atomic energy commission says it's an important forward step for science.

There are also special atomic watchmen for detecting and measuring alpha, beta and gamma rays in specific physical and chemical processes, and not all the new radiation detectors are bulky. There are many small ones made for workers in atomic energy plants and chemical and physical laboratories to carry on their persons which look much like hearing aids. Their purpose is to warn the men they have stepped into a field of dangerous radiation.

Another type works somewhat like a fever thermometer. It looks like a fountain pen and the worker carries it in his pocket. Every day at quitting time, this little meter is stuck into a reading machine which registers on a dial how much radiation this particular worker has been exposed and subjected to during the day. Obviously, this device is intended only for use in places where the worker would normally find practically no radiation. It is just a check-off safeguard, and not a real alarm.

Since this months discussion has been on radiation, let's amplify this line of thought to include X-rays, which are also a form of radio-activity. At the time Roentgen announced his discovery of this unknown quantity, a rather odd story began to circulate as to what the rays could do. This was to the effect that a machine had been devised that would permit scientists to see through anything they desired. This news almost started a riot because it was thought this meant the end of privacy, even in the home. Fears arose that any rays capable of penetrating the skin, and outlining the bones of the hand could also play peekaboo through the walls of a house. It took quite some time to get this tall tale straightened out.

X-rays can penetrate solid objects, but a film is needed to obtain an image. These rays aren't visible to the eye. Further, film only shows light and shadow when exposed to X-rays. The bones of the hand are outlined, for instance, because bone produces darker shadows in the film than skin or muscles or flesh. The reason for this is that the denser material slows down passage of the X-ray and so casts the shadow seen on the film.

Many people seem to think that if an X-ray is made of the abdominal section that it is going to show up the intestines, and several other internal organs. Such is not the case unless the patient first swallows a good quantity of a meally fluid which has about the same opacity to X-rays as bone, and can thus outline the internal organs in which the meal is assimilated. This fluid can

be traced, as it progresses through the gastro-intestinal tract, either by a series of X-ray plates, or on a fluoroscopic screen - another version of X-ray viewing of the subject.

Barium meal, used in this fluid is the substance used for outlining your organs and while not the tastiest thing there is, can be downed to do the job. One other fluid, which can be injected into sinal cavities, and derived as an oil from the poppy flower, will do much the same job as barium in this different application.

A lot of people will be glad to know that the experts on lightning have now figured out some safe corners in which to riue out a violent electrical storm. The rules are that when a lightning storm - a really bad one - starts, you should first of all, stay in the house. Stay indoors - don't go outside - and the centre of the room is safer than the walls when the jagged streaks of electricity are in your neighborhood.

In fact, when the lightning is flashing in the heavens, you should avoid being near screen doors, stoves, chimneys, drain pipes, electric light circuits, fireplaces, or any metal object that projects through a wall or roof.

If you are outdoors, and can't get in, stay away from isolated trees, wire fences, hill tops or small sheds or shelters in an exposed location. Wide open spaces like golf courses are dangerous - more dangerous on the hilltops than in the hollows. Actually, the best place of all to be - and the very safest is a metal bed at home. Other safe places in a lightning storm are railway trains, steel structure buildings, steel towers of any kind, and automobiles. If you are in a car and can park some place where no tree or wire can fall on you, you're as safe as if you were home in bed.

Although we have already learned to do many things automatically, with machinery there is most certainly still more to come in the future. One authority has said that we are on the threshold of a second industrial revolution brought on by the automatic machine. He seems to feel that this could be a national catastrophe, unless if is handled well and very wisely.

This man, a famous mathemetician from the Massachusetts Institute of Technology and by name Doctor Norbert Wiener, says the age of robots, when machines took over the jobs now done by men and women, would be hastened by another war. He also adds that within one decade, new machines, controlled by electronic brains could completely wipe out the factory assembly lines of many plants.

The result, he thinks would be a great migration of people from the cities, back to the country, probably to live under entirely different types of an economic society. Instead of working on factory assembly lines, men might be out playing golf, while electronically controlled machinery keeps up the output of the factories. There is just one serious problem at the moment, and that's how to pay people for not working at all.

How long do you think it takes a radio signal to girdle the earth completely? The answer is about one tenth of a second, and even then, that signal is not following the most direct route of travel. If it went in a straight line around the twenty five thousand circumference miles at the equator, that would be a pretty good speed. Actually the signal travelled a much greater distance. A low frequency signal makes a trip around the globe in anything but a straight line. Actually it has a bouncing motion between earth and the ionosphere, taking at least 55 bounces of about four hundred and fifty miles each.

TOWN and COUNTRY

Maritimes - VE1

From 1EV in Moncton has come a report on some of the locals there -- GF is busy repairing damage done to beam after having it frozen up last winter. GN was chairman of Field Day activities of VE1RC. UT works 80 with 20w when not rebuilding. He claims S-8 in VO. ABI also on 80 with 100w and an 1155. YM, mostly on 75 but experimenting with antennas when not. JG has taken up gardening and housecleaning for the summer. TZ splitting time between rebuilding car and working 20. CX has new 807 rig and EL has moved up to 813 at 150w, bandswitching. YU, transferred to Churchill, will be on 40 this Fall. EV is QRT for lawn making and fishing during summer. PAØAZ is now awaiting naturalization papers so he can join VE's. Over around Halifax, OM, with little Two Watter, worked Kingston, N.S. on 75 for S-6 with antenna disconnected???? BK is heading back to traffic nets with an 813 this time. WL, rebuilding to bandswitch has a grid dipper to make sure what is going on should! FQ did a fine traffic job during Western floods. PQ and QZ had 10 meter roundtable recently with two VQ4's and a VE5 which is quite a feat. PQ now has 130 countries. KW is building one, this time on AM, altho this FM sounds fine. QG, an op with a new xyl is going to Cross Island for DOT while VO and family come ashore for leave. FQ is another traffic handler, doing Winnipeg stint plus regular VE8 work. A consistent 75 sig is that of GL, now in Dartmouth. Our sympathy to LG on the loss of his wife. ABM, brother to TH just got his ticket, and AAP is another new one. Halifax Ladies Dit and Dah Club held a wonderful banquet at the Dresden Arms in May - everyone having a great time. OM busy as Editor of the HARC Bulletin.

Quebec - VE2

HI spending lot of time teaching hams-to-be CW for Fall meeting with DOT. KH with 6 opening is hoping for good FD results on 50 megs. AHL is trying new type 20m antenna. GD has moved to St. Lambert. EX and UN are spending most free time building house-trailers for vacation. OS, whose xyl is NJ, has set up portable at office, to chat with her during lunch. KG, building a new home in Longueuil, locating hamshack in a special basement room. FX is now located in Mount Royal, and JV in Montreal North. EP replaced his AR77 with an 88 and JJ got himself a new NC-173. AJD is running half a gallon 813 final. ZL, RB, JN, NE, TC, OF and RV did fine traffic during Rimouski fire as did BE, BG, CA, ZF, plus XP and a number of others, during Winnipeg crisis. Alex, BE, was given the Carling Award for outstanding help in several emergencies such as this. Alex has been hamming now for 31 years and as C.C.M. of ARRL, has seen a lot of ham radio. ADB just got WAC cert. ACD working portable FM on 75. QE is now rebuilding. AGF bought a Hillman car. ZF is reported unofficial traffic relay for Baird Expedition. XM has built Clapp VFO. FX has new 32 foot cabin cruiser, called as you could guess See-Queue, and is all for mobile marine. HN now out in Montreal West and on 75 with 696. HY has just completed bandswitch rig covering 10 to 160m!!!

Ontario - VE3

In Ontario, ABG abuilding 50' tower. AAJ, settling in new home is QRT. ADJ and BUV haunt 10 when it's open. BLY, dodging TVI works 10, 20, 40. AOP had TVI too, but it is almost licked now. RW says TVI isn't bad but you should hear line noise at the place! AJS enjoying 6 with band all to himself altho he'd like company. AUU, new ham is going on 40. BGG and ACY have moved to QTH surrounded by TV antennas. QE back in town again. FT now located in Toronto and VR who was supposed to go too, is back in town. ABP added new DX to make it 109c. AGW's are back from Florida. JU was busy with a load of Winnipeg tfc. BTE has cards now, and has sent them in, for WAVE.

British Columbia - VE7

On the West Coast, OK trying 8JK in attic, found rig was good sub for Hydro. LZ is moving to new QTH between EO and KC. EO has total of more than 100 countries, but lack of foreign QSL's has him down. AJW and AX both sport new receivers. TR is on jaunt to Orient. What about Korea, Doug? AJI with new Jr. Op is mixing baby sitting with TV looking. TP moving to the Ridge. KC moans about the new ham next door, LZ! EY hasn't been heard on air much recently. Perhaps his marriage a couple of weeks ago is reason. SK is almost a BCL again, too.

CLUB ACTIVITIES

The Mohawk Amateur Radio Society, located near Hamilton, Ontario, is growing appreciably with fourteen members turning out at the last meeting. The club is affiliated with ARRL, and has its own club crest now. The club station call is VE3BAC, and according to the notes which were sent along, has just gone through another Field Day outing very successfully. Working on five bands, all the members pitched in and ran up a good score. You'll be hearing more of this comparatively new club in the future.

The Montreal Amateur Radio Club held it's last official meeting of the season, until Fall, in the Westmount YMCA, the regular meeting place now, on May 31st. Three of the local boys 2JK, AGF and BK gave talks on the uses of Grid Dip Oscillators, demonstrating them and answering all questions from the floor, so there should be no doubts left among MARC members as to what can be done with these gimmicks. Apparently, this meeting preceeded the annual picnic by a few days, and in spite of poor weather on Saturday, June 3rd, the gang got out with xyl's and Jr. Ops and took home a raft of prizes presented by local jobbers.

The Hamilton Amateur Radio Club reported itself busy with Field Day and getting as many rigs into operation as possible. Hamilton has always turned in excellent scores in this affair, and Wib, 3KM has sparked this contest into its present activity through a lot of hard work.

The West Side Radio Club of Toronto was out on Field Day with bells on, and plenty of good sounding transmitters, hoping to pull down first place again this year. West Side, operating from a point north of the city under the club call of VE3JJ, and among a nest of other club locations in the same general area was knocking down contacts in fine style. Incidentally, in winning last year, club members won the Trophy for Field Day, put up by Eveready, and just recently had their banquet celebrating this event. Total scores are not at this moment on hand, but Bert Viney and the boys will be among the top scorers again.

Here's something for all club executives to think about seriously! The first Canadian ham to receive a temporary suspension of license to operate, because of television interference is a Belleville ham. Fringe area or not, the D.O.T. now considers TVI as interference with a commercial service and therefore unlawful. While this may not seem a justified action, with TV originating across the line, nevertheless, it is time every group of hams in areas now affected, or likely to be, took some definite and constructive action before it is too late. TVI can be cured! Hamilton Radio Club and West Side have both taken steps to ensure a more complete understanding of the difficulties encountered, and Skywire would like to know what other clubs are working on this matter. Swap information and we'll all benefit.

In conjunction with the coming Hamfest get-together of the Ontario Phone Club up at the town of Bayfield on July 9th, there will be a special meeting of the CAROA committeeon the Saturday evening just before this (July 8th)! This will be held about 8.00 p.m. in one of the Clinton Radar School Buildings. All paid-up members of CAROA who would like to attend, are invited to do so and participate in the discussions scheduled.

Halifax Radio Club is meeting regularly at the RCAF Mess at Gorsebrook on South Street now, and there's always a good turnout for an interesting program. Doug Johnson, VE1OM is the club bulletin Editor, and the man to contact if you're in Halifax for a visit.

HAMFEST!

The Ontario Phone Club of the Air will be holding a Picnic on Sunday, July 9th, 1950 at Jewett's Grove, near Bayfield, Ontario. This location, on Highway 21 is about halfway between the town of Bayfield itself and the city of Goderich, Ontario.

Program officially starts at 10.30 a.m. with a tour of the Clinton Radio School. The Picnic activities, after a break for lunch between noon and 2.00 p.m., include kiddies games, tug-of-war, ballgame, phone contest, CW contest, brain trust, equipment show, a transmitter hunt on foot and one mobile, plus a swap session throughout the afternoon. Accomodation there for a two day stay is excellent and availableat low cost. Bring your own food, and the family, and have a wonderful time. Meet your air QSO's. There's time to make your plans to be there still. See you up at Jewetts Grove, Bayfield, July 8th and 9th!!!!!!!!!!

HAM FEST

The Ottawa Amateur Radio Club is holding its annual Hamfest Sunday, July 16th, at the Abboretum in the Experimental Farm, Ottawa. Many valuable prizes will be presented, tops of which is a Radiovision - Commander Receiver, tickets for which are now on sale. Electronics International donated this to the club for the affair. There is an exceptional program ready for the entire family. VE3OA, Chairman, can give you further information. Another fine Canadian hamfest!!!!

HAMFEST!

There's one to be held in Calgary this year, July 29 and 30, for the Province of Alberta. The VE6's hope for attendance from the entire country, if you're on a Western tour and there's a fine program set up now including a tour of Calgary. Registration fee will be $2.50 and further information can be obtained by air mailing inquiries to Dot Ciccone, VE6DF, Box 196, in Calgary, Alberta. The Westerners have a name for fine hamfests, so if you can be there, don't miss out!!!!!

TRAFFIC LIGHTS

Bert Altherr - VE2GM

The purpose of this new series of articles starting this month is threefold. First, to acquaint the newcomer with the correct procedure in message handling on a net; second - to bring the Old Timer up-to-date on current net practices; and third - to inform those who are not actively interested in traffic handling, but who might, nevertheless, suddenly find themselves on a traffic or emergency net.

The procedure to be outlined is standard! It is that which is generally accepted by all nets handling traffic today. However, many variations will be found in different parts of the country - minor variations in routine, to which you can quickly adapt yourself. Anyone familiar with the standard procedures will feel at home on any net, as long as the most important net rule of all is observed: follow the instructions issued by the net control station or NCS.

Before going further, it should be clearly understood that there is no difference in procedure and organization between a traffic and emergency net. They are - or should be - completely interchangeable. In fact the only way you should be able to tell whether you're on a traffic or emergency net is by the type of message you are handling.

The basic procedure on a phone net is also the same, but the actual operation is a little different because it is not as flexible as a CW grouping. Generally speaking, it takes more time to move traffic on phone than by CW, although under ideal conditions the actual message can be relayed faster by voice. Under tough conditions, we believe CW to be faster and more reliable with fewer repeats required. Push-to-talk voice transmission speeds things up considerably, providing all net stations are on their toes and conversant with the peculiarities of the net.

This month, we'll talk mainly about the CW Section Net. Let's consider some of the requirements of an efficient net. There are nine important factors that come to mind at the moment, and there are others of course to be discussed in later articles. These factors are not listed in order of importance because it is difficult to decide which should be considered as first. Each has its own essential and necessary function for smooth and efficient net operation.

1. The NCS! Have you ever seen a Traffic Cop at an important intersection during rush hour, and watched him in action? He's an NCS. If the motorists didn't heed his signals, there would be sad head-on crashes and within minutes chaotic confusion and a traffic jam. As a parallel, the NCS on a net is the traffic 'cop'. He is in complete control while the net is in session. His job is to call the net to order at a prearranged time and frequency - to direct the flow of traffic between net members and maintain net discipline while doing this - and to close the operation of the net when traffic on hand has been disposed of, or at the end of a fixed period of operation after the starting time.

As with a Traffic Cop, authority of the NCS must be respected by all. Sole reason for his being on the job is to ensure that traffic will be moved to its destination as speedily as possible without jamming.

2. Member Stations! You can't operate a net without stations, and the more of these there are, the more useful the net will be. A Section net can be as large as desired, although 15 members is enough to operate in the generally accepted period of 45 minutes per session. If more stations are obtained, organize another net. There are many possibilities. A slow speed net could be run on a different time and channel. Or leave a certain area within the section to another net or two. Two - or more - nets in the Canadian sections are a must because of the great area in each of them. However, the problem is up to the local Net Manager to solve, and is dependent on such factors as distance between outlets, station power, population density and general local conditions.

The Section Net, beyond doubt is the most important link in the entire amateur traffic

system enveloping the continent. And most important man within the section net, is *not* the NCS or Manager, but the member station. The fundamental purpose of the amateur traffic system is to be useful to the community, exemplified when a message has been delivered. The whole team - the Section, Regional, Area and Independent nets score a goal each time a message has been put in the addressees hands.The other main function of the member station is to originate traffic so that another member can also score a point by delivering it. And - to carry out these functions, member stations should know net procedure fully, following NCS instruction while at the same time being able to handle the NCS job, so he'll be ready if an emergency arises.

3. Net Manager. Usually much in evidence on a net, he has no special role while the net is in session. Just another station then, he can be the brains behind. His duties are to keep Net informed of new procedures, and routings, do administration if there is any. Large nets have considerable paper work to do. It's the NM's job to do this and keep in touch with the latest dope on net operation. This information is passed on by message or by issuing a net bulletin, the latter being best for pointing out the faults and good points of the group. The NM also keeps in touch with neighboring nets and higher organizations, such as Regional and Area nets to make sure proper and correct listing of net frequency and schedule appears in ARRL's Net Directory. Lastly, the NM assigns net duties such as NCS and relay stations to the other nets. Without outside contacts, a net would lose both efficiency and usefullness.

4. Punctuality. Importance of reporting into net late need hardly be underlined. Each net should make a local rule stipulating the tolerance permitted - 5 or 10 minutes at most from opening time, but the NM has to make this and other net rules.

5. Net Frequency. Nets are assigned frequencies by the NM. If there is no conflict with other local nets, these will be listed in the Net Directory so others will know where to find your group, especially in an emergency. Every effort should be made to operate spot frequency to reduce QRM. If a dozen stations occupy as many different spots near the required channel, there can be great confusion. Remember too, your net hasn't sole right to the frequency and if a stranger comes on it and doesn't want to move, you're stuck with him. Ask the net to stand by - QNE - ask the interloper to move nicely, and you'll find he will co-operate.

6. Break In. With the many systems available today, every net station should use this. It cuts down calling time, speeds up operations when traffic loads are heavy. It eliminates the need for repeats after a message has been sent as you simply interrupt the sender and get what is needed at the time. Once used, BK is indispensable. It's fine for DX work: when signals are weak, and it reduces QRM very appreciably.

7. VFO. It adds greatly to your usefullness to a net as the NCS can move you aside when traffic is heavy, to above or below the main net frequency, to take traffic from another station. As a relay station to another net, VFO is essential and if you operate low power, it's again needed for dodging QRM. Make sure you eliminate chirps and clicks, when the VFO is keyed, however.

8. Accuracy. In transmitting a message, this is highly important. Accuracy means a good fist of well-formed characters, properly spaced in words and between them. The speed of transmission is not important. What is, is getting the message across in its' entirety without repeats as often as possible, even if 15 wpm is the speed at which it must be done. Make haste slowly in traffic work.

9. Conventional Signals. Many are used to speed up operations. Abbreviations eliminating tedious sentences can be used many times. They're easy to learn, but there's a lengthy list and we'll publish them in a later issue so you can hang it up on the shack wall.

A late flash from 5YF reports activity in the Winnipeg Flood by the Saskatoon Radio Club which shows what can be done when need arises. Net stations 5DR, 5EE and 5YF had been carrying the load when 5UC suggested the club station should be operating. The Navy provided space in HMCS Unicorn and a half kw. was in operation within 3 hours. For eight days, 19 hours per, the boys worked with Red Cross and did a fine job. It also produced a new crop of traffic handlers..... From 7ID has come a fine BC Emergency Organization Bulletin we'll tell you more about next month, along with the continuance of this series on traffic operations. Teamwork and net experience will serve your community and prepare you for any emergency which arises.

HAM GEAR—BARGAINS

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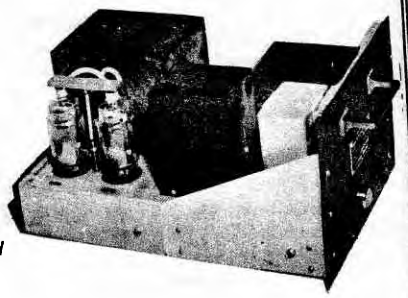

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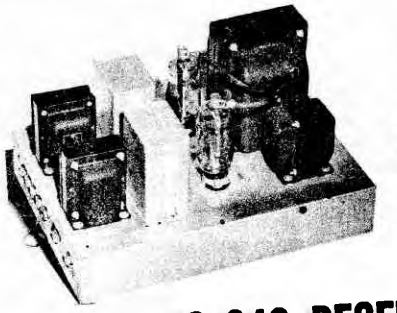

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TELEVISION

One of the best laughs of the month on television was a gimmick show on the new Baltimore station in which a silhouetted picture of a well-known personality was shown on the screen, and the audience to the quiz was asked to identify the person it represented. The emcee called a Mrs.A Kiel who correctly identified the picture. She was informed that she had just won a new refrigerator, plus a big cash prize. There was no answer - and after a lengthy pause her husband came on the line to say his wife had fainted and was still out, but thanks anyway for the fine prizes.

There are many other humorous aspects to a television show. As you may be aware, some brands of comedy require visual impact to put the stuff across, and of course in video, you've got it. But perhaps one of the funniest things possible is to see a seasoned performer breaking himself up and trying hard not to laugh, when in front of the ikes. Milton Berle, the Clown Prince of TV is one of the laughingest men in the business, and probably has more fun being funny, than the audience has in watching his antics. And he's strictly slapstick and a fast man with a gag.

Speaking of color television as was done in the column last month, here's a very unusual application possibility which in the future may become a fact. That TV set in the living room may have a far more important role than entertainment. One expert says color television may enable physicians miles away to diagnose illness. If we think medicine is in an age of specialists now, then tomorrows doctor may seem like a superman. The electrical forecast says television, plus a brighter image fluoroscope may bring the super-specialists - a group of men who have been highly trained in one field of medicine, and diagnose cases all over the country, remotely, by means of color TV transmissions of the patient consulted. And we husbands may lose one of our favorites today - the business convention. Telephonic television will provide face-to-face contact between businessmen, over a long distance and they won't have to meet to talk over business matters. But these are two fiction and fancy possibilities, with no fact to them at this time. Put them in a memo to come up again about 1965, and you may come close.

Television may revolutionize the cosmetics industry and change the color of make-up, or so the experts say.

In television, the old type make-up is not satisfactory - TV make-up is in light brown tones, starting almost with a tan foundation base, brown-eyed pencils and eyeshadow - and an orange-red lipstick. One firm says this last item will be found in general use before long.

Television may bring out a girls freckles or a mans beard, unless the skin is first covered with a smooth foundation. There have been a few sad times, before this fact was learned, in which the person being televised had all the color and life of a good corpse. And rouge is definitely out. However, for TV, a deeper shade of brown, to accentuate the cheek highlights and emphasize the lines of the face, is used.

To cope with the bearded look on a mans face, a simple pancake foundation is used, with a second lighter, almost white layer of pancake added. The men look as if they have been whitewashed under normal light, but the appearance before the TV cameras is just right.

Actually, there's no definite rule to follow on this subject. Studio lighting, and the actors own coloring must determine the shades to use and how to use them. But an elaborate paint job is not necessary, so say those who should know, and you can leave the studio to mingle with ordinary crowds, without people becoming too curious. If you were in the business, the stares of the curious wouldn't be too noticeable anyway.

That television is fast growing up in the United States, has been pointed out in a statement by Frank Mansfield, the director of sales research for Sylvania Products, Inc. The Sylvania study has shown that TV is now a mass market product with 58% of all sets owned by families earning less than five thousand dollars yearly, and the rate of purchase in this group is growing much faster than families earning more than this amount per year.

The well-to-do and prosperous families entered the television market early, and have continued to buy sets at a steadily growing rate. Families with incomes of less than $5000 entered the market at a low purchase rate which has been increasing by leaps and bounds. Even the low income groups have been buying into the new entertainment field rapidly. As a result, according to one researcher, TV in New York City alone, a survey showed, has cut two and one half million dollars monthly from the incomes of movies, plays and night clubs. It has been found that New Yorkers owning TV sets attended 64% fewer movies, 32% fewer plays and 45% fewer nightclubs. Similarly, attendance at boxing showed a 45% drop and only wrestling showed a gain - a quite substantial one of 22%.

Here in Canada, the ten inch direct view video tube has been a comparatively recent addition, although in the last two months, the larger twelve and a half inch job has been manufactured here. From the looks of things, the ten incher is now obsolete, and it won't be long (this Fall) before there are several competitive makes of sixteen inch or larger, direct view sets on the market here. Phillips is reported ready to release by C.N.E. time their surprise in the form of a projection job at, so our information goes, a reasonable price which should make possible large screen viewing in Canadian centers now reached by U.S. video stations. Windsor and district is the test market area used by most Canadian manufacturers, because there is a choice possible from among several stations which can be seen well there.

The U.S. set makers have now mostly discontinued the making of receivers with a ten inch screen, and those still available on the market are being sold at bargain prices. An indication of the trend is shown in the fact that 35% of all sets produced today use a fourteen inch or larger bottle. And the price on the new nineteen inchers would make your mouth water, when comparing these to our existing domestic prices on the smaller screen models. If you find the reason for large screens difficult to understand, it's a cinch to draw representative circles and realize that the nineteen inch sets produce a picture of full, life-size proportions when a close-up shot of the act is being made.

Kinescope recording which has been in use for some considerable time in the Eastern part of the U.S. seems to be the answer to the time differences between this section and the west coast. This system may also permit semi-network operation by a group of stations who could not otherwise, pay the rather high cost of a coaxial cable.

Originally developed as part of a system for large screen theatre video, the process has been extended now for re-telecast work and a good many of the shows now being seen operate by this means. As a matter of fact, some of the top shows are complete on kine recording, and are shipped down the cable instead of the live show. Ed Sullivans show is one example. During the past season, there occurred a number of times on the program, a flickering which seems to have been caused by the film projector pulling the film through in such a manner as to give the actors appearing on the show a real St. Vitus dance. This condition would exist for a few moments, and then the duty operator would make the needed adjustments and things would go back to normal for a time. Actually, it isn't difficult to discern which shows are live and which appear on film, although the latter are becoming better all the time.

The Texaco Star Theater has often been in the newspaper listings for TV as the Milton Berle show. That this was the correct way of doing things was shown recently when B. was missing on a Tuesday eve because of illness. Although essentially a variety show, the entire program is fully dependent on Berle - with the quality waxing and waning with the great comedians performance. One of the young comics who took over for Berle on this particular show did a terrific job to which there was just one objection - he wasn't Berle. He

is definitely one of the greats in television and must be seen to be liked.A new addition to the show just before the summer hiatus started this year was the full-blown Martha Raye who is nothing more than a female counterpart of the maestro. Martha is known around Hollywood not only for the size of her mouth, but for the very generous proportions of her figure. On her first appearance on the Texaco show she wore what was probably the tightest dress ever eyed by a TV camera, and the crowd was knocked out almost literally. She has made a number of repeat appearances and looks like a candidate for a regular berth on the show.

The increasing impact of TV on the nations economy is having far reaching effects in the U.S. today. In the few years since the second world war ended, tens of thousands of workers have been engaged in producing sets directly, or producing the needed raw materials with which to build them. This activity, coupled with the larger operation of manufacturing, contributed to stopping the continuance of a general industrial slump which had begun to make itself felt.

The reasons for the enthusiastic and wholehearted acceptance of TV as a fundamental addition to home life were the high standard and values adhered to by most manufacturers in the industry and the rapid increase in the number, variety and quality of television programs.

It was felt, when television got its first start right after the end of the war, that its first appeal would be only to those in the upper income brackets, but the exact opposite has been true. TV's appeal has been to the masses - the people in all economic walks of life, and the greatest supporters have come from families in the middle to lower income brackets. And the social implications of TV's wide public acceptance are becoming apparent. It is evident that television has done much to establish the closer family relationship which has been missing through the past years.

People have become enthused about seeing, as well as hearing subjects of entertainment, education and news, and television comes closer than any other medium to fulfilling, completely, this basic human desire. Improvements are constantly being made, and new ideas are making their appearance all the time. During the evening periods, in New York, when seven stations are on the air, viewing audiences are finding it a difficult thing to choose between the many fine programs on the air. As a result, the demands on artists and performers of all types are increasing. This, in turn, is sure to bring better programs, greater variety, and higher levels of entertainment.

North America may be advancing more rapidly than other countries in the number of stations on the air, and the variety of fare offered, but Brazils largest radio network is just now introducing television to the fast growing center of Sao Paulo, with all equipment being supplied by RCA. It's a very interesting thing to note that RCA is first in receiver sales, with an almost two two to one advantage over its' nearest competitor - Philco. But going back to Brazil, transmitter, and the necessary studio and mobile equipment were begun in 1948, with the final details ironed out just recently.

The transmitter and antenna will be located on the top of the city's highest edifice, the State Bank Building, and the three-bay super-turnstile antenna is to be 520 feet above street level. The effective radiated power level would seem to be about 20 kw. which is a lot of energy in video. Since the city power supply is 60 cycles, it is going to be possible to use the American standard of 525 lines and 60 fields. The station will be operating on Channel 3 so if you get an opening on VHF, it's a possibility you'll be looking at Sao Paulo!

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