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THE CANADIAN RADIO AMATEURS' JOURNAL



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SKYWIRE

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Editor - Fenwick Job, VE3WO

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IMPORTANT NOTICE -- Last month there was an error in the Hunts Condenser advertisement. This was in the capacity ranges for the W99 type metallized miniatures. The correct and useful ranges are as shown on page 31 here.

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SIDEBANDS

Change

It is widely believed that Amateur Radio is one of the few human activities that takes no heed of race, colour, creed, social distinction or politics—and over the world, as a whole, this was almost true in fact until about 1930.

But since then human freedom has ceased to have the meaning in many parts of the world that it still has in this country. The Fascists, Nazis and now the Communists—different names for the same sort of autocratic regime—have had to be guided by strictly political considerations in all their dealings with the miserable serfs absorbed into their hideous systems. Hence, an amateur in a country like Hungary or Czechoslovakia must, first and foremost, be politically pure before he can be officially licensed. The term political purity in countries brought under Communist domination within, say, the last ten years or so, means whole-hearted acceptance of the theory and principles of Communism.

Since all these countries have been communised against the known wishes of the vast majority of their peoples, those who do accept the regime are regarded as collaborators, in the same way as anyone who supported the Germans in the occupied countries during the last war. Hence we see it that Amateur Radio in these countries is based on political considerations and that the HA's, OK's and all the rest are themselves collaborators—to use the mildest term.

It is easy to take the view that such matters are of no concern to anybody on this side of the Iron Curtain. Certainly, nothing can be done at present for those on the other side.

But the fact remains that over a large part of the world Amateur Radio has been drawn into the arena of politics, with all that is implied by that melancholy reflection.

*Austin Foster
G6FO*

PRACTICAL SUPER MODULATION

Circuits and Values for the Communication Bands, Setting Up and Operation

By F. C. JUDD

THE system to be described, and known as Super Modulation, should not be confused with somewhat similar systems of efficiency modulation. Basically, it is the derivation of a system due to Doherty (*Ref. 1*), later developed by R. E. Taylor (U.S.A.) for commercial purposes and for certain broadcast equipment used during the last war (*Ref. 2*). After several years' delay in presenting this new method to the industry, development has brought the practical application at a time when an improvement is seriously (*Ref. 3*) needed in the amateur and other spheres of communication service. Many experimental transmitters have been constructed using this new system, and the writer has used super-modulation on three different transmitters working on 20 metres and 160 metres with power inputs ranging from one watt to a hundred watts, details of which will be given later.

Advantages of Super Modulation

Super-modulation makes use of emphasised sidebands and semi-suppressed carrier transmission and provides far greater signalling efficiency than was previously considered possible. With more than four times the true sideband power at full modulation, and one half or less than the band-width required in conventional amplitude systems, transmission efficiency is about equal to that claimed for single side-

This is a very useful article on the practical application of Super Modulation and takes matters several steps further than the preliminary discussion on the same subject in our October issue. G2BCX describes two experimental layouts, full power and QRP, and the treatment is detailed and factual.—
Editor.

band methods—and in some operational respects it is superior. Fifteen to twenty times or more peak power output at full modulation, with a band-width of two to three kc each side of the carrier, without spread or splatter, is obtainable. Conventional systems are limited to four times or less than peak power. With compression of the *carrier power* under full modulation, the sideband power is driven upward to a high level output, resulting in a reduction in heterodyne interference and noise level at the receiving end. The greater signal voltage out of a linear detector results in 6 dB or more gain over a normally modulated transmission. The first difference that will be noticed is that a super-modulated signal is extremely sharp to tune and, at the same time, is far "louder" than any amplitude modulated signal of the same effective field strength. Further, at the receiving end when the BFO is switched on, the carried heterodyne is barely audible, and in many instances possible interfering heterodynes are not heard at all, except from very local transmitters. Speech quality is quite equal to normal amplitude - modulated transmissions. Tests made with two one-kilowatt transmitters, both super-modulated, and operated 2.5 kc apart, using full modulation for maximum sideband power production with the S-meter on the receiver "pinned" by both signals, showed that

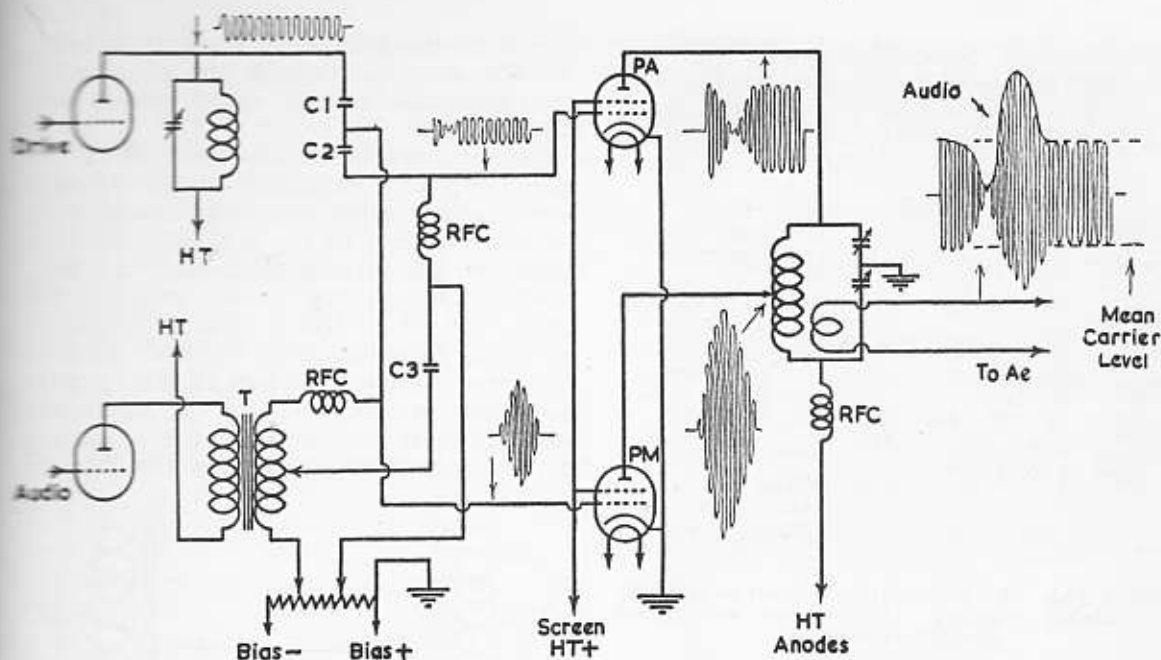


Fig. 1. Basic circuit for the Super Modulation system, showing how the output waveform is built up.

either transmitter could be tuned-in as desired without interference from the other. The system has also the following advantages:—

(1). Considerable reduction in BCL and TV interference. In the case of the writer's transmitter operating on twenty metres with 100 watts input and super-modulation, no interference to nearby televisions was experienced, or on a BC receiver on medium waves some 10 feet from the transmitter; this was unscreened and without harmonic traps in either the drive or PA stages. With conventional amplitude modulation to the same transmitter, either anode or cathode, TVI and BCI are reported.

(2). The audio power fully to modulate 1 kilowatt is only about 8 watts. In the case of the writer's 100-watt transmitter mentioned above, the output from a 10-watt amplifier with one quarter of the gain required for normal anode modulation on a 10-watt transmitter was found to be more than sufficient; in fact, a maximum audio output of from 3 to 5 watts is all that is necessary for a 150-watt carrier input.

Theory of Operation

Sideband power alone, irrespective of how it is generated, is that part of the

transmitted carrier wave which conveys speech to the receiver at a distant point. Thus, the greater the true sideband power produced by the transmitter, the stronger the received signal and the lower the interference level, especially if the carrier can be suppressed during modulation, a feature which decreases the heterodyne interference between stations operating only two or three kc apart. Also, if the sideband power is a true reproduction of the modulation, the band-width required is about one half of that necessary with the usual high modulation percentages and their attendant distortion, phase shift, and splatter. Theory shows that a true two and a half kc modulation frequency produces sidebands two and a half kc removed from the carrier, whereas in practice harmonics and distortion usually produce sidebands five to ten kc or more away from the carrier. The basic function of super-modulation is shown in the pictorial diagram in Fig. 1, which

represents a conventional PA adjusted for maximum output. Bias, drive and tuning are as for any normal Class-C amplifier. The RF drive power is

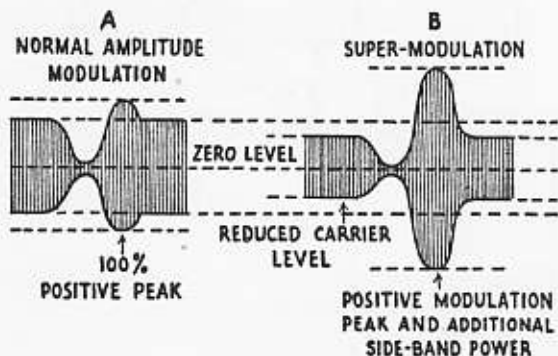


Fig. 1 (A). The shape of a normal amplitude modulated carrier. (B) Super modulated output waveform.

applied through C1 and C2, which provides an RF potential divider to the grids of the PA and the Positive Modulator (PM). Thus, both valves have RF applied to their grids, the PM valve having twice that of the PA. The audio power (best referred to in terms of voltage) is also applied to the grids of the PA and PM respectively, the PA having half the amount of that to the grid of the PM. It will be seen that the audio transformer, which is centretapped at the secondary, will provide the necessary halving of the audio volts which, in the case of the PA, are passed through the condenser to C3, which also isolates its grid from the bias applied to the grid of the PM and which goes directly through the transformer. The PM is biased to approximately two to three times cut-off so that, with RF drive applied, the valve takes little or no current and allows the PA to be tuned-up in the normal way.

With modulation applied, the standing bias on the PM will be overcome and the valve allowed to pass current and amplify, the result being a very large positive peak wave at the anode. Since the anode of the PM is taken to the

centre of the PA anode load (tank coil), an RF step-up through the auto-transformer action of the tuned circuit will also result.

Now to return to the PA. With the valve already working under Class-C conditions, positive-going modulation voltage applied to the grid will have no effect on its operational condition; but, with negative-going speech voltage, the grid will be driven more negative, resulting in a reduction in anode current and therefore a reduction in RF output. In other words, the PA is producing decrement or negative-going modulation peaks (carrier suppression) while the PM

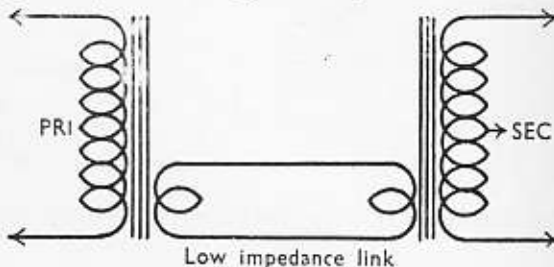


Fig. 2. Method of coupling two small transformers back-to-back; if the transformers are similar electrically, with low impedance windings of the same value, the ratio overall will be approximately 1 : 1.

is producing positive-going modulation peaks (increased sideband power) superimposed on the carrier; this remains at normal amplitude over the period of positive modulation. Under proper operating conditions, the PA output is reduced almost to zero during the negative modulation period. The resultant modulated RF output is shown pictorially in Fig 1 and also in Fig 1A, which shows a comparison with an amplitude modulated carrier of normal type.

Further advantages of the system are that no large modulator/speech amplifier equipment and power supplies are needed and no expensive modulation transformer is required, since accurate matching of modulator to transformer is no longer necessary. A small amplifier with a maximum of 4 to 5 watts output is

ample for up to 150 watts input to the PA, and the transformer needs only to match the audio output valve and have a centre tapped secondary and a ratio of 1:1. In the writer's transmitters, two speaker transformers are coupled back-to-back, with one having a centre tapped primary, which becomes the secondary winding of the system shown in Fig. 2.

Practical Circuit for Super-Modulation

A practical circuit is shown in Fig 3 and can be used for any of the conventional types of RF tetrode—6V6, 807, 813 and similar. The drive stages must be able to deliver sufficient RF for normal Class-C operation of the PA, with a little in reserve for the positive modulation period. For example, the RF output from an 807 buffer with 500 volts or so at the anode will be enough to drive, say, an 813; or at reduced input, say 300-400 volts, would drive another 807 operating at maximum conditions plus an 807 as the positive modulator.

The RF potential divider condensers C1 and C2 are best if of the variable pre-set airspaced type, as control over the drive to either the PA and PM allows for better adjustment of the super-modulation condition. The audio input, as already mentioned, is fed through a 1:1 transformer centre tapped at the secondary, so that half the audio voltage may be applied to the grid of the PA through the 2μ F condenser C3, which isolates the PA bias from the PM bias.

The circuit shows an RF drive, audio and bias arrangement similar to that in Fig 1.

The screen voltage to the PA and PM must be well regulated and preferably taken from a separate supply. Much greater control over the whole system will be possible if the RF drive, bias and screen volts are variable.

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June, 1952

Amateur Radio WRITERS WANTED

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PA valve to be used. Check bias volts for the PM, which should be enough just to cut the valve off with RF drive on the grid and with HT on. The grid current for the PA should be normal, and this stage may be tuned in the usual way for dip and aerial loading. Adjust bias on the PM valve until it just starts to draw and, with modulation applied, this valve will take current, which should swing up to almost the maximum rating for the valve in use, e.g., for an 807 with about 600 to 700 volts at the anode the current should rise to approximately 90-100 mA. The PA valve anode current will, at the same time, decrease, but the aerial current will rise by the same amount as for normal amplitude modulation.

If these conditions are not forthcoming, adjustments to bias, audio and RF drive volts will be necessary until the system is properly operating. All tuning and modulation adjustments should be carried out on an artificial aerial designed to match and load the PA to its normal operating condition, and only when the operator is satisfied that the whole system is working correctly should the transmitter be connected to an open aerial.

Modulation may be checked in the usual way with a diode phone monitor or modulation meter, and with a sine-wave input to the modulator, checks may be made with an oscilloscope, which will show the positive going modulation peaks at full amplitude. Make sure, above all, that the drive and PA stages are perfectly stable before attempting to use super-modulation.

Results Obtained

It has already been mentioned that the writer has used super-modulation on three different transmitters with inputs of from one watt to one hundred watts, and the results have been all that are claimed. On 20 metres with an 813 PA running at 100 watts input, tests were carried out using an 807 as the positive modulator; with an anode voltage of

700 to both valves, and the 813 taking just under 150 mA with the PM (807) drawing about 5-6 mA, a total input of 108-110 watts was obtained. Reports of S9-plus from PY, LU and similar distances were consistent, and no trouble was experienced from QRM. Speech quality was equal to that from the same transmitter using normal amplitude modulation.

On 160 metres some tests were made using two 807's with 300 volts at the anodes and inputs varying from one to ten watts. It was found, however, that 807's with this anode voltage gave best results with reduced anode current to the PA (higher bias and less drive) with the PM biased almost to cut-off under drive condition. A better valve would be the 6V6G or TT11, where the power input is limited to 10 watts. Some notes from the tests made with super-modulation on 20 metres using an 813 as PA and an 807 as PM with reduced input to the 813 (100 watts) may be of interest to those who may contemplate trying the system. The following applies, in some respects, to a circuit using similar valves for PA and PM.

- (1) The grid drive to the PA needs to be just sufficient to operate the valve around Class-C conditions. Then adjust bias for a little below the normal grid current, when the transmitter is tuned and loaded.
- (2) The anode tap for the PM was tried nearer the PA anode end of the tuning coil with no improvements in results; the centre tap is optimum.
- (3) Plenty of drive required to the PM and this valve biased to slightly above cut-off under drive conditions.
- (4) Distortion and broken speech are indications of *too much* drive to the PA and too little bias to the PM. If the PM is over-biased then low modulation and distortion will result, and aerial current will drop on modulation peaks.
- (5) Aerial loading will affect the condition of super-modulation and must be correct for the PA valve in use, and an important factor is good regulation of the bias and screen volts.

This may interest those who are keen on QRP and portable phone operation. The circuit shows a similar RF drive, audio, and bias arrangement to Fig 3, and the PA and PM anode circuit is the only difference with the original. It will

be seen that HT to the PA anode is fed through the tank coil, and therefore the anode current meter is common to both PM and PA valves. By arranging for the meter to read about half scale for the PA current, it will then cater for the additional current taken by the PM on positive modulation, which is about half as much again as that showing for the PA. The audio volts were obtained from the LF end of the receiver.

Further experiments are being made with an expanded form of super-

modulation, with which it is possible to obtain a gain of 12 dB or more on speech power, and which is being used on a transmitter for 160 metres with an input of 8-10 watts.

Fig. 4. Circuit for QRP Super Modulation Working on 160 Metres

- C1 = 350 $\mu\mu\text{F}$
- C2 = 160 $\mu\mu\text{F}$
- C3 = 2 μF
- C4, C5 = 0.5 μF
- C6 = .005 μF
- C7 = 0.1 μF
- Ct = 200 $\mu\mu\text{F}$ for 160 metres
- R1 = 2,000 ohms, $\frac{1}{2}$ -watt
- R2 = 5,000 ohms, $\frac{1}{2}$ -watt
- R3 = 100,000 ohms
- R4 = 12,000 ohms
- R5 = 47 ohms
- T = 1 : 1 ratio transformer
- L = For the band

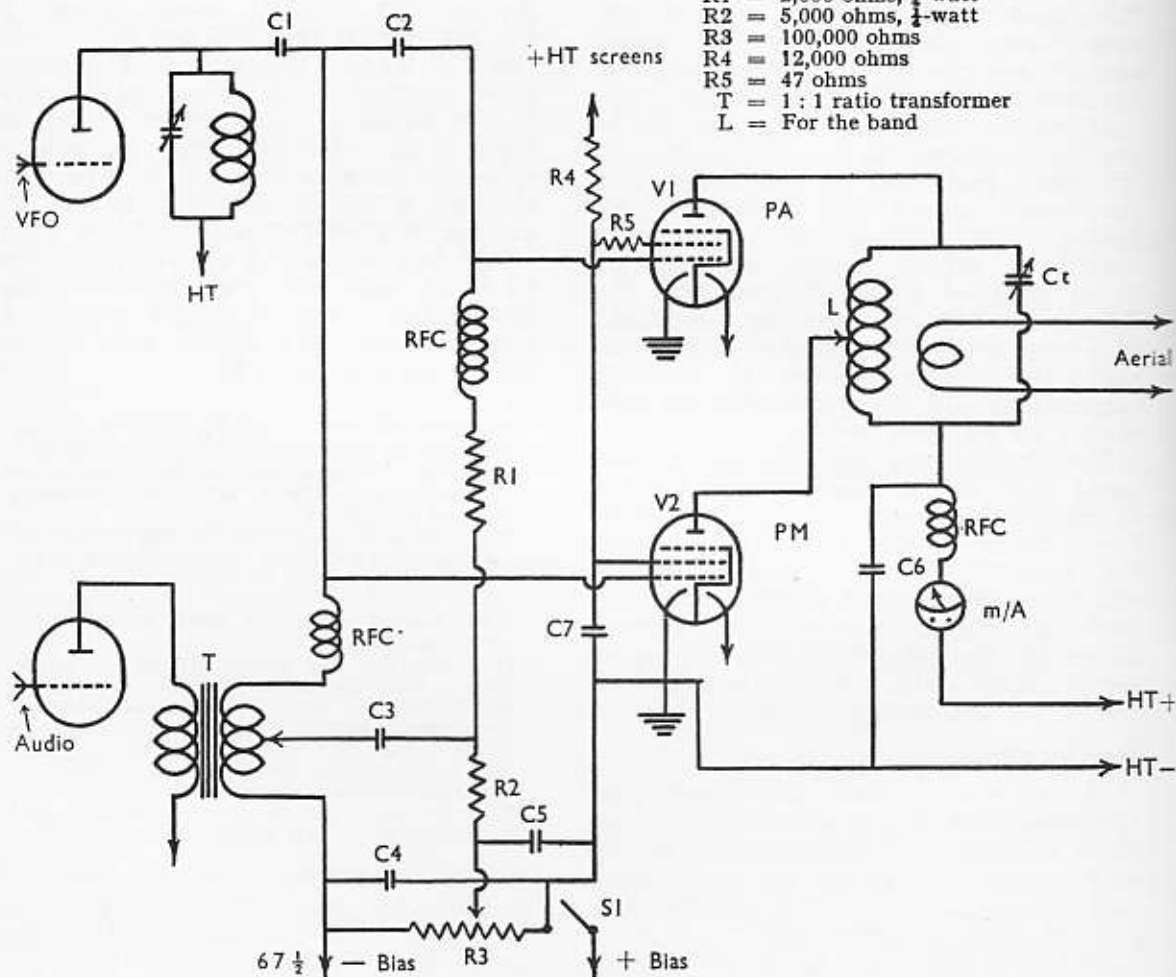


Fig. 4. Circuit used for QRP battery-operated transmission, applying Super Modulation.

ADAPTING RECEIVERS FOR TOUCH TUNING

Operation for the Blind

ONE of the first problems facing a blind operator is to equip himself with a good standard communications receiver which he can use with complete independence, and after several years of comparative floundering, this was found in the famous National HRO. With its splendid slow-motion dial engraved with degree markings which can be easily felt, this receiver requires no adapting at all except for identification marks on the coil packs. This is achieved simply by fitting soldering tags under one of the fixing screws in the corners of the frames enclosing the groups, putting a tag in a different position on each coil.

In spite of success with the HRO, the search has gone on for other receivers which can be easily adapted for use by a blind operator without too much mechanical complication, expense, or disfigurement. But it was not until a few months ago, when a Hallicrafter SX₂₄ became available, that it was possible to extend these researches. This receiver also can be adapted in a reasonably simple way, and although so far the same accuracy of handling has not been achieved as with the HRO, the writer is satisfied that it is only a matter of careful operating practice to get equally satisfactory results.

The SX₂₄ Modification

The first thing to do is to remove the existing band set and band spread dials. Take out the four self-threading screws (two at each end of the top edge of the cabinet) which secure the frame of the hinged cover, then lift out the front edge of the frame. Loosen the rotating dials on the spindles. Remove the four screws and nuts securing the band set

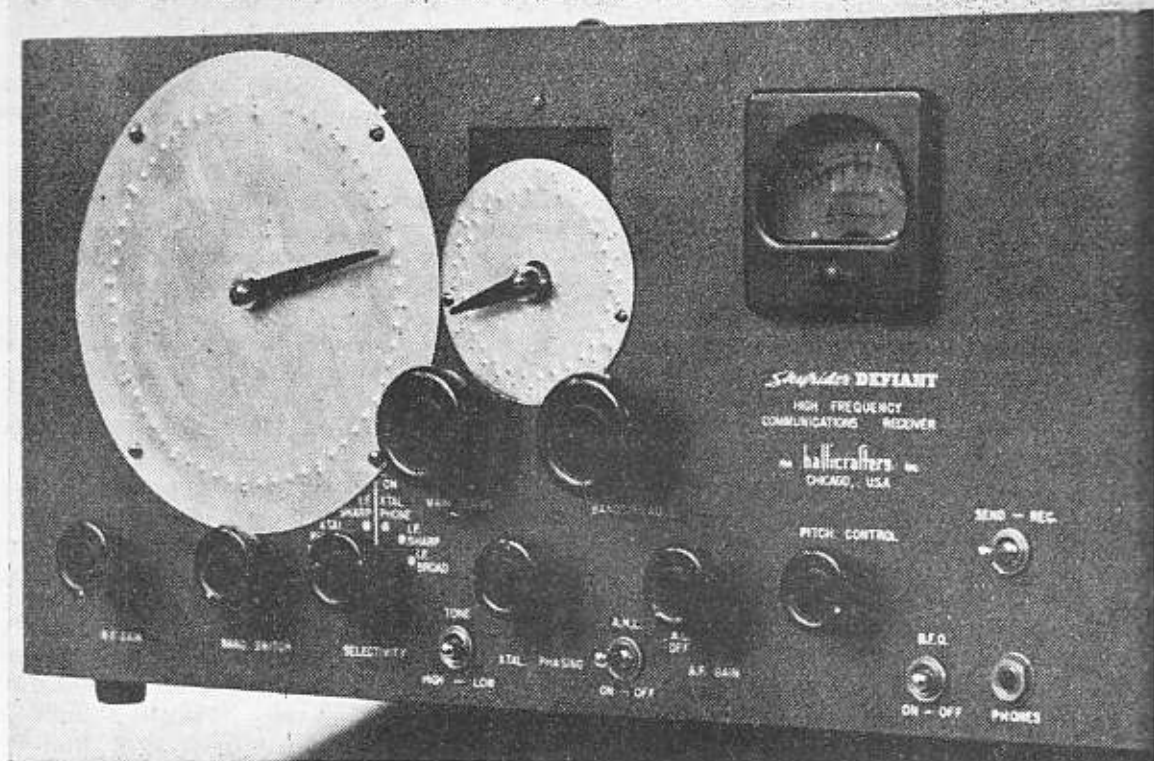
The author of this article is an active amateur who, having been blind from birth, has never actually seen any of his gear. Yet he is able to build and operate equipment with the same ease and certainty as his sighted friends—and indeed is an experienced amateur, having been licensed for well over 20 years. His article is an interesting discussion on the practical problems of adapting an SX-24 for touch tuning.—
Editor.

dial cover, when by springing the panel slightly forward it should be possible to slide the cover out. The circular dial will then come out through the hole in the panel.

Now remove the three screws securing the band spread frame on the panel—this is a little tricky, as the bottom screws are not accessible—and then extract the band spread dial. This is the most difficult operation, as there is very little space between the end of the spindle and the back of the panel, but a little judicious "brute force" achieved it, as the object here was to try to do the job without removing the receiver from its case. Now, with a fine hacksaw blade, cut a small piece out of the panel in the bottom edge of the band spread opening to expose the spindle. Before doing this, slip a piece of stiffish folded paper between the panel and the chassis to catch as much metal as possible. This cutting can, of course, be avoided by drilling a hole accurately opposite the end of the spindle—but the cutting is easier, as the drilling of a hole at least half-an-inch in diameter in a springy panel is a difficult operation.

The Touch Dials

For the bandset dial, a 6½-in. disc of light gauge aluminium is marked with the "minutes of a clock face," embossing double dots at the points which would represent the hours; this disc is drilled half-inch at its centre and secured to the panel by four short screws and nuts.



The SX-24 as modified by G6KJ for tuning by touch. Himself a blind operator, he designed this system and carried out all the mechanical work entirely unaided. With the receiver modified as shown, he can get within a few kc of a given frequency on any amateur band covered by the SX-24. The large dial is bandset, and the smaller bandspread, as in the original.

A brass boss drilled quarter-inch to a depth of $\frac{1}{8}$ -in. is slipped through the dial on to the spindle and tapped for a grub screw. Slotted and screwed into the end of the boss is the pointer. The pointer is fitted with the main set of condensers at minimum capacity, and fixed to read "12 o'clock"; the smaller bandspread dial is fixed in the same way. Adequate clearance of the boss in the dial is most important, as any binding may cause the belt drive to slip.

In applying the same method of fitting and marking to the bandspread dial, it was punched with two rings of markings; the conclusion since reached, however, is that this is pointless—it is, in fact, confusing to the touch to have

too many markings, as any blind person will appreciate. Like using a Braille watch, it is only a matter of practice to achieve a high degree of accuracy in reading.

Operation

On the SX24 I now know that if the wave switch is on "two" and the bandset pointer at "three minutes before nine" (in other words, at 84 degrees) the bandspread covers the whole 80-metre band; similarly, with the switch at "three" and the pointer at "three-quarters of a minute before five," the bandspread covers 40 metres.

The marking out of these dials is not at all a difficult matter for a sighted person, but as the writer is stubbornly

independent, a most satisfactory machine has been devised with which any dial from two to ten inches in diameter can be punched, dividing the circumference into tenths or multiples of ten, or twelfths or multiples. The markings are done with an adjustable automatic spring punch so that the embossings come out reasonably even. The fundamental idea for this marker is due to Stanley Wartenberg (W2ET), who wrote a splendid article on making Braille dials for the *Braille Technical Press*. In the writer's machine the positioning of the disc to be marked is

achieved by a ratchet; hence the spacing of the markings is dependent on the number of teeth on the ratchet wheel and the number of notches counted between each punching. Being in the fortunate position of having a lot of useful tools, including a small power-driven lathe, it was possible to make at home every part for the marker except the gear wheels. There is no doubt that many other types of standard communications receiver could be similarly modified for accurate use by blind operators, and it is hoped to take the idea further as opportunity offers.

ONCE again heavy mail including interesting letter from new DX chum, signing ANØDE—very subtle. He says: Remember meeting your pal MO1FFI out East during last war, real FB type with permanently bloodshot eyes. (*Susie, QRX?*)

Another letter, signed 73ES88, from keen beginner saying Starting new c/s sequence to make DX bands more interesting. Am in partial agreement of course but consider ample scope yet for exotic calls without confusing issue this way. In future DX chums asked apply OMØTO (this of course is me G1BF) for selection DX calls—and pse do not send in cards decorated jolly roger, sketches Susie in beach wear and similar deviations from path strict rectitude.

My T20 still pumping full bore and can now get dull red glow in loop-lamp held near filament xformer, about same as near tank coil. This shows RF everywhere as it should be. From this it is easy step forward to heat filament T20 from RF generated in tank, thus producing self-sustaining PA requiring only regular dose 2000 volts on plate at 50-cycle intervals to maintain condition. Filament T20 connected across small winding in field tank coil, with adjustment marked. "Pick up Amps," and process started by connecting heater xformer to T20 through RF chokes then switching off LT when filament glowing really well. No other technical writer yet formulated this new principle valve technique. Just mention idea to show why it is imperative beginners watch this space for real gen



T20 running a bit warm, OM"

Am now being plagued by DX-hungry types in Zone 16 for skeds famous station OMØTO (this of course is me. All cards say "Pse pse dr dr OB OB ur ur QSL QSL tnx tnx Popoff Father of Radio." Box 88 now gummed up QSL's for OMØTO. All reports say "Ur RST589x vy vy FB dr OM pse QSL tnx". This gives lie to accusation jealous locals PP1PPP and SS5SS that signal OMØTO indistinguishable from QRM by local vacuum cleaner with loose pin connections. Laugh this off by some crack like it takes a buzz-saw note to fetch in the Real Stuff.

Editor says this feature makes him think so more sound advice next month.

(Readers may be assured that we are doing our best to reclaim this space.—Editor.)



Here is the perfect answer to the need for compact, dependable and versatile VHF reception. Can be used as a complete receiver in itself or as a VHF converter with any receiver tuning to 10.7 mcs. As converter, makes features of connected receiver usable on VHF. Covers entire high frequency spectrum from 27 mcs to 250 mcs — receives AM, FM and CW with amazing selectivity and sensitivity.

EXPLORE VHF

HERE'S THE SET



the national HFS

- **COMPLETE COVERAGE!**
27 mcs to 250 mcs in 6 bands.
- **AM-FM-CW!**

The most versatile and widest range receiver in the VHF field!

The HFS is the *only* moderate-priced receiver covering the entire VHF spectrum from 27 mcs. to 250 mcs. in 6 bands. Receives AM, FM and CW with exceptional selectivity and sensitivity. Can be used as either fixed or portable receiver, operating from a standard power supply, 6-volt vibrator-type supply or a combination of "B" and storage batteries.

Can be used as a complete receiver or a converter for any receiver tuning to 10.7 mcs.

In range, versatility, price and performance, the HFS stands alone in the VHF field!

SEE IT AT YOUR LOCAL JOBBERS



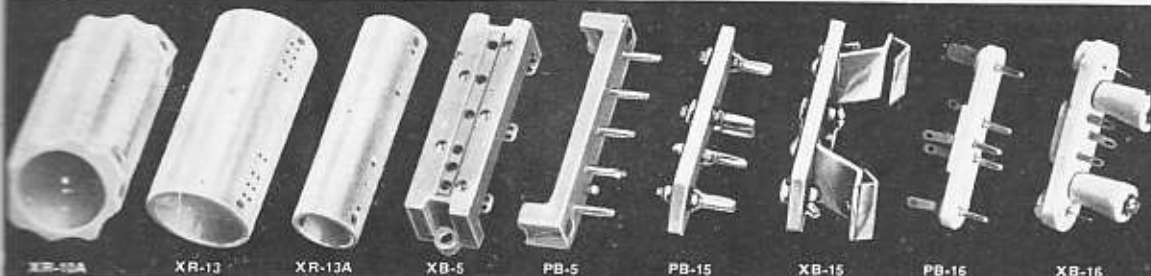
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VANCOUVER WINNIPEG MONTREAL HALIFAX ST. JOHN'S Nfld.

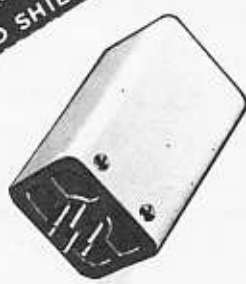
POPULAR *National* COMPONENTS



TRANSMITTER COIL FORMS
 BUFFER COIL FORMS
 COILS AND COIL FORMS
 EXCITER COILS



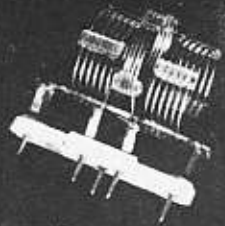
PLUG-IN BASE
 AND SHIELD



500 WATT COILS



AR15



AR16



AR17



AR18

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VANCOUVER WINNIPEG MONTREAL HALIFAX ST. JOHN'S NFLD.

DX PREDICTIONS

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

DX PREDICTIONS FOR MONTH OF JULY, 1952

Skywire frequency predictions are for amateur communications on various circuits to almost any part of the world. These tables are for five major areas in Canada, and amateurs who are operating reasonably close to the circles indicated will find these predictions quite adequate.

Figures shown are in megacycles and indicate the band to be used. They are for normal F layer transmission and don't consider Sporadic E which may provide unusual DX openings!

Sackville to:	AST	01	03	05	07	09	11	13	15	17	19	21	23
Europe	7	7	7	14	14	14	14	14	14	14	14	7	7
Africa	7	7	14	14	-	-	-	-	-	-	-	7	7
Caribbean	14	7	7	14	14	14	14	14	14	14	14	14	14
S. America	14	7	7	14	14	14	14	14	14	14	14	14	14
Australia	7	7	7	7	-	-	-	-	-	-	-	-	-
U.S. - West	14	14	7	14	14	14	14	14	14	14	14	14	14
U.S. - Central	14	14	14	14	14	14	14	14	14	14	14	14	14
U.S. - South	14	14	7	14	14	14	14	14	14	14	14	14	14
Vancouver	14	7	7	7	14	14	14	14	14	14	14	14	14
Hurons	14	7	7	14	14	14	14	14	14	14	14	14	14
Toronto	14	14	7	14	14	14	14	14	14	14	14	14	14
Montreal	7	7	7	7	14	14	14	14	14	14	14	14	14

Montreal to:	EST	00	02	04	06	08	10	12	14	16	18	20	22
Europe	7	7	7	14	14	14	14	14	14	14	14	14	7
Africa	7	7	14	14	-	-	-	-	-	-	-	7	7
Caribbean	14	7	7	14	14	14	14	14	14	14	14	14	14
S. America	14	7	7	14	14	14	14	14	14	14	14	14	14
Australia	7	7	14	7	-	-	-	-	-	-	-	-	-
U.S. - West	14	14	14	14	14	14	14	14	14	14	14	14	14
U.S. - Central	14	7	7	7	7	14	14	14	14	14	14	14	14
U.S. - South	14	7	7	14	14	14	14	14	14	14	14	14	14
Vancouver	14	7	7	7	14	14	14	14	14	14	14	14	14
Hurons	7	7	7	7	14	14	14	14	14	14	14	14	14
Toronto	4	4	4	4	4	7	7	7	7	7	7	7	7
Sackville	7	7	7	7	7	14	14	14	14	14	14	14	14

Toronto to:	EST	00	02	04	06	08	10	12	14	16	18	20	22
Europe	7	7	7	14	14	14	14	14	14	14	14	14	14
Africa	7	7	14	14	-	-	-	-	-	-	-	7	7
Caribbean	14	7	7	14	14	14	14	14	14	14	14	14	14
S. America	14	7	7	14	14	14	14	14	14	14	14	14	14
Australia	7	7	14	7	-	-	-	-	-	-	-	-	-
U.S. - West	14	14	14	7	14	14	14	14	14	14	14	14	14
U.S. - Central	7	7	7	7	7	14	14	14	14	14	14	14	14
U.S. - South	14	14	7	14	14	14	14	14	14	14	14	14	14
Vancouver	14	14	7	7	7	14	14	14	14	14	14	14	14
Hurons	7	7	7	7	7	14	14	14	14	14	14	14	14
Montreal	4	4	4	4	4	7	7	7	7	7	7	7	7
Sackville	14	14	7	14	14	14	14	14	14	14	14	14	14

Hurons to:	AST	22	00	02	04	06	08	10	12	14	16	18	20
Europe	7	7	7	-	-	14	14	14	14	14	14	14	7
Africa	7	14	7	14	-	-	-	-	-	-	-	14	7
Caribbean	14	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	14
Australia	14	14	14	14	7	7	-	-	-	-	-	-	-
U.S. - West	14	7	7	7	7	7	14	7	14	14	14	14	14
U.S. - Central	14	7	7	7	7	7	7	7	7	7	7	7	7
U.S. - South	14	14	14	14	14	14	14	14	14	14	14	14	14
Vancouver	14	7	7	7	7	7	7	7	14	14	14	14	14
Toronto	7	7	7	7	7	7	14	14	14	14	14	14	14
Montreal	7	7	7	7	7	7	14	14	14	14	14	14	14
Sackville	14	7	7	7	14	14	14	14	14	14	14	14	14

Vancouver to:	PST	21	23	01	03	05	07	09	11	13	15	17	19
Europe	7	7	-	-	14	14	14	14	14	14	14	14	7
Africa	14	7	7	7	14	14	14	14	14	14	14	14	14
Caribbean	14	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	14
Australia	14	14	14	7	7	7	-	-	-	-	-	-	-
U.S. - West	14	14	14	14	14	14	14	14	14	14	14	14	14
U.S. - Central	14	14	14	7	7	7	14	14	14	14	14	14	14
U.S. - South	14	14	14	14	7	7	14	14	14	14	14	14	14
Vancouver	14	7	7	7	7	7	7	14	14	14	14	14	14
Hurons	14	14	14	7	7	7	7	14	14	14	14	14	14
Toronto	14	14	14	7	7	7	7	14	14	14	14	14	14
Montreal	14	14	7	7	7	14	14	14	14	14	14	14	14
Sackville	14	7	7	7	7	14	14	14	14	14	14	14	14

RADIO CENTRE SPECIALS FOR JUNE-JULY

TAPE RECORDERS,

Utah complete recording mechanism -----	\$38.50
Utah 6 tube amplifier 100V/60cy for above -----	\$18.95
Crystal microphone-----	\$9.75

NEW,

Utah cabinet for complete tape recorder -----	\$9.75
---	--------

(See May issue Skywire for details)

MOBILE OPERATORS

Dynamotor - Input 5.6 volts at 35 amperes.

Output - 420 volts at 280 ma.

These are brand new - special while they last - \$29.95

GONSET - Tri-band converters - in stock now - \$68.00

Antennas - Master Mobile Mounts - we have complete and varied stock on hand for every band. Write ur needs!!!

WHIP - 12 feet in 3 sections from Army 19 Set \$1.95

Base for this 12 footer ----- .75¢

HI-FI



KT66 TETRODE HI-FI OUTPUT

Famed British high slope indirectly heated beam tetrode, interchangeable with 6L6 in any circuit, same pins and connections. For output stage of audio amplifiers, oscillator or RF power amplifier for frequencies to 30 mc/sec.

Price net - \$2.71

Oxford 12 inch coaxial speakers (May Skywire) \$19.50

G.E. Reluctance Cartridge .. RPX-050----- \$10.05

G.E. Phono Pre-Amp ... UPX-003 ----- \$13.59

WEBSTER Changer, 3 speed automatic, complete with a G.E. reluctance cartridge and Pre-Amp as above ----- \$55.00

TEST EQUIPMENT

Triumph Scope - 3 incher - No. 840 ----- \$75.00

Jackson Audio Oscillator - No. 652 ----- \$85.00

Dumont Scope -- 5 incher - No. 274 ----- \$150.00

WE ALSO HAVE THE EICO KITS STOCKED

NYLON DIAL CORD -----	100' spool \$1.50
	25' skein .39¢

PARTS FOR AMATEURS AND SERVICEMEN

The
RADIO CENTRE

72 CRAIG ST. WEST, MONTREAL

HAMADS

Skywire Hamads must pertain to amateur radio. Rates are 20 cents per word per insertion for commercial advertisements for profit, and 4 cents per word for all non commercial, non-profit advertisements by experimenters or licensed radio amateurs. Full remittance MUST accompany copy. Print plainly and count address in the total. Do NOT send personal checks unless exchange is included. Mail to Skywire, Toronto.

FOR SALE - R-1155-A - AC including the phones and speaker. Hallicrafter HT-17 including coils for 10, 11, 15, 20, 40, and 80 meters. Hammond Modulator 1264 including chassis cover. All three include tubes and service manuals. Have a Hallicrafter HT-18 VFO practically new, complete. Everything is excellent in appearance and operation - 60 cycle. reason for sale - going hi-power. Write Ernie, VE2APO, 57 St. Laurent, Valleyfield, Quebec.

FOR SALE - ATTENTION HAMS!! Dynamotor six volts DC input 200 mils at 600 volts output - \$40.00. Voltage regulator with ten outlets - \$35.00. Guardian Time Delay - \$8.75. Vomax Vacuum Tube Volt-Ohm-Milliammeter as new - \$39.00. Desk cradle phone minus dial - \$15.00. 10 Hammond chokes, 100 and 150 mil capacity, as new for two bucks each. Eight large single and double stator condensers - \$25.00 for the bunch. New R9'er with both 10 and 20 meter coils - \$30.00. Transmitter single 813 Hammond cabinet and chassis, phone-CW, VFO - \$275.00. For further information, contact VEGFF, E.M. Broadfoot, Box 650, Camrose, Alberta.

FOR SALE - Marconi SMR-3 six band receiver, 97 kilocycles to 30 megacycles except for broadcast band. Instruction manual and power supply, \$95.00. VE3AVS at Box 471, Kapuskasing, Ontario.

HARVEY WELLS TRANSMITTER - TBS-50-D, complete with crystal mike, 25 cycle Hammond power supply, crystals for operation and in especially good condition.

Say you saw it in Skywire - it helps us
Page 20

Hardly used - cost \$300.00. Will sell for \$175.00. H. Livingston, 47 Parkwood, Toronto, Ontario, HUDSON 0681.

BC-348 with power supply, \$100.00 or best offer. Command receivers and transmitters - state what frequency required. They're \$18.00 each. Heavy duty power supply for transmitter - \$25.00. LM-8 frequency meter - \$45.00. Write John Thomas, 2 Jane Street, Lindsay, Ontario, for more complete details.

FOR SALE - BC-221 - complete with phones and built-in 220 volt AC power pack, not regulated - price \$60.00. Also R-28/ARC5 VHF receiver complete with all the tubes - \$20.00. 47 Union Street, Kingston, Ontario (S. Chisholm, VE3ATU.)

SELLING - AR-88 receiver with speaker and S-meter, in good condition - \$245. VHF-152 in new condition - \$90.00. Wireway recorder unit, complete less amplifier - \$20.00. Also have three Hammond dual .0001/3000V variable condensers at \$5.00 each - one Hammond dual .00005/3000V condenser at \$3.75 and one Hammond single .00035/8000V variable condenser for \$4.00. National ACN dial - \$4.00 Hammond 747 transformer, 200 mils at 600 volts, new condition - \$7.50 and two Hammond 10-150 chokes at \$3.00 each. All items FOB Viking. Need better wheels under the mobile, VE6MP, H.V. Gilpin, Viking, Alberta.

WANTED TO BUY - ATR-5 in good condition. VE7DV, 3307 Browning, Victoria, BC.

Skywire Hamads get proven results. Use them to dispose of your surplus gear.
Skywire

LEE-BERN ...AND COMPANY LTD.
WINNIPEG ... CANADA



We in the west

Can handle your amateur needs best

WHOLESALE DISTRIBUTORS OF RADIO, SOUND
AND ELECTRONIC EQUIPMENT



RADIO SUPPLY
EDMONTON ... SASKATOON

THESE **ASTATIC**
MICROPHONES
NOW ENJOY A
DOUBLE
POPULARITY



MANUFACTURED IN CANADA
CANADIAN ASTATIC LTD.
2273 Danforth Avenue
TORONTO, CANADA

THE ALL-TIME, leading popularity of Astatic Microphones now goes **DOUBLE**. All models shown are available with ceramic as well as crystal elements. The growing acceptance for the ceramic types has placed them almost shoulder to shoulder—in point of preference—with the tried-and-true favorites, the crystal units. Here, to aid you in your personal choice, is the technical data on each:

Model	Output Level	Range	Response Characteristics
D-104	-48 db.	30-7,500	Rising
T-3	-52 db.	30-10,000	Substantially flat
IT-30	-52 db.	30-10,000	Substantially flat
IT-40	-52 db.	30-10,000	Rising
200	-52 db.	30-10,000	Substantially flat
241	-52 db.	30-10,000	Rising
D-104-C	-58 db.	30-7,500	Rising
T-3-C	-62 db.	30-10,000	Substantially flat
IT-30-C	-62 db.	30-10,000	Substantially flat
IT-40-C	-62 db.	30-10,000	Rising
VC	-62 db.	30-10,000	Substantially flat
VC-1	-62 db.	30-10,000	Rising

Letter "C" in model number designates ceramic unit.

CLAROSTAT

MFG. CO., INC.

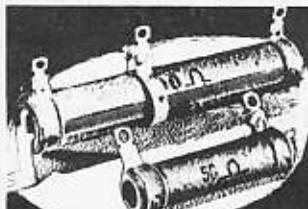
the House of Resistors



GREENOHM JR. POWER RESISTORS (Series GJ)

C7GJ, 7-watt, 0.5 to 5,000 ohms.
C4GJ, 4-watt, 0.5 to 1,000 ohms.
Standard resistance tolerance $\pm 10\%$.
Breakdown voltage between surface and resistance element, > 2500 volts A.C.
Ceramic tube casing, inorganic materials throughout. Pigtail terminals, standard.

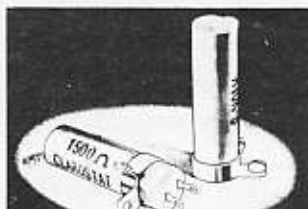
Engineering Bulletin No. 110



GREENOHM POWER RESISTORS

Fixed, 4 to 200 watts; adjustables, 10 to 200 watts.
10% plus/minus; 1%, special. Intermediate taps, special.
Wider choice of mountings and terminals.
Non-inductive units made to specifications.

Engineering Bulletin No. 113

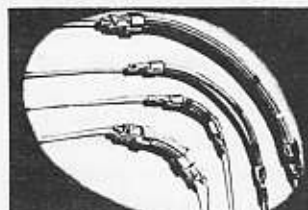


"STANDEE" RESISTOR (Series KS)

ABOVE-CHASSIS-MOUNTED

Rated, 10 to 25 watts.
Resistance range, 0.25 ohms to 15,000 ohms.
Taps can be furnished as special order.
Resistors are so designed to be above-chassis mounted for heat dissipation.

Engineering Bulletin No. 146



GLASOHM FLEXIBLE RESISTORS (Series FXG and FYG)

Used as resistors and also as miniature heating elements.
Ratings per winding inch: FXG, 1-watt; FYG, 2-watt.
Clutch-grip ferrule ends with bare pigtail terminals. Other terminals, special.

Engineering Bulletin No. 105



POWER RHEOSTATS (Series PW-25 & PW-50)

Full power rating even at fractional settings.
25-watt, $\frac{1}{2}$ to 2,500 ohms; 50-watt, $\frac{1}{2}$ to 5,000 ohms. Linear and tapered.
Tandem units available.
PW-25G and PW-50G approved under AN-R-14a specifications.

Engineering Bulletin No. 115

WIRE-WOUND CONTROLS (Series 43)

1-1/8 DIA.

Linear, 1 to 10,000 ohms.
Tapered, submit your requirements.
Rated at 2 watts, for linear units.
Mechanical rotation 300°. Electrical 280° without switch; 260° with switch.

Engineering Bulletin No. 116



WIRE-WOUND CONTROLS (Series 58)

Linear, 1 to 50,000 ohms.
Tapered, 5 to 25,000 ohms.
Non-inductive 1 to 12,000 ohms.
Linear only.
Linear, 3 watts.
Mechanical rotation 300°. Electrical 280° without switch; 240° with switch.

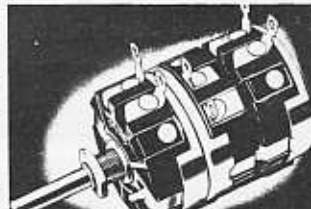
Engineering Bulletin No. 118



CONSTANT-IMPEDANCE PADS (Series CIT-58)

Continuous range Zero to 30 db.
Approximate, attenuation in 90° rotation, infinite attenuation last 10%, 4 to 2,000 ohm values. Below 4 and above 2,000, up to 10,000 ohms, special.
2.5 watts continuous D.C. rating.
Series CIT rated at 10 watts.
"L"-Pads, Bridged "T"-Pads, Bridged "M"-Pads available.

Engineering Bulletin No. 102, and Bulletin No. 111

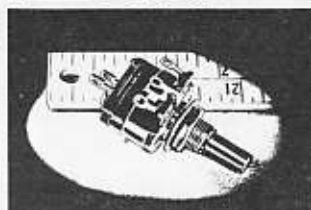


COMPOSITION-ELEMENT CONTROLS (Series 47)

15/16 DIA.

Linear and tapered, 1,000 ohms to 5 megohms.
Rated at 0.25 watt for linear units.
Standard taps at 20% or 70% of effective rotation.
300° rotation without switch; 320° with.

Engineering Bulletin No. 117

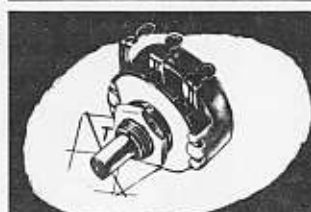


COMPOSITION-ELEMENT CONTROLS (Series 37)

1-1/8 DIA.

Linear and tapered, 1,000 ohms to 5 megohms.
Rated at 0.5 watt for linear units.
Standard taps at 27%, 50 and 62 1/2% of effective rotation.
300° rotation without switch; 320° with.

Engineering Bulletin No. 112



Represented in Canada by
CANADIAN MARCONI COMPANY
ESTABLISHED 1903
861 BAY STREET, TORONTO, ONTARIO
VANCOUVER WINNIPEG MONTREAL HALIFAX ST. JOHN'S Nfld.



HOW'S UR OBS IQ?

Official Bulletin Nr 346, May 10, 1952. The ARRL Board of Directors at its 1952 meeting May 9 and 10 elected a new president, Goodwin L. Dosland, WØTSN, re-elected Vice President Wayland M. Groves, W5NW, appointed Director Percy C. Nobel, W1BVR, to serve on Executive Committee and adopted effective July 1st, new by-laws proposed by the Constitution Revision Committee. In allocations matters the Board, mostly by unanimous decisions instructed the ARRL General Manager to make the following requests of the FCC. 1. Open 7,200 to 7,300 and 21,250 to 21,450 kc for voice operation, and extend the ten meter voice band down to 28,250 kc. 2. Open 3775 to 3800 kc for mobile phone operation. 3. Continue the present Novice privileges and add 7150 to 7200 kc for Novice CW operation, and for a temporary period of one year permit Novice operation CW or voice in 51 to 53 Mc. 4. Continue limiting 75 and 20 meter voice operation to Advanced or higher class licenses and continue the issuance of new Advanced Class licenses after end of 1952. 5. Permit duplex operation in 51 to 54 mc. 6. Open 7150 to 7200 kc for frequency shift radioteletype operation. The Board continued its policy of providing funds for travel by SCMs, SECs and QSL Managers. Other actions include establishing a special membership dues rate of one dollar for blind amateur operators without receiving QST, general

approval for a National Convention in Houston Texas sometime in 1953, instructions to the General Manager to continue studying problem of maritime mobile privileges and continuance of aggressive program in TVI matters.

Official Bulletin Nr 347, May 19, 1952. reciprocal operating privileges for amateurs of Canada and the United States came a step closer when diplomatic representatives of both governments met recently to bring formally into effect the treaty which provides basic authorization. Fixed, portable and mobile reciprocal privileges are contemplated.

Official Bulletin Nr 349, June 6, 1952. The Arctic Institute of North America Expedition Schooner, Blue Dolphin, will cruise in northern waters again this summer and plans to communicate with radio amateurs. Bruce Wald, W2BZD, will operate from the schooner using his amateur call and has requested special FCC authorization permitting maritime mobile work in the lower amateur frequencies. Daily watches will be kept June 20 through 10th of September as follows: 0000, 1430, and 2030 GMT on 14075 kc CW. 0100 GMT on 7065 kc CW. 2045, 2340 GMT on 14260 kc phone. If no calls are noted in five minutes, alternate frequencies of 14106, 7115 and 14240 kc will be tried.



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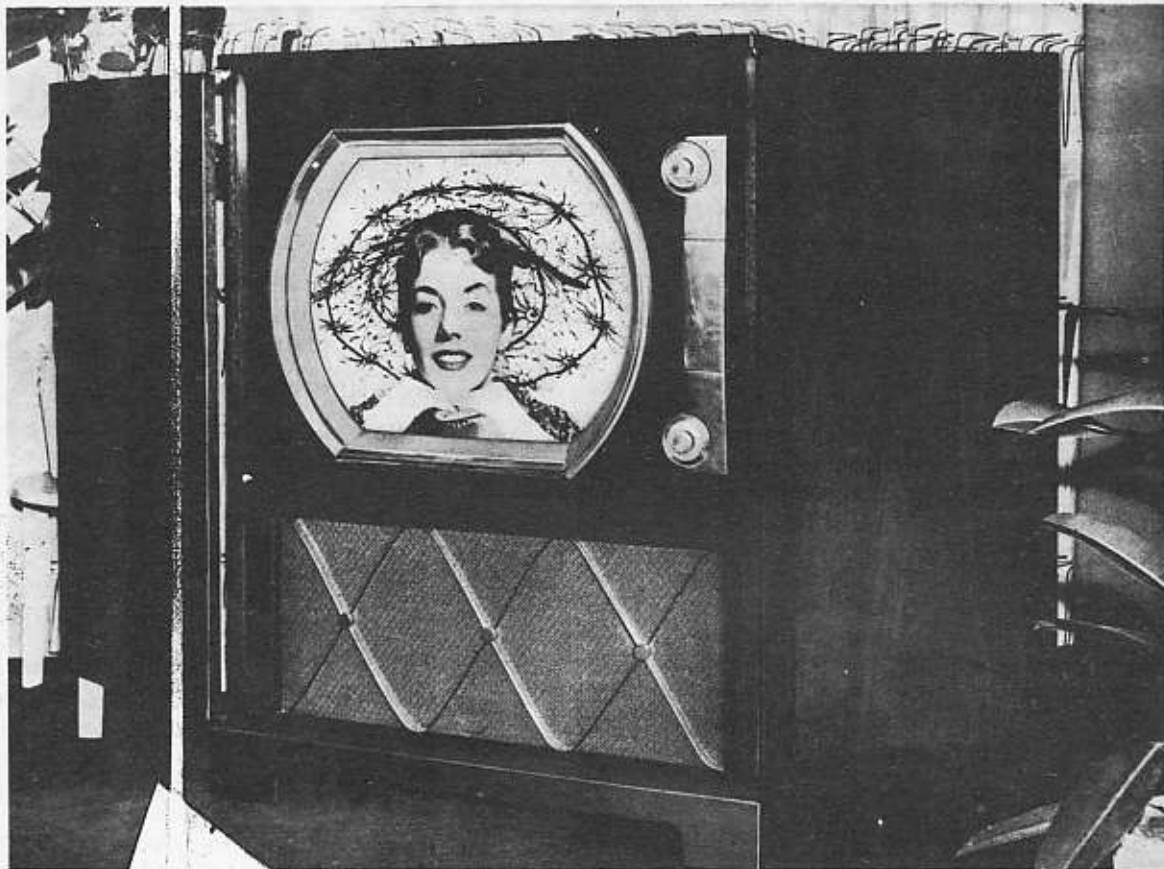
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AJAX, Ontario

Milliammeters, Voltmeters, Tube Testers,

Analyzers Oscilloscopes, etc.





Big as life—this television console has a 24-inch tube.

Electronics

TRANSMITTERS

A new, 5-kw air-cooled television transmitter cuts power consumption in half, with initial tube cost below that of any other 5-kw transmitter on the market. The manner of modulating the FM transmitting section permits exacting crystal control of the aural transmitter frequency. By modulating the television section in the low-power stages instead of in the final one, the modulator contains inexpensive receiver-type tubes.

Station WHAS-TV in Louisville, Ky., is potentially the highest-power station in the country. The antenna has 12 bays

—double the number of any previous design, and correspondingly large. The design of a new diplexor saved several thousand dollars for one transmission line to the tower's top.

The largest radio communications relay yet undertaken will supply communication along the entire length of pipe line from Brownsville and Dallas to New York City. The system, owned by Transcontinental Gas Pipe Corporation, will have 51 relay stations.

Greater use of radio for taxicabs and other mobile services has caused the establishing of "party lines" with 50 or

60 subscribers on each frequency. In common practice, all receivers responded to all calls on a given frequency. A limited-purpose selective-calling system has now been evolved to differentiate by groups. A single audio tone preceding each station-to-mobile unit is used to operate a vacuum-tube switch in a device attached to each mobile receiver. The speaker is turned on and off as dictated by the code tone and carrier. Completely electronic, it is without contacts or relays.

A new line of television studio units was engineered and built during the year. An outstanding installation, at the CBS studios in New York, consisted of four studio camera channels, including camera monitor consoles and racks, two film camera channels, line monitor con-

Skywire

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Some of the equipment listed below is urgently needed by our company to meet the demands of customers and we will pay the highest cash prices.

Send letter with full description describing condition and quote price. We will immediately answer and if we can use your equipment, we will authorize you to send it to us COD.

WE NEED AT ONCE

19 SETS MK 3.

Best prices paid for Type 19 Tank Sets, Mark III. If you have any of these, it's cash in ur pocket.

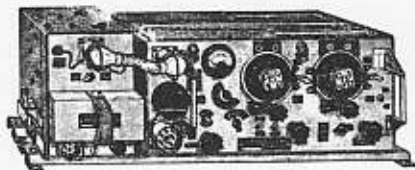
Many other types of World War II equipment wanted. Write for details and state model number you have. There are buyers waiting

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TORONTO SURPLUS CENTRE,

9 - 6 PM PHONE - WA. 8471 AFTER 6 PM ME. 6525

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Westinghouse

RADIO TUBES

For better reception!

CANADIAN WESTINGHOUSE COMPANY LIMITED
HAMILTON, CANADA



sole, special switching facilities incorporating the electronic mixer and future use of special effects and sync-lock, two sync generators with switching, two stabilizing amplifiers, patch panels, and a special test monitor dolly.

A new calibration monitor, for picture and waveform monitoring at transmitter locations, gives quick waveform checks by built-in percentage and peak-to-peak signal amplitude measurement. Provision for use of a standard external comparison signal allows use of a common reference.

A wipe and montage amplifier gives a new programming technique. The montage part blanks out the background picture in the shape of the insert, thus giving a clear, sharp picture that is not provided by the superimposition method normally used. The wipe section of the amplifier allows different types of wipes, performed electronically. Stopping wipes at a desired position forms extra-interest shots.

NEW COLOR SYSTEM

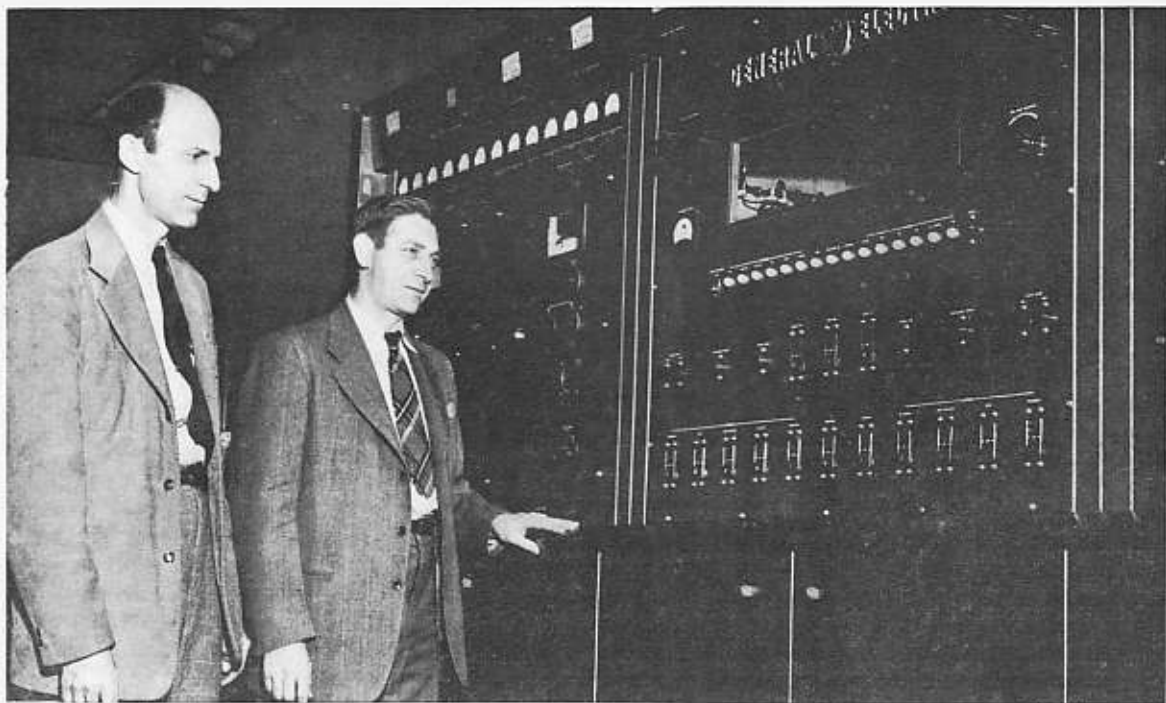
The television committee of the Radio Television Manufacturers Association took steps during the autumn to reassure the public that, in the opinion of industry's best informed men, black-and-white telecasting will continue for years to come, and that television sets may be bought with confidence that they will receive the most popular television programs. A program designed to give the public "all the facts" about color television was instituted.

In the opinion of Radio Television Manufacturers Association set manufacturers, the growth of television under the system approved by the Federal Communications Commission will necessarily be very slow. Manufacturers are confident a completely electronic color television system compatible with present black-and-white sets will be developed by the industry's engineers in the relatively near future.



One of the 114 communications system microwave reflectors for the Transcontinental Pipe Line Corp., to extend over 1840-mile pipe line under construction between Houston and New York.

The new 5-kw low-channel television transmitter is entirely air-cooled. With this self-contained, packaged unit, low-frequency video distortion found in many output signals has been eliminated.



ICA INSULINE ICA

RADIO PRODUCTS

ENCLOSED RELAY RACKS

Standardized designed rack for transmitters and public address systems. Front vertical; covers provided. Rack is fabricated of 1/8" cold rolled steel; panel mounting angles of 1/8" steel. Available for either Amateur or Western Electric type panels. Panels fit into recess so edges are not exposed. Screen ventilation on rear door and louvers on sides afford proper ventilation. Rear door hinge on inside hinge and equipped with two brass door catches. Shipped "KNOCKED DOWN" with all necessary hardware. Finished in black gray ripple finish. Black Ripple finish available on specification.

No. 3870 Overall Size 42 1/2" x 22 1/2" x 18 1/2"
Panel Space 26 1/2" x 18 1/2"
Interior Width 17 1/2"
Interior Depth 15 1/2"
Shipping Weight 97 Lbs.

No. 3871 Overall Size 68 1/2" x 22 1/2" x 18 1/2"
Panel Space 61 1/2" x 18 1/2"
Interior Width 17 1/2"
Interior Depth 15 1/2"
Shipping Weight 145 Lbs.

No. 3872 Overall Size 82 1/2" x 22 1/2" x 18 1/2"
Panel Space 77 1/2" x 18 1/2"
Interior Width 17 1/2"
Interior Depth 15 1/2"
Shipping Weight 172 Lbs.



ICA MULTI-USE METAL CABINETS

An ideal unit for public address systems, transmitters, receivers, test equipment, etc. Has rounded corners on front of Cabinet. Trimmed with handsome chrome trim moulding. Equipped with hinge doors, and nickel-plated snap locks. Complete assembly, ready for use. Finished in Black or Marine Gray Ripple Enamel. Black will be supplied unless Gray is specified.



SINGLE UNITS
DOUBLE UNIT



TABLE MOUNT RELAY RACKS

Sturdily constructed heavy duty table rack with one piece base. Accurately drilled mounting holes universally spaced for RMA, Western Electric or Amateur panels. Finished in black ripple. Shipped in "KNOCKED DOWN" with all necessary hardware.

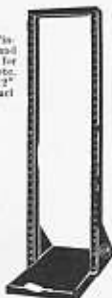
No. W. H. D. Panel Space
3910 31" x 25" x 13" 21" x 19"
3911 31" x 32" x 13" 28" x 19"

OPEN FACE RELAY RACK

For standard 18" Rack Panels. Black Ripple Finish. Rigidity assured with top cross-brace and vertical sections strongly welded. Designed for P.A. units, various types of transmitters, etc. Sturdily made of 1/2" thick steel. Base depth: 22". Accurately drilled mounting holes. Includes rear screws and cap washers.

No. Size Overall Panel Space
3912 28 1/2" x 28" x 20 1/2" 21 1/2"

TRIPLE UNIT
QUADRUPLE UNIT



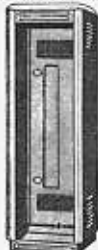
ICA DE LUXE TRANSMITTER RACKS

New modern design, streamlined transmitter and public address racks. Removable vertical covers, toolings are rounded and completely cover panel edges and mounting screws. Chrome trim. Rack is made of 1/16" cold rolled steel. Panel mounting angles drilled for either Amateur or Western Electric type panels. Screen ventilators on rear door and louvers afford ample ventilation. Easily assembled. Shipped in Marine Gray Ripple Finish. Black ripple finish furnished only on specification.

No. 3865 Overall Size 48 1/2" x 22 1/2" x 18 1/2"
Panel Space 26 1/2" x 18 1/2"
Interior Width 17 1/2"
Interior Depth 15 1/2"
Shipping Weight 110 Lbs.

No. 3866 Overall Size 67 1/2" x 22 1/2" x 18 1/2"
Panel Space 61 1/2" x 18 1/2"
Interior Width 17 1/2"
Interior Depth 15 1/2"
Shipping Weight 162 Lbs.

No. 3867 Overall Size 82 1/2" x 22 1/2" x 18 1/2"
Panel Space 77 1/2" x 18 1/2"
Interior Width 17 1/2"
Interior Depth 15 1/2"
Shipping Weight 198 Lbs.



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RECEIVING VALVES OF THE WORLD How many times have you wanted an easy THEIR DATA, USES AND INTERCHANGEABILITY to-use cross reference on radio tubes of other than Standard U.S. types?? Every ham needs a copy of the World Radio Valve Handbook, which tabulates this information. 115 pages of data you haven't been able to find elsewhere. Get a copy for the shack for two dollars, postpaid direct ur qth

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SKYWIRE

THE CANADIAN RADIO AMATEURS' JOURNAL
Four South Street
BRAMPTON, ONTARIO



To give Rio de Janeiro its first television programs, engineers of the International General Electric Company installed transmitting equipment atop famed Sugar Loaf Mountain high over nearby Copacabana Beach. Several tons of equipment, including the 150-foot antenna, had to be hauled by cable car, mule-back, and by hand to the mountain summit.

First details of a new color system called "frequency interlace" were revealed at Syracuse during the summer. Its greatest advantage is that it permits all of the high-precision equipment to be localized at the transmitter, and therefore probably will not cause any great increase in the cost of home TV sets equipped to receive the color telecasts.

The system makes possible the simultaneous transmission of three different colors (green, red, and blue) signals in heretofore unused portions of present-day TV channels. It could be used with either the three-tube or single picture tube systems previously proposed. It was announced that the system had not yet undergone field tests.

The system is inherently compatible with present black and white television and overcomes all objections to any system which would not permit black-and-white broadcasts to be received on color sets, or color broadcasts to be

ceived in black and white on present-day receivers.

RECEIVERS

A new clock-radio line was introduced with the "Wake-up-to-music" buzzer alarm, and "Go-to-sleep-with-music" features of previous models, with the additional feature of an appliance outlet, the "electronic servant," to turn on automatically almost any home appliance. By using the timer on the clock-radio, an appliance can be turned off automatically within a 60-minute cycle.

Four radio-phonograph combinations were introduced. Two were equipped with a three-gang tuned RF amplifier to give increased sensitivity of signal detection and better selectivity of stations. Three models feature FM-AM radio, and electronic reproducer for record playing. A three-speed turntable and a tone arm employing a dual reversible

stylus provide for automatic playing of 7-, 10-, and 12-inch records of standard and microgroove types.

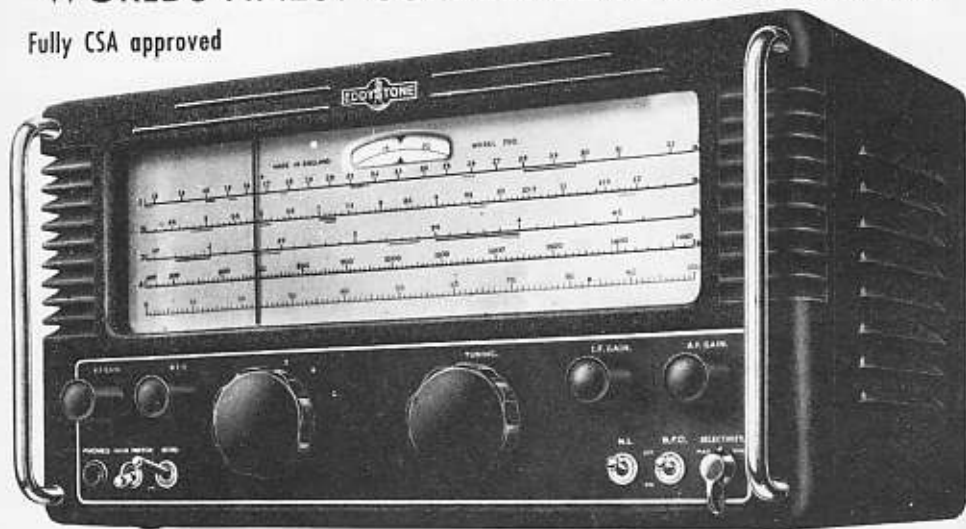
Television picture tubes gradually increased in size, with a 24-inch console produced late in the year. Rectangular-shaped tubes predominated, and the so-called "black" tube, with natural-density face plate to cut down reflections, was standardized.

A balanced-input transformer, for TV receivers, properly matches antenna and lead-in to receiver to give maximum transfer of signal energy from antenna to receiver. Inclusion of a high-frequency iron core in the balanced antenna coil provides a uniform transfer of signal from lowest to highest channel. Using 40 to 50 megacycles IF frequencies virtually eliminated interference from medical, industrial or scientific apparatus or international shortwave broadcasts in the 20 to 30 megacycle band.

The EDDYSTONE Model 750

WORLDS FINEST COMMUNICATIONS RECEIVER

Fully CSA approved



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THERE ARE MANY REASONS WHY EDDYSTONE 750 IS SETTING NEW SALES RECORDS AND A NEW STANDARD OF PERFORMANCES. CHECK THE FEATURES BELOW:

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- All-available Miniature tubes
- Highly effective series noise limiter
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- More performance for your investment

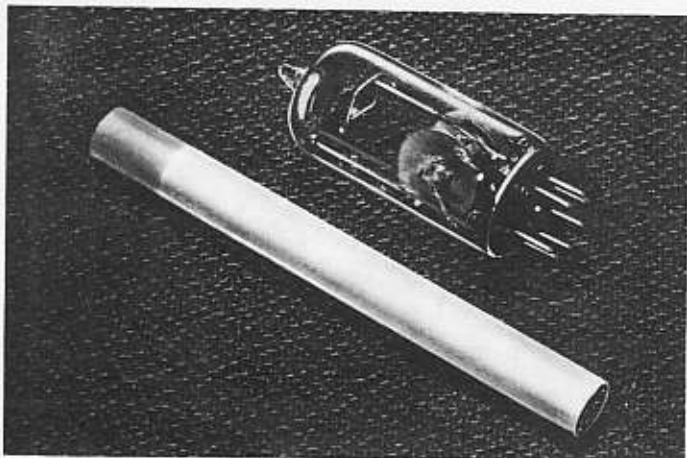
Write today for an illustrated brochure giving many more important reasons why you'll be glad you waited for the Eddystone 750. Hear it and see it—the most beautiful communications receiver built—before buying any.

ASTRAL ELECTRIC COMPANY

CANADIAN DISTRIBUTOR

44 DANFORTH ROAD

TORONTO, ONTARIO



General Electric developed a new miniature magnetron for use, experimentally, in ultra-high-frequency television receivers, as well as in other equipment in which a low-power oscillator is required.

TUBES

A 24-inch metal tube, to provide a picture about 22 by 16 in. was developed with the normal-density faceplate which increases picture contrast and detail under conditions of high ambient light. A similar tube with a 30-in. screen was in development.

An important tube development was a miniature continuous-wave magnetron for ultra-high-frequency television oscillator use in the 500 to 1000 megacycle band. It represents the first application of a magnetron to home receivers.

Significant in transmitting-tube progress was the development of metal-and-ceramic envelope tubes. Two such tubes with outputs of 1 kw were developed, one for the new ultra-high-frequency television band, the other for a ground-grid amplifier and oscillator at frequencies up to 400 megacycles.

The FCC allocation of the 450 to 460 megacycle band for fixed, mobile, and emergency communications developed several new applications for the lighthouse tube which is particularly suited to the power levels and frequencies involved. A relatively simple transmitter can be built for the new frequency range with a pair of these tubes, one used as a frequency tripler and the other as a power amplifier. Such a transmitter should be useful in taxicab, police, and fire communication as well as in the citizens' band. New applications for this tube have been developed in the 2000-megacycle band for relay transmitters.



At the high frequencies required in modern broadcasting, use of ceramic material to replace glass in tubes such as this results in a marked improvement in tube operation. This 1-kw tube was developed for high-frequency television band under consideration.

ESICO

Green Label
HIGH GRADE

Electric Soldering Irons

Nick Nack

55 Watt

No. 415

No. 415 Tip $\frac{3}{8}$ " Dia.
Wt. .38 lb., Lgth. 11 $\frac{1}{2}$ "



Midget

60 Watt

No. 416

No. 416 Tip $\frac{3}{8}$ " Dia.
Wt. .38 lb., Lgth. 12"



Junior

100 Watt

No. 417

No. 417 Tip $\frac{3}{8}$ " Dia.
Wt. .50 lb., Lgth. 12"



Trophy

130 Watt

No. 418

No. 418 Tip $\frac{3}{8}$ " Dia.
Wt. .75 lb., Lgth. 12"



* No. 61 Pencil Iron

Asstour Net \$4.50

This pencil iron is only seven inches in length and weighs just 295 ounces exclusive of cord. The handle temperature of the point where it is held in the fingers, is actually no higher than body temperature. Diameter of handle is $\frac{1}{2}$ " and may be used as a pencil for the most delicate soldering operations. The element construction is of the same type as used in ESICO industrial irons and will give long service. The tip is the so-called plug type, held in place with a set screw. Three shapes of tips are available, Type B— $\frac{1}{16}$ " dia. pyramidal point, Type A— $\frac{1}{16}$ " dia. straight pencil point and Type C— $\frac{1}{16}$ " dia. bent 90 degrees with a pencil point.



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Fading of Radio Signals Minimized by New Transmitter System

By Grant E. Hansell

*RCA Laboratories Division
Riverhead, N. Y.*

Fading of radio signals has been a problem for the communications engineer since he first attempted to transmit radio messages over distances of 100 miles or more. It required only a short time for research to reveal the Cause; the Remedy—even a partial one—is taking a great deal longer. While a complete mastery has not yet been reached, one of the most recent developments, a system called Transmitter Diversity, already has demonstrated its value in minimizing the effects of fading in certain types of communications.

In the early Twenties, when transoceanic radiotelegraphy was coming into its own as the fastest means of intercontinental communications, fading had to be taken in stride. In the knowledge of its cause lay a paradox. Strangely enough, the same phenomenon which made long-distance radio possible was also the basic cause of fading signals, namely the so-called Kennelly-Heaviside Layer. This layer, a mass of ionized particles high in the atmosphere, is created by the action of the sun's rays upon molecules of gas in the air. The particles act like a huge mirror reflecting back to the earth the radio signals which have passed beyond the horizon and outward into space.

Without this "ethereal blanket" long-distance telegraphy, radiotelephony, broadcasting, and radiophoto would be undependable, if not impossible. With it there is almost no limit to the travelling span of a radio signal, provided enough power is available at the transmitter.

Early research on fading disclosed that a transmitter signal which faded at one location was, at the same instant, at its maximum strength at another receiving point some distance away. Further experiments revealed that it was possible to connect the outputs of two receivers, connected to spaced antennas, so that the stronger signal, or a combination of the two signals, could be selected at all times. This method, called Re-

ceiver Diversity, has been in use for many years at the large radio centers operated by RCA Communications, Inc., at Riverhead, N. Y., Point Reyes, California, and many other locations.

From the foregoing description it is obvious that Receiver Diversity requires considerable space for the location of the two receiving antennas, thus limiting its use principally to fixed land stations. Reception by this method on planes, ships at sea, or at receiving points in congested areas, such as large cities, is impractical.

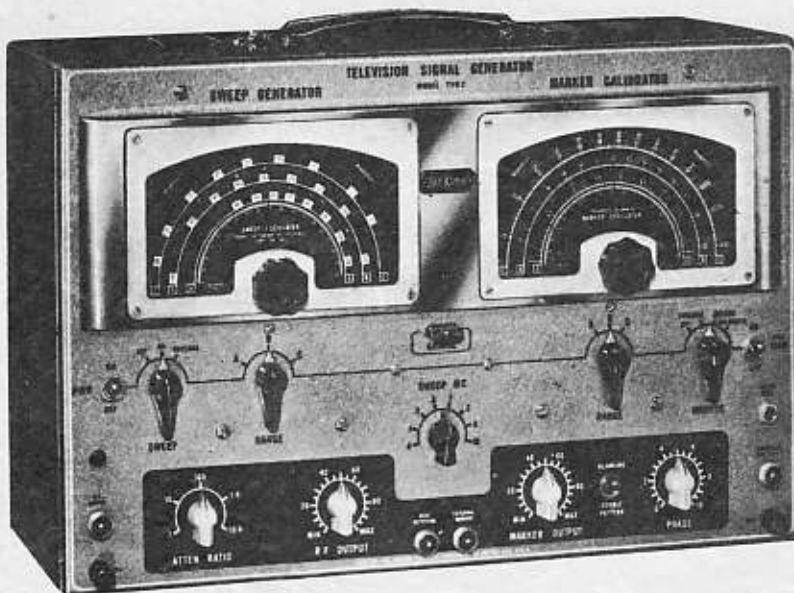
With this knowledge RCA engineers began work on Transmitter Diversity. They reasoned that duplicate transmitters connected to spaced antennas in the same manner as the receivers in the earlier method would provide a single distant receiving point with a continuously usable signal, since it was extremely unlikely that both incoming signals would fade simultaneously.

To determine the soundness of this theory, RCA conducted tests from Bolinas, Calif., to Riverhead, N. Y., and later from Bolinas to receiving points in lower and midtown Manhattan. In each instance, results demonstrated the effectiveness of Transmitter Diversity, particularly in urban areas where man-made radio noise is at a high level.

Transmitter Diversity, however, is not expected to replace the established Receiver Diversity for most point-to-point circuits but it does offer a practical solution for certain types of important message services, including shore-to-ship, ground-to-plane, and fixed base to mobile vehicles.

From an economic standpoint, also, Transmitter Diversity has an advantage. It is less costly, for instance, to improve the reception of a signal at a single receiver by adding a second transmitter than to increase the power of the single transmitter to get the same results. The power of the single transmitter would have to be increased from 16 to 1,000 times that needed by each of the dual transmitters to give the same results at the receiver.

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Model 77

An accurate band-spread wavemeter, and a sensitive 0-100 microammeter as a resonance indicator.

Separate plug-in coils for 10, 20, 40 and 80 meter bands supplied—coils for other bands available at slight extra cost.

Provision for headphones for use in station monitoring and quality control.

A direct-reading Percentage Modulation Indicator with the instrument calibrated at 0-110% Modulation.

Designed to function on the 144, 235, and 420 megacycle bands without coils, but with a quarter wave antenna section.

Extremely rugged construction.

Used as a field strength indicator to determine radiation pattern.

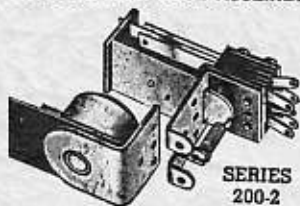


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Either one of 6 contact assemblies may be used with any of the coils shown. Coils available in various voltages.

Your Cost

COILS	Volts	Cycles	
200-6A	6 A.C.	60	\$2.40
200-6A	6 A.C.	25	\$2.76
200-115A	115 A.C.	60	\$2.97
200-115A	115 A.C.	25	\$3.45
200-5000D	—Plate circuit coil		\$3.06

CONTACT ASSEMBLIES

200-1—Single pole double throw 8 amps.....	\$1.95
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Model 737A..... Your cost - \$34.65



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50 watt transmitter unit!!

Tri-Tet oscillator good to fourth harm-
onic so one proper xtal gives four band
output of 25 to 50 watts. Requires 750V
at 250 ma as power. Less tubes, but has
one set of coils -- your cost -- \$63.75

New B & W Model 600 Dipmeter. You've read about it. Now
C.E.S. brings it to you. This dipper covers 1.75 to 260
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110v/60 cycles. Late summer delivery, but order now for
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