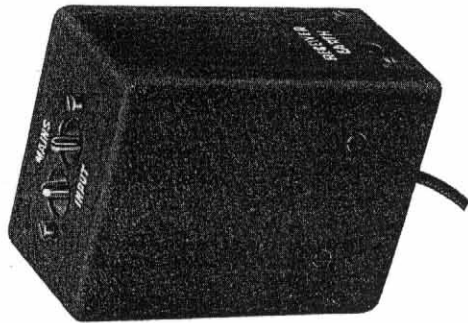


EDDYSTONE MAINS FILTER UNIT

Due to sparking at the commutator, rotating electrical machinery is liable to cause interference to radio reception and other electrical equipment (e.g. razors and fluorescent lights) can cause similar trouble. Inside the "870" receiver is fitted a filter to minimise such interference but where the noise is very bad, it will help if an external filter is included in the mains supply lead.

The Eddystone Mains Filter Unit (Cat. No. 732) is designed specifically for use with receivers and will be found most efficient in any instance where mains-borne interference is being experienced. It takes the form of a small metal box, finished ripple brown, and is supplied with all necessary plugs and sockets. The unit is inserted between the mains supply and the receiver and takes but a few minutes to fit.

Cat. No. 732 Price £2 : 15 : 0 (in U.K.)



EDDYSTONE DOUBLET AERIAL

When a single wire aerial is used, the lead-in portion must necessarily be brought close to metal-work and attention must be paid to adequate insulation. Electrical interference radiated off the mains wiring is liable to be picked up by the lead-in and an unduly high level of background noise will be evident.

These disadvantages can be overcome by using the Eddystone Doublet Aerial. The two arms forming the aerial proper can be strung in any convenient position, as high as possible, and the flexible twin insulated feeder brought into the receiver without the necessity of additional insulation.

Cat. No. 731 (50 ft. feeder) Price £2 : 17 : 9 (in U.K.)

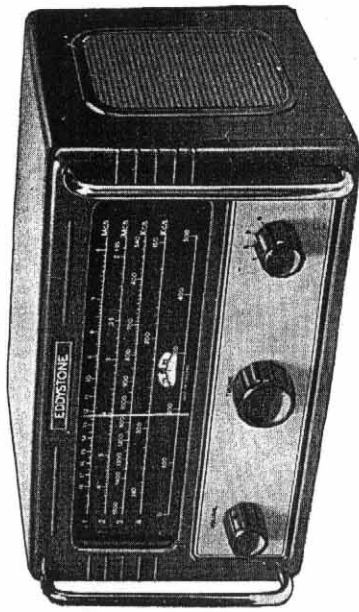
Cat. No. 731/1 (100 ft. feeder) Price £3 : 3 : 3 (in U.K.)

STRATTON & Co. Ltd., West Heath, Birmingham 31

Cables: "STRATNOID" Birmingham

Telephone: PRIory 2231-2-3-4

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EDDYSTONE

MODEL "870" RECEIVER

Instruction Manual

The Eddystone "870" receiver is ideal for use in situations where compactness, good performance and wide coverage are sought. The receiver is especially suitable for use on board ship since, in addition to medium and long wave bands, two short wave ranges are provided and stations can be received over long distances.

The "870" works equally well off either AC or DC mains and is designed for supplies of 110 volts or 200/250 volts. Measures have been taken to reduce mains-borne interference to a minimum and long, reliable service can be expected in any climate. A special mechanical bandwidth system assists fine tuning.

The four bands cover the following frequency ranges :—

Band 1	..	18 Mc/s. to 5.9 Mc/s.	(16.66 to 50.7 metres).
Band 2	..	6.3 Mc/s. to 1.95 Mc/s.	(47.6 to 153.8 metres).
Band 3	..	1500 kc/s. to 540 kc/s.	(200 to 556 metres).
Band 4	..	380 kc/s. to 150 kc/s.	(789 to 2000 metres).

INSTALLATION DETAILS

The first essential is an aerial — and the better the aerial, the better the results you will obtain. It is particularly important aboard ship to try and get an aerial up clear of metal-work and to bring the lead-in portion to the receiver without an undue length trailing along metal rails and deckhouses, to avoid picking up interference radiated off the ship's mains wiring.

An ordinary single wire aerial may be used. It can be of any length up to 60 feet, erected as high and as clear as circumstances permit. Good insulation is necessary at the supporting points and at the lead-in. The aerial is connected to the socket marked "A" at the rear of the receiver, the small plug between the other "A" socket and the "E" socket being left in place. An earth lead must be connected to the lower socket marked "E."

INSTALLATION OF EDDYSTONE DOUBLET AERIAL

The Eddystone Doublet Aerial is supplied ready for immediate use. The insulators attached to the aerial wires should be fixed between convenient supports, as clear as possible of other metal objects. The special feeder cable is then run in through any convenient aperture, no additional insulation being necessary. Mechanical protection — a wrapping of insulating tape — may be advisable in some instances.

If too long, the feeder cable need not be cut. The surplus can easily be made into a neat roll and tucked behind the receiver.

The small black plug between the "A" and "E" sockets at the rear of the receiver should be removed and the two ends of the feeder cable plugged into the two "A" sockets. Again an earth should be connected to the "E" socket.

CONNECTIONS TO EDDYSTONE MAINS FILTER UNIT

A filter is fitted internally to the "870" receiver but in cases where very severe mains-borne noise is experienced, it is probable an external filter will help. When the Eddystone Cat. No. 732 Mains Filter Unit is used, the following connections should be made **before making any connection to the mains supply.**

The short flexible lead in the unit is plugged into the mains input socket on the receiver. The earth lead is connected to the socket marked "Earth" on the Filter Unit. A connection is made with a short piece of insulated wire between the "E" socket on the receiver and the socket marked "Receiver Earth" on the Filter Unit. Finally, the mains lead may be plugged into the socket on the Filter Unit. If the Filter Unit is not used, the earth lead is plugged directly into the "E" socket on the receiver.

VOLTAGE ADJUSTMENT (See Fig. 1)

The "870" receiver is of the Universal type and may be operated equally well off either AC or DC mains. As sent out, the set is adjusted for 230/250 volt mains supply and, where necessary, the following alteration should be made, **before connecting to the mains supply.**

The four screws at the rear are withdrawn, when the metal cabinet can be drawn away from the chassis. If necessary, leverage can be applied to the two slots on the underside. On one side of the chassis will be seen a metal "pocket" in which is housed the mains dropping (or "ballast") resistor. The lead which will be seen attached to the terminal marked "240V" should be detached and placed under either the "210V" or "110V" terminals, as appropriate to the supply voltage from which the receiver is to operate.

FUSES

A fuse is fitted in each supply lead, and access to them is obtained by removing the cabinet, as described above. Before a fuse is renewed, the reason for its blowing should be investigated. The fuse is rated at $\frac{1}{2}$ ampere.

POLARITY OF MAINS SUPPLY

On AC mains, the receiver will work with the power supply plug either way round, but it may be found that hum will be present with the plug inserted one particular way. If this is so, the plug should be reversed, when the receiver will be found to function normally. On DC mains it will be necessary to ensure correct polarity of the supply leads. If, after the normal warming up period, the set remains lifeless, the power plug should be reversed.

OPERATION

The set is switched on by rotating clockwise the volume control on the left hand side of the panel. After a short period the dial lamps will glow and then the receiver will become fully operative.

The right-hand knob operates the wave-change switch and is set to the desired range, as indicated by the figures. Tuning is carried out with the centre knob and will be found delightfully smooth. The slow motion drive is of the gear type and is flywheel loaded.

Volume is controlled with the knob on the left-hand side of the panel.

The mechanical bandspread scale in the centre of the main dial is read in conjunction with the lowest straight line scale. It will be found invaluable for making a log of the exact settings of preferred stations for future reference.

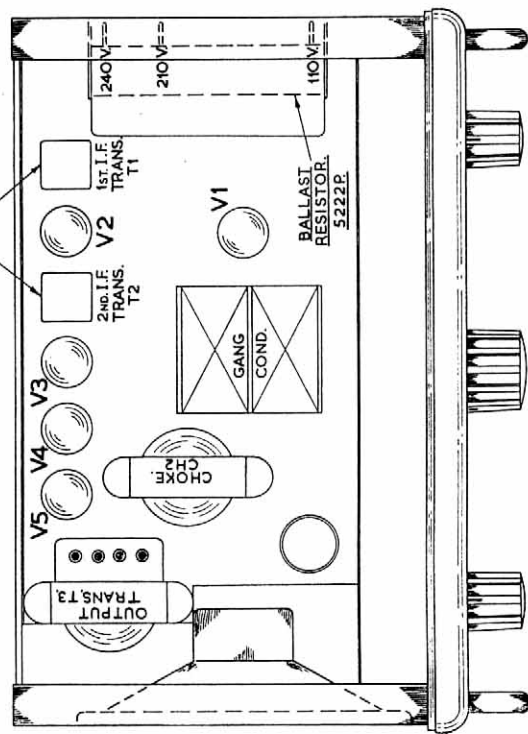


Fig. 1. Plan view of the "370" receiver, showing positions of mains adjustment points and valve locations.

SERVICING INSTRUCTIONS

The "870" receiver is of the Universal type and great care should be exercised when carrying out tests with the cabinet removed, since the interior metal-work may be alive. If at any time the receiver fails to function, ensure that all connections at the rear are firm and that the mains are plugged in correctly.

Further inspection entails removal of the cabinet, which is secured by the four large screws to be seen at the rear. The fuses should be checked and the continuity of the valve heater chain. Failure of the dial lamps will not result in the receiver ceasing to function and will not cause discontinuity of the heater chain.

When testing valves by substitution, the full number of valves should be in the holders since the heaters are series connected. The dial lamps are rated at 5 volts, 0.15 amps.

The factory alignment of the "870" receiver will hold good for a long period and only at infrequent intervals will it become necessary to make any adjustments to the tuned circuits. Such attention is advisable when the performance falls off to a degree which cannot be put down to weak valves, or other factors, such as change of location or aerial.

It is strongly recommended that re-alignment be carried out only by a skilled service engineer and using proper instruments. Tampering with the trimmer and core adjustments by an individual not thoroughly conversant with the work, and probably using the ear as a guide, will, in most cases, lead to a degradation of the performance.

It is well that the owner of this receiver (which may be used anywhere in the World) should have available full technical details of the alignment procedure, for the guidance of an engineer. The following information is provided on this basis. For the sake of completeness, the whole re-alignment procedure is described but it is emphasised that in the majority of cases, only slight adjustments will be called for, to correct any ageing which has occurred.

ALIGNMENT

The following test instruments are required :-

1. A Signal Generator, fitted with a calibrated attenuator and having internal modulation. The frequency range should cover that of the receiver and the intermediate frequency. The Signal Generator should preferably be isolated with .01 μ F condensers, a 1 megohm resistor being connected across the leads, on the receiver side, to ensure D.C. continuity. For the sake of brevity the Signal Generator is referred to in the following notes as the Sig. Gen. When aligning the R.F. stages, a dummy aerial, suitable for high frequencies, should be interposed between the direct output of the generator and the aerial terminals of the receiver. Should no dummy aerial be supplied with the generator, a 400 ohm carbon resistor will serve, fitted in series with the high potential lead.
2. An audio output meter, calibrated in milliwatts and decibels to match an impedance of 2.5 ohms.
3. A non-metallic trimming tool, with a screwdriver shaped end, for adjusting coil cores, etc. The Eddystone Cat. No. 122T tool is suitable.
4. A Philips type tool for adjustment of trimmer condensers. The receiver should be removed from its cabinet (by unscrewing the four screws at the rear) and stood on its left-hand end, face to the operator, taking care not to damage the speaker. Connect the output meter across the speaker terminals, leaving the speaker connected, as this is helpful.

Both the receiver and the Sig. Gen. should be allowed to warm up for at least ten minutes, to minimise possible frequency drift.

INTERMEDIATE FREQUENCY STAGES.

The volume control should be turned to maximum (fully clockwise) and the waveband switch to Band 4. The leads from the Sig. Gen. are clipped, the "earthy" one to the frame of the gang condenser and the "hot" lead to the rear section stator. The generator is set to 465 kc/s., 30% audio modulation, and the attenuator adjusted to give an output in the region of 200 microvolts.

Using the insulated trimming tool, the cores of the I.F. transformers (see Fig. 1 for locations) are adjusted for maximum output, as shown on the audio output meter. The Sig. Gen. attenuator will need adjustment as the circuits come into exact resonance and finally the setting should be such that less than 90 microvolts is recorded for 50 milliwatts output, using the meter only (speaker disconnected). Should the attenuator reading be higher than 90 microvolts, it is possible the emission of one or more valves is beginning to fail.

RADIO FREQUENCY CIRCUITS.

In the first place, only trimmer adjustments should be made. If the alignment is then still unsatisfactory, attention can be given to the coil cores, but it must be remembered that care is necessary if proper tracking is to be maintained. On each band the oscillator frequency is 465 kc/s. higher than the signal frequency.

OSCILLATOR STAGES.

The leads from the Sig. Gen. are connected, via the dummy aerial, to the aerial and earth sockets on the receiver. Very few signal generators are calibrated to an accuracy better than 1%. To ensure absolutely correct calibration, it is necessary to use a Crystal Calibrator, incorporating a close tolerance 1000 kc/s. crystal, for the final setting of the oscillator circuit. Hence, if a Crystal Calibrator is not available and only a small discrepancy exists between the receiver and Sig. Gen. calibrations, it will be well to leave the oscillator circuits untouched.

If found necessary, the procedure is as follows :-

The highest frequency range (Band 1) is checked first. The Sig. Gen. should be set to 6.5 Mc/s., with an output of 150 microvolts or less, and the signal tuned in on the receiver. If the pointer on

the receiver scale is well off, it should be set to the correct mark and the core of the Oscillator Coil, Band 1, adjusted until the audio output is maximum.

Next, the wave change switch is moved to Band 2 and the procedure carried out on a frequency of 2 Mc/s. Then Band 3 oscillator core on a frequency of 600 kc/s. and Band 4 on a frequency of 160 kc/s. A similar procedure is followed at the high frequency end of each band, using the frequencies set out below, but this time it is the trimmer condensers which are adjusted. On Bands 1 and 2, it may happen that the signal is heard at two settings of the trimmer — the correct position is the one where the trimmer has the lower value of capacity. The adjustments of cores and trimmers affect one another slightly and the foregoing procedure should be repeated once or twice.

	Band	Frequency	Osc.	Aerial
CORES	1	6.5 Mc/s.	L5	L1
	2	2 Mc/s.	L6	L2
	3	600 kc/s.	L7	L3
	4	160 kc/s.	L8	L4
TRIMMERS	1	17 Mc/s.	L5	L1
	2	6 Mc/s.	L6	L2
	3	1400 kc/s.	L7	L3
	4	350 kc/s.	L8	L4

AERIAL STAGE.

The procedure adopted in trimming the aerial circuits is similar to that described above, using the frequencies given in the table. Tuning will be found less critical and the output of the Sig. Gen. should be reduced as necessary.

I.F. REJECTOR CIRCUIT.

An I.F. rejector circuit is placed across the input circuit, to minimise breakthrough at the intermediate frequency. To check, a modulated signal at 465 kc/s. is applied from the Sig. Gen. across the aerial and earth sockets and the core in L9 (see Fig. 2) adjusted until the reading on the Output Meter is at a minimum.

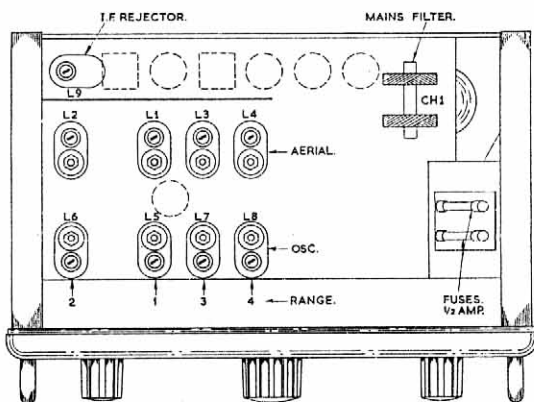


Fig. 2. Location of trimmers and other parts on the underside of the "870" receiver.

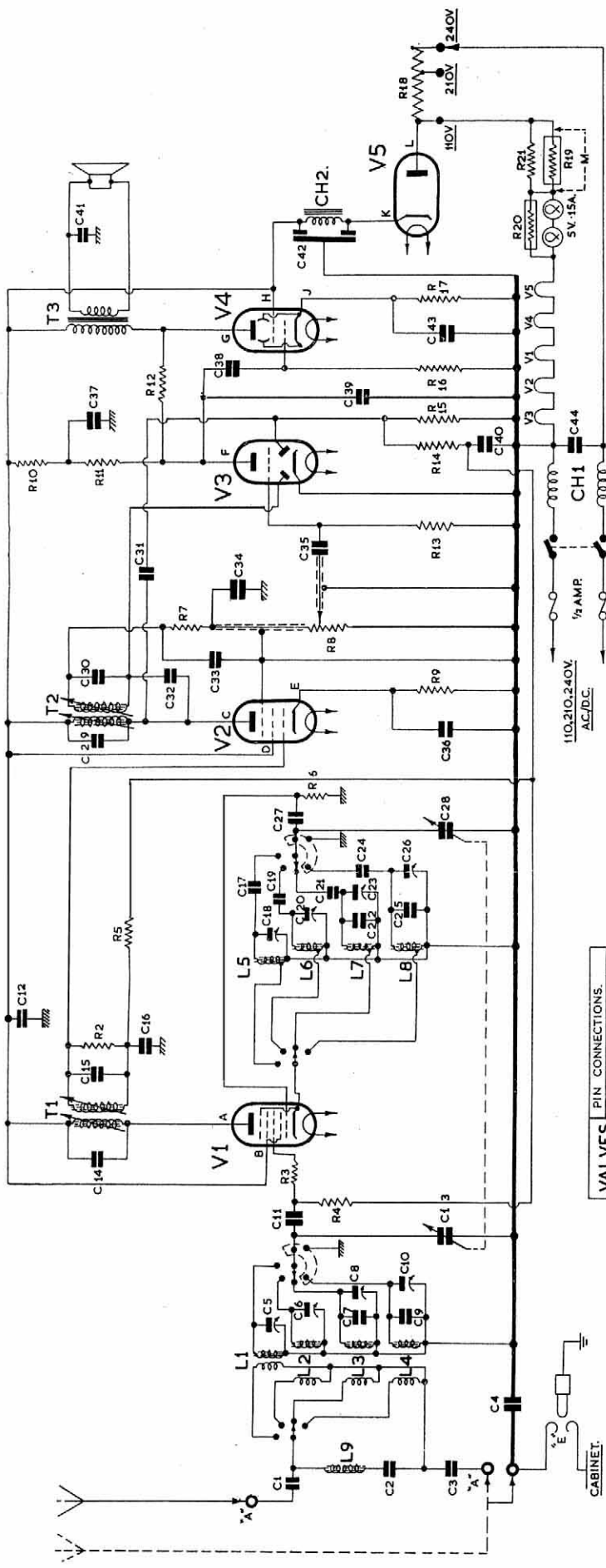
VOLTAGE VALUES.

The voltages are between the points indicated and chassis (except point M). Set switch to Band 4. Short out aerial to earth. Set volume controls at maximum.

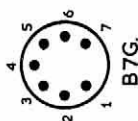
Values are given for A.C. input of 240V. (and these values are substantially correct when the input is 110V) using two types of meter. It will be evident that the actual voltage indicated depends upon the particular meter employed. A tolerance of $\pm 5\%$ should be allowed on the values given.

CIRCUIT REF.	20,000 Ω /volt	240V. A.C. Input AVO 40	
A ...	100	93	
B ...	101	94	
C ...	100	93	
D ...	101	94	
E ...	0.65	0.5	
F ...	43	30	
G ...	98	95	
H ...	101	94	
J ...	4	3.7	
K ...	105	98	
L ...	115	110	A.C.
M ...	18	17	

Current consumption at 240V. 190 mA.



VALVES	PIN CONNECTIONS.						
	1	2	3	4	5	6	7
V1	12BE6	G1	G5	H	H	A	G4 G3
V2	12BA6	G1	S	H	A	A	G2 K
V3	12AT6	G	K	H	H	D	D A
V4	19AQ5	G1	K	H	H	A	G2 G1
V5	35W4	-	-	H	H	A	TAP K



- CAPACITORS.**
- C1 1800 pf. Ceramic.
 - C2 200 pf. Silvered Mica.
 - C3 1800 pf. Ceramic.
 - C4 1800 pf. Tubular Paper.
 - C5 -01 mid. Tubular Paper.
 - C6 3-33 pf. Air Trimmer.
 - C7 3-33 pf. Air Trimmer.
 - C8 20 pf. Silvered Mica.
 - C9 3-33 pf. Air Trimmer.
 - C10 10 pf. Silvered Mica.
 - C11 200 pf. Air Trimmer.
 - C12 -01 mid. Tubular Paper.
 - C13 13-446 pf. 2 Gang.
 - C14 100 pf. I.F. Assembly.
 - C15 100 pf. Tubular Paper.
 - C16 -05 mid. Tubular Paper.
 - C17 4-400 pf. Silvered Mica.
 - C18 3-33 pf. Air Trimmer.
 - C19 1600 pf. Silvered Mica.
 - C20 3-33 pf. Air Trimmer.
 - C21 540 pf. Silvered Mica.
 - C22 20 pf. Silvered Mica.

- VALVES.**
- C23 3-33 pf. Air Trimmer.
 - C24 200 pf. Silvered Mica.
 - C25 50 pf. Silvered Mica.
 - C26 3-33 pf. Air Trimmer.
 - C27 100 pf. Ceramic.
 - C28 13-446 pf. 2 Gang.
 - C29 100 pf. I.F. Assembly.
 - C30 100 pf. Ceramic.
 - C31 20 pf. Ceramic.
 - C32 6 pf. Ceramic.
 - C33 100 pf. Ceramic.
 - C34 100 pf. Ceramic.
 - C35 -05 mid. Tubular Paper.
 - C36 -05 mid. Tubular Paper.
 - C37 4 mid. Tub. Elect. 350V. Wkg.
 - C38 -05 mid. Tubular Paper.
 - C39 200 pf. Ceramic.
 - C40 -05 mid. Tubular Paper.
 - C41 1800 pf. Ceramic.
 - C42 32+-32 mid. Tub. Elect. 350V. Wkg.
 - C43 30 mid. Tub. Elect. 15V. Wkg.
 - C44 -05 mid. Tubular Paper.

- RESISTORS.**
- R1 -18 Megohm.
 - R2 47 ohm.
 - R3 -47 Megohm.
 - R4 -47 Megohm.
 - R5 22,000 ohms.
 - R6 22,000 ohms.
 - R7 5 Mins.
 - R8 68 ohms.
 - R9 22,000 ohms.
 - R10 -47 Megohm.
 - R11 2 or 2-2 Megohms.
 - R12 8-2 Megohm.
 - R13 -47 Megohm.
 - R14 -47 Megohm.
 - R15 270 ohms.
 - R16 Thermistor.
 - R17 Thermistor.
 - R18 1500 ohms. W. W.
 - R19 Thermistor.
 - R20 1500 ohms. W. W.
 - R21 Thermistor.
 - R22 1500 ohms. W. W.

- TRANSFORMERS.**
- T1 1st I.F. Transformer.
 - T2 2nd I.F. Transformer.
 - T3 Output Transformer 5267P.
- CHOKES.**
- CH1 Mains Filter, D2024.
 - CH2 Smoothing, 5268P.
- INDUCTANCES.**
- L1 Aerial Coil Range 1. D.2258
 - L2 " " " 2. D.2260
 - L3 " " " 3. D.2262
 - L4 " " " 4. D.2264
 - L5 Oscillator Coil Range 1. D.2259
 - L6 " " " 2. D.2261
 - L7 " " " 3. D.2263
 - L8 " " " 4. D.2265
 - L9 I.F. Rejector ... D.2266