

# The 'Eddystone' 358

## A New Communications Receiver

**T**HE 358 Receiver is specially designed for reception of telegraphy and telephony signals. It has a tuning range of 31,000 kc/sec to 1,250 kc/sec by the use of interchangeable plug-in coil units. (Additional units will shortly be available to extend the range to 100 kc/sec.)

The Receiver operates from an input of 6 volts 1.4 amperes, and 175/180 volts 65 milliamperes high tension which is supplied by a separate power unit when operating the set from A.C. Mains.

The aerial input is arranged for a doublet or single wire aerial system. The output circuit incorporates twin jacks for the use of either high or 120 ohm low-impedance type telephones. To simplify maintenance, a meter and test switch is fitted by which the emission of each valve can be checked while in position. The meter when switched in position "V<sub>1</sub>" will act as a resonant dip tuning indicator.

**Selectivity.**—Adjacent channel: (two kilocycles at 2.5 dB down). (Five kilocycles at 35 dB down).

**Sensitivity.**—Approximately 3 microvolts above 1,500 kilocycles. 8 microvolts for lower frequencies. 30 per cent. modulation for 50 milliwatts output on all ranges.

**Audio Output.**—1.5 watts.

**Intermediate Frequency.**—450 kilocycles.

**Dial Calibration.**—Ranges B.C.D. and E are directly calibrated. Graphs are supplied for other ranges calibrated against 0-100 degree scale. The frequency ranges of the coil units are as follows:—

Range B	9,000—22,000 kilocycles.
C	4,500—9,000 "
D	2,100—4,500 "
E	1,250—2,100 "

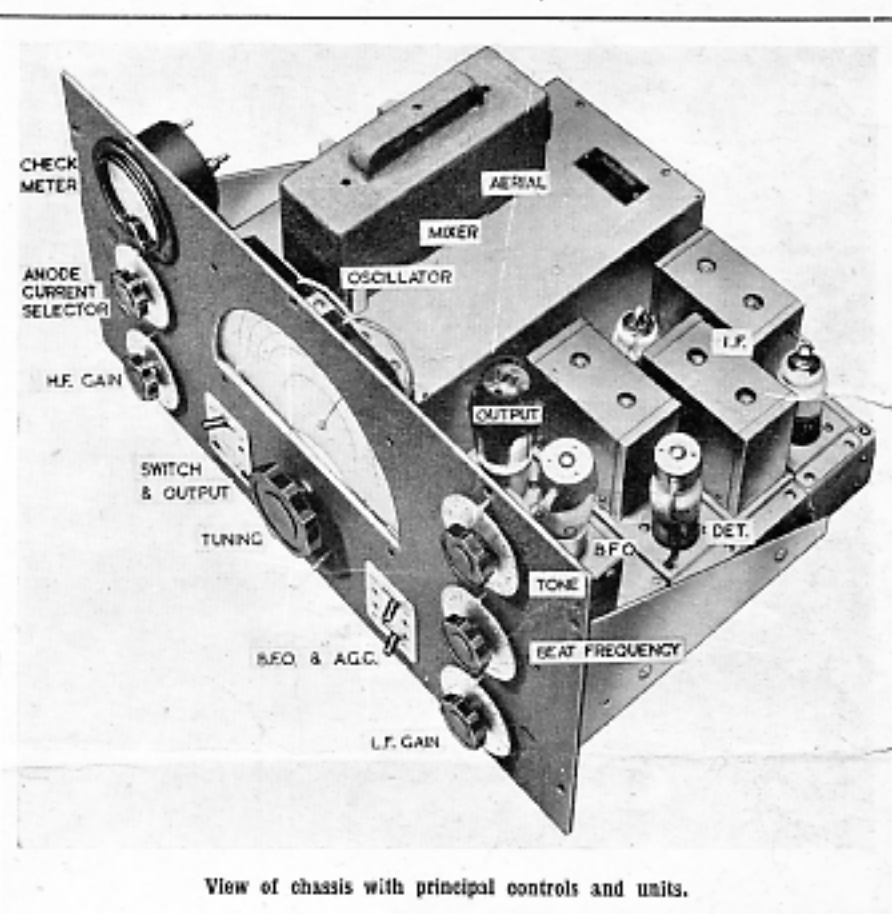
Additional ranges are as follows:—

Range A	22,000—31,000 kilocycles.
F	600—1,250 "
G	300—600 "
H	150—300 "
I	90—150 "

**Cabinet.**—Steel, finished in an attractive durable grey crackle, provided with spring loaded lid, and substantial carrying handles. All brass fittings are chromium plated. Dimensions.—20½ in. by 12 in. by 13½ in. deep. The panel is of steel measuring 19 in. by 10½ in. by ½ in. (Standard rack mounting size). Weight of receiver: 50½ lb.

### Power Unit.

A separate power unit is provided, built on a cadmium plated steel chassis with steel cover. The finish is grey to match the receiver and the case weighs 16 lb. Dimensions: 6½ in. by 9 in. by



View of chassis with principal controls and units.

4½ in. deep. The unit will operate on A.C. mains of 200-250 v. 40-60 c.p.s. and supplies 6 v. 1.4 a. A.C. and 175-180 v. 65 mA. The smoothing is effective to allow reception of weak stations on headphones without hum interference.

### Loudspeaker.

A separate loudspeaker is supplied in a grey cabinet. This contains a 7 in. cone unit with dust-proof protection, fitted with a dual ratio transformer of 600 ohms (for extension use) and 7,000 ohms for matching the receiver. The handling capacity of the speaker is 3.5 watts and special attention has been given to the middle register response to ensure clear speech.

Dimensions: 9 in. by 9 in. by 4½ in. deep. Weight, 8½ lb.

### Operating Data.

The receiver is fitted with flywheel drive tuning control having a ratio of approximately 70:1. Delayed A.G.C. working on three stages can be cut in or out at will. The beat frequency oscillator is variable in frequency and can also be cut off by means of a switch on the front panel. The stages are: R.F., F.C., two I.F., Det. and L.F.,

Output, B.F.O., employing either octal base Marconi-Osram or Mullard 6.3 volt valves.

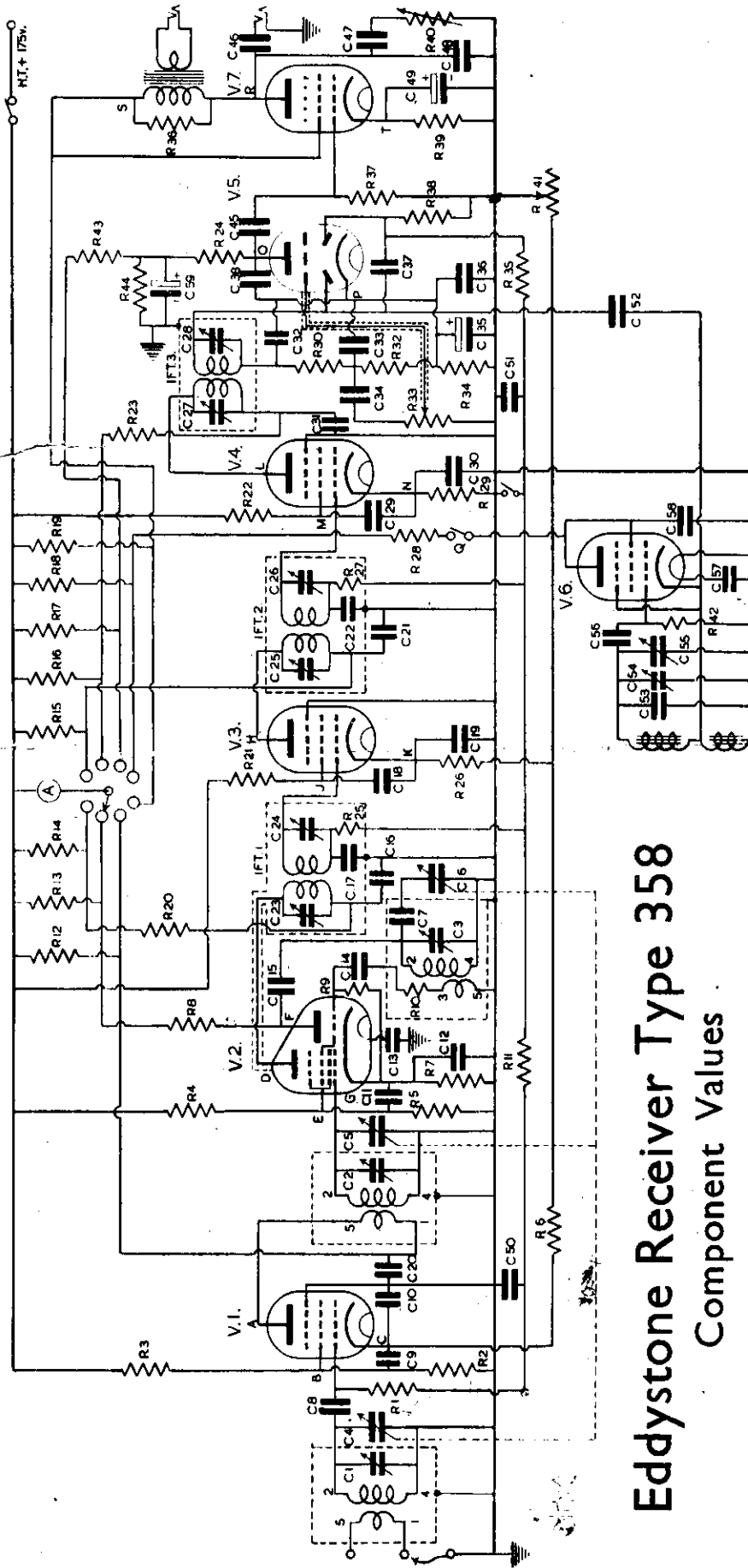
### Image Ratio:

At 20 Megacycles ...	33/1
12 " ...	100/1
9 " ...	210/1
4.5 " ...	400/1
3 " ...	500/1
2 " ...	1,500/1
1.6 " ...	3,000/1
1.2 " ...	10,000/1

### Operation.

Two output impedances are provided on the receiver. Telephones or speaker may be used in either jack, provided their resistances are reasonably close to the values engraved on the plate.

It should be noted that the output jacks of the receiver are engraved 120 ohms and 2,000 ohms. These values actually refer to the D.C. resistance of the telephones likely to be used under the operating conditions. The actual impedance of these two output jacks are 600 ohms and 6,000 ohms for the 120 ohms and 2,000 ohms positions respectively. As a matter of interest the impedance of 120 ohms and 2,000 ohms



## Eddystone Receiver Type 358

### Component Values

R.1	1 megohm	C.11	In Coil Unit.	R.39	200 ohms	C.35	10 mfd. Elect.
R.2	30,000 ohms	C.12	In Coil Unit.	R.40	50,000 ohms var.	C.36	.01 mfd.
R.3	20,000 ohms	C.31		R.41	10,000 ohms	C.37	100 pf.
R.4	20,000 ohms	C.41		R.42	50,000 ohms	C.38	300 pf.
R.5	30,000 ohms	C.21		R.43	20,000 ohms	C.39	
R.6	300 ohms	C.22		R.44	.1 megohm	C.40	In Coil Unit.
R.7	250 ohms	C.23				C.41	
R.8	30,000 ohms	C.24				C.42	
R.9	30,000 ohms	C.25				C.43	3 pf.
R.10	In Coil Unit	C.26				C.44	75 pf.
R.11	.1 megohm	C.27				C.45	15-45 pf.
R.12	6 ohms	C.28				C.46	7 pf.
R.13	1,000 ohms	C.29				C.47	100 pf.
R.14	6 ohms	C.30				C.48	.01 mfd.
R.15	1,000 ohms	C.31				C.49	.1 mfd.
R.16	6 ohms	C.32				C.50	.1 mfd.
R.17	1,000 ohms	C.33				C.51	4 mfd. 350 v. wkg. elect.
R.18	6 ohms	C.34					
R.19	.33 ohms						
C.1	1 megohm	R.20	5,000 ohms	C.18	.1 mfd.		
C.2	30,000 ohms	R.21	.1 megohm	C.19	.1 mfd.		
C.3	20,000 ohms	R.22	.1 megohm	C.20	.01 mfd.		
C.4	20,000 ohms	R.23	5,000 ohms	C.21	.1 mfd.		
C.5	300 ohms	R.24	.1 megohm	C.22	.01 mfd.		
C.6	250 ohms	R.25	.1 megohm	C.23			
C.7	30,000 ohms	R.26	1,000 ohms	C.24			
C.8	In Coil Unit	R.27	1 megohm	C.25			
C.9	.1 mfd.	R.28	10,000 ohms	C.26			
C.10	.1 mfd.	R.29	500 ohms	C.27			
C.11	.1 mfd.	R.30	50,000 ohms	C.28			
C.12	.1 mfd.	R.31	In Coil Unit				
C.13	500 pf.	R.32	.5 megohms				
C.14	75 pf.	R.33	.5 megohms				
C.15	75 pf.	R.34	1,000 ohms				
C.16	.1 mfd.	R.35	.5 megohms				
C.17	.01 mfd.	R.36	.25 megohms				
		R.37	1 megohm				
		R.38	.5 megohms				

For values of C1, C7, C39, etc., R10 & R31, (see text)

telephones at 400 cycles approximates to 600 ohms and 6,000 ohms respectively.

If twin wire feeder from the aerial is used, this is connected one wire to each aerial terminal (marked "A1" and "A2") the earth being joined to the terminal adjacent to these. If a single wire aerial is used the aerial terminal "A2" is joined to the earth terminal together with the earth wire.

The functions of the controls on the panel are indicated by engraving on the dials.

The moving-coil meter provides an indication of valve emission and also operates as a tuning indicator of the resonant dip type when the associated switch is in position "V1." Valve emission is shown by switching the meter into each H.T. feed line by means of the eight position switch located below the meter. It should be noted that "V2" has two positions since the particular valve, the mixer, has two separate anodes. The meter scale is arbitrary and is only intended as a guide to the emission of each valve. Readings obtained on the test bench at the factory are supplied with the receiver and any wide variation from these readings should be regarded with suspicion, the appropriate valve or valves being replaced if performance is affected. When checking valves for emission the H.F. gain control must be at the maximum position, the A.G.C. switch "on" and the aerial disconnected. The B.F.O. V6 will only register when the B.F.O. switch is "on"; this switch should be "off" when checking any other valves.

In the case of weak signals, or when rapidly searching for signals it will be found easier to locate these by having the B.F.O. switched "on" and tuning to the silent point of the beat note caused by the heterodyne, switching the B.F.O. off when so tuned, to get clear reception of the modulated carrier.

The calibrations on the tuning scale are marked in kc/s. and the particular coil to which they refer is indicated at each end of the calibrations. Ranges B.C.D. & E. only are calibrated directly, and any extra ranges to these are separately calibrated on graphs supplied with the receiver, their readings being referred to the 0 to 100 degree inner engraving on the scale.

Ranges covered by the coil units, valve positions, and other technical information will be found in the service instructions issued with each receiver.

### Service Notes.

The full circuit diagram of the receiver is shown in Fig. 2 together with a list of the component values. The following service notes are not intended to be comprehensive and the instruction book issued by the manufacturers should be referred to if the receiver is to be overhauled.

### I.F. Amplifier Alignment.

The following apparatus will be required for the successful alignment of

the I.F. amplifier stages of this receiver:—

Signal generator with calibrated attenuator to generate at 450 kc/s (modulated 30 per cent.).

Output meter (power) giving loads of 600 ohms and/or 6,000 ohms.

For aligning the I.F. amplifier stages, the lead from the generator should be direct, i.e., no dummy aerial in circuit, and must show continuity between the high and low potential leads.

If the amplifier is only slightly misaligned, connect the generator leads between the grid of V2 (after removing the cap) and chassis. Set H.F. gain and L.F. gain controls to maximum position. Switch off the A.G.C. and B.F.O.

Set the generator to give a suitable deflection on the output meter, and adjust all six I.F. trimmers, C25, C27, C26, C25, C24 and C23, to give maximum deflection. If no signal is obtained in this manner, proceed as follows:—

Connect the generator leads between grid of V4 (after removing clip) and chassis, and trim I.F.T.3. Transfer lead to grid of V3 trimming I.F.T.2, then repeat on V2 as already described.

A.G.C. and B.F.O. may be checked at this point. Adjust for zero beat by means of the trimmer C54 located near valveholder of V6. To check A.G.C. switch off B.F.O., switch on A.G.C. and increase input from the generator to 100 microvolts, reducing the output of the receiver if the output meter is overloaded by means of the L.F. gain control (not H.F. gain). Switch off A.G.C. Output meter deflection should now show a sharp rise.

### Coil Alignment.

The plug-in coil units are very carefully adjusted before leaving the factory, and the tracking and padding condensers set to give the greatest possible efficiency. If after consideration, it is decided these units required re-adjustment, the following procedure should be carried out systematically:—

The tracking condensers in Ranges A B and C are of the fixed capacity type, whilst those of Ranges D E F G H and I are variable, adjustments being made through the holes in the top of the covers by means of a non-metallic trimming tool, which is insulated to avoid short circuits from high potential trimmers to the chassis. Approximate value of tracking condensers are given in the list of component values.

For this procedure a signal generator giving output between 32 Mc/s and 1,250 kc/s is required if Ranges A B C D and E are used. If Ranges F G H and I are used, the frequency range must be extended to 85 kc/s.

On Ranges A B C and D use a dummy aerial consisting of a non-inductive 400 ohms resistor. For other ranges a standard dummy aerial consisting of a 200 mmfd. condenser, 20

ohms non-inductive resistor and a 40μH inductance in series with the high potential lead from the generator. (This dummy aerial is usually supplied with a generator).

Great care should be taken to avoid any overloading of the output meter, as may be caused by leaving the H.F. gain control full on, and injecting a signal from the generator of sufficient output to cause the needle to go hard over against the stop and possibly become bent. The controls should be adjusted so that the signal is enough to give deflection on the meter to about 50 per cent. of the total scale of reading.

### Valve Positions.

No.	Function	Mullard	Marconi-Osram
V 1	Radio Frequency Amplifier ..	EF39	KTW73M
V 2	Mixer ..	ECH35	—
V 3	1st I.F. Amplifier ..	EF39	KTW73M
V 4	2nd I.F. Amplifier ..	EF39	KTW73M
V 5	Detector ..	EBC33	DH73M
V 6	Beat Frequency Oscillator ..	EF39	KTW73M
V 7	Output ..	EL32	KT63

It should be noted that the Mullard EL32 is not a replacement type valve for the Marconi-Osram KT63, since it utilises a top-grid form of connexion. Sets supplied with the Mullard EL32 are modified accordingly.

The Mullard ECH35 Mixer valve is used in receivers supplied with either type of valve, and apart from the exception mentioned above the valves are interchangeable.

### Voltages.

Referring to circuit diagram, voltages are measured between the points indicated by the letters and chassis, using a high resistance type meter on 1,000 volt range. Range B coil unit should be in use, and the receiver tuned to 22.5 Mc/s with A.G.C. switched off and aerial disconnected.

Mullard Values	Contact Point	Marconi-Osram Values
167 volts ..	A	165 volts
67 " ..	B	70 " "
1.5 " ..	C	1.8 " "
155 " ..	D	150 " "
75 " ..	E	70 " "
50 " ..	F	50 " "
1.7 " ..	G	1.6 " "
165 " ..	H	160 " "
75 " ..	J	85 " "
3.2 " ..	K	4.4 " "
150 " ..	L	140 " "
65 " ..	M	70 " "
1.8 " ..	N	2.4 " "
45 " ..	O	55 " "
0.9 " ..	P	0.8 " "
167 " ..	Q	165 " "
155 " ..	R	150 " "
167 " ..	S	165 " "
6 " ..	T	6 " "

A variation of 5 per cent. in H.T. supply voltage is permissible.

### Alternative Models

## Type 358/1

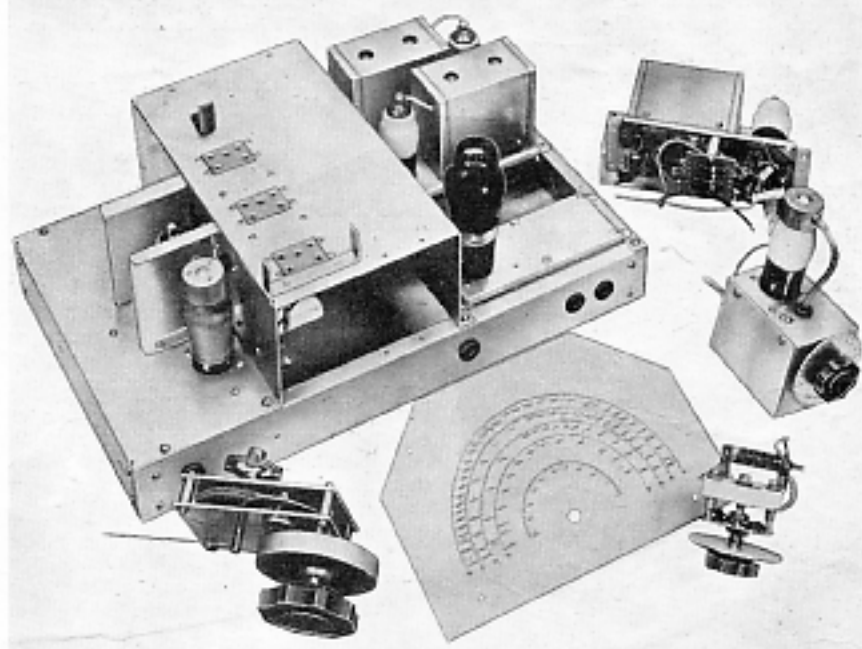
This received is a modified version of the Standard 358 Receiver, and is intended primarily for headphone reception and battery operation if necessary. The normal output valve has been replaced by one drawing less anode current, and giving as a result a lower audio output. To accommodate the new type valve, the auto-bias resistor R.39 has been increased to a value of 1,000 ohms, and R.26 in the second I.F. amplifier stage has been reduced to 500 ohms. By means of the above modifications the total anode current consumption has been reduced to approximately 33 milliamperes at 180 volts.

To stabilise the voltage from the power unit at the new load, a bleeder resistance of 15,000 ohms 3 watt rating has been placed across the rectified output.

It will be noted that the "on-off" high tension switch referred to in the operating instructions has been replaced with a similar type switch controlling the dial illumination.

The power unit has been provided with an "on-off" switch on the opposite side to the output socket, this switch being in the mains supply circuit. It is advisable to place this in the "off" position when changing coil units. In the case of battery operation the H.T. switch, located in the switch-box unit should be put in a similar position, the L.T. switch being left "on," while the new coil unit is being inserted.

A special battery lead is supplied when the receiver has to be operated from batteries. This lead incorporates a small switch-box unit. It is essential that both switches be in the "off" position when the receiver is left inoperative, as should the H.T. switch be left



The photograph shows the unit type of assembly adopted whereby each I.F., B.F.O., Audio Unit, etc., is built on a separate complete chassis. This considerably simplifies both construction and maintenance. Also shown is the fly wheel drive and Tufnol gearing mechanism for dial indicator.

on there will be a small drain, even though the filament supply has been switched off, due to the potential divider circuits incorporated in the receiver itself.

For battery operation the following will be required:—A 6-volt accumulator of a sufficient capacity to give a reasonable number of operating hours, and a high-tension supply which may consist of four 45-volt block units of the super-capacity type, connected in series to give 180 volts.

## Type 400

The Eddystone Type 400 has been designed for Service requirements and covers the medium frequency band only.

It is similar to the "358" but the four coils cover a range of 130 kc/s. to 2,200 kc/s. The dial is calibrated in frequency and a separate logging scale, as in the "358" is supplied.

Separate models of both the "358" and the "400," incorporating band-pass crystal filter units are available.

Coil Unit Component Values for Type 358.

[illegible]



# EDDYSTONE COMPONENTS

IMMEDIATELY AVAILABLE



Cat. No. 1018



Cat. No. 1027



Cat. No. 1002/3



Cat. No. 1076



Cat. No. 1009

**VALVEHOLDER.** DL9 Chassis Mounting. 4 and 5 pin. Cat. No. 954.  
**COIL BASE.** DL9 Chassis Mounting. For 6 pin Eddystone Coil. Cat. No. 964.  
**COIL FORMER.** A Frequentite ceramic former 5" x 2 1/2". Spiral grooves take 26 turns of wire up to 12 gauge. Cat. No. 1090.  
**S.W. COIL FORMER.** 8 ribs with an outside diameter 1 1/2", winding space is 2 1/2". Threaded formers carry 14 threads to the inch. Cat. No. 1002 6-pin plain. Cat. No. 1003 6-pin threaded.

**STAND OFF INSULATOR.** Beehive pattern. Cat. No. 916.

**AERIAL STRAIN INSULATOR.** 3 1/2", 400 lbs. strain. Cat. No. 999.

**LEAD THROUGH INSULATOR.** Cat. No. 1018.

**MIDGET STAND OFF INSULATOR.** Complete or Frequentite Insulator can be supplied separately. Cat. No. 1019.

**INSULATED FLEXIBLE COUPLER.** Diameter 1 1/2" for 1/2" spindle. Cat. No. 1009.

**SHORT WAVE H.F. CHOKE.** Low loss end connexions. D.C. resistance 22 ohms. Inductance 1.25 millihenries. 5—180 metres. Cat. No. 1010.

**ULTRA SHORT WAVE H.F. CHOKE.** D.C. resistance 1.3 ohms. Inductance 5.6 microhenries. 2.5—12 metres. Cat. No. 1011.

**SHORT WAVE H.F. CHOKE.** D.C. resistance 10 ohms. Inductance 1.5 millihenries. Heavy duty. Cat. No. 1022.

**POINTER KNOB.** 2" black bakelite for 1/2" spindles. Cat. No. 1027.

**SMALL POINTER KNOB.** 1 1/2" black bakelite for 1/2" spindles. Cat. No. 1044.

**INSTRUMENT KNOB.** 2 1/2" fluted knob in polished black bakelite with brass insert for 1/2" spindle. Cat. No. 1076.

1 1/2" knob as above. Cat. No. 1089.

Popular Type 1 1/2" knob. Fitted grub screw but without brass insert. Cat. No. 1086.

**NEW TYPE MICRODENSERS.** Cat. No. 1094. 18 mmfd., high voltage type.

Minimum capacity, 3 mmfd. Max., 18 mmfd. D.C. flash-over voltage, 3,500 volts.

Cat. No. 1129. 40 mmfd., high voltage type. Min. capacity, 3.8 mmfd. Max., 40 mmfd. D.C. flash-over voltage, 2,300 volts.

Cat. No. 1093. 60 mmfd., high voltage type. Min. capacity, 4 mmfd. Max., 59.5 mmfd. D.C. flash-over voltage, 2,300 volts.

Cat. No. 1130. 100 mmfd. Min. capacity, 4.5 mmfd. Max., 100.5 mmfd. D.C. flash-over voltage, 1,000 volts.

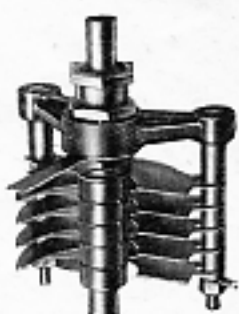
Cat. No. 1131. 160 mmfd. Min. capacity, 4.75 mmfd. Max., 161 mmfd. D.C. flash-over voltage, 1,000 volts.

**AIR DIELECTRIC TRIMMER.** Designed for use with I.F. Transformers.

Minimum capacity, 3 mmfd. Maximum, 65 mmfd.

**MIDGET CONDENSERS.** Suitable for trimming, balancing or band-spreading.

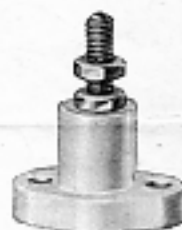
Minimum capacity, 3 mmfd. Maximum, 65 mmfd.



Cat. No. 1094



Cat. No. 1044



Cat. No. 1019



Air Dielectric Trimmer



Cat. No. 916

## ENERGETIC PRODUCTION

Due to the stress of present-day conditions EDDYSTONE products have for some time been difficult to obtain. A proportion of components are available for experimenters and additional items are being added as quickly as possible, our only proviso being that EDDYSTONE quality is maintained.

## WEBB'S RADIO

(C. WEBB LTD.)

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LONDON, W.1

'Phone : GERrard 2089



Cat. No. 1010



Cat. No. 1011

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