COLIN

Eddystone

TRANSISTORISED BROADCAST RECEIVER MODEL EB36

INSTRUCTION MANUAL

The EDDYSTONE Model EB36 is a fully transistorised receiver designed and produced primarily for the enthusiastic broadcast listener whose requirements are not entirely fulfilled by the average domestic "wireless set". Normal long and medium wave reception is provided together with continuous short-wave coverage down to the popular 16-metre band. The receiver is normally powered from a self-contained battery pack but provision is made for mains operation using a special power unit which fits into the battery compartment

Ten transistors and five diodes are employed in the high-performance circuit which is based on the well-proven "EC10" communication receiver in use by professional and amateur operators throughout the world. The design makes use of a fully-tuned r.f. amplifier stage which ensures excellent reception even when using a short inefficient aerial. An overload protection circuit is incorporated to prevent damage to the receiver when used in close proximity to a high-powered transmitter.

Facilities are available for using the receiver as a high-quality "tuner" to feed a tape recorder or "hi-fi" outfit. In this role, the external unit can remain permanently connected ready for immediate use without affecting the normal functions of the receiver in any way. The internal loudspeaker can be employed for monitoring purposes or telephones can be used where this is more convenient.

Versatility is further enhanced by making provision for using the audio stages of the receiver in conjunction with an external pick-up, tape-deck or microphone. Many varied applications will be found for the receiver when used in this manner.

Construction follows much the same pattern as that found on the professional receivers in the Eddystone range. Styling is in keeping with modern trends and the receiver will fit nicely into any domestic decor. Finish is to the highest standard with attractive two-tone colouring.

The complete frequency coverage is divided into five ranges as follows:—

Range 1	.. ..	8·5 — 22·0 Mc/s. (SW1).
Range 2	.. ..	3·5 — 8·5 Mc/s. (SW2).
Range 3	.. ..	1·5 — 3·5 Mc/s. (SW3).
Range 4	.. ..	550 — 1500 kc/s. (MW).
Range 5	.. ..	150 — 350 kc/s. (LW).

INSTALLATION

Batteries

Six standard 1·5 volt dry cells need to be fitted in the internal battery box before the receiver can be put into use. Any of the following batteries may be used, leak-proof types being preferred where available.

EVER READY	U2	OLDHAM	K532
VIDOR	V0002	SIEMENS	T1
DRYDEX	T20/T21	RAYOVAC	3LP

To fit the batteries, first unscrew the two knurled screws which retain the battery box at the rear of the receiver. Carefully remove the box and free it from the receiver proper by disengaging the battery connector. Lay the box on a flat surface and take off the inner cover. Arrange the batteries in two groups of three and then slide them into the battery troughs.

Use the diagram printed on the container as a guide when fitting the batteries and make certain that they are in the correct positions before replacing the box. Switching on with the batteries connected the wrong way round could damage the transistors. Replace the inner cover, re-connect the battery plug (yellow dots adjacent to each other) and then re-fit the box at the rear of the set.

Mains Operation

The receiver can be operated directly from all standard AC mains supplies by fitting a Power Unit Type 924 in place of the battery container. The P.U. gives an output of 9V and has the same physical size and fixing arrangements as the normal battery box. An instruction sheet is supplied with the power unit which can be ordered through your local stockist. Specify for use with EB36 receiver when ordering.

Aerials and Aerial Connections

The type of aerial used with the EB36 receiver will depend to a large extent on the permanency of the installation. Reasonable results may be obtained in a temporary installation with a relatively short length of wire located indoors. Some 15—20 feet of insulated wire run round the picture rail will provide reception from all long and medium stations serving the area; many of the high-powered short-wave stations should also be audible at good strength. Such an aerial is of course relatively inefficient and it should be realised that signals are received only because of the high receiver sensitivity.

An outside aerial is strongly recommended for a permanent installation, permitting reception from a greater number of stations with a lower level of background noise. A suitable aerial could take the form of some 30—60 feet of insulated wire strung between two insulators and located as high as conveniently possible. It should be kept well away from local obstructions (especially those of metallic construction). The down-lead can be taken from either end or from any point along the horizontal top and should be run well clear of house guttering etc. to avoid any loss in the available signal voltage Soldered joints should be used where connections are necessary.

Aerials of the types so far described are known broadly as "single-wire" or unbalanced aerials and are connected to socket "A1". The socket marked "AE" should be linked to the "EARTH" terminal using the special shorting plug supplied.

Improved results may be obtained when the wire length is less than 15 feet if the "A2" socket is used for the aerial connection. "A2" should also be used for connecting short rod aerials when a longer aerial is not available as for example when using the receiver in a vehicle.

For serious short-wave reception a further improvemment can be obtained if a "balanced" aerial system is employed. One type which falls in this category and involves no difficult constructional problems is the dipole aerial. This takes the form of a letter "T" in appearance, the horizontal portion being the aerial proper and the vertical section the down-lead or feeder. Any wire of adequate strength (either insulated or bare) can be used for the top while the feeder can be any good quality twisted flex suitable for outside use (e.g. plastic covered). Special feeder cables are manufactured for this specific application but these are more expensive and offer little in the way of advantage for a normal domestic installation. They can of course be employed if the user so wishes.

For general short-wave reception the overall length of the horizontal portion should be of the order 50—60 feet, the wire being broken at the centre with each lead connected separately to the feeder cable. An insulator is used at this point to facilitate connection and provide mechanical support for the feeder. The length of the feeder is of minor importance and little attention need be paid to its actual positioning. The aerial proper should be erected as high as conveniently possible using insulators for supporting the two ends of the wire.

If attention is centred in one specific short-wave broadcast band, performance can be optimised at this frequency by cutting the aerial to a predetermined length. Overall lengths for the main broadcast bands are as follows—49m : 76ft, 31m : 48ft, 25m : 39ft, 19m : 30ft, 16m : 26ft. Overall lengths (in feet) for other bands can be calculated by dividing 468 by the frequency in megacycles. (If wavelength only is known, refer to the following section for instructions on converting to frequency).

When using a twisted flex feeder of the type described above, one feeder wire is connected to the "A1" socket and the other to the "AE" socket. The special shorting plug is removed and can be stored in the "A2" socket to avoid loss. The same connections are employed when using a standard flat twin transmission line. Coaxial feeders are unbalanced and are connected as follows: braid to "EARTH" terminal, inner wire to "A1", shorting plug in position between "AE" and "EARTH" terminal. On the lower frequencies the dipole can be operated as a single-wire aerial by strapping both the feeder wires together and connecting to the "A1" socket. This will give greater signal pick-up and increase the versatility of the aerial.

A dipole aerial suitable for use with the "EB36" is manufactured by Eddystone Radio Ltd. Full details are available on request.

Earthing.

In some cases it will be found that reception can be improved if an earth connection is made to the "EARTH" terminal. One benefit is a reduction of locally generated electrical interference, especially when listening on the lower frequencies in the tuning range. The earth lead should be as short and direct as possible connected to a water pipe or an external earth rod.

Connecting telephones or an external loudspeaker.

The "PHONES" socket on the panel of the receiver can be used either for connection of telephones for personal listening or an external loudspeaker which can if required be located some distance from the receiver.

Telephones should preferably be of low impedance and the "high-quality" type are recommended. The external loudspeaker should have an impedance in the range 8—15 ohms and can be any size or type. An external transformer is not required. Twisted flex can be used for connection, using a standard jack plug to mate with the telephone socket. Bulgin Type P38 plug will be found suitable. Inserting the plug into the socket automatically switches off the internal loudspeaker.

Connecting to a tape recorder or hi-fi amplifier

The socket labelled "TAPE" at the rear of the set can be used to extract a low-level signal for connection to a tape recorder or hi-fi system. A suitable plug is supplied with the receiver and this should be used to terminate a screened cable to feed the external unit. The braid of the cable should be soldered to the neck of the plug shell and the inner wire to the pin.

When using the receiver in this way, it will be found that the normal volume control has no effect on the output level at the "TAPE" socket. The volume control on the tape recorder should therefore be used to control the recording level in the usual manner. The receiver speaker (and telephone output) function normally and either can be used for monitoring when a recording is being made.

Volume must be controlled externally when using the receiver as a "tuner" feeding into a hi-fi system and in this case it is best to set the receiver volume control at minimum.

Using the receiver as an audio amplifier.

A second plug is supplied for use when employing the audio stages of the receiver as an amplifier in conjunction with a microphone, gramophone pick-up or tape-replay-head. The socket for this facility is marked "AF INPUT" and is arranged to cut out normal signals when the plug is inserted.

The input has a low impedance and it will be necessary to obtain a suitable matching transformer from your local dealer if a crystal microphone or other high impedance device is to be used.

OPERATION

The EB36 will be found easy to operate. Controls have been kept to a minimum in the interest of simplicity and the user will quickly become familiar with their functions.

Assuming that a suitable aerial has been connected and that either the battery pack or the mains power unit are in situ, the receiver can be brought into use by moving the SUPPLY SWITCH at the left-hand end of the panel to the "ON" position. The VOLUME and TONE controls should be set initially to their midway positions and can be re-adjusted to suit reception conditions once the desired signal has been selected.

To tune to a specific frequency, first determine the appropriate range by reference to the figures printed at the left-hand end of the calibrated scales. Set the WAVECHANGE SWITCH to the range indicated and then move the tuning pointer to the correct setting by means of the TUNING CONTROL. This has a larger knob than the other four controls and requires over fifty revolutions to give a complete traverse of the pointer. The very high tuning ratio makes for ease of tuning especially on the short-wave ranges. Flywheel-loading of the control allows it to be "spun" for rapid tuning.

Dial calibration is in terms of frequency rather than wavelength, a feature which will be found most advantageous when using the short-wave coverage. Published frequencies for stations operating in this range are usually precise whereas the wavelengths quoted are often approximate. All broadcast and amateur bands are underlined on the scales as a further aid to rapid tuning. Broadcast bands are marked in yellow and amateur bands in white.

If the wavelength but not the frequency of a station is known, the approximate frequency can be determined quite easily by making a simple calculation. Dividing the known wavelength into 300 will give the frequency in megacycles. For example, a station on 100 metres would appear on a frequency of 3 Mc/s, one on 50 metres at 6 Mc/s and so on.

On the long and medium wavebands, frequencies are usually given in kilocycles (kc/s) and since 1 Mc/s=1000 kc/s. the figure in Mc/s obtained in the calculation above is simply multiplied by 1000 to convert it to kilocycles. 0·5 Mc/s for example would be 500 kc/s, 1·4 Mc/s is 1400 kc/s etc. Ranges 4 and 5 are calibrated in kilocycles.

A further scale will be found below the frequency scales, this being calibrated in arbitrary divisions 0—500. It is used in conjunction with the small calibrated vernier (located above the tuning knob) to obtain very accurate dial settings for specific stations. The readings on the horizontal and vernier scales are combined to give a one, two, or three figure number which corresponds to the actual frequency setting in use. A list of dial settings can be compiled for those stations which attract greatest personal interest.

The small slide switch at the lower left-hand corner of the panel controls the dial illumination, a facility which will be required only on rare occasions. The switch must be held down to illuminate the scale (two lamps, one at each end), and will automatically return to the "off" position on being released. This simple precaution avoids undue drain on the batteries since the dial light consumption doubles the average current taken from the supply.

LIST OF COMPONENTS

RESISTORS

R1, 20, 39 :	68,000Ω
R2, 10, 37, 42, 43 :	1,000Ω
R3, 19 :	470Ω
R4, 7, 48 :	68Ω
R5, 5a, 7a, 15, 18, 28, 29, 31, 41, 51 :	100Ω
R6, 12, 13 :	22Ω
R8, 16 :	15,000Ω
R9, 21 :	3,300Ω
R11, 49 :	390Ω
R14 :	Reference not allocated
R17, 27, 33, 38, 40 :	4,700Ω
R22, 36 :	10,000Ω
R23 :	1,500Ω
R24 :	270Ω
R25, 50 :	330Ω
R26 :	47,000Ω
R30 :	220Ω
R32 :	8,200Ω
R34 :	2,700Ω
R35 :	6,800Ω
R44, 45 :	33,000Ω
R46 :	10Ω
R47 :	560Ω
R52 :	620Ω
R53, 54 :	2·2Ω
R55 :	39Ω

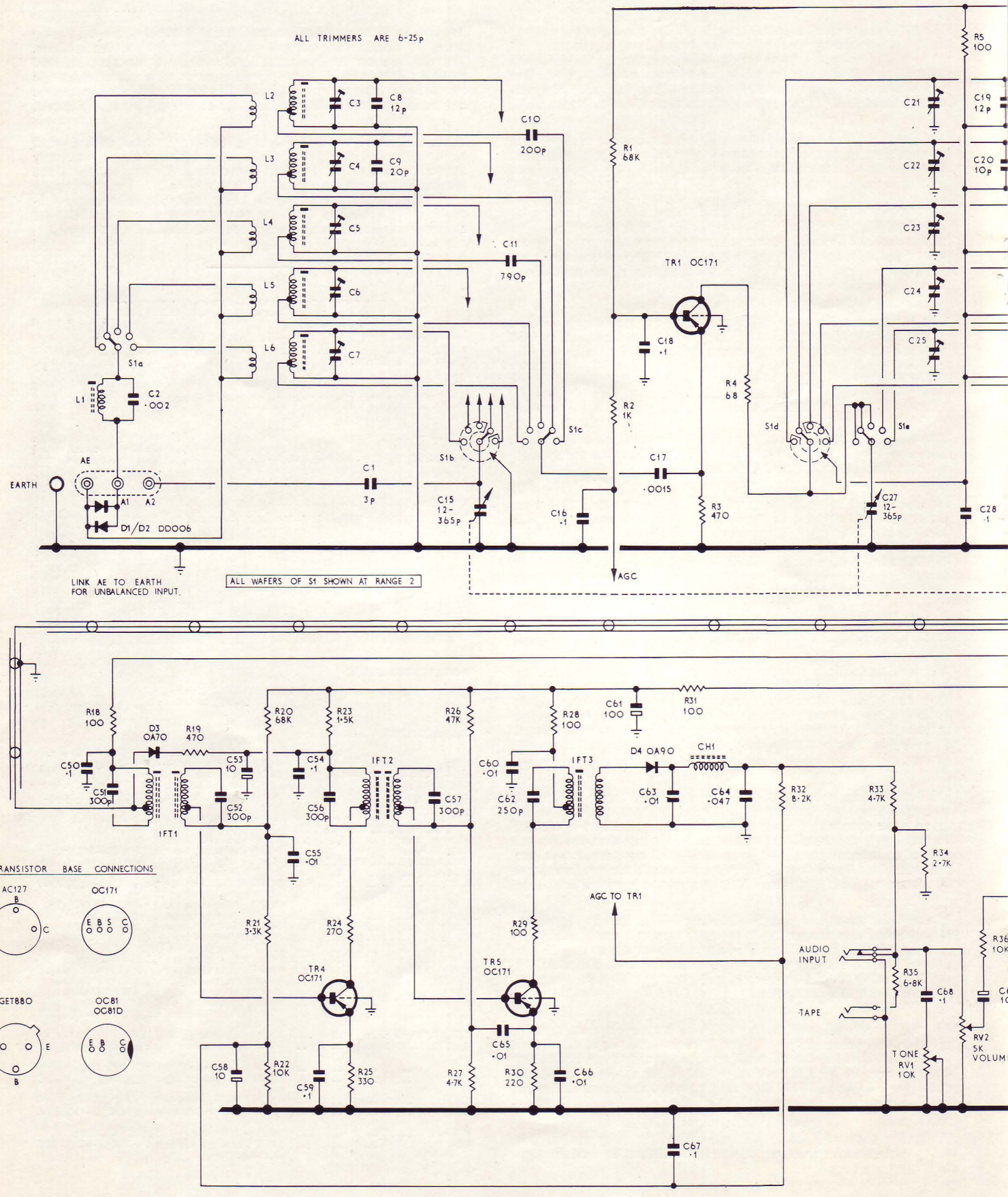
All resistors are 10% ½-watt except R53/54 : 5% 3-watt and R55 : 5% ½-watt

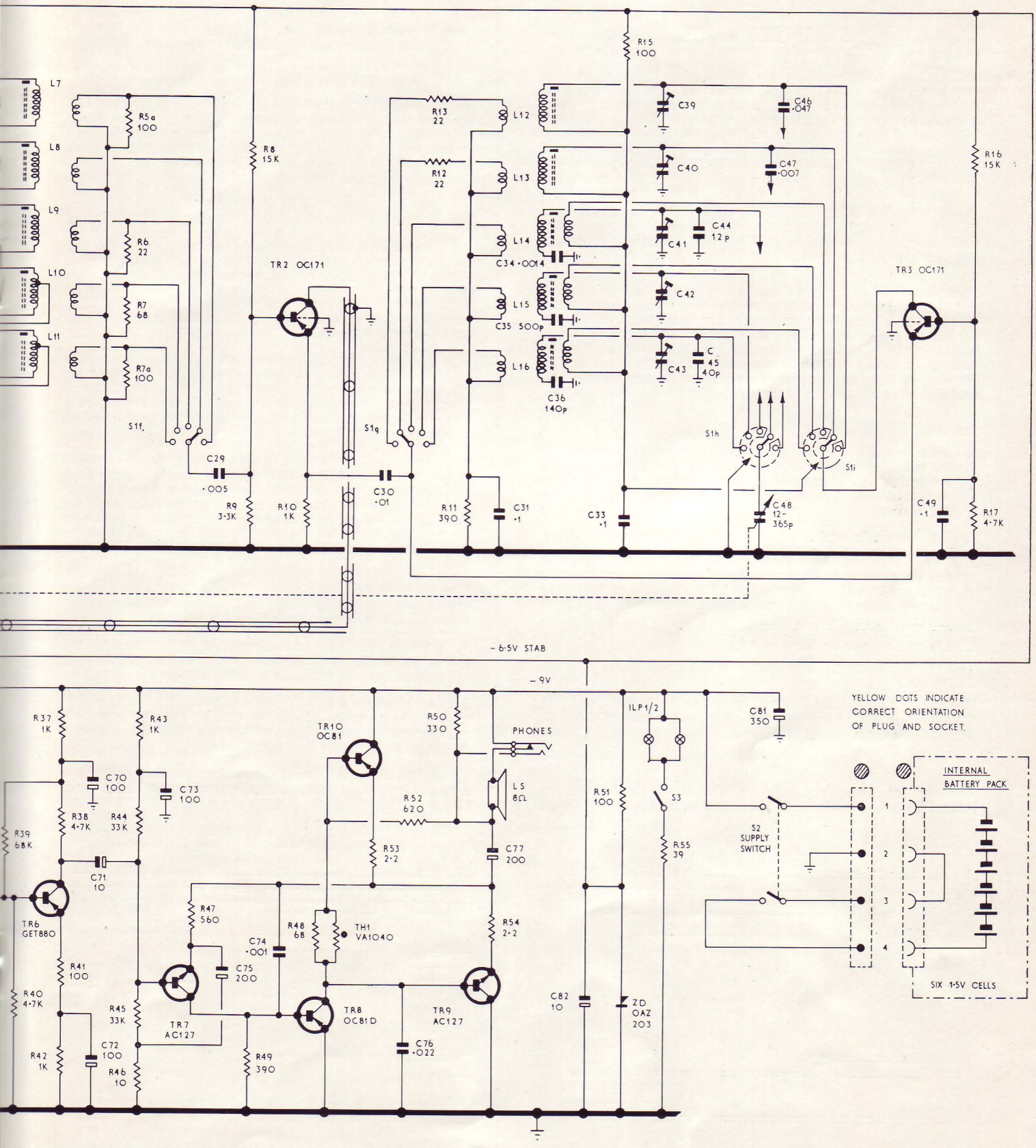
POTENTIOMETERS

RV1 :	10,000Ω carbon
RV2 :	5,000Ω carbon

CAPACITORS

C1 :	3pF Tubular Ceramic ± 0·5pF 750V DC wkg.
C2 :	0·002uF Polystyrene ± 5% DC wkg.
C3—7, C21—25, C39—43 :	6—25pF Ceramic Trimmers.
C8, 19, 44 :	12pF Tubular Ceramic ± 10% 750V DC wkg.
C9 :	20pF Tubular Ceramic ± 10% 750V DC wkg.
C10 :	200pF Polystyrene ± 5% 125V DC wkg.
C11 :	790pF Polystyrene ± 5% 125V DC wkg.
C12, 13, 14, 26, 32, 37, 38, 78, 79, 80 :	References not allocated.
C15, 27, 48 :	3-gang air-spaced variable (3 × 12—365pF).
C16, 18, 28, 31, 33, 49, 50, 54, 59, 67, 68 :	0·1uF Polyester ± 20% 250V DC wkg.
C17 :	0·0015uF Tubular Ceramic +50% —25% 750V DC wkg.
C20 :	10pF Tubular Ceramic ± 10% 750V DC wkg.
C29 :	0·005uF Tubular Ceramic ± 10% 750V DC wkg.
C30 :	0·01uF Metallised Paper ± 20% 200V DC wkg.
C34 :	0·0014uF Polystyrene ± 5% 125V DC wkg.
C35 :	500pF Silvered Mica ± 2% 350V DC wkg.
C36 :	140pF Polystyrene ± 5% 125V DC wkg.
C45 :	40pF Tubular Ceramic ± 10% 750V DC wkg.
C46, 64 :	0·047uF Polyester ± 20% 250V DC wkg.
C47 :	0·007uF Polystyrene ± 5% 125V DC wkg.
C51, 52, 56, 57 :	300pF Polystyrene ± 5% 60V DC wkg.
C53, 58, 69, 71, 82 :	10uF Tubular Electrolytic + 50% —10% 16V DC wkg.
C55, 60, 65, 66 :	0·01uF Polyester ± 20% 250V DC wkg.
C61, 70, 72, 73 :	100uF Tubular Electrolytic + 100% —20% 15V DC wkg.
C62 :	250pF Polystyrene ± 5% 60V DC wkg.
C63 :	0·01uF Metallised Paper ± 20% 150V DC wkg.
C74 :	0·001uF Polystyrene ± 5% 125V DC wkg.
C75, 77 :	200uF Tubular Electrolytic + 100% —20% 6V DC wkg.
C76 :	0·022uF Polyester ± 20% 250V DC wkg.
C81	350uF Tubular Electrolytic + 100% —20% 12V DC wkg.


ALL TRIMMERS ARE 6-25p
L2
L3
L4
L5
L6
C3
C8 12p
C4
C9 20p
C5
C6
C7
C10 200p
C11 790p
S1a
L1
C2 .002
AE
EARTH
A1
A2
D1/D2 DD006
C1 3p
S1b
S1c
C15 12-365p
C16 .1
R1 68K
R2 1K
TR1 OC171
C18 .1
C17 .0015
R3 470
R4 68
S1d
S1e
C27 12-365p
C28 .1
R5 100
C21
C19 12p
C22
C20 10p
C23
C24
C25
AGC
LINK AE TO EARTH FOR UNBALANCED INPUT.
ALL WAFERS OF S1 SHOWN AT RANGE 2
R18 100
D3 OA70
R19 470
C50 .1
C51 300pf
C53 10
C52 300p
IFT1
R20 68K
R23 1·5K
C54 .1
C56 300p
IFT2
C57 300p
C55 .01
R21 3·3K
R24 270
TR4 OC171
C58 10
R22 10K
C59 .1
R25 330
R26 47K
R28 100
C60 .01
C62 250p
IFT3
C61 100
R31 100
D4 OA90
CH1
C63 .01
C64 .047
R32 8·2K
R33 4·7K
R34 2·7K
AGC TO TR1
R29 100
TR5 OC171
C65 .01
R27 4·7K
R30 220
C66 .01
C67 .1
TRANSISTOR BASE CONNECTIONS
AC127
OC171
GET880
OC81
OC81D
AUDIO INPUT
TAPE
R35 6·8K
C68 .1
TONE RV1 10K
RV2 5K VOLUM
R36 10K


L7
L8
L9
L10
L11
R5a 100
R6 22
R7 68
R7a 100
R8 15K
TR2 OC171
S1f
S1g
C29 ·005
R9 3·3K
R10 1K
C30 ·01
R13 22
R12 22
L12
L13
L14
L15
L16
C34 ·0014
C35 500p
C36 140p
R15 100
C39
C40
C41
C42
C43
C44 12p
C45 40p
C46 ·047
C47 ·007
S1h
S1i
C48 12-365p
R11 390
C31 ·1
C33 ·1
TR3 OC171
R16 15K
C49 ·1
R17 4·7K
- 6·5V STAB
- 9V
R37 1K
R43 1K
C70 100
C73 100
R38 4·7K
R44 33K
R39 68K
C71 10
TR6 GET880
R41 100
R40 4·7K
R45 33K
R42 1K
C72 100
R46 10
R47 560
C74 ·001
R48 68
TH1 VA1040
C75 200
TR7 AC127
TR8 OC81D
R49 390
TR9 AC127
C76 ·022
TR10 OC81
R50 330
PHONES
LS 8Ω
R52 620
R53 2·2
C77 200
R54 2·2
ILP1/2
S3
R55 39
R51 100
C82 10
ZD OAZ 203
C81 350
S2 SUPPLY SWITCH
INTERNAL BATTERY PACK
SIX 1·5V CELLS
YELLOW DOTS INDICATE CORRECT ORIENTATION OF PLUG AND SOCKET.

MODEL EB36.

MAINTENANCE

General

The EB36 receiver should require very little in the way of routine maintenance apart from replacement of the batteries from time to time. If a fault should develop, check first that it is not an obvious one such as poor contact in the battery connector due to this not being pushed fully into the socket. Other simple faults which may occur are broken or shorting aerial connections and, in the case of a receiver operating from the mains with a Power Unit Type 924—a blown fuse.

If the fault cannot be traced, take the receiver to the nearest EDDYSTONE Agent who will rectify the trouble at reasonable cost. A list of Agents can be obtained from the Sales and Service Dept., at our usual address.

If there is no Agent in your district the set can be taken to any reputable dealer but you are then advised to take this sheet with the set because the engineer concerned may not be familiar with Eddystone equipment. The sheet contains information which will assist him in locating the fault and will help to ensure that the receiver is serviced in the shortest possible time. Receivers can be returned to the manufacturer but prior arrangements should be made by writing first to the Sales and Service Dept.

Removing the Cabinet.

1. Remove the battery container (or power unit) by unscrewing the two knurled retaining screws and disengaging the internal connector. In the case of a mains operated receiver, make sure that the supply is disconnected before taking out the power unit.
2. Remove the four cabinet retaining screws located at the rear.
3. Free the cabinet from the panel by applying pressure with the fingers between the inner edge of the cabinet and the ends of the strip which supports the IF printed board (near top edge of cabinet). If stiff, use screwdriver as lever in slots at lower front edge of cabinet.
4. Slide cabinet away from panel.

Dial lamps.

Faulty dial bulbs can be changed by prising the holders free from the rubber mounting grommets at the extreme ends of the dial. Replacement bulbs should be of the L.E.S. type rated at 6V, 50mA

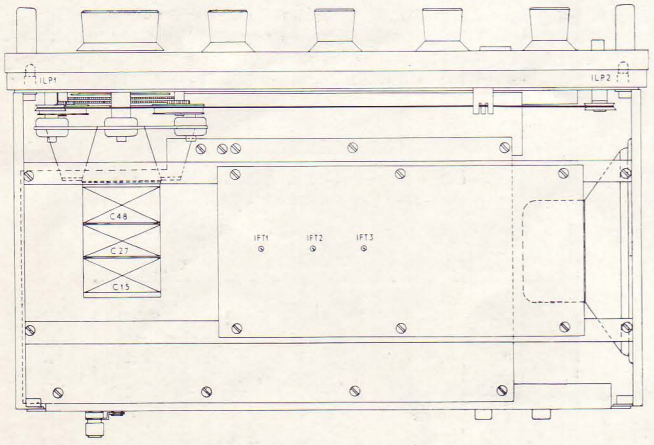
Fuses.

These are fitted only for mains operation of the receiver and are located inside the power unit. The mains input is fused at 100mA and the 9V output feeding the receiver at 500mA. Standard $1\frac{1}{4}'' \times \frac{1}{4}''$ cartridge fuses are required as replacements.

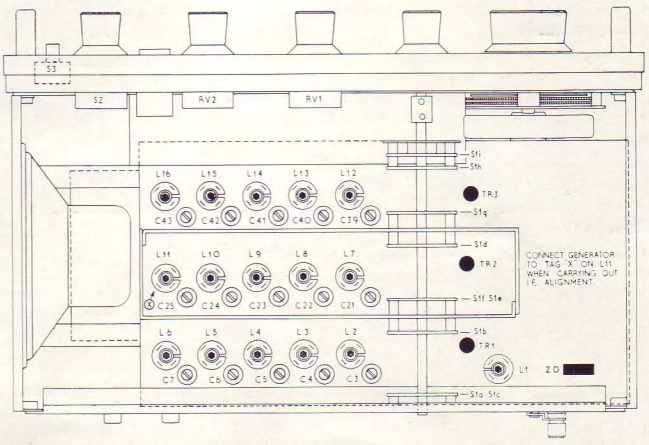
Re-stringing the pointer drive cord.

It is most unlikely that trouble would be experienced with the high quality cord used on the EB36 receiver. If a breakage should occur however, a length of suitable cord can be obtained from the manufacturer. No difficulty should be encountered in fitting the replacement if the instructions given below are followed carefully step by step. Right-hand and left-hand are as viewed from the rear of the set.

1. Remove the existing cord and set the tuning gang to full mesh.
2. Tie a double knot in one end of the replacement cord and feed the cord through the hole provided in the left-hand drive pulley with the knot on the inside of the rim.
3. Wind approximately one and a half turns anti-clockwise round the drive pulley and then pass the cord under and over the left-hand guide pulley.
4. Pass the cord across the dial from left to right and then, while holding the free end of the cord in tension, rotate the tuning control to fully unmesh the tuning gang. This operation will wind just over three complete turns of cord onto the left-hand drive pulley and tension must now be maintained to prevent the cord from slipping out of the pulley groove.
5. Pass the cord clockwise round the jockey pulley (right-hand side of receiver) and then back across to the right-hand drive pulley. Feed the cord into the pulley groove and then through the hole in the rim. Increase tension on the cord until the outer rim of the jockey pulley takes up a position level with the nearest edge of the panel handle retaining screw. Mark the cord with a pencil at the point where the retaining knot must be tied.
6. Free the cord from the jockey pulley and, while maintaining tension, draw the cord through the hole in the right-hand drive pulley until it tightens on the left-hand guide pulley.
7. Tie a double knot in the position marked in (5) above and then cut off the surplus cord. Feed the cord back through the hole and replace in position round the jockey pulley.
8. Set the tuning gang to full mesh and slide the pointer to "0" on the logging scale. Attach the cord to the pointer in this position making sure that the cord passes under the two outer prongs at the rear of the pointer carrier
9. Check the drive for free and normal operation. Verify scale accuracy by tuning to one of the frequency standard stations (2·5, 5, 10, 15, 20 Mc/s).



Plan view of Model EB36 Receiver



Underside view of Model EB36 Receiver

RE-ALIGNMENT

Initial factory alignment of the receiver should hold for a long period and further adjustment should not be attempted unless there is a clear indication that this course of action is in fact essential. An adequate range of test equipment is required for accurate re-alignment (see below) and the task should be performed only by individuals having a skilled knowledge of the procedures involved.

Sensitivity figures quoted in the instructions which follow are based on the assumption that the battery pack is delivering a supply voltage of 9V. All dust cores and trimmers are self-locking.

The following items of test equipment are required for re-aligning the EB36 receiver:—

Signal generator(s) covering the intermediate frequency of 465 kc/s and the signal frequency ranges 150—350 kc/s and 550 kc/s—30 Mc/s. Output impedance 50/75Ω, modulation 30% at 400 c/s.

Modulated crystal-controlled harmonic-generator providing 100 kc/s markers up to 7·5 Mc/s and 1 Mc/s markers up to 22 Mc/s

Output meter matched to 8Ω with plug to mate with telephone socket on panel.

Trimming tools:— Miniature insulated screwdriver with $\frac{1}{16}$" blade, small metal-tipped insulated screwdriver and a Neosid Type H.S.1. hexagonal core adjuster

Re-alignment of the IF Stages

First locate and remove the four screws holding the two angle strips on which the IF printed wiring board is mounted. Rotate the board through 90° and temporarily secure in this position using two of the screws just removed. Access to both ends of the IF Transformers is now possible and the receiver can be placed on its left-hand side-plate to permit connection of the generator output lead to the Range 5 Mixer coil L11 (see underside view of receiver). Generator output impedance should be arranged to match 50Ω, the earthy lead being clipped to the screen adjacent to the coil.

Short out the forward section of the tuning gang (C48) to disable the Local Oscillator and connect the output meter to the telephone socket on the panel. The speaker circuit is interrupted by insertion of the plug and the meter will therefore indicate true output power. Switch on the generator, allow it adequate time to stabilise against drift and set the receiver controls as follows:—

Range Switch ..	Range 5.	Volume ..	Maximum.
Tuning	350 kc/s.	Tone	Fully c/wise.

Tune the signal generator to 465 kc/s (with modulation 30% at 400 c/s) and then set the attenuator to give a reading of approximately 50mW on the output meter. Peak the cores in IFT1, IFT2 and IFT3 for maximum output remembering that the first two transformers are double-tuned and the final transformer has a single core only. All cores should be set to the "outer" peak, each adjustment being repeated several times to ensure accurate alignment.

On completion of the adjustments detailed above, re-set the attenuator for an output reading of 50mW and check that the overall IF sensitivity is of the order 4uV. If the gain appears to be on the low side, commence investigation by taking sensitivity readings from the bases of TR4 and TR5. The live generator lead must be blocked with a capacitor of some 0·05uF while making this check which should reveal sensitivities of the order 35 uV and 1mV respectively for an output of 50mW.

A low reading from the base of TR5 almost certainly indicates a fault in the audio section of the receiver. The appropriate stages can be tested by introducing a 1000 c/s signal via the Audio Input socket at the rear. An input of approximately 5mV should produce 50mW output.

Once the IF alignment has been completed, disconnect the generator(s) and output meter, remove the shorting link from C48 and re-fit the IF board in its normal position.

RF Alignment.

The first step in this part of the alignment procedure is a check on the overall calibration accuracy. Proceed as follows:—

Connect the output of the harmonic generator to the "A1" and "AE" sockets with the shorting link in place between the "AE" socket and the EARTH terminal. Set the generator to provide modulated 1 Mc/s markers and then tune across the whole of Range 1, checking the scale accuracy at each megacycle point. Accuracy should be within 1% (i.e. 200 kc/s at 20 Mc/s, 100 kc/s at 10 Mc/s, 20 kc/s at 2 Mc/s etc.). Re-alignment of the Local Oscillator circuits should be considered necessary only if the error observed is greater than this.

Repeat the check on Range 2 and then select Range 3 .The 100 kc/s markers can be introduced on this range to permit checking at 500 kc/s intervals. On Ranges 4 and 5, check each 100 kc/s point.

Errors in excess of 1% on any range should be rectified by carrying out normal tracking procedure, taking care to repeat all adjustments several times to nullify interaction between the appropriate trimmer and core. Alignment frequencies and adjustments are given in Table 1.

Table 1

OSCILLATOR ALIGNMENT FREQUENCIES AND ADJUSTMENTS

Range	Freq.	Trimmer	Freq.	Core
1	20·0 Mc/s	C39	8·0 Mc/s	L12
2	8·0 Mc/s	C40	3·6 Mc/s	L13
3	3·5 Mc/s	C41	1·5 Mc/s	L14
4	1400 kc/s	C42	550 kc/s	L15
5	330 kc/s	C43	160 kc/s	L16

On completion of any re-alignment of the Local Oscillator circuits, disconnect the harmonic generator and connect the signal generator in its place prior to commencing re-alignment of the RF (Aerial) and Mixer circuits. The generator output impedance should be arranged to match 75Ω when aligning Ranges 1—3 and 400Ω for Ranges 4 and 5. Modulation should be set to 30% at 400 c/s and the output meter should be connected to the telephone socket as during IF alignment.

Adjustments are made at the same frequencies employed for oscillator alignment but using the trimmers and cores listed in Table 2. As with oscillator alignment, each adjustment should be repeated several times to cancel the inevitable interaction between trimmer and core. The aerial input circuits should be adjusted for best signal/noise ratio.

Table 2.

RF/MIXER ALIGNMENT FREQUENCIES AND ADJUSTMENTS

Range	Trimmer			Core		
	Freq.	Aerial	Mixer	Freq.	Aerial	Mixer
1	20·0 Mc/s	C3	C21	8·6 Mc/s	L2	L7
2	8·0 Mc/s	C4	C22	3·6 Mc/s	L3	L8
3	3·5 Mc/s	C5	C23	1·5 Mc/s	L4	L9
4	1400 kc/s	C6	C24	550 kc/s	L5	L10
5	330 kc/s	C7	C25	160 kc/s	L6	L11

The IF rejector coil L1 should be adjusted when aligning Range 4, the procedure being as follows:—

Tune the receiver to 550 kc/s (low frequency alignment point) and the generator to the intermediate frequency of 465 kc/s. Increase output from the generator until an indication is obtained on the output meter. Adjust the rejector coil for *minimum* signal. Re-tune the generator to 550 kc/s, reduce its output and check the adjustment of L5 for *maximum* signal. Repeat both checks to ensure accurate alignment of the two circuits.

Finally, carry out a check on the overall sensitivity at the mid-band frequency on each range. With the generator properly matched sensitivities of the order 5uV or better should be realised on the three higher frequency ranges. On Ranges 4 and 5 the sensitivity is a little lower being in the region of 15uV or better. All sensitivities are quoted for a signal/noise ratio of 15dB and an output of 50mW in 8Ω.

VOLTAGE ANALYSIS

Typical voltage readings for each stage are given in the Table which follows. All readings were taken under no-signal conditions on Range 5 using a testmeter with a sensitivity of 20,000Ω/V. All readings are negative w.r.t. earth and a tolerance of 20% should be allowed.

Reference	Collector	Base	Emitter
TR1	6·1V	0·95V	0·65V
TR2	6·3V	1·25V	1·3V
TR3	6·1V	1·5V	1·5V
TR4	5·0V	1.15V	0·95V
TR5	8·0V	0·7V	0·45V
TR6	6·4V	0·5V	0·45V
TR7	0·16V	4·2V	4·6V
TR8	4·7V	0·16V	—
TR9	—	4·8V	4·9V
TR10	9·0V	5·0V	4·9V

SPARES

The following list details all major spares for the EB36 receiver. The Serial No. of the receiver must be quoted in all correspondence and enquiries should be directed to the "Sales and Service Dept".

Inductors, Transformers etc.

L1	465 kc/s IF Rejector coil	D3204
L2	Range 1 RF (Aerial) coil	D3517
L3	Range 2 RF (Aerial) coil	D3191
L4	Range 3 RF (Aerial) coil	D3192
L5	Range 4 RF (Aerial) coil	D3193
L6	Range 5 RF (Aerial) coil	D3518
L7	Range 1 Mixer coil	D3519
L8	Range 2 Mixer coil	D3196
L9	Range 3 Mixer coil	D3197/1
L10	Range 4 Mixer coil	D3198
L11	Range 5 Mixer coil	D3520
L12	Range 1 Oscillator coil	D3521
L13	Range 2 Oscillator coil	D3201
L14	Range 3 Oscillator coil	D3202
L15	Range 4 Oscillator coil	D3203
L16	Range 5 Oscillator coil	D3522
IFT1	1st 465 kc/s IF transformer	6653P
IFT2	2nd 465 kc/s IF transformer	6654P
IFT3	3rd 465 kc/s IF transformer	6655P
CH1	Detector filter choke	D2414/1

Semiconductors.

TR1	RF Amplifier	Mullard OC171
TR2	Mixer	Mullard OC171
TR3	Local Oscillator	Mullard OC171
TR4	1st IF Amplifier	Mullard OC171
TR5	2nd IF Amplifier	Mullard OC171
TR6	1st AF Amplifier	Mullard GET 880
TR7	2nd AF Amplifier	Mullard AC127
TR8	AF Driver	Mullard OC81D
TR9	Complementary	Mullard AC127
TR10	AF Output	Mullard OC81
D1/D2	Overload Protector	Lucas DD006's
D3	AGC Attenuator	Mullard OA70
D4	Detector/AGC	Mullard OA90
D5 (ZD)	Zener Stabiliser	Mullard OAZ203

Miscellaneous.

Range Switch:	Clicker mechanism	5625P
	Wafers Sla/c, Sle/f Slg	5393P
	Wafers Slb, Sld, Slh, Sli	5404P
Supply Switch (S2)		6916P
Dial Light Switch (S3)		6918P
Volume Control (RV2)		6860P
Tone Control (RV1)		6860/1P
Dial Bulbs (L.E.S., 50mA, 6·7mm.)		6659P
Dial Bulb Holder		6600P
Phone Jack		6660P
Loudspeaker (8Ω, 5-inch round)		7156P
Drive Assembly		LP2864
Pointer Assembly		D3215
Dial Glass (Calibrated)		D3662
Knobs:	Tuning	D3613/2
	Wavechange	D3663
	Vol., Tone, Supply	D3617
Tape Socket		6941P
AF Input socket		6942P
Tape Plug (white)		6943P
AF Input plug (black)		6943/1P
3-gang Tuning Capacitor		6528P
Flexible coupler		D2017
Shorting Plug (AE)		D3210
Earth Terminal		6371P
Aerial Socket Strip		D3209

Manufacturers :

EDDYSTONE RADIO LIMITED

ALVECHURCH ROAD, BIRMINGHAM 31

Telephone : PRIORY 2231 Cables : EDDYSTONE, BIRMINGHAM

Telex : 33708

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AMENDMENT SHEET NO. 1

Circuit Revision.

Change TR8 and TR10 to read:- "Mullard AC128."

Delete existing base diagram for OC81 and OC81D.

AC128 basing is as AC127.

Issued by:- EDDYSTONE RADIO LIMITED, ALVECHURCH ROAD, BIRMINGHAM 31, ENGLAND.