EDDYSTONE MODEL EB36A

TRANSISTORISED COMMUNICATION RECEIVER

The EDDYSTONE Model EB36A is a compact light-weight communication receiver expressly designed for professional monitoring purposes, primarily in world-wide news collection agencies. Frequency ranges have been chosen to provide adequate coverage of the major bands employed in this type of service.

Nine transistors and five diodes are employed in the total solid-state single conversion circuit which features a very narrow i.f. bandwidth to minimise interference problems. Overall selectivity is determined by a piezoelectric ceramic filter which is permanently connected in the i.f. chain. Audio outputs are at low level and are intended for use with telephones or line circuits of 600Ω impedance.

The receiver can be operated from any standard a.c. mains supply using internally fitted power unit Type P.U. 924. Alternatively, operation from external 12/24V DC supplies or from a self-contained 9V battery-pack can be arranged to suit operational requirements. Zener regulation is provided in all modes of operation.

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AMENDMENT RECORD

Amend. No.	Incorporated by	Date
1		
2		
3		
4		
5		

Sole Manufacturer:-

EDDYSTONE RADIO LIMITED,
ALVECHURCH ROAD, BIRMINGHAM 31, ENGLAND

Telephone : 021-475-2231 Telex 33708

Cables : Eddystone Birmingham.

TECHNICAL DATA

GENERAL

Frequency Coverage.

Range 1 :: 15.0 - 22.0 MHz.
Range 2 :: 8.5 - 15.0 MHz.
Range 3 :: 3.5 - 8.5 MHz.
Range 4 :: 550 - 1500 kHz.
Range 5 :: 150 - 350 kHz.

Intermediate Frequency. 455kHz.

Aerial Input Impedance. Ranges 1 - 3 :: 75 ohms. Ranges 4/5 :: 400 ohms.

Audio Output Impedance.

Telephones :: to suit impedances up to 600Ω.
Lines :: 600Ω balanced or unbalanced.
:: 150Ω unbalanced.

Power Supply. 100/125V or 200/250V AC (50 Hz) using internal power unit (P.U. Type 924). External DC supplies of 12V or 24V using internal Voltage Converter (Type 945). 9V dry battery pack mounted internally for portable use.

TYPICAL PERFORMANCE

Sensitivity.

Ranges 1 - 3 :: 7μV for 15dB s/n ratio.
Ranges 4 / 5 :: 20μV for 15 dB s/n ratio. (30% at 400Hz.
(Taken for output of 1mW in 600Ω with signal modulated

Selectivity. Filter provides fixed 6dB bandwidth of 3.5kHz. Bandwidth at -60dB is 7.0kHz.

Image Rejection. 50dB down at 1.5MHz. 15dB down at 18MHz.

AGC Characteristic. Audio output level does not change by more than 15dB when input level is increased by 80dB from 6μV (Range 4).

Audio Output. 10mW for telephones. Line level adjusted to suit normal line transmission standards.

Audio Response.

Tone Max. Level within 3dB over range 180Hz - 13.4kHz.
Tone Min. Level within 3dB over range 130Hz - 2kHz.

DIMENSIONS AND WEIGHT

Height. $6\frac{3}{4}$" (16.2 cm).
Width. $12\frac{1}{2}$" (31.7 cm).
Depth. 8" (20.3 cm).
Weight. $13\frac{1}{4}$ lb. (6.0 kg).

CIRCUIT DESCRIPTION

The EB36A is assembled on two separate printed wiring boards, one of which carries the entire RF circuitry. This portion of the receiver comprises TR1, TR2 and TR3 (3 x OC171) in a conventional RF, Mixer and separate Local Oscillator combo. The other board carries the IF and audio circuits (TR4-TR9).

The RF Board.

TR1 is a grounded-base amplifier with signal input applied to the emitter from a tap on the appropriate tuned input circuit. Low impedance coupling windings are provided for connection to the external aerial, the input stage being protected by the diodes D1/D2 (2 x DD006) against high transient voltages induced in the aerial proper. AGC is applied to TR1 base via R2.

Signal transfer to the following Mixer Stage (TR2) is effected by the tuned collector circuits (L7-L11) which have low impedance secondaries to feed the base electrode. Resistors R7 and R7a damp these windings on the two low frequency ranges, and so preserve stability with the higher circuit impedances encountered at these frequencies. Oscillator injection is to the emitter of the Mixer and IF output is taken to the second printed board through a screened coaxial lead from the collector.

The Local Oscillator (TR3) employs a tuned collector circuit and tracks above the signal frequency on all ranges. R12, R12a, and R13 hold the oscillator drive at a sensibly constant level on the higher frequency ranges.

All three stages in the RF Section are operated from a regulated supply derived from the zener diode ZD (OAZ203). This gives a nominal 6.5V and reinforces the regulation afforded by the 9V zener diode found in the built-in power supply unit.

Individual trimmer and core adjustments are provided for each of the fifteen tuned circuits which go to make up the RF coil pack. A further circuit, (L1/C2) is included to serve as a trap for input signals close to the intermediate frequency of 455kHz. This circuit has an adjustable core but no trimmer. All unselected coils are short-circuited to prevent absorption effects, oscillator suck-out etc.

The IF/AF Board.

Two stages of IF amplification are employed (TR4 & TR5 : 2 x OC171), selectivity being determined by a piezo-electric ceramic filter which serves as the coupling element between the first and second stage. Overall bandwidth is 3.5kHz at -6dB and the 6/60dB shape factor of the order 2:1. A double-tuned transformer is used to couple the Mixer Stage to the 1st IF Amplifier which operates with AGC. Additional control is afforded by the diode D3 (OA70) when taking extremely strong signals. D3 is reverse-biased at low signal levels but conducts to damp IFTI as the carrier strength increases to the point where overloading of the Detector would occur.

Coupling to the Detector is by a single-tuned transformer IFT2, the diode D4 (OA90) being housed within the screening can. This stage also provides the AGC voltage to control TR1 and TR4. Filtering of the AGC line is by R32/C67.

Audio developed across the AF Gain is applied to TR6 (AC127) which feeds the Audio Driver Stage TR7 (AC128). The Output Stage TR9/10 (AC127/AC128) employs a PNP/NPN complementary circuit with a matching transformer to transform the effective output impedance from some 10Ω to 600Ω for connection to the external circuit. Two paralleled outputs are available, one at the rear, the other on the panel. The latter is for use with low impedance telephones for local monitoring and the other for direct connection to low-level line circuits. Provision is made for balanced or unbalanced operation.

INSTALLATION

Power Supplies.

Unless otherwise specified, the Receiver Type EB36A will be delivered complete with a self-contained power unit which is suitable for operation from all standard AC mains supplies. Alternative interchangeable units are available and can be fitted to allow the receiver to be operated from self-contained batteries or external supplies of 12V or 24V DC. The receiver is therefore suitable for use in any location provided an appropriate supply unit is to hand.

All three units have the same basic dimensions and are fitted through an aperture in the rear of the receiver cabinet. Two captive screws serve to secure the unit when fitted in position. Interconnecting leads between the main receiver and supply unit are completed by a small 4 - way connector which facilitates rapid removal and replacement, as for example when changing from mains to battery operation.

AC Power Unit Type 924.

When installing a receiver equipped with P.U. 924, it is important to check whether the mains transformer input tap is adjusted to suit the local mains supply voltage. Two tapping positions are provided, one marked "240V" for 200/250V supplies, and the other marked "110V" for voltages in the range 100/125V.

NB When despatched from the factory, the voltage tap is set to 240V position.

To gain access to the tap adjustment, first remove the power unit from the receiver cabinet and disengage the 4-way connector. Locate and remove the two 4BA nuts at the ends of the unit so that the cover plate can be taken off. In doing this, feed the mains lead through the grommet to provide the required amount of slack.

The adjustment panel is clearly marked and changeover from one voltage range to the other merely requires that the black lead be connected to the appropriate side of the connector. Make sure that the lead is pushed properly into the appropriate hole and that the screw is tightened securely.

A circuit diagram of the P.U. 924 appears at the rear of this Manual. Further technical data is as follows:-

Output Voltage	9V DC at up to 200mA with zener diode regulation.
Fusing	500mA fuse in -9V line.
	100mA fuse in live AC line.

The external mains connecting lead is left unterminated so that the user can fit a connector suited to the local electrical fittings. Coding of the supply lead is as follows:- RED :: LIVE, BLACK :: NEUTRAL, GREEN :: EARTH.

WARNING DISCONNECT FROM SUPPLY BEFORE REMOVING P.U. 924 FROM MAIN RECEIVER UNIT.

Voltage Converter Type 945.

This unit can be used to operate the EB36A from external high-capacity batteries when a period of prolonged operation without an AC supply is envisaged. Either 12V or 24V supplies can be accommodated, changeover being effected by a toggle switch located within the unit. The unit is fully fused, provides a zener regulated output of 9V and features reverse-polarity protection to prevent damage to the receiver should the supply be inadvertently connected the wrong way round.

A circuit diagram of the Voltage Converter Type 945 appears at the rear of this Manual. Reference should be made to this for details of fusing etc. Filtering is included to suppress local noise transferred to the receiver circuits from the supply source. A miniature polarised connector is provided for connection of the external supply, the lead being coded RED :: Positive, BLACK :: Negative.

NB Check voltage switch at correct setting before operating receiver.

Battery Box Type 938.

This unit allows the EB36A to be used as a totally self-contained portable receiver, requiring only connection to an external aerial for it to become fully operational. Six standard 1.5V dry cells (leakproof) are fitted to provide the 9V supply required. Consumption is relatively small, frequent battery replacement being unnecessary with intermittent operation.

The inner cover of the Battery Box is removed to allow the batteries to be fitted into place. Take care to ensure that the batteries are installed in accordance with the diagrams printed inside the battery troughs. Inserting the batteries with wrong polarity could result in damage to the transistors.

Aerial Input.

One SOCKET COAXIAL NO. 1 is supplied with the receiver to mate with the fixed PLUG COAXIAL NO. 1C fitted at the rear. Aerial input impedance is 75Ω on Ranges 1-3 and 400Ω on Ranges 4 and 5.

Earth Terminal.

Some reduction in electrical interference can be achieved by connecting a more direct and efficient earth than that provided at the mains supply point. This is especially true at the lower frequencies in the tuning range and may also be effective when using the Voltage Converter Type 945.

Audio Output.

A miniature 4-way Elcom connector is supplied for connection to the fixed socket at the rear of the receiver. Terminations should be made as follows:-

BALANCED 600Ω WITH EARTHED CENTRE-TAP

Take output from pins 1 & 2.
Fit link between pins 3 & 4.

BALANCED 600Ω WITH FLOATING CENTRE-TAP

Take output from pins 1 & 2.
Remove link between pins 3 & 4.

UNBALANCED 600Ω WITH ONE LEG EARTHED

Take output from pins 1 & 2.
Fit link between pins 2 and 4.

Screening braid on external cables can be earthed to pin 4 of the free plug used for connection to the receiver. This pin is earthed internally.

Telephones.

Any standard low-impedance headset can be connected to the socket on the panel. A 3-point jack plug is employed for this purpose. Output is across tip and ring; the sleeve is earthed.

OPERATION

The EB36A will be found easy to operate. Controls have been kept to a minimum in the interest of simplicity and the user will rapidly become familiar with their functions.

Assuming that the receiver has been installed as detailed in the previous Section, it can be brought into use by moving the SUPPLY SWITCH at the left-hand end of the panel to the "ON" position. The AF GAIN 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 specified frequency, first determine the appropriate range by reference to the figures printed at the left-hand end of the calibrated scales. Set the RANGE SWITCH to the appropriate position 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.

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. Readings can be recorded for future reference.

The small slide switch at the lower left-hand corner of the panel, controls the dial illumination, a facility which will only be required 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 when released. This simple precaution prevents undue drain on the supply when operating from internal dry batteries. The saving will be appreciated when it is noted that the dial lamp consumption exceeds that taken by the whole receiver circuit.

MAINTENANCE

GENERAL

The EB36A receiver should require very little in the way of routine maintenance, except for regular inspection of the batteries when this form of supply is employed. The tuning drive and other mechanical arrangements will need no attention, for these have been treated with a permanent lubricant (molybdenum disulphide). External connections should be checked from time to time to ensure complete serviceability.

Servicing facilities are available for all Eddystone receivers; the usual arrangement being for one of our Agents to return the item direct to the factory. A list of Agents is available on request. In the absence of any local Agent, receivers can be sent direct, but only after prior arrangements have been made with our Works. The Serial No. of the receiver should be stated in all communications.

Spares are available for user-servicing, a list of the major items appearing in Appendix "C" at the rear of this Manual. Advice will be given quite freely where it is inconvenient to return the set to the factory.

The following paragraphs cover minor aspects of servicing together with full information on re-alignment.

SERVICING

Removing the cabinet.

It is most important that no attempt should be made to remove the receiver cabinet without first taking out the power supply unit fitted at the rear. Proceed as follows.

1. Disconnect from supply.
2. Remove P.U. 924 (or 945 or 938 as appropriate) by unscrewing the two knurled retaining screws and disengaging the miniature 4-way connector.
3. Take out the four retaining screws at the rear of the cabinet.
4. Free the cabinet from the panel by applying pressure with the fingers between the rear inner edge of the cabinet and the ends of the strip which supports the IF printed board near the top of the cabinet. If stiff, use large screwdriver as lever in slots at lower front edge of cabinet.
5. Slide cabinet away from panel.

Dial Bulbs.

Faulty bulbs can be removed for replacement by levering the holders free from the rubber mounting grommets at the extreme ends of the dial. Spare bulbs should be of the L.E.S. type with a rating of 6V @ 50mA.

Fuses.

The fuse complement is dependent on the type of supply unit installed with the receiver. Ratings are as follows, all fuses being standard cartridge types with o/s dimensions 1.25" X 0.25".

BATTERY BOX 938	. .	No fuses fitted.
AC POWER UNIT 924	. .	1 @ 100mA (Input), 1 @ 500mA (Output).
VOLTAGE CONVERTER 945	. .	2 @ 1 Amp.

Re-stringing the pointer drive cord.

It is most unlikely that trouble would be experienced with the high quality cord used on the EB36A receiver. If a breakage should occur however, a length of suitable cord can be obtained from the manufacturer. No difficulty should be experienced in fitting the replacement provided 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 (5, 10 or 15MHz). Re-set pointer if this is necessary.

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 receiver is operating with the correct supply voltage. All dust cores and trimmers are self-locking.

The following test equipment is required for aligning the EB36A receiver:-

Signal generator(s) covering the intermediate frequency of 455kHz and the signal frequency ranges 150-350kHz, 550-1500kHz and 3.5-22MHz. Output impedance 50/75Ω, modulation 30% at 400Hz.

Modulated crystal-controlled harmonic generator providing 100kHz markers up to 7.5MHz and 1MHz markers to 22MHz.

Output meter matched to 600Ω with plug to mate with telephone socket on panel.

Trimming Tools: Miniature insulated screwdriver. Neosid H.S.1. hex 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 1st IF Transformer 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. If aural monitoring is required during alignment, connect the output meter instead to the 4-way socket at the rear (pins 1 and 2), so leaving the panel socket free for connection of a pair of headphones. Switch on the generator, allow it adequate time to stabilise against drift and set the receiver controls as follows:-

Range Switch . .	Range 5	AF Gain . .	Maximum
Tuning . .	350kHz	Tone . .	Fully clockwise.

Tune the signal generator to 455kHz (modulation 30% at 400Hz) and then set the attenuator to give a reading of approximately 1 mW on the output meter. Re-tune the generator very slowly across the IF passband to accurately determine the centre-frequency. Leave the generator set to this channel and then tune the cores in the two IF transformers for maximum output reading. The first transformer has two cores, both of which should be set to the outer peak. Only one core is fitted in the second transformer, this being set to the upper peak (i.e. the one occurring nearest the top of the screening can). Re-adjust the cores as necessary to achieve maximum output reading.

On completion of these adjustments, re-set the attenuator for a precise output reading of 1 mW and check that the overall IF sensitivity is of the order 2.5μV. If 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 0.05μF while making this check which should reveal sensitivities of the order 25 μV and 1.4mV respectively for an output of 10mW.

If sensitivity is low from the base of TR5, this almost certainly indicates a fault in the audio section of the receiver. The appropriate stages can be checked by introducing a 1kHz signal at the AF GAIN. An input of approximately 5 mV should produce an output of 1 mW.

Remember to remove the shorting strap from across the oscillator section of the gang when IF alignment has been completed. Also, re-fit the IF printed wiring 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 harmonic generator output lead to the aerial input socket. Set the generator to provide modulated 1MHz markers and then tune over the whole of Range 1, checking the scale accuracy at each megahertz point. Accuracy should be within 1% (i.e. 200kHz at 20MHz, 100kHz at 10MHz, 20kHz at 2MHz etc). Re-alignment of the Local Oscillator circuits should be considered necessary, only if the error observed is much greater than this.

Repeat this check on Range 2 and then select Range 3. The 100kHz markers can be introduced on this range to permit checking at 500kHz intervals. On Ranges 4 and 5, check each 100kHz 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	21MHz	C39	15MHz	L12
2	15MHz	C40	9MHz	L13
3	8.0MHz	C41	3.6MHz	L14
4	1400kHz	C42	550kHz	L15
5	330kHz	C43	160kHz	L16

On completion of any re-alignment of the Local Oscillator circuits which may have been required, 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 400Hz and the output meter is connected as during IF alignment.

Adjustments should be 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 carried out 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	21.5MHz	C3	C21	15.5MHz	L2	L7
2	14.5MHz	C4	C22	8.8MHz	L3	L8
3	8.0MHz	C5	C23	3.6MHz	L4	L9
4	1400kHz	C6	C24	550kHz	L5	L10
5	300kHz	C7	C25	160kHz	L6	L11

The IF rejector coil L1 should be adjusted when aligning Range 4 using the procedure detailed below:-

Tune the receiver to 550kHz (low-frequency alignment point) and the generator to the intermediate frequency of 455kHz. 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 550kHz, reduce its output and check the adjustment of L5 for maximum signal. Repeat both checks to ensure accurate alignment of the two circuits.

Complete the procedure by carrying out a check on the overall sensitivity at the mid-band frequency on each of the five ranges. With the generator properly matched, sensitivities of the order 7μV or better should be realised on the three high-frequency ranges. Sensitivities will be somewhat lower on the other two ranges, a figure of the order 20μV being typical. All sensitivities are quoted for a signal/noise ratio of 15dB and an output of 1mW in 600Ω (telephones disconnected).

APPENDIX "A"

SEMICONDUCTOR COMPLEMENT

Ref	Type	Manufacturer	Circuit Function
TR1	OC171	Mullard	RF Amplifier.
TR2	OC171	Mullard	Mixer.
TR3	OC171	Mullard	Local Oscillator.
TR4	OC171	Mullard	1st 455kHz IF Amplifier.
TR5	OC171	Mullard	2nd 455kHz IF Amplifier.
TR6	AC127	Mullard	1st Audio Amplifier.
TR7	AC128	Mullard	Audio Driver.
TR8	AC127	Mullard	Complementary Output Stage.
TR9	AC128	Mullard	
D1/2	DD006	Lucas	Aerial Protection Diodes.
D3	OA70	Mullard	AGC Attenuator.
D4	OA90	Mullard	Detector/AGC.
D5 (ZD)	OAZ203	Mullard	Zener Stabiliser (6.5V).

APPENDIX "B"

LIST OF COMPONENT VALUES, TOLERANCES AND RATINGS

Capacitors.

Ref	Value	Type	Tolerance	Wkg. V.
C1	-	Not fitted on EB36A	-	-
C2	0.002µF	Polystyrene	5%	125V
C3	10-60pF	Ceramic Trimmer	-	-
C4 - C7	6-25pF	Ceramic Trimmer	-	-
C8	250 ~~180~~pF	Polystyrene	2%	125V
C9	100pF	Polystyrene	5%	125V
C9a	20pF	Tubular Ceramic	10%	750V
C10	0.001µF	Polystyrene	5%	125V
C10a	500 ~~790~~pF	Polystyrene	5%	125V
C11	-	Not fitted on EB36A	-	-
C11a	200pF	Polystyrene	5%	125V
C12-C14	-	Not fitted on EB36A	-	-
C15	12-365pF	Air-spaced variable	-	-
C16	0.1µF	Polyester	20%	200V
C17	0.0015µF	Tubular Ceramic	+50%-25%	750V
C18	0.1µF	Polyester	20%	200V
C19	-	Not fitted on EB36A	-	-
C19a	790pF	Polystyrene	5%	125V
C20	100pF	Polystyrene	5%	125V
C20a	140pF	Polystyrene	5%	125V
C21	10-60pF	Ceramic Trimmer	-	-
C22-C25	6-25pF	Ceramic Trimmer	-	-
C23a	10pF	Tubular Ceramic	10%	750V
C26	-	Not fitted on EB36A	-	-
C27	12-365pF	Air-spaced variable	-	-
C28	0.1µF	Polyester	20%	200V
C29	0.005µF	Tubular Ceramic	10%	750V
C30	0.01µF	Metallised Paper	20%	200V
C31	0.1µF	Polyester	20%	200V
C31a	0.047µF	Polyester	20%	200V
C32	-	Not fitted on EB36A	-	-
C33	0.1µF	Polyester	20%	200V
C34	-	Not fitted on EB36A		
C34a	180pF	Polystyrene	2%	125V
C35	500pF	Silvered Mica	2%	350V
C35a	110pF	Silvered Mica	5%	350V
C36	140pF	Polystyrene	5%	125V
C37 & C38	-	Not fitted on EB36A	-	-
C39	10-60pF	Ceramic Trimmer	-	-
C40 - C43	6-25pF	Ceramic Trimmer	-	-
C44	-	Not fitted on EB36A	-	-
C45	40pF	Tubular Ceramic	10%	750V
C46	800pF	Silvered Mica	2%	350V
C47	0.0091µF	Polystyrene	2%	125V
C47a	0.007µF	Polystyrene	5%	125V
C48	12-365pF	Air-spaced variable	-	-
C49	0.1µF	Polyester	20%	200V

Ref.	Value	Type	Tolerance	Wkg. V.
C50	0.1µF	Polyester	20%	200V
C51	300pF	Polystyrene	5%	60V
C52	300pF	Polystyrene	5%	60V
C53	10µF	Tubular Electrolytic	+50%-10%	16V
C54	0.1µF	Polyester	20%	200V
C55	0.1µF	Polyester	20%	200V
C56/57	-	Not fitted on EB36A	-	-
C58	10µF	Tubular Electrolytic	+50%-10%	16V
C59	0.1µF	Polyester	20%	200V
C60	0.1µF	Polyester	20%	200V
C61	100µF	Tubular Electrolytic	+100%-20%	15V
C62	250pF	Polystyrene	5%	60V
C63	0.01µF	Metallised Paper	20%	150V
C64	0.047µF	Polyester	20%	200V
C65	-	Not fitted on EB36A	-	-
C66	0.1µF	Polyester	20%	200V
C67	0.1µF	Polyester	20%	200V
C68	XXXXX 0.25µF	XXXXXXXXX Metallised Paper	20%	200V
C69	10µF	Tubular Electrolytic	+50%-10%	16V
C70	100µF	Tubular Electrolytic	+100%-20%	15V
C71	0.001µF	Polystyrene	5%	125V
C72	200µF	Tubular Electrolytic	+100%-20%	6V
C73	0.022µF	Polyester	20%	200V
C74	200µF	Tubular Electrolytic	+100%-20%	6V
C75-C80	-	Not fitted on EB36A	-	-
C81	350µF	Tubular Electrolytic	+100%-20%	18V
C82	10µF	Tubular Electrolytic	+50%-10%	16V

Resistors.

Ref	Value	Tol.	Rating
R1	47,000Ω	10%	½-watt
R2	1,000Ω	10%	½-watt
R3	470Ω	10%	½-watt
R4	68Ω	10%	½-watt
R5	100Ω	10%	½-watt
R6	Not fitted	-	-
R7	68Ω	10%	½-watt
R7a	100Ω	10%	½-watt
R8	15,000Ω	10%	½-watt
R9	3,300Ω	10%	½-watt
R10	1,000Ω	10%	½-watt
R11	390Ω	10%	½-watt
R12	22Ω	10%	½-watt
R12a	22Ω	10%	½-watt
R13	150Ω	10%	½-watt
R14	Not fitted	-	-
R15	100Ω	10%	½-watt

Ref	Value	Tol.	Rating
R16	15,000Ω	10%	½-watt
R17	4,700Ω	10%	½-watt
R18	100Ω	10%	½-watt
R19	470Ω	10%	½-watt
R19a	33,000Ω	5%	½-watt
R20	68,000Ω	10%	½-watt
R21	3,300Ω	10%	½-watt
R22	6,800Ω	10%	½-watt
R23	1,000Ω	10%	½-watt
R24	820Ω	10%	½-watt
R25	XXXX 270Ω	10%	½-watt
R25a	3,300Ω	10%	½-watt
R26	47,000Ω	10%	½-watt
R27	6,800Ω	10%	½-watt
R28	100Ω	10%	½-watt
R29	100Ω	10%	½-watt

Resistors. (cont.)

Ref	Value	Tol	Rating
R30	220Ω	10%	½-watt
R31	100Ω	10%	½-watt
R32	8,200Ω	10%	½-watt
R33	4,700Ω	10%	½-watt
R34&35	Not fitted	-	-
R36	10,000Ω	10%	½-watt
R37	1,000Ω	10%	½-watt
R38	33,000Ω	10%	½-watt
R39	33,000Ω	10%	½-watt

Ref	Value	Tol	Rating
R40	10Ω	10%	½-watt
R41	560Ω	10%	½-watt
R42	390Ω	10%	½-watt
R43	68Ω	10%	½-watt
R44	16Ω w.w.	5%	3-watt
R45	620Ω	10%	½-watt
R46	2.2Ω w.w.	5%	3-watt
R47	2.2Ω w.w.	5%	3-watt
R48	39Ω	5%	½-watt
R49-50	Not fitted	-	-
R51	100Ω	10%	½-watt

Thermistors.

Ref	Type	Maker
TH1	VA1040	Mullard

Potentiometers.

Ref	Value	Type
RV1	10,000Ω	Log law carbon track
RV2	5,000Ω	Log law carbon track

APPENDIX "C"

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 with an applied mains voltage of 240V, using a testmeter with a sensitivity of 20,000Ω/V. A tolerance of 20% applies.

Ref	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	3.1V	1.05V	0.08V
TR5	7.5V	0.9V	0.65V
TR6	0.61V	4.2V	4.6V
TR7	4.7V	0.16V	-
TR8	-	4.8V	4.9V
TR9	9.0V	5.0V	4.9V

VOLTAGES ARE NEGATIVE W.R.T. EARTH.

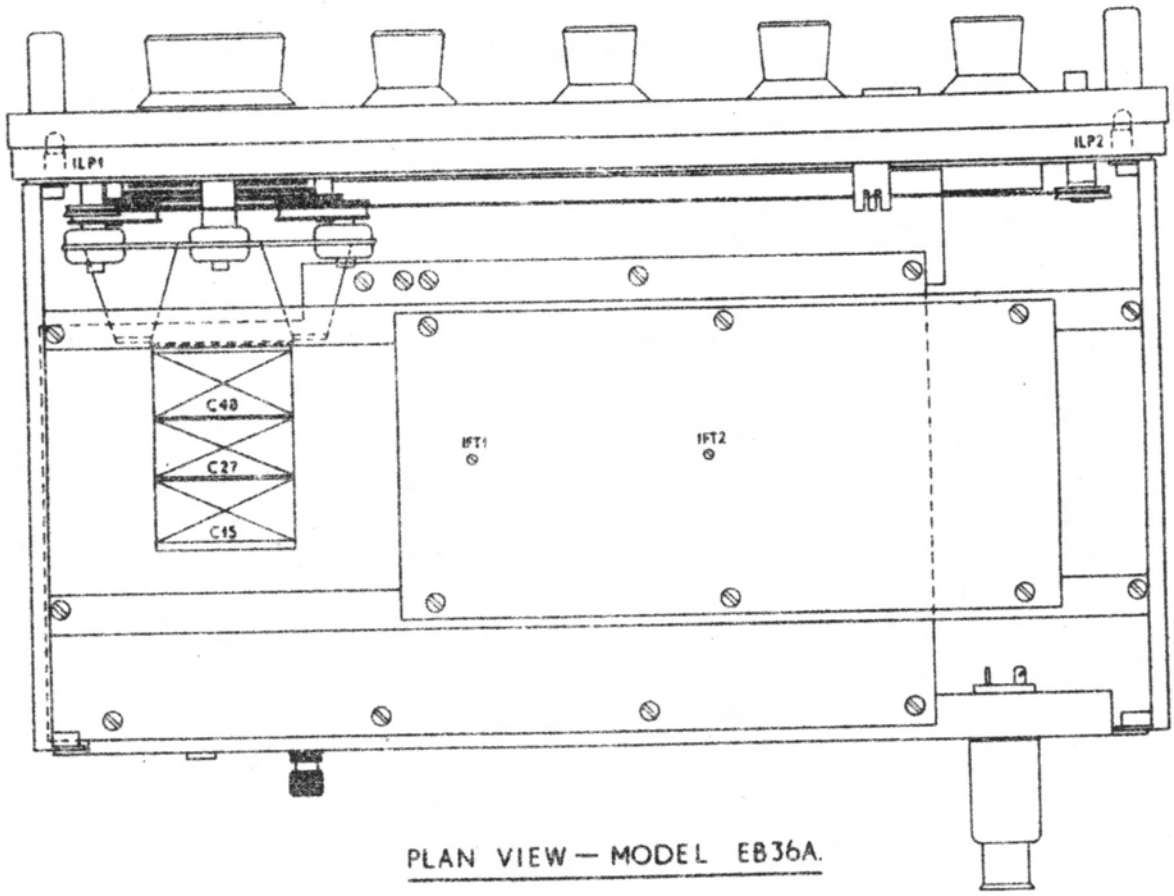
APPENDIX "D"

SPARES

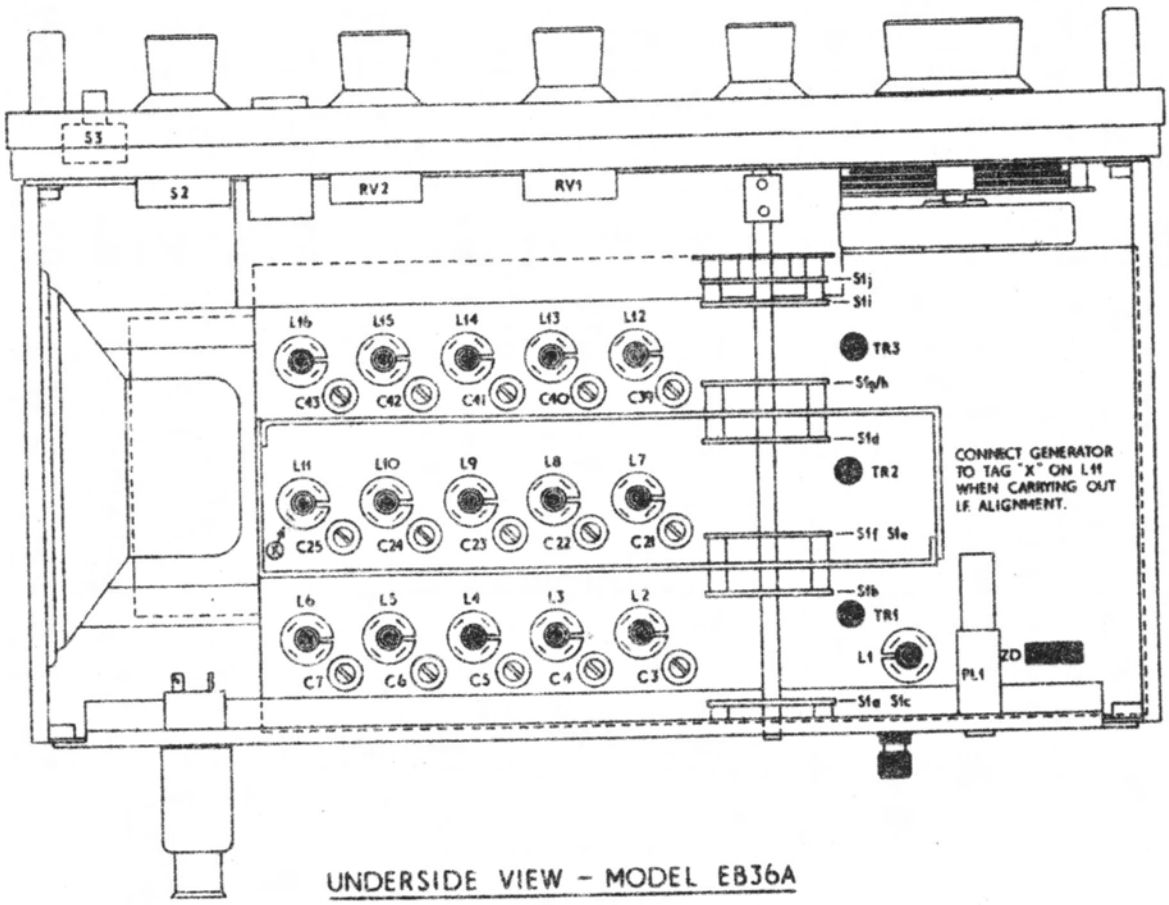
The following list details all major spares for the Receiver Type EB36A. Orders and enquiries should be directed to the "Sales & Service Dept." Please quote the Serial Number of the receiver in all correspondence.

Ref	Description	Part No.
	INDUCTORS	
L1	455kHz IF Rejector coil	D3204
L2	Range 1 RF (Aerial) coil	D3825
L3	Range 2 RF (Aerial) coil	D3826
L4	Range 3 RF (Aerial) coil	D3191
L5	Range 4 RF (Aerial) coil	D3193
L6	Range 5 RF (Aerial) coil	D3518
L7	Range 1 Mixer coil	D3827
L8	Range 2 Mixer coil	D3828
L9	Range 3 Mixer coil	D3196
L10	Range 4 Mixer coil	D3198
L11	Range 5 Mixer coil	D3520
L12	Range 1 Oscillator coil	D3829
L13	Range 2 Oscillator coil	D3830
L14	Range 3 Oscillator coil	D3201
L15	Range 4 Oscillator coil	D3203
L16	Range 5 Oscillator coil	D3522
	TRANSFORMERS	
IFT1	1st 455kHz IF Transformer	7391P
IFT2	2nd 455kHz IF Transformer	6655P
CH1	4.7mH Choke	7472P
T1	Output Transformer	7392P
	FILTER	
-	Filter Type TCF4-4D10A	7471P
	SWITCHES	
S1	Range Switch : : 5-position clicker mechanism	5625P
	Wafers S1b, S1d, S1i, S1j	5404P
	Wafers S1a/c, S1e/f, S1g/h	5393PA
S2	Supply Switch : : DPST Rotary	6916P
S3	Dial Lamp Sw : : SPST Biased slide switch	6918P
	POTENTIOMETERS	
RV1	Tone Control 10,000Ω log law	6860/1PA
RV2	AF Gain Control 5,000Ω log law	6860PA

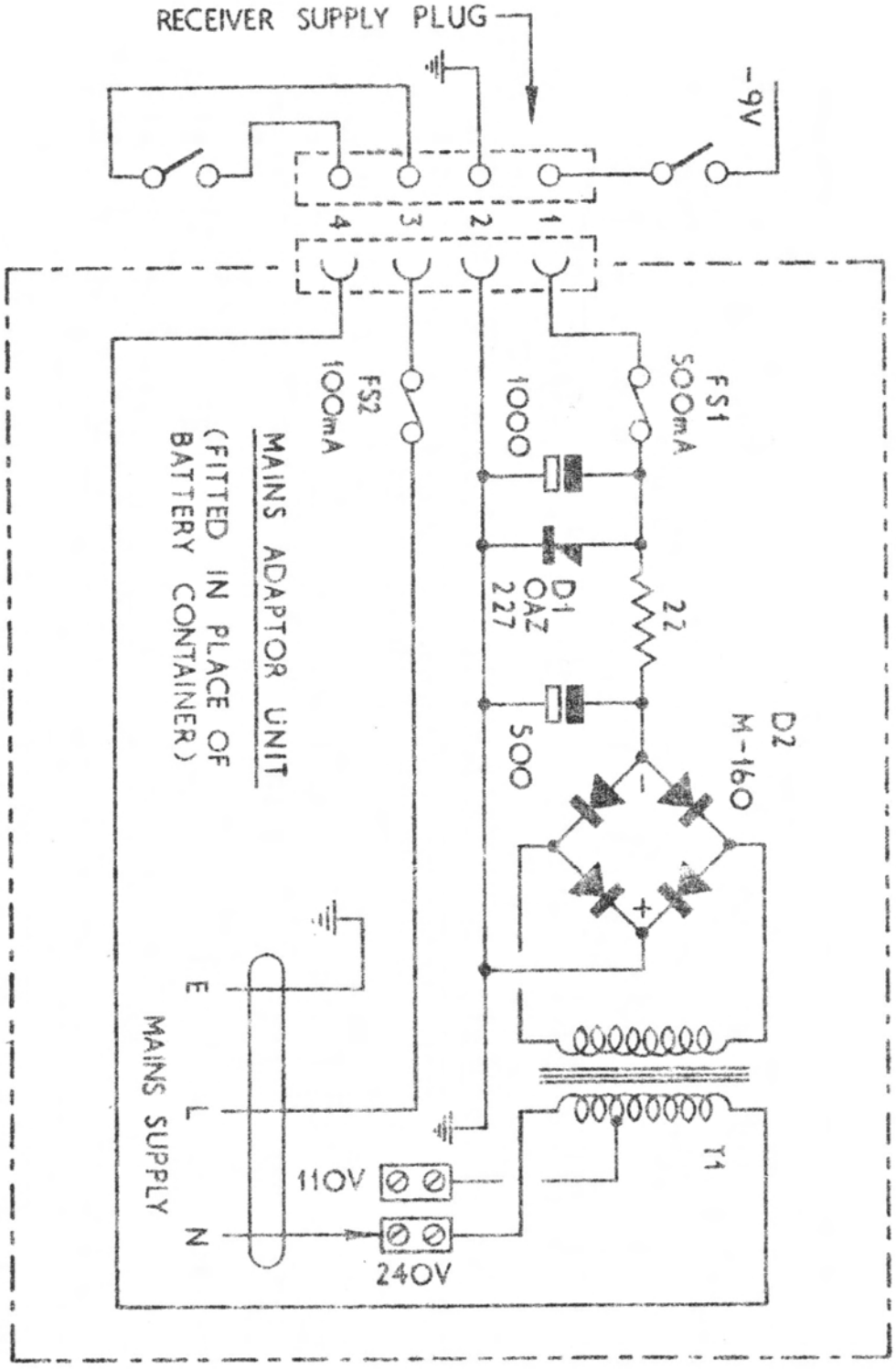
Ref	Description	Part No.
	KNOBS	
-	Tuning	D3613/2
-	Skirt for Tuning knob	7089/1PA
-	Wavechange	D3663
-	Supply Switch, AF Gain, Tone	D3617/3
	CONNECTORS	
	M.U.S.A. Plug Coaxial Type P.O. No. 1.C.	7390P
	4-way socket (600Ω output)	6855P
	4-way plug (600Ω output)	6856P
	Case for 4-way plug	6857P
	M.U.S.A. Socket Coaxial Type P.O. No. 1.	7396P
	Telephone socket	7380P
	MISCELLANEOUS	
	Drive Gear Assembly	LP2864
	Dial Glass (Calibrated)	D3823
	Earth Terminal	6371P
	Chrome Handles	6518P
	Cover Retaining Screws	3405PC
	Flexible Coupler	S893
	Tuning Capacitor (3 x 12-365pF)	6528PB
	Dial Lamps (6V 60mA L.E.S.)	6659P
	Lampholders (L.E.S.)	6600P
	Finger Plate	6914/1PA
	Pointer Assembly	D3215
	Fuses. 100mA.	6734P
	0.5A	6244P
	1A	6124P



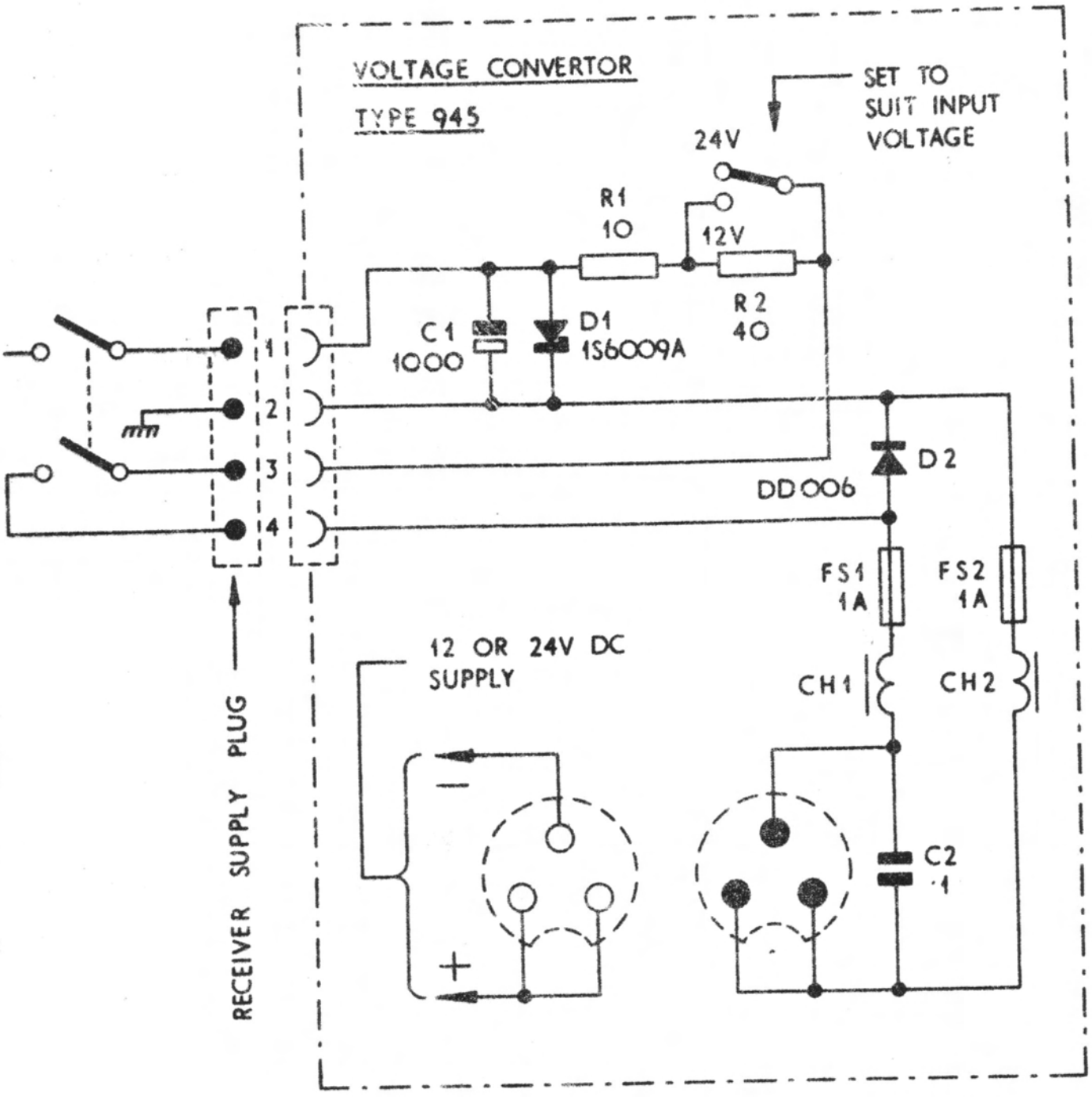
PLAN VIEW — MODEL EB36A.



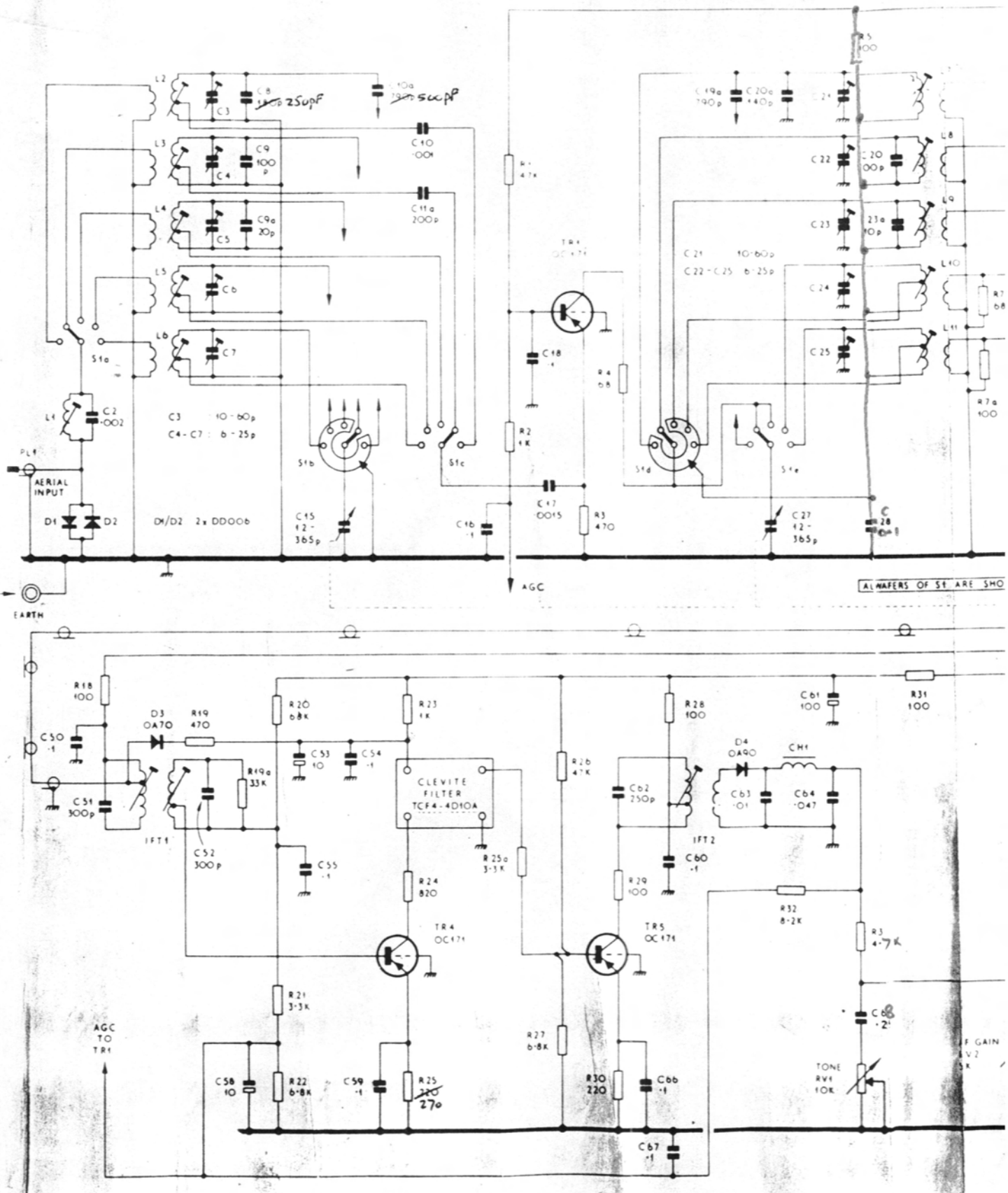
UNDERSIDE VIEW - MODEL EB36A

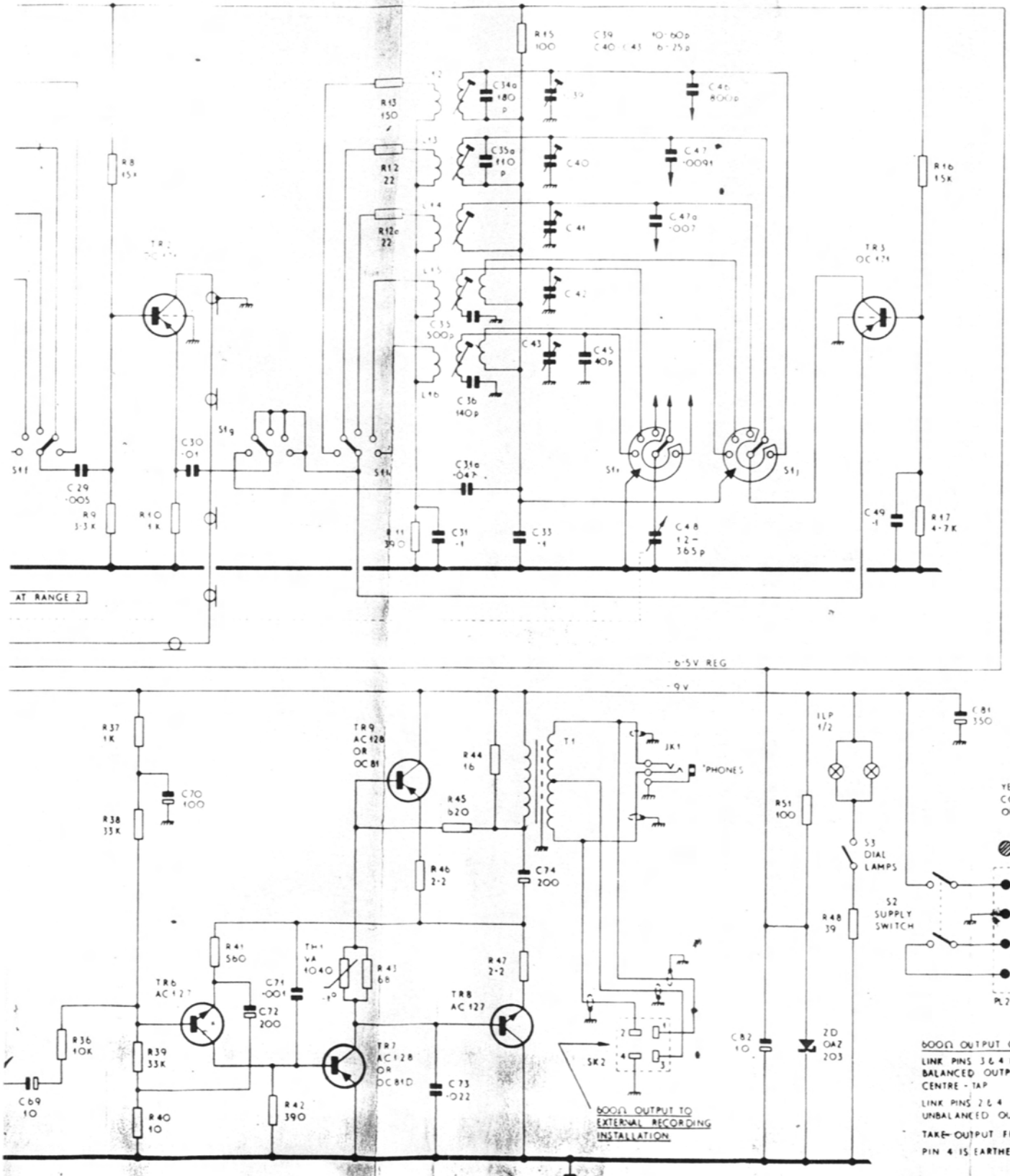


CIRCUIT DIAGRAM OF MAINS ADAPTOR UNIT TYPE 924



CIRCUIT DIAGRAM OF VOLTAGE CONVERTOR TYPE 945


L2
C8
C3
25upF
50upF
C10
·001
L3
C9
100
p
C4
C11a
200p
L4
C9a
20p
C5
L5
C6
L6
C7
S1a
L1
C2
·002
C3 10 - 60p
C4 - C7 : 6 - 25p
PL1
AERIAL
INPUT
D1
D2
D1/D2 2 x DD006
S1b
C15
12 -
365p
C16
·1
S1c
EARTH
AGC
R1
47K
TR1
OC171
C18
·1
R4
68
R2
1K
C17
·0015
R3
470
C19a
190p
C20a
440p
C21
C22
C20
00p
C23
23a
10p
C24
C25
C21 10-60p
C22 - C25 6-25p
S1d
S1e
C27
12 -
365p
C28
·1
R5
100
L8
L9
L10
L11
R7
68
R7a
100
ALL WAFERS OF S1 ARE SHO
R18
100
C50
·1
D3
OA70
R19
470
C51
300p
IFT1
R19a
33K
C52
300p
R20
6·8K
C53
10
C54
·1
C55
·1
R23
1K
CLEVITE
FILTER
TCF4-4D10A
R25a
3·3K
R24
820
TR4
OC171
R21
3·3K
AGC
TO
TR1
C58
10
R22
6·8K
C59
·1
R25
270
R26
4·7K
R28
100
C62
250p
IFT2
C60
·1
R29
100
TR5
OC171
R27
6·8K
R30
220
C66
·1
C67
·1
C61
100
R31
100
D4
OA90
CH1
C63
·01
C64
·047
R32
8·2K
R3
4·7K
C68
·2
TONE
RV1
10K
F GAIN
LV2
5K


R15 100
C39 40-60p
C40 C41 6-25p
C34a 180 p
C46 800p
R13 150
C35a 110 p
C40
C47 ·0091
R12 22
R12a 22
C41
C47a ·007
C42
C35 500p
C43
C45 40p
C36 140p
R8 15K
R16 15K
TR3 OC171
C30 ·01
S1g
S1h
S1f
S1i
S1j
C29 ·005
R9 3·3K
R10 1K
C31 ·1
C33 ·1
C31a ·047
C48 12-365p
C49 ·1
R17 4·7K
AT RANGE 2
6·5V REG
-9V
R37 1K
R38 33K
C70 100
TR9 AC128 OR OC81
R44 16
R45 620
T1
JK1
'PHONES
R46 2·2
C74 200
R41 560
TH1 VA 1040
R43 68
R47 2·2
TR6 AC127
C71 ·001
C72 200
TR8 AC127
TR7 AC128 OR OC81D
C73 ·022
R36 10K
R39 33K
C69 10
R40 10
R42 390
SK2
600Ω OUTPUT TO EXTERNAL RECORDING INSTALLATION
ILP 1/2
R51 100
S3 DIAL LAMPS
S2 SUPPLY SWITCH
R48 39
C82 10
2D OA2 203
C81 350
YELLOW DOTS INDICATE CORRECT ORIENTATION OF PLUG AND SOCKET
9V
PL2
SK1
AC MAINS POWER UNIT TYPE 912, VOLTAGE CONVERTER TYPE 945
600Ω OUTPUT (SK2)
LINK PINS 3 & 4 IN PLUG FOR BALANCED OUTPUT WITH EARTHED CENTRE - TAP
LINK PINS 2 & 4 IN PLUG FOR UNBALANCED OUTPUT
TAKE OUTPUT FROM PINS 1 & 2
PIN 4 IS EARTHED INTERNALLY

MODEL EB36A