Eddystone

EC10A2 SERIES

INSTALLATION NOTES OPERATING INSTRUCTIONS AND SERVICE DATA

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NOMENCLATURE

Receivers in the original EC10A/2 Series are now referred to as EC10A2 variants. Three versions are currently available as follows:-

EC10A2/1 — Bench-mounting receiver previously known as Model EC10A/2.

EC10A2/2 — Rack-mounting receiver with one panel speaker only. Previously known as Model EC10A/2/RM/S. *

EC10A2/3 — Rack mounting receiver with two panel speakers. Internal cabinet speaker retained to facilitate conversion to bench-mounting. Previously known as Model EC10A/2/RM.

* See page 18.

E D D Y S T O N E

TRANSISTORISED COMMUNICATION RECEIVER

MODELS EC10A/2 & EC10A/2/RM

The EDDYSTONE Model EC10A/2 is a compact light-weight transistorised communication receiver covering the frequency bands 300-550 kc/s and 1.5-30 Mc/s in five switched ranges. An additional position on the wavechange switch provides crystal-controlled reception on the International HF Calling and Distress Frequency of 2182 kc/s.

Operation is from an external 12V or 24V DC supply with zener regulation to ensure stable performance under conditions of varying supply voltage. Current consumption is less than 300mA total.

Thirteen transistors and 7 diodes are used in the single-conversion circuit which employs an intermediate frequency of 720 kc/s. Facilities are provided for CW, MCW and AM reception. A built-in loudspeaker is fitted as standard but arrangements are made so that telephones can be connected when listening in noisy locations. An extension loudspeaker can be operated via a 600Ω line.

The receiver is also available in rack-mounting form (designated EC10A/2/RM). This version incorporates two small panel-mounted loudspeakers, one of which is available for use with any other receiver forming part of the same receiving installation.

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Sole Manufacturer:-

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Telephone : PRI 2231/4. Telex : 33708.

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TECHNICAL DATA

Frequency Coverage.

Pre-set crystal-controlled channel 2182 kc/s and five tunable ranges covering 300-550 kc/s and 1.5-30 Mc/s.

Range 1	.. ..	18.0 - 30.0 Mc/s.
Range 2	.. ..	8.3 - 18.0 Mc/s.
Range 3	.. ..	3.5 - 8.3 Mc/s.
Range 4	.. ..	1.5 - 3.5 Mc/s.
Range 5	.. ..	300 - 550 kc/s.

Intermediate Frequency.

720 kc/s.

Semiconductor Complement.

TR1	OC171	RF Amplifier.
TR2	OC171	Mixer.
TR3	OC171	Local Oscillator.
TR4	OC171	1st IF Amplifier.
TR5	OC171	2nd IF Amplifier.
TR6	OC171	Beat Oscillator.
TR7	OC71	Audio Amplifier.
TR8	OC83	Audio Driver.
TR9 & TR10	2 x OC83	Audio Output.
TR11*	OC171	RF Amplifier.
TR12*	OC171	Mixer.
TR13*	OC171	Crystal Oscillator.
D1	OA70	AGC Attenuator.
D2	OA90	Detector/AGC.
D3	OAZ203	Voltage Stabiliser.
D4	1S600°A	Voltage Stabiliser.
D5	DD006	Reverse Polarity Protector.
D6/7	2 x DD006	Overload Protector.

* 2182 kc/s Converter.

Power Supply.

12V or 24V from external source, positive or negative earth. Consumption 280mA.

Aerial Input Impedance.

Ranges 1-4 & 2182 ..	75Ω unbalanced.
Range 5	400Ω unbalanced.

Audio Output Impedance.

External speaker (local) ..	3Ω.
External speaker (remote lines)	600Ω.

TYPICAL PERFORMANCE FIGURES

Sensitivity.

Better than 5µV for 15dB s/n ratio on Ranges 1-4 and 2182 kc/s. Better than 15µV on Range 5.

IF Selectivity.

Typical overall bandwidths at 6dB and 30dB down are 7 kc/s and 25 kc/s respectively.

IF Breakthrough.

Ranges 1-4 ..	greater than 85dB down.
Range 5 ..	greater than 65dB down.

Image Rejection.

25dB at 18 Mc/s and 55dB at 2.0 Mc/s.

Calibration Accuracy.

1% on all ranges.

Frequency Stability.

Drift does not exceed 1 part in 10^4 per °C change in ambient temperature. A close-tolerance crystal provides excellent stability in the pre-set 2182 kc/s posn.

AGC Characteristic.

An 80dB increase in signal produces less than 12dB change in output. Taken from 6µV at 2.0 Mc/s on Range 4.

Audio Output and Responses.

The maximum audio output exceeds one watt. 800mW is available at 10% distortion.

Frequency response is level within 6dB in the range 300 c/s to 8 kc/s except when using the audio filter. The filter is resonant at approximately 1000 c/s and can be brought into circuit for selective CW reception. 6dB bandwidth is of the order 180 c/s.

DIMENSIONS AND WEIGHT

EC10A/2.

Width	12½" (31.7 cm.).
Height	6⅜" (16.2 cm.).
Depth	8" (20.3 cm.).
Weight	13¼ lb. (6.0 kg.).

EC10A/2/RM.

Panel ..	19" x 7" (48.2 x 17.7 cm.).
Depth	8" (20.3 cm.).
Weight	16¼ lb. (7.4 kg.).

Note: Dimensions exclude projections at the rear.

CIRCUIT DESCRIPTION

Aerial input is taken via the IF rejector (L1/C2) to the first section of the wave-change switch S1k which makes connection to the input coil of the 2182 kc/s Converter (with switch at "2182") or to the selector of S1a in all other positions of the switch. S1a selects the appropriate aerial coupling coil for the tunable range in use.

It should be noted that switches S1a through S1j are actually 5-position wafers but are shown with six positions on the circuit diagram. At "2182" the selectors on these switches move into a vacant position on the wafer. S1k through S1n are 6-position wafers.

Two silicon diodes (2xDD006) are wired across the aerial input socket to protect the input coils and the RF transistors in the event of operation in close proximity to a high-powered transmitter.

The earthy ends of all input coupling coils are returned to the frame of the set and not to the printed wiring board ground. C1 completes this circuit at r.f. but prevents accidental shorting of the supply voltage in the event of this having a negative earth. A shorting plug (PL1) is supplied with the receiver and can be inserted at SKT1 when there is no danger of short-circuiting the supply.

Circuitry of the RF and Mixer Stages is very similar both on the tunable ranges and on the 2182 kc/s Converter Unit. Grounded-base RF Amplifiers (TR1 & TR11) are employed using OC171 transistors. In both cases signal is fed to the emitter from low-impedance taps on the tuned input circuits. Gain control is effected in TR1 and TR11 by varying the base voltage either by adjustment of RV1 or by AGC. Switching of the base circuits to the control line is by S11.

The two Mixer Stages (TR2 & TR12 : 2 x OC171) are fed from low-impedance secondaries on the inter-stage tuning coils, signal being applied to the base in each case. Oscillator injection is to the emitter from coupling windings on the appropriate Local Oscillator coils.

On Ranges 1-5, the Local Oscillator (TR3 : OC171) uses a tuned-collector circuit which is arranged to track above the signal frequency by 720 kc/s. On "2182", the crystal controlled Local Oscillator (TR13 : OC171) employs a close-tolerance series - mode crystal to furnish injection to TR12 at 2902 kc/s.

All six stages in the RF Section of the receiver (i.e. TR1-3 & TR11-13) are operated from the stabilised supply provided by the zener diode D3 (OAZ203). The stabilised voltage is nominally 6.5V and since D3 is itself fed from a stabilised source (D4 : 9V : 1S6009A), regulation is extremely good. The 6.5V line is switched to the tunable front-end or to the 2182 kc/s Converter Unit by S1n.

IF amplification is provided by TR4 and TR5 (OC171) which operate at 720 kc/s with a total of five tuned circuits to ensure a high degree of adjacent channel selectivity. AGC and manual gain control are applied to the first stage while the second operates at constant gain. Improved operation under strong signal conditions is given by the diode switch (D1 : OA70) which introduces a damping resistor (R19) across the primary of IFT1 when the signal exceeds a certain level. This action assists the AGC circuit and prevents overload of the Detector and TR5.

The diode (D2 : OA90) which serves as the Detector is housed in the IFT3 screening can and also provides the AGC voltage which is applied to TR1 and TR4 via the filter circuit C63/R28. Audio output from the Detector is coupled through C74 to the base of the Audio Amplifier which is an OC71 (TR7).

The gain control line feeding TR1 and TR4 is brought out at SKT3/3 to permit desensitising of the receiver from an external switch or relay contact. The circuit must be opened for normal reception.

TR6 is introduced for CW reception and provides a locally generated carrier which is amplified by TR5 and applied to the Detector along with the normal IF signal. The beat frequency obtained can be adjusted by means of the pitch control C70. TR6 derives its supply from the zener diode D3.

An audio filter (L18/C76) is included in the coupling between TR7 and the Audio Driver Stage TR8 (OC83). The filter is resonated at approximately 1,000 c/s and will be found useful for CW reception when interference is severe. The filter can be switched out by S4 when receiving AM signals.

The push-pull Output Stage operates in Class "B" and provides a 3Ω output for the built-in loudspeaker. An external speaker can be plugged into a socket at the rear (JK2), this being the left-hand panel speaker in the case of the EC10A/2/RM. An auxiliary contact on JK2 is arranged to interrupt the internal speaker when the external unit is in use.

Low-impedance telephones can be connected at JK1, and in this case insertion of the telephone plug will cut the operative loudspeaker output. A second winding on the output transformer provides a 600Ω output to feed a remote loudspeaker at a distant listening point. The 600Ω winding is electrostatically screened from the primary and the 3Ω secondary. It is not interrupted by the telephone and local speaker switching.

The supply voltage applied to the receiver is stabilised at 9V by the zener diode D4 (1S6009A) and changeover from 12 to 24V operation is effected by S7 which short-circuits R53 in the 12V position. D5 (DD006) is wired across the supply socket in such a manner that it will conduct if the external supply is inadvertently connected with reversed polarity. The current drawn from the supply causes the fuses to blow and so protects the receiver from possible damage.

INSTALLATION

Mounting.

The standard Model EC10A/2 is suitable for bench-mounting only. Fixing plates are available for use in installations where the receiver must be fixed to the surface on which it is mounted. The plates are supplied in pairs and can be ordered separately by quoting Part No. 5344P. Plates are supplied with screws for fitting to receiver.

The EC10A/2/RM is attached to a standard 19" (48.2 cm.) panel which occupies an overall height of 7" (17.7 cm.) in the rack. Two panel speakers are provided on this version, the right-hand one (viewed from front) being available for use with another receiver forming part of the same installation.

Voltage Adjustment.

The voltage selector switch (S7) must be set to the correct position before connecting the receiver to the external supply. S7 is located in the Voltage Converter Unit which is fitted at the rear of the set. To remove the unit proceed as follows:-

Place the receiver "face-down" resting on its handles and slacken the two captive screws which retain the Voltage Converter Unit. Carefully withdraw the unit and then disengage the internal 10-way connector which connects it to the receiver proper.

The unit can now be removed completely to allow the voltage selector switch to be set to 12V or 24V to suit the external supply. In replacing the unit make certain that the internal plug is inserted with the yellow dots adjacent to one another.

External Connections.

These comprise:- aerial, earth, shorting plug (PL1), local speaker socket, telephone socket and a six-way connector for supply, remote loudspeaker and external desensitising switch. All connections with the exception of the telephone socket are at the rear of the set.

On the EC10A/2/RM version, the left-hand speaker (viewed from the front) is wired to a plug which mates with the external speaker socket at the rear of the set. The right-hand speaker has a socket for connection to any other associated receiver. The impedance is 3Ω and a suitable plug is supplied with the set.

Wiring of 6-way Elcom Connector.

This connector is non-reversible by virtue of two of the end pins having different spacing. The free female plug should be wired as follows:-

SUPPLY (12 or 24V DC) . . . . NEGATIVE to "1", POSITIVE to "2".

DESENSITISING SWITCH . . . . To "3" & "4".

600Ω AUDIO OUTPUT . . . . To "5" & "6".

It should be noted that when operating the receiver from a 12 or 24V supply with floating or negative earth connection, PL1 must be removed from SKT1 to prevent shorting of the supply through other earth connections. When the supply has a positive earth connection, PL1 should be inserted at SKT1 to common the printed board and cabinet (frame) earthing.

Note also that pin 4 of the socket is wired directly to the printed board earth and it is therefore necessary to run a separate earth line to the desensitising switch when using a supply having a floating or negative earth connection.

If screened twin is employed for the 600Ω line circuit, the braid should be earthed to the receiver earth terminal except when operating the set from a supply with a +ve earth, in which case connection of the braid can be to SKT3/4 via PL3/4.

A matching transformer with a step-down from 600Ω is required at the remote speaker station. The output impedance of this transformer should be chosen to match the remote loudspeaker.

Aerial.

Connection to the aerial socket is with the coaxial plug supplied with the receiver. Optimum results will be obtained when using low-impedance aerials.

Earth.

In some cases a good earth will give improved reception and it is well worth taking the trouble to connect to a suitable earthing point. Reduction in the level of locally generated noise (especially on the low frequencies) is one of the advantages gained from proper earthing of the receiver. Connection can be to the earth terminal adjacent to the aerial socket or, when using a supply with positive earth, to PL1 which mates with SKT1.

Telephones and (Local) External Speaker.

The telephone output is located on the panel and will give best results with low-impedance telephones (impedances up to 600Ω). Higher impedances can be used satisfactorily but with some reduction in output and slightly inferior quality. Insertion of the telephone plug interrupts the local speaker circuits but not the 600Ω remote output.

The local external loudspeaker is connected to a socket at the rear, the circuit being arranged such that the built-in speaker is muted when using the external speaker.

OPERATION

Tuning.

The receiver is tuned to the required frequency by adjustment of the TUNING control which is conveniently located at the right-hand side of the receiver. The control is flywheel-loaded and drives a spring-loaded gear mechanism with a reduction ratio of the order 110-1. Rapid change of frequency can be effected by spinning the knob in the desired direction.

The calibrated vernier which appears in the window above the TUNING control is used in conjunction with the bottom logging scale on the main dial. Combining the two readings will give an arbitrary figure which corresponds to the frequency to which the receiver is tuned. Readings can be recorded to allow rapid re-setting to specific frequencies.

The TUNING control is inoperative when the WAVECHANGE switch is set to the "2182 kc/s" position.

Wavechange.

Range positions are marked 1-5 and "2182 kc/s", the numbering for the tunable ranges being repeated at the left-hand side of the tuning scales. The "2182 kc/s" position provides instant selection of this channel without need for adjustment of the TUNING control.

RF Gain/Supply Switch.

The RF GAIN is operative with or without AGC in use and controls the 1st IF Amplifier and the appropriate RF Stage (TR1 or TR11).

The receiver is brought into operation by rotating the RF GAIN knob in a clockwise direction to operate the SUPPLY SWITCH which is ganged to it.

AF Gain.

Controls audio output to the internal loudspeaker (or local external speaker when in use), telephones and 600Ω output to remote external loudspeaker.

BFO Pitch.

This control is functional only when receiving CW signals with the BFO switched on. The Beat Oscillator can be set above or below the frequency of the incoming signal (at intermediate frequency) and the beat can be adjusted to coincide with the audio filter resonance at approximately 1000 c/s.

AF Filter Switch.

Introduces a selective audio filter for CW reception under conditions of severe adjacent channel interference. The filter is tuned to approximately 1000 c/s and the switch is a push-on/push-off type.

BFO Switch.

Brings the BFO into use for CW reception. The switch is a push-on/push-off type.

AGC Switch.

Allows choice of manual or automatic gain control of the pre-detector stages. AGC should normally be used for AM reception only in which case the RF GAIN should be set at maximum to secure best AGC action. The switch is a push-on/push-off type.

Dial Light Switch.

This switch is mechanically biased to the "OFF" position and must be held in the "ON" position to obtain scale lighting. Two dial bulbs are fitted, one at each end of the tuning scale.

MAINTENANCE

Removing the cabinet.

1. Remove the Voltage Converter Unit by slackening the two captive screws which retain it and disengaging the internal 10-way connector.
2. Slacken the four cabinet retaining screws.
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.

The two fuses are located in holders at the left-hand side of the front panel. Replacements should be rated at 1 Amp and are standard miniature cartridge types 20 x50mm

Instructions for re-stringing the drive cord.

In the unlikely event of the pointer drive cord either breaking or slipping out of the pulley grooves, replacement will present no real problem provided the instructions given below are followed carefully. If the cord is broken, a new length should be obtained and this can be made longer than the length actually required (32" : 82 cm.) to make it easier to handle. Right-hand and left-hand in the instructions which follow are as viewed from the rear of the receiver.

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 then feed the cord through the hole provided in the left-hand drive pulley with the knot on the inside of the rim. The hole should lie at approximately "4 o'clock."
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 (hole lies at about "10 o'clock"). Increase the 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 the cord tightens on the left-hand guide pulley.
7. Tie a double knot in the position marked in (5) above and cut off any surplus cord. Feed the cord 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 pointer to the cord (when viewed from above the cord should pass under the two outer prongs at the rear of the pointer carrier) and then check the drive for free and normal operation.
9. Check the calibration accuracy against a convenient standard transmission.

Re-alignment.

The initial factory alignment of the receiver should hold good for a long period and re-alignment should not be carried out unless there is a clear indication that it is in fact necessary. Alignment should be carried out only by individuals with a sound knowledge of the procedures involved and the test equipment listed below must be available if the task is to be completed satisfactorily. The 2182 kc/s Converter is crystal controlled and the initial factory adjustments should not be altered.

Test Equipment.

1. Signal generator(s) covering 300 kc/s to 30 Mc/s with provision for modulation at 30% (400 c/s) and with an output impedance of 50/75Ω.
2. Crystal controlled harmonic generator providing 100 kc/s markers up to 7.5 Mc/s and 1 Mc/s markers to 30 Mc/s.
3. Output meter matched to 3Ω with plug to mate with external speaker socket.
4. Trimming tools:- Miniature insulated screwdriver with 1/16" blade, small metal-tipped insulated screwdriver and a Neosid Type H.S.1 hexagonal core adjuster.

Re-alignment of the IF Stages and BFO.

First locate and remove the four screws which retain the IF printed wiring board. Turn the board through 90° into a vertical position and replace two of the screws to keep the board in this position. All trimming adjustments are now accessible and there is no need to unsolder connections to the board.

Now stand the receiver on one end to allow connection of the generator output lead to the Range 5 Mixer coil L11 (see underside view of receiver). The generator should be arranged to provide a 50Ω source and the earth lead can be clipped to the screen adjacent to the coil. Disable the Local Oscillator by shorting out the forward section of the tuning gang (C48) and then plug the lead from the output meter into the external speaker socket at the rear of the receiver. The speaker is automatically disconnected on insertion of the plug and the meter will therefore read true output power.

Switch on the generator, allow it adequate time to stabilise against drift and then set the receiver controls as follows:-

Range Switch . .	Range 5.	AGC/BFO	Off.
Tuning . .	550 kc/s.	Audio Filter ...	Out.
RF/AG Gains . .	Maximum.		

Tune the generator to 720 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, all cores being set to the "outer" peak. Re-check each adjustment several times to ensure accurate alignment and then set the attenuator for an output reading of 50mW. Input should be of the order 4μV at 720 kc/s if all is well. If sensitivity is appreciably lower than this, check from the base of TR4 and TR5 in turn, connecting the generator via a 0.05μF isolating capacitor. Figures of the order 35μV and 1mV should be obtained for an output of 50mW. Audio sensitivity with the signal applied across RV2 should be in the region of 12mV at 1000 c/s for 50mW output.

Leave the generator tuned to the intermediate frequency, switch off the modulation and unplug the output meter. Set the BFO pitch control to mid-travel (index on knob at 12 o'clock) and check that the mid-position corresponds to the half-capacity setting of the capacitor and that clockwise rotation of the control results in an increase in capacity. If necessary, slacken the grub screw and re-set the knob before proceeding. With the control at mid-travel, switch on the BFO and adjust the core in L17 for zero-beat. Check for normal operation of the BFO control and then disconnect the generator and the shorting link across C48.

Re-alignment of the RF Section. (Ranges 1-5 only)

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 receiver aerial input socket. Set the generator to provide 1 Mc/s markers and then with the BFO switched on, tune across Range 1, checking the scale calibration at each megacycle point. The scale accuracy should be within 1% (i.e. 300 kc/s at 30 Mc/s, 180 kc/s at 18 Mc/s etc.) and re-alignment of the Local Oscillator should not be attempted unless the error observed is greater than this.

Repeat the check on Ranges 2 and 3, again using the 1 Mc/s markers and then check Range 4. The 100 kc/s markers can be introduced on this range so that checks can be made at the half-megacycle points. Finally, use the 100 kc/s markers to check Range 5.

If errors in excess of 1% are noted, carry out normal tracking procedure using the alignment frequencies and adjustments listed in the Table which follows. Adjustment should be restricted to those ranges on which excessive error is noted and care should be taken to repeat the adjustment of trimmer and core until interaction between the two adjustments is nullified.

Range	Freq.	Trimmer	Freq.	Core
1	29.0 Mc/s	C39	18.0 Mc/s	L12
2	18.0 Mc/s	C40	8.5 Mc/s	L13
3	7.5 Mc/s	C41	3.6 Mc/s	L14
4	3.5 Mc/s	C42	1.5 Mc/s	L15
5	500 kc/s	C43	320 kc/s	L16

Alignment of the RF (Aerial) and Mixer circuits can now be commenced. Disconnect the harmonic generator and connect the standard signal generator (modulation 30% at 400 c/s) and arrange the output impedance to match 75Ω for ranges 1-4 and 400Ω for Range 5. Re-connect the output meter and switch off the BFO.

Adjustments are made at the same frequencies employed for oscillator alignment but using the trimmers and cores listed in the Table below. As with oscillator alignment, each adjustment should be repeated several times to cancel interaction between core and trimmer.

Range	Trimmer			Core		
	Freq.	Aerial	Mixer	Freq.	Aerial	Mixer
1	29.0 Mc/s	C3	C21	18.0 Mc/s	L2	L7
2	18.0 Mc/s	C4	C22	8.5 Mc/s	L3	L8
3	7.5 Mc/s	C5	C23	3.6 Mc/s	L4	L9
4	3.5 Mc/s	C6	C24	1.5 Mc/s	L5	L10
5	500 kc/s	C7	C25	320 kc/s	L6	L11

On completion of the adjustment on Range 5, tune the receiver to the high frequency alignment point (500 kc/s) and the generator to 720 kc/s. Increase the generator output until an indication is obtained on the output meter and then adjust the IF rejector coil L1 for minimum output. Re-tune the generator to 500 kc/s, reduce its output and check the alignment of C7 for maximum signal. Repeat the adjustments and then carry out a sensitivity check on all ranges including the 2182 kc/s pre-tuned channel.

APPENDIX "A"

VOLTAGE ANALYSIS

The voltage readings given in the Table below will prove useful in the event of the receiver developing a fault which makes it necessary to carry out voltage checks. All readings are typical and were taken with a meter having a sensitivity of 20,000Ω/V. A tolerance of 10% will apply to readings taken with a meter of this sensitivity and greater latitude should be allowed when using meters of lower sensitivity.

Readings should be taken under "no-signal" conditions with the controls set as follows. All readings are negative with respect to chassis and the two stabilised supplies should lie in the ranges 8.6-9.6V and 6.4-6.6V respectively. Note that chassis refers to the printed board earthing and not to the frame of the receiver, except when PL1 is fitted at SKT1. Connection is most conveniently made to the screens on the RF board.

WAVECHANGE	Range 1.*	AG GAIN	Maximum.
TUNING	20 Mc/s.	AGC	Off.
RF GAIN	Maximum.	BFO	On.

*Set to "2182 kc/s" position when checking TR11, 12 & 13.

Ref	Collector	Base	Emitter
TR1 †	6.2V	0.8V	0.57V
TR2	6.3V	1.2V	1.0V
TR3	6.25V	1.3V	1.2V
TR4 ††	6.5V	1.0V	0.8V
TR5	8.0V	1.0V	0.0V
TR6	5.9V	0.7V	0.5V
TR7	3.5V	1.0V	1.0V
TR8	9.1V	1.8V	1.7V
TR9	9.1V	0.2V	0.05V
TR10			
TR11	6.3V	0.8V	0.55V
TR12	6.2V	1.5V	1.3V
TR13	6.2V	1.2V	1.15V

† Readings become 6.3V, 0.1V, 0V with RF Gain at minimum.

†† Readings become 7.2V, 0.4V, 0.15V with RF Gain at minimum.

APPENDIX "B"

LIST OF COMPONENT VALUES, TOLERANCES AND RATINGS

Capacitors.

Ref	Value	Type	Tolerance	Wkg. V.
C1	0.035µF	Disc Ceramic	+150% -0%	250V
C2	0.0012uF	Polystyrene	5%	125V
C3	6-25pF	Ceramic Trimmer	-	-
C4	6-25pF	Ceramic Trimmer	-	-
C5	6-25pF	Ceramic Trimmer	-	-
C6	6-25pF	Ceramic Trimmer	-	-
C7	6-25pF	Ceramic Trimmer	-	-
C8	80pF	Silvered Mica	10%	350V
C9	50pF	Tubular Ceramic	10%	750V
C10	20pF	Tubular Ceramic	10%	750V
C10a	50pF	Tubular Ceramic	10%	750V
C11	390pF	Polystyrene	5%	125V
C12	330pF	Polystyrene	5%	125V
C13	200pF	Polystyrene	5%	125V
C14	790pF	Polystyrene	5%	125V
C15	12-36pF	Air-spaced variable	-	-
C16	0.1µF	Polyester	20%	250V
C17	0.0015uF	Tubular Ceramic	+50% -25%	750V
C18	0.1uF	Polyester	20%	250V
C19	390pF	Polystyrene	5%	125V
C20	70pF	Tubular Ceramic	10%	750V
C21	6-25pF	Ceramic Trimmer	-	-
C22	6-25pF	Ceramic Trimmer	-	-
C23	6-25pF	Ceramic Trimmer	-	-
C23a	10pF	Tubular Ceramic	10%	750V
C24	6-25pF	Ceramic Trimmer	-	-
C25	6-25pF	Ceramic Trimmer	-	-
C26	50pF	Tubular Ceramic	10%	750V
C26a	50pF	Tubular Ceramic	10%	750V
C27	12-365pF	Air-spaced variable	-	-
C28	0.1uF	Polyester	20%	250V
C29	0.005uF	Tubular Ceramic	10%	750V
C30	0.01uF	Metallised Paper	20%	200V
C31	0.1uF	Polyester	20%	250V
C32	0.047uF	Polyester	20%	250V
C33	0.1uF	Polyester	20%	250V
C34	70pF	Tubular Ceramic	10%	750V
C35	40pF	Tubular Ceramic	10%	750V
C36	-	Reference not allocated	-	-
C37	790pF	Polystyrene	5%	125V
C38	180pF	Polystyrene	2%	125V
C39	6-25pF	Ceramic Trimmer	-	-
C40	6-25pF	Ceramic Trimmer	-	-
C41	6-25pF	Ceramic Trimmer	-	-
C42	6-25pF	Ceramic Trimmer	-	-
C43	6-25pF	Ceramic Trimmer	-	-
C44	330pF	Polystyrene	2%	125V

Ref	Value	Type	Tolerance	Wkg. V.
C45	0.0032uF	Polystyrene	5%	125V
C46	0.0018uF	Polystyrene	5%	125V
C47	12pF	Tubular Ceramic	10%	750V
C47a	90pF	Comprising 10pF Tubular Cer. and 80pF Polystyrene	10% 5%	750V 125V
C48	12-365pF	Air-spaced variable.	-	-
C49	0.1uF	Polyester	20%	250V
C50	0.1uF	Polyester	20%	250V
C51	300pF	Polystyrene	5%	60V
C52	300pF	Polystyrene	5%	60V
C53	0.1uF	Polyester	20%	250V
C54	0.1uF	Polyester	20%	250V
C55	10uF	Tubular Electrolytic	+50% -10%	16V
C56	0.1uF	Polyester	20%	250V
C57	300pF	Polystyrene	5%	60V
C58	300pF	Polystyrene	5%	60V
C59	0.1uF	Polyester	20%	250V
C60	250pF	Polystyrene	5%	60V
C61	0.1uF	Polyester	20%	250V
C62	0.1uF	Polyester	20%	250V
C63	10uF	Tubular Electrolytic	+50% -10%	16V
C64	0.047uF	Polyester	20%	250V
C65	0.01uF	Metallised Paper	20%	150V
C66	100uF	Tubular Electrolytic	+100% -20%	15V
C67	1pF	Tubular Ceramic	0.5pF	750V
C68	390pF	Polystyrene	2%	125V
C69	640pF	Polystyrene	2%	125V
C70	5-60pF	Air-spaced variable	-	-
C71	0.1uF	Polyester	20%	250V
C72	0.1uF	Polyester	20%	250V
C73	0.1uF	Polyester	20%	250V
C74	0.01uF	Metallised Paper	20%	200V
C75	100uF	Tubular Electrolytic	+100% -20%	15V
C76	0.1uF	Polyester	20%	250V
C77	100uF	Tubular Electrolytic	+100% -20%	15V
C78	1.25uF	Tubular Electrolytic	+100% -10%	16V
C79	100uF	Tubular Electrolytic	+100% -20%	15V
C80	0.25uF	Metallised Paper	20%	150V
C81	350uF	Tubular Electrolytic	+100% -20%	12V
C82	10uF	Tubular Electrolytic	+50% -10%	16V
C83	1000uF	Tubular Electrolytic	+100% -20%	12V
C84	0.1uF	Disc Ceramic	+50% -20%	500V
C85	180pF	Polystyrene	2%	125V
C86	790pF	Polystyrene	5%	125V
C87	0.1uF	Polyester	20%	250V
C88	0.1uF	Polyester	20%	250V
C89	180pF	Polystyrene	2%	125V
C90	0.005uF	Tubular Ceramic	10%	750V
C91	0.01uF	Polyester	20%	250V
C92	390pF	Polystyrene	5%	125V
C93	0.01uF	Polyester	20%	250V
C94	200pF	Polystyrene	2%	125V

Ref	Value	Type	Tolerance	Wkg. V.
C95	200pF	Polystyrene	2%	125V
C96	6-25pF	Ceramic Trimmer	-	-
C97	20pF	Tubular Ceramic	5%	750V
C98	0.1uF	Disc Ceramic	+50% -20%	500V

Resistors.

Ref	Value	Tol	Rating
R1	68,000 ohms	10%	½-watt
R2	1,000 ohms	10%	½-watt
R3	470 ohms	10%	½-watt
R4	68 ohms	10%	½-watt
R5	100 ohms	10%	½-watt
R6	220 ohms	10%	½-watt
R7	100 ohms	10%	½-watt
R8	15,000 ohms	10%	½-watt
R9	3,300 ohms	10%	½-watt
R10	1,000 ohms	10%	½-watt
R11	390 ohms	10%	½-watt
R12	Not used	.	.
R13	22 ohms	10%	½-watt
R14	150 ohms	10%	½-watt
R15	100 ohms	10%	½-watt
R16	15,000 ohms	10%	½-watt
R17	4,700 ohms	10%	½-watt
R18	100 ohms	10%	½-watt
R19	470 ohms	10%	½-watt
R20	68,000 ohms	10%	½-watt
R21	3,300 ohms	10%	½-watt
R22	10,000 ohms	10%	½-watt
R23	470 ohms	10%	½-watt
R24	1,500 ohms	10%	½-watt
R25	33,000 ohms	10%	½-watt
R26	4,700 ohms	10%	½-watt
R27	470 ohms	10%	½-watt
R28	8,200 ohms	10%	½-watt
R29	100 ohms	10%	½-watt
R30	100 ohms	10%	½-watt
R31	470 ohms	10%	½-watt
R32	1,000 ohms	10%	½-watt
R33	1,000 ohms	10%	½-watt
R34	22,000 ohms	10%	½-watt
R35	47,000 ohms	10%	½-watt
R36	6,800 ohms	10%	½-watt
R37	82,000 ohms	10%	½-watt
R38	15,000 ohms	10%	½-watt
R39	1,200 ohms	10%	½-watt

Ref	Value	Tol.	Rating
R40	4,700 ohms	10%	½-watt
R41	2,200 ohms	10%	½-watt
R42	47,000 ohms	10%	½-watt
R43	12,000 ohms	10%	½-watt
R44	680 ohms	10%	½-watt
R45	0.18M ohms	10%	½-watt
R46	2,200 ohms	10%	½-watt
R47	39 ohms	5%	½-watt
R48	5 ohms w.w.	5%	3-watt
R49	100 ohms	10%	½-watt
R50	39 ohms	5%	½-watt
R51	100 ohms	10%	½-watt
R52	10 ohms w.w.	5%	6-watt
R53	40 ohms w.w.	5%	6-watt
R54	68,000 ohms	10%	½-watt
R55	1,000 ohms	10%	½-watt
R56	470 ohms	10%	½-watt
R57	190 ohms	10%	½-watt
R58	220 ohms	10%	½-watt
R59	10,000 ohms	10%	½-watt
R60	3,300 ohms	5%	½-watt
R61	390 ohms	10%	½-watt
R62	330 ohms	10%	½-watt
R63	1,000 ohms	10%	½-watt
R64	10,000 ohms	10%	½-watt
R65	2,200 ohms	10%	½-watt

Potentiometers.

Ref	Value	Type
*RV1	10,000 ohms	Carbon
RV2	5,000 ohms	Carbon
	*With double-pole switch.	

APPENDIX "C"

SPARES

The following list details all major spares for the EC10A/2 receiver. Spares should be ordered by quoting the Circuit Ref. (where applicable), the written description given in the list and the Part No. in the right-hand column. The Serial No. of the receiver should be stated in all communications.

All orders and enquiries should be addressed to:-

EDDYSTONE RADIO LTD., SALES & SERVICE DEPT., ALVECHURCH RD., BIRMINGHAM, ENGLAND.

In cases of extreme urgency, ring PRIory 2231/4, cable EDDYSTONE Birmingham or use. TELEX 337081

Ref	Description	Part No.
	INDUCTORS	
L1	720 kc/s IF Rejector coil	D3429
L2	Range 1 RF (Aerial) coil	D3189
L3	Range 2 RF (Aerial) coil	D3190
L4	Range 3 RF (Aerial) coil	D3191
L5	Range 4 RF (Aerial) coil	D3192
L6	Range 5 RF (Aerial) coil	D3423
L7	Range 1 Mixer coil	D3194
L8	Range 2 Mixer coil	D3195
L9	Range 3 Mixer coil	D3196
L10	Range 4 Mixer coil	D3197
L11	Range 5 Mixer coil	D3424
L12	Range 1 Oscillator coil	D3199
L13	Range 2 Oscillator coil	D3426
L14	Range 3 Oscillator coil	D3427
L15	Range 4 Oscillator coil	D3428
L16	Range 5 Oscillator coil	D3425
L17	Beat Oscillator coil	6798P
L18	Audio Filter coil	D3216
L19	2182 kc/s Converter RF (Aerial) coil	D3656
L20	2182 kc/s Converter Mixer coil	D3657
L21	2182 kc/s Converter Crystal Oscillator coil	D3658
CH1	Filter choke	D2414/1
CH2	Filter choke } Voltage Converter Unit	D2854
CH3	Filter choke } Voltage Converter Unit	D2854
	TRANSFORMERS.	
IFT1	1st IF transformer (720 kc/s)	6795P
IFT2	2nd IF transformer (720 kc/s)	6796P
IFT3	3rd IF transformer (720 kc/s)	6797P
T1	Audio Driver transformer	6657P
T2	Audio Output transformer (3 ohms and 600 ohms)	7141P

Ref	Description	Part No.
	SWITCHES	
S1	Range Switch: Clicker mechanism	7140P
	Wafers: S1a/c, S1e/f, S1g/h	5393P
	Wafers: S1b, S1d, S1i	5404P
	Wafers: S1j	D3475
	Wafers: S1k, S1l, S1m	D3524
	Wafers: S1n	D3676
S2/5	Push-switch assembly	6510P
S6	Part of RV1	-
S7	Voltage Selector Switch	4771P
	TUNING CAPACITORS & ASSOCIATED ITEMS	
-	3-gang tuning capacitor (3 x 12-365pF)	6528P
-	BFO tuning capacitor (5-60pF single-gang)	D830
-	Flexible coupler for 3-gang tuning capacitor	D2017
	PLUGS, SOCKETS, TERMINALS ETC.	
-	Coaxial plug (Aerial Input)	6712/1P
-	Adaptor for aerial connector	6713P
SKT1	Earthing socket	6941P
SKT2	10-way socket (internal connector to Voltage Conv. Unit)	6286P
SKT3	6-way supply socket (fixed)	7171P
SKT4	Aerial socket (coaxial)	6370P
PL1	Plug for SKT1	6943/1P
PL2	10-way plug (internal connector to Voltage Conv. Unit)	6285P
PL3	6-way supply plug (free female)	7170P
-	Cover for supply plug	7172P
-	Earth terminal	6371P
JK1/2	Jack socket (as used for telephones and ext. speaker)	6660P
-	Plug (as used for telephones and ext. speaker)	6567P
	CRYSTALS	
XL1	Crystal 2902 kc/s ± .002% 40pF Style D.	7143P
	MISCELLANEOUS	
RV1	RF Gain control (with switch)	6861P
RV2	AF Gain control	6860P
-	Dial bulbs (L.E.S. 6V-50mA-6.7mm)	6659P
-	Dial bulb holders	6600P
-	Loudspeaker (internal) 5" dia.	7347P
-	Loudspeaker (rack-mounted receiver only) 3x2 eliptical	7151P
-	Fuses (1A x 20mm)	7173P
-	Fuseholder	6372P
-	Drive assembly	LP2864
-	Pointer assembly (less pointer steady)	D3215
-	Dial glass (calibrated)	D3649
-	Knobs (large)	6250P
-	Knobs (small)	7139P

APPENDIX "D"

COMPARISON OF MODELS EC10A AND EC10A/2

The main differences between these two versions of the basic EC10 receiver are as follows:-

1. The EC10A version is suitable for use with external DC supplies of 12 and 24V, with an internal battery pack comprising six 1.5V dry cells, or standard AC mains supplies. (The standard 12/24V Voltage Adaptor is removed for mains operation or dry battery operation).

   The EC10A/2 operates from external supplies of 12 or 24V only.

2. The EC10A/2 has an additional position on the Wavechange switch permitting crystal controlled reception on the International HF Calling and Distress Freq. 2182 kc/s.

3. The EC10A/2 has provision for desensitising with an external switch.

4. The EC10A/2 has a screened 600Ω output for feeding a distant loudspeaker unit via a remote matching transformer.

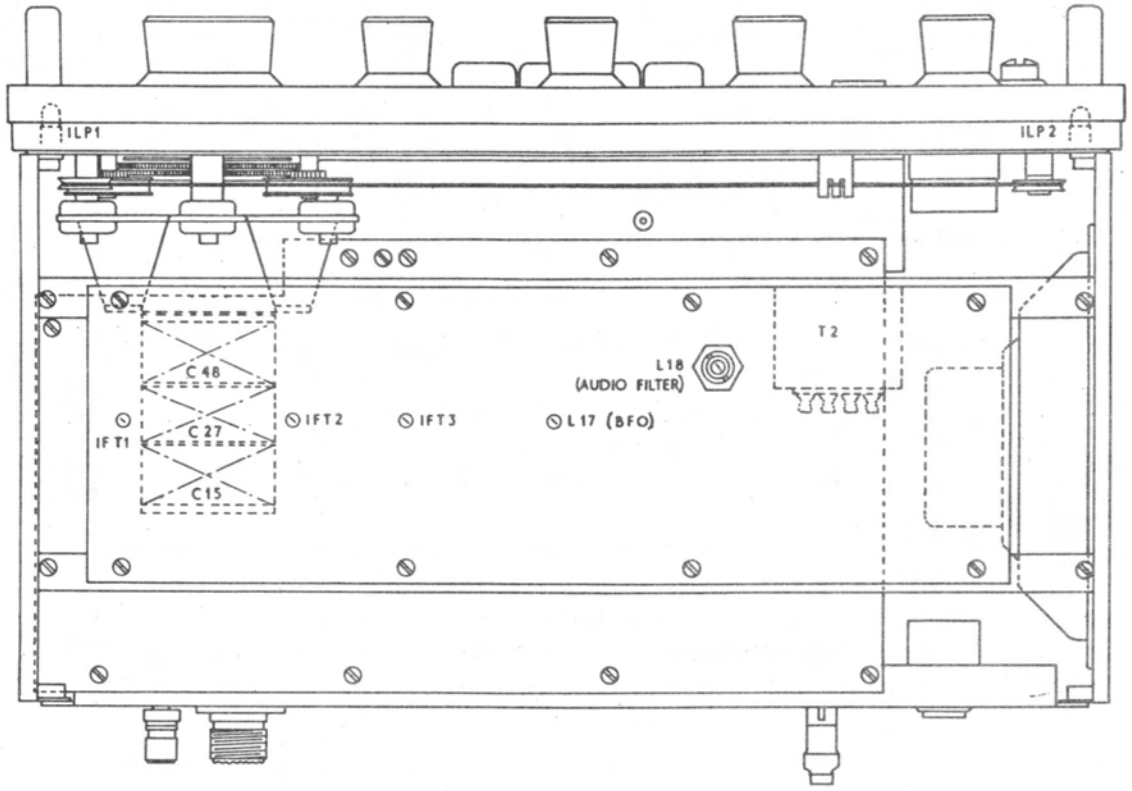
5. The EC10A/2/RM has a spare loudspeaker for use with an associated receiver forming part of the same installation.

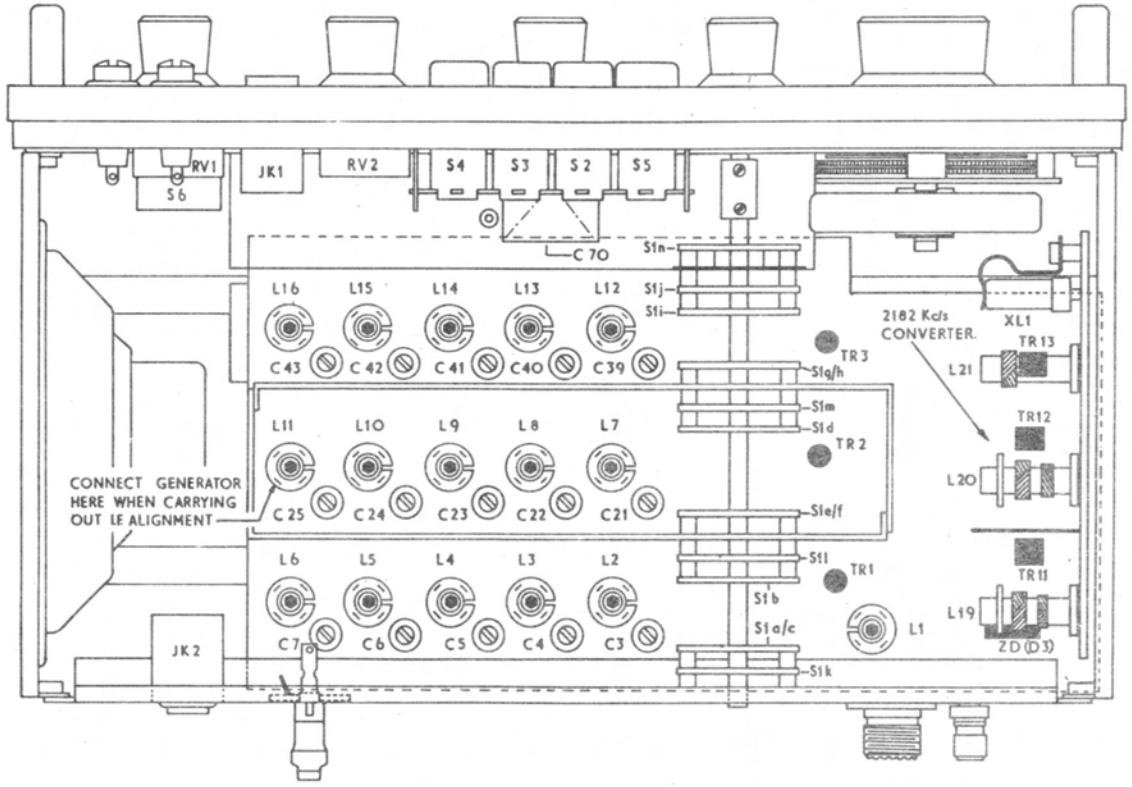
EC10A/2 and EC10A/2/RM receivers are instantly recognisable by the white scale plate with black calibration. EC10A receivers have grey scale plate with white calibration.

CIRCUIT REVISION

The following changes refer to the circuit diagram bound at the rear of the manual. Corrections have been incorporated in the text where appropriate.

1. Change value of C10 to read:- "20pF."
2. Change TR5 to read:- "OC171."
3. Delete base diagram for GM290 transistor.
4. Add a 10pF capacitor across tuned winding of L9 (Reference "C23a").
5. Add a 150Ω resistor in series with lead from S1h to primary of L12 (Reference "R14").
6. SKT3/4 should be earthed via SKT2/2.
7. PL2/7 and SKT2/7 should be connected respectively to cabinet earth and Voltage Converter frame.





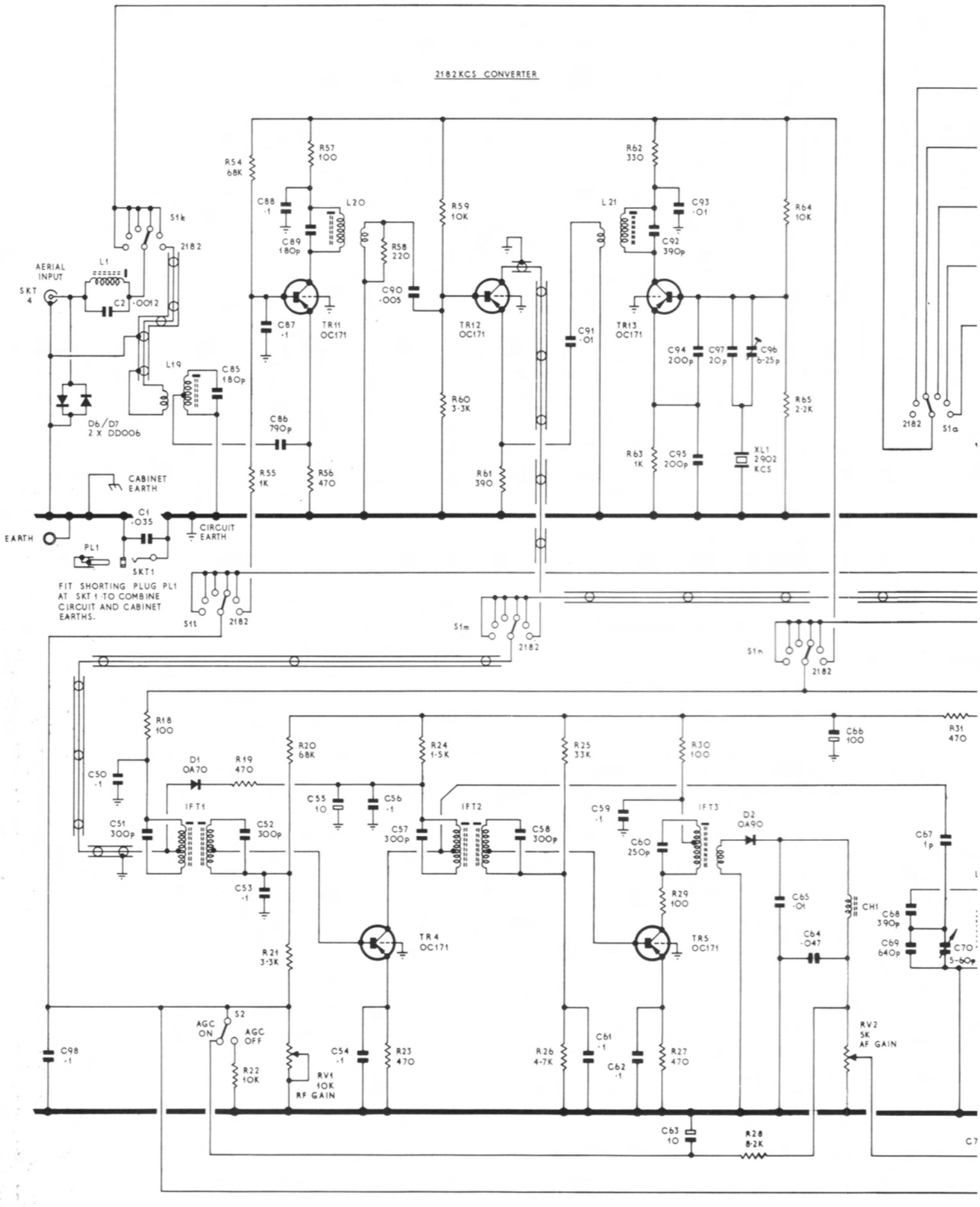
Plan and Underside Views of EC10A/2 Receiver.

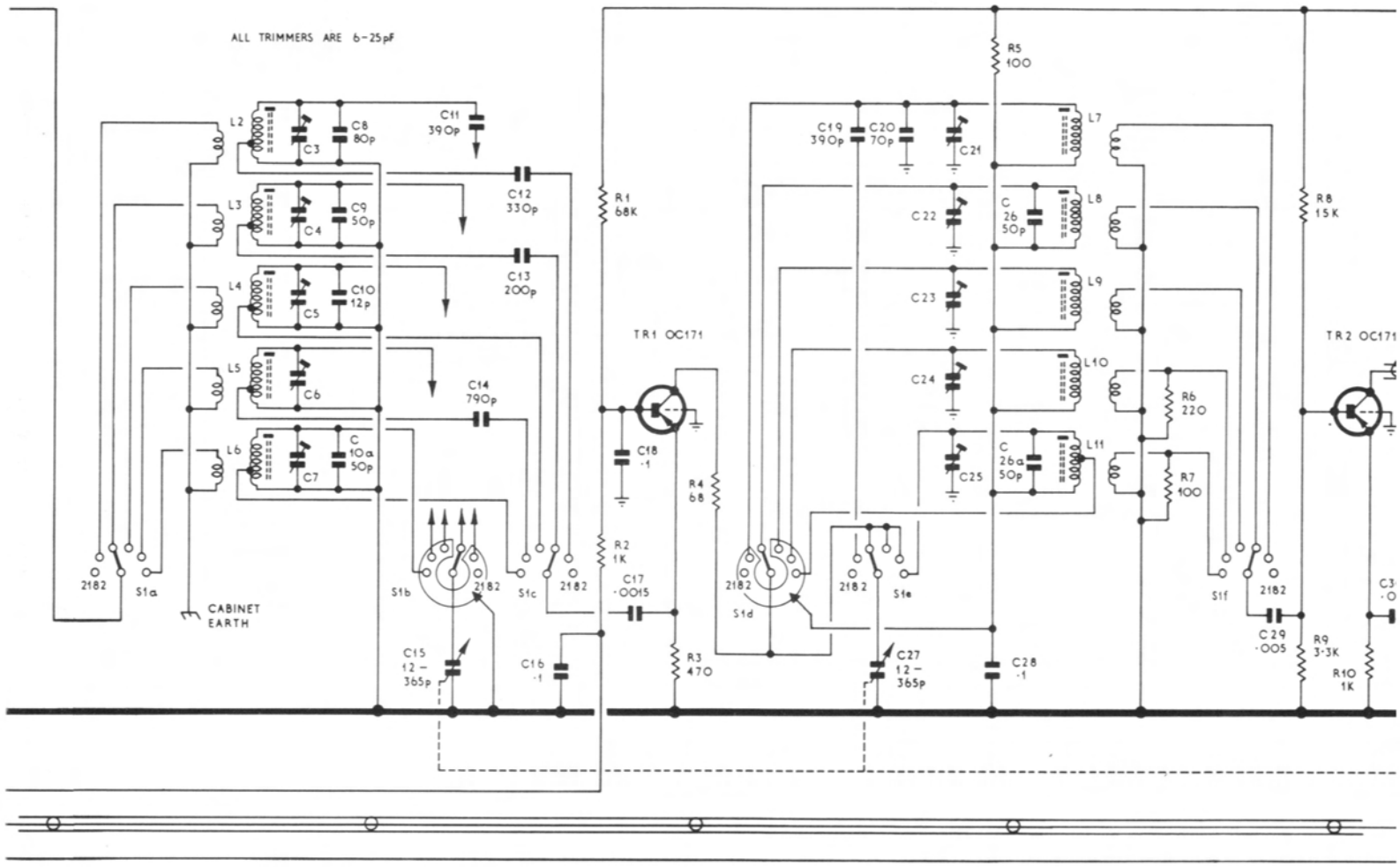
EDDYSTONE MODEL EC10A2/2

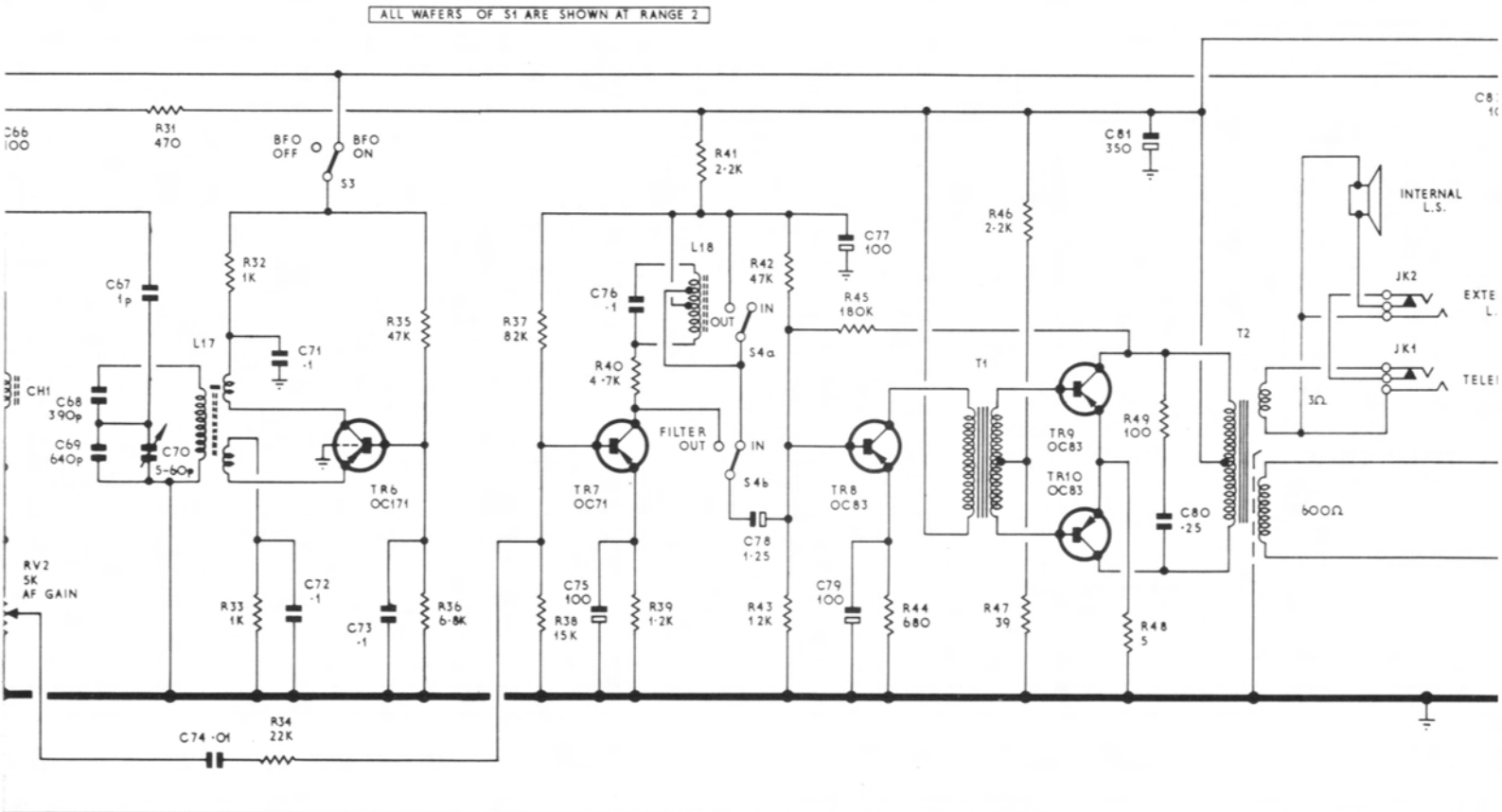
This receiver is a variant of the EC10A2/3 (previously EC10A/2/RM) from which it differs in that only one of the two panel-mounted loudspeakers is fitted. Additionally, the internal 5" diameter speaker which is retained on the EC10A2/3 version, is omitted on the EC10A2/2. The second speaker port on the panel is retained on the EC10A2/2 to permit installation of an additional speaker if required. This would normally be used with associated equipment and not with the EC10A2/2, e.g. as part of a local intercommunication link.

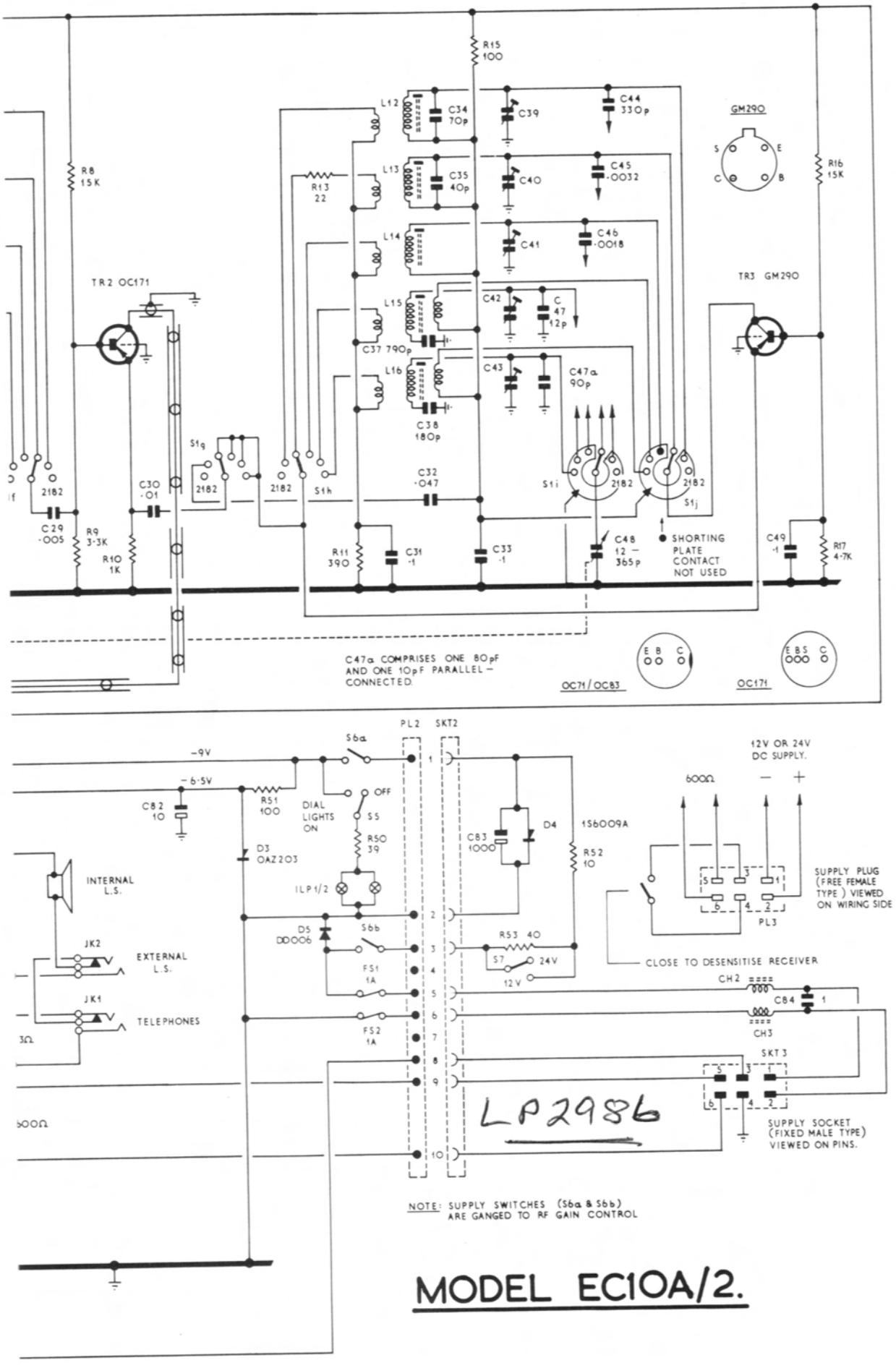
The internal loudspeaker should be deleted on the circuit diagram at the rear of the Instruction Manual, and a 5Ω (3-watt wirewound) resistor should be shown connected from the auxiliary contact on the telephone socket to the lower end of the 3Ω winding. This component should be allocated the circuit reference R66. Its purpose is to prevent damage to the output transistors in the event of the receiver being operated without the external speaker connected and with the telephone plug out.

The internal speaker connecting leads are left in-situ, the two terminations being suitably insulated to prevent accidental short-circuit. The external speaker will be muted on insertion of the telephone plug.


2182KCS CONVERTER
AERIAL INPUT
SKT 4
L1
C2 ·0012
S1k
2182
L19
C85 180p
D6/D7 2 X DD006
CABINET EARTH
EARTH
C1 ·035
CIRCUIT EARTH
PL1
SKT1
FIT SHORTING PLUG PL1 AT SKT 1 TO COMBINE CIRCUIT AND CABINET EARTHS.
S11
2182
R54 68K
R57 100
C88 ·1
C89 180p
L20
R58 220
C90 ·005
C87 ·1
TR11 OC171
R55 1K
R56 470
C86 790p
R59 10K
TR12 OC171
R60 3·3K
R61 390
S1m
2182
C91 ·01
R62 330
L21
C93 ·01
C92 390p
TR13 OC171
C94 200p
C97 20p
C96 6-25p
R63 1K
C95 200p
XL1 2902 KCS
R64 10K
R65 2·2K
2182
S1a
S1n
2182
R18 100
C50 ·1
D1 0A70
R19 470
IFT1
C51 300p
C52 300p
C53 ·1
R20 68K
C55 10
C56 ·1
R24 1·5K
IFT2
C57 300p
C58 300p
R25 33K
C59 ·1
IFT3
C60 250p
D2 0A90
R30 100
C66 100
R31 470
C67 1p
R29 100
C65 ·01
CH1
C64 ·047
C68 390p
C69 640p
C70 5-60p
TR4 OC171
TR5 OC171
R21 3·3K
S2
AGC ON
AGC OFF
R22 10K
RV1 10K RF GAIN
C54 ·1
R23 470
R26 4·7K
C61 ·1
C62 ·1
R27 470
RV2 5K AF GAIN
C98 ·1
C63 10
R28 8·2K


ALL TRIMMERS ARE 6-25pF
L2
C3
C8 80p
C11 390p
C12 330p
L3
C4
C9 50p
C13 200p
L4
C5
C10 12p
L5
C6
C14 790p
L6
C7
C 10a 50p
2182
S1a
CABINET EARTH
S1b
S1c
S1d
S1e
S1f
C15 12-365p
C16 ·1
R1 68K
TR1 OC171
C18 ·1
R4 68
R2 1K
C17 ·0015
R3 470
R5 100
C19 390p
C20 70p
C21
L7
C22
C 26 50p
L8
C23
L9
C24
L10
C25
C 26a 50p
L11
C27 12-365p
C28 ·1
R6 220
R7 100
R8 15K
TR2 OC171
C29 ·005
R9 3·3K
R10 1K


ALL WAFERS OF S1 ARE SHOWN AT RANGE 2
R31 470
BFO OFF
BFO ON
S3
C67 1p
R32 1K
L17
C71 ·1
R35 47K
CH1
C68 390p
C69 640p
C70 5-60p
TR6 OC171
RV2 5K AF GAIN
R33 1K
C72 ·1
C73 ·1
R36 6·8K
C74 ·01
R34 22K
R41 2·2K
L18
C76 ·1
R42 47K
OUT
IN
S4a
R37 82K
R40 4·7K
FILTER
OUT
IN
S4b
C78 1·25
TR7 OC71
TR8 OC83
C77 100
R45 180K
C75 100
R38 15K
R39 1·2K
R43 1·2K
C79 100
R44 680
R46 2·2K
R47 39
R48 5
C81 350
T1
T2
TR9 OC83
TR10 OC83
R49 100
C80 ·25
3Ω
600Ω
INTERNAL L.S.
JK2
JK1



MODEL EC10A/2.