Q.M.
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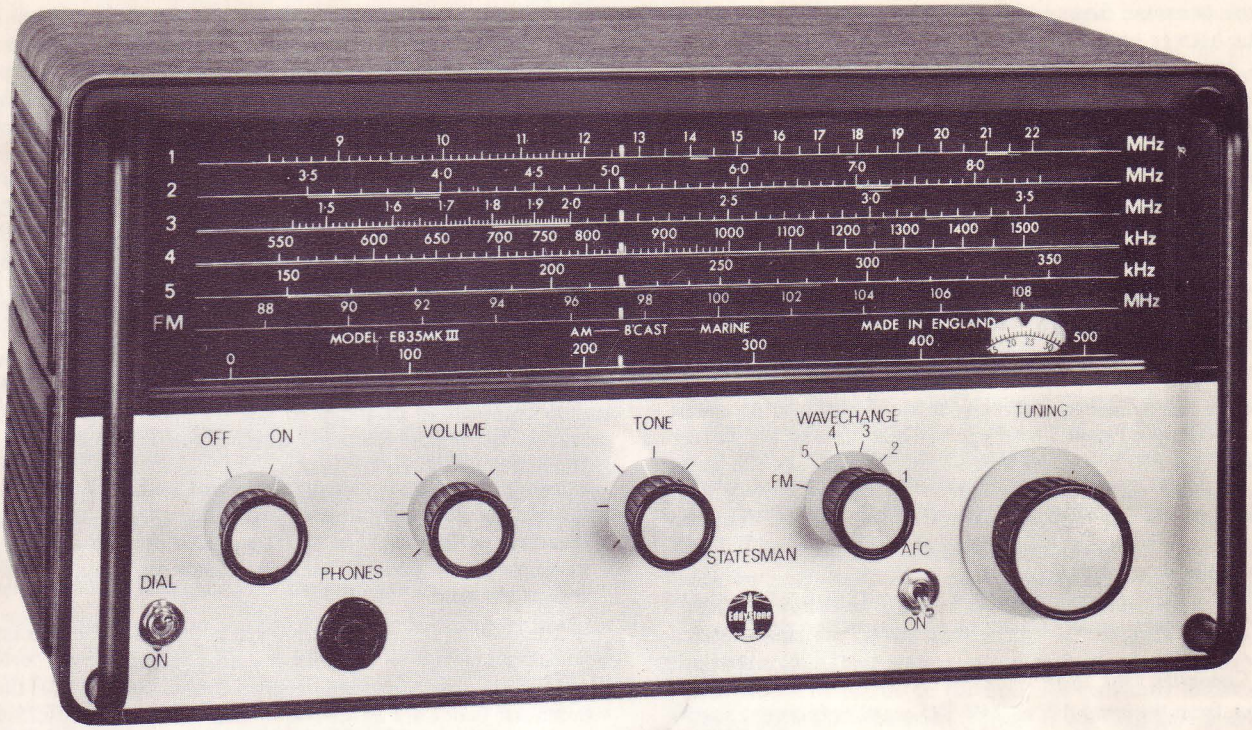
Eddystone

AM/FM RECEIVER MODEL EB35 Mk III

INSTRUCTION MANUAL



The EDDYSTONE Model EB35 Mk III is a fully transistorised AM/FM broadcast receiver designed to meet the requirements of the enthusiastic listener who demands somewhat superior performance to that given by the conventional domestic type of set. It is ideally suited for use as a ship's cabin receiver. Advanced techniques and components of the type normally found only in professional communication equipment are used in the EB35 Mk III receiver and largely account for its unusually good performance.

Sensitivity is high and in addition to reception of the usual long- and medium-wave broadcasts, provision is made for receiving the high quality FM transmissions in the VHF range and the long-distance programmes transmitted on the short-wave bands. The versatility of the receiver is enhanced by providing facilities for feeding any received signal to a tape recorder or alternatively to a hi-fi system when greater volume is required than is available from the internal loudspeaker. Another useful feature is the ability to use the audio frequency section independently of the other stages for amplifying the output from a record-player or microphone.

Power for the receiver is normally derived from a self-contained battery pack but provision is made to fit power units for direct operation from any standard AC mains supply and from ships DC supplies 12/24V DC thus dispensing with the inconvenience of batteries in a permanent installation. A socket is provided to permit connection of telephones for personal listening and another socket permits connection of an external loudspeaker if so desired.

The construction comprises a very strong steel cabinet and chassis as on other receivers in the EDDYSTONE range. Styling and appearance are in keeping with current trends and the finish is to the highest standard with attractive simulated wood cabinet and two tone front panel.

The complete frequency coverage is divided into six ranges as follows:

Range 1	8.5 – 22.0 MHz
Range 2	3.5 – 8.5 MHz
Range 3	1.5 – 3.5 MHz
Range 4	550 – 1500 kHz
Range 5	150 – 350 kHz
FM Band	88.0 – 108.0 MHz

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.

INTERNATIONAL SIZE D (MONO)		VIDOR	HP2
EVER READY	SP2		
EXIDE	T20	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 924A 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 EB35 Mk III receiver when ordering.

IMPORTANT: Ensure that the 924A Power Unit is adjusted for negative earth operation as detailed on the instruction sheet.

Voltage Converter Unit Type 945A

Operation from external 12 or 24V DC supplies (negative earth) is possible by removing the normal battery container and fitting a Voltage Converter Unit in its place. Full details are available on request.

Aerial Connections

Three aerial sockets are provided, together with a coaxial socket which is used only for FM aerials. The other sockets are marked "A1", "A2" and "AE". "A1" is for AM reception only and "A2" for AM or FM reception when using short indoor aerials. "AE" is normally linked to the "EARTH" terminal except as indicated below

A telescopic aerial is supplied and may be fitted to the "A2" socket.

Aerials for use on Ranges 1–5

The type of aerial used with the EB35 Mk III 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 wave 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 length of 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 needed.

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 improvement can be obtained if a balanced aerial 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 downlead 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,13m :21ft. Overall lengths (in feet) for other bands can be calculated by dividing 468 by the frequency in megahertz. (If wavelength only is known, the aerial length should be exactly half this. See following section).

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 "A2", 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 together both the feeder wires and connecting to the "A1" socket. This will give greater signal pick-up and increase the versatility of the aerial.

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.

Aerials for FM reception

In the case of a permanent installation it will usually be found best to employ an outside aerial except when the receiver is situated very close to the transmitting station. A wide variety of commercial designs are available at moderate cost and can be installed by your local supplier who will be in a position to advise on the type of aerial most suited to local conditions. Such an aerial will have a coaxial feeder which should be terminated with the plug supplied and connected to the "FM" aerial socket.

For FM reception in regions of high signal strength an indoor aerial will usually suffice. The simplest type of indoor aerial takes the form of a short piece of insulated wire some 4–6 feet in length connected to the "A2" socket. Its position will have quite a marked effect on reception and some experimentation is called for if optimum results are to be achieved.

Greater signal pick-up and reduced background noise are features of the dipole aerial already referred to in connection with AM reception on the short wave bands. A dipole suitable for receiving FM signals in the VHF band is relatively small and can be conveniently made from a length of ordinary twisted flex. Unravel some 30 inches at one end and straighten the two wires to form a horizontal top with an overall length of approximately 60 inches. Tape the flex to prevent further unravelling. The remainder of the lead will serve as the feeder; one wire being connected to the "A2" socket and the other to the "EARTH" terminal.

As with the single-wire aerial, various positions should be tried for best results and it may be found convenient to tape the aerial proper to a short length of bamboo cane to facilitate handling the wire which should be kept in a horizontal plane. Once the best position has been determined, the wire can be removed from the cane and tacked to a picture rail or otherwise retained in an unobtrusive location.

Use of an FM Attenuator

In some installations it may be found that too strong a signal is picked up by the aerial, especially when this is an outdoor type located only a few miles from the broadcast station. Excessive signal input to the receiver will be indicated by distorted output and a tendency for the station to remain in tune when the tuning is off-set from the correct tuning point. If this effect is noticed, it can be eliminated by removing the aerial plug from the set, plugging it instead into the attenuator and connecting this to the "FM" aerial socket.

Connecting headphones and external loudspeaker

The 'PHONES' socket on the panel of the receiver can be used for connection of headphones for personal listening. Headphones should preferably be of low impedance and the 'high quality' type are recommended. Inserting the plug in the socket automatically switches off the internal/external loudspeaker.

An external loudspeaker socket is provided at the rear of the receiver. The external loudspeaker should have an impedance in the range 8–15 ohms and can be any size or type. Inserting the plug in 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 and the volume control on the tape recorder should be used to control the recording level in the usual manner. The receiver speaker (and telephone output) function as before so that when feeding into a hi-fi installation the receiver volume control should be set to give minimum output. The output from the hi-fi speaker(s) will be controlled by the amplifier volume control in the normal way.

Using the receiver as an audio amplifier

A second plug is supplied with the receiver for use when it is required to use the audio stages 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 EB35 Mk III will be found just as easy to operate as any other domestic type receiver. Controls have been kept to a minimum in the interest of simplicity and the user will quickly become familiar with their functions.

Assuming that batteries have been fitted and a suitable aerial connected as described earlier, the receiver is 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 position and can be readjusted 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 controls and requires over fifty revolutions to give a complete traverse of the pointer. Flywheel-loading is employed and the control can be "spun" for rapid movement of the pointer across the dial. The very high reduction ratio makes for ease of tuning on the short wave bands and helps considerably in obtaining the precise setting required for FM reception. In this connection it should be noted that whereas a small degree of mistuning is acceptable on the other frequency bands, this is not the case when listening on FM. Mistuning of an FM signal will introduce distortion and so make the signal unpleasant to listen to. It is best therefore to always make a point of tuning *across* the signal so that the correct tuning point can be readily determined. The tuning must be set to the exact centre of the transmission.

Dial calibration is in terms of frequency rather than wavelength, a feature which will be found advantageous especially when tuning on the short wave ranges. Published frequencies for stations using these bands are precise whereas the wavelengths quoted are often approximate. These stations can therefore be selected more rapidly than would otherwise be the case. All broadcast bands are underlined on the scales to assist the user in locating their position.

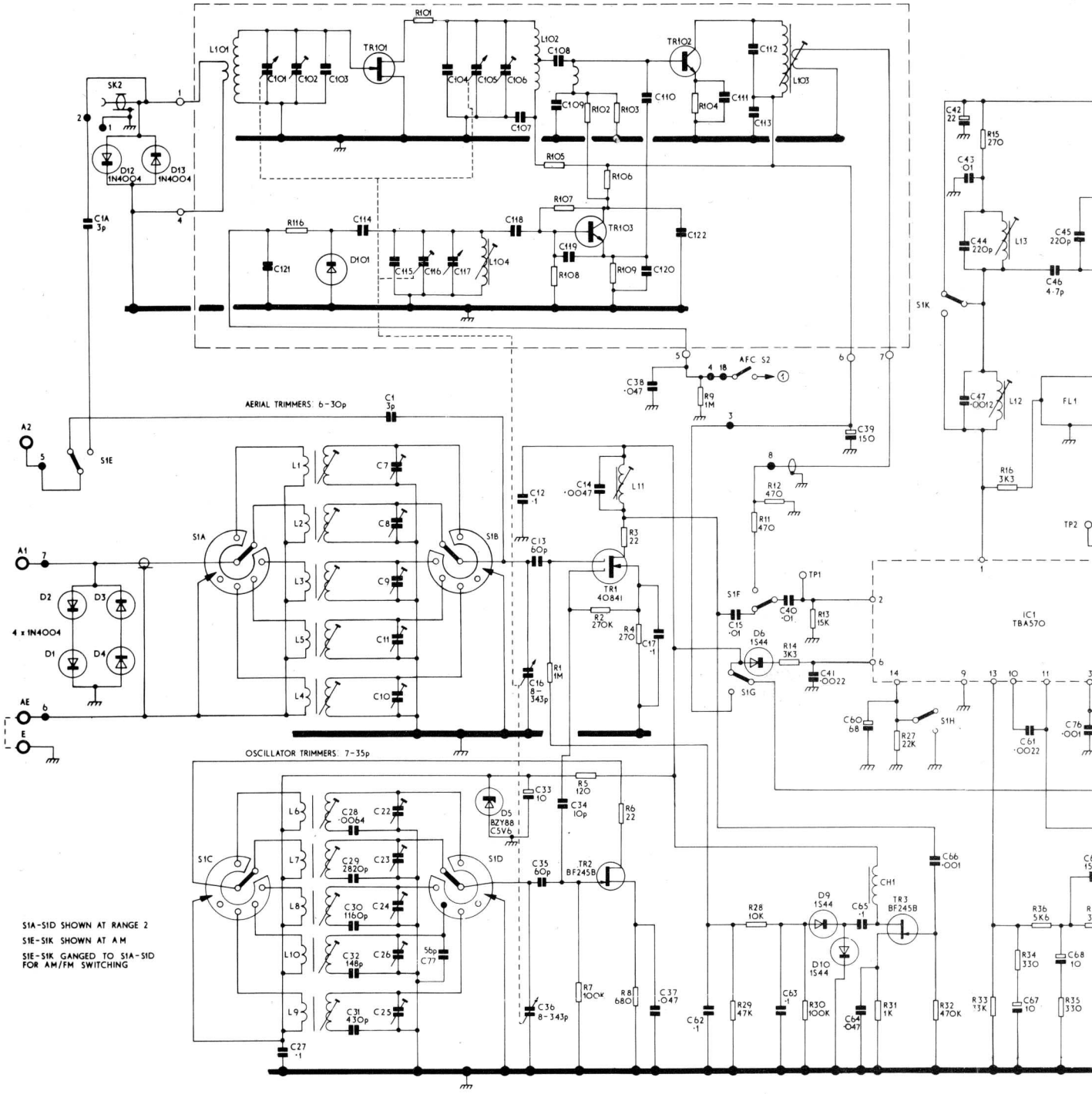
If the wavelength but not the frequency of a station is known, the latter can be determined quite easily by making a simple calculation. Dividing 300 by the wavelength will give the frequency in megahertz. For example, a station on 100 metres would appear on a frequency of 3 MHz, one on 50 metres at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

On the long and medium wavebands, frequencies are usually given in kilohertz (kHz) and since 1 MHz = 1000 kHz, the figure in MHz is simply multiplied by 1000 to obtain the frequency in kHz. 0.5 MHz for example would be 500 kHz, 1.4 MHz is 1400 kHz, etc.

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 preferred stations which can then be tuned more rapidly than would otherwise be the case.

The small toggle 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 dial 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.

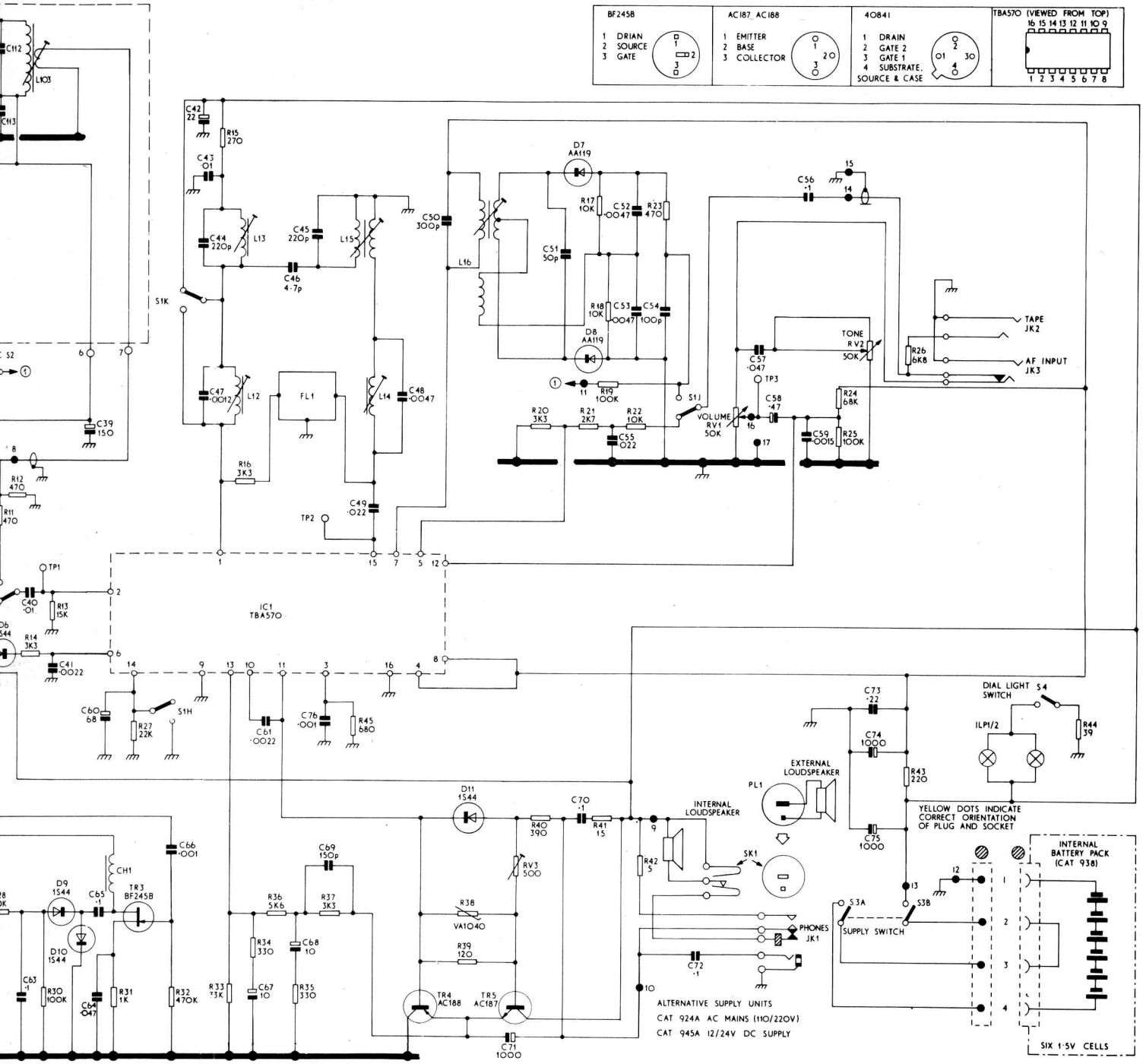
The small toggle switch to the left of the 'TUNING' control switches an automatic frequency control (AFC) circuit into use on the FM band. Having tuned into an FM broadcast station as described above, the AFC may be switched on to compensate for any mistuning or drift in the receiver.



LIST OF COMPONENTS

Capacitors

C1,C1A	3pF Tubular Ceramic ±¼pF, 750V
C2-6,18-21	References not allocated
C7-11	6-30pF Ceramic Trimmer
C12,17,27,56,62,63,65,70,72	0.1µF Polyester ±20% 250V
C13,35	60pF Tubular Ceramic ±10% 750V
C14,48,52,53	0.0047µF Polystyrene ±1% 63V
C15,40,43	0.01µF Disc Ceramic +80% -20% 25V
C16,36	8-343pF 2-gang air-spaced
C22-26	7-35pF Ceramic Trimmer
C28	0.0064µF Polystyrene ±1% 125V
C29	2820pF Polystyrene ±1% 125V
C30	1160pF Polystyrene ±1% 125V
C31	430pF Polystyrene ±1% 125V
C32	148pF Polystyrene ±1% 125V
C33,67,68	10µF Tantalum Electrolytic ±20% 25V
C34	10pF Polystyrene ±1pF 125V
C37,38,57,64	0.047µF Polyester ±20% 250V
C39	150µF Tubular Electrolytic +50% -10% 16V
C41,61	0.0022µF Ceramic ±25% 500V
C42	22µF Tantalum Electrolytic ±20% 20V
C44,45	220pF Polystyrene ±2% 125V
C46	4.7pF Ceramic ±10% 750V
C47	0.0012µF Polystyrene ±1% 125V
C49,55	0.022µF Polyester ±20% 250V
C50	300pF Polystyrene ±2% 125V
C51	50pF Polystyrene ±2% 125V
C54	100pF Polystyrene ±2% 125V
C58	0.47µF Tantalum Electrolytic ±20% 35V
C59	0.0015µF Polystyrene ±2% 125V
C60	68µF Tantalum Electrolytic ±20% 6.3V
C66,76	0.001µF Polystyrene ±5% 125V
C69	150pF Polystyrene ±2% 125V
C71,74,75	1000µF Electrolytic +50% -10% 16V
C73	0.22µF Polycarbonate +10% 250V
C77	56pF Polystyrene ±2% 125V



Resistors

R1,9	1,000,000 Ohm
R2	270,000 Ohm
R3,6	22 Ohm
R4,15	270 Ohm
R5,39	120 Ohm
R7,19,25,30	100,000 Ohm
R8,45	680 Ohm
R10	Reference not allocated
R11,12,23	470 Ohm
R13	15,000 Ohm
R14,16,20,37	3,300 Ohm
R17,18,22,28	10,000 Ohm
R21	2,700 Ohm
R24	68,000 Ohm
R26	6,800 Ohm
R27	22,000 Ohm
R29	47,000 Ohm
R31	1,000 Ohm
R32	470,000 Ohm
R33	33,000 Ohm
R34,35	330 Ohm
R36	5,600 Ohm
R38	Thermistor type VA1040
R40	390 Ohm
R41	15 Ohm
R42	5 Ohm
R43	220 Ohm
R44	39 Ohm

All resistors are 5% 0.3 watt except R42: 5% 3 watt and R44: 5% 0.5 watt.

Potentiometers

RV1	50,000 Ohm log. Carbon
RV2	50,000 Ohm lin. Carbon
RV3	500 Ohm lin. Carbon

Components with reference numbers in the 100 series are part of the FM tuner, and are not available separately.

MAINTENANCE

General

The EB35 Mk III 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 924A – 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 in question 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 returned to you 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 by unscrewing the two knurled retaining screws and disengaging the battery connector.
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 rear inner edge of the cabinet and the ends of the metal strap which links the side plates of the receiver near the top of the cabinet.
4. Slide the cabinet away from the panel.

Dial Bulbs

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

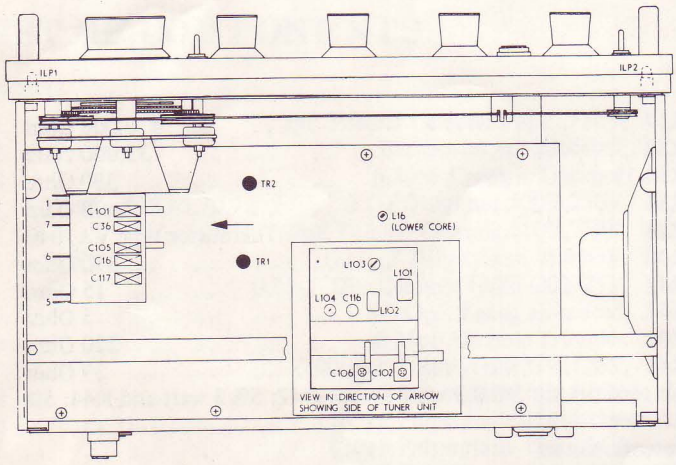
Re-stringing the pointer drive cord

In the unlikely event of the pointer drive cord either breaking or slipping out of the pulley grooves, replacement can be simply effected if the instructions given below are carefully followed. If the cord is broken, a new length should be obtained which should be about 33½ in (830mm) long. Right-hand and left-hand in these instructions are as viewed from the front of the receiver.

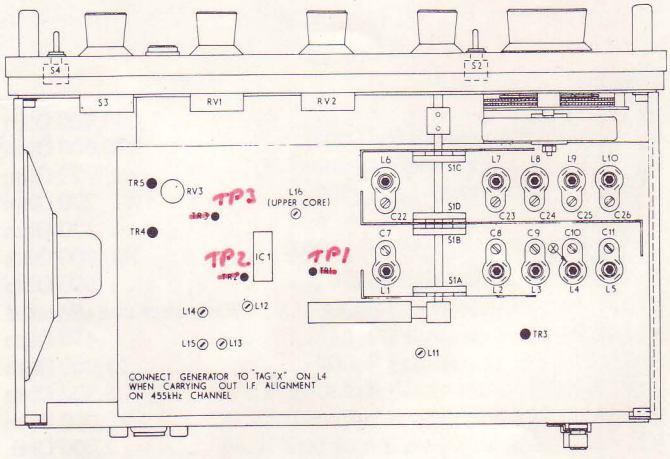
1. Remove the "E" clips retaining both cord drums. Remove the existing cord and the cord drums. Take care not to mislay the "E" clips.
2. If the existing cord is in good condition it can be utilised as it is. If new cord is being used feed one end through the hole in the cord drum from the outside and tie a secure knot about 1 in (25mm) from the end of the string, on the inside of the drum. Repeat this with the other cord drum. The length of string between the drums should be about 31½ in (800mm).
3. Turn the TUNE knob fully clockwise to the limit of its travel.
4. Wind four turns of cord onto the right-hand cord drum so that the cord will leave the top of the drum going towards the right. With the hole in the drum at the top put the drum on the spindle and mesh the gear on the drum with the main gear.
5. Keeping tension on the cord, pass the cord under and over the right-hand guide pulley, across the tuning scale from right to left, over and under the spring loaded jockey pulley and from left to right across the tuning scale.
6. Put the second cord drum on its spindle and without meshing the gears turn the drum clockwise (viewed again from the front) to take up the slack in the cord. Continue winding cord onto the drum until the jockey arm at the left-hand end of the scale is vertical. Mesh the gears.
7. Replace the two "E" clips to retain the cord drums. Check that the drive runs freely and the cord lies neatly on the drums without crossing.
8. Turn the TUNE knob fully anti-clockwise to give "0" on the vernier scale. Align the cursor to "0" on the logging scale and ease the cord into the slots on the top of the cursor, the cord passing above the outer prongs and below the centre prong. Check the drive again for free and normal operation, trimming the ends of the cord if necessary.

Re-alignment

The initial factory alignment of the receiver should hold for a long period and re-alignment should not be carried out unless there is a clear indication that this course of action is necessary. It should be noted that any figures quoted for sensitivity etc., in the instructions which follow are based on the assumption that a new set of batteries is in use.



PLAN VIEW OF MODEL EB35 MKIII RECEIVER



UNDERSIDE VIEW OF MODEL EB35 MKIII RECEIVER

The following test equipment is required for satisfactory re-alignment of the EB35 Mk III receiver:

Signal generator(s) covering the two intermediate frequencies (455 kHz and 10.7 MHz), the AM range (150 kHz – 22 MHz) and the FM band 88–108 MHz.
Output meter matched to 8Ω with plug to mate with external loudspeaker socket.

Trimming tools: Miniature insulated screwdriver with 1.6mm blade (length 50mm maximum), small metal-tipped insulated screwdriver and a Neosid HS1 hexagonal core adjuster.

455 kHz Stages

Stand the receiver on one end to allow connection of the generator output lead to the Range 5 Mixer coil L4 (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 (C36) and then plug the output meter into the external loudspeaker socket. The speaker is automatically disconnected on insertion of the plug and the meter if matched to 8Ω will read the 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 Volume .. .. Maximum
Tuning .. .. 350 kHz Tone.. .. Fully clockwise

Tune the generator to 455 kHz (with modulation 30% at 400 Hz) and then set the attenuator to give a reading of approximately 50mW on the output meter. Peak the cores in L11, L12 and L14 for maximum output. 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 4uV. If the IF sensitivity is lower than this figure, check the AF sensitivity by introducing an audio generator across RV1. At 1,000 Hz an input of 5mV should give an output of 50mW.

Disconnect the generator(s) and remove the shorting link from C36 on completion of the alignment.

10.7 MHz Stages

N.B. The 10.7 MHz IF Transformer is not aligned with the other 10.7 MHz circuits. It forms part of the FM Tuner Unit and is adjusted when aligning this unit later in the alignment procedure.

Switch on the generator, allow adequate time to stabilise against drift and set all receiver controls as for 455 kHz alignment except the Range Switch which should be at FM. Short out the one discriminator diode D8 and connect the output meter to the external loudspeaker socket as before. Tune the generator to 10.7 MHz, adjust for 30% modulation at 400 Hz and then connect its output lead to TP1 via 0.1μF. The adjacent screen can be used as an earthing point.

Peak the cores in the 10.7 MHz transformers L13, L15 and L16 for maximum reading on the output meter. Remove the short from D8 and adjust the secondary (upper) core of L16 for minimum signal.

IF sensitivity using an AM signal and with D8 shorted should be of the order 30uV for 50mW output.

RF Alignment (Ranges 1–5)

The first step in this part of the procedure is a check on the overall calibration accuracy. Proceed as follows:
Standardise the generator calibration against a reliable frequency standard and connect its output lead to the "A1" socket and "EARTH". The shorting plug should be in position between "AE" and "EARTH".

Select Range 1 and tune the generator and receiver to each mega-hertz point in turn noting the degree of error present. Errors should not exceed 1% (*i.e.* 180 kHz at 18 MHz, 90 kHz at 9 MHz etc.). Repeat on Range 2 and then select Range 3. Checks should be made at 500 kHz intervals on this range followed by checks at 100 kHz intervals on Ranges 4 and 5.

Oscillator adjustments should not be touched unless errors of greater than 1% are detected. If re-alignment is found to be necessary, carry out normal tracking procedure using trimmers at the high frequency end of the band and cores at the low frequency end. Each adjustment must be repeated several times to ensure accurate alignment. Alignment frequencies and adjustments are listed in the Table which follows:

Range	Frequency	Trimmer	Frequency	Core
1	20.0 MHz	C22	8.6 MHz	L6
2	8.0 MHz	C23	3.6 MHz	L7
3	3.5 MHz	C24	1.5 MHz	L8
4	1400 kHz	C26	550 kHz	L10
5	330 kHz	C25	160 kHz	L9

Alignment of the RF circuits can now be commenced. The generator is connected to "A1" and "EARTH" as before but must now be adjusted to match the receiver input impedance (75Ω for Ranges 1/3 and 400Ω for Ranges 4/5). The output meter is connected as for IF alignment. Adjustments are made at the same frequencies used for oscillator alignment but using the adjustments listed in the second Table. Care should be taken to ensure that the aerial circuits are set for best s/n ratio.

Range	Frequency	Trimmer	Frequency	Core
1	20.0 MHz	C7	8.6 MHz	L1
2	8.0 MHz	C8	3.6 MHz	L2
3	3.5 MHz	C9	1.5 MHz	L3
4	1400 kHz	C11	550 kHz	L5
5	330 kHz	C10	160 kHz	L4

FM Alignment

Alignment of the FM tuner is most conveniently carried out by using an AM signal and with D8 shorted out as in alignment of the 10.7 MHz stages. The generator is required to establish the accuracy of the dial calibration, all other adjustments being made on noise to avoid the need for continual re-tuning of the generator to cope with pulling of the receiver oscillator which occurs when the RF circuits are re-tuned.

The calibration check should be carried out with the generator connected either to the FM coaxial socket or to "A2" and "EARTH". Oscillator coil L104 and trimmer C116 should be adjusted at 88 MHz and 105 MHz respectively to nullify any error which may be present. Now switch off the generator and adjust C102 and C106 at 105 MHz for maximum noise output. At 88 MHz also tune IF transformer L103 for maximum noise output. Re-check calibration accuracy and then carry out a sensitivity check (of the order 10μV input for 50mW output). Disconnect the short across D8 before putting the set back into its case.

VOLTAGE ANALYSIS

Reference	Source/ Emitter	Drain/ Collector	Gate 1/ Base	Gate 2
TR1	1V	8.8V	0V	0.4V
TR2	2.2V	5.9V	0V	–
TR3	1.8V	3.5V	0V	–
TR4	4.75V	0V	4.7V	–
TR5	4.75V	9V	4.8V	–

IC1: 16 lead dual-in-line package

1	9V (Note 1)	9	0V
2	1.5V (Note 2)	10	0.75V
3	0.7V	11	4.7V (Note 6)
4	6.4V (Note 3)	12	3.5V (Note 7)
5	0.75V (Note 4)	13	3.75V
6	6V (Note 5)	14	0.6V (Note 8)
7	6.4V (Note 3)	15	0.65V
8	6.4V (Note 3)	16	0V

Notes:
1 8.8V on FM range
2 10V DC range
3 6.5V on FM range
4 0.25V on FM range
5 3.5V on FM range
6 4.8V on FM range
7 25V DC range
8 0V on FM range

TR101, TR102 and TR103 form part of the FM tuner unit and are not accessible for voltage analysis.

All readings are taken under no-signal conditions on Range 5 (except as indicated) using a testmeter with a sensitivity of 20,000 Ω/V. A tolerance of 20% should be allowed. All voltages are positive w.r.t. earth.

SPARES

The following list details all major spares for the EB35 Mk III receiver. The Serial No. of the receiver must be quoted in all correspondence. Orders and enquiries should be directed to the "Sales and Service Dept."

L1	Range 1 Aerial Coil	D4945
L2	Range 2 Aerial Coil	D4946
L3	Range 3 Aerial Coil	D4947
L4	Range 5 Aerial Coil	D4949
L5	Range 4 Aerial Coil	D4948
L6	Range 1 Oscillator Coil	D4950
L7	Range 2 Oscillator Coil	D4951
L8	Range 3 Oscillator Coil	D4952
L9	Range 5 Oscillator Coil	D4954
L10	Range 4 Oscillator Coil	D4953
L11	Mixer Output Coil	D4959
L12	AM IF Coil (INPUT)	D4955
L13	FM IF Filter Coil	D4957
L14	AM IF Coil (OUTPUT)	D4956
L15	FM IF Transformer	D4958
L16	FM Discriminator Coil	6934P
CH1	22mH RF Choke	9445P
L101-L104	Part of FM Tuner	

Semiconductors

TR1	RCA Type 40841
TR2	Mullard Type BF245B
TR3	Mullard Type BF245B
TR4	Mullard Type AC188
TR5	Mullard Type AC187
D1	Texas Type 1N4004
D2	Texas Type 1N4004
D3	Texas Type 1N4004
D4	Texas Type 1N4004
D5	Mullard Type BZY88C5V6
D6	Texas Type 1S44
D7	Mullard Type AA119
D8	Mullard Type AA119
D9	Texas Type 1S44
D10	Texas Type 1S44
D11	Texas Type 1S44
D12	Texas Type 1N4004
D13	Texas Type 1N4004
TR101,TR102,TR103,D101	Part of FM Tuner

Miscellaneous

Range Switch:	Clicker mechanism	9356P
	Wafers S1A - S1C	8528P
	Wafer S1D	D4983
AM/FM Switch S1E - S1K		9400P
ON/OFF Rotary Switch		9501P
AGC Switch (S2)		6760P
Dial Light Switch (S4)		8486P
Volume Control		9430P
Tone Control		9430P
Dial Bulbs (L.E.S., 50mA, 6.7mm)		6659P
Dial Bulb Holder		6600P
Phone Socket		9409P
Loudspeaker (3 Ohm 5 inch round)		6482P
Drive Assembly		LP2864
Pointer Assembly		D3215/1
Dial Glass Front (Calibrated)		D5009
Dial Glass Rear		D4966
Knobs: Supply,Wavechange,Volume,Tone		LP3460/1
Tuning		LP3459/1
Tape Socket		6941P
AF Input Socket		6942P
Tape Plug		6943P
AF Input Plug		6943/1P
Aerial Socket Strip		D3209
Earth Terminal		6371P
Shorting Plug A.E		D3210
Loudspeaker Socket		8857P
Loudspeaker Plug		8687P
Co-ax Socket		6087P
Co-ax Plug		6079P
Tuning gang & FM Tuner		9503P

Manufactured in England by

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AMENDMENT NO. 1

The following changes should be incorporated in the spares list and circuit diagram:-

DIODES : : D12 - D13

Delete	Type IN4004
Add	Type BY210

AF INPUT SOCKET

Delete	Part No. 6942P (Socket Black Switched)
Add	Part No. 10503P (Miniature Switched Jack Socket).

AF INPUT PLUG

Delete	Part No. 6943/1P
Add	Part No. 10504P.