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The large diagrams are given in two formats – in A4 size sheets to allow easy printing, and complete as originally published to allow easy on-screen viewing. These versions are in different sections of the document, which can be found within the bookmarks.

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Please get in touch with me at archivist@vmarsmanuals.co.uk.

Richard Hankins, VMARS Archivist, Summer 2004

THIS BOOK IS THE PROPERTY OF H.M. GOVERNMENT

B.R.1618

Handbook for

A.P. 57141 SERIES

RECEIVER B41

ANY SUGGESTIONS FOR AMENDMENTS OR ADDITIONS TO THIS BOOK SHOULD BE SUBMITTED TO THE CAPTAIN SUPERINTENDENT, A.S.R.E., THROUGH THE USUAL CHANNELS

★

RADIO EQUIPMENT DEPARTMENT · ADMIRALTY
SEPT. 1957 (R.E., 691/57)

ADMIRALTY, S.W.1.

SEPTEMBER, 1957.

R.E.691/57

B.R.1618 "Handbook for A.P.57141 Series Receiver B41" having been approved by My Lords Commissioners of the Admiralty is hereby promulgated.

B.R.1618 and Addendum "Handbook for Receiver B41, 1946", is hereby superseded and copies should be disposed of in accordance with instructions in B.R.1.

By Command of Their Lordships

J G Lang

To:-
Flag Officers and
Commanding Officers
of H.M. Ships and
Vessels concerned.

H A N D B O O K F O R A . P . 5 7 1 4 1 S E R I E S ,

R E C E I V E R B 4 1

LIST OF CONTENTS

RECEIVER OUTFITS CDY AND CAR

SUMMARY OF DATA

PURPOSE

Receiver B41 is the main unit in Receiver Outfits CDY and CAR fitted in H.M. Ships and R.N. Shore Wireless Stations respectively. Four versions of the receiver are in service - Patterns 57141/A/B/C.

TYPE OF RECEPTION

C.W. and A.M. Voice.

FREQUENCY RANGE

Five ranges, giving continuous coverage from 14.7 kc/s to 720kc/s. Intermediate frequency is 800 kc/s.

ELECTRICAL CHARACTERISTICS

Sensitivity: 1 μV for 500 mW output, signal+noise to noise ratio 22 dB.

Selectivity:

	Pattern 57141/A		Pattern 57141B/C	
	Wide	Narrow	3 kc/s	1 kc/s
-6 dB	>6.5 kc/s	> 2.5 kc/s	> 3.5 kc/s	>1 kc/s
-30 dB	-	-	-	< 5 kc/s
-40 dB	< 17 kc/s	< 9.5 kc/s	< 15 kc/s	-

A.G.C. Performance:- For 70 dB change in input voltage, the output change is less than 3.5 dB.

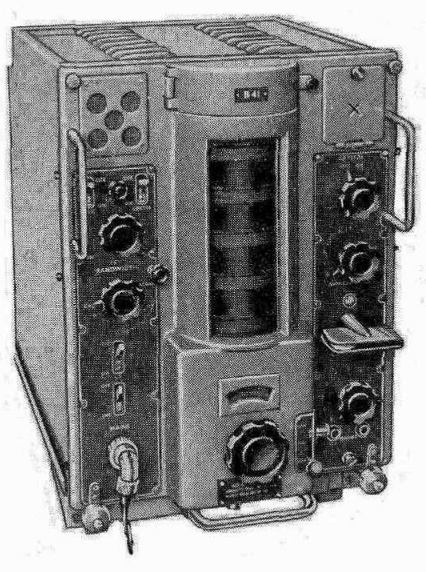
Noise Limiter:- Effective between modulation depths of 10 per cent and 60 per cent.

Max. Power Output:- Loudspeaker 2.5W, ship's control system 35 mW, telephones 14 mW.

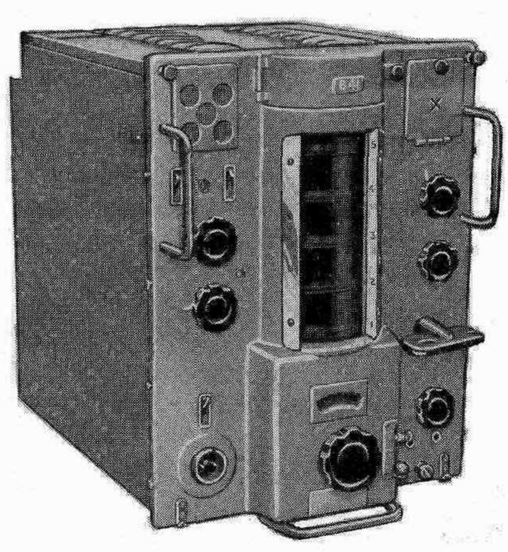
PHYSICAL DATA

(Including resilient mounts and tray)

Height	Width	Depth	Weight
19½ in.	13 in.	16 in.	114 lb



PATTERN 57141/A



PATTERN 57141B/C

BRIEF TECHNICAL DESCRIPTION

The receiver is divided into three separate units as follows:-

R.F. Unit (all patterns)

Stage 1. Bandpass aerial input circuit, followed by r.f. amplifier with anti-cross-modulation control in the grid circuit.

Stage 2. Mixer employing a separate oscillator which can be crystal-controlled. Harmonics from the b.f.o. crystal oscillator are fed to the grid for calibration purposes. A.G.C. is applied.

I.F. Unit

	Patterns 57141/A	Patterns 57141B/C
Stage 3.	I.F. Amplifier, a.g.c. voltage applied.	I.F. Amplifier, a.g.c. voltage applied.
Stage 4.	I.F. Amplifier, a.g.c. voltage applied.	I.F. Amplifier with crystal bandpass filter (1 kc/s) A.G.C. applied.
Stage 5.	I.F. Amplifier, second detector, noise limiter and b.f.o.	I.F. Amplifier, second detector, noise limiter and b.f.o.
	Three bandwidths are available as follows:- 8 kc/s (wide) 3 kc/s (narrow) and 3 kc/s (followed by a 200 c/s note filter).	Three bandwidths are available as follows:- 3 kc/s, 1 kc/s (crystal filter) and 1 kc/s (followed by a 200 c/s note filter).

A.F. and Power Unit

Stage 6. A.F. Amplifier.

Stage 7. Output.

Power supply circuits are incorporated in this unit.

POWER REQUIREMENTS AND CONSUMPTION

Power Supply 115/230V 40/60 c/s.

Consumption 80W.

AERIAL SYSTEM

Standard wire or whip aerial.

REMARKS

Pattern 57141 series receivers are also used in the LF receiver common aerial working system (Outfit EAL). It is then the main unit in Outfit CAZ.

HANDBOOK

B.R.1618.

ESTABLISHMENT LIST

E935.

INSTALLATION SPECIFICATION

B649.

CHANGES

When a change to this handbook is promulgated the brief details required below are to be filled in.

CHANGE No.	AUTHORITY (P Series A.F.O. No.)	DATE OF INSERTION	INITIALS
1	AFO.P202/62	4-DEC-68	JGM
2	AFO P 59/64	4-DEC-68	JGM
3	RNBAS P45/64	4-DEC-68	JGM
4	RNBAS P589/65	4-DEC-68	JGM
5	RNBAS P347/67	4-DEC-68	JGM

Continued Overleaf

AMENDMENT RECORD SHEET

Incorporation of an Amendment List in this publication is to be recorded by signing in the appropriate column and inserting the date of making the amendments

A.L. No.	AMENDED BY	DATE	A.L. No.	AMENDED BY	DATE
1	Incorporated in this issue	—	28		
2	I G Mant	4-12-68	29		
3	I G Mant	4-12-68	30		
4	I G Mant	4-12-68	31		
5			32		
6			33		
7			34		
8			35		
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B.R.1618 - HANDBOOK FOR RECEIVER B41 - CHANGE NO. 5

(D.G.W.(N) - June 1967)

Removal and Insertion Changes

PART 3

Figure 12 After Figure 12, remove and destroy the middle leaf (from C136 to R110) of the Pattern 57141C Components List. Insert new Components List for Receiver B41C (R.F. UNIT) attached (3 leaves).

Figure 18 After Figure 18, remove and destroy the last two leaves (from C236 to S202m, n, p, q, s) of the I.F. Unit B41/A/B/C Components List. Insert new Components List for Receivers B41/A/B/C (I.F. Unit) attached (3 leaves).

Figure 27 Immediately before Figure 27 insert new Components List for Receiver B41C (A.F. and Power Unit) attached (2 leaves).

Manuscript Changes

PART 2

Chapter 6 Paragraph 3, line 1. Insert after "trimming tool" - "(A.P.71479)".

PART 3

Figure 12 On back of Figure 12 delete Components List Receiver B41 (C101 to C135).

Figure 13 On back of Figure 13 delete Components List Receiver B41 (R111 to SKT103).

Figure 18 On back of Figure 18 delete Components List I.F. Unit B41/A/B/C (C201 to C235).

Components List Receiver B41 A.F. and Power Unit (after Figure 26). In title amend "PATTERNS 57141/A/B/C" to read "PATTERNS 57141/A/B". At the head of each section amend "B41/A/B/C" to read "B41/A/B".

Record the insertion of this change on the Change Record Leaf at the beginning of B.R.1618.

B.R.1618 - HANDBOOK FOR A.P.57141
SERIES RECEIVER B41 - CHANGE NO. 4

(D.G.W.(N) - December, 1965)

Removal and Insertion Change

Remove and destroy the last leaf in the handbook (inserted by Change No. 1) and insert new leaf attached.

Record the insertion of this Change on the Change Record Leaf at the beginning of B.R.1618.

B.R.1618 - HANDBOOK FOR A.P.57141 SERIES
RECEIVER B41 - CHANGE NO. 3

(D.G.W.(N) - April, 1964)

Removal and Insertion Changes

Part 3

FIG. 27 Remove and destroy left hand page of FIG. 27 and insert new Components List and FIG. 27 attached.

Record the insertion of this change on the Change Record Page at the beginning of B.R.1618.

B.R.1618 - HANDBOOK FOR A.P.57141 SERIES RECEIVER B41 - CHANGE NO. 2

(D.G.W. - January, 1964)

Manuscript Changes

Part 1 Chapter 3	Fig. 11. Against V206 amend "CV303" to read "CV327".
Part 1 Chapter 3	Figs. 11 and 12 and Part 3 Figs. 21, 24, 27 and 28. Against R304 insert "*", across R308 insert a resistor and label it "R308A*, 470". Amend R308 to read "R308B*". Against V302 CV304 insert "or CV4043*" At bottom of Figs. insert "* when CV4043 is fitted R304 is altered to 220Ω, R308A is fitted across R308 which is labelled R308B and value altered to 470Ω".
Part 2 Chapter 7 para. 45	Step 3 against "CT82" insert "*". Fig. 2 against Noise Generator CT82 insert "*". To the right hand side of Fig. 2 insert "* Note:- CT410 may also be used, set INPUT IMPEDANCE to 600 ohm and read 75 ohm dB scale, see B.R.1771(43)."
Part 2 Chapter 7 para. 53	Table 3. Against Noise Factor and to right hand side of present readings insert "noise factors taken with CT82 and CT410 should be similar" Against Noise Gain and to right hand side of present reading insert " -15 dB on all ranges".
Part 3 Components List	Receiver B41 Pattern 57141/A/B/C A.F. and Power Unit. At bottom of Resistor Table add

"R304, 022-1148, 220Ω, 5%, $\frac{1}{4}$W
R308A, 022-1192, 470Ω, 5%, $\frac{1}{2}$W
R308B, 022-1192, 470Ω, 5%, $\frac{1}{2}$W
} B41/A/B when CV4043 is fitted".

Record the insertion of this Change on the Change Record Page at the beginning of B.R.1618.

B.R.1618 - HANDBOOK FOR A.P.57141 SERIES RECEIVER B41 - CHANGE NO. 1

(D.G.W. - April, 1962)

Removal and Insertion of Leaves

Insert new Change Record Sheet before Amendment Record Sheet.

Insert new sheets containing patternisation information, attached, at rear of book.

Manuscript Changes

Part 2, Chap 6, Para. 14, Step 4, Line 2.

Amend T203 to read T204

Part 3, Component Lists. B41C. S102.

Delete 65638

Part 3, Fig. 14, V206.

Amend CV303 to read CV327

Part 3, Fig. 52, Winding data, Primary and Secondary Windings.

Amend 68½ turns to read 66½ turns

Part 3, Fig. 53, Primary and Secondary Windings.

Amend 68½ turns to read 66½ turns

Part 3, Fig. 54, Primary and Secondary Windings.

Amend 68½ turns to read 66½ turns

Part 3, Fig. 56, Winding

Delete first 3 lines, substitute * See details below.

Add below Core Material.

L104 (same as L102)
$84\frac{1}{2}$ turns 30/48 DFRC Wire.
Section 1 28 turns
Section 2 28 turns
Section 3 $28\frac{1}{2}$ turns

Adjusted to an inductance of 347 µH ± 2%.

L105 (same as L101)
$78\frac{1}{2}$ turns 30/48 DFRC Wire.
Section 1 26 turns
Section 2 26 turns
Section 3 $26\frac{1}{2}$ turns

Adjusted to an inductance of 304 µH ± 2%.

Note:- The inductance is measured at 10 kc/s using A.P.54709 Impedance Bridge.

Part 3, Fig. 58, Winding data.

Amend "Finish - Tag 2" to read "Finish - Tag 1"

AMENDMENT LIST NO. 4

TO

B.R. 1618 HANDBOOK FOR A.P. 57141 SERIES RECEIVER B41

Removal and Insertion of Sheets

Part 2, Chapter 7	Remove sheets containing paragraphs 46 to 57, and insert new sheets.
Part 3, Components List	Remove sheet headed I.F. Unit B41/A/B/C - Inductors, and insert new sheet.

Manuscript Amendment

Part 3, Components List	Sheet headed A.F. and Power Unit B41/A/B/C - Transformers. Amend Switches S302 and S304 - A.P.W9836A to read A.P.52805.

Amendment Record Sheet

Record the incorporation of this amendment list.

AMENDMENT LIST NO. 3

TO

B.R.1618 HANDBOOK FOR A.P.57141 SERIES RECEIVER B41

Part 2 Chapter 7	REMOVE sheet containing Figures 2, 3 and 4 and para. 45 steps 5-10 (on reverse) and INSERT new sheet.

AMENDMENT RECORD SHEET

RECORD the incorporation of this amendment list.

AMENDMENT LIST NO. 2

TO

B.R.1618 HANDBOOK FOR A.P. 57141 SERIES RECEIVER B41

MANUSCRIPT AMENDMENTS

Part 1 Chapter 1 List of Contents	Line 4.	Amend Function or other Controls to read Function of other Controls.
Part 1 Chapter 3 Para. 13	Fig. 2.	In top left hand corner, Amend B4 to read· B41C.
Part 1 Chapter 3 Para. 39	Last Line.	Amend to read:- produce the audio note that is passed on to the A.F. and Power Unit.
Part 2 Chapter 6 Para. 8(c)	In table fourth column.	Amend A.P. to read A.F.
Part 3 Fig. 13	Bottom centre.	Amend (See Chap. 7 Fig.) to read (See Chap. 7 Fig. 13).
Part 3 Fig. 15	Bottom centre.	Amend (See Chap. 7 Fig.) to read (See Chap. 7 Fig. 13).
Part 3 Fig. 17	Bottom centre.	Amend (See Chap. 7 Fig.) to read (See Chap. 7 Fig. 13).

AMENDMENT RECORD SHEET

Record the incorporation of this amendment list.

PART 1

OPERATION AND TECHNICAL DESCRIPTION

INTRODUCTION

1. Receiver B41, covered in this Handbook, is available in several different forms (A.P.57141 SERIES), differing appreciably in technical detail.

2. The bulk of the book therefore, covers the receiver in general terms, where possible. Where this is not possible, individual descriptions of features in the different types are given.

3. Related diagrams, drawings and illustrations are placed adjacent to the text to which they refer. Cross reference to other portions of the book are made by quoting the chapter and paragraph thus:-

2.5 or 5.8 (a)(iii)

4. In the Chapters dealing with Alignment Procedures and Performance Testing, different techniques have been laid down for use according to the complexity of the Test Equipment available. In general, only the simplest procedures are visualised as being undertaken in seagoing ships. Nevertheless, these should suffice to maintain the equipment at a very high standard of performance. The subject is fully covered in the introduction to the Chapters devoted to Alignment and Performance Measurement.

5. The circuit diagrams for the B41C receivers, have, in many cases, different circuit references from those shown in the equivalent diagrams for the other patterns, especially with regard to the R.F. Unit. Therefore descriptions of the B41C should be read only with reference to the circuit diagram concerned, for that pattern.

6. The four patterns of the B41 receivers are generally identified throughout the Handbook as B41, B41A, B41B, and B41C.

CHAPTER 1

OPERATING INSTRUCTIONS

LIST OF CONTENTS

FIGURES

CHAPTER 1

OPERATING INSTRUCTIONS

Initial Setting-Up - Figs. 1, 2 and 3

1. (1) Ensure that the output line is connected, if not, switch in the Dummy Load, i.e. switch toggle towards the front of the receiver.

(2) Place the Mains Switch in the "ON" position. Until it has warmed up there will be a tendency for the receiver to drift slightly off tune.

(3) Limiter switch to "OFF".

(4) Bandwidth switch to "NARROW" or 1 kc/s.

(5) Crystal switch to "OFF".

(6) Loudspeaker switch to "OFF". Use 'phones.

(7) System switch to "Tune".

(8) Anti-Cross-Mod. Control fully clockwise.

(9) A.G.C. switch (where fitted) to "ON".

To tune-in a required Signal

2.(a) If the station has been "logged" and the precise setting on the logging scale is known, set the Band switch to the appropriate waveband and adjust the tuning control to the required logging scale position, search to and fro across this setting until the required station is heard. Tune very carefully to the "Dead Space" of the signal, then set the System Switch to the "HIGH" or "LOW" position, for the reception of c.w. signals, or to the "R/T" position for the reception of "Voice" signals.

NOTE The HIGH and LOW positions of the System Switch are provided to clear "Adjacent Channel" interference when receiving c.w. signals. The position selected should be the one which gives greatest freedom from this type of interference.

See paragraph 3(f) for the full use of the System Switch.

(b) If no logging scale setting for the required station is available, set the Waveband Switch and Tuning control to the approximate tuning position. Then proceed as follows:-

(1) Set the System Switch to "CAL".

(2) Tune to the zero beat of the calibration mark (black spot) nearest to the required frequency.

(3) Shift the tuning drum cursor, by means of the cursor adjustment, until the arrow in the centre lines up with the "Dead Space".

(4) Set the System Switch to "Tune", and adjust the tuning control to the required frequency. Search to and fro over this setting until the station is heard. Tune very carefully to the "Dead Space" of the signal then set the System Switch to the "HIGH" or "LOW" position for the reception of c.w. signals, or to the R/T position for the reception of "Voice" signals.

(5) Record the logging scale reading.

(c) Adjust gain controls as follows:-

(1) A.F. Gain to give a suitable level in the Remote Reception positions.

(2) Gain Control to give adequate level to operator's 'phones.

To receive Signals from a Station

3. The satisfactory reception of signals, whether Morse or Voice, whether or not in the presence of interference, jamming or fading, requires an understanding of the function of the various controls provided. A detailed explanation of the use of each control provided for this purpose, and its effect upon the incoming signal is given below:-

(a) Crystal Switch

This switches in or out of circuit, a crystal whose function is to maintain the receiver accurately at a frequency determined by the crystal frequency. The crystal itself is housed in the Crystal Compartment. A pilot light shows behind a slot in the door of this compartment when the Crystal Switch is in the "ON" position.

(b) Anti-Cross-Modulation Control

This control is normally in the "fully clockwise" position, and is used when cross-modulation interference is encountered. This form of interference is rare, and may be recognised by the manner in which the interfering signal "rides" on the wanted signal. It ceases when the wanted signal ceases, e.g. between morse symbols, and cannot be removed by tuning re-adjustments. It can be minimised, and possibly eliminated, by rotating the Anti-Cross-Modulation Control to the point where the interference is least.

(c) Limiter Switch (S203) and Limiter Control (RV221)

Under conditions of severe interference, pulse or otherwise, the Limiter Switch should be switched "ON". The amount of limitation imposed on the interference is effected by the Limiter Control. When the control is fully clockwise, limiting action is minimum. As the control is turned counter-clockwise, the amplitude of the interfering signals is reduced. The optimum position for this control is the point where interference cannot be reduced any further without undue distortion of the speech or (as in the case of morse signals) reducing the wanted signal also.

(d) A.G.C. Switch (S206) B41B/C

This switch will normally be set to "ON", so that the a.g.c. circuit is operative. Only when a very weak signal is being received should it be necessary to switch off a.g.c. When switched "ON", the a.g.c. system levels out variations of signal strength due to fading, or variations of signal strength among ships operating on the same frequency. In the case of receivers B41/A, a.g.c. is switched "ON" or "OFF" according to the position of the System Switch.

(e) <u>Bandwidth Switch (S201)</u>

(i) <u>B41/A</u>

This is a three position switch giving two positions of i.f. selectivity 8 kc/s and 3 kc/s. In the third position, the bandwidth remains at 3 kc/s, but an additional Note Filter with an effective audio bandwidth of approximately 200 c/s at 1 kc/s, is brought into circuit in the A.F. Unit. In the WIDE position, the b.f.o. circuit is inoperative.

(ii) <u>B41B/C</u>

A similar switch to that already described for the previous two patterns, is used to provide bandwidth positions of 3 kc/s, 1 kc/s and 200 c/s. The second position is a 1 kc/s Crystal Filter Circuit, and the third the Note Filter. The b.f.o. functions in all three positions.

(f) <u>System Switch (S202)</u>

This switch permits selection of the following positions:-

(i) <u>CAL</u>

This is used when tuning-in a station which has not previously been logged. It permits the scale to be set accurately to the frequency in use. The receiver is tuned to the dead space of the calibration signal nearest to the required signal frequency, and the cursor is rotated to the black spot denoting the calibration point in question.

By referring to the table below it will be seen that it is possible to check the calibration at other points, as well as the obvious ones due to the 100 kc/s b.f.o. harmonics beating with the local oscillator output. Definite intermediate fractions of the fundamental crystal frequency such as halves, quarters and thirds of 100 kc/s will be found to produce a sufficiently strong beat at the output of the set to enable accurate calibration to be accomplished. This is due to the fact, that harmonics of the local oscillator mix with the b.f.o. harmonics at these points to produce the i.f. of 800 kc/s. The audio beat is produced by the i.f. signal mixing with the eighth harmonic of the b.f.o. in the second detector circuit.

Tuning Scale Cal. point	L.O. Frequency	L.O. Harmonic	b.f.o. Harmonic
25 kc/s	825 kc/s	3300 kc/s (4th)	2500 kc/s (25th)
$33\frac{1}{3}$ kc/s	$833\frac{1}{3}$ kc/s	2500 kc/s (3rd)	1700 kc/s (17th)
50 kc/s	850 kc/s	1700 kc/s (2nd)	900 kc/s (9th)
66 2/3 kc/s	866 2/3 kc/s	2600 kc/s (3rd)	1800 kc/s (18th)
100 kc/s	900 kc/s		Fundamental
$133\frac{1}{3}$ kc/s	$933\frac{1}{3}$ kc/s	2800 kc/s (3rd)	2000 kc/s (20th)
150 kc/s	950 kc/s	1900 kc/s (2nd)	1100 kc/s (11th)
166 2/3 kc/s	966 2/3 kc/s	2900 kc/s (3rd)	2100 kc/s (21st)
200 kc/s	1000 kc/s		2nd
250 kc/s	1050 kc/s	2100 kc/s	1300 kc/s (13th)
300 kc/s	1100 kc/s		3rd
350 kc/s	1150 kc/s	2300 kc/s	1500 kc/s (15th)
400 kc/s	1200 kc/s		4th
500 kc/s	1300 kc/s		5th
600 kc/s	1400 kc/s		6th
700 kc/s	1500 kc/s		7th

It will be seen from the table that when the local oscillator frequency itself does not mix with the 100 kc/s b.f.o. signal or its harmonics, as it does at the even hundred of kc/s to produce the i.f. frequency of 800 kc/s, the specified harmonics in columns 3 and 4 do this.

(ii) R/T (Voice)

This position is used when receiving voice signals.

(iii) TUNE

When tuning-in a station this position is used. The tuning control should be adjusted to the dead space of the required station. Subsequently, the System Switch should be set to R/T for "Voice" signals, or to HIGH or LOW for morse signals.

(iv) HIGH or LOW

When receiving morse, if interference from a station working on an adjacent channel is experienced, the switch should be set either to HIGH or LOW, according to which position affords the greatest freedom from interference. This is most effective on the 1 kc/s position.

(v) MANUAL (B41/A only)

The a.g.c. circuit is inoperative in this position. It should be used only when very strong interfering signals are experienced. Under these circumstances, if the a.g.c. circuits are in use, they will tend to produce such large a.g.c. voltages, that reception is blocked.

It must be remembered however, that in the MANUAL position, the b.f.o. is at 800 kc/s and will produce "dead space" tuning conditions if the wanted signal is tuned in accurately. The receiver must therefore be detuned slightly to ensure an audible note from the wanted signal.

(g) A.F. Gain Control RV225)

This control is normally set to give the required volume on the remote loudspeakers and 'phones connected to the control system. The degree of automatic control afforded by the a.g.c. system should ensure that variations in strength of incoming signals will not often require a change in the setting of the A.F. Gain Control.

(h) Gain Control (RV305/309)

(i) When the a.g.c. system is in use, this control effects only the loudness of the signal heard in the built-in loudspeaker or receiver telephones. It does not effect the level in the control system.

(ii) When the a.g.c. is inoperative, i.e. in MANUAL or a.g.c. "OFF", the overall signal level, both local and remote, is varied by this control.

4. The function of the other controls is as follows:-

(a) Bandswitch

This is the turret switch which selects the appropriate coils for each waveband, at the same time illuminating the relevant dial scale.

(b) Tuning Assembly

Tuning facilities are situated in the centre of the receiver and consist of the tuning drum, its associated cursor adjustment and dial locking device, logging scale and flywheel tuning drive; the knob being at the lower centre of the instrument. Tuning is by means of four ganged capacitors, one in each part of the bandpass filter, the mixer, and local oscillator circuits. The drive operates the tuning drum through a 20:1 reduction gear-box, a 5:4 reduction is made in the transmission to the ganged capacitors through a chain drive. Receivers B41B/C employ a modified drive incorporating a further gear-box between the ganged capacitors and the chain drive. A stopping device at each end of the drive travel prevents damage to the ganged capacitors.

(c) Tuning Drum

The five scales - one for each band - are positioned on the drum. Calibration points on the scales are indicated by dots, and the alignment reference points are indicated by a + sign.

(d) Cursor Shift Control

This is a knurled wheel behind the curved hinged cover at the top of the central part of the front panel. It is used to enable the cursor to be aligned with the calibration marks on the tuning scales.

(e) Dial Lock

Situated at the right hand side of the tuning knob, this lever controls a device for holding the tuning assembly in a particular setting. Loading springs prevent excessive pressure being placed on the locking mechanism. A thumb set screw at the side of the lever prevents it dropping under severe vibration.

(f) Monitor Loudspeaker and Switch

This is used for local loudspeaker reception. It is switched "ON" or "OFF" by means of the loudspeaker Switch, and can be used in circuit whether or not the external lines are connected. The audio output is relatively small, and care must be taken not to overload it by using excessively high settings of the gain control.

(g) Telephone Jacks JK301/2

Headphones A.P.W621, impedance 600 ohms, should be inserted into these jacks. Either two or three contact jack plugs may be used.

(h) Earthing Terminal

This terminal is situated at the bottom right-hand side (as seen by the operator) of the receiver, below the 'phone jacks.

(j) Dummy Load Switch S205

It is essential that this switch is in the "ON" position, i.e. with the lever towards the front of the receiver, when the 600 ohms output line is not in use. The switch then connects a dummy load resistor to 620 ohms across this line. The switch is placed in the OFF position when a remote loudspeaker is connected in the line.

(k) Scale Lamps Brilliance Control RV118 B41/A/B RV102 B41C

Part of this control is in series with the scale lamp selected by the Bandswitch and adjusts the brightness of the scale lamps.

NOTE: Controls described in (j) and (k) above, are at the back of the I.F. and R.F. Units.

5. External Connections

(a) Power Supply

The power supply is fed to the receiver via a Mk.4 plug and socket on the front panel.

The remainder of the external connections are made to the plugs and sockets on the brackets at the rear of the R.F. and I.F. Units.

(b) Aerial Input Plug PL101

This is a four pin Mark 4 plug, situated at the rear of the R.F. Unit. Pins B and C are used for the low impedance aerial inputs. A high impedance aerial is connected to pin D; Pin A is earthed.

(c) Socket SKT102 (SKT101, B41C)

This is a coaxial type socket (rear of the R.F. Unit).

(d) REC Socket - SKT202

This is a coaxial type socket, situated at the rear of the I.F. Unit. This i.f. output can be used for Outfit REC.

(e) REB Socket - SKT203

This is a coaxial type socket, situated at the rear of the I.F. Unit. This socket is the one nearest to the R.F. Unit, and provides d.c. for use with Outfit REB.

(f) Audio Output Plug - PL203

This is a Mark 4 six pole sealed type plug, providing three output channels as follows:-

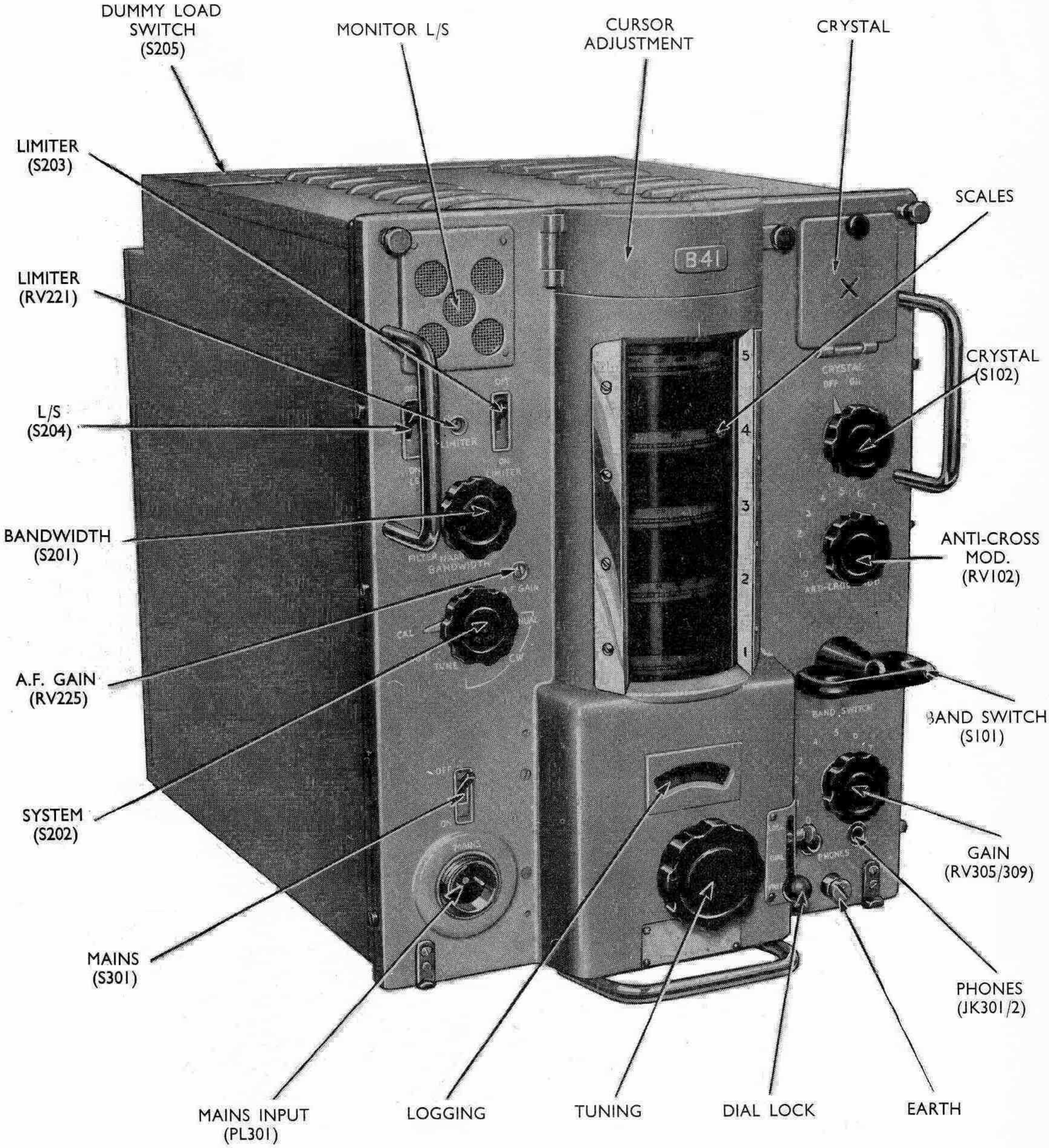
(i) Pins A and B deliver 2.5 watts into a 600 ohms line. This output is normally connected to a remote loudspeaker.

(ii) Pins C and D deliver 35 mW into a 600 ohms line from a separate winding on the transformer.

(iii) Pins E and F give an output of 14 mW into a 600 ohms line. They are an extension of the headphone and monitor loudspeaker circuits.

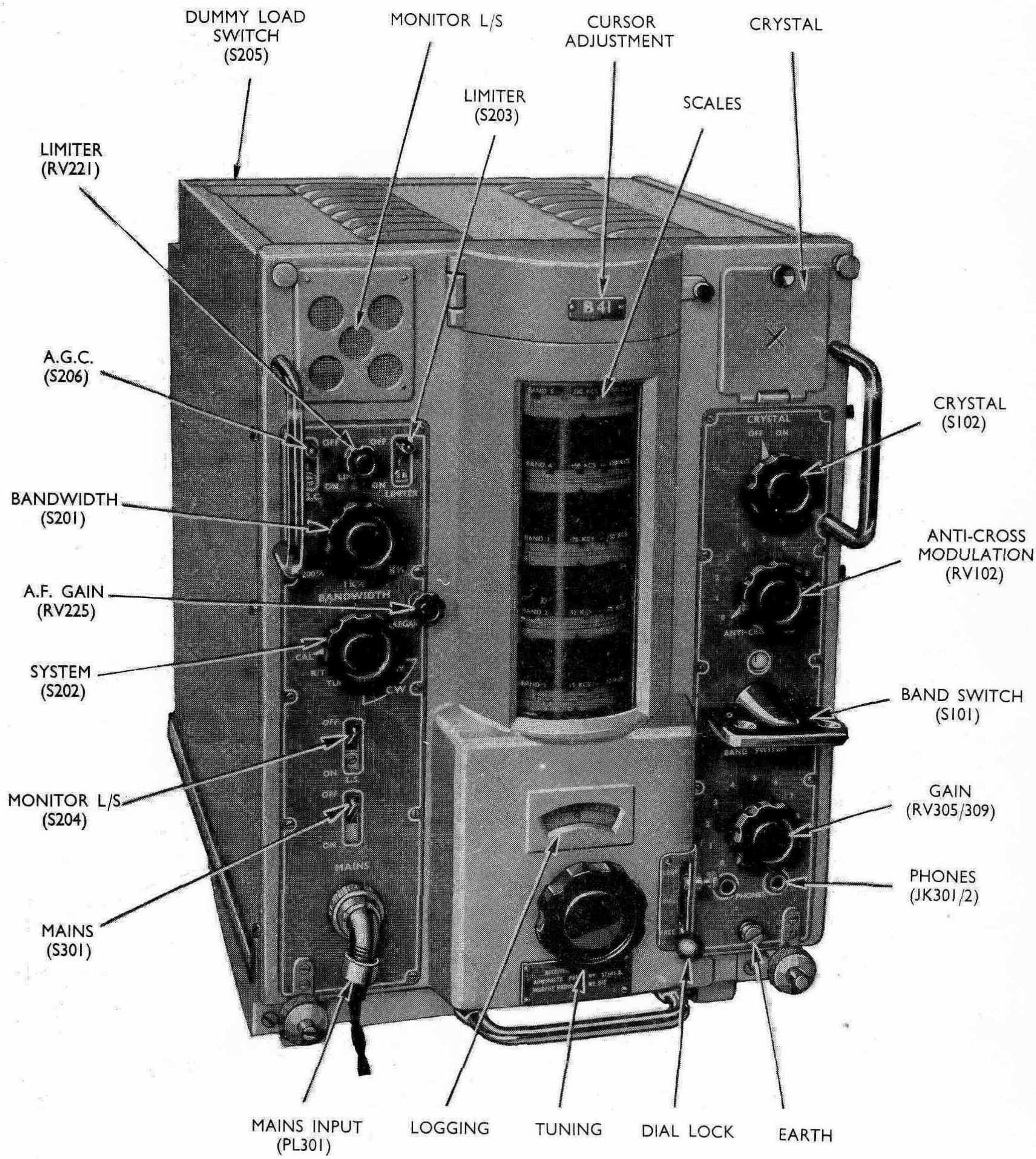
(iv) Pins A and F are earthed.

FIG. 1



RECEIVER B41
A.P. 57141/A

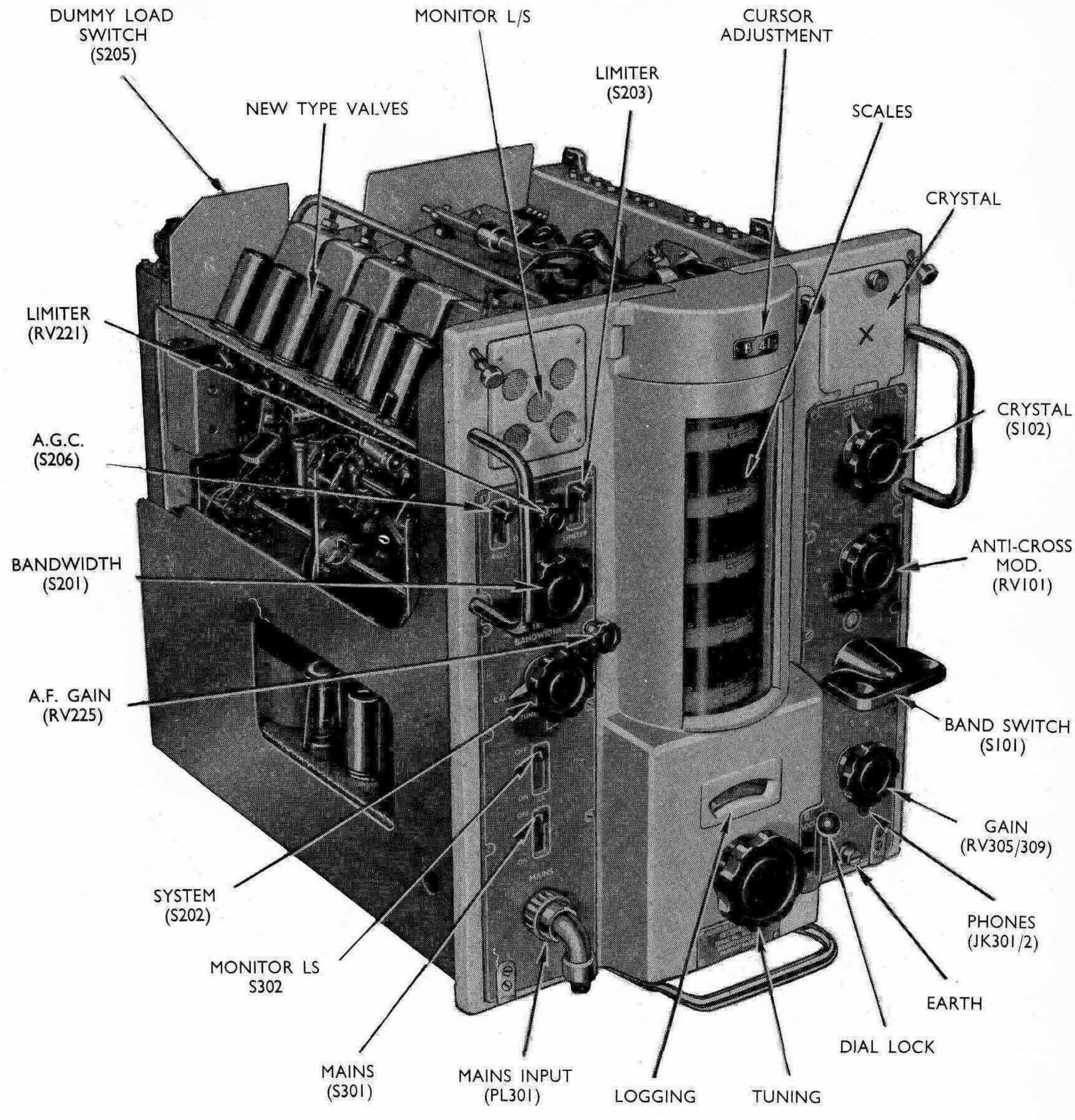
FIG. 2



RECEIVER B41

A.P. 57141B

FIG. 3



RECEIVER B41
A.P. 57141C

CHAPTER 2

BRIEF TECHNICAL DESCRIPTION

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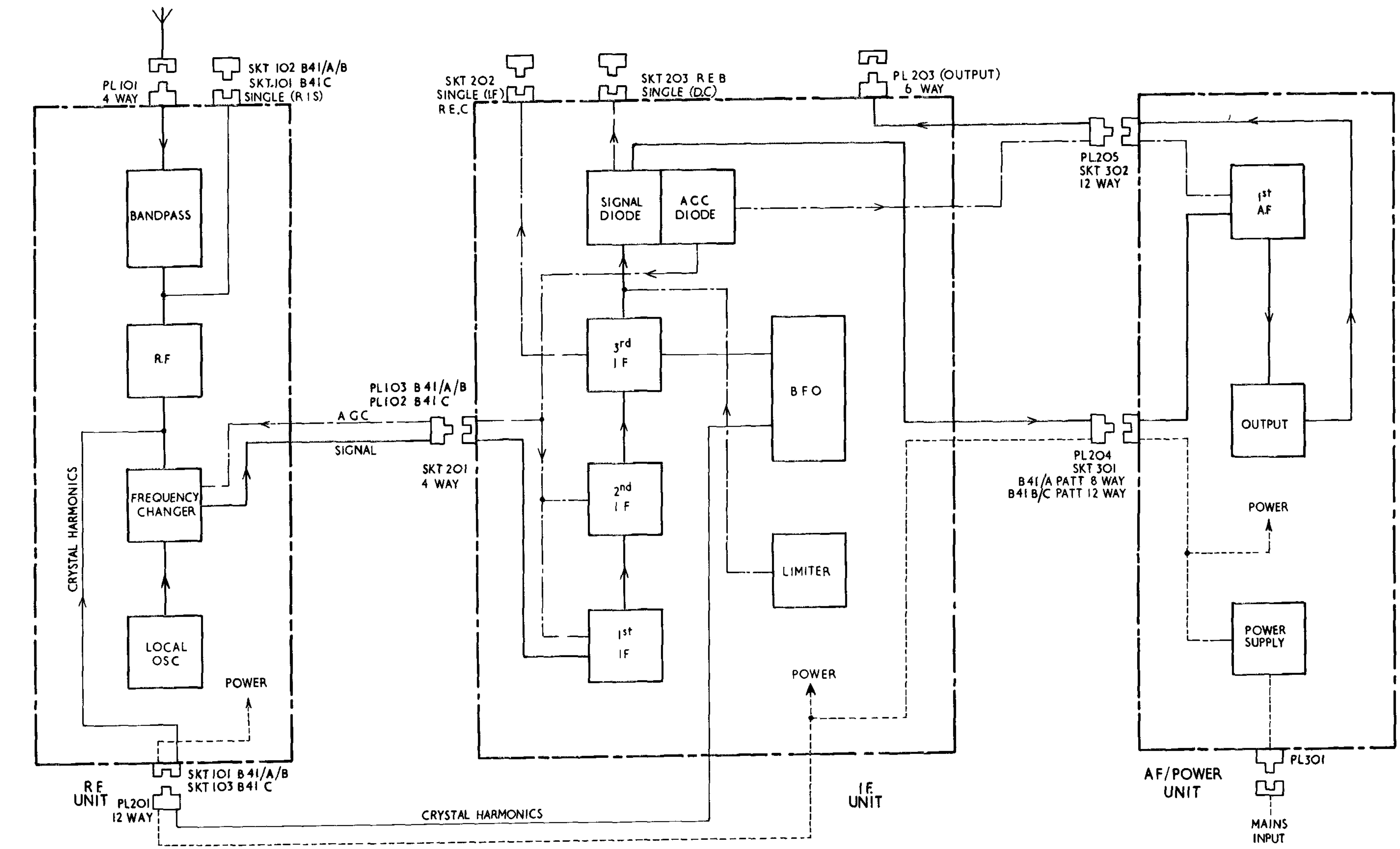
FIGURES

FIG. 1



BLOCK DIAGRAM SHOWING INTER UNIT CONNECTIONS

CHAPTER 2

BRIEF TECHNICAL DESCRIPTION

(Refer to Figs. 11, 12 and 13, Chapter 3)

Introduction

1. This section is devoted to a brief description at block diagram level of the arrangement and connections of the receiver. For a full detailed explanation of the circuitry, Chapter 3 (Detailed Circuit Description) should be read.

2. The receiver B41 is a conventional communications receiver for the reception of voice, c.w. and f.s.k. signals in the frequency range 14.7 kc/s to 720 kc/s. Four versions of the receiver are at present in service, and are identified under the pattern numbers 57141, 57141A, 57141B and 57141C. These are customarily referred to, other than in naval store transactions, as B41, B41A, B41B and B41C. The main differences between the four versions are given below. For full details see Chapter 4.

<u>B41</u> Original version.

<u>B41A</u> Physical changes in the layout, mechanical changes to facilitate maintenance, and the substitution of improved components in certain cases.

<u>B41B</u> Re-designed tuning drive, the addition of a crystal filter in the i.f. circuits, i.f. rejection ratio improved by the addition of rejector and acceptor circuits in the high impedance aerial circuit. Modifications to the i.f. circuits to reduce bandwidth; a.g.c. circuits modified and a separate switch fitted, System switch changed to work on five positions instead of six. The note filter modified to give a band-pass response. Improved h.t. smoothing incorporated, mains transformer replaced. A waveband Indicator fitted.

<u>B41C</u> This receiver is fitted with preferred valves, consequently some changes in component values have also been made.

3. The instrument is of unit construction, consisting of:- R.F. Unit, I.F. Unit A.F. and Power Unit. These three units, each with their own controls are inter-connected and mounted on the framework which fits into the receiver case. The tuning drive mechanism, and front panel are also mounted separately on this framework.

4. The frequency range is covered in five bands, a turret switching arrangement selecting the required band. Switching to a particular band illuminates the appropriate scale. A logging scale is provided to facilitate re-setting the receiver to a particular frequency or station.

5. Facilities are provided for the following functions:-

(a) Matching the receiver to either a high impedance or low impedance aerial.

(b) Varying the selectivity by changing the bandwidth.

(c) Reduction of interference by use of a noise limiter.

(d) Reduction or elimination of cross-modulation interference.

(e) Provision of facilities for reception of:-

(i) C.W. - by means of a beat frequency oscillator.

(ii) R.T. (Voice).

selected by means of a SYSTEM switch.

This switch, in the CAL position, brings into operation a calibrator circuit which is used to check the setting accuracy of the scale.

(f) Automatic gain control, to provide a reasonably constant level of audio frequency output, where the input signal or signals is not of constant strength.

(g) Crystal control of the local oscillator when exceptional frequency stability is required.

(h) Control of receiver gain.

6. The audio frequency output can be used locally at the receiver for telephone or monitor loudspeaker reception, or can be fed to remote positions for loudspeaker or telephone reception via 600 ohm lines.

7. The receiver may be operated from a 230 volt or 115 volts, 40 to 60 c/s a.c. supply.

8. A brief description of the units comprising the receiver, and the function and operation of the controls, is given below.

R.F. UNIT

9.(a) The input circuits to this receiver are designed to function with either high or low impedance aerials. The first two stages of the receiver are the r.f. and mixer stages.

The r.f. stage is a conventional r.f. amplifier with a band-pass filter input, and anti-cross-modulation control in the grid circuit.

The frequency changer stage employs a mixer valve with a separate local oscillator valve, a.g.c. voltage can be applied.

(b) The receiver covers a frequency range of 14.7 kc/s to 720 kc/s, in five bands as follows:-

Band	Frequency Range
1	14.7 kc/s to 33.3 kc/s
2	31.7 kc/s to 72 kc/s
3	68.5 kc/s to 155 kc/s
4	147 kc/s to 344 kc/s
5	317 kc/s to 720 kc/s

I.F. UNIT

10.

(a) There are three stages of amplification at an intermediate frequency of 800 kc/s. The third stage incorporates the detecting, a.g.c and noise limiter diodes. To receive c.w. signals and to calibrate the receiver, the b.f.o. output is also mixed with the i.f. signal in this stage, and the resultant audio signal passed to the first audio amplifier in the following unit; a.g.c. voltage may be applied to the first two stages.

(b) Different degrees of i.f. selectivity are available. These and associated circuits are as follows:-

	B41/A	B41B/C
(i)	Two positions of selectivity "Wide" - 8 kc/s, "Narrow" - 3 kc/s (The third position of the switch concerned, is a 200 c/s audio note filter in the A.F. and Power Unit).	Two positions of selectivity 3 kc/s and 1 kc/s. The last position is a 1 kc/s crystal band-pass filter in the second i.f. grid circuit. (The third position is the 200 c/s note filter modified for band-pass response)
(ii)	A.G.C. voltage automatically applied for all conditions of working excepting MANUAL.	A.G.C. is controlled by an ON/OFF switch, for all conditions of working.

(c) The operating conditions controlled by the SYSTEM switch are as follows:-

Receivers B41/A — 6 position SYSTEM switch

Receivers B41B/C — 5 position SYSTEM switch

Receiver B41/A/B/C - SYSTEM SWITCH -

System	Condition	A.Ps. 57141/A		A.Ps. 57141B/C	
		S. Pos.	a.g.c.	S. Pos.	a.g.c.
Manual	B.F.O. at I.F.	1	Off		
Low	B.F.O. at I.F. - 1 kc/s	2	On	1	On or Off
High	B.F.O. at I.F. + 1 kc/s	3	On	2	"
Tune	B.F.O. at I.F. (for initial tuning)	4	On	3	"
R/T (Voice)	B.F.O. Off	5	On	4	"
Cal:	B.F.O. crystal controlled I.F.	6	On	5	"

(d) As indicated above, the beat frequency oscillator is included in this unit. For calibration, the 100 kc/s crystal controlled position is used to give suitable check points on the scales. The monitor loudspeaker and 600 ohm main output socket are also mounted on this unit.

A.F. AND POWER UNIT

11.

(a) The audio amplifier consists of a pre-amplifier and the output stage. The coupling between these two stages is normally resistance capacity, position three of the Bandwidth switch replaces this coupling with the note filter, tuned to 1000 c/s.

(b) There are three audio outputs.

(i)	Monitor Loudspeaker and Headphones	All these outputs are nominally at 600 ohms.
(ii)	External Loudspeaker	
(iii)	Ship's Control System	

(c) The Power Unit consists of h.t. supply circuits employing a double diode rectifier valve connected to the mains transformer, to give full wave rectification. In the B41C, two replacement double diodes are used with the anodes strapped, in the same type of circuit. A stabilised h.t. supply is provided to the local oscillator. Supplies for the valve heaters and pilot lamps are also derived from the unit.

CHAPTER 3

DETAILED CIRCUIT DESCRIPTION

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FIGURES

CHAPTER 3

DETAILED CIRCUIT DESCRIPTION

Circuit References

1. The circuit references quoted in this chapter, refer particularly to the pattern or patterns of the receiver described, as the references are not necessarily the same for the same component in different pattern circuit diagrams; this is especially the case with B41C. Circuit changes made necessary by the introduction of the later type valves in the B41C are given in Chapter 4.

AERIAL CIRCUITS Figs. 11, 12 and 13

B41/A

2. A transmission line or low impedance aerial source is connected to the primary of the first r.f. transformer T101, through Pins B and C of PL101; this primary has a nominal impedance of 80 ohms. Normally Pin B is earthed on the aerial socket, the aerial being connected via the A.P.13831 coaxial transmission line of 92 ohms characteristic impedance to Pin C. A high impedance aerial may be connected through Pin D of the same plug through C103, which feeds directly into the band-pass tuned circuits. This capacitance coupled tuned band-pass filter is the main feature of the aerial circuits and consists of:-

(a) T101 secondary, tuned by capacitors C101/2 and ganged capacitor section C105.

(b) L101, tuned by capacitors C108/9 and the ganged capacitor section C106.

The two circuits are coupled by C104 and C107; the second section of the band-pass filter - (b) above, is the tuned grid circuit of the r.f. valve V101. Pin A of PL101 is the earth connection.

B41B/C

3. These patterns have 800 kc/s i.f. rejector (B41B - L105, C139 and C141) and acceptor (B41B - L104, C140 and C142) circuits, connected in the high impedance aerial lead from Pin D of PL101. These improve the i.f. rejection ratio; otherwise the aerial circuits are similar to those above for B41/A.

R.F. TURRET ASSEMBLY

B41/A/B

4. The turret (See Fig. 3 Part 3) revolves in the R.F. Unit, controlled by the waveband switching knob on the front panel. It houses the tuning coils and capacitors, and associated components (with the exception of the ganged tuning capacitors), in separate compartments. These compartments are arranged in rows of four, comprising the aerial, band-pass grid, r.f. and oscillator tuned circuits, for each of the five wavebands, arranged concentrically round the turret. The output pins from each compartment intermesh with fixed contacts in the unit, to form the turret switch and select the required circuits, as the turret is switched from one band to the other.

B41C

5. Certain modifications and deletions have been made to the r.f. turret components in this pattern to achieve correct tuning of the circuits. Full particulars are given in Chapter 4.

R.F. AMPLIFIER

B41/A/B Figs. 11 and 12

6. The valve (CV303) is a variable mu pentode, which is controlled by the anti-cross-modulation circuit explained below. For this purpose, the control grid voltage is adjusted by the ANTI-CROSS-MODULATION control RV102. The anode circuit is transformer coupled (T103), to the tuned grid of the frequency changer V102. The capacitor C112 is brought into circuit parallel with C113 on Bands 1 and 2 to improve the stability of the circuit. A separate h.t. supply is provided for the valve, this is broken by the SYSTEM switch S202 in the CAL position, to prevent signals from the aerial getting through to the receiver, and also to prevent the calibration signals from being radiated. A separate heater transformer T102 is provided for the valve in this stage, to avoid excessive potential difference between the heater and cathode, as the operation of the ANTI-CROSS-MODULATION control can cause the cathode voltage to rise to 100V above earth.

7. The ANTI-CROSS-MODULATION control varies the grid bias of V101. When a large r.f. signal, other than the tuned signal is present at the grid of V101, the selectivity of the r.f. stage may be inadequate to prevent over-loading the valve. De-modulation takes place in the r.f. valve, and the interfering signal modulates the wanted one. By varying the bias of V101, the working point on the mutual characteristic of the valve can be chosen so that de-modulation does not occur, or is minimised.

B41C Fig 13

8. The circuit is similar to the other patterns. The replacement valve type CV454, has been incorporated into the circuit with some modifications and additional components, to provide the correct valve electrode potentials and stage gain. A germanium diode MR101, connected between the slider of RV101 and the junction of R104 and R105, ensures that the grid of V101 is never driven positive by large input voltages. If this grid were driven positive, the resulting grid current would reduce the input impedance of the valve, with consequent reduction of selectivity and increase of cross-modulation. Further modifications are included to correct the range of RV101, so that it is consistent with the gain of the new valve. Full details of all these changes are given in Chapter 4.

FREQUENCY CHANGER

B41/A Fig. 11

9. Signals from the previous stage are fed via T103 to the tuned grid circuit of the frequency changer, which consists of the secondary of the transformer, a section of the ganged capacitor C119 in series with C120 and the two capacitors C117 and C118 (Trimmer). The valve V102 is a triode heptode (CV302), only the heptode portion of which is in use. With the SYSTEM switch in the CAL position, signals originating from the crystal controlled 100 kc/s b.f.o. are fed into the mixer circuit via C119 and C120, to enable a calibration check to be made over the tuning scales.

10. The earth lead from C120 is routed through SKT101/PL201 to S202j in the I.F. Unit where it is switched to earth in all positions of the SYSTEM switch except CAL. The local oscillator signal is fed into the injector grid (Pin 4) of the mixer valve. The tuned circuit, comprising the primary of T104 and C127, is tuned to the i.f. and forms part of the anode load of the frequency changer valve V102. The secondary of T104, also tuned to the i.f., consists of two windings, i.e., the principal winding and the coupling coil used to provide the wide bandwidth. These windings are connected to the I.F. Unit through Pins 2, 3 and 4 of PL103 to provide a low impedance coupling into the i.f. amplifier.

11. The a.g.c. voltage is applied to the grid of V102, when the SYSTEM switch is in position 2 to 6. In the first position of this switch (MANUAL), the a.g.c. line is earthed, the receiver gain is then controlled manually by varying the cathode voltage of this and other valves. The GAIN potentiometer used for this purpose (RV305) is positioned in the A.F. and Power Unit; it completes the cathode return from R111 to earth, when the gain is manually controlled.

B41B/C Figs. 12 and 13

12. In B41C, the new type valve V102 is CV2128, it replaces the CV302 of the other patterns. In both B41B and B41C an added facility has been provided to give either manual or automatic gain control on any position of the SYSTEM switch. This is achieved by means of a further switch labelled A.G.C. ON/OFF (S206); resulting from this, the MANUAL position of the SYSTEM switch featured in the previous patterns is no longer required and does not appear in these two receivers. Excepting these changes, the frequency-changer circuit is similar to the other patterns.

LOCAL OSCILLATOR

B41/A/B

13. The local oscillator circuit functions either:-

(a) As a normal variable frequency oscillator, tracking with the incoming radio frequency signal, to produce the intermediate frequency signal or:-

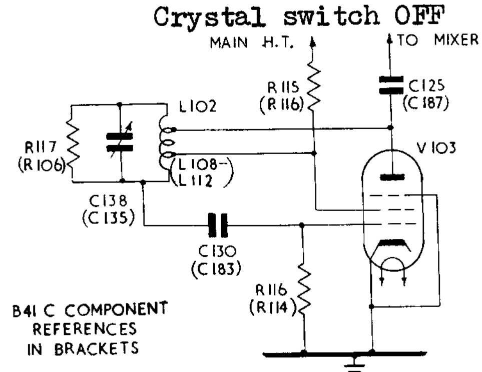
(b) Crystal controlled, to provide stable reception on fixed working frequencies.

Details are as follows:-

Variable frequency oscillator

A Hartley oscillating circuit is employed, both sides of the ganged capacitor section C138 being insulated from earth. The output from the anode of the valve (V103) is taken to the frequency changer through C125. The crystal terminals are short-circuited to minimise the effect of the crystal on the oscillator

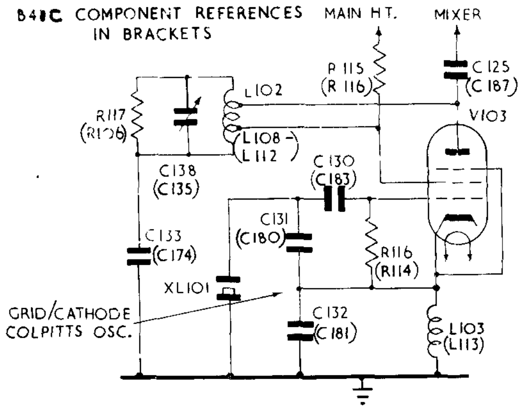
Crystal switch OFF



SIMPLIFIED VARIABLE FREQUENCY OSCILLATOR CIRCUIT
FIG. 1

Crystal controlled oscillator

AL 2



CRYSTAL CONTROLLED OSCILLATOR

FIG. 2

Crystal switch ON

When switched to this method of operation the circuit becomes a Colpitt's crystal oscillator, coupled electronically to the anode circuit, which is tuned to the crystal frequency. The function of L103, is to provide a high impedance path to radio frequencies from the cathode to earth. The crystal employed should be 800 kc/s higher than the required signal frequency.

14. The resistor R117, connected across the local oscillator tuned circuit provides the damping to give a broad response.

B41C

15. The valve V103, is changed to the new type CV4009. The resistor R116 in the h.t. feed line has been increased in value, so that the valve delivers the correct local oscillator voltage to the frequency changer. In other respects, the local oscillator circuit is similar to that of the previous patterns.

THREE STAGE I.F. AMPLIFIER

B41/A Fig. 11

16. This amplifier follows conventional lines, employing variable-mu pentode valves V201, V202 and V203. The centre frequency is 800 kc/s. The inductor L201 provides fixed input coupling into the amplifier from the R.F. Unit. The i.f. signal voltage thus obtained, is fed into the primary circuit of T201. The BANDWIDTH switch S201 varies the coupling between the primary and secondary windings of all the i.f. transformers, excepting T204, the final one. In position 1 of S201 (WIDE), the windings are over-coupled, as an extra winding from the secondary and adjacent to the primary, is switched into circuit; this gives a bandwidth of approximately 8 kc/s. In positions 2 and 3 (NARROW and NOTE FILTER) the bandwidth is reduced to 3 kc/s due to S201 switching out the coupling winding in these positions. This reduction in coupling would cause a loss of gain; however, compensation for this is provided by the switch section S201c, which short circuits the resistor R204, included in the cathode circuit of the first two variable-mu valves of the amplifier to reduce their bias voltage and increase their gain.

17. The first two stages of the amplifier have a.g.c. applied to the grids of the valves in all positions of the SYSTEM switch except MANUAL, similarly to the frequency changer stage (para. 11). The gain of the last i.f. valve is fixed, since its grid returns to the same point as the cathode.

18. An output for the i.f. method of working Outfit REC is taken from the cathode resistors R237/211 of the third i.f. valve V203, to the coaxial socket SKT202.

B41B Fig. 12

19. This is a similar circuit to that described above for the earlier patterns with regard to the stages of amplification and gain control circuits. The main differences consist of the addition of an 800 kc/s crystal filter between V201 and

V202 and considerable alteration in the bandwidth facilities. The three positions on the switch S201 are in this case, 3 kc/s, 1 kc/s (crystal filter) and 200 c/s (note filter). The last position retains the i.f. bandwidth of the intermediate position (1 kc/s crystal stabilised), but includes the note filter in the A.F. and Power Unit. The response of the i.f. filter exceeds 1 kc/s at 6 dB down, and is less than 5 kc/s at 30 dB down.

20. A.G.C. voltage can be applied to valves V201 and V202 by means of the A.G.C. ON/OFF switch. When switched to OFF (manual operation), the a.g.c. line is earthed and the gain setting is determined by the position of the RF GAIN control RV305.

B41C Fig. 13

21. In B41C the CV131 is used in place of CV303 in V201, V202 and V203. Modifications to the cathode circuits have been made to ensure correct biasing of the new type valves and to compensate for variations in gain between the three positions of the BANDWIDTH switch.

A.G.C. CIRCUITS

22. Rectification of the a.g.c. voltage is carried out by half of the double diode valve V204a, fed from the primary side of the last i.f. transformer, T204. The cathode of this valve is biased from the potential divider R212 and R213; to give the requisite delay voltage. The load comprises two resistors R214 and R215; the full a.g.c. voltage being applied to the r.f. and i.f. stages concerned. The tapping from the load applies part of the available voltage to the grid of the first audio frequency amplifier V301.

B41/A Fig. 11

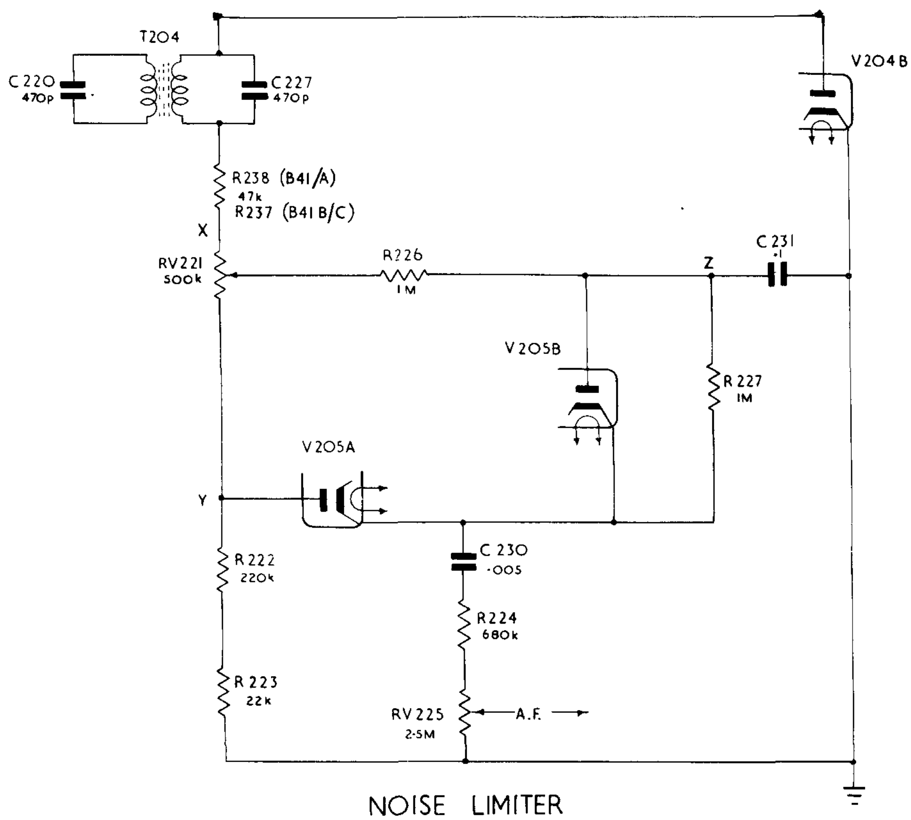
23. For c.w. operation, resistor R218 and capacitor C222 are short-circuited by the SYSTEM switch S202b/c, positions 2, 3 and 4. This reduces the resistance and increases the capacitance of the line, to shorten the voltage build-up and retard the decay time. As soon as the c.w. transmission commences, a.g.c. voltage is applied and retained during the telegraphic spaces in the carrier. In switch position 5, R218 and C222 are in circuit, to make equal the a.g.c. voltage build-up and decay time, for effective voice working, when the carrier is constant during transmission.

B41B/C Figs. 12 and 13

24. The a.g.c. operation is controlled by the A.G.C. ON/OFF switch S206, instead of the SYSTEM switch. The circuits for providing different a.g.c. time constants for telegraphic and voice reception are deleted; the circuit is modified to give a suitable time constant for both types of reception. Full details are given in chapter 4, para. 4(g).

NOISE LIMITER

25. Under normal signal conditions, an alternating voltage at 800 kc/s with a.f. modulations superimposed is developed across the secondary of T204 such that, when the anode of the detecting diode is positive with respect to the cathode, the diode will conduct. R.F. filters remove the carrier frequency, leaving only the rectified modulation. Current will flow through the circuit RV221, R222 and R223; the point 'X' becoming negative with respect to point 'Y'.



NOISE LIMITER
FIG. 3

26. C231 will charge through R226 and due to the long time constant of this circuit, the point 'Z' will take up a mean d.c. level with respect to earth (Fig. 3).

27. Since the anode of V205a is connected to point 'Y', whilst its cathode is connected via R225 and R226 to a point of relatively negative potential on RV221, the diode will conduct. It will thus present a low impedance to the a.f. modulation, which will be coupled by C230 to the A.F. GAIN control.

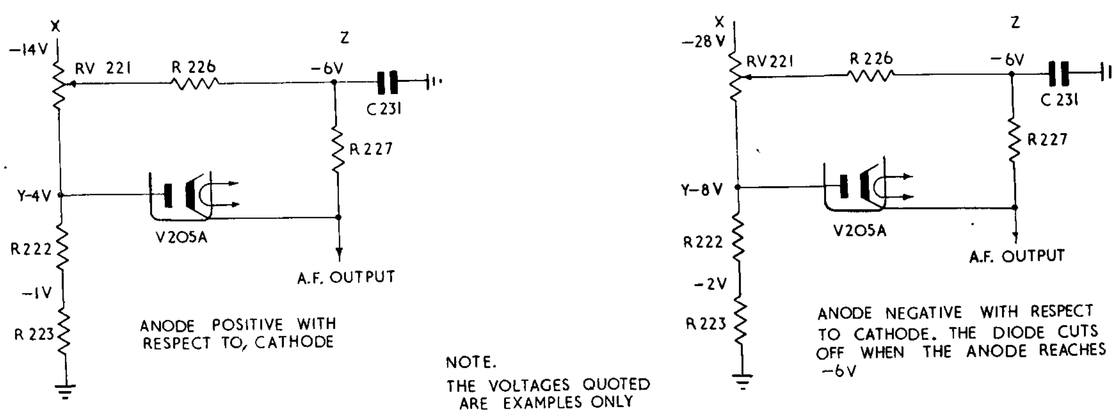


FIG. 4

28. Meanwhile the cathode of V205b is connected virtually to point 'Y' (due to the low impedance presented by V205a), whilst its anode is connected via R226 to a point of relatively low potential on RV221. The valve is therefore, non-conducting.

29. For the proper understanding of the noise limiting action of the circuit, it should be realised that the potential at point 'Y' varies with the a.f. modulation. Point 'Z', however, remains at a fairly steady d.c. potential, due to the long time constant of R226 and C231.

30. A pulse of interference will have the effect therefore, that instantaneously, the potential at 'Z' will not change but the potentials along the chain RV221, R222 and R223 will increase their negative value as shown in Fig. 4.

31. When the voltage at 'Y' falls below the voltage at 'Z', V205a will cease to conduct.

32. Thus the voltage at V205a cathode, passed to the audio circuits is normally not limited, but sharp peaks of interference will be clipped off.

33. If, due to the self-capacity of V205a, some of the interfering pulse passes through the valve after it has become non-conducting, it is shunted to earth via C231 and V205b, whose cathode is now negative with respect to its anode and is therefore conducting.

34. It will be seen that RV221 can vary the potential between 'Y' and 'Z', and consequently the depth of modulation that can be passed without clipping. In this case it is a maximum of 80% with the slider of RV221 at the top, and 10% at the bottom where the points 'X', 'Y' and 'Z' are at the same potential.

BEAT FREQUENCY OSCILLATOR

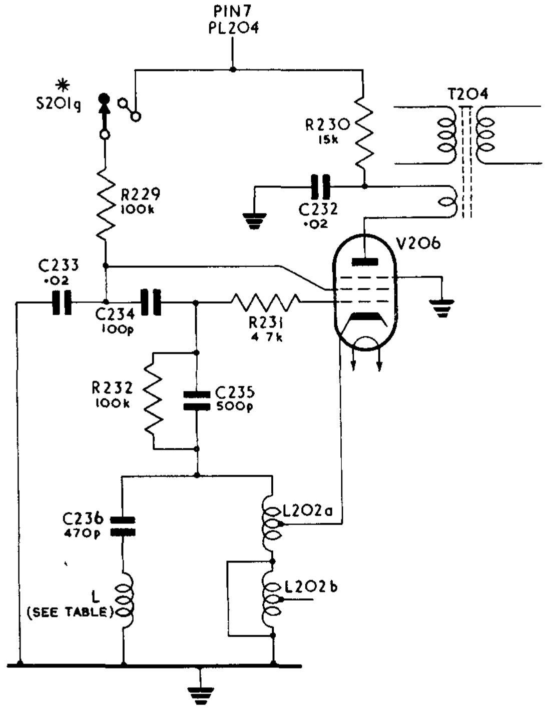
B41/A/B/C Fig. 5

35. The circuit, functioning as a Hartley oscillator in the c.w. positions of the SYSTEM switch S202, is inoperative in the R/T position, and is crystal controlled in the CAL position. In receivers B41/A the oscillator does not function in the WIDE position of the BANDWIDTH switch S201, as in this position the screen supply to the valve is broken. With the SYSTEM switch in the CAL position, the screen draws its h.t. supply from another source of higher potential, to increase the screen current and make the circuit oscillate, to provide the range of harmonics required. The calibration facility is independent of the position of the BANDWIDTH switch. In B41B/C the b.f.o. functions on all positions of the BANDWIDTH switch.

36. The main tuned circuit consists of L202a and C236 and resonates 1 kc/s above the i.f. of 800 kc/s. The operating frequencies of the b.f.o. are depicted in Fig. 5, the SYSTEM switch position varying according to requirements. For those positions where the frequency of the tuned circuit equals the i.f., a small inductance L203 is added in series with the main circuit. The larger inductance L204 reduces the resonant frequency still further to 1 kc/s below the i.f. for the LOW working position of the SYSTEM switch.

37. The anode circuit of the b.f.o. oscillator valve V206, is inductively coupled to the secondary winding of the last i.f. transformer T204 this is the sole function of the anode of this valve, in the oscillatory circuit the screen operates as the virtual anode. As there is only a small degree of coupling between the i.f. transformer windings, the b.f.o. injection has negligible effect on the a.g.c. voltage derived from the primary.

FIG. 5



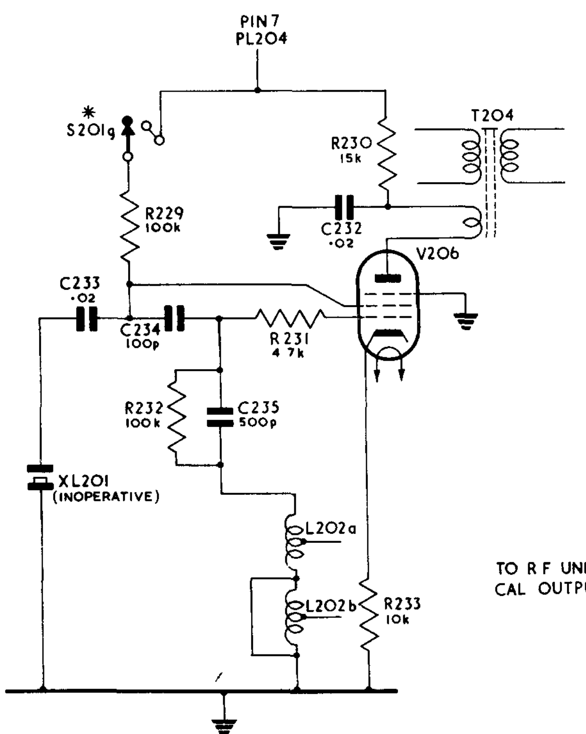
S202 POSITION PATTS 57141/A	PATTS 57141B/C	L	SYSTEM	FREQ
1		L203	MANUAL	800Kc/s
2	1	L204	LOW	799Kc/s
3	2	SHORT CCT	HIGH	801Kc/s
4	3	L203	TUNE	800Kc/s

* S201g PATTS 57141/A
DIRECT CONNECTION PATTS 57141B/C

NOTE.- IN PATT 57141B/C, CAPACITORS C242 AND C243 ARE CONNECTED IN PARALLEL WITH C236
C236 – 250p
C242 – 180p
C243 – 39p

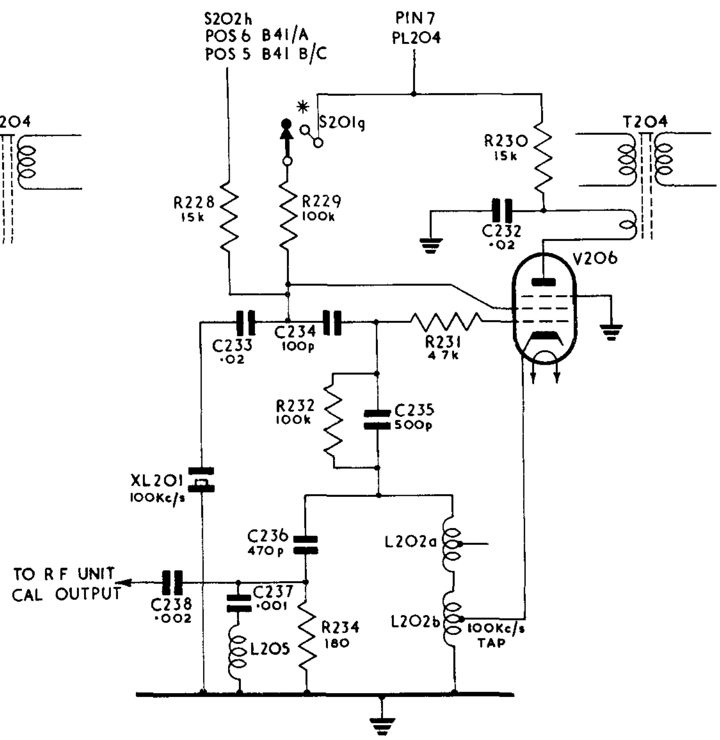
CW POSITIONS

S202 POS 1–4 PATTS 57141/A
POS 1–3 PATTS 57141B/C



R/T VOICE

S202 POS 5 PATTS 57141/A
POS 4 PATTS 57141B/C
(INOPERATIVE)



CAL

S202 POS. 6 PATTS 57141/A
POS. 5 PATTS 57141B/C

B.F.O CIRCUIT SIMPLIFIED

38. With the SYSTEM switch in the R/T position the b.f.o. valve cathode is connected to chassis through R233 via S202n. As well as stopping the valve from oscillating this prevents the potential of the cathode from rising too far above that of the chassis, this could happen if the cathode was left unconnected, thereby causing arcing when the switch was moved to another position, with resultant damage to the cathode of the valve.

39. In the 'CAL' position, the SYSTEM switch removes the short-circuit from the crystal XL201 and the circuit is crystal controlled. The short-circuit is also removed from the loading coil L202b and the cathode of the valve connected to the tapping on this coil; under these conditions the tuned circuit has a resonant frequency of 100 kc/s. The additional screen voltage required to provide a strong oscillation to give the necessary harmonics for calibration purposes, is obtained through S202h to the h.t. line which comes through Pin 4 of PL204, as well as the normal supply coming from Pin 7. The h.t. supply to the first r.f. valve is open circuited to prevent signals from the aerial entering the receiver during calibration. This also prevents the harmonics from being radiated and breaking wireless silence. The calibration signal consisting of the fundamental 100 kc/s and its associated harmonics, is fed from R234 through S202k, C120 and C119 to the signal grid of the frequency changer valve V102. For details concerning the calibration points see 1.3(f)(i). A further portion of the b.f.o. output is used for beating with the i.f. signal coming through the receiver. The eighth harmonic of the b.f.o. fundamental is employed for this purpose, mixing with the i.f. signal in T204 to produce the audio note that is passed on TO the A.F. and Power Unit. AL 2

B41C

40. The valve is changed from CV327 to CV131. No other change is made to the b.f.o. circuits.

41. The calibrator crystals for the B41B/C receivers are specially processed, and though similar to the type 'A' crystals fitted to the other patterns, are not interchangeable with them. For identification, crystals for B41B/C are marked "A.P.67863 Crystal 100 kc/s", they may be used as replacements in B41/A.

FIRST A.F. AMPLIFIER Figs. 11/12/13

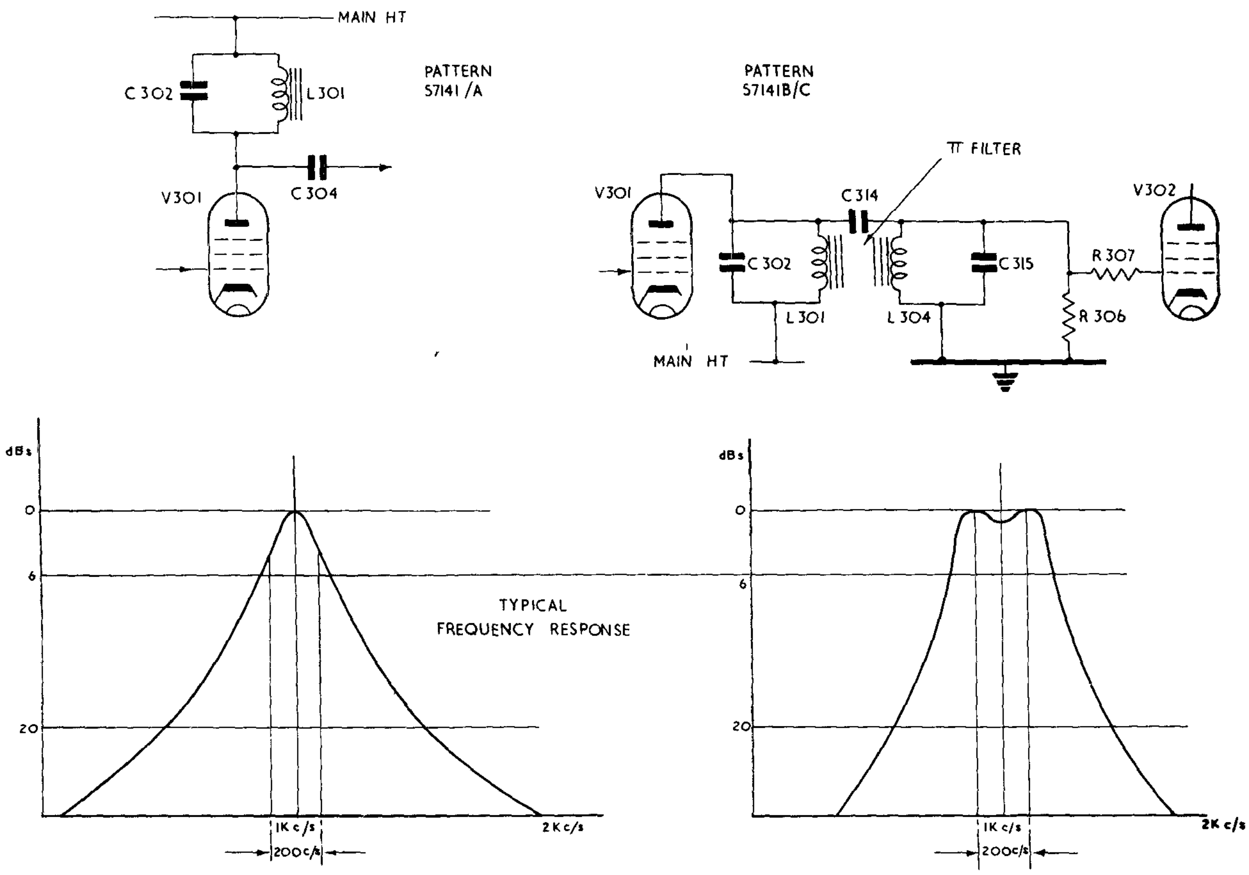
B41/A

42. The valve V301 is a variable mu pentode, with a.g.c. voltage tapped from the a.g.c. load network applied to its grid. The audio signal comes from the main A.F. GAIN control RV225. The receivers have the anode circuit of the valve arranged to function with two alternative loads, switched by the BANDWIDTH switch S201f in the I.F. Unit, through PL204 and SKT301. In the WIDE and NARROW positions of this switch, the anode load is R302; in the NOTE FILTER position, it becomes a tuned circuit consisting of L301 and C302. This circuit resonates at 1000 c/s and only signals of about this frequency develop appreciable voltages across the load, to be passed to the output valve. The pass-band of this circuit is about 200 c/s.

B41B/C

43. In the patterns described above, the response of the note filter follows that of the usual tuned circuit:- rather peaky at maximum amplitude with broad skirts. A.P.57141B/C have this circuit modified, to give the frequency response a band-pass characteristic. This is accomplished by switching in a further identical

circuit between the grid of the following valve V302 and chassis. A simplified form of this circuit is shown below in Fig. 6. It is in fact a π filter circuit, each tuned circuit constituting a leg of the filter, one in V301 anode and the other in V302 grid circuit. (From the point of view of the audio signal current, the h.t. line and earth are the same). The over coupling thus introduced, results in the usual band-pass response characteristic, the bandwidth at 20 dB down being less than 700 c/s. The circuit L304/C315 is switched in the I.F. Unit, by means of a further switch position on the BANDWIDTH switch. Plug PL204 and Socket SKT301 are changed from eight to twelve way, to enable the leads from the additional filter to be carried to the I.F. Unit. This plug and socket is also utilised to take the lead from T205/303 to the Monitor Loudspeaker in the I.F. Unit. In these patterns R302 is the V301 anode load in the "3 kc/s" and "1 kc/s" positions of the BANDWIDTH switch. The modified filter is switched in to circuit in the third position - 200 c/s:-



NOTE FILTER
POS.3 BANDWIDTH SWITCH S201.
FIG. 6

44. Due to the valve V301 being changed to the new type CV454 certain component changes have been made in the circuits (see 4.6).

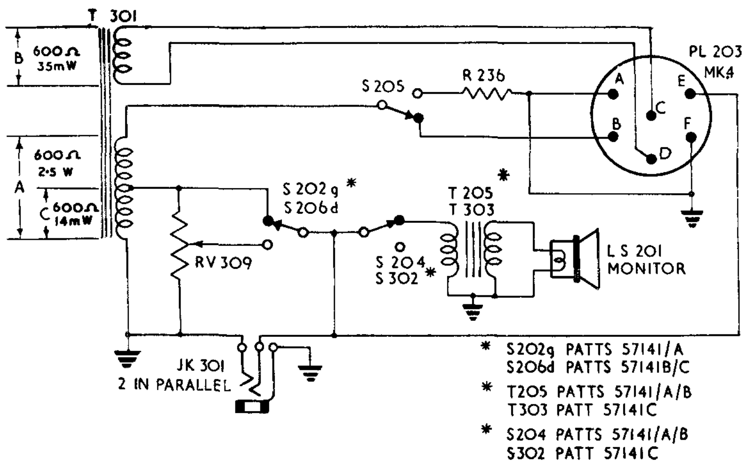
OUTPUT CIRCUITS

Output Stage Figs. 11/12/13

45. The receiver has a single valve output stage, employing a power pentode valve V302. This delivers a maximum audio frequency of 2.5 watts to the output lines. The full output power is normally used to feed an external loudspeaker.

Operating the DUMMY LOAD switch S205 to the ON position, connects a 620 ohms resistor across this output and disconnects the loudspeaker line. The output transformer T301 has a resistor R313 connected across its primary to reduce peak voltage, this prevents flash-over, should the remote loudspeaker become inadvertently disconnected. In B41C the valve is replaced by a new type CV2136. This has resulted in minor changes in the cathode circuit components.

Output Lines



OUTPUT LINES
FIG. 7

46. The three audio outputs are fed from the secondary of transformer T301, through socket and plug connectors from the A.F. and Power Unit, to the output plug in the I.F. Unit. The output plug is a Mark 4 sealed type and provides a six-way outlet at the rear of the I.F. Unit. To make the above diagram as clear as possible, the intermediate unit connecting plugs and sockets have been omitted.

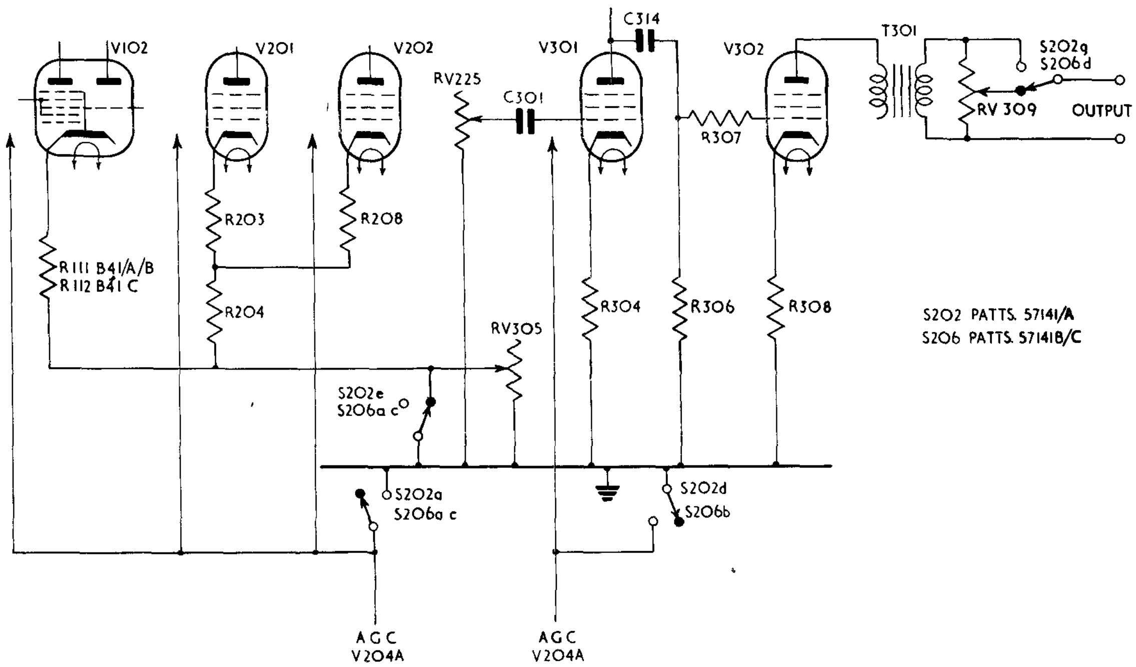
47. The three output channels comprise:-

-A- A 2.5W loudspeaker line, incorporating a switch S205 (DUMMY LOAD). When this switch is placed in the "External L.S. OFF" position, i.e. the switch toggle to the front of the receiver, a compensating resistor R236 is connected to earth across the output.

-B- An output derived from a separate winding of the transformer, normally employed to provide up to 35 mW into a ship's control system.

-C- The subsidiary headphone and monitor loudspeaker line extension, with a nominal power rating of 14 mW. RV309 gives further audio gain control when the a.g.c. is operative. This control is part of the two gang GAIN control RV305/309. The operation of RV309 is determined by the SYSTEM switch (S202g) in B41/A receivers and by the a.g.c. switch (S206d) in the later patterns.

48. All these outputs have a nominal impedance of 600 ohms, so that it is necessary for the external reproducers to be matched to this impedance. The output level for all lines is governed by the setting of the A.F. GAIN control RV225.



GAIN CIRCUITS
FIG. 8

49. The receiver can be operated with a.g.c. ON or OFF depending upon the setting of the control switches. "Manual" control of a.f. gain is provided at all times, but r.f. gain is manually or automatically controlled. The means by which the a.g.c. is switched, differs between the B41/A receivers and the later patterns. On the former, a.g.c. is provided on positions 2 to 6 of the SYSTEM switch and is disconnected in position 1, where r.f. gain is manually controlled. In B41B/C receivers, a.g.c. is controlled simply by the A.G.C. ON/OFF switch, manual control being provided in the OFF position.

50. Electrically, the circuit is the same in all patterns of the receiver, the switch names representing the only difference. This is shown in Fig. 8 above. In the case of S202, only positions 1 and 2 are shown, as the remainder of the positions on the SYSTEM switch sections concerned, are connected to position 2.

51. In the switching position shown, r.f. gain is controlled by the a.g.c. voltage. The headphones and monitor loudspeaker output line level is adjusted under these conditions by RV309, which is the a.f. section of the ganged GAIN control, switched by S202g/206d. The other outputs are omitted from the diagram, as they are not controlled by RV309. The r.f./i.f. section of the GAIN control (RV305) is short-circuited by S202e/206c and automatic control voltage fed to the grids of the relevant valves.

52. When the r.f. gain is manually controlled, RV309 is disconnected by the opening of S202g/206d. Switch sections S202e/206c open and RV305 becomes the operative component of the GAIN control, varying the cathode voltages of the r.f. and i.f. valves concerned, to give the desired gain adjustment. The a.g.c. lines to these valves and the first a.f. valve are short-circuited to earth at S202a/206a and S202d/206b respectively.

RECTIFIER AND STABILISING CIRCUITS

B41/A/B Figs. 11/12

53. The double-diode valve V303, functions as a full wave rectifier. The smoothing circuit comprises two chokes, L302 in the positive h.t. line, and L303 in the negative h.t. return line, with smoothing capacitors C305, C307 and C308.

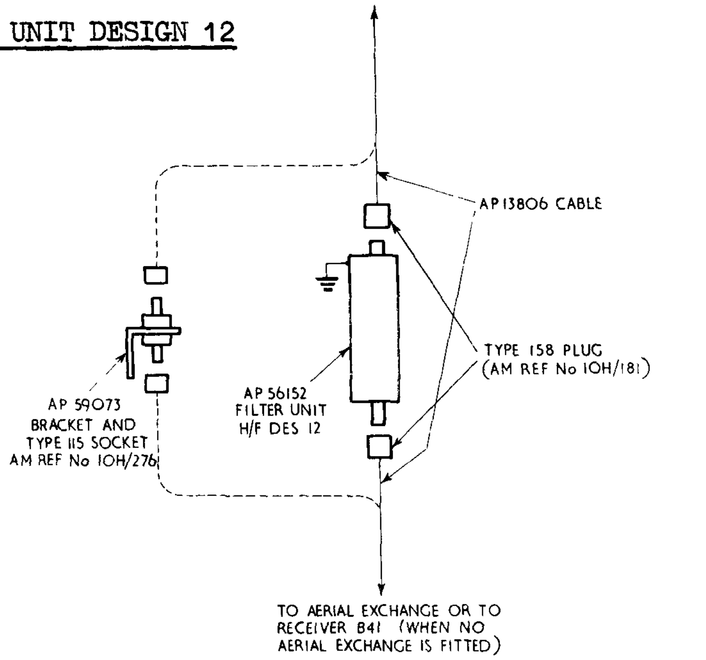
54. V304 is a neon stabiliser for the supply voltage to the local oscillator valve V104. The stabiliser priming electrode is supplied from the main h.t. line through R310. To provide effective de-coupling, the stabiliser valve is earthed at the R.F. Unit. Resistor R312 reduces the voltage to the first r.f. valve, which is a separate supply.

B41C Fig. 13

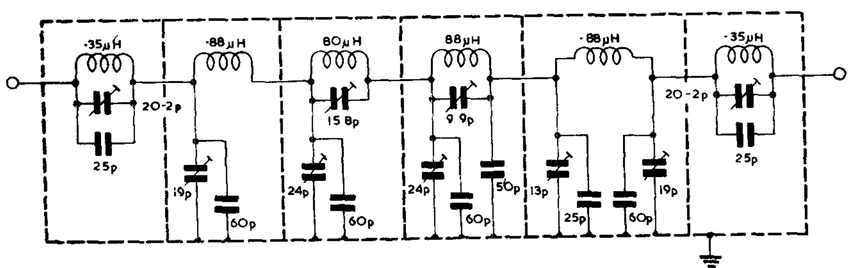
55. This receiver incorporates an additional rectifier valve, the two anodes of each valve being strapped together and the whole arrangement used to form a full-wave rectifier circuit, with a valve at each end of the mains transformer h.t. winding. The valves employed are the preferred type CV493 (V303 and V305). In this pattern the stabilising valve V304 is a replacement type CV1832. As there is no priming electrode in this new valve, R310 is not included in this pattern. With the exception of the modifications mentioned above, the circuits are similar to the other pattern receivers.

R.F. FILTER UNIT DESIGN 12

56. Additional protection against Radar transmissions, particularly Types 79, 279, 281, 960 and variants, is provided by fitting the Filter Unit Design 12, (A.P.56152) in series with the aerial lead to the set, external to the receiver.



FILTER UNIT DES. 12 A.P. 56152 INSTALLATION DIAGRAM
FIG. 10

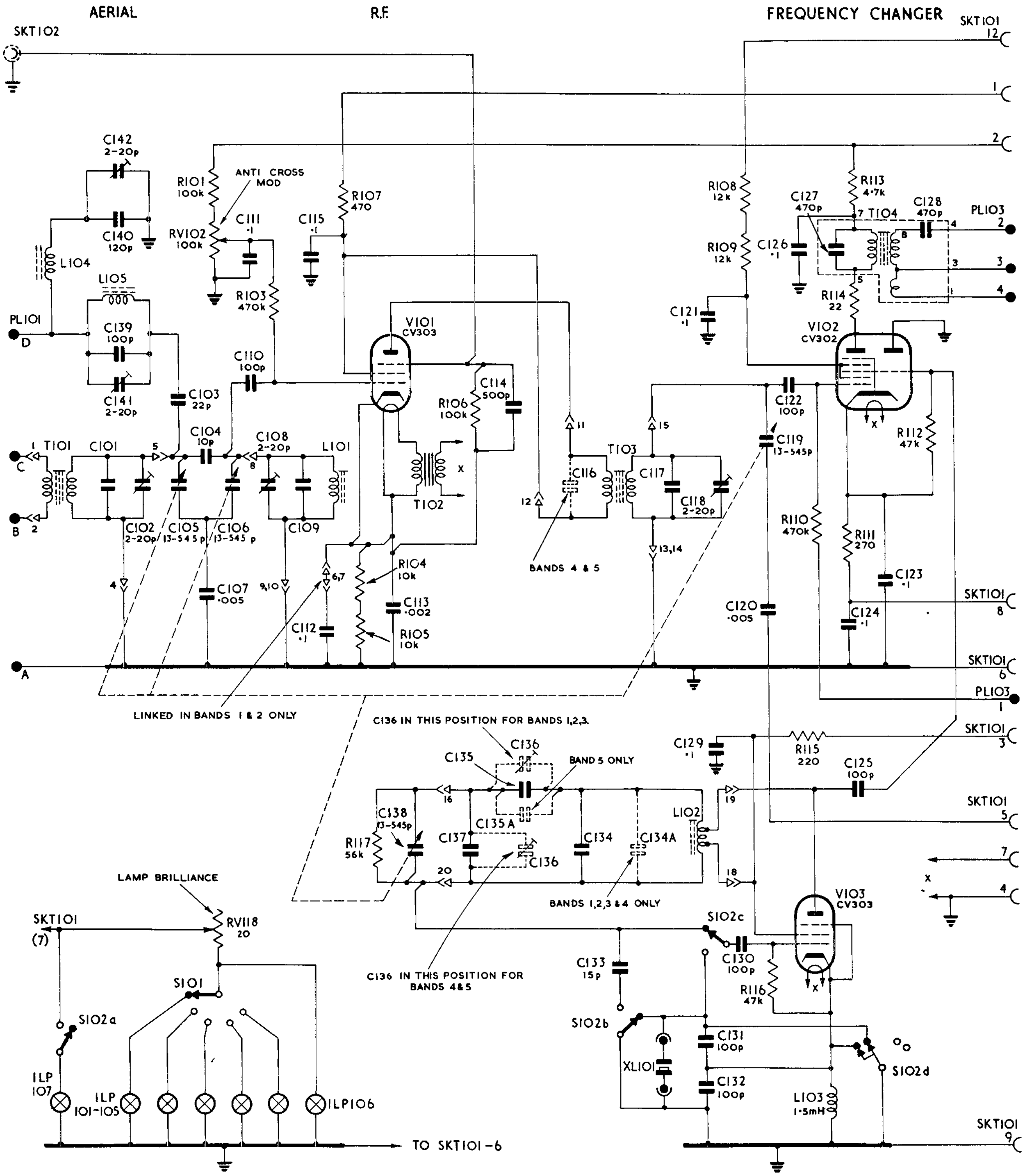


FILTER UNIT DES.12 A.P. 56152 CIRCUIT DIAGRAM.
FIG. 9

FIG. 11

R	101 103 104 107 117 105 106 108 116 109 110 111 115 113 114 112	R
C	139-142 101 103 104 106 102 105 107 111 108 110 115 112 109 113 138 137 114 136 135 135A 116 134 133 134A 117 131 121 118 130 132 129 119 120 122 126 127 125 123 124 128	C
MISC	PL101 L105 T101 L104 SKT102 S102a ILP101-107 RV118 S101 RV102 L101 V101 T102 T103 XL101 S102b L102 S102c V103 L103 V102 S102d T104 SKT101 PL103	MISC

R.F. UNIT



LOCAL OSCILLATOR

NOTE –
1 THE FOLLOWING COMPONENTS ARE NOT FITTED IN PATT 57141/A — C139, C140, C141, C142, L104, L105
2 C135A AND C134A ARE FITTED ONLY IN PATT 57141B
3 REFER TO FIG 2 PART 3 FOR VALUES OF COMPONENTS IN TURRET COMPARTMENT.
4 THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z 160009 4-18p

5. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

This sheet issued with A.L. No. 1 January 1958

R	202 201 205 219 203 236 204 207 206 209 208 235 210 237 211 218 212 217 214 216 213 234 215 228 229 232 229 231 233 230
C	201 202 203 207 204 205 206 208 209 210 212 224 222 223 211 213 239 215 214 216 238 217 218 219 233 234 236 232 220 221 237 235 227
MISC.	PL201 S201a & b T201 V201 T202 S201d V202 T203 S201e V203 S202s V204A T204 V206 SKT201 PL203 T205 S202a S201c L206 S202b S202c S202q. L204. L203 SKT202 S201g. L202a L207 TL L201 S204 S205 S202g LS201 PL205 S202j S202k S202p XL201 S202m L205 L202b S202n

I.F. UNIT.

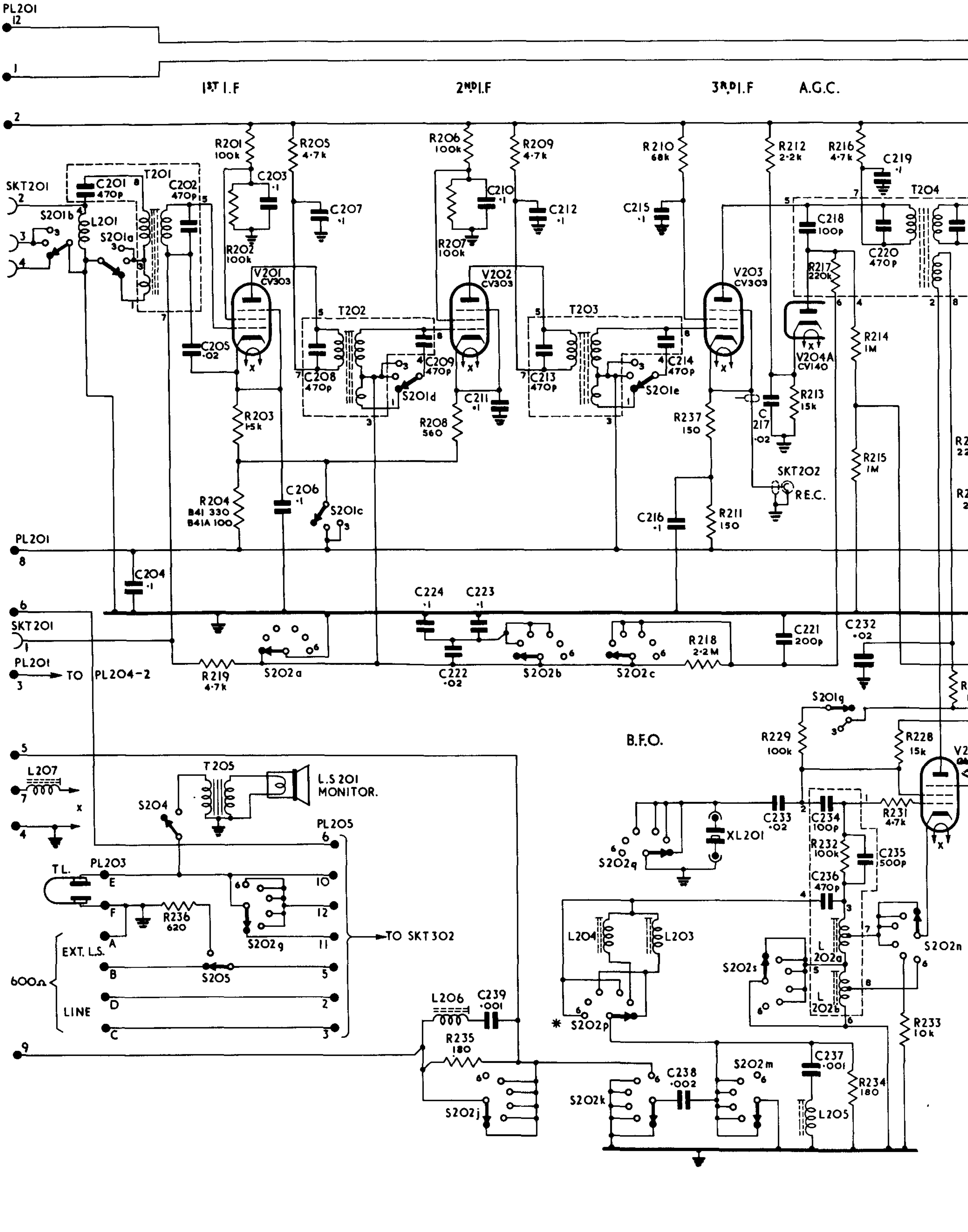
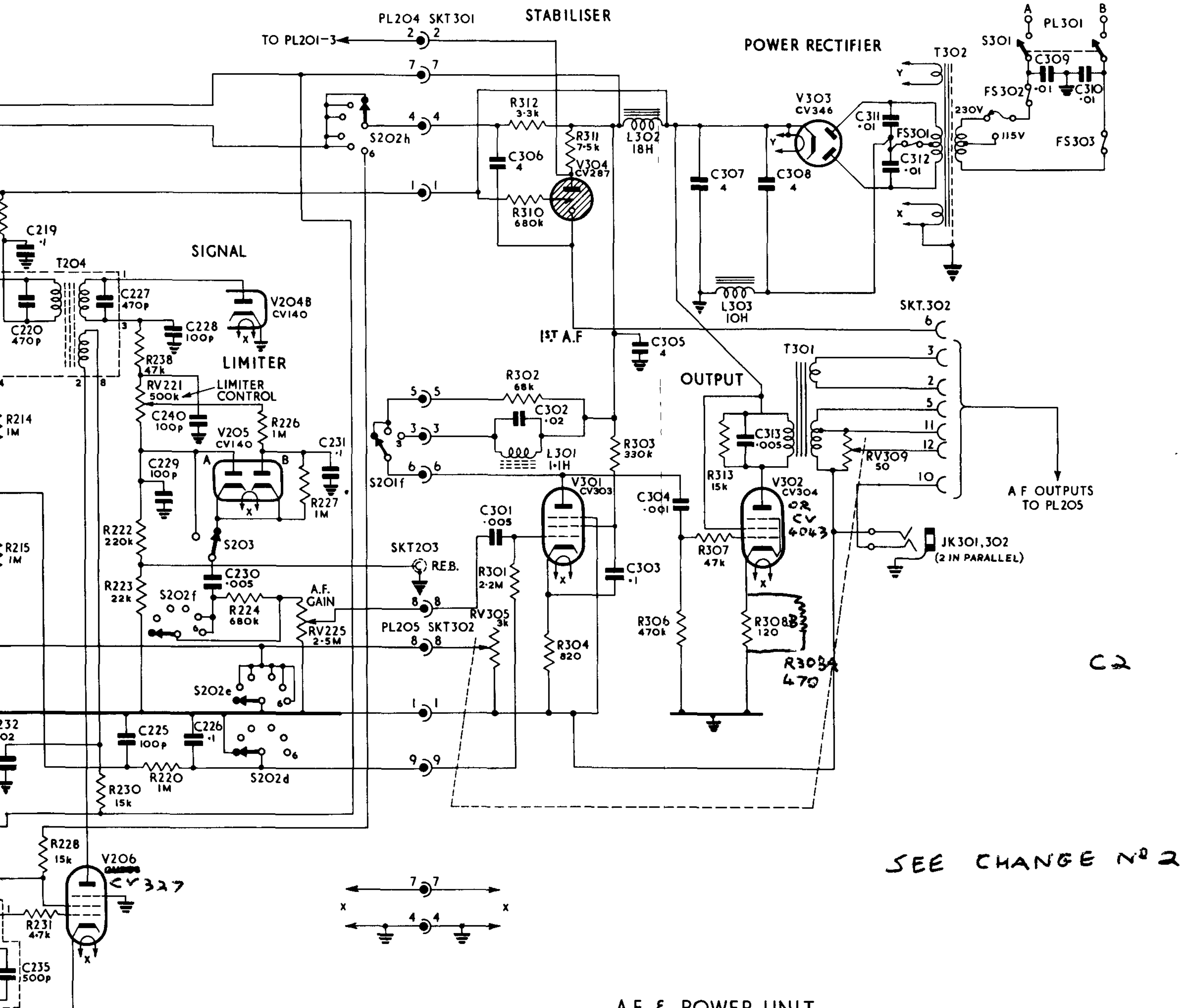


FIG. 11

216 228 229 231 233 230 238 222 220 223 227 224 226 312 311 303 301 310 304 302 313 306 307 308 — R

219 220 235 227 228 229 225 240 230 226 231 306 301 302 305 303 307 304 308 313 311 312 309 310 — C

T204 V206 RV221 L202a L202b S202n V204B S203. V205 S202f S202e RV225 S202d S202h PL204 SKT301 SKT203 S201f RV305 L301 SKT302 V304 V301 L302 L303 V303 T301 V302 RV309 FS301. T302 SKT302 JK301 302 S301 PL301 FS302 FS303 — MISC



A.F & POWER UNIT

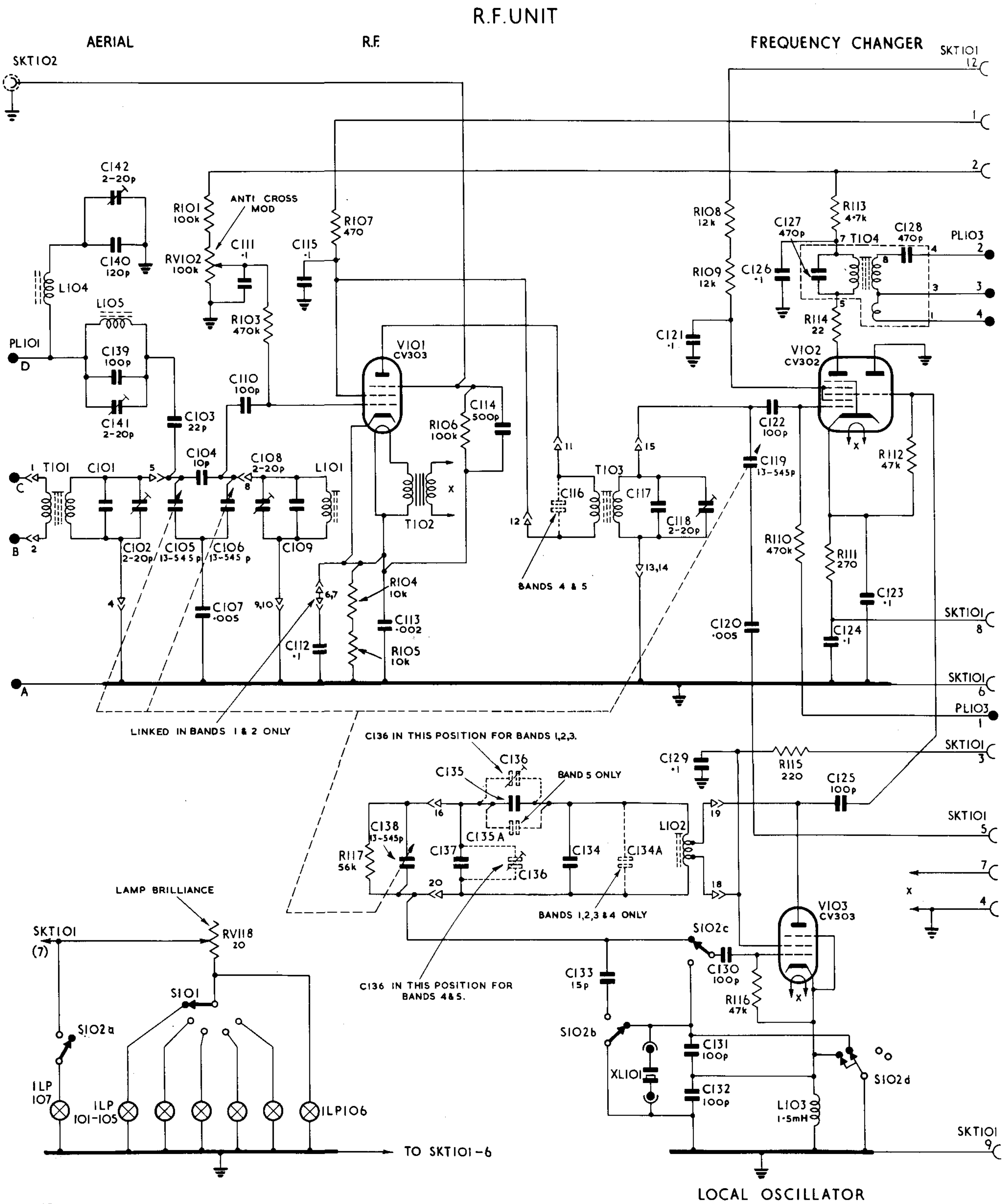
* S202p IN POSITION 5 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH.
IN POSITION 6 (CAL) L203 & L204 ARE SHORT CIRCUITED.

NOTE:- 1 THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z160009 4-18p.
2. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

RECEIVER B41
CIRCUIT DIAGRAM. A.P. 57141/A

FIG. 12

R	101 104 108 110 113 103 107 117 106 116 111 112 105 109 115 114	R
C	139-142 103 104 111 115 136 116 131 121 119 127 106 108 112 113 137 114 135 133 134A 117 118 130 126 125 123 128 101 102 105 107 110 109 138 135A 134 132 129 120 122 124	C
MISC	PL101 L105 RV118 T103 L102 V103 V102 SKT101 T101 L104 S101 L101 V101 T102 XL101 S102d SKT102 S102a ILP101-107 RV102 S102b S102c L103 T104 PL103	MISC



NOTE:–
1. THE FOLLOWING COMPONENTS ARE NOT FITTED IN PATT. 57141/A — C139, C140, C141, C142, L104, L105.
2. C135A AND C134A ARE FITTED ONLY IN PATT. 57141B.
3. REFER TO FIG.2 PART 3 FOR VALUES OF COMPONENTS IN TURRET COMPARTMENT.
4. THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z 160009 4-18p
5. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

This sheet issued with A.L. No. 1 January 1958

R	202 201 205 203 219 235 204 236 207 206 209 208 210 238 212 211 234 230 213
C	201 202 203 204 239 205 206 208 207 209 246 244 247 245 241 238 210 211 212 213 215 214 216 237 221 232 233 217 218
MISC.	S201b T201 PL201 L201 SKT201 S201a L207 TL V201 PL203 L206 S201c S206ac S205 T202 S206d S201d S201h PL205 S202j XL202 S201k S201l L208 S201m S202k V202 T203 S202m L205 S202q V203 XL201 L204 S202p SKT202 L203 V204 S202s

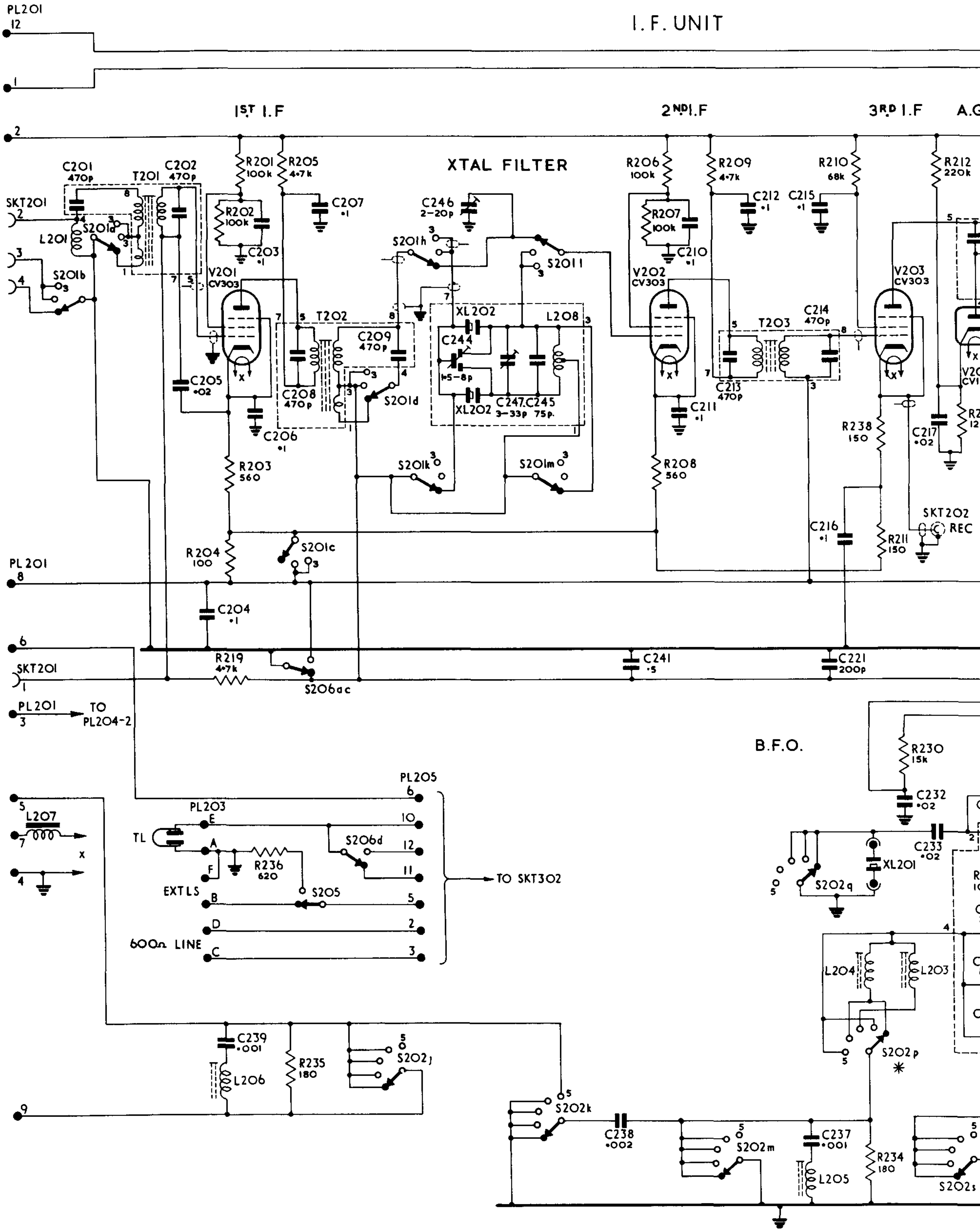
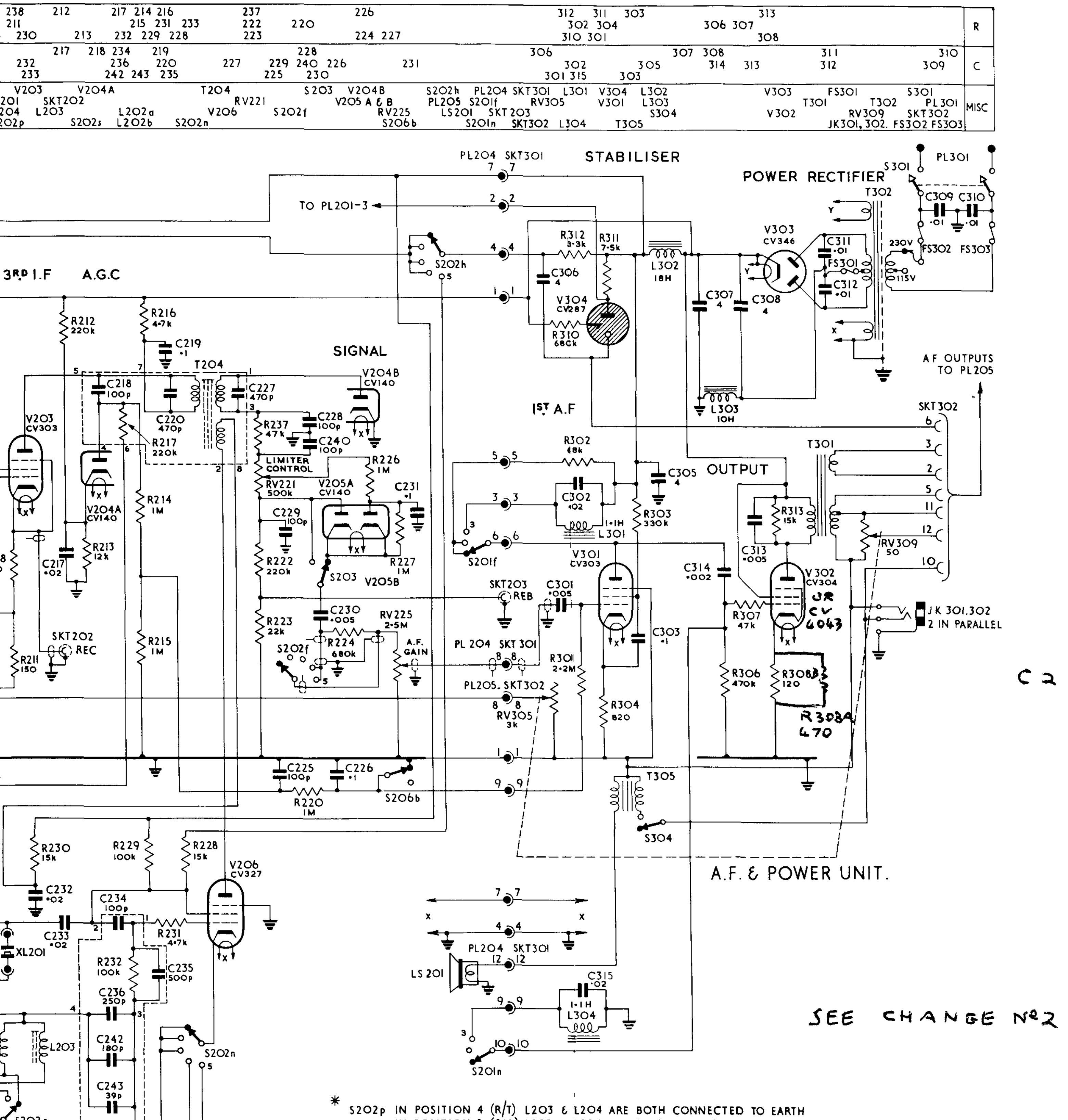


FIG. 12



C 2

SEE CHANGE No2

* S202p IN POSITION 4 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH
IN POSITION 5 (CAL) L203 & L204 ARE SHORT CIRCUITED.
THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z160009 4-18p

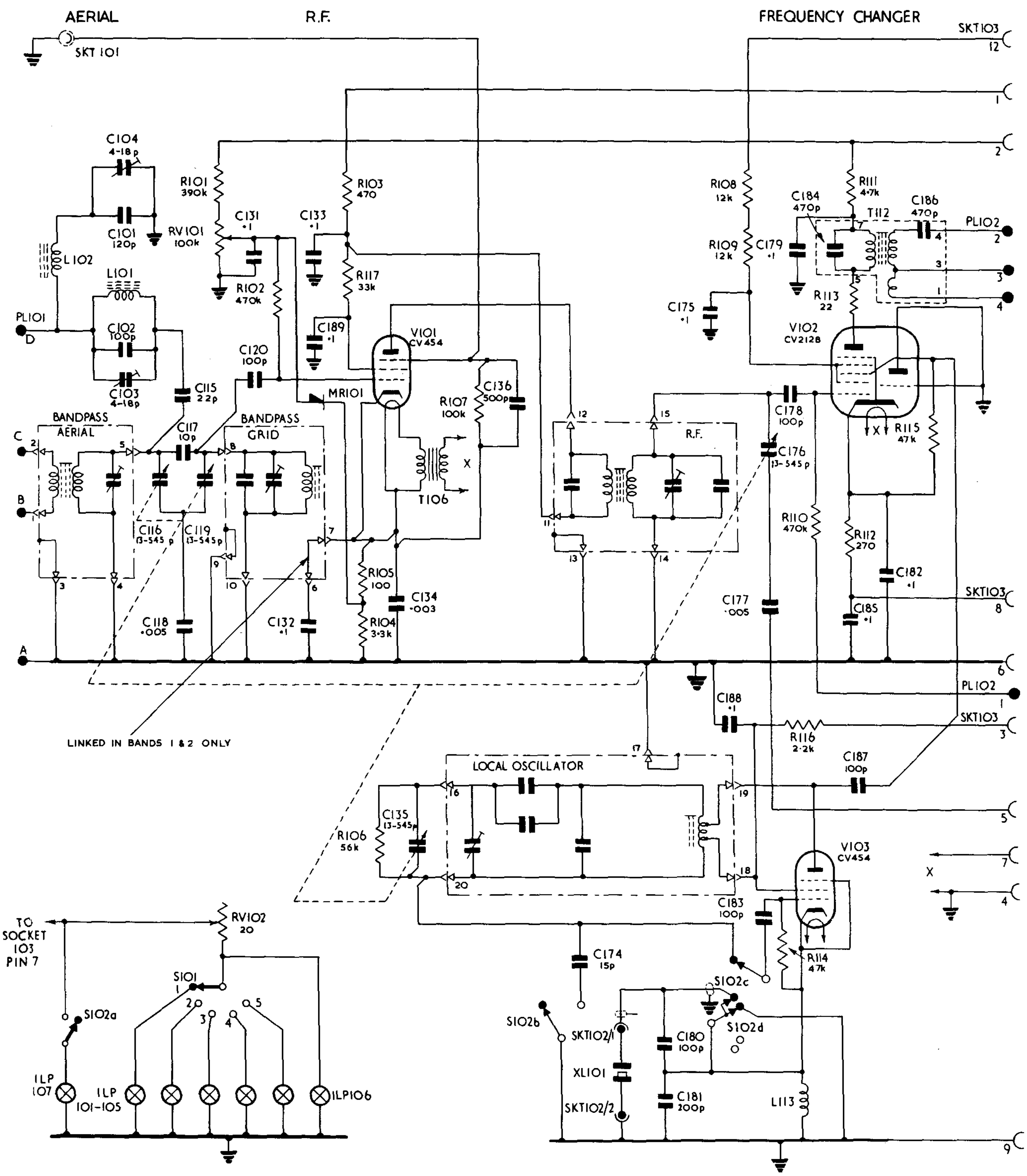
RECEIVER B41

CIRCUIT DIAGRAM. A.P. 57141B

FIG. 13

R	101 102 103 117 106 105 104 107 108 109 111 110 116 114 113 112 115	R
C	101–104 116 115 117 118 119 131 120 132 133 189 135 134 136 174 175 180 181 188 183 177 179 178 176 184 185 187 182 186	C
MISC	L102 PL101 S102a SKT101 L101 RV101 S101 ILP 101–107 RV102 MR101 V101 T106 S102b XL101 SKT102 S102c S102d V102 V103 L113 T112 SKT103 PL102	MISC

R.F. UNIT



NOTE.
FOR CIRCUIT & LAYOUT DETAILS OF BAND SWITCH TURRET COMPARTMENTS REFER TO FIGS.7 & 8 PART 3.
ABOVE CIRCUIT SHOWS BAND SWITCH ON BAND 5.

This sheet issued with A L No 1 January 1958

R	202 201 205 203 219 235 204 236 207 206 209 208 210 238 211 234 230 212 213
C	201 202 204 239 205 203 206 208 207 209 246 244 247 245 241 238 210 211 212 213 215 214 237 221 216 232 233 217 218
MISC.	S201b PL201 L201 SKT201 S201a L207 T201 TL PL203 L206 V201 S201c S206ac S205 S206d T202 S201d PL205 S202j S201h S201k XL202 S201l L208 S201m S202k V202 S202m T203 S202q L205 SKT204 V203 XL201 L204 S202p SKT202 L203 V204A S202s

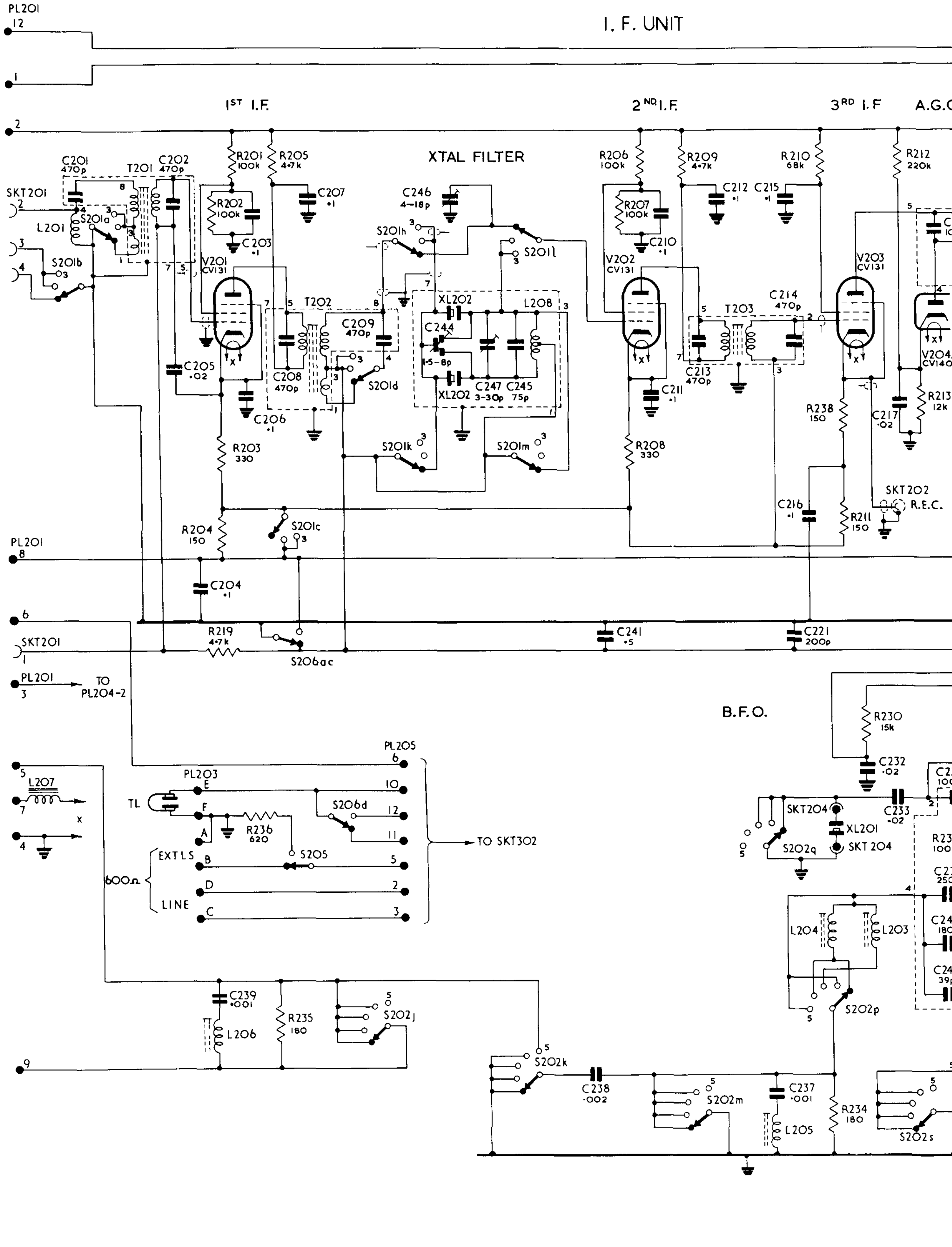
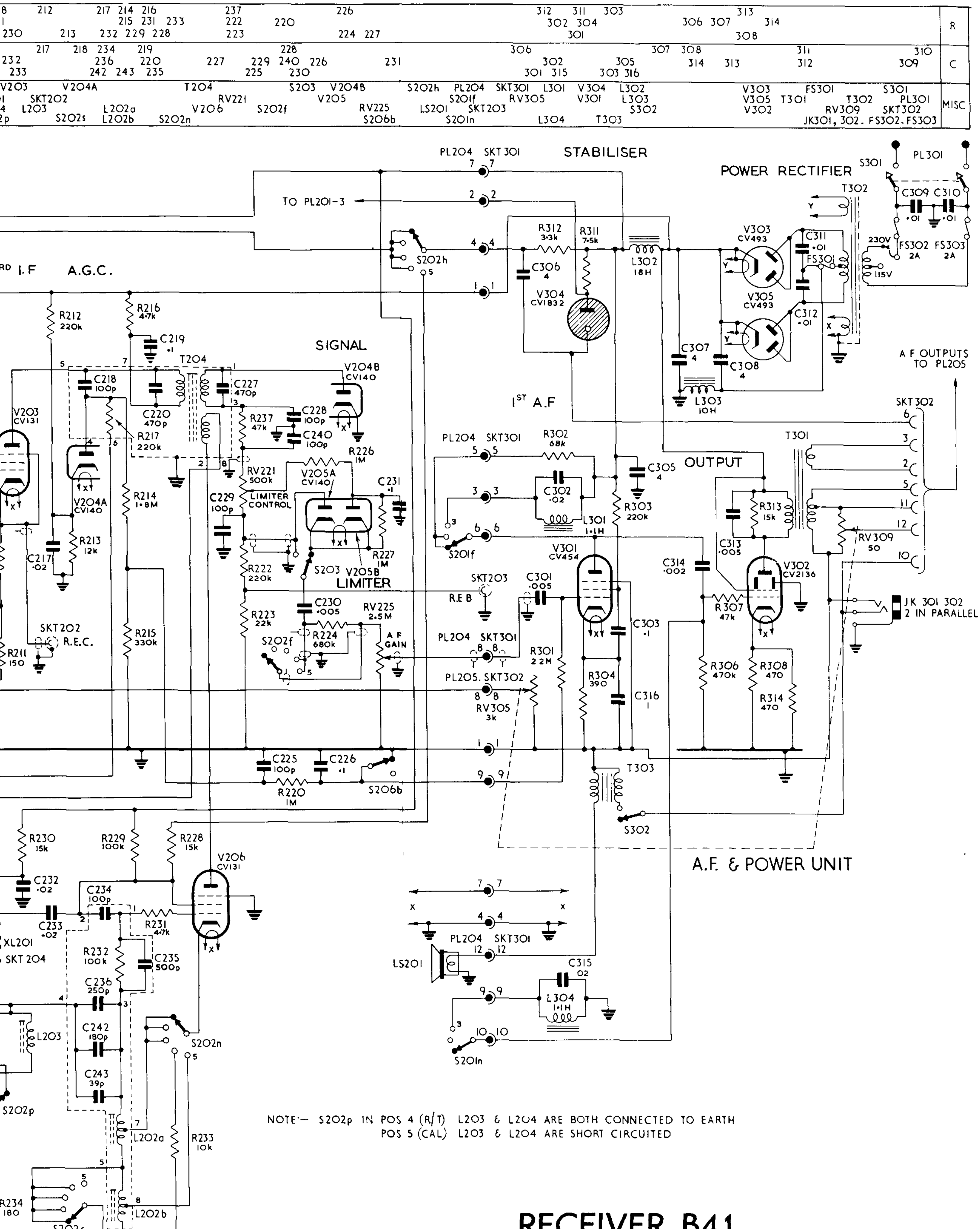


FIG. 13



NOTE:— S202p IN POS 4 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH
POS 5 (CAL) L203 & L204 ARE SHORT CIRCUITED

RECEIVER B41
CIRCUIT DIAGRAM. A.P. 57141C

CHAPTER 4

RECEIVER PATTERN DIFFERENCES

LIST OF CONTENTS

CHAPTER 4

RECEIVER PATTERN DIFFERENCES

Introduction

1. The principle differences between the four patterns of the receiver are detailed in the following paragraphs. As a general rule, subsequent patterns retain all improvement modifications and special facilities incorporated in the earlier types of the receiver. Thus B41B retains all the modifications of B41A, whilst incorporating additional modifications.

2. It should be remembered that the identity of a component in the circuit drawings of one pattern of receiver, is not necessarily the same in the circuit drawings of other patterns of the B41 receiver.

A.P.57141A

3. This pattern differs from A.P.57141 as follows:-

(a) The position of the noise limiter valve on the I.F. Unit is changed, to provide additional space for the fitting of an improved design of monitor loudspeaker.

(b) A tensioning device is fitted to the driving chain of the tuning mechanism to minimise backlash.

(c) The LIMITER and A.F. GAIN potentiometers are brought out to control knobs, instead of the screwdriver adjustments.

(d) The mains transformer is an oil filled type instead of the original open type.

NOTE: In accordance with Minor Modification No. 5, B.R.1917, this transformer should now be replaced by A.P.65561B.

(e) A protection bar is fitted above the i.f. transformer trimmers to prevent damage when the unit is withdrawn from the case.

(f) A portion of the left-hand side plate is cut away to facilitate removal of the crystal.

(g) The screen of the R.F. Unit is bent to prevent vibration.

(h) The size of the dowel holes is increased to bring the i.f. chassis forward.

(j) The manual GAIN control is fitted with a ganged potentiometer of improved design.

(k) Reconditioned B41/A receivers (with modification labels above the logging scale) will have temperature compensated capacitors fitted as in the B41B receivers (see 4(n)).

A.P.57141B

4. This pattern differs from A.P.57141A as follows:-

(a) A redesigned tuning drive is fitted.

(b) The disposition of several items on the front panel have been changed. The monitor loudspeaker switch is mounted above the mains switch. The A.G.C. switch, new to this pattern, is mounted in the position formerly occupied by the monitor loudspeaker switch. Two engraved escutcheon plates are added to the flat side portions of the front panel; these give clear labelling of the controls and also improve the general appearance of the receiver.

(c) The i.f. rejection ratio is improved by the insertion of a rejection filter (L105, C139 and C141) in the lead from Pin D of PL101 (Aerial) to C103; also an acceptor filter (L104, C140 and C142) from Pin D to earth. Both circuits are tuned to 800 kc/s.

(d) The coupling coil on the i.f. transformer T203 and the switch S201e are removed to reduce the i.f. bandwidth in the expanded position to 3 kc/s. The connection from C214 is made direct to the bottom of the secondary winding of T203. The BANDWIDTH switch S201 has been rewired and an extra wafer incorporated, to bring in the crystal filter (see (f) below) in the second position of the switch. The crystal filter and the note filter are switched into circuit in the third position. The three positions of the BANDWIDTH switch are therefore as follows:-

3 kc/s, 1kc/s and 200 c/s.

(e) The SYSTEM switch has five instead of six positions. The MANUAL position of the B41A being no longer required, as a separate A.G.C. switch (S206) is fitted to provide facilities for both manual and automatic gain control in all positions of the SYSTEM switch.

(f) An 800 kc/s crystal filter is fitted in the i.f. chain, between the first two stages in the I.F. Unit. The mounting of the filter is effected by removing T201 to the position formerly occupied by the monitor loudspeaker transformer T205; this last mentioned component is moved to the A.F. and Power Unit. The position formerly occupied by T201 is taken by T202. The crystal filter (L206, XL202 etc.,) is positioned in the place vacated by T202.

(g) The a.g.c. time constants are modified. S202c and R218 are removed. S202b and associated capacitors C222, C223 and C224 are removed and replaced by C241 (0.5 µF).

(h) The note filter in the A.F. and Power Unit, is modified to give a band-pass response characteristic. This is achieved by an identical circuit (L304, C315) to the one already existing (L301, C302), being inserted into the grid circuit of V302 in the 200 c/s position of the BANDWIDTH switch.

(j) The connectors PL204 and SKT301 are changed from 8 to 12 pin; to enable leads to be carried from the additional note filter circuit to the BANDWIDTH switch wafer in the I.F. Unit.

(k) A replacement mains transformer A.P.67763A (T302) with a 'C' core, is fitted.

(l) A device is fitted to give a direct indication of the frequency band to which the receiver is switched.

(m) The trimming tools formerly supplied with the receiver are changed for the following reasons:

(i) It was found that the existing tools were not suitable for lining up the crystal filter, due to the excessive metal.

(ii) In view of this, the tools were modified and simplified, so that one tool, capable of trimming both the crystal filter and the ordinary i.f. trimmers, replaced two trimming tools previously supplied.

(n) Certain new capacitors are included in the r.f., l.o. and b.f.o. circuits, and in some cases the values of existing ones are changed. The modifications provided temperature compensation to prevent frequency drift.

A.P.57141C

5. As previously stated in the introduction to the handbook, circuit references have been extensively changed in this pattern of the receiver. The differences between A.P.57141B and A.P.57141C are best considered in two groups as follows:-

(a) Changes due to the introduction of preferred type valves

(b) Miscellaneous changes.

Dealing with the above groups in order:-

Changes due to the new valves

6.(a) Valves

Unit	Valve	B41/A/B CV No.	B41C CV No.	Operation
R.F.	V101 V102 V103	CV303 CV302 CV303	CV454 CV2128 CV454	R.F. Mixer Oscillator
I.F.	V201/2/3 V206	CV303 CV327	CV131 CV131	1st, 2nd and 3rd I.F. B.F.O.
A.F. & POWER	V301 V302 V303 V304 V305	CV303 CV304 CV346 CV287 -	CV454 CV2136 CV493 CV1832 CV493	1st A.F. Output Rectifier Stabiliser Rectifier

In the table given overleaf, the valves underlined are those fitted so far, by the manufacturer. Eventually, the valves shown in the "Reliable" column will be used exclusively.

Meanwhile when a "Preferred" valve fails, it should be replaced by its "Reliable" equivalent, if this is available.

Ref.	Reliable	Preferred
V101	CV4009	CV454
V102	CV2128	
V103	CV4009	CV454
V201	CV4015	CV131
V202	CV4015	CV131
V203	CV4015	CV131
V204	CV4007	CV140
V205	CV4007	CV140
V206	CV4015	CV131
V301	CV4009	CV454
V302	CV4043	CV2136
V303	CV4005	CV493
V304	CV1832	
V305	CV4005	CV493

(b) Other component changes due to revalving

R.F. Unit

(1) Aerial Turret Coil Compartments

Band	B41B		B41C		Remarks
	Ref.	Value	Ref.	Value	
1	C101	22 pF			Deleted
2	C101	18 pF			"
3	C101	47 pF	C109	39 pF	Changed
4	C101	47 pF	C111	27 pF	"
5	C101	47 pF			Deleted

The above capacitors were in parallel with the aerial circuit trimmers. The changes and deletions have been made in order to achieve correct tuning of the circuits. The change relates to receivers with serial numbers above 776.

(2) V101 cathode circuit

B41B		B41C		Remarks
Ref.	Value	Ref.	Value	
R104	10k ohms	R105	100 ohms	Changed
R105	10k ohms	R104	3.3k ohms	"
R101	100kohms	R101	390k ohms	"
C113	0.002 μF	C134	0.003 μF	"

These changes ensure that the range of the ANTI-CROSS-MODULATION control is correct and consistent with the gain of the new valve V101.

(3) V103 (Oscillator) anode circuit.

B41B		B41C		Remarks
Ref.	Value	Ref.	Value	
R115	220 ohms	R116	2.2k ohms	Changed

This is so that the CV454 delivers the correct local oscillator voltage to the mixer.

I.F. Unit

(4) V201 cathode circuit

R203 changed from 560 ohms to 330 ohms

(5) V202 cathode circuit

R208 changed from 560 ohms to 330 ohms

(6) V201/2 cathode circuits

R204 changed from 100 ohms to 150 ohms.

(7) V203 cathode circuit

R211, instead of being connected to the common cathode line, is now connected to the junction of R203/4 and R208. The above cathode circuit change is necessary for the correct biasing of the new type valves and also to obtain the correct compensation of gain between the three positions of the bandwidth switch.

(8) V204a a.g.c. circuit

R214 changed from 1 Megohm to 1.8 Megohms.
R215 changed from 1 Megohm to 330k ohms.

This change permits the correct a.g.c. characteristic to be obtained from the new type valves whose grid base is different to that of the earlier types.

A.F. and Power Unit

(9) V301 circuit

R304 changed from 820 ohms to 390 ohms
C316 - 1 μF - added
R303 changed from 330k ohms to 220k ohms

(10) V302 cathode circuit

R308 (B41B) 120 ohms, is changed to two 470 ohms resistors R308 and R314 in parallel (B41C). These changes ensure that the d.c. and gain conditions of the audio frequency valves of the new type are correct.

(11) V304 stabiliser circuit

R310 (B41B) is deleted, as it is not required with the new type valve V304.

Miscellaneous changes

7. (1) In the ANTI-CROSS-MODULATION control circuit of the B41C, a crystal rectifier MR101 (CV448) has been added between the slider of the control and the junction of R104 and R105, to prevent positive excursions of grid potential.

(2) The following modifications are made to the r.f. stage to increase overall sensitivity:-

(a) R101 820k ohms replaced by 390k ohms.

(b) R117 33k ohms, added in series with the feed to the screen of V101; C189 is the associated de-coupling capacitor.

(3) Modification made to the i.f. rejection filter to facilitate trimmings:-

C105 10 pF removed (not fitted on other patterns)

(4) Modifications in the r.f. stage to facilitate trimming:-

(a) C190 10 pF, added in parallel with C121 (Band-pass grid Band 1)

(b) C166 47 pF replaced with a 56 pF capacitor (Band 3 mixer grid).

(5) To eliminate positive feedback in the i.f. amplifier, some modifications have been made to the main cableform and the grid lead of V203 screened. This has reduced the i.f. sensitivity in comparison with that of the B41B.

PART 2

ALIGNMENT, TESTING, ADJUSTING

MAINTENANCE AND REPAIR

CHAPTER 5

DISMANTLING THE RECEIVER

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CHAPTER 5

DISMANTLING THE RECEIVER

To remove the Receiver from its case Part 1 Figs. 1, 2, 3

1. Undo the two retaining nuts covering the front feet at the bottom of the front panel. Undo the two milled headed screws at the top corners of the front panel. Withdraw the connectors at the rear of the Receiver. Pull the Receiver upwards and forwards with the handles, it will then run out on two rollers situated at the bottom rear of the framework. It should be noted that the Receiver weighs nearly 100 lbs.

To remove the I.F. Unit Part 3 Fig. 13

2. Remove the knobs of the BANDWIDTH and SYSTEM switches (S201/2). Withdraw the four Painton plugs and sockets to the unit i.e. PL201 and SKT201 to the R.F. Unit, plugs PL204/5 to the A.F. and Power Unit. Unscrew the two large retaining screws at the back of the I.F. Unit. Clear the dowel pins at the rear of the unit, it will then be possible to lift it clear.

To remove the A.F. and Power Unit Part 3 Fig. 19

3. Remove the GAIN knob at the bottom right of the front panel. Withdraw the two large screws at the back of the unit. Withdraw plugs PL204/5. Pull back the unit and lift away from the panel.

R.F. Unit

4. All components can be reached on this unit without dismantling it from the Receiver framework. If it should become necessary for the tuning mechanism to be removed, details are given in Chapter 8. The screws holding it in position are situated on the underside of the set.

Switch Wafers

5. When replacing switch wafers on switches containing more than one of these items, make sure that the locating notches are all pointing in the right direction.

CHAPTER 6

ALIGNMENT

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LIST OF FIGURES

CHAPTER 6

ALIGNMENT

GENERAL INSTRUCTIONS

Introduction

1. Alignment will probably be necessary after replacement of major components in the r.f. and i.f. circuits, or if the receiver fails to reach the limits prescribed in performance measurements. However, before alignment is attempted, all other possible causes of poor sensitivity should be investigated. Alignment should be undertaken only by order of the officer responsible for the maintenance of the equipment.

Precautions

2. When lining-up, the following precautions must be observed:-

(a) The receiver and test instruments must be connected individually to a common earth.

(b) All connecting leads must be as short as possible.

(c) Screened leads must be used to carry currents at r.f. or i.f., the screening being connected to the common earth.

(d) The receiver and test equipment must be allowed to warm through for at least 15 minutes before alignment is commenced, but a longer warming up period is sometimes advisable.

Trimming Tools

AP 71479 C 5

3. The appropriate trimming tool for the alignment procedure in hand should be selected from the Kit of Trimming Tools allowed for E.M.R. use. These trimming tools were at one time fitted in the receiver, but are now supplied as a kit.

Component Identification

4. Where no ambiguity can arise, switches and controls have been referred to by name, but not identified by component numbers in order to make the instructions more readable.

Test Equipment

5. The principal items required are:-

(a) Test Oscillator

This should cover the i.f. frequency band of the receiver. The new Test Oscillator CT212 is particularly suitable, but G73 is also satisfactory. Its function is to provide a signal at a constant frequency and constant level to align the i.f., crystal and b.f.o. circuits.

The modulation frequency employed is 1000 c/s for CT212, or 400 c/s for G73.

(b) Signal Generator

As the B41 receiver frequency range covers very low frequencies, the only signal generator that is capable of use for the alignment of all the r.f. circuits, is Signal Generator A.P.54704A. It follows therefore that unless this instrument is available, it is not possible to align B41 r.f. circuits at sea. If this should become necessary in these circumstances, the assistance of the dockyard or depot ship should be sought in the usual way.

(c) Output Meter

The new Decibel Meter Portable No. 3 will provide this facility. Meanwhile, the output meter of the CT82 Noise Generator can be used, or a high resistance Avometer connected to read d.c. volts.

The function of the instrument is to show how the receiver output varies, due to adjustments during alignment.

(d) Variable frequency A.F. Oscillator

This is required to provide an accurate test oscillator setting when aligning the b.f.o. in receivers employed in RATT circuits. Ships fitted with these receivers will require dockyard or depot ships assistance in this phase of alignment if they do not possess this test instrument. The Audio Frequency Oscillator G205 is the most suitable instrument at present in service.

(e) Oscilloscope Type 13A

This is needed for the same reason as given under (d) above. It is also used in conjunction with a frequency swept oscillator in a method of aligning the crystal filter giving greater accuracy than the method which employs the signal generator and a microammeter.

(f) Microammeter

This indicates changes in second detector current due to adjustments made during crystal filter alignment. It is used to plot the crystal filter response curve when the test oscillator frequency is varied over the region around 800 kc/s.

Special Items

6. In order to save time when a receiver is in hand for alignment, certain special leads, connectors, etc., should be demanded or made up beforehand.

The following special items, not already provided elsewhere will be required.

Item No.	Function	Item
1	To stop the b.f.o. valve oscillating. Connected between grid and chassis.	A 0.01 μF capacitor, such as Z115552 with an A.P.W5845 crocodile clip joined to each end.
2	To permit an Output Meter to be connected to the receiver output (PL203)	A Mk. 4 Socket Free, 6 way, Z560120. Connect about four feet of twin cable to Pins A and B. Prepare the other end of the twin cable for connection to the output meter. Early receivers with 'W' type outlet sockets, will require the corresponding item instead of the Mk. 4 socket.

Item No.	Function	Item
3	To enable second detector current to be read on a high resistance Avometer No. 8 A.P.12945.	A.P.60046 plug, fitted in socket SKT203 should be removed. Connect it to a three foot length of Uniradio 70 cable (A.P.13870) or similar. Prepare the other end of the cable for connection to a high resistance Avometer No. 8.
4	To reduce i.f. gain and so avoid over-loading the receiver when carrying out r.f. alignment.	An 0.01 μF capacitor, such as Z115552 connected in series with a 390 ohms resistor. A crocodile clip A.P.W5845 is connected to each free end.

THE ALIGNMENT PROCEDURES IN BRIEF

7.(a) The object of aligning the i.f. stages is to ensure:-

(i) That each stage is tuned to 800 kc/s (the intermediate frequency) so that the maximum voltage and the correct bandwidth are obtained at the output of the final i.f. amplifier.

(ii) That the b.f.o. is adjusted to the i.f. amplifier centre frequency of 800 kc/s and to give a 1 kc/s beat note above and below this frequency. A special b.f.o. alignment drill for those receivers used in RATT circuits is given separately.

(b) It should not be necessary to re-align the i.f. stages after changing valves in the I.F. Unit. The b.f.o. coil L202 may require readjustment if the b.f.o. valve is changed. To do this the drill given in para. 14 up to step 13 should be followed omitting step 4, i.e. do not alter the trimming of the last i.f. transformer.

(c) The adjustment to the dust cored trimmers should be carried out with the trimming tool provided in the E.M.R. trimming tool kit. The effect of an adjustment, as indicated in the output meter, should be noted when the trimming tool has been withdrawn from the trimmer.

(d) As the various circuits are brought into tune, the output from the test oscillator should be altered as necessary to maintain the maximum wattmeter reading at a level of about 300 mW.

B.F.O. Alignment for RATT Receivers

8.(a) The following b.f.o. frequencies need to be set up with an accuracy of ± 30 c/s in the HIGH, LOW and TUNE positions of the SYSTEM switch.

System Switch Position	Frequency	Remarks
HIGH	1000 c/s	above 800 kc/s
LOW	1000 c/s	below 800 kc/s
TUNE	-	on 800 kc/s

(b) This order of accuracy cannot be achieved by the normal "beat" method. An oscilloscope is therefore employed. The necessary frequency is fed into the oscilloscope from an audio frequency oscillator, and the audio output frequency of the receiver adjusted by means of the b.f.o. trimmers to "match" the audio oscillator frequency, thus producing an ellipse in the c.r.t.

(c) An r.f. signal is fed in at the grid of the mixer valve. As the signal generator cannot be tuned to the receiver CAL signal with sufficient accuracy by the "zero beat" method, the signal generator or test oscillator is tuned to 799.5 kc/s (500 c/s below the receiver i.f. centre frequency), and "matched" in the oscilloscope for accuracy with a 500 c/s signal from the audio frequency oscillator. This has to be taken into account when adjusting the audio frequency oscillator, whose output frequencies are given in the table below:-

AL2

System Switch Position	Sig. Gen. Frequency (kc/s)	B.F.O. Adjusted for:-	Resultant A.F. Output (c/s)	A.F. Oscillator Frequency (c/s)
HIGH	799.5	800 kc/s + 1000 c/s	1500	1500
LOW	799.5	800 kc/s - 1000 c/s	500	500
TUNE	799.5	800 kc/s	500	500

Crystal Filter Alignment

9.(a) The object of aligning the crystal filter is to ensure that it possesses the correct response curve and bandwidth, with its centre frequency at 800 kc/s.

(b) If the filter is very badly out of adjustment, it is recommended that realignment should not normally be undertaken in seagoing ships, but that assistance be sought from the dockyard or depot ship, unless the crystal filter facility is considered to be of particular and immediate importance. A great deal of time, patience and care is necessary if the correct response curve is to be achieved.

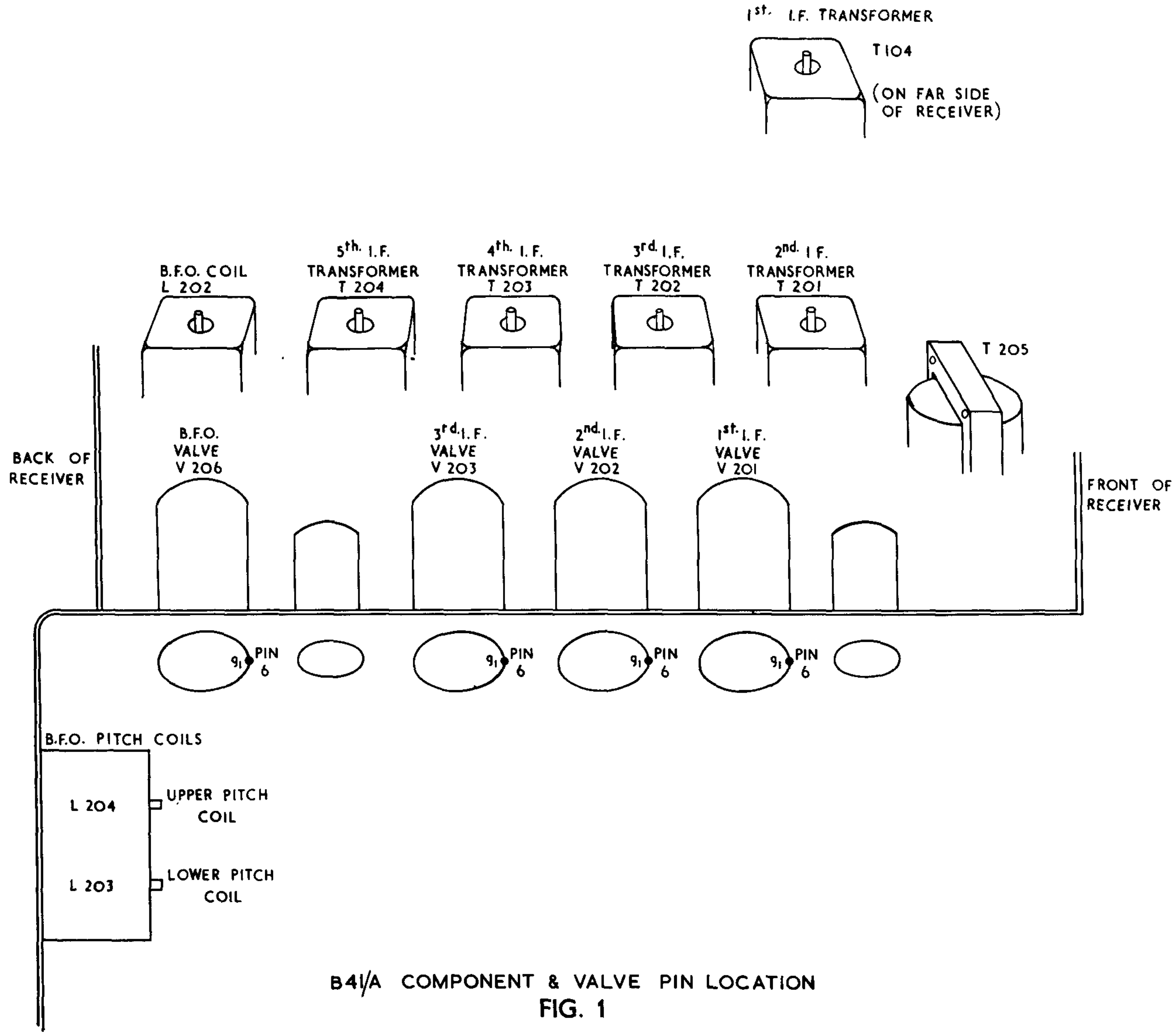
R.F. Alignment

10. In general this ensures:-

(a) Maximum voltage output from the r.f. section, optimum selectivity and the correct bandwidth over the frequency band covered by the receiver, by bringing the r.f. tuned circuits into correct alignment. This is done by trimming the r.f. circuits to the oscillator circuits (which have previously been aligned to the scale calibration) for maximum receiver output at "trimming points" near the top and bottom of each waveband.

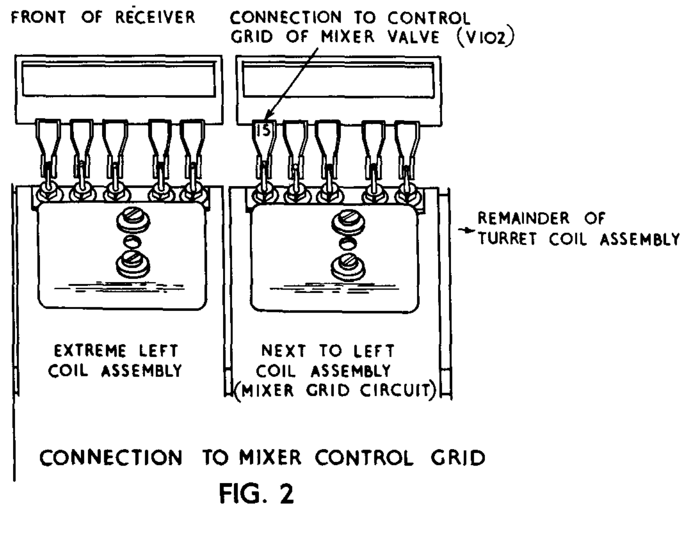
(b) Correct indication of frequency (including calibration points) on the tuning dial, by adjustment of the local oscillator trimming components.

FIG. 1 & 2



B41/A COMPONENT & VALVE PIN LOCATION

FIG. 1

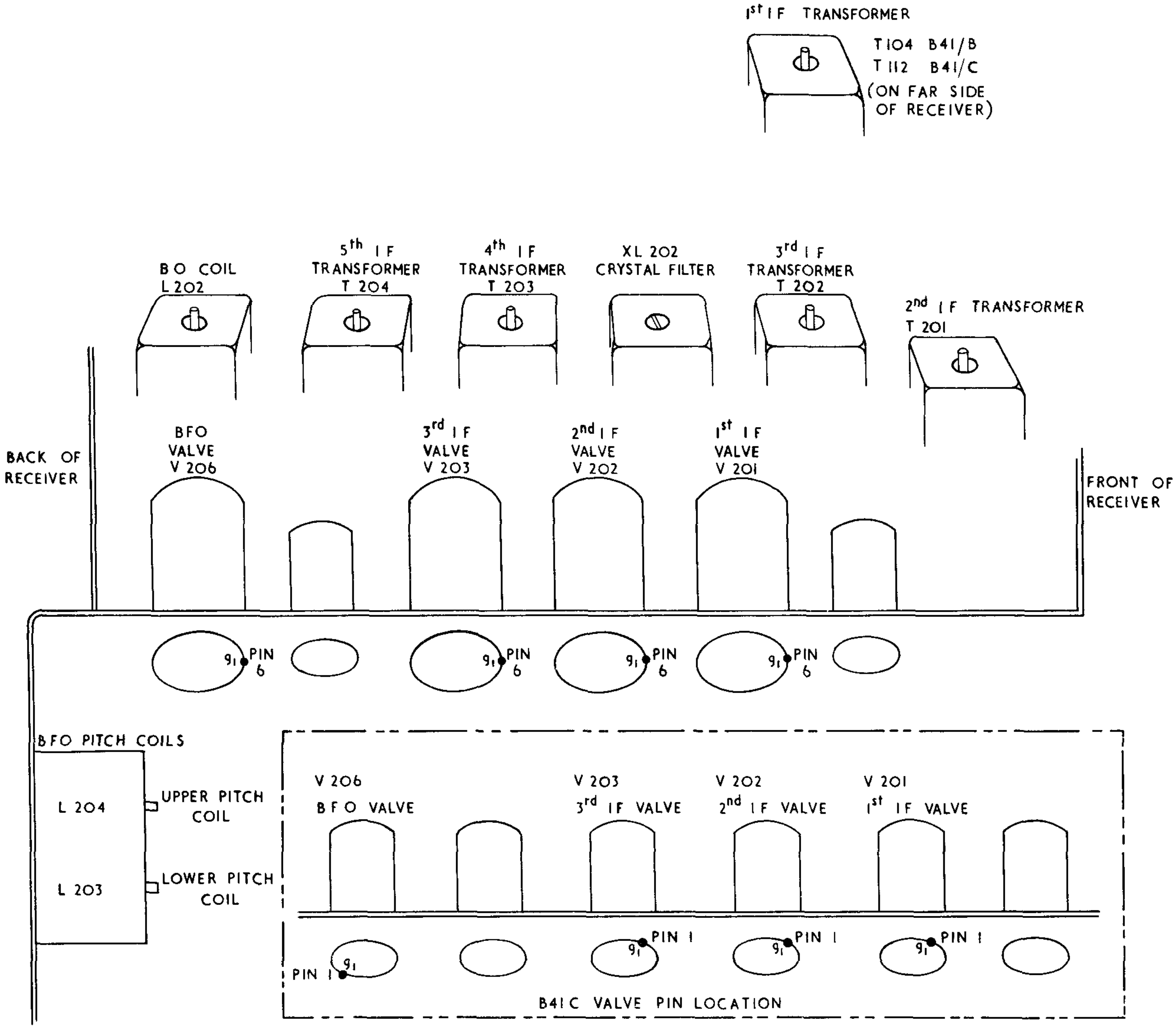


CONNECTION TO MIXER CONTROL GRID

FIG. 2

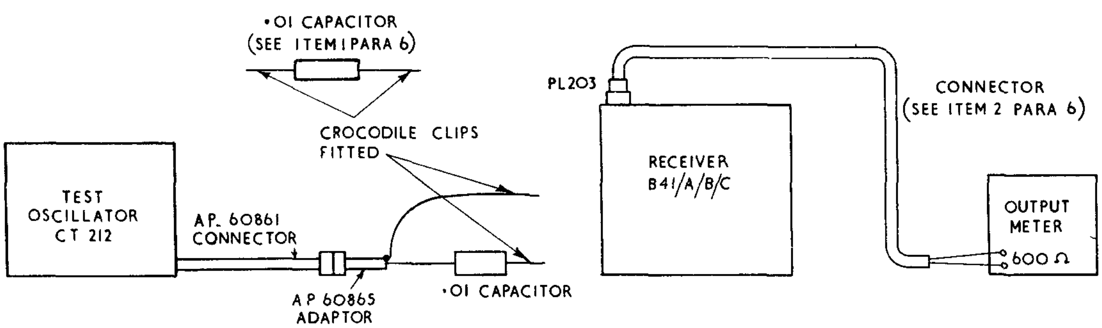
I.F. ALIGNMENT CONNECTION DIAGRAMS

FIG. 3 & 4



B41 B/C COMPONENT & VALVE PIN LOCATION

FIG. 3



TEST EQUIPMENT CONNECTION DIAGRAM

FIG. 4

I.F. ALIGNMENT CONNECTION DIAGRAMS

I.F. ALIGNMENT

Test Equipment Required

11.

Test Equipment Description	Type	A.P. No.
Test Oscillator or Signal Generator covering 800 kc/s, modulated 30% at 400 or 1000 c/s.	CT212 G73 CT218 Marconi	ZD.00784 W.2508 10S/16780 54704/A
Output Meter	Decibel Meter Portable No. 3. Output Meter of Noise Generator CT82 TF340	ZD.00022 67166 54708
Connector * Adaptor	-	60861 60865
Attenuator } Used with Signal Generator A.P. 54704/A Connector }		62693 62692

* These items are required for CT212 Test Oscillator, and are obtained from the A.P.60875 Box of Flexible Connectors for CT82 Noise Generator.

Special Items

12. The following special items will be required:-

Items No. 1 and 2, shown in para. 6 under "General Instructions".

The Drill in Outline

13.

		Steps
(1)	Remove the receiver from its case, remove the side panel from the r.f. stages, connect up the test equipment and switch on. Allow to warm through for one hour.	1-3
(2)	Line up last i.f. stage approximately.	4-5
(3)	Adjust the b.f.o. for crystal control.	6-7
(4)	Alignment of the b.f.o.	8-13
(5)	Line up accurately the last i.f. stage	14-15
(6)	Line up the remaining i.f. stages	16-18
(7)	Final "touch up"	19-21
(8)	Complete instructions, with test equipment list and connections for alignment of B41B/C receivers b.f.o. circuits for RATT systems.	15-19

The Drill in Detail

14. STEP — ACTION

1 Remove the receiver from its case, and take off the side panel covering part of the R.F. Unit. Connect test equipment as shown and allow to warm through for at least 1 hour.

N.B. The SYSTEM switch should be to C.W., so that b.f.o. will warm through.

2 Position receiver controls as follows:-

(1) ANTI-CROSS-MOD. control fully clockwise.

(2) CRYSTAL switch to ON. There should be no crystal in position. This renders the local oscillator inoperative without altering the load on the h.t. line.

(3) LIMITER switch to OFF.

(4) OUTPUT switch (at back of the receiver) toggle towards back of receiver.

(5) L.S. switch to ON.

(6) A.F. GAIN control fully clockwise.

(7) GAIN control fully clockwise.

(8) BAND switch to Band 5, tuning dial to about 680 kc/s.

(9)

Control	B41/A	B41B/C
Bandwidth Switch	Narrow	3 kc/s
System Switch	Manual	R/T
A.G.C. Switch	-	OFF

3 Adjust the test equipment as follows:-

Test Oscillator

(1) Output about 0.1 volt, modulation depth 30% at 400 c/s or 1000 c/s.

(2) Output frequency - 800 kc/s.

(3) Output connected via the 0.01 µF capacitor to the grid of the third i.f. valve. Identify by Figs. 1 or 3.

(4) B41/A only. Connect the 0.01 µF capacitor between the grid of the b.f.o. valve and chassis (see Fig. 1).

(5) Output meter. Set to 600 ohms input impedance and to read at least 500 mW.

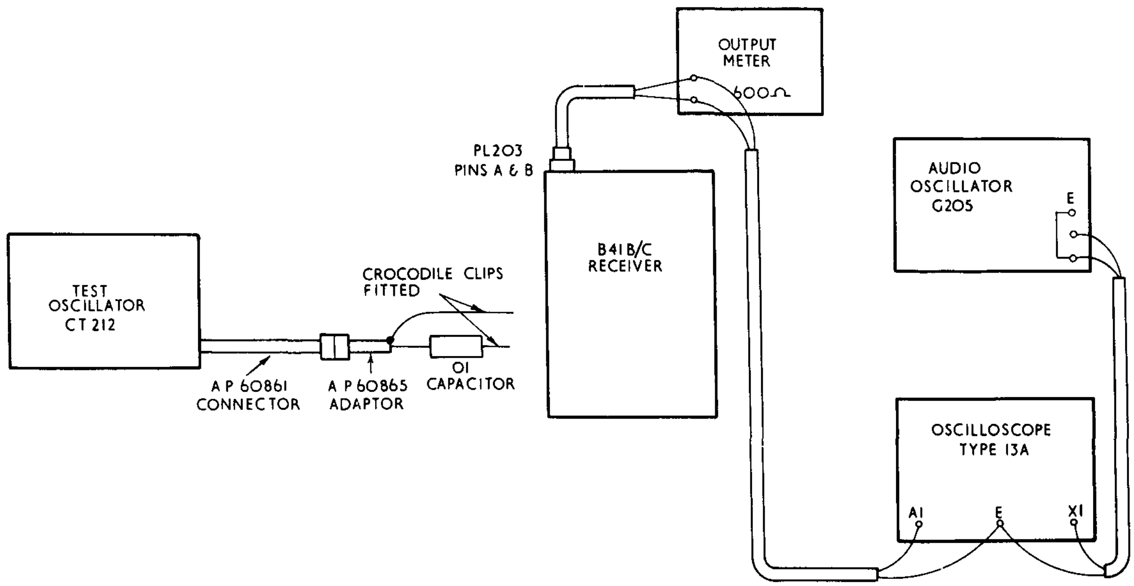
STEP	ACTION
4	Adjust the trimming controls (screwed rods) at the top and bottom of the final i.f. transformer (T204) for maximum reading in the C1 output meter. Adjust the output of the test oscillator as necessary for a convenient output meter reading.
5	Switch off the test oscillator modulation. Unclip the 0.01 μF capacitor between the grid of the b.f.o. valve and chassis (B41/A).
6	SYSTEM switch to TUNE. Adjust the upper b.f.o. trimming rod (L202a) for zero output meter reading at zero beat.
7	SYSTEM switch to CAL. First unscrew and then adjust the bottom b.f.o. trimming rod (L202b), until the b.f.o. is heard to lock to the crystal, i.e. there is a sudden change in the frequency of the whistle heard in the monitor loudspeaker. Turn the trimmer counter-clockwise about half a turn so that the b.f.o. unlocks. With one hand keep moving the SYSTEM switch quickly backwards and forwards from R/T to CAL and with the other hand gradually turn the L202b trimmer clockwise again, until the b.f.o. can be heard to lock in the CAL position with just a slight delay (1/10 sec.). If the trimming rod is turned too far the b.f.o. will be heard to go off beat.
8	SYSTEM switch still at CAL. Adjust the test oscillator tuning for zero output meter reading (zero beat). This ensures that the test oscillator is accurately tuned to 800 kc/s.
9	SYSTEM switch: B41/A to MANUAL, B41B/C to TUNE. Adjust the top trimmer of the b.f.o. coil for zero beat, indicated in the output meter by zero reading. In B41/A to prevent the a.g.c. system from being brought into operation in steps 10 and 11, the test oscillator output must not exceed 100 mV. Note. In those receivers B41B and B41C incorporated into RATT circuits the b.f.o. must be adjusted within close tolerances. For these receivers the drill given in paragraphs 15-19 should be followed instead of the following steps.
10	SYSTEM switch to HIGH and the BANDWIDTH switch to NOTE FILTER (200 c/s B41B/C). Adjust the b.f.o. coil trimmer L202a at the top of the coil can for maximum output meter reading.
11	SYSTEM switch to LOW. Adjust the upper b.f.o. pitch coil L204 for maximum output.
12	SYSTEM switch to TUNE. BANDWIDTH switch to NARROW or 3 kc/s. Adjust the lower b.f.o. pitch coil L203 for zero beat, i.e. for zero output meter reading.
13	SYSTEM switch to CAL; check that the test oscillator is still on frequency i.e. zero output meter reading. If not, readjust the test oscillator and repeat the drill from 9 onwards.
14	B41/A SYSTEM switch to MANUAL. Clip the 0.01 μF capacitor between the grid of the b.f.o. valve and chassis.

STEP	ACTION
14	B41B/C SYSTEM switch to R/T Switch on the test oscillator modulation.
15	Adjust the top and bottom trimmers of the fifth i.f. transformer T204, for maximum output meter reading, (see Fig. 1/3 for component positions).
16	Connect the test oscillator output to the grid of the second i.f. valve. Adjust the top and bottom trimmers of the fourth i.f. transformer T203, for maximum output meter reading.
17	Connect the test oscillator output to the grid of the first i.f. valve. Adjust the top and bottom trimmers of the third i.f. transformer T202 for maximum output meter reading.
18	Connect the test oscillator to the grid of the mixer valve, i.e. to the stationary turret contact 15 as shown in Fig. 2. Tune the first i.f. transformer T104 in the R.F. Unit (T112 B41C) and also the second i.f. transformer T201 in the I.F. Unit.
19	SYSTEM switch to CAL. Switch off test oscillator modulation, unclip capacitor from b.f.o. grid. Check that the test oscillator is still on frequency. If not readjust the test oscillator and repeat the drill from 14 onwards.
20	B41/A SYSTEM switch to MANUAL, reconnect capacitor to b.f.o. grid. B41B/C SYSTEM switch to R/T Switch on test oscillator modulation. Recheck adjustment of T104 (T112 B41C), T201, T202, T203, and T204 in that order for maximum output reading.
21	Disconnect test oscillator and output meter. Unclip capacitor from grid of b.f.o. valve.

B.F.O. ALIGNMENT FOR RECEIVERS B41B/C EMPLOYED IN RATT CIRCUITS

15. Unless ships are provided with an a.f. variable frequency oscillator, it will not be possible for sea-going personnel to align the b.f.o. circuits of these receivers. If these circuits are in need of alignment in those ships without this instrument, assistance should be sought in the normal manner from the depot ship or dockyard.

16. For dockyards and those ships having access to an a.f. oscillator the procedure is as follows:-



B.F.O. ALIGNMENT RATT RECEIVERS B41B/C
TEST EQUIPMENT CONNECTION DIAGRAM

FIG. 5

Test Equipment Required

17.

Test Equipment Description	Type	Admiralty or Service Pattern
Test Oscillator or Signal Generator covering 800 kc/s	CT212 CT218 Marconi	ZD.00784 10S/16780 54704A
Audio Frequency Oscillator covering 0-5000 cycles per second	G205	W7252
Oscilloscope	Type 13A	10S/831
Output Meter	Decibel Meter Portable No. 3 TF340	ZD.00022 54708

The Drill in Outline

		STEP
18.	Carry out the drill for i.f. alignment up to and including step 9.	1
	Connect the test equipment to the receiver.	2
	Set up the reference position.	3
	Set up the HIGH position.	4-5
	Set up the LOW position.	6-7
	Set up the TUNE position.	8-9
	Recheck the signal generator or test oscillator setting	10
	Recheck all settings.	11

The Drill in Detail

19. See Figs. 2 and 3 for positions and identities of receiver components. In order to achieve stability at the critical settings of the b.f.o. necessary for RATT working, allow the receiver to warm up over a period of about 6 hours.

STEP	ACTION
1	Follow the procedure for i.f. alignment up to and including step 9.
2	Make the following additional receiver and test equipment connections and adjustments (Fig. 5):-

(1) A.F. Oscillator. Adjust to 500 c/s.

Output to X1 and E of oscilloscope.
One side of output to Earth.

(2) Oscilloscope.

A1 to output meter.
X1 to a.f. oscillator.
CAL markers - OFF.
Trig. sync. - EXT.
Velocity range - Xx1.
Y plate selector - A1A2.

(3) Receiver.

A.G.C. to ON.
Loudspeaker switch to ON.
SYSTEM switch to CAL.

(4) Test Oscillator or Signal Generator.

Adjust to a frequency several kc/s below 800 kc/s (c.w.). Connect output via the 0.01 μF capacitor to the grid of the mixer valve. See Fig. 2 for connection identity. Produce a "square" picture by suitable adjustments of the oscilloscope A1 gain and the a.f. oscillator gain.

3 Increase the input signal frequency slowly to 799.5 kc/s. An ellipse* will appear on the oscilloscope c.r.t. at this frequency.

* In all cases the adjustment to obtain the ellipse is very critical and difficult to achieve.

STEP	ACTION
4	Audio frequency oscillator to 1500 c/s. SYSTEM switch to HIGH.
5	Adjust L202a, the inductance trimmer at the top of the b.f.o. can for an ellipse in the c.r.t. The correct setting is that which produces the ellipse with the trimmer screwed furthest out from the can.
6	Audio frequency oscillator to 500 c/s. SYSTEM switch to LOW.
7	Adjust the upper b.f.o. pitch coil L204 for an ellipse in the c.r.t.
8	SYSTEM switch to TUNE.
9	Adjust the lower pitch coil L203 for an ellipse in the c.r.t.
10	Check frequency settings as follows:-

SYSTEM switch to CAL
Audio frequency oscillator to 500 c/s
Input signal to 799.5 kc/s.

An ellipse should be seen on the c.r.t. If necessary vary the signal generator tuning slightly until the ellipse appears, but do NOT tune to 800.5 kc/s where another ellipse will appear.

11 Check that the ellipse appears in the c.r.t. at the following settings.

Receiver System Switch	A.F. Oscillator Output
HIGH	1500 c/s $\pm$ 30 c/s
LOW	500 c/s $\pm$ 30 c/s
TUNE	500 c/s $\pm$ 30 c/s

CRYSTAL FILTER ALIGNMENT

(B41B/C only)

NOTE This procedure does not apply to the receivers B41/A which are not fitted with a crystal filter.

Test Equipment required

20.

Instrument	Title	A.P.
Signal Generator or Test Oscillator covering 800 kc/s	CT212 CT218 Marconi G73	ZD.00784 10S/16780 54704/A W.2508
Meter reading 250 microamps full scale deflection	H.R. Avometer 8S or 8SX Microammeter	12945 54148
Connector) ж Adaptor)	- -	60861 60865
Attenuator) For use with A.P.54704/A Connector)		63693 63692

ж These items are required for CT212 Test Oscillator, and are obtained from the A.P.60875 Box of Flexible Connections for CT82 Noise Generator.

Special Items

21. The following special item is required:-

Item 3 shown in para. 6 under "General Instructions".

NOTE The i.f. stages must be accurately aligned before the crystal filter is aligned.

The Drill in Outline

		STEPS
22.	Remove receiver from case. Connect up test equipment. Switch on.	1-3
	Set crystal filter frequency exactly in centre of i.f. pass-band i.e. to 800 kc/s.	4-5
	Obtain adjustments, and mark the test oscillator incremental tuning control at two points, one 1 kc/s above and one 1 kc/s below, the centre frequency of 800 kc/s.	6-10
	Obtain smooth crystal filter response curve, symmetrical and with sharp cut-off.	11-12
	Final "touch-up".	13-14

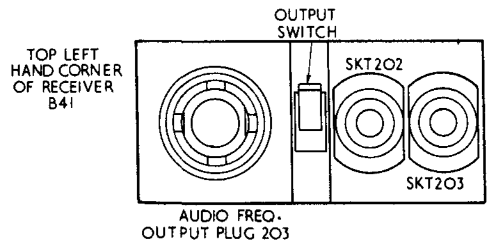


FIG 6(a)

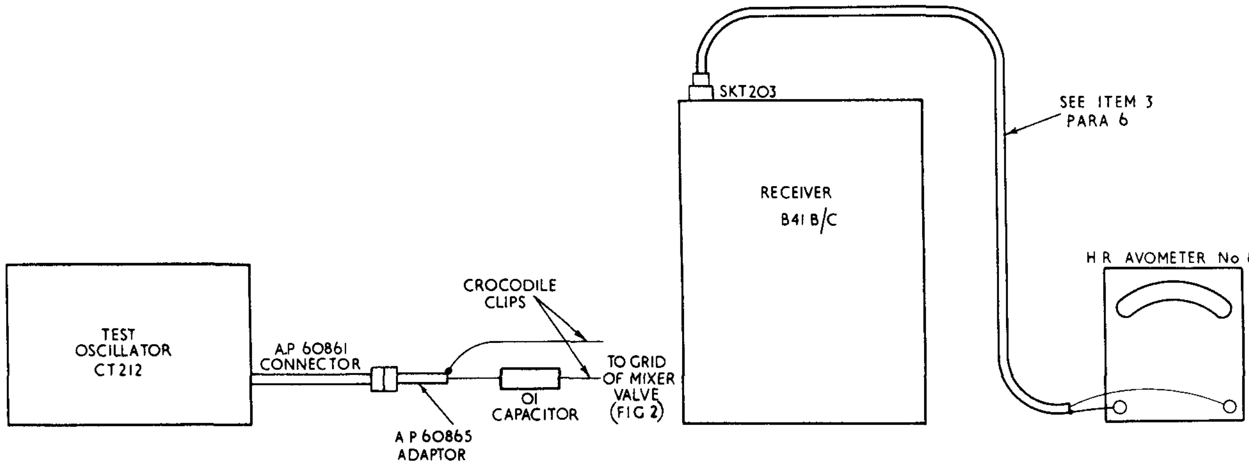


FIG. 6(b)
TEST EQUIPMENT CONNECTION DIAGRAM
CRYSTAL FILTER ALIGNMENT

The Drill in Detail

23. STEP ACTION

1 With the receiver out of its case and the side panel removed, switch on the receiver and test oscillator and allow 15 minutes to warm through.

2 Receiver control as follows:-

CRYSTAL switch to ON, with crystal removed.

BANDWIDTH switch to 1 kc/s.

SYSTEM switch to CAL.

Tune to 0.68 Mc/s.

Output switch at the back of the receiver, toggle towards front of receiver.

A.G.C. switch to OFF.

LIMITER switch to OFF.

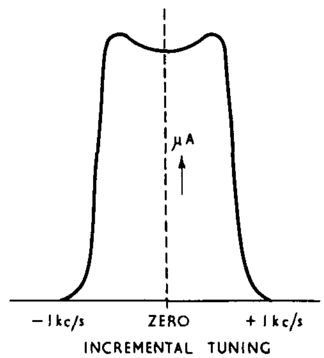
A.F. GAIN control fully clockwise (RV.225)

GAIN control fully clockwise (RV305/309)

Monitor L.S. switch to "ON".

STEP	ACTION
3	Adjust the test equipment as follows:-
	(1) Test oscillator Output not exceeding 500 uV (5 mV for Signal Generator A.P.54704/A) Output frequency 800 kc/s C.W. Output connected via A.P.60861 connector, A.P.60865 adaptor, and a 0.01 μF capacitor to the grid of the mixer valve, or suitable substitutes if using another Signal Generator, i.e. to the stationary turret coil contact as shown in Fig. 2 under i.f. alignment.
	(2) Avometer. Connect to the made-up lead, with the plug inserted in SKT203 and the other end joined to the Avometer, central conductor of the coaxial cable to negative of Avometer. N.B. This enables second detector current to be read on the Avometer. Set the Avometer to read d.c. microamps, 50 A range.
4	Test oscillator - incremental tuning scale to zero. Tune to 800 kc/s and adjust for zero beat as heard in receiver telephones.
5	SYSTEM switch to R/T. Adjust C247 at the top of the crystal filter can (shown in Fig. 3 under i.f. alignment) for maximum reading in the Avometer with trimming tool removed. The oscillator output should be adjusted to give an Avometer reading of approximately 30 microamps. SYSTEM switch to CAL. Check that test oscillator is still on 800 kc/s (zero beat note, using telephones for greater accuracy).
6	SYSTEM switch to R/T. Test oscillator from c.w. output to 1000 c/s modulation output. Listen to the 1000 c/s note.
7	SYSTEM SWITCH to TUNE. Test oscillator to c.w. By means of the incremental tuning control on the test oscillator, slowly increase the frequency. A low pitched note, due to the action of the b.f.o., will be heard.
8	Increase the test oscillator frequency still further until the b.f.o. beat note is equal in pitch to the 1 kc/s modulation. Mark the incremental tuning control to indicate the setting at which this occurs.
9	Rotate the incremental tuning control back to its zero position, then slowly decrease the test oscillator frequency until the b.f.o. beat note and the modulation note are equal in pitch. Mark the incremental tuning control to indicate the setting at which this occurs. The incremental tuning control will now be marked at two points, one 1 kc/s above and the other 1 kc/s below the zero position.
10	Test oscillator to c.w. output, incremental scale to zero. Receiver SYSTEM switch to CAL. Check that test oscillator is still at 800 kc/s. If not, repeat the drill from step 6 onwards.

STEP	ACTION
11	SYSTEM switch to R/T. Set the incremental tuning control to the mark 1 kc/s above 800 kc/s. Carefully increase the test oscillator output so that 10 microamps is indicated in the Avometer. Adjust C244 (side of crystal filter can) for minimum reading in the Avometer.
12	Slowly sweep the incremental tuning control between the two marks above and below the centre frequency, at the same time noting the manner in which the reading in the Avometer indicates the response curve of the crystal filter. The current reading in the Avometer should follow the curve shown below.



RESPONSE-CRYSTAL FILTER B41 B/C
FIG. 7

13	Make very small adjustments to C244, if necessary, to obtain sharp cut-off on both sides with symmetrical response.
14	SYSTEM switch to CAL., make a final check that the test oscillator is at 800 kc/s.
15	Tune C246 the compensating capacitor adjacent to the centre wafer of the SYSTEM switch for maximum output.

ALTERNATIVE METHOD OF CRYSTAL FILTER ALIGNMENT

Introduction

24. It has been found that a more positive result in crystal filter alignment can be achieved by the use of a ganging oscillator and a cathode ray oscilloscope.

25. Since this test equipment is not universally available, the method of alignment already described is considered to be the standard method. For the benefit of dockyards and ships which may possess the necessary equipment, however, the alternative method, using a ganging oscillator, is described overleaf.

26. Crystal filter alignment should not be undertaken unless the i.f. stages are correctly aligned.

Test Equipment Required

27.

Test Equipment Description	Type	A.P.
Ganging Oscillator covering 800 kc/s, sweep speed down to 5 c/s, if possible	Cossor Model 343	54707
Cathode Ray Oscilloscope, with amplifier linear down to 5 c/s if possible	13A Cossor	10S/831

WARNING If the sweep rate of the ganging oscillator is higher than approximately 10 cycles, the crystal filter response curve picture will be distorted due to "ringing" in the high Q crystal filter circuit.

Conversely, if the sweep rate is much lower than 10 cycles, the crystal filter response curve picture may be distorted due to non-linearity of the c.r.t. amplifier.

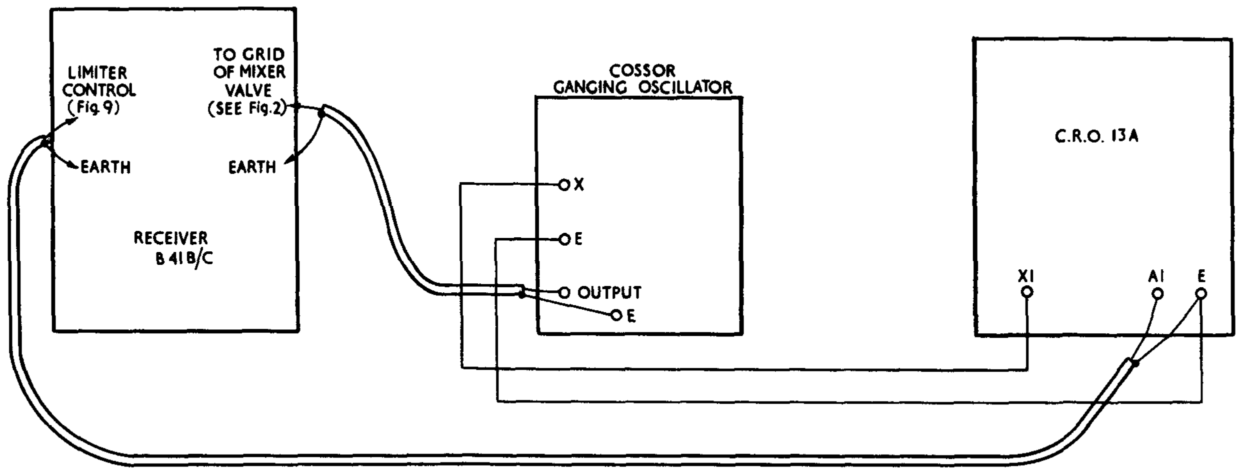
These points must be remembered during alignment

The Drill in Outline

	STEPS
28. Connect up, set up and switch on test equipment and receiver	1-5
Tune ganging oscillator until a response curve is seen on the c.r.o.	6
Adjust the trimming controls until the required shape of response curve is obtained.	7-10

The connection to the mixer grid can be identified by reference to Fig. 2 under i.f. alignment. The connections shown are used with the Cossor Ganging Oscillator and 13A Oscilloscope, (Figs. 8 and 9).

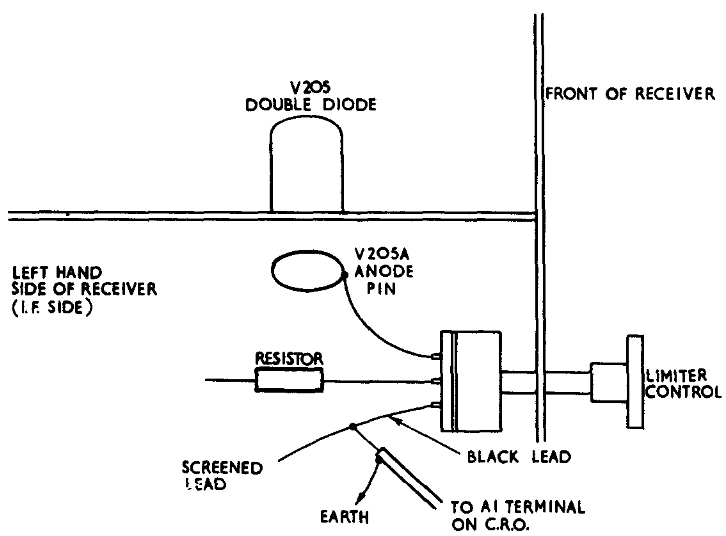
FIG. 8 & 9



NOTE:- CONNECTIONS USED WITH COSSOR GANGING OSCILLATOR AND 13A OSCILLOSCOPE

TEST EQUIPMENT CONNECTION DIAGRAM
CRYSTAL FILTER ALIGNMENT (ALTERNATIVE METHOD)

FIG. 8



CONNECTION TO RECEIVER FROM C.R.O.

FIG. 9

The Drill in Detail

29. STEP ACTION

1 Remove the receiver from its case. Remove the R.F. Unit side-panel.

2 Position the controls on the receiver as follows:-

(1) CRYSTAL switch to "ON", with crystal removed.

(2) BANDWIDTH switch to 3 kc/s.

(3) SYSTEM switch to R/T.

(4) WAVEBAND switch to BAND 5, tuning dial to about 0.68 Mc/s.

(5) Output switch at back of receiver, towards front of receiver.

(6) A.G.C. switch to OFF.

(7) LIMITER switch to OFF.

(8) A.F. GAIN control fully clockwise.

(9) GAIN control fully clockwise.

(10) Monitor L.S. switch to "OFF".

3 Frequency swept oscillator controls as follows:-

(Cossor Ganging Oscillator for example)

(1) Modulation control to frequency modulation.

(2) Adjust frequency to 800 kc/s approximately.

(3) Bandwidth switch to 20 kc/s.

4 Cathode ray oscilloscope controls as follows:-

(Type 13A Oscilloscope for example - important controls only are mentioned.)

(1) Trig. sync. - external.

(2) Velocity range - 10 c/s.

(3) Fine velocity - as low as convenient (not more than 10 sweeps per sec.)

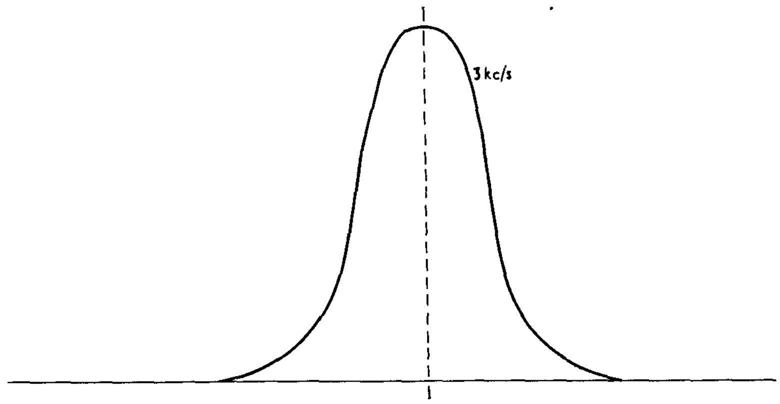
(4) Probe selector to OFF.

(5) Y plate selector to A1A2.

(6) CAL. markers to OFF.

STEP	ACTION
5	Switch on equipment and allow to warm through.
6	Rotate the ganging oscillator tuning dial until the response curve is seen in the oscilloscope. If the i.f. stages have been accurately aligned, the peak of the curve will be at 800 kc/s. As it has been aligned against its own crystal, the i.f. calibration will probably be more accurate than the calibration of the frequency scale on the ganging oscillator. The latter should therefore be disregarded.

The shape of the response curve should be as shown in Fig. 10.



I.F. RESPONSE CURVE 3kc/s
FIG. 10

NOTE If the ganging oscillator has a bandwidth control, the width of the curve can be adjusted.

If the curve is distorted, then the i.f. stages need adjustment, and the complete i.f. alignment should be carried out.

7 Receiver BANDWIDTH switch to 1 kc/s. If possible reduce the ganging oscillator bandwidth to 10 kc/s.

The response curve obtained will depend upon the crystal filter settings. One of the following curves should be seen:-

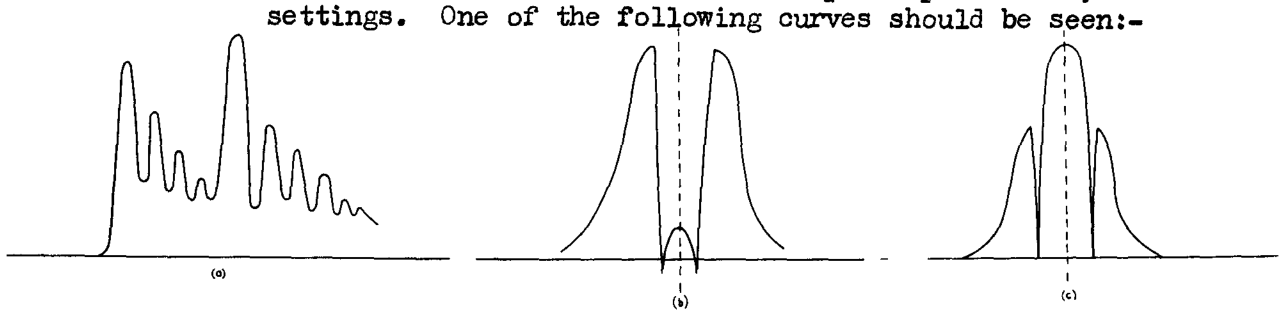


FIG. 11

STEP	ACTION
8	Adjustment of the "top" trimmer will normally produce a picture similar to Fig. 11(b) or (c), and further adjustment should be made to obtain equal peaks of maximum height.
9	Adjustment of the "side" trimmer has the effect of lifting the central hollow in sketch Fig. 11(b), or of reducing the two side peaks in Fig. 11(c).
	Adjustment should continue until a curve similar to (d) below is achieved.

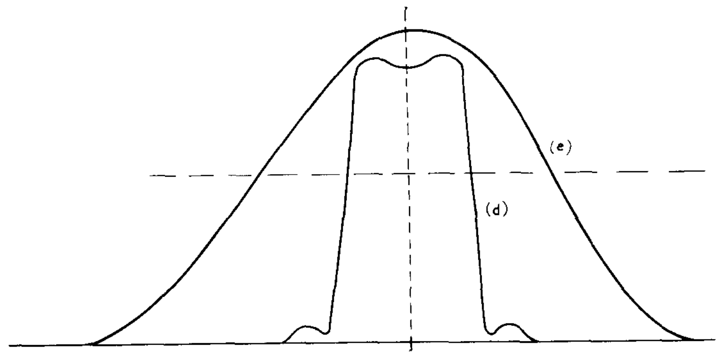


FIG. 12

STEP	ACTION
10	On switching receiver BANDWIDTH switch between 1 kc/s and 3 kc/s, the two curves (d) and (e) should appear in turn. It will be observed that the bandwidth of the 1 kc/s curve is approximately half the bandwidth of the 3 kc/s curve at half maximum amplitude, i.e. 6 dB down from maximum.
11	Tune C246 for maximum amplitude.

R.F. ALIGNMENT

30. All i.f. tuned circuits must be correctly aligned before r.f. alignment is commenced.

31. The local oscillator circuits of Bands 4 and 5 follow the conventional pattern, but the oscillator trimming capacitor for Bands 1, 2 and 3 is connected in a different position. This necessitates different alignment procedures for the different bands. Bands 4 and 5 have the normal adjustment (capacitor trimming at the h.f. end and inductor trimming at the l.f. end of the bands). On Bands 1, 2 and 3 the h.f. adjustment is made by means of the inductor trimmer and the l.f. adjustment by means of the capacitor.

32. To give the full details as clearly as possible, the drill has been divided into two sections.

(a) The local oscillator alignment for all five bands starting at Band 5.

(b) The r.f. circuits alignment to the local oscillator, described in terms of Band 5 only, as the procedure is the same for all bands.

Normally when aligning any particular band, the local oscillator for the band concerned should be set up first, following the instructions given under that section; afterwards the r.f. circuits of the band are brought into line with the local oscillator before proceeding to align another frequency band.

Test Equipment required

33.

Test Equipment Description	Type	A.P.
Signal Generator covering 15 kc/s to 700 kc/s	Marconi	54704A
Meter reading approx. 250 microamps	H.R. Avometer 8S or 8SX	12945
	Microammeter	54148
Connector) See Note 3		63691
Attenuator) See Note 3		63693

Note 1: The high resistance Avometer (Model 8) is used as a tuning indicator, reading second detector current. Alternatively, the CT82 output meter, or Decibel Meter Portable No. 3, may be used as an indicator reading a.f. power output. The former method is preferred.

Note 2: Special items No. 3 and 4 will be required (see para. 6 under General Instructions).

Note 3: A.P.63693 Attenuator and A.P.63691 Connector are employed with A.P.54704A Signal Generator. R.F. alignment can only be accomplished with this signal generator, as it is the only one available which covers the frequencies of Bands 1, 2 and 3 of the receiver.

Drill in Outline

	STEPS
34. Remove the receiver from its case. Connect up test equipment. Switch on.	1-5
Local oscillator alignment Band 5	
Rough alignment at trimming points	6-7
Final alignment at calibration points	8-10
Local oscillator alignment Band 4	11

ACTION		STEPS
Local oscillator alignment Band 3		
Rough alignment at trimming point		12-14
Final alignment at calibration point. Drill to obtain calibration point at the l.f. end of the band		15-19
Local oscillator alignment Band 2		20
Local oscillator alignment Band 1 including method employed to obtain a calibration point at the l.f. end of the band.		21
R.F. alignment to local oscillator (given for Band 5)		
Setting up and aligning the circuits at the l.f. trimming point.		22-30
Aligning the circuit at the h.f. trimming point. Final adjustments to the trimming at both ends of the scale until all circuits are in line.		31-34
The alignment of other bands		35
Alignment of i.f. rejector circuits	Para. 36	1-3
Alignment of i.f. trap	Para. 37	1-4

The Drill in Detail

35. Alignment of local oscillator circuits

STEP	ACTION
1	Remove the receiver from its case and remove the side panel.
2	Switch on receiver and signal generator and allow equipment to warm through for 30 minutes.
3	Receiver controls as follows:-

(1) ANTI-CROSS-MOD control fully clockwise.

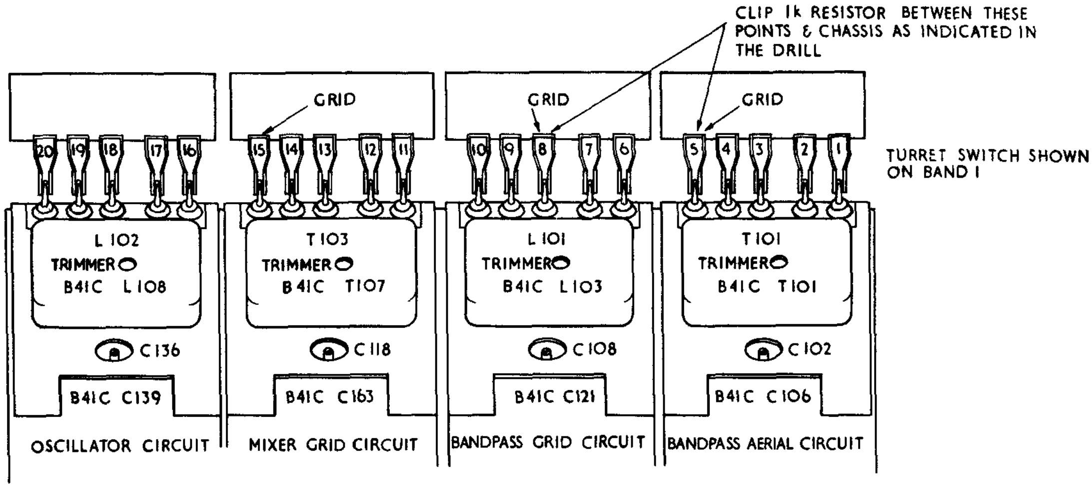
(2) CRYSTAL switch to OFF.

(3) A.F. GAIN control fully clockwise.

(4) GAIN control fully clockwise

(5) L.S. switch to ON.

(6) LIMITER switch to OFF.



DETAILS OF R.F. COIL ASSEMBLY

FIG. 13

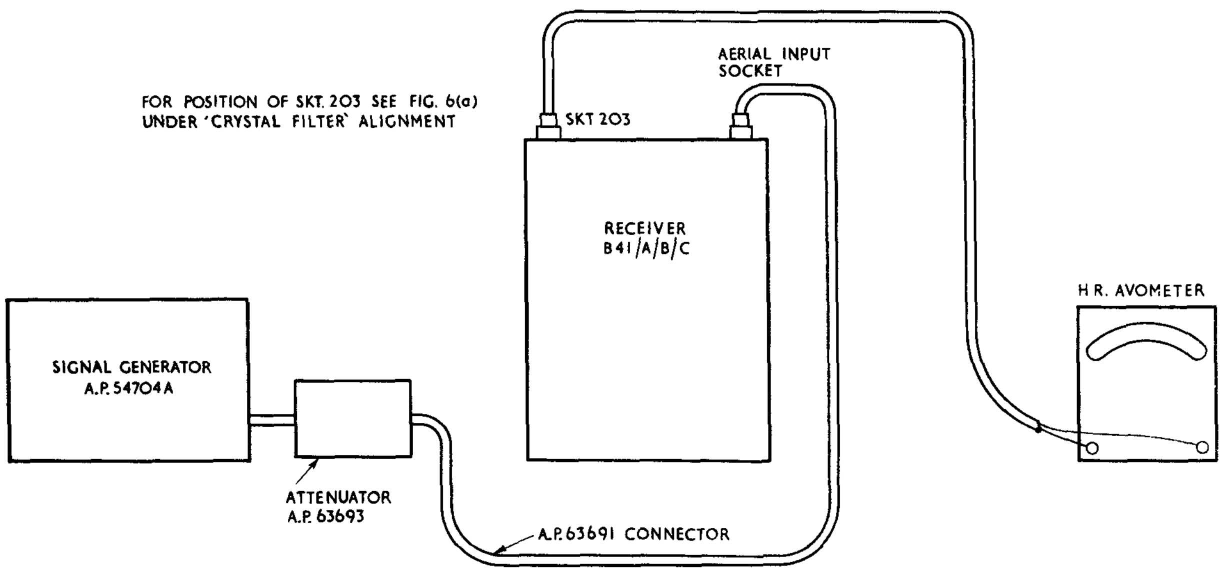


FIG. 14(a)

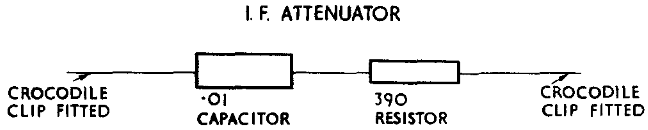


FIG. 14(b)

TEST EQUIPMENT CONNECTION DIAGRAMS

R.F. ALIGNMENT CONNECTION DIAGRAMS

STEP	ACTION

3 (7) Output switch (at back of receiver) towards the front of the receiver, unless an output meter is connected across pins A and B of the six pin output plug.

(8)

Control	B41/A	B41B/C
BANDWIDTH SWITCH	NARROW	3 kc/s
SYSTEM SWITCH	MANUAL	TUNE
A.G.C. SWITCH	-	OFF

(9) WAVEBAND switch to Band 5.

(10) TUNING control fully counter-clockwise. Set the cursor frame so that the pointers line up with the low frequency end of the scales. The cursor must remain in this position throughout the alignment. Tune to 680 kc/s, i.e. the alignment position indicated by a + on the h.f. end of Band 5.

4 Reduce the sensitivity of the receiver i.f. amplifier by connecting the i.f. attenuator, i.e. the 0.01 μF capacitor and 390 ohms resistor in series (Item 4, para. 6), between the grid of the first amplifier valve V201 and earth (See Figs. 1 and 3 under i.f. alignment for valve pin numbers, and Fig. 14b for details of attenuator). This reduces the i.f. voltage by about 40 dB.

Signal Generator adjust to:-

5 C.W.

Tune to 680 kc/s

Output - approx. 1 mV. If r.f. stages are badly misaligned a larger output will be necessary.

Connect the signal generator output connector to the aerial socket.

Band 5, Local oscillator alignment

6 Adjust the local oscillator trimming capacitor C136 (C158 - B41C) for zero beat note in the telephones (telephones are used to obtain a greater degree of clarity).

STEP	ACTION
7	Tune the signal generator to 340 kc/s. Tune the receiver to 340 kc/s i.e. the trimming point indicated by a + at the l.f. end of the band. Adjust the local oscillator inductor trimmer L102 (L112-B41C) for zero beat in monitor loudspeaker or telephones.
8	Tune the receiver to the calibration point at 700 kc/s, indicated by a dot below the scales. SYSTEM switch to CAL. Adjust the capacitor trimmer for zero beat.
9	Tune to the calibration point at 350 kc/s. Adjust the inductor trimmer for zero beat.
10	Repeat steps 8 and 9, until both calibration points are accurately aligned.
	Note Some of the calibration signals are weaker than others; in certain cases it will probably be necessary to disconnect the i.f. attenuator in order to hear them.
	Band 4. Local oscillator alignment
11	Repeat steps 1 to 10 for this band, adjusting the local oscillator trimmers for Band 4. In this case, the B41C components are L111 and C154. The trimming points are 156 kc/s and 314 kc/s and the calibration points are 150 kc/s and 300 kc/s.
	Band 3. Local oscillator alignment
12	B41A. SYSTEM switch to MANUAL.
	B41B/C. SYSTEM switch to TUNE.
13	Tune the signal generator to 73 kc/s and set the receiver to the l.f. trimming point at 73 kc/s. Trim the capacitor (C150-B41C), for zero beat.
14	Tune the signal generator to 147 kc/s and the receiver to the h.f. trimming point at 147 kc/s. Adjust the inductor (L110-B41C) for zero beat.
15	SYSTEM switch to CAL.
16	Tune the receiver to 150 kc/s calibration point and adjust the inductor trimmer for zero beat.
17	As there is no crystal calibration point at the l.f. end of this band a suitable signal can be obtained as follows:-
	(1) SYSTEM switch to CAL.
	(2) Set the receiver tuning to 150 kc/s calibration point (zero beat).

STEP	ACTION
17	(3) SYSTEM switch to TUNE.
	(4) Tune the signal generator to 75 kc/s, make the final tuning adjustment by using sufficient generator output to obtain zero beat between the second harmonic of the signal generator frequency and the receiver b.f.o. Leave the signal generator at this setting. This 75 kc/s signal from the generator is set accurately with respect to the calibration point at the l.f. end of the band.
18	SYSTEM switch to TUNE. Tune the receiver to 75 kc/s and adjust the capacitor trimmer for zero beat with the signal obtained by step 17.
19	Repeat steps 15, 16 and 18 until the calibration points are accurately in line.
	Band 2. Local oscillator alignment
20	Repeat the procedure as given for Band 3 for this band. The B41C trimmer references are L109 and C144. Two suitable calibration points are available, i.e. 66.6 kc/s and 33.3 kc/s. Trimming points are 33.7 kc/s and 68.5 kc/s.
	Band 1. Local oscillator alignment
21	The procedure is similar to Band 3. The B41C trimmer references being L108 and C139. The trimming points are 15.6 kc/s and 31.4 kc/s. The calibration point at the h.f. end of the band is 25 kc/s. As there is no calibration signal available at the l.f. end of this band, one can be obtained by similar means to that employed for Band 3, but for this band at a frequency of 16.6 kc/s:-
	(1) SYSTEM switch to CAL.
	(2) Set receiver tuning to 33.3 kc/s (Band 2) crystal check point (zero beat).
	(3) SYSTEM switch to TUNE.
	(4) Tune signal generator to 16.6 kc/s and make the final adjustment by using sufficient output from the generator to obtain zero beat between the second harmonic of the signal generator frequency and the receiver b.f.o. Leave the signal generator at this setting. This 16.6. kc/s signal from the signal generator is set accurately with respect to the calibration crystal in the receiver and is employed as the calibration check at the l.f. end of the band.

Alignment of the r.f. circuits to the local oscillator

STEP	ACTION
22	Adjust Avometer to read d.c. microamps at a convenient level and plug it into socket SKT203, (or audio frequency output meter to the 6 pin output socket).
23	Set the signal generator to C.W.
24	Clip the i.f. attenuator (390 ohms and 0.01 μF in series - Item 4 para. 6) between the grid of V201 and chassis.
25	Depending upon whether an output meter or Avometer is employed for measuring output, set the following controls as indicated:-

	Output Meter	Avometer
SYSTEM switch to:-	HIGH	R/T
BANDWIDTH switch:-	NOTE FILTER	3 kc/s
ANTI-CROSS-MOD. control:-	fully clockwise for both methods.	

STEP	ACTION
26	Tune the receiver to the l.f. trimming point (340 kc/s).
27	Adjust the signal generator tuning dial at the frequency for maximum reading in the Avometer (or output meter). In B41/A maintain a low output level so that the a.g.c. does not operate.
28	Adjust T103 (T111 - B41C) the Band 5 inductance trimmer for maximum reading of the Avometer or output meter. Note Inductor trimmers on Bands 1 and 2 have to have the lock nut slackened before trimming is carried out, it is tightened again when the operation is complete.
29	To obtain the correct response of the band-pass circuit, it is necessary to connect a 1000 ohms resistor across the other band-pass coil (T101 or T105 - B41C), i.e. between stationary turret contact No. 5 and chassis. Then adjust L101 (L107 - B41C) for maximum Avometer or output meter reading.
30	Remove the 1000 ohms resistor from turret contact No. 5 and clip it between turret contact No. 8 and chassis. Adjust T101 (T105 - B41C) for maximum Avometer or output meter reading. This adjustment will be rather flat.
31	Tune the receiver to the h.f. trimming point (680 kc/s). Adjust the signal generator tuning to this frequency and tune it for maximum output from the receiver. Leave the 1000 ohms resistor connected to stationary turret contact No. 8.
32	Trim C118 and C102 (C173 and C114 - B41C), for maximum output. The adjustment for C102 is flat, but should be carried out as accurately as possible. Keep the output as low as possible so that a.g.c. is not brought into operation, by adjusting the signal generator output as necessary.

STEP	ACTION
33	Clip the 1000 ohms resistor between stationary turret contact No. 5 and chassis. Adjust C108 (C129-B41C) for maximum output.
34	Repeat the drill until no appreciable improvement in output can be obtained.
35	Repeat the procedure on the remaining frequency bands if required. The following table lists the calibration and trimming points employed in R.F. Alignment.

Band	L.F.		H.F.	
	CAL.	TRIMMING	TRIMMING	CAL.
1	* 16.6 kc/s	15.6 kc/s	31.4 kc/s	25 kc/s
2	33.3 kc/s	33.7 kc/s	68.5 kc/s	66.6 kc/s
3	* 75 kc/s	73 kc/s	147 kc/s	150 kc/s
4	150 kc/s	156 kc/s	314 kc/s	300 kc/s
5	350 kc/s	340 kc/s	680 kc/s	700 kc/s
	* Obtained with the aid of the signal generator			

Alignment of I.F. Rejectors (B41B/C only)

36. (1) Set Test oscillator or signal generator to give a c.w. signal at 800 kc/s (modulated, if a.f. output meter is employed). Tune the receiver to 680 kc/s.

(2) Increase the signal generator output until a reading appears in the Avometer.

(3) Adjust the filter trimmers C142 (C104 - B41C) and C141 (C103 - B41C) for minimum reading of the meter. Disconnect the generator from the aerial.

Alignment of I.F. Trap

37. (1) Adjust the test oscillator or signal generator for maximum voltage output (1 volt if possible) at 800 kc/s (modulated, if a.f. output meter is employed).

(2) Inject this signal through a 2 k ohms resistor between the top of C237 (see Part 3 Fig. 13) and chassis.

(3) Connect the grid of V206 to chassis via the 0.01 μF Capacitor (para. 6, item 1).

(4) Adjust L205 and L206 (Fig. 13 Part 3) for minimum signal output.

CHAPTER 7

MAINTENANCE AND PERFORMANCE TESTS

CONTENTS LIST

PART B

PERFORMANCE TESTS MORE SUITABLE FOR USE IN DEPOT SHIPS AND DOCKYARDS

FIGURES

CHAPTER 7

MAINTENANCE AND PERFORMANCE TESTS

INTRODUCTION

Arrangement and layout of the information

1. The performance of a receiver needs to be checked:-

(a) As an aid to diagnosis during fault location.

(b) To determine whether the receiver is still working within satisfactory limits.

(c) By the Dockyard, following extensive repair, to ensure that the receiver meets the full Test Specification.

2. The tests in (a) and (b) above, entail the use of simple test equipment which is found in most ships. They have been grouped together in Part A, which is therefore primarily for the use of ships and the noise generator tests given in this section, comprise the principle routine performance maintenance for the receivers. Part B contains the tests applicable to (c) above. These tests will seldom be carried out in ships, which will in any case not always possess the necessary tests equipment or facilities. The information in Part B is therefore principally for the benefit of dockyards and depot ships, but other ships may make use of the information when necessary.

3. The tests are designed to ensure that the overall performance of the receiver is satisfactory, and that the special facilities afforded by the receiver are functioning correctly. In addition to the overall tests, there are individual tests for the r.f. i.f. and a.f. sections. Individual stage gains may also be checked. These section checks are necessary when the overall sensitivity is below the specified figure.

4. The tests have been arranged so that overall tests are carried out first. Functional tests of special circuits are given next. The last group, which may be loosely termed fault-finding checks, should be necessary only if the overall tests are unsatisfactory. Tests specially required on receivers in RATT Installations are given in B.R.2133.

Precautions to be observed in connecting-up test equipment

5. Receiver and test equipment must be connected to a common earth.

6. All connecting leads must be as short as possible. Screened leads, with the screen connected to a common earth must be used for all connectors carrying current at radio frequencies.

7. The receiver and associated test equipment must be switched on and allowed to warm up for at least one hour, before a test is carried out. The SYSTEM switch should not be left in the R/T position, otherwise the b.f.o. valve will not warm up with the rest of the receiver.

8. In setting-up the test rig, only those controls whose setting is important are mentioned. The remainder may be ignored.

9. When feeding in r.f. at the low impedance aerial input of the receiver, the signal generator must be connected by means of a screened lead of the correct matching impedance, and in the case of A.P.54704/A Sig. Gen., a suitable attenuator. Specific details will be given in the instructions for each performance measurement concerned. Where signal generator output voltages to the receiver are quoted, they refer to the figures actually set up on the signal generator attenuator.

Test Equipment to be used

10. For r.f. performance tests, it will generally be necessary to use Signal Generator A.P.54704A on Bands 1, 2 and 3, as it is the only one which covers this range of frequencies. The remainder of the tests can be carried out by either the CT218 or the A.P.54704/A generators as convenient, as the instructions have been framed to cover any of these instruments; although any signal generator of suitable accuracy which provides the required facilities, may be employed. The necessity for correct matching of the signal generator output, the connecting lead and the receiver input must be remembered. If this is not carried out, the value of the voltage at the receiver input will be uncertain.

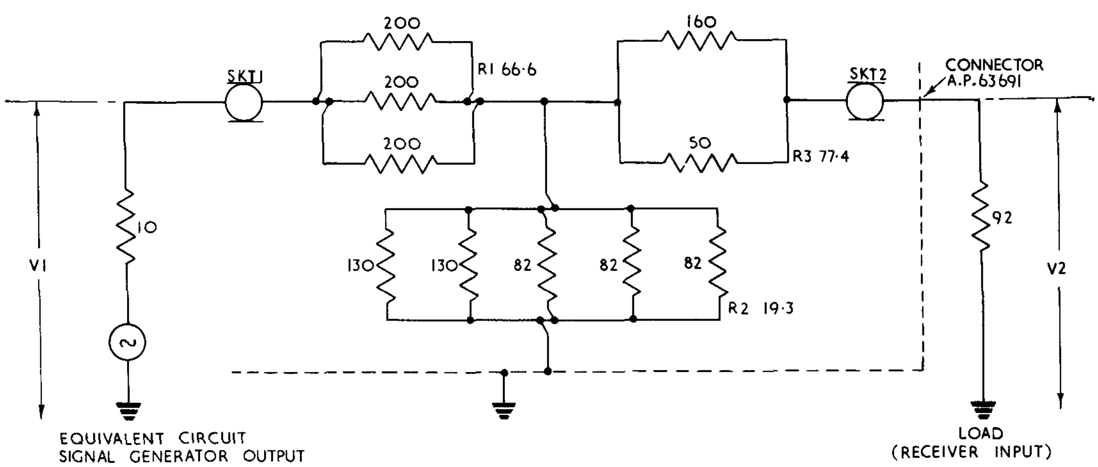
11. Since the modulation frequencies of the signal generators in question are not the same, 1000 c/s has been specified for CT218, and 400 c/s for A.P.54704/A. This difference in modulation frequency should make no significant difference to the figures achieved for the test in question. The difference in fact amounts to a little over 1 dB. Other test equipment specified is C.N.R.T.E., normally supplied to the ships or dockyards concerned.

Connector details

12. The following connectors are designed to conform with the alignment and testing requirements for the B40 and B41 Receivers, when using A.P.54704/A Signal Generators.

Connector Input

13. This connector comprises two items; an attenuator and a connector. The attenuator plugs directly into the Signal Generator A.P.54704/A output and is joined to the receiver input by the connector.



ATTENUATOR A.P. 63693

FIG. 1

Attenuator Unit, Design 38, 20 dB, 10 ohm input, 92 ohm load A.P.63693 Fig. 1

14. The attenuator is housed in a small metal screening box containing two resistances R1 and R3 in series, with resistance R2 connected from the centre point to earth. The box is fitted with two connector terminations, one (SKT1) to fit the output of the Signal Generator (A.P.54704/A), whilst the other (SKT1) is an A.P.62151 connector. The attenuator is designed, so that when used with Signal Generator A.P.54704/A, (output Voltage V1) and working into a nominal 92 ohm load represented by the receiver input, the voltage V2 across this load is given by $\frac{V1}{V2} = \frac{1}{10}$ or 20 dB voltage ratio.

Connector Flexible Screened, 3 ft long A.P.63691

15. This is used to connect the attenuator to the receiver. It comprises a suitable length of Uniradio No. 31 cable (A.P.13831), with a characteristic impedance of 92 ohms. This cable is fitted at one end with a plug (A.P.62150); the other end terminates with a 4 pin Mk. 4 socket (Z560110) to fit into the aerial plug on the receiver (PL101). The cable connector is connected to Pin "C"; Pins "A" and "B" are connected together and Pin "D" is left unconnected.

Connector I.F. (A.P.63692)

16. Comprises a suitable length of Uniradio No. 31 cable (A.P.13831); fitted at one end with A.P.62150 plug to fit into the A.P.63693 Attenuator output. The other end terminates a 0.01 μF capacitor screened by a small piece of brass tube which is sweated to the cable screen. Two short flexible insulated leads, each about three inches long and terminating in a "crocodile" clip, are connected to capacitor and screen respectively. A rubber cover is fitted over the brass screening tube. The connector is primarily used for feeding signals into the i.f. amplifier, although in one case it is used for taking r.f. measurements.

NOTE: If these special connectors are not available, they should be made up.

17. When using Signal Generator CT218, all leads for connection between the signal generator and the receiver (if not supplied with the signal generator) may be found in the "Box of Flexible Connectors for A.P.67166 Noise Generator CT82".

18. The output connector employed for the tests given in Section 'B', consists of a 6 Pin Mark 4 socket (Free termination) and a twisted pair of different coloured wires (flex, or p.v.c. insulated), one end of which is connected to Pins A and B of the socket. Pattern numbers for all the items to assemble the socket are given in Chapter 8 Para. 18, of B.R.1617, this chapter also details approved methods of assembling and socket with the leads, and soldering to the pins. The leads should be about four feet long, with the free ends connected to spade terminals, or crocodile clips. In use, the wire from Pin A must be connected to the earth terminal of the output meter. In early receivers with a 'W' type output outlet plug the corresponding item must be used instead of the Mark 4 socket. (See also Chap. 6, Para. 6, Item 2.)

19. Other special items and leads of a minor nature, are specified in the instructions for the test concerned.

SUMMARY OF THE TESTS AND THEIR OBJECT

PART A

Receiver B41 Maintenance, Testing, Checking and Fault Location with the Noise Generator CT82 A.P.67166

20. General

These tests are designed to give a quick over-all check of the receiver from aerial input to audio frequency output. Normally they will constitute the first line maintenance, testing and trouble shooting drills at sea, as ships will usually be provided with the A.P.67166 Noise Generator CT82. The tests take only a few minutes, and by careful tabulation of results over a period of time, an informative log concerning the performance of each receiver is obtained. These tests are therefore planned maintenance and must be carried out monthly. Wrong diagnosis of a fault is less likely to occur if the trend of receiver performance, as indicated by the figures obtained in the monthly tests, is studied; furthermore, from the data thus collected, the cause of the trouble itself may often be inferred.

21. The nature of the tests

The tests which are made as routine measurements consist of:-

(a) Noise Factor measurements.

(b) Noise Output measurements.

From these two measurements the Noise Gain of the Receiver can be calculated, simply by subtracting the Noise Factor from the Noise Output.

22. Noise Factor

The measurement of noise factor ensures that the receiver is not generating more internal noise than is normal. If the noise factor is bad (i.e. high), then this is so, and very weak signals which would normally be received, are lost below the noise level. The receiver defects which result in increased noise factor are discussed in para. 58.

23. Noise Output

The measurement of output noise power made on the audio frequency meter of the CT82, ascertains whether the noise gain of the receiver has varied from previous measurements (see para. 21).

24. Brief theory of Noise Factor and its meaning

The best way to appreciate the principles of Noise Factor, is to consider a normal type of receiver, whose circuits will be generating noise all the time it is in operation, and the effect this noise has on the ratio of Signal + Noise to Noise. To state that this receiver has a Noise Factor N, means that, due to the extra noise produced in the receiver, the noise output is increased to the same extent that it would be if the noise in the aerial had been multiplied N times. It follows therefore that 'N', the noise factor is a noise ratio, however, the signal ratio is not increased correspondingly. Thus, a receiver causes a deterioration of Signal + Noise to Noise ratio measured at the output, which is compared with the Signal + Noise to Noise ratio measured at the aerial, and this ratio is the Noise Factor. This deterioration in Signal + Noise to Noise ratio is caused by the noise generated throughout the receiver, although in actual practice only the first few stages of the receiver contribute an important amount. For convenience, this noise, although generated throughout the receiver, is expressed as an equivalent source of noise at the input of the receiver and it is this equivalent source which causes the apparent increase of N times the aerial noise. Thus, a receiver with a Noise Factor 'N', is generating N times the aerial noise.

25. The aerial noise is generally known as "Thermal Noise" (see B.R.1771(12) and (15)), because for the purpose of noise factor measurement the aerial is assumed to be a resistance at room temperature producing ordinary thermal noise. This thermal noise is a quantity which is known exactly, and it provides a fixed standard of reference which is obviously essential as a basis for this measurement of Noise Factor. It should be appreciated that in practice, aerials are not resistances at room temperature, so that the importance of an increase in noise factor will depend on the actual noise level in the aerial.

26. The equivalent noise can be looked upon as separate from the receiver, so that the noisy receiver can be divided into a "noise generator" developing N times thermal noise, feeding into a receiver which generates no noise itself. So, by measuring the noise factor of a receiver the power generated by the equivalent noise source to the receiver is also measured - it is N times the thermal noise. This is the power input to the receiver; the noise output can be measured by an audio frequency meter. The ratio of these two powers - output divided by input - gives the gain of the receiver i.e.:-

$$\text{GAIN} = \frac{\text{Noise Power Output as measured}}{\text{N times thermal noise}}$$

Thermal noise is a constant for any given type of receiver, provided the bandwidth is also constant; therefore, it follows that for any given type of receiver:-

$$\frac{\text{Noise Output Power}}{\text{N}}$$

is a measurement of the gain and changes in the quotient can be used to detect changes in gain.

27. The quotient is called the Noise Gain. If both the noise factor and the noise gain are expressed in decibels then:-

$$\text{Noise Gain (dB)} = \text{Noise Output (dB)} - \text{Noise Factor (dB)}$$

From this, it follows that if a record of noise factor and noise gain is made at regular intervals for each receiver, deterioration in performance will be noticed.

28. In general, noise factor can be read to an accuracy of about $\pm \frac{1}{2}$ dB and noise output to about $\pm \frac{1}{4}$ dB. Variations in conditions under which the measurements are made can cause further experimental errors, so that variations in noise factor of less than $\pm$ 1 dB and in noise gain $\pm$ 2 dB are more likely to

be experimental errors, rather than receiver variations. Variations of this order will probably "smooth out" over several readings. Inspection of readings over a period of time will show any obvious downward trend of results. This idea of watching the trend in readings over a period - so common in other branches of engineering - demonstrate the importance of recording the actual readings obtained, rather than just noting that the test was satisfactory as it passed the laid down limits.

Valve Electrode Potentials

29. The first phase in receiver fault finding is to narrow down the investigation to a particular unit or circuit. It may then be possible to locate the faulty component by checking the electrode potentials of the valve in the suspected circuit. It is desirable to place certain receiver controls in predetermined positions in order to obtain controlled conditions for the test.

PART B

Signal + Noise /Noise ratio, and overall sensitivity

30.

(a) The receiver should be capable of an output of 500 milliwatts when fed with an r.f. input voltage of 1 microvolt at the low impedance aerial connection. This output is due to signal and receiver noise i.e. Signal + Noise.

(b) When the signal is switched off, the output should fall by at least 22 dB. The output now remaining is due to receiver noise alone.

(c) The Signal + Noise/Noise ratio is therefore quoted as 22 dB, and the sensitivity as 500 milliwatts for 1 microvolt. These are the performance figures which the receiver should achieve.

Overall Audio Frequency Response

31.

(a) This test ensures that the a.f. response at the receiver output conforms to the following requirements:-

(i) With a reference level established at the maximum output obtainable over the a.f. band, the output at 300 c/s and 3000 c/s modulation should not fall by more than 4 dB below the reference level.

(ii) The output at 80 c/s modulation frequency should fall by at least 12 dB below the reference level.

(b) An r.f. signal at 680 kc/s is fed in at the receiver aerial connection. The modulation applied to this signal is varied from 80 c/s to 3 kc/s, and the a.f. response as indicated by the output meter readings is noted. The amplitude of the r.f. signal, and the depth of modulation, is maintained at a constant level.

(c) Besides checking the response of the a.f. stages, this test provides useful information as to the alignment of the remainder of the receiver, since misalignment of the r.f. or i.f. stages would probably influence the shape of the a.f. response curve.

Output levels

32.
(a) This test ensures that the output levels are not less than:-

LINE	- 5 milliwatts	From output socket
PHONES	- 3.5 milliwatts	From output socket
PHONE JACK 1	- 3.5 milliwatts	
PHONE JACK 2	- 3.5 milliwatts	

(b) The reference level of output is 500 milliwatts from the loudspeaker connections of the output plug.

A.G.C. Performance

33.
(a) The function of the a.g.c. system is to maintain a reasonably constant receiver output with an input signal which is varying over a wide voltage range.

(b) The test is designed to ensure that the receiver output does not vary by more than 3.5 dB, whilst the input r.f. voltage is varied over a range of 70 dB.

Anti-Cross-Modulation

34.
(a) This test is designed to check the range of control of the ANTI-CROSS-MODULATION potentiometer. With this potentiometer turned fully clockwise- that is, permitting the r.f. stage to give maximum gain - the receiver GAIN control is adjusted so that an input of 100 microvolts at the aerial terminal produces an output of 500 milliwatts.

(b) When the ANTI-CROSS-MODULATION control is turned to the other end of its travel i.e. fully counter-clockwise the r.f. stage gain is reduced. In order to produce an output of 500 mW from the receiver, the signal generator output must now be increased by at least 15 dB.

Crystal controlled operation

35. Where exceptional receiver frequency stability is required, the local oscillator frequency may be crystal controlled. This test checks that the receiver operates satisfactorily in this condition. The test is purely functional.

Noise Limiter Action

36.
(a) The noise LIMITER control should be effective on signals whose modulation depth lies between 10% and 60%.

(b) In this test, an r.f. voltage modulated successively between 10% and 60%, is fed to the grid of the mixer valve. At each variation of depth of modulation the receiver limiter control is operated to ensure that the receiver output, which is displayed as a trace on the c.r.t. of an oscilloscope, is limited by the action of the LIMITER control.

A.F. Gain

37.
(a) The gain of the audio frequency stages is checked at a nominal frequency of 1000 c/s. An input of 0.17 volts to the grid of the first a.f. valve should produce a reading of 500 milliwatts or more in the output meter.

(b) Due to the poor setting accuracy of the "Output Voltage" scale of the a.f. oscillator at low voltages, an output of 17 volts is used. This is reduced to an input of 0.17 volts at the receiver by means of a 100/1 (approx.) voltage divider between a.f. oscillator and receiver.

I.F. Response - adjacent channel selectivity -

38.
(a) This test ensures that on NARROW or 3 kc/s at 6 dB down, the receiver bandwidth does not fall below certain minimum figures; i.e. 2.5 kc/s (B41/A and 3.5 kc/s, B41B/C. At 40 dB down the bandwidth must not be greater than 9.5 kc/s (B41/A) or 15 kc/s (B41B/C). On the WIDE position of B41/A the bandwidth must not be less than 6.5 kc/s at 6 dB down or greater than 17 kc/s at 40 dB down. In B41B/C the 1 kc/s position must not be less than 1 kc/s at 6 dB down or greater than 5 kc/s at 30 dB down.

(b) The incremental tuning scale of the signal generator is first calibrated, to provide an accurate measurement of bandwidth.

(c) The signal generator output voltage and the receiver output power are then established at fixed levels. The signal generator output is increased by 6 dB, and the output frequency detuned until the receiver output falls to its original figure. The bandwidth is then measured by means of the incremental tuning scale. The measurement is then made for 40 dB.

(d) On B41/A receivers this test is repeated on the WIDE position of the BANDWIDTH switch and on B41B/C receivers on the 1 kc/s position of this switch, in this case the second measurement is at 30 dB down.

(e) An alternative method, involving the use of a frequency swept oscillator and oscilloscope, is included. Although this method is preferred, it is not often applicable, since the frequency swept oscillator is not generally available.

(f) By this method, the response curve due to the i.f. voltage at the second detector is displayed on an oscilloscope, a swept frequency about 800 kc/s being fed in at the mixer grid. Using the scan length as a scale, the bandwidth at 6 dB, 40 dB and 30 dB, down from resonance, can be measured for each position of the BANDWIDTH switch.

I.F. Gain

39. Overall gain

(a) This test ensures that the voltage gain over the i.f. stages is correct. It is carried out with the BANDWIDTH switch in the WIDE (B41/A) position, and also in the NARROW (B41/A) or 3 kc/s (B41B/C) position.

(b) With the BANDWIDTH switch set to NARROW or 3 kc/s as applicable, an r.f. signal of 120 microvolts, modulated 30% at 400 or 1000 c/s, should produce an output of at least 500 milliwatts.

(c) On B41/A receivers, an r.f. signal of 150 microvolts, modulated as before injected at the mixer grid, should produce a receiver output of at least 500 milliwatts with the BANDWIDTH switch in its widest bandwidth position.

40. Stage gain

Should the overall stage gain not reach the specified figure, it is necessary to determine which stage(s) are at fault. Individual stage gain figures are therefore taken.

R.F. Gain

41.

(a) In this test, the gain over the entire r.f. amplifier is measured. Should this prove unsatisfactory the gain of individual r.f. stages can be checked. The gain is measured indirectly, in the sense that if the receiver is operating within satisfactory limits, a given r.f. input should produce an a.f. output of 500 mW. It is possible to derive stage gain figures if so desired.

(b) When the Signal Generator A.P.54704/A is used, a 20 dB attenuator is inserted between it and the receiver. In addition, when the signal generator is connected to the grid of a valve, a special lead incorporating a screened 0.01 μF capacitor is employed.

(c) The i.f. gain is reduced when the signal voltage is fed in at the first r.f. grid, or at the aerial connector. This is achieved by connecting an attenuator, consisting of a 0.01 μF capacitor and a 390 ohm resistor in series, between the grid of the first i.f. valve, and the chassis.

(d) To check individual stage gain, commencing on Band 1 at 22 kc/s, a signal is fed in at the mixer grid, sufficient to produce a reading of 500 mW in the output meter. The signal generator output voltage is noted, to see that it does not exceed the maximum value permitted, as laid down in the table provided in the test instructions. The procedure is repeated on the same frequency, but with the signal fed in through the r.f. valve grid, and the aerial connector, in that order, the value of signal generator output voltage being checked at each stage.

(e) The entire procedure is repeated at a given frequency in each waveband.

PART A

MAINTENANCE PERFORMANCE TESTS PRIMARILY FOR THE USE OF SHIPS

NOISE OUTPUT AND NOISE FACTOR MEASUREMENT

Test Equipment required

42.

Test Equipment Description	Identity	A.P.
Noise Generator	CT82	67166
Box of flexible connectors for use with CT82	-	60875A

Preliminary Preparations

43. It is necessary to switch on the receiver for at least 2 hours before making these tests. As a variation of 10 volts in the mains input potential will cause a corresponding variation of 0.5 dB in the Noise Output, the mains voltage should be periodically checked during the actual testing. Mains voltage variations do not alter the Noise Factor to any appreciable extent.

44. This drill is planned maintenance, to be carried out monthly and a record has to be kept of the results obtained during the tests, blank tables like the one shown in para. 51 should be prepared, ready for use.

The Drill

45.

Step	Procedure
1	Connect the Test Equipment as shown in Fig. 2.
2	Set the receiver controls as in Fig. 3 or 4, depending upon the pattern of the receiver.
3	Set the Noise Generator CT82* controls as follows:-

C2

(1) Set the mains selector to the correct mains voltage.

(2) Set AUDIO IN switch to HIGH.

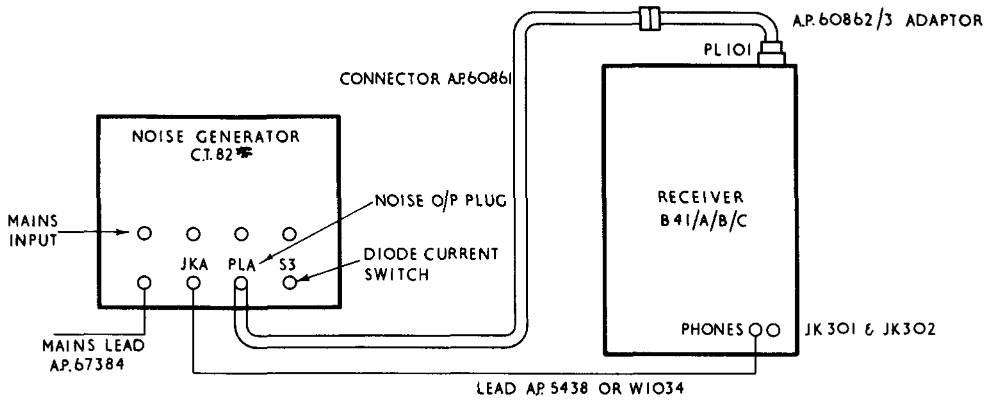
(3) Set NOISE OUT switch to 75 ohms.

(4) Set DIODE CURRENT switch to OFF and the DIODE CURRENT control to minimum.

Step	Procedure
4	Tune the B41 receiver to the mid-band frequency on Range 1, i.e., 22 kc/s.

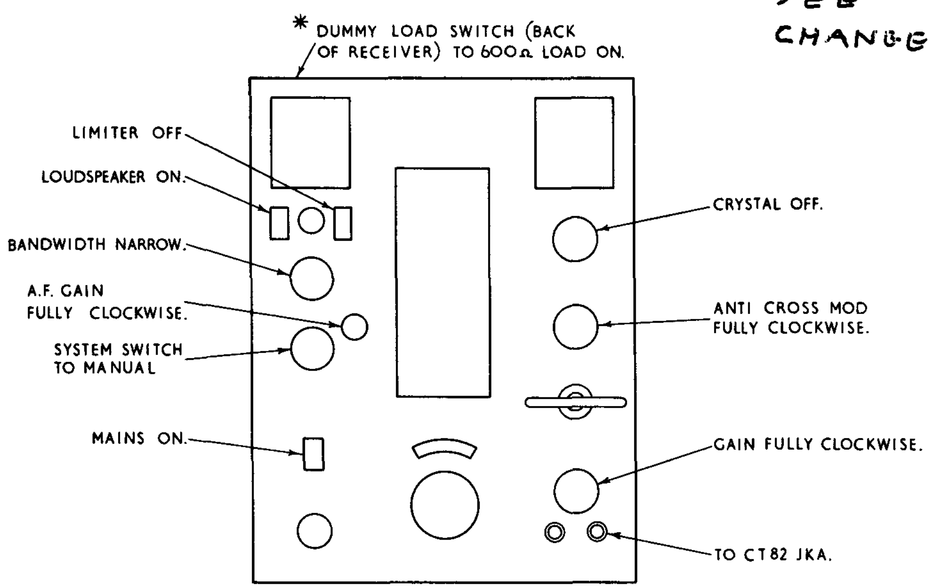
FIG. 2, 3 & 4

C2

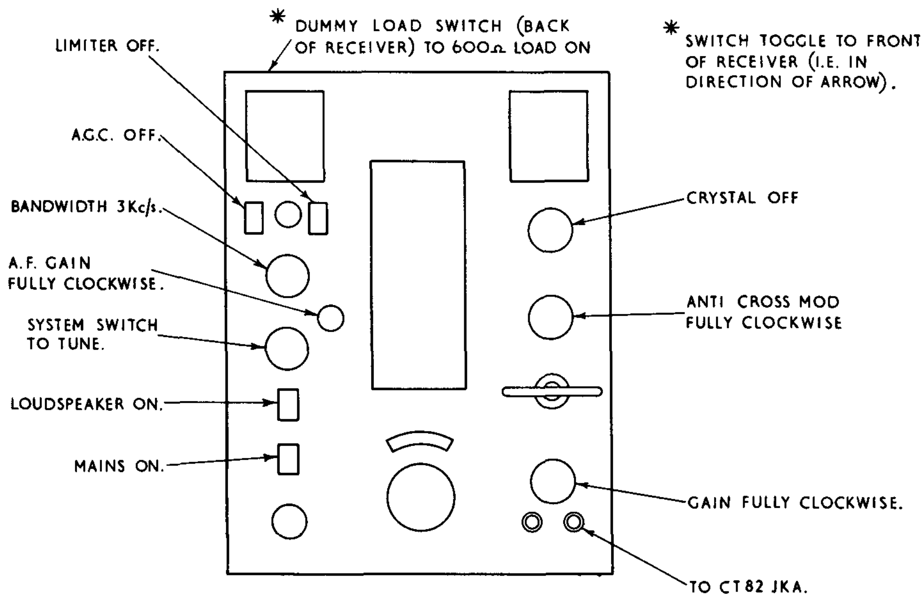


TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 2

*SEE CHANGE No 2



SETTINGS FOR RECEIVERS A.P.57141/A
FIG. 3



SETTINGS FOR RECEIVERS A.P. 57141 B/C
FIG. 4

Step	Procedure

Noise Output

5 The reading in the a.f. output meter is the Noise Output and should be entered in the appropriate column of the table already prepared for the maintenance schedule (Para. 44). If the reading obtained is less than 6 dB, switch the AUDIO IN switch to MEDIUM; similarly if the reading still fails to reach 6 dB in the meter, switch to LOW. For simplicity it is convenient to express all Noise Output figures in terms of the LOW position of the AUDIO IN switch. In many cases readings will have been taken with the switch in either the MEDIUM or HIGH position. The method of calculating this conversion to LOW is as follows:-

(a) To convert a reading from HIGH to LOW - add 15.5 dB, for example:-

The Noise Output reads 15 dB in the HIGH position. This is equal to 15 + 15.5 = 30.5 dB in terms of LOW, therefore the figure of 30.5 dB should be recorded in the column under Noise Output.

(b) To convert a reading from MEDIUM to LOW, add 6 dB, for example:-

The Noise Output reads 12 dB in the MEDIUM position. This is equal to 12 + 6 = 18 dB in the LOW position. The figure of 18 dB therefore is the one which must be entered into the Noise Output columns of the maintenance schedule.

Noise Output in itself is not an essential criterion of the receiver performance but it is used to obtain Noise Gain (see Para. 46) which is essential.

NOTES 1. Noise Output and Noise Factor measurements on Receivers B41 are sometimes found to be too high (when compared with previous results). This is often caused by external interference and this is particularly relevant on the lower two bands, such interference will falsify results. When outside interference is suspected remove the mains lead earth from the Noise Generator. This will probably reduce interference and if it does, the tests should be made under this condition. Reconnect lead on completion of test.

2. Noise Output on some receivers is found to be so high that the reading on the output meter is off the scale. A reading may be taken by using the following method:-

(1) Turn down R.F. GAIN of receiver until output meter reads say 15 dB.

(2) Turn down A.F. GAIN of receiver until output meter reads say 5 dB.

(3) Turn up R.F. GAIN of receiver to maximum.

(4) Carry on with readings as before remembering that the output meter reading is now 10 dBs down.

Noise Factor

6 Adjust the receiver a.f. gain for a mid-scale reading (i.e. 10 dB) in the output meter. If this is not possible, change the AUDIO IN switch first to MEDIUM, and if this still fails to reach the 10 dB position, to LOW. If by any chance 10 dB still cannot be obtained in this final position, adjust the receiver gain to give a convenient reading as near as possible to this figure.

7 Switch the DIODE CURRENT switch to 10 mA.

8 Rotate the DIODE CURRENT control in a clockwise direction until the reading in the output meter is increased by 3 dB.

9 Read off the Noise Factor on the 75 ohms scale of the NOISE FACTOR meter. Record the reading in the appropriate column of the table.

10 Restore the receiver and noise generator controls to the positions given in Steps 2 and 3.

Step	Procedure
11	Repeat the drill as given and obtain the Noise Output and Noise Factor at all the frequencies shown in Col. 2 of the Table 1, (Para. 51). See note at end of Step 5.

Noise Gain

46. The actual measurements made are of the Noise Output and the Noise Factor. Although these two quantities provide all the information required, a new term "Noise Gain" has recently been introduced purely for convenience in comparing receiver performance in the light of routine measurements taken over a period of time. However it is important to remember that the actual figure of Noise Gain for a particular type of receiver is applicable only to that type of receiver, so that comparisons between different types of receiver cannot be made. The Noise Gain at a particular frequency is obtained by subtracting the Noise Factor in dB from the Noise Output in dB (see Tables 1, 2 and 3).

47. To clarify the concept of Noise Gain, three examples are given below:-

(1) Noise Output - 20 dB (LOW)
Noise Factor - 10 dB
Noise Gain = Noise Output (dB) - Noise Factor (dB)

= 20 dB - 10 dB
= 10 dB

A negative sign for Noise Gain should not cause confusion as it is a relative term applying only to one particular type of receiver. In this case, the Noise Gain is positive, example (3) illustrates figures which give a negative Gain.

The next example shows that if the Noise Factor is bad and the Noise Output normal, the Noise Gain of the receiver must be low:-

(2) Noise Output = 20 dB (LOW)
Noise Factor = 19 dB
Noise Gain = 1 dB

From this it will be appreciated that although the two examples given have the same output noise, due to the different noise factors, there is 9 dB difference between the gain of the receivers (10 dB Example 1, - 1 dB Example 2), with the obvious inference that Example 1 is considerably the better of the two receivers.

As the receiver performance deteriorates with consequent fall in gain, a time may come when the noise gain figure becomes negative, this is shown in the following example:-

(3) Noise Output = 6 dB (LOW)
Noise Factor = 18 dB
Noise Gain = -12 dB

Such negative results are in order, reference to Table 3 will show that the receiver of the above example is just on its lower limits. When considering negative gain it should be realised that a noise gain of -3 dB is better than a noise gain of -6 dB, but worse than a noise gain of 0 dB.

Results to be Expected

48. The tables of results are given for guidance, so that by watching the trend of the monthly test figures and comparing them with the tables, some idea of the condition of each receiver can be obtained. The tables represent the results obtained from receivers in two states as follows:-

(a) Table 1 is a blank specimen only as referred to in para. 44.

(b) Table 2 gives noise factor for receivers which satisfy the Test Specification for signal to noise ratio.

(c) Table 3 gives noise factors which should be considered as the worst that can be permitted. When the receiver deteriorates to this level, it should be removed from operational use and fault finding procedure as indicated in Table 4 applied.

49. The readings given in Tables 2, and 3 and those obtained by measurement for Table 1 apply only when the CT82 Noise Generator A.P. 67166 is used.

With the internal loudspeaker of the B41 switched off, the noise output and hence noise gain will increase by approximately 2 dB.

50. The noise generator cannot measure bandwidth, but practical tests have shown that a change in bandwidth, particularly in the i.f. stages, is apparent from the noise generator measurement, the usual sign of this happening is a falling off in receiver gain.

51. Levels of Performance (Ships only)

In receivers which only just satisfy the Test Specification criteria of performance for signal to noise ratio, the following average results have been obtained over the whole band except range 1.

On ranges 2-5 noise factor should not be worse than 8.5 dB.

On range 1 noise factor should not be worse than 10 dB.

All new receivers must reach the above standard of performance. However, it is found in practice that due to allowed component tolerances, many new or repaired receivers attain a standard of performance better than that quoted above, and in some cases noise factors as good as 4 dB may be found. This is quite in order and the table below gives the noise factor to be expected from receivers on installation.

NOISE FACTOR (See Note 1)

Noise factors should be taken as soon as possible after the new or repaired receiver has been installed, and these figures should be recorded as the initial figures. These results obtained should be as indicated in the table, any cases where the noise factor is more than 1 dB worse, i.e. greater than the higher figure shown in the table, the fact should be brought to the notice of the issuing authority of the receiver. Subsequently the receiver should be checked periodically as indicated on the maintenance schedule and a slow deterioration in noise factor is permissible (see Note 2).

TABLE 1

SPECIMEN RECORD CARD

(Column 3, 4 and 5, to be completed as described in text)

Date:

Ship:

Receiver Type & No.

1	2	3	4	5
RANGE	Frequency kc/s	Noise Output ref. dB LOW	Noise Factor dB	Noise Gain dB Col. 3 - Col. 4
1	B15.6 M22 T31.5	x	x	⊗
2	B33.7 M50 T68.5	x	x	⊗
3	B73 M110 T147	x	x	⊗
4	B156 M220 T314	x	x	⊗
5	B340 M500 T680	x	x	⊗

x To be measured and inserted by ship's staff. ⊗ Calculated as shown.

TABLE 2

NOISE FACTOR AT BOTTOM, MIDDLE AND TOP OF BAND				
Range 1	Normally	lies	between	7 dB and 10 dB
2	"	"	"	5 dB and 8.5 dB
3	"	"	"	5 dB and 8.5 dB
4	"	"	"	3 dB and 8.5 dB
5	"	"	"	6 dB and 8.5 dB

NOISE GAIN (See Note 3)

The actual figure obtained for noise gain is somewhat dependent on the location of the receiver, e.g. in a screened cubicle, lower noise gains may be obtained than in a "noisy" location or where there is considerable interference on the mains supply. For this reason it is better to install the receiver in its bay and take a series of noise factor and noise gain readings. If these had been taken when the receiver was just received or was know to be good, they should be used as the initial noise gain and any subsequent results showing a deterioration of more than 3 dB should be investigated. A steady deterioration in noise gain is permissible (See Note 2 below)

52. NOTE 1

The recommended practice as stated is to obtain the noise factor and noise gain when the receiver is know to be in good condition and use these results as a basis for comparison of later periodic readings. In general, the noise factors will tend to worsen, i.e. increase and the noise gain to decrease with time. A steady deterioration is to be expected and only sudden changes of several dB need be investigated.

NOTE 2

It is emphasised that the figures given in the tables only apply when the receiver is first installed and the receiver should not normally be defected if the results gradually deteriorate below those given in the table. The results given in para. 53 below are the noise results which should be obtained, when a receiver has reached this low level of performance, effort should be made to discover the reason (See table of Fault diagnosis using CT82), and either the necessary action taken to restore the performance or a copy of the results (not the receiver) sent to the Dockyard or base for information and proposed action.

Realignment of the receiver should not be attempted except in an emergency and in general it will be found that the performance c[illegible] be restored without realignment.

NOTE 3

The Noise Gain figures are calculated as shown in para. 46.

53. In general, it is considered that B41 receivers which do not reach the standard of Noise Factor and Noise Gain performance shown below should be considered unserviceable and removed to the E.M.R. for investigation at the earliest opportunity.

SEE CHANGE Nº 2

TABLE 3

Noise Factor	18 dB on ranges 2 to 5 20 dB on range 1.
Noise Gain	-15 dB on all ranges

The minus sign of Noise Gain which occurs when receiver performance is poor need not lead to confusion if it is remembered, for example, that a Noise Gain of -7 dB is 3 dB better than a Noise Gain of -10 dB.

54. It may be found that before the noise factor drops to 18 dB or the noise gain falls to -15 dB that the noise output has become too low, i.e. worse than 0 dB in the LOW position of the AUDIO IN switch. In this case it will not be possible to measure the noise factor. In this case the receiver should be considered unserviceable and Table 4 should be consult[illegible].

55. It is emphasised that when a receiver is removed from service every effort should be made to restore its performance before returning it as defective. In general, the fault finding table 4 will give a good indication of the remedy. (See also para. 57g).

Fault Finding

56. The Tables 4, 5 and 6 given in this fault finding section are to be used only as a guide, as it i[illegible] obvious that every contingency cannot be covered by this means. They may be considered as giving a general line on certain types of trouble revealed by the tests just described, as these tests allow logical deductions to be made concerning the nature of a fault and its location in the receiver. If the methods given in the tables does not give its actual location, it will more often that not be localised so that accurate test [illegible]quipment can be brought to bear, to find and remedy the fault.

57. When using [illegible] tables the following important points should be taken into account:-

(a) It is assumed that the initial tests on the receiver and the figures recorded were taken with the receiver in a correctly aligned condition.

(b) The noise generator tests are routine performance checks and it will sometimes be necessary to apply more detailed tests to the receiver. These are fully detailed in Part B of this chapter, and where such tests becomes necessary and the equipment is not available, the receiver must be held until it can receive attention in a dockyard or depot ship. It should be possible however to locate and remedy most of the faults met in service, by means of the noise generator, the help given by the tables, circuit and layout data and maintenance information given in this handbook.

(c) Receivers B41B/C used for the reception of RATT should also be checked as indicated in Handbook for RATT B.[illegible] 2133.

(d) The limit figures given in Table 3 represent a considerable deterioration of the receiver performance, therefore, if possible, the receiver should be withdrawn from operation before the tests show it to have reached these low limits.

(e) It should be appreciated that if the noise factor has increased by X dB, and the gain of the receiver has remained normal, the noise output should have increased a corresponding X dB; similarly, if the noise factor falls by, say, X dB (due perhaps to a valve change in the r.f. stage), then the noise output will drop by X dB, assuming the gain remains constant. The use of Column 5 Noise Gain, takes these variations into account, hence 3 and 5 are the significant columns in the test record table.

(f) Simple checks such as voltage measurements will be made in conjunction with the procedures laid down in the tables. The Remedy column gives probable causes of trouble and suggestions, no more.

(g) Whenever alignment is given as a possible cause of trouble, it is essential to perform every other possible test to establish beyond all doubt that misalignment is indeed the fault. Then and only then, should the alignment be undertaken as an emergency measure and the receiver made a dockyard defect item as soon as convenient.

58. TABLE 4

NOISE FACTOR FAULTS

Symptom	Possible Fault	Location of Fault	Remedy
High (poor) noise factor on all bands.	A. Bad contact in r.f. valves	A. r.f. valve and mixer valve.	Move valves about in socket to give cleaning action on pins. Inspect holders.
	B. r.f. valve failing	B. r.f. valve and mixer valve.	Check valves on CT160 Valve Tester, for emission etc. Replace faulty valves.
	C. Low r.f. gain	C. h.t. voltages or mains voltage low. Unswitched components in r.f. stages, i.e. any component common to all bands of the receiver.	Check, using Avometer Model 7X. Check by-pass capacitors electrode voltages etc. in r.f. and mixer stages. Replace faulty component.

TABLE 4 (Contd.)

Symptom	Possible Fault	Location of Fault	Remedy
High (poor) noise factor on whole of one band	r.f. gain low in that band only.	D. Switched components in that band, in r.f. and mixer circuits.	Check appropriate components, coils etc.
		E. Alignment of r.f. stages on that band only.	Realign r.f. stages and oscillator stage on that band only. See para. 57(a).
High (poor) noise factor at one end of a band.	r.f. gain low at that point.	F. As in E above.	See para. 57(a).
Noise factor measurement not obtainable due to no increase in receiver Noise Output.	No noise entering receiver aerial terminals.	G. Noise generator not operating.	Check mains on, diode current meter reading etc. See B.R.1771(12) for fault finding.
		H. Connecting lead from noise generator to receiver aerial terminals open or short circuited.	Check for continuity and insulation.
		J. Receiver noise factor greater than 20 dB.	Check overall gain etc. as indicated in para. 66. Pay particular attention to first r.f. and mixer stages.
Noise factor suddenly changes on one band only.	r.f. gain low on that band.	K. See D, E, F above	See para. 57(a).
Noise factor suddenly changes in all bands.	r.f. gain changed.	L. r.f. stages of receiver	Check h.t., mains voltage, electrode voltages.
		M. Noise generator fault.	See B.R.1771(12).

59.

TABLE 5

NOISE OUTPUT - NOISE GAIN FAULTS

Symptom	Possible Fault	Location of Fault	Remedy
Noise gain low on all bands, Noise Factor normal.	Receiver gain low.	N. H.T. voltage low. mains voltage low.	
		P. Faulty components in non switched sections of R.F. Unit e.g. by-pass capacitors.	Check electrode voltages, refer to Figs. 3-6, 9-12, Part 3, to trace fault.
		Q. Valve or valves low in gain or emission.	Check a.f. and i.f. gain to locate fault, see paras. 85 to 88 and 97 to 101. Check suspect valves on CT160 valve tester.
		R. B.F.O. not working properly.	Check the signal + noise/noise ratio (paras. 64-66) and also that the b.f.o. functions correctly on the HIGH and LOW positions of the SYSTEM switches.
		S. I.F. alignment incorrect.	Realign i.f. as an emergency measure only.
Noise gain low on one band only, noise factor being normal.	r.f. gain low in mixer stage.	T. Switched components in r.f. stages and oscillator, particularly in the mixer stage.	Check these components.
		U. Alignment of r.f. stages and oscillator stage.	Try all other fault finding before attempting an r.f. realignment.
Noise output low on one end of one band only and noise factor normal.	r.f. gain low at bad point.	V. As in T, & U above.	

TABLE 5 (Contd.)

Symptom	Possible Fault	Locating of Fault	Remedy
		W.	
Noise output higher than usual.	High receiver gain	Mains voltage high. H.T. high.	Check, using Avometer.
		X.	
Noise output low on all bands, noise factor slight change.	B.F.O. frequency or level change.	B.F.O. circuit	Check b.f.o. frequency. Increase noise into receiver by 1 or 2 dB and check that there is a corresponding increase in noise output. If not, investigate b.f.o. circuit.

VALVE ELECTRODE POTENTIALS

60. In order to obtain the figures given within reasonable limits, the receiver should be operated with the controls set as follows:-

(1) ANTI-CROSS-MOD. control, fully clockwise.

(2) CRYSTAL switch to OFF.

(3)

RECEIVER	BANDWIDTH SWITCH	SYSTEM SWITCH	A.G.C. SWITCH
B41/A	Narrow	Manual	-
B41/B/C	3 kc/s	Tune	Off

(4) LIMITER switch to OFF.

(5) OUTPUT switch at back of receiver, toggle to front of receiver.

(6) MONITOR L.S. switch to OFF.

(7) GAIN controls both fully clockwise.

Test Equipment to be used

61.
(a) The figures given overleaf were obtained using an Avometer No. 7 or 7X. If a different instrument is used, the results obtained may in certain instances differ considerably from those laid down, particularly where a voltage measurement is being made across a high impedance.

(b) Variations from quoted figures greater than ± 10% for anode ± 15% for screen, and ± 20% for cathode voltages, must be investigated.

Valve Electrode Potential Tables (B41/A/B/C)

62.
(a) R.F. Unit

Valve	Electrode	Meter range (volts)	Reading (Volts)	
			B41/A/B	B41C
1st r.f. V101	Anode Screen Cathode	400 400 400	205 206 123	202 200 35.5
Mixer V102	Anode Screen Cathode	400 400 10	245 84 2.0	242 107 2.25
L.O. V103	Anode Screen Cathode	400 400	149 146	117 120

(b) A.F. and Power Unit

Valve (or socket)	Electrode	Meter range (volts)	Reading (Volts)	
			B41/A/B	B41C
SKT301	Pin 1 " 2 " 4 " 7	400 400 400 400	257 150 210 230	257 150 210 230
SKT302 Gain control fully counter clockwise; i.e. Min. Gain.	Pin 8 (Prod. on RV305 slider)	100	27	24V
1st a.f. valve V301	Anode Screen Cathode	400 400 10	102 43 1.8	95 50 1.5
Output Valve V302	Anode Screen Cathode	400 400 10	230 250 5.5	260 270 11

(c) I.F. Unit

Valve	Electrode	Meter Range (Volts)	Reading (Volts)		
			B41/A	B41B	B41C
1st i.f. valve V201	Anode Screen Cathode	400 400 10	245 92 4.0	250 85 3.5	250 106 2.6
2nd i.f. valve V202	Anode Screen Cathode	400 400 10	235 73 2.5	249 84 3.45	250 84 2.4
3rd i.f. valve V203	Anode Screen Cathode	400 400 10	225 97 2.5	231 110 4.35	240 142 1.8
A.G.C. diode V204a	Cathode (a.g.c. delay voltage)	100	13	11.4	11
B.F.O. (V206) B.F.O. "ON") B41/A - MANUAL) B41B/C - TUNE)	Anode Screen	400 400	* 132 82	198 111	200 125
B.F.O. "OFF" (SYSTEM SW. to R/T)	Anode Screen Cathode	400 400 100	200 157 3.3	222 160 3.0	215 155 7
SYSTEM switch to CAL	Anode Screen	400 400	40 160	232 202	238 205

* V206 voltages for B41/A receivers only, are taken with the grid to earth via an 0.01 μF capacitor.

LOCAL OSCILLATOR OUTPUT

Test Equipment required

63.
(a) Valve Voltmeter, CT54, A.P.67921.
Set to measure a.c. volts, 24 volts range.

(b) Connections

The probe connector of the CT54 need not be used.
Connect the valve voltmeter between the oscillator grid of the mixer valve (Pin 4 B41/A/B), Pin 7 B41C, and earth.

(c) R.F. Voltage

The r.f. voltage measured should approximate to the values given below, ∓ 2 volts.

Band	Frequency (kc/s)	Nominal R.F. voltage	
		B41/A/B	B41/C
1	15.6	7.2	6.0
2	33.7	7.9	6.5
3	73	8.1	7.4
4	156	9.8	7.0
5	340	8.2	6.0

PART B

PERFORMANCE TESTS MORE SUITABLE FOR USE IN DEPOT SHIPS AND DOCKYARDS

SIGNAL + NOISE/NOISE RATIO, AND OVERALL SENSITIVITY

Test Equipment required

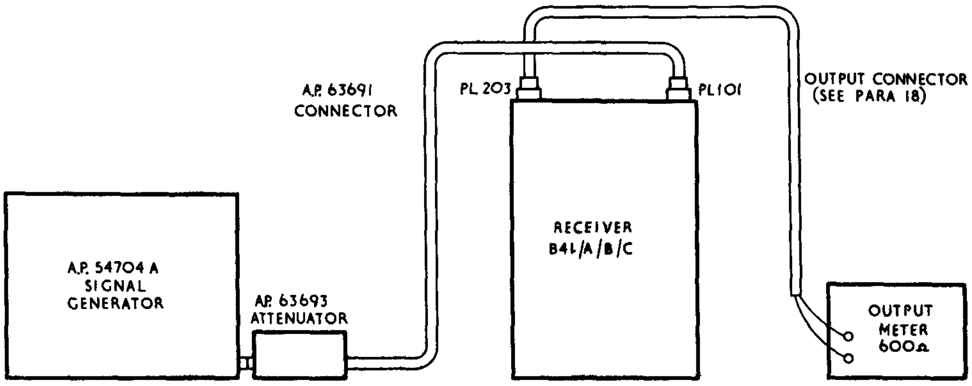
64.

Instrument	Title	A.P.	Remarks
Signal Generator	Marconi	54704A	
Output Wattmeter with connector (see para. 18)	Decibel Meter Portable No. 3 Output Power Meter TF340	ZD00022 54708	
Attenuator	-	63693	These two items are required for use with A.P.54704A Signal Generator.
Connector	-	63691	

Test Requirement

65.
(a) SENSITIVITY 500 mW output for not more than 1 microvolt input.

(b) SIGNAL + NOISE/NOISE RATIO Better than 22 dB for an input of 1 microvolt.



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 5

The Drill

66. Step — Procedure

1 Connect the instruments as shown in Fig. 5. Switch on, and allow to warm through for 15 mins.

2 Set the receiver controls as follows:-

(1) ANTI-CROSS-MOD. control fully clockwise.

(2) CRYSTAL switch to OFF.

(3) LIMITER switch to OFF.

(4)

RECEIVER	BANDWIDTH SWITCH	SYSTEM SWITCH	A.G.C. SWITCH
B41/A	Narrow	Manual*	-
B41B/C	3 kc/s	R/T	OFF

* Stop b.f.o. oscillating by connecting an 0.01 μF capacitor between the chassis and the grid of the b.f.o. valve. Short-circuit R224. (See Fig. 13 Part 3).

(5) OUTPUT switch towards back of receiver.

Step	Procedure
2	(6) LOUDSPEAKER switch to OFF.
	(7) TELEPHONES unplugged.
	(8) A.F. GAIN control fully clockwise (RV225).
	(9) GAIN control fully clockwise (RV305/309).
	(10) TUNE the receiver to 680 kc/s.
3	Set the signal generator controls in accordance with its handbook instructions to provide the following:- Modulation - 400 c/s 30%. Output frequency - 680 kc/s. Output level - 10 microvolts.
4	Set the output meter controls to provide the following:- Input impedance - 600 ohms. Output level - to read at least 500 mW.
5	Tune the signal generator accurately to the receiver setting as indicated by maximum reading in the output meter. The receiver output must exceed 500 mW. NOTE:- If it is not possible to obtain this output, sensitivity is low, and the reason must be investigated.
6	Reduce receiver gain by means of the GAIN control (RV305/309) if necessary, until 500 mW is obtained.
7	SYSTEM switch to TUNE: B41/A only - unclip capacitor shorting grid of b.f.o. valve to chassis and remove short-circuit from R224. Switch off signal generator modulation i.e. to c.w.
8	Tune signal generator for zero beat.
9	SYSTEM switch to LOW.
10	Adjust receiver A.F. GAIN control (RV225) for a reading of 500 mW in the output meter.
11	Switch off the signal generator carrier, but retain all the connections to the receiver.
12	Check that the output meter reading has fallen by at least 22 dB, i.e. to less than 3 milliwatts.

Step	Procedure
13	Repeat the above procedure on the following frequencies:-

BAND	Frequency (kc/s)		
	Bottom	Middle	Top
1	15.6	22	31.4
2	33.7	50	68.5
3	73	105	147
4	156	220	314
5	340	500	680

OVERALL AUDIO FREQUENCY RESPONSE

Test Equipment required

67.

Description	Identity	A.P.
Signal Generator with provision for external modulation.	CT218 Marconi	10S/16780 54704/A
Audio frequency variable frequency Oscillator	G.205	W7252
Output Meter with Connector (see para. 18)	Decibel Meter Portable No. 3 TF340	ZD00022 54708
Attenuator } See Note 1	-	63693
Connector } See Note 1	-	63691
Connector } See Note 2	-	60861
Adaptor } See Note 2	-	60862/3

NOTE 1:- These will be required if A.P.54704/A Signal Generator is used. For details see paras. 13 to 15.

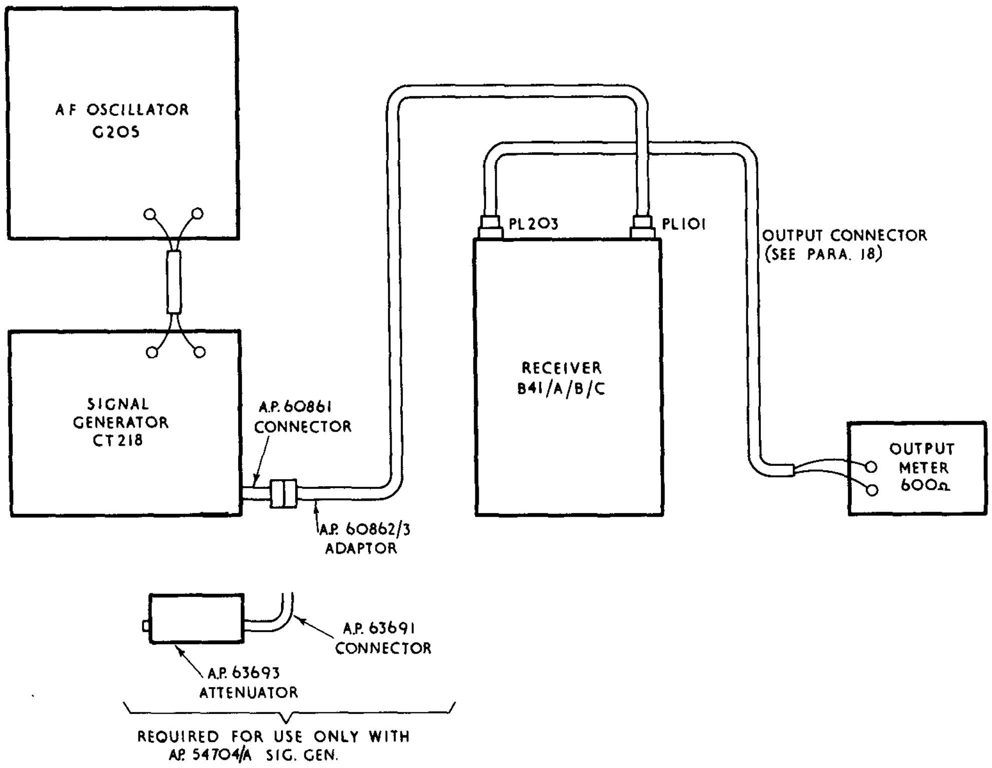
NOTE 2:- These will be required if CT218 Signal Generator is used. They are provided in the "Box Stowage for connectors for CT82 Noise Generator".

Test requirement

68. The audio frequency response, measured at the receiver output, with the signal fed to the receiver input, should conform to the following requirements:-

(a) With a reference level established at the maximum output obtainable over the audio frequency range, the output at 300 c/s and 3000 c/s modulation should not fall by more than 4 dB below the reference level.

(b) The output at 80 c/s modulation frequency should fall by at least 12 dB below the reference level.



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 6

The Drill

69. Step | Procedure

1 RECEIVER CONTROLS as follows:-

(1) ANTI-CROSS-MOD. control fully clockwise.

(2) CRYSTAL switch to OFF.

(3) LIMITER switch to OFF.

(4) OUTPUT switch, toggle to rear of receiver.

(5) LOUDSPEAKER switch to OFF.

(6) GAIN control fully clockwise (RV305/309).

(7) TUNE to 680 kc/s.

(8)

RECEIVER	BANDWIDTH SWITCH	SYSTEM SWITCH	A.G.C. SWITCH
B41/A	Wide	Tune	-
B41B/C	3 kc/s	Tune	OFF

2 Signal generator

(1) Adjust output level to 10 microvolts, (100 microvolts in the case of A.P.54704/A).

(2) TUNE to 680 kc/s (the receiver frequency) and adjust carefully for MINIMUM output meter reading i.e. zero beat.

3 SYSTEM switch to R/T (B41B/C). SYSTEM switch to MANUAL (B41/A) and stop b.f.o. oscillating by connecting 0.01 μF capacitor between b.f.o. valve grid and chassis.

4 Signal generator to external modulation. Adjust modulation frequency of external a.f. oscillator for maximum receiver output, maintaining modulation depth at 30%.

5 Adjust receiver gain by means of the A.F. GAIN control (RV225) for a reading of +15 dB on the 10 milliwatts output, meter range i.e. 316 milliwatts. This is the reference level.

6 Maintaining the modulation depth at 30%, vary the a.f. modulation frequency in steps between 80 c/s and 3000 cycles per second.

Check that:-

(1) The output meter reading does not fall more than 4 dB below the +15 dB reference level at any modulating frequency between 300 c/s and 1300 c/s, i.e. it must not fall below 125 milliwatts.

Step		Procedure
6	(2)	The output meter reading falls more than 12 dB below the +15 dB reference level, i.e. below 20 mW, at a modulating frequency of 80 cycles per second.

OUTPUT LEVELS

Test Equipment Required

70. (a)

Description	Identity	A.P.
Signal Generator	CT218 Marconi	10S/16780 54704/A
Output Meter with Connector (see para. 8)	Decibel Meter Portable No. 3 TF340	ZD00022 54708
Connector } See Note 1	-	63691
Attenuator } See Note 1	-	63693
Connector } See Note 2	-	60861
Adaptor } See Note 2	-	60862/3

NOTE 1:- Required for use with A.P.54704/A Signal Generator.

NOTE 2:- Required for use with CT218 Signal Generator.

(b) To facilitate this test a special output connector should be made up. It consists of a six way Mark 4 socket with three twisted pairs suitably coloured for identification, about 4 ft long. The three pairs are connected to Pins A and B, C and D, and E and F, the free ends being fitted with either spade terminals or crocodile clips. B.R.1617 Chapter 8 gives information on how to assemble this socket connector and details concerning approved methods of soldering to the pins.

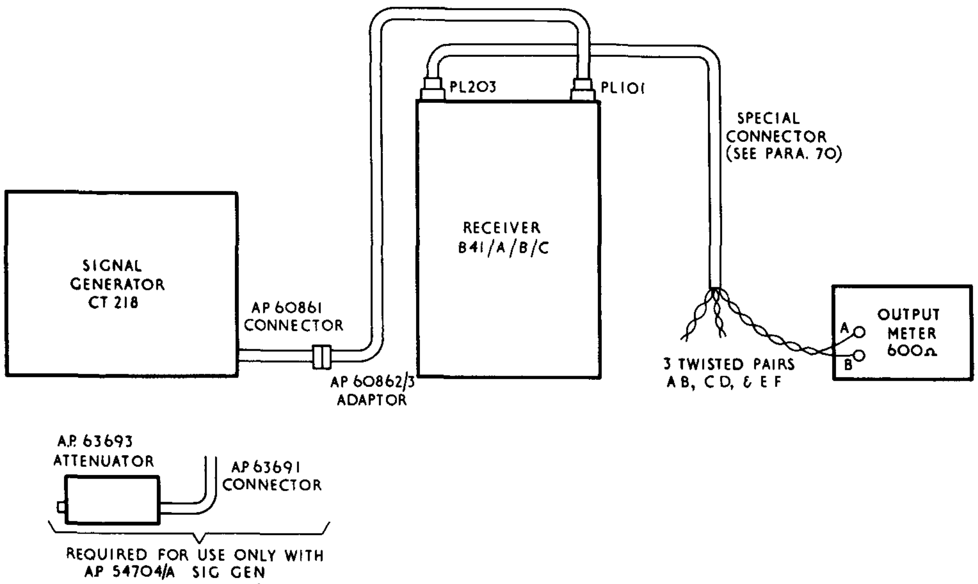
(c) A further connector is required for Step 5 of the test to connect the output meter to the phone jack. This consists of a standard phone jack plug terminating a twisted pair about 3 feet long. Spade terminals or crocodile clips are connected to the free ends.

Test requirement

71. When the receiver is set up to give 500 mW at the external loudspeaker

of the output socket, the levels at the other outputs should be as follows:-

Output Socket pins for LINE	- 5 milliwatts	± 1.5 dB
" " " " PHONES	- 3.5 milliwatts	
Phone Jack 1	3.5 milliwatts	
Phone Jack 2	3.5 milliwatts	



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 7

The Drill

72. Step — Procedure

1 RECEIVER controls as follows:-

(1) ANTI-CROSS-MOD. control - fully clockwise.

(2) CRYSTAL SWITCH - OFF.

(3) LIMITER switch - OFF.

(4) OUTPUT switch (at back of receiver) - Toggle to rear of receiver.

(5) LOUDSPEAKER switch - OFF.

(6) GAIN control - fully clockwise.

Step	Procedure

1 (7)

RECEIVER	BANDWIDTH SWITCH	SYSTEM SWITCH	A.G.C. SWITCH
B41/A	Narrow	R/T	-
B41B/C	3 kc/s	R/T	ON

(8) TUNE to 680 kc/s.

2 Signal Generator controls as follows:-

(1) Modulation, 1000 c/s (CT218) or 400 c/s (54704/A) 30% depth of modulation.

(2) Tune to 680 kc/s, and adjust for maximum reading in the output meter.

(3) Output level - 100 microvolts (A.P.54704/A)
10 microvolts (CT218)

3 With the output meter connected to pins A and B of the special connector described in para. 70(b), adjust receiver A.F. GAIN control for a reading of 500 mW in the meter.

4 Put the toggle of the output switch towards the front of the receiver. Disconnect output wattmeter from pins A and B of PL203, and connect it in turn, by means of the special connector, to pins C and D (600 ohms line) and E and F (600 ohms 'phones). An output power reading of 5 mW for "Line" and 3.5 mW for "'phones" ($\mp 1\frac{1}{2}$ dB) should be obtained.

NOTE:- Pins A and F should be connected to the earth terminal of the output meter. When testing the output across pins C and D, no particular connection is required.

5 Plug in the output meter in turn to each of the telephone jacks on the front panel, using the connector described in para. 70(c). With the wattmeter set to 600 ohms an output power reading of 3.5 mW $\pm 1\frac{1}{2}$ dB should be obtained from each jack.

A.G.C. PERFORMANCE

Test Equipment Required

73.

Description	Identity	A.P.
Signal Generator	CT218 Marconi	10S/16780 54704/A
Output Meter with Connector (see para. 18)	Decibel Meter Portable No. 3 TF340	ZD00022 54708
Attenuator } See Note 1	-	63693
Connector } See Note 1	-	63691
Connector } See Note 2	-	60861
Adaptor } See Note 2	-	60862/3

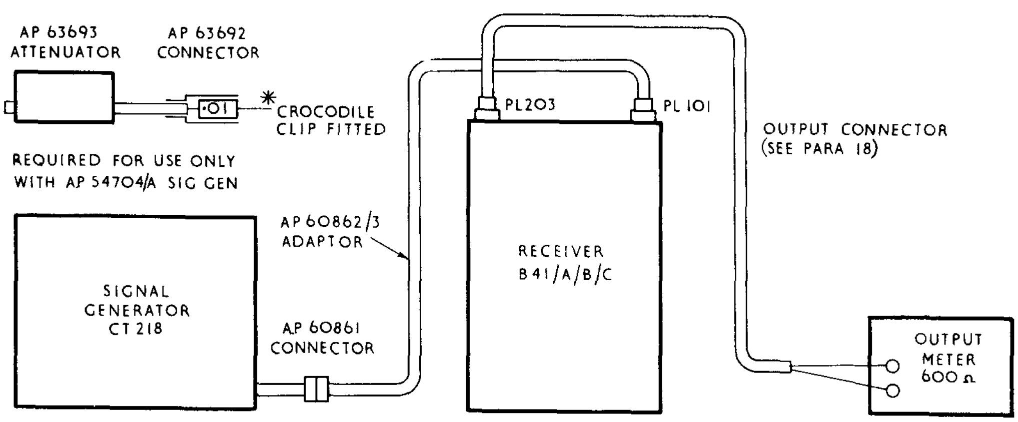
NOTE 1:- These will be required if A.P.54704/A Signal Generator is used.

NOTE 2:- These will be required if CT218 Signal Generator is used. They are provided in the "Box Stowage for connectors for CT82 Noise Generator".

Test Requirement

74. The receiver is adjusted to give a 200 mW output with a 1.5 microvolts input. Modulation is 30%, 1000 c/s (CT218) or 400 c/s (A.P.54704/A). The input at the receiver is increased from 1.5 microvolt to 4.8 millivolts (i.e. by 70 dB). The receiver output should not change by more than 3.5 dB at any point between the two input voltage levels.

N.B. When using A.P.54704/A Signal Generator, the output attenuator should be set to 15 microvolts and 48 millivolts respectively, due to the use of the Attenuator A.P.63693.



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 8

The Drill

75. **Step** — **Procedure**

1 RECEIVER controls as follows:-

(1) ANTI-CROSS-MOD. control - fully clockwise.

(2) CRYSTAL switch - OFF.

(3) LIMITER switch - OFF.

(4) OUTPUT switch at back of receiver - toggle toward back of receiver.

(5) LOUDSPEAKER switch - OFF.

(6) GAIN control - fully clockwise.

(7) TUNE to 500 kc/s.

(8)

RECEIVER	BANDWIDTH SWITCH	SYSTEM SWITCH	A.G.C. SWITCH
B41/A	Narrow	R/T	-
B41B/C	3 kc/s	R/T	ON

2 Signal Generator controls:-

(1) Output level - 1.5 microvolt (CT218)
15 microvolts (A.P.54704/A)

(2) Modulation - 30%, 1000 c/s (CT218) or 400 c/s (A.P.54704/A)

(3) Frequency - tune to receiver frequency of 500 kc/s, as indicated by maximum output meter readings.

3 Adjust receiver A.F. GAIN control (RV225) to give a reading of 200 milliwatts in the output meter.

4 Slowly increase the signal generator output voltage in convenient steps 3200 times, i.e. by 70 dB (CT218 to 4.8 millivolts, A.P.54704A to 48 millivolts).
Check that output meter reading does not increase by more than 3.5 dB at any point between the two voltage output limits.

ANTI-CROSS-MODULATION

Test Equipment Required

76.

Description	Identity	A.P.
Signal Generator	CT218 Marconi	10S/16780 54704/A
Output Meter with Connector (see para. 18)	Decibel Meter Portable No. 3 TF340	ZD00022 54708
Attenuator } See Note 1	-	63693
Connector } See Note 1	-	63691
Connector } See Note 2	-	60861
Adaptor } See Note 2	-	60862/3

NOTE 1:- These will be required if A.P.54704/A Signal Generator is used.

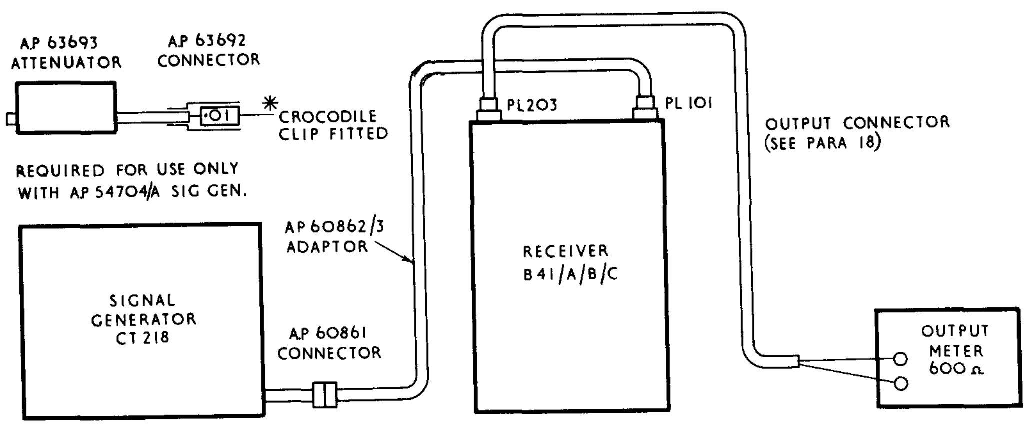
NOTE 2:- These will be required if CT218 Signal Generator is used. They are provided in the "Box Stowage for connectors for CT82 Noise Generator".

Test Requirement

77.

(a) With the ANTI-CROSS-MODULATION control fully clockwise (maximum gain position) receiver gain is adjusted so that with an input of 100 microvolts (CT218) or 1 millivolt (A.P.54704/A), an output of 500 milliwatts is obtained.

(b) Turn the ANTI-CROSS-MODULATION control fully counter-clockwise. Increase the output of the signal generator until the output meter again reads 500 mW, and check that the signal generator output is now at least 15 dB greater than in (a) i.e. 560 microvolts (CT218) or 5.6 millivolts (A.P.54704/A).



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 9

The Drill

78. **Step** — **Procedure**

1 RECEIVER controls as follows:-

(1) ANTI-CROSS-MOD. control - fully clockwise.

(2) CRYSTAL switch - OFF.

(3) LIMITER switch - OFF.

(4) LOUDSPEAKER switch - ON.

(5) A.F. GAIN control - fully clockwise (RV225).

(6) TUNE to 500 kc/s.

(7)

RECEIVER	BANDWIDTH SWITCH	SYSTEM SWITCH	A.G.C. SWITCH
B41/A	Narrow	Manual	-
B41B/C	3 kc/s	Tune	OFF

(8) OUTPUT switch at rear of receiver, toggle to rear of set.

2 Signal Generator controls as follows:-

(1) Tune to 500 kc/s, unmodulated, exactly to zero beat as indicated by zero output meter reading.

(2) Output to 100 microvolts (1 millivolt A.P.54704/A Sig. Gen.)

3 SYSTEM switch to:-

B41/A - Manual, but detune receiver for maximum "audio" output.

B41B/C - LOW.

Adjust GAIN control (RV305/309) for a reading of 500 milliwatts in the output meter.

4 ANTI-CROSS-MOD. control fully counter-clockwise.

5 Increase signal generator output until output meter again reads 500 mW.

6 Check that signal generator output has increased by at least 15 dB i.e. at least 560 microvolts, or 5.6 millivolts, depending upon the signal generator employed.

CRYSTAL CONTROLLED OPERATION

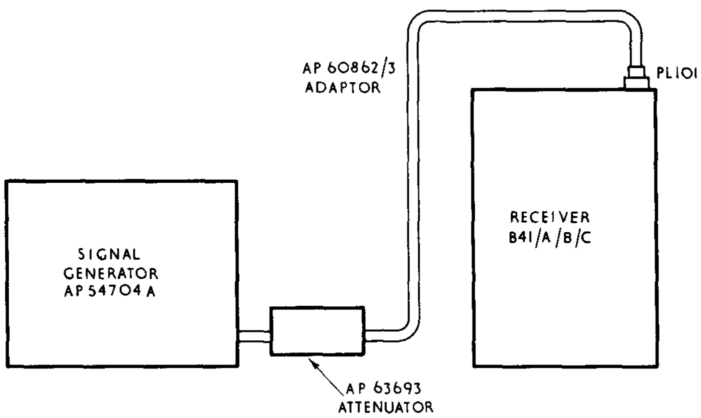
Test Equipment Required

79.

Description	Identity	A.P.
Signal Generator	-	54704A
Connector	-	63691
Attenuator	-	63693

Test Requirement

80. With a suitable crystal of frequency Fc plugged in, the receiver should operate, crystal controlled, at frequency F, when F = Fc - 800 kc/s.



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 10

The Drill

81. Step — Procedure

1 RECEIVER controls as follows:-

(1) ANTI-CROSS-MOD. control - fully clockwise.

(2) CRYSTAL switch - to ON.

(3) Plug in a crystal of any frequency, e.g. 1300 kc/s (F = 500 kc/s).

(4) OUTPUT switch at back of receiver - toggle towards front of receiver.

(5) LIMITER switch - OFF.

(6) LOUDSPEAKER switch - to ON.

Step	Procedure
1	(7) GAIN controls - adjust for adequate loudspeaker output.
	(8)

RECEIVER	BANDWIDTH SWITCH	SYSTEM SWITCH	A.G.C. SWITCH
B40/A	Narrow	Manual	-
B41B/C	3 kc/s	Tune	OFF

2 Signal Generator Controls:-

(1) C.W. operation.

(2) OUTPUT level - 10 microvolts (A.P.54704A).

(3) Tune to Fc - 800 kc/s e.g. (500 kc/s).

3 Tune receiver to Fc - 800 kc/s (500 kc/s) then tune signal generator to receiver frequency as indicated by maximum volume in the loudspeaker. Tune the receiver around this frequency and check that a note is obtained, which varies in amplitude but not in pitch. The receiver is then operating crystal controlled.

NOISE LIMITER ACTION

Test Equipment Required

82.

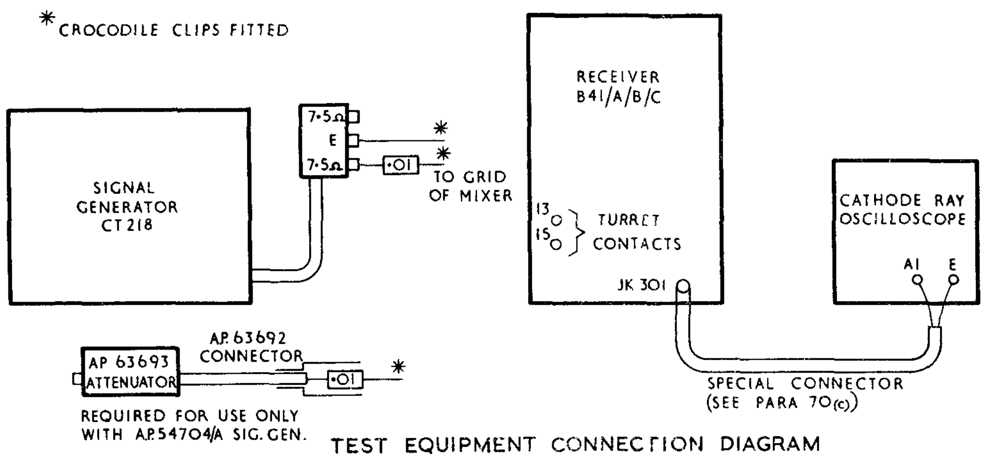
Description	Identity	A.P.
Signal Generator	CT218 Marconi	10S/16780 54704/A
Oscilloscope	Type 13A	10S/831
Attenuator } See Note 1	-	63693
Connector } See Note 1		63692
Connecting lead with attenuator. As supplied with CT218. See Note 2	-	
Connector consisting of a phone jack (A.P.650/1) connected to a twisted pair (see para. 70(c)).		

NOTE 1:- This will be required if A.P.54704/A Signal Generator is used.

NOTE 2:- This will be required for use with CT218.

Test Requirement

83. When a signal of 200 μV (CT218) or 1000 μV (A.P.54704/A) modulated at 1000 or 400 c/s, the modulation depth being any value between 10% and 60%, is applied to the mixer valve grid, the limiter control is effective in its limiting action.



TEST EQUIPMENT CONNECTION DIAGRAM

FIG. 11

The Drill

84. Step — Procedure

1 Set RECEIVER controls as follows:-

(1) CRYSTAL switch - ON. Remove crystal.

(2) SYSTEM switch - R/T.

(3) LIMITER switch - OFF.

(4) OUTPUT switch at back of receiver, toggle towards rear of receiver.

(5) LOUDSPEAKER switch - OFF.

(6) GAIN control - to give suitable amplitude of trace without distortion.

(7) A.F. GAIN control - fully clockwise.

(8) TUNE to 680 kc/s.

(9)

RECEIVER	BANDWIDTH SWITCH	A.G.C. SWITCH
B41/A	Wide	-
B41B/C	3 kc/s	ON

Step	Procedure
2	Set Signal Generator controls as follows:- Frequency - 800 kc/s Modulation - CT218, 1000 c/s A.P.54704/A, 400 c/s Modulation Depth - 10% Output Level - 1000 microvolts A.P.54704/A 200 microvolts CT218. Connect output via an 0.01 μF capacitor (already incorporated in A.P.54704/A Signal Generator lead) to the receiver mixer grid.
3	Set oscilloscope controls as follows:- Trig. Sync to Y1 Velocity range - 100 c/s Fine velocity - suitable value. Y Plate selector - A1, A2.
4	Tune the signal generator exactly to the receiver i.f. as shown by maximum height of trace on the c.r.t. Adjust the oscilloscope "Y" plate amplifier control for a convenient height of trace.
5	Switch the receiver LIMITER switch to "ON". Check that the LIMITER control is effective, as indicated by a reduction in the amplitude of the trace on the c.r.t., when the limiter control is operated.
6	By steps, increase the modulation depth up to a maximum of 60%, checking the effectiveness of the LIMITER control at each step.

A.F. GAIN

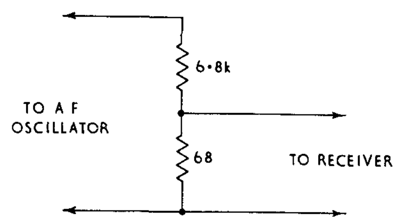
Test Equipment Required

85.

Description	Identity	A.P.
Audio Frequency Test Oscillator capable of operating at 1 kc/s	G205	W7252
Output Meter	Decibel Meter Portable No. 3 TF340	ZD00022 54708

86. Special Items

A 100/1 voltage divider should be made up as follows:-

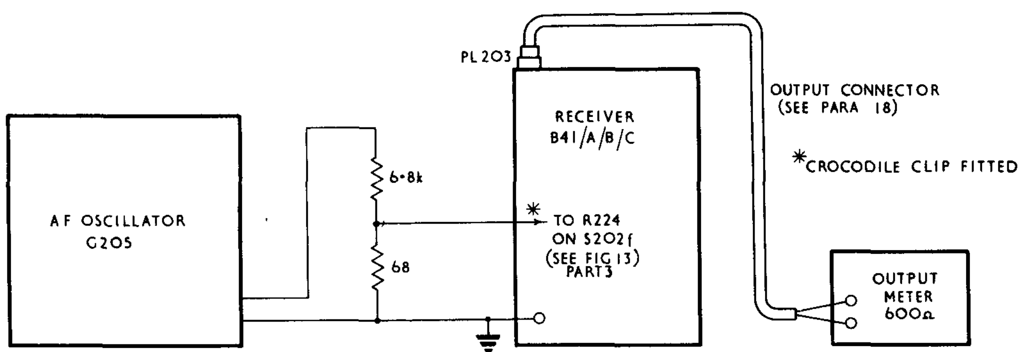


100/1 VOLTAGE DIVIDER
FIG. 12

Test Requirement

87. For a receiver output of 500 milliwatts, the input to the grid of the first a.f. valve should be not greater than 0.17 volts, at 1000 c/s.

Note:- With the test equipment connected as shown, the output voltage at the a.f. oscillator should be less than 17 volts. The input from the a.f. oscillator is connected to either end of R224 with the SYSTEM switch set to R/T (See Fig. 13 Part 3).



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 13

The Drill

88. Step	Procedure
1	Switch on and allow 15 minutes to warm through.
2	Toggle switch at back of receiver switched to the back of the receiver.
3	SYSTEM switch to R/T.
4	A.F. GAIN control fully clockwise.
5	A.F. Oscillator frequency, 1000 c/s.
6	Adjust the a.f. oscillator output level so that the output meter reads 500 milliwatts. The oscillator output should not be more than 17 volts.

I.F. RESPONSE

ADJACENT CHANNEL SELECTIVITY

METHOD USING SIGNAL GENERATOR, A.F. OSCILLATOR AND OUTPUT METER

Test Equipment Required

89.

Description	Identity	A.P.
Signal Generator	CT218 Marconi	10S/16780 54704/A
Output Wattmeter with Output Connector (Para. 18)	Decibel Meter Portable No. 3 Output Power Meter TF340	ZD00022 54708
A.F. Oscillator	-	W7252
Model 8 Avometer	-	A.P.12945
Attenuator } See Note	-	63693
Connector } See Note		63692

NOTE:- For use with A.P.54704/A Signal Generator.

Additional equipment

90.
(a) An 0.01 μF capacitor with a crocodile clip on each lead. (B41/A only).

(b) A coaxial plug (A.P.60046) connected to a suitable length of coaxial cable (see Chap. 6, Para. 6).

Test Requirement

91. The minimum acceptable bandwidth at 6 dB down, and the maximum acceptable bandwidth at 40 dB down for each position of the BANDWIDTH switch is as follows:-

Response level	Receiver B41/A		Receiver B41B/C	
	Narrow	Wide	1 kc/s	3 kc/s
6 dB (Min.)	2.5 kc/s	6.5 kc/s	1 kc/s	3.5 kc/s
40 dB (Max.)	9.5 kc/s	17 kc/s	*5 kc/s	15 kc/s

* "1 kc/s position" measured at 30 dB down

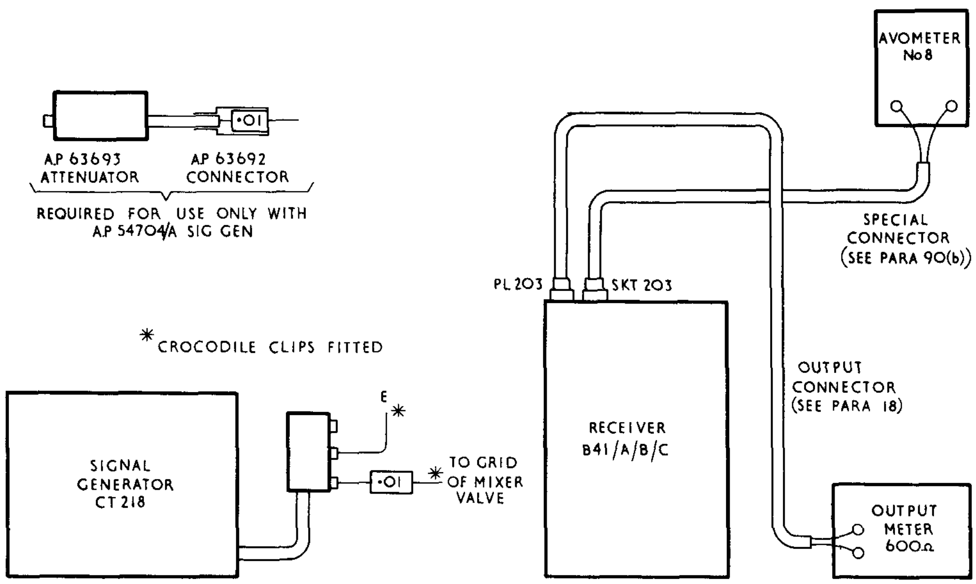


FIG. 14

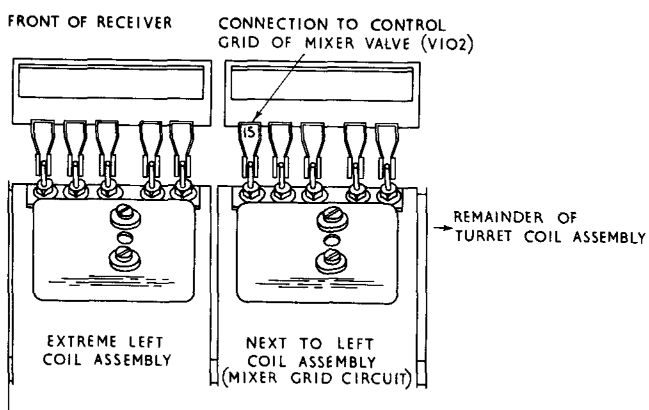


FIG. 15

TEST EQUIPMENT CONNECTION DIAGRAMS

The Drill

92. Step — Procedure

1 Receiver settings as follows:-

OUTPUT switch towards rear of receiver.

ANTI-CROSS-MOD. control fully clockwise.

Step	Procedure
1	CRYSTAL switch ON, crystal removed. A.G.C. switch to OFF. NOISE LIMITER to OFF. LOUDSPEAKER switch to ON. GAIN and A.F. GAIN controls fully clockwise. SYSTEM switch to TUNE. BANDWIDTH switch to NARROW or 3 kc/s. TUNE receiver to 680 kc/s.
2	Calibrate the signal generator incremental or logging scale.

(a) A.P.54704/A - follow the instructions contained in the Signal Generator Handbook, or use a method similar to that given below.

(b) CT218

(1) Set the signal generator output to approximately 50 micro-volts, and connect to mixer grid, no modulation.

(2) Tune the signal generator accurately for zero beat at 800 kc/s as indicated by the output meter. Note the logging scale reading, and identify this reading as (A).

(3) Increase the signal generator frequency until the audio note is approximately 1000 c/s.

(4) Receiver SYSTEM switch to R/T.
Signal generator to modulate 30% at 1000 c/s.

(5) Compare the 1000 c/s note with the audio note heard in (3) above.

(6) Switch off signal generator modulation. SYSTEM switch to TUNE. Adjust the signal generator frequency and repeat steps 4 and 5 as necessary until the two notes are equal in pitch.

(7) Note the logging scale reading, and identify this reading as (B).

The difference between readings (A) and (B) represents 1000 c/s (1 kc/s).

Greater accuracy can be achieved by repeating the procedure with the signal generator 1 kc/s below the zero beat frequency (see (3) above), and taking an average of the two results.

Step	Procedure
3	SYSTEM switch to CAL. Adjust signal generator frequency for zero beat as observed in the output meter. Signal generator output level to 50 microvolts (CT218) or 250 μV (A.P.54704A).
4	SYSTEM switch to TUNE. Any note heard represents an error in b.f.o. alignment, and if this note is higher in pitch than a low "burr", the b.f.o. should be re-aligned.
5	Adjust the signal generator accurately for zero beat.
6	SYSTEM switch to R/T (B41B/C), MANUAL (B41/A). In B41/A, stop b.f.o. oscillating by connecting an 0.01 μF capacitor between b.f.o. valve grid and chassis.
7	Switch signal generator to modulate, 30%, CT218 - 1000 c/s A.P.54704/A - 400 c/s Adjust A.F. GAIN to give suitable receiver output i.e. 100 milliwatts.
8	Increase signal generator output voltage by 6 dB i.e. from 50 microvolts to 100 microvolts (or 250 to 500 microvolts for A.P.54704/A). Detune the signal generator until the receiver output falls to the original level. Note carefully the amount of detuning on the incremental or logging scale, and convert this reading to kc/s.
9	Repeat, detuning the signal generator in the opposite direction. The sum of the two frequencies derived for the incremental scale readings, gives the bandwidth at 6 dB down. This should be greater than 2.5 kc/s.
10	Repeat steps (7), (8) and (9), but this time increase the input by 40 dB i.e. from 50 microvolts to 5 millivolts (250 μV to 25 mV for A.P.54704/A), after detuning the signal generator so that the output meter is not damaged. Read off from the incremental scale readings, the bandwidth at 40 dB. It should be less than 9.5 kc/s for B41/A and 15 kc/s for B41B/C. <u>B41/A</u>
11	Repeat steps (5) to (10) inclusive, with receiver BANDWIDTH to WIDE. In this case, the bandwidth 6 dB down should be greater than 6.5 kc/s, and the bandwidth 40 dB down should be less than 17 kc/s.

Step	Procedure
12	In the case of B41B/C, to check the receiver bandwidth in the 1 kc/s position, the output meter should be disconnected and a Model 8 (high resistance) Avometer connected to read second detector current. The connection of the Avometer is fully described in Chapter 6 Para. 6 (3) under Special Items. The following procedure should be carried out using the Avometer for measuring receiver output.

(1) With the Avometer disconnected, set receiver BANDWIDTH switch to 1 kc/s and SYSTEM switch to CAL. Switch OFF signal generator modulation, and adjust its tuning for zero beat, as heard in the monitor loudspeaker. Note the logging scale reading.

(2) SYSTEM switch to R/T. Connect Avometer and adjust the signal input voltage to obtain a reading of 10 microamps in the Avometer (switched to the correct current range - 50 μA). Care must be taken when using the meter to ensure that it is not damaged by overloading.

(3) Increase the signal input voltage to twice its original setting (6 dB), and increase the signal generator frequency until the reading in the Avometer is again 10 microamps. Carefully note the amount of de-tuning on the logging scale and convert the reading to c/s.

(4) Decrease the signal generator frequency to the setting below 800 kc/s where the Avometer again reads 10 microamps. Note the frequency on the logging scale, and convert to c/s.

(5) The two frequencies so obtained are added together and should exceed 1 kc/s.

(6) Tune the signal generator to 800 kc/s and repeat the procedure, but this time increase the signal input voltage 30 times (30 dB approx.). The bandwidth at this level should not exceed 5 kc/s.

Important. When making this test it is essential that the signal generator is detuned over 5 kc/s before making the voltage increase, both above and below 800 kc/s, to avoid damaging the meter.

I.F. RESPONSE

METHOD USING FREQUENCY SWEPT OSCILLATOR AND OSCILLOSCOPE

93. For those ships and dockyards who may possess a ganging oscillator, such as the Cossor Model A.P.54707, a quicker method is available. The shape of the response curves which should be seen, are given in Fig. 18 and 19.

Test Equipment Required

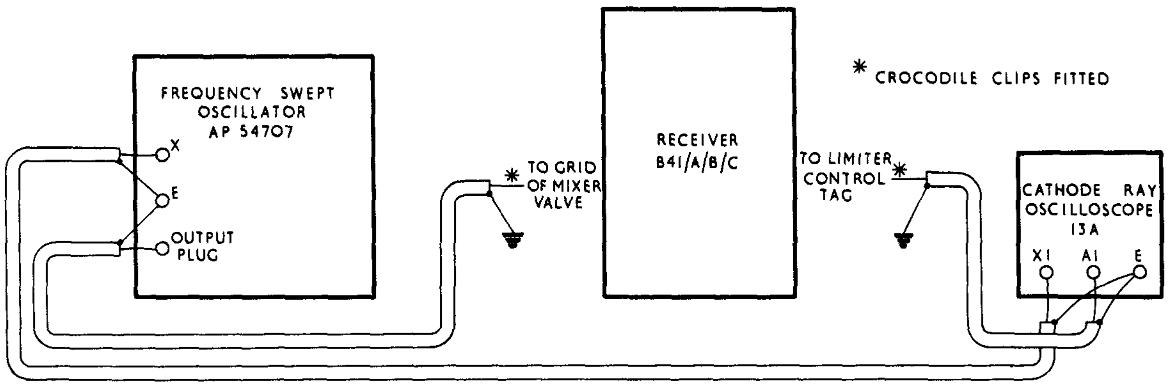
94.

Description	Identity	A.P.
Frequency swept Oscillator covering 800 kc/s	Cossor Model	54707
Oscilloscope	Type 13A	10S/831

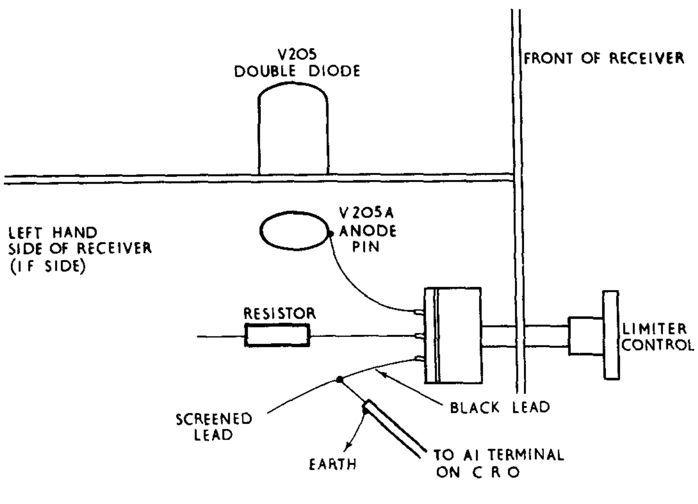
95. Additional Equipment

An 0.01 μF capacitor with a crocodile clip at each end. (For use with B41/A only.)

Connectors of suitable length made up from any convenient uniradio (screened) cable.



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 16



CONNECTION TO RECEIVER FROM C R O
FIG 17

The Drill

96. Step — Procedure

1 Receiver settings:-

(1) OUTPUT switch towards front of receiver.

(2) ANTI-CROSS-MOD. control fully clockwise.

(3) CRYSTAL switch to ON, crystal removed.

(4) SYSTEM switch to CAL.

(5) LOUDSPEAKER switch to OFF.

(6) A.F. GAIN control fully clockwise (RV225).

(7) GAIN control, adjust for reasonable output in the telephones.

(8)

RECEIVER	BANDWIDTH SWITCH	A.G.C. SWITCH
B41/A	Narrow	-
B41B/C	3 kc/s	ON

(9) TUNE to 680 kc/s.

(10) Plug in telephones.

2 Ganging oscillator settings:-

(1) Frequency - 800 kc/s. Adjust tuning slightly until zero beat is heard in the telephones. Leave the tuning dial at this setting.

(2) Bandwidth - 20 kc/s.

3 Oscilloscope settings:-

(1) Trig. Sync. - EXT.

(2) Velocity Range - 10 c/s.

(3) Fine Velocity - As low as convenient.

(4) Cal. Markers - OFF.

(5) Y Plate Selector - A1, A2.

4 SYSTEM switch B41/A - MANUAL.
Short the grid of the b.f.o. valve to earth by an 0.01 μF capacitor.

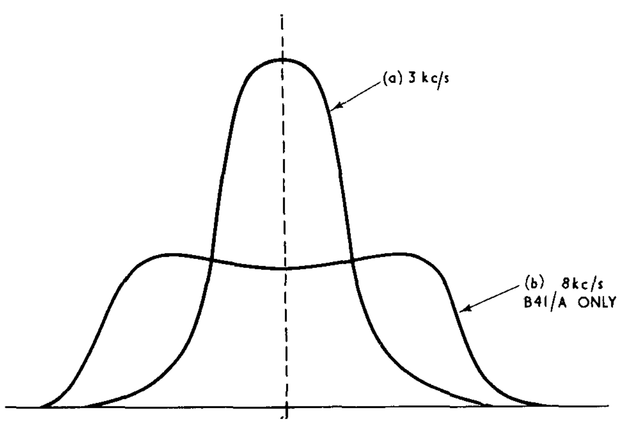
B41B/C - R/T

Adjust GAIN control for reasonable picture amplitude in c.r.t.

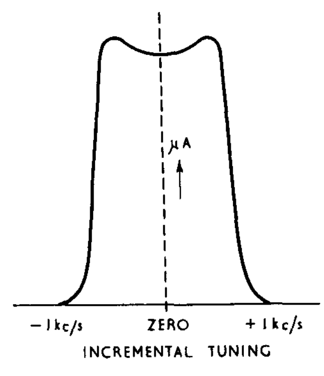
Step	Procedure
	Do not overload the receiver
5	Adjust the A1 gain control on the oscilloscope to give a convenient measurable deflection on the graticule.
6	Inspect the i.f. response curve displayed in the c.r.t., for symmetry. Realignment must be undertaken if the skirts are noticeable assymmetric.
7	Measure the bandwidth across the response curve at the point where the amplitude has dropped to half the value of the centre frequency (800 kc/s) amplitude i.e. at the 6 dB down points. The horizontal frequency scale may be calibrated by the 20 kc/s length of the oscilloscope time base.
8	Repeat the above procedure, with the BANDWIDTH switch in the following positions:-

RECEIVER	BANDWIDTH POSITIONS
B41/A	Wide
B41B/C	1 kc/s

9	The curves should be shaped similarly to those illustrated in Figs. 18 and 19. It is especially important that the 1 kc/s curve should be accurate.
	Receivers which fail to satisfy the test should have the i.f. stages realigned.



I.F. RESPONSE CURVES
FIG. 18



RESPONSE-CRYSTAL FILTER B41 B/C
FIG. 19

I.F. GAIN MEASUREMENTS

PART 1

OVERALL I.F. GAIN

Test Equipment Required

97.

Description	Identity	A.P.
Signal Generator capable of operation at 800 kc/s, and modulation of 400 or 1000 cycles per second at 30%	CT218 Marconi	10S/16780 54704/A
Output Meter with Output Connector (see Para. 18).	Decibel Meter Portable No. 3 TF340	ZD00022 54708
Connector See Note 1	-	
Connecting lead with attenuator. See Note 2	-	63692/3

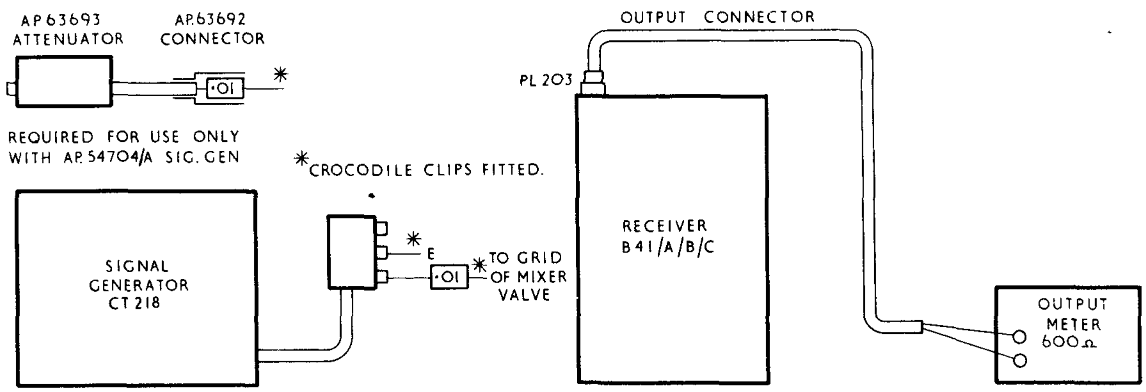
NOTE 1:- This is supplied with CT218 Signal Generator.

NOTE 2:- This will be required if A.P.54704/A Signal Generator is used.

Test Requirement

98. In order to produce a reading of 500 milliwatts in the output meter, a signal at 800 kc/s modulated 30%, injected by the signal generator at the grid of the mixer valve, must not exceed the following:-

BANDWIDTH SWITCH POSITION	INPUT VOLTAGE	
	CT218	A.P.54704/A
NARROW, or 3 kc/s	120 microvolts	600 microvolts
WIDE, (B41/A)	150 microvolts	750 microvolts



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 20

The Drill

99. Step Procedure

1 Receiver controls as follows:-

(1) ANTI-CROSS-MOD. control fully clockwise.

(2) CRYSTAL switch - ON, with crystal removed.

(3) SYSTEM switch - CAL.

(4) LIMITER switch - OFF.

(5) OUTPUT switch (at back of receiver) - toggle toward rear or receiver.

(6) LOUDSPEAKER switch - ON.

(7) GAIN control - fully clockwise.

(8) A.F. GAIN control - fully clockwise.

(9)

RECEIVER	BANDWIDTH SWITCH	A.G.C. SWITCH
B41/A	Narrow	-
B41B/C	3 kc/s	OFF

2 Signal Generator controls as follows:-

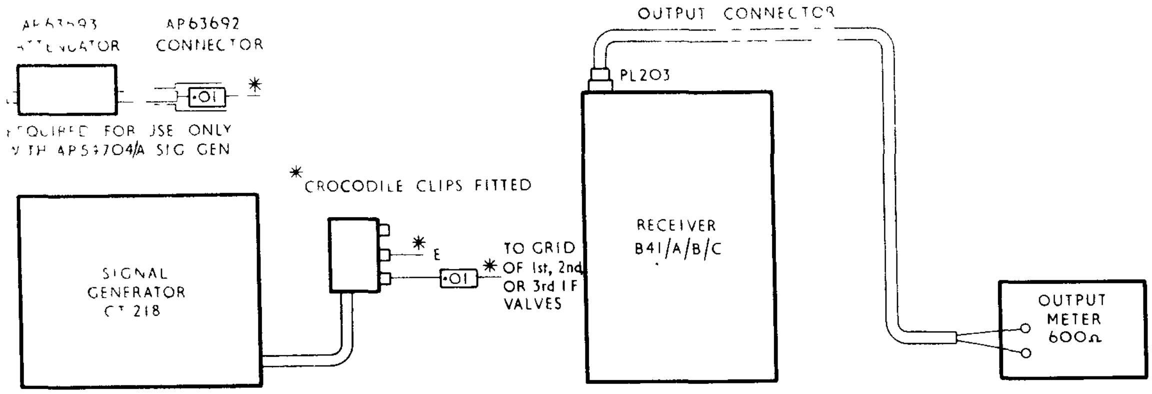
(1) Operate on c.w.

(2) Tune to 800 kc/s, and tune exactly for zero reading in the output meter. (Zero beat with receiver calibrator.)

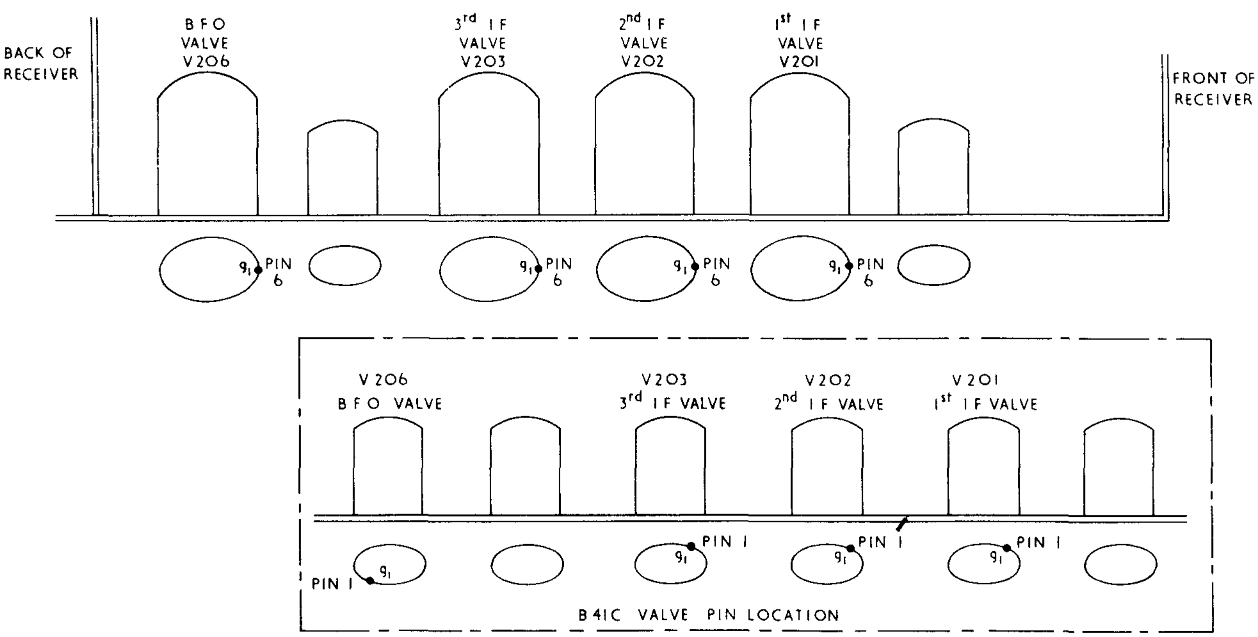
Step	Procedure
3	Receiver controls. (1) Monitor L.S. switch - OFF. (2) SYSTEM switch - R/T.
4	Signal Generator controls. (1) Modulate carrier at 1000 or 400 cycles, per second, 30%. (2) Output - adjust output level for a reading of 500 milliwatts in the output meter. Check that signal generator output voltage does not exceed 120 μV (CT218) or 600 μV (A.P.54704/A).
	B41/A Only
5	RECEIVER BANDWIDTH SWITCH to:- WIDE Adjust the signal generator output for a reading of 500 milliwatts in the output meter. Check that the signal generator output voltage does not exceed 150 μV (CT218) or 750 μV (A.P.54704/A).

PART 2

I.F. STAGE GAIN



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 21



VALVE & GRID PIN LOCATION–I F UNIT
FIG. 22

Test Requirement

100. An 800 kc/s signal, modulated 30% at 400 or 1000 cycles per second, is applied to the grids of the three i.f. valves in turn, to give a receiver output of 500 mW.

Test Point	Input level to all patterns of B41	
	CT218	A.P.54704/A
V201	200 μV	1.1 millivolts
V202	5 millivolts	25 "
V203	200 " (approx.)	1000 "

For a receiver output of 500 milliwatts, the input should not exceed the figures given in the table above.

The Drill

101. Step — Procedure

1 Receiver controls as follows:-

(1) ANTI-CROSS-MOD. control - fully clockwise.

(2) CRYSTAL switch - ON. Remove crystal.

(3) SYSTEM switch - CAL.

(4) LIMITER switch - OFF.

(5) OUTPUT switch at back of receiver, toggle towards back of receiver.

(6) LOUDSPEAKER switch - ON.

(7) GAIN control - fully clockwise.

(8) A.F. GAIN control - fully clockwise.

(9)

RECEIVER	BANDWIDTH SWITCH	A.G.C. SWITCH
B41/A	Narrow	-
B41B/C	3 kc/s	OFF

2 Signal Generator controls as follows:-

(1) Switch to c.w.

(2) Tune to 800 kc/s, and tune for zero reading in the output meter. (Zero beat with receiver calibrator).

Step	Procedure
3	Receiver controls as follows:- (1) MONITOR LOUDSPEAKER switch - OFF. (2) B41/A - SYSTEM switch to MANUAL. Clip an 0.01 μF capacitor between the grid of the b.f.o. valve and chassis. (See Fig. 22). Short circuit R224 on Switch Wafer. (See Fig. 13 Part 3). (3) B41B/C - SYSTEM switch to R/T.
4	Signal Generator controls as follows:- Modulation - 400 c/s or 1000 c/s (as applicable) 30% depth of modulation.
5	Connect the signal generator output via the 0.01 μF capacitor - (N.B. This is "built-in" in Connector A.P.63692) - to the grid of the third i.f. valve, (V203). Check that an output of 500 milliwatts can be obtained with less than the signal input specified in the chart under "Test requirements".
6	Repeat the procedure in (5) with the signal generator output connected successively to the grid of the second and first i.f. valves.

R.F. GAIN

Test Equipment Required

102.

Description	Identity	A.P.
Signal Generator	Marconi	54704A
Output Meter and Connector (see Para. 18)	Decibel Meter Portable No. 3 TF340	ZD00022 54708

The following additional items will be required to use with A.P.54704A Signal Generator:-

Attenuator - A.P.63693

Connector - A.P.63692 (non-aerial inputs)

Connector - A.P.63691 (Aerial input)

The following special item is required:-

A 390 ohm $\frac{1}{2}$ watt resistor, in series with a 0.01 μF capacitor, with crocodile clips at the free ends (Fig. 23) to be connected between the first i.f. grid and earth for measurements from r.f. valve grids and aerial. (Fig. 22).

Test Requirement

103.
(a) The following table gives:-

(i) The equivalent voltage at the test point, (assuming no attenuators).

(ii) The voltage shown on the A.P.54704A output indicator.

(b) For a receiver output of 500 milliwatts, the signal input modulated 30% at 400 c/s, should not exceed the figures laid down in the table.

Band	Freq. kc/s	Signal Generator Output Reading					
		Mixer Grid (Turret Contact 15)		R.F. Valve Grid (Turret Contact 8)		Aerial	
		Equivalent	54704A	Equivalent	54704A	Equivalent	54704A
		µV	mV	µV	mV		
1	22	260	1.3	14	7	Not more than 1 micro-volt on any range	Not more than 1 milli-volt on any range
2	50	240	1.2	13	6.5		
3	105	280	1.4	19	9.5		
4	220	240	1.2	13	6.5		
5	500	260	1.3	14	7		

104. The variation between the figures given under "equivalent", and "A.P.54704A" may be explained as follows:-

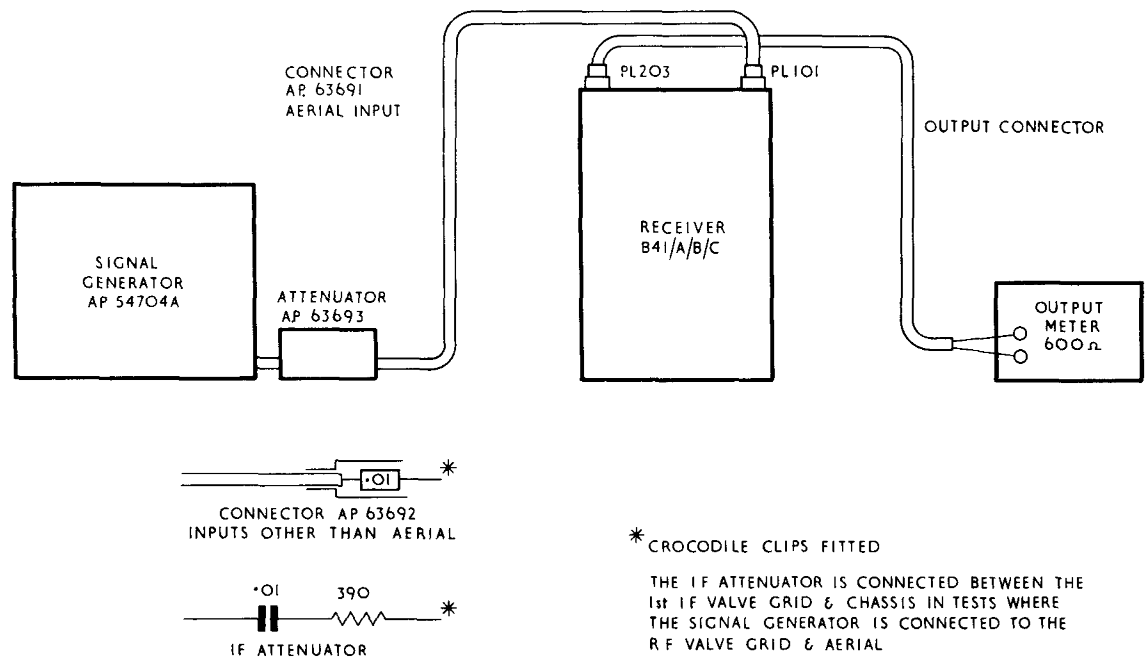
(a) Under "Mixer Grid" and "R.F. Valve Grid"

Because the A.P.54704A 10:1 attenuator is not correctly terminated i.e. it is connected across a high impedance, the actual attenuation is approximately 5:1 in practice. With the 100:1 attenuator in the i.f. circuits, the total attenuation from the r.f. grid is 500:1.

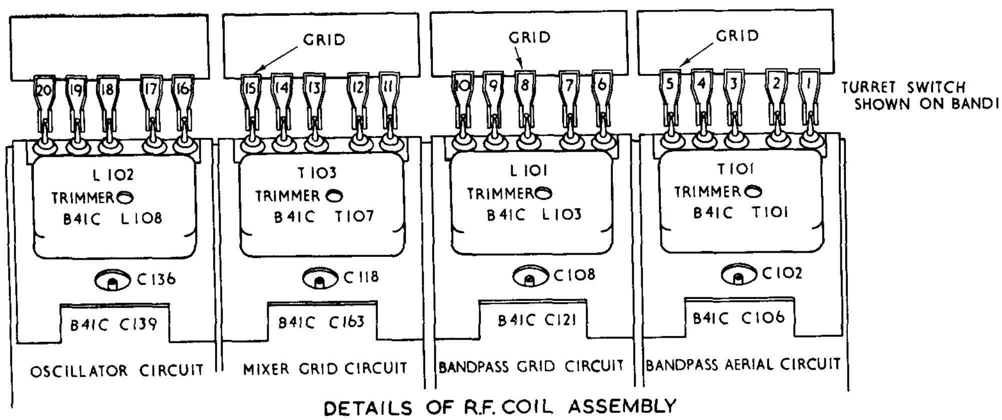
(b) Under "Aerial"

The signal generator figure is 1000 times the 'equivalent' figure due to the 100 times i.f. attenuator and the 10:1 attenuator in the aerial lead.

Details of the attenuators employed are given in the Test Equipment Connection Diagram.



TEST EQUIPMENT CONNECTION DIAGRAM
FIG. 23



DETAILS OF R.F. COIL ASSEMBLY
FIG. 24

The Drill

105. Step — Procedure

1 Receiver controls as follows:-

(1) ANTI-CROSS-MOD. control - fully clockwise.

(2) CRYSTAL switch - OFF.

(3) OUTPUT switch at back of receiver - toggle towards back of receiver.

(4) LOUDSPEAKER switch - OFF.

Step	Procedure
1	(5) GAIN control - fully clockwise.
	(6) A.F. GAIN control - fully clockwise.
	(7) TUNE to 22 kc/s.
	(8)

RECEIVER	BANDWIDTH SWITCH	SYSTEM SWITCH	A.G.C. SWITCH
B41/A	Narrow	Manual	-
B41B/C	3 kc/s	R/T	OFF

NOTE:- B41/A - stop b.f.o. valve oscillating by connecting an 0.01 μF capacitor between its grid and chassis. Short circuit R224 (see Fig. 13 Part 3).

2 Signal Generator controls as follows:-

(1) Modulation - 400 c/s 30%.

(2) Output - Connect to receiver mixer grid, using the appropriate connector.

(3) Tune to 22 kc/s, and adjust tuning for maximum output meter reading.

3 Signal Generator output level to give an output meter reading of 500 milliwatts. Check that this output level does not exceed the figure specified in the table para. 103(b).

4 Repeat the procedure, with the signal generator connected in turn to the r.f. valve grid, and lastly, to the aerial connector, employing the connectors and attenuators specified.

5 Repeat the whole procedure for the remaining four frequency bands.

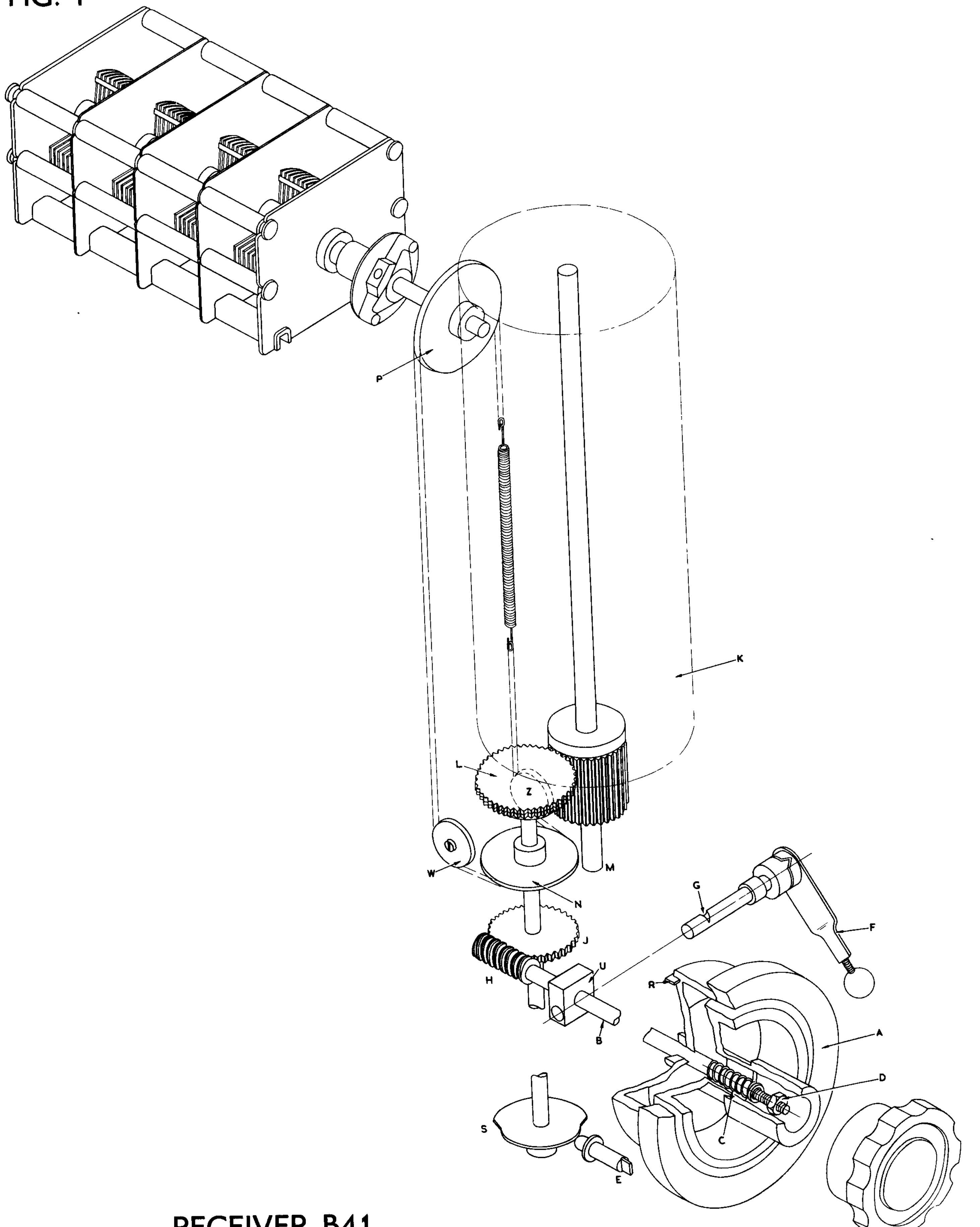
CHAPTER 8

REPAIR DATA

TUNING DRIVE MECHANISM

LIST OF CONTENTS

FIG. 1



RECEIVER B41

TUNING DRIVE MECHANISM. A.P. 57141/A

CHAPTER 8

REPAIR DATA

TUNING DRIVE MECHANISM

DESCRIPTION RECEIVERS B41/A

1. From the drawing (Fig. 1) it will be seen that the tuning knob spindle assembly comprises the following items:-

   The knob
   The spindle (B)
   The flywheel and clutch mechanism (C and D)
   The logging scale (A) mounted on the flywheel
   The worm gearing to the scale drum and gang (H and J)
   The drive locking device (F, G and U).

2. The boss of the flywheel houses the clutch, which is a simple friction type comprising the spring (C) secured at the end of the spindle by the nut (D). Reference to the drawing will show that the spring fits over and along the spindle. It exerts sufficient pressure against the face of the flywheel for the turning moment provided by the knob and flywheel, to be transferred to the spindle and work the mechanism. When the drive is stopped by means of the locking device or cam operated stop, the clutch slips, so that only the knob and flywheel turn.

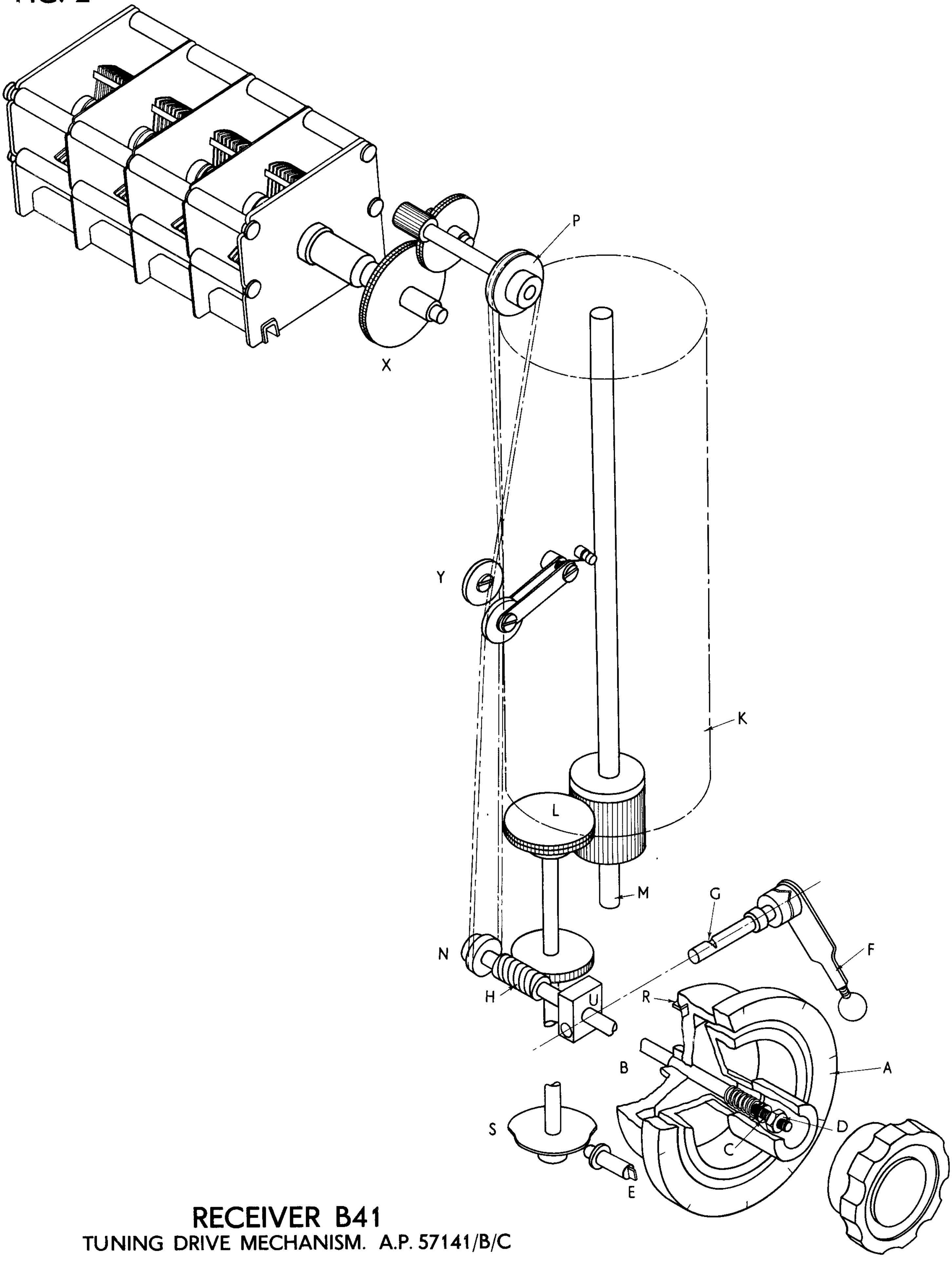
3. As flywheel tuning is employed, the resultant mechanical inertia could cause damage to the gang by exerting sudden excessive pressure at the ends of its travel, especially as it has a comparatively fragile ceramic spindle. To prevent this, the cam operated stop is fitted. It is located at the bottom of the worm wheel shaft and consists of the cam plate (S) mounted on the shaft. Due to the gearing, the total movement of this shaft is about 0.6 turns, from the closed to the open position of the gang. The plate is adjusted to operate the spring loaded push rod (E) against the stop (R) on the logging scale, at each end of the gang traverse.

4. The mechanism can also be stopped at any given point by means of the dial locking device. The dial lock lever (F) when placed in the locking position, turns an eccentrically grooved shaft (G) at right angles to the tuning spindle to produce sufficient breaking effect on this spindle (in the item (U)) to stop it turning. The lever has a spring loaded clutch to prevent the grooved shaft from jamming the tuning spindle.

5. The worm (H) at the end of the tuning spindle drives the worm wheel (J). The scale drum (K) which rotates on the spindle (M) is driven by the split driving pinion (L). Each individual scale is presented through 5/6 of a turn of the drum, due to the ratio between the pinion (L) and its mating gear on (M).

6. A chain sprocket (N) is mounted underneath the split driving pinion on the worm wheel shaft. This is connected by a suitable chain to a further sprocket (P) mounted on the ganged capacitors spindle. The chain incorporates a spring to reduce backlash. (A.P.57141 is fitted with the spring only.) Due to the relative size of the chain sprockets a transmission reduction of 5:4 takes

FIG. 2



RECEIVER B41

TUNING DRIVE MECHANISM. A.P. 57141/B/C

place through this particular drive, as the reduction from the tuning spindle to sprocket (P) is 20:1, it follows that the total reduction to the gang is 25:1.

SUMMARY RECEIVERS B41/A

7.(a) The gear box reduction ratio is 20:1.

(b) The chain drive reduction is 5:4.

(c) Total speed reduction from the tuning knob to the ganged variable capacitors is 25:1.

(d) During the whole travel of the tuning mechanism between the mechanical stops the variable capacitors are rotated through about 172° and not 180°.

(e) The scale drum calibrations are marked in five scales around the drum which turns through about 300° to move past the cursor from stop to stop.

(f) Backlash throughout the mechanism is taken up by spring loading.

(g) The stop bar engages with an angle piece on the high speed shaft of the gear box and is cam operated from the gear box low speed shaft.

(h) The tuning knob drives the gear box through a friction clutch that prevents an excessive strain being placed on the mechanism when the stops are hit.

(j) The tuning mechanism flywheel makes easier, large movements of the ganged capacitors.

DESCRIPTION RECEIVERS B41B/C Fig. 2

8. The clutch, flywheel, locking and stopping devices are the same as those in Receivers B41/A previously described. The drawing shows that the mechanism driving the scale drum, is exactly the same as for the other patterns.

9. The chain sprocket (N) is mounted at the end of the tuning spindle (B) instead of on the shaft associated with the driving pinion (L), thus it is not subjected to the 20:1 speed reduction of the earlier models and as the chain drive ratio between sprockets (N) and (P) remains the same, the reduction is provided by a further gear box (X) in the transmission from the sprocket (P) to the ganged capacitors. Jockey pulleys (Y) are fitted in the chain drive to take up any slack. The arrangement constitutes a considerable improvement over the earlier patterns, resulting in reduced backlash.

SUMMARY RECEIVERS B41B/C

10.

(a) Reduction to driving pinion (L) is 20:1.

(b) Ratio between pinion (L) and the scale drum, about 0.6 turns to 0.833, i.e. about 5:7.

(c) Reduction from the tuning spindle through the chain drive is 5:4.

(d) Reduction between the chain drive and the ganged capacitors is 20:1.

(e) Total reduction from the spindle to the ganged capacitors is 25:1.

(f) The backlash is not more than $\pm$ one division of the logging scale.

(g) The stop bar engages with an angle piece on the high speed shaft of the lower gear box and is cam operated from the associated low speed shaft.

(h) The tuning knob drives the gear box through a friction clutch, which slips to prevent an excessive strain being put on the mechanism when the stops are hit.

(j) The flywheel facilitates large movements of the ganged capacitors.

CHECKING THE MECHANISM

11. Warning

Before making any adjustments, free the shaft of the ganged capacitors from the drive by loosening the relevant grub screws. Failure to take this precaution can result in damage to the gang by causing it to turn through an angle greater than it would move with correctly adjusted stops.

(a) Scale Drum

The scale drum should be free on its shaft during the whole of its travel. If necessary it should be oiled.

(b) Scale Position

Turn the tuning knob fully counter-clockwise and set the cursor pointers to the end of their corresponding scales. The pointer should be nearly central.

(c) Stops

With the cursor frame set as above, turn the tuning knob fully clockwise until engaged by the stop. The end of the scales should be within about 1/16" of the cursor pointers. If the tuning drum overshoots by about $\frac{3}{4}$", the cam operated stop must be adjusted (see para. 17).

(d) Drive

All set screws securing the gears to their shafts must be tight on their flats. Similarly the screws on the stop bar operating cam should be tight.

(e) Chain

See that the chain is arranged as illustrated in Figs. 1 and 2 for the different pattern receivers. Make sure that it is not twisted and in B41/A receivers see that the tensioning coil spring does not foul either the upper capstan pulley (P) or the idler pulleys (W and Z) at the other end of the travel, thus restricting the tuning traverse. The chain should be lubricated with a thin layer of anti-seize grease A.P.556.

(f) Gang Capacitor Coupling

The coupling grub screws fixing the ganged capacitors shaft to the mechanism must be accessible when the tuning knob is rotated fully counter-clockwise.

CONNECTING THE GANGED CAPACITOR TO THE DRIVE

12.
(1) Turn the tuning knob fully counter-clockwise.

(2) Turn the gang shaft carefully by hand, until it is fully clockwise as seen from the front of the receiver.

(3) Holding the shaft in position by hand, tighten the grub screws. In Receivers B41B/C, Allen type grub screws are fitted and it will be necessary to have the special tool for fitting this item.

NOTE:- It is essential that this operation is done at the l.f. end of the travel, for the angle through which it is rotated by the driving mechanism is much less than the angle through which the capacitor is free to rotate away from its full counter-clockwise position.

TO REMOVE THE SCALE DRUM ASSEMBLY

13.
(1) Remove the logging scale pilot lamp holder by slackening the screw from the left hand side of the receiver to release and drop it.

(2) Remove the scale lamp carrier inside the drum after undoing the two retaining screwed rods at the top.

(3) Remove the $\frac{1}{4}$" B.S.F. hexagonal nut and washer at the top of the centre shaft.

(4) Pull forward the top of this shaft until it clears the die-casting, then lift out the assembly.

TO REMOVE SHAFT AND DRUM FROM THE CURSOR FRAME

14.
(1) Lay the cursor frame, with the scale drum in it, face downwards on the bench.

(2) Screw the shaft down the drum as far as it will go. Undo the grub screws in pinion by about 2 turns. Then remove the friction washer and the two $\frac{3}{8}$" B.S.F. hexagonal nuts from the shaft.

(3) Take the shaft right out of the assembly, from the top, taking care not to scratch the drum.

(4) Lift out the drum.

(5) Pull through the drum bearing with a piece of soft rag soaked in petrol or paraffin.

(6) Clean the shaft with the same sort of rag.

(7) Put a few drops of thin anti-seize lubricating oil on the shaft.

TO REASSEMBLE SHAFT AND DRUM INTO THE CURSOR FRAME

15.
(1) Lay the drum in the cursor frame so that the drum pinion boss is at the opposite end to the cursor knurled thumb plate.

(2) Insert the shaft into the centre tube of the drum, through the top hole in the cursor frame, putting the locating groove of the shaft in first, until the shaft projects through the bottom hole of the frame.

(3) On to the shaft put the two $\frac{3}{8}$" B.S.F. hexagonal nuts, with chamfered ends outwards, and then the friction washer. Have the nuts so that there is about $\frac{3}{8}$" of thread clear above the washer.

(4) Do up the grub screw of the pinion into the locating groove of the shaft until it binds, then slacken it back $\frac{1}{2}$ turn and lock.

(5) Pull back the shaft until the top end is inside, flush with the upper end of the tap hole in the cursor frame.

(6) Check that the shaft is located vertically, and is free to turn.

TO REASSEMBLE THE SCALE DRUM ASSEMBLY INTO THE DIE CASTING

16.
(1) Lock the tuning, with the knob turned fully clockwise.

(2) Hold the scale drum assembly vertical and have the spigot on the end of the shaft just projecting below the hole at the bottom of the cursor frame.

(3) Rotate the centre shaft until the cursor pointers are opposite the h.f. ends of the calibrated scales.

(4) Insert the spigot on the end of the shaft into the hole in the bottom of the die casting.

(5) Place one of the two $\frac{1}{4}$" steel washers on the top of the shaft just above the top bearing of the cursor frame.

(6) Slide the top of the shaft backwards until this end just engages the slot in the die casting.

(7) With the second finger of the right hand hold the top half of the split pinion (L) against its anti-backlash springs.

(8) With the first finger of the right hand keep the drum turned so that the h.f. ends of the calibrated scales are central.

(9) With the left hand, gently push the top of the shaft to the back of the slot in the top of the die casting.

(10) On the top end of the shaft put the other $\frac{1}{4}$" steel washer, then the $\frac{1}{4}$" B.S.F. hexagonal nut.

(11) Make sure that the anti-backlash springs in the pinion gearing are working and that the h.f. ends of the scales are central.

(12) Still holding the shaft steady with the screwdriver, tighten the $\frac{1}{4}$" B.S.F. hexagonal nut on the top.

(13) Adjust the tightness of the friction washer holding the cursor frame, by altering the position of the two $\frac{3}{8}$" B.S.F. hexagonal nuts that are just below the cursor frame, until this can be comfortably, but not too easily, rotated by one thumb.

Replace the scale illuminating lamps. Make sure that the bottom end of the carrier for the lamps does not touch the inside of the drum at either side.

TO ADJUST THE CAM OPERATED DRIVE STOP MECHANISM

17.

(a) This mechanism is indicated in the two drawings Figs. 1 and 2 by the letter "S". It is situated at the bottom of the low speed shaft of the reduction gear box to the scale drum. It is accessible, if the receiver is turned on to its right hand side. The following points must be checked:-

(i) The tuning knob should rotate about 11.95 turns between the operations of the cam and push rod against the stop bar on the logging dial. It is possible to rotate through either 10.95, 11.95 or 12.95 turns, according to the angular position of the operating cam on the shaft.

(ii) Adjust this angular position of the cam (S) until the movement of the push rod is the same at each end of the 11.95 turns of the tuning knob.

(iii) Make sure that the flat spring between the cam boss and the thrust race underneath the gear box occupies 1/16" ± 1/64"; this should be measured when the gear box output shaft is held down by a finger applied to the end of the shaft at the top of the split driving pinion (L).

TO ADJUST THE LOCKING MECHANISM AND/OR THE CLUTCH

18.

(1) Remove the tuning knob and unscrew the self locking nut (D) on the front end of the tuning spindle (B). Remove the washer helical spring and flywheel.

(2) Turn the logging scale fully counter-clockwise. Set the cursor frame so that the pointer corresponds accurately with the l.f. end of the drum scale for Band 5. Lock the dial.

Note:- Do not touch the cursor again until the following adjustments are completed.

(3) Undo the screw in the logging scale boss, and remove the logging scale complete.

(4) Release the dial lock. BE CAREFUL NOT TO TOUCH THE TUNING SPINDLE.

(5) Undo the screw in the end of the locking cross shaft (G). Remove the washer, helical spring and locking lever.

(6) Loosen the grub screws in both the collars on the cross shaft.

(7) Turn the cross shaft by finger pressure as far as it will go in a clockwise direction, looking at its right hand end.

(8) Slide the inside collar up to the die casting and tighten the grub screw.

(9) Place a thin piece of paper between the external collar and the spherical bearing and hold the collar tight against this bearing, with the cam faces in a horizontal position. Tighten the collar grub screw really hard. Remove the piece of paper.

(10) Put back the locking lever, helical spring, washer and screw.

(11) Lock the tuning spindle with the locking lever.

(12) Replace the logging scale dial in the fully counter-clockwise position i.e. against its stop (R), and in such a position on the shaft that it has running clearance.

(13) Tighten the screw in the logging scale dial boss.

<u>Note</u>. If, when tried, the logging scale has not enough clearance, turn it back to the fully counter-clockwise position, lock the tuning spindle and undo the screw in the central boss. With the logging scale still held against its stop, move it a little along its shaft and re-tighten the central boss screw.

(14) Release the tuning spindle. See that the logging scale revolves freely in a clockwise direction. In the counter-clockwise position the logging scale should be against the stop bar, when the l.f. end of the tuning scale for Band 5 corresponds with the cursor pointer.

(15) Replace the flywheel, spring, washer and the 2 B.A. hexagonal nut.

(16) Tighten the self-locking 2 B.A. hexagonal nut until there is sufficient friction to drive the gears easily, but insufficient to overcome the lock when applied gently.

REMOVAL OF THE UPPER GEAR BOX (X) ON RECEIVERS B41B/C ONLY

19.

(a) This gear box is situated between the drive and the upper chain sprocket (P) on these patterns and provides the 20:1 speed reduction to the gang, lost on these models earlier on in the transmission; due to the chain drive being taken from the tuning spindle, instead of the wormwheel shaft as in the earlier patterns.

(b) It will be noted that the gear box is encased, and from the diagram Fig. 2 will be seen to consist of two split pinion wheels with anti-backlash springs, driven by corresponding spur gears, to give the required transmission reduction.

(c) The construction is such, that normally no maintenance will be required. However if it ever becomes necessary to remove the gear box for repair, the following procedure will achieve this:-

(1) Remove the scale drum.

(2) Slacken the grub screws keying the drive to the gang capacitor shaft.

(3) Remove the four fixing screws that secure the gang capacitors to the chassis and slide the gang away from the gear box until it is free of the spindle.

(4) Remove the chain sprocket (P) from the gear drive.

(5) Remove 3 fixing screws from the gear box frame situated directly behind the scale drum position.

(6) Remove the socket SKT101, by withdrawing the fixing screws. The gear box can now be removed. When replacing, reference should also be made to paragraph 12.

PART 3

ILLUSTRATIONS, COMPONENT LISTS AND COIL DATA

PART 3

ILLUSTRATIONS, COMPONENTS LISTS AND COIL DATA

LIST OF CONTENTS

LIST OF CONTENTS (Continued)

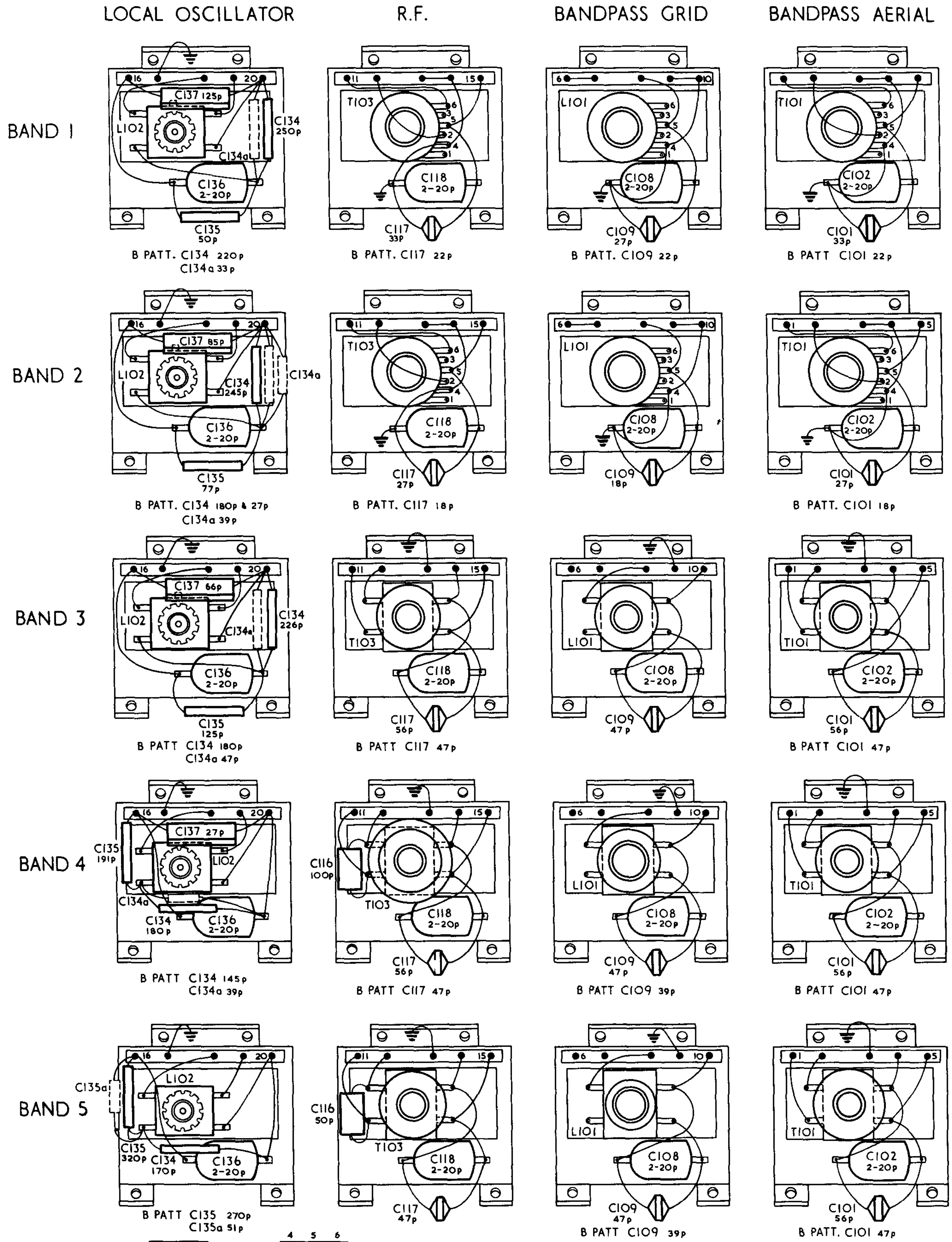
REPAIR AND WINDING DATA FOR COILS

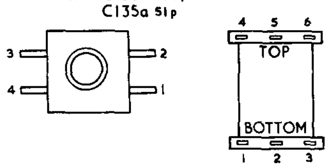
LIST OF CONTENTS (Continued)

I.F. COILS

IRON CORED TRANSFORMER AND CHOKE - DATA

FIG. 1





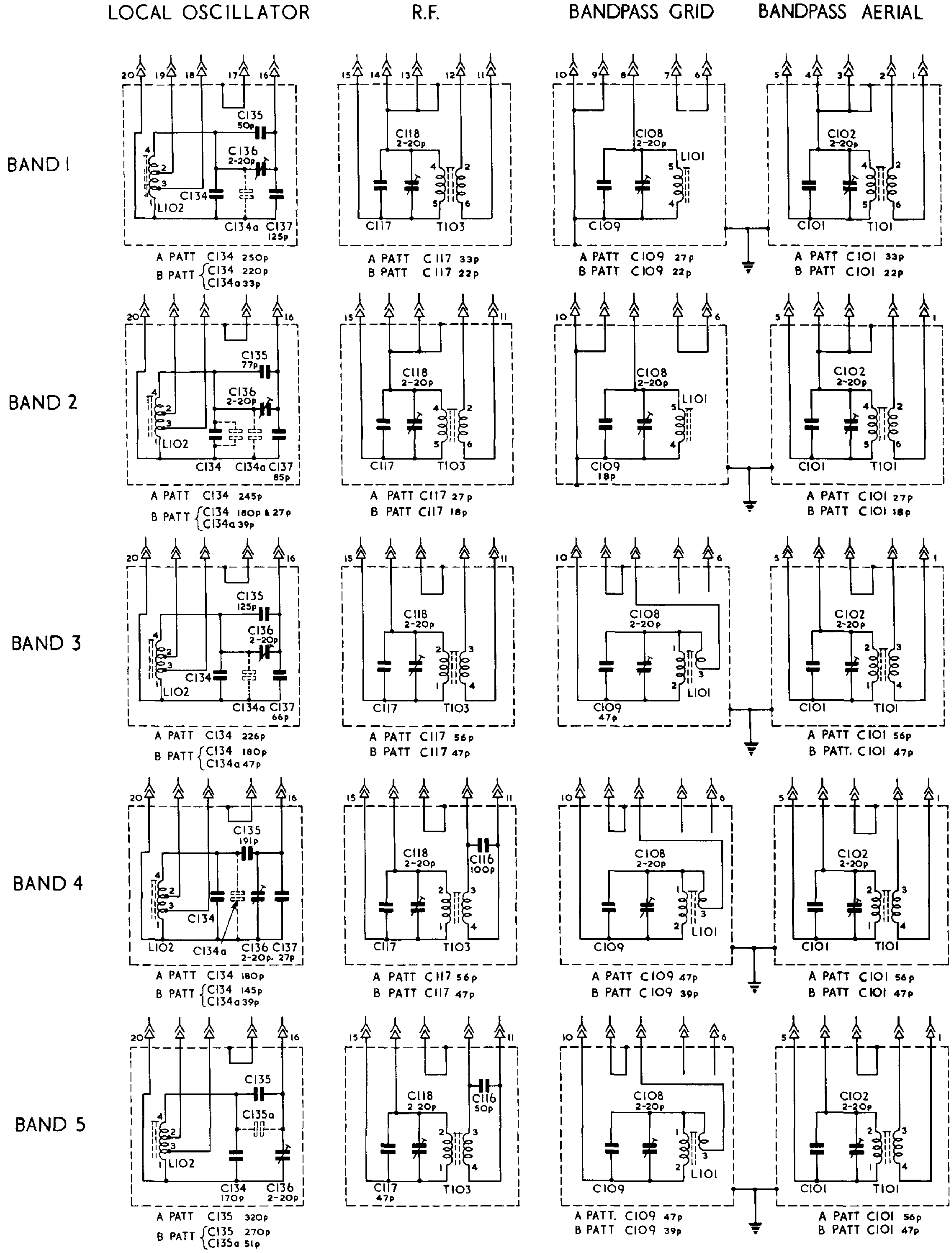
COIL TAG NUMBERS

NOTE - 1. ADDITIONAL COMPONENTS IN A P 57141B ARE SHOWN DOTTED.
2. THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z160009 4-18p.

RECEIVER B41

TURRET SWITCH COMPONENTS. LAYOUT. A.P. 57141/A/B

FIG. 2



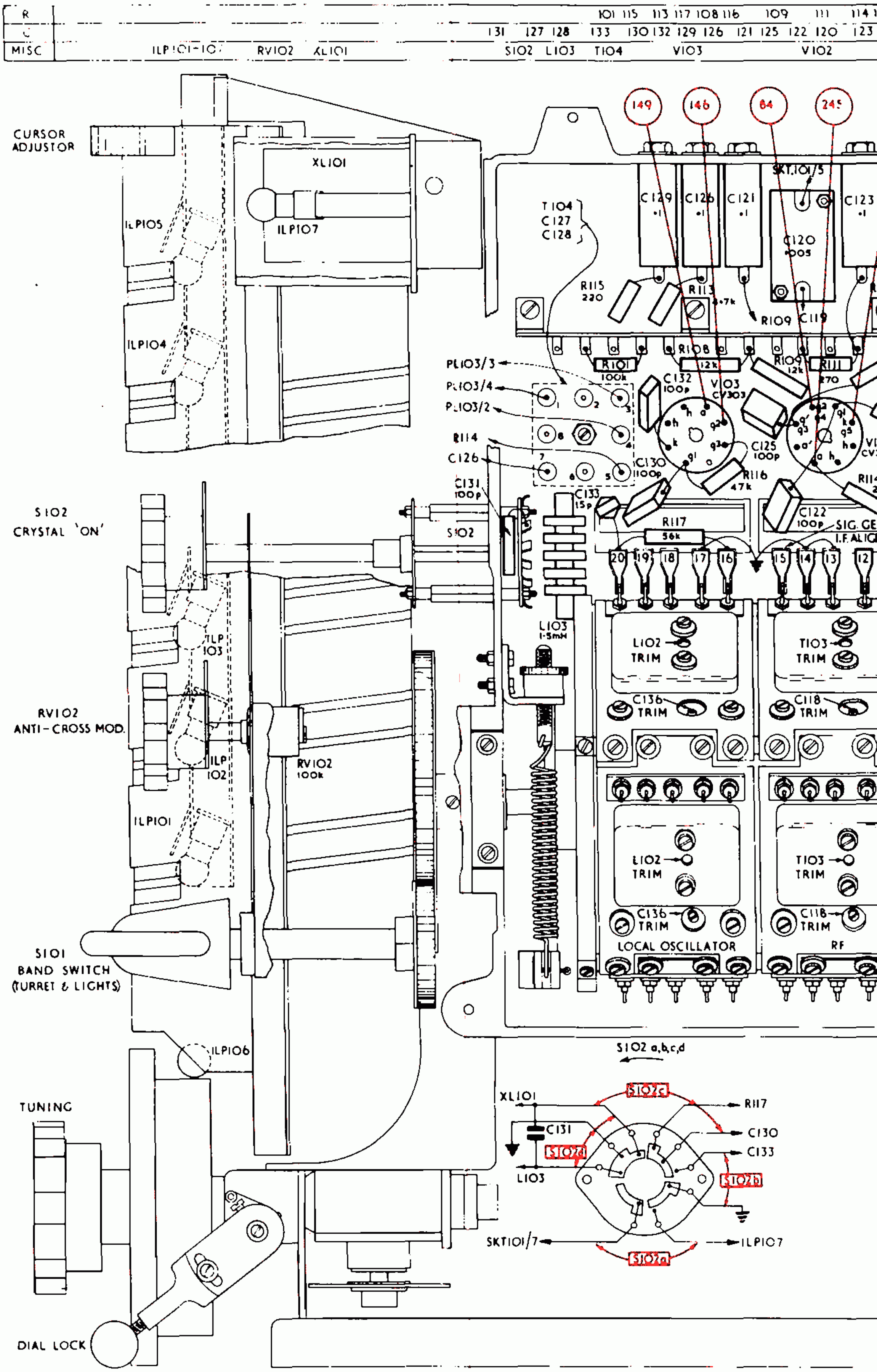
NOTES

ADDITIONAL COMPONENTS IN AP 57141B ARE SHOWN DOTTED

THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z 160009 4-18p

RECEIVER B41
TURRET SWITCH COMPONENTS. LAYOUT. A.P. 57141/A/B

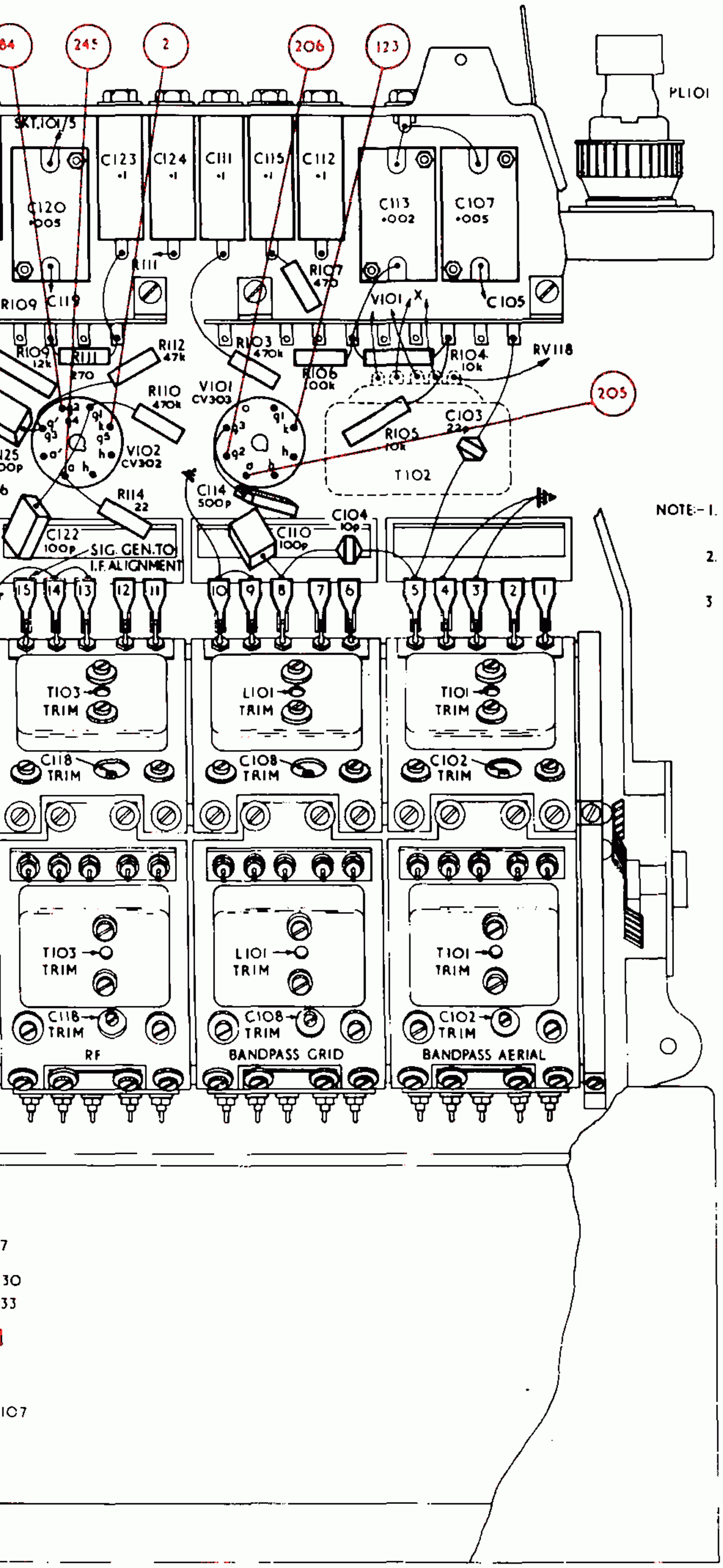
FIG. 3

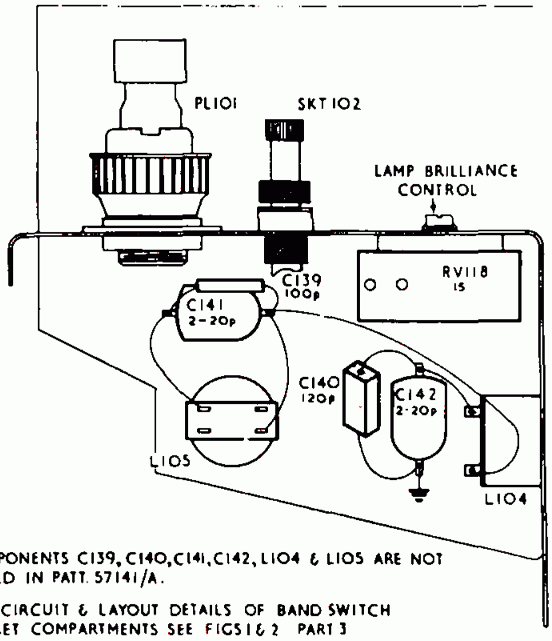


RI

R.F. UNIT. RIGHT

109 111 114 112 110 103 107 106 105 104	R
125 122 120 123 124 111 110 114 115 112 104 113 103 107 141 139 140 142	C
V102 V101 T102 PL101 S101 PL101 L105 SKT102 L104 RV118	MISC

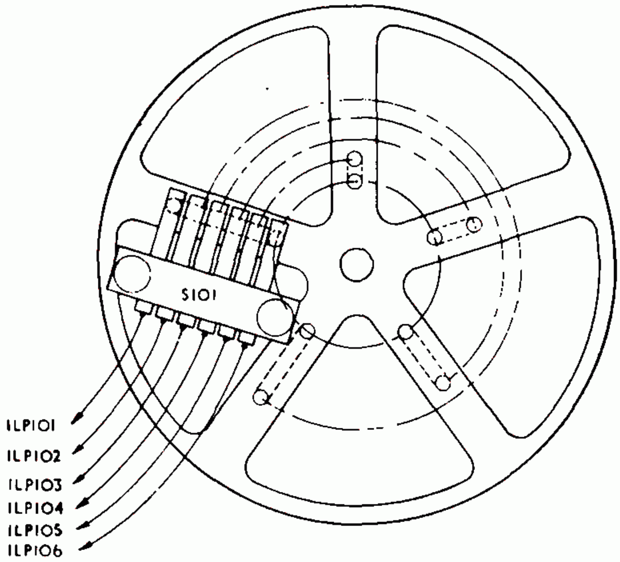




NOTE:- 1. COMPONENTS C139, C140, C141, C142, L104 & L105 ARE NOT FITTED IN PATT. 57141/A.

2. FOR CIRCUIT & LAYOUT DETAILS OF BAND SWITCH TURRET COMPARTMENTS SEE FIGS 1 & 2 PART 3

3. THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z160009 4-18p.



NOTE:-4 RECONDITIONED B41/A RECEIVERS, CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R/F, LOCAL OSCILLATOR & BFO CIRCUITS AS IN B41 B/C.

7
30
33
107

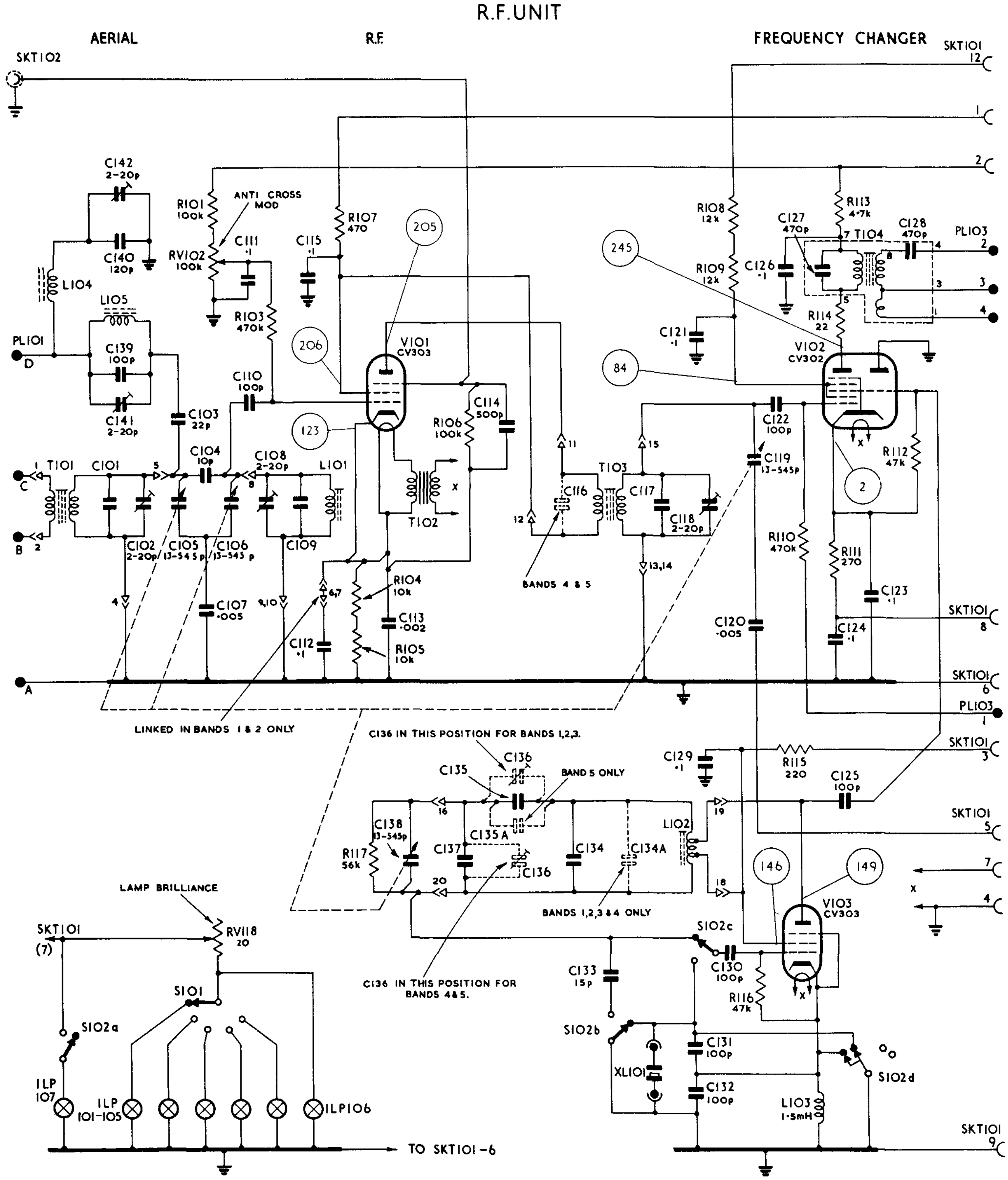
RECEIVER B41

IT. RIGHT HAND LAYOUT. A.P. 57141/A/B

FIG. 4

R	101 104 108 110 113 103 107 117 106 116 111 112 105 109 115 114	R
C	139–142 103 104 111 115 136 116 131 121 119 127 106 108 112 113 137 114 135 133 134A 117 118 130 126 125 123 128 101 102 105 107 110 109 138 135A 134 132 129 120 122 124	C
MISC	PL101 L105 RV118 T103 L102 V103 V102 SKT101 T101 L104 S101 L101 V101 T102 XL101 S102d SKT102 S102a ILP101–107 RV102 S102b S102c L103 T104 PL103	MISC

R.F. UNIT



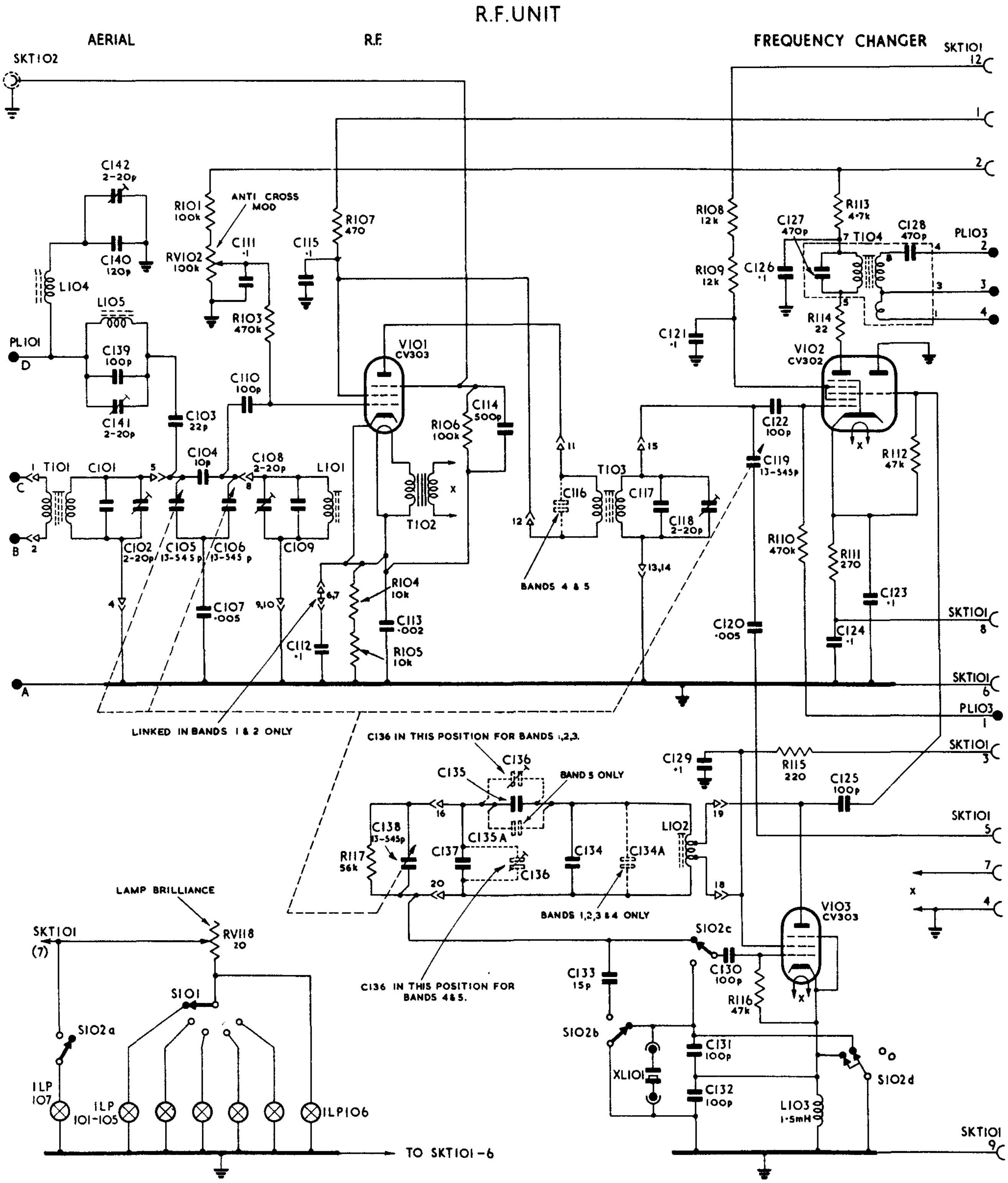
NOTE :–
1. THE FOLLOWING COMPONENTS ARE NOT FITTED IN PATT. 57141/A — C139, C140, C141, C142, L104, L105.
2. C135A AND C134A ARE FITTED ONLY IN PATT. 57141B.
3. REFER TO FIG.2 PART3 FOR VALUES OF COMPONENTS IN TURRET COMPARTMENT.
4. THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z 160009 4-18p
5. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

RECEIVER B41

R.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141/A/B

FIG. 5

R	101 103 104 107 117 105 106 108 116 109 110 115 111 113 114 112	R
C	139-142 101 102 103 104 105 107 106 108 111 110 109 115 112 113 138 137 114 136 135 135A 116 134 133 134A 117 131 121 132 118 130 129 119 120 122 126 127 125 123 124 128	C
MISC	PL101 L105 T101 L104 SKT102 S102a ILP101-107 RV118 S101 RV102 L101 V101 T102 T103 XL101 S102b L102 S102c V103 L103 V102 S102d T104 SKT101 PL103	MISC



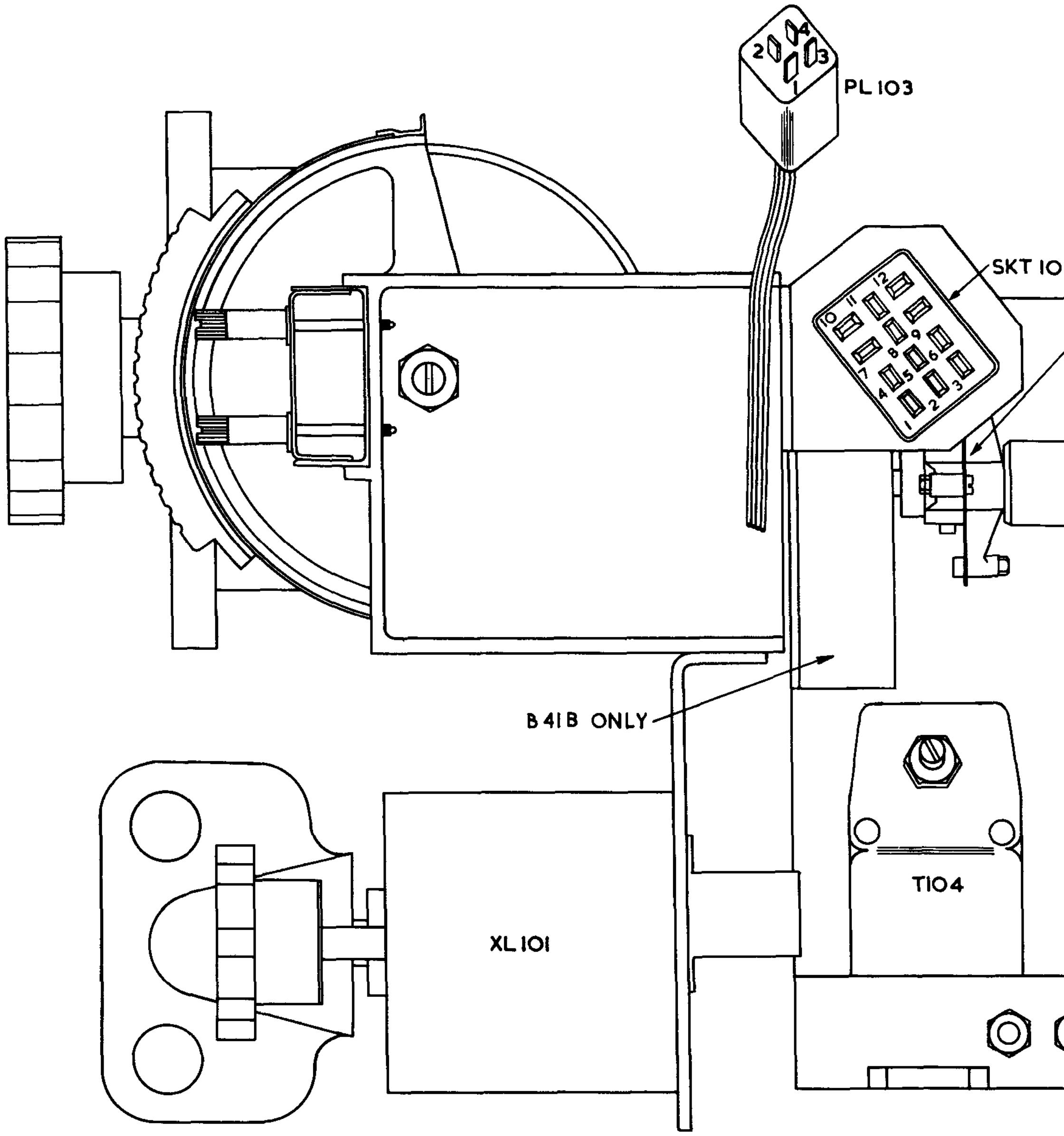
NOTE:-

1. THE FOLLOWING COMPONENTS ARE NOT FITTED IN PATT. 57141/A — C139, C140, C141, C142, L104, L105
2. C135A AND C134A ARE FITTED ONLY IN PATT. 57141B
3. REFER TO FIG.2 PART 3 FOR VALUES OF COMPONENTS IN TURRET COMPARTMENT.
4. THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z 160009 4-18p
5. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

RECEIVER B41

R.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141/A/B

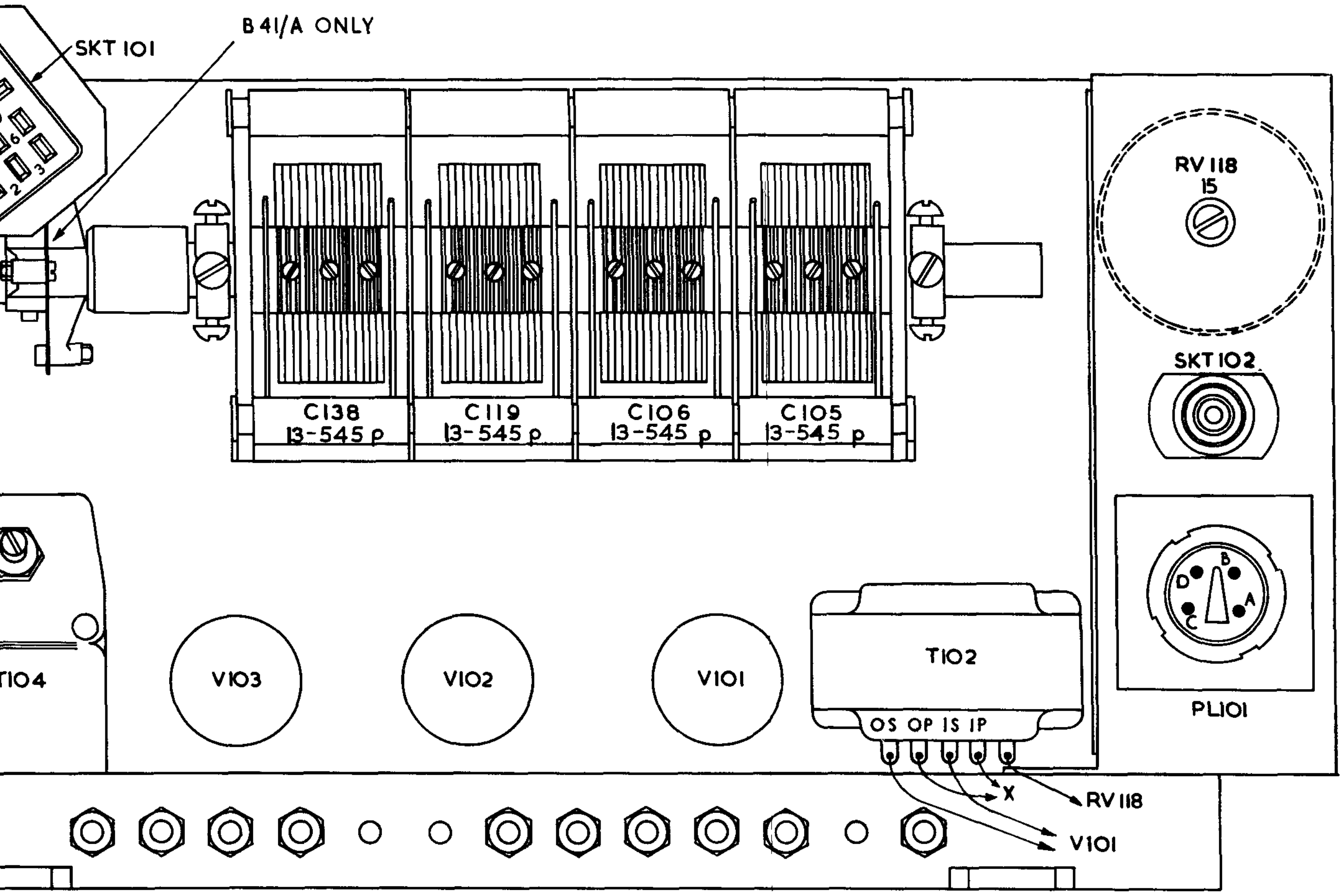
This sheet issued with A L No 1 January 1958



R

R.F. UNIT.

FIG. 6



RECEIVER B41

R.F. UNIT. TOP LAYOUT. A.P. 57141/A/B

COMPONENTS LIST RECEIVER B41

PATTERNS 57141/A/B

NOTE:- Before ordering replaceable parts reference should be made to the relevant E List and the Substitution Guide.

CAPACITORS

R.F. Unit B41/A

Ref.	A.P. or Joint-Services Cat. No.	Value	Tol.	Rating	Remarks
C101	Z131188	33 pF	5%	500V	Band 1
C101	Z131186	27 pF	10%	500V	Band 2
C101	Z131197	56 pF	5%	500V	Band 3
C101	Z131197	56 pF	5%	500V	Band 4
C101	Z131197	56 pF	5%	500V	Band 5
C102	Z160009	4-18 pF	10%		Variable
C103	Z131184	22 pF	10%	500V	
C104	Z131058	10 pF		500V	
C105	52578	13-545 pF			Section of 4 ganged capacitors
C106	52578	13-545 pF			Section of 4 ganged capacitors
C107	Z124300	0.005 μF	10%	350V	
C108	Z160009	4-18 pF	10%		Variable
C109	Z131186	27 pF	10%	500V	Band 1
C109	Z131181	18 pF		500V	Band 2
C109	Z131194	47 pF	5%	500V	Band 3
C109	Z131194	47 pF	5%	500V	Band 4
C109	Z131194	47 pF	5%	500V	Band 5
C110	Z123194	100 pF	20%	350V	
C111	Z115095	0.1 μF	20%	350V	
C112	Z115095	0.1 μF	20%	350V	
C113	Z124175	0.002 μF	20%	350V	
C114	Z124356	500 pF	20%	350V	
C115	Z115095	0.1 μF	20%	350V	
C116	Z123161	100 pF	10%	350V	Band 4
C116	W1651	50 pF	15%	350V	Band 5
C117	Z131188	33 pF	5%	500V	Band 1
C117	Z131186	27 pF	10%	500V	Band 2
C117	Z131197	56 pF	5%	500V	Band 3
C117	Z131197	56 pF	5%	500V	Band 4
C117	Z131194	47 pF	5%	500V	Band 5
C118	Z160009	4-18 pF	10%		Variable
C119	52578	13-545 pF			Section of 4 ganged capacitors
C120	Z124300	0.005 μF	10%	350V	
C121	Z115095	0.1 μF	20%	350V	
C122	Z123194	100 pF	20%	350V	

CAPACITORS (Contd.)

R.F. UNIT B41/A

Ref.	A.P. or Joint-Services Cat. No.	Value	Tol.	Rating	Remarks
C123	Z115095	0.1 µF	20%	350V	
C124	Z115095	0.1 µF	20%	350V	
C125	Z123194	100 pF	20%	350V	
C126	Z115095	0.1 µF	20%	350V	
C127	Z125665	470 pF	5%	350V	
C128	Z125665	470 pF	5%	350V	
C129	Z115095	0.1 µF	20%	350V	
C130	Z123194	100 pF	20%	350V	
C131	Z123194	100 pF	20%	350V	
C132	Z123194	100 pF	20%	350V	
C133	Z131178	15 pF	10%	500V	
C134	Z125662	250 pF	2%	350V	Band 1
C134	Z125661	245 pF	2%	350V	Band 2
C134	Z125660	226 pF	2%	350V	Band 3
C134	Z125327	180 pF	2%	350V	Band 4
C134	Z125658	170 pF	2%	350V	Band 5
C135	W6188	50 pF	2%	350V	Band 1
C135	Z125655	77 pF	2%	350V	Band 2
C135	Z125657	125 pF	2%	350V	Band 3
C135	Z125659	191 pF	2%	350V	Band 4
C135	Z125663	320 pF	2%	350V	Band 5
C136	Z160009	4.18 pF			Variable
C137	Z125657	125 pF	2%	350V	Band 1
C137	Z125656	85 pF	2%	350V	Band 2
C137	Z125654	66 pF	2%	350V	Band 3
C137	Z125090	27 pF	2%	350V	Band 4
C138	52578	13.545 pF			Section of 4 ganged capacitors

R.F. Unit B41B

C101	Z131184	22 pF	10%	500V	Band 1
C101	Z131181	18 pF	10%	500V	Band 2
C101	Z131194	47 pF	5%	500V	Bands 3, 4 and 5
C102	Z160009	4-18 pF	10%		Variable
C103	Z131184	22 pF	10%	500V	

R.F. UNIT B41B

Ref.	A.P. or Joint-Services Cat. No.	Value	Tol	Rating	Remarks
C104	Z131058	10 pF	10%	500V	
C105	52578	13-545 pF			Section of 4 ganged capacitors
C106	52578	13-545 pF			Section of 4 ganged capacitors
C107	Z124300	0.005 µF	10%	350V	
C108	Z160009	4-18 pF	10%		Variable
C109	Z131184	22 pF	10%	500V	Band 1
C109	Z131181	18 pF	10%	500V	Band 2
C109	Z131194	47 pF	5%	500V	Band 3
C109	Z131191	39 pF	5%	500V	Bands 4 and 5
C110	Z123194	100 pF	20%	350V	
C111	Z115095	0.1 µF	20%	350V	
C112	Z115095	0.1 µF	20%	350V	
C113	Z124175	0.002 µF	20%	350V	
C114	Z123456	500 pF	20%	350V	
C115	Z115095	0.1 µF	20%	350V	
C116	Z123161	100 pF	10%	350V	Band 4
C116	W1651	50 pF	15%	350V	Band 5
C117	Z131184	22 pF	10%	500V	Band 1
C117	Z131181	18 pF	10%	500V	Band 2
C117	Z131194	47 pF	5%	500V	Bands 3, 4 and 5
C118	Z160009	4-18 pF	10%		Variable
C119	52578	13-545 pF			Section of 4 ganged capacitors
C120	Z124300	0.005 µF	10%	350V	
C121	Z115095	0.1 µF	20%	350V	
C122	Z123194	100 pF	20%	350V	
C123	Z115095	0.1 µF	20%	350V	
C124	Z115095	0.1 µF	20%	350V	
C125	Z123194	100 pF	20%	350V	
C126	Z115095	0.1 µF	20%	350V	
C127	Z125665	470 pF	5%	350V	
C128	Z125665	470 pF	5%	350V	
C129	Z115095	0.1 µF	20%	350V	
C130	Z123194	100 pF	20%	350V	
C131	Z123194	100 pF	20%	350V	
C132	Z123194	100 pF	20%	350V	

R.F. UNIT B41B

CAPACITORS (Contd.)

Ref.	A.P. or Joint-Services Cat. No.	Value	Tol	Rating	Remarks
C133	Z131178	15 pF	10%	500V	
C134	Z125360	220 pF	2%	350V	Band 1
C134	Z125327	180 pF	2%	350V	Band 2 } In parallel
C134	Z125090	27 pF	5%	350V	Band 2 } In parallel
C134	Z125327	180 pF	2%	350V	Band 3
C134	50527	145 pF	1%	350V	Band 4
C134	Z125658	170 pF	2%	350V	Band 5
C134A	Z132282	33 pF	5%	350V	Band 1
C134A	Z132285	39 pF	5%	350V	Band 2
C134A	Z132288	47 pF	5%	350V	Band 3
C134A	Z132285	39 pF	5%	350V	Band 4
C135	W6188	50 pF	2%	350V	Band 1
C135	Z125655	77 pF	2%	350V	Band 2
C135	Z125657	125 pF	2%	350V	Band 3
C135	Z125659	191 pF	2%	350V	Band 4
C135	Z125395	270 pF	2%	350V	Band 5
C135A	52856	51 pF	5%	350V	Band 5
C136	Z160009	4-18 pF	10%		Variable
C137	Z125657	125 pF	2%	350V	Band 1
C137	Z125656	85 pF	2%	350V	Band 2
C137	Z125654	66 pF	2%	350V	Band 3
C137	Z125090	27 pF	5%	350V	Band 4
C138	52578	13-545 pF			Section of 4 ganged capacitors
C139	Z123140	100 pF	2%	350V	
C140	Z123208	120 pF	2%	350V	
C141	Z160009	4-18 pF	10%		Variable
C142	Z160009	4-18 pF	10%		Variable

RESISTORS

R.F. UNIT B41/A/B

Ref.	A.P. or Joint-Services Cat. No.	Value Ohms	Tol	Rating Watts	Remarks
R101	Z223038	100k	10%	1/4	
RV102	51464A	100k	20%	0.25	Anti-cross-mod control
R103	Z223122	470k	10%	1/4	
R104	Z222132	10k	10%	1/2	
R105	Z222132	10k	10%	1/2	
R106	Z223038	100k	10%	1/4	
R107	Z221194	470	10%	1/4	
R108	Z222144	12k	10%	1/2	
R109	Z222144	12k	10%	1/2	
R110	Z223122	470k	10%	1/4	
R111	Z221164	270	10%	1/4	
R112	Z222215	47k	10%	1/4	
R113	Z222089	4.7k	10%	1/4	
R114	Z221026	22	10%	1/4	
R115	Z221152	220	10%	1/4	
R116	Z222215	47k	10%	1/4	
R117	Z223009	56k	10%	1/2	
RV118	60480A	20	10%	0.25	Lamps Brilliance control

TRANSFORMERS

R.F. UNIT B41/A/B

Ref.	A.P.	Description
T101		Transformer r.f. - Aerial - See Figs. 31/35
T102	65197	Transformer - Heater
T103		Transformer r.f. See Figs. 41/45
T104		Transformer i.f. 1st - See Fig. 52

INDUCTORS

R.F. UNIT B41/A/B

Ref.	A.P.	Description
L101		Coil tuned - V101 Grid - See Figs. 36/40.
L102		Coil tuned - Oscillator - See Figs. 46/50.
L103		Choke 1.5 mH - Oscillator - See Fig. 58
L104		Coil tuned I.F. Rejector See Fig. 56 (B41B only)
L105		Coil tuned I.F. Rejector See Fig. 56 (B41B only)

LAMPS

R.F. UNIT B41/A/B

Ref.	J.S. Cat. No.	Description
ILP101-107	X951225	Pilot Lamps, 6.5V, 0.3A M.E.S.

SWITCHES

B41/A/B

Ref.	A.P.	Description
S101		Switch, Lamps
S102	65638	Switch, Wafer, Crystal

CRYSTAL

B41/A/B

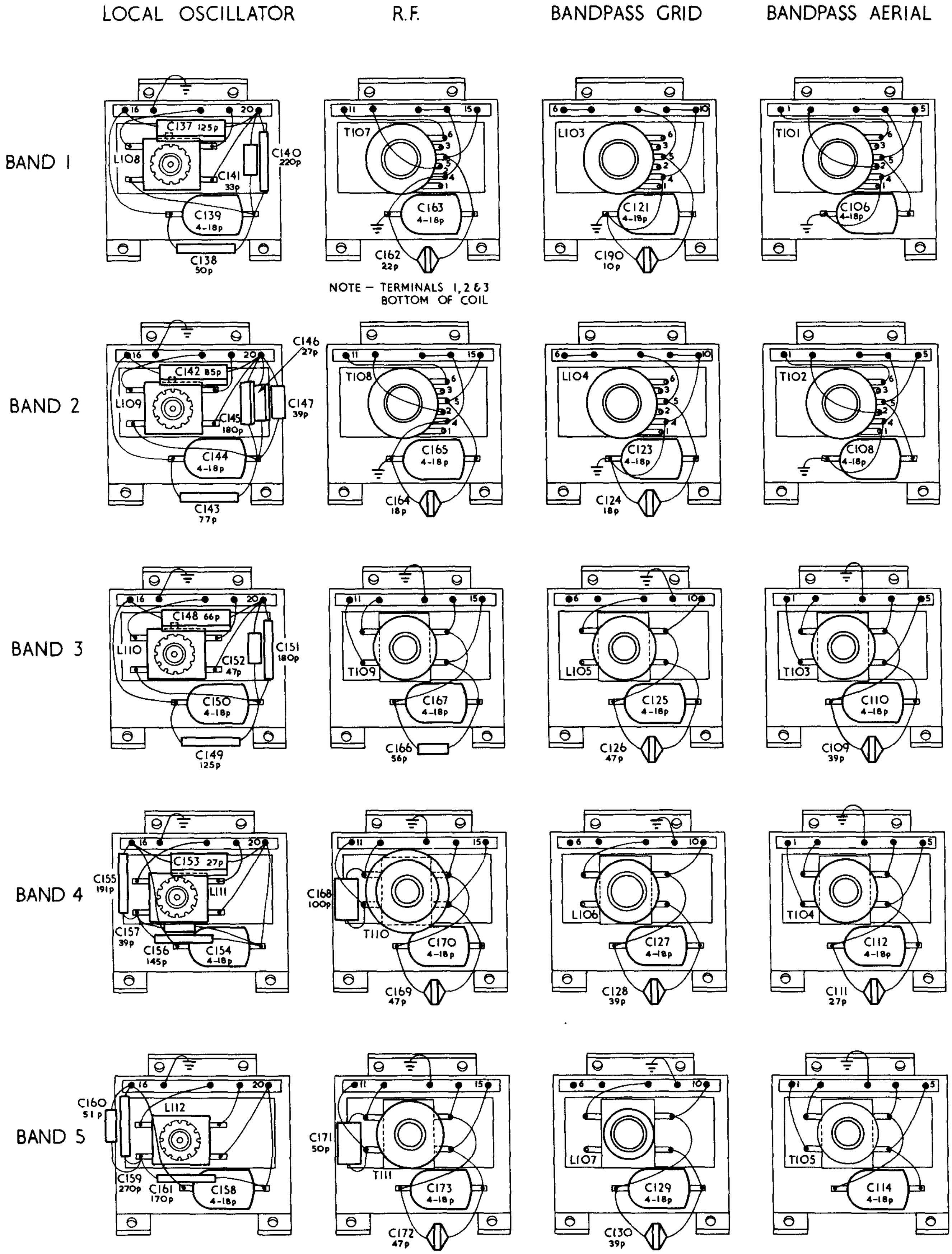
Ref.	A.P.	Description
XL101	As required	Crystal, 2 pin, - Local Oscillator -

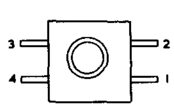
PLUGS AND SOCKETS

B41/A/B

Ref.	A.P. or Joint-Service Cat. No.	Description
PL101	Z560070	Plug 4 pin - Aerial (Mk. 4)
PL103	70332	Plug 4 pin - I.F. Output
	70362	Cover for above
SKT101	70377	Socket 12 way - R.F./I.F. Unit inter-connection
SKT102	60451	Socket Coaxial - RIS

FIG. 7



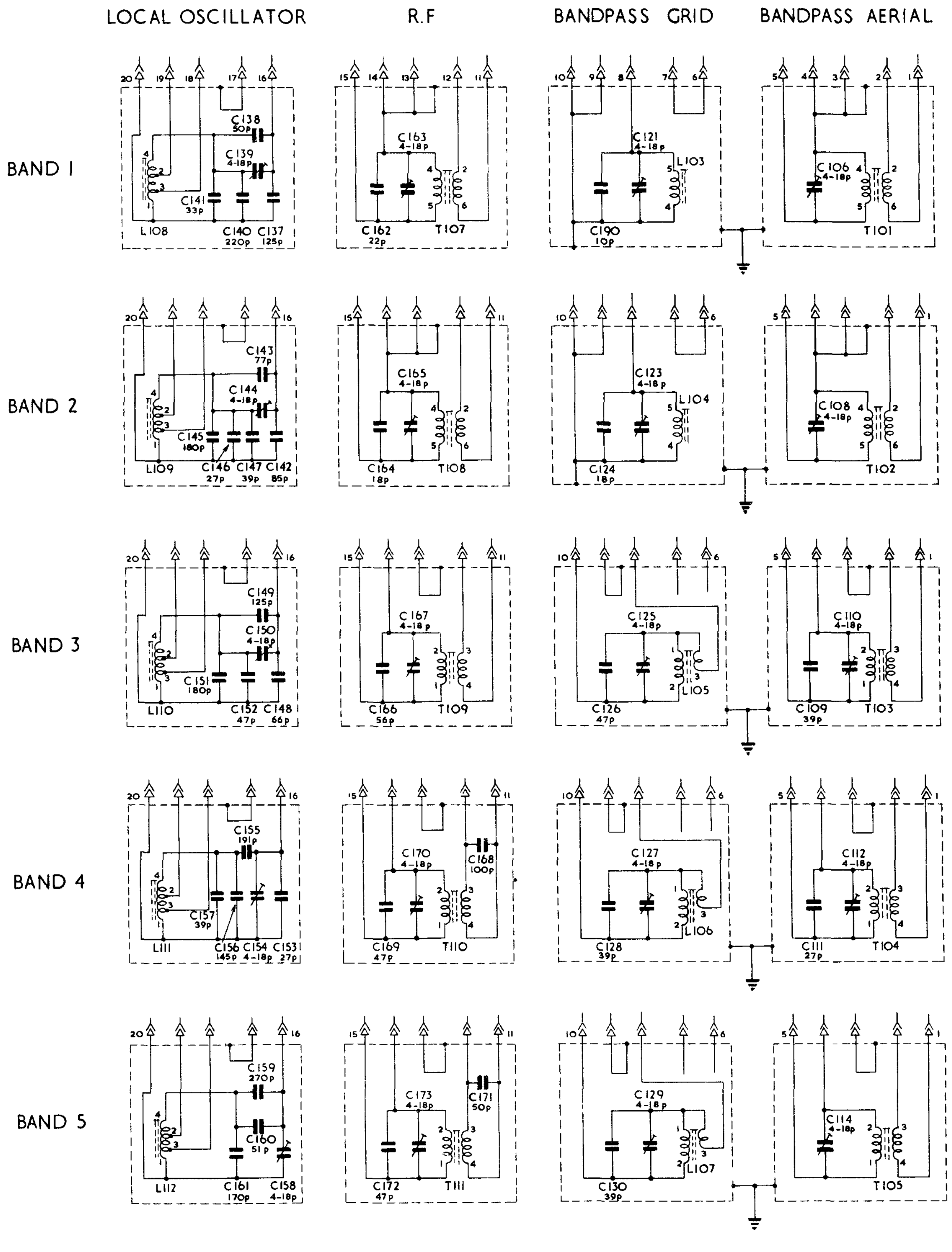


COIL TAG NUMBERS

RECEIVER B41

TURRET SWITCH COMPONENTS. LAYOUT. A.P. 57141C

FIG. 8

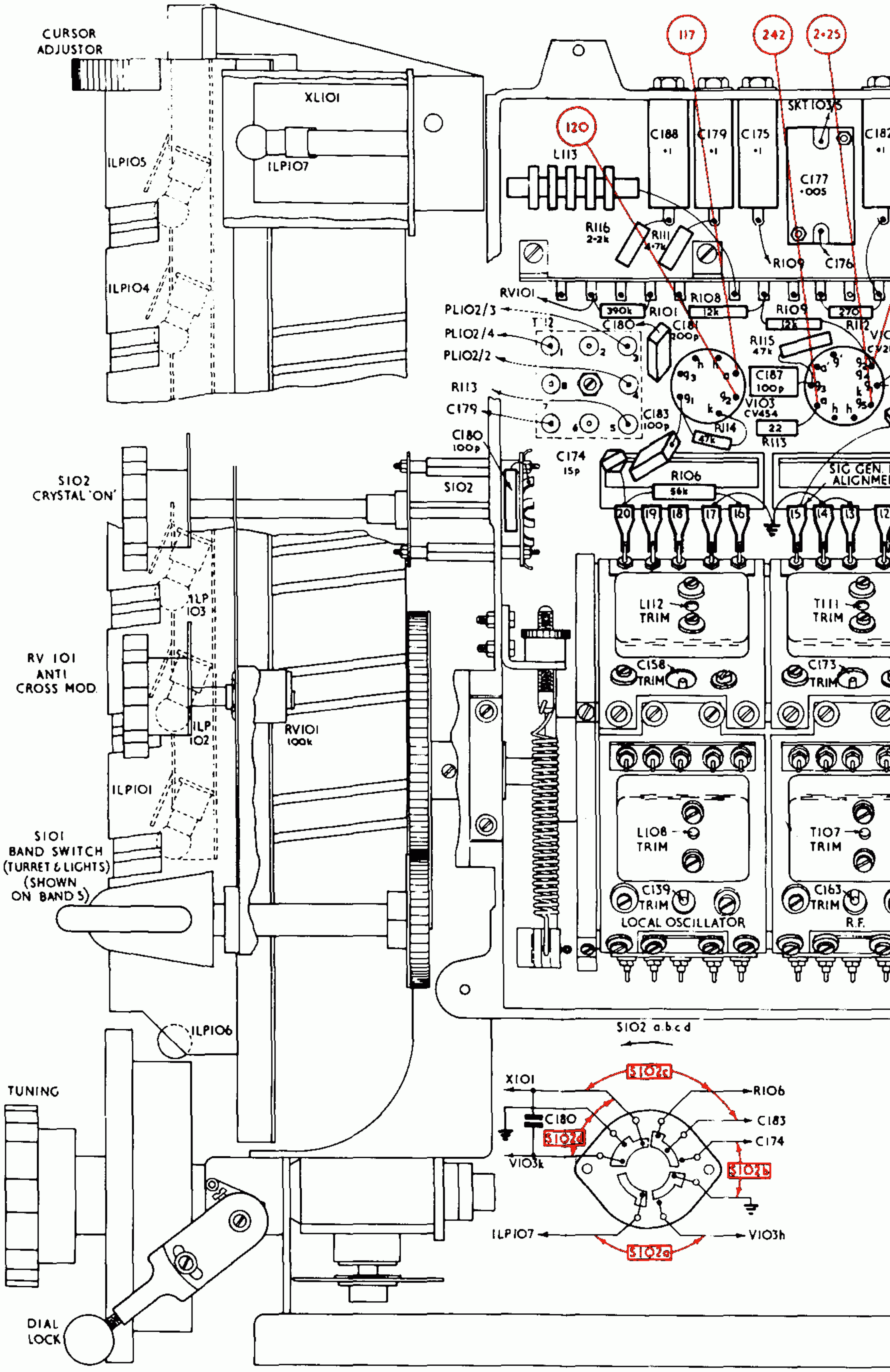


RECEIVER B41

TURRET SWITCH COMPONENTS. CIRCUIT DIAGRAM. A.P. 57141C

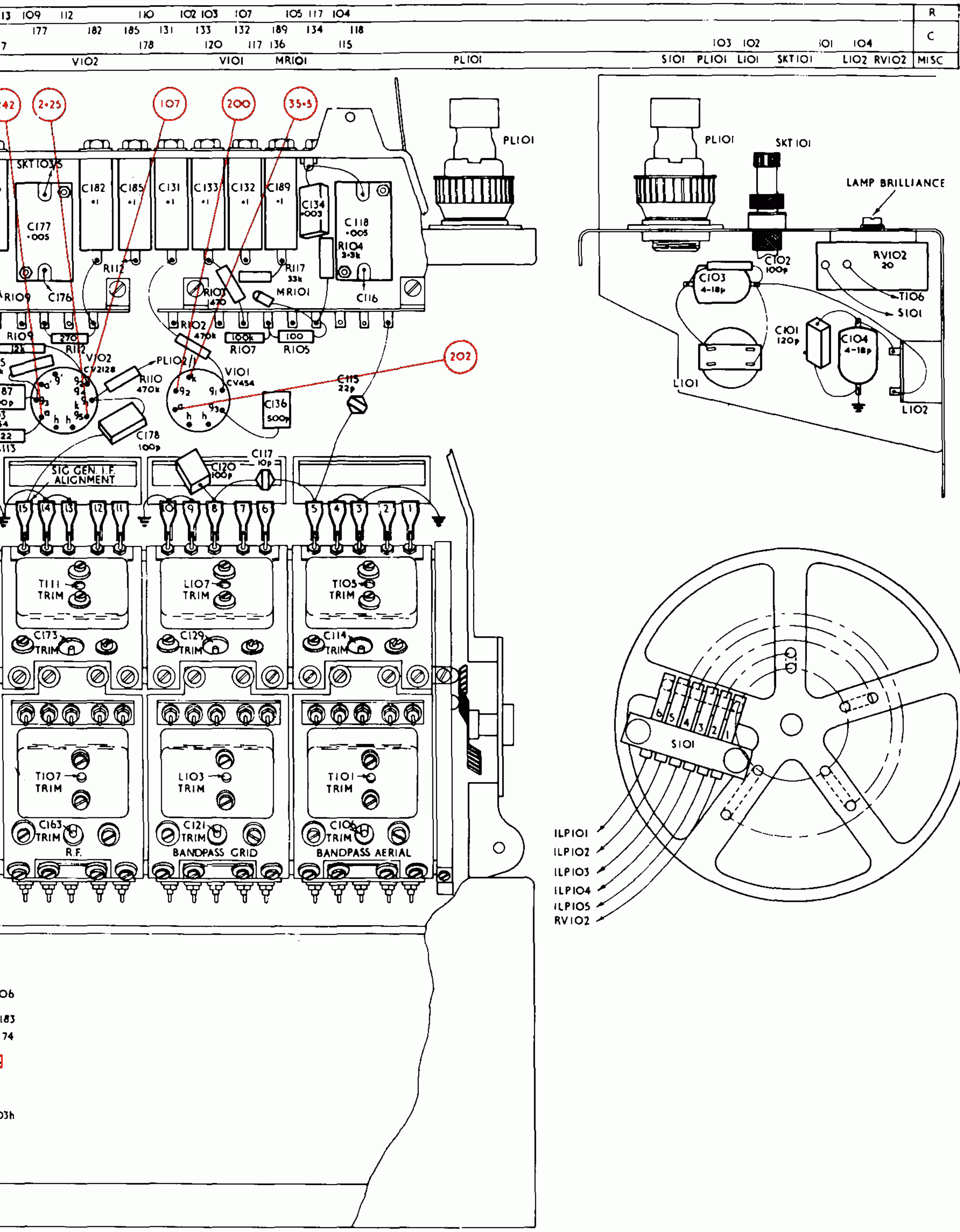
FIG. 9

R	116 101 111 106 108 114 115 113 109 112
C	180 174 188 183 179 181 175 187 177 182
MISC	ILP101-107 RV101 XL101 S102 T112 L113 V103 V102



R

R.F. UNIT. RIGH



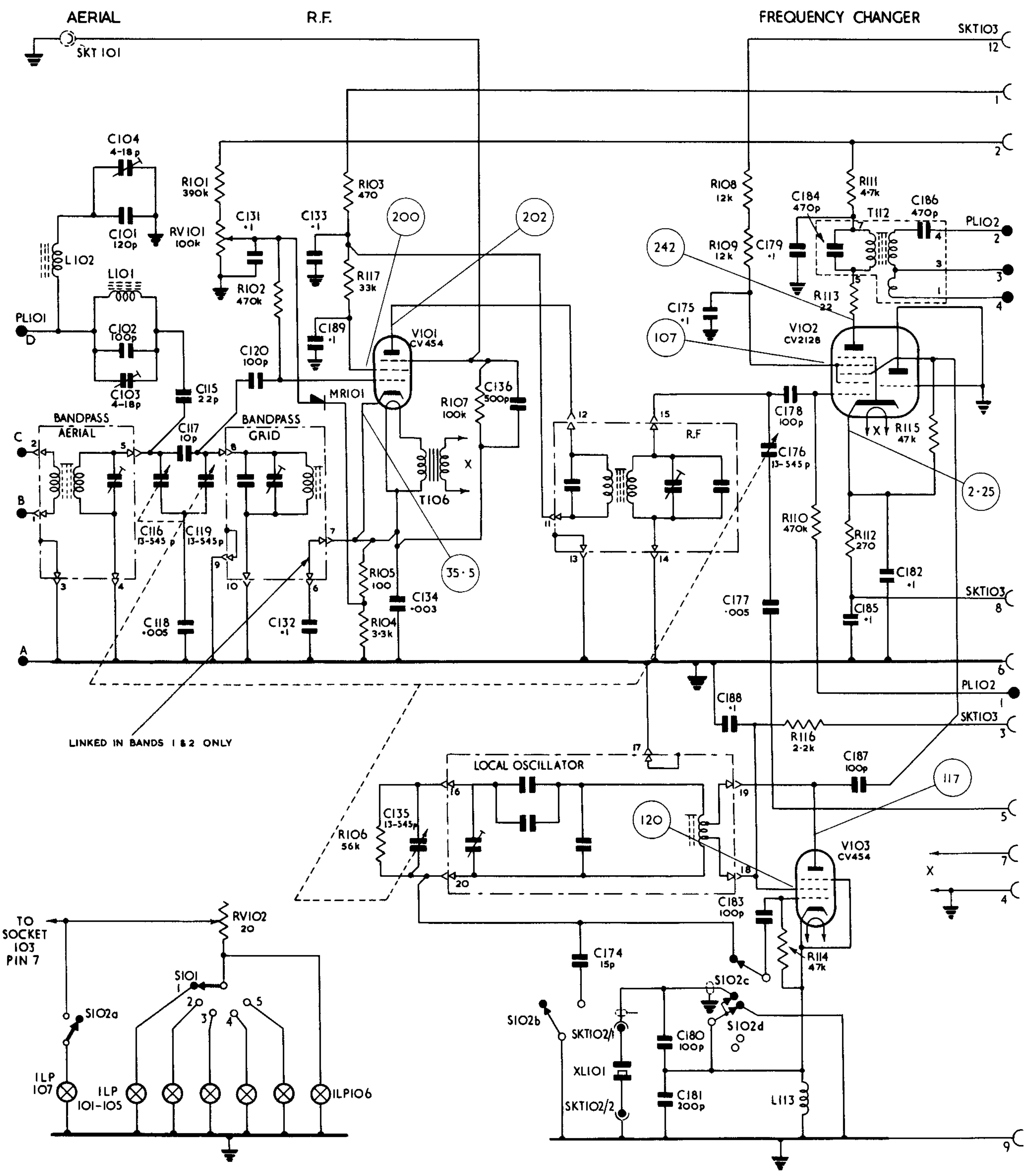
RECEIVER B41

NIT. RIGHT HAND LAYOUT. A.P. 57141C

FIG. 10

R	101 102 103 117 105 106 104 107 108 109 111 110 113 116 114 112 115	R
C	101–104 115 117 116 118 119 131 120 132 133 189 134 135 136 174 175 180 188 181 183 177 179 184 178 176 185 187 186 182	C
MISC	L102 PL101 S102a L101 SKT101 RV101 S101 RV102 ILP 101–107 MR101 V101 T106 S102b XL101 SKT102 S102c S102d V102 V103 L113 T112 SKT103 PL102	MISC

R.F. UNIT



NOTE.
FOR CIRCUIT & LAYOUT DETAILS OF BAND SWITCH TURRET COMPARTMENTS REFER TO FIGS.7 & 8 PART 3
ABOVE CIRCUIT SHOWS BAND SWITCH ON BAND 5.

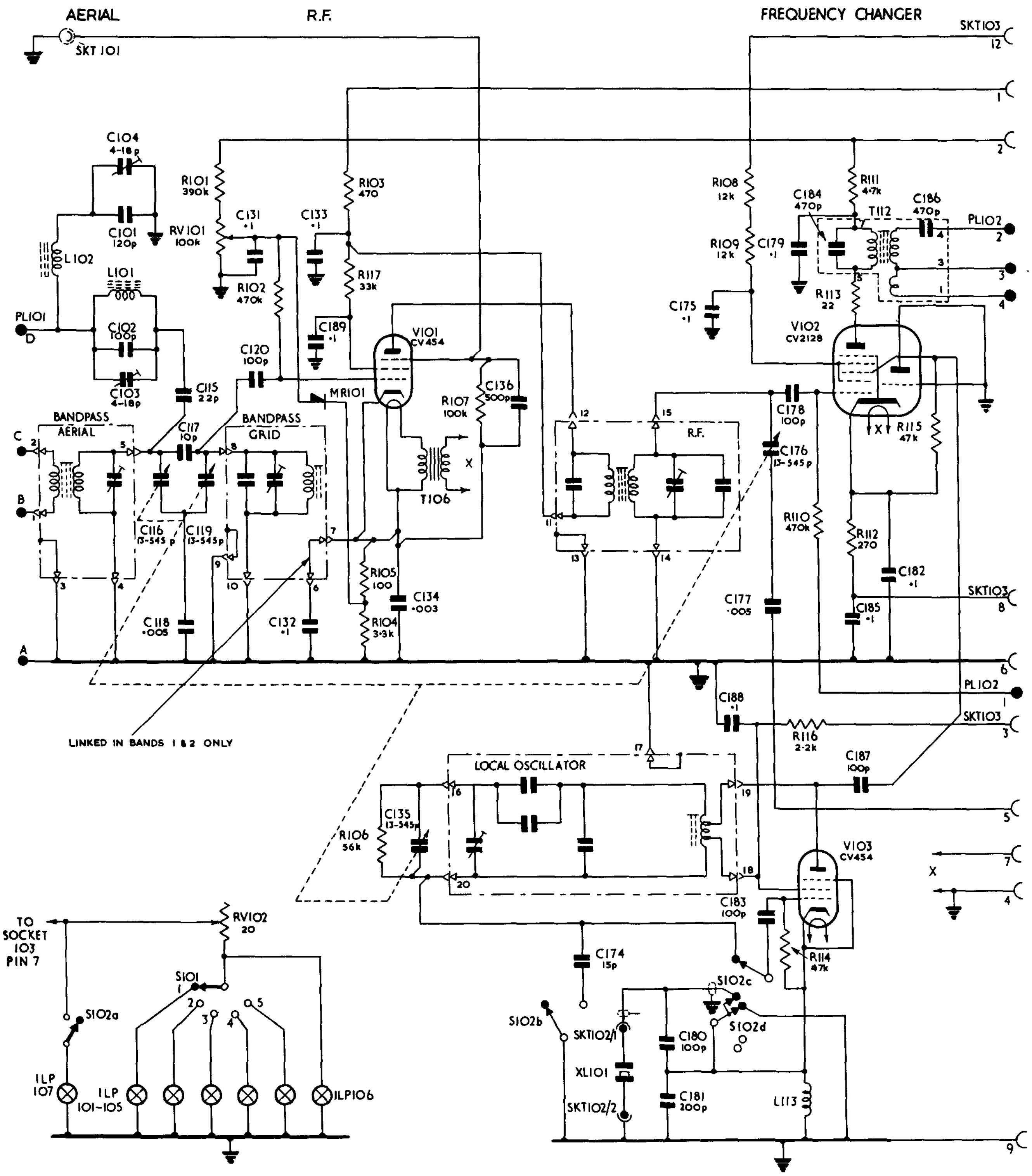
RECEIVER B41

R.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141C

FIG. 11

R	101 102 103 117 105 106 104 107 108 109 111 110 113 116 114 112 115	R
C	101–104 115 117 116 118 119 131 120 132 133 189 134 135 136 174 175 180 181 188 183 177 179 178 176 184 185 187 182 186	C
MISC	L102 PL101 S102a L101 SKT101 RV101 S101 RV102 ILP 101–107 MR101 V101 T106 S102b SKT102 XL101 S102c S102d V102 V103 L113 T112 SKT103 PL102	MISC

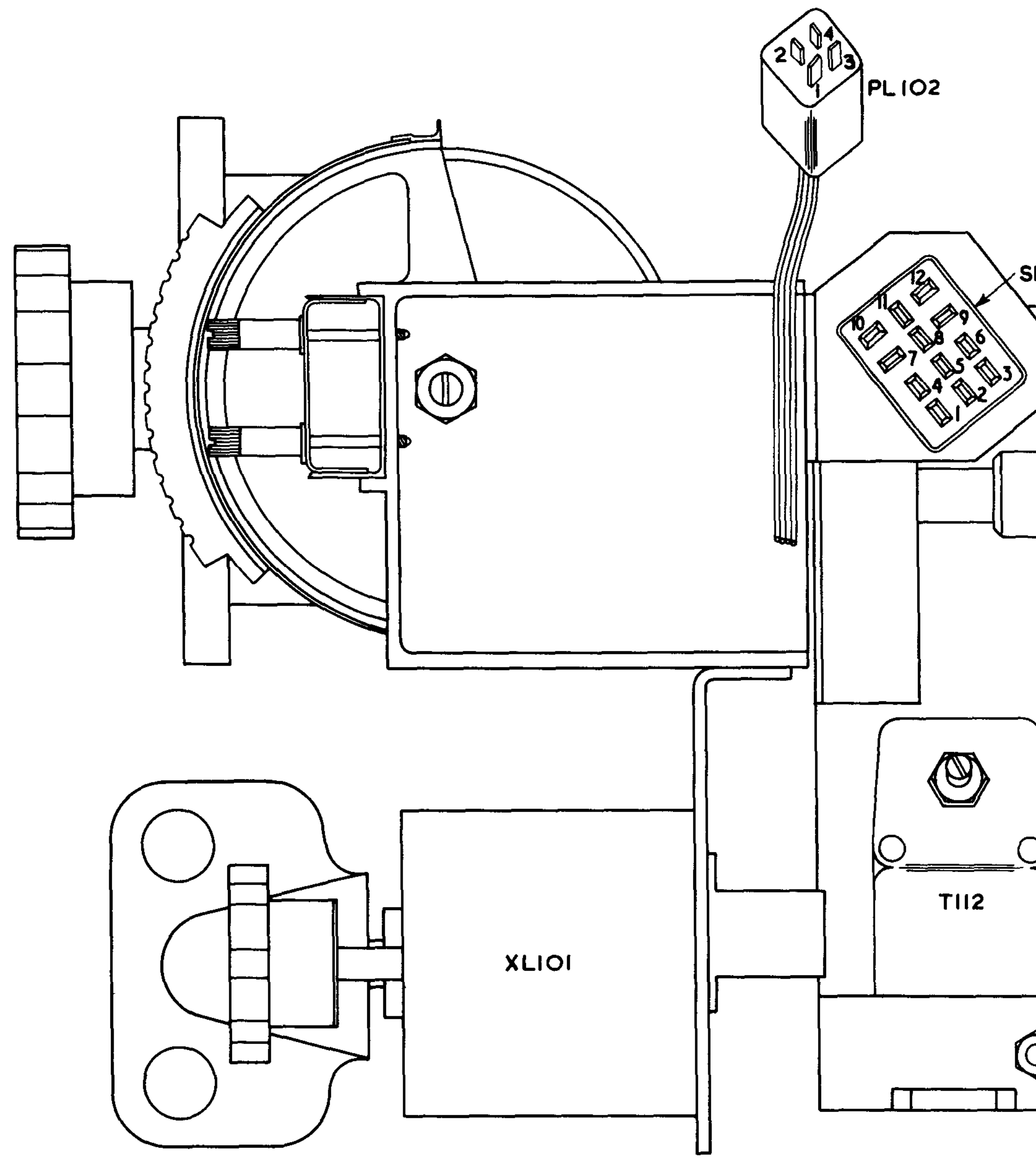
R.F. UNIT



NOTE.
FOR CIRCUIT & LAYOUT DETAILS OF BAND SWITCH TURRET COMPARTMENTS REFER TO FIGS.7 & 8 PART 3.
ABOVE CIRCUIT SHOWS BAND SWITCH ON BAND 5.

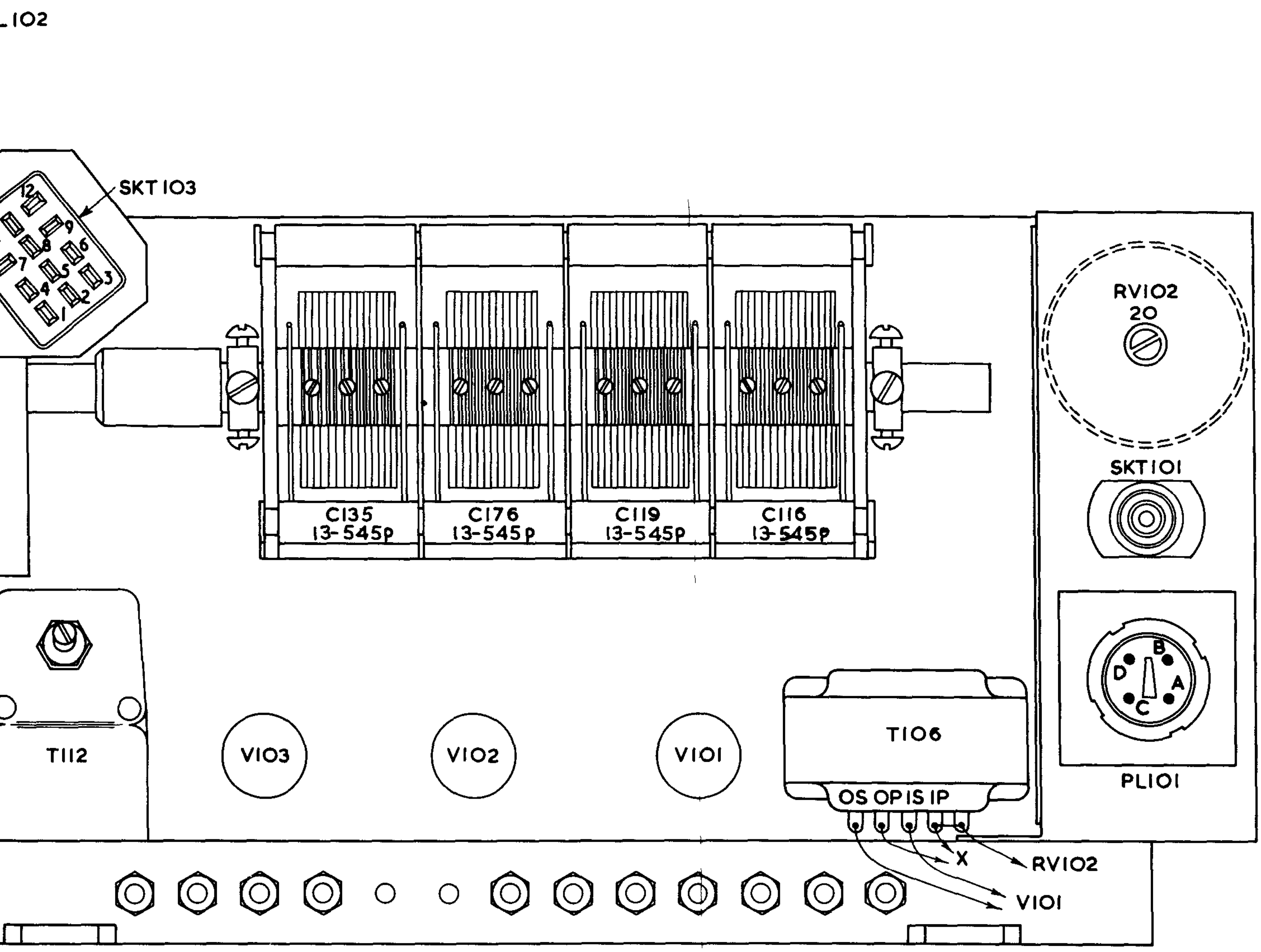
RECEIVER B41
R.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141C

This sheet issued with A L No 1 January 1958



R.F. UI

FIG. 12



RECEIVER B41

R.F. UNIT. TOP LAYOUT. A.P. 57141C

COMPONENTS LIST RECEIVER B41C

PATTERN 571413

NOTE:- Before ordering replacement parts, reference should be made to the relevant E List and substitution guide.

CAPACITORS

R.F. UNIT

Ref.	Service Ref. No. or NSN	Value	Tol.	Rating	Remarks
C101	5910-99-012-3926	120 pF	2%	750 V	Fixed
C102	5910-99-012-3923	100 pF	2%	750 V	Fixed
C103	5910-99-016-0009	4-18 pF	10%		Variable
C104	5910-99-016-0009	4-18 pF	10%		Variable
C105					
C106	5910-99-016-0009	4-18 pF	10%		Variable
C107					
C108	5910-99-016-0009	4-18 pF	10%		Variable
C109	5910-99-012-7103	39 pF	5%	500 V	Fixed
C110	5910-99-016-0009	4-18 pF	10%		Variable
C111	5910-99-012-7099	27 pF	5%	750 V	Fixed
C112	5910-99-016-0009	4-18 pF	10%		Variable
C113					
C114	5910-99-016-0009	4-18 pF	10%		Variable
C115	5910-99-012-7097	22 pF	5%	750 V	Fixed
C116	N.P.	17-550 pF	½%		Variable (Ganged)
C117	5910-99-012-7089	10 pF	0.5 pF	750 V	Fixed
C118	5910-99-012-4301	0.005 μF	10%	350 V	Fixed
C119	N.P.	17-550 pF	½%		Variable (Ganged)
C120	5910-99-012-3165	100 pF	20%	750 V	Fixed
C121	5910-99-016-0009	4-18 pF	10%		Variable
C122					
C123	5910-99-016-0009	4-18 pF	10%		Variable
C124	5910-99-012-7095	18 pF	5%	500 V	Fixed
C125	5910-99-016-0009	4-18 pF	10%		Variable
C126	5910-99-012-7105	47 pF	2%	500 V	Fixed
C127	5910-99-016-0009	4-18 pF	10%		Variable
C128	5910-99-012-7103	39 pF	5%	750 V	Fixed
C129	5910-99-016-0009	4-18 pF	10%		Variable
C130	5910-99-012-7103	39 pF	5%	750 V	Fixed
C131	5910-99-011-5095	0.1 μF	20%	350 V	Fixed
C132	5910-99-011-5095	0.1 μF	20%	350 V	Fixed
C133	5910-99-011-5095	0.1 μF	20%	350 V	Fixed
C134	5910-99-911-5674	0.003 μF	20%	350 V	Fixed
C135	N.P.	17-550 pF	½%		Variable (Ganged)

CAPACITORS (Contd.)

R.F. UNIT B41C

Ref.	Service Ref. No. or NSN	Value	Tol.	Rating	Remarks
C136	5910-99-012-3412	470 pF	10%	750 V	Fixed
C137	5910-99-972-9510	125 pF	2%	350 V	Fixed
C138	5910-99-911-4641	50 pF	2%	350 V	Fixed
C139	5910-99-016-0009	4-18 pF	10%		Variable
C140	5910-99-012-3935	220 pF	2%	750 V	Fixed
C141	5910-99-012-7101	33 pF	5%	750 V	Fixed
C142	5910-99-972-9511	85 pF	2%	750 V	Fixed
C143	5910-99-972-9512	77 pF	2%	750 V	Fixed
C144	5910-99-016-0009	4-18 pF	10%		Variable
C145	5910-99-012-3932	180 pF	2%	750 V	Fixed
C146	5910-99-012-3906	27 pF	5%	750 V	Fixed
C147	5910-99-012-7103	39 pF	5%	750 V	Fixed
C148	5910-99-972-9513	66 pF	2%	750 V	Fixed
C149	5910-99-972-9510	125 pF	2%	750 V	Fixed
C150	5910-99-016-0009	4-18 pF	10%		Variable
C151	5910-99-012-3932	180 pF	2%	750 V	Fixed
C152	5910-99-012-7105	47 pF	2%	750 V	Fixed
C153	5910-99-012-3905	27 pF	5%	350 V	Fixed
C154	5910-99-016-0009	4-18 pF	10%		Variable
C155	5910-99-972-9508	191 pF	2%	750 V	Fixed
C156	5910-99-972-9509	145 pF	1%	750 V	Fixed
C157	5910-99-012-7103	39 pF	5%	750 V	Fixed
C158	5910-99-016-0009	4-18 pF	10%		Variable
C159	5910-99-012-3938	270 pF	2%	350 V	Fixed
C160	5910-99-972-9515	50 pF	1%	350 V	Fixed
C161	5910-99-911-4899	170 pF	2%	350 V	Fixed
C162	5910-99-012-7097	22 pF	5%	750 V	Fixed
C163	5910-99-016-0009	4-18 pF	10%		Variable
C164	5910-99-012-7095	18 pF	5%	750 V	Fixed
C165	5910-99-016-0009	4-18 pF	10%		Variable
C166	5910-99-012-7107	56 pF	2%	750 V	Fixed
C167	5910-99-016-0009	4-18 pF	10%		Variable
C168	5910-99-012-3165	100 pF	10%	350 V	Fixed
C169	5910-99-012-7105	47 pF	2%	750 V	Fixed
C170	5910-99-016-0009	4-18 pF	10%		Variable
C171	23834	50 pF	15%	350 V	Fixed
C172	5910-99-012-7105	47 pF	2%	750 V	Fixed
C173	5910-99-016-0009	4-18 pF	10%		Variable
C174	5910-99-012-7093	15 pF	5%	750 V	Fixed
C175	5910-99-011-5095	0.1 μF	20%	350 V	Fixed

CAPACITORS (Contd.)

R.F. UNIT B41C

Ref.	Service Ref. No. or NSN	Value	Tol.	Rating	Remarks
C176	N.P.	17-550 pF	½%		Variable (Ganged)
C177	5910-99-012-4301	0.005 µF	10%	350 V	Fixed
C178	5910-99-012-3165	100 pF	5%	750 V	Fixed
C179	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C180	5910-99-012-3165	100 pF	5%	750 V	Fixed
C181	5910-99-012-3292	220 pF	10%	750 V	Fixed
C182	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C183	5910-99-012-3165	100 pF	5%	750 V	Fixed
C184	5910-99-012-3948	470 pF	5%	750 V	Fixed
C185	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C186	5910-99-012-3948	470 pF	5%	750 V	Fixed
C187	5910-99-012-3165	100 pF	5%	750 V	Fixed
C188	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C189	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C190	5910-99-012-7089	10 pF	0.5 pF	750 V	Fixed

RESISTORS

B41C

Ref.	Service Ref. No. or NSN	Value Ohms	Tol.	Rating	Remarks
FIXED					
R101	5905-99-022-3112	390 k	10%		RC7-K
R102	5905-99-022-3121	470 k	10%		RC7-K
R103	5905-99-022-1193	470	10%		RC7-K
R104	5905-99-022-2069	3.3 k	10%		RC7-H
R105	5905-99-022-1109	100	10%		RC7-K
R106	5905-99-022-3009	56 k	10%		RC7-H
R107	5905-99-022-3037	100 k	10%		RC7-K
R108	5905-99-022-2144	12 k	10%		RC7-H
R109	5905-99-022-2144	12 k	10%		RC7-H
R110	5905-99-022-3121	470 k	10%		RC7-K
R111	5905-99-022-2088	4.7 k	10%		RC7-K
R112	5905-99-022-1163	270	10%		RC7-K
R113	5905-99-022-1026	22	10%		RC7-J
R114	5905-99-022-2214	47 k	10%		RC7-K
R115	5905-99-022-2214	47 k	10%		RC7-K
R116	5905-99-022-2046	2.2 k	10%		RC7-K
R117	5905-99-022-2193	33 k	10%		RC7-K

RESISTORS (Contd.)

R.F. UNIT B41C

Ref.	Service Ref. No. or NSN	Value Ohms	Tol.	Rating Watts	Remarks
VARIABLE					
RV101	5905-99-900-4142	100 k	20%	$\frac{1}{4}$	
RV102	5905-99-580-3198	20	10%	2.5	

TRANSFORMERS

B41C

Ref.	Service Ref. No. or NSN	Description
TR101	A.P.184031	Transformer, r.f.
TR102	A.P.184032	Transformer, r.f.
TR103	A.P.184033	Transformer, r.f.
TR104	A.P.184034	Transformer, r.f.
TR105	A.P.184035	Transformer, r.f.
TR106	5950-99-971-9624	Transformer, Heater
TR107	A.P.106130	Transformer, r.f.
TR108	A.P.106131	Transformer, r.f.
TR109	A.P.106132	Transformer, r.f.
TR110	A.P.106133	Transformer, r.f.
TR111	A.P.106134	Transformer, r.f.
TR112	A.P.106140	Transformer, i.f.

INDUCTORS

B41C

Ref.	Service Ref. No.	Description
L101	A.P.106149	Coil Tuned
L102	A.P.106150	Coil Tuned
L103	A.P.106125	Coil Tuned
L104	A.P.106126	Coil Tuned
L105	A.P.106127	Coil Tuned
L106	A.P.106128	Coil Tuned
L107	A.P.106129	Coil Tuned
L108	A.P.106135	Coil Tuned
L109	A.P.106136	Coil Tuned
L110	A.P.106137	Coil Tuned

INDUCTORS (Contd.)

R.F. UNIT B41C

Ref.	Service Ref. No.	Description
L111	A.P.106138	Coil Tuned
L112	A.P.106139	Coil Tuned
L113	A.P.106151	Choke, 1.5 mH

LAMPS

B41C

Ref.	NATO Stock No.	Description
LP101	6240-99-995-1225	6.5 V, 3 A
LP102	6240-99-995-1225	6.5 V, 3 A
LP103	6240-99-995-1225	6.5 V, 3 A
LP104	6240-99-995-1225	6.5 V, 3 A
LP105	6240-99-995-1225	6.5 V, 3 A
LP106	6240-99-995-1225	6.5 V, 3 A
LP107	6240-99-995-1225	6.5 V, 3 A

SWITCHES

B41C

Ref.	Service Ref. No. or NSN	Description
SW101	N.P.	Indicator
SW102	N.P.	Crystal Switch, 2-position

CRYSTAL

B41C

Ref.	Service Ref. No. or NSN	Description
XL101	N.P.	Crystal, Local Oscillator

RECTIFIER

B41C

Ref.	NATO Stock No.	Description
MR101	5960-99-037-2373	CV7130

PLUGS

R.F. UNIT B41C

Ref.	NATO Stock No.	Description
PL101	5935-99-999-3526	4 pin, Fixed
PL102	(5935-99-972-8183	4-way
	(5935-99-972-8214	Cover

SOCKETS

B41C

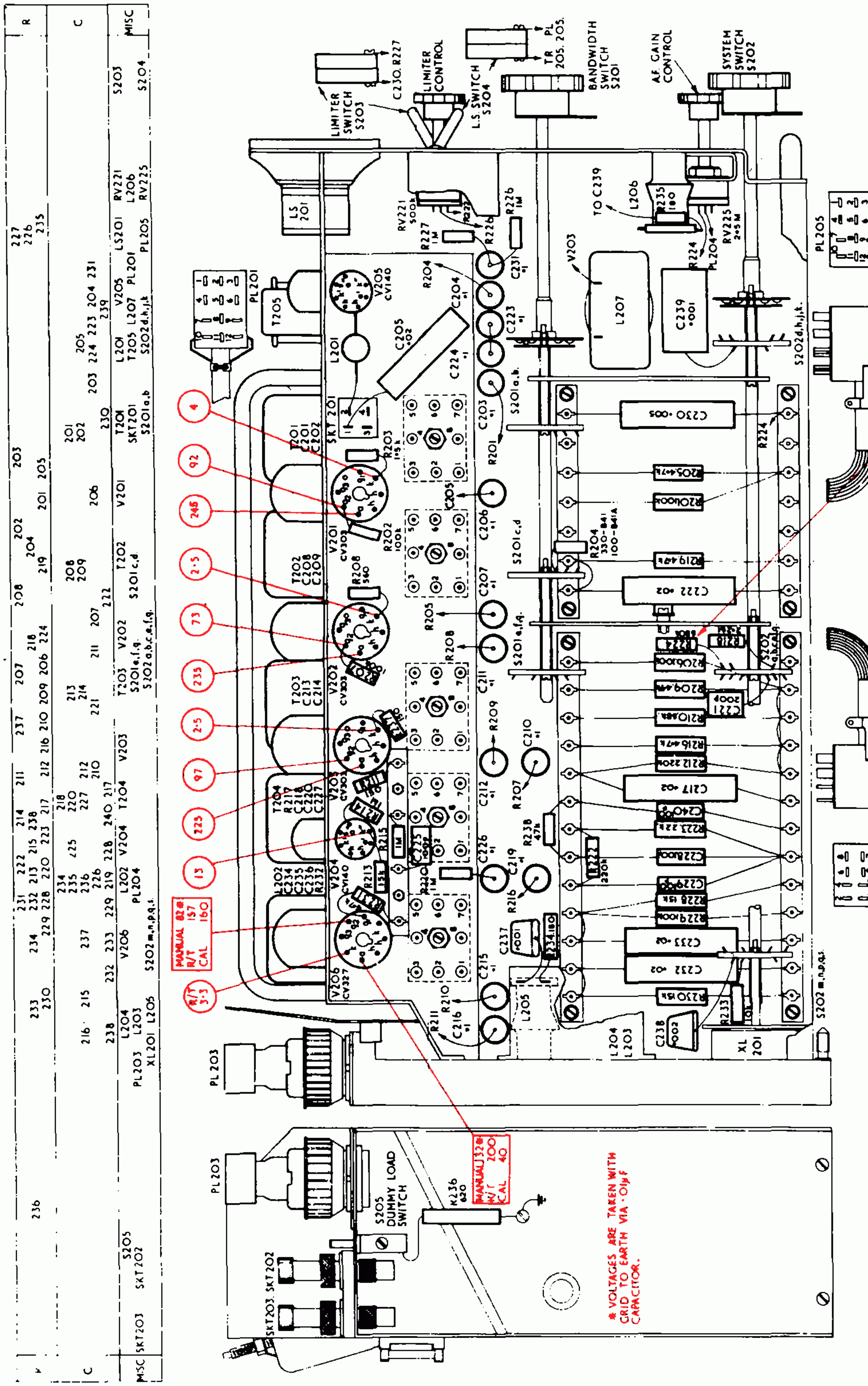
Ref.	NATO Stock No.	Description
SK101	5935-99-580-3620	Coaxial
SK102	N.P.	(Crystal)
SK103	5935-99-972-8233	12-way
SK104	5935-99-945-4267	4-way

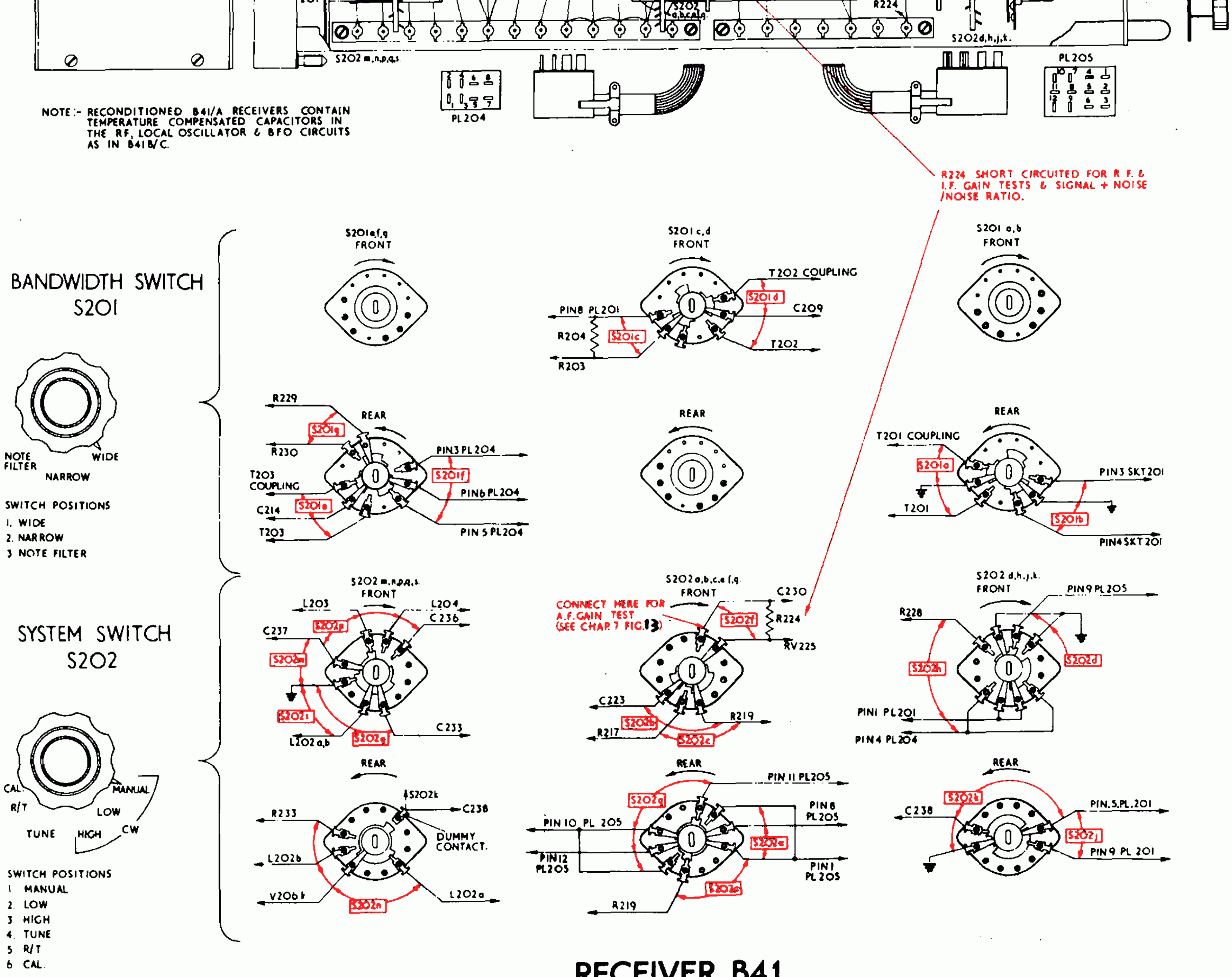
VALVES, ELECTRONIC

B41C

Ref.	NATO Stock No.	Description
V101	5960-99-000-4009	CV4009
V102	5960-99-000-2128	CV2128
V103	5960-99-000-4009	CV4009

FIG. 13


LIMITER SWITCH S203
LIMITER CONTROL
L.S. SWITCH S204
BANDWIDTH SWITCH S201
AF. GAIN CONTROL
SYSTEM SWITCH S202
S205 DUMMY LOAD SWITCH
* VOLTAGES ARE TAKEN WITH GRID TO EARTH VIA ·01µF CAPACITOR.



RECEIVER B41

I.F. UNIT. LAYOUT & SWITCH WIRING DIAGRAM. A.P. 57141/A

This sheet issued with A.L No. 1 January 1958

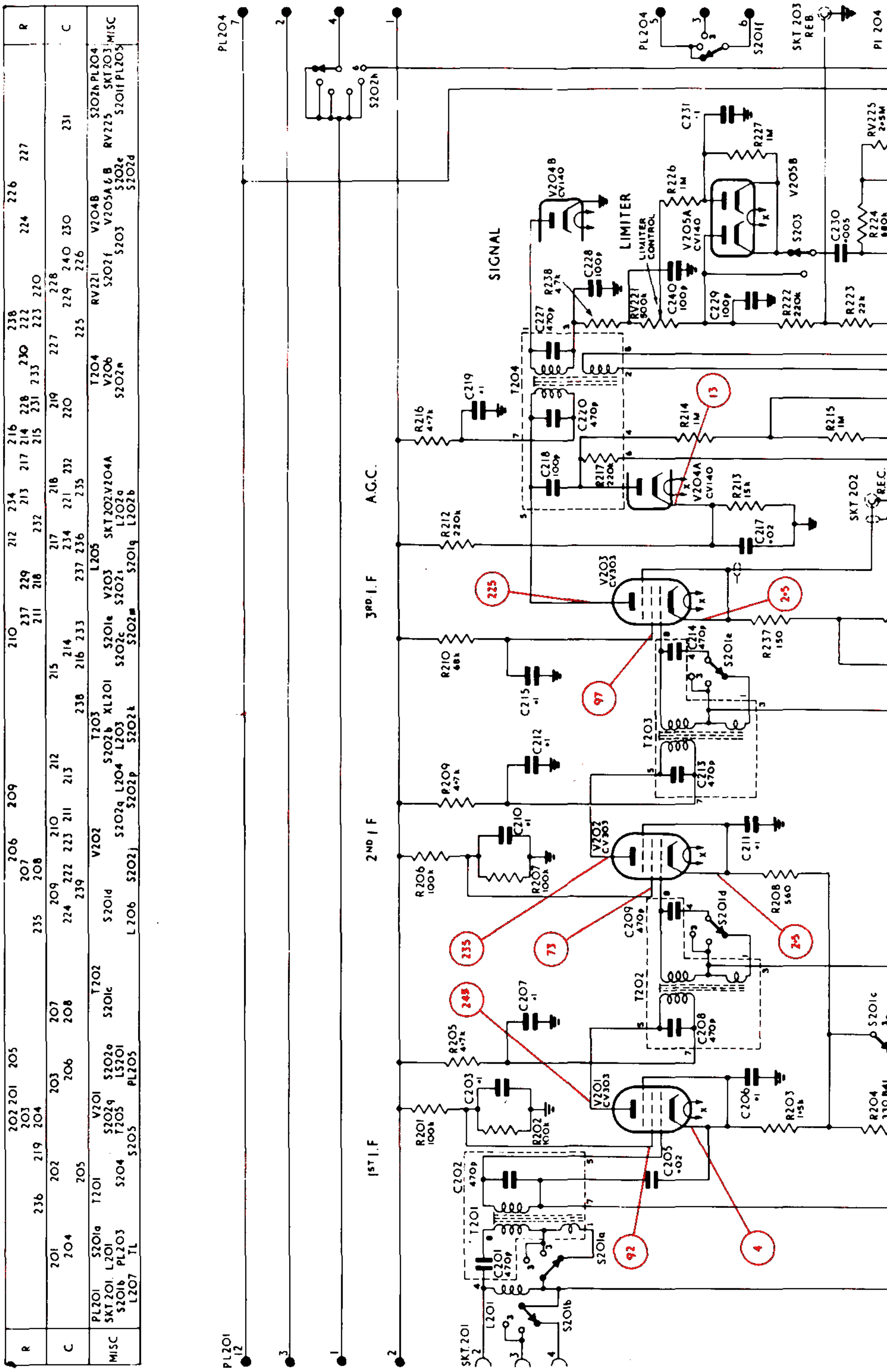
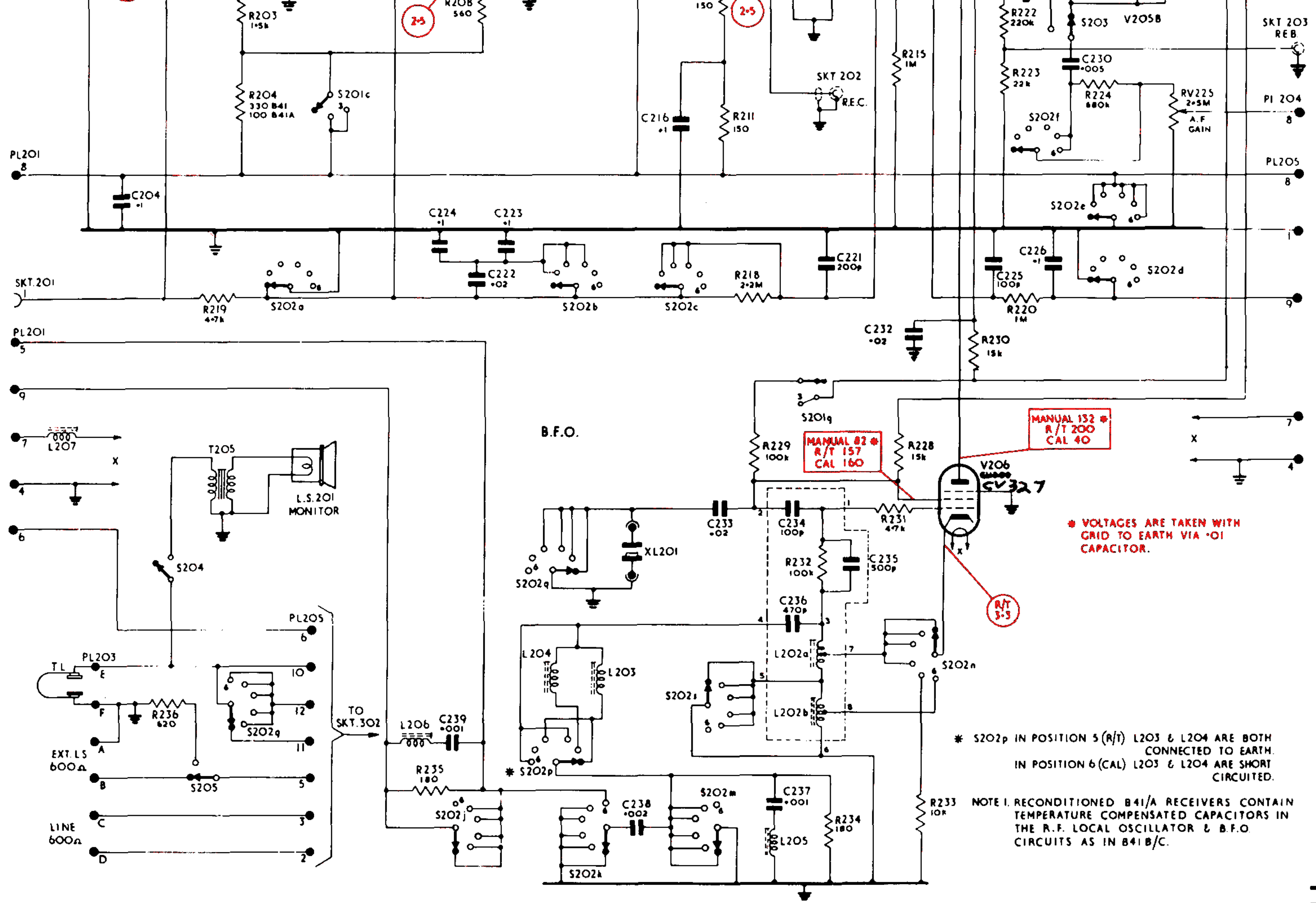


FIG. 14



* VOLTAGES ARE TAKEN WITH GRID TO EARTH VIA ·01 CAPACITOR.

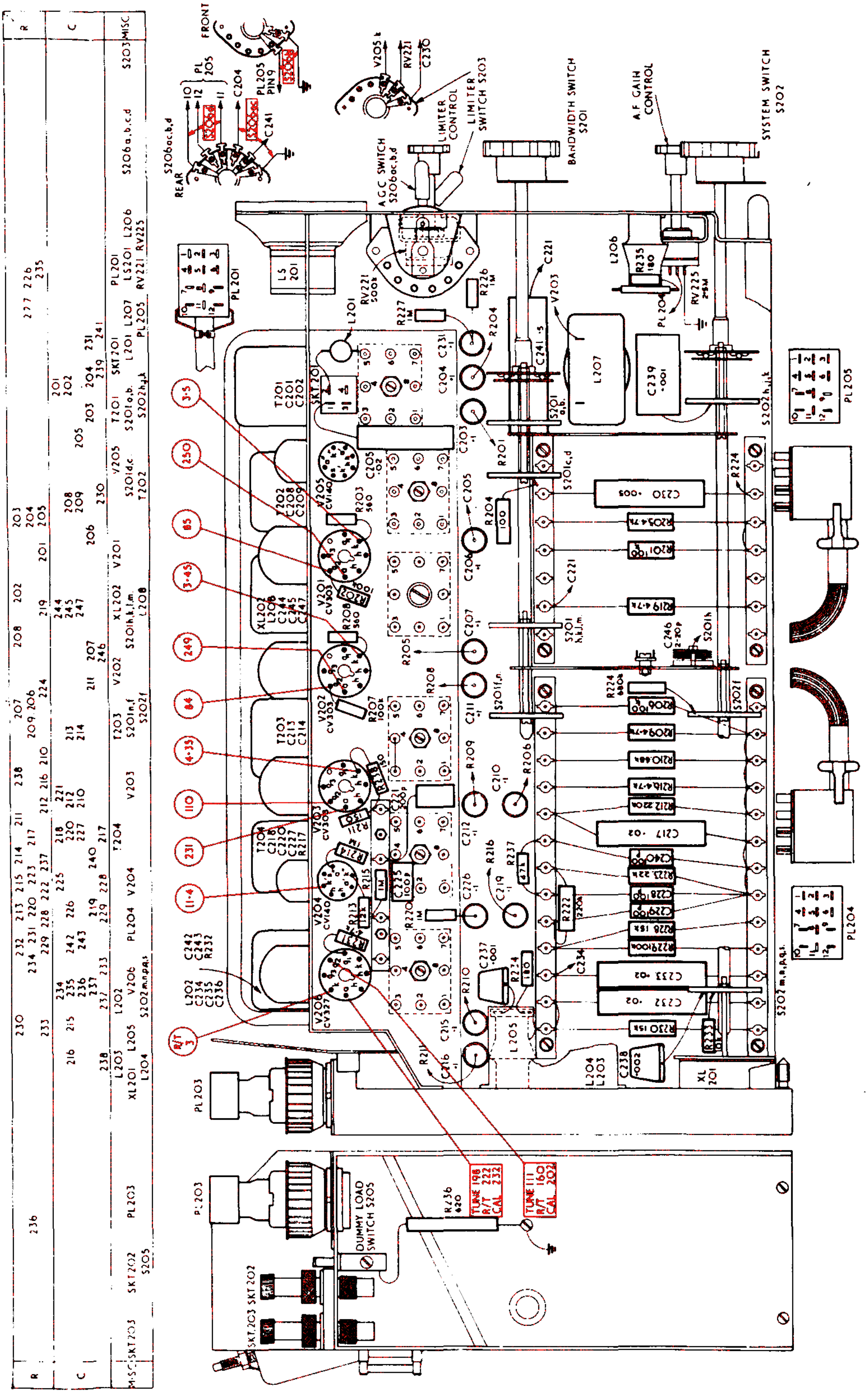
* S202p IN POSITION 5 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH. IN POSITION 6 (CAL) L203 & L204 ARE SHORT CIRCUITED.

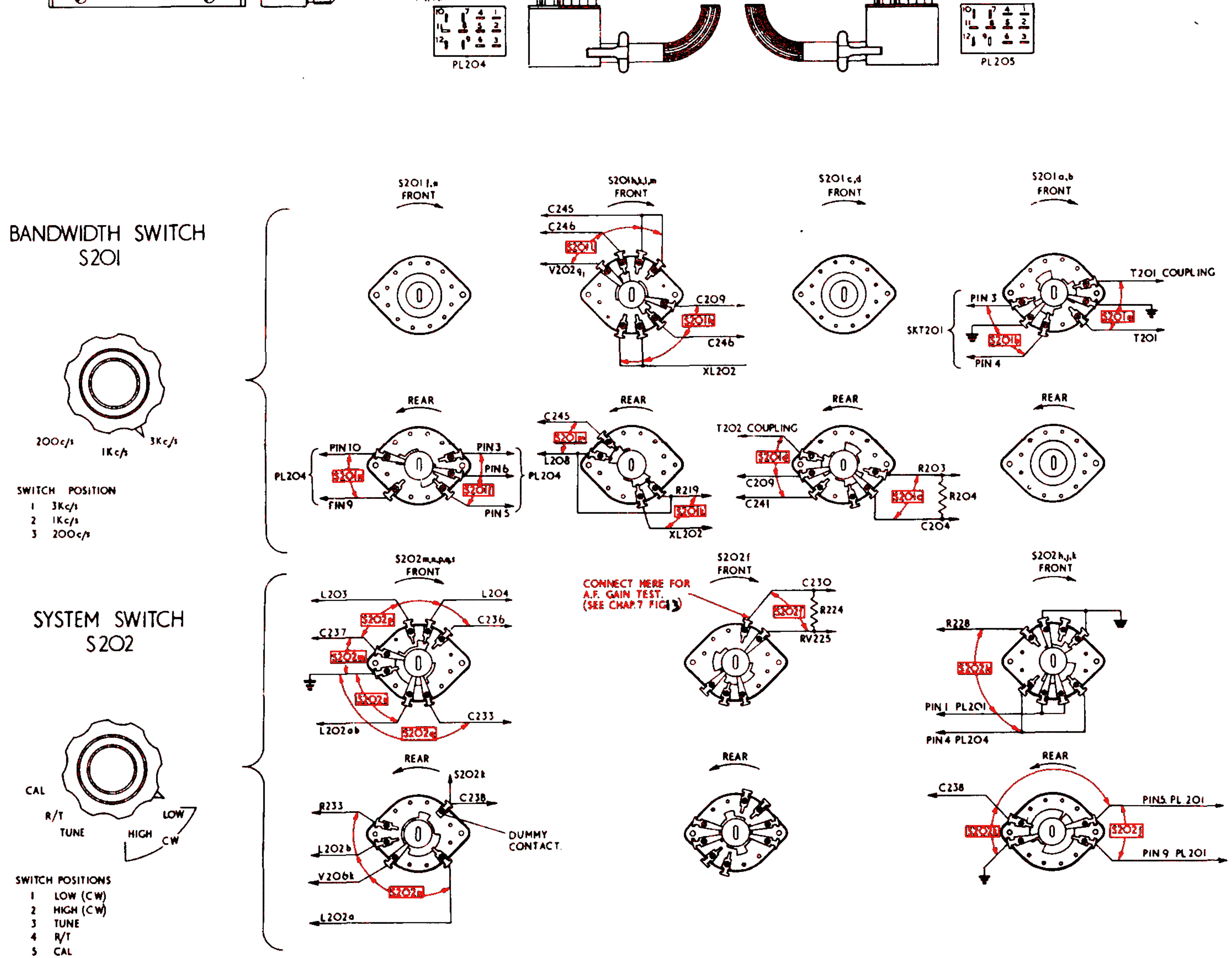
NOTE 1. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

RECEIVER B41

I.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141/A

FIG. 15





RECEIVER B41

I.F. UNIT. LAYOUT & SWITCH WIRING DIAGRAM. A.P. 57141B

This sheet issued with A.L. No. 1 January 1958

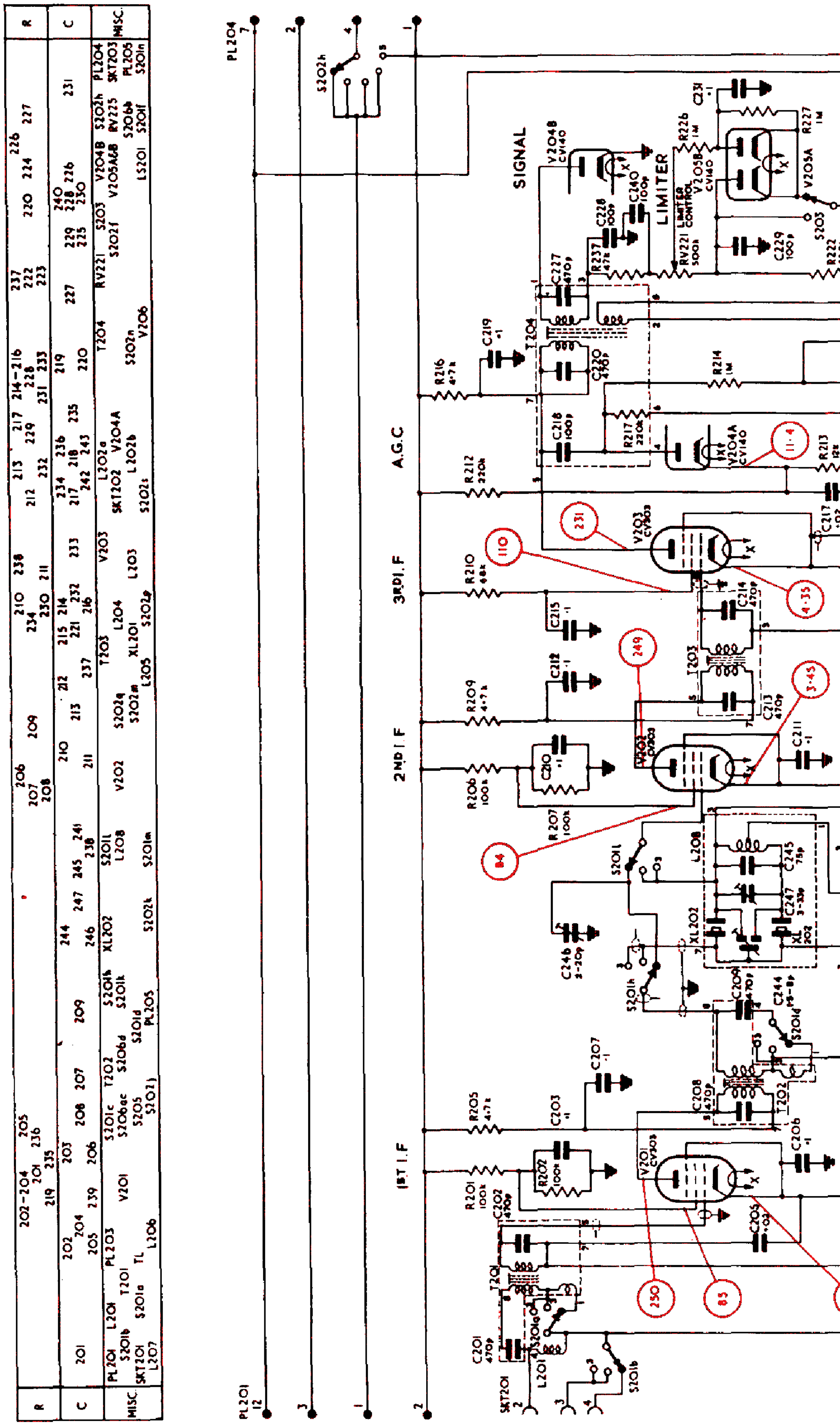
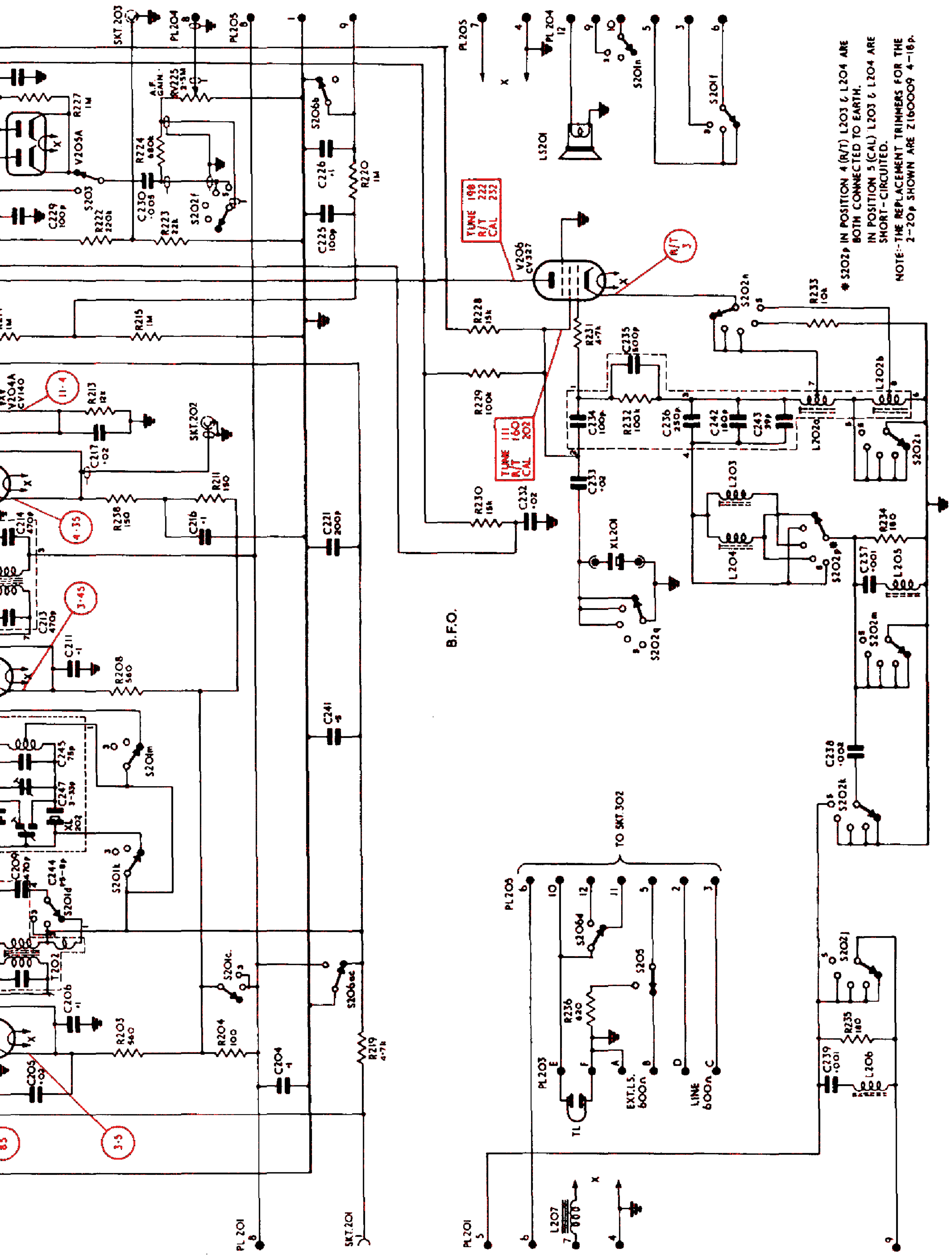


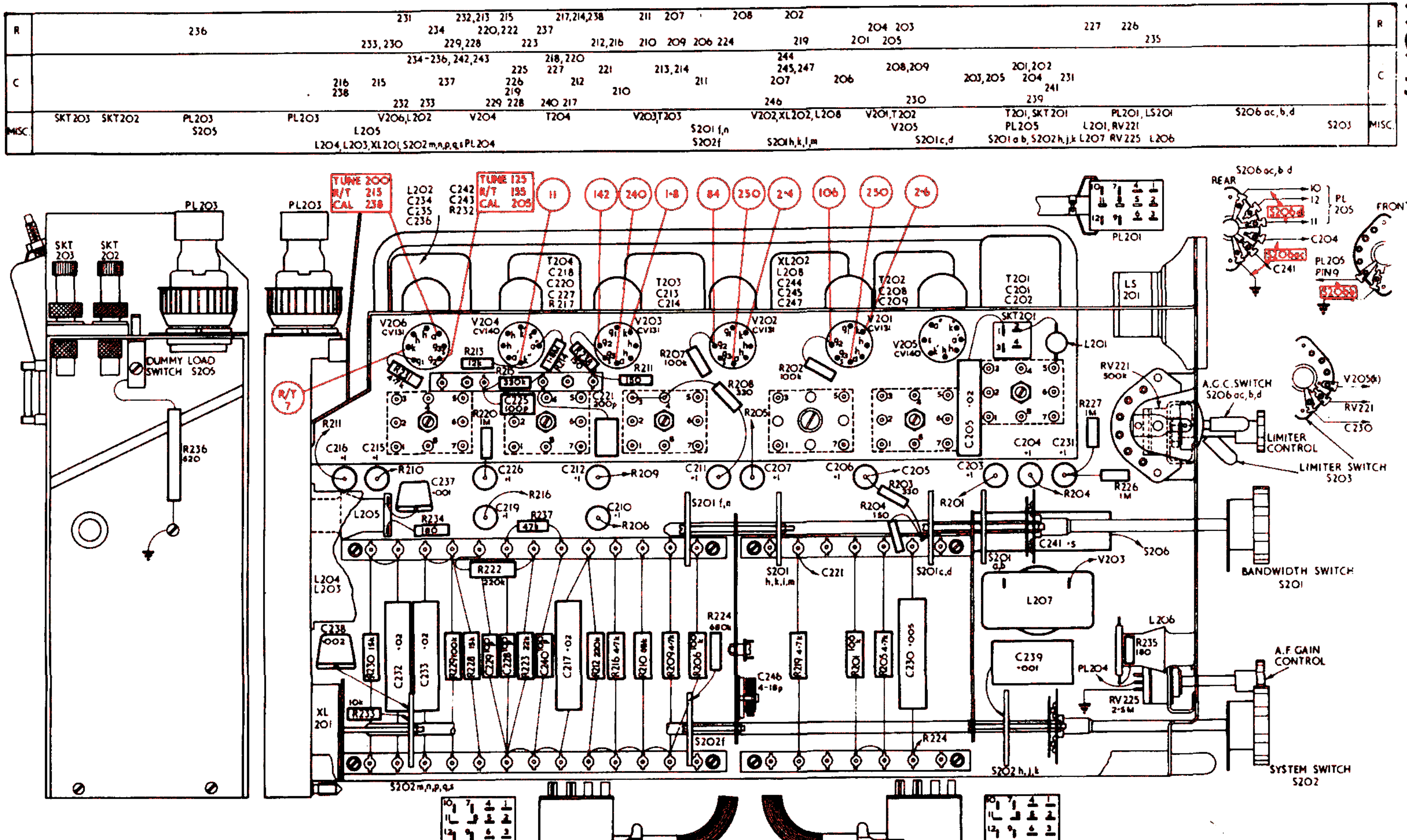
FIG. 16

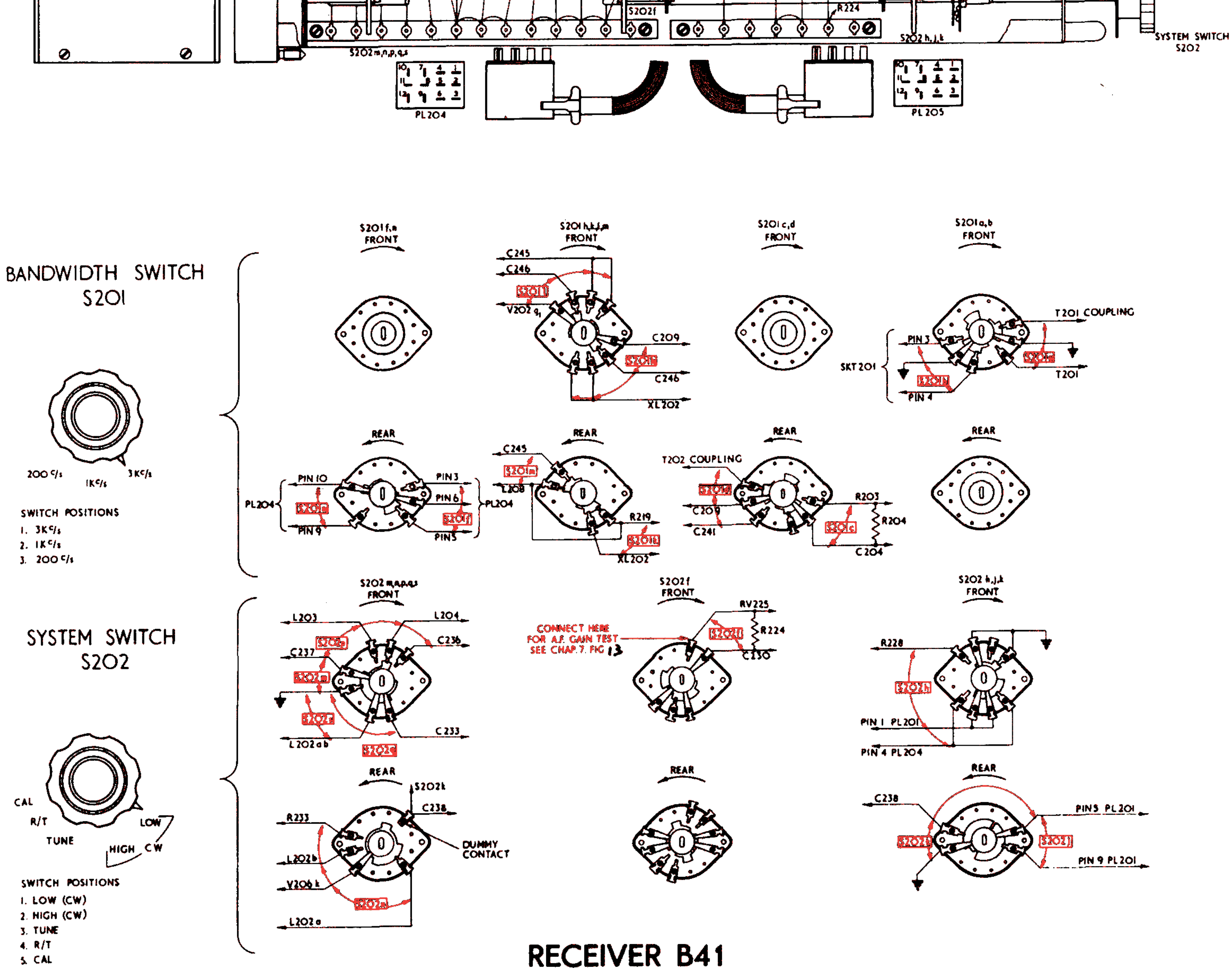


RECEIVER B41

I.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141B

FIG. 17


DUMMY LOAD SWITCH S205
BANDWIDTH SWITCH S201
A.F. GAIN CONTROL
SYSTEM SWITCH S202
LIMITER CONTROL
LIMITER SWITCH S203
A.G.C. SWITCH S206 ac, b, d
REAR
FRONT
TUNE 200
R/T 215
CAL 238
TUNE 125
R/T 135
CAL 205



RECEIVER B41

I.F. UNIT. LAYOUT & SWITCH WIRING DIAGRAM. A.P. 57141C

This sheet issued with A.L. No. 1 January 1958

R	202–204 201 219 205 236 235 206 207 208 209 210 234 230 211 238 212 213 232 217 224 214–216 228 231 233 237 222 223 220 224 226 227
C	201 202 204 205 239 203 206 208 207 209 244 246 247 245 238 241 210 211 213 212 237 215 221 214 232 216 233 234 217 242 236 218 243 235 219 220 227 229 225 240 228 230 226 231
MISC.	PL201 S201b SKT201 L207 L201 S201a T201 TL PL203 L206 V201 S201c S206ac S205 S202j T202 S206d S201h S201k S201d PL205 XL202 S202k S201l L208 S201m V202 S202q S202m T203 SKT204 XL201 L205 L204 S202p V203 L203 L202a SKT202 S202i V204A L202b T204 S202n V206 RV221 S203 S202f V204B V205A&B S202h RV225 S206b LS201 S201f PL204 SKT203 PL205 S201n

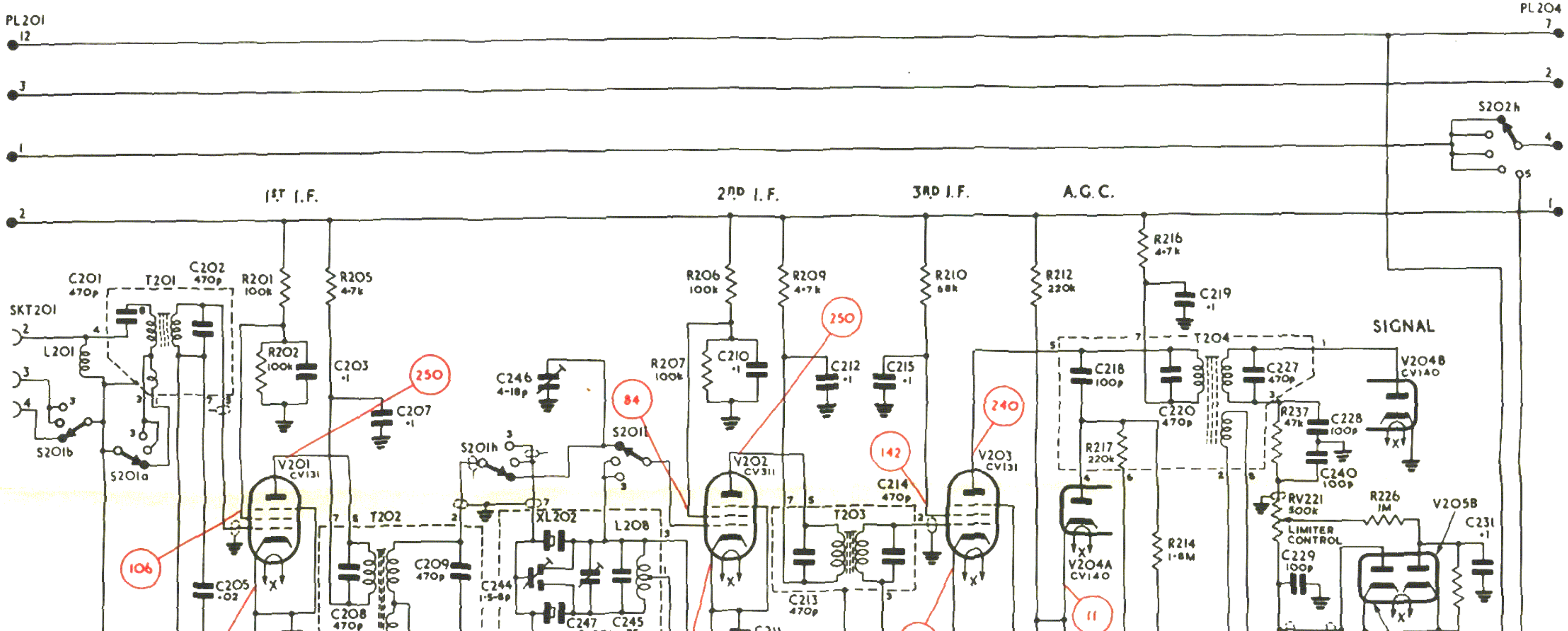
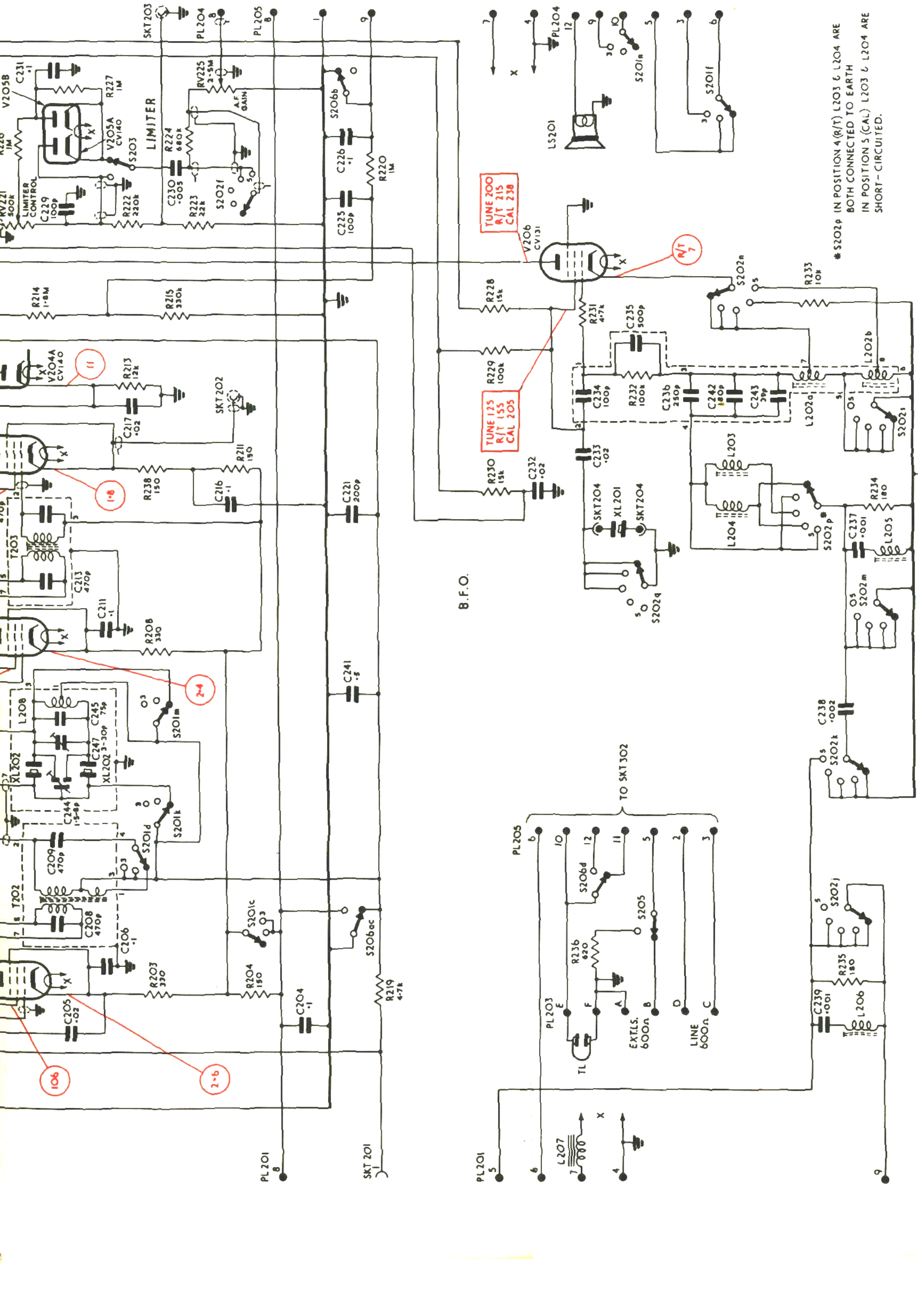


FIG. 18



RECEIVER B41

I.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141C

COMPONENTS LIST RECEIVERS B41/A/B/C

PATTERNS 571410/1/2/3

NOTE:- Before ordering replacement parts, reference should be made to the relevant E List and substitution guide.

CAPACITORS

I.F. UNIT B41/A/B/C

Ref.	Service Ref. No. or NSN	Value	Tol.	Rating	Remarks
C201	5910-99-012-3948	470 pF	5%	750 V	Fixed
C202	5910-99-012-3948	470 pF	5%	750 V	Fixed
C203	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C204	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C205	5910-99-011-7826	0.02 µF	20%	750 V	Fixed
C206	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C207	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C208	5910-99-012-3948	470 pF	5%	750 V	Fixed
C209	5910-99-012-3948	470 pF	5%	750 V	Fixed
C210	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C211	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C212	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C213	5910-99-012-3948	470 pF	5%	750 V	Fixed
C214	5910-99-012-3948	470 pF	5%	750 V	Fixed
C215	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C216	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C217	5910-99-011-7826	0.02 µF	20%	750 V	Fixed
C218	5910-99-012-3165	100 pF	20%	750 V	Fixed
C219	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C220	5910-99-012-3948	470 pF	5%	750 V	Fixed
C221	5910-99-012-3292	220 pF	10%	750 V	Fixed
C222					
C223					
C224					
C225	5910-99-012-3165	100 pF	20%	750 V	Fixed
C226	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C227	5910-99-012-3948	470 pF	5%	750 V	Fixed
C228	5910-99-012-3165	100 pF	20%	350 V	Fixed
C229	5910-99-012-3165	100 pF	20%	350 V	Fixed
C230	5910-99-011-7827	0.005 µF	20%	1000 V	Fixed
C231	5910-99-011-5095	0.1 µF	20%	350 V	Fixed
C232	5910-99-011-7826	0.02 µF	20%	750 V	Fixed
C233	5910-99-011-7826	0.02 µF	20%	750 V	Fixed
C234	5910-99-012-3165	100 pF	20%	750 V	Fixed
C235	5910-99-012-3412	470 pF	10%	750 V	Fixed

CAPACITORS (Contd.)

I.F. UNIT B41/A/B/C

Ref.	Service Ref. No. or NSN	Value	Tol.	Rating	Remarks
C236	5910-99-911-4644	250 pF	2%	350 V	Fixed
C237	5910-99-012-4701	0.001 μF	5%	350 V	Fixed
C238	5910-99-972-9616	0.002 μF	10%	350 V	Fixed
C239	5910-99-012-4701	0.001 μF	5%	350 V	Fixed
C240	5910-99-012-3165	100 pF	20%	350 V	Fixed
C241	5910-99-011-5148	0.5 μF	20%	350 V	Fixed
C242	5910-99-012-3932	180 pF	2%	750 V	Fixed
C243	5910-99-012-7103	39 pF	5%	500 V	Fixed
C244	5910-99-945-4604	1.5-8 pF			Variable
C245	N.P.	75 pF	2%	350 V	Fixed
C246	5910-99-016-0009	4-18 pF	10%		Variable
C247	5910-99-016-0047	4-34 pF	5%		Variable

RESISTORS

B41/A/B/C

Ref.	Service Ref. No. or NSN	Value Ohms	Tol.	Rating Watts	Remarks
FIXED					
R201	5905-99-022-3037	100 k	10%		RC7-K
R202	5905-99-022-3039	100 k	10%		RC7-H
R203	5905-99-022-1172	330	10%		RC7-K
R204	5905-99-022-1132	150	10%		RC7-H
R205	5905-99-022-2090	4.7 k	10%		RC7-H
R206	5905-99-022-3039	100 k	10%		RC7-H
R207	5905-99-022-3037	100 k	10%		RC7-K
R208	5905-99-022-1172	330	10%		RC7-K
R209	5905-99-022-2090	4.7 k	10%		RC7-H
R210	5905-99-022-3018	68 k	10%		RC7-H
R211	5905-99-022-1130	150	10%		RC7-J
R212	5905-99-022-3081	220 k	10%		RC7-H
R213	5905-99-022-2142	12 k	10%		RC7-K
R214	5905-99-022-3197	1.8 M	10%		RC7-J
R215	5905-99-022-3100	330 k	10%		RC7-K
R216	5905-99-022-2090	4.7 k	10%		RC7-H
R217	5905-99-022-3081	220 k	10%		RC7-H
R218					
R219	5905-99-022-2090	4.7 k	10%		RC7-H
R220	5905-99-022-3164	1 M	10%		RC7-J

RESISTORS (Contd.)

I.F. UNIT B41/A/B/C

Ref.	Service Ref. No. or NSN	Value Ohms	Tol.	Rating Watts	Remarks
FIXED (Contd.)					
R221					
R222	5905-99-022-3081		10%		RC7-H
R223	5905-99-022-2174	22 k	10%		RC7-H
R224	5905-99-022-3143	680 k	10%		RC7-J
R225					
R226	5905-99-022-3164	1 M	10%		RC7-J
R227	5905-99-022-3164	1 M	10%		RC7-J
R228	5905-99-022-2153	15 k	10%		RC7-H
R229	5905-99-022-3039	100 k	10%		RC7-H
R230	5905-99-022-2153	15 k	10%		RC7-H
R231	5905-99-022-2088	4.7 k	10%		RC7-K
R232	5905-99-022-3037	100 k	10%		RC7-K
R233	5905-99-022-2130	10 K	10%		RC7-K
R234	5905-99-022-1142	180	10%		RC7-K
R235	5905-99-022-1142	180	10%		RC7-K
R236	5905-99-011-3482	620	5%		RWV4-K
R237	5905-99-022-2214	47 k	10%		RC7-K
R238	5905-99-022-1130	150	10%		RC7-K
VARIABLE					
RV221	5905-99-972-9483	500 k	20%	$\frac{1}{4}$	
RV225	5905-99-972-9482	2.5 M	20%	0.1	

TRANSFORMERS

B41/A/B/C

Ref.	Service Ref. No.	Description
TR201	A.P.106140	Transformer, i.f.
TR202	A.P.106141	Transformer, i.f.
TR203	A.P.106141	Transformer, i.f.
TR204	A.P.106142	Transformer, i.f.
TR205	A.P.65690	A.F. Monitor Loudspeaker (B41/A only)

INDUCTORS

B41/A/B/C

Ref.	Service Ref. No.	Description
L201	A.P.106146	Coil, i.f.
L202a	A.P.106143	Coil Tuned, 800 kc/s

INDUCTORS (Contd.)

I.F. UNIT B41/A/B/C

Ref.	Service Ref. No. or NSN	Description
L202b	A.P.106143	Coil Tuned, 100 kc/s
L203	A.P.106144	Coil Pitch
L204	A.P.106145	Coil Pitch
L205	A.P.106147	Coil Filter
L206	A.P.106147	Coil Filter
L207	5950-99-971-9623 (810097)	Choke, 0.42 mH
L208	A.P.106148	Coil Assembly 800 kc/s

LOUDSPEAKERS

B41/A/B/C

Ref.	Service Ref. No. or NSN	Description
LS201	5965-99-972-9307	3 ohms (B41C)
	A.P.66922	(B41A/B
	A.P.57160	(B41)

PLUGS

B41/A/B/C

Ref.	NATO Stock No.	Description
PL201	5935-99-972-8185)	Painton, 12-way
	5935-99-972-8210)	Cover
PL203	5935-99-972-9112	6 pin, Fixed
PL204	5935-99-972-8185)	Painton, 12-way
	5935-99-972-8210)	Cover
PL205	5935-99-972-8185)	Painton, 12 way
	5935-99-972-8210)	Cover

SOCKETS

B41/A/B/C

Ref.	NATO Stock No.	Description
SK201	5935-99-972-8230	Painton, 4-way
SK202	5935-99-580-3620	Coaxial

SOCKETS (Contd.)

I.F. UNIT B41/A/B/C

Ref.	NATO Stock No.	Description
SK203	5935-99-580-3620	Coaxial
SK204	N.P.	Crystal
SK205	5935-99-972-9117	6-way, Free

CRYSTALS

B41/A/B/C

Ref.	Service Ref. No.	Description
XL201	A.P.509669	Crystal, 10X, 100 kc/s
XL202	N.P.	Crystal Assembly, 800 kc/s

SWITCHES

B41/A/B/C

Ref.	Service Ref. No. or NSN	Description
SW201	A.P.206828	3 position Mechanism
	A.P.65631	Wafer
	A.P.65632	Wafer
	A.P.206827	Wafer
	A.P.206826	Wafer
SW202	A.P.206829	5 position Mechanism
	A.P.65634	Wafer
	A.P.65635	Wafer
	A.P.65637	Wafer
SW203	972-8826	Single Pole
SW204		
SW205	A.P.436691 (Modified)	Single Pole
SW206	972-8825	2 position

VALVES, ELECTRONIC

B41/A/B/C

Ref.	NATO Stock No.	Description
V201	5960-99-000-4015	CV4015
V202	5960-99-000-4015	CV4015
V203	5960-99-000-4015	CV4015
V204	5960-99-000-4007	CV4007
V205	5960-99-000-4007	CV4007
V206	5960-99-000-4015	CV4015

FIG. 19 & 20

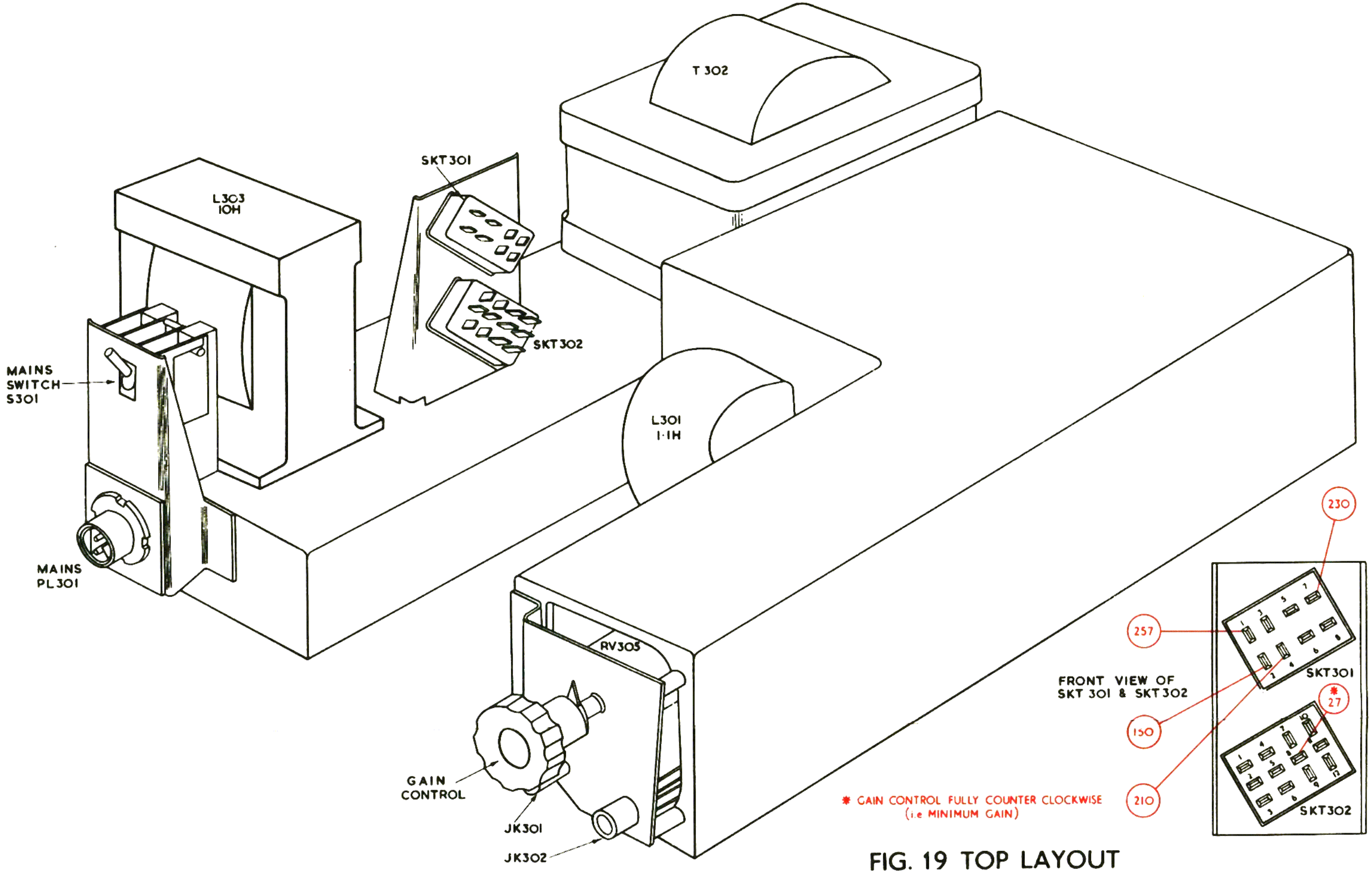


FIG. 19 TOP LAYOUT

R	302 304 301 303 312 307 308 306 313 310 311	R
C	309 310 301 306 302 305 303 304 313 307 311 312 308	C
MISC	RV305 RV309 JK302 JK301 V301 L301 V302 V304 V303 T301 T302 L302 FS302 FS303 FS301	MISC

MISC RV305 RV309 JK302 JK301 V301 L301 V302 V304 V303 T301 T302 L302 FS302 FS303 FS301 MISC

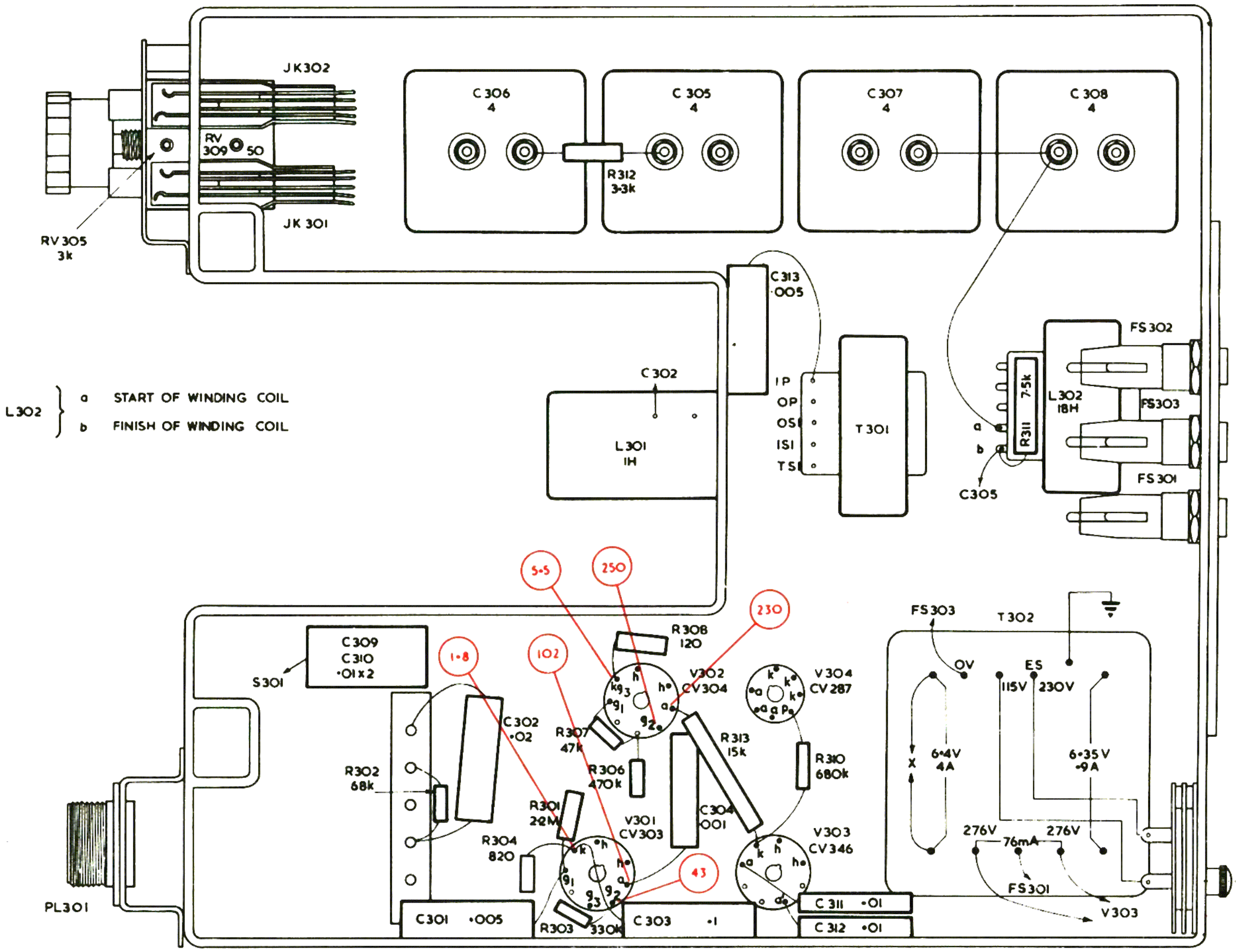


FIG.20 BOTTOM LAYOUT

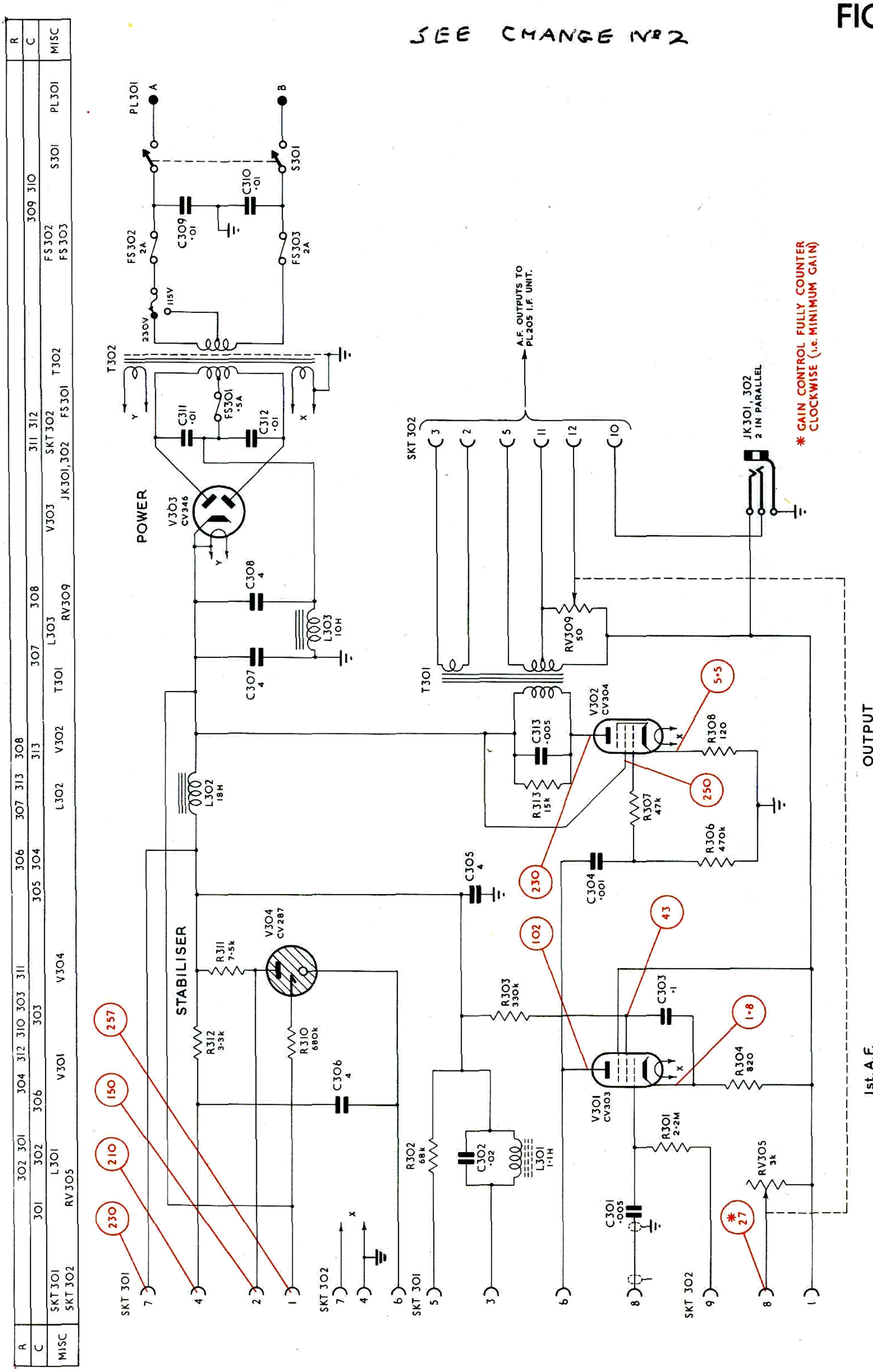
RECEIVER B41
A.F. & POWER UNIT. LAYOUTS. A.P. 57141/A

This sheet issued with A.L. No. 1 January 1958

B.R. 1618 Part 3

FIG. 21

SEE CHANGE No 2



RECEIVER B41

A.F. & POWER UNIT. CIRCUIT DIAGRAM. A.P. 57141/A

FIG. 22 & 23

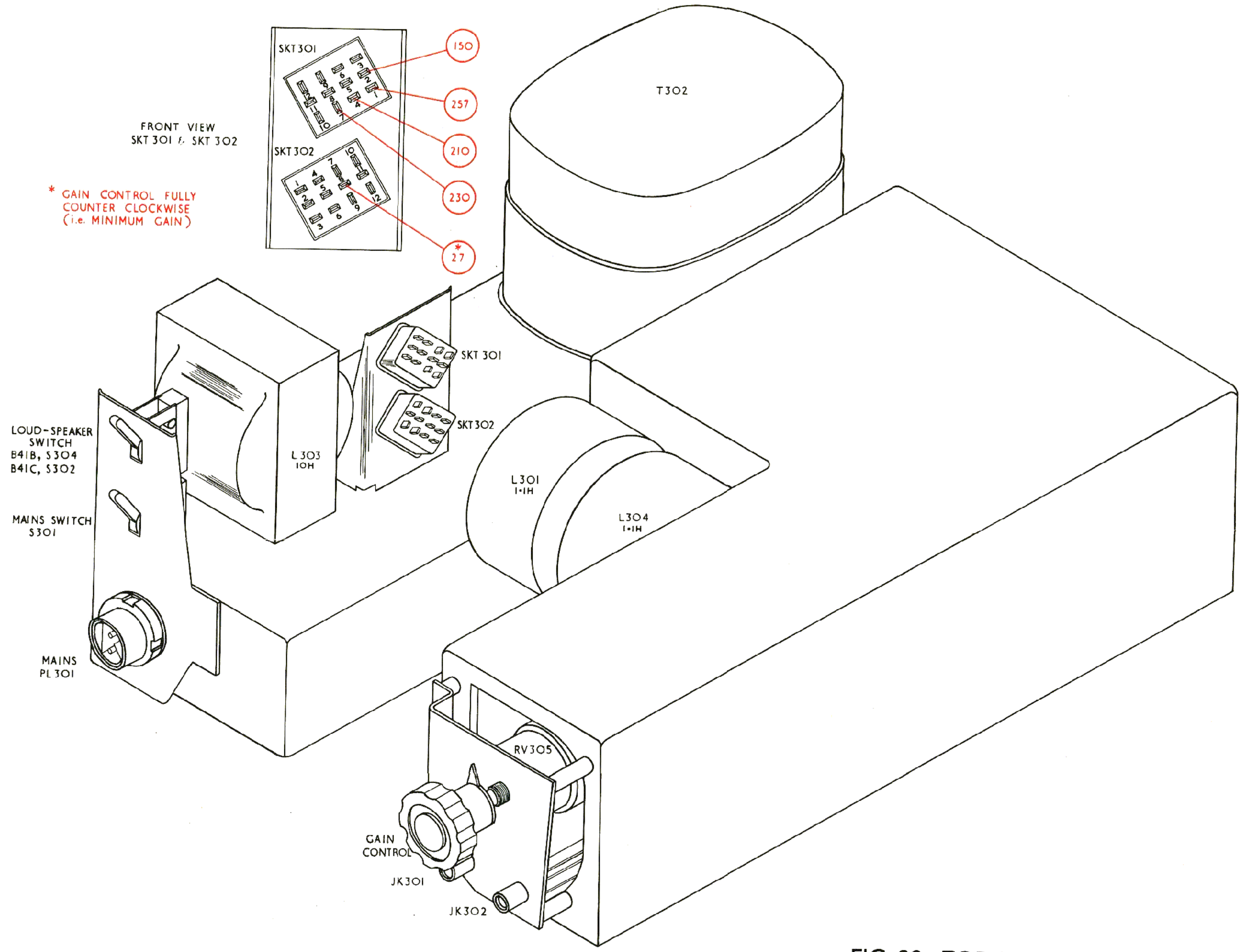
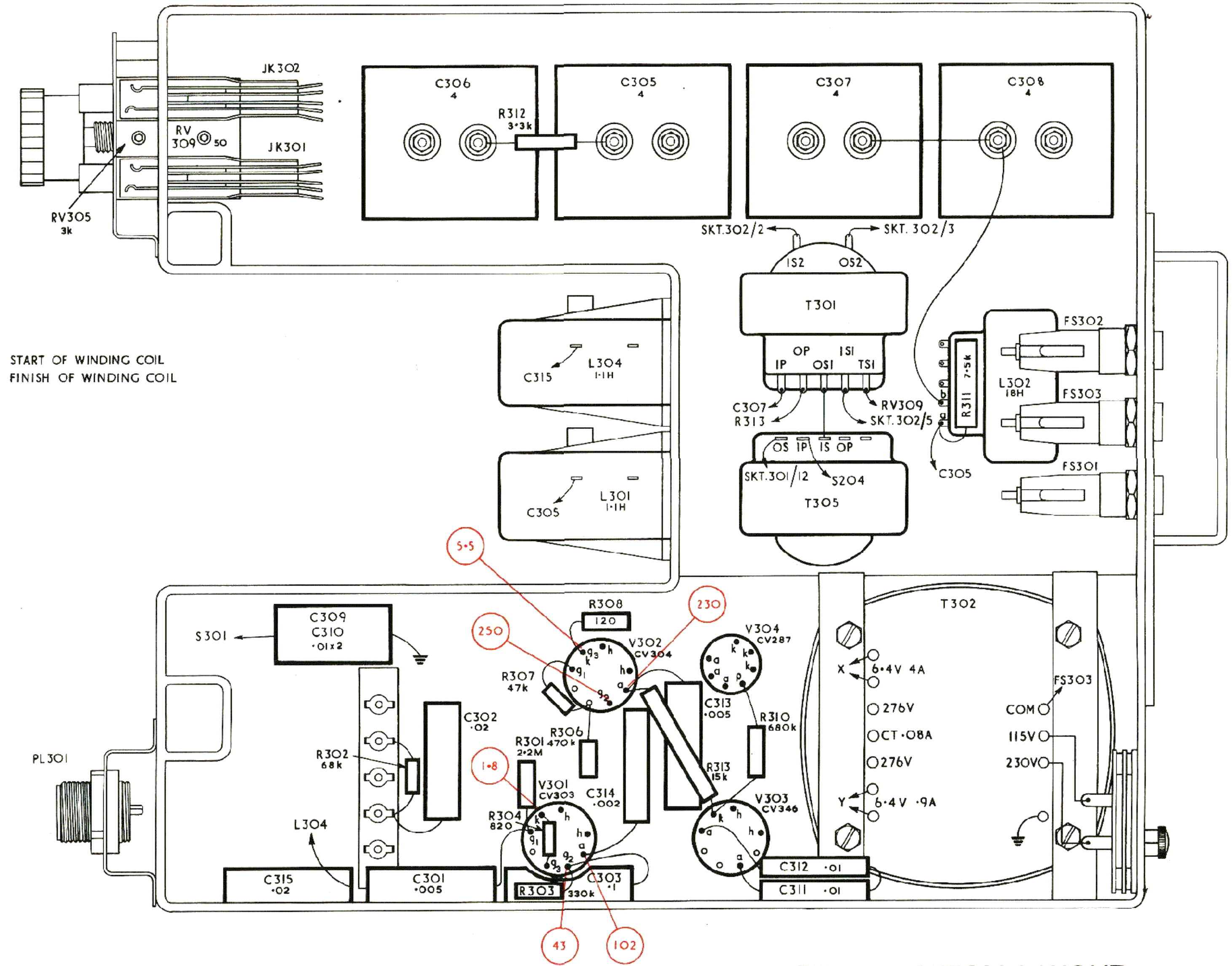


FIG. 22 TOP LAYOUT

R: 302 301 312 303 304 307 306 308 313 310 311
C: 315 309 310 301 302 306 303 314 305 313 311 312 307 308
MISC.: RV305 PL301 RV309 JK302 JK301 V301 V302 L304 L301 V304 V303 T301 T305 T302 L302 FS302 FS303 FS301



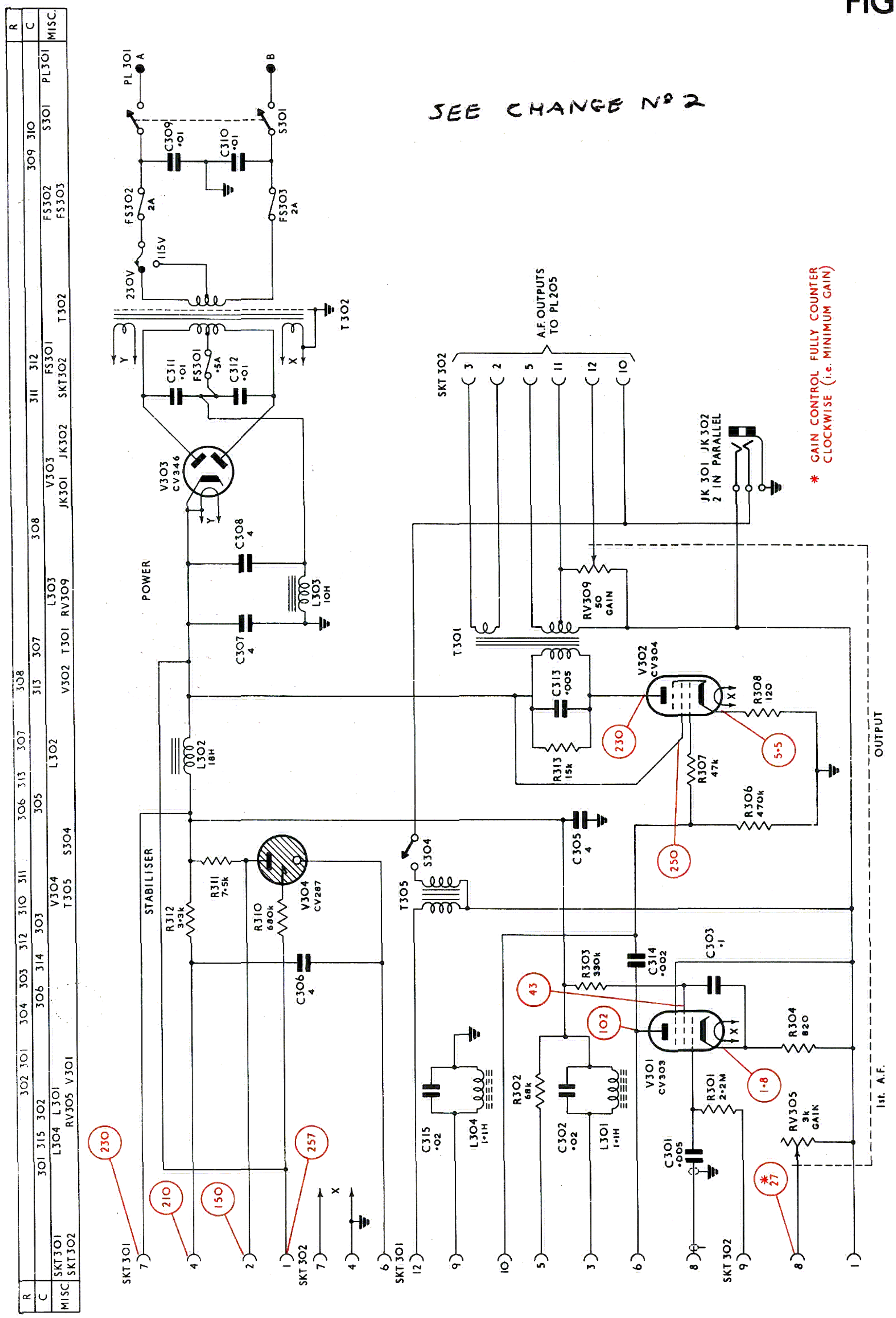
L302 { a START OF WINDING COIL
b FINISH OF WINDING COIL }

FIG. 23 BOTTOM LAYOUT

RECEIVER B41

A.F. & POWER UNIT. LAYOUTS. A.P. 57141B

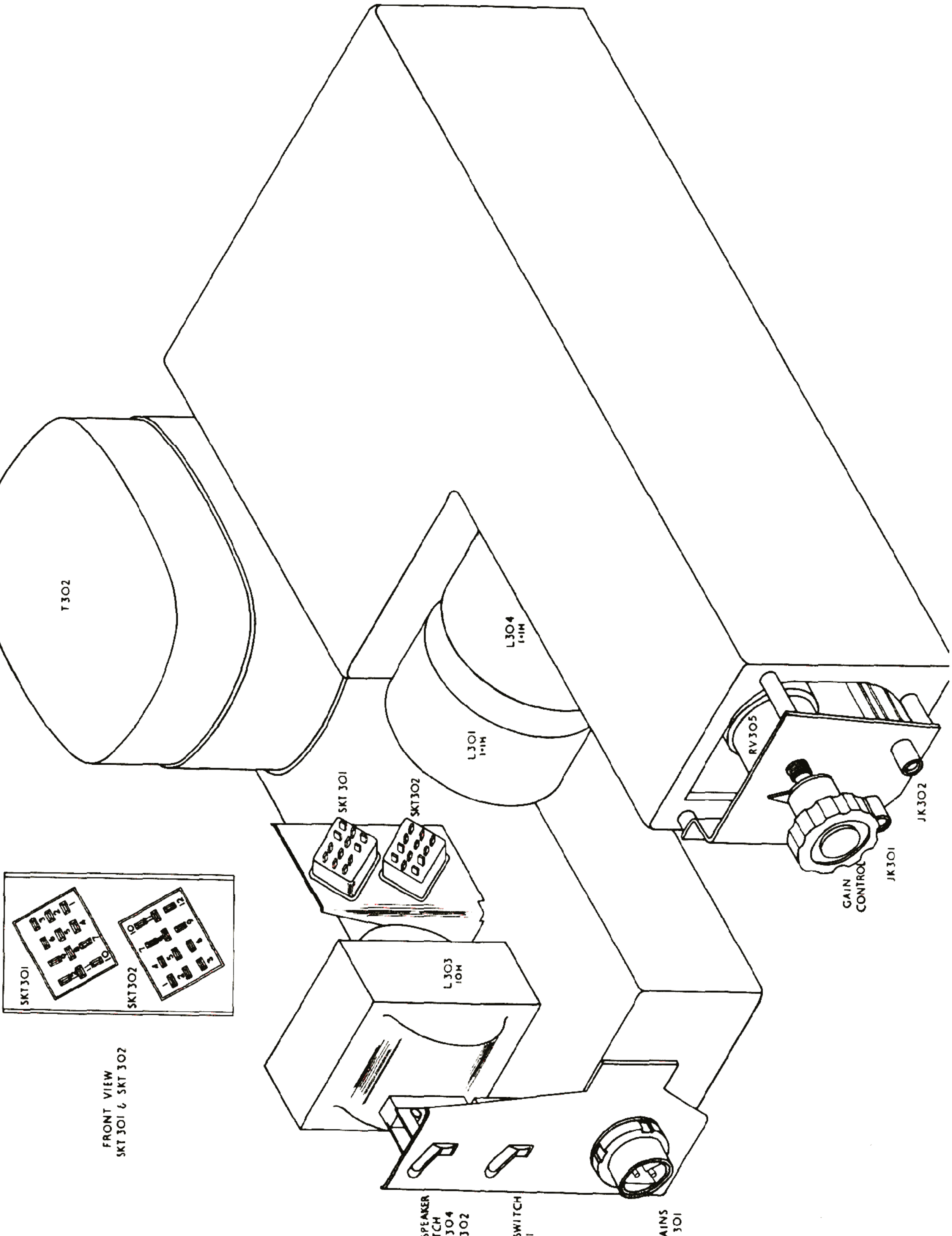
FIG. 24



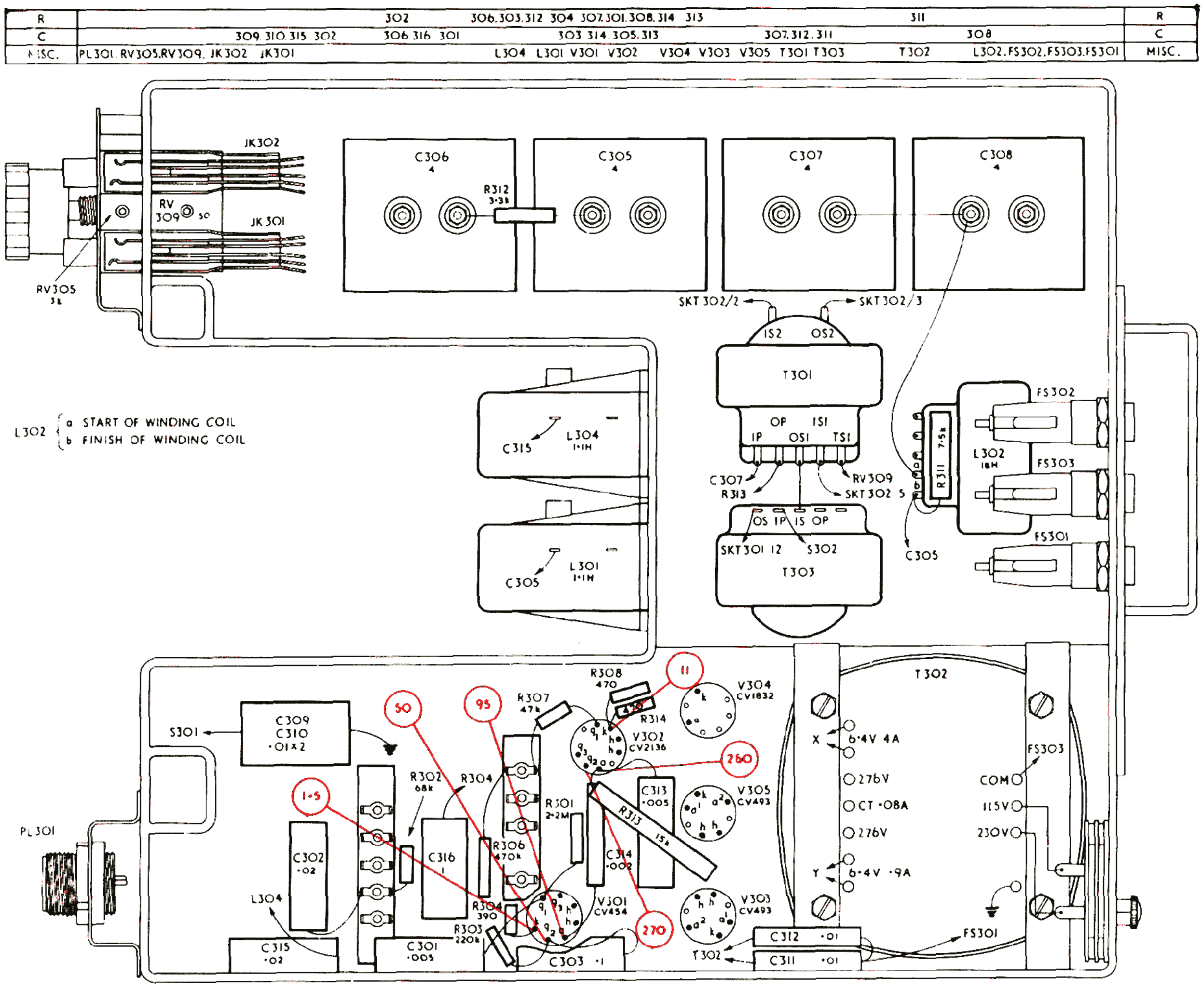
RECEIVER B41

A.F. & POWER UNIT. CIRCUIT DIAGRAM. A.P. 57141B

FIG. 25



TOP LAYOUT

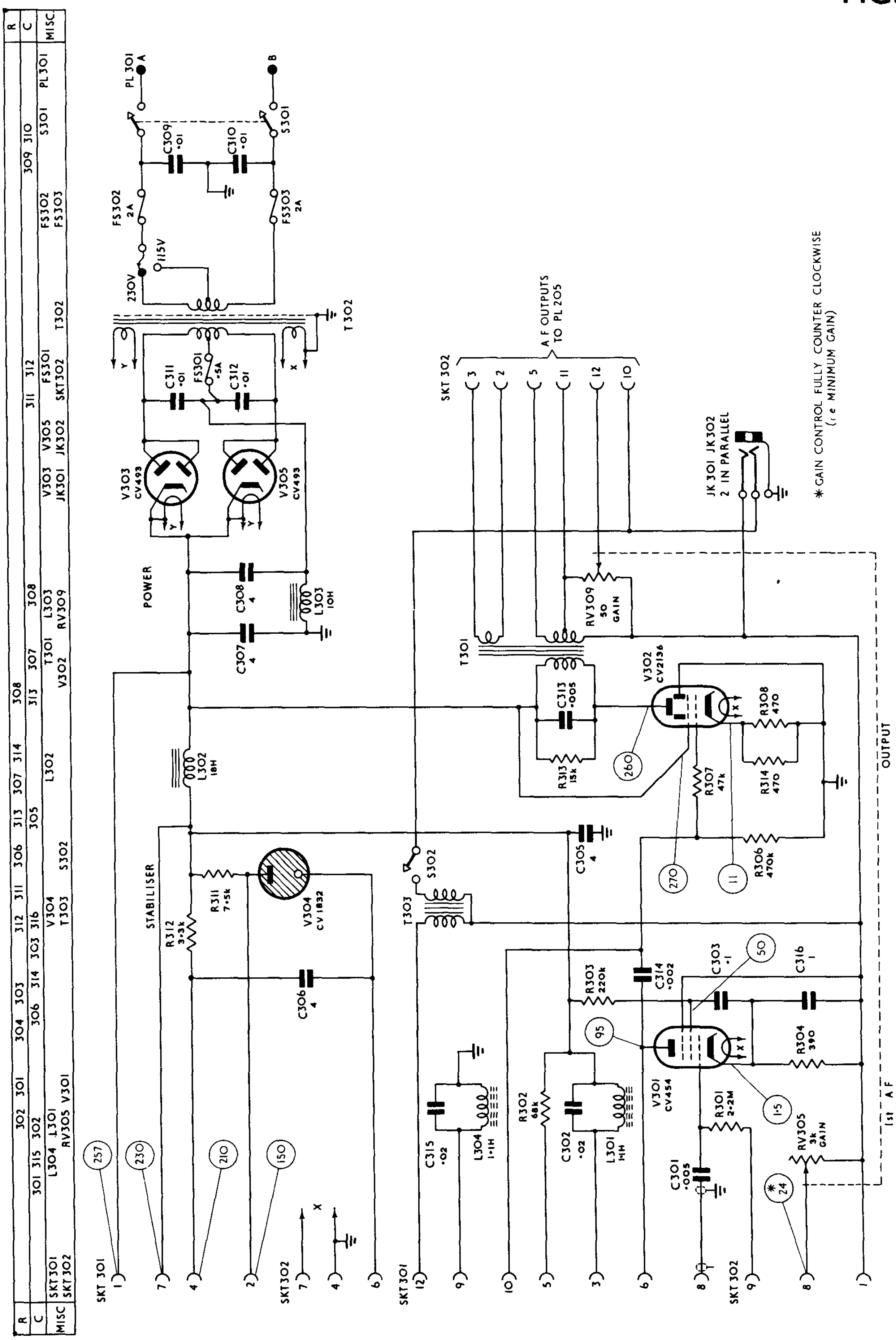


BOTTOM LAYOUT

RECEIVER B41

A.F. & POWER UNIT. LAYOUTS. A.P. 57141C

FIG. 26



✱ GAIN CONTROL FULLY COUNTER CLOCKWISE (i.e MINIMUM GAIN)

RECEIVER B41

A.F. & POWER UNIT. CIRCUIT DIAGRAM. A.P. 57141C

COMPONENTS LIST RECEIVER B41

PATTERNS 57141/A/B/[redacted] C5

A. F. AND POWER UNIT

CAPACITORS

NOTE:- Before ordering replaceable parts reference should be made to the relevant E List and the Substitution Guide.

B41/A/B/C

Ref.	A.P. or Joint Service Cat. No.	Value	Tol	Rating	Remarks
C301	Z115502	0.005 μF	20%	1000V	
C302	Z115516	0.02 μF	10%	750V	
C303	Z115506	0.1 μF	20%	350V	
C304	Z115500	0.001 μF	20%	1000V	B41/A only
C305	Z112521	4 μF	20%	400V	
C306	Z112521	4 μF	20%	400V	
C307	Z112521	4 μF	20%	400V	
C308	Z112521	4 μF	20%	400V	
C309	Z124409	0.01 μF	20%	750V	
C310	Z124409	0.01 μF	20%	750V	
C311	Z124409	0.01 μF	20%	750V	
C312	Z124409	0.01 μF	20%	750V	
C313	Z115502	0.005 μF	20%	1000V	
C314	-	0.002 μF	10%	1000V	B41B/C only
C315	Z115516	0.02 μF	10%	750V	B41B/C only
C316	Z115569	1 μF	25%	750V	B41C only

RESISTORS

C5 B41/A/B/[redacted] SEE CHANGE No2

Ref.	A.P. or Joint Service Cat. No.	Value Ohms	Tol	Rating Watts	Remarks
R301	Z223207	2.2M	10%	$\frac{1}{2}$	
R302	Z223017	68k	10%	$\frac{1}{4}$	
R303)	Z223101	330k	10%	$\frac{1}{4}$	B41/A/B only
R303)	Z223080	220k	10%	$\frac{1}{4}$	B41C only
R304)	Z221227	820	10%	$\frac{1}{4}$	B41/A/B only
R304)	Z221185	390	10%	$\frac{1}{4}$	B41/C only
RV305	Z273001	3k	10%	$2\frac{1}{2}$	R.F. section of ganged GAIN control RV305/309
R306	Z223122	470k	10%	$\frac{1}{4}$	
R307	Z222215	47k	10%	$\frac{1}{4}$	
R308)	Z221123	120	10%	$\frac{1}{2}$	B41/A/B only
R308)	Z221195	470	10%	$\frac{1}{2}$	B41C only
R309	Z273001	50	10%	$2\frac{1}{2}$	A.F. section of ganged GAIN control RV305/309
R310	Z223144	680k	10%	$\frac{1}{2}$	
R311	Z244085	7.5k	5%	4.5	
R312	Z222069	3.3k	10%	$\frac{1}{2}$	
R313	Z244114	15k	5%	6	
R314	Z221195	470	10%	$\frac{1}{2}$	B41C only

TRANSFORMERS

B41/A/B/C

C5

Ref.	A.P.	Description
T301	65689	Output Transformer
T302	65561B	Mains Transformer B41/A
T302	67763A	Mains Transformer B41/B/C
T303	65690	Transformer Monitor Loudspeaker B41C only
T305	65690	Transformer Monitor Loudspeaker B41B only

INDUCTORS

B41/A/B/C

C5

Ref.	A.P.	Description
L301		Choke 1H, Note Filter See Fig. 62
L302	65560	Choke 18H, Smoothing
L303	65564	Choke 10H, Smoothing
L304		Choke 1H, Note Filter - B41/B/C only See Fig. 62

FUSES

B41/A/B/C

C5

Ref.	A.P.	Description
FS301	Z590108	Fuse 0.5 Amp
FS302	Z590110	Fuse 2 Amp
FS303	Z590110	Fuse 2 Amp

PLUGS AND SOCKETS

B41/A/B/C

C5

Ref.	A.P. or Joint Service Cat. No.	Description
PL301	Z560050	Plug 2 Pin, Mains (Mark 4)
SKT301)	70376	Socket 8 Way, I.F/A.F. and Power Unit B41/A only
SKT301)	70377	Socket 12 Way, I.F/A.F. and Power Unit B41B/C only
SKT302)	70377	Socket 12 Way, I.F/A.F. and Power Unit

The mains input cable and items required for a mating socket for the 2 pin plug PL301 are as follows:-

	6145-99-910-0008	Min. cable 2R
	5935-99-056-0090	Socket electrical (free) male shell
	5935-99-011-9877	Seal, rubber, special shaped section
	5935-99-011-9122	Shield, electrical, plug-socket (angle)
	5935-99-097-0293	Adaptor, cable to electrical plug-socket
	5310-99-097-0095	Washer, flat
	5975-99-097-0101	Ring, electrical bonding
	5935-99-097-0107	Seal, rubber, special shaped section
	5975-99-097-0114	Sleeve, cable binding

SWITCHES

B41/A/B/C

C5

Ref.	A.P.	Description
S301	60448	Switch, Double Pole, Mains
S302	52805	Switch Monitor Loudspeaker - B41C only
S304	52805	Switch Monitor Loudspeaker - B41B only

JACKS

B41/A/B/C

C5

Ref.	A.P.	Description
JK301/2	676A	Jacks, 3 Pole, Telephones

COMPONENTS LIST RECEIVER B41C

PATTERN 571413

NOTE:- Before ordering replacement parts, reference should be made to the relevant E List and substitution guide.

CAPACITORS

A.F. AND POWER UNIT

Ref.	Service Ref. No. or NSN	Value	Tol.	Rating	Remarks
C301	5910-99-011-7827	0.005 µF	20%	1000 V	Fixed
C302	5910-99-580-1816	0.02 µF	10%	750 V	Fixed
C303	5910-99-011-7818	0.1 µF	20%	350 V	Fixed
C304					
C305	5910-99-011-2926	4 µF	20%	400 V	Fixed
C306	5910-99-011-2926	4 µF	20%	400 V	Fixed
C307	5910-99-011-2926	4 µF	20%	400 V	Fixed
C308	5910-99-011-2926	4 µF	20%	400 V	Fixed
C309	5910-99-012-4409	0.01 µF	20%	750 V	Fixed
C310	5910-99-012-4409	0.01 µF	20%	750 V	Fixed
C311	5910-99-012-4409	0.01 µF	20%	750 V	Fixed
C312	5910-99-012-4409	0.01 µF	20%	750 V	Fixed
C313	5910-99-011-7827	0.005 µF	20%	1000 V	Fixed
C314	N.P.	0.002 µF	10%	1000 V	Fixed
C315	5910-99-580-1816	0.02 µF	10%	750 V	Fixed
C316	5910-99-011-9836	1 µF	25%	150 V	Fixed

RESISTORS

A.F. AND POWER UNIT

Ref.	Service Ref. No. or NSN	Value Ohms	Tol.	Rating Watts	Remarks
FIXED					
R301	5905-99-022-3206	2.2 M	10%		RC7-J
R302	5905-99-022-3016	68 k	10%		RC7-K
R303	5905-99-022-3079	220 k	10%		RC7-K
R304	5905-99-022-1184	390	10%		RC7-K
R305					
R306	5905-99-022-3121	470 k	10%		RC7-K
R307	5905-99-022-2214	47 k	10%		RC7-K
R308	5905-99-022-1195	470	10%		RC7-H
R309					
R310					

RESISTORS (Contd.)

A.F. AND POWER UNIT

Ref.	Service Ref. No. or NSN	Value Ohms	Tol.	Rating Watts	Remarks
FIXED (Contd.)					
R311	5905-99-011-3508	7.5 k	5%		RWV4-K
R312	5905-99-022-2069	3.3 k	10%		RC7-H
R313	5905-99-011-3425	15 k	10%		RWV4-L
R314	5905-99-022-1195	470	10%		RC7-H
VARIABLE					
RV305	5905-99-580-0482	3 k	10%		Ganged
RV309	5905-99-580-0482	50	10%		Ganged

TRANSFORMERS

A.F. AND POWER UNIT

Ref.	NATO Stock No.	Description
TR301	5950-99-971-9621	Audio
TR302	5950-99-971-9596	Mains
TR303	5950-99-971-9513	L.S.O.P.

INDUCTORS

A.F. AND POWER UNIT

Ref.	Service Ref. No. or NSN	Description
L301	A.P.106152	Choke, 1.2 H
L302	5950-99-971-9618	Choke, 18 H
L303	5950-99-971-9620	Choke, 10 H
L304	A.P.106152	Choke, 1.2 H

FUSES

A.F. AND POWER UNIT

Ref.	NATO Stock No.	Description
FS301	5920-99-059-0108	Cartridge, 500 mA
FS302	5920-99-059-0110	Cartridge, 2 A
FS303	5920-99-059-0110	Cartridge, 2 A

PLUGS AND SOCKETS

A.F. AND POWER UNIT

Ref.	NATO Stock No.	Description
PL301	5935-99-999-3528	2 pin, Fixed
SK301	5935-99-972-8233	12-way, Painton
SK302	5935-99-972-8233	12-way, Painton
SK303	5935-99-999-3523	2-way, Free
JK301	5935-99-972-9652	3 pole, Jack
JK302	5935-99-972-9652	3 pole, Jack

SWITCHES

A.F. AND POWER UNIT

Ref.	NATO Stock No.	Description
SW301	5930-99-953-0018 (Modified)	Double Pole
SW302	5930-99-972-5014	Single Pole

VALVES, ELECTRONIC

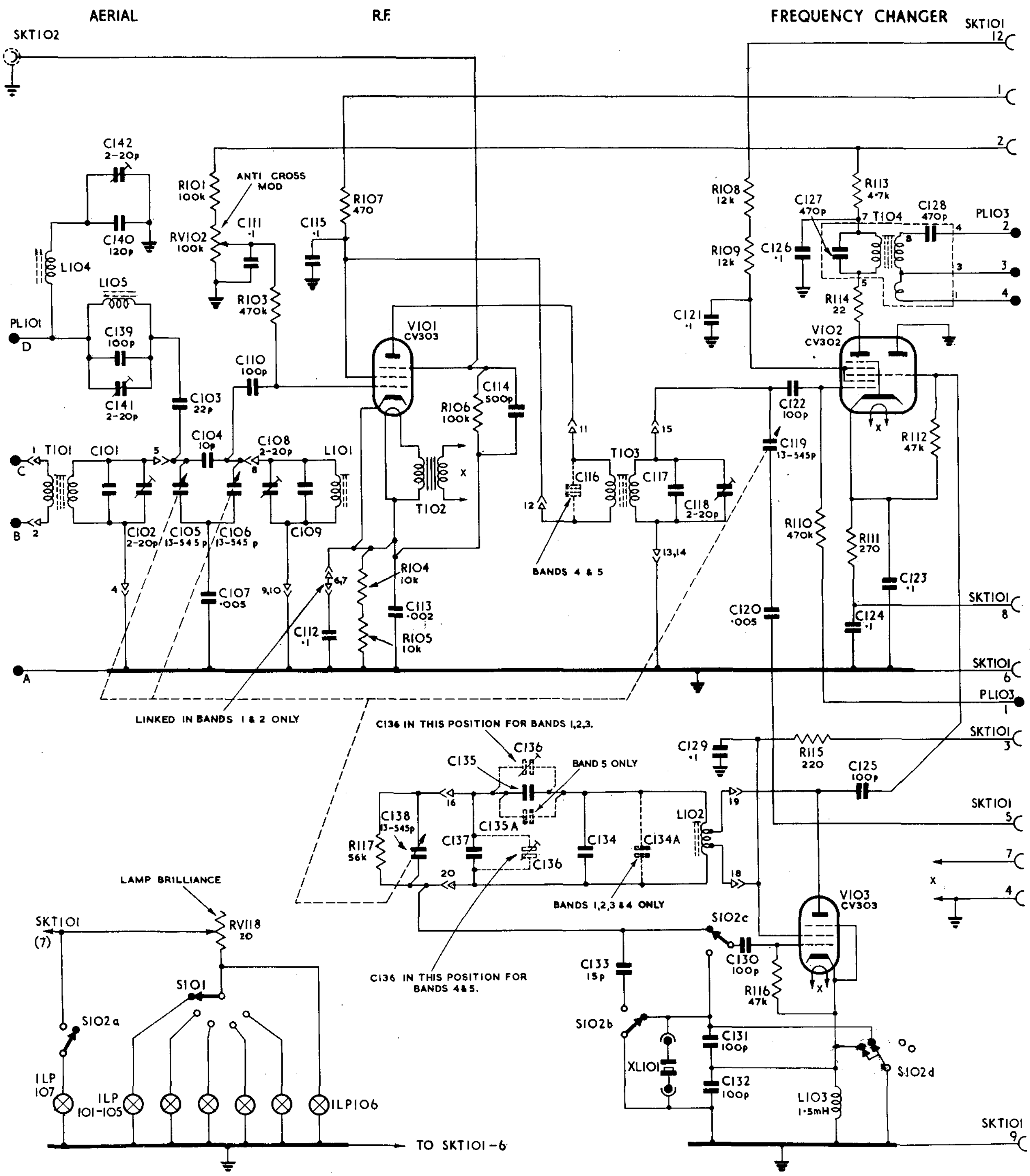
A.F. AND POWER UNIT

Ref.	NATO Stock No.	Description
V301	5960-99-000-4009	CV4009
V302	5960-99-000-4043	CV4043
V303	5960-99-000-4005	CV4005
V304	5960-99-037-2254	CV4100
V305	5960-99-000-4005	CV4005

FIG. 27

R	101 103 104 107 117 105 106 108 116 109 110 111 115 113 114 112	R
C	139–142 103 104 111 115 136 116 131 121 119 127 106 108 112 113 137 114 135 133 134A 117 118 130 126 125 123 128 101 102 105 107 110 109 138 135A 134 132 129 120 122 124	C
MISC	PL101 L105 RV118 T103 L102 V103 V102 SKT101 T101 L104 S101 L101 V101 T102 XL101 S102d SKT102 S102a ILP101–107 RV102 S102b S102c L103 T104 PL103	MISC

R.F. UNIT



NOTE :–
1. THE FOLLOWING COMPONENTS ARE NOT FITTED IN PATT. 57141/A — C139, C140, C141, C142, L104, L105.
2. C135A AND C134A ARE FITTED ONLY IN PATT. 57141B.
3. REFER TO FIG.2 PARTS FOR VALUES OF COMPONENTS IN TURRET COMPARTMENT.
4. THE REPLACEMENT TRIMMERS FOR THE 2–20p SHOWN ARE Z 160009 4–18p
5. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

This sheet issued with A L. No. 1 January 1958

R	202. 201 205 207 206 209 210 237 212 217.214.216 23 219 203 208 211 213 234 215 228 236 204 235 218 229 232.229.231 233
C	201 202 203 207 209 210 212 215 214 217 218 219 22 206 208 224 222 223 211 213 216 233 234 236 232 220 204 205 239 238 221 237 235
MISC	PL201 S201a & b T201 V201 T202 S201d V202 T203 S201e V203 S202s V204A T204 V20 SKT201 PL203 T205 S202a S201c L206 S202b S202c S202q. L204. L203. SKT202. S201g. L202a L207 TL L201 S204 S205 S202g. LS201. PL205. S202j S202k S202p XL201 S202m L205 L202b S202n

I.F. UNIT.

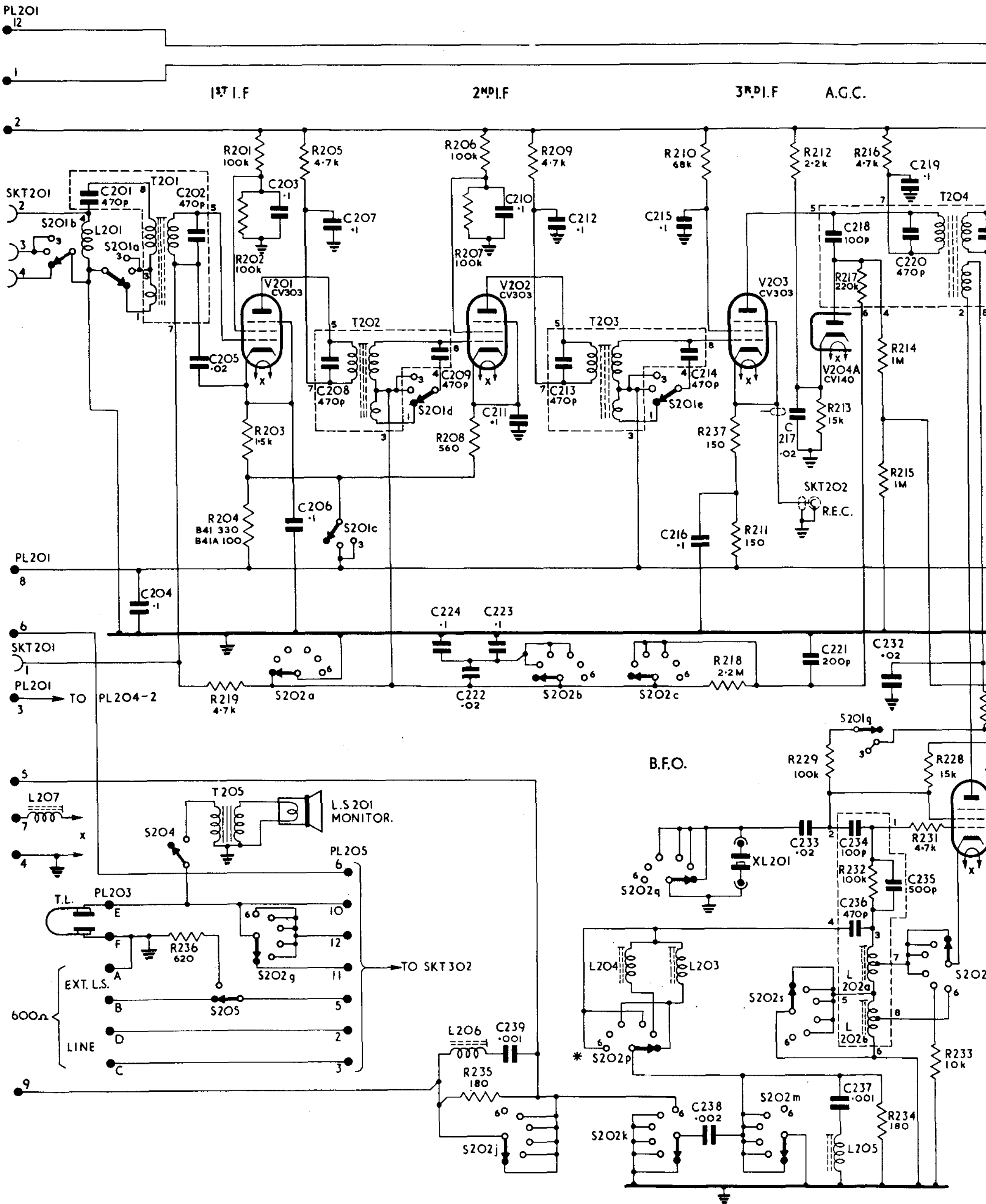
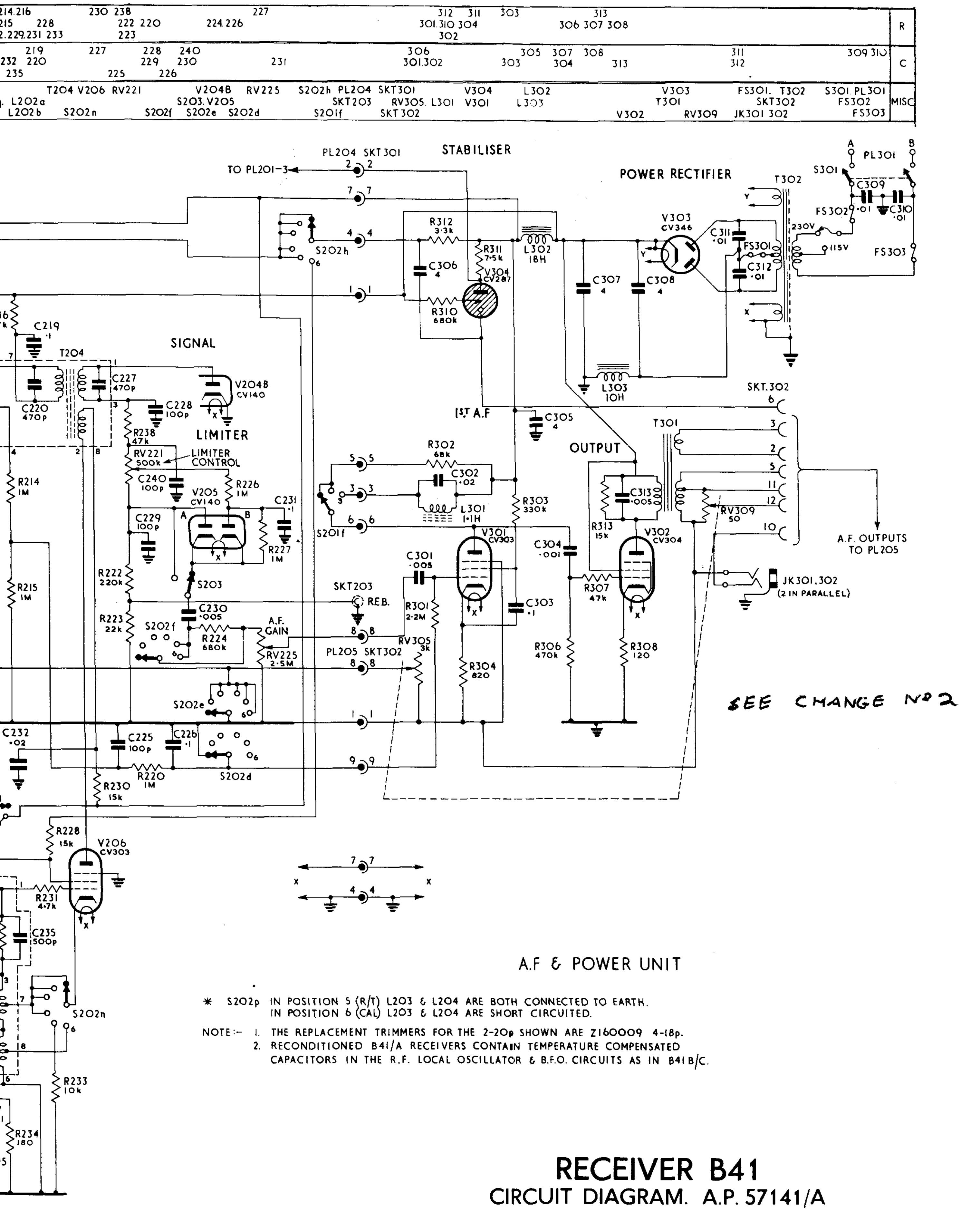


FIG. 27



A.F & POWER UNIT

* S202p IN POSITION 5 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH.
IN POSITION 6 (CAL) L203 & L204 ARE SHORT CIRCUITED.

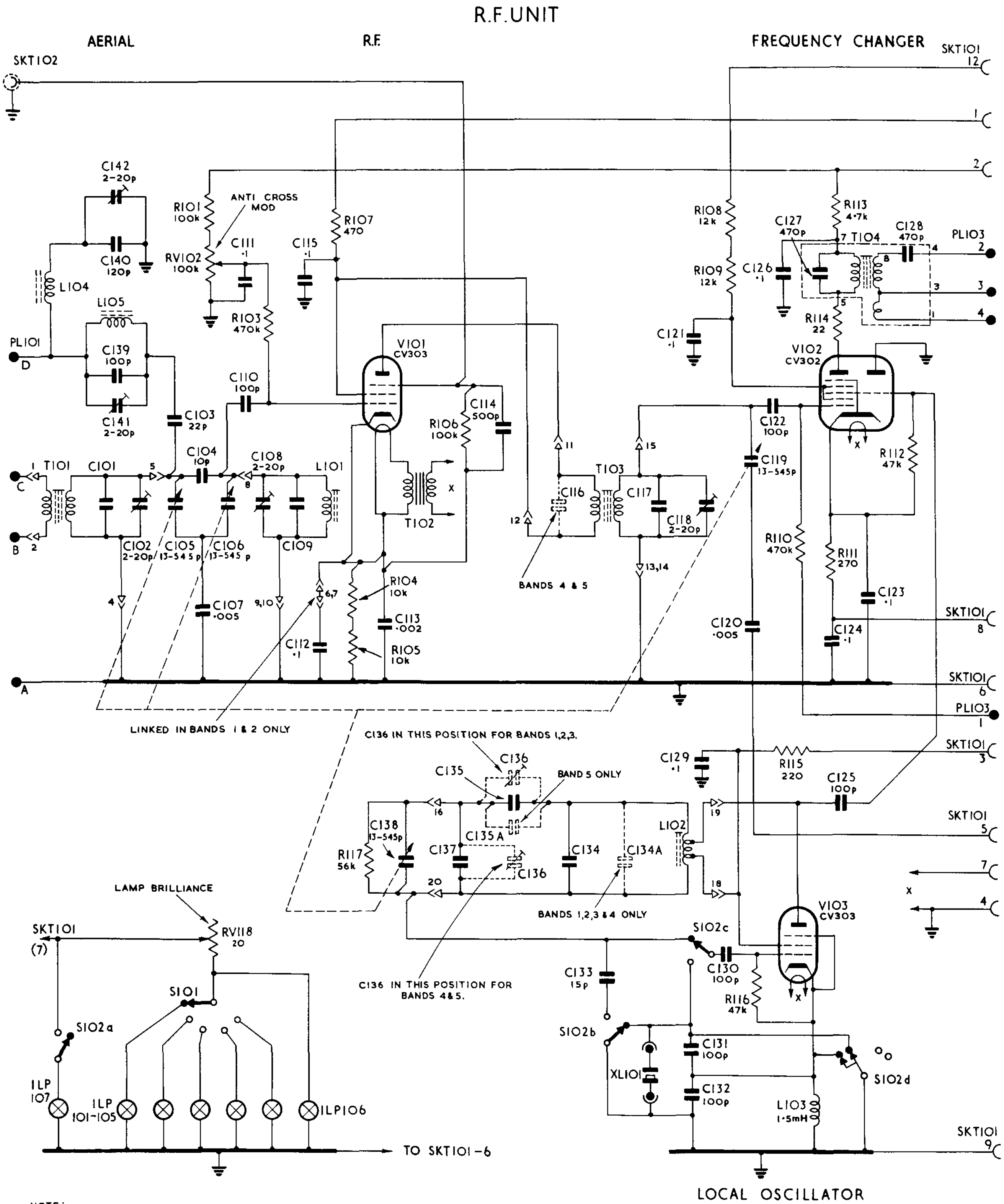
NOTE:- 1. THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z160009 4-18p.
2. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

RECEIVER B41

CIRCUIT DIAGRAM. A.P. 57141/A

FIG. 28

R	101 104 108 110 113 103 107 117 106 116 111 112 105 109 115 114	R
C	139–142 103 104 111 115 136 116 131 121 119 127 106 108 112 113 137 114 135 133 134A 117 118 130 126 125 123 128 101 102 105 107 110 109 138 135A 134 132 129 120 122 124	C
MISC	PL101 L105 RV118 T103 L102 V103 V102 SKT101 T101 L104 S101 L101 V101 T102 XL101 S102d SKT102 S102a ILP101–107 RV102 S102b S102c L103 T104 PL103	MISC



NOTE:–
1. THE FOLLOWING COMPONENTS ARE NOT FITTED IN PATT. 57141/A — C139, C140, C141, C142, L104, L105.
2. C135A AND C134A ARE FITTED ONLY IN PATT 57141B.
3. REFER TO FIG.2 PART 3 FOR VALUES OF COMPONENTS IN TURRET COMPARTMENT
4. THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z 160009 4-18p
5. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41 B/C.

This sheet issued with A.L. No. 1 January 1958

R	202 201 205 207 210 238 212 217 214 216 203 219 235 206 209 211 215 231 233 204 236 208 234 230 213 232 229 228
C	202 203 246 210 212 215 217 218 234 219 201 204 239 208 207 209 244 247 245 241 211 214 216 232 236 220 205 206 238 213 237 221 233 242 243 235
MISC.	S201b T201 V201 S201c T202 S201h XL202 S201l T203 V203 V204A T2 PL201 L201 S206ac S201d S201k L208 V202 XL201 SKT202 SKT201 S201a PL203 S205 PL205 S201m S202q L204 L203 L202a L207 TL L206 S206d S202j S202k S202m L205 S202p S202s L202b S202n

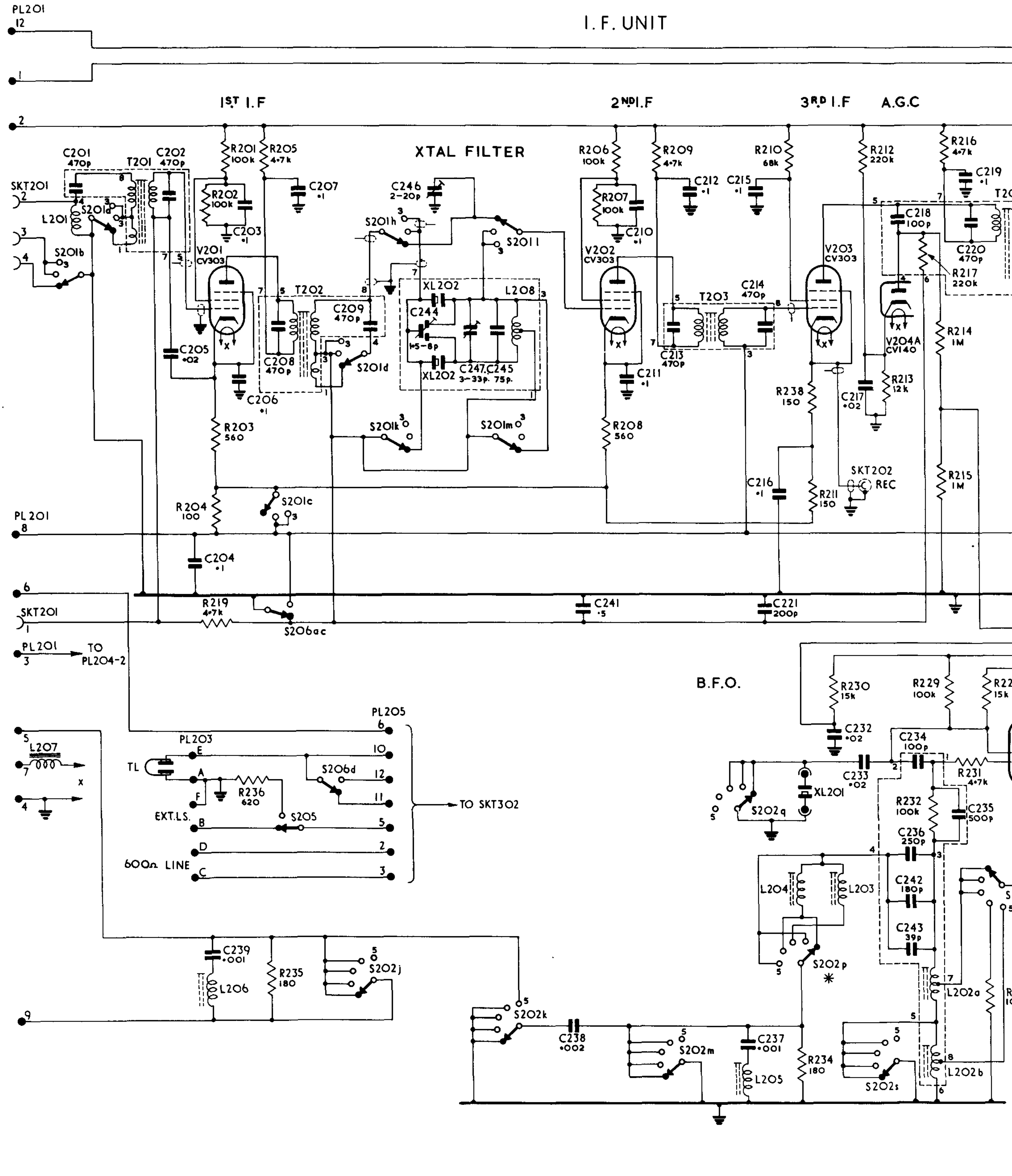
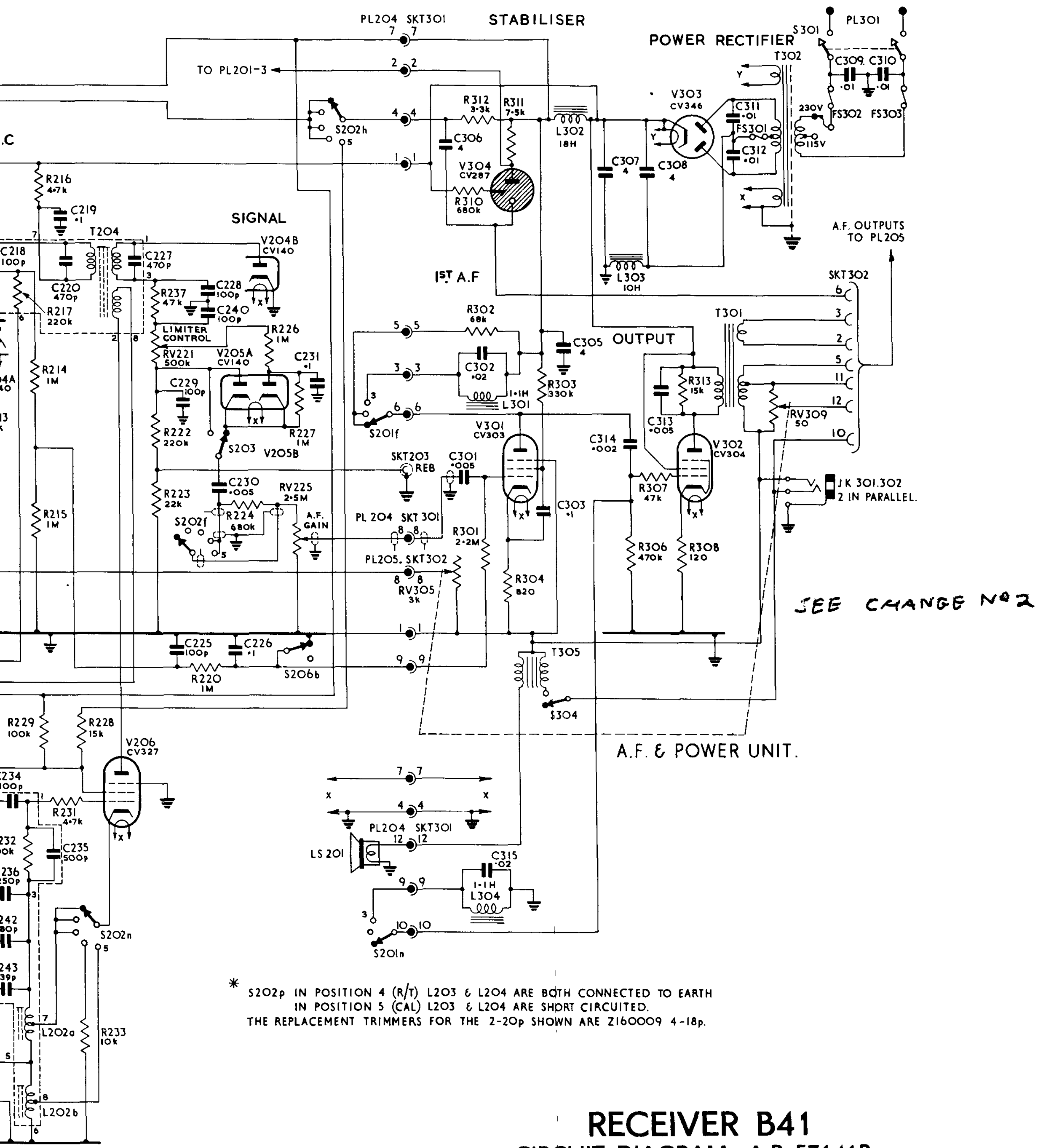


FIG. 28

217 214 216 215 231 233 232 229 228 237 222 223 220 226 224 227 312 311 303 302 304 310 301 306 307 313 308	R
234 219 236 220 242 243 235 227 228 229 240 226 225 230 231 306 302 301 315 305 303 307 308 314 313 311 312 310 309	C
A T204 RV221 L202a V206 L202b S202n S203 S202f V204B V205 A & B RV225 S206b S202h PL204 SKT301 PL205 S201f LS201 SKT203 S201n SKT302 L301 RV305 L304 V304 V301 T305 L302 L303 S304 V303 V302 T301 FS301 RV309 T302 S301 PL301 SKT302 JK301, 302. FS302 FS303	MISC.



SEE CHANGE No 2

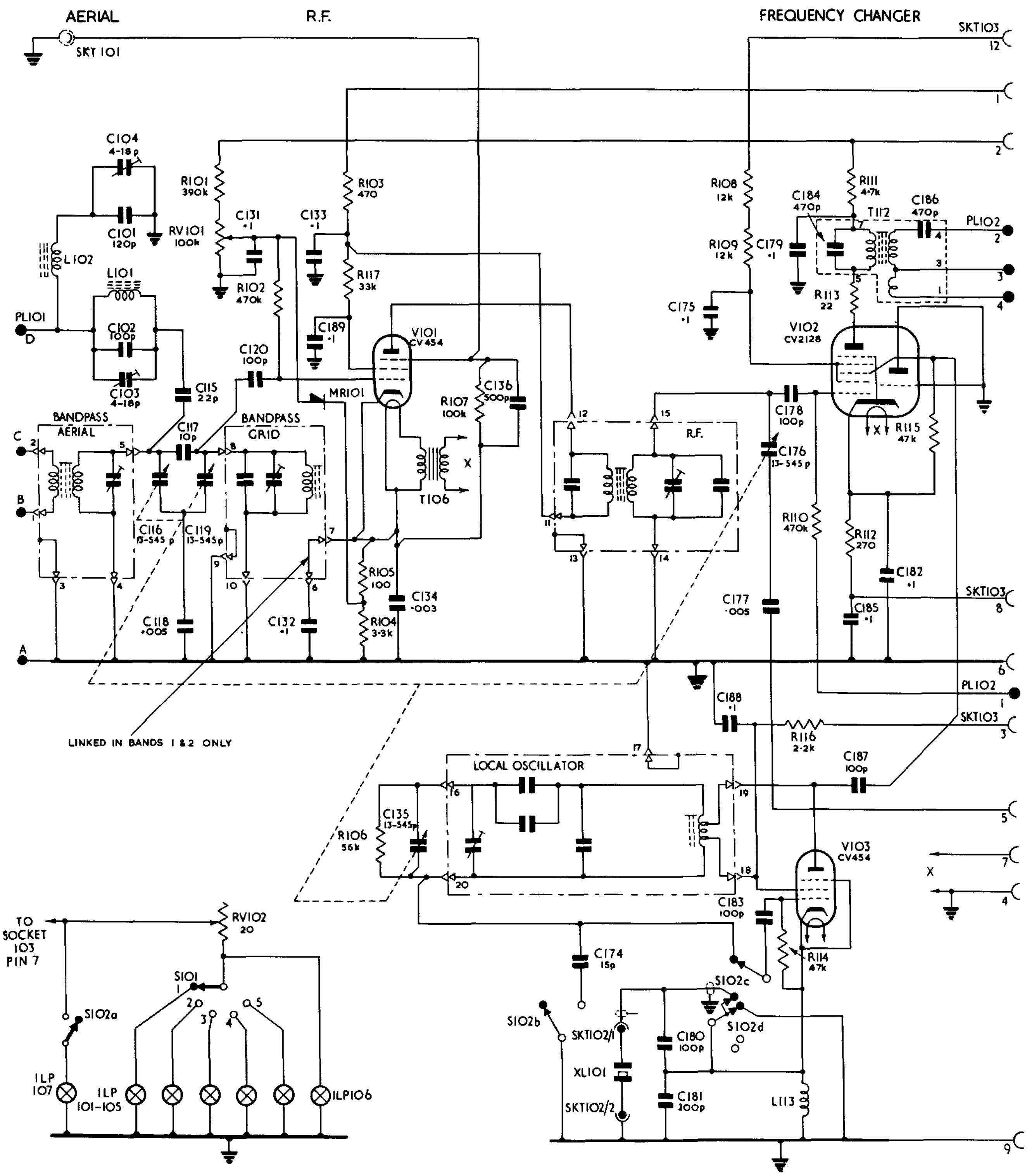
* S202p IN POSITION 4 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH
IN POSITION 5 (CAL) L203 & L204 ARE SHORT CIRCUITED.
THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z160009 4-18p.

RECEIVER B41
CIRCUIT DIAGRAM. A.P. 57141B

FIG. 29

R	101 102 103 117 105 106 104 107 108 109 111 110 113 116 114 112 115	R
C	101-104 115 117 116 118 119 131 120 132 133 189 135 134 136 174 175 180 181 188 183 177 179 184 178 176 185 187 182 186	C
MISC	L102 PL101 S102a SKT101 L101 RV101 S101 ILF 101-107 RV102 MR101 V101 T106 S102b XL101 SKT102 S102c S102d V102 V103 L113 T112 SKT103 PL102	MISC

R.F. UNIT



NOTE.
FOR CIRCUIT & LAYOUT DETAILS OF BAND SWITCH TURRET COMPARTMENTS REFER TO FIGS.7 & 8 PART 3.
ABOVE CIRCUIT SHOWS BAND SWITCH ON BAND 5.

This sheet issued with A.L. No. 1 January 1958

R	202 201 205 203 219 235 204 236 207 206 209 208 210 238 211 234 230 212 213 217 21 21 232
C	201 202 205 204 239 203 206 208 207 209 246 244 247 245 241 238 210 211 212 213 215 214 237 221 216 232 233 217 218 234 236 242 24
MISC.	S201b PL201 L201 SKT201 S201a L207 T201 TL V201 PL203 L206 S201c S206ac S205 T202 S206d S201d S201h PL205 S202j S201k XL202 S201l L208 S201m S202k V202 S202m T203 S202q L205 SKT204 XL201 L204 S202p V203 SKT202 L203 V204A S202s L20 L20

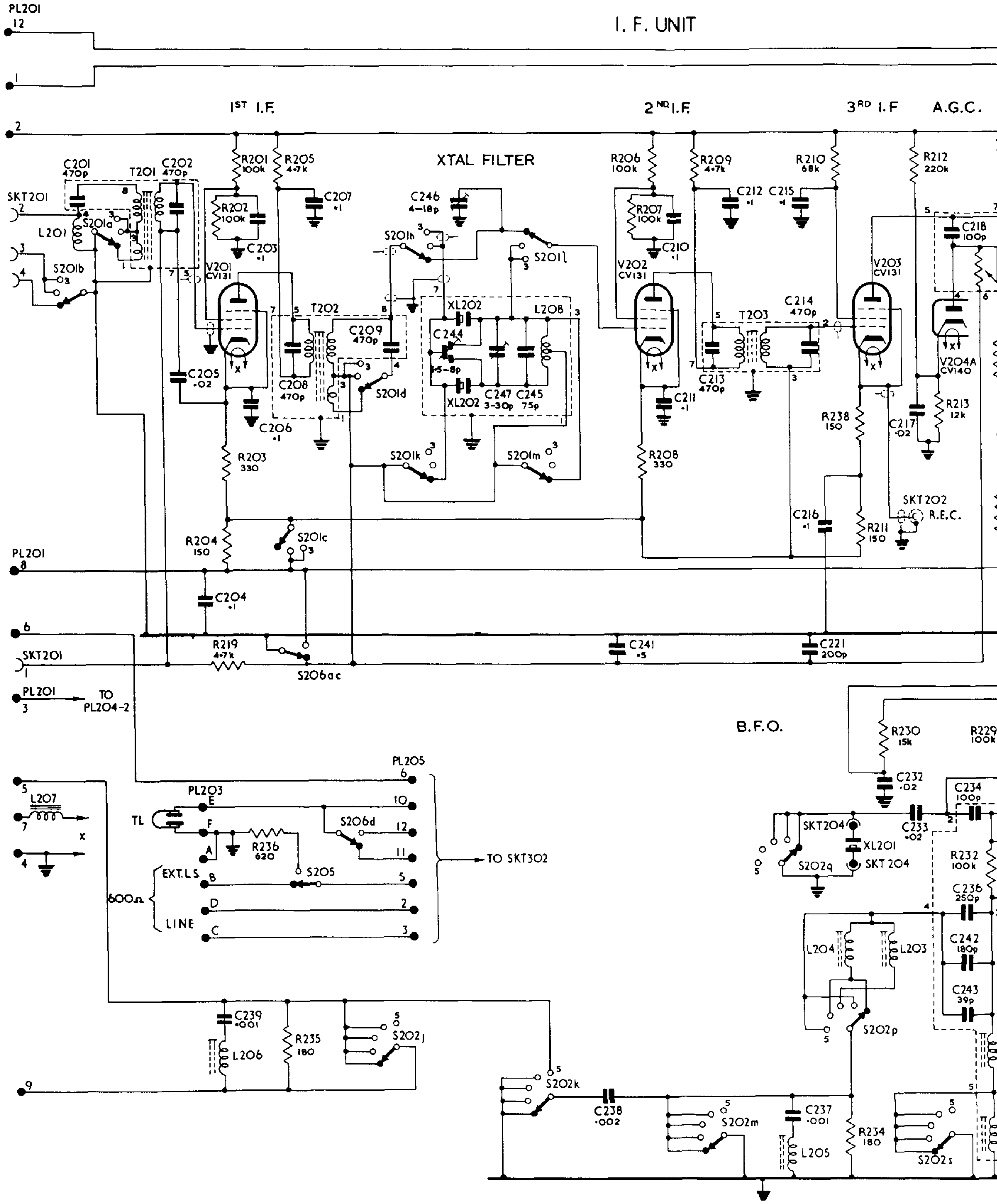
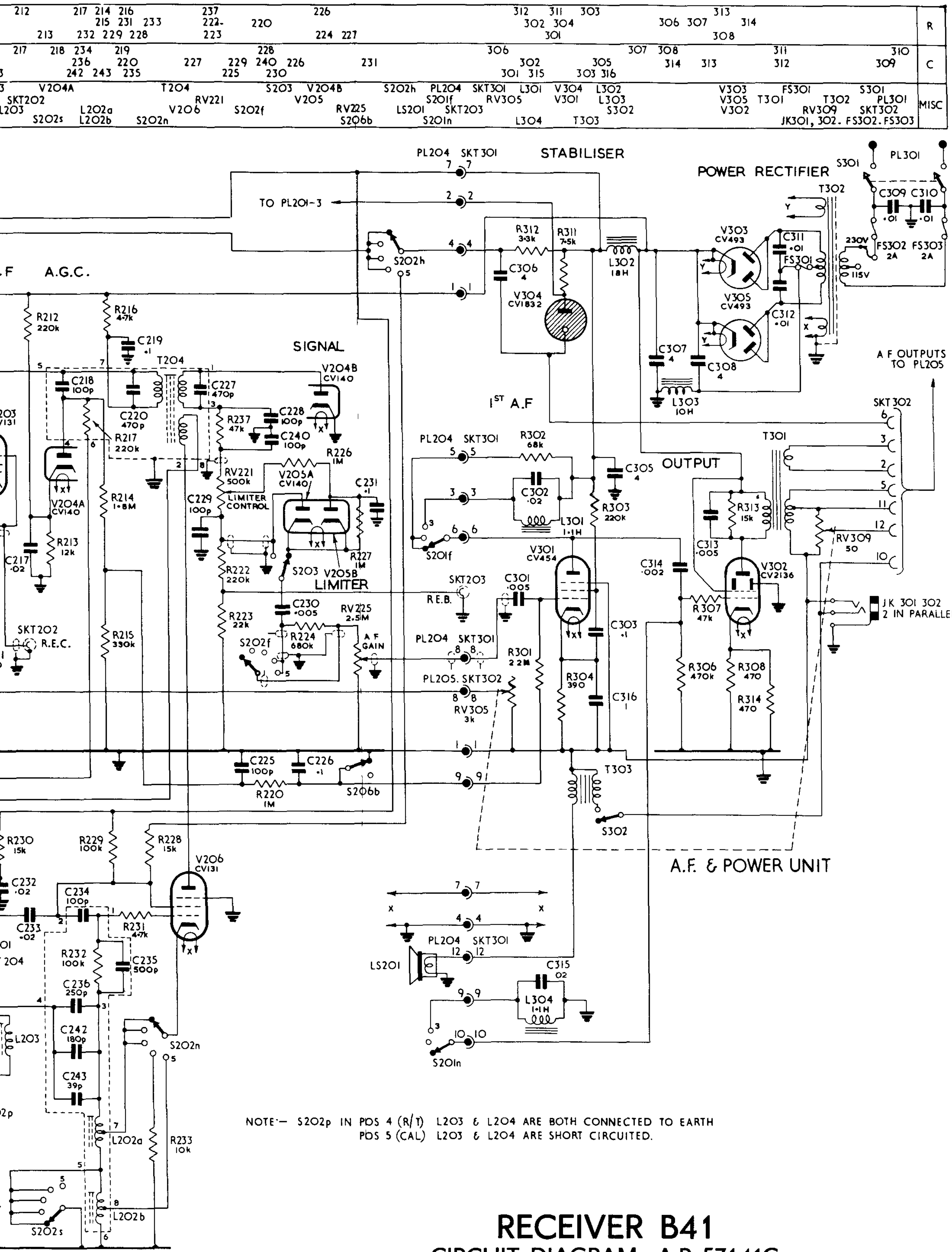


FIG. 29

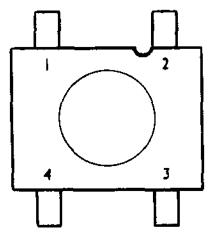


RECEIVER B41
CIRCUIT DIAGRAM. A.P. 57141C

FIG. 30

REPAIR AND WINDING DATA FOR COILS

1. The following pages give details concerning the coils for the various transformers, chokes and similar components through-out the receiver. All patterns are covered by this information. Winding data is not given for the later types of iron cored transformers and chokes, as these items are not repairable, it is important therefore, that spares of these items should be available. Details are given concerning the rating and general characteristics of these components so that in the case of a real emergency where no direct spare is available, a suitable substitute could be fitted.



All references to direction of winding refer to this position.

Small coil from the base showing the tag positions

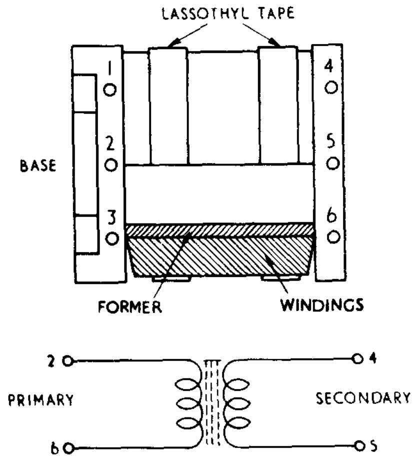
FIG. 31

AERIAL COIL BAND I (T!01)
T101-B41C

WINDING DATA

PRIMARY WINDING

Start Tag 6. Finish Tag 2.
55 turns counter-clockwise* with 38 s.w.g.
wire (double fortisan covered - d.f.c.-)
Single layer to occupy the full length of the former
Pitch - 17.3 mils
Turns per inch - 58
Finish - Two layers of 0.002 x 1" paper secured
with Chatterton's compound.



SECONDARY WINDING

Start Tag 4. Finish Tag 5.
2870 turns counter-clockwise* with 40 s.w.g.
enamel wire. Each layer 15/16" wide interleaved
with 0.002" x 1" x 3¾" paper.
Pitch 6.38 mils
Turns per layer - 147 (19½ layers).
Finish - 2 layers 0.002" x 1" paper secured
with Chatterton's compound
Secure outside layer of paper with 2 turns
of 0.005" x ¼" Lassothyl tape at each end

*Direction of rotation of former looking at the base.

Coils to be vacuum impregnated and wax dipped

Colour Code - Red. Red. Yellow

FIG. 32

AERIAL COIL BAND 2 (T101)
T102 - B41C

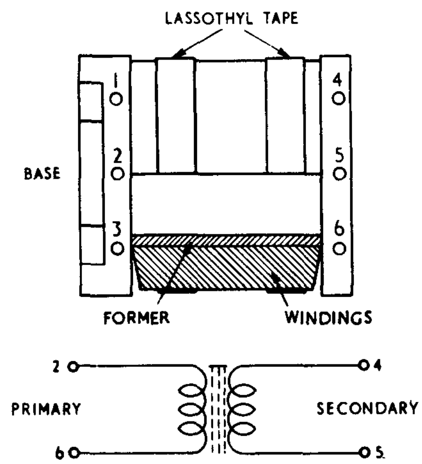
WINDING DATA

PRIMARY WINDING

Start Tag 6, Finish Tag 2.
35 turns counter-clockwise* of 38 s.w.g. double fortisan covered wire.
Single layer to occupy full length of the former.
Pitch - 27 mils
Turns per inch - 37
Finish - Two layers of 0.002" x 1" paper secured with Chatterton's compound.

SECONDARY WINDING

Start Tag 4, finish Tag 5.
1350 turns counter-clockwise* of 36 s.w.g. enamel wire. Each layer 15/16" wide, interleaved with 0.002" x 1" x 3¾" paper.
Pitch - 9.38 mils.
Turns per layer - 100 (13½ layers).
Finish - Two layers of 0.002" x 1" paper, secured with Chatterton's compound. Secure outside layer of paper with two turns of 0.005" x ¼" Lassothyl tape at each end.



*Direction of rotation of the former looking at the base.

Coils to be vacuum impregnated and wax dipped.

Colour code - Red, Yellow Yellow

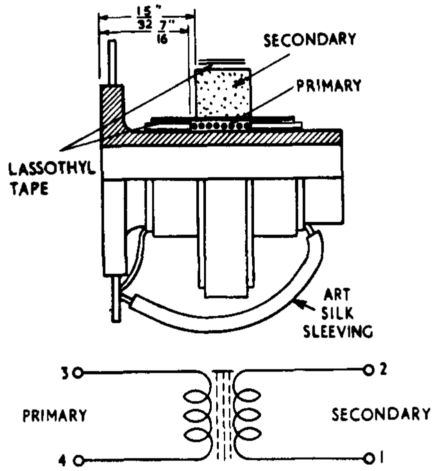
FIG. 33

AERIAL COIL BAND 3 (T101)
T103 - B41C

WINDING DATA

PRIMARY WINDING

Start Tag 3, finish Tag 4.
38¼ turns counter-clockwise* (start 7/16" from the former base) of 37 s.w.g. wire (d.f.c.)
Type of winding - single layer solenoid (see note).
Start and finish held with 0.005" x ¼" Lassothyl tape. The whole winding is covered with two layers of 0.002" x 3/16" paper, secured with Chatterton's compound.



SECONDARY WINDING

Start Tag 2, finish Tag 1.
700¼ turns clockwise * (start 15/32" from former base) of 38 s.w.g. wire, enamel and single fortisan covered - s.f.c.-).
Type of winding - half wave 31/63,
Length of winding - 5/16"
Douglas gears - A-38, B-29, C-36, D-48, E-40, F-80
Finish - Two turns of 0.005" x ¼" Lassothyl tape

*Direction of rotation of former, looking at base.

Coils to be vacuum impregnated and wax dipped.

Note: The primary winding is wound directly underneath the secondary winding and is insulated from it by the two layers of 0.002" paper. Both ends of the primary winding are held by tape. The end remote from the base must be sleeved with art silk sleeving.

Colour Code - Red, Green, Yellow.

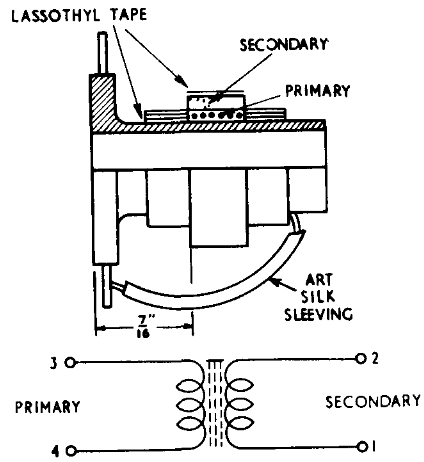
FIG. 34

AERIAL COIL BAND 4 (T101)
T104 - B41C

WINDING DATA

PRIMARY WINDING

Start Tag 3, finish Tag 4.
26¼ turns counter-clockwise* (start 7/16" from the former base) of 30 s.w.g. wire (d.f.c.)
Type of winding - Close wound single layer solenoid (see note).
Start and finish held with 0.005" x ¼" Lassothyl tape. The whole winding is covered with two layers of 0.002" x 13/16" paper, secured with Chatterton's compound.



SECONDARY WINDING

Start Tag 2, finish Tag 1.
335¼ turns clockwise * (start 7/16" from the former base) of 9/46 s.w.g. enamelled wire, single fortisan covered.
Type of winding - half wave 21/43.
Length of winding - ⅜"
Douglas gears - A-50, B-42, C-41, D-50, E-40, F-80.
Finish - Two turns of 0.005" x ¼" Lassothyl tape.

*Direction of rotation of former, looking at the base.

Coils to be vacuum impregnated and wax dipped.

Note: The primary winding is wound directly underneath the secondary winding and is insulated from it by the two layers of 0.002" paper. Both ends of the primary winding are held by tape. The end remote from the base must be sleeved with art silk sleeving. It must be left free until after the secondary winding has been wound

Colour Code - Red, Blue, Yellow.

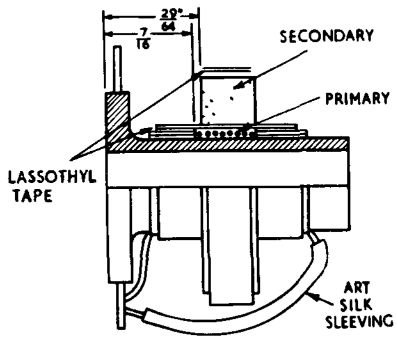
FIG. 35

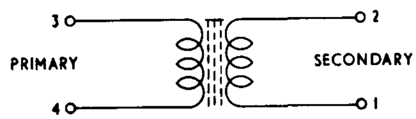
AERIAL COIL BAND 5 (T101)
T105 - B41C

WINDING DATA

PRIMARY WINDING

Start Tag 3, finish Tag 4.
18¼ turns counter-clockwise* (start 7/16" from former base) of 26 s.w.g. wire d.f.c.
Type of winding - close wound single layer solenoid. (See note.)
Start and finish held with 0.005" x ¼" Lassothyl tape. The whole of the winding covered with two layers of 0.002" x 13/16" paper, secured with Chatterton's compound.





SECONDARY WINDING

Start Tag 2, finish Tag 1.
156¼ turns, clockwise* (start 29/64" from former base) of 30/48 s.w.g. enamelled wire, s.f.c.
Type of winding - half wave 31/64.
Length of winding - 11/32"
Douglas gears - A-50, B-32, C-31, D-50, E-40, F-80.
Finish - two turns of 0.005" x ¼" Lassothyl tape.

*Direction of rotation of former, looking at base.

Coils to be vacuum impregnated and wax dipped.

Note: The primary winding is wound directly underneath the secondary wave winding and is insulated from it by the two layers of 0.002" paper. Both ends of the primary winding are held by tape. The end remote from the base must be sleeved with art silk sleeving. It must be left free until after the secondary winding has been wound.

Colour Code - Red, White, Yellow.

FIG. 36

BAND-PASS COIL BAND I (L101) L103 - B41C

WINDING DATA

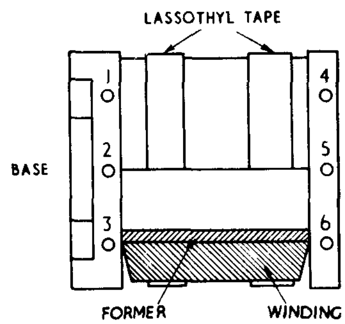
WINDING

Start Tag 4, finish Tag 5.
2870 turns counter-clockwise* of 40 s.w.g. enamelled wire, each layer 15/16" wide, interleaved 0.002" x 1.0" x 3¾" paper.
Pitch - 6.38 mils.
Turns per layer - 147 (19½ layers).
Finish - Two layers 0.002" x 1.0" paper, secure with Chatterton's compound. Secure outside layer of paper with two turns of 0.005" x ¼" Lassothyl tape at both ends.

*Direction of rotation of former, looking at base.

Coil to be vacuum impregnated and wax dipped.

Colour Code - Yellow, Red, Yellow.



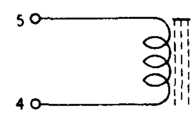


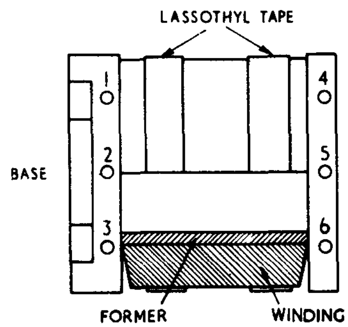
FIG. 37

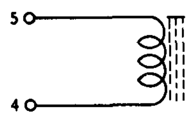
BAND-PASS COIL BAND 2 (L101)
L104 - B41C

WINDING DATA

WINDING

Start Tag 4, finish Tag 5.
1350 turns counter-clockwise* of 36 s.w.g. enamelled wire, each layer 15/16" wide; inter-leaved with 0.002" x 1" x 3¾" paper.
Pitch - 9.38 mils.
Turns per layer - 100 (13½ layers)
Finish - 2 layers of 0.002" x 1" paper, secured with Chatterton's compound. Secure the outside layer paper with two turns of 0.005" x ¼" Lassothyl tape at both ends.





Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at base.

Colour Code - Yellow, Yellow, Yellow

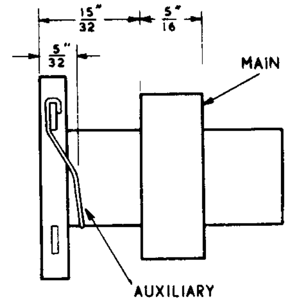
FIG. 38

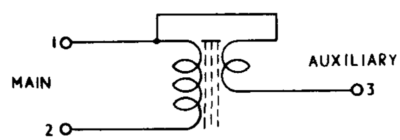
BAND-PASS COIL BAND 3 (L101) L105 - B41C

WINDING DATA

AUXILIARY WINDING

Start Tag 1, finish Tag 3 (start 5/32" from the former base).
½ turn clockwise* of 23 s.w.g. tinned copper wire.
Winding type - Link.
Finish - Taut and solder to tags.





MAIN WINDING

Start Tag 2, finish Tag 1 (start 15/32" from former base).
720¼ turns clockwise* 38 s.w.g. enamelled and single fortisan covered wire.
Length of winding - 5/16"
Winding Type - Half wave 31 : 63
Wound on Douglas gears -
A-38, B-29, C-36, D-48, E-40
F-80.
Finish - Two turns of 0.005" x ¼" Lassothyl tape.

Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at base.

Colour Code - Yellow, Green, Yellow.

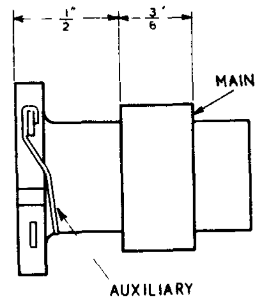
FIG. 39

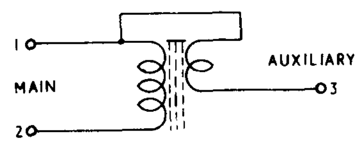
BAND-PASS COIL BAND 4 (L101)
L106 - B41C

WINDING DATA

AUXILIARY WINDING

Start Tag 1, finish Tag 3 (start 5/32" from former base)
Half a turn clockwise of 23 s.w.g. tinned copper wire.
Winding type – Link.
Finish – Taut and solder to tags.





MAIN WINDING

Start Tag 2, finish Tag 1 (start ½" from former base).
370¼ turns clockwise* 9/46 s.w.g. enamelled and single fortisan covered wire.
Length of winding – 3/8"
Type of winding – half wave 21:43.
Wound on Douglas gears A-50, B-42, C-41, D-50
E-40, F-80
Finish – Two turns of 0.005" x ¼" Lassothyl tape

Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at the base.

Colour Code – Yellow, Blue, Yellow.

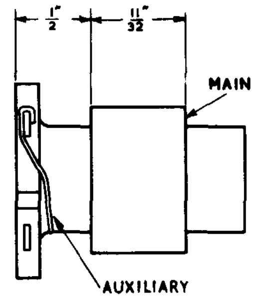
FIG. 40

BAND-PASS COIL BAND 5 (L101)
L107 - B41C

WINDING DATA

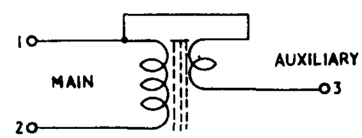
AUXILIARY WINDING

Start Tag 1, finish Tag 3 (start 5/32"
from former base).
Half a turn clockwise of 23 s.w.g.
tinned copper wire.
Type of winding - Link.
Finish - Taut and solder to tags.



MAIN WINDING

Start Tag 2, finish Tag 1 (start ½" from
the former base).
170¼ turns clockwise 30/48 s.w.g. enamelled
and single fortisan covered wire.
Length of winding - 11/32"
Type of winding - Half wave 31:64
Wound on Douglas gears - A-50, B-32, C-31, D-50,
E-40, F-80.
Finish - Two turns of 0.005" x ¼" Lassothyl tape.



Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at the base.

Colour Code - Yellow, White, Yellow.

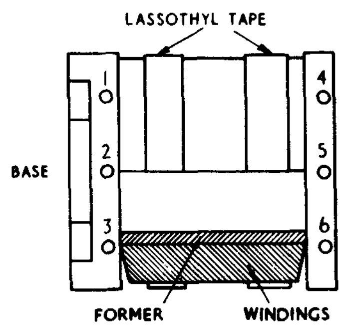
FIG. 41

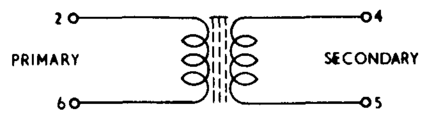
R.F. COIL BAND I (T103)
T107 - B41C

WINDING DATA

PRIMARY WINDING

Start Tag 6, finish Tag 2.
125 turns counter-clockwise* of 41 s.w.g.
double fortisan covered wired.
Single layer to occupy the whole length
of the former.
Pitch - 7.8 mils.
Turns per inch - 128.
Finish - Three layers of 0.002" x 1" paper
secured with Chatterton's compound.





SECONDARY WINDING

Start Tag 4, finish Tag 5.
2870 turns counter-clockwise* of 40 s.w.g.
enamelled wire. Each layer 5/16" wide
interleaved with 0.002" x 1" x ¾" paper.
Pitch - 6.38 mils.
Turns per layer - 147 (19½ layers).
Finish - Two layers of 0.002" x 1" paper,
secured with Chatterton's compound.
Secure outside layer with two turns of 0.005" x ¼"
Lassothyl tape at both ends.

Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at the base.

Colour Code - White, Red, Yellow.

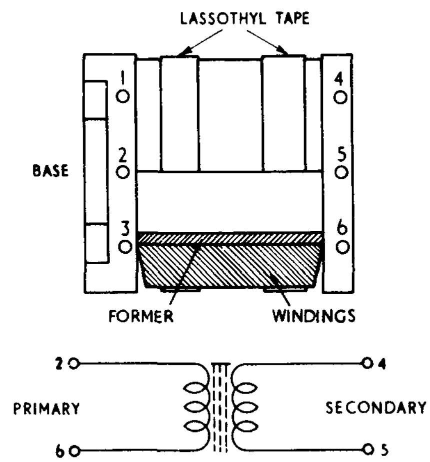
FIG. 42

R.F. COIL BAND 2 (T103)
T108 - B41C

WINDING DATA

PRIMARY WINDING

Start Tag 6, finish Tag 2.
60 turns counter-clockwise* of 38 s.w.g. wire, d.f.c., single layer to occupy full length of former.
Pitch – 16.1 mils.
Turns per inch – 62.
Finish – Three layers 0.002" x 1" paper secured with Chatterton's compound.



SECONDARY WINDING

Start Tag 4, finish Tag 5.
1350 turns counter-clockwise* of 36 s.w.g. enamelled wire, each layer 15/16" wide, interleaved with 0.002" x 1" x 3¾" paper
Pitch – 9.38 mils.
Turns per layer 100 (13½ layers)
Finish – Two layers of 0.002" x 1" paper secured with Chatterton's compound
Secure outside layer of paper with two turns of 0.005" x ¼" Lassothyl tape at both ends.

Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at base.

Colour Code – White, Yellow, Yellow.

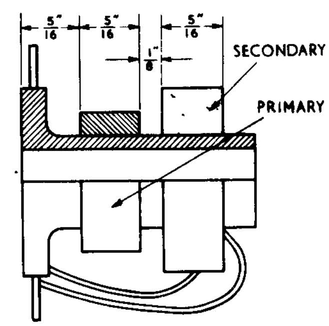
FIG. 43

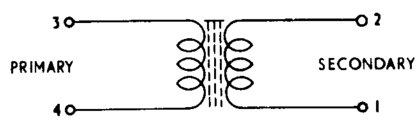
R.F. COIL BAND 3 (T103)
T109 - B41C

WINDING DATA

PRIMARY WINDING

Start Tag 4, finish Tag 3.
300½ turns clockwise* (start 5/16" from former base) of 39 s.w.g. wire, d.f.c.
Finish – Two turns of 0.005" x ½" Lassothyl tape.
Type of winding – Half wave 31:63
Length of winding – 5/16"
Douglas gears – A–48, B–36, C–31, D–42, E–40 F–80.





SECONDARY WINDING

Start Tag 2, finish Tag 1.
770½ turns clockwise* (start 1/8" from primary winding) of 38 s.w.g. enamelled wire, single fortisan covered.
Type of winding – Half wave 31:63.
Length of winding – 5/16"
Douglas gears – A–38, B–29, C–36, D–48, E–40, F–80.
Finish – Two turns of 0.005" x ½" Lassothyl tape.
Both ends of the secondary winding are to be sleeved to prevent contact with the primary winding. Use 2mm art silk sleeving.

Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at base.

Colour Code – White, Green, Yellow.

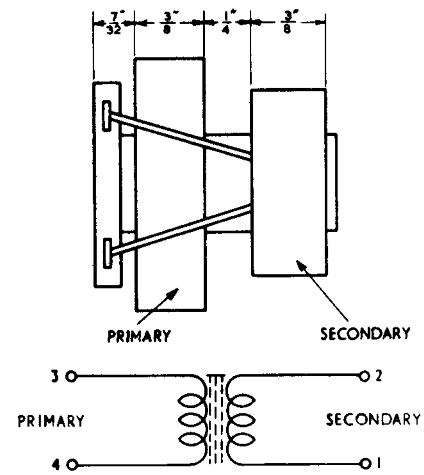
FIG. 44

R.F. COIL BAND 4 (T103)
T110 - B41C

WINDING DATA

PRIMARY WINDING

Start Tag 3, finish Tag 4 (start 7/32"
from the former base).
2000¾ turns clockwise* of 41 s.w.g. double
fortisan covered wire.
Length of winding – 3/8".
Type of winding – Quarter wave 23:91.
Wound on Douglas gears – A-48, B-32, C-31,
D-46, E-24, F-96.
Finish – Two turns of 0.005" x ¼" Lassothyl
tape.



SECONDARY WINDING

Start Tag 2, finish Tag 1.
Start ¼" from primary winding.
380¼ turns clockwise* of 9/46 enamelled and
single fortisan covered wire.
Length of winding – 3/8".
Type of winding – Half wave 21:43
Wound on Douglas gears – A-50, B-42, C-41, D-50,
E-40, F-80.
Finish – Two turns of 0.005" x ¼" Lassothyl tape.
Both ends of this winding to be sleeved with 2 mm
art silk sleeving, to prevent contact with the
primary winding.

Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at the base.

Colour Code – White, Blue, Yellow

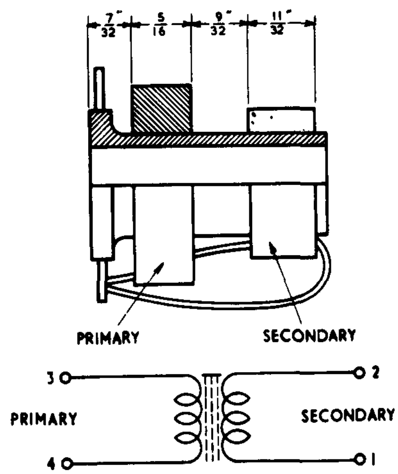
FIG. 45

R.F. COIL BAND 5 (T103)
T111 - B41C

WINDING DATA

PRIMARY WINDING

Start Tag 3, finish Tag 4.
Start 7/32" from the former base.
1000¾ turns clockwise* of 39 s.w.g.
double fortisan covered wire.
Type of winding – Half wave 31:63
Length of winding – 5/16"
.Douglas gears – A-48, B-36, C-31,
D-42, E-40, F-80.
Finish – Two turns of 0.005" x ½" Lassothyl
tape.



SECONDARY WINDING

Start Tag 2, finish Tag 1.
Start 9/32" from the primary winding.
108¼ turns clockwise* of 30/48 s.w.g.
enamelled and single fortisan covered wire.
Type of winding – Half wave 31:64.
Length of winding – 11/32"
Wound on Douglas gears – A-50, B-32, C-31,
D-50, E-40, F-80.
Finish – Two turns of 0.005" x ½" Lassothyl tape

Coils to be vacuum impregnated and wax dipped.

Both ends of the secondary winding to be sleeved with 22 mm art silk sleeving, to prevent contact with the primary winding.

*Direction of rotation of the former, looking at the base.

Colour Code – White, White, Yellow.

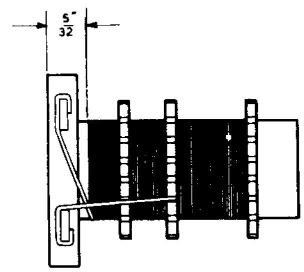
FIG. 46

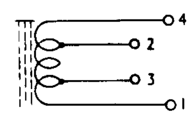
OSCILLATOR COIL BAND I (L102)
L108 - B41C

WINDING DATA

WINDING

Start Tag 1, finish Tag 4.
Start 5/32" from the former base.
All turns counter-clockwise* of 40 s.w.g. enamelled wire.
31½ turns to Tap 1 (Tag 3)
62¼ turns to Tap 2 (Tag 2)
124¾ turns, finish at Tag 4.
Type of winding - close wound solenoid.
Finish - Three washers, one for each tap and one for the finish.





Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at the base.

Colour Code - Green, Red, Yellow

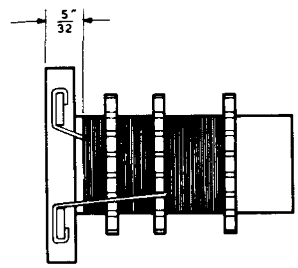
FIG. 47

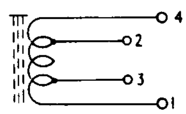
OSCILLATOR COIL BAND 2 (L102)
L109 - B41C

WINDING DATA

WINDING

Start Tag 1, finish Tag 4.
Start 5/32" from former base.
All turns counter-clockwise* of 40 s.w.g. enamelled wire.
29½ turns to Tap 1 (Tag 3)
58¼ turns to Tap 2 (Tag 2).
111¾ turns to the finish (Tag 4)
Type of winding – Close wound solenoid.
Finish – Three washers, one for each tap and one for the finish.





Coil to be vacuum impregnated and wax-dipped.

*Direction of rotation of the former, looking at the base.

Colour Code – Green, Yellow, Yellow.

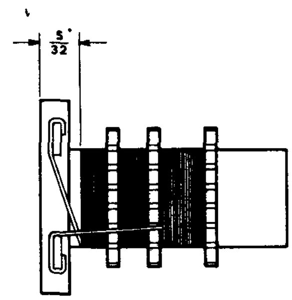
FIG. 48

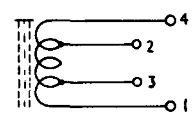
OSCILLATOR COIL BAND 3 (L102)
L110 - B41C

WINDING DATA

WINDING

Start Tag 1, finish Tag 4.
Start 5/32" from the former base.
All windings counter-clockwise* of 40 s.w.g.
enamelled wire.
26¼ turns to Tap 1 (Tag 3)
53¼ turns to Tap 2 (Tag 2)
100¾ turns to the finish at Tag 4.
Type of winding - Close wound solenoid.
Finish - Three washers, one for each tap
and one for the finish.





Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at the base.

Colour Code - Green, Green, Yellow.

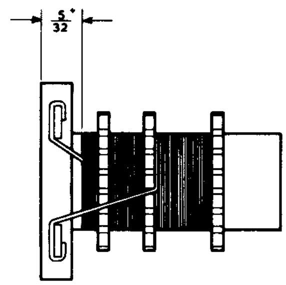
FIG. 49

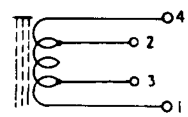
OSCILLATOR COIL BAND 4 (L102)
L111 - B41C

WINDING DATA

WINDING

Start Tag 1, finish Tag 4.
Start 5/32" from the base of the former
All turns counter-clockwise* of 40 s.w.g.
enamelled wire.
20½ turns to Tap 1 (Tag 3)
41¼ turns to Tap 2 (Tag 2)
80¾ turns to the finish at Tag 4.
Type of winding – Close wound solenoid.
Finish – Three washers, one for each tap and
one for the finish.





Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at the base.

Colour Code – Green, Blue, Yellow.

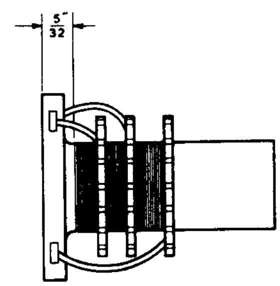
FIG. 50

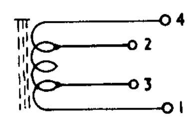
OSCILLATOR COIL BAND 5 (L102)
L112 - B41C

WINDING DATA

WINDING

Start Tag 1, finish Tag 4.
Start 5/32" from the base of the former
All turns counter-clockwise* of 40 s.w.g. enamelled wire.
16½ turns to Tap 1 (Tag 3)
32¼ turns to Tap 2 (Tag 2)
59¾ turns to the finish at Tag 4.
Type of winding - Close wound solenoid.
Finish - Three washers, one for each tap and one for the finish. Distrene lacquer.





Coil to be vacuum impregnated and wax dipped.

*Direction of rotation of former, looking at the base.

Colour Code - Green, White, Yellow.

FIG. 51 & 52

I.F. COILS

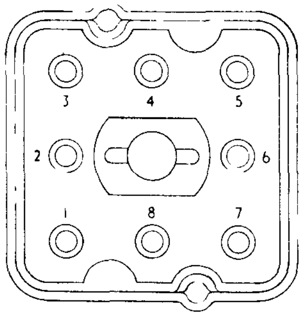


FIG. 51

View of the I.F. Coil Assembly from the base, showing tag positions. Refers to all I.F. Assemblies.

All windings are anchored to washers and securely soldered to the stated spills and tags.

I.F. TRANSFORMER

B41A/B - T104 B41/A/B/C - T201 B41C - T112

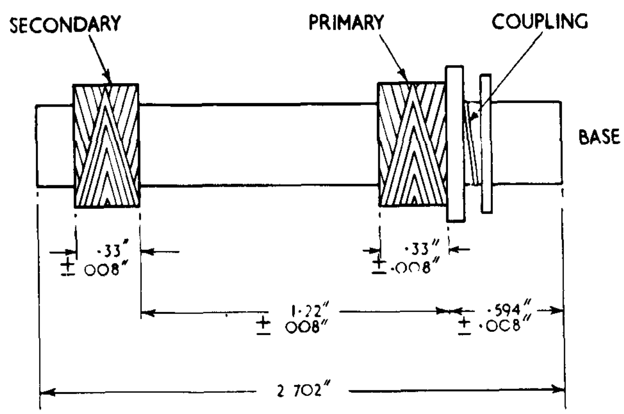
WINDING DATA

PRIMARY AND SECONDARY WINDINGS

Primary. Start Tag 5, finish Tag 7.

Secondary. Start Tag 8, finish Tag 3.

~~68½~~ 66½ turns of 30/48 s.w.g. enamelled and double fused fortisan covered wire.
0.003 lbs weight.
Wound on Douglas gears A-50, B-32, C-31, D-50, E-40, F-80.
Two turns of Lassothyl tape.



COUPLING WINDING

Start Tag 3, finish Tag 1.
½ turn of 40 s.w.g. Eureka enamelled wire, 0.0001 lb weight.

Note: All windings to be anchored to washers and securely soldered to spills and tags stated above. See drawing for position of the washers.

To be wax impregnated and dipped.

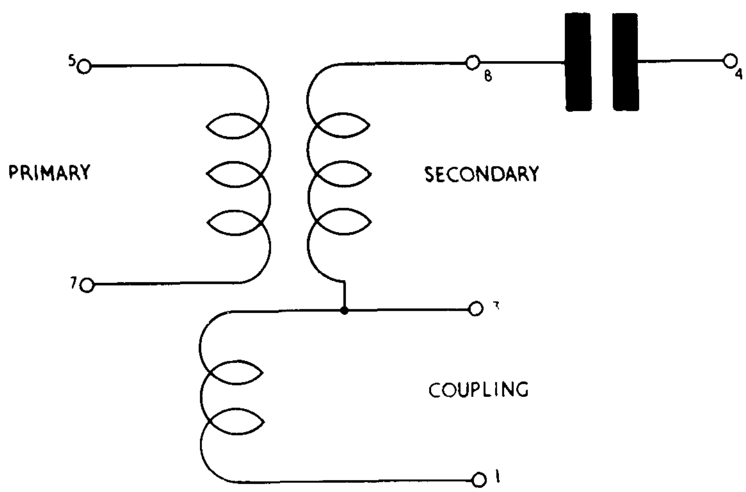


FIG. 52

FIG. 53

I.F. TRANSFORMER

B41/A/B/C - T202 AND T203

WINDING DATA

PRIMARY AND SECONDARY WINDINGS

Primary. Start Tag 5, finish Tag 7.

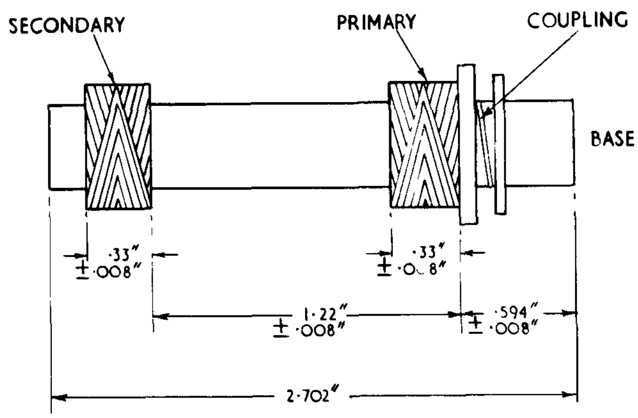
Secondary. Start Tag 8, finish Tag 3.
66½ ~~60½~~ turns on 30/48 s.w.g. enamelled and double fused fortisan covered wire.
0.003 lbs weight.
Wound on Douglas gears A-50, B-32, C-31, D-50, E-40, F-80.
Two turns of Lassothyl tape.

COUPLING WINDING

Start Tag 3, finish Tag 1.
½ turn of 40 s.w.g. Eureka enamelled wire, 0.0001 lb weight.

Note: All windings to be anchored to washers and securely soldered to spills and tags stated above. See drawing for position of the washers.

To be wax impregnated and dipped.



C (

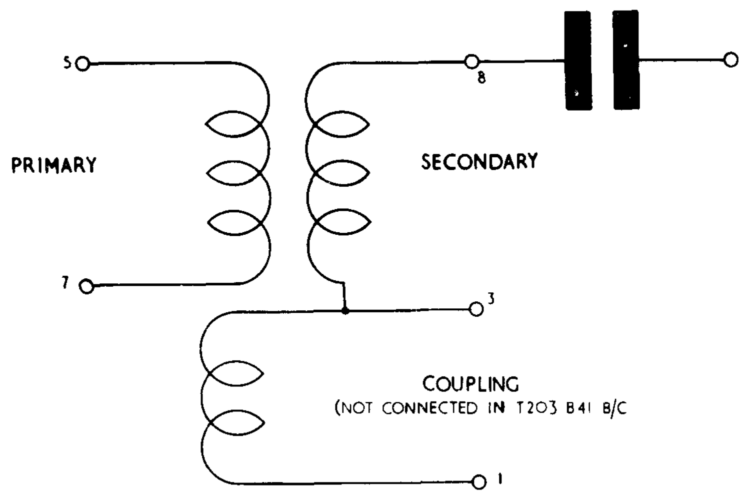


FIG. 54

I.F. TRANSFORMER

B41A/B/C - T204

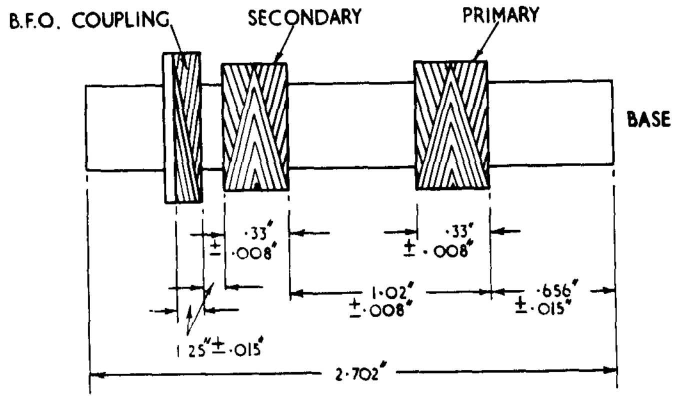
WINDING DATA

PRIMARY AND SECONDARY WINDINGS

Primary. Start Tag 5, finish Tag 7.

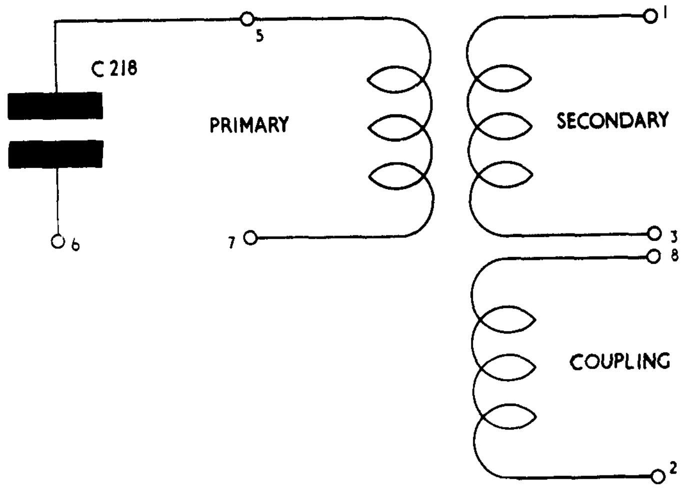
Secondary. Start Tag 1, finish Tag 3.

C1 66½
~~60½~~ turns of 30/48 s.w.g. enamelled and double fused fortisan covered wire (0.003 lbs weight).
Wound on Douglas gears - A-50, B-32, C-31, D-50, E-40, F-80.
Two turns of Lassothyl tape.



B.F.O. COUPLING WINDING

Start Tag 2, finish Tag 8.
30¾ turns of 36 s.w.g. double fortisan covered wire (0.004 lbs weight)
Wound on Douglas gears - A-50, B-36, C-34, D-50, E-60, F-60.
Two turns of Lassothyl tape.



All windings to be anchored to washers and securely soldered to spills and tags as stated above. See drawing for washer positions. Seal coupling coil with Chatterton's compound.

To be wax impregnated and dipped.

FIG. 55

BEAT FREQUENCY OSCILLATOR COILS L202A AND L202B

WINDING DATA

WINDING L202A

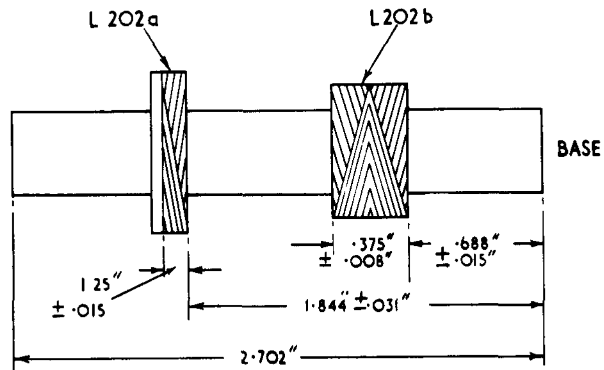
Start Tag 3, finish Tag 5.
25½ turns to Tap (Tag 7)
Total turns – 50¼ of 3/42 enamelled and single fortisan covered wire (0.0015 lb weight).
Wound on Douglas gears – A-50, B-36, C-34, D-50, E-60, E-60.
Two turns of Lassothyl tape.

WINDING L202B

Start Tag 5, finish Tag 6.
270-3/8 turns to tap (Tag 8)
Total turns – 540-1/8 of 38 s.w.g. enamelled and double fortisan covered wire (0.01 lb weight).
Wound on Douglas gears – A-35, B-42, C-40, D-34, E-40, F-80.
Two turns of Lassothyl tape.

Wax impregnate and dip.

All windings to be anchored to washers and securely soldered to spills and tags stated above and indicated in drawings.



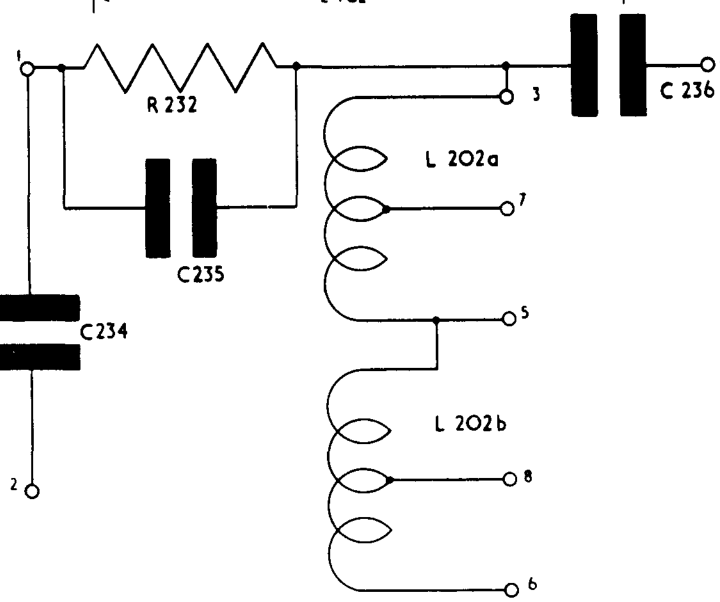
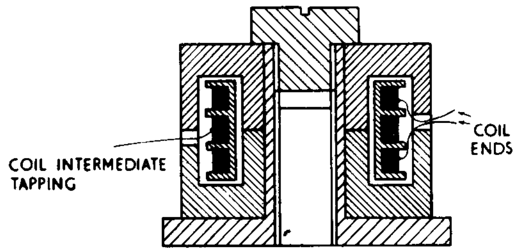


FIG. 56

REJECTOR COILS

B41B - L104 AND L105 B41C - L101 AND L102

WINDING DATA



Take apart and remove former.

WINDING

~~81 turns of 30/48 Litz wire~~
~~Sectionalised thus~~:- SEE CHANGE Nº 1

~~27 turns in each of the three sections~~

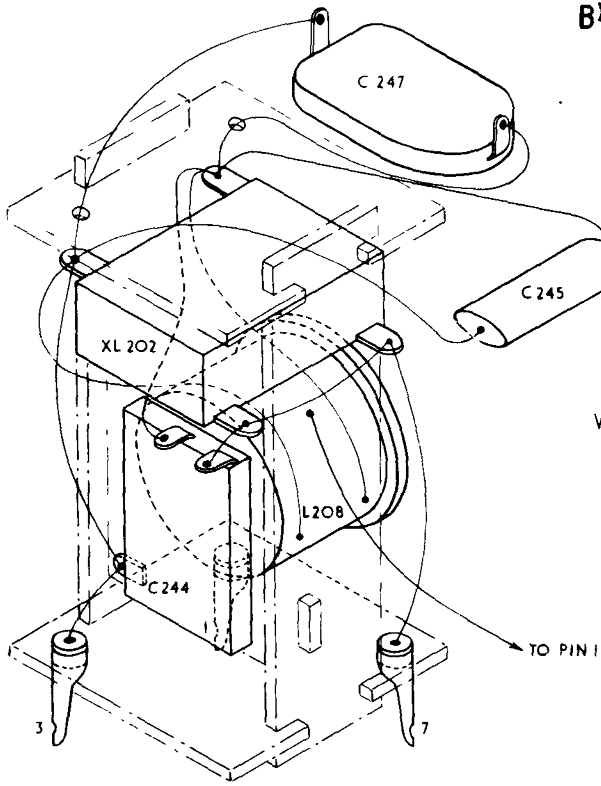
Secured with Chatterton's compound.
Leave wire ends 2" long
Leads to be tinned for 1½" of their length
Start lead to have red 2 mm art silk sleeving
Finish lead to have white 2 mm art silk sleeving

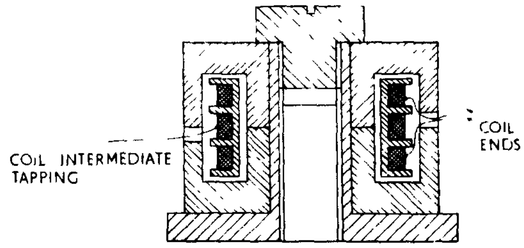
Wind the bobbin and then dip in Messrs. Cambells LPRM 3 wax
When assembled, test electrically and then dip
in the same wax and Messrs. Berry Wiggins compound 1202.

CORE MATERIAL Neosid 10D

CRYSTAL FILTER DETAILS B41B/C

FIG. 57

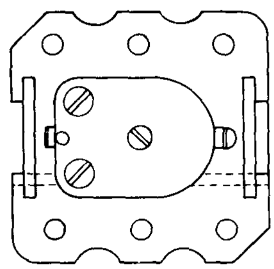


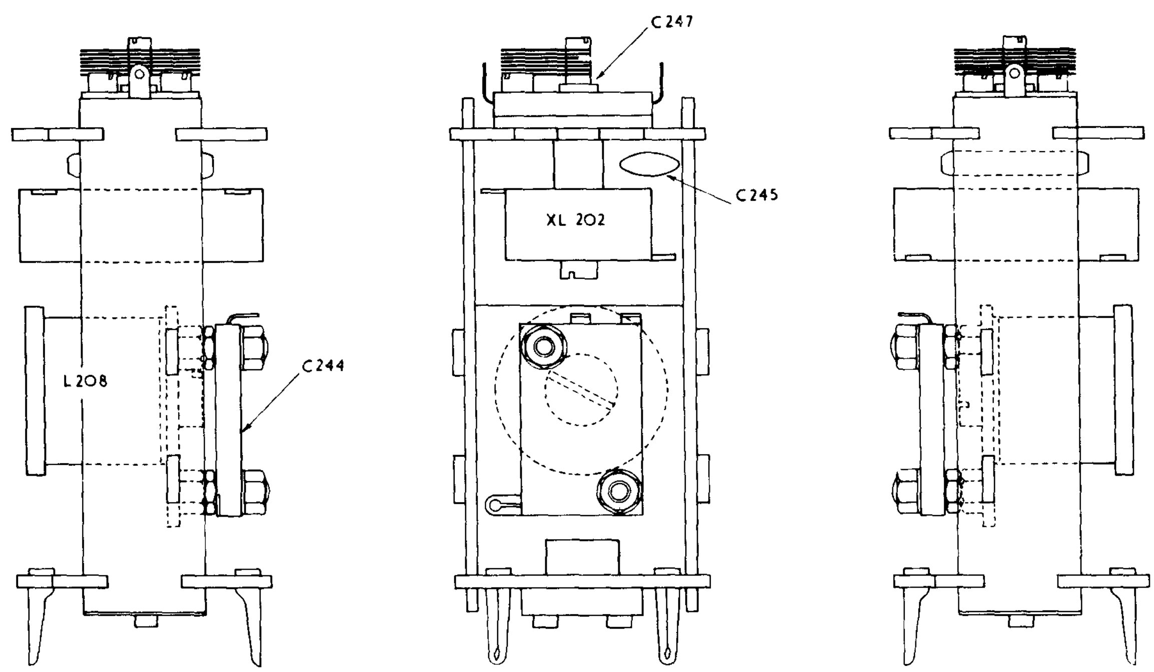


COIL FOR CRYSTAL FILTER

WINDING DATA:–
87 TURNS 30/48 LITZ WIRE
SECTIONALIZING 29 TURNS 1st SECTION
29 { 14½ TURNS 2nd SECTION
TAP LEAD 2" LONG
14½ TURNS 2nd SECTION }
29 TURNS 3rd SECTION
SECURED WITH CHATTERTONS COMPOUND
LEAVE ENDS 2" LONG
LEADS TO BE TINNED FOR 1½" OF LENGTH.
START LEAD TO HAVE RED 2 m.m. ART SILK SLEEVING.
FINISH LEAD TO HAVE WHITE 2 m.m. ART SILK SLEEVING.
WIND BOBBIN AND DIP IN MESSRS. CAMPBELL'S LPRM 3 WAX.
WHEN ASSEMBLED SHALL BE TESTED ELECTRICALLY AND THEN DIPPED IN MESSRS. CAMPBELL'S LPRM 3 WAX AND MESSRS. BERRY WIGGINS' COMPOUND 1202.

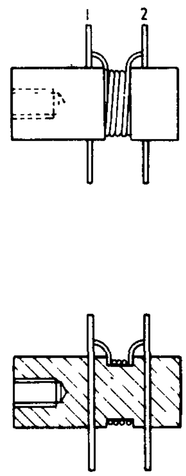
MATERIAL:– 10D NEOSID CORE





I.F. COUPLING COIL

L201



WINDING DATA

Start Tag 2.
4 turns of 24 s.w.g. enamelled wire in slot. Clockwise rotation of the former from the right hand side of the coil as shown in the drawing.
Finish - Tag 1.

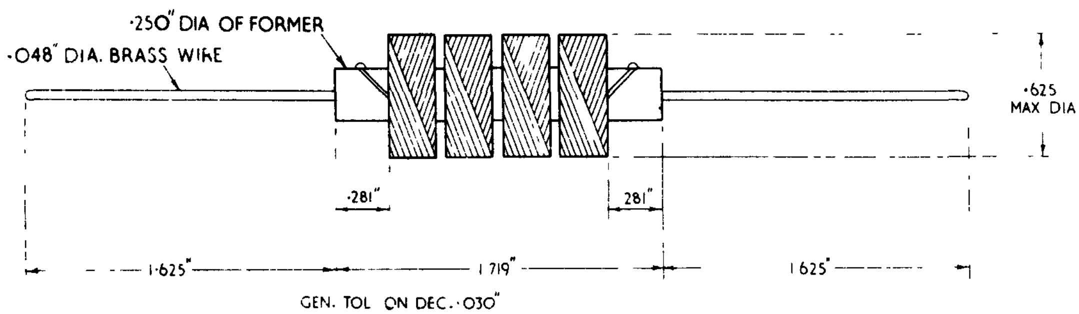
C1

The coil to be vacuum wax impregnated and wax dipped.

FIG. 58

H.F. CHOKE

B41/A/B; L103; B41C; L113



WINDING This may be split into four or five sections.

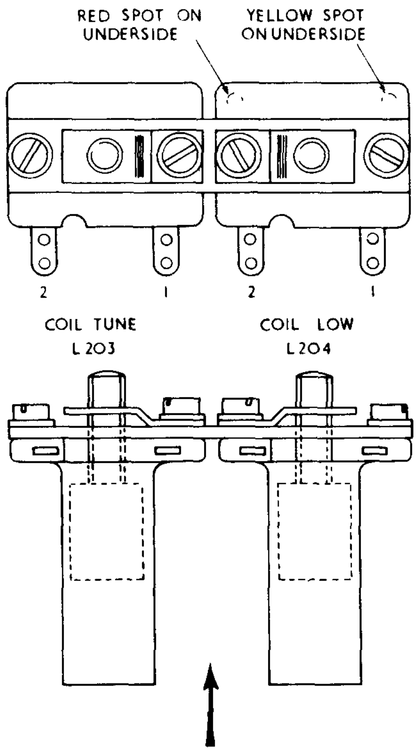
INDUCTANCE 1.5 millihenries ± 10%

D.C. RESISTANCE 10 ohms ± 25%

FIG. 59

FIG. 60

PITCH COILS AND BRACKET



WINDING DATA

COIL 'LOW'

$4\frac{3}{4}$ turns of 24 s.w.g. enamel copper wire
Start Tag 2 (nearest to the shoulder of the former).
Finish Tag 1.

COIL 'TUNE'

$3\frac{3}{4}$ turns of 20 s.w.g. enamelled copper wire
Start Tag 2 (nearest to the shoulder of the former).
Finish Tag 1.

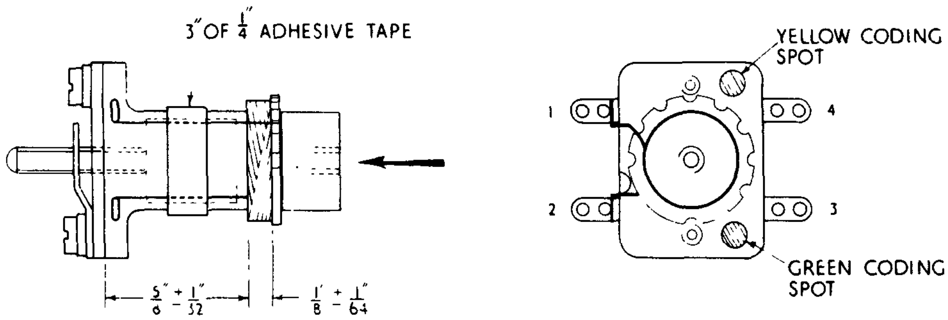
<u>Note</u>: Tags 3 and 4 to be cut off before impregnation.

Rotation of both formers is clockwise looking in the direction of the arrow.

Finish – Vacuum impregnate and wax dip.

FIG. 61

CAL. LINE FILTER COIL
B41/A/B/C, L205/6



WINDING DATA

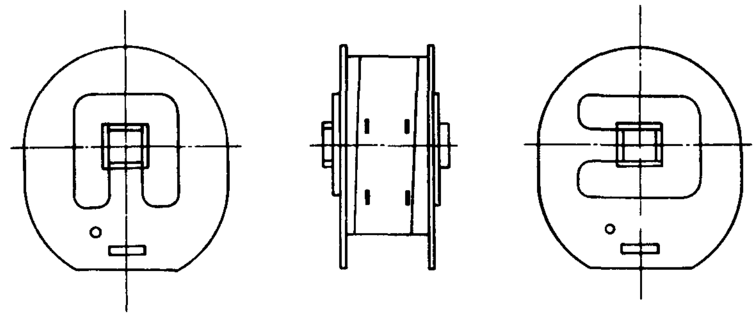
42¼ turns of enamelled single fortisan wire.
Start Tag 2, finish Tag 1.
Ratio - 51:54
Douglas gears - A-50, B-36, C-34, D-50, E-60, F-60.

Finish - Vacuum wax impregnate and wax dip.

Rotation of former - Counter-clockwise
looking in the direction of the arrow.

FIG. 62

NOTE FILTER
B41/A - L301
B41B/C - L301 AND L304



WINDING DATA

6800 turns of 36 s.w.g. enamelled copper wire, random wound. Ends looped and twisted into three way cable for lead outs. Sleeved with 1 mm art silk sleeving. Two tag panel and backing piece fixed by two turns of white tape 7/8" wide and secured by Chatterton's compound where the tape is cut off. This cut off is half an inch beyond the tag pushed through the hole in the tape. Alternative use half inch wide tape, half lapped and secured in the same way, using only one layer.

Solder the lead outs to tags above the tape. The twisted lead outs are anchored by ¼" wide adhesive tape and insulated from the windings by 0.002" paper ¾" wide.

Adjust inductance to ± 10% of standard by moving core. Fix with Adhesive 'A' before impregnating.

RESISTANCE (d.c.) - 390 Ohms

INDUCTANCE - 1 Henry.

This sheet is issued with A.L. No. 1 January, 1958

IRON CORED TRANSFORMERS AND CHOKES DATA

As these components are not considered repairable, the information given is limited to that necessary to provide a suitable substitute for emergency use.

1. <u>Choke A.P.65560</u>

Circuit Reference - L302
Fitted to all patterns of the receiver.

Inductance - 25 Henrys at 7 mA d.c.
- 18 Henrys at 20 mA d.c.

D.C. Resistance - 690 ohms.

Distance between fixing centres - 1-25/32 in.

Tags (a and b) - See Figs. 20, 23 and 25

2. <u>Choke A.P.65564</u>

Circuit Reference - L303.

Inductance - 10 Henrys at 100 mA d.c.

D.C. Resistance - 260 ohms ± 10%.

Distance between fixing centres - $2\frac{1}{8}$ in. x $1\frac{3}{4}$ in. ± 3/16 in.

3. <u>Choke A.P.65175</u>

Circuit Reference - L207

Inductance - 0.42 mH at 0.7A d.c. (1000 c/s).

Distance between fixing centres - 1.45 in. x 0.688 in.

D.C. Resistance 0.09 ohms.

4. <u>Output Transformer A.P.65689</u>

Circuit Reference - T301
Fitted to all patterns of the receiver

Primary Inductance - 5.6 Henrys at 10V 50 c/s and 40 mA d.c.

D.C. Resistance -	Primary - 240 ohms	2,200 Turns
	Secondary 1 IS/TS - 61 ohms	650 "
	OS/TS - 1.67 ohms	62 "
	Secondary 2 (On side) - 4.9 ohms	69 "

Distance between fixing centres - 2-13/16 in.

Tags - See Figs. 20, 23 and 25.

5. Output Transformer, Monitor Loudspeaker, A.P.65690

Circuit Reference B41/A T205, B41B - T305, B41C - T303.
Fitted to all patterns of the receiver.

Primary Turns - 107 Secondary Turns - 34.

D.C. Resistance - Primary - 1.0 ohm ± 10%
Secondary - 0.15 ohms ± 10%

Tags - See Figs 23 and 25.

Distance between fixing centres - 1-27/32 in. x 1 in.

6. Mains Transformer A.P.65561/A/B

Circuit Reference T302.
A.P.65561 open core type fitted to Receiver A.P.57141.
A.P.65561A oil filled type fitted to A.P.57141A Receiver. In case of trouble from either type (especially oil leaks from the latter pattern) the replacement transformer should be A.P.65561B.

Primary Winding

Voltage - Common	115	230	Volts
D.C. Resistance	4.7	4.9	Ohms

Secondary Winding

Voltage	276-0-276	Volts
Current	78	Milliamps
D.C. Resistance	89-CT-100	Ohms

Heater Winding

Voltage	6.4	Volts
Current	4	Amps
D.C. Resistance	0.078	Ohms

Rectifier Heater Winding

Voltage	6.35	Volts
Current	0.9	Amps
D.C. Resistance	0.315	Ohms.

Tags - See Fig. 18.

Distance between fixing centres - 3.875 in. x 3.375 in.

7. Mains Transformer A.P.67763A (C Core)

Circuit Reference T302.
Fitted to Patterns 57141B/C only.

Primary Winding

Voltage - Common	115		230	Volts	40/60 c/s a.c.
D.C. Resistance		20		Ohms	over-all

Secondary Winding

Voltage	276-0-276	Volts	
Current	80	Milliamps	
D.C. Resistance	320	Ohms	overall.

Heater Winding

Voltage	6.4	Volts
Current	4	Amps
D.C. Resistance	less than 0.5	ohms

Rectifier Heater Winding

Voltage	6.4	Volts
Current	0.9	Amps
D.C. Resistance	less than 0.75	Ohms

Tags - See Figs. 21 and 23.

8. Mains Transformer (Heaters) A.P.65197

Circuit Reference - T102 - B41/A/B
T106 - B41C

Primary Winding

Voltage 6.3V
Current 100 mA (no load) at 50 c/s
D.C. Resistance - 1.7 ohms

Secondary Winding

Voltage - 6.3V
Current - 0.3A
D.C. Resistance 2.4 ohms

Tags Primary 2 and 4 (1 and 2 commoned)
Secondary 3 and 5.

Fixing Centres 1-13/15 in. x 1-1/32 in.

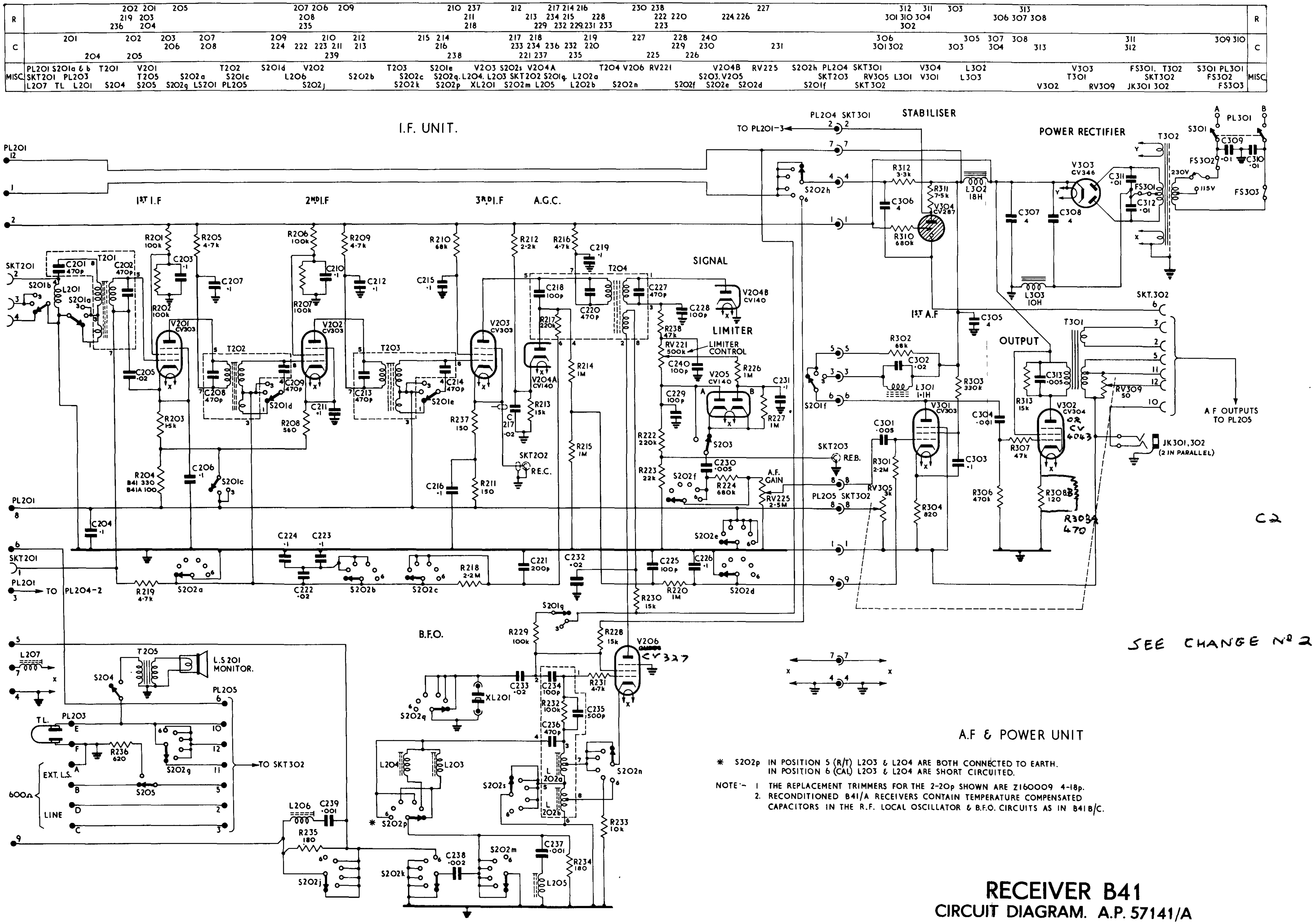
The following sheets contain details of the pattern numbers of Transformers, Coils and Switches for units of A.P.57141/A/B/C Receivers. The relevant items in the Component Lists in B.R.1618 should be annotated to the effect that further information is available at the rear of the book.

Receiver A.P.No.	Circuit Ref.	Description	A.P.No.	N.S.N.
57141/A/B	L101	R.F. Grid Coil (1st r.f.) Band 1	106125	
		Band 2	106126	
		Band 3	106127	
		Band 4	106128	
		Band 5	106129	
57141/A/B	L102	Oscillator Coil Band 1	106135	
		Band 2	106136	
		Band 3	106137	
		Band 4	106138	
		Band 5	106139	
57141/A/B	T101	Aerial Transformer Band 1	184031	
		Band 2	184032	
		Band 3	184033	
		Band 4	184034	
		Band 5	184035	
57141/A/B	T103	Mixer Grid Coil (2nd r.f.) Band 1	106130	
		Band 2	106131	
		Band 3	106132	
		Band 4	106133	
		Band 5	106134	
57141/A/B	T104/201	I.F. Assembly	106140	
	T202/203	I.F. Assembly	106141	
	T204	I.F. Assembly	106142	
	L103	Choke 1.5 mH	106151	
57141/A/B	L201	I.F. Coupling Coil	106146	
	L203	Pitch Coil (Tune)	106144	
	L204	Pitch Coil (Low)	106145	
	L205/206	Calibrator Filter Coil	106147	
	L202A/B	B.F.O. Assembly	106143	
57141/A	L301	Choke 1H Filter	106152	
57141B	L104	Rejector Coil	106149	
	L105	Rejector Coil	106150	
	L208	Coil Tuned (800 kc/s)	106148	
	L301/304	Choke 1H Filter	106152	
		Crystal Filter	102828	

Receiver A.P.No.	Circuit Ref.	Description		A.P.No.	N.S.N.
57141C	L103	R.F. Grid Coil (1st r.f.)	Band 1	106125	
	L104		Band 2	106126	
	L105		Band 3	106127	
	L106		Band 4	106128	
	L107		Band 5	106129	
57141C	L108	Oscillator Coil	Band 1	106135	
	L109		Band 2	106136	
	L110		Band 3	106137	
	L111		Band 4	106138	
	L112		Band 5	106139	
57141C	TR101	Aerial Transformer	Band 1	184031	
	TR102		Band 2	184032	
	TR103		Band 3	184033	
	TR104		Band 4	184034	
	TR105		Band 5	184035	
57141C	TR107	Mixer Grid Coil (2nd r.f.)	Band 1	106130	
	TR108		Band 2	106131	
	TR109		Band 3	106132	
	TR110		Band 4	106133	
	TR111		Band 5	106134	
57141C	TR112/201	I.F. Assembly		106140	
	TR202/203			106141	
	TR204			106142	
57141C	L101	Rejector Coil		106149	
	L102	Rejector Coil		106150	
	L201	I.F. Coupling Coil		106146	
	L202A/B	B.F.O. Assembly		106143	
	L203	Pitch Coil (Tune)		106144	
	L204	Pitch Coil (Low)		106145	
	L205/206	Calibrator Filter Coil		106147	
	L208	Coil Tuned (800 kc/s)		106148	
		Crystal Filter		102828	
57141C	L113	Choke 1.5 mH		106151	
	L301/304	Choke 1H Filter		106152	
		<u>Switches</u>			
57141/A	SW201	Switch, 3 position - Bandwidth			
		4 Items (i) Wafer		65631	
		(ii) Wafer		65632	
		(iii) Wafer		65633	
		(iv) Mechanism		65639	

Receiver A.P. No.	Circuit Ref.	Description	A.P. No.	NSN
57141B/C	SW201	Switch, 3 position - Bandwidth		
		5 Items		
		(i) Wafer	65631	
		(ii) Wafer	65632	
		(iii) Wafer	5930-A.P. 206827	
		(iv) Wafer	5930-A.P. 206826	
		(v) Mechanism	5930-A.P. 206828	
57141/A	SW202	Switch, 5 position - System		
		4 Items		
		(i) Wafer	65634	
		(ii) Wafer	65635	
		(iii) Wafer	65637	
		(iv) Mechanism	65640	
57141B/C	SW202	Switch, 5 position - System		
		4 Items		
		(i) Wafer	65634	
		(ii) Wafer	65635	
		(iii) Wafer	65637	
		(iv) Mechanism	5930-A.P. 206829	

FIG. 11



* S202p IN POSITION 5 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH.
IN POSITION 6 (CAL) L203 & L204 ARE SHORT CIRCUITED.

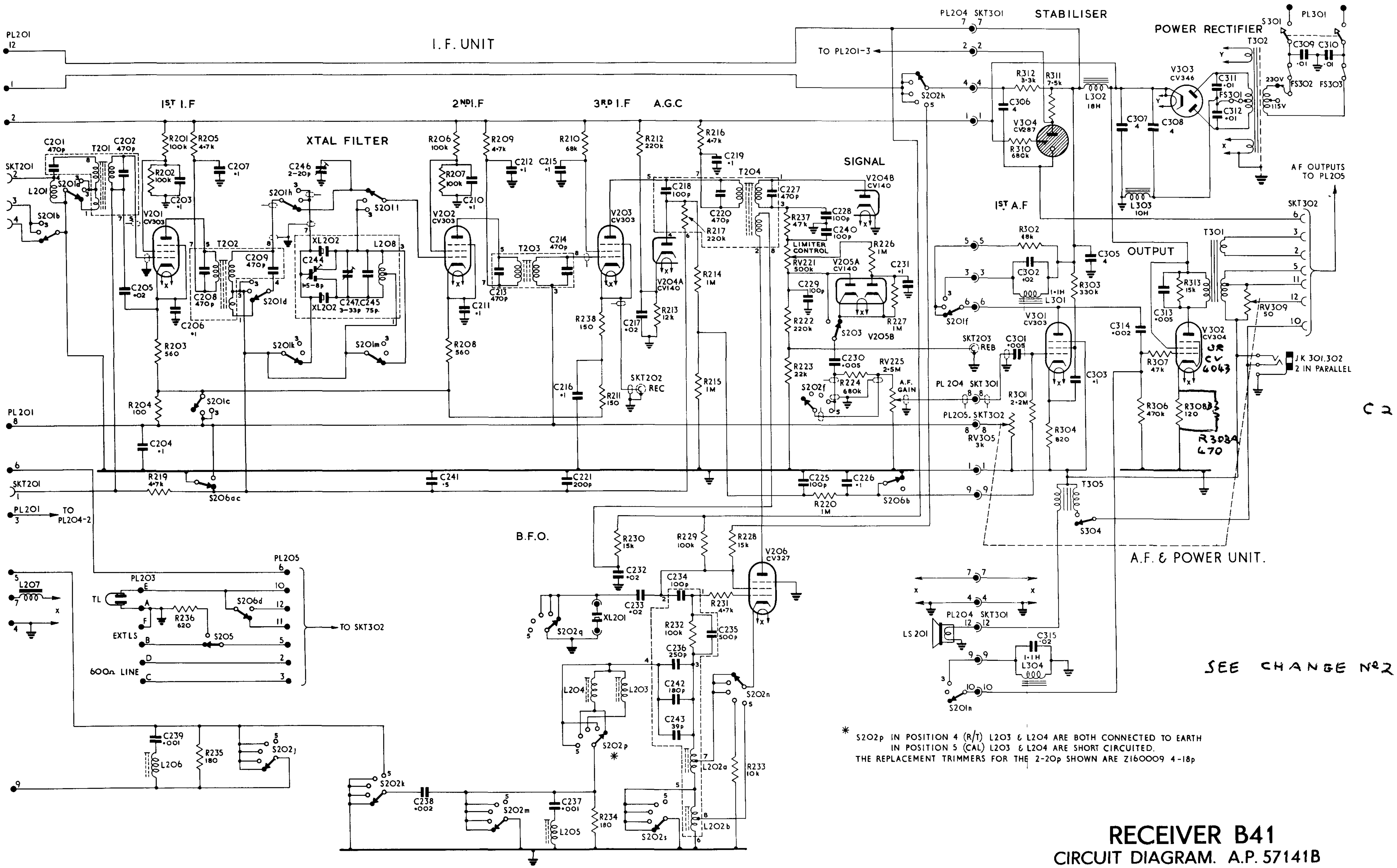
NOTE:- 1 THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z160009 4-18p.
2. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

RECEIVER B41

CIRCUIT DIAGRAM. A.P. 57141/A

FIG. 12

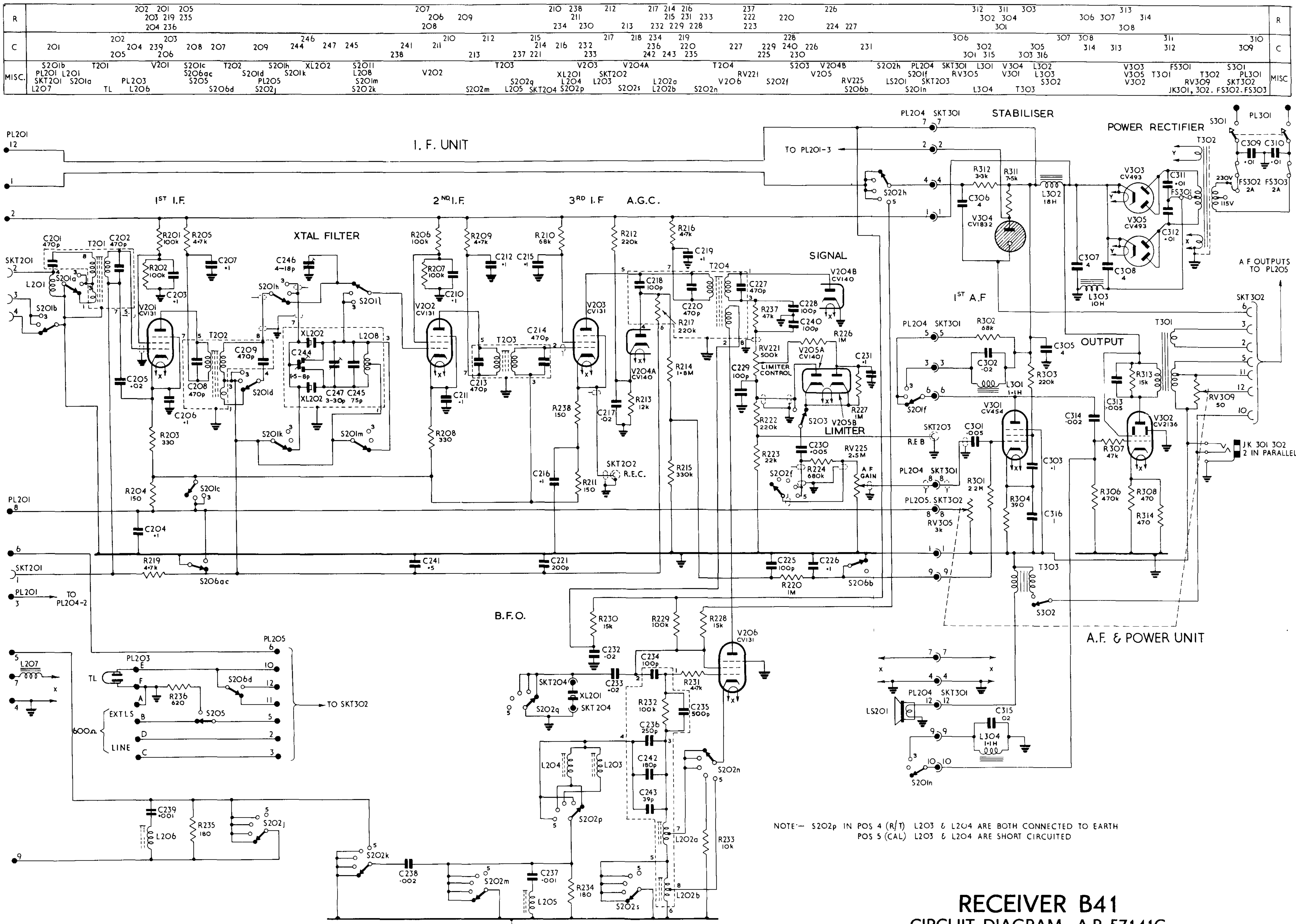
R	202 201 205 203 219 235 204 236 207 206 209 208 210 238 211 234 230 212 213 217 214 216 215 231 233 232 229 228 237 222 223 220 226 224 227 312 311 303 302 304 310 301 306 307 313 308
C	201 202 204 239 205 203 206 208 207 209 246 244 247 245 241 238 210 211 212 213 215 214 216 237 221 232 233 217 218 234 236 242 243 219 220 235 227 229 240 226 228 225 230 231 306 302 301 315 305 303 307 308 314 313 311 312 310 309
MISC	S201b PL201 L201 SKT201 S201a L207 T201 TL PL203 L206 V201 S201c S206ac S205 S206d T202 S201d PL205 S202j S201h S201k XL202 S201l L208 S201m S202k V202 T203 S202m S202q L205 V203 XL201 L204 S202p SKT202 L203 V204A S202s L202a L202b S202n T204 V206 RV221 S202f S203 V204B V205 A & B RV225 S206b S202h PL205 S201f LS201 S201n PL204 SKT301 SKT203 SKT302 RV305 L301 V304 V301 L304 L302 L303 S304 T305 V303 V302 T301 FS301 RV309 T302 JK301, 302. S301 PL301 SKT302 FS302 FS303



RECEIVER B41

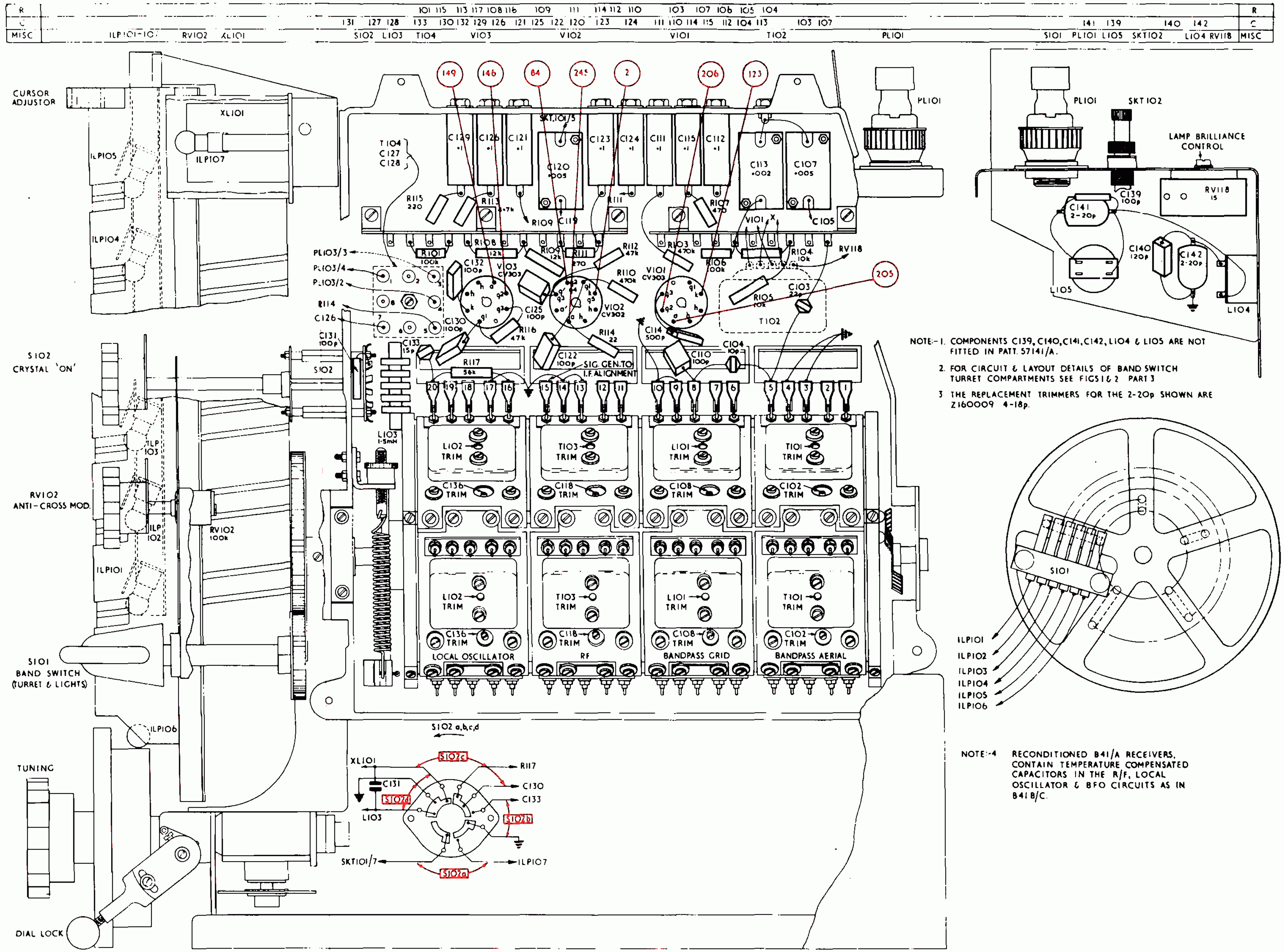
CIRCUIT DIAGRAM. A.P. 57141B

FIG. 13



RECEIVER B41
CIRCUIT DIAGRAM. A.P. 57141C

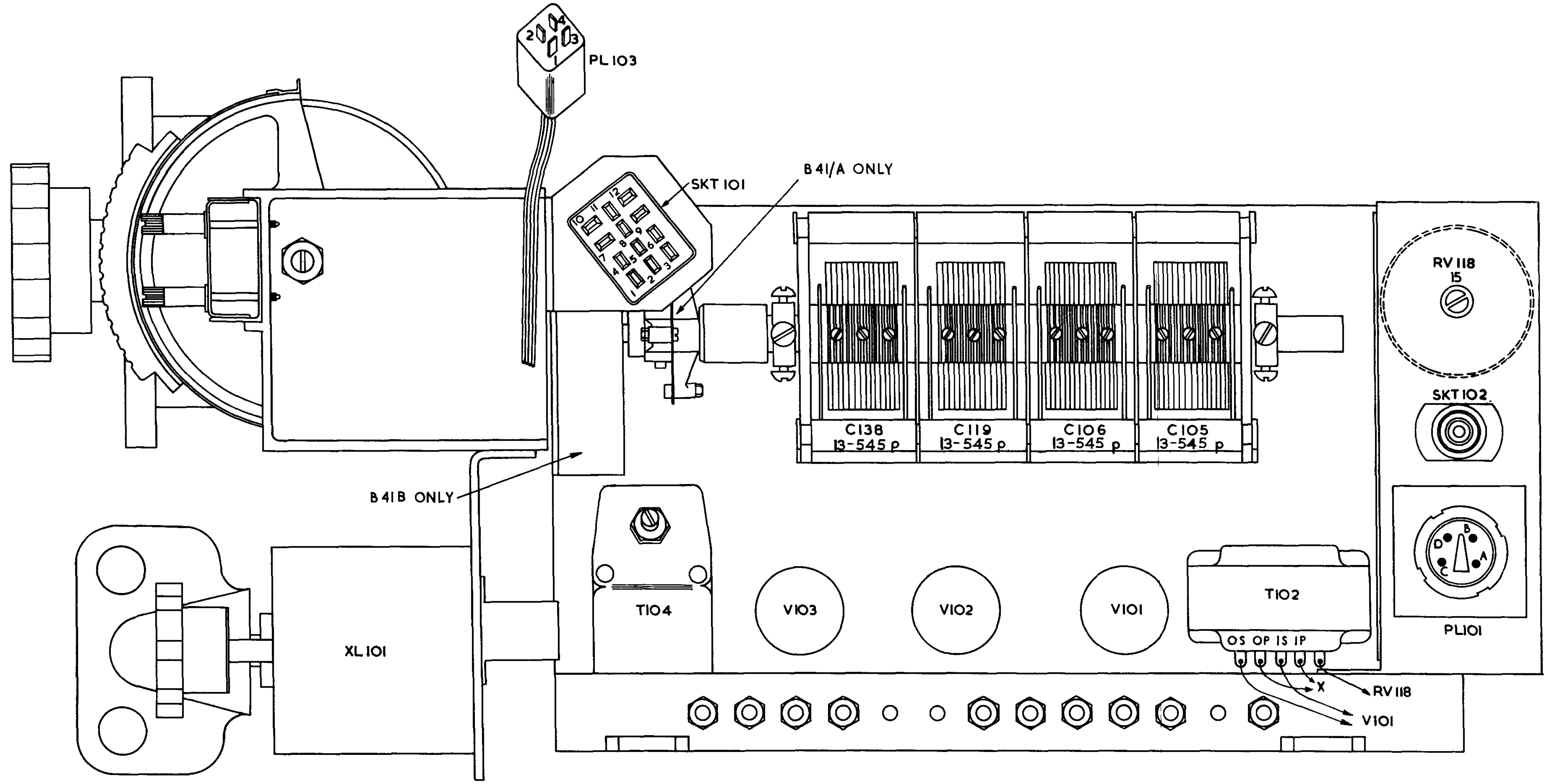
FIG. 3



RECEIVER B41

R.F. UNIT. RIGHT HAND LAYOUT. A.P. 57141/A/B

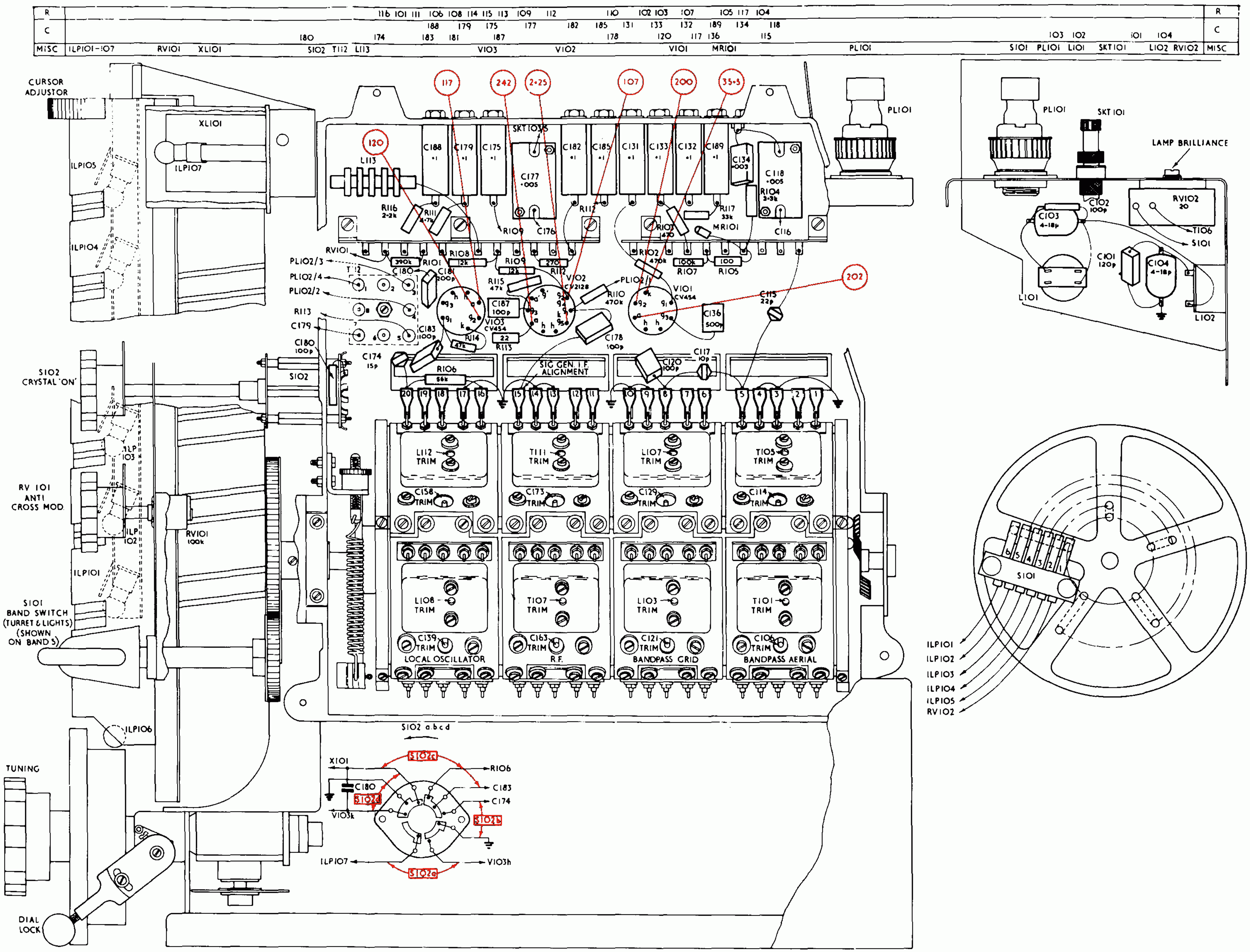
FIG. 6



RECEIVER B41

R.F. UNIT. TOP LAYOUT. A.P. 57141/A/B

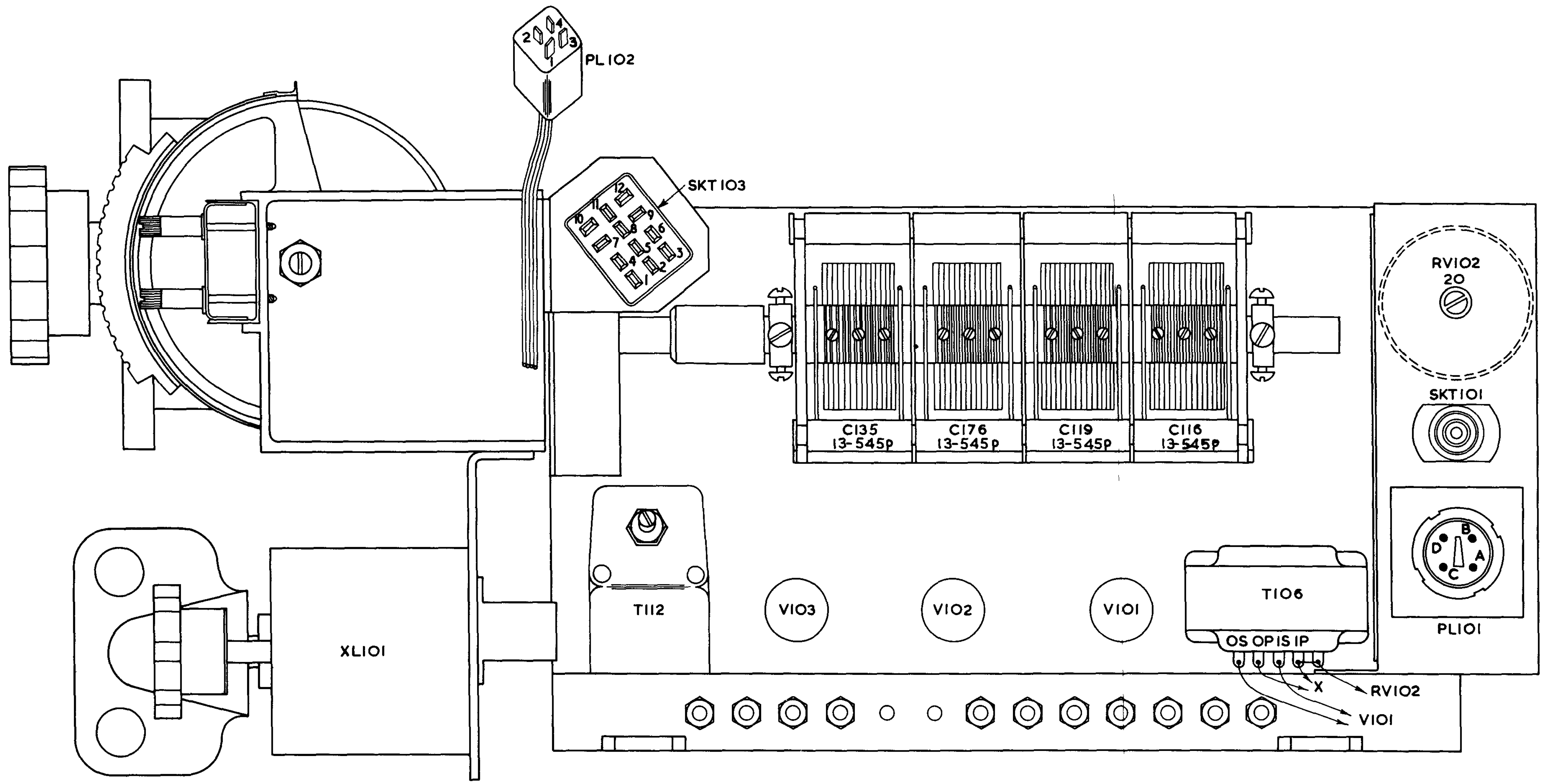
FIG. 9



RECEIVER B41

R.F. UNIT. RIGHT HAND LAYOUT. A.P. 57141C

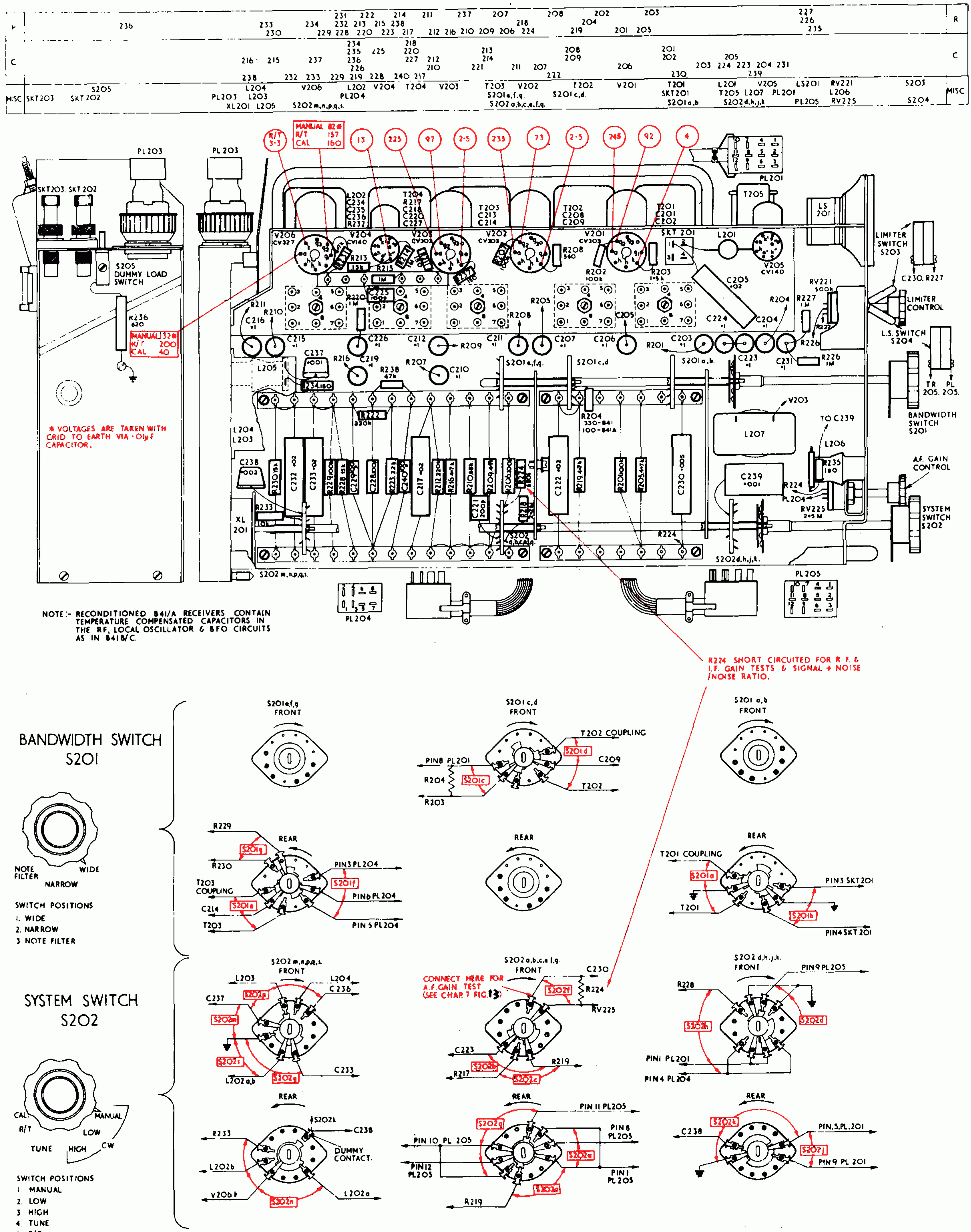
FIG. 12



RECEIVER B41

R.F. UNIT. TOP LAYOUT. A.P. 57141C

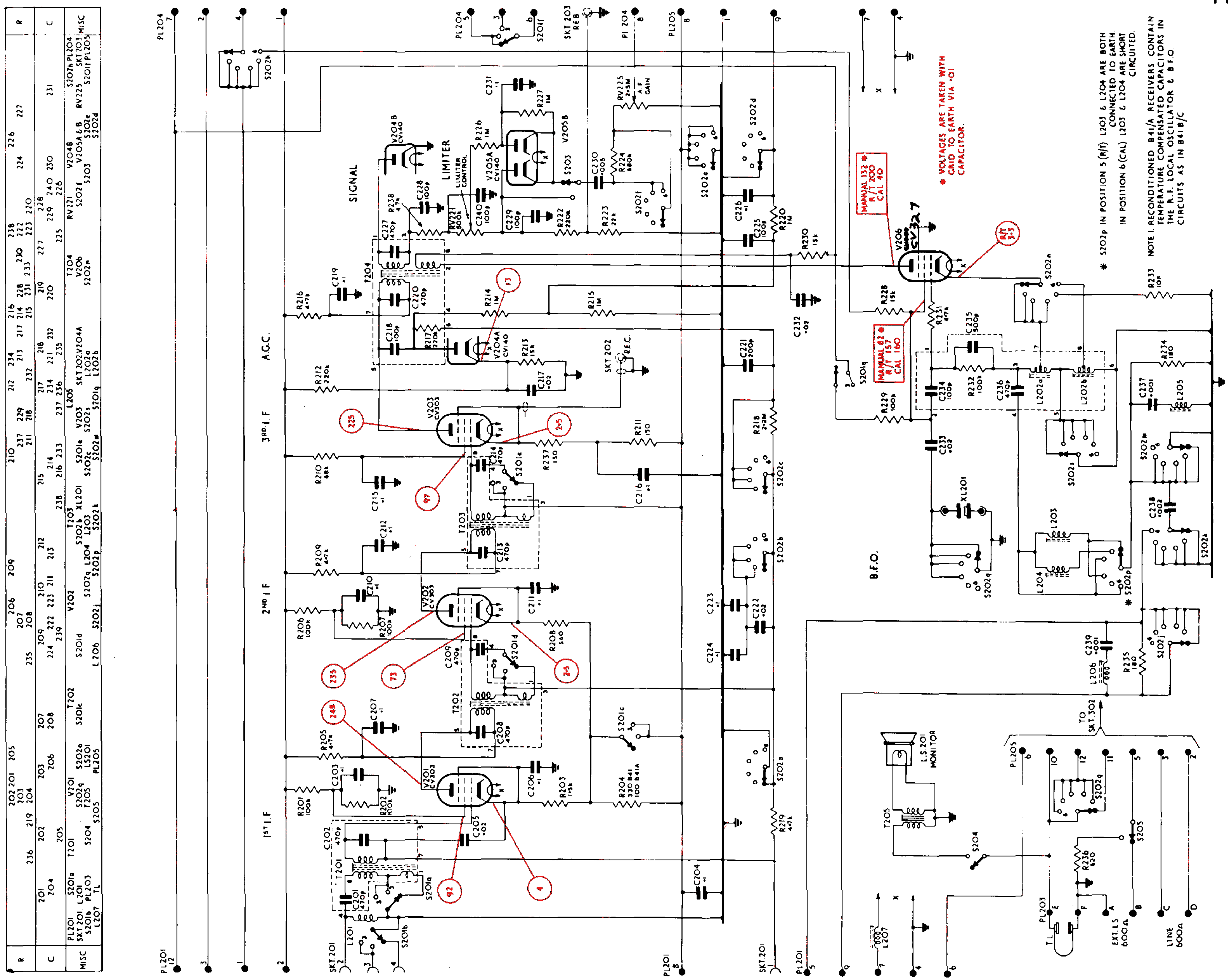
FIG. 13



RECEIVER B41

I.F. UNIT. LAYOUT & SWITCH WIRING DIAGRAM. A.P. 57141/A

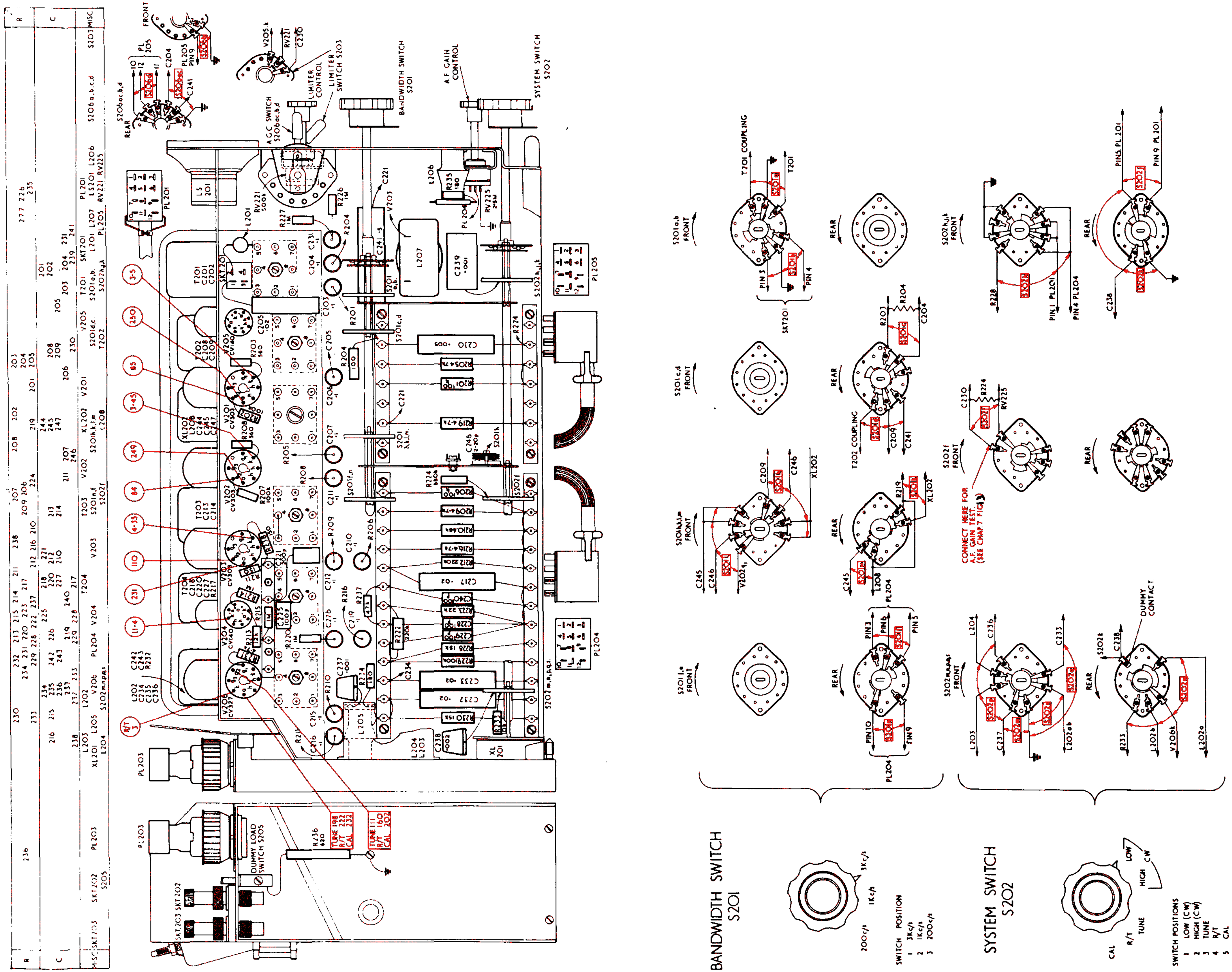
FIG. 14



RECEIVER B41

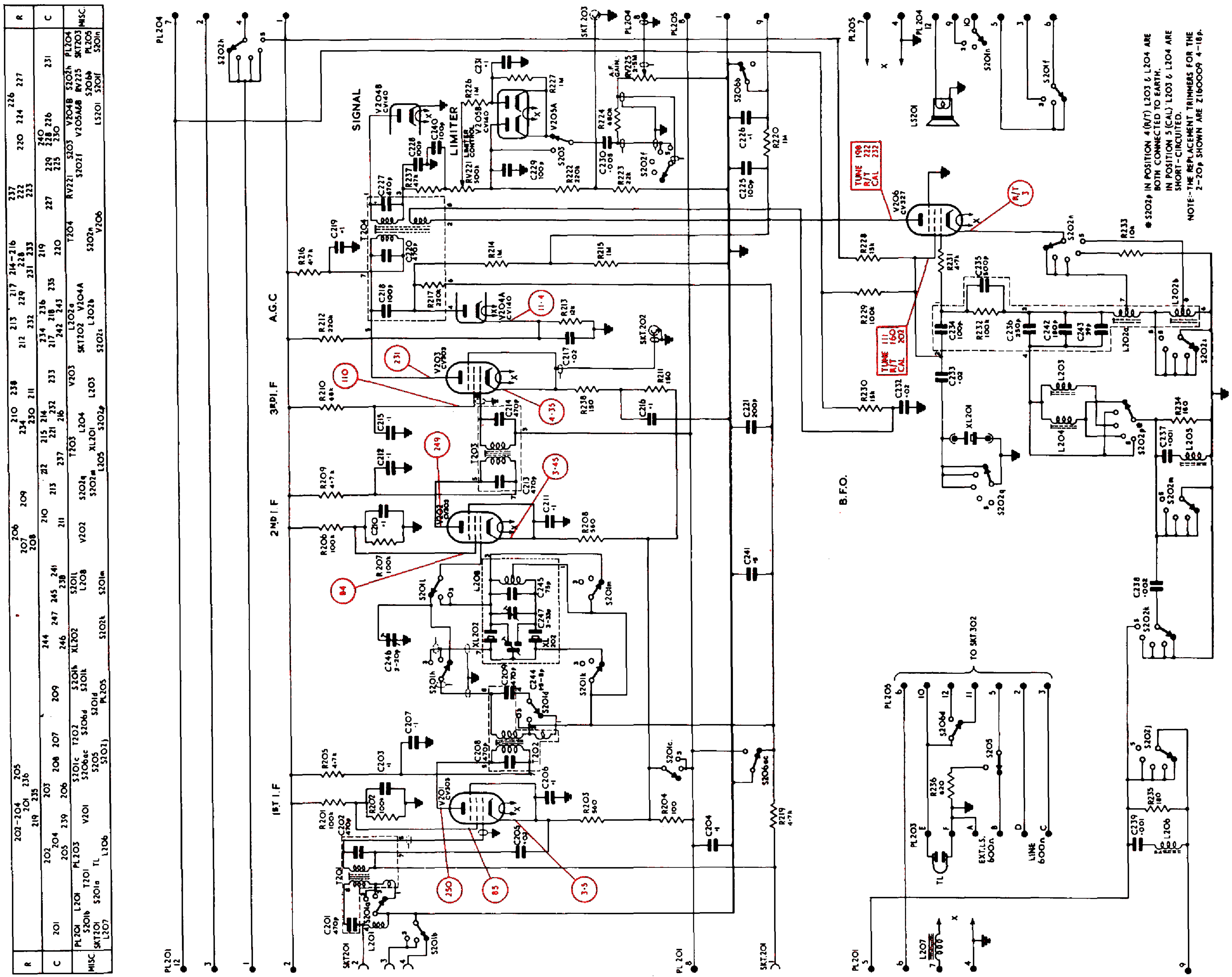
I.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141/A

FIG. 15



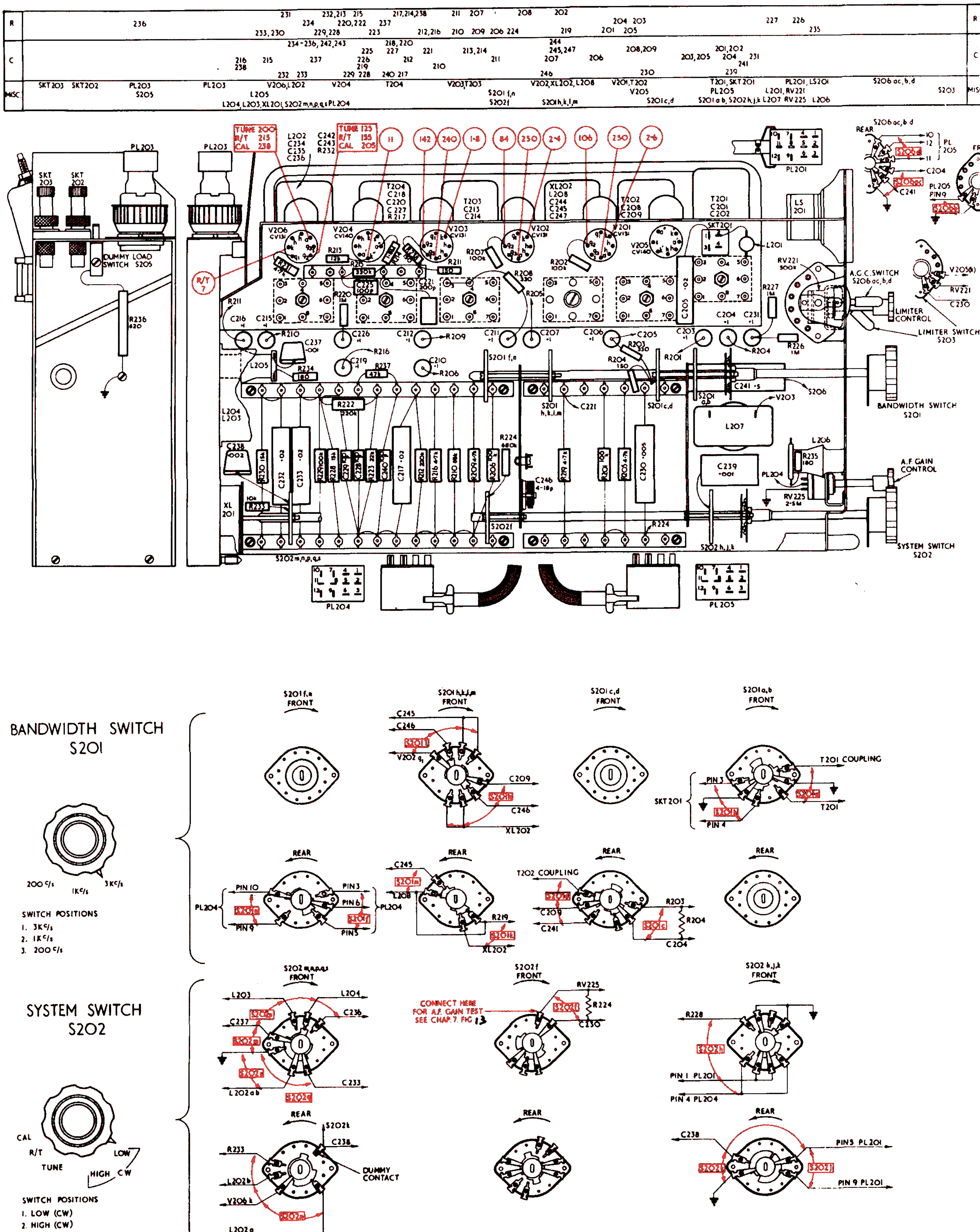
RECEIVER B41
I.F. UNIT. LAYOUT & SWITCH WIRING DIAGRAM. A.P. 57141B

FIG. 16



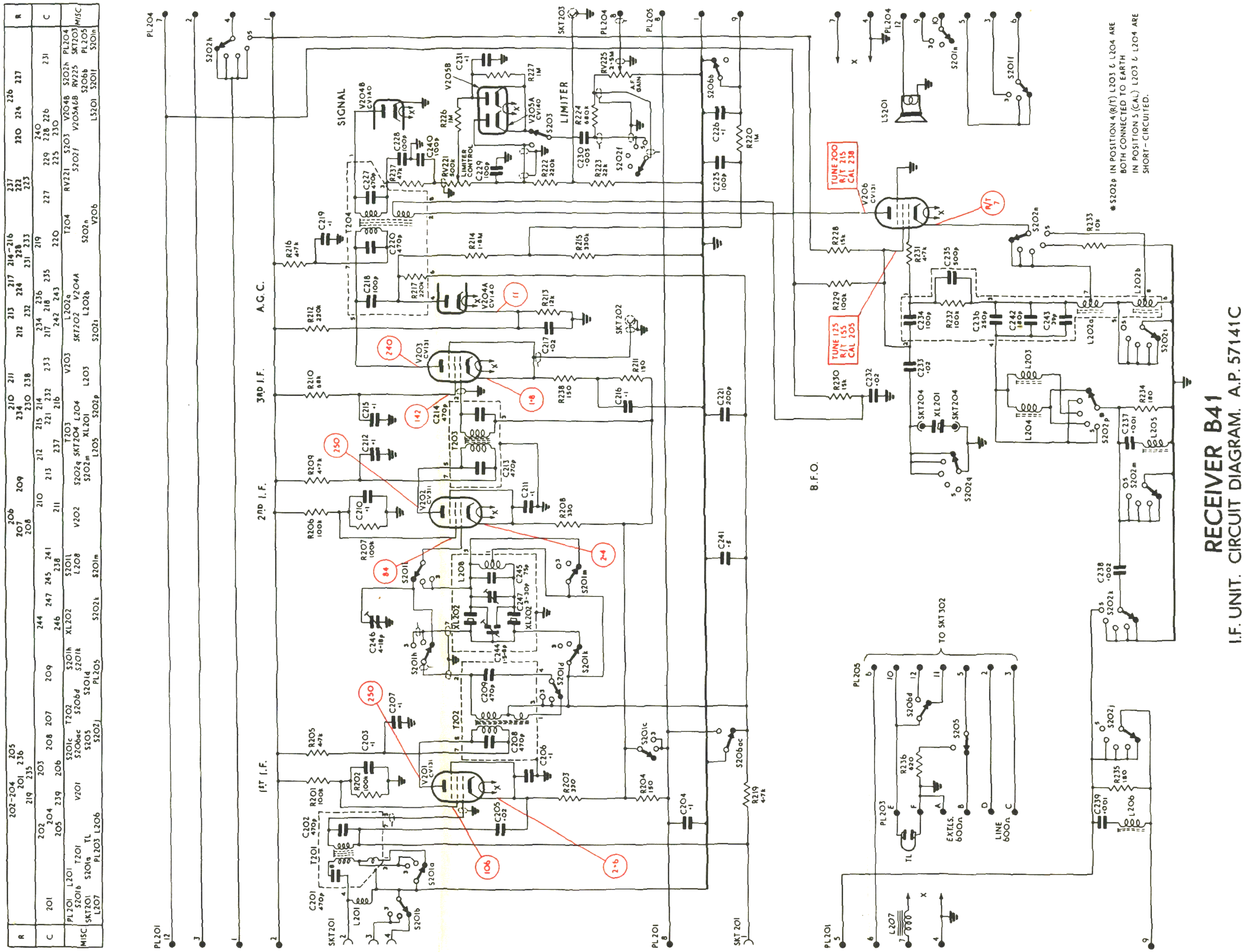
RECEIVER B41
I.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141B

FIG. 17



RECEIVER B41
I.F. UNIT. LAYOUT & SWITCH WIRING DIAGRAM. A.P. 57141C

FIG. 18



RECEIVER B41

I.F. UNIT. CIRCUIT DIAGRAM. A.P. 57141C

FIG. 19 & 20

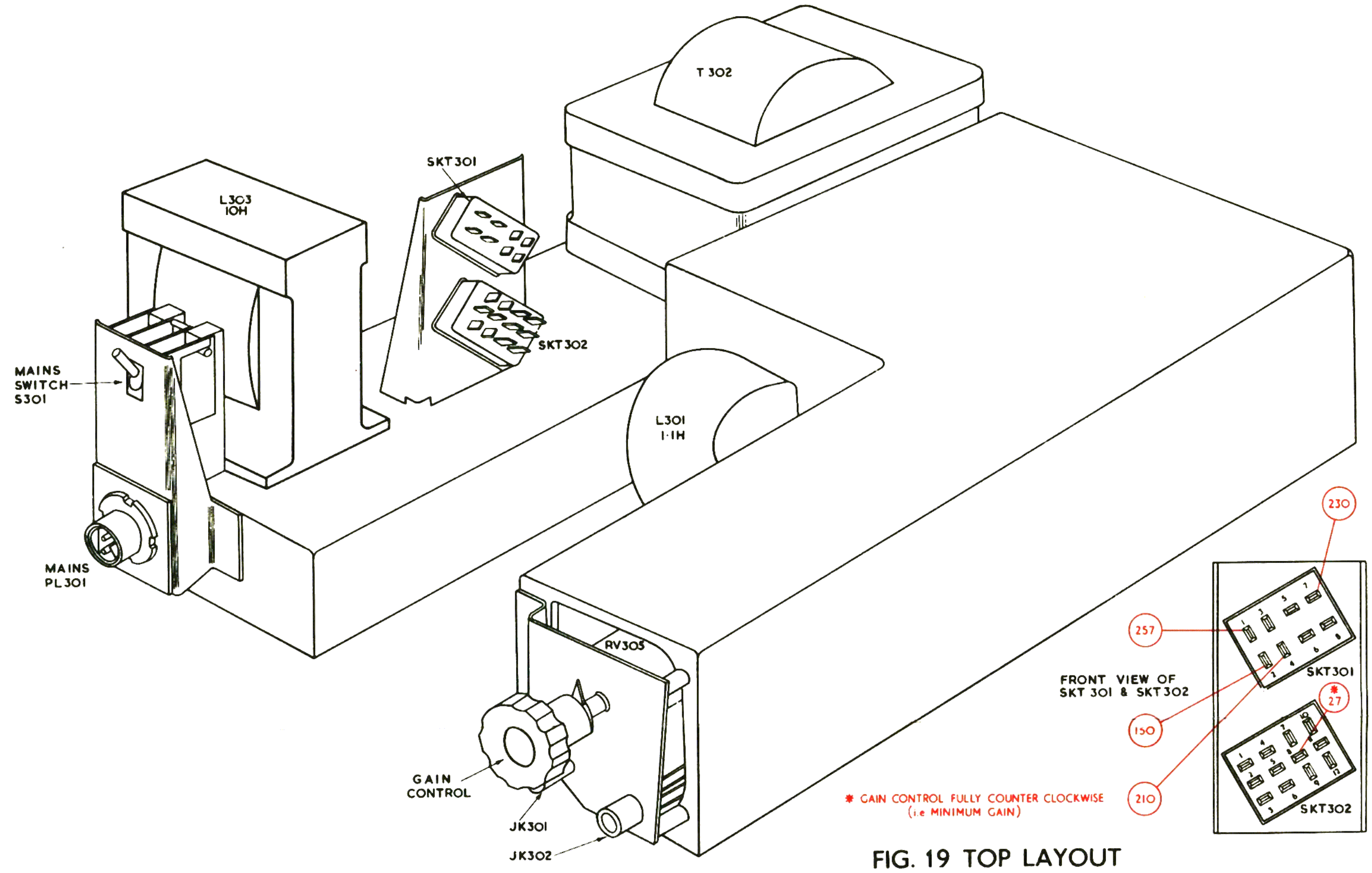


FIG. 19 TOP LAYOUT

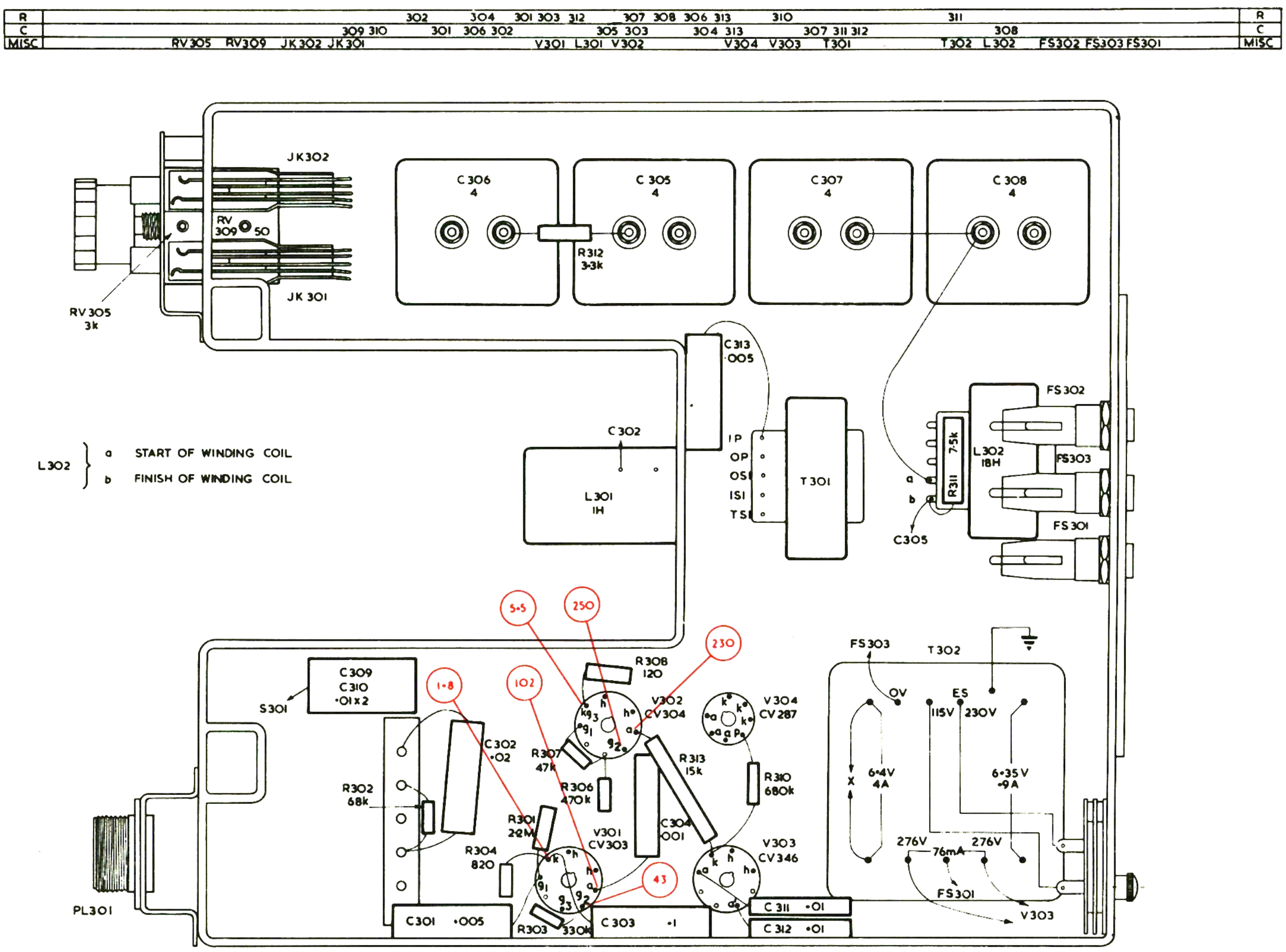


FIG.20 BOTTOM LAYOUT

RECEIVER B41

A.F. & POWER UNIT. LAYOUTS. A.P. 57141/A

FIG. 22 & 23

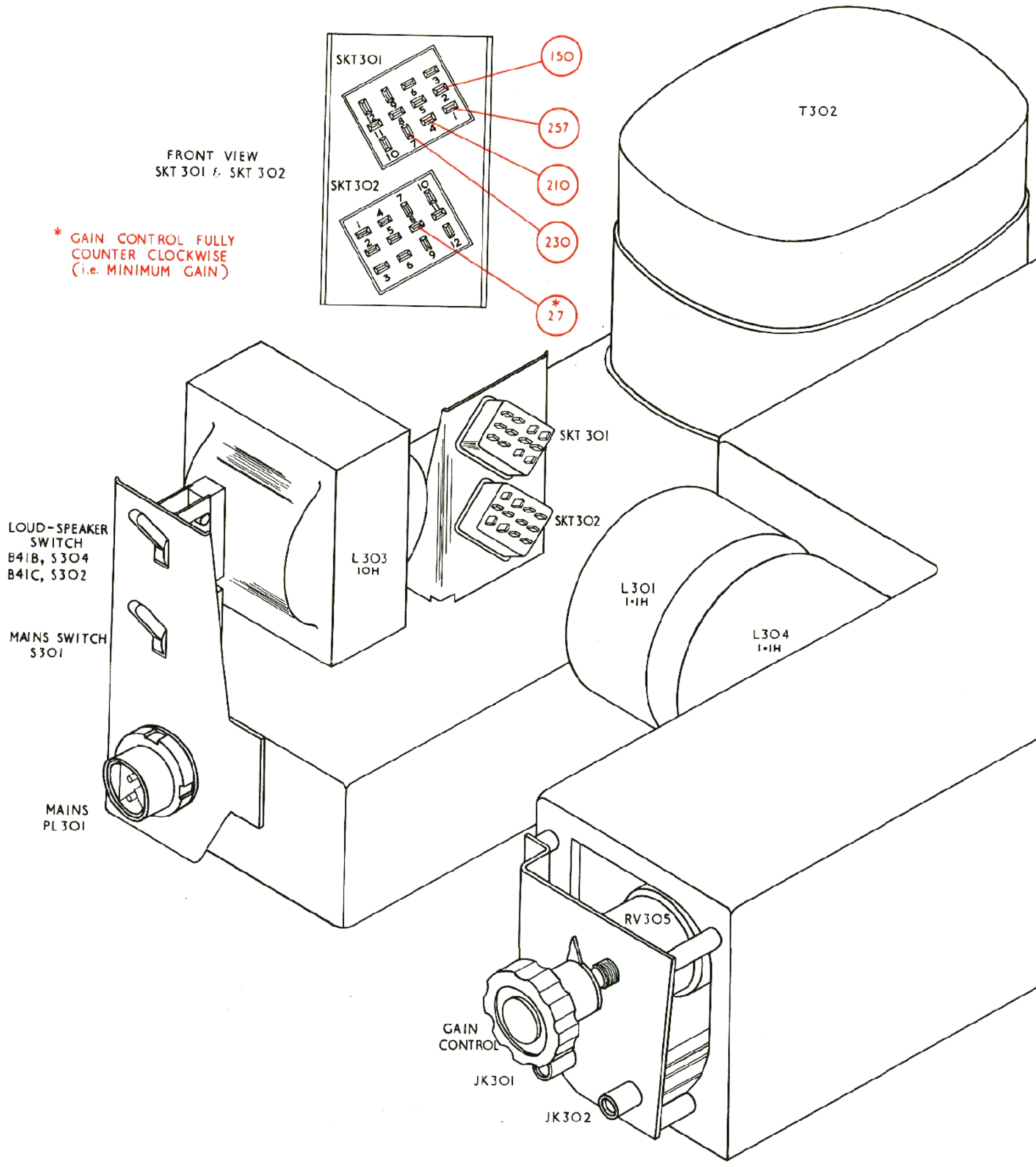


FIG. 22 TOP LAYOUT

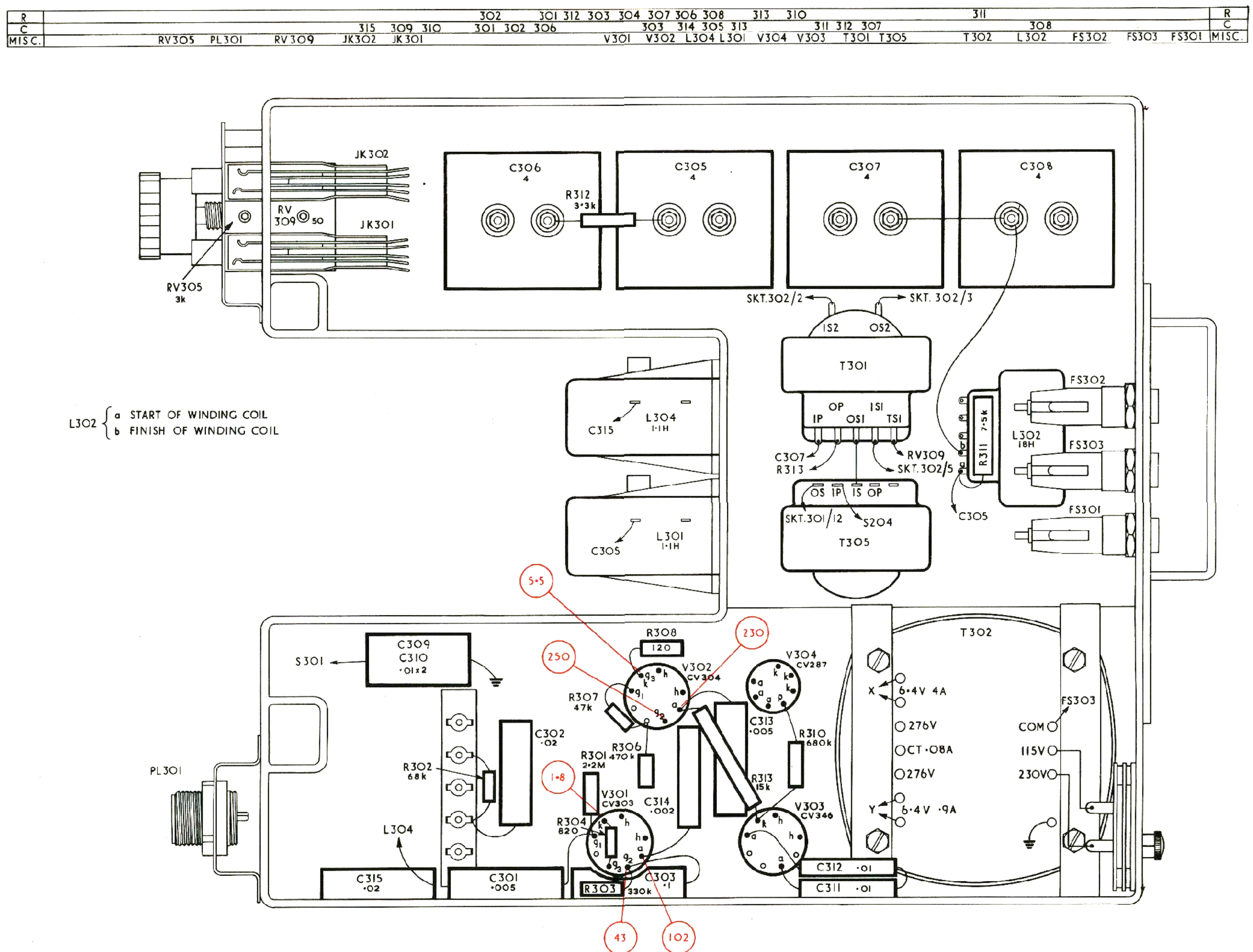
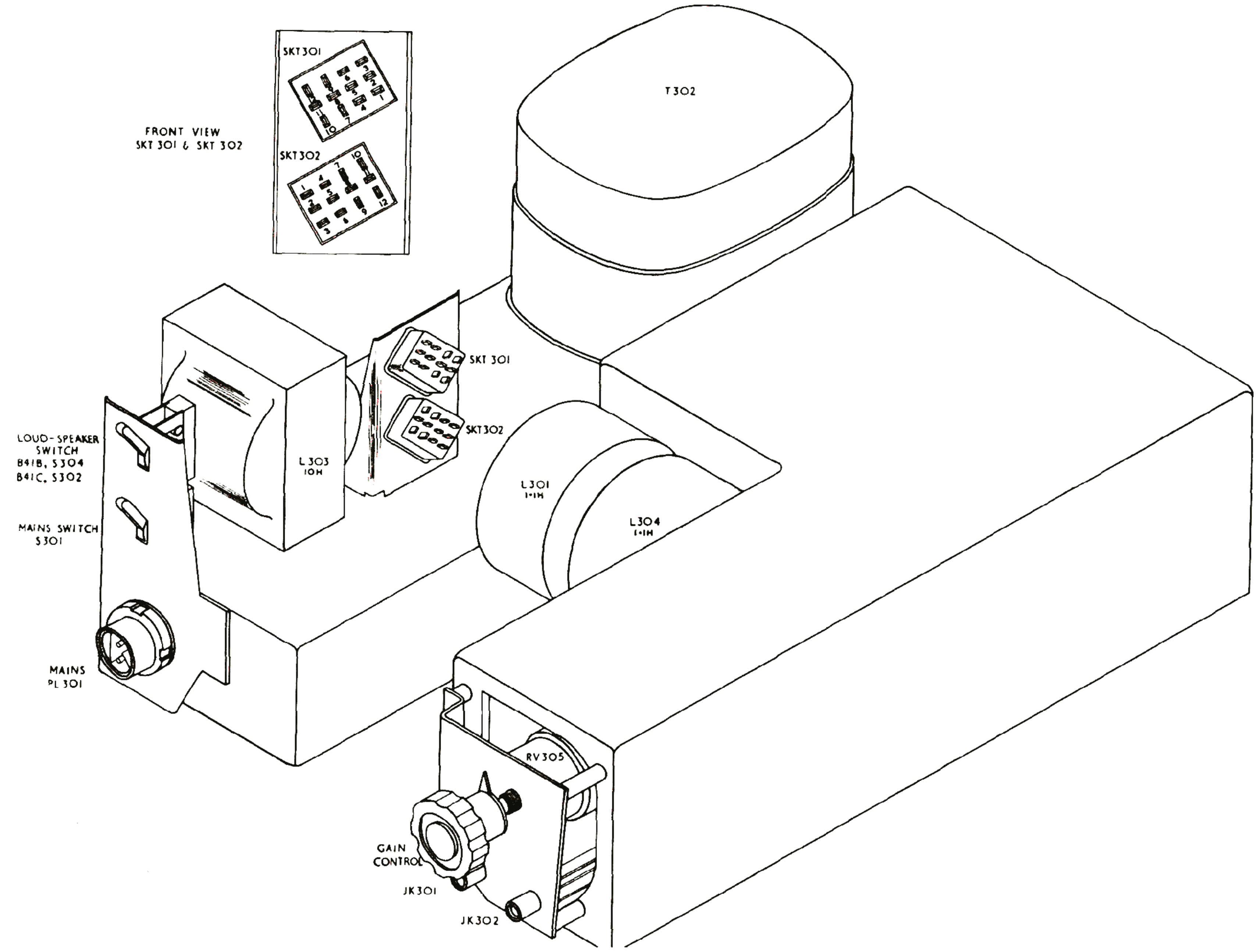


FIG. 23 BOTTOM LAYOUT

RECEIVER B41

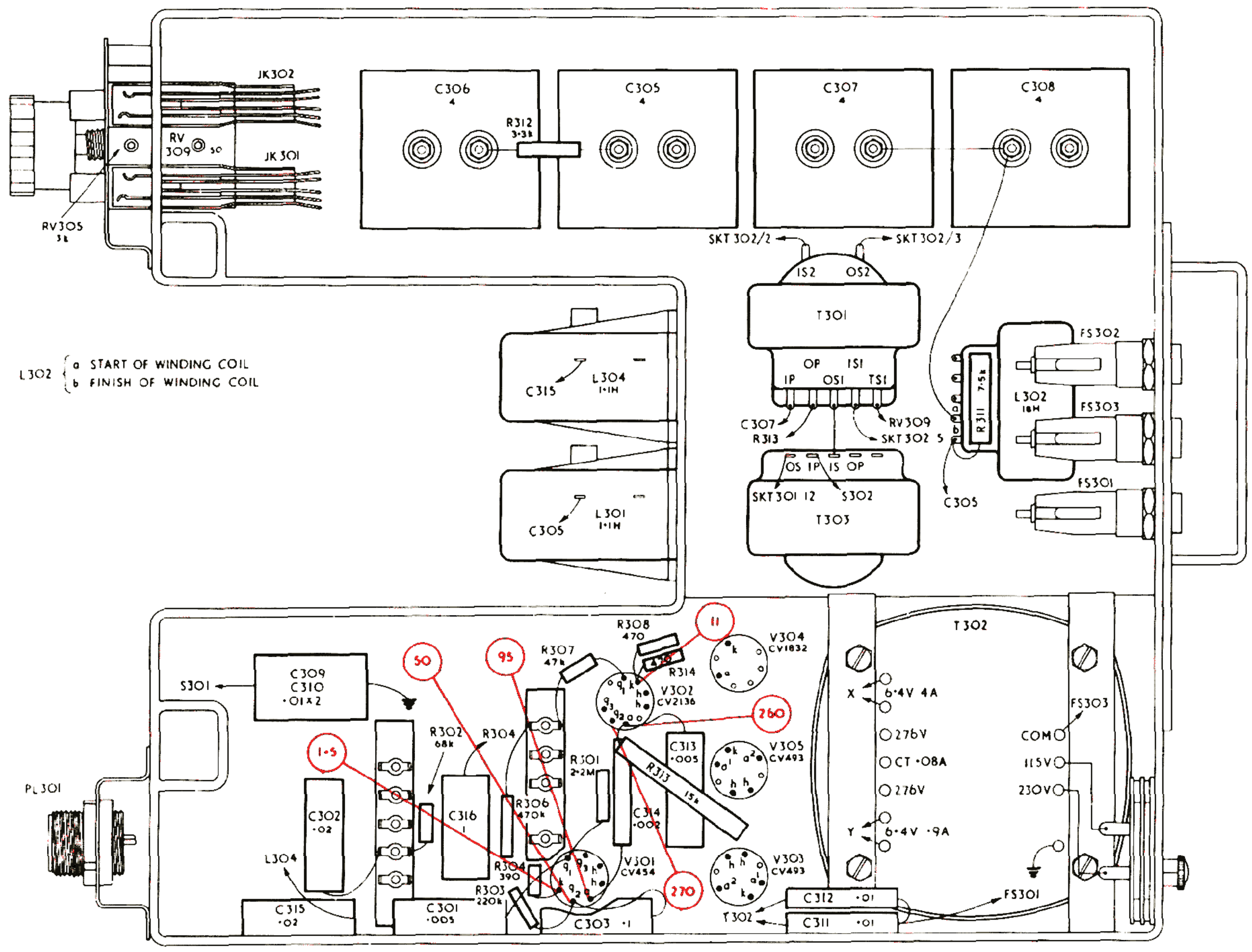
A.F. & PCWER UNIT. LAYOUTS. A.P. 57141B

FIG. 25



TOP LAYOUT

R		302	306, 303, 312 304 307, 301, 308, 314 313		311		R
C	309, 310, 315 302	306 316 301	303 314 305, 313	307, 312, 311		308	C
MISC.	PL301 RV305, RV309, JK302 JK301		L304 L301 V301 V302	V304 V303 V305 T301 T303	T302	L302, FS302, FS303, FS301	MISC.



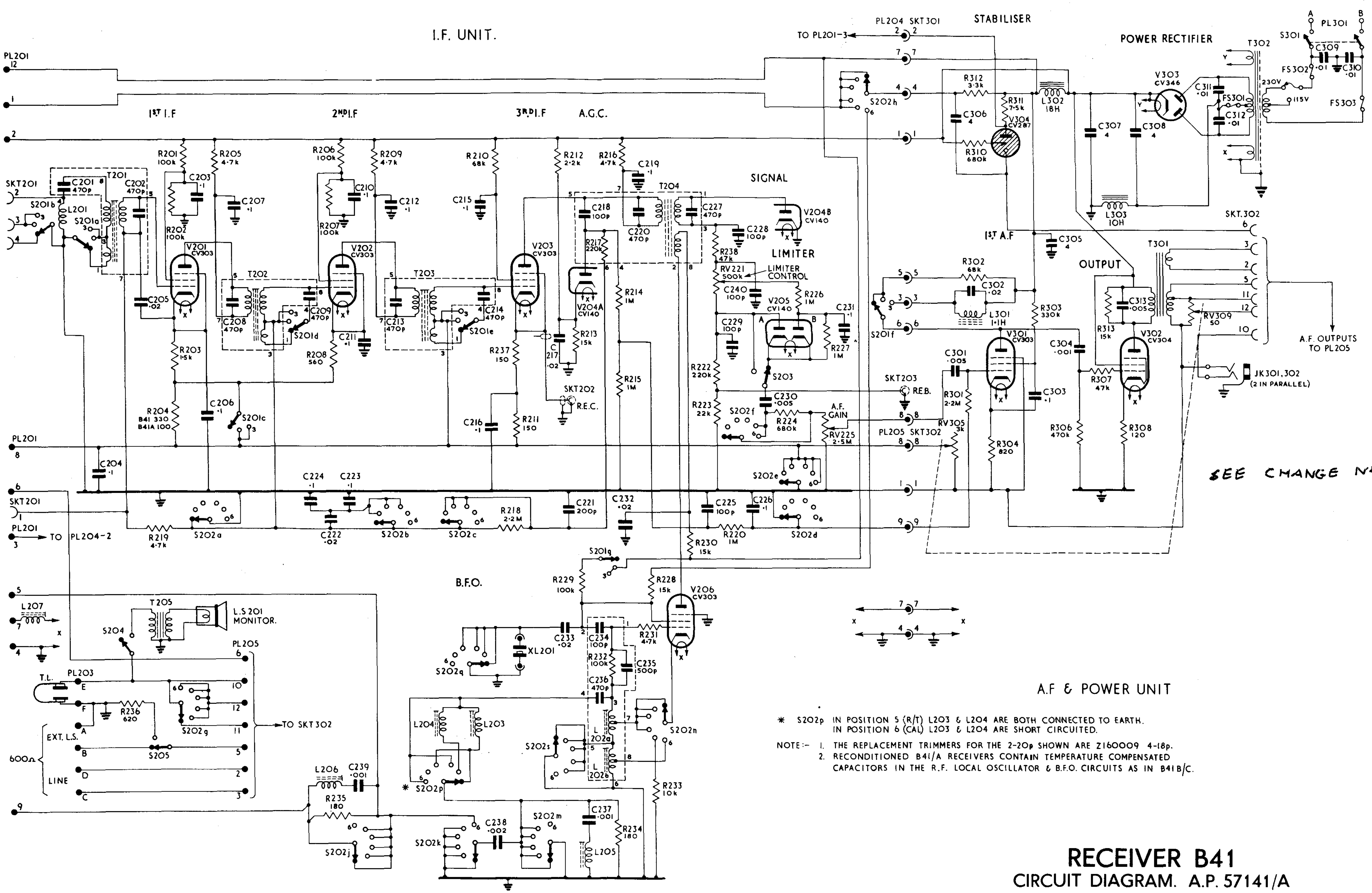
BOTTOM LAYOUT

RECEIVER B41

A.F. & POWER UNIT. LAYOUTS. A.P. 57141C

FIG. 27

R	202. 201 219 203 236 204 205 207 206 209 208 235 210 237 211 218 212 217.214.216 213 234 215 228 229 232.229.231 233 230 238 222 220 223 224.226 227 312 311 303 301.310 304 302 313 306 307 308	R
C	201 204 202 205 203 206 207 208 209 224 222 223 211 210 239 212 213 215 214 216 238 217 218 233 234 236 232 221 237 219 220 235 227 225 228 229 240 230 226 231 306 301.302 305 303 307 304 308 313 311 312 309 310	C
MISC	PL201 S201a & b SKT201 PL203 L207 TL L201 T201 S204 V201 T205 S205 S202a S202g. LS201. PL205. T202 S201c S201d L206 V202 S202j S202b T203 S202c S202k S201e S202q. L204. L203. SKT202. S201g. S202p XL201 V203 S202s V204A S202m L205 L202a L202b T204 V206 RV221 S202n S202f V204B S203. V205 S202e RV225 S202d S202h PL204 SKT301 SKT203 S201f RV305. L301 SKT302 V304 V301 L302 L303 V303 T301 V302 RV309 FS301. T302 SKT302 JK301 302 S301. PL301 FS302 FS303	MISC



* S202p IN POSITION 5 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH.
IN POSITION 6 (CAL) L203 & L204 ARE SHORT CIRCUITED.

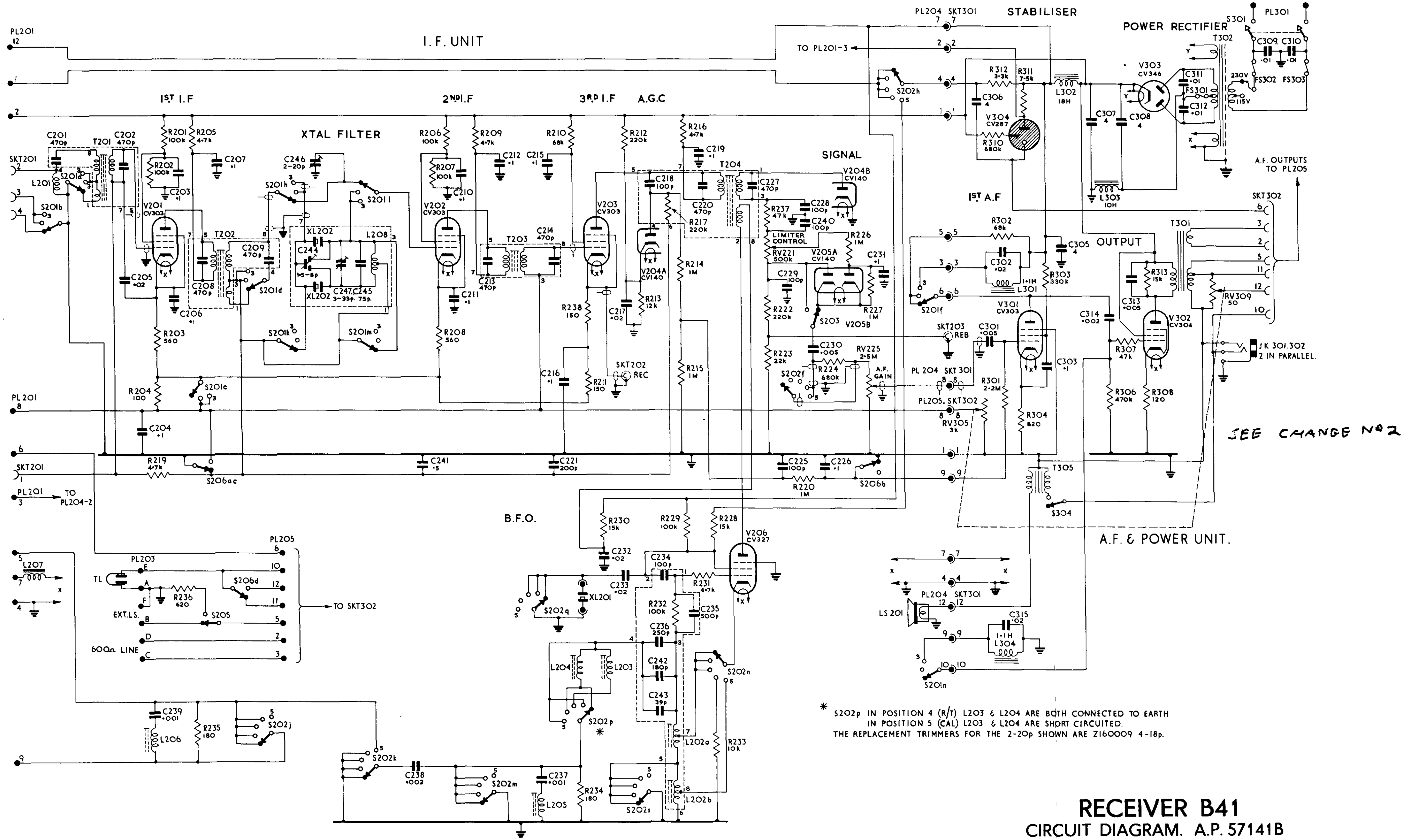
NOTE:- 1. THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z160009 4-18p.
2. RECONDITIONED B41/A RECEIVERS CONTAIN TEMPERATURE COMPENSATED CAPACITORS IN THE R.F. LOCAL OSCILLATOR & B.F.O. CIRCUITS AS IN B41B/C.

RECEIVER B41
CIRCUIT DIAGRAM. A.P. 57141/A

This sheet issued with A.L. No. 1 January 1958

FIG. 28

R	202 201 205 203 219 235 204 236 207 206 209 208 210 238 211 234 230 212 213 217 214 216 215 231 233 232 229 228 237 222 223 220 226 224 227 312 311 303 302 304 310 301 306 307 313 308	R
C	201 202 204 239 205 203 206 208 207 209 246 244 247 245 241 238 210 211 212 213 215 214 216 237 221 232 233 217 218 234 236 242 243 219 220 235 227 229 225 228 240 226 230 231 306 302 301 315 305 303 307 308 314 313 311 312 310 309	C
MISC.	S201b PL201 L201 SKT201 S201a L207 T201 TL V201 PL203 L206 S201c S206ac S205 T202 S201d S206d S201h PL205 S202j XL202 S201k S201l L208 S201m S202k V202 S202m T203 S202q L205 XL201 L204 S202p V203 SKT202 L203 S202s V204A L202a L202b S202n T204 RV221 V206 S203 S202f V204B V205 A & B RV225 S206b S202h PL205 LS201 PL204 SKT301 S201f S201n SKT203 SKT302 L301 RV305 L304 V304 V301 T305 L302 L303 S304 V303 V302 T301 FS301 RV309 JK301, 302. T302 S301 PL301 SKT302 FS302 FS303	MISC.

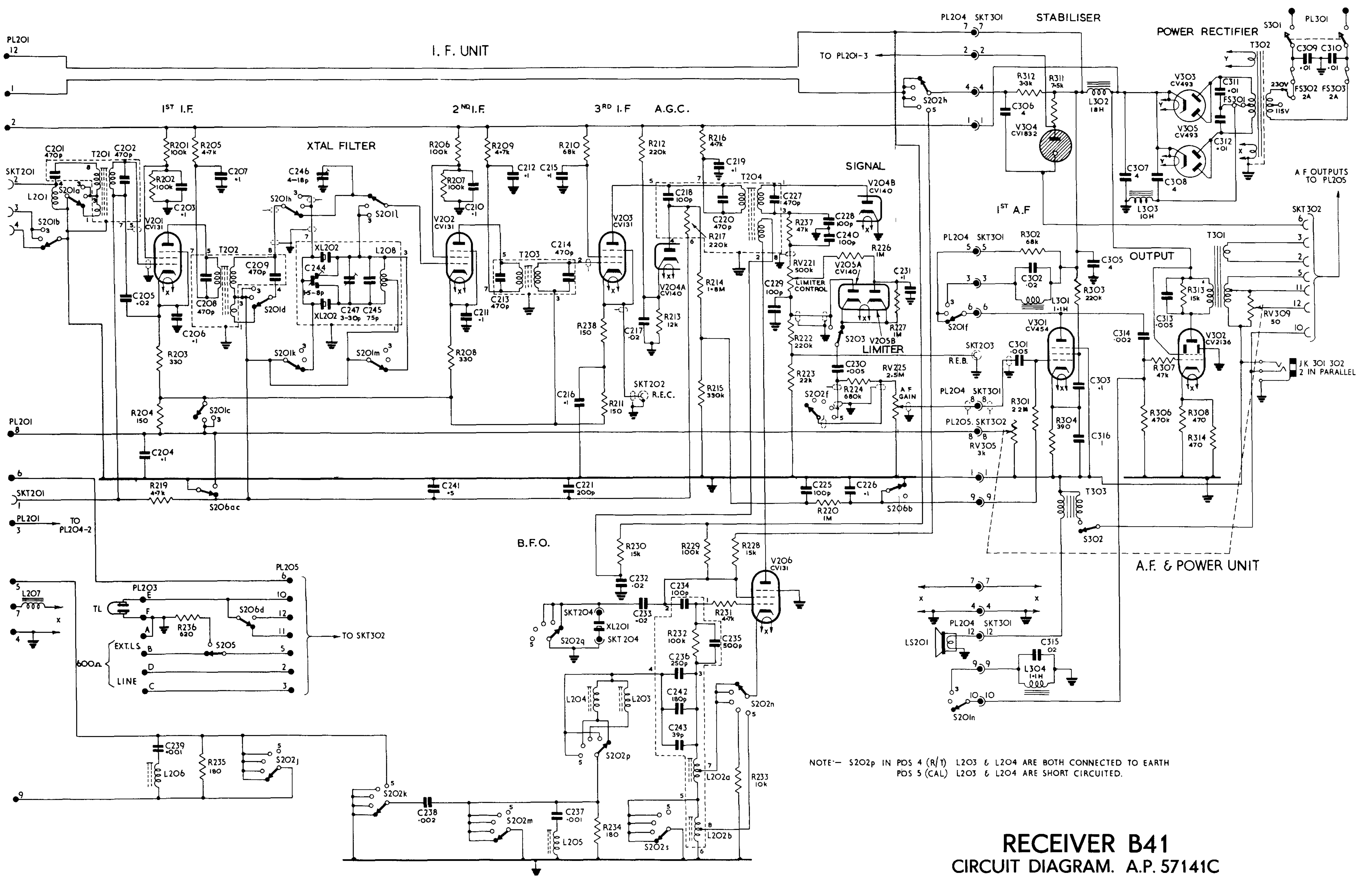


* S202p IN POSITION 4 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH
IN POSITION 5 (CAL) L203 & L204 ARE SHORT CIRCUITED.
THE REPLACEMENT TRIMMERS FOR THE 2-20p SHOWN ARE Z160009 4-18p.

RECEIVER B41
CIRCUIT DIAGRAM. A.P. 57141B

FIG. 29

R	202 201 205 203 219 235 204 236 207 206 209 208 210 238 211 234 230 212 213 217 214 216 215 231 233 232 229 228 237 222 223 220 226 224 227 312 311 303 302 304 301 306 307 313 314 308	R
C	201 202 204 239 205 203 206 208 207 209 246 244 247 245 241 238 210 211 212 213 215 214 216 237 221 232 233 217 218 234 236 242 219 220 243 235 227 229 225 228 240 226 230 231 306 302 301 315 305 303 316 307 308 314 313 311 312 310 309	C
MISC.	S201b PL201 L201 SKT201 S201a L207 T201 TL PL203 L206 V201 S201c S206ac S205 S206d T202 S201d PL205 S202j S201h S201k XL202 S201l L208 S201m S202k V202 S202m T203 S202q L205 SKT204 XL201 L204 S202p V203 SKT202 L203 V204A S202s L202a L202b T204 V206 RV221 S202n S202f S203 V205 V204B RV225 S206b S202h LS201 S201f PL204 SKT301 S201n RV305 SKT203 L301 L304 V304 V301 L302 L303 S302 T303 V303 V305 V302 T301 FS301 T302 RV309 S301 PL301 SKT302 JK301, 302. FS302. FS303	MISC



NOTE:— S202p IN POS 4 (R/T) L203 & L204 ARE BOTH CONNECTED TO EARTH
POS 5 (CAL) L203 & L204 ARE SHORT CIRCUITED.

RECEIVER B41
CIRCUIT DIAGRAM. A.P. 57141C