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INDEPENDENT SIDEBAND ADAPTOR TYPE RA. 121A/B

Operating and Maintenance Manual

Technical Handbooks Department

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THE NEXT TWO PAGES

concern all users of electrical equipment from a different point of view

•

read carefully .....it

COULD AFFECT YOU

FIRST AID in case of Electric Shock

FIG.1

1. *SWITCH OFF.* If this is not possible, *PROTECT YOURSELF* with dry insulating material and pull the victim clear of the conductor.
   DON'T TOUCH THE VICTIM WITH YOUR BARE HANDS until he is clear of the conductor, but *DON'T WASTE TIME.*

FIG.2

2. (a) Lay patient face down with head to one side, arms bent and forehead on his hands to keep mouth and nose clear. (see Fig.1)
   (b) Give one or two firm thumps with flat of hand between his shoulders.
   (c) Kneel at his head, one knee near the head and your other foot alongside the elbow. (see Fig.2)
   (d) Place your hands on his shoulder blades with thumbs touching on the mid-line and and fingers pointing towards his feet. (see Fig.3)

FIG.3

3. (a) Bend forward with your arms straight and apply weight lightly. (see Fig.4)
   (b) Release pressure gradually and slide your hands to grip him just above the elbows. (see Fig.5)
   (c) Draw his arms and shoulders towards you by leaning backwards with your arms straight till you feel resistance, but without lifting his chest off the ground. (see Fig.6)
   (d) Lay his arms down and slide your hands on to the shoulder blades.

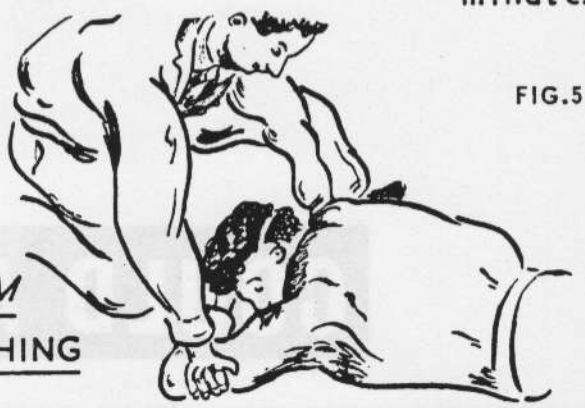
   Repeat paragraph 3 at a rate of 9 times to the minute until breathing is restored, & then omit the back pressure but continue the movement at a rate of 12 times to the minute.

HAVE SOMEONE ELSE

SEND FOR DOCTOR

FIG.4

FIG.5

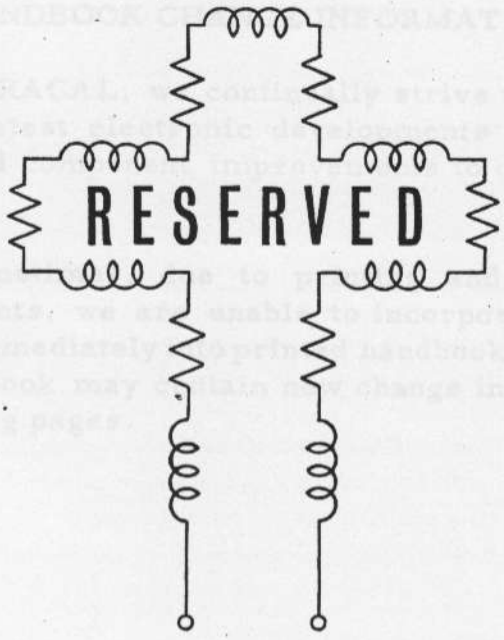


KEEP PATIENT WARM

AND LOOSEN HIS CLOTHING

FIG.6

DO NOT *give liquids until patient is conscious*



FOR THOSE WHO MEDDLE WITH *LIVE* WIRES

THE VOLTAGES EMPLOYED IN THIS EQUIPMENT ARE SUFFICIENTLY HIGH TO ENDANGER HUMAN LIFE.

EVERY REASONABLE PRECAUTION HAS BEEN OBSERVED IN DESIGN TO SAFEGUARD OPERATING PERSONNEL.

The Power MUST BE SWITCHED OFF
BEFORE SERVICING EQUIPMENT,

and

GREAT CARE taken
WHEN MAKING INTERNAL ADJUSTMENTS——etc.,

SWITCH OFF —— PLAY SAFE !!

now . . .

proceed

with

CAUTION

HANDBOOK CHANGE INFORMATION

At RACAL, we continually strive to keep up with the latest electronic developments by adding circuit and component improvements to our equipments.

Sometimes, due to printing and despatch requirements, we are unable to incorporate these changes immediately into printed handbooks. Hence, your handbook may contain new change information on following pages.

NOTES

CHAPTER 4

BRIEF TECHNICAL DESCRIPTION

Introduction

1. This section briefly describes, with the aid of the block diagram in figure 1, the basic theory of operation. For a fully detailed explanation of the adaptor, Chapter 5 (Detailed Circuit Description) should be read.

Mixer and Oscillator

2. An input signal at 100 kc/s, fed via a preset potentiometer, is mixed with the output of a stable 118 kc/s oscillator. This oscillator is variable over ±2 kc/s and is fitted with a slow motion drive which provides an accurate control of tuning; essential to take full advantage of the carrier and unwanted sideband rejection characteristics of the unit, and to avoid pitch distortion. A further control in the form of a three position switch alters the frequency by ± 3 kc/s.

Filters and Carrier Rejection Bridge.

3. The mixer output centred on 18 kc/s, is fed via a 12 to 24 kc/s (18 kc/s ± 6 kc/s) band-pass filter, carrier rejection bridge stage and an amplifier stage to both upper and lower sideband filters. The filters provide a high degree of rejection to all signals other than the wanted sideband.

Product Detectors and Carrier re-insertion Oscillator.

4. Each sideband filter output is mixed in a product detector, with a signal at 18 kc/s, from a fixed frequency oscillator, giving products including an audio frequency component. Unwanted signal frequencies are subsequently removed by means of a further filter network. The resultant output therefore consists only of the audio frequencies.

Audio Stages

5. The audio frequency on each channel is fed to an a.f. output stage with a gain control and having three independent outputs, one of which is provided with a switch for sideband selection.

Indicator(c.r.t.)

6. A c.r.t. functions as a tuning indicator. The 18 kc/s carrier re-insertion oscillator output is applied to the X-plates and the input carrier signal, taken from the band-pass filter is applied to the Y-plates through a two-stage tuned amplifier. This gives a Lissajous presentation showing a stationary ellipse when the input carrier frequency, after the first mixer, is the same as the frequency of the carrier re-insertion oscillator, (18 kc/s) i.e. when tuning of the input signal is correct.

Audio Frequency control

7. A simple form of a.f.c. is provided for optional use to maintain correct tuning over a small range of drift of either the input signal or the internal oscillators.

CHAPTER 5

DETAILED CIRCUIT DESCRIPTION

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CHAPTER 5

DETAILED CIRCUIT DESCRIPTION

Mixer Stage (Fig. 7)

1. A 75Ω (unbalanced) source of signal at 100 kc/s is connected via socket PL2 and an input potentiometer RV1 to the signal grid of V1. R1 provides a suitable impedance match. The output of a 118 kc/s oscillator V2 is applied via C11 to the suppressor grid of V1. The resultant output centred on 18 kc/s is taken from the anode.

118 kc/s Oscillator

2. V2 is a cathode coupled Colpitts circuit operating at a nominal frequency of 118 kc/s. Switched capacitors vary this frequency by ± 3 kc/s whilst a fine tuning control C3 coupled to a slow motion drive varies it by ±2 kc/s.

Band-Pass Filter

3. This filter is a single section constant K have a sensibly flat response from 12 - 24 kc/s. A tuned r.f. transformer in series with the filter couples the 18 kc/s carrier to an amplifier V3 and thence the Y - plates of the c.r.t. The carrier plus sidebands is applied via C20 to the carrier rejection bridge stage.

Carrier Rejection Bridge.

4. V4 together with R22, L9, C42, R21 and RV3 form a bridge. The tuned circuit L9, C42 is resonant at 18 kc/s and its dynamic impedance balances the bridge so there is no output. At the sideband frequencies L9, C42 is no longer resonant, its impedance unbalances the bridge and an output is available.

5. RV3 is a preset control which ensures an accurate balance at 18 kc/s.

6. The 30B rejection provided prevents the carrier from producing an audio-beat note with the carrier re-insertion oscillator at a later stage. This could occur if the carrier level was at or near the sideband level.

Pilot carrier systems.

12. This heading covers single sideband and independent sideband signals where the carrier is transmitted 0 to -26dB below normal level. Tuning of these signals is accomplished in a similar manner to those with a full carrier (Paras. 7 to 11).

13. The Y GAIN control on the RA. 121A/B should be set near maximum, and the receiver gain set to give a full screen display on the c. r. t. when the pilot carrier is tuned to give an ellipse.

14. With independent sideband emission, the receiver will be tuned so that the carrier lies near the centre of its pass-band. For s. s. b. signals, however, an improvement may sometimes be obtained by tuning the receiver so that the carrier lies to one side of its pass-band, i. e. so that the sideband falls symmetrically within the available band width. This is not essential, but may help in the cases of interference since it allows the RA. 17 to be set to a narrower bandwidth, and in order to achieve it a slight modification to the tuning procedure is necessary.

15. For receiving lower sidebands, the adaptor tuning is first set to a higher frequency, by an amount corresponding to half the bandwidth of the signal to be received. For example, with an l. s. b. signal of 3 kc/s bandwidth, the adaptor main tuning control is set to +1. 5 kc/s. The receiver is set to the required bandwidth (3 kc/s) and tuned until the pilot carrier is approximately on tune, as indicated by the rise in amplitude in the tuning indicator. Final precise tuning is carried out on the adaptor tuning control, but only a small amount of adjustment should be necessary.

16. To take signals with 6 kc/s sidebands the adaptor is detuned 3 kc/s from zero. To preserve a slow tuning rate however, the main tuning capacitor covers only ±2 kc/s. In order to cover a greater range than this, a switch is provided which gives a further ±3 kc/s.

17. For upper sidebands the above procedure is adopted with the adaptor detuned to the l. f. side of zero.

18. The use of this detuning procedure helps with the reduction of any possible intermodulation products from adjacent strong signals.

Systems with completely suppressed carrier.

19. No simple method of tuning these signals is known, No pilot carrier is available for the tuning indicator to work on, so these signals must be tuned by ear.

20. Listening to the RA. 17 output, the signal is first tuned until it appears to be centred on the pass-band, judged by loudness. The adaptor tuning is then adjusted slowly until the signal becomes intelligible. If it is not known whether the signal is of the l. s. b. or u. s. b. variety it will be necessary to listen to each output channel in turn. With a little practice it is possible to recognize the characteristic sound of this type of emission, and tuning will not present too much difficulty.

21. Where the signal is of the i. s. b. type, the tuning is carried out precisely as above, except that intelligence will be obtained from both sideband output channels.

22. For the reception of double sideband suppressed carrier signals (i. e. both carrying the same intelligence) the signals are treated as normal s. s. b. signals. Since the two sidebands are separated in the adaptor, it is not necessary to re-insert the carrier in phase. Providing it is within approximately 50 c/s of the correct frequency an intelligible signal will result. Tuning is carried out in exactly the same way as with other fully suppressed carrier systems.

Amplifier and a.f.c.

14. The 18 kc/s carrier output from the band-pass filter is coupled to a two stage tuned amplifier using a triode pentode V3. A gain control RV2 is included. The output is coupled via C29 to the Y-plates of the c.r.t. indicator and also via C30 and the a.f.c. ON/OFF switch to the tuned circuit of the carrier reinsertion oscillator V6. This locks the oscillator frequency to the carrier frequency when the carrier frequency is near enough to enable such locking to be carried out without affecting the intelligibility of the signal.

15. When the a.f.c. is switched off C38 and C39 are switched across the oscillator tuned circuit to compensate for the capacitance introduced by the amplifier output circuit in the a.f.c. ON condition.

c.r.t. Indicator

16. The c.r.t. operates as a tuning indicator by means of a Lissajous presentation. One X and one Y plate are strapped together at the potential of the accelerating anode whilst the potentials on the other two plates can be adjusted by RV3 and RV5 to above and below the anode potential giving X and Y shift control. The output of the carrier re-insertion oscillator V6 is applied to the X-plates and the amplified carrier is applied to the Y-plates.

Power Supply

17. The power supply is conventional, except that an additional negative line is supplied, so that a total of nearly 600 volts is available for the c.r.t. circuits.

SECTION 2

MAINTENANCE

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CHAPTER 1

TEST EQUIPMENT REQUIRED FOR MAINTENANCE

CHAPTER 1

TEST EQUIPMENT REQUIRED FOR MAINTENANCE

1. The following items of test gear are required to carry out the maintenance described in this part of the handbook:-

(a) Multi-range meter (20,000Ω/volt) measuring a.c. and d.c. up to 500 volts.

(b) Signal Generator (100 kc/s) with a matching device to provide 75 ohms source impedance.

(c) Valve Voltmeter (50 mV to 100V r.m.s.)

(d) Digital Frequency Meter (max. frequency 125 kc/s).

(e) Output power meter.

(f) 10KΩ, $\frac{1}{4}$ watt resistor.

CHAPTER 2

VALVE DATA.

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CHAPTER 2

VALVE DATA.

Introduction

1. Details of the valves used in this Adaptor are shown below. Valve base pin connections are provided on the circuit diagram.

Base Connections

2.

Type	6AS6 CV2522	6AU6 CV2524	12AT7 CV455	12AX7 CV492	ECF82 CV5065 6U8	EF91 CV138	6X4 CV493
Base	B7G	B7G	B9A	B9A	B9A	B7G	B7G
Pin No.							
1	G1	G1	A"	A"	At	G1	A"
2	K	G3	G"	G"	G1p	K	
3	H	H	K"	K"	G2p	H	
4	H	H	H	H	H	H	H
5	A	A	H	H	H	A	H
6	G2	G2	A'	A'	Ap	G3	
7	G3	K	G'	G'	K, G3p	G2	A'
8			K'	K'	Kt		
9			H.c.t.	H.c.t.	G1t		K

Valve complement and typical voltages

3. The following voltage to chassis measurements (d.c.) are approximate and are measured with a 20,000Ω/volt meter. Valve pin numbers are indicated in brackets.

Cct. Ref.	Type	Anode	Screen	Cathode	Anode"	Screen"	Cathode"
V1	6AS6	182V(5)	87V(6)	2V(2)			
V2	6AU6	90V(5)	90V(6)	13V(7)			
V3	ECF82	96V(1)		3.3V(8)	64V(6)	36V(3)	1.3V(7)
V4	12AX7	157V(1)		30.5V(3)	158V(6)		30.5V(8)
V5	12AT7	125V(1)		1.0V(3)	125V(6)		1.0V(8)
V6	12AT7	318V(1)		167V(3)	176V(6)		0V(8)
V7	6AS6	90V(5)	115V(6)	2.5V(2)			
V8	6AS6	90V (5)	120V(6)	2.5V(2)			
V10	EF91	330V(5)	240V(7)	2.0V(2)			
V11	EF91	330V(5)	240V(7)	2.0V(2)			

V12, CRT Type DG7-32 (Remove rubber base cover to test).

Anode (6, 8 and 9)	= 225V
Grid 2 (4) in focus	= -140V
Grid 1 (2) at normal brilliance	= -220V
Cathode (3)	= -220V

Junction of R18 and R19 = -29V
" " R56 and R57 = 207V
" " R50 and R51 = 208V

Total H. T. consumption 54mA.

H. T. 1 = 320V d.c.
H. T. 2 = 188V d.c.

CHAPTER 3

TEST SPECIFICATION

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CHAPTER 3

TEST SPECIFICATION

Introduction

1. If the performance of the adaptor is suspect, the following tests will indicate if it meets its specification or if re-alignment is necessary.

Dial Calibration

2. (1) Connect the signal generator to the 100 kc/s input socket.

(2) Using the frequency meter set the signal generator output frequency to exactly 100 kc/s.

(3) Connect the frequency meter to junction of C16 and L3.

(4) Set the -3 kc/s/0/+3 kc/s switch to the 0 position and the tuning dial to 0 kc/s.

(5) Check the tuning dial at 200 c/s intervals. At any of the calibration points the frequency error should not exceed 50 c/s.

(6) Set the -3 kc/s/0/+3 kc/s switch to -3 kc/s and +3 kc/s in turn and check that the frequency does not differ by more than 100 c/s from 115 kc/s and 121 kc/s respectively.

Passband Response

3. (1) Set the RX - L.S.B. -U.S.B. switch to U.S.B..

(2) Connect the output power meter, set at 600Ω, on the milliwatt range, and the frequency meter to the switched output terminals at the rear of the unit.

(3) Connect the signal generator to the 100 kc/s input socket.

(4) Adjust the signal generator frequency to give a reading of 1000 c/s on the frequency meter.

(5) Adjust the signal generator output level to give a reading of 1 milliwatt on the output power meter.

(6) Tune the signal generator to give output frequencies, indicated by the frequency meter from 300 c/s to 6 kc/s, noting any variation in the output power.

(7) Repeat operation (1) to (6) with the sideband switch set L. S. B.

Channel Sensitivity

4. (1) Connect the signal generator to the 100 kc/s input socket and adjust the frequency output accurately to 100 kc/s.

(2) Connect the output power meter, set at 600Ω on the milliwatt range, to the switched output terminals at the rear of the unit.

(3) Set the gain controls to maximum and the sideband switch to U. S. B.

(4) Adjust the tuning dial to -1kc/s and the signal generator output level to give an output of 3 milliwatts on the output power meter.

(5) Note the signal generator output level which should not exceed 100mV.

(6) Repeat the above procedure with the sideband switch set to U. S. B, and the tuning dial to +1 kc/s.

Tuning Indicator Sensitivity

5. (1) Connect the signal generator to the 100 kc/s input socket and adjust the frequency output accurately 100 kc/s.

(2) Set the R. F. GAIN control (on the rear) and the Y GAIN control to maximum.

(3) Adjust the tuning dial until a stationary Lissajous ellipse is obtained on the tuning indicator.

(4) Adjust the output level of the signal generator until the vertical deflection on the c. r. t. indicator is 2 inches and note the signal generator output level; this should not exceed 80 mV.

(5) Note the horizontal deflection on the c.r.t. indicator; this should not be less than $\frac{3}{4}$ inch.

Opposite Sideband Rejection

6. (1) Switch the a.f.c. OFF.

(2) Set the sideband switch to L.S.B.

(3) Connect the output power meter and the frequency meter to the switched output terminals at the rear.

(4) Connect the signal generator to the 100 kc/s input socket.

(5) With the GAIN controls at maximum adjust the frequency and output level of the signal generator until the frequency meter indicates 1000 c/s and the output power meter 1 milliwatt.

(6) Connect the frequency meter to the UPPER S.B. output terminals.

(7) Tune the signal generator to obtain a reading of 300 c/s on the frequency meter and note the reading on the output power meter. This should be greater than -40dB with respect to the 1mW reference.

(8) Continue tuning the signal generator until the frequency meter indicates 6 kc/s and check that the output power meter reading does not rise above -40dB relative to 1 milliwatt.

(9) Repeat operations (6), (7) and (8) for the opposite sideband by switching the UPPER S.B./LOWER S.B. switch to UPPER S.B. and connecting the frequency meter to the LOWER S.B. output terminals.

(10) Repeat operations (6) to (9) with the a.f.c. ON when the output power in the opposite sideband should be greater than -40dB from 300 c/s to 6 kc/s, and -30dB from 150 c/s to 300 c/s; referred to 1mW.

Carrier Rejection

7. (1) Turn the UPPER S.B. and LOWER S.B. A.F.GAIN controls to maximum (fully clockwise).

(2) Set the sideband switch to U. S. B.

(3) Connect the signal generator to the 100 kc/s input socket.

(4) Connect the output power meter, set to 600Ω on the milliwatt range to the switched output terminals at the rear of the unit.

(5) Connect the frequency meter to the junction of C16 and L3.

(6) Connect the valve volt meter between pin 1 of V7 and chassis.

(7) Tune the signal generator until the frequency meter indicates 17 kc/s (101 kc/s on the signal generator)

(8) Adjust the level of the signal generator output to give a reading of 3 milliwatts on the output power meter and note the valve volt meter reading. This reading provides the reference level.

(9) Adjust the signal generator frequency until a stationary ellipse is obtained on the c. r. t. indicator.

(10) Note the valve voltmeter reading, the reduction in reading is a measure of the carrier rejection and should be at least -30dB below the reference level.

(11) Connect the valve voltmeter between pin 1 of V8 and chassis and check that the reading is at least -30dB below the reference level.

Automatic Frequency Control

8. (1) Connect the signal generator to the 100 kc/s input socket and the frequency meter to the junction of C16 and L3.

(2) Switch the a. f. c. ON.

(3) Set the Y GAIN control to maximum.

(4) Tune the signal generator around 100 kc/s until a stationary ellipse is obtained on the c. r. t. indicator.

(5) Adjust the output level of the signal generator until the vertical deflection of the ellipse on the c. r. t.

indicator is 2 inches high.

(6) Slowly rotate the tuning control in each direction until the a.f.c. just unlocks, indicated by a confused pattern replacing the ellipse.

(7) Note the frequency meter readings at the two points of unlock. These should not be less than 90 c/s apart.

Noise Level

9. (1) Set the R.F. GAIN (on the rear) and UPPER and LOWER S.B. GAIN controls to maximum (fully clockwise).

(2) Connect the output power meter, set to 600Ω, to the switched output terminals at the rear.

(3) Measure the noise level on each sideband by selecting the sideband with the RX-L.S.B.-U.S.B. switch.

(4) The noise level should exceed -44dB relative to 3 milliwatts.

CHAPTER 4

BRIEF TECHNICAL DESCRIPTION

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CHAPTER 4

ALIGNMENT PROCEDURE

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CHAPTER 4

ALIGNMENT PROCEDURE

OSCILLATORS

18 kc/s Carrier re-insertion Oscillator

1. (1) Connect the frequency meter to pin 7 of V7 or V8.

   (2) Switch the a.f.c. ON.

   (3) With no input to the unit adjust the core of L8 until the frequency meter reads 18 kc/s.

   (4) Switch the a.f.c. OFF.

   (5) Adjust C39 until the frequency meter reads 18 kc/s.

   (6) With the valve voltmeter check the injection voltage on pin 7 of V7 and V8. This should be 4V$\pm\frac{1}{2}$V.

118 kc/s Oscillator

2. (1) Connect the frequency meter to the junction of C16 and L3.

   (2) Turn the -3 kc/s/0/+3 kc/s switch to the 0 position.

   (3) Set the tuning dial to 0 kc/s.

   (4) Set the trimming capacitor C6 to approximately 45 degrees from the fully open position.

   (5) Adjust the core of L1 until the frequency meter reads 118 kc/s.

   (6) Check the calibration of the tuning dial at 200 c/s intervals. This should be within ±50 c/s. If this calibration is not obtained, slightly alter the initial setting of C6 and re-adjust L1.

   (7) Reset the tuning dial to 0 kc/s.

(8) Turn the -3 kc/s/0/+3 kc/s switch to -3 kc/s and +3 kc/s and check that the frequency meter reads 115 kc/s and 121 kc/s respectively. (tolerance ±100 c/s)

(9) Turn the -3 kc/s/0/+3 kc/s switch to 0.

(10) With the valve voltmeter check the injection voltage on pin 7 of V1. This should be greater than 4V.

CARRIER AMPLIFIER

3. (1) Switch the a.f.c. OFF.

(2) Adjust the c.r.t. controls to give a horizontal line across the centre of the screen.

(3) Turn the Y GAIN control to maximum (fully clockwise).

(4) Turn the R.F. GAIN control to maximum (fully clockwise).

(5) Connect the valve voltmeter to the c.r.t. side of C29 (Caution: A d.c. potential of approximately 250V exists at this point).

(6) Connect the frequency meter to the junction of C16 and L3.

(7) Connect the signal generator to the 100 kc/s input socket and set the generator output to approximately 100 millivolts.

(8) Tune the signal generator frequency around 100 kc/s until a stationary ellipse appears on the c.r.t.

(9) Adjust the cores of L5, L6 and L7, alternately, for a maximum indication on the valve voltmeter reducing the signal generator output after each adjustment to give 30 volts on the valve voltmeter. When no further increase can be obtained, check that the signal generator output is not greater than 80 millivolts.

(10) Check that the overall vertical deflection on the c.r.t. is not less than 2 inches.

(11) Take the 30 volt reading on the valve voltmeter as an 0dB reference level at 18 kc/s.

(12) Tune the signal generator each side of 100 kc/s until the response falls by -6dB and note the frequencies at which this occurs on the frequency meter. These should be not less than 80 c/s above or below 18 kc/s.

(13) Similarly check the frequencies which give readings of -26dB and -36dB on the valve voltmeter. They should be less than 350 c/s and 525 c/s above and below 18 kc/s respectively.

CARRIER REJECTION BRIDGE

4. (1) Turn the UPPER S. B. and LOWER S. B. gain controls to maximum (fully clockwise).

(2) Set the sideband switch to U. S. B.

(3) Connect the output power meter set at 600Ω on the milliwatt range, to the switched output terminals at the rear of the unit.

(4) Connect the signal generator to the 100 kc/s input socket.

(5) Connect the frequency meter to the junction of C16 and L3.

(6) Tune the signal generator until the frequency meter indicates 17 kc/s (101 kc/s on the signal generator).

(7) Adjust the signal generator output to give a reading of 3 milliwatts on the output power meter.

(8) Connect the valve voltmeter between pin 1 of V7 and chassis and note the reading, which is taken as an 0dB reference.

(9) Adjust the signal generator frequency until a stationary ellipse is obtained on the c.r.t. indicator.

(10) Remove V6.

(11) Adjust L9 and RV3 alternatively for a minimum reading on the valve voltmeter.

(12) When no further reduction can be obtained note the valve voltmeter reading. This should be at least -30dB below the reference level.

(13) Connect the valve voltmeter between pin 1 of V8 and chassis and note the reading. This should be at least -30dB below the reference level.

(14) Replace V6.

SIDEBAND FILTERS

5. (1) These filters must be adjusted and tested outside the main unit and must therefore be removed.

(2) Unsolder the screened connecting leads which come out of the filters at their remote terminating points, so that the leads remain attached to the filters.

(3) Unscrew the four 6BA screws holding each filter to the chassis.

(4) Lift the filters clear.

NOTE; Adjust the low-pass filter first as it is required for the adjustments and tests on the high-pass filter. The frequency meter must be disconnected when actually tuning the stages also when testing the stop band response.

Low-Pass filter

6. (1) Connect the test equipment and filter as shown in figure 2.

(2) Connect leads A and B across each section in turn and adjust the coil of that section for minimum response on the valve voltmeter with the signal generator frequency set according to the following table:-

LI	-	18.23 kc/s
L2	-	20.8 kc/s
L3	-	19.6 kc/s
L4	-	21.125 kc/s
L5	-	18.5 kc/s
L6	-	23 kc/s

(3) Repeat these adjustments until no further reduction can be obtained.

(4) Connect the leads A and B to the remote ends of the input and output screened leads.

(5) Adjust the signal generator to 17 kc/s and take the valve-voltmeter reading as a reference.

(6) Check the response down to 12 kc/s. This should not vary by more than ± 2dB.

(7) Adjust the signal generator to 17.65 kc/s. The response should be -3dB ($\pm\frac{1}{2}$dB).

(8) Check the response continuously from 18.4 kc/s to 24 kc/s. The attenuation should be greater than -60dB.

High-pass filter

7. (1) Connect the test equipment, the previously aligned low-pass filter and the high-pass filter as shown in figure 2.

(2) Connect lead A to point C.

(3) Connect the remote ends of leads D and E together.

(4) Connect lead B to the remote end of the capacitor which couples the inductor being tuned, to the next inductor i.e. to tune L1, connect lead B to the junction of C2 and L2. Tune each inductor in turn for minimum response on the valve-voltmeter with the signal generator set according to the following table.

L1	-	17.8 kc/s.
L2	-	15.725 kc/s
L3	-	17 kc/s
L4	-	15.4 kc/s
L5	-	17.5 kc/s
L6	-	13 kc/s

(5) Repeat these adjustments until no further reduction can be obtained.

(6) Disconnect D and E.

(7) Connect lead A to point E.

(8) Connect lead B to point F.

(9) Adjust the signal generator to 19 kc/s and take the valve-voltmeter reading as a reference.

(10) Check the response up to 24 kc/s. This should not vary by more than ± 2dB.

(11) Adjust the signal generator to 18.35 kc/s. The response should be -3dB ($\pm\frac{1}{2}$dB). If this is not correct slightly re-adjust L1 and re-check the reference level and pass-band.

(12) Remove lead A from point E.

(13) Connect D and E together.

(14) Connect lead A to point C.

(15) Check the response continuously from 17.6 kc/s to 12 kc/s. The attenuation should be greater than -60dB. If this is not achieved near 12 kc/s, slightly re-adjust L6.

OPPOSITE SIDEBAND REJECTION

8. (1) Switch the sideband switch to L.S.B. and the a.f.c. OFF.

(2) Connect the valve voltmeter, frequency meter and the output power meter to the switched output terminals.

(3) With no input to the unit, adjust L11 for a minimum on the valve voltmeter and note the reading.

(4) Switch to U.S.B.

(5) Adjust L10 for a minimum on the valve voltmeter and note the reading.

(6) Connect the signal generator to the 100 kc/s input socket.

(7) Tune the signal generator to give 1 kc/s on the frequency meter and adjust the output to give a reading of 3 milliwatts on the output power meter.

(8) Note the valve voltmeter reading. This should be at least +50dB relative to the readings taken in operations (3) and (5) and is taken as an 0dB reference.

(9) Connect the frequency meter to the lower sideband output terminals.

(10) Tune the signal generator to obtain a reading of 150 c/s on the frequency meter.

(11) Note the valve voltmeter reading. This should be at least -40dB relative to the reference level taken in paragraph 8.

(12) Continue tuning the signal generator until the frequency meter indicates 6 kc/s and check that the valve voltmeter reading does not rise above -40dB relative to the reference level.

(13) Switch to L. S. B.

(14) Repeat operations (9) to (12) connecting the frequency meter to the upper sideband instead of the lower in operation (9).

NOTE: The level on this sideband may rise slightly, between 5 kc/s and 6 kc/s, to not more than -40dB. This is due to second harmonic breakthrough.

CHAPTER 5

LIST OF COMPONENTS

Note: It is recommended that users quote the Serial No. of the equipment on all orders for spare parts.

\+ Indicates components used in RA. 121A Adaptors

* Indicates components used in RA. 121B Adaptors

Cct. Ref.	Value	Description	Rat.	Tol. %	N. A. T. O. No.	Manufacturer
Resistors					5905-99-	
R1	68	carbon	¼W	10%	022-1088	Dubilier B. T. T.
R2	47k	carbon	½W	10%	022-2216	Erie Type 8
R3	10k	carbon	½W	10%	022-2132	Erie Type 8
R4	680	carbon	¼W	10%	022-1214	Dubilier B. T. T.
R5	1M	carbon	¼W	10%	022-3163	Dubilier B. T. T.
R6	680k	carbon	¼W	10%	022-3142	Dubilier B. T. T.
R7	2. 2k	carbon	¼W	10%	022-2046	Dubilier B. T. T.
R8	10k	carbon	¼W	10%	022-2130	Dubilier B. T. T.
R9	68k	carbon	½W	10%	022-3018	Erie Type 8
R10	4. 7k	carbon	¼W	10%	022-2088	Dubilier B. T. T.
R11	1k	carbon	¼W	10%	022-2004	Erie Type 8
R12	270k	carbon	½W	10%	022-3093	Erie Type 8
R13	270k	carbon	½W	10%	022-3093	Erie Type 8
R14	1M	carbon	½W	10%	022-3165	Erie Type 8
R15	10k	carbon	½W	10%	022-2132	Erie Type 8
R16	10k	carbon	¼W	10%	022-2130	Dubilier B. T. T.
R17	470k	carbon	¼W	10%	022-3121	Dubilier B. T. T.
R18	2. 7k	carbon	½W	10%	022-2060	Erie Type 8
R19	47k	carbon	½W	10%	022-2216	Erie Type 8
R20	470k	carbon	¼W	10%	022-2130	Dubilier B. T. T.
R21	82k	carbon	¼W	10%	022-3028	Dubilier B. T. T.
R22	47k	carbon	¼W	10%	022-2214	Dubilier B. T. T.
R23	100k	carbon	½W	10%	022-3039	Erie Type 8
R24	100k	carbon	½W	10%	022-3039	Erie Type 8
R25	680k	carbon	¼W	10%	022-3142	Dubilier B. T. T.
R26	22k	carbon	½W	10%	022-2174	Erie Type 8
R27	22k	carbon	½W	10%	022-2174	Erie Type 8
R28	15k	carbon	¼W	10%	022-2151	Dubilier B. T. T.
R29	180	carbon	¼W	10%	022-1142	Dubilier B. T. T.
R30	47k	carbon	½W	10%	022-2216	Erie Type 8
R31	680k	carbon	¼W	10%	022-3142	Dubilier B. T. T.
R32	100k	carbon	½W	10%	022-3039	Erie Type 8
R33	100k	carbon	½W	10%	022-3039	Erie Type 8
R34	1M	carbon	¼W	10%	022-3163	Dubilier B. T. T.
R35	3. 3k	carbon	¼W	10%	022-2067	Dubilier B. T. T.
R36	3. 3k	carbon	¼W	10%	022-2067	Dubilier B. T. T.
R37	220k	carbon	½W	10%	022-3081	Erie Type 8
R38	220k	carbon	½W	10%	022-3081	Erie Type 8
R39	6. 8k	carbon	1W	10%	022-2111	Erie Type 8
R40	6. 8k	carbon	1W	10%	022-2111	Erie Type 8

Cct. Ref.	Value	Description	Rat.	Tol. %	N. A. T. O. No.	Manufacturer
Resistors continued....					5905-99-	
R41	100k	carbon	½W	10%	022-3039	Erie Type 8
R42	47k	carbon	½W	10%	022-2216	Erie Type 8
R43	220k	carbon	½W	10%	022-3081	Erie Type 8
R44	150	wirewound	3W	5%	011-3300	Painton 306A
R45	1k	carbon	½W	10%	022-2006	Erie Type 8
R46	10k	carbon	¼W	10%	022-2130	Dubilier B. T. T.
R47	470	carbon	¼W	10%	022-1193	Dubilier B. T. T.
R48	27k	carbon	¼W	10%	022-2184	Dubilier B. T. T.
R49	82k	carbon	½W	10%	022-3030	Erie Type 8
R50	33k	carbon	½W	10%	022-2195	Erie Type 8
R51	82k	carbon	½W	10%	022-3030	Erie Type 8
R52	10k	carbon	¼W	10%	022-2130	Dubilier B. T. T.
R53	470	carbon	¼W	10%	022-1193	Dubilier B. T. T.
R54	27k	carbon	¼W	10%	022-2184	Dubilier B. T. T.
R55	82k	carbon	½W	10%	022-3030	Erie Type 8
R56	33k	carbon	½W	10%	022-2195	Erie Type 8
R57	82k	carbon	½W	10%	022-3030	Erie Type 8
R58	100k	carbon	¼W	10%	022-3037	Dubilier B. T. T.
R59	100k	carbon	¼W	10%	022-3037	Dubilier B. T. T.
R60	100k	carbon	½W	10%	022-3039	Erie Type 8
R61	100k	carbon	½W	10%	022-3039	Erie Type 8
R62	22k	carbon	½W	10%	022-2174	Erie Type 8
R63	220	carbon	½W	10%	022-1153	Erie Type 8
R64	100k	carbon	¼W	10%	022-3037	Dubilier B. T. T.
R65	100k	carbon	¼W	10%	022-3037	Dubilier B. T. T.
R66	100k	carbon	½W	10%	022-3039	Erie Type 8
R67	100k	carbon	½W	10%	022-3039	Erie Type 8
R68	22k	carbon	½W	10%	022-2174	Erie Type 8
R69	220k	carbon	½W	10%	022-1153	Erie Type 8
Capacitors						
C1	8.2pF	silv'd mica	350V	±1pF		J. & M. Ltd. C22S
C2	150pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C3	200pF	variable				Wingrove & Rodgers C74/02
C4	68pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C5	10pF	silv'd mica	350V	±1pF		J. & M. Ltd. C22S
C6	50pF	variable				Jackson C8-03

Cct. Ref.	Value	Description	Rat.	Tol. %	N. A. T. O. No.	Manufacturer
Capacitors continued...						
C7	3300pF	silv'd mica	200V	2%		J. & M. Ltd. C22S
C8	330pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C9	2200pF	silv'd mica	200V	2%		J. & M. Ltd. C22S
C10	100pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C11	100pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C12	.005mfd.	Tubular paper	500V	20%		Hunts W97/BM20
C13	.04mfd	Tubular paper	250V	20%		Hunts W97/BM16
C14	220pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C15	82pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C16	820pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C17	2200pF	silv'd mica	200V	2%		J. & M. Ltd. C22S
C18	.022mfd	silv'd mica	350V	1%		J. & M. Ltd. C33S
C19	2700pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
** C19A	2200pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
** C19B	500pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C20	1000pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C21	820pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C22	82pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C23	.005mfd	Tubular paper	500V	20%		Hunts W97/BM20
C24	.01mfd	Tubular paper	350V	20%		T.C.C. CP32N
C25	.04mfd	Tubular paper	250V	20%		Hunts W97/BM16
C26	.01mfd	Tubular paper	350V	20%		T.C.C. CP32N
C27	.022mfd	silv'd mica	350V	1%		J. & M. Ltd. C33S
C28	100pF	silv'd mica	350V	5%		J. & M. Ltd. C33S
C29	.001mfd	Tubular paper	750V	20%		Hunts W97/BM32
C30	33pF	silv'd mica	200V	2%		J. & M. Ltd. C22S
C31	.022mfd	silv'd mica	350V	1%		J. & M. Ltd. C33S
C32	100pF	silv'd mica	350V	1%		J. & M. Ltd. C22S
C33	.001mfd	Tubular paper	750V	5%		Hunts W97/BM32
C34	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C35	3900pF	silv'd mica	200V	2%		J. & M. Ltd. C22S
C36	100pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C37	220pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C38	18pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C39	0-33pF	variable				Wingrove & Rogers C31-01/1
C40	1000pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C41	1000pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C42	.022mfd	silv'd mica	350V	1%		J. & M. Ltd. C33S
C43	1mfd	electrolytic.	450V			T.C.C. CE132PE

** Equipments up to Serial No. N100 only.

Cct. Ref.	Value	Description	Rat.	Tol. %	N.A.T.O. No.	Manufacturer
Capacitors continued....						
C44	.005mfd	Tubular paper	500V	20%		Hunts W97/BM20
C45	.005fmd	Tubular paper	500V	20%		Hunts W97/BM20
C46	100pF	silv'd mica	350V	5%		L.E.M. 1106S
C47	4mfd	electrolytic Fabric	450V			Plessey CE1632/1
C48	.001mfd	Tubular paper	750V	20%		Hunts W97/BM32
C49	32mfd	electrolytic Fabric	350V			Plessey CE513
C50	16mfd)	electrolytic	450V			T.C.C. C28C
C51	8mfd)	16 + 8mfd				
C52	4mfd	electrolytic Fabric	450V			Plessey CE1632/1
C53	100pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C54		DELETED				
C55	16mfd)	electrolytic	350V			Plessey CE504
C56	16mfd)	16 + 16mfd				
C57		DELETED				
C58	68pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C59	.001mfd	Tubular paper	750V	20%		Hunts W97/BM32
C60	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C61	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C62	100pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C63		DELETED				
C64	10mfd	electrolytic	25V			T.C.C. CE30C
C65	68pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C66	.001mfd	Tubular paper	750V	20%		Hunts W97/BM32
C67	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C68	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C69	10mfd	electrolytic	25V			T.C.C. CE30C
C70		DELETED				
C71	100pF	silv'd mica	350V	5%		J. & M. Ltd. C22S
C72	1mfd	electrolytic	450V			T.C.C. CE132PE
C73	.001mfd	Tubular paper	750V	20%		Hunts W97/BM32
C74	1mfd	electrolytic	450V			T.C.C. CE132PE
C75	.001mfd	Tubular paper	750V			Hunts W97/BM32
C76	150pF	silv'd mica	350V	2%		J. & M. Ltd. C22S

Cct. Ref.	Value	Description	Rat.	Tol. %	N. A. T. O. No.	Manufacturer
LOW PASS FILTER ASSEMBLY TYPE BA13480						
Capacitors						
C1	4700pF	silv'd mica	200V	2%		J. & M. Ltd. C22S
C1A	22pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C2	560pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C2A	56pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C3	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C3A	56pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C4	470pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C4A	82pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C5	1800pF	silv'd mica	200V	2%		J. & M. Ltd. C22S
C5A	330pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C6	820pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C6A	56pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C7	560pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C7A	68pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C8	680pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C8A	120pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C9	820pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C10	680pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C10A	15pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C11	470pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C11A	82pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
Inductors						
L1	16.2mH					Racal BA12667
L2	93.5mH					Racal BA13668
L3	64mH					Racal BA13669
L4	103mH					Racal BA13670
L5	35mH					Racal BA13671
L6	55mH					Racal BA14338
HIGH PASS FILTER ASSEMBLY TYPE BA13481						
Capacitors						
C1	100pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C1A	47pF	silv'd mica	350V	2%		J. & M. Ltd. C22S

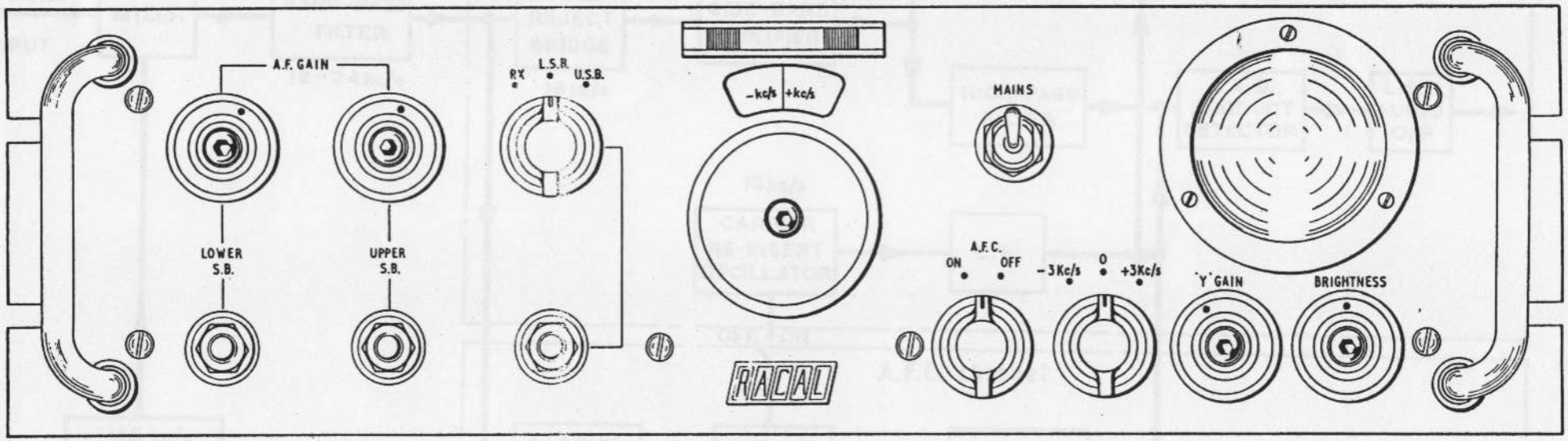
Cct. Ref.	Value	Description	Rat.	Tol. %	N. A. T. O. No.	Manufacturer
C2	1200pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C2A	120pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C3	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C3A	150pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C4	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C4A	56pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C5	680pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C5A	47pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C6	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C6A	27pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C7	1200pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C7A	82pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C8	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C9	270pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C9A	33pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C10	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C10A	270pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C11	1000pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
C11A	220pF	silv'd mica	350V	2%		J. & M. Ltd. C22S
Inductors						
L1	484mH					Racal BA13672
L2	88mH					Racal BA13673
L3	122mH					Racal BA13674
L4	82.8mH					Racal BA13675
L5	251mH					Racal BA13676
L6	127mH					Racal BA13679
Potentiometers						
RV1	5 kilohms	linear				Racal ASW 13661
RV2	1 megohm	log law				Racal ASW 13663
RV3	50 kilhoms	linear				Racal ASW 14076
RV4	1 megohm	linear				Racal ASW 13662
RV5	1 megohm	linear				Racal ASW 13662
RV6	1 megohm	linear				Racal ASW 13660
RV7	1 megohm	linear				Racal ASW 13663
RV8	1 megohm	log law				Racal ASW 13663
RV9	1 megohm	log law				Racal ASW 13663

Cct. Ref.	Value	Description	Rat.	Tol. %	N. A. T. O. No.	Manufacturer
Inductors						
L1		118 kc/s oscillator				Racal BA 13664/A
L2		Bandpass filter				Racal BA 13666
L3		Bandpass filter				Racal BA 13665
L4		Bandpass filter				Racal BA 13665
L5		Bandpass filter				Racal BA 14108
L6		Carrier amplifier				Racal BA 16041
L7		Carrier amplifier				Racal BA 16041
L8		18kc/s oscillator				Racal BA 13484
L9		Carrier rejector				Racal BA 13678
L10		Audio filter U. S. B.				Racal BA 13677
L11		Audio filter L. S. B.				Racal BA 13677
L12		Smoothing choke				Racal B.T 13646
Valves						
V1+		Mixer				Mull. 6AS6 (CV2522)
V2+		119kc/s oscillator				Mull. 6AU6 (CV2524)
V3+		18kc/s amplifier				Mull. EFC82 (CV5065)
V4+		18kc/s rejector				Mull. 12AX7(CV492)
V5+		Sideband amplifer				Mull. 12AT7(CV455)
V6+		18kc/s oscillator				Mull. 12AT7(CV455)
V7+		U. S. B. detector				Mull. 6AS6 (CV2522)
V8+		L. S. B. detector				Mull. 6AS6 (CV2522)
V9+		H. T. rectifier				Mull. 6X4 (CV493)
V10+		U. S. B. output				Mull. EF91 (CV138)
V11+		L. S. B. output				Mull. EF91 (CV138)
V12+		C. R. T. indicator				Mull. DG7-32(CV2431
V1*		Mixer				6AS6
V2*		118kc/s oscillator				6AU6
V3*		18kc/s amplifier				6U8
V4*		18kc/s rejector				12AX7
V5*		Sideband amplifier				12AT7
V6*		18kc/s oscillator				12AT7
V7*		U. S. B. detector				6AS6
V8*		L. S. B. detector				6AS6
V9*		H. T. rectifier				6X4
V10*		U. S. B. output				EF91
V11*		L. S. B. output				EF91
V12*		C. R. T. indicator.				DG7-32

Cct. Ref.	Value	Description	Rat.	Tol. %	N. A. T. O. No.	Manufacturer
Valveholders and screening cans						
V1		Screening can				McMurdo 7/6
		Valveholder				McMurdo XM7/UJ1
V2		Screening can				McMurdo 7/6
		Valveholder				McMurdo XM7/UJ1
V3		Screening can				McMurdo 8/6
		Valveholder				McMurdo XM9/UC1
V4		Screening can				McMurdo 10/6
		Valveholder				McMurdo XM9/UC1
V5		Screening can				McMurdo 10/6
		Valveholder				McMurdo XM9/UC1
V6		Screening can				McMurdo 10/6
		Valveholder				McMurdo XM9/UC1
V7		Screening can				McMurdo 7/6
		Valveholder				McMurdo XM7/UJ1
V8		Screening can				McMurdo 7/6
		Valveholder				McMurdo XM7/UJ1
V9		Screening can				McMurdo 7/6
		Valveholder				McMurdo XM7/UJ1
V10		Screening can				McMurdo 7/6
		Valveholder				McMurdo XM7/UJ1
V11		Screening can				McMurdo 7/6
		Valveholder				McMurdo XM7/UJ1
V12		Tube base				McMurdo 13. 12/U
Transformers						
T1		Mains (power)				Racal BT 13645
T2		L. S. B. output				Racal T 1079
T3		U. S. B. output				Racal T 1079
Fuses and Fuseholders						
FS1		150mA H. T. (B+) fuse				Belling Lee L1055
		Fuseholder				Belling Lee L356
FS2		3A Mains (power) fuse				Belling Lee L 1055
		Fuseholder				Belling Lee L356

Cct. Ref.	Value	Description	Rat.	Tol. %	N. A. T. O. No.	Manufacturer
Lamp and lampholders						
1LP1		Lampholder Indicator lamp 8V 0.3A MES				Bulgin M. E. S. 19
Metal rectifiers						
MR1		C. R. T. rectifier				Sentercel N8/30T
MR2		Zener diode				S. T. C. Type Z2A110F
MR3		Zener diode				S. T. C. Type Z2A110F
Plugs and sockets						
PL1+		Mains input				Plessey MK4 fixed Type Z560060 Plessey MK4 Free Type Z560100(Socket)
PL2+		100kc/s input				Film & Equipment Type Z540101 Film & Equipment Type Z54902B(Socket)
SK1*		100kc/s input				Film & Equipment Type SO. 239 Film & Equipment Type PL. 259 (plug)
JK1+		U. S. B. jack				Shipton AP61492A
JK1*		U. S. B. jack				Igranic P71
JK2+		Switched jack				Shipton AP61492A
JK2*		Switched jack				Igranic P71
JK3+		L. S. B. jack				Shipton AP61492A
JK3*		L. S. B. jack				Igranic P71
Switches						
S1		Mains (power)				N. S. F. Z510554
SA1F		-3 kc/s/0/+3 kc/s				Racal BSW. 13501
SB1F		A. F. C. ON/OFF.				Racal BSW. 14072
SC1F		U. S. B. /L. S. B. /RX				Racal BSW. 13501

Cct. Ref.	Value	Description	Rat.	Tol. %	N. A. T. O. No.	Manufacturer
Miscellaneous						
		Front Panel Assembly				Racal CA. 13479
		Low-pass Filter Assembly				Racal BA. 13480/A
		High-pass Filter Assembly				Racal BA. 13481/A
		Top cover				Racal DD. 13488
	+	Top cover				Racal DD. 13933
	*	Bottom cover				Racal CD. 13489
		Voltage Selector				McMurdo B279001
	+					



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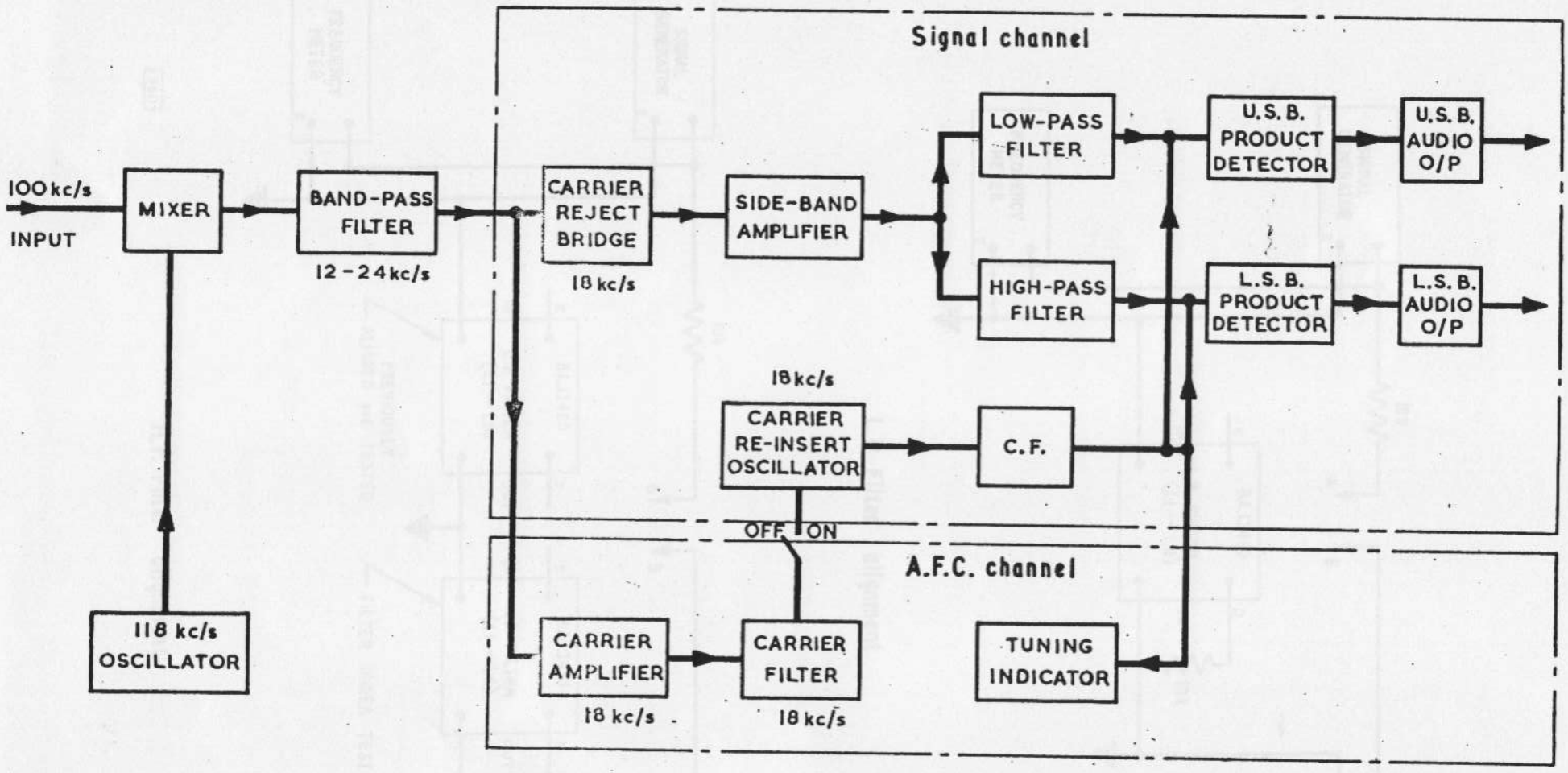
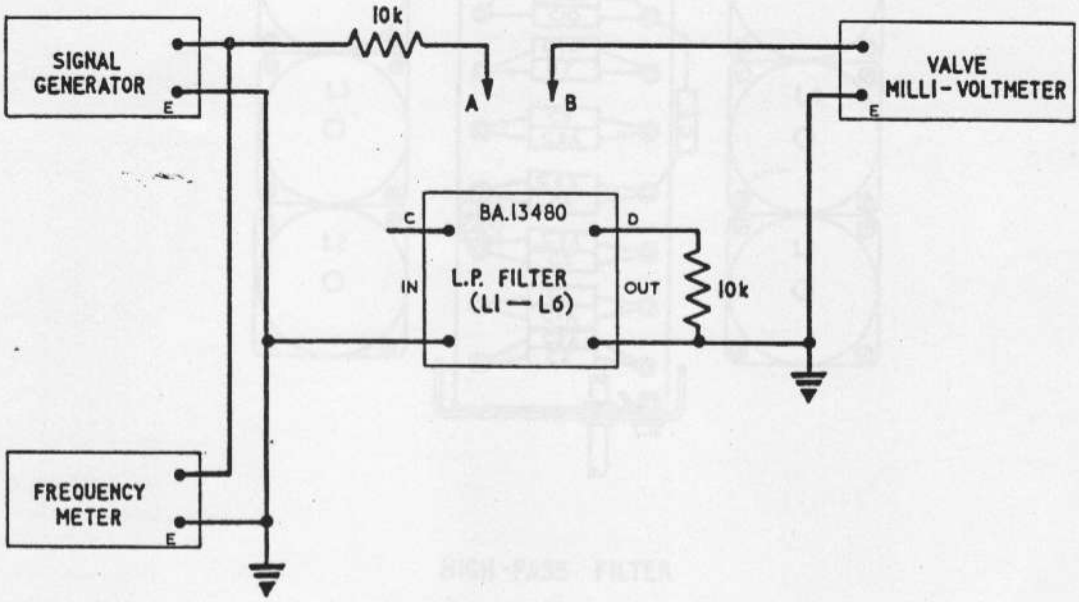
INDEPENDENT SIDEBAND ADAPTOR TYPE RA121 A & B



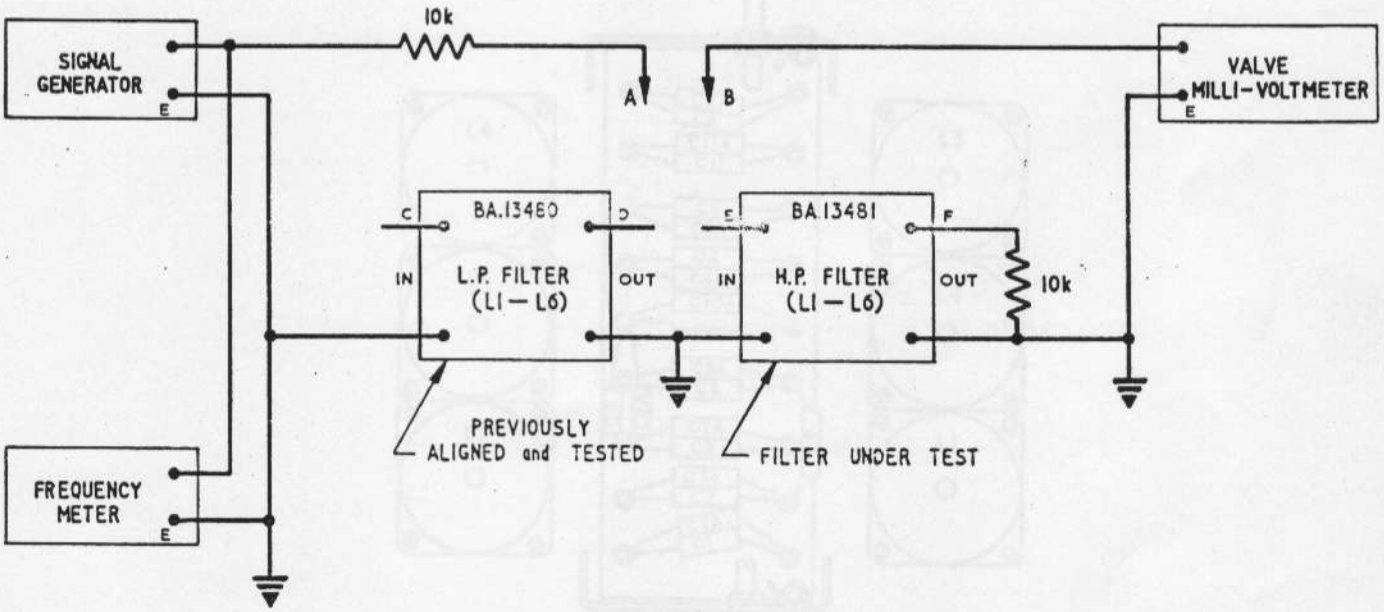
10615

Block diagram: I.S.B. adaptors type RA.121A and RA 121B

Fig.1



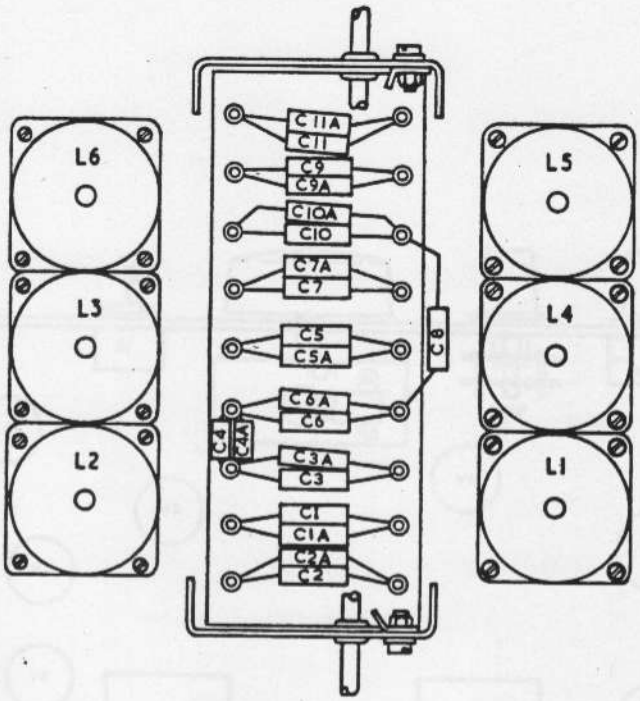
L.P. Filter alignment



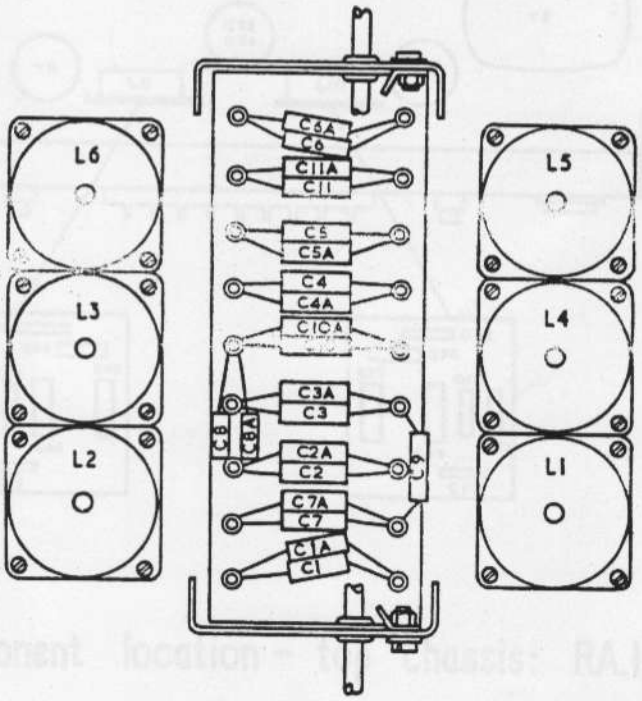
3611

H.P. Filter alignment

Fig. 2

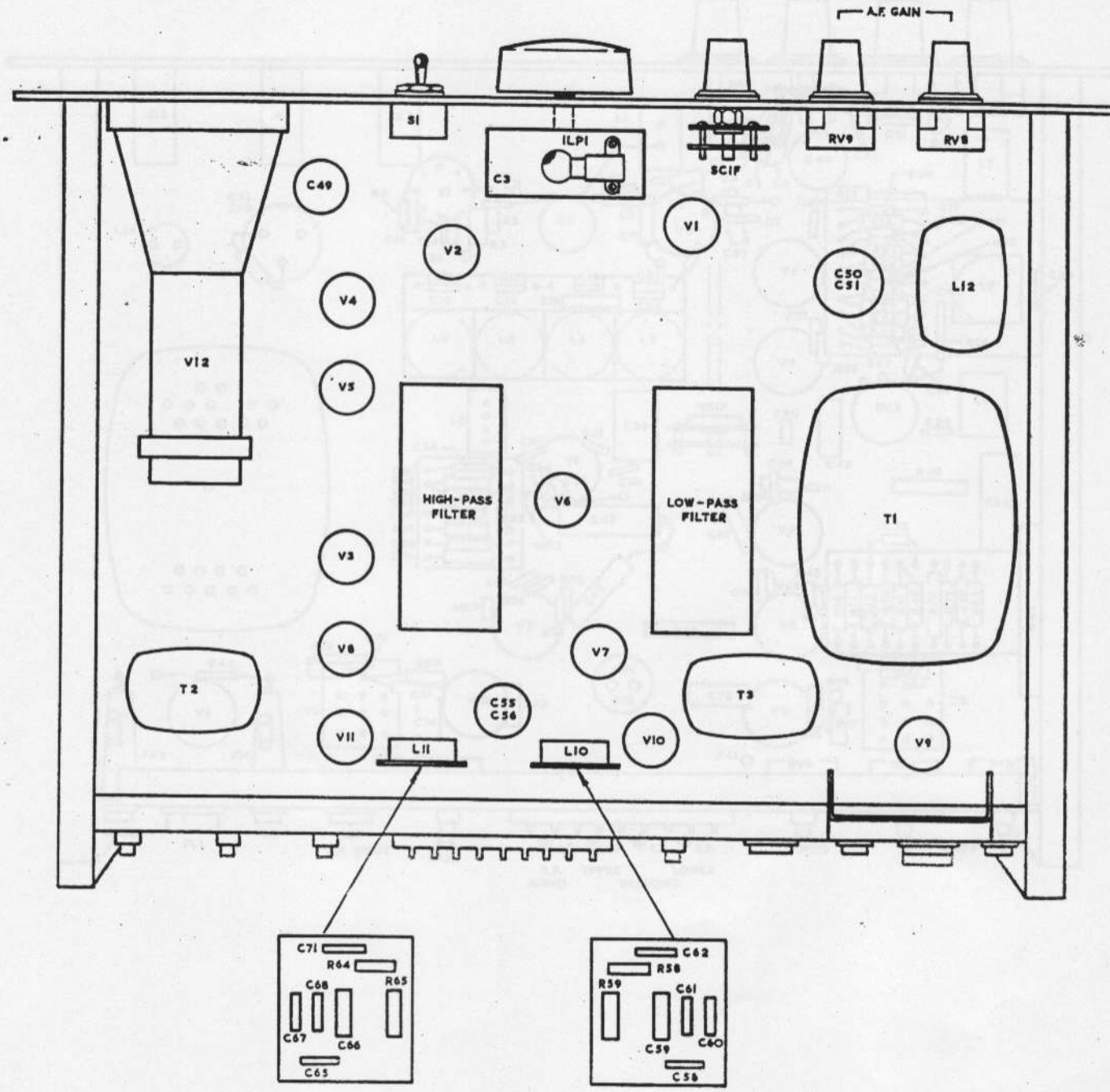


HIGH-PASS FILTER

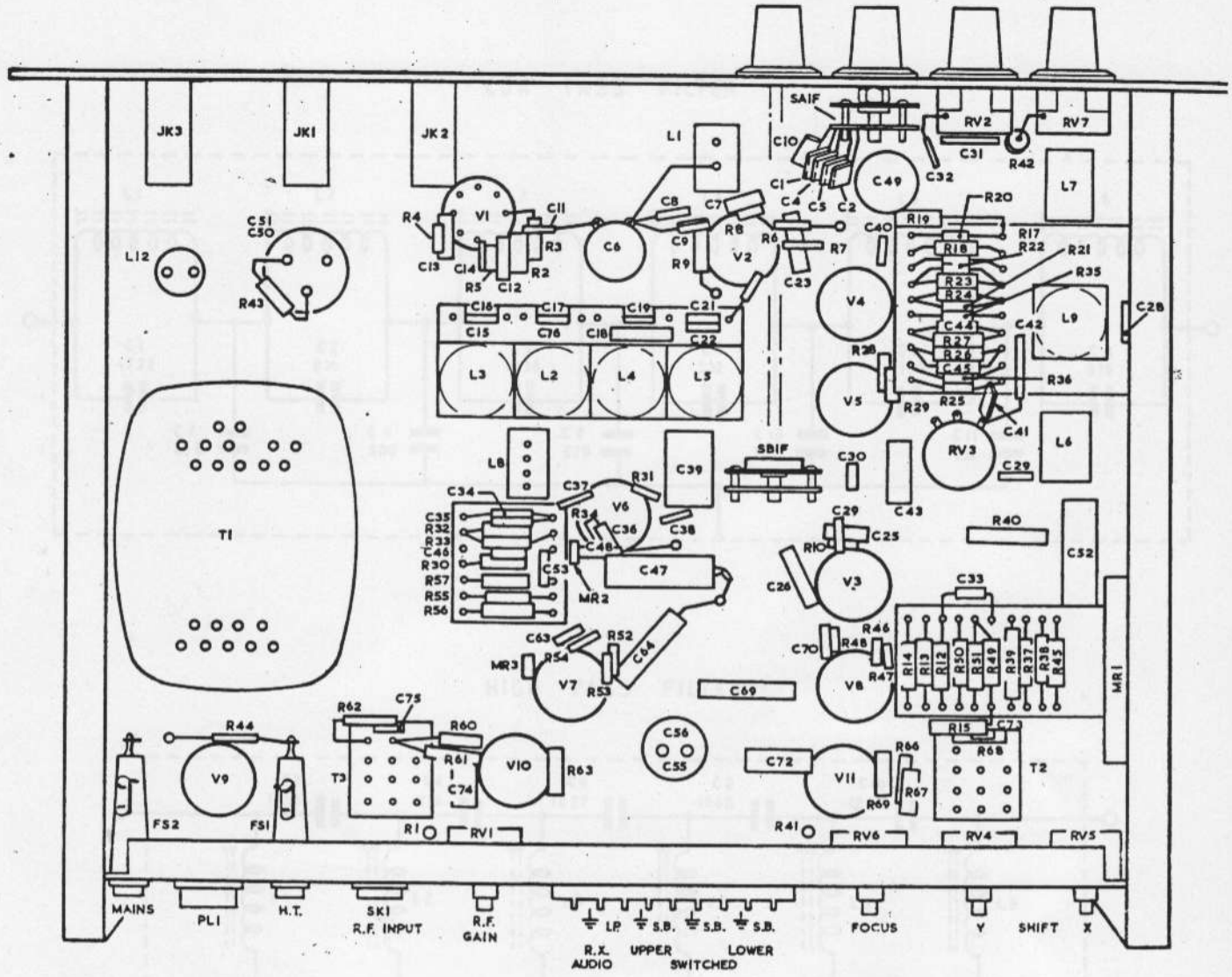


LOW-PASS FILTER

Component Location : Sideband Filters Fig.3

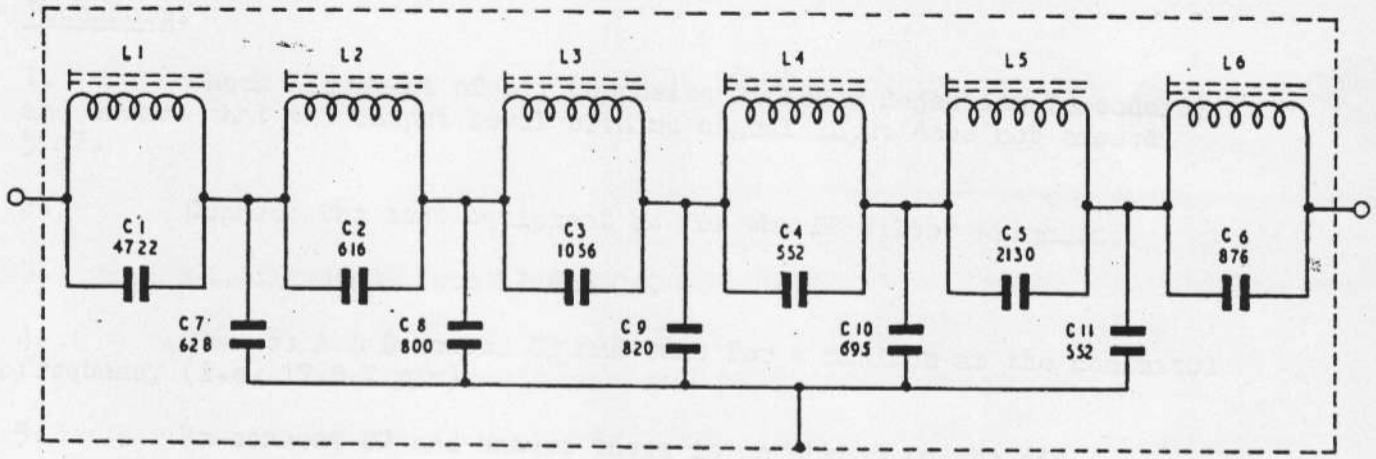


10613 Component location - top chassis: RA.121A & B Fig.4

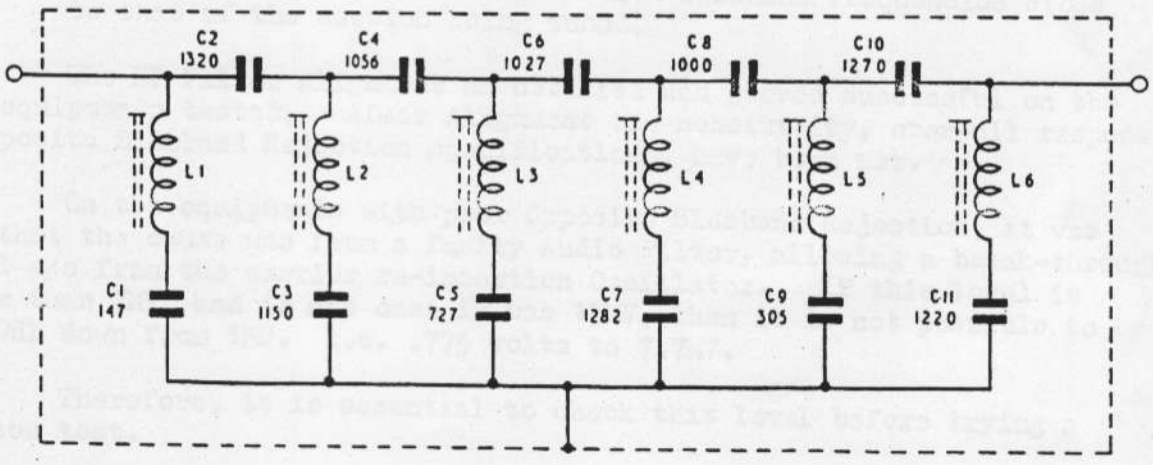


10612 Component location - underchassis: RA.12!A & B Fig.5

LOW PASS FILTER



HIGH PASS FILTER



3613

FILTERS: RA.121A & B

FIG.6

HIGH PASS FILTER ALIGNMENT

This procedure replaces Chap 4 Para 7 (1) to (5) of the RACAL RA 121 A/B Handbook.

Procedure.

1. Check Alignment of L11 (Opposite Sideband Rejection Procedure) and ensure that the output level with no signal input does not exceed 5 MV.

2. Connect the test equipment as for the LP Filter Alignment.

3. Disconnect C2 from L2 and C4.

4. Connect A & B across C2 and tune for a minimum at the nominated frequency (i.e. 17.8 K c/s).

5. Re-connect C2 and ensure there is no change in the dip.

6. Repeat this procedure across each section in turn.

7. Continue with Para 7 (6).

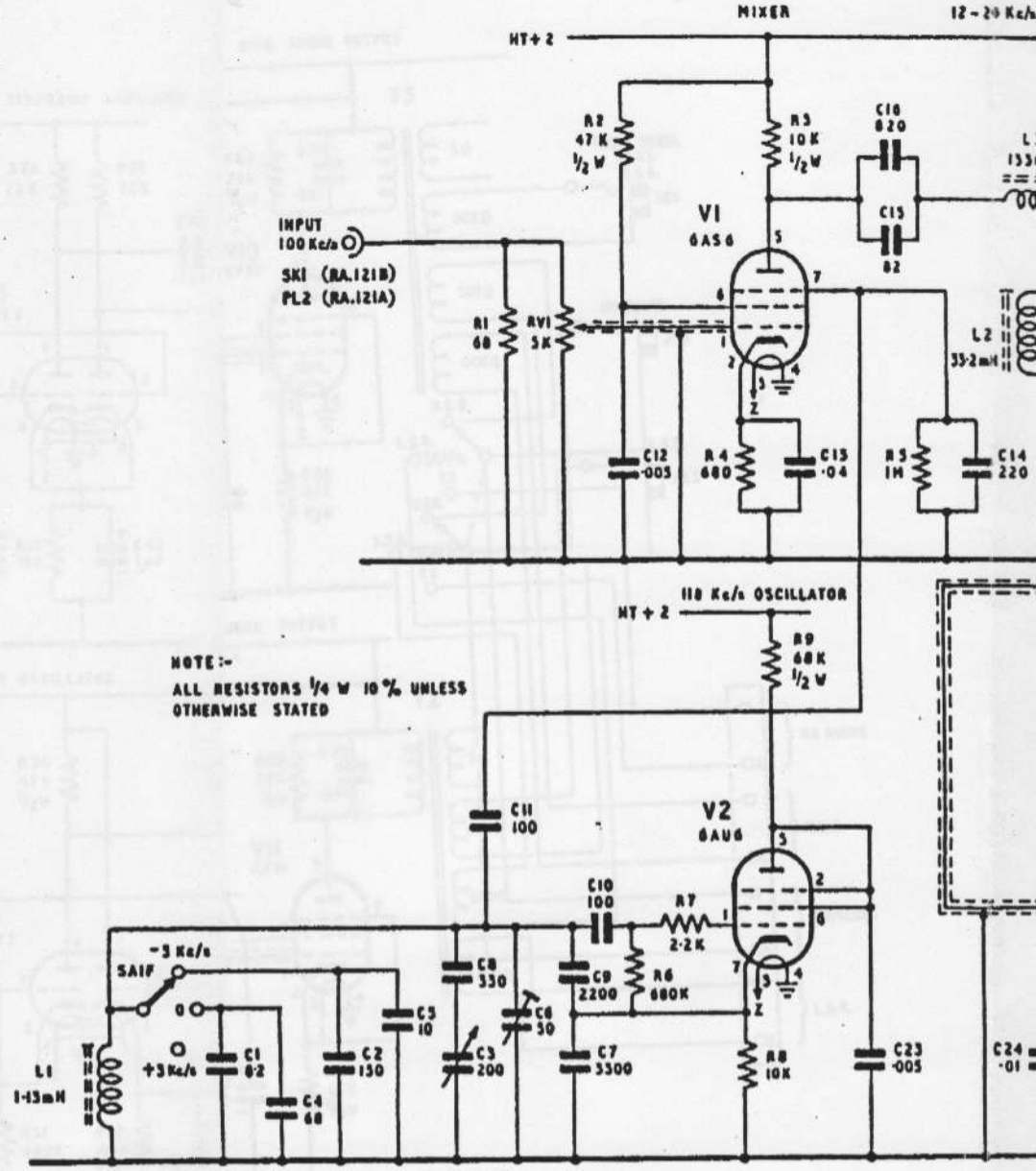
NOTE: Each section is disconnected to ensure there is no interaction from other sections with resonant frequencies close to that of the section being tuned.

The HP Filter Alignment as detailed has proved successful on the three equipments tested. After Alignment the sensitivity, over-all response, and Opposite Sideband Rejection specifications, have been met.

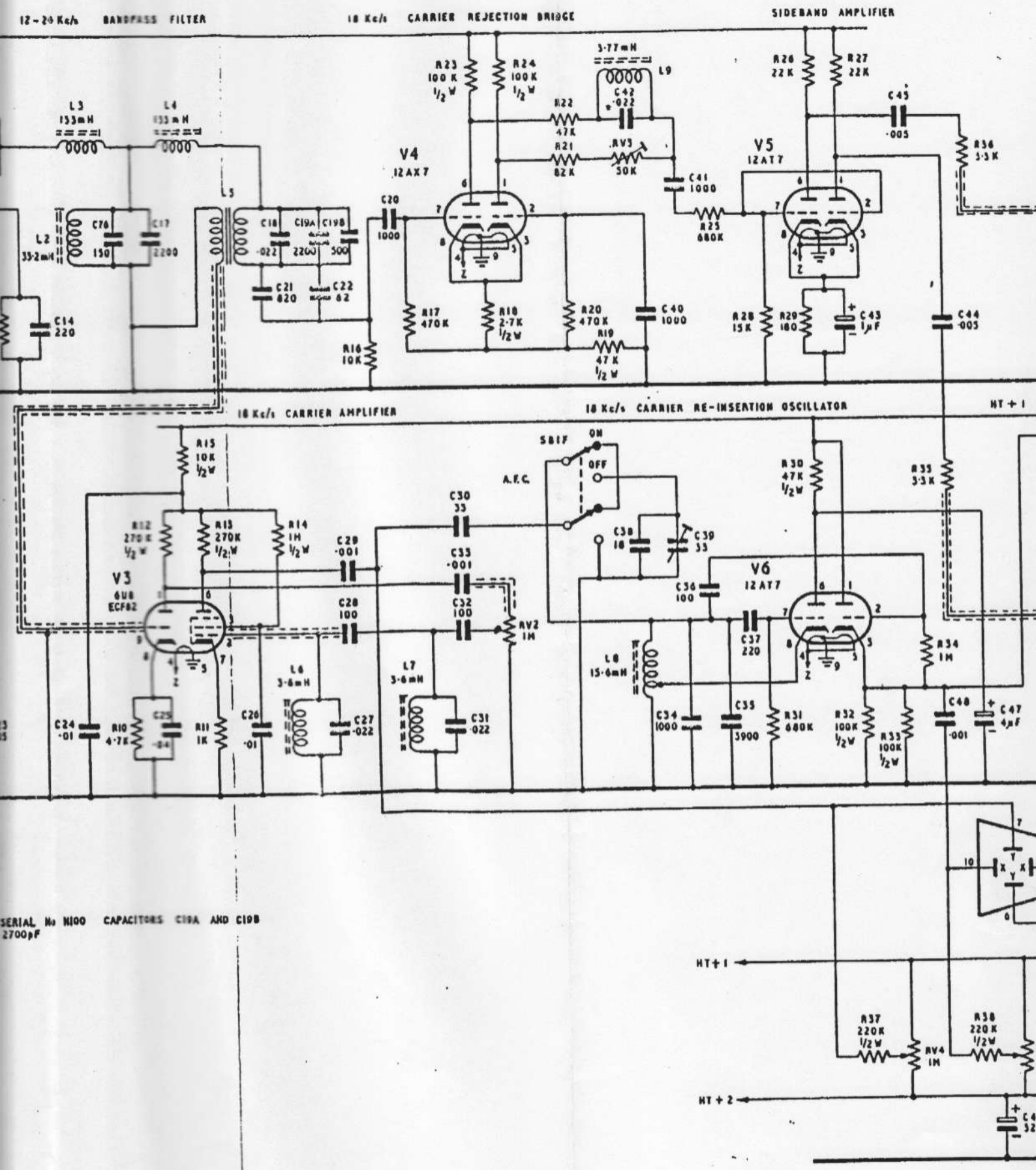
On the equipments with poor Opposite Sideband Rejection, it was found that the cause was from a faulty Audio Filter, allowing a break-through of 18 K c/s from the carrier re-insertion Oscillator. If this level is greater than 7MV, and in one case it was 13MV, then it is not possible to read 40db down from 1MV. i.e. .775 volts to 7.7MV.

Therefore, it is essential to check this level before trying a rejection test.

If this level cannot be obtained, replacement of L10 or L11 or checking the associated capacitors is required.

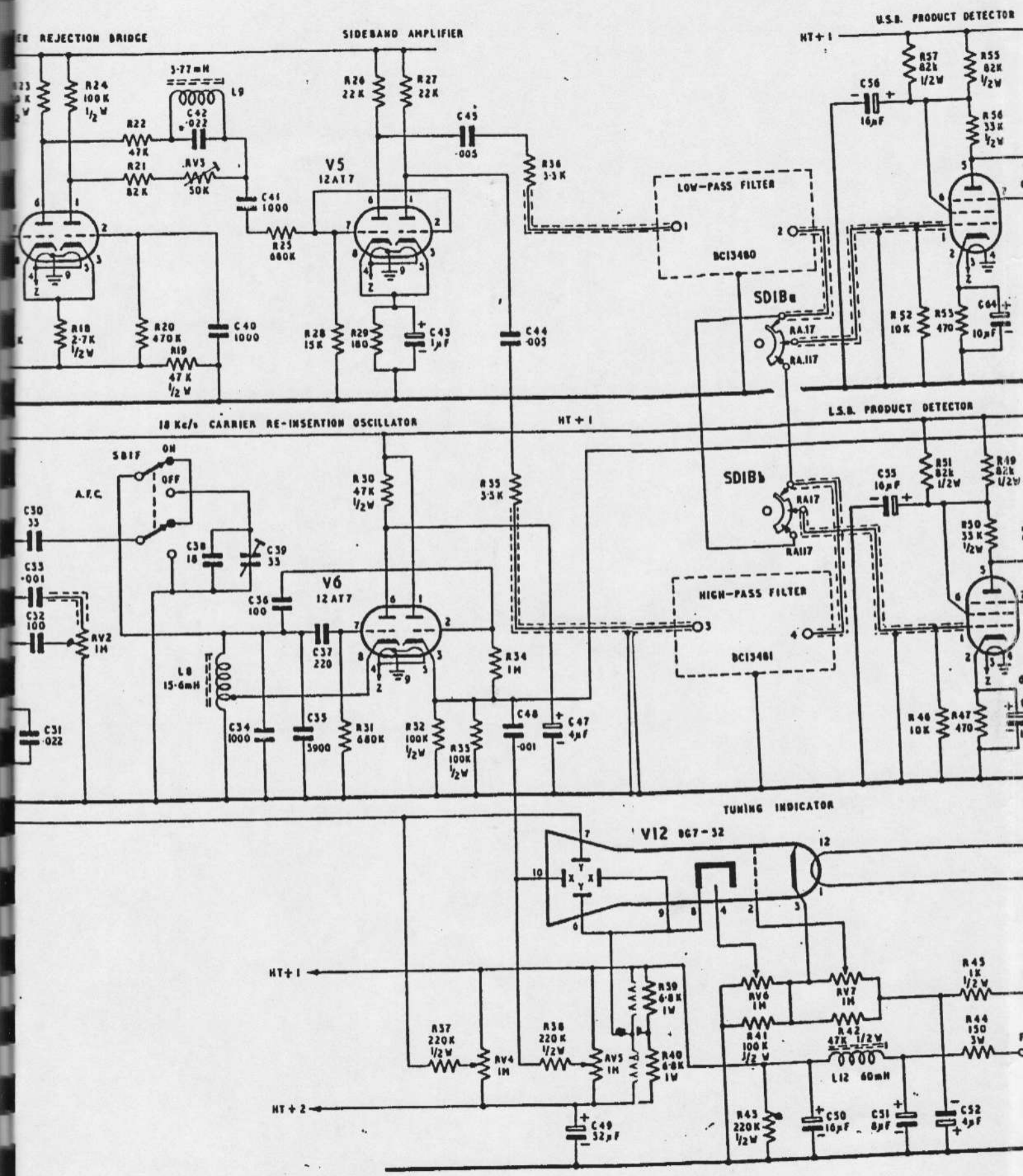


NOTE.
EQUIPMENTS AFTER SERIAL No M100
REPLACED BY C10 2700pF



SERIAL No N100 CAPACITORS C19A AND C19B 2700pF

Circuit: Independent sideband adaptor Types RA.



Circuit: Independent sideband adaptor Types RA. 121A/1A & B

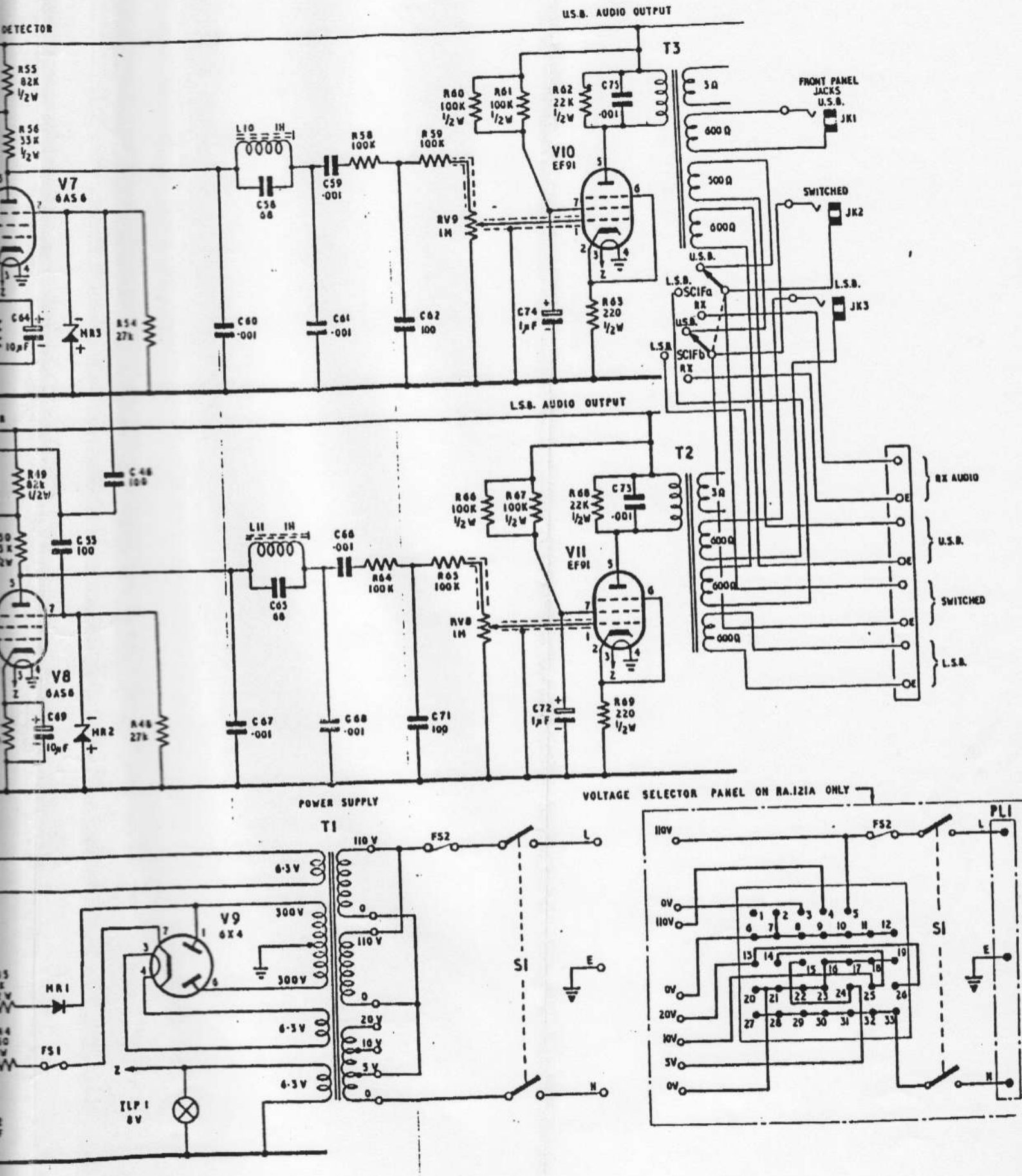

U.S.B. AUDIO OUTPUT
DETECTOR
T3
R55 82K 1/2W
R56 33K 1/2W
V7 6AS6
L10 1H
C56 68
R58 100K
R59 100K
C59 .001
R60 100K 1/2W
R61 100K 1/2W
R62 22K 1/2W
C75 .001
V10 EF91
RV9 1M
C60 .001
C61 .001
C62 100
C74 1μF
R63 220 1/2W
C64 10μF
MR3
R54 27K
3Ω
600Ω
500Ω
600Ω
FRONT PANEL JACKS U.S.B.
JK1
SWITCHED
JK2
L.S.B.
JK3
U.S.B.
L.S.B.
SC1Fa RX
SC1Fb RX
L.S.B. AUDIO OUTPUT
T2
R49 82K 1/2W
C48 100
C53 100
L11 1H
C66 .001
R64 100K
R65 100K
R66 100K 1/2W
R67 100K 1/2W
R68 22K 1/2W
C73 .001
V11 EF91
RV8 1M
C67 .001
C68 .001
C71 100
C72 1μF
R69 220 1/2W
C69 10μF
MR2
R48 27K
V8 6AS6
RX AUDIO
U.S.B.
SWITCHED
L.S.B.
POWER SUPPLY
T1
110V
FS2
L
6·3V
V9 6X4
300V
300V
110V
20V
10V
5V
6·3V
6·3V
MR1
FS1
TLP1 8V
S1
N
E
VOLTAGE SELECTOR PANEL ON RA.121A ONLY
PL1
110V
0V
110V
0V
20V
10V
5V
0V
S1

FIG.7