

Philips' "Radioplayer" Broadcast Model 6500 Circuit Description and Operating Voltages

(Circuit diagram and component values will be found on Page 304.)

Radioplayer 6500 is a five-valve receiver designed for broadcast coverage and operation from 220—260 volts, 40—100 cycles, A.C. mains. This receiver is housed in a console cabinet and three controls—volume, tone and tuning—are fitted. The loudspeaker is an 8-inch unit with a field coil resistance of 1,000 ohms.

The five valves used in this receiver are of the Philips' "P" base type; the "radio" valves having 4-volt heaters, while the rectifier has a 6-volt heater. The circuit arrangement is unusual in that all biasing voltages are obtained from a resistor (R10) wired in series with the negative high-tension return lead. This resistor is wound as part of the main voltage divider (R2) and is provided with a clip for adjustment of the mixer, I.F. and A.F. bias. The total voltage drop across R10 is 24 volts, while the clip is usually fixed at a point which will give a negative bias of approximately 3 volts (just under 40 ohms from the earthed end). The bias voltage for the mixer and I.F. valves is applied through the A.V.C. system and, to ensure that the static potential of the oscillator grid is the same as that of the

mixer, it will be noted that the oscillator grid leak (R1) is returned direct to the source of bias and not merely earthed. It is important to note that the oscillator grid leak must not under any circumstances be returned to the A.V.C. line, because, even though the voltage present at this point is the same as that at the bias source under "no-signal" conditions, reception of even a moderately strong signal will cause the oscillator to stop operating if this is done.

Other points to note in the circuit are the use of a tapped-secondary I.F. transformer for diode feeding; the presence of a high-resistance (R8) as filter between the interstage coupling condenser (C8), and output pentode grid; the use of the tone-control potentiometer element as output pentode grid resistor; the fact that both electrolytic condenser cans are

insulated from earth, as both are returned direct to the H.T. secondary C.T.; and the use of a bridging link on the loud-speaker plug to complete the circuit to the first electrolytic condenser (C11). Finally, it should be noted that the dial lamps used in this receiver are of the single-contact auto. tail light type, with a filament rating of 6 volts.

OPERATING VOLTAGES.

The following measurements were made between chassis and the socket contact indicated. A "1,000 ohms per volt" meter was employed and the receiver was detuned from any signal. Due to the high values of resistance present in the grid circuits, an accurate indication of the actual applied grid voltages is impossible unless a vacuum-tube voltmeter or similar "no-drain" instrument is available. Failing this, an indication of the bias voltages may be obtained with a conventional voltmeter by direct measurement across the bias source (R10).

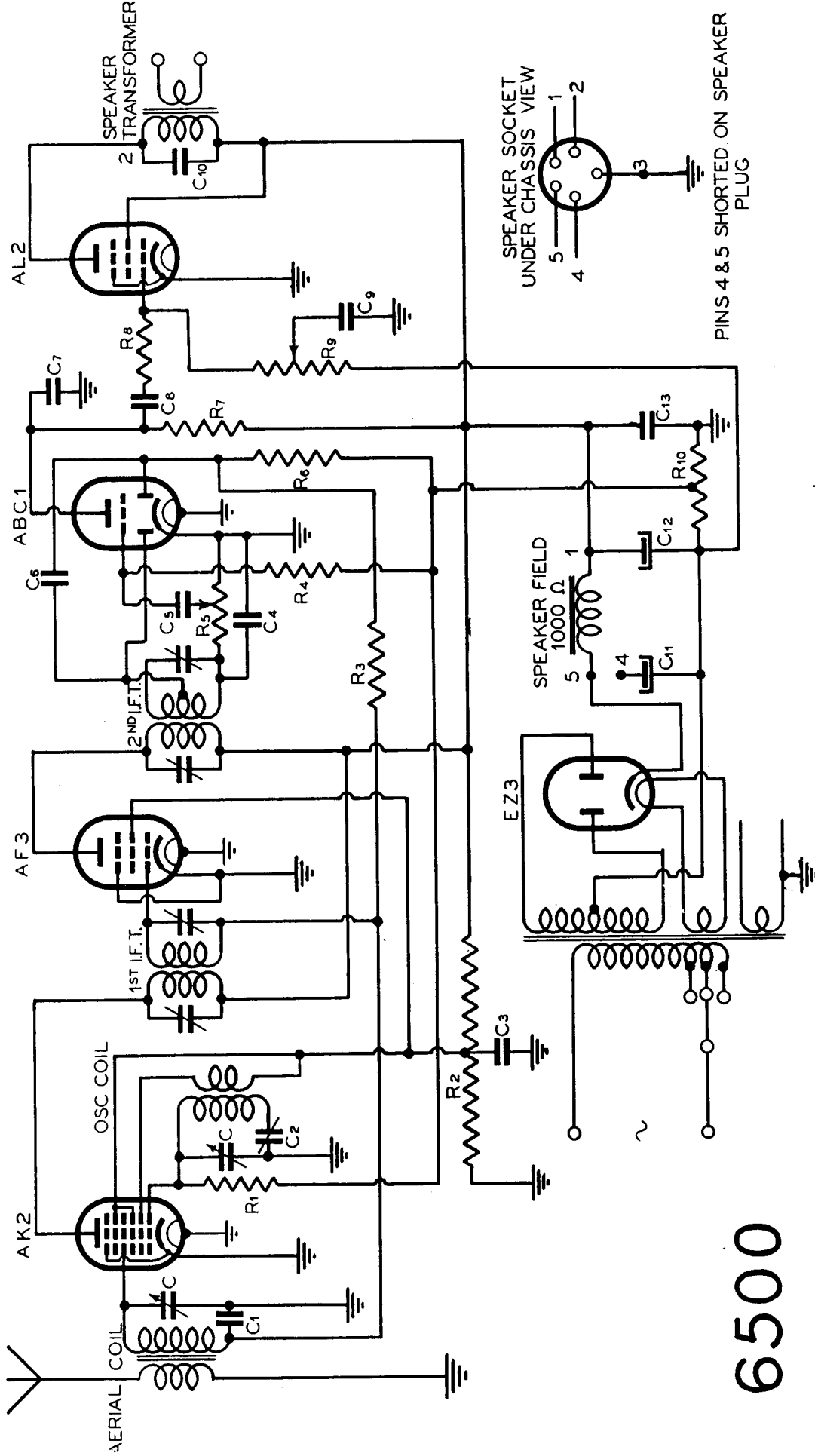
AK2, Octode Frequency Converter. Plate, 250 v.; screen, 90 v.; osc. plate, 90 v.; grid, —3 v. Plate current, 1.5 mA.

AF3, 462.5 KC. I.F. Amplifier. Plate, 250 v.; screen, 90v.; grid, —3 v. Plate current, 8mA.

ABC1, Detector, A.V.C. Rectifier, and A.F. Amplifier. Plate, 75 v.; grid, —3 v. Plate current, 0.6 mA.

AL2, Output Pentode. Plate, 235 v.; screen, 250 v.; grid, —24 v. Plate current, 36 mA.

Philips' "Radioplayer" A.C. Operated Broadcast Model 6500



6500

INTERMEDIATE FREQUENCY—482.5 KC.

CONDENSERS.
 C. C.—2 gang condenser; C1, C3—0.1 mf d. paper; C2—osc. padder; C4, C7—0.00025 mfd. mica; C5, C8, C9—0.02 mfd. paper; C6—0.0001 mfd. mica; C10—0.004 mfd. mica; C11, C12—8 mfd. electrolytic; C13—0.25 mfd. paper.

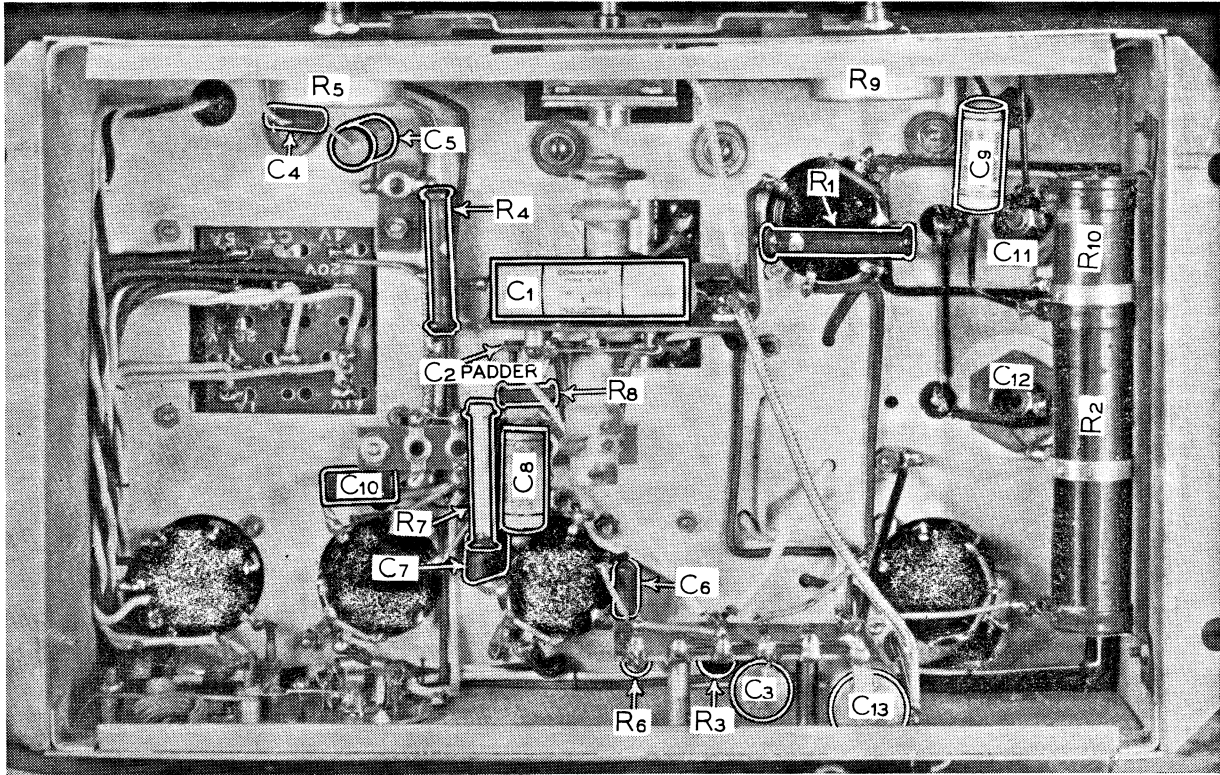
RESISTORS.
 R1—50,000 ohms; R2—25,000 ohms voltage divider; R3—1 megohm, 1 W.; R4—1 megohm, 1 W.; R5, R9—0.5 megohm potentiometers; R6—2 megohms, 1 W.; R7—0.25 megohm, 1 W.; R8—0.25 megohm, 1 W.; R10—300 ohms wire-wound, with variable tapping clip.



PINS 4 & 5 SHORTED ON SPEAKER PLUG

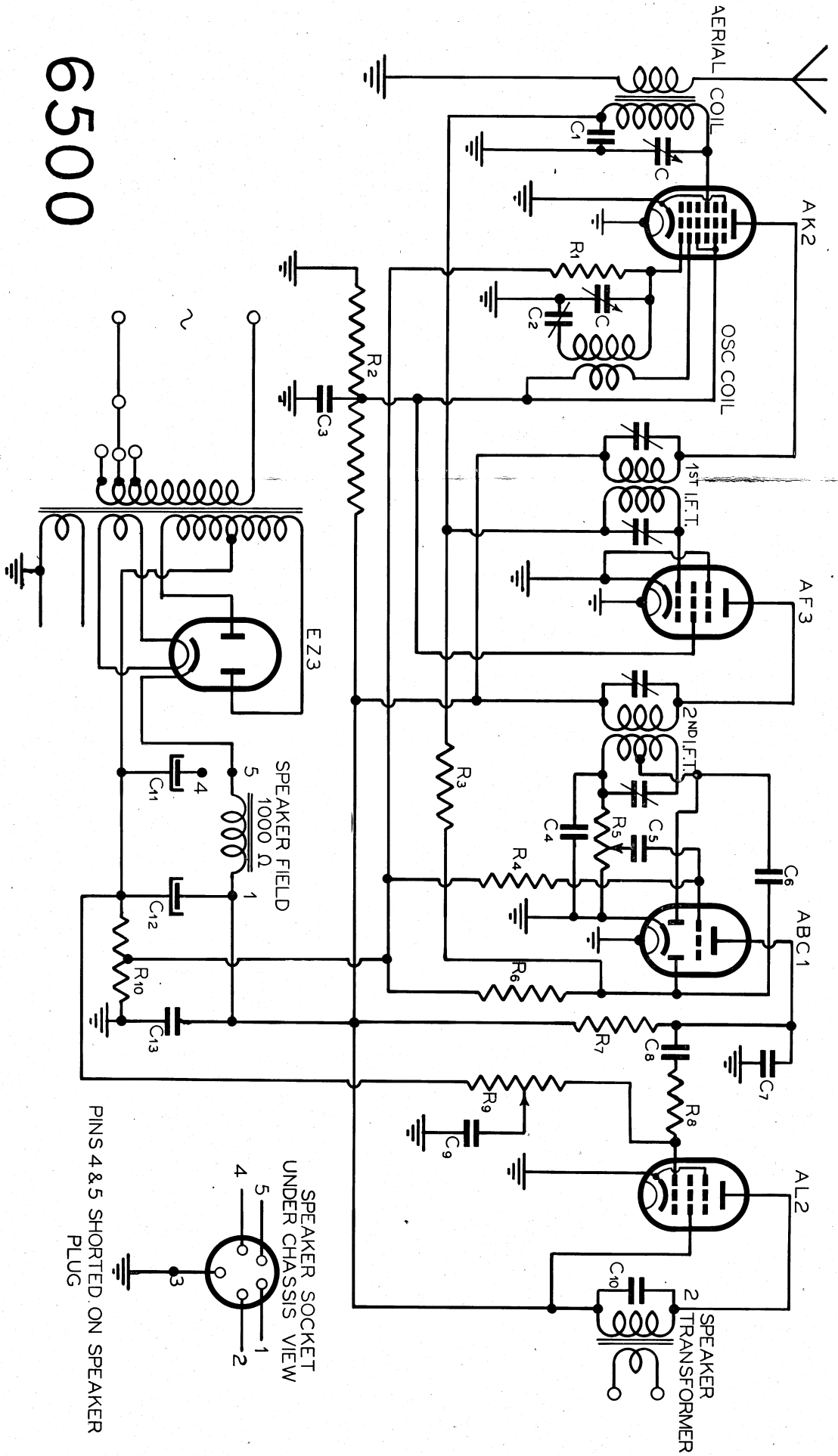
SERVICE DATA.

COMPONENT LOCATIONS.



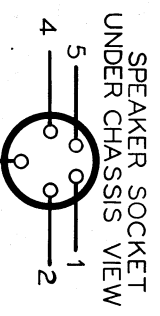
COMPONENT PARTS

CONDENSERS.	RESISTORS.
C.C. Two gang condenser	R1 50,000 ohm
C1, C3 0.1 uF paper	R2 25,000 ohm voltage divider
C2 padder	R3 1 megohm, ½ watt
C4, C7 0.00025 uF mica	R4 1 megohm, 1 watt
C5, C8, C9 0.02 uF paper	R5, R9 0.5 megohm potentiometer
C6 0.0001 uF mica	R6 2.0 megohm, ½ watt
C10 0.004 uF mica	R7 0.25 megohm, 1 watt
C11, C12 8 uF electrolytic	R8 0.25 megohm, ½ watt
C13 0.25 uF paper	R10 300 ohm wire wound

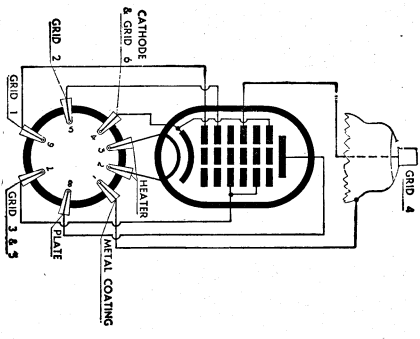


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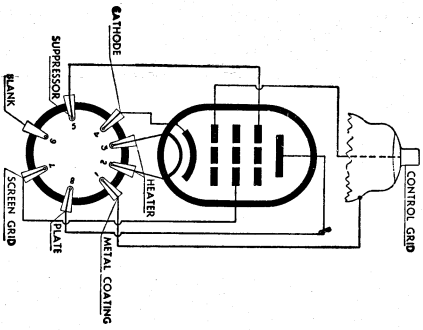
PINS 4 & 5 SHORTED ON SPEAKER PLUG



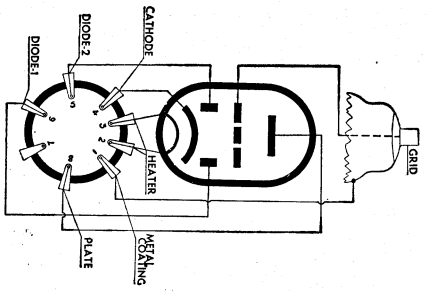
SOCKET CONNECTIONS VIEWED FROM BOTTOM OF BASE



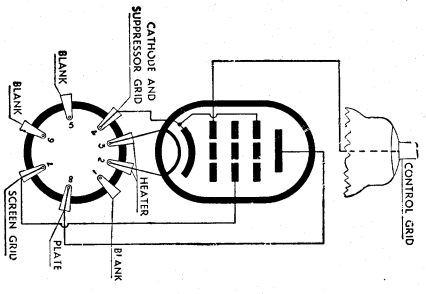
AK2



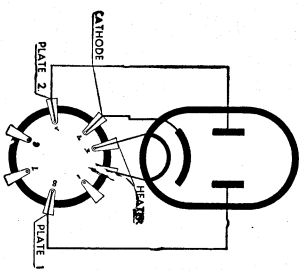
AF3



ABC1



AL2



EZ3

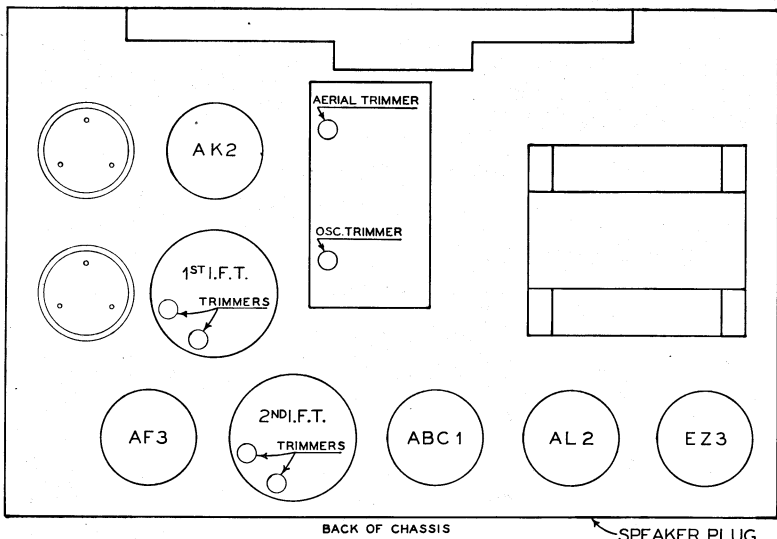
VOLTAGE ANALYSIS

Valve Type	Plate Voltage	Plate Current (mA.)	Screen Voltage	Grid Bias Voltage	Heater Voltage (A.C.)
AK2	250	1.5	90	-3	4.0
AF3	250	8.0	90	-3	4.0
ABC1	250	0.6	—	-3	4.0
AL2	235	36	250	-24	4.0
EZ3	—	—	—	—	6.3

NOTE.—The above mentioned voltage values are measured between the socket points indicated and chassis with the receiver in the no signal condition and with the volume control at zero. Voltages are measured with a 1,000 ohm per volt voltmeter and may vary as much as 10% from the figures quoted. Bias voltages are measured at the voltage source and not at the socket.



CHASSIS LAYOUT



(Continued from page 1.)

Then adjust the two trimmers on the 2nd I.F. transformer for peak receiver output. Next adjust the two trimmers on the first I.F. transformer for maximum indication on the output meter.

During these adjustments the output of the test oscillator should be regulated so that the output is as low as possible. This will prevent errors in alignment due to the A.V.C. action. The I.F. trimmers should be gone over again to ensure that mutual coupling has not displaced the original adjustment.

R.F. TRIMMER ADJUSTMENTS. The trimmers on the gang condenser are indicated as aerial, and oscillator trimmer in the chassis layout diagram.

The padder is indicated in the component illustration. Before proceeding with the R.F. adjustment see that the dial pointer just coincides with the end of the scale when the tuning condenser plates are fully engaged.

Attach the output of the test oscillator to the aerial and earth terminal of the receiver.

Proceed further as follows:—

- (a) Connect output meter to output of set and turn volume control to maximum.
- (b) Adjust test oscillator to 1500 kc/s and tune receiver until pointer indicates 1500 kc/s on dial.
- (c) Increase test oscillator output until a small indication is given on output meter.
- (d) Adjust the oscillator trimmer until a maximum output is recorded.
- (e) Adjust test oscillator to 1400 kc/s and set dial of receiver to same frequency. Adjust aerial trimmer for maximum output on meter.
- (f) Adjust test oscillator to 600 kc/s and tune dial of set to same frequency. Adjust padder for maximum output.
- (g) If padder has been altered very much it will be advisable to return to 1400 kc/s and recheck alignment as per para. (e).



PHILIPS RADIOPLAYER

MODEL 6500

SPECIFICATIONS.

(Subject to alteration without notice.)

Voltage Rating (power supply) 220-260 volts A.C.40-100 cycles.

Tuning range 200-550 metres

Intermediate frequency 462.5 kc/s.

VALVE EQUIPMENT.

Frequency Converter	AK2—octode
I.F. Amplifier	AF3—R.F. penthode
A.V.C., Demodulator and Audio Amplifier	ABC1—diode triode
Power Amplifier	AL2—power penthode
Rectifier	EZ3—indirectly heated rectifier
Dial Lamps	6 volt auto tail lamps (single contact)

INSTALLATION. Full instructions for the installation of Model 6500 are contained in the instruction book supplied with each Radioplayer.

VOLTAGE ADJUSTMENT.

The power transformer may be adapted for A.C. mains of 220-240 or 260 volts by means of a switch located at rear of chassis. This switch is normally covered by an inspection plate and the plate should not be removed unless the power plug is disconnected at the socket. It is important that the receiver should be operated with the transformer switch set at the correct position in accordance with the mains voltage in the locality.

DISMANTLING THE SET.

1. Disconnect power plug.
2. Remove knobs at front of cabinet (recessed grub screws).
3. Withdraw loudspeaker plug from socket.
4. Unscrew the four bolts holding the chassis to floor of cabinet. The chassis may now be withdrawn from the cabinet.

REMOVING LOUDSPEAKER.

If it is desired to remove the speaker, this may be accomplished by unscrewing the four woodscrews securing same.

ALIGNMENT. Precise alignment is vital to the proper functioning of this receiver. There are four trimming adjustments provided on the intermediate frequency transformers and three in the octode tuning circuits (two at the gang condenser together with the padder).

These trimmers are accurately adjusted at the factory and will retain the alignment unless affected by abnormal climatic conditions or unless alterations have been made to the trimmers or wiring for service purposes. Incorrect alignment is usually indicated by loss of selectivity coupled with poor sensitivity. The correct performance can only be obtained if the set alignment is achieved by reliable test apparatus and no attempt should be made to tamper with the trimmers unless a suitable service oscillator and visual output meter is available.

I.F. TRIMMER ADJUSTMENTS. The position of the four I.F. trimmers is shown in the chassis layout diagram. Each must be aligned to the basic frequency of 462.5 kc/s. To accomplish this, connect an output meter to the receiver. The "hot" side of the test oscillator should be connected to the grid of the AK2 octode through an 0.5 uF condenser and the "earth" side of the oscillator should be joined to the receiver chassis. The normal grid clip should remain on the cap of the valve. Tune the oscillator to exactly 462.5 kc/s. Advance the volume control to full on position and adjust the receiver tuning control to a point where the condenser plates are fully engaged. Increase the output of the test oscillator until a slight indication is observed on the output indicator.

(Continued on back page.)