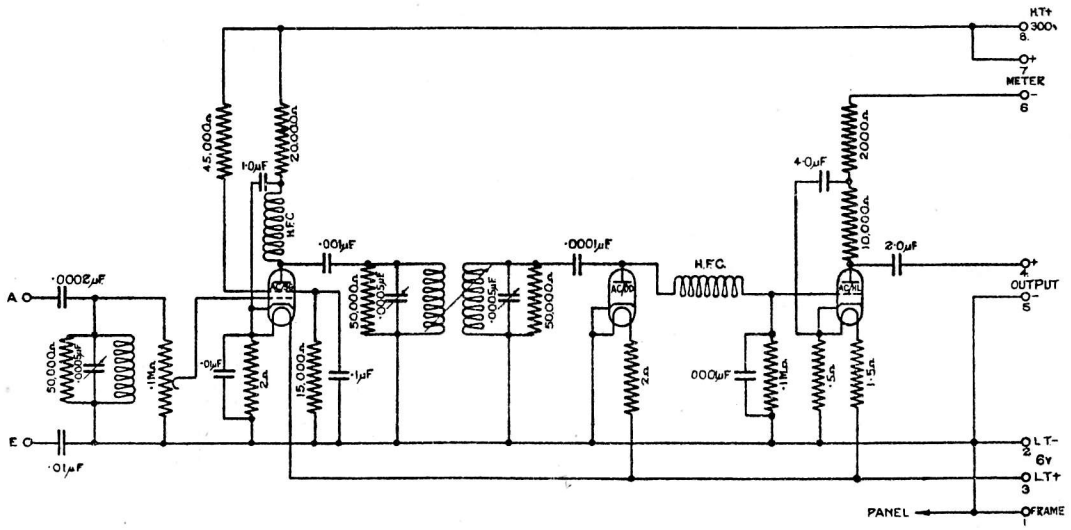
CHECK RECEIVER, HR/4



Drawing A. 2115, Issue 3.

Function.—This receiver is designed for use at provincial offices for programme checking purposes and can be supplied for reception in either the medium or the long waveband. It is essentially designed for high-quality reception of a particular transmission and the performance is largely determined by the initial tuning adjustments. These are somewhat involved, but once they have been made, at the time of installation, it should be unnecessary to disturb them except in the case of a change of wavelength of the transmitter.

The receiver, when properly adjusted for the particular transmission which it is to receive, has a sensitivity of 5 millivolts, that is to say, with the volume control on maximum a signal of 5 millivolts at the frequency to which the receiver is tuned, applied across the input terminals of the receiver, will produce a fall in the rectified current of 1 milliampere (see ' Tuning Adjustments '). The selectivity is such that at 100 kc/s from resonance the attenuation is not less than 50 db., while the frequency response curve over a band of 20 kc/s is flat to within $\pm\frac{1}{2}$ db.

Circuit.—The receiver consists of a screen-grid H.F. amplifier choke-capacity coupled, via a loosely-coupled band-pass circuit, to a diode detector which is followed by a single stage of L.F. amplification. The L.F. stage is resistance-capacity coupled to the checkphone and loudspeaker (CPL) amplifier.

The aerial tuning circuit and each half of the tuned band-pass circuit are shunted with a resistance which flattens the tuning and thereby reduces the side-band cut-off. The value

Circuit (*Contd.*)

of this resistance differs from receiver to receiver, the value used for any particular unit being that found by experiment to give the best frequency response characteristic. Volume control is effected in the input to the screen-grid stage by means of an 0.1 megohm continuously variable potentiometer. The band-pass coupling can be varied by adjusting the relative positions of the coils. The diode is loaded with an 0.1 megohm resistance and, to prevent H.F. from reaching the grid of the L.F. valve, an H.F. choke is included in the diode output circuit and a 0.0001 μF. condenser shunted across the diode load resistance. The screen voltage is obtained from a fixed potentiometer connected across the H.T. supply, and an 0.1 μF. condenser is connected between the screen and L.T. negative for decoupling purposes. Anode decoupling in the interests of stability is provided in the H.F. and L.F. amplifier stages by the use of individual dropping resistances in series with the H.T. supply and of large capacity condensers connected across the anode circuit. The grid bias for the H.F. and L.F. stages is automatic, and is obtained from resistances included in the filament negative leads. In the case of the H.F. stage the biassing resistance serves also to step-down the voltage of the filament supply from 6 to 4 volts, but in the case of the L.F. stage an additional resistance is necessary and this is included in the positive lead. Grid decoupling is provided in the case of the H.F. stage by a 0.01μF condenser connected across the biassing resistance. A suppressed zero milliammeter is connected in series with the H.T. supply to the L.F. stage and from its readings the value of the rectified current can be deduced.

Controls.

Aerial tuning condenser.
Inter-stage band-pass tuning condensers (two).
Inter-stage variable coupling control.
Volume control (continuously variable 0.1 megohm potentiometer in H.F. stage Input).

Supply Data.

Stage.	*Valve.*	*H.T. Feed.*		*Filament.*	
			mA.	Volts.	Amps.
H.F. Amplifier.	AC/SG	Anode	9		
		Screen Grid (including potentiometer).	6	4	1
Rectifier	AC/DD		—	4	1
L.F. Amplifier	AC/HL		9	4	1
			—		—
		Total	24		3

High Tension Supply .. .. 300 volts.
Low Tension Supply .. .. 6 ,, (adjusted to 4 V by a series resistance)
Grid Bias to H.F. and L.F. Amplifier Stages .. Automatic.

A suppressed zero meter, reading 8 to 12 mA, is connected between terminals 6 and 7 to read rectified current, and a meter reading 0-50 mA. is connected in series with the 300 volt H.T. supply to read the total feed.

Tuning Adjustments.—The following routine sets out the method by which the initial tuning adjustments are performed.

(1) The standing feed of the AC/HL valve, indicated by the rectified current meter, with the receiver detuned, should be noted.
(2) The coupling between the band-pass coils should then be made as weak as possible by turning the control on the front panel so as to move the coils away from one another.
(3) The receiver should then be tuned, by means of the aerial and band-pass tuning condensers, to receive the wanted station. Rectified current will be indicated by a fall in the reading which will have a minimum value when the receiver is correctly tuned.
(4) The coupling between the coils should then be increased until the point of critical coupling is reached at which the rectified current commences to fall again, i.e. at which the meter reading commences to rise.
(5) The value of the rectified current, i.e. the difference between the standing feed of the AC/HL valve before the receiver was tuned (1) and the reading with the receiver tuned and at the point of critical coupling (4), should now be adjusted by means of the H.F. volume control to approximately 1 mA.
(6) The coupling between the coils should then be increased slightly to produce a fall in the rectified current which will be specified for each case by the Equipment Department.

For example, if the standing feed of the receiver in the untuned condition is 9.2 mA. the reading with the receiver tuned at the point of critical coupling should be adjusted to 8.2 mA. If the reduction in the rectified current specified for the particular case is 0.03 mA., the coupling should then be increased to obtain a reading of 8.23 mA. The actual figures will, of course, vary slightly for each case.