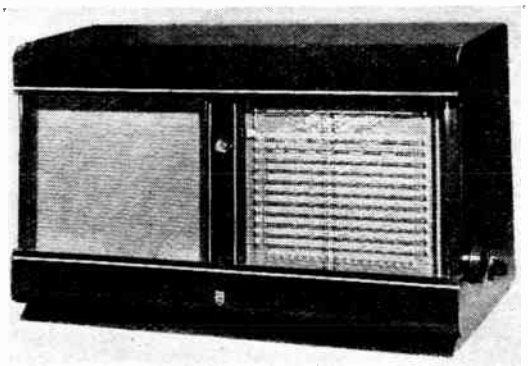
TEST REPORT

PHILIPS MODEL 681A

Double Frequency Changing on Short Waves



FEATURES
Waveranges:
Normal Tuning:
11.1—34.2 m.
34.2—110.5 m.
192—560 m.
900—2,000 m.
Bandspread ; 11, 13, 16, 19, 25, 31, 41 and 49 m. bands.
Power Output ; 8-9 watts.
Mains Supply ; 100-250 V., 50-100 c/s.
Consumption ; 85 watts at 220 V.
Price (including tax) £48 8s 9d.

UNUSUAL care has been taken in the design of this table model receiver to provide ease and stability of tuning on short waves. In addition to the usual medium- and long-wave ranges and two short-wave ranges covering 11 to 110 metres, which are covered by the basic superheterodyne circuit consisting of r.f. amplifier, frequency changer, i.f. amplifier, detector and a.f. stages, there are eight selected short-wave broadcast bands of about 0.5 Mc/s which are each expanded to the full width of the 7-inch horizontal tuning scale. A double superheterodyne principle has been applied to the bandspread circuits in such a manner that the local oscillator on each band works at a single fixed frequency and is therefore easier to stabilize.

On the bandspread ranges the section of the main ganged tuning condenser associated with the input to the r.f. stage is disconnected, and the second section tuning the intervalve coupling is transferred to a first intermediate-frequency transformer in the anode circuit of the mixer section of the auxiliary frequency changer. The r.f. stage is fixed-tuned to a point in the middle of the band and will accept, without appreciable attenuation, signals up to 250 kc/s on either side of the centre frequency. The oscillator section of the first frequency changer is also fixed-tuned to a frequency 3 Mc/s higher than the centre point of the r.f. tuned circuits. Other signals in the band produce a spectrum of frequencies, centred on 3 Mc/s, and this first intermediate band is explored by the tuned secondary circuit connected to the grid of the second frequency changer. Here the conversion is made to the main i.f. of 452 kc/s and the signals follow the same course as on other wave ranges.

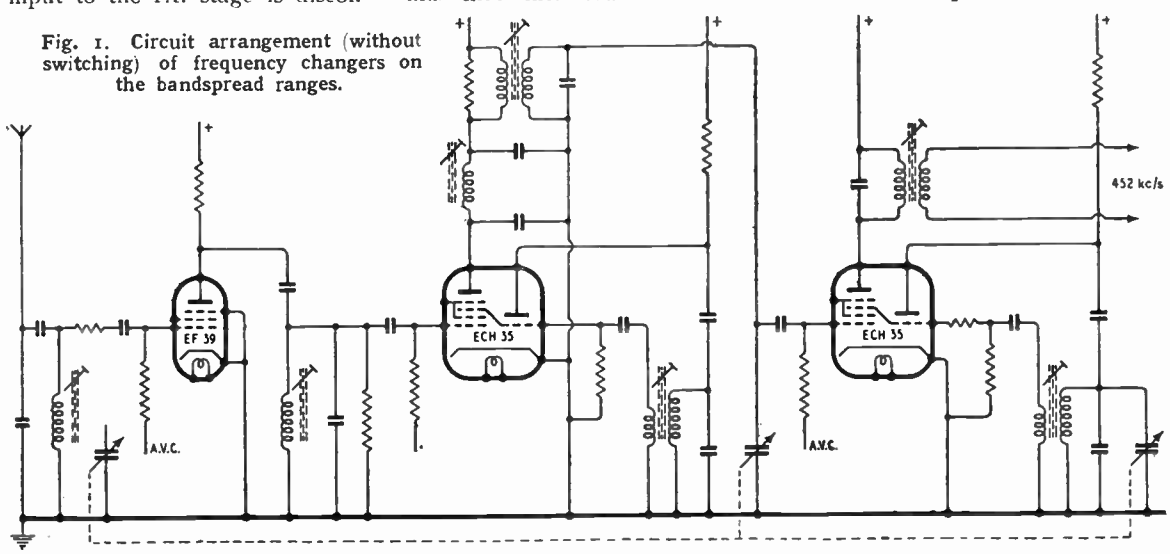
Fig. 1 shows the circuit arrangement of the two frequency changers on the bandspread ranges. The filter circuit in series with the primary of the first i.f. transformer is included for whistle suppression. Fig. 2 shows the progress of the signal through the receiver on the bandspread ranges.

As the first oscillator is higher in frequency than the signals, the calibration of the scales on the bandspread ranges is opposite to that on the normally tuned broadcast ranges. Wavelength decreases as the pointer moves from left to right, instead of increasing as on the long-, medium- and general-coverage short-wave bands.

The i.f. amplifier, detector and a.v.c. stages follow standard practice and a cathode-ray tuning indicator, controlled by the a.v.c. bias, is included.

A centre-tapped auto-trans-

Fig. 1. Circuit arrangement (without switching) of frequency changers on the bandspread ranges.



Philips Model 681A

former couples the triode a.f. amplifier to the push-pull pentode output valves, and Fig. 3 gives the circuit arrangement of the stage. To balance out hum in the push-pull circuits R_1C_1 is introduced to offset RC. Feedback is applied from the secondary of the output transformer to one side of the phase-inverting circuit.

Tone control is effected by feedback through a capacitance from the anode to the grid of the first a.f stage. A potential divider, which includes the tone control resistance, is connected across the phase-splitting inductance, and values are chosen so that the point X is at the same a.f. potential as the grid of the valve. When the slider is at this end of the control there is no feedback, and maximum high-note response is obtained.

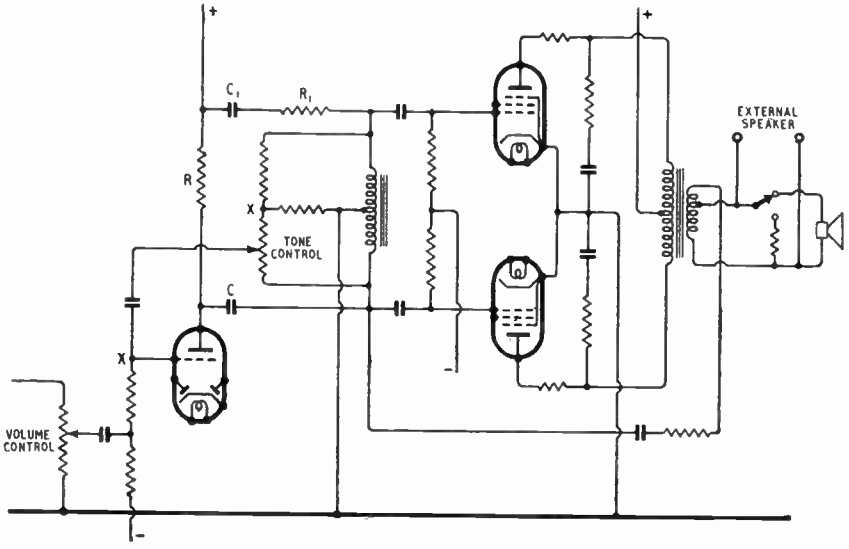


Fig. 3. Output stage and its associated circuits.

Performance. — On the bandspread ranges the set handles like an ordinary broadcast receiver on medium waves—except that there are more stations to choose from and there is less overlapping. Each station can be tuned in to the mid-point of its bandwidth as easily as the local station, and if the ear does not give this point clearly, it can be found quite accurately by observing the cathode-ray tuning indicator with its two-stage sensitivity.

The set is remarkably free from self-generated whistles on all wavebands and the sensitivity and selectivity enable any station above background noise to be well received. On the bandspread ranges the scales are accurately calibrated in both metres and megacycles and a check at several points showed that the graduations could be relied upon to find a wanted station.

Frequency stability was also very good and no warming-up drift could be detected. Station settings can be logged with accuracy by means of an auxiliary 180-degree scale.

The 8-inch loudspeaker gives good quality, and volume much above the average for a table model.

Mechanical Features. — The rather complicated wave-range switching is accomplished on three spindles, ganged together by a rack and pinion mechanism. It is positive in action and not unduly heavy to operate.

All trimmers are accessible from the back of the set and a large proportion of the top area of the chassis is occupied by them. The main tuning condenser is rubber-mounted, but we did not find any evidence of microphony even when the condenser body was clamped for transit.

From every point of view the Type 681A can be classed as a high-quality receiver and it is particularly well fitted for serious short-wave listening.

The makers are Philips Electrical, Century House, Shaftesbury Avenue, London, W.C.2.

PUBLICATION DATE

In future *Wireless World* will be published on the last Thursday of the month preceding the date of publication instead of on the 26th as in the past.

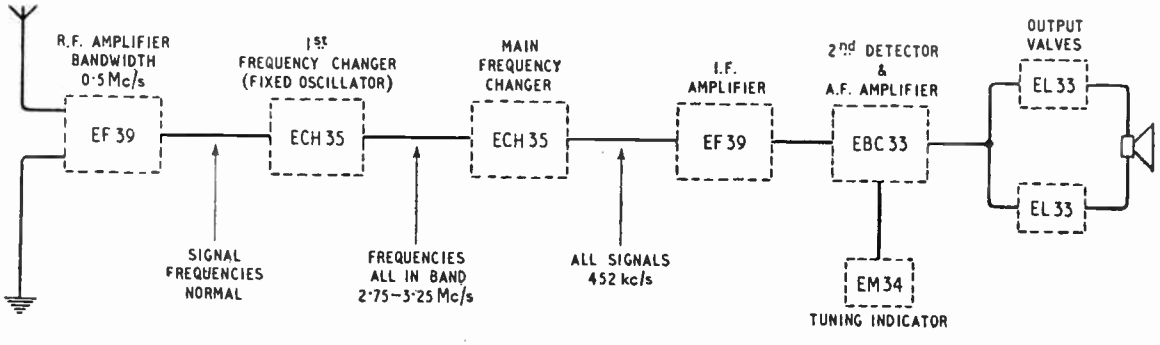


Fig. 2. Block diagram showing progress of signal on bandspread ranges