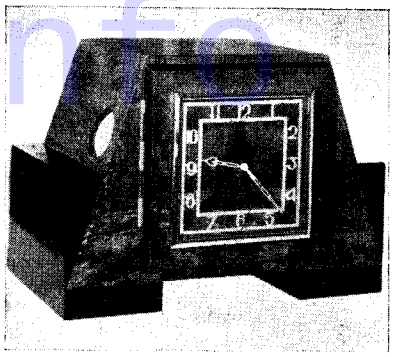
TEMPOVOX COMBINED CLOCK-RADIO



The model R3 mantel radio clock for A.C. by British Tempovox, Ltd. The same chassis is used in the R3G grandmother style receiver. There are also A.C.-D.C. versions of both types using the same chassis but with 8-day spring clocks.

CIRCUIT.—The aerial input circuit on medium and long wavebands consists of H.F. aerial transformers, while an I.F. wavetrap is also included operating on the medium waveband. The D.C. connection from the aerial circuit is effectively isolated by a series aerial condenser. The oscillator section incorporates a coupling condenser and load resistance for the oscillator anode coupling to the reaction windings. V1, a triode hexode frequency changer, is of course A.V.C. controlled.

An I.F. transformer tuned to 465 kc. provides the coupling between V1 and the I.F. amplifying valve V2, an H.F. pentode. V2 is also A.V.C. controlled.

Another I.F. transformer effects the coupling between the I.F. amplifying valve and the demodulating diode of V3, a double diode triode. The rectified potentials are led *via* an L.F. coupling condenser and H.F. filter circuit to the manual volume control VR1, and thence to the grid of the triode section of the valve.

The other diode of V3, fed by a coupling condenser C12, provides a D.C. potential that is utilised to feed the grids of V1 and V2 to give automatic volume control.

V3 is resistance capacity coupled to V4, an output tetrode between the anode of which, and the chassis earth line, is connected a tone-modifying condenser.

Mains equipment consists of a barretter providing automatic voltage regulation for valve heaters, a half wave-rectifying valve V5, electrolytic smoothing condensers, and two smoothing chokes, one of which is the speaker field coil.

RESISTANCES

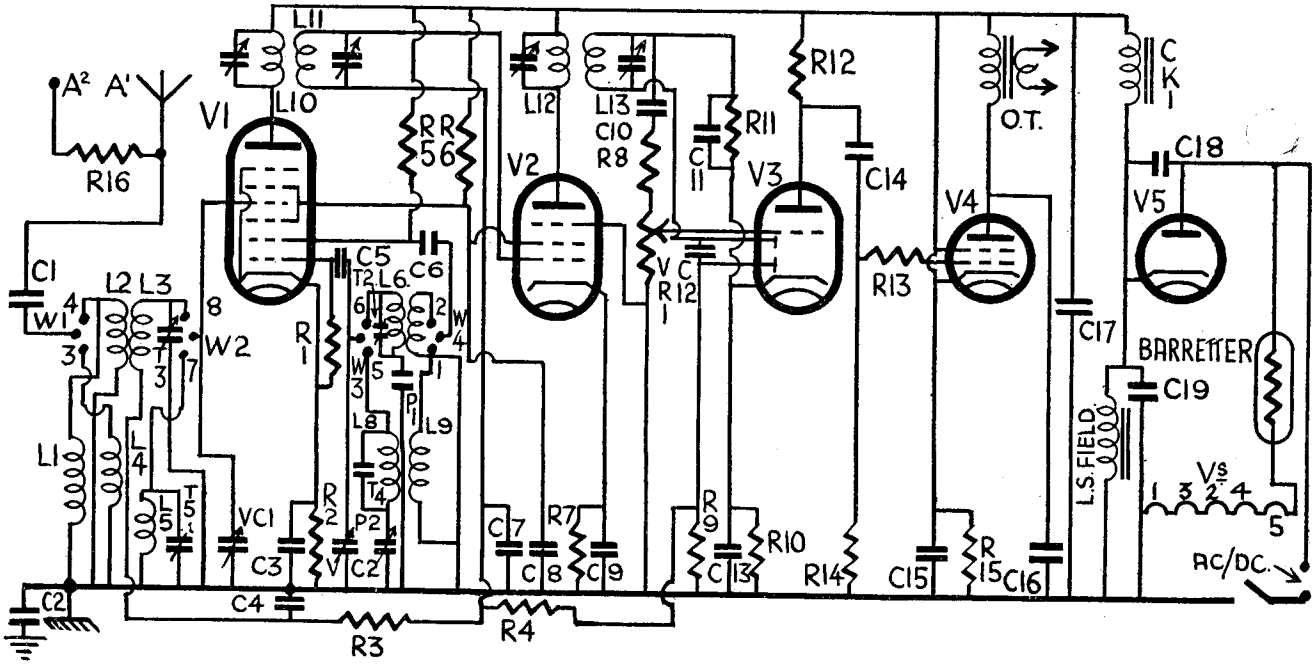
R.	Purpose.	Ohms.
1	Osc. grid leak	50,000
2	V1 cathode bias	250
3	V1 A.V.C. decoupling	500,000
4	V2 A.V.C. decoupling	500,000
5	Osc. anode load	30,000
6	V1 and V2 screen decoupling.	30,000
7	V2 cathode bias	250
8	H.F. stopper	1 megohm
9	A.V.C. diode load	1 megohm
10	V3 cathode bias	6,000
11	Demodulating diode load	500,000
12	V3 anode load	1 megohm
13	V4 grid stopper	100,000
14	V4 grid leak	500,000
15	V4 cathode bias	150
V.R.1	Volume control	250,000
16	Series aerial	10,000

CONDENSERS

C.	Purpose.	Mfds.
1	Series aerial	.0001
2	Chassis isolating	.01
3	V1 cathode bias shunt	.1
4	V1 A.V.C. decoupling	.1
5	Osc. grid	.0001
6	Osc. anode coupling	.01
7	V2 A.V.C. decoupling	.1
8	V1 and V2 screens decoupling.	.1
9	V2 cathode bias shunt	.1
10	L.F. coupling	.02
11	H.F. bypass	.0001
12	A.V.C. diode coupling	.0001
13	V3 cathode bias shunt	25
14	L.F. coupling	.01
15	V4 cathode bias shunt	25
16	Pentode compensator	.01
17	H.T. smoothing	16
18	Rectifier H.F. bypass	.05
19	H.T. smoothing	16

WINDINGS (D.C. Resistance)

L.	Ohms.	Range.	Where meast
1	10.6	Any	Across tags.
2	18.4	M.W.	C1 and chassis.
3	4.8	M.W.	Top grid V1 and C4+ R3.
4	45.6	L.W.	C1 and chassis.
5	23.4	L.W.	Top grid V1 and C4+ R3.
6	4.7	M.W.	C5 and P1.
7	73.5	M.W.	C6 and chassis.
8	12.5	L.W.	C5 and P2
9	8.5	L.W.	C6 and chassis.
10	3.5	Any	Across tags.
11	3.5	Any	Across tags.
12	3.3	Any	Across tags.
13	3.4	Any	Across tags.
CK1	410	Any	White and red leads, speaker panel.
Field	680	Any	Black and white leads, speaker panel.
O.T. Prim.	300	Any	Blue and red leads, speaker panel.



A conventional form of four-valve plus rectifier and barretter A.C.-D.C. circuit is utilised in both A.C. and universal models. A.C. models have synchronous clocks and A.C.-D.C. use spring clocks. Two bands are covered with transformer coils in both aerial and oscillator stages.

Chassis Removal.—Open front panel, unscrew the hexagonal insulation-headed securing bolt from the rear of the clock and remove the clock's rear covering member.

Next remove the mains connections from the clock and insulate both leads with tape or the like. Replace cover to avoid breakages.

Turn the cabinet on its side and remove the two (sometimes six) wood screws from the extreme edge of base, afterwards returning the cabinet to its original upright position.

Open the clock-face panel, when the cabinet may be lifted off, leaving the chassis exposed.

To obtain access to the underside of the chassis, the four chassis-securing bolts and washers must be removed from the base, when the base board and speaker can be taken away from the chassis, free to the extent of the speaker cable.

Special Notes.—To start the electric clock, open the front panel and press the small knob behind same. Then on releasing the knob the clock should operate. The same knob also rotates the hands. A point to bear in mind is the fact that the mains plug connections should always be live, irrespective of whether the receiver is in use or not, otherwise the clock will stop.

Sockets at the rear of the chassis provide connections for an aerial and earth system, while an alternative aerial connection is provided.

The heaters of the valves are connected in series to obviate the use of a mains transformer, thereby effecting a considerable saving of space. As the chassis is connected to one side of the mains, care should be taken to avoid shorts.

The barretter is a Tungsram Type BR201. In our particular chassis, R8 was found to have a value of 250,000 ohms.

(*Continued in column 3.*)

VALVE READINGS

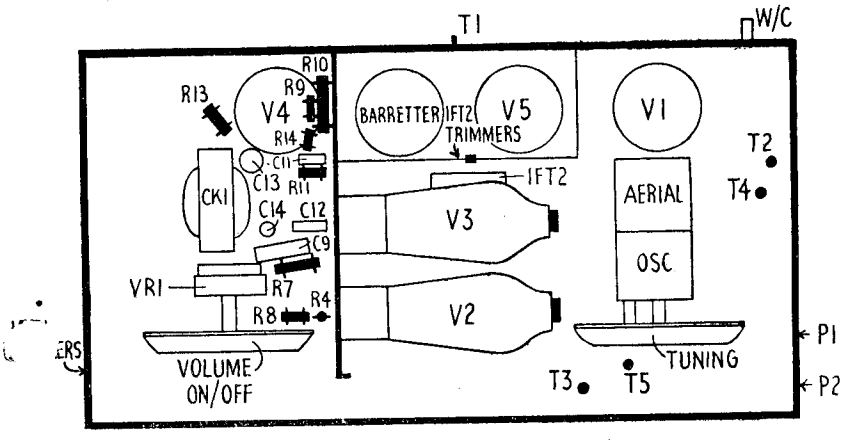
No signal. Volume maximum. M.W. band min. capacity. 200 volt A.C. mains.

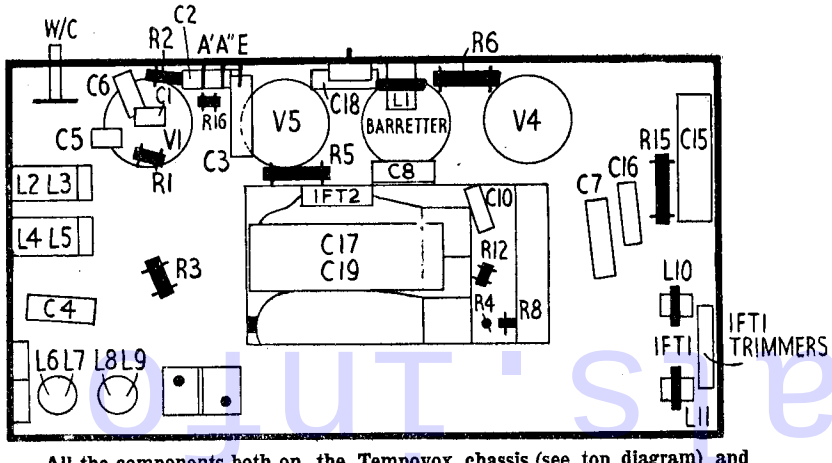
	Type.	Electrode.	Volts.	Ma.
	Il Cossor.			
	202 STH	Anode ..	200	1.4
	(7 met.).	Screen ..	50	3.1
		Osc. anode ..	25	1
2	13VPA	Anode ..	200	3.8
	(7 met.).	Screen ..	50	1
3	202DDT	Anode ..	Very low.	Very low.
	(7 met.).			
4	402OT	Anode ..	184	36
	(7).	Screen ..	200	8
5	40SUA ..	Cathode ..	220	—

QUICK TESTS

Quick tests are available on the leads on the speaker transformer. Volts measured between these and the chassis should be:—

White lead, 220 volts, unsmoothed H.T.
Red lead, 200 volts, smoothed H.T.
Blue lead, 184 volts, smoothed H.T.





All the components both on the Tempovox chassis (see top diagram) and underneath can be identified with these drawings. All resistors are in solid black and condensers in outline.

Tempovox R3 on Test

MODEL Tempovox R3.—Standard model for A.C. mains operation, 200-250 volts, 50 cycles.
PRICE.—11 gns.
DESCRIPTION.—A combined electric clock and four-valve, plus rectifier, two-band superhet.
FEATURES.—Clock and receiver contained in attractive cabinet with controls at side and rear of same. Edge-type tuning and combined volume and receiver master switch, both calibrated, the former in station names and the latter in degrees 0 to 100. Wave selection switch at rear of chassis. Barretter regulation of valve heater voltages. Alternative aerial socket for local station reception. Speaker on base of cabinet.
LOADING.—68 watts.

Sensitivity and Selectivity

MEDIUM WAVES.—Quite good gain and selectivity, with small local station spread and a good background.
LONG WAVES.—All main stations easily received with ample volume. Overlap on Deutschlandsender.

Acoustic Output

Crisp, clean attack with ample volume for an ordinary room. Quite good low-note reproduction for a small speaker. Orchestral music well balanced and a general pleasing performance.

Alignment Notes

I.F. Circuits.—Connect an output meter across the primary of the speaker transformer, taking the precaution of inserting a 2 mfd. condenser in series with one lead. Switch set to M.W., turn gang and volume to maximum. Connect a service oscillator between the top grid of V1 and earth socket.

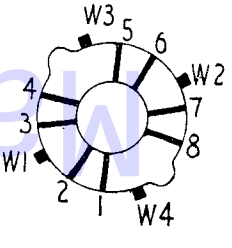
Tune the service oscillator to 465 kc. and adjust first the trimmers of I.F.T.2 and then I.F.T.1 for maximum response, reducing the input as the circuits come into line to render the A.V.C. inoperative.

Signal Circuits.—Connect the service oscillator to the aerial and earth sockets *via* a dummy aerial, only feeding sufficient input (unless otherwise stated) to obtain reliable peaks in the output meter and progressively reducing the input as the circuits come into line.

I.F. Wavetrap.—Tune the service oscillator to 465 kc. (the I.F.) and inject a strong signal. Adjust T1 for minimum.

Medium Waves.—Tune set and oscil-

(*Continued on page viii.*)



The switch bank of the R3 and R3G chassis is shown (right) with contacts numbered corresponding to the circuit.

Invicta 500 Monomatic Alignment Notes

(*Continued from page iii.*)

I.F. Circuits.—As there are no trimmers to drift it should not be found necessary to touch the I.F. transformers. However, should an I.F. transformer be found faulty and need replacing, the following procedure should be carried out.

Connect an output meter across the primary of the speaker transformer. Switch the receiver to the M.W. band, turn gang and volume to maximum and the tone switch to the high position.

Connect a service oscillator between the top grid cap of V1 and chassis. Tune the service oscillator to 465 kc. and vary the coupling between the coils of the transformers (adjusting the outer coils only), until the maximum peak is obtained. Reduce the input from the service oscillator as the circuits come into line to render the A.V.C. inoperative.

Then reseal the coils to the formers with coil dope and allow to dry before carrying out any signal circuit adjustments.

Signal Circuits.—Connect the service oscillator to the aerial and earth sockets *via* a dummy aerial, only feeding sufficient input to obtain reliable peaks in the output meter, and progressively reducing the input as the circuits come into line.

Turn gang to maximum and set pointer exactly on the 51 and 200 metres calibration marks.

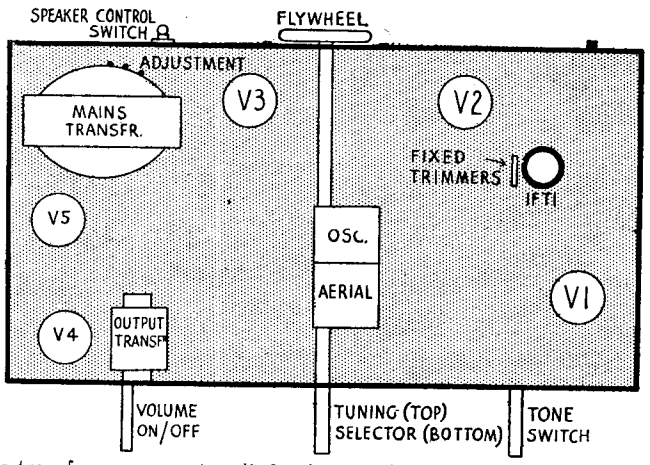
Medium Waves.—Tune set and oscillator to 250 metres (1,200 kc.), and adjust T1 and then T2 for maximum.

The padding is fixed, but check calibration throughout the range covered compensating with T1 if very much out.

Long Waves.—Tune set and oscillator to 1,200 metres (250 kc.), and adjust T3 to bring in the signal spot on.

Short Waves.—BAND 1, 13.5 TO 52 METRES.—Tune set and oscillator to 14 metres (21.4 mcs.), and adjust T4 for maximum output. Check calibration at 50 metres. BAND 2, 50 TO 200 METRES.—There are no trimming adjustments to be effected on this band.

Pre-set Stations.—TO RE-SET TRIMMERS connect an aerial and earth to the receiver as for ordinary broadcast reception. With the receiver on its side (preferably with the mains transformer nearest the test bench) the trimmers from top to bottom are in line with and correspond to the station names on the W/L panel. The oscillator trimmers are those nearest the rear of the chassis.



Valve positions and components on the top of the Invicta chassis are identified by this diagram. The below "deck" diagram is on page iii.

Turn the selector switch so that the station name "Droitwich" lights up, tune in the actual station spot on (with the aid of the visual tuning indicator) by means of the corresponding oscillator trimmer, and then adjust the aerial trimmer for maximum volume.

The other stations should be treated in the same manner in turn.

TO CHANGE A PRE-SET STATION.—There are two long-wave and three medium-wave station settings. These, if desired, can be changed from the stations originally set by the makers. Choice of two long-wave and three medium-wave can be obtained.

To change a station very close in wavelength to the original station it will only be necessary to adjust the trimmers to tune in the desired station.

To change to a station appreciably different in wavelength from the original station, it will be necessary to obtain from the makers a set of two fixed condensers and connect these across the oscillator and aerial trimmers in place of those already fitted.

As sent out the station names are engraved on a celluloid strip. Remove this strip by lifting out from behind dial backplate, and, with a pair of scissors, cut out the superseded station or stations. Refit the remains of the strip in original position, and in the empty slot place the new station name supplied.

Replacement Condensers

Replacement condensers are available from A. H. Hunt, Ltd., Garratt Lane, Wandsworth, London, S.W.18, for the Invicta Model 500. These are: for either C39 or C40, unit list number 2,935, 1s. 9d., and for the block C32, unit 1,573, 6s. 6d.

Tempovox R3

(*Continued from page vii.*)

lator to 200 metres (1,500 kc.) and adjust T2 and then T3 for maximum response.

Tune set and oscillator to 500 metres (600 kc.) and adjust P1 for maximum, simultaneously rocking the gang.

Repeat both operations until no further improvement results.

Long Waves.—Tune set and oscillator to 1,200 metres (250 kc.) and adjust T4 and then T5 for maximum.

Tune set and oscillator to 1,800 metres (166 kc.) and adjust P2 for maximum, simultaneously rocking the gang.

Repeat both operations.

Replacement Condensers

Exact replacement condensers are available from A. H. Hunt, Ltd., for the Tempovox models R3 and R3G. For either C13 or C15 there is unit 2,918, 1s. 9d., and for the block containing C17 and C19, unit 4,207, 9s.

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