

ULTRA 202 THREE BAND THREE

CIRCUIT.—The aerial input is via a series aerial condenser to an I.F. wavetraps and thence to aerial coils feeding the signal grid of V1, a triode hexode frequency changer.

The triode section of V1 operates as an oscillator or L.F. amplifier. Pick-up potentials can be applied to the triode grid via C12, whereupon R7 becomes the anode load and the output passes via C17 to the manual control R21, and thence to the grid of the pentode section of V3.

The output of V1, consisting of the signal converted to the I.F., passes by a transformer tuned to 470 kc. to the amplifier V2, an H.F. pentode.

A further I.F. transformer effects the coupling between V2 and the demodulating diode of V3, a double diode output pentode, and the demodulating diode load R17. The rectified signal impulses pass through an L.F. coupling condenser C21 and H.F. stopper R16 to the manual volume control R21, and thence to the grid of the pentode section of V3.

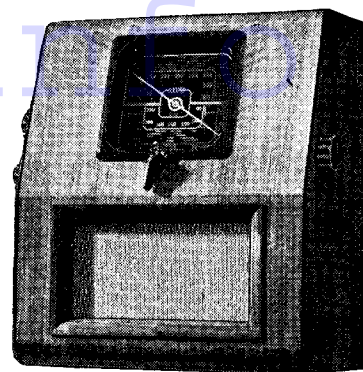
The other diode of V3 provides the impulse feeding the A.V.C. circuit controlling V1 and V2.

A circuit, R23 and C25, provides a control of tone, and a pentode compensator condenser is connected across the primary of the speaker transformer.

Mains equipment resistance, a half-wave rectifying valve V4, electrolytic smoothing condensers and a smoothing choke (the speaker field). An interference filter con-

sisting of two chokes and mains suppressor condenser C28 is included.

Chassis Removal.—Remove back of cabinet and the grub-screw fixed wave-change switch from the front. The grub screws securing the extension shafts of the three controls at the side should be loosened. These are accessible from the rear. The extension shafts may then be withdrawn.



Controls on the sloping front are a feature of the Ultra 202, which employs a 3-valve superhet chassis covering three wavebands.

Remove the two chassis securing bolts and washers from the rear (underside) of the chassis. These also secure the

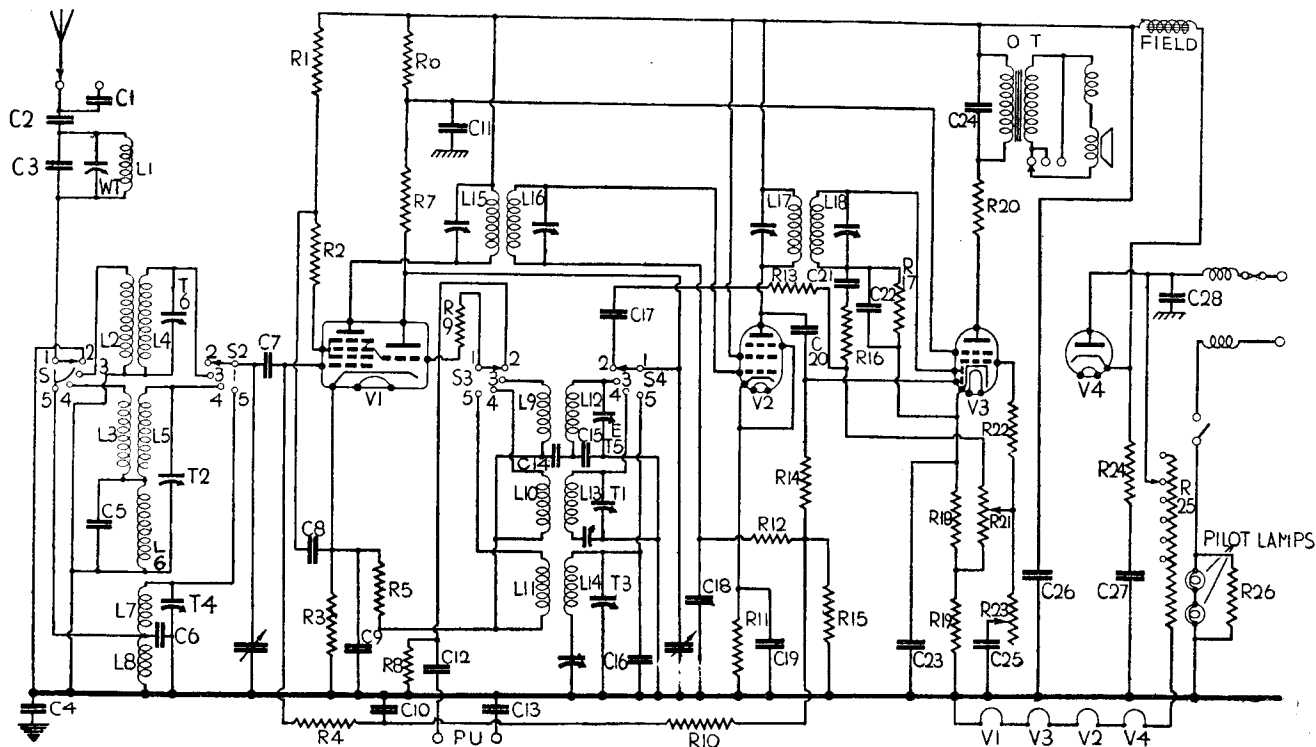
RESISTANCES

R.	Purpose.	Ohms.
1	V1 screen pot. (part) ..	10,000
2	V1 screen pot. (part) ..	60
3	V1 cathode bias.	200
4	V1 A.V.C. decoupling (part)	1 meg.
5	Osc. grid return	25,000
6	Osc. anode and V3 screen de-	
7	coupling	2,000
8	Osc. anode load (gram.) . . .	40,000
9	V1 triode grid load (gram.) .	250,000
10	Osc. grid stopper	60
11	V1 A.V.C. decoupling (part) .	1 meg.
12	V2 cathode bias	30
13	V2 A.V.C. decoupling	1 meg.
14	H.F. stopper	100,000
15	A.V.C. diode load (part) . . .	250,000
16	A.V.C. diode load (part) . . .	750,000
17	H.F. stopper	100,000
18	Demodulating diode load . . .	500,000
19	V3 cathode bias (part)	115
20	V3 cathode bias (part)	140
21	V3 anode stabiliser	60
22	Volume control	1 meg.
23	V3 grid stopper	1,000
24	Tone control	2 meg.
25	Rect. safety resistance	55
26	Mains adjustment	645
26	Dial lamps shunt	55

VALVE READINGS

No signal. Volume maximum. M.W. min. cap 230 volt A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
1	All Mazda TH/2320 ..	Anode ..	170	3
		Screen ..	85	7.5
		Osc. anode ..	70	1.7
2	V.P. 1322	Anode ..	170	11
		Screen ..	170	2.6
3	Pen.D.D./4021.	Anode ..	150	48
		Screen ..	140	10.4
4	U. 4020 ..	Cathode ..	225	—



In the Ultra 202 circuit the triode section of the frequency changer is used as the pick-up input stage.

For more information remember
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mains adjustment resistance. The two nuts should then be removed from the chassis securing brackets at the front.

Undo the three bolted clips securing the speaker and the chassis, speaker and mains adjustment resistance may be then completely removed.

If the chassis is operated externally, care should be taken to prevent short circuits of the speaker and mains adjustment resistance, etc.

Special Notes.—Two aerial sockets are provided at the rear of the chassis, one connecting a series condenser.

Sockets provide connections for a pick-up and for a low-impedance permanent-magnet extension speaker. To silence the internal speaker the wander plug near the L.S. sockets should be withdrawn.

Two dial illumination lights are mounted in screw-in holders clipped one each side of the wavelength scale. They are rated at 4.5 volts .3 amp., and have M.E.S. bases.

A 750 ma. fuse of the cartridge type, located at the rear of the chassis deck, is connected in one of the mains leads.

Under certain conditions the chassis is "live."

Alignment Notes

I.F. Circuits.—Connect an output meter across the primary of the speaker transformer and, if necessary, insert a 2 mfd. condenser in series with one of the output meter leads. Switch set to M.W. band, turn gang to maximum, volume to maximum, and tune to "high." Connect a service oscillator between the top grid cap of V1 and chassis.

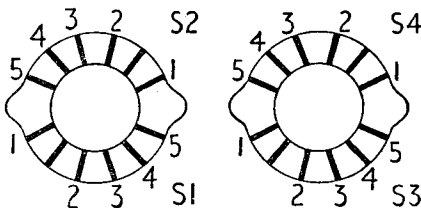
(Continued on page 42)

WINDINGS (D.C. Resistances)

Winding.	Ohms.	Range.	Measured between.
L1	3.8	—	Across C3.
L2	Below .1	SW	S1—1 and chassis.
L3 and L6	16	MW	S1—1 and chassis.
L4	Below .1	SW	S2—1 and chassis.
L5 and L6	18.3	MW	S2—1 and chassis.
L7 and L8	51	MW	S2—1 and chassis.
L8	31.4	LW	S1—1 and chassis.
L9	.1	SW	S3—1 and R5.
L10	1.1	MW	S3—1 and R5.
L11	1.2	LW	S3—1 and R5.
L12	.1	SW	S4—1 and C15 + C14.
L13	6	MW	S4—1 and P1.
L14	17	LW	S4—1 and P2.
L15	12	—	Anode V1 and H.T. line.
L16	11	—	Top grid V2 and C18.
L17	10	—	Anode V2 and H.T. line.
L18	10.5	—	C 21 and diode V3.
O.T. prim.	380	—	R20 and H.T. line.
Field	630	—	Cathode V4 and H.T. line.
Mains chokes.	2	—	Across component.

CONDENSERS

C.	Purpose.	Mfds.
1	Series aerial	.00005
2	Series aerial	.01
3	Wave trap fixed trimmer	.002
4	Chassis isolator	.1
5	Aerial coupling	.004
6	Aerial coupling	.002
7	V1 grid isolator	.0002
8	V1 screen decoupling	.1
9	V1 cathode bias shunt	.1
10	V1 A.V.C. decoupling	.05
11	V3 screen and osc. anode decoupling	4
12	Pick-up coupling	.1
13	Pick-up isolator	.1
14	Osc. grid condenser S.W.	.0002
15	S.W. osc. fixed padder	.004
16	L.W. osc. fixed trimmer	.00001
17	L.F. coupling (gram.)	.004
18	V2 A.V.C. decoupling	.05
19	V2 cathode bias shunt	.00001
20	A.V.C. diode coupling	.004
21	L.F. coupling	.0002
22	H.F. bypass	.0002
23	V3 cathode bias shunt	25
24	Pentode compensator	.004
25	Tone control	.002
26	H.T. smoothing	32
27	H.T. smoothing	16
28	Mains suppressor	.1



Ultra 202 on Test

MODEL 202.—Standard model for universal operation, 195-255 volts and A.C., 40-60 cycles. Price 9/ gns.

DESCRIPTION.—Three-valve, plus rectifier, three-band superhet table model.

FEATURES.— Full-vision "air-plane" scale calibrated in metres and station names. Sloping top cabinet with speaker situated under chassis. Controls for tuning, combined volume and master switch and tone control all at side of cabinet. Wave selection switch on front. Sockets for pick-up and extension L.S. with control of internal speaker.

LOADING.—59 watts.

Sensitivity and Selectivity

SHORT WAVE (16.8-52 metres).— Good sensitivity and adequate selectivity. Gain well maintained, easy handling.

MEDIUM WAVE (195-550 metres).— Average sensitivity, good selectivity. Gain well maintained at the top of the band. Local stations spread on adjacent channels.

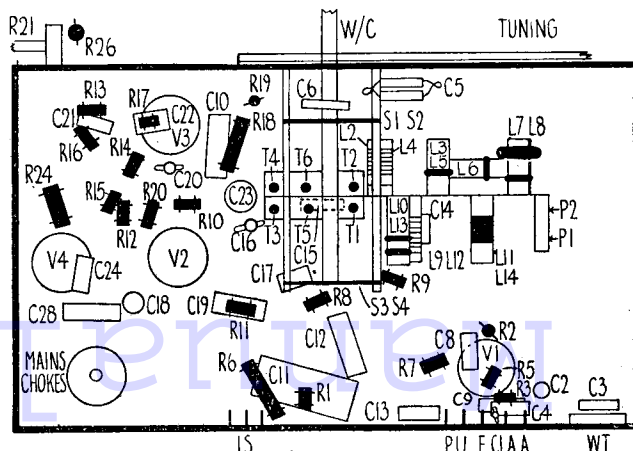
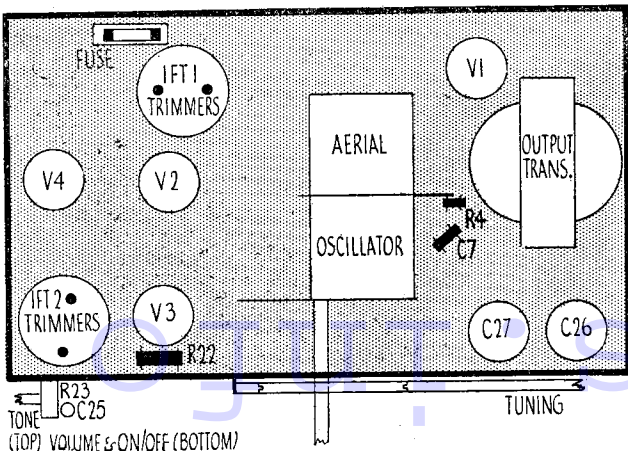
LONG WAVE (900-2,000 metres).— Good sensitivity and selectivity. Certain amount of interference on Deutschlandsender. All main stations easily received.

Acoustic Output

Good tone with little colouration on speech, low-note radiation being very pleasing. Well-balanced reproduction on orchestral items and a good amount of high-note response with a not too vigorous tone control.

Replacement Condensers

EXACT replacement condensers for the Ultra Model 202 are available from A. H. Hunt, Ltd., of Garratt Lane, Wandsworth, London, S.W.18. These are: for C26, unit 2,989A, at 7s. 6d.; for C27, unit 2,868A, at 6s.; and for C11, unit 2,546, at 2s. 3d.



Left, the layout of the top deck of the Ultra 202 chassis and right the underside component layout. On top is the switch contact diagram.

DECCA MODEL PT/ML PRESTOMATIC

(Continued from page 41.)

Although T1 and T3, the medium- and long-wave oscillator trimmers, are shown for the sake of clarity directly across the oscillator coils in the circuit, they are actually on the trimmer assembly strip.

Alignment Notes

Alignment operations should be carried out with the chassis in the cabinet where access may be obtained to all trimmers.

I.F. Circuits.—Connect an output meter across the primary of the speaker transformer. Turn gang to maximum capacity and press the medium-wave manual knob fully in. Turn volume control to maximum and tone control to high position. Connect a service oscillator between the top grid cap of V1 and chassis.

Tune the service oscillator to 456 kcs. and adjust first the trimmers of I.F.T.2 and then I.F.T.1 for maximum, reducing the input from the oscillator as the circuits come into line. This must be done to prevent the A.V.C. action giving misleading results.

Signal Circuits.—Connect the service oscillator to the A and E sockets via a dummy aerial. Only feed sufficient input to obtain reliable peaks in the output meter, and reduce the input as the circuits come into line.

Medium Waves.—Press medium-wave manual button fully in. Tune set and oscillator to 200 metres (1,500 kc.) and adjust T1 and then T2 for maximum.

The padding is fixed, but check at 550 metres.

Long Waves.—Press long-wave manual button fully in. Tune set and oscillator to 1,000 metres (300 kc.), and adjust T3 and then T4 for maximum.

The long-wave padding is fixed, but check at 2,000 metres.

Press-button Alignment

Remove service oscillator and output meter, and connect an external aerial and earth, placing the cabinet on its side so as to obtain access to the trimmer panel through the false bottom.

Each button should be calibrated on the station it is to receive. For example, press the button inscribed London Regional, adjust the oscillator trimmer

(see sketch) to bring in the station, and then adjust the aerial trimmer to obtain maximum volume.

If desired, the station may be tuned in with the oscillator trimmer, the aerial and earth system removed, and a service oscillator, tuned to the frequency of the station concerned, connected in its place, and the aerial trimmer adjusted to give maximum volume. This prevents operation of the A.V.C. if the input is kept down. However, for all practical purposes, it will be found satisfactory to adjust the trimmers on the stations themselves.

ULTRA MODEL 202

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Tune service oscillator to 470 kc. and adjust the trimmers of I.F.T.2 and then I.F.T.1 for maximum response, reducing the input from the oscillator as the circuits come into line to keep the A.V.C. inoperative.

Signal Circuits.—Adjust the tuning pointer to lay between the two cream horizontal dial lines when the gang is fully closed.

Connect the service oscillator to the A and E sockets via a dummy aerial. To prevent operation of the A.V.C., only feed sufficient input to obtain reliable peaks in the output meter.

Medium Waves.—Tune set and oscillator to 200 metres (1,500 kc.), and adjust T1 and then T2 for maximum.

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

Repeat both operations until no further improvement results.

Long Waves.—Tune set and oscillator to 1,300 metres (230 kc.), and adjust T3 and then T4 for maximum response.

Tune set and oscillator to 1,700 metres (176.5 kc.), and adjust P2 for maximum simultaneously rocking the gang.

Repeat both operations until no further improvement results.

Short Waves.—Tune set and oscillator to 17 metres, screw T5 right up, unscrew until the second peak is heard, then adjust T6 for maximum response.

The short-wave padding is fixed, but check calibration at 30 and 51 metres.

I.F. Wavetrap.—Inject a strong signal of 470 kc., tune set to 950 metres and adjust W.T. trimmer for minimum response in the output meter.

Tune service oscillator to 464 kcs., and adjust the trimmers of I.F.T.2 and then I.F.T.1 for maximum, reducing the input from the service oscillator as the circuits come into line to keep below the point at which the A.V.C. begins to operate.

Signal Circuits.—The wavelength pointer should coincide with the right-hand vertical line on the dial when the gang is fully closed.

Connect the service oscillator to the A and E sockets via a dummy aerial, only feeding sufficient input to obtain reliable peaks in the output meter.

Medium Waves.—Tune set and oscillator to 214 metres (1,400 kcs.), this is marked with a small dot on the M.W. scale, and adjust T1 and then T2 for maximum response.

Tune set and oscillator to 500 metres

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be found running across the coil former, and this loop must be bent up or down until maximum output is obtained.

It may be necessary to remove the coil can to identify the loop, but final adjustments must be made with the can in position and properly secured. Then recheck at 18 metres.

Medium Waves.—Tune oscillator to 195 metres (1,538.5 kc.), set gang to minimum capacity and adjust T3 for maximum response.

Tune service oscillator to 225 metres (1,333 kc.), tune in on receiver and adjust T4 and then T5 for maximum.

Tune service oscillator to 530 metres (566 kc.) and adjust P1 for maximum, at the same time rocking the gang.

Return to 195 metres and check setting of T5. **Long Waves.**—Tune oscillator to 725 metres (413.8 kc.), set gang to minimum and adjust T6 for maximum.

Tune oscillator to 800 metres (375 kc.), tune in on receiver and adjust T7 and T8 for maximum.

Tune oscillator to 1,900 metres (158 kc.), tune in on receiver and adjust P2 for maximum, simultaneously rocking the gang.

Check setting to T6 at 725 metres and then return to medium waves and go through entire M.W. and L.W. alignment again.

WINDINGS (D.C. Resistances)

Windings.	Ohms.	Range.	Measured between.
L1 .. ..	.1	SW	Top grid V1 and tag 1 S1.
L1+L2 ..	6	MW	Top grid V1 and tag 1 S1.
L1+L2+L3	20	LW	Top grid V1 and tag 1 S1.
L5 .. ..	.1	SW	Anode V1 and tag 23 S1.
L6	5.5	MW	Tag 25 and tag 23 S1.
L7	14	LW	Tag 23 and tag 24 S1.
L8 .. ..	.1	—	Cathode V1 and chassis.
L9 .. ..	.1	—	Across T1.
L10	5.5	—	Across T3.
L11	4.2	—	Across T6.
L12+L13+L14	6	—	Osc. anode V2 and R8.
L16	5	—	Anode V2 and screen V5.
L17 R24 ..	5	—	Top grid V3 and yellow / black lead IFT1.
L18	5	—	Anode V3 and red lead IFT2.
L19 R10 ..	500,000	—	Diode and cathode V4.
CK1	1,600	—	Tags 5 and 6 L.S.
O.T. prim.	400	—	Red and yellow leads from transformer.
M.T. prim.	26	—	Terminals M and 195/223 volts.
Total HT sec.	630	—	Anode pins V6.

KOLSTER-BRANDES 652

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cuit on the medium- and short-wave bands.

As the chassis is of the universal type, under certain conditions the chassis is "live" and should not be connected to earth.

Alignment Notes

I.F. Circuits.—Connect an output meter across the primary of the output transformer, taking the precaution of inserting a 2-mfd. condenser in series with one of the meter leads. Switch set to M.W. band, turn gang to maximum and volume to maximum. Connect a service oscillator between the top grid cap of V1 and chassis, leaving set connection made.

Tune service oscillator to 464 kcs., and adjust the trimmers of I.F.T.2 and then I.F.T.1 for maximum, reducing the input from the service oscillator as the circuits come into line to keep below the point at which the A.V.C. begins to operate.

Signal Circuits.—The wavelength pointer should coincide with the right-hand vertical line on the dial when the gang is fully closed.

Connect the service oscillator to the A and E sockets via a dummy aerial, only feeding sufficient input to obtain reliable peaks in the output meter.

Medium Waves.—Tune set and oscillator to 214 metres (1,400 kcs.), this is marked with a small dot on the M.W. scale, and adjust T1 and then T2 for maximum response.

Tune set and oscillator to 500 metres

(600 kcs.) and adjust P1 for maximum, simultaneously rocking the gang. P1 is the nut of the double padding condenser.

Repeat both operations until no further improvement results.

Long Waves.—Tune set and oscillator to 1,200 metres (250 kcs.) and adjust T3 and then T4 for maximum.

Tune set and oscillator to 1,714 metres (175 kcs.), also marked with a dot, and adjust P2 for maximum, simultaneously rocking the gang.

Repeat both operations.

Short Waves.—Tune set and oscillator to 17.6 metres (17 mcs.) and adjust T5 and T6 for maximum response.

The short-wave padding is fixed, but check at 50 metres (6 mcs.), and if any appreciable error is found then compensate with T5 to halve the error.