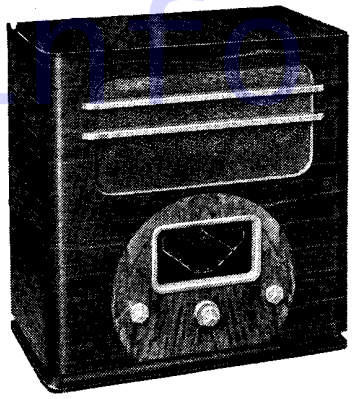
ULTRA 49 A.C.-D.C. SUPERHET 5



Four valves and a rectifier are used in the Ultra 49 superhet for A.C. or D.C. mains. The receiver covers three wavebands, the short section extending from 16.8 to 50 metres.

CIRCUIT.—The aerial is transformer-coupled to the grid of V1, an H.F. pentode, which acts as an amplifier. The output passes to V2, a triode-hexode frequency changer, and thence through an I.F. transformer to the I.F. amplifying valve, V3, another H.F. pentode.

The signal passes to V4, a double diode pentode, where it is demodulated by one diode, the other diode providing A.V.C. in the usual manner. The pentode section of the valve amplifies the demodulated signal and feeds it to the speaker.

Mains equipment consists of half-wave rectifier, smoothing condensers and smoothing choke. The receiver is designed to work on 200-255 volts D.C. or A.C. (40/100 cycles).

Special Notes.—The dial lights are two Osram bulbs rated at 4.5 volts, and each consumes .3 amp. They are fixed in screw-in holders clipped on to the end of the dial assembly.

Fixed condensers C8, C9 and resistances R3 and R8 are inside the H.F. coil can. C18, R17, R18, R19 and R23 are inside the second I.F. transformer can, and R1 inside the aerial coil can.

An external speaker can be used with the set, plug and socket connections being provided. A permanent magnet speaker having a speech-coil impedance of between 2 and 4 ohms should be used. By removing the single plug connection to the internal speaker, the external speaker only can be used.

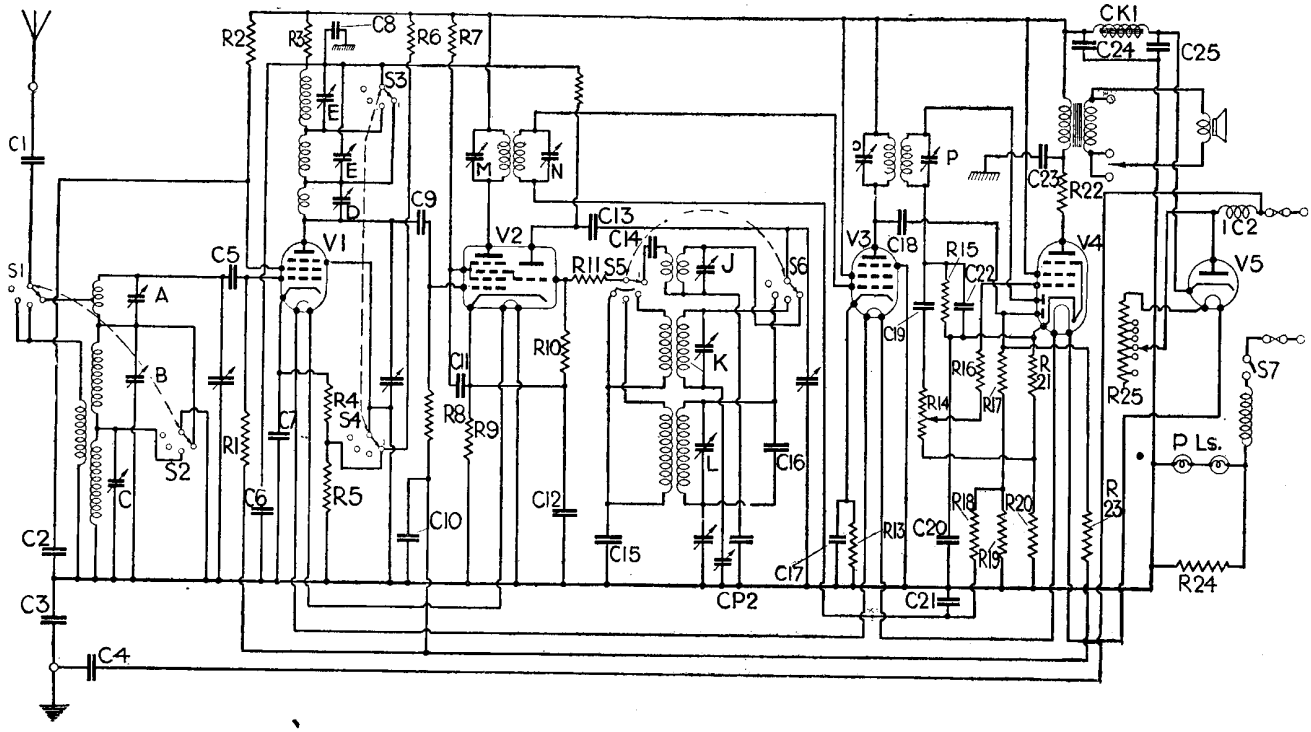
Chassis Removal.—Remove the six screws fixing the back and the four control

RESISTANCES

R.	Purpose.	Ohms.
1	V1 bias feed	1 meg.
2	V1 screen decoupling	30,000
3	V1 anode and V2 osc. anode decoupling.	4,000
4	V1 cathode bias potr. (part)	138
5	V1 cathode bias potr. (part)	6,000
6	V1 cathode bias potr. (part)	80,000
7	V2 screen decoupling	30,000
8	V2 grid leak	1 meg.
9	V2 cathode bias	200
10	Oscillator grid leak	25,000
11	Regeneration modifier	60
12	Oscillator anode feed	40,000
13	V3 cathode bias	30
14	Volume control	1 meg.
15	Signal diode load	500,000
16	V4 pentode section, grid stopper.	1,000
17	A.V.C. diode load (part of)	250,000
18	V3 A.V.C. decoupling	1 meg.
19	A.V.C. diode load (part of)	750,000
20	V4 cathode bias (part of)	110
21	V4 cathode bias (part of)	110
22	V4 anode stabiliser	60
23	V1, V2, A.V.C. decoupling	1 meg.
24	Pilot lamp shunt	80
25	Mains voltage adjustment	520

CONDENSERS

C.	Purpose.	Mfds.
1	Series aerial	.004
2	V1 screen decoupling	.1
3	Chassis isolating	.1
4	Mains interference filter	.1
5	V1 grid isolating	.0001
6	V1 anode and V2 osc. anode	2
7	V1 cathode shunt	.5
8	V1 anode short wave decoupling.	.01
9	V2 grid	.0001
10	V2 A.V.C. decoupling	.05
11	V2 screen decoupling	.1
12	V2 cathode shunt	.5
13	Oscillator anode coupling	.0001
14	Oscillator short-wave grid coupling.	.0001
15	M. and L.W. grid condenser	.001
16	Long-wave osc. shunt	.0001
17	V3 cathode shunt	.1
18	A.V.C. diode coupling	.0001
19	L.F. coupling	.01
20	V4 cathode shunt	50
21	V3 A.V.C. decoupling	.05
22	Diode load H.F. by-pass	.0002
23	Pentode compensator	.01
24	H.T. smoothing	16
25	H.T. smoothing	8



A straightforward superhet circuit is used in the Ultra 49. A radio frequency amplifier precedes the triode-hexode frequency changer. As a combined diode and output valve is employed, the set actually corresponds to many "sixes."

knobs on the panel, which are fixed by grub screws.

Then turn the set on one side and remove the two wood strips covering the chassis bolt heads. The chassis bolts and washers can then be removed, making the chassis free to the extent of the speaker leads.

If it should be found necessary to completely remove the chassis from the cabinet it will be found easier to remove the speaker rather than use an external speaker for testing. The speaker is held by three clips secured by ¼ in. Whitworth bolts.

VALVE READINGS

No signal. Volume maximum. 200 volts A.C. mains.

V.	Type.	Electrode.	Volts.	Ma.
	All Mazda.			
1	VP1321 met. (7).	Anode ..	150	.46
		Screen ..	155	.2
2	TH2320 met. (7).	Anode ..	170	2
		Screen ..	55	3.8
		Osc. anode	60	2
3	VP1321 met. (7).	Anode ..	170	13
		Screen ..	170	3.5
4	Pen. 4020DD (7).	Anode ..	170	32
		Screen ..	170	6.5
5	U4020 (5) ..	Filament..	20.0	—

Ultra 49 on Test

MODEL 49. Standard model for A.C. or D.C. mains, 200-250 volts (40-100 cycles). Price 14½ gns.

DESCRIPTION. — Three waveband, four-valve plus rectifier, table type universal superhet.

FEATURES.—Controls for tuning, waveband and volume. Full-vision dial calibrated in wavelengths and station names.

LOADING.—60 watts.

Selectivity and Sensitivity.

SHORT WAVES (16.8-50 metres).—Sensitivity and selectivity up to standard. Concentric tuning makes for easy handling with no appreciable oscillator drift.

MEDIUM WAVES (200-550 metres).—Good gain and reasonable selectivity. Locals spread to adjacent channels. Reasonable quiet background.

LONG WAVES (900-2,000 metres).—Representative gain and selectivity sufficient to give all usual stations.

Acoustic Output.

Representative balance and tone, with ample volume for a large room.

Circuit Alignment Notes

I.F. Circuits.—With the gang condenser at maximum, connect an output meter across the external speaker sockets.

Inject a modulated oscillator signal of 465 kc. between the aerial socket and earth. Adjust I.F.T.1, I.F.T.2, I.F.T.3, and I.F.T.4, in that order, for maximum response on output meter, reducing the input as the circuits come into line to render the A.V.C. inoperative.

Medium Waves.—Before adjustments are made, confirm that the pointer of the set coincides with the top left-hand white line of the scale with the gang condenser at maximum.

Turn the pointer to 200 metres (1,500 kc.) and inject a signal of the same wavelength. Adjust the oscillator trimmer K, and trimmers E and B, for maximum response on output meter.

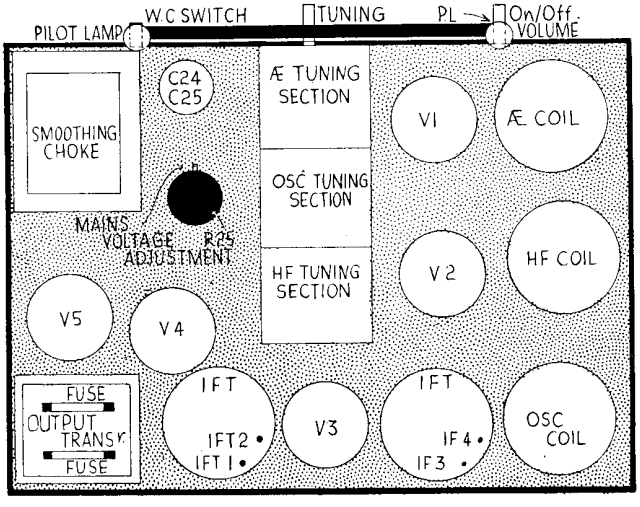
Tune the set to 500 metres (600 kc.) and inject a signal of 500 metres. Adjust CP2 for maximum response, rocking the gang simultaneously through the tuning point to ensure maximum setting.

Long Waves.—Turn the set pointer to 950 metres (316 kc.) and inject a signal of 1,000 metres (300 kc.).

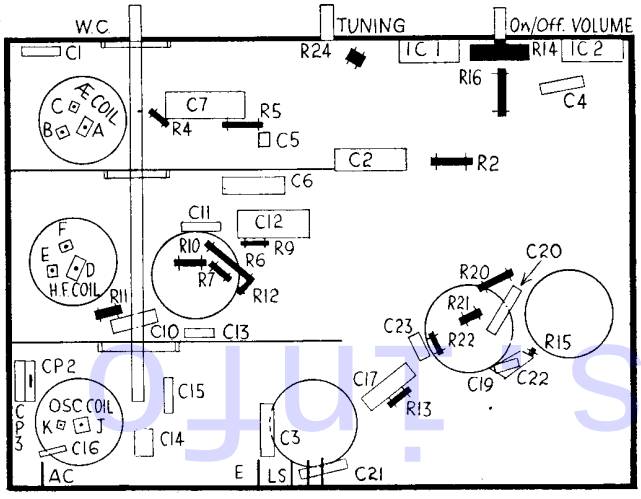
Adjust the oscillator trimmer L, and trimmers F and C for maximum response.

Tune the set to 1,700 metres (176.4 kc.) and inject a signal of that wavelength and adjust CP3 for maximum response, rocking the gang condenser through the tuning point to ensure maximum setting.

Short Waves.—Tune the set to 17.1 metres and inject a signal of 17.1 metres (17.55 mc.). Screw trimmer J right home, then unscrew it slowly until the signal is heard a second time, and adjust A and D for maximum response.



As the tinted "top deck" diagram (right) shows, the parts on the Ultra chassis are arranged in logical order. An interesting point is that the output transformer is carried on the chassis. Mounted on this are the mains fuses—two Bulgin 750 ma. types.



With the aid of this diagram components under the chassis can be identified easily. All resistors are in solid black, and condensers in outline. Trimmers are accessible at the bases of the coil cans.

Replacement Condensers

Exact replacement condensers for this receiver are available from A. H. Hunt, Ltd., of Garratt Lane, Wandsworth, London, S.W.18. These are a unit containing Cs 24 and 25, list number 3603, price 9s.; a cardboard tubular C6, list 2964, price 1s. 10d ; and a bias type, C20, list 2915, price 1s. 9d.

WHEN TESTING—

WHEN testing components in a receiver, the possibility that the connection of the testing appliance itself—say, a voltmeter—may give misleading results should always be borne in mind.

For example, the connection of a meter across a suspect resistance may itself complete the circuit, and a reading may be obtained even if the resistor itself has broken down.

In most cases, of course, the engineer has an idea of the resistance of his meter and a few moments' consideration will enable him to decide if a reading is genuine or spurious.

Another reason why careful thought should be given to each test is that a component may be in parallel with other components.

Remembering this possibility, an experienced engineer can sometimes check several resistances by a single measurement. A glance at the circuit and a simple exercise in mental arithmetic can enable him to decide what the resultant resistance of a whole network should be.