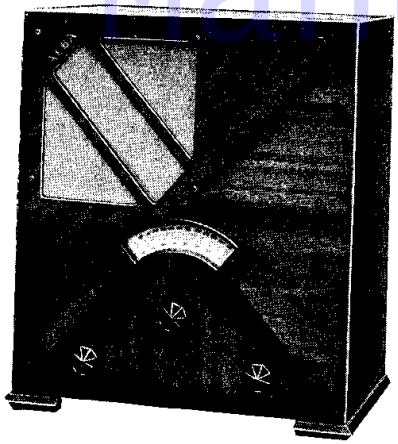
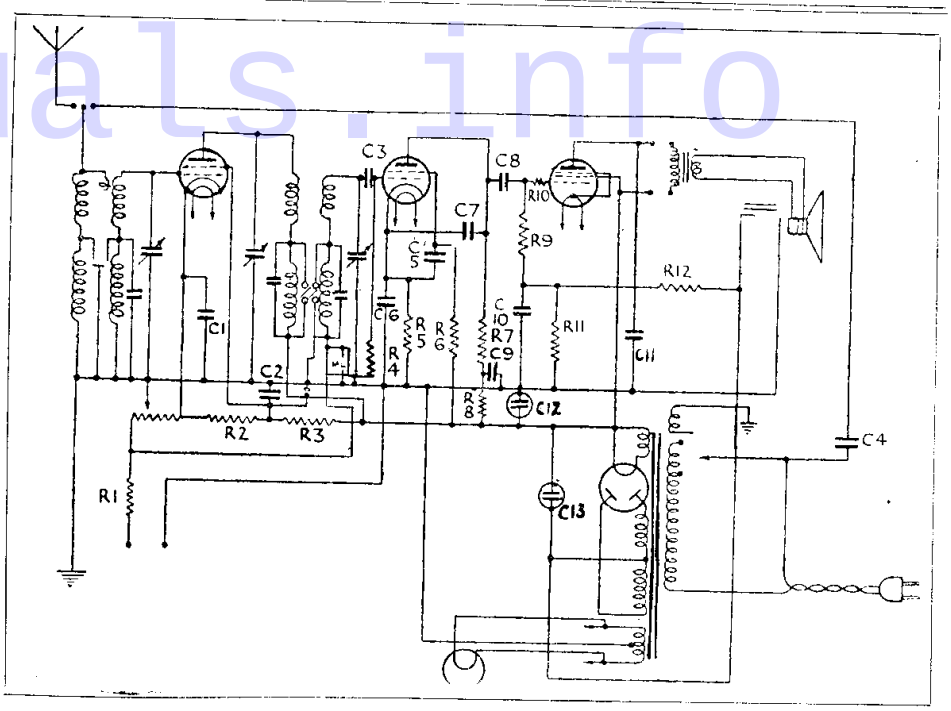
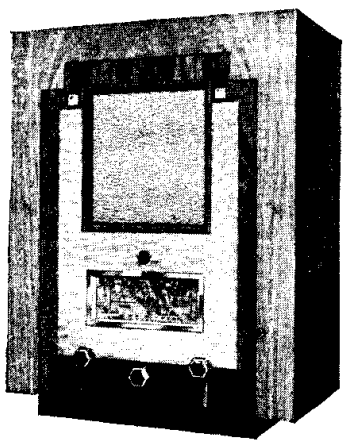
ALBA 52 A.C. MAINS THREE (Cont.)



The Alba 52A.C. is a product of A. J. Balcombe, Ltd. On the right is the circuit, which utilises pentodes in H.F., detector and output stages. It is interesting to note that the band-pass tuning circuits are between the H.F. and detector valves.



FERRANTI ARCADIA FOUR-VALVE MAINS SUPERHET



A "five-point" tuning dial is one of the foremost characteristics of the Arcadia receiver made by Ferranti, Ltd.

Circuit.—The first valve VHT4 (V1) is a heptode, and a band-pass aerial circuit precedes it. The conversion is obtained by electronic mixing in the valve, and reaction is applied between the oscillator anode and grid. Coupling to the next valve is by band-pass I.F. transformer (frequency 125 kc.), and bias is obtained partly by cathode resistance, and partly from the A.V.C. line.

The I.F. valve, VPT4 (V2), an H.F. pentode, operates with bias partly fixed and partly controlled from the A.V.C. line.

For the second detector, an H4D double diode is used. One diode anode is used for rectification for L.F. purposes and the other for A.V.C. The load on the former consists of R10 and R11, with C12 as the L.F. coupling and the A.V.C. potentiometer is formed by R7, R8 and R9. Bias for the triode section is obtained by cathode resistance R14 and "delay" from the H.T. potentiometer R19, R20, R21 and R22, from which the various screen potentials are taken.

Coupling to the output valve is by resistance-capacity with tone correcting transformer. The grid leak of the triode section is a variable potentiometer, which forms an L.F. volume control. A variable resistance R16 in series with a condenser between the anode and chassis gives the control.

The output valve LP4 (V4) is a triode. Bias is obtained from a potentiometer across the L.S. field, which is in the negative H.T. lead. The speaker is the standard Ferranti D4.

Mains equipment consists of transformer, full-wave rectifier, and the L.S. field is used for smoothing in conjunction with two 8 mfd. condensers.

Special Notes.—A switch at the back of the set can disconnect the speech coil of the internal speaker.

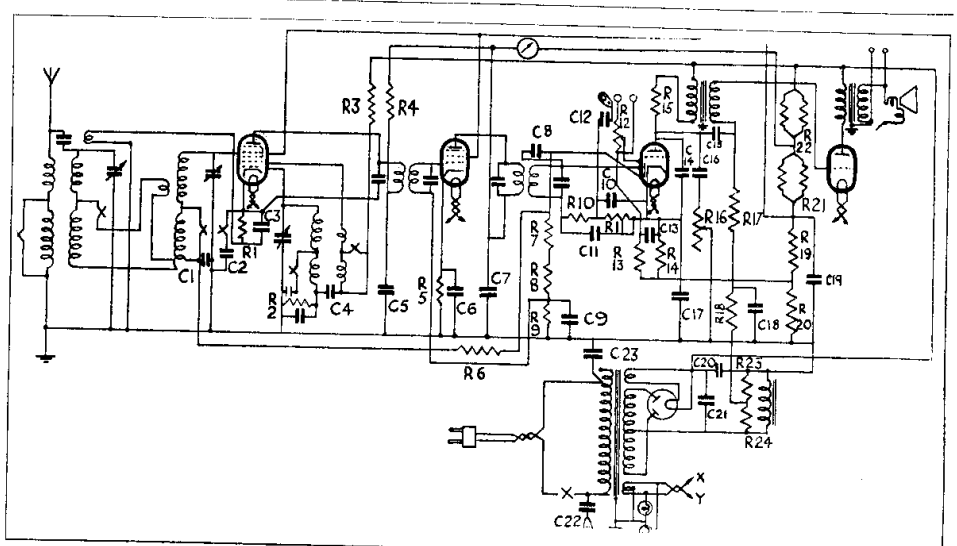
The wave-change switch, the tone control and the volume control are provided with indicators. These are controlled by means of cords passing round the respective spindles and working against springs on the pointers. Visual tuning indication consists of a milli-ampere meter connected in the common anode lead to the first two valves. This usually gives an indication as to whether or not H.F. and detector valves are working correctly.

In some models the A.V.C. tapping for V1 is taken from the same point as for V2.

Quick Tests.—The upper (front) row of terminals on the panel above the mains transformer are the connections to the speaker. From left to right, looking from the rear, the voltages are (note the polarity): (1) Blue, 110 volts negative (H.T.—); (2) Green, 230 volts positive, V4 anode; (3) Red, 240 volts positive H.T. + smoothed; (4) chassis earth.

Removing Chassis.—Pull off the knobs and remove the four holding screws. Pull the "push on" connectors to the L.S. leads

(Continued on next page.)



The latest types of valves—all Ferranti products—are employed in the Arcadia four-valve A.C. mains superhet.

FERRANTI ARCADIA SUPERHET (Cont.)

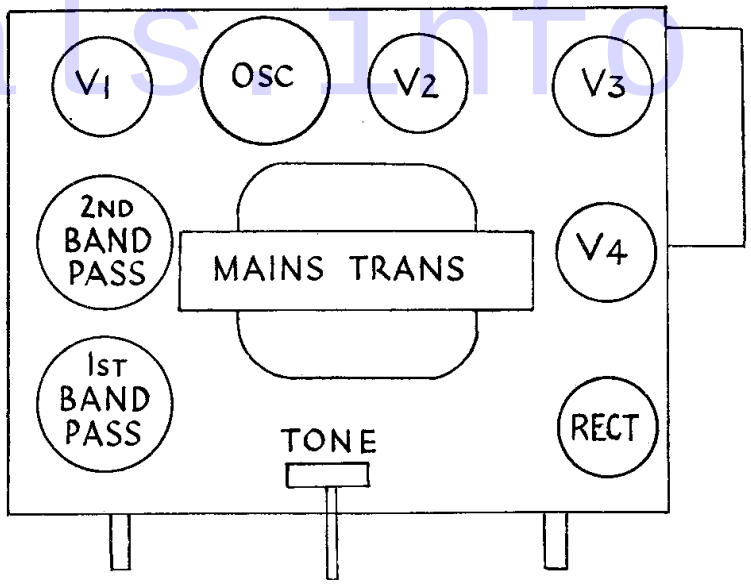
from the panel on the mains transformer and lift the chassis out.

General Notes.—It may be found that the order in which the resistances on the larger panel are given is not the same in which they appear on the lay-out diagram. Before deciding definitely, a comparison between the code value and that given in the resistance table should be made.

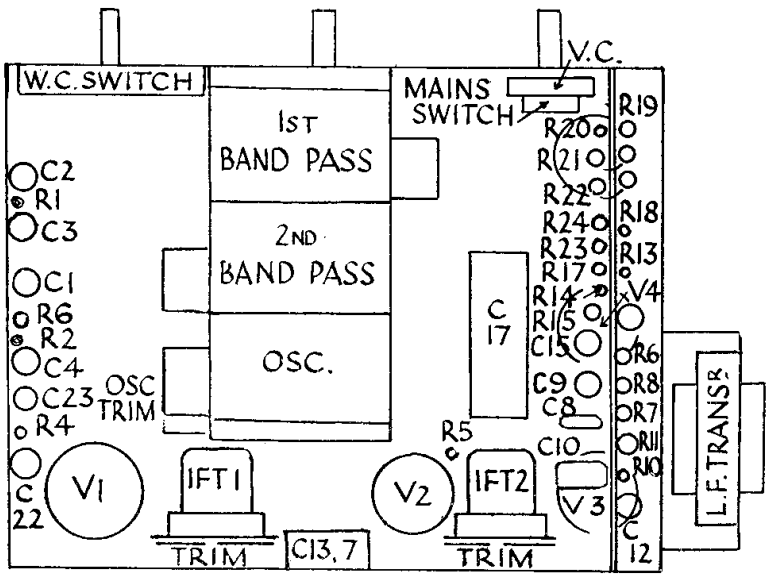
The tone, volume and switch control cords are fixed to collars which are easily adjusted by loosening the grub screws and tightening in the correct position.

Replacing the Chassis.—See that rubber supports are in position and that control cords have not been disturbed. Lay chassis inside cabinet and connect the L.S. leads. These are colour-coded (looking from rear and left to right: Blue, green, red, black). Replace holding screws and push the knobs on to the spindles.

If in an A.V.C. set, the visual tuning indicator functions the H.F., I.F. and detector valves must be in working order.



Cords attached to the various drives operate the indicators provided in the five-point dial fitted to the Arcadia. An unusual feature is the placing of the mains transformer in the position usually occupied by the tuning condenser.



The resistances on the larger panel are not always in the order shown here, and it is as well to check their values by means of the colour code, which is, of course, the R.M.A. standard.

CONDENSERS

C.	Purpose.	Mfd.
1	Decoupling bias to V1	.05
2	Direct H.F. cathode return on L.W.	.02
3	V1 cathode condenser feeding suppressor coil	.02
4	Decoupling osc. anode V1	.01
5	Decoupling V1 anode	.1
6	V2 cathode	.1
7	Decoupling V2 anode	.1
8	H.F. feed to A.V.C. diode anode	.0005
9	Decoupling A.V.C. to V2	.05
10	H.F. by-pass from detector diode	.00015
11	Across diode load	.00015
12	L.F. feed to V3 grid	.01
13	Decoupling to V3 grid	.25
14	V3 anode by-pass	.0003
15	Part of tone control circuit	.02
16	Part of tone control circuit	.05
17	V3 cathode	1 el.
18	Decoupling V4 grid	.25
19	Decoupling H.T. to V1 and V2 screens	.1
20	H.T. smoothing	8 el.
21	H.T. smoothing	8 el.
22	Mains aerial	.002
23	H.F. by-pass from mains	.002

RESISTANCES

R.	Purpose.	Ohms.
1	V1 cathode bias	300
2	Across L.W. coil in osc. grid	50,000
3	Voltage dropping to V1 osc. anode.	100,000
4	H.F. decoupling V1 anode	1,000
5	V2 cathode bias	450
6	Decoupling A.V.C. to V1	1 meg.
7	A.V.C. ptr.	2 meg.
8	A.V.C. ptr.	2 meg.
9	A.V.C. ptr.	1 meg.
10	H.F. stopper to diode load	100,000
11	Diode load	500,000
12	V3 grid leak (V.C. ptr.)	1 meg.
13	Decoupling V3 grid	100,000
14	V3 cathode bias	1,700
15	Part of L.F. coupling V3 anode	40,000
16	Tone control (var.)	.5 meg.
17	Series with the L.F. trans. sec.	250,000
18	Decoupling V4 grid	60,000
19	H.T. ptr.	1,300
20	H.T. ptr.	800
21	H.T. ptr., two in parallel	9,000
22	H.T. ptr., two in parallel	3,000
23	Part of bias ptr. across L.S. field	100,000
24	Part of bias ptr. across L.S. field	250,000

VALVE READINGS

No signal.

Valve.	Type.	Electrode.	Volts.	M.A.
1	VHT4	anode	168	1.7
		screen	62	
		osc. anode	82	1.4
2	VPT4	anode	165	3.3
		aux. grid	82	
3	H4D	Triode anode	145	1.7
4	LP4	anode	223*	46

* Note that this reading does not include the bias voltage, as with indirectly heated valves.

Reckoning Wattage

Wattage is usually obtained by multiplying the current passing (in amps.) by the voltage drop.

When, however, the resistance and current are known and the voltage is not, the wattage can be obtained by multiplying the resistance by the current squared. When the current is in milliamps., correct for this by dividing the answer by a million.

SERVICE ENGINEER

FERRANTI ARCADIA ALL-WAVE SUPERHET

CIRCUIT.—A four-valve receiver for operation on A.C. mains, and working on long, medium and short wave ranges.

An inductively coupled band-pass input circuit precedes V1, the frequency changer, on medium and long waves. On short waves an inductively coupled coil is used, the medium and long portions of the assembly that might couple into the short wave coils being shorted out.

Coupling to V2, an H.F. pentode, is through an I.F. transformer, tuned to 125 kc. The coupling between the windings of this transformer is manually variable giving variable selectivity and a certain amount of tone control.

The tuning indicator, which is of the milliameter type, is connected in the anode circuits of V1 and V2.

A second I.F. transformer with fixed coupling is employed between V2 and V3, a double diode triode. One diode is used for demodulation, and the other to supply A.V.C. bias to the preceding valves.

Rectified signals from the demodulator diode pass to the grid of V3 through the volume control.

Signals are then passed to V4, a super power output triode, by means of a resistance and capacity stage, and then through a matching transformer to the moving-coil speaker.

Mains equipment consists of transformer, full-wave rectifier, the speaker field in the negative H.T. lead, and electrolytic condensers.

Special Notes.—The dial lamp is rated at 6 volts .3 amp., and is fitted to the underside of a metal plate, which clips into the top of the dial assembly. The plate may be raised by means of a projecting bar on the right. The bulb is then easily accessible.

Connections for an external speaker are provided on the back of the output transformer. They are on the secondary and an extension speaker should have a voice coil impedance of about 3 ohms.

To adapt this receiver for use with a pick-up a flying lead on the back of the chassis connected to one of the pick-up terminals must be disconnected. This puts out of circuit the L.F. coupling condenser C17.

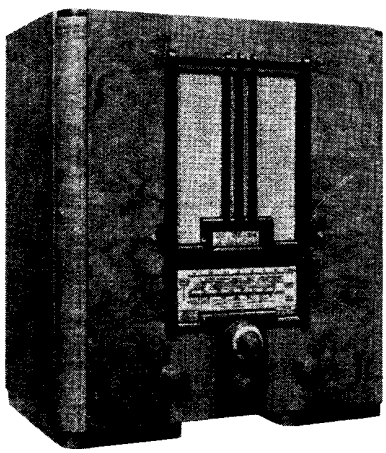
Switch Positions.—On the three wavebands the switches are closed as follows :—

Long waves : 2 and 3 ; 14 and 15 ; 7 and 8.

Medium waves : 2 and 3, 10 and 11 ; 14 and 15 ; 16 and 17 ; 18 and 19 ; 20 and 21 ; 4 and 5 ; 7 and 8.

Short waves : 1 and 2 ; 13 and 14 ; 12 and 24 ; 5, 6 and 7 ; 8 and 9 ; 20, 21, 22 and 23.

Removing Chassis.—Remove the four knobs from the front of the cabinet (spring clips) and four bolts from underneath. The chassis may be removed to the extent of the speaker leads which should be far enough for all ordinary purposes.



The Ferranti Arcadia four-valve plus rectifier superhet incorporates the special optically-projected Magnascopic dial.

VALVE READINGS

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

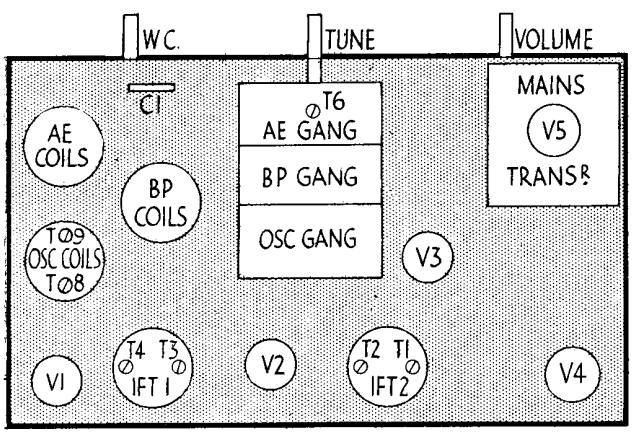
V.	Type.	Electrode.	Volts.	M.a.
1	VHT4 (7) (Ferranti) ..	Anode ..	240	2.5
		Screen ..	90	2.5
		Osc.anode	90	1.7
2	MVS Pen. (7) (Cossor) ..	Anode ..	240	4.5
		Screen ..	90	2.5
3	H4D (7) (Ferranti) ..	Anode ..	155	1.7
4	PX4 (4) (Osram) ..	Anode ..	240	47.5
5	R4 (4) (Ferranti) ..	Filament	240	—

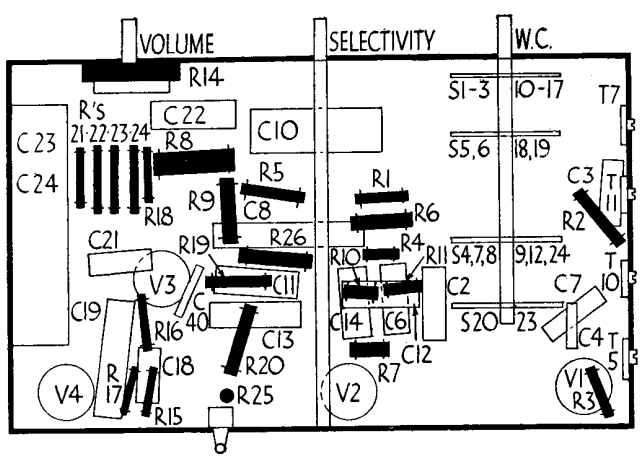
QUICK TESTS

Quick tests are available on this receiver at the terminal strip on the top of the mains transformer.

Volts measured between this and the chassis should be :

Blue, 120 volts (chassis positive).
Green, 230 volts, smoothed H.T.
Red, 240 volts, smoothed H.T.
Black, chassis link.





The arrangement of components on top (left) and inside (right) the Arcadia chassis is clearly shown by these two layout diagrams. Note all resistors are shown in solid black.

FERRANTI ARCADIA ALIGNMENT

I.F. Circuits.—Inject a signal of 125 kc. to the grid of V1 and the chassis, and trim T1, T2, T3 and T4 for maximum reading on an output meter.

Medium Waves.—Inject a signal of 228 metres to the grid of V1, and after fully screwing T5 in, slowly unscrew it until the second peak is reached which is the correct one.

Transfer the oscillator leads to the aerial and earth terminals via a .0002 mfd. condenser, inject the 228 metre signal and adjust T6 and T7 for maximum output.

Inject and tune in a signal of 500 metres and while rocking the tuning condenser adjust T8 for maximum.

Long Waves.—Inject and tune in a signal of 1,807 metres and adjust T9 for maximum.

Short Waves.—Inject and tune in a signal of 19.7 metres (a black line on the

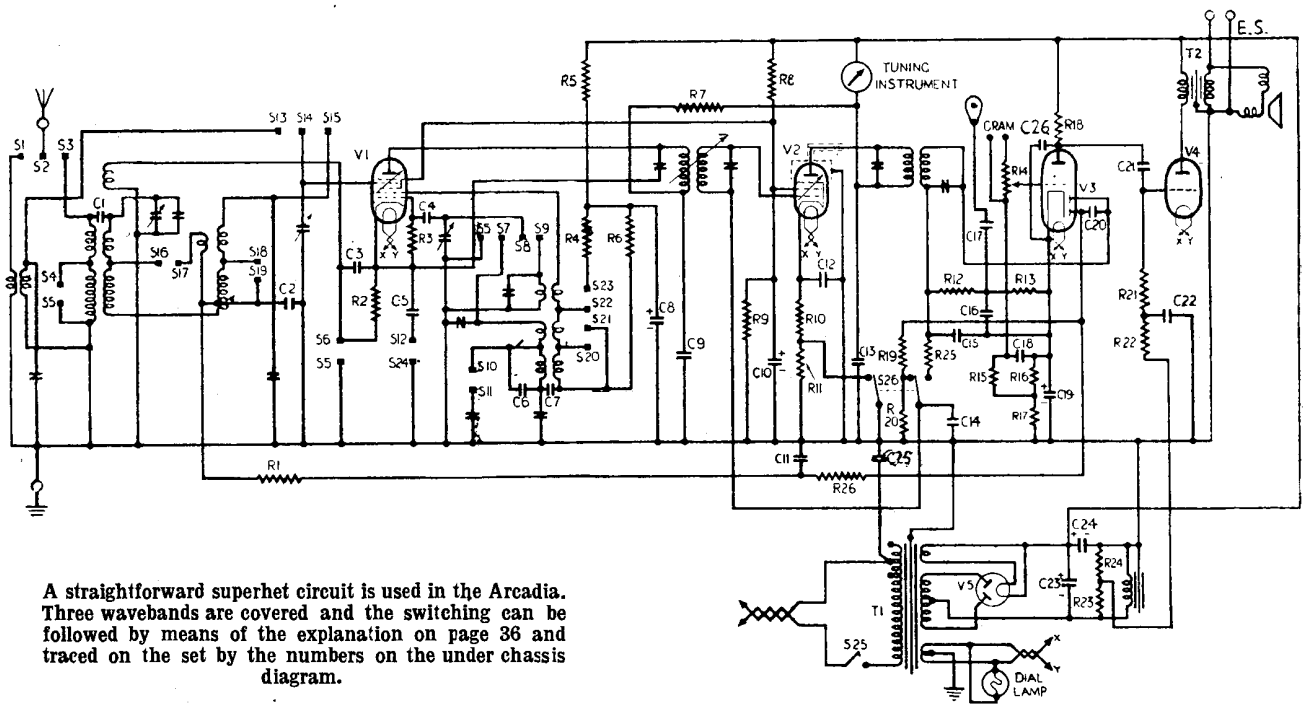
(*Continued on page* 39.)

RESISTANCES

R.	Purpose.	Ohms.
1	V1 A.V.C. decoupling ..	250,000
2	V1 cathode bias	300
3	V1 osc. grid leak	100,000
4	V1 osc. anode feed	1,000
5	V1 osc. anode decoupling ..	30,000
6	V1 osc. anode feed (m. and l.w.)	150,000
7	V1 anode decoupling.. ..	1,000
8	V1 and V2 screen potr. ..	25,000
9	V1 and V2 screen potr. ..	50,000
10	V2 cathode bias	450
11	V2 cathode bias	300
12	H.F. filter	100,000
13	Demodulator diode load ..	500,000
14	Volume control	1 meg.
15	V3 cathode bias decoupling..	100,000
16	V3 auto. bias	1,700
17	A.V.C. delay	3,500
18	V3 anode load	40,000
19	A.V.C. diode load potr. ..	4 meg.
20	A.V.C load potr. ..	1 meg.
21	V4 grid leak	250,000
22	V4 grid potr.	60,000
23	V4 grid bias potr.	250,000
24	V4 grid bias potr.	100,000
25	V2 grid bias feed	250,000
26	A.V.C. decoupling	1 meg.

CONDENSERS

C.	Purpose.	Mfds.
1	Band-pass coupling	.000016
2	Band-pass coupling	.05
3	V1 cathode bias shunt ..	.05
4	V1 osc. grid	.00005
5	V1 cathode bias shunt (s.w.)	.0005
6	V1 osc. corrector (l.w.) ..	.000018
7	V1 osc. anode coupling ..	.01
8	V1 osc. anode decoupling ..	30
9	V1 anode decoupling ..	.1
10	V1 and V2 screen decoupling	4
11	A.V.C. decoupling	.05
12	V2 cathode bias shunt ..	.1
13	V2 anode decoupling ..	.1
14	V2 grid decoupling	.05
15	H.F. by-pass	.00015
16	H.F. by-pass	.00015
17	L.F. coupling	.02
18	V3 grid decoupling	.25
19	V3 cathode bias shunt ..	2
20	A.V.C. diode coupling ..	.00015
21	L.F. coupling	.02
22	V4 grid decoupling	.25
23	H.T. smoothing	8
24	H.T. smoothing	8
25	Mains by-pass	.002
26	H.F. filter	.0003



A straightforward superhet circuit is used in the Arcadia. Three wavebands are covered and the switching can be followed by means of the explanation on page 36 and traced on the set by the numbers on the under chassis diagram.