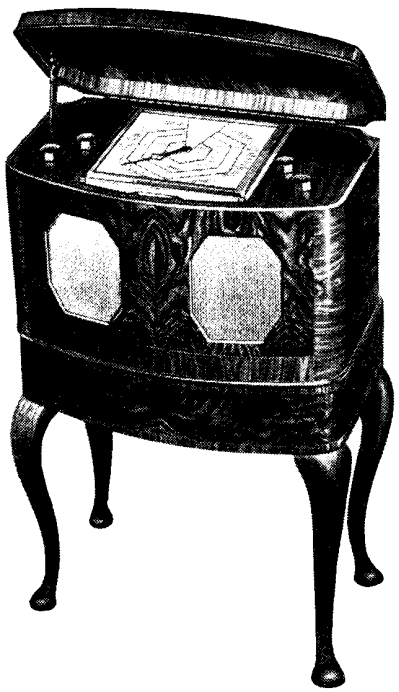
SERVICE ENGINEER

McMICHAEL 135U UNIVERSAL SUPERHET



The 135U by McMichael Radio, Ltd., is an A.C./D.C. three-valve superhet with dual speakers.

CIRCUIT.—The input to V1, a triode-pentode frequency-changer, is an inductively-coupled band-pass filter provided with an image rejector coil. The first I.F. transformer feeds V2, a variable-mu H.F. pentode, a harmonic suppressor choke being included in the grid lead.

The second I.F.T. is connected to the double-diode portion of V3 in an orthodox manner. The A.V.C. diode is fed from the primary of the second I.F.T.

In the pentode section of the output valve there are grid and anode stopper resistances (R14 and R17), and tone is controlled by an anode shunt circuit comprising a variable resistance (RV2) and fixed condenser (C19).

The H.T. circuit includes a U4020 rectifier and a Philips C1 barretter regulates the heater current.

The supply circuit includes an elaborate filter comprising chokes in each lead and a bank of four condensers. For smoothing there is a separate choke in addition to the field winding of the smaller speaker. The larger speaker is fitted with a permanent magnet.

Special Notes.—A sub-baffle assembly carries the twin speakers and also the smoothing circuit consisting of the choke and condenser block, which is connected to the chassis through a multiple cable. The speaker input transformer is carried on the main chassis.

There is no pilot lamp.

Removing Chassis.—First of all remove the front edge of the scale bezel which is held by two coin slot screws. Withdraw the glass, pull off the pointer and (to keep it perfectly clean) take off scale. All the knobs are of the pull-off type.

Felt pads on the bottom cover the fixing screws, which, on removal, free the chassis. This can be lifted out by tilting up the back to allow the pointer shaft to clear the hole. The chassis is then slid out of the cabinet left side first.

Replacing Chassis.—Reverse the removal procedure, but be very careful to ease the pointer shaft through the clearance hole, making sure that the scale is replaced.

After the chassis is screwed back and the knobs replaced tune in the local station and lightly push the pointer on to the arbor. Check the setting at several points and make a slight compromise if necessary, finally pushing the pointer firmly home. The scale glass and bezel are then replaced.

For Circuits and Layouts, see next page.

QUICK TESTS

The terminal strip on the right-hand side of the chassis is available for a quick test without removing the chassis. The volts between the tags and the chassis, with a 200 v. A.C. supply, should be :—

Top lead (F) (red), unsmoothed H.T., 210 volts.

Lead 4 (green), link to chassis only.

Lead 2 (white and black), speech coils.

Lead 1 (black), speech coils.

Bottom lead (F), yellow, smoothed H.T., 180 volts.

VALVE READINGS

V.	Type.	Electrode.	Volts.	M.a.
1	TP 2620 (9) (metallised).	anode ..	140	No room for adaptor
		aux. grid	139	
		osc. anode	58	
2	VP 1321 (7) met	anode ..	172	6.5
		aux. grid	172	2.1
3	Pen DD 4020 (7)	anode ..	165	23.8
		aux. grid	165	5
	Mazda types throughout.			

USING "SERVICE ENGINEER"

"QUICK TEST" readings are obtained at the most accessible points of a receiver. These are usually the tags on the speaker transformer connection strip, and the readings give the voltages across the field winding and the speaker transformer primary. By dividing the voltage differences by the resistances of the windings in 1,000 ohm units the currents passing can be obtained.

The voltages will indicate at a glance any fault such as a complete breakdown or short circuit. Also, as the output valve usually takes about half the H.T. current, this can be suspected at once if it is noticed the voltage *differences* are about half what they should be.

When "Quick Tests" are not conclusive, the next step is to take the valve readings.

This is usually quite easily done by the use of valve adaptors in conjunction with either a special test set or separate meters. Sometimes it is advisable to stabilise a valve by connecting a fairly large condenser between anode and chassis.

When there is a high anode resistance it may be necessary to find the anode voltage by measuring the current and applying Ohm's Law.

ALIGNMENT NOTES

I.F. Circuits.—The intermediate frequency is 128 kc., to which frequently the oscillator should be set and the output connected to V2. The output can be applied between the chassis and the grid, and if a suitable dummy aerial is available it is not necessary to isolate the grid connection. Valve V1 is treated in a similar manner for ganging the first I.F.T.

Medium Waves.—The oscillator and signal circuits should be trimmed temporarily against the scale setting at about 200 metres, adjusting the oscillator trimmer on top of the gang condenser until correct agreement with the scale is obtained. The output is then brought to maximum by varying the pre-selector trimmers. A compromise position may be made at 300 to 400 metres.

Long Waves.—On the long-wave band a similar procedure is adopted, the long-wave padding condenser being adjusted to give the correct reading somewhere near the end of the scale.

McMICHAEL 135U (Continued)

CONDENSERS

C.	Purpose.	Mfd.
1	Series aerial	.0002
2	Series aerial	.00001
3	V1 grid	.001
4	A.V.C. decoupling	.1
5	V1 anode decoupling	.1
6	V1 screen decoupling	2
7	V1 osc. grid	.0002
8	V1 bias decoupling	.1
9	M.W. tracking	.0023
10	L.W. tracking	.001258
11	V2 grid decoupling	.1
12	V2 screen decoupling	.1
13	V2 bias decoupling	.1
14	Chassis isolating	.01
15	I.F. feed to diode	.0001
16	L.F. coupling from diode	.005
17	H.F. bypass	.0001
18	V3 bias decoupling	25
19	Tone compensating	.002
20	Tone controlling	.03
21		
22	H.T. smoothing	8+8+8
23		
24		
25	Mains filter by-pass	.1
26		
27		

RESISTANCES

R.	Purpose.	Ohms.
1	V1 grid leak	1 meg (½)
2	I.F.T.1. shunt	.5 meg (½)
3	V1 anode decoupling	5,000 (1)
4	A.V.C. decoupling	1 meg (½)
5	V1 osc. grid suppressor.	1,000 (½)
6	V1 osc. grid leak	50,000 (½)
7	V1 cathode bias	750 (½)
8	V1 osc. anode decoupling	60,000 (1)

(*Continued in next column*)

R.	Resistances (continued)	Ohms.
9	V2 cathode bias	150 (½)
10	A.V.C. decoupling	.5 meg (½)
11	Part of A.V.C. Ptr.	.5 meg (½)
12	Part of A.V.C. Ptr.	.5 meg (½)
13	Diode load	.5 meg (½)
14	V3 grid stopper	.1 meg (½)
15	Part of V3 bias Ptr.	150 (1)
16	Part of V3 bias Ptr.	500 (1)
17	V3 anode stopper	50 (½)
	Field winding	500

Figures in brackets denote wattage.

Right, are diagrams of the McMichael chassis as viewed from the rear and from underneath. The layout on the left, below, gives the plan view. A feature of the set is the elaborate mains filters.