

COSSOR 71 THREE-BAND FIVE

Four valve, plus rectifier, three waveband table superhet for 200-240 volt, 50-100 cycle, AC supplies, price 8½ gns.

CIRCUIT OUTLINE

THE aerial connection is made through a series wavetrap to the input circuits which are selected in the normal manner by the aerial switch. This selects separate untuned and tuned windings for each band and provides the input for the grid of V1, a triode hexode mixer. On the short band the AVC voltage is omitted.

An orthodox tuned grid circuit is used on the oscillator section and the anode circuit of the hexode contains the first IFT primary winding. This is a permeability tuned unit and feeds V2, the IF valve.

AVC is provided on the grid circuit of V2 which itself is connected in the usual manner, the screen being fully decoupled.

A further permeability tuned transformer couples V2 to the diode section of V3, a double diode triode. Tappings are used on both primary and secondary. One diode provides for AVC and other signal demodulation. A simple HF filter is used and the volume control forms the diode load. LF voltages are taken through a coupling condenser to the grid of the triode section.

Resistance-capacity coupling is used between V3 and the output stage, V4, a directly heated triode with a 2-volt filament. The arrangement is on standard lines and calls for no comment.

Bias arrangements are unusual. That for the triode section of V3 is derived from a cathode resistance. A potentiometer network is used, however, for the remaining bias which supplies the output triode and also the delay voltage for the diode. The energising voltage for the network comes from the volt drop across

the speaker which is in the negative lead. Power supply is derived from V5, a full wave rectifier, and two electrolytic condensers in conjunction with the speaker field.

CONSTRUCTIONAL FEATURES

THIS chassis should present little difficulty in servicing. It appears to conform closely to specification.

We found two slight modifications. In the first place the anode load of V3, which is nominally 30,000 ohms, was actually 50,000 ohms. In the input circuits there was a modification, the long wave tuned circuit being provided with a fixed trimmer of 30 mmfd. in addition to the variable element.

Some care is necessary in carrying out any servicing adjustment or measurements since the output valve is a directly heated 2-volt type, a separate 2-volt heater winding being provided.

Wave-change Switches.

Switching is accomplished by two wafers, the first wafer dealing with the aerial circuits and carrying three wiper.

The wiper W1 and W2 select the untuned and tuned circuits respectively. The remaining wiper, W3, is used to short out the long wave tuned circuit to prevent absorption effects.



The second wafer carries only two wiper, W4 and W5, which select the oscillator coils in the normal manner.

Chassis Removal.

This receiver follows the now standard Cossor practice of rubber suspension by means of a locking bar. In order to remove the chassis the control knobs are taken off and the bar is released by removing the two retaining screws at the back of the cabinet. The chassis actually rests on two spigots bolted to the inside of the cabinet, and as it is pulled off these it can be removed from the cabinet.

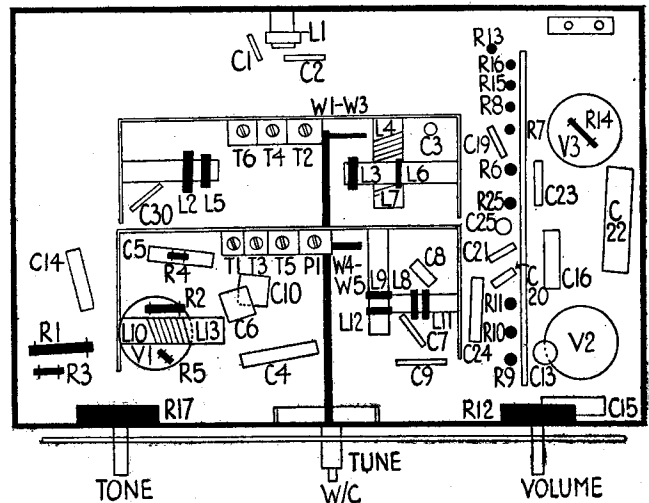
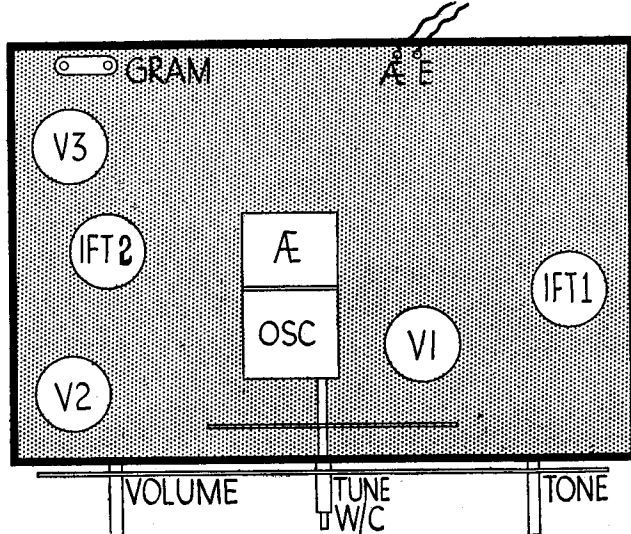
A multiple plug and socket are used between the chassis proper and a subsidiary chassis which is bolted to the bottom of the cabinet in the normal manner. This, of course, is released by removing the retaining bolts. It can be completely withdrawn after removing the multiple plug used to connect the chassis to the loud speaker. Incorrect reconnection of either plug is impossible as both are non-reversible.

(Continued on page 56)

VALVE READINGS

V.	Type.	Electrode.	Volts.	Ma.
1	41STH	Anode ..	280 ..	1.95
		Screen ..	112 ..	4
		Osc. anode ..	100 ..	6.1
	MVS Pen B	Anode ..	242 ..	7.2
		Screen ..	140 ..	1.5
3	DDT	Anode ..	157 ..	2.4
4	2XP	Anode ..	273 ..	45
5	43 IU	Heater ..	280 ..	—

Pilot lamps—Osram, 6.3v. 300 ma.



Layout diagrams of the top and underside (on right) of the main chassis. A diagram identifying parts under the power chassis is on page 56.

For more information remember
www.savoy-hill.co.uk

10-MINUTE FAULT-FINDER

COSSOR 71

Power Test.—This set has the speaker field in the negative lead. The volt drop should be measured across it, that is on the black and red leads on the speaker strip. The voltage is 68 volts. As the speaker field is 1,000 ohms the total H.T. feed is 68 m.a. When satisfied the power side is correct, proceed to the following injection test. When injection gives an output, proceed at once to the next stage.

The italic letters below refer to test points in the circuit. All voltages are with respect to chassis.

Output Stage, V4.—Inject 2 volts AF at V4 grid. If defective, check :—
Voltage C, 275.

Resistances : *B-C*, 170; *D-E*, 697,000 ohms.

AF Stage, V3 Triode Section.—Inject 0.5 volt AF V3 grid. If defective, check :—
Voltage : *G*, 157.

Resistances : *G-B*, 30,000 or 50,000; *F-E*, 2.1 megohms.

Demodulation Stage.—Inject strong modulated 465 kcs. signal V2 anode. If defective, check :—

Resistances : L17, 9; L16, 17; *H-E*, 551,000 ohms.

IF Stage, V2.—Inject 465 kcs. signal V2 grid. If defective, check :—

Voltages : *I*, 242; *J*, 140 volts.
Resistance : *I-B*, 5,000 ohms.

Hexode Section, V1.—Inject 465 kcs. signal V1 anode. If defective, check :—

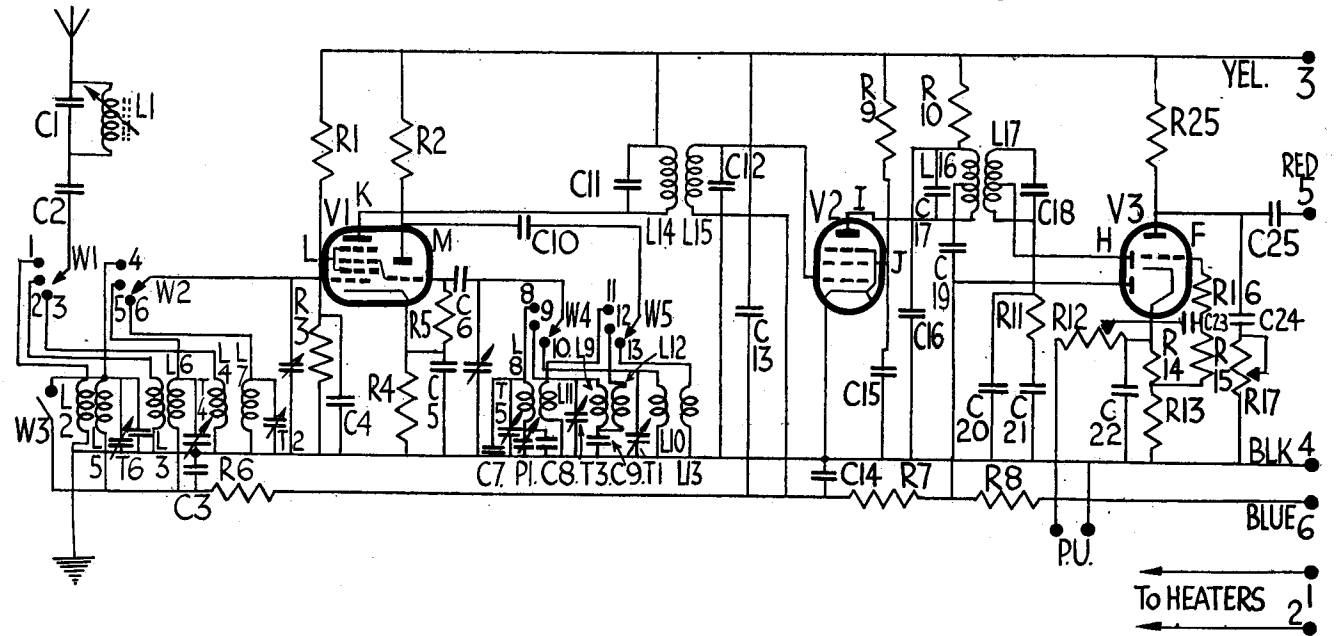
Resistances : L14, 4; L15, 4 ohms.
Inject 465 kcs. signal V2 grid. If defective, check :—

Voltages : *K*, 280; *L*, 112 volts.
Resistance : *L-B*, 20,000 ohms.

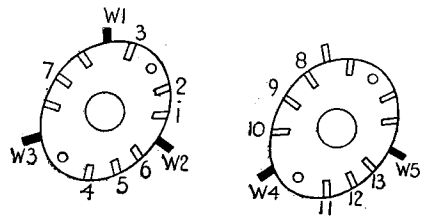
Oscillator Section.—Check :—
Voltage : *M*, 100.

Resistances : *M-B*, 30,000; *N-E*, 40,000 ohms.

Input Circuits.—If signals still absent, tune to local station and inject that frequency plus 465 kcs. at *N*. If ineffective, check resistances of input circuit and switching.



Bias arrangements are a point to note in the model 71 circuit. The circuit of the power unit is on page 56 Right, are the switch banks (refer also to "Wavechange Switches" in text).



RESISTANCES

No.	Description	Ohms.
1	V1 screen decouple	20,000
2	Osc. anode load	30,000
3	V1 screen pot. (part)	30,000
4	V1 cathode bias	130
5	Osc. grid leak	40,000
6	V1 AVC decouple	500,000
7	V2 AVC decouple	3 meg.
8	AVC diode load	1 meg.
9	V2 screen decouple	100,000
10	V2 anode decouple	5,000
11	HF filter	50,000
12	Volume control	500,000
13	V3 cathode bias (part)	1,000
14	V3 cathode bias (part)	750
15	V3 grid leak	2 meg.
16	V3 grid stopper	100,000
17	Tone control	250,000
18	V4 grid leak	500,000
19	V4 grid stopper	100,000
20	V4 heater shunt	25
21	Series bias (part)	7,000
22	Series bias (part)	90,000
23	Series bias (part)	150,000
24	Heater shunt	25
25	V3 anode load	30,000

CONDENSERS

No.	Description	Mfd.
1	Trap tune	.000225
2	Aerial coupling	.0005
3	V1 AVC decouple	.05
4	V1 screen decouple	.05
5	V1 cathode shunt	.1
6	Osc. grid	.0001
7	LW osc. fixed trimmer	.00005
8	LW fixed padder	.00014
9	MW fixed padder	.000638
10	Osc. anode couple	.0005
11	IFT1 Primary tune	.000225
12	IFT2 Secondary tune	.000225
13	HT line shunt	.1
14	V2 AVC decouple	.05
15	V2 screen decouple	.05
16	V2 anode decouple	.1
17	IFT2 primary tune	.00006
18	IFT2 secondary tune	.000075
19	AVC coupling	.00005
20	HF filter	.00005

Condensers (continued)

21	VF filter	.00005
22	H3 cathode shunt	.50
23	LF coupling	.005
24	Tone control	.01
25	LF coupling	.01
26	Series bias shunt	.10
27	Field shunt	.05
28	HT smoothing	.8
29	HT smoothing	.8
30	LW input fixed trimmer	.00003

WINDINGS

L.	Ohms.	Range.	Where measured.
1	4	—	Across C1.
2	140	—	W1 and earth.
3	24	MW	W1 and earth.
4	V. low	SW	W1 and earth.
5	15	LW	W2 and AVC.
6	2	MW	W2 and AVC.
7	V. low	SW	W2 and earth.
8	12	LW	W4 and C8.
9	5	MW	W4 and C9.
10	V. low	SW	W4 and earth.
11	6	LW	W5 and earth.
12	2	MW	W5 and C9.
13	V. low	SW	W5 and earth.
14	4	—	V1 anode and HT+.
15	4	—	V2 grid and R6+R7.
16	17	—	C17+R10 and HT+.
17(part)	9	—	V3 diode and C20+R11.
18	170	—	Extension speaker sockets.
19	1,000	—	Pins 7 and 8 on speaker plug.
20	22	—	Mains plug.

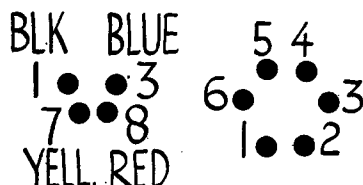
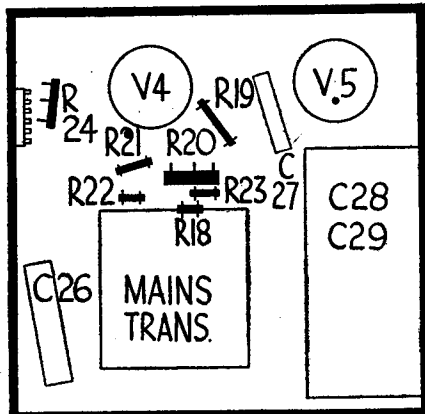
Cossor 71 Alignment Notes

Continued from page 54)

I.F. Circuits (Frequency 465 kcs.).

The intermediate transformers should not require adjustment as they are permeability tuned. If one is replaced the method of alignment is as follows.

Connect an output meter to the set and the generator to the grid of V1, tuning the



set to maximum and switching to the MW position.

Inject a low 465-kc. signal, adjusting the two iron cores from the insides of the can. Reduce the input as they come into line. The input must be below the AVC level.

Short Waves (16 to 52.5 metres).

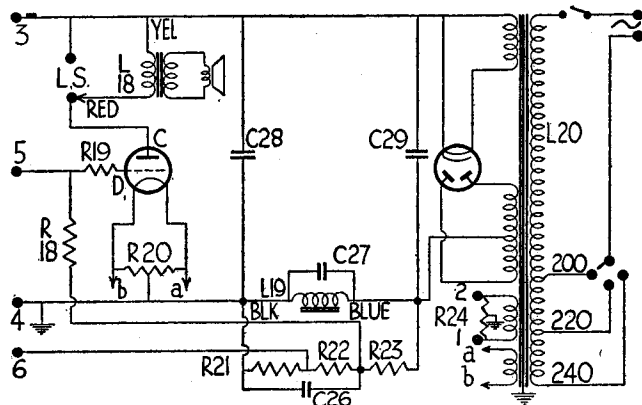
With the generator connected to the input of the set, tune set and generator to 18 megacycles and adjust T1 for resonance and T2 for maximum output.

There are no padding adjustments, but check the ganging through the band.

Medium Waves (195 to 560 metres).

Tune set and generator to 1,400 kcs. (214 metres) and adjust T3 for resonance and T4 for maximum.

Left, diagram identifying components underneath the power chassis and right, the circuit for this section of the model 71. Below, left, are connection details of the speaker plug (looking at back of pins) and power socket (looking at back).



Philco A539 Push-button

(Continued from page 52)

—these simply push on to the shafts. Then pull off the push-button knobs, which are similarly fixed.

On removing the four chassis retaining bolts from the bottom of the cabinet the chassis may be withdrawn. If it is desired to remove it completely, the speaker must be disconnected. This is joined to the set by a three-lead multiple cable.

Looking at the speaker strip from the back of the set, the leads, reading from left to right, are green-white, white, green.

Alignment

I.F. Circuits. (Intermediate Frequency, 475 kcs.)

Connect an output meter to the set and a signal generator to the grid circuit of V1. Maintain the grid return path and inject a low-level 475 kcs. signal.

Adjust progressively for maximum output T1, T2, T3 and T4. Reduce the input as the circuits come into line, always keeping below AVC level.

Medium Waves. (200-540 metres.)

See that the pointer hub is on the fourth green line from the top. Open the tuning condenser vanes to minimum and insert a .006 feeler gauge under the heel of the rotor vanes and close the condenser on to the feeler.

Check that the pointer reads on the

white dot under the letter "P" in the word "Plymouth." Remove the feeler and proceed as follows.

Tune generator to 214 metres (1,400 kcs.) and set pointer to this position, shown by the white dot against the word "Dublin." Adjust T5 for resonance and T6 for maximum.

Tune set and generator to 500 metres (600 kcs.) and adjust P1, simultaneously rocking the gang.

Check the trimming at 214 metres, and repeat the operations until no further improvement results.

Long Waves. (1,000 to 1,950 metres.)

This band can be aligned in the normal manner, but for correct coincidence of certain medium and long-wave stations for a single push-button setting the following method should be used.

(1) In the MW position inject and tune to 296.2 metres (1,013 kcs.), corresponding to Midland Regional. Without moving the pointer, turn to LW and then (2) inject 232 kcs. (1,293 metres), corresponding to Luxembourg. Adjust T7 and T8. (3) Tune set and generator to 160 kcs. (see red dot at 1,875 metres), rock condenser and adjust P2 for maximum.

Repeat operations (1) and (2). Then repeat operations (3), (1) and (2) until there is no improvement.

Short Waves. (16.6-60 metres.)

Inject a signal of 18 mcs. through

The medium wave padding is fixed but alignment should be checked near the top of the band.

Long Waves (810 to 2,058 metres).

Tune set and generator to 250 kcs. (1,200 metres) and adjust T5 for resonance and T6 for maximum.

Tune set and generator to 160 kcs. (1,875 metres) and adjust P1 simultaneously rocking the gang.

Repeat both operations until no improvement results.

Before checking the ganging it is important that the pointer coincides with the last calibration mark.

Replacement Condensers

REPLACEMENT electrolytics are available from A. H. Hunt, Ltd., who make the units in the set. List numbers and prices are: C28 + 29, 2860B, 7s. 3d.; C26, 3723B, 1s. 6d.; C22, 2915D, 1s. 9d.

resistive dummy aerial. Tune set to this frequency and adjust T9.

There are two peaks very close together. The correct one is that first heard after unscrewing T9 from maximum.

Push-buttons

THE push-button control is effected through a rocking arm and lever link motion which operates the gang condenser. The displacement of the rocker arm is controlled by push-button plungers carrying adjustable pallets, locked by a screw operated by the push-button knob.

The method of setting up the buttons is as follows.

First of all tune in accurately the desired station. Then release the push-button locking screw on the button which it is desired to use for the station. About half a turn will generally release the locking screw.

Push the button inwards and re-lock the screw. After locking the screw, check that the setting has not slipped, which can be observed by movement of the pointer when the button is depressed.

If it has slipped, re-tune the set and readjust the button.

Replacement Condensers

EXACT replacement condensers are available from A. H. Hunt, Ltd. For C24 there is unit 1,284, price 6s.; for C22 + C24, unit 1,979, 6s. 9d., and for C21, unit 2,970, price 2s.