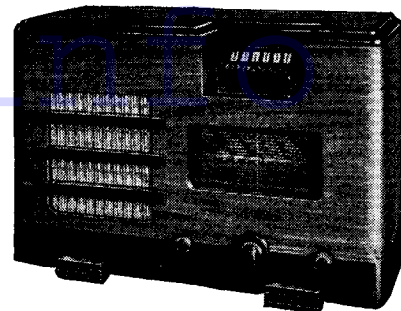


COSSOR 398 PRESS-BUTTON SIX



Outstanding feature of the 398 is incorporation of the Du Monge anti-interference system in which a special valve cancels out static picked up on the down lead.

CIRCUIT.—The input to this receiver is taken through a special differential circuit employing V1, an H.F. pentode, and two downleads, one of which is connected to an ordinary horizontal aerial. The valve is so operated that the pick-up due to the two downleads cancels out and only the potentials due to pick up on the horizontal aerial are passed on to the input circuits of V2. If the horizontal part of the aerial is erected out of the interference zone, reception will be free of any noise picked up by the downleads. The cancellation is adjusted by a variable resistance on the input circuit of V1.

Either standard input circuits or permeability tuned press button circuits form the input of V2, the frequency changer. An orthodox oscillator circuit is used both for manual and press button tuning, the latter utilising permeability adjusted

coils. On the medium, long and press button positions, A.V.C. is applied.

Intermediate amplification is carried out by a screened pentode, V3, connected in the usual manner, with A.V.C. control. The primary winding of the second I.F.T., which is in the anode circuit of the valve, has a tapping for the A.V.C. coupling and the signal diode is similarly tapped down.

For the diode load, use is made of the volume control, which is connected to the second I.F.T. through the usual filter. This controls the grid circuit of V4, a double diode triode, through a coupling condenser and grid leak and grid stopper. The two diodes are used for demodulation and A.V.C. respectively. Bias is obtained through the usual cathode resistance.

The output valve, V5, is a power triode with a directly heated filament, the coupling from the previous triode being by resistance capacity. Bias is obtained from a network across the speaker field,

a tapping on this network also providing the delay voltage for the A.V.C.

Power supply is by means of a full-wave rectifier, V6, and smoothing is effected by the speaker field and electrolytic condensers.

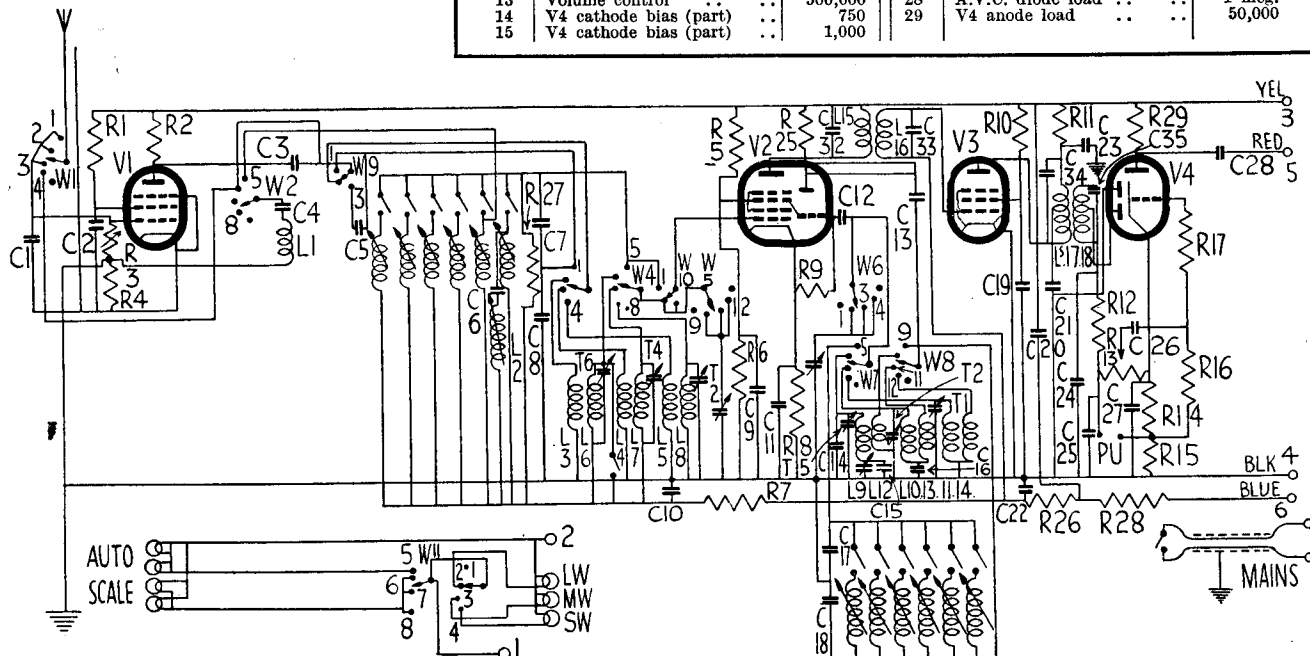
Chassis removal.—Remove the four control knobs from the front of the cabinet and the "setting switch" knob at the back. Release the two bolts which hold

VALVE READINGS

V.	Type.	Electrode.	Volts.	Ma.
1	All Cossor. MS PenB ..	Anode ..	100	—
		Screen ..	50	—
2	41STH ..	Anode ..	255	2
		Screen ..	155	5
3	MVS Pen B..	Osc. Anode	75	6
		Anode ..	230	5.3
4	DDT ..	Screen ..	115	1.5
		Anode ..	130	2.5
5	2XP ..	Anode ..	250	42.5
6	481U ..	Heater ..	260	—
Pilot l'ps	Osram ..	Filament..	6.5	—

RESISTANCES

k.	Purpose.	Ohms.	R.	Purpose.	Ohms.
1	V1 screen feed ..	250,000	16	V4 grid return ..	2 meg.
2	V1 anode load ..	50,000	17	V4 grid stopper ..	100,000
3	Neutralising control ..	1,000	18	V5 grid leak ..	500,000
4	V1 cathode impedance ..	500	19	V5 grid stopper ..	100,000
5	V2 screen pot. (part) ..	20,000	20	V5 filament shunt ..	25
6	V2 screen pot. (part) ..	30,000	21	Bias network (part)..	7,000
7	V2 A.V.C. decouple ..	500,000	22	Bias network (part)..	80,000
8	V2 cathode bias ..	130	23	Bias network (part)..	150,000
9	V2 osc. grid ..	40,000	24	Heater shunt ..	25
10	V3 screen feed ..	100,000	25	V2 osc. anode load ..	30,000
11	V3 anode decouple ..	5,000	26	V3 A.V.C. decouple ..	3 meg.
12	H.F. filter ..	50,000	27	Press button input shunt	2 meg.
13	Volume control ..	500,000	28	A.V.C. diode load ..	1 meg.
14	V4 cathode bias (part) ..	750	29	V4 anode load ..	50,000
15	V4 cathode bias (part) ..	1,000			



V1 is the Du Monge interference-suppressing valve. Note that a special twin lead-down is employed. From V2 onwards the set is basically orthodox, using permeability tuned coils for press-button tuning. Order of switching, top to bottom, is: auto, L.W., M.W., S.W., off. For clarity some switch contact numbers are omitted.

For more information remember

the locking bar at the back of the cabinet and withdraw the bar.

Pull off the press button knobs and remove two wood screws which hold the tuning scale against the inside of the cabinet and the four screws which hold the press button assembly. The receiver chassis can then be removed, after pulling out the two plugs.

The power pack and output valve chassis is removed by unscrewing the four bolts from the bottom of the cabinet. The speaker is connected to this unit by means of a multiple plug which can be withdrawn.

Special Notes.—Most of the components are easily located and there are no divergencies from the makers' specification.

Particular attention is drawn to the fact that the filament rating of the output valve is 2 volts, and care should be taken in testing this valve out of the chassis.

As the I.F. transformers are permeability tuned fixed condensers are used and C32 to C35 are inside the cans and will not be found. Condenser C5 is completely hidden inside a length of thick sleeving.

Wavechange Switches.—The switching is more complicated than usual in this set owing to the change over from manual to press-button and also on account of the special setting process for the latter. In addition there is a wafer devoted to pilot lamp switching.

(Continued on page 32)

Cossor 398 on Test

MODEL 398.—For A.C. operation, 200-250 volts, 40-100 cycles. Price 12 gns.

DESCRIPTION.—Three waveband manual and permeability tuned press-button table model employing five valves, plus rectifier.

FEATURES.—The first valve is for interference elimination on the De Monge system. Full-vision scale, calibrated in names and wavelengths and with coloured pilot lamp indication. Controls for volume, tuning, range, and interference balance. Illumination of selected press-button name. Special press-button setting switch.

LOADING.—80 watts.

Sensitivity and Selectivity

SHORT WAVES (16-52 metres).—Good gain and selectivity, with easy handling and no drift trouble.

MEDIUM WAVES (190-580 metres).—Very good gain and selectivity with small local station spread. Clean background and well maintained sensitivity.

LONG WAVES (840-2,150 metres).—Excellent sensitivity and selectivity with very little interference on Deutschlandsender. All main stations cleanly received.

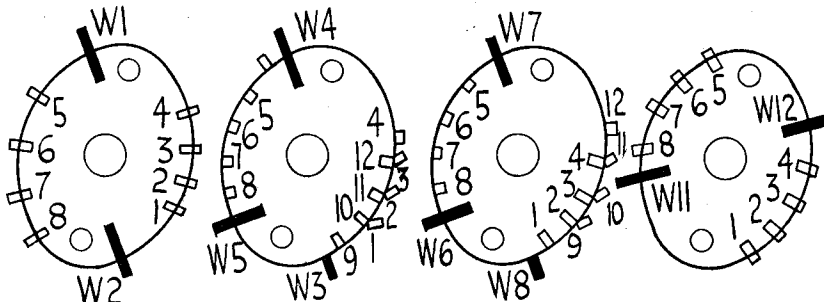
Acoustic Output

The triode output gives an excellent tone with a well-balanced characteristic. The upper registers are crisp and clean and the lower note radiation is excellent. speech is very free from colouration and the general balance on all types of transmission is pleasant. There is ample volume for a large room.

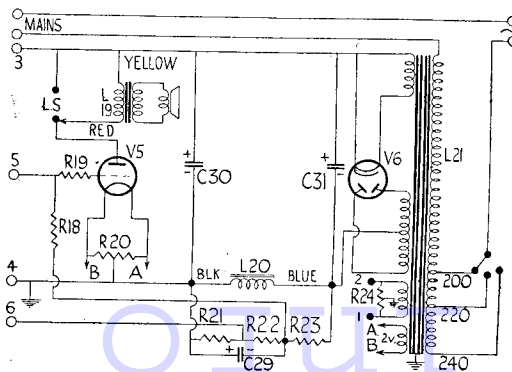
THE original electrolytic condensers in the 398 are by A. H. Hunt, Ltd., and replacements are available as follows: For C30 + C31, unit 4140, 11s.; C29, 3723B, 1s. 6d.; and C27, 2915D, 1s. 9d.

CONDENSERS

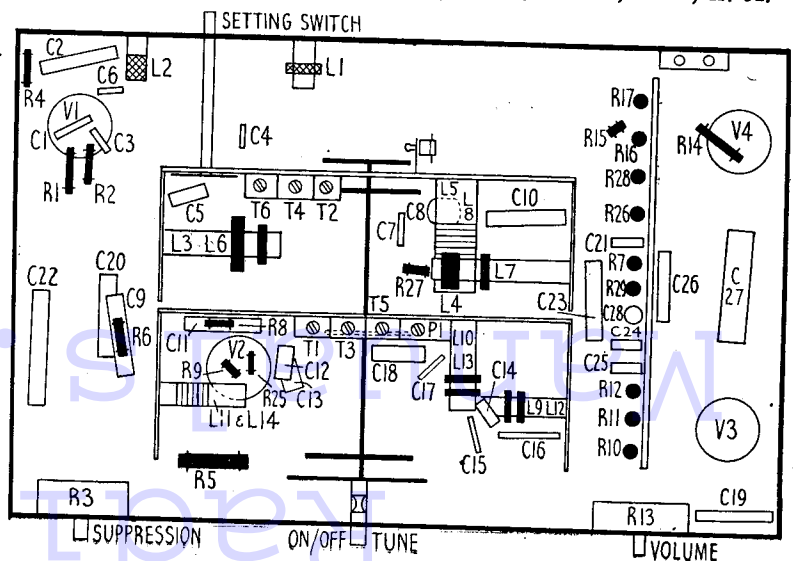
C.	Purpose.	Mfds.	C.	Purpose.	Mfds.
1	V1 grid shunt	.0002	18	Press button osc. tune (part)	.00172
2	V1 screen decouple	.05	19	V3 screen decouple	.05
3	V1 coupling	.0005	20	H.T. line shunt	.1
4	Filter fixed tune	.000065	21	A.V.C. coupling	.00005
5	Press button input coupling	.000005	22	V3 A.V.C. decouple	.05
6	Press button input tune (part)	.0001	23	V3 anode decouple	.1
7	Press button input fixed tune (part)	.00022	24	H.F. filter	.00005
8	Press button input fixed tune (part)	.0005	25	H.F. filter	.00005
9	V2 screen decouple	.05	26	L.F. coupling	.005
10	V2 A.V.C. decouple	.05	27	V4 cathode bias shunt	50
11	V2 cathode bias shunt	.1	28	L.F. coupling	.01
12	V2 osc. grid	.0001	29	Series bias shunt	10
13	V2 osc. anode coupling	.0005	30	H.T. smoothing	16
14	L.W. fixed trimmer	.00005	31	H.T. smoothing	16
15	L.W. fixed padder	.00014	32	I.F.T.1 primary fixed tune	.000225
16	M.W. fixed padder	.000638	33	I.F.T.1 secondary fixed tune	.000225
17	Press button osc. tune (part)	.00039	34	I.F.T.2 primary fixed tune	.00006
			35	I.F.T.2 secondary fixed tune	.000075



The switch banks with the one nearest the "click" plate on the right. See also Switch Notes above. Switching is easier to follow in the circuit if traced from the grid ends.



Above, the circuit of the separate power pack. Power pack layout and connecting plug details are on page 32 with top layout of main chassis. Underside radio chassis layout on right.



Cossor 398 A.C. Six

(Continued from page 31)

The first wafer carries W1 and W2 and these control the aerial input to the tuned circuits through the suppression valve. The next wafer is very inaccessible, being located by the side of the first internal screening compartment. This carries three wiper which control the tuned and untuned input coils and also remove the gang for press-button operation.

The next wafer is similarly mounted against the side of the next screen and carries the corresponding wiper for the oscillator circuits. Finally there is the fourth wafer carrying W11 and W12. This controls the various pilot lamps and the wafer is easily identified against the "click" plate.

There is also another wafer not ganged with the main assembly. This carries W9 and W10, which are used for setting up the push-button controls as explained under that heading.

Press-button Adjustment

Adjustment of both aerial and oscillator circuits is by means of inductances fitted with iron cores. These must be adjusted by a non-metallic screw-driver.

Tune in the desired station in the normal manner with the set switched to the correct waveband. Adjacent to the trimming screws is a series of numbered indications corresponding to the buttons, which read from left to right and start at No. 1. The wave-range which the button will embrace is shown adjacent to each button.

Turn the setting switch to position 1 and hold it there while the upper trimmer screw is adjusted for maximum. Then allow the setting switch to return to normal and turn the selector switch to the AT position and adjust the corresponding lower trimmer of the same number. This is the oscillator adjustment and care must be taken to tune in the correct station.

Finally, make a slight adjustment of the first or upper trimmer. If this adjustment appears to be unduly flat, turn the setting switch to position 2, which will facilitate the adjustment.

Alignment Notes

I.F. Circuits.—It is only necessary to trim an I.F. transformer when one has been replaced, as the transformers are permeability adjusted, there being no trimmer condensers. Should adjustment be necessary, proceed as follows:—

Connect an output meter to the set, turn to the M.W. range, tune the gang to maximum and connect the generator to the grid of V2.

Adjust the generator to 465 kc. and adjust the cores of I.F.T.2 and then I.F.T.1 for maximum response and seal them with wax compound.

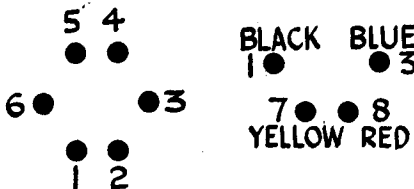
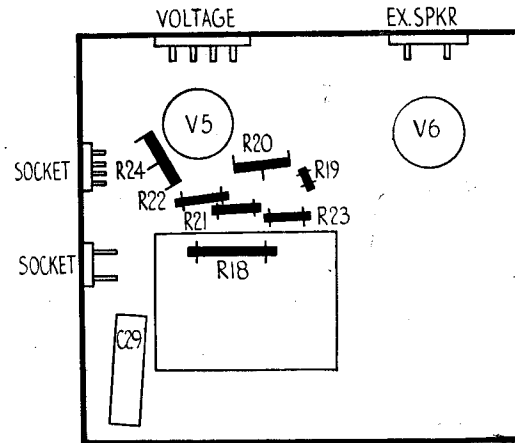
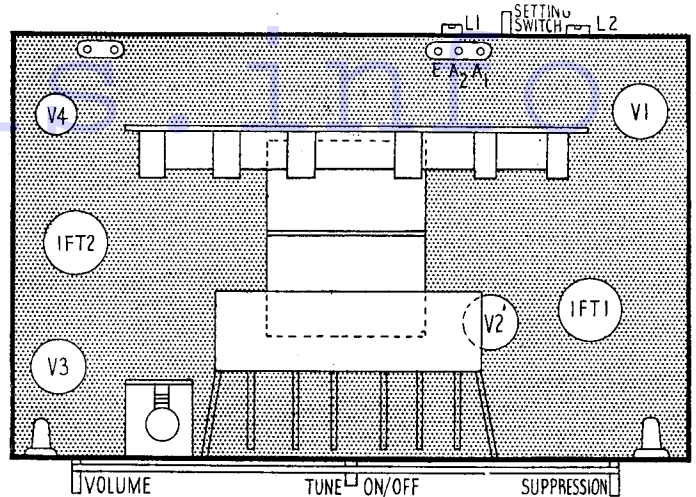
Use a low input below the A.V.C. value. **Medium Waves.**—Connect the generator to the aerial and earth sockets and turn the suppression control to the mid position, using the lowest possible input.

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

Long Waves.—Tune set and generator to 1,200 metres (250 kc.) and adjust T5 and then T6 for maximum output.

(Continued in column 3.)

Right, top-of-chassis layout diagram of the Cossor 398. Press-button tuning is by permeability-tuned aerial and oscillator coils which are switched into signal and oscillator circuits of V2, which, in effect, is the first valve.



Left, the power plug looking at the pins and, right, the speaker plug looking at the back of the pins.

Left, the underside lay out diagram for the separate power supply chassis (see circuit on page 30). Of the two plugs, the six pin is for power supplies and the four pin for the speaker connections.

(Continued from column 1)

Tune set and generator to 1,875 metres (160 kc.) and adjust P1 for maximum, simultaneously rocking the gang. Repeat both operations.

Short Waves.—Tune set and oscillator to 18 megacycles and adjust T1 and T2. There are no padding operations.

(Continued from page 29.)

Short Waves (Band One).—Unshort the oscillator section, connect oscillator to aerial and earth through a dummy aerial, and tune the set and generator to 31 metres.

Adjust T5 for maximum output.

Short Waves (Band Two).—Tune set and generator to about 100 metres, and adjust T6 for resonance and then T7 for maximum output.

Medium Waves.—Tune set and generator to 250 metres, and adjust T8 for resonance and then T9 and T10 for maximum output in that order.

Check the adjustment of T9 and T10.

Long Waves.—Tune set and generator to 1,500 metres, and adjust T11 for resonance. Do not adjust either T9 or T10.

Tune set and generator to the region of 1,750 metres and adjust P1 for maximum, simultaneously rocking the gang.

Re-check the trimming at 1,500 metres, and repeat the padding operation if necessary.

Replacement Condensers are available from A. H. Hunt, Ltd., for C11, unit 3479, 1s. 9d., and for C16, unit 2915, 1s. 9d.

WINDINGS (D.C. Resistances)			
L.	Ohms.	Range.	Where measured.
1	3	—	On tags.
2	3	—	On tags.
3	180	L.W.	C3 and chassis.
4	23	M.W.	C3 and chassis.
5	Very low.	S.W.	C3 and chassis.
6	15	L.W.	V2 grid and C10 + R7.
7	2	M.W.	V2 grid and C10 + R7.
8	Very low.	S.W.	V2 grid and chassis.
9	13	L.W.	W7 and P1.
10	6	M.W.	W7 and C16.
11	Very low.	S.W.	W7 and chassis.
12	6	—	Chassis and contact 10 W8.
13	2.5	M.W.	C16 and contact 11 W8.
14	Very low.	S.W.	Chassis and contact 12 W8.
15	4	—	V2 anode and H.T. +
16	3.3	—	V3 grid and C22 + R26.
17	17	—	V3 anode and R11 + C23.
18	9(c.t.)	—	V4 diode and R12 + C25.
19	187	—	Pins 7 and 8 on speaker socket.
20	1,000	—	Pins 1 and 3 on speaker socket.
21	23	—	Mains plug.