LISSEN

SERVICE MANUAL FOR FIVE VALVE THREE-WAVE BAND SUPERHET MAINS RECEIVER MODEL 8421

Circuit Alignment Procedure for Receivers 8421.

Intermediate Frequency Circuit Alignment.

(1) Short circuit the gang condenser across the oscaillator section (rear section).

(2) Adjust the wave switch to the M.W. position.

(3) Apply a signal of 473 Kc/s., modulated 30 per cent., 400 c.p.s., through a condenser of 0.1 μF. capacity across the signal grid and chassis of the frequency changer valve V1. Trim each I.F. circuit in the following order : —

2nd I.F.T. Secondary trimmer (C28), 2nd I.F.T. Primary trimmer (C27), 1st I.F.T. Secondary Trimmer (C26), 1st I.F.T. Primary trimmer (C25). The circuits should be trimmed to a single peak.

(4) Check each circuit by going over the trimmers in the same order again.

(5) Remove the short circuit from the gang condenser.

NOTE.—As the circuits are brought into line the level of the 473 Kc/s. signal should be reduced to prevent the A.V.C. from coming into action and giving misleading results.

Radio Frequency Circuit Alignment.

The three wave bands, long, medium and short waves, are quite independent of each other and any adjustment to the trimmers or padders of any one band affects only that particular band.

Long Wave Band Alignment.

(1) See that the pointer registers with the 180° line on the scale with the gang at maximum capacity.

(2) Set the long wave padder (C21) approximately two-thirds in.

(3) Set the pointer against the 1,000-metre mark on the scale.

(4) Apply a modulated signal of 1,000 metres to the A and E sockets of the receiver.

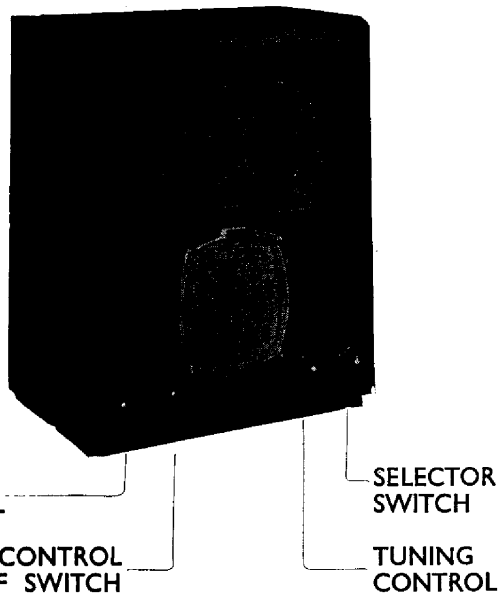
(5) Adjust the L.W. oscillator trimmer (C18) to receive this signal. Then adjust the L.W. bandpass trimmers (C10, C3) to give maximum output.

(6) Set the pointer to the 1,700-metre mark on the scale.

(7) Apply a signal of 1,700 metres and adjust the long wave padder (C21) to give maximum output on that signal.

(8) Reset the pointer to the 1,000-metre mark on the scale and readjust the L.W. oscillator and bandpass trimmers (C18, C10, C3) to give maximum output on the 1,000-metre signal.

(9) Check again at 1,700 metres and see that the pointer is at the 1,700-metre mark when receiving the 1,700-metre signal. If it is not, make slight adjustment to the long wave padder (C21).



Medium Wave Band Alignment.

(1) See that the pointer registers with the 180° line with the gang at maximum capacity.

(2) Set the medium wave padder (C19) approximately two-thirds in.

(3) Set the pointer against the 214-metre mark on the scale.

(4) Apply a signal of 214 metres to the A and E sockets of the receiver.

(5) Adjust the M.W. oscillator trimmer (C17) to receive this signal. Then adjust the M.W. bandpass trimmers (C9, C2) to give maximum output.

(6) Set the pointer to the 500-metre mark on the scale.

(7) Apply a signal of 500 metres and adjust the M.W. padder (C19) to give maximum output on that signal.

(8) Reset the pointer to the 214-metre mark on the scale and readjust the M.W. oscillator and bandpass trimmers (C17, C9, C2) to give maximum output on the 214-metre signal.

(9) Check again at 500 metres and see that the pointer is at the 500-metre mark when receiving the 500-metre signal. If it is not, make a slight adjustment to the M.W. padder (C19).

Short Wave Band Alignment.

(1) See that the pointer registers with the 180° line with the gang at maximum capacity.

(2) Set the pointer against the 15 Mc/s. mark on the scale.

(3) Unscrew fully the S.W. oscillator trimmer (C16). Apply a signal of 15 Mc/s. to the A and E sockets. Slowly screw in the S.W. oscillator trimmer until this signal is heard. Care should be taken that the right peak is selected. Two peaks will be found on this trimmer; the correct one is the one with the trimmer at the lower capacity, that is, the first one heard when screwing in the trimmer. Having selected the correct peak, adjust the S.W. signal circuit trimmer (C8) to give maximum output.

(4) Apply a signal of 6 Mc/s. and tune the receiver to this signal. Adjust the top turn of the S.W. oscillator coil (L9) and the gang simultaneously to give maximum output on this signal.

(5) Reset the pointer to the 15 Mc/s. mark and readjust the S.W. oscillator and signal circuit trimmers (C16, C8) to give maximum output.

SERVICE DATA FOR MODEL 8421

CONDENSERS

Code	Description	Part No.	Values
C1	M.W. Aerial Coupling ..	71,261	5 mmfd.
C2	M.W. Bandpass Primary Trimmer	80,000	100 mmfd. Max.
C3	L.W. Bandpass Primary Trimmer	80,000	100 mmfd. Max.
C4	Triple Gang, 540 mmfd. Swing	80,508	
C5			
C6			
C7	A.V.C. Decoupling ..	68,008	.05 mfd.
C8	S.W. Signal Circuit Trimmer	82,503	20 mmfd. Max.
C9	M.W. Bandpass Secondary Trimmer	80,000	100 mmfd. Max.
C10	L.W. Bandpass Secondary Trimmer	80,000	100 mmfd. Max.
C11	V1 Screen By-pass ..	68,009	.1 mfd.
C12	V1 Anode and Oscillator Anode Decoupling ..	67,513	8 mfd., 350 v. Peak elec.
C13	Oscillator Anode Coupling	66,515	300 mmfd. Mica
C14	Oscillator Grid Coupling	66,513	100 mmfd. Mica
C15	V1 Cathode By-pass ..	68,009	.1 mfd.
C16	S.W. Oscillator Circuit Trimmer	82,503	20 mmfd. Max.
C17	M.W. Oscillator Circuit Trimmer	80,000	100 mmfd. Max.
C18	L.W. Oscillator Circuit Trimmer	80,000	100 mmfd. Max.
C19	M.W. Padder Variable ..	80,511	300 mmfd. Max.
C20	M.W. Padder Fixed ..	66,515	300 mmfd. Mica
C21	L.W. Padder Variable ..	80,511	300 mmfd. Max.
C22	S.W. Padder Fixed ..	66,534	.0033 mfd. Mica
C23	A.V.C. Decoupling ..	68,009	.1 mfd.
C24	A.V.C. Decoupling ..	68,009	.1 mfd.
C25	I.F. Trimmers ..	80,000	100 mmfd. Max.
C26			
C27		80,001	300 mmfd. Max.
C28			
C29	V2 Cathode By-pass ..	68,009	.1 mfd.
C30	V2 Screen By-pass ..	68,009	.1 mfd.
C31	V3 Anode Decoupling ..	67,009	2 mfd., 300 v. Peak elec.
C32	Signal Diode Load By-pass	66,512	50 mmfd. Mica
C33	L.F. Coupling	68,008	.05 mfd.
C34	V3 Cathode By-pass ..	67,005	50 mfd., 12 v. Peak elec.
C35	L.F. Coupling	68,008	.05 mfd.
C36	V4 Cathode By-pass ..	67,005	50 mfd., 12 v., Peak elec.
C37	A.V.C. Coupling.. ..	71,262	10 mmfd.
C38	H.T. Smoothing	67,513	16 mfd., 350 v., Peak elec.
C39	V5 Reservoir ..	67,513	8 mfd., 350 v., Peak elec.
C40	Tone Control	25,656	.002 mfd.
C41	H.F. By-pass	68,009	.1 mfd., 3,000 v. Test
C42	H.F. By-pass	68,503	.01 mfd., 3,000 v. Test
C43	Pick-up Isolating ..	68,503	.01 mfd., 3,000 v. Test
C44	Pick-up Isolating ..	68,503	.01 mfd., 3,000 v. Test
C45	Aerial Isolating	66,520	.001 mfd. Mica 350 v. A.C. working
C46	Earth Isolating	68,503	.01 mfd., 3,000 v. Test
C47	I.F. Decoupling	68,020	.1 mfd., 1,000 v. D.C. Test
C48	H.F. By-pass Mains Filter	68,502	.005 mfd., 3,000 v. Test
C49	H.F. By-pass Mains Filter	68,502	.005 mfd., 3,000 v. Test

VALVES

Code	Description	Part No.	
V1	Frequency Changer ..	4,113	Ever Ready C36C
V2	I.F. Amplifier	4,076	Ever Ready C50N
V3	2nd Det., A.V.C., Rect. and L.F. Amp. ..	4,105	Ever Ready C23B
V4	Output	4,078	Ever Ready C70D
V5	Rectifier	4,079	Ever Ready C10B

RESISTANCES

Code	Description	Part No.	Values
R1	A.V.C. Decoupling ..	71,945	260,000 ohm, ½ watt
R2	V1 Bias..	71,943	200 ohm, ½ watt
R3	Oscillator Grid Leak ..	71,968	51,000 ohm, ½ watt
R4	V1 Screen Feed ..	71,979	41,000 ohm, ½ watt
R5	V1 Anode and Oscillator Anode Decoupling ..	71,935	5,000 ohm, ½ watt
R6	Oscillator Anode Feed..	71,928	20,000 ohm, 1 watt
R7	S.W. Het. Voltage Control	71,943	200 ohm, ½ watt
R8	M.W. Het. Voltage Control	71,906	1,500 ohm, ½ watt
R9	L.W. Het. Voltage Control	71,988	5,100 ohm ½ watt
R10	V2 Screen Feed ..	71,999	30,000 ohm, ½ watt
R11	V2 Bias..	71,969	150 ohm, ½ watt
R12	A.V.C. Decoupling ..	71,945	260,000 ohm, ½ watt
R13	V3 Anode Decoupling..	71,963	11,000 ohm, ½ watt
R14	V3 Anode Load ..	71,979	41,000 ohm, ½ watt
R15	Signal Diode Load Part	71,945	260,000 ohm, ½ watt
R16	Signal Diode Load Part	71,945	260,000 ohm, ½ watt
R17	V3 Bias and A.V.C. Delay Part	71,961	800 ohm, ½ watt
R18	A.V.C. Delay Part ..	71,906	1,500 ohm, ½ watt
R19	Volume Control ..	81,501	500,000 ohm, Vari.
R20	A.V.C. Diode Load Part	71,944	510,000 ohm, ½ watt
R21	A.V.C. Diode Load Part	71,944	510,000 ohm, ½ watt
R22	A.V.C. Decoupling ..	71,944	510,000 ohm, ½ watt
R23	V4 Grid Leak ..	71,944	510,000 ohm, ½ watt
R24	V4 Bias..	71,969	150 ohm, ½ watt
R25	V4 Grid Stopper ..	71,968	51,000 ohm, ½ watt
R26	Reverse Feed-Back Coupling	71,911	250,000 ohm, ½ watt
R27	Tone Control	81,509	2 Megohm, Variable
R28	L.W. Aerial Primary Shunt..	71,963	11,000 ohm, ½ watt
R29	Ballast Resistor ..	89,602	715 ohm
R30	I.F. Decoupling ..	71,936	2,500 ohm, ½ watt
R31	V3 Grid Stopper ..	71,962	110,000 ohm, ½ watt

VOLTAGE AND CURRENT MEASUREMENTS FOR RECEIVER TYPE 8421

Measurements made with a Model 7 Avometer on the 1,000 v. range for voltages above 10 v., and on the 10 v. range for voltages below 10 v. Measurements made with the receiver tuned to 1,000 Kc/s., volume and tone controls at maximum but no signals applied.

Frequency Changer TH30C	Ea	187 v.	Ia	1·3 mA.
	Es	67 v.	Is	3·9 mA.
	Eoa	83 v.	Ioa	5·3 mA.
	Ec	1·9 v.	Ic	10·7 mA.
	Eh	27 v.		
I.F. Amplifier VP13B ..	Ea	202 v.	Ia	7·4 mA.
	Es	140 v.	Is	2·6 mA.
	Ec	1·4 v.	Ic	10·0 mA.
	Eh	11·2 v.		
L.F. Amplifier TDD13C ..	Ea	104 v.	Ia	2·5 mA.
	Ec	4·6 v.	Ic	2·5 mA.
	Eh	12·0 v.		
Output Pentode Pen36C ..	Ea	209 v.	Ia	44·3 mA.
	Es	222 v.	Is	7·3 mA.
	Ec	7·0 v.	Ic	50·3 mA.
	Eh	29 v.		
Rectifier UR1C	Ea	229 v.		
	Ec	245 v.	Ic	73 mA.
	Eh	18 v.		

Main H.T. line 222 v.
Main H.T. current 73 mA.
Normal Input current 0·35 mA.
Total Valve Heater current 0·2 amp.
Note.—The Eh readings may vary considerably for individual valves. The value shown above is an average figure.

SWITCHES

Code	Description	Part No.	
S1	Aerial Circuit Primary Selector	83,510	
S2	Bandpass Primary Selector		
S3	Bandpass Secondary Selector		
S4	Oscillator Grid Circuit Selector		
S5	Oscillator Anode Circuit Selector		
S6	Mains On-off ganged to		
S7	Volume Control ..		

INDUCTANCES

Code	Description	Part No.	
L1	M.W. Aerial Primary Coil..	77,519	
L2	L.W. Aerial Primary Coil ..	77,520	
L3	M.W. Bandpass Primary Coil	77,519	
L4	L.W. Bandpass Primary Coil	77,520	
L5	S.W. Aerial Primary Coil	77,521	
L6	S.W. Signal Grid Coil		
L7	M.W. Bandpass Secondary Coil	77,519	
L8	L.W. Bandpass Secondary Coil	77,520	
L9	S.W. Oscillator Grid Coil ..	77,531	
L10	M.W. Oscillator Grid Coil	77,530	
L11	L.W. Oscillator Grid Coil		
L12	S.W. Tickler Coil	77,531	
L13	M.W. Tickler Coil	77,530	
L14	L.W. Tickler Coil		
L15	1st I.F.T. Primary Coil	77,535	
L16	1st I.F.T. Secondary Coil		
L17	2nd I.F.T. Primary Coil	77,503	
L18	2nd I.F.T. Secondary Coil		
L19	Output Transformer on		
L20	Speaker		
L21	H.T. Smoothing Choke ..	79,501	
L22	Mains Filter Choke ..	79,004	
L23			

RECEIVER TYPE 8421

D.C. Resistance of Inductances.

Radio Frequency Circuits.

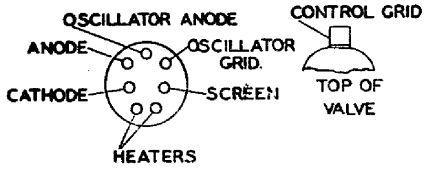
M.W. Aerial Primary Coil	(L1)	17·0 ohms
L.W. Aerial Primary Coil	(L2)	135·0 ohms
M.W. Band Pass Primary Coil ..	(L3)	2·6 ohms
L.W. Band Pass Primary Coil ..	(L4)	45·0 ohms
S.W. Aerial Primary Coil	(L5)	2·1 ohms
S.W. Signal Grid Coil	(L6)	Very Low
M.W. Band Pass Secondary Coil ..	(L7)	2·5 ohms
L.W. Band Pass Secondary Coil ..	(L8)	43·0 ohms
S.W. Oscillator Grid Coil	(L9)	Very Low
M.W. Oscillator Grid Coil	(L10)	1·7 ohms
L.W. Oscillator Grid Coil	(L11)	5·0 ohms
S.W. Tickler Coil	(L12)	Very Low
M.W. Tickler Coil	(L13)	3·0 ohms
L.W. Tickler Coil	(L14)	9·8 ohms

Intermediate Frequency Circuits.

Primary and Secondary Coils of each I.F.T. (L15, L16, L17, L18)	6·7 ohms

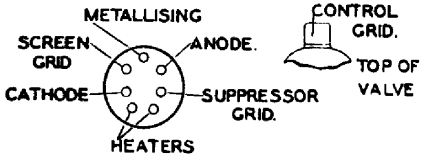
Low Frequency Circuits.

Output Transformer, Primary ..	(L19)	260 ohms
Output Transformer, Secondary ..	(L20)	Very Low
Smoothing Choke	(L21)	230 ohms
Mains Filter Choke	(L22) (L23)	1·0 ohm



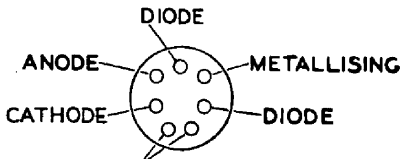
UNDERSIDE OF HOLDER
FOR C36C VALVE

Fig. 1



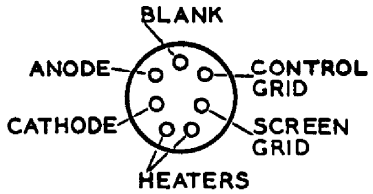
UNDERSIDE OF HOLDER
FOR C50N VALVE

Fig. 2



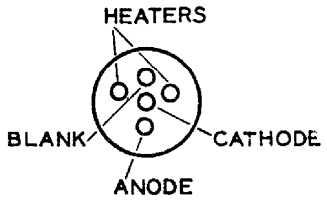
UNDERSIDE OF HOLDER
FOR C23B VALVE.

Fig. 3



UNDERSIDE OF HOLDER
FOR C70D VALVE

Fig. 4



UNDERSIDE OF HOLDER
FOR C10R VALVE

Fig. 5

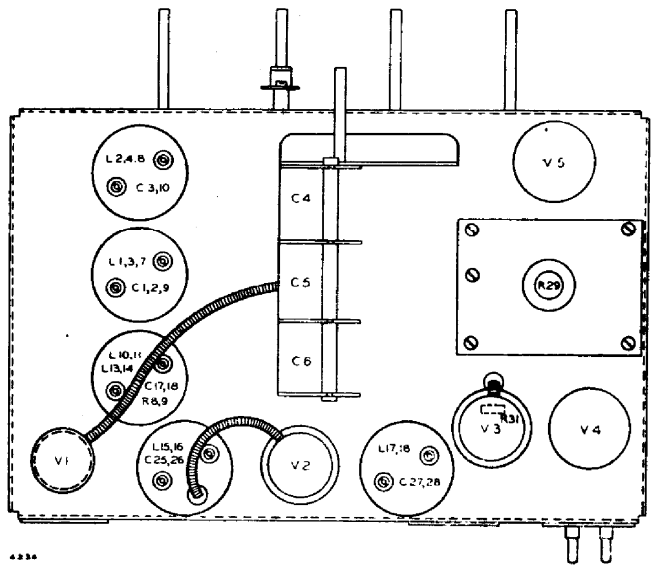


Fig. 6

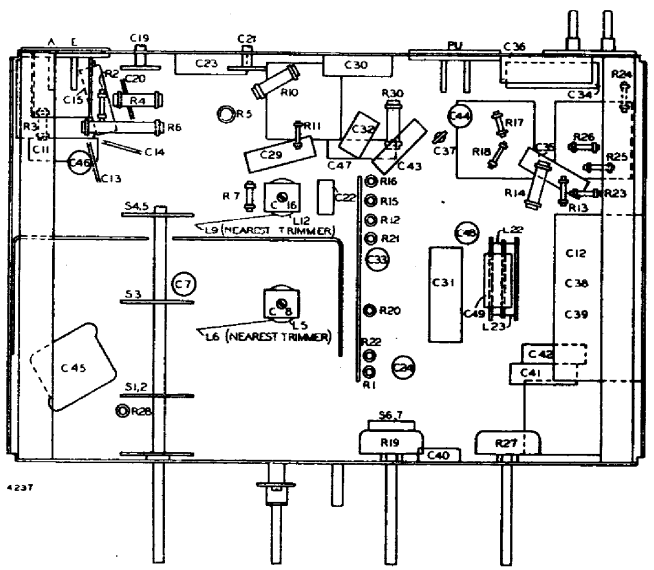
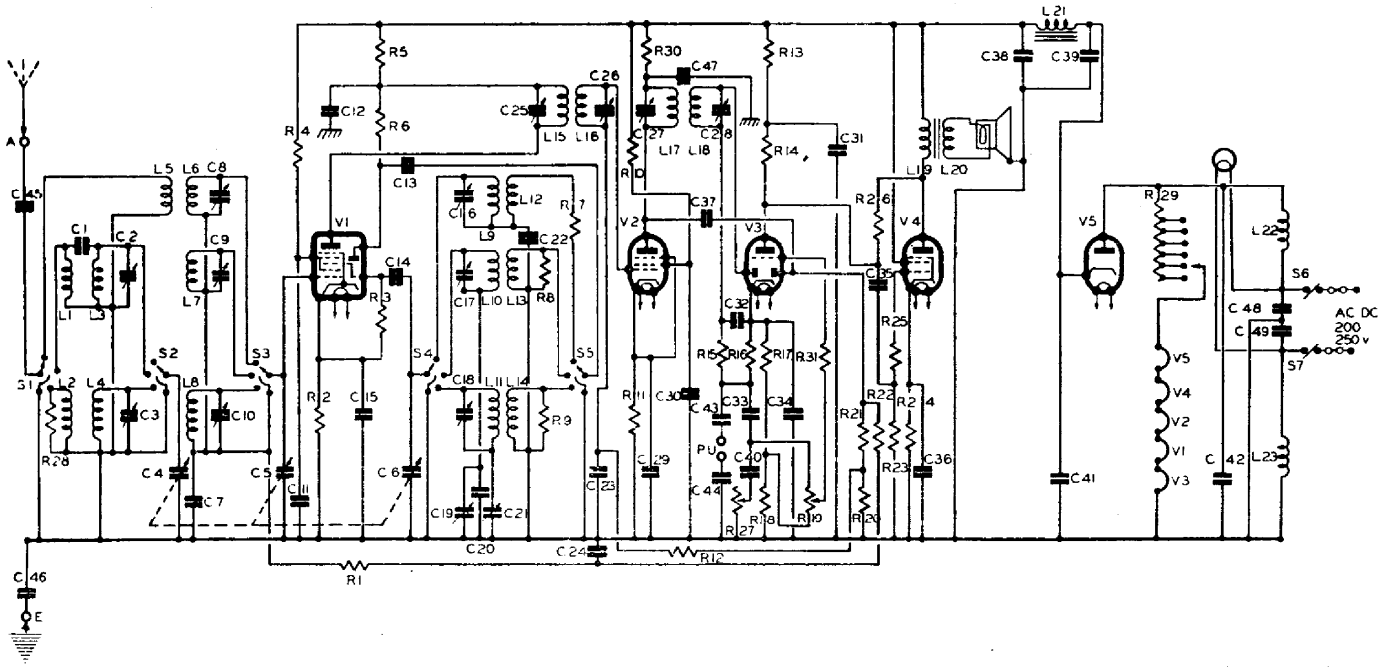


Fig. 7



CIRCUIT DIAGRAM

Fig. 8