

KOLSTER BRANDES LTD.

CRAY WORKS, SIDCUP, KENT.

SERVICE MANUAL

NEW SERIES

ISSUED FEBRUARY, 1940.

MODEL

860

IMPORTANT. This Receiver uses BRIMAR valves and was specifically designed round them. Its performance will be impaired unless BRIMAR valves of the correct types are used when replacements are needed.

REMOVAL OF CHASSIS.

REMOVE: Three knobs, two loud speaker clips on baffle, and four chassis bolts; also release lamp holder. The chassis may then be slid out of cabinet.

● For general information refer to Instruction Book and Instruction Card.

ALIGNMENT CHART FOR 860

*Operations MUST be carried out in the order indicated.

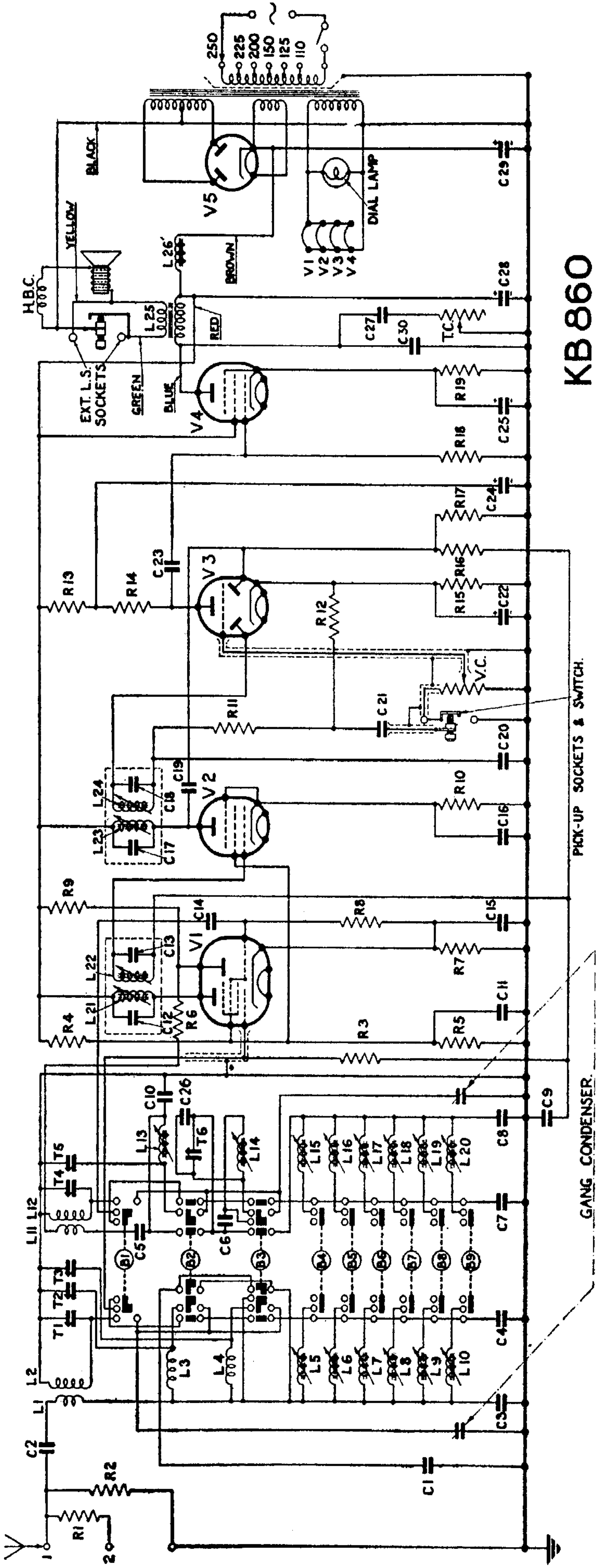
*Operation	Alignment of	Connect Signal Gen. to	Inject Signal via	Adjust Input Signal to	Depress Key	Set Tuning Pointer to	To be adjusted for maximum output
1	I.F.	Grid of 20D2	.1mfd.	464kcs	M.W. (B2)	580m	Cores of L21, L22, L23, L24
2	M.W.	Aer 1	Standard Dummy Aerial	600kcs	M.W.	500m	Core of L13 (M.W. Tracker)
3	"	"	"	1,400kcs	"	214m spot	Trimmers, T5 & T2
4	"	Repeat		Operation		No. 2	Rock Tuning Condenser slightly while adjusting, for max. gain
5	"	Repeat		Operation		No. 3	
6	L.W.	Aer 1	"	175kcs	L.W. (B3)	1,714m spot	Core of L14 (L.W. Tracker)
7	"	"	"	350kcs	L.W.	857m	Trimmers, T6 & T3
8	"	Repeat		Operation		No. 6	Rock Tuning Condenser slightly, for max. gain
9	"	Repeat		Operation		No. 7	Trimmers, T6 & T3
10	S.W.	Aer 1	400Ω	15Mcs	S.W. (B1)	20m	" T4 & T1

ALL ON COIL UNIT

ADJUSTMENT OF "KEYS." Depress appropriate 'Key,' checking that wave-length of desired station falls within tuning range of 'Key' to be adjusted.

Inject via Aer 1, a signal of the same frequency as that of the desired station and adjust for maximum output, the cores of the two coils appropriate as indicated below.

Button No.	Wave-length Range	Frequency Range	Standard "Key" Setting	Aerial Coils	Oscillator
B4	193m to 286m	1,554kcs to 1,049kcs	R. Normandie (274m)	L.5	L.15
B5	250m to 363m	1,200kcs to 826kcs	Midland Reg. (296.2m)	L.6	L.16
B6	300m to 416m	1,000kcs to 721kcs	London Reg. (342.1m)	L.7	L.17
B7	400m to 552m	750kcs to 543kcs	North Reg. (449.1m)	L.8	L.18
B8	1,100m to 1,565m	273kcs to 192kcs	Luxembourg (1293m)	L.9	L.19
B9	1,340m to 2,000m	224kcs to 150kcs	Droitwich (1,500m)	L.10	L.20

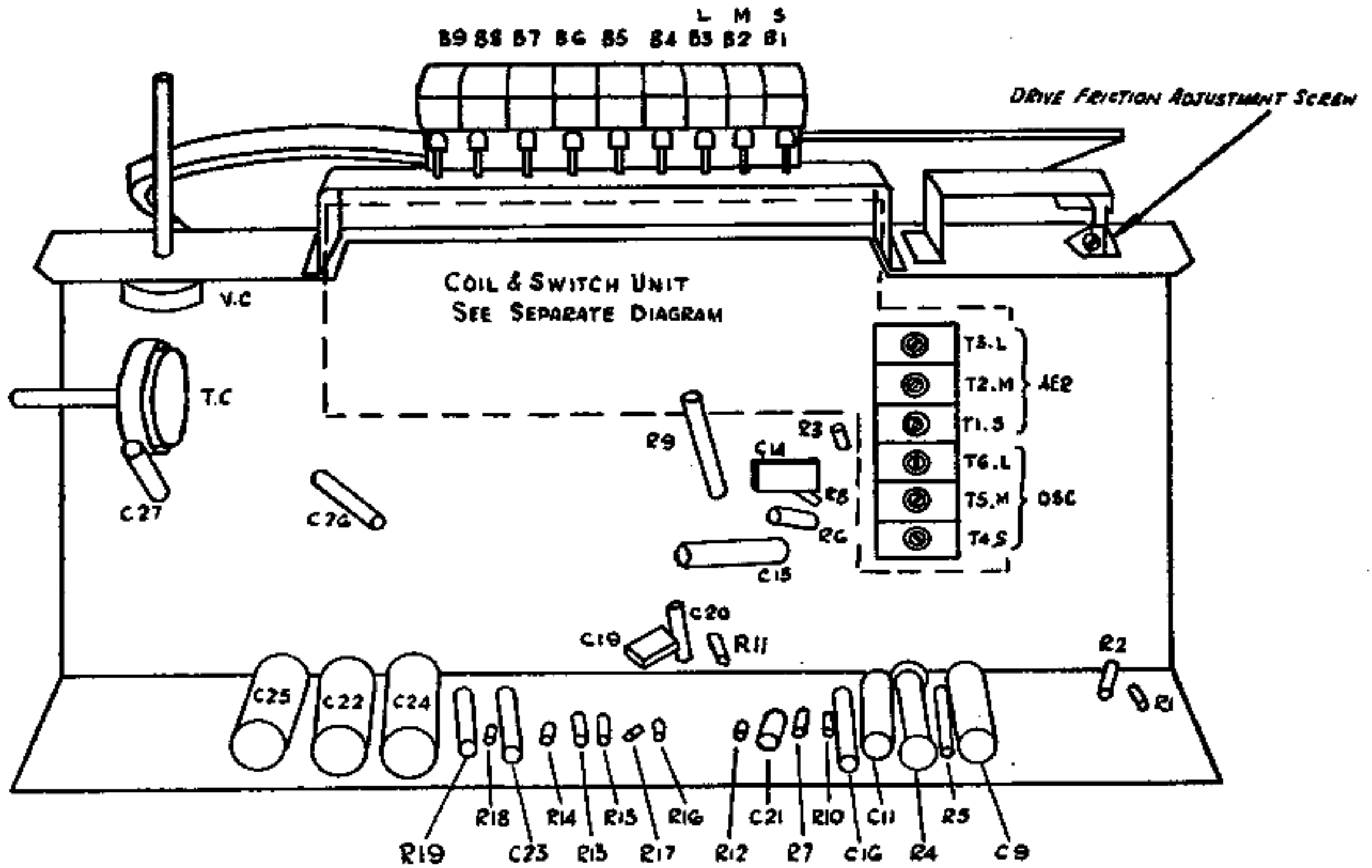


KB 860

PICK-UP SOCKETS & SWITCH.

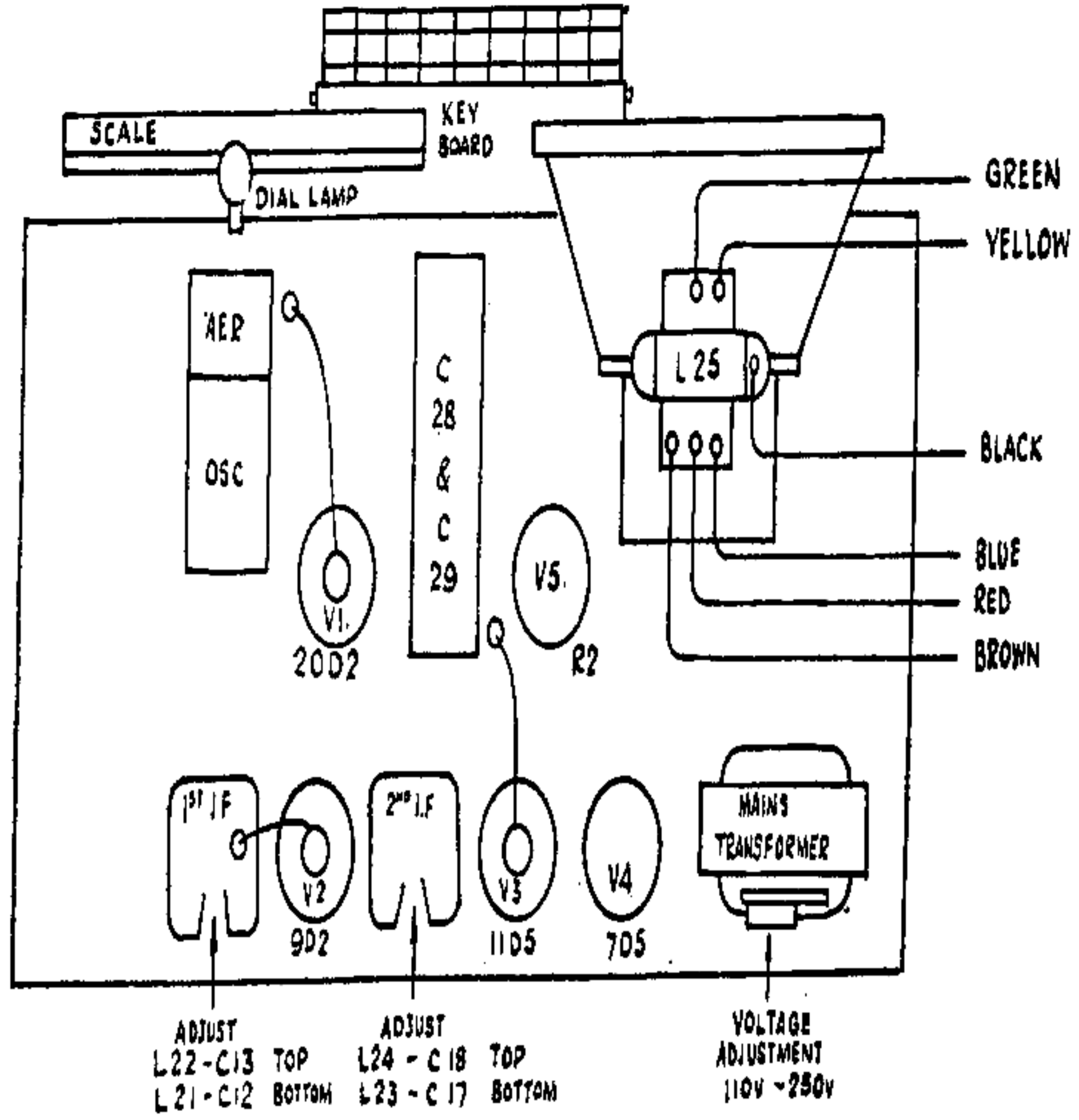
GANG CONDENSER.

UNDER CHASSIS DIAGRAM

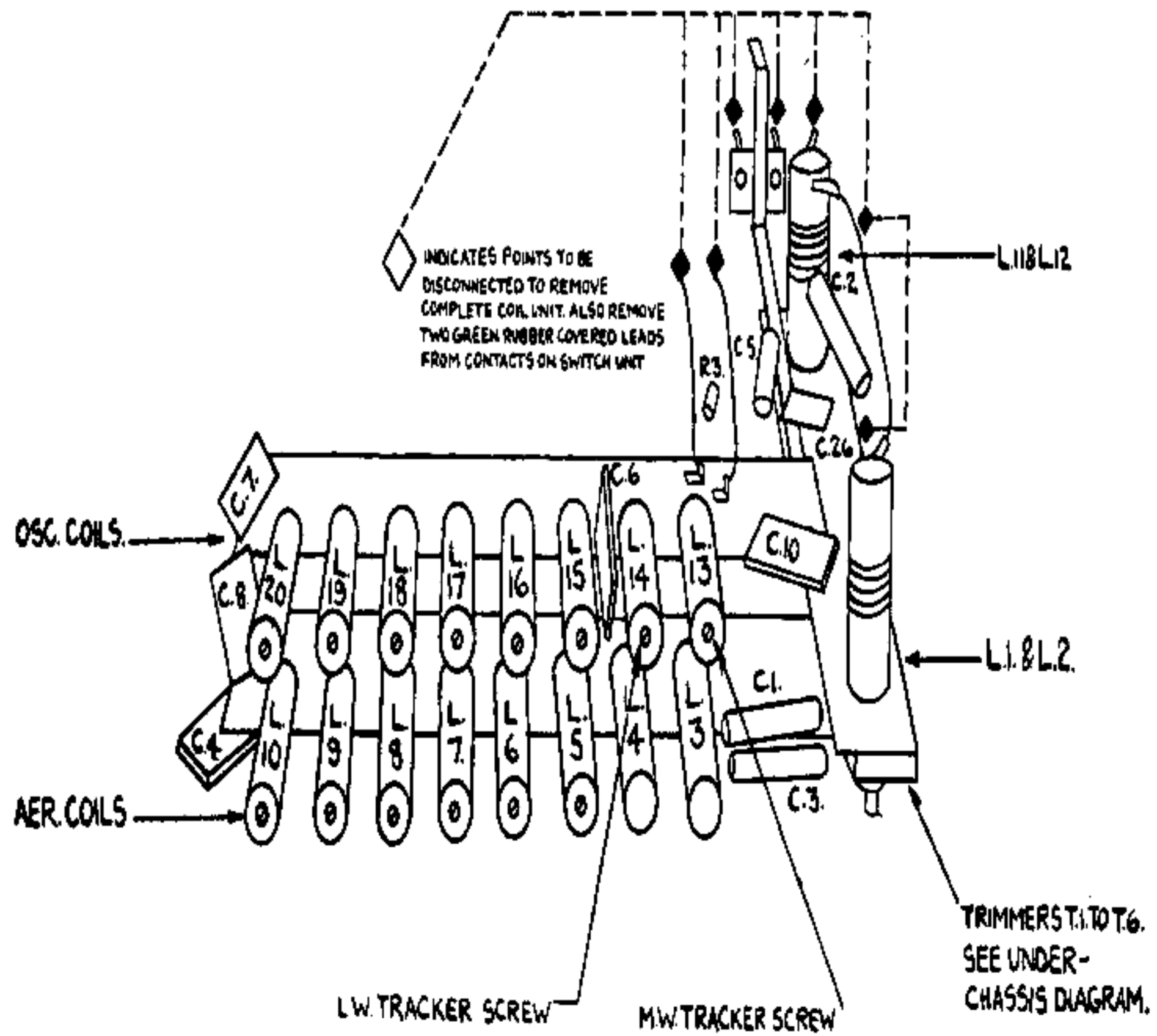


S. M. L.
 B1 B2 B3 B4 B5 B6 B7 B8 B9

TOP VIEW OF CHASSIS



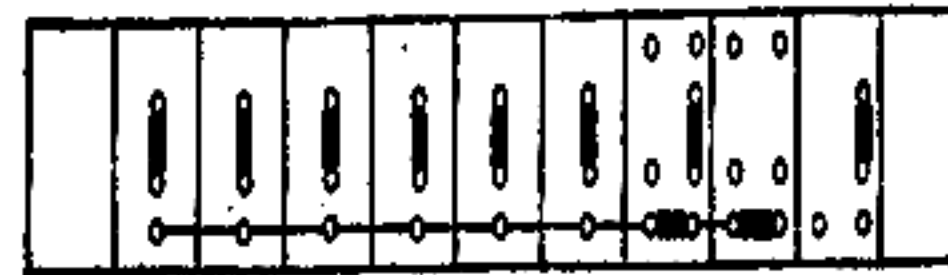
COIL & SWITCH UNIT
 VIEW FROM FRONT OF CHASSIS
 WITH KEYS & KEY PLATE RE-
 MOVED.



**CIRCLES INDICATE FIXED CONTACTS.
HEAVY BLOCKS INDICATE SWITCHING ACTION.**

**SWITCH DIAGRAM,
SHOWING CONTACT
ACTION**

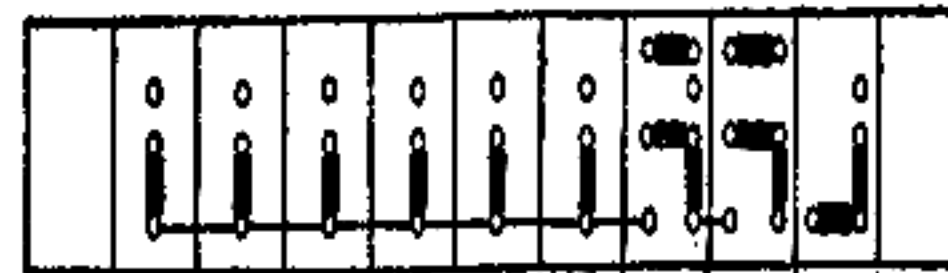
**ALL KEYS
OFF**



BOTTOM CONTACT STRIP

VIEWED FROM UNDER CRASSIS

**ALL KEYS
DEPRESSED**

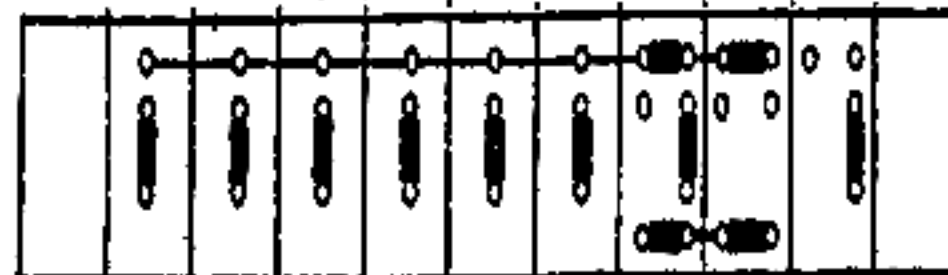


Key No.

89 · 88 · 87 · 86 · 85 · 84 · 83 · 82 · 81

L M S

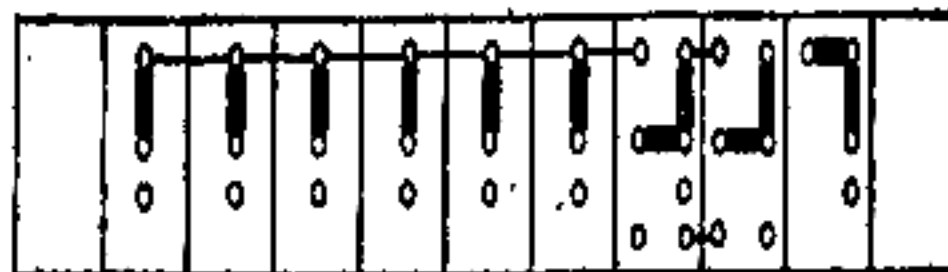
**ALL KEYS
OFF**



TOP CONTACT STRIP

VIEWED AS FROM TOP OF CRASSIS

**ALL KEYS
DEPRESSED**



**OSCILLATOR
SECTION**

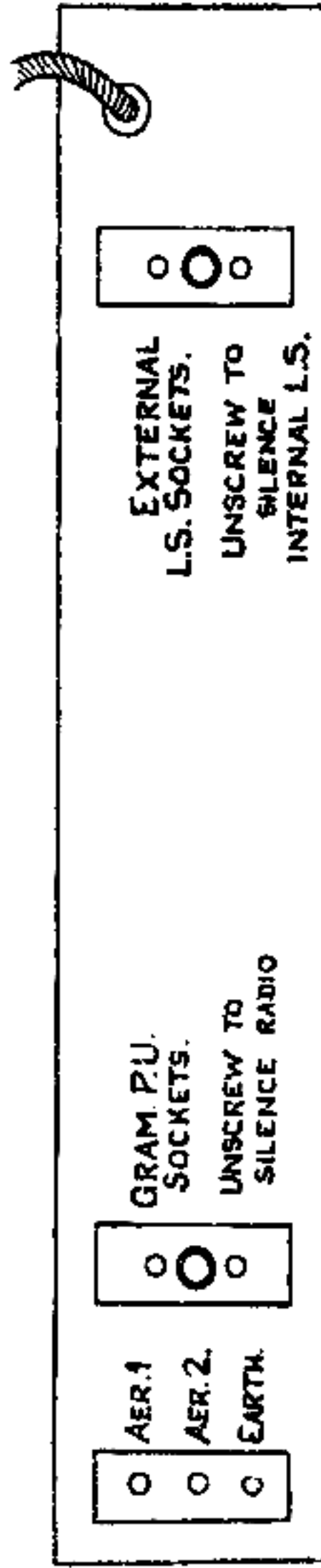
**AERIAL
SECTION**

KEY TO CIRCUIT DIAGRAM

- VC. = ½ Meg. Ω
 TC. = 50,000 Ω
 R1. = 10,000 Ω
 R2. = 2,000 Ω
 R3. = ½ Meg. Ω
 R4. = 20,000 Ω 2 watt
 R5. = 25,000 Ω 1 watt
 R6. = 150 Ω
 R7. = 300 Ω
 R8. = 50,000 Ω
 R9. = 50,000 Ω 1 watt
 R10. = 300 Ω
 R11. = 50,000 Ω
 R12. = ¼ Meg. Ω
 R13. = 50,000 Ω
 R14. = 150,000 Ω
 R15. = 7,000 Ω
 R16. = ¼ Meg. Ω
 R17. = ¼ Meg. Ω
 R18. = ¼ Meg. Ω
 R19. = 400 Ω 1 watt
 C1. = .002μF (± 5%)
 C2. = .005μF
 C3. = .002μF (± 5%)
 C4. = 400μμF (± 5%)
 C5. = .001μF
 C6. = 230μμF (± 1%)
 C7. = 800μμF (± 5%)
 C8. = 400μμF (± 5%)
 C9. = .1μF
 C10. = 400μμF (± 1%)
 C11. = .1μF (± 1%)
 C12. = 150μμF (± 2%)
 C13. = 150μμF (± 2%)
 C14. = 50μμF
 C15. = .1μF
 C16. = .02μF
 C17. = 150μμF (± 2%)
 C18. = 280μμF (± 2%)
 C19. = 25μμF
 C20. = .0005μF
 C21. = .005μF
 C22. = 25μF (Elect)
 C23. = .02μF

- C24. = 2μF (Elect)
 C25. = 25μF (Elect)
 C26. = 25μμF
 C27. = .03μF
 C28. = 16μF (Elect)
 C29. = 16μF (Elect)
 C30. = .001μF

BACK OF CHASSIS



AERIAL COILS.

- * [L1. = S.W. Pri.
 L2. = S.W. Sec.
 L3. = M.W.
 L4. = L.W.
 L5. = M.W. Push Button
 L6. = " " "
 L7. = " " "
 L8. = " " "
 L9. = L.W. Push Button
 L10. = " " "

Code-Spot Colour

- Dark Blue
 Red
 Green & Yellow
 Dark Blue
 Red
 Light Blue
 Green
 Yellow
 Dark Blue & Red

OSCILLATOR COILS.

- * [L11. = S.W. Pri.
 L12. = S.W. Sec.
 L13. = M.W.
 L14. = L.W.
 L15. = M.W. Push Button
 L16. = " " "
 L17. = " " "
 L18. = " " "
 L19. = L.W. Push Button
 L20. = " " "

COIL RESISTANCES.

- L3. = 2.5 Ω L15. = 1.5 Ω
 L4. = 37 Ω L16. = 1.8 Ω
 L5. = 2.5 Ω L17. = 2.1 Ω
 L6. = 3.6 Ω L18. = 2.5 Ω
 L7. = 4.8 Ω L19. = 4.3 Ω
 L8. = 6.5 Ω L20. = 4.3 Ω
 L9. = 18 Ω L21. = 3.7 Ω
 L10. = 22 Ω L22. = 3.7 Ω
 L13. = 5.2 Ω L23. = 3.8 Ω
 L14. = 11.5 Ω L24. = 2.7 Ω

* Square brackets indicate coils wound on one former.

- L21. = 1st I.F. Pri.
 L22. = 1st I.F. Sec.
 L23. = 2nd I.F. Pri.
 L24. = 2nd I.F. Sec.
 L25. = Output Transformer
 L26. = Field Coil

SPARES 860

ALWAYS QUOTE PART No. WHEN ORDERING SPARES

Component	Part No.	List Price	Component	Part No.	List Price
Volume Control	80601	each 4/6	Coil and Switch Unit (complete)	A84096/A	each 60/-
Tone Control and Switch ...	80602	6/-	Keys, press-button	84011	3d.
Scale	83050	3/9	Rubber Cushion Caps	84033+4	1d.
Drive Spindle Assembly ...	A83037	2/-	Press-button Switch	86026	19/-
Drive Cord Assembly	A83076/A	1/-	L.S. Escutcheon	A83060	6/6
Pointer Cord Assembly ...	A76060/B	1/-	Key Escutcheon	84010/A	2/6
Dial Lamp, 12v.—16v.	64017	8d.	Station Name Labels	84025	6d.
1st I.F. Transformer	A83094	9/6	Mains Transformer	A83074	21/-
2nd I.F. Transformer	A83095	9/6	Loud Speaker, complete ...	A80590	35/-
2—Gang Condenser	A83080/A	15/6	Condenser Block	KE27	8/-
Output Transformer	A80565	9/-	Field Coil	A80566/A	7/-
Trimmers, ceramic, T1 to T6	A63067	11d.	Voltage Tap Plug	A80368	9d.
Loudspeaker Silk	—	1/-	COILS:—		
Iron Dust Core	77007	9d.	S.W. Aerial. L1 & L2	A83089/B	} 1/8
SPECIAL CONDENSERS	C1, C3	KT35	S.W. Oscillator. L11 & L12 ...	A83089/C	
	C4, C8	KSM5/4	M.W. Aerial. L3	A83088	
	C6	KSM5/3	M.W. Oscillator. L13	A83090/A	
	C7	KSM5/12	L.W. Aerial. L4	A83090/C	
	C10	KSM5/13	L.W. Oscillator. L14	A83090/B	
	C12, C13, C17	KSM5/10	L5	A84090	
	C13	KSM5/9	L6	A84090/A	
	C18	KSM5/11	L7	A84090/C	
C17	KM.1.	L8	A84090/D		
Cabinet	A86075	45/-	L9	A84090/E	} 1/3
Service Screen (base cover) ...	83075/2	8d.	L10	A84090/F	
Knobs, front	A81069	1/-	L15	A84089	
Knobs, side	81012	10d.	L16	A84089/A	
Valve Can	80420	1/6	L17	A84089/B	
A. & E. Panel	A83066	6d.	L18	A84089/C	
Extension L.S. Panel	A83067	6d.	L19 & L20	A84089/D	
			PRESS- BUTTON COILS		

VOLTAGE CHART KB 860

Line Voltage 230v. A.C. in 225v. tap.
Aerial & Earth Disconnected

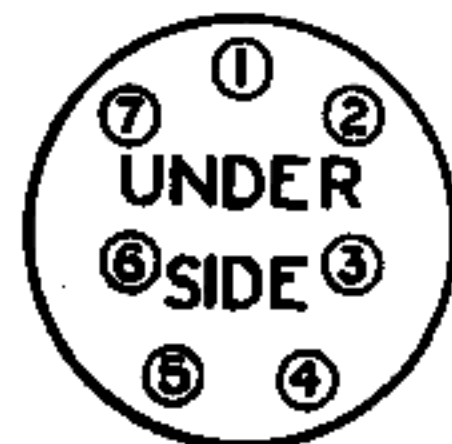
All Keys Off

Volume Control Full On
Readings + or - 10%

Contacts numbered as diagram below.

Valve	Function	Volts measured between SOCKET and CHASSIS.							
		1	2	3	4	5	6	7	TOP CAP
20D2	Frequency Changer	50	0	57	12.5*	0	3.4	257	0
9D2	Pent. I.F. amp.	—	255	1.3	0	12.5*	1.3	57	0
11D5	2nd det, AVC & LF	0	—	0	0	12.5*	2.1	93	0
7D5	Output Pent.	—	0	258	0	12.5*	17.0	243	—
R2	Rectifier	Anodes = 300v. *				Heaters = 336v.			

Voltage Across Output Transformer Primary ...	L25	13 volts
" " Field Coil	L26	75 "
Current through " "		57 mA
" " Mains Transformer Primary ...		260 mA. A.C.
Total Consumption		65 watts



* Asterisk indicates A.C. voltages measured on Rectifier-type meter.

All D.C. voltages measured on 1000 ohm per volt meter.