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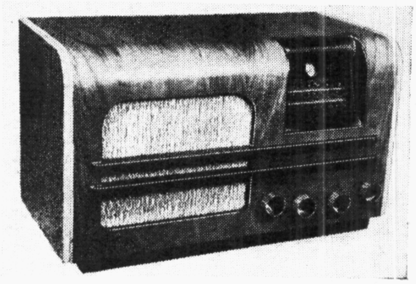
"TRADER" SERVICE SHEET

791

VIDOR CN349

"CHANSON" 3-BAND SUPERHET



The Vidor "Chanson" CN349

THREE wavebands are covered in the Vidor type CN349 "Chanson" receiver, including a S.W. band of 15-50 m. The set has four valves (plus rectifier) and a two-speed cathode-ray tuning indicator, and is designed for use on A.C. mains of 200-250 V, 40-100 c/s.

The chassis is easily removable, and comes out of the cabinet complete with speaker in working order. Slots are provided to facilitate the replacement of controls on the front chassis member, and knurled screws permit the rapid removal of the tuning indicator and its holder.

Release date and original price: April, 1946; £16 10s, plus £3 11s purchase tax.

CIRCUIT DESCRIPTION

Aerial input is via coupling coils **L1** (S.W.), **L2** (M.W.) and **L3** (L.W.) to single-tuned circuits **L4, C36** (S.W.), **L5, C36** (M.W.) and **L6, C36** (L.W.), which precede a triode-hexode valve **(V1, Mullard metallized ECH35)** operating as frequency changer with internal coupling.

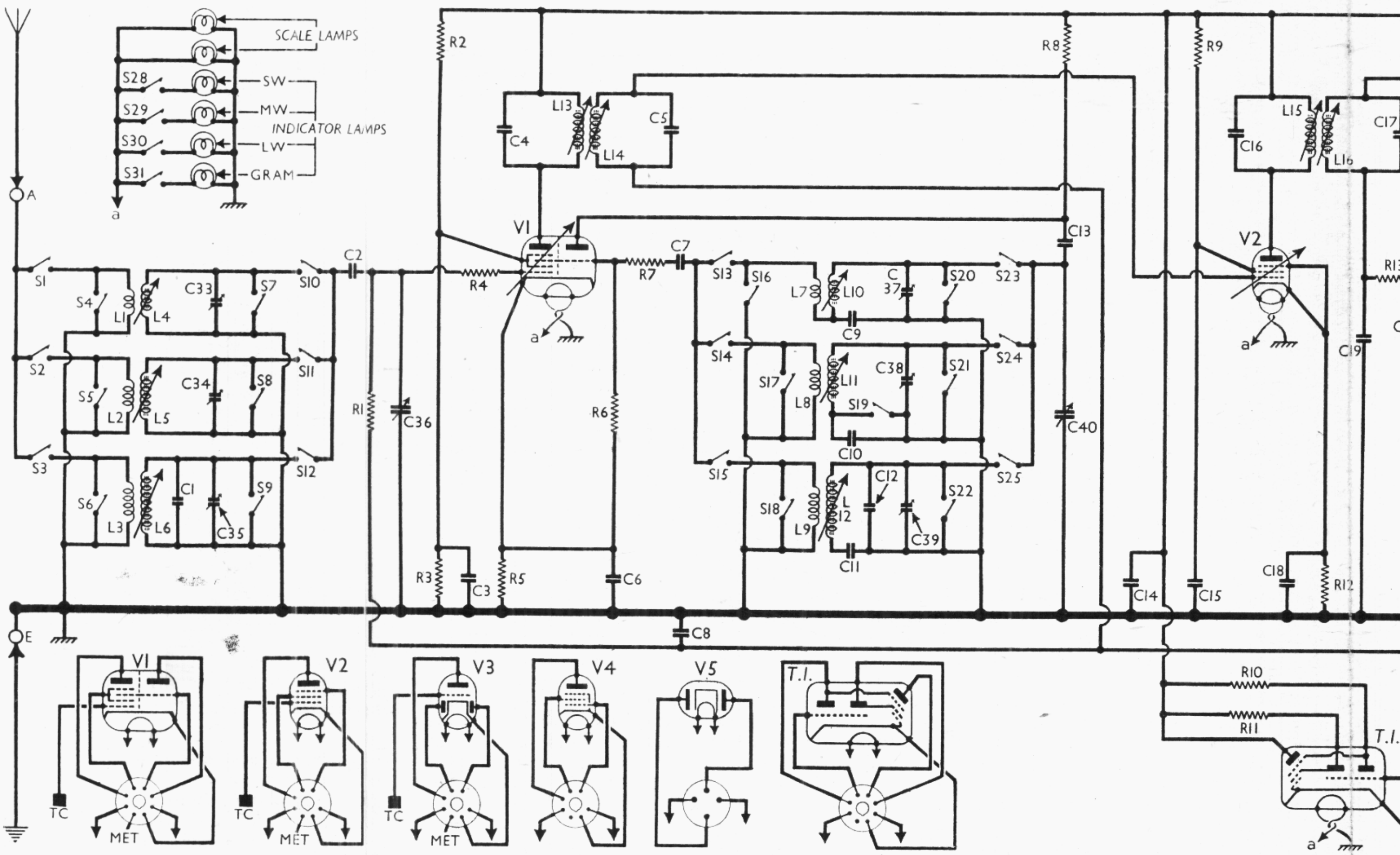
Triode oscillator anode coils **L10** (S.W.), **L11** (M.W.) and **L12** (L.W.) are tuned by **C40.** Parallel trimming by **C37** (S.W.), **C38** (M.W.) and **C12, C39** (L.W.); series tracking by **C9** (S.W.), **C10** (M.W.) and **C11** (L.W.). Reaction coupling by coils **L7** (S.W.), **L8** (M.W.) and **L9** (L.W.), with additional coupling on S.W. due to the common impedance of tracker **C9** in grid and anode circuits.

Second valve **(V2, Mullard metallized EF39)** is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary, tuned-secondary transformer couplings **C4, L13, L14, C5** and **C16, L15, L16, C17.** All the tuning capacitors are fixed, and trimming is effected by varying the positions of the iron-dust cores.

Intermediate frequency 456 kc/s.

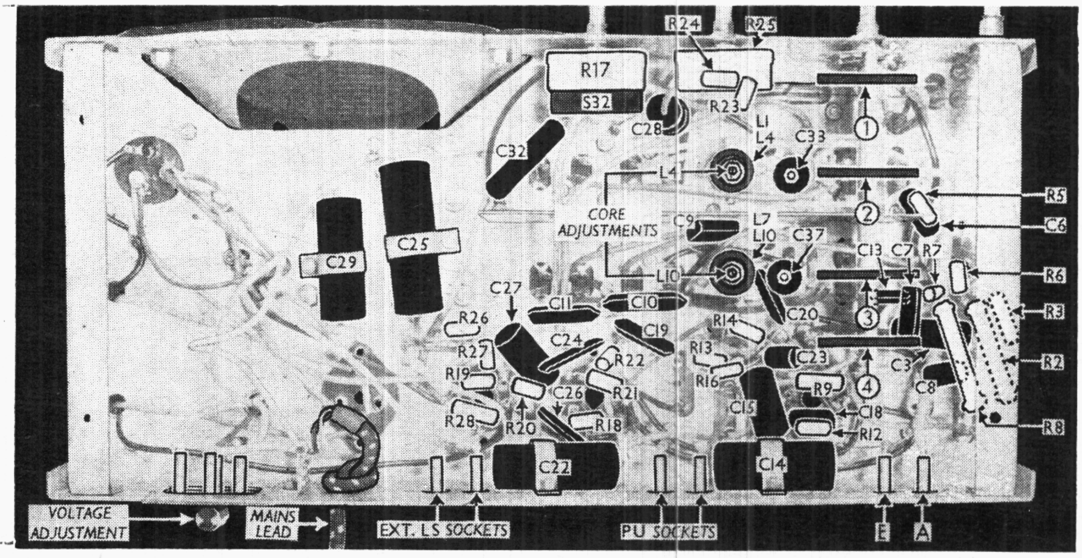
Diode second detector is part of double diode triode valve **(V3, Mullard metallized EBC33).** Audio frequency component in rectified output is developed across load resistor **R16** and passed via coupling capacitor **C23,** switch **S26** and manual volume control **R17** to control grid of triode section, which operates as A.F. amplifier. I.F. filtering by **C19, R13** and **C20** in diode circuit and by **C26** in triode anode circuit.

D.C. potential developed across **R16** also appears across potential divider **R14, R15,** from the lower section of which it is tapped off and applied as control voltage to cathode ray tuning indicator **(T.I.,**



Circuit diagram of the Vidor "Chanson" A.C. superhet. Short-circuiting switches which close across all coils not in use at any time are for the negative feed-back circuit. In some chassis, **R9** and **C15** are omitted, and **V2** screen is connected to the screen of **V1**. **R3** then becomes 100,00

Under-chassis view, where the waveband switch units are indicated by arrows and numbers in circles. These units are shown in detail in the diagrams in col. 6 overleaf, viewed in the direction of the arrows in this illustration. The two S.W. coil core adjustments are also indicated here.

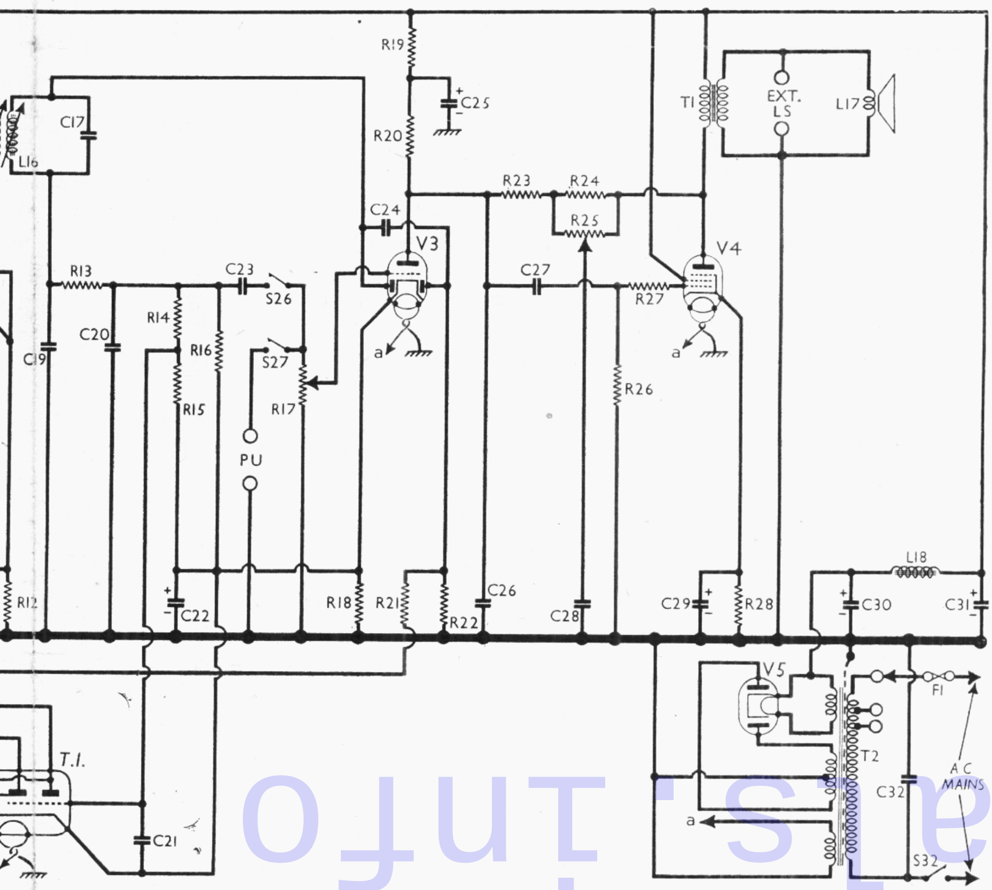


Mullard EM34). Provision for the connection of a gramophone pick-up across **R17**, via **S27**, which closes when the waveband switch is turned to "Gram"; **S26** then opens to mute radio.

Second diode of **V3**, fed from **L16** via **C24**, provides D.C. potentials which are developed across load resistor **R22** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. Delay voltage, together with G.B. for triode section, is obtained from the drop along **R18** in **V3** cathode circuit.

Resistance-capacitance coupling by **R20**, **C27** and **R26**, via grid stopper **R27**, between **V3** triode and pentode output valve **(V4, Mullard EL33).** A portion of the voltage developed in **V4** anode circuit is fed back via coupling circuit **R24**, **R25** and **R23** to **V3** triode anode. Its magnitude and frequency characteristic are determined by the position of the slider of **R25**, which is returned to chassis via **C28**, and the whole circuit forms the variable tone control.

H.T. current is supplied by I.H.C. full-wave rectifying valve **(V5, Brimar R2).** Smoothing by iron-cored choke **L18** and electrolytic capacitors **C30**, **C31**. R.F. filtering in the mains circuit by **C32**, and in the H.T. circuit by **C14**.

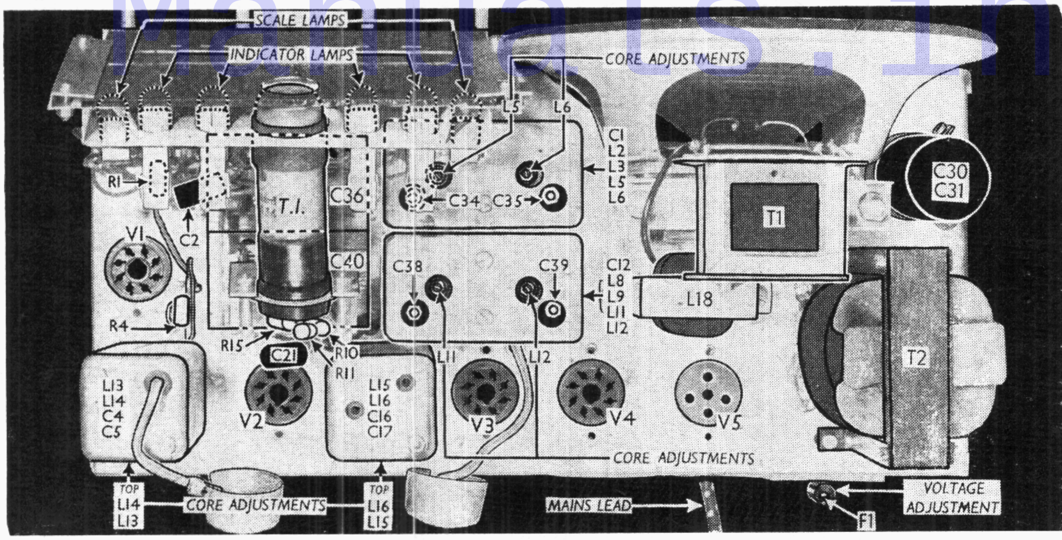


e are formed by circular plates on the switch rotors. The tone control circuit is associated with es 100,000 Ω. This and other modifications are described under "Chassis Divergencies" overleaf.

COMPONENTS AND VALUES

	CAPACITORS	Values (μF)
C1	Aerial L.W. fixed trimmer	0·000025
C2	V1 hex. C.G. capacitor ...	0·0001
C3	V1 S.G. decoupling ...	0·1
C4	} 1st I.F. transformer tuning	{ 0·00015
C5	} capacitors	{ 0·00015
C6	V1 cathode by-pass ...	0·1
C7	V1 osc. C.G. capacitor ...	0·0001
C8	A.V.C. line decoupling ...	0·1
C9	Osc. circ. S.W. tracker ...	0·005
C10	Osc. circ. M.W. tracker ...	0·000565
C11	Osc. circ. L.W. tracker ...	0·000185
C12	Osc. circ. L.W. fixed trimmer	0·00006
C13	V1 osc. anode coupling ...	0·0001
C14	H.T. circuit R.F. by-pass	0·25
C15	V2 S.G. decoupling ...	0·1
C16	} 2nd I.F. transformer	{ 0·00015
C17	} tuning capacitors ...	{ 0·0003
C18	V2 cathode by-pass ...	0·1
C19	} I.F. by-pass capacitors ...	{ 0·0001
C20	}	{ 0·0001
C21	T.I. C.G. decoupling ...	0·01
C22*	V3 cathode by-pass ...	50·0
C23	A.F. coupling to V3 triode	0·01
C24	V3 A.V.C. diode coupling	0·0001
C25*	V3 anode decoupling ...	4·0
C26	V3 anode I.F. by-pass ...	0·0001
C27	A.F. coupling to V4 ...	0·1
C28	Part variable tone control	0·05
C29*	V4 cathode by-pass ...	50·0
C30*	} H.T. smoothing capacitors	{ 16·0
C31*	}	{ 24·0
C32	Mains R.F. by-pass ...	0·01
C33‡	Aerial S.W. trimmer ...	0·00003
C34‡	Aerial M.W. trimmer ...	0·00003
C35‡	Aerial L.W. trimmer ...	0·00003
C36†	Aerial circuit tuning ...	0·000511§
C37‡	Osc. circ. S.W. trimmer ...	0·00003
C38‡	Osc. circ. M.W. trimmer...	0·00003
C39‡	Osc. circ. L.W. trimmer...	0·00003
C40†	Oscillator circuit tuning...	0·000511§

* Electrolytic. † Variable. ‡ Pre-set.
§ Value quoted is "swing" rating, minimum to maximum.



Plan view of the chassis, showing the two rectangular coil units, and the two I.F. units, with their core adjustments identified. **R10, R11** and **R15** are mounted on the back of the tuning indicator socket.

	RESISTORS	Values (ohms)
R1	V1 hex. C.G. resistor ...	470,000
R2	V1 S.G. H.T. potential	33,000
R3	divider	33,000
R4	V1 hex. grid stopper ...	47
R5	V1 fixed G.B. resistor ...	220
R6	V1 osc. C.G. resistor ...	47,000
R7	V1 osc. C.G. stabiliser ...	100
R8	V1 osc. anode H.T. feed ...	33,000
R9	V2 S.G. H.T. feed ...	100,000
R10	T.I. anode load resistors ...	1,000,000
R11		1,000,000
R12	V2 fixed G.B. resistor ...	330
R13	I.F. stopper	50,000
R14	T.I. C.G. feed potential	3,300,000
R15	divider	2,200,000
R16	V3 signal diode load ...	220,000
R17	Manual volume control ...	1,000,000
R18	V3 triode G.B. resistor ...	680
R19	V3 anode decoupling ...	22,000
R20	V3 triode anode load ...	50,000
R21	A.V.C. line decoupling ...	470,000
R22	V3 A.V.C. diode load ...	1,000,000
R23	Negative feedback re-	100,000
R24	sistors	100,000
R25	Variable tone control ...	50,000
R26	V4 C.G. resistor	100,000
R27	V4 grid stopper	50,000
R28	V4 fixed G.B. resistor ...	150

	OTHER COMPONENTS		Approx. values (ohms)
L1	Aerial S.W. coupling coil ...		Very low
L2	Aerial M.W. coupling coil ...		0·2
L3	Aerial L.W. coupling coil ...		58·0
L4	Aerial S.W. tuning coil ...		Very low
L5	Aerial M.W. tuning coil ...		1·8
L6	Aerial L.W. tuning coil ...		9·0
L7	Osc. S.W. reaction coil ...		Very low
L8	Osc. M.W. reaction coil ...		1·0
L9	Osc. L.W. reaction coil ...		2·0
L10	Osc. S.W. tuning coil ...		Very low
L11	Osc. M.W. tuning coil ...		1·6
L12	Osc. L.W. tuning coil ...		2·8
L13	1st I.F. trans.	Pri. ...	4·0
L14		Sec. ...	4·0
L15	2nd I.F. trans.	Pri. ...	3·5
L16		Sec. ...	2·0
L17	Speaker speech coil ...		1·75
L18	H.T. smoothing choke ...		390·0
T1	Output trans.	Pri. ...	380·0
		Sec. ...	0·2
T2	Mains trans.	Pri., total ...	28·0
		Heater sec. ...	Very low
		Rect. heat. sec.	0·1
		H.T. sec., total	570·0
F1	Mains input fuse		—
S1-S25	Waveband switches ...		—
S26-S27	Radio/gram switches ...		—
S28-S31	Indicator lamp switches ...		—
S32	Mains switch, ganged R17		—

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 232 V, using the 230 V tapping on the mains transformer.

The receiver was tuned to the lowest wavelength on the M.W. band and the volume control was at maximum, but there was no signal input. Voltages were measured on the 400 V scale of a model 7 Universal Avometer, chassis being the negative connection.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 ECH35	235	2·2	72	2·5
	Oscillator			
	95	3·9		
V2 EF39	235	5·4	66	1·8
V3 EBC33	102	2·5	—	—
V4 EL33	220	37·0	235	4·1
V5 R2	237†	—	—	—
T.I. EM34	37	0·2	(Pin 3)	—
	27	0·22	(Pin 6)	—
	Target			—
	235	0·58	(Pin 5)	—

† Each anode, A.C.

GENERAL NOTES

Switches.—S1-S25 are the waveband switches, **S26, S27** the radio/gram change-over switches, and **S28-S31** the waveband indicator lamp switches, ganged in four rotary units beneath the chassis deck. These are indicated in our under-chassis view, where they are identified by numbers **(1 to 4)** in circles, and arrows.

They are shown in detail in the diagrams in col. 6, where they are drawn as seen from the rear of an inverted chassis. The table (col. 6) gives the switch positions for the four control settings, starting from the fully anti-clockwise position of the control. A dash indicates open, and **C.** closed.

S32 is the Q.M.B. mains switch, ganged with the volume control **R17.**

Coils.—Of the aerial and oscillator coils, the S.W. units **L1, L4** and **L7, L10** are in two unscreened units beneath the chassis, while the remainder **L2-L6** and **L8-L12** are in two screened units on the chassis deck. The I.F. transformers **L13, L14** and **L15, L16** are in two further screened units on the chassis deck. All the tuning coils have adjustable iron-dust cores.

Scale and Indicator Lamps.—These are six Osram lamps, with spherical bulbs and M.E.S. bases, rated at 6.5 V, 0.3 A. They are arranged in a horizontal row behind the scale assembly, the outer two being provided for scale illumination, and the other four to indicate the position of the waveband control.

External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a low impedance (about 3Ω) external speaker.

Capacitors C30, C31.—These are two dry electrolytics in a tubular metal container mounted on the chassis deck. The red tag is the positive of **C31** (24 μF), and the yellow tag is that of **C30** (16 μF); the black tag is the common negative connection. The unit in our chassis was a T.C.C. type CE28L, rated at 350 V peak working.

Fuse F1.—The fuse consists of a small fibre strip carrying fuse wire inside the body of the mains voltage adjustment plug. If the legs are unscrewed about one turn, the strip can be extracted. Suitable wire for fuse replacement is 32 G tinned copper, and it may be wound round the rivets on the strip.

CHASSIS DIVERGENCIES

Our chassis was a sample taken from an early production run, and this *Service Sheet* is based entirely on it. The values quoted in our tables are those found in our chassis, but in some samples they may be a little different. **R6, R13, R20** and **R27** may be 47,000 Ω or 50,000 Ω according to availability. Similarly, **C1** may be 0.000047 μF, **C10** may be 0.000645 μF, **C11** may be 0.00025 μF, **C12** may be 0.0001 μF, and **C26** may be 0.0005 μF, according to the requirements of a particular chassis.

R9 and **C15** may be omitted altogether, so may **C14, C32** and **R4,** which were not shown in the makers' diagram, where **R3** becomes 100,000 Ω, and **V2** screen is connected directly to the screen of **V1.**

In the later version, a different gang unit is used, having a "swing" value of 0.000532 μF, and with it goes a different scale. At the same time **C33, C34, C37** and **C38** become 0.00004 μF, and **C35** and **C39** become 0.00008 μF; **C1** becomes 0.000047 μF, **C10** becomes 0.000645 μF, and **C11** becomes 0.00025 μF.

DISMANTLING THE SET

The cabinet is fitted with a detachable bottom cover, upon removal of which (two round head wood screws with washers) access may be gained to most of the under-chassis components.

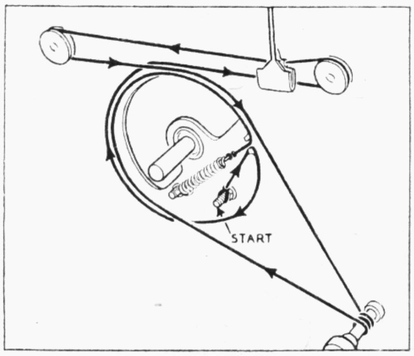
Removing Chassis.—Remove the four control knobs (pull off) from the front of the cabinet;

remove the four bolts (with large steel washers) holding the chassis to the base of the cabinet, when the chassis and speaker may be withdrawn as a single unit, tilting slightly to avoid fouling the top of the tuning scale assembly on the upper rear edge of the cabinet.

REPLACING DRIVE CORD

The length of the cord is about 41 inches, and the course it takes is indicated in the sketch below, where the drive system is shown as it would be seen from the front if the metal chassis and scale support structure were transparent.

With the gang at minimum capacitance, the gap in the rim of the drive drum should be at about 3 o'clock, as shown in our sketch. Cut off about 45 inches of cord, tie a non-slipping loop at one end, and slip this over the anchor screw marked "Start" in the sketch.



The drive cord system is depicted here as it would be seen from the front if all metallic obstacles were transparent. The drum and pointer are at the low wavelength end of their travel. A single cord completes the entire circuit. Arrowheads show the direction taken when fitting the cord.

Take the cord through the gap, and back round the groove in the drum in a clockwise direction, as shown by the arrowheads, as far as the top of the drum, then under and round the right-hand pulley, over and round the left-hand pulley, over the drum and round its groove for about a quarter of the circle, down through the hole provided in the chassis deck, *under* the undercut portion of the control spindle and round it in an anti-clockwise direction (always viewed from the front) to show three turns, up through a second hole in the chassis deck, and again round the drum groove in a clockwise direction, and through the gap.

Although we show the gap at 3 o'clock, the pull of the cord during the operation will pull the drum round so that the gap is at 9 o'clock during most of this operation, but it is advisable to turn it back at this stage to the position shown in the sketch, when the tension spring should be tied to the free end of the cord at such a position as to open the spring about ½ inch when it is hooked on to its anchor screw. The spare cord may now be cut off.

The pointer must now be attached to the upper cord in the position shown. In our sample, the centre of the pointer was 13⅜ inches from the "Start" end of the cord, measured from the outer extreme of the loop. There is no calibration mark at this end of the scale, but at the long wavelength end the pointer should coincide with the yellow mark beyond the 2,000 m line on the L.W. scale. The fixing tags can be pressed lightly on to the cord at first, then the adjustment can be made roughly at the high wavelength end, the pointer being returned to the low wavelength end for permanent fixing. Final adjustment may then be made by adjusting the drum on the gang spindle.

CIRCUIT ALIGNMENT

I.F. Stages.—Connect signal generator leads via a 0.1 μF capacitor to control grid (top cap) of **V1** and chassis, and short-circuit **C40** to mute the oscillator. Turn the volume control to maximum, and keep the input low to avoid A.V.C. action. Feed in a 456 kc/s (657.8 m) signal, and adjust the cores of **L13, L14, L15** and **L16** in turn for maximum output. Remove short-circuit from **C40.**

R.F. and Oscillator Stages.—For these adjustments, the chassis must be removed from the cabinet. With the gang at maximum, the pointer should coincide with the yellow calibration mark beyond the 2,000 m mark on the L.W. scale. It may be corrected if required either by adjusting the scale in its clamps or by adjusting the drive drum on the gang spindle. Transfer signal generator leads to **A** and **E** sockets, via a suitable dummy aerial.

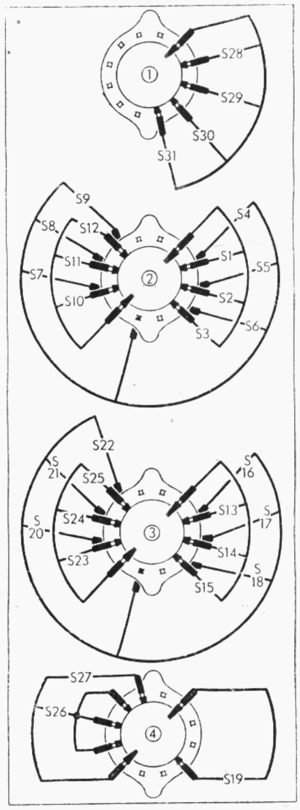
S.W.—Switch set to S.W., tune to 20 m on scale, feed in a 20 m (15 Mc/s) signal, and adjust **C37,** then **C33,** for maximum output. Feed in a 45 m (6.67 Mc/s) signal, tune it in, and adjust the cores of **L4** and **L10,** while rocking the gang, for maximum output and correct calibration.

M.W.—Switch set to M.W., tune to 250 m on scale, feed in a 250 m (1,200 kc/s) signal, and adjust **C38,** then **C34,** for maximum output. Feed in a 500 m (600 kc/s) signal, tune it in, and adjust the cores of **L5** and **L11,** while rocking the gang, for maximum output and correct calibration.

L.W.—Switch set to L.W., tune to 1,000 m on scale, feed in a 1,000 m (300 kc/s) signal, and adjust **C39,** then **C35,** for maximum output. Feed in a 2,000 m (150 kc/s) signal, tune it in, and adjust the cores of **L6** and **L12,** while rocking the gang, for maximum output and correct calibration.

Switch Table and Diagrams

Switch	Gram	L.W.	M.W.	S.W.
S1	—	—	—	C
S2	—	—	C	—
S3	—	C	—	—
S4	C	C	C	—
S5	C	C	—	C
S6	C	—	C	C
S7	C	C	C	—
S8	C	C	—	C
S9	C	—	C	C
S10	—	—	—	C
S11	—	—	C	—
S12	—	C	—	—
S13	—	—	—	C
S14	—	—	C	—
S15	—	C	—	—
S16	C	C	C	—
S17	C	C	—	C
S18	C	—	C	C
S19	—	C	—	—
S20	C	C	C	—
S21	C	C	—	C
S22	C	—	C	C
S23	—	—	—	C
S24	—	—	C	—
S25	—	C	—	—
S26	—	C	C	C
S27	C	—	—	—
S28	—	—	—	C
S29	—	—	C	—
S30	—	C	—	—
S31	C	—	—	—



Diagrams of the four switch units, drawn as seen from the rear of an inverted chassis.

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