"TRADER" SERVICE SHEET

958

PYE T19D & 19D

Band-spread A.C. Superhets

FIVE band-spread S.W. ranges and three normal tuning ranges are provided in the Pye T19D, their coverage being 16 m, 19 m, 25 m, 31 m and 49 m, then 75-200 m (to include "trawler" band), 190-560 m and 1,000-2,000 m.

The 19D is in general like the T19D, but the waveband ranges are different. The differences are fully described beneath the circuit diagram below.

Release dates: T19D, *May*, 1949; 19D, *November*, 1948. *Original price, both models*, £22 1s *plus purchase tax.*

CIRCUIT DESCRIPTION

On the three normal tuning bands the aerial is coupled by **C2, L2** (S.W.), **L3** (M.W.) and **L4** (L.W.) to single-tuned circuits **L10, C42** (S.W.), **L11, C42** (M.W.) and **L12, C42** (L.W.) which precede triode-hexode valve **(V1, Mullard ECH 35)** operating as a frequency-changer with internal coupling. **S18** closes to connect **C42**, which is the larger section of the gang.

On the five band-spread ranges, **S18** opens and **S19** closes to connect the smaller gang section **C43.** The aerial is coupled by **C2, C5** to single-tuned circuits **L5, C43** (16 m band), **L6, C43** (19 m band), **L7, C43** (25 m band), **L8, C43** (31 m band) and **L9, C43** (49 m band). I.F. filter **L1, C1** is in circuit on all bands.

On the three normal waveband ranges, triode oscillator anode coils **L20** (S.W.), **L21** (M.W.) and **L22** (L.W.) are tuned by **C46** (larger section of gang). Parallel trimming by **C44** (S.W.), **C45** (M.W.) and **C16** (L.W.); series tracking by **C13** (S.W.), **C14** (M.W.) and **C15** (L.W.). Reaction coupling from grid via the common impedance of the trackers, with the addition of inductive coupling by **L13** on S.W. and **L14** on M.W.

For bandspread operation, **S53** opens, and **S20** and **S54** close. The bandspread oscillator coils **L15** (16 m band), **L16** (19 m band), **L17** (25 m band), **L18** (31 m band) and **L19** (49 m band) are arranged in a Colpitts circuit with **C12, C18, C19** and **C47.** Tuning is performed by **C47,** which is the smaller gang section.

Second valve **(V2; Mullard EF39)** is a variable-mu R.F. pentode, operating as intermediate frequency amplifier with tuned transformer couplings **C8, L23, L24, C9** and **C22, L25, L26, C23.**

Intermediate frequency 465 kc/s.

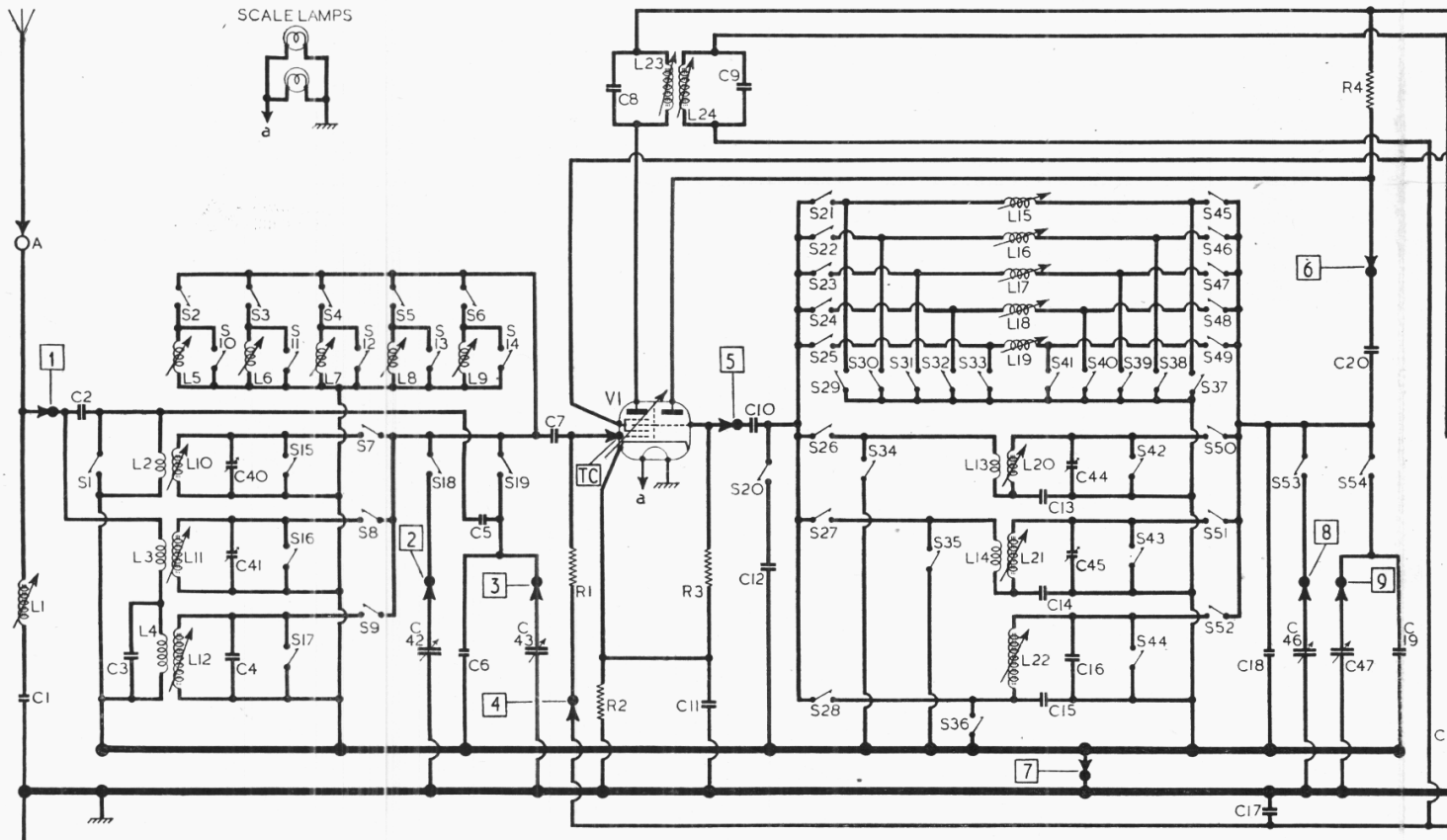
The diode signal detector is part of double diode triode valve **(V3, Mullard EBC33).** Audio frequency component in rectified output is developed across load resistor **R7** and passed via **C27,** manual volume control **R9,** and **R10** to the grid of the triode section, which operates as an A.F. amplifier. I.F. filtering by **C25, R6** and **C26.**

Provision is made for the connection of a gramophone pick-up across **R9** via **S56** which closes when the tone switch is turned to Gram. **S55** and **S57** then open to prevent radio breakthrough.

Second diode of **V3,** fed from **V2** anode via **C29,** provides D.C. potential which is developed across load resistor **R14** and fed back via decoupling circuit to F.C. and I.F. valves, giving automatic gain control. Delay voltage, together with G.B. for **V3** triode section, is obtained from the drop across **R13** in cathode lead to chassis.

Resistance-capacitance coupling by **R12, C32** and **R15** between **V3** triode and pentode output valve **(V4, Mullard EL33).** Fixed tone correction in anode circuit by **C33.** Provision is made for the connection of a low-impedance speaker.

A proportion of the speech voltage in **T1** secondary circuit is fed back from the potential divider **R20, R21, C37, C36, R22** and **C38** via **R19, C35** to **V3** control grid circuit. Six-position tone control is provided by changing the frequency characteristic of this circuit via the medium of switches **S58-S61.** Four of these



Circuit diagram of the Pye T19D receiver from which this Service Sheet was prepared. Coils shown as pre-set without iron-dust cores have aluminium slugs. **TC** and Nos. **1-9** in rectangular boxes indicate connections between the tuning assembly and the main chassis.

Model 19D Divergencies.—T
ence in the 19D is that the
the M.S.W. band is 8-2.5 Mc
the band-spread ranges are
16-49 m., this is accompani
the M.W. and L.W. tuning
aerial coupling circuits. The
shown in col. 3 overleaf, wh
that the band-spread circuit
aerial via **Cx** (5 pF) instead

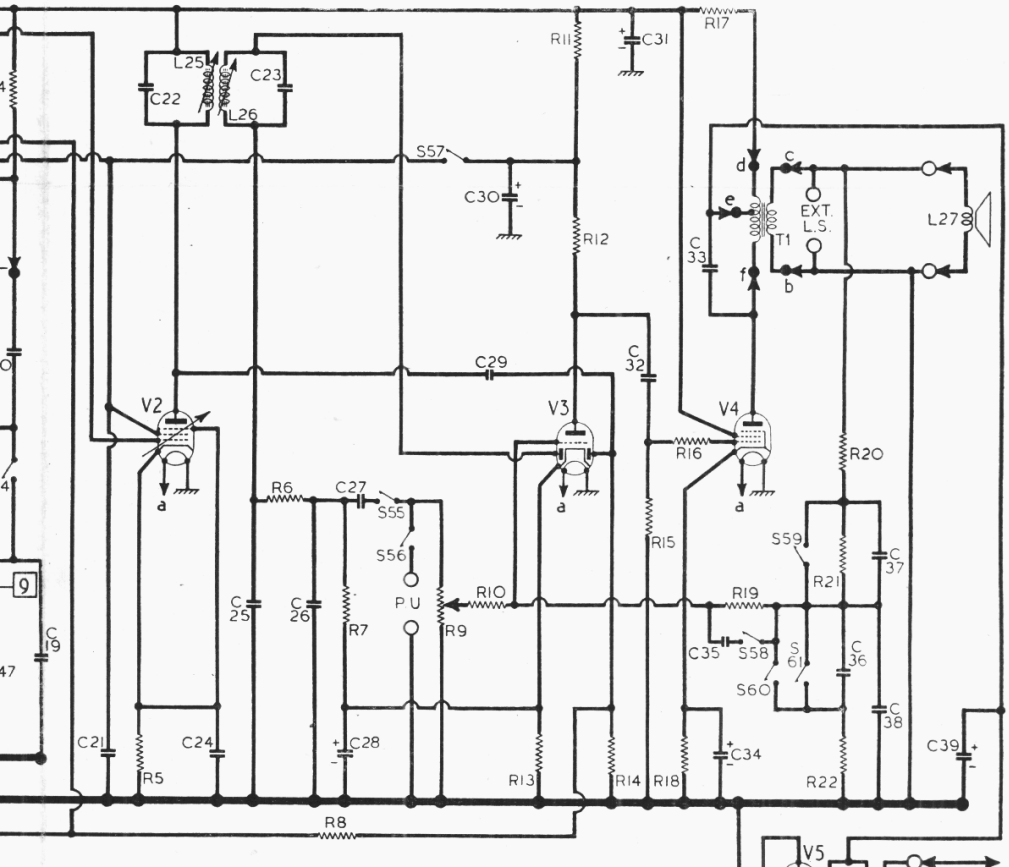
positions operate on radio signals, and two on gram only, the change-over from radio to gram being performed by **S55-S57** which are ganged with the tone control switches.

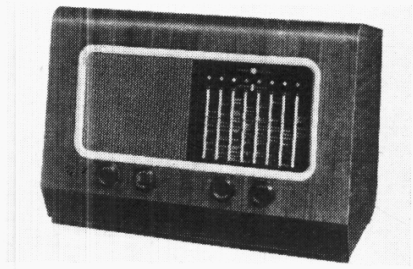
H.T. current is supplied by D.H.C. full-wave rectifying valve **(V5, Mullard AZ31)**. Smoothing by **C39, R17** and **C31**. Residual hum is neutralized by passing H.T. current to the early stages through part of the output transformer **T1** primary winding.

COMPONENTS AND VALUES

	RESISTORS	Values	Locations
R1	V1 hex. C.G. ...	1MΩ	F3
R2	V1 G.B.	220Ω	G4
R3	V1 osc. C.G. ...	47kΩ	G4
R4	V1 osc. H.T. feed	15kΩ	G4
R5	V2 G.B.	330Ω	F5
R6	I.F. stopper ...	100kΩ	F5
R7	Diode load ...	470kΩ	E5
R8	A.G.C. decoupling	1MΩ	E5
R9	Volume control ...	1MΩ	E3
R10	V3 grid stopper	2.2MΩ	E3
R11	V3 H.T. feed ...	33kΩ	E4
R12	Triode anode load	220kΩ	E4
R13	V3 G.B.	6.8kΩ	E5
R14	A.G.C. diode load	1MΩ	E5
R15	V4 C.G.	470kΩ	E4
R16	V4 grid stopper ...	22kΩ	E4
R17	H.T. smoothing ...	1.8kΩ	F4
R18	V4 G.B.	150Ω	E4
R19	Neg. feedback ...	4.7MΩ	E3
R20		10kΩ	E3
R21		18kΩ	E3
R22		10kΩ	E3

	OTHER COMPONENTS	Approx. Values (ohms)	Locations
L1	I.F. filter coil ...	34.0	G5
L2	Aerial coupling coils	12.5	F3
L3		45.0	G3
L4		250.0	F3
L5	16 m aerial tuning	Very low	F3
L6	19 m aerial tuning	Very low	F3
L7	25 m aerial tuning	Very low	F3
L8	31 m aerial tuning	Very low	G3
L9	49 m aerial tuning	0.5	F3
L10	S.W. aerial tuning	1.0	F3
L11	M.W. aerial tuning	3.0	G3
L12	L.W. aerial tuning	18.0	F3
L13	Osc. reaction coils	Very low	F4
L14		0.4	F4
L15	16 m osc. tuning	Very low	G4
L16	19 m osc. tuning	Very low	G4
L17	25 m osc. tuning	Very low	G4
L18	31 m osc. tuning	0.3	F4
L19	49 m osc. tuning	0.5	F4
L20	S.W. osc. tuning	0.5	F4
L21	M.W. osc. tuning	2.6	F4
L22	L.W. osc. tuning ...	4.5	F4
L23	1st. I.F. trans. Pri.	10.0	A2
L24	1st. I.F. trans. Sec. ...	10.0	A2
L25	2nd I.F. trans. Pri.	10.0	B2
L26	2nd I.F. trans. Sec.	10.0	B2
L27	Speech coil ...	2.5	—
T1	O.P. trans Pri. total	460.0	B1
	O.P. trans Sec.	0.4	B1
T2	Mains trans. Pri. total	40.0	C2
	Mains trans. H.T. sec. total	480.0	
	Mains trans. 6.3V htr.	Very low	
	Mains trans. Rect. htr.	Very low	





The Pye 19D. The T19D is similar.

	CAPACITORS	Values	Locations
C1	I.F. filter tune ...	47pF	G5
C2	Aerial coupling ...	100pF	G4
C3	L.W. aerial shunt ...	100pF	G4
C4	L.W. aerial fixed trim.	120pF	F3
C5	Aerial coupling ...	5pF	F3
C6	Bandspread fixed trim.	50pF	F3
C7	V1 hex. C.G. ...	100pF	F3
C8	1st I.F. transformer tuning	100pF	A2
C9		100pF	A2
C10	V1 osc. C.G. ...	100pF	G4
C11	V1 cath. by-pass ...	0·01μF	G4
C12	Bandspread osc. tune	125pF	F4
C13	S.W. osc. tracker ...	0·0017μF	F4
C14	M.W. osc. tracker ...	500pF	F4
C15	L.W. osc. tracker ...	200pF	F4
C16	L.W. osc. fixed trim	150pF	F4
C17	A.G.C. line decoup.	0·05μF	F5
C18	Oscillator fixed trim	15pF	F4
C19	Bandspread fixed trimmer ...	100pF	F5
C20	Osc. anode coupling	100pF	G4
C21	V1, V2 S.G. decoupling	0·1μF	G4
C22	2nd I.F. trans-former tuning ...	100pF	B2
C23		100pF	B2
C24	V2 cath. by-pass ...	0·1μF	F5
C25	I.F. by-passes ...	100pF	F5
C26		100pF	E5
C27	A.F. coupling ...	0·002μF	E5
C28*	V3 cath. by-pass ...	50μF	E5
C29	A.G.C. coupling ...	10pF	F4
C30*	H.T. feed decoup.	2μF	E3
C31*	H.T. smoothing ...	32μF	B2
C32	A.F. coupling ...	0·005μF	E5
C33	Tone correction ...	0·01μF	E4
C34*	V4 cath. by-pass ...	50μF	E3
C35	Neg. feedback ...	20pF	E3
C36		0·05μF	E3
C37		0·05μF	E3
C38		0·002μF	E3
C39*	H.T. smoothing ...	32μF	B2
C40‡	S.W. aerial trim. ...	50pF	F4
C41‡	M.W. aerial trim. ...	50pF	F4
C42†	Aerial tuning ...	§487pF	B1
C43†	Aerial band-spread tuning	§10pF	B1
C44‡	S.W. osc. trim. ...	50pF	F4
C45‡	M.W. osc. trim. ...	50pF	F4
C46†	Osc. tuning ...	§487pF	B2
C47†	Osc. band-spread tuning	§45pF	B2

* Electrolytic. † Variable. ‡ Pre-set.
§ "Swing" value, min. to max.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on A.C. mains of 240 V, using the 236-250 V adjustment tapping. Voltages, with

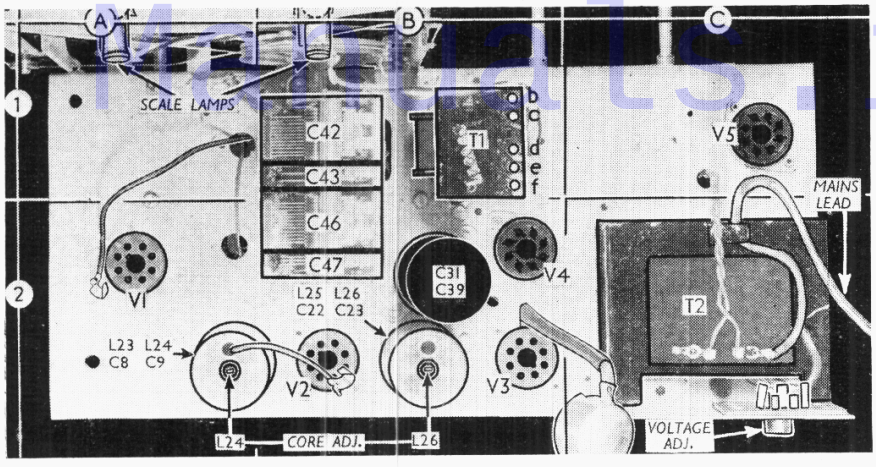
Valve	Anode V	Anode mA	Screen V	Screen mA	Cath. V
ECH35 ...	250	2·0	100	2·7	2·3
	Oscillator 155	6·5			
EF39 ...	250	5·3	100	1·7	2·4
EBC33 ...	35	0·3	—	—	0·9
EL33 ...	280	32·0	250	4·2	5·5
AZ31 ...	280†	—	—	—	295.0

† Each anode A.C.

rgencies.—The primary differ- that the waveband range of is 8-2.5 Mc/s (37.5-110 m) and anges are 13-31 m instead of accompanied by changes in . tuning circuits and in the uits. The 19D aerial circuit is verleaf, where it will be seen ad circuits are fed from the) instead of **C2, C5** and **S19.**

The aerial coupling circuits are switched, and **L11, L12** are air-cored. The drive cord also is a little different.

In the oscillator circuit, **L22** is provided with a reaction coil connected between **S28** and **C15,** and the following component value changes occur: **C1** becomes 60pF; **C4** is 50 pF; **C7** is 220 pF; **C13** is 0.002 μF; **C14** and **C15** are both 570 pF; **C16** is 370 pF, and **C12** is 100 pF. **R1** becomes 330 kΩ and **R4** becomes 10 kΩ.



Plan view of the chassis. The output transformer connections are letter-coded **b-f**

the exception of cathode readings, were measured on the 400 V scale of a Model 7 Avometer, chassis being the negative connection.

DISMANTLING THE SET

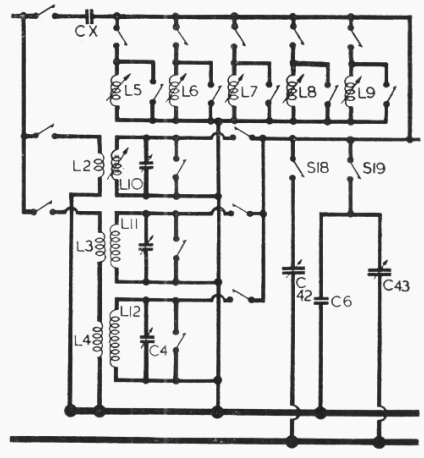
Removing Chassis.—Remove the four control knobs (pull-off) from the front of the cabinet;
remove the two cheese-head screws located at the rear bottom corners of the chassis;
withdraw the two speaker plugs from their sockets.
The chassis may now be slid out, lifting the front edge slightly to enable it to clear the chassis-fixing brackets in the bottom of the cabinet.

Removing Tuning Assembly.—Unsolder the nine leads connecting the assembly to the main chassis, and remove the top cap lead to **V1**;
remove the large nut (with lock-washer) from the switch spindle bush and the waveband indicator drive bush from the spindle;
remove the two screws holding the assembly to the chassis deck, and lift out the assembly.
When replacing, the nine interconnecting points at which soldered joints are to be made are indicated in the waveband switch diagrams (seen below) and the tuning assembly in our under- chassis view by numbers 1-9 in rectangular boxes. The tenth connection is to V1 top cap. These numbers are repeated in our circuit diagram.

GENERAL NOTES

Switches.—**S1-S54** are the waveband switches, ganged in four rotary wafers beneath the chassis, on the tuning assembly. Numbered diamonds **1—4** in our under-chassis photograph indicate the direction in which they are viewed in the diagrams below, where the table beside them gives the switch action for the eight control settings, starting from the fully anti-clockwise position of the control knob. A dash indicates open, and **C**, closed.

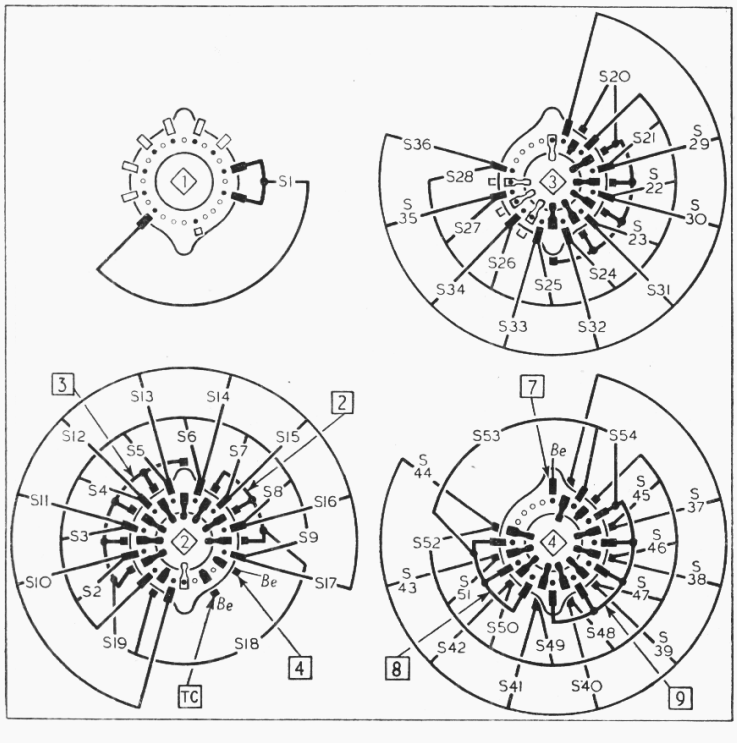
S55-S57 are the radio/gram change-over switches, and **S58-S61** are the six-position tone control switches, ganged in two further rotary wafers beneath the chassis. Numbered diamonds



Aerial circuit of the model 19D, in which the coupling coils are switched. Other differences between this and the T19D are explained beneath the diagram overleaf.

Switch	L.W.	M.W.	S.W.	B-S.5 49 m.	B-S.4 31 m.	B-S.3 25 m.	B-S.2 19 m.	B-S.1 16 m.
S1	C	C	—	—	—	—	—	—
S2	—	—	—	—	—	—	C	C
S3	—	—	—	—	—	—	—	—
S4	—	—	—	—	—	C	—	—
S5	—	—	—	—	C	—	—	—
S6	—	—	—	C	—	—	—	—
S7	—	—	C	—	—	—	—	—
S8	—	C	—	—	—	—	—	—
S9	C	—	—	—	—	—	—	—
S10	C	C	C	C	C	C	C	—
S11	C	C	C	C	C	C	—	C
S12	C	C	C	C	—	C	C	C
S13	C	C	C	C	C	C	C	C
S14	C	C	—	C	C	C	C	C
S15	C	—	C	C	C	C	C	C
S16	C	C	C	C	C	C	C	C
S17	—	C	C	—	C	C	C	C
S18	C	C	—	—	C	C	C	C
S19	—	—	—	C	C	C	C	C
S20	—	—	—	—	—	—	C	C
S21	—	—	—	—	—	—	—	—
S22	—	—	—	—	—	C	—	—
S23	—	—	—	—	C	—	—	—
S24	—	—	—	C	—	—	—	—
S25	—	—	C	—	—	—	—	—
S26	—	—	—	—	—	—	—	—
S27	—	C	—	—	—	—	—	—
S28	C	—	—	—	—	—	—	—
S29	C	C	C	C	C	C	C	—
S30	C	C	C	C	C	C	—	C
S31	C	C	C	C	—	C	C	C
S32	C	C	C	C	C	C	C	C
S33	C	C	—	C	C	C	C	C
S34	C	—	C	C	C	C	C	C
S35	C	C	C	C	C	C	C	C
S36	—	C	C	—	C	C	C	C
S37	C	C	C	C	C	C	C	C
S38	C	C	C	C	C	C	C	C
S39	C	C	C	C	C	C	C	C
S40	C	C	C	C	C	C	C	C
S41	C	C	C	C	C	C	C	C
S42	C	C	—	C	C	C	C	C
S43	C	C	C	C	C	C	C	C
S44	—	C	C	—	C	C	C	C
S45	—	—	—	—	—	—	C	—
S46	—	—	—	—	—	—	—	—
S47	—	—	—	—	—	C	—	—
S48	—	—	—	—	C	—	—	—
S49	—	—	—	C	—	—	—	—
S50	—	—	C	—	—	—	—	—
S51	—	C	—	—	—	—	—	—
S52	C	C	C	—	—	—	—	—
S53	C	C	C	—	—	—	—	C
S54	—	—	—	C	C	C	C	C

Diagrams of the waveband switch units (below) veiwed from the rear of an inverted chassis. Numbers in rectangular boxes indicate connections to the main chassis. The associated switch table is on the left.



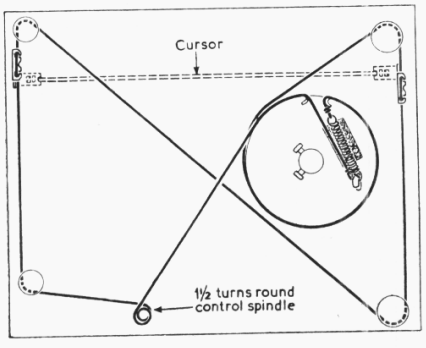
5 and **6** in our under-chassis view identify them and indicate how they are viewed in the diagrams in col. 6, where the table beside them gives the switch action for the seven control settings, starting from "Off."

Scale Lamps.—These are two white-sprayed Mazda lamps, with large spherical bulbs and M.E.S. bases, rated at 6.5 V, 0.3 A.

External Speaker.—Two sockets are provided at the rear of the chassis for the connection of a low-impedance (2-4 Ω) external speaker.

DRIVE CORD REPLACEMENT

About 50 inches of Nylon braided glass yarn is required for a new drive cord for the T19D, and about 30 inches for the 19D. A few inches more would allow greater latitude in tying off.



The course taken in the T19D is shown in the sketch above, where it is viewed from the rear (neglecting obstructions) with the gang at maximum capacitance.

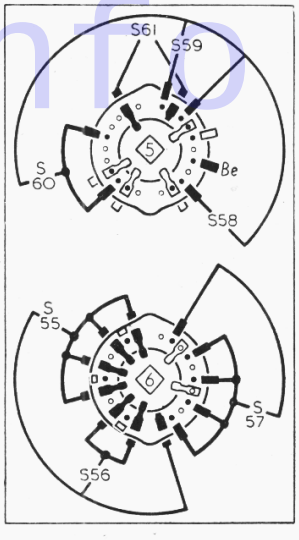
The 19D drive looks like the T19D drive with the right-hand vertical run omitted, the downward diagonal run from the top left pulley going round the drum instead of past it. The cursor is supported on one side only.

CIRCUIT ALIGNMENT

I.F. Stages.—Remove the chassis from the cabinet, switch set to M.W., turn gang and volume control to maximum. Connect signal generator leads to control grid of **V1**, via a 0.1μF capacitor, and to chassis. Feed in a 465 kc/s (645.16 m) signal, and adjust the cores of **L26, L25** (locations **B2, F5**), **L24, L23** (A2, F5) in that order for maximum output, reducing the input as the circuits come into line to avoid A.G.C. action.

I.F. Filter.—Switch set to M.W. and turn gang to maximum. Transfer signal generator leads to **A** and **E** sockets via a suitable dummy aerial (see R.F. and Oscillator stages). Feed in a 465 kc/s signal, and adjust the core of **L1** for minimum output.

Switch	Off	Fid.	Bri.	Mel.	S.W.	Gram Fid.	Gram Mel.
S55	—	C	C	C	C	—	—
S56	—	—	—	—	—	C	C
S57	—	C	C	C	C	—	—
S58	C	—	—	C	C	—	C
S59	—	C	—	C	C	—	—
S60	C	C	—	C	—	C	—
S61	—	—	—	C	—	C	C



Tone control switch diagrams (right) and the associated switch table (above).

R.F. and Oscillator Stages.—Since the calibrated glass scale is mounted in the cabinet, and alignment adjustments must be carried out with the chassis on the bench, a substitute scale having 100 divisions is printed on the rear left-hand side of the scale backing plate. Readings on this scale are taken against the upper edge of the middle tongue of the drive cord clamp on the cursor carriage.

With the gang at maximum capacitance, the reading on the substitute scale should be 100, and if any error is found, the cursor carriage may be slid up or down on the drive cord to correct it. When the chassis is inserted in the cabinet, the cursor should coincide with the black dots at the highest wavelength ends of the scales with the gang at maximum capacitance. Connect the signal generator leads to **A** and **E** sockets, inserting a suitable dummy aerial in the "live" lead. This may consist of a **200pF capacitor** for L.W. and M.W., and a 400Ω resistor for the S.W. and band-spread ranges.

L.W.—Switch set to L.W., tune to 1,330 m (41 on substitute scale), feed in a 1,330 m (225 kc/s) signal (200 kc/s (1,500 m) for model 19D and adjust the cores of **L22** (F4) and **L12** (F3) for maximum output.

M.W.—Switch set to M.W., tune to 500 m (83 on scale), feed in a 500 m (600 kc/s) signal and adjust the cores of **L21** (F4) and **L11** (G3) for maximum output. Tune to 200 m (6 on scale), feed in a 200 m (1,500 kc/s) signal and adjust **C45** (F4) and **C41** (F4) for maximum output.

S.W. (Model T19D).—Switch set to M.S.W., tune to 1,500 kc/s (95 on scale), feed in a 1,500 kc/s (200 m) signal and adjust the cores of **L20** (F4) and **L10** (F3) for maximum output. Tune to 3.3 Mc/s (17 on scale), feed in a 3.3 Mc/s (90.9 m) signal and adjust **C44** (F4) and **C40** (F4) for maximum output.

S.W. (Model 19D).—Switch set to M.S.W., tune to 3.0 Mc/s (83 on scale), feed in a 3.0 Mc/s (100 m) signal and adjust the cores of **L20** (F4) and **L10** (F3) for maximum output. Tune to 7.0 Mc/s (11 on scale), feed in a 7.0 Mc/s (42.87 m) signal and adjust **C44** (F4) and **C40** (F4) for maximum output.

Band-spread Ranges. — A crystal-controlled signal generator should be used to align these ranges, but where this is not available the calibration may be checked against broadcasting stations of known frequency. Note: Coil numbers move up one in the 19D.

49 m band.—Switch set to 49 m, tune to 6.1 Mc/s (44 on scale), feed in a 6.1 Mc/s (49.18 m) signal and adjust the aluminium cores of **L19** (F4) and **L9** (F3) for maximum output.

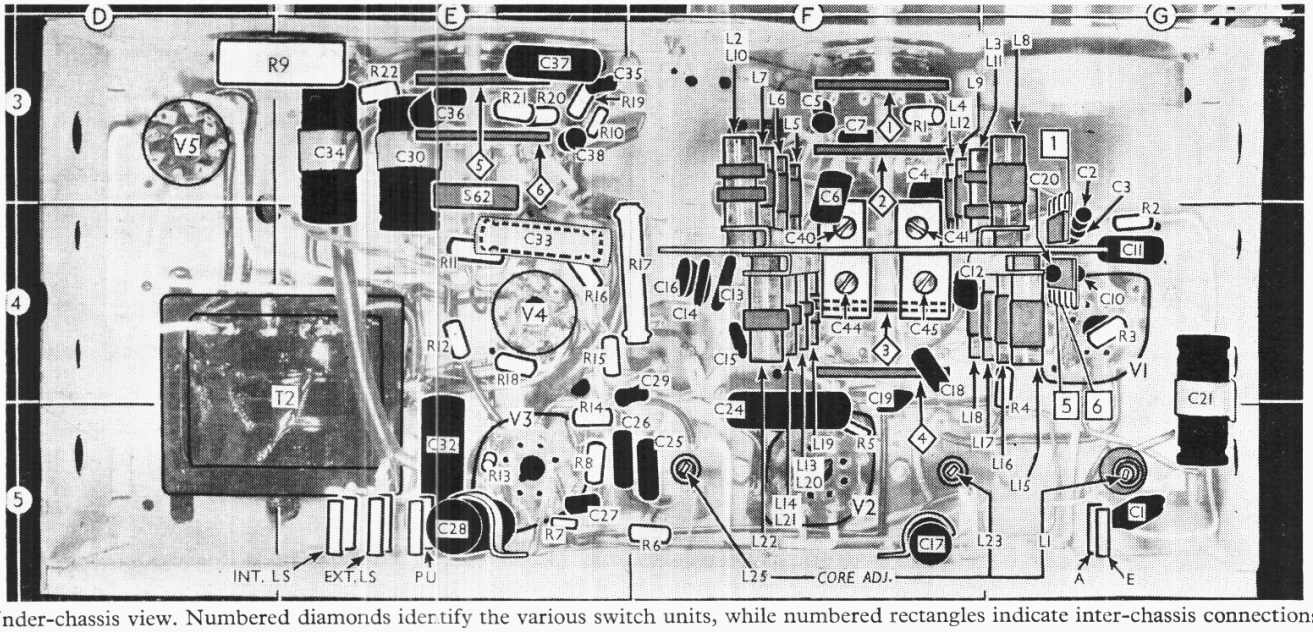
31 m band.—Switch set to 31 m, tune to 9.6 Mc/s (45 on scale), feed in a 9.6 Mc/s (31.25 m) signal and adjust the aluminium cores of **L18** (F4) and **L8** (G3) for maximum output.

25 m band.—Switch set to 25 m, tune to 11.8 Mc/s (45 on scale), feed in a 11.8 Mc/s (25.42 m) signal and adjust the aluminium cores of **L17** (G4) and **L7** (F4) for maximum output.

19 m band.—Switch set to 19 m, tune to 15.3 Mc/s (44 on scale), feed in a 15.3 Mc/s (19.61 m) signal and adjust the aluminium cores of **L16** (G4) and **L6** (F3) for maximum output.

16 m band.—Switch set to 16 m, tune to 17.8 Mc/s (44 on scale), feed in a 17.8 Mc/s (16.85 m) signal and adjust the aluminium cores of **L15** (G4) and **L5** (F3) for maximum output.

13 m band (Model 19D).—Switch set to 13 m, tune to 21.6 Mc/s (50 on scale), feed in a 21.6 Mc/s (13.89 m) signal and adjust the aluminium cores of **L15** (G4) and **L5** (F3) for maximum output.



Under-chassis view. Numbered diamonds identify the various switch units, while numbered rectangles indicate inter-chassis connections.

Printed in England by The Cornwall Press Ltd., Paris Garden, London, S.E.1.