'TRADER' SERVICE SHEET 178

PYE T18

4-VALVE A.C. SUPERHET

A TRIODE output valve is employed in the Pye T18 table receiver. In its standard form it is suitable for operation on A.C. mains of 200-250 V, 40-100 c.p.s., but models for other voltages and periodicities are also made.

In the Pye range there is also a T18 console receiver and a T18 radio-gramophone, but the chassis of these are somewhat different owing to the use of a push-pull output stage.

CIRCUIT DESCRIPTION

Aerial input via coupling coil **L1** and small condenser **C2** to inductively coupled band-pass filter. Primary **L2, L3** is tuned by **C27**; secondary **L4, L5** is tuned by **C29.** Image suppression by **C1.**

First valve (**V1, Ever Ready metallised A80A**) is an octode operating as frequency changer with electron coupling. Oscillator grid coils **L6, L7** are tuned by **C32**; parallel trimming by **C31** (M.W.) and **C33** (L.W.); tracking by shaped condenser plates; oscillator anode reaction coil **L8.**

Second valve, a variable-mu H.F. pentode (**V2, Ever Ready metallised A50N**) operates as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C34, L11, L12, C35** and **C36, L13, L14, C37.** Variable selectivity control operates switches **S7, S8,** which connect first I.F. transformer tertiary winding **L9, L10,** in order to produce a broad I.F. characteriestic. Resistance **R2,** isolated by condenser **C4,** has the effect of levelling the two peaks which provide the broad topped response curve, while condenser **C5** corrects any shift in tuning.

Intermediate frequency 127 KC/S.

Neon tuning indicator **T.I.** in **V2** anode H.T. feed circuit.

Diode second detector is part of double diode triode valve (**V3, Ever Ready A23A**). Audio-frequency component in rectified output is developed across resistances **R18, R19,** and manual volume control **R21,** and passed via coupling condenser **C16** to C.G. of triode section, which operates as L.F. amplifier. Special compensating circuit, switched by **S12** and **S13,** provides inter-station noise suppression without distortion.

Second diode of **V3,** fed from **V2** anode via **C19,** provides D.C. potential which is developed across **R30** and fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control. In conjunction with the noise suppression circuit, the A.V.C. system provides a form of Q.A.V.C.

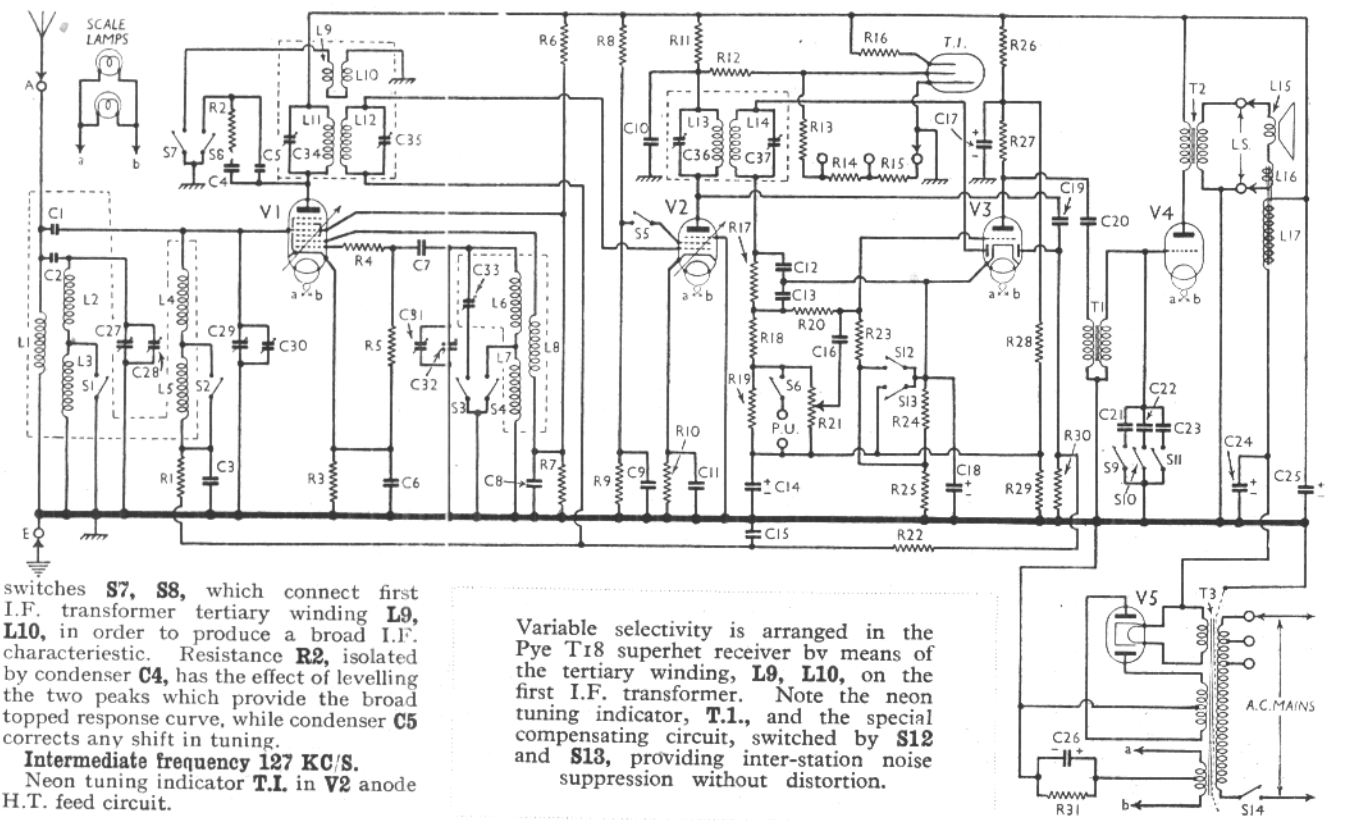
Provision for connection of gramophone pick-up is **V3** triode C.G. circuit by switch **S6.**

Parallel-fed auto-transformer coupling by **R27, C20** and **T1** between **V3** and triode output valve (**V4, Ever Ready S30C**). Three-point tone control by switches **S9, S10, S11** (operated by variable selectivity control) which shunt **V4** grid circuit with fixed condensers **C21, C22** and **C23** respectively.

H.T. current is supplied by I.H.C. full-wave rectifying valve (**V5, Ever Ready A11B**). Smoothing by speaker field coil **L17** and dry electrolytic condensers **C24** and **C25.**

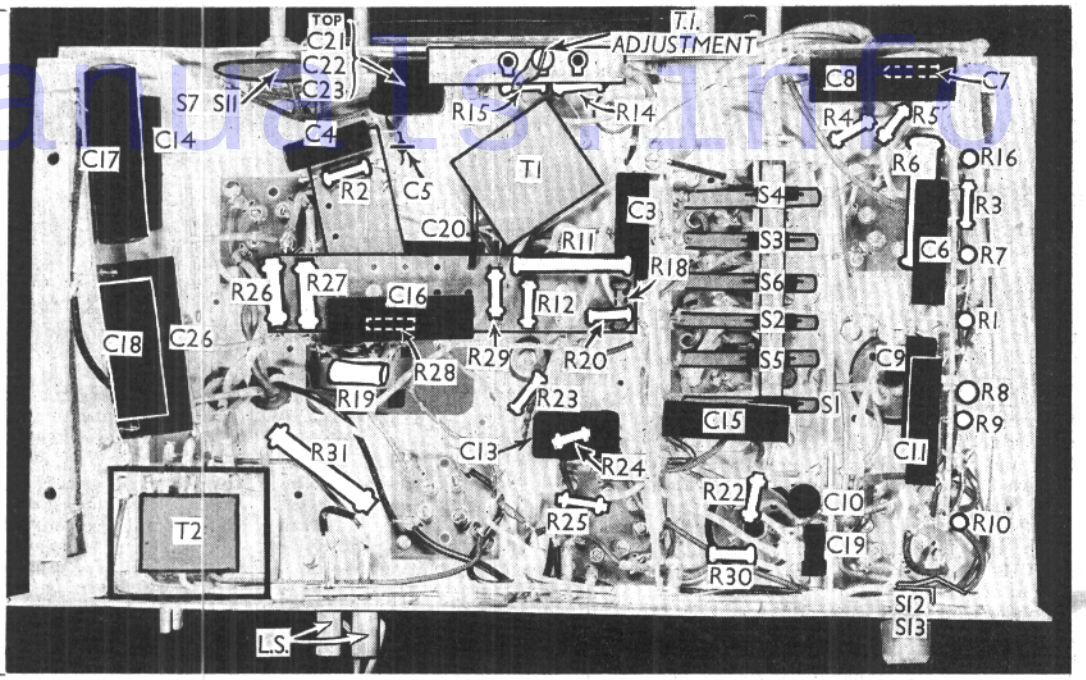
COMPONENTS AND VALUES

	RESISTANCES	Values (ohms)
R1	V1 pentode C.G. decoupling ..	10,000
R2	Var. selectivity circuit ..	150,000
R3	V1 fixed G.B. resistance ..	150
R4	V1 osc. C.G. stabiliser ..	1,000
R5	V1 osc. C.G. resistance ..	100,000
R6	V1 S.G.'s and osc. A H.T. potential divider ..	30,000
R7		40,000
R8	V2 S.G. H.T. potential divider	80,000
R9		100,000
R10	V2 fixed G.B. resistance ..	200
R11	V2 anode decoupling	27,000
R12	T.I. anode feed	100,000
R13	T.I. adjustment resistances	200,000
R14		150,000
R15		500,000
R16	T.I. exiter H.T. feed	2,100,000
R17	I.F stopper	100,000
R18	V3 signal diode load ..	160,000
R19		260,000
R20	V3 C.G. decoupling	1,100,000
R21	Manual volume control ..	250,000
R22	A.V.C. line decoupling ..	1,100,000
R23	V3 C.G. resistance	2,100,000
R24	V3 G.B. and A.V.C. delay voltage resistances ..	1,000
R25		3,000
R26	V3 triode A decoupling ..	10,000
R27	V3 triode A load	30,000
R28	Parts of Q.A.V.C. circuit	100,000
R29		3,000
R30	V3 A.V.C. diode load	510,000
R31	V4 G.B. resistance	750



Variable selectivity is arranged in the Pye T18 superhet receiver by means of the tertiary winding, **L9, L10,** on the first I.F. transformer. Note the neon tuning indicator, **T.I.,** and the special compensating circuit, switched by **S12** and **S13,** providing inter-station noise suppression without distortion.

All of the wave-change, radio muting and gramophone switches, **S1-S6,** are in a single unit beneath the chassis, as shown in this under-chassis view. **S7-S11,** the variable selectivity and tone control switches, are also in a single unit, while noise suppressor switches, **S12** and **S13,** are mounted on the back of the chassis.



CONDENSERS		Values (μF)
C1	Image suppressor	Very low
C2	Capacitative aerial coupling	0·000005
C3	V1 pentode C.G. decoupling	0·1
C4, C5	Parts of variable selectivity control circuit	0·01, 0·00003
C6	V1 cathode by-pass	0·1
C7	V1 osc. C.G. condenser	0·001
C8	V1 S.G.'s and osc. A decoupling	0·25
C9	V2 S.G. by-pass	0·1
C10	V2 anode decoupling	0·1
C11	V2 cathode by-pass	0·1
C12, C13	I.F. by-passes	0·0001, 0·0001
C14*	Part of Q.A.V.C. circuit	10·0
C15	A.V.C. line decoupling	0·1
C16	L.F. coupling to V3 triode	0·25
C17*	V3 triode A decoupling	2·0
C18*	V3 cathode by-pass	10·0
C19	V3 A.V.C. diode feed	0·0001
C20	T1 L.F. feed	0·25
C21, C22, C23	Tone control condensers	0·001, 0·0003, 0·0007
C24*, C25*	H.T. smoothing	8·0, 8·0
C26*	V4 G.B. circuit by-pass	20·0
C27†, C28‡	Band-pass pri tuning, Band-pass pri. trimmer	—
C29†, C30‡	Band-pass sec. tuning, Band-pass sec. trimmer	—
C31‡, C32†	Osc. circuit M.W. trimmer, Osc. circuit tuning	—
C33‡, C34‡	Osc. circuit L.W. trimmer, 1st I.F. trans. pri. tuning	—
C35‡, C36‡	1st I.F. trans. sec. tuning, 2nd I.F. trans. pri. tuning	—
C37‡	2nd I.F. trans. sec. tuning	—

* Electrolytic. † Variable. ‡ Pre-set.

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial coupling coil	24·0
L2, L3	Band-pass primary coils	2·3, 15·0
L4, L5	Band-pass secondary coils	2·3, 15·0
L6, L7	Oscillator tuning coils	1·7, 3·3
L8	Oscillator reaction coil	45·0
L9, L10	1st I.F. trans. Tertiary winding	0·3
L11	1st I.F. trans. Primary	93·0
L12	1st I.F. trans. Secondary	93·0
L13	2nd I.F. trans. Primary	42·0
L14	2nd I.F. trans. Secondary	42·0
L15	Speaker speech coil	1·7
L16	Hum neutralising coil	0·2
L17	Speaker field coil	1,650 0

OTHER COMPONENTS (*Continued*)		Approx. Values (ohms)
T1	Intervalve trans. Pri.	600·0
	Intervalve trans. Sec.	2,100·0
T2	Output trans. Pri.	190·0
	Output trans. Sec.	0·1
T3	Mains trans. Pri. total	44·0
	Mains trans. Heater sec.	0·1
	Mains trans. Rect. heat. sec.	0·2
	Mains trans. H.T. sec. total	350·0
T.I.	Neon tuning indicator	—
S1-4	Waveband switches	—
S5	Radio muting switch	—
S6	Gram. pick-up switch	—
S7, S8	Var. selectivity switches	—
S9-11	Tone control switches	—
S12	Noise suppressor switches	—
S13	Noise suppressor switches	—
S14	Mains switch, ganged R21	—

DISMANTLING THE SET

A detachable bottom is fitted to the cabinet and upon removal (four round-head wood screws) gives access to most of the under-chassis components.

Removing Chassis.—If it should prove necessary to remove the chassis from the cabinet, first remove the four control knobs (pull off) and free the speaker leads from the cleats on the side of the cabinet and on the mains transformer. Now remove the four bolts (with washers) holding the chassis to the cabinet, when it can be withdrawn to the extent of the speaker leads.

Removing Speaker.—To remove the speaker from the cabinet, disconnect the leads and free the speech coil leads from the cleat on the speaker frame, and then remove the four bolts (with spring washers and washers) holding the speaker to the sub-baffle. Alternatively the speaker and sub-baffle may be removed together by removing the nuts, lock washers and washers from the four bolts holding the sub-baffle to the front of the cabinet.

When replacing, see that the terminal panels are at the bottom and connect the grey speech coil lead to the tag on the speaker chassis and the red lead to the left-hand of the three tags on the strip.

VALVE ANALYSIS

Valve voltages and currents given in the table below are those measured in our receiver when it was operating on mains of 220 V, using the 216-235 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium band and both the volume and sensitivity controls were at maximum (clockwise), but there was no signal input.

Voltages were measured on the 1,200 V scale of an Avometer, with chassis as negative.

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
V1 A80A*	320	1·5	80	3·9
V2 A50N	165	4·4	80	2·0
V3 A23A	110	4·6	—	—
V4 S30C	310	40·0	—	—
V5 A11B	355†	—	—	—

* Oscillator anode (G2) 80 V, 1.5 mA.
† Each anode, A.C.

GENERAL NOTES

Switches—S1-S6 are the wave-change and gramophone switches ganged in an assembly mounted under the chassis immediately beneath the signal-frequency and oscillator coil units. The table below gives their positions for the various control knob settings, O indicating *open* and C *closed*.

Switch	M.W.	L.W.	Gram.
S1	C	O	C
S2	C	O	C
S3	O	C	O
S4	C	O	C
S5	C	C	O
S6	O	O	C

S7-S11 are the variable selectivity and tone control switches in a single rotary unit at the front of the chassis. The arrangement of contacts is clearly shown in a separate diagram on page VIII.

S12 and **S13** at the rear of the chassis form the single-pole change over switch

Continued overleaf

PYE TI8—*Continued*

controlling the noise suppression circuit. Looking from the underside of the chassis the top fixed contact is part of **S12** and the bottom contact part of **S13**, the moving contact being common to both.

S14 is the Q.M.B mains circuit switch ganged with the volume control **R21.**

Coils.—**L1-L5** are the aerial coupling and band-pass signal frequency coils in a single screened unit on the chassis deck. The can also contains **C1** and **C2.**

L6-L8 are the oscillator tuning and reaction coils in a screened unit on the chassis deck. **C33** in the same can is the pre-set oscillator L.W. trimmer.

L9-L12 and **L13, L14** are the two I.F. transformers which are housed with their respective pre-set tuning condensers **C34, C35** and **C36, C37** in screening cans mounted on the chassis deck. The additional winding **L9, L10** in the first unit is used to provide variable selectivity, while the additional components **R17** and **C12** in the second unit form part of an I.F. filter.

Condensers.—**C24** and **C25** are two 8μF, 550 V peak, dry electrolytic condensers in a single carton on the chassis deck. They have a common negative (black) lead and separate positive (red and yellow) leads.

C14, C17, C18, C26.—These are dry electrolytic condensers of the tubular type. **C14** and **C18** have capacities of 10μF and are rated to work at 50 V D.C., while **C17** is a 2μF 300 V type and **C26** a 20 μF 30 V type.

Tuning Indicator.—This is a G.E.C. "Tuneon" neon tube with a 4-pin base. Should replacement become necessary, unscrew the milled nut fixing the tube-holder to the chassis and withdraw the holder. With a new tube in position, the adjustment provided may have to be altered. This is done by attaching the wandering lead to the terminal which causes the glow to start moving up the tube (with no aerial or earth connected).

Scale Lamps.—These are two Ever Ready M.E.S. types rated at 6.2 V 0.3 A.

External Speaker.—There is provision at the rear of the chassis for a low-impedance external speaker (1.5-2.5 O). This may be used either alone or, by plugging into the internal speaker socketed plugs, in conjunction with the internal speaker.

CIRCUIT ALIGNMENT

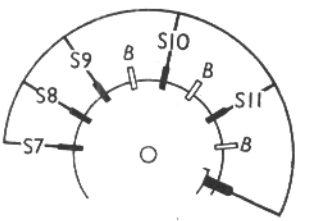
Calibration.—To check calibration, rotate tuning knob in clockwise direction until pointer is at higher wavelength end of scale. Push flat end of pencil or rod through hole in side of gang cover and against vanes. Rock gang until it is felt that rotor vanes are fully in mesh. Scale pointer should now be located at end of horizontal scale lines. If it is not, release two grub screws in driving disc boss and set pointer accurately.

Alignment Conditions.—All adjustments should be made with the variable selectivity control at maximum selectivity (anti-clockwise), the noise suppressor control fully clockwise, the volume control at maximum, and with a modulated signal which is sufficiently low to ensure that the A.V.C. system does not operate.

I.F. Transformers.—Remove F.C. **V1** C.G. connection (top cap) and connect 0.5 MO resistance between cap and chassis. By-pass triode oscillator anode to chassis with 0.25μF condenser to stop oscillation. Feed in 127 KC/S modulated signal between chassis and **V1** top cap via 0.002 μF condenser, and adjust I.F. trimmers **C37, C36, C35, C34** in that order for maximum reading on output meter. In view of the band-pass characteristics of the transformers, a loading resistance of 50,000 O must be employed.

When tuning the primary of either transformer the resistance should be connected across the secondary, and when a secondary is tuned, the load should be applied to the primary.

Signal Frequency and Oscillator Circuits.—After the I.F. alignment has been



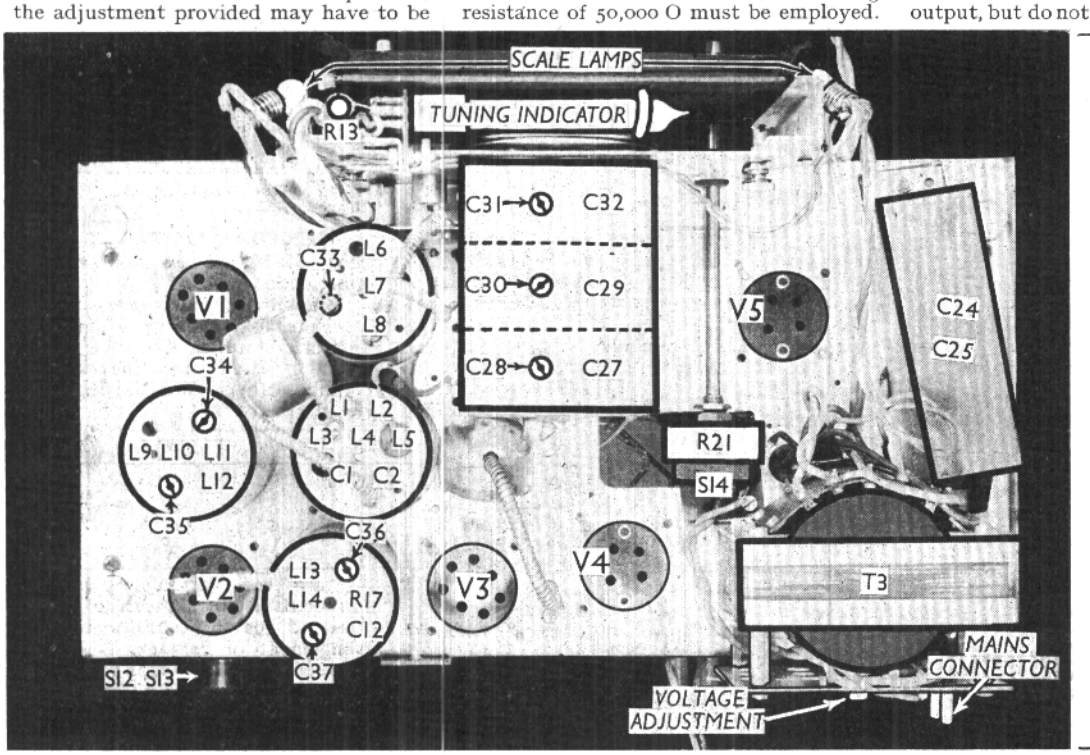
Connections for the variable selectivity and tone control switches are given in this diagram.

carried out, the by-pass condenser in the oscillator circuit and the F.C. resistance should be removed, and the top cap connection replaced.

All M.W. signal frequency and oscillator adjustments are made with the gang condenser vanes fully out of mesh, the scale pointer being set to lie over the ends of the horizontal scale lines.

Feed in a 196 m. (1,530 KC/S) modulated signal via a 0.002 μF condenser to the aerial and earth sockets and adjust oscillator M.W. trimmer **C31** for maximum output, bearing in mind that if more than one peak is obtained that nearer to *minimum* capacity is correct. Next adjust band-pass trimmers **C30** and **C28.** Check calibration at top of scale; if low, it is fairly certain that **C31** is tuned to an incorrect peak.

Set wavechange switch to L.W. and tuning pointer to 1,300 m. (231 KC/S), and feed in a 1,300 m. signal. Adjust oscillator L.W. trimmer **C33** for maximum output, but do not disturb **C28, C30** or **C31.**



Note the positions of the tuning indicator and **R13** in this plan view of the chassis. The **L1-L5** unit also contains **C1** and **C2,** while the **L13, L14** unit contains **R17** and **C12. C24** and **C25** are the H.T. smoothing condensers and are in a single unit.

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