

NUMBER 146

'TRADER' SERVICE SHEETS

PHILCO 269 (AND 444)

(ALSO 269 RADIOGRAM)

H.T. current is supplied by full-wave rectifying valve (V4, Philco 80). Smoothing by speaker field coil L14 and dry electrolytic condensers C14, C15. Mains H.F. by-passing by condenser C16.

COMPONENTS AND VALUES

CONDENSERS		Values (μ F)
C1	Aerial coupling condenser	0.00025
C2	V1 tetrode C.G. decoupling	0.05
C3	V1 cathode by-pass	0.09
C4	V1 osc. anode coupling	0.0008
C5	V1, V2 S.G.'s by-pass	0.05
C6	V2 C.G. decoupling	0.05
C7	V2 cathode by-pass	0.09
C8	H.T. supply H.F. by-pass	0.1
C9	I.F. by-passes	0.00011
C10	L.F. coupling to V3 pentode	0.00011
C11	V3 pentode C.G. decoupling	0.1
C12	Tone corrector	0.003
C13	H.T. smoothing	8.0
C14*	Mains H.F. by-pass	8.0
C15*	Aerial I.F. filter tuning	0.015
C16*	Aerial circuit L.W. trimmer	0.000125
C17†	Aerial circuit tuning	0.00008
C18†	Aerial circuit trimmer	—
C19†	Oscillator circuit tuning	—
C20†	Oscillator circuit trimmer	—
C21†	Oscillator circuit L.W. trimmer	0.00005
C22†	Oscillator M.W. tracker	0.0005
C23†	Oscillator L.W. tracker	0.00024
C24†	1st I.F. trans. pri. tuning	—
C25†	1st I.F. trans. sec. tuning	—
C26†	2nd I.F. trans. pri. tuning	0.00008
C27†		
C28†		

* Electrolytic. † Variable. ‡ Pre-set.

THE 3-valve (plus rectifier) A.C. superhet chassis fitted in the Philco 269 table receiver is also fitted, with slight modifications, in the model 444 "People's Set" and in the 269 radiogramophone. Our Service Sheet was produced in conjunction with a chassis taken from a 269 table model (runs 3 and 4). Full details of the changes which have been effected since run 1 are given in the General Notes section.

Features of special interest in the 269 chassis are the unscreened signal frequency and oscillator coils and the unscreened second I.F. transformer which has only its primary tuned.

CIRCUIT DESCRIPTION

Aerial input via coupling condenser C1 to coupling coils L2 (M.W.) and L3 (L.W.). Tuned filter L1, C17 by-passes interference at the intermediate frequency.

Single tuned circuits comprising L3 C19 (M.W.) and L4, C19 (L.W.) precede first valve (V1, Philco 6A7), a heptode operating as frequency changer with electron coupling. Oscillator grid coils

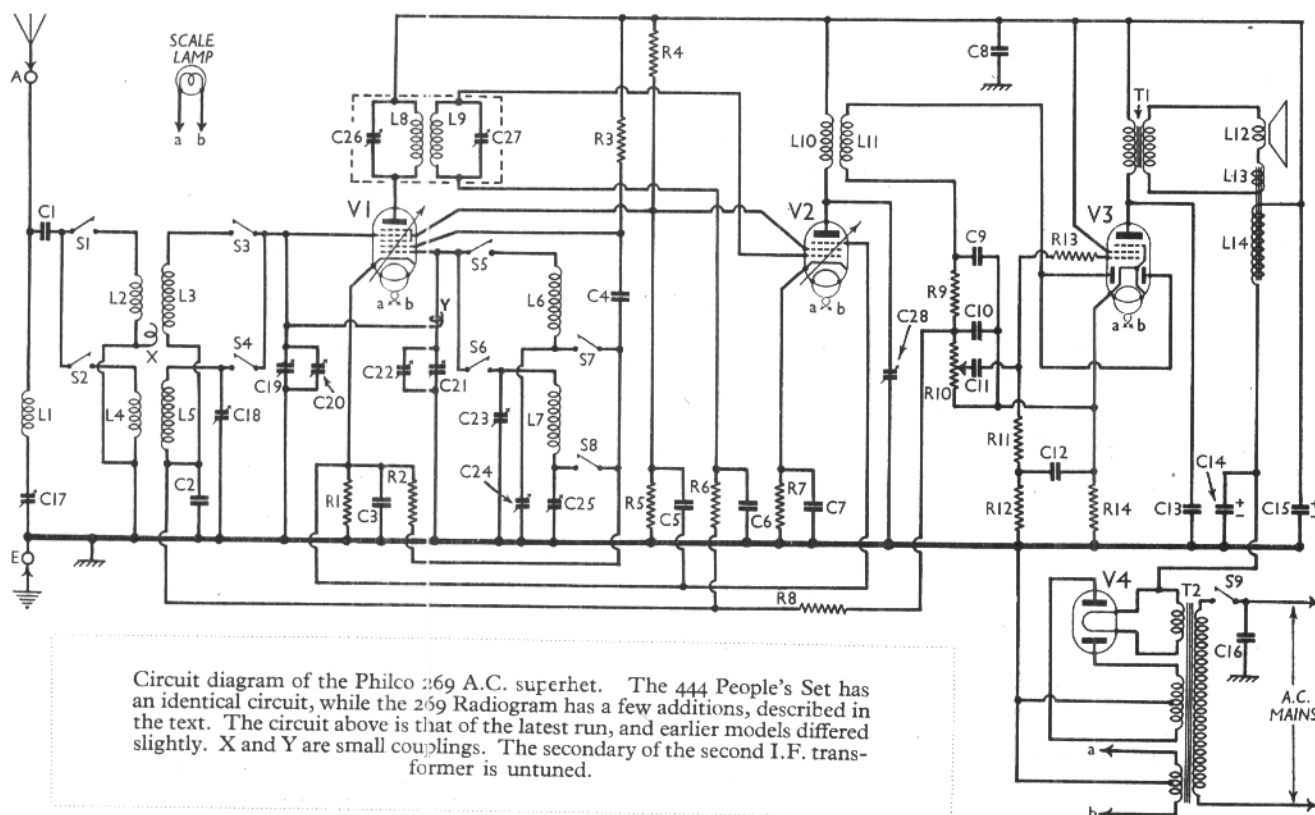
L6 (M.W.) and L7 (L.W.) are tuned by C21; trimming by C22 (M.W.) and C23 (L.W.); tracking by C24 (M.W.) and C25 (L.W.); reaction is applied from anode by fixed condenser C4.

Second valve, a variable-mu H.F. pentode (V2, Philco 78E), operates as intermediate frequency amplifier with tuned-primary tuned-secondary input transformer C26, L8, L9, C27 and tuned-primary output transformer C28, L10, L11.

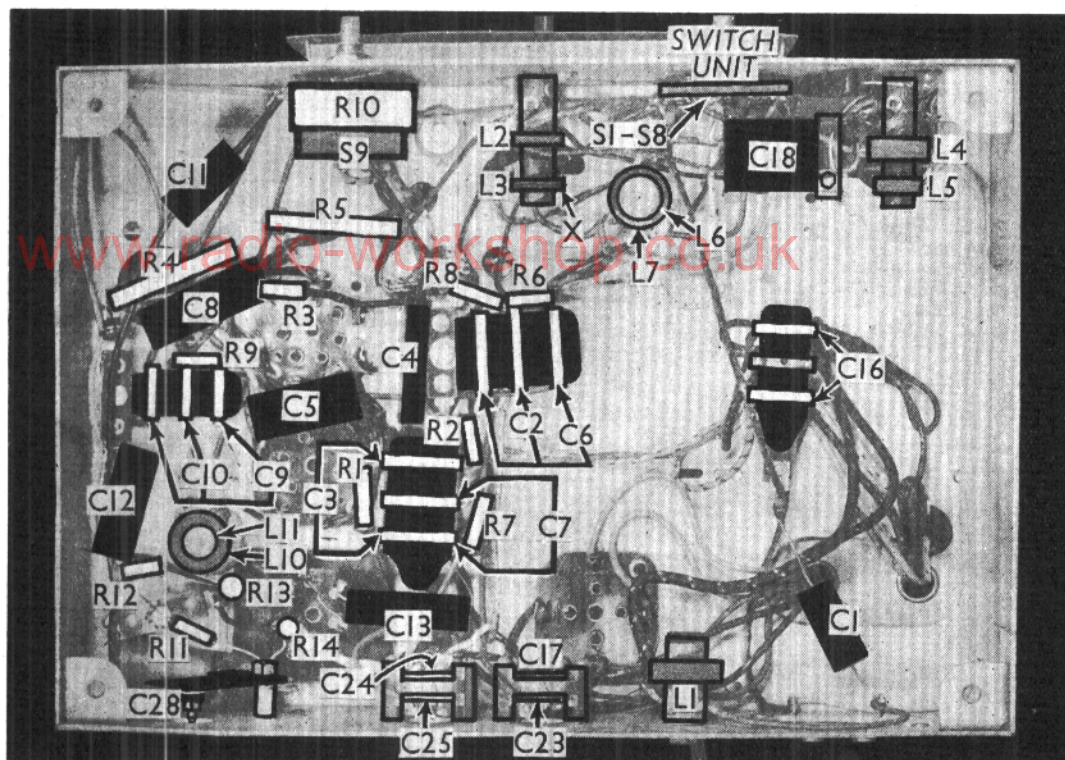
Intermediate frequency 451 KC/S.

Diode second detector is part of double diode output pentode (V3, Mazda Pen DD.61). Audio-frequency component in rectified output developed across manual volume control R10 is passed via coupling condenser C11 and I.F. stopper R13 to C.G. of pentode section. Tone correction by fixed condenser C13 in anode circuit.

D.C. potential developed across R10 is fed back through decoupling circuits as G.B. to F.C. and I.F. valves, giving automatic volume control.



Under - chassis view. L10 is below L11, and L7 is below L6. Note the connections of the condensers in the four moulded units, indicated by arrows. The coupling X consists of a turn of wire wound round the outside of L3. A diagram of the switch unit is on this page.



RESISTANCES		Values (ohms)
R1	V1 fixed G.B. resistance ..	700
R2	V1 osc. C.G. resistance ..	51,000
R3	V1 osc. anode resistance ..	10,000
R4	V1, V2, S.G.'s H.T., potential divider ..	25,000
R5	..	51,000
R6	V2 C.G. decoupling ..	2,000,000
R7	V2 fixed G.B. resistance ..	800
R8	V1, V2, A.V.C. line decoupling ..	2,000,000
R9	I.F. stopper ..	51,000
R10	V3 diode load; vol. control ..	330,000
R11	V3 pentode C.G. resistance ..	490,000
R12	V3 pentode C.G. decoupling ..	490,000
R13	V3 pentode C.G. I.F. stopper ..	100,000
R14	V3 G.B. resistance ..	140

OTHER COMPONENTS		Approx. Values (ohms)
L1	Aerial I.F. filter coil ..	20·0
L2	Aerial M.W. coupling coil ..	25·0
L3	Aerial M.W. tuning coil ..	2·5
L4	Aerial L.W. coupling coil ..	95·0
L5	Aerial L.W. tuning coil ..	37·5
L6	Oscillator M.W. tuning coil ..	2·5
L7	Oscillator L.W. tuning coil ..	14·5
L8	1st I.F. trans. { Pri. ..	8·0
L9		12·0
L10	2nd I.F. trans. { Pri. ..	30·0
L11		80·0
L12	Speaker speech coil ..	2·2
L13	Hum neutralising coil ..	0·1
L14	Speaker field coil ..	2000·0
T1	Speaker input trans. { Pri. ..	230·0
	.. { Sec. ..	0·25
	.. { Pri. total ..	35·0
T2	Mains trans. { Heater sec. ..	0·2
	.. { Rect. fil. sec. ..	0·15
	.. { H.T. sec. total ..	480·0
X	Small couplings ..	—
Y		—
S1-S8	Waveband switches ..	—
S9	Mains switch, ganged R10 ..	—

DISMANTLING THE SET

Removing Chassis.—Remove the three control knobs from their spindles (pull off). Remove the four hexagonal headed

self-tapping screws from the underside of the cabinet, and the chassis can be withdrawn to the extent of the speaker leads for all normal repairs. When replacing do not omit to place the rubber bushes under the chassis before inserting the screws, and make sure that the buffers at the front of the chassis are also in position.

Removing Speaker.—Four bolts with ornamental heads support the speaker chassis inside the 269 cabinet, while in the 444 four bolts hold the speaker on a wooden sub-baffle. Removal of the nuts in each case enables the speaker to be taken from the cabinet. When replacing, the input transformer of the 269 speaker should project towards the bottom right-hand corner of the cabinet (viewed from the rear) and the 444 speaker should be at the top. The colour coding of the leads is as follows:—centre tag, green; nearest outer tag, green-white; remaining outer tag, white.

VALVE ANALYSIS

Valve	Anode Voltage (V)	Anode Current (mA)	Screen Voltage (V)	Screen Current (mA)
6A7*	230	2·9	90	2·5
78E	230	6·2	90	1·5
PenDD61	225	30·0	235	6·0
80	330†	—	—	—

* Osc. anode (G2) 180 V 3·7 mA.

† Each anode, A.C.

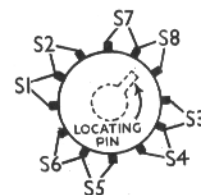
Valve voltages and currents listed in the table above were obtained from a representative chassis operating with a 230 V. 50 c.p.s. mains supply. There was no signal input (aerial and earth sockets s/c), and the receiver controls

were set as follows:—wavechange switch at M.W., tuning condenser at minimum capacity, volume control at maximum. All voltage readings were taken on the 1,200 V scale of an Avometer, chassis being negative.

GENERAL NOTES

Switches.—S1-S8 are in a single rotary unit beneath the chassis. The unit is indicated in our under-chassis view, and is shown on this page in diagrammatic form, as seen from the rear of the underside of the chassis. Note that the switches are in pairs, each pair having one common contact. S1, S3, S5 and S7 are closed on the M.W. band and open on the L.W. band, while S2, S4, S6 and S8 are open on the M.W. band and closed on the L.W. band.

Diagram of the switch unit, as seen looking at the underside of the chassis from the rear.



S9 is the Q.M.B. mains switch, ganged with the volume control R10.

Coils.—Most of the coils are beneath the chassis, and are unscreened. They are weave-wound on cylindrical formers. L1 is attached to the rear of the chassis. L2, L3 and L4, L5 are mounted behind the front of the chassis. L6 and L7 are mounted vertically under the chassis; L7 being nearest to the chassis.

(Continued overleaf)

PHILCO 269 (and 444)—Continued

L8 and L9, the first I.F. transformer, is in a screened unit on the chassis deck, while **L10, L11**, forming the second I.F. transformer, is mounted vertically beneath the chassis, **L10** being nearest to the chassis. The trimmers of **L8, L9** are operated through holes in the top of the screen, but the second I.F. unit has an untuned secondary, the primary, **L10**, being tuned by **C28** (reached through a hole in the rear of the chassis).

Scale Lamp.—This is a Philco M.E.S. tubular type, marked "6-8," Philco part number 6608.

External Speaker.—No provision is made for this, but a high resistance type could be connected across the primary of the internal speaker transformer **T1** (to the tags to which the white and green leads are already attached).

Coupling X.—This consists of a single turn of wire with one end free, taken round the outside of **L3** (beneath the chassis).

Coupling Y.—This consists of a short length of insulated connecting wire soldered to the tag of **C20** and taken to the tag of **C22**, through which it is looped (but not soldered, of course).

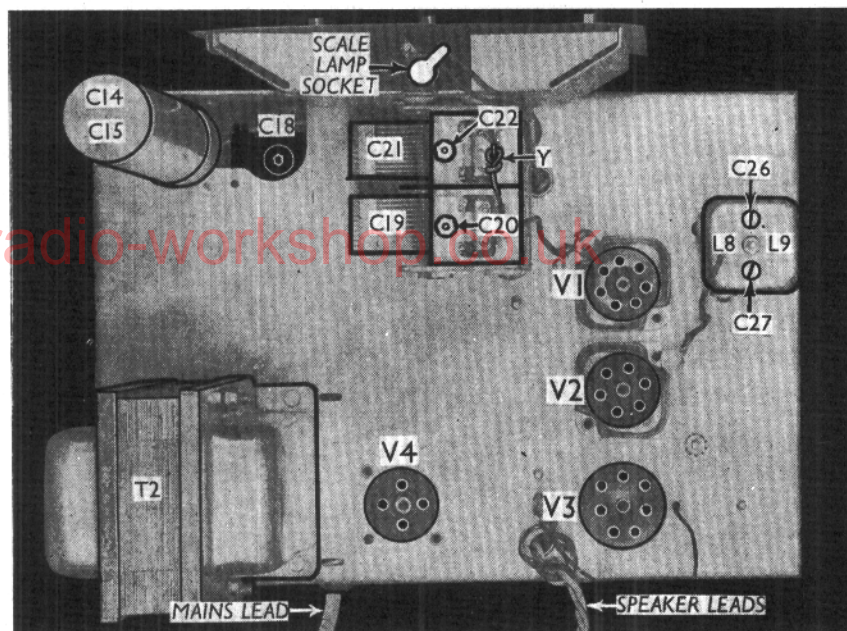
Condensers C14, C15.—These are two 8 μ F electrolytics in a single tubular metal can mounted in a clip on the chassis deck. The can is negative. The plain tag is the positive of **C14**, while the other tag, marked with a spot of red enamel, is the positive of **C15**.

Black Moulded Condensers.—There are four paper condenser units with black moulded containers. Three of these each contain two condensers, having one common contact. In the **C2, C6** and **C3, C7** units, the common tags are earthed by the mounting bolt. In the **C9, C10** unit, the common tag is not earthed. The fourth unit only contains a single condenser, **C16**, connected across the outer two tags. The central tag on the unit merely acts as a bearer. The individual condensers are identified in our under-chassis view.

Trimmers C17, C23, C24, C25.—**C17, C23, C24, C25** form two dual units, adjustable through holes in the rear of the chassis. The screws adjust **C17** and **C24** respectively, and the nuts **C23** and **C25**.

Radiogram Model.—The chassis of this is similar to that of the 269 table model except for a few additions and modifications. An extra rotary switch, with "radio" and "gram" positions, is fitted. Only two single pole units of this are used. One contact of one of these goes to chassis. The connection of **R1** to chassis is broken, and taken to the other contact of this switch. On radio the switch closes, connecting **R1** to chassis, while on gram, the switch opens.

One side of the pick-up goes to the lower end of the volume control **R10**, while the other side goes to one contact of the other switch. The other contact of this switch goes to the top end of **R10**. On radio the switch is open, while on gram it is closed, connecting the pick-up across **R10**.



Plan view of the chassis. Note the small coupling Y. **C18**, a pre-set condenser, does not occur in the early runs.

A fixed condenser (0.01 μ F) and a fixed resistor (51,000 Ω) are connected in series across the two outer tags of the volume control in run 3 and run 4 radiograms.

Chassis Divergencies.—In runs 1 and 2, **C18** was not incorporated, but a 50 μ F fixed mica condenser was used instead. The H.F. by-pass **C8** was also omitted. **C28** had a maximum of 50 μ F instead of 80 μ F as in the run 3 and run 4 models.

In the earlier radiograms, the 0.01 μ F condenser and 51,000 Ω resistance across **R10** were omitted.

CIRCUIT ALIGNMENT

Connect an output meter across the primary of **T1** (green and white leads). With gang condenser at maximum, check that the pointer is in line with the index arrow. Set wavechange switch to M.W. (clockwise), turn gang to minimum, and volume control to maximum.

I.F. Stages.—Feed a 451 KC/S signal from the signal generator to the grid (top cap) of **V1**, previously disconnecting the grid lead to the cap. Earth the generator to receiver chassis. Adjust generator to give a half scale deflection on output meter. Adjust **C28, C27, C26** in turn for maximum output. Repeat until no further improvement can be obtained. Take particular care with **C28**.

I.F. Filter.—Transfer signal generator lead, via a dummy aerial, to the A socket and replace top cap connection of **V1**. Feed in a 451 KC/S signal and adjust **C17** (screw) for minimum output.

H.F. and Oscillator Stages.—Set gang condenser to 1400 KC/S on scale. Feed in a 1,400 KC/S signal and adjust **C22**, then **C20**, for maximum output. Feed in and tune a 600 KC/S signal. Rock the gang condenser slightly and adjust **C24** (screw) for maximum output. Re-adjust **C22** and **C20** at 1,400 KC/S and

C24 at 600 KC/S until no further improvement can be obtained.

Switch set to L.W. (anti-clockwise). Feed in a 290 KC/S signal, and set pointer to 290 KC/S. Adjust **C23** (nut) and **C18** (from above chassis) for maximum output. Feed in and tune a 160 KC/S signal. While rocking the gang slightly adjust **C25** (nut) for maximum output. Re-adjust **C23** and **C18** at 290 KC/S and **C25** at 160 KC/S until no improvement results.

Note.—In runs 1 and 2, **C18** was not fitted, a small fixed mica condenser (50 μ F) being used instead. In this case the adjustment at 290 KC/S consists in feeding in a 290 KC/S signal, tuning it in and adjusting **C23** while rocking the gang slightly. Otherwise the alignment is the same.

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