'TRADER' SERVICE SHEET 286

# MARCONIPHONE 347, 346, 363, 366 AND 367

FIVE bands are covered by the Marconiphone 347 5-valve (plus rectifier) A.C. superhet, the actual short-wave ranges being 7-16 (referred to below as S.W.1), 16, 16·7-50 (S.W.2) and 46-140 m. (S.W.3). The receiver is for mains of 200-250 V, 50-100 C/S, and has separate treble and bass tone controls, a cathode ray tuning indicator, and provision for an extension speaker and a gramophone pick-up. An identical chassis is fitted in the 367 automatic radiogram, but this model is for mains of 50-60 C/S.

The chassis fitted in the 346 receiver, 363 radiogram and 366 automatic radiogram are very similar but do not include the tuning indicator. This *Service Sheet* was prepared on a 347.

## CIRCUIT DESCRIPTION

Aerial input on all bands excepting S.W.1, via coupling coils **L1** (S.W.2), **L2** (S.W.3), **L3** (M.W.) and **L4** (L.W.) to single-tuned circuits **L6, C52** (S.W.2), **L7, C52** (S.W.3), **L8, C52** (M.W.) and **L9, C52** (L.W.) which precede variable-mu pentode R.F. amplifier (**V1, Marconi metallised VMP4G**).

Tuned-primary R.F. transformer coupling by **C53, L11, L15** (S.W.2), **C53, L12, L16** (S.W.3), **C53, L13, L17** (M.W.) and **C53, L14, L18** (L.W.), between **V1** and triode hexode valve (**V2, Marconi metallised X41**), which operates as frequency changer with internal coupling.

On S.W.1 (television band) input is via coupling condenser **C1** to single-tuned circuit **L5, C52** which is coupled via **C2, L10** to C.G. of **V2**.

**V2** oscillator triode grid coils **L19** (S.W.1), **L20** (S.W.2), **L21** (S.W.3), **L22** (M.W.) and **L23** (L.W.) are tuned by **C58**; parallel trimming by **C61** S.W.1), **C62** (S.W.2), **C63** (S.W.3), **C64** (M.W.) and **C65** (L.W.); series tracking by **C20** (S.W.2), **C21** (S.W.3), **C22, C59** (M.W.) and **C60** (L.W.). Reaction by coils **L24** (S.W.1), **L25** (S.W.2), **L26** (S.W.3), **L27** (M.W.) and **L28** (L.W.).

Third valve (**V3, Marconi metallised VMP4G**) is a variable-mu R.F. pentode operating as intermediate frequency amplifier with tuned-primary tuned-secondary transformer couplings **C66, L29, L30, C16, C67** and **C68, L31, L32, C69**.

**Intermediate frequency 460 KC/S.**

Diode second detector is part of double diode triode valve (**V4, Marconi metallised MHD4**). Audio frequency component in rectified output is developed across manual volume control **R26**, which operates also as load resistance, and passed via A.F. coupling condenser **C33** and C.G. resistance **R27** to C.G. of triode section, which operates as A.F. amplifier. Provision for connection of gramophone pick-up across **R26** via **S49** and feed resistances **R24, R25**. When control switch is pushed over to "Gram" **S49** closes and **S47, S48** open, muting radio.

Second diode of **V4**, fed from **V3** anode via **C29**, provides D.C. potentials which are developed across load resistances **R31, R32** and fed back through decoupling circuits as G.B. to R.F. (except on S.W.1), F.C. (except on S.W.1 and S.W.2), and I.F. valves, giving automatic volume control. Delay voltage is developed across **R28** in cathode circuit.

Resistance-capacity coupling by **R30, C37** and **R35**, via stopper **R36**, between **V4** triode and beam tetrode output valve (**V5, Marconi KT41**). Coupling capacity is modified for "Bass" tone control purposes by alternatively connecting either **C36** (maximum bass), **C35** (medium) or neither of the latter (minimum), in parallel with **C37**, via switches **S50, S51**. Second, "Brilliant," tone control is effected by means of a five-position rotary switch unit comprising **S52, S53, S54, S55** in anode circuit. High note response is greatest when all switches are open and is progressively reduced as either **C38, C39, C40** or **C41** respectively are switched into circuit. Fixed tone correction by **C43**, also in anode circuit. Provision for connection of low impedance external speaker across secondary of internal speaker transformer **T1**.

Operating potential for cathode ray tuning indicator (**T.I., Marconi Y63**) is obtained from **V1** A.V.C. line. C.G. feed decoupling by **R40, C47**.

H.T. current is supplied by full-wave rectifying valve (**V6, Marconi U12**). Smoothing by speaker field **L35** and electrolytic condensers **C45, C46**. H.T. circuit R.F. filtering by **C19**.

## DISMANTLING THE SET

**Removing Chassis.**—Remove the small tuning knob (recessed grub screw), the large tuning knob (pull off) and the other four knobs (recessed self-tapping screws). Now free the mains and speaker leads from the cleats holding them to the cabinet, remove the mains switch from the side of the cabinet (lock nut and knurled escutcheon), remove the strap holding the tuning indicator (two round-head screws with lock washers), and free the indicator.

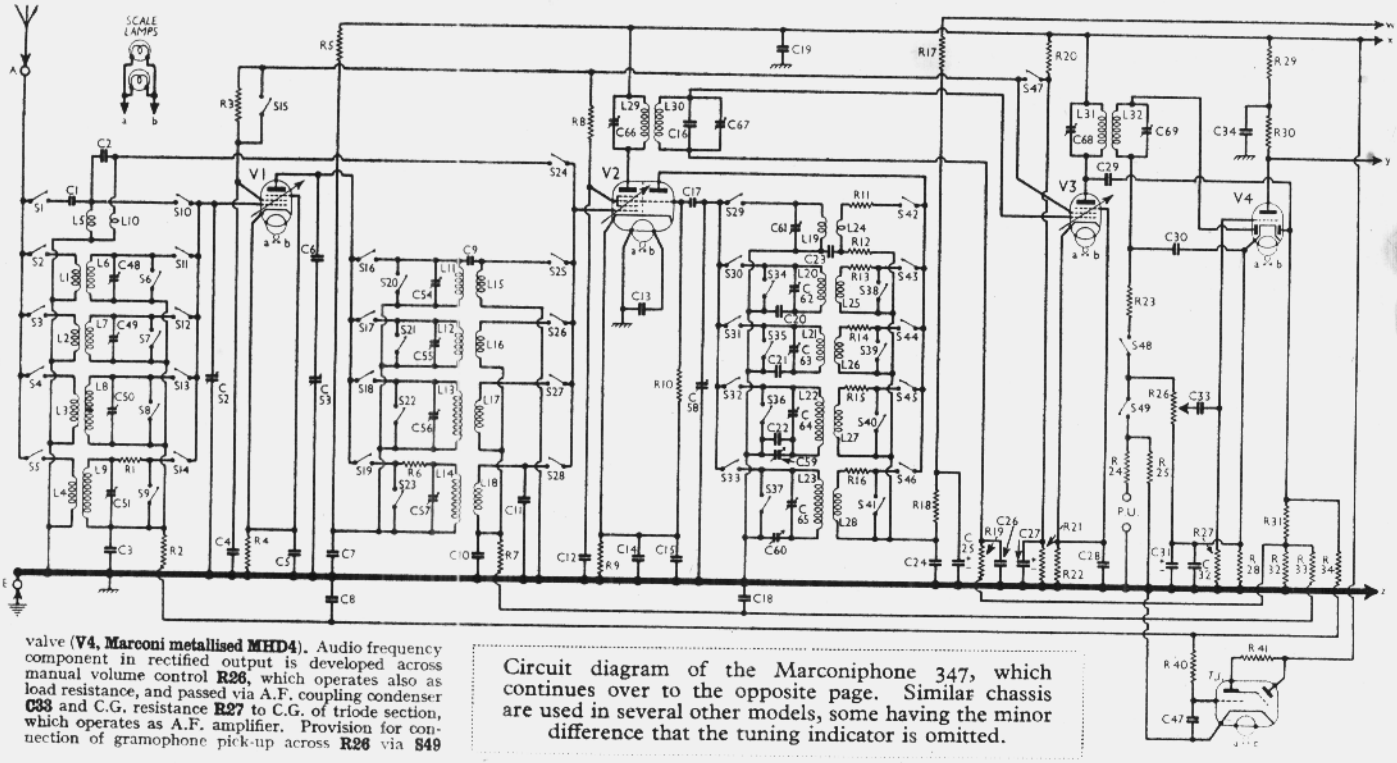
Now remove the four bolts (with washers, rubber washers and distance pieces) holding the chassis to the bottom of the cabinet, when the chassis can be withdrawn to the extent of the speaker leads, which is sufficient for normal purposes, by tilting the back upwards slightly.

To free chassis entirely, unsolder the speaker leads from the panel at the back of the chassis and *when replacing*, connect the leads as follows, numbering the tags from left to right:—1, red/yellow; 2, red/black; 3, red; 4, black.

**Removing Speaker.**—Should it be necessary to remove the speaker from the cabinet, unsolder the leads from the chassis and those from the extension speaker terminal panel (or remove the panel, two round-head wood screws). Now remove the two round-head bolts (with washers) holding the speaker cross bar, when the speaker can be withdrawn. If the leads have been disconnected from the speaker, connect them as follows, *when replacing*:—6, red; 7, red/black; 8, red/yellow. The black lead goes to the earthing tag, while the leads from the extension speaker panel go to tags 2 and 3.

## COMPONENTS AND VALUES

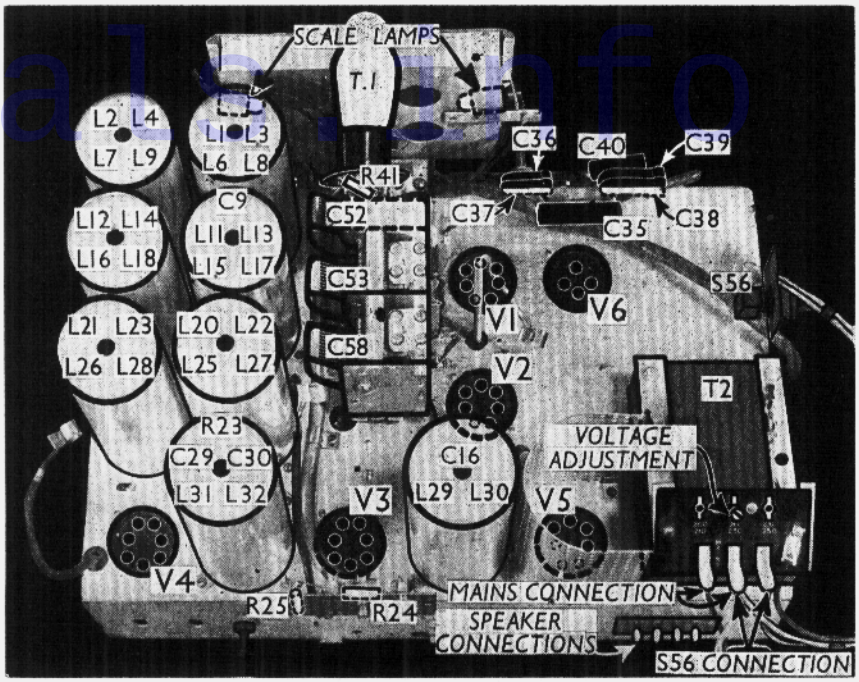
| | CONDENSERS | Values (μF) |
|---|---|---|
| C1 | Aerial S.W.1 coupling | 0·00001 |
| C2 | Part V2 C.G. S.W.1 coupling | 0·00023 |
| C3 | V1 C.G. decoupling | 0·05 |
| C4 | V1 S.G. decoupling | 0·1 |
| C5 | V1 cathode by-pass | 0·1 |
| C6 | H.T. blocking condenser | 0·1 |
| C7 | V1 anode decoupling | 0·1 |
| C8 | A.V.C. line decoupling | 0·001 |
| C9 | Part V2 hex. S.W.2 coupling | 0·000005 |
| C10 | V2 hex. C.G. decoupling | 0·05 |
| C11 | R.F. trans. sec. L.W. shunt | 0·0003 |
| C12 | V2 S.G. decoupling | 0·1 |
| C13 | V2 heater R.F. by-pass | 0·002 |
| C14, C15 | V2 cathode by-pass condensers | 0·0023, 0·1 |




Circuit diagram of the Marconiphone 347, which continues over to the opposite page. Similar chassis are used in several other models, some having the minor difference that the tuning indicator is omitted.

| | CONDENSERS (Continued) | Values (μF) |
|---|---|---|
| C16 | 1st I.F. trans. sec. fixed trimmer | 0·0001 |
| C17 | V2 osc. C.G. condenser | 0·00005 |
| C18 | A.V.C. line decoupling | 0·05 |
| C19 | H.T. circuit R.F. by-pass | 0·23 |
| C20 | Osc. circuit S.W.2 tracker | 0·00285 |
| C21 | Osc. circuit S.W.3 tracker | 0·00184 |
| C22 | Osc. circ. M.W. fixed tracker | 0·00035 |
| C23 | V2 osc. anode S.W.1 decoupling | 0·0023 |
| C24 | V2 osc. anode decoupling | 0·05 |
| C25* | V2 osc. anode H.T. smoothing | 8·0 |
| C26 | V3 C.G. decoupling | 0·05 |
| C27* | V1, V2, V3 S.G.'s decoupling | 4·0 |
| C28 | V3 cathode by-pass | 0·1 |
| C29 | Coupling to V4 A.V.C. diode | 0·0001 |
| C30 | I.F. by-pass | 0·00035 |
| C31* | V4 cathode by-pass condensers | 4·0 |
| C32 | | 0·1 |
| C33 | A.F. coupling to V4 triode | 0·05 |
| C34 | V4 triode anode decoupling | 0·5 |
| C35 | "Bass" tone control condensers | 0·0015 |
| C36 | | 0·05 |
| C37 | V4 triode to V5 A.F. coupling | 0·001 |
| C38 | | 0·0023 |
| C39 | "Brilliant" tone control condensers | 0·005 |
| C40 | | 0·02 |
| C41 | | 0·05 |
| C42 | V5 cathode by-pass | 0·1 |
| C43 | Fixed tone corrector | 0·0023 |
| C44 | Speaker field R.F. by-pass | 0·05 |
| C45* | H.T. smoothing | 8·0 |
| C46* | | 16·0 |
| C47 | T.I. C.G. decoupling | 0·00023 |
| C48‡ | Aerial circuit S.W.2 trimmer | — |
| C49‡ | Aerial circuit S.W.3 trimmer | — |
| C50‡ | Aerial circuit M.W. trimmer | — |
| C51‡ | Aerial circuit L.W. trimmer | — |
| C52† | Aerial circuit tuning | — |
| C53† | R.F. trans. pri. tuning | — |
| C54‡ | R.F. trans. pri. S.W.2 trimmer | — |
| C55‡ | R.F. trans. pri. S.W.3 trimmer | — |
| C56‡ | R.F. trans. pri. M.W. trimmer | — |
| C57‡ | R.F. trans. pri. L.W. trimmer | — |
| C58† | Oscillator circuit tuning | — |
| C59‡ | Osc. circuit M.W. tracker | — |
| C60‡ | Osc. circuit L.W. tracker | — |
| C61‡ | Osc. circuit S.W.1 trimmer | — |
| C62‡ | Osc. circuit S.W.2 trimmer | — |
| C63‡ | Osc. circuit S.W.3 trimmer | — |
| C64‡ | Osc. circuit M.W. trimmer | — |
| C65‡ | Osc. circuit L.W. trimmer | — |
| C66‡ | 1st I.F. trans. pri. tuning | — |
| C67‡ | 1st. I.F. trans. sec. tuning | — |
| C68‡ | 2nd I.F. trans. pri. tuning | — |
| C69‡ | 2nd I.F. trans. sec. tuning | — |

* Electrolytic. † Variable. ‡ Pre-set.




Plan view of the chassis. In some models a fixed condenser may be connected across **R25.**

| | RESISTANCES | Values (ohms) |
|---|---|---|
| R1 | Aerial circuit L.W. stabiliser | 100 |
| R2 | V1 C.G. decoupling | 100,000 |
| R3 | V1 S.G. H.T. feed | 230,000 |
| R4 | V1 fixed G.B. resistance | 150 |
| R5 | V1 anode H.T. feed | 5,000 |
| R6 | V1 anode circ. L.W. stabiliser | 100 |
| R7 | V2 hex. C.G. decoupling | 100,000 |
| R8 | V2 S.G. H.T. feed | 23,000 |
| R9 | V2 hex. fixed G.B. resistance | 150 |
| R10 | V2 osc. C.G. resistance | 50,000 |
| R11 | Osc. circuit S.W.1 stabiliser | 6 |
| R12 | V2 osc. anode S.W.1 decoupling | 5,000 |
| R13 | Osc. circuit S.W.2 stabiliser | 150 |
| R14 | Osc. circuit S.W.3 stabilier | 500 |
| R15 | Osc. circuit M.W. stabiliser | 2,300 |
| R16 | Osc. circuit L.W. stabiliser | 15,000 |
| R17 | V2 oscillator anode H.T. feed resistances | 35,000 |
| R18 | | 15,000 |
| R19 | V3 C.G. decoupling | 1,000,000 |
| R20 | V1, V2, V3 S.G.'s H.T. feed potential divider | 7,666* |
| R21 | | 3,750† |
| R22 | V3 fixed G.B. resistance | 150 |
| R23 | I.F. stopper | 50,000 |
| R24 | P.U. feed resistances | 23,000 |
| R25 | | 50,000 |
| R26 | Manual volume control and V4 signal diode load | 250,000 |
| R27 | V4 triode C.G. resistance | 1,000,000 |
| R28 | V4 G.B. and A.V.C. delay resistance | 1,000 |
| R29 | V4 triode anode decoupling | 50,000 |
| R30 | V4 triode anode load | 35,000 |
| R31 | V4 A.V.C. diode load resistances | 350,000 |
| R32 | | 230,000 |
| R33 | A.V.C. line decoupling resistances | 750,000 |
| R34 | | 1,500,000 |
| R35 | V5 C.G. resistance | 230,000 |
| R36 | V5 grid stopper | 1,000 |
| R37 | V5 G.B. resistance | 100 |
| R38 | V5 anode stopper | 500 |
| R39 | Hum neut. coil shunt | 0·6 |
| R40 | T.I. C.G. feed resistance | 500,000 |
| R41 | T.I. anode H.T. feed | 1,000,000 |

* Three-23,000 Ω 3W resistances in parallel.
† Two-7,500 Ω 3W resistances in parallel.

| | OTHER COMPONENTS | Approx. Values (ohms) |
|---|---|---|
| L1 | Aerial S.W.2 coupling coil | 2·5 |
| L2 | Aerial S.W. 3 coupling coil | 16·0 |
| L3 | Aerial M.W. coupling coil | 50·0 |
| L4 | Aerial L.W. coupling coil | 150·0 |
| L5 | Aerial S.W.1 tuning coil | Very low |
| L6 | Aerial S.W.2 tuning coil | 0·1 |
| L7 | Aerial S.W.3 tuning coil | 0·75 |

| | OTHER COMPONENTS (Continued) | Approx. Values (ohms) |
|---|---|---|
| L8 | Aerial M.W. tuning coil | 5·5 |
| L9 | Aerial L.W. tuning coil | 30·0 |
| L10 | V2 C.G. S.W.1 coupling coil | 0·7 |
| L11 | R.F. trans. S.W.2 primary | 0·1 |
| L12 | R.F. trans. S.W.3 primary | 0·75 |
| L13 | R.F. trans. M.W. primary | 5·5 |
| L14 | R.F. trans. L.W. primary | 30·0 |
| L15 | R.F. trans. S.W.2. secondary | 3·0 |
| L16 | R.F. trans. S.W.3 secondary | 27·0 |
| L17 | R.F. trans. M.W. secondary | 95·0 |
| L18 | R.F. trans. L.W. secondary | 145·0 |
| L19 | Osc. circuit S.W.1 tuning coil | Very low |
| L20 | Osc. circuit S.W.2 tuning coil | 0·1 |
| L21 | Osc. circuit S.W.3 tuning coil | 0·5 |
| L22 | Osc. circuit M.W. tuning coil | 5·0 |
| L23 | Osc. circuit L.W. tuning coil | 10·0 |
| L24 | Oscillator S.W.1 reaction | 0·1 |
| L25 | Oscillator S.W.2 reaction | 0·4 |
| L26 | Oscillator S.W.3 reaction | 0·7 |
| L27 | Oscillator M.W. reaction | 2·0 |
| L28 | Oscillator L.W. reaction | 7·0 |
| L29 | 1st I.F. trans. Pri. | 12·0 |
| L30 | 1st I.F. trans. Sec. | 8·0 |
| L31 | 2nd I.F. trans. Pri. | 12·0 |
| L32 | 2nd I.F. trans. Sec. | 12·0 |
| L33 | Speaker speech coil | 4·0 |
| L34 | Hum neutralising coil. | 0·5 |
| L35 | Speaker field coil | 1,100·0 |
| T1 | Speaker input trans. Pri. | 580·0 |
| | Sec. | 0·5 |
| T2 | Mains trans. Pri., total | 15·0 |
| | Heater sec., total | 0·2 |
| | Rect. heat. sec. | 0·1 |
| | H.T. sec., total | 300·0 |
| S1-S46 | Waveband switches | — |
| S47-49 | Radio-gram. change switches | — |
| S50-51 | "Bass" tone control switches | — |
| S52-55 | "Brilliant" tone control switches | — |
| S56 | Mains switch | — |

## VALVE ANALYSIS

Valve voltages and currents given in the table overleaf are those measured in our receiver when it was operating on mains of 225 V, using the 211-230 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the medium 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 negative.

If, as in our case, **V1** and **V3** should become unstable when measurements are being made of the screen and anode current respectively, they can be stabilised

*Continued overleaf*

## MARCONIPHONE 347—*Continued*

by connecting a non-inductive condenser of about 0·1 μF from the test electrode to chassis.

| Valve | Anode Voltage (V) | Anode Current (mA) | Screen Voltage (V) | Screen Current (mA) |
|---|---|---|---|---|
| V1 VMP4G | 253 | 0·6 | 15 | 0·2 |
| | 257 | 0·8 | | |
| V2 X41 | Oscillator | | 42 | 1·4 |
| | 84 | 7·3 | | |
| V3 VMP4G | 257 | 6·0 | 73 | 3·1 |
| V4 MHD4 | 103 | 1·6 | — | — |
| V5 KT41 | 212 | 40·0 | 257 | 9·3 |
| V6 U12 | 365† | — | — | — |
| | 18 | 0·2 | | |
| T.I. Y63 | Target | | — | — |
| | 257 | 0·5 | | |

† Each anode, A.C.

## GENERAL NOTES

**Switches.**—**S1-S46** are the wavechange switches, in six rotary units beneath the chassis. They are indicated in our under-chassis view, and shown in detail in the diagrams on this page, where each unit is as seen looking from the rear of the underside of the chassis. The table (col. 3) gives the switch positions for the five control settings, starting from fully anti-clockwise. Note that our S.W.1 band (lowest wavelengths) is designated by the makers as S3, our S.W.2 as S2 and our S.W.3 as S1.

**S47-S49** are the Q.M.B. radio-gram switches in a lever type unit at the rear of the chassis, indicated in our under-chassis view. **S47** and **S48** are closed on radio and open on gram; **S49** is open on radio and closed on gram.

**S50** and **S51** are the bass control switches. They are in a rotary unit at the front of the chassis, and are indicated in our under-chassis view (unit 7), and shown in detail in the diagram in col. 3. In the fully anti-clockwise position of the control, both switches are open; in the next position, **S50** is closed; and in the third position **S51** is closed.

**S52-S55** are the brilliance control switches, ganged in another rotary unit at the front of the chassis, and indicated in our under chassis view (unit 8), and shown in detail in the diagram in col. 3. In the fully anti-clockwise position of the control **S55** is closed; in the second, **S54** is closed; in the third, **S53**; in the fourth, **S52**; while in the fifth position all the switches are open.

**S56** is the Q.M.B. mains switch, mounted on the plate at the left-hand side of the cabinet.

**Coils.**—All the coils except **L5, L10, L19** and **L24** are in eight screened units on the chassis deck, some of the units containing one or two other components. No trimmers are inside the tops of the cans, but all

*Continued on page V*

## DIAGRAMS AND TABLE OF THE SWITCH UNITS

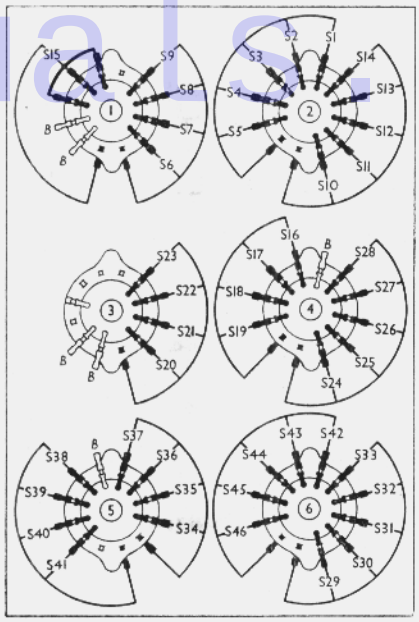



Diagram of the six wavechange switch units, as seen looking from the rear of the underside of the chassis.

| Switch | S.W.1 (S3) | S.W.2 (S2) | S.W.3 (S1) | M.W. | L.W. |
|---|---|---|---|---|---|
| S1 | C | | | | |
| S2 | | C | | | |
| S3 | | | C | | |
| S4 | | | | C | |
| S5 | | | | | C |
| S6 | C | | | | |
| S7 | | C | | | |
| S8 | | | C | | |
| S9 | | | | C | |
| S10 | C | | | | |
| S11 | | C | | | |
| S12 | | | C | | |
| S13 | | | | C | |
| S14 | | | | | C |
| S15 | C | C | C | | |
| S16 | | C | | | |
| S17 | | | C | | |
| S18 | | | | C | |
| S19 | | | | | C |
| S20 | C | | | | |
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| S24 | C | | | | |
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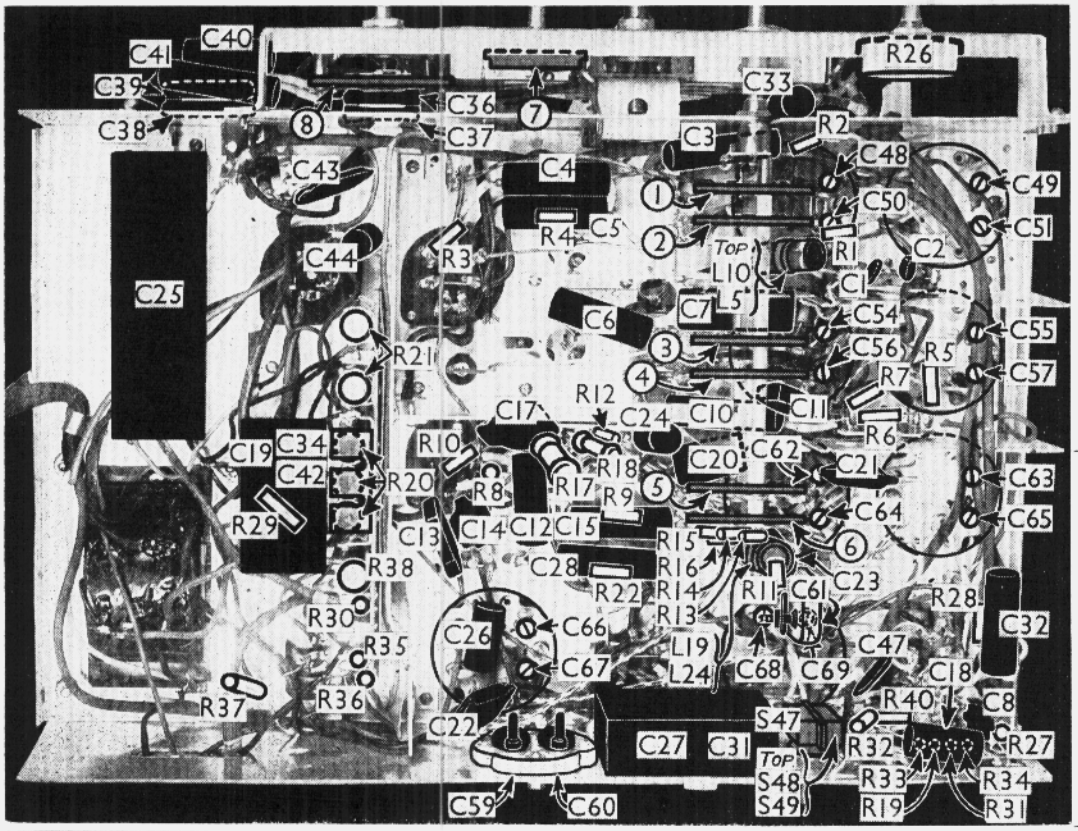
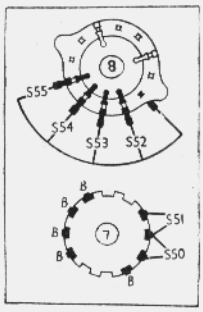
| S29 | C | | | | |
| S30 | | C | | | |
| S31 | | | C | | |
| S32 | | | | C | |
| S33 | | | | | C |
| S34 | C | | | | |
| S35 | | C | | | |
| S36 | | | C | | |
| S37 | | | | C | |
| S38 | C | | | | |
| S39 | C | C | | | |
| S40 | | C | C | | |
| S41 | | | C | C | |
| S42 | C | | | | |
| S43 | | C | | | |
| S44 | | | C | | |
| S45 | | | | C | |
| S46 | | | | | C |




Under-chassis view. The only coils beneath the chassis are the **L5, L10** and **L19, L24** units. The various trimmer screws are all indicated. **R20** and **R21** are each made up of paralleled resistances.




The two tone control switch units, which are mounted at the front of the chassis.

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# MAINTENANCE PROBLEMS

## Faulty "Hum-Dinger"

AN H.M.V. A.C. transportable receiver was brought in for service, and was found to be suffering from chronic instability, whistles occurring on every station. The chassis was removed and all decoupling condensers, etc., were carefully checked, but found to be O.K. New valves were tried and a search for dry joints and bad earth returns was made, but to no avail.

Next the cover was removed from the mains unit, and the electrolytic smoothing condensers checked, as some sets appear to go unstable, rather than hum, when these condensers suddenly lose their capacity. They were alright, however, and the trouble was eventually traced to the small "hum-dinger" potentiometer mounted at the rear of the power unit. The sliding arm was making a high resistance contact to the resistance element, and as it formed the common H.T. negative return circuit for all stages of the receiver, the result was as stated above, just uncontrollable instability.—L.S.N.

## Broken Bias Resistors

TWO new Murphy AD32 receivers were unpacked on the same day, and were found to be faulty, and, furthermore, to have identical faults, a most unusual occurrence with this make.

No signals at all could be received, and a change of valves made no difference. All voltages measured from chassis appeared to be normal, but when anode and screen currents were checked, the I.F. valve (VP1322) was found to be taking none whatever.

A further voltage test between *cathode* and anode revealed a complete lack of volts, and, of course, the bias resistor was immediately suspect.

Upon examining this component, it was found that in both sets one end of it had been broken clean off through being drawn up too tightly by its connecting wires on the sub-panel on which it was mounted.—L. S. NORRIS, FARNHAM.

## Brief Hints

MARCONI 314.—I have fitted at least thirty new coil units to the above model. The unit in question is the combined anode tuning and reaction coil, mounted on the right-hand side of the chassis. (Top of chassis, right-hand side, viewed from rear.) These coils cannot be repaired.

* * *

FERRANTI Lancastria.—Usual breakdown, tuning indicator, which breaks the H.T. feed to the anode of V1 via the first I.F. primary.

* * *

PYE G/B.—The small coupling condenser (C12) between the S.G. and H.F. valves (mounted on small insulating washers and accessible without removing chassis), gives a lot of trouble.—E. R. HEALE, GUERNSEY.

# SERVICE SHEET 286—MARCONIPHONE 347

*Continued from page VIII*

are reached from beneath the chassis, most of them being beneath their respective coil units.

**L5, L10** and **L19, L24,** the coils for the lowest wavelength band, are beneath the chassis, on two small tubular formers.

**Scale Lamps.**—These are two Osram 6·2 V, 0·3 A M.E.S. types, with tubular bulbs.

**External Speaker.**—Two sockets are provided on a bracket at the rear of the cabinet for a low impedance (about 6 Ω) external speaker.

**Condensers C45** and **C46.**—These electrolytics are mounted on a platform on the speaker unit.

**Resistance R39.**—This is also on the speaker unit, and consists of a short length of resistance wire, in yellow sleeving, connected between tags 3 and 4 on the speaker unit.

**Condensers C19, C34, C42.**—These are three paper condensers in a single metal case beneath the chassis. Each condenser is brought out separately to two tags. The two tags nearest the rear of the chassis (marked 1) belong to **C19** (0·23 μF); the next two tags (marked 2) belong to **C34** (0·5 μF); and the two tags nearest the front of the chassis (marked 3) belong to **C42** (0·1 μF).

**Condensers C27, C31.**—These are two 4 μF dry electrolytics in a single metal case, fixed inside the rear member of the chassis, and having a common negative (black) lead. The red lead to **S47** is the positive of **C27,** and the red lead to **V4** valveholder is the positive of **C31.**

**Resistances R20, R21.**—Note that these respectively consist of three and two resistances in parallel.

**Chassis Divergencies.**—**R24** in our chassis was 23,000 Ω and **R25,** 50,000 Ω. Most chassis, however, will have **R24** 75,000 Ω and **R25,** 23,000 Ω, and in addition a fixed condenser of 0·01 μF will be connected across **R25** (not in our chassis). This modification increases the volume on gram.

**Models 346, 363, 366** and **367.**—Model 367 is the automatic radiogram version of the 347, and has an almost identical chassis. The speaker is slightly different, having a speech coil resistance of 1·75 Ω instead of 4 Ω, while the resistance of the primary of **T1** is 300 Ω.

Model 346 is a table receiver, only differing from the 347 in that a tuning idicator is not fitted. The circuit is therefore the same except for the deletion of the **T.I., R40, R41** and **C47,** while the heater secondary of **T2** has no 6·3 V tapping.

Models 363 and 366 are radiogram and auto-radiogram versions of the 346, but are otherwise similar.

## CIRCUIT ALIGNMENT

**I.F. Stages.**—Set bass tone control to minimum cut, brilliance control to maximum cut, waveband switch to M.W., volume control to maximum, and gang condenser about half-way in mesh. Connect signal generator to control grid (top cap) of **V2** and chassis, see that the screen is on the I.F. valve, and then short circuit **C58.**

Feed in a 460 KC/S signal and adjust **C66, C67, C68** and **C69,** in that order, for maximum output. Recheck these settings, then remove short from **C58.**

**R.F. and Oscillator Stages.**—Tone and volume controls should be set as above. Connect signal generator to **A** and **E** sockets. With gang fully meshed, pointer should cover 0 and 50 calibration marks on vernier scale (or 25 and 75 in the radiogram models).

The calibration mark for 46 m. on the S1 (our S.W.3) range is used as a ganging point on all bands. Where instructed, see that pointer is over this calibration mark, but that the waveband switch is set correctly for the range being aligned. A dummy aerial of 400 Ω resistance should be used.

**L.W.**—Adjust receiver to ganging point, switch to L.W., and feed in a 750 m. (400 KC/S) signal. Adjust **C65** for maximum output. Feed in a 775 m. (387 KC/S) signal, tune it in, and adjust **C57** and **C51,** while rocking the gang.

Feed in a 1,700 m. (176 KC/S) signal, tune it in, and adjust **C60** for maximum output while rocking the gang.

Repeat these adjustments. It may be necessary to desensitize **V2** by temporarily including an additional 2,000 Ω resistance in its cathode circuit to make the receiver stable while ganging.

**M.W.**—Adjust receiver to ganging point, switch to M.W. and feed in a 185 m. (1,620 KC/S) signal. Adjust **C64** for maximum output. Feed in a 205 m. (1,460 KC/S) signal, tune it in, and adjust **C56** and **C50** for maximum output.

Feed in a 500 m. (600 KC/S) signal and tune it in. Adjust **C59** for maximum output, while rocking the gang.

Repeat these adjustments.

**S.W.3 (S1).**—Adjust receiver to ganging point, switch to S.W.3 (S1) band, and feed in a 46 m. (6·5 MC/S) signal. Adjust **C63** for maximum output. Feed in a 50 m. (6 MC/S) signal, tune it in, and adjust **C55** and **C49** for maximum output, rocking the gang.

Repeat these adjustments.

**S.W.2 (S2).**—Adjust receiver to ganging point, switch to S.W.2 (S2) band, and feed in a 16·7 m. (18 MC/S) signal. Adjust **C62** for maximum output. Two resonance points will be found, and the correct one is that requiring the least capacity. Feed in a 17·8 m. (16·8 MC/S) signal, tune it in, and adjust **C54** and **C48** for maximum output, rocking the gang very carefully for optimum results. The adjustment of **C54** is particularly critical. Repeat all these adjustments several times to ensure that correct results have been obtained.

**S.W.1 (S3).**—Switch set to S.W.1 ($S_3$) range, feed in a 16 m. (18·75 MC/S) signal, and having set **C61** approximately half way between maximum and minimum capacity, tune in the signal. If two tuning points are found, use that received with the greater capacity of the gang condenser.

The inductance of **L19** must now be adjusted for maximum output. This is done by altering the length of the return lead from the coil tag to the chassis. This lead (of thick tinned copper wire) is in two parts; unsolder them, and slide that from the chassis up and down that from the coil tag until a point is reached where the maximum output reading is obtained; finally, solder the two wires together at this point.

Feed in a 7 m. (43 MC/S) signal, and tune to 7 m. on scale. Adjust **C61** for maximum output. If two peaks are obtained, use that requiring the greater trimmer capacity. Now while rocking the gang slightly very carefully re-adjust **C61** for optimum results.

# ALPHABETICAL LIST OF 'TRADER' SERVICE SHEETS NOS. 261 - 286

| Receiver | No. |
|---|---|
| Aerodyne 284 (Battery) | 267 |
| Alba 625, 825, 920 (A.C.) | 283 |
| Beethoven P107 (Battery) | 285 |
| Belmont 600 (A.C./D.C.) | 261 |
| Burndept 276 (and Vidor 284) (A.C./D.C.) | 269 |
| Bush SW41, RG41 (A.C.) | 270 |
| Cossor 538, 584, 598 (A.C.) | 274 |
| Decca 99, 110, 120 (A.C.) | 280 |
| Ekco B38 (Battery) | 279 |
| AW88, C88, RG109 (A.C.) | 263 |
| Ever Ready 5038 (A.C.) | 281 |
| Ferguson 502, 502C, 502RG (A.C.) | 276 |
| Ferranti 1737, 2037 (A.C.) | 264 |
| G.E.C. A.C. All-Wave Super 6 (A.C.) | 282 |

| Receiver | No. |
|---|---|
| Halcyon B333 (Battery) | 273 |
| Invicta 360 (A.C.) | 271 |
| K.-B. 610 (Battery) | 265 |
| McMichael 137 (A.C.) | 266 |
| 372 (A.C.) | 284 |
| Marconiphone 346, 347, 363, 366, 367 (A.C.) | 286 |
| 557, 559, 567, 575, 576 (A.C.) | 262 |
| Mullard MAS6 (A.C.) | 272 |
| Philips 747A, 747AX (A.C.) | 268 |
| Pye Baby Q (Battery) | 277 |
| Ultra 115, 125 (A.C.) | 278 |
| Vidor 279, 283 (A.C.) | 275 |
| 284 (and Burndept 276) (A.C./D.C.) | 269 |