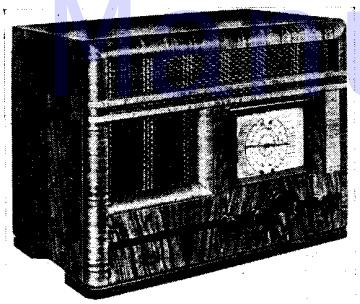
# MARCONIPHONE 346
# ALL-WAVE FIVE



## VALVE READINGS

Measured on medium waves. No signal. Volume maximum. 200 volt A.C. mains.

| V. | Type. | Electrode. | Volts. | Ma. |
|---|---|---|---|---|
| | (All Marconi). | | | |
| 1 | VMP4G .. | Anode .. | 245 | .5 |
| | (7) .. | Screen .. | 15 | .6 |
| 2 | X41 Met .. | Anode .. | 245 | 2.7 |
| | (7) .. | Screen .. | 40 | 2.7 |
| | | Osc. anode | 80 | 5 |
| 3 | VMPvG Met | Anode .. | 245 | 4.3 |
| | (7) .. | Screen .. | 68 | 1.9 |
| 4 | MHD4 Met | | | |
| | (7) .. | Anode .. | 87 | 1.75 |
| 5 | N41 (7) .. | Anode .. | 210 | 37 |
| | | Screen .. | 250 | 6.8 |
| 6 | U12 (4) .. | Filament .. | 375 | — |

**CIRCUIT.**—A five-valve superhet receiver operating on five wave-bands, covering from seven to 2,250 metres.

Inductively coupled H.F. transformers are used to couple the aerial to V1, an H.F. pentode, on all except the 7-metre band. On this band signals are taken to V2, the frequency-changer.

The output of V1 is transformer coupled to V2. Signals are fed to V3, an H.F. pentode, through an I.F. transformer tuned to 460 kc. and through a second I.F. transformer to V4, which is a double-diode-triode. One diode is used for demodulation and the other to supply AVC bias to the preceding valves in the orthodox manner.

A resistance and capacity stage is used to couple the signal to V5, the output pentode. The value of the L.F. coupling condenser C8 is made variable by switching other condensers in parallel with it, thus controlling the bass response. The output of V5 is tone controlled by means of condensers and a selector switch. Volume is controlled by VR1, which varies the input to the grid of V4.

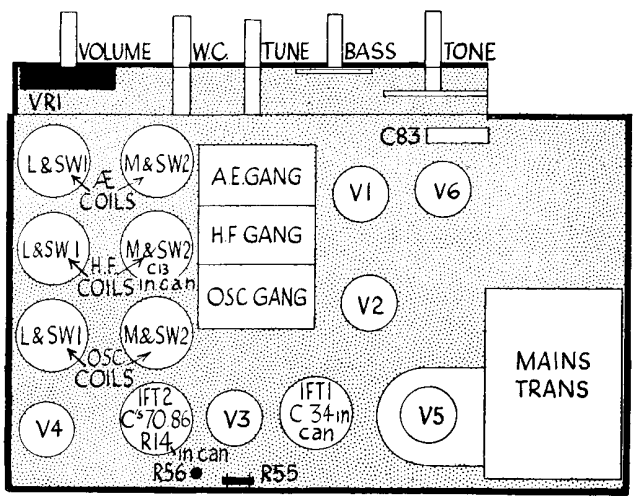
Mains equipment consists of transformer, full-wave rectifier, electrolytic condensers and the speaker field.

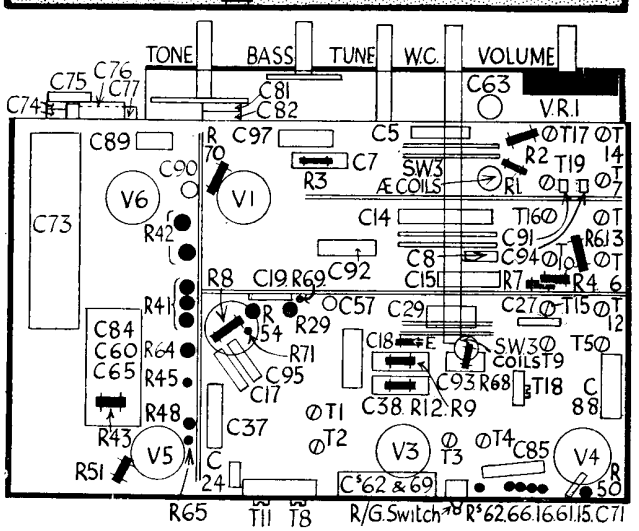
**Special Notes.**—The dial lights are rated at 6.2 volt .3 amp; they will be found one on each side of the scale, and are secured by spring clips.

Extension speaker sockets are provided, these being taken from the secondary of the output transformer. The external speaker should have a speech coil impedance of about 4 ohms.

C67 and C68 are mounted on a bracket and fixed to the speaker chassis.

The black and white panels shown in the circuit diagram between the switch contacts indicate whether those particular contacts are open or closed in various positions. From top to bottom the positions are long, medium, first short wave, second short wave and third short wave. A white panel indicates that




Left of the letters " C18 " is C56.

**Left and below are the chassis layouts of the Marconi 346. The "tinted" one is the top view. Resistor "E" in the bottom view is explained under special Notes.**

## QUICK TESTS

Quick tests are available on the terminal strip on the back of the chassis. Volts measured between this and the chassis should be :—

Tag 1—250 volts, smoothed H.T.
Tag 2—270 volts, smoothed H.T.
Tag 3—375 volts, unsmoothed H.T.
Tag 4—earth.

# MARCONIPHONE MODEL 346 ALL-WAVE—*Continued*

the switch is open on that range and a black panel that it is closed.

The switches in the chassis diagram are as follows, from front to back, left and right: S9, S2, S5, S10, S11; S3, S4, S5, S6, S7, S12, S8.

At the end of the switch a resistor marked "E" is shown. This represents a bank of resistors, the numbers being: R's 60, 59, 58 and 57, reading from the top.

**Removing Chassis.**—First remove the knobs from the front of the cabinet, which are secured by self-threading grub screws, and free the mains switch from the side of the cabinet by undoing the escutcheon.

Next free the speaker and mains leads from their cleats and remove four bolts from underneath the cabinet. The chassis may now be removed to the extent of the speaker leads, which will be enough for all ordinary purposes. Should it be necessary to disconnect these leads, reconnection will be as follows: Tag 1 is connected to tag 8, tag 2 to tag 7, tag 3 to tag 6, and tag 4 to the speaker chassis.

## *ALIGNMENT NOTES*

**I.F. Circuits.**—Tune the receiver to the centre of the medium wave band and short circuit the oscillator section of the gang condenser. Set the bass control to minimum and the treble control to maximum.

Inject a signal of 460 kc. to the grid cap of V2, and adjust T1, T2, T3 and

(*Continued on page* 14.)

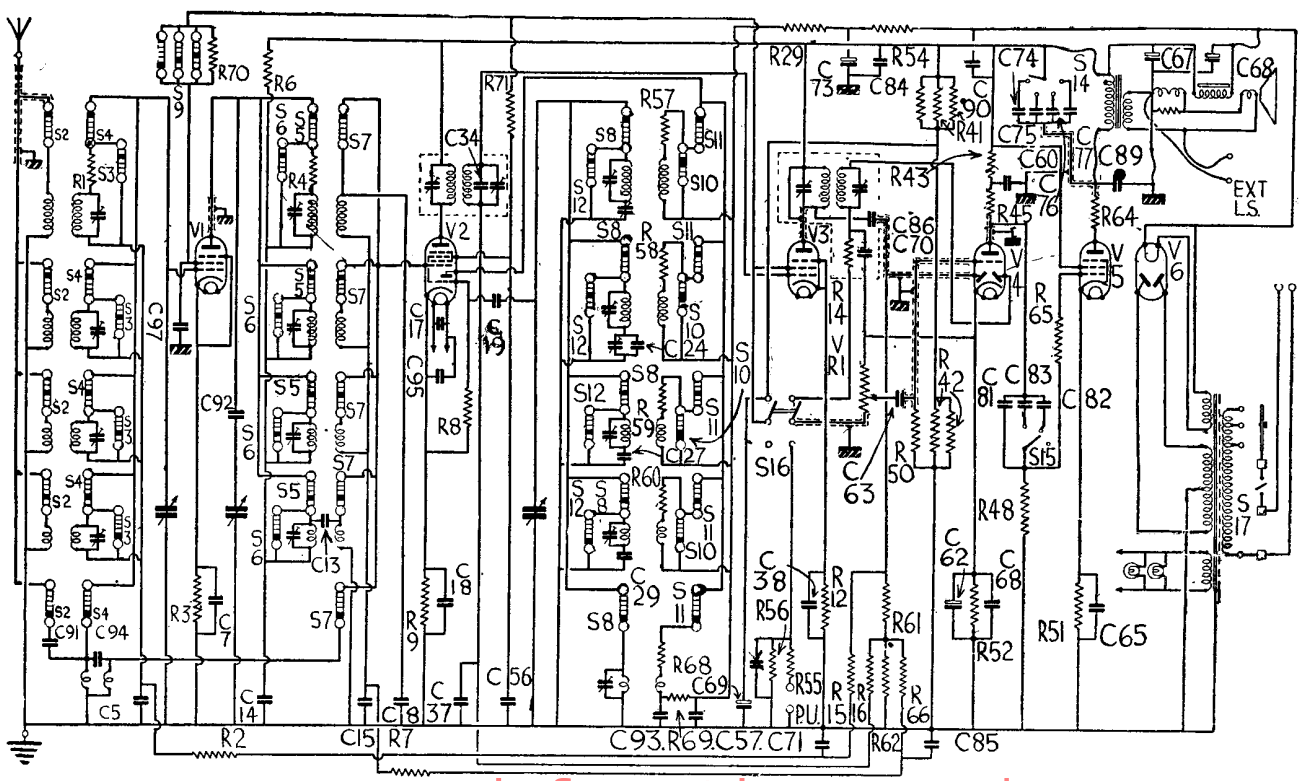
## RESISTANCES

| R | Purpose | Ohms. |
|---|---|---|
| 1 | V1 grid circuit modifier (long waves). | 100 |
| 2 | V1 A.V.C. decoupling | 100,000 |
| 3 | V1 cathode bias | 150 |
| 4 | V1 anode circuit modifier | 100 |
| 6 | V1 anode decoupling | 5,000 |
| 7 | V2 A.V.C. decoupling | 100,000 |
| 8 | V2 osc. grid leak | 50,000 |
| 9 | V2 cathode bias | 150 |
| 12 | V3 cathode bias | 150 |
| 14 | Demodulator diode load | 50,000 |
| 15 | V1 A.V.C. decoupling | 1.5 meg. |
| 16 | V3 A.V.C. decoupling | 1 meg |
| 19 | V2 osc. anode feed | 15,000 |
| 41 | V1, V2 and V3 screen decoupling potr. | 23,000 |
| 42 | V1, V2 and V3 screen decoupling potr. | 7,500 |
| 43 | V4 anode decoupling | 50,000 |
| 45 | V4 anode load | 35,000 |
| 48 | V5 grid leak | 230,000 |
| 50 | V4 grid leak | 1 meg |
| 51 | V5 cathode bias | 100 |
| 52 | V4 cathode bias | 1,000 |
| 54 | V2 osc. anode decoupling | 35,000 |
| 55 | Pick up potr. | 23,000 |
| 56 | Pick up potr. | 50,000 |
| 57 | Regeneration modifier (l.w.) | 15,000 |
| 58 | Regeneration modifier (m.w.) | 2,300 |
| 59 | Regeneration modifier (s.w.1) | 500 |
| 60 | Regeneration modifier (s.w.2) | 150 |
| 61 | A.V.C. diode load part | 350,000 |
| 62 | A.V.C. diode load part | 230,000 |
| 64 | V4 anode stabiliser | 500 |
| 65 | V5 grid stopper | 1,000 |
| 66 | V2 A.V.C. decoupling | 750,000 |
| 68 | Regeneraion modifier (s.w.3) | 6 |
| 69 | V2 osc. anode feed | 5,000 |
| 70 | V1 screen decoupling | 230,000 |
| 71 | V2 screen decoupling | 23,000 |
| VR1 | Volume control | 250,000 |

## CONDENSERS

| C. | Purpose. | Mfds. |
|---|---|---|
| 5 | V1 A.V.C. decoupling | .05 |
| 7 | V1 cathode bias shunt | .1 |
| 8 | Long wave loading | .0003 |
| 13 | H.F. coupling (S.W.2) | .000005 |
| 14 | V1 anode decoupling | .1 |
| 15 | V2 A.V.C. decoupling | .05 |
| 17 | V2 heater shunt | .002 |
| 18 | V2 cathode bias shunt | .1 |
| 19 | V2 osc. grid | .00005 |
| 24 | Medium wave padding | .00035 |
| 27 | Short wave 1 padding | .00184 |
| 29 | Short wave 2 padding | .00285 |
| 34 | I.F. T1 secondary circuit part | .0001 |
| 37 | V3 A.V.C. decoupling | .05 |
| 38 | V3 cathode bias shunt | .1 |
| 56 | V2 screen decoupling | .1 |
| 57 | V2 osc. anode decoupling | .05 |
| 60 | V4 anode decoupling | .5 |
| 62 | V4 cathode bias shunt | 4 |
| 63 | L.F. coupling | .05 |
| 65 | V5 cathode bias shunt | .1 |
| 67 | H.T. smoothing | 16 |
| 68 | H.T. smoothing | 8 |
| 69 | V1, V2 and V3 screen decoupling potr. | 4 |
| 70 | H.F. filter | .00035 |
| 71 | V1 A.V.C. H.F. by-pass | .001 |
| 73 | V2 osc. anode decoupling | 8 |
| 74 | Tone control | .0023 |
| 75 | Tone control | .005 |
| 76 | Tone control | .02 |
| 77 | Tone control | .05 |
| 81 | L.F. coupling and tone filter | .001 |
| 82 | L.F. coupling and tone filter | .0015 |
| 83 | L.F. coupling and tone filter | .05 |
| 84 | V2 and V3 anode decoupling | .23 |
| 85 | V2 A.V.C. decoupling | .05 |
| 86 | A.V.C. diode coupling | .0001 |
| 88 | V4 cathode bias shunt | .1 |
| 89 | Pentode compensating | .0023 |
| 90 | H.T. decoupling | .05 |
| 91 | Series aerial (S.W.3) | .00001 |
| 92 | H.F. gang H.T. isolator | .1 |
| 93 | V2 osc. anode decoupling (S.W.3) | .0023 |
| 94 | S.W.3 top coupling | .000023 |
| 95 | V2 heater by-pass | .0023 |
| 97 | V1 screen decoupling | .1 |

**A complete guide to the circuit of the Marconiphone 346 all-wave superhet A.C. five is given in the circuit diagram below and the tables of component values above.**



# INSTALLING EXTRA SPEAKERS

(*Continued from page* 12.)

is most important that the "live" lead be isolated by a 4-mfd. high-voltage test (say, 750 volts) condenser of good construction (Fig. 1).

Before leaving the subject of matching, it can be pointed out that extra speakers with multi-ratio transformers, particularly those with both high and low-impedance adjustments, are a great aid to the service man. They enable him to select, by practical trial, the *highest* impedance which gives the required volume.

Coming to (b), what wire should be used? There can be different ideas on this subject, but 20-gauge or heavier bell-type wire—preferably enamelled, double-cotton covered and waxed—is suitable for low-impedance work, and good quality lighting flex for high impedance.

When installing in a new house, the wires can be run under the floors or through ½-in. (or smaller) electrical conduit under the plaster. There is also a tough rubber cable that can be used under plaster.

Occasionally, a shorter run can be obtained by using lead covered cable from window to window outside a house.

## Double-Pole Switches

Switching of extra speakers can be carried out by the usual type of mains Q.M.B. switch or a special type for the purpose. The double-pole type, breaking both leads, is preferable. If a single-pole type is used there may be some signal "leakage" through the speaker, although this likelihood is minimised if the switch is put in the "live" lead.

When a volume control is fitted, a switch is not necessary if the control reduces right to zero in the minimum position.

A variable series resistance can be used for volume control with a low impedance speaker, but the best arrangement is a potentiometer connected with the slider going to the speaker (Fig. 2).

For low impedance the potentiometer resistance should be 50-100 ohms; for high resistance 25-50,000 ohms.

The connection to the speaker should be made by a plug and socket—probably on the wainscoting. A special plug and socket should be employed for this—surface mounting forms are available. Ordinary mains two- or three-pin types should be avoided.

Thirdly, we come to problems (c)—the practical ones of actual installation. To some extent these have been discussed under (b).

Largely, installation is a matter of common-sense and a "tidy instinct." Normally, in houses already furnished, the extra speaker leads are run along the wainscoting, up by door frames, and along the top of picture rails, being held in place by insulated staples.

## Consider the "Run"

The best "run" should be thought out carefully before work is started, and it should be remembered that to achieve a neat plug connection on the wainscot the final stretch should be along the wainscot and not the picture rail.

Where more than one speaker are to be wired it is better, from the point of view of subsequent service, to loop the "run" to each rather than have a "main line" with a number of T junctions. When a junction is unavoidable, a small junction box should be used and mounted in an accessible place.

In new houses the wiring can be run under the floors or put in before plastering. In this case, conduit or tough rubber cable should be used—not lead covered.

The value of extension speakers is multiplied enormously by a remote control system enabling the receiver to be switched off from the speaker. Retailers should endeavour to instal such a system simultaneously with the speakers (pointing out to the customer the saving in cost). In any event, a remote control can often form a follow-up sale.

Most systems on the market use a relay operated by a push-button at the speaker.

The activating current is obtained from a small battery, and the arrangement involves the use of two wires. Sometimes a common return is employed for both speakers and remote control, and, therefore, only three wires are required.

Special cables are available for most of these systems. Bell-type wire is suitable, and it can be run side by side with the speaker leads.

When the receiver is controlled from more than one point, it is a good idea, if possible, to provide some means of ensuring that each speaker must be cut out when switching off, otherwise annoyance can be caused to persons in one room when the set is switched on from another. At the same time a wasteful load can be left connected to the receiver.

Another idea for remote control systems is the provision of pilot lights at each speaker. These can consist of 60-ma. lamps run from the 4-volt heater supply of the receiver and mounted behind small red windows let in the speaker cabinets.

These ensure that the receiver will not be left running without any speakers in use.

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*Technical Books*

## "Practical Electrician's Pocket Book"

Radio transmission and reception, picture telegraphy, and the principles and laws of electricity are dealt with in three of the many sections of the *Practical Electrician's Pocket Book*, 1937, published by Odhams Press Technical Book Department, 85, Long Acre, London, W.C.2, at 2s. 10d. post free.

Further extension has been made to the reference tables of supply voltages. Covering eighty pages, these tables are in two sections. The first gives the main details of supply for each of the electricity undertakings in Great Britain; the second contains the voltages of some 7,000 cities, towns and villages on the mains of these undertakings.

In revising the 1937 *Pocket Book* the editor has consulted Professor C. L. Fortescue, O.B.E., M.A., M.Inst.C.E., M.I.E.E., principal of the electrical engineering department of the City and Guilds Institute. Substantial revision has been made in many sections.

Principal among these are the sections dealing with Power and Power Factor, Furnaces, A.C. Motors, the Theory of Dynamos, Rectifiers, Electricity Regulations, Transmission and Distribution, Photometry and Illumination, and Domestic Electrical Appliances.

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## *Marconiphone 346—*

(*Continued from page* 8.)

T4 for maximum reading on an output meter, which should be connected across the external speaker terminals and adjusted to read about 1 volt.

**Calibration.**—With the gang condenser plates fully meshed the pointer should coincide with the 0 and 50 calibration marks on the vernier scale.

The receiver should be accurately calibrated before starting to gang, as the 46-metre index mark is used as a ganging point.

**Long Waves.**—Tune the receiver to the ganging point, and inject a signal of 750 metres to the aerial and earth terminals, and adjust T5 for maximum output.

Inject and tune in a signal of 775 metres, rock the gang condenser and adjust T6 and T7 for maximum output. Inject and tune in a signal of 1,700 metres and adjust T8 while rocking the gang condenser.

*Note.*—If there is any tendency for the receiver to become unstable during the above adjustments, a 2,000-ohm resistance should be included in the cathode lead to V2. The amount of signal injected should be such that a reading of about .5 volt is obtained.

**Medium Waves.**—Tune the receiver to the ganging point and inject a signal of 185 metres. Adjust T9 for maximum.

Inject and tune in a signal of 205 metres. Adjust T10 and T19 for maximum output. Inject and tune in a signal of 500 metres and adjust T11 while rocking the gang condenser.

**Short Wave 1.**—Set receiver to 46 metres and inject a signal of that wavelength; adjust T12 for maximum output Inject and tune in a signal of 50 metres, rock the gang condenser and trim T12 and T14. Check the above for accuracy.

**Short Wave 2.**—With the pointer at ganging-point inject a signal of 16.7 metres and adjust T15 for maximum reading Two peaks will be found; use the one nearer minimum.

Inject and tune in a signal of 17.8 metres, rock the gang condenser and adjust T16 and T17 for maximum output.

Check the above two or three times.

**Short Wave 3.**—Inject a signal of 16 metres. Adjust T18 to approximately half capacity, and tune in the signal. Two tune points will be found; the one on the higher wavelength should be used.

The inductance of the oscillator coil must now be adjusted for maximum output. This is done by altering the length of the lead from the coil to the chassis.

Set the pointer to 7 metres, and inject a signal of this wavelength. Adjust T18, for maximum output, while rocking the gang condenser. If two peaks are found, use the one with the greater capacity.