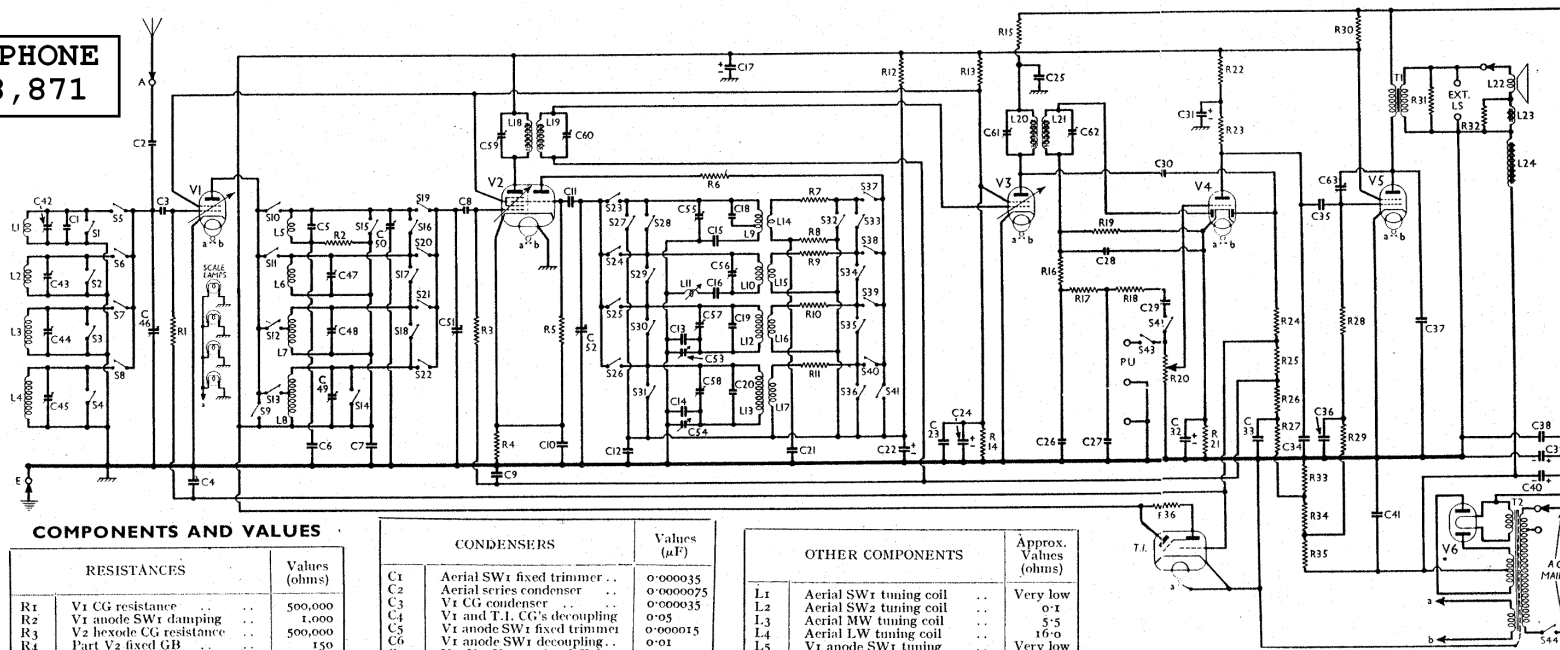


# MARCONI PHONE 853,858,871



## COMPONENTS AND VALUES

| RESISTANCES                                       | Values (ohms) |
|---|---------------|
| R1 V1 CG resistance                               | 500,000       |
| R2 V1 anode SW1 damping                           | 1,000         |
| R3 V2 hexode CG resistance                        | 500,000       |
| R4 Part V2 fixed GB                               | 150           |
| R5 V2 osc. CG resistance                          | 100,000       |
| R6 V2 osc. anode stabiliser                       | 75            |
| R7 Osc. SW1 reaction damping                      | 50            |
| R8 V2 osc. anode SW1 HT feed                      | 150           |
| R9 Osc. SW2 reaction damping                      | 350           |
| R10 Osc. MW reaction damping                      | 500           |
| R11 V1 osc. anode HT feed                         | 1,000         |
| R12 V1, V2, V3 SG's HT feed                       | 35,000        |
| R13 potential divider                             | 10,000        |
| R14 V3 anode HT feed                              | 23,000        |
| R15 V3 anode HT feed                              | 10,000        |
| R16 IF stopper resistances                        | 50,000        |
| R17 V4 signal diode load                          | 50,000        |
| R18 Manual volume control                         | 350,000       |
| R19 V4 triode GB; AVC delay                       | 2,000,000     |
| R20 V4 triode anode decoupling                    | 750           |
| R21 V4 triode anode load                          | 23,000        |
| R22 V4 AVC diode load resistances                 | 50,000        |
| R23 V5 CG resistance                              | 500,000       |
| R24 V5 CG decoupling                              | 500,000       |
| R25 V5 SG, V1, V2, V3, V4 HT feed                 | 150,000       |
| R26 V5 SG decoupling                              | 350,000       |
| R27 T1 sec. artificial loading                    | 1,000         |
| R28 Hum neut. coil shunt                          | 50            |
| R29 V1, part V2 hex. and V3 fixed GB pot. divider | 0.6           |
| R30 Speaker field coil shunt                      | 1,000         |
| R31 T.I. anode HT feed                            | 7,500         |
| R32   | 50,000        |
| R33   | 1,000,000     |
| R34   |               |
| R35   |               |
| R36   |               |

## H.M.V. 668 AND MARCONI 871 MODIFICATIONS

These are auto-radiogram models of the 657 and 853 respectively, and incorporate the auto-tuning mechanism. In addition they include, of course, a hysteresis type of motor, wired to the 224/255 V tapping on the primary of T2, and an 8-record changer with pick-up. The pick-up resistance is 60Ω, and the pick-up is connected via an auto-transformer (primary, 0.18Ω, secondary 600Ω) to the pick-up sockets as shown in our circuit of the H.M.V. 656. In addition, however, there is a filter circuit, consisting of a 0.02 μF condenser and a 50,000Ω resistance in series, across the upper and lower pick-up sockets. In early models, these values may be 0.01 μF and 100,000Ω.

## CONDENSERS

| CONDENSERS                        | Values (μF) |
|-----------------------------------|-------------|
| C1 Aerial SW1 fixed trimmer       | 0.000035    |
| C2 Aerial series condenser        | 0.000075    |
| C3 V1 CG condenser                | 0.000035    |
| C4 V1 and T.I. CG's decoupling    | 0.05        |
| C5 V1 anode SW1 fixed trimmer     | 0.000015    |
| C6 V1 anode SW1 decoupling        | 0.01        |
| C7 V1, V2, V4 anodes RF by-pass   | 0.1         |
| C8 V2 hexode CG condenser         | 0.000035    |
| C9 V2 hex. and V3 CG's decoupling | 0.23        |
| C10 V2 cathode by-pass            | 0.1         |
| C11 V2 osc. CG condenser          | 0.00001     |
| C12 V2 osc. anode RF by-pass      | 0.005       |
| C13 Osc. circuit MW fixed tracker | 0.00035     |
| C14 Osc. circuit LW fixed tracker | 0.00015     |
| C15 Osc. circuit SW1 tracker      | 0.0035      |
| C16 Osc. circuit SW2 tracker      | 0.0023      |
| C17 HT line decoupling            | 4.0         |
| C18 HT decoupling                 | 0.00005     |
| C19 V1 anode SW1 fixed trimmer    | 0.000015    |
| C20 Osc. circuit MW fixed trimmer | 0.000035    |
| C21 V2 osc. anode SW1 decoupling  | 0.0023      |
| C22 V2 osc. anode decoupling      | 4.0         |
| C23 V1, V2, V3 SG's RF by-pass    | 0.1         |
| C24 V1, V2, V3 SG's decoupling    | 0.05        |
| C25 V3 anode decoupling           | 0.00005     |
| C26 IF by-pass condensers         | 0.00005     |
| C27 AF coupling to V4 triode      | 0.01        |
| C28 Coupling to V4 AVC diode      | 0.000075    |
| C29 V4 triode anode decoupling    | 2.0         |
| C30 V4 cathode by-pass            | 25.0        |
| C31 V4 AVC diode decoupling       | 0.23        |
| C32 IF by-pass                    | 0.00035     |
| C33 V4 triode to V5 AF coupling   | 0.05        |
| C34 V5 CG decoupling              | 0.23        |
| C35 Fixed tone corrector          | 0.0023      |
| C36 HT circuit RF by-pass         | 0.015       |
| C37 HT smoothing condensers       | 4.0         |
| C38                               | 8.0         |
| C39                               | 0.05        |
| C40                               | 0.05        |
| C41 Auto GB and L24 by-pass       | —           |
| C42 Aerial SW1 trimmer            | —           |
| C43 Aerial SW2 trimmer            | —           |
| C44 Aerial LW trimmer             | —           |
| C45 Aerial circuit tuning         | —           |
| C46 V1 anode SW2 trimmer          | —           |
| C47 V1 anode MW trimmer           | —           |
| C48 V1 anode LW trimmer           | —           |
| C49 V1 anode SW1 trimmer          | —           |
| C50 V1 anode circuit tuning       | —           |
| C51 Oscillator circuit tuning     | —           |
| C52 Osc. circuit MW tracker       | —           |
| C53 Osc. circuit LW tracker       | —           |
| C54 Osc. circuit SW1 trimmer      | —           |
| C55 Osc. circuit SW2 trimmer      | —           |
| C56 Osc. circuit MW trimmer       | —           |
| C57 Osc. circuit LW trimmer       | —           |
| C58 1st IF trans. pri. tuning     | —           |
| C59 1st IF trans. sec. tuning     | —           |
| C60 2nd IF trans. pri. tuning     | —           |
| C61 2nd IF trans. sec. tuning     | —           |
| C62 Variable tone control         | 0.0005      |
| C63                               | —           |

\* Electrolytic. † Variable. ‡ Pre-set.

## OTHER COMPONENTS

| OTHER COMPONENTS                 | Approx. Values (ohms) |
|----------------------------------|-----------------------|
| L1 Aerial SW1 tuning coil        | Very low              |
| L2 Aerial SW2 tuning coil        | 0.1                   |
| L3 Aerial MW tuning coil         | 5.5                   |
| L4 Aerial LW tuning coil         | 16.0                  |
| L5 V1 anode SW1 tuning           | Very low              |
| L6 V1 anode SW2 tuning           | 0.1                   |
| L7 V1 anode MW tuning, total     | 5.5                   |
| L8 V1 anode LW tuning, total     | 16.0                  |
| L9 Osc. circuit SW1 tuning coil  | Very low              |
| L10 Osc. circuit SW2 tuning coil | Very low              |
| L11 Osc. SW2 tracking coil       | 5.2                   |
| L12 Osc. circuit MW tuning coil  | 5.5                   |
| L13 Osc. circuit LW tuning coil  | 0.2                   |
| L14 Oscillator SW2 reaction      | 1.4                   |
| L15 Oscillator MW reaction       | 1.8                   |
| L16 Oscillator LW reaction       | 4.5                   |
| L17 1st IF trans.                | 4.0                   |
| L18 2nd IF trans.                | 4.0                   |
| L19 Speaker speech coil          | 4.0                   |
| L20 Speaker field coil           | 1600.0                |
| L21 Output trans.                | 450.0                 |
| L22 Mains trans.                 | 0.8                   |
| L23 Waveband switches            | 30.0                  |
| L24 Radio/gram change switches   | 0.1                   |
| T1 Mains trans.                  | 0.1                   |
| T2 Rect. heat. sec.              | 0.1                   |
| T3 HT sec., total                | 690.0                 |
| T4                               | —                     |
| T5                               | —                     |
| T6                               | —                     |
| T7                               | —                     |
| T8                               | —                     |
| T9                               | —                     |
| T10                              | —                     |
| T11                              | —                     |
| T12                              | —                     |
| T13                              | —                     |
| T14                              | —                     |
| T15                              | —                     |
| T16                              | —                     |
| T17                              | —                     |
| T18                              | —                     |
| T19                              | —                     |
| T20                              | —                     |
| T21                              | —                     |
| T22                              | —                     |
| T23                              | —                     |
| T24                              | —                     |
| T25                              | —                     |
| T26                              | —                     |
| T27                              | —                     |
| T28                              | —                     |
| T29                              | —                     |
| T30                              | —                     |
| T31                              | —                     |
| T32                              | —                     |
| T33                              | —                     |
| T34                              | —                     |
| T35                              | —                     |
| T36                              | —                     |
| T37                              | —                     |
| T38                              | —                     |
| T39                              | —                     |
| T40                              | —                     |
| T41                              | —                     |
| T42                              | —                     |
| T43                              | —                     |
| T44                              | —                     |
| T45                              | —                     |
| T46                              | —                     |
| T47                              | —                     |
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| T61                              | —                     |
| T62                              | —                     |
| T63                              | —                     |
| T64                              | —                     |
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| T67                              | —                     |
| T68                              | —                     |
| T69                              | —                     |
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| T71                              | —                     |
| T72                              | —                     |
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| T87                              | —                     |
| T88                              | —                     |
| T89                              | —                     |
| T90                              | —                     |
| T91                              | —                     |
| T92                              | —                     |
| T93                              | —                     |
| T94                              | —                     |
| T95                              | —                     |
| T96                              | —                     |
| T97                              | —                     |
| T98                              | —                     |
| T99                              | —                     |
| T100                             | —                     |

## VALVE ANALYSIS

Valve voltages and currents in the table (col. 3) are those measured in our receiver when it was operating on mains of 233 V, using the 224-255 V tapping on the mains transformer. The receiver was tuned to the lowest wavelength on the MW 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.

| Valve     | Anode Voltage (V) | Anode Current (mA) | Screen Voltage (V) | Screen Current (mA) |
|-----------|-------------------|--------------------|--------------------|---------------------|
| V1 RTW63  | 215               | 8.2                | 96                 | 2.0                 |
| V2 X65    | 215               | 1.3                | 96                 | 3.65                |
| V3 KTW63  | 145               | 8.0                | 96                 | 2.1                 |
| V4 DH63   | 108               | 1.0                | —                  | —                   |
| V5 KT63   | 230               | 25.0               | 215                | 4.0                 |
| V6 U50    | 332               | 0.2                | —                  | —                   |
| T.I. T165 | 230               | 0.02               | —                  | —                   |

† Each anode, AC.

## GENERAL NOTES

**Switches.**—S1-S41 are the waveband, and S42, S43 the radio/gram switches, ganged in three rotary units beneath the chassis. The units are indicated in our under-chassis view, and shown in detail in the diagrams in col. 6, where they are drawn as seen looking from the rear of the underside of the chassis. The table (col. 5) gives switch positions for the five settings, starting from fully anti-clockwise. A dash indicates open; C, closed.

It should be noted that the shorting switches on the oscillator switch unit (S27-S36) operate not only as shown, but also, since the two shorting plates on the rotor are joined together, the top ends of the tuning and reaction coils are joined together as well.

S44 is the OMB mains switch, ganged with the volume control R20.

**Coils.**—L1; L5; and L9, L14 are in three unscreened tubular units beneath the chassis. In the L9, L14 unit, L9 is the thick wire winding. L11 is a single turn of insulated wire connected between C16 and chassis, and adjustable in inductance for alignment.

L2-L4; L6-L8; L10, L12, L13, L15-L17; and the IF transformers L18, L19, and L20, L21, are in five screened units on the chassis deck. The third and fifth of these also contain other components.

**Scale Lamps.**—These are four Osram MIES types, with tubular bulbs. They are all rated at 6.5 V, 0.3 A.

**External Speaker.**—There are three sockets on a panel at the rear of the cabinet, two being provided for a low impedance (5Ω) external speaker. The third socket normally has a plug attached to a flying lead inserted in it. On removal of the plug, the internal speaker is muted. R31 is a safety load resistance, which is always in circuit. It is wired behind the external speaker panel.

**Condensers C17, C22, C24, C39, C40.**—These are five dry electrolytics in a unit (Dubilier 3221) on the chassis deck, the case being isolated. The brown lead is the negative, and the red the positive, of C40 (8 μF, 570 V DC peak). The black lead is the common negative of the other four condensers. The green lead is the positive of C24 (4 μF, 300 V DC peak). The remaining three condensers are all 4 μF, 570 V DC peak, and have yellow positive leads. That to the junction of R13 and R30 is the positive of C17; that to R12, C12 is the positive of C22; and that to the same tag as the red lead is the positive of C39. The unit is a Dubilier type 3221.

**Condensers C42, C50, C55.**—These SW trimmers are of the tubular air dielectric type, and are adjusted from the deck of the chassis by sliding their plungers in or out, and then locking them. See plan chassis view.

**Inductance L11.**—See under "Coils."  
**Resistance R32.**—This is a length of resistance wire, inside insulating sleeving, connected between tags 3 and 4 on the speaker unit.

**Trackers C53, C54.**—These are in a twin unit, and are adjustable through holes in the rear member of the chassis.

## H.M.V. 657 AND MARCONI 853 MODIFICATIONS

These two models are almost identical with the H.M.V. 656 and Marconi 858 as far as the main chassis is concerned, but in addition they include a motor-driven automatic tuning system.

The system uses a special reversible induction motor and a split selector drum with eight adjustable contacts. The system is of the "direct homing" type.

The contacts are switched into circuit by eight press-button switches, each of which is associated with one contact. The ninth button is marked "manual," and when depressed it releases any automatic button that may be depressed.

The circuit of the auto-mechanism starts at a chassis connection which goes to one end of the common motor winding via a built-in thermal switch (normally closed). The free ends of the two reversing windings of the motor each go (via sliding contacts) to one of the sectors of the split selector drum. Each selector contact goes to one side of its associated press-button switch. The other side of each switch is common, and goes to one end of an extra secondary winding on **T2**, the other end of which goes to chassis, and thus completes the circuit.

When a contact is switched into circuit, the motor is energised, its automatic clutch operates, and drives the gang one way or the other until the contact reaches the gap in the split selector drum, when the motor (and gang) stops.

While the motor is running, a switch mounted on its casing closes, and as this switch is connected across the secondary of **T1**, it temporarily mutes the speaker.

Another subsidiary circuit is that incorporating the selector adjustment lamp. A tag on a flying lead (which can be connected to any adjustable contact) goes, via the lamp, and a 15  $\Omega$  resistance, to the side of the heater secondary of **T2** which is not connected to chassis. This lamp lights when the tag is connected to a contact resting on the selector drum, but goes out when the contact is adjusted so that it is over the gap in the selector drum, and this serves as a visual means of adjusting the contact to the correct position for any station which has previously been tuned in manually.

The tuning motor operates on 17.6 V, 30 W. The resistance across the two tags connected to the selector drum is 5  $\Omega$ , and from each tag to chassis tag, 5.5  $\Omega$ . The resistance of the motor secondary on **T2** is 0.3  $\Omega$ .

#### CIRCUIT ALIGNMENT

NOTE:—Our **SW1** is the lowest wavelength range, and corresponds to makers' **SW2**, and *vice-versa*.

**IF Stages.**—Switch set to LW, turn gang to maximum, volume control to maximum and tone control fully clockwise, and short circuit **C52**. Connect signal generator to chassis and to control grid (top cap) of **V2**, via a 0.1  $\mu$ F condenser, leaving the existing connection in place. Feed in a 465 KC/S signal, and adjust **C59**, **C60**, **C61** and **C62**, in that order, for maximum output. Re-check, then remove short from **C52**.

**RF and Oscillator Stages.**—With gang at maximum, pointer should cover small vertical white line below the LW calibration line, on the right. Connect signal generator, via a suitable dummy aerial, to **A** and **E** sockets.

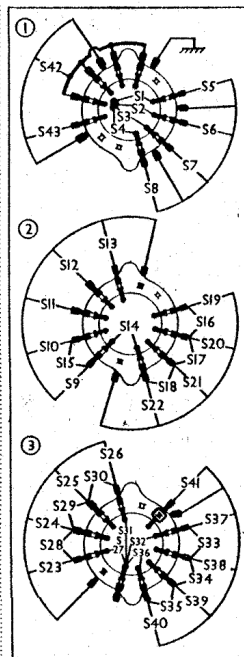
**LW.**—Switch set to LW, turn gang to minimum, and feed in a 725 m (413.8 KC/S) signal. Adjust **C58** for maximum output. Feed in an 850 m (353 KC/S) signal, tune it in, and adjust **C45** and **C49** for maximum output. Feed in a 1,900 m (158 KC/S) signal, tune it in, and adjust **C54** for maximum output, while rocking the gang for optimum results. Re-check all settings.

**MW.**—Switch set to MW, turn gang to minimum, and feed in a 195 m (1,538 KC/S) signal. Adjust **C57** for maximum output. Feed in a 210 m (1,429 KC/S) signal, tune it in, and adjust **C44** and **C48** for maximum output. Feed in a 530 m (566 KC/S) signal, tune it in, and adjust **C53** for maximum output, while rocking the gang for

TABLE AND DIAGRAMS OF SWITCH UNITS

| Switch | LW | MW | SW2 | SW1 | Gram. |
|--------|----|----|-----|-----|-------|
| S1     | —  | —  | —   | —   | C     |
| S2     | —  | —  | —   | C   | C     |
| S3     | —  | —  | C   | C   | —     |
| S4     | —  | C  | C   | —   | —     |
| S5     | —  | —  | —   | C   | —     |
| S6     | —  | —  | C   | —   | —     |
| S7     | —  | C  | —   | —   | —     |
| S8     | C  | —  | —   | —   | —     |
| S9     | —  | —  | —   | —   | C     |
| S10    | —  | —  | —   | C   | —     |
| S11    | —  | —  | C   | —   | —     |
| S12    | —  | C  | —   | —   | —     |
| S13    | C  | —  | —   | —   | —     |
| S14    | —  | C  | —   | —   | —     |
| S15    | C  | —  | —   | —   | C     |
| S16    | —  | —  | —   | C   | C     |
| S17    | —  | —  | —   | C   | —     |
| S18    | —  | —  | C   | C   | —     |
| S19    | —  | —  | —   | C   | —     |
| S20    | —  | —  | C   | —   | —     |
| S21    | —  | C  | —   | —   | —     |
| S22    | C  | —  | —   | —   | —     |
| S23    | —  | —  | —   | C   | —     |
| S24    | —  | —  | C   | —   | —     |
| S25    | —  | C  | —   | —   | —     |
| S26    | C  | —  | —   | —   | —     |
| S27    | C  | —  | —   | —   | —     |
| S28    | —  | —  | —   | —   | C     |
| S29    | —  | —  | —   | C   | C     |
| S30    | —  | —  | C   | C   | —     |
| S31    | —  | C  | —   | —   | —     |
| S32    | C  | —  | —   | —   | —     |
| S33    | —  | —  | —   | C   | C     |
| S34    | —  | —  | —   | C   | —     |
| S35    | —  | —  | C   | C   | —     |
| S36    | —  | C  | C   | —   | —     |
| S37    | —  | —  | —   | C   | —     |
| S38    | —  | —  | C   | —   | —     |
| S39    | —  | C  | —   | —   | —     |
| S40    | C  | —  | —   | —   | —     |
| S41    | —  | —  | —   | —   | C     |
| S42    | C  | C  | C   | C   | —     |
| S43    | —  | —  | —   | —   | C     |

Diagrams of the three switch units, as seen from the rear of the underside of the chassis.



optimum results. Re-check all settings.

**SW2.**—Switch set to this band (H.M.V. **SW1**), and turn gang to minimum. Feed in a 30 m (10 MC/S) signal, and adjust **C56** for maximum output. Feed in a 32 m (9.38 MC/S) signal, and tune it in. Adjust **C43** and **C47** for maximum output. Feed in an 86 m (3.88 MC/S) signal, tune it in, and adjust **L11** (loop of wire joining **C16** to chassis), while rocking the gang, for maximum output. Adjustment is by opening out, or pinching in, the loop. Re-check all settings.

**SW1.**—Switch set to this band (H.M.V. **SW2**), and turn gang to minimum. Feed in a 13 m (23.08 MC/S) signal, and adjust **C55** (by sliding plunger, and then locking), for maximum output. Feed in a 14 m (21.43 MC/S) signal, and tune it in. Adjust **C42** and **C50** for maximum output (as **C55**) while rocking the gang. Feed in a 30 m (10 MC/S) signal, tune it in, and adjust loop at **C15** end of **L9** for maximum output, while rocking gang. Re-check all settings.

NOTE.—The adjustments to **L11** and the loop of **L9** will not be necessary unless the wiring has been seriously disarranged, or **L10** or **L9** have been replaced.