46

# MURPHY SERVICE INSTRUCTIONS

ISSUED BY
MURPHY RADIO LTD, WELWYN GARDEN CITY
TELEPHONE: WELWYN GARDEN 800

# SPECIFICATION

## A46 A46C A46RG D46 D46C D46RG

| | | |
|---|---|---|
| BASIC DESIGN: | | 4 valve (+ rectifier) superhet. |
| INTERMEDIATE FREQUENCY: | | 465 Kc/s. |
| WAVE RANGES: | | 16.7 to 50 metres (18 Mc/s to 6 Mc/s).<br>200 to 550 „ (1500 Kc/s to 545 Kc/s).<br>950 to 2000 „ (316 Kc/s to 150 Kc/s). |
| MAINS SUPPLY: | A46 : | 200-250 volts 50-100 cycles A.C.<br>100-125 „ 50-100 „ „<br>(Radio-gramophone 50-60 cycles only) |
| | D46: | 200-250 volts D.C. or A.C. (25-100 cycles).<br>(Radio-gramophone 25-60 cycles only, on A.C.) |
| VALVES: | A46: | AC/TH1, AC/VP2, HL41DD, AC5/Pen, UU4. |
| | D46: | TH2321, VP133, HL133DD, Pen3820, U4020. |
| PILOT LAMPS: | A46: | 6.2 v. 0.3 amp Globular Frosted. |
| | D46: | 3.5 v. 0.15 amp Globular Frosted. |
| SPEECH COIL IMPEDANCE: | | Table 2 ohms.<br>Console and Radio-gramophone, 4 ohms. |
| TOTAL WEIGHT: | | Table $24\frac{3}{4}$ lbs.<br>Console 42 lbs.<br>Radio-gramophone 61 lbs. |
| OVERALL DIMENSIONS: | | Table $10\frac{1}{4}'' \times 18'' \times 17\frac{1}{2}''$<br>Console $11\frac{3}{4}'' \times 22'' \times 32''$<br>Radio-gramophone $17'' \times 19'' \times 36''$ |
| CONSUMPTION: | A46: | 65 watts (approx.) |
| | D46: | 65 watts at 200 v. to 85 watts at 250 v.<br>Radio-gramophones 15 watts extra on "gram." |

# Circuit Analysis

THE tuning circuits of the "46" receiver are identical with the "48." The signals from the aerial are fed through an aerial coupling coil (L2 or L3) to an inductively coupled band-pass unit (L6, 7, 8 and 9) for medium and long waves but on the short wave band the aerial coil (L1) is directly coupled to the single tuned grid coil (L4). The three sets of coils are connected to a common low potential point and the high potential ends are taken to the contacts of the wave range switch (S1b and S1c) which connects the coils selected to the tuning condensers (C1a and C1b).

The long wave coils have fixed parallel trimmers (C3 and 4). The medium wave aerial circuit trimmer (C6) is mounted on the variable condenser frame, and the medium wave grid coil trimmer (C2) is on the chassis. The trimmer (C7) mounted on the second section of the variable condenser (C16) aligns the short wave tuning coil (L4). The positions of the trimmers are marked on the chassis plan.

The tuned R.F. signals are fed into a triode hexode valve (V1) where they are mixed with the signals from the local oscillator circuit.

Each oscillator coil has a separate trimmer and all have a common low potential connection. The high potential ends are taken to a section of the wave range switch (S1e) and another section of the switch (S1f) is used to short circuit the long wave coil (L16) during medium wave operation, to prevent energy absorption by the coil and its associated padder (C18). This condenser, and C15 across the medium wave coil, are included so that trimmers (C17 and C19) of small value can be used to reduce frequency drift. Padding condensers (C22 and C23) are used on the medium and long wave band to maintain correct alignment.

The circuit allows the oscillator trimmer of any wave-band to be adjusted without affecting the trimming of the other two bands.

The oscillator circuit is tuned to 465 Kc/s above the signal frequency on the medium and long wave bands, but on short waves it is tuned to 465 Kc/s *below* the signal frequency and any "image signals" on this wave band will therefore be received at a wavelength shorter than that of the time signal.

The two I.F. transformers (L17, 18, and L19, 21) have coils wound on iron dust cores and the capacities tuning the transformers are made up of fixed condensers with small trimmers in parallel. The fixed condensers, which are of a particularly constant type, form the greater part of the capacity, and the effect of any drift which may occur of the trimmer is therefore reduced to a minimum.

The signals, amplified by the I.F. valve (V2) are fed on to the signal diode of the valve (V3) and the rectified signal is developed across the load resistances (R12 and 13).

The rectified carrier voltage, smoothed by the resistance and condenser (R11 and C8) is fed to the first two valves to give automatic volume control.

An I.F. filter is provided by the resistance and condenser (R12, C39) and the L.F. voltage is passed through C37 (and the radiogram switch) to the volume control.

Pickup sockets are fitted on the A.C. models only, as the difficulty of overcoming hum and risk of electric shock make these fittings undesirable on A.C./D.C. receivers.

The L.F. signals amplified by the valve (V3) are passed through the condenser (C34) and the "grid stopper" resistance (R22) to the output valve; a beam tetrode capable of giving 5 watts undistorted output.

Negative feed back is introduced on medium and long waves by leaving the cathode resistance R23 without a by-pass condenser, to reduce the gain and extend the frequency response. On short waves, where the extra gain

is required, the condenser is put into circuit through the short wave contact of the switch S1f.

On the radiogramophones the pickup is connected across the volume control (through a transformer in the A.C./D.C. models) by the gramophone switch (S3b). Another section of this switch (S3a) breaks the H.T. supply to the local oscillator (V1 triode) on gramophone, to prevent radio break through while section S3c connects the condenser C46 across the cathode resistance R23 to give the full L.F. gain.

The mains and H.T. circuits are quite orthodox in arrangement except that in the A.C./D.C. receivers a thermal delay switch is arranged to short circuit the pilot lamps when the receiver is switched on to prevent the initial current surge through the cold valve heaters passing through them. As soon as the valves have warmed up the switch operates and removes the short circuits and the pilot lamp lights up. There is a small screw on this switch which is adjusted to give a delay of between ten and thirty seconds; further adjustment should not be necessary. In checking the operation of the switch, care should be taken to allow the set to cool down completely before switching on again. The valves take about five minutes to become cold.

# The Diagram Sheets

THE diagrams on pages 4 to 11 of this book contain most of the information required for carrying out normal service work. The following information will help you to make full use of the sheets.

Each sheet contains the circuit diagram, the top and underside views of the chassis, the key to values of components, and the voltage table, for one particular model.

The circuit diagram is numbered at each "junction point," so that every component has a number at each terminal. These numbers are marked at the ends of the components in the underside and top views of the chassis so that the respective terminals may easily be identified with those on the circuit diagram.

The underside and top views of the chassis are divided into squares which are lettered horizontally and numbered vertically so that any section may be referred to by quoting the appropriate "square."

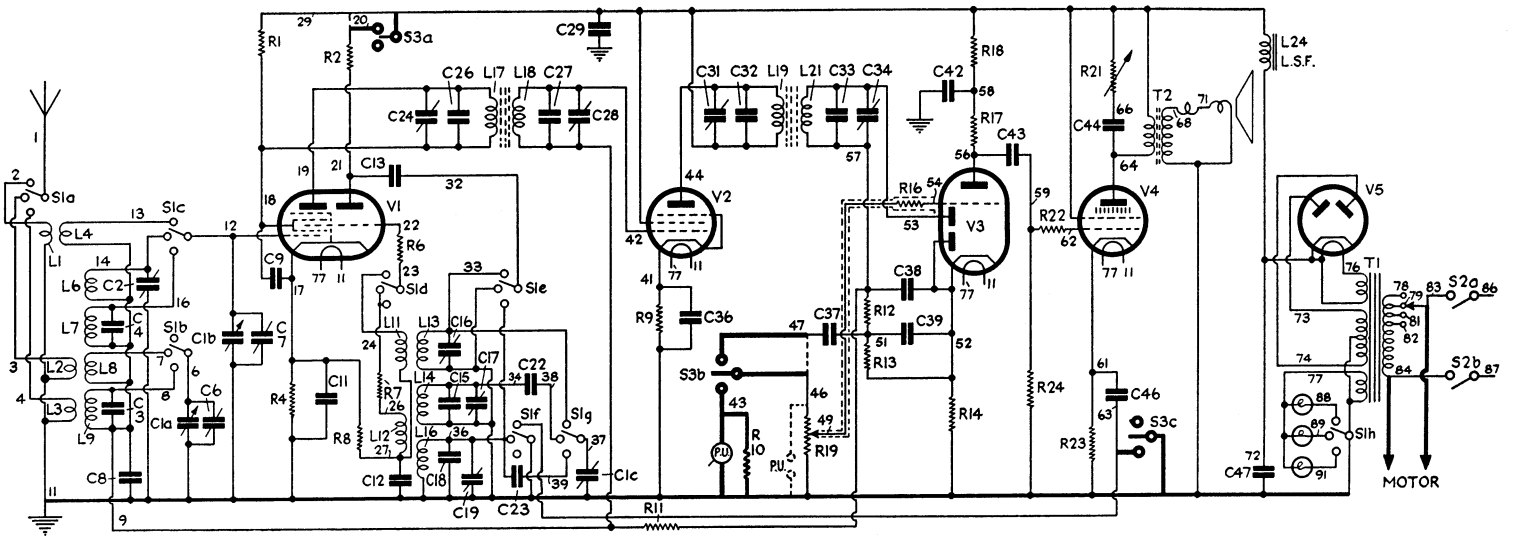
In the underside and top views a table model is shown, but with the radio-gramophone components added. The radio-gramophone components must therefore be ignored when considering a table model, and allowance must be made for the re-arrangement of one or two components in the case of the radio-gramophones.

A composite circuit diagram is used for the table and radio-gramophone models. For the A46 and D46 table and console models, the heavy lines should be ignored and the dotted lines treated as full. For the radio-gramophones, ignore the dotted lines and include the parts shown in heavy lines.

In the component tables, all resistances are given in ohms, and capacities in microfarads, unless otherwise stated. The D.C. resistance of coils is quoted in ohms in all cases, except where the reading would be too small to be of use, when they are omitted altogether.

The voltage tables should only be taken as a guide, as considerable variations may occur without affecting the efficiency of the receiver.

The readings were taken to chassis unless otherwise stated using a 0-50v. and 0-500v. 1000 ohms-per-volt meter, with the receivers working on 230 volts A.C.



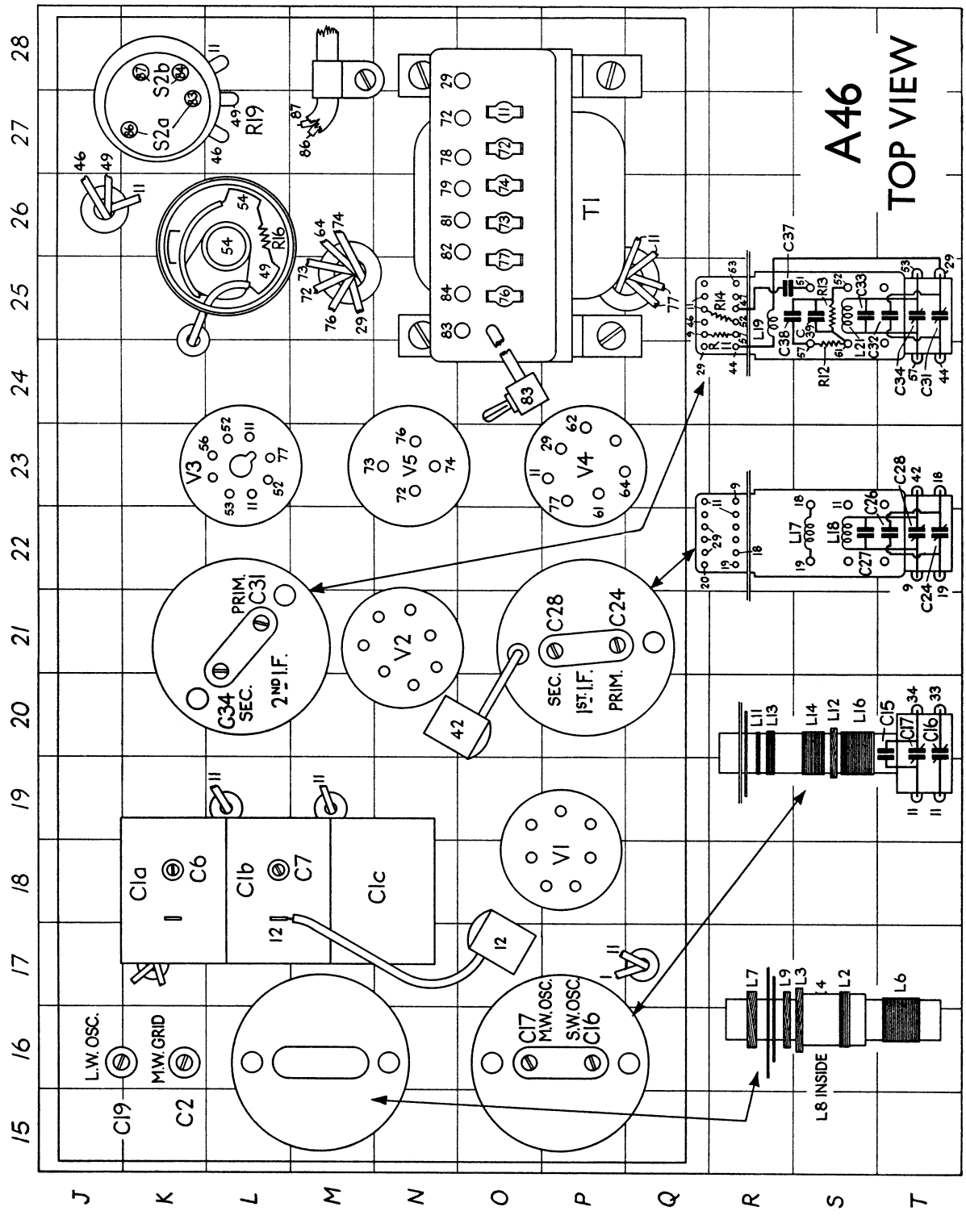

# TABLE OF VOLTAGES

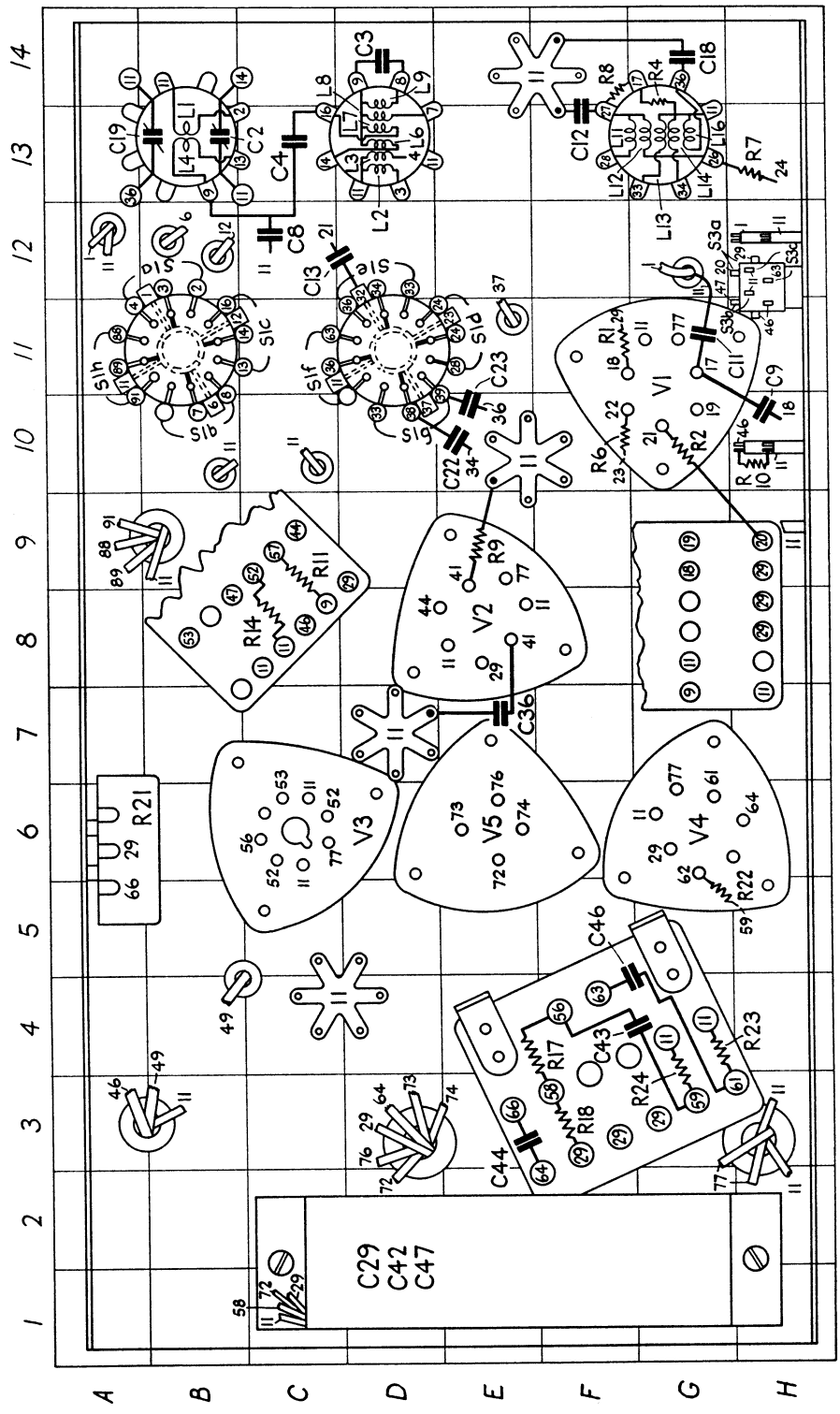
# A46

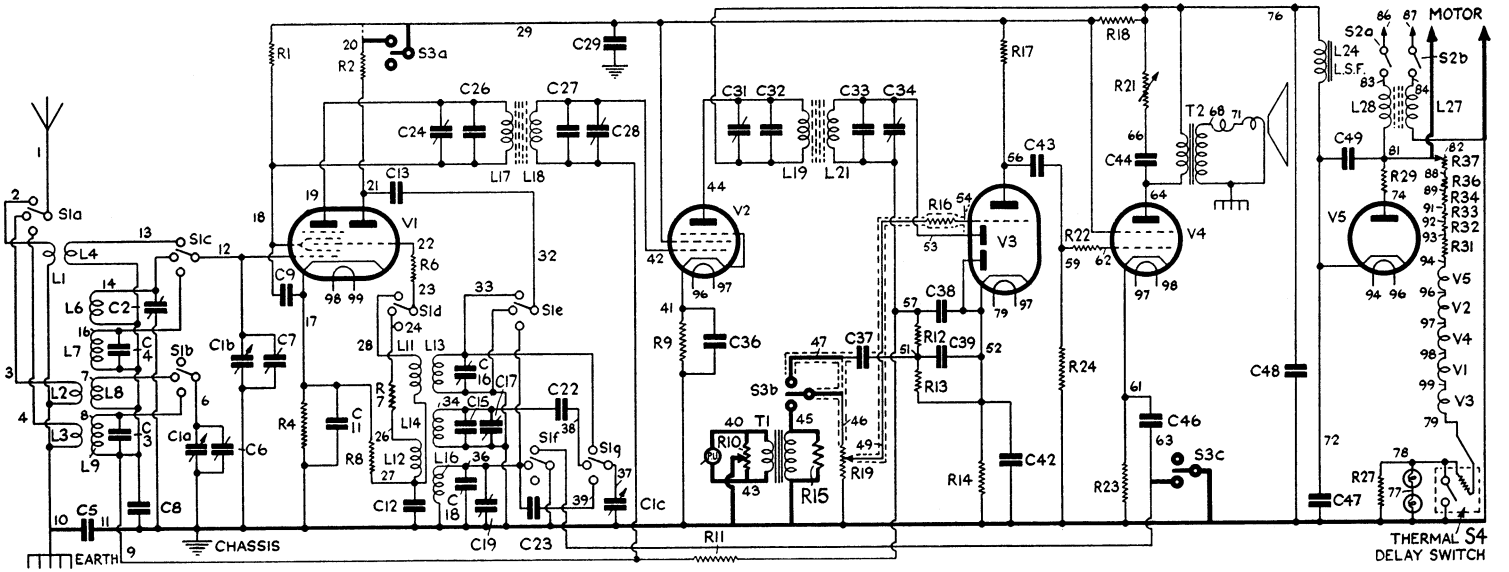
| VALVE | TYPE | ELECTRODE | TEST POINT | SQUARE | VOLTAGE |
|---|---|---|---|---|---|
| V1 | Mazda AC/TH1 | Hexode Anode | 19 | 10 G | 110 |
| | | Hexode Screen | 18 | 11 F | 90 |
| | | Triode Anode | 21 | 10 G | S.W. 60<br>M.W. 70<br>L.W. 80 |
| | | Cathode | 17 | 11 G | 3·5 |
| V2 | Mazda AC/VP2 | Anode | 44 | 8 E | 230 |
| | | Screen | 29 | 8 E | 230 |
| | | Cathode | 41 | 8 E | 4 |
| V3 | Mazda HL41DD | Anode | 56 | 6 C | 85 |
| | | Cathode | 52 | 6 C | 1 |
| V4 | Mazda AC5PEN | Anode | 64 | 6 H | 220 |
| | | Screen | 29 | 6 G | 230 |
| | | Cathode | 61 | 6 G | 7 |
| V5 | Mazda UU4 | Cathode | 72 | 6 E | 315 |
| L.S. Field | | | 29 72 | 27 O | 90 |

# TABLE OF COMPONENTS A46

| CODE | VALUE | TEST From | TEST To | SQUARE |
|---|---|---|---|---|
| C1a | Variable | 6 | 11 | 18 K |
| C1b | „ | 11 | 12 | 18 L |
| C1c | „ | 11 | 37 | 18 N |
| C2 | Trimmer | 11 | 14 | 16 K |
| C3 | 50 mmf. | 8 | 9 | 14 D |
| C4 | 62 „ | 9 | 16 | 13 C |
| C6 | Trimmer | 6 | 11 | 18 K |
| C7 | „ | 11 | 12 | 18 L |
| C8 | 0·1 | 9 | 11 | 12 C |
| C9 | ·025 | 17 | 18 | 10 H |
| C11 | ·05 | 11 | 17 | 11 G |
| C12 | 200 mmf. | 11 | 27 | 13 F |
| C13 | 100 „ | 21 | 32 | 12 D |
| C15 | 35 „ | 11 | 34 | 20 T |
| C16 | Trimmer | 11 | 33 | 16 P |
| C17 | „ | 11 | 34 | 16 O |
| C18 | 245 mmf. | 11 | 36 | 14 G |
| C19 | Trimmer | 11 | 36 | 16 J |
| C22 | 703 mmf. | 34 | 38 | 10 E |
| C23 | 386 „ | 36 | 39 | 10 E |
| C24 | Trimmer | 18 | 19 | 21 P |
| C26 | 125 mmf. | 18 | 19 | 22 T |
| C27 | 134 „ | 9 | 42 | 22 S |
| C28 | Trimmer | 9 | 42 | 21 P |
| C29 | 8 (400v.) | 11 | 29 | 1 D |
| C31 | Trimmer | 29 | 44 | 21 L |
| C32 | 125 mmf. | 29 | 44 | 25 T |
| C33 | 125 „ | 53 | 57 | 25 S |
| C34 | Trimmer | 53 | 57 | 20 L |
| C36 | ·025 | 11 | 41 | 8 E |
| C37 | ·01 | 47 | 51 | 25 R |
| C38 | 100 mmf. | 52 | 57 | 25 R |
| C39 | 100 „ | 51 | 52 | 25 S |
| C42 | 4 (400v.) | 11 | 58 | 1 D |
| C43 | ·025 | 56 | 59 | 4 G |
| C43 (RG) | ·003 | 64 | 66 | |
| C44 | ·04 | | | 3 E |
| C46 | 50 (12v.) | 61 | 63 | 5 F |
| C47 | 8 (400v.) | 11 | 72 | 1 D |
| C47 (RG) | 16 | | | |
| R1 | 15,000 | 18 | 29 | 11 F |
| R2 | 33,000 | 20 | 21 | 10 G |
| R4 | 300 | 11 | 17 | 14 G |
| R6 | 100 | 22 | 23 | 10 F |
| R7 | 1,000 | 24 | 26 | 13 H |
| R8 | 20,000 | 17 | 27 | 14 F |
| R9 | 450 | 11 | 41 | 9 E |
| R10 | 100,000 | 11 | 43 | |
| R11 | 2 MΩ | 9 | 57 | 9 C |
| R12 | 100,000 | 51 | 57 | 25 S |
| R13 | 500,000 | 51 | 52 | 25 S |
| R14 | 500 | 11 | 52 | 8 C |
| R16 | 50,000 | 49 | 54 | 26 L |
| R17 | 50,000 | 56 | 58 | 4 F |
| R18 | 15,000 | 29 | 58 | 3 F |
| R19 | 1 MΩ | 11 | 46 | 27 L |
| R21 | 25,000 | 29 | 66 | 6 A |
| R22 | 50,000 | 59 | 62 | 5 G |
| R23 | 210 | 11 | 61 | 4 G |
| R24 | 500,000 | 11 | 59 | 4 G |
| L1 | — | 2 | 11 | 13 B |
| L2 | 1·25 | 3 | 11 | 13 D |
| L3 | 10 | 4 | 11 | 13 D |
| L4 | — | 9 | 13 | 13 B |
| L6 | 4 | 9 | 14 | 13 D |
| L7 | 12 | 9 | 16 | 13 D |
| L8 | 4 | 7 | 9 | 13 D |
| L9 | 12 | 8 | 9 | 14 D |
| L11 | — | 27 | 28 | 13 G |
| L12 | 1·5 | 26 | 27 | 13 G |
| L13 | — | 11 | 33 | 13 G |
| L14 | 2·5 | 11 | 34 | 13 G |
| L16 | 4 | 11 | 36 | 13 G |
| L17 | 6 | 18 | 19 | 22 S |
| L18 | 6 | 9 | 42 | 22 S |
| L19 | 6 | 29 | 44 | 25 R |
| L21 | 6 | 53 | 57 | 25 S |
| L24 | 1400 | 29 | 72 | LSF |
| T1 prim | | | | |
| 200-213v | 26 | 78 | 84 | 26O |
| 214-228v | 28 | 79 | 84 | |
| 229-244v | 31 | 81 | 84 | |
| 245-260v | 33 | 82 | 84 | |
| H.T. sec. | | | | |
| | 210 | 11 | 73 | |
| | +240 | 11 | 74 | |
| T2 prim | 140 | 29 | 64 | ON |
| T2 sec | — | 11 | 68 | L.S. |
| L.S. Sp. coil | 2 | 11 | 71 | |








# TABLE OF VOLTAGES

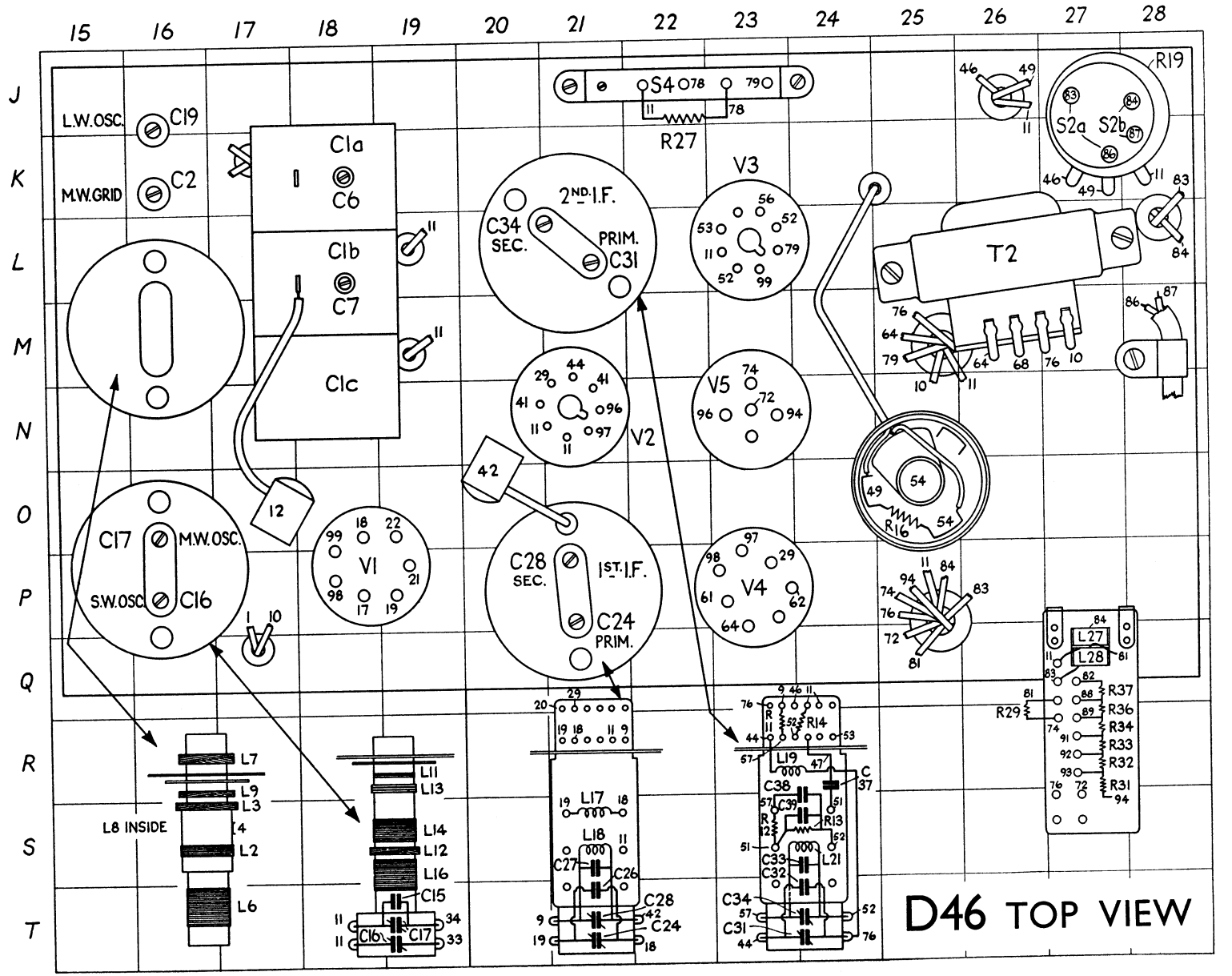
# D46

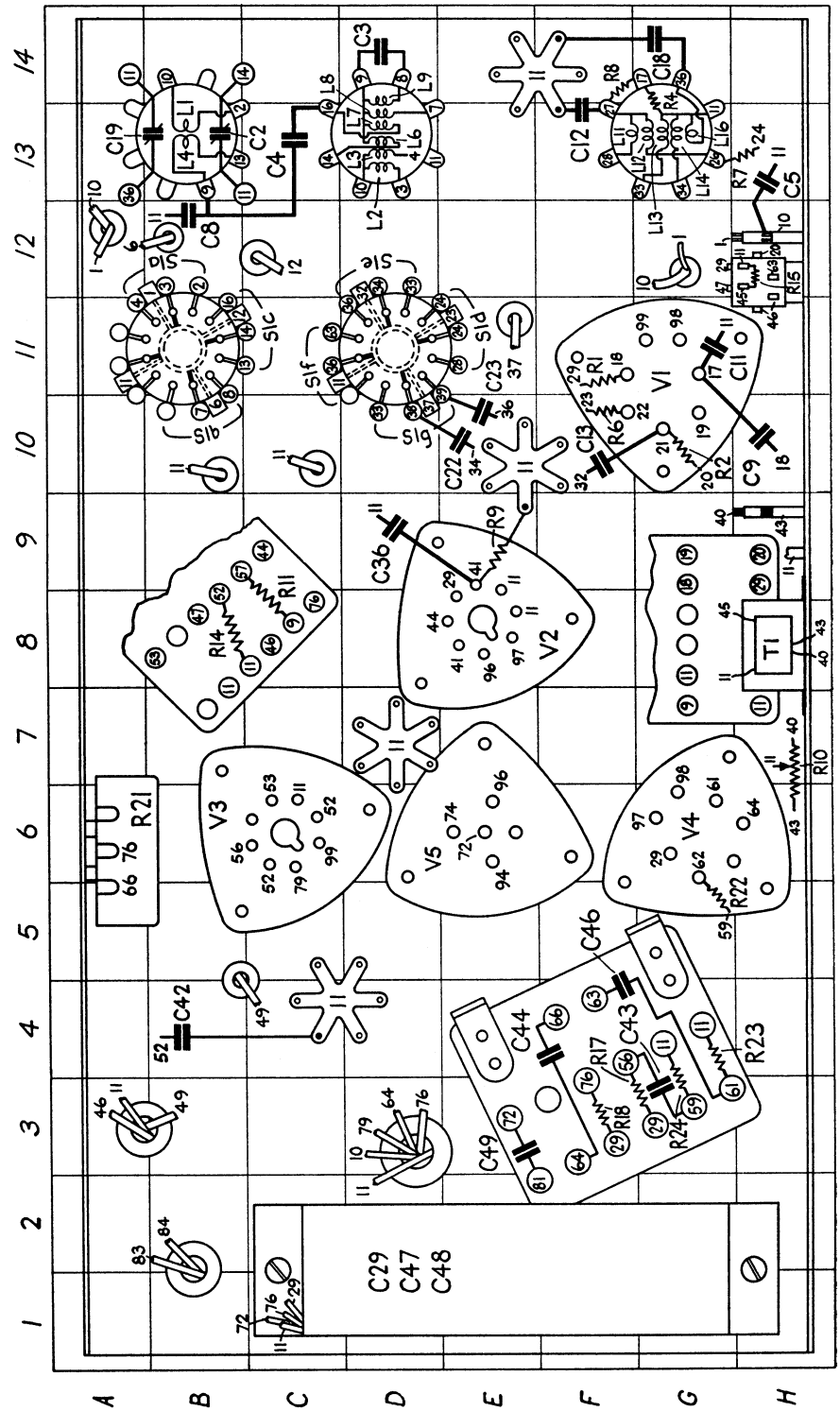
| VALVE | TYPE | ELECTRODE | TEST POINT | SQUARE | VOLTAGE |
|---|---|---|---|---|---|
| V1 | Mazda TH2321 | Hexode Anode | 19 | 10 G | 100 |
| | | Hexode Screen | 18 | 11 F | 100 |
| | | Triode Anode | 21 | 10 G | S.W. 60<br>M.W. 80<br>L.W. 85 |
| | | Cathode | 17 | 11 G | 4 |
| V2 | Mazda VP133 | Anode | 44 | 5 E | 180 |
| | | Screen | 29 | 5 E | 160 |
| | | Cathode | 41 | 9 E | 5 |
| V3 | Mazda HL133DD | Anode | 56 | 6 C | 80 |
| | | Cathode | 52 | 6 D | 2 |
| V4 | Mazda Pen3820 | Anode | 64 | 6 H | 175 |
| | | Screen | 29 | 6 G | 160 |
| | | Cathode | 61 | 6 G | 10 |
| V5 | Mazda U4020 | Cathode | 72 | 6 E | 230 |
| L.S. Field | | | 72–76 | 27 S | 50 |

# TABLE OF COMPONENTS D46

| CODE | VALUE | TEST From | TEST To | SQUARE |
|---|---|---|---|---|
| C1a | Variable | 6 | 11 | 18 K |
| C1b | „ | 11 | 12 | 18 L |
| C1c | „ | 11 | 37 | 18 N |
| C2 | Trimmer | 11 | 14 | 16 K |
| C3 | 50 mmf. | 8 | 9 | 14 D |
| C4 | 62 „ | 9 | 16 | 13 C |
| C5 | ·01 „ | 10 | 11 | 13 H |
| C6 | Trimmer | 6 | 11 | 18 K |
| C7 | „ | 11 | 12 | 18 M |
| C8 | ·1 | 9 | 11 | 12 B |
| C9 | ·025 | 17 | 18 | 10 H |
| C11 | ·05 | 11 | 17 | 11 G |
| C12 | 200 mmf. | 11 | 27 | 13 F |
| C13 | 100 „ | 21 | 32 | 10 F |
| C15 | 35 „ | 11 | 34 | 19 T |
| C16 | Trimmer | 11 | 33 | 16 P |
| C17 | „ | 11 | 34 | 16 O |
| C18 | 245 mmf. | 11 | 36 | 14 G |
| C19 | Trimmer | 11 | 36 | 16 J |
| C22 | 703 mmf. | 34 | 38 | 10 E |
| C23 | 386 „ | 36 | 39 | 10 E |
| C24 | Trimmer | 18 | 19 | 21 P |
| C26 | 125 mmf. | 18 | 19 | 21 T |
| C27 | 134 „ | 9 | 42 | 21 S |
| C28 | Trimmer | 9 | 42 | 21 P |
| C29 | 16 (400v) | 11 | 29 | 1 D |
| C31 | Trimmer | 44 | 76 | 21 L |
| C32 | 125 mmf. | 44 | 76 | 23 T |
| C33 | 125 „ | 53 | 57 | 23 S |
| C34 | Trimmer | 53 | 57 | 20 L |
| C36 | ·025 | 11 | 41 | 9 D |
| C37 | ·01 | 47 | 51 | 24 R |
| C38 | 100 mmf. | 52 | 57 | 23 S |
| C39 | 100 „ | 51 | 52 | 23 S |
| C42 | 25 (12v) | 11 | 52 | 4 B |
| C43 | ·025 / (RG) ·003 | 56 | 59 | 3 G |
| C44 | ·1 | 64 | 66 | 4 F |
| C46 | 50 (12v) | 61 | 63 | 4 F |
| C47 | 8 (400v) / (RG) 16 | 11 | 72 | 1 D |
| C48 | 16 (400v) | 11 | 76 | 1 D |
| C49 | ·04 | 72 | 81 | 3 E |
| R1 | 6,500 | 18 | 29 | 11 F |
| R2 | 20,000 | 20 | 21 | 10 G |
| R4 | 300 | 11 | 17 | 14 G |
| R6 | 100 | 22 | 23 | 10 F |
| R7 | 1,000 | 24 | 26 | 13 H |
| R8 | 20,000 | 17 | 27 | 14 F |
| R9 | 400 | 11 | 41 | 9 E |
| R10 | 400 | 40 | 43 | 7 H |
| R11 | 2 meg. | 9 | 57 | 8 C |
| R12 | 100,000 | 51 | 57 | 23 S |
| R13 | 500,000 | 51 | 52 | 24 S |
| R14 | 1,500 | 11 | 52 | 8 B |
| R15 | 50,000 | 40 | 43 | 12 H |
| R16 | 50,000 | 49 | 54 | 25 O |
| R17 | 50,000 | 29 | 56 | 3 G |
| R18 | 1,000 | 29 | 76 | 3 G |
| R19 | 1 meg. | 11 | 46 | 27 K |
| R21 | 25,000 | 66 | 76 | 6 A |
| R22 | 50,000 | 59 | 62 | 5 G |
| R23 | 140 | 11 | 61 | 4 G |
| R24 | 500,000 | 11 | 59 | 3 G |
| R27 | 51 | 11 | 78 | 22 J |
| R29 | 100 | 74 | 81 | 26 R |
| R31 | 314 | 93 | 94 | 27 R |
| R32 | 50 | 92 | 93 | 27 R |
| R33 | 50 | 91 | 92 | 27 R |
| R34 | 50 | 89 | 91 | 27 R |
| R36 | 50 | 88 | 89 | 27 R |
| R37 | 50 | 82 | 88 | 27 Q |

| CODE | VALUE | TEST From | TEST To | SQUARE |
|---|---|---|---|---|
| L1 | —— | 2 | 10 | 13 B |
| L2 | 1·5 | 3 | 10 | 13 D |
| L3 | 10 | 4 | 10 | 13 D |
| L4 | —— | 9 | 13 | 13 B |
| L6 | 4 | 9 | 14 | 13 D |
| L7 | 12 | 9 | 16 | 13 D |
| L8 | 4 | 7 | 9 | 13 D |
| L9 | 12 | 8 | 9 | 14 D |
| L11 | —— | 27 | 28 | 13 G |
| L12 | 1·5 | 26 | 27 | 13 G |
| L13 | —— | 11 | 33 | 13 G |
| L14 | 2·5 | 11 | 34 | 13 G |
| L16 | 4 | 11 | 36 | 13 G |
| L17 | 6 | 18 | 19 | 21 S |
| L18 | 6 | 9 | 42 | 21 S |
| L19 | 6 | 44 | 76 | 23 R |
| L21 | 6 | 53 | 57 | 24 S |
| L24 | 600 | 72 | 76 | L.S.F. |
| L27 | 3 | 11 | 84 | 27 Q |
| L28 | 3 | 81 | 83 | 27 Q |
| T1 prim | 56 | 40 | 43 | 5 H |
| T1 sec. | 1500 | 10 | 45 | |
| T2 prim. | 170 | 64 | 76 | 26L |
| T2 sec. | —— | 10 | 68 | |
| L.S. Speech coil | 2 | 10 | 71 | |






# D46 UNDERSIDE

# Trimming

TRIMMING on this receiver is very critical and must be carried out carefully as small inaccuracies may completely spoil the performance of the receiver.

## THE SERVICE OSCILLATOR

It is important to ensure that the service oscillator is accurately calibrated and it is advisable to check this regularly by the method described on page 10 of the Service Manual for the "28" series.

Checking points for the higher I.F. range were not given in these instructions but the stations listed below can be used and as they will beat with the second harmonic of the service oscillator in each case it should be quite easy to adjust the two inputs to give the required beat.

| STATION | FREQUENCY | SERVICE OSCILLATOR FREQUENCY |
|---|---|---|
| | Kc/s | Kc/s |
| Milan | 814 | 407 |
| Berlin | 841 | 420.5 |
| London Regional | 877 | 438.5 |
| Hamburg | 904 | 452 |
| Radio Toulouse | 913 | 456.5 |
| Brussels, No. 2 | 932 | 466 |
| Breslau | 950 | 475 |
| Post Parisien | 959 | 479.5 |
| NorthIrelandReg. | 977 | 488.5 |
| Hilversum, No. 2 | 995 | 497.5 |

## THE OUTPUT METER

We suggest the use of a 0 to 3 volt rectifier type voltmeter, placed across the loud-speaker sockets, for measuring the output of the receiver when trimming as this method is both simple and straightforward.

The input from the service oscillator, when the output meter is used, should always be kept sufficiently low to keep the reading below 1 volt. It is therefore necessary to reduce the input as each stage is brought into tune.

All the trimmers are on top of the chassis and they should be adjusted with an insulated screwdriver having a blade approximately 3/16" wide.

The correct sequence for completely retrimming is I.F.'s (465 Kc/s) S.W., M.W., and L.W., but small errors in calibration occurring at the lower end of the bands may be corrected by adjusting the oscillator trimmers only, and on this receiver any of these can be adjusted without affecting the calibration of the other bands.

The trimmer positions are marked on the chassis plan view and may also be located by the square numbers in brackets which are marked on the diagram sheets.

## I.F. TRIMMING

The characteristics of the I.F. transformers make it essential to damp one of each pair of coupled circuits as the other is trimmed and a unit for this purpose should be made up with a 20,000 ohms (quarter watt) resistance and a 0.1 mfd. condenser. Attach a crocodile clip to one end of the resistance and connect the other end to the condenser. Then attach a short flexible lead terminated with a crocodile clip to the free end of the condenser.

1. Connect the output meter across L.S. terminals.

2. Clip the flexible lead of the damping unit to chassis and the resistance end to the signal diode anode of V3 (square 6C, test point 53).

3. Tune the receiver to the top end of the long wave scale.

4. Connect the service oscillator between the control grid of V2 (square 20O, test point 42) and chassis, through a fixed condenser of 0.1 mfd.

5. Tune the service oscillator to exactly 465 Kc/s and switch on the internal modulation.

6. Adjust C31 (square 21L) for maximum reading on the output meter.

7. Remove the damping unit from V3 diode anode and clip it to anode of V2 (square 8E, test point 44). Adjust C34 (square 21L).

8. Connect the service oscillator between the control grid of V1 (square 17O, test point 12) and chassis via the dummy aerial, switch the receiver to medium waves.

9. Remove the damping from V2 anode and apply it to V2 control grid (square 20O, test point 42). Adjust C24 (square 21P).

10. Remove the damping from V2 grid and apply to V1 hexode anode (square 10G test point 19). Adjust C28 (square 21P).

If the trimmers are found to require only a very small adjustment, the I.F. trimming may now be regarded as complete, but if large adjustments have been made it is advisable to repeat the whole procedure as a final adjustment.

It is always advisable to check the R.F. circuits after I.F. adjustments.

The accuracy of long wave calibration depends upon the accuracy of the I.F. trimming.

S.W. TRIMMING.

Connect the service oscillator between the aerial and earth sockets of the receiver and the output meter across the L.S. terminals. Tune both the oscillator and the receiver to 21 metres. Adjust C16 (square 16P). It will be found that the signal can be received at two settings of this condenser. The correct adjustment is the one with the higher capacity, that is, the second point when screwing in the trimmer screw. The other is the "image."

When the oscillator trimmer has been adjusted, set the trimmer on the centre section of the gang condenser C7 (square 18L) to give maximum gain. A fairly accurate adjustment of the short wave trimmers can be made by tuning to a known station on about twenty metres and trimming for the best results judged by ear, but care should be taken to tune to the highest capacity setting on the oscillator trimmer.

After adjustment check that the 16 metre band still registers correctly at the bottom of the scale as too much trimmer capacity may throw it out.

M.W. TRIMMING

1. Connect the service oscillator to the aerial and earth terminals and the output meter to the L.S. terminals.

2. Tune the receiver and oscillator to 220 metres.

3. Adjust the oscillator trimmer C17 (square 16O), the grid trimmer C2 (square 16K), and the aerial trimmer C6 (square 18K) in that order. Repeat for final adjustment.

4. If possible, check the calibration on the local broadcast station.

L.W. TRIMMING

1. Connect the service oscillator to the aerial and earth terminals and the output meter to the L.S. terminals.

2. Tune receiver and oscillator to 1000 metres.

3. Adjust the oscillator trimmer C19 (square 16J).

# Mechanical Details

THE output transformer in the A46 is mounted on the loudspeaker and the wires from it are soldered to the mains tapping panel. The D46 has the leads from the speech coil soldered to the output transformer on the chassis.

The wires are long enough to permit the chassis to be examined without removing the loudspeaker. Alternatively, the speaker clamps can be removed after the chassis fixing bolts have been withdrawn and both chassis and loudspeaker can be taken from the cabinet together.

The A46 Console loudspeaker is mounted on a bracket which is held to the shelf by four bolts. The loudspeaker must be released before the chassis can be removed, but it is unnecessary to remove the four bolts holding the bracket. There are two holes in the shelf to allow the two bolts holding the loudspeaker to the bracket to be removed. The loudspeaker can then be moved off the bracket to allow clearance for the chassis, and when the chassis bolts and control knobs have been removed the chassis and loudspeaker can be lifted out together.

It is important when the loudspeaker is replaced that it should be pressed firmly against the front of the cabinet.

## THE PILOT LAMPS

The pilot lamps may be replaced by removing the screen behind the tuning scale. There are dividing plates between the lamps to confine the illuminations to one particular section. When replacing the screen see that these plates fit into the slots provided for them in the tuning scale frame.

## EARTHING

Although in the circuit diagram many of the components are shown as earthed to chassis, it does not follow that they can be earthed at the nearest convenient point. It will be noticed that on the chassis, several of the earth connexions, particularly for the S.W. components, are earthed in rather unexpected places. This is to prevent unwanted couplings between the circuits and it is therefore most important that the original wiring layout is adhered to if any components are replaced.

It will also be noticed that the left-hand front screw securing the tuning assembly is insulated from the tuning frame by a bakelite washer. If this screw short circuits to the frame, second channel interference on short waves will be increased.

## THE TUNING SCALE

The frame which holds the tuning scale is secured by three screws. If these are slackened the frame may be lifted out forwards.

If the scale is replaced, see that the rubber strips are properly in place and that the new dial is so placed in the frame that the ribs cover the colour divisions. Do not tighten the clamping screws more than is necessary to hold the glass firmly. The frame when replaced on the tuning condenser assembly should be so adjusted that the trolley carrying the pointer rests against the glass.

## THE POINTER

To replace a damaged pointer, slip the tension spring off the lug on the condenser drive pulley. This will relieve the tension on the cord and allow the old pointer to be slipped out and a new one fitted. When the tension spring has been replaced on the lug see that the pointer trolley rests against the glass scale. If it does not, the screws holding the scale frame should be slackened and the dial eased forward.

## THE TUNING CONDENSER

To remove the tuning condenser, the leads should be unsoldered from the wave range switch and earth tags, as the tags of the tuning condenser itself are not accessible. The short lead above the chassis should be disconnected by unscrewing the earth tag. There are three earthing points, one above and two below the chassis. Remove the three fixing screws and drive pulley. The condenser can then be lifted out.

To fit a new condenser, first solder the leads to it. The leads must be as short as possible and it is particularly important that no loops of leads are left between the condenser tags and the top of chassis. These loops add to the stray capacities, alter the short wave inductances, and give feed back between the circuits. *The earth leads must be connected to the correct points*, otherwise gain and image suppression will be reduced.

THE CORD DRIVE

Changing the drive cord is simplified by removing the tuning dial and the drive mechanism to make the condenser drive pulley more accessible.

Fit the pointer and trolley on to $24\frac{1}{2}''$ of cord and pass the cord over the two vertical pulleys and around the condenser drive pulley. Push the ends through the small hole in this pulley and pull them through from the inside until the ends are of equal length.

Attach the tension spring by threading it on to the cord, then double the cord back and clamp it.

Replace the tuning scale and drive mechanism and slip the free end of the tension spring over the lug on the condenser drive pulley.

Turn the tuning control to the left until the stop is reached and slide the pointer trolley down the cord until the pointer covers the end lines on the dial (550 metres).

# Fault Finding

THE table below is included to assist service men in recording systematically faults which develop in the "46" receivers. Some known faults have been included to start the table, and these should be added to by the service man from information published in the MURPHY NEWS and from faults which develop in the field.

| Symptoms | Cause |
|---|---|
| No signals or weak signals | Speech coil o/c. |
| Instability | C8 s/c or o/c |
| Distortion | T2 s/c turns |
| Hum | |
| Crackle | Bad contact in slow motion drive |

# Modifications

The table below is intended to be filled in if and when any modification to the circuit or layout of the chassis is announced in the Murphy News.

| Receiver | Serial no. of 1st Set Modified | Particulars of Modification |
|---|---|---|
| | | |