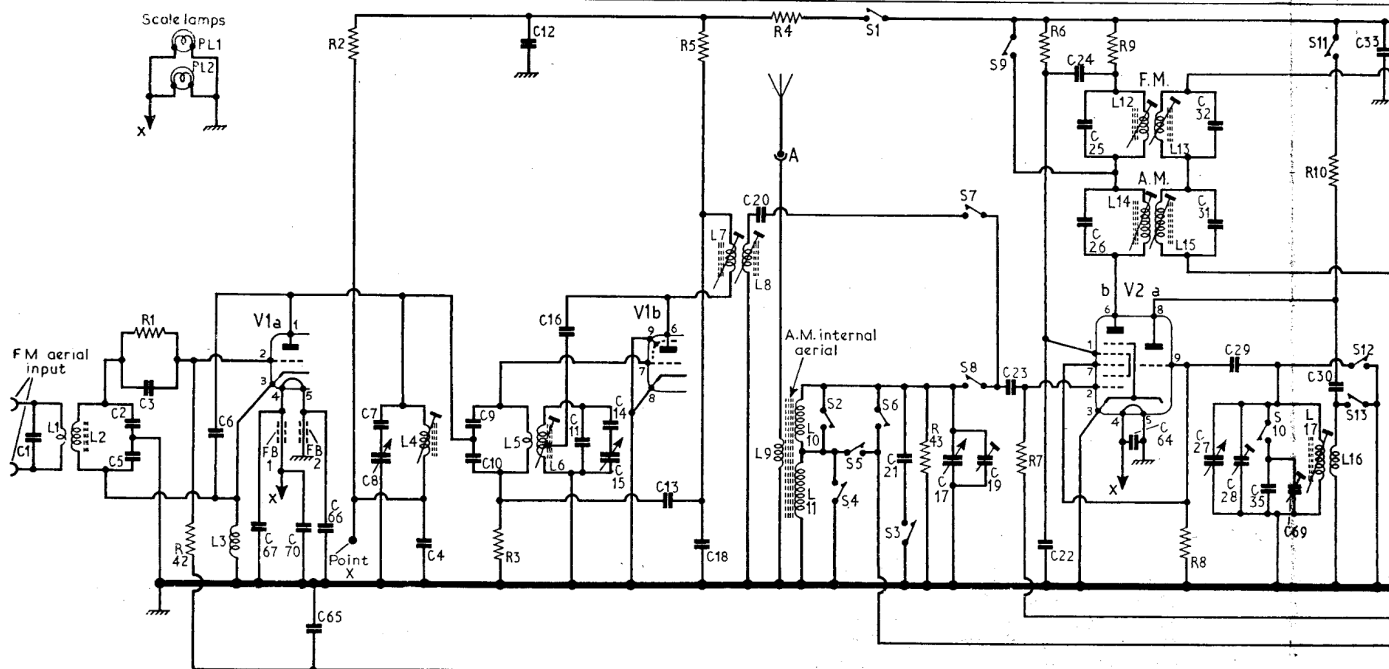


|   |   |       |    |    |          |     |   |      |    |             |    |    |    |    |    |    |    |    |             |                      |    |    |    |
|---|---|-------|----|----|----------|-----|---|------|----|-------------|----|----|----|----|----|----|----|----|-------------|----------------------|----|----|----|
| C | 1 | 2,5,3 | 6  | 67 | 70,65,66 | 7,8 | 4 | 9,10 | 12 | 16,11,14,15 | 13 | 18 | 20 | 21 | 17 | 19 | 23 | 22 | 24,25,26,64 | 32,31,27,29,28,35,69 | 30 | 33 |    |
| R |   | 1     | 42 |    |          | 2   |   | 3    |    | 5           |    | 4  |    | 43 |    | 7  | 6  |    | 9           |                      | 8  |    | 10 |

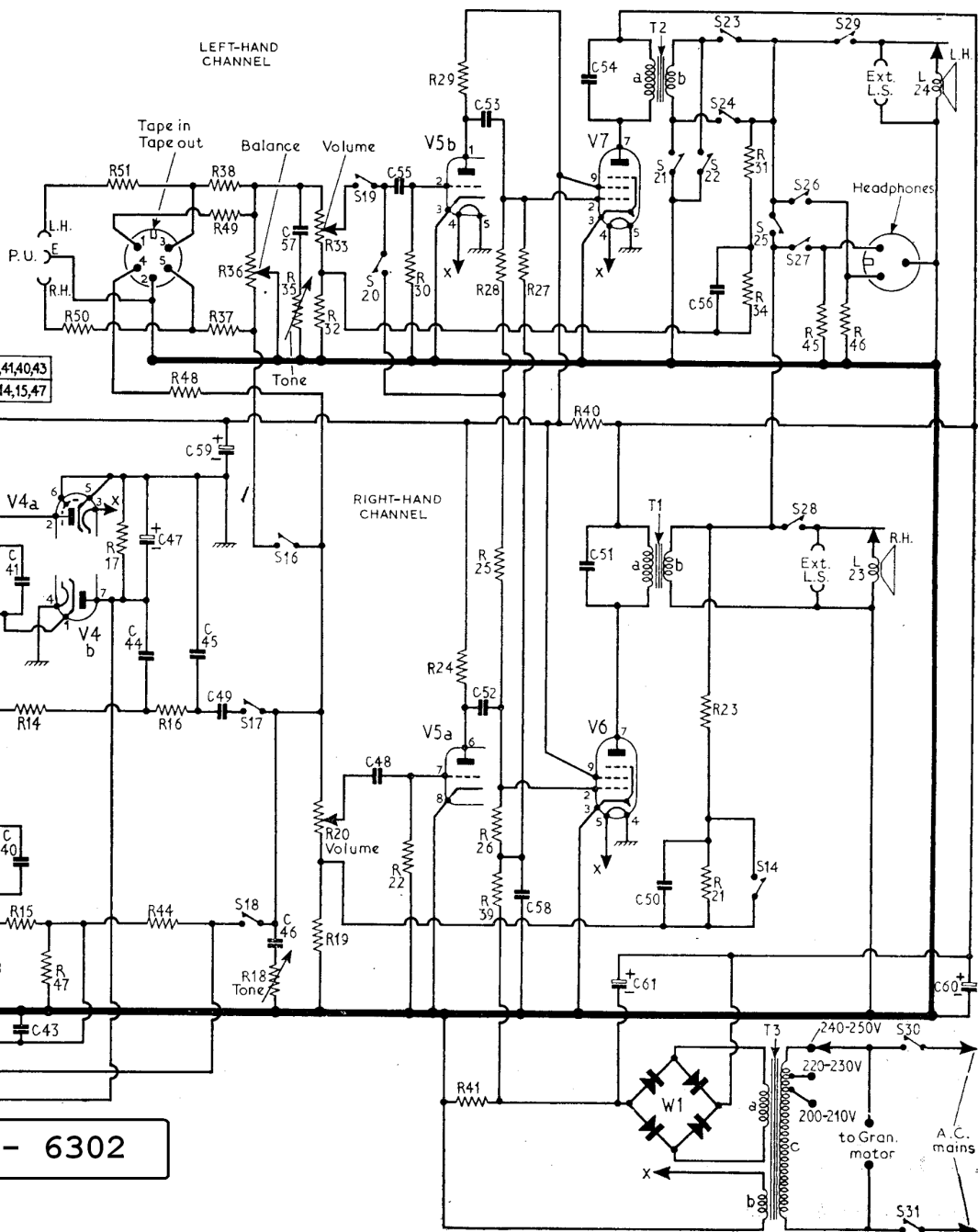


|     |       |    |
|-----|-------|----|
| R39 | 560kΩ | D1 |
| R40 | 1.2kΩ | D3 |
| R41 | 100Ω  | D2 |
| R42 | 1.5MΩ | E4 |
| R43 | 470kΩ | C3 |
| R44 | 470kΩ | C1 |
| R45 | 3Ω    | C3 |
| R46 | 3Ω    | C3 |
| R47 | 330kΩ | C2 |
| R48 | 2.2MΩ | D1 |
| R49 | 2.2MΩ | D1 |
| R50 | 100kΩ | D3 |
| R51 | 100kΩ | D3 |

#### Capacitors

|    |         |    |
|----|---------|----|
| C1 | 47pF    | E4 |
| C2 | 15pF    | E4 |
| C3 | 220pF   | E4 |
| C4 | 1,500pF | E4 |
| C5 | 47pF    | E4 |
| C6 | 7pF     | E4 |

|       |          |  |       |                      |       |       |    |          |    |    |    |   |
|-------|----------|--|-------|----------------------|-------|-------|----|----------|----|----|----|---|
| 47,44 | 45,49,59 | 46   | 57    | 48                   | 55    | 52,53 | 58 | 54,51,61 | 50 | 56 | 60 | C |
| 50    | 17,51    | 44,16,48,38,49,37,36,18,35,33,32,19,20,30,22 | 29,24 | 41,28,25,26,39,27,40 | 23,21 | 31,34 | 45 | 46       |    |    |    | F |



ULTRA - 6302

## Resistors

|     |       |
|-----|-------|
| R1  | 680kΩ |
| R2  | 2.2kΩ |
| R3  | 680kΩ |
| R4  | 1.5kΩ |
| R5  | 6.8kΩ |
| R6  | 33kΩ  |
| R7  | 2.2MΩ |
| R8  | 47kΩ  |
| R9  | 2.7kΩ |
| R10 | 27kΩ  |
| R11 | 47kΩ  |
| R12 | 3.3kΩ |
| R13 | 2.2MΩ |
| R14 | 220Ω  |
| R15 | 100kΩ |
| R16 | 100kΩ |
| R17 | 27kΩ  |
| R18 | 1MΩ   |
| R19 | 47Ω   |
| R20 | 1MΩ   |
| R21 | 1.5kΩ |
| R22 | 6.8MΩ |
| R23 | 680Ω  |
| R24 | 220kΩ |
| R25 | 1MΩ   |
| R26 | 680kΩ |
| R27 | 680kΩ |
| R28 | 1MΩ   |
| R29 | 220kΩ |
| R30 | 6.8MΩ |
| R31 | 680Ω  |
| R32 | 47Ω   |
| R33 | 1MΩ   |
| R34 | 1.5kΩ |
| R35 | 1MΩ   |
| R36 | 1.5MΩ |
| R37 | 470kΩ |
| R38 | 470kΩ |
| R39 | 560kΩ |
| R40 | 1.2kΩ |
| R41 | 100Ω  |
| R42 | 1.5MΩ |
| R43 | 470kΩ |
| R44 | 470kΩ |
| R45 | 3Ω    |
| R46 | 3Ω    |
| R47 | 330kΩ |
| R48 | 2.2MΩ |
| R49 | 2.2MΩ |
| R50 | 100kΩ |
| R51 | 100kΩ |

## Capacitors

|     |         |
|-----|---------|
| C1  | 47pF    |
| C2  | 15pF    |
| C3  | 220pF   |
| C4  | 1,500pF |
| C5  | 47pF    |
| C6  | 7pF     |
| C7  | 47pF    |
| C8  | —       |
| C9  | 5pF     |
| C10 | 5pF     |
| C11 | 11.5pF  |
| C12 | 0.01μF  |
| C13 | 12pF    |
| C14 | 50pF    |
| C15 | —       |
| C16 | 18.5pF  |
| C17 | —       |
| C18 | 100pF   |
| C19 | 40pF    |
| C20 | 100pF   |
| C21 | 140pF   |
| C22 | 3,900pF |
| C23 | 220pF   |
| C24 | 0.005μF |
| C25 | 12pF    |
| C26 | 220pF   |
| C27 | —       |
| C28 | 40pF    |
| C29 | 220pF   |
| C30 | 220pF   |
| C31 | 220pF   |
| C32 | 12pF    |
| C33 | 0.02μF  |
| C34 | 3,900pF |
| C35 | 315pF   |
| C36 | 0.01μF  |
| C37 | 220pF   |
| C38 | 15pF    |
| C39 | 0.04μF  |
| C40 | 220pF   |
| C41 | 56pF    |
| C42 | 100pF   |
| C43 | 100pF   |
| C44 | 330pF   |
| C45 | 100pF   |
| C46 | 2,000pF |
| C47 | 4μF     |
| C48 | 0.04μF  |
| C49 | 0.02μF  |

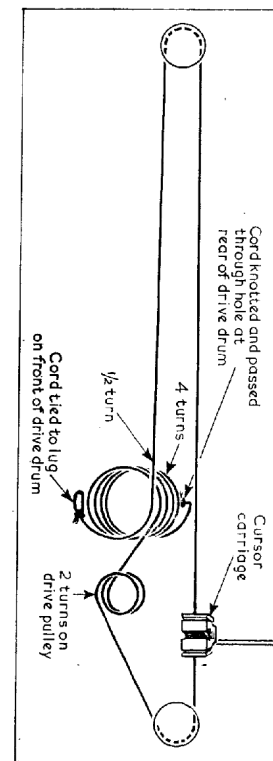
|     |         |
|-----|---------|
| C50 | 1μF     |
| C51 | 2,000pF |
| C52 | 0.01μF  |
| C53 | 0.01μF  |
| C54 | 2,000pF |
| C55 | 0.04μF  |
| C56 | 1μF     |
| C57 | 0.002μF |
| C58 | 0.05μF  |
| C59 | 50μF    |
| C60 | 50μF    |
| C61 | 100μF   |
| C62 | —       |
| C63 | 0.005μF |
| C64 | 0.01μF  |
| C65 | 0.01μF  |
| C66 | 1,000pF |
| C67 | 1,000pF |
| C68 | —       |
| C69 | 30pF    |
| C70 | 0.01μF  |

## CIRCUIT ALIGNMENT

**Equipment Required.**—An a.m. signal generator modulated 30%; an output meter; an r.f. coupling loop for alignment of the a.m. aerial circuits; an f.m. signal generator with 25kc/s deviation at an output impedance of 75Ω and also capable of supplying a 30% modulated signal at 10.7Mc/s; two capacitors (0.01μF and 400pF) and a hexagonal trimming tool for the i.f. coil cores, specially shaped to allow the bottom core to be adjusted through the top core in the case of formers which contain two cores.

### A.M. Circuits

- 1.—Switch receiver to m.w., turn the tuning gang to the minimum capacitance position and the volume control to maximum output. Connect the output meter across the loudspeaker terminals and connect the a.m. signal generator via the 0.01μF capacitor to the control grid of V2 mixer section.
- 2.—Feed in a 470kc/s modulated signal and adjust **L19**, **L18**, **L15** and **L14** (location reference C2) for maximum output.
- 3.—Disconnect the signal generator from V2b grid and connect its output across the r.f. coupling loop, with the loop loosely coupled to the ferrite rod aerial. With the tuning gang at maximum capacitance check that the cursor coincides with the "zero" mark on the edge of the scale diffuser.



- 4.—Tune receiver to 517m (if out of the cabinet, tune to the 517m calibration mark on the edge of the scale diffuser). Feed in a 580kc/s signal and adjust **L17** (B1) and **L10** (B3) for maximum output. Adjust **L10** by sliding the tuning ring along the ferrite rod.
- 5.—Tune receiver to 205m (mark on scale diffuser), feed in a 1,460kc/s signal and adjust **C28** (B2) and **C19** (B2) for maximum output.
- 6.—Switch receiver to l.w. and feed in a 220kc/s signal. Tune receiver to this signal then adjust **C69** (C1) and **L11** (A3) for correct calibration and maximum output.

### F.M. Circuits

Throughout the alignment of the f.m. circuits the input signal should be adjusted to maintain an audio output of approximately 100mW.

- 1.—Switch receiver to f.m. and allow a ten-minute warm-up period. Set the volume control 90 deg. back from maximum output and set the tone control to maximum treble. Connect the signal generator via the 400pF capacitor to the mixer control grid of V2.
- 2.—Feed in a 10.7Mc/s f.m. signal and adjust **L20**, **L21**, **L13** and **L12** (location reference C2) for maximum output.
- 3.—Switch the signal generator to a.m., feed in a 10.7Mc/s modulated signal and adjust **L21** for minimum output. Then feed in a 10.7Mc/s f.m. signal and check that the f.m. output has not reduced. If maximum a.m. rejection does not coincide with maximum f.m. output, adjust **L21** for maximum a.m. rejection at the expense of output.
- 4.—Unscrew the core of **L8** (A2) until it protrudes from the former by

- signal and adjust **C28** (B2) and **C19** (B2) for maximum output.
- 6.—Switch receiver to l.w. and feed in a 220kc/s signal. Tune receiver to this signal then adjust **C69** (C1) and **L11** (A3) for correct calibration and maximum output.

### F.M. Circuits

Throughout the alignment of the f.m. circuits the input signal should be adjusted to maintain an audio output of approximately 100mW.

- 1.—Switch receiver to f.m. and allow a ten-minute warm-up period. Set the volume control 90 deg. back from maximum output and set the tone control to maximum treble. Connect the signal generator via the 400pF capacitor to the mixer control grid of V2.
- 2.—Feed in a 10.7Mc/s f.m. signal and adjust **L20**, **L21**, **L13** and **L12** (location reference C2) for maximum output.
- 3.—Switch the signal generator to a.m., feed in a 10.7Mc/s modulated signal and adjust **L21** for minimum output. Then feed in a 10.7Mc/s f.m. signal and check that the f.m. output has not reduced. If maximum a.m. rejection does not coincide with maximum f.m. output, adjust **L21** for maximum a.m. rejection at the expense of output.
- 4.—Unscrew the core of **L8** (A2) until it protrudes from the former by

- approximately  $\frac{3}{8}$  in. Connect the signal generator to point X (A2).
- 5.—Feed in a 10.7Mc/s f.m. signal and adjust **L7** (A2) for maximum output then peak **L8**.
- 6.—Fully close the tuning gang and check that the cursor coincides with the "zero" mark on the edge of the scale diffuser, then tune to 91Mc/s on scale.
- 7.—Connect the signal generator to the f.m. aerial sockets. Feed in a 91Mc/s signal and adjust **L6** (A2) to tune receiver to this signal. If two peaks occur, select the one with the core nearer the top of the former.
- 8.—Adjust **L4** for maximum audio output with the core towards the bottom of the former.

ULTRA - 6302