

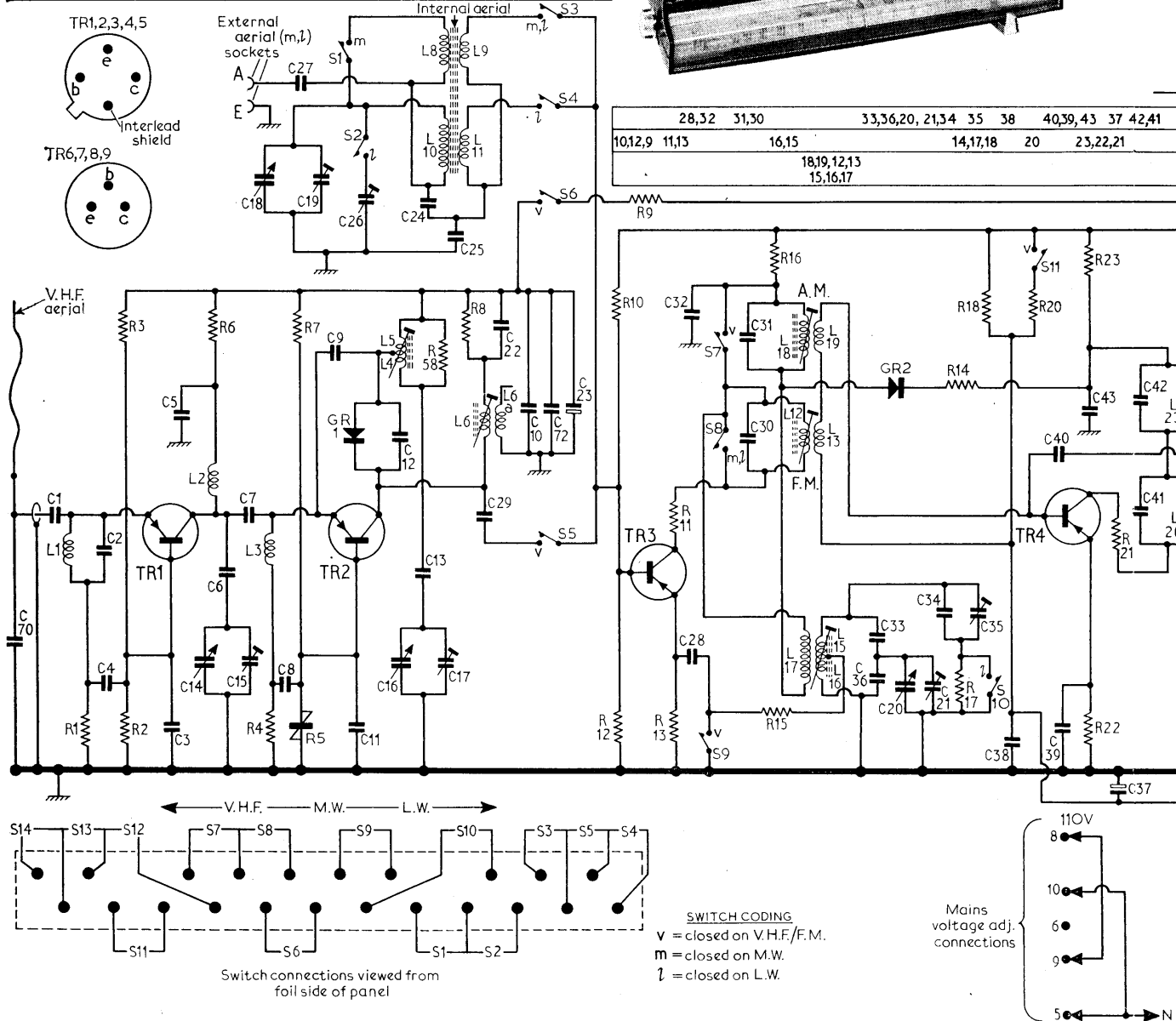
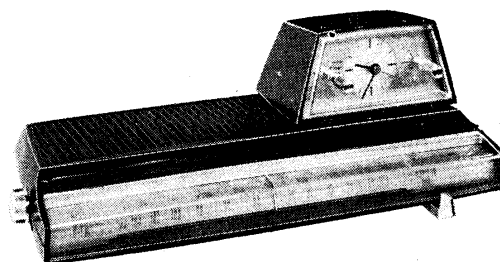
# Philips 22RS274

# 1886

A.M./F.M. mains clock radio receiver

Circuit diagram of the Philips 22RS274. Lower left: Waveband switch connections viewed from the foil side of printed panel.

|   |      |     |     |    |             |         |       |                         |     |      |    |
|---|------|-----|-----|----|-------------|---------|-------|-------------------------|-----|------|----|
| C | 70,1 | 2,4 | 3,5 | 14 | 6,15,7,18,8 | 27,19,9 | 11,26 | 12,16,13,24,17,25,29,22 | 10  | 72   | 23 |
| R | 1    | 2,3 | 6   | 4  | 7,5         |         |       | 58                      | 8   |      |    |
| L | 1    |     | 2   | 3  |             |         |       | 4,5                     | 8,9 | 6,6a |    |



Electrical and Electronic Trader 10 January, 1969

## Component values and locations

| Resistors |        |    |                  | Capacitors |    |     |         | Coils and transformers* |     |         |    | Miscellaneous |       |    |   |
|-----------|--------|----|------------------|------------|----|-----|---------|-------------------------|-----|---------|----|---------------|-------|----|---|
| R1        | 680Ω   | D2 | R33              | 10kΩ       | B3 | C7  | 3.9pF   | D2                      | C41 | 82pF    | C2 | L32           | 14-2Ω | A2 |   |
| R2        | 12kΩ   | D2 | R34              | 120Ω       | B2 | C8  | 560pF   | D1                      | C42 | 3,600pF | C2 | L33           | 10-3Ω |    |   |
| R3        | 47kΩ   | D2 | R35              | 5.6kΩ      | B2 | C9  | 10pF    | D2                      | C43 | 0.01μF  | C2 | L34           | 1-6Ω  |    |   |
| R4        | 820Ω   | D1 | R36              | 10kΩ       | C2 | C10 | 8,200pF | D2                      | C44 | 0.01μF  | B2 | L35           | 500Ω  |    |   |
| R5        | V.D.R. | D2 | R38 <sup>1</sup> | 220kΩ      | A2 | C11 | 4,700pF | D2                      | C45 | 2.7pF   | B2 | L36           | 90-0Ω |    |   |
| R6        | 100Ω   | D2 | R39              | 22kΩ       | B2 | C12 | 82pF    | D2                      | C46 | 0.047μF | B2 | L37           | 600Ω  |    |   |
| R7        | 33kΩ   | D2 | R40              | 2.2kΩ      | C2 | C13 | 39pF    | D2                      | C47 | 0.01μF  | C2 | L38           | 50Ω   |    | † |
| R8        | 100Ω   | D2 | R41              | 18kΩ       | B2 | C14 | —       | D2                      | C48 | 82pF    | B3 |               |       |    |   |
| R9        | 3.3kΩ  | B1 | R42              | 3.9kΩ      | B2 | C15 | —       | D2                      | C49 | 100pF   | ** |               |       |    |   |
| R10       | 56kΩ   | C2 | R43              | 6.2Ω       | B1 | C16 | —       | D2                      | C50 | 82pF    | B3 |               |       |    |   |
| R11       | 220Ω   | C2 | R44              | 150Ω       | B2 | C17 | —       | D2                      | C51 | 3,900pF | C2 |               |       |    |   |
| R12       | 5.6kΩ  | C2 | R45              | 47kΩ       | B1 | C18 | —       | D2                      | C52 | 2,200pF | B2 |               |       |    |   |
| R13       | 1kΩ    | C2 | R46              | 10kΩ       | B1 | C19 | —       | D2                      | C53 | 2,200pF | B2 |               |       |    |   |
| R14       | 56Ω    | C2 | R47              | 390Ω       | B2 | C20 | —       | D2                      | C54 | 4μF     | B2 |               |       |    |   |
| R15       | 12Ω    | C2 | R48              | 1.8kΩ      | B2 | C21 | —       | D2                      | C55 | 4,700pF | B2 |               |       |    |   |
| R16       | 100Ω   | C2 | R49              | 56Ω        | B2 | C22 | 1,800pF | D2                      | C56 | 2.5μF   | C1 |               |       |    |   |
| R17       | 390kΩ  | C2 | R50              | 3.3Ω       | B2 | C23 | 40μF    | C1                      | C57 | 0.47μF  | B1 |               |       |    |   |
| R18       | 150kΩ  | C2 | R51              | 3.3Ω       | B2 | C24 | 3,900pF | C1                      | C58 | 400μF   | B1 |               |       |    |   |
| R19       | 15kΩ   | C2 | R52              | 1.5kΩ      | B1 | C25 | 0.056μF | C2                      | C59 | 0.1μF   | B1 |               |       |    |   |
| R20       | 220kΩ  | C2 | R53              | 1kΩ        | B2 | C26 | 100pF   | C2                      | C60 | 270pF   | B2 |               |       |    |   |
| R21       | 220Ω   | C2 | R54              | 1kΩ        | C1 | C27 | 270pF   | D1                      | C61 | 125pF   | B2 |               |       |    |   |
| R22       | 820Ω   | C2 | R55              | 1kΩ        | C1 | C28 | 0.047μF | C2                      | C62 | 320pF   | B1 |               |       |    |   |
| R23       | 560Ω   | C2 | R56              | 5.6kΩ      | C2 | C29 | 3,900pF | C2                      | C63 | 40μF    | B2 |               |       |    |   |
| R24       | 8.2kΩ  | C2 | R57              | N.T.C.     | B2 | C30 | 82pF    | C2                      | C64 | 125μF   | B2 |               |       |    |   |
| R25       | 1.2kΩ  | C2 | R58              | 5.6kΩ      | D2 | C31 | 3,600pF | C2                      | C65 | 640μF   | C1 |               |       |    |   |
| R26       | 220Ω   | B2 |                  |            |    | C32 | 0.047μF | C2                      | C66 | 1,250μF | B2 |               |       |    |   |
| R27       | 1kΩ    | B2 | C1               | 820pF      | D2 | C33 | 290pF   | C3                      | C67 | 3,900pF | C2 |               |       |    |   |
| R28       | 3.9kΩ  | C2 | C2               | 18pF       | D2 | C34 | 150pF   | C2                      | C68 | 1,000pF | B2 |               |       |    |   |
| R29       | 560Ω   | C2 | C3               | 5,000pF    | D2 | C35 | 100pF   | C2                      | C69 | 120pF   | B2 |               |       |    |   |
| R30       | 3.9kΩ  | C2 | C4               | 2,200pF    | D2 | C36 | 10pF    | C2                      | C70 | 4pF     | D1 |               |       |    |   |
| R31       | 15kΩ   | B2 | C5               | 4,700pF    | D2 | C37 | 10μF    | C2                      | C71 | 0.047μF | C2 |               |       |    |   |
| R32       | 10kΩ   | B2 | C6               | 100pF      | D2 | C38 | 0.01μF  | C2                      | C72 | 1,000pF | D2 |               |       |    |   |
|           |        |    |                  |            |    | C39 | 0.047μF | C2                      | C73 | 3,300pF | C1 |               |       |    |   |
|           |        |    |                  |            |    | C40 | 10pF    | C2                      | C74 | 0.1μF   | C1 |               |       |    |   |

\* Approximate d.c. resistance in ohms.

† Tapped at 50kΩ.

‡ Part of mains transformer assembly.

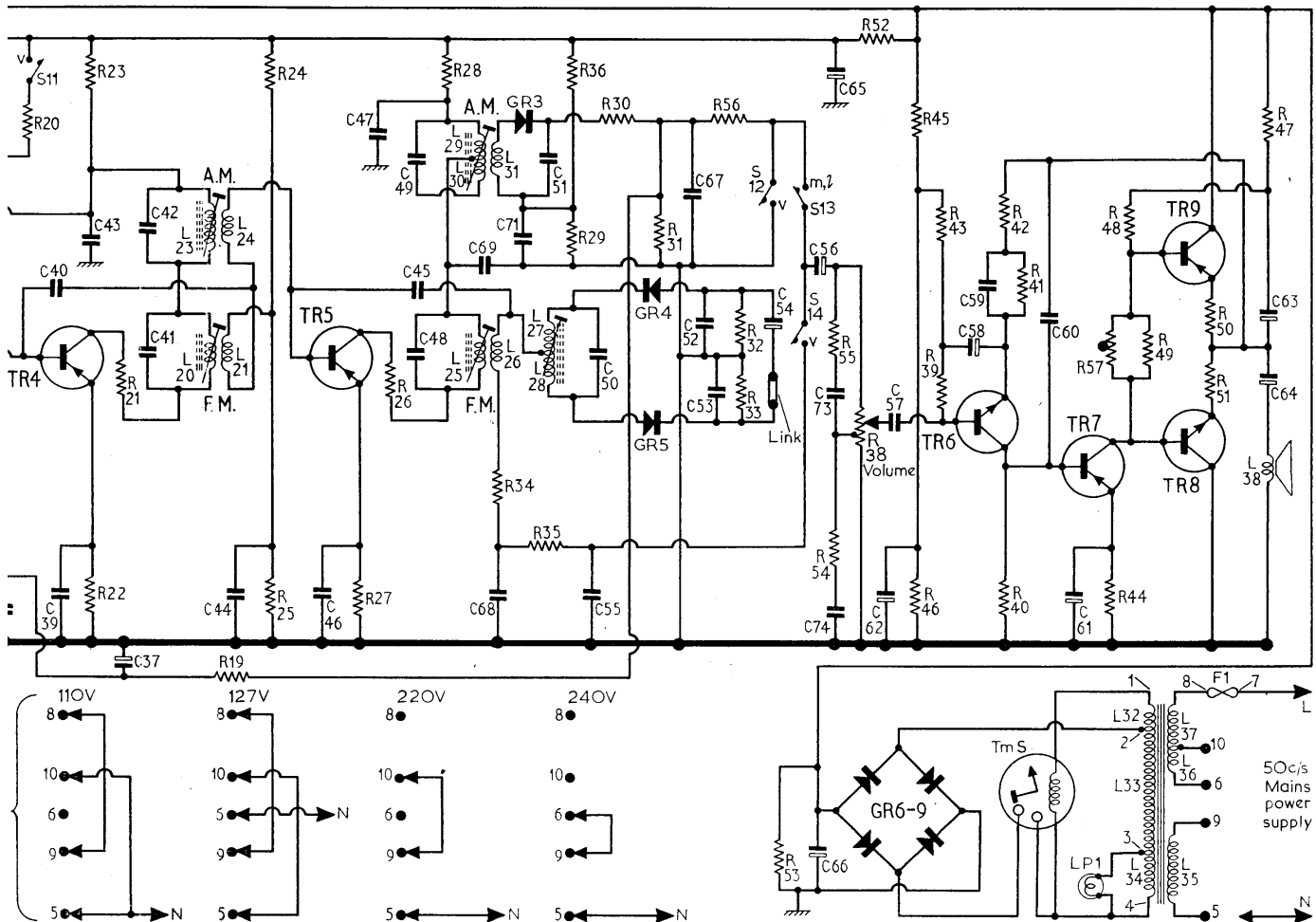
§ Loudspeaker.

†† Clock timer.

\*\* May not be fitted.

§ Waveband switches

|          |          |       |    |    |    |          |          |          |       |          |    |                      |             |                         |          |             |       |    |   |
|----------|----------|-------|----|----|----|----------|----------|----------|-------|----------|----|----------------------|-------------|-------------------------|----------|-------------|-------|----|---|
| 40,39,43 | 37       | 42,41 | 44 | 46 | 47 | 45,49,48 | 69,68,71 | 51       | 55,50 | 67,52,53 | 54 | 66,56,65,73,74,62,57 | 58,59       | 60,61                   | 63,64    | C           |       |    |   |
| 20       | 23,22,21 |       | 19 | 24 | 25 | 27       | 26       | 28       | 34    | 35,36,29 | 30 | 31                   | 56,32,33,53 | 55,54,38,52,45,46,43,39 | 40,42,41 | 57,44,48,49 | 50,51 | 47 | R |
|          |          | 23,24 |    |    |    |          |          | 29,30,31 | 27    |          |    |                      |             |                         |          | 32,35,36    |       |    | L |
|          |          | 20,21 |    |    |    |          |          | 25,26    | 28    |          |    |                      |             |                         |          | 33,34,37    |       | 38 | L |



## 1886 Philips 22RS274

### Introduction

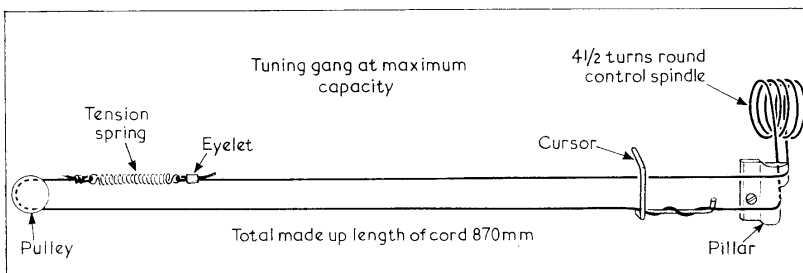
Designed for operation from 50c/s mains supplies only, Philips 22RS274 clock-radio is a three waveband, transistored, a.m./f.m. radio receiver. The period of operation of which can be controlled by the time switching associated with the synchronous clock.

Two knobs, set each side of the clock face, control the time switch functions. The one on the left has four positions. Radio on; off; automatic switch on and radio/buzzer alarm. When switched to this last position the radio is switched on at the pre-determined time, the buzzer comes into action at about nine minutes later. The right hand knob, designated 'Slumber', can be set so that the radio is automatically switched off at any pre-determined time, up to a maximum of 60 minutes, provided the left hand function switch is set to off.

Nine transistors and five diodes form the semi-conductor complement of the radio receiver which covers the following wavebands: L.w. 1,154 – 2,000m; m.w. 165 – 288m and v.h.f./f.m. 87.5 – 104Mc/s. Reception of long and medium waveband signals is via either the internal ferrite rod aerial assembly or an external aerial for which sockets are provided. For v.h.f./f.m. a 'throw – out' wire is permanently connected to the r.f. input circuit of the v.h.f. tuner.

An audio output of 1W is handled by a 5in by 2½in, 50Ω elliptical loudspeaker. power overall being supplied via a bridge rectifier circuit fed via a mains isolating transformer which can be adjusted to suit 110V; 127V; 220V or 240V 50c/s mains supplies.

Transistor voltages quoted in the table cols. 3 and 4 were obtained from information supplied by the manufacturers. Measurements were made using an electronic voltmeter and they are all negative with respect to the positive chassis line. The quiescent d.c. is quoted at 42mA.



Transistor table

| Transistor | A.M. Emitter (V) | Base (V) | Collector (V) | F.M. Emitter (V) | Base (V) | Collector (V) |
|------------|------------------|----------|---------------|------------------|----------|---------------|
| TR1 AF124  | —                | —        | —             | 1.7              | 2.0      | 10.3          |
| TR2 AF124  | —                | —        | —             | 2.4              | 2.6      | 10.5          |
| TR3 AF126  | 1.0              | 1.3      | 13.3          | 1.0              | 1.3      | 13.3          |
| TR4 AF126  | 1.5              | 1.8      | 12.4          | 1.5              | 1.8      | 12.4          |
| TR5 AF126  | 1.5              | 1.8      | 8.4           | 1.5              | 1.8      | 7.6           |
| TR6 AC127  | 4.5              | 4.4      | 0.9           | 4.4              | 4.3      | 0.9           |
| TR7 AC126  | 0.8              | 0.9      | 13.0          | 0.8              | 0.9      | 12.8          |
| TR8 AC127  | 13.1             | 13.0     | 0             | 13.0             | 12.8     | 0             |
| TR9 AC128  | 13.1             | 13.2     | 24.5          | 13.0             | 13.0     | 24.5          |

### Circuit alignment

**Equipment required.** — An a.m. r.f. signal generator; a 0.033μF capacitor; a standard dummy aerial, a v.h.f./f.m. signal generator and oscilloscope.

Switch on test equipment and allow about 15 minutes to warm up. Pre-set volume control to maximum and during alignment adjustments attenuate the input signal so that the magnitude of the receiver output is just sufficient for accurate alignment purposes, thereby preventing the a.g.c. from masking alignment peaks.

1. — Switch receiver to m.w., rotate tuning gang to minimum capacitance, connect a 0.033μF capacitor in series with the signal generator output and connect the signal generator earth to receiver chassis.
2. — Feed in a 470kc/s a.m. signal to base of **TR5** and adjust **L29/L30** for maximum output.
3. — Feed in a 469kc/s a.m. signal to base of **TR4** and adjust **L23** for maximum output.
4. — Feed in a 471kc/s a.m. signal to base of **TR3** and adjust **L18** for maximum output.
5. — Disconnect and remove the 0.033μF capacitor also the signal generator earth from receiver chassis. Reconnect signal generator via a standard dummy aerial to the aerial and earth sockets located at the rear of the receiver.
6. — Switch receiver to m.w., rotate tuning gang to maximum capacitance and feed in a 508kc/s a.m. signal. Adjust **L15/L16** for maximum output.
7. — Rotate tuning gang to minimum capacitance and feed in a 1,630kc/s a.m. signal. Adjust **C21** for maximum output.
8. — Switch receiver to l.w., rotate tuning gang to maximum capacitance and feed in a 147kc/s a.m. signal. Adjust **C35** for maximum output.
9. — Tune receiver to 1,936m. and feed in a 155kc/s a.m. signal. Adjust **L10** for maximum output.
10. — Switch receiver to m.w., tune to 545m. and feed in a 550kc/s a.m. signal. Adjust **L8** for maximum output.
11. — Tune receiver to 200m. and feed in a 1,500kc/s a.m. signal. Adjust **C19** for maximum output.

12. — Switch receiver to l.w., tune to 1,936m. and feed in a 155kc/s a.m. signal. Adjust **L10** for maximum output.

13. — Tune receiver to 1,200m. and feed in a 250kc/s a.m. signal. Adjust **C26** for maximum output. Disconnect and remove a.m. signal generator.

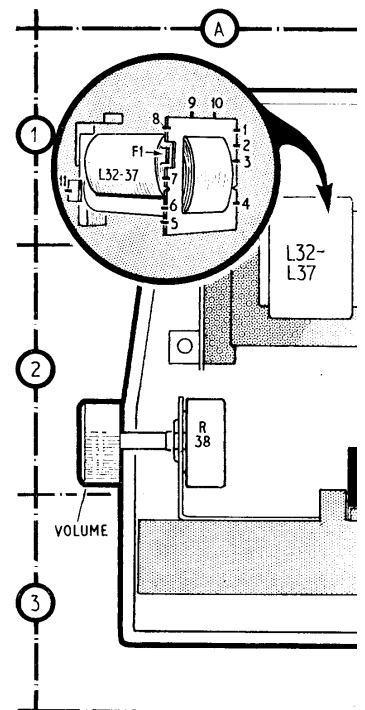
14. — Detach: **C54** (solder bridge at positive connection) and **L6a** (solder bridge to earth). Connect an oscilloscope between junction of **R33/C53** and earth. Tune v.h.f./f.m. signal generator to 10.7Mc/s deviated 200kc/s at 50c/s, switch receiver to v.h.f./f.m. and rotate tuning gang to minimum capacitance.

15. — Feed in a 10.7Mc/s f.m. signal at the junction **L20/L23** and adjust **L25** for maximum amplitude.

16. — Feed in a 10.7Mc/s f.m. signal at the junction **L12/R11** and adjust **L20** for maximum amplitude.

17. — Feed in a 10.7Mc/s f.m. signal at collector of **TR2** and adjust **L12** and **L6** for maximum amplitude.

18. — Reconnect **C54**; transfer oscilloscope input to junction **R35/C55**; feed in a 10.7Mc/s f.m. signal at collector of **TR2** and adjust **L27/L28**



Right: General view of the receiver, shown with the upper section of the case (which contains the synchronous clock and loudspeaker) removed.

Left: Illustration of the drive cord assembly as seen from the front of the receiver, with the tuning gang at maximum capacitance.

for a symmetrical 'S' curve, the straight portion of which should be centred on 10.7Mc/s. Disconnect oscilloscope, reconnect **L6a** and transfer v.h.f./f.m. signal to junction **C70** and aerial wire.

19. — Adjust signal generator to give an f.m. signal deviated 25kc/s at 1kc/s; and rotate tuning capacitor to maximum capacitance. Feed in an 87.2Mc/s f.m. signal, adjust **L4/L5** for maximum audio output then feed in a 104.5Mc/s f.m. signal and adjust **C17** for maximum output.

20. — Tune receiver to 88Mc/s and feed in an 88Mc/s f.m. signal. Adjust **L2** for maximum output.

21. — Tune receiver to 102Mc/s and feed in a 102Mc/s f.m. signal. Adjust **C15** for maximum output.

#### General Notes

**Dismantling.** — To obtain access for servicing, first unscrew and remove six screws located in the bottom half of case. The case may now be gently eased apart giving access to the component side of printed panel in the bottom half and the loudspeaker and clock fixing screws in the top half. Access to the foil side of printed panel may be obtained by first unscrewing and removing: (a) the screw securing the wavechange switch knob, then (b) the two screws securing the mains transformer to case (extreme left). Slide off switch knob the chassis may now be carefully eased out of the bottom half of case.

**Clock Adjustments.** — When a replacement clock unit is fitted, or when the hands of the existing unit have been removed, the following setting up procedure should be carried out.

With the clock unit viewed from the bottom (vibrator reed furthest), observe that the cam faces on the two large gear wheels nearest the clockface are not co-incident. If they are co-incident push in and turn the alarm set control, on the back of the clock, to separate them.

#### Manufacturer's service department

Combined Electronics Services Limited,  
Queensway, Waddon Factory Estate,  
Croydon CR9 4DR

Spare part orders  
(Telephone 01-686 7311)

General service enquiries  
(Telephone: 01-688 7722)

*Note: After business hours messages are recorded on both lines.*

Turn the sleep control knob fully clockwise to the 'OFF' position.

Turn the function control knob fully anti-clockwise to the 'ON' position, then fully clockwise to the 'ALARM' position.

Push in and *slowly* turn the alarm set control at rear of the clock so that the alarm hand spindle (outer, largest) turns in an anti-

clockwise direction. The mechanism will produce two audible clicks; the first will be the radio operating switch closing, and the second the alarm reed releasing. Immediately the second click is heard, stop turning the alarm set control and affix the hands to their respective spindles in the following order at the 12 o'clock position; alarm, hour, minute, and sweep. Check for adequate clearance between adjacent hands and between the clockface fascia.

#### Additional notes and modifications

