

PERDIO 'Multi-band 102'

portable radio receiver

THIS is a ten-transistor five-waveband superhet receiver. On long waves, the coverage is from 150kc/s to 385kc/s; on m.w., from 525kc/s to 1620kc/s; on short waveband S1, 1.6Mc/s to 4.05Mc/s; on S2, from 3.85Mc/s to 10.7 Mc/s; and on S3, 10.3Mc/s to 26.5Mc/s. Second harmonic mixing is employed on Band S3.

The receiver has an internal 7in ferrite-rod aerial for medium and long wave reception and a 2ft 9in telescopic aerial for short waves. Two coaxial sockets are provided, one for an external aerial and the other giving a low-level high impedance audio-output independent of the volume control.

Sensitivity

Owing to the high sensitivity of the receiver, it is specified by the field strength required to produce a 15dB signal to noise ratio in the output:

- Long Waves—275kc/s: approximately
750 μ V/m.
Medium Waves—600kc/s: 280 μ V/m.
1Mc/s: 200 μ V/m.
Short Waves: S1: 2–4 μ V.
S2: 3–8 μ V.
S3: 8–15 μ V.

The sensitivity on the three short wavebands is measured by injecting a

signal from a generator of source impedance 75 Ω into the external aerial socket and measuring the level required to produce a 15dB signal to noise ratio.

The image rejection is better than 12dB at 25Mc/s, improving to better than 60dB at 2Mc/s. Spurious responses on Short Waveband S3, owing to the oscillator fundamental, are better than 30dB down.

DISMANTLING

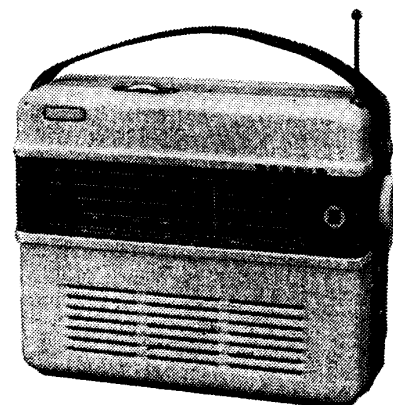
Remove the two self-tapping screws from the back of the cabinet and remove the back. Undo the battery-fixing strap and disconnect and remove the battery. Locate and unscrew the four 4B.A. cheese-head bolts which secure the chassis (a magnetised screwdriver will be found helpful). It will now be possible to remove the chassis by lifting it at the back where the coaxial sockets are fitted.

ALIGNMENT PROCEDURE

A signal generator with a frequency coverage of 150kc/s to 27Mc/s will be required. It should have provision for amplitude modulation at, say, 400c/s to a depth of 30%. An output meter will also be required and a 20k/V d.c. meter together with a 0–10mA d.c. meter. Note that a non-metallic trimming tool must be used.

A.F. stages

Insert a meter having an f.s.d. of 10mA between pin 2 of the audio-output transformer and the negative line. Turn the volume control to minimum and



RELEASE DATE AND ORIGINAL PRICE

Spring, 1961
28gn (£22 5s. 3d. plus tax)

adjust VR2 to give a reading on the meter of 7.5mA.

I.F. strip alignment

Connect the signal generator between the chassis and the green lead on the left-hand side of the i.f. board, and connect an output meter of 150 Ω impedance (if one is available) across the loudspeaker terminals, first disconnecting the loudspeaker. Connect a 20k/V meter of 10V f.s.d. between the chassis and the collector of Tr6 (the brown lead on the left-hand side of the i.f. board). Note that the chassis is 7V negative with respect to the positive connection of the battery.

Switch the receiver to Band S1 and turn the tuning capacitor to minimum capacity (fully-open position). Set the signal generator to give a modulated output at 470kc/s and adjust the cores of i.f. transformers 1, 2 and 3 for maximum output as indicated on the output meter or on the meter connected to the collector of Tr6. Reduce the output from the signal generator as the circuits come into line so that the reading on the meter connected to the collector of Tr6 is less than 3V.

R.F. and oscillator alignment

The alignment of the r.f. and oscillator sections should be carried out with the chassis in the cabinet since then the scale calibration can be used for setting up the oscillator circuits.

M.W. and L.W.

On these wavebands, the signals from the signal generator should be injected via a coupling coil to the ferrite-

BASIC DATA

Transistors: AF115 (tuned r.f. stage); AF115 (oscillator); AF115 (mixer); AF117 (first i.f. amplifier); AF117 (second i.f. amplifier); OC71 (a.g.c. amplifier); OC71 (a.f. amplifier); OC81D (driver); two OC81 (push-pull output pair).

Diodes: OA70 (detector); OA79 (a.g.c. clamp).

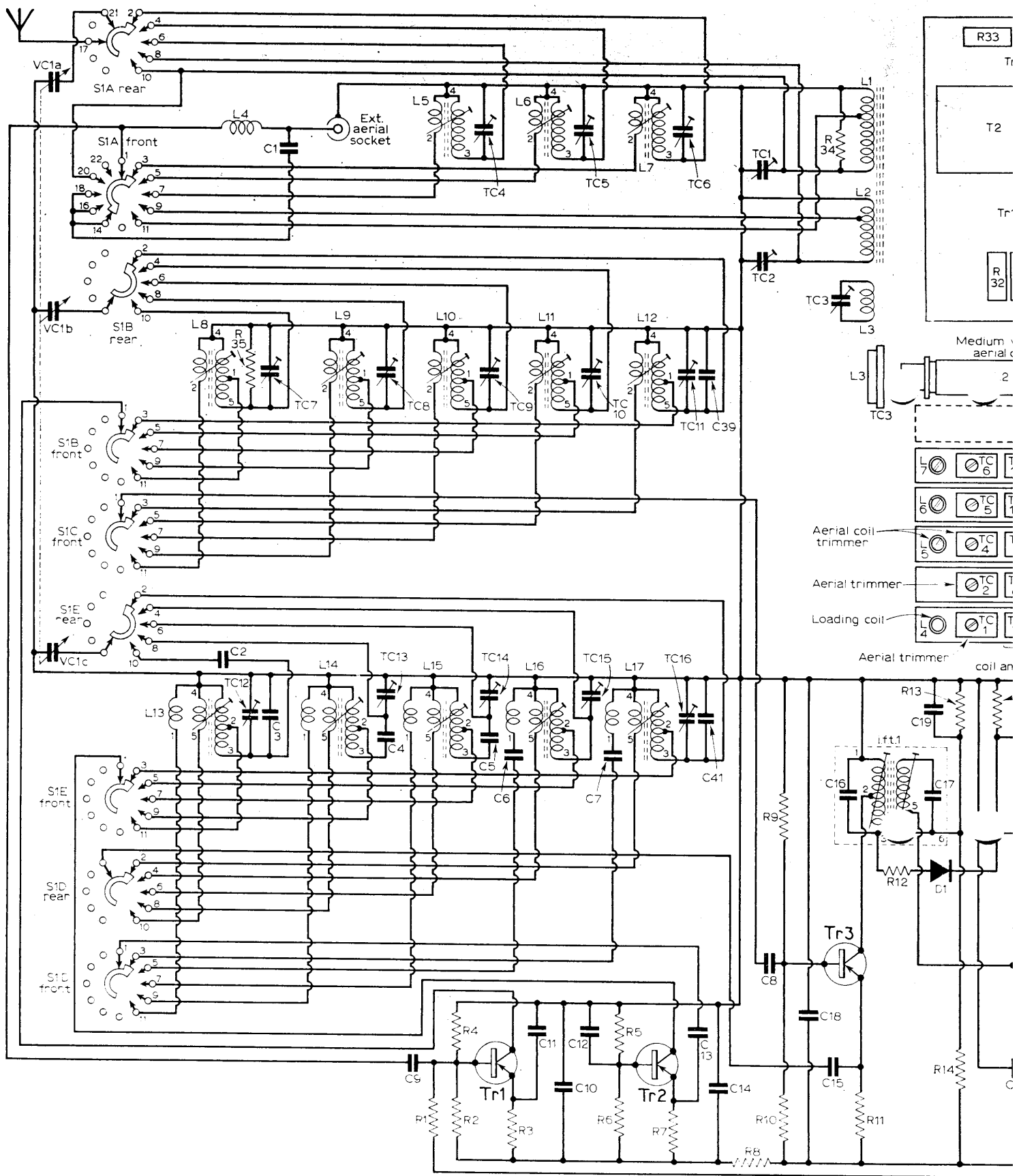
Volume Control: 5k

Intermediate Frequency: 470kc/s.

Electrolytics: Five 160 μ F 10V; one 5000 μ F 12V, 2 μ F 10V, 20 μ F 6.4V, 0.8 μ F 25V.

Battery: PP9, or T.6009, or DT.9, etc.

Consumption: 22mA (without signal); 30–40mA (normal listening level—200mW).



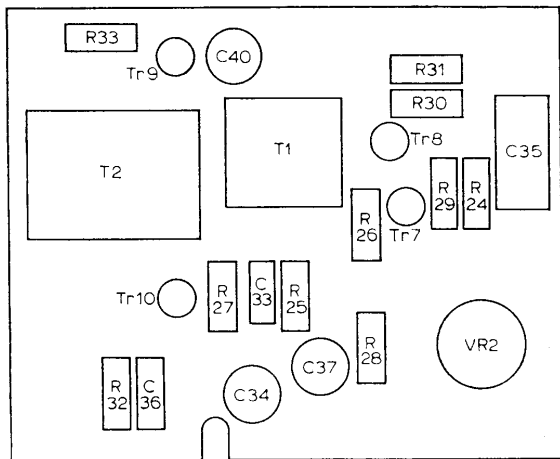


Fig. 1 (left)—The a.f. amplifier board.

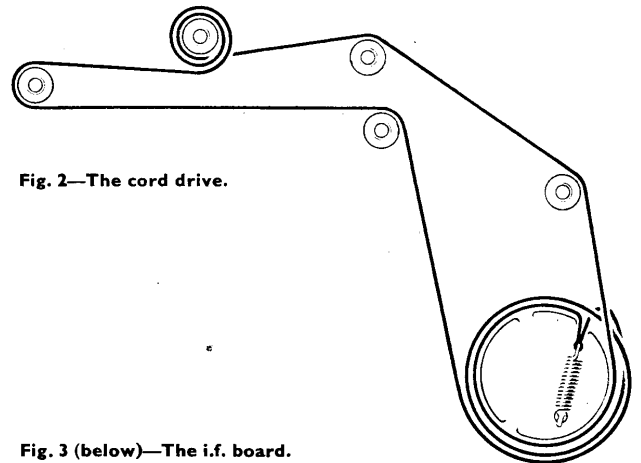


Fig. 2—The cord drive.

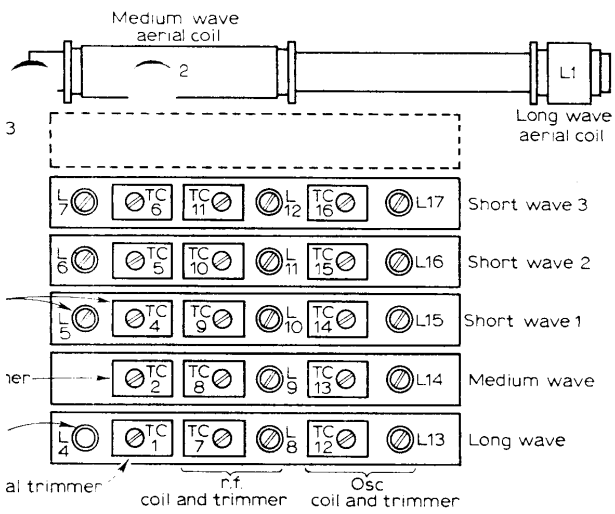


Fig. 4 (left)—Trimmer positions.

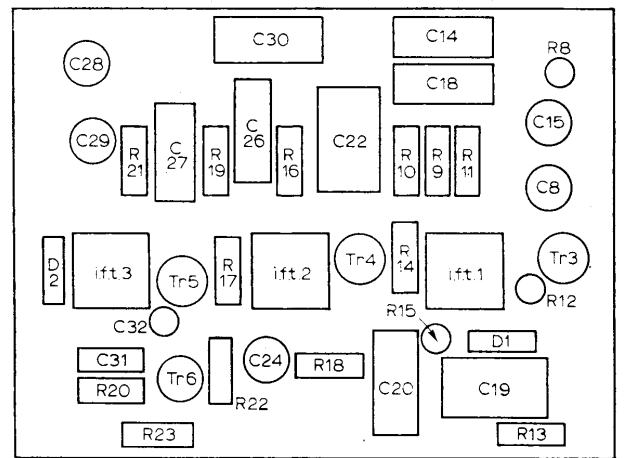
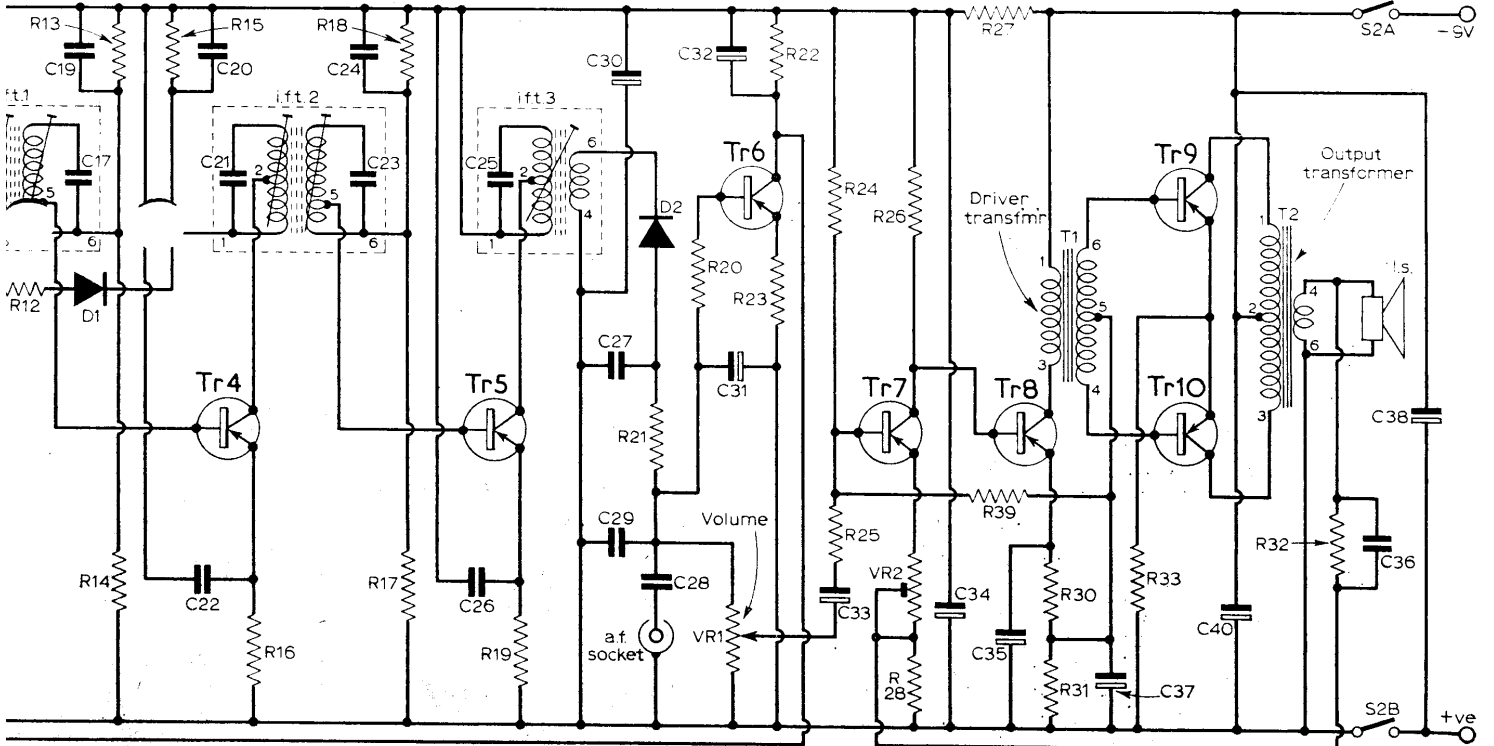


Fig. 5 (below)—The circuit diagram of the receiver.



rod aerial of the receiver. This coupling coil should consist of four turns of insulated wire about 10in in diameter—one end of the coil should be connected to the earthy side of the output from the signal generator and the other via a resistor of about 200Ω to the live side of the output. The coupling coil should be situated on the axis of the ferrite-rod aerial and a foot or two from the receiver.

Switch the receiver to long waves and tune it and the signal generator to 160kc/s. Adjust the core of L13 for maximum output. Now, tune the receiver and the generator to 350kc/s and adjust TC12 for maximum output. Repeat these two adjustments.

Set the signal generator to 175kc/s and tune in the signal on the receiver. Adjust the cores of L8 and L1 for maximum. Set the generator to 352kc/s, tune in the signal on the receiver and adjust TC1 and TC7 for maximum. Repeat these four adjustments.

Switch the receiver to m.w. and tune it and the generator to 550kc/s. Adjust the core of L14 for maximum. Tune the set and the generator to 1600kc/s and adjust TC13 for maximum output. Repeat these two adjustments.

LIST OF PARTS

Resistors:	Capacitors:
R 1 68k	C 1 1000pF
R 2 22k	C 2 220pF
R 3 820Ω	C 3 68pF
R 4 220k	C 4 250pF
R 5 10k	C 5 1000pF
R 6 2.2k	C 6 1000pF
R 7 1k	C 7 680pF
R 8 39Ω	C 8 0.047μF
R 9 47k	C 9 0.047μF
R10 10k	C10 0.047μF
R11 1k	C11 0.047μF
R12 820Ω	C12 0.047μF
R13 56k	C13 0.047μF
R14 22k	C14 0.047μF
R15 2.2k	C15 0.047μF
R16 820Ω	C16 300pF
R17 4.7k	C17 300pF
R18 22k	C18 0.047μF
R19 1k	C19 0.1μF
R20 10k	C20 0.047μF
R21 2.2k	C21 300pF
R22 8.2k	C22 0.1μF
R23 100Ω	C23 300pF
R24 120k	C24 0.047μF
R25 3.9k	C25 250pF
R26 6.8k	C26 0.047μF
R27 120Ω	C27 0.01μF
R28 56Ω	C28 0.047μF
R29 22k	C29 0.01μF
R30 470Ω	C30 160μF 10V
R31 56Ω	C31 2μF 10V
R32 27k	C32 20μF 6.4V
R33 3.3	C33 0.8μF 25V
R34 120k	C34 160μF 10V
R35 120k	C35 160μF 10V
	C36 500pF
Variable resistors:	C37 160μF 10V
VR1 5k	C38 500pF
VR2 1.5k	C39 20pF
Trimmers:	C40 160μF 10V
TC1-TC16 4-40pF	C41 20pF

Set the generator to 575kc/s and tune in the signal on the receiver. Adjust the cores of L9 and L2 for maximum output. Set the generator to 1400kc/s, tune in the signal and adjust TC8 and TC2 for maximum. Repeat these four adjustments.

Finally, set the signal generator to 940kc/s, tune the receiver to the signal and adjust TC3 for *minimum* output.

Short wave alignment

Connect the signal generator to the external aerial socket of the receiver via a 4.7k resistor. Extend the telescopic aerial of the receiver fully.

Note, that on the short wavebands, it is necessary to take great care that the set is aligned on the correct frequency and not on the image frequencies. On all the short wavebands, the oscillator operates above the signal frequency, so that if the set is correctly aligned, it should be possible to obtain a second, weaker, response when the frequency of the signal generator is *increased* by 940kc/s. Alternatively, if the frequency of the generator is kept constant, the weaker response should be found on retuning the receiver to a frequency which is 940kc/s lower.

First, switch the receiver to Band S1 and tune it and the signal generator to 1.7Mc/s. Adjust the core of L15 for maximum. Tune the receiver and the generator to 4.0Mc/s and adjust TC14 for maximum. Repeat these two adjustments.

Set the generator to 1.8Mc/s, tune in the signal on the receiver and adjust the cores of L5 and L10 for maximum. Set the generator to 3.5Mc/s, tune in the signal, and adjust TC4 and TC9 for maximum. Repeat these four adjustments.

Switch the receiver to Band S2 and tune it and the signal generator to 4.0Mc/s. Adjust the core of L16 for maximum. Tune the receiver and the generator to 10.0Mc/s and adjust TC16 for maximum. Repeat these two adjustments.

Set the generator to 4.25Mc/s, tune in the signal on the receiver and adjust the cores of L6 and L11 for maximum output. Set the generator to 9.5Mc/s, tune in the signal and adjust TC5 and TC10 for maximum output. Repeat these four adjustments.

Switch the receiver to Band S3, and tune it and the signal generator to 10.5Mc/s. Adjust the core of L17 for maximum. Tune the receiver and the generator to 26Mc/s and adjust TC16 for maximum. Repeat these four adjustments.

Set the signal generator to 11Mc/s, tune in the signal and adjust the cores of L7 and L12 for maximum. Set the generator to 24Mc/s, tune in the signal and adjust TC6 and TC11 for maximum output. Repeat these four adjustments.

VOLTAGES

Transistor	Ve	Vb	Vc
Tr1	1.7	1.9	7.6
Tr2	1.65	1.65	7.6
Tr3	1.3	1.03	7.6
Tr4	1.3	1.23	4.2
Tr5	1.0	1.2	7.6
Tr6	0	0	6.0
Tr7	1.15	1.2	2.1
Tr8	2.0	2.1	8.7
Tr9	0.04	0.18	9.0
Tr10	0.04	0.18	9.0

All the above readings are with respect to the positive battery connection and were taken with a voltmeter of 20k/V internal resistance. No signal was present and the volume control was at its minimum setting; the wavechange switch was in the S3 position and the battery voltage was 9. It should be noted that the figures given are an approximate guide and variations may be expected between receivers.

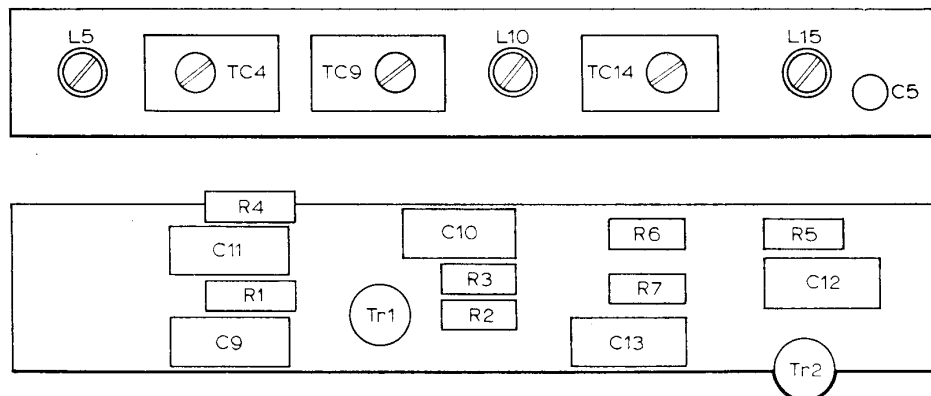


Fig. 6—Short-wave band I, and Tr1 and Tr2 printed boards.

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