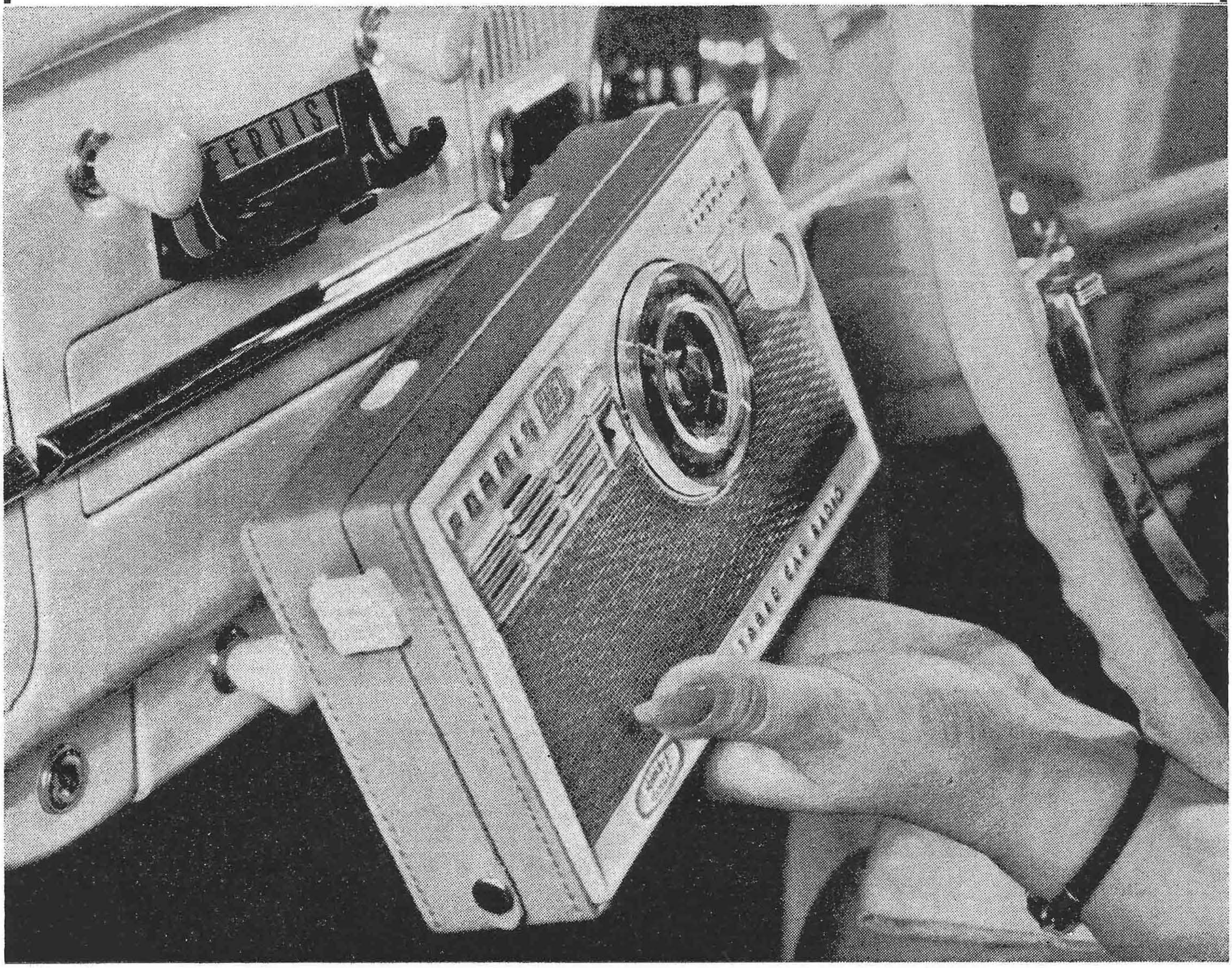
SERVICE MANUAL

Ferris Cadet

Model 234

7 TRANSISTOR PORTABLE CAR RADIO



DESIGN

The Ferris Model 234 portable car radio is an efficient transistor portable with preferred size, weight and battery. In addition it is a compact dash-mounted car radio giving excellent, ignition noise free reception. This is achieved by the use of the Ferris "Shielded Chassis" technique and separate high gain aerial coil for connection to a car radio aerial. The Ferris 12V car battery adaptor M234 BA permits connection to the car battery.

A protective diode in the car battery adaptor prevents current flowing in the unit if connected in the wrong polarity. Thus neither adaptor nor set can be damaged. Adequate filtration ensures suppression of interference which could otherwise enter the set.

SPECIFICATIONS

Band coverage — 525-1760 kc/s.
Intermediate frequency — 455 kc/s.
Speaker — $2\frac{3}{4}$" round, 15 Ω voice coil.
Power output — undistorted, 330 mW; maximum, 420 mW.
Current drain — 10 mA at 9V.
Battery — Eveready Type ER2364.
Transistors — 2N1639 converter; 2N1638 1st IF amplifier; 2N1638 2nd IF amplifier; AC172 audio amplifier; AC125 audio driver; AC127 AC128 power output complementary pair.
Diodes — OA90 detector and AVC; OA90 signal overload.

Mingay's ELECTRICAL WEEKLY Tecdata Series No. 8

FERRIS

SERVICE MANUAL

CADET PORTABLE CAR RADIO MODEL 234

Do not operate set without speaker connected.

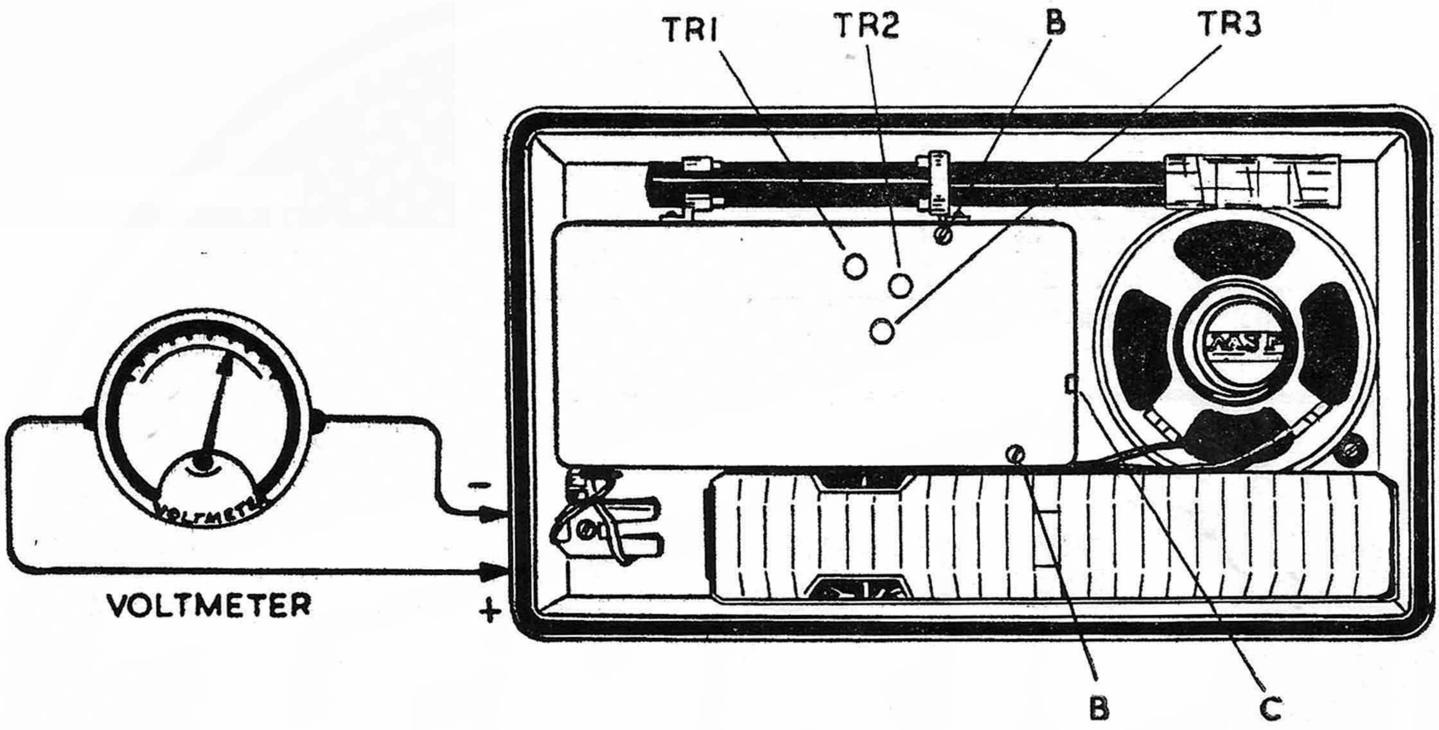


FIG. 1.

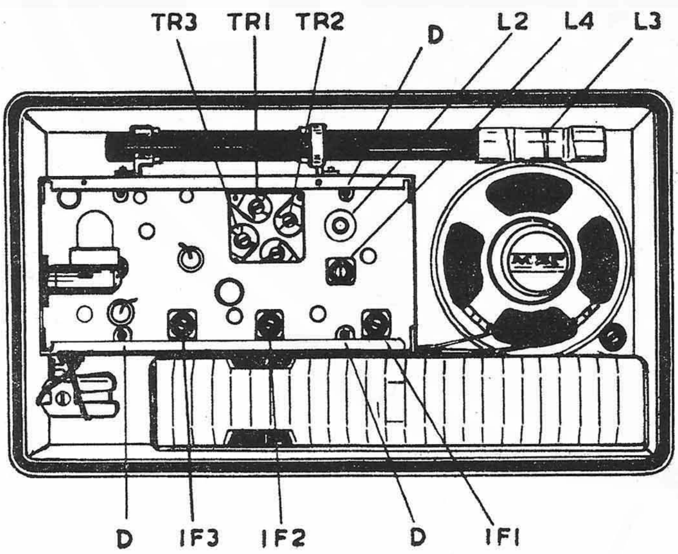


FIG. 2.

BATTERY REPLACEMENT

Remove back by releasing the single holding screw. After fitting a new battery ensure an even fit of the moulded back before tightening the holding screw.

To gain access to receiver components, remove moulded back as previously described. Refer to Fig. 1 — remove screws marked "B", then with the aid of a screwdriver engage the slot "C" and lever off the rear metal lid. Note that the complete circuit alignment can be carried out when these lids have been removed.

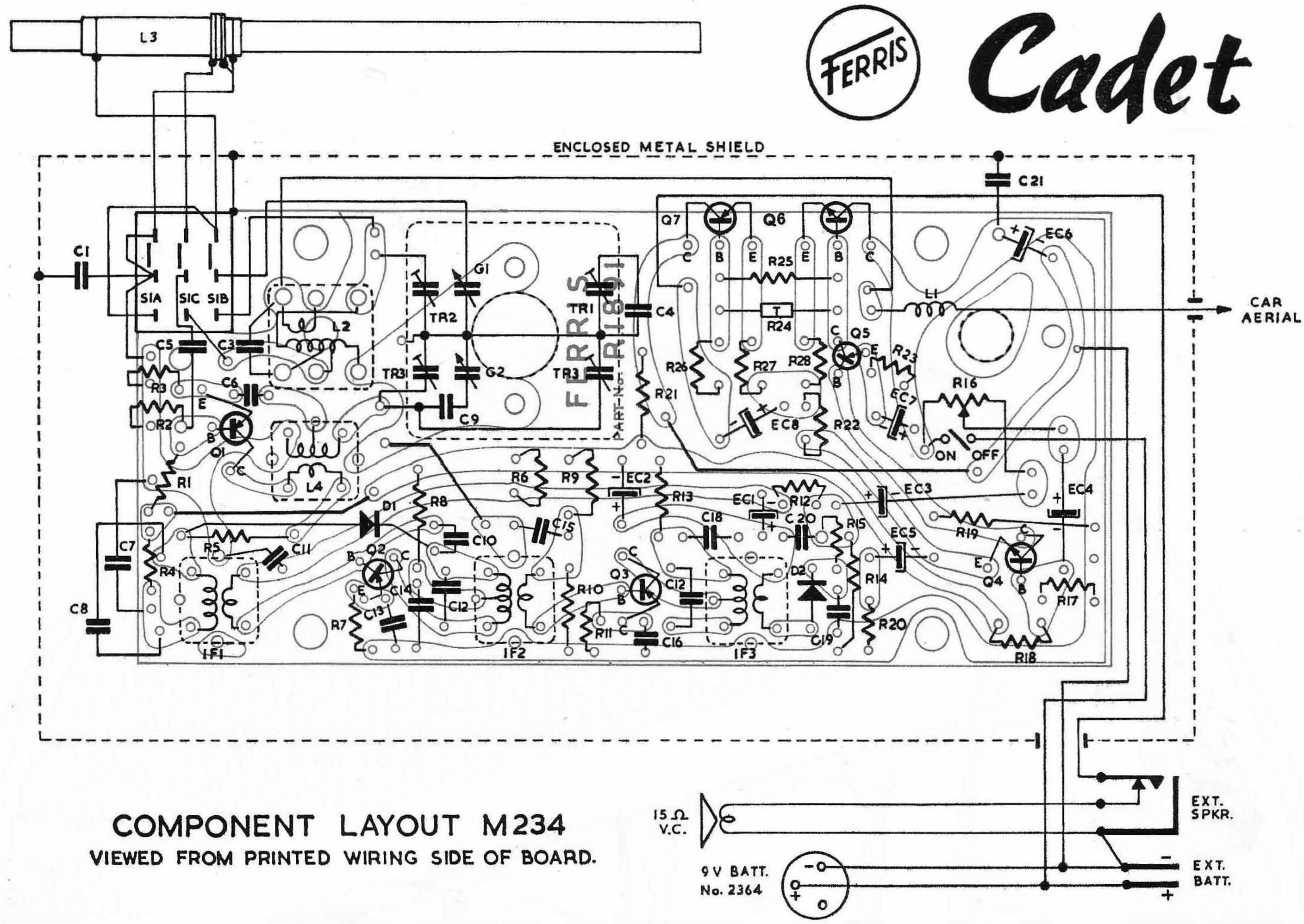
REMOVING "SHIELDED CHASSIS" FROM CASE

1. Remove handspan wheel.
2. Remove volume control knob (knob pulls off).
3. Remove case back and rear metal lid.
4. Remove three screws marked "D" in Fig. 2.
5. Shielded chassis can now be swung clear of moulded case.
6. Lever off front metal lid. Both sides of the printed circuit board are now accessible, thus permitting replacement of any major component.

DC RESISTANCE OF WINDINGS

		in ohms
Aerial filter choke (L1)		5
Aerial coil primary	(L.2)	25
Aerial coil secondary	(L.2)	7
Ferrite rod aerial (L3)		1
Oscillator coil primary	(L4)	0.25
Oscillator coil secondary total	(L4)	2
IF1 primary		2
IF1 secondary		0.3
IF2 primary total		2
IF2 secondary		0.3
IF3 primary total		2
IF3 secondary		1

FERRIS Cadet



COMPONENT LAYOUT M234

VIEWED FROM PRINTED WIRING SIDE OF BOARD.

ALIGNMENT PROCEDURE

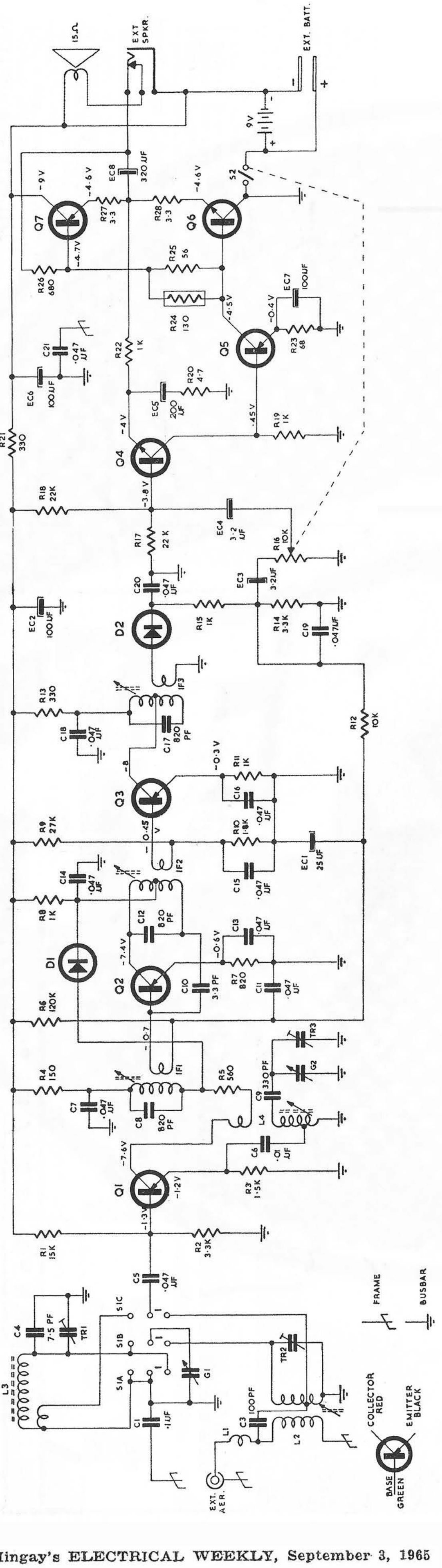
For all alignment operations, connect the ground side of the signal generator to the metal shield and keep the generator output as low as possible to avoid AVC action. Set volume control at maximum.

NB. Use the correct alignment tool for making adjustments. Cores are easily broken by improper handling, thus making replacement of entire coil or transformer necessary. Set aerial switch to "C".

Note: When aligning the rod aerial as described, the output from the signal generator will need to be in the order of 0.3–1 mV, as it is only loosely coupled to the set via the capacity of the aerial switch.

Step	Connect sig. generator to	Tune sig. generator to	Tune receiver to	Adjust for max. output
1.	Base of 2N1639		Gang fully	IF3 Peak cores
2.	converter via	455 kc/s	open	IF2 toward top
3.	0.1 μF capacitor			IF1 of can
4.	Repeat above adjustments until no further increase can be obtained.			
5.	Aerial socket via standard	525 kc/s	Gang fully closed	Osc. coil core L4
6.	dummy aerial	1760 kc/s	Gang fully open	Osc. trimmer TR3
7.	Repeat steps 5 and 6 until band limits are 525–1760 kc/s.			
8.	Aerial socket via standard	600 kc/s	600 kc/s	Aerial coil core L2
9.	dummy aerial	1500 kc/s	1500 kc/s	Aerial trimmer TR2
Repeat steps 8 and 9 until no further increase can be obtained. Check sensitivity at 1500, 1000 and 600 kc/s for satisfactory performance.				
Ferrite rod alignment: Set aerial switch to "P".				
1.	Aerial socket via dummy	1500 kc/s	1500 kc/s	Rod aerial trimmer TR1
2.	aerial. See note.	600 kc/s	600 kc/s	Slide winding L3 along ferrite rod
Repeat steps 1 and 2 until no further increase can be obtained.				

CADET PORTABLE CAR RADIO MODEL 234



COMPONENT LIST

Resistors (all ½ watt)

R1	15k	10%
R2	3.3k	10%
R3	1.5k	10%
R4	150Ω	10%
R5	560Ω	10%
R6	120k	10%
R7	820Ω	10%
R8	1k	10%
R9	27k	10%
R10	1.8k	10%
R11	1k	10%
R12	10k	10%
R13	330Ω	10%
R14	3.3k	10%
R15	1k	10%
R16	10k	Pot.
R17	22k	10%
R18	22k	10%
R19	1k	10%
R20	4.7Ω	10%
R21	330Ω	10%
R22	1k	10%
R23	68Ω	10%
R24	130Ω	NTC
R25	56Ω	10%
R26	680Ω	10%
R27	3.3Ω	10%
R28	3.3Ω	10%

Capacitors

C1	0.1 µF	25V
C3	100 pF	125V*
C4	7.5 pF	500V
C5	0.047 µF	25V
C6	0.01 µF	25V
C7	0.047 µF	25V
C8	820 pF	125V*
C9	330 pF	125V*
C10	3.3 pF	500V
C11	0.047 µF	25V
C12	820 pF	125V*
C13	0.047 µF	25V
C14	0.047 µF	25V
C15	0.047 µF	25V
C16	0.047 µF	25V
C17	820 pF	125V*
C18	0.047 µF	25V
C19	0.047 µF	25V
C20	0.047 µF	25V
C21	0.047 µF	25V

* STYROSEAL

Electros

EC1	25 µF	6V
EC2	100 µF	6V
EC3	3.2 µF	6V
EC4	3.2 µF	6V
EC5	200 µF	6V
EC6	100 µF	10V
EC7	100 µF	4V
EC8	320 µF	6V

Transistors and Diodes

Q1	2N1639, 2N374, AF116
Q2	2N1638, 2N373, AF117
Q3	2N1638, 2N373, AF117
Q4	AC172, 2N649
Q5	AC125, 2N406
Q6	AC127, 2N649
Q7	AC128, 2N408
D1	OA90, 1N60A
D2	OA90, 1N60A

Chokes and Coils

L1	Aerial choke Type 8326
L2	Aerial coil Type 7120
L3	Rod aerial coil Type 7122
L4	Osc. coil Type 7325

IF Transformers

IF1	455 kc/s	Type 9133
IF2	455 kc/s	Type 9133
IF3	455 kc/s	Type 9134

Trimmers

TR1, TR2, TR3 — trimmers mounted on gang

Switches

S1A, S1B, S1C — three-pole, two-position slide switch

S2 — single-pole, single-throw switch on volume control

Battery 9V Type 2364

Band coverage 525-1760 kc/s

IF frequency 455 kc/s

Total battery current 10 mA for 9V battery.

Collector current of output stage for zero signal, 2 mA.

All resistors ½W unless otherwise stated.

Note: All voltages checked with 40,000 ohms per volt meter at zero signal input.