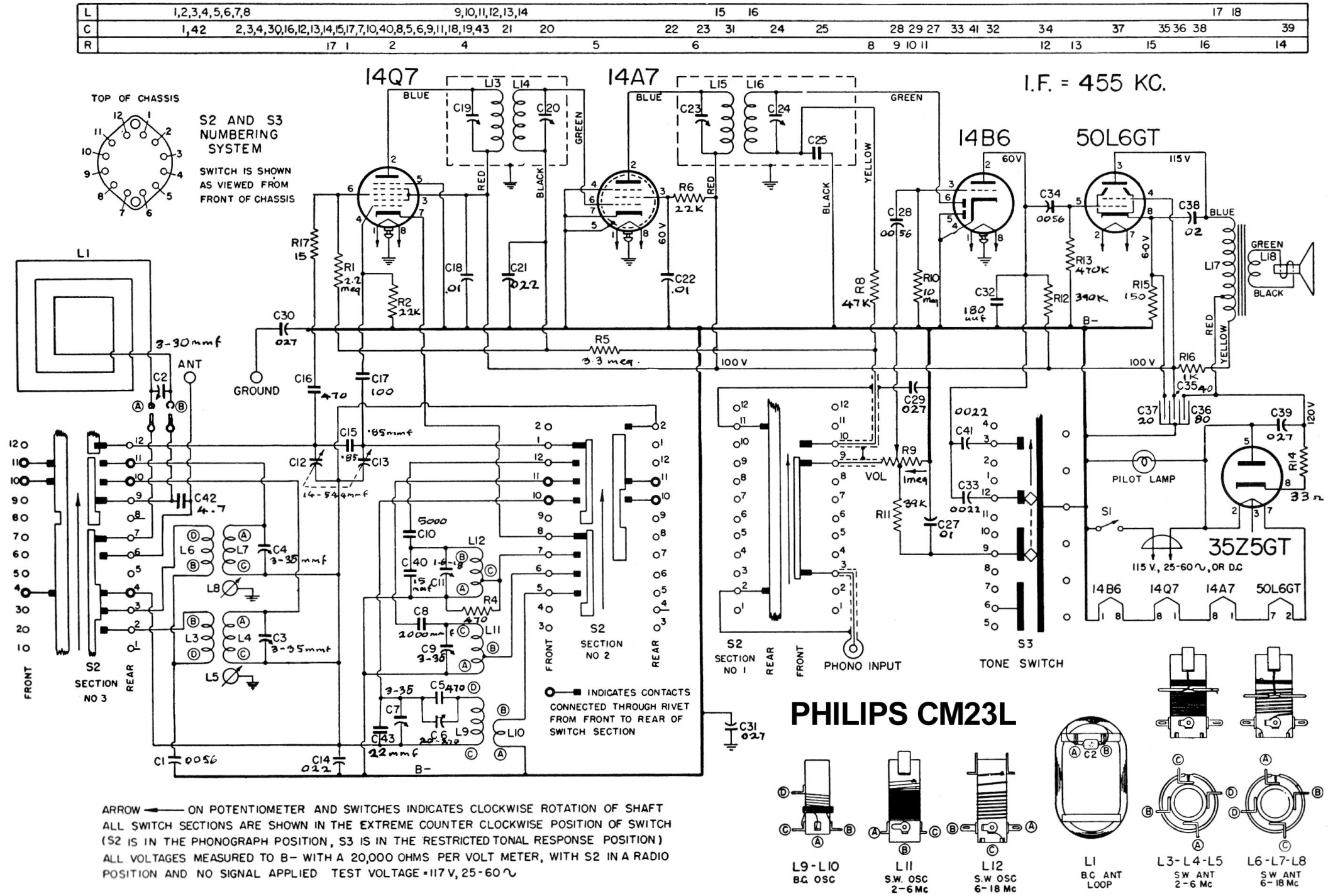

L 1,2,3,4,5,6,7,8 9,10,11,12,13,14 15 16 17 18
C 1,42 2,3,4,30,16,12,13,14,15,17,7,10,40,8,5,6,9,11,18,19,43 21 20 22 23 31 24 25 28 29 27 33 41 32 34 37 35 36 38 39
R 17 1 2 4 5 6 8 9 10 11 12 13 15 16 14
TOP OF CHASSIS
S2 AND S3 NUMBERING SYSTEM
SWITCH IS SHOWN AS VIEWED FROM FRONT OF CHASSIS
14Q7
14A7
I.F. = 455 KC.
14B6
50L6GT
35Z5GT
PHILIPS CM23L
PHONO INPUT
TONE SWITCH
PILOT LAMP
115 V., 25-60 ~, OR D.C
INDICATES CONTACTS CONNECTED THROUGH RIVET FROM FRONT TO REAR OF SWITCH SECTION
ARROW ← ON POTENTIOMETER AND SWITCHES INDICATES CLOCKWISE ROTATION OF SHAFT
ALL SWITCH SECTIONS ARE SHOWN IN THE EXTREME COUNTER CLOCKWISE POSITION OF SWITCH (S2 IS IN THE PHONOGRAPH POSITION, S3 IS IN THE RESTRICTED TONAL RESPONSE POSITION)
ALL VOLTAGES MEASURED TO B- WITH A 20,000 OHMS PER VOLT METER, WITH S2 IN A RADIO POSITION AND NO SIGNAL APPLIED TEST VOLTAGE = 117 V, 25-60 ~
L9-L10 B.C. OSC
L11 S.W. OSC 2-6 Mc
L12 S.W. OSC 6-18 Mc
L1 B.C. ANT LOOP
L3-L4-L5 S.W. ANT 2-6 Mc
L6-L7-L8 S.W. ANT 6-18 Mc

Model CM23L is a five tube superheterodyne receiver designed for use on AC or DC power. Three tuning ranges cover from 535 kc. to 18.15 Mc. (560 to 16.5 meters).

PHILIPS TUBES

Converter 14Q7, I.F. Amplifier 14A7, Detector, A.V.C. and 1st A.F. Amplifier 14B6, Audio Output 50L6GT, Rectifier 35Z5GT or 35Z4GT.

RANGE SWITCH POSITIONS AND TUNING RANGES:

1st—Phonograph Position.
2nd—560 to 190 m.—535 to 1600 kc. (Standard Broadcast).
3rd—155 to 49 m.—1.95 to 6.1 Mc. (Short Wave).
4th—53 to 16.5 m.—5.6 to 18.15 Mc. (Short Wave).

INTERMEDIATE FREQUENCY: 455 kc.

AUDIO POWER OUTPUT:

0.9 watt undistorted, 1.9 watts maximum.

LOUDSPEAKER:

Is a 6 inch permanent magnet dynamic type. Voice Coil D.C. resistance, 3.0 to 3.4 ohms.

CONTROLS: Left to right (looking at front)

1. Tone Switch
2. On-Off Switch and Volume Control
3. Tuning Control
4. Wave Range and Phonograph Switch

ANTENNA AND GROUND

A loop antenna on the inside of the back cover provides a built-in antenna. For optimum results, an outside antenna is necessary.

An external ground connection is not usually required when using the built-in antenna. When hum or other interference is present, or when using an external antenna, it is advisable to ground the receiver. A secure ground connection should be made to a cold water pipe, or to a grounding plate buried in damp ground.

PHONOGRAPH CONNECTION

Any crystal type pickup may be used with this receiver. However, the type with the crystal cartridge and leads insulated from the pickup arm is recommended. If any objectionable power line hum is present, it can be reduced when the insulated type pickup is used, by connecting a lead from the pickup arm mounting to the frame of the receiver chassis. A screw located to the left of the phono socket on the receiver, is provided for this purpose.

SERVICE DATA

WAVE RANGE SWITCH

The schematic diagram shows each section of this switch in a straight line form. The short stator contacts are represented as solid squares; the long contacts as solid rectangles; and the rotor contacts as bars. All sections are shown in the extreme counter-clockwise (phonograph) position of the switch. As the switch rotates clockwise, the rotor contacts move upwards through the second, third and fourth wave range switch positions as indicated above. The exact location of each stator is shown on a front view drawing of a switch wafer on the schematc diagram.

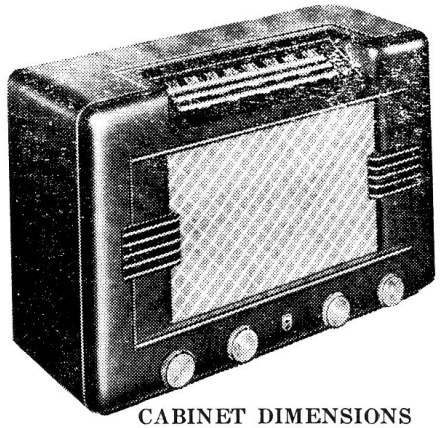
TO REMOVE CHASSIS

1. Disconnect plug from line socket.
2. Remove antenna and ground connections from chassis.
3. Remove control knobs.
4. Remove back cover and disconnect loop leads.
5. Unsolder speaker leads if it is necessary to completely remove the chassis.
6. Remove the two screws securing the vertical arms to the front of the cabinet, and slide chassis out of the cabinet.

ALIGNMENT OF RECEIVER

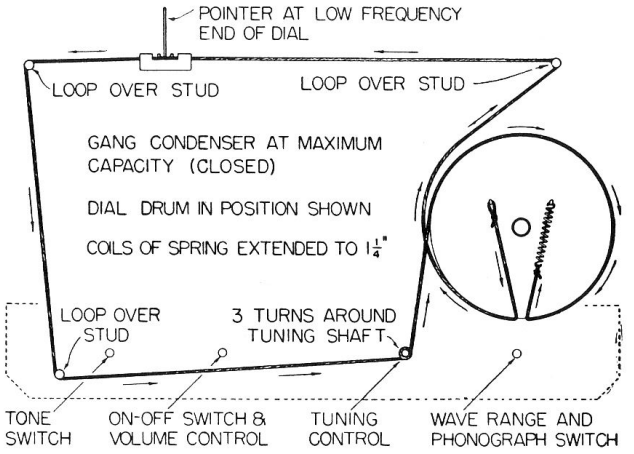
With the variable capacitor fully closed, adjust the centre of the dial pointer to the edge of the dial opening (clear area) to the left of the 550 kc. calibration mark. Set the tone switch to position No. 2, and the volume to the full clockwise (maximum) position.

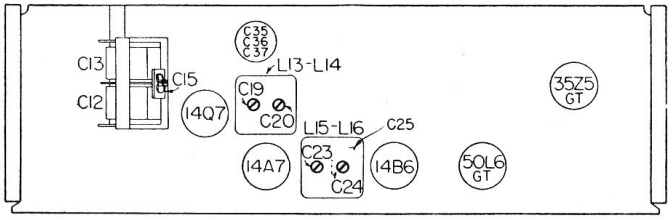
CM 23L

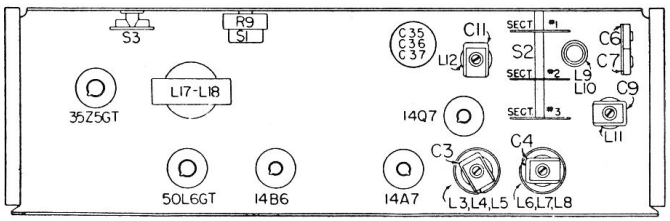


CABINET DIMENSIONS

Width—16½ inches
Height—11¼ inches
Depth—7½ inches (including knobs)







EQUIPMENT REQUIRED

OUTPUT INDICATOR: A high resistance A.C. voltmeter and an output transformer.
SIGNAL GENERATOR: A generator capable of supplying modulated signals between 450 kc. and 20 Mc.
ISOLATING TRANSFORMER: A one to one ratio line isolating transformer, if aligned on A.C. power.

EQUIPMENT CONNECTIONS AND ALIGNMENT PROCEDURE

OUTPUT INDICATOR: Connect the A.C. voltmeter across the voice coil of the speaker. During alignment, keep the output below 1½ A.C. volts across the voice coil. If the meter is not sensitive enough to indicate 1 volt, connect the secondary of an output transformer across the speaker voice coil and connect the A.C. voltmeter across the primary. When using the latter method, the maximum output reading should be kept below 25 A.C. volts. When the output indication increases, regulate the signal generator attenuator to restore the original indication.
SIGNAL GENERATOR: Connect the output lead of the signal generator to the points indicated in the chart below, in series wth the specified resistor or capacitor. Connect the return lead of the signal generator to the B— lead of the receiver through a .05 mfd. condenser. The B— connection to the receiver is to be made to terminal No. 5 of the 14Q7 tube socket. **Do not connect a grounded lead to B— unless a line isolating transformer is used.**

ALIGNMENT PROCEDURE

Steps Operation	SIGNAL GENERATOR		RECEIVER			
	Output Connections to Receiver	Frequency	Range Switch	Tuning Capacitor	See Notes	Adjust in Stated Order for Maximum Output
1	To 14A7 Control Grid (6) through .05 mf. capacitor	455 kc.	Pos. 2	Min.		2nd I.F. Trimmers C24, C23
2	To stator of C12 through .05 mf. capacitor	455 kc.	Pos. 2	Min.		1st I.F. Trimmers C20, C19
3	To Antenna Contact through 400 ohms resistor*	5 Mc.	Pos. 3	5 Mc.	A	S.W. Osc. Trimmer C9 S.W. Ant. Trimmer C3
4	To Antenna Contact through 400 ohms resistor*	2.4 Mc.	Pos. 3	2.4 Mc. approx.	B	Loop L5 on S.W. Ant. Coil (adjust loop position)
5	To Antenna Contact through 400 ohms resistor*	17 Mc.	Pos. 4	17 Mc.	A	S.W. Osc. Trimmer C11 S.W. Ant. Trimmer C4
6	To Antenna Contact through 400 ohms resistor*	6 Mc.	Pos. 4	6 Mc. approx.	B	Loop L8 on S.W. Ant. Coil (adjust loop position)
7	To Antenna Contact through 100 mmf. capacitor*	1500 kc.	Pos. 2	1500 kc.		B.C. Osc. Trimmer C7
8	To Antenna Contact through 100 mmf. capacitor*	600 kc.	Pos. 2	600 kc.	C	B.C. Osc. Padder C6
9	To Antenna Contact through 100 mmf. capacitor*	1500 kc.	Pos. 2	1500 kc.	D	Loop Trimmer C2

* or a standard dummy antenna with a 200 mmf. capacitor in series.

ALIGNMENT NOTES

NOTE A — Unscrew Oscillator Trimmer approximately **three turns from tight.** Then turn adjustment clockwise until first output peak is obtained. Make adjustments using this peak. Rock the tuning capacitor slowly back and forth while adjusting antenna trimmer.
NOTE B — Adjust position of loop with a non-metallic rod. Return to previous operation and carefully adjust antenna trimmer.
NOTE C — After completing this operation, return to 1500 kc. and repeat operation 7, then repeat operation 8.
NOTE D — Disconnect generator ground lead. Replace the chassis in the cabinet and adjust the trimmer which is mounted on the loop. The trimmer is accessible through the back cover.

PHILIPS CM23L

LOCATION OF PARTS