

model TH-666 6 TRANSISTOR RADIO SERVICE MANUAL

No. 1/1959

DESCRIPTION

This new pocket radio is the smallest of its type yet produced anywhere, and fully maintains Hitachi's consistently high standards as to sensitivity, tone and reliability.

It fits easily in a purse or shirt pocket.

This instrument contains 6 Hitachi transistors, 1 germanium diode and a temperature compensating thermistor.

In this service book are described operation of the set, the circuit system, and several simplified repairing methods.

1. The use of the high efficiency Hitachi transistor with almost endless life assures that this radio will be operating at optimum reception for many years.
2. The all-printed circuit and the new "dip-soldering" method adopted for parts attachment eliminate all risk of failure and assure almost endless life for this radio.
3. The high quality speaker with a wide sound range and push-pull output circuit reproduce undistorted tones, rich in volume.
4. Uniformly excellent reception is assured by the temperature compensating thermistor even under wide variation of ambient temperature.
5. The case is of shock-proof molded plastic and comes in three attractive colors which will not discolor even after years of use.
6. Hitachi home speaker, ES-20 or ES-70, can be connected to the earphone jack for increased listening pleasure.

SPECIFICATIONS

Circuit system	6-transistor superheterodyne
Tuning range	535-1605 kc
Intermediate frequency	455 kc
Transistor components	HJ-23 Frequency converter HJ-22×2 Intermediate frequency amplifier IN34-Detector and automatic volume controller HJ 17×2 Power amplifier B-2B Temperature compensation
Output	80 mW
Power source	9 V BL-006 P (Japan) N. E. D. A. 1604 Eveready 216 Bay-0-Vac 1604 Burgess 2V6 G. E. 88
Earphone	EL-212 type magnetic earphone
Speaker	2" dynamic speaker
	Dimensions 2 ³ / ₈ "W × 3 ⁵ / ₁₆ "H × 1 ¹ / ₂ "D

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HOW TO OPERATE THIS RADIO

1. Volume Control

The milled knob at the left is an "off and on" switch also controlling volume.

Turn the knob in a clockwise direction until a "click" announces that the power has been turned on.

Continue turning to the right through the numerals 1.2.3... the volume increasing until the maximum is reached at "10". Adjust the knob to the volume desired. When switching off the set, turn the dial in an anti-clockwise direction until a "click" is heard.

2. Station selection

The milled knob at the right is the tuner. Turn the tuning knob to select the desired station. The numeral 54 on dial indicates 540 kc, and 16, 1,600 kc. Turn the knob slightly back and forth to locate the position where the volume is loudest.

3. Earphone :

One earphone socket will be found on the top of the set. Insert the plug of the Hitachi Magnetic Earphone EL-212 into this earphone socket. Then the speaker automatically stops and the earphone starts operating.

4. Battery replacement.

Under normal operating conditions, a battery will last about 30 hours. Therefore a battery must be replaced

with new one when volume starts decreasing after approximately 1/2 month operation. (3 hour use daily).

In order to replace the battery, first turn off the switch, then open the case by turning a coin inserted in the opening at the bottom of the case. Replace the old battery with new one, but see that the new battery snaps properly into the battery plug.

Snap the back of the case closed.

To conserve battery life, turn volume "off" when listening is finished. If the set is to be stored or put away for any long period, or when the battery is dead, remove the battery from the set, as a precaution for preventing the set from being damaged by possible battery leakage.

5. Precaution.

The set contains a temperature compensator which insures consistent performance under normal weather conditions. However, as high quality transistors used in this set are quite sensitive to heat and moisture, care must be taken not to expose the set to rain, direct sunlight (particularly in summer) or any heating device.

With these simple precautions, this instrument will prove to be a handy, long lasting source of entertainment.

HINTS FOR SERVICE-MEN

1. The first thing to check when the receiver is inoperative, is the battery with the receiver turned on. A new battery should test 9 volts although the receiver can be expected to operate with a battery which tests 5 volts or more.

2. To check for a circuit defect which would cause excessive battery drain, an overall current measurement and supplementary voltage measurements should be made.

For reasons explained below, continuity measurements can be misleading.

3. The output circuit used in this receiver is of the "Class B" type. It should be noted that in "Class B" output the Battery Current increases greatly with increased signal input.

4. Extreme care should be used to avoid accidental shorting of transistor elements to the circuit ground. This is especially true of the output transistors; if the junction of R₁₃-R₁₄ should be accidentally grounded for a few seconds, the output transistor would be permanently damaged.

5. With no signal input, the A. G. C source as measured at the base of the TR₂ will be 0.5 volts negative in respect to ground. Rectifier signal voltage will make this point less negative in respect to chassis ground.

6. Do not remove any transistor from its socket (or reinsert it) when the set is turned on.

7. Oscillator performance can not be judged by measurement of a D.C. voltage developed across a resistor. Measurement of oscillator signal strength with an A.C. voltmeter at the emitter terminal of TR, will give an indication of oscillator performance.

8. Voltage measurements should be made only with a sensitive voltmeter.

9. Interchanging transistors in the I-F stages may necessitate realignment.

10. It is possible to damage a transistor when testing

circuit continuity. Since a transistor needs only low voltage applied to its terminals for conduction, testing continuity of a circuit which includes a transistor can result in misleading continuity indications. To avoid transistor damage and misleading continuity indications, remove the transistor from its socket before making continuity tests of its circuit.

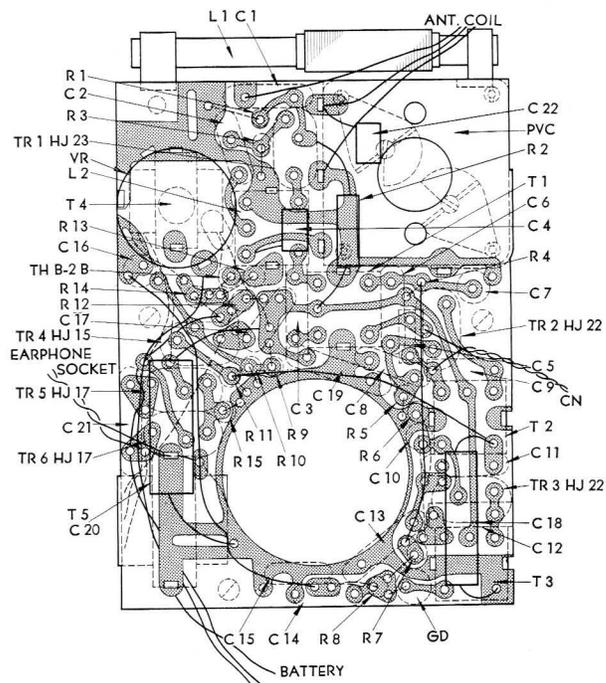
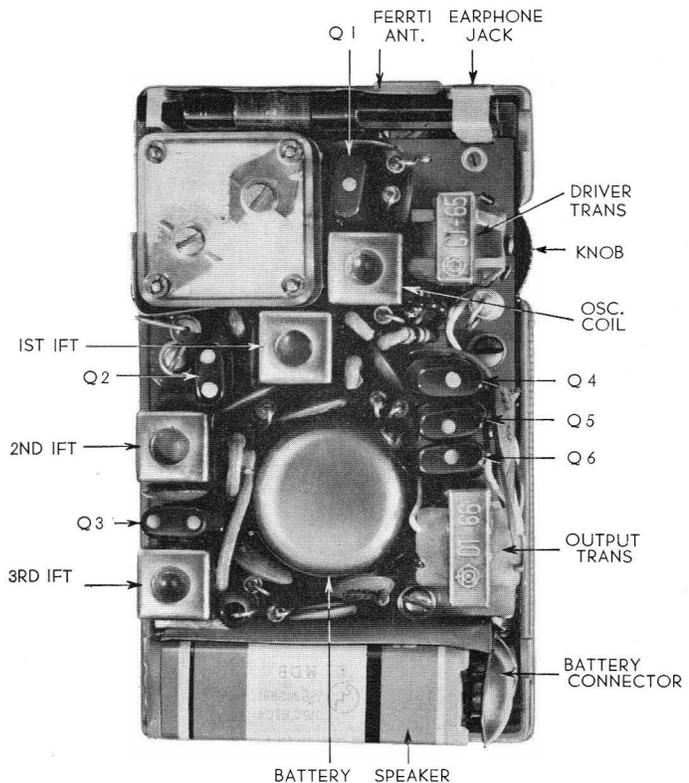
ALIGNMENT PROCEDURE

Connect an output meter across the voice coil terminals of the speaker and turn the receiver volume control to maximum.

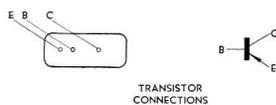
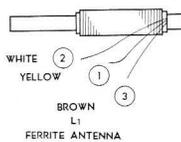
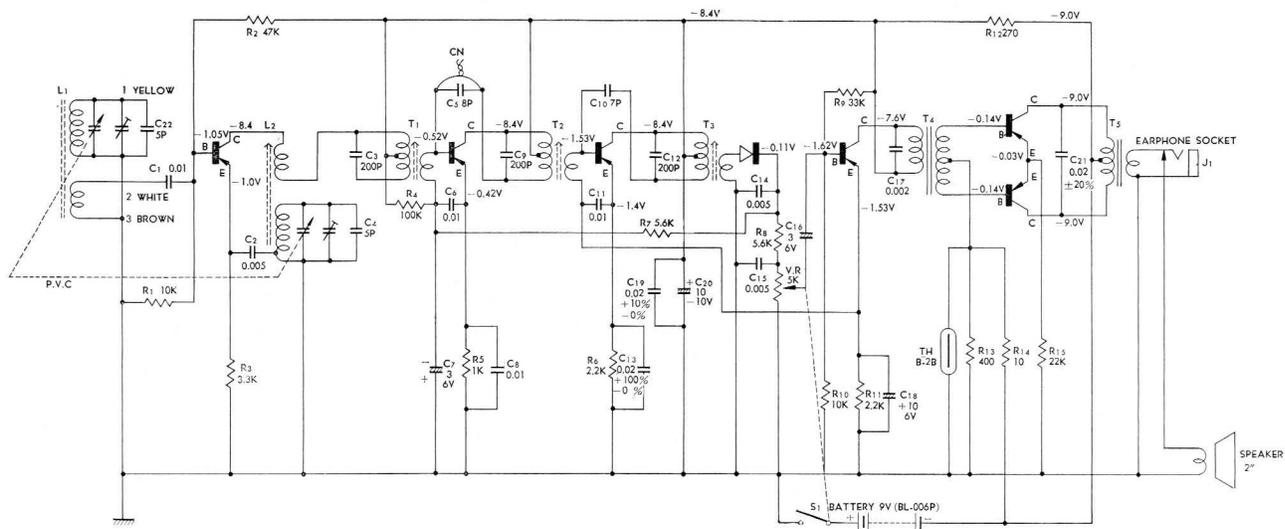
For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid A.G.C. action.

Step	Connect high side of S.G. to	S. G. output	Dial pointer setting	Adjust for Max. output
1	Connection lug of variable condenser terminal of oscillator	455 kc	Quiet point near 1,600 kc	IFT ₃ IFI ₂ IFT ₁
2		repeat	step 1	
3	Short wire placed near antenna for radiated signal	525 kc	Lowest frequency of dial scale	Dust core of oscillator coil L2
4		1,630 kc	Highest frequency of dial scale	Trimmer of oscillator variable condenser
5			Repeat 3 and 4	
6		650 kc	650 kc	Move antenna coil
7		1,300 kc	1,300 kc	Trimmer of antenna variable condenser

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CONV.	1ST. I.F.	2ND. I.F.	DETECTOR DIODE	A.F. AMP.	OUT PUT
TR ₁ HJ 23	TR ₂ HJ 22	TR ₃ HJ 22	IN 34 A	TR ₄ HJ 15	TR _{5,6} HJ 17x2



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Item No.	Symbol No.	Stock No.	Description
1			Cabinet Assembly
2			Tuning Dial
3		710737	Volume Control Knob
4		620714	2 inch Speaker
5			Speaker Clamp
6	J ₁		Earphone Jack
7			Battery Cable Plug
8	L ₁	380724	Ferrite Core Antenna
9			Supporter for Antenna
10			Supporter Clamp
11	V C	273718	Variable Capacitor
12			Rubber Bushing
13	L ₂	370718	Oscillator coil
14	T ₁	420715	I. F. Transformer (A)
15	T ₂	420716	I. F. Transformer (B)
16	T ₃	420717	I. F. Transformer (C)
17	T ₄	480705	Driver Transformer
18	T ₅	490709	Output Transformer
19	T R ₁	530704	Transistor HJ-23
20	T R ₂ T R ₃	530703	Transistor HJ-22
21	T R ₄	530701	Transistor HJ-15
22	T R ₅ T R ₆	530702	Transistor HJ-17
23	G D	550701	Germanium Diode 1N34A
24	T H	560701	Thermistor B-2B
25	V R	132719	Volume Control (with Switch)
26	R ₁ R ₁₀ R ₁₄	141701	Solid Resistor 10 Kohm
27	R ₂	141707	Solid Resistor 47 Kohm
28	R ₉		Solid Resistor 33 Kohm
29	R ₄		Solid Resistor 100 Kohm
30	R ₆ R ₁₁	941703	Solid Resistor 2.2 Kohm
31	R ₁₂	141711	Solid Resistor 270 Kohm
32	R ₇ R ₈	141705	Solid Resistor 5.6 Kohm
33	R ₅	141706	Solid Resistor 1 Kohm
34	R ₃		Solid Resistor 3.3 Kohm
35	R ₁₃		Solid Resistor 400 Kohm
36	R ₁₅		Solid Resistor 22 Kohm
37	C ₁₃ C ₁₇	254002	Ceramic Capacitor KD-10 0.002F
38	C ₂ C ₁₄ C ₁₅	254702	Do. ULD-10 0.005 μF
39	C ₁ C ₆ C ₈ C ₁₁	255704	Do. ULD-12 0.01 μF
40	C ₁₃ C ₁₉	255703	Do. ULD-15 0.02 μF (+100-0)
41	C ₂₁	255705	Do. ULD-15 0.02 μF (±20)
42	C ₇	267703	Electro-Chemical Capacitor 3F
43	C ₁₈	268708	Do. 10 μF (A)
44	C ₁₆	268709	Do. 10 μF (B)
45	C ₄ C ₂₂	231004	Ceramic Capacitor S-26 5 PF
46	C ₃ C ₉ C ₁₂	233702	Do. S-32 200 PF
47	C ₁₀	231005	Do. S-26 7 PF
48	C ₅ C ₂₀	232001	Do. S-26 10 PF
49		632729	Magnetic Earphone
50			Packaging