

# FM-AM 10-TRANSISTOR PORTABLE RADIO MODEL KH-1006L SERVICE MANUAL

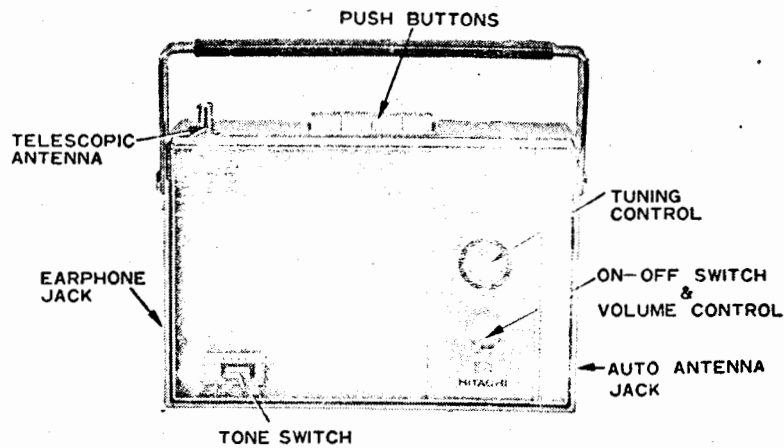
No. 161

1968

## SPECIFICATIONS

CIRCUIT SYSTEM.....10-Transistor Superheterodyne	1N60.....FM Limiter
TUNING RANGE.....FM:86.5~108MHz	1N60x2.....FM Discriminator
MW:530~1,605KHz	1N34A.....AM Det. & A. G. C.
LW:150~300KHz	
INTERMEDIATE FREQUENCY.....FM 10.7MHz	VARISTOR
AM 455KHz	HV 23x2.....Voltage Compensator
TRANSISTOR COMPONENT	THERMISTOR
2SC535.....FM R.F. Amp.	D 1E.....Temperature Compensator
2SC535.....FM Converter	POWER OUTPUT.....800mW (Maximum)
2SC460.....FM I.F. Amp. & AM Converter	600mW (Undistorted)
2SC460.....FM I.F. Amp. & AM I.F. Amp.	LOUDSPEAKER.....4" P. M.
2SC460.....FM I.F. Amp. & AM I.F. Amp.	POWER SUPPLY.....DC:6Volts
2SB 77.....Line Filter	(JIS"UM 2"x4,"C"x4 or equivalent)
2SC458.....1st A.F. Amp.	EARPHONE JACK.....One. Hitachi dynamic earphone
2SB 77.....2nd A.F. Amp.	EL-216 is provided.
2SB156x2.....Push-Pull Power Amp.	ANTENNA.....AM ferrite core antenna,
GERMANIUM DIODE	FM swivel telescopic antenna
IN60.....FM Stability	built-in.
1S85.....FM Automatic Frequency Control	AUTO ANTENNA JACK...One. (Usable this radio as a car
1N60.....AM A.G.C.	radio.)
	DIMENSIONS.....6 $\frac{5}{16}$ " (16cm) High, 9 $\frac{1}{2}$ " (24.2cm)
	Wide, 2 $\frac{5}{8}$ " (6.6cm) Deep.
	WEIGHT.....2.9 lbs (1.3kg) with batteries

**NAME OF THE PARTS**



**DISASSEMBLY**

**HOW TO REMOVE THE PRINTED CIRCUIT BOARD**

After taking out the battery case, pull out the two knobs (TUNING CONTROL, ON-OFF SWITCH & VOLUME CONTROL).

Remove two studs and five screws shown in Fig. 1.

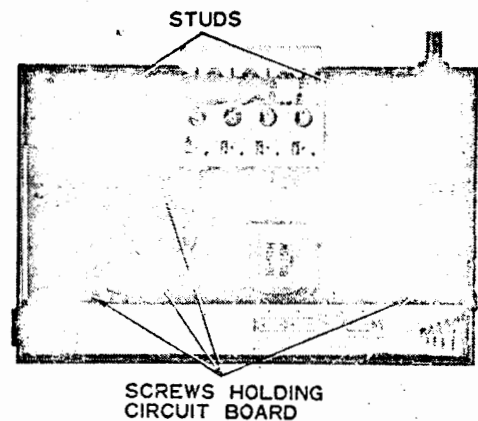


Fig. 1

**HOW TO LOOP THE DIAL CORD**

After taking out the chassis, move the dial pointer to the low frequency by tuning knob. Refer to Fig. 2.

- 1) Cut the dial cord to 25 $\frac{3}{8}$ ".
- 2) Turn the tuning shaft fully counterclockwise and set

the knotted section of dial pulley shown in Fig. 2.

- 3) Loop the dial cord according to each arrow's direction as shown in Fig. 2.
- 4) After the dial pointer to punched position on the rail and fix it to the dial cord.

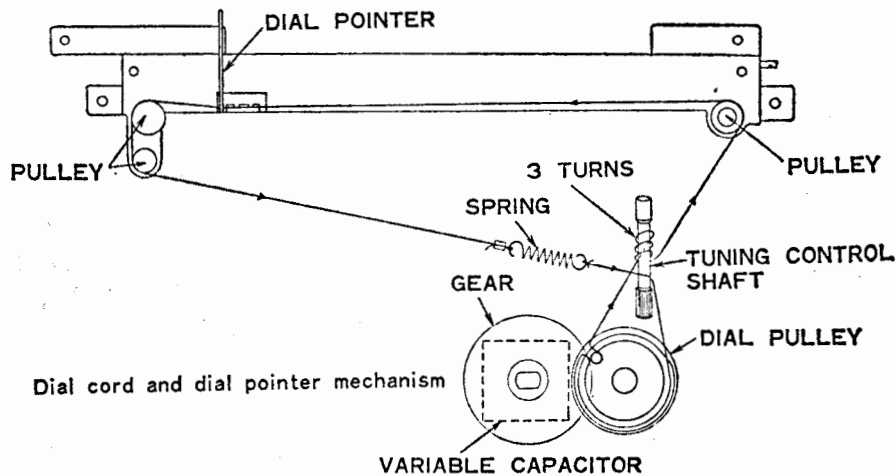


Fig. 2

ALIGNMENT PROCEDURE

1. Use batteries having the specified voltage. Voltage, when the switch is turned on (with no signal), must not be less than 5.5 volts.
2. After turning the volume control to maximum, connect the output of the signal generator (modulated to 400HZ or 1000HZ) to loop antenna (4" in diameter, looped 2 or 3 rounds), connect the loop antenna to the ferrite core antenna and the earth terminal of the signal generator to the receiver chassis.

And connect the voltmeter (AC 3V or less range) with the speaker terminals. In case of FM-RF alignment, connect the output of signal generator to telescopic antenna using to such a dummy antenna Fig. 3.

3. Adjust with insulated screw driver to prevent bodyeffect.
4. The order of adjustment is shown as below. In proportion to adjustment the reading of voltmeter rises. Therefore, adjust so that the oscillator's output may not exceed 3V at maximum.

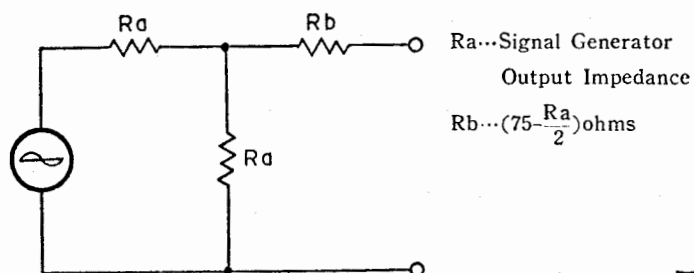


Fig. 3

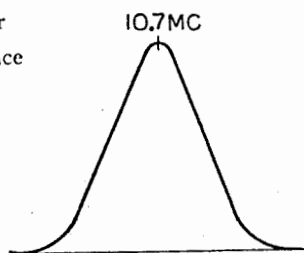


Fig. 4

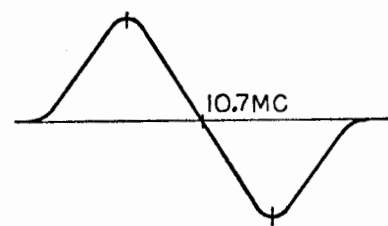
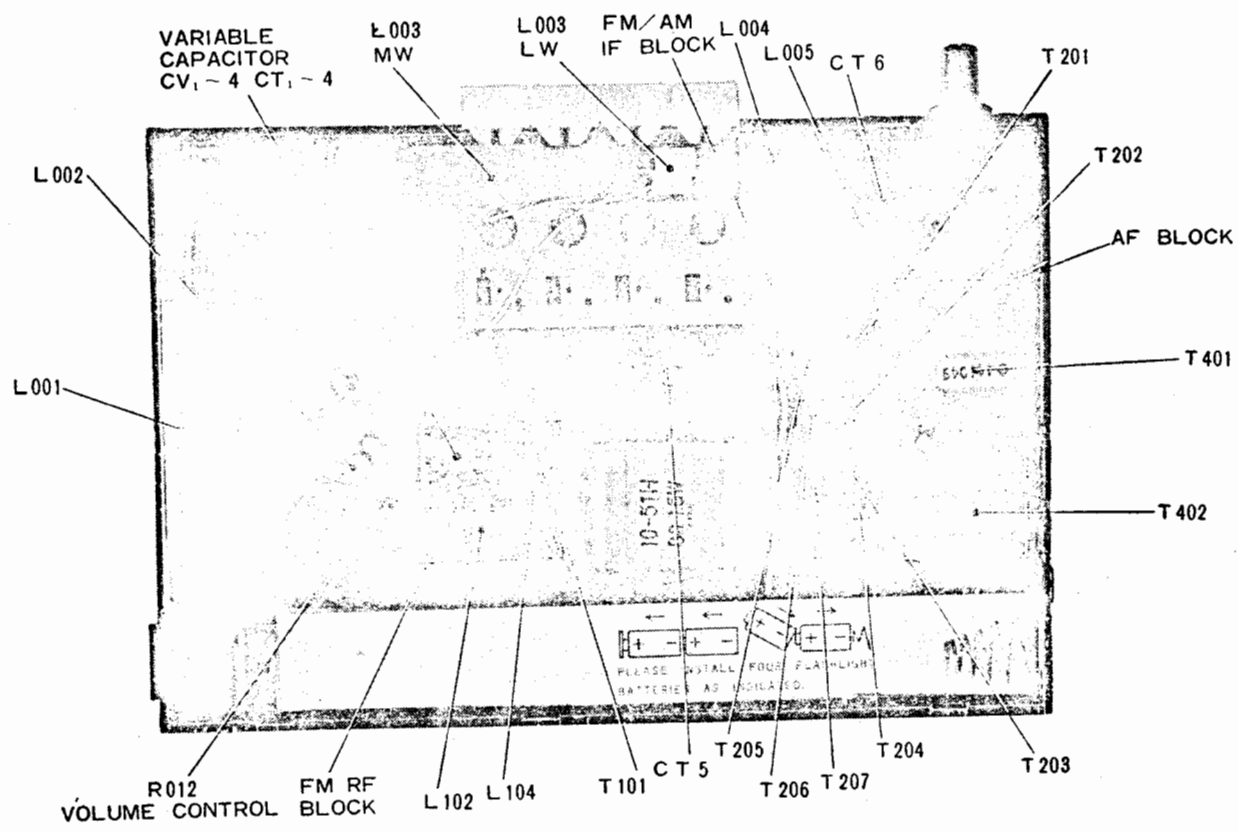


Fig. 5

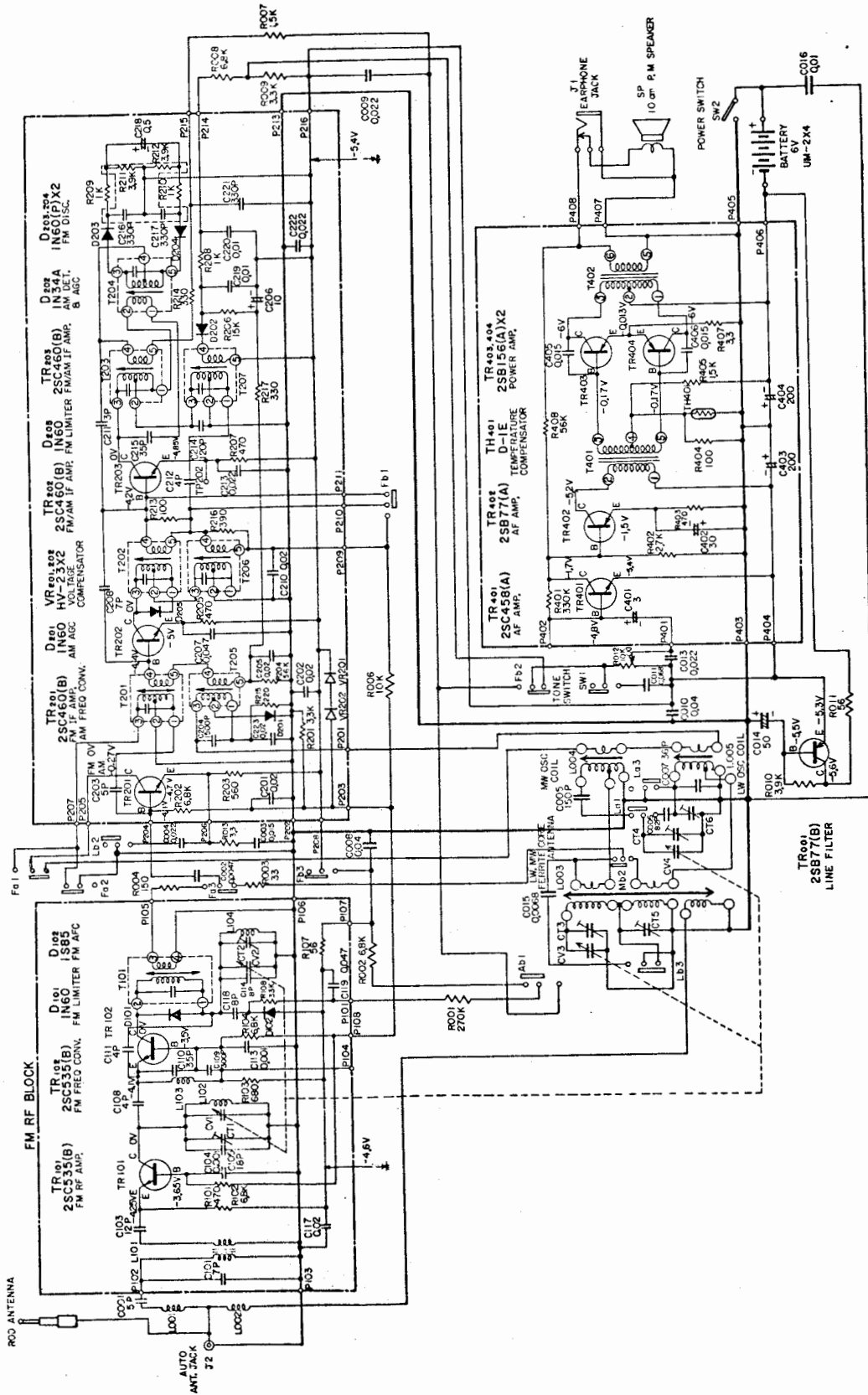
Adjusted circuit	Using meter and connecting points	step	Dial Pointer setting	Signal Generator Frequency	Adjust for Max. Output
FM-IF	OSCILLOSCOPE.....Connect VERT. Terminal of oscilloscope to P215. SWEEP GENERATOR.....Connect to P104. Be sure to cut off direct current by putting suitable capacitor between sweep generator and P104. Then, adjust as follows until the waveform shown in Fig.4 is obtained.	(1)	High frequency end	10.7MHz±1MHz sweep	Remove T204 core and adjust T203 T202 T201 T101
FM-DISC	OSCILLOSCOPE ..... Connect to P215. SWEEP GENERATOR.....same as FM-IF MARKER GENERATOR ..... same as FM-IF Then, adjust as follows until the waveform shown in Fig. 5 is obtained.	(2)	High frequency end	10.7MHz±1MHz sweep	T204 core for waveform centered at 10.7MHz maker T204 core until waveform maximum and minimum points are at the same distance from horizontal line as figured in Fig.5, and maximum and minimum points and 10.7MHz point on waveform are on a straight line.
AM-IF	SIGNAL GENERATOR ..... Connect output terminal of AM signal generator to loop antenna. VACUUM TUBE VOLTMETER..... Connect AC probe of vacuum tube voltmeter to speaker terminals. Adjust as follows to gain maximum on voltmeter.	(3) (4) (5) (6)	High frequency end	455KHz	T207 T206 T205 Repeat steps (3), (4) and (5)
FM-RF	SIGNAL GENERATOR ..... Connect output terminal of FM signal generator to rod antenna. VACUUM TUBE VOLTMETER Same as in AM-IF circuit alignment. Adjust as follows to gain maximum on voltmeter.	(7) (8) (9) (10) (11) (12)	Low frequency end High frequency end 90MHz signal 105MHz signal	85.0MHz 110.5MHz 90MHz 105MHz	L104 CT2 Repeat steps (7) and (8) L102 CT1 Repeat steps (10) and (11)
MW-RF	Same as in AM-IF circuit alignment. Adjust as follows to gain maximum on voltmeter.	(13) (14) (15) (16) (17) (18)	Low frequency end High frequency end 600KHz signal 1,400KHz signal	515KHz 1,670KHz 600KHz 1,400KHz	L004 CT4 Repeat steps (13) and (14) L003 MW Ant. Coil CT3 Repeat steps (16) and (17)
LW-RF	Same as in AM-IF circuit alignment. Adjust as follows to gain maximum on voltmeter.	(19) (20) (21) (22) (23) (24)	Low frequency end High frequency end 160KHz signal 280KHz signal	145KHz 310KHz 160KHz 280KHz	L005 CT6 Repeat steps (19) and (20) L003 LW Ant. Coil CT5 Repeat steps (22) and (23)

# MODEL KH-1006L SERVICE MANUAL

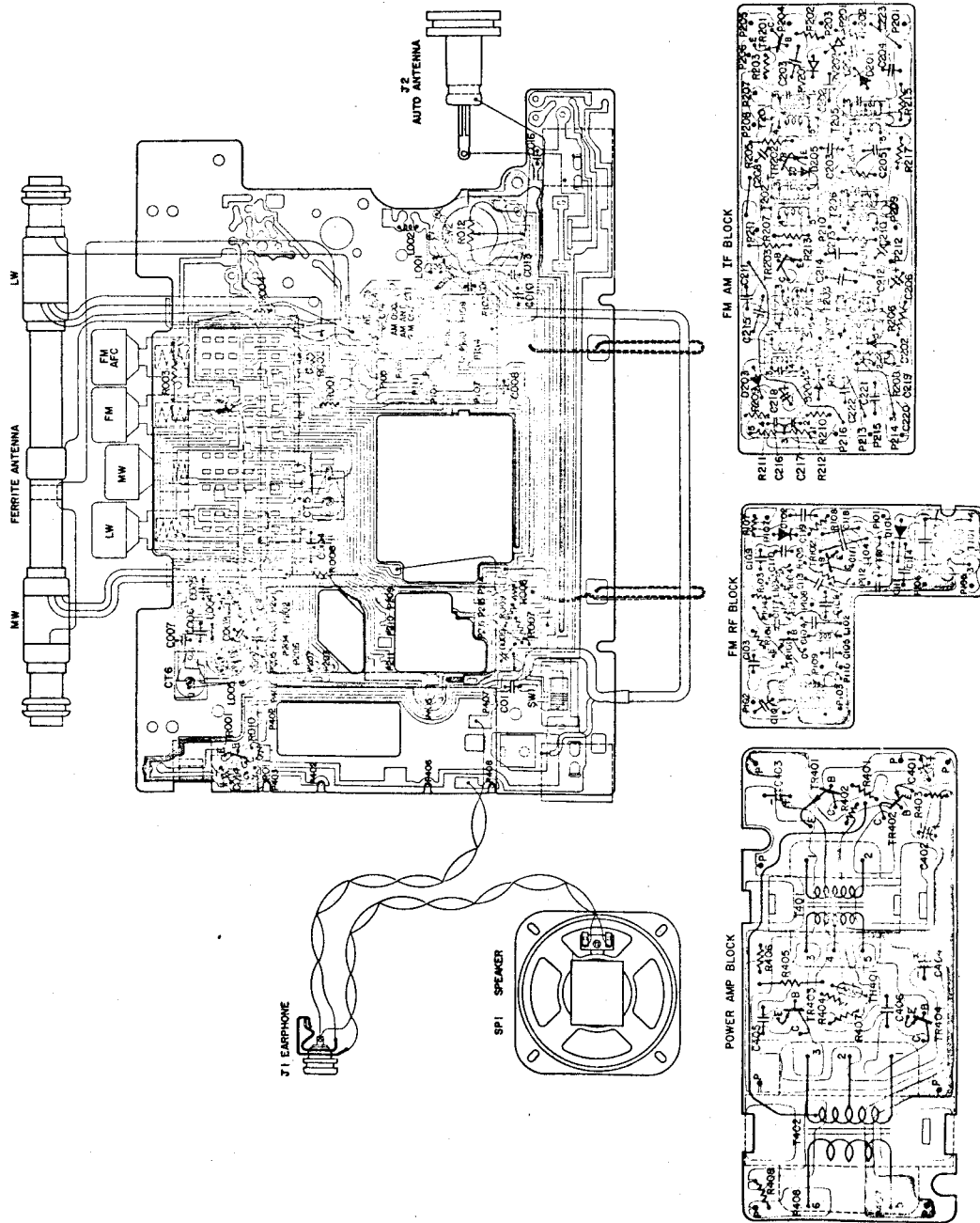
## INTERNAL VIEW



CIRCUIT DIAGRAM



CIRCUIT BOARD DIAGRAM



# MODEL KH-1006L SERVICE MANUAL

## REPLACEMENT PARTS

Symbol No.	Stock No.	Description		Symbol No.	Stock No.	Description	
<b>CAPACITORS:</b>							
C001	0248645	Ceramic, discal	5pF ± 0.5pF	R211	—	C-R pack	
C002	0274115	Mylar	0.0047 μF ± 20%	R212	—		3.9kΩ ± 10% × 2
C003	0275112	Mylar	0.015 μF ± 20%	R213	0137801	Carbon film	
C004	0275113	Mylar	0.022 μF ± 20%	R214	0114447	Carbon film	
C005	0233021	Ceramic, cylindrical	150pF ± 5%	R215	0137805	Carbon film	
C006	0248682	Ceramic, discal	82pF ± 5%	R216	0117101	Carbon film	
C007	0248673	Ceramic, discal	36pF ± 5%	R217	0137807	Carbon film	
C008	0245019	Ceramic, discal	0.04 μF ± 80%	R401	0137957	Carbon film	
C009	0275113	Same as C004	0.068 μF ± 20%	R402	0137856	Carbon film	
C010	0245019	Same as C008		6WV	R403	0137809	Carbon film
C011	0275116	Mylar			R404	0137801	Carbon film
C013	0275113	Same as C004	50 μF	R405	0137853	Carbon film	
C014	0252225	Electrolytic		0.0068 μF ± 20%	R406	0137768	Carbon film
C015	0274116	Mylar	0.01 μF ± 80%		R407	0131597	Composition
C016	0245017	Ceramic, discal	4pF ± 0.5pF	R408	0137910	Carbon film	
C208	0248644	Ceramic, discal	7pF ± 0.5pF		0599223	C-R pack	
C101	0248647	Ceramic, discal	12pF ± 10%		0186003	C-R pack	
C103	0248702	Ceramic, discal	0.001 μF ± 80%	<b>TRANSISTORS:</b>			
C104	0244016	Ceramic, discal	18pF ± 5%	TR001	0573114	2SB77(B)	
C105	0242834	Ceramic, discal	4pF ± 0.5pF	TR101	0573510	2SC535(B)	
C108	0248644	Ceramic, discal	35pF ± 5%	TR102	0573510	Same as TR101	
C109	0233006	Ceramic, cylindrical	300pF ± 10%	TR201	0573486	2SC460(B)	
C110	0242004	Ceramic, discal	4pF ± 0.5pF	TR202	0573486	Same as TR201	
C111	0241868	Ceramic, discal	8pF ± 0.5pF	TR401	0573479	2SC458(A)	
C113	0244016	Same as C104	0.02 μF ± 80%	TR402	0573103	2SB77(A)	
C114	0248648	Ceramic, discal		0.02 μF ± 20%	TR403	0573011	2SB156(A)P
C117	0245018	Ceramic, discal	0.047 μF ± 20%	TR404	0573011	2SB156(A)P	
C118	0248648	Same as C114	0.02 μF ± 80%	D 101	0575005	Diode	
C119	0275115	Mylar		0.047 μF ± 20%	D 102	0575024	Diode
C201	0245018	Ceramic	5pF ± 0.5pF	D 201	0575005	Diode	
C202	0245018	Same as C201	1500pF ± 5%	D 202	0575001	Diode	
C203	0248645	Ceramic	10 μF	D 203	0575019	Diode	
C204	0221128	Styrol	0.047 μF ± 20%	D 204		Diode	
C205	0245018	Same as C201	7pF ± 0.5pF	D 205	0575005	Same as D201	
C206	0252221	Electrolytic	3pF ± 0.5pF	VR201	0576054	Varistor	
C207	0275115	Mylar	4pF ± 0.5pF	VR202	0576054	Same as VR201	
C208	0248647	Ceramic	0.01 μF ± 80%	TH401	0576044	Thermistor	
C210	0245018	Same as C201	0.01 μF ± 20%	<b>TRANSFORMERS:</b>			
C211	0248643	Ceramic	330pF ± 10%	T 101	0322327	FM, IF	
C212	0248644	Ceramic	3pF ± 0.5pF	T 201	0322339	FM, IF	
C213	0275113	Mylar	4pF ± 0.5pF	T 202	0322340	FM, IF	
C214	0248726	Ceramic	0.022 μF ± 20%	T 203	0326029	Discriminator	
C215	0242004	Ceramic	120pF ± 10%	T 204	0326024	Discriminator	
C216	—	C-R pack	35pF ± 5%	T 205	0322144	AM, IF	
C217	—		330pF ± 20% × 2	T 206	0322145	AM, IF	
C218	0257040	Electrolytic	0.5 μF ± 20%	T 207	0322130	AM, IF	
C219	—	C-R pack	0.01 μF ± 80%	T 401	0441049	Driver	
C220	—		330pF ± 10%	T 402	0452024	Output	
C221	0243004	Ceramic	3 μF	<b>COILS:</b>			
C222	0275113	Same as C213	30 μF	L 001	0324003	Choke coil for FM	
C223	0245018	Same as C201	200 μF	L 002	0333100	Choke coil	
C401	0252313	Electrolytic	0.015 μF ± 20%	L 003	5112073	MW, LW ferrite antenna	
C402	0252223	Electrolytic	6WV	L 004	0319651	Oscillator coil for MW	
C403	0252232	Electrolytic		6WV	L 005	0319652	Oscillator coil for LW
C404	0252232	Same as C403	0.015 μF ± 20%	L 101	0318519	FM antenna	
C405	0275112	Mylar		10WV	L 102	0318536	FM RF
C406	0275112	Same as C405	6WV		L 103	0324003	FM trap
<b>RESISTORS:</b>				<b>MISCELLANEOUS:</b>			
R001	0137956	Carbon film	270kΩ ± 10%	0592052 for final assembly			
R002	0137861	Carbon film	6.8kΩ ± 10%				Earphone—magnetic earphone Stud (28) (2 req'd)
R003	0131622	Composition	33Ω ± 20%	Screw—3mm φ × 8mm binding screw (2 req'd) for rear case mounting			
R004	0137803	Carbon film	150Ω ± 10%				Washer—3mm φ washer (2 req'd) for printed circuit board
R006	0131745	Composition	10kΩ ± 20%	Screw—3mm φ × 6mm tapping screw (4 req'd) for front case mounting			
R007	0130193	Composition	1.5kΩ ± 10%				0015085 Knob—knob for tuning
R008	0137861	Same as R002	3.3kΩ ± 10%	0015084 Knob—knob for volume			
R009	0137857	Carbon film					3.9kΩ ± 10%
R010	0137858	Carbon film	56Ω ± 10%	7660042 Washer—washer for knob			
R011	0137768	Carbon film	10kΩ (X)				for Case assembly
R012	0153618	Variable	33Ω ± 10%	0681380 Case assembly			
R013	0137753	Carbon film	680Ω ± 10%				0619248 Knob—tone control knob
R015	0137811	Carbon film	470Ω ± 10%	5410072 Speaker			
R101	0117309	Carbon film	6.8kΩ ± 10%				0681115 Holder—speaker holder
R102	0117361	Carbon film	680Ω ± 10%	Screw—3mm φ × 6mm tapping screw (2 req'd)			
R103	0117311	Carbon film	56Ω ± 10%				0543179 Jack—earphone jack
R104	0117361	Same as R102	33kΩ ± 10%	0543228 jack—car antenna jack			
R107	0117268	Carbon film	3.3kΩ ± 10%				6310193 Handle
R108	0117407	Carbon film	6.8kΩ ± 10%	0680346 Shaft—handle shaft (2 req'd)			
R201	0137857	Carbon film	56Ω ± 5%				0680347 Spring—handle spring
R202	0137861	Carbon film	56kΩ ± 10%	0680348 Washer—handle washer (2 req'd)			
R203	0137569	Carbon film	470Ω ± 5%				
R204	0137910	Carbon film	15kΩ ± 10%				
R205	0114147	Carbon film	1kΩ ± 20%				
R206	0137903	Carbon film	1kΩ ± 10%				
R207	0114147	Same as R205					
R208	—	C-R pack					
R209	0137851	Carbon film					
R210	0137851	Same as R209					

REPLACEMENT PARTS

Symbol No.	Stock No.	Description	Symbol No.	Stock No.	Description
	0015539	Cover—battery cover for Chassis assembly			Screw—2.6mm $\phi$ $\times$ 6mm pan head screw } Screw—2.6mm $\phi$ $\times$ 8mm pan head screw } for antenna mounting
	0924836	Pointer			
	0662001	Spring (A)	5112073		Antenna—ferrite core antenna
	0666058	Bracket—dial bracket	0638351		Wedge— for ferrite antenna
		Screw—2.6mm $\phi$ $\times$ 6mm pan head screw } Nut—2.6mm $\phi$ nut } (2 req'd) for printed circuit board mounting	0644102		Antenna—rod antenna
		Washer—3mm $\phi$ washer (2 req'd)			Screw—3mm $\phi$ $\times$ 6mm pan head screw } (2 req'd)
		Screw—3mm $\phi$ $\times$ 4mm pan head screw			Washer—3mm $\phi$ locking washer } (2 req'd)
		Screw—2.6mm $\phi$ $\times$ 4mm pan head screw	0533172		Switch—push button switch
CV1~4	0282091	Plastic film variable capacitor	0532162		Switch—slide switch
		(includes trimmer capacitor (CT1~4))			Screw—3mm $\phi$ $\times$ 8mm pan head screw } for antenna holder mounting
CT5.6	0283103	Trimmer capacitor			Screw—3mm $\phi$ $\times$ 5mm $\phi$ pan head screw } for push button, antenna holder mounting
	0924628	Terminal assembly			Washer—3mm $\phi$ locking washer
	0924630	Terminal			
	0924835	Holder—antenna holder			
	0930042	Holder—antenna holder			



Head Office : 4,1 chome, Marunouchi, Chiyoda ku, Tokyo  
Tel. Tokyo (212) 1111 (80lines)  
Cable Address: "HITACHY" TOKYO  
Code : All Codes Used

Printed in Japan