

Service Manual

Radio

FM-LW-MW-SW ALL BAND RECEIVER

RF-B65D



Color

(K) Black Type

Area

Country Code	Area	Color
(EG)	F.R. Germany	(K)
(G)	Asia, Latin America, Middle Near East, Africa and Oseania.	

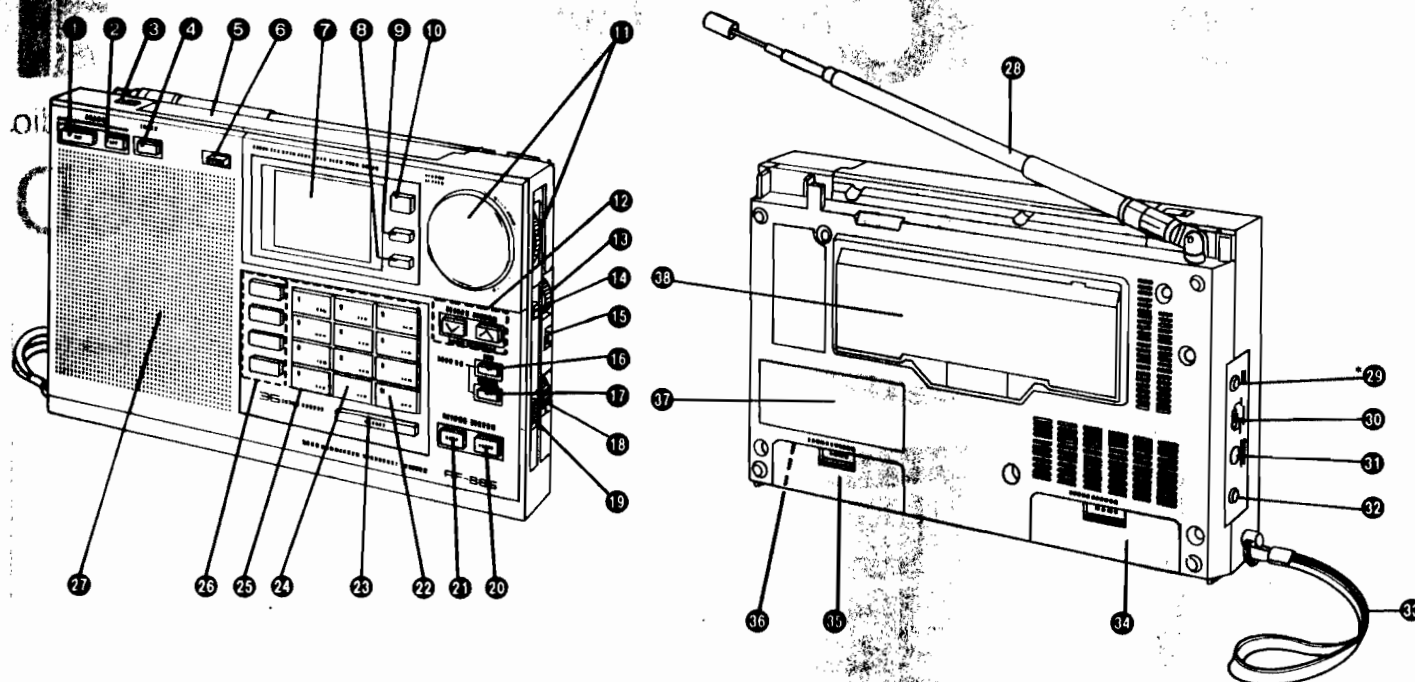
■ SPECIFICATIONS

Frequency Range:	FM; 87.5~108 MHz LW; 153~519 kHz MW; 522~1611 kHz (at 9 kHz step) 520~1610 kHz (at 10 kHz step) SW; 1,615~29,999 kHz For (G) area 1,615~26.1 kHz For (EG) area
Intermediate Frequency:	FM; 10.7 MHz AM 1st; 55,843 MHz AM 2nd; 450 kHz For (G) area 459 kHz For (EG) area
Sensitivity:	FM; 4 μ V/50 mW output (-3 dB Limit Sens.) LW; 500 mV/m/50 mW output MW; 300 μ V/50 mW output SW; 16 μ V/50 mW output
Power Source:	Battery; 6 V (four UM-3 batteries for radio) 3 V (two UM-3 batteries for memory back-up) AC; with included AC adaptor 110~127/220~240 V, 50/60 Hz For (G) area 220 V, 50 Hz For (EG) area
Power Consumption:	5 W (with included AC adaptor)
Speaker:	8 cm PM dynamic speaker, 8 Ω
Power Output:	550 mW (RMS Max.)
Jacks:	Earphone; 8 Ω , ϕ 3.5 EXT. ANT. (LW/MW/SW); ϕ 3.5 DC IN; 6 V
Dimensions:	204.5 (W) $\times$ 119 (H) $\times$ 36.5 (D) mm
Weight:	625 g without batteries

Design and specifications are subject to change without notice.

National/Panasonic
Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

LOCATION OF CONTROLS AND COMPONENTS



- 1 Power On Key (ON)...(G)**
Operation On Key (ON)...(EG)
- 2 Power Off Key (OFF)...(G)**
Operation Off Key (Off)...(EG)
- 3 Station Reminder Open Switch**
Use the switch to open the Station Reminder cover.

- 4 Sleep Key (SLEEP)**
Press the key to turn the radio off automatically in 60 minutes.

- 5 Station Reminder (STATION REMINDER)**
Attach the included Memory Channel Sheets to the Station Reminder. It is useful for Memory Tuning.

- 6 AM Mode Selector (AM MODE)**
When receiving the SSB (Single Side-Band), set to "SSB". For others, set to "NORMAL".

- 7 LCD Multi-Information Display**

- 8 Time Set Key (TIME SET)**
Press the key when setting a clock time.

- 9 Dual Time Set Key (DUAL TIME)**
This unit enables the dual clock time besides the normal clock time to be set. Press the key when setting the dual clock time, or selecting the display of the normal or dual clock time.

- 10 Display Select Key (CLOCK/FREQ)**
Press the key to select the frequency display or the clock display.

- 11 Rotary Tuning Control (ROTARY TUNING)**

- 12 Up and Down Keys ($\vee \cdot \wedge$)**
Press the Up Key ($\wedge$) or Down Key ($\vee$) to make the frequency change up or down during Manual Tuning and Auto Scan Tuning. Or press to stop Auto Scan Tuning.

- 13 Fine Tuning Control (FINE TUNE)**
When receiving the SSB, use this control for more precise tuning.

- 14 Rotary Tuning Step Selector**
For Rotary Tuning, set the selector to "FAST" or "SLOW" to make the frequency change at your desired tuning steps. In "LOCK" position, Rotary Tuning cannot operate. So, the frequency being received will be locked, and cannot be drifted accidentally.

- 15 Tone Selector (TONE)**

- 16 Standby Time Set Key (SET)**
Press the key to set the time you want to turn the radio on automatically.

- 17 Standby Time Cancel Key (CANCEL)**
Press the key to cancel the standby time.

- 18 Volume Control (VOLUME)**

- 19 Hold Switch**
Usually set the switch to the opposite direction of the arrow. When it is set to the direction of the arrow, the operation of all the keys and the Rotary Tuning Control will be locked. It is effective during both the radio-on and off.

- 20 Meter Band Direct Access Key (METER)**
Press the key before calling the lowest frequency of the SW meter band including your desired station.

- 21 Frequency Direct Access Key (FREQ)**
When you know the frequency of your desired station, press the key before entering the frequency number.

- 22 Memory/Meter Band Key**
Use the key first when you preset the desired stations into each of the memory channels. This key also functions as the Meter Band Key, which can call the lowest frequency of a SW meter band.

- 23 Enter Key (ENTER)**
After entering the frequency number of your desired station or the number of a clock time, press the key to begin receiving the broadcast of the station or to complete the time setting.

- 24 Decimal Point/Meter Band Key**
For Frequency Direct Access Tuning, use the key to enter the decimal point of the frequency. This key also functions as the Meter Band Key.

25 Number/Memory Channel/Meter Band Keys

Press the keys in the following ways.

- In Frequency Direct Access Tuning, to enter the frequency number of your desired stations.
- In Memory Tuning, to preset and call the stations.
- In Meter Band Direct Access Tuning, to call the lowest frequency of a SW meter band.

26 Band Select Keys**27 Speaker (8 cm, 8Ω)*****28 External Antenna Jack (EXT ANT)**

*28 is not equipped with the model for F.R. Germany.

30 Sensitivity Selector (SENS)

Normally set to "DX". When the reception is impaired or interfered by powerful station, set to "LOCAL".
The selector cannot operate for FM reception.

31 DC Input Jack (DC IN 6 V $\ominus \oplus$)**32 Earphone Jack ($\odot$)**

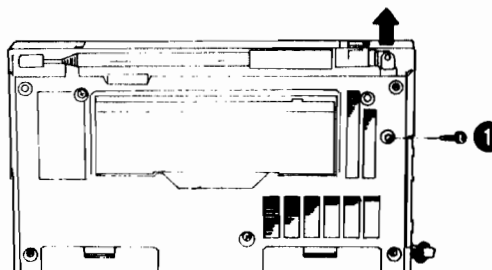
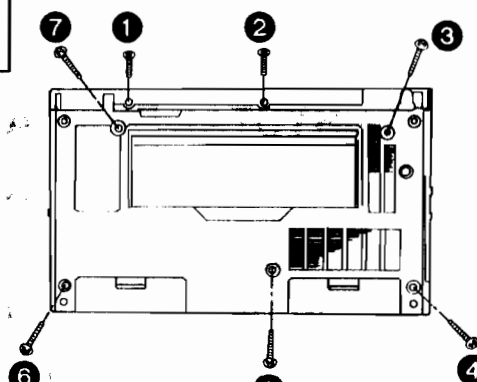
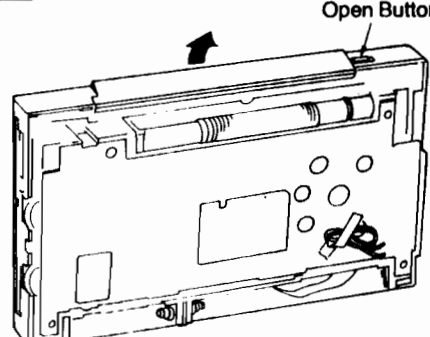
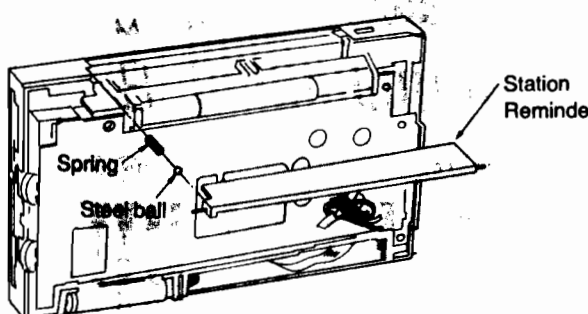
Connect the included earphone to the jack.
• Adjust the volume to lower level so as not to injure your ear.

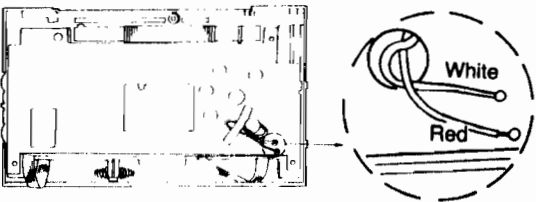
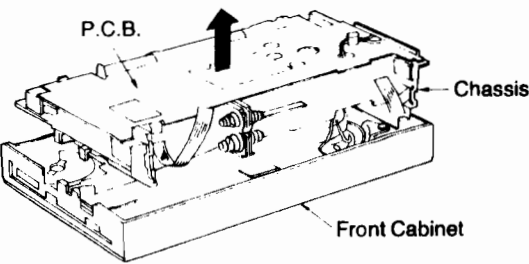
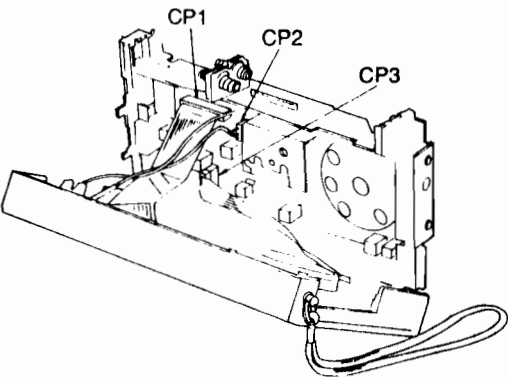
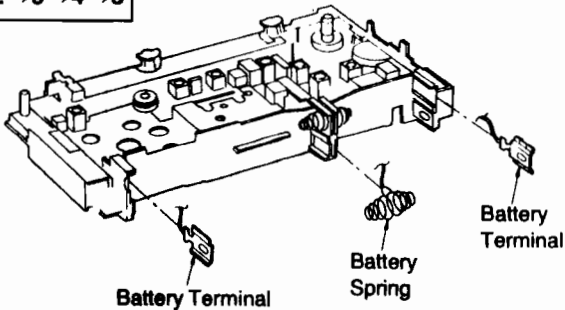
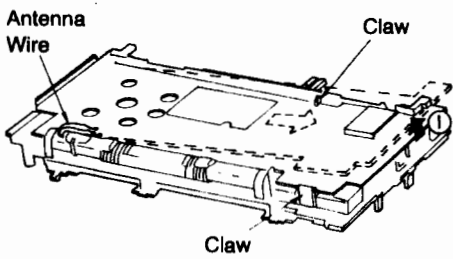
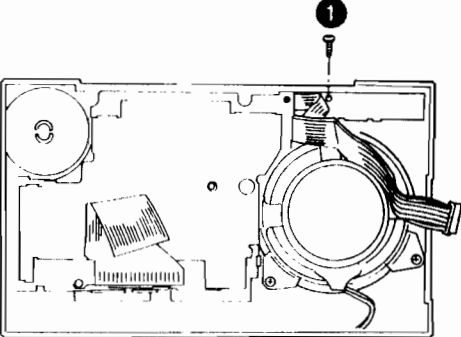
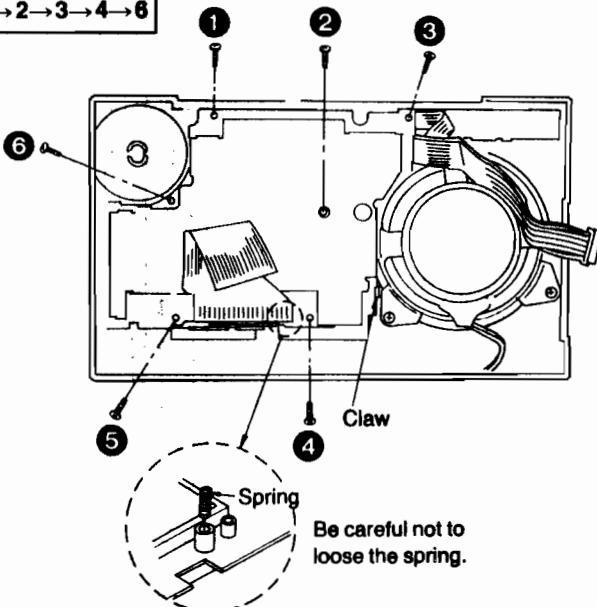
33 Carrying Strap**34 Radio Battery Compartment (RADIO BATTERY)****35 Memory Back-up Battery Compartment (BACK-UP BATTERY)****36 MW Frequency Step Selector (In the Memory Back-up Battery Compartment)**

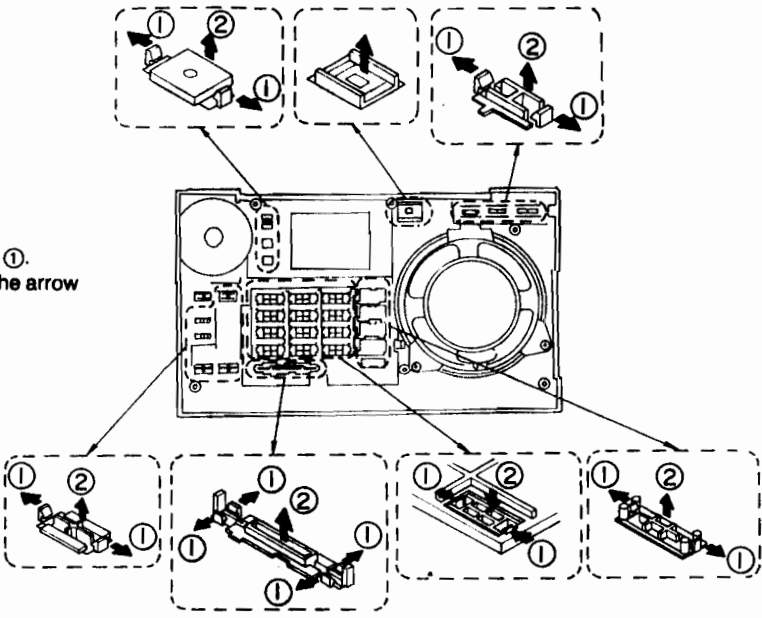
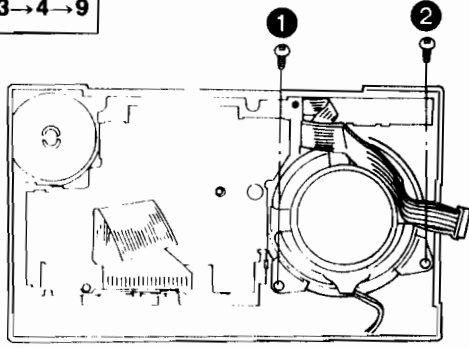
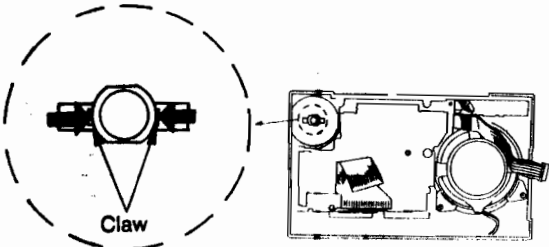
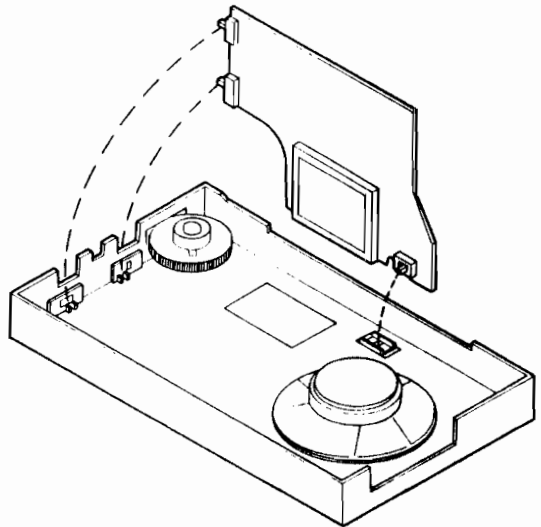
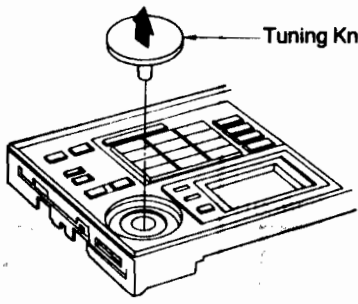
Before use, check that the selector is set to the frequency step corresponding to your area.
If not so, set the selector to the correct position.

37 World Time Table**38 Stand/Short Wave Frequency Allocation**

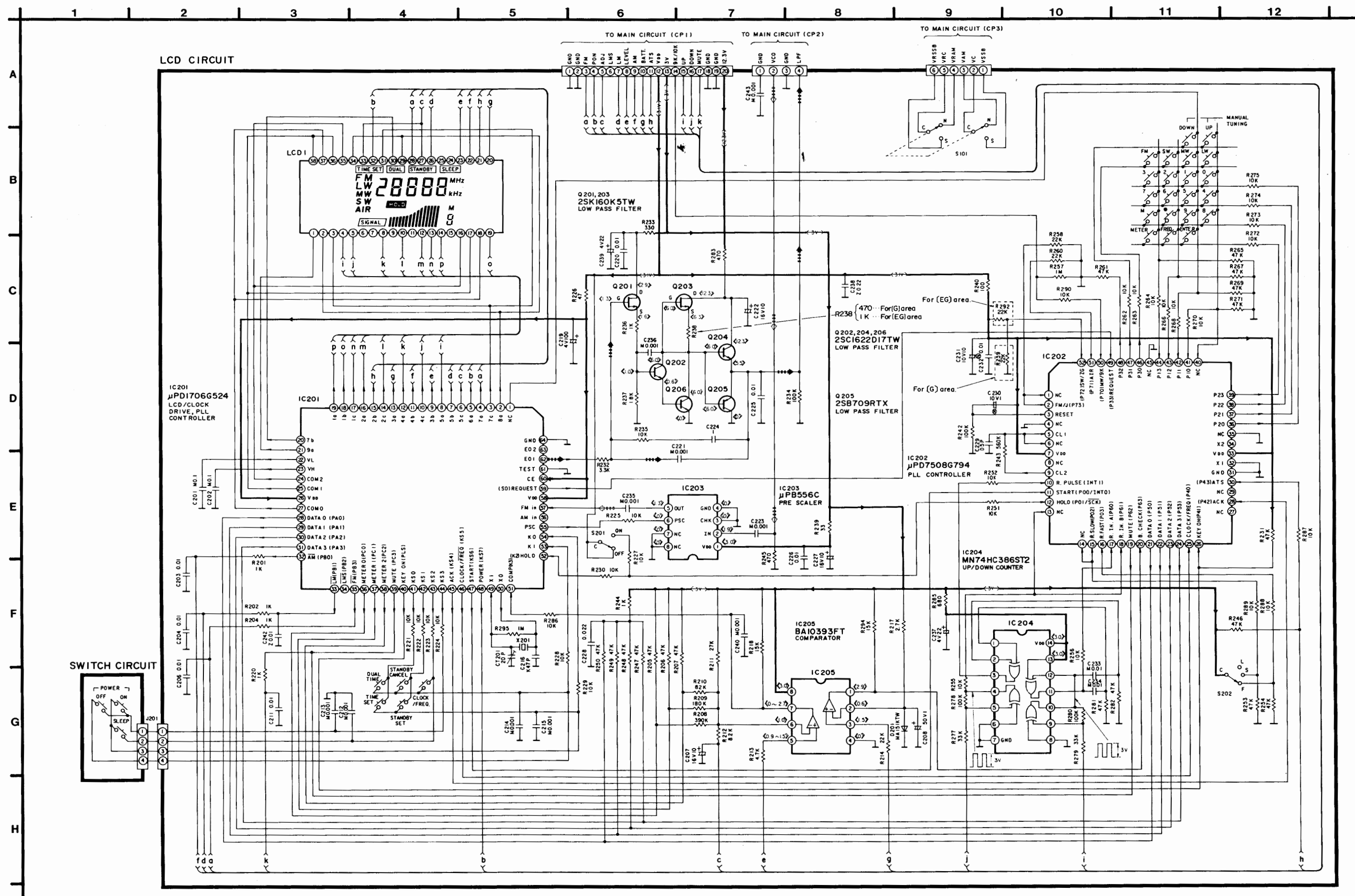
DISASSEMBLY INSTRUCTIONS

Ref. No. 1	Removal of the Telescopic Antenna	Ref. No. 2	Removal of the Rear Cabinet
Procedure 1	 1. Remove the screw ①. 2. Remove the Telescopic Antenna in the direction of the arrow.	 1. Remove the 2 screws (①, ②). 2. Remove the 5 screws (③~⑦).	
Ref. No. 3	Removal of the Station Reminder		
Procedure 1→2→3	 1. Open the Station Reminder.	 2. Remove the Station Reminder. Be careful not to loose the steel ball and the spring.	

Ref. No. 4 Procedure 1→2→3→4	Removal of the Chassis	Ref. No. 5 Procedure 1→2→3→4→5	Removal of the Main P.C.B.
 1. Remove the solder from speaker terminal.  2. Remove the chassis and P.C.B.  3. Remove the connector (CP1, CP2, CP3).		 1. Remove the 2 battery terminals and battery spring.  2. Remove the 2 claws and then remove the Main P.C.B. in the direction of the arrow.	
Ref. No. 7 Procedure 1→2→3→4→7	Removal of the Power Switch P.C.B.	Ref. No. 6 Procedure 1→2→3→4→6	Removal of the L.C.D. P.C.B.
 ●Remove the screw (1).			 1. Remove the 6 screws (1~6). 2. Remove the claw.

Ref. No. 8 Procedure 1→2→3→4→6 →8	Removal of the Buttons and Knobs	 1. Remove the claws in the direction of the arrow ①. 2. Remove the button or knob in the direction of the arrow ②.	
Ref. No. 9 Procedure 1→2→3→4→9	Removal of the Speaker	Ref. No. 10 Procedure 1→2→3→4→10	Removal of the Tuning Knob
	 ● Remove the 2 screws (①, ②).		 1. Remove the 2 claws in the direction of the arrow.
■ L.C.D. P.C.B. Assembly 		 2. Remove the Tuning Knob in the direction of the arrow.	

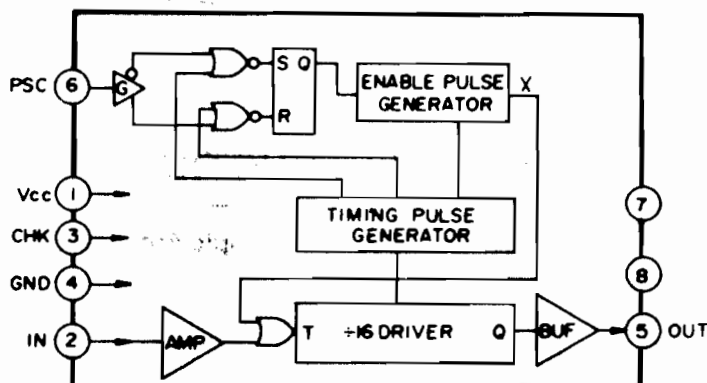
SCHEMATIC DIAGRAM (for LCD Circuit Section and Switch Circuit Section)



Notes:

1. S101: AM mode select switch in "NORMAL" position.
(N...NORMAL, S...SSB)
2. S201: Hold switch.
3. S202: Rotary tuning step select switch in "FAST" position.
(L...LOCK, S...SLOW, F...FAST)
4. DC voltage measurement are taken with electronics voltmeter from negative terminal of battery.
 << >> ...SW position
- The supply parts number is described alone in the replacement parts list.
- This schematic diagram may be modified at any time with the development of new technology.

IC203 RVIUPB556C



- ➔ +B Voltage Line
- ◻ FM, LW, MW, SW VCO In Line
- ◻ FM, LW, MW, SW Vcap Out Line

LIQUID CRYSTAL DISPLAY (LCD)

1) The LCD and IC201 are connected in the following way:

2) The common and segment terminals of the LCD are connected in the following way:

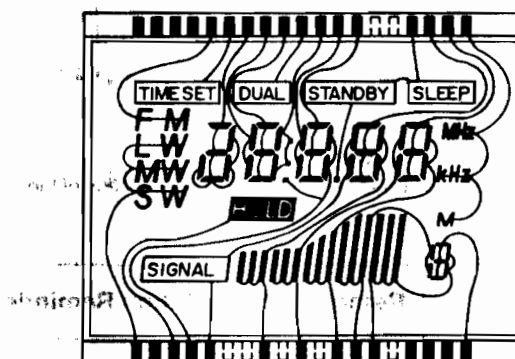
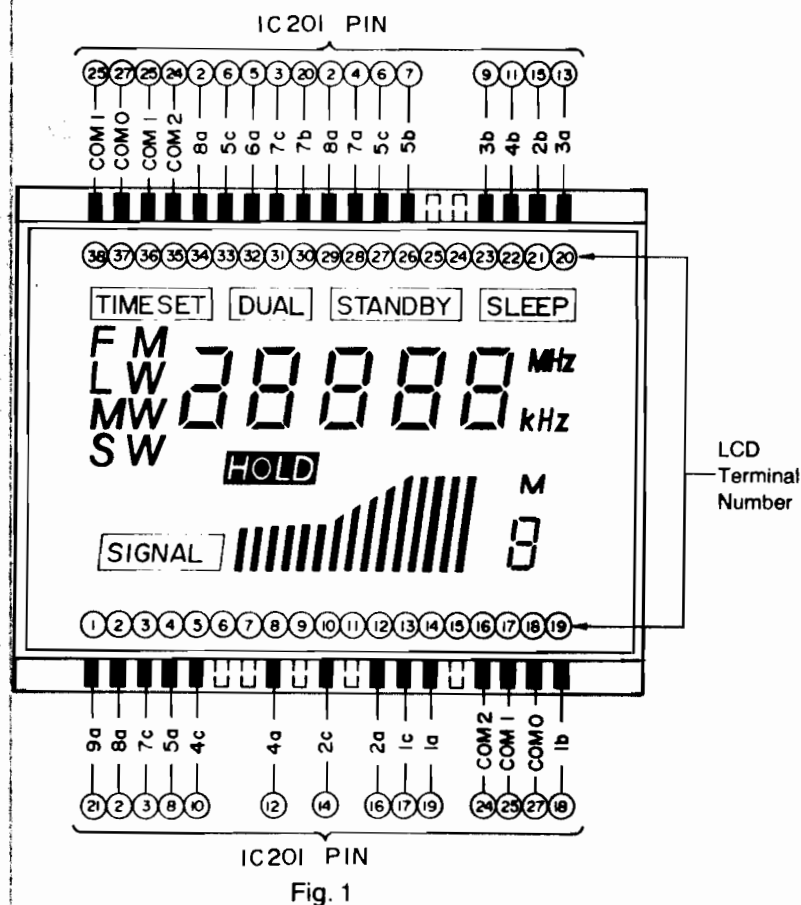


Fig. 2 (Segment)

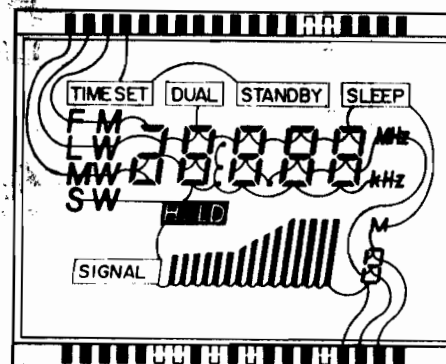


Fig. 3 (Common)



1. S1: Sensitivity select switch in "DX" position.
(L...LOCAL, D...DX)
2. S2: MW frequency step select switch in "9 kHz" position.
3. S3-1, S3-2: Tone select switch in "HIGH" position.
(H...HIGH, L...LOW)
4. S4: Rotary tuning switch.
5. VR1: Signal meter (SW) adjustment VR.
6. VR2: Signal meter (FM) adjustment VR.
7. VR4: Volume control VR.
8. VR5: Fine tuning control VR.
9. The mark () shows test point e.g. TP1 = test point 1.
10. DC voltage measurement are taken with electronics voltmeter from negative terminal of battery.
< >...FM position, ()...AM position, []...SSB, ...MUTING
11. Battery current No signal 52 mA (FM), 62 mA (MW)
Maximum output 171 mA (FM),
132 mA (MW)

- The supply parts number is described alone in the replacement parts list.
- This schematic diagram may be modified at any time with the development of new technology.

 +B Voltage Line

 LW, MW, SW Signal Line

⇒ Main Signal Line

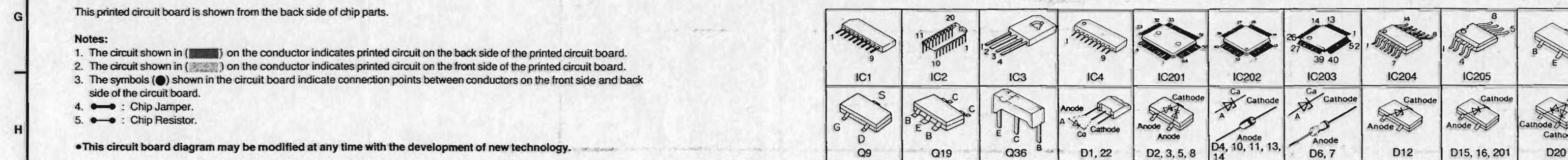
000➡ FM, LW, MW, SW VCO Out Line

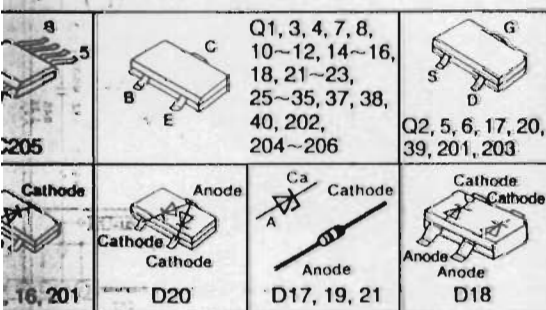
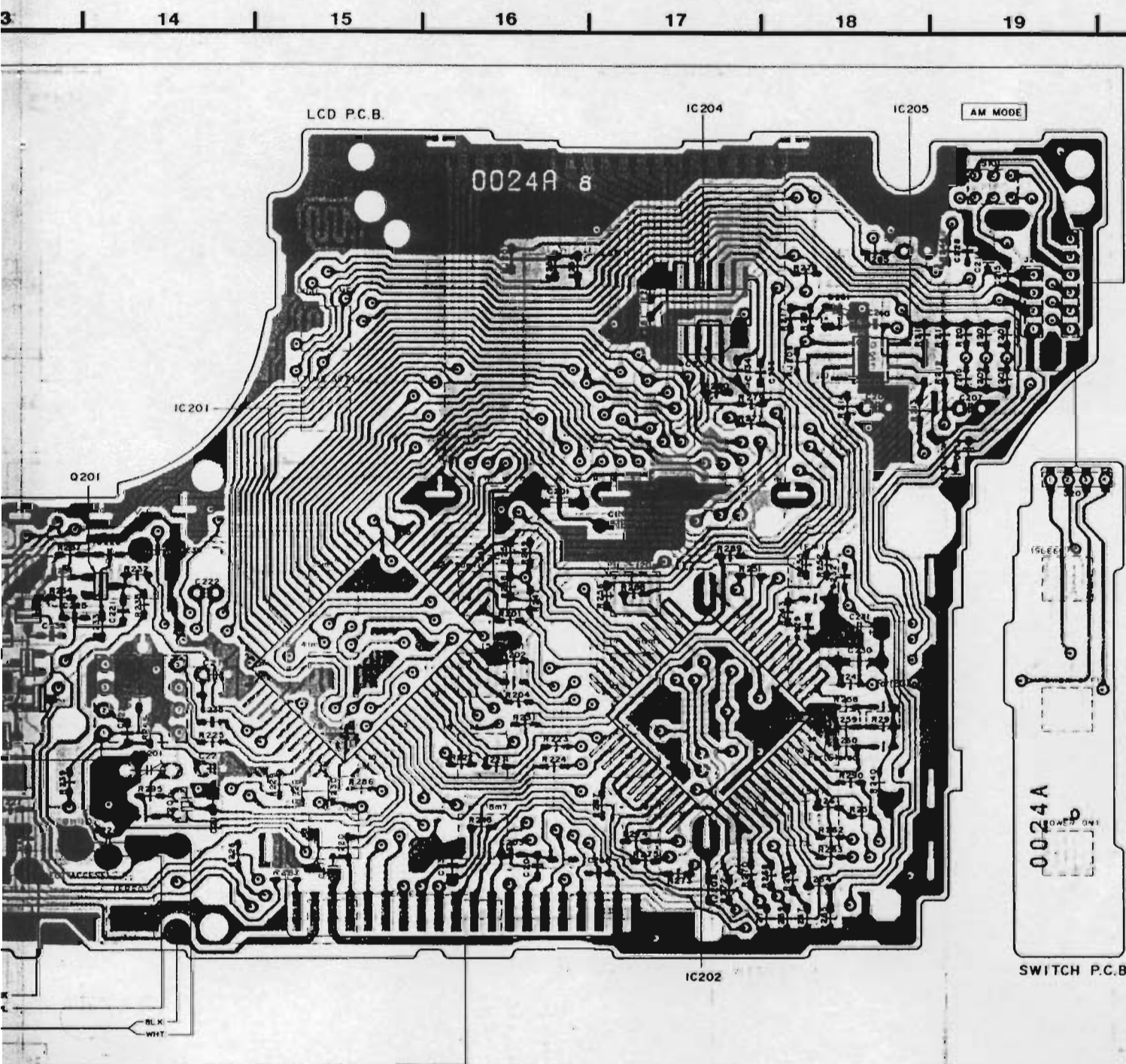
➡ LW, MW, SW 2nd OSC Signal Line

FM, LW, MW, SW Vcap in Line

⇒ FM Signal Line

→ FM Signal Line





NOTES:

BLK Black
 BLU Blue
 BRN Brown
 GRY Gray
 GRN Green
 L.BLU Light Blue

ORG Orange
 PNK Pink
 RED Red
 SLD Shield Wire
 VLT Violet
 WHT White
 YEL Yellow

MEASUREMENTS AND ADJUSTMENTS

■ ALIGNMENT INSTRUCTIONS

READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Note:

1. Set power on switch to ON.
 2. Set display select switch to FREQUENCY.
 3. Set volume control to MAXIMUM.
 4. Set tone select switch to HIGH.
 5. Set hold switch to OFF.
 6. Set sens switch to DX.
 7. Set MW frequency step select switch to 9 kHz.
 8. Set band switch to LW, MW, SW or FM.
 9. Set SSB switch to OFF or ON.
 10. Set power source voltage to 6 V DC.
 11. Memorize the following frequency.
- | | |
|-------------------|---------------------|
| FM CH1...87.5 MHz | LW CH1...155 kHz |
| CH2...90.0 MHz | CH2...450 kHz |
| CH3...98.0 MHz | CH3...459 kHz |
| CH4...106.0 MHz | MW CH1...605 kHz |
| CH5...108.0 MHz | SW CH1...10,000 MHz |
| CH6...94.0 MHz | CH2...15,000 MHz |
| | CH3...29,999 MHz |

EQUIPMENT REQUIRED

1. Frequency counter.
2. Oscilloscope (Dual dimension).
3. RF voltmeter.
4. DC digital voltmeter.
5. Ampere meter.
6. Signal generator.

■ FM VCO, SW VCO, SW 2nd LOCAL OSC ALIGNMENT

BAND	FREQUENCY DISPLAY SETTING	DC DIGITAL VOLTMETER	FREQUENCY COUNTER	ADJUSTMENT (Refer to Fig. 1)	REMARKS
FM VCO ALIGNMENT					
(1) FM	108.00 MHz (CH5)	TP27 ...(+) TP28 ...(-)	—	L13	Adjust L13 for 9.00 ± 0.1 V reading on DC digital voltmeter.
SW VCO ALIGNMENT					
(2) SW	29,999 MHz (CH3)	"	—	L8	Adjust L8 for 10.00 ± 0.1 V reading on DC digital voltmeter.
SW 2nd LOCAL OSC ALIGNMENT					
(3) SW	10,000 MHz (CH1)	—	TP13 ...(+) TP14 ...(-)	L24	Adjust L24 for 55,395 MHz (EG...55,386 MHz) ± 100 Hz reading on frequency counter.

■ SSB ALIGNMENT

BAND	FREQUENCY DISPLAY SETTING	INDICATOR (ELECTRONICS VOLTMETER or OSCILLOSCOPE)	ADJUSTMENT (Refer to Fig. 1)	REMARKS
(4) SW	—	TP23 ...(+) TP24 ...(-)	T12	Adjust for maximum output.

■ FM IF, RF, AUTO STOP ZERO VOLTAGE ALIGNMENT

BAND	SIGNAL GENERATOR or SWEEP GENERATOR		FREQUENCY DISPLAY SETTING	INDICATOR (ELECTRONICS VOLTMETER or OSCILLOSCOPE)	ADJUSTMENT (Refer to Fig. 1)	REMARKS
	CONNECTIONS	FREQUENCY				
FM-IF ALIGNMENT						
FM	Connect to test point TP7 through 0.001 μF. Negative side to test point TP8	10.7 MHz (400 Hz SWP.)	Point of non-interference. (on/ about 90 MHz)	Connect vert. amp. of scope to test point TP16. Negative side to test point TP15.	T6 (FM 1st IFT)	Adjust of maximum amplitude. (Refer to fig. 2.)
FM	"	"	"	"	T11 (FM 2nd IFT)	Adjust for maximum amplitude. (Refer to fig. 3.)

RF-B65D

BAND	SIGNAL GENERATOR or SWEEP GENERATOR		FREQUENCY DISPLAY SETTING	INDICATOR (ELECTRONICS VOLTMETER or SCOPE)	ADJUSTMENT (Refer to Fig. 1)	REMARKS
	CONNECTIONS	FREQUENCY				
FM-RF ALIGNMENT						
FM	Connect to test point TP1 through FM dummy antenna. Negative side to test point TP2 .	90.00 MHz	90.00 MHz (CH2)	Connect vert. amp. of scope to test point TP21 . Negative side to test point TP22 .	L10	Adjust for maximum output.
FM	"	106.00 MHz	106.00 MHz (CH4)	"	CT1	Adjust for maximum output. Repeat steps (6), (7).
FM-AUTO STOP ZERO VOLTAGE ALIGNMENT						
FM	Connect to test point TP1 through FM dummy antenna. Negative side to test point TP2 .	98.00 MHz (40 dB DEMOD.)	98.00 MHz (CH3)	Connect vert. amp. of scope to test point TP11 . Negative side to test point TP12 .	T11	Adjust T9 for 0 ± 0.05 V electronics voltmeter reading.

■ SW IF, LW IF TRAP ALIGNMENT

BAND	SIGNAL GENERATOR or SWEEP GENERATOR		FREQUENCY DISPLAY SETTING	INDICATOR (ELECTRONICS VOLTMETER or OSCILLOSCOPE)	ADJUSTMENT (Refer to Fig. 1)	REMARKS
	CONNECTIONS	FREQUENCY				
SW-IF (1st) ALIGNMENT						
(10) SW	TP3 ... (+) TP4 ... (-)	55,843 MHz 95 dB, 4% Mod. with 1 kHz (Frequ. Mod.)	10,000 MHz (CH1)	Connect vert. amp. of scope to test point TP9 . Negative side to test point TP10 .	T4 T5 T7	Adjust for flat and maximum output. (Refer to Fig. 4)
(11) SW	"	10,000 MHz 30% Mod. with 400 Hz (Ampli. Mod.)	10,000 MHz (CH1)	Output meter across Voice coil.	T7	Adjust for maximum output.
SW-IF (2nd) ALIGNMENT						
(12) SW	TP25 ... (+) TP26 ... (-)	450 kHz... (G) 459 kHz... (EG) 30% Mod. with 400 Hz.	Point of noninterference. (on/about 600 kHz).	Connect vert. amp. of scope to test point TP16 . Negative side to test point TP15 .	T8 T10	Adjust for maximum output.
LW-IF TRAP ALIGNMENT						
(13) LW	Fashion loop of several turns of wire and radiate signal into loop of receiver.	450 kHz... (G) 459 kHz... (EG) 40 dB, 30% Mod. with 400 Hz	450 kHz... (G) 459 kHz... (EG) (CH2)	Output meter across Voice coil.	T1 (Trap Coil)	Adjust for maximum output.

■ SIGNAL METER ALIGNMENT

BAND	SIGNAL GENERATOR or SWEEP GENERATOR		FREQUENCY DISPLAY SETTING	ADJUSTMENT (Refer to Fig. 1)	REMARKS
	CONNECTIONS	FREQUENCY			
(14) FM	Fashion loop of several turns of wire and radiate signal into loop of receiver.	94.00 MHz (30 dB)	94.00 MHz (CH6)	VR2	●Adjust VR2 so that the all signal indicator appears. (Refer to Fig. 6)
(15) SW	"	15,000 MHz (45 dB)	15,000 MHz (CH2)	VR1	●Adjust VR1 so that the all signal indicator appears. (Refer to Fig. 6)

■ CLOCK ALIGNMENT

	BAND	FREQUENCY DISPLAY SETTING	FREQUENCY COUNTER	ADJUSTMENT (Refer to Fig. 5)	REMARKS		
(16)	SW	29,999 MHz...(G) 26,100 MHz...(EG)	TP5 ...(+) TP6 ...(-)	CT201	Adjust the frequencies according to room temperature.		
					Room Temperature	Area	Frequency
					8°C ≤ t < 22°C	(EG)	81,845000 MHz ± 300 Hz
						(G)	85,844000 MHz ± 300 Hz
					22°C ≤ t < 26°C	(EG)	81,844800 MHz ± 300 Hz
						(G)	85,843800 MHz ± 300 Hz
					26°C ≤ t < 30°C	(EG)	81,844500 MHz ± 300 Hz
						(G)	85,843500 MHz ± 300 Hz
					30°C ≤ t < 33°C	(EG)	81,844100 MHz ± 300 Hz
						(G)	85,843100 MHz ± 300 Hz

■ ALIGNMENT POINT

● Please refer to Circuit Board and Wiring Connection Diagram for test point locations.

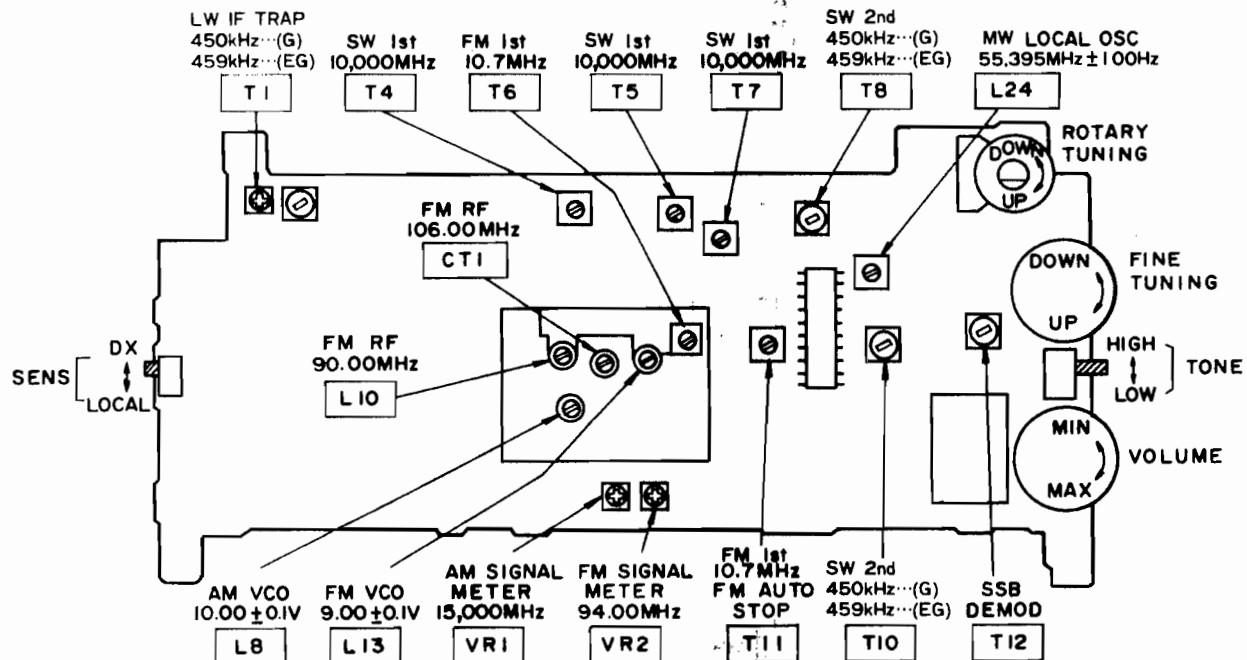


Fig. 1

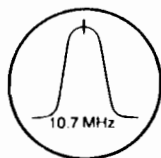


Fig. 2



Fig. 3

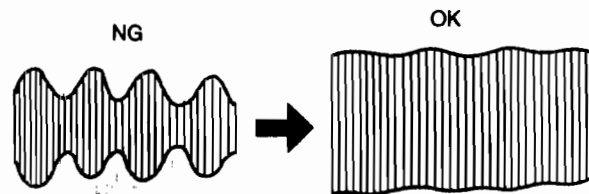


Fig. 4

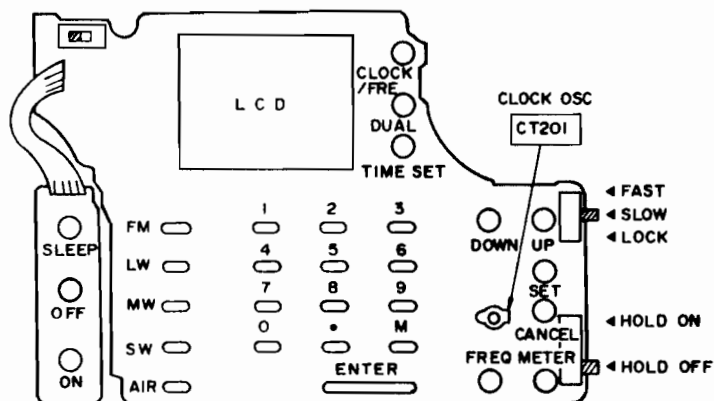
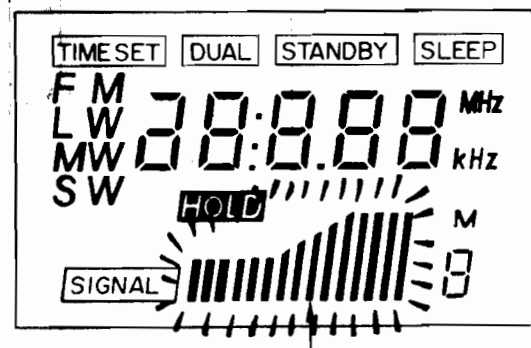


Fig. 5



Signal Indicator

Fig. 6

IC TERMINAL FUNCTION

3)

2) Block diagram

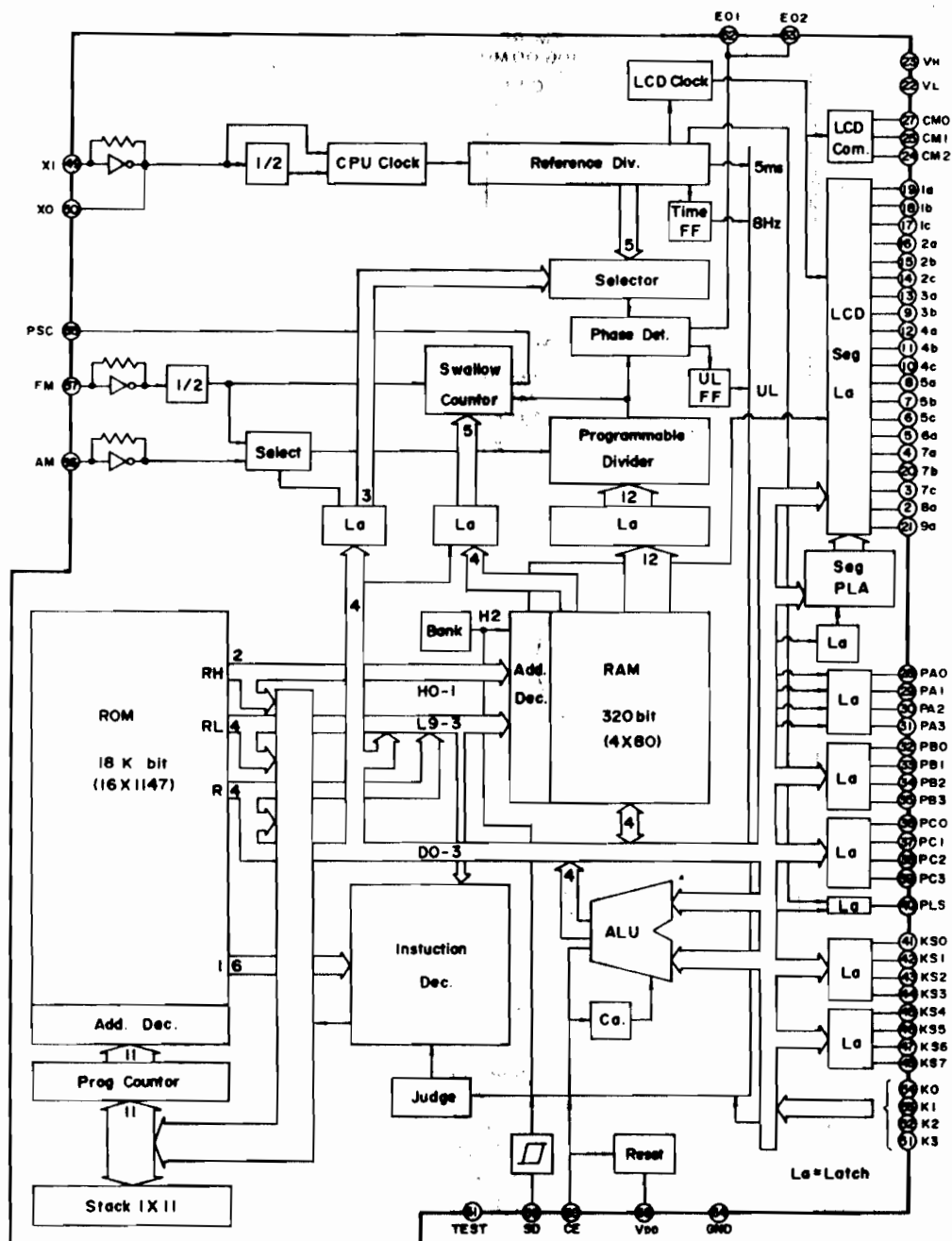
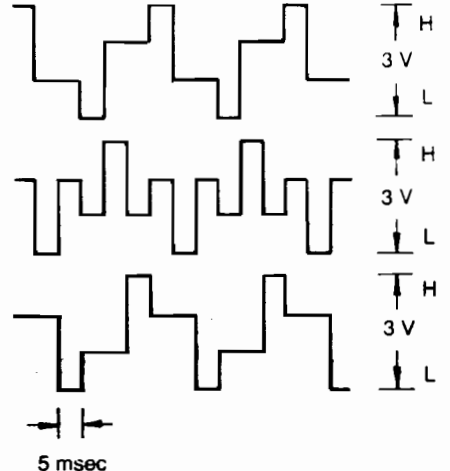
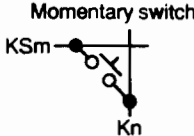
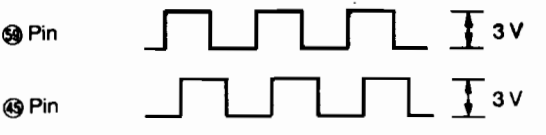


Fig. 2

RF-B65D

RF-B65D

3) Explanation of each terminal

Pin. No.	Symbol	Description
2~21	1a~9a, 1b~5b, 7b 1c, 2c, 4c, 5c, 7c	Output terminals for LCD segment signals. (1/5 duty and 1/4 bias LCD drive.) Refer to Fig. 3 for output waveforms.
22 23	V _L V _H	Intermediate voltage output terminals for LCD. In this model, a 0.1 μ F capacitor is connected to stabilize the intermediate voltage.
24 25 27	COM2 COM1 COM ϕ	Terminals for LCD common signal output. 
26, 58	V _{DD}	A voltage of 3 V $\pm$ 10% supply to this terminal during device.
28~31	PA0~PA3	Data signal output terminal.
32 33 34 35	PB ϕ PB1 PB2 PB3	Band select output terminals. Outputs a low signal during LW, MW and SW. Outputs a low signal during LW and MW. Outputs a low signal during LW, MW and SW. Outputs a low signal during FM.
36 37 38	PC ϕ PC1 PC2	Level meter comparator output terminals.
39	PC3	Muting output terminal. The noise generated from the speaker when the power is turned on and off is muted.
40	PLS	Key on terminal. Outputs a low when a key on the IC201 side is pressed.
41~44	KS ϕ ~KS3	Key return signal source output terminals for momentary switch on the key matrix. 
45 59	KS4 SD	Accept signal output terminal for data to IC202. High during operation. Transfer request signal output terminal or data to IC202. High during operation. 

Pin. No.	Symbol	Description
46	KS5	Status control output terminal for IC202. High during time setting.
47	KS6	Automatic control output terminal for IC202. High when power is on and during times setting.
48	KS7	Radio power on/off output terminal. High when radio is on.
49 50	X1 X ϕ	Terminals used for connecting a quartz oscillator. Connects a 150 kHz quartz oscillator.
51	K3	Level meter comparator input terminal.
52	K2	Hold signal input terminal.
53 54	K1 K ϕ	Terminals for key matrix key return signal input.
55	PSC	Select signal output terminal for prescaler divider ratio. This terminal generates pulses at the leading edge of the signal applied to the FM terminal (pin 57) and continues to do so until the contents of the internal swallow counter are 0. At this time, the divider ratio of the prescaler is 1/17. When the contents of the swallow counter become 0, this terminal goes low and the divider ratio of the prescaler becomes 1/16.
57	FM	Input terminal for the FM local oscillator (VCO) output divided by 1/16 or 1/17 by the prescaler.
60	CE	Device select signal input terminal. Set the terminal high to select a device and low to deselect a device.
61	TEST	Terminal to test the device. Normally connected to "GND".
62	E02	PLL error output terminal. The output signal is output to the LPF (Q201~Q206). If the divided oscillation frequency is higher than the standard frequency, a high signal is output. If lower, a low signal is output. If the same, the terminal floats.
64	GND	Ground terminal.

4) Output signal waveforms of LCD segment

These output signal waveforms are produced when the frequency is SW 15,000 MHz, waveforms of the segments vary with frequency.

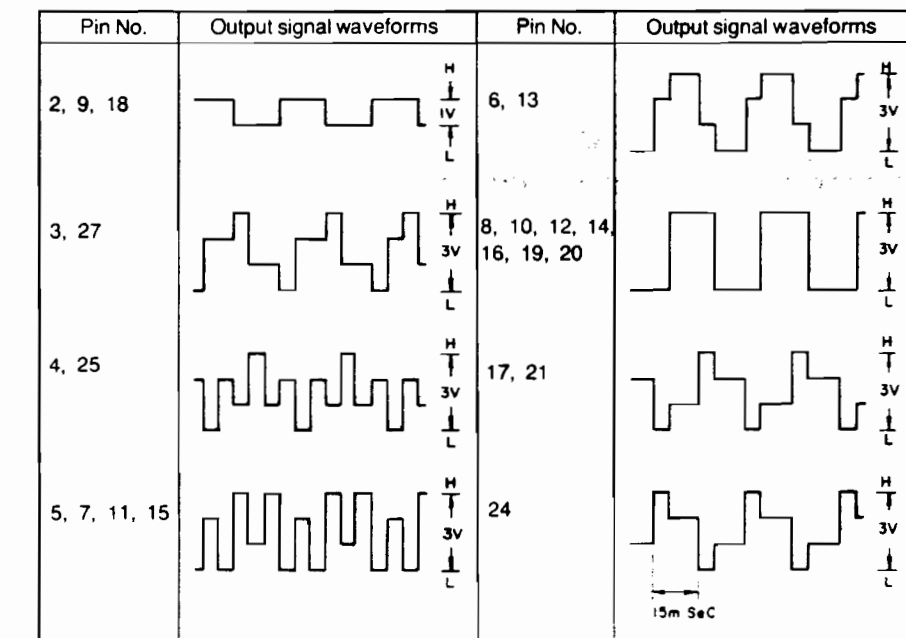


Fig. 3

■ IC202 (UPD7508G794)

1) Terminal view
μPD7508G732 (IC202)

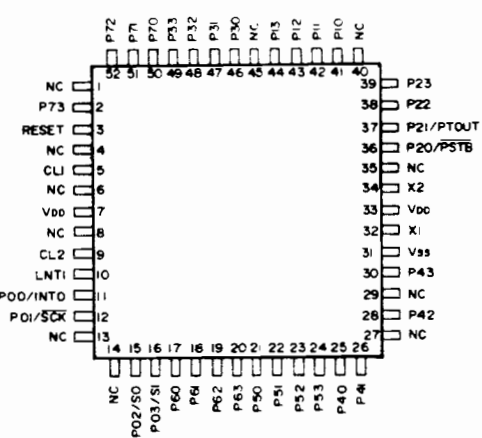


Fig. 4

2) Block diagram

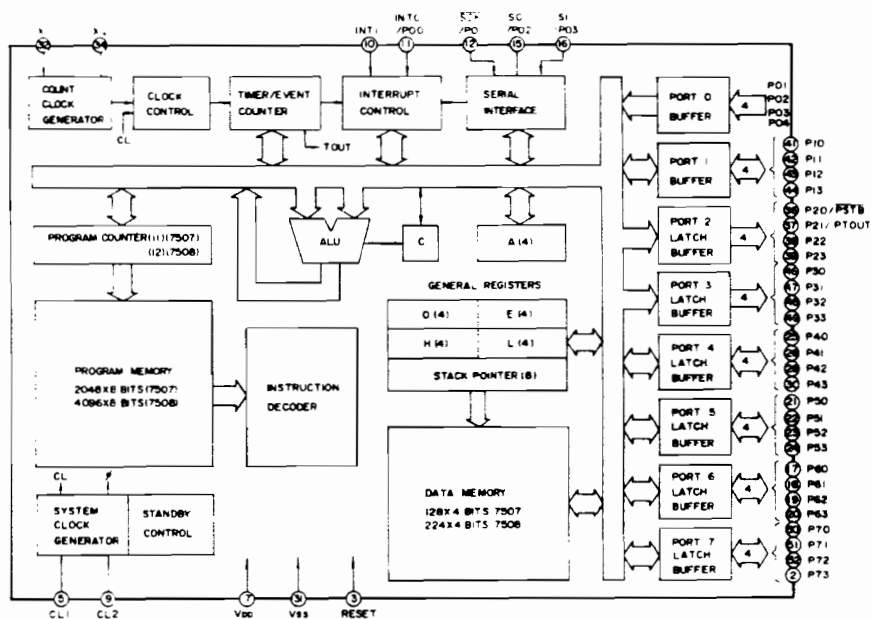
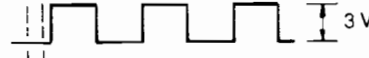
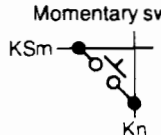


Fig. 5

3) Explanation of each terminal

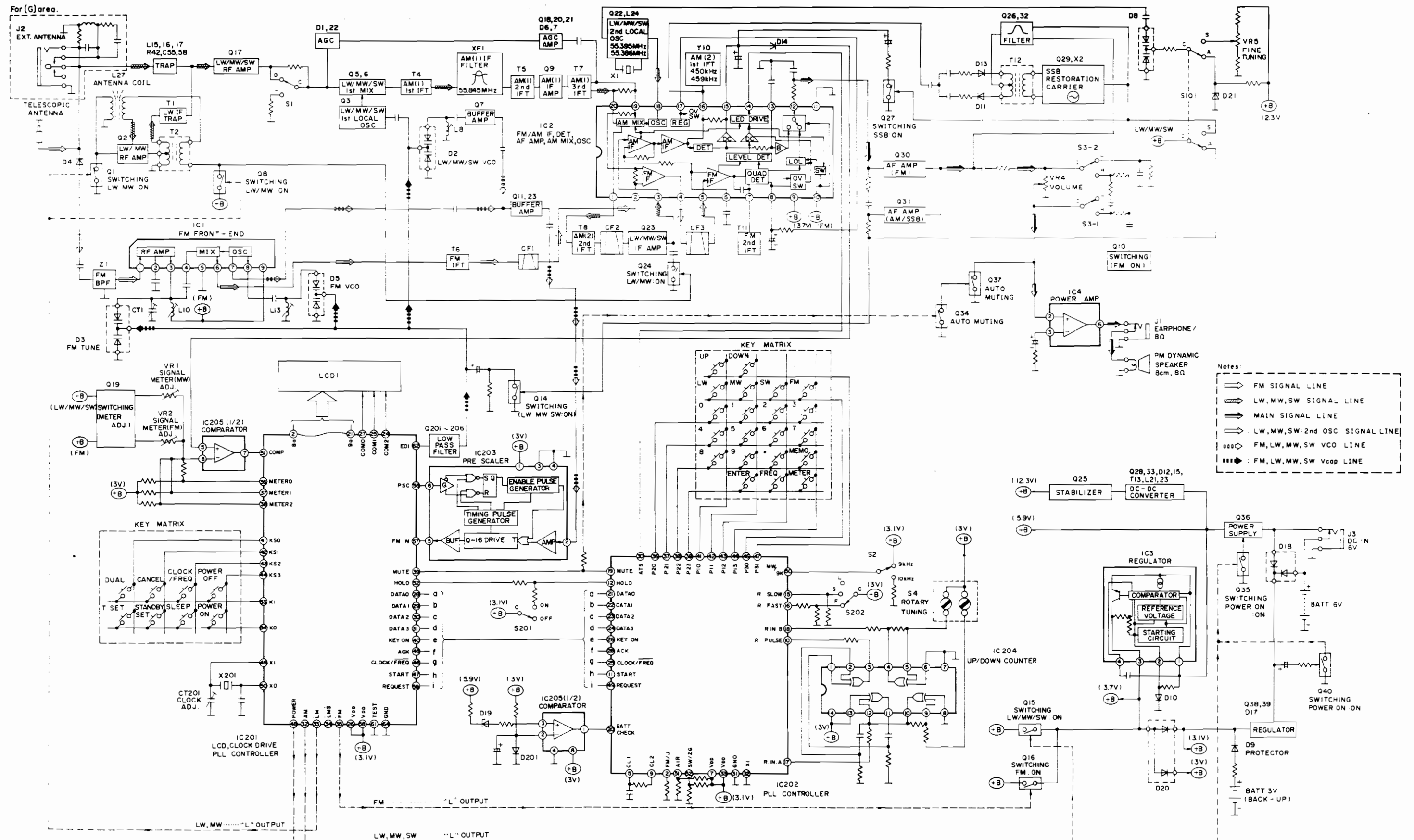
Pin No.	Symbol	Description
2	P73	FM receiving frequency select terminal. Low=87.5–108.0 MHz (for main unit) High=76.0–108.0 MHz
3	REST	Reset signal input terminal.
5	CL1	Clock signal input terminal.
7, 33	V _{cc}	A voltage of 3 V ± 10% supply to this terminal during device.
9	CL2	Clock signal output terminal.
10 17 18	INT1 P60 P61	Trigger pulse input terminal for rotary tuning. Data input terminal for rotary tuning. Data input terminal for rotary tuning. During the down mode (leading edge of the rotary pulse, ROTARY INPUT A=ROTARY INPUT B): ⑩ Pin (ROTARY PULSE)  ⑪ Pin (ROTARY IN. A)  ⑫ Pin (ROTARY IN. B)  max. 85 μs During the up mode (leading edge of the rotary pulse, ROTARY INPUT A=ROTARY INPUT B): ⑩ Pin (ROTARY PULSE)  ⑪ Pin (ROTARY IN. A)  ⑫ Pin (ROTARY IN. B) 

Pin No.	Symbol	Description
11	P00/INTO	Start signal input terminal.
12	P01/SCK	Hold input terminal. A high signal sets the key lock mode.
15	P02/S0	Rotary tuning speed select input terminal. High for slow and low for lock.
16	P03/S1	Rotary tuning speed select input terminal. High for fast and low for lock.
19	P62	Tuning output terminal. During rotary tuning or manual tuning (up or down), a high signal is output from this terminal.
20	P63	Battery 4 V check input terminal. Monitors in intervals of 100 μs. If low for 3 consecutive times, a flashing "E" is displayed and 7 seconds later the power is switched off.
21~24	P50~P53	Data signal output terminal.
25	P40	CLOCK/FREQ display input terminal. High for "CLOCK" display and low for "FREQ" display.
26	P41	Key on terminal. Low when a key on the IC201 side is pressed.
28 49	P42 P33	Accept signal input terminal for data from IC201. High during operation. Transfer request signal input terminal for data from IC201. High during operation. ④ Pin  ⑤ Pin 
30	P43	ATS (Auto scan stop) input terminal. If a low signal is input during auto scan for 118 msec or longer, the scan stops.
31	GND	Ground terminal.
32	X1	Ground terminal.
36~39 46 47	PSTB/P20~P23 P30 P31	Key return signal source output terminals for the momentary switches in the key matrix. 
41~44	P10~P13	Terminals for key matrix key return signal input.
50	P70	MW 9/10 kHz select terminal. High for 9 kHz and low for 10 kHz.
51	P71	Air band country select terminal. High for Japan and low for other countries.
52	P72	SW band country select terminal. High for Germany and low for other countries.

RF-B65D

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BLOCK DIAGRAM



RF-B65D

RF-B65D

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Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUITS					
IC1	AN7205	IC, FRONT END		Q35	UN221FTW	TRANSISTOR	
IC2	TA7758P	IC, FM/AM IF, DET, etc		Q36	2S8793R	TRANSISTOR	
IC3	RV1LA5003	IC, REGULATOR		Q37	2SD601RTW	TRANSISTOR	
IC4	LA4147	IC, POWER AMP		Q38	2SD601RTW	TRANSISTOR	
IC201	UPD1706G524	IC, LCD/CLOCK DRIVE, PLL		Q39	2SK160K4TW	TRANSISTOR	
IC202	UPD7508G794	IC, PLL COUNTER		Q40	2SD601RTW	TRANSISTOR	
IC203	RV1UPB556C	IC, PRE SCALER		Q201	2SK160K5TW	TRANSISTOR	
IC204	1M74HC386ST2	IC, UP/DOWN COUNTER		Q202	2SC1622D17TW	TRANSISTOR	
IC205	BA10393FT	IC, COMPARATOR		Q203	2SK160K5TW	TRANSISTOR	
		TRANSISTORS		Q204	2SC1622D17TW	TRANSISTOR	
Q1	2SD601RTW	TRANSISTOR		Q205	2S8793RTX	TRANSISTOR	
Q2	2SK436A20TW	TRANSISTOR		Q206	2SC1622D17TW	TRANSISTOR	
Q3	2SC2404CTW	TRANSISTOR				DIODES	
Q5	2SK436A20TW	TRANSISTOR		D1	MA553	DIODE	
Q6	2SK436A20TW	TRANSISTOR		D2	RVDSVC203ATX	DIODE	
Q7	2SC2404CTW	TRANSISTOR		D3	RVDSVC203ATX	DIODE	
Q8	2S8709RTW	TRANSISTOR		D4	RVDS135TA	DIODE	
Q9	2SK238K16TX	TRANSISTOR		D5	RVDSVC203ATX	DIODE	
Q10	UN221FTW	TRANSISTOR		D6	0A90	DIODE	
Q11	2SC2404CTW	TRANSISTOR		D7	0A90	DIODE	
Q12	2SC2404CTW	TRANSISTOR		D8	RVDSVC203ATX	DIODE	
Q14	UN221FTW	TRANSISTOR		D9	MA721TW	DIODE	
Q15	UN211FTW	TRANSISTOR		D10	MA165TA	DIODE	
Q16	UN211FTW	TRANSISTOR		D11	MA700TA	DIODE	
Q17	2SK436A20TW	TRANSISTOR		D12	MA3130MTW	DIODE	
Q18	2SC2404CTW	TRANSISTOR		D13	MA700TA	DIODE	
Q19	RVTFMG3TX	TRANSISTOR		D14	MA700TA	DIODE	
Q20	2SK160K4TW	TRANSISTOR		D15	MA151KTW	DIODE	
Q21	2SD601RTW	TRANSISTOR		D16	MA151KTW	DIODE	
Q22	2SC2404CTW	TRANSISTOR		D17	MA4051LRA	DIODE	
Q23	2SC2295BTX	TRANSISTOR		D18	MA724TX	DIODE	
Q24	UN221FTW	TRANSISTOR		D19	MA4036LTA	DIODE	
Q25	2SD601RTW	TRANSISTOR		D20	MA151WATW	DIODE	
Q26	2SD601RTW	TRANSISTOR		D21	MA4062MTA	DIODE	
Q27	UN221FTW	TRANSISTOR		D22	MA553	DIODE	
Q28	2SC2295BTX	TRANSISTOR		D201	MA151KTW	DIODE	
Q29	2SC2295BTX	TRANSISTOR				VARIABLE RESISTORS	
Q30	2SD601RTW	TRANSISTOR		VR1	EVND4A00B24	V. RESISTOR, SIGNAL METER	
Q31	2SD601RTW	TRANSISTOR		VR2	EVND4A00B24	V. RESISTOR, SIGNAL METER	
Q32	2SD601RTW	TRANSISTOR		VR4	EVUJ05T02B54	V. RESISTOR, VOLUME	
Q33	2SC2295BTX	TRANSISTOR		VR5	EVUJ05T02B54	V. RESISTOR, BATT ERROR ADJ.	
Q34	2SD601RTW	TRANSISTOR				COMPONENT COMBINATIONS	

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
Z1	RXABPM8L	COMPONENT COMBINATION	#2			OSCILLATORS	
		COILS		X1	RSXB55M4W01	OSCILLATOR	<G>
L1	RLQZPR47MT-Y	COIL		X1	RSXB55M3W01	OSCILLATOR	<EG>
L2	RLQY25S5-0	COIL		X2	RSX2450H0M01	OSCILLATOR	<G>
L3	RLQZP1R0MT-Y	COIL		X2	RSX2459H0M01	OSCILLATOR	<EG>
L4	RLQZPR220MT-Y	COIL		X201	RSXD150K501	OSCILLATOR	
L5	RLQZPR56MT-Y	COIL				JUMPER	
L7	RLQZP1R6MT-Y	COIL		RJ1	RRD18X0000V	CHIP JUMPER	
L8	RL04N253-0	COIL		RJ2	RRD18X0000V	CHIP JUMPER	
L9	RLQZP1R0MT-Y	COIL		RJ4	RRJ6GCJ000TE	CHIP JUMPER	
L10	RL04N125-0	COIL		RJ5	RRD18X0000V	CHIP JUMPER	
L11	RLQZP181KT-Y	COIL		RJ6	RRJ6GCJ000TE	CHIP JUMPER	
L12	RLQZP680KT-Y	COIL		RJ7	RRJ6GCJ000TE	CHIP JUMPER	
L13	RL04N125-0	COIL		RJ8	RRJ6GCJ000TE	CHIP JUMPER	
L14	RLQZP220KT-Y	COIL	<G>	RJ207	RRJ6GCJ000TE	CHIP JUMPER	
L15	RLQZP680KT-Y	COIL		RJ208	RRJ6GCJ000TE	CHIP JUMPER	
L16	RLQZP1R0MT-Y	COIL		RJ209	RRJ6GCJ000TE	CHIP JUMPER	
L17	RLQZPR47MT-Y	COIL				TRIMMER CAPACITORS	
L18	RLQZP221KT-Y	COIL		CT1	RCV10AF1-S	TRIMMER CAPACITOR	
L19	RLQZPR47MT-Y	COIL		CT201	RCV20AF1-S	TRIMMER CAPACITOR	
L20	RLQY15G5-0	COIL				SWITCHES	
L21	RLQZP101KT-Y	COIL		S1	RSS2B43YA-W	SW, DX-LOCAL	
L22	RLQZP470KT-Y	COIL		S2	QSS1228A	SW, 9K/10K	
L23	RLQZP101KT-Y	COIL		S3	RSS2B004-Q	SW, TONE	
L24	RL03A001-T	COIL		S4	EVQWHE1025B	SW, ENCODER	
L27	RLF6019-0	ANT COIL		S101	RSS2B362A-W	SW, SSB	
		TRANSFORMERS		S201	RSS2B402A-Q	SW, HOLD	
T1	RL12A004-T	TRANSFORMER		S202	RSS3B322A-A	SW, SLOW/FAST	
T2	RLA5C1-T	TRANSFORMER				TERMINALS	
T3	RLA3Z11-0	TRANSFORMER		J1	RJJD3M2A-C	JACK, EARPHONES	
T4	RL13A4-W	TRANSFORMER		J2	RJJD5M22A-H	JACK, EXT ANT	<G>
T5	RL13A4-W	TRANSFORMER		J3	RJJB1B12-C	JACK, DC IN	
T6	RL14A4-W	TRANSFORMER				DISPLAYS	
T7	RL13A3-T	TRANSFORMER		LCD1	HLCS340	LCD	
T8	RL12A35-T	TRANSFORMER					
T10	RL12A002-T	TRANSFORMER					
T11	RL14A33-T	TRANSFORMER					
T12	RL12A003-W	TRANSFORMER					
T13	RL09A11-T	TRANSFORMER					
		FILTERS					
CF1	RVTSFE107MAR	CERAMIC FILTER					
CF2	RVTSFR45011	CERAMIC FILTER	<G>				
CF2	RLFASFR45911	CERAMIC FILTER	<EG>				
CF3	RVTSFE107MAR	CERAMIC FILTER					
XF1	RVX5M845A	FILTER					

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Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET AND CHASSIS					
1	RBC10292B-0	BUTTON, MANUAL TUNING (UP)		42	EASBP24S	SPEAKER	
2	RGV011-K	KNOB, SSB		43	RBC1023PA-0	BUTTON, ()	
3	RYFFB65DG	REAR CABINET ASS'Y	<G>	44	RBC1023QA-0	BUTTON, (0)	
3A	RYFFB65DEG	REAR CABINET ASS'Y	<EG>	45	RBC1023RA-0	BUTTON, (9)	
4	RHG3842A-0	RUBBER		46	RBC1023SA-0	BUTTON, (8)	
5	RHL302A	STAND		47	RBC1023TA-0	BUTTON, (7)	
6	RHQS22A	SPRING		48	RBC1023UA-0	BUTTON, (6)	
7	RYNF865DG	BATTERY COMPARTMENT		49	RBC1023VA-0	BUTTON, (5)	
8	RBT2602A-0	KNOB, FINE VOL		50	RBC1023WA-0	BUTTON, (4)	
9	RJP4G182A	CONNECTOR		51	RBC1023XA-0	BUTTON, (3)	
10	RJPSG182A	CONNECTOR		52	RBC1023YA-0	BUTTON, (2)	
11	RJS20Q52A	CONNECTOR		53	RBC1023ZA-0	BUTTON, (1)	
12	RJT10732A	ANT. TERMINAL		54	RBC10230A-0	BUTTON, (0)	
13	RSC0018	SHIELD PLATE		55	RBC1024WB-0	BUTTON, BAND (SW)	
14	RSC0019	SHIELD PLATE		56	RBC1024XB-0	BUTTON, BAND (MW)	
15	RSC0020	SHIELD PLATE		57	RBC1024YB-0	BUTTON, BAND (LW)	
16	RSC0021	SHIELD PLATE		58	RBC1024ZB-0	BUTTON, BAND (FM)	
17	RSC0036	SHIELD PLATE		59	RBC1025ZA-0	BUTTON, STAND BY	
18	XSHW17-2FZ	SCREW		60	RBC1026YB-0	BUTTON, ACCESS (METER)	
19	RHS322A	TAPE		61	RBC1026ZB-0	BUTTON, ACCESS (FREQ.)	
20	RJC3F00102C	TERMINAL		62	RBC1027ZA-0	BUTTON, DIAL TIME	
21	RJC700122A	BATT. SPRING		63	RBC1028ZB-0	BUTTON, MANUAL TUNING	
22	RJC700132A	BATT. SPRING		64	RBC10302A-0	BUTTON, CLOCK/FREQ.	
23	RMD0022-K	CHASSIS	<G>	65	RBC1031ZB-0	BUTTON, POWER OFF	
24	RMD0022A-K	CHASSIS	<EG>	66	RBC1032ZB-0	BUTTON, ENTER	
25	RHQ522A	SPRING		67	RBC10332A-0	BUTTON, SLEEP	
26	RJC700142A	BATT. SPRING		68	RBC1034ZB-0	BUTTON, POWER ON	
27	RDX16592A-0	PLATE		69	RBC10412A-0	BUTTON, TIME SET	
28	RHG50432A	RUBBER		70	RBD4292A-0	KNOB, SLOW FAST	
29	RHG50442A	RUBBER		71	RBD4302A-0	KNOB, HOLD	
30	RHG50452A	RUBBER		72	RBD4312A-0	KNOB, OPEN	
31	RHG50472A	RUBBER		73	RBN7542A-0	KNOB, ROTARY TUNING	
32	RMC10992A	SHIELD PLATE		74	RBT2842A-0	KNOB, ROTARY TUNING	
33	RMC11002A	SHIELD PLATE		75	RBM1562A	STEEL BALL	
34	RMC11012A	SHIELD PLATE		76	RHR21102A	SPACER	
35	RMC11052A	SHIELD PLATE		77	RHC1022A-0	LEVER	
36	RMC11152A	SHIELD PLATE		78	RKH1462A-0	CARRING STRAP	
37	RSC0017	LCD HOLDER		79	RMS12B	HOLDER	
38	RSC0037	SHIELD PLATE		80	RUQ532A	SPRING	
39	RJP21182AM	F. P. C		81	XUC3FY-V	C. RING	
40	RJS6142A	CONNECTOR (6P)		82	RYFFB65DG	STATION REMINDER	
41	RJT8072B-X	TERMINAL		83	RYMFB65DG	FRONT CABINET ASS'Y	<G>
	WB66CB-14	FLAT CABLE WIRE		84	RYMFB65DEG	FRONT CABINET ASS'Y	<EG>
	RJSS4L42A-X	SOCKET		85	RHS1282A	SCREW	
				86	WB84GB-6	FLAT CABLE	
				87	RHG10412A	RUBBER	
					RHG11152A	RUBBER	

Ref. No.	Part No.	Part Name & Description	Remarks
88	RHG11752A	RUBBER	
89	RHG21192A	RUBBER	
90	XEARS147GA-Y	TELESCOPIC ANTENNA	
91	XTR2+5C	SCREW	
92	XTR26+14JFZ	SCREW	
93	XTR26+8C	SCREW	
94	XYN3-C8FZ	SCREW	
95	RKX3192A-0	BATTERY COMPARTMENT	
		ACCESSORIES	
A1	RD9496XR	AC ADAPTOR	<G> Δ
A1	RD9496SNGR	AC ADAPTOR	<EG> Δ
A2	RFC0003	SHOLDER BAG	<G>
A2	RFC0004	SHOLDER BAG	<EG>
A3	RJP120ZDS-K	PLUG	<G> Δ
A4	RQT0046G	INSTRUCTION MANUAL	<G>
A4	RQT0046B	INSTRUCTION MANUAL	<EG>
A5	RQX94122A	MEMORY CHANNEL SHEET	<G>
A5	RQX9436YA	MEMORY CHANNEL SHEET	<EG>
A6	RQX94542A	SHORT WAVE GUIDE	
A7	RS40002	EXTERNAL ANTENNA LEAD	<G>
A8	XEH1A1-X	EARPHONE	
		PACKING MATERIAL	
P1	RPFB822A	COVER	
P2	RPMS42A	POLYETHYLENE COVER	
P3	RPMD030	SLEEVE	<G>
P3	RPMD032	SLEEVE	<EG>
P4	RPMS1312A	PAD (SET)	
P5	RPMS3602A	PAD (AC ADAPTOR)	

RF-B65D

This exploded view diagram illustrates the assembly of a portable electronic device, likely a handheld calculator or small terminal. The components are numbered 1 through 95, and their assembly sequence is indicated by letters A through H. The diagram shows the following parts and their assembly order:

- Top Housing (A):** Components 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95.
- Internal Components (B-H):**
 - MAIN CIRCUIT BOARD (B):** Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95.
 - SWITCH P.C.B. (C):** Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95.
 - LCD 1 (D):** Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95.
 - LCD CIRCUIT BOARD (E):** Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95.
 - Bottom Housing (F-H):** Components 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95.

RESISTORS & CAPACITORS

Notes: * Important safety notice

Components identified by a mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

* Bracketed indications in Ref. No. columns specify the area. (Refer to the first page for area.)

Parts without these indications can be used for all areas.

Numbering System For Resistors

Example:

ERD	25	F	J	102
Type	Wattage (1/4W)	Shape	Tolerance	Value (1KΩ)
ERX	2	AN	J	471
Type	Wattage (2W)	Shape	Tolerance	Value (470Ω)

Numbering System For Capacitors

Example:

ECKD	1H	102	Z	F
Type	Voltage (50V)	Value (1000µF)	Tolerance	Unique
ECEA	5C	M		330
Type	Voltage (50V)	Characteristics		Value (330µF)

● Capacity values are in microfarads (µF) unless specified otherwise. P = Pico-farads (pF). F = Farads (F).

● Resistance values are in ohms (Ω), unless specified otherwise. 1K = 1,000Ω. 1M = 1,000kΩ.

Resistor Type	Wattage	Tolerance
ERD : Carbon	10: 1/8W 12: 1/2W	J: ±5%
ERG : Metal Oxide	14: 1/4W 25: 1/4W	F: ±1%
ERQ : Fuse Type Metal	1A: 1W 18: 1/8W	G: ±2%
ERX : Metal Film	S2: 1/4W S1: 1/2W	J: ±5%
ERD L Carbon (chip)	2F: 1/4W 50: 1/2W	K: ±10%
ERD K Metal Film (chip)	2A: 2W 3A: 3W	M: ±20%
ERC : Solid	5G: 1/10W 8G: 1/8W	
ERF : Incombustible Box-Shaped		
ERM : Wire-Wound		
RRJ : Chip Resistor		
ERJ : Chip Resistor		

Capacitor Type	Voltage	Tolerance
ECE : Electrolytic	2J: 6.3V 1A: 10V	K: ±10%
ECCD : Ceramic	1C: 16V 1E: 25V	M: ±20%
ECKD : Ceramic Capacitor	1H: 50V 1V: 35V	Z: ±80%
ECOM : Polyester	50: 50V 25: 50V	J: ±5%
ECOP : Polypropylene	2H: 500V 2A: 100V	J: ±5%
ECG : Ceramic	1: 100V 1J: 53V	G: ±2%
ECEA N Non Polar Electrolytic	KC: 400V AC	F: ±1%
QCU : Ceramic (Chip Type)	KC: 125V AC	C: ±0.25pF
ECUX : Ceramic (Chip Type)	(UL)	D: ±0.5pF
FCF : Semiconductor		
EECW : Liquid electrolyte double layer capacitor		

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
R57	RRJ6GCJ220TE	RESISTOR 1/10 W 22		R111	RRJ6GCJ222TE	RESISTOR 1/10 W 2.2K	
R58	RRJ6GCJ224TE	RESISTOR 1/10 W 220K		R112	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R59	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R113	RRJ6GCJ224TE	RESISTOR 1/10 W 220K	
R60	RRJ6GCJ104TE	RESISTOR 1/10 W 100K		R114	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R61	RRJ6GCJ472TE	RESISTOR 1/10 W 4.7K		R115	RRJ6GCJ272TE	RESISTOR 1/10 W 2.7K	
R62	RRJ6GCJ223TE	RESISTOR 1/10 W 22K		R116	RRJ6GCJ152TE	RESISTOR 1/10 W 1.5K	
R63	RRJ6GCJ104TE	RESISTOR 1/10 W 100K		R117	RRJ6GCJ471TE	RESISTOR 1/10 W 470	
R64	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R118	RRJ6GCJ153TE	RESISTOR 1/10 W 15K	
R65	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R119	RRJ6GCJ471TE	RESISTOR 1/10 W 470	
R66	RRJ6GCJ222TE	RESISTOR 1/10 W 2.2K		R120	RRJ6GCJ333TE	RESISTOR 1/10 W 33K	
R67	RRJ6GCJ472TE	RESISTOR 1/10 W 4.7K		R121	RRJ6GCJ333TE	RESISTOR 1/10 W 33K	
R68	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R122	RRJ6GCJ470TE	RESISTOR 1/10 W 47	
R69	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R123	RRJ6GCJ332TE	RESISTOR 1/10 W 3.3K	
R70	RRJ6GCJ221TE	RESISTOR 1/10 W 220		R124	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R71	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R125	RRJ6GCJ222TE	RESISTOR 1/10 W 2.2K	
R72	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R126	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R73	RRJ6GCJ471TE	RESISTOR 1/10 W 470		R127	RRJ6GCJ222TE	RESISTOR 1/10 W 2.2K	
R74	RRJ6GCJ473TE	RESISTOR 1/10 W 47K		R128	RRJ6GCJ152TE	RESISTOR 1/10 W 1.5K	
R75	RRJ6GCJ562TE	RESISTOR 1/10 W 5.6K		R129	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R76	RRJ6GCJ272TE	RESISTOR 1/10 W 2.7K		R130	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R77	RRJ6GCJ471TE	RESISTOR 1/10 W 470		R131	RRJ6GCJ470TE	RESISTOR 1/10 W 47	
R78	RRJ6GCJ471TE	RESISTOR 1/10 W 470		R132	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R79	RRJ6GCJ332TE	RESISTOR 1/10 W 3.3K		R133	RRJ6GCJ470TE	RESISTOR 1/10 W 47	
R80	RRJ6GCJ222TE	RESISTOR 1/10 W 2.2K		R134	RRJ6GCJ221TE	RESISTOR 1/10 W 220	
R81	RRJ6GCJ102TE	RESISTOR 1/10 W 1K		R135	RRJ6GCJ562TE	RESISTOR 1/10 W 5.6K	
R82	RRJ6GCJ471TE	RESISTOR 1/10 W 470		R136	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R83	RRJ6GCJ331TE	RESISTOR 1/10 W 330		R137	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R84	RRJ6GCJ470TE	RESISTOR 1/10 W 47		R138	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R85	RRJ6GCJ102TE	RESISTOR 1/10 W 1K		R139	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R86	RRJ6GCJ332TE	RESISTOR 1/10 W 3.3K		R140	RRJ6GCJ272TE	RESISTOR 1/10 W 2.7K	
R87	RRJ6GCJ471TE	RESISTOR 1/10 W 470		R141	RRJ6GCJ153TE	RESISTOR 1/10 W 15K	
R88	RRJ6GCJ562TE	RESISTOR 1/10 W 5.6K		R142	RRJ6GCJ153TE	RESISTOR 1/10 W 15K	
R89	RRJ6GCJ101TE	RESISTOR 1/10 W 100		R143	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R90	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R144	RRJ6GCJ104TE	RESISTOR 1/10 W 100K	
R91	RRJ6GCJ331TE	RESISTOR 1/10 W 330		R145	RRJ6GCJ104TE	RESISTOR 1/10 W 100K	
R92	RRJ6GCJ562TE	RESISTOR 1/10 W 5.6K		R146	RRJ6GCJ104TE	RESISTOR 1/10 W 100K	
R93	RRJ6GCJ332TE	RESISTOR 1/10 W 3.3K		R147	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R94	RRJ6GCJ101TE	RESISTOR 1/10 W 100		R201	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
R95	RRJ6GCJ101TE	RESISTOR 1/10 W 100		R202	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
R96	RRJ6GCJ471TE	RESISTOR 1/10 W 470		R203	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
R97	RRJ6GCJ223TE	RESISTOR 1/10 W 22K		R204	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R98	RRJ6GCJ223TE	RESISTOR 1/10 W 22K		R205	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R99	RRJ6GCJ224TE	RESISTOR 1/10 W 220K		R206	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R100	RRJ6GCJ682TE	RESISTOR 1/10 W 6.8K		R207	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R101	RRJ6GCJ332TE	RESISTOR 1/10 W 3.3K		R208	RRJ6GCJ394TE	RESISTOR 1/10 W 390K	
R102	RRJ6GCJ102TE	RESISTOR 1/10 W 1K		R209	RRJ6GCJ184TE	RESISTOR 1/10 W 180K	
R103	RRJ6GCJ471TE	RESISTOR 1/10 W 470		R210	RRJ6GCJ823TE	RESISTOR 1/10 W 82K	
R104	RRJ6GCJ471TE	RESISTOR 1/10 W 470		R211	RRJ6GCJ273TE	RESISTOR 1/10 W 27K	
R105	RRJ6GCJ223TE	RESISTOR 1/10 W 22K		R212	RRJ6GCJ822TE	RESISTOR 1/10 W 8.2K	
R106	RRJ6GCJ223TE	RESISTOR 1/10 W 22K		R213	RRJ6GCJ472TE	RESISTOR 1/10 W 4.7K	
R107	RRJ6GCJ152TE	RESISTOR 1/10 W 1.5K		R214	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R108	RRJ6GCJ223TE	RESISTOR 1/10 W 22K		R217	RRJ6GCJ272TE	RESISTOR 1/10 W 2.7K	
R109	RRJ6GCJ473TE	RESISTOR 1/10 W 47K		R218	RRJ6GCJ153TE	RESISTOR 1/10 W 15K	
R110	RRJ6GCJ102TE	RESISTOR 1/10 W 1K		R220	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
				R221	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	

Ref. No.	Part No.	Part Name & Description	Remarks	Ref. No.	Part No.	Part Name & Description	Remarks
RESISTORS							
R1	RRJ6GCJ102TE	RESISTOR 1/10 W		R28	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R2	RRJ6GCJ222TE	RESISTOR 1/10 W 1K		R29	RRJ6GCJ562TE	RESISTOR 1/10 W 5.6K	
R3	RRJ6GCJ101TE	RESISTOR 1/10 W 2.2K		R30	RRJ6GCJ470TE	RESISTOR 1/10 W 47	
R4	RRJ6GCJ220TE	RESISTOR 1/10 W 100		R31	RRJ6GCJ104TE	RESISTOR 1/10 W 100K	(G)
R5	RRJ6GCJ104TE	RESISTOR 1/10 W 100K		R32	RRJ6GCJ332TE	RESISTOR 1/10 W 3.3K	
R6	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R33	RRJ6GCJ470TE	RESISTOR 1/10 W 47	
R7	RRJ6GCJ104TE	RESISTOR 1/10 W 100K		R34	RRJ6GCJ331TE	RESISTOR 1/10 W 330	(G)
R9	RRJ6GCJ220TE	RESISTOR 1/10 W 22		R35	RRJ6GCJ224TE	RESISTOR 1/10 W 220K	
R10	RRJ6GCJ221TE	RESISTOR 1/10 W 220		R36	RRJ6GCJ470TE	RESISTOR 1/10 W 47	(G)
R11	RRJ6GCJ103TE	RESISTOR 1/10 W 10K		R37	RRJ6GCJ101TE	RESISTOR 1/10 W 100	
R12	RRJ6GCJ220TE	RESISTOR 1/10 W 22		R38	RRJ6GCJ101TE	RESISTOR 1/10 W 100	
R14	RRJ6GCJ104TE	RESISTOR 1/10 W 100K		R40	RRJ6GCJ220TE	RESISTOR 1/10 W 22	
R15	RRJ6GCJ102TE	RESISTOR 1/10 W 1K		R41	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R16	RRJ6GCJ101TE	RESISTOR 1/10 W 100		R42	RRJ6GCJ152TE	RESISTOR 1/10 W 22K	
R17	RRJ6GCJ102TE	RESISTOR 1/10 W 1K		R43	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R18	RRJ6GCJ104TE	RESISTOR 1/10 W 100K		R44	RRJ6GCJ101TE	RESISTOR 1/10 W 100	
R19	RRJ6GCJ470TE	RESISTOR 1/10 W 47		R45	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
R20	RRJ6GCJ221TE	RESISTOR 1/10 W 220		R46	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R21	RRJ6GCJ101TE	RESISTOR 1/10 W 100		R47	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R22	RRJ6GCJ101TE	RESISTOR 1/10 W 100		R48	RRJ6GCJ101TE	RESISTOR 1/10 W 100	
R23	RRJ6GCJ102TE	RESISTOR 1/10 W 1K		R49	RRJ6GCJ332TE	RESISTOR 1/10 W 33K	
R24	RRJ6GCJ101TE	RESISTOR 1/10 W 100		R50	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
R25	RRJ6GCJ102TE	RESISTOR 1/10 W 1K		R51	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R26	RRJ6GCJ333TE	RESISTOR 1/10 W 33K		R52	RRJ6GCJ101TE	RESISTOR 1/10 W 100	
R27	RRJ6GCJ101TE	RESISTOR 1/10 W 100		R53	RRJ6GCJ470TE	RESISTOR 1/10 W 47	
				R54	RRJ6GCJ220TE	RESISTOR 1/10 W 22	
				R55	RRJ6GCJ224TE	RESISTOR 1/10 W 220K	
				R56	RRJ6GCJ101TE	RESISTOR 1/10 W 100	

RF-B65D

RF-B65D

Ref. No.	Part No.	Part Name & Description	Remarks
R218	RRJ6GCJ153TE	RESISTOR 1/10 W 15K	
R220	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
R221	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R222	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R223	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R224	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R225	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R226	RRJ6GCJ470TE	RESISTOR 1/10 W 47	
R227	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R228	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R229	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R230	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R231	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R232	RRJ6GCJ332TE	RESISTOR 1/10 W 3.3K	
R233	RRJ6GCJ331TE	RESISTOR 1/10 W 330	
R234	RRJ6GCJ104TE	RESISTOR 1/10 W 100K	
R235	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R236	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
R237	RRJ6GCJ182TE	RESISTOR 1/10 W 1.8K	
R238	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
R239	RRJ6GCJ330TE	RESISTOR 1/10 W 33	
R240	RRJ6GCJ101TE	RESISTOR 1/10 W 100	
R242	RRJ6GCJ104TE	RESISTOR 1/10 W 100K	
R243	RRJ6GCJ564TE	RESISTOR 1/10 W 560K	
R244	RRJ6GCJ102TE	RESISTOR 1/10 W 1K	
R245	RRJ6GCJ471TE	RESISTOR 1/10 W 470	
R246	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R247	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R248	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R249	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R250	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R251	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R252	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R253	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R254	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R255	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R256	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R257	RRJ6GCJ105TE	RESISTOR 1/10 W 1M	
R258	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R259	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R260	RRJ6GCJ223TE	RESISTOR 1/10 W 22K	
R261	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R262	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R263	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R264	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R265	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R266	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R267	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R268	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R269	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	
R270	RRJ6GCJ103TE	RESISTOR 1/10 W 10K	
R271	RRJ6GCJ473TE	RESISTOR 1/10 W 47K	

Ref. No.	Part No.	Part Name & Description	Remarks
C30	RCUV1H472MD	CAPACITOR 50 V 0.0047	
C31	RCUV1E103MD	CAPACITOR 25 V 0.01	
C32	RCUV1H680NC	CAPACITOR 50 V 68P	
C33	ECEA0GK4701	CAPACITOR 4 V 47	
C34	RCUV1H680NC	CAPACITOR 50 V 68P	
C35	RCUV1H472MD	CAPACITOR 50 V 0.0047	
C36	RCUV1H220NC	CAPACITOR 50 V 22P	
C37	RCUV1H150NC	CAPACITOR 50 V 15P	
C38	RCUV1H103ZF	CAPACITOR 50 V 0.01	
C39	ECEA1CK1001	CAPACITOR 16 V 10	
C40	RCUV1H030CC	CAPACITOR 50 V 3P	
C41	RCUV1H221K	CAPACITOR 50 V 220P <G>	
C42	RCUV1H472MD	CAPACITOR 50 V 0.0047	
C43	RCUV1H681K	CAPACITOR 50 V 680P <G>	
C44	RCUV1H103ZF	CAPACITOR 50 V 0.001	
C45	RCUV1H020CC	CAPACITOR 50 V 2P	
C46	ECEA1CK1001	CAPACITOR 16 V 10	
C47	RCUV1H103ZF	CAPACITOR 50 V 0.01	
C48	RCUV1H221K	CAPACITOR 50 V 220	
C49	RCUV1H103ZF	CAPACITOR 50 V 0.01	
C50	RCUV1H103ZF	CAPACITOR 50 V 0.01	
C51	ECEA1H0R471	CAPACITOR 50 V 0.47	
C52	RCUV1H102MD	CAPACITOR 50 V 0.001	
C53	RCUV1E103MD	CAPACITOR 25 V 0.01	
C54	ECEA0JK2201	CAPACITOR 6.3V 22	
C55	RCUV1H030CC	CAPACITOR 50 V 3P	
C56	ECEA1H0R471	CAPACITOR 50 V 0.47	
C57	ECEA1CK1001	CAPACITOR 16 V 10	
C58	RCUV1H050DC	CAPACITOR 50 V 5P	
C59	RCUV1H330NC	CAPACITOR 50 V 5P	
C60	ECEA1CK1001	CAPACITOR 16 V 10	
C61	ECEA1H0D101	CAPACITOR 50 V 1	
C62	RCUV1H102MD	CAPACITOR 50 V 0.001	
C63	RCUV1H103ZF	CAPACITOR 50 V 0.01	
C64	RCUV1H103ZF	CAPACITOR 50 V 0.01	
C65	RCUV1E103MD	CAPACITOR 25 V 0.01	
C66	ECEA1H0R331	CAPACITOR 25 V 0.33	
C67	RCUV1H101K	CAPACITOR 50 V 100P	
C68	RCUV1E103MD	CAPACITOR 25 V 0.01	
C69	RCUV1H103ZF	CAPACITOR 50 V 0.01	
C70	RCUV1E223MD	CAPACITOR 25 V 0.022	
C71	ECEA1H0D101	CAPACITOR 50 V 1	
C72	RCUV1H270JU	CAPACITOR 50 V 27P	
C73	RCUV1H472MD	CAPACITOR 50 V 0.0047	
C74	ECEA0GK4701	CAPACITOR 4 V 47	
C75	RCUV1H103ZF	CAPACITOR 50 V 0.01	
C76	RCUV1E103MD	CAPACITOR 25 V 0.01	
C77	RCUV1H103ZF	CAPACITOR 50 V 0.01	
C78	RCUV1H220NC	CAPACITOR 50 V 22P	
C79	ECEA0GK1011	CAPACITOR 4 V 100	
C80	RCUV1H103MD	CAPACITOR 25 V 0.01	
C81	ECEA1CK1001	CAPACITOR 16 V 10	

[illegible]