

Service Manual

Radio

RF-B65D

FM-LW-MW-SW ALL BAND RECEIVER

Color

(K) Black Type



Area

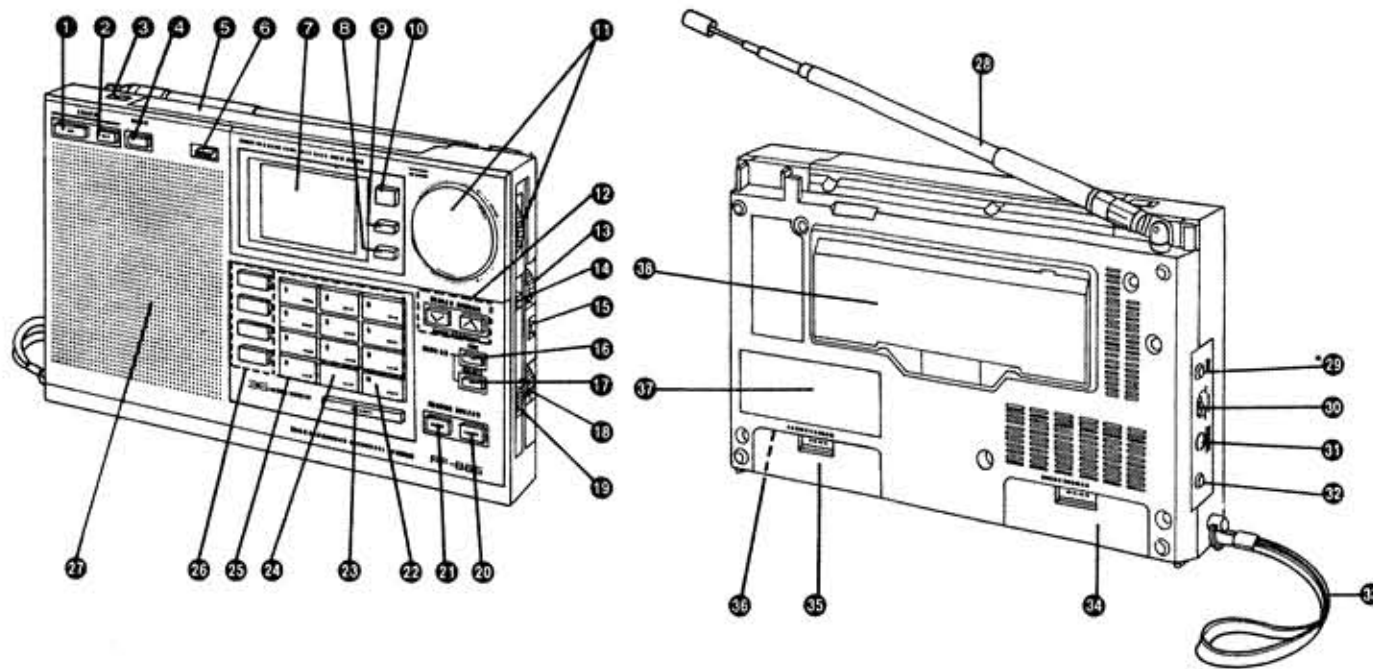
Country Code	Area	Color
(EG)	F.R. Germany	(K)
(G)	Asia, Latin America, Middle Near East, Africa and Oseania.	

■ 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 , \varnothing 3.5 EXT. ANT. (LW/MW/SW); \varnothing 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.

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 (v • ^)**
Press the Up Key (^) or Down Key (v) 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)**

- *29** 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 ⊖ ⊕)**

- 32 Earphone Jack (C)**
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)**

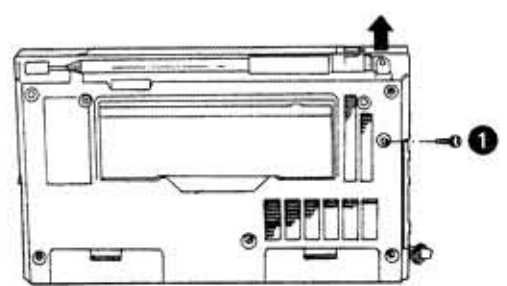
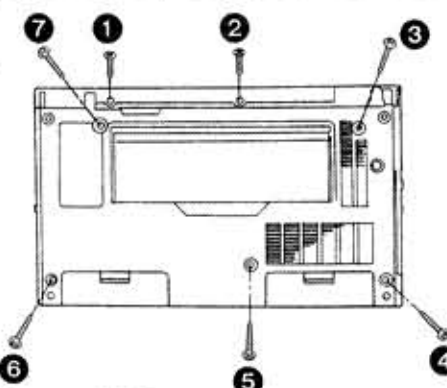
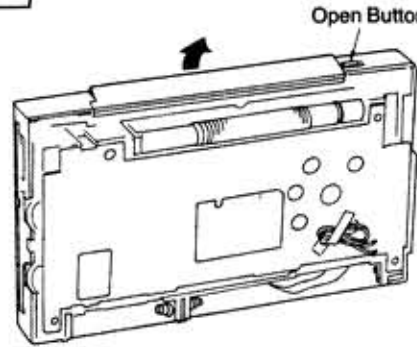
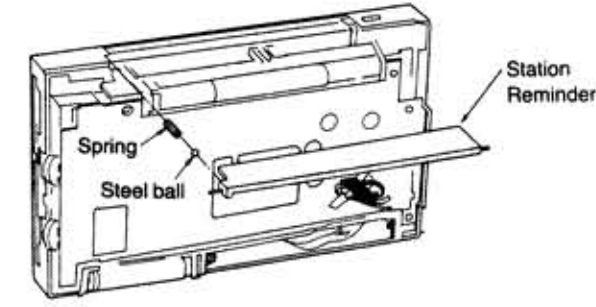
- 35 Memory Back-up Battery Compartment (BACK-UP BATTERY)**

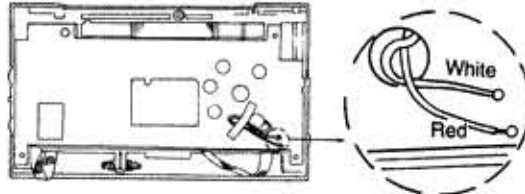
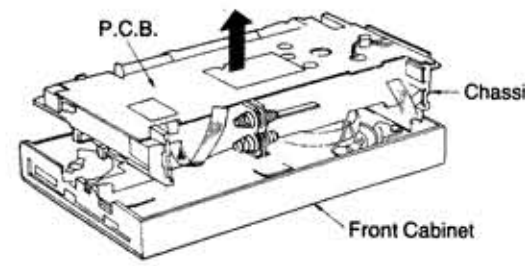
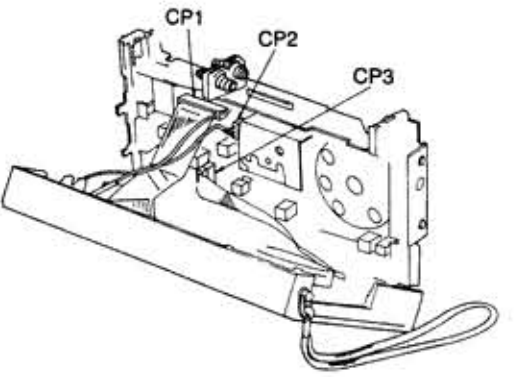
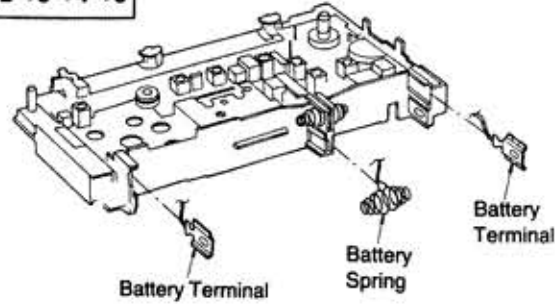
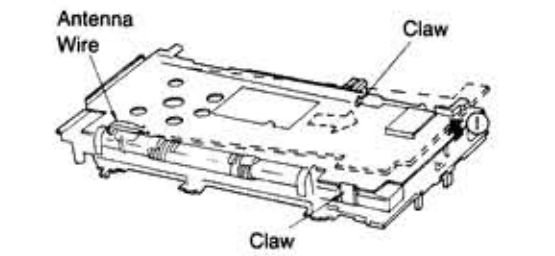
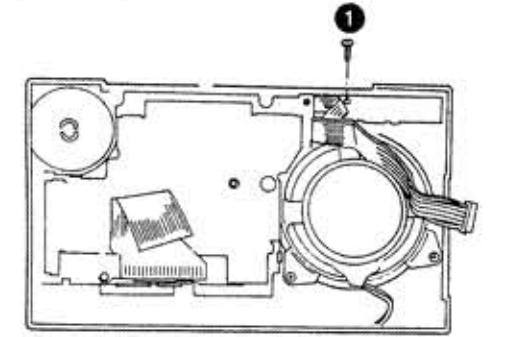
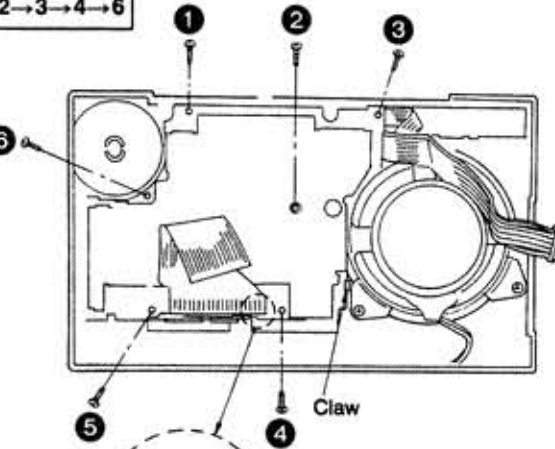
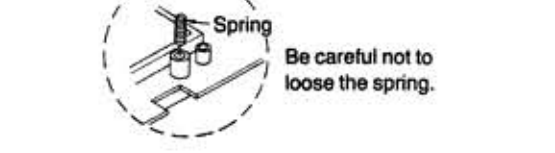
- 36 MW Frequency Step Selector (In the Memory Back-up Battery Compartment)**
Before use, check that the selector is set to the frequency step corresponding to your area. If not so, set the selector to the correct position.

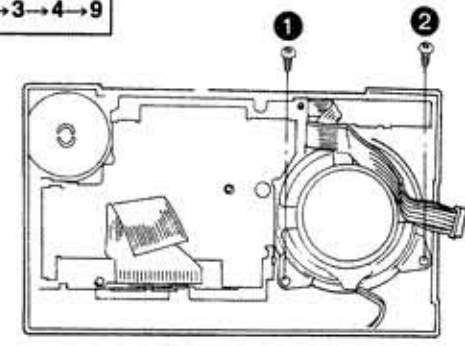
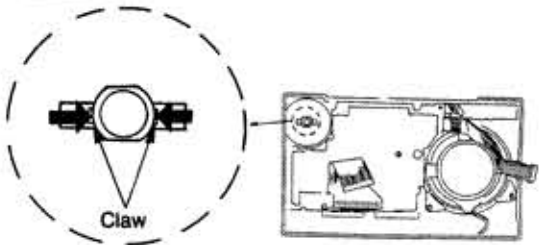
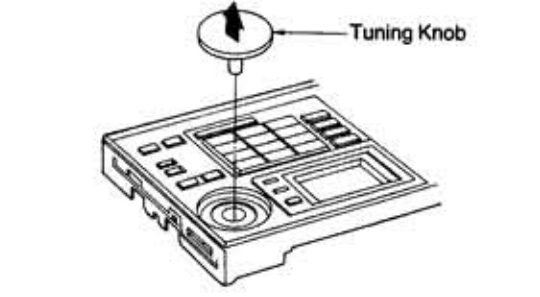
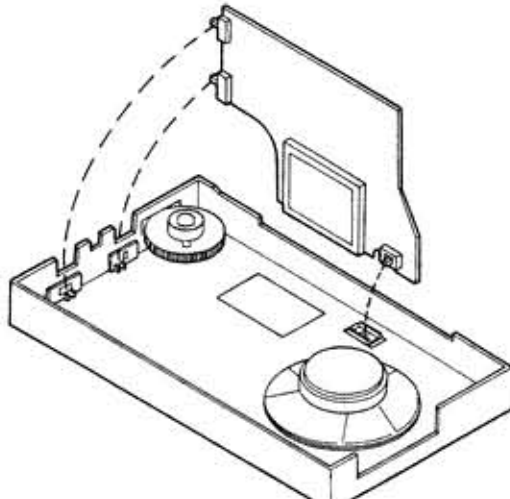
- 37 World Time Table**

- 38 Stand/Short Wave Frequency Allocation**

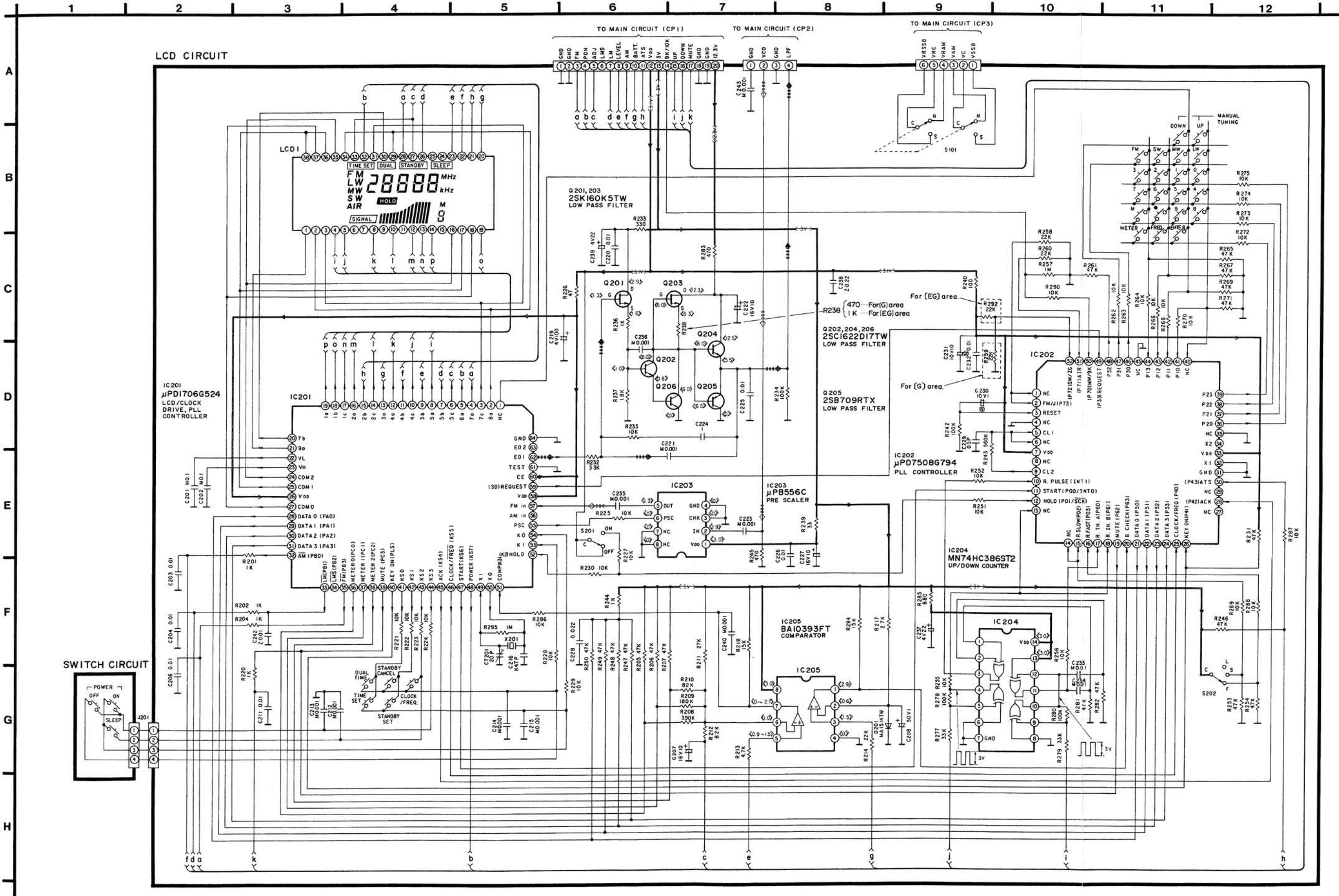
DISASSEMBLY INSTRUCTIONS

Ref. No. 1	Removal of the Telescopic Antenna	Ref. No. 2	Removal of the Rear Cabinet
Procedure 1	 <ol style="list-style-type: none"> 1. Remove the screw ①. 2. Remove the Telescopic Antenna in the direction of the arrow. 	Procedure 1→2	 <ol style="list-style-type: none"> 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	 <ol style="list-style-type: none"> 1. Open the Station Reminder. 		 <ol style="list-style-type: none"> 2. Remove the Station Reminder. Be careful not to loose the steel ball and the spring.

Ref. No. 4	Removal of the Chassis	Ref. No. 5	Removal of the Main P.C.B.
Procedure 1→2→3→4  1. Remove the solder from speaker terminal.  2. Remove the chassis and P.C.B.  3. Remove the connector (CP1, CP2, CP3).		Procedure 1→2→3→4→5  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		Ref. No. 6	
Removal of the Power Switch P.C.B. Procedure 1→2→3→4→7  • Remove the screw (①).		Removal of the L.C.D. P.C.B. Procedure 1→2→3→4→6  1. Remove the 6 screws (①~⑥). 2. Remove the claw.  Be careful not to loose the spring.	

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

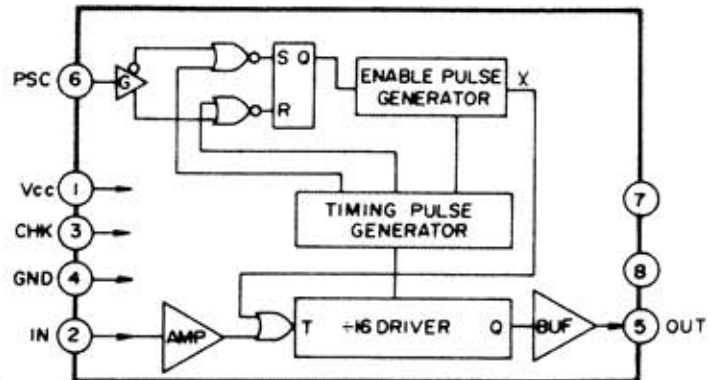
SCHEMATIC DIAGRAM (for LCD Circuit Section and Switch Circuit Section)



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.

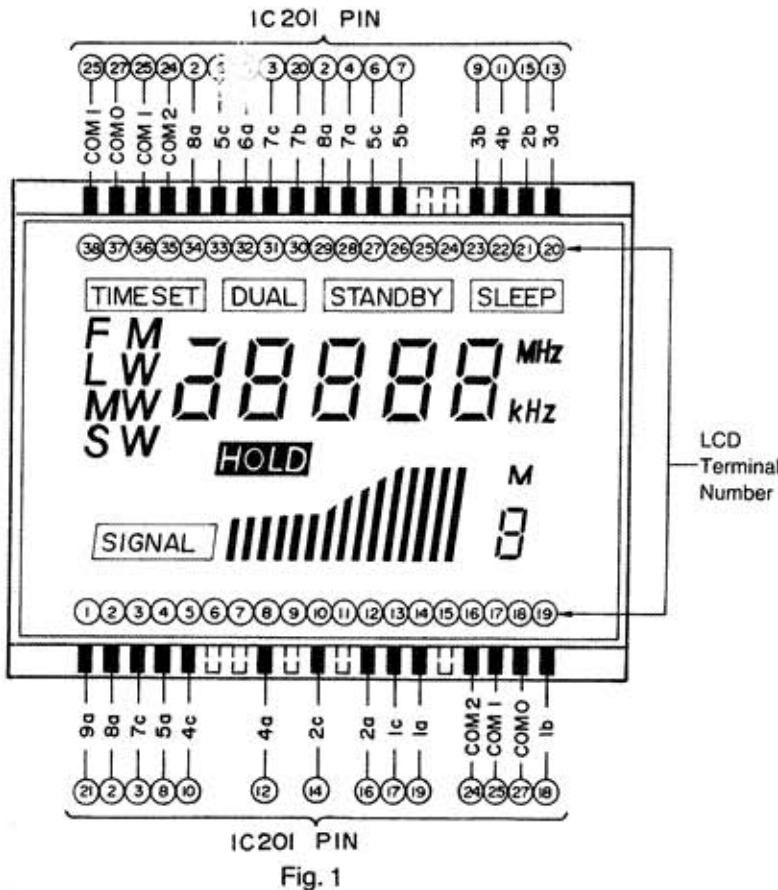
IC203 RVIUPB556C



- ➔ +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:

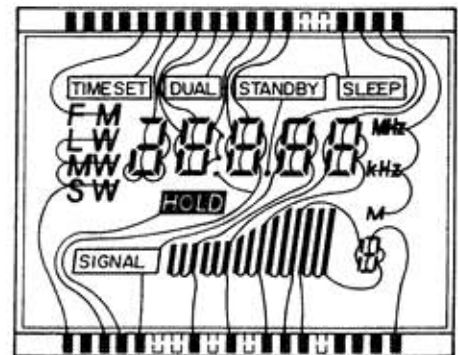


Fig. 2 (Segment)

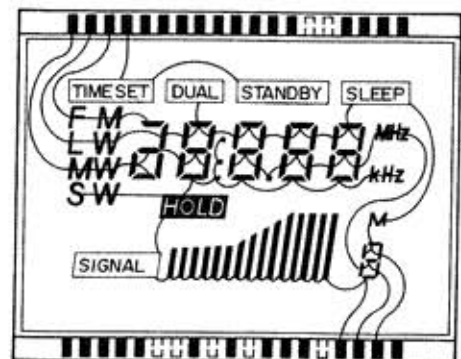
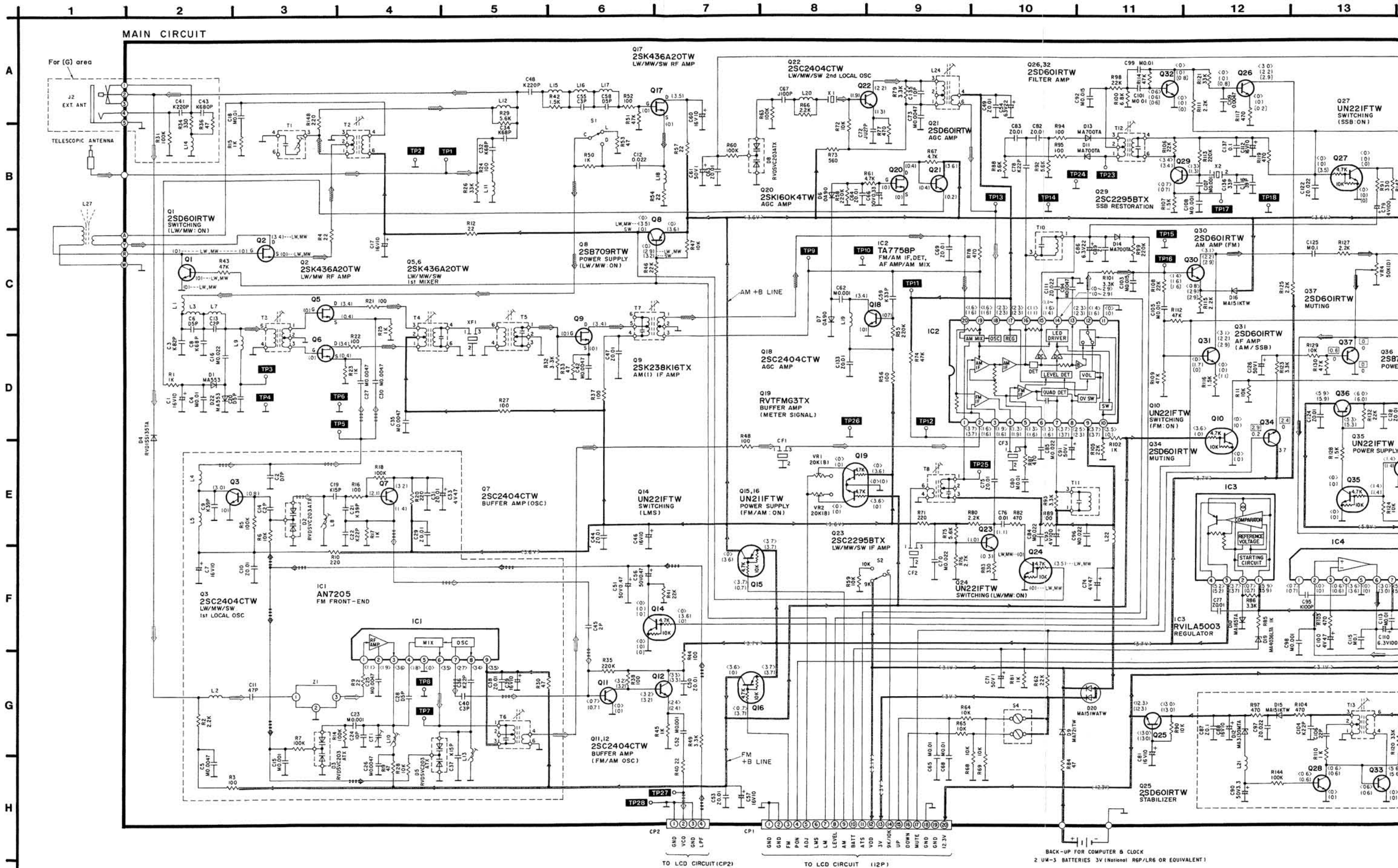


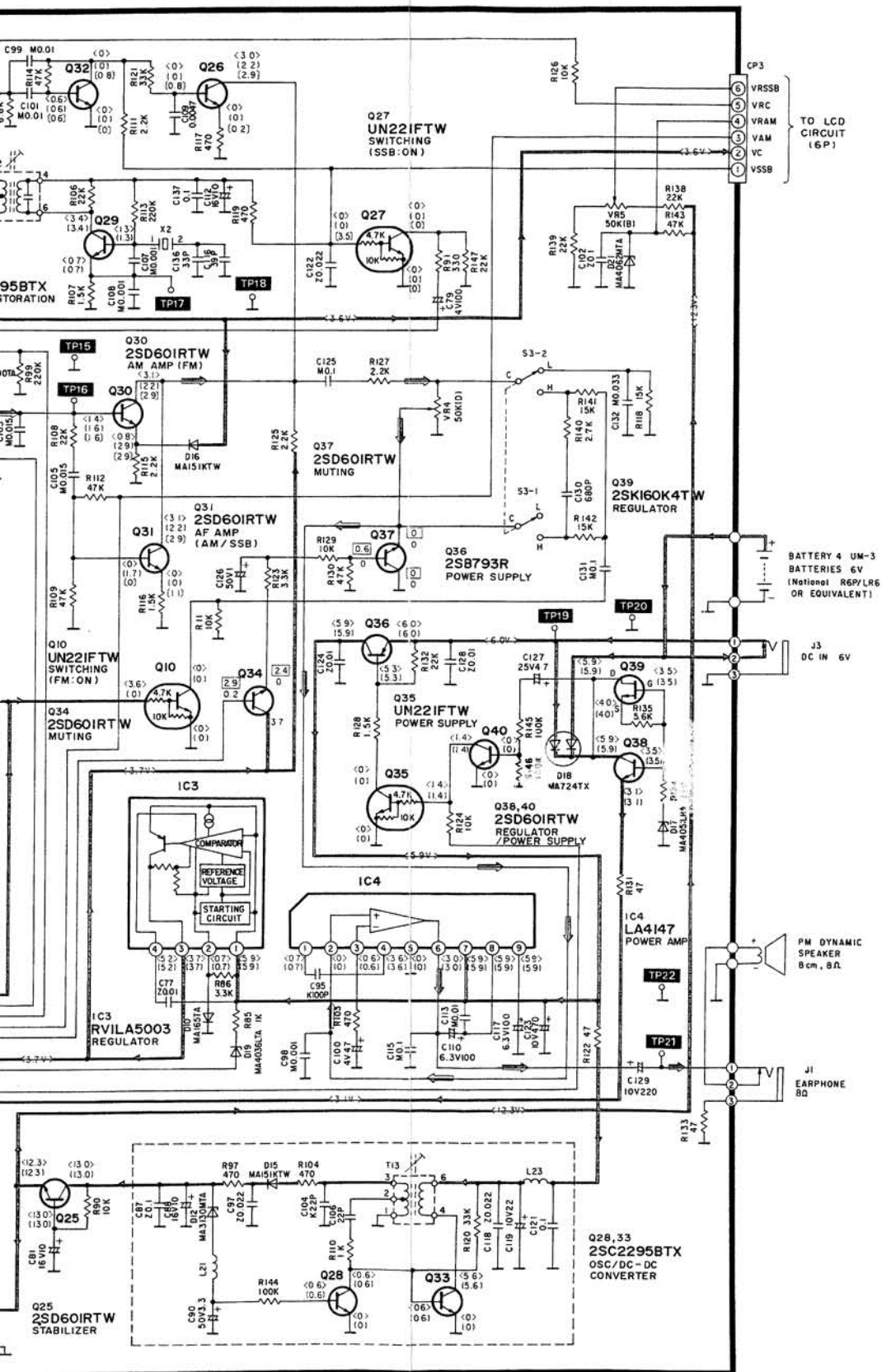
Fig. 3 (Common)

SCHEMATIC DIAGRAM (for Main Circuit Section)



BACK-UP FOR COMPUTER & CLOCK
 2 LW-3 BATTERIES 3V (National R6P/LR6 OR EQUIVALENT)

11 12 13 14 15 16 17 18 19

**Note:**

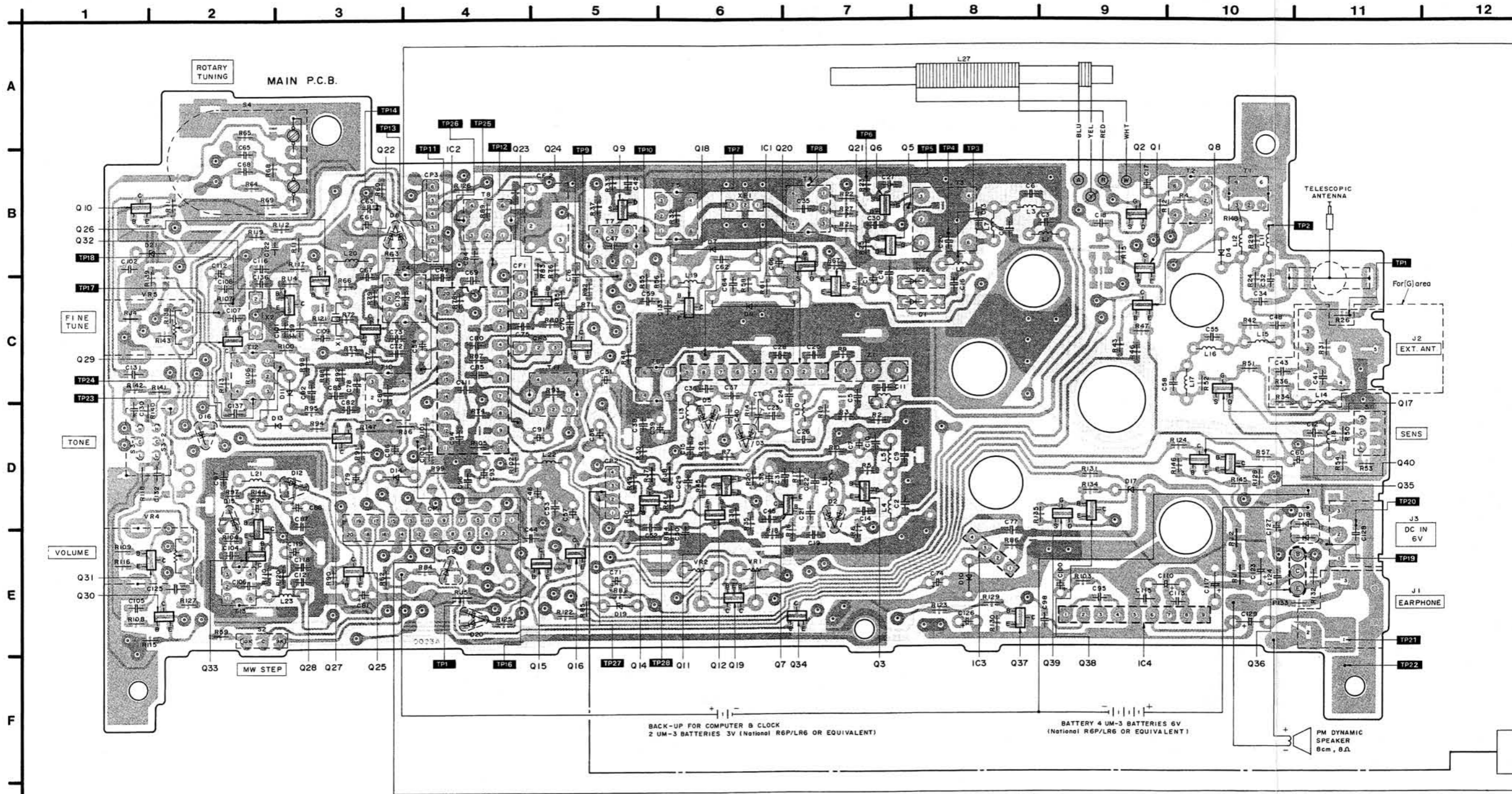
- S1: Sensitivity select switch in "DX" position. (L...LOCAL, D...DX)
- S2: MW frequency step select switch in "9 kHz" position.
- S3-1, S3-2: Tone select switch in "HIGH" position. (H...HIGH, L...LOW)
- S4: Rotary tuning switch.
- VR1: Signal meter (SW) adjustment VR.
- VR2: Signal meter (FM) adjustment VR.
- VR4: Volume control VR.
- VR5: Fine tuning control VR.
- The mark (■) shows test point e.g. TP1=test point 1.
- DC voltage measurements are taken with an electronics voltmeter from the negative terminal of the battery.
 - < >...FM position, ()...AM position, []...SSB, □...MUTING
- 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
- FM, LW, MW, SW VCO Out Line
- LW, MW, SW 2nd OSC Signal Line
- FM, LW, MW, SW Vcap in Line
- FM Signal Line

CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

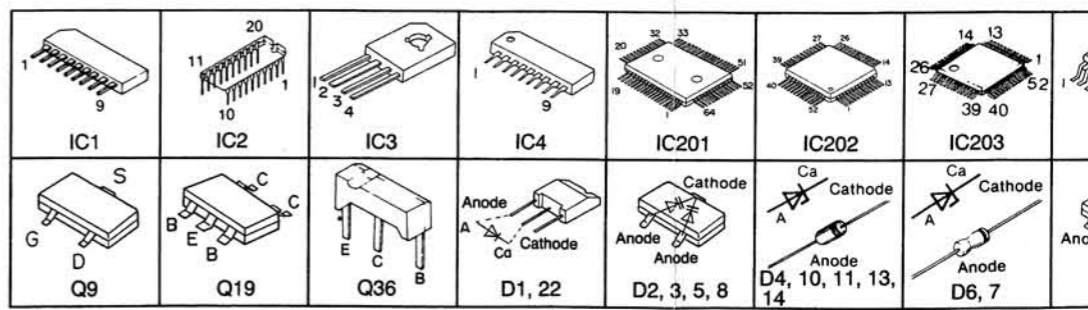


This printed circuit board is shown from the back side of chip parts.

Notes:

1. The circuit shown in () on the conductor indicates printed circuit on the back side of the printed circuit board.
2. The circuit shown in () on the conductor indicates printed circuit on the front side of the printed circuit board.
3. The symbols () shown in the circuit board indicate connection points between conductors on the front side and back side of the circuit board.
4. : Chip Jumper.
5. : Chip Resistor.

• This circuit board diagram may be modified at any time with the development of new technology.



LCD P.C.B.

IC204

IC205

AM MODE

0024A a

IC201

Q201

ROTARY
TUNING
STEP

Q202

Q206

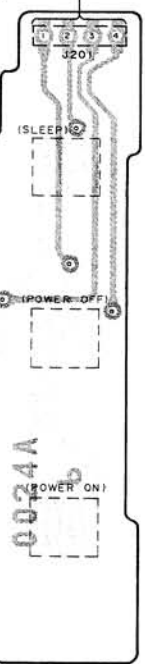
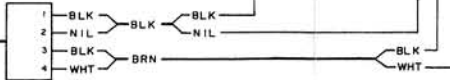
Q205

Q204

Q203

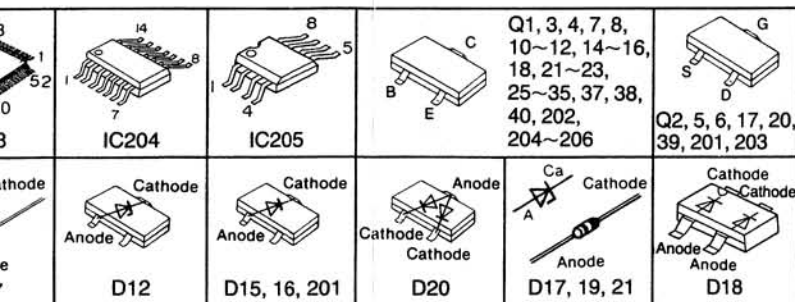
IC203

HOLD



SWITCH P.C.B.

IC202

**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:

- | | | | | | | | | | | | | | | | |
|--|---|-------------------|------------------|----------------|---------------|----------------|---------------|-----------------|------------------|-----------------|---------------------|----------------|------------------|--|------------------|
| <ol style="list-style-type: none"> 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. | <ol style="list-style-type: none"> 9. Set SSB switch to OFF or ON. 10. Set power source voltage to 6 V DC. 11. Memorize the following frequency. <table border="0" style="margin-left: 20px;"> <tr> <td>FM CH1...87.5 MHz</td> <td>LW CH1...155 kHz</td> </tr> <tr> <td>CH2...90.0 MHz</td> <td>CH2...450 kHz</td> </tr> <tr> <td>CH3...98.0 MHz</td> <td>CH3...459 kHz</td> </tr> <tr> <td>CH4...106.0 MHz</td> <td>MW CH1...605 kHz</td> </tr> <tr> <td>CH5...108.0 MHz</td> <td>SW CH1...10,000 MHz</td> </tr> <tr> <td>CH6...94.0 MHz</td> <td>CH2...15,000 MHz</td> </tr> <tr> <td></td> <td>CH3...29,999 MHz</td> </tr> </table> | 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 |
| 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

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Frequency counter. 2. Oscilloscope (Dual dimension). 3. RF voltmeter. | <ol style="list-style-type: none"> 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						
(5) 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.)
(6) FM	"	"	"	"	T11 (FM 2nd IFT)	Adjust for maximum amplitude. (Refer to fig. 3.)

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						
(7)	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.
(8)	FM	"	106.00 MHz	106.00 MHz (CH4)	"	CT1 Adjust for maximum output. Repeat steps (6), (7).
FM-AUTO STOP ZERO VOLTAGE ALIGNMENT						
(9)	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 loof 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 loof of several turns of wire and radiate signal into loop of receiver.	94.00 MHz (30 dB)	94.00 MHz (CH6)	VR2 ●Adjust VR2 50 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. <table border="1"> <thead> <tr> <th>Room Temperature</th> <th>Area</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td rowspan="2">8°C ≤ t < 22°C</td> <td>(EG)</td> <td>81,945000 MHz ± 300 Hz</td> </tr> <tr> <td>(G)</td> <td>85,844000 MHz ± 300 Hz</td> </tr> <tr> <td rowspan="2">22°C ≤ t < 26°C</td> <td>(EG)</td> <td>81,944800 MHz ± 300 Hz</td> </tr> <tr> <td>(G)</td> <td>85,843800 MHz ± 300 Hz</td> </tr> <tr> <td rowspan="2">26°C ≤ t < 30°C</td> <td>(EG)</td> <td>81,944500 MHz ± 300 Hz</td> </tr> <tr> <td>(G)</td> <td>85,843500 MHz ± 300 Hz</td> </tr> <tr> <td rowspan="2">30°C ≤ t < 33°C</td> <td>(EG)</td> <td>81,944100 MHz ± 300 Hz</td> </tr> <tr> <td>(G)</td> <td>85,843100 MHz ± 300 Hz</td> </tr> </tbody> </table>	Room Temperature	Area	Frequency	8°C ≤ t < 22°C	(EG)	81,945000 MHz ± 300 Hz	(G)	85,844000 MHz ± 300 Hz	22°C ≤ t < 26°C	(EG)	81,944800 MHz ± 300 Hz	(G)	85,843800 MHz ± 300 Hz	26°C ≤ t < 30°C	(EG)	81,944500 MHz ± 300 Hz	(G)	85,843500 MHz ± 300 Hz	30°C ≤ t < 33°C	(EG)	81,944100 MHz ± 300 Hz	(G)	85,843100 MHz ± 300 Hz
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	(G)	85,843100 MHz ± 300 Hz																									

■ ALIGNMENT POINT

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

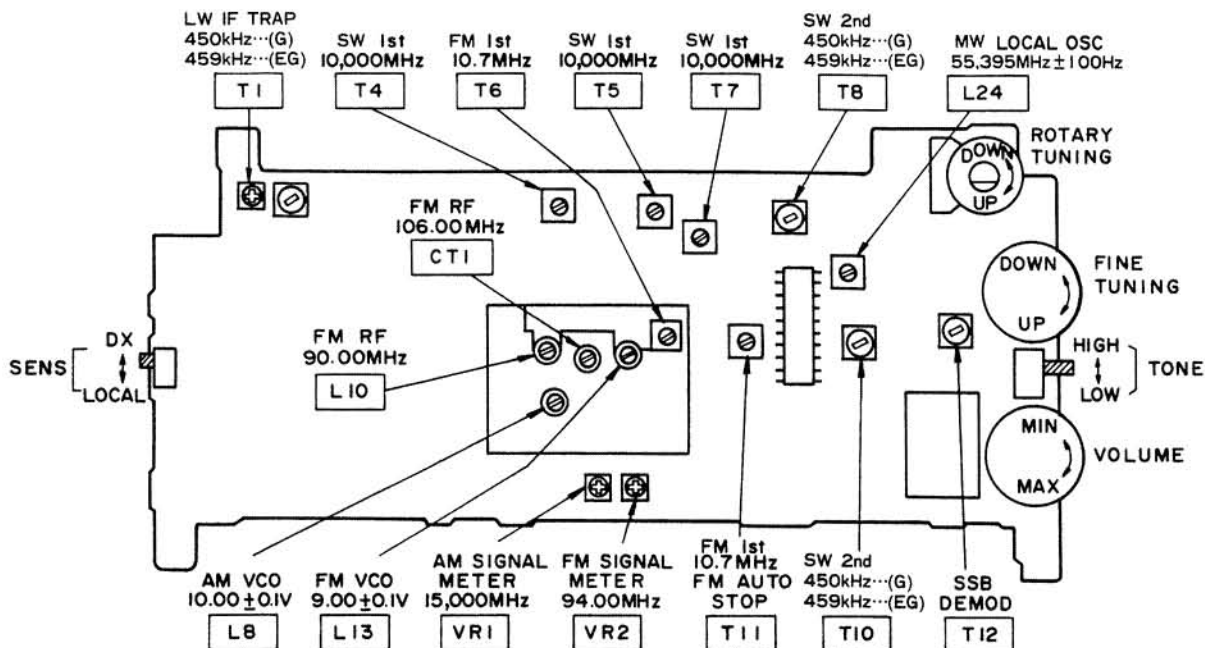


Fig. 1

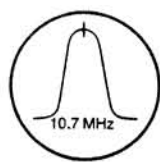


Fig. 2



Fig. 3

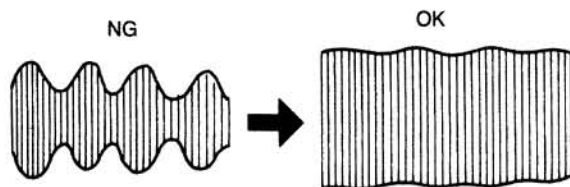


Fig. 4

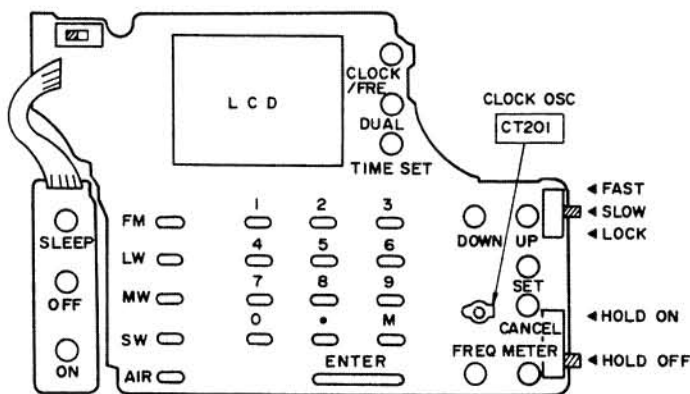
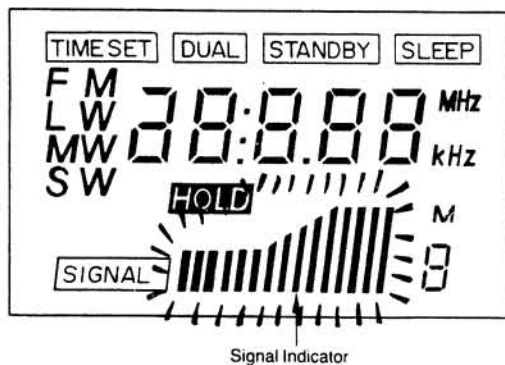


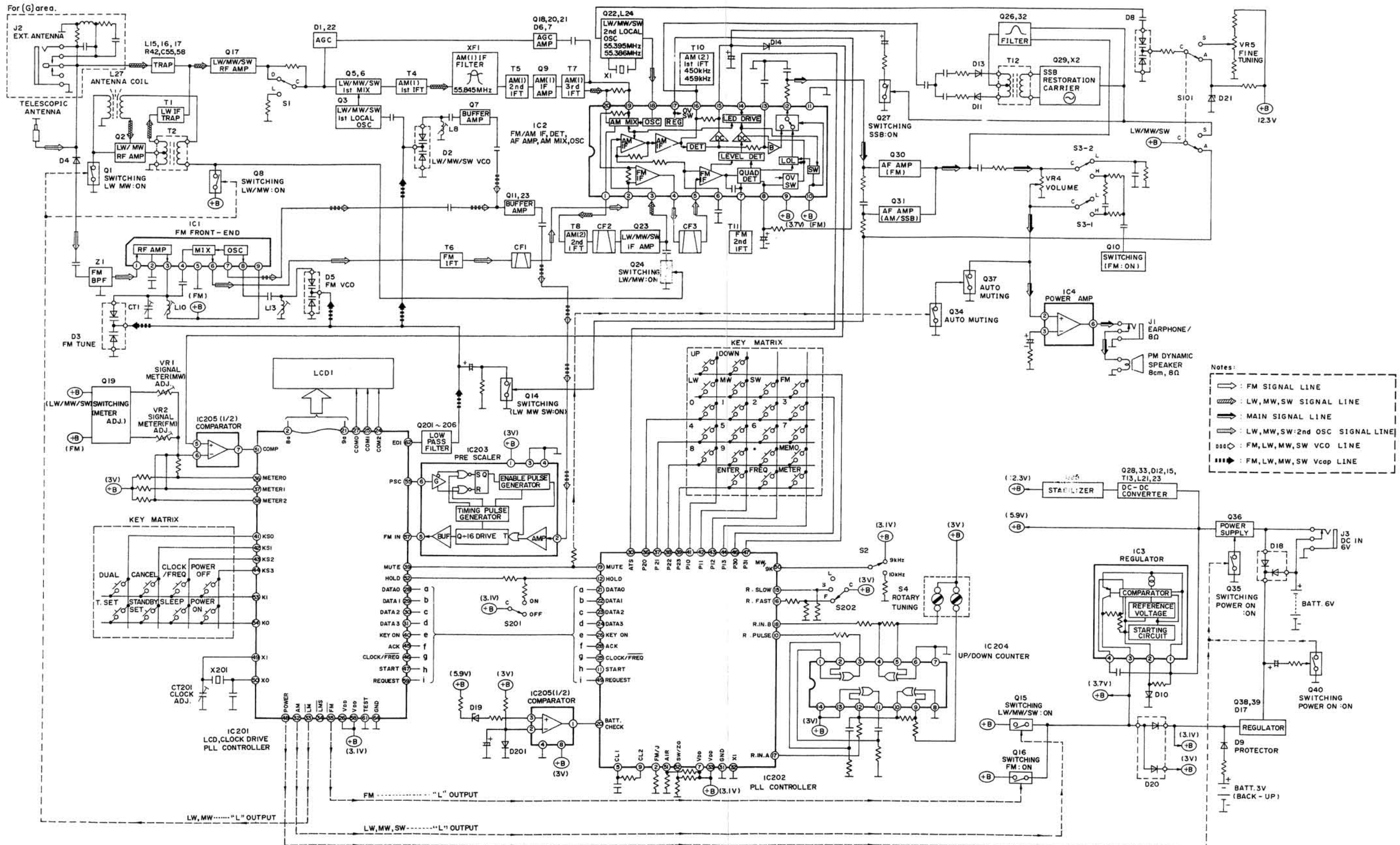
Fig. 5



Signal Indicator

Fig. 6

BLOCK DIAGRAM



- Notes:
- FM SIGNAL LINE
 - ▨ LW, MW, SW SIGNAL LINE
 - MAIN SIGNAL LINE
 - ▨ LW, MW, SW: 2nd OSC SIGNAL LINE
 - ◊ FM, LW, MW, SW VCO LINE
 - ◊ FM, LW, MW, SW Vcop LINE

CABINET PARTS LOCATION

