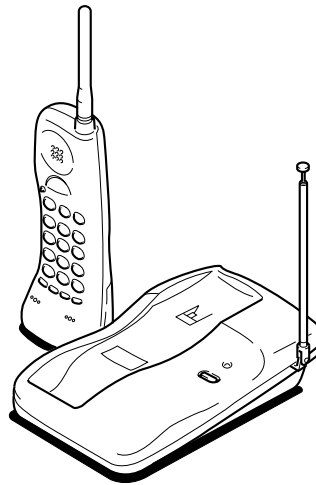


# SPP-68

## SERVICE MANUAL

*E Model*



### SPECIFICATIONS

#### General

Frequency control	Crystal-controlled PLL
Operation mode	FM, duplex
Operation channel	10 channels
Supplied accessories	AC power adaptor AC-T56 (1) Telephone line cord (1) Rechargeable battery pack BP-T16 (1) Screws (2) Directories (2 sheets)

#### Handset

Power source	Rechargeable battery pack BP-T16
Battery life	Standby: Approx. 14 days Talk: Approx. 6 hours
Dimensions	Approx. 59 x 201 x 59 mm (w/h/d), antenna excluded Antenna: Approx. 110 mm
Mass	Approx. 230 g, battery included

#### Base unit

Power source	DC 9V from AC power adaptor
Battery charging time	Approx. 12 hours
Dimensions	Approx. 148 x 58 x 233 mm (w/h/d), antenna excluded Antenna: Approx. 430 mm
Mass	Approx. 345 g

Design and specifications are subject to change without notice.

CORDLESS TELEPHONE

**SONY**®



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### Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270 °C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

### Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

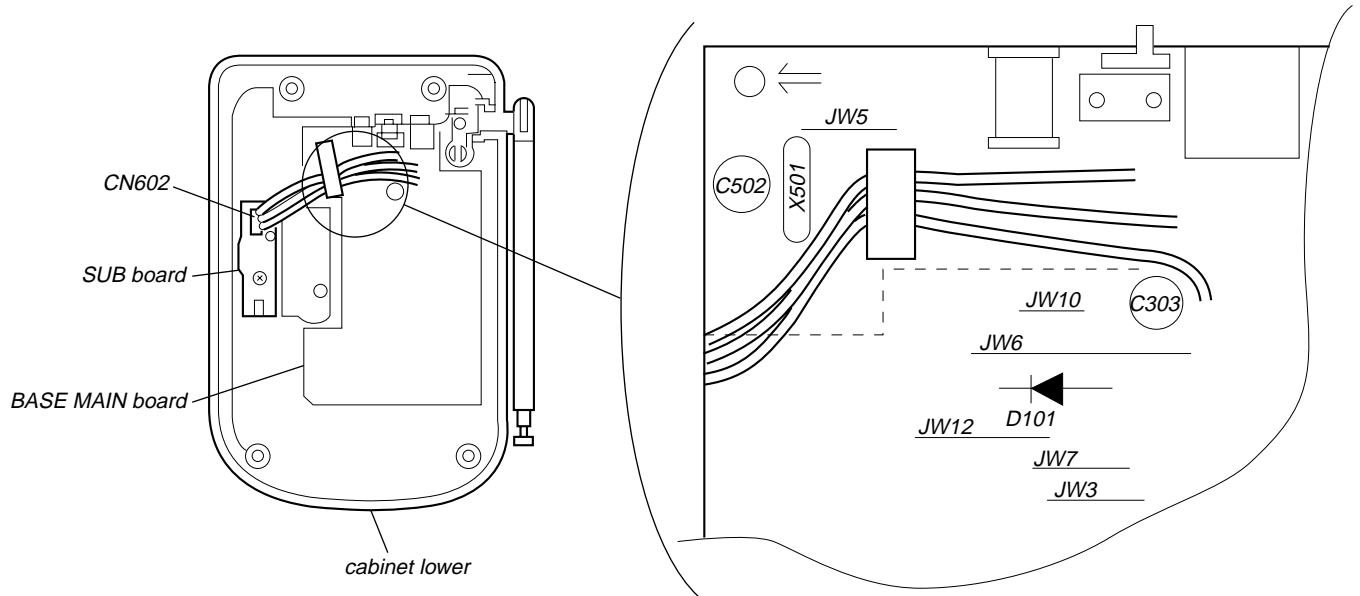
### SAFETY-RELATED COMPONENT WARNING!!

**COMPONENTS IDENTIFIED BY MARK  $\triangle$  OR DOTTED LINE WITH MARK  $\triangle$  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.**

# SECTION 1 SERVICING NOTES

## PREVENT ELECTROSTATIC DESTRUCTION

- To prevent electrostatic destruction in replacing the main board, etc., fasten the CN602 cable as shown below.



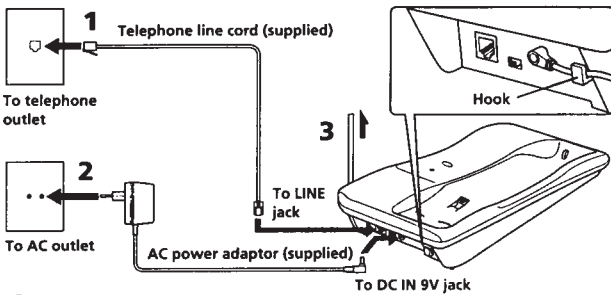
## SECTION 2 GENERAL

This section is extracted from instruction manual.

### Setting up the phone

#### Connect the base unit

If you want to hang the base unit on the wall, mount the unit first (see below).

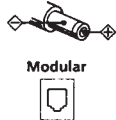


- 1 Connect the telephone line cord to the LINE jack and to a telephone outlet.
- 2 Connect the AC power adaptor to the DC IN 9V jack and to an AC outlet.
- 3 Fully extend the antenna. Make sure it points toward the ceiling.

#### Notes

- Use only the supplied AC-T56 AC power adaptor. Do not use any other AC power adaptor.
- Connect the AC power adaptor to a continuous power supply.
- Place the base unit close to the AC outlet so that you can unplug the AC power adaptor easily.

#### Polarity of the plug

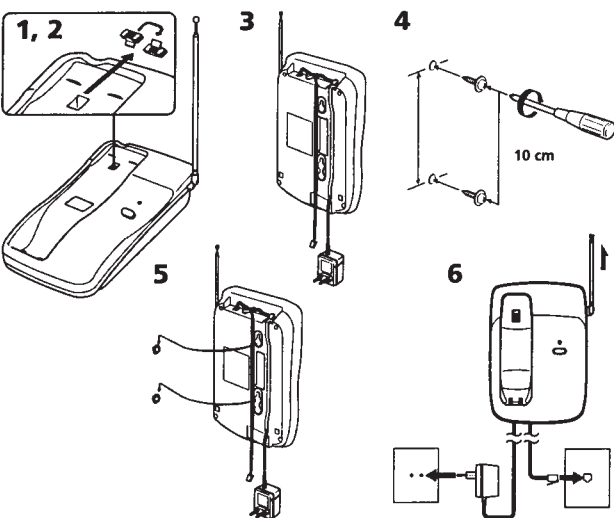


#### Tip

If your telephone outlet is not modular, contact your telephone service company for assistance.

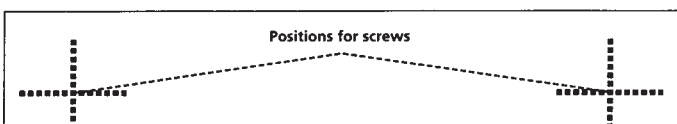
#### If you mount your phone on the wall

- 1 Remove the hang-up tab.
- 2 Reverse the hang-up tab and insert it back.
- 3 Plug one end of the telephone line cord to the LINE jack and the AC power adaptor cord to the DC IN 9V jack. Then attach each cord to the base unit.
- 4 Attach the screws (supplied) to the wall.
- 5 Hook the base unit to the screws as illustrated.
- 6 Plug the other end of the telephone line cord into the telephone outlet and the AC power adaptor into the AC outlet. Then fully extend the antenna.



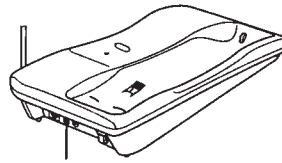
#### Template for mounting the phone on the wall

To determine the positions for the screws, cut out the template below and use it as a guide. Consider the weight of the phone when you choose the place to hang it.



#### Choose the dialing mode

For the telephone to work properly, select an appropriate dialing mode (tone or pulse).



DIAL MODE switch

Depending on your dialing system, set the DIAL MODE switch as follows:

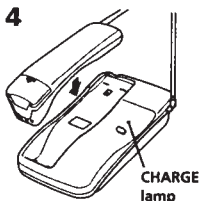
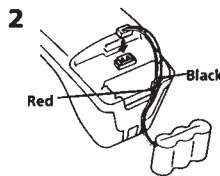
If your dialing system is	Set the switch to
Tone	T
Pulse	P

#### If you aren't sure of your dialing system

Make a trial call with the DIAL MODE switch set to T. If the call connects, leave the switch as is; otherwise, set to P.

#### Prepare the battery pack

Insert the battery into the handset and charge first before you start using your phone.



- 1 Slide open the battery compartment lid of the handset.
- 2 Connect the battery connector with correct polarity (black and red cords).
- 3 Insert the battery pack, and close the lid.
- 4 Place the handset on the base unit.

The CHARGE lamp lights up when the handset is properly seated on the charge terminals of the base unit. Charge the battery pack for more than 12 hours so that the battery is fully charged. The CHARGE lamp remains lit even after charging is completed.

#### Battery duration

A fully charged battery pack lasts for about:

- 6 hours when you use the handset continuously.
- 14 days when the handset is standing by.

#### Notes

- The battery pack will gradually discharge over a long period of time, even if not in use.
  - The battery works best when charged every two or three days. For best performance, do not return the handset to the base unit after every call.
- If the battery runs out completely, the speed dial numbers and the digital security code will be erased. If this happens, charge it on the base unit for over 12 hours. Then reprogram the speed dial numbers, and assign a new digital security code (see "Resetting the digital security code"). You may need to charge the battery several times before it is recharged to its full capacity.

#### When to purchase a new battery pack

If the battery lasts only a few minutes even after 12 hours of charging, the usable life of the battery has expired and needs replacement. Contact your local Sony authorized dealer or service center, and ask for Sony BP-T16 rechargeable battery pack.

### Making and receiving calls

#### Making calls

- 1 Pick up the handset from the base unit.
- 2 Press **TALK**, and wait until the TALK/BATT LOW lamp lights up. You then hear a dial tone. If you hear beeps, move closer to the base unit.
- 3 Dial the phone number.
- 4 When you're done talking, press **OFF**. The TALK/BATT LOW lamp goes off.

#### Additional tasks

To	Do this
Switch to tone dialing temporarily	Press <b>TONE</b> (*) after you're connected. The line will remain in tone dialing until disconnected.

## Receiving calls

- When you hear the phone ring;
    - Press **(TALK)** (or any key except **(OFF)**).
    - or
    - Pick up the handset from the base unit when the handset is placed on the base unit.

The TALK/BATT LOW lamp lights up.
  - When you're done talking, replace the handset on the base unit or press **(OFF)**.
- The TALK/BATT LOW lamp goes off.

### Additional tasks

To	Do this
Switch to another call ("call waiting" service)	Press <b>(FLASH)</b> . Press <b>(FLASH)</b> again to get back to the first caller.

- You need to subscribe to this service from your telephone company.

### Notes

- Do not cover the microphone during the conversation; otherwise, the other party cannot hear your voice.
- If you hear beeps during the conversation, move closer to the base unit; otherwise, the call will be disconnected after 15 seconds. Note that, however, you may not hear beeps if it's noisy on the handset.

### If interference occurs on the handset

When you press **(TALK)**, the handset automatically searches for the channel with the best reception. However, if you notice interference during a conversation, move closer to the base unit.

If interference persists, press **(CHANNEL)** to switch to another channel to improve the sound quality of your telephone conversation.

### Note

If you hear five short beeps when you press **(CHANNEL)**, move closer to the base unit.

### If the handset battery becomes weak during a call

The handset will beep every three seconds with the TALK/BATT LOW lamp flashing at the same time. Finish your call and charge the battery pack.

### Caution

If this occurs, you cannot use the handset without charging it for more than 1 minutes.

## Redialing

- Press **(TALK)**, and wait until the TALK/BATT LOW lamp lights up.
- Press **(REDIAL/PAUSE)** to redial the number last dialed.

### Note

If the number exceeds 32 digits, the beeps will alert you that the number can't be dialed.

### To erase the last phone number dialed

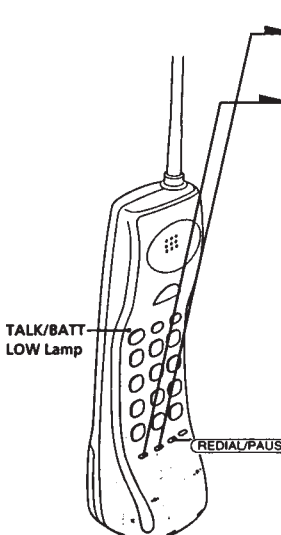
Press **(REDIAL/PAUSE)** twice.

The number will be erased from the memory, and you'll hear a long confirmation beep.

## Speed dialing

You can dial with a touch of a few keys by storing a phone number on a dialing key.

### Storing phone numbers

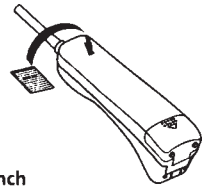
- 
- Press **(PGM)**.  
The TALK/BATT LOW lamp flashes.
  - Press **(SPEED DIAL)**.
  - Press one of the dialing keys (**(0)** to **(9)**) to store a phone number on.  
You hear a confirmation beep.
  - Enter the phone number you want to store.  
You can enter up to 16 digits, including a tone and a pause, each of which is counted as one digit.
  - Press **(PGM)**.  
You hear a long confirmation beep, and the number is stored. The TALK/BATT LOW lamp goes off.

### Note

Do not allow more than 20 seconds to elapse between each step of the procedure.

### Tips

- If you enter a wrong number, press **(PGM)**, then start from the beginning.
- You can attach the supplied directory on the handset.
- You can't receive calls while you're storing numbers.



### To store a number to be dialed via Private Branch Exchange (PBX)

Before entering a phone number in step 4, do as follows:

- Enter the outside line access digit (e.g., 9).
- Press **(REDIAL/PAUSE)**.

### To change a stored number

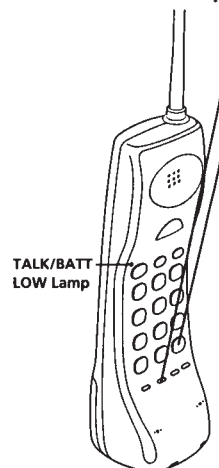
Store a new number, as described previously.

## Making calls with speed dialing

- Press **(TALK)** and wait until the TALK/BATT LOW lamp lights up.
- Press **(SPEED DIAL)**.
- Enter the desired speed dialing number (**(0)** to **(9)**).  
The phone number stored in the speed dialing number will be dialed.

## Resetting the digital security code

The first time you charge the battery pack, a random security code is automatically assigned between the base unit and the handset. Only a handset which has this security code can make calls through the base unit. This system prevents the possibility of other cordless telephone handsets making calls through your base unit. You normally do not need to reset the security code. However, in the unlikely event that you suspect that another cordless phone uses the same security code, you can manually change the code. Pick up the handset from the base unit, and proceed as follows:

- 
- Press **(PGM)**.  
The TALK/BATT LOW lamp flashes.
  - Press **(#)**.  
You hear a confirmation beep.
  - Press three of the dialing keys (**(001)** to **(999)**) to store a new code.
  - Press **(PGM)**.  
You hear a long confirmation beep and the TALK/BATT LOW lamp goes off.
  - Immediately replace the handset on the base unit.  
You hear a long confirmation beep and the phone stores the new code.

### Note

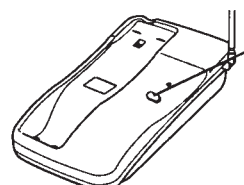
If the battery pack in the handset is completely discharged, or is removed from the handset for more than several seconds, the digital security code stored will be lost. If this happens, charge the battery pack and a new security code will be automatically assigned.

### Tip

This procedure will change the code in both the base unit and the handset. The code can be changed as often as desired.

## Paging

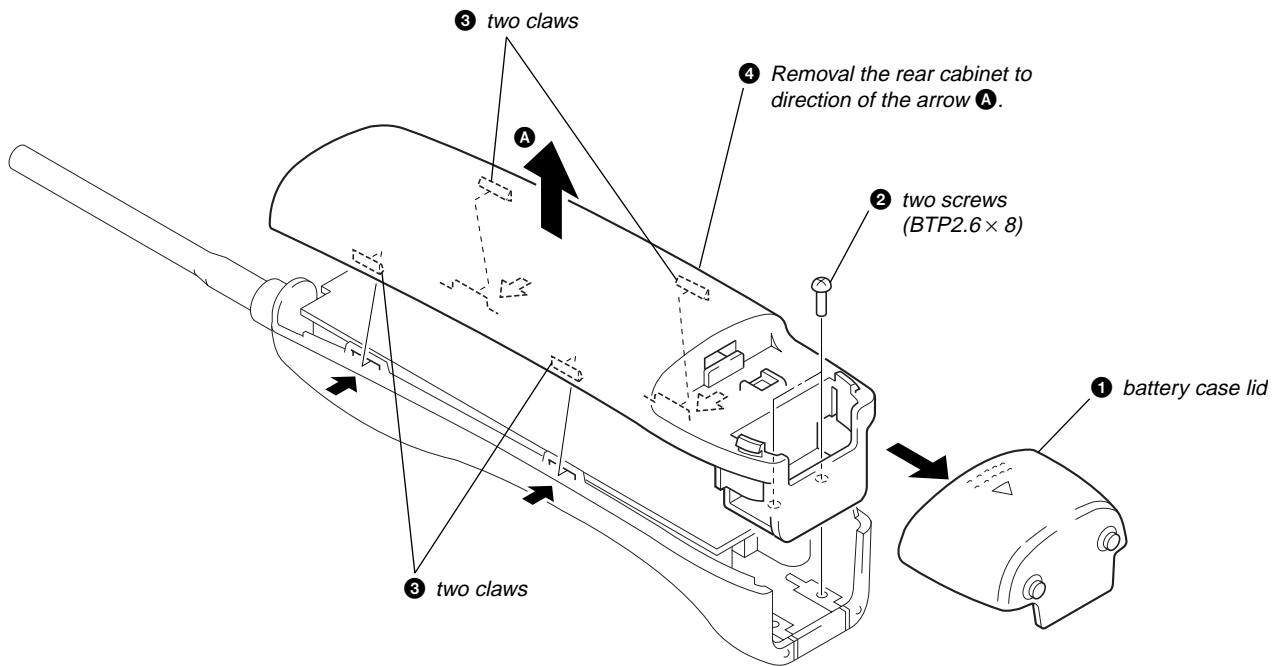
You can page the handset from the base unit. Note that you can't page if the handset is in use.

- 
- To page**
- Press **(HANDSET LOCATOR)**.  
The handset rings.  
When you keep pressing **(HANDSET LOCATOR)**, the handset rings continuously.

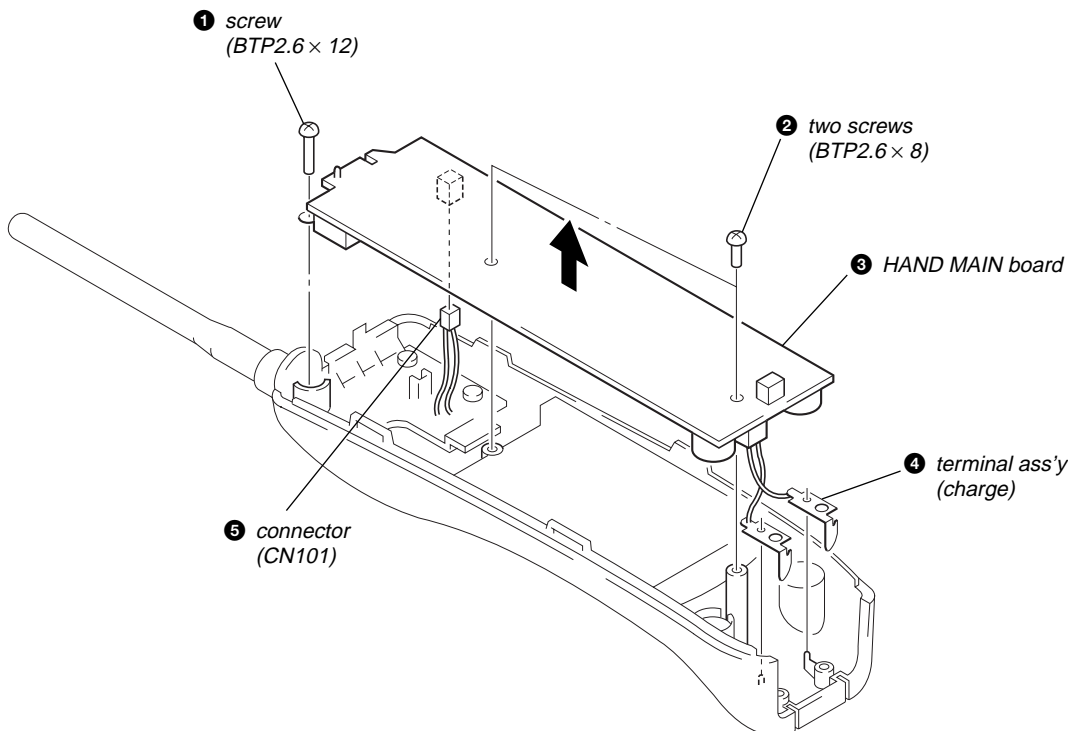
## SECTION 3 DISASSEMBLY

**Note:** Follow the disassembly procedure in the numerical order given.

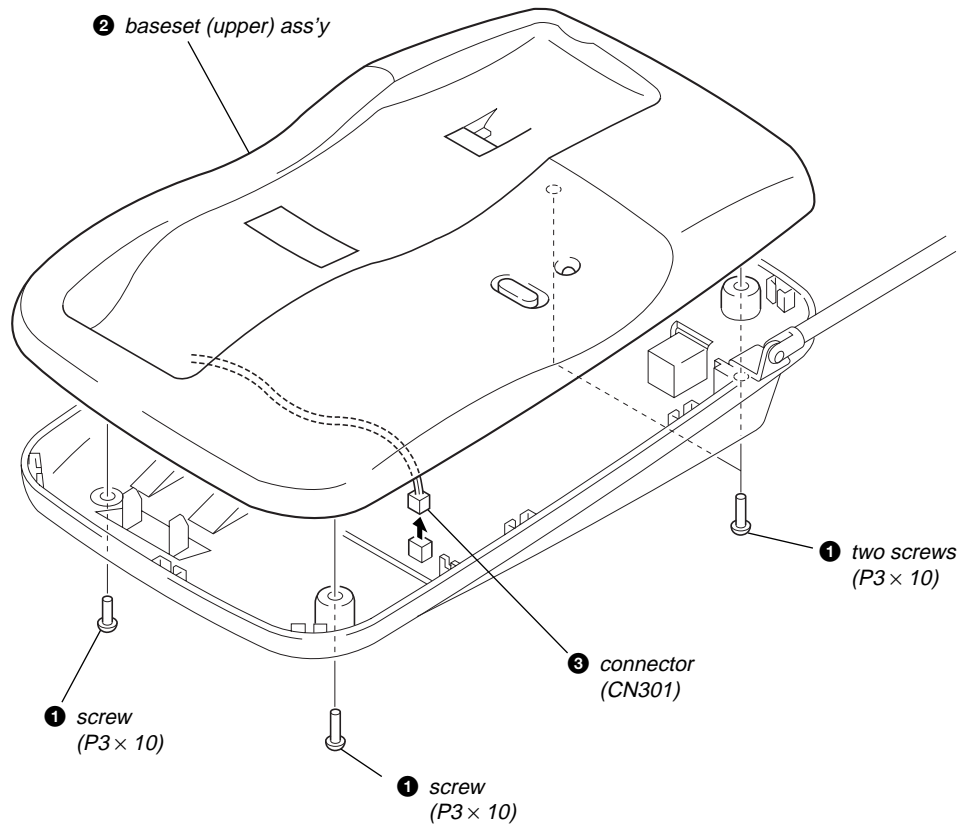
### • HANDSET REAR CABINET



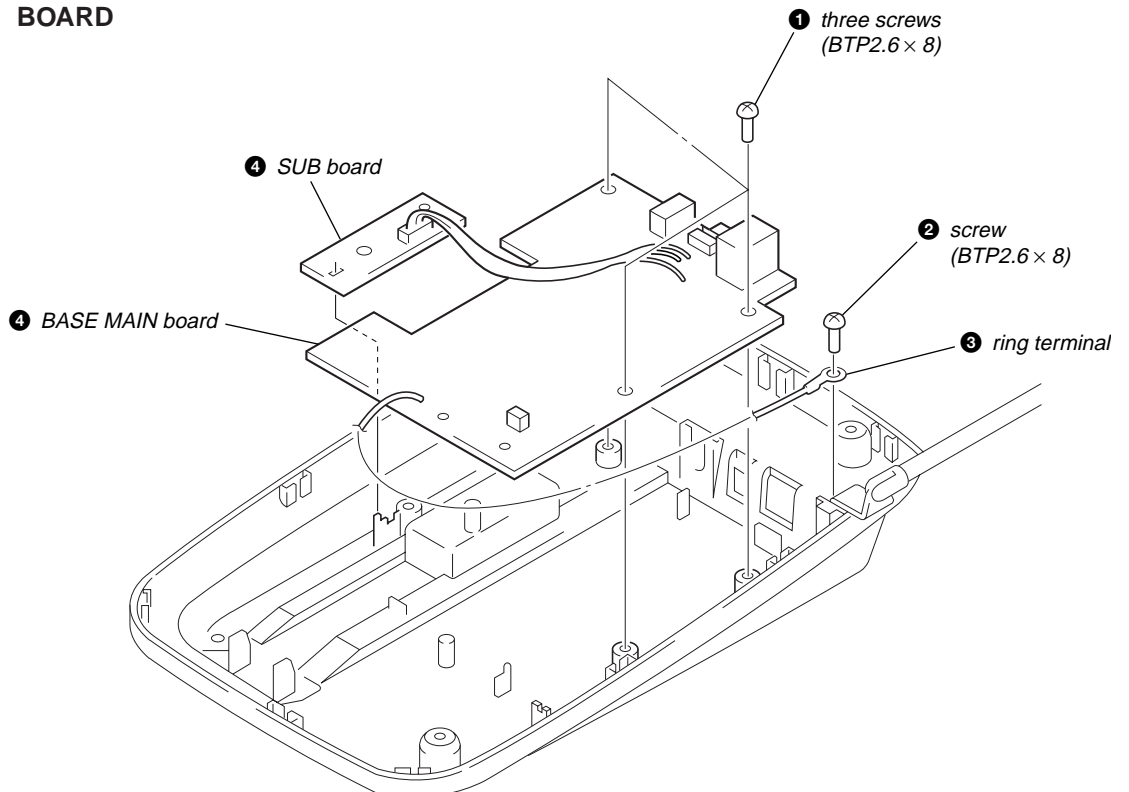
### HAND MAIN BOARD



• BASESET  
BASESET (UPPER) ASS'Y



BASE MAIN BOARD



## SECTION 4 TEST MODE

### 4-1. BASE UNIT SECTION

#### <Enter the Test Mode>

##### Manual Test Mode

1. Set the **[DIAL MODE]** switch to "P" (pulse).
2. While pressing the **[PAGE]** key, switch on the power supply (Reset start).
3. With the **[PAGE]** key, still held down, switch the **[DIAL MODE]** switch "P" (pulse) → "T" (tone) → "P" (pulse).
4. When you release the **[PAGE]** key, test mode starts.
5. First dial "0" at 10 pps. Then output "1", "4", "8" and "#" with DTMF.
6. Set to TX ON. Goes to external line state in 1 CH.

##### • Release the Test Mode

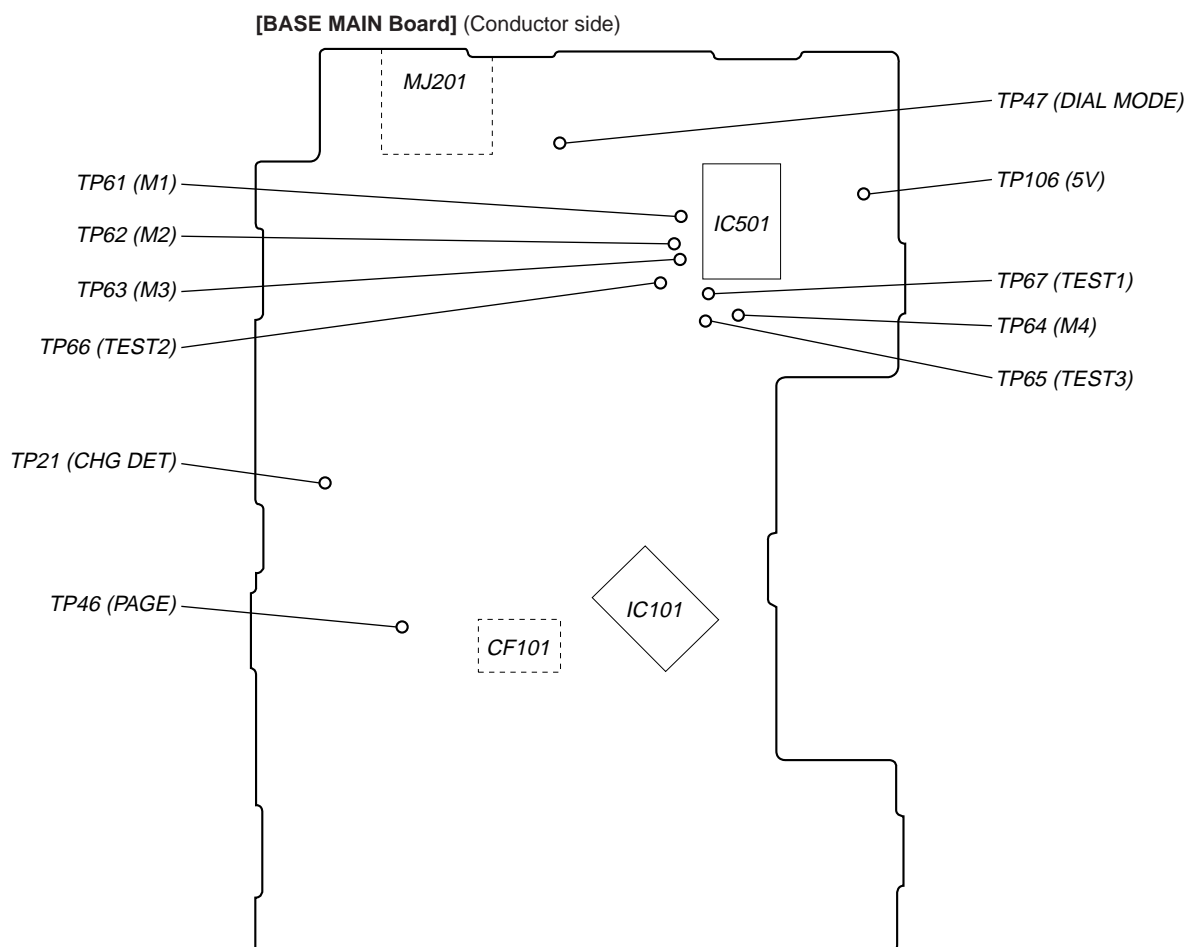
1. Pull out the AC adapter and turn off the power.

##### Machine Test Mode

1. With one of the CH setting terminals in "H" input state, cause Reset of Power ON. Equipment enters machine test mode.
2. Setting of CH according to logic input with CH setting terminal.
3. ON/OFF of TX is according to the input logic of the Dial Mode terminal.

##### • Release the Test Mode

1. Pull out the AC adapter and turn off the power.
2. Remove the short plug and turn on the power again.



## Channel Setting

During startup in machine test mode, make the following channel settings by loading the terminal input data.

Pin No. Channel	㉓ M1 (TP61)	㉔ M2 (TP62)	㉕ M3 (TP63)	㉖ M4 (TP64)	TX Frequency (MHz)	RX Frequency (MHz)
CH1	H	L	L	L	43.720	48.760
CH2	L	H	L	L	43.740	48.840
CH3	H	H	L	L	43.820	48.860
CH4	L	L	H	L	43.840	48.920
CH5					43.920	49.020
CH6					43.960	49.080
CH7					44.120	49.100
CH8					44.160	49.160
CH9					44.180	49.200
CH10					44.200	49.240
CH11					44.320	49.280
CH12					44.360	49.360
CH13					44.400	49.400
CH14	H	L	H	L	44.460	49.460
CH15	L	H	H	L	44.480	49.500
CH16	H	H	H	L	46.610	49.670
CH17	L	L	L	H	46.630	49.845
CH18					46.670	49.860
CH19					46.710	49.770
CH20					46.730	49.875
CH21					46.770	49.830
CH22					46.830	49.890
CH23	H	L	L	H	46.870	49.930
CH24	L	H	L	H	46.930	49.990
CH25	H	H	L	H	46.970	49.970
TEST1	L	L	H	H	43.780	48.800
TEST2	H	L	H	H	43.890	48.970
TEST3	L	H	H	H	46.800	49.910
TEST4	H	H	H	H	46.900	49.950

## Machine Test Mode Input/Output

### 1. Input (Input ports for other than main tasks)

Pin Name	Pin No.	Function	Logic
M1 (TP61)	㉓	Setting the CH (channel)	Refer to channel setting
M2 (TP62)	㉔		
M3 (TP63)	㉕		
M4 (TP64)	㉖		
DIAL MODE (TP47)	⑰	Setting the TX ON/OFF	H (T); OFF, L (P): ON
PAGE (TP46)	⑱	Manual: Channel increment	Incrementing of channels in order from 16 to 25.
		Machine: Dial data "5" is output to DTMF/DP exchange	Key input with "L" input. The first time there is output of "5" with DTMF.

TEST 1 (TP67) ㉙	TEST 2 (TP66) ㉚	TEST 3 (TP65) ㉛	Operation with CHARGE LED	Operation with TX ON
L	L	L	If RSSI (H) is, detected: Light ON	If RSSI (H) is, detected: Light ON
L	L	H	If RSSI (L) is, detected: Light ON	If RSSI (L) is, detected: Light ON
L	H	L	If TX LOCK is detected: Light OFF	If TX LOCK is detected: Light OFF
L	H	H	If RX LOCK is detected: Light OFF	If RX LOCK is detected: Light OFF
H	L	L	_____	BEEP output
H	L	H	_____	ID CODE output
H	H	L	If RING is detected: Light ON	If RING is detected: Light ON
H	H	H	If PAGE KEY is input: Light ON	If PAGE KEY is input: Light ON

### 2. Output (Output ports for other than main tasks)

Pin Name	Pin No.	Function	H Logic	L Logic
CHARGE DET	⑲	State in section 1. Input	Refer to Section 1. Input	

## 4-2. HANDSET SECTION

### <Enter the Test Mode>

#### Manual Test Mode

1. Enter the test mode by pressing **[0]** key while pressing the **[1]** key and **[TALK]** when in idle condition.  
(Key operation: **[0]** → **[1]** → **[TALK]** )
2. The RINGER will ring for 500msec when the test mode is started.
3. Measurement mode of consumption current. (42# state. Refer to 2-3)
4. Use key input to carry out the various settings.
5. Use port inputs to set output from LED terminals.

#### • Release the Test Mode

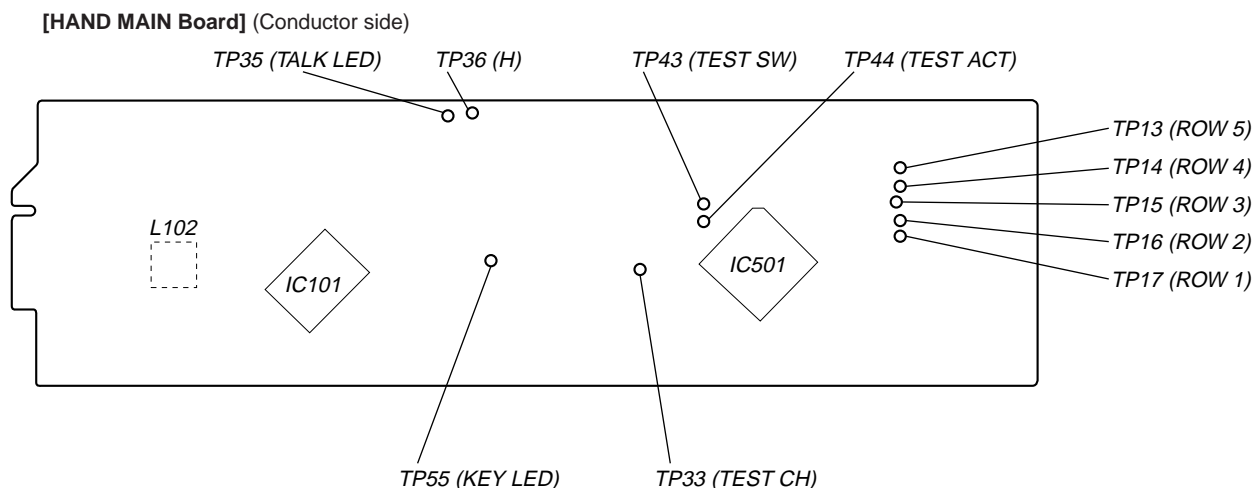
1. Press the **[0]**, **[0]** and **[#]** key.
2. Turn OFF the power. (Remove the battery and replace them)

#### Machine Test Mode

1. When power on reset is applied while a H (high) is input to the TEST SW (TP43) terminal (IC501 pin ④), the RING (Level H, 500 msec) sounds.
2. Following that, at a timing in which the TEST SW terminal has “H” (High) input, there is output of “L” by the CH (Channel) setting control terminal. Then there is PLL setting to the CH which was read to with the CH setting terminal according to that “L” output.
3. Set the TX setting to TX OFF.
4. The TX channel is used by voice, not by data.
5. Use port inputs to set output from LED terminals.

#### • Release the Test Mode

1. Turn off the power.
2. Remove the short plug and turn on the power.



## Channel Setting

During startup in machine test mode, make the following channel settings by loading the terminal input data.

Pin No. Channel	③④ ROW 5 (TP13)	③③ ROW 4 (TP14)	③② ROW 3 (TP15)	③① ROW 2 (TP16)	②⑨ ROW 1 (TP17)	RX Frequency (MHz)	TX Frequency (MHz)
CH1	H	L	L	L	L	43.720	48.760
CH2	H	L	L	L	H	43.740	48.840
CH3	H	L	L	H	L	43.820	48.860
CH4	H	L	L	H	H	43.840	48.920
CH5	H	L	H	L	L	43.920	49.020
CH6	H	L	H	L	H	43.960	49.080
CH7	H	L	H	H	L	44.120	49.100
CH8	H	L	H	H	H	44.160	49.160
CH9	H	H	L	L	L	44.180	49.200
CH10	H	H	L	L	H	44.200	49.240
CH11	H	H	L	H	L	44.320	49.280
CH12	H	H	L	H	H	44.360	49.360
CH13	H	H	H	L	L	44.400	49.400
CH14	H	H	H	L	H	44.460	49.460
CH15	H	H	H	H	L	44.480	49.500
CH16	L	L	H	H	L	46.610	49.670
CH17	L	L	H	H	H	46.630	49.845
CH18	L	H	L	L	L	46.670	49.860
CH19	L	H	L	L	H	46.710	49.770
CH20	L	H	L	H	L	46.730	49.875
CH21	L	H	L	H	H	46.770	49.830
CH22	L	H	H	L	L	46.830	49.890
CH23	L	H	H	L	H	46.870	49.930
CH24	L	H	H	H	L	46.930	49.990
CH25	L	H	H	H	H	46.970	49.970
TEST1	L	L	L	H	L	43.780	48.800
TEST2	L	L	L	H	H	43.890	48.970
TEST3	L	L	H	L	L	46.800	49.910
TEST4	L	L	H	L	H	46.900	49.950

## Machine Test Mode Input/Output

### 1. Input (Input ports for other than main tasks)

Pin Name	Pin No.	Function	Logic
ROW 1 (TP17)	②⑨	Setting the CH (channel)	Refer to channel setting
ROW 2 (TP16)	③①		
ROW 3 (TP15)	③②		
ROW 4 (TP14)	③③		
ROW 5 (TP13)	③④		
TEST CH (TP33)	①	Control terminal for setting the CH (channel)	H: OFF, L: ON
TEST SW (TP43)	④⑩	Start up of test mode	H: Start, L: No start
TEST ACT (TP44)	④④	During test mode, causes start of intermittent operation with external input.	H: Intermittent start

### 2. Output (Output ports for other than main tasks)

Pin Name	Pin No.	Function	H Logic	L Logic
TALK LED (TP35)	④⑧	Various input/output monitor output (default: RSSI(H) detection).	No detection	Detection
KEY LED (TP55)	②	During test mode: All lights lit, However, does not include measurement of consumption current.	No light	Light

### Key processing (Setting the manual test mode)

1. (Upper position) (Lower Position) Set with #.
2. 3X# can be substituted with X✱.

Upper position Lower position	0	1	2	3	4					7
					TX	RX RF	RX AF	MIC	Lk	
0	QUIT	10ch	20ch	Batt Alarm	H	A	L	T	✕	KEY TEST
1	1ch	11ch	21ch	CHARG DET	✕	○	✕	✕	✕	
2	2ch	12ch	22ch		✕	○	○	✕	✕	
3	3ch	13ch	23ch		○	○	✕	✕	✕	
4	4ch	14ch	24ch	RX LOCK	○	○	○	✕	✕	
5	5ch	15ch	25ch	TX LOCK	○	○	○	○	✕	
6	6ch	16ch	T1ch	RSSI (H)	○	○	○	○	○	
7	7ch	17ch	T2ch	RSSI (L)	-	-	-	-	-	
8	8ch	18ch	T3ch	DATA TX	-	-	-	-	-	
9	9ch	19ch	T4ch		-	-	-	-	-	
Purpose	CH setting only			SIGOUT control						General operation
Application	The standard is external line communication state. State for standard electrical adjustment process.			Condition surveillance with TALK LED.	Measurement mode of consumption current.					

○: ON, ✕: OFF  
Lk: KEY LED

- By pressing the CH key there is increment of the channel. However, this does not include the test channel.
- Control of the power source during 38# DATA TX is (TX&RX RF&RX AF=ON) in 44# state.
- Control of the power source during the 70# key check mode is 41# state (TX OFF).
- For CH setting, SIGOUT control and power source control (with the exception of above-mentioned 38# state) the state can be set independently.

Example: In 15 ch, the order for carrying out TX modulation level and RSSI (H) sensitivity setting is as follows:

The following are possible: 15# → 44# → 36#  
36# → 15# → 44#  
44# → 36# → 15#

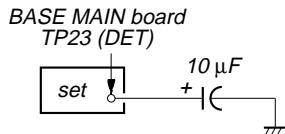
# SECTION 5 ELECTRICAL ADJUSTMENTS

## 5-1. BASE UNIT SECTION

- Apply 9 V dc from regulated DC power supply.
- Set to base unit machine test mode. (See page 8)
- Switch position:  
SW302 (DIAL MODE): P (pulse)

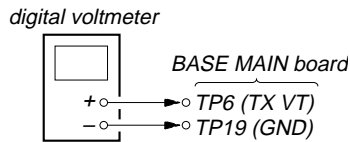
### TX Section Adjustment

- Perform the adjustment at T3CH (28CH: 46.8 MHz) as a rule.
- Note:** The electrolytic capacitor (10  $\mu$ F/10 V) connected TP23 (DET) to GND. (Only TX section adjustment)



### 1. TX VT Adjustment

Setting:



Procedure :

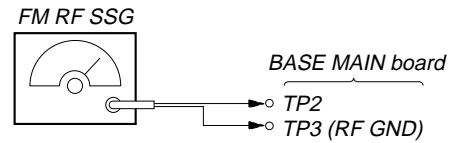
1. The digital voltmeter connected TP6 (TX VT) to TP19 (GND).
2. Adjust the L52 for  $2.2 \pm 0.05$  V reading on the digital voltmeter.

**Adjustment Location:** BASE MAIN board (See page 16)

### RX Section Adjustment

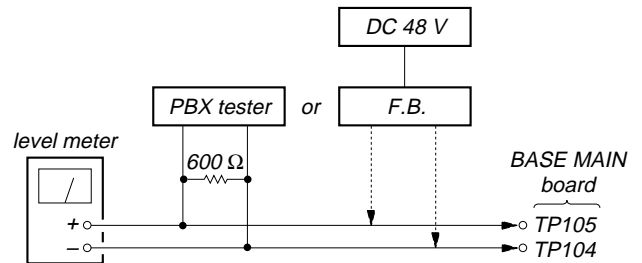
### 1. RX Level Adjustment

- Perform the adjustment at T3CH (28CH: 49.910 MHz) as a rule.
- Setting :



Procedure :

1. FM RF SSG condition :
  - Carrier frequency : 49.910 MHz
  - Modulation frequency: 1 kHz
  - Deviation : 3 kHz
  - Output level : 60 dB $\mu$ V (1 mV) (EMF)
2. Adjust the FL101 for the maximum reading on the level meter. Also check that the output level is within the specified values.

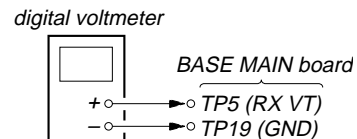


**Specified value:** - 2.6 to - 10.6 dBV

**Adjustment Location:** BASE MAIN board (See page 16)

### 2. RX VT Adjustment

Setting:



Procedure :

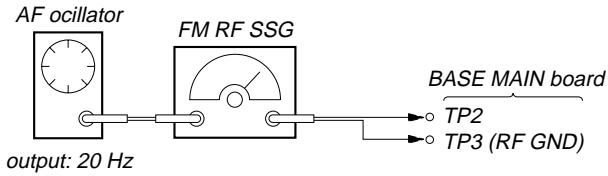
1. The digital voltmeter connected TP5 (RX VT) to TP19 (GND).
2. Adjust the L101 for  $2.4 \pm 0.05$  V reading on the digital voltmeter.

**Adjustment Location:** BASE MAIN board (See page 16)

### 3. RSSI (H) Sensitivity Adjustment

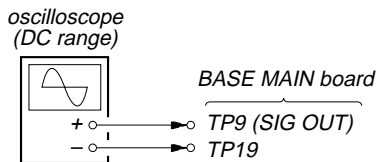
- Perform the adjustment at T3CH (28CH: 49.910 MHz) as a rule.

Setting :

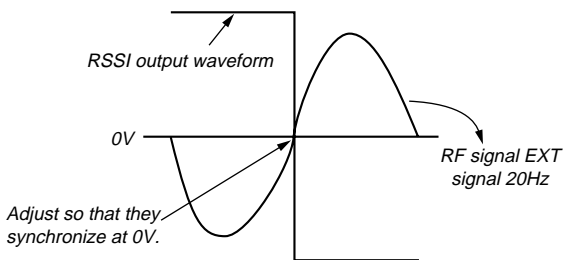


Procedure :

- FM RF SSG condition :
  - Carrier frequency : 49.910 MHz
  - Modulation frequency: 20 Hz (EXT)
  - Deviation : AM 50%
  - Output level : 60 dB $\mu$ V (1mV) (EMF)
- Use the oscilloscope to confirm the FM RF SSG input (AF) signal waveform and RSSI signal, and use the RV101 so that they are synchronized matched (duty is synchronized).



#### RSSI WAVEFORM



Adjustment Location: BASE MAIN board (See page 16)

### 5-2. HANDSET SECTION

- Apply 4 V dc from regulated DC power supply.
- Set to handset machine test mode. (See page 10)

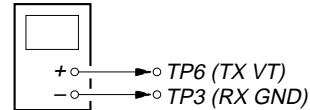
#### TX Section Adjustment

- Perform the adjustments at T1CH (26CH: 43.780 MHz) as a rule.

#### 1. TX VT Adjustment

Setting:

digital voltmeter



Procedure:

- The digital voltmeter connected TP6 (TX VT) to TP3 (RX GND).
- Adjust the L52 for 0.9 V  $\pm$  0.05 V reading on the digital voltmeter.

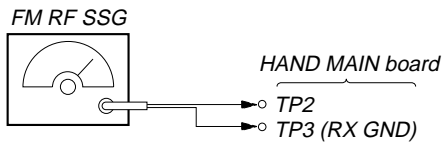
Adjustment Location: HAND MAIN board (See page 17)

## RX Section Adjustment

### 1. RX Level Adjustment

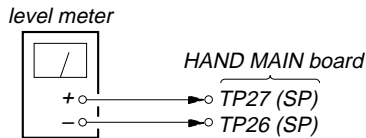
- Perform the adjustment at T1CH (26CH: 43.780 MHz) as a rule.

Setting :



Procedure :

- FM RF SSG condition :
  - Carrier frequency : 43.780 MHz
  - Modulation : 1 kHz
  - Deviation : 3 kHz
  - Output level : 60 dB $\mu$ V (1 mV) (EMF)
- Adjust the FL101 for the maximum reading on the level meter. Also check that the output level is within the specified values.

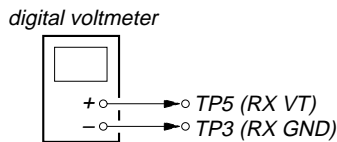


Specified value: -16.6 to -8.6 dBV

Adjustment Location: HAND MAIN board (See page 17)

### 2. RX VT Adjustment

Setting:



Procedure:

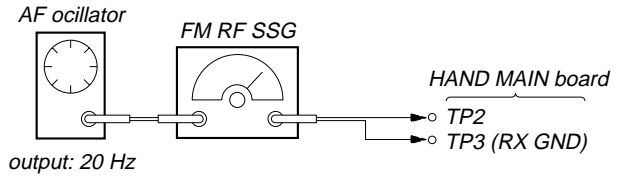
- The digital voltmeter connected TP5 (RX VT) to TP3 (RX GND).
- Adjust the L102 for 0.8 V  $\pm$  0.05 V reading on the digital voltmeter.

Adjustment Location: HAND MAIN board (See page 17)

### 3. RSSI (H) Sensitivity Adjustment

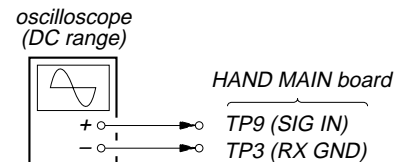
- Perform the adjustment at T1CH (26CH: 43.780 MHz) as a rule.

Setting :

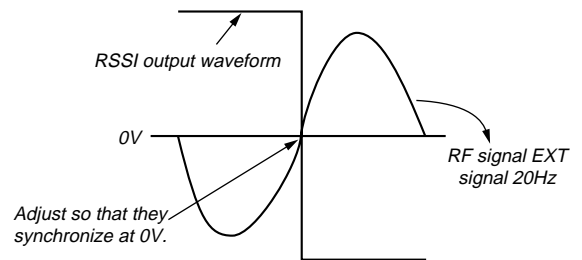


Procedure :

- FM RF SSG condition :
  - Carrier frequency : 43.780 MHz
  - Modulation frequency : 20 Hz (EXT)
  - Deviation : AM 50%
  - Output level : 2 dB $\mu$ V (1.259  $\mu$ V) (EMF)
- Use the oscilloscope to confirm the FM RF SSG input (AF) signal waveform and RSSI signal, and use the RV101 so that they are synchronized matched (duty is synchronized).



### RSSI WAVEFORM



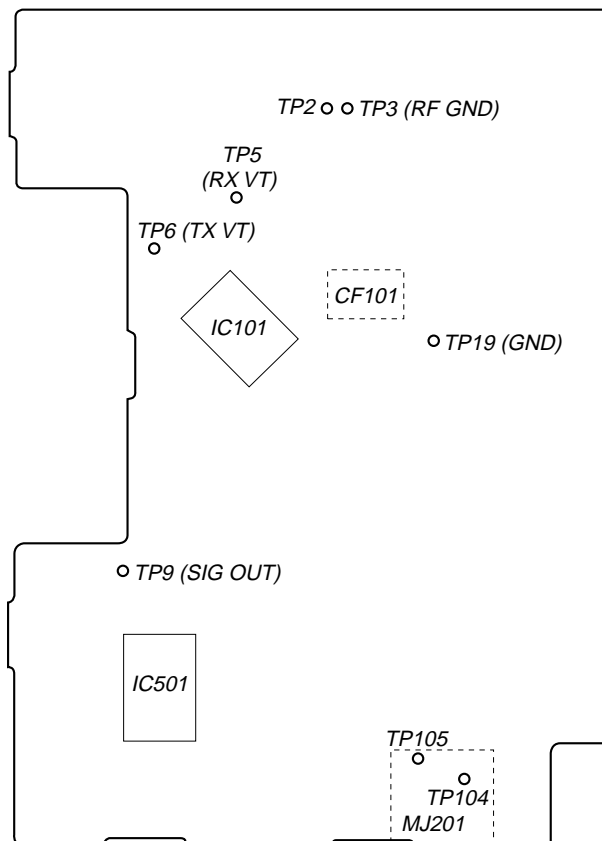
Adjustment Location: HAND MAIN board (See page 17)

**Adjustment Location :**

**[BASE MAIN Board] (Component Side)**

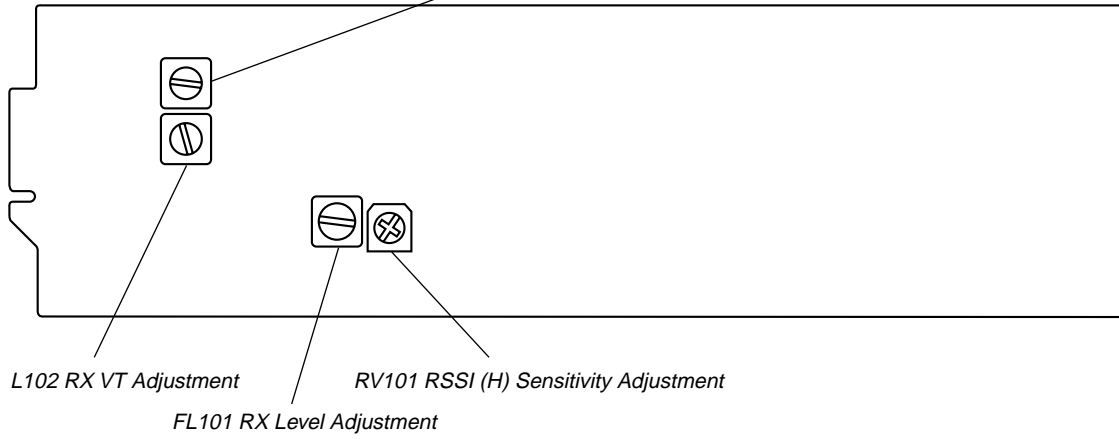


**[BASE MAIN Board] (Conductor Side)**

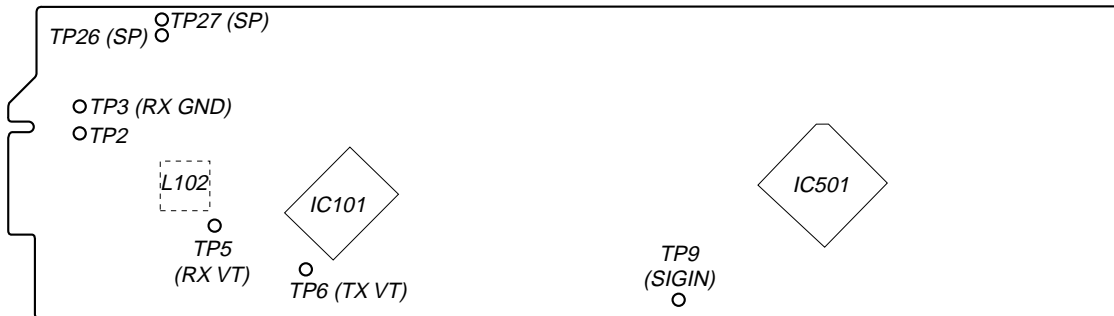


**Adjustment Location :**

**[HAND MAIN Board] (Component Side)** *L52 TX VT Adjustment*

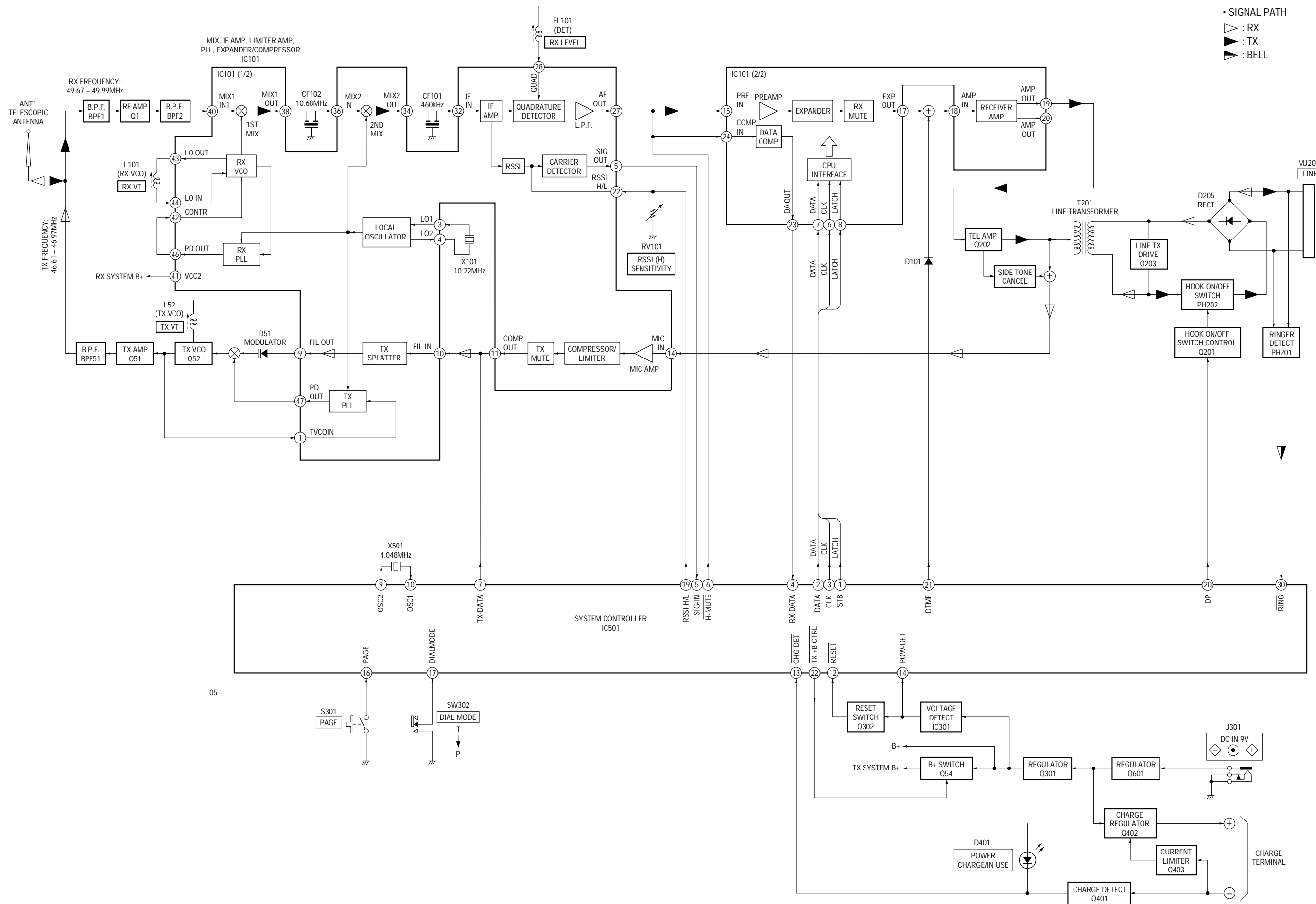


**[HAND MAIN Board] (Conductor Side)**

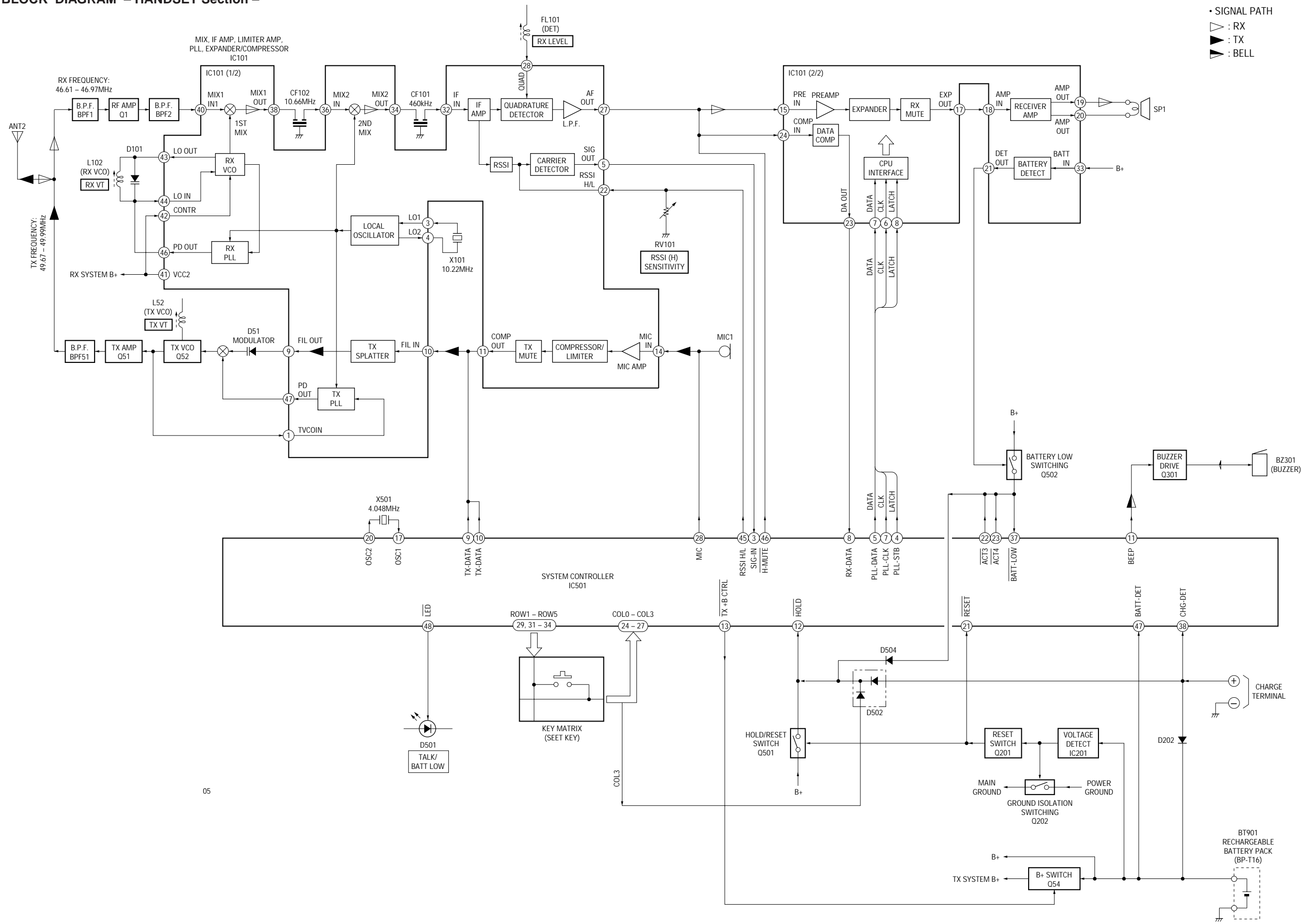


## SECTION 6 DIAGRAMS

6-1. BLOCK DIAGRAM – BASE UNIT Section –



6-2. BLOCK DIAGRAM - HANDSET Section -



• SIGNAL PATH  
 ▽ : RX  
 ▲ : TX  
 ▴ : BELL

05

### 6-3. NOTES FOR PRINTED WIRING BOARD AND SCHEMATIC DIAGRAM

#### Note on Schematic Diagram:

- All capacitors are in  $\mu\text{F}$  unless otherwise noted. pF:  $\mu\mu\text{F}$  50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $1/4\text{ W}$  or less unless otherwise specified.
- $\triangle$  : internal component.
- $\square$  : panel designation.
- $\text{B}+$  : B+ Line.
- $\square$  : adjustment for repair.
- Power voltage is dc 9 V and fed with regulated dc power supply from external power voltage jack (J301 on the BASE MAIN board).
- Power voltage is dc 12 V and fed with regulated dc power supply from modular jack (MJ201 on the BASE MAIN board) with  $100\ \Omega$  in series.
- Power voltage is dc 3.6 V and fed with regulated dc power supply from battery jack (CN201 on the HAND MAIN board).
- Voltages and waveforms are dc with respect to ground in test mode.
- \* : Impossible to measure
- Voltages are taken with a VOM (Input impedance  $10\ \text{M}\Omega$ ). Voltage variations may be noted due to normal production tolerances.
- Waveforms are taken with a oscilloscope. Voltage variations may be noted due to normal production tolerances.
- Circled numbers refer to waveforms.
- Signal path.
  - $\triangleleft$  : RX
  - $\blacktriangleright$  : TX
  - $\nabla$  : bell

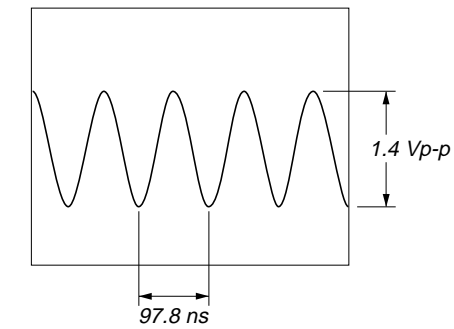
#### Note on Printed Wiring Boards:

- $\circ$  : parts extracted from the component side.
- $\text{---}$  : parts extracted from the conductor side.
- $\triangle$  : internal component.
- $\text{---}$  : Pattern from the side which enables seeing. (The other layers' patterns are not indicated.)

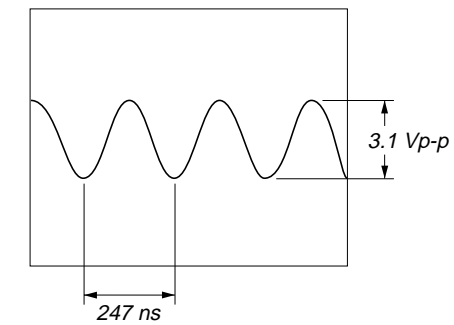
Caution:  
 Pattern face side: Parts on the pattern face side seen from the pattern face are indicated.  
 Conductor Side  
 Parts face side: Parts on the parts face side seen from the parts face are indicated.  
 Component Side

#### • Waveforms – BASE MAIN Board –

##### ① IC101 ③ (Test Mode)

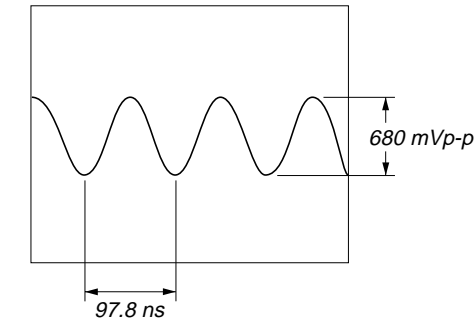


##### ② IC501 ⑨ (OSC2) (Tset Mode)

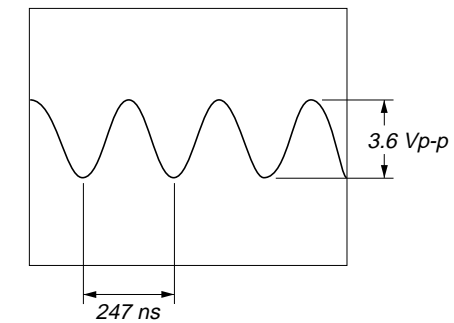


#### – HAND MAIN Board –

##### ① IC101 ③ (Test Mode)



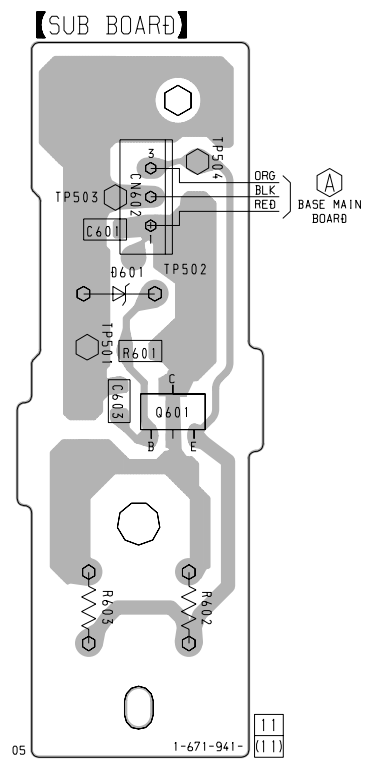
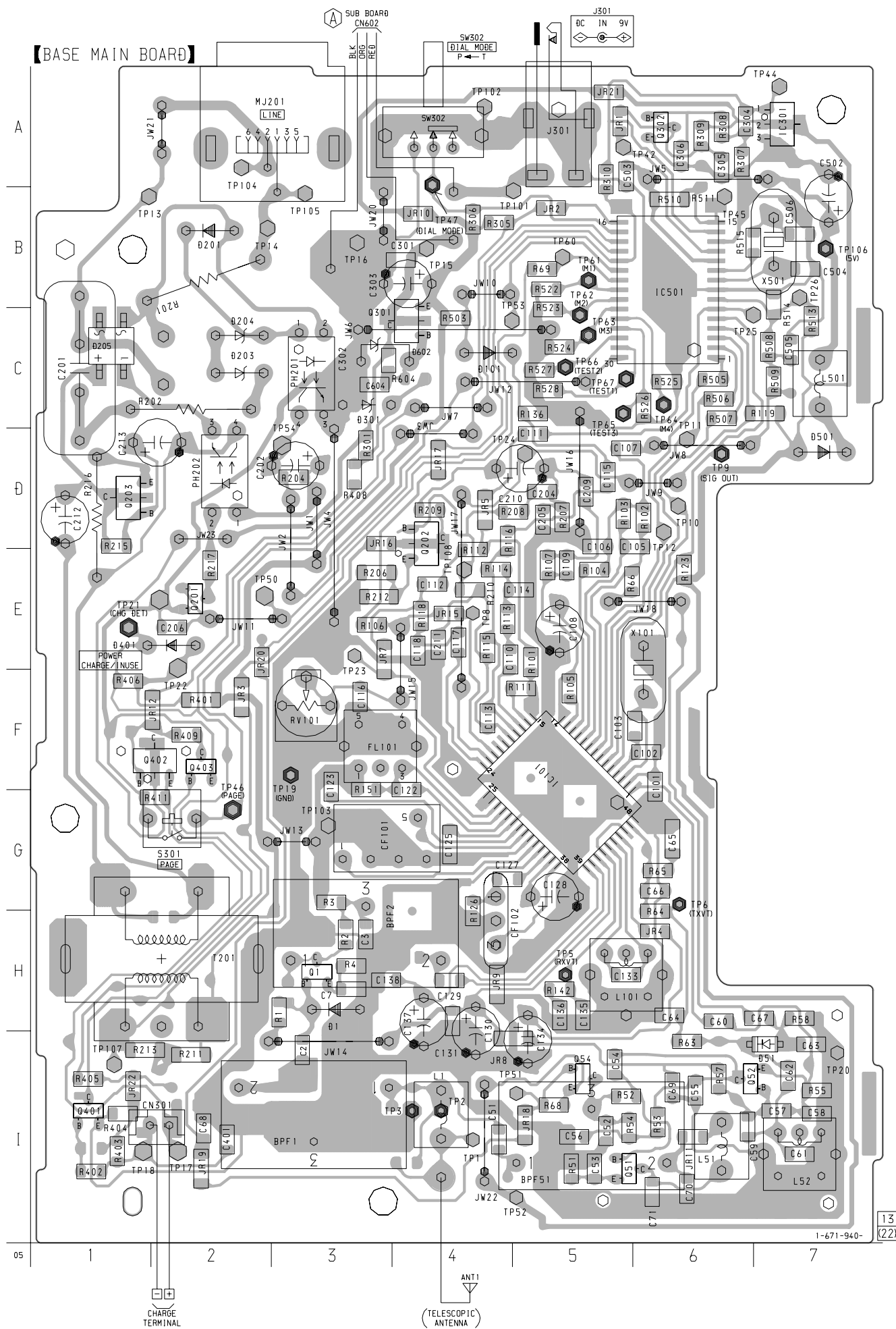
##### ② IC501 ⑩ (OSC2) (Tset Mode)



6-4. PRINTED WIRING BOARDS – BASE UNIT Section –

• Semiconductor Location

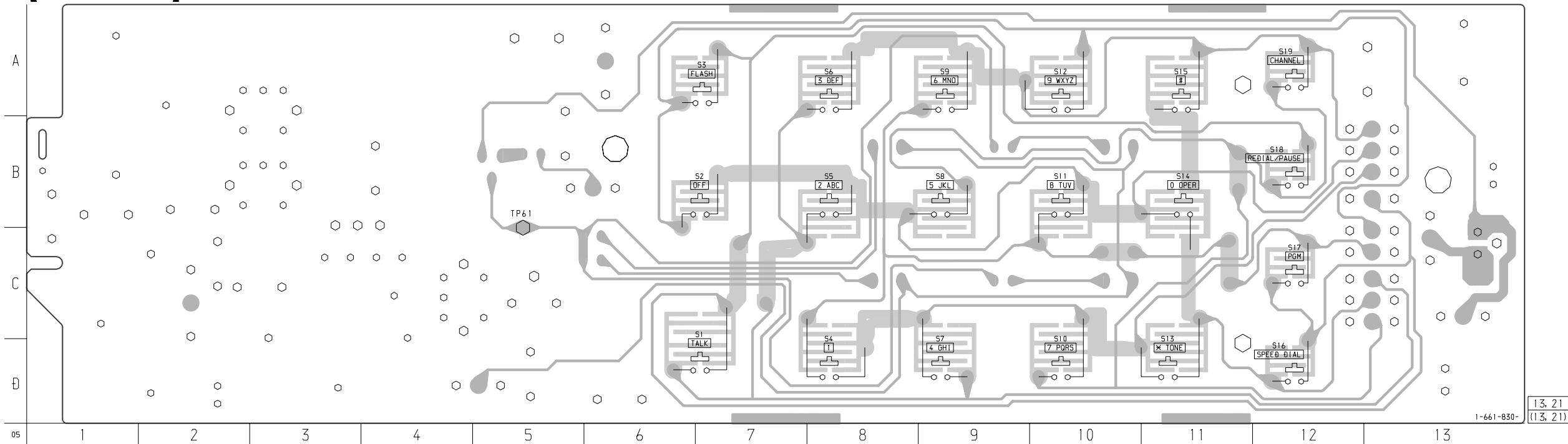
Ref. No.	Location
D1	H-3
D51	I-7
D101	C-4
D201	B-2
D203	C-2
D204	C-2
D205	C-1
D301	C-3
D401	E-2
D501	D-7
D602	C-3
IC101	F-5
IC301	A-7
IC501	B-6
PH201	C-3
PH202	D-2
Q1	H-3
Q51	I-5
Q52	I-6
Q54	I-5
Q201	E-2
Q202	D-4
Q203	D-1
Q301	C-4
Q302	A-6
Q401	I-1
Q402	F-2
Q403	F-2





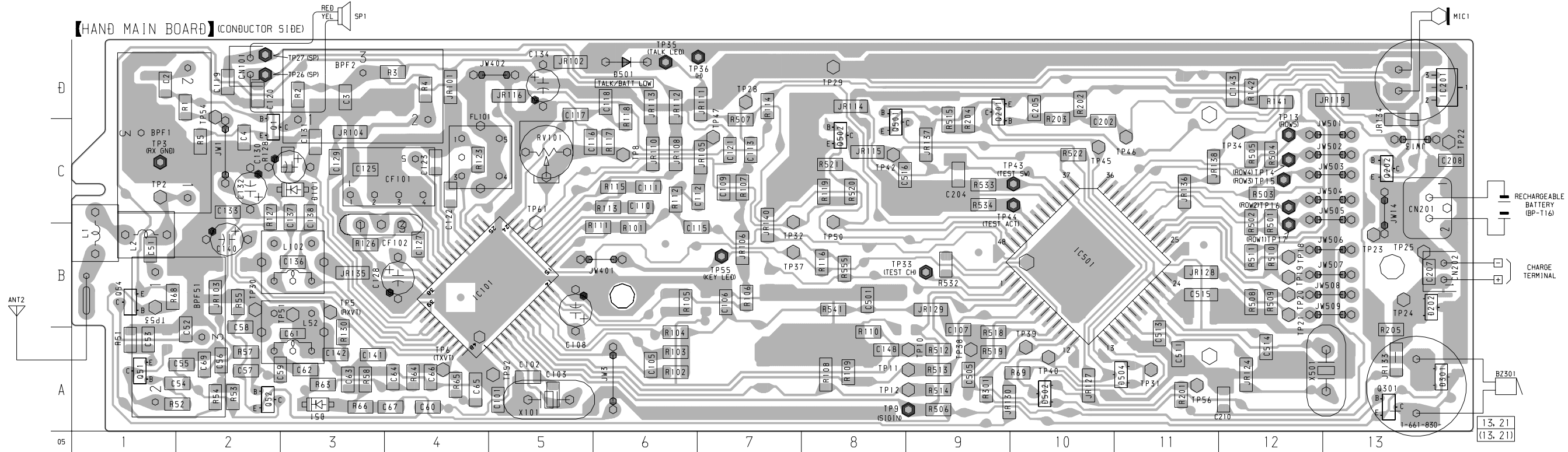
6-6. PRINTED WIRING BOARD – HANDSET Section –

【HAND MAIN BOARD】(COMPONENT SIDE)



13. 21  
(13. 21)

【HAND MAIN BOARD】(CONDUCTOR SIDE)



13. 21  
(13. 21)

• Semiconductor Location (Conductor Side)

Ref. No.	Location	Ref. No.	Location
D51	A-3	Q1	C-2
D101	C-3	Q51	A-1
D202	B-13	Q54	B-1
D301	A-13	Q201	D-9
D501	D-6	Q202	C-13
D502	A-10	Q301	A-13
D504	A-11	Q501	C-8
IC101	B-4	Q502	C-8
IC201	D-13		
IC501	B-10		



## 6-8. IC PIN FUNCTION DESCRIPTION

### • BASE MAIN BOARD IC501 SB662106A-4J90-TLM (SYSTEM CONTROLLER)

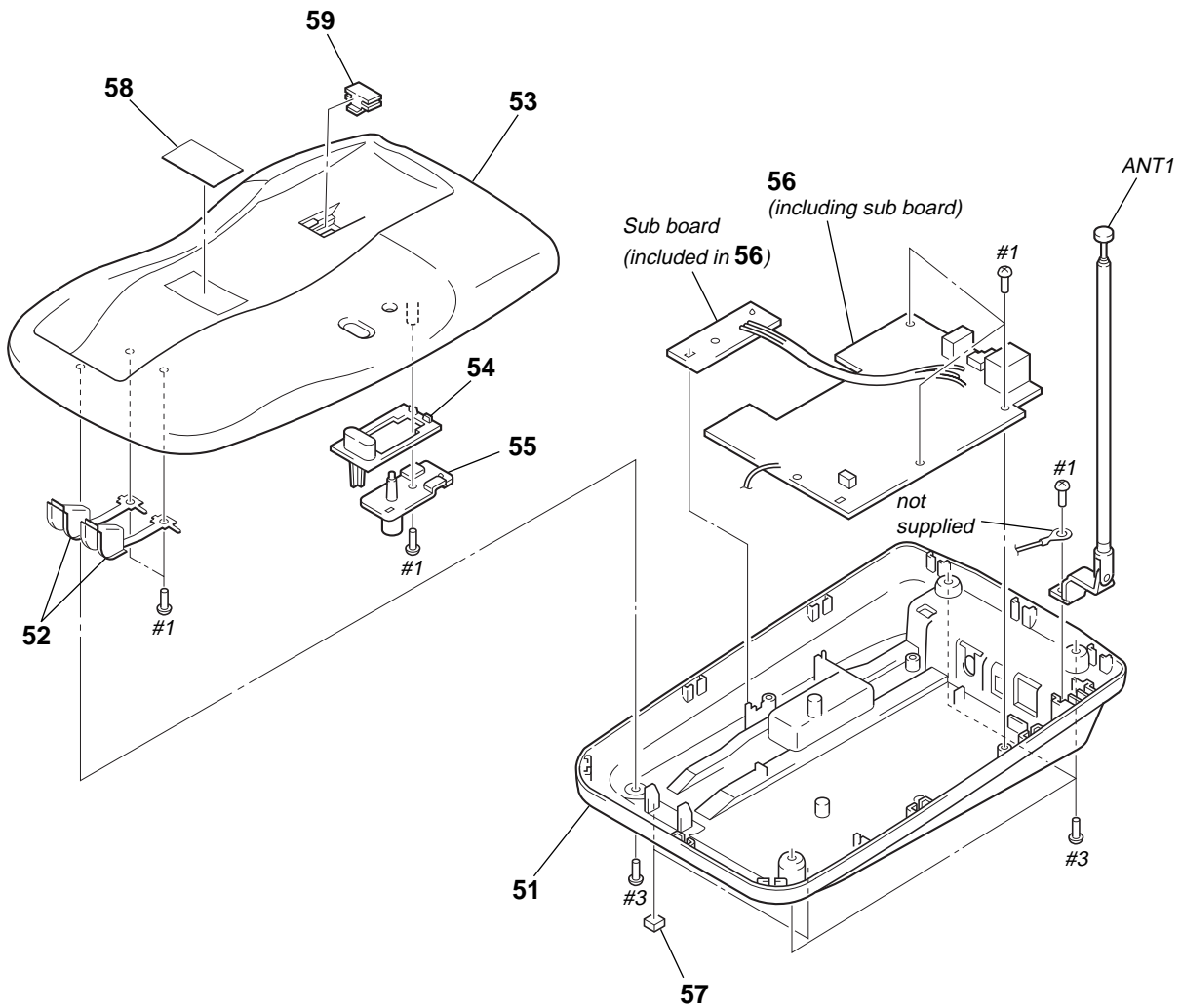
Pin No.	Pin Name	I/O	Function
1	STB	O	PLL serial data latch pulse signal output to the TB31223F (IC101)
2	DATA	O	PLL serial data output to the TB31223F (IC101)
3	CLK	O	PLL serial data transfer clock signal output to the TB31223F (IC101)
4	RX-DATA	I	Receive data input from the TB31223F (IC101)
5	SIG-IN	I	Squelch signal (carrier detection signal) input from the TB31223F (IC101) “L”: carrier present, “H”: no carrier
6	H-MUTE	O	Halt muting on/off control signal output for the receiving data “L”: muting on
7	TX-DATA	O	Transmit data output terminal
8	VSS	—	Ground terminal
9	OSC2	O	Main system clock output terminal (4.048 MHz)
10	OSC1	I	Main system clock input terminal (4.048 MHz)
11	VDD	—	Power supply terminal (+5V)
12	RESET	I	System reset signal input from the reset signal generator (Q302 and IC301) “L”: reset For several hundreds msec. after the power supply rises, “L” is input, then it changes to “H”
13	TEST	I	Test terminal (fixed at “L”)
14	POW-DET	I	Power down detection signal input from the voltage detector (IC301) “L”: power down
15	MBR	I	Setting terminal for the make 30% or 40% select “L”: 40%, “H”: 30% Fixed at “H” in this set
16	PAGE	I	PAGE switch (S301) input terminal When key pressing: “L”
17	DIALMODE	I	Detect signal input of the should dial in pulse mode or tone mode “L”: pulse, “H”: tone
18	CHG-DET	I	Charge on/off detection signal input terminal “L”: charge on
19	RSSI H/L	O	RSSI sensitivity H/L selection signal output to the TB31223F (IC101) “L”: low sensitivity
20	DP	O	Hook on/off control signal output terminal “H”: hook on
21	DTMF	O	DTMF tone signal output terminal
22	TX +B CTRL	O	Power on/off control signal output of the transmit system “L”: power on
23 to 26	M1 to M4	I	Channel setting terminal for the test mode Normally: fixed at “L”
27	TEST3	I	Setting terminal for the test mode-3
28	TEST2	I	Setting terminal for the test mode-2
29	TEST1	I	Setting terminal for the test mode-1
30	RING	I	Detect signal input of the ringer coming “L”: ringer coming

### • HAND MAIN BOARD IC501 SH66358C-4J91 (SYSTEM CONTROLLER)

Pin No.	Pin Name	I/O	Function
1	TEST CH	O	Test mode channel control output terminal “H” active
2	KEY LED	O	LED drive signal output of the key illumination LED “L”: LED on Not used (open)
3	SIG-IN	I	Squelch signal (carrier detection signal) input from the TB31223F (IC101) “L”: carrier present, “H”: no carrier
4	PLL-STB	O	PLL serial data latch pulse signal output to the TB31223F (IC101)
5	PLL-DATA	O	PLL serial data output to the TB31223F (IC101)
6	NC	O	Not used (open)
7	PLL-CLK	O	PLL serial data transfer clock signal output to the TB31223F (IC101)
8	RX-DATA	I	Receive data input from the TB31223F (IC101)
9, 10	TX-DATA	O	Transmit data output terminal
11	BEEP	O	Buzzer drive signal output terminal
12	HOLD	I	Hold control signal input terminal “L”: hold Used for the released standby
13	TX +B CTRL	O	Power on/off control signal output of the transmit system “L”: power on
14	RX +B CTRL	O	Power on/off control signal output of the receiver system “L”: power on Not used (open)
15	TEST	I	Test terminal (fixed at “L”)
16	VSS	—	Ground terminal
17	OSC1	I	Main system clock input terminal (4.048 MHz)
18, 19	NC	O	Not used (open)
20	OSC2	O	Main system clock output terminal (4.048 MHz)
21	RESET	I	System reset signal input from the reset signal generator (Q201 and IC201) “L”: reset For several hundreds msec. after the power supply rises, “L” is input, then it changes to “H”
22	ACT3	O	Intermittent reception activation control output terminal “L” active
23	ACT4	O	Intermittent reception activation control output terminal “L” active
24 to 27	COL0 to COL3	I	Key return signal input from the key matrix When key pressing: “L”
28	MIC	O	Microphone bias control signal output terminal
29	ROW1	O	Key send signal output to the key matrix
30	NC	O	Not used (open)
31 to 34	ROW2 to ROW5	O	Key send signal output to the key matrix
35, 36	NC	O	Not used (open)
37	BATT-LOW	I	Battery voltage detection signal input from the TB31223F (IC101) “L”: power down
38	CHG-DET	I	Charge on/off detection signal input terminal “H”: charge on
39	VDD	—	Power supply terminal (+3.6V)
40	TEST SW	I	Start-up of the test mode “L”: no start, “H”: start Normally: fixed at “L”
41	—	I	Not used (fixed at “L”)
42, 43	NC	O	Not used (open)
44	TEST ACT	I	During test mode, causes start of intermittent operation with external input “H”: intermittent start Normally: fixed at “L”
45	RSSI H/L	O	RSSI sensitivity H/L selection signal output to the TB31223F (IC101) “L”: low sensitivity
46	H-MUTE	O	Halt muting on/off control signal output for the receiving data “L”: muting on
47	BATT-DET	I	Power down detection input terminal “L”: power down
48	LED	O	LED drive signal output of the TALK/BATT LOW LED (D501) “L”: LED on



(2) BASESET SECTION



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	3-936-691-01	CABINET (LOWER)		* 56	A-3672-611-A	BASE MAIN BOARD, COMPLETE	
52	3-936-695-01	TERMINAL (CHARGE)		57	3-936-696-21	FOOT, RUBBER	
53	3-027-558-21	CABINET (UPPER)		58	3-007-173-01	LABEL (TERMINAL CAUTION) (JS)	
54	3-936-692-01	BUTTON (PAGE)		59	3-936-694-01	CLAW (WALL HOOK)	
55	3-936-693-01	LENS		ANT1	1-501-511-11	ANTENNA, TELESCOPIC (BASESET)	

# SECTION 8 ELECTRICAL PARTS LIST

BASE MAIN

**NOTE:**

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- **RESISTORS**  
All resistors are in ohms.  
METAL: Metal-film resistor.  
METAL OXIDE: Metal oxide-film resistor.  
F: nonflammable

- Items marked “\*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- **SEMICONDUCTORS**  
In each case, u:  $\mu$ , for example:  
uA. . . :  $\mu$ A. . .      uPA. . . :  $\mu$ PA. . .  
uPB. . . :  $\mu$ PB. . .    uPC. . . :  $\mu$ PC. . .  
uPD. . . :  $\mu$ PD. . .
- **CAPACITORS**  
uF:  $\mu$ F
- **COILS**  
uH:  $\mu$ H

The components identified by mark  $\Delta$  or dotted line with mark  $\Delta$  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
*	A-3672-611-A	BASE MAIN BOARD, COMPLETE ***** (Including SUB BOARD)		C112	1-163-037-11	CERAMIC CHIP 0.022uF 10%	25V
		< BAND PASS FILTER >		C113	1-163-009-11	CERAMIC CHIP 0.001uF 10%	50V
				C114	1-163-809-11	CERAMIC CHIP 0.047uF 10%	25V
				C115	1-163-021-11	CERAMIC CHIP 0.01uF 10%	50V
				C116	1-163-021-11	CERAMIC CHIP 0.01uF 10%	50V
				C117	1-163-989-11	CERAMIC CHIP 0.033uF 10%	25V
BPF1	1-239-916-11	FILTER, BAND PASS		C118	1-163-021-11	CERAMIC CHIP 0.01uF 10%	50V
BPF2	1-233-692-11	FILTER, BAND PASS		C122	1-163-235-11	CERAMIC CHIP 22PF 5%	50V
BPF51	1-239-918-11	FILTER, BAND PASS		C123	1-165-319-11	CERAMIC CHIP 0.1uF	50V
		< CAPACITOR >		C125	1-163-077-00	CERAMIC CHIP 0.1uF 10%	25V
C2	1-163-031-11	CERAMIC CHIP 0.01MF	50V	C127	1-163-033-00	CERAMIC CHIP 0.022uF	50V
C3	1-163-037-11	CERAMIC CHIP 0.022uF	10% 25V	C128	1-126-964-11	ELECT 10uF 20%	50V
C7	1-163-021-11	CERAMIC CHIP 0.01uF	10% 50V	C129	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C51	1-163-009-11	CERAMIC CHIP 0.001uF	10% 50V	C130	1-126-791-11	ELECT 10uF 20%	16V
C52	1-163-037-11	CERAMIC CHIP 0.022uF	10% 25V	C131	1-165-319-11	CERAMIC CHIP 0.1uF	50V
C53	1-163-021-11	CERAMIC CHIP 0.01uF	10% 50V	C133	1-163-241-11	CERAMIC CHIP 39PF 5%	50V
C54	1-163-009-11	CERAMIC CHIP 0.001uF	10% 50V	C134	1-126-791-11	ELECT 10uF 20%	16V
C55	1-163-113-00	CERAMIC CHIP 68PF	5% 50V	C135	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C56	1-163-033-00	CERAMIC CHIP 0.022uF	50V	C136	1-163-035-00	CERAMIC CHIP 0.047uF	50V
C57	1-163-235-11	CERAMIC CHIP 22PF	5% 50V	C137	1-126-791-11	ELECT 10uF 20%	16V
C58	1-163-235-11	CERAMIC CHIP 22PF	5% 50V	C138	1-165-319-11	CERAMIC CHIP 0.1uF	50V
C59	1-163-227-11	CERAMIC CHIP 10PF	0.5PF 50V	C201	1-136-193-11	FILM 0.47uF 10%	250V
C60	1-163-227-11	CERAMIC CHIP 10PF	0.5PF 50V	C202	1-104-664-11	ELECT 47uF 20%	16V
C61	1-163-231-11	CERAMIC CHIP 15PF	5% 50V	C204	1-164-346-11	CERAMIC CHIP 1uF	16V
C62	1-163-251-11	CERAMIC CHIP 100PF	5% 50V	C205	1-163-019-00	CERAMIC CHIP 0.0068uF	10% 50V
C63	1-162-587-11	CERAMIC CHIP 0.039uF	10% 25V	C206	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C64	1-164-004-11	CERAMIC CHIP 0.1uF	10% 25V	C209	1-163-037-11	CERAMIC CHIP 0.022uF	10% 25V
C65	1-164-337-11	CERAMIC CHIP 2.2uF	16V	C210	1-126-960-11	ELECT 1uF 20%	50V
C66	1-163-021-11	CERAMIC CHIP 0.01uF	10% 50V	C211	1-163-034-00	CERAMIC CHIP 0.033uF	50V
C67	1-163-037-11	CERAMIC CHIP 0.022uF	10% 25V	C212	1-126-961-11	ELECT 2.2uF 20%	50V
C68	1-163-031-11	CERAMIC CHIP 0.01uF	50V	C213	1-126-961-11	ELECT 2.2uF 20%	50V
C69	1-163-009-11	CERAMIC CHIP 0.001uF	10% 50V	C301	1-163-033-00	CERAMIC CHIP 0.022uF	50V
C70	1-163-099-00	CERAMIC CHIP 18PF	5% 50V	C303	1-126-964-11	ELECT 10uF 20%	50V
C71	1-163-224-11	CERAMIC CHIP 7PF	0.25PF 50V	C304	1-164-336-11	CERAMIC CHIP 0.33uF	25V
C101	1-165-319-11	CERAMIC CHIP 0.1uF	50V	C305	1-163-033-00	CERAMIC CHIP 0.022uF	50V
C102	1-163-239-11	CERAMIC CHIP 33PF	5% 50V	C306	1-163-033-00	CERAMIC CHIP 0.022uF	50V
C103	1-163-106-00	CERAMIC CHIP 36PF	5% 50V	C401	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C105	1-163-243-11	CERAMIC CHIP 47PF	5% 50V	C502	1-126-934-11	ELECT 220uF 20%	10V
C106	1-163-137-00	CERAMIC CHIP 680PF	5% 50V	C503	1-163-031-11	CERAMIC CHIP 0.01uF	50V
C107	1-165-319-11	CERAMIC CHIP 0.1uF	50V	C504	1-163-104-00	CERAMIC CHIP 30PF 5%	50V
C108	1-126-964-11	ELECT 10uF	20% 50V	C505	1-163-137-00	CERAMIC CHIP 680PF 5%	50V
C109	1-163-021-11	CERAMIC CHIP 0.01uF	10% 50V	C506	1-163-104-00	CERAMIC CHIP 30PF 5%	50V
C110	1-163-035-00	CERAMIC CHIP 0.047uF	50V	C604	1-163-033-00	CERAMIC CHIP 0.022uF	50V
C111	1-164-161-11	CERAMIC CHIP 0.0022uF	10% 100V				

# BASE MAIN

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
		< FILTER >				< COIL >	
CF101	1-760-418-11	FILTER, CERAMIC (460kHz)		L1	1-414-108-11	INDUCTOR 0.68uH	
CF102	1-767-129-81	FILTER, CERAMIC (10.68MHz)		L51	1-408-958-21	INDUCTOR 1uH	
		< CONNECTOR >		L52	1-411-884-11	COIL, OSC	
* CN301	1-506-984-11	PIN, CONNECTOR (PC BOARD) 2P		L101	1-409-798-11	COIL, OSC	
* CN602	1-506-985-11	PIN, CONNECTOR (PC BOARD) 3P		L501	1-408-958-21	INDUCTOR 1uH	
		< DIODE >				< MODULAR JACK >	
D1	8-719-991-33	DIODE 1SS133T-77		MJ201	1-766-250-11	JACK, MODULAR (2C) 6P (LINE)	
D51	8-719-055-14	DIODE KV1832CTR3				< PHOTO COUPTER >	
D101	8-719-991-33	DIODE 1SS133T-77		PH201	8-719-156-73	PHOTO COUPLER PS2501-1LA	
D201	8-719-991-33	DIODE 1SS133T-77		PH202	8-719-024-09	PHOTO COUPLER PS2532-1	
D203	8-719-109-89	DIODE RD5.6ESB2				< TRANSISTOR >	
D204	8-719-109-89	DIODE RD5.6ESB2		Q1	8-729-031-85	TRANSISTOR 2SC4365-34-TB	
D205	8-719-820-97	DIODE U05G4B48		Q51	8-729-031-85	TRANSISTOR 2SC4365-34-TB	
D301	8-719-109-97	DIODE RD6.8ES-B2		Q52	8-729-031-86	TRANSISTOR 2SC3142-J3J4-TB	
D401	8-719-059-87	LED SLR-342VRTB7	(POWER CHARGE/IN USE)	Q54	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
D501	8-719-991-33	DIODE 1SS133T-77		Q201	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
D602	8-719-109-89	DIODE RD5.6ESB2		Q202	8-729-106-68	TRANSISTOR 2SD1615A-GP	
		< FILTER >		Q203	8-729-032-66	TRANSISTOR 2SC5069-TD	
FL101	1-409-671-11	COIL, IFT		Q301	8-729-106-68	TRANSISTOR 2SD1615A-GP	
		< IC >		Q302	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
IC101	8-759-361-65	IC TB31223F		Q401	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
IC301	8-759-273-93	IC S-80740AL-A4-T1		Q402	8-729-106-68	TRANSISTOR 2SD1615A-GP	
IC501	8-759-487-52	IC SB662106A-4J90-TLM		Q403	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
		< JACK >				< RESISTOR >	
J301	1-778-380-11	JACK, DC (POLARITY UNIFIED TYPE)	(DC IN 9V)	R1	1-216-061-00	METAL CHIP 3.3K 5% 1/10W	
		< SHORT >		R2	1-216-019-00	METAL CHIP 56 5% 1/10W	
JR1	1-216-295-00	SHORT 0		R3	1-216-025-00	RES, CHIP 100 5% 1/10W	
JR2	1-216-295-00	SHORT 0		R4	1-216-037-00	METAL CHIP 330 5% 1/10W	
JR3	1-216-296-00	SHORT 0		R51	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
JR4	1-216-295-00	SHORT 0		R52	1-216-073-00	METAL CHIP 10K 5% 1/10W	
JR5	1-216-296-00	SHORT 0		R53	1-216-037-00	METAL CHIP 330 5% 1/10W	
JR7	1-216-296-00	SHORT 0		R54	1-216-025-00	RES, CHIP 100 5% 1/10W	
JR8	1-216-296-00	SHORT 0		R55	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
JR9	1-216-296-00	SHORT 0		R57	1-216-085-00	METAL CHIP 33K 5% 1/10W	
JR10	1-216-295-00	SHORT 0		R58	1-216-049-11	RES, CHIP 1K 5% 1/10W	
JR11	1-216-295-00	SHORT 0		R63	1-216-085-00	METAL CHIP 33K 5% 1/10W	
JR12	1-216-296-00	SHORT 0		R64	1-216-073-00	METAL CHIP 10K 5% 1/10W	
JR15	1-216-295-00	SHORT 0		R65	1-216-069-00	METAL CHIP 6.8K 5% 1/10W	
JR16	1-216-295-00	SHORT 0		R66	1-216-115-00	METAL CHIP 560K 5% 1/10W	
JR17	1-216-296-00	SHORT 0		R68	1-216-097-00	RES, CHIP 100K 5% 1/10W	
JR18	1-216-296-00	SHORT 0		R69	1-216-057-00	METAL CHIP 2.2K 5% 1/10W	
JR19	1-216-296-00	SHORT 0		R101	1-216-095-00	METAL CHIP 82K 5% 1/10W	
JR20	1-216-295-00	SHORT 0		R102	1-216-105-00	RES, CHIP 220K 5% 1/10W	
JR21	1-216-295-00	SHORT 0		R103	1-216-105-00	RES, CHIP 220K 5% 1/10W	
JR22	1-216-295-00	SHORT 0		R104	1-216-105-00	RES, CHIP 220K 5% 1/10W	
				R105	1-216-118-00	RES, CHIP 750K 5% 1/10W	
				R106	1-216-095-00	METAL CHIP 82K 5% 1/10W	
				R107	1-216-081-00	METAL CHIP 22K 5% 1/10W	
				R111	1-216-109-00	METAL CHIP 330K 5% 1/10W	
				R112	1-216-097-00	RES, CHIP 100K 5% 1/10W	
				R113	1-216-065-00	RES, CHIP 4.7K 5% 1/10W	
				R114	1-216-081-00	METAL CHIP 22K 5% 1/10W	

**BASE MAIN**

**HAND MAIN**

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
R115	1-216-089-00	RES, CHIP	47K 5% 1/10W			< VARIABLE RESISTOR >	
R116	1-216-091-00	METAL CHIP	56K 5% 1/10W				
R118	1-216-073-00	METAL CHIP	10K 5% 1/10W	RV101	1-223-387-21	RES, ADJ, CARBON 330K	
R119	1-216-246-00	RES, CHIP	100K 5% 1/8W			< SWITCH >	
R123	1-216-109-00	METAL CHIP	330K 5% 1/10W				
R126	1-216-057-00	METAL CHIP	2.2K 5% 1/10W	S301	1-571-977-11	SWITCH, TACTIL (PAGE)	
R136	1-216-073-00	METAL CHIP	10K 5% 1/10W	SW302	1-692-991-11	SWITCH, SLIDE (DIAL MODE)	
R142	1-216-081-00	METAL CHIP	22K 5% 1/10W			< TRANSFORMER >	
R151	1-216-073-00	METAL CHIP	10K 5% 1/10W				
R201	1-215-861-00	METAL OXIDE	47 5% 1W	T201	1-431-832-11	TRANSFORMER, LINE	
R202	1-215-877-11	METAL OXIDE	22K 5% 1W			< VIBRATOR >	
R204	1-216-069-00	METAL CHIP	6.8K 5% 1/10W				
R206	1-216-174-00	RES, CHIP	100 5% 1/8W	X101	1-760-325-11	VIBRATOR, CRYSTAL (10.22MHz)	
R207	1-216-049-11	RES, CHIP	1K 5% 1/10W	X501	1-760-324-11	VIBRATOR, CRYSTAL (4.048MHz)	
R208	1-216-053-00	METAL CHIP	1.5K 5% 1/10W	*****			
R209	1-216-065-00	RES, CHIP	4.7K 5% 1/10W	*	A-3672-609-A	HAND MAIN BOARD, COMPLETE	
R210	1-216-041-00	METAL CHIP	470 5% 1/10W			*****	
R211	1-216-178-00	RES, CHIP	150 5% 1/8W				
R212	1-216-176-11	RES, CHIP	120 5% 1/8W			3-935-517-01	TERMINAL ASSY, CHARGE
R213	1-216-178-00	RES, CHIP	150 5% 1/8W			3-935-518-01	CUSHION (MICROPHONE)
R215	1-216-085-00	METAL CHIP	33K 5% 1/10W			3-939-070-01	TERMINAL, ANTENNA
R216	1-215-859-00	METAL OXIDE	22 5% 1W				< BAND PASS FILTER >
R217	1-216-037-00	METAL CHIP	330 5% 1/10W	BPF1	1-239-918-11	FILTER, BAND PASS	
R301	1-216-033-00	METAL CHIP	220 5% 1/10W	BPF2	1-233-667-11	FILTER, BAND PASS	
R305	1-216-097-00	RES, CHIP	100K 5% 1/10W	BPF51	1-239-916-11	FILTER, BAND PASS	
R306	1-216-097-00	RES, CHIP	100K 5% 1/10W				< BUZZER >
R307	1-216-113-00	METAL CHIP	470K 5% 1/10W	BZ301	1-544-603-11	BUZZER	
R308	1-216-097-00	RES, CHIP	100K 5% 1/10W				< CAPACITOR >
R309	1-216-097-00	RES, CHIP	100K 5% 1/10W	C2	1-163-031-11	CERAMIC CHIP	0.01uF 50V
R310	1-216-065-00	RES, CHIP	4.7K 5% 1/10W	C3	1-163-033-00	CERAMIC CHIP	0.022uF 50V
R401	1-216-190-00	RES, CHIP	470 5% 1/8W	C4	1-163-021-11	CERAMIC CHIP	0.01uF 10% 50V
R402	1-216-025-00	RES, CHIP	100 5% 1/10W	C51	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V
R403	1-216-005-00	METAL CHIP	15 5% 1/10W	C52	1-163-037-11	CERAMIC CHIP	0.022uF 10% 25V
R404	1-216-005-00	METAL CHIP	15 5% 1/10W	C53	1-163-021-11	CERAMIC CHIP	0.01uF 10% 50V
R405	1-216-025-00	RES, CHIP	100 5% 1/10W	C54	1-163-009-11	CERAMIC CHIP	0.001uF 10% 50V
R406	1-216-073-00	METAL CHIP	10K 5% 1/10W	C55	1-163-243-11	CERAMIC CHIP	47PF 5% 50V
R408	1-216-041-00	METAL CHIP	470 5% 1/10W	C56	1-163-033-00	CERAMIC CHIP	0.022uF 50V
R409	1-216-017-00	RES, CHIP	47 5% 1/10W	C57	1-163-235-11	CERAMIC CHIP	22PF 5% 50V
R411	1-216-065-00	RES, CHIP	4.7K 5% 1/10W	C58	1-163-235-11	CERAMIC CHIP	22PF 5% 50V
R503	1-216-073-00	METAL CHIP	10K 5% 1/10W	C59	1-163-227-11	CERAMIC CHIP	10PF 0.5PF 50V
R505	1-216-049-11	RES, CHIP	1K 5% 1/10W	C60	1-163-227-11	CERAMIC CHIP	10PF 0.5PF 50V
R506	1-216-049-11	RES, CHIP	1K 5% 1/10W	C61	1-163-241-11	CERAMIC CHIP	39PF 5% 50V
R507	1-216-049-11	RES, CHIP	1K 5% 1/10W	C62	1-163-243-11	CERAMIC CHIP	47PF 5% 50V
R508	1-216-097-00	RES, CHIP	100K 5% 1/10W	C63	1-162-587-11	CERAMIC CHIP	0.039uF 10% 25V
R509	1-216-117-00	METAL CHIP	680K 5% 1/10W	C64	1-164-004-11	CERAMIC CHIP	0.1uF 10% 25V
R510	1-216-246-00	RES, CHIP	100K 5% 1/8W	C65	1-164-337-11	CERAMIC CHIP	2.2uF 16V
R513	1-216-075-00	METAL CHIP	12K 5% 1/10W	C66	1-163-021-11	CERAMIC CHIP	0.01uF 10% 50V
R514	1-216-073-00	METAL CHIP	10K 5% 1/10W	C67	1-164-004-11	CERAMIC CHIP	0.1uF 10% 25V
R515	1-216-057-00	METAL CHIP	2.2K 5% 1/10W	C69	1-163-031-11	CERAMIC CHIP	0.01uF 50V
R522	1-216-097-00	RES, CHIP	100K 5% 1/10W	C101	1-165-319-11	CERAMIC CHIP	0.1uF 50V
R523	1-216-097-00	RES, CHIP	100K 5% 1/10W	C102	1-163-241-11	CERAMIC CHIP	39PF 5% 50V
R524	1-216-097-00	RES, CHIP	100K 5% 1/10W	C103	1-163-239-11	CERAMIC CHIP	33PF 5% 50V
R525	1-216-097-00	RES, CHIP	100K 5% 1/10W	C105	1-163-243-11	CERAMIC CHIP	47PF 5% 50V
R526	1-216-097-00	RES, CHIP	100K 5% 1/10W	C106	1-163-137-00	CERAMIC CHIP	680PF 5% 50V
R527	1-216-097-00	RES, CHIP	100K 5% 1/10W				
R528	1-216-097-00	RES, CHIP	100K 5% 1/10W				
R604	1-216-029-00	METAL CHIP	150 5% 1/10W				

# HAND MAIN

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
C107	1-165-319-11	CERAMIC CHIP	0.1uF	50V		< DIODE >	
C108	1-126-964-11	ELECT	10uF	20%	50V		
C109	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V	D51	8-719-055-14 DIODE KV1832CTR3
C110	1-163-037-11	CERAMIC CHIP	0.022uF	10%	25V	D101	8-719-055-14 DIODE KV1832CTR3
						D202	8-719-938-75 DIODE SB05-05CP
C111	1-163-023-00	CERAMIC CHIP	0.015uF	5%	50V	D301	8-719-914-43 DIODE DAN202K
C112	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V	D501	8-719-059-87 LED SLR-342VRTB7 (TALK/BATT LOW)
C113	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V		
C115	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V	D502	8-719-914-43 DIODE DAN202K
C116	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V	D504	8-719-941-04 DIODE SB007-03CP
							< FILTER >
C117	1-163-989-11	CERAMIC CHIP	0.033uF	10%	25V		
C118	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V	FL101	1-409-671-11 COIL, IFT (460kHz)
C119	1-163-033-00	CERAMIC CHIP	0.022uF		50V		< IC >
C120	1-163-033-00	CERAMIC CHIP	0.022uF		50V		
C121	1-165-319-11	CERAMIC CHIP	0.1uF		50V		
C122	1-163-235-11	CERAMIC CHIP	22PF	5%	50V	IC101	8-759-361-65 IC TB31223F
C123	1-165-319-11	CERAMIC CHIP	0.1uF		50V	IC201	8-759-082-66 IC S-80727AL-AQ-T1
C125	1-165-319-11	CERAMIC CHIP	0.1uF		50V	IC501	8-759-487-53 IC SH66358C-4J91
C127	1-163-033-00	CERAMIC CHIP	0.022uF		50V		< SHORT/RESISTOR >
C128	1-126-791-11	ELECT	10uF	20%	16V		
C129	1-163-031-11	CERAMIC CHIP	0.01uF		50V	JR101	1-216-296-00 SHORT 0
C130	1-126-791-11	ELECT	10uF	20%	16V	JR102	1-216-296-00 SHORT 0
C131	1-165-319-11	CERAMIC CHIP	0.1uF		50V	JR103	1-216-296-00 SHORT 0
C132	1-126-791-11	ELECT	10uF	20%	16V	JR104	1-216-296-00 SHORT 0
C133	1-165-319-11	CERAMIC CHIP	0.1uF		50V	JR105	1-216-296-00 SHORT 0
C134	1-126-924-11	ELECT	330uF	20%	6.3V	JR106	1-216-296-00 SHORT 0
C136	1-163-237-11	CERAMIC CHIP	27PF	5%	50V	JR108	1-216-296-00 SHORT 0
C137	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	JR110	1-216-296-00 SHORT 0
C138	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	JR111	1-216-296-00 SHORT 0
C140	1-126-791-11	ELECT	10uF	20%	16V	JR112	1-216-296-00 SHORT 0
C141	1-163-021-11	CERAMIC CHIP	0.01uF	10%	50V	JR113	1-216-296-00 SHORT 0
C142	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	JR114	1-216-296-00 SHORT 0
C143	1-162-638-11	CERAMIC CHIP	1uF		16V	JR115	1-216-296-00 SHORT 0
C148	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	JR116	1-216-296-00 SHORT 0
C202	1-164-336-11	CERAMIC CHIP	0.33uF		25V	JR117	1-216-296-00 SHORT 0
C204	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	JR119	1-216-296-00 SHORT 0
C205	1-163-033-00	CERAMIC CHIP	0.022uF		50V	JR124	1-216-296-00 SHORT 0
C207	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	JR127	1-216-296-00 SHORT 0
C208	1-163-809-11	CERAMIC CHIP	0.047uF	10%	25V	JR128	1-216-296-00 SHORT 0
C210	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	JR129	1-216-296-00 SHORT 0
C501	1-164-161-11	CERAMIC CHIP	0.0022uF	10%	100V	JR130	1-216-296-00 SHORT 0
C505	1-163-017-00	CERAMIC CHIP	0.0047uF	5%	50V	JR133	1-216-222-00 RES, CHIP 10K 5% 1/8W
C511	1-163-104-00	CERAMIC CHIP	30PF	5%	50V	JR134	1-216-296-00 SHORT 0
C513	1-163-104-00	CERAMIC CHIP	30PF	5%	50V	JR135	1-216-296-00 SHORT 0
C514	1-163-031-11	CERAMIC CHIP	0.01uF		50V	JR136	1-216-296-00 SHORT 0
C515	1-107-682-11	CERAMIC CHIP	1uF	10%	16V	JR137	1-216-296-00 SHORT 0
C516	1-163-009-11	CERAMIC CHIP	0.001uF	10%	50V	JR138	1-216-296-00 SHORT 0
						JR140	1-216-296-00 SHORT 0
							< COIL >
CF101	1-760-418-11	FILTER, CERAMIC (460kHz)				L1	1-408-958-21 INDUCTOR 1uH
CF102	1-767-129-81	FILTER, CERAMIC (10.66MHz)				L2	1-408-958-21 INDUCTOR 1uH
						L52	1-411-883-11 COIL, OSC
						L102	1-409-670-11 COIL, OSC
							< MICROPHONE >
* CN101	1-506-984-11	PIN, CONNECTOR (PC BOARD) 2P				MIC1	1-542-118-11 MICROPHONE, ELECTRET CONDENSER
* CN201	1-766-180-11	PIN, CONNECTOR (PC BOARD) 2P					
* CN202	1-506-984-11	PIN, CONNECTOR (PC BOARD) 2P					

Ref. No.	Part No.	Description	Remark
< TRANSISTOR >			
Q1	8-729-031-86	TRANSISTOR 2SC3142-J3J4-TB	
Q51	8-729-031-85	TRANSISTOR 2SC4365-34-TB	
Q52	8-729-031-86	TRANSISTOR 2SC3142-J3J4-TB	
Q54	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q201	8-729-120-28	TRANSISTOR 2SC1623-L5L6	
Q202	8-729-028-27	FET 2SK2009 (TE85L)	
Q301	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q501	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
Q502	8-729-026-49	TRANSISTOR 2SA1037AK-T146-R	
< RESISTOR >			
R1	1-216-061-00	METAL CHIP 3.3K	5% 1/10W
R2	1-216-033-00	METAL CHIP 220	5% 1/10W
R3	1-216-025-00	RES, CHIP 100	5% 1/10W
R4	1-216-049-11	RES, CHIP 1K	5% 1/10W
R5	1-216-041-00	METAL CHIP 470	5% 1/10W
R51	1-216-017-00	RES, CHIP 47	5% 1/10W
R52	1-216-073-00	METAL CHIP 10K	5% 1/10W
R53	1-216-037-00	METAL CHIP 330	5% 1/10W
R54	1-216-025-00	RES, CHIP 100	5% 1/10W
R55	1-216-053-00	METAL CHIP 1.5K	5% 1/10W
R57	1-216-085-00	METAL CHIP 33K	5% 1/10W
R58	1-216-049-11	RES, CHIP 1K	5% 1/10W
R63	1-216-085-00	METAL CHIP 33K	5% 1/10W
R64	1-216-073-00	METAL CHIP 10K	5% 1/10W
R65	1-216-069-00	METAL CHIP 6.8K	5% 1/10W
R66	1-216-112-00	RES, CHIP 430K	5% 1/10W
R68	1-216-097-00	RES, CHIP 100K	5% 1/10W
R69	1-216-057-00	METAL CHIP 2.2K	5% 1/10W
R101	1-216-093-00	METAL CHIP 68K	5% 1/10W
R102	1-216-105-00	RES, CHIP 220K	5% 1/10W
R103	1-216-105-00	RES, CHIP 220K	5% 1/10W
R104	1-216-101-00	METAL CHIP 150K	5% 1/10W
R105	1-216-117-00	METAL CHIP 680K	5% 1/10W
R106	1-216-049-11	RES, CHIP 1K	5% 1/10W
R107	1-216-077-00	METAL CHIP 15K	5% 1/10W
R108	1-216-246-00	RES, CHIP 100K	5% 1/8W
R109	1-216-097-00	RES, CHIP 100K	5% 1/10W
R110	1-216-097-00	RES, CHIP 100K	5% 1/10W
R111	1-216-109-00	METAL CHIP 330K	5% 1/10W
R112	1-216-093-00	METAL CHIP 68K	5% 1/10W
R113	1-216-083-00	METAL CHIP 27K	5% 1/10W
R114	1-216-093-00	METAL CHIP 68K	5% 1/10W
R115	1-216-081-00	METAL CHIP 22K	5% 1/10W
R116	1-216-097-00	RES, CHIP 100K	5% 1/10W
R118	1-216-073-00	METAL CHIP 10K	5% 1/10W
R119	1-216-121-00	RES, CHIP 1M	5% 1/10W
R123	1-216-073-00	METAL CHIP 10K	5% 1/10W
R126	1-216-037-00	METAL CHIP 330	5% 1/10W
R127	1-216-085-00	METAL CHIP 33K	5% 1/10W
R128	1-216-085-00	METAL CHIP 33K	5% 1/10W
R130	1-216-081-00	METAL CHIP 22K	5% 1/10W
R141	1-216-206-00	RES, CHIP 2.2K	5% 1/8W
R142	1-216-057-00	METAL CHIP 2.2K	5% 1/10W
R201	1-216-295-00	SHORT 0	
R202	1-216-113-00	METAL CHIP 470K	5% 1/10W

Ref. No.	Part No.	Description	Remark
R203	1-216-097-00	RES, CHIP 100K	5% 1/10W
R204	1-216-097-00	RES, CHIP 100K	5% 1/10W
R205	1-216-073-00	METAL CHIP 10K	5% 1/10W
R301	1-216-057-00	METAL CHIP 2.2K	5% 1/10W
R501	1-216-073-00	METAL CHIP 10K	5% 1/10W
R502	1-216-073-00	METAL CHIP 10K	5% 1/10W
R503	1-216-073-00	METAL CHIP 10K	5% 1/10W
R504	1-216-073-00	METAL CHIP 10K	5% 1/10W
R505	1-216-073-00	METAL CHIP 10K	5% 1/10W
R506	1-216-097-00	RES, CHIP 100K	5% 1/10W
R507	1-216-041-00	METAL CHIP 470	5% 1/10W
R508	1-216-097-00	RES, CHIP 100K	5% 1/10W
R509	1-216-097-00	RES, CHIP 100K	5% 1/10W
R510	1-216-097-00	RES, CHIP 100K	5% 1/10W
R511	1-216-097-00	RES, CHIP 100K	5% 1/10W
R512	1-216-049-11	RES, CHIP 1K	5% 1/10W
R513	1-216-049-11	RES, CHIP 1K	5% 1/10W
R514	1-216-049-11	RES, CHIP 1K	5% 1/10W
R515	1-216-073-00	METAL CHIP 10K	5% 1/10W
R518	1-216-073-00	METAL CHIP 10K	5% 1/10W
R519	1-216-073-00	METAL CHIP 10K	5% 1/10W
R520	1-216-121-00	RES, CHIP 1M	5% 1/10W
R521	1-216-097-00	RES, CHIP 100K	5% 1/10W
R522	1-216-129-00	METAL CHIP 2.2M	5% 1/10W
R532	1-216-073-00	METAL CHIP 10K	5% 1/10W
R533	1-216-097-00	RES, CHIP 100K	5% 1/10W
R534	1-216-097-00	RES, CHIP 100K	5% 1/10W
R541	1-216-112-00	RES, CHIP 430K	5% 1/10W
R555	1-216-097-00	RES, CHIP 100K	5% 1/10W
< VARIABLE RESISTOR >			
RV101	1-223-387-21	RES, ADJ, CARBON 330K	
< VIBRATOR >			
X101	1-760-326-11	VIBRATOR, CRYSTAL (10.2MHz)	
X501	1-760-324-11	VIBRATOR, CRYSTAL (4.048MHz)	
*****			
SUB BOARD			
*****			
(Included in BASE MAIN BOARD, COMPLETE)			
< CAPACITOR >			
C601	1-163-033-00	CERAMIC CHIP 0.022uF	50V
C603	1-164-336-11	CERAMIC CHIP 0.33uF	25V
< DIODE >			
D601	8-719-110-17	DIODE RD10ESB2	
< TRANSISTOR >			
Q601	8-729-106-68	TRANSISTOR 2SD1615A-GP	
< RESISTOR >			
R601	1-216-045-00	METAL CHIP 680	5% 1/10W
R602	1-249-415-11	CARBON 680	5% 1/4W
R603	1-249-415-11	CARBON 680	5% 1/4W
*****			

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Remark</u>
		MISCELLANEOUS *****	
13	1-762-664-11	SWITCH, RUBBER KEY	
ANT1	1-501-511-11	ANTENNA, TELESCOPIC (BASESET)	
ANT2	1-501-839-11	ANTENNA (HANDSET)	
SP1	1-505-333-11	SPEAKER (2.1cm)	

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HARDWARE LIST  
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#1	7-685-134-19	SCREW +BTP 2.6X8 TYPE2 N-S	
#2	7-685-136-19	SCREW +BTP 2.6X12 TYPE2 N-S	
#3	7-685-647-79	SCREW +P 3X10 TYPE2 NON-SLIT	

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ACCESSORIES & PACKING MATERIALS  
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△	1-475-210-11	ADAPTOR, AC (AC-T56)	
	1-528-710-12	BATTERY, NICKEL CADMIUM(BP-T16)	
	1-696-454-11	CORD (WITH MODULAR PLUG) (LINE) (2m15cm)	
	3-864-806-11	MANUAL, INSTRUCTION (ENGLISH, CHINESE)	
	3-936-680-01	LABEL (ADDRESS)	
	X-3368-367-1	SCREW ASSY	

The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.