ORDER NO. KM40402342C3

Service Manual

Telephone Equipment

Caller ID Compatible

KX-TG2360JXS
KX-TGA236JXS

Digital Cordless Answering System

Silver Version

(for Asia, Middle Near East and Other Areas)

(Handset)

(Base Unit)

SPECIFICATIONS

	Base Unit	Handset
Power Supply	AC Adaptor (PQLV1BX, 220-240 V AC, 50/60 Hz)	Rechargeable Ni-MH battery (3.6 V, 830 mAh)
Receiving/Transmitting Frequency	90 channels within 2400~2481MHz	90 channels within 2400~2481MHz
Receiving Method	Super Heterodyne	Super Heterodyne
Oscillation Method	PLL synthesizer	PLL synthesizer
Detecting Method	Quadrature Discriminator	Quadrature Discriminator
Tolerance of OSC Frequency	13.824MHz±100Hz	13.824MHz±100Hz
Modulation Method	Frequency Modulation	Frequency Modulation
Spread spectrum Method	Frequency Hopping Spread spectrum	Frequency Hopping Spread spectrum
ID Code	19bit	23bit
Security Codes	——	1,000,000
Dialing Mode	——	Tone (DTMF)/Pulse
Ringer Equivalence No. (REN)	0.1B	——
Redial	——	Up to 48 digits
Speed Dialer	——	Up to 32 digits
Power Consumption	Standby: Approx. 2.3W Maximum: Approx. 5.2W	11 days at Standby, 5 hours at Talk
Operating Environment	5˚C - 40 ˚C (41 ˚F - 104 ˚F)	5˚C - 40 ˚C (41 ˚F - 104 ˚F)
Dimension (H x W x D)	Approx. 85mm × 175mm × 200mm (3 11/32" × 6 7/8" × 7 7/8")	Approx. 208mm × 52mm × 39mm (8 3/16" × 2 1/16" × 1 17/32")
Weight	Approx. 470 g (1.04 lb.)	Approx. 190 g (0.42 lb.)

Design and specifications are subject to change without notice.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF. Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.

When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

Panasonic

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.

Note:

Because CONTENTS 2 to 9 are the extracts from the Operating Instructions of this model, they are subject to change without notice. Please refer to the original Operating Instructions for further information.

CONTENTS

1 ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:

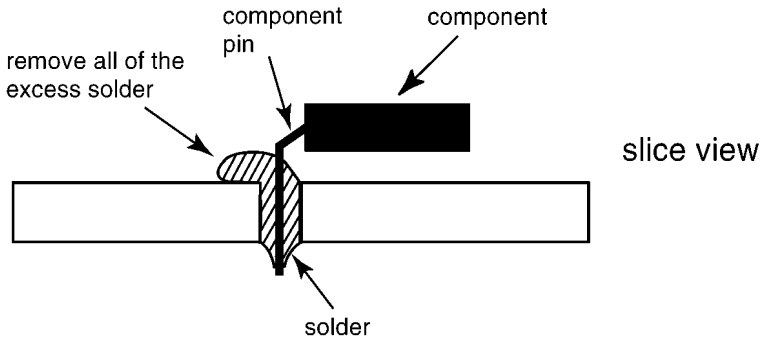
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin (Sn), Silver (Ag), and Copper (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

Caution

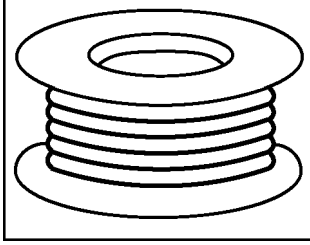
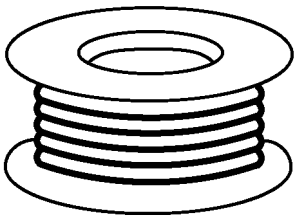
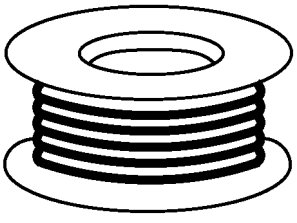
- PbF solder has a melting point that is 50°F ~70°F (30°C ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700°F ± 20°F (370°C ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F (600°C).
- If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See the figure below).



1.1. Suggested PbF Solder

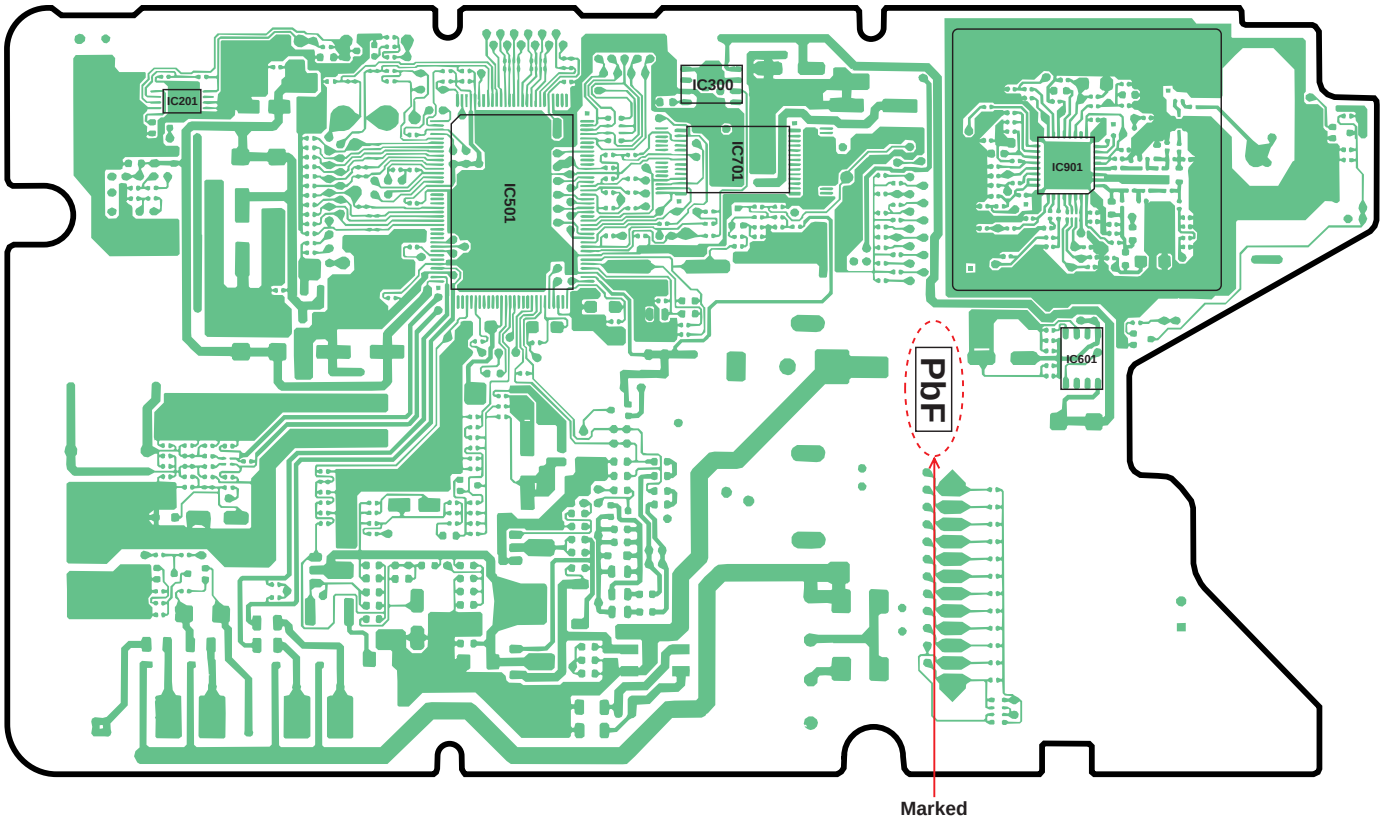
There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper (Sn+Ag+Cu), you can also use Tin and Copper (Sn+Cu) or Tin, Zinc, and Bismuth (Sn+Zn+Bi). Please check the manufac turer's specific instructions for the melting points of their products and any precautions for using their product with other materials.

The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

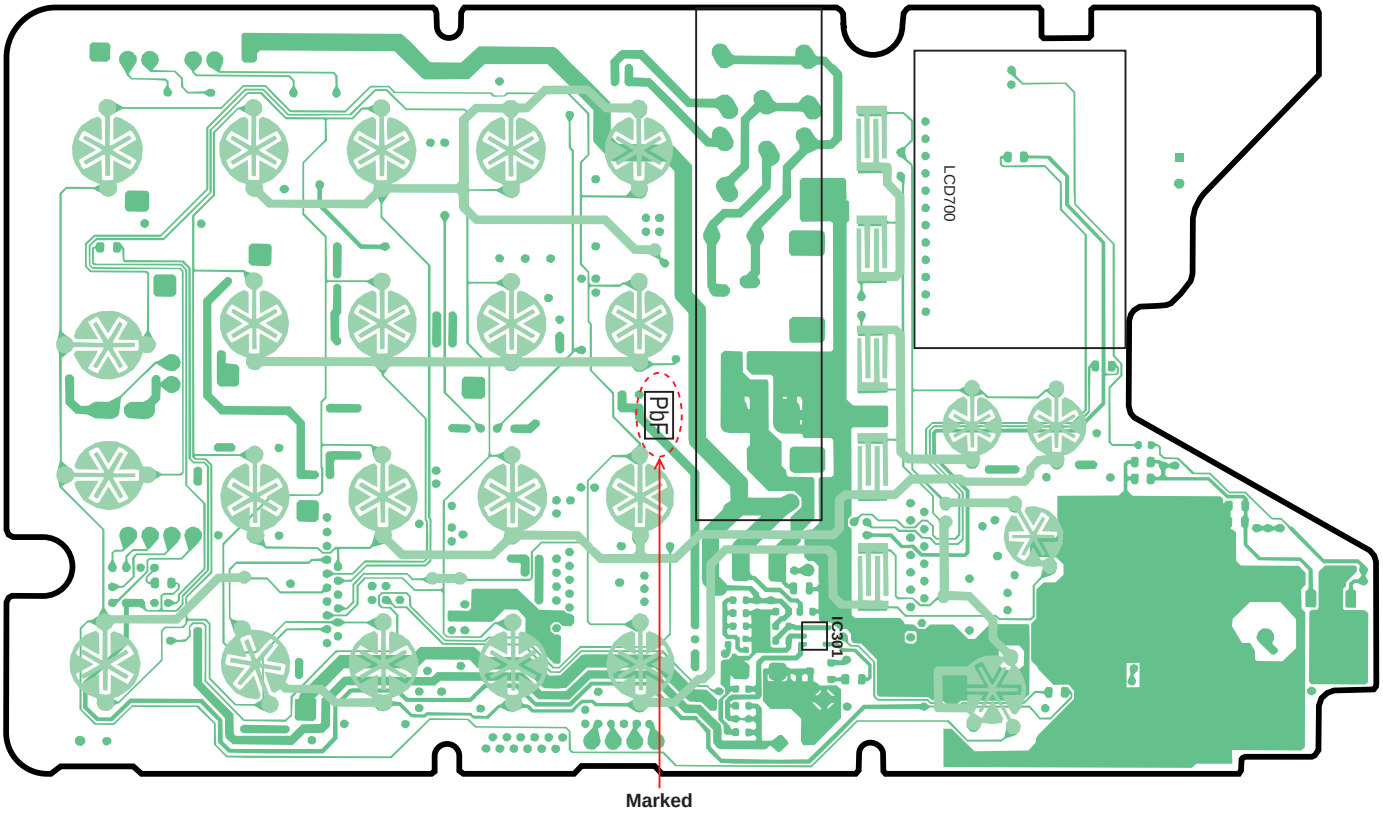
0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

1.2. How to recognize that Pb Free solder is used

1.2.1. Base Unit PCB



(Component View)

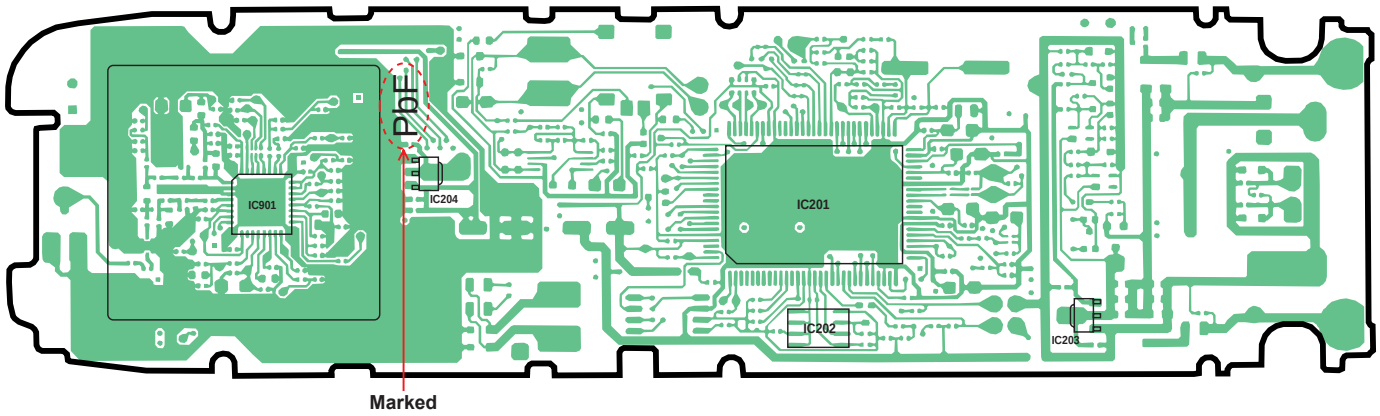


(Flow Solder Side View)

Note:

The location of the “PbF” mark is subject to change without notice.

1.2.2. Handset PCB



(Component View)

Note:

The location of the “PbF” mark is subject to change without notice.

2 FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

When repairing, the following precautions will help prevent recurring malfunctions.

1. Cover the plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on the worktable.
4. Do not grasp IC or LSI pins with bare fingers.

3 CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

Dispose of used batteries according to the manufacture's Instructions.

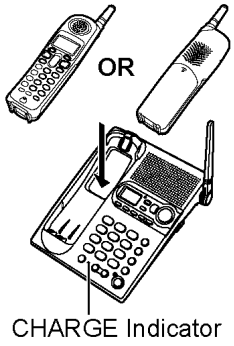
4 BATTERY

4.1. Standard Battery Life

4.1.1. Battery Charge

Place the handset on the base unit.
Charge for **6 hours** before initial use.

- The unit beeps once, the CHARGE indicator lights, and "Charging" is displayed.
- When the battery is fully charged, "Charge completed" is displayed.



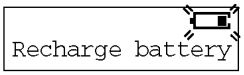
4.1.2. Battery Strength

You can confirm battery strength on the handset display.
Battery strength is indicated by the icons shown in the chart to the right.

Display prompt	Battery strength
	Fully charged
	Medium
	Low
(flashing)	Needs to be recharged.
	Discharged

4.1.3. Recharge

Recharge the battery when:
—"Recharge battery" is displayed on the handset,
—" " flashes, or
—the handset beeps intermittently while it is in use.



- The display will continually indicate "Recharge battery" and/or " " will flash when the handset battery is charged for less than 15 minutes and the handset is lifted off the base unit.
- If the battery has been discharged, the handset will display "Charge for 6h" and " " when you place the handset on the base unit. The handset will not work unless the battery is charged. Continue charging.

Note for service:

The battery strength may not be indicated correctly if the battery is disconnected and connected again, even after it is fully charged. In that case, by recharging the battery as mentioned above, you will get a correct indication of the battery strength.

4.1.4. Battery Information

After your Panasonic battery is fully charged, you can expect the following performance:

Operation	Operating time
While in use (TALK)	Up to 5 hours
While not in use (Standby)	Up to 11 days

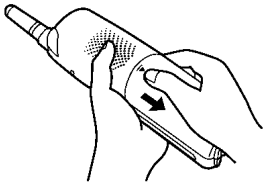
- A fully charged battery will give you up to 5 hours of continuous talk time, or keep your handset in standby mode to receive incoming calls for up to 11 days (if no phone calls are made). Battery power is consumed whenever the handset is off of the base unit, even when the handset is not in use. The longer you leave the handset off of the base unit, the time you can actually talk on the handset will be shortened. Actual battery performance depends on a combination of how often the handset is in TALK mode and how often it is in Standby mode.
- **Clean the charge contacts of the handset and the base unit with a soft, dry cloth. Clean if the unit is subject to grease, dust or high humidity.** Otherwise the battery may not charge properly.
- If the battery is fully charged, you do not have to place the handset on the base unit until "Recharge battery" is displayed and/or "▭" flashes. This will maximize the battery life.
- If you want to keep the battery fully charged at all times, place the handset on the base unit when the handset is not used. The battery cannot be overcharged.

4.2. Battery Replacement

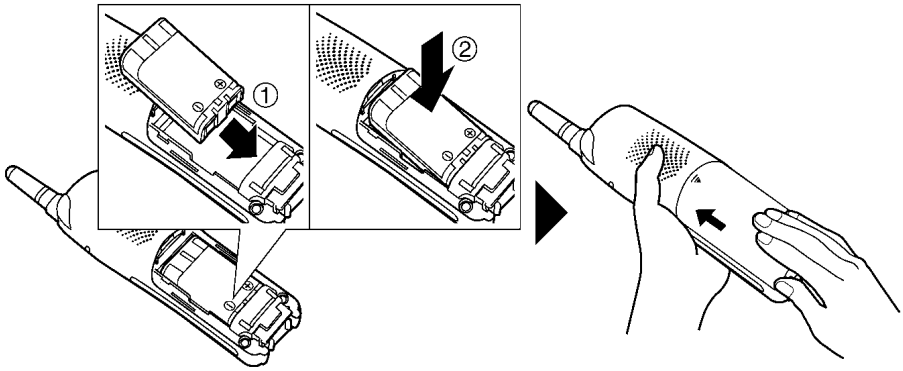
If you cleaned the charge contacts and fully charged the battery, but after a few telephone calls, "Recharge battery" is displayed and/or "▭" continues to flash, or "Charge for 6h" and "▭" are displayed, the battery may need to be replaced. Please order a new Panasonic HHR-P104 battery.

To replace the battery:

Press the notch on the cover firmly and slide it as indicated by the arrow. Replace the old battery with a new one.

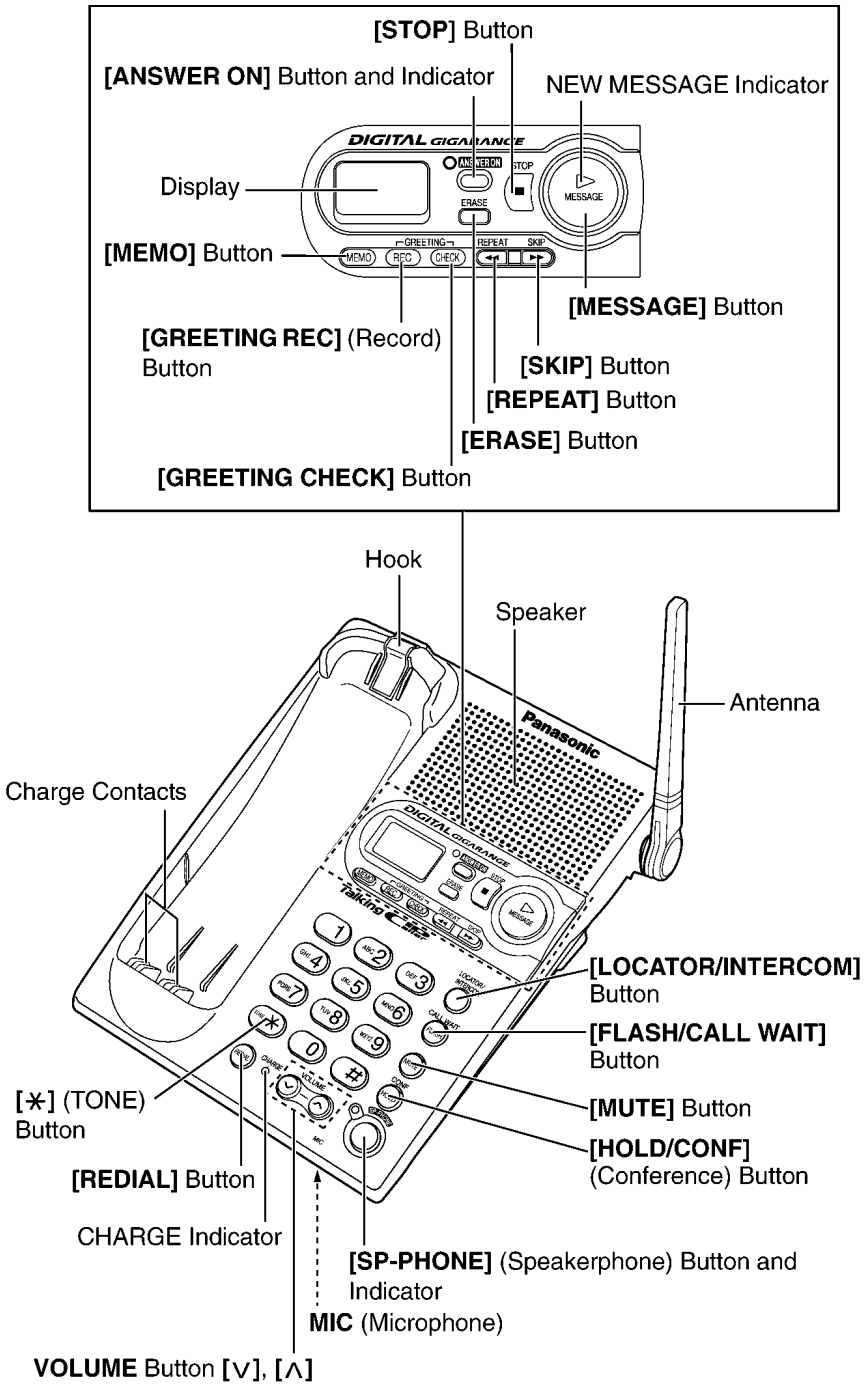


Insert the battery (①), and press it down until it snaps into the compartment (②). Close the cover and charge the battery for 6 hours.

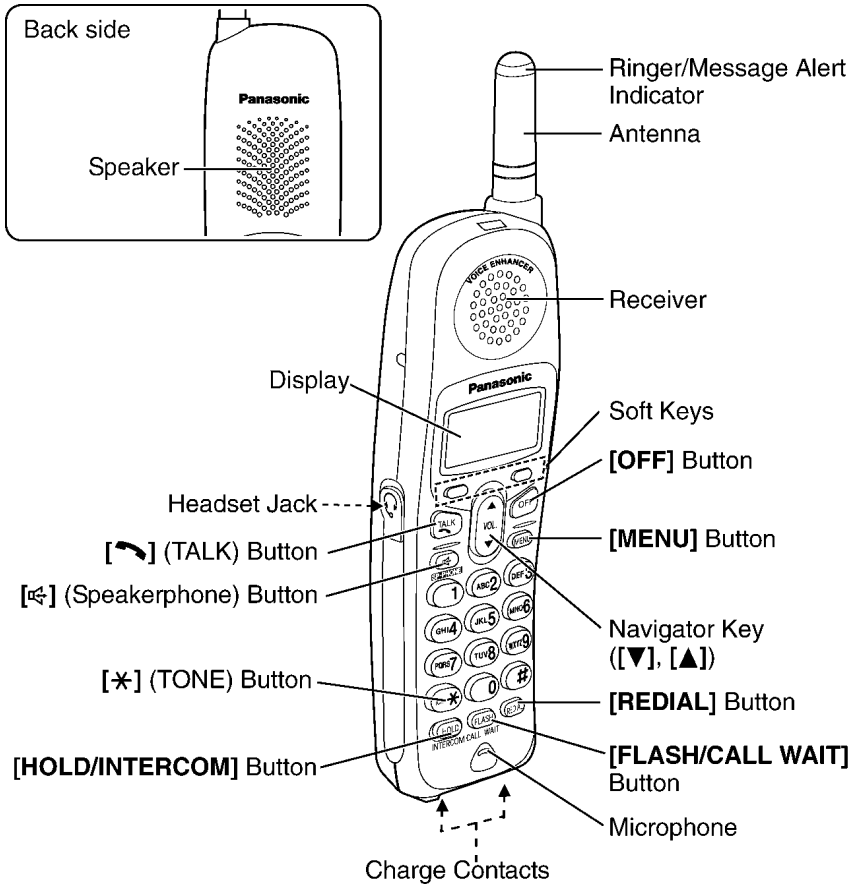


5 LOCATION OF CONTROLS

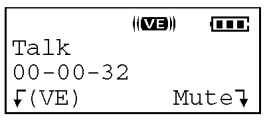
5.1. Base unit



5.2. Handset



Handset soft keys



Two soft keys are used to select functions displayed directly above each key. Functions displayed above the keys will change depending on the state of use.
On this sample display, "(VE)" and "Mute" are displayed above soft keys.

Pressing the right soft key selects mute "Mute".
Pressing the left soft key selects Voice Enhancer "(VE)".

- When a function name does not appear above a soft key, the soft key has no function.

Handset navigator key

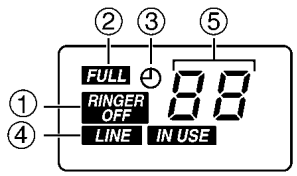
Scrolls up **[▲]** and down **[▼]** the function menu, the Caller List and the phone book.
Increases **[▲]** or decreases **[▼]** the handset ringer and receiver/speaker volumes.

Throughout this Service Manual:

- The soft keys are indicated by what is displayed above the keys.
  Ex. "Press **Mute**." indicates "Press the soft key below Mute".
- The navigator key is indicated by the arrows **[▼]** or **[▲]**.

6 DISPLAY

6.1. Base Unit Display



① "RINGER OFF" indicates the base unit ringer is off.

② "FULL" flashes when no new messages can be recorded. Erase unnecessary messages.

③ "◴" flashes until you set the date and time, and flashes after a power failure. If it is flashing, set the date and time.

④ "LINE IN USE" functions as follows.

Off (invisible)	The line is free.
On	The line is being used.
Flashing	A call is on hold on the handset or base unit or the Answering System is answering a call.
Flashing rapidly	A call is being received.

• "IN USE" displays when a handset is operating the Answering System.

⑤ Message counter shows:

—the total number of recorded messages. If the recording time is set to "Greeting only", "90" will be displayed.

—the selected volume level while you are adjusting the volume.

—" E " when your greeting message or memo message was not recorded correctly.

6.2. Troubleshooting (Handset LCD)

The following will be displayed when the unit needs your attention.

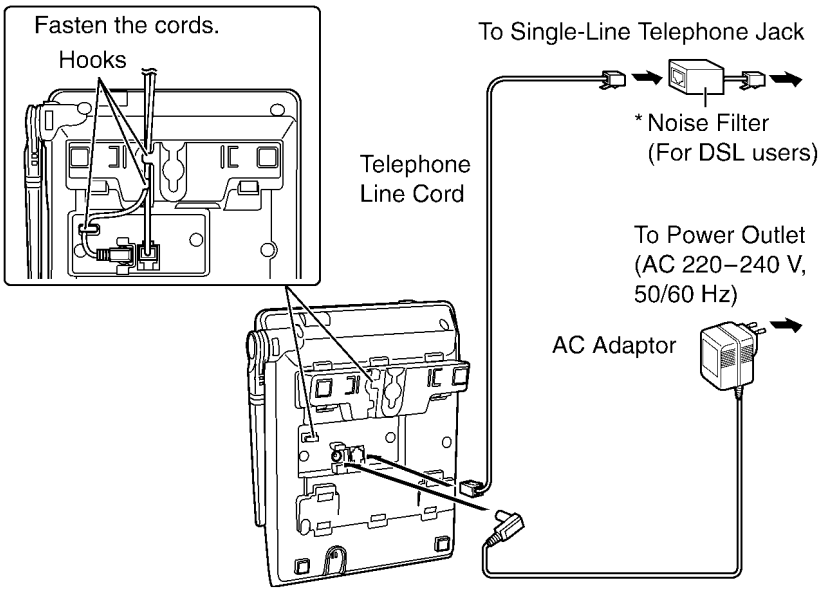
Display message	Cause & Remedy
Recharge battery	• The battery needs to be charged. Recharge the battery.
Charge for 6h	• The battery has been discharged. The handset will not work. Fully charge the battery.
No link to base. Move closer to base, try again.	• The handset has lost communication with the base unit. Walk closer to the base unit and try again or re-register the handset. • Confirm the base unit's AC adaptor is plugged in. • Raise the base unit antenna.
Please lift up and try again.	• A handset button was pressed while the handset was on the base unit. Lift the handset and press the button again.
Busy	• The base unit is in use. Try again later.
Error!!	• When you tried to re-register the handset, the handset and base unit could not link for some reason, such as interference from electrical appliances. Move the handset and base unit away from any electrical appliances and try again.
Phone book full	• When you tried to store an item in the phone book, the phone book memory was full. Press **[OFF]** to exit the programming mode. To erase other items from the phone book, see **"Erasing an Item in the Phone Book"**.
System is busy. Please try again later.	• The handset has lost communication with the base unit. Walk closer to the base unit and try again. • The Answering System is in use, such as answering a call or playing back messages. Try again later.
Save error	• The entered password was wrong in programming the Dial Lock. Enter the correct password.
Dial locked	• The Dial Lock is turned on. If necessary, cancel the Dial Lock.
Line in use	• The base unit is conducting an outside call or a parallel connected telephone is in use.
Line on hold	• The base unit is on hold for an outside call.

Cross Reference:

Erasing an Item in the Phone Book (P.35)

7 SETTINGS

7.1. Connections



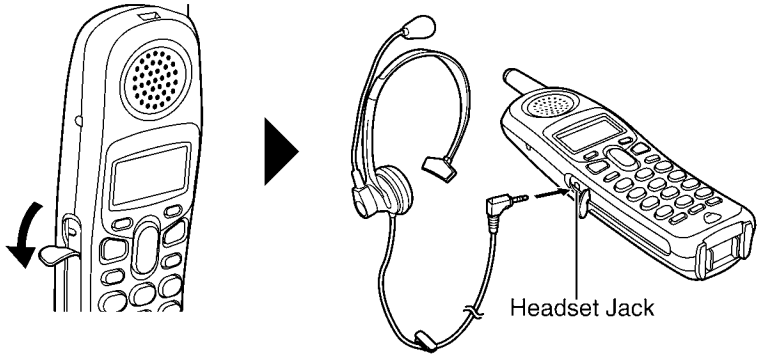
- USE ONLY WITH Panasonic AC ADAPTOR PQLV1BX.
- The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)
- If your unit is connected to a PBX which does not support Caller ID, you cannot access Caller ID services.
- The unit will not work during a power failure. We recommend connecting a standard telephone to the same telephone line or to the same telephone jack using a T-adaptor.
- When more than one unit is used, the units may interfere with each other. To prevent or reduce interference, please keep ample space between the base units.

* If the unit is connected to a telephone line with DSL service, you may hear noise from the receiver or speaker during conversations or the unit may not display caller's phone number properly. We recommend connecting a noise filter (contact your DSL service provider) to the telephone line between the unit and the telephone line jack.

7.2. Connecting an Optional Headset

Connecting an optional headset to the handset allows hands-free phone conversation. Please use only the Panasonic KX-TCA89BX headset.

Open the headset jack cover, and insert the headset plug into the headset jack as shown below.

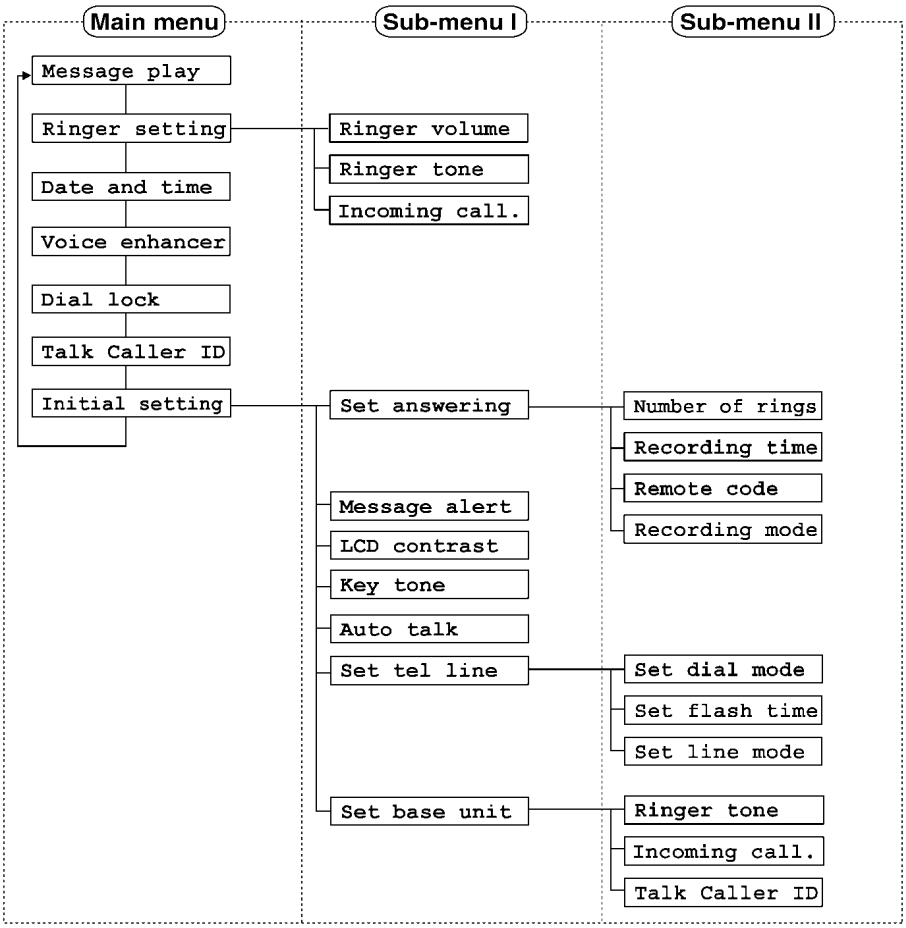


To switch to the speakerphone while using the headset:
Press [ ]. To return to the headset, press [ ].

7.3. Function Menu Table

You can use the following functions to customize your unit.

- After pressing **[MENU]**, you can also program menu items directly by pressing (**[0]** to **[9]**, **[✳]** and **[#]**) instead of using the soft keys. Refer to "**Direct Commands**".



Cross Reference:

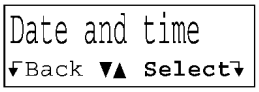
Direct Commands (P.20)

7.4. Date and Time

You need to set the date and time;
— to display the time and date the calls were received in the Caller List, and
— to announce the day and time when each message was recorded, during a message playback.

1 Press **[MENU]**.

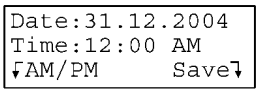
2 Scroll to "Date and time" by pressing **[▼]** or **[▲]**, then press **Select**.



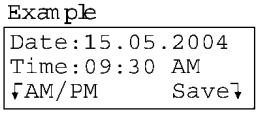
3 ① Enter 2 digits each for the day, month, and year. (Ex. To set May 15, 2004, enter "15 05 04".)

② Enter 4 digits for the time (hour and minute).
(Ex. To set 9:30, enter "0930".)

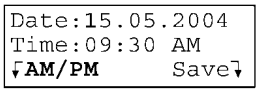
- If you enter a wrong number, press **[▼]** or **[▲]** to move the cursor to the incorrect number. Enter the correct number.



Example



4 Select "AM" or "PM" by pressing **AM/PM**.



5 Press **Save**.

- The date and time are set and "🕘" disappears from the base unit display.
- If the handset beeps 3 times, the date and time were not set correctly. Start again from step 3.

6 Press **[OFF]**.

- When entering the time in step 3, you cannot enter numbers greater than 12. **Do not use military time.** (To set 13:00 hours, enter "0100", then select "PM" in step 4.)

The date and time may be incorrect after a power failure. When "🕘" flashes on the base unit display or "Press MENU." flashes on the handset display, adjust the date and time.

To adjust the date and time when "Press MENU." flashes on the handset display:

Press **[MENU]**, then go to step 3 above.

To confirm the date and time, repeat steps 1 and 2 above.

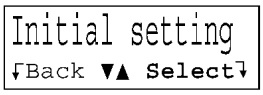
- The current date and time are displayed. When finished, press **[OFF]**.

7.5. Dialing Mode

If you have touch tone service, set the dialing mode to "Tone". For rotary or pulse service, set to "Pulse". The factory preset is "Tone".

1 Press **[MENU]**.

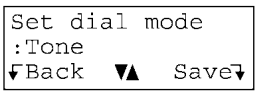
2 Scroll to "Initial setting" by pressing **[▼]** or **[▲]**, then press **Select**.



3 Scroll to "Set tel line" by pressing **[▼]** or **[▲]**, then press **Select**.

4 Press **Select** at "Set dial mode".

5 Select "Pulse" or "Tone" by pressing **[▼]** or **[▲]**.



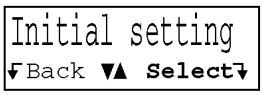
6 Press **Save**, then press **[OFF]**.

7.6. Line Mode

The line mode is preset to "B" and generally should not be adjusted.
If "Line in use" on the handset and "LINE IN USE" on the base unit are not displayed properly, the line mode selection is incorrect. Set line mode to "A".

1 Press **[MENU]**.

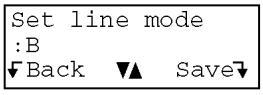
2 Scroll to "Initial setting" by pressing **[▼]** or **[▲]**, then press **Select**.



3 Scroll to "Set tel line" by pressing **[▼]** or **[▲]**, then press **Select**.

4 Scroll to "Set line mode" by pressing **[▼]** or **[▲]**, then press **Select**.

5 Select "A" or "B" by pressing **[▼]** or **[▲]**.



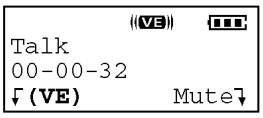
6 Press **Save**, then press **[OFF]**.

7.7. Voice Enhancer Technology

Panasonic's Voice Enhancer Technology clarifies the voice of the person you are talking to, reproducing a more natural-sounding voice that is easier to hear and understand.
Voice Enhancer Technology can be turned on or off. The factory preset is OFF.

- Depending on the condition and quality of your telephone line, this feature may emphasize existing line noise. If it becomes difficult to hear, turn this feature off.

To turn this feature on, press (**VE**) during a conversation.



- "(VE)" is displayed.
- **To turn this feature off,** press **(VE)** again.
  "(VE)" disappears from the display.
- After hanging up a call, the on/off setting will be retained.

When the handset is not in use, you can also turn this feature on or off by programming as follows:

1. Press **[MENU]**.
2. Scroll to "Voice enhancer" by pressing **[▼]** or **[▲]**, then press **Select**.
3. Select "On" or "Off" by pressing **[▼]** or **[▲]**.
4. Press **Save**, then press **[OFF]**.

7.8. Ringer Tone

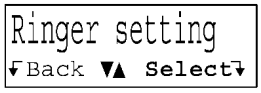
You can set the handset and base unit ringers to use one of 7 ringer patterns for outside calls. "Tone 1" to "Tone 3" are bell ringer patterns. "Melody 1" to "Melody 4" are melody patterns. The factory preset is "Tone 1".

- You cannot change the ringer tone for intercom calls.
- If you select one of the melody ringer patterns, the ringer will continue to sound for several seconds if:
  — the caller hangs up before you answer the call, or
  — another person answers the call using another phone connected on the same line.

Handset ringer tone

1 Press **[MENU]**.

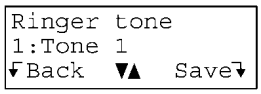
2 Scroll to "`Ringer setting`" by pressing **[▼]** or **[▲]**, then press **`Select`**.



3 Scroll to "`Ringer tone`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

4 Select the desired ringer tone by pressing **[▼]** or **[▲]**.

- The handset will ring and the ringer tone will change. If the ringer volume has been turned off, the handset will not ring.
- You can also select the ringer tone by pressing **[1]** to **[7]**.



5 Press **`Save`**, then press **[OFF]**.

Base unit ringer tone (use either the handset or the base unit)

Make sure the base unit is not being used.

Press **VOLUME** [∨] or [∧], then select the desired ringer tone by pressing **[1]** to **[7]**.

[1] to **[3]** : Bell ringer patterns **[4]** to **[7]** : Melody patterns

- After pressing **VOLUME** [∨] or [∧], the base unit will ring using the current ringer tone.
- The base unit will ring and the ringer tone will change.
- To stop ringing, press **[STOP]**.

Setting the base unit ringer tone by using the Handset

1 Press **[MENU]**.

2 Scroll to "`Initial setting`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

3 Scroll to "`Set base unit`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

4 Press **`Select`** at "`Ringer tone`".

5 Select the desired ringer tone by pressing **[▼]** or **[▲]**.

- The base unit will ring and the ringer tone will change. If the base unit ringer volume has been turned off, the base unit will not ring.
- You can also select the ringer tone by pressing **[1]** to **[7]**.

6 Press **`Save`**, then press **[OFF]**.

7.9. Direct Commands

After pressing **[MENU]**, you can also program menu items directly by pressing (**[0]** to **[9]**, **[✳]** and **[#]**) instead of using the soft keys.

Menu item	Command	Selection items
Ringer volume	**[1] [1]**	**[0]** : Off **[1]** : Low **[2]** : Medium **[3]** : High
Ringer tone (for handset)	**[1] [2]**	**[1]**–**[3]** : Tone pattern 1–3 **[4]**–**[7]** : Melody pattern 1–4
Incoming call tone (for handset)	**[1] [3]**	**[1]** : On **[2]** : Twice **[0]** : Off
Message play	**[2]**	
Date and time	**[4]**	Go to step 3 of **Date and Time**.
Voice enhancer	**[5]**	**[1]** : On **[0]** : Off
Dial lock	**[6]**	Go to step 3 of **Dial Lock**.
Talking Caller ID (for handset)	**[9]**	**[1]** : On **[0]** : Off
LCD contrast	**[0] [1]**	**[1]**–**[6]** : Level 1–6
Key tone	**[0] [2]**	**[1]** : On **[0]** : Off
Auto talk	**[0] [3]**	**[1]** : On **[0]** : Off
Dial mode	**[0] [5] [1]**	**[1]** : Pulse **[2]** : Tone
Flash time	**[0] [5] [2]**	**[1]** : 700 ms **[2]** : 600 ms **[3]** : 400 ms **[4]** : 300 ms **[5]** : 250 ms **[6]** : 110 ms **[7]** : 100 ms **[8]** : 90 ms
Line mode	**[0] [5] [3]**	**[1]** : A **[2]** : B
Number of rings	**[0] [6] [1]**	**[2]**–**[7]** : 2–7 rings **[0]** : Toll saver
Recording time	**[0] [6] [2]**	**[1]** : 1 minute **[2]** : 2 minutes **[3]** : 3 minutes **[0]** : Greeting only
Remote code	**[0] [6] [3]**	Go to step 5 of **Remote Code**.
Recording mode	**[0] [6] [4]**	**[1]** : Standard recording **[2]** : Enhanced recording
Message alert	**[0] [#]**	**[1]** : On **[0]** : Off
Ringer tone (for base unit)	**[0] [✳] [1]**	**[1]**–**[3]** :Tone pattern 1-3 **[4]**–**[7]** :Melody pattern 1-4
Incoming call tone (for base unit)	**[0] [✳] [2]**	**[1]** : On **[2]** : Twice **[0]** : Off
Talking Caller ID (for base unit)	**[0] [✳] [4]**	**[1]** : On **[0]** : Off

During programming:
When "Save" is displayed, press the right soft key **to save the new settings**.
To exit programming, press **[OFF]**.

- If you press the direct command incorrectly, press **[OFF]**, then re-enter programming mode by pressing **[MENU]**.
- For function details, see the corresponding pages.

8 OPERATION

8.1. Answering System

8.1.1. Greeting Message

You can record a personal greeting message of **up to 2 minutes**. If you do not record your own message, one of two pre-recorded greetings will be played for callers.

The total recording time of all messages (greeting, incoming and memo) is **about 16 minutes**.
We recommend you record **a brief greeting message** in order to leave more time for recording new messages.

- You can use the enhanced recording mode for clearer sound, if necessary.

To record a greeting message

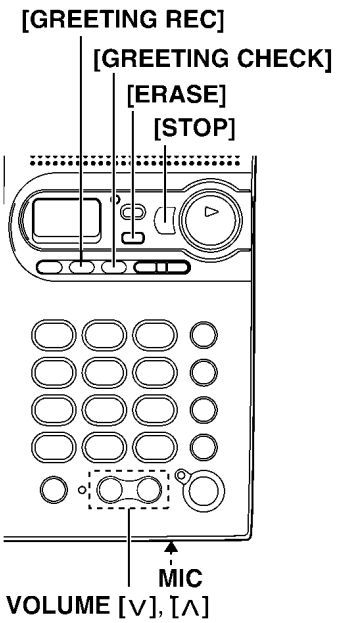
Sample greeting message
"Hello, this is (your name and/or number). Sorry, I cannot take your call. Please leave a message after the beep. Thank you."

1 Press **[GREETING REC]**.
- "To record greeting, press RECORD again" is heard.

2 Within 10 seconds, press **[GREETING REC]** again to record your greeting.

3 After the long beep, talk clearly, about 20cm away from the **MIC** (microphone).
- The elapsed recording time is displayed.
- If you record for over 2 minutes, the unit will stop recording.

4 When finished, press **[GREETING REC]** or **[STOP]**.
- To change the greeting, start again from step 1.



- If "E" is displayed, 6 beeps sound and "Your greeting was not recorded. Record your greeting again." is announced, start again from step 1.

To adjust the speaker volume, press **VOLUME [∨]** or **[∧]** during playback.
- 9 levels (0–8) are available while using the Answering System. The level is displayed on the base unit.

To review the greeting

Press **[GREETING CHECK]**.

To erase the greeting

Press **[GREETING CHECK]**, then press **[ERASE]** while the recorded message is being played.

• The unit will answer calls with a pre-recorded greeting (see below).

Pre-recorded greeting

If you do not record a greeting, one of two greetings will be played when a call is received, depending on the caller's recording time.

To review the pre-recorded greeting, press **[GREETING CHECK]**.

• A pre-recorded greeting will be played as follows:

■ When the recording time is set to "1 minute", "2 minutes" or "3 minutes":
"Hello, we are not available now. Please leave your name and phone number after the beep. We will return your call."

• If recording time runs out, the unit will automatically switch to the "Greeting only" mode (see below), and no new messages will be recorded.

■ When the recording time is set to "Greeting only":
"Hello, we are not available now. Please call again. Thank you for your call."

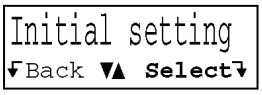
Flash Memory Message Backup (Message storage)
Messages stored in memory will not be affected by power failures. All messages are saved until you erase them.

8.1.2. Caller's Recording Time

You can select "1 minute", "2 minutes", "3 minutes" or "Greeting only" for the caller's recording time. The factory preset is "3 minutes".

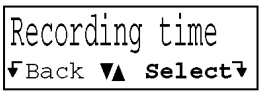
1 Press **[MENU]**.

2 Scroll to "`Initial setting`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

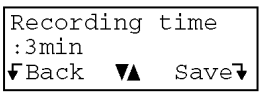


3 Press **`Select`** at "`Set answering`".

4 Scroll to "`Recording time`" by pressing **[▼]** or **[▲]**, then press **`Select`**.



5 Select the recording time by pressing **[▼]** or **[▲]**.
• You can also select the recording time by pressing **[1]**, **[2]**, **[3]** or **[0]** (Greeting only).



6 Press **`Save`**, then press **[OFF]**.

If you select "`Greeting only`", the unit will answer calls with the greeting message, and then hang up. The unit will not record any incoming messages. The base unit will display "go" instead of the number of messages.

8.1.3. Message Alert

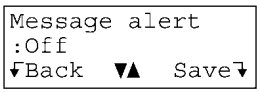
You can select whether or not the Ringer/Message Alert indicator on the handset will flash slowly when new messages have been recorded. The factory preset is OFF.

1 Press **[MENU]**.

2 Scroll to "`Initial setting`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

3 Scroll to "`Message alert`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

4 Select "`On`" or "`Off`" by pressing **[▼]** or **[▲]**.



5 Press **`Save`**, then press **[OFF]**.

- The Ringer/Message Alert indicator will not flash for new messages while the handset is in use.
- The Ringer/Message Alert indicator acts both as a ringer indicator and as a message alert indicator. The indicator will flash rapidly when a call is received whether this feature is on or off.
- Battery operating time may be shortened when using this feature.

8.1.4. Erasing Messages

The unit will announce the remaining recording time after playback if it is less than 3 minutes. New messages cannot be recorded when:

—"Memory full" is heard.
—"FULL" flashes on the base unit.
—the ANSWER ON indicator flashes rapidly (when the Answering System is on).

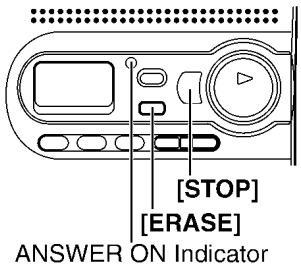
Erase unnecessary messages. We recommend you erase unnecessary messages after each playback.

Erasing a specific message

<Base Unit>

Press **[ERASE]** while the message you want to erase is being played.

- The unit beeps, then plays back the next message.
- To exit playback mode, press **[STOP]** twice.



<Handset>

Press **[✳]** **[4]** while the message you want to erase is being played.

- The unit beeps, then plays back the next message.
- To exit remote operation mode, press **[OFF]**.

Erasing all messages

All recorded messages, except the greeting message, can be erased at one time.

<Base Unit>

1 Press **[ERASE]** while the base unit is not being used.
- "To erase all messages, press ERASE again" is heard.

2 Within 10 seconds, press **[ERASE]** again.
- The unit beeps, then announces "No messages".
- The base unit display shows "0".

<Handset>

1 Press **[MENU]**.

2 Press **Select** at "Message play".

3 Press **[✳]** **[5]**.
- The unit beeps, then announces "No messages".
- To end remote operation, press **[OFF]**.

- Information in the Caller List will not be erased.

8.2. For Call Waiting Service Users

Press **[FLASH/CALL WAIT]** if you hear a call waiting tone during a conversation.

- The first call is put on hold and you can answer the second call.
- To return to the first caller, press **[FLASH/CALL WAIT]** again.
- Call Waiting service cannot be used when the first call is put on hold, or the Answering System is handling a call.
- If this function does not operate properly, consult your telephone company for details.

8.3. Using the PAUSE Key

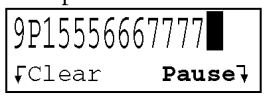
(For PBX Line/Long Distance Calls)

We recommend you press **Pause** or **P** if a pause is required for dial with a PBX or to make a long distance call.

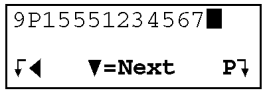
Ex. Line access number **[9]** (PBX)

[9] ➡ **Pause** or **P** ➡ Phone number

Example



OR



- Pressing **Pause** or **P** once creates a 3.5 second pause. This prevents misdialing when you dial after confirming the entered number or dial a stored number.
- Pressing **Pause** or **P** more than once increases the length of the pause between numbers.

8.4. Dial Lock

The Dial Lock feature allows you to prevent others from making calls with the handset and base unit. To use this feature, turn the feature on. The factory preset is OFF.

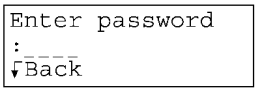
When the Dial Lock is turned on, only numbers stored in the phone book as emergency numbers (numbers stored with a # at the beginning of the name) can be dialed. We recommend storing emergency numbers in the phone book before using this feature.

To turn the Dial Lock on

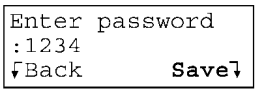
1 Press **[MENU]**.

2 Scroll to "Dial lock" by pressing **[▼]** or **[▲]**, then press **Select**.

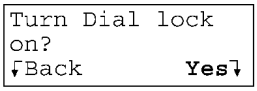
3 Enter a 4-digit password.
- This password is required when canceling the Dial Lock.
- If more than 4 digits are entered, the last 4 digits are the password.



4 Press **Save**.



5 Press **Yes**, then press **[OFF]**.
- "Dial lock on" is displayed.



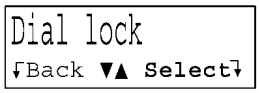
- If the Dial Lock is turned on, the handset displays "Dial lock" while there are not missed calls and new messages, and the handset is off the base unit.

- If you make a call while the Dial Lock is turned on:
  — using the handset, the handset beeps 3 times and "Dial locked" is displayed.
  — using the base unit, the base unit beeps 3 times.
- Please write down your password. If you forget your password, consult your nearest Panasonic service center.

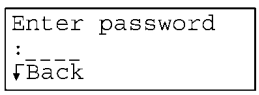
To cancel the Dial Lock

1 Press **[MENU]**.

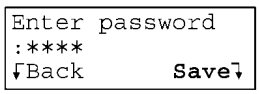
2 Scroll to "Dial lock" by pressing **[▼]** or **[▲]**, then press **Select**.



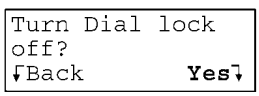
3 Enter the password set when the Dial Lock was turned on.



4 Press **Save**.



5 Press **Yes**, then press **[OFF]**.
- "Dial lock off" is displayed.
- If you entered the wrong password, the handset beeps 3 times and "Save error" is displayed. Enter the correct password.



8.5. FLASH Button

Pressing **[FLASH/CALL WAIT]** allows you to use special features of your host PBX such as transferring an extension call, or accessing optional telephone services such as call waiting.

- Pressing **[FLASH/CALL WAIT]** cancels Temporary Tone Dialing mode or the mute.

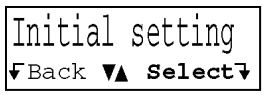
Selecting the flash time

The flash time required depends on your telephone exchange or host PBX. You can select the following flash times: "700, 600, 400, 300, 250, 110, 100 or 90 ms (milliseconds)". The factory preset is "700 ms".

- If PBX functions do not work correctly, consult your PBX supplier for the correct settings.

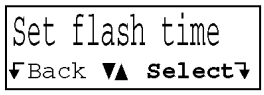
1 Press **[MENU]**.

2 Scroll to "`Initial setting`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

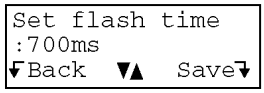


3 Scroll to "`Set tel line`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

4 Scroll to "`Set flash time`" by pressing **[▼]** or **[▲]**, then press **`Select`**.



5 Select the desired time by pressing **[▼]** or **[▲]**.



6 Press **`Save`**, then press **[OFF]**.

8.6. Remote Operation from a Touch Tone Phone

While outside, you can operate the Answering System from any touch tone phone. A synthesized voice menu will guide you through the Answering System.

Summary of remote operation

Call your unit from a touch tone phone.

↓

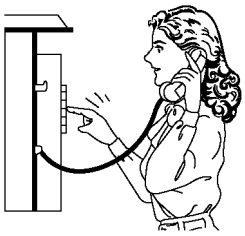
Enter your remote code during or after the greeting message.
- The number of new messages is heard, and the new messages will be played.*

↓

After 3 seconds, the voice menu will start.
Follow the menu or enter direct commands.

↓

To end remote operation, hang up.



- The unit will announce the remaining recording time after playback if it is less than 3 minutes.
- The messages are saved.

* If "No new messages" is announced, the unit has only old messages.
If "No messages" is announced, the unit has no messages.

8.6.1. Remote Code

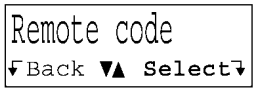
The remote code prevents unauthorized people from accessing your unit and listening to your messages. Choose any **2-digit number (00–99)** for your remote code. The factory preset remote code is **"11"**. If you do not program your own remote code, you can use "11".

1 Press **[MENU]**.

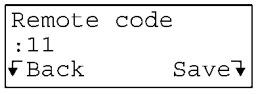
2 Scroll to "`Initial setting`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

3 Press **`Select`** at "`Set answering`".

4 Scroll to "`Remote code`" by pressing **[▼]** or **[▲]**, then press **`Select`**.



5 Enter a **2-digit remote code (00–99)**.

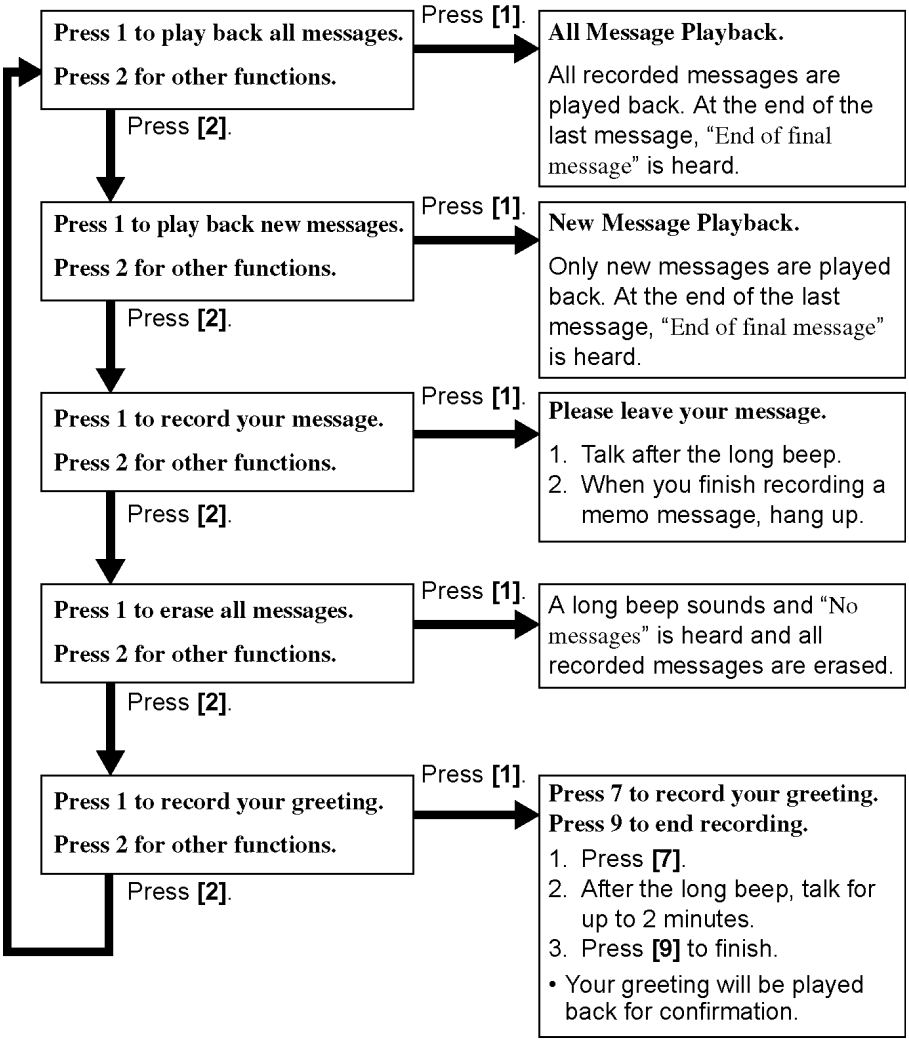


6 Press **`Save`**, then press **[OFF]**.

To confirm the remote code, repeat steps 1 to 4.
- The remote code is displayed. When finished, press **[OFF]**.

8.6.2. Voice Menu

The parts in bold letters are voice prompts.



- 3 seconds after playback, the voice menu will start again from the beginning.
- The unit will announce the remaining recording time after playback if it is less than 3 minutes.
- If you hear "Memory full" after playback, erase unnecessary messages.
- If you do not press any buttons within 10 seconds after a voice prompt, "Thank you for your call." will be heard and the call will be disconnected.

8.6.3. Direct Remote Operation

Once you have entered the remote code, you can also control your unit by direct commands instead of using the voice menu. To end remote operation, hang up at anytime.

Direct commands

[4] :	Plays back new messages.
[5] :	Plays back all messages.
[1] :	Repeats the current message. • If pressed within the first 5 seconds of playback, the previous message will be played.
[2] :	Skips the current message.
[9] :	Stops the current operation. • To resume, enter a direct command within 15 seconds, or the voice menu will start.

[7] :	Records a greeting message. After the long beep, talk for up to 2 minutes.
↓	
[9]	Recording is stopped. • The greeting is played.
[✳] [4] :	Erases the current message. • A short beep will sound and the next message will be played.
[✳] [5] :	Erases all messages. • A long beep will sound and "No messages" will be heard.
[0] :	Turns off the Answering System. • The unit hangs up.

To turn on the Answering System:

Call your unit and wait for 15 rings.

- The unit will answer and the greeting will be played.
- The Answering System will be turned on. Hang up or enter the remote code for other options.
- When turning on the Answering System using a rotary or pulse service telephone, you cannot enter the remote code for other options.

Skipping the greeting

After calling your unit, press **[✳]** during the greeting.

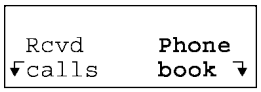
- The unit skips the rest of the greeting and you can start recording your message after the long beep.

8.7. Phone Book

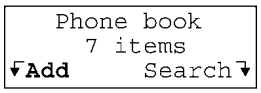
The handset can store up to 50 names and phone numbers in its phone book. You can make a call by selecting a name or number from the phone book.

8.7.1. Storing Names And Numbers

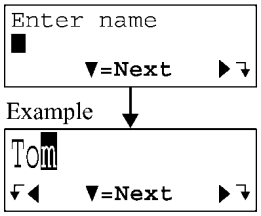
1 Press **Phone book**.



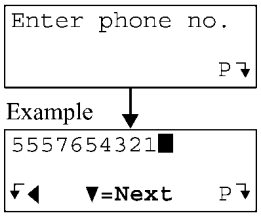
2 Press **Add**.
- The display will show the number of stored items.



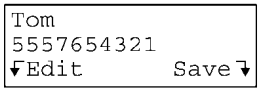
3 Enter a name of up to 16 characters with the dialing buttons (**[0]** to **[9]**), then press **[▼]**.
- If a name is not required, press **[▼]** then go to step 4.



4 Enter a phone number of up to 32 digits.
- Each time you press ◀, a digit is erased. To erase all of the digits, press and hold ◀.
- If a pause is required when dialing, press **P**. A pause is stored in a phone number as one digit.



5 Press **[▼]**.
- If you want to change the name, press **Edit**. The display returns to step 3. Change the name.
- If you want to change the number, press **[▲]**. The display returns to step 4. Change the number.



6 Press **Save**.
- To continue storing other items, repeat from step 2.

7 Press **[OFF]**.

When the Dial Lock is turned on, only numbers stored in the phone book as emergency numbers can be dialed.

To store an emergency number:
When storing a name, press **[1]** in step 3 to enter # at the beginning of the name.

- To store numbers for calling card access (see "**Chain Dial**"), we recommend you add pauses after each item. Storing pauses with numbers will prevent misdialing. The delay time necessary will depend on your telephone company.
- You cannot store a name and phone number in the phone book if the Dial Lock is turned on.

Cross Reference:

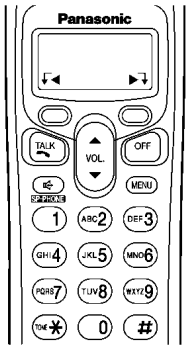
Chain Dial (P.34)

Selecting characters to enter names

Enter names using the dialing buttons. Press each button until the desired character is displayed.

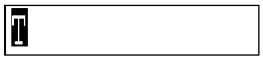
• Pressing each button selects a character in the order shown below.

Keys	Characters	Keys	Characters
[1]	# & ' ( ) ∗ , – . / 1	[6]	m n o M N O 6
[2]	a b c A B C 2	[7]	p q r s P Q R S 7
[3]	d e f D E F 3	[8]	t u v T U V 8
[4]	g h i G H I 4	[9]	w x y z W X Y Z 9
[5]	j k l J K L 5	[0]	0 Space
◀	Erases the character to the left.		
▶	Moves the cursor to the right. (To enter another character using the same number key, move the cursor to the next space.)		



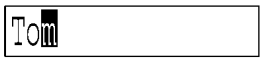
For example, to enter "Tom":

1 Press **[8]** four times.



2 Press **[6]** three times, then press ▶ to move the cursor.

3 Press **[6]** once.



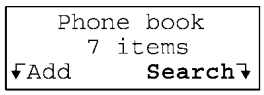
If you make a mistake when entering a name or number

Use ◀ to erase the incorrect character. Each time you press ◀, a character is erased. Re-enter the correct character. To erase all characters, press and hold ◀.

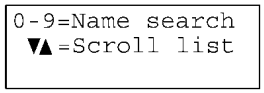
8.7.2. Dialing from the Phone Book

1 Press **Phone book**.

2 Press **Search**.

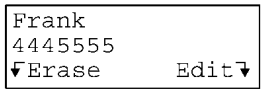


3 Scroll to the desired item. To scroll down, press **[▼]**. To scroll up, press **[▲]**.



Phone book items are sorted in the following order:	
1	Alphabet letters (Alphabetical)
2	Space & ' ( ) , – . /
3	Numbers 0 to 9
4	# *
5	Telephone numbers (If no name is stored)

4 Press **[ ]** or **[ ]**.
- The displayed phone number is dialed.



- If "No items stored" is displayed in step 1, the phone book is empty.
- To exit the phone book, press **[OFF]**.
- To view a phone number over 16 digits long, repeat steps 1 to 3, then press **Edit** and then **[▼]**. When finished, press **[OFF]**.
- To quickly search the desired item, press **[▼]** or **[▲]** after step 1.

To search for a name by initial

1. Press **Phone book**.
2. Press **Search**.
3. Press the dialing button for the first letter of the desired name until any name with the same initial is displayed (see the Index).
   Ex. To find "Frank", press **[3]** repeatedly until the first item under "F" is displayed.
   - If there are no items beginning with the character you selected, the first item in the next alphabetical index will be displayed.
4. Press **[▼]** repeatedly until the desired name is displayed.

Index table

Keys	Index	Keys	Index
[1]	Symbols, 1	**[6]**	M, N, O, 6
[2]	A, B, C, 2	**[7]**	P, Q, R, S, 7
[3]	D, E, F, 3	**[8]**	T, U, V, 8
[4]	G, H, I, 4	**[9]**	W, X, Y, Z, 9
[5]	J, K, L, 5	**[0]**	0, Space

8.7.3. Chain Dial

You can dial a combination of phone book or manual key pad entries while making a call. This feature can be used, for example, to first automatically dial a calling card access number that you have stored in the phone book, then manually or automatically dial your PIN and then automatically dial the destination number from the phone book.

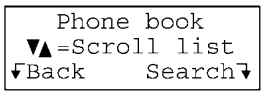
Ex. Using a long distance calling card

- To prevent misdialing, we recommend you add pauses where needed when storing numbers. For example, add pauses after a calling card access number and your PIN when storing in the phone book.

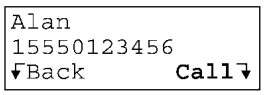
1. Search and dial from phone book: 18000123456 (Calling card access number).
   - The voice guidance may be announced.
2. Search and dial from phone book: 1234 (Calling card PIN).
3. Search and dial from phone book: 15550123456 (Destination number).

1 While you are on a call;
Press **[MENU]**.

2 Search for the desired item by pressing **[▼]** or **[▲]**.
- To search for an item by initial, see "**To search for a name by initial**".



3 Press `Call`.
- The phone number is dialed.
  If required, repeat steps 1 to 3 for any remaining numbers.



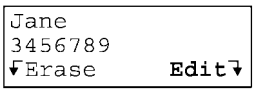
- If you have rotary or pulse service, you need to press **[✳]** before pressing **[MENU]** in step 1 to change the dialing mode temporarily to tone.

8.7.4. Editing an Item in the Phone Book

1 Press **Phone book**.

2 Press **Search**.

3 Scroll to the desired item by pressing **[▼]** or **[▲]**, then press **Edit**.

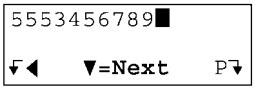


- To search for the item by initial, see "**To search for a name by initial**" in **Dialing from the Phone Book**.

4 Edit the name, then press **[▼]**.

- If you do not need to change the name, press **[▼]** then go to step 5.

5 Edit the phone number, then press **[▼]**.



- If you do not need to change the number, press **[▼]** then go to step 6.
- Each time you press ◀, a digit is erased. To erase all of the digits, press and hold ◀.

6 Press **Save**.

- To continue editing other items, repeat from step3.

7 Press **[OFF]**.

- You cannot edit an item, if the Dial Lock is turned on.

Cross Reference:

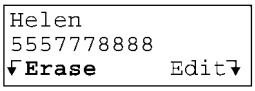
Dialing from the Phone Book (P.33)

8.7.5. Erasing an Item in the Phone Book

1 Press **Phone book**.

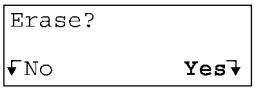
2 Press **Search**.

3 Scroll to the desired item by pressing **[▼]** or **[▲]**, then press **Erase**.



- To search for the item by initial, see "**To search for a name by initial**" in **Dialing from the Phone Book**.

4 Press **Yes**.



- To erase other items, repeat from step 3.

5 Press **[OFF]**.

- To cancel erasing, press **No** after step 3.
- You cannot erase an item, if the Dial Lock is turned on.

Cross Reference:

Dialing from the Phone Book (P.33)

9 TROUBLESHOOTING

If the handset display shows error messages, see "Troubleshooting (HandsetLCD)" of "DISPLAYS" for the Cause & Remedy.

Telephone System

Problem	Cause & Remedy
"No link to base. Move closer to base, try again." is displayed and an alarm tone sounds.	• You are too far from the base unit. Walk closer to the base unit. • Confirm the base unit's AC adaptor is plugged in. • Raise the base unit antenna. • If the above remedies do not solve the problem, the handset may have lost communication with the base unit. Register the handset again. (*1)
Static, sound cuts in/out, fades. Interference from other electrical units.	• Move the handset and base unit away from other electrical appliances. • Walk closer to the base unit. • Raise the base unit antenna. • If the unit is connected to a telephone line with DSL service, you may hear noise from the receiver or speaker during conversations. We recommend connecting a noise filter (contact your DSL service provider) to the telephone line between the unit and the telephone line jack.
The handset and/or base unit does not ring.	• The ringer volume is turned off. Set to high, medium, or low.
The handset display is blank.	• If only the handset display is blank, fully charge the battery. (*2)
You cannot program any function items.	• Programming is not possible while the handset and/or base unit is being used. • Do not pause for over 60 seconds while programming. • Walk closer to the base unit. • While another user is listening to messages or the Answering System is handling a call, you cannot program. Try again later. • When the Dial Lock is turned on (*3), you cannot store the phone number in the phone book.
While programming or searching, the handset starts to ring and the program/ search stops.	• A call is coming in. To answer the call, press. **[ ]**, **[ ]** or **[SP-PHONE]**. Start again from the beginning after hanging up.
You cannot make an intercom/ outside call.	• Your handset is in remote operation mode Exit by pressing **[OFF]**. • The handset you called is too far from the base unit. • If the handset or base unit is in use, you may not be able to make a call. Try again later. • You cannot make an outside call when the Dial Lock is turned on. (*3)

Cross Reference:

(*1) **Re-registering a Handset** (P.49)

(*2) **Battery Charge** (P.8)

(*3) **Dial Lock** (P.26)

Problem	Cause & Remedy
You cannot redial.	• If the last number dialed was more than 48 digits long, the number will not be redialed correctly. • You cannot redial when the Dial Lock is turned on. (*4)
The handset does not display the caller's phone number.	• You need to subscribe to Caller ID. • Other telephone equipment may be interfering with your phone. Disconnect it and try again. • Other electrical appliances connected to the same outlet may be interfering with Caller ID. • Telephone line noise may be affecting Caller ID. • The caller requested not to send his/her Caller ID information. • If a call is being transferred to you, the Caller ID information will not be displayed. • If a (separate) Caller ID box is connected between the unit and the telephone wall jack, disconnect the Caller ID box or plug the unit directly into the wall jack. • If the unit is connected to a telephone line with DSL service, the unit may not display caller's phone number properly. We recommend connecting a noise filter (contact your DSL service provider) to the telephone line between the unit and the telephone line jack.
The handset and/or base unit does not announce the displayed caller's name.	• The handset and/or base unit ringer volumes are turned off. Set to high, medium, or low. • The Talking Caller ID feature is turned off. Turn it on.
The handset and/or base unit does not announce the displayed caller's name properly.	• Name pronunciation may vary. • The handset and/or base unit will announce each letter of abbreviations, such as "Co." and "Inc.". • Caller ID supports names of up to 15 letters. If the caller's name has more than 15 letters, the name will not be announced correctly.
The handset display exits the Caller List or phone book.	• Do not pause for over 60 seconds while searching.
The Ringer/Message Alert indicator flashes slowly when the handset is not ringing and in use.	• The Message Alert is turned on and new messages have been recorded. Turn the Message Alert off (*5) or listen to the new messages.
You cannot have a conversation using the headset.	• Make sure the optional headset is connected properly. (*6) • If "SP-phone" is displayed on the handset, press **[ ]** to switch to the headset.

Cross Reference:

(*4) **Dial Lock** (P.26)

(*5) **Message Alert** (P.23)

(*6) **Connecting an Optional Headset** (P.14)

Answering System

Problem	Cause & Remedy
The Answering System is on, but incoming messages are not recorded.	• The recording time is set to "Greeting only". Select "1 minute", "2 minutes" or "3 minutes". (*7) • Memory is full. Erase unnecessary messages. (*8)
" FULL " flashes and the ANSWER ON indicator flashes rapidly. No new messages are recorded.	• Memory is full. Erase unnecessary messages. (*8)
You cannot operate the Answering System from the base unit or the handset.	• If another user is in use, you may not be able to operate the Answering System. Try again later. • If another user is listening to messages or the Answering System is handling a call, you cannot operate the Answering System. Try again later.
You cannot operate the Answering System from a touch tone phone.	• Make sure you entered the correct remote code. (*9) • The Answering System may not respond if the tones are too short to activate the unit. Press each button firmly. • The Answering System is off. Turn it on. (*10)
You cannot erase messages.	• While another user is operating the Answering System or a caller is leaving a message, you cannot erase messages.
When you play back messages or turn on the Answering System, the handset and/or base unit announces the wrong day and time.	• The date and time may be set incorrectly. Set the date and time again. (*11)

Cross Reference:

(*7) **Caller's Recording Time** (P.22)

(*8) **Erasing Messages** (P.24)

(*9) **Remote Code** (P.28)

(*10) "**To turn on the Answering System**" in **Direct Remote Operation** (P.30)

(*11) **Date and Time** (P.16)

General

Problem	Cause & Remedy
The handset and/or base unit does not work.	• Check the settings. (*12)(*13) • Check whether the dialing mode setting is correct. (*14) • Fully charge the battery. (*15) • Clean the charge contacts and charge again. (*16) • Check battery installation. (*17) • Unplug the base unit's AC adaptor to reset it. Plug in, and try again. • Re-install the battery (*17) and fully charge it.
Time setting is erased, and "⏲" flashes on the base unit display or "Press MENU." flashes on the handset display.	• If a power failure occurs, time setting may be erased. Set the date and time again (*18).
"Recharge battery" is displayed, "▭" flashes, or the handset beeps intermittently.	• Fully charge the battery. (*15)
"Charge for 6h" and "▭" are displayed and the handset does not work.	• The battery has been discharged. Fully charge the battery. (*15) • Check battery installation. (*17)
You charged the battery fully, but "Recharge battery" is still displayed and/or "▭" continues to flash, or "Charge for 6h" and "▭" are displayed.	• Clean the charge contacts and charge again. (*16) • The battery may need to be replaced. • If you install a new battery, fully charge it. (*15)
The CHARGE indicator does not go out after the battery has been charged.	• This is normal.

Cross Reference:

(*12) **BATTERY** (P.8)

(*13) **Connections** (P.14)

(*14) **Dialing Mode** (P.17)

(*15) **Battery Charge** (P.8)

(*16) **Recharge** (P.8)

(*17) **Battery Replacement** (P.9)

(*18) **Date and Time** (P.16)

10 DISASSEMBLY INSTRUCTIONS

10.1. Base Unit

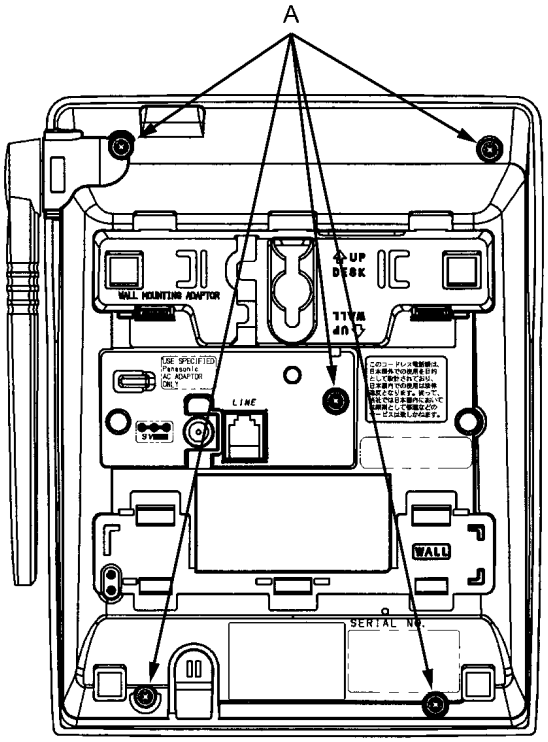


Fig. 1

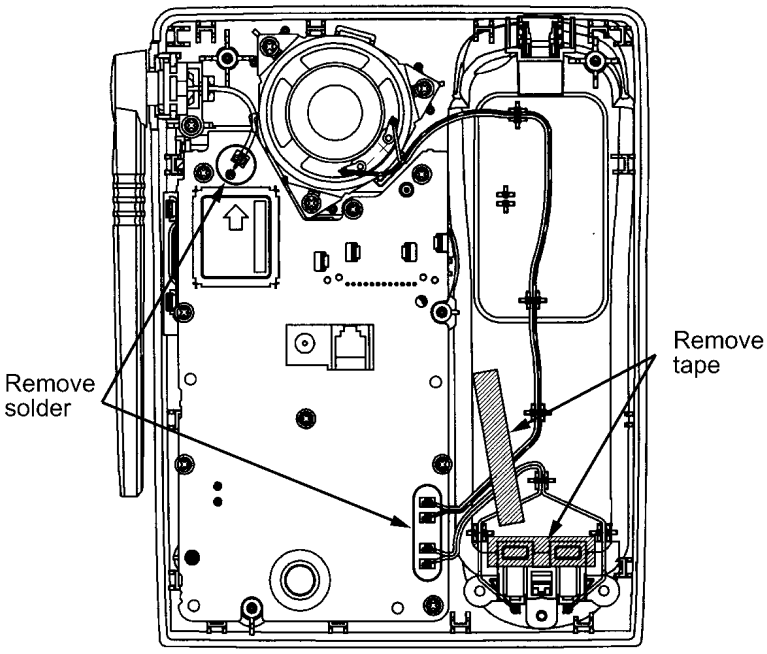


Fig. 2

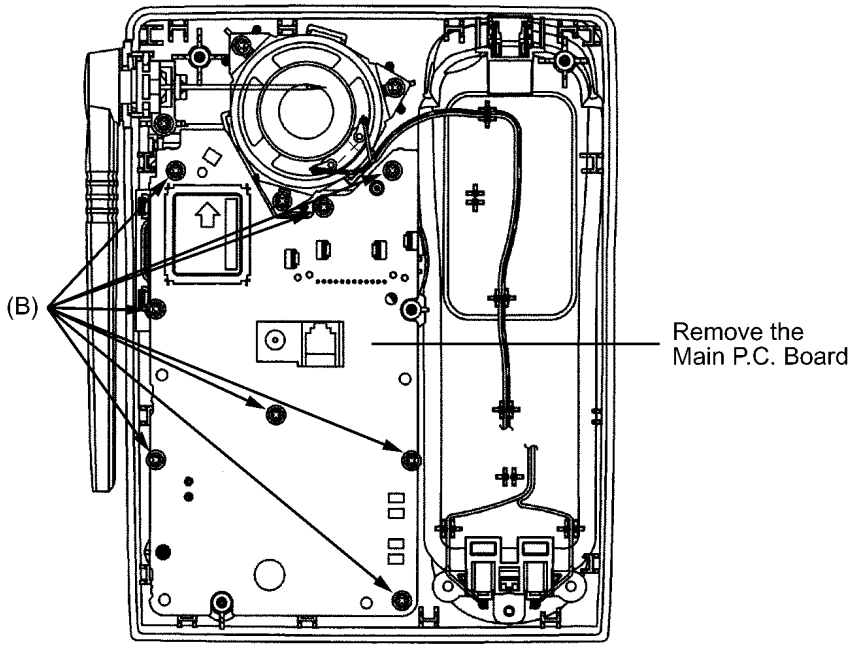


Fig. 3

Shown in Fig.-	To Remove	Remove
1	Lower Cabinet	Screws (2.6 × 14).....(A) × 5
2	Main P.C. Board	Tape and Solder
3		Screws (2.6 × 8).....(B) × 8

10.2. Handset

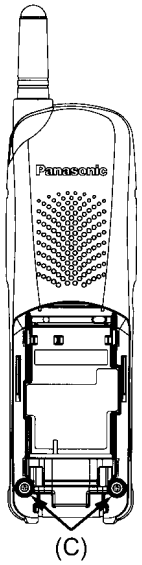


Fig. 4

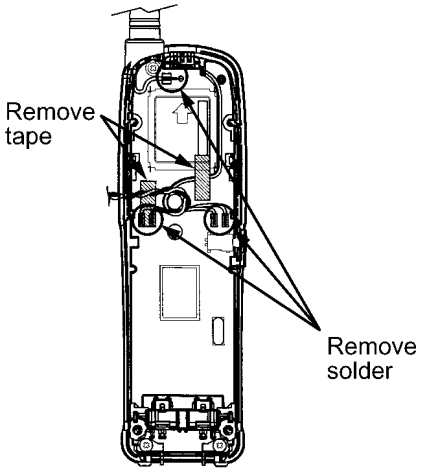


Fig. 6

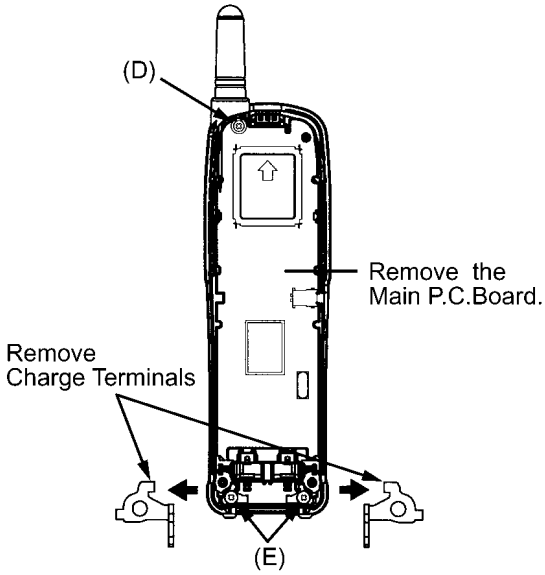


Fig. 7

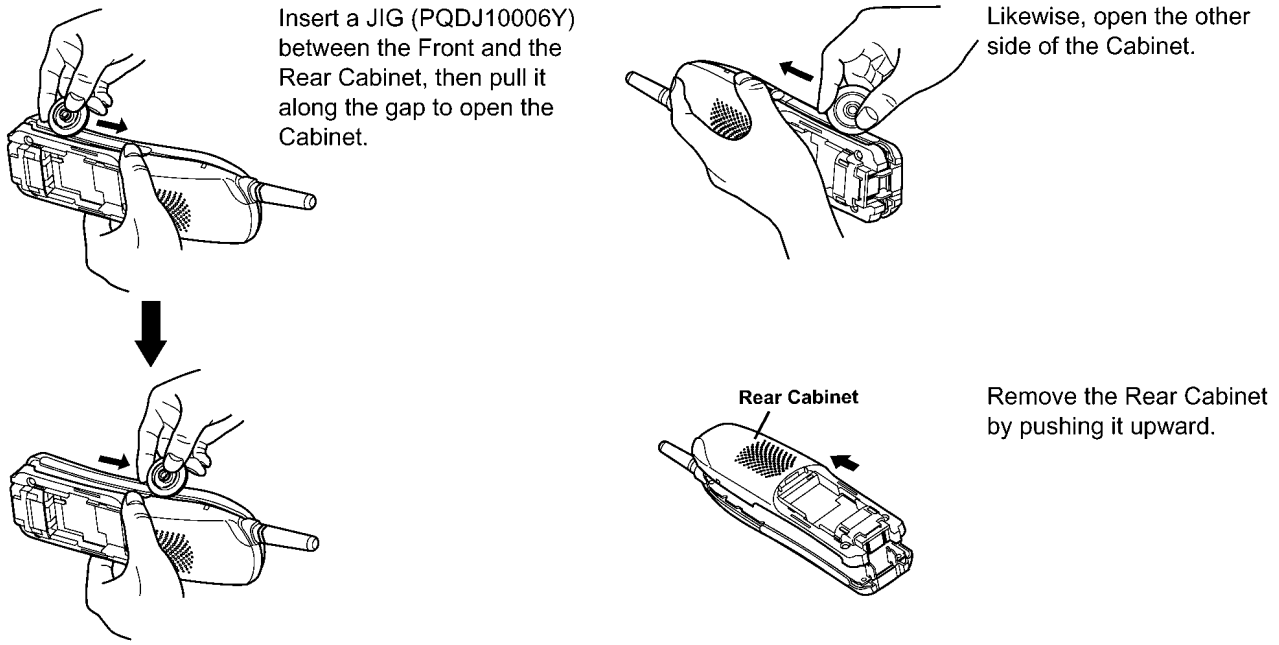
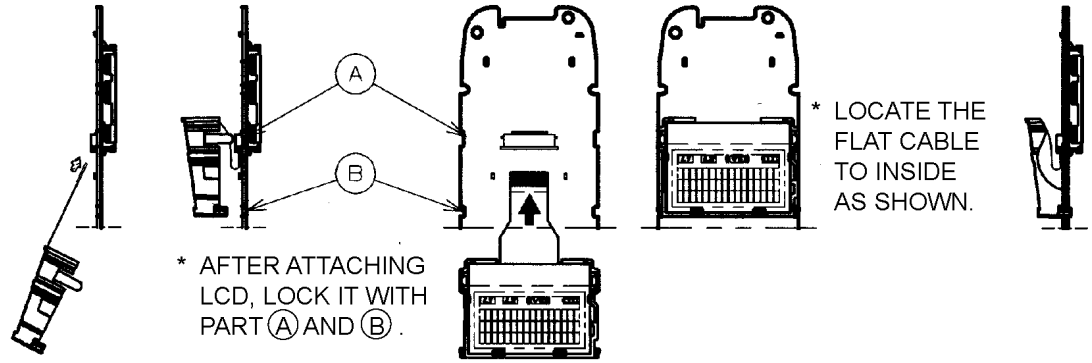


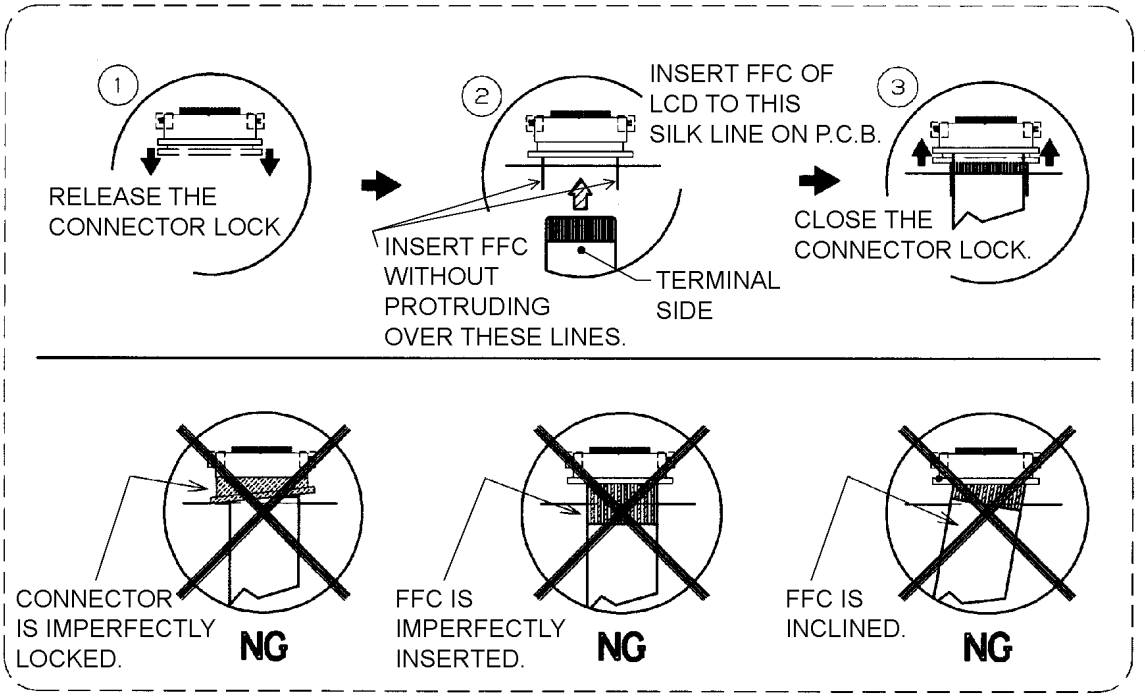
Fig. 5

Shown in Fig.-	To Remove	Remove
4	Rear Cabinet	Screws (2.6 × 12).....(C) × 2
5		Follow the procedure.
6	Main P.C. Board	Tape and Solder
7		Screw (2.6 × 12).....(D) × 1
		Screws (2.6 × 9).....(E) × 2
		Charge Terminals

11 ASSEMBLY INSTRUCTIONS

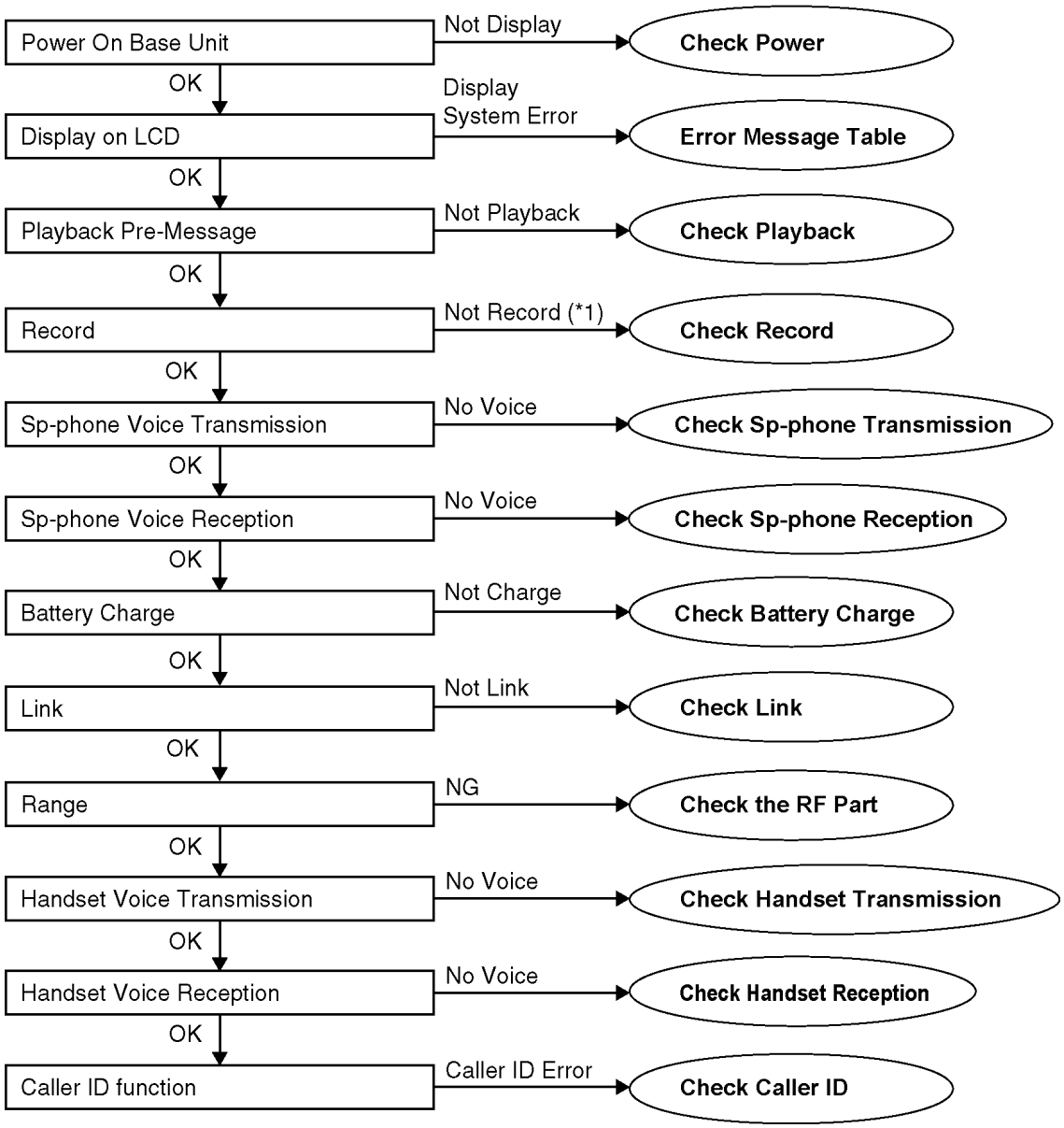
11.1. Fix the LCD to P.C. Board (Handset)





12 TROUBLESHOOTING GUIDE

FLOW CHART



Cross Reference:

Check Power (P.44)
Error Message Table (P.44)
Check Playback (P.46)
Check Record (P.45)
Check Sp-phone Transmission (P.46)
Check Sp-phone Reception (P.47)
Check Battery Charge (P.47)
Check Link (P.48)
Check the RF Part (P.49)
Check Handset Transmission (P.53)
Check Handset Reception (P.53)
Check Caller ID (P.53)

Note:

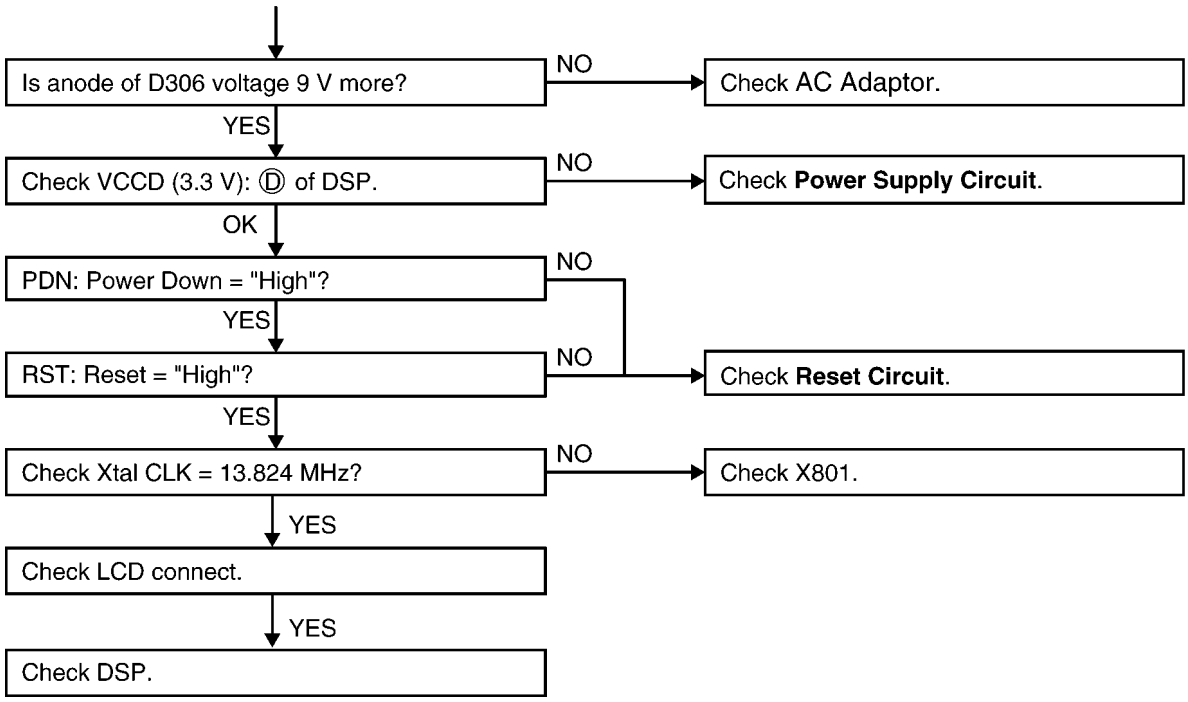
(*1) When a user claims that the unit disconnects a call right after the greeting message and no incoming messages can be recorded, this symptom can not be reappeared with TEL simulator in the service center. So in that case try **Check Record** item (C).

12.1. Check Power

BASE UNIT

Is the AC Adaptor inserted into 220~240V outlet?

(AC Adaptor PQLV1BX)



Cross Reference:

Power Supply Circuit (P.73)

Reset Circuit (P.75)

Note:

DSP is IC501.

12.2. Error Message Table

Display	Symptom	Remedy
E1	The initialization was tried, but it could not be done.	1. Check the peripheral circuit of Flash Memory visually. 2. Confirm that the voltage is added to the power supply pin. If no voltage is detected, replace the Flash Memory because it might be defect. 3. Solder the Flash Memory again.
E3 E9	When the adjustment data was checked, an error was detected. (The adjustment data may not be written.)	

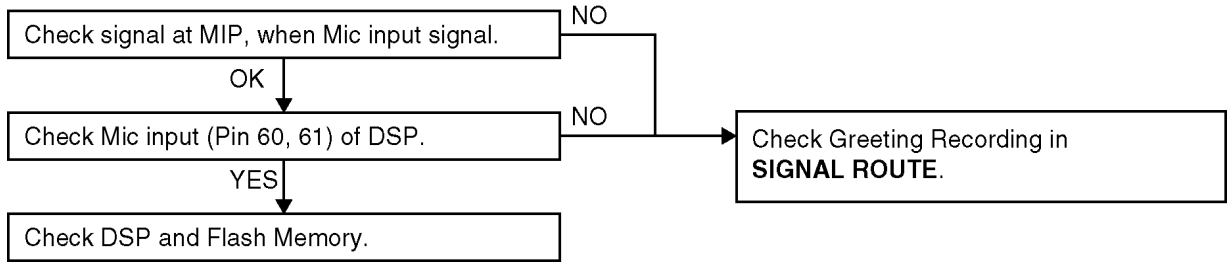
Note:

Flash Memory is IC701.

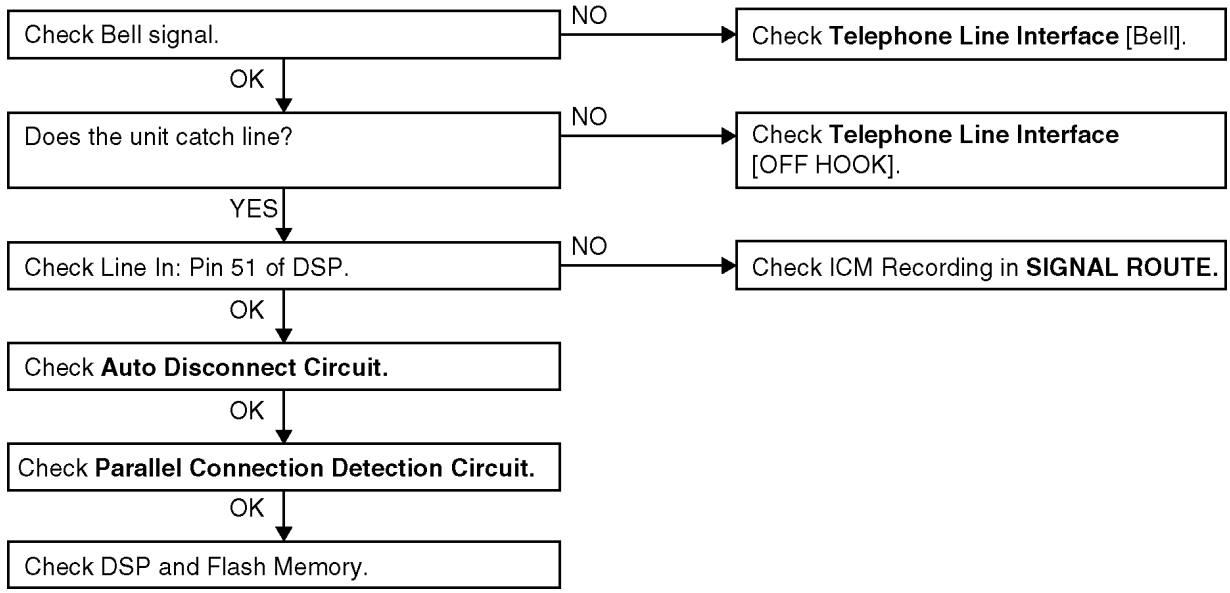
12.3. Check Record

BASE UNIT

a) Not record Greeting Message



b) Not record Incoming Message



c) How to change the Auto Disconnect activation (time)

Some Telephone Company lines (fiber or cable) ON Hook and OFF Hook voltages are lower than conventional lines, which may cause a malfunction of Auto Disconnect detection.To solve this problem, try changing the Auto Disconnect activation (time) through the procedures below.

Auto Disconnect activation (time)		PROCEDURE	Status
Enable	2 sec [default]	“STOP”→“GREETING CHK”+“[LOCATOR]” simultaneously	Stand-by
	4 sec	”STOP”→“GREETING CHK”+“[UP]” simultaneously	
Disable*		”STOP”→“GREETING CHK”+“[DOWN]” simultaneously	

*If the “Disable” is selected, even if the parallel-connected telephone is OFF HOOK, the line isn’t disconnected.

Cross Reference:

Telephone Line Interface (P.76)

Auto Disconnect Circuit (P.77)

Parallel Connection Detect Circuit (P.78)

SIGNAL ROUTE (P.85)

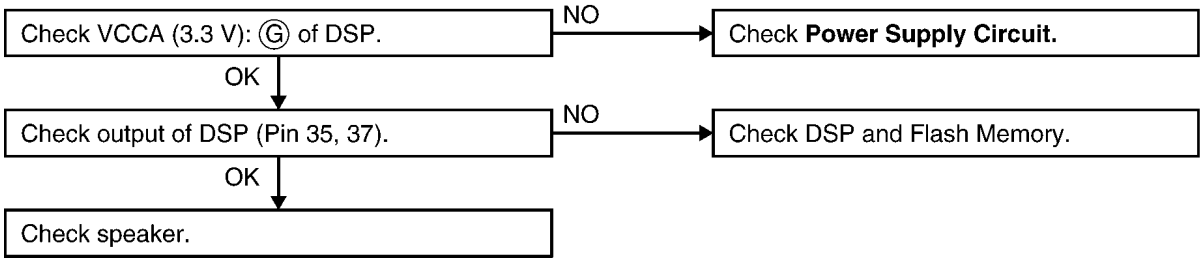
Note:

Flash Memory is IC701.

DSP is IC501.

12.4. Check Playback

BASE UNIT



Cross Reference:

Power Supply Circuit (P.73)

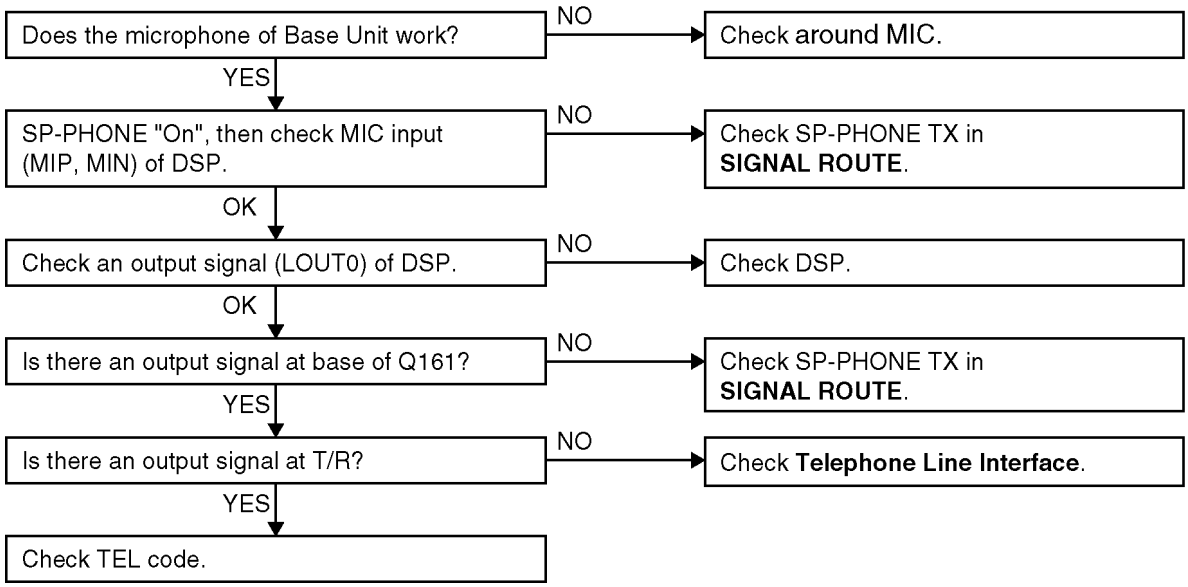
Note:

Flash Memory is IC701.

DSP is IC501.

12.5. Check Sp-phone Transmission

BASE UNIT



Cross Reference:

Telephone Line Interface (P.76)

SIGNAL ROUTE (P.85)

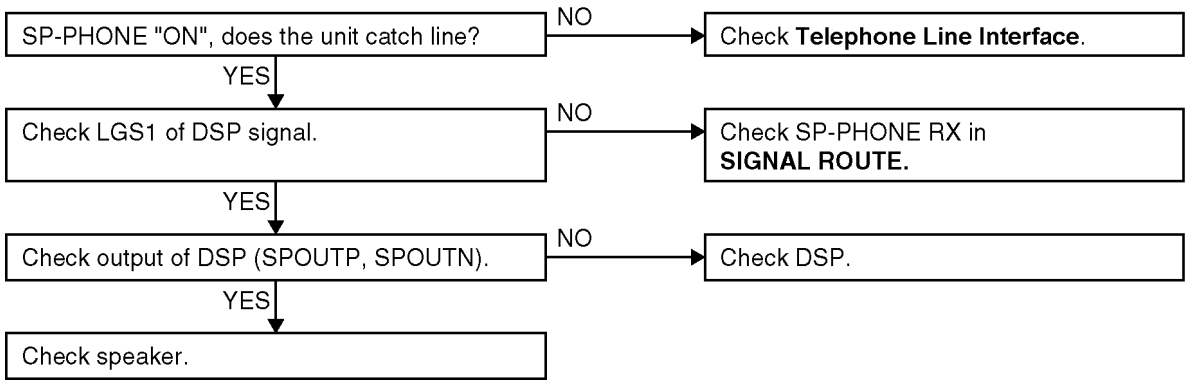
Note:

Flash Memory is IC701.

DSP is IC501.

12.6. Check Sp-phone Reception

BASE UNIT



Cross Reference:

Telephone Line Interface (P.76)

SIGNAL ROUTE (P.85)

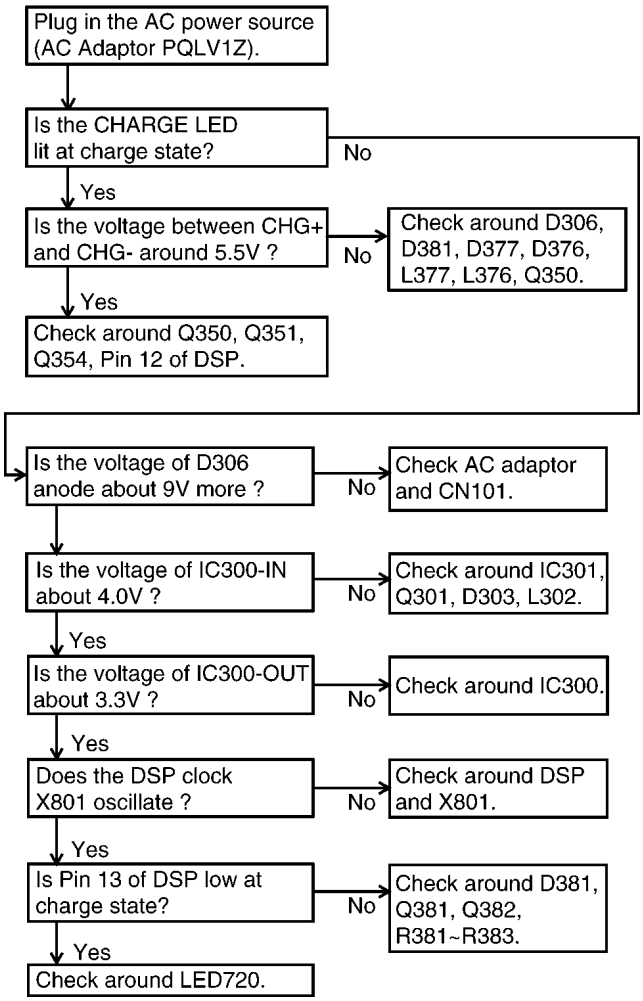
Note:

Flash Memory is IC701.

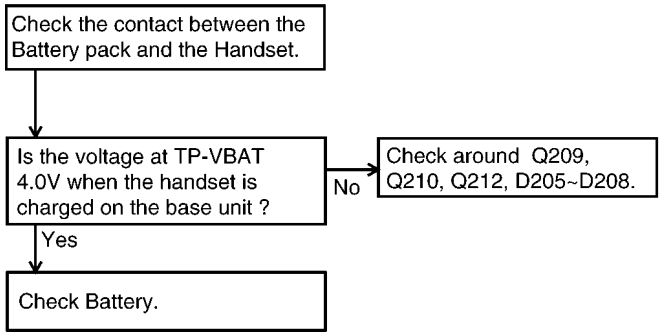
DSP is IC501.

12.7. Check Battery Charge

BASE UNIT



HANDSET

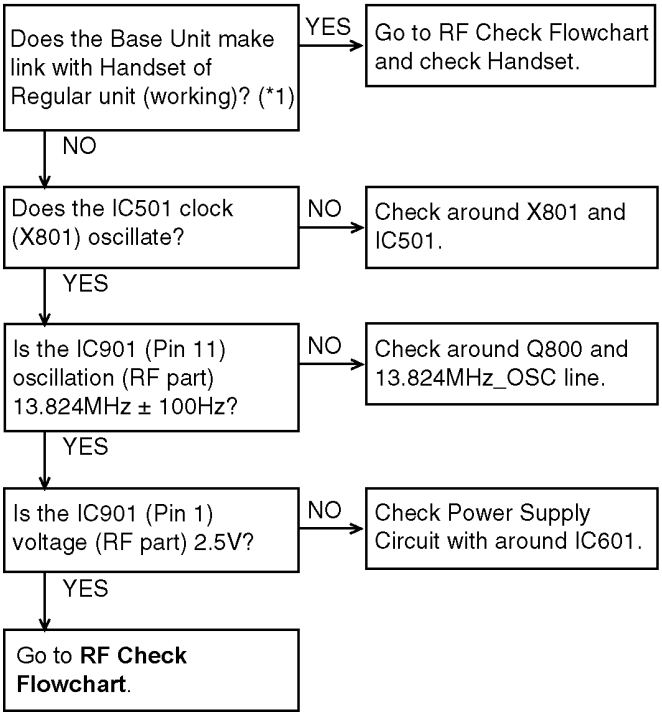


Note:

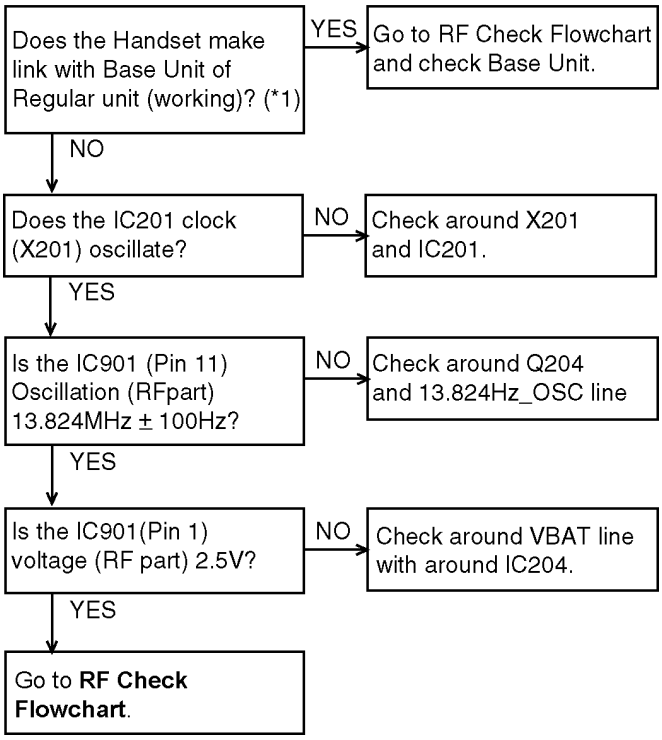
DSP is IC501.

12.8. Check Link

BASE UNIT



HANDSET



(*1) Refer to **Finding Out the Defective Part** (P.49).

Cross Reference:

RF Check Flowchart (P.50)

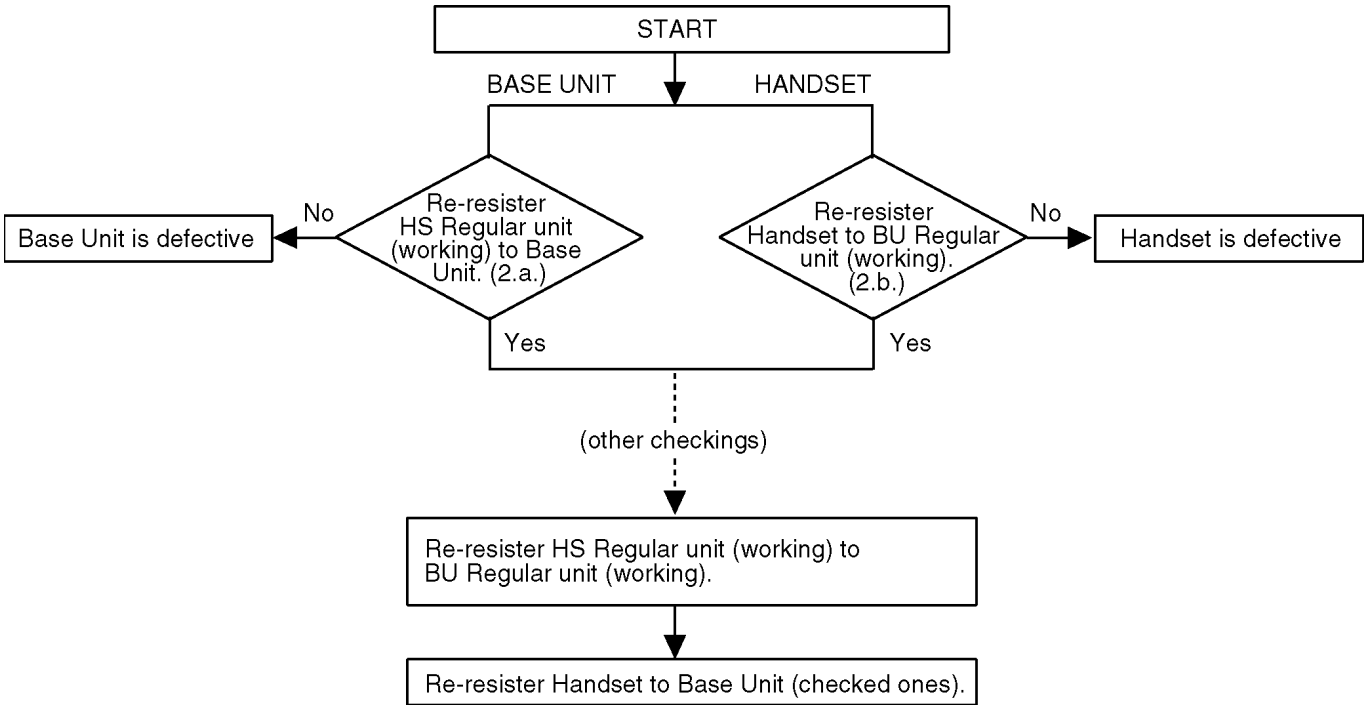
12.9. Check the RF Part

12.9.1. Finding Out the Defective Part

1. Prepare HS Regular unit (working) and BU Regular unit (working).
2. a. Re-register HS of Regular unit (working) to Base Unit (to be checked).
   If this operation fails in some ways, the Base Unit is defective.
   b. Re-register Handset (to be checked) to BU Regular unit (working).
   If this operation fails in some ways, the Handset is defective.

After All the Checkings or Repairing

Re-register Handset (to be checked) to Base Unit (to be checked) and HS to BU Regular unit (working).

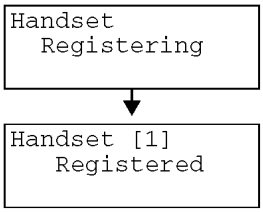


12.9.1.1. Re-registering a Handset

- **Make sure the base unit is not being used.**
- **Have both the handset and base unit nearby during registration.**
- **Follow steps 1and 2 listed below. You have about 1 minute to complete them.**

1 *Base unit:* Press and hold **[LOCATOR/INTERCOM]** until a beep sounds.
- The CHARGE indicator flashes.

2 *Handset:* Press and hold **[FLASH/CALL WAIT]** until a beep sounds.
- When registration is complete, a beep sounds from the handset.
- **Wait for 20 seconds after registration is complete while the handset establishes communication with the base unit.**

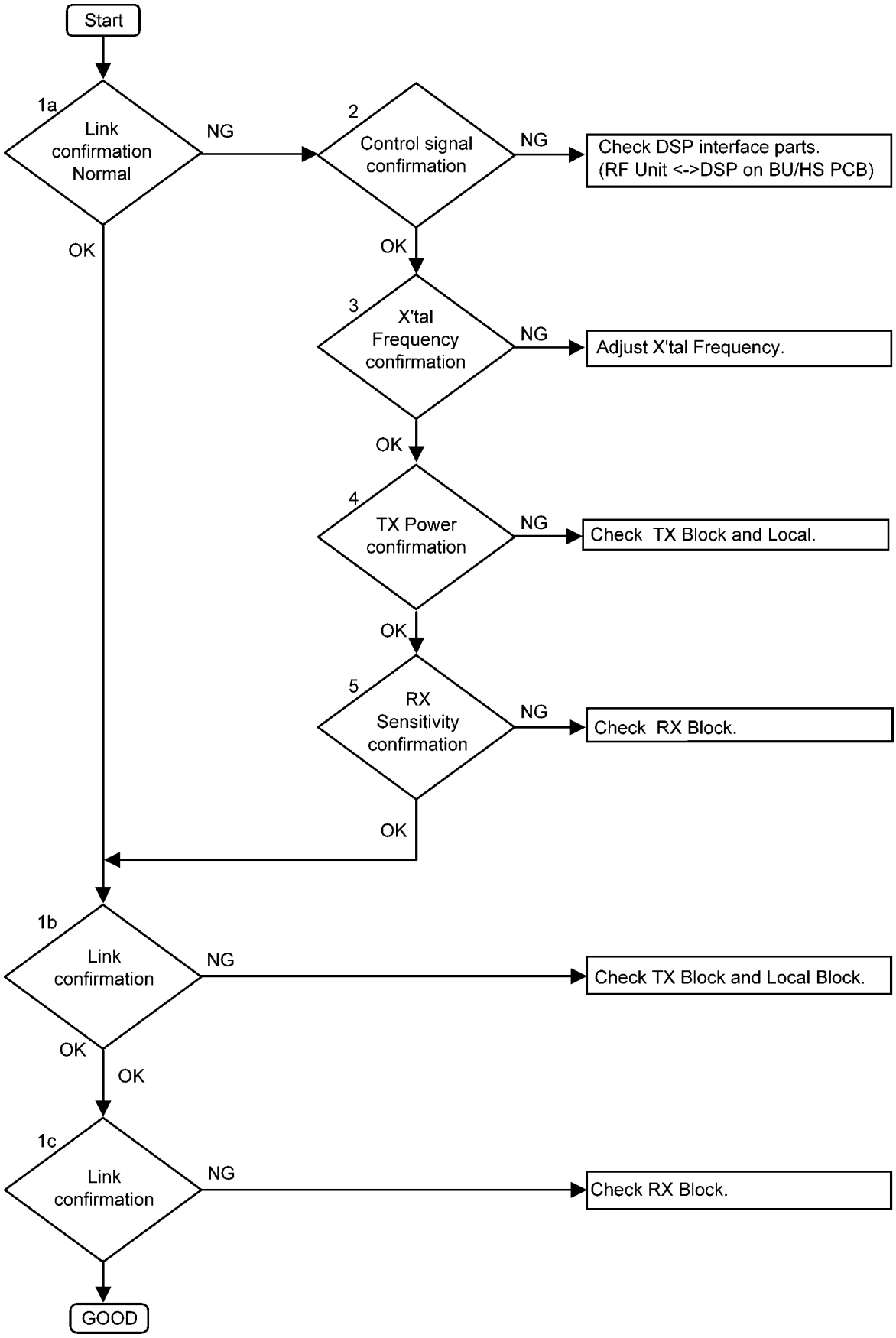


- If the handset beeps 3 times and "Error!!" is displayed, an error occurred. Try again from step 1.
- You can stop registration by pressing **[OFF]** on the handset, and pressing **[LOCATOR/INTERCOM]** on the base unit.

12.9.2. RF Check Flowchart

Each item (1a ~5) of RF Check Flowchart corresponds to **Check Table for RF part**.

Please refer to the each item.



Cross Reference:

Check Table for RF part (P.51)

12.9.3. Check Table for RF part

No.	Item	BU checking	HS checking
1a	Link confirmation Normal	1. Re-resister HS Regular Unit (working) to BU. 2. Press [Talk] key of the HS Regular Unit to establish link.	1. Re-resister HS to BU of Regular Unit (working). 2. Press [Talk] key of the HS to establish link.
1b	Link confirmation TX Test	1. Re-resister HS Regular Unit (working) to BU. 2. Set BU to TEST Link mode. (*1) (CH:45ch / TX Power:High / RX Gain:High) 3. Set HS Regular Unit to TEST Link mode. (*1) (CH:45ch / TX Power:High / RX Gain:Low) 4. Press [1] key of HS Regular Unit to establish link about 5m away from BU. 5. Press [1] key of HS Regular Unit to set RSSI mode, and press [2] key to set RX Gain Low. 6. Confirm the value of RSSI in LCD of HS Regular Unit is more than "e0(hex)".	1. Re-resister HS to BU Regular Unit (working). 2. Set BU Regular Unit to TEST Link mode. (*1) (CH:45ch / TX Power:High / RX Gain:Low) 3. Set HS to TEST Link mode. (*1) (CH:45ch / TX Power:High / RX Gain:High) 4. Press [1] key of HS to establish link about 5m away from BU of Regular Unit. 5. Press [1] key of BU Regular Unit to set RSSI mode, and press [2] key to set RX Gain Low. 6. Confirm the value of RSSI in LCD of BU Regular Unit is more than "e0(hex)".
1c	Link confirmation RX Test	1. Re-resister HS Regular Unit (working) to BU. 2. Set BU to TEST Link mode. (*1) (CH:45ch / TX Power:High / RX Gain:Low) 3. Set HS Regular Unit to TEST Link mode. (*1) (CH:45ch / TX Power:High / RX Gain:High) 4. Press [1] key of HS Regular Unit to establish link about 5m away from BU. 5. Press [1] key of BU to set RSSI mode, and press [2] key to set RX Gain Low. 6. Confirm the value of RSSI in LCD of BU is more than "e0(hex)".	1. Re-resister HS to BU of Regular Unit (working). 2. Set BU Regular Unit to TEST Link mode. (*1) (CH:45ch / TX Power:High / RX Gain:High) 3. Set HS to TEST Link mode. (*1) (CH:45ch / TX Power:High / RX Gain:Low) 4. Press [1] key of HS to establish link about 5m away from BU Regular Unit. 5. Press [1] key of HS to set RSSI mode, and press [2] key to set RX Gain Low. 6. Confirm the value of RSSI in LCD of HS is more than "e0(hex)".
2	Control signal confirmation	1. Set TX Burst mode.(*1) 2. Check DSP interface.(*2)	1. Set TX Burst mode.(*1) 2. Check DSP interface.(*2)
3	X'tal Frequency confirmation (*5)	1. Adjust X'tal mode. 2. Check X´tal Frequency. (13.824000MHz±100Hz)	1. Adjust X'tal mode. 2. Check X´tal Frequency. (13.824000MHz±100Hz)
4	TX Power confirmation	1. Set BU to TX Burst mode at 45ch. (*1) (TX Power:High) 2. Set HS Regular Unit to RX-CW TEST mode at 45ch (RX Gain is fixed Low Gain). (*1) 3. Place HS Regular Unit about 5m away from BU. 4. Confirm RSSI of HS Regular Unit is more than 1.75V by Oscilloscope.(*4)	1. Set HS to TX Burst mode at 45ch. (*1) (TX Power:High) 2. Set BU Regular Unit to RX-CW TEST mode at 45ch (RX Gain is fixed Low Gain). (*1) 3. Place HS about 5m away from BU Regular Unit. 4. Confirm RSSI of BU Regular Unit is more than 1.75V by Oscilloscope.(*3)
5	RX Sensitivity confirmation	1. Set BU to RX-CW TEST mode at 45ch (RX Gain is fixed Low Gain). (*1) 2. Set HS Regular Unit to TX Burst mode at 45ch. (*1) (TX Power:High) 3. Place HS Regular Unit about 5m away from BU. 4. Confirm RSSI of BU is more than 1.75V by Oscilloscope.(*3)	1. Set HS to RX-CW TEST mode at 45ch (RX Gain is fixed Low Gain). (*1) 2. Set BU Regular Unit to TX Burst mode at 45ch. (*1) (TX Power:High) 3. Place HS about 5m away from BU Regular Unit. 4. Confirm RSSI of HS is more than 1.75V by Oscilloscope.(*4)

Note:

(*1) **TEST MODE** (P.54)

(*2) **RF-DSP interface signal wave form** (P.52)

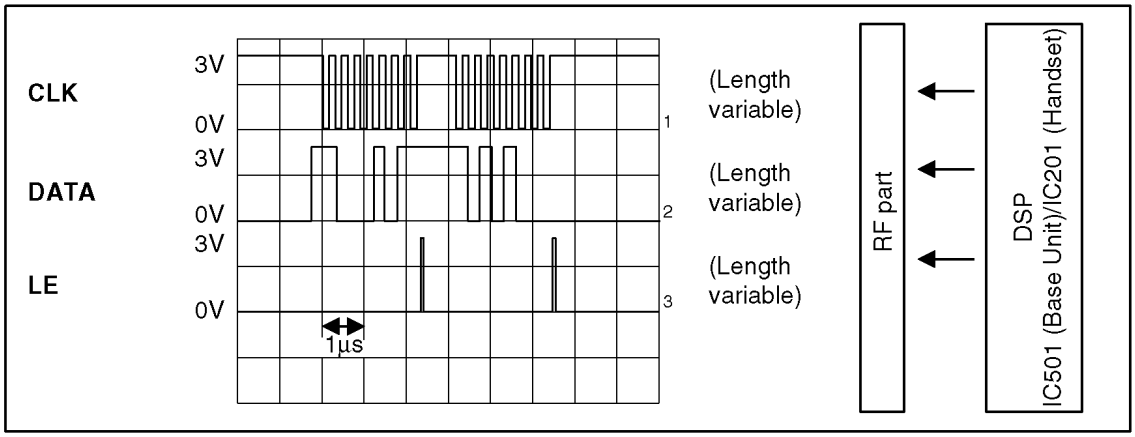
(*3) **CIRCUIT BOARD (Base Unit) Component View** (P.105)

(*4) **CIRCUIT BOARD (Handset) Component View** (P.107)

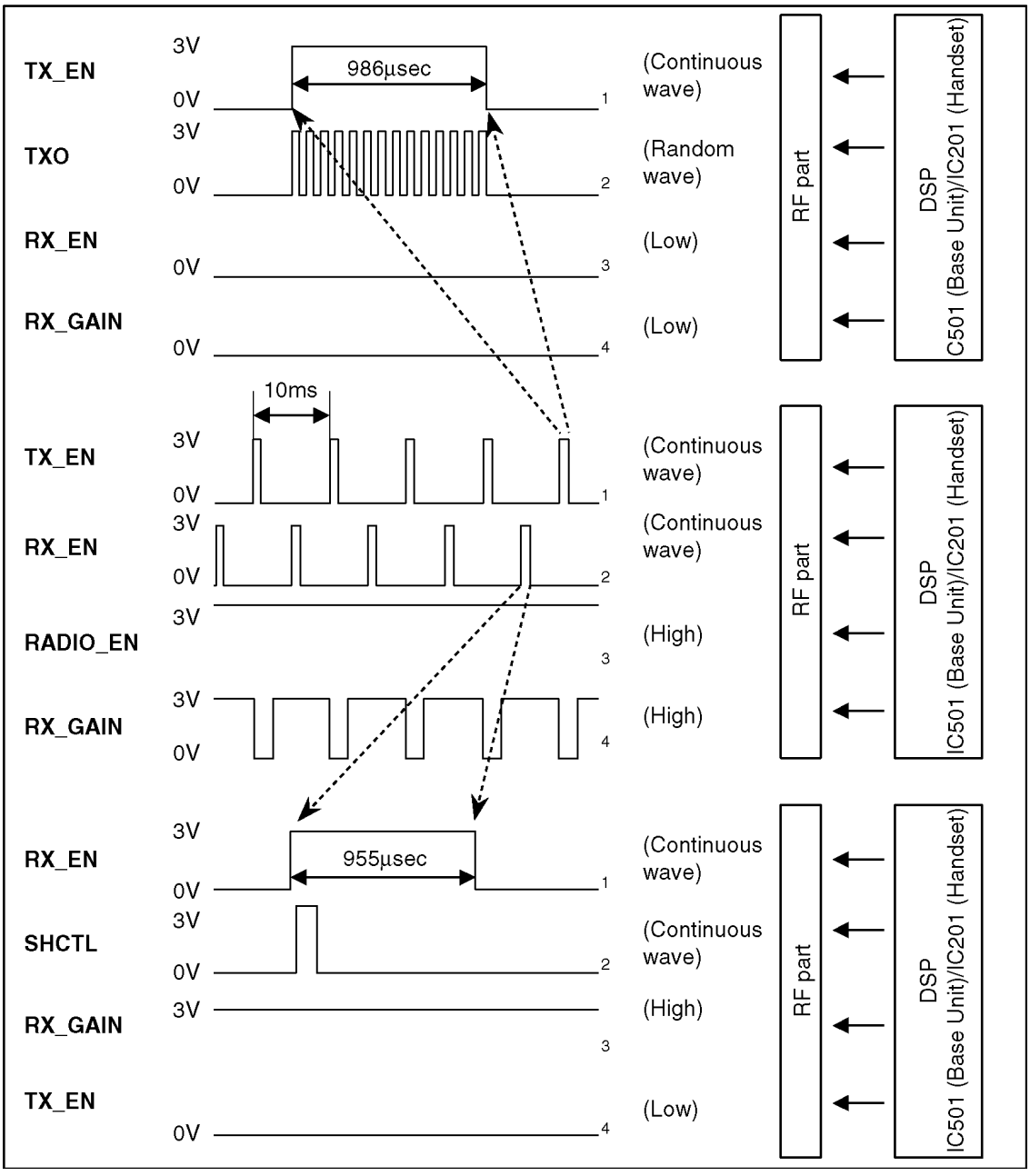
(*1) **X801 (Base Unit), X201 (Handset) Check** (P.61)

12.9.4. RF-DSP interface signal wave form

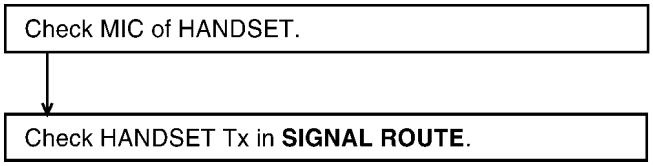
< Test Burst mode > CLK&DATA



< Test Burst mode > TX&RX



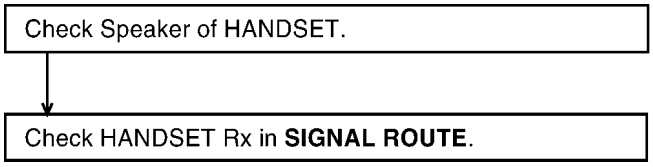
12.10. Check Handset Transmission



Cross Reference:

SIGNAL ROUTE (P.85).

12.11. Check Handset Reception



Cross Reference:

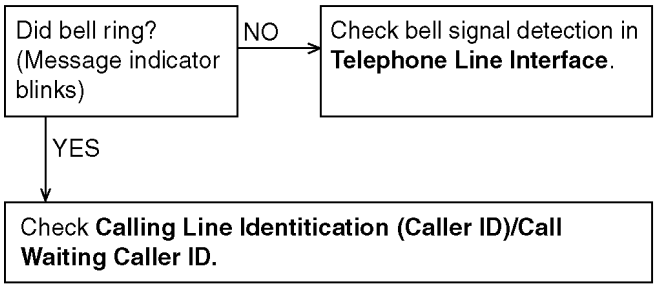
SIGNAL ROUTE (P.85).

Note:

When checking the RF UNIT, Refer to **Check the RF Part** (P.49)

12.12. Check Caller ID

BASE UNIT



Cross Reference:

Telephone Line Interface (P.76).

Calling Line Identification (Caller ID) (P.79).

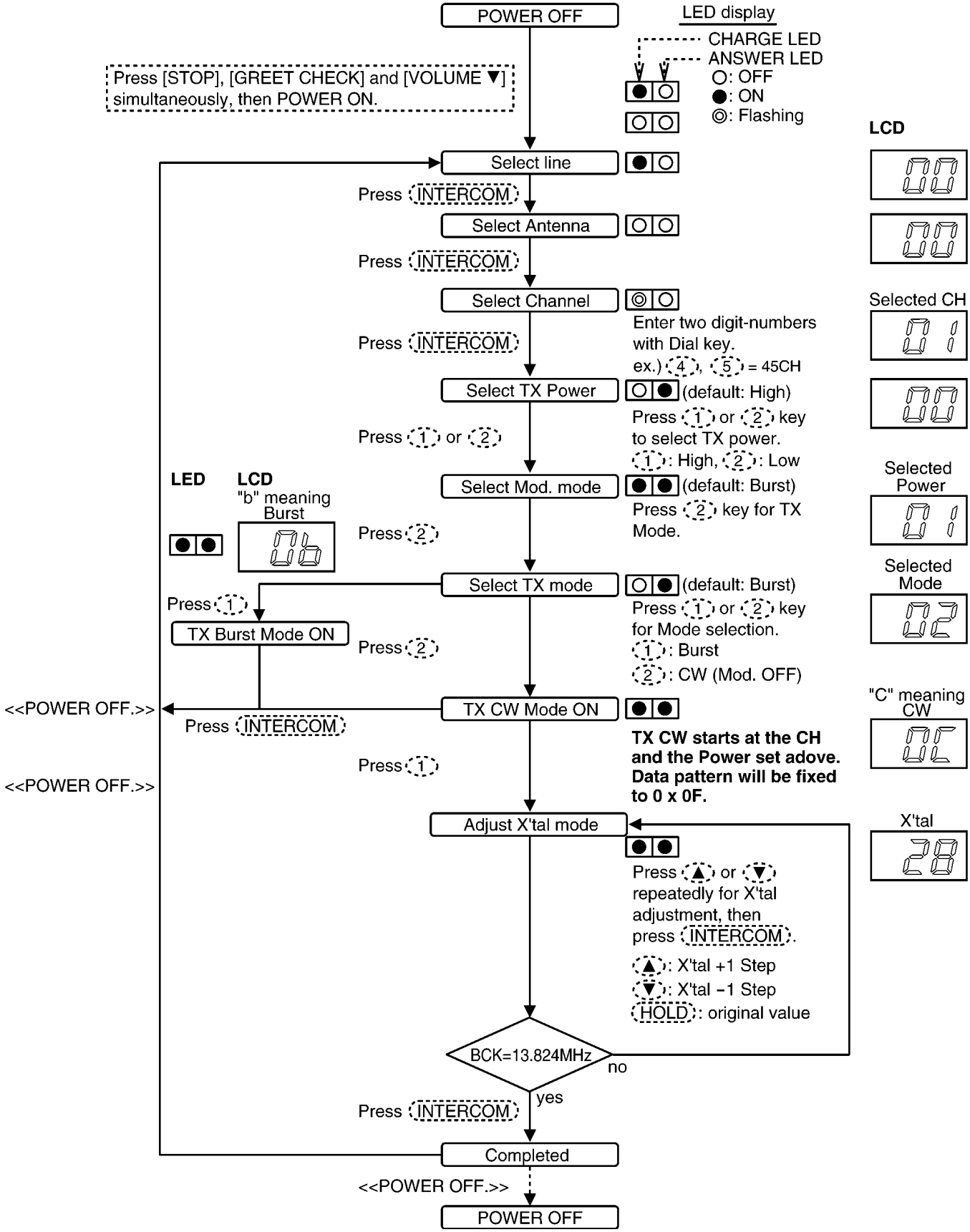
Note:

- Make sure the format of the Caller ID or Call Waiting Caller ID service of the Telephone company that the customer subscribed to.
- Also we recommend to confirm that the customer is really a subscriber of the service.

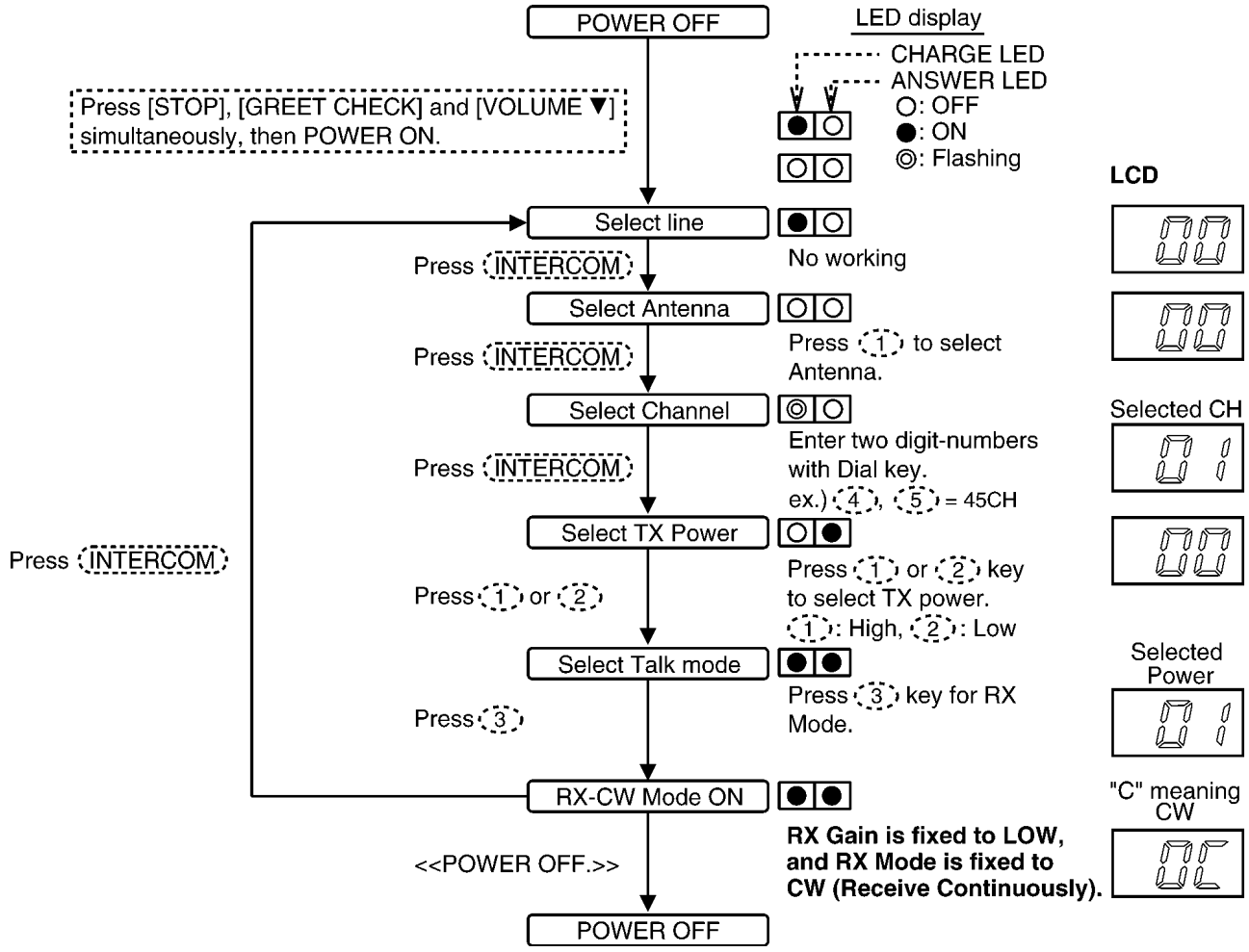
13 TEST MODE

13.1. Test Mode Flow Chart for Base Unit

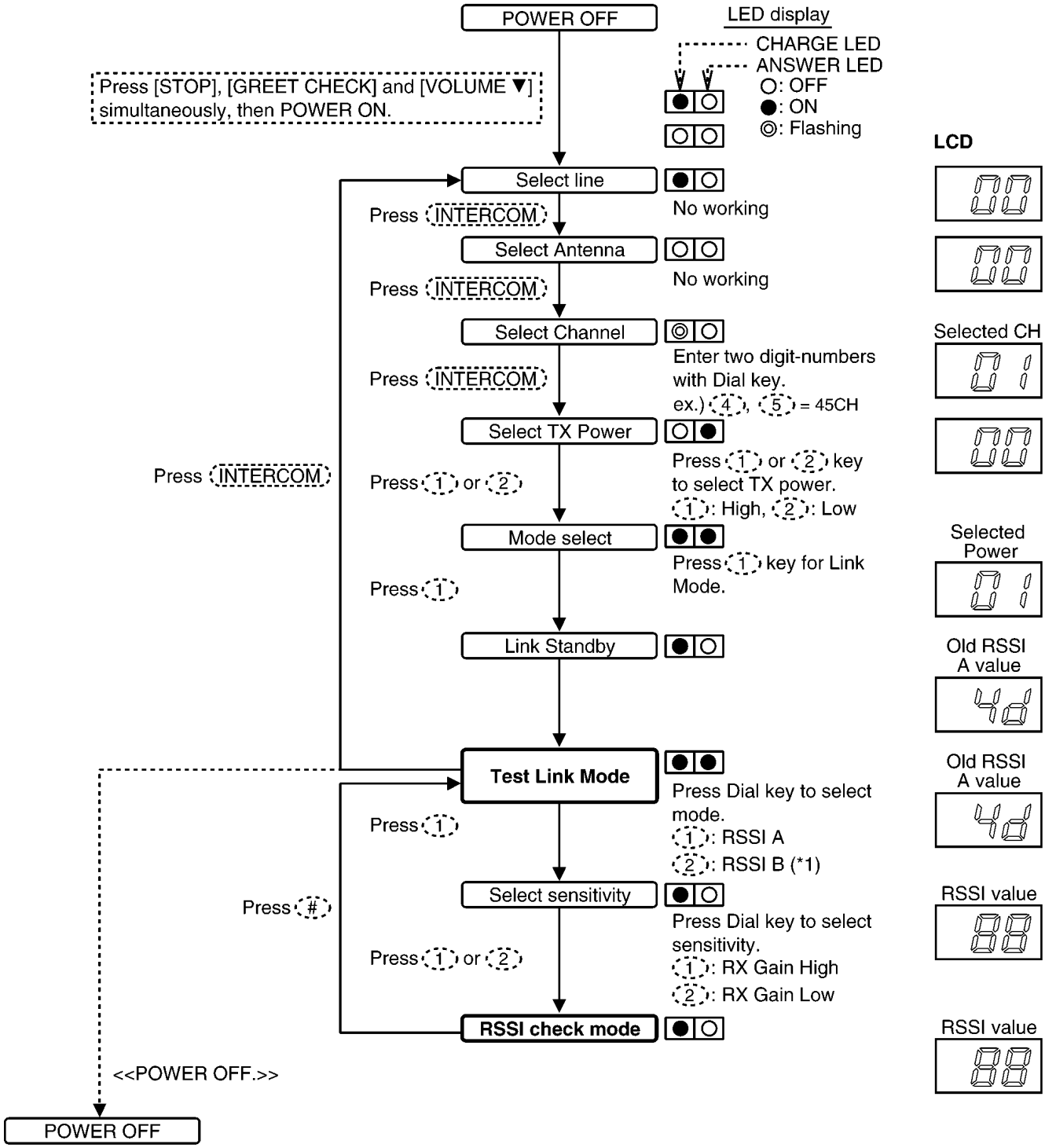
13.1.1. TX Burst Mode and Adjust X'tal Mode



13.1.2. RX-CW TEST Mode



13.1.3. Test Link Mode

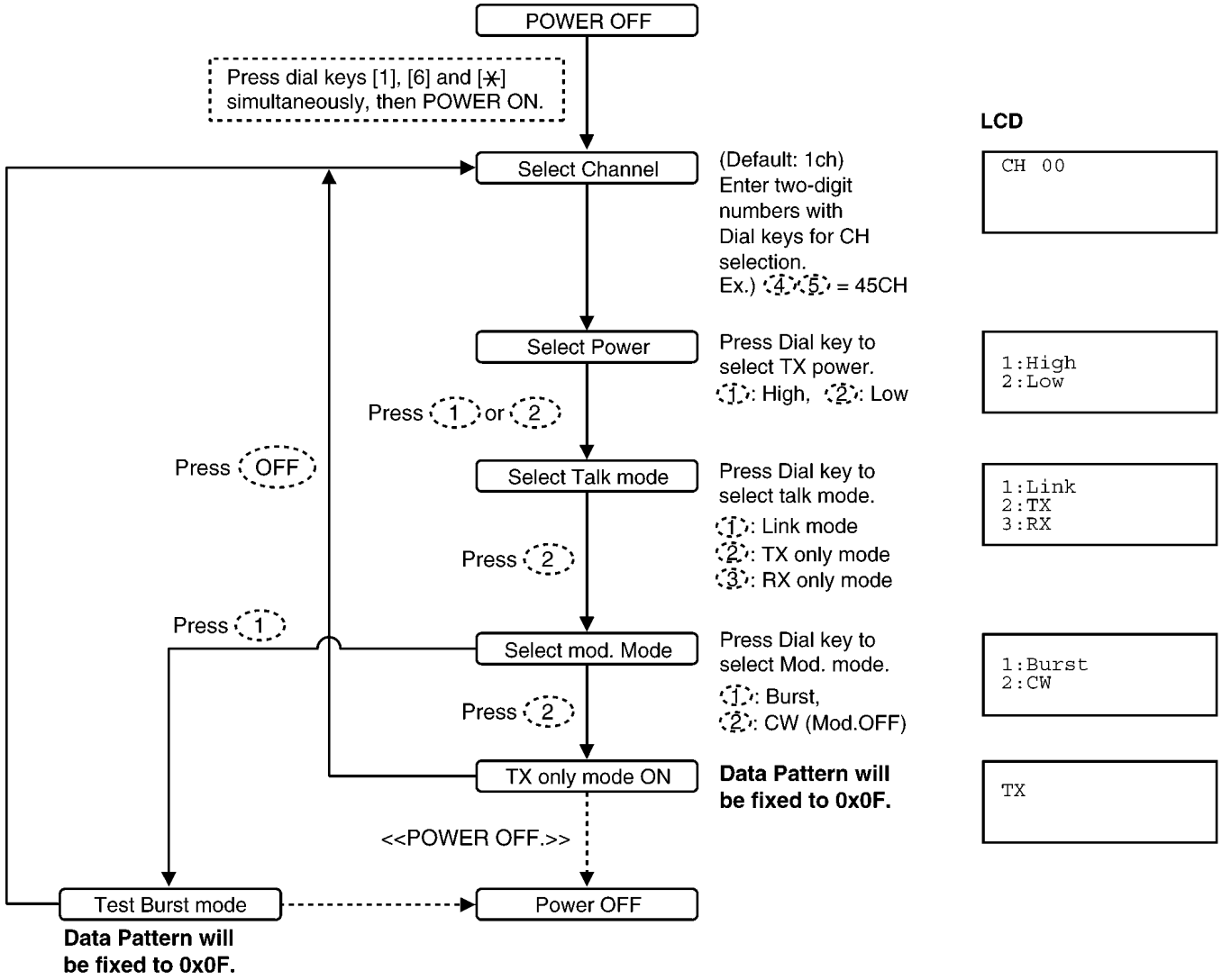


Note:

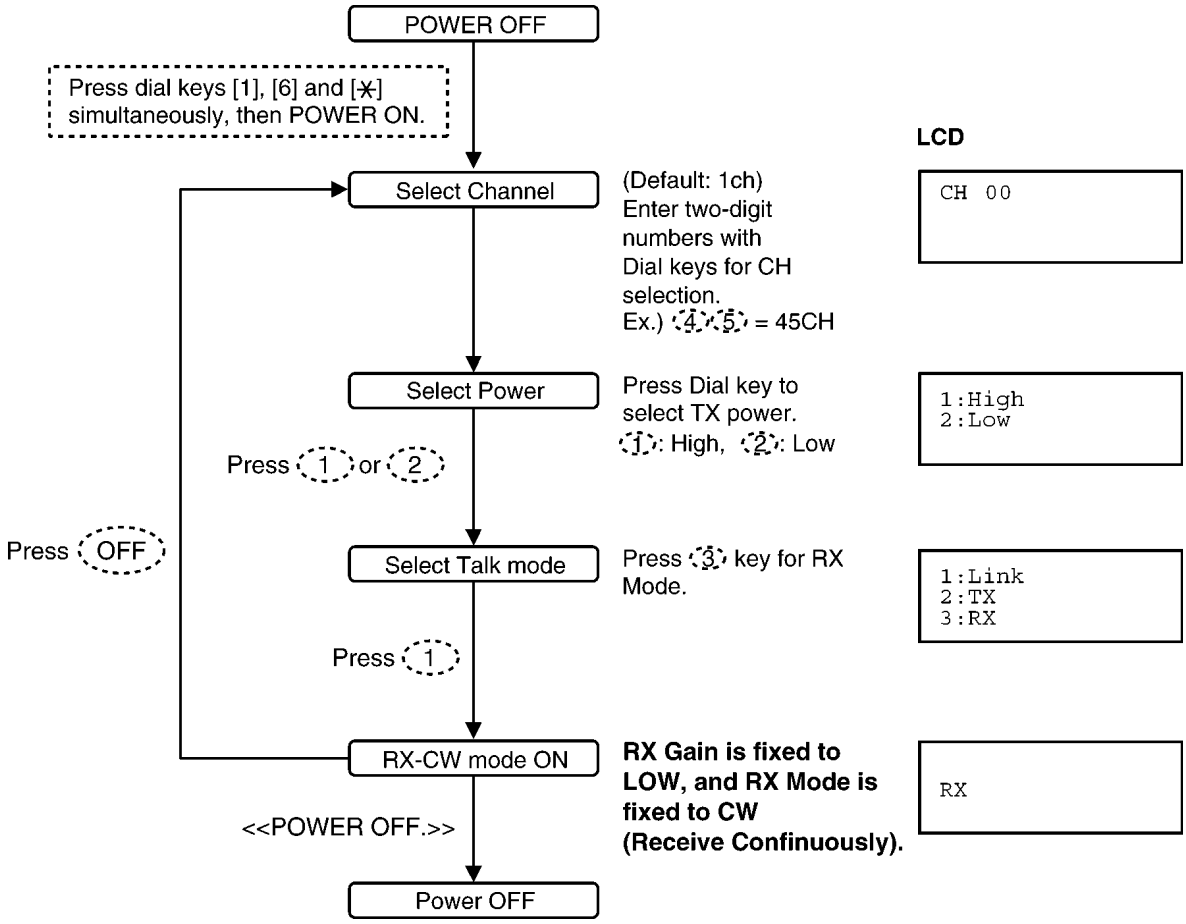
(*1) for factory use only.

13.2. Test Mode Flow Chart for Handset

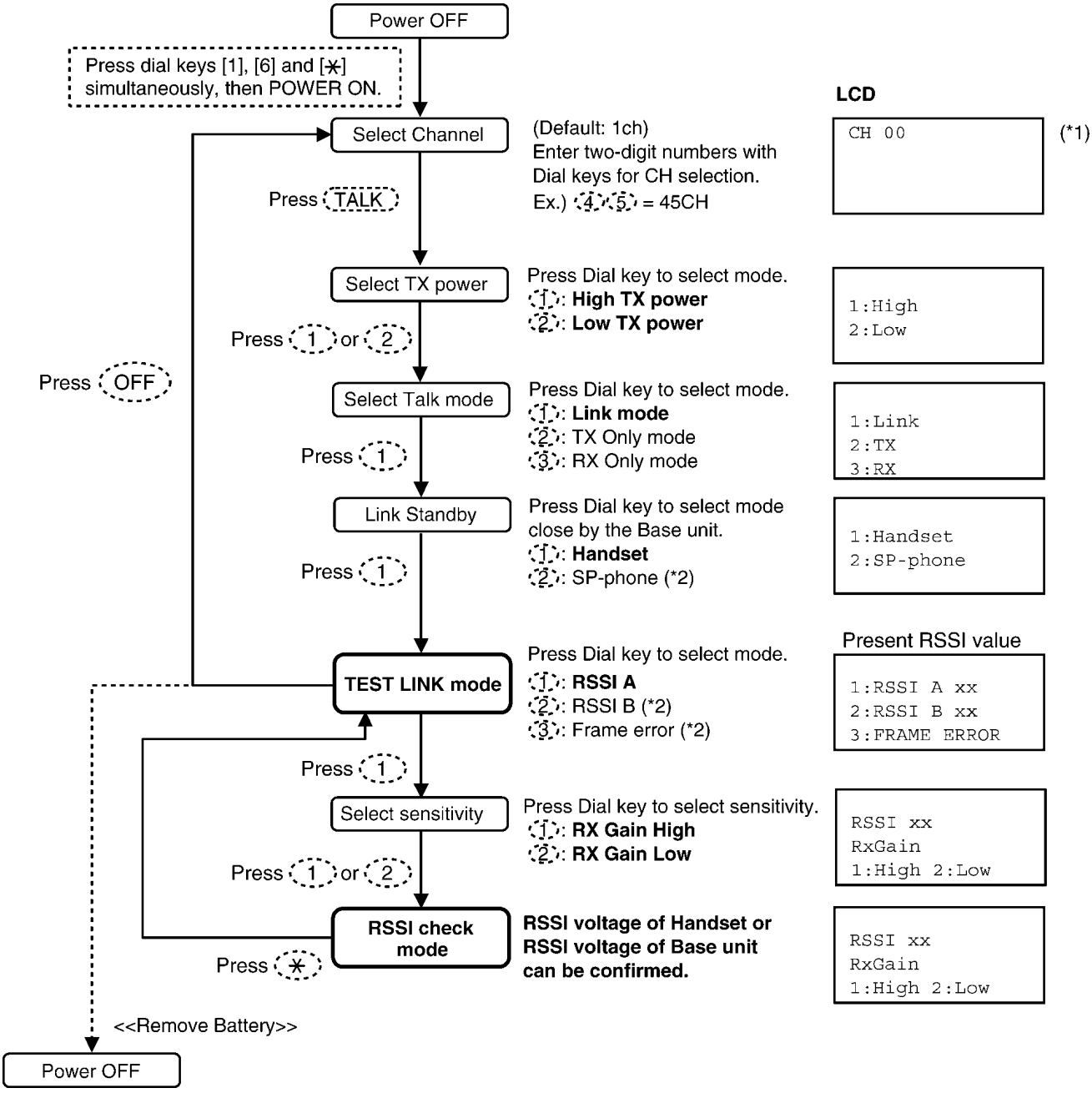
13.2.1. TX Burst Mode



13.2.2. RX-CW TEST Mode



13.2.3. Test Link Mode



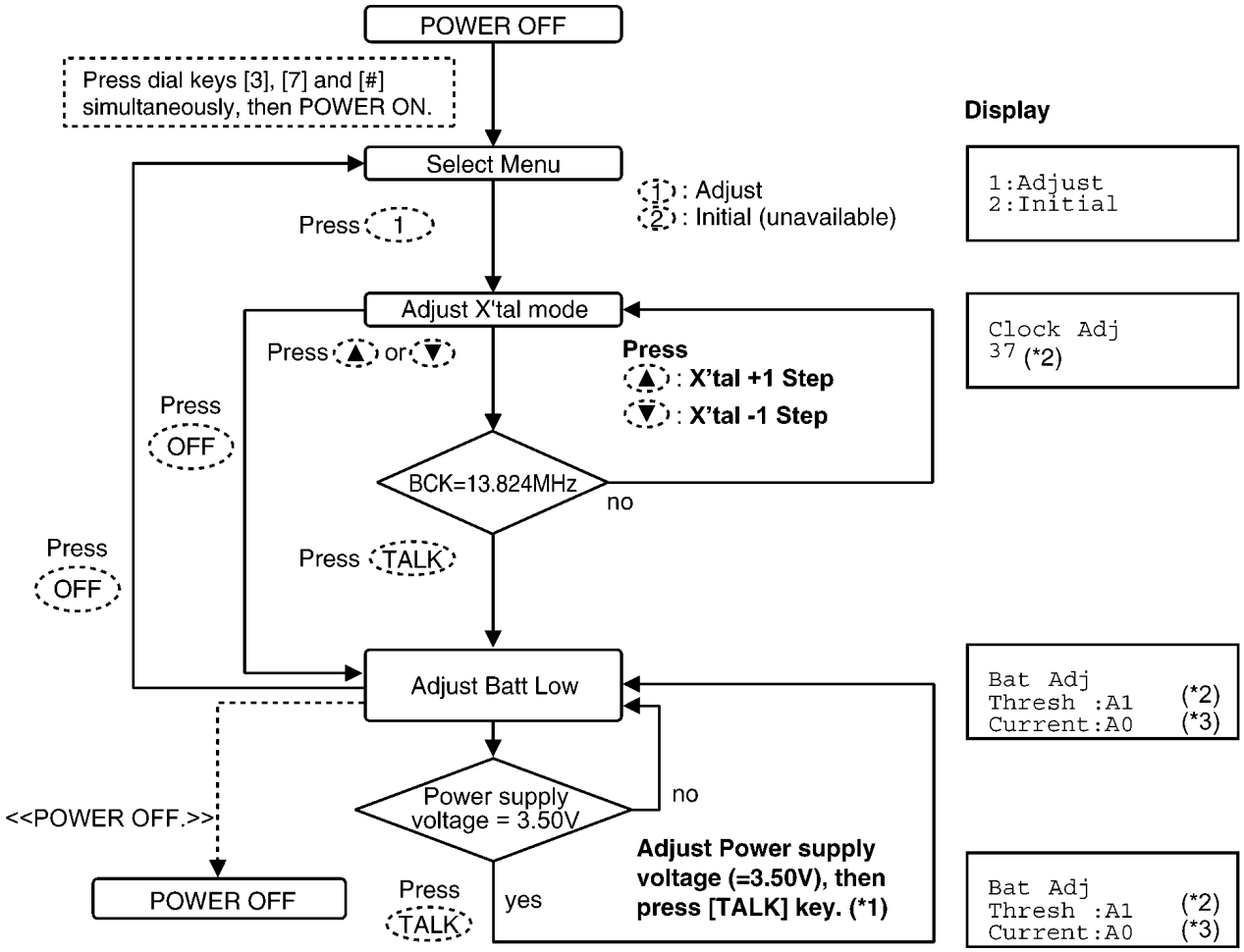
Note:

(*1) LCD displays the Channel number.

(exception: default/ CH00 = 1ch.)

(*2) for factory use only.

13.2.4. Adjustment flow (X'tal mode and Batt Low Mode)



Cross Reference

(*1) Adjustment Battery Low Detector Voltage (Handset) (P.61)

Note:

(*2) These are the default values.

(*3) These values may not be fixed depending on the battery strength.

X101 Adjustment guide		
Base Unit (LOCATOR button)	Handset	
The frequency increases every time [VOLUME ▼] is pressed.	:	
	28	High frequency
	29	
	2A	
	2B	
	2C	
	2D	The frequency changes by 6 kHz.
	2E	
	2F	
	30	
	31	
	32	
	33	Low frequency
	34	
The frequency decreases every time [VOLUME ▲] is pressed.	:	

13.3. X801 (Base Unit), X201 (Handset) Check

Equipment: Frequency counter

Check Point for measurement: BCK

Checking tolerance: 13.824MHz ± 100Hz

13.3.1. Check and Adjustment X801 (Base Unit) Frequency

1. Set up Base Unit in TEST mode.
2. Press following keys in order to Adjust Crystal mode. [LOCATOR], [LOCATOR], [LOCATOR], [▲] or [▼], [▼], [▲]
   * Check BCK frequency.
3. If the BCK frequency is out of the checking tolerance (± 100Hz), adjust to Adjustment tolelance (± 30Hz) by pressing [▲] or [▼] key.
   Adjustment Tolerance: 13.824MHz ± 30Hz
4. Press [LOCATOR] key to write the new frequency factor in Memory.
5. Turn the power off. Then this value is available.

When you have replaced IC501 or IC701, adjust X801 by the procedure above.

Cross Reference:

TX Burst Mode and Adjust X'tal Mode (P.54)

13.3.2. Check and Adjustment X201 (Handset) Frequency

1. Set DC power supply to 3.9V.
2. Set up Handset in TEST mode (Adjustment flow).
3. Press [1] key to Adjust Crystal mode. ("Clock Adj" is displayed on LCD)
   * Check BCK frequency.
4. If the BCK frequency is out of the checking tolerance (± 100Hz), adjust to Adjustment tolelance (± 30Hz) by pressing [▲] or [▼] key.
   Adjustment Tolerance: 13.824MHz ± 30Hz
5. Press [TALK] key to write the new frequency factor in EEPROM.
6. Turn the power off. Then this value is available.

When you have replaced IC201 or IC202, adjust X201 by the procedure above.

Cross Reference:

Adjustment flow (X'tal mode and Batt Low Mode) (P.60)

13.4. Adjustment Battery Low Detector Voltage (Handset)

After handset´s DSP (IC201) or EEPROM (IC202) replacement (*1), Re-writing Battery Low voltage to EEPROM is required.

Follow **Test Mode Flow Chart for Handset** (P.57).

DC power supply and DC voltmeter require the adjustment below.

1. Set DC power supply to 3.9V.
2. Set up handset in test mode (Adjustment flow).
3. Press [1] key and [OFF] key twice to Adjust Batt Low mode. ("Bat Adj" is displayed on LCD)
4. Change voltage to 3.50V accurately for the DC power supply.
   * Check voltage at P.C. board test points because some voltage drops occur due to the usage of long or thin cable.
5. Press [TALK] key to write voltage value in EEPROM.
6. Turn the power off. Then this value is available.

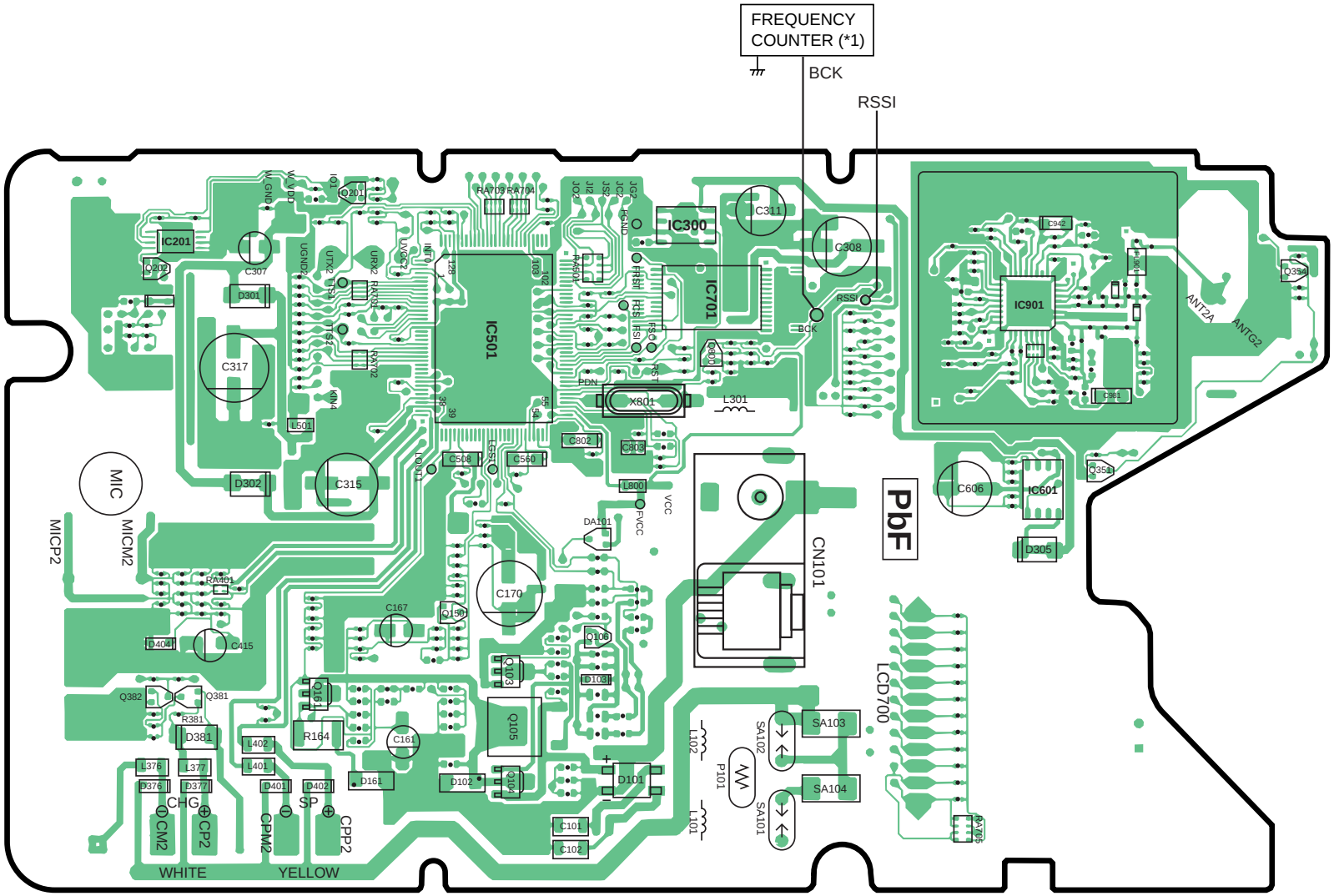
Note:

For connection of DC power source and voltmeter, see **Handset Reference Drawing** (P.64).

13.5. Base Unit Reference Drawing

When connecting the Simulator and Equipments for checking, please refer to the illustration below.

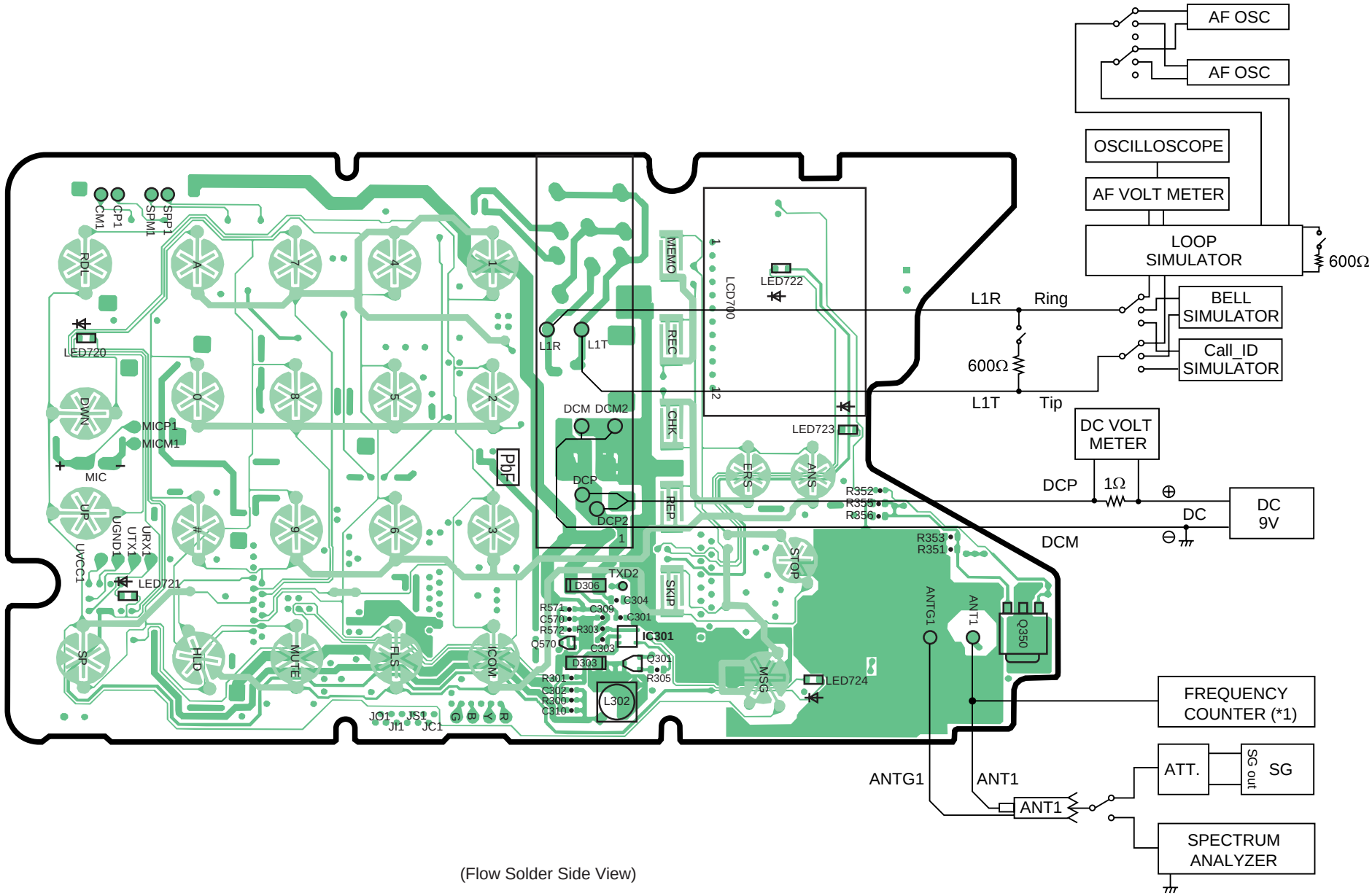
13.5.1. Component View



(Component View)

Note: (*1) is referred to No.3 of **Check Table for RF part** (P.51)

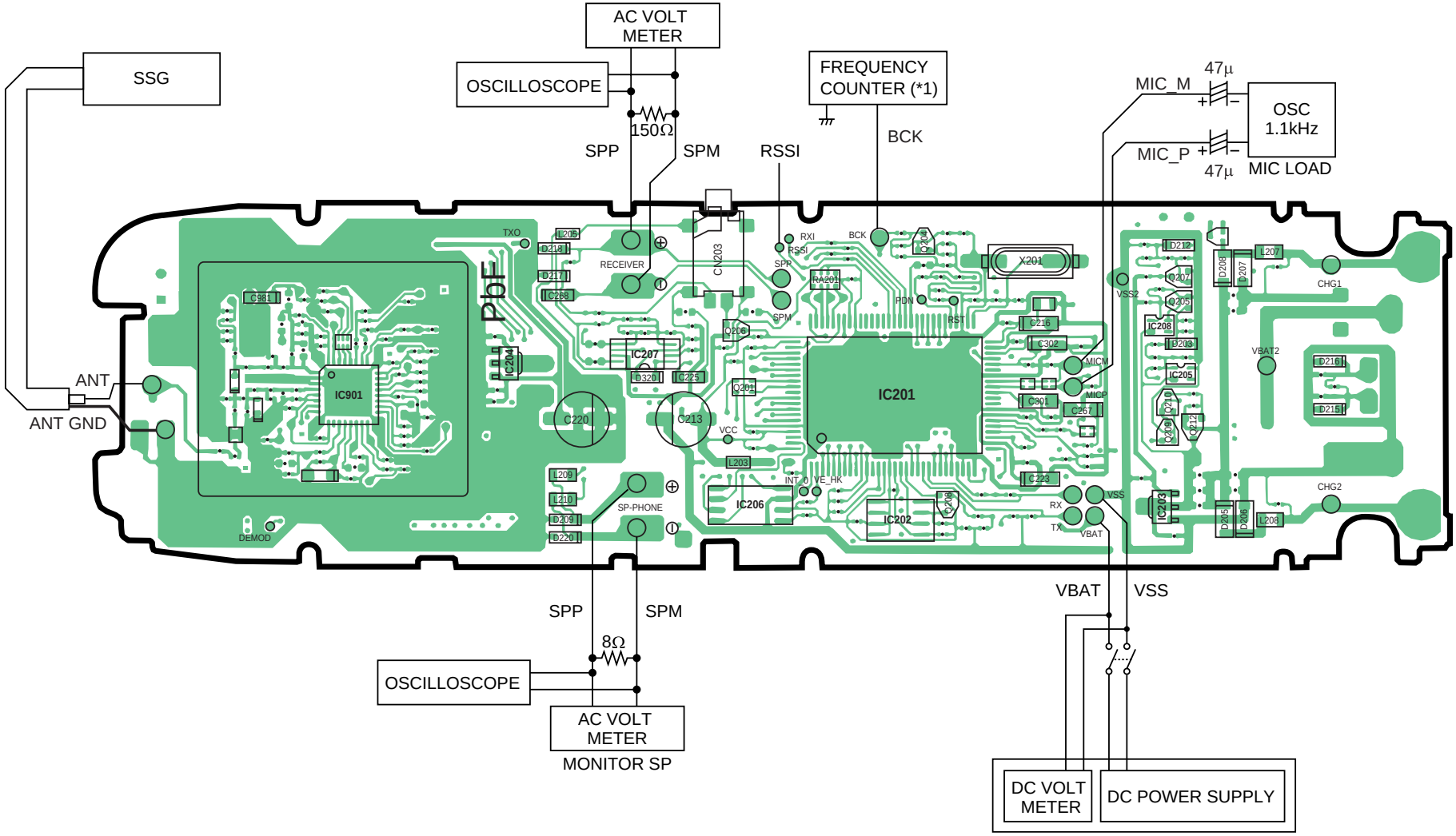
13.5.2. Flow Solder Side View



(Flow Solder Side View)

13.6. Handset Reference Drawing

When connecting the Simulator and Equipments for checking, please refer to the illustration below.



Note: (*1) is referred to No.3 of **Check Table for RF part** (P.51)

13.7. FREQUENCY TABLE

Channel	TX/RX Frequency (MHz)	TEST MODE Frequency (MHz)
1	2400.914355	2400.724512
2	2401.808203	2401.618359
3	2402.698096	2402.508252
4	2403.591943	2403.402100
5	2404.481836	2404.291992
6	2405.375684	2405.185840
7	2406.265576	2406.075732
8	2407.159424	2406.969580
9	2408.049316	2407.859473
10	2408.943164	2408.753320
11	2409.833057	2409.643213
12	2410.726904	2410.537061
13	2411.616797	2411.426953
14	2412.510645	2412.320801
15	2413.400537	2413.210693
16	2414.294385	2414.104541
17	2415.184277	2414.994434
18	2416.078125	2415.888281
19	2416.968018	2416.778174
20	2417.861865	2417.672021
21	2418.751758	2418.561914
22	2419.645605	2419.455762
23	2420.535498	2420.345654
24	2421.429346	2421.239502
25	2422.319238	2422.129395
26	2423.213086	2423.023242
27	2424.102979	2423.913135
28	2424.996826	2424.806982
29	2425.886719	2425.696875
30	2426.780566	2426.590723
31	2427.670459	2427.480615
32	2428.564307	2428.374463
33	2429.454199	2429.264355
34	2430.348047	2430.158203
35	2431.237939	2431.048096
36	2432.131787	2431.941943
37	2433.021680	2432.831836
38	2433.915527	2433.725684
39	2434.805420	2434.615576
40	2435.699268	2435.509424
41	2436.589160	2436.399316
42	2437.483008	2437.293164
43	2438.372900	2438.183057
44	2439.266748	2439.076904
45	2440.156641	2439.966797
46	2441.050488	2440.860645
47	2441.940381	2441.750537
48	2442.834229	2442.644385
49	2443.724121	2443.534277
50	2444.617969	2444.428125
51	2445.507861	2445.318018
52	2446.401709	2446.211865
53	2447.291602	2447.101758
54	2448.185449	2447.995605
55	2449.075342	2448.885498
56	2449.969189	2449.779346
57	2450.859082	2450.669238
58	2451.752930	2451.563086
59	2452.642822	2452.452979
60	2453.536670	2453.346826
61	2454.426563	2454.236719
62	2455.320410	2455.130566
63	2456.210303	2456.020459
64	2457.104150	2456.914307

Channel	TX/RX Frequency (MHz)	TEST MODE Frequency (MHz)
65	2457.994043	2457.804199
66	2458.887891	2458.698047
67	2459.777783	2459.587939
68	2460.671631	2460.481787
69	2461.561523	2461.371680
70	2462.455371	2462.265527
71	2463.345264	2463.155420
72	2464.239111	2464.049268
73	2465.129004	2464.939160
74	2466.022852	2465.833008
75	2466.912744	2466.722900
76	2467.806592	2467.616748
77	2468.696484	2468.506641
78	2469.590332	2469.400488
79	2470.480225	2470.290381
80	2471.374072	2471.184229
81	2472.263965	2472.074121
82	2473.157813	2472.967969
83	2474.047705	2473.857861
84	2474.941553	2474.751709
85	2475.831445	2475.641602
86	2476.725293	2476.535449
87	2477.615186	2477.425342
88	2478.509033	2478.319189
89	2479.398926	2479.209082
90	2480.292773	2480.102930

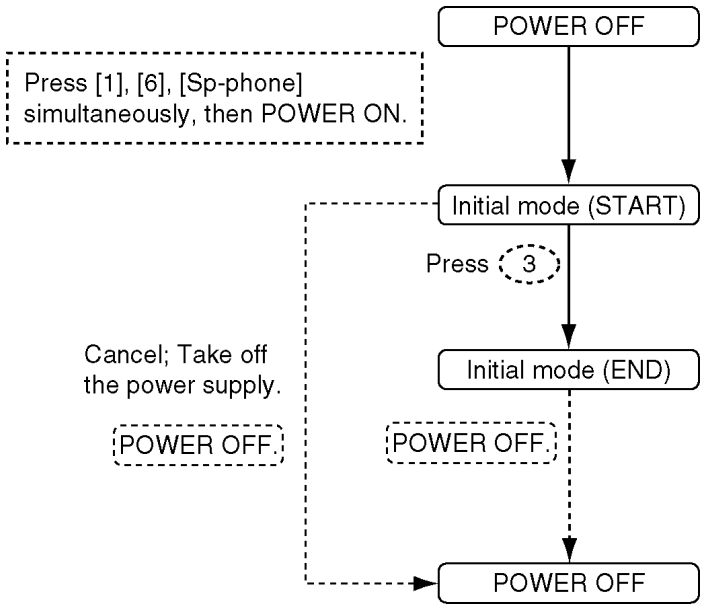
13.8. How to Clear User Setting

The operation reset the unit to Factory setting.

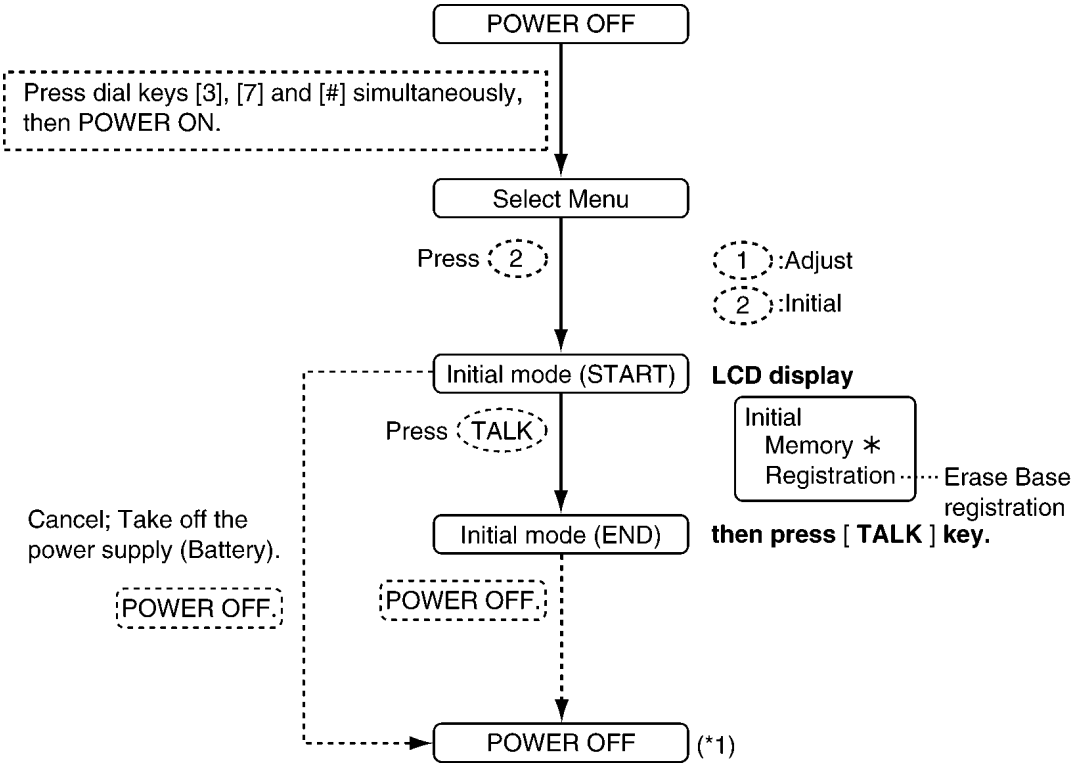
(Erase recording Voice messages, Stored phone numbers, Caller list and etc.)

This operation should not be performed for a usual repair.

13.8.1. Base unit



13.8.2. Handset



Note:

(*1) Be sure to short the battery terminals of the handset with a lead wire, etc. for 2 seconds for discharge after removing the battery.

14 DESCRIPTION

14.1. Frequency

The frequency range of 2400MHz~2480MHz is used. Transmitting and receiving channel between base unit and handset is same frequency. Refer to the Frequency Table.

14.2. FHSS (Frequency Hopping Spread Spectrum)

This telephone is using an IC chip which has similar specification to WDCT (World Digital Cordless Telephone) and is the cordless telephone system that can use multiple portable unit simultaneously.

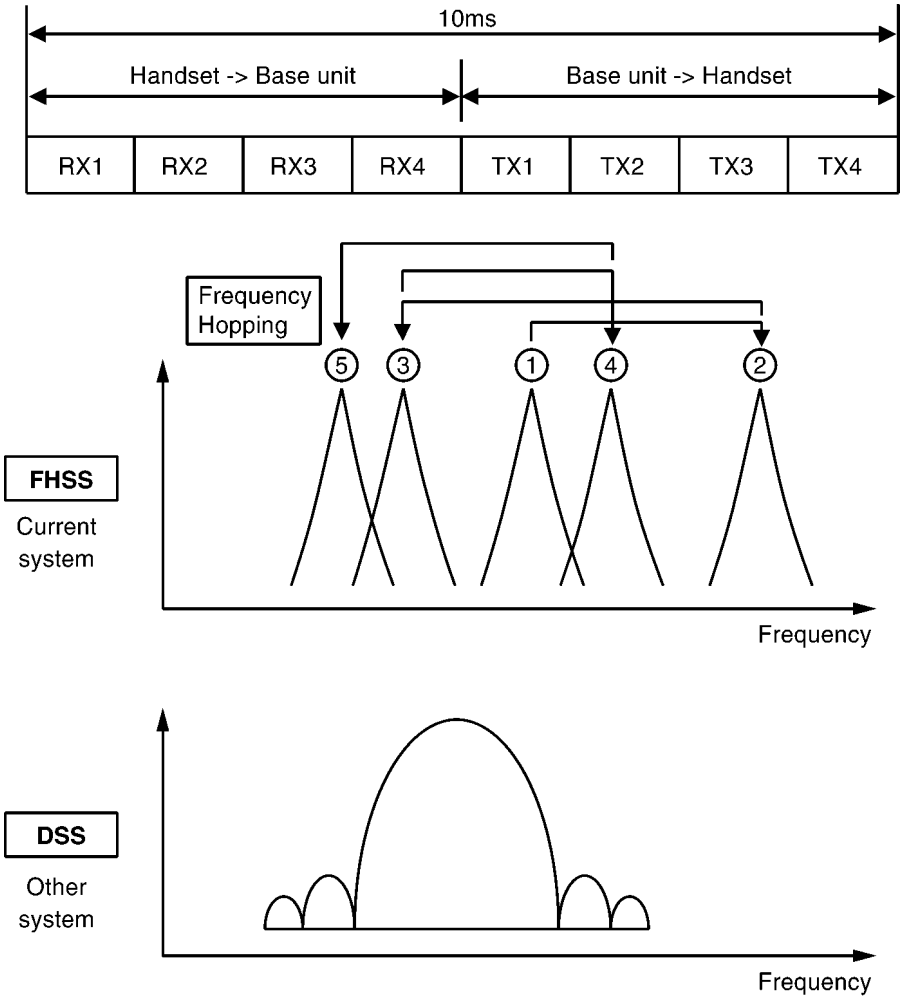
The explanation of this system is mentioned below.

This system uses a Time Division Multiple Access/Time Division Duplex (**TDMA**/**TDD**) scheme: transmitting and receiving frequencies of the base unit and cordless handset are shared in the same frequency. The construction of RX/TX frequency data is shown below. It consists of 4 slots from the base unit to the cordless handset, and 4 slots from the cordless handset to the base unit, total 8 slots in 10ms. By this slot system, simultaneous air link and communication between 4 cordless handsets and the base unit can be realized. One communication between cordless handset and the base unit is done by one slot from the base unit to cordless handset, and another slot from cordless handset to the base unit.

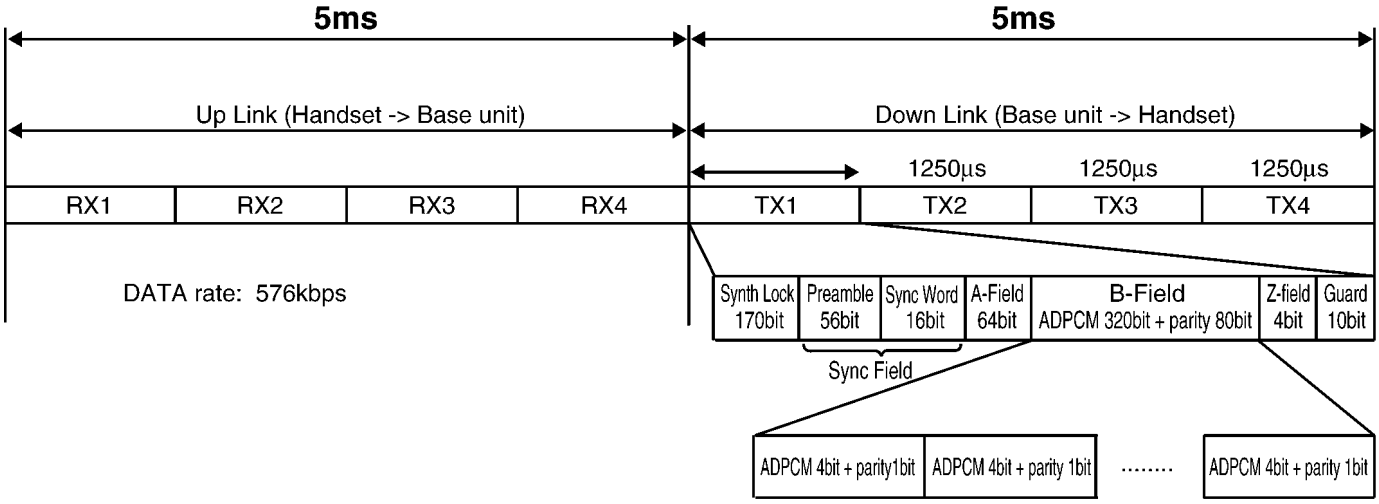
DSS makes spectrum spread by multiplying carrier signal by PN code.

The purpose to make spectrum spread is to reduce power density per time and per band.

On the other hand, **FHSS** makes spectrum spread by changing channel every 10ms according to Hopping table. Also the purpose to make spectrum spread is to reduce power density per time and per band.



14.2.1. TDD Frame Format

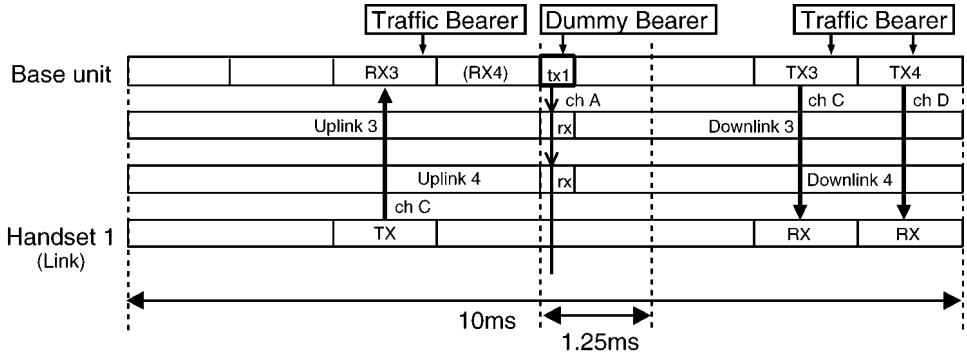


Sync Field (72Bit): Preamble56Bit + SyncWord16Bit
Base set (handset) adjusts the timing of reception so that reception of base set (handset) can correspond to transmission of handset (base unit). It is necessary for sync-field that handset gets synchronization.
A - field (64bit) : Each kinds of DATA: ch data, line condition, etc
B - field (320bit + 80bit) : Sound data + parity
Z - Filed (4Bit) : Parity Check

14.2.2. TDMA system

This system is the cycles of 10ms, and has four duplex paths,
so it is possible to perform four duplex communications simultaneously.
In 1 slot 1.25ms, the 10ms of voice data is transmitted.
Each slot makes every frame frequency hop. (100hops/sec)
Although each slot (UpLink3 and UpLink4) is different frequency, UpLink3 and DownLink3 use the same frequency.

· 2 - Handsets Link



Traffic Bearer

A link is established between Base set and handset.
The state where duplex communication is performed.
The hopping pattern of a 1800hops (18 seconds) cycle.

Dummy Bearer

The Base unit send Dummy-data to the all stand-by state Handsets.
The Handsets receive that data for keeping synchronization and monitoring request from the Base unit.
Dummy Bearer doesn´t contain B-field (sound) data.

14.3. Signal Flowchart in the Whole System

Reception

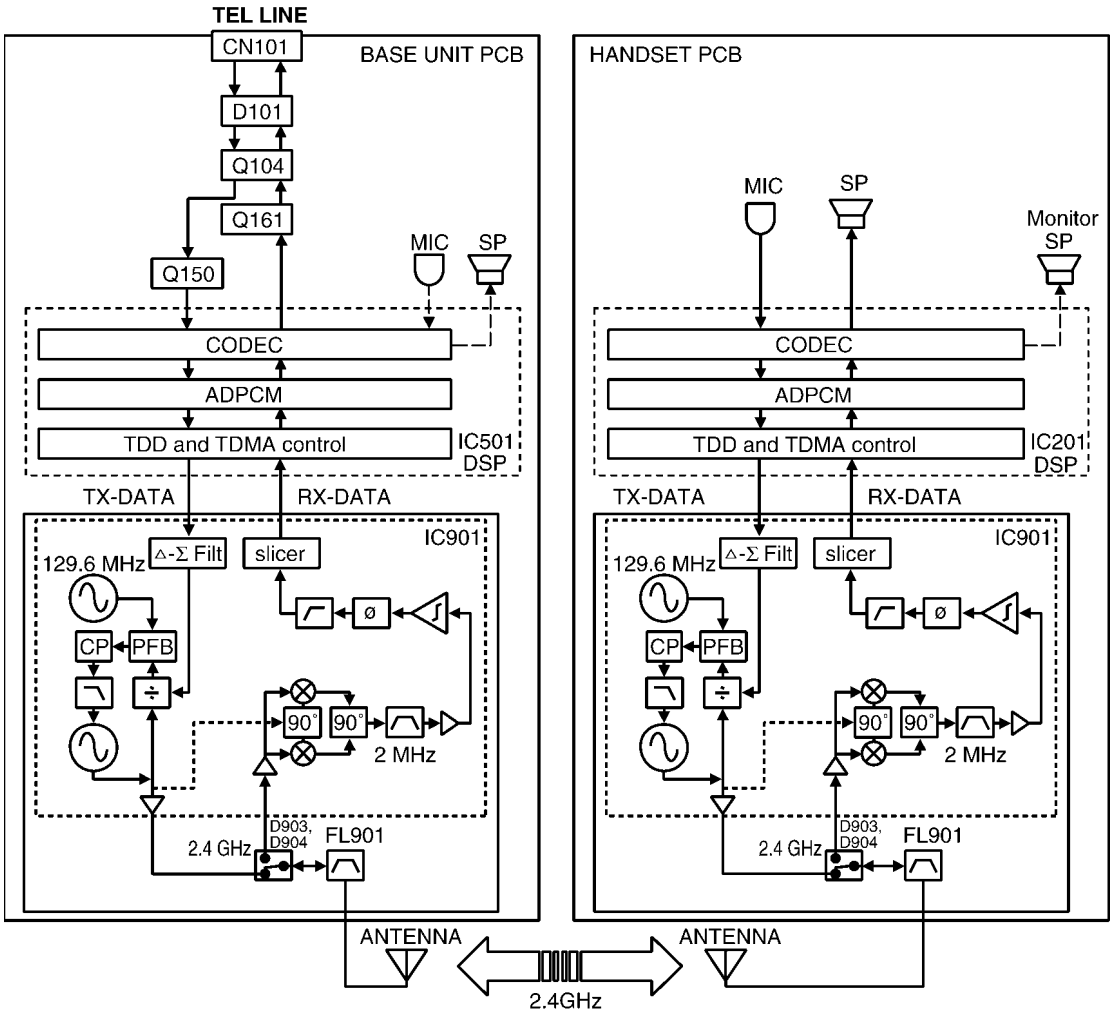
CN101 of the base unit is connected to the TEL line, and signal is entered through the bridge diode D101. While talking, the relay (Q104) is turned ON and amplified at the Q150, then led to DSP (IC501). The DSP encodes ADPCM and TDD/TDMA with FHSS to TX-DATA. The TX-DATA signal is entered to IC901 of RF UNIT, and modulated to 2.4GHz. The RF signal is fed into Tx/Rx switch (D904). The RF signal is passed through filter (FL901) and fed to ANTENNA.

As for the handset, RF signal from the antenna passes through filter (FL901), then is routed by Tx/Rx switch (D904) and led to IC901. The RF signal is amplified by LNA and down-converted to IF signal in IC901. The IF signal passing through internal filter is demodulated into RX-DATA, then enters DSP (IC201). The DSP performs TDD/TDMA and ADPCM decoding to convert the RX-DATA into the voice signal, then it is output to the speaker.

Transmission

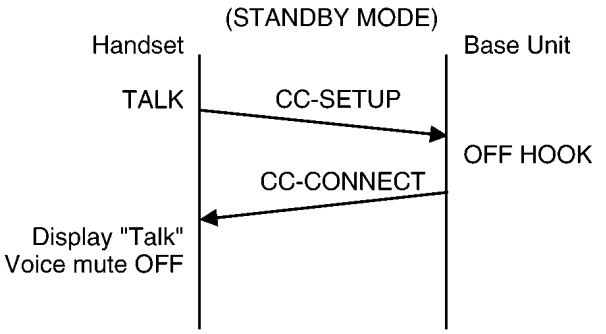
The voice signal entering from the microphone is led to DSP (IC201). The DSP encodes ADPCM and TDD/TDMA with FHSS to TX-DATA. The TX-DATA signal enters IC901 of RF UNIT, and is modulated to 2.4GHz. The RF signal is fed into Tx/Rx switch (D904). The RF signal is passed through filter (FL901) and fed to ANTENNA.

As for the base unit, RF signal from the antenna passes through filter (FL901), then is routed by Tx/Rx switch (D904) and led to IC901. The RF signal is amplified by LNA and down-converted to IF signal in IC901. The IF signal passing through internal filter is demodulated into, then enters DSP (IC201). The DSP performs TDD/TDMA and ADPCM decoding to convert the RX-DATA into the voice signal. The voice signal is amplified at the TX amplifier (Q161), then output to the TEL line CN101 through the relay (Q104) and bridge (D101).



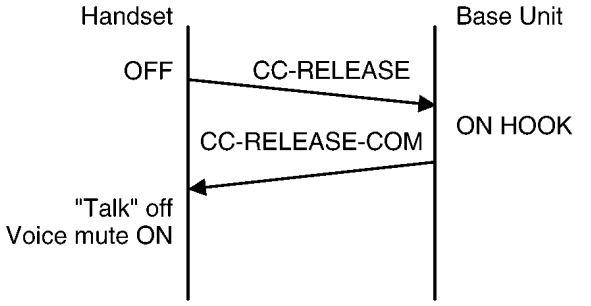
15 EXPLANATION OF LINK DATA COMMUNICATION

15.1. Calling



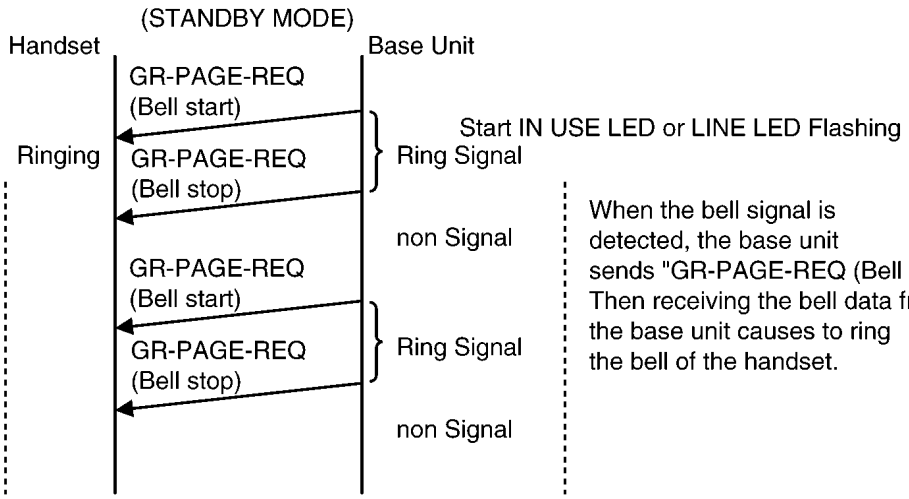
When calling, a communication request DATA (CC-SETUP) is transmitted from the Handset, and a permitting DATA (CC-CONNECT) is returned from the Base Unit to it. At that time the audio path opens.

15.2. To Terminate Communication



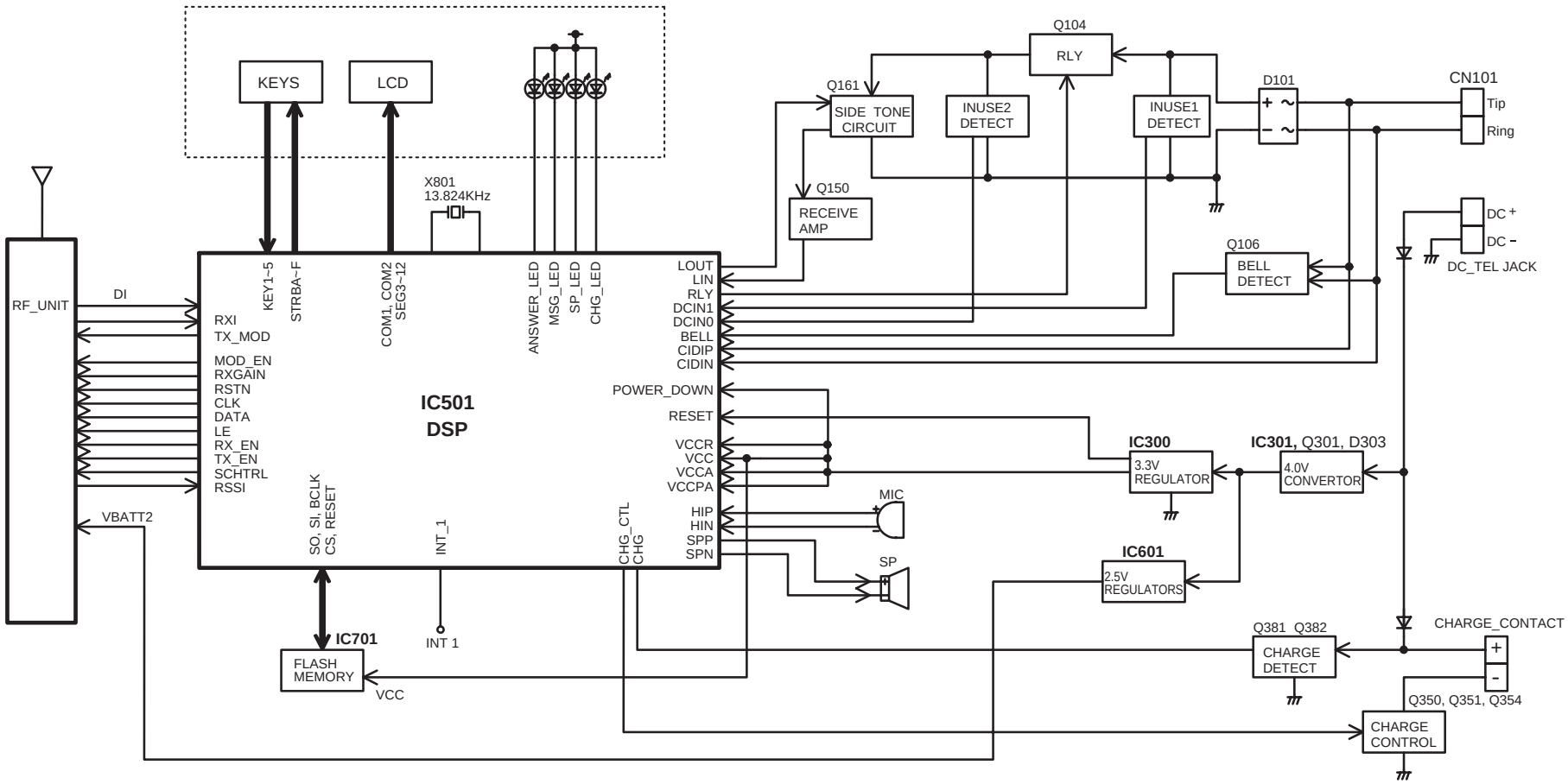
When the OFF button on the Handset is pressed during communication, a LINK terminating DATA (CC-RELEASE) is sent to terminate the communication. Then DATA (CC-RELEASE-COM) is returned from Base Unit.
Handset receives it and reset the link.

15.3. Ringing



When the bell signal is detected, the base unit sends "GR-PAGE-REQ (Bell start)". Then receiving the bell data from the base unit causes to ring the bell of the handset.

16 BLOCK DIAGRAM (Base Unit)



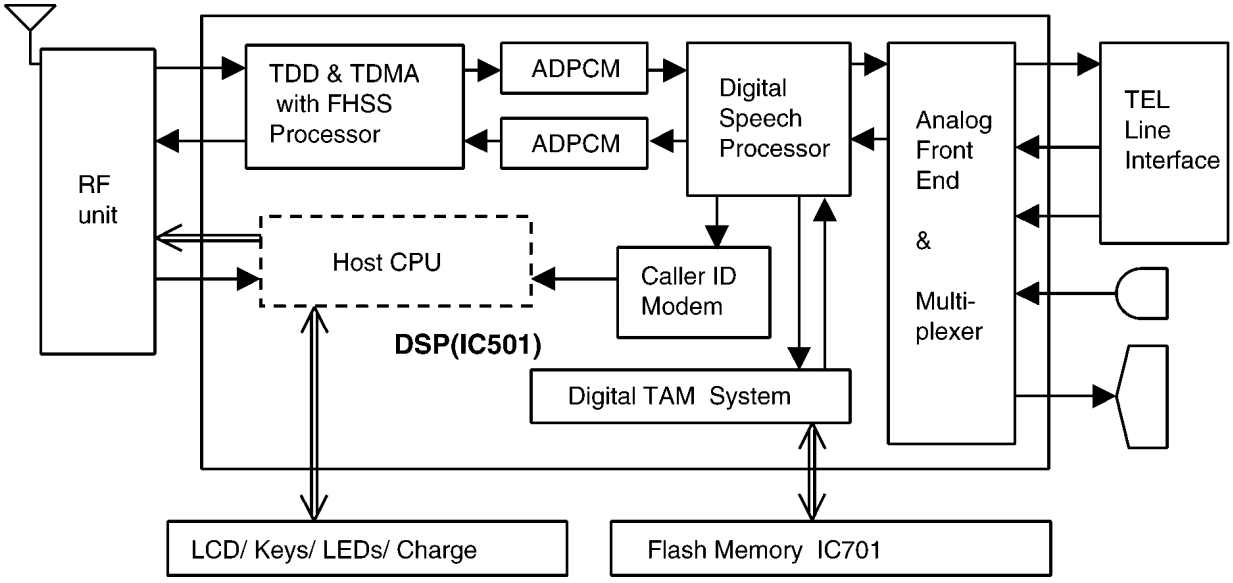
KX-TG2360JXS BLOCK DIAGRAM (Base Unit)

17 CIRCUIT OPERATION (Base Unit)

General Description:

(DSP, Flash Memory) is a digital speech/signal processing system that implements all the functions of speech compression, record and playback, and memory management required in a digital telephone answering machine.

The DSP system is fully controlled by a host processor DSP. The host processor provides activation and control of all that functions as follows.



17.1. DSP (Digital Speech/Signal Processing: IC501)

17.1.1. Function

- **Voice Message Recording/Play back**

The DSP system use a proprietary speech compression technique to record and store voice message in FLASH MEMORY. An error correction algorithm is used to enable playback of these messages from the FLASH MEMORY.

- **DTMF Detection/Generator**

The DTMF detection is implemented by the DSP system in software. The DTMF detection is performed during Record, Play back, and Line Monitoring modes of operation.

When the DTMF data from the Handset is received, the DTMF signal is output.

- **Synthesized Voice (Pre-recorded message)**

The DSP implements synthesized Voice, utilizing the built in speech detector and an FLASH MEMORY, which stored the vocabulary.

- **Caller ID and Call Waiting CID demodulation**

The DSP implements monitor and demodulate the FSK signals that provide CID information from the Central Office.

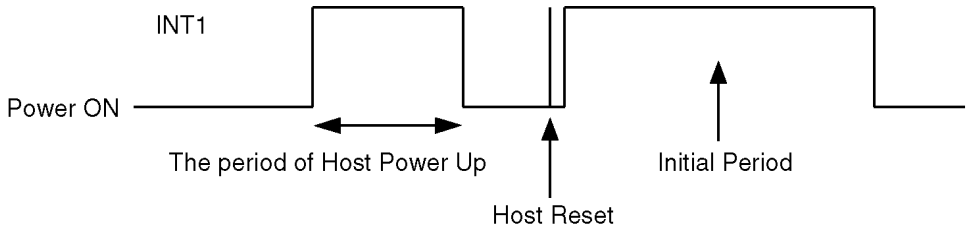
- **Analog Switching**

The voice signal from Handset is transmitted to the speaker or the voice signal from Digital TAM System is transmitted to the Telephone line, etc. They are determined by the signal path route operation of voice signal.

- **Block Interface Circuit**

RF unit, LED, Key scan, Speaker, Microphone, Telephone line, LCD.

17.1.2. The Meaning of the Motion of Pin 128



- **The period of Host Power Up (Hardware Initialization)**

  In this period, the host sets up some registers in order to wake up the system.

- **The period of Host Reset (Software Initialization)**

  In this period, the host reads the parameter from the memory and initializes module.

17.2. Flash Memory (IC701)

Following information data is stored.

- **Voice signal**

  ex: Pre-recorded Greeting message, Incoming message

- **Telephone number, etc.**

  ex: Telephone Directory number, Caller ID data, ID code

- **Settings**

  ex: message numbers, caller ID numbers, pulse tone dial

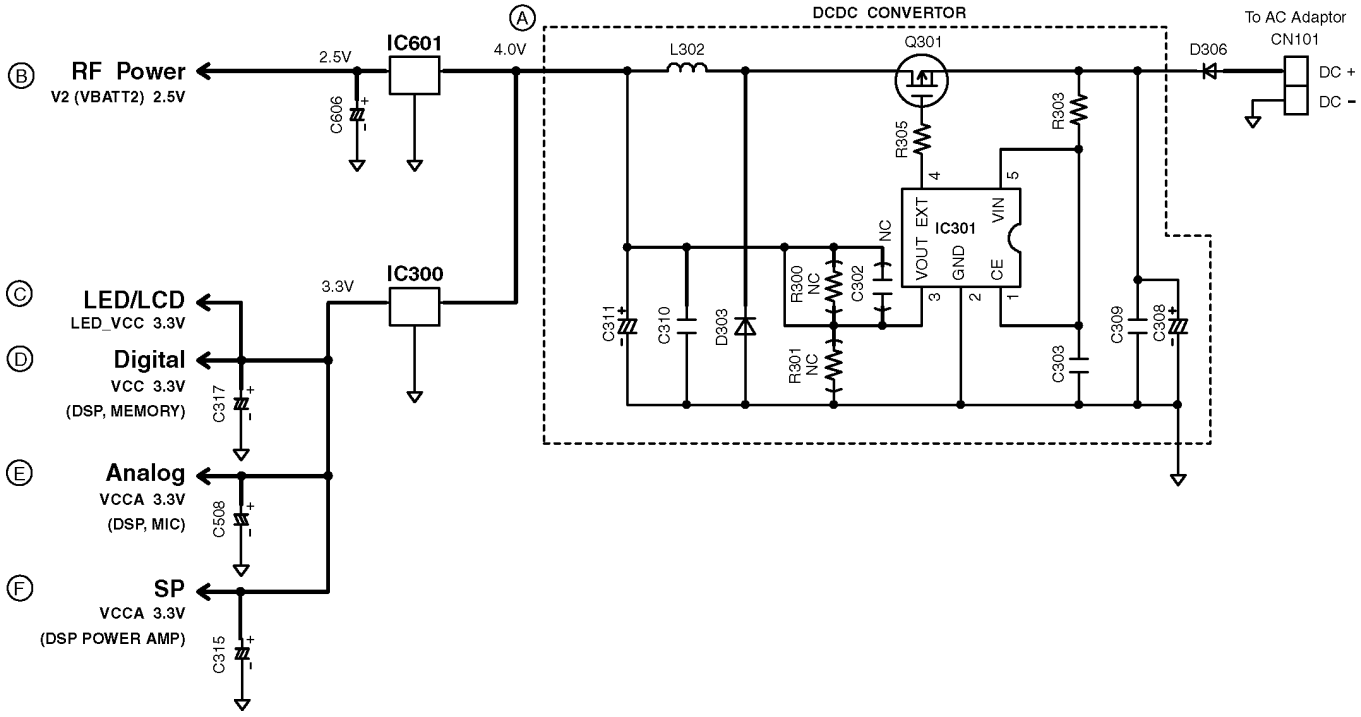
17.3. Power Supply Circuit

Function:

The power supply voltage from AC adaptor is converted to the desired voltage of each block.

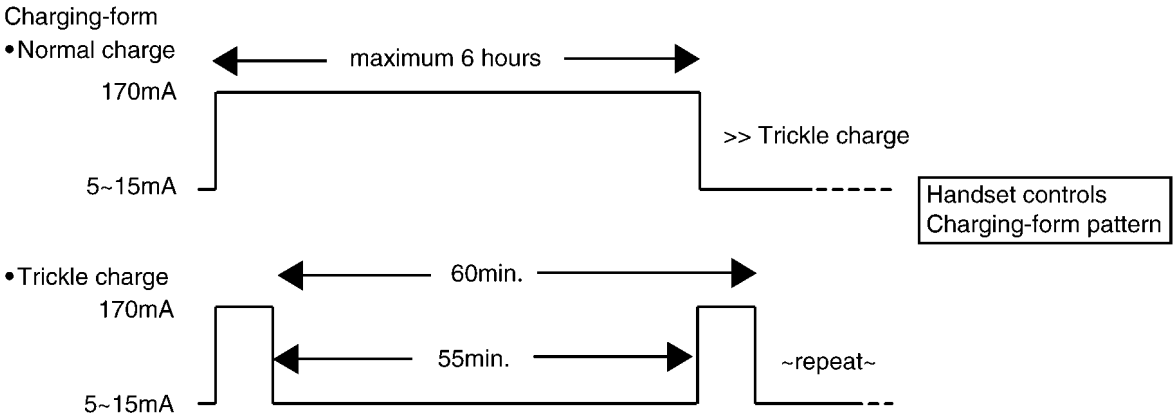
Circuit Operation:

- IC301, Q301 and D303: 4.0V DCDC Converter
- IC300: 3.3V Regulator
- IC601: 2.5V Regulator

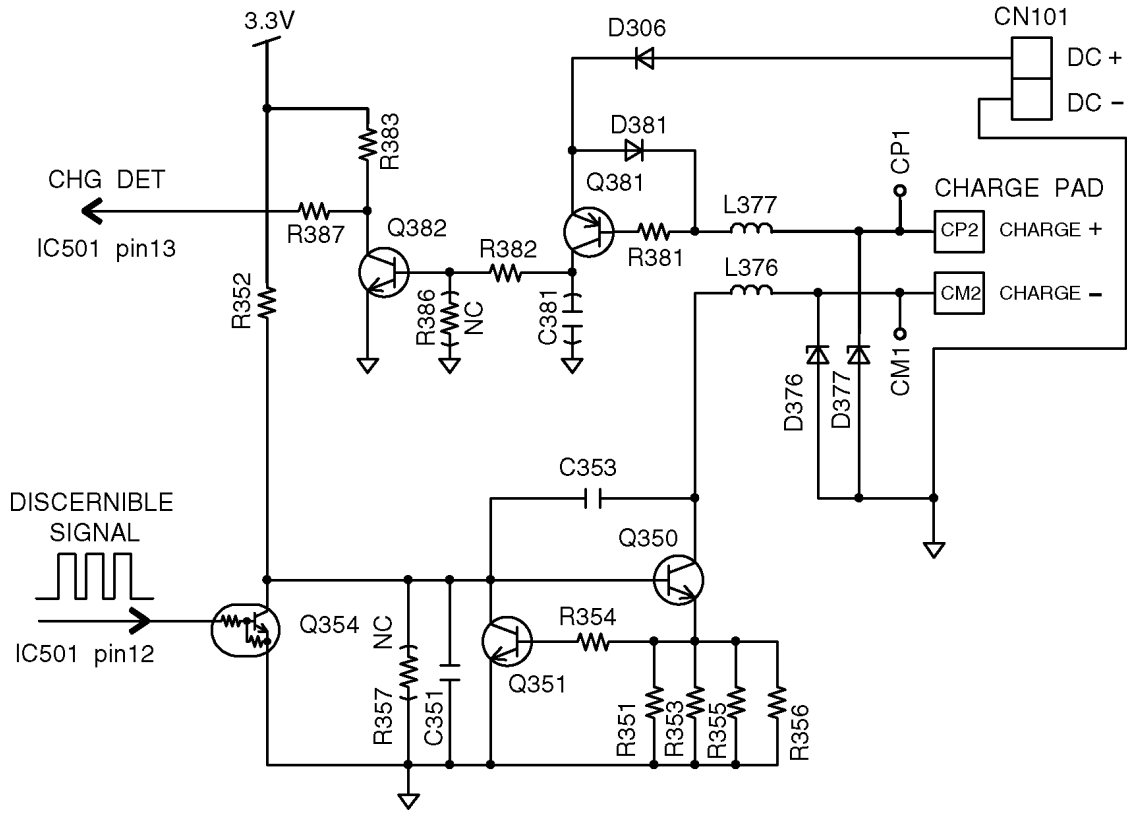


17.3.1. Charge Circuit

The voltage from the AC is supplied to the charge circuits. Normal charge of maximum 6-hours is started soon after the Handset is placed on the base unit. Then it changes to Trickle charge to prevent from overcharging.



Q381 and Q382 detect the ON-HOOK state (Handset is placed on base unit).



Q350 and Q351 control the charge current.

Q352 sends a signal to the handset for about 5 seconds soon after the handset is placed on the base unit.

This signal tells that the handset is been charging on the base unit or the optional charger.

When the signal is received: charging on the base unit

No signal: charging on the optional charger.

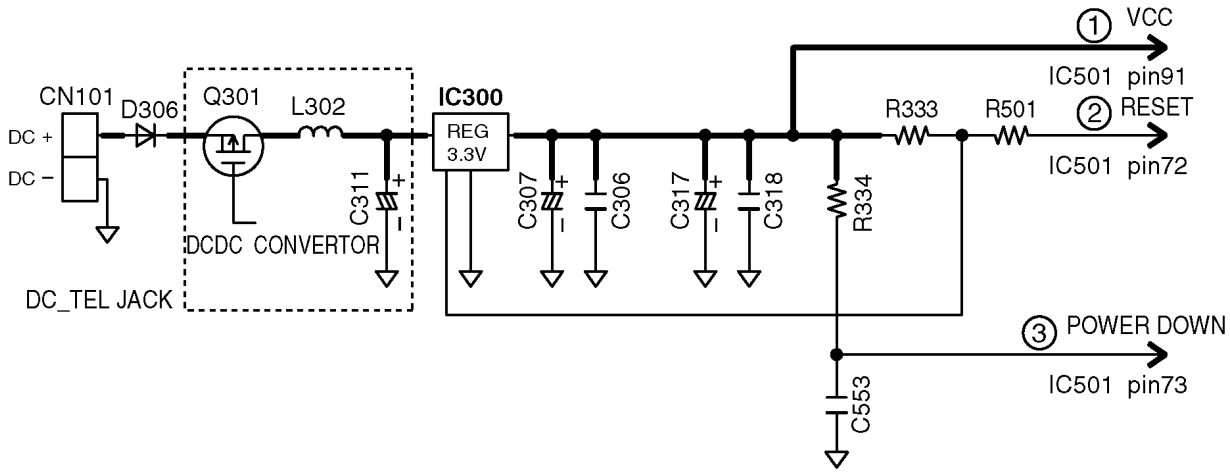
17.4. Reset Circuit

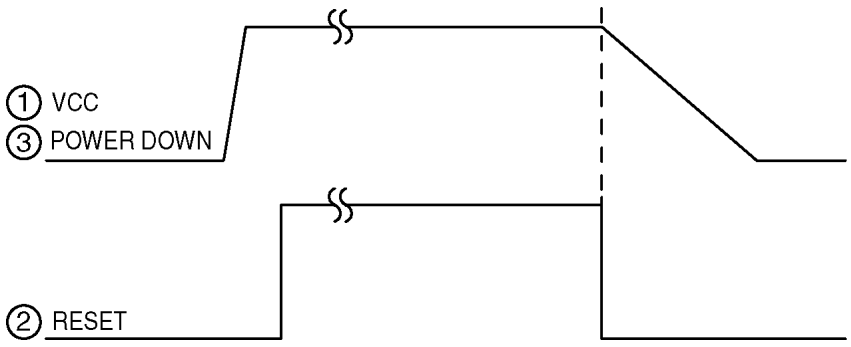
Function:

This circuit is used to initialize the microcomputer when it incorporates an AC adaptor.

Circuit Operation:

When the AC Adaptor is inserted into the unit, then the voltage is shifted by IC300 and power is supplied to the DSP. The set starts to operate when VCC goes up to 3.3V or more in the circuit voltage diagram.





17.5. Locator/Intercom Mode

1. Press the base LOCATOR/INTERCOM button, then a beep is output from pins 35 and 37 of IC501, and blinks on the SP-PHONE LED (LED 721) is caused by pin 15 of IC501.
2. At the same time, a beep is output from pin 35, pin 37 of IC501. This status is called “Intercom stand-by“.
3. Then press TALK button of the Handset, the status is changed to "Intercom mode".
4. The receiving signal flows:

   RF → pins 35 and 37 of IC501 → SP

   The transmission signal flows:

   MIC → C447, C448 → RA401 → pins 60 and 61 of IC501 → RF

17.6. Telephone Line Interface

Telephone Line Interface Circuit:

Function

- Bell signal detection
- ON/OFF hook and pulse dial circuit
- Side tone circuit

Bell signal detection and OFF HOOK circuit:

In the idle mode, Q104 is open to cut the DC loop current and decrease the ring load. When ring voltage appears at the Tip (T) and Ring (R) leads (When the telephone rings), the AC ring voltage is transferred as follows:

T → L101 → R130 → C116 → Q106 → DSP pin 3. [BELL]

When the CPU (DSP) detects a ring signal, Q104 turns on, thus providing an off-hook condition (active DC current flow through the circuit). Following signal flow is the DC current flow.

T → L101 → D101 → Q104 → Q161 → R164 → D161 → D101 → L102 → P101 → R

ON HOOK Circuit:

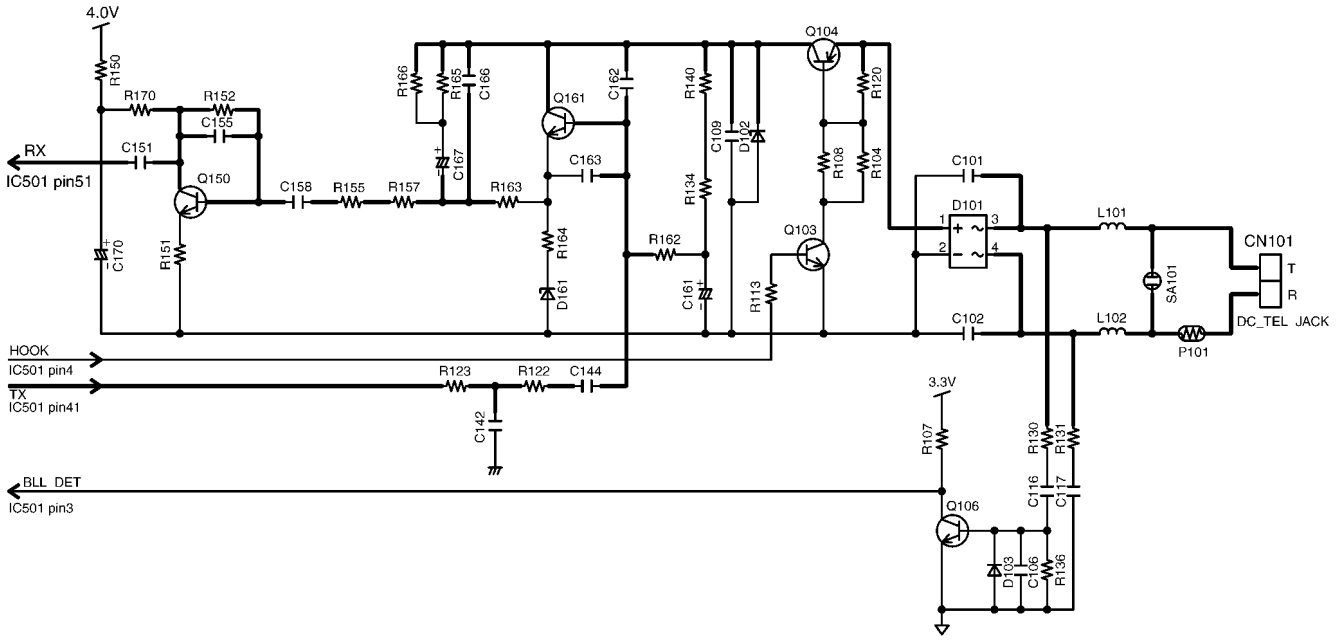
Q104 is open, Q104 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

Pulse Dial Circuit:

DSP pin 4 turns Q104 ON/OFF to make the pulse dialing.

Side Tone Circuit:

Basically this circuit prevents the TX signal from feeding back to RX signal.As for this unit, TX signal feed back from Q161 is canceled by the chancellor circuit of DSP.



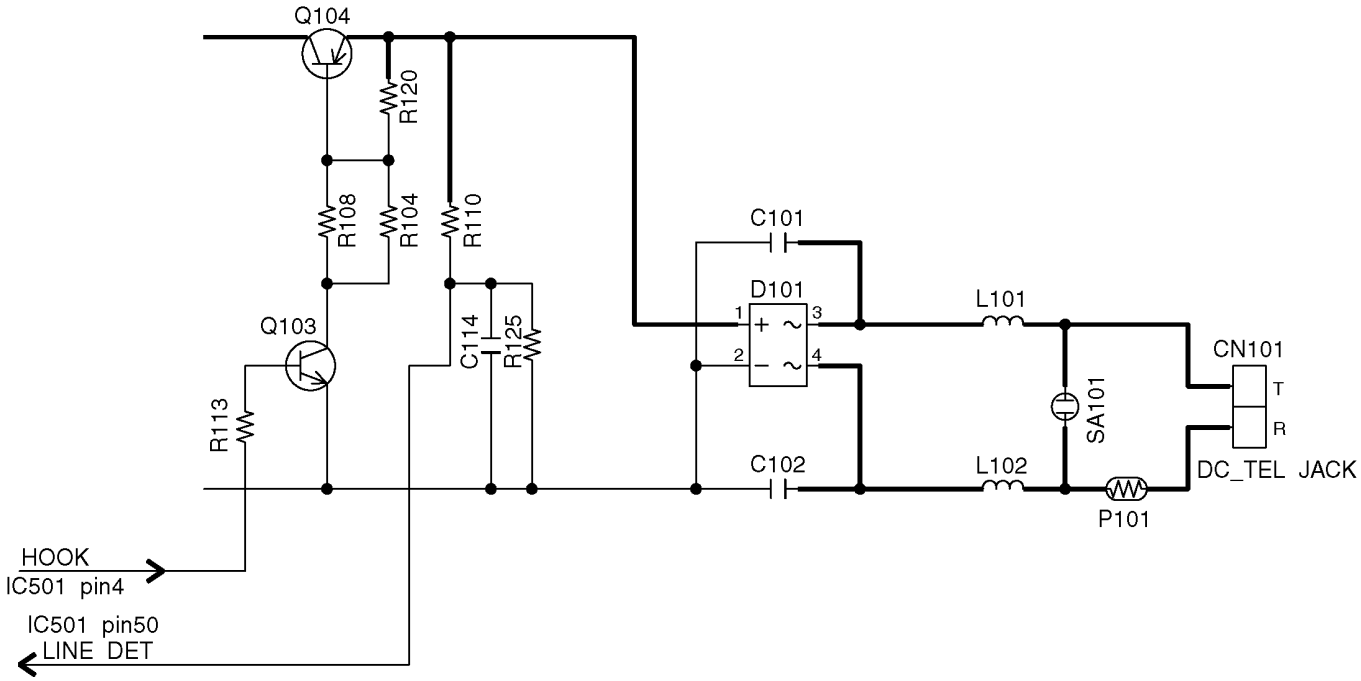
17.7. Auto Disconnect Circuit

Function:

This circuit is used to detect the fact that another telephone connected to the same line is OFF-HOOK while the unit is in a receiving status or OGM transmitting status.

Circuit Operation:

The voltage of pin50 of IC501 is monitored. If a parallel-connected telephone is put into OFF HOOK status, the presence/absence of a parallel connection is determined when the voltage changes by 0.2V or more.When the set detects the parallel-connected telephone is OFF HOOK status, the line is disconnected.



You can enable or disable the Auto Disconnect function.

See **Check Record** (P.45)

17.8. Parallel Connection Detect Circuit

Function:

In order to disable call waiting and stutter tone functions when using telephones connected in parallel, it is necessary to have a circuit that judges whether a telephone connected in parallel is in use or not. This circuit determines whether the telephone connected in parallel is on hook or off hook by detecting changes in the T/R voltage.

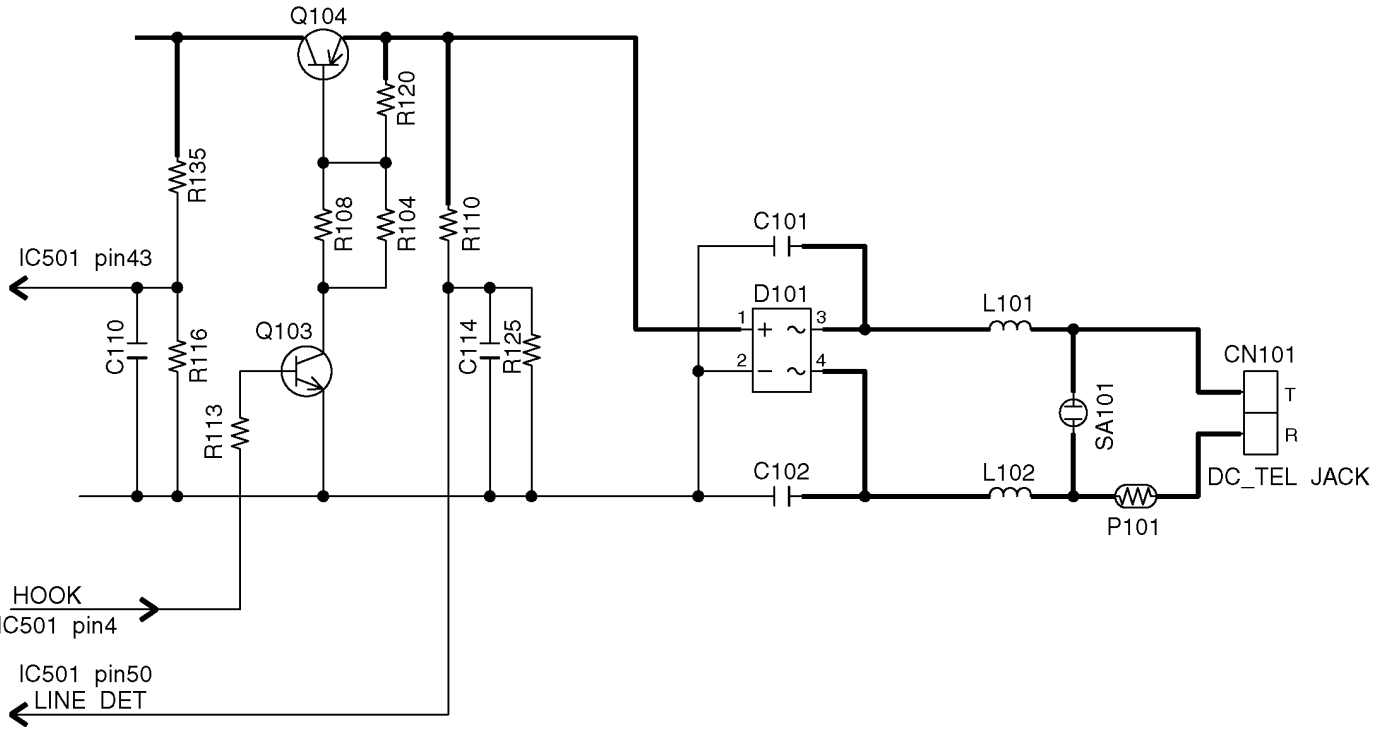
Circuit Operation:

Parallel connection detection when on hook:

When the set is on hook, the voltage is monitored at DSP (DCIN0). There is no parallel connection if the voltage is 2.50 V or higher, while a parallel connection is deemed to exist if the voltage is lower.

Parallel connection detection when off hook:

When the set is off hook, the voltage is monitored at DSP (DCIN1); the presence/absence of a parallel connection is determined when the voltage changes by 0.2 V or more.



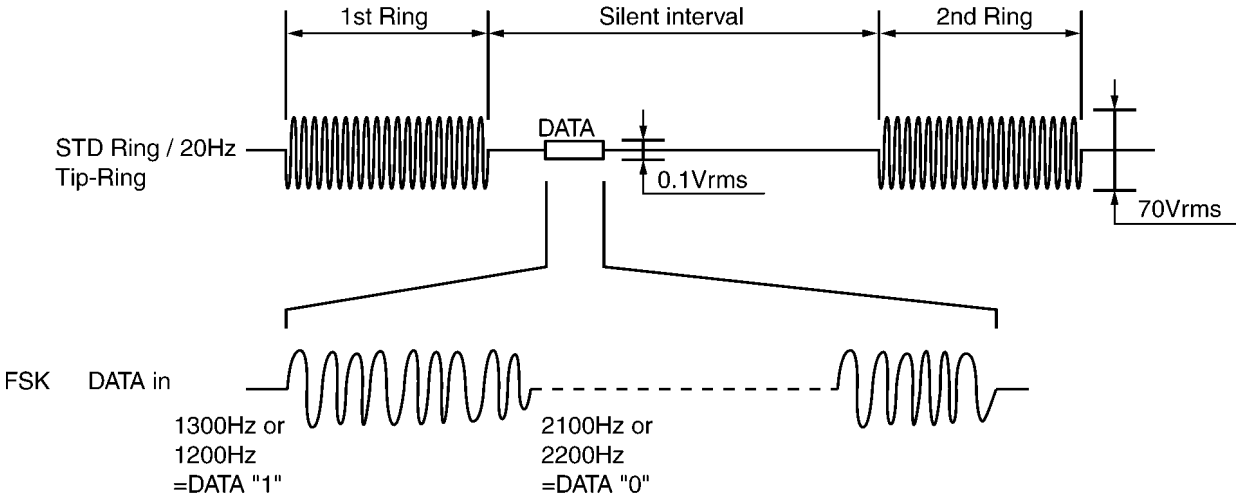
17.9. Calling Line Identification (Caller ID)

Function:

The caller ID is a chargeable ID which the user of a telephone circuit obtains by entering a contract with the telephone company to utilize a caller ID service. For this reason, the operation of this circuit assumes that a caller ID service contract has been entered for the circuit being used.

The Caller-ID data from exchange is supplied to the telephone using either method of FSK or DTMF. The method is chosen according to the exchange of telephone office. This unit is available to receive the data with both methods and displays the received data on LCD.

· FSK (Frequency Shift Keying) format

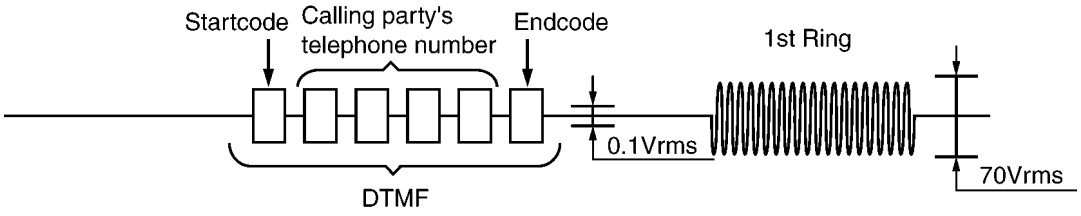


· DTMF format

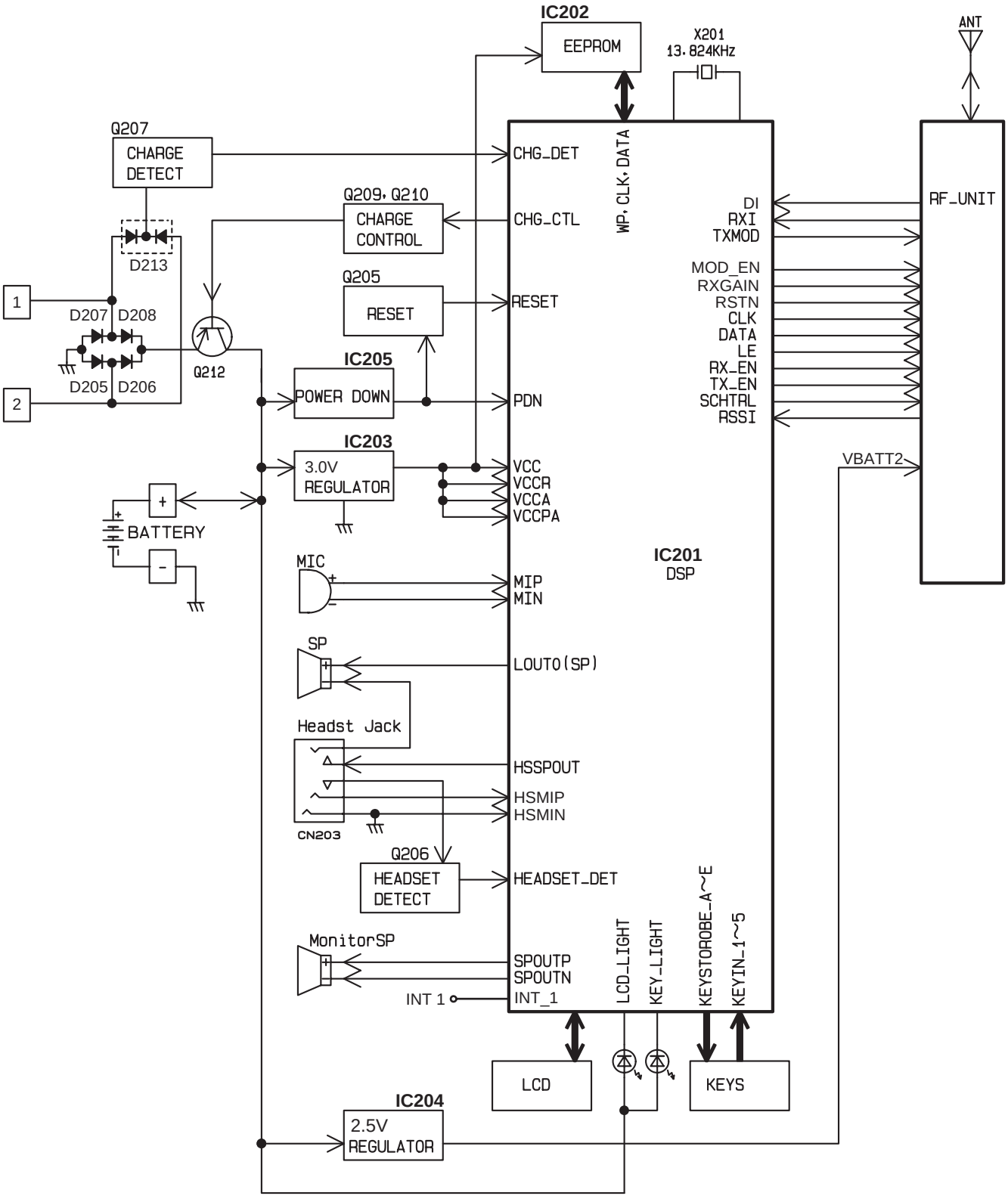
It is the method to send the telephone number of calling party with DTMF to the telephone. DTMF is sent before the first bell signal.

The data is sent in turn; first the start code, secondly the telephone number of calling party, lastly end code.

The DTMF is chosen from A (1633Hz and 697Hz), B (1633Hz and 770Hz), C (1633Hz and 852Hz) and D (1633Hz aand 941Hz) as the start code and end code acording to the exchange.



18 BLOCK DIAGRAM (Handset)



KX-TGA236JXS BLOCK DIAGRAM (Handset)

19 CIRCUIT OPERATION (Handset)

19.1. Construction

The circuit mainly consists of DSP and RF unit as shown in the block diagram.

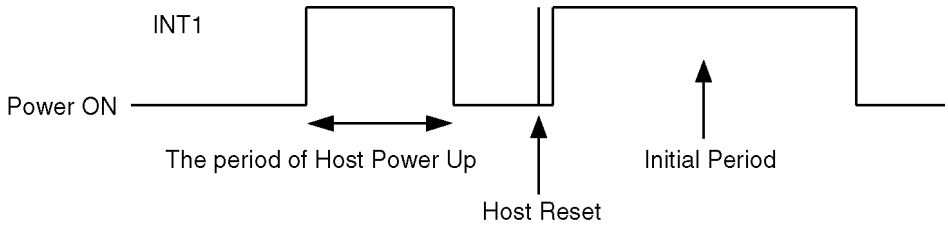
19.1.1. DSP:IC201

19.1.1.1. Function

- Battery Low, Power down defect circuit
- Ringer Generation
- Interface circuit

  RF unit, speaker, mic, LED, Key scan, LCD, Headset

19.1.1.2. The Meaning of the Motion of Pin 100



- **The period of Host Power Up (Hardware Initialization)**

  In this period, the host sets up some registers in order to wake up the system.
- **The period of Host Reset (Software Initialization)**

  In this period, the host reads the parameter from the memory and initializes module.

19.1.2. RF unit

Mainly voice signal is modulated to RF, or it goes the other way.

19.1.3. EEPROM: IC202

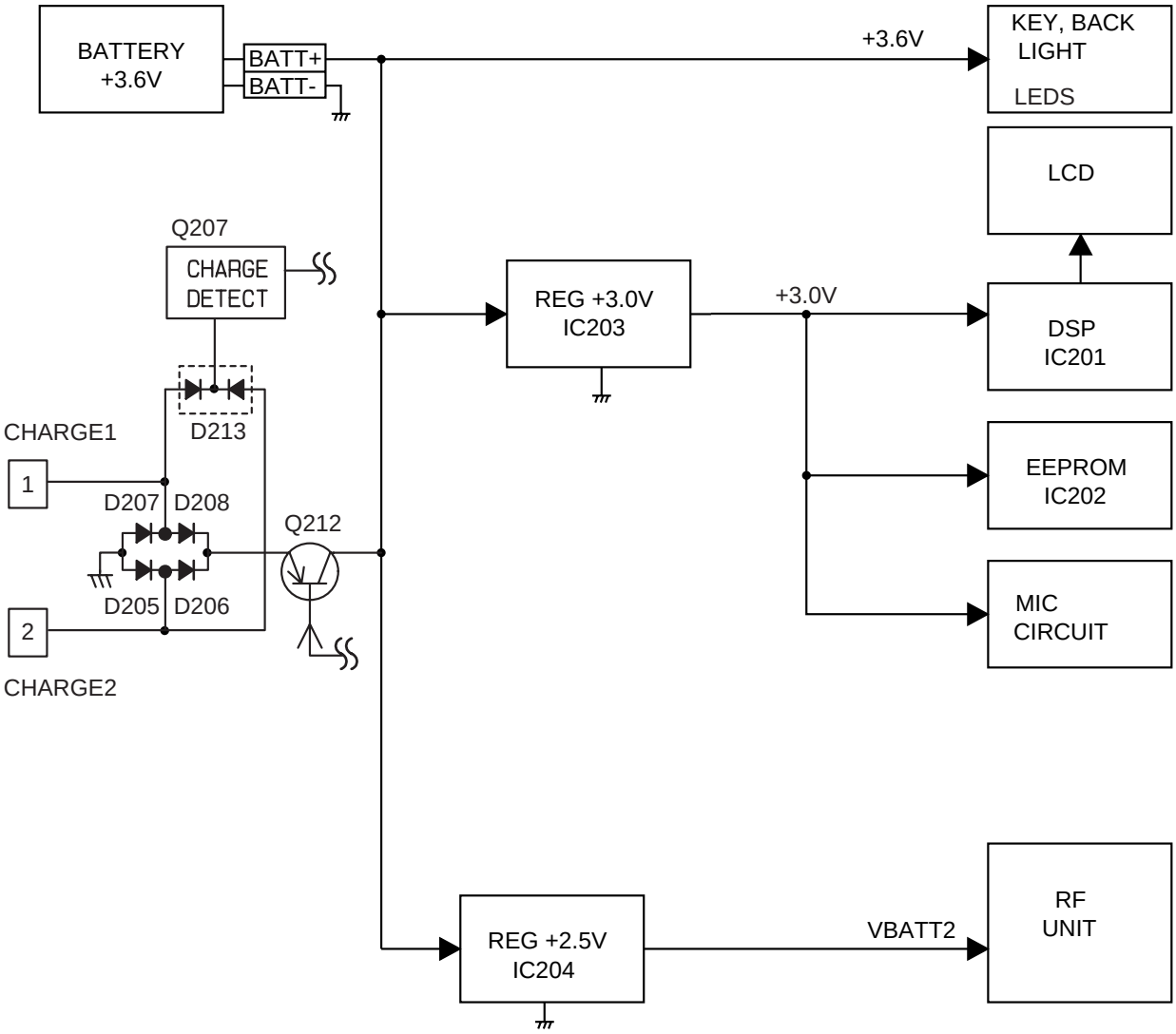
All setting data is stored.

ex: ID code, user setting (Flash Time, Tone/Pulse)

19.2. Power Supply Circuit

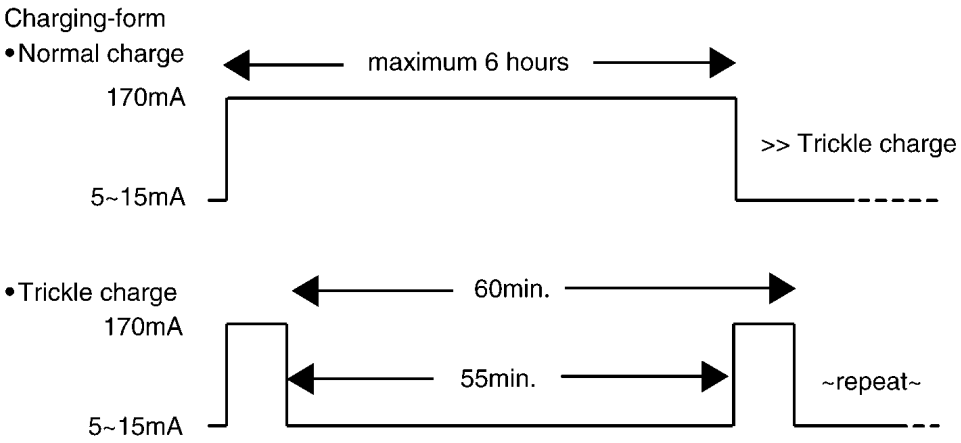
Voltage is supplied separately to each block.

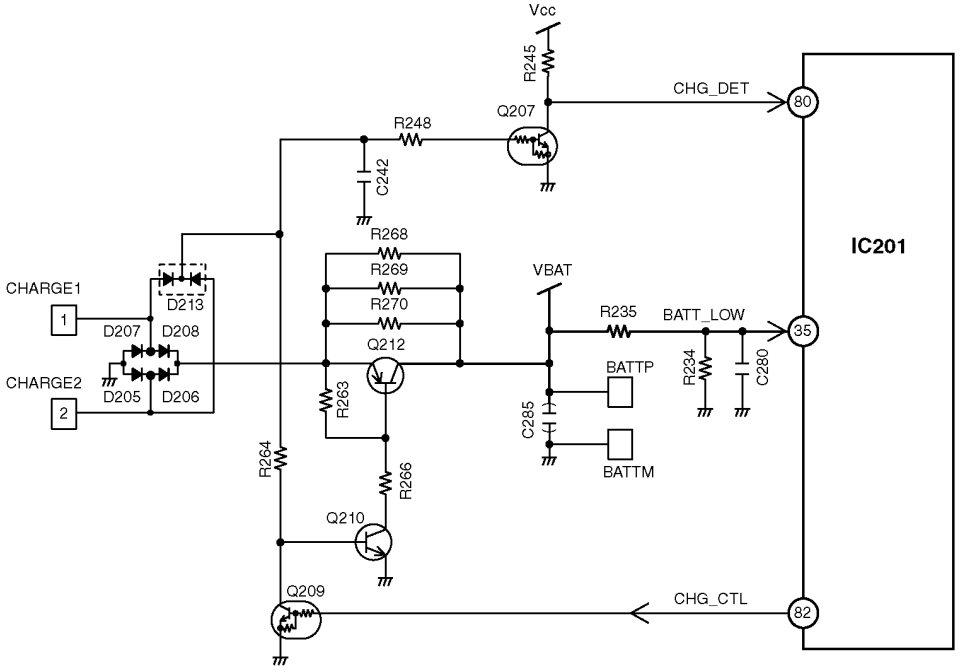
Block Diagram (Handset Power)



19.3. Charge Circuit

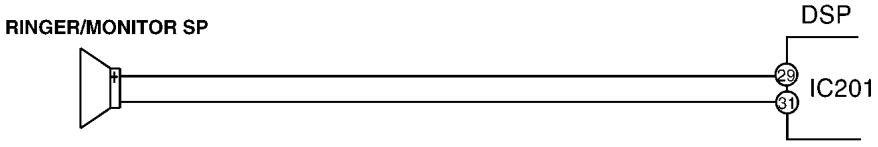
When the handset is put on the cradle of the Base unit or the optional charger, the power is supplied from CHARGE2 and CHARGE1 terminals to charge the battery via D205 (D207), R268, Q212. The voltage between CHARGE2 and CHARGE1 flows D213 -> R248 -> Q207 -> pin80 of IC201, where the charge is detected. Then IC201 calculates the battery consumption amount from the previous charge, and it controls Q212/Q210/Q209 by pin82 of IC201 until charging is complete. When charging is complete, the control pattern is switched to Trickle charging form from Normal charging form.





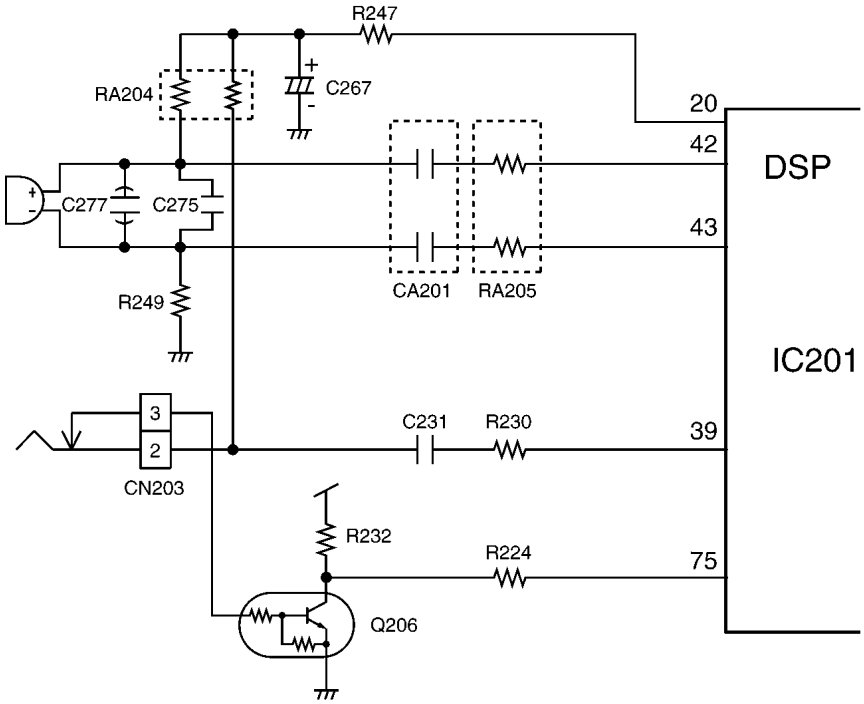
Pin 35 of IC201 monitors the battery voltage and detect BATT LOW at 3.50V.

19.4. Ringer and Handset SP-Phone



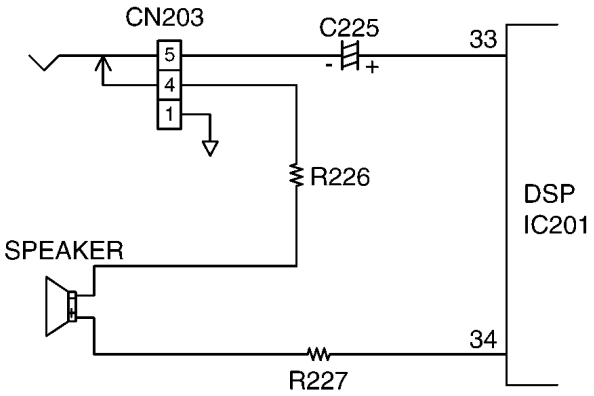
19.5. Sending Signal

The voice signal from the microphone input to DSP (42-43). CN203 is the headset jack. When the headphone is connected, the Q206 detect it. The input from the microphone of the handset (MIN, MIP) is cut and the microphone signal from the headset is input to DSP (39). Also the power for the microphone is supplied from DSP (20), and the power is turned OFF on standby.



19.6. Reception Signal

The voice signal from the base unit is output to DSP (33) (HSSPOUT). This signal is led to the headset jack (CN203).The signal through the headset jack and the other signal output from DSP (34) to drive the speaker. When the headset is inserted to the jack, the voice signal is cut at the jack, so the sound does not come out from the speaker, but from the headset only.



20 SIGNAL ROUTE

Each signal route is as follows.

SIGNAL ROUTE	IN → signal ROUTE → OUT
HANDSET TX	[HANDSET MIC - CA201 - RA205 - IC201 (43/42 - 57) - IC901 (27) ---] --- IC901 (16) - IC501 (84 - 41) - R123 - R122 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
HANDSET RX	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R157 - R155 - C158 - Q150 - C151 - R127 - IC501 (51 - 75) - IC901 (27) --- [--- IC901 (16) - IC201 (66 - 33/34) - C225 - L206 - HEADSET JACK (5 - 4) - R226/R227- HANDSET SPEAKER]
HEADSET TX	[HEADSET JACK (2) - L204 - C231 - R230 - IC201 (36 - 57) - IC901 (27) ---] --- IC901 (16) - IC501 (84 - 41) - R123 - R122 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
HEADSET RX	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R157 - R155 - C158 - Q150 - C151 - R127 - IC501 (51 - 75) - IC901 (27) --- [--- IC901 (16) - IC201 (66 - 33) - C225 - L206 - HEADSET JACK (5)]
SP-Phone TX	MIC - C447/C448 - RA401 - IC501 (60/61 - 41) - R123 - R122 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
SP-Phone RX	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R157 - R155- C158 - Q150 - C151 - R127 - IC501 (51 - 35/37) - L401/L402 - SPEAKER
HANDSET SP-Phone TX	[HANDSET MIC - CA201 - RA205 - IC201 (43/42 - 57) - IC901 (27) ---] --- IC901 (16) - IC501 (84 - 41) - R123 - R122 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
HANDSET SP-Phone RX	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R157 - R155 - C158 - Q150 - C151 - R127 - IC501 (51 - 75) - IC901 (27) --- [--- IC901 (16) - IC201 (66 - 29/31) - MONITOR SP]
INTERCOM HANDSET TO BASE UNIT	[HANDSET MIC - CA201 - RA205 - IC201 (43/42 - 57) - IC901 (27) ---] --- IC901 (16) - IC501 (84 - 35/37) - L401/L402 - SPEAKER
INTERCOM BASE UNIT TO HANDSET	MIC - C447/C448 - RA401 - IC501 (60/61 - 75) - IC901 (27) --- [--- IC901 (16) - IC201 (66 - 33/34) - C225 - L206 - HEADSET JACK (5 - 4) - R226/R227- HANDSET SPEAKER]
GREETING RECORDING	MIC - C447/C448 - RA401 - IC501 (60/61 - 77/78) - IC701
GREETING PLAY TO TEL LINE	IC701 - IC501 (77/78 - 41) - R123 - R122 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
ICM RECORDING	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R157 - R155 - C158 - Q150 - C151 - R127 - IC501 (51 - 77/78) - IC701
ICM PLAY TO SPEAKER	IC701 - IC501 (77/78 - 35/37) - L401/L402 - SPEAKER
DTMF SIGNAL TO TEL LINE	IC501 (41) - R123 - R122 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
DTMF DETECTION	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R157 - R155 - C158 - Q150 - C151 - R127 - IC501 (51)
CALLER ID	CN101 (TEL LINE) - L101/L102 - C111/112 - R114/115 - C120/121 - IC501 (57/58)
BELL DETECTION	CN101 (TEL LINE) - L101/L102 - R130/R131 - C116/C117 - Q106 - IC501 (3)

Note:

[ ]: inside of Handset

21 CPU DATA (Base Unit)

21.1. IC501

Pin	Description	I/O	High	High_Z	Low
1	INT0	D.O	--	--	--
2	NC	D.O	--	--	--
3	L1_BELL	D.I	OFF	--	ON
4	L1_RLY	D.O	Off Hook	--	On Hook
5	AC_DOWN_DET	D.I	High	--	Low
6	KEY_STB_F	D.O	Active	Not	--
7	KEY_STB_E	D.O	Active	Not	--
8	KEY_STB_D	D.O	Active	Not	--
9	KEY_STB_C	D.O	Active	Not	--
10	KEY_STB_B	D.O	Active	Not	--
11	KEY_STB_A	D.O	Active	Not	--
12	CHG_CTRL	D.O	NoCharge	--	Charge
13	CHG_DET	D.I	Off Charge	--	On Charge
14	CHG_LED	D.O	--	Off	On
15	SP_LED	D.O	--	Off	On
16	VCC	VCC	VCC	--	--
17	GND	GND	--	--	GND
18	NC	D.O	--	--	--
19	NC	D.O	--	--	--
20	NC	D.O	--	--	--
21	KEY_IN5	D.I	Non	--	Key In
22	KEY_IN4	D.I	Non	--	Key In
23	KEY_IN3	D.I	Non	--	Key In
24	KEY_IN2	D.I	Non	--	Key In
25	KEY_IN1	D.I	Non	--	Key In
26	NC	D.O	--	--	--
27	NC	D.O	--	--	--
28	NC	D.O	--	--	--
29	SERIAL_DATA	D.O	High	--	Low
30	SERIAL_LE	D.O	Not	--	Active
31	SERIAL_CLK	D.O	High	--	Low
32	SERIAL_IO	D.O	High	--	Low
33	NC	D.O	--	--	--
34		GND			
35		A.O			
36		GND			
37		A.O			
38		VCC			
39	HSSPOUT	A.O			
40	LOUT0	A.O			
41	LOUT1	A.O			
42	VREFO	A.O			
43	DCIN0	A.I			
44	LIN0	A.I			
45	LGS0	A.I			
46	CIDO0	A.I			
47	CIDIN0	A.I			
48	CIDIP0	A.I			
49	VCCA	VCC			
50	DCIN1	A.I			
51	LIN1	A.I			
52	LGS1	A.I			
53	CIDO1	A.I			
54	CIDIN1	A.I			
55	CIDIP1	A.I			
56	GNDA	GND			
57	HSMIP	A.I			
58	HSMIN	A.I			
59	VREF	A.O			
60	MIN	A.I			
61	MIP	A.I			
62	GNDR	GND			

Pin	Description	I/O	High	High_Z	Low
63	TXMOD	A.O			
64	VREFR	A.O			
65	RSSI	A.I			
66	VCCR	VCC			
67	GNDPLL	GND			
68	VCCPLL	VCC			
69	XOUT	A.O			
70	XIN	A.I			
71	GND	GND			
72	Reset	D.I	Normal	--	Reset
73	Power Down	D.I	Normal	--	Power Down
74	FLASH_RST	*	High	Middle	Low
75	TX_OUT	D.O	High	--	Low
76	MOD_EN	D.O	Active	--	Not
77	FLASH_SO	*	High	Middle	Low
78	FLASH_SI	*	High	Middle	Low
79	FLASH_CS	*	High	Middle	Low
80	NC	D.O	--	--	--
81	RXEN	D.O	Active	--	Off
82	TXEN	D.O	Active	--	Off
83	RXGAIN	D.O	High	--	Low
84	RXI	D.I	High	--	Low
85	INUSE_LED	D.O	--	Off	On
86	ANS_LED	D.O	--	Off	On
87	MSG/VM_LED	D.O	--	Off	On
88	RF_RST	D.O	Normal	--	WakeUp
89	RADIO_EN	D.O	Active	--	Not
90	GND	GND	--	--	GND
91	VCC	VCC	VCC	--	--
92	NC	D.O	--	--	--
93	NC	D.O	--	--	--
94	NC	D.O	--	--	--
95	SHCTRL	D.O	Active	--	Not
96	NC	D.O	--	--	--
97	NC	D.O	--	--	--
98	TCK	D.O	--	--	--
99	TMS	D.O	--	--	--
100	TDI	D.I	--	--	--
101	TDO	D.O	--	--	--
102	NC	D.O	--	--	--
103	NC	D.O	--	--	--
104	NC	D.O	--	--	--
105	NC	D.I	--	--	--
106	GND	GND	--	--	GND
107	VCC	VCC	VCC	--	--
108	SEG12	D.O	High	--	Low
109	SEG11	D.O	High	--	Low
110	SEG10	D.O	High	--	Low
111	SEG9	D.O	High	--	Low
112	SEG8	D.O	High	--	Low
113	SEG7	D.O	High	--	Low
114	SEG6	D.O	High	--	Low
115	SEG5	D.O	High	--	Low
116	SEG4	D.O	High	--	Low
117	SEG3	D.O	High	--	Low
118	COM2	D.O	High	Middle	Low
119	COM1	D.O	High	Middle	Low
120	UART_TX	D.O	High	--	Low
121	UART_RX	D.I	High	--	Low
122	NC	D.O	--	--	--
123	WDT CTL	D.O	--	Normal	Low
124	GND	GND	--	--	GND

Pin	Description	I/O	High	High_Z	Low
125	VCC	VCC	VCC	--	--
126	NC	D.O	--	--	--
127	FLASH_SCK	*	High	Middle	Low
128	WDT CLK	D.O	High	--	Low

Note:

- The mark "*" in the I/O column means the port is controlled by the firmware.
- Data in the blank columns are omitted because of the Analog I/O.

22 CPU DATA (Handset)

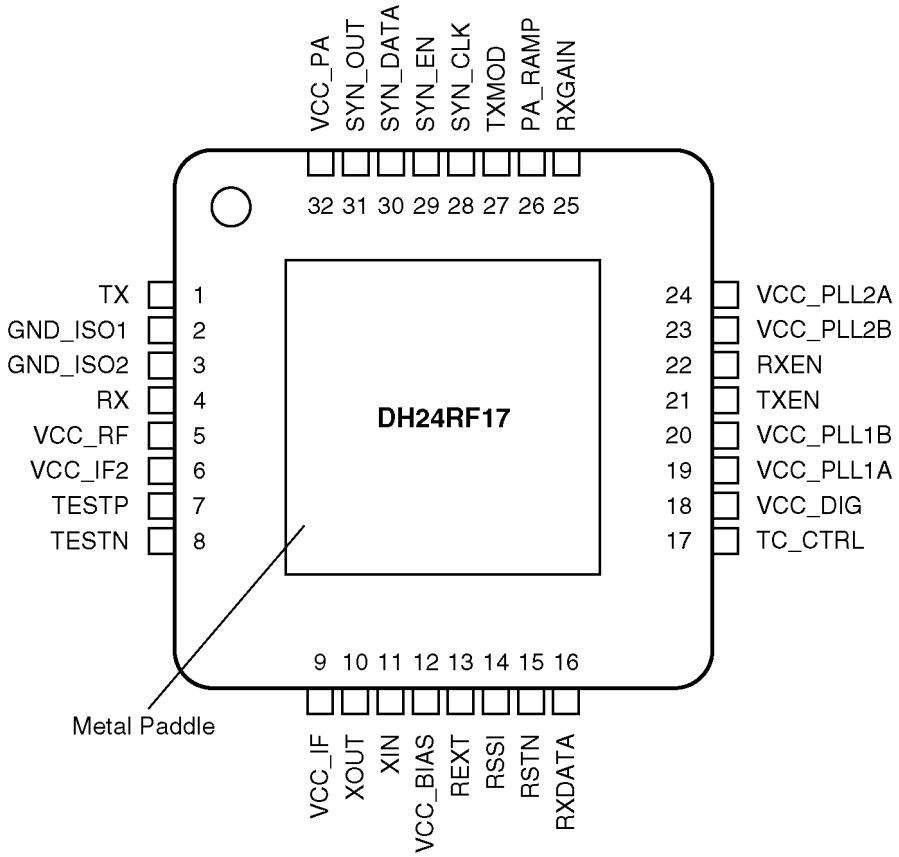
22.1. IC201

Pin	Description	I/O	High	High_Z	Low
1	NC	D.O	--	--	Normal
2	NC	D.O	--	--	Normal
3	DOT_LCD_RS	D.O	Data	--	Instruct
4	DOT_LCD_RW_WR	D.O	Read	--	Write
5	DOT_LCD_E_RD	D.O	Active	--	Not
6	DOT_LCD_D4	D.O	High	--	Low
7	DOT_LCD_D5	D.O	High	--	Low
8	DOT_LCD_D6	D.O	High	--	Low
9	DOT_LCD_D7	D.O	High	--	Low
10	DOT_LCD_POWER_SW	D.O	on	--	off
11	DOT_LCD_RESET	D.O	Normal	--	Reset
12	NC	D.O	--	--	Normal
13	MIPS_CHANGE	D.I	73MIPS	--	65MIPS
14	VCC	VCC	VCC	--	--
15	GND	GND	--	--	GND
16	EEPROM_DATA	D.I.O	High	--	Low
17	EEPROM_CLK	D.O	High	--	Low
18	EEPROM_WP	D.O	WP	--	Write
19	ANT_LED	D.O	Off	--	On
20	MIC POWER SW	D.O	Bias on	--	Bias off
21	UART_TX	D.O	High	--	Low
22	UART_RX	D.I	High	--	Low
23	SERIAL_DATA	D.O	High	--	Low
24	SERIAL_LE	D.O	High	--	Low
25	SERIAL_CLK	D.O	High	--	Low
26	SERIAL DI	D.I	High	--	Low
27	eeprom det	D.O	64K	--	16K
28	GND	GND	--	--	GND
29	SPOUTP	A.O	--	--	--
30	GNDPA	GND	--	--	GND
31	SPOUTN	A.O	--	--	--
32	VCCPA	VCC	VCC	--	--
33	HSSPOUT	A.O	--	--	--
34	LOUT0	A.O	--	--	--
35	DCIN0	A.I	--	--	--
36	LIN0	A.I	--	--	--
37	VCCA	VCC	VCC	--	--
38	GNDA	GND	--	--	GND
39	HSMIP	A.I	--	--	--
40	HSMIN	A.I	--	--	--
41	VREF	A.O	--	--	--
42	MIN	A.I	--	--	--
43	MIP	A.I	--	--	--
44	GNDR	GND	--	--	GND
45	TXMOD	A.O	--	--	--
46	VREFR	A.O	--	--	--
47	RSSI	A.I	--	--	--
48	VCCR	VCC	VCC	--	--
49	GNDPLL	GND	--	--	GND
50	VCCPLL	VCC	VCC	--	--

Pin	Description	I/O	High	High_Z	Low
51	XOUT	A.O	--	--	--
52	XIN	A.I	--	--	--
53	GND	GND	--	--	GND
54	RESET	D.I	Normal	--	Reset
55	PDN	D.I	Power On	--	Power Down
56	(FLASH_RESET)	D.O	--	--	Normal
57	TX OUT	D.O	High	--	Low
58	MOD_EN	D.O	On	--	Off
59	(FLASH_SO)	D.O	--	--	Normal
60	(FLASH_SI)	D.O	High	--	Low
61	(FLASH_CS)	D.O	--	--	Normal
62	OSC_Buf	D.O	--	--	--
63	RXEN	D.O	Active	--	Off
64	TXEN	D.O	Active	--	Off
65	RXGAIN	D.O	High	--	Low
66	RXI	D.I	--	--	--
67	VE_LED(NC)	D.O	--	Off	On
68	Talk_LED(NC)	D.O	--	Off	On
69	RECHARGE_LED(NC)	D.O	--	Off	On
70	LED(NC)	D.O	--	--	Normal
71	nc	D.0	On	--	Off
72	GND	GND	--	--	GND
73	VCC	VCC	VCC	--	--
74	SHCTRL	D.O	On	--	Off
75	HEADSET_DET	D.I	Headset In	--	Non
76	TEST_CLK	D.I	--	--	--
77	TEST_MODE_SELECT	D.I	--	--	--
78	TEST_DATA_IN	D.I	--	--	--
79	TEST_DATA_OUT	D.O	--	--	--
80	CHARGE_DET	D.I	Off Charge	--	On Charge
81	RF_RESET	D.0	Normal	--	Reset
82	CHARGE_CNT	D.O	Trickle	--	Normal
83	KEYIN5	D.I	Non	--	Key In
84	KEYIN4	D.I	Non	--	Key In
85	KEYIN3	D.I	Non	--	Key In
86	KEYIN2	D.I	Non	--	Key In
87	KEYIN1	D.I	Non	--	Key In
88	LIGHTED	D.O	On	--	Off
89	LCD_BACK_LIGHT	D.O	On	--	Off
90	KEYSTROBE_F	D.O	--	Not	Active
91	KEYSTROBE_E	D.O	--	Not	Active
92	KEYSTROBE_D	D.O	--	Not	Active
93	KEYSTROBE_C	D.O	--	Not	Active
94	KEYSTROBE_B	D.O	--	Not	Active
95	KEYSTROBE_A	D.0	--	Not	Active
96	GND	GND	--	--	GND
97	VCC	VCC	VCC	--	--
98	NC	D.I.O	High	--	Low
99	(FLASH_SCK)	D.O	High	--	Low
100	NC	D.O	--	--	Normal

23 EXPLANATION OF IC TERMINALS (RF Unit)

23.1. IC901



Pin	Description	I/O
1	TX	O & VCC
2	GND_ISO1	GND
3	GND_ISO2	GND
4	RX	I
5	VCC_RF	VCC
6	VCC_IF2	VCC
7	TESTP	O
8	TESTN	O
9	VCC_IF	VCC
10	XOUT	XI/XO
11	XIN	XI/XO
12	VCC_BIAS	VCC
13	REXT	I
14	RSSI	O
15	RSTN	I
16	RXDATA	O
17	TC_CTRL	I

Pin	Description	I/O
18	VCC_DIG	VCC
19	VCC_PLL1A	VCC
20	VCC_PLL1B	VCC
21	TXEN	I
22	RXEN	I
23	VCC_PLL2B	VCC
24	VCC_PLL2A	VCC
25	RXGAIN	I
26	PA_RAMP	I
27	TXMOD	I
28	SYN_CLK	I
29	SYN_EN	I
30	SYN_DATA	I
31	SYN_OUT	O
32	VCC_PA	VCC
PKG	PADDLE_GND	GND

24 HOW TO REPLACE A FLAT PACKAGE IC

24.1. Preparation

- PbF (: Pb free) Solder
- Soldering Iron

  Tip Temperature of 700°F ± 20°F (370°C ± 10°C)

  Note: We recommend a 30 to 40 Watt soldering iron. An expert may be able to use a 60 to 80 Watt iron where someone with less experience could overheat and damage the PCB foil.
- Flux

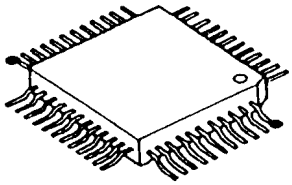
  Recommended Flux: Specific Gravity → 0.82.

  Type → RMA (lower residue, non-cleaning type)

  Note: See **ABOUT LEAD FREE SOLDER (PbF: Pb free)** (P.4).

24.2. Procedure

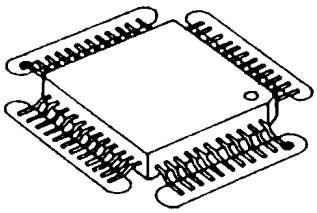
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.



● – – – – – –Temporary soldering point.

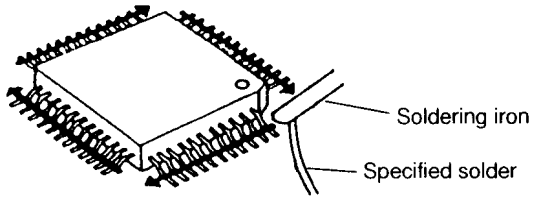
Be certain each pin is located over the correct pad on the PCB.

2. Apply flux to all of the pins on the IC.



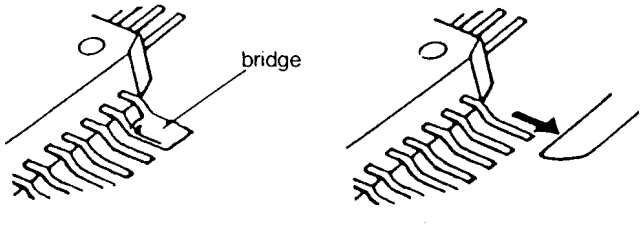
– – – – – Flux

3. Being careful to not unsolder the tack points, slide the soldering iron along the tips of the pins while feeding enough solder to the tip so that it flows under the pins as they are heated.

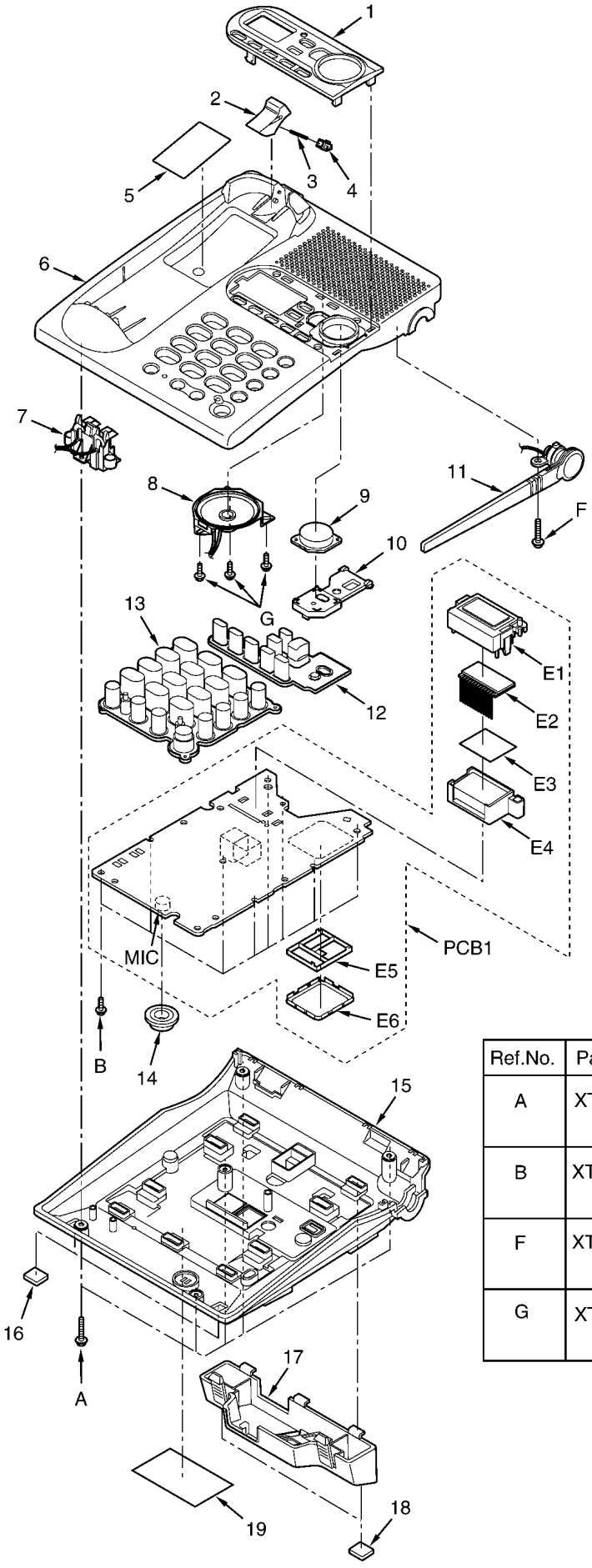


24.3. Removing Solder from Between Pins

1. Add a small amount of solder to the bridged pins.
2. With a hot iron, use a sweeping motion along the flat part of the pin to draw the solder from between the adjacent pads.

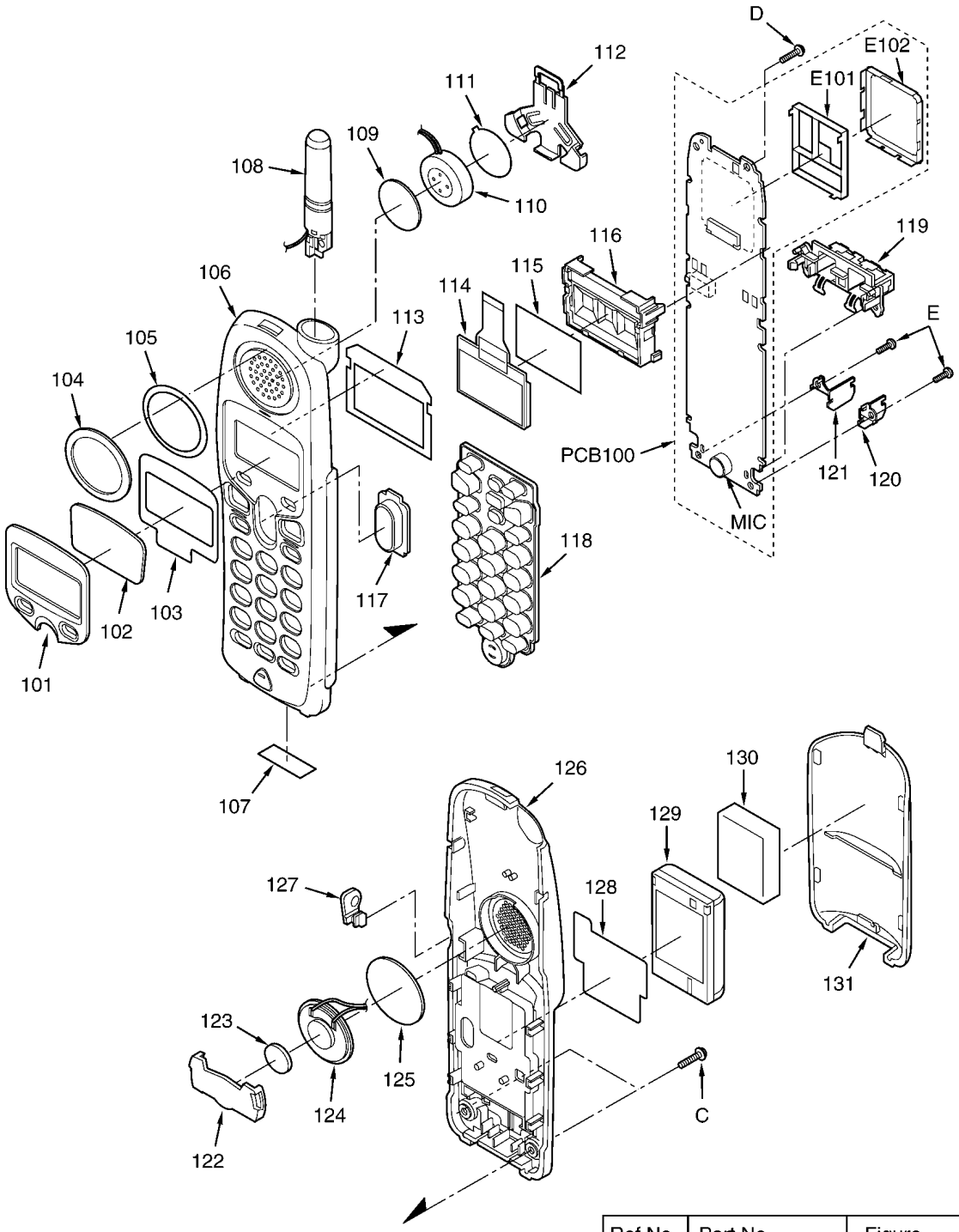


25 CABINET AND ELECTRICAL PARTS (Base Unit)



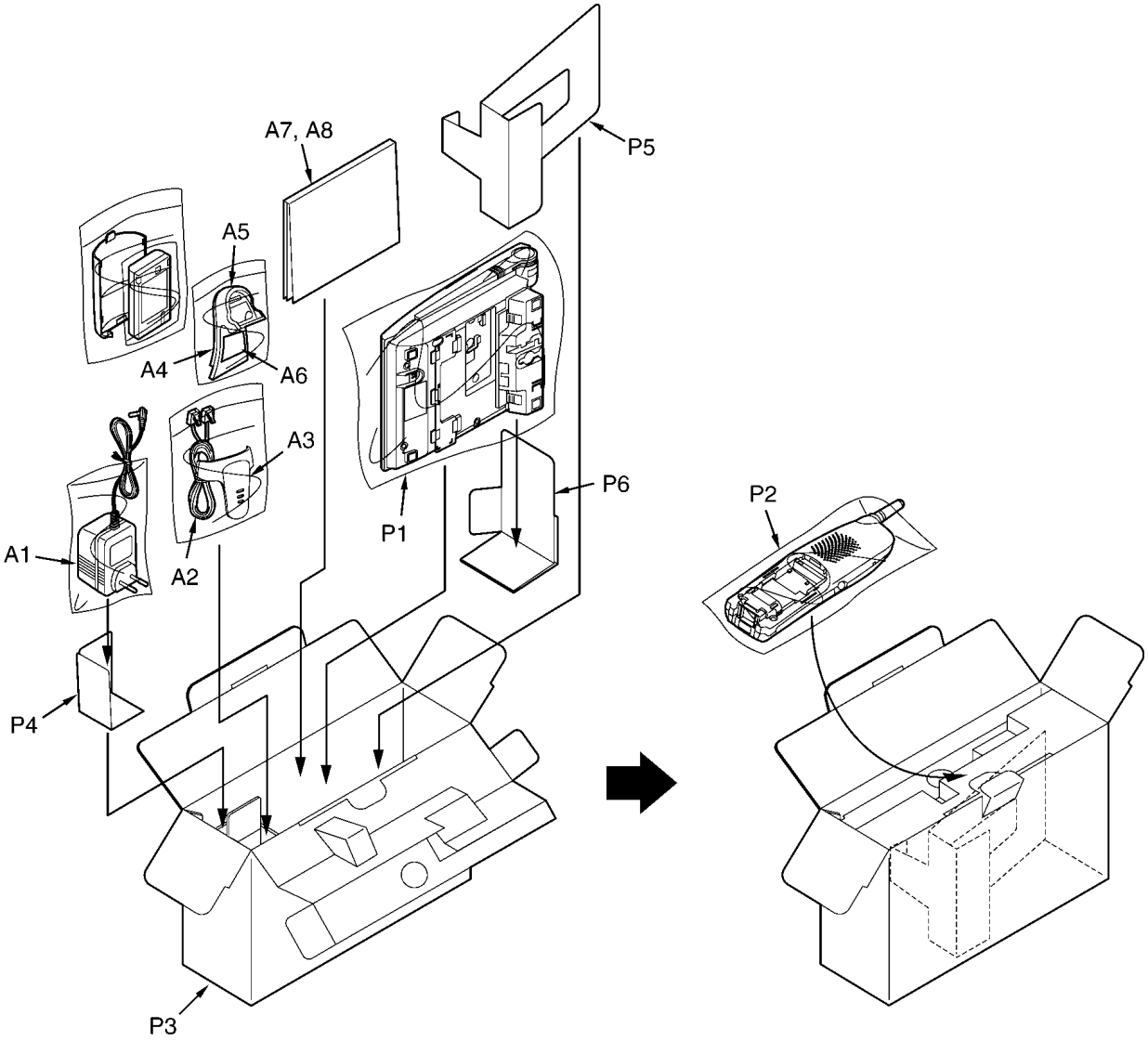
Ref.No.	Part No.	Figure
A	XTW26+14P	ϕ2.6 × 14mm
B	XTW26+8P	ϕ2.6 × 8mm
F	XTW26+14P	ϕ2.6 × 14mm
G	XTW26+8P	ϕ2.6 × 8mm

26 CABINET AND ELECTRICAL PARTS (Handset)



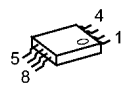
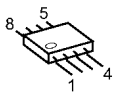
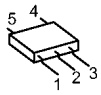
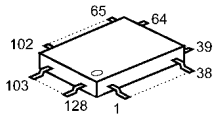
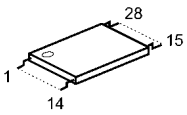
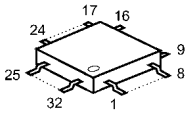
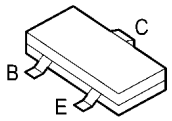
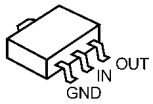
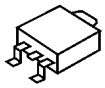
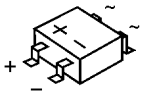
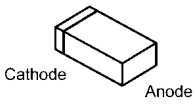
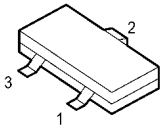
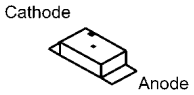
Ref.No.	Part No.	Figure
C	XTW26+12P	ϕ2.6 × 12mm
D	XTW26+12P	ϕ2.6 × 12mm
E	XTB26+9J	ϕ2.6 × 9mm

27 ACCESSORIES AND PACKING MATERIALS

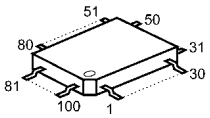
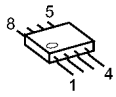
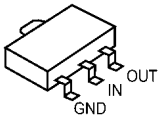
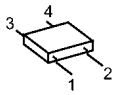
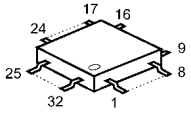
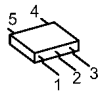
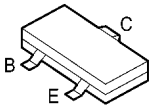
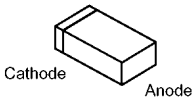
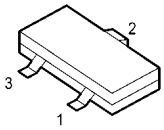
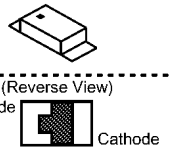
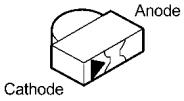


28 TERMINAL GUIDE OF THE IC´S, TRANSISTORS AND DIODES

28.1. Base Unit

 PQVINJM2904V	 C0DBFGD00017 C0CBAAD00054	 C0DBAGZ00023	 C2HBBL000006	 PQWIG2358BXH
 C1CB00001657	 2SB1218A, UN5213 B1DHCD000016, 2SC39300CL 2SD1819A		 B1BBAP000011 B1ADGP000001 2SD0874AS	 2SD1758Q
 PQVDMD5S	 PQVDRLZ2R0 PQVDRLZ20A	 MA111, MA8220 B0DCCD000011 B0JCME000035 B0ECKM000008	 MA147	 PQVDSML210L

28.2. Handset

 C2HBBK000037	 PQWIG2358BXR	 C0CBABD00019 C0CBAAD00018	 PQVIC61CN32N	 C1CB00001657
 PSVTUMG11NTR	 2SB1197KQ, 2SC39300CL 2SD1819A, PQVTDTC123JU PQVTDTC143E, UN521		 B0JCMD000010 B0DCCD000011 MA8047 MA111	 MA132WK
 PQVDSML310MT	 B3AAB0000170			

29 REPLACEMENT PARTS LIST

Note:

1. RTL (Retention Time Limited)

   The marking (RTL) indicates that the Retention Time is limited for this item.

   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.

2. Important safety notice

   Components identified by the ⚠ ; mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture´s parts.

3. The S mark means the part is one of some identical parts. For that reason, it may be different from the installed part.

4. ISO code (Example: ABS-94HB) of the remarks column shows quality of the material and a flame resisting grade about plastics.

5. RESISTORS & CAPACITORS

   Unless otherwise specified;

   All resistors are in ohms (Ω) K=1000Ω, M=1000kΩ

   All capacitors are in MICRO FARADS (µF) P=µµF

   *Type & Wattage of Resistor

Type

ERC:Solid ERDS:Carbon ERJ:Chip	ERX:Metal Film ERG:Metal Oxide ER0:Metal Film	PQ4R:Chip ERS:Fusible Resistor ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage Of Capacitor

Type

ECFD:Semi-Conductor ECQS:Styrol ECUV,PQCUV,ECUE:Chip ECQMS:Mica	ECCD,ECKD,ECBT,F1K,ECUV:Ceramic ECQE,ECQV,ECQG:Polyester ECEA,ECST,EEE:Electlytic ECQP:Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H:50V 2A:100V 2E:250V 2H:500V	05:50V 1:100V 2:200V	0F:3.15V 1A:10V 1V:35V 0J:6.3V	0J :6.3V 1A :10V 1C :16V 1E,25:25V	1V :35V 50,1H:50V 1J :16V 2A :100V

29.1. Base Unit

29.1.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQGG10250Y1	GRILLE, TAM	ABS-HB
2	PQKE10131Z7	HANGER, HOOK LEVER	PC+ABS-HB
3	PQUS10285Z	SPRING, HOOK	
4	PQKE10134Z1	HANGER, HOOK KNOB	POM-HB
5	PQQT22706Z	LABEL, CHARGE	
6	PQKM10624T1	CABINET BODY	PS-HB
7	PQWE10027Z	BATTERY TERMINAL	
8	PQAS5P13Y	SPEAKER	
9	PQBC10404Z1	BUTTON, MESSAGE	AS-HB
10	PQHR11030Z	GUIDE, LED	ABS-HB
11	PQSA10098U	ANTENNA	
12	PQSX10258Z	KEYBOARD SWITCH, TAM	
13	PQSX10261V	KEYBOARD SWITCH, DIAL	
14	PQMG10025Z	RUBBER PARTS, MIC	
15	PQKF10611Y1	CABINET COVER	PS-HB
16	PQHA10018Z	RUBBER PARTS, FOOT CUSHION	
17	PQKL10061Z1	STAND, WALL MOUNT	PS-HB
18	PQHA10017Z	RUBBER PARTS, LEG CUSHION	
19	PQGT17060Z	NAME PLATE	

29.1.2. Main P.C. Board Parts

Note:

(*1) When you have replaced IC501 or IC701, adjust X801. refer to **Check and Adjustment X801 (Base Unit) Frequency** (P.61)

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWPG2358BXH	MAIN P.C.BOARD ASS´Y (RTL)	
		(ICs)	
IC201	PQVINJM2904V	IC	S
IC300	C0DBFGD00017	IC	
IC301	C0DBAGZ00023	IC	
IC501	C2HBBL000006	IC (*1)	
IC601	C0CBAAD00054	IC	
IC701	PQWIG2358BXH	IC (*1)	
IC901	C1CB00001657	IC	
		(TRANSISTORS)	
Q103	B1BBAP000011	TRANSISTOR(SI)	S
Q104	B1ADGP000001	TRANSISTOR(SI)	S
Q106	2SD1819A	TRANSISTOR(SI)	
Q150	2SD1819A	TRANSISTOR(SI)	
Q161	2SD0874AS	TRANSISTOR(SI)	
Q201	2SD1819A	TRANSISTOR(SI)	
Q202	UN5213	TRANSISTOR(SI)	S
Q301	B1DHCD000016	TRANSISTOR(SI)	
Q350	2SD1758Q	TRANSISTOR(SI)	S
Q351	2SD1819A	TRANSISTOR(SI)	
Q354	UN5213	TRANSISTOR(SI)	S
Q381	2SB1218A	TRANSISTOR(SI)	
Q382	2SD1819A	TRANSISTOR(SI)	
Q570	2SD1819A	TRANSISTOR(SI)	
Q800	2SC39300CL	TRANSISTOR(SI)	
		(DIODES)	
D101	PQVDMD5S	DIODE(SI)	
D102	PQVDRLZ20A	DIODE(SI)	S
D103	MA111	DIODE(SI)	S
D161	PQVDRLZ2R0	DIODE(SI)	S
D303	B0JCME000035	DIODE(SI)	
D306	B0JCME000035	DIODE(SI)	
D376	MA8220	DIODE(SI)	S
D377	MA8220	DIODE(SI)	S
D381	B0ECKM000008	DIODE(SI)	
D903	B0DCCD000011	DIODE(SI)	
D904	B0DCCD000011	DIODE(SI)	
DA101	MA147	DIODE(SI)	S
LED720	PQVDSML210L	LED	S
LED721	PQVDSML210L	LED	S
LED723	PQVDSML210L	LED	S
LED724	PQVDSML210L	LED	S
		(COILS)	
L101	PQLQXF330K	COIL	S
L102	PQLQXF330K	COIL	S
L302	G1C220M00037	COIL	
L376	G1C6R8MA0072	COIL	
L377	G1C6R8MA0072	COIL	
L401	G1C6R8MA0072	COIL	
L402	G1C6R8MA0072	COIL	
L501	PQLQR2KA213	COIL	S

Ref. No.	Part No.	Part Name & Description	Remarks
L901	MQLRE18NJF	COIL	
L903	MQLRF4N7DF2	COIL	
L904	MQLRE22NJF	COIL	
L905	MQLRF10NJF	COIL	
L909	MQLRF3N3DF2	COIL	
L911	MQLRF2N2DF2	COIL	
L913	MQLRF10NJF	COIL	
L990	PQLQR4D1R0K	COIL	S
R903	MQLRE10NJF	COIL	
		(COMPONENTS PARTS)	
RA401	D1H42222A006	RESISTOR ARRAY	
RA501	EXRV8V472JV	RESISTOR ARRAY	
RA705	EXRV8V104JV	RESISTOR ARRAY	
RA901	D1H810240004	RESISTOR ARRAY	
		(VARISTORS)	
SA101	PQVDDSS301L	VARISTOR (SURGE ABSORBER)	S
SA102	PQVDDSS301L	VARISTOR (SURGE ABSORBER)	S
		(RESISTORS)	
R104	ERJ3GEYJ103	10K	
R105	ERJ2GEJ102	1K	
R107	ERJ3GEYJ473	47K	
R108	ERJ3GEYJ103	10K	
R110	ERJ3GEYJ106	10M	
R112	ERJ3GEYJ102	1K	
R113	ERJ3GEYJ473	47K	
R114	ERJ3GEYJ394	390K	
R115	ERJ3GEYJ394	390K	
R116	ERJ3GEYJ335	3.3M	
R120	ERJ3GEYJ104	100K	
R122	ERJ2GEJ333	33K	
R125	ERJ3GEYJ105	1M	
R127	ERJ2GEJ102	1K	
R130	ERJ3GEYJ104	100K	
R131	ERJ3GEYJ104	100K	
R135	ERJ3GEYJ106	10M	
R136	ERJ3GEYJ472	4.7K	
R140	ERJ3GEYJ102	1K	
R150	ERJ2GEJ101	100	
R151	ERJ2GEJ5R6	5.6	
R152	ERJ2GEJ823	82K	
R155	ERJ2GEJ102	1K	
R157	ERJ2GE0R00	0	
R162	ERJ3GEYJ393	39K	
R163	ERJ2GEJ470	47	
R164	ERJ12YJ330	33	
R165	ERJ2GEJ681	680	
R166	ERJ2GEJ122	1.2K	
R170	ERJ2GEJ221	220	
R201	ERJ2GEJ105X	1M	
R202	ERJ2GEJ224	220K	
R203	ERJ2GEJ104	100K	
R204	ERJ2GEJ103	10K	
R205	ERJ2GEJ103	10K	
R303	ERJ3GEYJ121	120	
R305	PQ4R10XJ101	100	S
R333	ERJ2GEJ473	47K	
R334	ERJ2GEJ103	10K	
R351	PQ4R10XJ150	15	S
R352	ERJ3GEYJ681	680	
R353	PQ4R10XJ150	15	S
R354	ERJ2GEJ101	100	
R355	PQ4R10XJ150	15	S
R356	PQ4R10XJ120	12	S
R381	ERJ2GEJ332	3.3K	
R382	ERJ2GEJ472X	4.7K	
R383	ERJ2GEJ103	10K	
R387	ERJ2GEJ102	1K	
R409	ERJ2GEJ101	100	
R415	ERJ2GEJ222	2.2K	
R416	ERJ2GEJ222	2.2K	
R501	ERJ2GEJ102	1K	
R507	ERJ2GEJ102	1K	
R516	ERJ2GEJ151	150	

Ref. No.	Part No.	Part Name & Description	Remarks
R543	ERJ2GEJ472X	4.7K	
R570	ERJ2GEJ473	47K	
R571	ERJ3GEYJ123	12K	
R572	ERJ3GEYJ102	1K	
R612	ERJ2GEJ101	100	
R706	ERJ2GEJ104	100K	
R720	ERJ2GEJ271	270	
R721	ERJ2GEJ271	270	
R723	ERJ2GEJ391	390	
R724	ERJ2GEJ391	390	
R803	ERJ2GEJ182	1.8K	
R804	ERJ2GEJ151	150	
R805	ERJ2GEJ393X	39K	
R806	ERJ2GEJ561	560	
R807	ERJ2GEJ681	680	
R906	ERJ3GEYF103	330	
R909	ERJ2GEJ331	1K	
R919	ERJ2GEJ102	1K	
R930	ERJ2GEJ102		
R931	ERJ2GEJ102	1K	
R932	ERJ2GEJ102	1K	
R933	ERJ2GEJ331	330	
R940	ERJ2GEJ4R7	4.7	
R941	ERJ2GEJ100	10	
R942	ERJ2GEJ100	10	
R943	ERJ2GE0R00	0	
R991	ERJ2GEJ102	1K	
R992	ERJ2GEJ102	1K	
		(CAPACITORS)	
C101	ECUV2H681KB	680P	S
C102	ECUV2H681KB	680P	S
C106	PQCUV1A684KB	0.68	
C109	ECUV1H103KBV	0.01	
C110	ECUV1H103KBV	0.01	
C111	ECUV1H681JCV	680P	S
C112	ECUV1H681JCV	680P	S
C114	ECUV1H103KBV	0.01	
C116	PQCUV1H154KR	0.15	
C117	PQCUV1H154KR	0.15	
C124	ECUE1E562KBQ	0.0056	
C144	ECUE1A104KBQ	0.1	
C149	ECUE1A104KBQ	0.1	
C151	ECUE1A473KBQ	0.047	
C155	ECUE1H272KBQ	0.0027	S
C158	ECUV1A224KBV	0.22	
C161	EEE1EA100SR	10	
C162	ECUV1H101JCV	100P	
C163	ECUV1H472KBV	0.0047	S
C166	ECUE1A473KBQ	0.047	
C167	EEE1CA100SR	10	
C170	EEE0JA331P	330	
C201	ECUE1C103KBQ	0.01	S
C202	ECUV1C224KBV	0.22	
C300	ECUV1C474KBV	0.47	
C303	ECUV1E104KBV	0.1	
C308	F2G1E1010011	100	S
C309	ECUV1E104KBV	0.1	
C310	ECUV1A105KBV	1	
C311	EEEFK1C470P	47	
C315	EEE0JA331P	330	
C317	EEE0JA331P	330	
C318	ECUE1A104KBQ	0.1	
C351	ECUE1A104KBQ	0.1	
C353	ECUE1C103KBQ	0.01	S
C382	ECUE1C103KBQ	0.01	S
C415	EEE0JA470SR	47	
C440	ECUE1C103KBQ	0.01	S
C441	ECUE1A104KBQ	0.1	
C447	ECUE1A223KBQ	0.022	
C448	ECUE1A223KBQ	0.022	
C502	F1G0J1050007	1	
C509	ECUE1A104KBQ	0.1	
C510	ECUE1A104KBQ	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C511	ECUE1A104KBQ	0.1	
C512	ECUE1A104KBQ	0.1	
C553	ECUE1A104KBQ	0.1	
C554	ECUE1A104KBQ	0.1	
C560	ECST0JY106	10	
C591	ECUV1C104KBV	0.1	
C606	EEE0GA331WP	330	
C609	ECUE1A104KBQ	0.1	
C618	ECUE1H471KBQ	470P	
C713	ECUE1A104KBQ	0.1	
C801	ECUE1A104KBQ	0.1	
C803	F1J0J1060006	10	
C804	ECUE1H2R0CCQ	2P	
C805	ECUE1H2R0CCQ	2P	
C806	ECUE1A104KBQ	0.1	
C809	ECUE1H3R0CCQ	3P	
C810	ECUE1A104KBQ	0.1	
C812	ECUE1A104KBQ	0.1	
C813	ECUE1A104KBQ	0.1	
C901	ECUE1H100DCQ	10P	S
C903	ECUE1H100DCQ	10P	S
C904	ECUE1H010CCQ	1P	S
C910	ECUE1H010CCQ	1P	S
C911	ECUE1H100DCQ	10P	S
C915	ECUE1H100DCQ	10P	S
C917	ECUE1H100DCQ	10P	S
C918	ECUE1H100DCQ	10P	S
C921	ECUE1H100DCQ	10P	S
C922	ECUE1H100DCQ	10P	S
C937	ECUE1H471KBQ	470P	S
C938	ECUE1H100DCQ	10P	S
C939	ECUE1H100DCQ	10P	S
C940	ECUE1C103KBQ	0.01	S
C941	ECUE1H102KBQ	0.001	S
C942	ECSTAJ0JA106	10	S
C944	ECUE1A104KBQ	0.1	
C946	ECUE1H222KBQ	0.0022	S
C952	ECUE1H2R0CCQ	2P	
C956	ECUE1H100DCQ	10P	S
C960	ECUE1H100DCQ	10P	S
C962	ECUE1H100DCQ	10P	S
C963	ECUE1H100DCQ	10P	S
C964	ECUV1H102KBV	0.001	
C965	ECUE1H221JCQ	220P	S
C976	ECUE1A104KBQ	0.1	
C977	ECUE1H102KBQ	0.001	S
C979	ECUE1H102KBQ	0.001	S
C980	ECUE1C103KBQ	0.01	S
C983	ECUE1H102KBQ	0.001	S
C984	ECUE1H1R5CCQ	1.5P	S
C990	ECUE1H102KBQ	0.001	S
C991	ECUE1H100DCQ	10P	S
C992	ECUE1H121JCQ	120P	
C993	ECUE1A104KBQ	0.1	
C995	ECUE1H102KBQ	0.001	S
C996	ECUE1A104KBQ	0.1	
R126	ECUE1C103KBQ	0.01	S
		(OTHERS)	
MIC	L0CBAB000052	MICROPHONE	
E1	PQGP10254Z1	PANEL, LCD	S
E2	L5DCBCB00015	LIQUID CRYSTAL DISPLAY	
E3	PQHS10327Z	TAPE, LCD	
E4	PQHR11031Z	GUIDE, LCD	
E5	PQMC10471Z	MAGNETIC SHIELD, FRAME	
E6	PQMC10472Z	MAGNETIC SHIELD, COVER	
CN101	PQJJ2H003Z	JACK	S
FL901	J0E2457B0008	LCR FILTER	
P101	PFRT002	THERMISTOR (POSISTOR)	S
X801	H0J138500003	CRYSTAL OSCILLATOR	

29.2. Handset

29.2.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
101	PQGG10254Z1	GRILLE, LCD	
102	PQGP10234Z1	PANEL, LCD	
103	PQHS10630Z	TAPE, DOUBLE SIDE	
104	PQKE10373Z3	SPACER, SPEAKER RING	
105	PQHS10623Z	TAPE, DOUBLE SIDE	
106	PQKM10628Z1	CABINET BODY	
107	PQGT17061Z	NAME PLATE	
108	PQSA10146X	ANTENNA	
109	PQHS10592Z	SPACER, SPEAKER	
110	L0AD02A00020	SPEAKER	
111	PQHS10634Z	SPACER, SPEAKER	
112	PQHR10984Z	GUIDE, SPEAKER	
113	PQHS10624Z	SPACER, LCD CUSHION	
114	L5DCBDC00009	LIQUID CRYSTAL DISPLAY	
115	PQHX11186Z	SPACER, LCD	
116	PQHR11028Z	GUIDE, LCD	
117	PQBC10405Z1	BUTTON, VOLUME	
118	PQSX10264V	KEYBOARD SWITCH	
119	PQWE10032Z	BATTERY TERMINAL	
120	PQJT10211Z	BATTERY TERMINAL (L)	
121	PQJT10212Z	BATTERY TERMINAL (R)	
122	PQHR10778Z	GUIDE, SPEAKER	
123	PQHG10689Z	SPACER, SP RUBBER SHEET	
124	L0AD02A00010	SPEAKER	
125	PQHS10622Z	SPACER, SPEAKER NET	
126	PQKF10612Z1	CABINET COVER	
127	PQKE10374Z3	COVER, EARPHONE	
128	PQHX11247X	PLASTIC PARTS, BATTERY COVER SHEET	
129	HHR-P104	BATTERY	
130	PQHE10151Z	SPACER, BATTERY	
131	PQKK10141Z1	LID, BATTERY COVER	

29.2.2. Main P.C. Board Parts

Note:

(*2) When you have replaced IC201 or IC202, adjust X201. refer to **Check and Adjustment X201 (Handset) Frequency** (P.61)

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPG2358BXR	MAIN P.C.BOARD ASS´Y (RTL)	
		(ICs)	
IC201	C2HBBK000037	IC (*2)	
IC202	PQWIG2358BXR	IC (*2)	
IC203	C0CBABD00019	IC	
IC204	C0CBAAD00018	IC	
IC205	PQVIC61CN32N	IC	S
IC901	C1CB00001657	IC	
		(TRANSISTORS)	
Q201	PSVTUMG11NTR	TRANSISTOR(SI)	S
Q204	2SC39300CL	TRANSISTOR(SI)	
Q205	2SD1819A	TRANSISTOR(SI)	
Q206	PQVTDTC143E	TRANSISTOR(SI)	S
Q207	UN521	TRANSISTOR(SI)	S
Q208	2SD1819A	TRANSISTOR(SI)	
Q209	PQVTDTC143E	TRANSISTOR(SI)	S
Q210	2SD1819A	TRANSISTOR(SI)	
Q212	2SB1197KQ	TRANSISTOR(SI)	
Q213	PQVTDTC123JU	TRANSISTOR(SI)	S
		(DIODES)	
D203	MA111	DIODE(SI)	S
D205	B0JCMD000010	DIODE(SI)	
D206	B0JCMD000010	DIODE(SI)	
D207	B0JCMD000010	DIODE(SI)	
D208	B0JCMD000010	DIODE(SI)	
D213	MA132WK	DIODE(SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
D217	MA8047	DIODE(SI)	S
D218	MA8047	DIODE(SI)	S
D219	MA8047	DIODE(SI)	S
D220	MA8047	DIODE(SI)	S
D903	B0DCCD000011	DIODE(SI)	
D904	B0DCCD000011	DIODE(SI)	
LED201	PQVDSML310MT	LED	S
LED202	PQVDSML310MT	LED	S
LED203	PQVDSML310MT	LED	S
LED204	PQVDSML310MT	LED	S
LED205	PQVDSML310MT	LED	S
LED206	PQVDSML310MT	LED	S
LED207	PQVDSML310MT	LED	S
LED208	B3AAB0000170	LED	
		(COILS)	
L204	PQLQR2KB113T	COIL	S
L205	PQLQR2KB113T	COIL	S
L206	PQLQR2KB113T	COIL	S
L207	G1CR47J00005	COIL	
L208	G1CR47J00005	COIL	
L209	G1CR47J00005	COIL	
L210	G1CR47J00005	COIL	
L901	MQLRE18NJF	COIL	
L903	MQLRF4N7DF2	COIL	
L904	MQLRE22NJF	COIL	
L905	MQLRF10NJF	COIL	
L909	MQLRF3N3DF2	COIL	
L911	MQLRF2N2DF2	COIL	
L913	MQLRF10NJF	COIL	
L990	PQLQR4D1R0K	COIL	S
R903	MQLRE10NJF	COIL	
		(COMPONENTS PARTS)	
CA201	F5A421030002	CAPACITOR ARRAY	
CA202	F5A424740002	CAPACITOR ARRAY	
CA203	F5A841040004	CAPACITOR ARRAY	
RA201	EXRV8V472JV	RESISTOR ARRAY	
RA204	D1H42222A006	RESISTOR ARRAY	
RA205	D1H41022A006	RESISTOR ARRAY	
RA207	EXB28V221JX	RESISTOR ARRAY	
RA901	D1H810240004	RESISTOR ARRAY	
		(CONNECTOR AND JACK)	
CN201	K1MN22B00096	CONNECTOR	
CN203	K2HD103D0001	JACK	
		(RESISTORS)	
R201	ERJ2GEJ331	330	
R202	ERJ2GEJ331	330	
R203	ERJ2GEJ331	330	
R204	ERJ2GEJ331	330	
R208	ERJ2GEJ121	120	
R217	ERJ3GEYF434	430K	S
R218	ERJ3GEYF824	820K	S
R220	ERJ2GEJ274	270K	
R222	ERJ2GEJ102	1K	
R223	ERJ2GEJ102	1K	
R224	ERJ2GEJ103	10K	
R226	ERJ2GEJ180	18	
R227	ERJ2GEJ180	18	
R228	ERJ2GEJ224	220K	
R230	ERJ2GEJ102	1K	
R232	ERJ2GEJ103	10K	
R234	ERJ2GEJ225	2.2M	
R235	ERJ2GEJ225	2.2M	
R236	ERJ2GEJ223	22K	
R241	ERJ2GEJ183	18K	
R242	ERJ2GEJ223	22K	
R245	ERJ2GEJ103	10K	
R247	ERJ2GEJ391	390	
R248	ERJ2GEJ223	22K	
R249	ERJ2GEJ222	2.2K	
R260	ERJ2GEJ104	100K	
R263	ERJ2GEJ473	47K	
R264	ERJ2GEJ473	47K	
R266	ERJ2GEJ102	1K	

Ref. No.	Part No.	Part Name & Description	Remarks
R268	ERJ3GEYJ102	1K	
R269	ERJ3GEYJ102	1K	
R270	ERJ3GEYJ102	1K	
R275	ERJ2GEJ104	100K	
R276	ERJ2GEJ561	560	
R277	ERJ2GEJ104	100K	
R279	ERJ2GEJ104	100K	
R284	ERJ2GEJ182	1.8K	
R285	ERJ2GEJ151	150	
R286	ERJ2GEJ393X	39K	
R906	ERJ3GEYF103	10K	
R909	ERJ2GEJ331	330	
R919	ERJ2GEJ102	1K	
R930	ERJ2GEJ102	1K	
R931	ERJ2GEJ102	1K	
R932	ERJ2GEJ102	1K	
R933	ERJ2GEJ331	330	
R940	ERJ2GEJ4R7	4.7	
R941	ERJ2GEJ100	10	
R942	ERJ2GEJ100	10	
R943	ERJ2GE0R00	0	
R991	ERJ2GEJ102	1K	
R992	ERJ2GEJ102	1K	
		(CAPACITORS)	
C203	ECUE1A104KBQ	0.1	
C206	ECUE1H101JCQ	100P	S
C208	ECUE1C103KBQ	0.01	S
C209	ECUE1C103KBQ	0.01	S
C210	ECUV1C104KBV	0.1	
C211	ECUV1C474KBV	0.47	
C212	ECUE1C103KBQ	0.01	S
C213	EEE0GA331WP	330	
C214	ECUE1A104KBQ	0.1	
C215	ECUE1C103KBQ	0.01	S
C216	ECST0JY226	22	
C217	F1G0J1050007	1	S
C218	F1G0J1050007	1	S
C219	ECUE1A104KBQ	0.1	
C220	EEE0JA101SP	100P	
C221	ECUE1A104KBQ	0.1	
C222	ECUE1A104KBQ	0.1	
C224	ECUE1A104KBQ	0.1	
C225	ECST0JY226	22	
C226	ECUE1H100DCQ	10P	S
C228	ECUE1A104KBQ	0.1	
C229	ECUE1H100DCQ	10P	S
C230	ECUE1C103KBQ	0.01	S
C231	ECUE1C103KBQ	0.01	S
C234	ECUE1A104KBQ	0.1	
C236	ECUE1H4R0CCQ	4P	
C237	ECUE1H4R0CCQ	4P	
C239	ECUE1C103KBQ	0.01	S
C240	ECUE1A104KBQ	0.1	
C242	ECUE1A104KBQ	0.1	
C267	ECST0JY226	22	
C268	ECST0JY225	2.2	
C271	ECUV1H103KBV	0.01	
C272	ECUV1C224KBV	0.22	
C273	ECUV1H103KBV	0.01	
C274	ECUV1C224KBV	0.22	
C275	ECUE1A683KBQ	0.068	
C277	ECUE1H100DCQ	10P	S
C278	ECUE1H100DCQ	10P	S
C280	ECUE1A104KBQ	0.1	
C284	ECUE1C103KBQ	0.01	S
C291	ECUE1A104KBQ	0.1	
C294	ECUE1A104KBQ	0.1	
C296	ECUE1A104KBQ	0.1	
C298	ECUE1A104KBQ	0.1	
C303	F1J0J1060006	10	
C306	ECUE1H471KBQ	470P	S
C308	F1G0J1050007	1	S
C309	ECUE1A104KBQ	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C311	ECUE1H3R0CCQ	3P	
C312	ECUE1A104KBQ	0.1	
C901	ECUE1H100DCQ	10P	S
C903	ECUE1H100DCQ	10P	S
C904	ECUE1H010CCQ	1P	S
C910	ECUE1H010CCQ	1P	S
C911	ECUE1H100DCQ	10P	S
C915	ECUE1H100DCQ	10P	S
C917	ECUE1H100DCQ	10P	S
C918	ECUE1H100DCQ	10P	S
C921	ECUE1H100DCQ	10P	S
C922	ECUE1H100DCQ	10P	S
C937	ECUE1H471KBQ	470P	S
C938	ECUE1H100DCQ	10P	S
C939	ECUE1H100DCQ	10P	S
C940	ECUE1C103KBQ	0.01	S
C941	ECUE1H102KBQ	0.001	S
C942	ECSTAJ0JA106	10	S
C944	ECUE1A104KBQ	0.1	
C946	ECUE1H222KBQ	0.0022	S
C952	ECUE1H2R0CCQ	2P	
C956	ECUE1H100DCQ	10P	S
C960	ECUE1H100DCQ	10P	S
C962	ECUE1H100DCQ	10P	S
C963	ECUE1H100DCQ	10P	S
C964	ECUV1H102KBV	0.001	
C965	ECUE1H221JCQ	220P	S
C976	ECUE1A104KBQ	0.1	
C977	ECUE1H102KBQ	0.001	S
C979	ECUE1H102KBQ	0.001	S
C980	ECUE1C103KBQ	0.01	S
C983	ECUE1H102KBQ	0.001	S
C984	ECUE1H1R5CCQ	1.5P	S
C990	ECUE1H102KBQ	0.001	S
C991	ECUE1H100DCQ	10P	S
C992	ECUE1H121JCQ	120P	
C993	ECUE1A104KBQ	0.1	
C995	ECUE1H102KBQ	0.001	S
C996	ECUE1A104KBQ	0.1	
		(OTHERS)	
MIC	L0CBAB000052	MICROPHONE	
E101	PQMC10471Z	MAGNETIC SHIELD, FRAME	
E102	PQMC10472Z	MAGNETIC SHIELD, COVER	
FL901	J0E2457B0008	LCR FILTER	
X201	H0J138500003	CRYSTAL OSCILLATOR	

29.3. Accessories and Packing Materials

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV1BXZ	AC ADAPTOR	⚠
A2	PQJA10075Z	CORD, TELEPHONE	
A3	PQKE10375Z3	HANGER, BELT CLIP	PC+ABS-HB
A4	PQHG10680Z	RUBBER PARTS, SHEET	
A5	PQKE10364Z1	PLASTIC PARTS, SHOULDER REST	
A6	PQQT22597Z	LABEL, CAUTION	
A7	PQQX14265Z	INSTRUCTION BOOK	
A8	PQQW13435Z	QUICK GUIDE	
P1	PQPP170Y	PROTECTION COVER (for Base Unit)	
P2	XZB10X35A02	PROTECTION COVER (for Handset)	
P3	PQPK14372Y	GIFT BOX	
P4	PQPD10595Z	CUSHION	
P5	PQPD10596Z	CUSHION	
P6	PQPD10597Z	CUSHION	

30 FOR SCHEMATIC DIAGRAM

30.1. Base Unit (SCHEMATIC DIAGRAM (Base Unit))

Notes:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.

> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

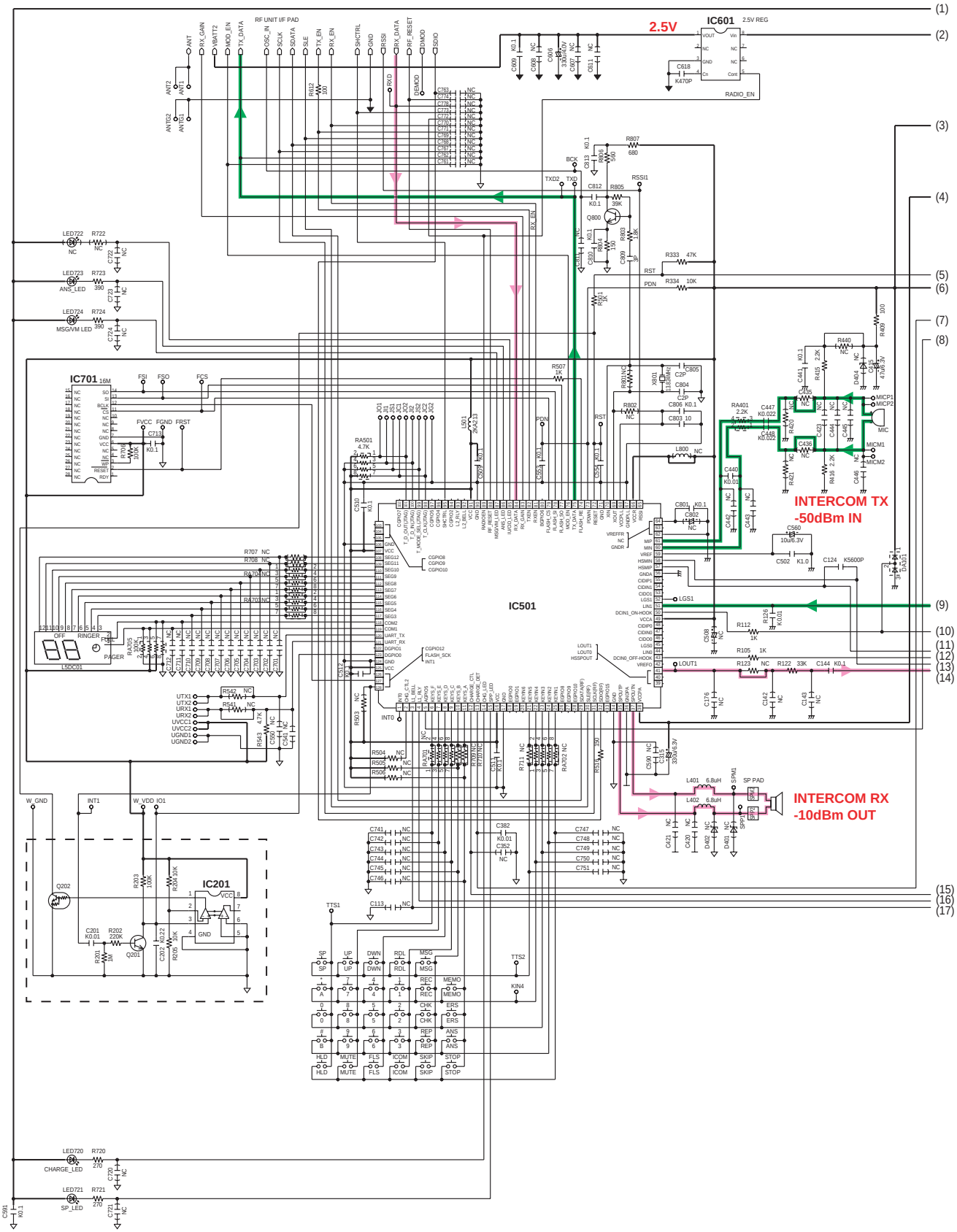
2. This schematic diagram may be modified at any time with the development of new technology.

30.2. Handset (SCHEMATIC DIAGRAM (Handset))

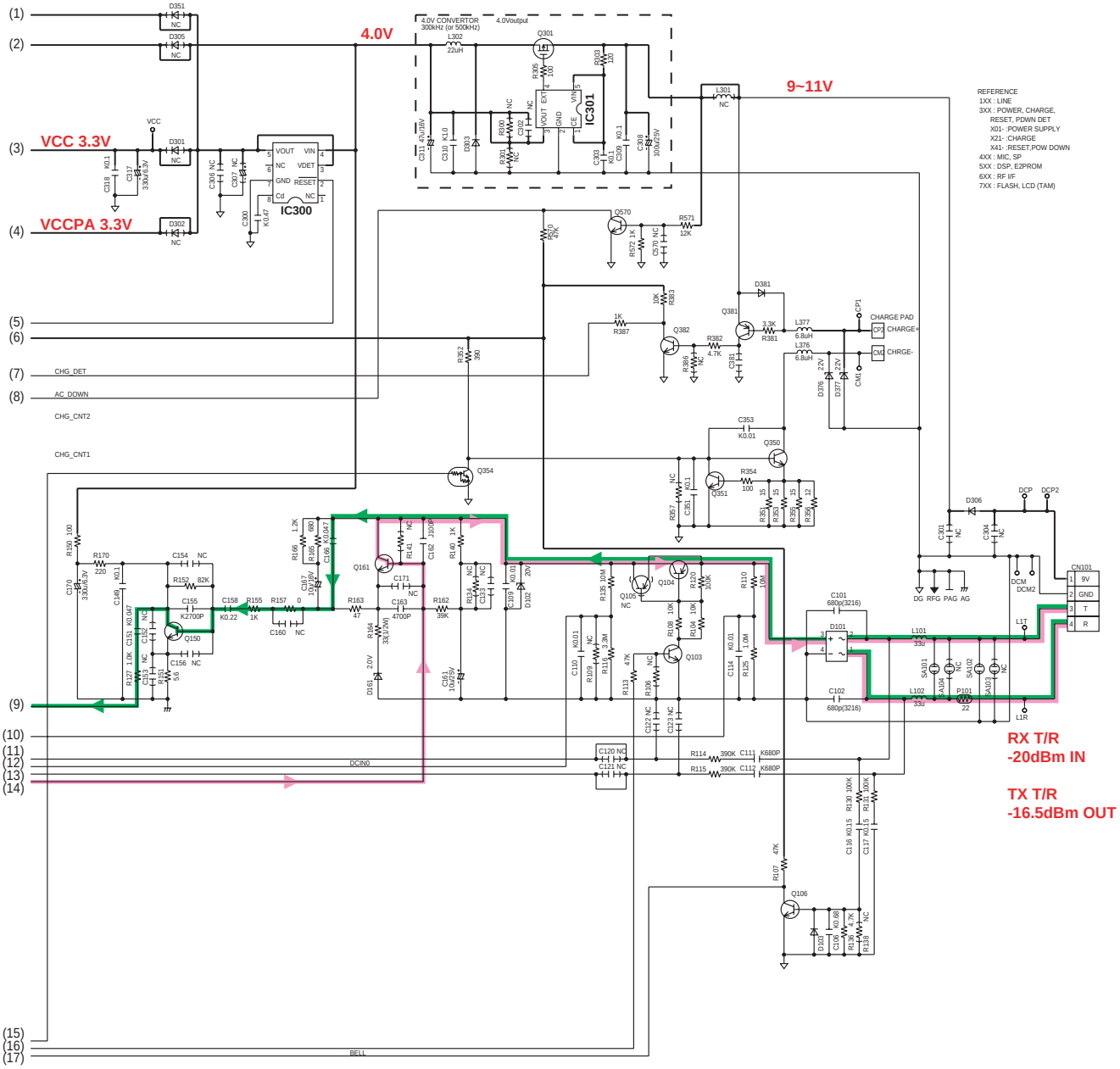
Notes:

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.

31 SCHEMATIC DIAGRAM (Base Unit)



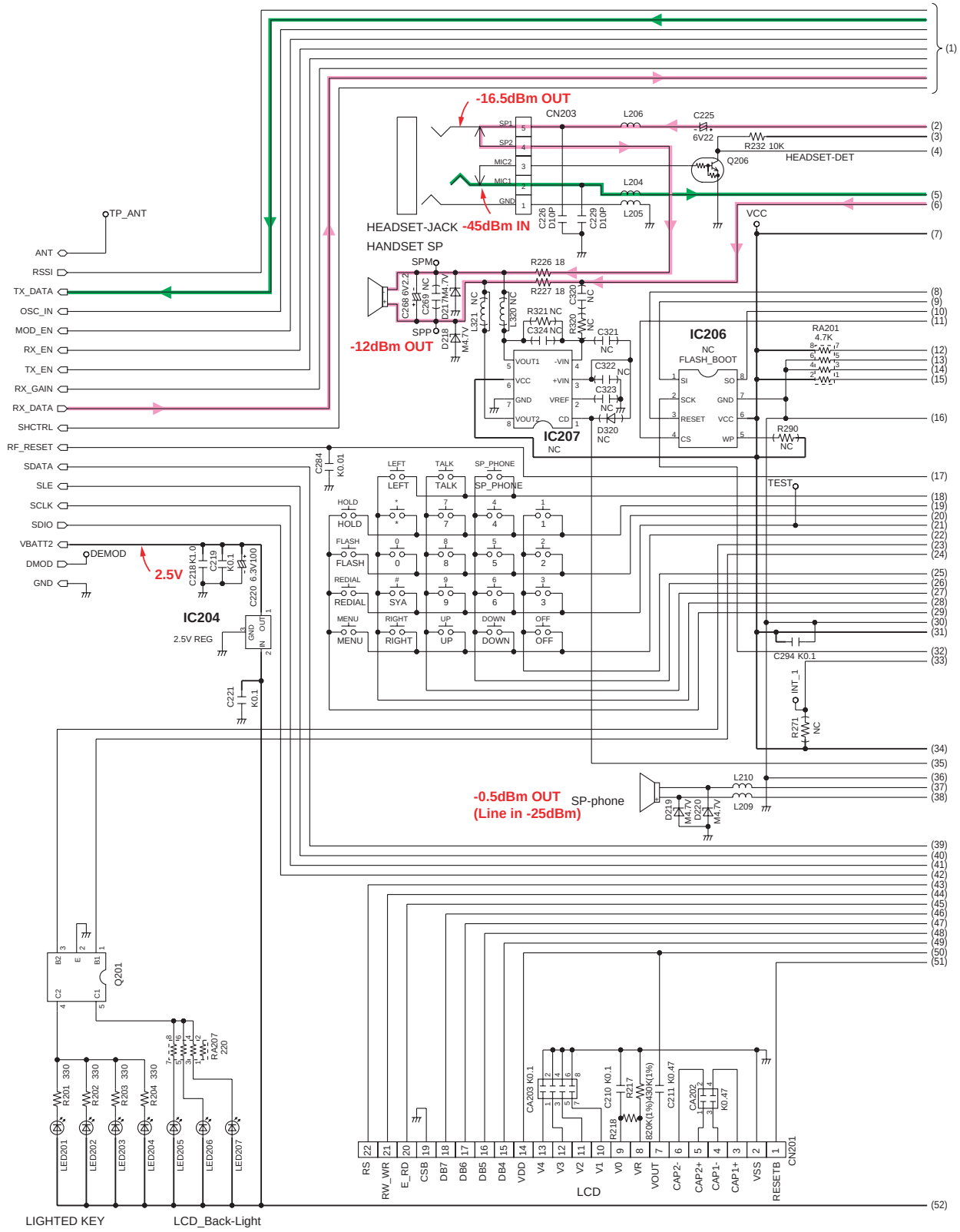
NC: No Components



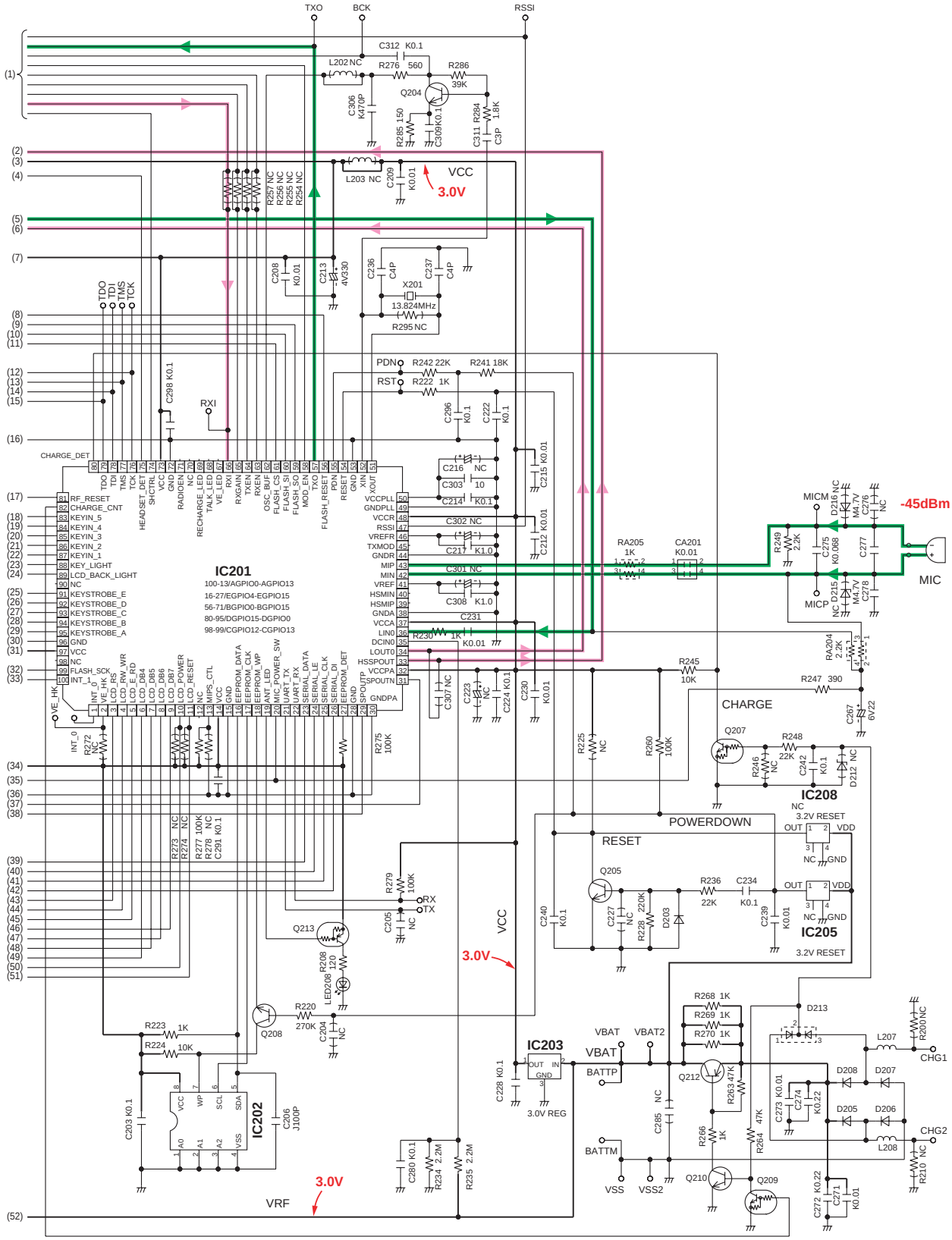
NC: No Components

KX-TG2360JXS SCHEMATIC DIAGRAM (Base Unit)

32 SCHEMATIC DIAGRAM (Handset)



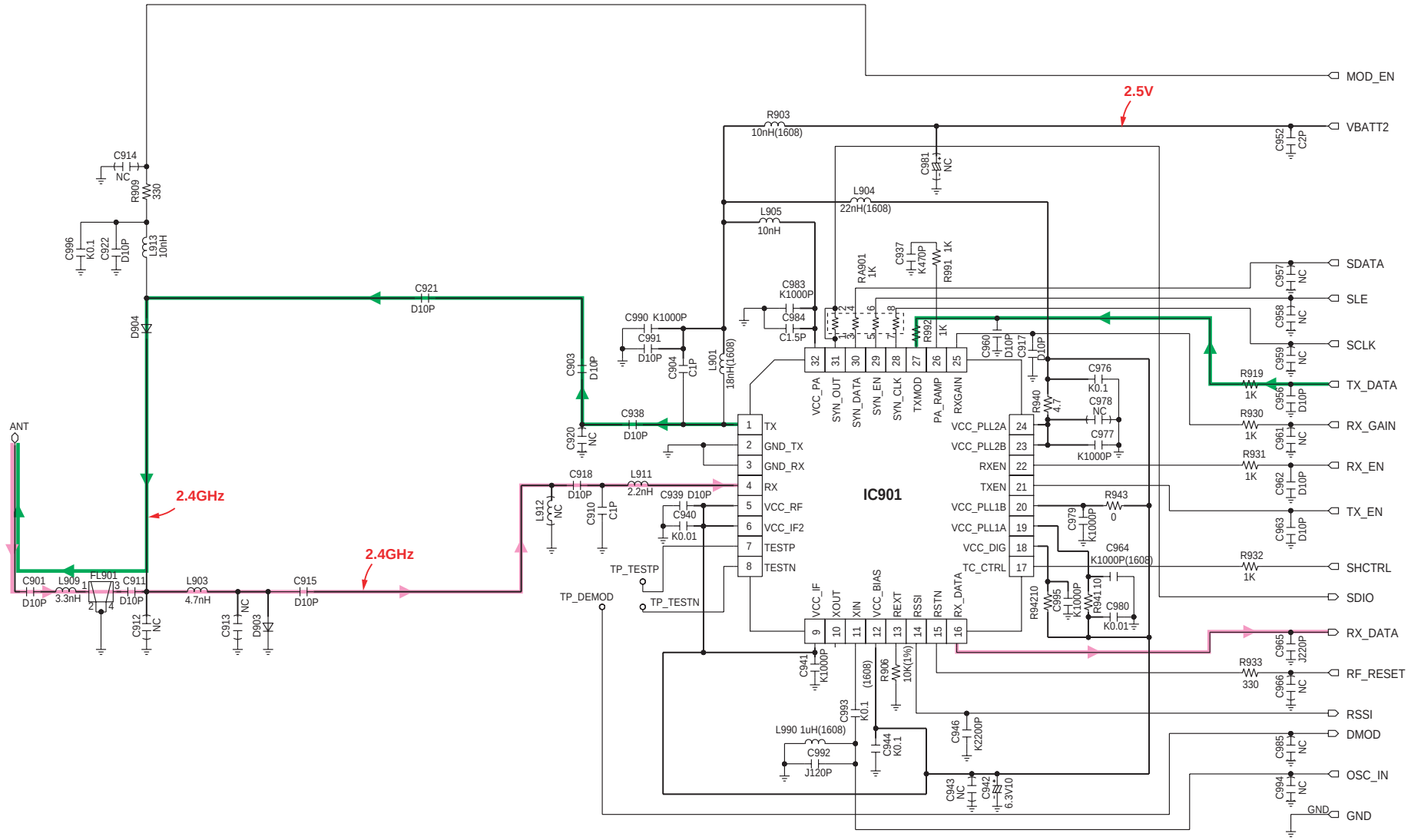
NC: No Components



NC: No Components

KX-TGA236JXS SCHEMATIC DIAGRAM (Handset)

33 SCHEMATIC DIAGRAM (RF PART)

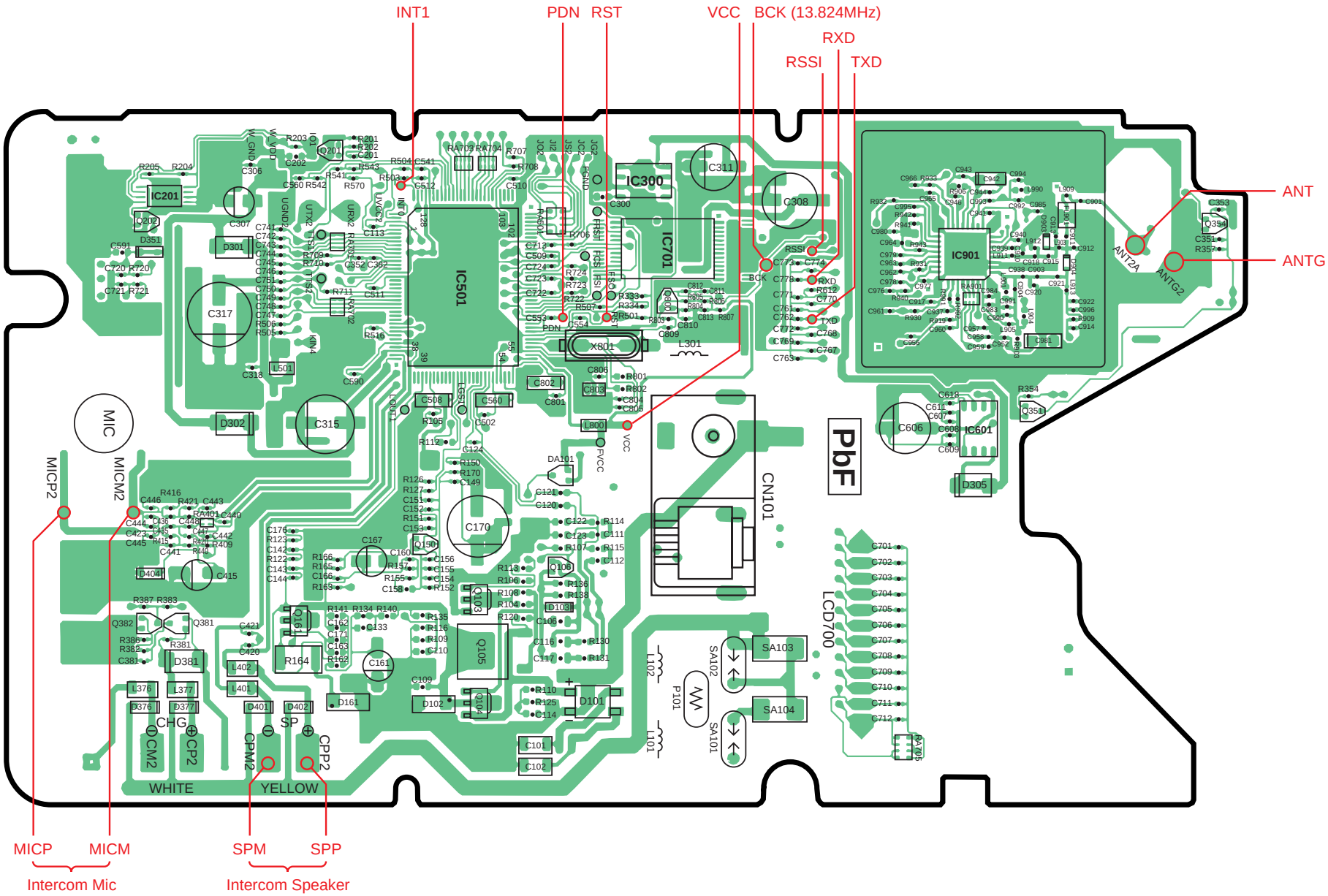


NC: No Components

KX-TG2360JXS, KX-TGA236JXS SCHEMATIC DIAGRAM (RF Part)

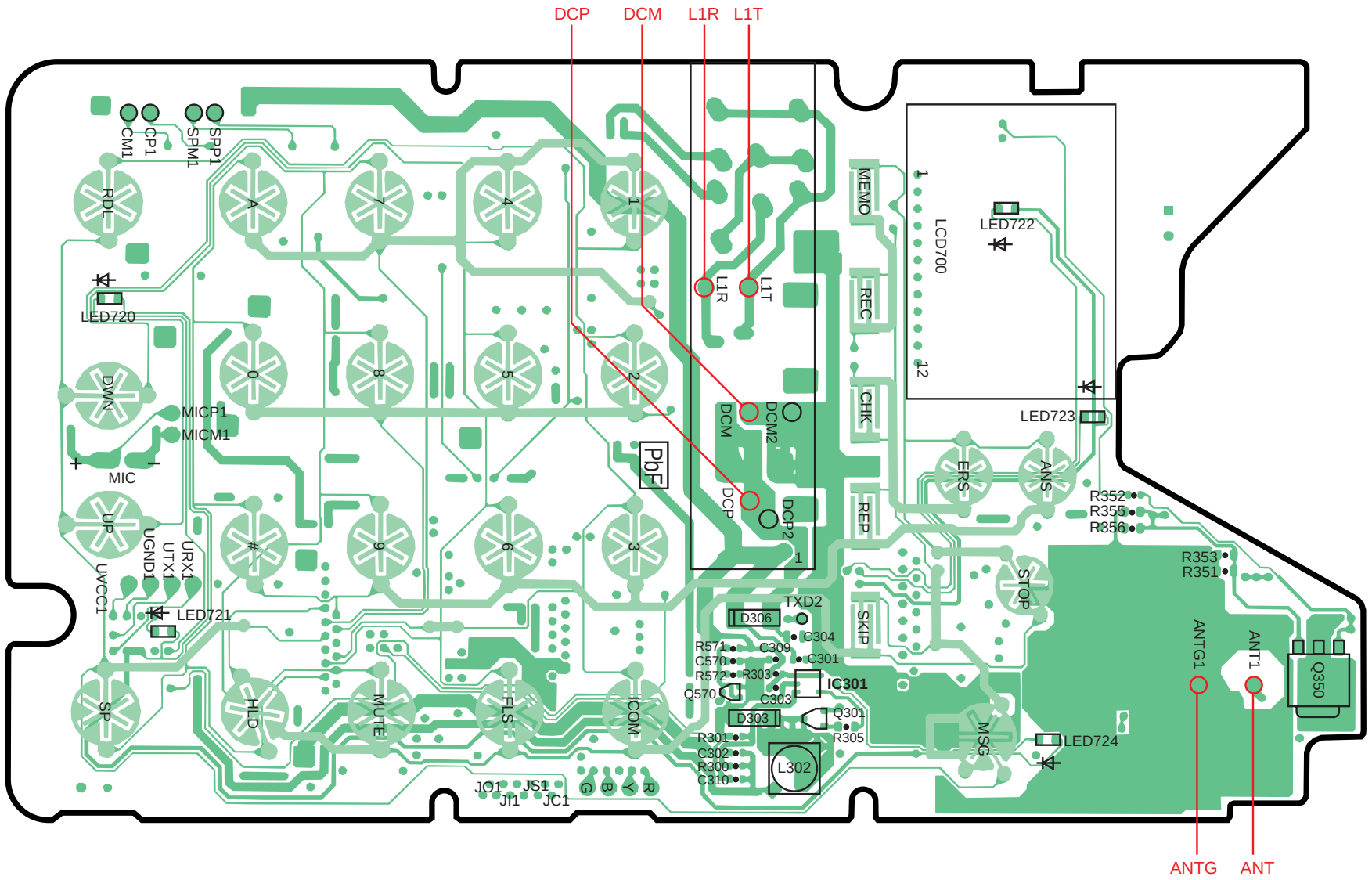
34 CIRCUIT BOARD (Base Unit)

34.1. Component View



KX-TG2360JXS CIRCUIT BOARD (Component View (Base Unit))

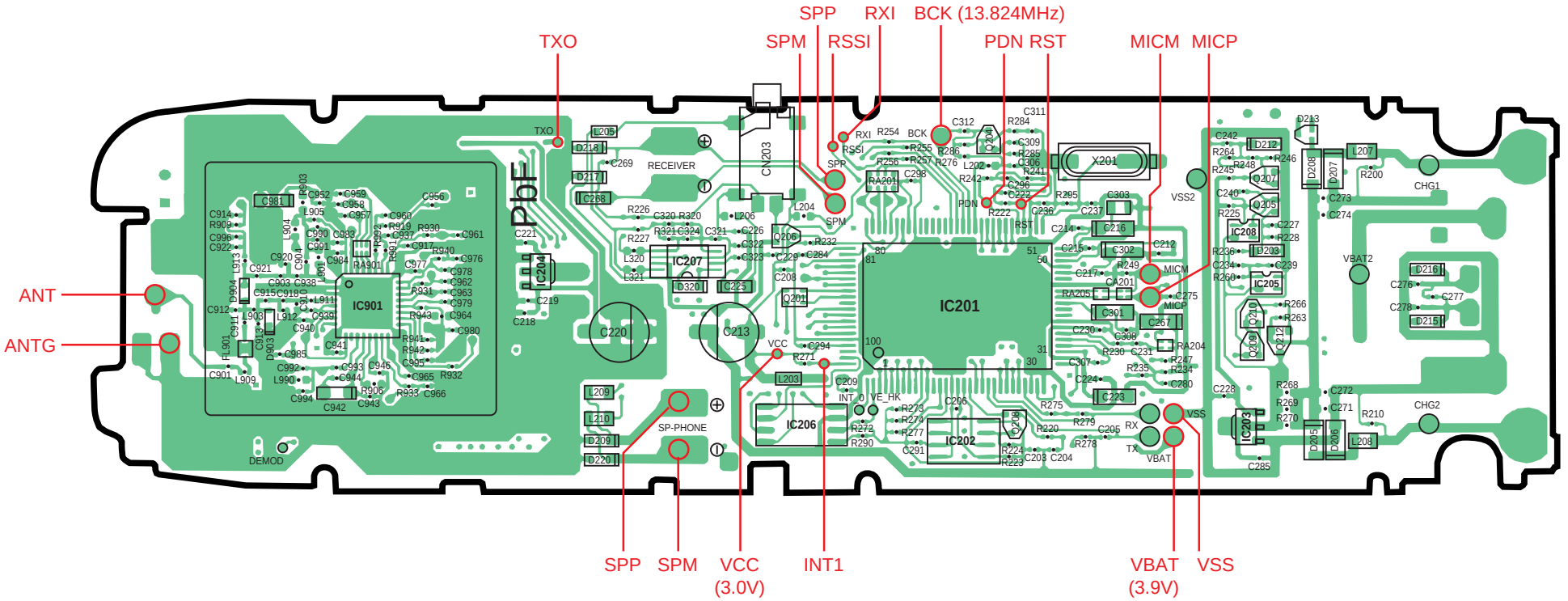
34.2. Flow Solder Side View



KX-TG2360JXS CIRCUIT BOARD (Flow Solder Side View (Base Unit))

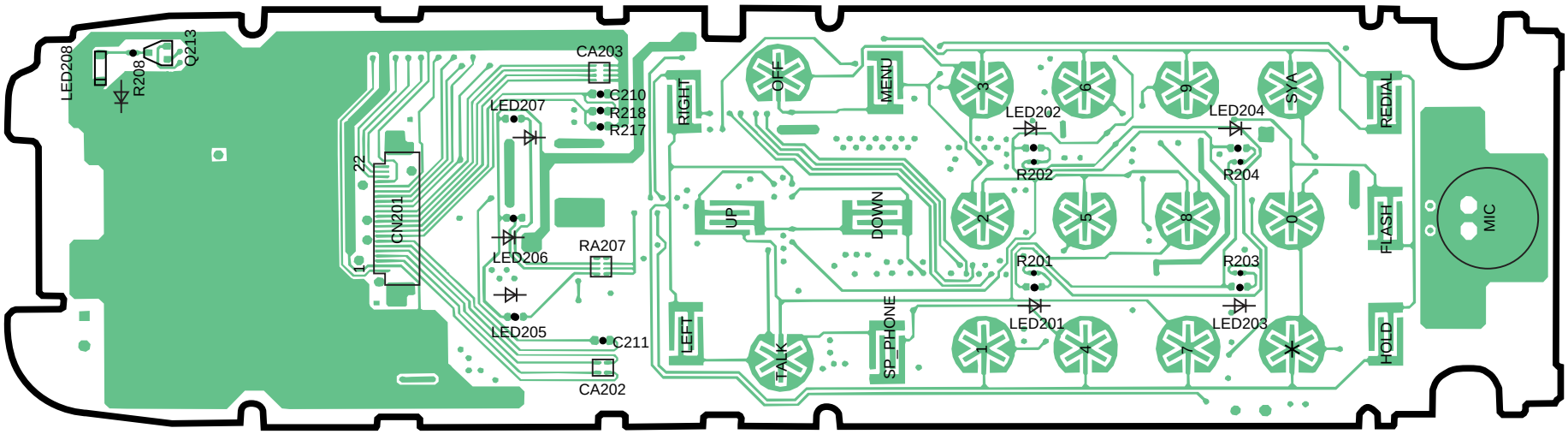
35 CIRCUIT BOARD (Handset)

35.1. Component View



KX-TGA236JXS CIRCUIT BOARD (Component View (Handset))

35.2. Flow Solder Side View



KX-TGA236JXS CIRCUIT BOARD (Flow Solder Side View (Handset))