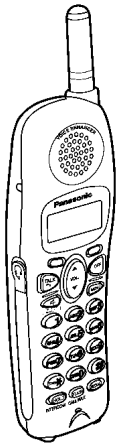
ORDER NO. KM40401327C1
F12

Service Manual

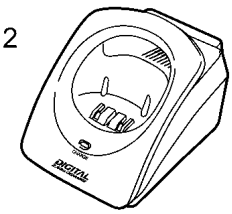
Telephone Equipment

Caller ID Compatible



(Handset) x 2

(Base Unit)



(Charger Unit)

KX-TG2344B
KX-TGA234B

2.4GHz Multi-Handset Digital Cordless Phone

Black Version

(for U.S.A.)

SPECIFICATIONS

	Base Unit	Handset	Charger Unit
Power Supply	AC Adaptor (PQLV1Z, 120 V AC, 60 Hz)	Rechargeable Ni-MH battery (3.6 V, 830 mAh)	AC Adaptor (KX-TCA1-G, 120 V AC, 60 Hz)
Receiving/Transmitting Frequency	90 channels within 2.40GHz~2.48GHz	90 channels within 2.40GHz~2.48GHz	
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	
Redial	——	Up to 48 digits	
Speed Dialer	——	Up to 32 digits	
Power Consumption	Standby: Approx. 2.1W Maximum: Approx. 5.0W	11 days at Standby, 5 hours at Talk	Standby: Approx. 0.8W Maximum: Approx. 4.0W
Operating Environment	5˚C - 40 ˚C (41 ˚F - 104 ˚F)	5˚C - 40 ˚C (41 ˚F - 104 ˚F)	5˚C - 40 ˚C (41 ˚F - 104 ˚F)
Dimension (H x W x D)	Approx. 124mm x 155mm x 174mm (4 7/8" x 6 3/32" x 6 27/32")	Approx. 208mm x 52mm x 39mm (8 3/16" x 2 1/16" x 1 17/32")	Approx. 69mm × 74mm × 99mm (2 23/32" × 2 29/32" × 3 29/32")
Weight	Approx. 390 g (0.86 lb.)	Approx. 190 g (0.42 lb.)	Approx. 110 g (0.24 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.

FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.
1. Cover plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on worktable.
4. Do not grasp IC or LSI pins with bare fingers.

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 manufacturer's Instructions.

NOte:

Because CONTENTS 2 to 7 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.

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1 ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:

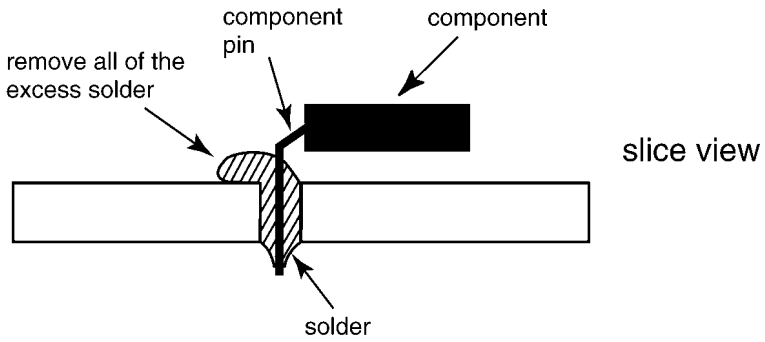
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

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

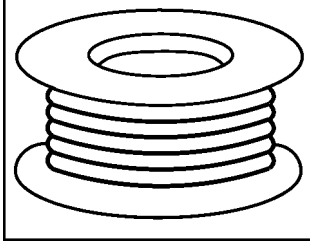
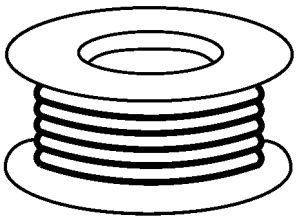
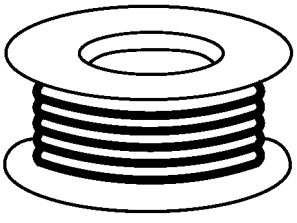
- PbF solder has a melting point that is 50°F ~70°F (30°C ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700°F ± 20°F (370°C ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.
- PbF solder will tend 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.

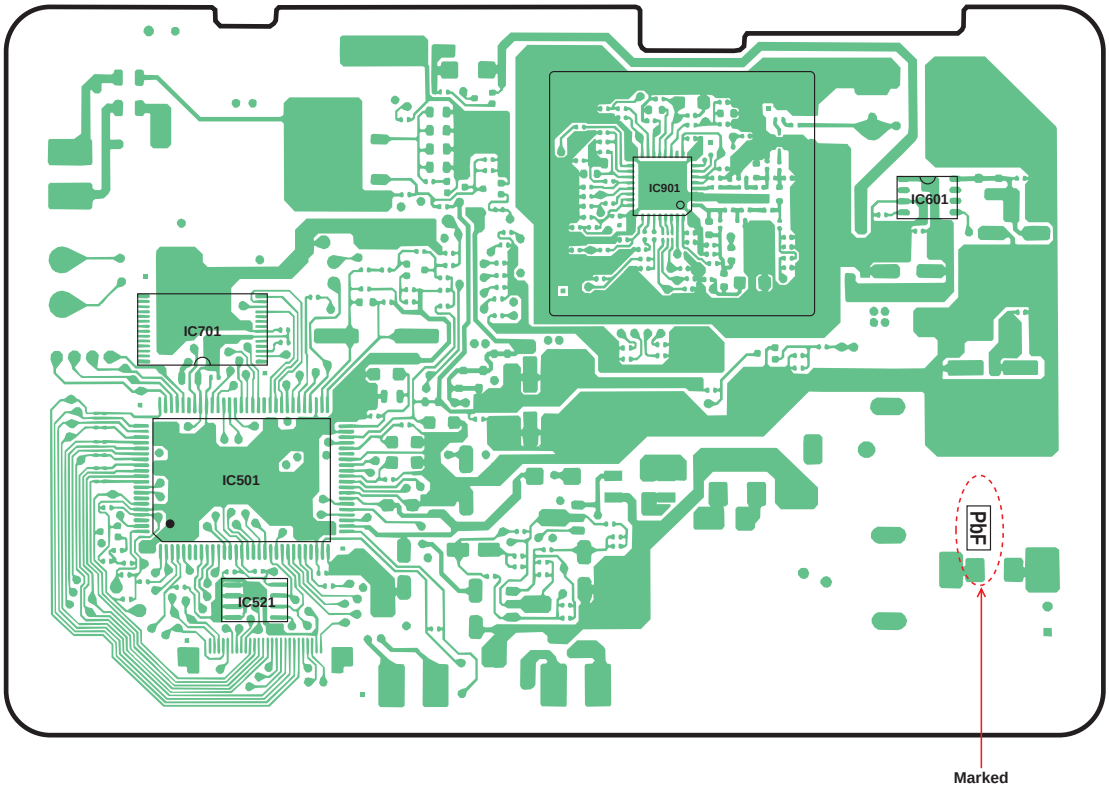
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.

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

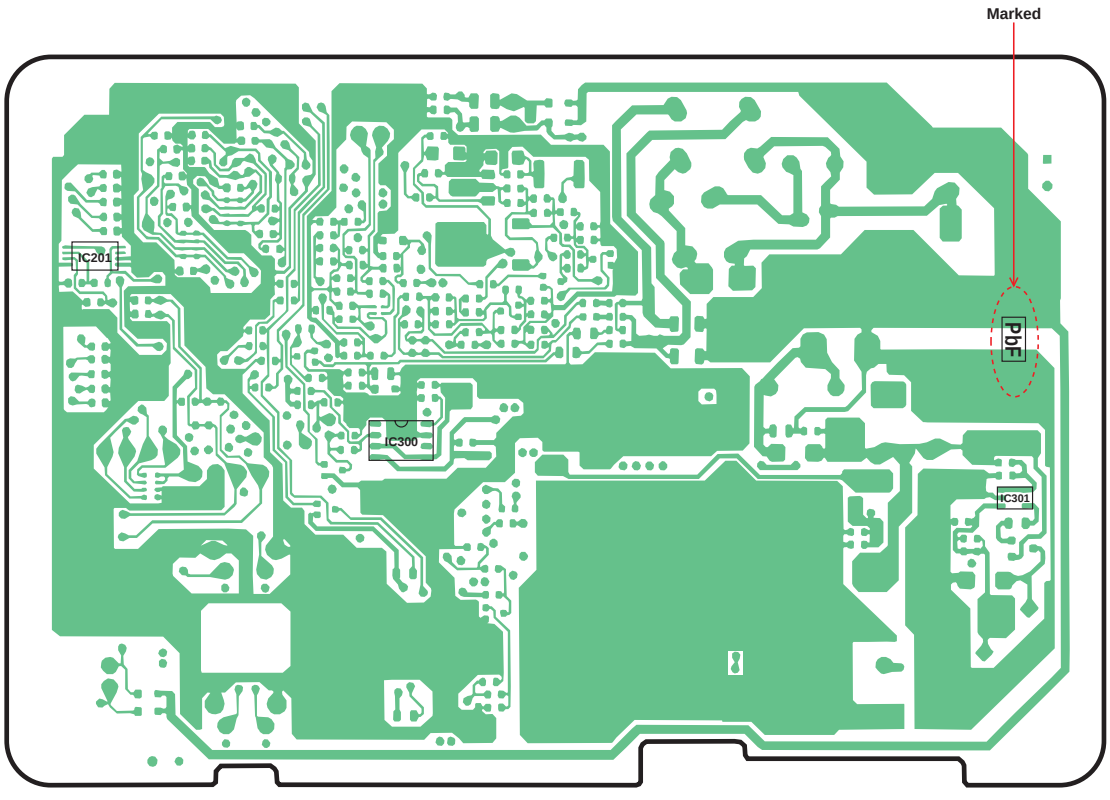
1.2. How to recognize that Pb Free solder is used

1.2.1. Base Unit PCB

1.2.1.1. Main



(Component View)

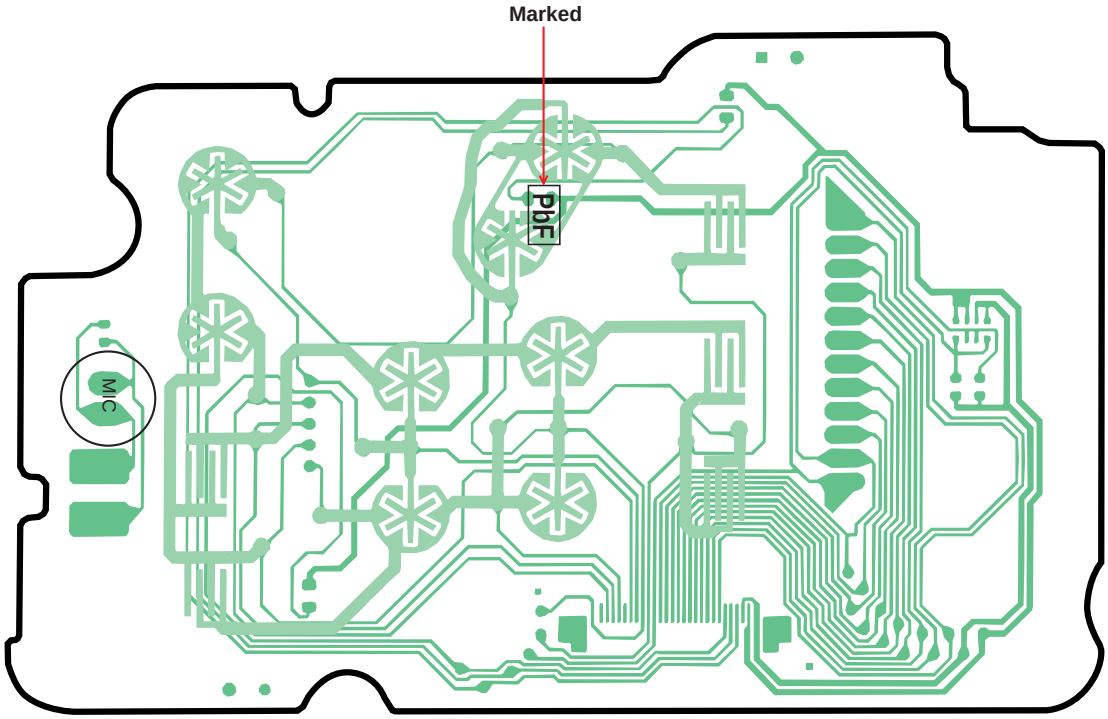


(Flow Solder Side View)

Note:

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

1.2.1.2. Operation

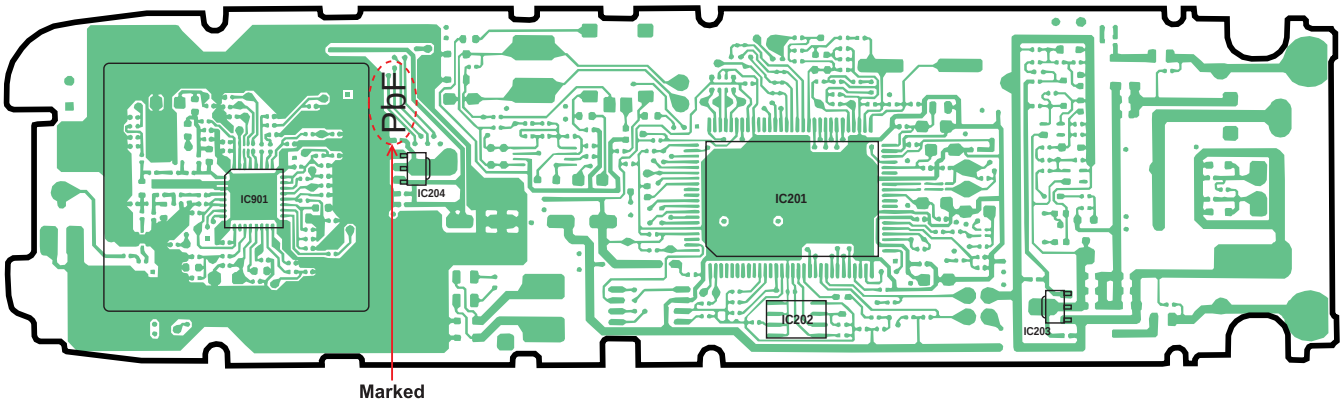


(Flow Solder Side View)

Note:

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

1.2.2. Cordless Handset PCB

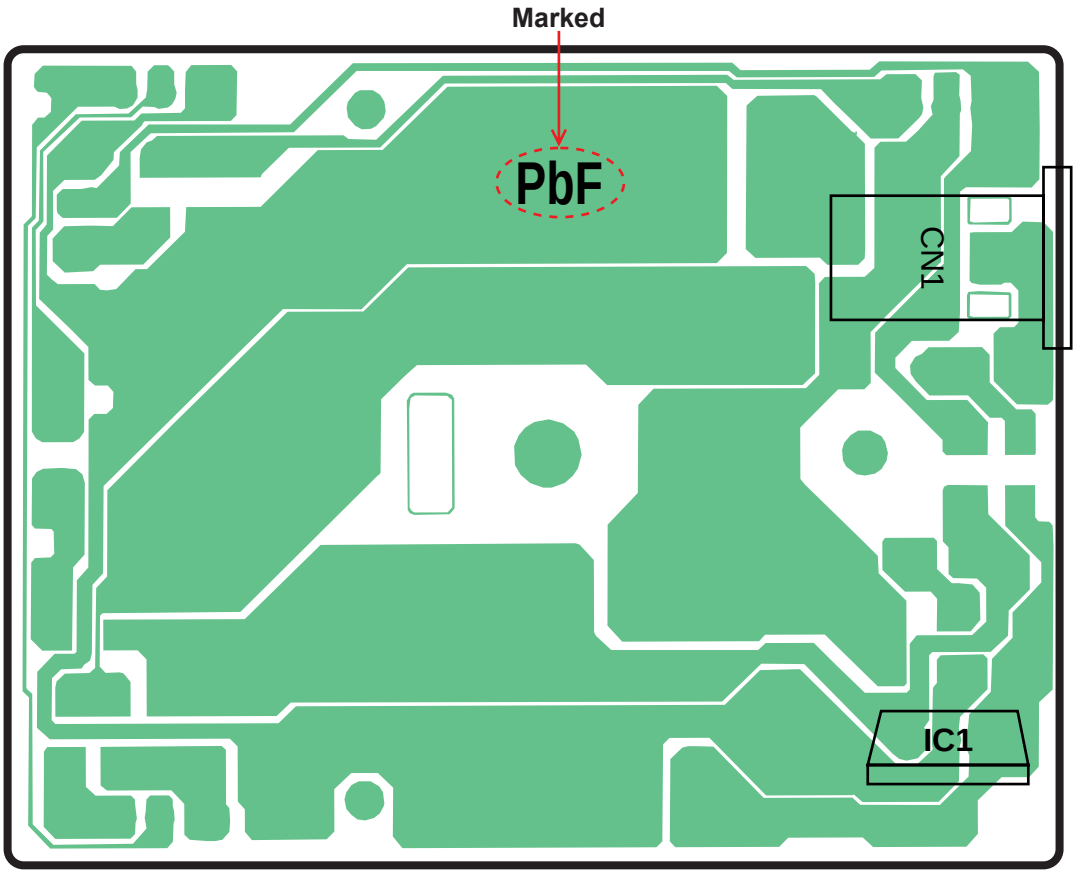


(Component View)

Note:

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

1.2.3. Charger Unit



(Component View)

Note:

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

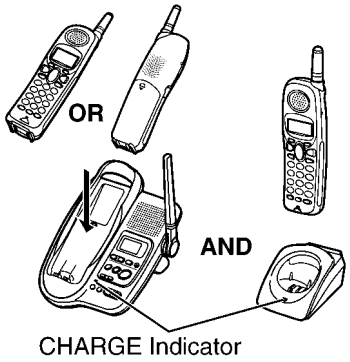
2 BATTERY

2.1. Standard Battery Life

2.1.1. Battery Charge

Place the handsets on the base unit and charger. Charge for **6hours** 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.



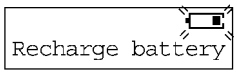
2.1.2. Battery Strength

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

2.1.3. 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 or charger.
- 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.

2.1.4. 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

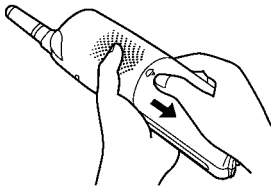
- A fully charged battery will give you up to 5 hours of continuous talk time, or keep your handset in standby mode to receive incoming calls for up to 11 days (if no phone calls are made). Battery power is consumed whenever the handset is off of the base unit, even when the handset is not in use. The 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.
- 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.
- **Clean the charge contacts of the handset, the base unit and the charger with a soft, dry cloth. Clean if the unit is subject to grease, dust or high humidity.** Otherwise the battery may not charge properly.

2.2. Battery Replacement

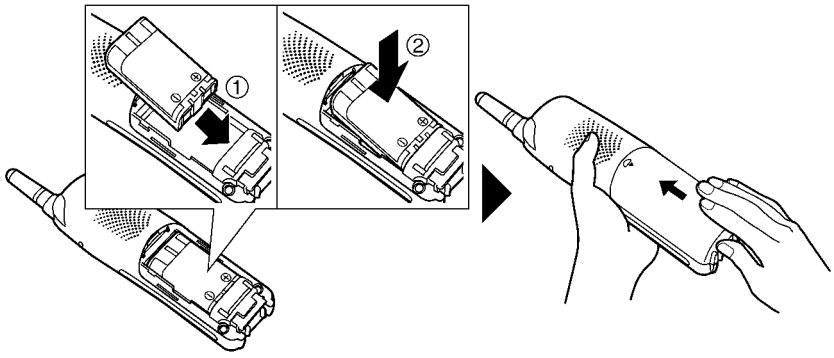
If you cleaned the charge contacts and fully charged the battery, but after a few telephone calls, "Recharge battery" is displayed and/or "▭" continues to flash, or "Charge for 6h" and "▭" are displayed, replace the battery with a new Panasonic HHR-P104 battery.

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. Close the cover and charge the battery for 6 hours.



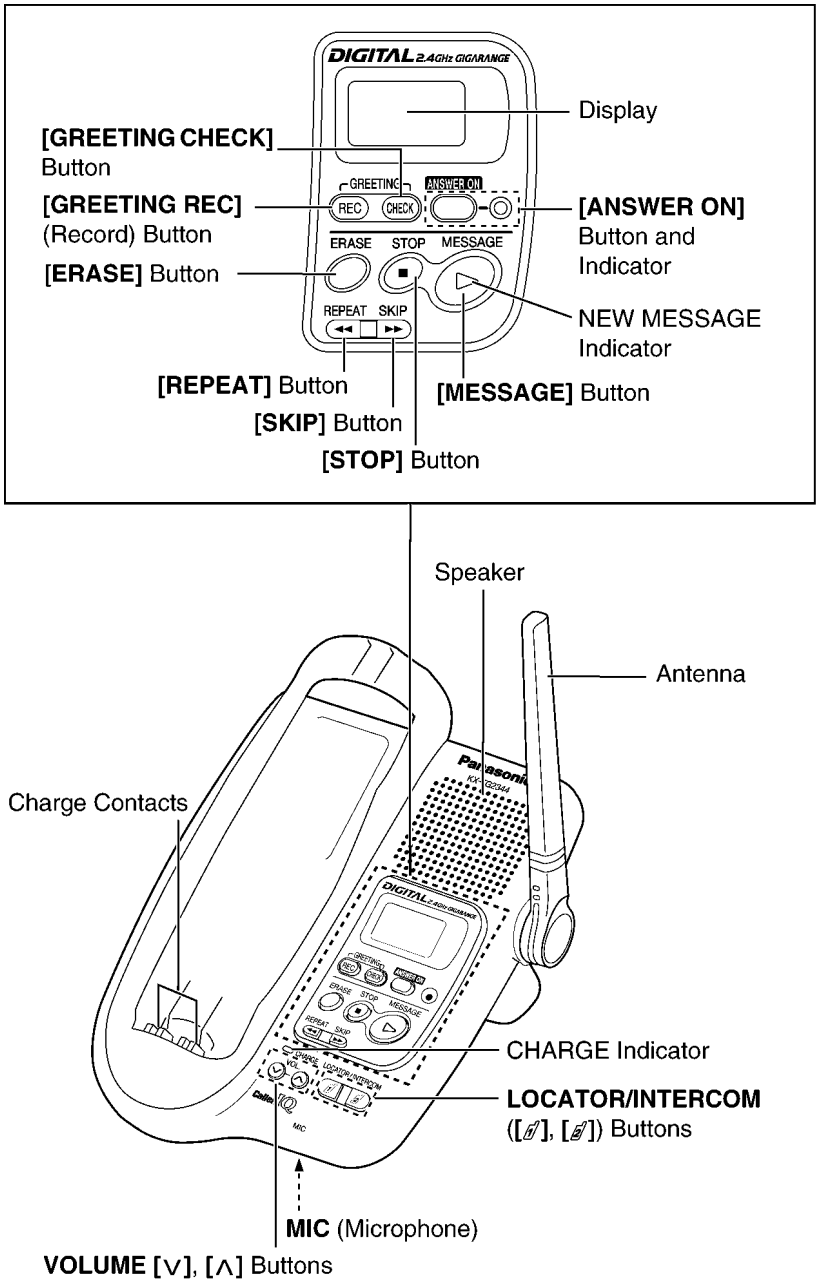
Insert the battery (①), and press it down until it snaps into the compartment (②). Close the cover.



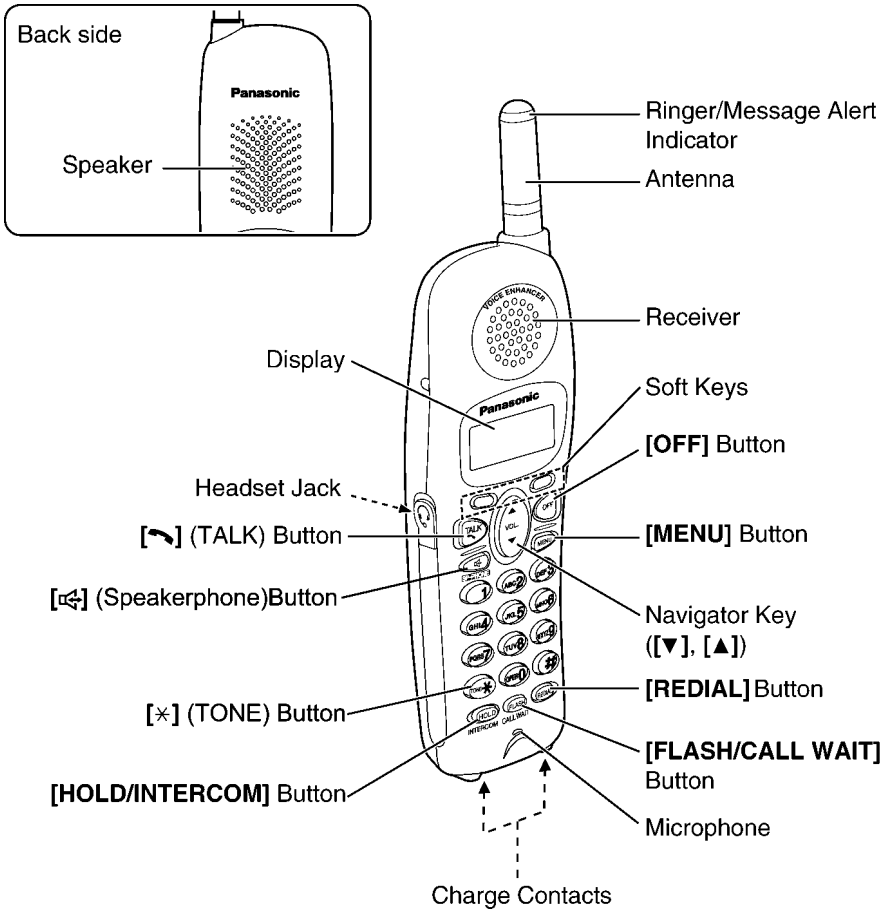
A nickel metal hydride battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY for information on how to recycle this battery.

3 LOCATION OF CONTROLS

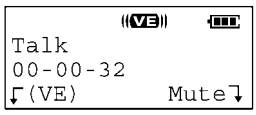
3.1. Base unit



3.2. Handset



Handset soft keys



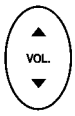
Two soft keys are used to select functions displayed directly above each key. Functions displayed above the keys will change depending on the state of use.
On this sample display, "(VE)" and "Mute" are displayed above soft keys.

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

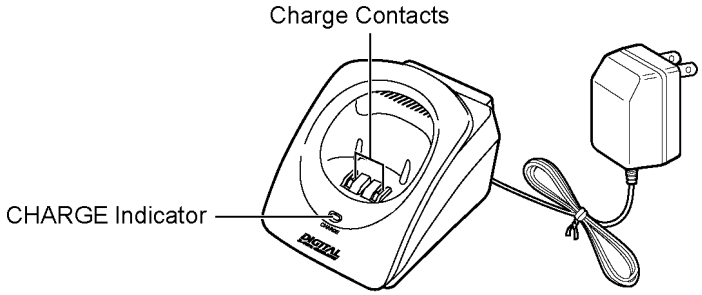


Scrolls up **[▲]** and down **[▼]** the function menu, the Caller List and the phone book.
Increases **[▲]** or decreases **[▼]** the handset ringer and receiver/speaker volumes.

Throughout this Service Manual:

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

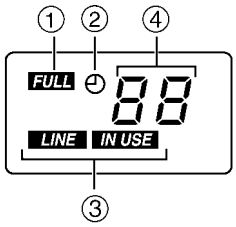
3.3. Charger Unit



This unit includes two handsets and one base unit. **The included handsets are pre-registered at the factory and assigned the extension numbers 1 and 2.**

4 DISPLAYS

4.1. Base Unit Display



① "FULL" flashes when no new messages can be recorded. Erase unnecessary messages.

② "◴" flashes until you set the date and time, and flashes after a power failure. If it is flashing, set the date and time.

③ "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 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.

④ 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 was not recorded correctly.

4.2. Troubleshooting (Handset LCD)

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

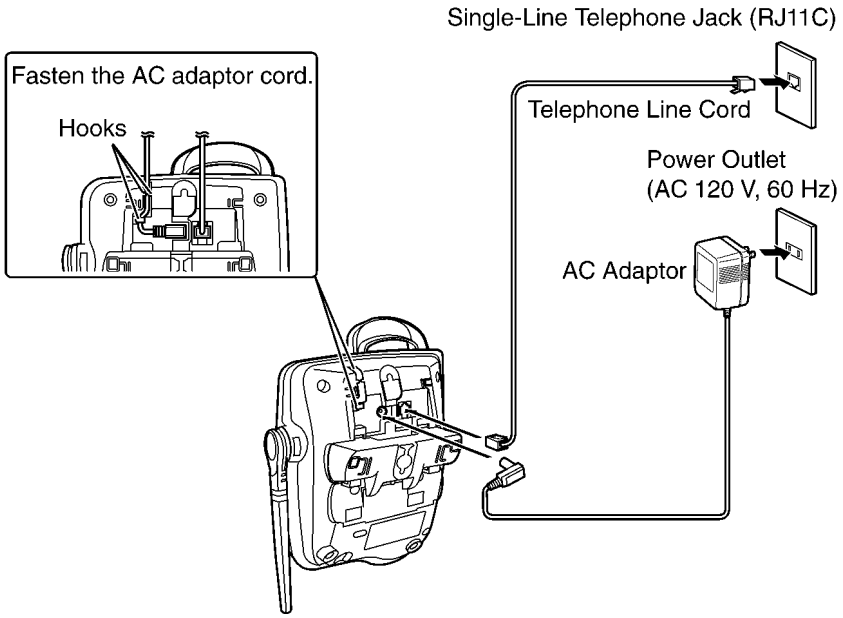
Display message	Cause & Remedy
Recharge battery	• The battery needs to be charged. Recharge the battery.
Charge for 6h	• The battery has been discharged. The handset will not work. Fully charge the battery.
No link to base. Move closer to base, try again.	• The handset has lost communication with the 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 or charger. Lift the handset and press the button again.
Busy	• The base unit and/or another handset is in use. Try again later. • The handset you are calling is too far from the base unit. 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. • Another handset tried to send phone book items to you but the copying stopped.
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.	• If the base unit or another handset is in use, such as conducting outside/intercom calls or listening to messages, you may not be able to use the handset. Try again later. • The handset you tried to send phone book items to is in use. • 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.

Display message	Cause & Remedy
---Incomplete--- Phone book full	When phone book item(s) was(were) sent to another handset, the phone book memory was full and copying stopped. Press [OFF] to exit. To erase items from another handset phone book, see **"Erasing an item in the Phone Book".** You can copy all of the items again or copy the items which have not been copied one by one.
Example Tom Jones 555-765-4321	When you tried to send phone book items, the other handset lost communication with the base unit, or the other handset made an outside call by pressing **[ ]** or **[ ]**. The handset displays the phone book item which was not copied to the other handset. Press **[OFF]**, then try again.
No items stored	Your phone book is empty. No items were copied to another handset.
Line in use	Another handset is conducting an outside call or a parallel connected telephone is in use.
Line on hold	Another handset is on hold for an outside call.

5 SETTINGS

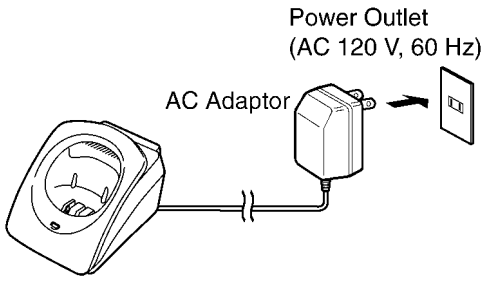
5.1. Connections

5.1.1. Base Unit



- USE ONLY WITH Panasonic AC ADAPTOR PQLV1Z.
- 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 the Panasonic KX-J66 T-adaptor.

5.1.2. Charger Unit

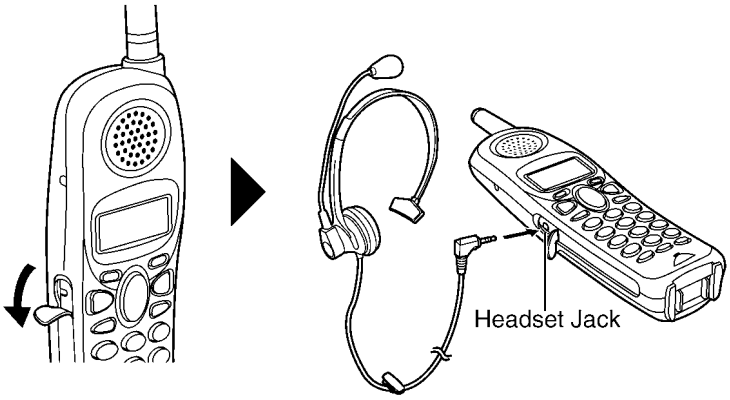


- Charger unit: USE ONLY WITH Panasonic AC ADAPTOR KX-TCA1-G.
- The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)

5.2. Connecting an Optional Headset

Connecting an optional headset to the handset allows hands-free phone conversation. Please use only a Panasonic KX-TCA60, KX-TCA86, KX-TCA88, KX-TCA88HA, KX-TCA91, KX-TCA92, or KX-TCA98 headset.

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



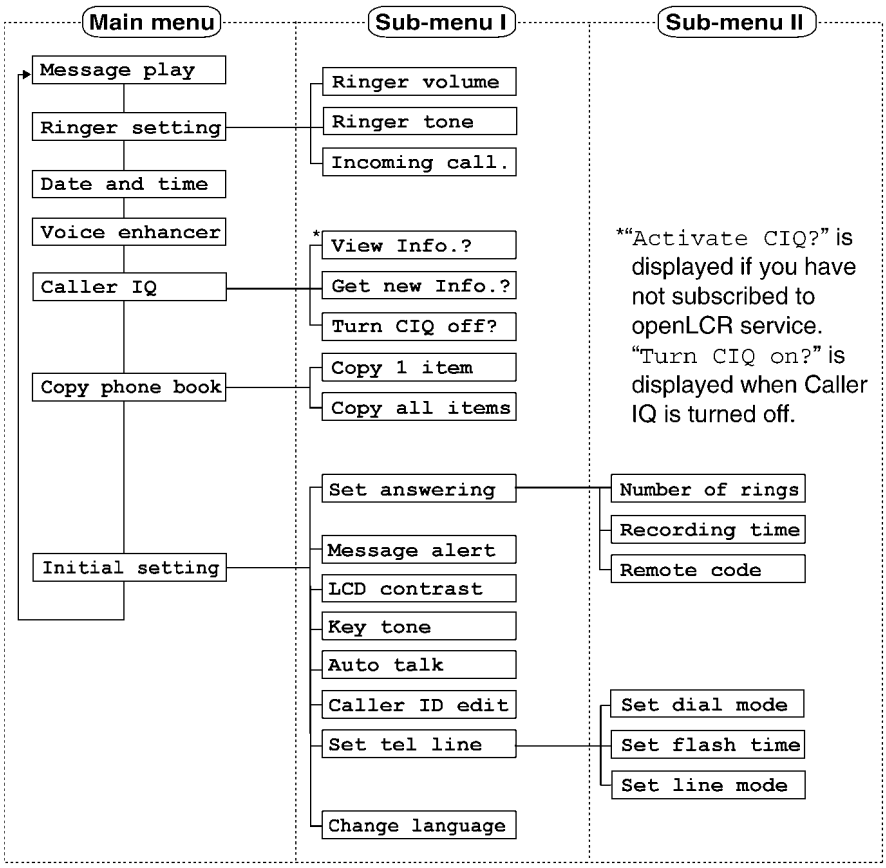
• Headset sold separately. Model shown here is KX-TCA88.

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

5.3. Function Menu Table

You can use the following functions to customize your unit. See the corresponding pages for function details.

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



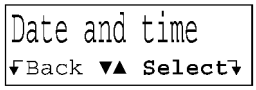
- If you program the date and time, dialing mode, flash time, line mode, number of rings, recording time or the remote code using one of the handsets, you will not need to program the same item using another handset.

5.4. Date and Time

We recommend you set the date and time so that the unit will announce the day and time each message was recorded when you play back messages.

1 Press **[MENU]**.

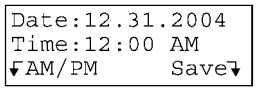
2 Scroll to "Date and time" by pressing **[▼]** or **[▲]**, then press **Select**.



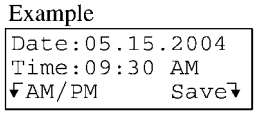
3 ① Enter 2 digits each for the month, day, and year. (Ex. To set May 15, 2004, enter "05 15 04".)

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

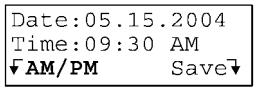
- If you enter a wrong number, press **[▼]** or **[▲]** to move the cursor to the incorrect number. Enter the correct number.



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, set the date and time again.

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

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

For Caller ID service users

- When a call is received, Caller ID information adjust the date and time if the time is incorrect.
- Caller ID information will automatically adjust the date and time for daylight saving time.
- If the date and time have not previously been set, Caller ID information will not adjust the date and time.

5.5. Display Language

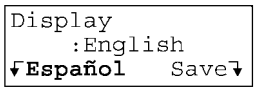
You can select either "English" or "Spanish" as the display language. The factory preset is "English".

1 Press **[MENU]**.

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

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

4 To change from English to Spanish, press **`Español`**.
To change from Spanish to English, press **`English`**.



- The display changes to the selected language.
- You can also select a language by pressing **[▼]** or **[▲]**.

5 When Spanish is selected, press **`Salvar`**, then press **[OFF]**.
When English is selected, press **`Save`**, then press **[OFF]**.

- If you select a language you cannot read, change the display language again using direct commands.

5.6. 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".

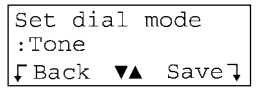
1 Press **[MENU]**.

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 **[▲]**.



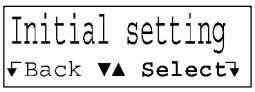
6 Press **`Save`**, then press **[OFF]**.

5.7. 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]**.

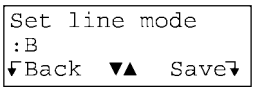
2 Scroll to "Initial setting" by pressing **[▼]** or **[▲]**, then press **Select**.



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 **[▲]**.



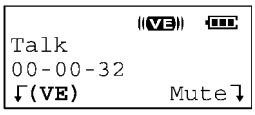
6 Press **Save**, then press **[OFF]**.

5.8. 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]**.

5.9. Ringer Tone

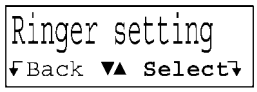
You can set the handset ringer to use one of 7 ringer patterns for outside calls. "Tone 1" to "Tone 3" are bell ringer patterns. "Melody 1" to "Melody 4" are melody patterns. The factory preset is "Tone 1".

- You cannot change the ringer tone for intercom calls.
- If you subscribe to a Distinctive Ring Service (such as IDENTA-RING) from your telephone company with 2 or 3 consecutive rings, select a bell ringer pattern (Tone 1 to 3). If you select a melody pattern, you will not be able to distinguish lines by their ringers.
- 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.

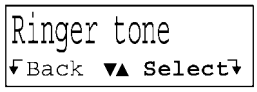
Handset ringer tone

1 Press **[MENU]**.

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

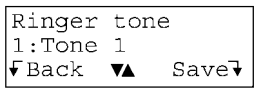


3 Scroll to "`Ringer tone`" by pressing **[▼]** or **[▲]**, then press **`Select`**.



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]**.

5.10. 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	**[1] [2]**	**[1]**–**[3]** :Tone pattern 1–3 **[4]**–**[7]** :Melody pattern 1–4
Incoming call tone	**[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
Activate Caller IQ *1	**[7] [1]**	
View information *3	**[7] [2]** *4	Go to Step 4 of **To View information**.
Get new information *2	**[7] [3]** *4	Go to Step 4 of **To download data from OpenLCR**.
Turn Caller IQ off *2	**[7] [4]** *4	
Turn Caller IQ on *2	**[7] [5]** *4	
Copy phone book –Copy 1 item	**[#] [1]**	Go to Step 4 of **Copying Items in the Phone Book**.
Copy phone book –Copy all items	**[#] [2]**	
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
Caller ID number auto edit	**[0] [4]**	**[1]** : On **[0]** : Off
Set dial mode	**[0] [5] [1]**	**[1]** : Pulse **[2]** : Tone
Set 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
Set 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 **Remoto Code**.
Change language	**[0] [8]**	**[1]** : English **[2]** : Spanish
Message alert	**[0] [#]**	**[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.

*1 Can be used to activate Caller IQ. See the leaflet included with this unit for more information.
*2 For openLCR subscribers only.
*3 For openLCR subscribers only. If information is not downloaded to your unit, "Get new Info.?" will be displayed.
*4 After pressing **[7]**, make sure "View Info.?" is displayed, then press the next command.
If Caller IQ is turned off, "Turn CIQ on?" is displayed after pressing **[7]**.

6 OPERATION

6.1. Answering System

6.1.1. 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 and incoming) is **about 15 minutes**.
We recommend you record **a brief greeting message** in order to leave more time for recording new messages.

To record a greeting message

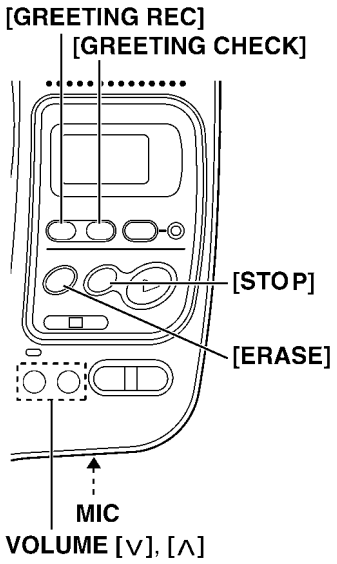
Sample greeting message
"Hello, this is (your name and/or number). Sorry, I cannot take your call. Please leave a message after the beep. Thank you."

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 20 cm (8 inches) 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.

6.1.2. Caller's Recording Time

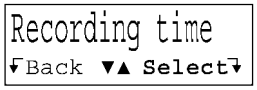
You can select "1 minute", "2 minutes", "3 minutes" or "Greeting only" for the caller's recording time. The factory preset is "3 minutes".

1 Press **[MENU]**.

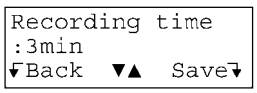
2 Scroll to "`Initial setting`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

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.

6.1.3. Message Alert

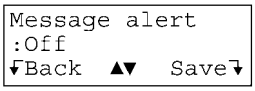
You can select whether or not the Ringer/Message Alert indicator on the handset will flash slowly when new messages have been recorded. The factory preset is OFF.

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 will be shortened when using this feature.

6.1.4. Erasing Messages

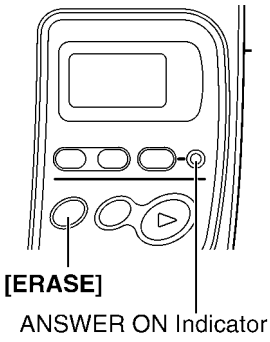
The unit will announce the remaining recording time after playback if it is less than 3 minutes. New messages cannot be recorded when:
—"Memory full" is heard.
—" FULL " flashes on the base unit.
— the ANSWER ON indicator flashes rapidly (when the Answering System is on).
Erase unnecessary messages. 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]**.



<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.

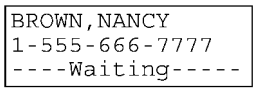
6.2. For Call Waiting Service Users

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.

Call Waiting Caller ID display

If you subscribe to both Caller ID and Call Waiting with Caller ID services (CWID), when a second call is received while talking, the second caller's information will be displayed. After you hear a call waiting tone while talking, the display shows the caller's name with the phone number and "----Waiting-----".



- Contact your telephone company for details about availability in your area, and to verify that CWID is activated on your telephone line.
- The caller's information will only be shown on the display of the handset which is on the outside call.

6.3. Using the PAUSE Key

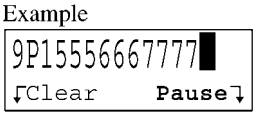
(For PBX Line/Long Distance Calls)

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

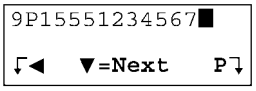
Ex. Line access number **[9]** (PBX)

[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.

6.4. 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.

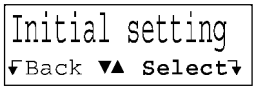
Selecting the flash time

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]**.

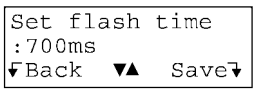
2 Scroll to "`Initial setting`" by pressing **[▼]** or **[▲]**, then press **`Select`**.



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]**.

6.5. 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.

↓

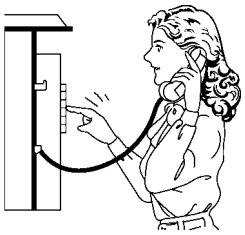
Enter your remote code during or after the greeting message.
- The number of new messages is heard, and the new messages will be played.*

↓

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.

6.5.1. Remote Code

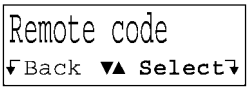
The remote code prevents unauthorized people from accessing your unit and listening to your messages. Choose any **2-digit number (00–99)** for your remote code. The factory preset remote code is "**11**". If you do not program your own remote code, you can use "11".

1 Press **[MENU]**.

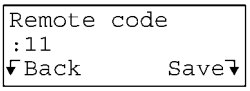
2 Scroll to "`Initial setting`" by pressing **[▼]** or **[▲]**, then press **`Select`**.

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)**.

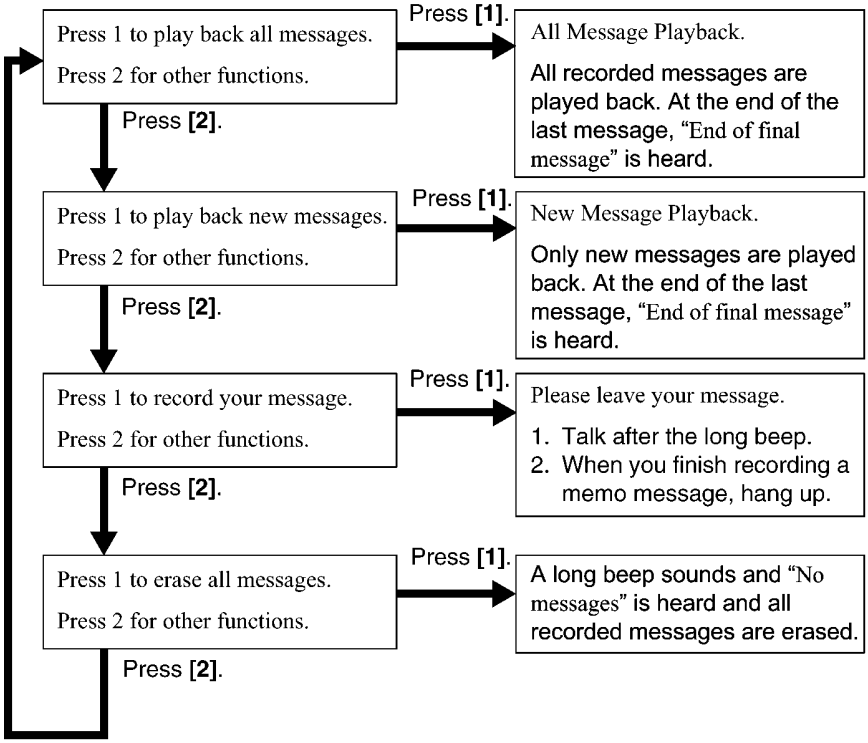


6 Press **`Save`**, then press **[OFF]**.

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

6.5.2. 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 3minutes.
- 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.

6.5.3. Direct Remote Operation

Once you have entered the remote code, you can also control your unit by direct commands instead ofusing 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.
[✳] [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.

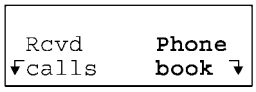
- The unit skips the rest of the greeting and you can start recording your message after the long beep.

6.6. Phone Book

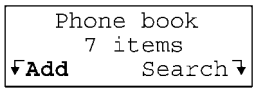
The handset can store up to 30 names and phone numbers in its phone book. You can make a call by selecting a name or number from the phone book, and copy phone book items from one handset to another.

6.6.1. Storing Names And Numbers

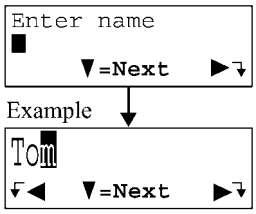
1 Press **Phone book**.



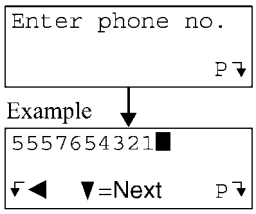
2 Press **Add**.
- The display will show the number of stored items.



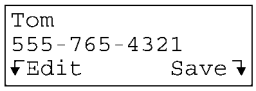
3 Enter a name of up to 16 characters with the dialing buttons (**[0]** to **[9]**), then press **[▼]**.
- If a name is not required, press **[▼]** then go to step 4.



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]**.

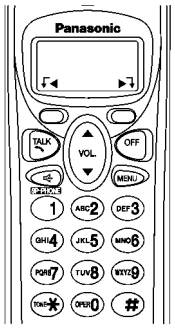
- To store numbers for calling card access (see "Chain Dial"), we recommend you add pauses after each item. Storing pauses with numbers will prevent misdialing. The delay time necessary will depend on your telephone company.

Selecting characters to enter names

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

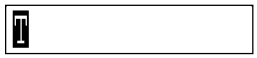
• Pressing each button selects a character in the order shown below.

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.)		



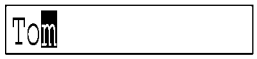
For example, to enter "Tom":

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



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

3 Press **[6]** once.



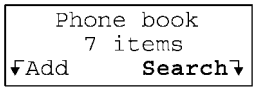
If you make a mistake when entering a name or number

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 ◄.

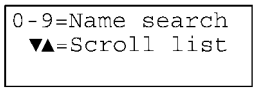
6.6.2. Dialing from the Phone Book

1 Press **Phone book**.

2 Press **Search**.

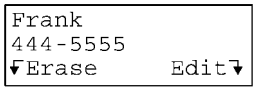


3 Scroll to the desired item. To scroll down, press **[▼]**. To scroll up, press **[▲]**.



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

6.6.3. 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.

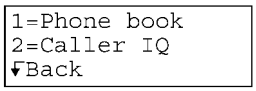
Ex. Using a long distance calling card

- 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.

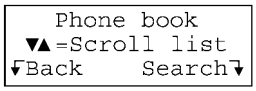
1. Search and dial from phone book: 1-800-012-3456 (Calling card access number).
   - The voice guidance may be announced.
2. Search and dial from phone book: 1234 (Calling card PIN).
3. Search and dial from phone book: 1-555-012-3456 (Destination number).

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

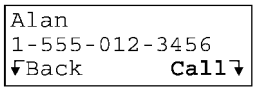
2 Press **[1]** to select "1=Phone book".



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



4 Press **Call**.
- The phone number is dialed.
  If required, repeat steps 1 to 4 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.

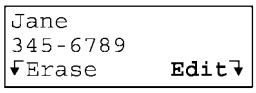
6.6.4. Editing an Item in the Phone Book

1 Press **Phone book**.

2 Press **Search**.

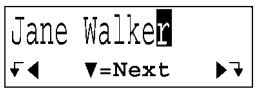
3 Scroll to the desired item by pressing **[▼]** or **[▲]**, then press **Edit**.

- To search for the item by initial, see "**To search for a name by initial**".



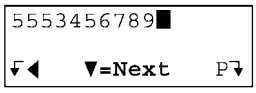
4 Edit the name, then press **[▼]**.

- 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 step 3.

7 Press **[OFF]**.

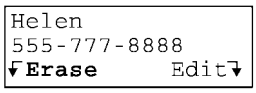
6.6.5. Erasing an Item in the Phone Book

1 Press **Phone book**.

2 Press **Search**.

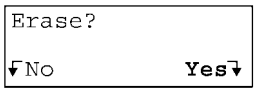
3 Scroll to the desired item by pressing **[▼]** or **[▲]**, then press **Erase**.

- To search for the item by initial, see "**To search for a name by initial**".



4 Press **Yes**.

- To erase other items, repeat from step 3.



5 Press **[OFF]**.

- To cancel erasing, press **No** after step 3.

7 TROUBLESHOOTING

If the handset display shows error messages, see "Troubleshooting (Handset LCD)"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.
The handset does not ring.	• The ringer volume is turned off. Set to high, medium, or low.
The handset display is blank.	• If the only 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.
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 **[ ]**. 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 redial.	• If the last number dialed was more than 48 digits long, the number will not be redialed correctly.

Cross Reference:

(*1)Re-registering a Handset (P.52)

(*2)Battery Charge (P.8)

Note for Service:

In case you cannot talk on one of two Handsets, replace their extension numbers as in the steps below:

1. Change the extension number of the Handset on which you CAN talk into the number of the other Handset on which you CANNOT talk.
2. Change the extension number of the Handset on which you CANNOT talk into the number of the other Handset on which you CAN talk.

Lastly, re-register both Handsets to the Base Unit.

Problem	Cause & Remedy
You cannot make long distance calls.	• Please make sure you have long distance service. • Check if Caller IQ is on. Turn Caller IQ off.
The handset does not display the caller's name and/or 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.
The handset cannot automatically edit the Caller List/incoming phone numbers.	• The Caller ID number auto edit feature is turned off. Turn it on and try again. • You need to press **[ ]** or **[ ]** after editing the number.
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. (*3) or listen to the new messages.
You cannot have a conversation using the headset.	• Make sure the optional headset is connected properly. (*4) • If " SP-phone" is displayd on the handset, press **[ ]** to switch to the headset.

Cross Reference:

(*3)Message Alert (P.27)

(*4)Connecting an Optional Headset (P.17)

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”. (*5) • Memory is full. Erase unnecessary messages. (*6)
“ FULL ” flashes and the ANSWER ON indicator flashes rapidly. No new messages are recorded.	• Memory is full. Erase unnecessary messages. (*6)
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.(*7) • 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.
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.(*8)

Cross Reference:

(*5)Caller’s Recording Time (P.26)

(*6)Erasing Messages (P.28)

(*7)Remote Code (P.31)

(*8)Date and Time (P.19)

General

Problem	Cause & Remedy
The handset and/or base unit does not work.	• Check the settings. (*9) (*10) • Check whether the dialing mode setting is correct. (*11) • Fully charge the battery. (*12) • Clean the charge contacts and charge again. (*13) • Check battery installation. (*14) • Unplug the base unit's AC adaptor to reset it. Plug in, and try again. • Re-install the battery and fully charge it. (*14)
"Recharge battery" is displayed, "▭" flashes, or the handset beeps intermittently.	• Fully charge the battery. (*12)
"Charge for 6h" and "▭" are displayed and the handset does not work.8	• The battery has been discharged. Fully charge the battery. (*12) • Check battery installation. (*14)
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. • The battery may need to be replaced. If you install a new battery, fully charge it. (*12)
The CHARGE indicator does not go out after the battery has been charged.	• This is normal.
If you cannot solve your problem.	• Visit our website: http://www.panasonic.com/support • Contact us via the web at: http://www.panasonic.com/contactinfo • Call our customer call center at: 1-800-211-PANA(7262)
When you try to download the data from openLCR, the voice prompt is not announced from the handset while "Listen & follow phone guidance." is being displayed.	• Check the settings. • Dialing to openLCR may have been disconnected. Try again. • If you cannot solve a problem, consult openLCR (see below).
For more information about Caller IQ	• Call openLCR's customer service department at 1-866-openLCR(1-866-673-6527). • openLCR's web site: www.openLCR.com

Cross Reference:

(*9)BATTERY (P.8)

(*10)Connections (P.16)

(*11)Dialing Mode (P.20)

(*12)Battery Charge (P.8)

(*13)Recharge (P.8)

(*14)Battery Replacement (P.9)

8 DISASSEMBLY INSTRUCTIONS

8.1. Base Unit

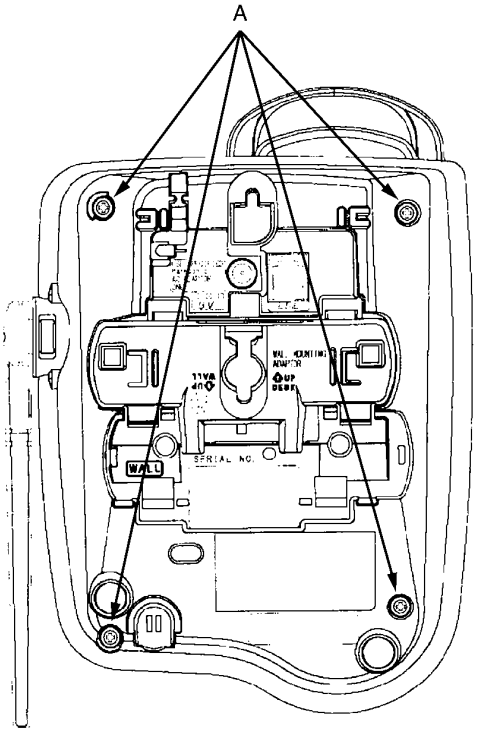


Fig. 1

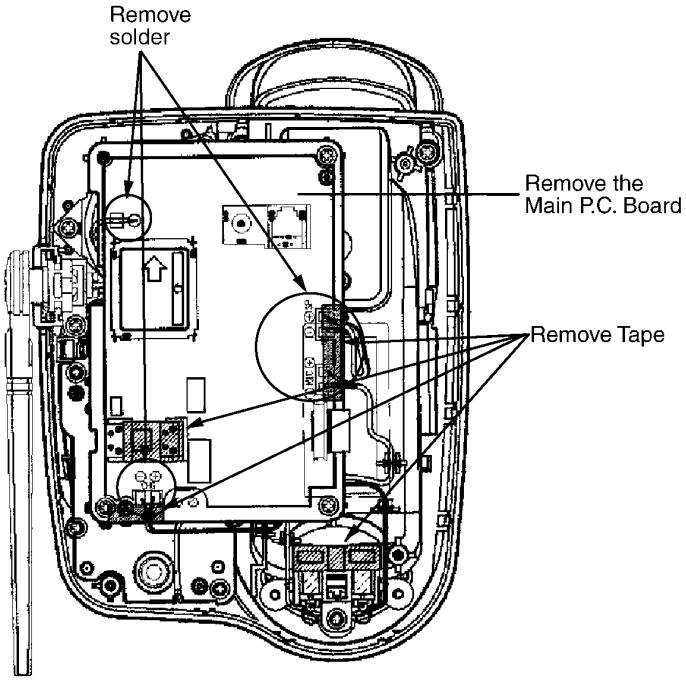


Fig. 2

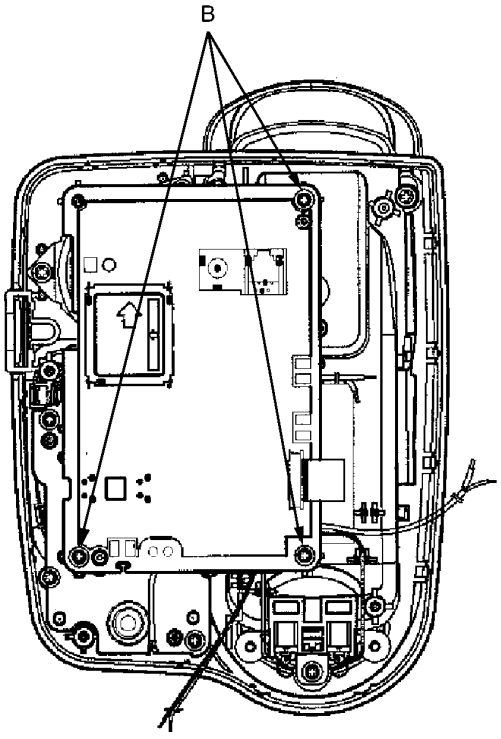


Fig. 3

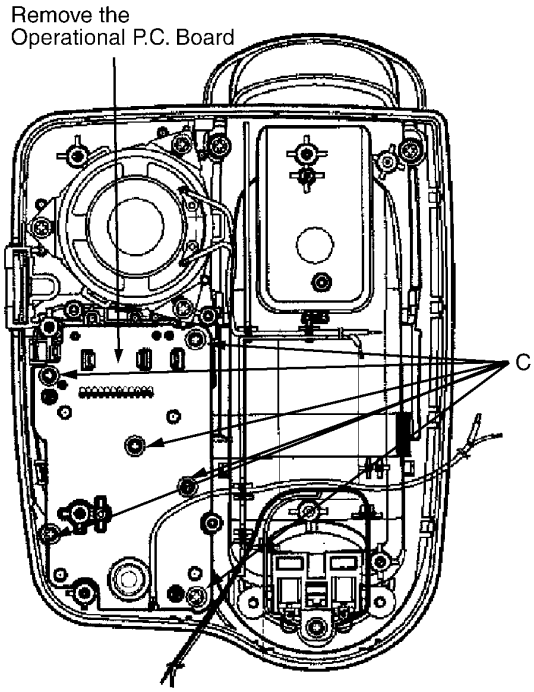


Fig. 4

Shown in Fig.-	To Remove	Remove
1	Lower Cabinet	Screws (2.6 × 12).....(A) × 4
2	Main P.C. Board	Tape and Solder
3		Screws (2.6 × 8).....(B) × 3
4	Operational P.C. Board	Screws (2.6 × 8).....(C) × 6

8.2. Handset

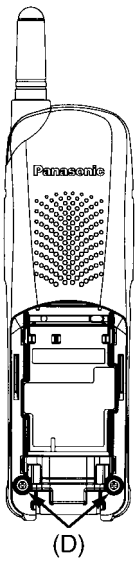


Fig. 4

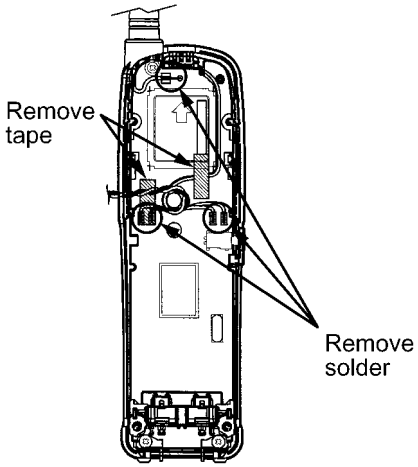


Fig. 6

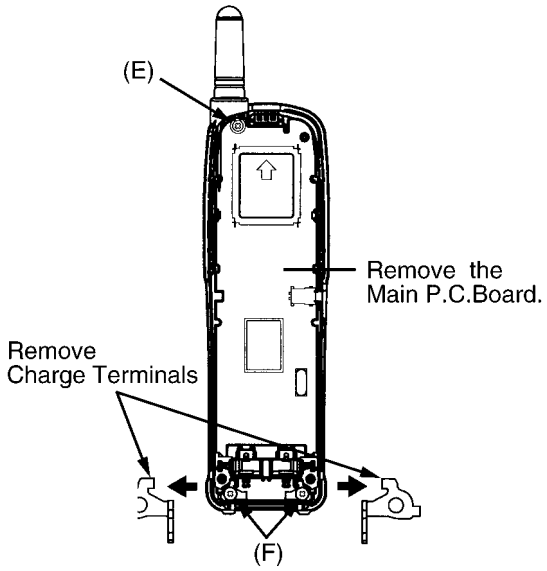


Fig. 7

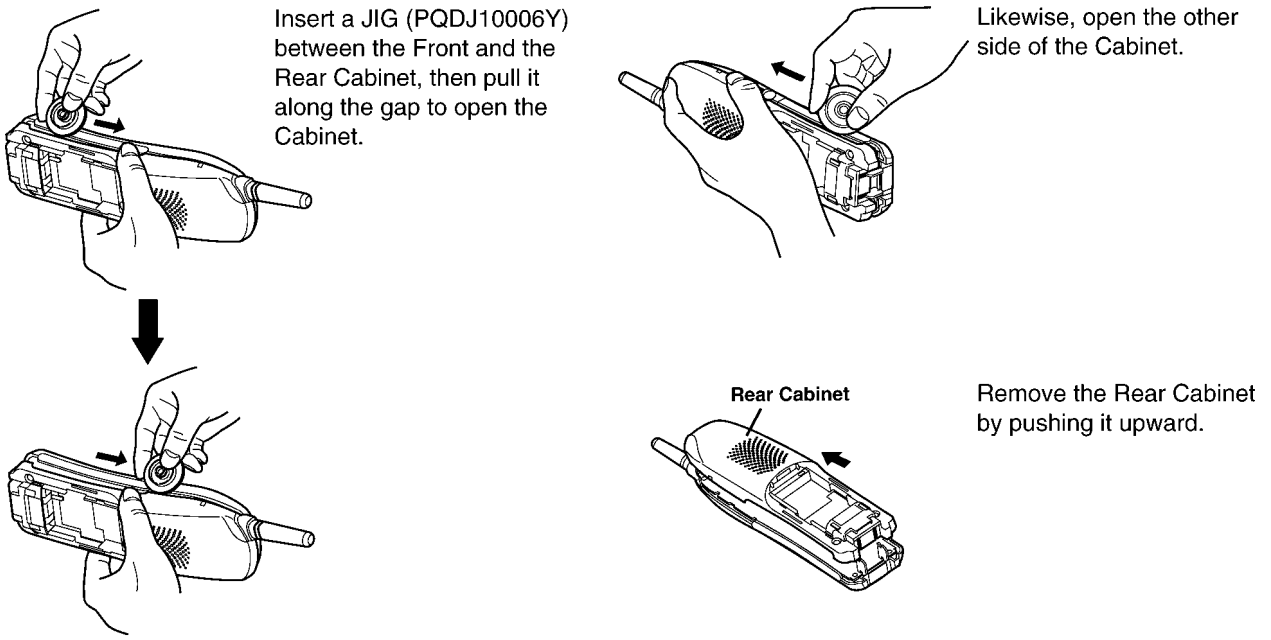


Fig. 5

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

8.3. Charger Unit

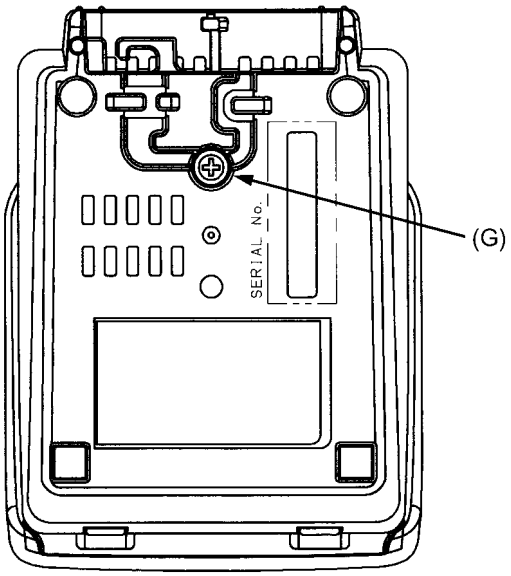


Fig. 8

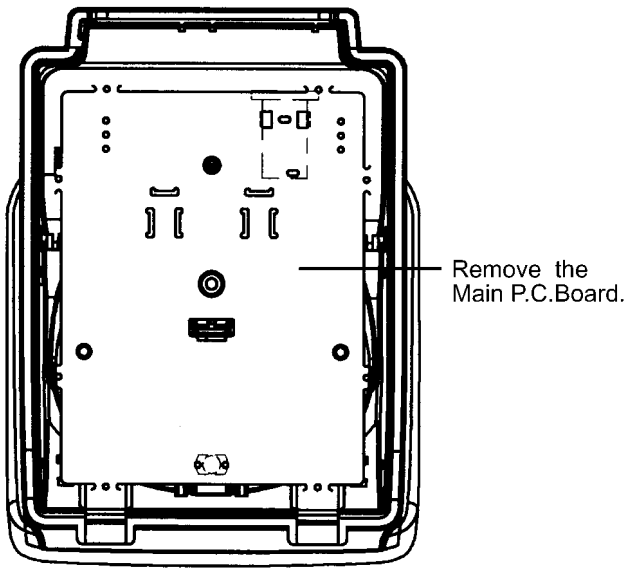
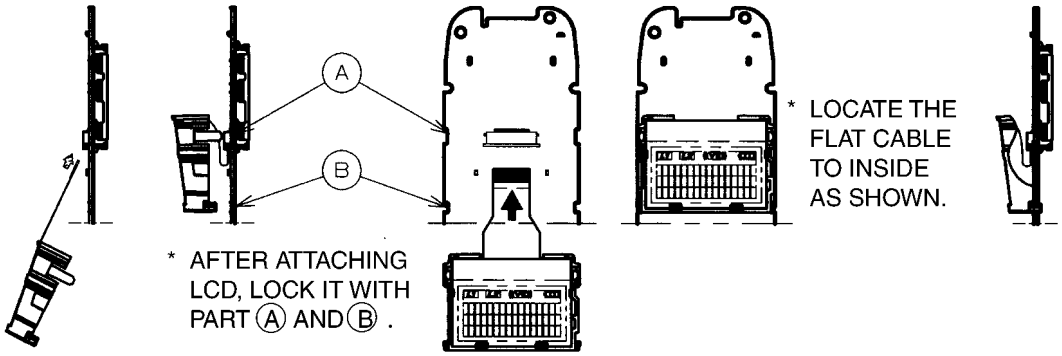


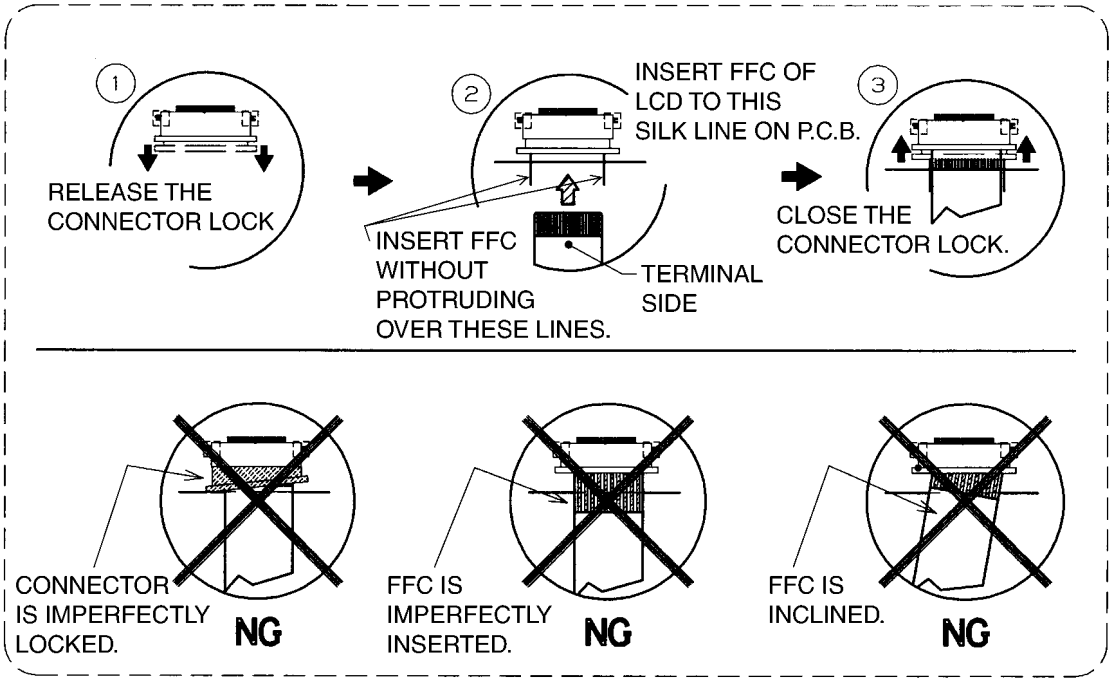
Fig. 9

Shown in Fig.-	To Remove	Remove
8	Lower Cabinet	Screw (2.6 × 12).....(G) × 1
9	Main P.C. Board	Main P.C. Board

9 ASSEMBLY INSTRUCTIONS

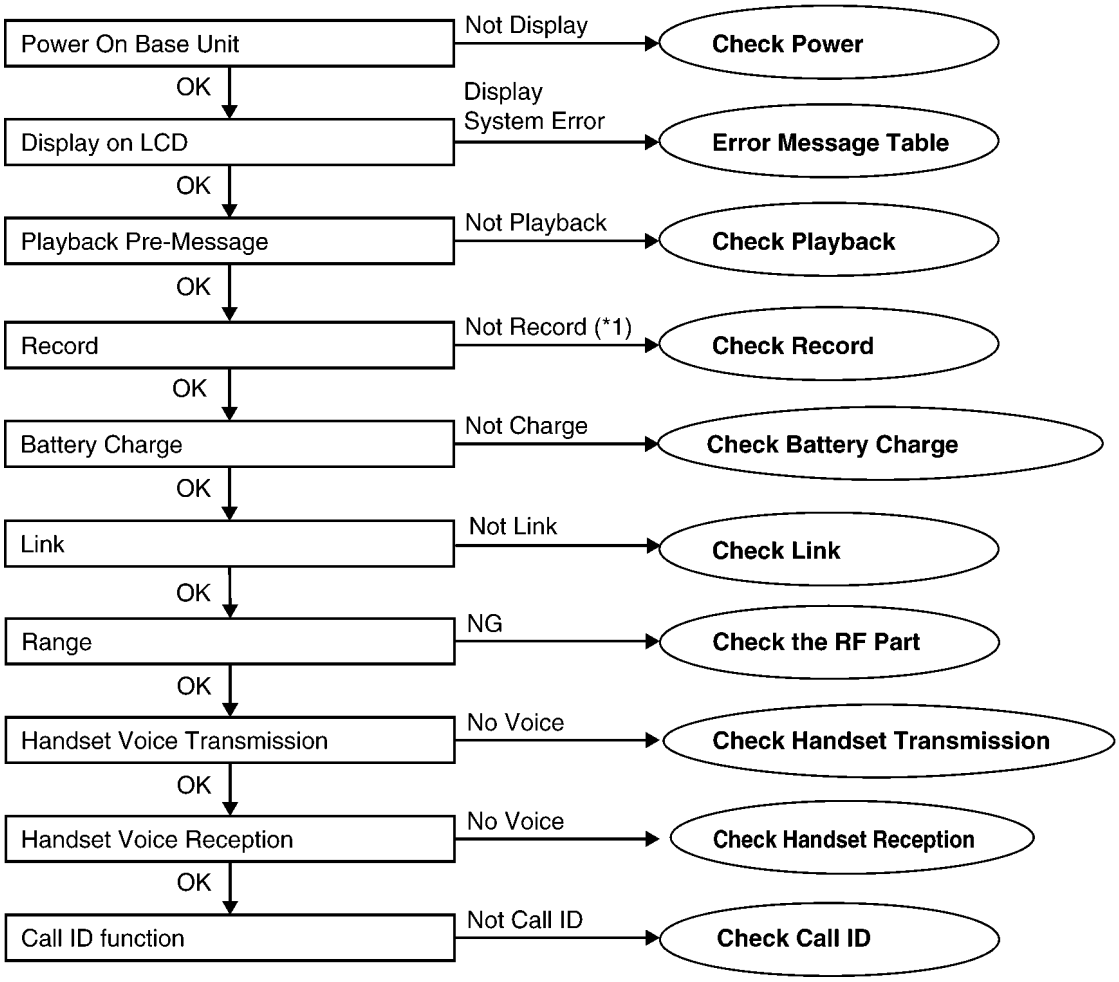
9.1. Fix the LCD to P.C. Board (Handset)





10 TROUBLESHOOTING GUIDE

FLOW CHART



Cross Reference:

Check Power (P.48)
Error Message Table (P.48)
Check Playback (P.50)
Check Record (P.49)
Check Battery Charge (P.50)
Check Link (P.51)
Check the RF Part (P.52)
Check Handset Transmission (P.56)
Check Handset Reception (P.56)
Check Caller ID (P.56)

Note:

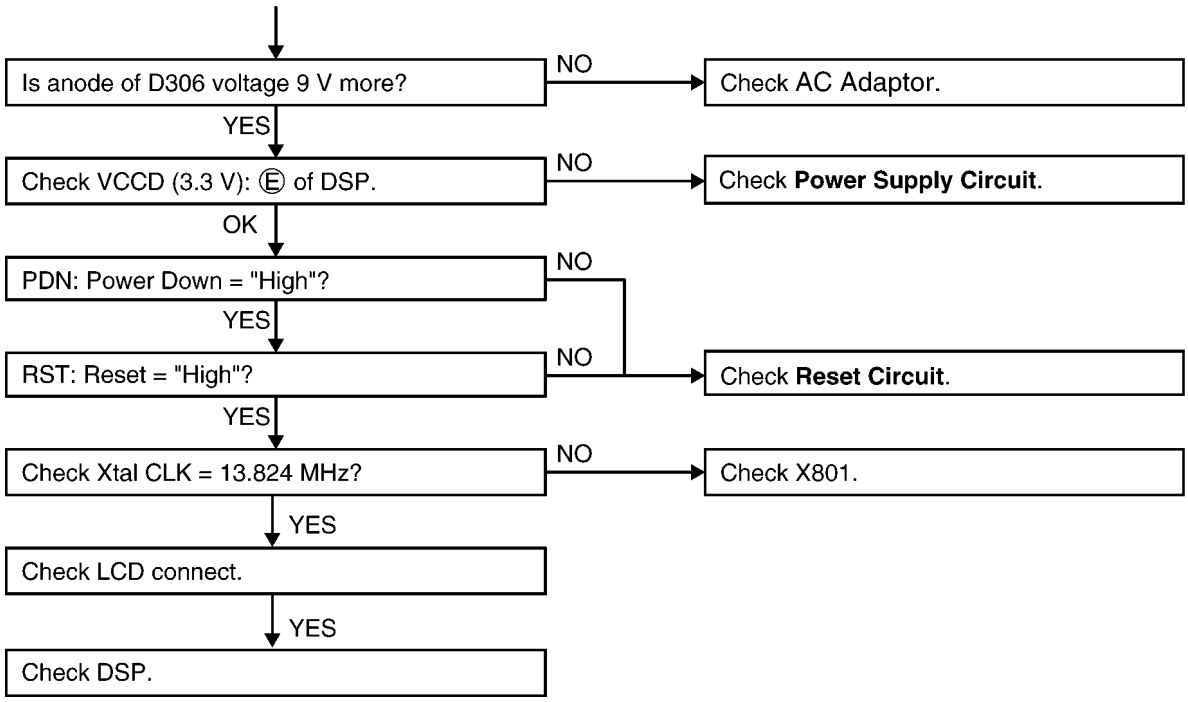
(*1) When a user claims that the unit disconnects a call right after the greeting message and no incoming messages can be recorded, this symptom can not be reappeared with TEL simulator in the service center. So in that case try **Check Record** item (C).

10.1. Check Power

BASE UNIT

Is the AC Adaptor inserted into 120V outlet?

(AC Adaptor PQLV1Z)



Cross Reference:

Power Supply Circuit (P.76)

Reset Circuit (P.78)

NOTE:

DSP is IC501.

10.2. 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.)	

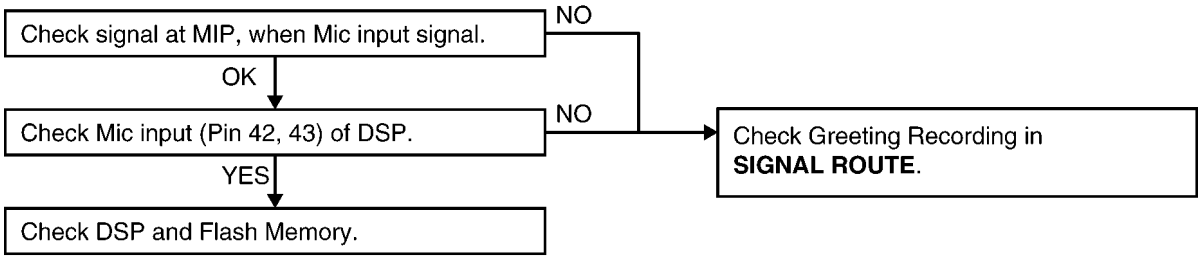
NOTE:

Flash Memory is IC701.

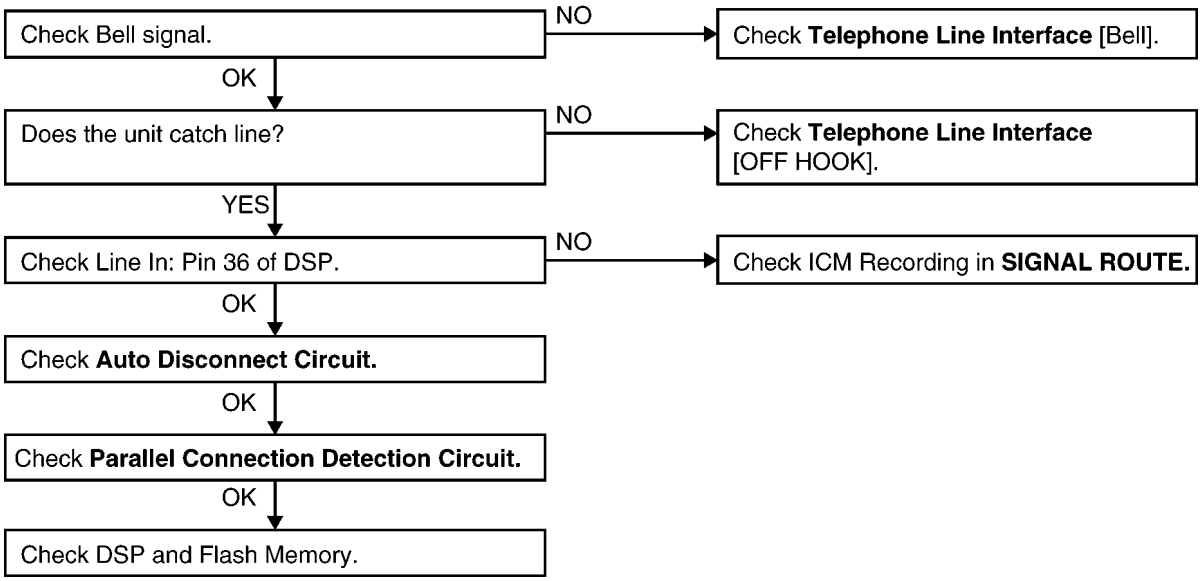
10.3. Check Record

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.79)

Auto Disconnect Circuit (P.80)

Parallel Connection Detect Circuit (P.81)

SIGNAL ROUTE (P.90)

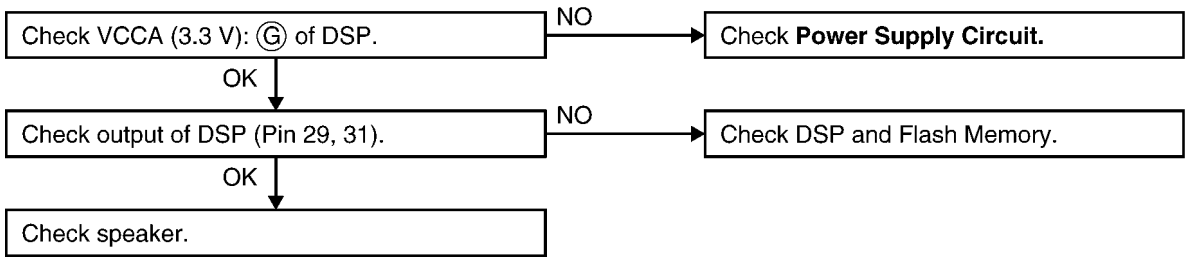
NOTE:

Flash Memory is IC701.

DSP is IC501.

10.4. Check Playback

BASE UNIT



Cross Reference:

Power Supply Circuit (P.76)

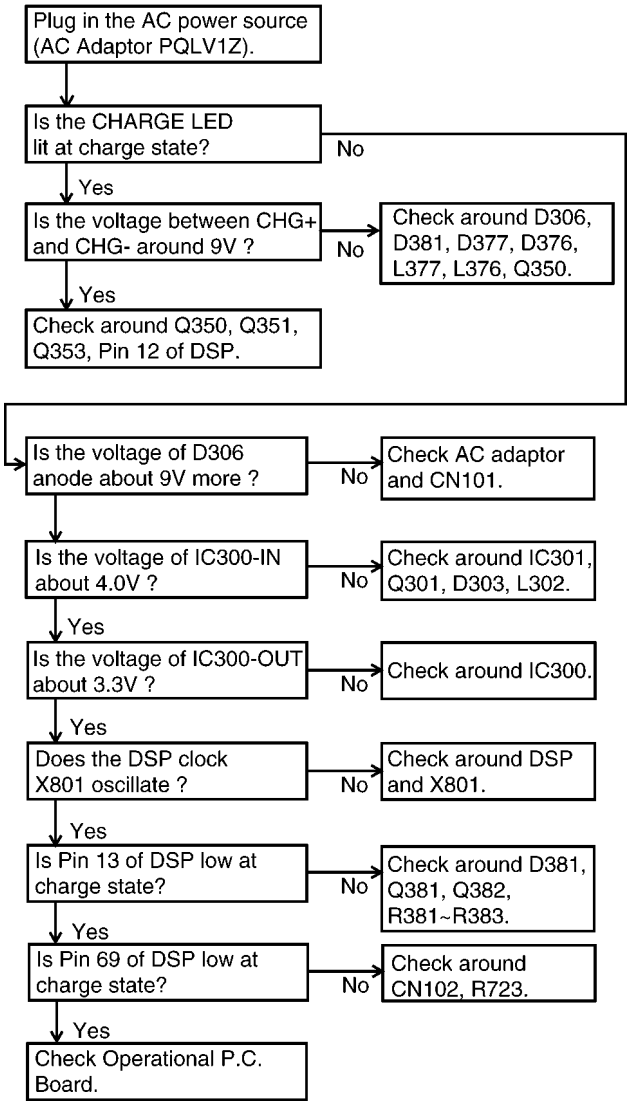
NOTE:

Flash Memory is IC701.

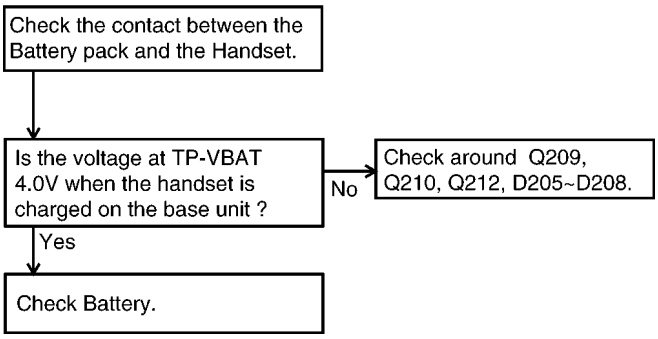
DSP is IC501.

10.5. Check Battery Charge

BASE UNIT



HANDSET

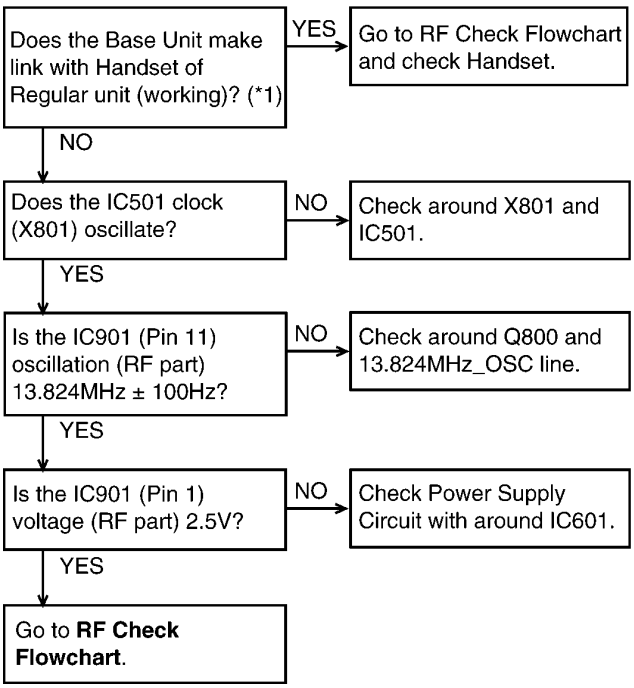


NOTE:

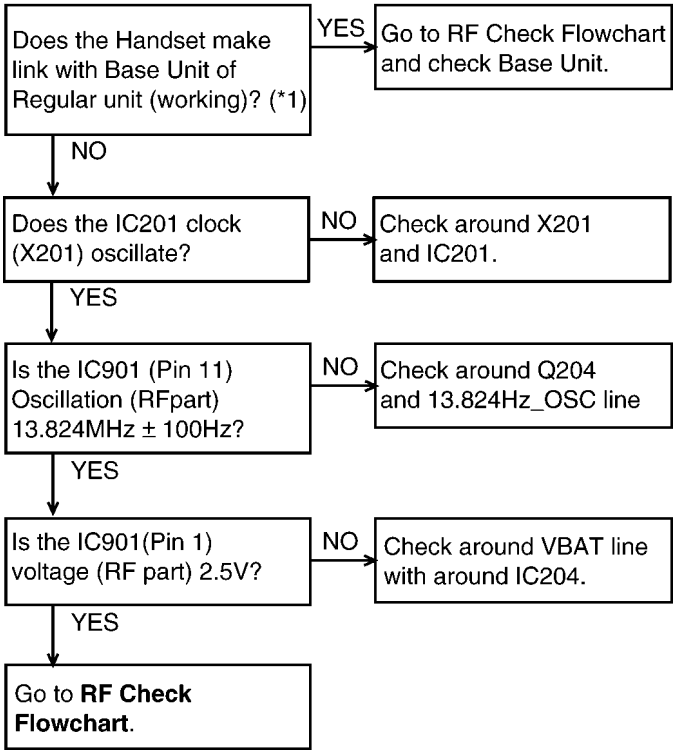
DSP is IC501.

10.6. Check Link

BASE UNIT



HANDSET



(*1) Refer to **Finding Out the Defective Part** (P.52).

Cross Reference:

RF Check Flowchart (P.53)

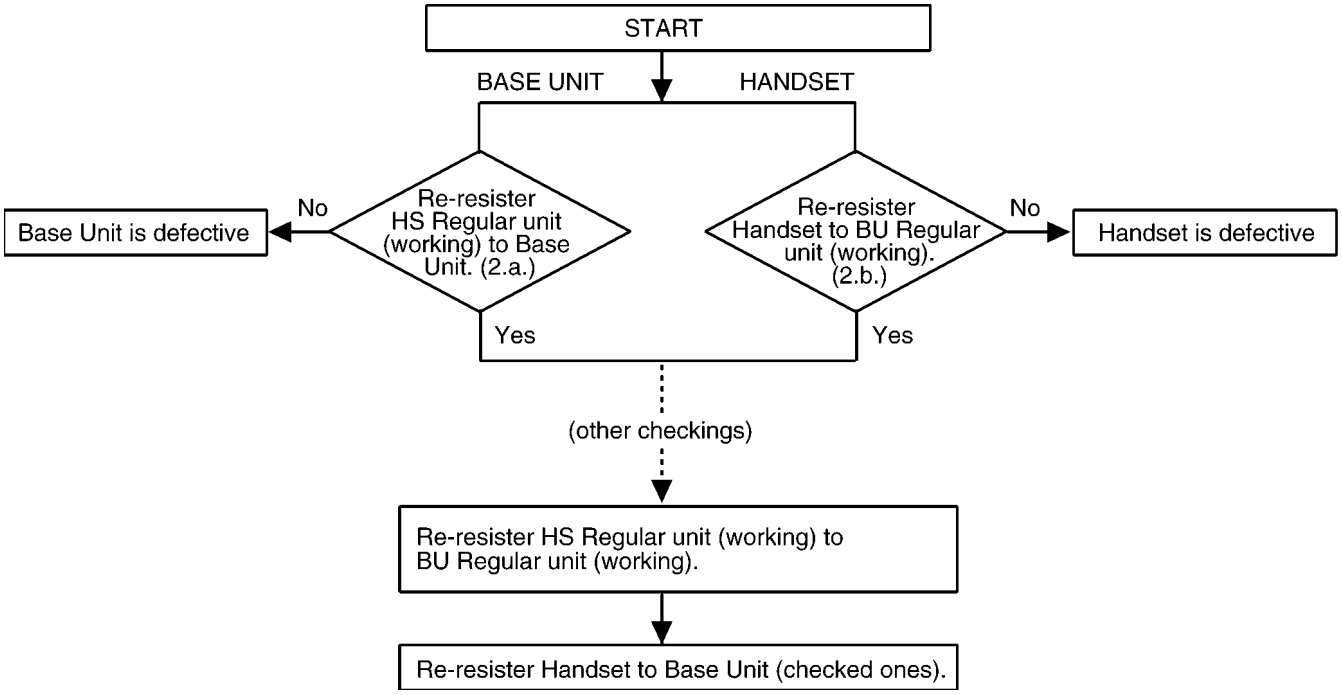
10.7. Check the RF Part

10.7.1. 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).

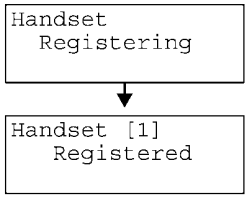


10.7.1.1. Re-registering a Handset

- **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 (** 1 or 2 **)]** 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.**

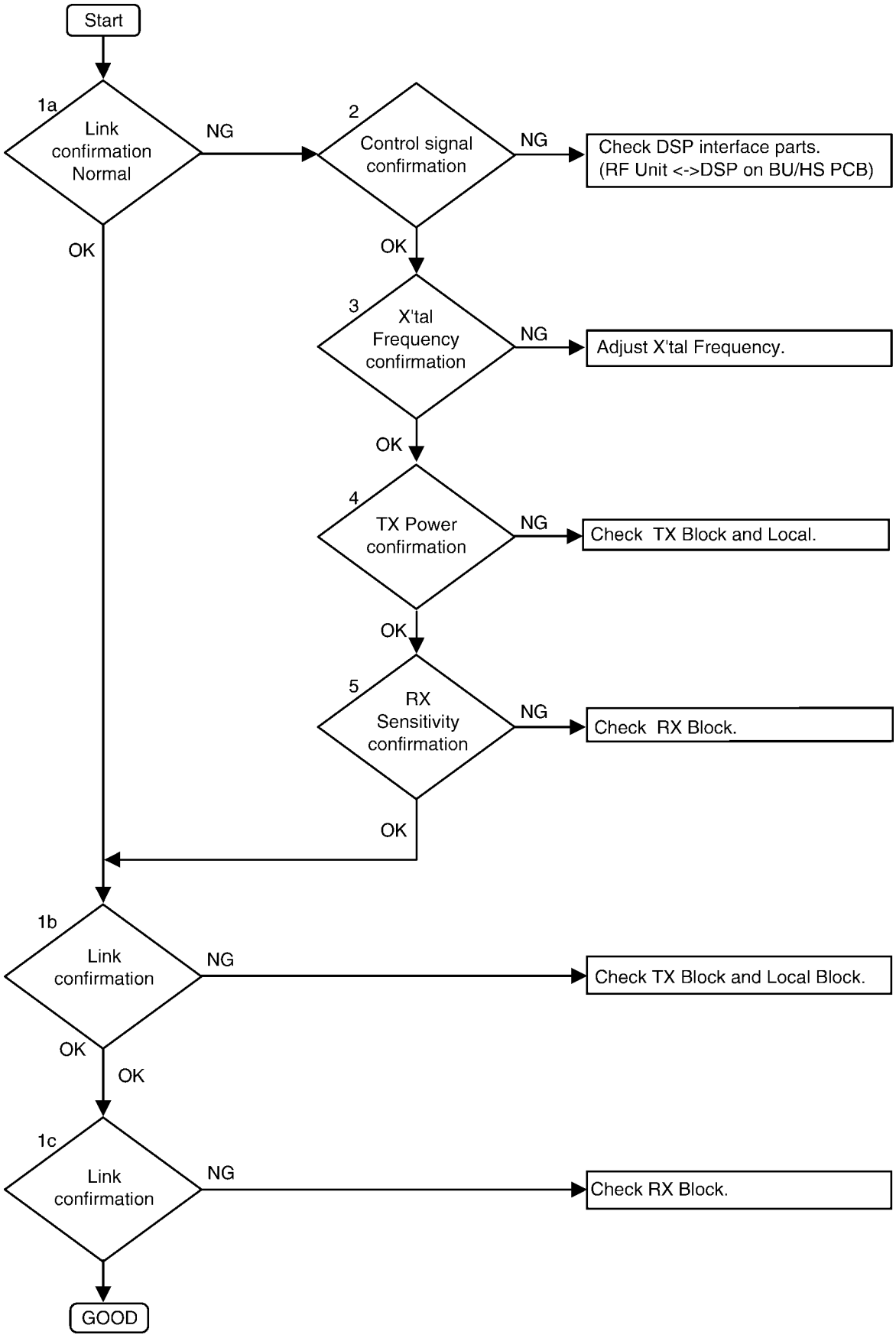


- If the handset beeps 3 times and "Error!!" is displayed, an error occurred. Try again from step 1.
- You can stop registration by pressing **[OFF]** on the handset, and pressing **[LOCATOR/INTERCOM]** on the base unit.

10.7.2. 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.54)

10.7.3. 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 [REC] key of BU Regular Unit to set RSSI mode, and press [GREETING CHECK] 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 [REC] key of BU to set RSSI mode, and press [GREETING CHECK] 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	1. Check X´tal Frequency. (13.824000MHz±100Hz)	1. 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.57)

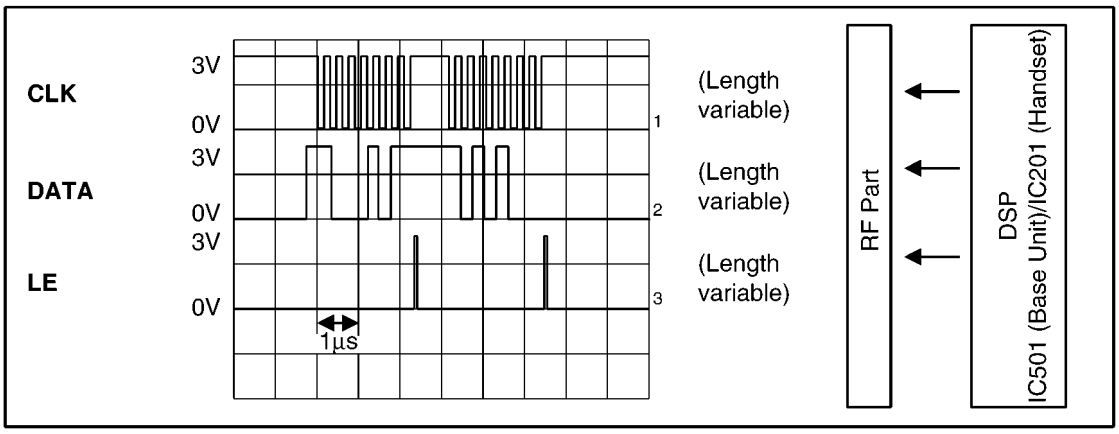
(*2) **RF-DSP interface signal wave form** (P.55)

(*3) **CIRCUIT BOARD (BASE UNIT) Component View** (P.115)

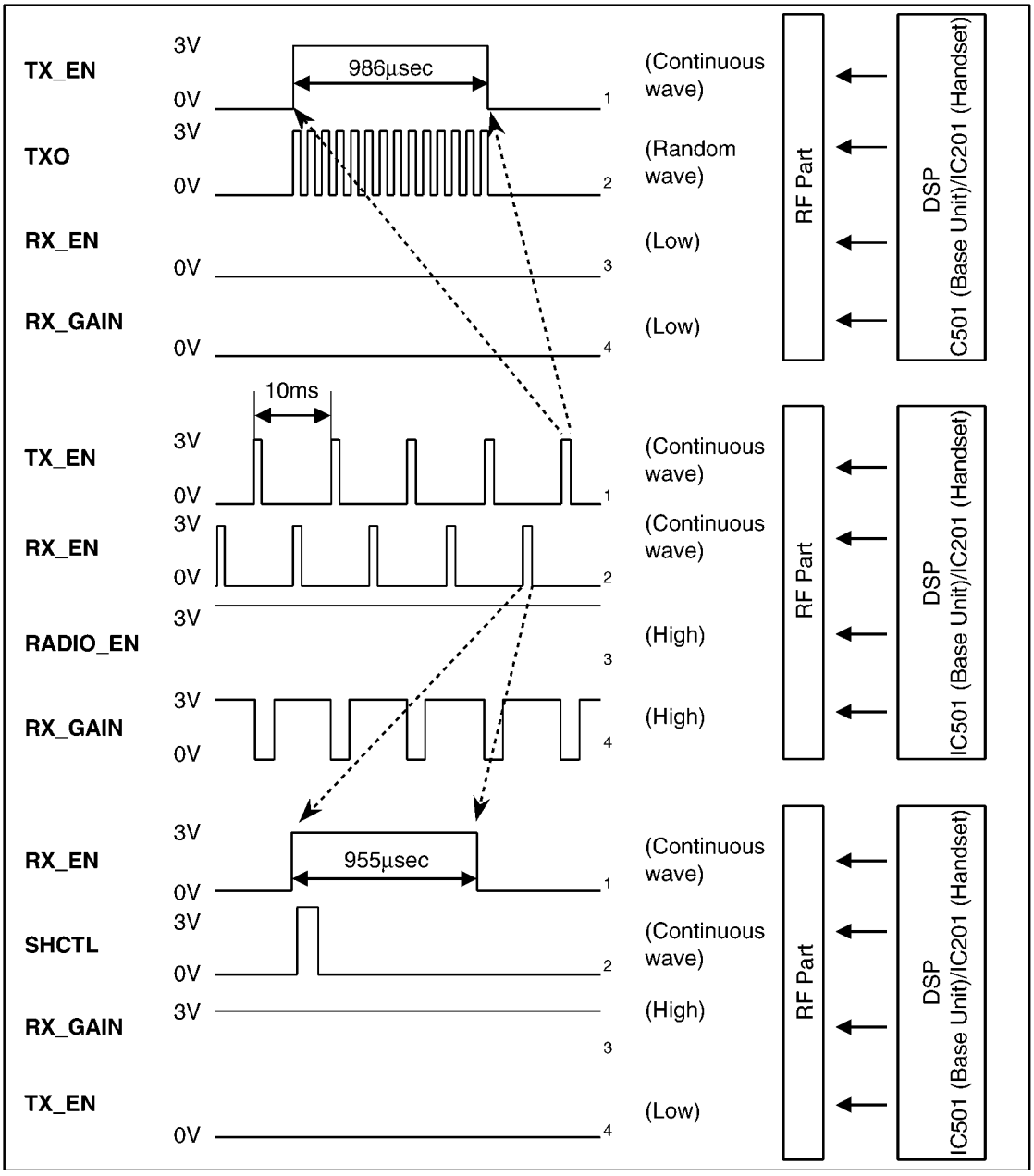
(*4) **CIRCUIT BOARD (Handset) Component View** (P.119)

10.7.4. RF-DSP interface signal wave form

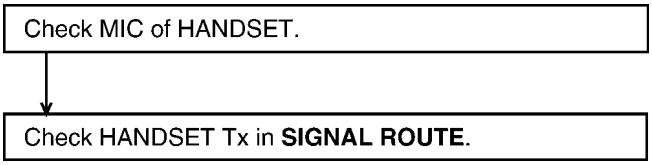
< Test Burst mode > CLK&DATA



< Test Burst mode > TX&RX



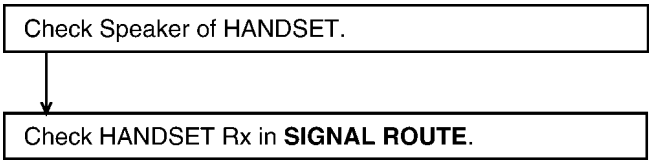
10.8. Check Handset Transmission



Cross Reference:

SIGNAL ROUTE (P.90).

10.9. Check Handset Reception



Cross Reference:

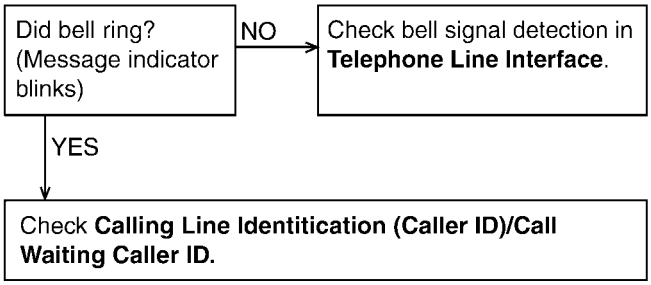
SIGNAL ROUTE (P.90).

NOTE:

When checking the RF UNIT, Refer to **Check the RF Part** (P.52)

10.10. Check Caller ID

BASE UNIT



Cross Reference:

Telephone Line Interface (P.79).

Calling Line Identification (Caller ID)/Call Waiting Caller ID (P.82).

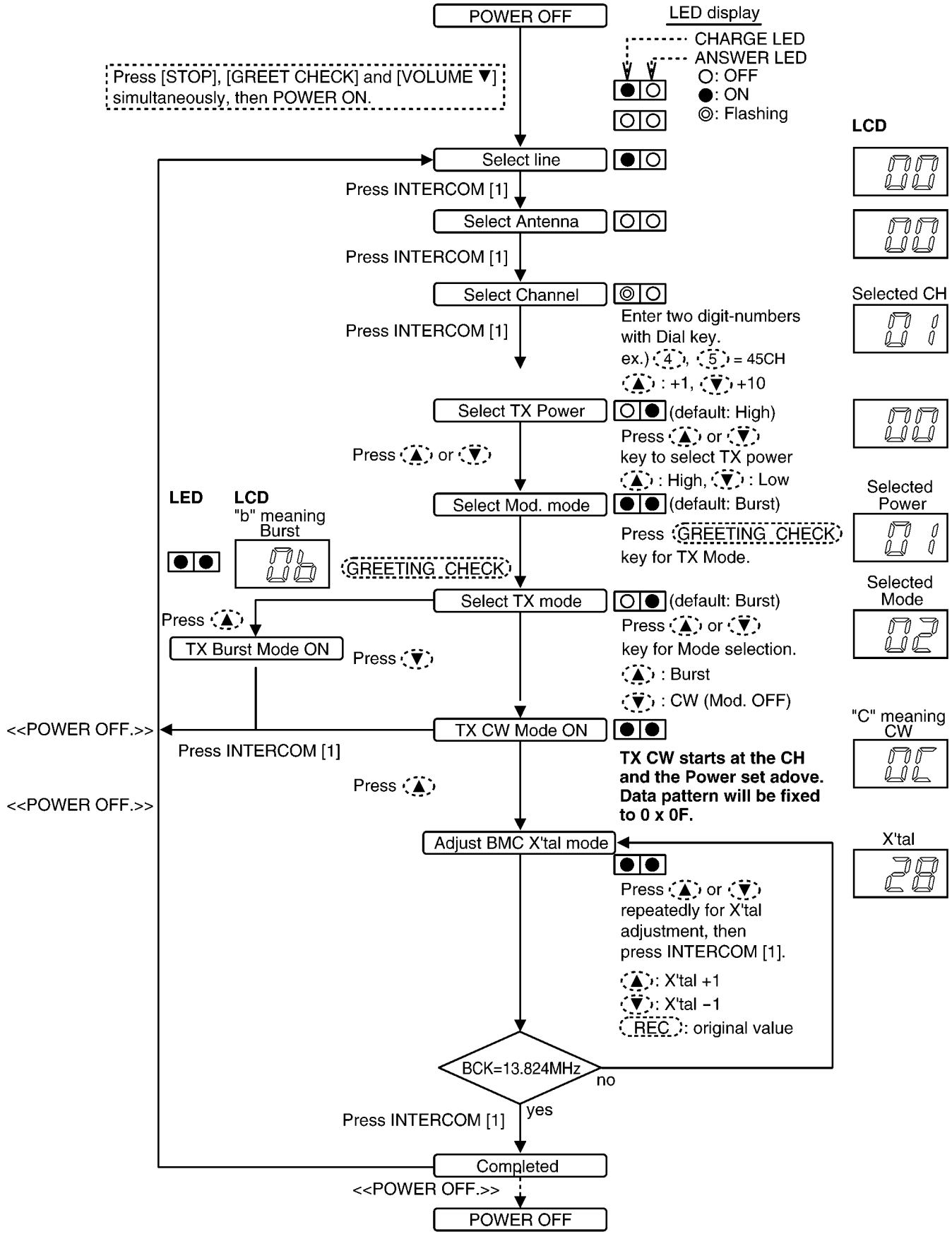
Note:

- 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.

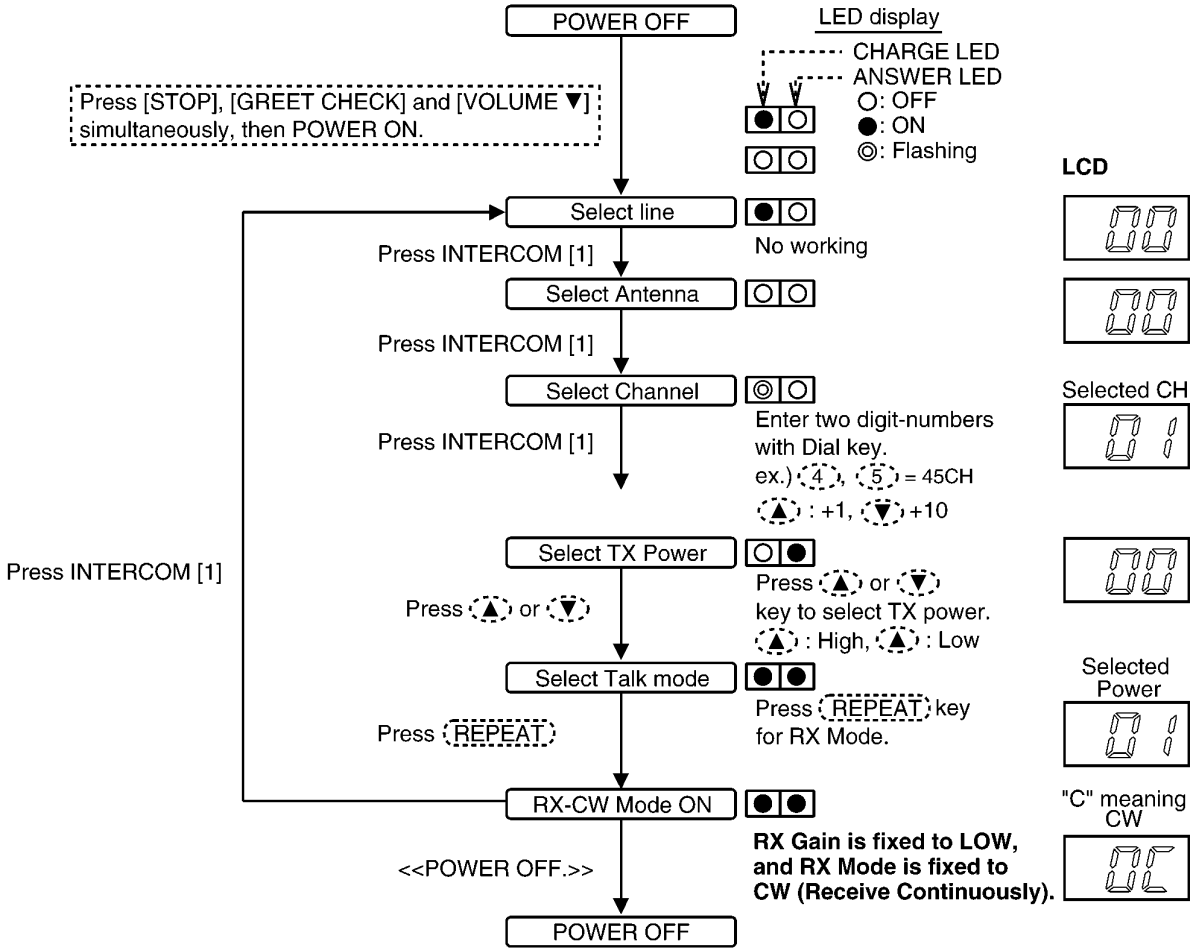
11 TEST MODE

11.1. Test Mode Flow Chart for Base Unit

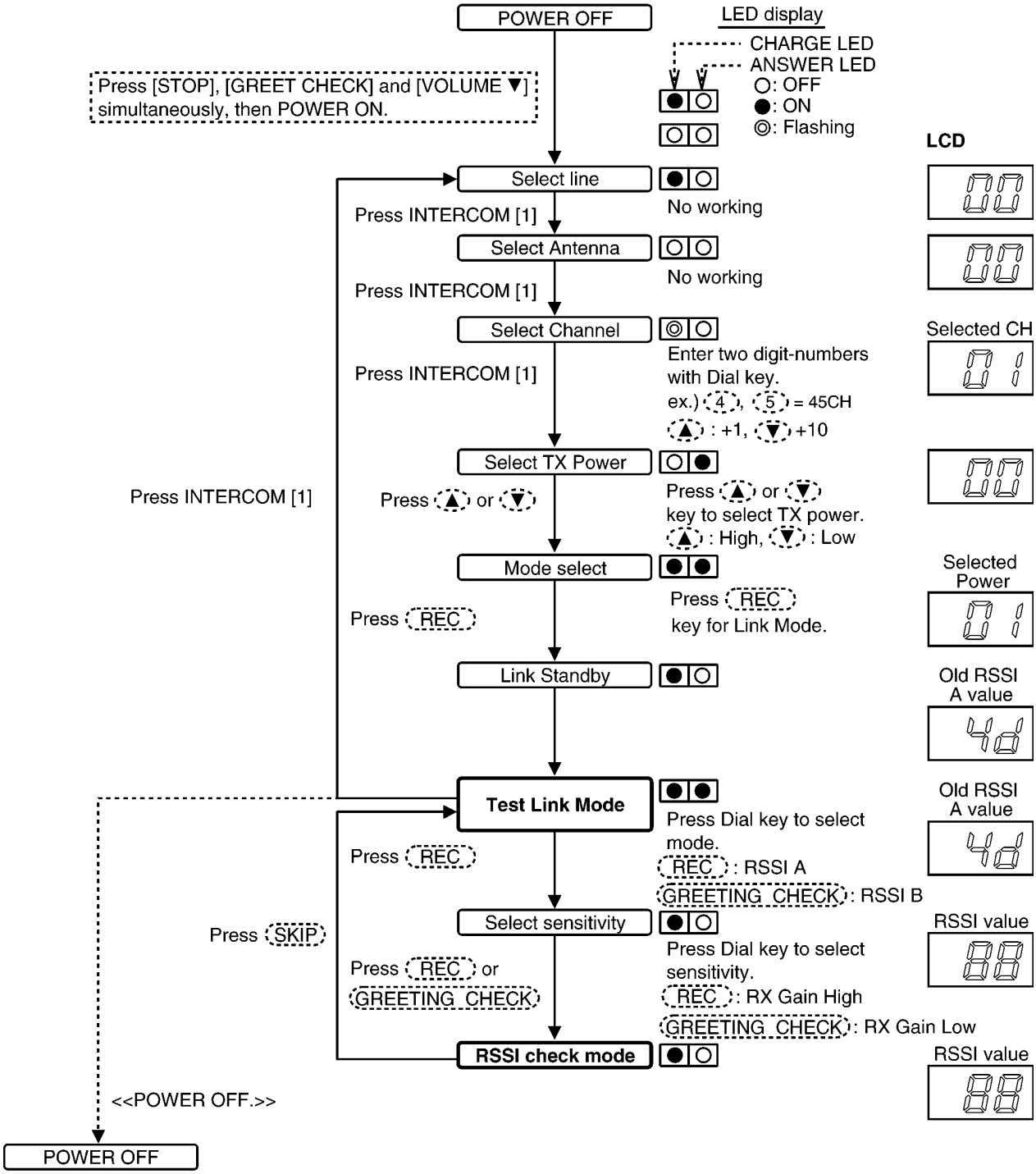
11.1.1. TX Burst Mode and Adjust X'tal Mode



11.1.2. RX-CW TEST Mode

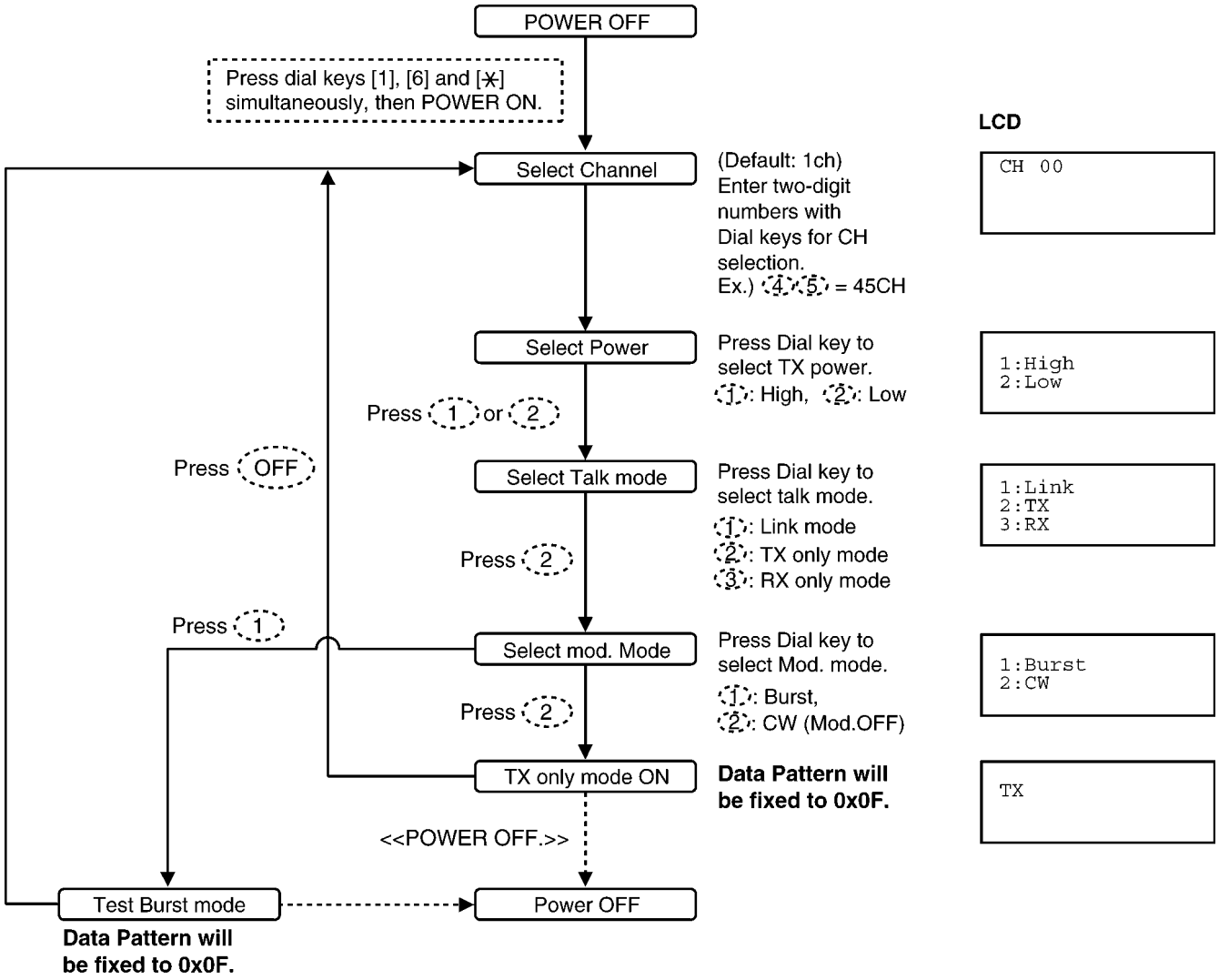


11.1.3. Test Link Mode

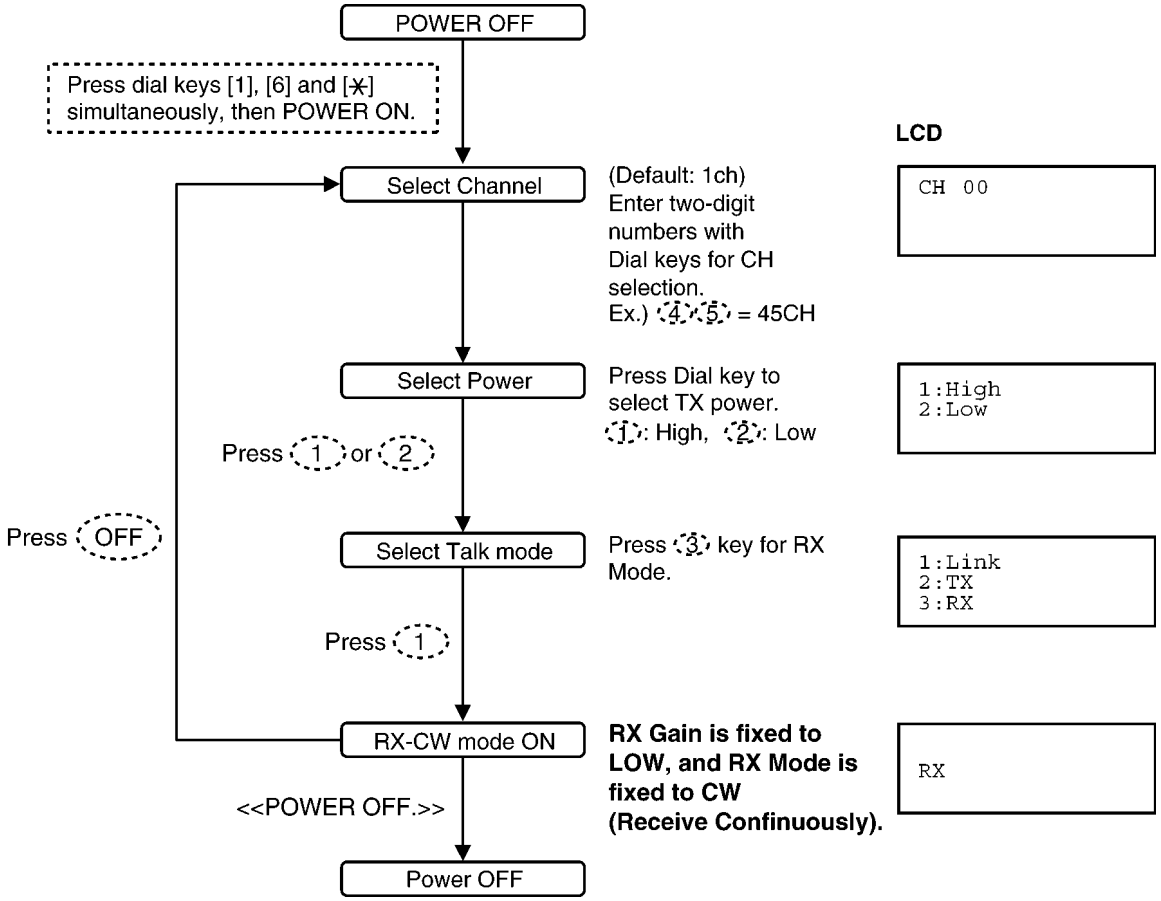


11.2. Test Mode Flow Chart for Handset

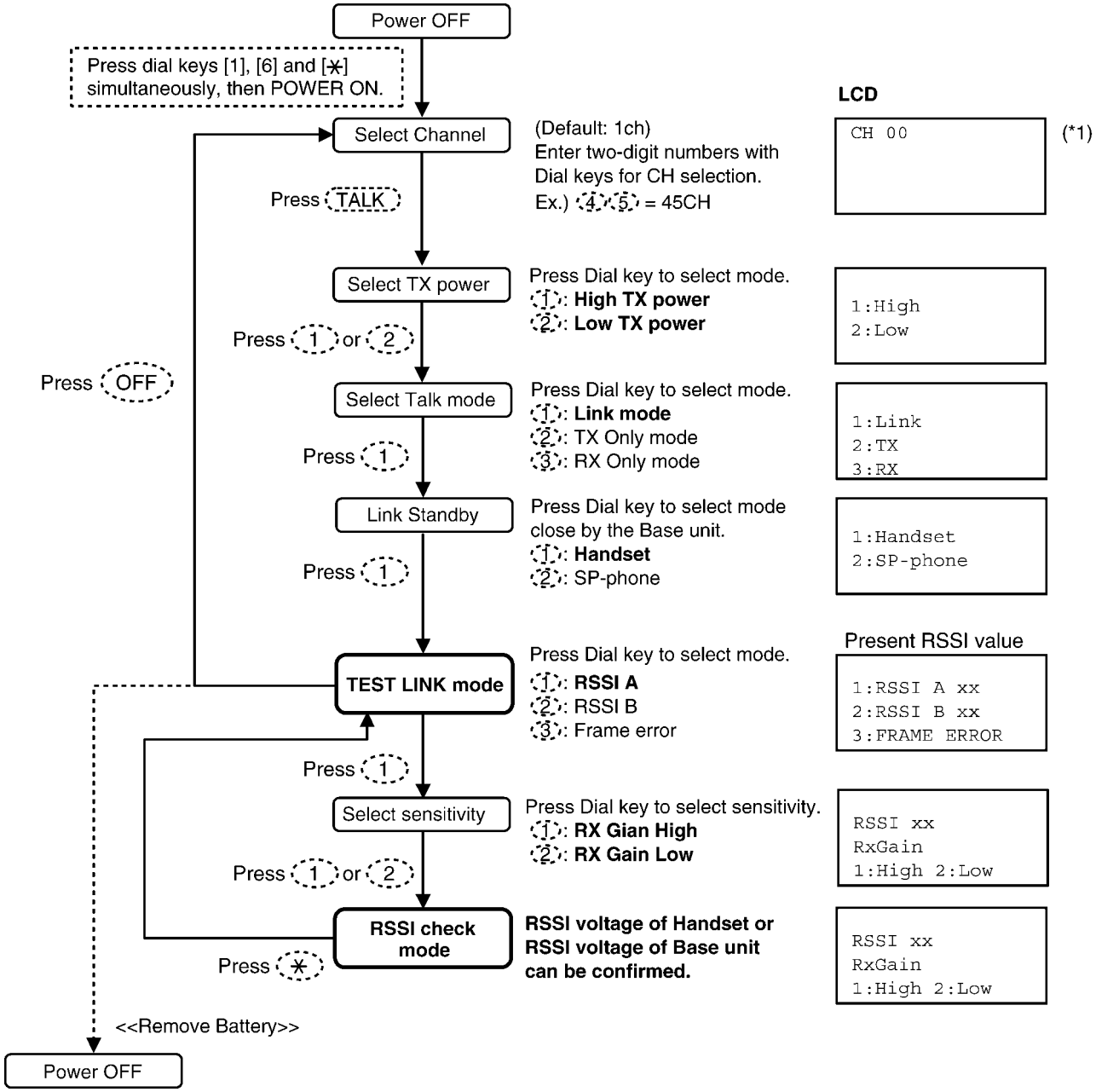
11.2.1. TX Burst Mode



11.2.2. RX-CW TEST Mode



11.2.3. Test Link Mode

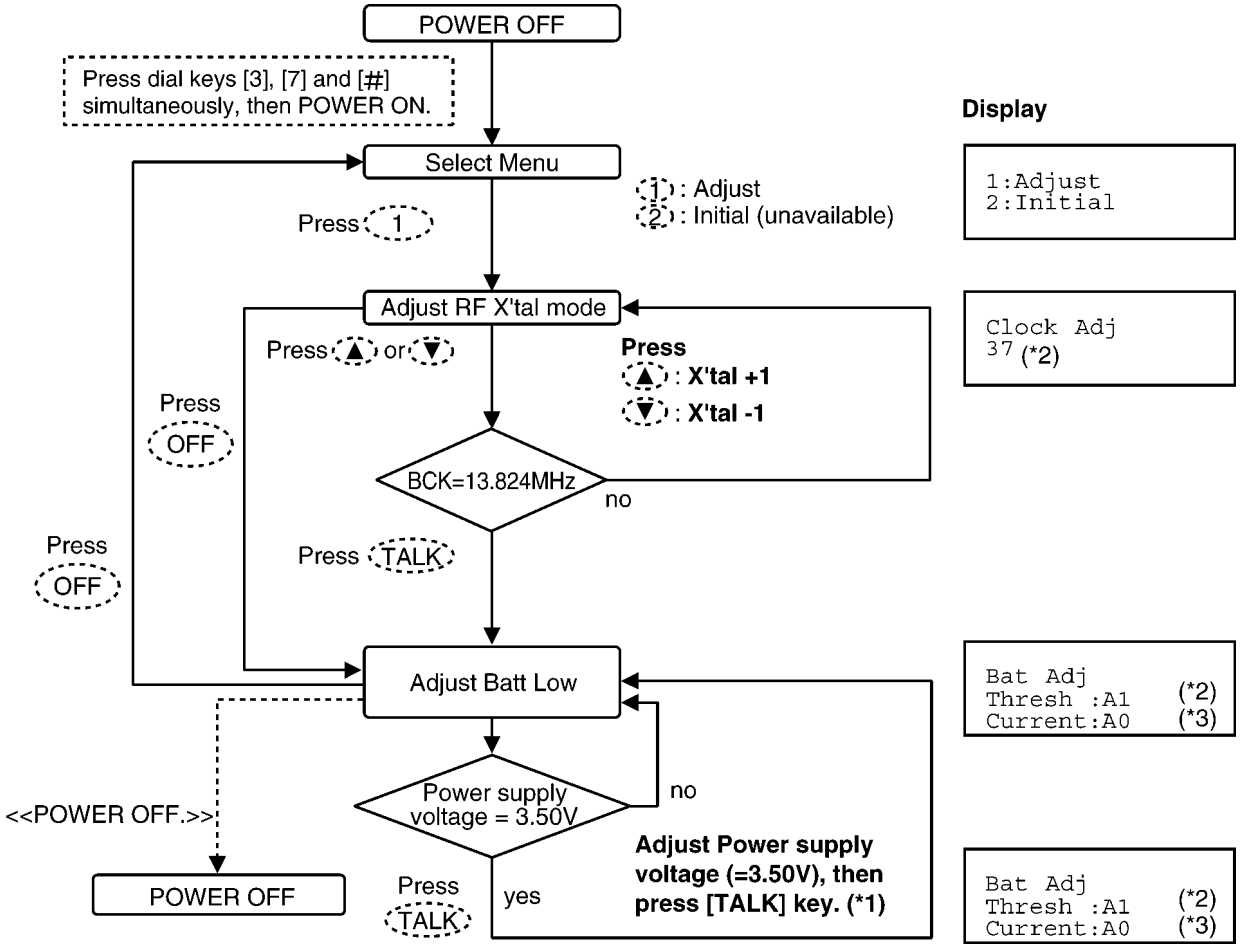


Note:

(*1) LCD displays the Channel number.

(exception: default/ CH00 = 1ch.)

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



Cross Reference

(*1) Adjustment Battery Low Detector Voltage (Handset) (P.64)

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.	:	

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

Equipment: Frequency counter

Check Point for measurement: BCK

Checking tolerance: 13.824MHz ± 100Hz

11.3.1. 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.

Cross Reference:

TX Burst Mode and Adjust X'tal Mode (P.57)

11.3.2. 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.

Cross Reference:

Adjustment flow (X'tal mode and Batt Low Mode) (P.63)

When you have replaced IC501, IC601 (Base unit), IC201 or IC202 (Handset), adjust X801 by the procedure above.

11.4. 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.60).

DC power supply and DC voltmeter require the adjustment below.

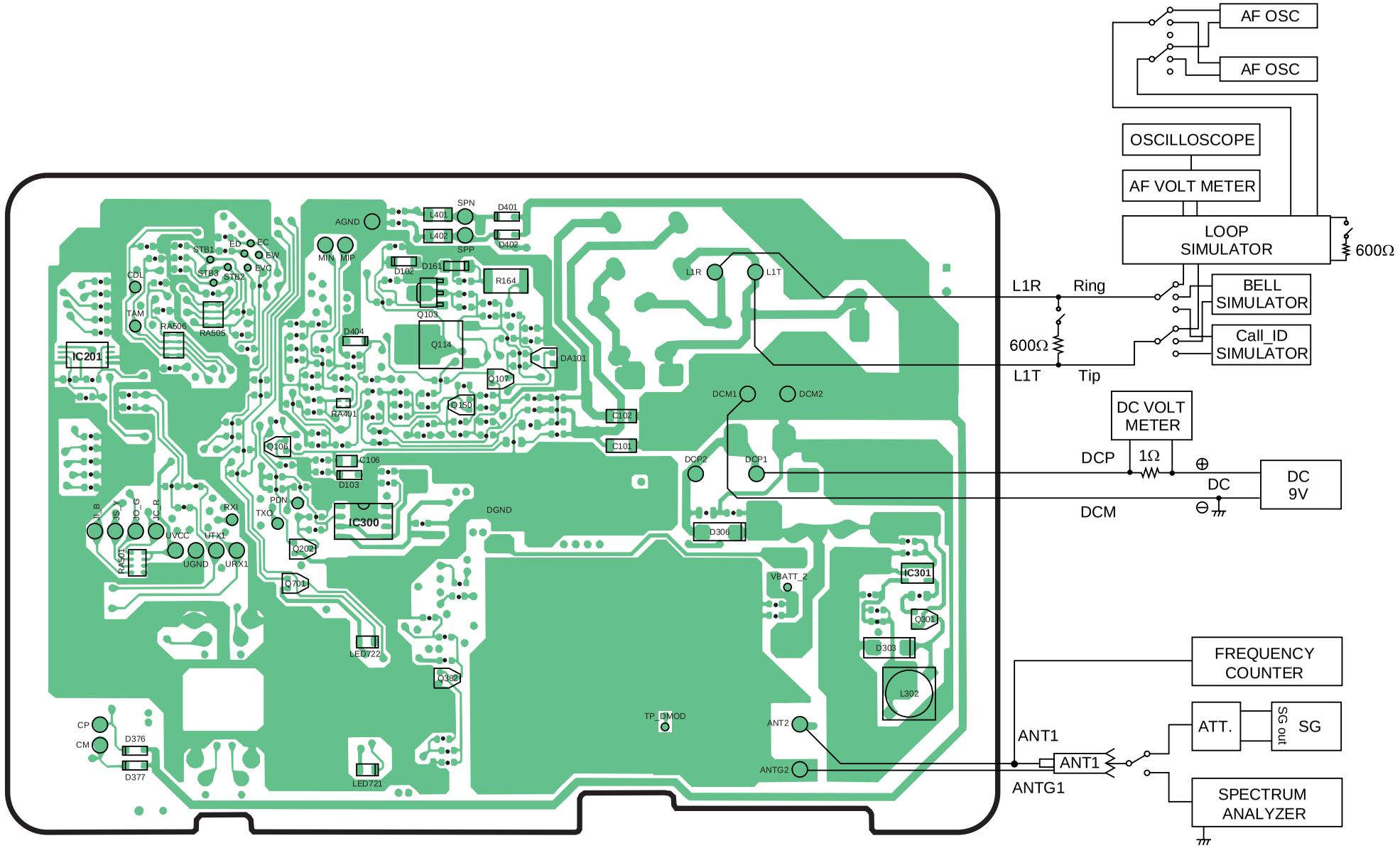
1. Set DC power supply to 3.9V.
2. Set up handset in test mode (Adjustment flow).
3. Press [1] key and [OFF] key twice to Adjust Batt Low mode. ("Bat Adj" is displayed on LCD)
4. Change voltage to 3.50V accurately for the DC power supply.
   * Check voltage at P.C. board test points because some voltage 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.66).

11.5. Base Unit Reference Drawing

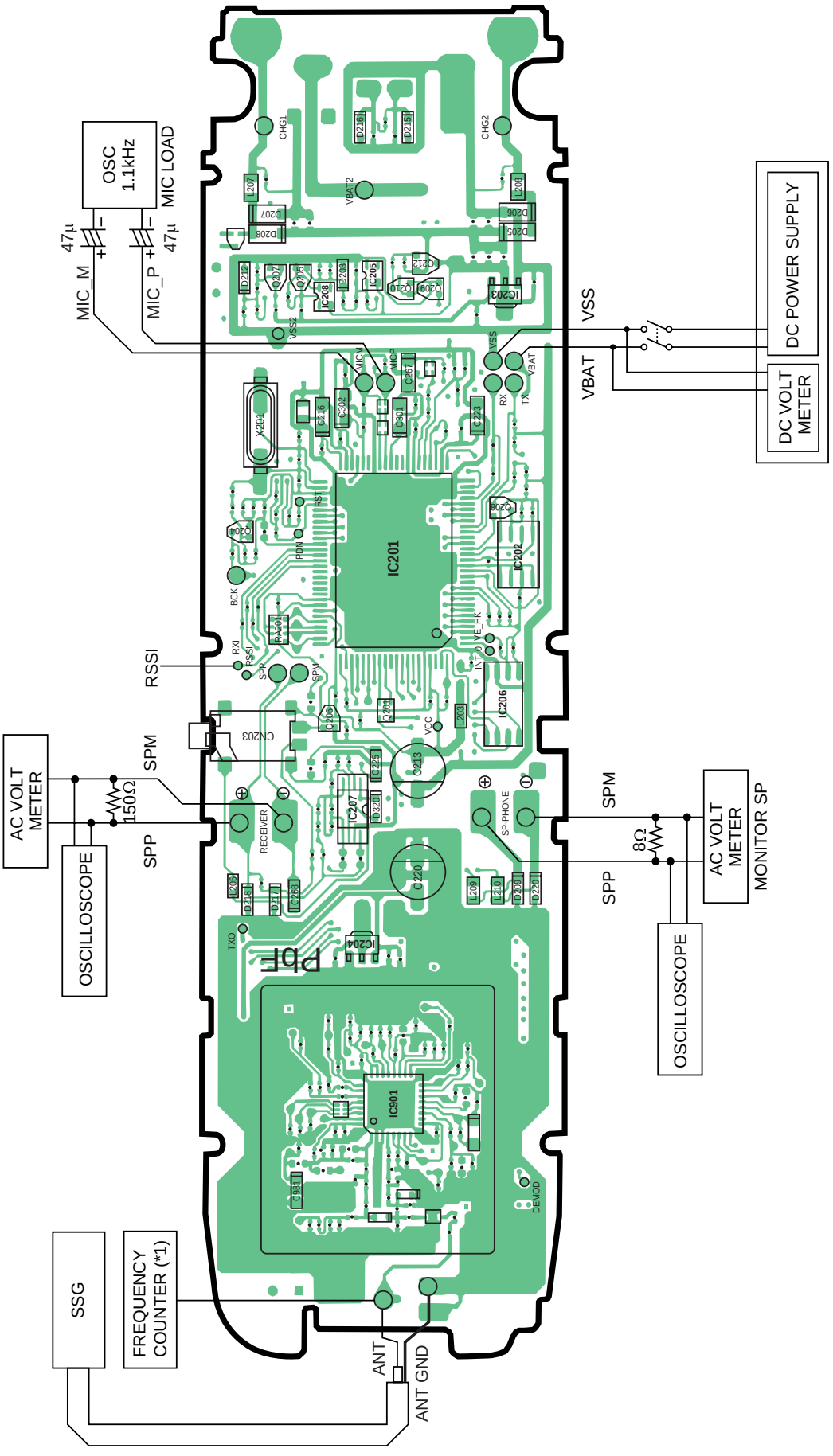
When connecting the Simulator and Equipments for checking, please refer to the illustration below.



Note: (*1) is refered to No.3 of **Check Table for RF part** (P.54)

11.6. Handset Reference Drawing

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



Note: (*1) is refered to No.3 of **Check Table for RF part** (P.54)

11.7. 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

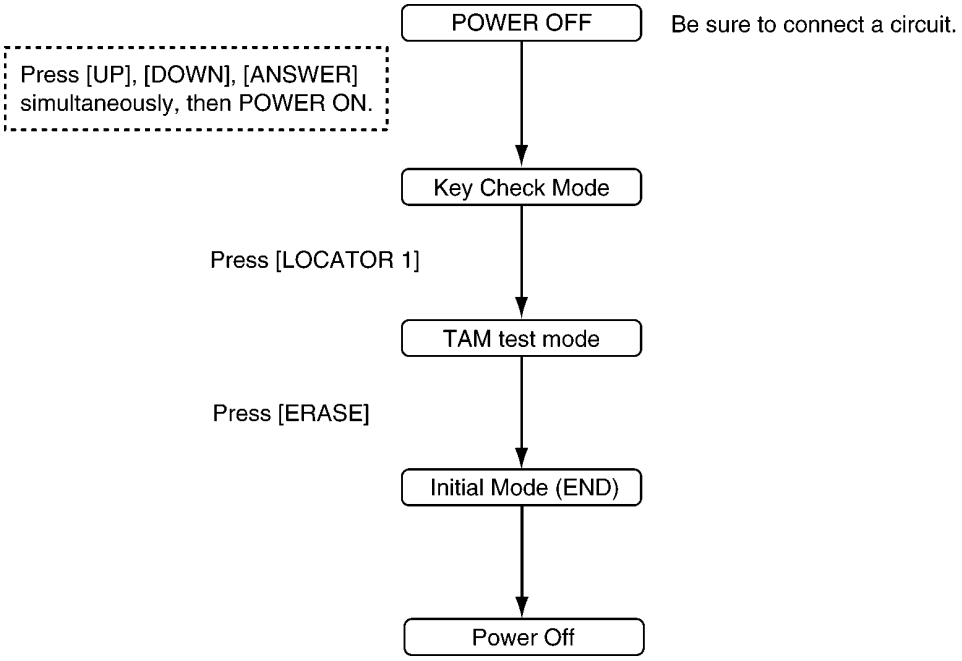
11.8. How to Clear User Setting

The operation reset the unit to Factory setting.

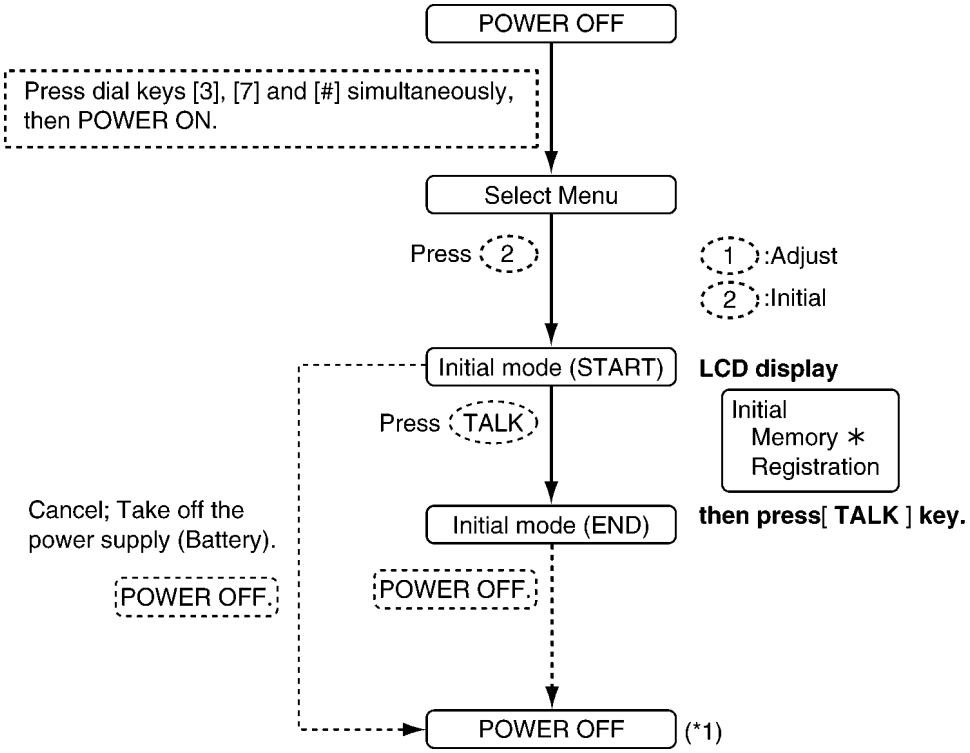
(Erase recording Voice messages, Stored phone numbers, Caller list and etc.)

This operation should not be performed for a usual repair.

11.8.1. Base unit



11.8.2. Handset



12 DESCRIPTION

12.1. 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.

12.2. 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.

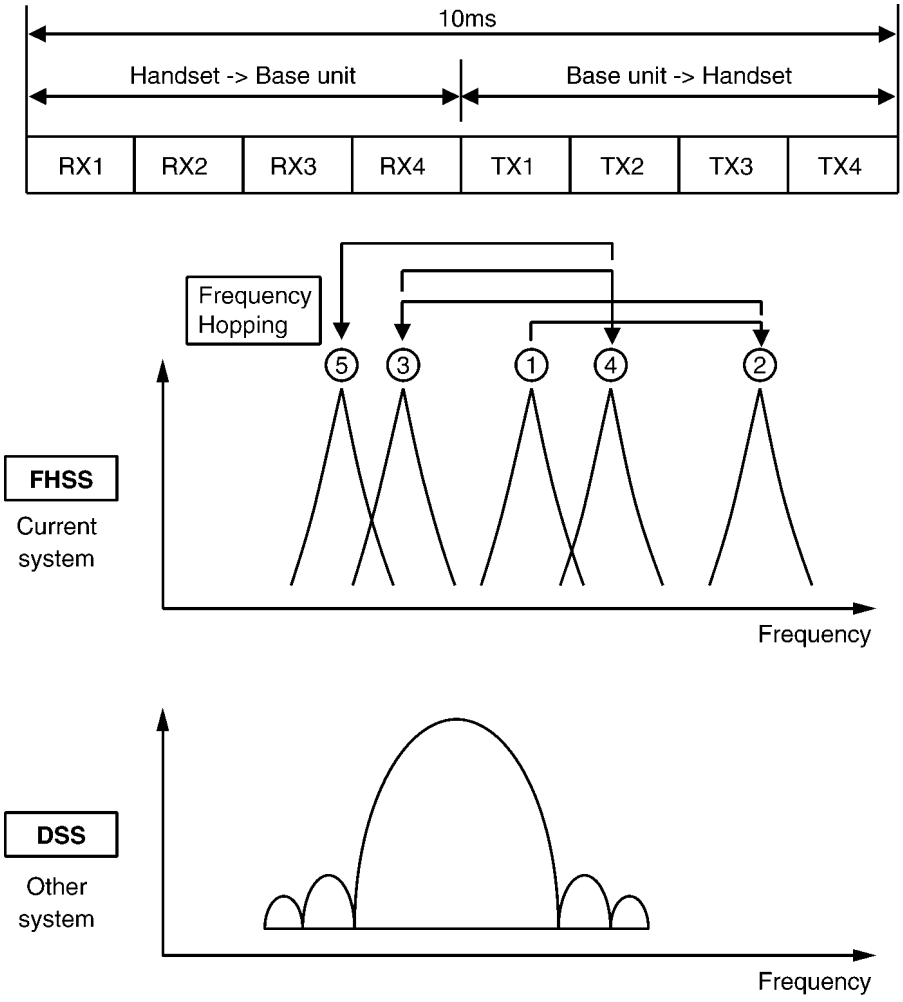
The explanation of this system is mentioned below.

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.

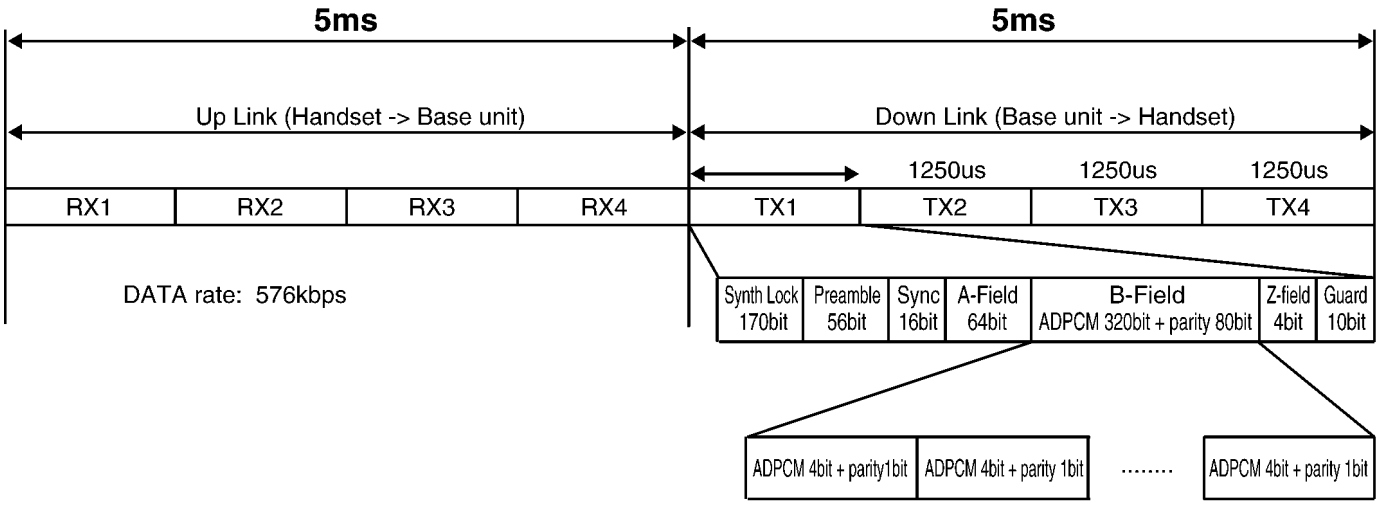
DSS makes spectrum spread by multiplying carrier signal by PN code.

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.



12.2.1. TDD Frame Format

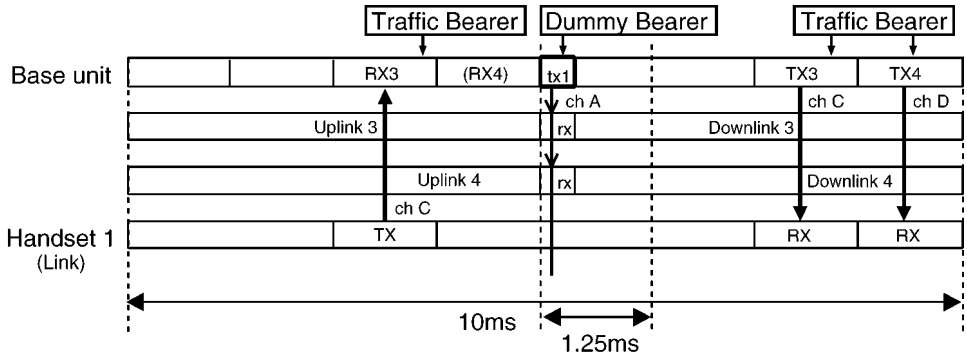


Sync Field (32Bit): Preamble16Bit + SyncWord16Bit
Base set (handset) adjusts the timing of reception so that reception of base set (handset) can correspond to transmission of handset (base unit). It is necessary for sync-field that handset gets synchronization.
A - field (64bit) : Each kinds of DATA: ch data, line condition, etc
B - field (420bit + 80bit) : Sound data + parity
Z - Filed (4Bit) : Parity Check

12.2.2. 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.

12.3. Signal Flowchart in the Whole System

Reception

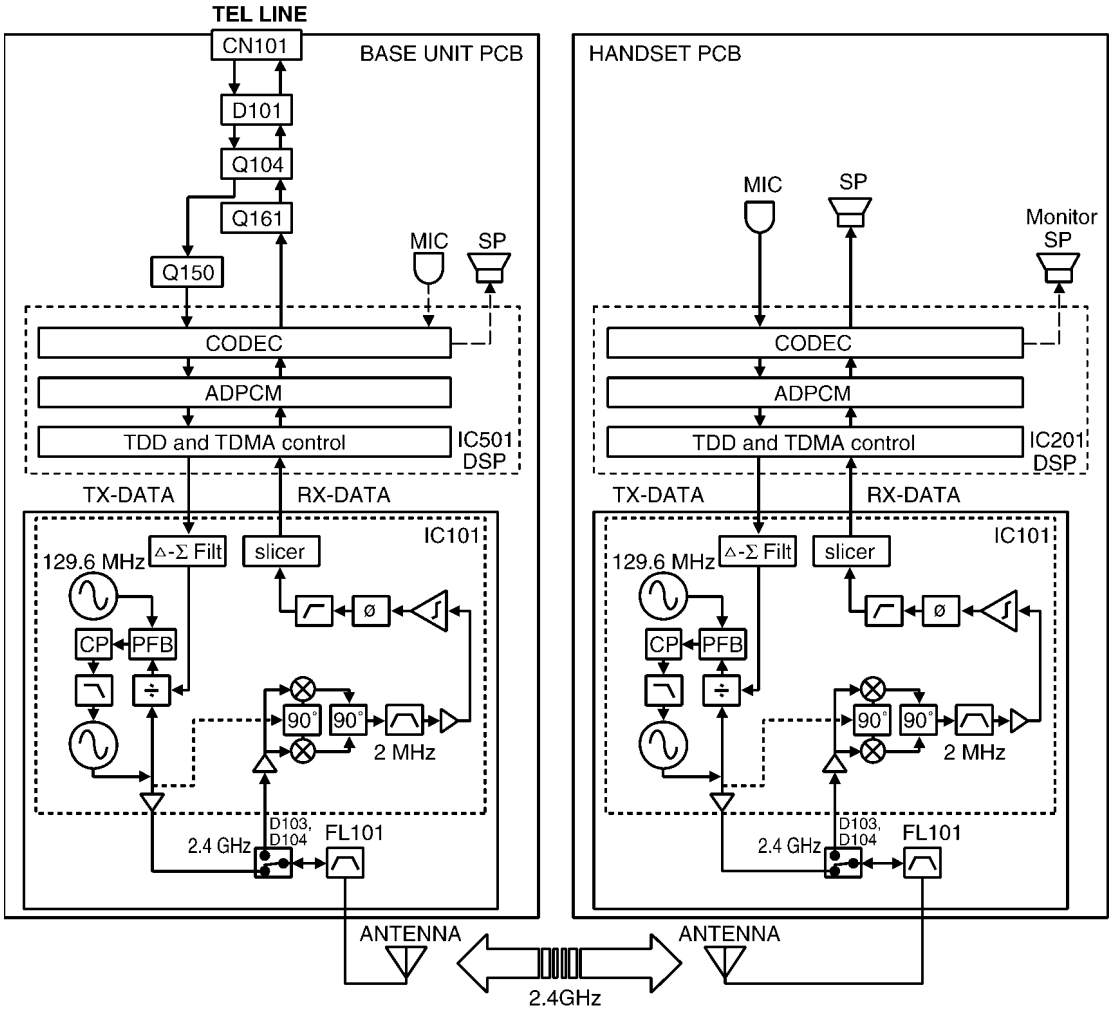
CN101 of the base unit is connected to the TEL line, and signal is entered through the bridge diode D101. While talking, the relay (Q104) is turned ON and amplified at the Q150, then led to DSP (IC501). The DSP encodes ADPCM and TDD/TDMA with FHSS to TX-DATA. The TX-DATA signal is entered to IC101 of RF UNIT, and modulated to 2.4GHz. The RF signal is fed into Tx/Rx switch (D104). The RF signal is passed through filter (FL101) and fed to ANTENNA.

As for the handset, RF signal from the antenna passes through filter (FL101), then is routed by Tx/Rx switch (D104) and led to IC101. The RF signal is amplified by LNA and down-converted to IF signal in IC101. 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

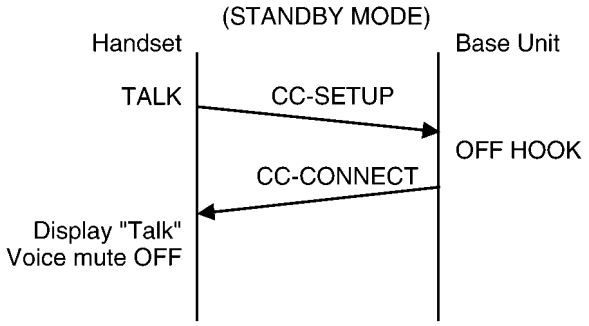
The voice signal entering from the microphone is led to DSP (IC201). The DSP encodes ADPCM and TDD/TDMA with FHSS to TX-DATA. The TX-DATA signal enters IC101 of RF UNIT, and is modulated to 2.4GHz. The RF signal is fed into Tx/Rx switch (D104). The RF signal is passed through filter (FL101) and fed to ANTENNA.

As for the base unit, RF signal from the antenna passes through filter (FL101), then is routed by Tx/Rx switch (D104) and led to IC101. The RF signal is amplified by LNA and down-converted to IF signal in IC101. 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).



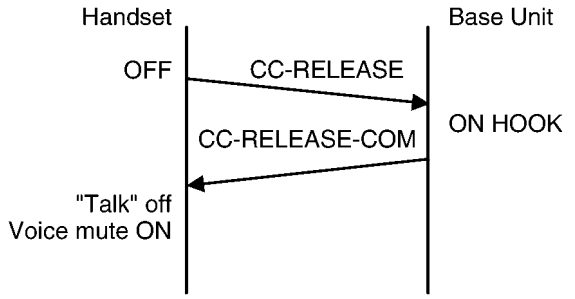
13 EXPLANATION OF LINK DATA COMMUNICATION

13.1. Calling



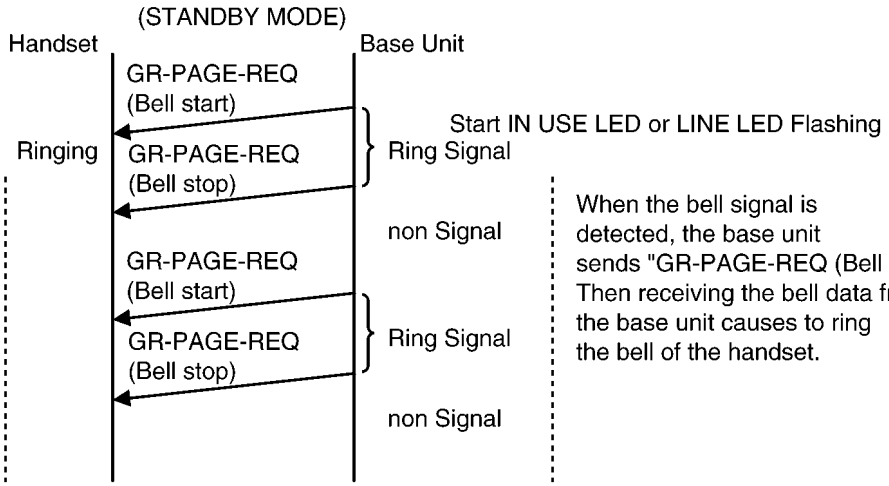
When calling, a communication request DATA (CC-SETUP) is transmitted from the Handset, and a permitting DATA (CC-CONNECT) is returned from the Base Unit to it. At that time the audio path opens.

13.2. To Terminate Communication



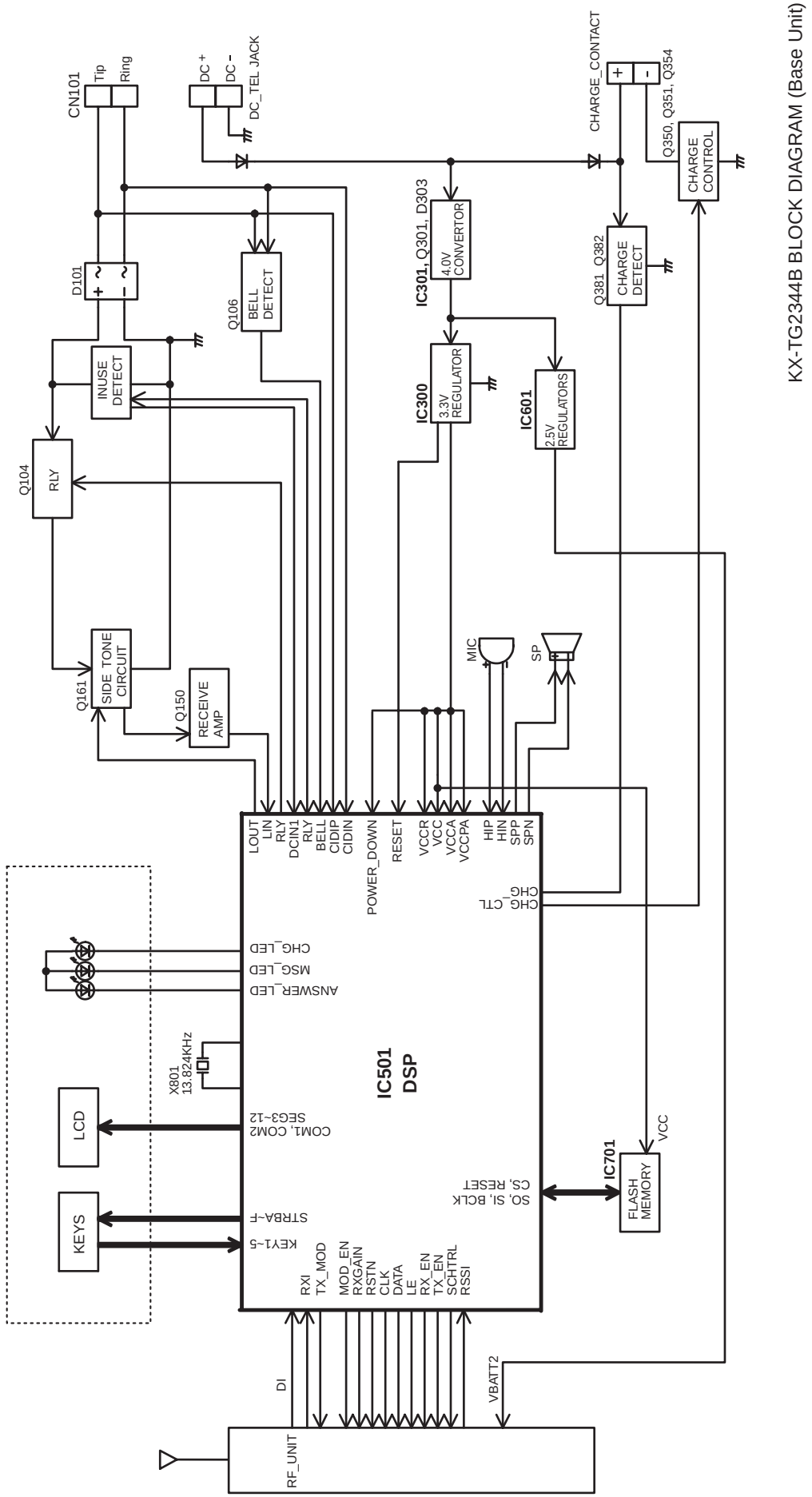
When the OFF button on the Handset is pressed during communication, a LINK terminating DATA (CC-RELEASE) is sent to terminate the communication. Then DATA (CC-RELEASE-COM) is returned from Base Unit.
Handset receives it and reset the link.

13.3. 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.

14 BLOCK DIAGRAM (Base Unit)



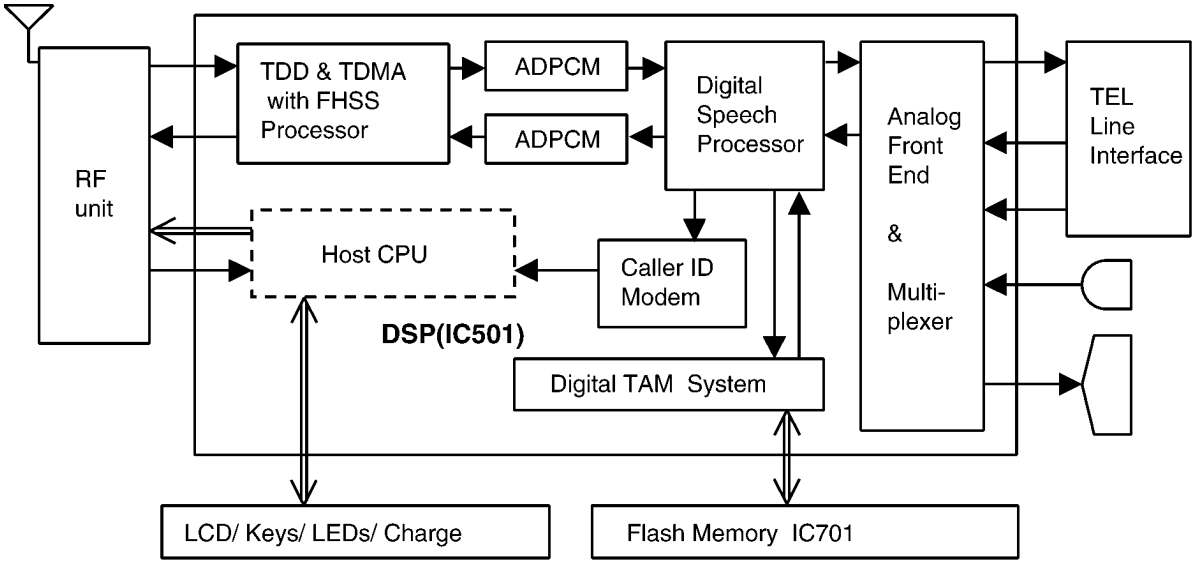
KX-TG2344B BLOCK DIAGRAM (Base Unit)

15 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.



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

15.1.1. 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.

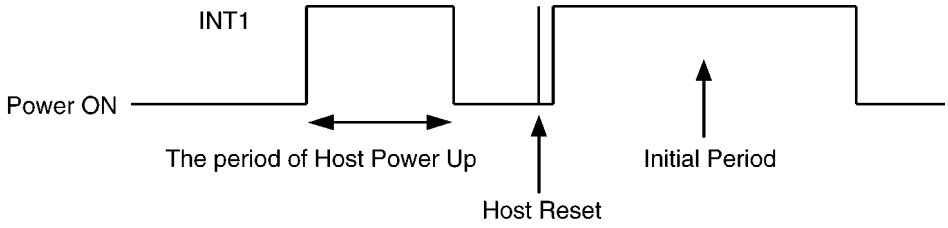
- **Analog Switching**

  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.

15.1.2. 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.

15.2. 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

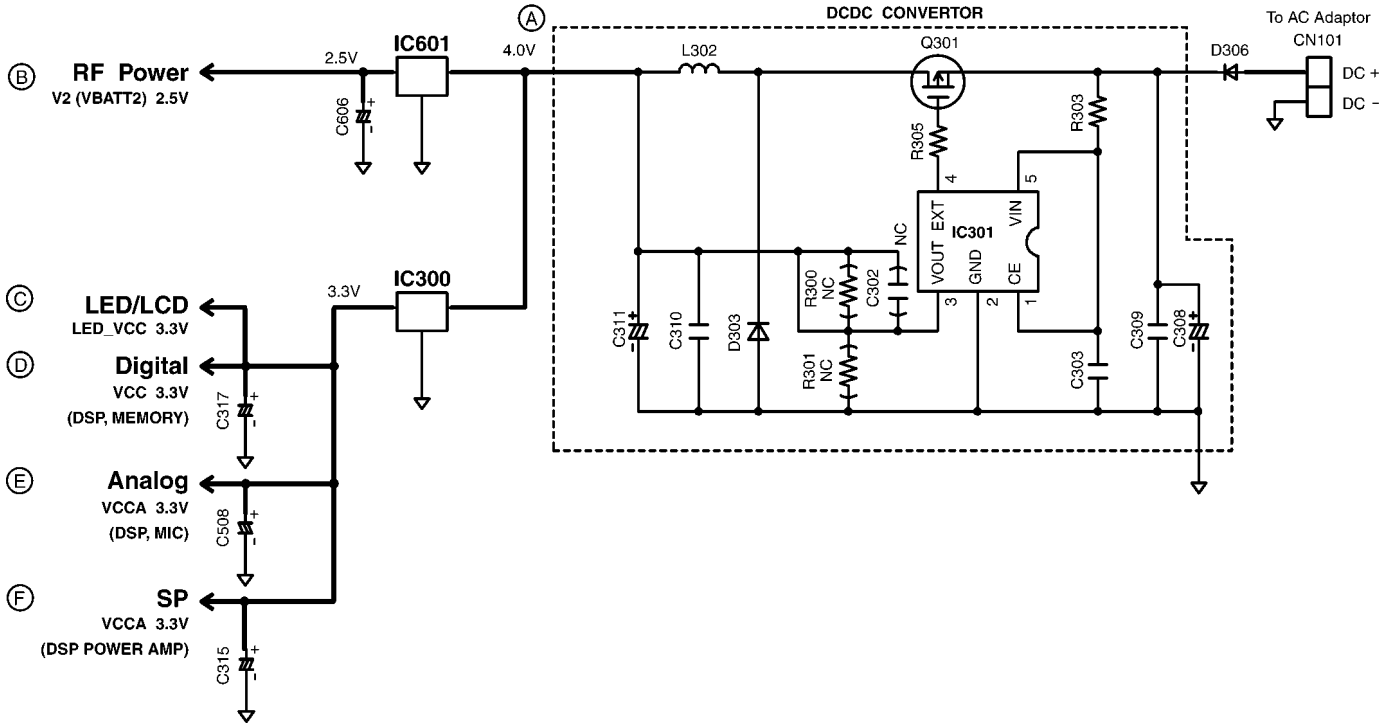
15.3. Power Supply Circuit

Function:

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

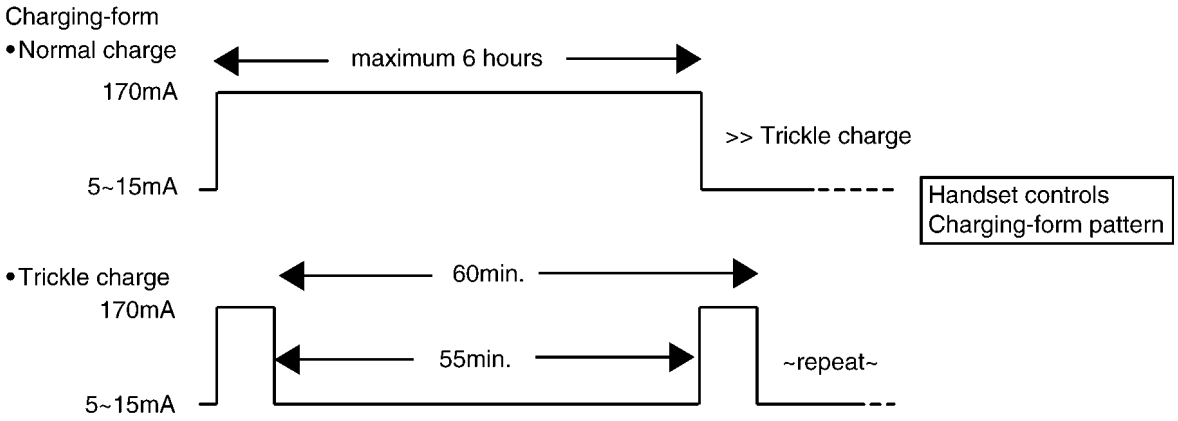
Circuit Operation:

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

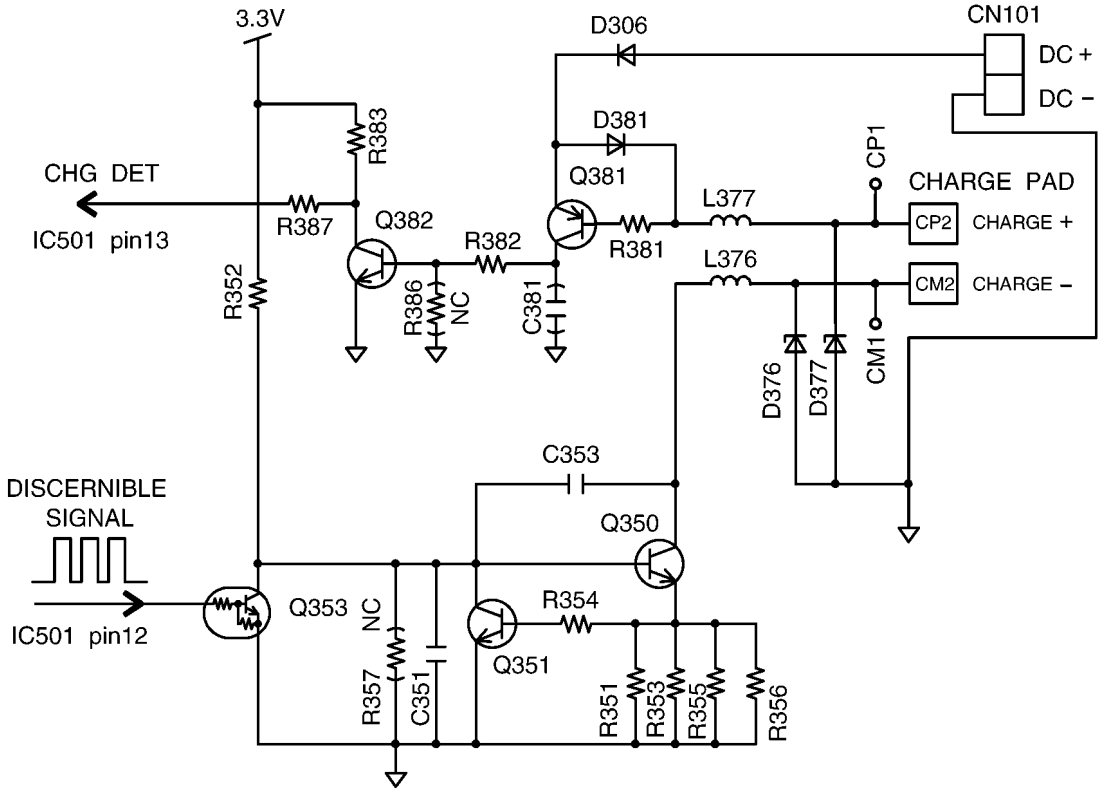


15.3.1. Charge Circuit

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.

15.4. Reset Circuit

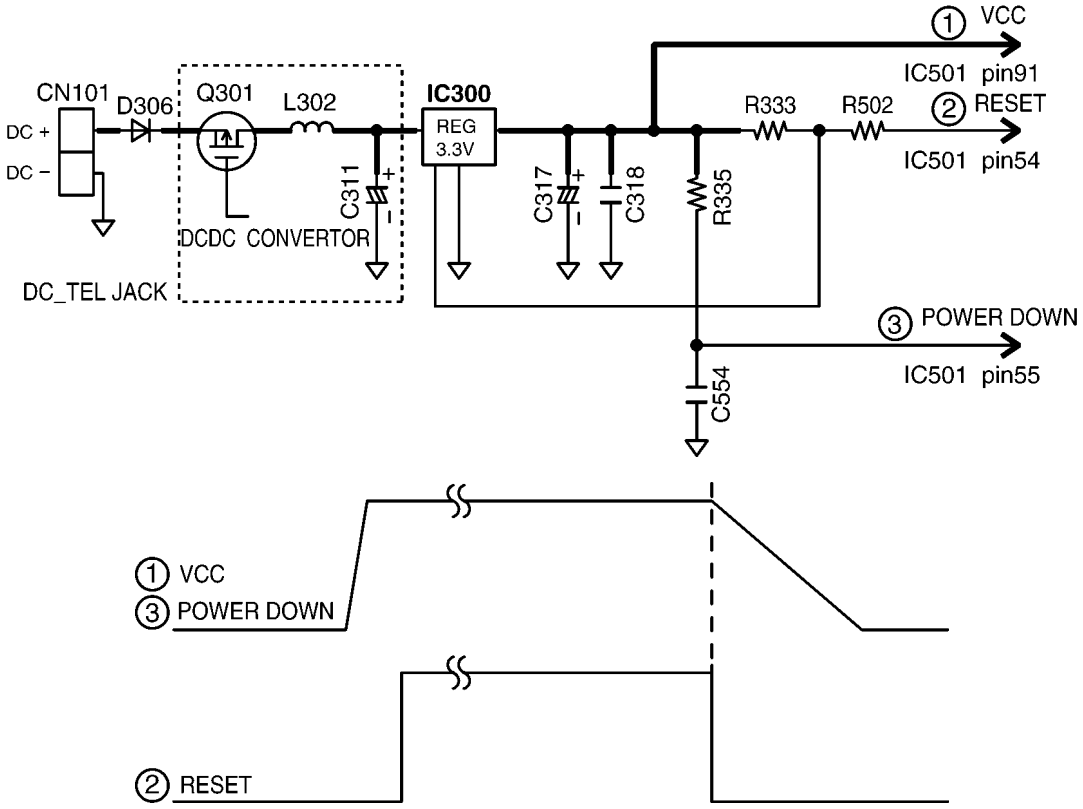
Function:

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.



15.5. Locator/Intercom Mode

1. Press the base LOCATOR/INTERCOM button, then a beep is output from pins 29 and 31 of IC501, and blinks on the display [IN USE] (LED) is caused by IC501.
2. At the same time, a beep is output from pin 29, pin 31 of IC501. The 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 29 and 31 of IC501 → SP

   The transmission signal flows:

   MIC → C447, C448 → RA401 → pins 42 and 43 of IC501 → RF

15.6. 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:

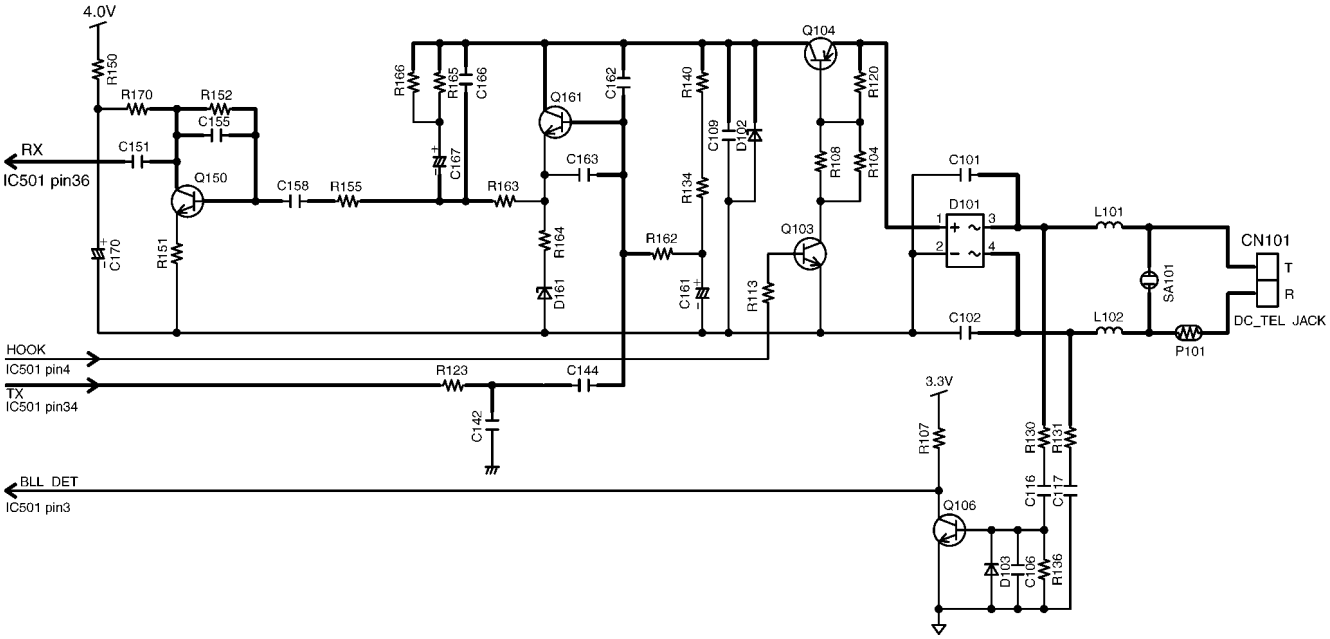
Q104 is open, Q104 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

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.



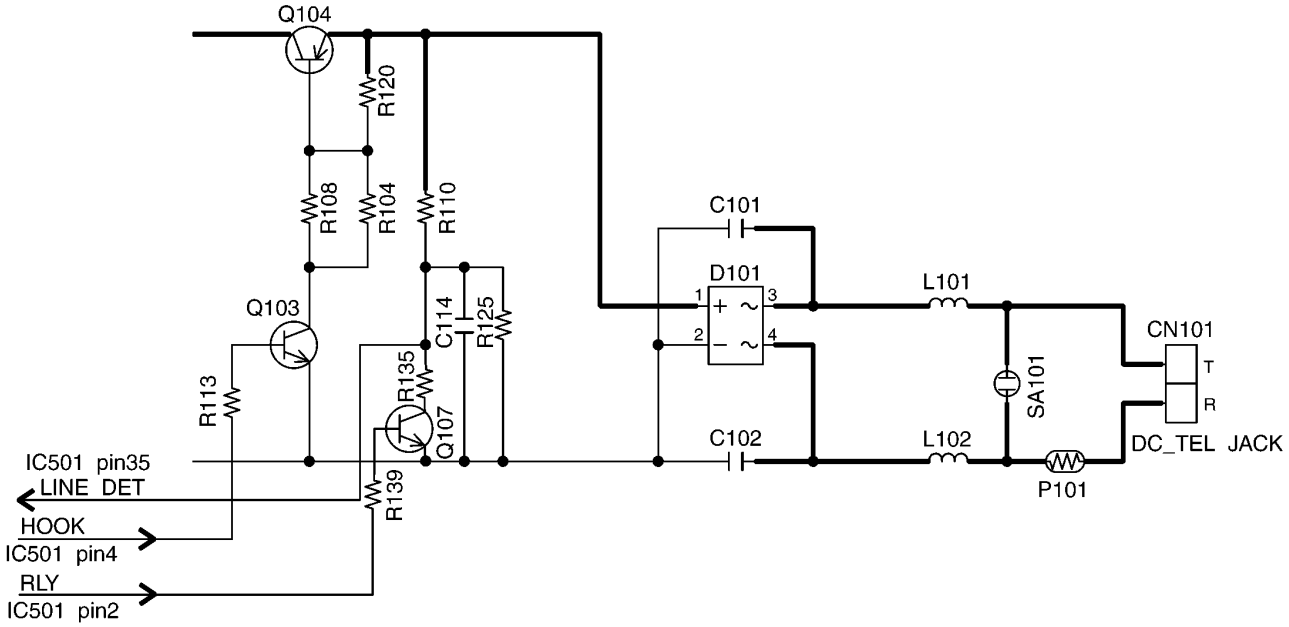
15.7. Auto Disconnect Circuit

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:

When off hook Q107 is OFF, 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.49)

15.8. 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.

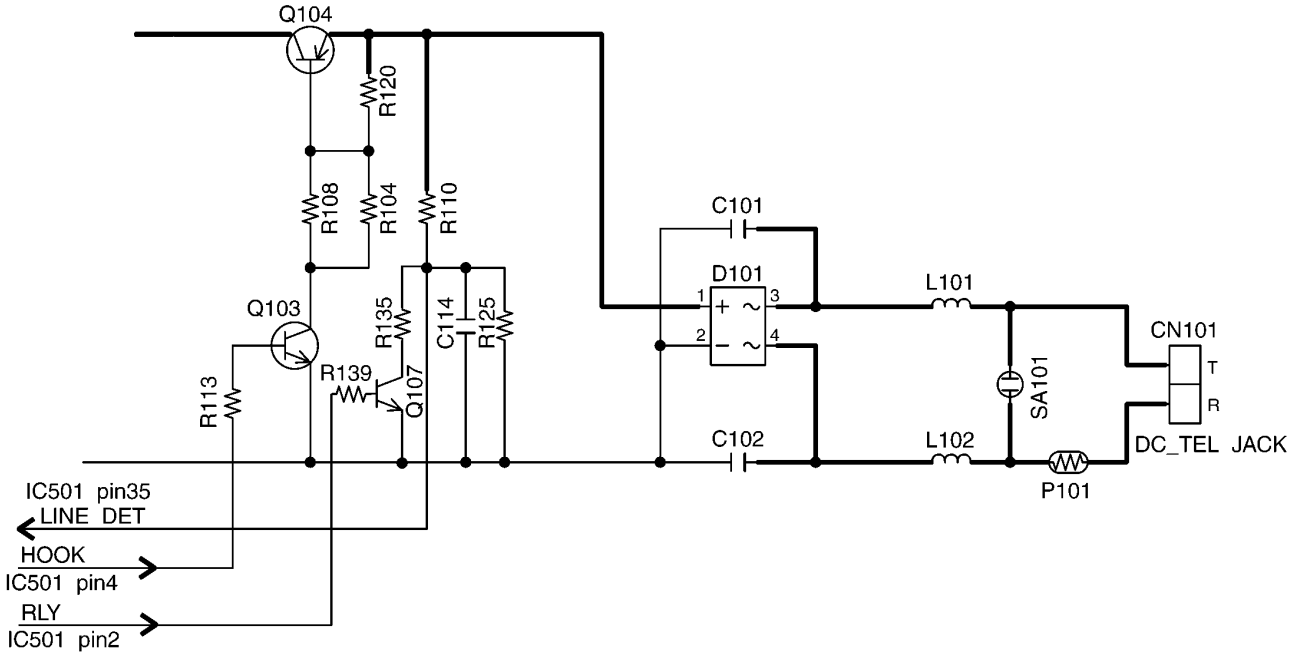
Circuit Operation:

Parallel connection detection when on hook:

When on hook Q107 is ON, the voltage is monitored pin35 of IC501. There is no parallel connection if the voltage is 1.65 V or higher, while a parallel connection is deemed to exist if the voltage is lower.

Parallel connection detection when off hook:

When off hook Q107 is OFF, the voltage is monitored pin35 of IC501; the presence/absence of a parallel connection is determined when the voltage changes by 0.2 V or more.



15.9. Calling Line Identification (Caller ID)/Call Waiting Caller ID

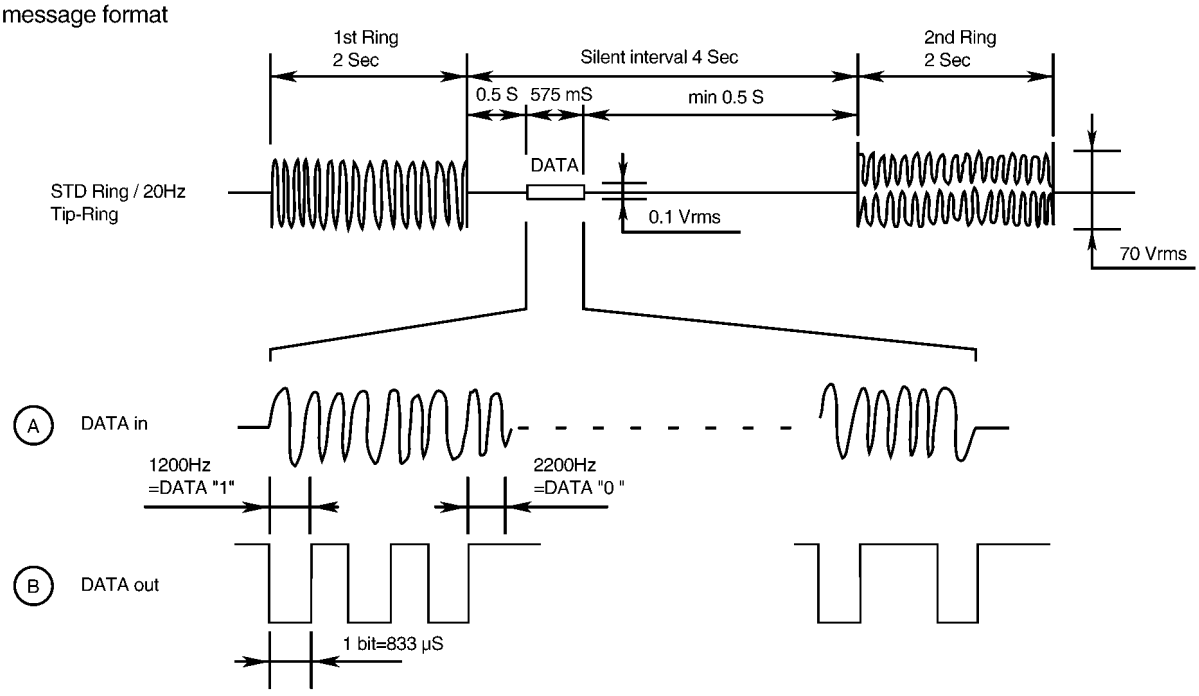
Function:

Caller ID

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 data for the caller ID from the telephone exchange is sent during the interval between the first and second rings of the bell signal. The data from the telephone exchange is a modem signal which is modulated in an FSK (Frequency Shift Keying) * format. Data “1” is a 1200 Hz sine wave, and data.... a 2200 Hz sine wave.There are two types of the message format which can be received: i.e. the single message format and plural message format. The plural message format allows to transmit the name and data code information in addition to the time and telephone number data.

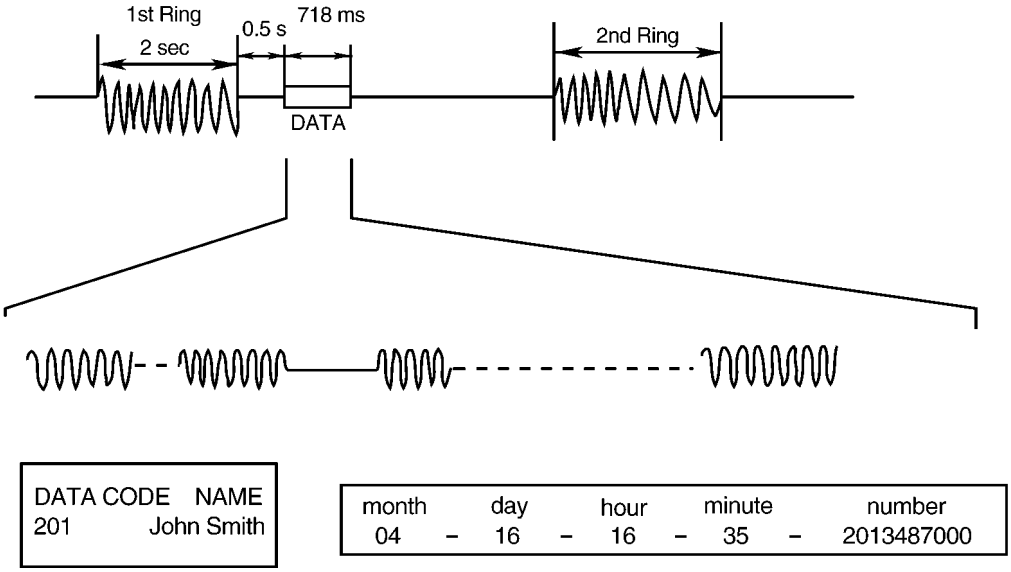
*: Also the telephone exchange service provides other formats.

- Single message format



month		day		hour		minute		number
04	–	15	–	16	–	35	–	2013487000

- Plural message format



DATA CODE	NAME
201	John Smith

month		day		hour		minute		number
04	–	16	–	16	–	35	–	2013487000

Call Waiting Caller ID

Calling Identity Delivery on Call Waiting (CIDCW) is a CLASS service that allows a customer, while off-hook on an existing call, to receive information about a calling party on a waited call. The transmission of the calling information takes place almost immediately after the customer is alerted to the new call so he/she can use this information to decide whether to take the new call.

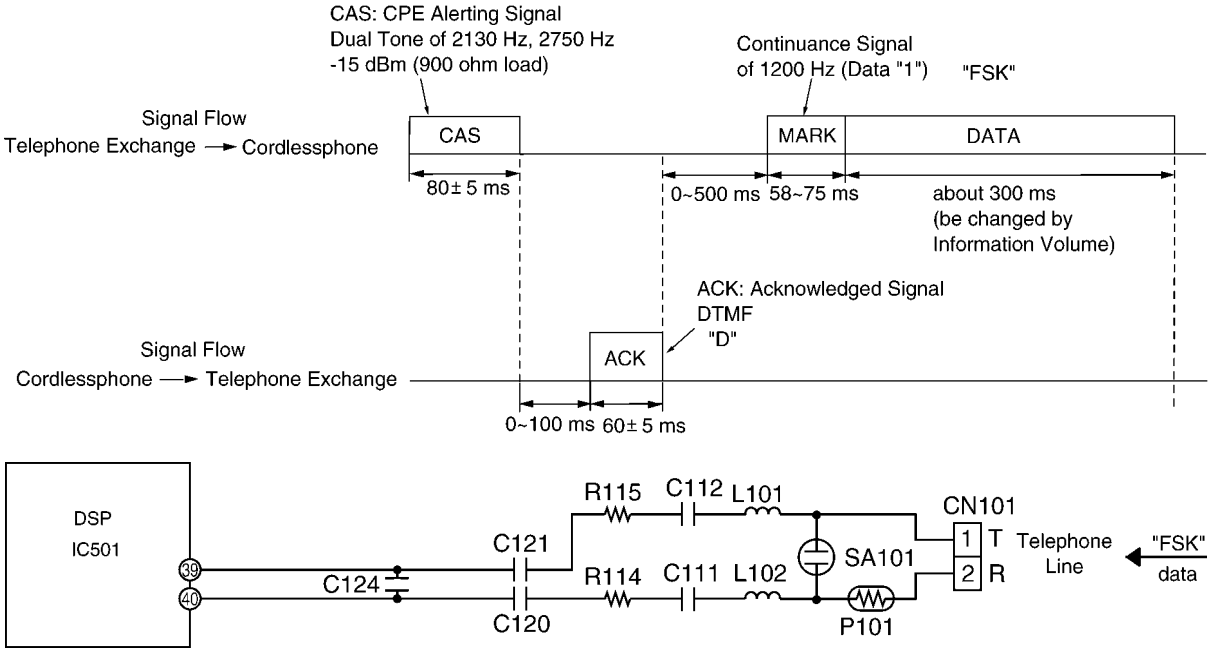
Function:

The telephone exchange transmits or receives CAS and ACK signals through each voice RX/TX route. Then FSK data and MARK data pass the following route.

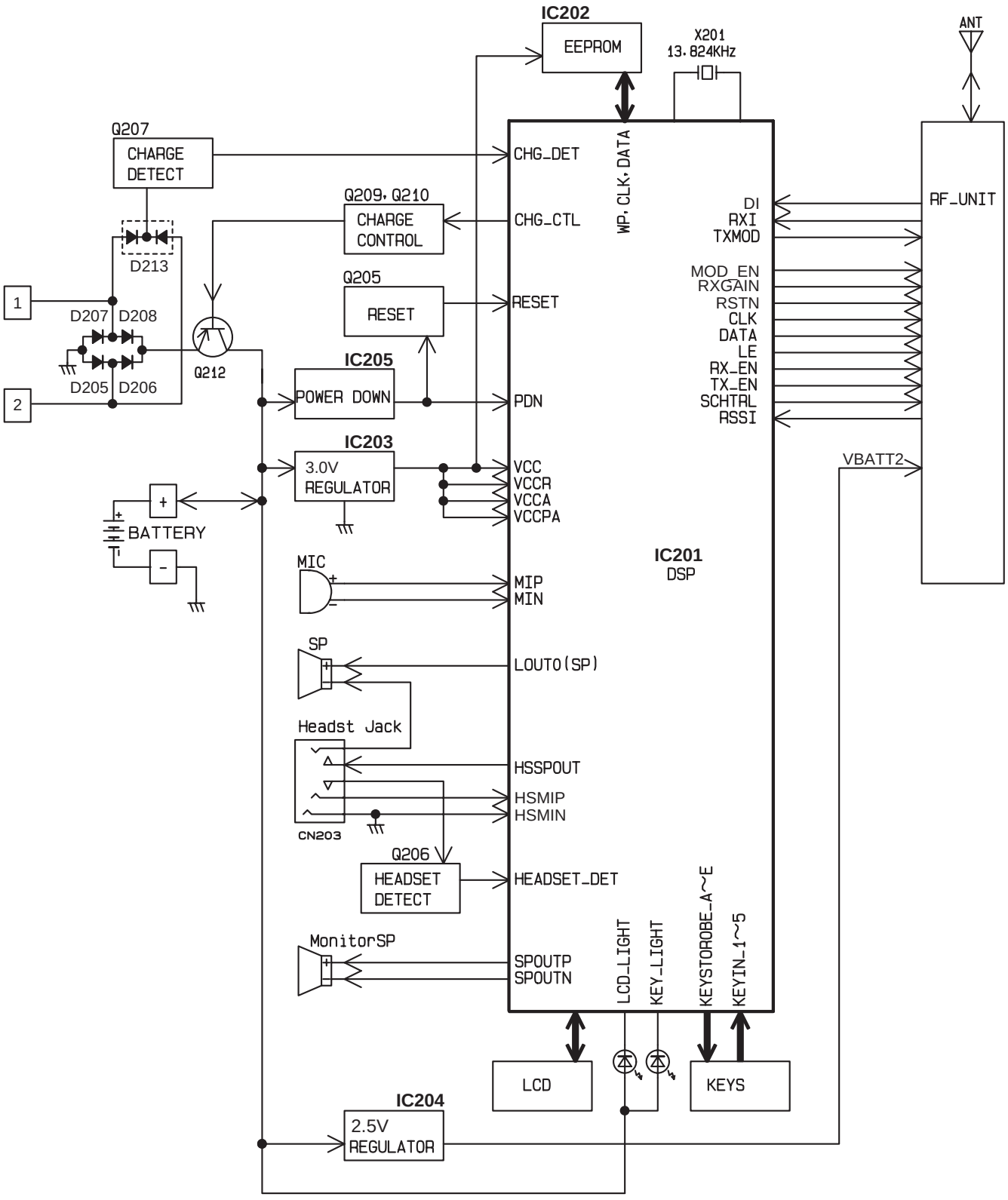
Telephone Line → CN101(T, R) → C111, C112 → R114, R115 → C120, C121 → IC501 (39, 40).

. If the unit deems that a telephone connected in parallel is in use, ACK is not returned even if CAS is received, and the information for the second and subsequent callers is not displayed on the portable handset display.

Call Waiting Format



16 BLOCK DIAGRAM (Handset)



KX-TGA234B BLOCK DIAGRAM (Handset)

17 CIRCUIT OPERATION (Handset)

17.1. Construction

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

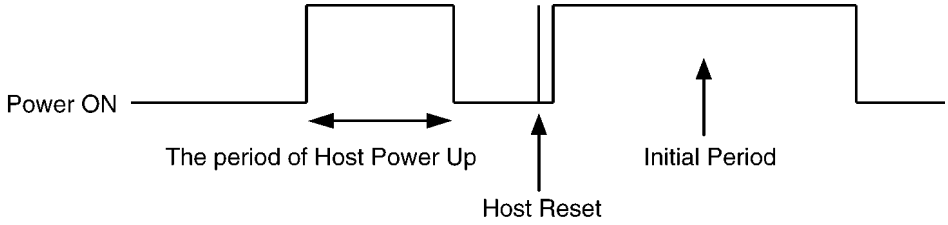
17.1.1. DSP:IC201

17.1.1.1. Function

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

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

17.1.1.2. 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.

17.1.2. RF unit

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

17.1.3. EEPROM: IC202

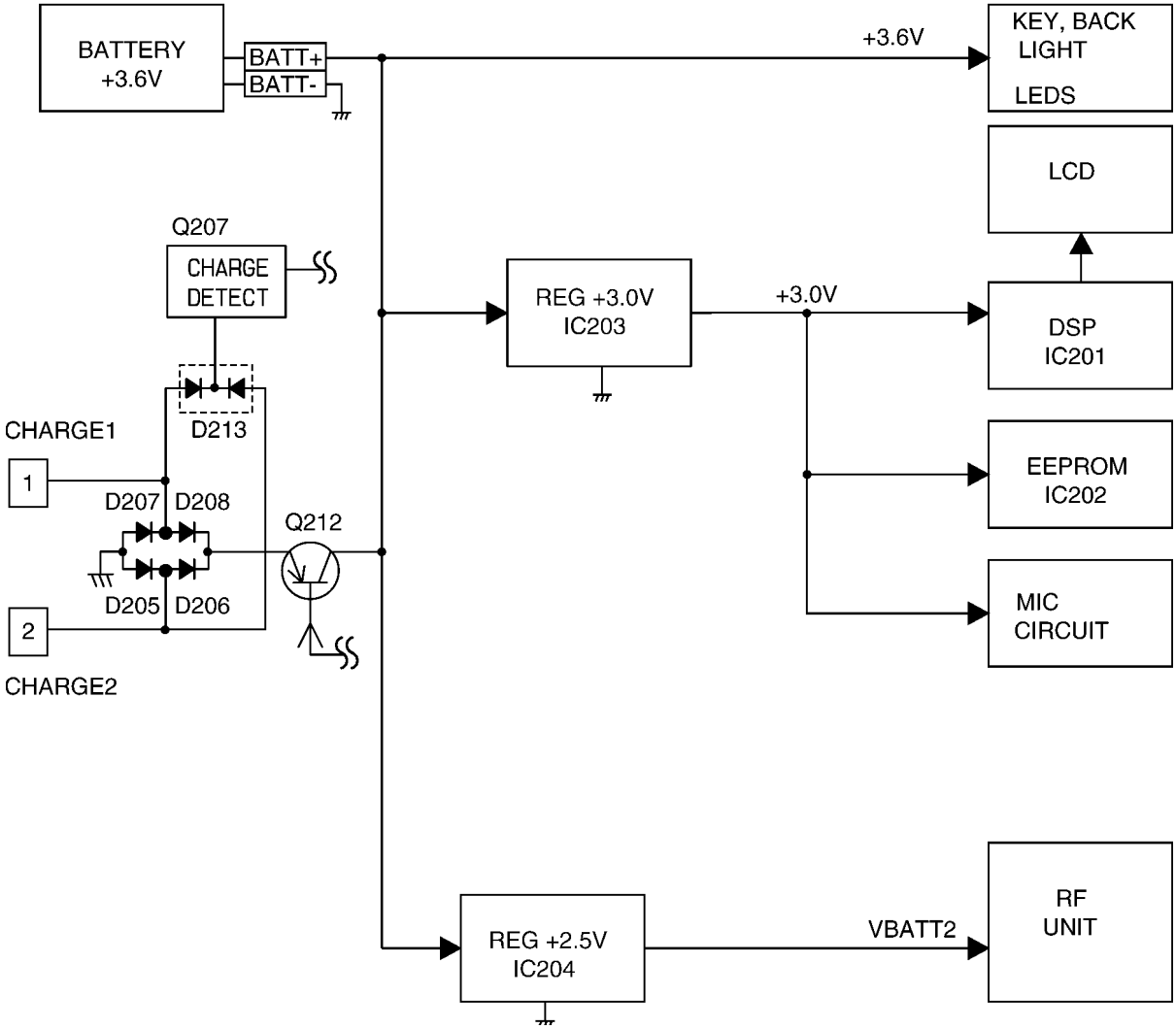
All setting data is stored.

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

17.2. Power Supply Circuit

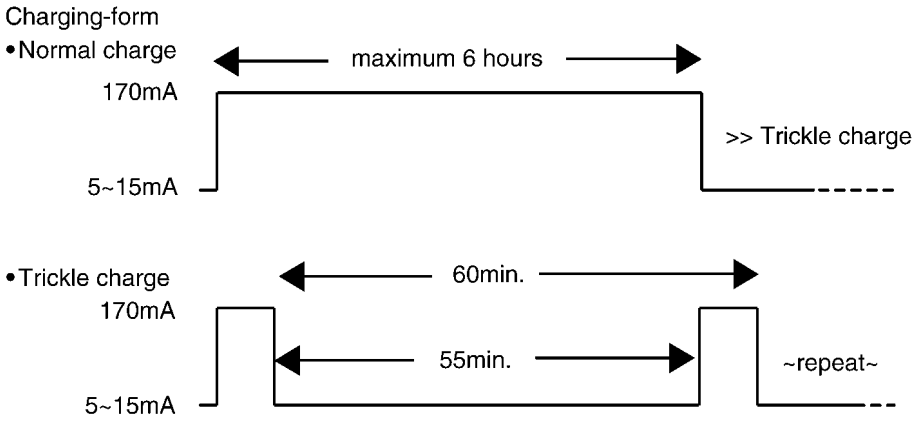
Voltage is supplied separately to each block.

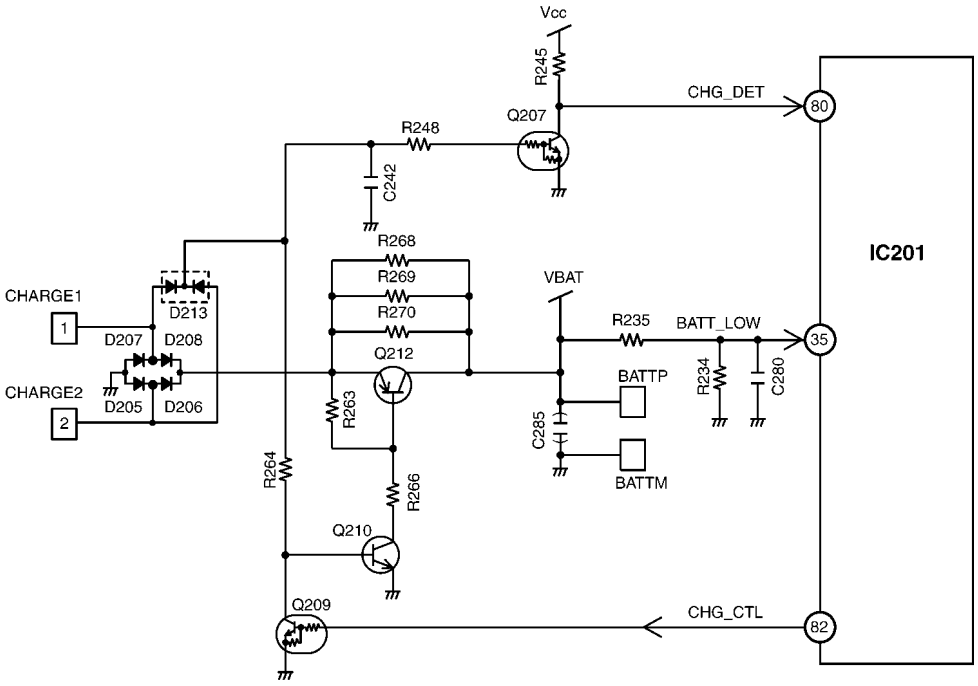
Block Diagram (Handset Power)



17.3. Charge Circuit

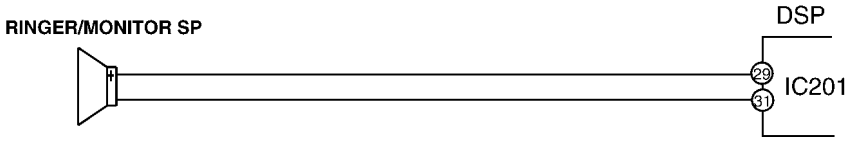
When the handset is put on the cradle of the Base unit or the optional charger, the power is supplied from CHARGE2 and CHARGE1 terminals to charge the battery via D205 (D207), R268, Q212. The voltage between CHARGE2 and CHARGE1 flows D213 -> R248 -> Q207 -> pin80 of IC201, where the charge is detected. 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.





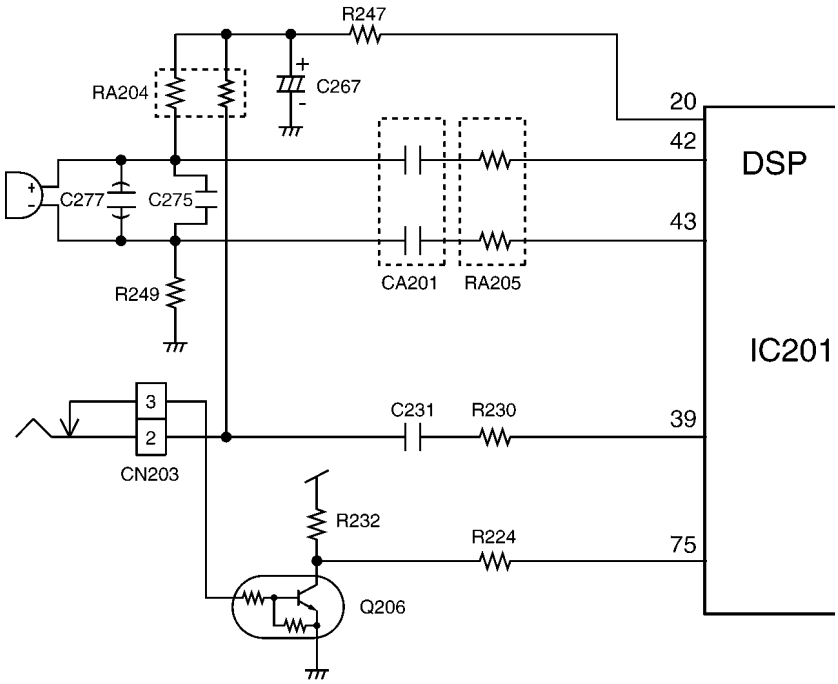
Pin 35 of IC201 monitors the battery voltage and detect BATT LOW at 3.50V.

17.4. Ringer and Handset SP-Phone



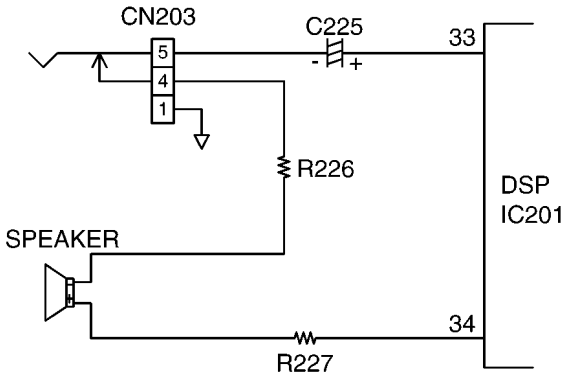
17.5. Sending Signal

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.



17.6. Reception Signal

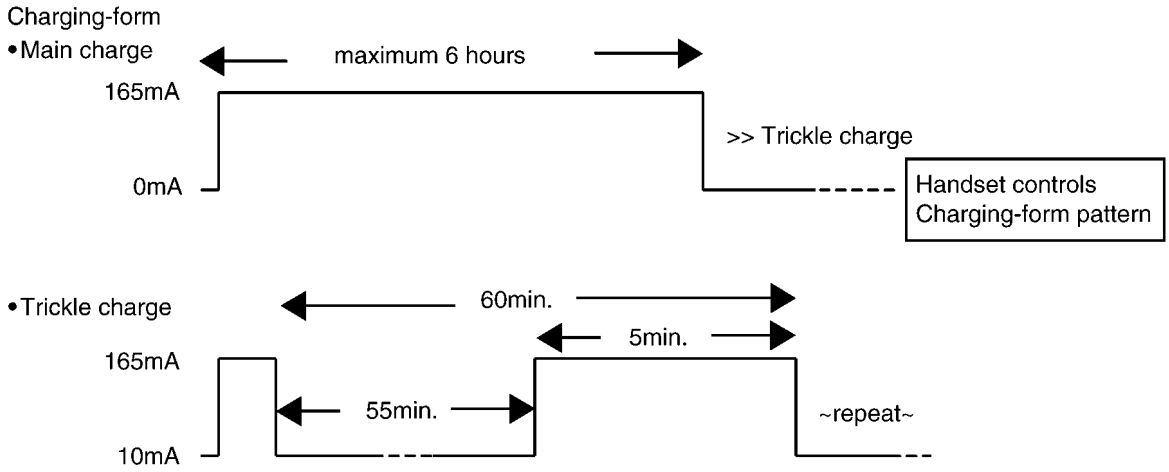
The voice signal from the base unit is output to DSP (33) (HSSPOUT). This signal is led to the headset jack (CN203).The signal through the headset jack and the other signal output from DSP (34) to drive the speaker. When the headset is inserted to the jack, the voice signal is cut at the jack, so the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



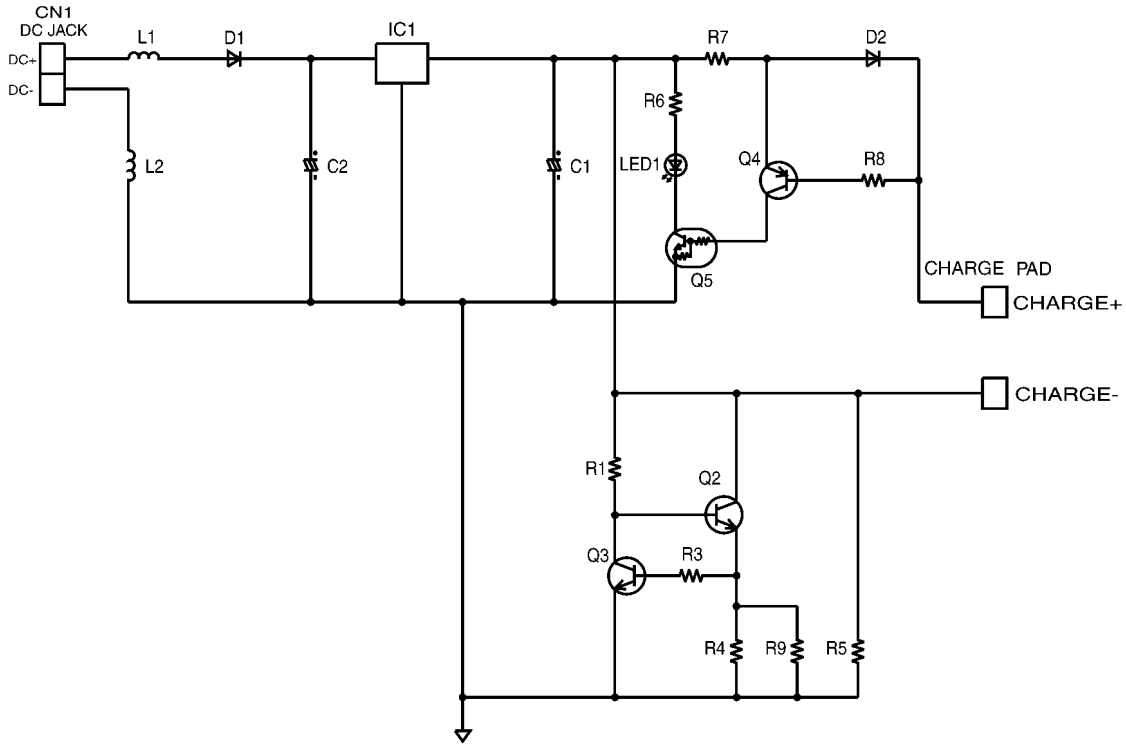
18 CIRCUIT OPERATION (CHARGER UNIT)

The voltage from the AC is supplied to the charge circuits. Main and Operational charge (165mA at the Battery) of maximum 6-hours is started soon after the Handset is placed on the charger unit. Then it changes to Trickle charge (average 10mA at the Battery) to prevent from overcharging.

Charging form



Q4 detects charging (Handset is placed on the charger unit), then Q5 turns ON and LED1 lights up.



Q2 and Q3 regulate the charge current.

The route for this is as follows: DC+pin of CN1→D1→IC1→R7→D2→CHARGE+pad→Cordless Handset→CHARGE-pad→Q2→R4 and R9→DC- pin of CN1.

19 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 - 34) - R123 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
HANDSET RX	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R155 - C158 - Q150 - C151 - R127 - IC501 (36 - 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 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
HEADSET RX	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R155 - C158 - Q150 - C151 - R127 - IC501 (36 - 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 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
HANDSET SP-Phone RX	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R155 - C158 - Q150 - C151 - R127 - IC501 (36 - 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 - 29/31) - L401/L402 - SPEAKER
INTERCOM BASE UNIT TO HANDSET	MIC - C447/C448 - RA401 - IC501 (42/43 - 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 (42/43 - 77/78) - IC701
GREETING PLAY TO TEL LINE	IC701 - IC501 (77/78 - 34) - R123 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
ICM RECORDING	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R155 - C158 - Q150 - C151 - R127 - IC501 (36 - 77/78) - IC701
ICM PLAY TO SPEAKER	IC701 - IC501 (77/78 - 29/31) - L401/L402 - SPEAKER
DTMF SIGNAL TO TEL LINE	IC501 (41) - R123 - C144 - Q161 - Q104 - D101 - L101/L102 - CN101 (TEL LINE)
DTMF DETECTION	CN101 (TEL LINE) - L101/L102 - D101 - Q104 - C166 - R155 - C158 - Q150 - C151 - R127 - IC501 (36)
CALLER ID	CN101 (TEL LINE) - L101/L102 - C111/112 - R114/115 - C120/121 - IC501 (39/40)
BELL DETECTION	CN101 (TEL LINE) - L101/L102 - R130/R131 - C116/C117 - Q106 - IC501 (3)

Note:

[ ]: inside of Handset

20 CPU DATA (Base Unit)

20.1. IC501

Pin	Description	I/O	High	High_Z	Low
1	INT0	D.O	--	--	--
2	NOT_RLY	D.O	On Hook	--	Off Hook
3	BELL	D.I	OFF	--	ON
4	RLY	D.O	Off Hook	--	On Hook
5	AC_DOWN_DET	D.I	High	--	Low
6	NC	D.O	--	--	--
7	NC	D.O	--	--	--
8	KEY_STB_4	D.O	Active	Not	--
9	KEY_STB_3	D.O	Active	Not	--
10	KEY_STB_2	D.O	Active	Not	--
11	KEY_STB_1	D.O	Active	Not	--
12	CHG_CTR	D.O	NoCharge	--	Charge
13	CHG_DET	D.I	Off Charge	--	On Charge
14	VCC	VCC	VCC	--	--
15	GND	GND	--	--	GND
16	KEY_IN_4	D.I	Non	--	Key In
17	KEY_IN_3	D.I	Non	--	Key In
18	KEY_IN_2	D.I	Non	--	Key In
19	KEY_IN_1	D.I	Non	--	Key In
20	NC	D.O	--	--	--
21	NC	D.O	--	--	--
22	NC	D.O	--	--	--
23	SERIAL_DATA	D.O	High	--	Low
24	SERIAL_LE	D.O	Not	--	Active
25	SERIAL_CLK	D.O	High	--	Low
26	SERIAL_IO_DI	D.O	High	--	Low
27	NC	D.O	--	--	--
28	GND	GND			
29	SPOUTP	A.O			
30	GNDPA	GND			
31	SPOUTN	A.O			
32	VCCPA	VCC			
33	HSSPOUT	A.O			
34	LOUT0	A.O			
35	DCIN0	A.I			
36	LIN0	A.I			
37	VCCA	VCC			
38	GNDA	A.I			
39	HSMIP	A.I			
40	HSMIN	A.I			
41	VREF	A.O			
42	MIN	A.I			
43	MIP	A.I			
44	GNDR	GND			
45	TXMOD	A.O			
46	VREFR	A.O			
47	RSSI	A.I			
48	VCCR	VCC			
49	GNDPLL	GND			
50	VCCPLL	VCC			
51	XOUT	A.O			
52	XIN	A.I			
53	GND	GND			
54	Reset	D.I	Normal	--	Reset
55	Power Down	D.I	Normal	--	Power Down

Pin	Description	I/O	High	High_Z	Low
56	FLASH_RST	*	High	Middle	Low
57	TX_OUT	D.O	High	--	Low
58	MOD_EN	D.O	Active	--	Not
59	FLASH_SO	*	High	Middle	Low
60	FLASH_SI	*	High	Middle	Low
61	FLASH_CS	*	High	Middle	Low
62	NC	D.O	--	--	--
63	RXEN	D.O	Active	--	Off
64	TXEN	D.O	Active	--	Off
65	RXGAIN	D.O	High	--	Low
66	RXI	D.I	High	--	Low
67	INUSE/MSG_LED	D.O	--	Off	On
68	ANS_LED	D.O	--	Off	On
69	CHG_LED	D.O	--	Off	On
70	RF_RST	D.O	Normal	--	WakeUp
71	RADIO_EN	D.O	Active	--	Not
72	GND	GND	--	--	GND
73	VCC	VCC	VCC	--	--
74	SHCTRL	D.O	Active	--	Not
75	NC	D.O	--	--	--
76	TCK	D.O	--	--	--
77	TMS	D.I	--	--	--
78	TDI	D.O	--	--	--
79	TD0	D.O	--	--	--
80	SEG12	D.O	High	--	Low
81	SEG11	D.O	High	--	Low
82	SEG10	D.O	High	--	Low
83	SEG9	D.O	High	--	Low
84	SEG8	D.O	High	--	Low
85	SEG7	D.O	High	--	Low
86	SEG6	D.O	High	--	Low
87	SEG5	D.O	High	--	Low
88	SEG4	D.O	High	--	Low
89	SEG3	D.O	High	--	Low
90	COM2	D.O	High	Middle	Low
91	COM1	D.O	High	Middle	Low
92	UART_TX	D.O	High	--	Low
93	UART_RX	D.I	High	--	Low
94	PULSE_MUTE	D.O	On	--	Off
95	WDT CTL	D.O	--	Normal	Low
96	GND	GND	--	--	GND
97	VCC	VCC	VCC	--	--
98	NC	D.O	--	--	--
99	FLASH_SCK	*	High	Middle	Low
100	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.

21 CPU DATA (Handset)

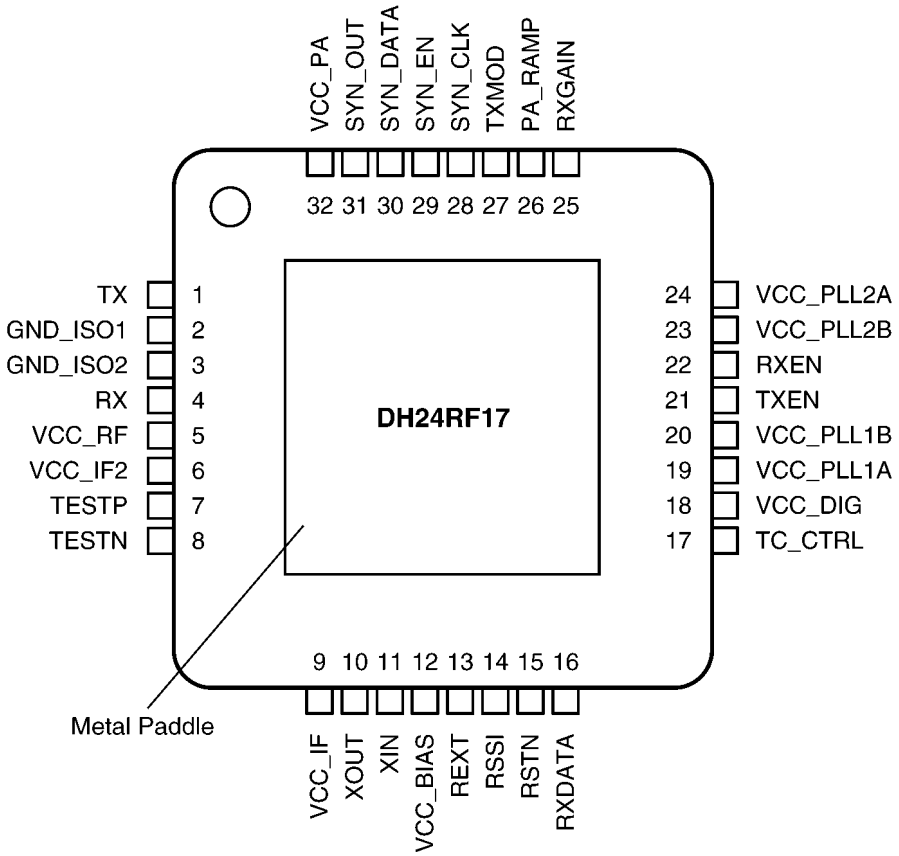
21.1. IC201

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

22 EXPLANATION OF IC TERMINALS (RF Unit)

22.1. 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

23 HOW TO REPLACE A FLAT PACKAGE IC

23.1. Preparation

- PbF (: Pb free) Solder
- Soldering Iron

  Tip Temperature of 662°F ± 50°F (350°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

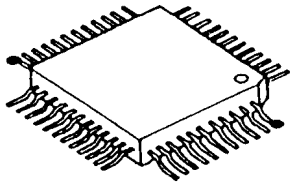
  Recommended Flux: Specific Gravity → 0.82.

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

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

23.2. Procedure

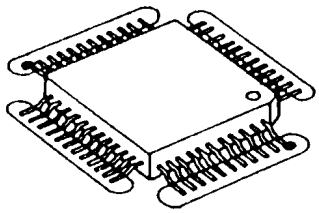
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.

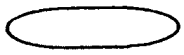


● - - - - - - Temporary soldering point.

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

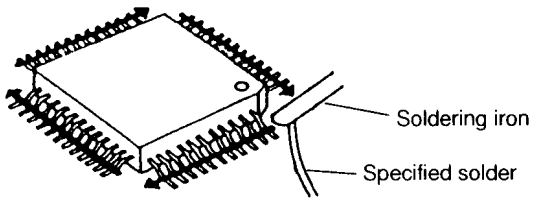
2. Apply flux to all of the pins on the IC.





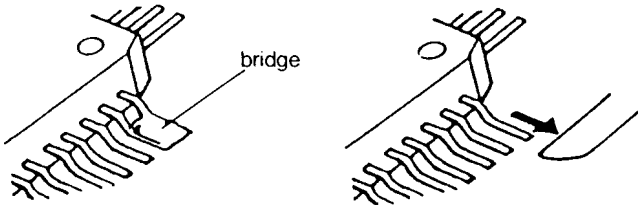
- - - - - - Flux

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.

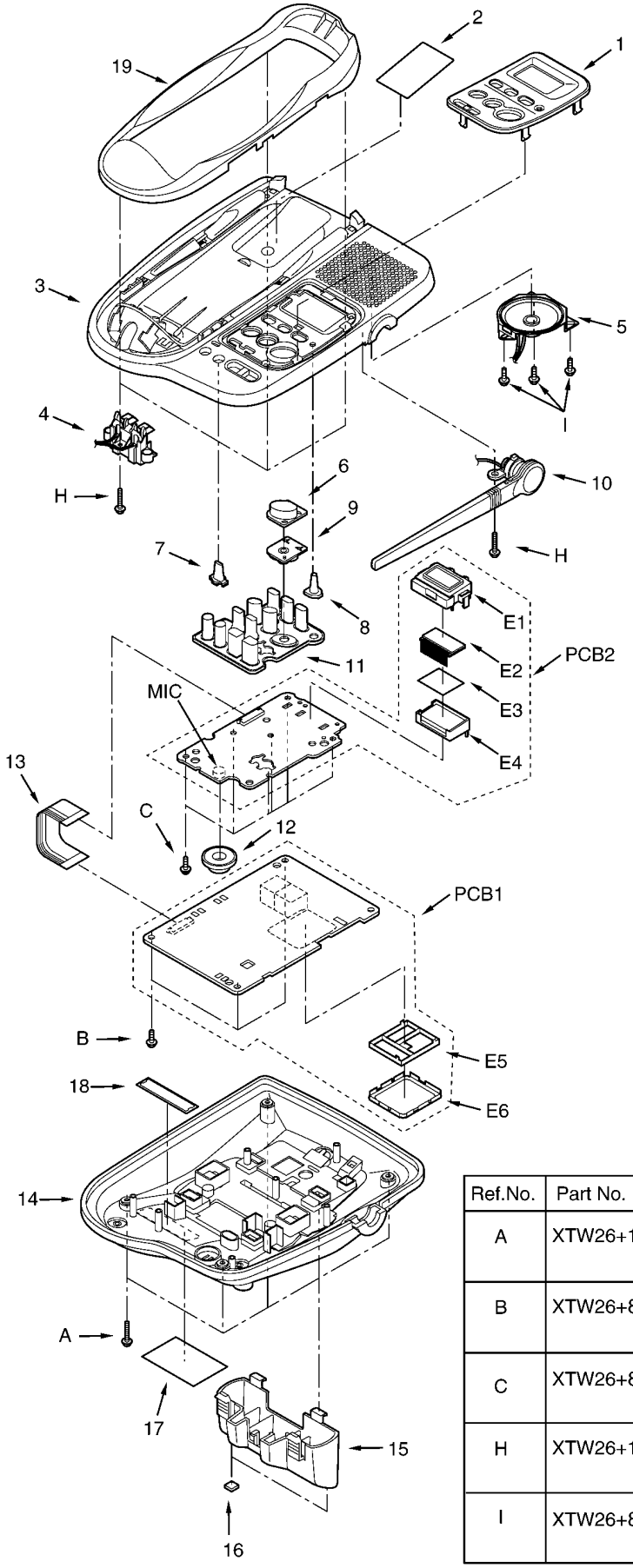


23.3. Removing Solder from Between Pins

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.

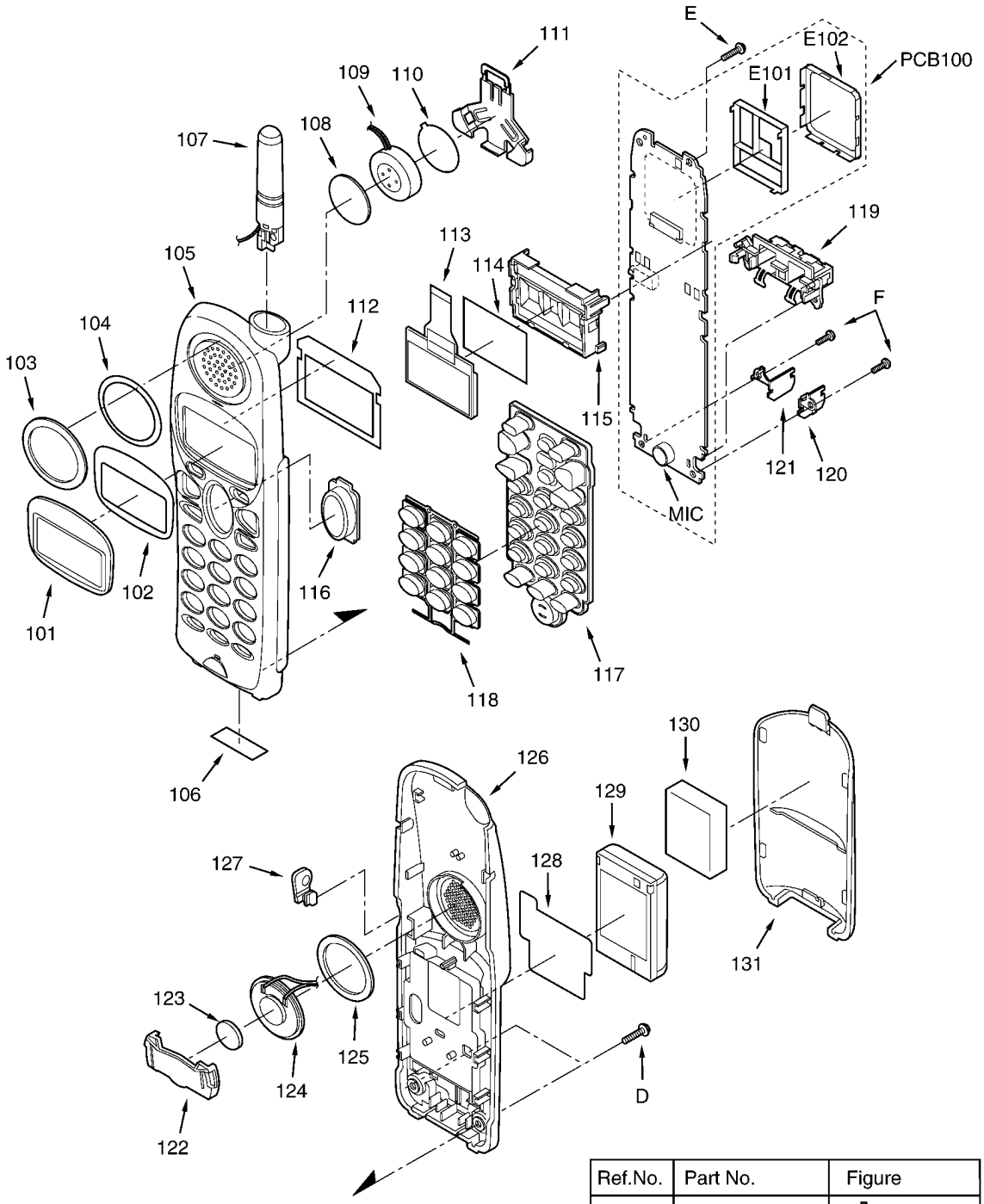


24 CABINET AND ELECTRICAL PARTS (Base Unit)



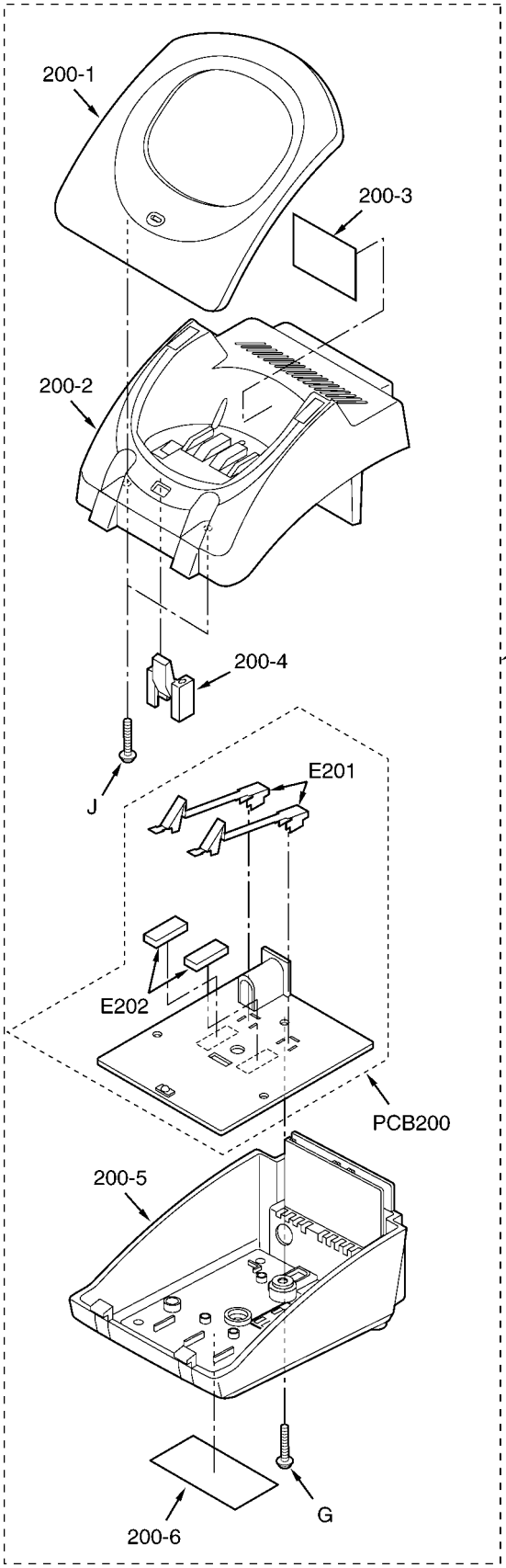
Ref.No.	Part No.	Figure
A	XTW26+12P	ϕ2.6 × 12mm
B	XTW26+8P	ϕ2.6 × 8mm
C	XTW26+8P	ϕ2.6 × 8mm
H	XTW26+12P	ϕ2.6 × 12mm
I	XTW26+8P	ϕ2.6 × 8mm

25 CABINET AND ELECTRICAL PARTS (Handset)



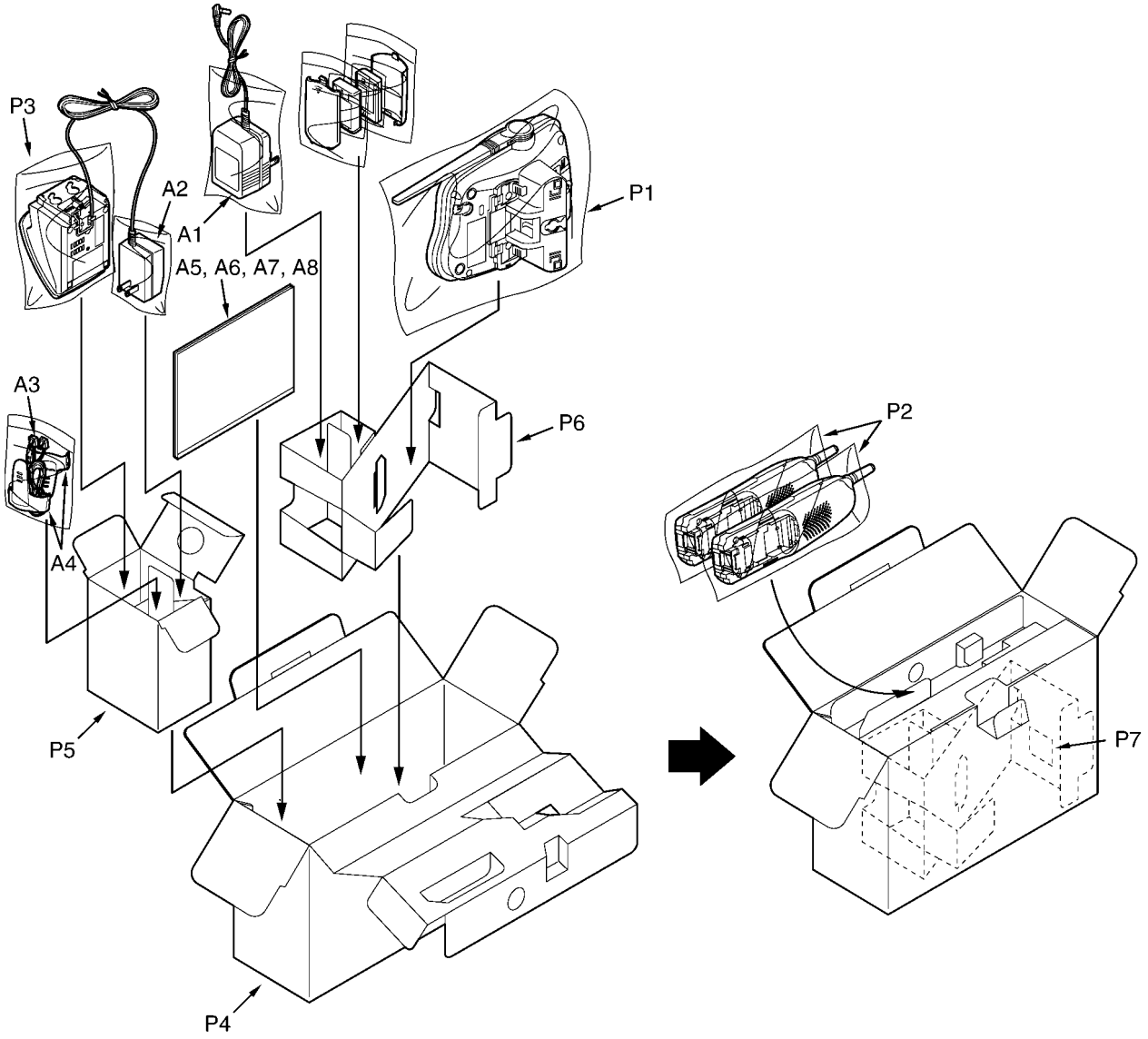
Ref.No.	Part No.	Figure
D	XTW26+12P	ϕ2.6 × 12mm
E	XTW26+12P	ϕ2.6 × 12mm
F	XTB26+9J	ϕ2.6 × 9mm

26 CABINET AND ELECTRICAL PARTS (Charger Unit)



Ref.No.	Part No.	Figure
G	XTW26+12P	ϕ2.6 × 12mm
J	XTW26+12P	ϕ2.6 × 12mm

27 ACCESSORIES AND PACKING MATERIALS



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

28.1. Base Unit

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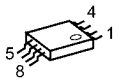
<td> 
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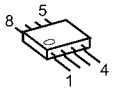
<td> 
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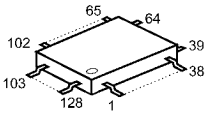
<td> 
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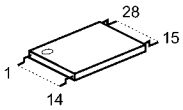
<td> 
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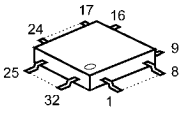
<td> 
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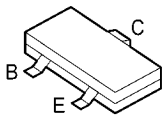
<td colspan="2"> 
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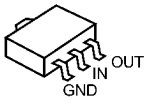
<td> 
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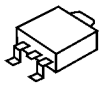
<td> 
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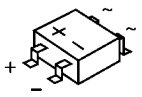
<td> 
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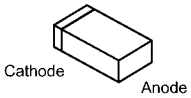
<td> 
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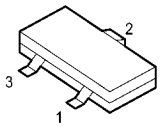
<td> 
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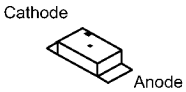
<td> 
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28.2. Handset

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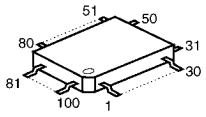
<td> 
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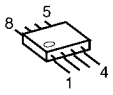
<td> 
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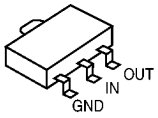
<td> 
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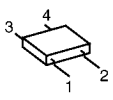
<td> 
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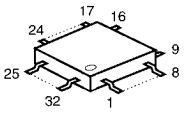
<td> 
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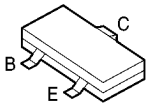
<td colspan="2"> 
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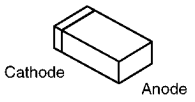
<td> 
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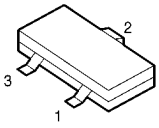
<td> 
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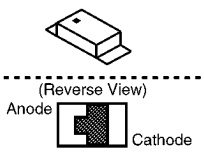
<td> 
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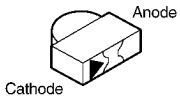
<td> 
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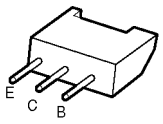
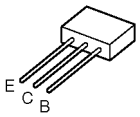
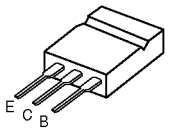
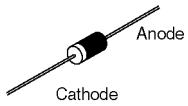
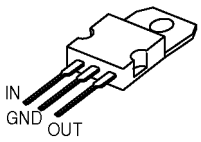
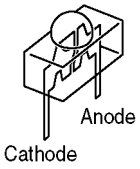
28.3. Charger Unit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29 REPLACEMENT PARTS LIST

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	PQGG10248Z2	GRILLE, TAM	
2	PQQT22706Z	LABEL, CHARGE	
3	PQKM10620Z3	CABINET BODY	
4	PQWE10027Z	BATTERY TERMINAL	
5	PQAS5P13Y	SPEAKER	
6	PQBC10398Z1	BUTTON, MESSAGE	
7	PQHR11024Z	LED LENS, CHARGE	
8	PQHR11025Z	LED LENS, ANSWER ON	
9	PQHR11023Z	GUIDE, LED	
10	PQSA10098V	ANTENNA	
11	PQSX10254Y	KEYBOARD SWITCH, TAM	
12	PQMG10023Z	RUBBER PARTS, MIC COVER	
13	PQJE10135Z	FLAT CABLE	
14	PQKF10609Z2	CABINET COVER	
15	PQKL10060Z2	STAND, WALL MOUNT	
16	PQHA10011Z	RUBBER PARTS, LEG CUSHION	
17	PQGT16458Z	NAME PLATE	
18	PQXDZLDRS1	LABEL, SECURITY	
19	PQGG10247Z3	GRILLE	

29.1.2. Main P.C. Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWP1TG2344H	MAIN P.C.BOARD ASS´Y (RTL)	
		(ICs)	
IC201	PQVINJM2904V	IC	S
IC300	C0DBFGD00017	IC	
IC301	C0DBAGZ00028	IC	
IC501	C2HBBK000023	IC	
IC601	C0CBAAD00054	IC	
IC701	PQWITG2344BH	IC	
IC901	C1CB00001657	IC	
		(TRANSISTORS)	
Q103	B1BBAP000011	TRANSISTOR(SI)	S
Q104	B1ADGP000001	TRANSISTOR(SI)	S
Q106	2SD1819A	TRANSISTOR(SI)	
Q107	2SD1819A	TRANSISTOR(SI)	
Q150	2SD1819A	TRANSISTOR(SI)	
Q161	2SD0874AS	TRANSISTOR(SI)	
Q201	2SD1819A	TRANSISTOR(SI)	
Q202	UN5213	TRANSISTOR(SI)	S
Q301	B1DHCD000022	TRANSISTOR(SI)	
Q350	2SD1758Q	TRANSISTOR(SI)	S
Q351	2SD1819A	TRANSISTOR(SI)	
Q353	UN5213	TRANSISTOR(SI)	S
Q381	2SB1218A	TRANSISTOR(SI)	
Q382	2SD1819A	TRANSISTOR(SI)	
Q570	2SD1819A	TRANSISTOR(SI)	
Q800	2SC39300CL	TRANSISTOR(SI)	
		(DIODES)	
D101	PQVDS1ZB60F1	DIODE(SI)	S
D102	PQVDRLZ20A	DIODE(SI)	S
D103	MA111	DIODE(SI)	
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)	
DA101	MA147	DIODE(SI)	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	
L500	PQLQR2KA213	COIL	S
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
		(JACKS AND CONNECTORS)	
CN101	PQJJ2H003Z	JACK	S
CN102	K1MN26B00096	CONNECTOR	

Ref. No.	Part No.	Part Name & Description	Remarks
		(LCR FILTERS)	
FL901	J0E2457B0008	IC FILTER	
		(COMPONENTS PARTS)	
RA10	EXRV8V104JV	RESISTOR ARRAY	
RA401	D1H42222A006	RESISTOR ARRAY	
RA501	EXRV8V472JV	RESISTOR ARRAY	S
RA901	D1H810240004	RESISTOR ARRAY	
		(VARISTORS)	
SA101	PQVDDSS301L	VARISTOR	S
SA102	PQVDDSS301L	VARISTOR	S
		(RESISTORS)	
R104	ERJ3GEYJ103	10K	
R107	ERJ3GEYJ473	47K	
R108	ERJ3GEYJ103	10K	
R110	ERJ3GEYJ106	10M	
R112	ERJ3GEYJ102	1K	
R113	ERJ3GEYJ473	47K	
R114	ERJ3GEYJ394	390K	
R115	ERJ3GEYJ394	390K	
R120	ERJ3GEYJ104	100K	
R123	ERJ3GEYJ333	33K	
R125	ERJ3GEYJ275	2.7M	
R127	ERJ3GEYJ102	1K	
R130	ERJ3GEYJ104	100K	
R131	ERJ3GEYJ104	100K	
R134	ERJ2GE0R00	0	
R135	ERJ3GEYJ155	1.5M	
R136	ERJ3GEYJ472	4.7K	
R139	ERJ3GEYJ472	4.7K	
R140	ERJ2GEJ102	1K	
R150	ERJ3GEYJ101	100	
R151	ERJ3GEYJ5R6	5.6	
R152	ERJ3GEYJ823	82K	
R155	ERJ3GEYJ102	1K	
R162	ERJ2GEJ393X	39K	
R163	ERJ2GEJ470	47	
R164	ERJ12YJ330	33	
R165	ERJ2GEJ681	680	
R166	ERJ2GEJ122	1.2K	
R170	ERJ3GEYJ221	220	
R201	ERJ2GEJ105X	1M	
R202	ERJ2GEJ224	220K	
R203	ERJ2GEJ104	100K	
R204	ERJ3GEYJ103	10K	
R205	ERJ3GEYJ103	10K	
R303	ERJ3GEYJ121	120	
R305	PQ4R10XJ101	100	S
R333	ERJ3GEYJ473	47K	
R335	ERJ3GEYJ102	1K	
R351	PQ4R10XJ120	12	S
R352	ERJ2GEJ391	680	
R353	PQ4R10XJ150	15	S
R354	ERJ2GEJ101	100	
R355	PQ4R10XJ150	15	S
R356	PQ4R10XJ150	15	S
R381	ERJ2GEJ332	3.3K	
R382	ERJ3GEYJ472	4.7K	
R383	ERJ3GEYJ103	10K	
R387	ERJ3GEYJ102	1K	
R409	ERJ3GEYJ101	100	
R415	ERJ3GEYJ222	2.2K	
R416	ERJ3GEYJ222	2.2K	
R502	ERJ3GEYJ102	1K	
R543	ERJ3GEYJ472	4.7K	
R507	ERJ2GEJ102	1K	
R516	ERJ2GEJ151	150	
R570	ERJ2GEJ473	47K	
R571	ERJ2GEJ123	12K	
R572	ERJ2GEJ102	1K	
R601	ERJ3GEY0R00	0	
R612	ERJ3GEYJ101	100	
R706	ERJ2GEJ104	100K	
R722	ERJ3GEYJ821	820	

Ref. No.	Part No.	Part Name & Description	Remarks
R723	ERJ3GEYJ821	820	
R724	ERJ3GEYJ821	820	
R803	ERJ2GEJ182	1.8K	
R804	ERJ2GEJ151	150	
R805	ERJ2GEJ393X	39K	
R806	ERJ2GEJ561	560	
R807	ERJ2GEJ681	680	
R903	MQLRE10NJF	COIL	
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)	
C10	ECUV1H101JCV	100P	
C11	ECUV1H101JCV	100P	
C101	F1K2J681A006	680P	
C102	F1K2J681A006	680P	
C106	PQCUV1A684KB	0.68	
C109	ECUV1H103KBV	0.01	
C111	ECUV1H681JCV	680P	S
C112	ECUV1H681JCV	680P	S
C114	ECUV1H103KBV	0.01	
C116	PQCUV1H154KR	0.15	
C117	PQCUV1H154KR	0.15	
C124	ECUV1H562KBV	0.0056	
C144	ECUV1C104KBV	0.1	
C149	ECUV1C104KBV	0.1	
C150	ECUV1H103KBV	0.01	
C151	ECUV1C473KBV	0.047	
C155	ECUV1H272KBV	0.0027	
C158	ECUV1C224KBV	0.22	
C161	EEE1EA100SR	10	
C162	ECUE1H101JCQ	100P	
C163	ECJ0EB1E472K	0.0047	S
C166	ECUE1A473KBQ	0.047	
C167	EEE1CA100SR	10	
C170	EEE0JA101SP	100	
C201	ECUE1C103KBQ	0.01	
C202	ECUV1C224KBV	0.22	
C303	ECUV1E104KBV	0.1	
C306	ECUV1C104KBV	0.1	
C308	F2G1E1010011	100	S
C309	ECUE1A104KBQ	0.1	
C310	F1G0J1050007	1	S
C311	EEEFK1C470P	47	
C317	EEE0JA331P	330	
C318	ECUE1A104KBQ	0.1	
C319	ECUV1C474KBV	0.47	
C351	ECUE1A104KBQ	0.1	
C353	ECUE1C103KBQ	0.01	S
C415	EEE0JA470SR	47	
C423	ECUV1C333KBV	0.033	
C441	ECUV1C104KBV	0.1	
C447	ECUV1C223KBV	0.022	
C448	ECUV1C223KBV	0.022	
C502	F1G0J1050007	1	S
C509	ECUE1A104KBQ	0.1	
C511	ECUE1A104KBQ	0.1	
C512	ECUE1A104KBQ	0.1	
C518	ECUE1H471KBQ	470P	
C553	ECUV1C104KBV	0.1	
C554	ECUV1C104KBV	0.1	
C606	EEE0GA331WP	330	
C608	ECUV1H103KBV	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C628	ECUE1H101JCQ	100P	
C629	ECUE1H101JCQ	100P	
C630	ECUE1H101JCQ	100P	
C701	ECUE1A104KBQ	0.1	
C800	ECUE1A104KBQ	0.1	
C801	F1G0J1050007	1	S
C803	F1J0J1060006	10	
C804	ECUE1H020CCQ	2P	S
C805	ECUE1H020CCQ	2P	S
C806	ECUE1A104KBQ	0.1	
C809	ECUE1H3R0CCQ	3P	
C810	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	
		(OTHERS)	
MIC	L0CBAB000052	MICROPHONE	
E5	PQMC10471Z	MAGNETIC SHIELD, FRAME	
E6	PQMC10472Z	MAGNETIC SHIELD, COVER	
P101	PFRT002	THERMISTOR	S
X801	H0J138500003	CRYSTAL OSCILLATOR	

29.1.3. Operational P.C. Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PQWP2TG2344H	OPERATIONAL P.C.BOARD ASS´Y (RTL)	
		(LEDS)	
LED10	PQVDSML210L	LED	S
LED11	PQVDSML210L	LED	S
LED12	PQVDSML210L	LED	S
		(CONNECTORS)	
CN10	K1MN26B00096	CONNECTOR	
		(OTHERS)	
E1	PQGP10252Z1	PANEL, LCD	S
E2	L5DCBCB00016	LIQUID CRYSTAL DISPLAY	
E3	PQHS10327Z	TAPE, LCD	
E4	PQHR11022Z	GUIDE, LCD	

29.2. Handset

29.2.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
101	PQGP10253Z3	PANEL, LCD	
102	PQHS10625Z	TAPE, DOUBLE SIDE	
103	PQKE10373Z1	SPACER, SPEAKER RING	
104	PQHS10623Z	TAPE, DOUBLE SIDE	
105	PQKM10622Z2	CABINET BODY	
106	PQGT16517Z	NAME PLATE	
107	PQSA10146Y	ANTENNA	
108	PQHS10592Z	SPACER, SPEAKER	
109	L0AD02A00020	SPEAKER	
110	PQHS10634Z	SPACER, SPEAKER	
111	PQHR10984Z	GUIDE, SPEAKER	
112	PQHS10624Z	SPACER, LCD CUSHION	
113	L5DCBDC00009	LIQUID CRYSTAL DISPLAY	
114	PQHX11186Z	SPACER, LCD	
115	PQHR11028Z	GUIDE, LCD	
116	PQBC10403Z1	BUTTON, VOLUME	
117	PQSX10256Y	KEYBOARD SWITCH	
118	PQBX10375Z1	BUTTON, 12 KEY	S
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	PQKF10610Z2	CABINET COVER	
127	PQKE10374Z2	COVER, EARPHONE	
128	PQHX11247Z	PLASTIC PARTS, BATTERY COVER SHEET	
129	HHR-P104	BATTERY	
130	PQHE10151Z	SPACER, BATTERY	
131	PQKK10140Z2	LID, BATTERY COVER	

29.2.2. Main P.C. Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPTG2344BR	MAIN P.C.BOARD ASS´Y (RTL)	
		(ICs)	
IC201	C2HBBK000030	IC	
IC202	PQWITG2344BR	IC	
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	PQVTDTC114TU	TRANSISTOR(SI)	
Q209	PQVTDTC143E	TRANSISTOR(SI)	S
Q210	2SD1819A	TRANSISTOR(SI)	
Q212	2SB0710ARL	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
D217	MA8047	DIODE(SI)	S
D218	MA8047	DIODE(SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
D219	MA8047	DIODE(SI)	S
D220	MA8047	DIODE(SI)	S
D903	B0DCCD000011	DIODE(SI)	
D904	B0DCCD000011	DIODE(SI)	
		(LEDS)	
LED201	PQVDSML310MT	LED	S
LED202	PQVDSML310MT	LED	S
LED203	PQVDSML310MT	LED	S
LED204	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	MQLRE10NJF2	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	
R268	ERJ3GEYJ102	1K	
R269	ERJ3GEYJ102	1K	

Ref. No.	Part No.	Part Name & Description	Remarks
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	
R903	MQLRE10NJF	COIL	
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
C217	F1G0J1050007	1	S
C218	F1G0J1050007	1	S
C219	ECUE1A104KBQ	0.1	
C220	EEE0JA101SP	100	
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	
C278	ECUE1H100DCQ	10P	
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	
C311	ECUE1H3R0CCQ	3P	
C312	ECUE1A104KBQ	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
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	

Ref. No.	Part No.	Part Name & Description	Remarks
D2	PQVDS5688G	DIODE(SI)	S
LED1	LNJ201LPQJA	LED	
		(COILS)	
L1	PQLQXF4R7K	COIL	
L2	PQLQXF4R7K	COIL	
		(JACK)	
CN1	PQJJ1B4Y	JACK	S
		(RESISTORS)	
R1	ERDS2TJ222	2.2K	
R3	ERDS2TJ101	100	
R4	ERDS2TJ3R9	3.9	
R6	ERDS2TJ102	1K	
R7	ERDS2TJ000	0	
R8	ERDS2TJ102	1K	
R9	ERDS2TJ560	56	
		(CAPACITORS)	
C1	ECEA1HKS010	1	
C2	ECEA1HKS010	1	
		(OTHERS)	
E201	PQJT10200Z	BATTERY TERMINAL	
E202	PQHG10584Z	SPACER	

29.3. Charger Unit

29.3.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
200	PQLV30023ZB	CHARGER UNIT	
200-1	PQGG10255Z2	GRILLE	ABS-HB
200-2	PQKM10629Z2	CABINET BODY	PS-HB
200-3	PQQT22711Z	LABEL, CHARGE	
200-4	PQHR10932Z	OPTIC CONDUCTIVE PARTS, LED LENS	PS-HB
200-5	PQKF10613Z2	CABINET COVER	PS-HB
200-6	PQGT16668Z	NAME PLATE	

29.3.2. Main P.C. Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB200	PQWPG30023ZB	MAIN P.C.BOARD ASS´Y (RTL)	
		(IC)	
IC1	C0CAAHG00013	IC	
		(TRANSISTORS)	
Q2	2SD2136	TRANSISTOR(SI)	
Q3	2SD1991A	TRANSISTOR(SI)	
Q4	2SA933	TRANSISTOR(SI)	S
Q5	UN4210	TRANSISTOR(SI)	S
		(DIODES)	
D1	PQVDAK04A	DIODE(SI)	S

29.4. Accessories and Pack,ing Materials

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV1Z	AC ADAPTOR (for Base Unit)	⚠
A2	KX-TCA1-G	AC ADAPTOR (for Charger Unit)	⚠
A3	PQJA10075Z	CORD, TELEPHONE	
A4	PQKE10375Z2	HANGER, BELT CLIP	S
A5	PQQX13990Y	INSTRUCTION BOOK	
A6	PQQW13193Y	QUICK GUIDE (English)	
A7	PQQW13194Y	QUICK GUIDE (Spanish)	
A8	PQQW13178Y	LEAFLET, OPENLCR	
P1	PQPP170Y	PROTECTION COVER (for Base Unit)	
P2	XZB10X35A02	PROTECTION COVER (for Handset)	
P3	XZB15X25A04	PROTECTION COVER (for Charger Unit)	
P4	PQPK14190Z	GIFT BOX	
P5	PQPN11709Z	ACCESSORY BOX, PAPER	
P6	PQPD10602Z	CUSHION	
P7	PQXDDS400-8	LABEL, SECURITY	

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.

30.3. Charger Unit (SCHEMATIC DIAGRAM (Charger Unit))

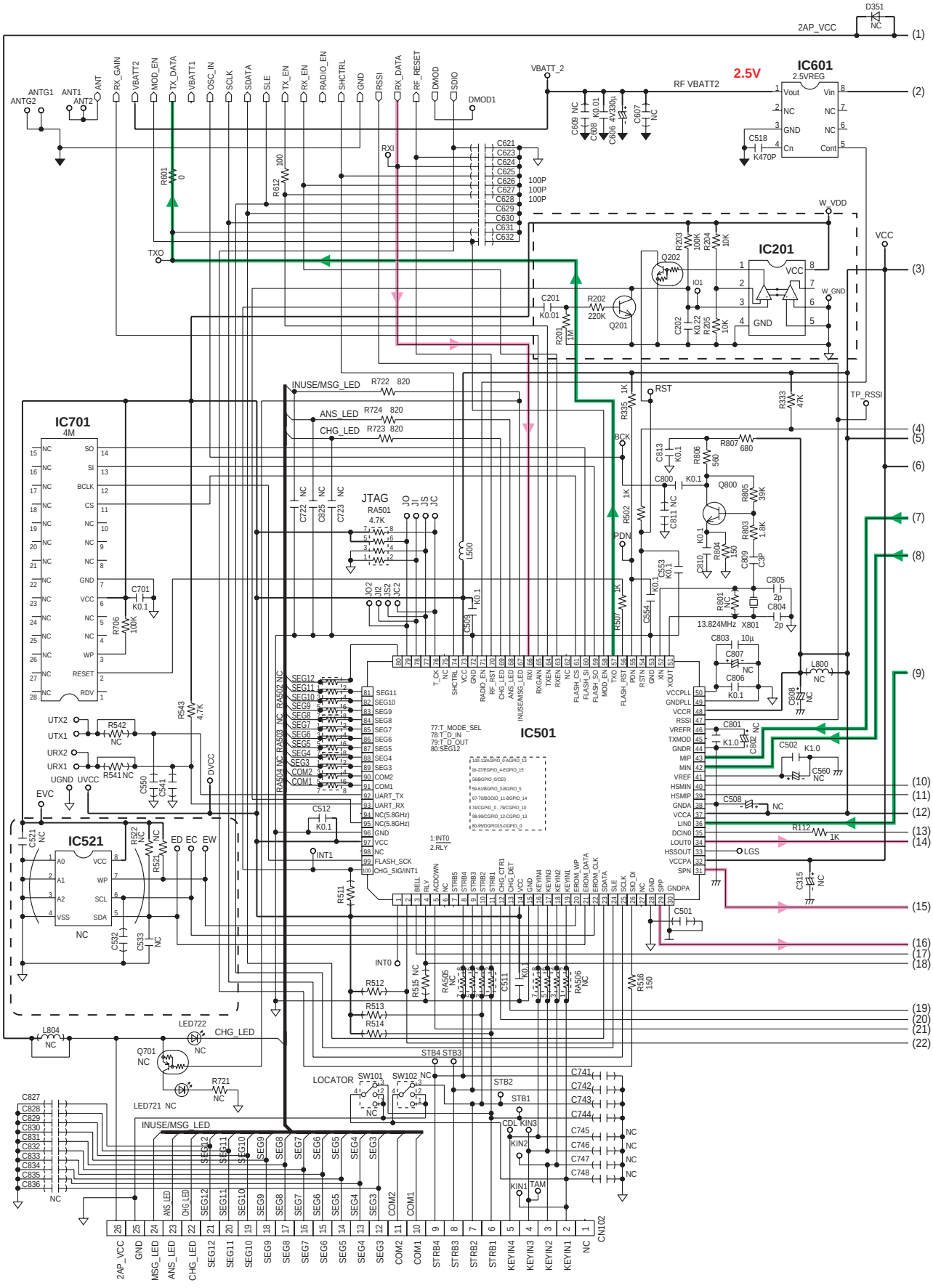
Notes:

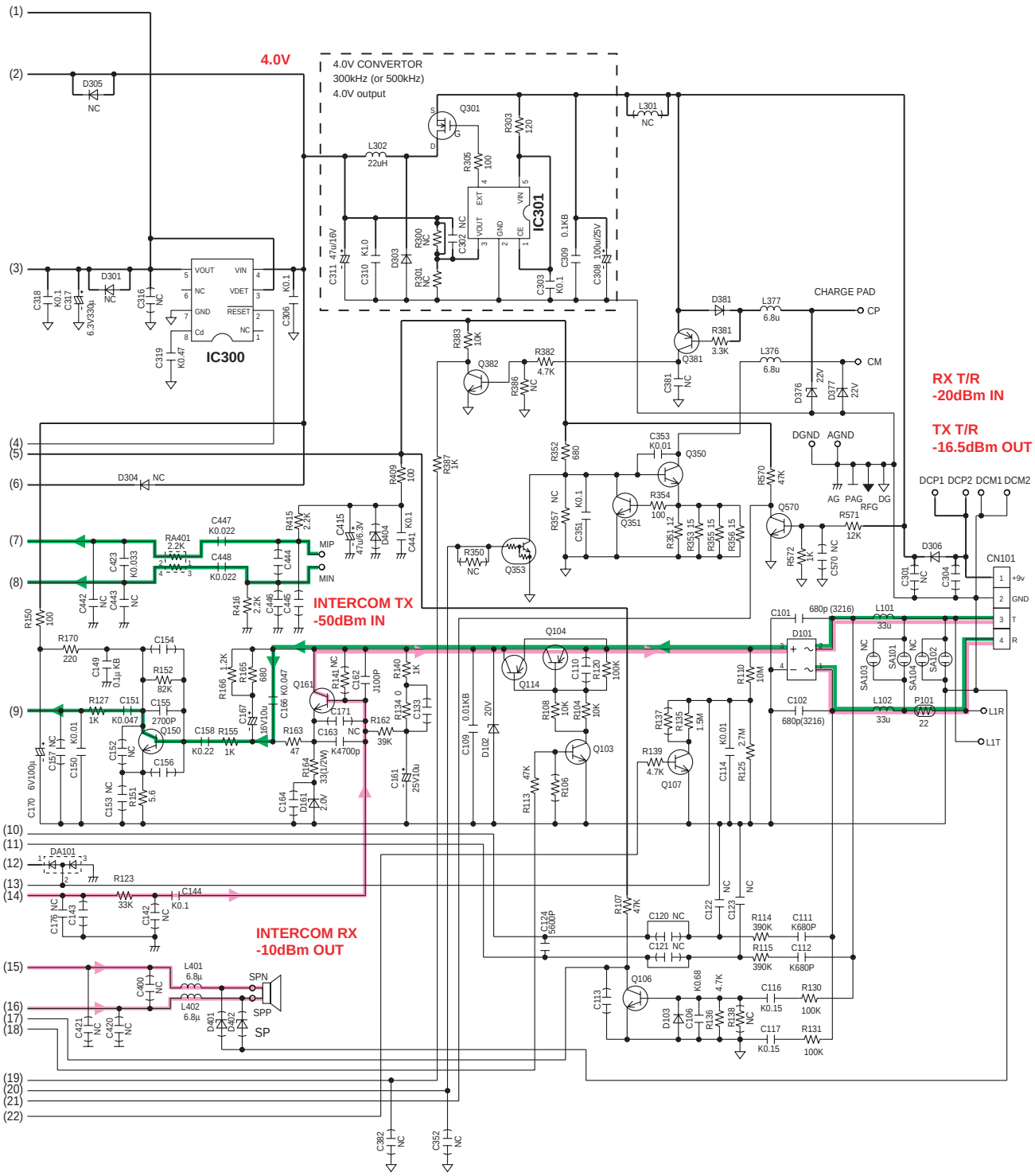
1. DC voltage measurements are taken with voltmeter from the negative voltage line.

> 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.

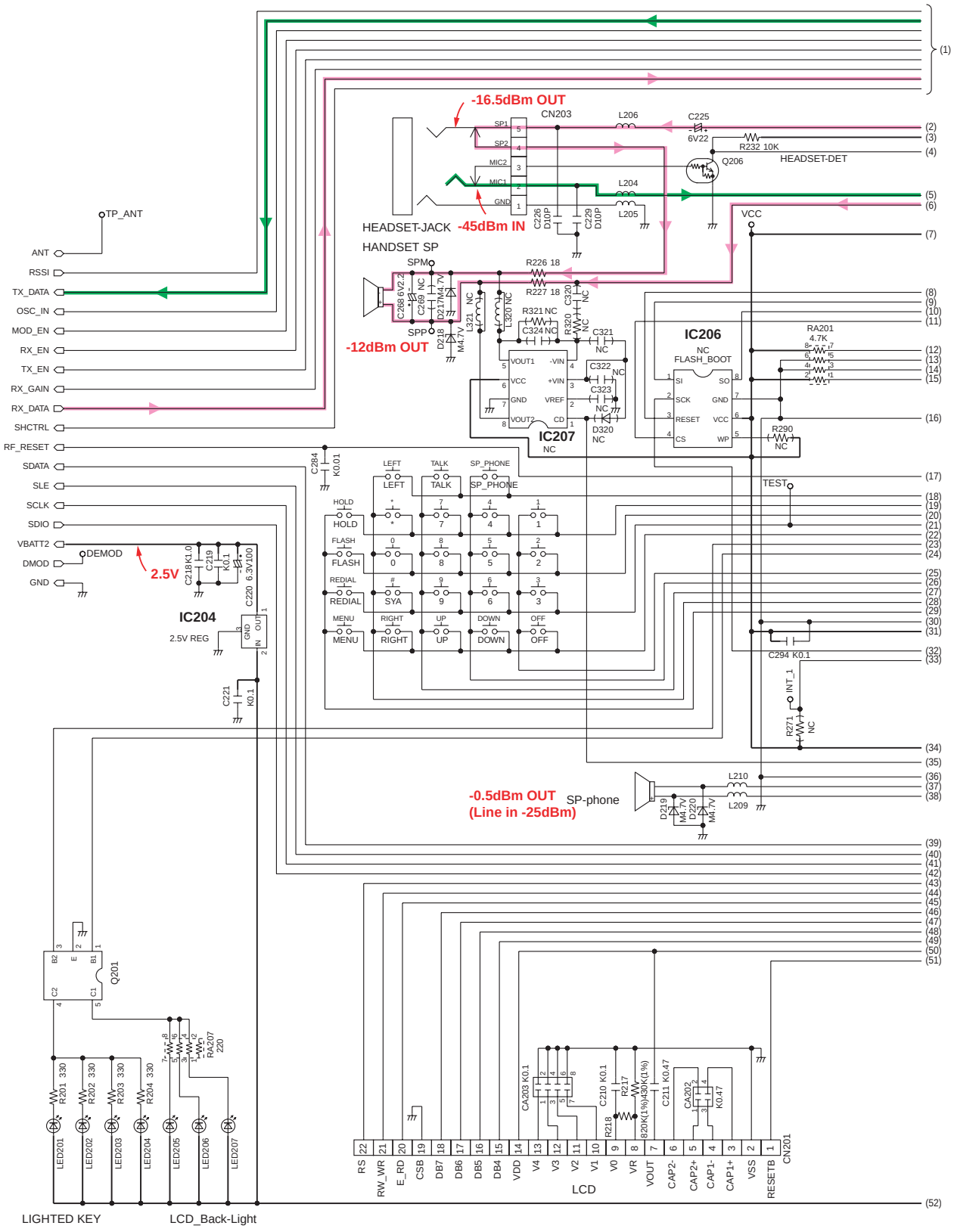
31 SCHEMATIC DIAGRAM (Base Unit)

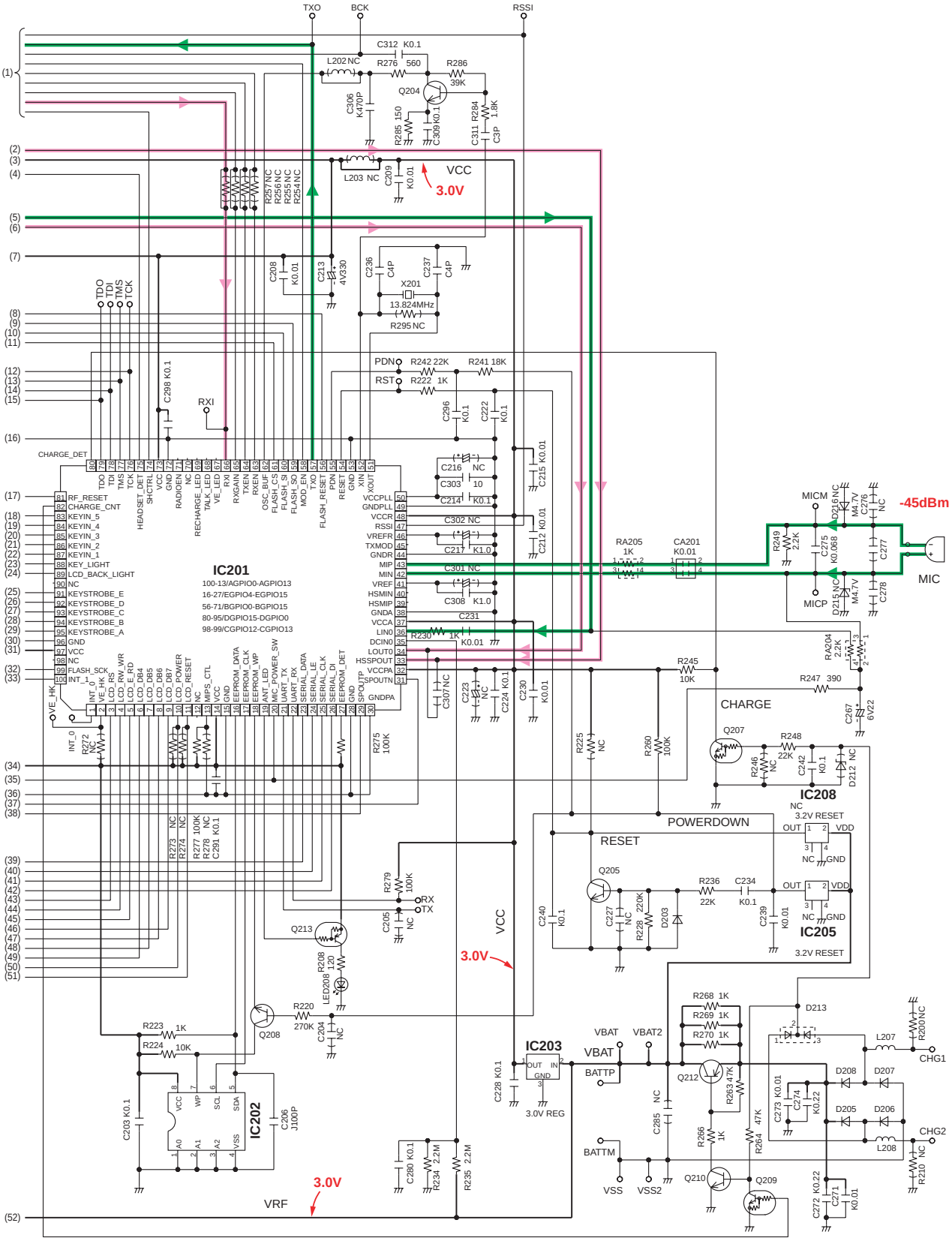




KX-TG2344B SCHEMATIC DIAGRAM (BASE UNIT)

32 SCHEMATIC DIAGRAM (Handset)

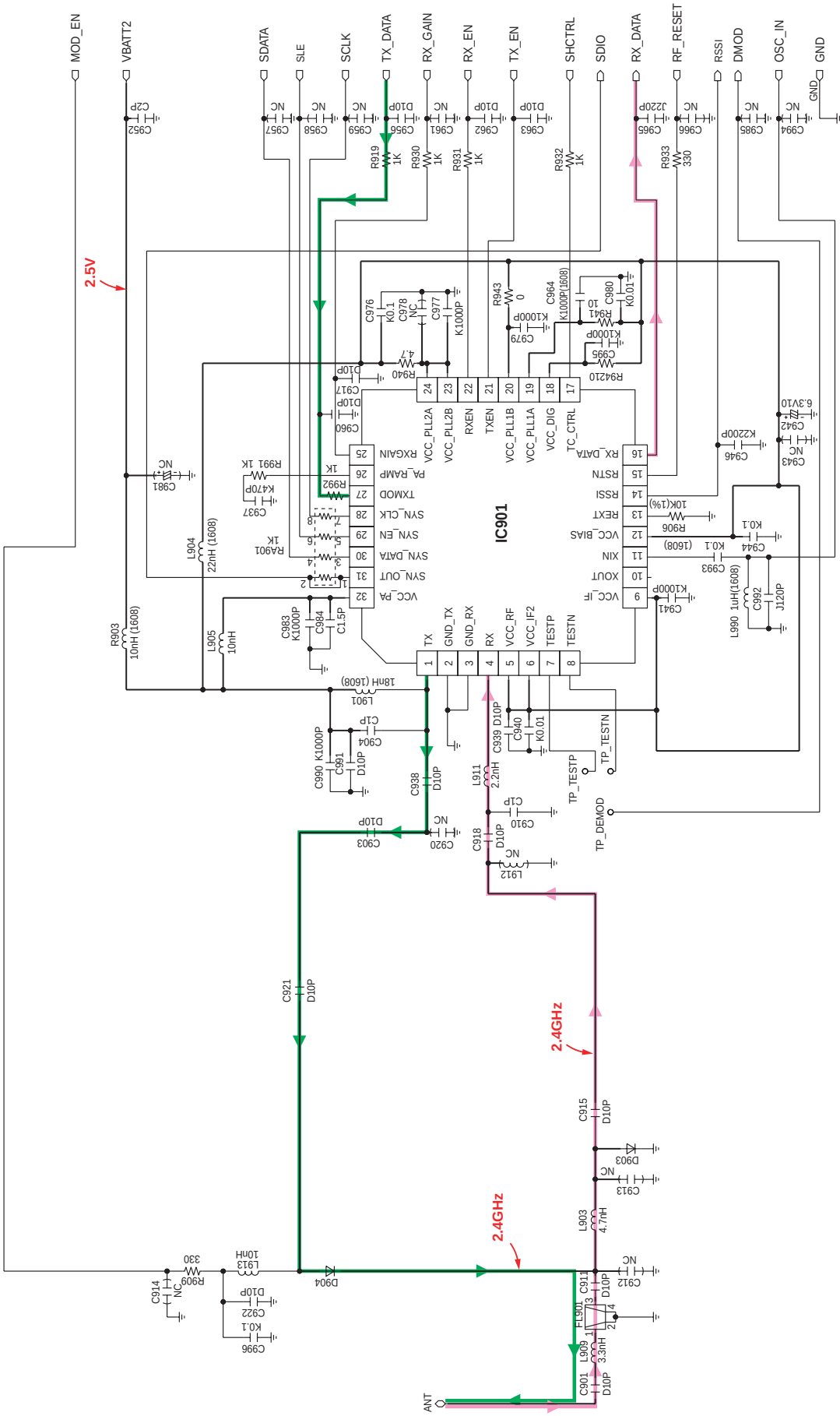




KX-TGA234B SCHEMATIC DIAGRAM (Handset)

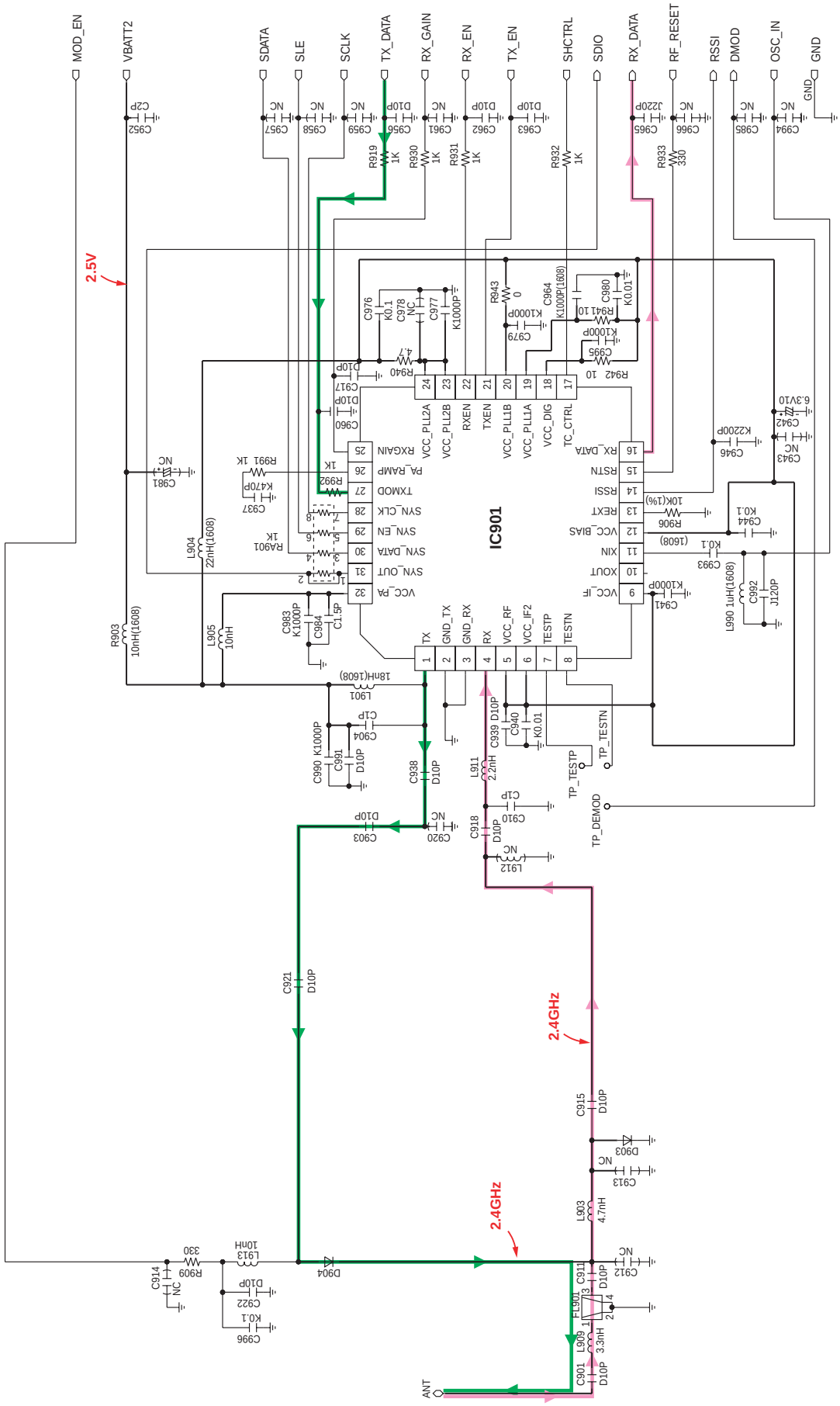
33 SCHEMATIC DIAGRAM (RF PART)

33.1. Base Unit

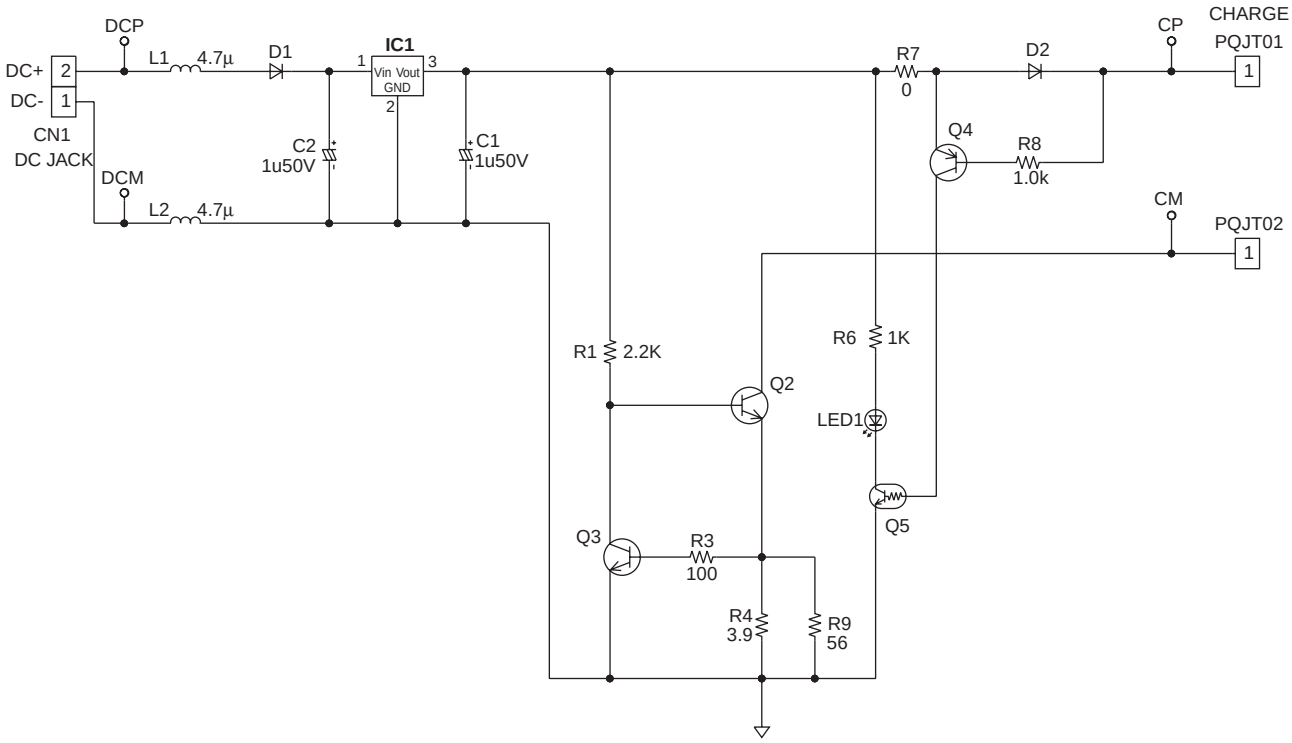


KX-TG2344B SCHEMATIC DIAGRAM (BASE UNIT_RF PART)

33.2. Handset


KX-TGA234B SCHEMATIC DIAGRAM (Handset_RF Part)
IC901
MOD_EN
VBATT2
SDATA
SLE
SCLK
TX_DATA
RX_GAIN
RX_EN
TX_EN
SHCTRL
SDIO
RX_DATA
RF_RESET
RSSI
DMOD
OSC_IN
GND
2.5V
2.4GHz
2.4GHz
ANT
TP_TESTP
TP_TESTN
TP_DEMOD

34 SCHEMATIC DIAGRAM (Charger Unit)

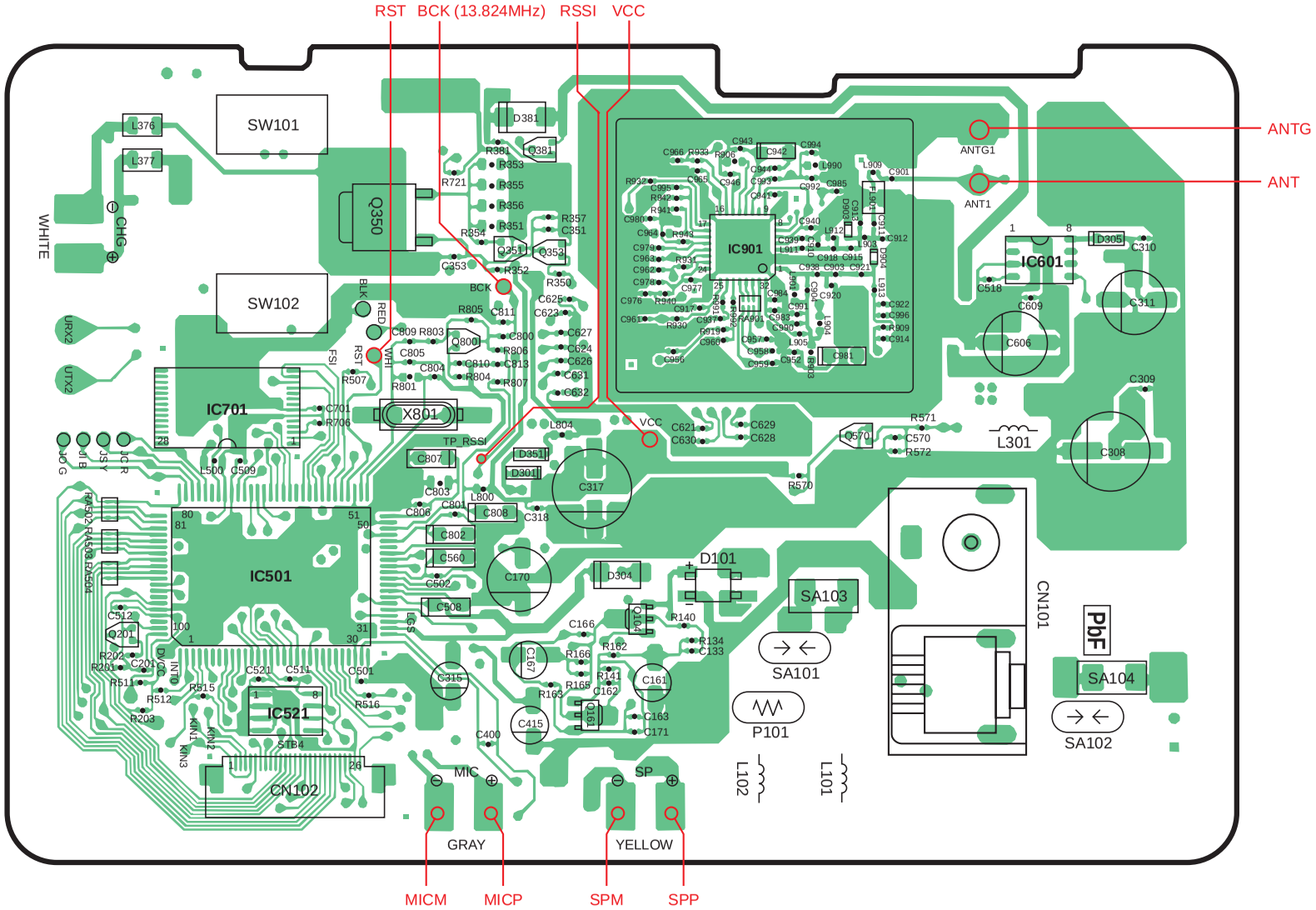


KX-TG2357B/S SCHEMATIC DIAGRAM (Charger Unit)

35 CIRCUIT BOARD (BASE UNIT)

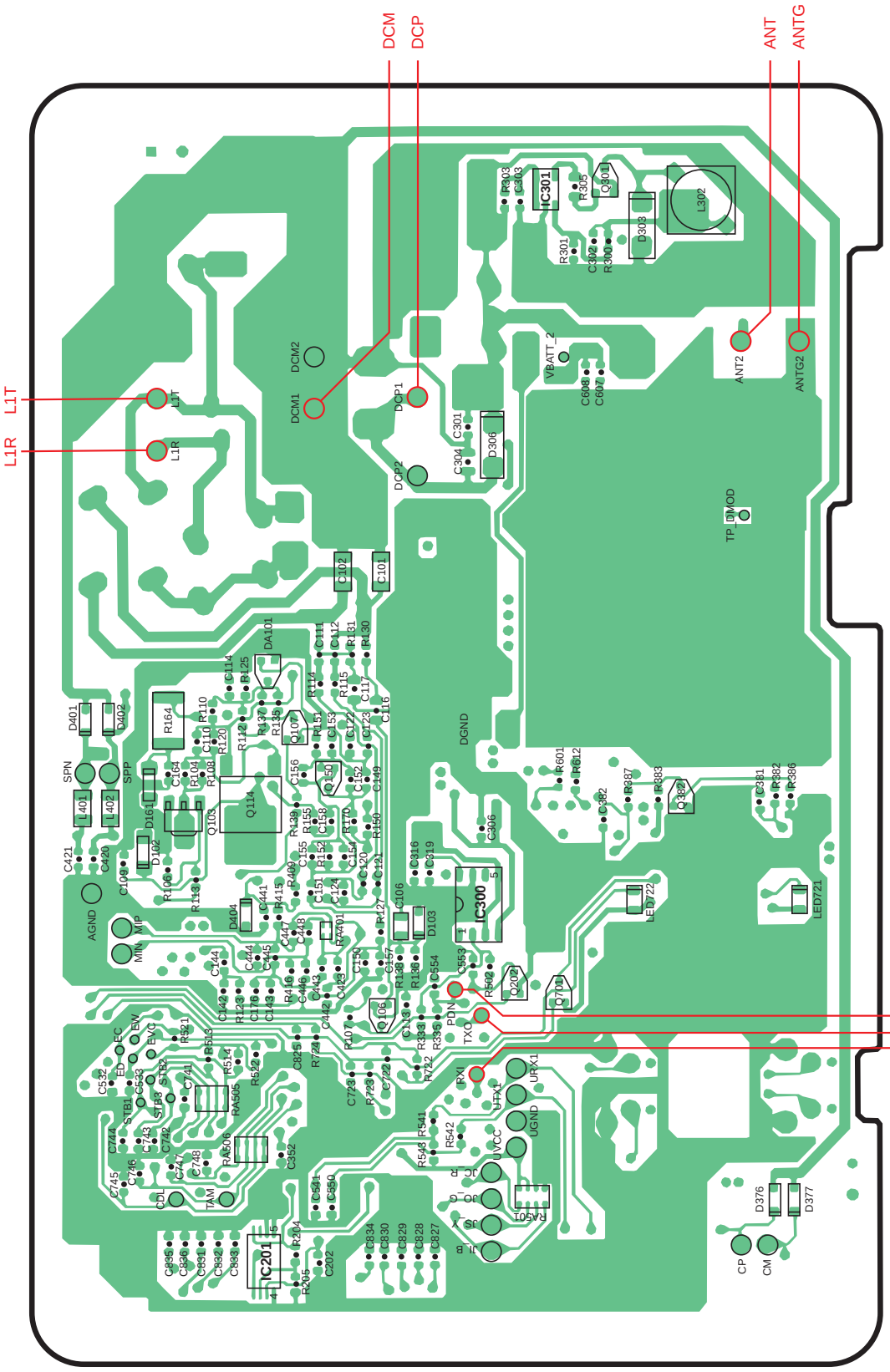
35.1. Main

35.1.1. Component View



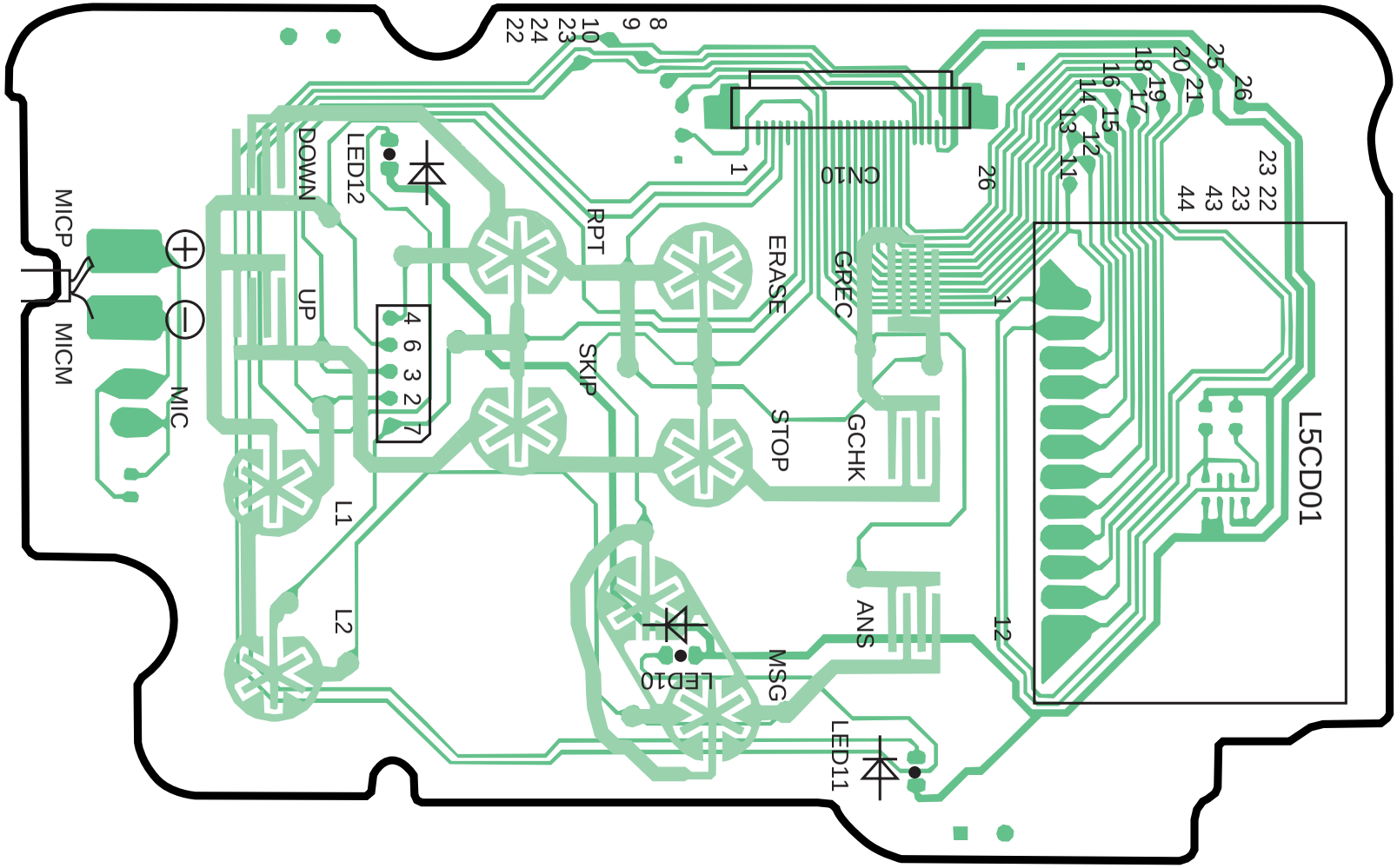
KX-TG2344B CIRCUIT BOARD (Component View (Base Unit))

35.1.2. Flow Solder Side View



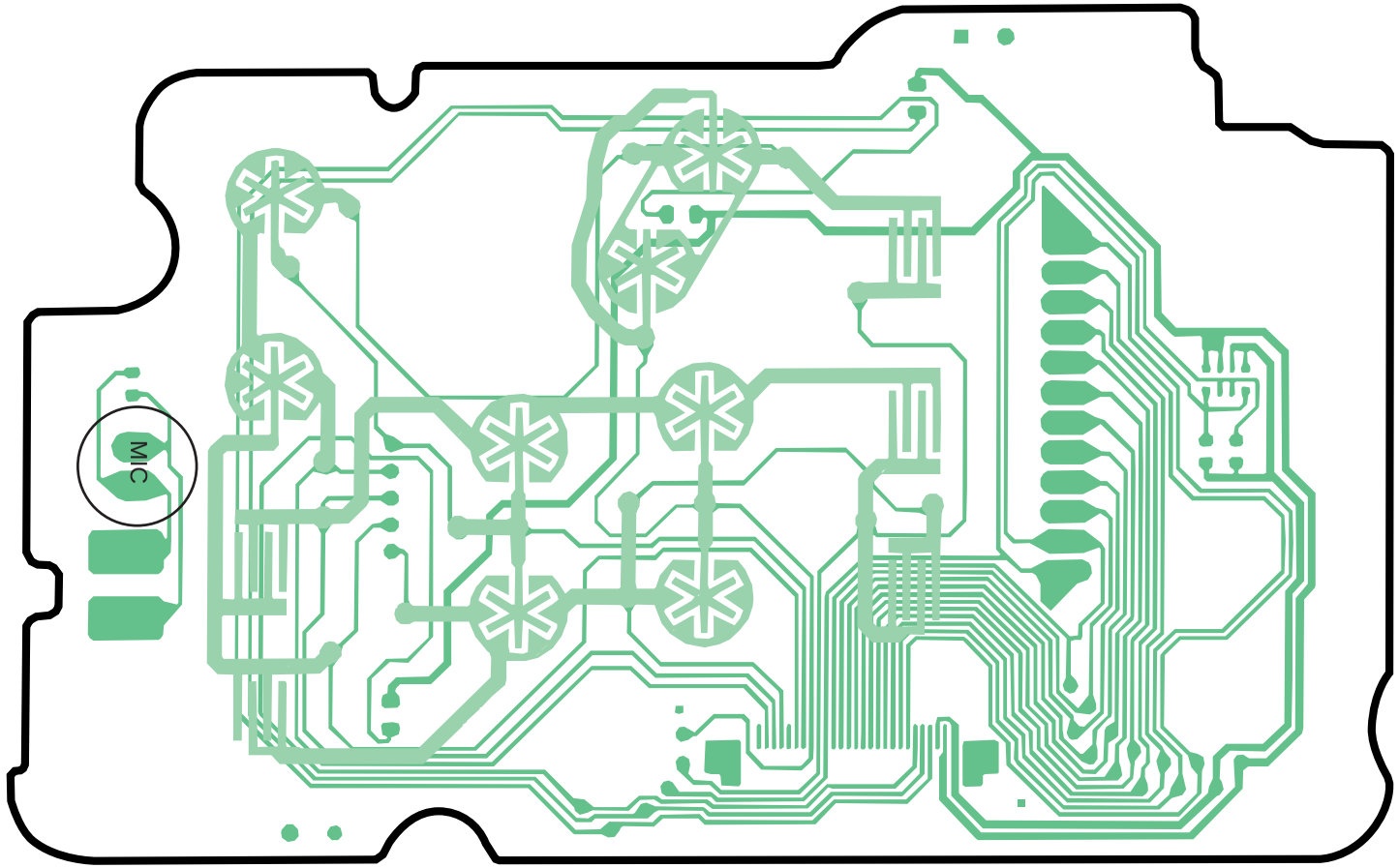
35.2. Operation

35.2.1. Component View



KX-TG2344B CIRCUIT BOARD (BASE UNIT) Operation (Component View)

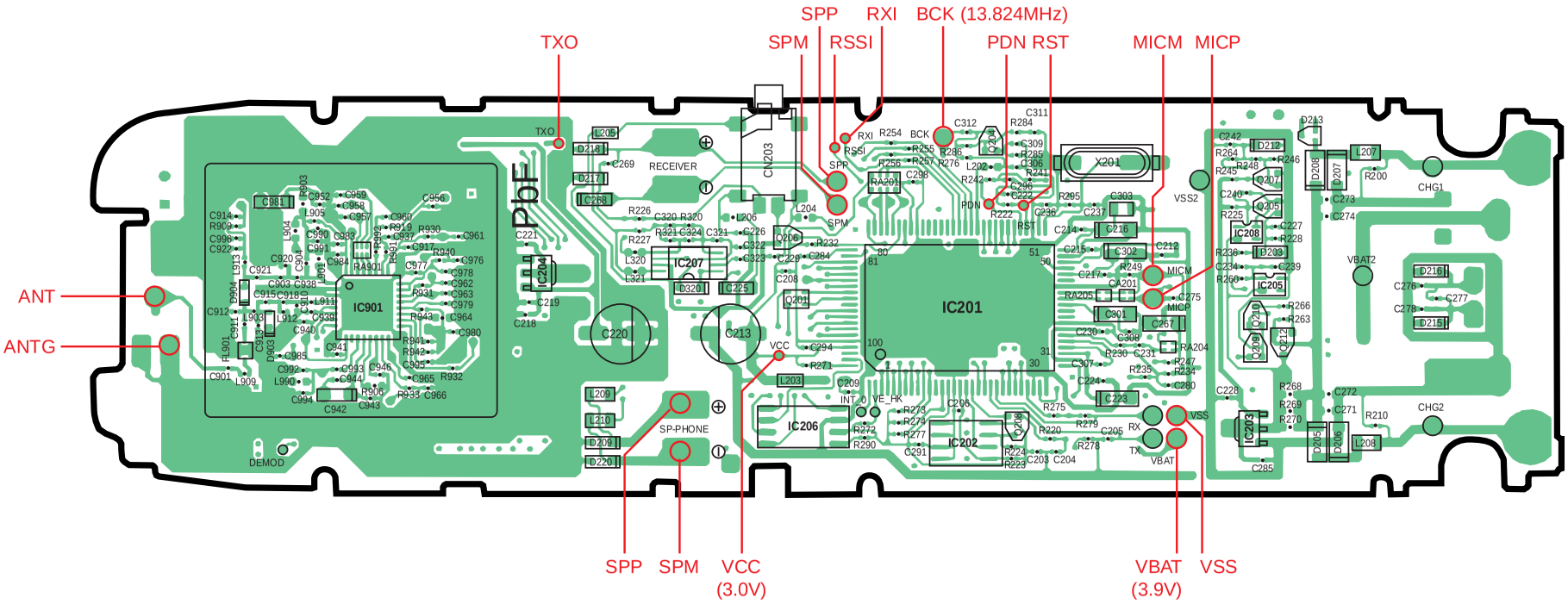
35.2.2. Flow Solder Side View



KX-TG2344B CIRCUIT BOARD (BASE UNIT) Operation (Flow Solder Side View)

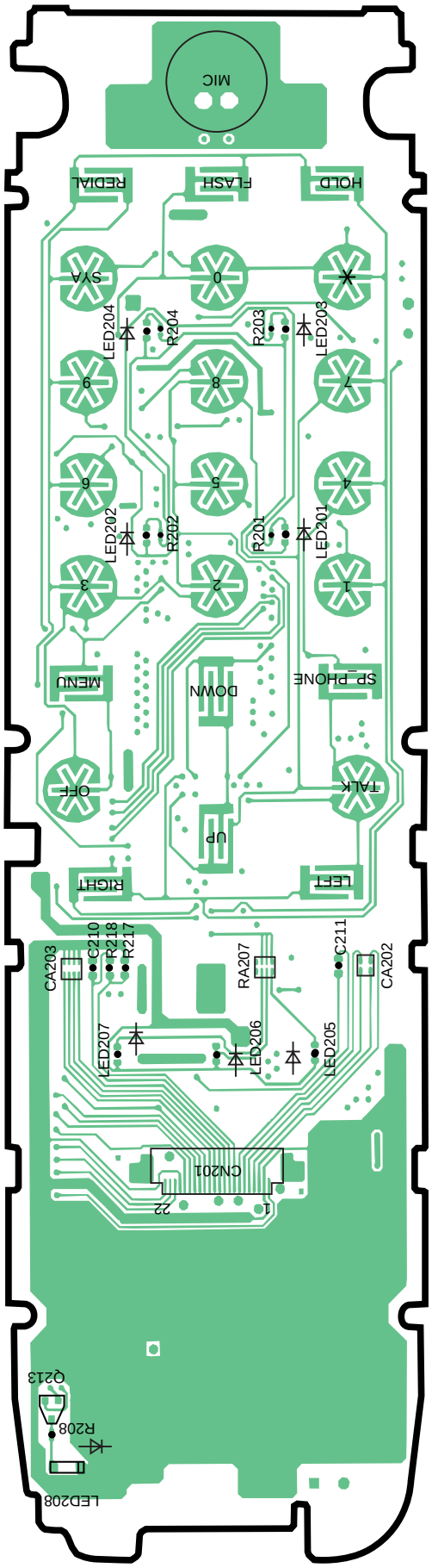
36 CIRCUIT BOARD (Handset)

36.1. Component View



KX-TGA234B CIRCUIT BOARD (Component View (Handset))

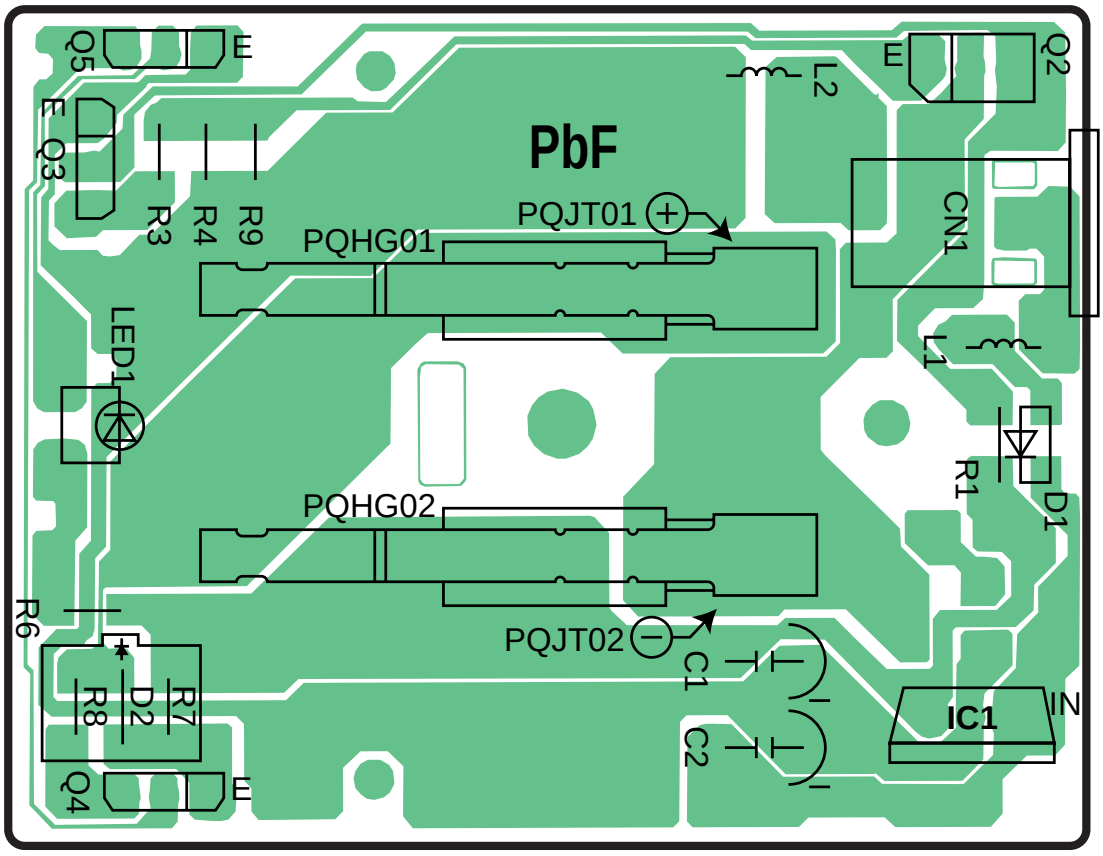
36.2. Flow Solder Side View



KX-TGA234B CIRCUIT BOARD (Flow Solder Side View (Handset))

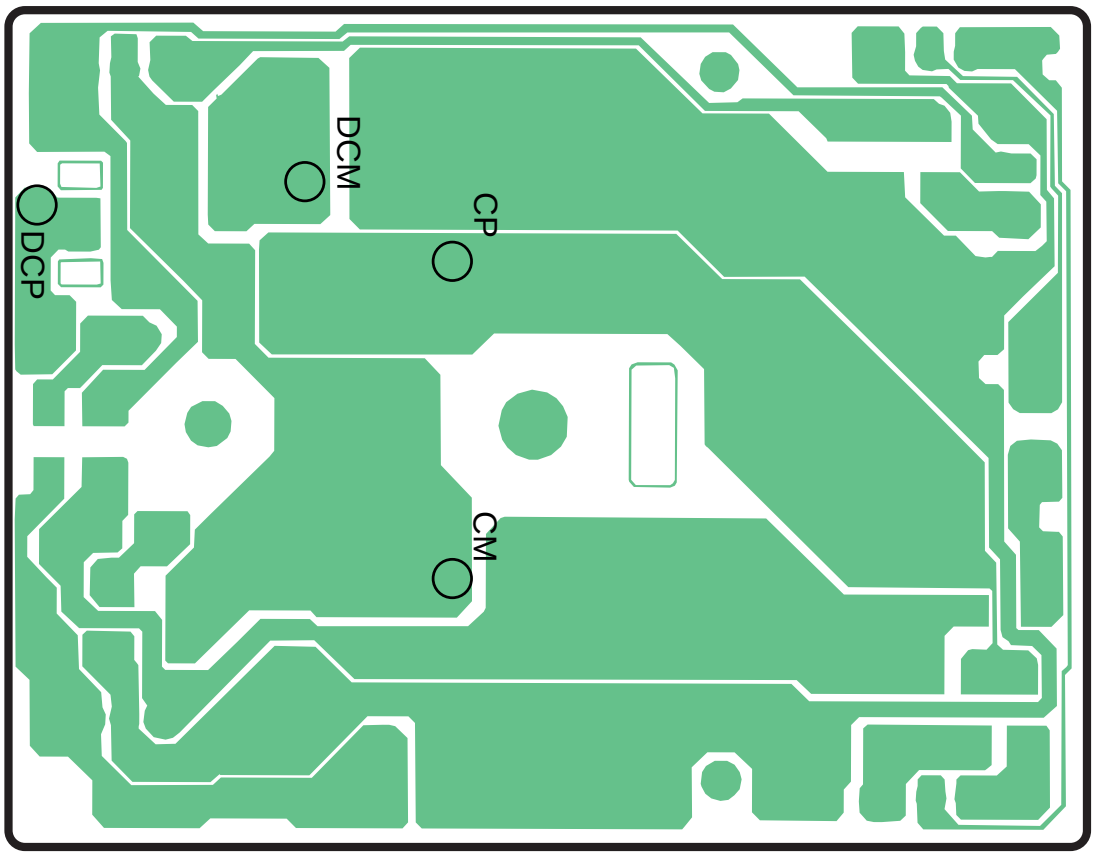
37 CIRCUIT BOARD (Charger Unit)

37.1. Component View



KX-TG2344B CIRCUIT BOARD (Component View (Charger Uint))

37.2. Flow Solder Side View



KX-TG2344B CIRCUIT BOARD (Flow Solder Side View (Charger Unit))