ORDER NO. KM40309202C3

Service Manual

Telephone Equipment

Caller ID Compatible

KX-TG2220BXB
KX-TG2220BXF
KX-TG2220BXS
KX-TGA226BXB
KX-TGA226BXF
KX-TGA226BXS

2.4GHz Digital Cordless Phone

Black Version

Blue Version

Silver Version

(for Asia, Middle Near East and Other areas)

KX-TGA226BXB/F/S
(Handset)

KX-TG2220BXB/F/S
(Base Unit)

SPECIFICATIONS

	Base Unit	Handset
Power Source:	AC Adaptor (220-240 V AC, 50/60 Hz)	Ni-MH battery (2.4 V, 1,500 mAh)
Power Consumption:	Stanby: Approx. 2.6 W Maximum: Approx. 3.9 W	11 days at Standby, 5 hours at Talk
Frequency:	39 channels within 2.426 GHz ~ 2.449 GHz	39 channels within 2.426 GHz ~ 2.449 GHz
Receiving Method:	Single super heterodyne	Single super heterodyne
Oscillation Method:	PLL synthesizer	PLL synthesizer
Tolerance of OSC Frequency:	8.192 MHz	8.192 MHz
Modulation Method:	TDD-FSK	TDD-FSK
ID Code	28-bit	28-bit
Dialing Mode:	Tone (DTMF)/Pulse	Tone (DTMF)/Pulse
Security Code:	———	1,000,000
Operating Enviroment:	5 °C ~ 40 °C	5 °C ~ 40 °C
Redial:	———	5 (Up to 32 digits)
Speed Dialer:	———	50 (Up to 22 digits)
Dimension (H × W × D):	Approx. 91 mm × 136 mm × 184 mm	Approx. 246 mm × 54 mm × 39 mm
Weight	Approx. 290 g	Approx. 230 g

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.

CONTENTS

1 ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:

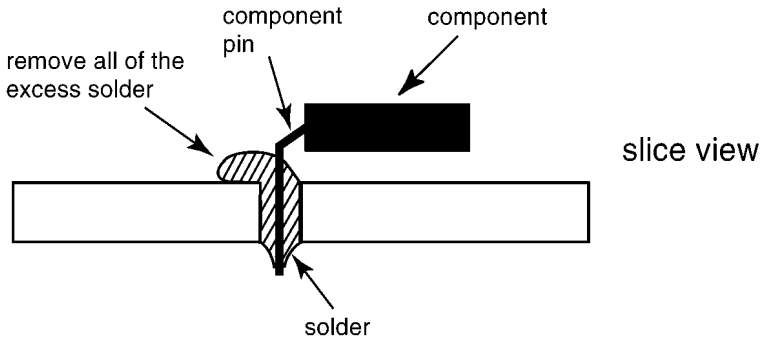
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

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

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

Caution

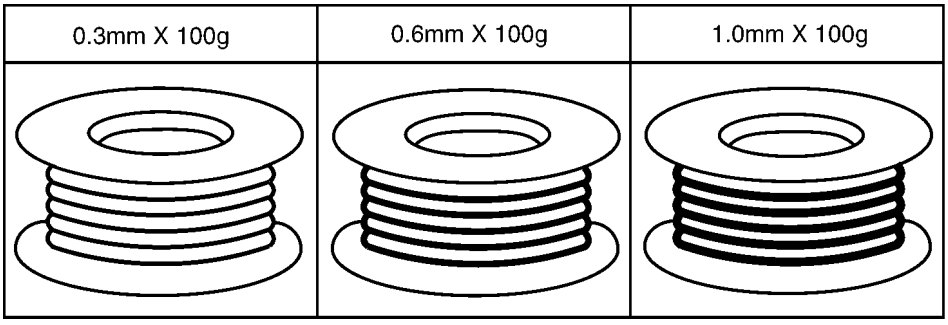
- PbF solder has a melting point that is 50°F ~ 70°F (30°C ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700°F ± 20°F (370°C ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.
- PbF solder will tend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

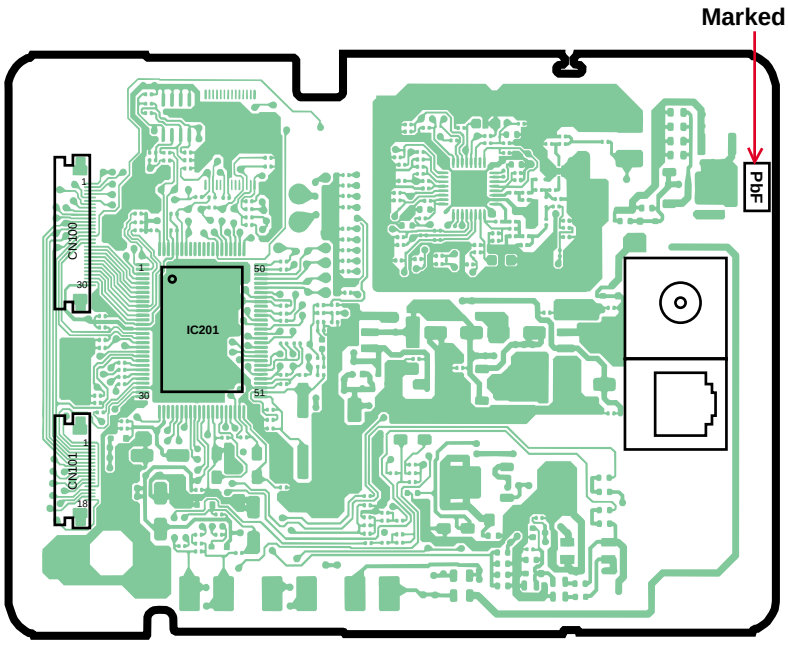
The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3mm, 0.6mm and 1.0mm.



1.2. How to recognize that Pb Free solder is used

1.2.1. Base Unit

1.2.1.1. Main

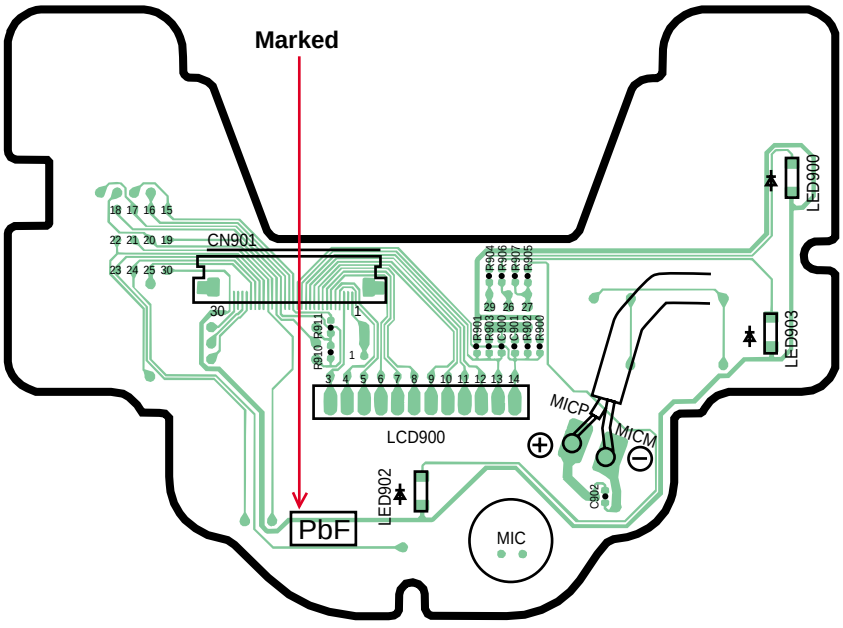


(Component View)

Note:

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

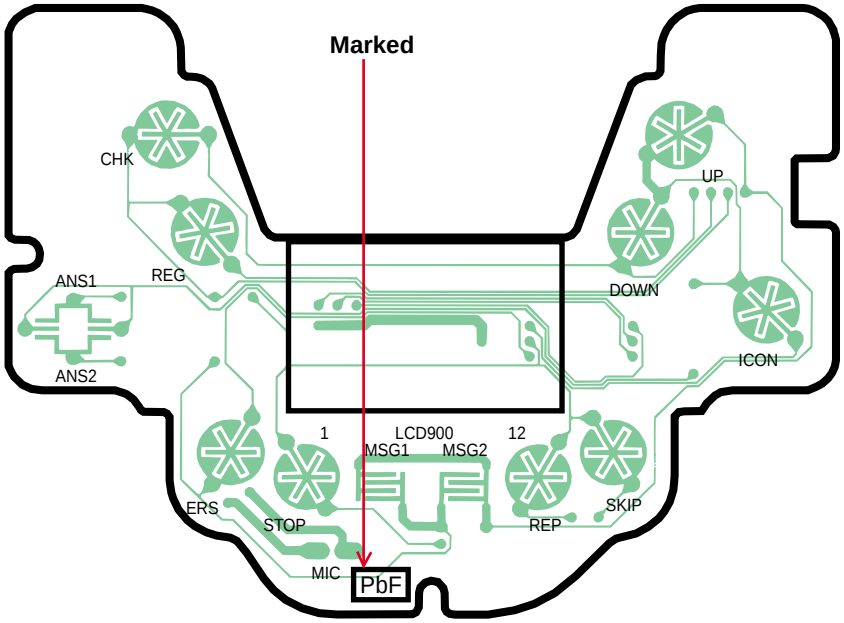
1.2.1.2. Operation



(Component View)

Note:

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

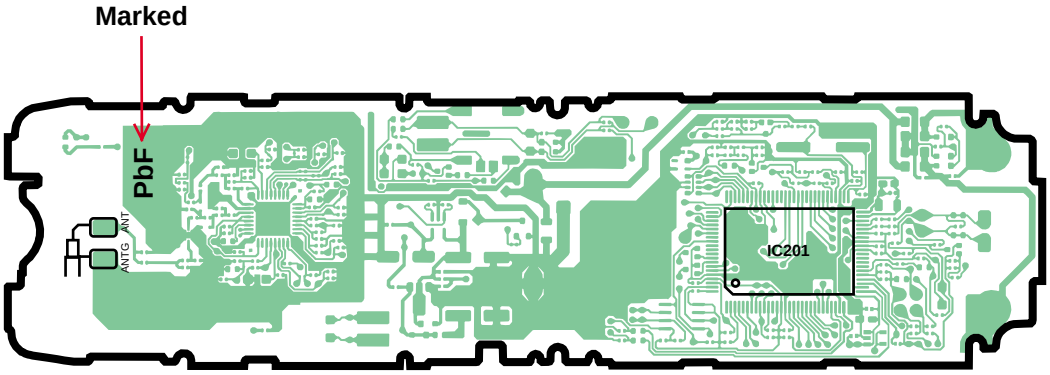


(Flow Solder Side View)

Note:

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

1.2.2. Handset



(Component View)

Note:

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

2 FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

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

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

3 CAUTION

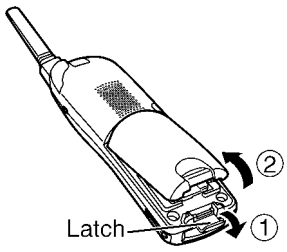
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommendenced by the manufacturer.

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

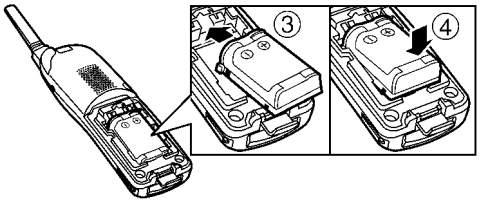
4 BATTERY

4.1. Installing the Battery in the Handset

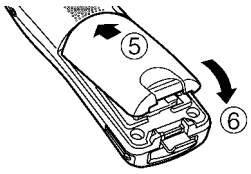
1 Pull down the latch (①), and remove the cover (②).



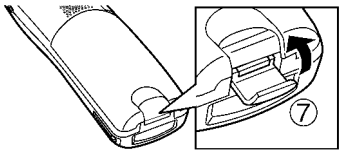
2 Insert the battery (③), and press it down until it snaps into the compartment (④).



3 Close the cover (⑤ and ⑥).



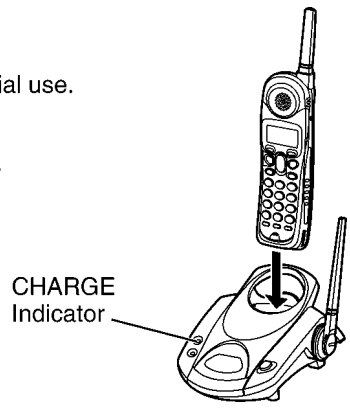
4 Push the latch (⑦) upward until it snaps shut.



4.2. Battery Charge

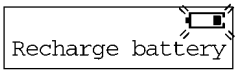
Place the handset on the base unit and charge for about **9 hours** before initial use.

- The CHARGE indicator lights and the unit beeps once.
- It is normal for the back on the handset to feel warm during battery charge.



4.3. Battery Recharge

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



- If you DO NOT recharge the handset battery for more than 30 minutes, the display will continually indicate "Recharge battery" and/or " " will flash when the handset is lifted off the base unit.

Note for Service:

The battery strength may not be indicated correctly if the battery is disconnected and connected again, even after it is fully charged.

In that case, by recharging the battery as mentioned above, you will get a correct indication of the battery strength.

4.4. Battery Strength

You can check the battery strength on the handset display.

The battery strength is as shown in the chart on the right.

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

4.5. 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, the battery needs to be replaced. Please replace a new Panasonic HHR-P513 battery.

4.6. Battery information

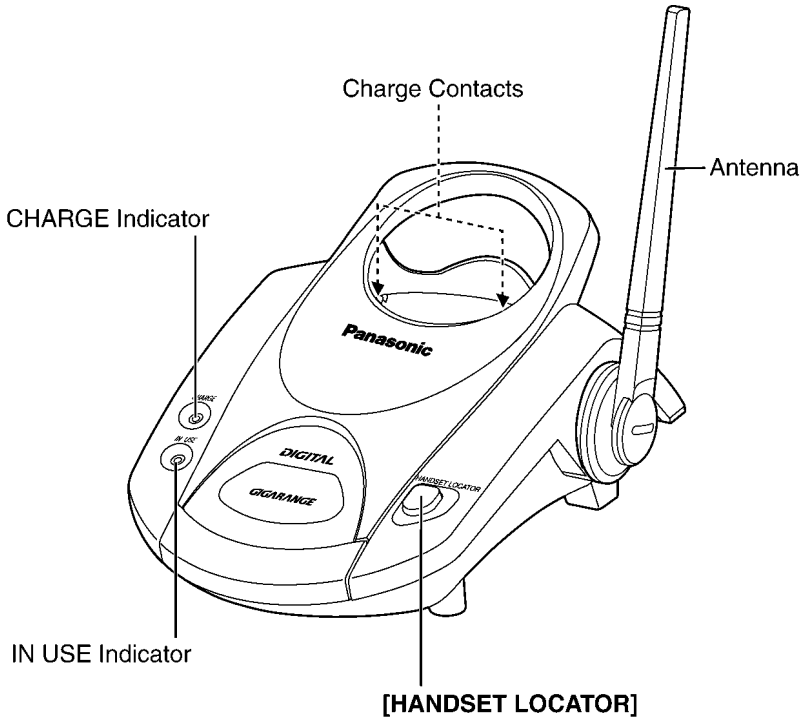
After your Panasonic battery is fully charged:

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

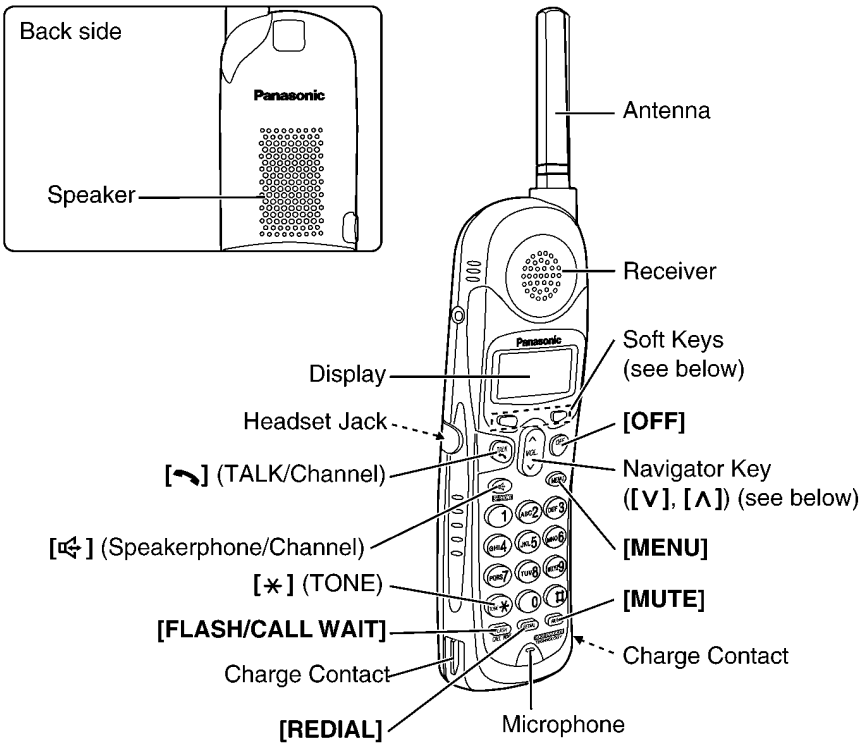
- The battery operating time may be shortened depending on usage conditions and ambient temperature.
- **Clean the charge contacts of the handset and the base unit with a soft, dry cloth. Clean if the unit is subject to grease, dust or high humidity.**
  Otherwise the battery may not charge properly.
- If the battery is fully charged, you do not have to place the handset on the base unit until "Recharge battery" is displayed and/or "  " flashes. This will maximize the battery life.
- The battery cannot be overcharged.

5 LOCATION OF CONTROLS

5.1. Base Unit

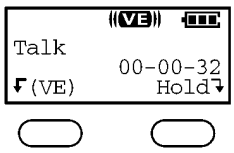


5.2. Handset



How to use the soft keys/navigator key

① **Soft keys:**



Two soft keys are used to select functions displayed directly above the keys. Functions displayed above the keys will change depending on the state of use.

For example, to operate "Hold", press the right soft key.

- When a function does not appear above a soft key, the soft key will not work.

② **Navigator key:**

Scrolls through the function menu, the Caller List and the phone book (works as a scroll key).
Adjusts the handset ringer and receiver/speaker volumes (works as a volume key).

Throughout this Service Manual:

- The soft keys are indicated with the display above the keys.
  Ex. "Press **Hold**." indicates "Press the soft key below Hold".
- The navigator key is indicated by the arrows **[V]** or **[Λ]** .

6 DISPLAY

6.1. Troubleshooting

Problem	Cause & Remedy
The unit does not work.	• Check the settings. • Check whether the dialing mode setting is correct. • Charge the battery fully. • Clean the charge contacts and charge again. • Install the battery properly. • Place the handset on the base unit and unplug the AC adaptor to reset it. Plug in, and try again. • Re-install the battery and charge it fully.
"No link to base. Place on cradle and try again." is displayed and an alarm tone sounds.	• You are too far from the base unit. Walk closer and try again. • Place the handset on the base unit and try again. • Plug in the AC adaptor. • Raise the base unit antenna.
Static, sound cuts in/out, fades. Interference from other electrical units.	• Move the handset and the base unit away from other electrical appliances. • Walk closer to the base unit. • Raise the base unit antenna. • Select a clearer channel.
The handset does not ring.	• The ringer volume is set to OFF. Set to HIGH, MEDIUM or LOW.
The handset display is blank.	• Charge the battery fully.
You cannot program function items.	• Programming is not possible while the unit is being used. • Do not pause for over 60 seconds while programming. • Walk closer to the base unit. • When the Dial Lock is set to ON you cannot store the phone number in the phone book.
While programming or searching, the unit starts to ring and stops the program/ search.	• A call is coming in. To answer the call, press **[ ]** or **[ ]**. Start again from the beginning after hanging up.
Time setting is erased, and "Press MENU." flashes on the display.	• If a power failure occurs, time setting may be erased. Readjust the date/time.

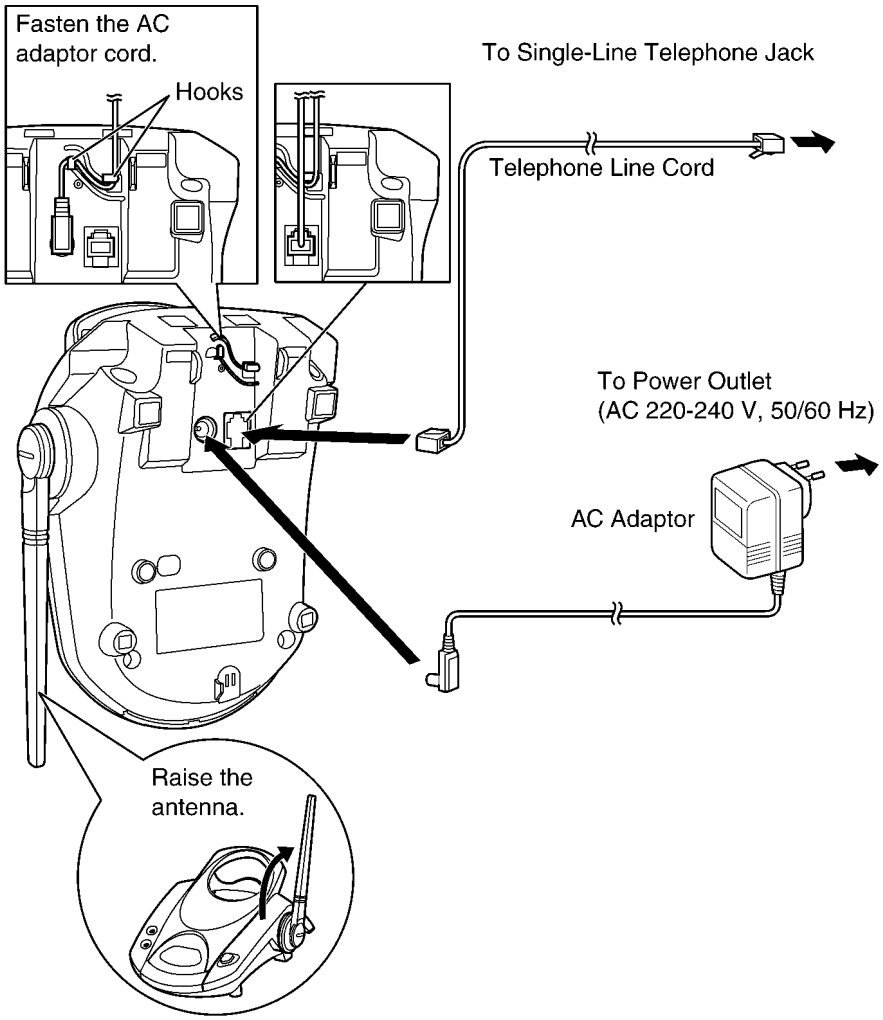
Problem	Cause & Remedy
The unit does not display the caller's phone number.	• You need to subscribe to a Caller ID service. • Other telephone equipment may be interfering with your phone. Disconnect it and try again. • Other electrical appliances connected to the same outlet may be interfering with Caller ID. • Telephone line noise may be affecting Caller ID. • The caller requested not to send his/her information. • If a 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 display exits the Caller List or phone book.	• Do not pause for over 60 seconds while searching.
You cannot page the handset.	• The handset is too far from the base unit. • The handset user is making an outside call or viewing the Caller List/phone book. Wait until the IN USE indicator light goes out. • The handset is in use. Try again later.
You cannot make a call.	• The Dial Lock is set to ON. To cancel the mode, see "**To Cancel the Dial Lock**".
You cannot redial.	• If the last number dialed was more than 32 digits long, the number will not be redialed correctly.
"Recharge battery" is displayed, "▭" flashes or the unit beeps intermittently.	• Charge the battery fully.
You charged the battery fully, but "Recharge battery" is still displayed and/or "▭" continues to flash.	• Clean the charge contacts and charge again • Install a new battery.
The CHARGE indicator light does not go out after the battery has been charged.	• This is normal.
You cannot have a conversation using the headset.	• Make sure the optional headset is connected properly. • If "SP-phone" is displayed on the handset, press [📞] to switch to the headset.

Cross Reference:

To Cancel the Dial Lock (P.20)

7 SETTINGS

7.1. Connections



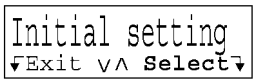
- USE ONLY WITH Panasonic AC ADAPTOR PQLV19BXZ.
- The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)
- If your unit is connected to a PBX which does not support Caller ID, you cannot access Caller ID services.
- The unit will not work during a power failure. If you want to connect a standard telephone on the same line, use a T-adaptor.
- When more than one unit is used, the units may interfere with each other. To prevent or reduce interference, please keep ample space between the base units.

7.2. Dialing Mode

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

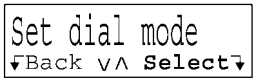
1 Press **[MENU]**.

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

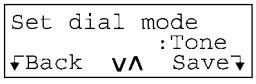


3 Scroll to "`Set tel line`" by pressing **[∨]** or **[∧]**, then press **Select**.

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



5 Select "`Pulse`" or "`Tone`" by pressing **[∨]** or **[∧]**.



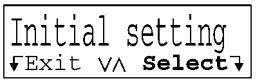
6 Press **Save**, then press **[OFF]**.

7.3. Line Mode (Handset)

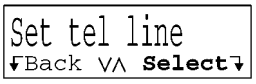
The line mode is preset at the factory to “B”. Generally leave the line mode “B”. If a change of the line mode setting is required by our customer call center or service person, change the line mode to “A”.

1 Press **[MENU]**.

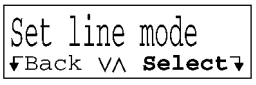
2 Scroll to “`Initial setting`” by pressing **[∨]** or **[∧]**, then press **Select**.



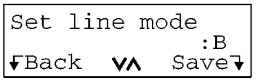
3 Scroll to “`Set tel line`” by pressing **[∨]** or **[∧]**, then press **Select**.



4 Scroll to “`Set line mode`” by pressing **[∨]** or **[∧]**, then press **Select**.



5 Select “`A`” or “`B`” by pressing **[∨]** or **[∧]**.



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

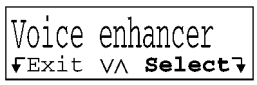
7.4. Voice Enhancer Technology

Voice Enhancer Technology ((VE)) helps clarify and improve sound reception creating a natural-sounding voice that is easy to hear and understand.
This is accomplished by enhancing the frequency that is narrowed through the telephone line and comes pre-set to OFF at the factory.
Under normal conditions, cordless phones are limited to a narrowed frequency bandwidth (300Hz to 3.5KHz). Panasonic's new Voice Enhancer Technology cordless phones are able to simulate a band signal above and below the normal bandwidth limitations. As a result, a clearer, crisp sound much closer to the actual voice is achieved.

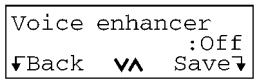
- "((VE))" is displayed when the Voice Enhancer Technology is set to ON.

1 Press **[MENU]**.

2 Scroll to "Voice enhancer" by pressing **[∨]** or **[∧]**, then press **Select**.



3 Select "On" or "Off" by pressing **[∨]** or **[∧]**.

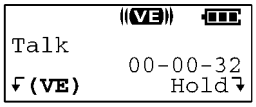


4 Press **Save**, then press **[OFF]**.

Helpful hint:
Depending on the condition and quality of your telephone line, Voice Enhancer may emphasize the noise already on the line. If it becomes difcult to hear the caller, please set Voice Enhancer mode to OFF.

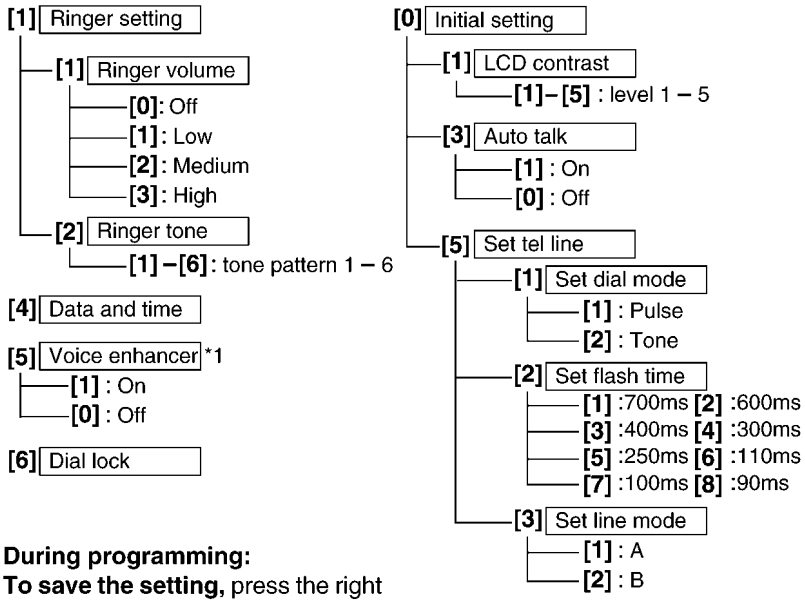
To turn the mode ON while talking, press **(VE)**.

- "((VE))" is displayed.
- Each time you press **(VE)**, the mode will change to ON or OFF.



7.5. Direct Commands

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



During programming:
To save the setting, press the right soft key (**Save**).
To exit the programming, press **[OFF]**.

- If you press the direct command incorrectly, exit the programming. Then re-enter the programming by pressing **[MENU]**.

Note:

*1: Refer to **Voice Enhancer Technology** (P.15).

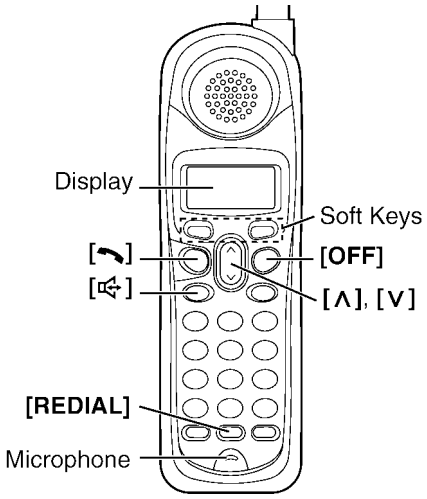
8 OPERATIONS

8.1. Making Calls

1 Press **[ ]**.
- "Talk" is displayed.

2 Dial a phone number.
- The dialed number is displayed.
- After a few seconds, the display will show the length of the call.

3 To hang up, press **[OFF]** or place the handset on the base unit.



To have a hands-free phone conversation

1 Press **[ ]**.
- "SP-phone" is displayed.

2 Dial a phone number.
- The dialed number is displayed.
- After a few seconds, the display will show the length of the call.

3 When the other party answers, talk into the microphone.

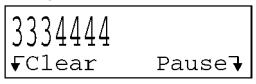
4 To hang up, press **[OFF]** or place the handset on the base unit.

Hands-free Digital Duplex Speakerphone
For best performance, please note the following:
- Talk alternately with the other party in a quiet room.
- If you or the other party has hearing difficulty, press **[V]** to decrease the speaker volume.
- While talking using **[ ]**, you can switch to the hands-free phone conversation by pressing **[ ]**. To switch back to the receiver, press **[ ]**.

- If the handset has lost communication with the base unit, the handset beeps 3 times and "No link to base. Place on cradle and try again." is displayed.
- If **[ ]**, **[ ]** or any other buttons except **[MUTE]** and **[OFF]** is pressed while the handset is on the base unit, the handset beeps 3 times and "Please lift up and try again." is displayed. Lift the handset and press the button again.

To dial after confirming the entered number

1 Enter a phone number.



- If you misdial, press **Clear**. Enter the correct number.
- If a pause is required for dialing, press **Pause** where needed
- To cancel, press **[OFF]**.

2 Press [ ] or [ ].

3 To hang up, press **[OFF]** or place the handset on the base unit.

If noise interferes with the conversation

Have the unit select a clearer channel by doing one of the following:
Press [ ] (Channel) if talking using [ ],
press [ ] (Channel) if talking using [ ], or
press **CH**, which is displayed when you adjust receiver or speaker volume
OR
Walk closer to the base unit.

To redial the last number dialed

Press [ ] or [ ], then press **[REDIAL]**.

To redial using the redial list (Memory Redial)

The last 5 phone numbers dialed with the handset are stored in the redial list.

1 Press **[REDIAL]**.

- The last number dialed is displayed.

2 Scroll to the desired number by pressing **[V]** or **[^]**.

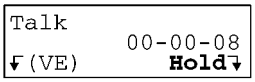
- You can also scroll through the list by pressing **[REDIAL]**.
- To exit the list, press **[OFF]** or **Exit**.

3 Press [ ] or [ ].

- **To erase an item,** scroll to the desired item then press **Erase**.
- If "No items stored" is displayed, the list is empty.

To put a call on hold

Press **Hold** during a conversation.



- "Hold" is displayed.

To return to the call, press [ ] or [ ].

- If another phone is connected on the same line, you can also return to the call by lifting its handset.
- If a call is kept holding for 6 minutes, an alarm tone will start to sound. After 4 additional minutes on hold, the call will be disconnected.
- The alarm volume corresponds to the ringer volume level. If the ringer is OFF, the alarm will sound at the LOW level.

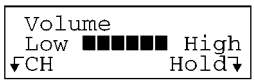
To adjust the receiver/speaker volume while talking

3 levels (HIGH, MEDIUM and LOW) are available for the receiver and 6 levels for the speaker.

To increase volume, press **[^]**.
To decrease volume, press **[V]**.

- The display shows the current volume setting.
- If you try to increase/decrease volume when it is at the maximum/minimum level, the handset will beep 3 times.

Ex. Receiver volume:HIGH
Speaker volume:level 6



Backlit LCD display

The lighted display of the handset will stay on for a few seconds after pressing a button or lifting the handset off the base unit.

Lighted handset keypad

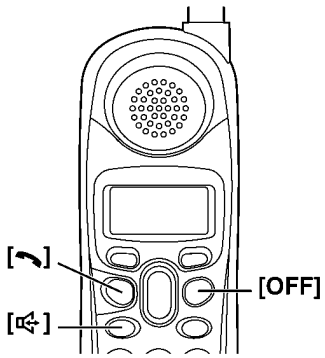
The handset dialing buttons will light when you press a button or lift the handset off the base unit. The light will go out after a few seconds.

8.2. Answering Calls

When a call is received, the unit rings and "Incoming call" is displayed, and the Ringer indicator on the handset and the IN USE indicator on the base unit flash rapidly.

1 Press [↷] or [🔊].
- You can also answer a call by pressing any button except [∨], [∧] and **[OFF]**.

2 To hang up, press **[OFF]** or place the handset on the base unit.



Auto Talk: If you set the Auto Talk feature to ON, you can answer a call by lifting the handset off the base unit.

- When the ringer volume is set to OFF, the unit will not ring.

8.3. FLASH Button

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

- Pressing **[FLASH/CALL WAIT]** cancels the following operations:
  - temporary tone dialing, or
  - muting your conversation.

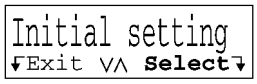
Selecting the flash time

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

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

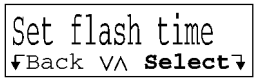
1 Press **[MENU]**.

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

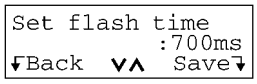


3 Scroll to "Set tel line" by pressing **[∨]** or **[∧]**, then press **Select**.

4 Scroll to "Set flash time" by pressing **[∨]** or **[∧]**, then press **Select**.



5 Select the desired time by pressing **[∨]** or **[∧]**.



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

8.4. Dial Lock

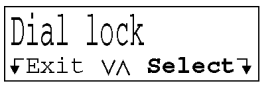
The Dial Lock feature allows you to prevent others from making calls.
To use this feature, turn the feature ON. The factory preset is OFF.

> Before using this feature, we recommend storing emergency numbers in the phone book. When the Dial Lock is set to ON, only numbers stored in the phone book as emergency numbers can be dialed.

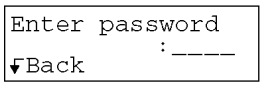
8.4.1. To Turn the Dial Lock ON

1 Press **[MENU]**.

2 Scroll to "`Dial lock`" by pressing **[∨]** or **[∧]**, then press **`Select`**.

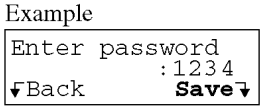


3 Enter a 4-digit password.
- You can enter the password more than 4 digits, but only the last 4 digits are effective.

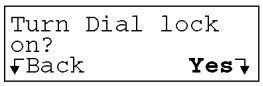


4 Press **`Save`**.

Example



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

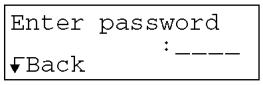


- If set to ON, the handset displays "`Dial lock`" while there is not missed calls and the handset is off the base unit.
- If you make a call while the Dial Lock is set to ON, the handset beeps 3 times and "`Dial locked`" is displayed.
- Please write down your password. If you forget your password, consult your nearest Panasonic service center. *1

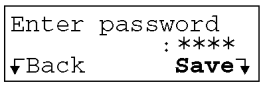
8.4.2. To Cancel the Dial Lock

1 Follow steps 1 and 2 of "**To turn the Dial Lock ON**".

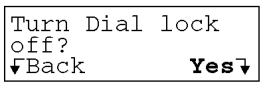
2 Enter the password set when the Dial Lock was turned on.



3 Press **`Save`**.



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



Note:

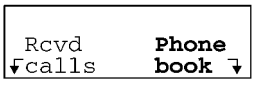
*1: If the password is forgotten when cancelling the Dial Lock, please enter "PANASONIC" (7, 2, 6, 2, 7, 6, 6, 4, 2).

8.5. Phone Book

You can store up to 50 names and phone numbers in the handset phone book. All phone book items are sorted alphabetically. You can make a call by selecting a name on the handset display.

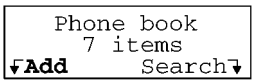
8.5.1. Storing Names and Numbers

1 Press **Phone book**.



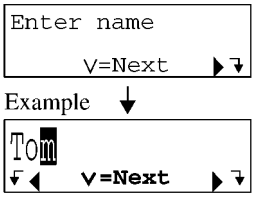
2 Press **Add**.

- When 50 items are stored in the phone book, "Add" is not displayed.



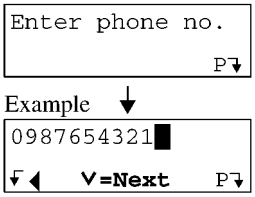
3 Enter a name, up to 15 characters with the dialing buttons (**[0]** to **[9]**), then press **[V]**.

- If a name is not required, press **[V]** then go to step 4.



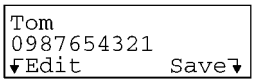
4 Enter a phone number, up to 32 digits.

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



5 Press **[V]**.

- If you want to change the name, press **Edit** then change it.
- If you want to change the number, press **[Λ]** then change it.



6 Press **Save**.

- To continue storing other items, repeat from step 2.
- When you store the 50th item, "Phone book full" is displayed.

7 Press **[OFF]**.

When the Dial Lock is set to ON, only numbers stored in the phone book as emergency numbers can be dialed.

To store an emergency number:

When storing a name, enter **#** at the beginning of the name by pressing **[1]** in step 3.

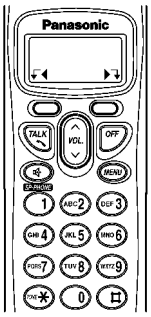
- If the handset beeps 3 times when you press **Save**, the item cannot be stored in the phone book. Place the handset on the base unit and try again from step 1.
- You cannot store a name and phone number in the phone book if the Dial Lock is set to ON.

Selecting characters to enter names

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

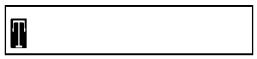
• Pressing each button selects a character in the order shown below.

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.)		

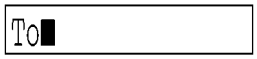


For example, to enter "Tom":

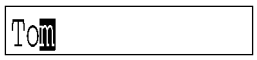
1 Press **[8]** four times.



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



3 Press **[6]**.



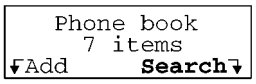
If you make a mistake when entering a name or number

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

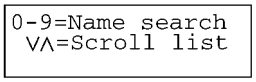
8.5.2. Dialing from the Phone Book

1 Press **Phone book** to enter the phone book.

2 Press **Search**.



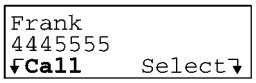
3 Scroll to the desired item. To scroll down, press **[V]**. To scroll up, press **[Λ]**.



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 **Call**, **[ ]** or **[ ]**.

- The displayed phone number is dialed.



5 To hang up, press **[OFF]** or place the handset on the base unit.

- To exit the phone book list, press **[OFF]**.
- If "No items stored" is displayed in step 2, the phone book is empty.
- To view a phone number over 16 digits, repeat steps 1 to 3, then press **Select**, **Edit** and then **[V]**. When finished, press **[OFF]**.

To search for a name by initial

1. Repeat the steps 1 and 2 above.
2. Press the dialing button for the first letter of the desired name until any name with the same initial is displayed (see the Index table below).
   Ex. To find "Frank", press **[3]** repeatedly until the first item under "F" is displayed.
   - If there are no items in the index you selected, the first entry in the next alphabetical index will be displayed.
3. Press **[V]** repeatedly until the desired name is displayed.

Index table

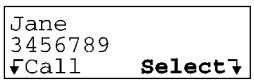
Keys	Index	Keys	Index
[1]	Other symbols, 1	[6]	M, N, O, 6
[2]	A, B, C, 2	[7]	P, Q, R, S, 7
[3]	D, E, F, 3	[8]	T, U, V, 8
[4]	G, H, I, 4	[9]	W, X, Y, Z, 9
[5]	J, K, L, 5	[0]	0, Space

8.5.3. Editing an Item in the Phone Book

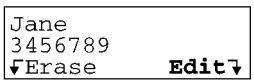
1 Press **Phone book** to enter the phone book.

2 Press **Search**.

3 Scroll to the desired item by pressing **[V]** or **[∧]**, then press **Select**.



4 Press **Edit**.

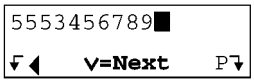


5 Edit the name, then press **[V]**.

- If you do not need to change the name, press **[V]** then go to step 6.

6 Edit the phone number, then press **[V]**.

- If you do not need to change the number, press **[V]** then go to step 7.
- If a pause is required for dialing, press **P**. A pause is stored in a phone number as one digit.



7 Press **Save**.

- To continue editing other items, repeat from step 2.

8 Press **[OFF]**.

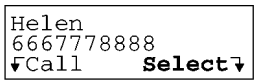
- You cannot edit an item, if the Dial Lock is set to ON.

8.5.4. Erasing an Item in the Phone Book

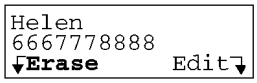
1 Press **Phone book** to enter the phone book.

2 Press **Search**.

3 Scroll to the desired item by pressing **[V]** or **[∧]**, then press **Select**.

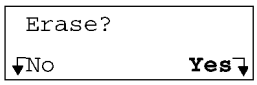


4 Press **Erase**.



5 Press **Yes**.

- A beep sounds and the item is erased.
- To erase other items, repeat from step 3.



6 Press **[OFF]**.

- To cancel erasing, press **No** after step 4.
- You cannot erase an item, if the Dial Lock is set to ON.

9 DISASSEMBLY INSTRUCTIONS

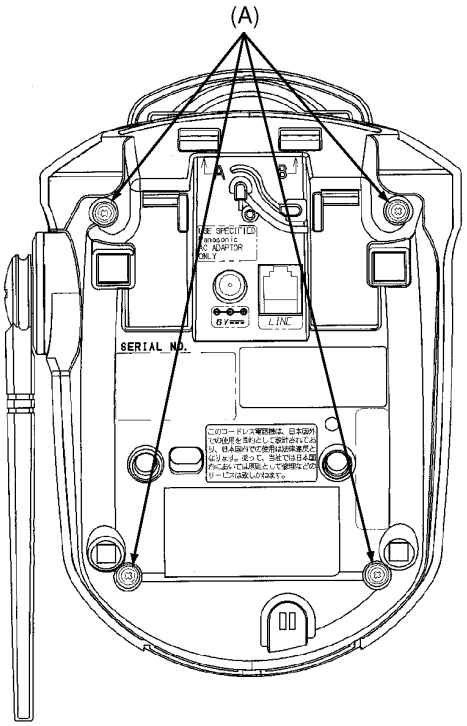


Fig. 1

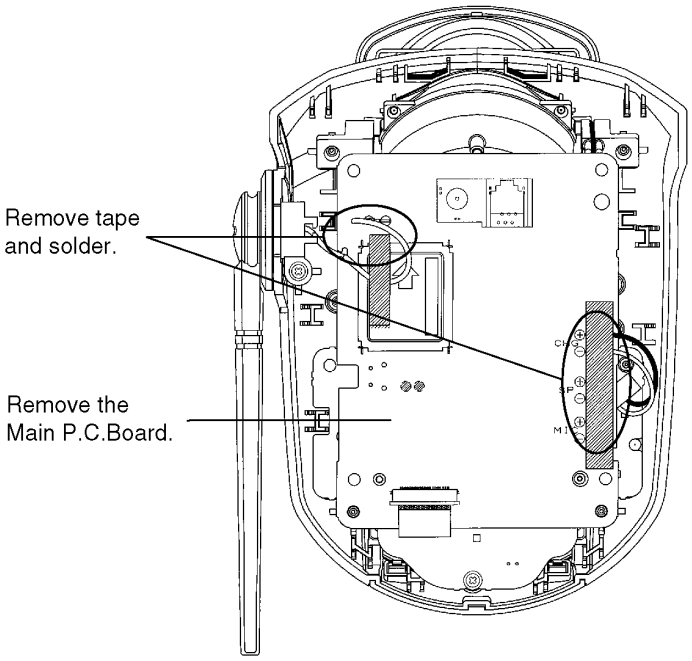


Fig. 2

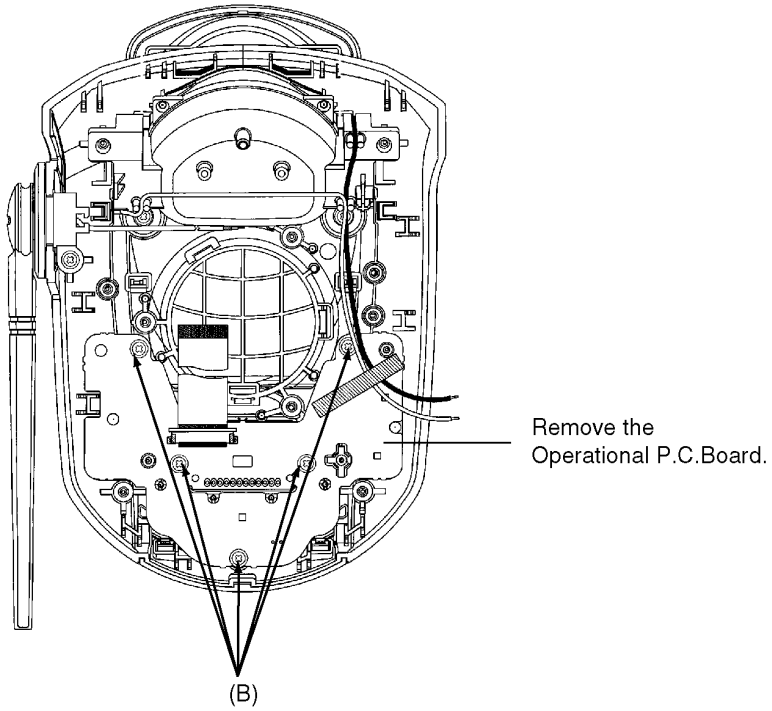


Fig. 3

Shown in Fig.-	To Remove -	Remove -
1	Lower Cabinet	Screws (2.6 × 14).....(A) × 4
2	Main P.C. Board	Tape and Solder
		Main P.C. Board
3	Operational P.C. Board	Screws (2.6 × 8).....(B) × 5
		Operational P.C. Board

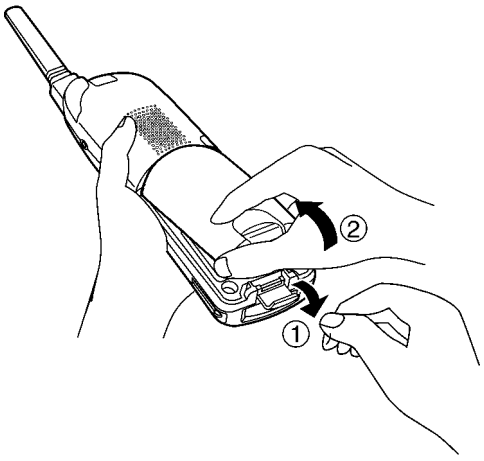


Fig.4

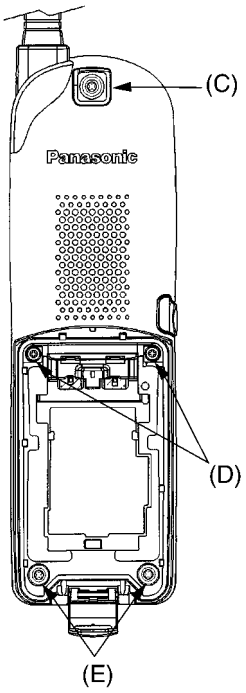


Fig. 5

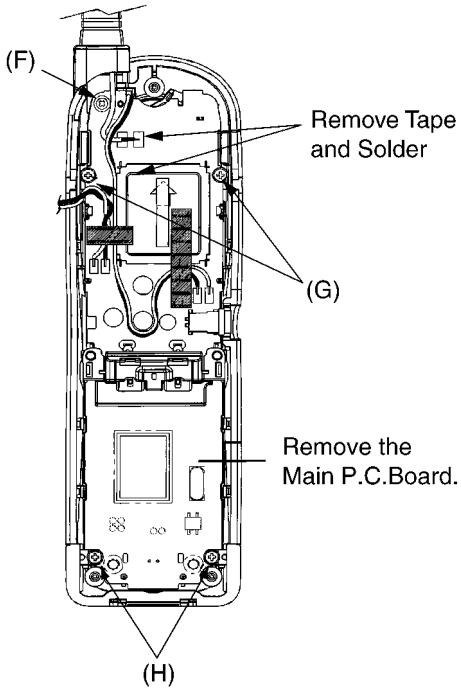
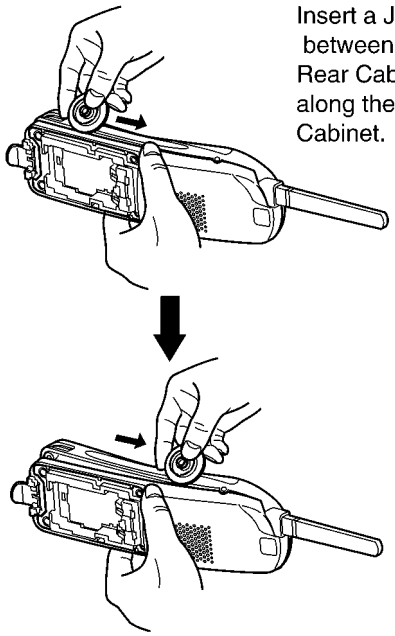
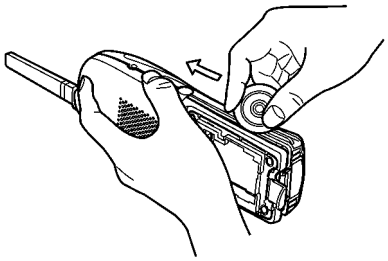
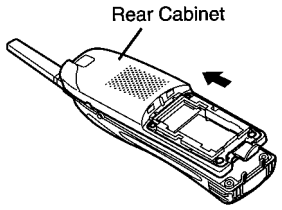


Fig. 7







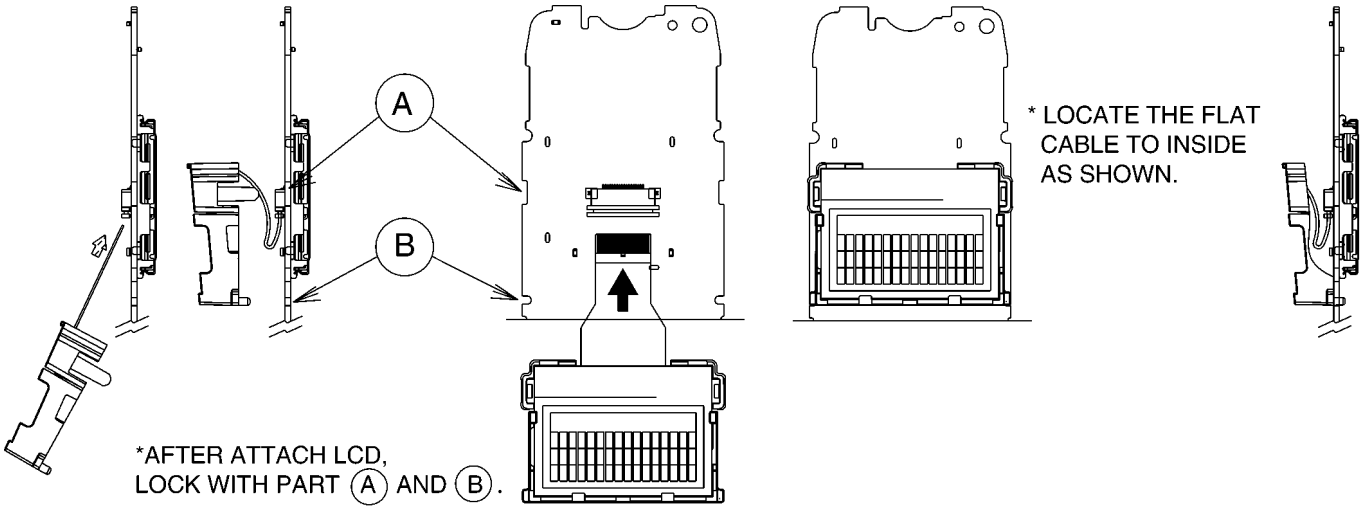
Remove the Rear Cabinet
by pushing it upward.

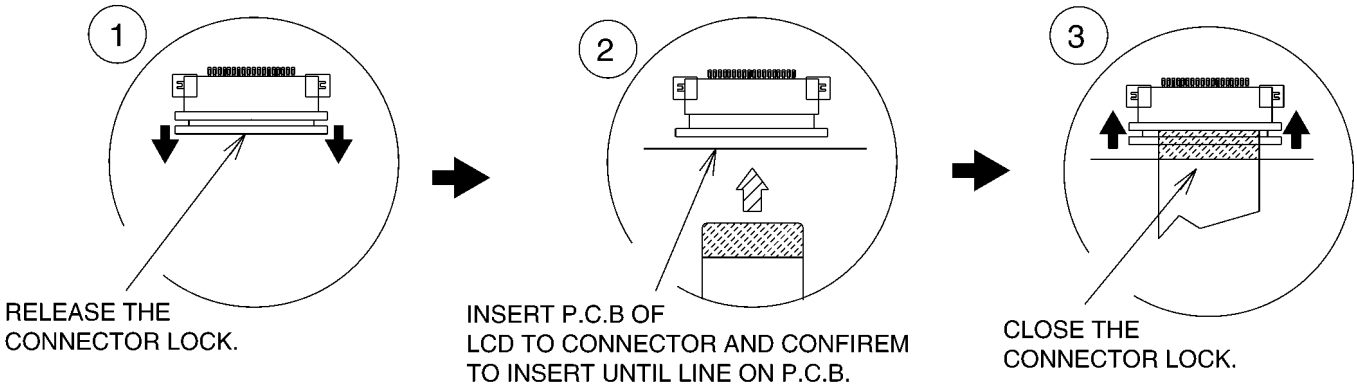
Fig.6

Shown in Fig.-	To Remove -	Remove -
4	Battery Cover	Battery Cover
5	Rear Cabinet	Screw (2.6 × 12).....(C) × 1
		Screws (2 × 14).....(D) × 2
		Screws (2.6 × 12).....(E) × 2
6	Rear Cabinet	Follow the procedure.
7	Main P.C. Board	Screw (2.6 × 12).....(F) × 1
		Screws (2 × 9).....(G) × 2
		Screws (2 × 9).....(H) × 2
		Tape and Solder
		Main P.C. Board

10 ASSEMBLY INSTRUCTIONS

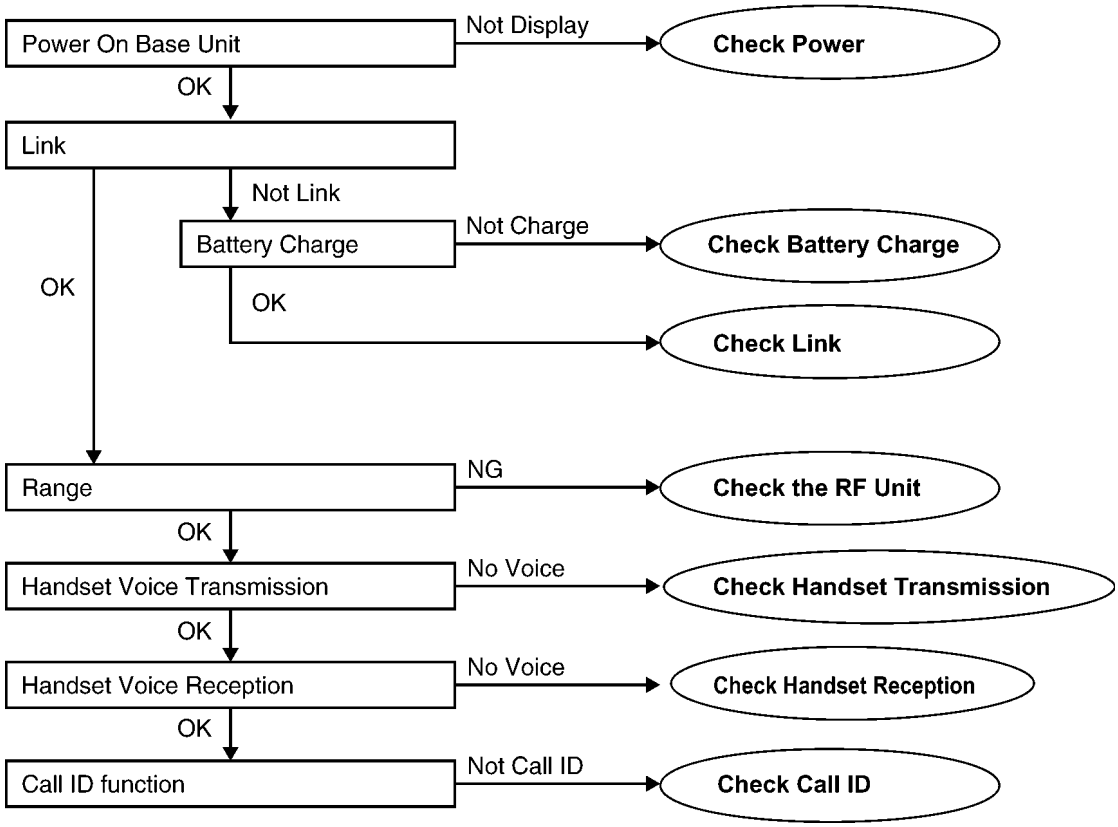
10.1. Fix the LCD to P.C. Board (Handset)





11 TROUBLESHOOTING GUIDE

FLOW CHART



Cross Reference:

Check Power (P.29)

Check Battery Charge (P.30)

Check Link (P.30)

Check the RF Unit (P.31)

Check Handset Transmission (P.36)

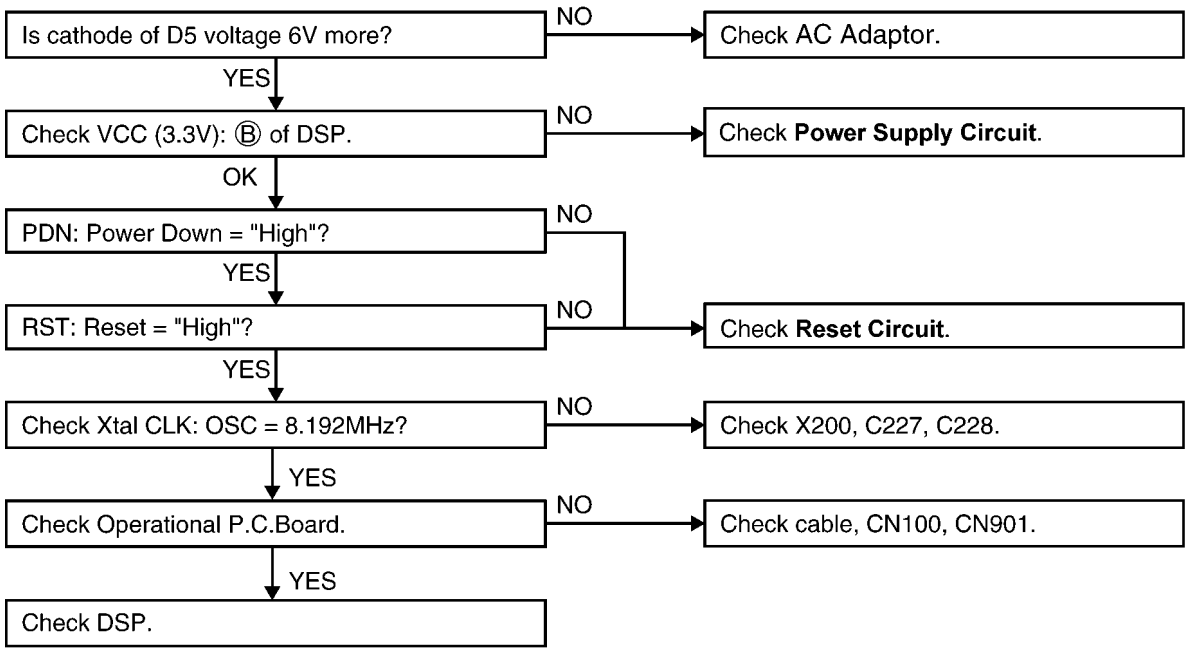
Check Handset Reception (P.36)

Check Caller ID (P.36)

11.1. Check Power

BASE UNIT

Is the AC Adaptor inserted into 220-240V outlet? (AC Adaptor PQLV19BXZ)



Cross Reference:

Power Supply Circuit (P.48)

Reset Circuit (P.49)

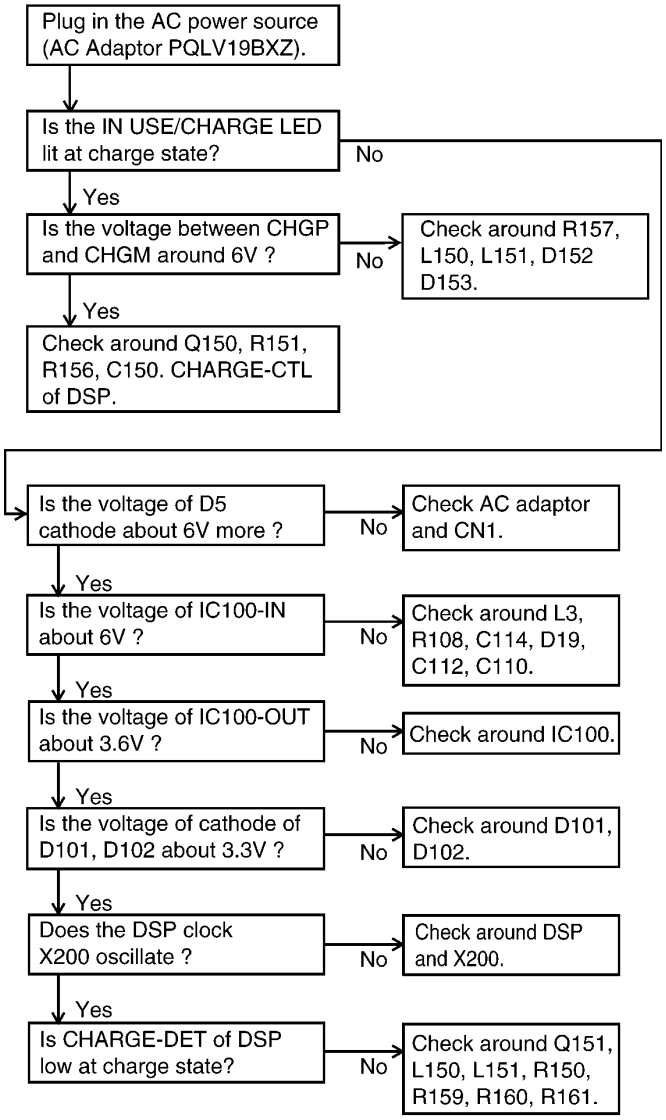
Note:

EEPROM is IC202.

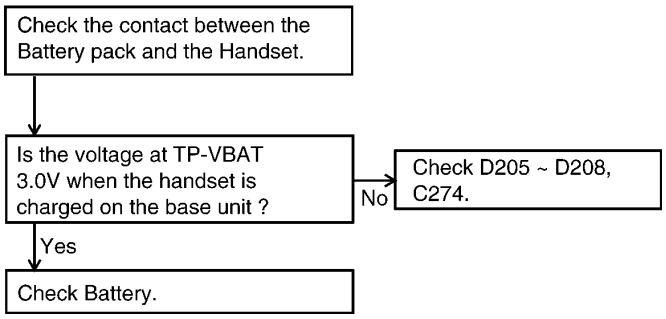
DSP is IC201.

11.2. Check Battery Charge

BASE UNIT

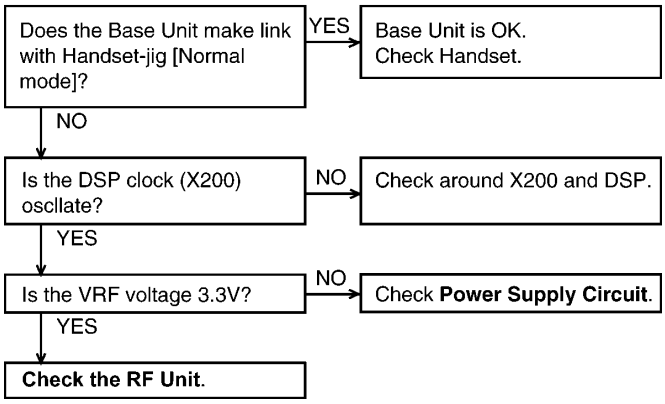


HANDSET



11.3. Check Link

BASE UNIT



Cross Reference:

Check the RF Unit (P.31)

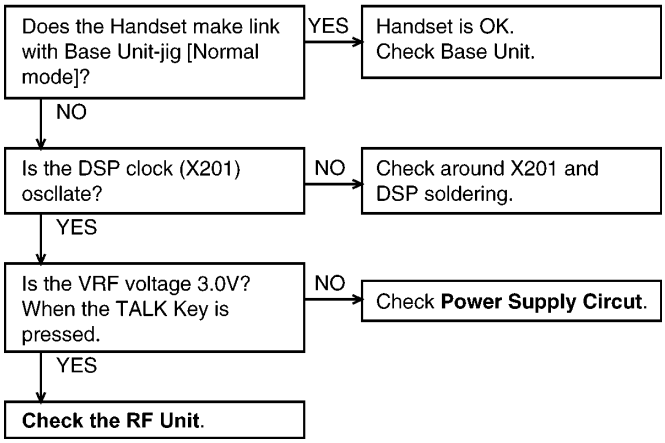
Power Supply Circuit (P.48)

Note:

EEPROM is IC202.

DSP is IC201.

HANDSET



Cross Reference:

Check the RF Unit (P.31)

Power Supply Circuit (P.54)

Note:

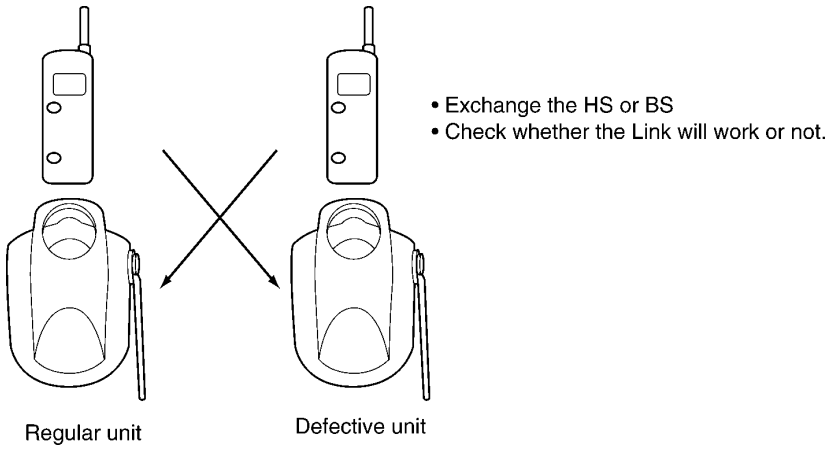
EEPROM is IC202.

DSP is IC201.

11.4. Check the RF Unit

11.4.1. Defective Unit Check

The defective unit should be checked using the HS of Regular unit (working) and BS of Regular unit (working). Both* of Regular unit (working) are required as the defect may be either in the handset or the base of the defective unit. For a defective BASE UNIT, place HS of Regular unit (working) on the cradle of the unit and check to see that the handset links with the base. To confirm that they do link, lift handset off the cradle and press TALK button. A beep is heard and in use/charge LED's of the base unit should turn on. For a defective HANDSET UNIT, place HS on the cradle of the BS of Regular unit (working) and check to see that the HS links with the base. Again, press TALK button. A beep is heard and in use/charge LED's of the BS of Regular unit (working) should turn on.



See **RF Check Flowchart** (P.33).

See **Check Table for RF Unit** (P.34).

11.4.2. Converting a Regular Production Unit to a JIG

Both base unit and handset unit have two modes: TEST POWER LOW mode and NORMAL POWER mode even a Regular production unit.

Each unit can be used as a JIG by changing the original NORMAL POWER mode to TEST POWER LOW mode.

- NORMAL POWER mode.

  In this mode both base unit and handset unit can be used as a regular set.

- **TEST POWER** LOW mode, when production unit has been changed into a jig and will be used to check RF link.

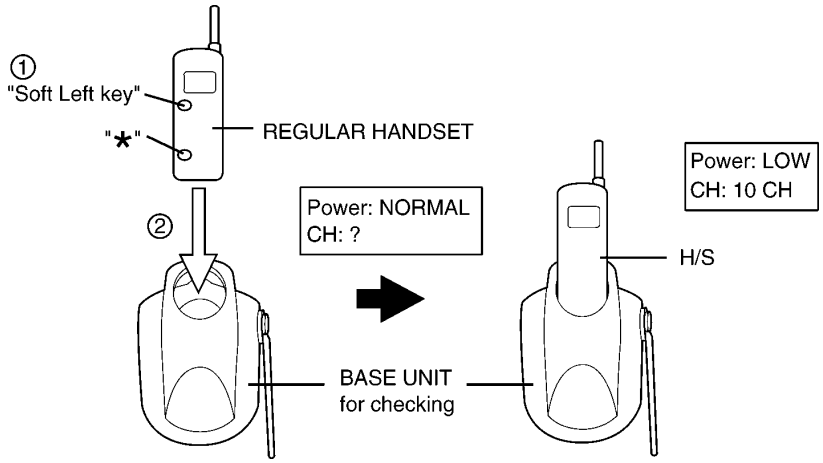
  In this mode it is for checking if the sensitivity of RF unit for both base unit and handset unit are good or not. Procedure as follows to enter this mode.

  (1) Press "Soft Left" and "⊠" of the handset simultaneously, and keep it (10CH is taken for example).

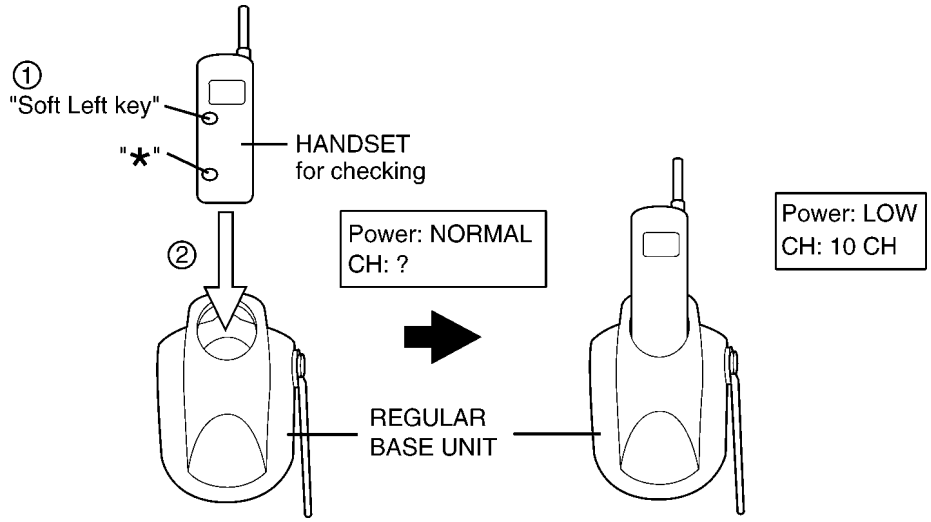
  (2) Place the handset unit on the cradle of the base unit. (A long beep sounds, and the display is not changed.)

  As shown in below a) HANDSET, b) BASE UNIT

a) HANDSET



b) BASE UNIT



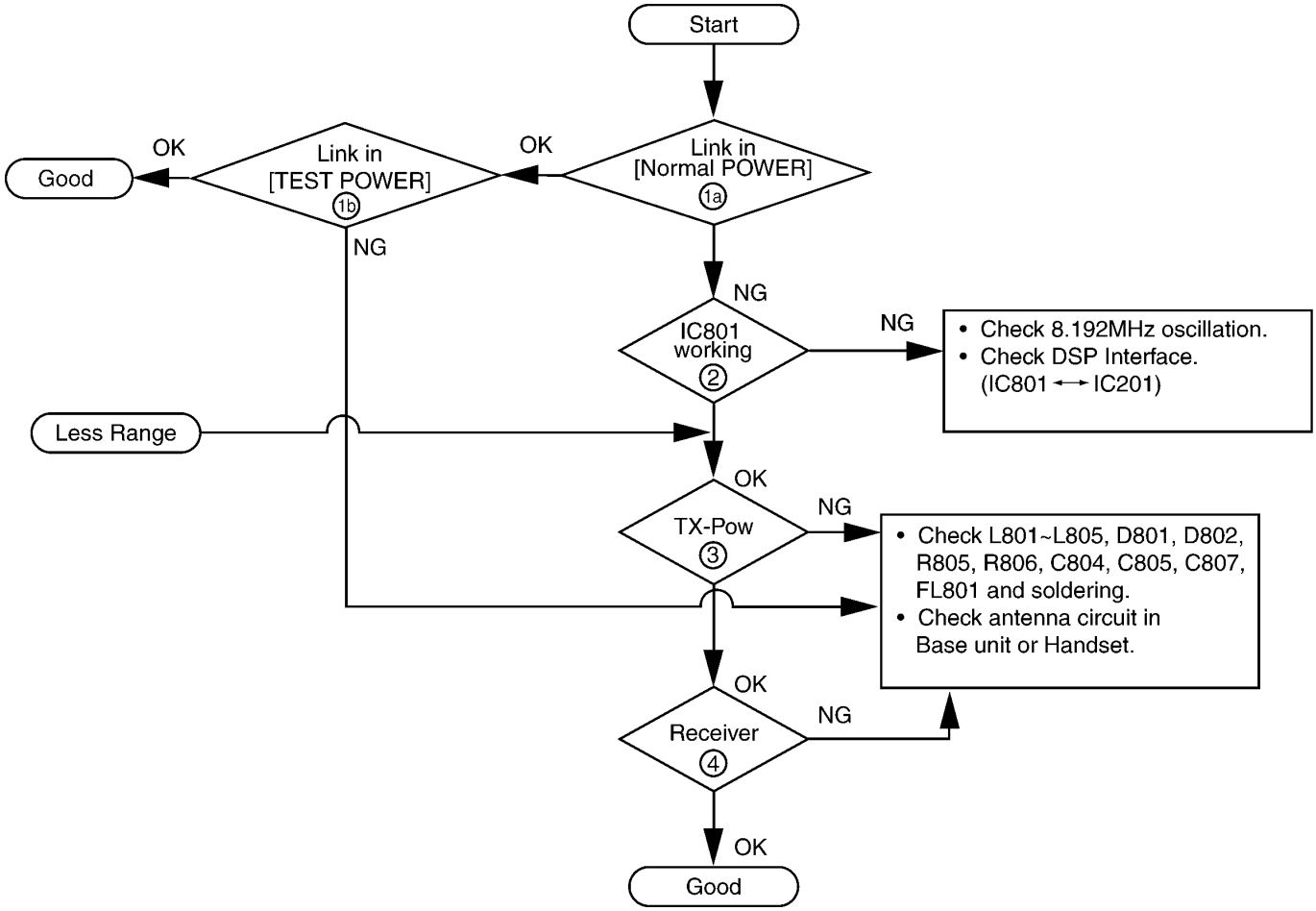
A short beep followed by a long beep is heard. This indicates the unit is in TEST POWER LOW mode. Once in TEST POWER LOW mode, to return the unit to the original NORMAL POWER mode, press 2, 5, 8, 0 simultaneously while the handset unit is in stand-by (not in use, not charging). A long beep is heard. Then disconnect the battery from the handset. Reconnect the battery and place the handset on the cradle to exchange security codes. A single beep is heard.

Note:

You can check the other channels as follows, if need.

Fixation CH	**Figure 1**	
CH	POWER	making key
1CH	“LOW“	"Soft Left key" + "1"
2CH	“LOW“	"Soft Left key" + "2"
3CH	“LOW“	"Soft Left key" + "3"
4CH	“LOW“	"Soft Left key" + "4"
5CH	“LOW“	"Soft Left key" + "5"
6CH	“LOW“	"Soft Left key" + "6"
7CH	“LOW“	"Soft Left key" + "7"
8CH	“LOW“	"Soft Left key" + "8"
9CH	“LOW“	"Soft Left key" + "9"
10CH	**“LOW”**	**"Soft Left key" + "** ⊠ **"** ← the above case
11CH	“LOW“	"Soft Left key" + "0"
12CH	“LOW“	"Soft Left key" + "#"
13CH	“LOW“	"Down key" + "1"
14CH	“LOW“	"Down key" + "2"
15CH	“LOW“	"Down key" + "3"
16CH	“LOW“	"Down key" + "4"
17CH	“LOW“	"Down key" + "5"
18CH	“LOW“	"Down key" + "6"
19CH	“LOW“	"Down key" + "7"
20CH	“LOW“	"Down key" + "8"
21CH	“LOW“	"Down key" + "9"
22CH	“LOW“	"Down key" + "⊠"
23CH	“LOW“	"Down key" + "0"
24CH	“LOW“	"Down key" + "#"
25CH	“LOW“	"OFF" + "⊠"
26CH	“LOW“	"OFF" + "#"
1CH	“NORMAL“	"OFF" + "1"
4CH	“NORMAL“	"OFF" + "2"
7CH	“NORMAL“	"OFF" + "3"
10CH	“NORMAL“	"OFF" + "4"
13CH	“NORMAL“	"OFF" + "5"
14CH	“NORMAL“	"OFF" + "6"
17CH	“NORMAL“	"OFF" + "7"
20CH	“NORMAL“	"OFF" + "8"
23CH	“NORMAL“	"OFF" + "9"
26CH	“NORMAL“	"OFF" + "0"

11.4.3. RF Check Flowchart



1a ~ ④ : Details of confirmation items are following in **Check Table for RF Unit** (P.34).

Note:

DSP is IC201. (for Base Unit)

DSP is IC201. (for Handset)

Both of RF units for Handset and Base Unit are same.

11.4.4. Check Table for RF Unit

No	Item		BS (Base unit) (*1)	HS (Handset) (*1)
1a.	Link confirmation [NORMAL POWER]	Procedure	1. Put “HS (working)” on BS. 2. Set MODE to [NORMAL POWER] of “HS (working)“. 3. Press [TALK] key of “HS (working)” to establish link.	1. Put HS on “BS (working)”. 2. Set MODE to [NORMAL POWER] of “BS (working)“. 3. Press [TALK] key of “HS” to establish link.
1b.	Link confirmation [TEST POWER] for confirmation the sensitivity of RF unit	Procedure	1. Change MODE to [**TEST POWER**] of “HS (working)”. 2. Press [TALK] key of “HS (working)” to establish link. 3. Confirm the suspicious BS links to HS (working) with approximately the same distance from BS (working).	1. Change MODE to [**TEST POWER**] of “BS (working)”. 2. Press [TALK] key of “HS“ to establish link. 3. Confirm the suspicious HS links to BS (working) with approximately the same distance from HS (working).
2	IC801 working confirmation	Procedure	1. Set Test-mode Just entering to test mode.(*3) 2. Confirm oscillate signal of RF UNIT (8.192 MHz at OSC). (*5)	1. Set Test-mode Just entering to test mode.(*3) 2. Confirm oscillate signal of RF UNIT (8.192 MHz at OSC). (*6)
		Check point	1. Check Xtal oscillator at Q260 - C of the base unit. 2. Check DSP interface(IC801←→DSP/BS) (*4).	1. Check Xtal oscillator at Q204 - C of the handset. 2. Check DSP interface(IC801←→DSP/HS) (*4).
3	TX Power confirmation	Procedure	1. Put RF wire to ANT and ANT_GND (See **Base Unit Reference Drawing**). Connect this wire to the Spectrum Analyzer. 2. Set Test-mode. (*7) 3. Confirm TX power level within +11±5dBm (*2)	1. Put RF wire to ANT and ANT_GND (See **Handset Reference Drawing**). Connect this wire to the Spectrum Analyzer. 2. Set Test-mode. (*8) 3. Confirm TX power level within +11±5dBm (*2)
		Check point	1. Check L801 ~ L805, D801, D802, R805, R806, C804, C805, C807, FL801 and soldering. 2. Check Antenna in BS.	1. Check L801 ~ L805, D801, D802, R805, R806, C804, C805, C807, FL801 and soldering. 2. Check Antenna in HS.
4	Receiver confirmation	Procedure	1. Put “HS (working)” on BS. 2. Set MODE to [NORMAL POWER] of “HS (working)”. 3. Press [TALK] key of “HS (working)“ to establish link. 4. Change MODE to [TEST POWER] of “HS (working)“. 5. Press [TALK] key of “HS (working)” to establish link. Confirm the suspicious BS links to HS (working) with approximately the same distance from BS (working).	1. Put HS on “BS (working)”. 2. Set MODE to [NORMAL POWER] of “BS (working)”. 3. Press [TALK] key of “HS” to establish link. 4. Change MODE to [TEST POWER] of “BS (working)”. 5. Press [TALK] key of “HS” to establish link. Confirm the suspicious HS links to BS (working) with approximately the same distance from HS (working).
		Check point	1. Check C115, C114, L111, C118 soldering. 2. Check Antenna in BS.	1. Check C115, C114, L111, C118 soldering. 2. Check Antenna in HS.

(1*) BS : Base unit which is checked.

HS : Handset unit which is checked.

BS (working) : Base unit which is working.

HS (working) : Handset unit which is working.

(*2)<Spectrum analyzer setting>

SPAN: 10MHz

VBW, RBW: 1MHz

SWEEP: 1sec.

(*3)See **TEST MODE (** P.37).

(*4)See **RF-DSP interface signal wave form** (P.35).

See **CIRCUIT BOARD (BASE UNIT)** (P.81).

See **CIRCUIT BOARD (HANDSET)** (P.85).

(*5)See **Base Unit Reference Drawing** (P.40).

(*6) see **Handset Reference Drawing** (P.41)

(*7) see **Test mode flow chart for Base Unit** (P.37)

(*8) see **Test mode flow chart for Handset** (P.38)

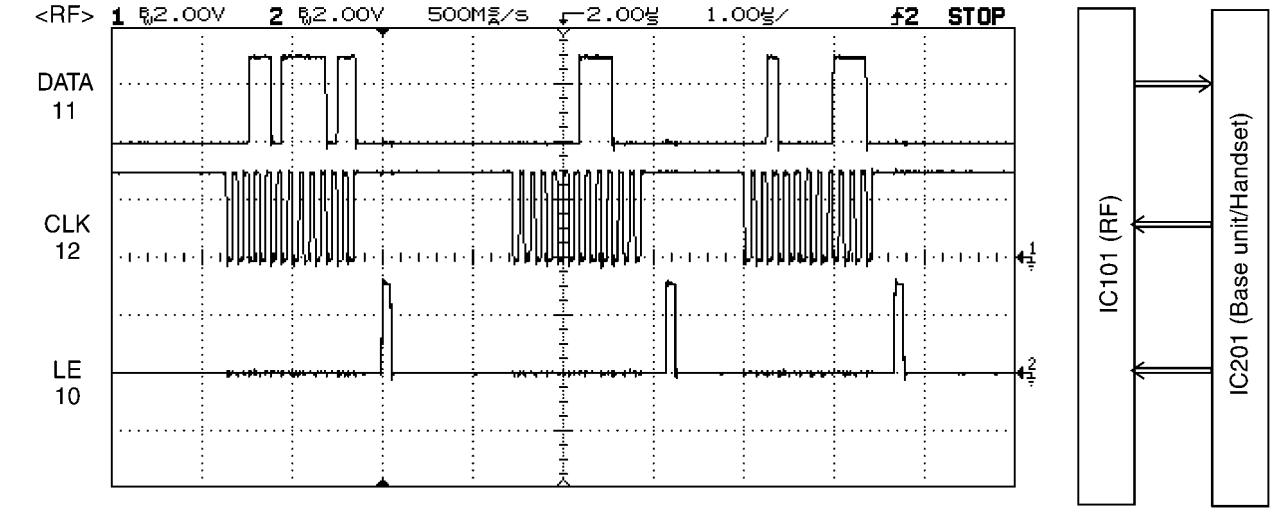
Note:

DSP is IC201. (for Base Unit)

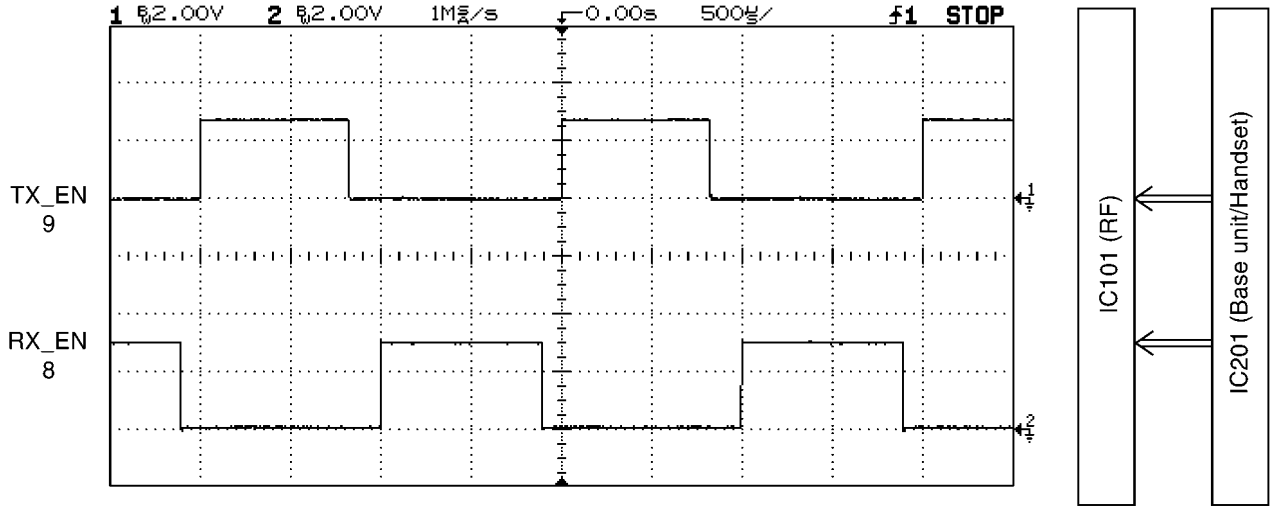
DSP is IC201. (for Handset)

11.4.5. RF-DSP interface signal wave form

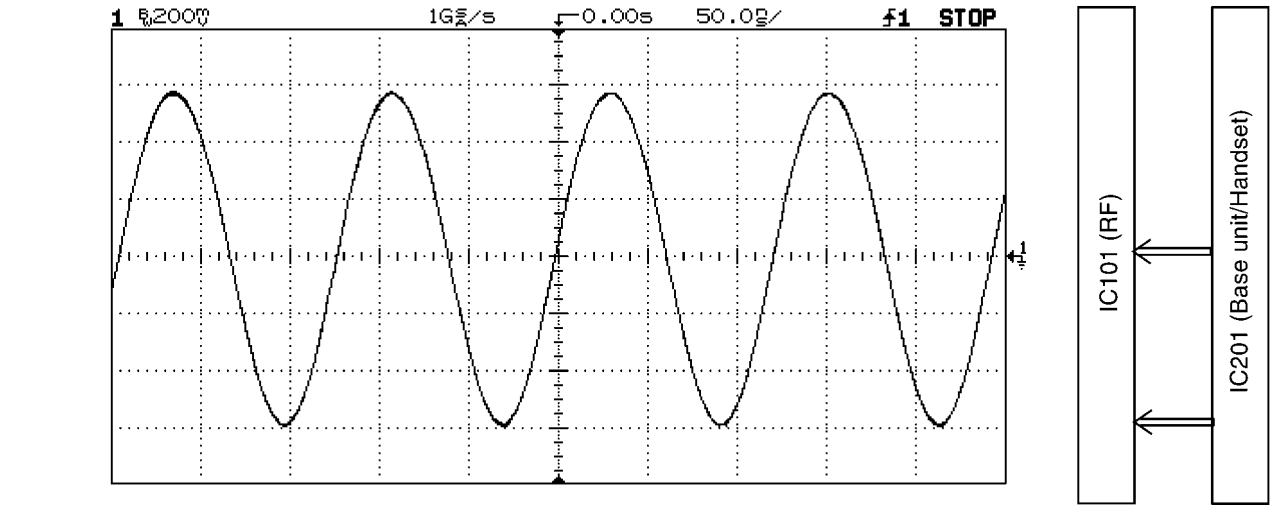
(1) Serial control line
<Standby mode>



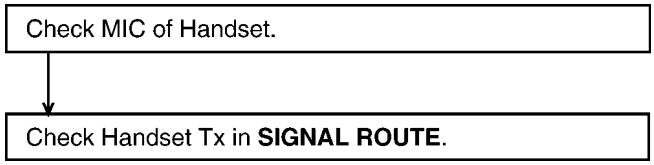
(2) Control line <Talk mode>
<Tx & Rx Power SW>



<Reference clock 8.192MHz>



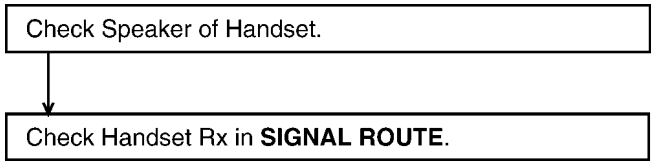
11.5. Check Handset Transmission



Cross Reference:

SIGNAL ROUTE (P.58).

11.6. Check Handset Reception



Cross Reference:

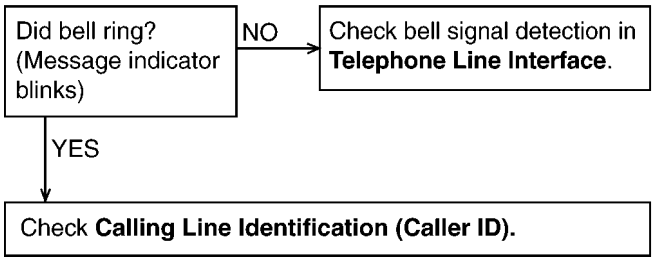
SIGNAL ROUTE (P.58).

Note:

When checking the RF UNIT, Refer to **Check the RF Unit** (P.31)

11.7. Check Caller ID

BASE UNIT



Cross Reference:

Telephone Line Interface (P.50).

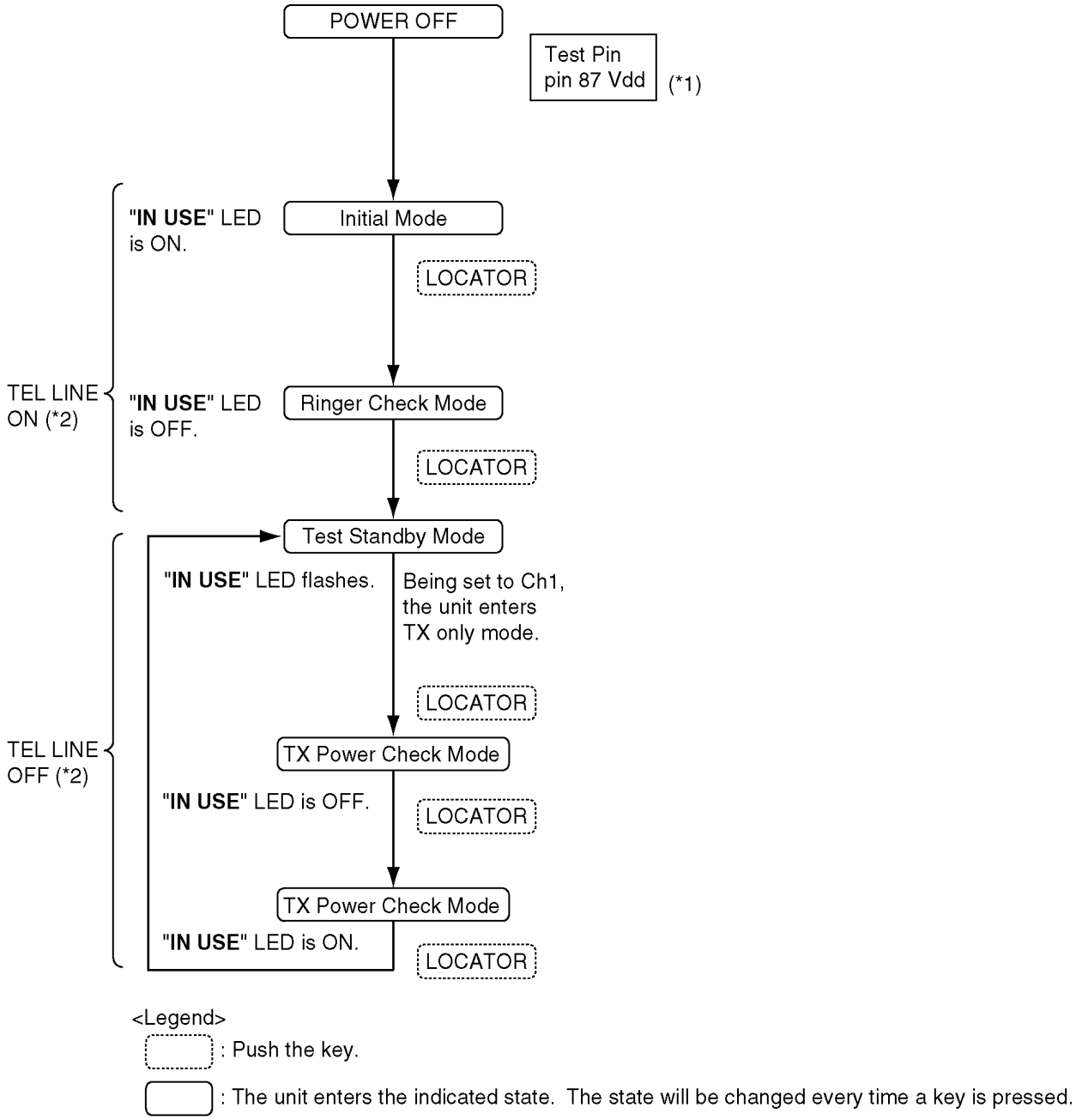
Calling Line Identification (Caller ID) (P.52).

Note:

- Make sure the format of the 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.

12 TEST MODE

12.1. Test mode flow chart for Base Unit

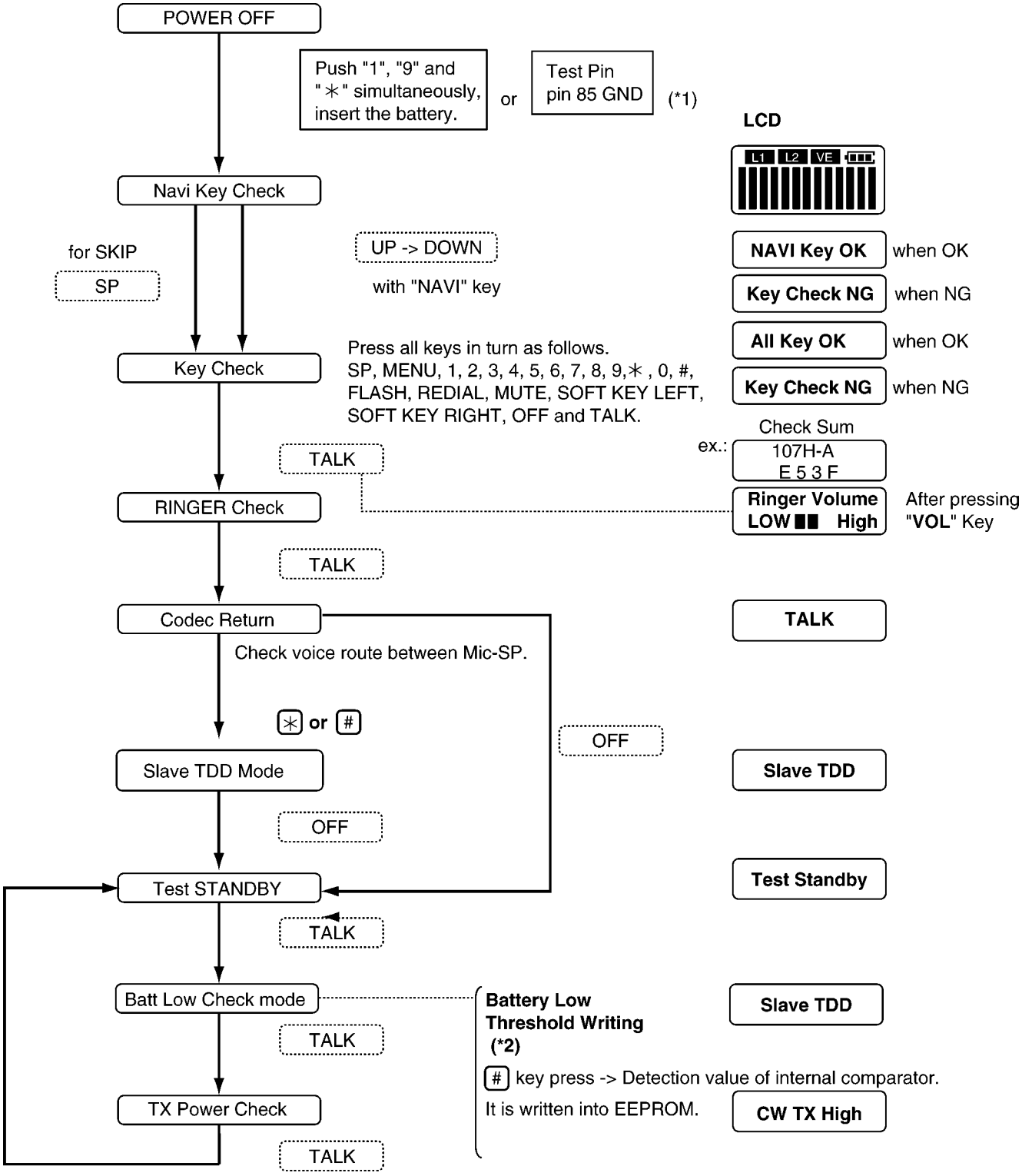


(*1) It shows whether the telephone line is connected or not.

-ON: OFF HOOK.

-OFF: ON HOOK

12.2. Test mode flow chart for Handset



<Legend>

: Push the key.

: The unit enters the indicated state. The state will be changed every time a key is pressed.

(*1) See **Handset Reference Drawing** (P.41).---Should return to OPEN after entering the Test mode.

(*2) See **Adjustment Battery Low Detector Voltage** (P.39).

12.3. X201 Check

The confirmation is made under the “TX Power Check” mode of TEST MODE.

Equipment: Frequency counter
TP for measurement: TP_ANT
Measure range: 2472.64550 MHz ± 5 kHz (1ch) at Test Standby mode in **TEST MODE** (P.37).

12.4. Adjustment Battery Low Detector Voltage

After replacing handset’s DSP (IC201), Re-writing Battery Low voltage to EEPROM is required.

<How to re-write>

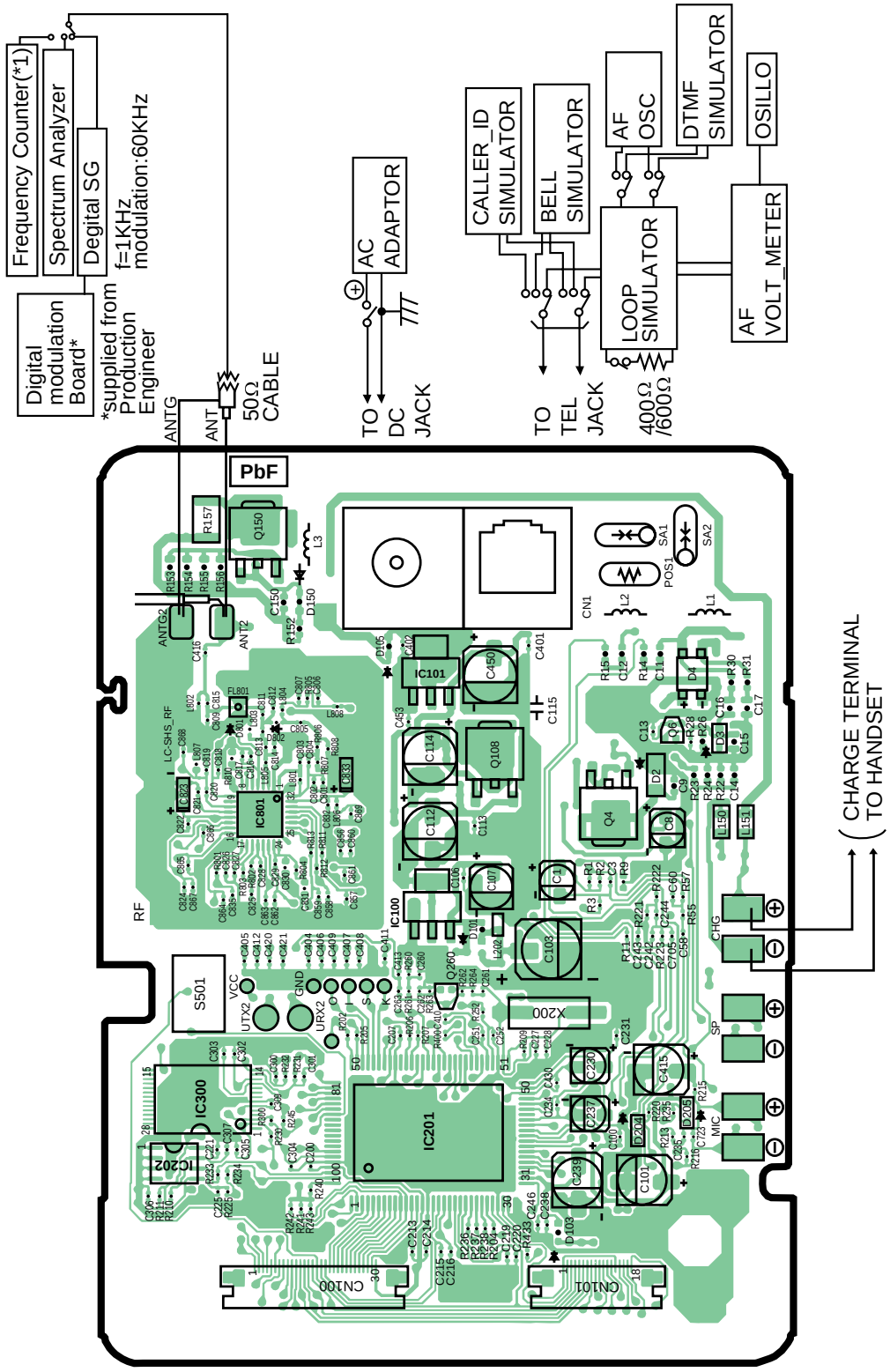
1. Set 2.7V for DC power supply.
2. Enter the test mode (Refer to **Test mode flow chart for Handset** (P.38))
3. Follow to “Batt Low Check” mode..... (Slave TDD is displayed on LCD)
4. Set 2.37V for DC power supply.

Note: Check voltage at battery connector, because some voltage drop is happened, using long or thin cable.

5. Press “#“ key to write voltage value in EEPROM.
6. Turn power off. Then this value is available.

12.5. Base Unit Reference Drawing

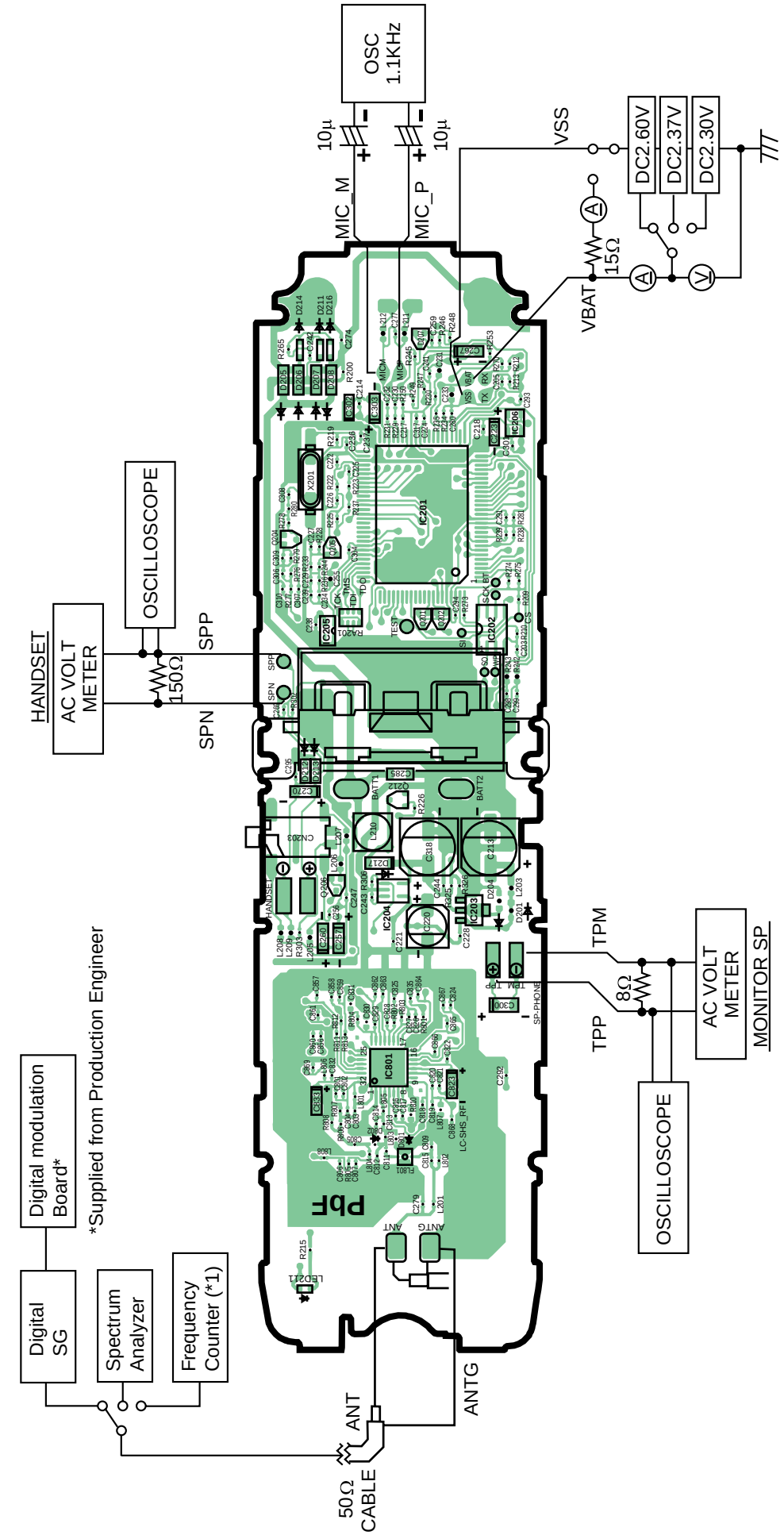
When connecting the Simulator and Equipments for checking, please refer to below.



Note: (*1) is refered to No.2 of **Check Table for RF Unit** (P.34)

12.6. Handset Reference Drawing

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



Note: (*1) is refered to No.2 of **Check Table for RF Unit** (P.34)

12.7. Frequency Table

Channel	TX/RX Frequency (MHz)	Channel	TX/RX Frequency (MHz)
1	2426.10875	21	2437.37325
2	2426.62225	22	2437.88675
3	2427.13250	23	2438.39700
4	2427.64925	24	2438.91050
5	2428.15950	25	2439.42075
6	2428.67300	26	2439.93425
7	2429.18325	27	2442.49200
8	2429.69675	28	2443.00550
9	2430.20700	29	2443.51575
10	2430.72050	30	2444.03250
11	2431.23075	31	2444.54275
12	2431.74425	32	2445.05625
13	2432.25450	33	2445.56650
14	2433.79175	34	2446.08000
15	2434.30200	35	2446.59025
16	2434.81550	36	2447.10375
17	2435.32575	37	2447.61400
18	2435.83925	38	2448.12750
19	2436.34950	39	2448.63775
20	2436.86300		

13 DESCRIPTION

13.1. Frequency

The frequency range of 2426.10875 MHz ~ 2448.63775 MHz is used. Transmitting and receiving channel between base unit and handset is same frequency. Refer to the Frequency Table.

13.2. Time Division Duplex (TDD) operation

Transmission/reception between the base unit and handset is performed by time-sharing as shown in Fig. 7. 1 slot time of transmission and reception is 1mS. Same frequency is used in transmitting and receiving. The figure shows an example; the frequency of 3ch is used in transmitting between the base unit and handset.

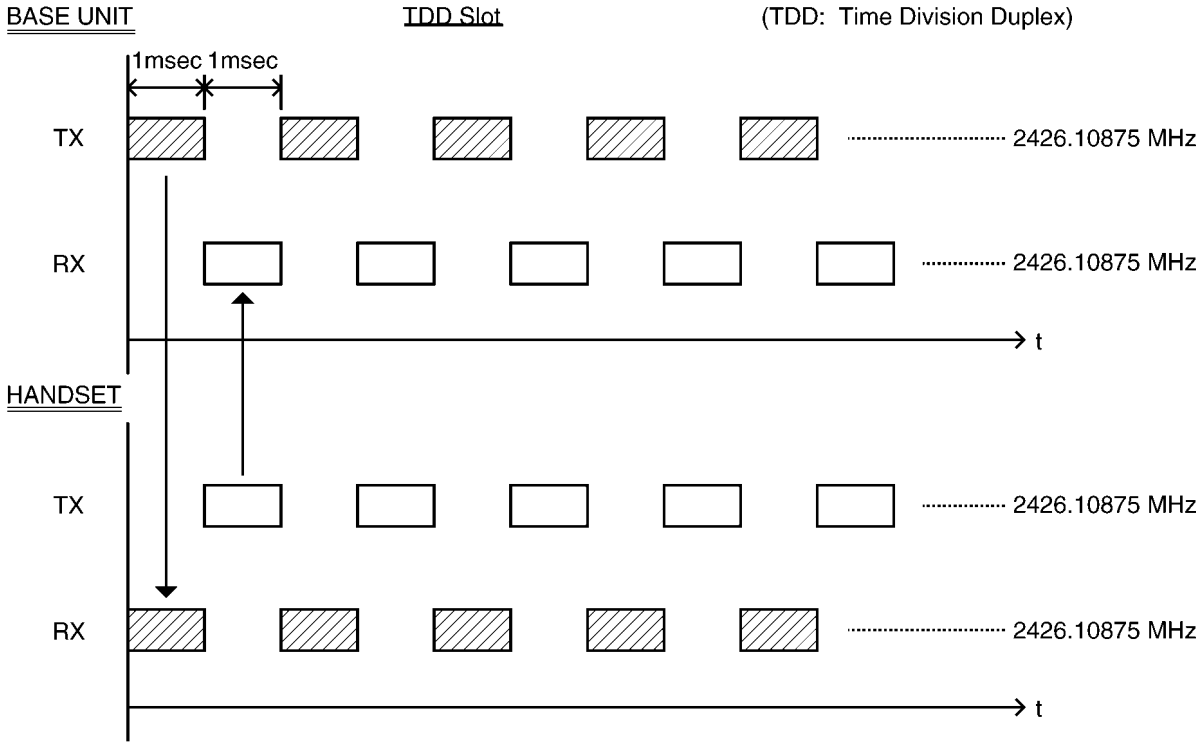


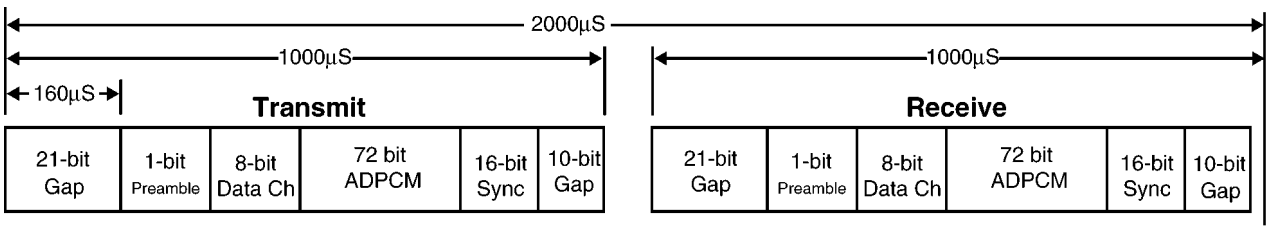
Fig. 7

13.2.1. TDD Frame Format

The TDD frame is 2mS in length. Each subframe contains 128 bits of 7.8µS duration.

Each subframe consists of the following four fields:

- A 1-bit Preamble field
- An 8-bit Data Channel field
- An 16-bit Sync Word
- A 72-bit ADPCM Payload (Parity 8-bit)



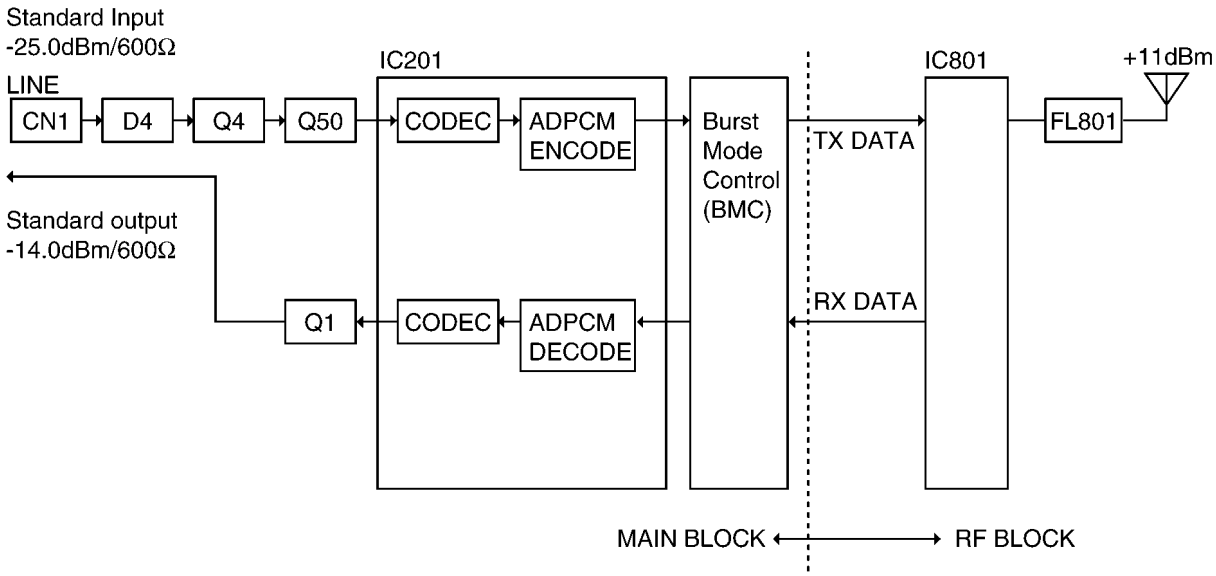
13.3. Signal Flowchart in the Whole System

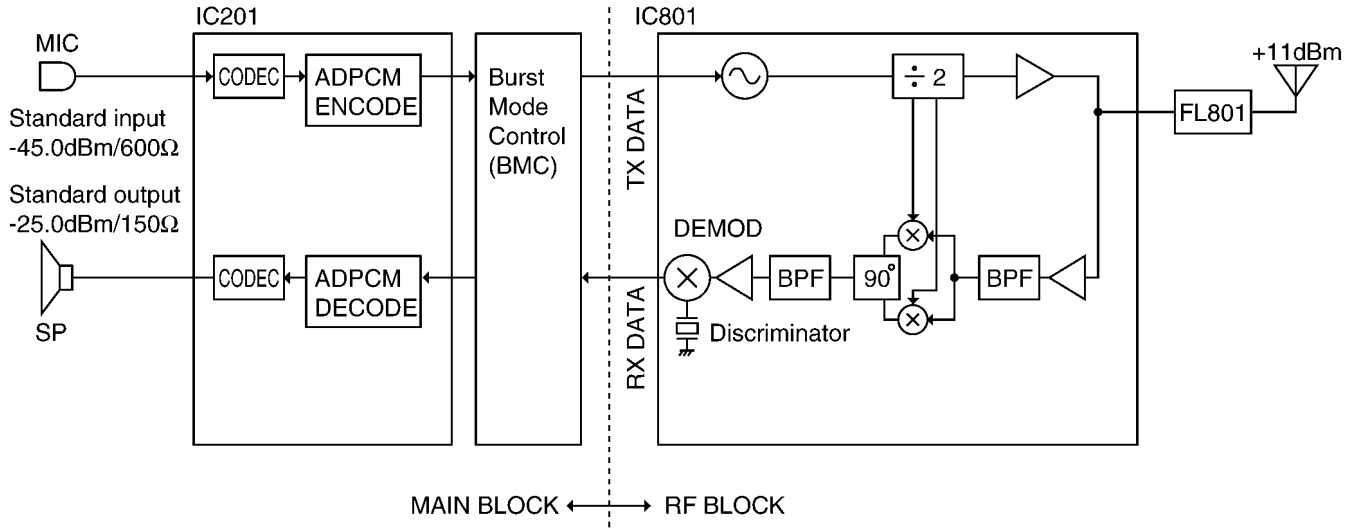
Reception

CN1 of the base unit is connected to the TEL line, and the signal is input through the bridge diode D4. While talking the relay (Q4) is turned ON and amplified at the amplifiers Q50, then led to DSP (IC201). DSP generates ADPCM signal. The ADPCM signal is input to RFIC (IC801) of RF UNIT. RFIC outputs FSK modulated RF signal. The RF signal is passed through filter (IC801) to be transmitted from the antenna. As for the handset, RF signal from the antenna is input to RFIC passing through filter (IC801) then input to DSP (IC201). DSP performs ADPCM decoding to convert the signal into the voice signal, then it is output to the speaker.

Transmission

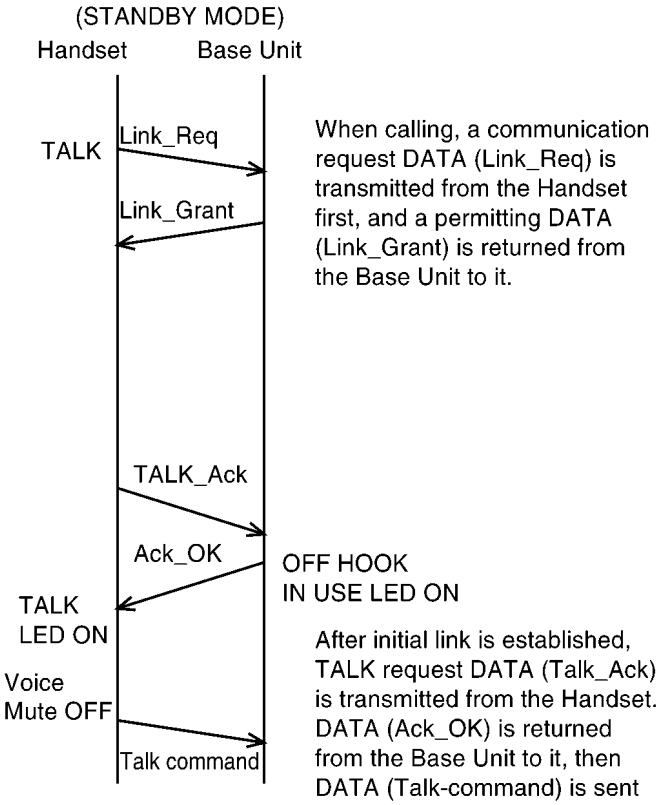
The voice signal input from the microphone is led to DSP (IC201). The DSP generates ADPCM signal. As well as the reception, it is converted into the RF signal by RFIC (IC801). Passing through filter (FL801), it is transmitted from the antenna. As for the base unit, RF signal from the antenna is input to RFIC (IC801) passing through filter (FL801) then input to DSP (IC201). DSP performs ADPCM decoding to convert the signal into the voice signal. The voice signal is amplified at the TX amplifier (Q1), then output to the TEL line (CN1) through the relay (Q4) and bridge (D4).



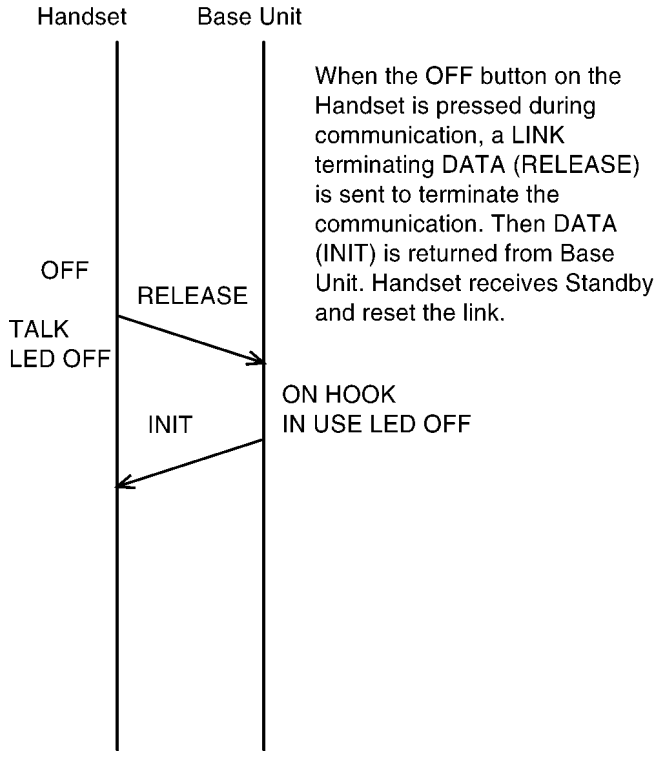


14 EXPLANATION OF BBIC (Base Band IC) DATA COMMUNICATION

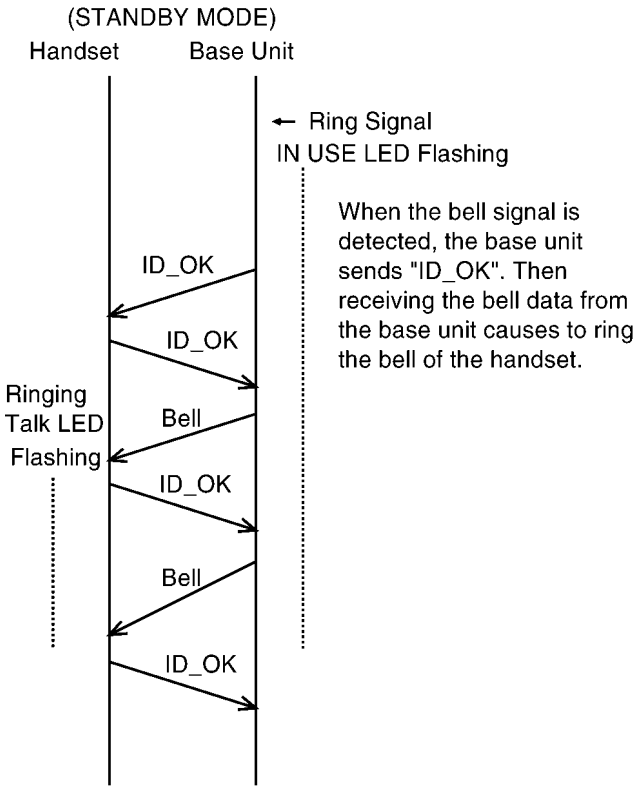
14.1. Calling



14.2. To Terminate Communication



14.3. Ringing

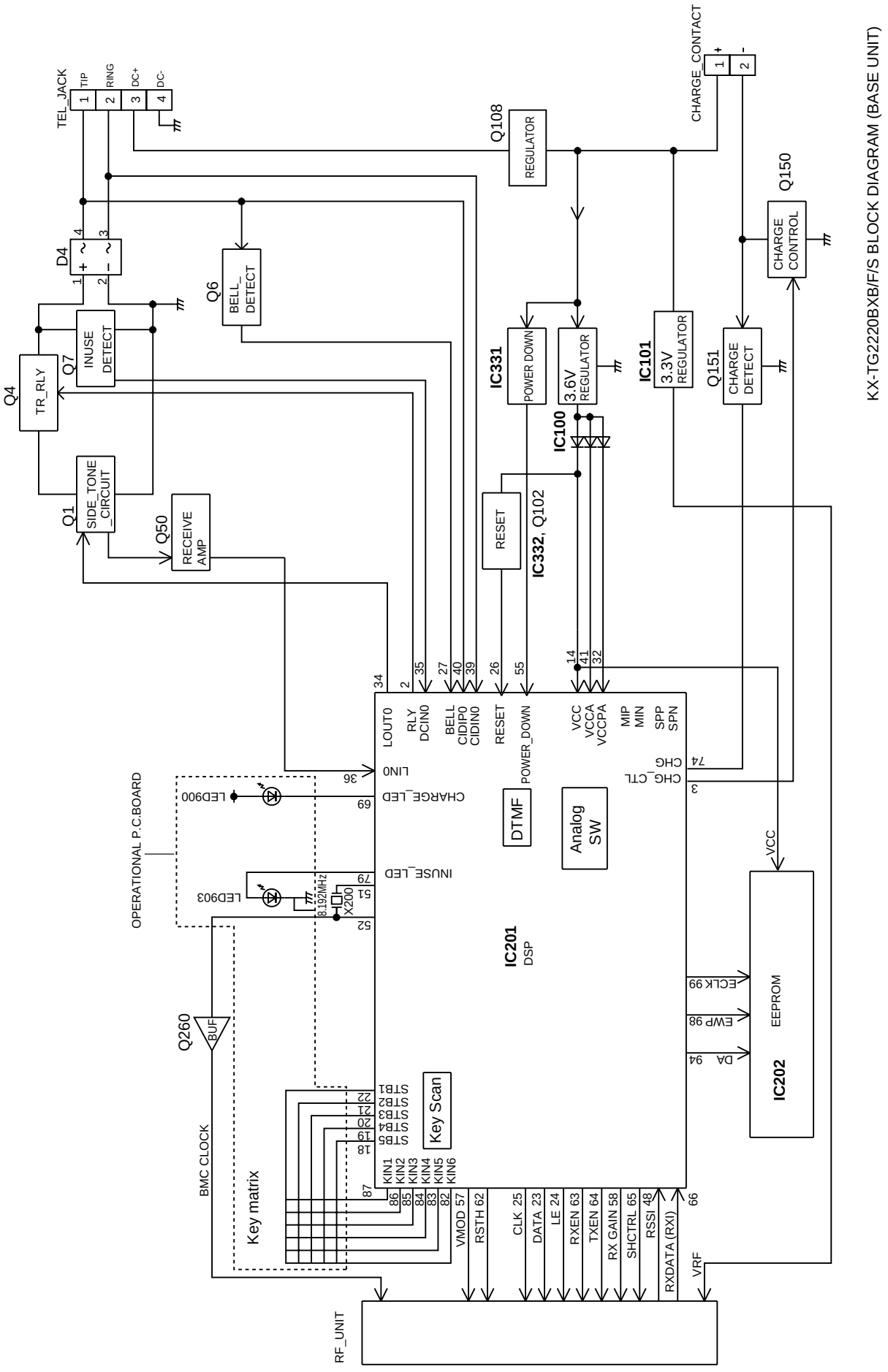


14.4. Ports for Transmitting and Receiving of Data

Handset: (IC201)
Transmitting ..... Pin 57 (TXO), Pin 64 (TXEN)
Receiving ..... Pin 66 (RXI), Pin 63 (RXEN)

Base Unit: (IC201)
Transmitting ..... Pin 57 (TXO), Pin 64 (TXEN)
Receiving ..... Pin 66 (RXI), Pin 63 (RXEN)

15 BLOCK DIAGRAM (BASE UNIT)



16 CIRCUIT OPERATION (BASE UNIT)

General Description:

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

16.1. DSP (Digital Speech/Signal Processing: IC201)

- **DTMF Detection/Generator**

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

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

- **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 telephone line is transmitted to the speaker or the voice signal from speakerphone microphone is transmitted to the Telephone line, etc. They are determined by the signal path route operation of voice signal.

- **Block Interface Circuit**

  RF unit, Speaker, Microphone, Telephone line (Main PCB) LED, Key Matrix, LCD (Operation PCB)

16.2. EEPROM (IC202)

Following information data is stored.

- **Telephone number, etc.**

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

- **Settings**

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

16.3. Power Supply Circuit

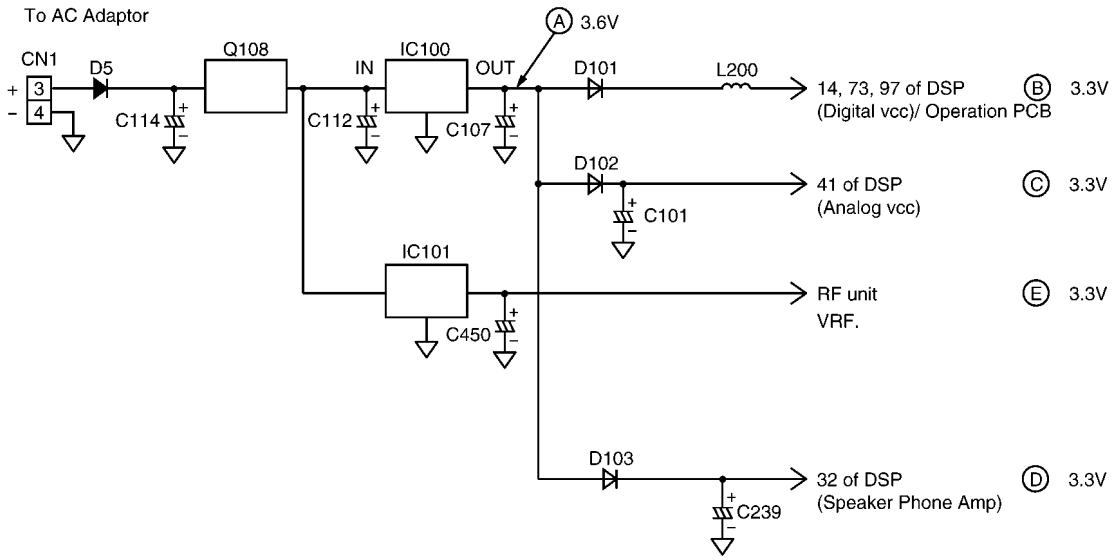
Function:

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

Circuit Operation:

This unit supplies the voltage to each block as shown below.

Circuit Diagram



Note:

As for Ⓐ−Ⓔ, see **CIRCUIT BOARD (BASE UNIT)** (P.81).

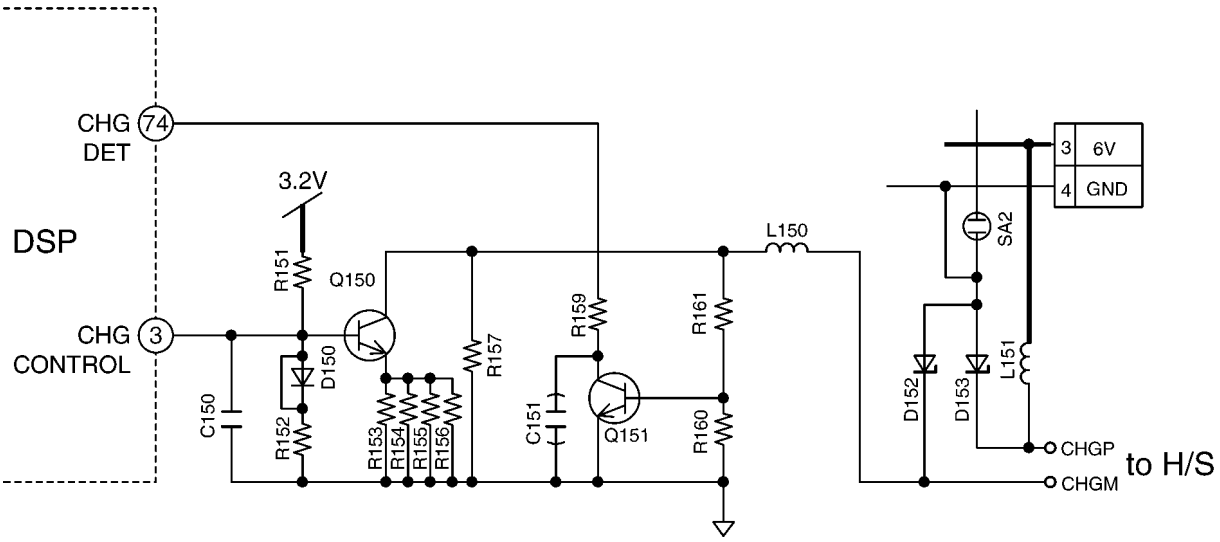
16.3.1. Charge Circuit

The voltage from the AC is supplied to the main charge circuits. Normal charge (220 mA) of maximum 9-hours is started soon after the Handset is placed on the base unit. Then it changes to trickle charge (15 mA on the average) to prevent from overcharging.

Normal charge : Q150 is ON

Trickle charge : Q150 is OFF

Circuit Diagram



16.4. Reset Circuit

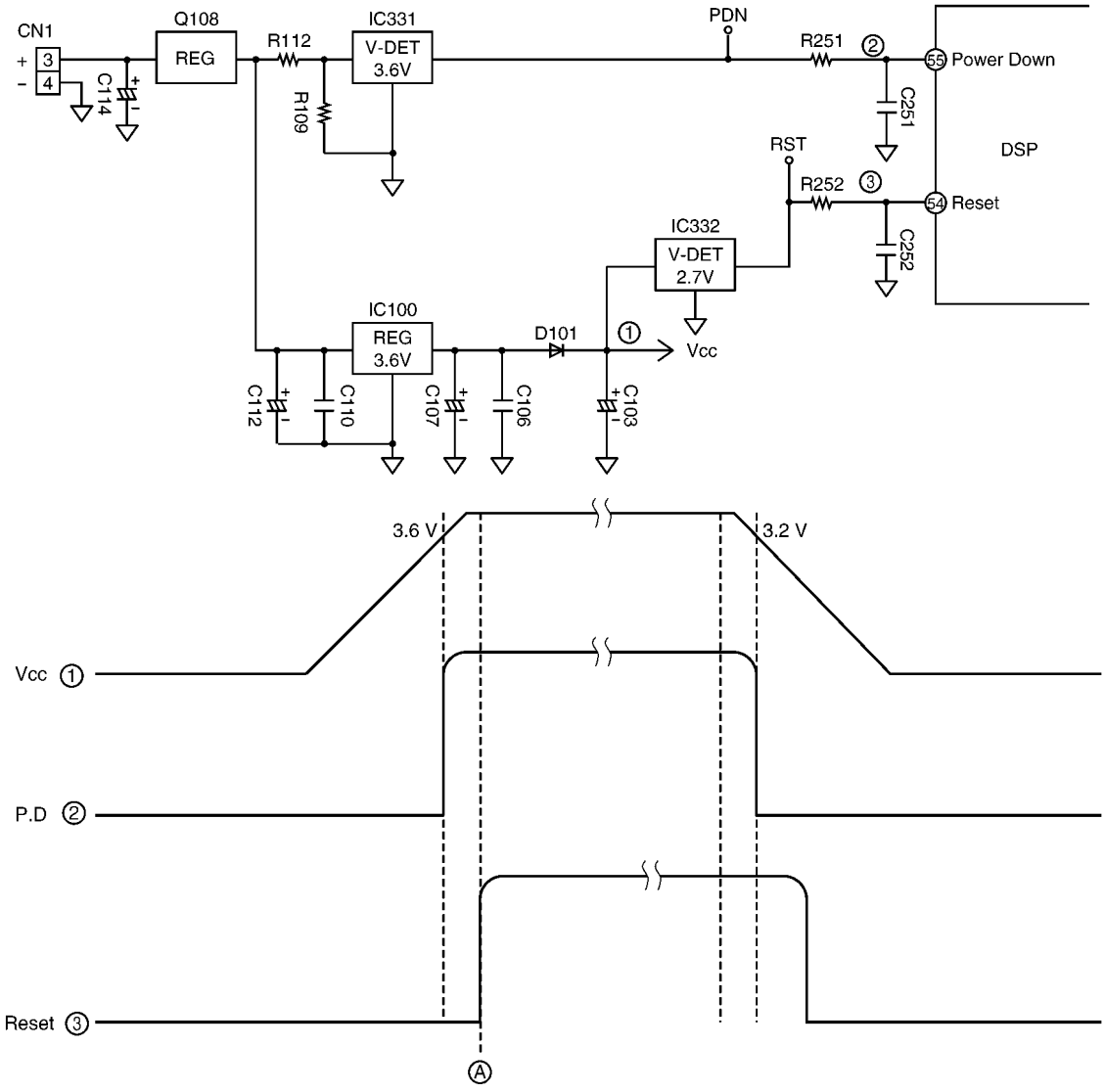
Function:

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 IC100, D101 and power is supplied to the DSP. The set can operate beyond point Ⓐ in the circuit voltage diagram.

Circuit Diagram



16.5. Locator Mode

1. When the base unit LOCATOR button is pressed, the IN USE (LED903) is flashed.

16.6. Telephone Line Interface

Telephone Line Interface Circuit:

Function

- Bell signal detection
- ON/OFF hook and pulse dial circuit
- Side tone circuit
- Auto-disconnect circuit/Parallel connection detection circuit

Bell signal detection and OFF HOOK circuit:

In the idle mode, Q4 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, R → L1, L2 → R30, R31 → C16, C17 → Q6 → DSP (BELL) **[BELL]**

When the CPU (DSP) detects a ring signal, Q4 turns on, thus providing an off-hook condition (active DC current flow through the circuit) and the following signal flow is for the DC line current.

T → D4 → Q4 → Q1 → R5 → D1 → D4 → L2 → POS1 → R **[OFF HOOK]**

ON HOOK Circuit:

Q4 is open, Q4 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 (RYL) turns Q4 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 Q1 is canceled by the echo canceller of DSP.

Note: DSP is IC201.

See **CPU DATA (BASE UNIT)** (P.59)

16.7. Auto Disconnect Circuit

Function:

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

Circuit Operation:

The voltage DSP (DCIN1) is monitored. If a parallel-connected telephone is put into an OFF HOOK status, the presence/absence of a parallel connection is determined when the voltage changes by 0.2V or more.

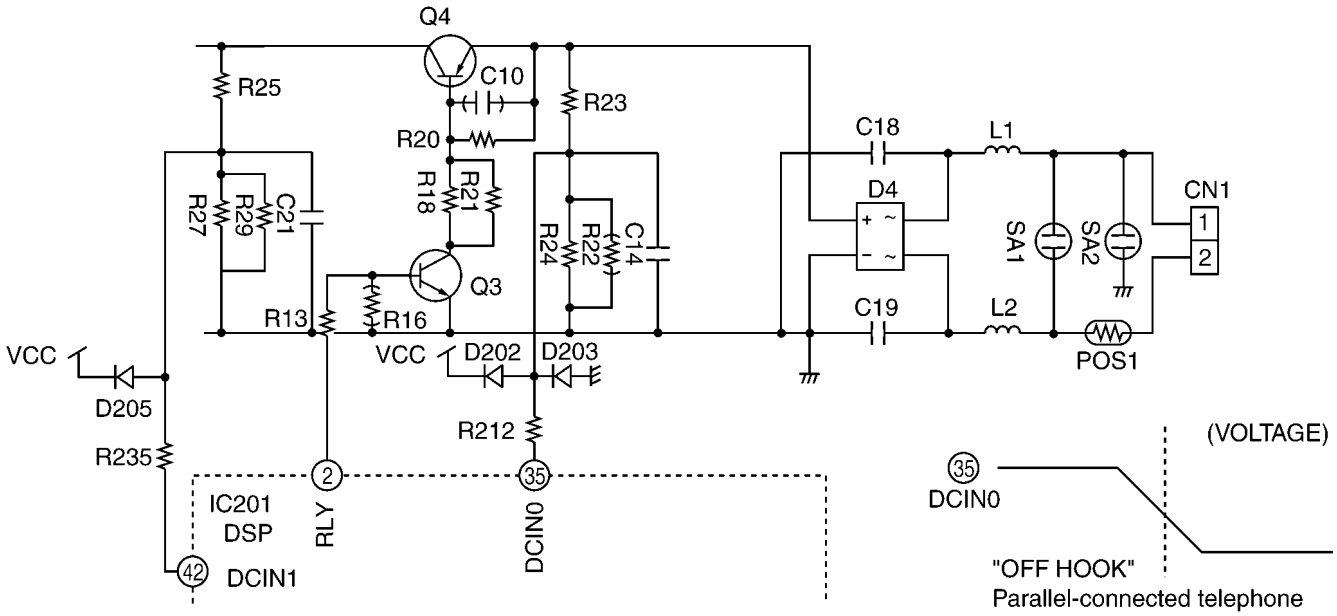
When the set detects the parallel-connected telephone is OFF HOOK status, the line is disconnected.

Note:

DSP is IC201.

See **CPU DATA (BASE UNIT)** (P.59)

Circuit Diagram



You can enable or disable the Auto Disconnect function.

16.8. 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.

It is like an “Auto Disconnect Circuit”.

Circuit Operation:

Parallel connection detection when on hook:

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

Parallel connection detection when off hook:

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

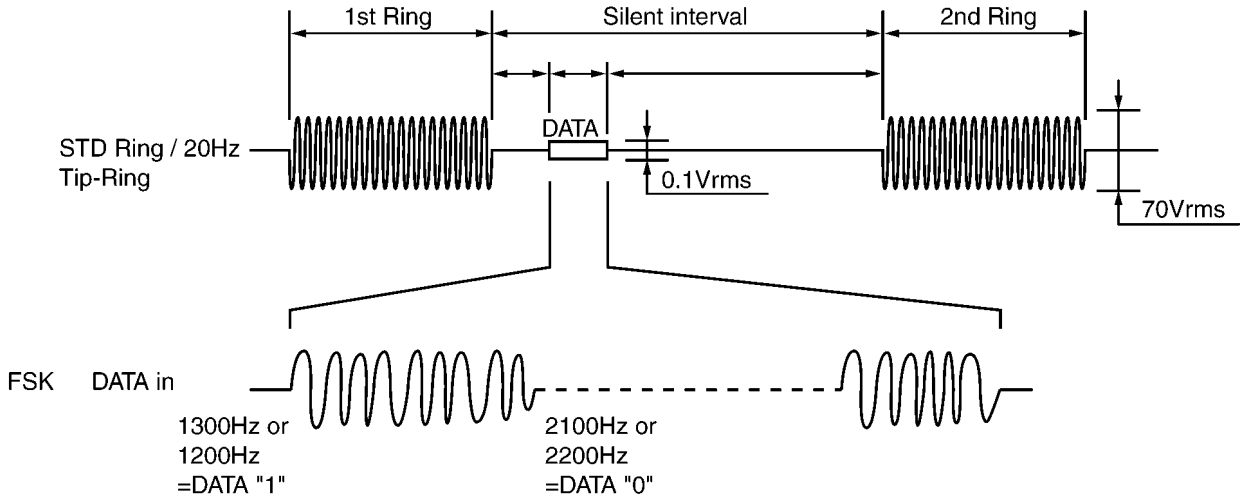
16.9. Calling Line Identification (Caller ID)

Function:

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

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

- **FSK (Frequency Shift Keying) format**

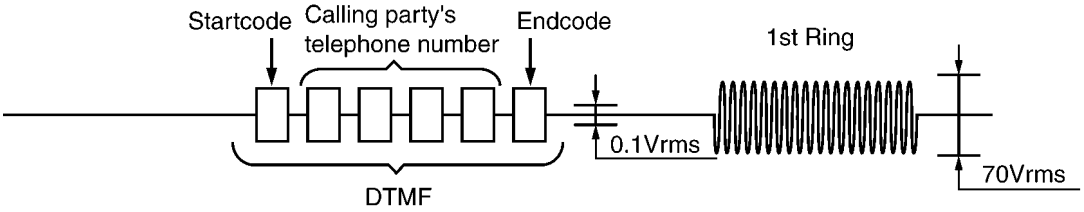


- **DTMF format**

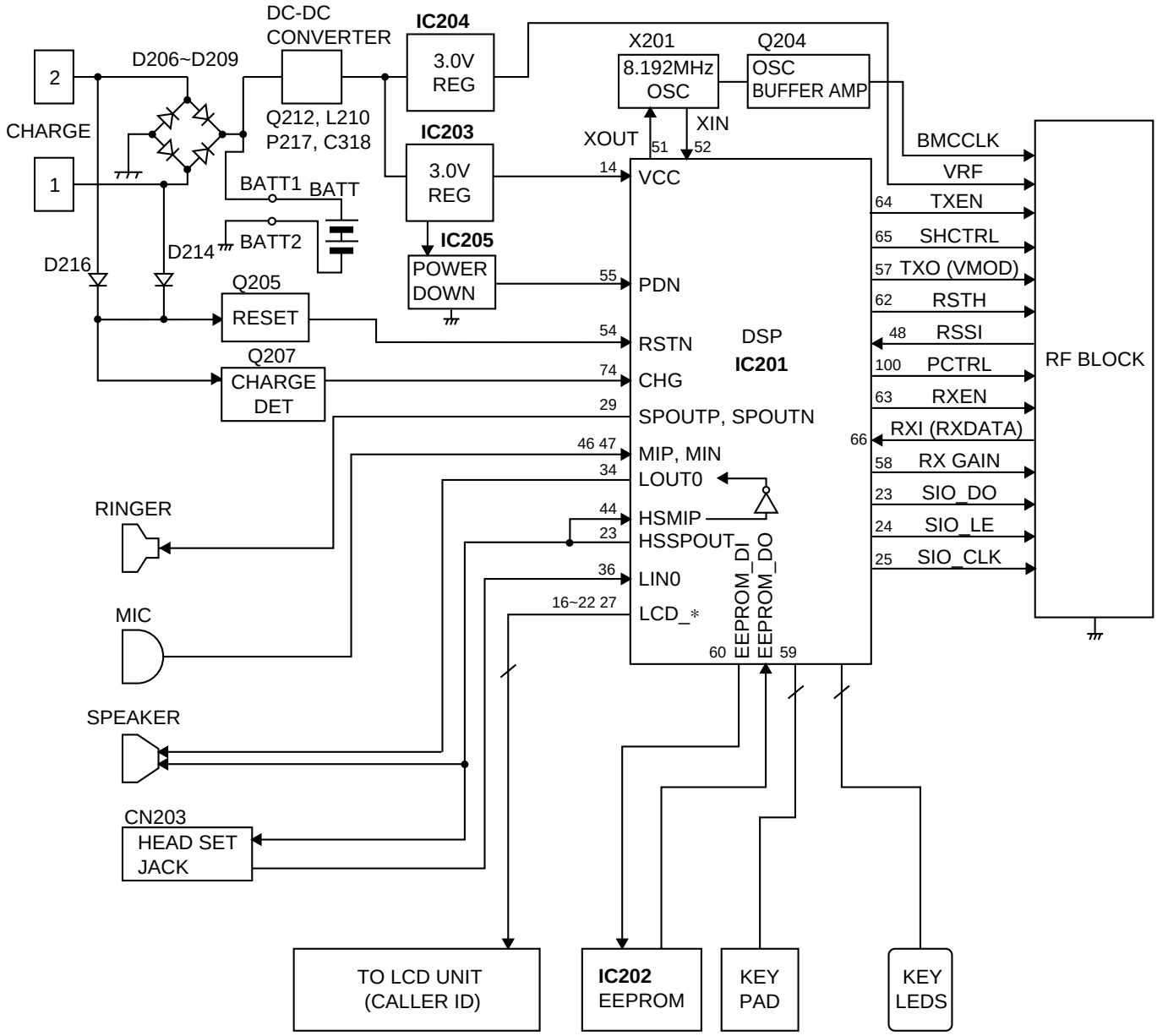
It is the method to send the telephone number of calling party with DTMF to the telephone. DTMF is sent before the first bell signal.

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

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



17 BLOCK DIAGRAM (HANDSET)



KX-TGA226BXB/F/S BLOCK DIAGRAM (HANDSET)

18 CIRCUIT OPERATION (HANDSET)

18.1. Construction

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

18.1.1. DSP:IC201

Function

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

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

18.1.2. RF unit

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

18.1.3. EEPROM: IC202

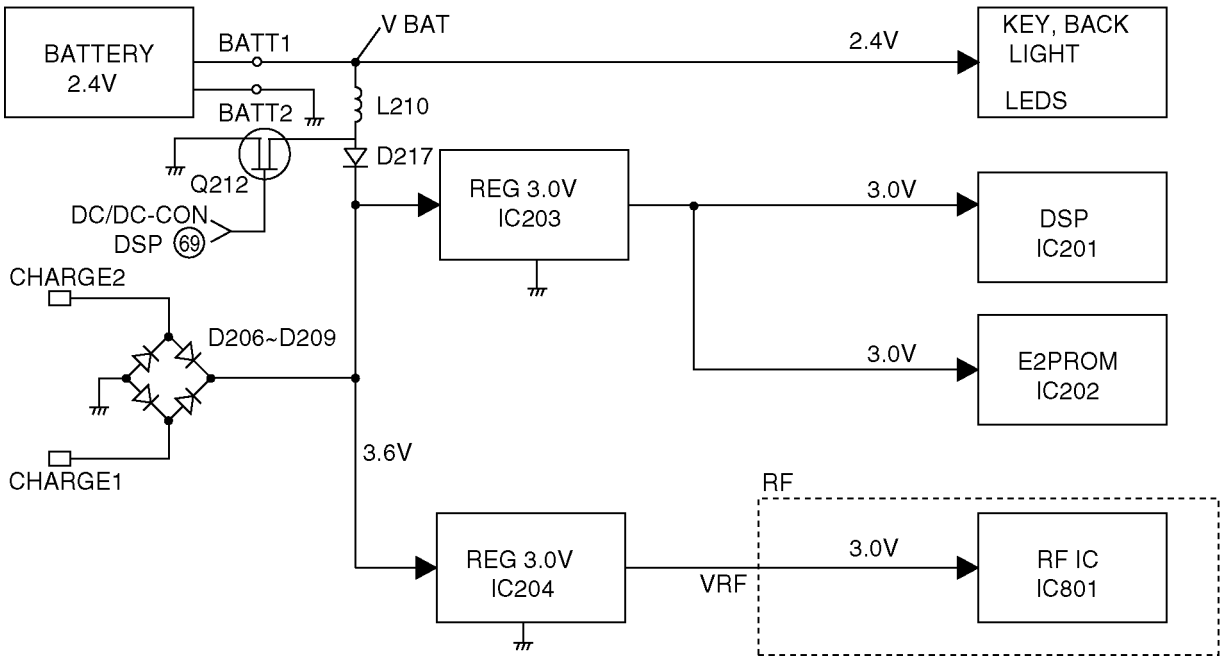
All setting data is stored.

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

18.2. Power Supply Circuit

Voltage is supplied separately to each block.

Circuit Diagram (Handset Power)



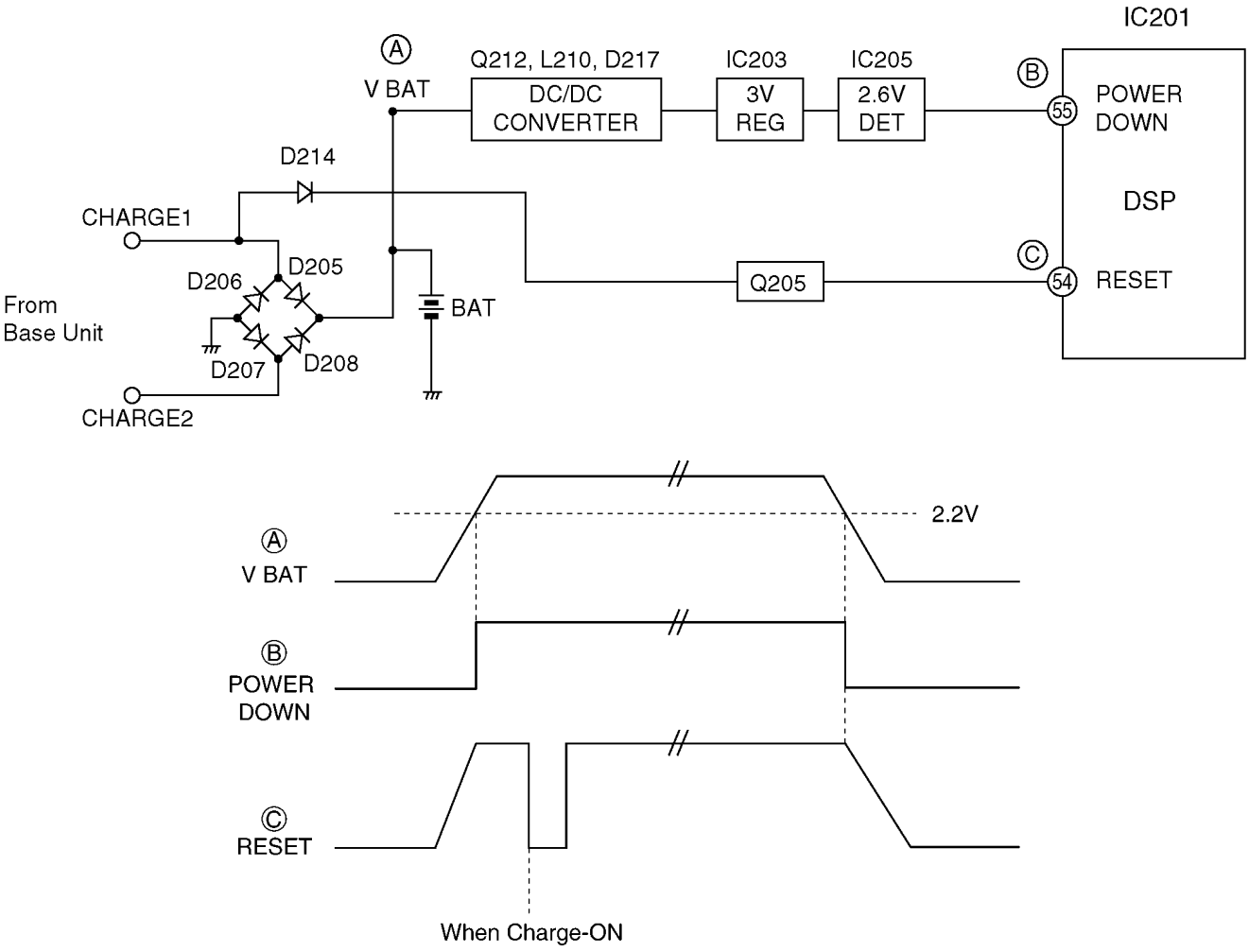
18.3. Reset Circuit

Function:

This circuit is used to initialize the microcomputer when it incorporates a Battery.

Circuit Operation:

When the Battery is inserted into the unit, Power Down signal and Reset signal are generated by IC205, IC203, Q212 and Q205 as shown below. The Reset signal will be generated when Charge-ON.



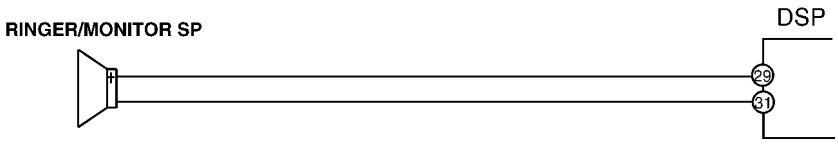
18.4. Charge Circuit

Ni-MH battery is connected to (BATT+, BATT-). When the handset is put on the cradle of the base unit, the power is supplied from CHARGE1 and CHARGE2 terminals to charge the battery. Q207 detects the voltage of CHARGE1 and CHARGE2 terminals, then the handset makes ID code setting (*) with the base unit.

18.5. Ringer and Handset SP-Phone

DSP (29-31) → SP/RINGER

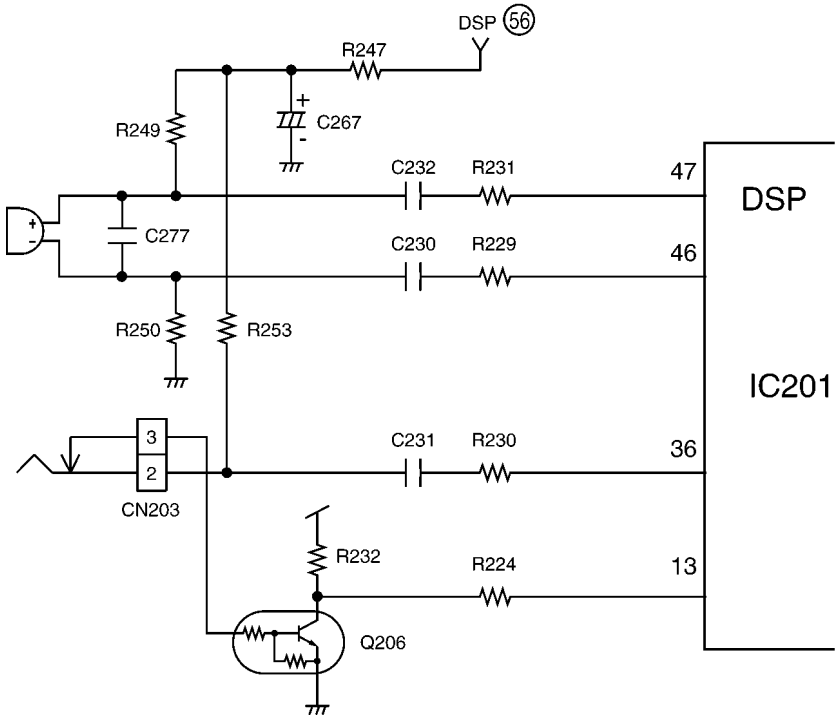
Circuit Diagram



18.6. Sending Signal

The voice signal from the microphone input to DSP (46-47). CN203 is the headphone 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 headphone is input to DSP (36). Also the power for the microphone is supplied from Q211, and the power is turned OFF on standby.

Circuit Diagram



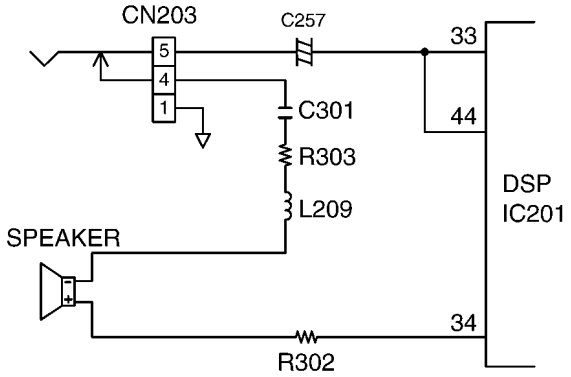
Note: DSP is IC201.

See **CPU DATA (HANDSET)** (P.60).

18.7. Reception Signal

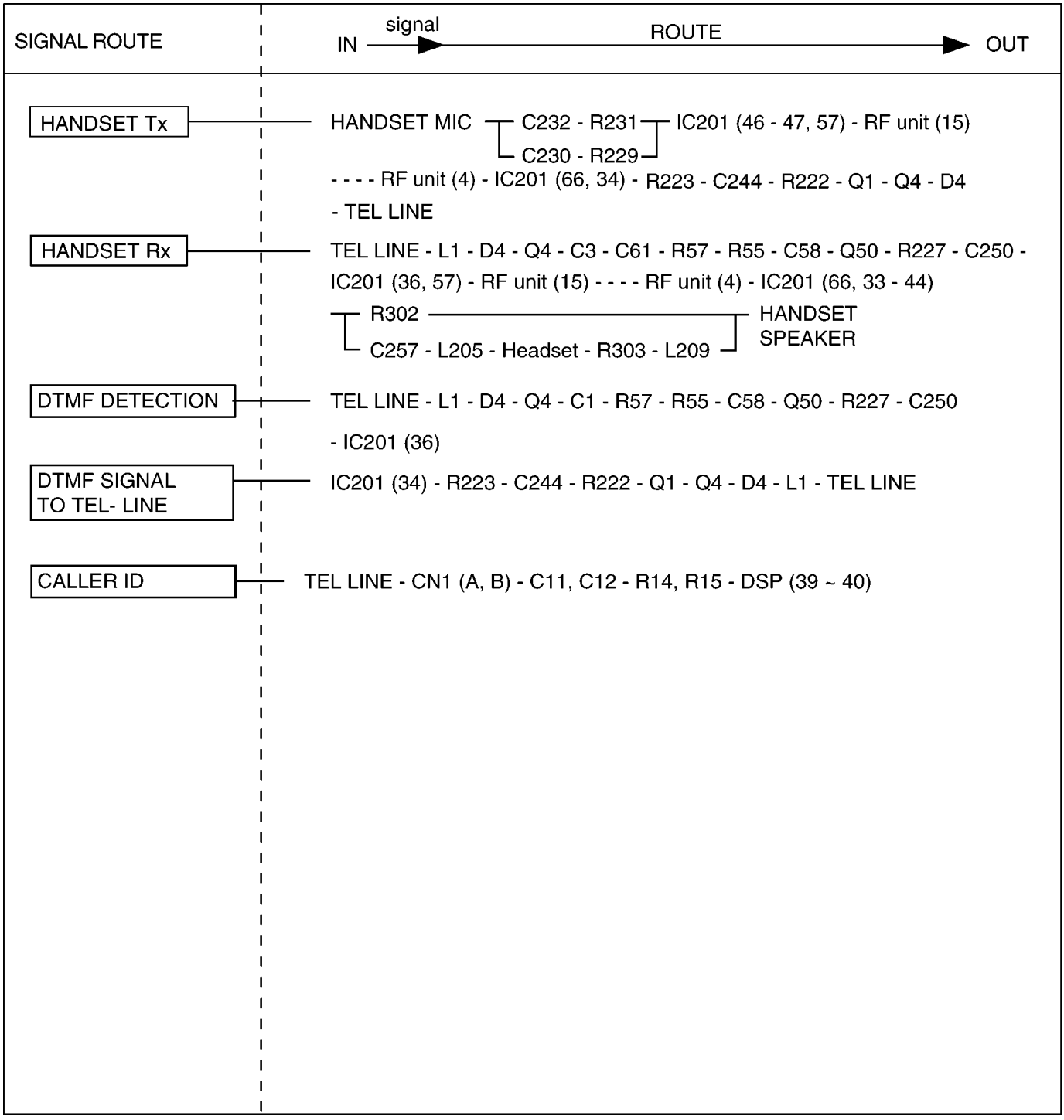
The voice signal from the base unit is output to DSP (33) (HSSOUT). This signal is led to the headset jack (CN203) and DSP (44) (HSMIP). The signal input to DSP (44) is inverted and output to DSP (34) (LOUTO).The signal through the headset jack is inverted, then output from DSP (34) to drive the speaker. 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.

Circuit Diagram



19 SIGNAL ROUTE

Each signal route is as follows.



20 CPU DATA (BASE UNIT)

20.1. IC201

Pin	Description	I/O	High	High_Z	Low
1	LINE_SZ	D.O	On	--	Off
2	RLY	D.O	On	--	Off
3	CHAGEG_CTL	D.O	--	Charge	Non Charge
4	SEG3	D.O	--	--	Normal
5	SEG4	D.O	--	--	Normal
6	SEG5	D.O	--	--	Normal
7	SEG6	D.O	--	--	Normal
8	SEG7	D.O	--	--	Normal
9	SEG8	D.O	--	--	Normal
10	SEG9	D.O	--	--	Normal
11	SEG10	D.O	--	--	Normal
12	SEG11	D.O	--	--	Normal
13	SEG12	D.O	--	--	Normal
14	VCC	VCC	Vcc	--	--
15	GND	GND	--	--	GND
16	COM2	D.O	--	--	Normal
17	COM1	D.O	--	--	Normal
18	STB5	D.O	Active	Not	--
19	STB4	D.O	Active	Not	--
20	STB3	D.O	Active	Not	--
21	STB2	D.O	Active	Not	--
22	STB1	D.O	Active	Not	--
23	SIOD0	D.O			
24	SIOALE	D.O			
25	SIOCLK	D.O			
26	RESET	D.O	--	--	Normal
27	BELL	D.I	Off	--	On
28	GND	GND	--	--	GND
29	SPP	A.O	--	--	--
30	GNDPA	GND	--	--	GND
31	SPN	A.O	--	--	--
32	VCCPA	VCC	VCC	--	--
33	HSSPOUT	A.O	--	--	--
34	LOUT0	A.O	--	--	--
35	DCIN0	A.I	--	--	--
36	LIN0	A.I	--	--	--
37	LGS0	A.I	--	--	--
38	CIDO0	A.I	--	--	--
39	CIDIN0	A.I	--	--	--
40	CIDIP0	A.I	--	--	--
41	VCCA	VCC	VCC	--	--
42	DCIN1	A.I	--	--	--
43	GNDA	GND	--	--	GND
44	HSMIP	A.I	--	--	--
45	VREF	A.O	--	--	--
46	MIN	A.I	--	--	--
47	MIP	A.I	--	--	--
48	DCIN2	A.I	--	--	--
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	RSTN	D.I	Normal	--	Reset
55	PDN	D.I	Power On	--	Power Down
56	CE	D.O	Not	--	Active
57	TXOUT	D.O	High	--	Low
58	RXGAIN	D.I	HIGH_GAIN	--	LOW_GAIN
59	ALE	D.O	High	--	Low
60	CLE	D.O	High	--	Low
61	NC	D.O	--	--	Normal
62	RSTH	D.O	Normal	--	Wakeup
63	RXEN	D.O	Enable	--	Disable
64	TXEN	D.O	Enable	--	Disable
65	SHCTRL	D.O	High	--	Low
66	RXI	D.I	High	--	Low
67	UART_RX	D.I	High	--	Low
68	UART_TX	D.O	High	--	Low
69	INUSE_LED	D.O	--	Off	On
70	SP_LED	D.O	--	Off	On
71	Tr_Ctrl	D.O	STOP	--	Normal
72	GND	GND	--	--	GND
73	VCC	VCC	VCC	--	--
74	CHARGE_DET	D.I	Off Charge	--	On Charge
75	TCK	D.O			
76	TMS	D.O			
77	TDI	D.I			
78	TDO	D.O			
79	MSG_LED	D.O	--	Off	On
80	OPENLCR_LED	D.O	--	Off	On
81	WP	D.O	Not	--	Active
82	KIN6	D.I	Key In	--	Non
83	KIN5	D.I	Key In	--	Non
84	KIN4	D.I	Key In	--	Non
85	KIN3	D.I	Key In	--	Non
86	KIN2	D.I	Key In	--	Non
87	KIN1	D.I	Key In	--	Non
88	IO7	D.O	High	--	Low
89	IO6	D.O	High	--	Low
90	IO5	D.O	High	--	Low
91	IO4	D.O	High	--	Low
92	IO3	D.O	High	--	Low
93	IO2	D.O	High	--	Low
94	IO1	D.O	High	--	Low
95	IO0	D.O	High	--	Low
96	GND	GND	--	--	GND
97	VCC	VCC	VCC	--	--
98	RE	D.O	--	Not	Active
99	WE	D.O	--	Not	Active
100	PCTRL	D.O	High Power	--	Low Power

21 CPU DATA (HANDSET)

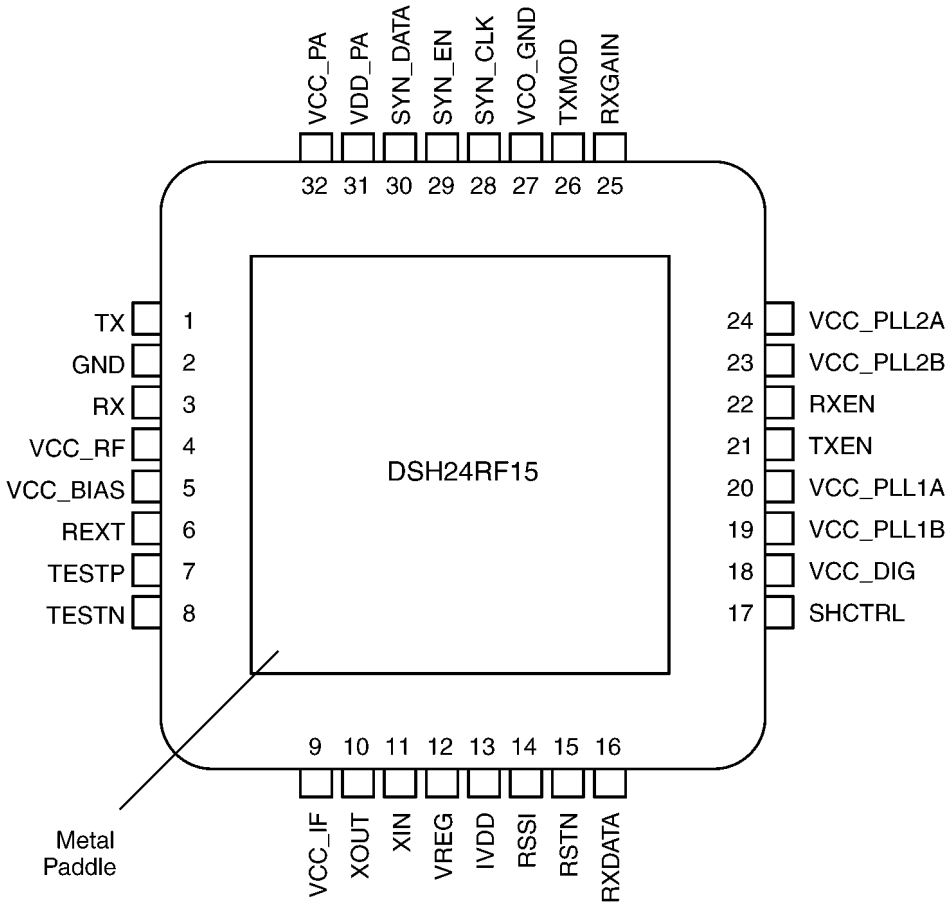
21.1. IC201

Pin	Description	I/O	High	High_Z	Low
1	NC	D.O	--	--	Normal
2	NC	D.O	--	--	Normal
3	UART_RX	D.I	High	--	Low
4	UART_TX	D.O	High	--	Low
5	LCD POWER_SW	D.O	Off	--	On
6	KEY STROBE_F	D.O	--	Not	Active
7	KEY STROBE_E	D.O	--	Not	Active
8	KEY STROBE_D	D.O	--	Not	Active
9	KEY STROBE_C	D.O	--	Not	Active
10	KEY STROBE_B	D.O	--	Not	Active
11	KEY STROBE_A	D.O	--	Not	Active
12	NC	D.O	--	--	Normal
13	HEADSET_DET	D.I	Headset In	--	Non
14	VCC	VCC	Vcc	--	--
15	GND	GND	--	--	GND
16	DOT_DB4	D.O	High	--	Low
17	DOT_DB5	D.O	High	--	Low
18	DOT_DB6	D.O	High	--	Low
19	DOT_DB7	D.O	High	--	Low
20	DOT_E/RD	D.O	Active	--	Not
21	DOT_RW/WR	D.O	Read	--	Write
22	DOT_RS	D.O	Data	--	Instruction
23	SIODO_RF	D.O	High	--	Low
24	SIOLE_RF	D.O	Latch	--	Latch
25	SIOCLK_RF	D.O	High	--	Low
26	NC	D.O	--	--	Normal
27	DOT_RESET	D.O	Not	--	Reset
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	LGS0	A.I	--	--	--
38	CIDO0	A.I	--	--	--
39	CIDIN0	A.I	--	--	--
40	CIDIP0	A.I	--	--	--
41	VCCA	VCC	VCC	--	--
42	DCIN1	A.I	--	--	--
43	GNDA	GND	--	--	GND
44	HSMIP	A.I	--	--	--
45	VRFF	A.O	--	--	--
46	MIN	A.I	--	--	--
47	MIP	A.I	--	--	--
48	RSSI	A.I	--	--	--
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	RSTN	D.I	Normal	--	Reset
55	PDN	D.I	Power On	--	Power Down
56	MIC_POWSW	D.O	Bias Off	--	Bias On
57	TX0	D.O	High	--	Low
58	RXGAIN	D.I	HIGH_GAIN	--	LOW_GAIN
59	EEPROM_DO	D.I	High	--	Low
60	EEPROM_DI	D.O	High	--	Low
61	NC	D.O	--	--	Normal
62	RSTH	D.O	Normal	--	Wakeup
63	RXEN	D.O	High	--	Low
64	TXEN	D.O	High	--	Low
65	SHCTRL	D.O	High	--	Low
66	RXI	D.I	High	--	Low
67	EEPROM_CS	D.O	Active	--	Not
68	NC	D.O	--	--	Normal
69	LITED LED	D.O	On	--	Off
70	TALK LED	D.0	Off	--	On
71	RADIOEN	D.0	On	--	Off
72	GND	GND	--	--	GND
73	VCC	VCC	VCC	--	--
74	CHAGE DET	D.I	Off Charge	--	On Charge
75	TCK	D.O			
76	TMS	D.O			
77	TDI	D.I			
78	TDO	D.O			
79	RECHAGE LED	D.O	Off	--	On
80	INTLED	D.O	Off	--	On
81	NC	D.O	Normal	--	--
82	KEYIN_5	D.I	Non	--	Key In
83	KEYIN_4	D.I	Non	--	Key In
84	KEYIN_3	D.I	Non	--	Key In
85	KEYIN_2	D.I	Non	--	Key In
86	KEYIN_1	D.I	Non	--	Key In
87	NC	D.O	Normal	--	--
88	LCD_BL	D.O	On	--	Off
89	NC	D.O	--	--	Normal
90	NC	D.O	--	--	Normal
91	NC	D.O	--	--	Normal
92	NC	D.O	--	--	Normal
93	NC	D.O	--	--	Normal
94	NC	D.O	--	--	Normal
95	NC	D.O	--	--	Normal
96	GND	GND	--	--	GND
97	VCC	VCC	VCC	--	--
98	NC	D.O	Normal	--	--
99	EPP_CLK	D.O	High	--	Low
100	POWCTRL	D.O	--	--	Normal

22 EXPLANATION OF RF UNIT TERMINALS

22.1. IC801



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

Pin	Description	I/O
17	SHCTRL	I
18	VCC_DIG	VCC
19	VCC_PLL1B	VCC
20	VCC_PLL1A	VCC
21	TXEN	I
22	RXEN	I
23	VCC_PLL2B	VCC
24	VCC_PLL2A	VCC
25	RXGAIN	O
26	BCLK	O
27	TXMOD	I
28	SYN_CLK	I
29	SYN_EN	I
30	SYN_DATA	I
31	VDD_PA	I
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 700°F ± 20°F (370°C ± 10°C)

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

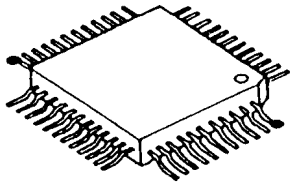
  Recommended Flux: Specific Gravity → 0.82.

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

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

23.2. Procedure

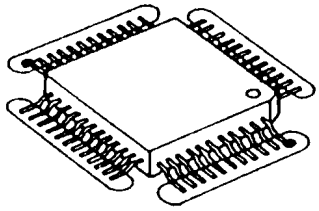
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.

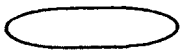


● - - - - - -Temporary soldering point.

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

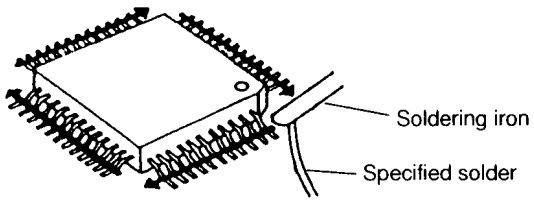
2. Apply flux to all of the pins on the IC.





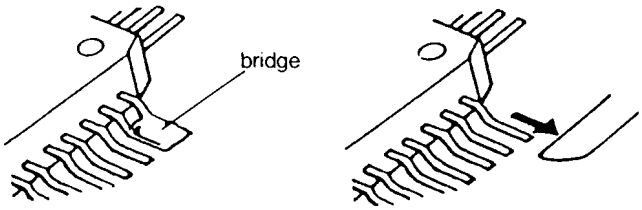
- - - - - - Flux

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.

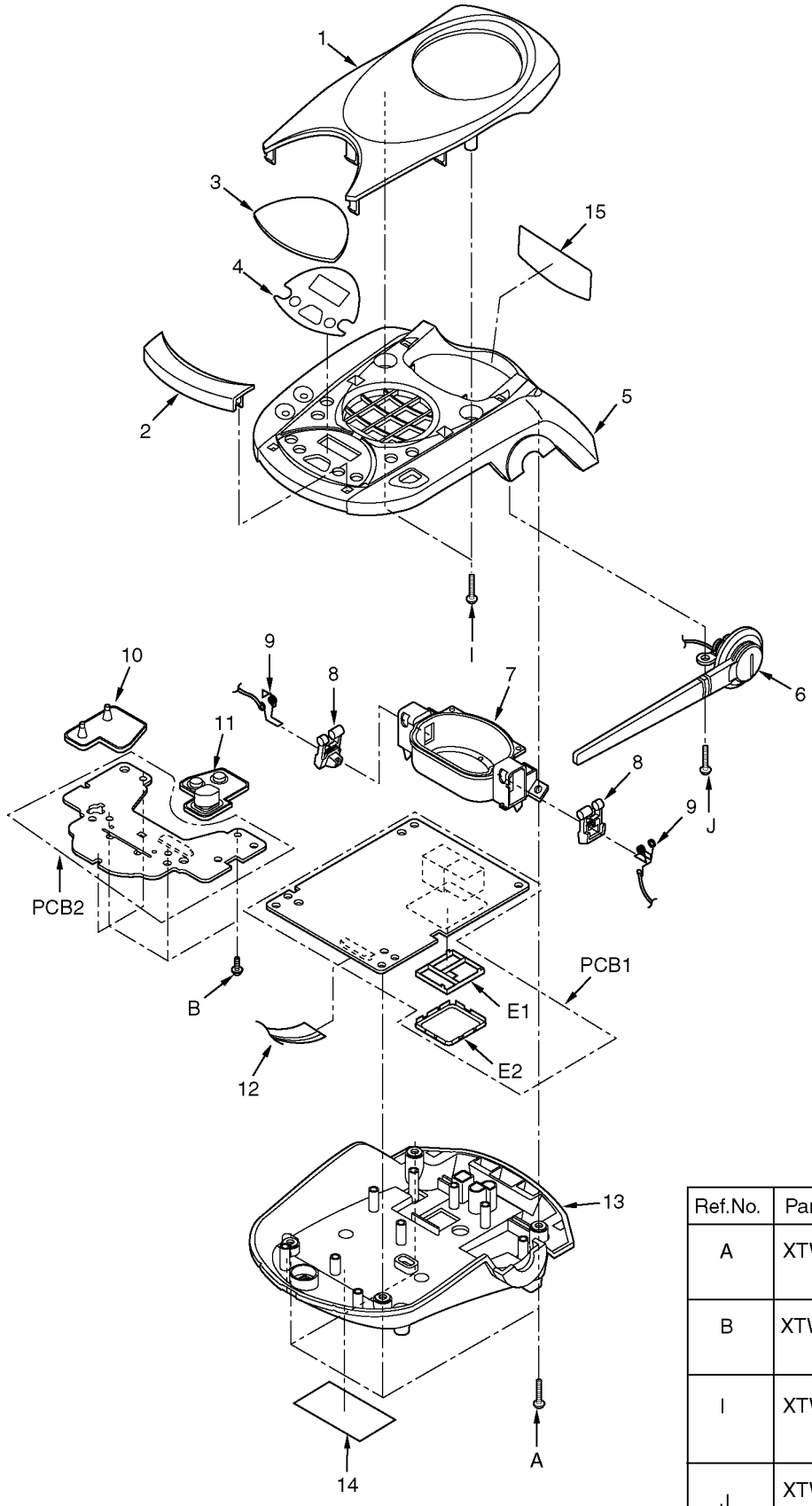


23.3. Removing Solder from Between Pins

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.

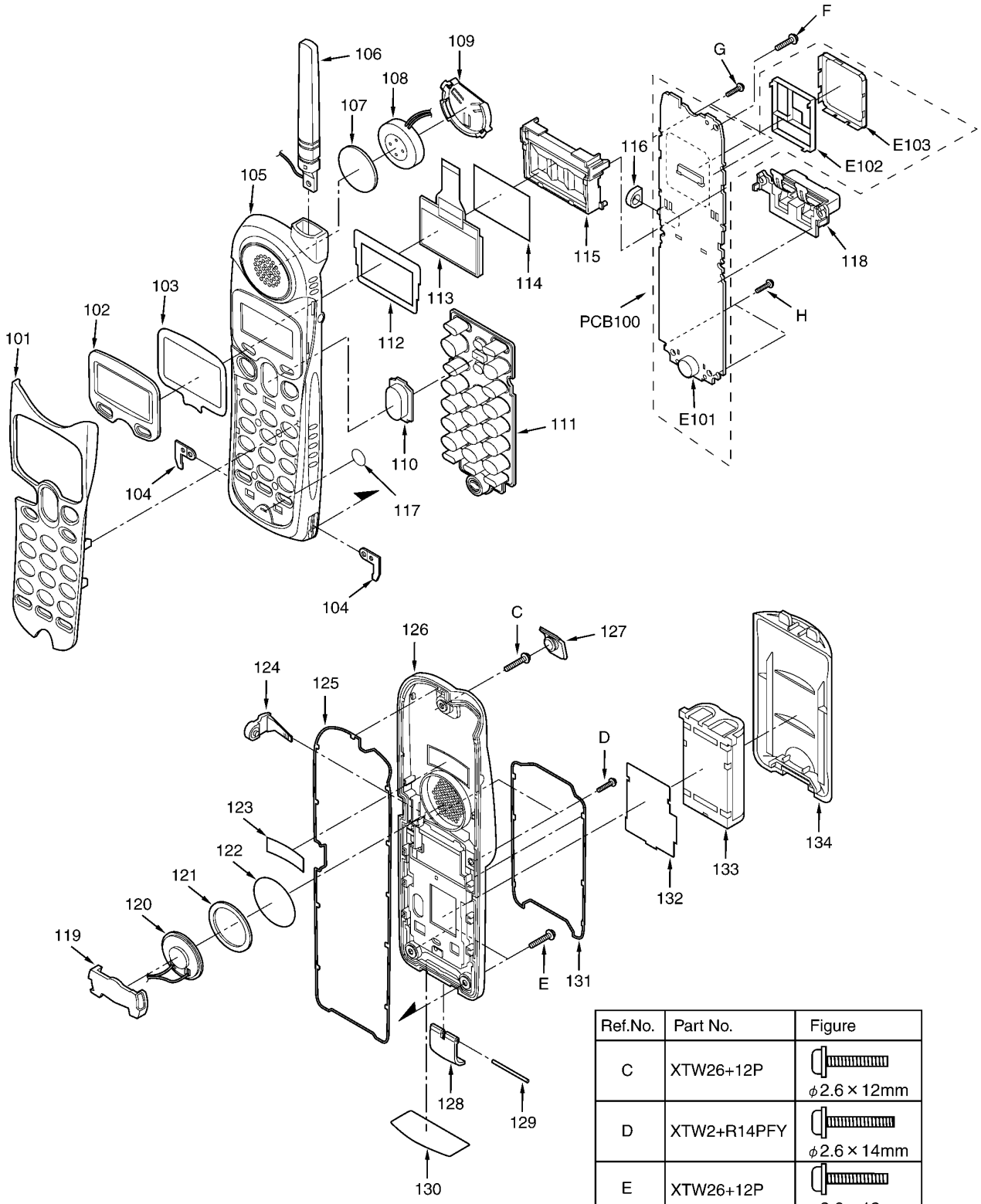


24 CABINET AND ELECTRICAL PARTS (BASE UNIT)



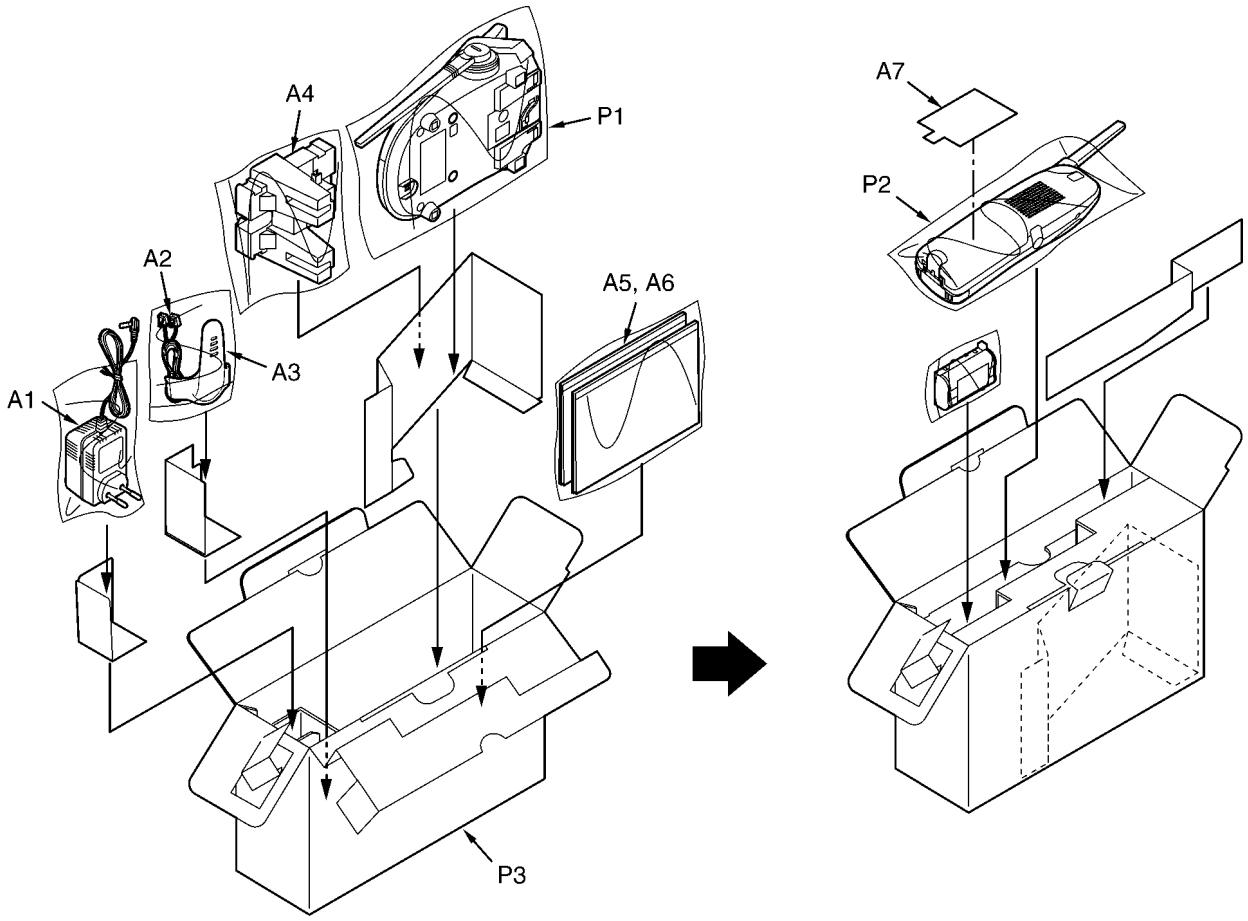
Ref.No.	Part No.	Figure
A	XTW26+14P	ø2.6×14mm
B	XTW26+8P	ø2.6 ×8mm
I	XTW26+14P	ø2.6×14mm
J	XTW26+14P	ø2.6×14mm

25 CABINET AND ELECTRICAL PARTS (HANDSET)



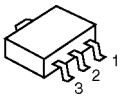
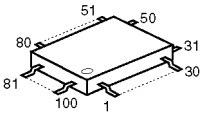
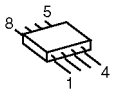
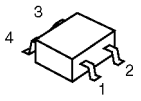
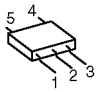
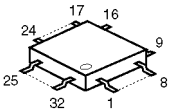
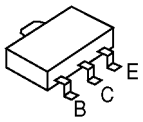
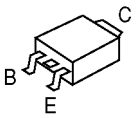
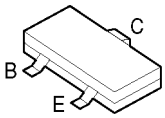
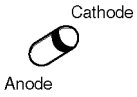
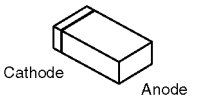
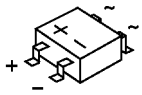
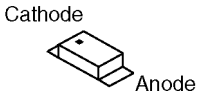
Ref.No.	Part No.	Figure
C	XTW26+12P	ϕ2.6 × 12mm
D	XTW2+R14PFY	ϕ2.6 × 14mm
E	XTW26+12P	ϕ2.6 × 12mm
F	XTW26+12P	ϕ2.6 × 12mm
G	XTW2+R9PFY	ϕ2.6 × 9mm
H	XTW2+R9PFY	ϕ2.6 × 9mm

26 ACCESSORIES AND PACKING MATERIALS

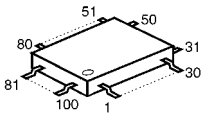
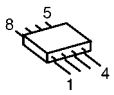
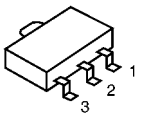
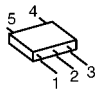
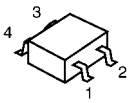
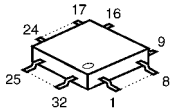
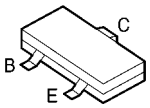
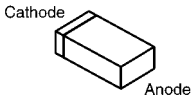
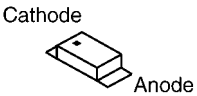


27 TERMINAL GUIDE OF THE ICs, TRANSISTORS AND DIODES

27.1. Base Unit

 C0CBABD00036 C0CBABD00017	 C2HBBJ000039	 PQWIG2220BXH	 PQVIPS3436UT	 C0EBE0000283
 C1CB00001486	 2SD0874AS B1BBAP000011	 B1BDBP000002 2SD1758Q	 2SD1819A 2SC39300CL	 PQVDRLZ2R0 PQVDRLZ20A
 MA111, MA8220 B0JCME000035 PQVDHRU0302A MA27P0700L	 PQVDMD5S	 LNJ311G8TRU LNJ211R8ARU		

27.2. Handset

 C2HBBJ000038	 PQWIG2220BXR	 C0CBABD00019	 PQVIMM1385HN C0CBAAC00119	 C0EBE0000292
 C1CB00001486	 PQVTDTC143E, 2SC39300CL 2SD1819A, PQVTXP151A13		 B0JCMD000017 MA111 PQVDEP10LA03 MA27P0700L	 PQVDSML310MT

28 REPLACEMENT PARTS LIST

1. RTL (Retention Time Limited)

   Note:

   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

28.1. Base Unit

28.1.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQGG10175Y2	GRILLE (for KX-TG2220BXB)	ABS-HB
1	PQGG10175Y1	GRILLE (for KX-TG2220BXF)(for KX-TG2220BXS)	ABS-HB
2	PQGG10173Y2	GRILLE	ABS-HB
3	PQGP10244Y1	PANEL (for KX-TG2220BXB)(for KX-TG2220BXF)	AS-HB
3	PQGP10244Y2	PANEL (for KX-TG2220BXS)	AS-HB
4	PQHS10590Z	TAPE, DOUBLE SIDED (PANEL)	
5	PQKM10608W7	CABINET BODY (for KX-TG2220BXB)	PS-HB
5	PQKM10608W3	CABINET BODY (for KX-TG2220BXF)	PS-HB
5	PQKM10608W9	CABINET BODY (for KX-TG2220BXS)	PS-HB
6	PQSA10110Y	ANTENNA	
7	PQKE10365Y1	GUIDE, CHARGE TERMINAL CASE (for KX-TG2220BXB)	ABS-HB
7	PQKE10365Y3	GUIDE, CHARGE TERMINAL CASE (for KX-TG2220BXF)	ABS-HB
7	PQKE10365Y2	GUIDE, CHARGE TERMINAL CASE (for KX-TG2220BXS)	ABS-HB
8	PQKE10366Z1	GUIDE, CHARGE TERMINAL HOLDER	POM-HB
9	PQJT10209Y	TERMINAL, CHARGE	
10	PQHR11005Z	OPTIC CONDUCTIVE PARTS, LED LENS	
11	PQSX10246X	KEYBOARD SWITCH	
12	PQJE10126Z	LEAD WIRE, FFC	
13	PQYF10574Y1	CABINET COVER	PS-HB
14	PQGT16336Z	NAME PLATE (for KX-TG2220BXB)	
14	PQGT16338Z	NAME PLATE (for KX-TG2220BXF)	
14	PQGT16334Z	NAME PLATE (for KX-TG2220BXS)	
15	PQQT22658Z	LABEL, CHARGE	

28.1.2. Main P.C.Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWP12220BXH	MAIN P.C.BOARD ASS´Y (RTL)	
		(ICs)	
IC100	C0CBABD00036	IC	
IC101	C0CBABD00017	IC	
IC201	C2HBBJ000039	IC	
IC202	PQWIG2220BXH	IC	
IC331	PQVIPS3436UT	IC	
IC332	C0EBE0000283	IC	
IC801	C1CB00001486	IC	
		(TRANSISTORS)	
Q1	2SD0874AS	TRANSISTOR(SI)	
Q3	B1BBAP000011	TRANSISTOR(SI)	
Q4	B1BDBP000002	TRANSISTOR(SI)	
Q6	2SD1819A	TRANSISTOR(SI)	
Q50	2SD1819A	TRANSISTOR(SI)	
Q108	2SD1758Q	TRANSISTOR(SI)	S
Q150	2SD1758Q	TRANSISTOR(SI)	S
Q151	2SD1819A	TRANSISTOR(SI)	
Q260	2SC39300CL	TRANSISTOR(SI)	
		(DIODES)	
D1	PQVDRLZ2R0	DIODE(SI)	S
D2	PQVDRLZ20A	DIODE(SI)	S
D3	MA111	DIODE(SI)	S
D4	PQVDMD5S	DIODE(SI)	
D5	B0JCME000035	DIODE(SI)	
D101	PQVDHRU0302A	DIODE(SI)	S
D102	PQVDHRU0302A	DIODE(SI)	S
D152	MA8220	DIODE(SI)	S
D153	MA8220	DIODE(SI)	S
D202	MA111	DIODE(SI)	S
D205	MA111	DIODE(SI)	S
D801	MA27P0700L	DIODE(SI)	
D802	MA27P0700L	DIODE(SI)	
		(COILS)	
L1	PQLQXF330K	COIL	S
L2	PQLQXF330K	COIL	S
L3	PQLQXF3R3K	COIL	S
L150	G1C6R8MA0072	COIL	
L151	G1C6R8MA0072	COIL	
L200	PQLQR2KA213	COIL	S
L801	MQLRF10NJF	COIL	
L802	MQLRF3N9DF	COIL	
L803	MQLRF2N7DF	COIL	
L804	MQLRF10NJF	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L805	MQLRF2N2DF2	COIL	
L806	MQLRF10NJF	COIL	
L807	PQLQR4D1R0K	COIL	S
		(JACK AND CONNECTOR)	
CN1	PQJJ2H003Z	JACK	S
CN100	PQJS30A12Z	CONNECTOR	S
		(VARISTORS)	
SA1	PQVDDSS301L	VARISTOR (SURGE ABSORBER)	S
SA2	PQVDDSS301L	VARISTOR (SURGE ABSORBER)	S
		(RESISTORS)	
R1	ERJ2GEJ122	1.2K	
R2	ERJ2GEJ681	680	
R3	ERJ2GEJ470	47	
R5	ERJ12YJ330	33	
R7	ERJ3GEYJ393	39K	
R8	ERJ3GEY0R00	0	
R10	ERJ3GEYJ102	1K	
R13	ERJ3GEYJ473	47K	
R14	ERJ3GEYJ394	390K	
R15	ERJ3GEYJ394	390K	
R17	ERJ3GEYJ473	47K	
R18	ERJ3GEYJ103	10K	
R20	ERJ3GEYJ104	100K	
R21	ERJ3GEYJ103	10K	
R23	ERJ3GEYJ106	10M	
R24	ERJ3GEYJ105	1M	
R25	ERJ3GEYJ106	10M	
R26	ERJ3GEYJ472	4.7K	
R29	ERJ3GEYJ335	3.3M	
R30	ERJ3GEYJ104	100K	
R31	ERJ3GEYJ104	100K	
R51	ERJ3GEYJ470	47	
R52	ERJ3GEYJ394	390K	
R55	ERJ2GEJ102	1K	
R57	ERJ2GE0R00	0	
R70	ERJ3GEYJ392	3.9K	
R101	PQ4R10XJ000	0	S
R105	ERJ3GEYJ104	100K	
R108	PQ4R10XJ000	0	S
R109	ERJ3GEYJ334	330K	
R112	ERJ3GEYJ103	10K	
R150	ERJ3GEYJ104	100K	
R151	ERJ3GEYJ331	330	
R152	ERJ3GEYJ391	390	
R153	PQ4R10XJ180	18	S
R154	PQ4R10XJ180	18	S
R155	PQ4R10XJ180	18	S
R156	PQ4R10XJ180	18	S
R157	ERJ12YJ221	220	
R159	ERJ3GEYJ103	10K	
R160	ERJ3GEYJ563	56K	
R161	ERJ3GEYJ273	27K	
R200	ERJ3GEYJ101	100	
R201	ERJ3GEYJ101	100	
R203	ERJ3GEYJ472	4.7K	
R205	ERJ2GEJ101	100	
R207	ERJ2GEJ101	100	
R210	ERJ2GEJ222	2.2K	
R211	ERJ2GEJ222	2.2K	
R212	ERJ3GEYJ102	1K	
R217	ERJ3GEYJ394	390K	
R218	ERJ3GEYJ123	12K	
R219	ERJ3GEYJ103	10K	
R220	ERJ2GEJ101	100	
R222	ERJ2GEJ333	33K	
R223	ERJ2GEJ222	2.2K	
R224	ERJ3GEYJ394	390K	
R225	ERJ2GEJ221	220	
R227	ERJ3GEYJ222	2.2K	
R233	ERJ2GEJ221	220	
R234	ERJ2GEJ221	220	
R235	ERJ2GEJ102	1K	
R236	ERJ2GEJ181	180	

Ref. No.	Part No.	Part Name & Description	Remarks
R237	ERJ2GEJ181	180	
R238	ERJ2GEJ181	180	
R251	ERJ3GEYJ102	1K	
R252	ERJ2GEJ102	1K	
R260	ERJ2GEJ471	470	
R261	ERJ2GEJ471	470	
R262	ERJ2GEJ104	100K	
R263	ERJ2GEJ101	100	
R264	ERJ2GEJ182	1.8K	
R400	ERJ2GEJ332	3.3K	
R433	ERJ2GEJ102	1K	
R801	ERJ2GEJ100	10	
R802	ERJ2GEJ100	10	
R803	ERJ2GEJ100	10	
R804	ERJ2GEJ4R7	4.7	
R805	ERJ2GEJ331	330	
R810	ERJ3GEYF103	10K	
		(CAPACITORS)	
C1	EEE1CA100SR	10	
C3	ECUE1A473KBQ	0.047	
C4	ECUV1H101JCV	100P	
C6	ECUV1H103KBV	0.01	
C8	EEE1HA010SR	1	
C9	ECUV1H103KBV	0.01	S
C11	ECUV1H681JCV	680P	S
C12	ECUV1H681JCV	680P	S
C13	ECUE1H102KBQ	0.001	S
C14	ECUV1H103KBV	0.01	
C15	PQCUV1A684KB	0.68	
C16	PQCUV1H154KR	0.15	
C17	PQCUV1H154KR	0.15	
C18	F1K2J681A006	680P	
C19	F1K2J681A006	680P	
C21	ECUV1H103KBV	0.01	
C55	ECUV1H102KBV	0.001	S
C58	ECUE1A104KBQ	0.1	
C100	ECUE1C104ZFQ	0.1	
C101	EEE0JA101SP	100P	
C103	EEE0JA331P	330P	
C106	ECUE1C104ZFQ	0.1	
C110	ECUV1C104ZFV	0.1	
C111	PQCUV1H104ZF	0.1	S
C112	EEE1CA101WP	100P	
C114	EEE1CA101WP	100P	
C150	ECUV1C104ZFV	0.1	
C200	ECUE1C104ZFQ	0.1	
C201	ECUV1H681JCV	680P	S
C207	ECUE1C104ZFQ	0.1	
C213	ECUE1C104ZFQ	0.1	
C221	ECUE1C104ZFQ	0.1	
C227	ECUE1H5R0CCQ	5	
C228	ECUE1H5R0CCQ	5	
C230	ECUV1A106ZF	10	S
C231	ECUE1C104ZFQ	0.1	
C234	ECUE1E103ZFQ	0.01	
C237	EEE1CA100SR	1	
C241	ECUV1C104ZFV	0.1	
C242	ECUE1H272KBQ	0.0027	
C244	ECUE1A104KBQ	0.1	
C245	ECUV1H121JCV	120P	
C250	ECUV1C473KBV	0.047	
C251	ECUE1C104ZFQ	0.1	
C252	ECUE1C104ZFQ	0.1	
C260	ECUE1C104ZFQ	0.1	
C261	ECUE1H3R0CCQ	3	
C262	ECUE1A104KBQ	0.1	
C263	ECUE1A104KBQ	0.1	
C302	ECUE1H101JCQ	100P	
C306	ECUE1H101JCQ	100P	
C307	ECUE1H101JCQ	100P	
C401	ECUE1E103ZFQ	0.01	
C402	ECUE1C104ZFQ	0.1	
C404	ECUE1H101JCQ	100P	

Ref. No.	Part No.	Part Name & Description	Remarks
C405	ECUE1H330JCQ	33P	
C406	ECUE1H101JCQ	100P	
C410	ECUE1H101JCQ	100P	
C411	ECUE1H101JCQ	100P	
C412	ECUE1H101JCQ	100P	
C415	EEE0JA101SP	100P	
C416	ECUE1H100DCQ	10P	S
C420	ECUE1H101JCQ	100P	
C421	ECUE1H101JCQ	100P	
C430	ECUE1H471KBQ	470P	
C450	EEE0JA101SP	100P	
C453	ECUE1H030CCQ	3P	
C801	ECUE1H102KBQ	0.001	S
C802	ECUE1H010CCQ	1P	S
C803	ECUE1H100DCQ	10P	S
C804	ECUE1H010CCQ	1P	S
C805	ECUE1H100DCQ	10P	S
C807	ECUE1H100DCQ	10P	S
C811	ECUE1H100DCQ	10P	S
C813	ECUE1H100DCQ	10P	S
C814	ECUE1H1R5CCQ	1.5	S
C815	ECUE1H100DCQ	10P	S
C816	ECUE1H100DCQ	10P	S
C817	ECUE1C104ZFQ	0.1	
C818	ECUE1C104ZFQ	0.1	
C819	ECUE1H391KBQ	390P	
C820	ECUE1C104ZFQ	0.1	
C821	ECUE1H102KBQ	0.001	S
C822	ECUE1H010CCQ	1P	S
C823	ECSTAJ0JA106	10	S
C824	ECUE1H102KBQ	0.001	S
C825	ECUE1H681KBQ	680P	
C827	ECUE1H102KBQ	0.001	S
C828	ECUE1H102KBQ	0.001	S
C829	ECUE1H102KBQ	0.001	S
C830	ECUV1A105ZFV	1	
C831	ECUV1A105ZFV	1	
C833	ECSTAJ0JA106	10	S
C856	ECUE1H2R0CCQ	2	
C857	ECUE1H2R0CCQ	2	
C858	ECUE1H2R0CCQ	2	
C859	ECUE1H2R0CCQ	2	
C860	ECUE1H100DCQ	10P	S
C861	ECUE1H2R0CCQ	2	
C862	ECUE1H100DCQ	10P	S
C863	ECUE1H100DCQ	10P	S
C865	ECUE1H221JCQ	220P	
C866	ECUE1C103KBQ	0.01	
C867	ECUE1H2R0CCQ	2	
C869	ECUE1H2R0CCQ	2	
R806	ECUE1H100DCQ	10P	S
		(OTHERS)	
E1	PQMC10471Z	MAGNETIC SHIELD, FRAME	
E2	PQMC10472Z	MAGNETIC SHIELD, COVER	
FL801	J0E2457B0008	LCR FILTER	
POS1	PFRT002	THERMISTOR, POSISTOR	S
RA201	EXRV8V472JV	RESISTOR ARRAY	S
X200	H0J819400004	CRYSTAL OSCILLATOR	

28.1.3. Operational P.C.Board

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PQWP2216LAH	OPERATIONAL P.C.BOARD ASS´Y (RTL)	
		(DIODES)	
LED900	LNJ211R8ARU	LED	
LED903	LNJ311G8TRU	LED	
		(RESISTORS)	
R904	ERJ3GEYJ391	390	
R907	ERJ3GEY0R00	0	
R911	ERJ3GEY0R00	0	
		(OTHERS)	

Ref. No.	Part No.	Part Name & Description	Remarks
CN901	PQJS30A12Z	CONNECTOR	S

28.2. Handset

28.2.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
101	PQGG10174Z1	GRILLE (for KX-TG2220BXB)	ABS-HB
101	PQGG10174Z3	GRILLE (for KX-TG2220BXF)	ABS-HB
101	PQGG10174Z2	GRILLE (for KX-TG2220BXS)	ABS-HB
102	PQGP10243Z1	PANEL, LCD (for KX-TG2220BXB)	AS-HB
102	PQGP10243Z2	PANEL, LCD (for KX-TG2220BXF) (for KX-TG2220BXS)	AS-HB
103	PQHS10591Z	TAPE, DOUBLE SIDED	
104	PQJT10210Z	TERMINAL, CHARGE	
105	PQKM10609Z1	CABINET BODY (for KX-TG2220BXB)	ABS-HB
105	PQKM10609Z2	CABINET BODY (for KX-TG2220BXF)(for KX-TG2220BXS)	ABS-HB
106	PQSA10140Z	ANTENNA (for KX-TG2220BXB)	
106	PQSA10140Y	ANTENNA (for KX-TG2220BXF) (for KX-TG2220BXS)	
107	PQHS10597Z	SPACER, RECEIVER	
108	L0AD02A00014	SPEAKER	
109	PQHR11003Z	GUIDE, RECEIVER	ABS-HB
110	PQBC10383Z1	BUTTON, VOLUME KEY (for KX-TG2220BXB)(for KX-TG2220BXS)	AS-HB
110	PQBC10383Z3	BUTTON, VOLUME KEY (for KX-TG2220BXF)	AS-HB
111	PQSX10247X	KEYBOARD SWITCH	
112	PQHS10602Z	SPACER, CUSHION LCD	
113	L5DCBDC00009	LIQUID CRYSTAL DISPLAY	
114	PQHX11186Z	SPACER, LCD	
115	PQHR10983Z	GUIDE, LCD	ABS-HB
116	PQHG10679Z	PACKING, E/P	
117	PQHS10386Z	COVER, MIC	
118	PQWE10031Z	BATTERY TERMINAL, CHARGE	
119	PQHR10778Z	GUIDE, SP	ABS-HB
120	PQAS3P07Y	SPEAKER	
121	PQHG10666Y	SPACER, SP RUBBER SHEET	
122	PQHS10615Z	SPACER , SP	
123	PQHS10598Z	SPACER, CABINET	
124	PQKE10370Z1	COVER, E/P (for KX-TG2220BXB)	
124	PQKE10370Z2	COVER, E/P (for KX-TG2220BXF) (for KX-TG2220BXS)	
125	PQHG10675Y	PACKING, CABINET	
126	PQKF10599Y1	CABINET COVER (for KX-TG2220BXB)	ABS-HB
126	PQKF10599Y3	CABINET COVER (for KX-TG2220BXF)	ABS-HB
126	PQKF10599Y2	CABINET COVER (for KX-TG2220BXS)	ABS-HB
127	PQKE10368Z1	COVER, SCREW (for KX-TG2220BXB)	
127	PQKE10368Z2	COVER, SCREW (for KX-TG2220BXF) (for KX-TG2220BXS)	
128	PQKE10369Z1	HANGER, LOCK KNOB	POM-HB
129	PQDF10100Z	SHAFT	
130	PQGT16337Z	NAME PLATE (for KX-TG2220BXB)	
130	PQGT16339Z	NAME PLATE (for KX-TG2220BXF)	
130	PQGT16335Z	NAME PLATE (for KX-TG2220BXS)	
131	PQHG10676Z	PACKING, COVER	
132	PQQT22570W	LABEL, BATTERY	
133	HHR-152U2A	BATTERY, NI-MH	
134	PQKK10139Z1	LID, BATTERY (for KX-TG2220BXB)	AS-HB
134	PQKK10139Z3	LID, BATTERY (for KX-TG2220BXF)	AS-HB
134	PQKK10139Z2	LID, BATTERY (for KX-TG2220BXS)	AS-HB

28.2.2. Main P.C.Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPG2220BXR	MAIN P.C.BOARD ASS´Y (RTL)	
		(ICs)	
IC201	C2HBBJ000038	IC	
IC202	PQWIG2220BXR	IC	
IC203	C0CBABD00019	IC	
IC204	PQVIMM1385HN	IC	
IC205	C0EBE0000292	IC	
IC206	C0CBAAC00119	IC	
IC801	C1CB00001486	IC	
		(TRANSISTORS)	
Q201	PQVTDTC143E	TRANSISTOR(SI)	S
Q202	PQVTDTC143E	TRANSISTOR(SI)	S
Q204	2SC39300CL	TRANSISTOR(SI)	
Q205	2SD1819A	TRANSISTOR(SI)	
Q206	PQVTDTC143E	TRANSISTOR(SI)	S
Q207	2SD1819A	TRANSISTOR(SI)	
Q212	PQVTXP151A13	TRANSISTOR(SI)	S
		(DIODES)	
D205	B0JCMD000017	DIODE(SI)	
D206	B0JCMD000017	DIODE(SI)	
D207	B0JCMD000017	DIODE(SI)	
D208	B0JCMD000017	DIODE(SI)	
D214	MA111	DIODE(SI)	S
D217	PQVDEP10LA03	DIODE(SI)	S
D801	MA27P0700L	DIODE(SI)	
D802	MA27P0700L	DIODE(SI)	
LED201	PQVDSML310MT	LED	S
LED202	PQVDSML310MT	LED	S
LED203	PQVDSML310MT	LED	S
LED204	PQVDSML310MT	LED	S
LED205	PQVDSML310MT	LED	S
LED206	PQVDSML310MT	LED	S
LED207	PQVDSML310MT	LED	S
		(COILS)	
L203	J0JCC0000186	COIL	
L205	PQLQR4RB601D	COIL	
L206	PQLQR4RB601D	COIL	
L207	PQLQR4RB601D	COIL	
L208	PQLQR4RB601D	COIL	
L209	PQLQR4RB601D	COIL	
L210	PQLE1G5K3220	COIL	S
L801	MQLRF10NJF	COIL	
L802	MQLRF3N9DF	COIL	
L803	MQLRF2N7DF	COIL	
L804	MQLRF10NJF	COIL	
L805	MQLRF2N2DF2	COIL	
L806	MQLRF10NJF	COIL	
L807	PQLQR4D1R0K	COIL	S
R242	PQLQR4RB601D	COIL	
R243	PQLQR4RB601D	COIL	
		(CONNECTOR AND JACK)	
CN201	PQJS22A12Z	CONNECTOR, FFC	S
CN203	K2HD103D0001	JACK	
		(RESISTORS)	
R201	ERJ3GEYJ101	100	
R202	ERJ3GEYJ101	100	
R203	ERJ3GEYJ101	100	
R204	ERJ3GEYJ101	100	
R205	ERJ3GEYJ820	82	
R206	ERJ3GEYJ820	82	
R207	ERJ3GEYJ820	82	
R209	ERJ2GEJ102	1K	
R210	ERJ2GEJ103	10K	
R212	ERJ2GEJ101	100	
R213	ERJ2GEJ101	100	
R217	ERJ3GEYF434	430K	S
R218	ERJ3GEYF824	820K	S
R222	ERJ2GEJ101	100	
R223	ERJ2GEJ102	1K	
R224	ERJ3GEYJ103	10K	
R228	ERJ2GEJ224	220K	
R229	ERJ2GEJ102	1K	
R230	ERJ2GEJ102	1K	
R231	ERJ2GEJ102	1K	
R232	ERJ3GEYJ103	10K	
R233	ERJ2GE0R00	0	
R234	ERJ2GEYF225	2.2M	
R235	ERJ2GEYF225	2.2M	
R237	ERJ2GEJ104	100K	
R240	ERJ3GEY0R00	0	
R244	ERJ2GEJ473	47K	
R245	ERJ2GEJ103	10K	
R246	ERJ2GEJ393X	39K	
R247	ERJ2GEJ182	1.8K	
R248	ERJ2GEJ393X	39K	
R249	ERJ2GEJ182	1.8K	
R250	ERJ2GEJ182	1.8K	
R253	ERJ2GEJ222	2.2K	
R265	ERJ2GEJ103	10K	
R270	ERJ2GEJ104	100K	
R276	ERJ2GEJ471	470	
R277	ERJ2GEJ471	470	
R278	ERJ2GEJ104	100K	
R279	ERJ2GEJ101	100	
R280	ERJ2GEJ182	1.8K	
R281	ERJ2GEJ104	100K	
R302	ERJ2GEJ470	47	
R303	ERJ2GEJ470	47	
R306	ERJ2GEJ104	100K	
R325	ERJ2GEYF185	1.8M	
R326	ERJ2GEYF105	1M	
R801	ERJ2GEJ100	10	
R802	ERJ2GEJ100	10	
R803	ERJ2GEJ100	10	
R804	ERJ2GEJ4R7	4.7	
R805	ERJ2GEJ331	330	
R810	ERJ3GEYF103	10K	S
		(CAPACITORS)	
C203	ECUE1C104ZFQ	0.1	
C205	ECUE1H101JCQ	100P	
C206	ECUV1C104KBV	0.1	
C207	ECUV1C104KBV	0.1	
C208	ECUV1C104KBV	0.1	
C209	ECUV1C104KBV	0.1	
C210	ECUV1C104KBV	0.1	
C211	ECUV1A474KBV	0.47	
C212	ECUV1A474KBV	0.47	
C213	EEE0JA331P	330P	
C214	ECUE1C104ZFQ	0.1	
C215	ECUV1A474KBV	0.47	
C217	ECUE0J105ZFQ	1	
C218	ECUE1C104ZFQ	0.1	
C220	EEE0JA101SP	100P	
C221	ECUE1C104ZFQ	0.1	
C223	ECST0JZ106R	10	
C224	ECUE1C104ZFQ	0.1	
C226	ECUE1C104ZFQ	0.1	
C228	ECUE1C104ZFQ	0.1	
C229	ECUE1C104ZFQ	0.1	
C230	ECUE1C183KBQ	0.018	
C231	ECUV1A224KBV	0.22	
C232	ECUE1C183KBQ	0.018	
C233	ECUV1A105ZFV	1	
C236	ECUE1H4R0CCQ	4	
C237	ECUE1H4R0CCQ	4	
C243	ECUE1C103KBQ	0.01	
C244	ECUE1C104ZFQ	0.1	
C255	ECUV1A224KBV	0.22	
C257	ECST0JY226	22	
C267	ECST0JY226	22	
C274	ECUE1C104ZFQ	0.1	
C277	ECUE1C103KBQ	0.01	
C291	ECUE1C104ZFQ	0.1	
C293	ECUE1H221JCQ	220P	

Ref. No.	Part No.	Part Name & Description	Remarks
C294	ECUE1C104ZFQ	0.1	
C298	ECUE1H101JCQ	100P	
C299	ECUE1H101JCQ	100P	
C301	ECUE0J105ZFQ	1	
C302	ECST0JZ106R	10	
C303	ECUV1A106ZF	10	S
C304	ECUE1C104ZFQ	0.1	
C306	ECUE1C104ZFQ	0.1	
C307	ECUE1A104KBQ	0.1	
C308	ECUE1H3R0CCQ	3	
C309	ECUE1A104KBQ	0.1	
C318	EEEFK0J331P	330P	
C801	ECUE1H102KBQ	0.001	S
C802	ECUE1H010CCQ	1P	S
C803	ECUE1H100DCQ	10P	S
C804	ECUE1H010CCQ	1P	S
C805	ECUE1H100DCQ	10P	S
C807	ECUE1H100DCQ	10P	S
C811	ECUE1H100DCQ	10P	S
C813	ECUE1H100DCQ	10P	S
C814	ECUE1H1R5CCQ	1.5	S
C815	ECUE1H100DCQ	10P	S
C816	ECUE1H100DCQ	10P	S
C817	ECUE1C104ZFQ	0.1	
C818	ECUE1C104ZFQ	0.1	
C819	ECUE1H391KBQ	390P	
C820	ECUE1C104ZFQ	0.1	
C821	ECUE1H102KBQ	0.001	S
C822	ECUE1H010CCQ	1P	S
C823	ECST0JY106	10	
C824	ECUE1H102KBQ	0.001	S
C825	ECUE1H681KBQ	680P	
C827	ECUE1H102KBQ	0.001	S
C828	ECUE1H102KBQ	0.001	S
C829	ECUE1H102KBQ	0.001	S
C830	ECUV1A105ZFV	1	
C831	ECUV1A105ZFV	1	
C833	ECST0JY106	10	
C856	ECUE1H2R0CCQ	2	
C857	ECUE1H2R0CCQ	2	
C858	ECUE1H2R0CCQ	2	
C859	ECUE1H2R0CCQ	2	
C860	ECUE1H100DCQ	10P	S
C861	ECUE1H2R0CCQ	2	
C862	ECUE1H100DCQ	10P	S
C863	ECUE1H100DCQ	10P	S
C865	ECUE1H221JCQ	220P	
C866	ECUE1C103KBQ	0.01	
C867	ECUE1H2R0CCQ	2	
C869	ECUE1H2R0CCQ	2	
L201	ECUE1H100DCQ	10P	S
R806	ECUE1H100DCQ	10P	S
		(OTHERS)	
E101	L0CBAB000044	MICROPHONE	
E102	PQMC10471Z	MAGNETIC SHIELD, FRAME	
E103	PQMC10472Z	MAGNETIC SHIELD, COVER	
FL801	J0E2457B0008	LCR FILTER	
RA201	EXRV8V104JV	RESISTOR ARRAY	S
X201	H0J819400004	CRYSTAL OSCILLATOR	

28.3. Accessories and Packing Materials

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV19BXZ	AC ADAPTOR	⚠
A2	PQJA10075Z	CORD, TELEPHONE	
A3	PQKE10367Z1	HANGER, BELT CLIP (for KX-TG2220BXB)	PC+ABS-HB
A3	PQKE10367Z2	HANGER, BELT CLIP (for KX-TG2220BXF)(for KX-TG2220BXS)	PC+ABS-HB
A4	PQKL10057Z1	STAND, WALL MOUNT ADAPTOR	
A5	PQQX13902Z	INSTRUCTION BOOK	
A6	PQQW13119Z	QUICK GUIDE (for Arabic)	
A7	PQQW13114Z	LEAFLET	
P1	XZB23X30A06	PROTECTION COVER (for Base Unit)	
P2	XZB10X35A02	PROTECTION COVER (for Handset)	
P3	PQPK14130Z	GIFT BOX (for KX-TG2220BXB)	
P3	PQPK14131Z	GIFT BOX (for KX-TG2220BXF)	
P3	PQPK14129Z	GIFT BOX (for KX-TG2220BXS)	

29 FOR SCHEMATIC DIAGRAM

29.1. Base Unit (SCHEMATIC DIAGRAM (BASE UNIT))

Note:

1. DC voltage measurements are taken with voltmeter from the negative voltage line.
2. This schematic diagram may be modified at any time with the development of new technology.

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.

29.2. Handset (SCHEMATIC DIAGRAM (HANDSET))

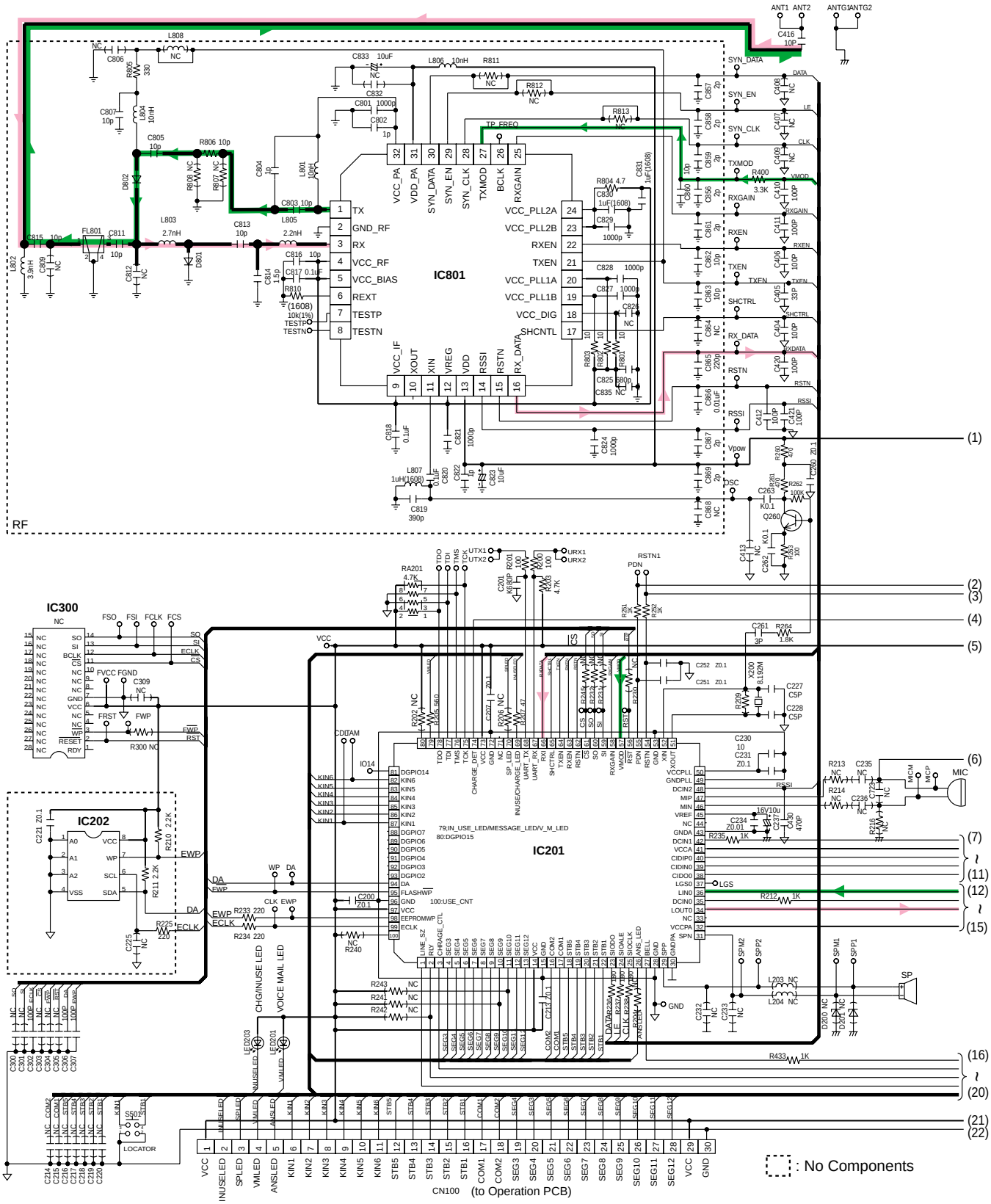
Note:

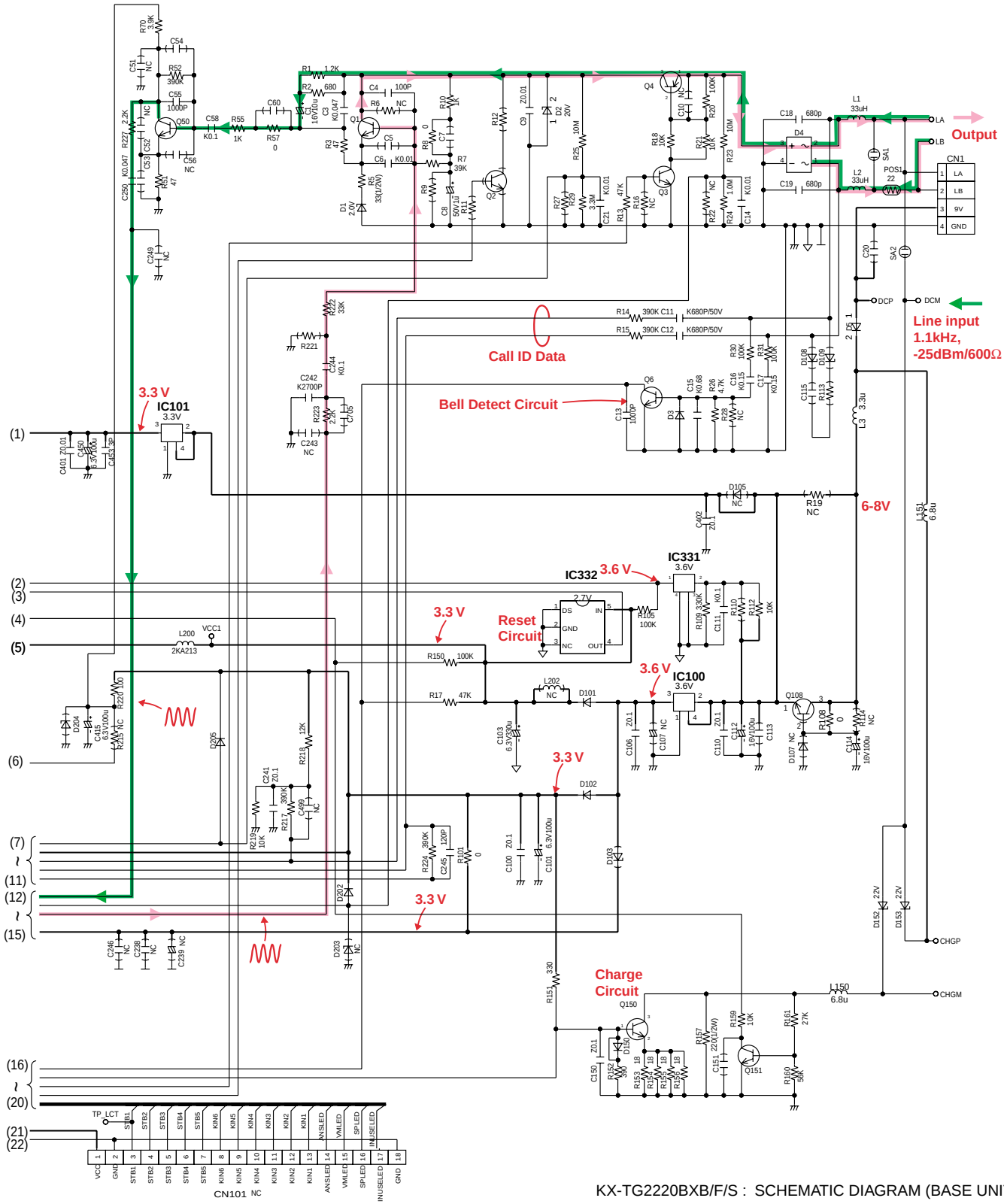
1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams and circuit board may be modified at any time with the development of new technology.

29.3. Memo

30 SCHEMATIC DIAGRAM (BASE UNIT)

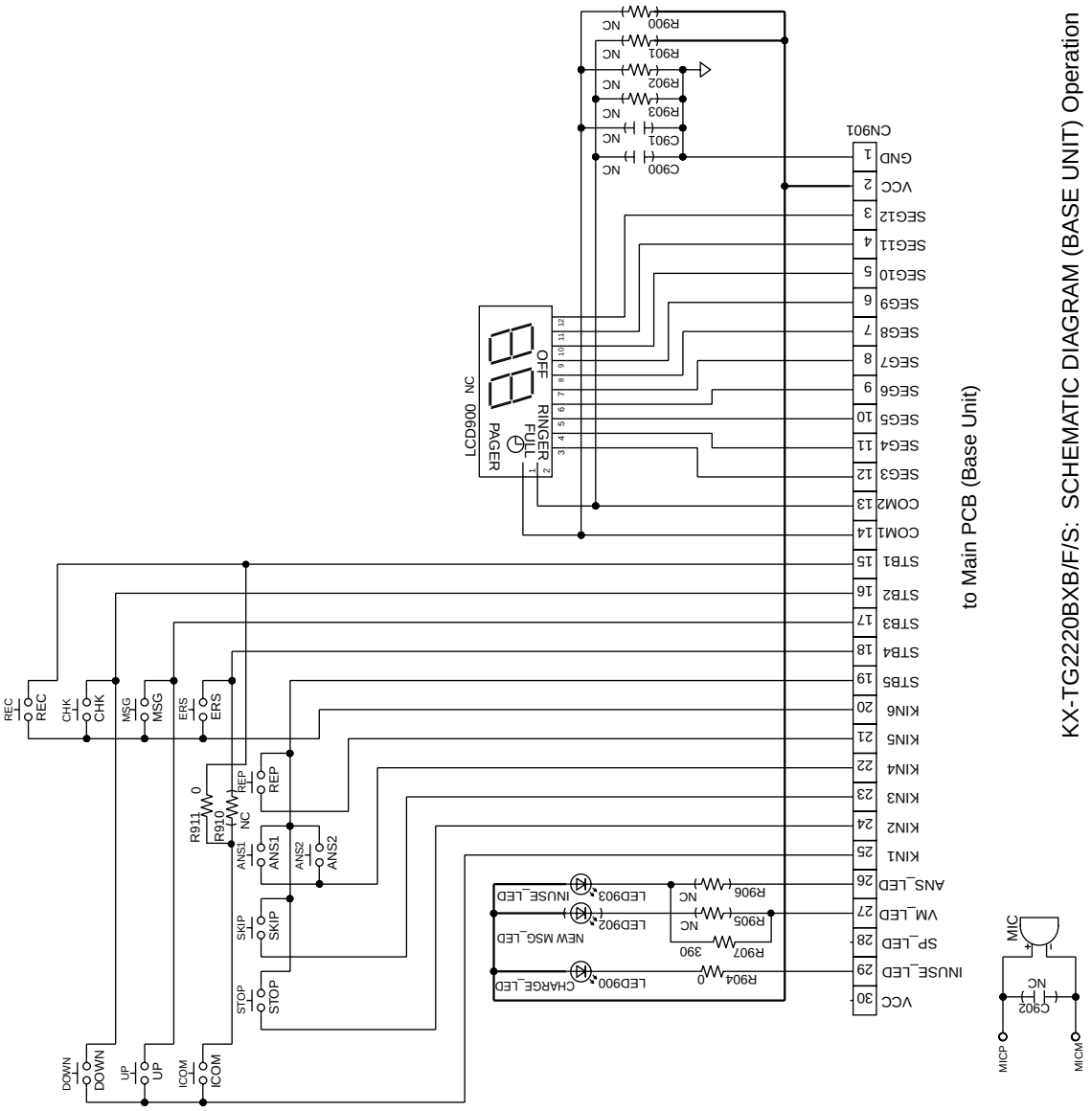
30.1. Main





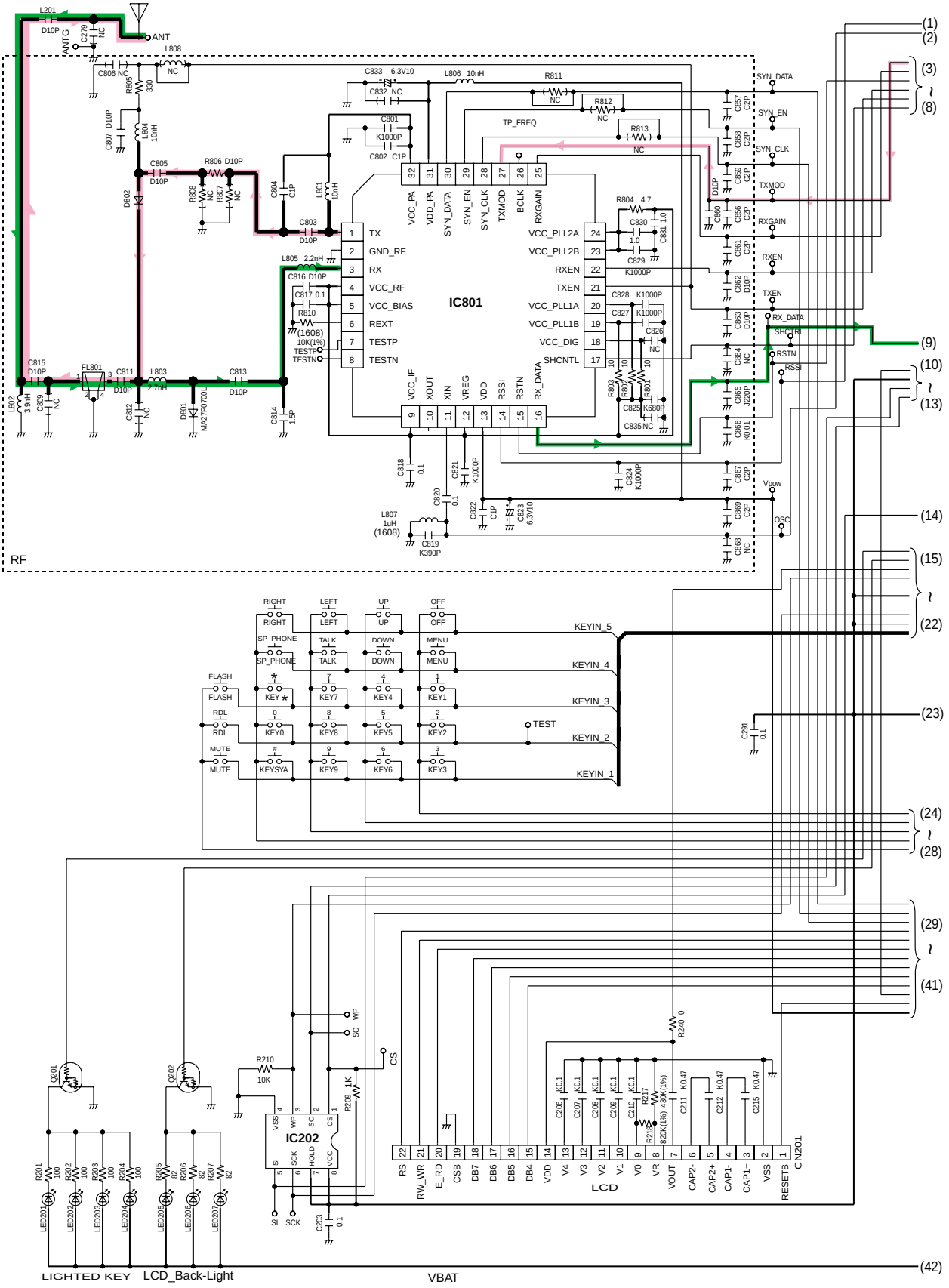
KX-TG2220BXB/F/S : SCHEMATIC DIAGRAM (BASE UNIT)

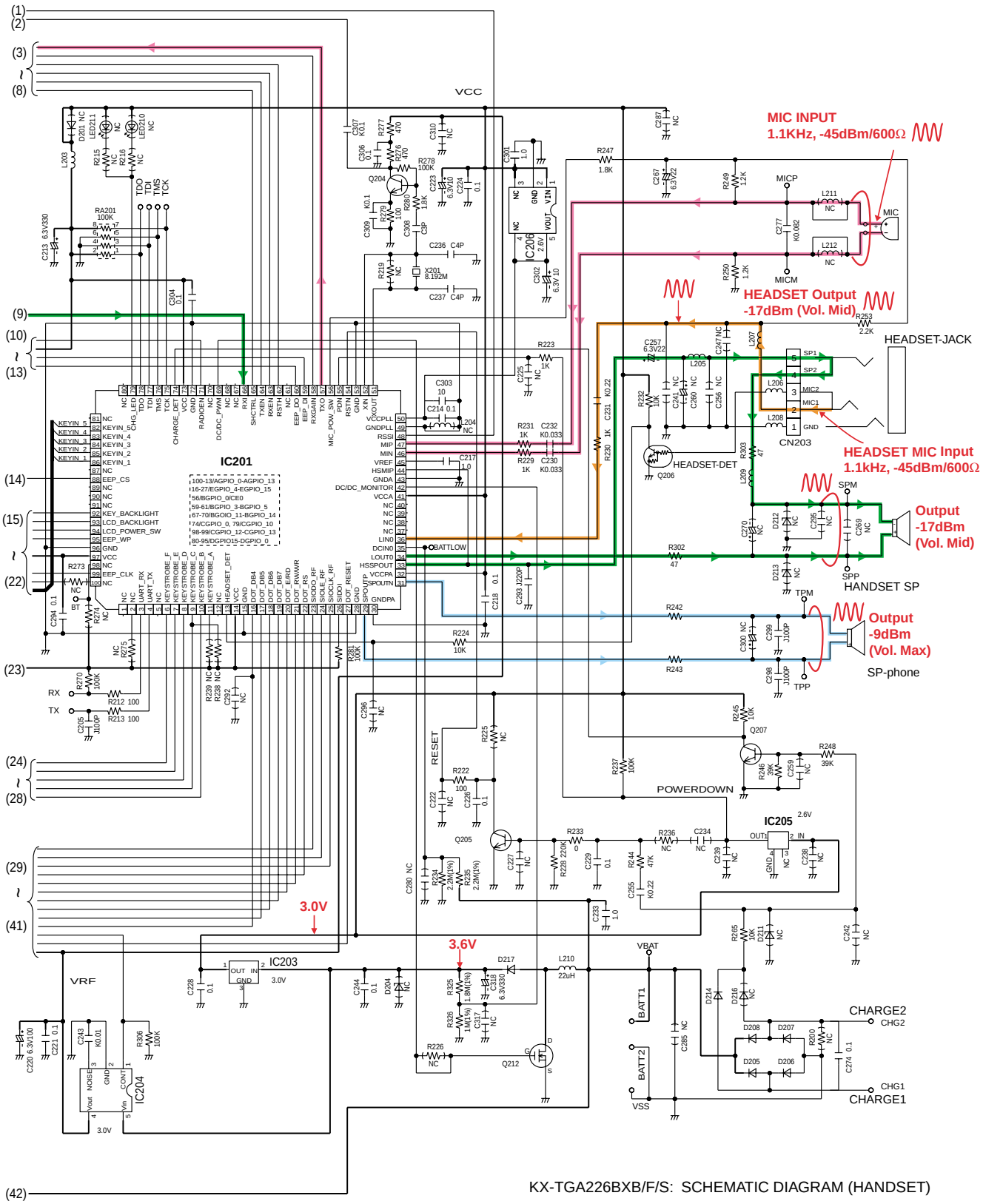
30.2. Operation



30.3. Memo

31 SCHEMATIC DIAGRAM (HANDSET)





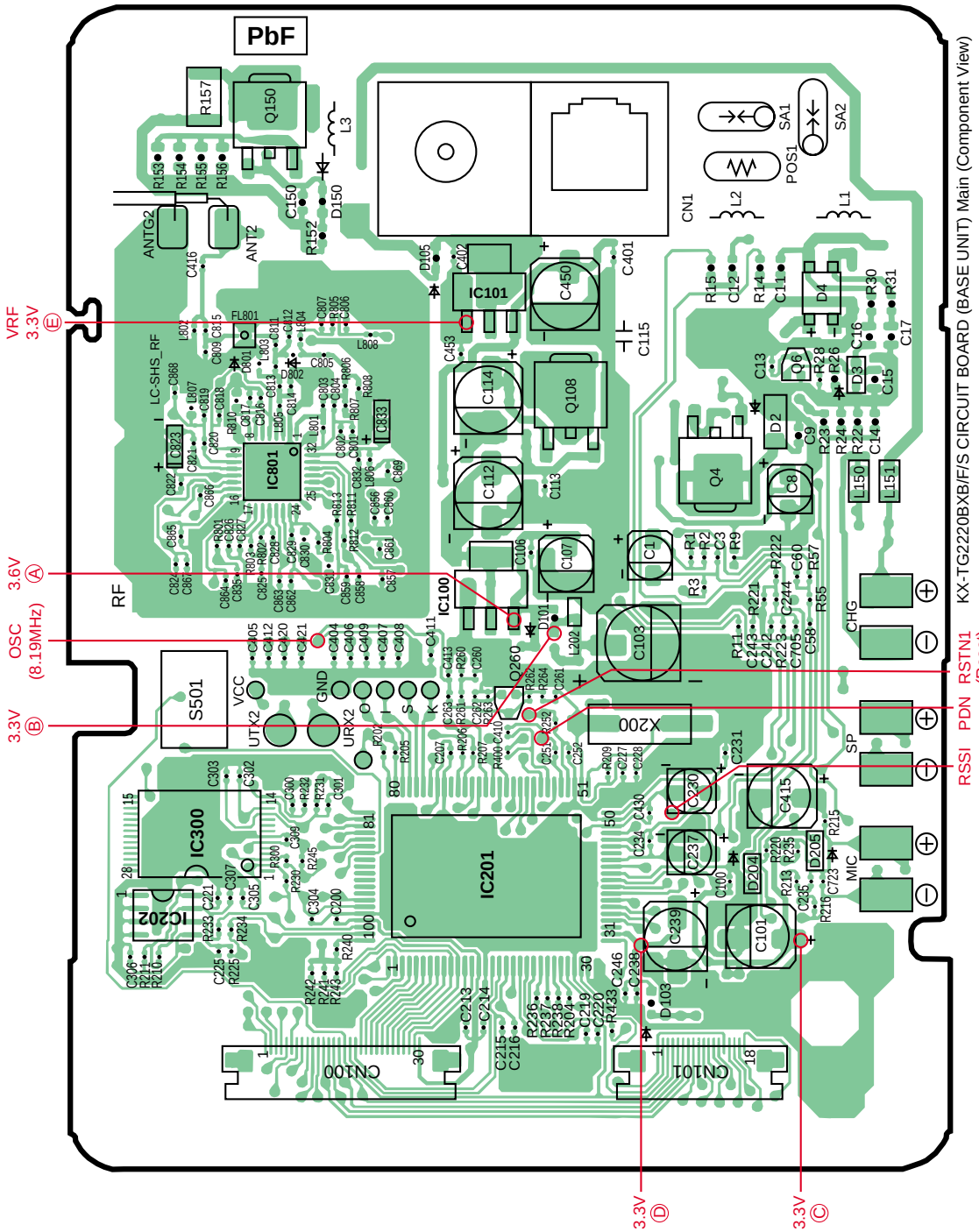
KX-TGA226BXB/F/S: SCHEMATIC DIAGRAM (HANDSET)

31.1. Memo

32 CIRCUIT BOARD (BASE UNIT)

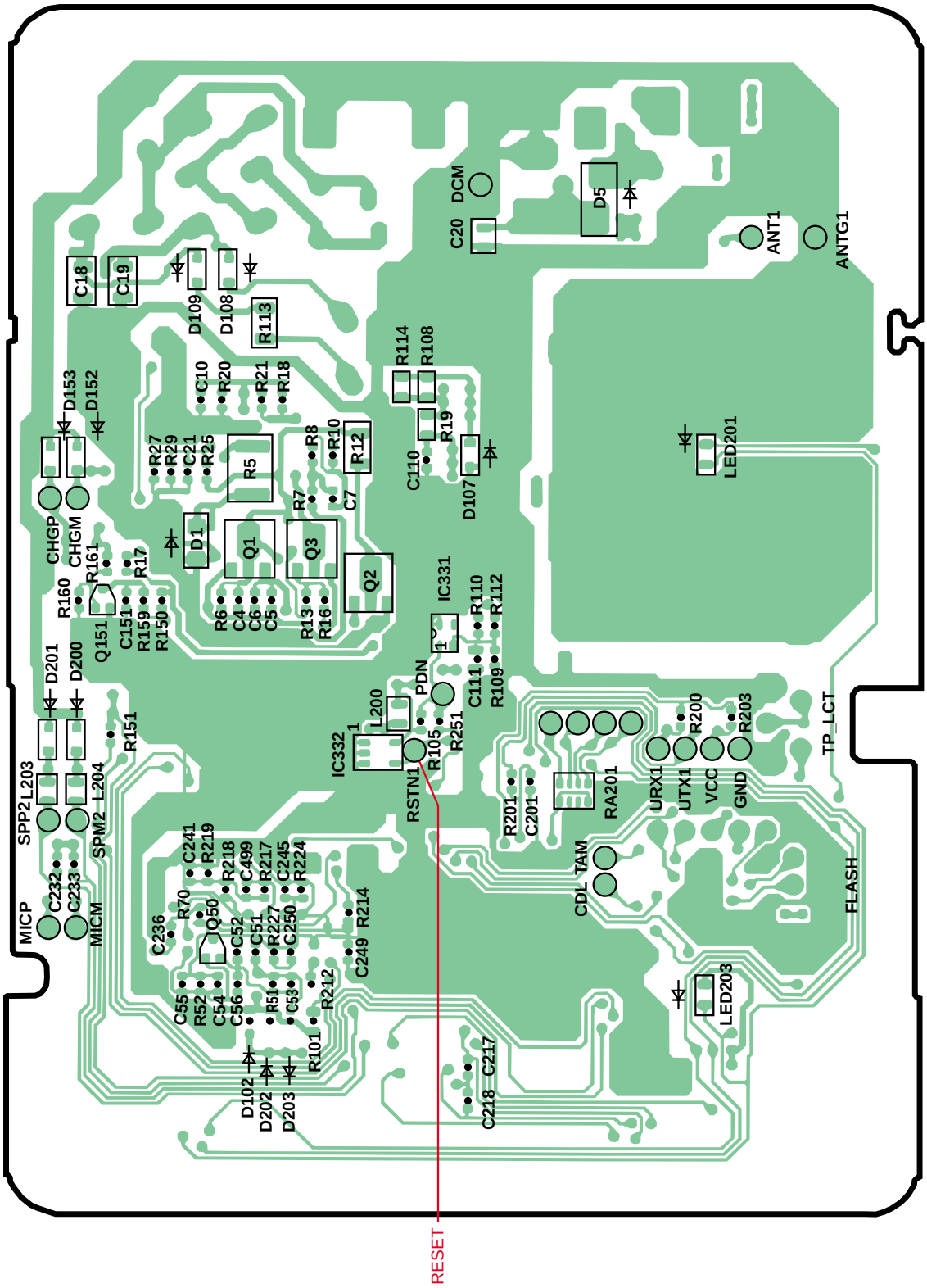
32.1. Main

32.1.1. Component View



KX-TG2220BXB/F/S CIRCUIT BOARD (BASE UNIT) Main (Component View)

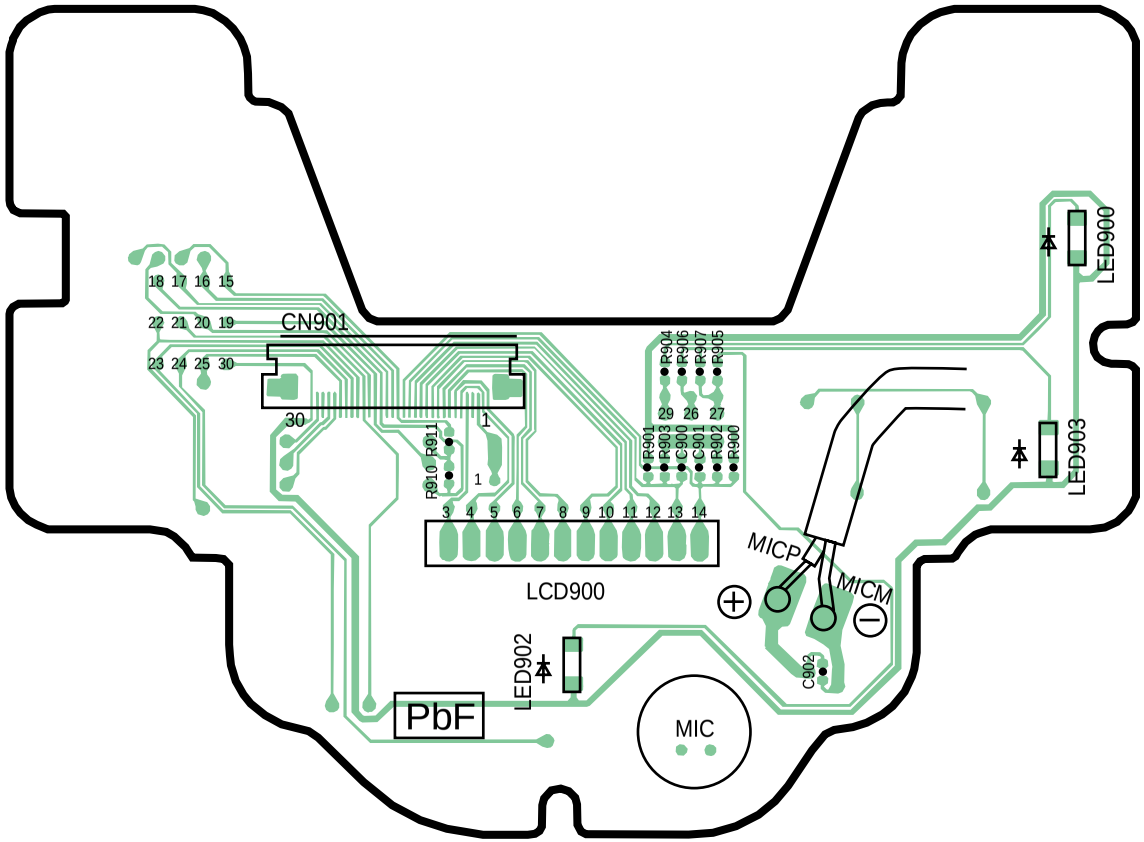
32.1.2. Flow Solder Side View



KX-TG2220BXB/F/S CIRCUIT BOARD (BASE UNIT) Main (Flow Solder Side View)

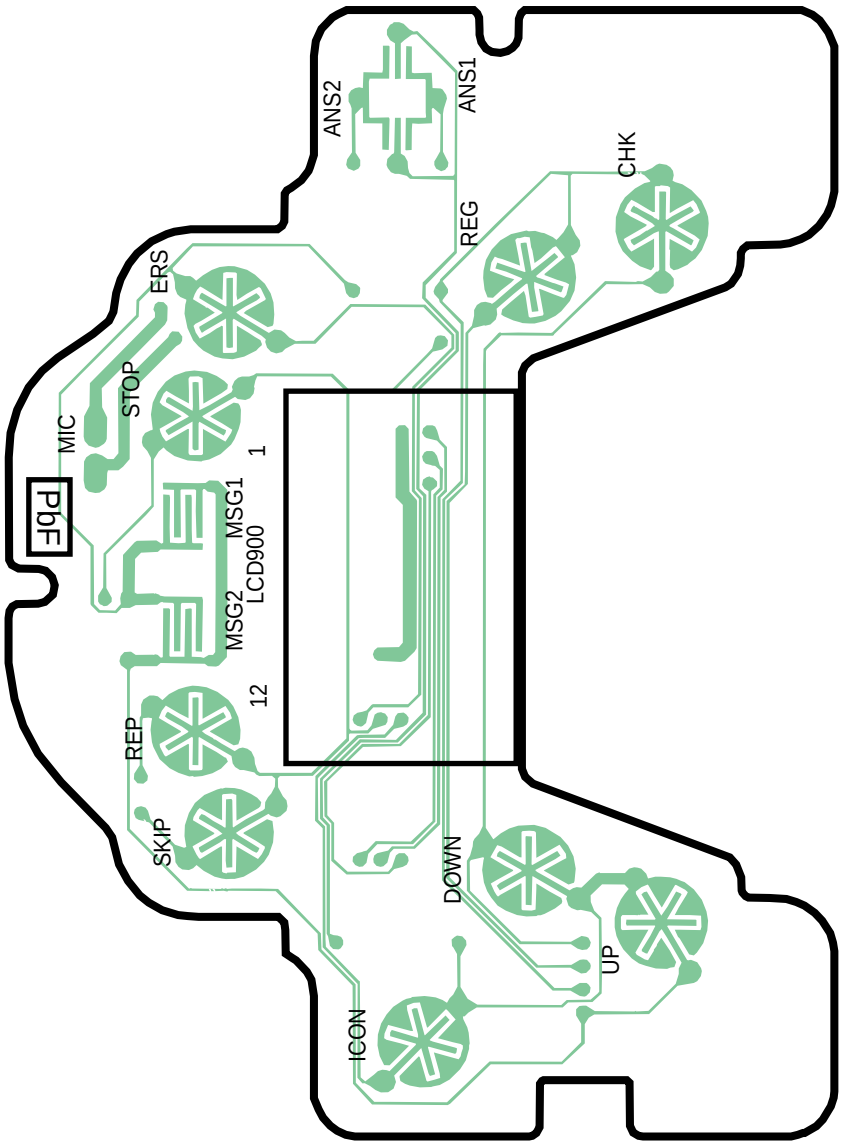
32.2. Operation

32.2.1. Component View



KX-TG2220BXB/F/S CIRCUIT BOARD (BASE UNIT) Operation (Component View)

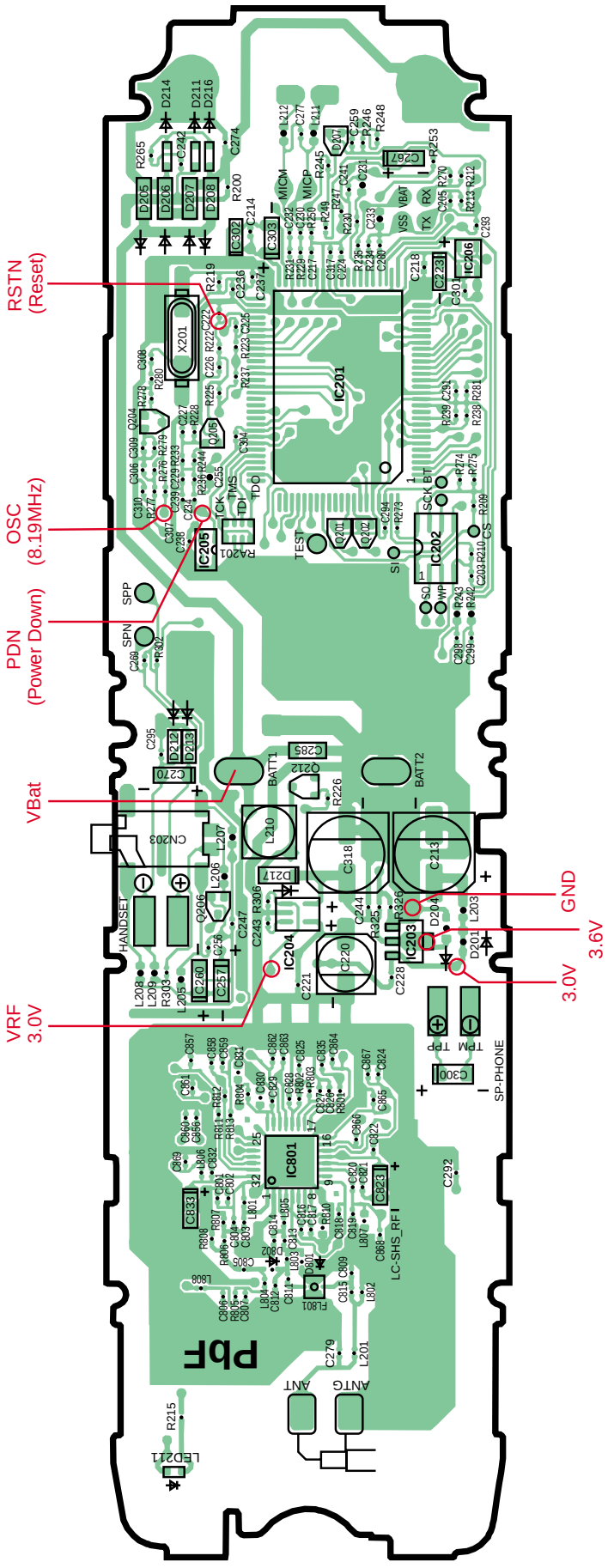
32.2.2. Flow Solder Side View



KX-TG2220BXB/F/S CIRCUIT BOARD (BASE UNIT) Operation (Flow Solder Side View)

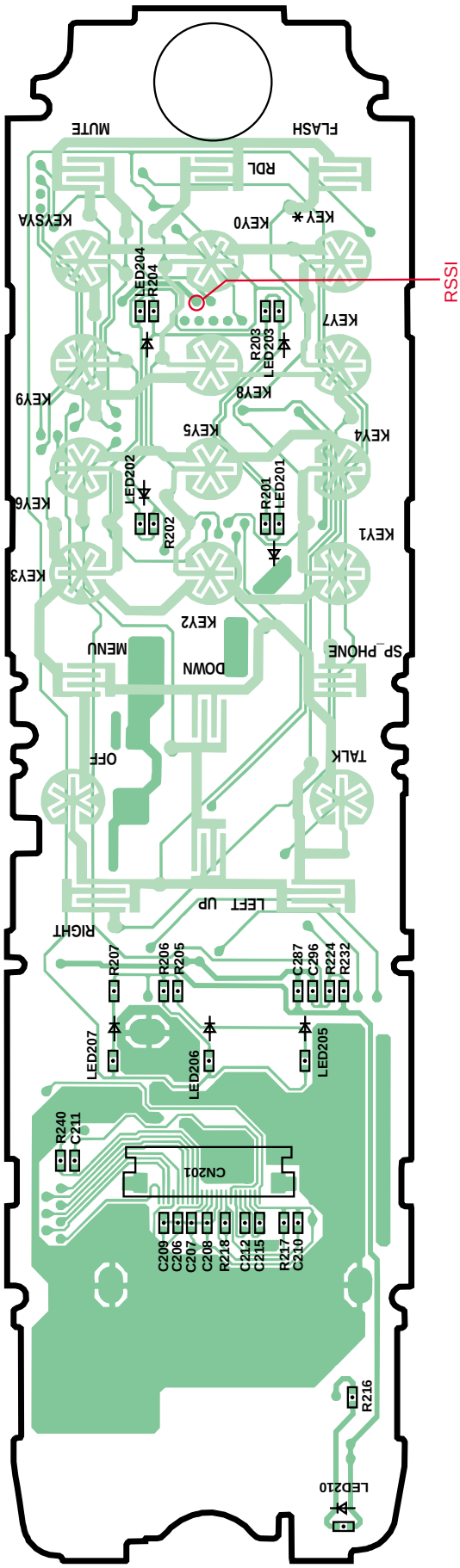
33 CIRCUIT BOARD (HANDSET)

33.1. Component View



KX-TGA226BXB/F/S CIRCUIT BOARD (HANDSET) Main (Component View)

33.2. Flow Solder Side View



KX-TGA226BXB/F/S CIRCUIT BOARD (HANDSET) Main (Flow Solder Side View)