

Service Manual

Telephone Equipment

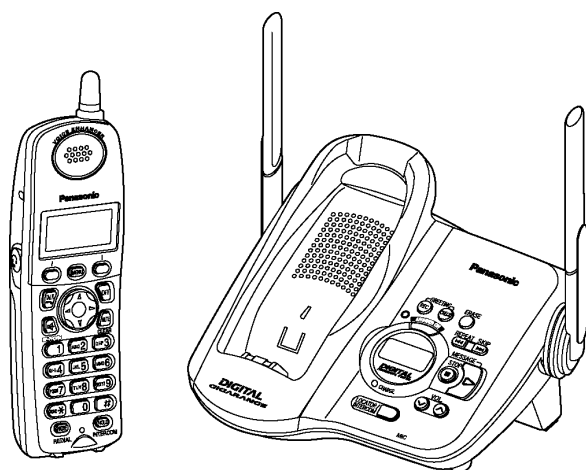
Caller ID Compatible

KX-TG5431BXS KX-TGA542BXS

5.8 GHz Digital Cordless Answering System

Silver Version

(for Asia, Middle Near East and Other areas)



(Handset)

(Base Unit)

SPECIFICATION

	Base Unit	Handset
Power Supply	AC Adaptor (PQLV1BXY, 220-240 V AC, 50/60 Hz)	Rechargeable Ni-MH battery (3.6 V, 830 mAh)
Receiving/Transmitting Frequency	89 channels within 5.76 GHz - 5.84 GHz	89 channels within 5.76 GHz - 5.84 GHz
Receiving Method	Super Heterodyne	Super Heterodyne
Oscillation Method	PLL synthesizer	PLL synthesizer
Detecting Method	Quadrature Discriminator	Quadrature Discriminator
Tolerance of OSC Frequency	13.824 MHz \pm 270 Hz	13.824 MHz \pm 100 Hz
Modulation Method	Frequency Modulation	Frequency Modulation
Spread spectrum Method	Frequency Hopping Spread spectrum	Frequency Hopping Spread spectrum
ID Code	19bit	22bit
Security Codes	—	1,000,000
Ringer Equivalence No. (REN)	0.1B	—
Dialing Mode	—	Tone (DTMF)/Pulse
Redial	—	Up to 48 digits
Speed Dialer	—	Up to 32 digits (Phonebook)
Power Consumption	Standby: Approx. 2.3W, Maximum: Approx. 5.5W	11 days at Standby, 5 hours at Talk
Operating Environment	5°C - 40 °C	5°C - 40 °C
Dimensions (H x W x D)	Approx. 95mm x 174mm x 143mm	Approx. 173mm x 48mm x 33mm
Mass (Weight)	Approx. 320 g	Approx. 170 g

- Design and specifications are subject to change without notice.
- The illustrations in this Service Manual may vary slightly from the actual product.

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.

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**WARNING**

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

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

Note:

Because CONTENTS 4 to 10 are the extracts from the Operating Instructions of this model, they are subject to change without notice. Please refer to the original Operating Instructions for further information.

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1 ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:

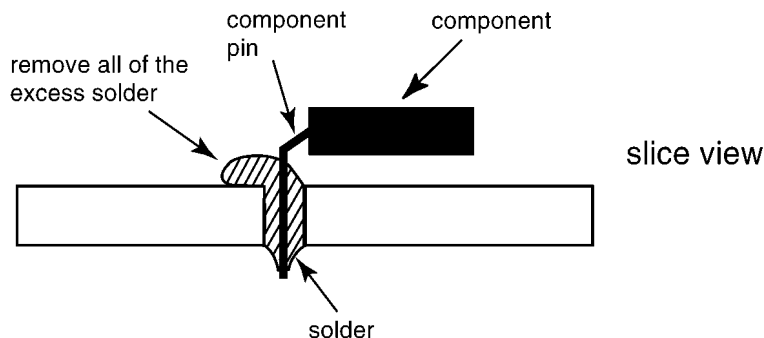
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

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

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

Caution

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



1.1. Suggested PbF Solder

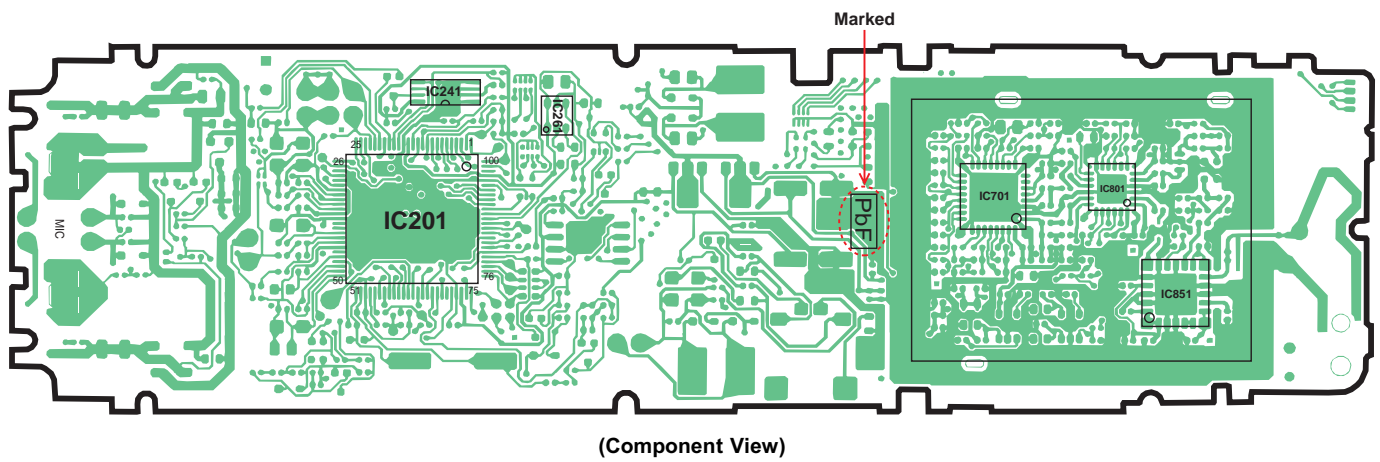
There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper (Sn+Ag+Cu), you can also use Tin and Copper (Sn+Cu), or Tin, Zinc, and Bismuth (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their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

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

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

1.2. How to Recognize that Pb Free Solder is Used

(Example: Handset P.C.B.)



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

3 CAUTION

Danger of explosion if battery is incorrectly replaced.

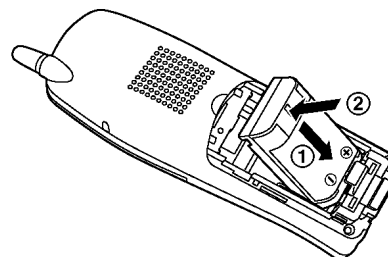
Replace only with the same or equivalent type recommended by the manufacturer.

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

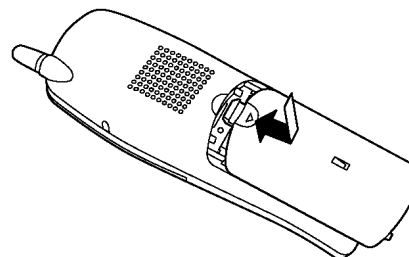
4 BATTERY

4.1. Battery Installation

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



- 2 Close the handset cover.



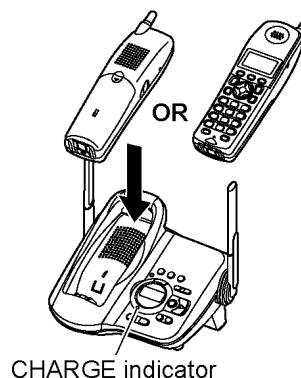
4.2. Battery Charge

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

- The unit will beep once, the CHARGE indicator will light, and “**Charging**” will be displayed.
- “**Charge completed**” is displayed when the battery has been fully charged. The CHARGE indicator will remain lit.


Note:

- To ensure the battery charges properly, clean the charge contacts of the handset and base unit with a soft, dry cloth. Clean if the unit is subject to grease, dust or high humidity.




4.3. Recharging the Battery

Recharge the battery when:

- “**Recharge battery**” is displayed or  flashes on the handset display.
- the handset beeps intermittently while it is in use.

Note:





- Recharge the handset battery for more than 15 minutes, or the display will continue showing the indication.
- If the battery has been discharged, the handset will display “**Charge for 6h**” and  when you place the handset on 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 confirm the battery strength on the handset display.

Battery icon	Battery strength
	Fully charged
	Medium
	Low When flashing: needs to be recharged.
	Discharged

4.5. Battery Replacement

If battery performance diminishes, make sure you have cleaned the charge contacts and fully charged the battery. The battery needs to be replaced if any of the following are displayed after a few phone calls even when you have fully charged the battery.

– **“Recharge battery”**

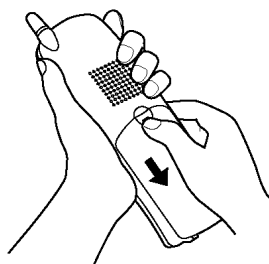
–  (flashing)

– **“Charge for 6h”**

– 

- Use only the rechargeable Panasonic battery HHR-P104A.

1 Press the notch on the cover firmly and slide it as indicated by the arrow.



2 Replace the old battery with a new one, and close the cover.


4.6. Battery Performance

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

Operation	Operating time
While in use (talking)	Up to 5 hours
While not in use (standby)*1	Up to 11 days
While using the Clarity Booster feature	Up to 3 hours

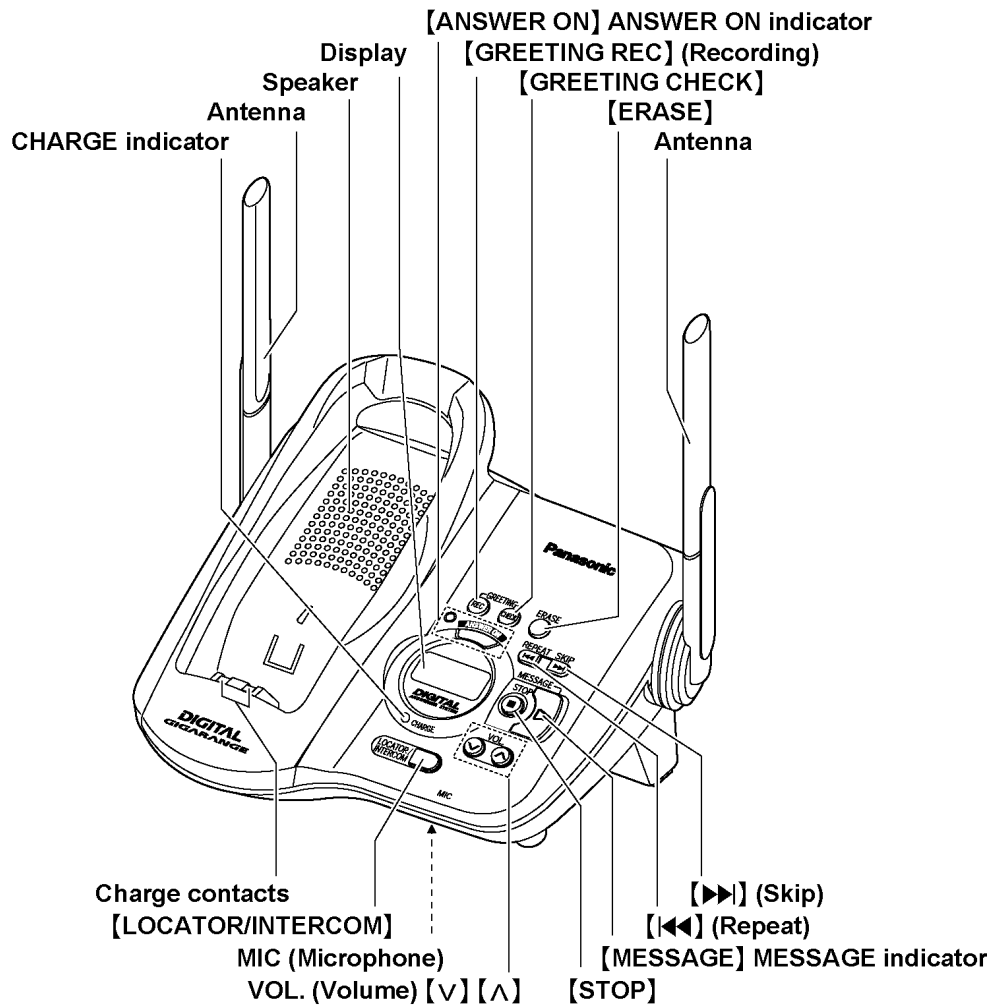
*1 Handset is off the base unit but not in use.

Note:

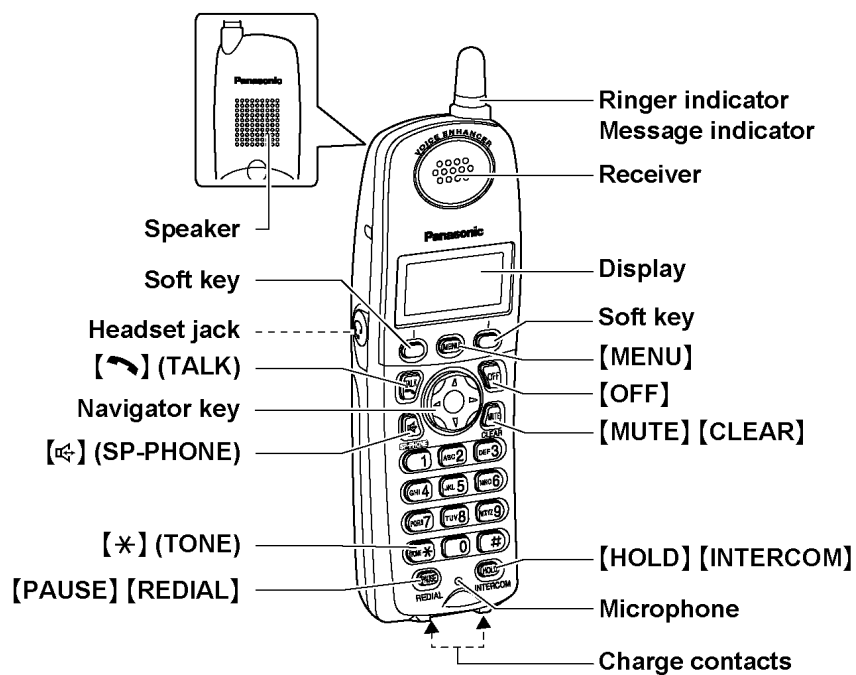
- Battery power is consumed whenever the handset is off the base unit, even when the handset is not in use. The longer you leave the handset off the base unit, the shorter you can actually talk on the handset. Actual battery performance depends on a combination of how often the handset is in use and how often it is not in use.
- Once the battery is fully charged, you do not have to charge it again until **“Recharge battery”** is displayed or  flashes. This will maximize the battery life.

5 LOCATION OF CONTROLS

5.1. Base Unit



5.2. Handset

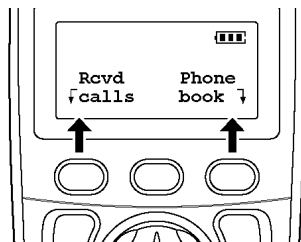


5.2.1. How to Use the Soft Keys/Navigator Key

Soft keys

The handset features 2 soft keys. By pressing a soft key, you can select the function displayed directly above it.

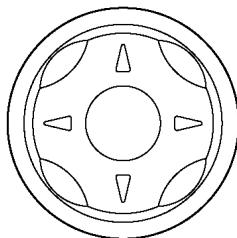
- The functions displayed will vary depending on how you are using the unit.
- When a function does not appear above a soft key, the soft key has no function.



Soft key examples:

Display function	Action
Rcvd calls	Enters caller list

Using the navigator key



The handset navigator key can be used to navigate through menus and to select items shown on the display, by pressing [▲], [▼], [◀], or [▶].

6 DISPLAYS

6.1. Display Items

Base unit display items

Displayed item	Meaning
FULL	Flashes when message memory is full.
⌚	Flashes when the date and time need to be set.
IN USE	Base unit is on an intercom call, or handset is using the answering system. When flashing: base unit is paging or is being paged.
LINE IN USE	Line is in use. When flashing: a call is on hold or the answering system is answering a call. When flashing rapidly: a call is being received.
E	Greeting message recording error
GO	Answering system is in greeting only mode (caller messages will not be recorded).

Handset display items

Displayed item	Meaning
VE	Voice enhancer is on.
■■■	Battery strength

6.2. Troubleshooting (Handset LCD)

If the unit detects a problem, one of the following messages will be displayed on the handset.

Display message	Cause & solution
Error!!	<ul style="list-style-type: none"> • When you tried to register the handset, the handset and the base unit could not link for some reason, such as interference from electrical appliances. Move the handset and the base unit away from the electrical appliances and try again. • The entered password was wrong in programming dial lock. Enter the correct password.
No link to base. Move closer to base, try again.	<ul style="list-style-type: none"> • The handset has lost communication with the base unit. Move closer to the base unit, and try again. • Confirm that the base unit's AC adaptor is plugged in. • Raise the base unit antennas. • The handset's registration may have been canceled. Re-register the handset (*1).
Phonebook full	<ul style="list-style-type: none"> • There is no space to store new items in the phonebook. Erase unnecessary items (*2).
No items stored	<ul style="list-style-type: none"> • Your phonebook or redial list is empty.
Please lift up and try again.	<ul style="list-style-type: none"> • A handset button was pressed while the handset was on the base unit. Lift the handset and press the button again.
System is busy. Please try again later.	<ul style="list-style-type: none"> • The handset has lost communication with the base unit. Move closer to the base unit and try again. • Another user is listening to messages. Try again later.
Dial locked	<ul style="list-style-type: none"> • Dial lock is turned on.

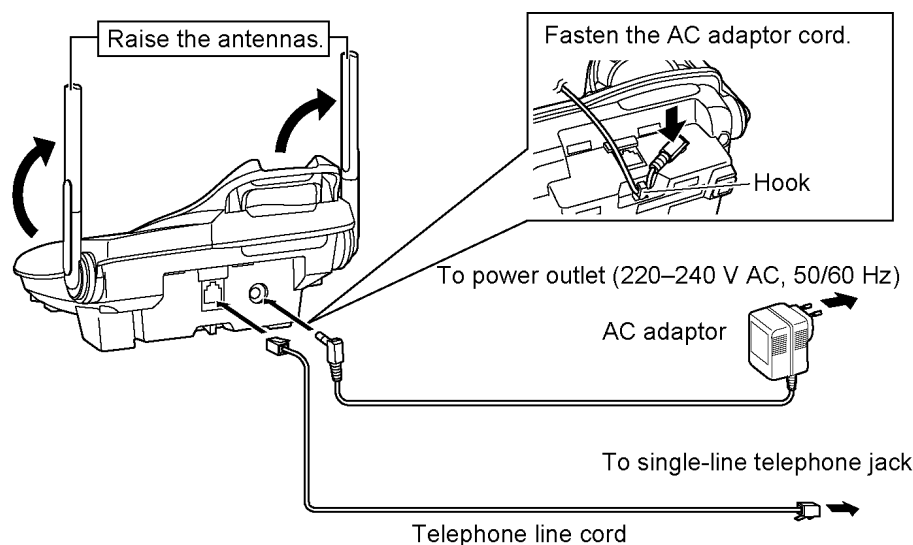
Cross Reference:

(*1) Re-registering the Handset (P.44)

(*2) Erasing Items in the Phonebook (P.22)

7 SETTINGS

7.1. Connections

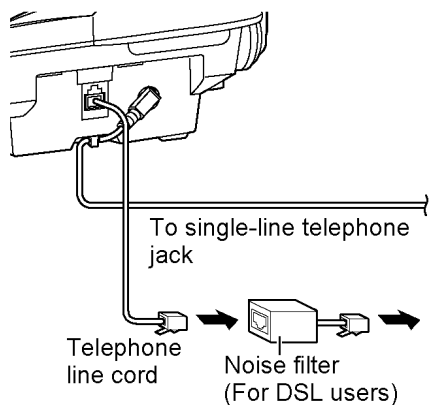


Note:

- Use only the included Panasonic AC adaptor PQLV1BXY.
- The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)
- The AC adaptor should be connected to a vertically oriented or floor-mounted AC outlet. Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.
- 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 unit.
- The unit will not work during a power failure. We recommend connecting a standard telephone to the same telephone line or to the same telephone jack using a T-adaptor. Emergency power can be supplied to the unit by connecting a Panasonic battery back-up power supply KX-TCA200BX.

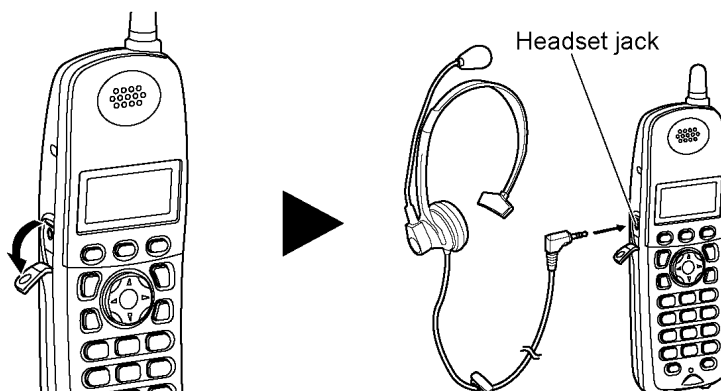
If you subscribe to a DSL service

- Please attach a noise filter (contact your DSL provider) to the telephone line between the base unit and the telephone line jack in the event of the following:
 - Noise is heard during conversations.
 - Caller ID features do not function properly.



7.2. Connecting an Optional Headset

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



Note

- To switch to the speakerphone, press **[]**. To return to the headset, press **[]**.

7.3. Guide to Handset Programming

For your reference, a chart of all programmable functions is printed below. To program, press **[MENU]**, press **[]** or **[]** to scroll through the menu, and press **[]** or **[Select]** when the desired menu item or setting is displayed.

Important:

- Before programming, make sure the handset and base unit are not being used. The handset must be operated near the base unit and while off the base unit.

Main menu	Sub-menu 1	Sub-menu 2
Message play	—	—
Ringer setting	Ringer volume	—
	Ringer tone	—
	Interrupt tone	—
Date and time	—	—
Voice enhancer	—	—
Dial lock	—	—
Initial setting	Set answering	Ring count
		Recording time
		Remote code
	Message alert	—
	LCD contrast	—
	Key tone	—
	Auto talk	—
	Time adjustment	—
	Set tel line	Set dial mode
		Set flash time
		Set line mode
	Registration	—

Note:

- To exit programming, press **[OFF]** at any time.
- To go back to the previous menu, press **[]** or **[Back]**, or press **[]** or **[Select]** while “(Go back)” is displayed.

7.4. Date and Time

Set the date and time so that the unit will:

- display the date and time the calls were received in the caller list.
- announce the day and time each message was recorded by the answering system when you play back messages.

Important:

- When “⓪ **Press MENU.**” flashes on the display, press **[MENU]**, then skip to step 3.

1 Press **[MENU]**.

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

Date and time
↵Back ▼▲ Select↵

3 Enter the current day, month, and year by selecting 2 digits for each.

Example: 15 June, 2005

Press **[1][5] [0][6] [0][5]**.

Date: 15.12.2005
Time: 12:00 AM
↵AM/PM Save↵

4 Enter the current hour and minute (12-hour clock format) by selecting 2 digits for each.

Example: 9:30 PM

Press **[0][9] [3][0]**.

Date: 15.06.2005
Time: 09:30 AM
↵AM/PM Save↵

5 Select “**AM**” or “**PM**” by pressing **[AM/PM]**.

Date: 15.06.2005
Time: 09:30 AM
↵AM/PM Save↵

6 Press **[Save]**.

- When the date and time are set, ⓪ disappears from base unit display.
- If the handset beeps 3 times, the date and time were not set correctly. Enter the correct digits.

7 Press **[OFF]**.

Note:

- If you make a mistake when entering the date and time, press **[◀]**, **[▶]**, **[▼]**, or **[▲]** to move the cursor, then make the correction.
- The date and time may be incorrect after a power failure. When “⓪ **Press MENU.**” flashes on the handset display or ⓪ flashes on the base unit display, adjust the date and time.

To confirm the date and time

Repeat steps 1 and 2. Press **[OFF]** when finished.

Time adjustment (Caller ID subscribers only)

If the Caller ID time and date display service is available in your area, Caller ID will automatically adjust the unit's date and time setting each time a call is received.

- To use this feature, you must first set the unit's date and time setting manually.
- You can turn this feature off.

7.5. Dialing Mode

If you cannot make calls, change this setting depending on your telephone line service.

“**Tone**” (default): For tone dial service.

“**Pulse**”: For rotary pulse dial service.

- 1 Press **[MENU]**.
- 2 Scroll to “**Initial setting**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 3 Scroll to “**Set tel line**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 4 Scroll to “**Set dial mode**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 5 Press **[▼]** or **[▲]** repeatedly to select the desired setting.
- 6 Press **[Save]**, then press **[OFF]**.

7.6. Line Mode

The line mode is preset to “**B**” and generally should not be adjusted. If “**Line in use**” on the handset is not displayed properly, the line mode selection is incorrect. Set line mode to “**A**”.

- 1 Press **[MENU]**.
- 2 Scroll to “**Initial setting**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 3 Scroll to “**Set tel line**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 4 Scroll to “**Set line mode**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 5 Press **[▼]** or **[▲]** repeatedly to select the desired setting.
- 6 Press **[Save]**, then press **[OFF]**.

7.7. Flash Button

Pressing **[Flash]** allows you to use special features of your host PBX such as transferring an extension call, or accessing optional telephone services such as Call Waiting.

Example:

Talk 00-00-20 ↓ Flash

Selecting the flash time

The flash time depends on your telephone exchange or host PBX.

You can select: “**90ms**” (milliseconds), “**100ms**”, “**110ms**”, “**250ms**”, “**300ms**”, “**400ms**”, “**600ms**”, or “**700ms**” (default).

- 1 Press **[MENU]**.
- 2 Scroll to “**Initial setting**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 3 Scroll to “**Set tel line**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 4 Scroll to “**Set flash time**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 5 Press **[▼]** or **[▲]** repeatedly to select the desired setting.
- 6 Press **[Save]**, then press **[OFF]**.

Note:

- If the unit is connected via a PBX, certain PBX functions (call transferring, etc.) may not work correctly. Consult your PBX supplier for the correct setting.

7.8. Voice Enhancer

This feature clarifies the voice of the person you are talking to, reproducing a more natural-sounding voice that is easier to hear and understand.

- 1 Press **[MENU]** during an outside call.
- 2 To turn this feature on or off, press **[3]**.
 - You can also select “**V.E. on**” or “**V.E. off**” by pressing **[▼]** or **[▲]** then pressing **[▶]**.
 - When turned on, “**(VE)**” will be displayed.

▶3=V.E. on

Note:

- Once you turn voice enhancer on, it will be activated for all outside calls until turned off.
- You can also turn this feature on or off by programming.*
- Depending on the condition and quality of your telephone line, this feature may emphasize existing line noise. If it becomes difficult to hear, turn this feature off.

* You can turn the voice enhancer feature on or off. The default setting is OFF.

- 1 Press **[MENU]**.
- 2 Scroll to “**Voice enhancer**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 3 Press **[▼]** or **[▲]** repeatedly to select “**On**” or “**Off**”.
- 4 Press **[Save]**, then press **[OFF]**.
 - When turned on, “**(VE)**” will be displayed.

7.9. Handset Ringer Tone

You can change the ringer tone heard when an outside call is received. There are 3 tones and 4 melodies. The default setting is “**Tone 1**”.

- 1 Press **[MENU]**.
- 2 Scroll to “**Ringer setting**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 3 Scroll to “**Ringer tone**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 4 Press **[▼]** or **[▲]** repeatedly to select the desired setting.
 - You can also select the ringer tone by pressing **[1]** to **[7]**.
 - If the ringer volume has been turned off, the handset will not ring.

Ringer setting

Ringer tone

Ringer tone
1=Tone 1
⏮Back ▼▲ Save⏭

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

Note:

- If you select one of the melody ringer patterns, the ringer will continue to sound for several seconds if:
 - the caller hangs up before you answer the call.
 - another person answers the call using another phone connected on the same line.

7.10. Dial Lock

This feature prohibits making outside calls. The default setting is OFF.

Important:

- When dial lock is turned on, only phone numbers stored in the phonebook as emergency numbers (numbers stored with a # at the beginning of the name) can be dialed using the phonebook. We recommend storing emergency numbers in the phonebook before using this feature.
- When dial lock is turned on, you cannot store, edit, or erase items in the phonebook.

To turn dial lock on

- 1 Press **[MENU]**.
- 2 Scroll to **"Dial lock"** by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 3 Enter a 4-digit password.*
 - This password is required when turning dial lock off. We recommend writing the password down.
- 4 Press **[Save]**.
- 5 Press **[Yes]**.
 - **"Dial lock on"** will be displayed.
- 6 Press **[OFF]**.

Note:

- If dial lock is turned on, the handset displays **"Dial lock"**. While there are missed calls, **"Dial lock"** is not displayed when the handset is off the base unit.

To turn dial lock off

- 1 Press **[MENU]**.
- 2 Scroll to **"Dial lock"** by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 3 Enter the same password* that was entered when dial lock was turned on.
- 4 Press **[Save]**.
- 5 Press **[Yes]**.
 - **"Dial lock off"** will be displayed.
- 6 Press **[OFF]**.

For Service Hint:

- *: If the current password is forgotten, enter **"726276642"** and you will be able to go to step 4.

7.11. Direct Commands

You can also program most features using “direct commands”—special codes that take you directly to the feature you wish to program and allow you to select the desired setting. There is no need to scroll through the unit’s menus.

- 1** Press **[MENU]**.
- 2** Enter the desired feature code (shown below).
- 3** Enter the desired setting code (shown below).
 - This step may vary depending on the feature being programmed.
- 4** Press **[Save]**.
- 5** Press **[OFF]** to exit programming mode.

Direct commands chart

Feature	Feature code	Setting code
Ringer volume	[1] [1]	[1] : Low [2] : Medium [3] : High [0] : Off
Ringer tone	[1] [2]	[1]–[3] : Tone pattern 1–3 [4]–[7] : Melody pattern 1–4
Interrupt tone	[1] [3]	[1] : On [2] : 2 times [0] : Off
Message play	[2]	–
Date and time	[4]	Go to step 3 of “ Date and Time ”.
Voice enhancer	[5]	[1] : On [0] : Off
Dial lock	[6]	Go to step 3 of “ Dial Lock ”.
LCD contrast	[0] [1]	[1]–[6] : Level 1–6
Key tone	[0] [2]	[1] : On [0] : Off
Auto talk	[0] [3]	[1] : On [0] : Off
Set dial mode	[0] [5] [1]	[1] : Pulse [2] : Tone
Set flash time	[0] [5] [2]	[1] : 700 ms [2] : 600 ms [3] : 400 ms [4] : 300 ms [5] : 250 ms [6] : 110 ms [7] : 100 ms [8] : 90 ms
Set line mode	[0] [5] [3]	[1] : A [2] : B

Cross Reference:

Date and Time (P.15)

Dial Lock (P.18)

Feature	Feature code	Setting code
Ring count	[0] [6] [1]	[2]–[7] : 2–7 rings [0] : Toll saver
Recording time	[0] [6] [2]	[1] : 1 minute [2] : 2 minutes [3] : 3 minutes [0] : Greeting only
Remote code	[0] [6] [3]	Go to step 5 of “ Remote Code ”.
Time adjustment	[0] [9]	[1] : Caller ID[auto] [0] : Manual
Handset registration	[0] [0]	Go to step 4 of “ Re-registering the Handset ”.
Message alert	[0] [11]	[1] : On [0] : Off

Note:

- If you make a mistake or enter the wrong code, press **[OFF]** then start again by pressing **[MENU]**.

Cross Reference:

Remote Code (P.29)

Re-registering the Handset (P.44)

8 OPERATION

8.1. Phonebook

The handset phonebook allows you to make calls without having to dial manually. You can add 50 names and phone numbers to the handset phonebook and search for phonebook entries by name.

8.1.1. Adding Items to the Phonebook

- 1 Press **[Phonebook]**.
- 2 Press **[Add]**.
 - The display shows the number of items in the phonebook.
- 3 Enter the name (max. 16 characters). See the character table for entry.
- 4 Press **[Next]**.
- 5 Enter the phone number (max. 32 digits).
 - If a pause is required when dialing, press **[PAUSE]** where needed.
- 6 Press **[Next]**.
 - If you want to change the name and number, press **[Edit]**, then repeat from step 3.
- 7 Press **[Save]**.
 - To add other items, repeat from step 2.
- 8 Press **[OFF]**.

Rcvd	Phone
calls	book
↓	↓

Example:

Phonebook	
7 items	
↓Add	Search↓

Enter name	
■	
↓Back	Next↓

Enter phone no.

Example:

Tom	
5557654321	
↓Edit	Save↓

Note:

- Caller ID subscribers can use ringer ID and light-up ID features.

Character table

The dial keys can be used to enter characters. To enter a character, press the appropriate dial key, repeatedly if necessary. To enter another character that is located on the same dial key, first press **[▶]** to move the cursor to the next space.

Key	Characters
[1]	& ' () , - . / 1
[2]	a b c A B C 2
[3]	d e f D E F 3
[4]	g h i G H I 4
[5]	j k l J K L 5
[6]	m n o M N O 6
[7]	p q r s P Q R S 7
[8]	t u v T U V 8
[9]	w x y z W X Y Z 9
[0]	0 Space
[*]	*
[#]	#
[CLEAR]	To delete a character or number

To edit/correct a mistake

Press **[◀]** or **[▶]** to move the cursor to the character or number you wish to erase, then press **[CLEAR]**. Enter the appropriate character or number.

Note:

- Press and hold **[CLEAR]** to erase all characters or numbers.

8.1.2. Calling Someone in the Phonebook

Phonebook items can be searched for alphabetically by scrolling through the phonebook items.

- 1 Press **[Phonebook]**.
 - For quick search, you can skip to step 3.

- 2 Press **[Search]**.

0-9=Name search
▼▲=Scroll list

- 3 Press **[▼]** or **[▲]** repeatedly to display the desired item.
 - To exit the phonebook, press **[OFF]**.

- 4 Press **[↶]** or **[↷]**.

Note:

- To view a phone number over 16 digits long, follow steps 1 to 3, then press **[Edit]** and **[Next]**. Press **[OFF]** when finished.

To search for a name by initial

- 1 Press **[Phonebook]**, then press **[Search]**.
- 2 Press the dialing button (**[0]** to **[9]**, **[#]** or **[*]**) which corresponds to the first letter you are searching for (see the **Character table***).
Example: "**LISA**"
Press **[5]** repeatedly to display any name with the initial "**L**".
 - If there is no item corresponding to the letter you selected, the next item will be displayed.
- 3 Press **[▼]** repeatedly to display the desired item.
 - To exit the phonebook, press **[OFF]**.
 - To dial the displayed number, press **[↶]** or **[↷]**.

Note:

*: Refer to **Adding Items to the Phonebook** (P.21)

8.1.3. Editing Items in the Phonebook

- 1 Press **[Phonebook]**, then press **[Search]**.
- 2 Press **[▼]** or **[▲]** repeatedly to display the desired item.
- 3 Press **[Edit]**.
- 4 Edit the name if necessary. See the **Character table*** for character entry.
- 5 Press **[Next]**.
- 6 Edit the phone number if necessary.
- 7 Press **[Next]**, then press **[Save]**.
 - To edit other items, repeat from step 2.
- 8 Press **[OFF]**.

Note:

*: Refer to **Adding Items to the Phonebook** (P.21)

8.1.4. Erasing Items in the Phonebook

- 1 Press **[Phonebook]**, then press **[Search]**.
- 2 Press **[▼]** or **[▲]** repeatedly to display the desired item.
- 3 Press **[CLEAR]**.
- 4 Press **[Yes]**.
 - To cancel erasing, press **[No]**.
 - To erase other items, repeat from step 2.
- 5 Press **[OFF]**.

8.1.5. Chain Dial

This feature allows you to dial phone numbers from the phonebook while you are on a call.

Example: Using a long distance calling card

- ① Dial from the phonebook:
18000123456 (Calling card access number).
- ② When prompted, dial from the phonebook:
1234 (Calling card PIN).
- ③ When prompted, dial from the phonebook:
15550123456 (the person you want to call).

1 During an outside call, press **[MENU]**.

2 Press **[1]** to select **"Phonebook"**.

3 Press **[▼]** or **[▲]** repeatedly to display the desired item.

4 Press **[Call]**.

- Repeat from step 1 to dial other numbers.

Note:

- When storing a calling card access number and your PIN in the phonebook as one phonebook item, press **[PAUSE]** to add pauses after the number and PIN as necessary.
- If you have rotary or pulse service, you need to press **[✕]** before pressing **[MENU]** in step 1 to change the dialing mode temporarily to tone.

8.2. Caller ID Service

This unit is Caller ID compatible. To use Caller ID features, you must subscribe to your telephone company's Caller ID service.

Caller ID features

When an outside call is being received, the calling party's telephone number will be displayed.

- If the unit cannot receive caller information, the following will be displayed:
"Out of area": The caller dialed from an area which does not provide Caller ID service.
"Private caller": The caller requested not to send caller information.

8.2.1. For Call Waiting Service Users

To use Call Waiting, you must subscribe to your telephone company's Call Waiting service.

This feature allows you to receive calls while you are already talking on the phone. If you receive a call while on the phone, you will hear a Call Waiting tone.

Press **[Flash]** to answer the 2nd call.

- The 1st call is put on hold while you answer the 2nd call.
- To switch between calls, press **[Flash]**.

Note:

- Please contact your telephone company for details and availability of this service in your area.

8.2.2. Caller List

Caller information for the last 50 different callers will be logged in the caller list. You can use this list to return missed calls.

- Caller information includes phone numbers, the date and time of calls, and the number of times the caller called.
- Make sure the unit's date and time setting is correct.

8.2.2.1. Storing Caller Information into the Phonebook

Items in the caller list can be stored into each handset's phonebook.

- 1** Press [**▼**] or [**▲**] to enter the caller list.
- 2** Press [**▼**] or [**▲**] repeatedly to display the desired item.
 - To edit the number, press [**Edit**], then edit the number.
- 3** Press [**Save**].
 - "**Enter name**" will be displayed.
 - If the caller has name information, the name and phone number will be saved. Skip to step 6.
- 4** Enter the name if necessary.
- 5** Press [**Next**], then press [**Save**].
 - To continue storing other items, repeat from step 2.
- 6** Press [**OFF**].

Note:

- If the caller information does not include a phone number, you cannot store it in the phonebook.

8.2.2.2. Erasing Caller Information

Erasing a selected item

- 1** Press [**▼**] or [**▲**] to enter the caller list.
- 2** Press [**▼**] or [**▲**] repeatedly to display the desired item.
- 3** Press [**CLEAR**].
 - To erase other items, repeat from step 2.
 - To exit the caller list, press [**OFF**].

Erasing all items

Make sure that you have no missed calls.

- 1** Press [**▼**] or [**▲**] to enter the caller list.
- 2** Press [**All erase**].
 - To cancel erasing, press [**No**].
- 3** Press [**Yes**].

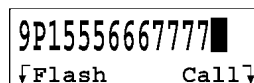
8.3. PAUSE Button (For PBX/Long Distance Service Users)

A pause is sometimes required when making calls using a PBX or long distance service.

For example, if you need to dial the line access number "9" when making outside calls with a PBX:

- 1** Press [**9**].
- 2** Press [**PAUSE**], then dial the phone number.

Example:



- 3** Press [**↶**], [**⏏**], or [**Call**].

Note:

- A 3.5 second pause is inserted each time [**PAUSE**] is pressed. Press repeatedly to insert longer pauses.

9 ANSWERING SYSTEM

The unit contains an answering system which can answer and record calls for you when you are unavailable to answer the phone.

Important:

- Only 1 person can access the answering system (listen to messages, record a greeting message, etc.) at a time.
- When callers leave messages, the unit records the day and time of each message. Make sure the date and time have been set.
- You can select the caller's recording time.

9.1. Recording Your Greeting Message

You can record your own greeting message (max. 2 minutes) that will be played when the answering system answers a call. If you do not record a greeting message, a pre-recorded greeting message will be used.

Sample greeting message: *"This is (your name). We are unable to answer the phone right now. Please leave a message after the beep. Thank you."*

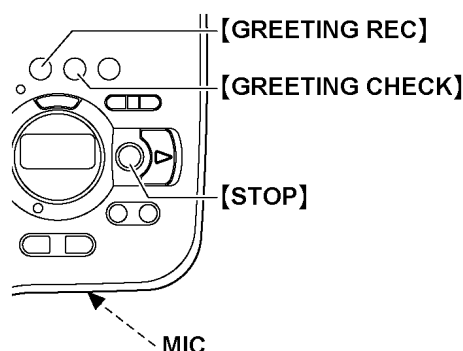
1 Press **[GREETING REC]**.

- The unit announces *"To record greeting, press record again."*

2 Within 10 seconds, press **[GREETING REC]** again.

3 After the unit beeps, speak clearly about 20 cm away from the MIC.

- The display will show the elapsed recording time.



4 To stop recording, press **[GREETING REC]** or **[STOP]**.

Note:

- If the greeting message is less than 1 second long, the unit beeps 6 times and announces, *"Your greeting was not recorded. Record your greeting again."*

To play back the greeting message

Press **[GREETING CHECK]**.

Erasing your greeting message

Press **[GREETING CHECK]**, and then press **[ERASE]** while your greeting message is playing.

- If you do not re-record your greeting message, the unit will use a pre-recorded greeting message.

Pre-recorded greeting message

If you do not record a greeting message, one of 2 pre-recorded messages will be played when a call is received depending on the caller's recording time.

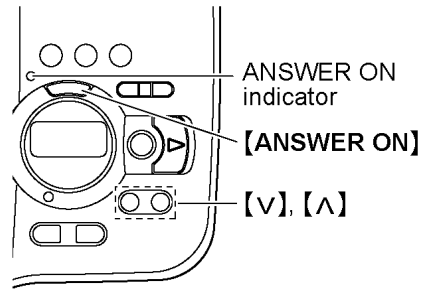
- When the recording time is set to **"1min"**, **"2min"**, or **"3min"**:
"Hello, we are not available now. Please leave your name and phone number after the beep. We will return your call."
- When the recording time is set to **"Greeting only"**:
"Hello, we are not available now. Please call again. Thank you for your call."

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

9.2. Turning the Answering System On/Off

Press **[ANSWER ON]**.

- When the answering system is turned on, the ANSWER ON indicator lights and the unit announces “*Answer set*” and the day and time.
- When the answering system is turned off, the ANSWER ON indicator turns off and the unit announces “*Answer off*”.



9.3. Caller's Recording Time

You can change the maximum message recording time allotted to each caller.

“**1min**”, “**2min**” or “**3min**” (default): Caller messages are limited to 1 minute to 3 minutes.

“**Greeting only**”: The unit plays the greeting message but does not record caller messages.

- 1 Press **[MENU]**.
- 2 Scroll to “**Initial setting**” by pressing **[v]** or **[^]**, then press **[>]**.
- 3 Scroll to “**Set answering**” by pressing **[v]** or **[^]**, then press **[>]**.
- 4 Scroll to “**Recording time**” by pressing **[v]** or **[^]**, then press **[>]**.
- 5 Press **[v]** or **[^]** repeatedly to select the desired setting.
 - You can also select the recording time by pressing **[1]** to **[3]**, or **[0]** (“**Greeting only**”).
- 6 Press **[Save]**, then press **[OFF]**.

Note:

- If message memory becomes full, the unit will automatically switch to the “**Greeting only**” mode.

9.4. Message Alert

You can select whether or not the message indicator on the handset will flash when new messages have been recorded. The default setting is OFF.

- 1 Press **[MENU]**.
- 2 Scroll to “**Initial setting**” by pressing **[v]** or **[^]**, then press **[>]**.
- 3 Scroll to “**Message alert**” by pressing **[v]** or **[^]**, then press **[>]**.
- 4 Press **[v]** or **[^]** repeatedly to select “**on**” or “**off**”.
- 5 Press **[Save]**, then press **[OFF]**.

Note:

- The message indicator will not flash for new messages while the handset is in use.
- While message alert is on, battery operating time will be shortened.

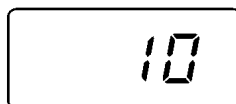
9.5. Listening to Messages

When new messages have been recorded:

- The MESSAGE indicator on the base unit will flash.
- The message indicator on the handset will flash slowly if the message alert feature is turned on.

The base unit display will show the number of messages (old and new) recorded by the answering system.

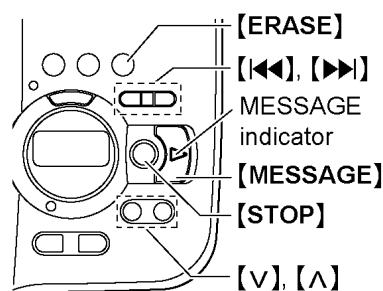
Example: The total number of recorded messages is 10.



9.5.1. Listening to Messages Using the Base Unit

Press **[MESSAGE]**.

- The unit will announce the number of new messages and will play back the new messages.
- When you have no new messages, the unit will announce “*No new messages. All message playback*”, and will play back all messages.



Note:

- The display shows the message number during playback.
- During playback, the unit will announce the day and time that each message was recorded. (**Voice time/day stamp**)
- At the end of the last message, the unit announces “*End of final message*”.

Erasing a specific message

Press **[ERASE]** while listening to the message you want to erase.

Erasing all messages

- 1 Press **[ERASE]** while the base unit is not being used.
 - The unit will announce “*To erase all messages, press ERASE again.*”
- 2 Within 10 seconds, press **[ERASE]** again.
 - The unit will announce “*No messages*”.

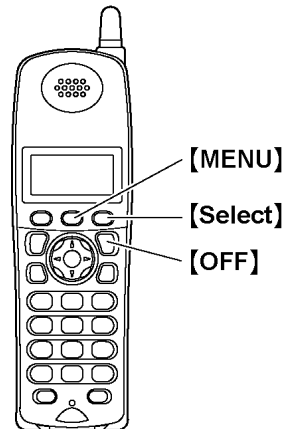
Note:

- Caller information for the erased messages will remain in the caller list.

9.5.2. Listening to Messages Using the Handset

When new messages have been recorded, “**New message**” is displayed.

- 1** Press **[MENU]**.
- 2** Press **[Select]** at “**Message play**”.
 - The unit will announce the number of new messages, and will play back the new messages.
 - To switch to the receiver and to listen to the messages in privacy, press **[📞]**. You can switch back to the speaker by pressing **[🔊]**.
 - When you have no new messages, the unit will announce “*No new messages. All message playback*”, and will play back all messages.
 - After the last message is played back, the unit’s voice guidance starts. Follow the guidance as necessary.
- 3** Press **[OFF]** when finished.



Note:

- Adjust the speaker or receiver volume using **[▼]** or **[▲]**.
- At the end of the last message, the unit announces “*End of final message*”.

9.5.3. Answering System Commands

You can also operate the answering system by pressing dial keys.

To use the following commands, press **[MENU]**, then press **[Select]** at “**Message play**”.

Key	Command
[1] or [◀]	Repeat message (during playback) ^{*1}
[2] or [▶]	Skip message (during playback)
[4]	Play new messages
[5]	Play all messages
[8]	Turn answering system on
[9]	Stop playback ^{*2}
[0]	Turn answering system off
[CLEAR] or [*][4]	Erase this message (during playback)
[*][5]	Erase all messages

^{*1} If pressed within the first 5 seconds of a message, the previous message will be played.

^{*2} To resume operation, press a command key within 15 seconds, or the voice guidance will start.

9.6. Remote Operation

Using a touch tone phone, you can call your phone number from outside and access the unit to listen to messages. The unit’s voice guidance will prompt you to press certain dial keys to perform different operations.

Important:

- In order to operate the answering system remotely, you must first set a remote code. This code must be entered each time you operate the answering system remotely.

9.6.1. Using the Answering System Remotely

- 1** Dial your phone number from a touch tone phone.
 - If the ring count is set to “**Toll saver**”, the number of rings you hear will indicate whether or not you have new messages.
- 2** After the greeting message starts, enter your remote code.
 - The unit will announce the number of new messages, and will play back the new messages.
- 3** After 3 seconds, the voice guidance will start. Follow the voice guidance as necessary.
- 4** When finished, hang up.

Note:

- When you press a key, press firmly.
- You can hang up at any time.
- You can ignore the voice guidance and control the unit using remote commands.

Voice guidance

During remote operation, the unit's voice guidance will prompt you to press **[1]** to perform a specific operation, or press **[2]** to listen to more available operations. Operations are presented by voice guidance in the following order:

- Play back all messages
- Play back new messages
- Record a message
- Erase all messages

Note:

- If you do not press any dial keys within 10 seconds after a voice guidance prompt, the unit will announce, “*Thank you for your call*” then disconnect your call.
- If less than 3 minutes of recording time is available, the unit will announce the remaining recording time after the last message is played back.
- If the unit announces “*Memory full*”, erase unnecessary messages.

9.6.2. Remote Code

A remote code must be entered when operating the answering system remotely. This code prevents unauthorized parties from listening to your messages remotely. Store any 2-digit number (00–99). The default setting is “**11**”.

- 1** Press **[MENU]**.
- 2** Scroll to “**Initial setting**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 3** Scroll to “**Set answering**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 4** Scroll to “**Remote code**” by pressing **[▼]** or **[▲]**, then press **[▶]**.
- 5** Select the desired remote code by entering a 2-digit number (00–99).
- 6** Press **[Save]**, then press **[OFF]**.

Note:

- To confirm the remote code, repeat steps 1 to 4. Press **[OFF]** when finished.

9.6.3. Remote Commands

You can press dial keys to access certain answering system functions without waiting for the voice guidance to prompt you.

Key	Remote command
[1]	Repeat message (during playback)* ¹
[2]	Skip message (during playback)
[4]	Play new messages
[5]	Play all messages
[9]	Stop* ²
[0]	Turn answering system off
[*][4]	Erase this message (during playback)
[*][5]	Erase all messages

*1 If pushed within the first 5 seconds of a message, the previous message will be played.

*2 To resume operation, enter a remote command within 15 seconds, or the voice guidance will start.

9.6.4. Turning on the Answering System Remotely

If the answering system is off, you can turn it on remotely.

1 Dial your phone number.

2 Let the phone ring 15 times.

- The unit will answer your call with the greeting message.
- You can hang up, or if you call from a touch tone phone, you can enter your remote code and begin remote operation.

10 TROUBLESHOOTING

If the handset display shows error messages, see “Troubleshooting (Handset LCD) (P.12)” for the Cause & Solution.

10.1. General Use

Problem	Cause & solution
The unit does not work.	<ul style="list-style-type: none"> • Make sure that the battery is installed correctly (*1). • Check the connections (*2). • Fully charge the battery (*3). • Clean the charge contacts and charge again (*3). • Unplug the base unit's AC adaptor to reset the unit. Reconnect the adaptor and try again. • Re-install the battery (*1) and fully charge it.
The display shows “ No link to base. Move closer to base, try again. ” and an alarm tone sounds.	<ul style="list-style-type: none"> • The handset is too far from the base unit. Move closer and try again. • Plug in the base unit's AC adaptor. • Raise the base unit antennas. • If the above remedies do not solve the problem, the handset may have lost communication with the base unit. Register the handset again (*4).
I cannot hear a dial tone.	<ul style="list-style-type: none"> • Confirm that the telephone line cord is connected (*2). • Disconnect the unit from the telephone line and connect a known working telephone. If the working telephone does not operate properly, contact your telephone company.

Cross Reference:

- (*1) **Battery Installation** (P.7)
- (*2) **Connections** (P.13)
- (*3) **Battery Charge** (P.7)
- (*4) **Re-registering the Handset** (P.44)

10.2. Programmable Settings

Problem	Cause & solution
I cannot program items.	<ul style="list-style-type: none"> • Programming is not possible while the handset and base unit are being used. • Do not pause for over 1 minute while programming. • Move closer to the base unit. • While another user is listening to messages or the answering system is answering a call, you cannot program. Try again later.
While programming, the handset starts to ring.	<ul style="list-style-type: none"> • A call is being received. Answer the call and start again from the beginning after hanging up.

10.3. Making/Answering Calls, Intercom

Problem	Cause & solution
Static is heard, sound cuts in and out. Interference from other electrical units.	<ul style="list-style-type: none"> ● Move the handset and the base unit away from other electrical appliances. ● Move closer to the base unit. ● Raise the base unit antennas. ● Turn on the clarity booster feature. ● If your unit is connected to a telephone line with DSL service, we recommend connecting a noise filter between the base unit and the telephone line jack. Contact your DSL provider for details.
The handset does not ring.	<ul style="list-style-type: none"> ● The ringer volume is turned off. Adjust it.
I cannot make a call.	<ul style="list-style-type: none"> ● The dialing mode may be set incorrectly. Set the dial mode (*5) to match the type of telephone service you have (tone or pulse). ● If the base unit (including answering system) is in use, you may not be able to make a call. Try again later. ● While listening to messages using the handset, you cannot make a call. Exit by pressing [OFF]. ● Dial lock is turned on (*6).
I cannot redial by pressing [REDIAL] .	<ul style="list-style-type: none"> ● If the last number dialed was more than 48 digits long, the number will not be redialed correctly. ● If you press [REDIAL] after you have started dialing, this button functions as the [PAUSE] button. To redial, do not dial any numbers before pressing [REDIAL]. ● Dial lock is turned on (*6).
I cannot have a conversation using the headset.	<ul style="list-style-type: none"> ● Make sure that an optional headset is connected properly (*7). ● If “SP-phone” is displayed on the handset, press [📞] to switch to the headset.
I cannot page the handset or base unit.	<ul style="list-style-type: none"> ● The called handset is too far from the base unit. ● The called unit is in use. Try again later.

Cross Reference:

(*5) **Dialing Mode** (P.16)

(*6) **Dial Lock** (P.18)

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

10.4. Phonebook

Problem	Cause & solution
I cannot store an item in the phonebook.	<ul style="list-style-type: none"> ● You cannot store an item in the phonebook while the handset is in talk, speakerphone or intercom mode, or while listening to messages. ● Do not pause for over 1 minute while storing. ● Dial lock is turned on (*8).
While storing an item in the phonebook, the handset starts to ring.	<ul style="list-style-type: none"> ● A call is being received. Answer the call and start again from the beginning after hanging up.
The display exits the phonebook while searching.	<ul style="list-style-type: none"> ● The handset automatically exits after 1 minute of inactivity.

Cross Reference:

(*8) **Dial Lock** (P.18)

10.5. Caller ID

Problem	Cause & solution
The handset does not display the caller's name and/or phone number.	<ul style="list-style-type: none"> • You have not subscribed to Caller ID service. Contact your telephone company to subscribe. • If your unit is connected to any additional telephone equipment such as a Caller ID box or wireless telephone jack, disconnect the unit from the equipment and plug the unit directly into the wall jack. • If your unit is connected to a telephone line with DSL service, we recommend connecting a noise filter between the base unit and the telephone line jack. Contact your DSL provider for details. • Other telephone equipment may be interfering with this unit. Disconnect the other equipment and try again. • The caller requested not to send caller information (*9).
The display exits the caller list while searching.	<ul style="list-style-type: none"> • The handset automatically exits after 1 minute of inactivity.
Time setting is erased, and "⌚ Press MENU." flashes on the handset and ⌚ flashes on the base unit display.	<ul style="list-style-type: none"> • If a power failure occurs, time setting may be erased. Set the date and time again (*10).

Cross Reference:

(*9) **Caller ID Service** (P.23)

(*10) **Date and Time** (P.15)

10.6. Answering System

Problem	Cause & solution
I cannot listen to messages from a remote location.	<ul style="list-style-type: none"> ● A touch tone phone is required for remote operation. ● Press the remote code correctly and press each key firmly (*11). ● The answering system is off. Turn it on (*12).
The other party complains that they cannot leave a voice message.	<ul style="list-style-type: none"> ● The recording time is set to “Greeting only”. Select “1min”, “2min”, or “3min” (*13). ● The memory is full. Erase unnecessary messages (*14).
“ FULL ” flashes and the ANSWER ON indicator flashes rapidly. No new messages are recorded.	<ul style="list-style-type: none"> ● Message memory is full. Erase unnecessary messages (*14).
I cannot operate the answering system.	<ul style="list-style-type: none"> ● Someone is operating the answering system.
During message playback, the unit rings and cancels playback.	<ul style="list-style-type: none"> ● A call is being received. Answer the call and start again from the beginning after hanging up.
The message indicator on the handset flashes slowly.	<ul style="list-style-type: none"> ● New messages have been recorded. Listen to the new messages (*14) or turn the message alert off (*15).
When you play back messages or turn on the answering system, the base unit and handset announce the day and time incorrectly.	<ul style="list-style-type: none"> ● Set the date and time again (*16).

Cross Reference:

(*11) **Remote Code** (P.29)

(*12) **Turning the Answering System On/Off** (P.26)





(*13) **Caller's Recording Time** (P.26)

(*14) **Listening to Messages Using the Base Unit** (P.27)

(*15) **Message Alert** (P.26)

(*16) **Date and Time** (P.15)

10.7. Battery Charge

Problem	Cause & solution
"Recharge battery" is displayed,  flashes or the handset beeps intermittently.	<ul style="list-style-type: none"> Fully charge the battery (*17).
"Charge for 6h" and  are displayed and the handset does not work.	<ul style="list-style-type: none"> The battery has been discharged. Fully charge the battery (*17).
I charged the battery fully, but "Recharge battery" is still displayed and/or  continues to flash, or "Charge for 6h" and  are displayed.	<ul style="list-style-type: none"> Clean the charge contacts and charge again (*17). The battery may need to be replaced (*18). If you install a new battery, fully charge it (*17).
The CHARGE indicator does not go out after the battery has been charged.	<ul style="list-style-type: none"> This is normal.
The handset display is blank.	<ul style="list-style-type: none"> Confirm that the battery is properly installed. Fully charge the battery (*17).

Cross Reference:

(*17) **Battery Charge** (P.7)

(*18) **Battery Replacement** (P.8)

10.8. Power Failure

Problem	Cause & solution
The unit will not function.	<ul style="list-style-type: none"> This product is not designed to make calls in the event of a power failure. We recommend connecting a standard telephone to the same telephone line in the event that emergency calls need to be made during a power failure (*19).

Cross Reference:

(*19) **Connections** (P.13)

11 DISASSEMBLY INSTRUCTIONS

11.1. Base Unit

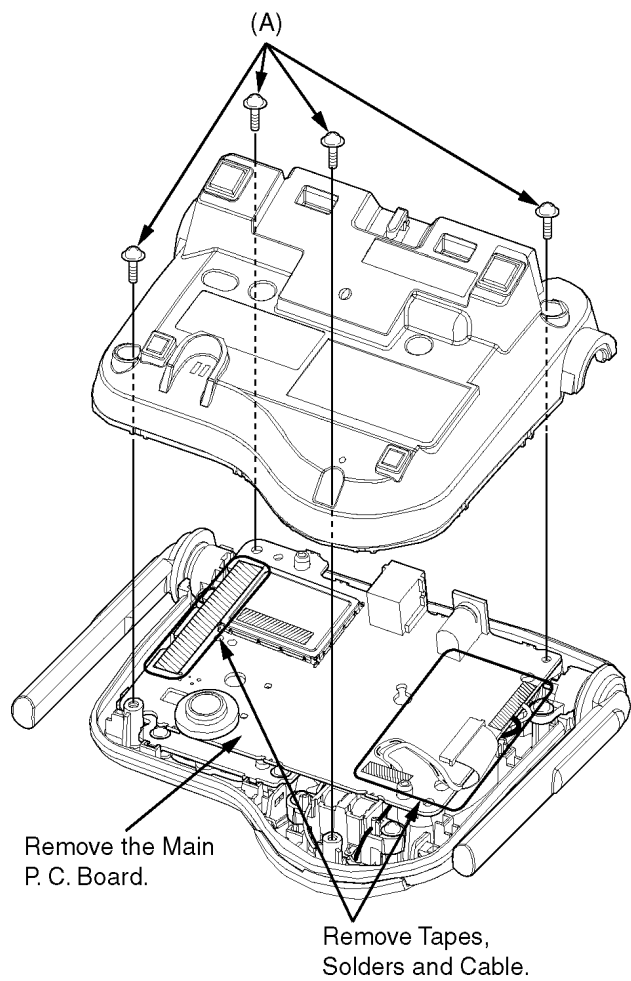


Fig. 1

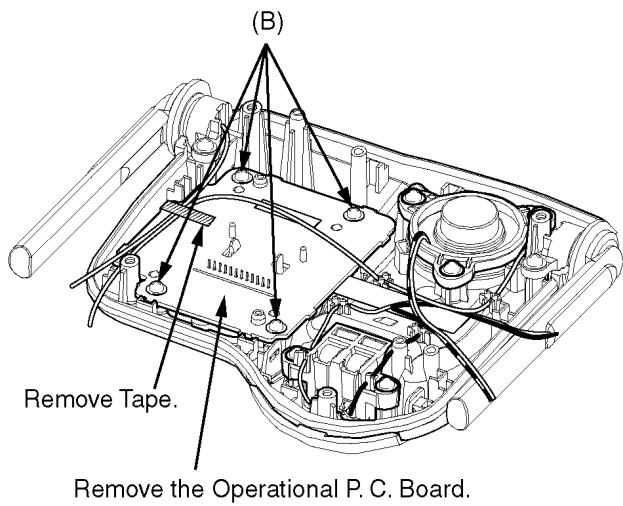


Fig. 2

Shown in Fig.-	To Remove -	Remove -
1	Cabinet Cover	Screws (2.6 × 12).....(A) × 4
	Main P. C. Board	Tapes, Solders and Cable
		Main P. C. Board
2	Operational P. C. Board	Tape
		Screws (2.6 × 8).....(B) × 4
		Operational P. C. Board

11.2. Handset

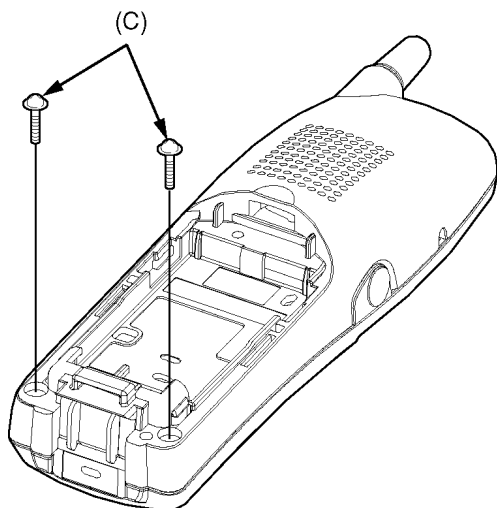


Fig. 3

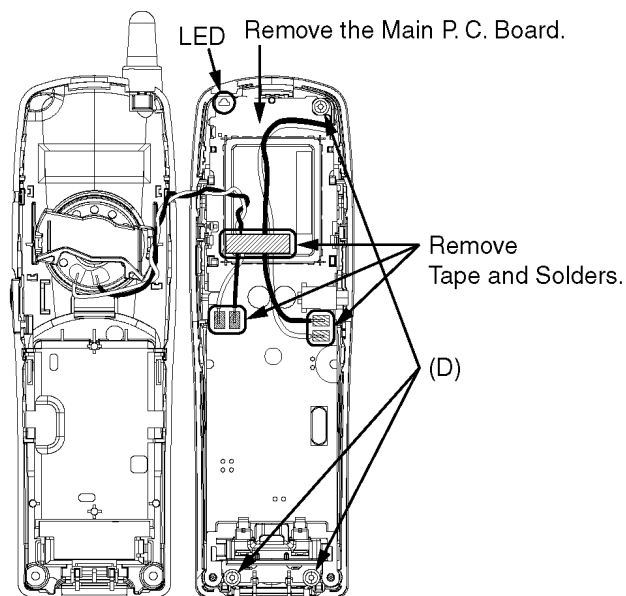
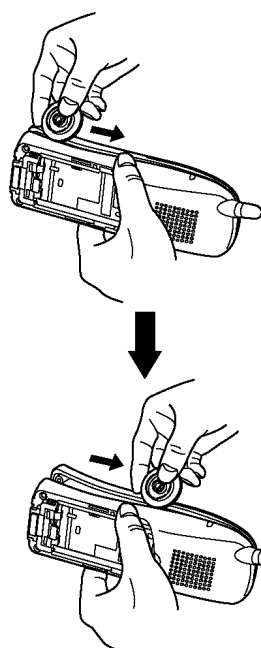
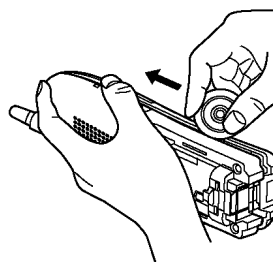


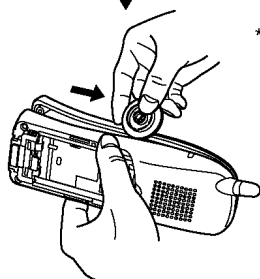
Fig. 5



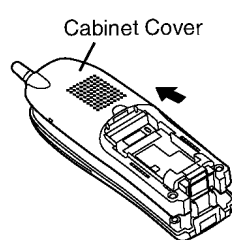
Insert a JIG (PQDJ10006Y) between the Cabinet Body and the Cabinet Cover, then pull it along the gap to open the Cabinet.



Likewise, open the other side of the Cabinet.



* Be careful not to damage LED. Refer to Fig. 5.



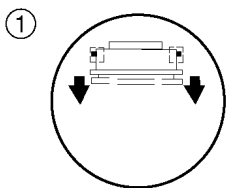
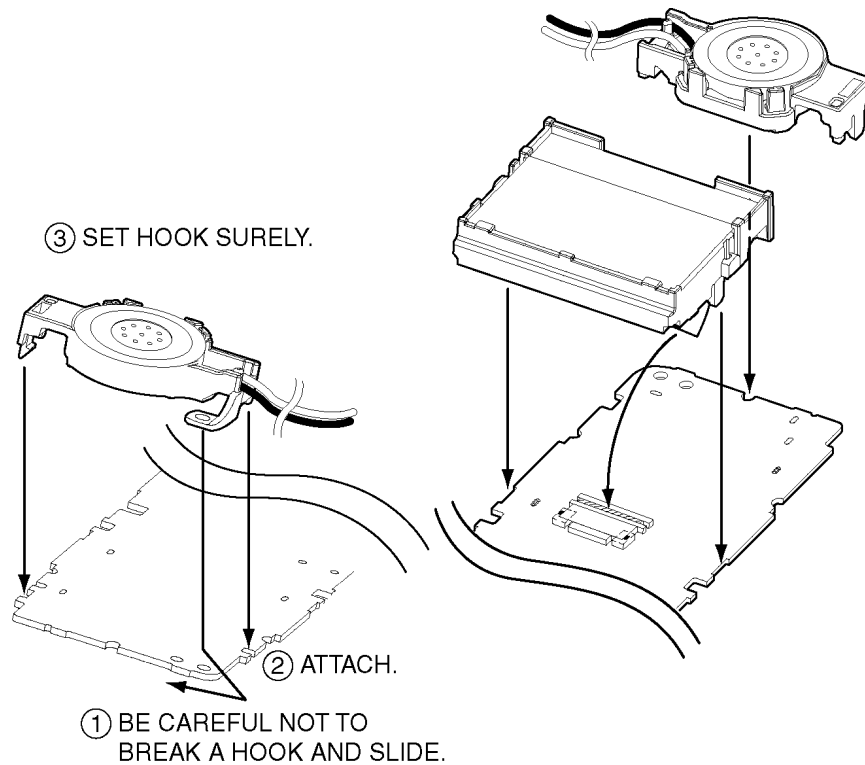
Remove the Cabinet Cover by pushing it upward.

Fig. 4

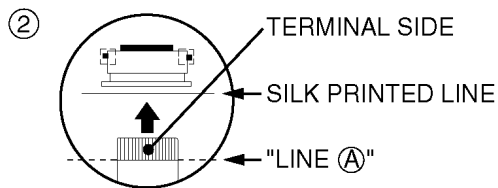
Shown in Fig.-	To Remove -	Remove -
3	Cabinet Cover	Screws (2 × 14).....(C) × 2
4		Follow the procedure.
5	Main P. C. Board	Tape and Solders
		Screws (2 × 9).....(D) × 3
		Main P. C. Board

12 ASSEMBLY INSTRUCTIONS

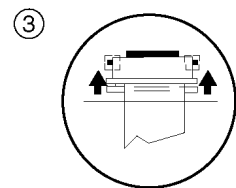
12.1. Fix the LCD and the Receiver Guide to the Main P.C. Board (Handset)



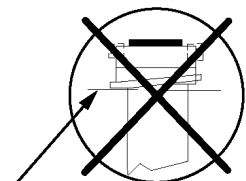
RELEASE THE
CONNECTOR LOCK.



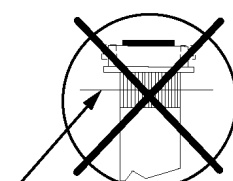
INSERT FFC OF LCD INTO
CONNECTOR SURELY UNTIL
"LINE A" REACHES
THE SILK PRINTED LINE ON P.C.B.



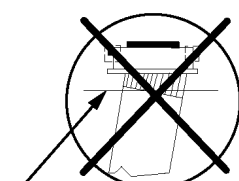
CLOSE THE
CONNECTOR LOCK.



NG
CONNECTOR IS
IMPERFECTLY
LOCKED.



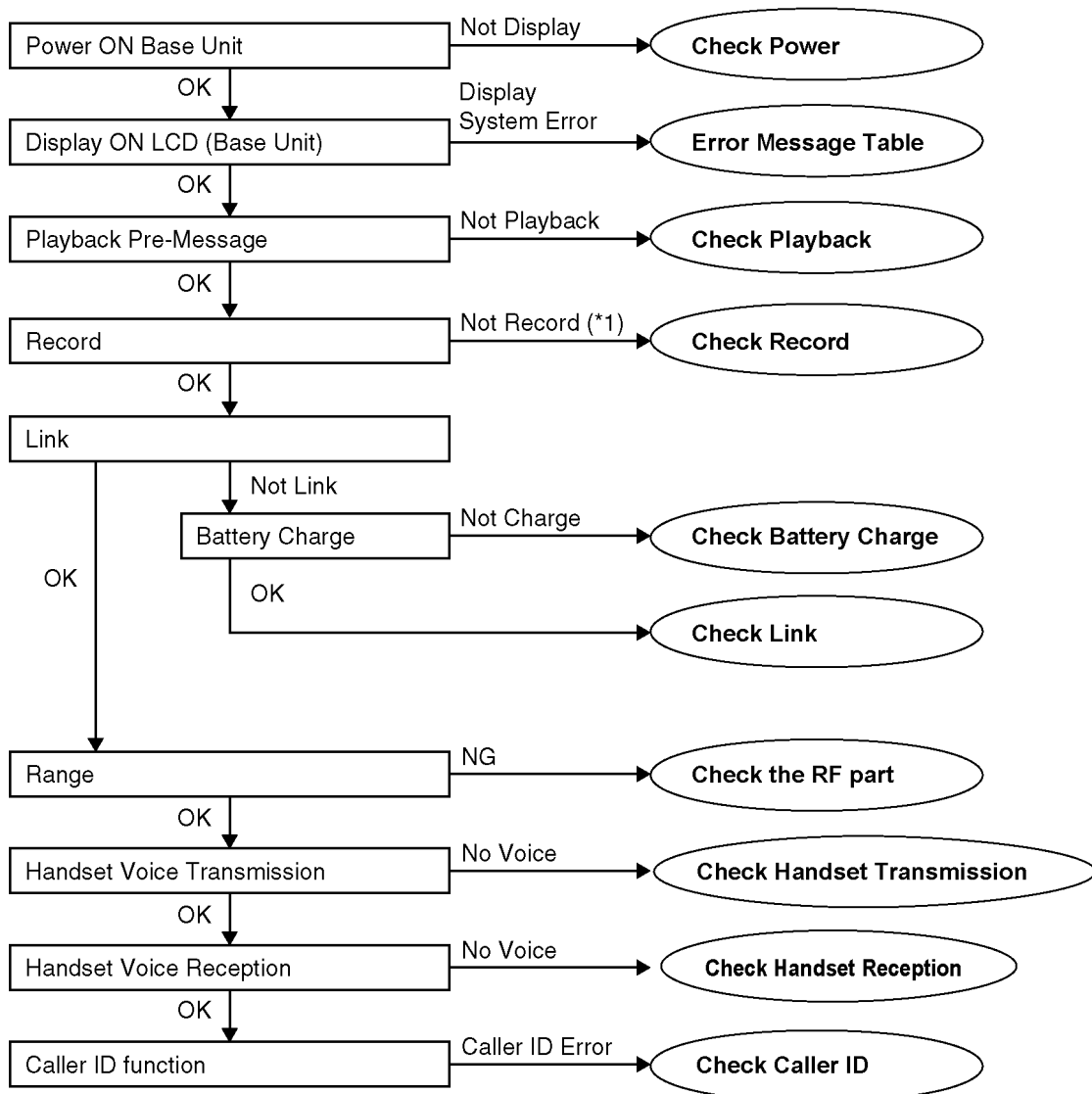
NG
FFC IS IMPERFECTLY
INSERTED.



NG
FFC IS INCLINED.

13 TROUBLESHOOTING GUIDE

FLOW CHART



Cross Reference:

Check Power (P.40)
Error Message Table (P.40)
Check Playback (P.42)
Check Record (P.41)
Check Battery Charge (P.42)
Check Link (P.43)
Check the RF part (P.44)
Check Handset Transmission (P.50)
Check Handset Reception (P.50)
Check Caller ID (P.50)

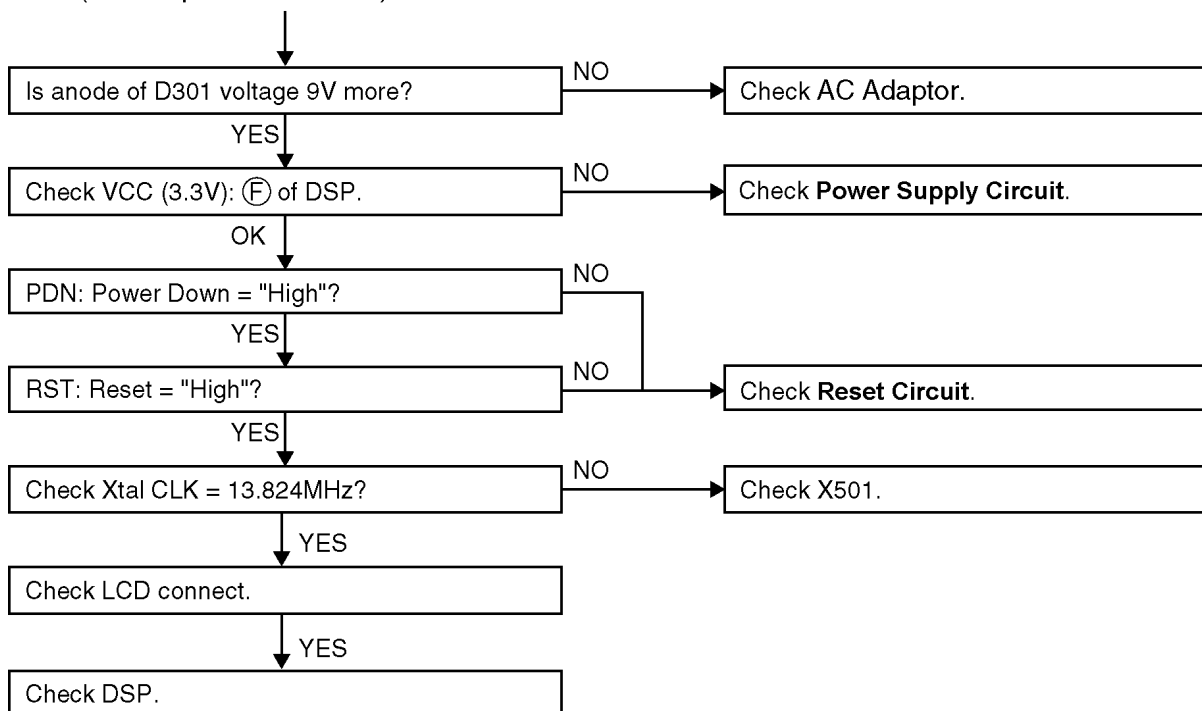
Note:

(*1) When a user claims that the unit disconnects a call right after the greeting message and no incoming messages can be recorded, this symptom can not be reappeared with TEL simulator in the service center. In this case, try **Check Record** (P.41) item (C).

13.1. Check Power

BASE UNIT

Is the AC Adaptor inserted into 220-240V outlet?
(AC Adaptor PQLV1BXY)



Cross Reference:

Power Supply Circuit (P.71)

Reset Circuit (P.73)

Note:

Flash Memory is IC601.

DSP is IC501.

13.2. Error Message Table

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

Note:

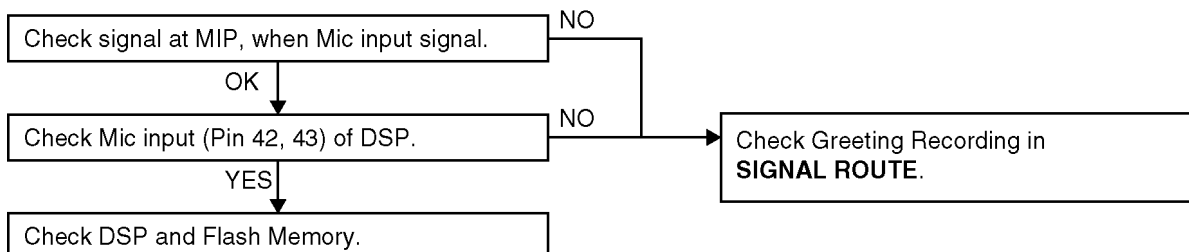
Flash Memory is IC601.

DSP is IC501.

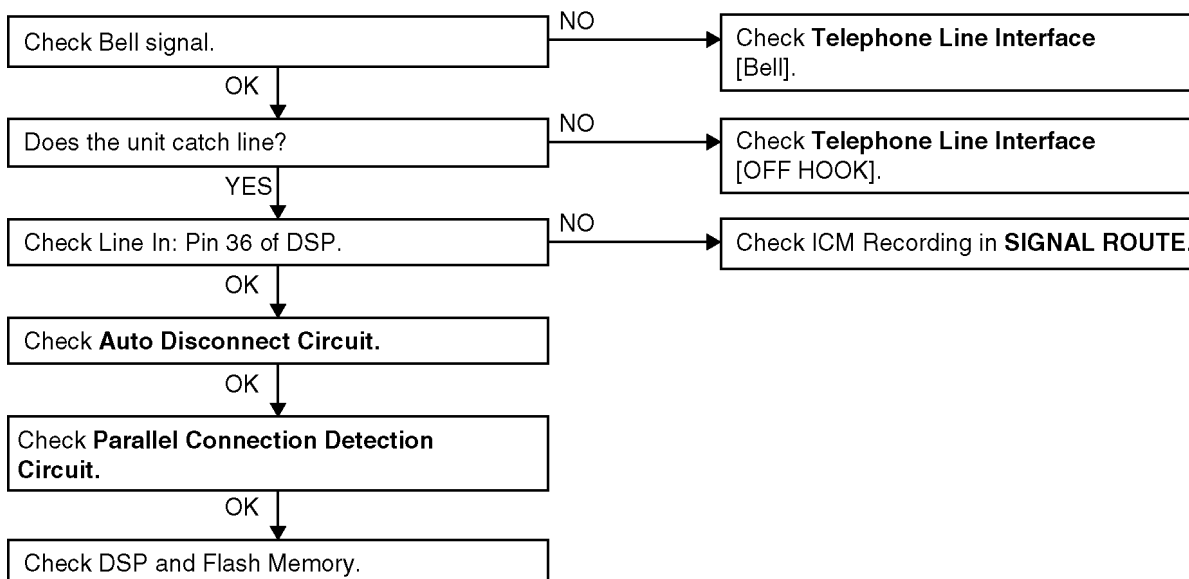
13.3. Check Record

BASE UNIT

a) Not record Greeting Message



b) Not record Incoming Message



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

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

Auto Disconnect activation		PROCEDURE	Status
Enable	2 sec. & CPU detect [default]	"STOP"+"GREETING CHECK"+"LOCATOR" simultaneously	Stand-by
	2 sec. & No CPU detect	"STOP"+"GREETING CHECK"+"VOL. [Λ]" simultaneously	
Disable*		"STOP"+"GREETING CHECK"+"VOL. [V]" simultaneously	

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

d) How to change the VOX level

VOX Level	PROCEDURE
Normal	"STOP"+"LOCATOR"+"VOL. [Λ]" simultaneously
-10 dB Down	"STOP"+"LOCATOR"+"VOL. [V]" simultaneously

Cross Reference:

SIGNAL ROUTE (P.91)

Telephone Line Interface (P.74)

Auto Disconnect Circuit (P.75)

Parallel Connection Detect Circuit (P.76)

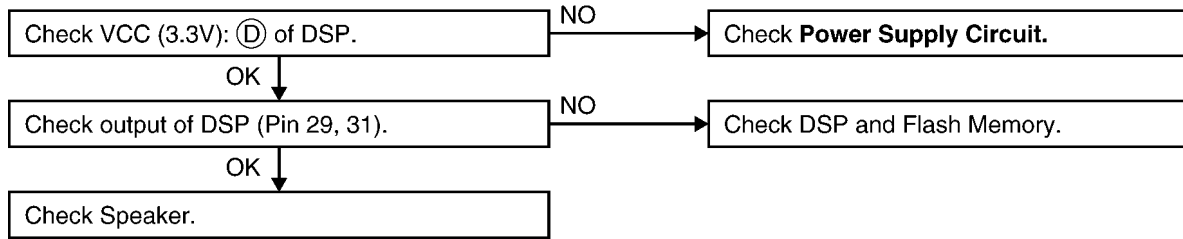
Note:

Flash Memory is IC601.

DSP is IC501.

13.4. Check Playback

BASE UNIT



Cross Reference:

Power Supply Circuit (P.71)

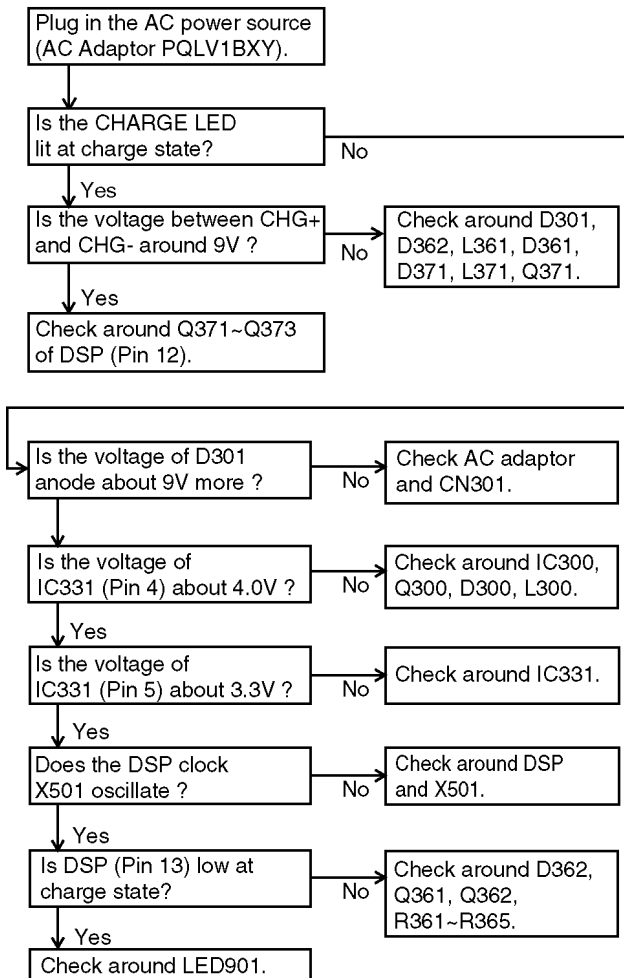
Note:

Flash Memory is IC601.

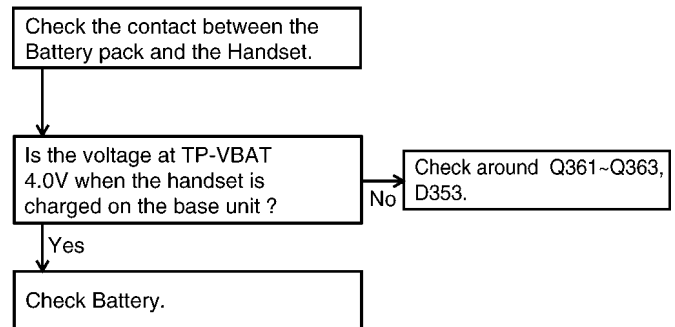
DSP is IC501.

13.5. Check Battery Charge

BASE UNIT



HANDSET



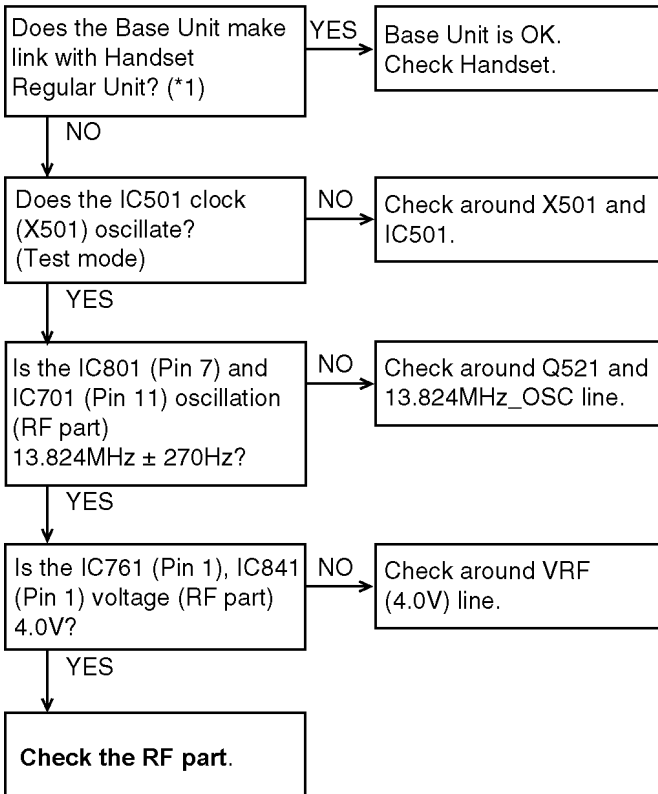
Note:

Flash Memory is IC601.

DSP is IC501.

13.6. Check Link

BASE UNIT



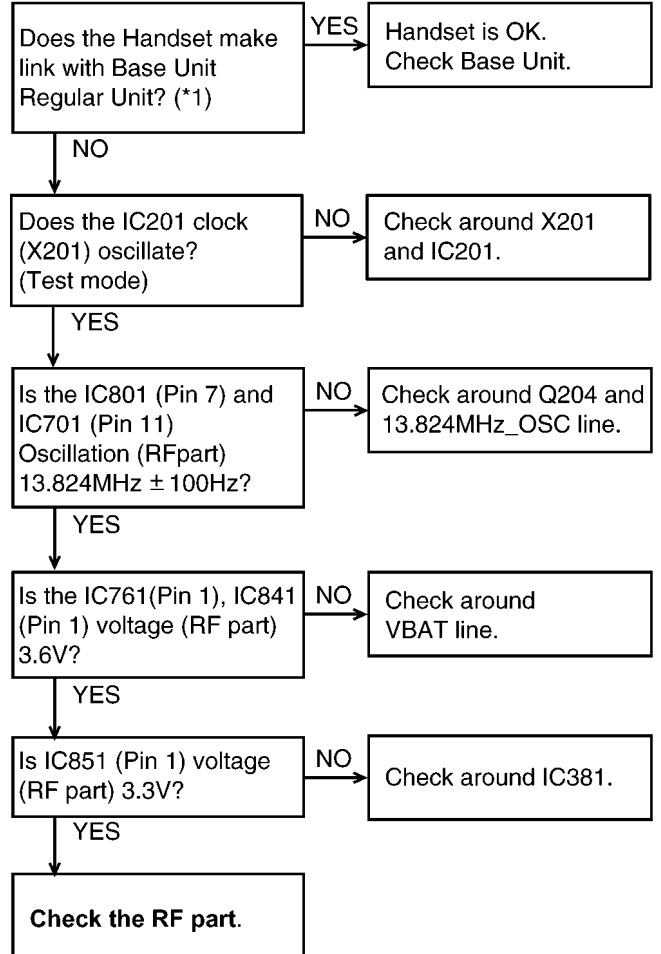
Note:

Flash Memory is IC601.

DSP is IC501.

(*1) Refer to **Finding out the Defective part** (P.44).

HANDSET



Cross Reference:

Check the RF part (P.44)

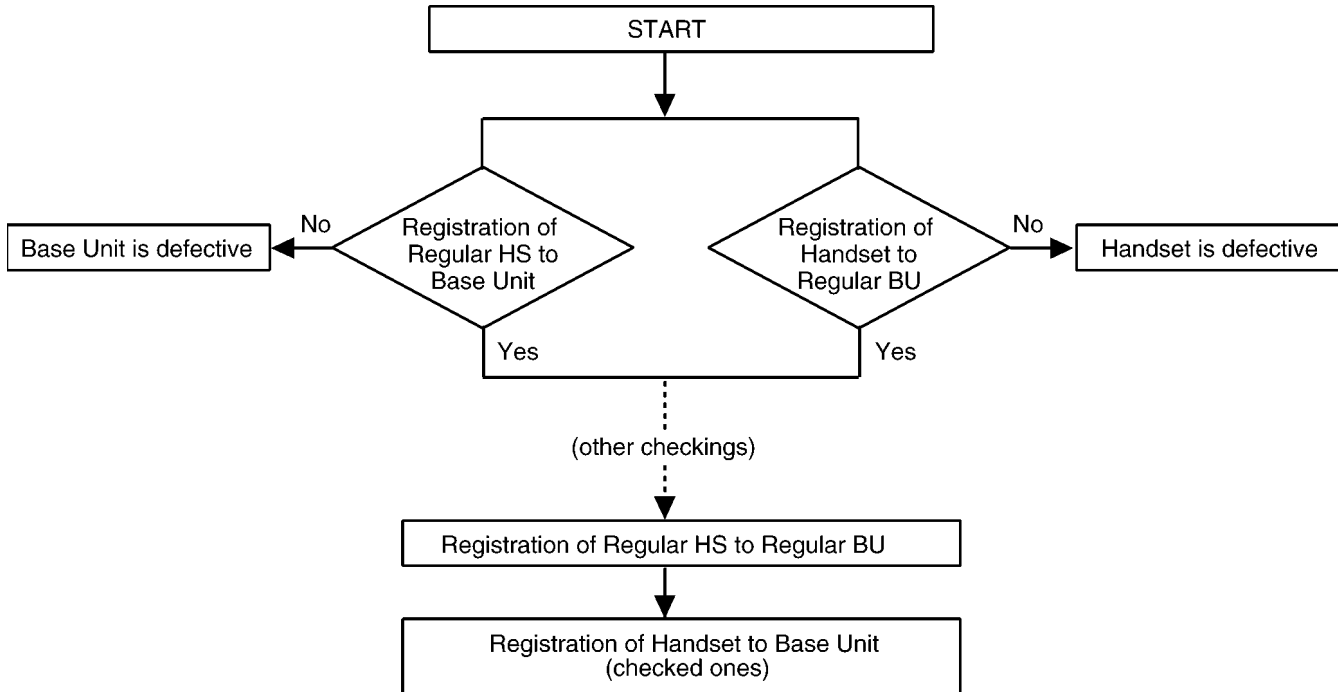
13.7. Check the RF part

13.7.1. Finding out the Defective part

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

After All the Checkings or Repairing

1. Re-register the checked Handset to the checked Base Unit, and Regular HS to Regular BU.



Note:

- (*1) HS: Handset
(*2) BU: Base Unit

13.7.1.1. Re-registering the Handset

If “**No link to base. Move closer to base, try again.**” is displayed even when the handset is near the base unit, you may need to re-register the handset to the base unit.

Important:

- Make sure the base unit is not being used.
- Have the handset and base unit near each other when re-registering the handset.

1 Handset:

Press **[MENU]**.

2 Scroll to “**Initial setting**” by pressing **[▼]** or **[▲]**, then press **[▶]**.

3 Scroll to “**Registration**” by pressing **[▼]** or **[▲]**, then press **[▶]**.

4 Base unit:

Press and hold **[LOCATOR/INTERCOM]** until the CHARGE indicator flashes.

- After the CHARGE indicator starts flashing, the rest of the procedure must be completed within 1 minute.

5 Handset:

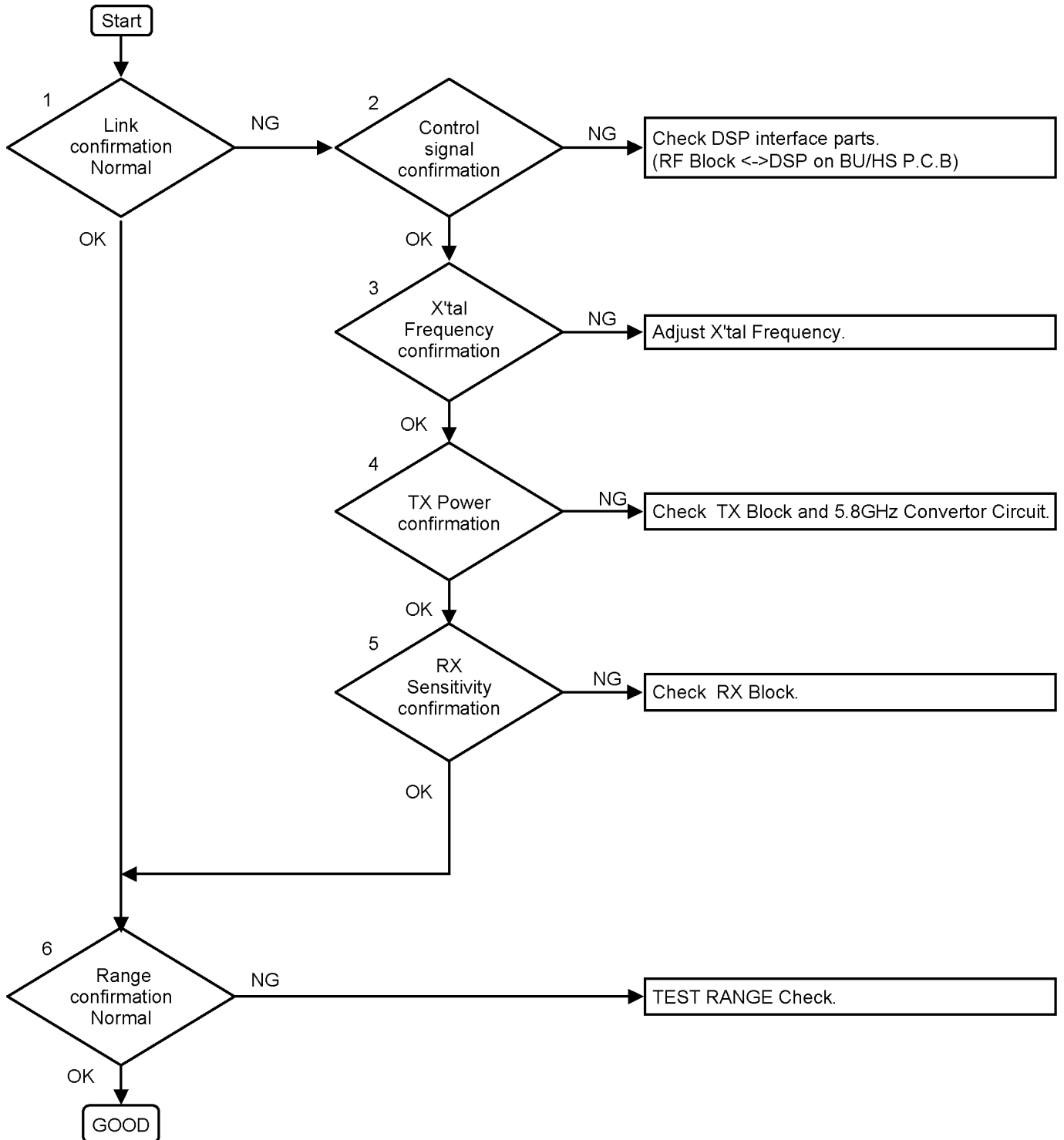
Press **[OK]**, then wait until the handset beeps.

- Registration is complete.

13.7.2. RF Check Flowchart

Each item (1 ~ 6) of RF Check Flowchart corresponds to **Check Table for RF part** (P.46).

Please refer to the each item.



13.7.3. Check Table for RF part

No.	Item	BU (Base Unit) Check	HS (HandSet) Check
1	Link Confirmation Normal HS, BU Mode [Normal Mode]	1. Register Regular HS to BU (to be checked). 2. Press [Talk] key of the Regular HS to establish link.	1. Register HS (to be checked) to Regular BU. 2. Press [Talk] key of the HS to establish link.
2	Control signal confirmation HS, BU Mode: [Test Burst Mode] (*1)	Check DSP interface. (*2)	Check DSP interface. (*2)
3	X'tal Frequency confirmation (*7) HS, BU Mode: [Adjustment] (*3)	Check X'tal Frequency. (13.824000MHz \pm 270Hz)	Check X'tal Frequency. (13.824000MHz \pm 100Hz)
4	TX Power confirmation Regular HS, BU Mode: [RX-CW Mode.] (*4) HS, BU (to be checked) Mode: [Test Burst Mode.] (*1)	1. Place the Regular HS about 15cm away from the BU. 2. Confirm that RSSI of the Regular HS is approximately 2V by Oscilloscope. (*5)	1. Place the HS about 15cm away from the Regular BU. 2. Confirm that RSSI of the Regular BU is approximately 2V by Oscilloscope. (*6)
5	RX Sensitivity confirmation Regular HS, BU Mode: [Test Burst Mode.] (*1) HS, BU (to be checked) Mode: [RX-CW Mode.] (*4)	1. Place the Regular HS about 15cm away from the BU. 2. Confirm that RSSI of the BU is approximately 2V by Oscilloscope. (*5)	1. Place the HS about 15cm away from the Regular BU. 2. Confirm that RSSI of the HS is approximately 2V by Oscilloscope. (*6)
6	Range Confirmation Normal HS, BU Mode: [Normal Mode]	1. Register Regular HS to BU (to be checked). 2. Press [Talk] key of the Regular HS to establish link. 3. Compare the range of the BU (being checked) with that of the Regular BU.	1. Register HS (to be checked) to Regular BU. 2. Press [Talk] key of the HS to establish link. 3. Compare the range of the HS (being checked) with that of the Regular HS.

Note:

(*1)(*3)(*4) **ADJUSTMENT AND TEST MODE** (P.51)

(*2) **RF-DSP Interface Signal Wave Form** (P.48)

(*5) **Base Unit Reference Drawing** (P.60)

(*6) **Handset Reference Drawing** (P.61)

(*7) **X501 (Base Unit), X201 (Handset) Check** (P.59)

13.7.4. TEST RANGE Check

Circuit block which range is defective can be found by the following check.

Item	BU (Base Unit) Check	HS (HandSet) Check
Range Confirmation TX TEST (TX Power check) HS, BU Mode: [Test Link Mode] (*1)	1. Register Regular HS to BU (to be checked). 2. Set BU to "Test Link mode". 3. Set Regular HS to "Test Link mode". *Set TX Power and RX Sensitivity of the BU and the Regular HS by CHART1. * At distance of about 20m between HS and BU, Link OK = TX Power of the BU is OK. No Link = TX Power of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set Regular BU to "Test Link mode". 3. Set HS to "Test Link mode". *Set TX Power and RX Sensitivity of the HS and the Regular BU by CHART1. * At distance of about 20m between HS and BU, Link OK = TX Power of the HS is OK. No Link = TX Power of the HS is NG.
Range Confirmation RX TEST (RX sensitivity check) HS, BU Mode: [Test Link Mode] (*1)	1. Register Regular HS to BU (to be checked). 2. Set BU to "Test Link mode". 3. Set Regular HS to "Test Link mode". *Set TX Power and RX Sensitivity of the BU and Regular HS by CHART1. * At distance of about 20m between HS and BU, Link OK= RX Sensitivity of the BU is OK. No Link = RX Sensitivity of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set Regular BU to "Test Link mode". 3. Set HS to "Test Link mode". * Set TX Power and RX Sensitivity of Checking_HS and Regular_BU by CHART1. * At distance of about 20m between HS and BU, Link OK= RX Sensitivity of the HS is OK. No Link = RX Sensitivity of the HS is NG.

CHART1: Setting of TX Power and RX Sensitivity in Range Confirmation TX TEST, RX TEST

	BU (to be checked)		Regular_HS	
	TX Power	RX Sens.	TX Power	RX Sens.
BU (Base Unit) TX Power Check	High	High	High	Low
BU (Base Unit) RX Sensitivity Check	High	High	Low	High

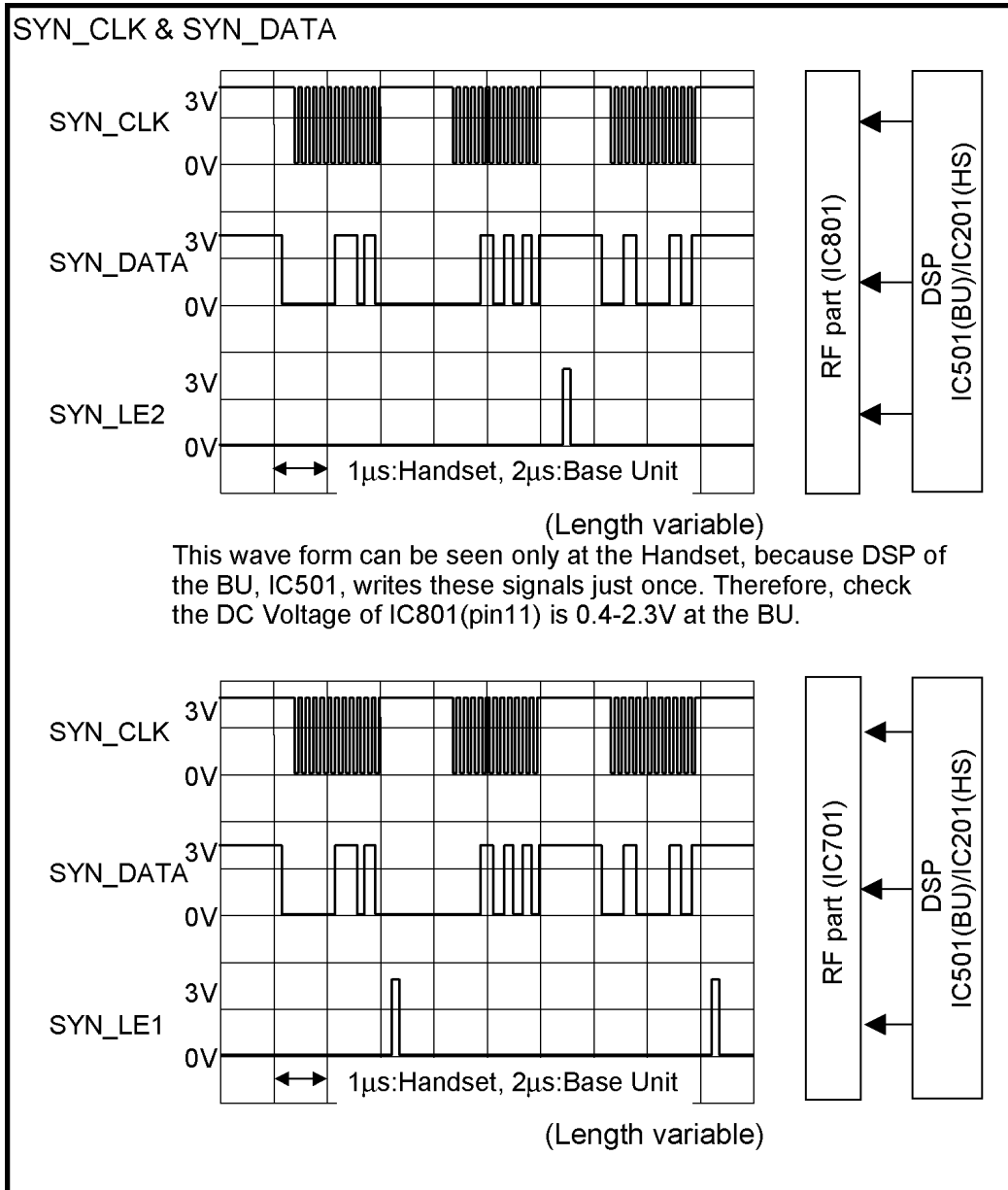
	HS (to be checked)		Regular_BU	
	TX Power	RX Sens.	TX Power	RX Sens.
HS (Handset) TX Power Check	High	High	High	Low
HS (Handset) RX Sensitivity Check	High	High	Low	High

Note:

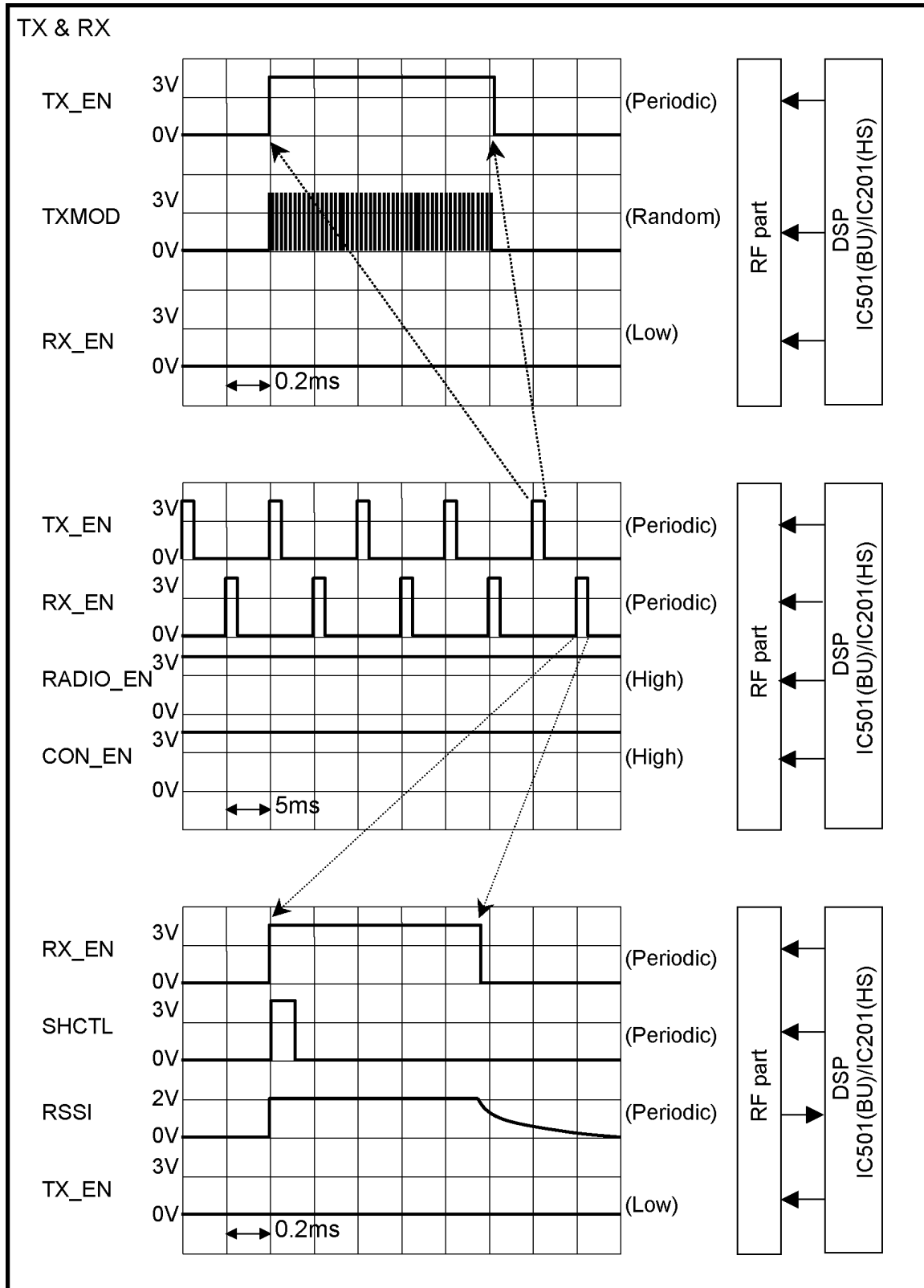
(*1) **ADJUSTMENT AND TEST MODE (P.51)**

13.7.5. RF-DSP Interface Signal Wave Form

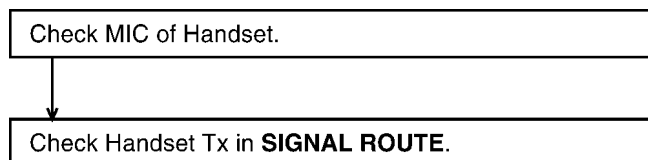
<Test Burst Mode>



<Test Burst Mode>



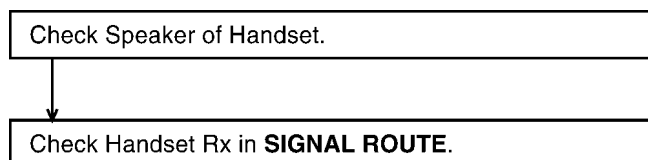
13.8. Check Handset Transmission



Cross Reference:

SIGNAL ROUTE (P.91).

13.9. Check Handset Reception



Cross Reference:

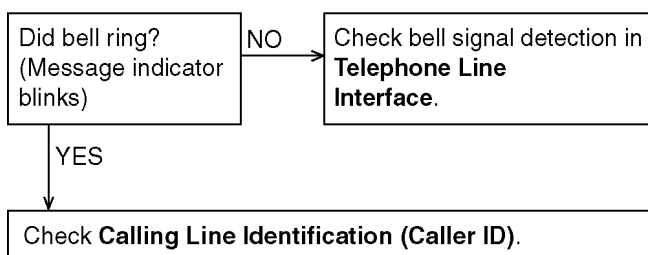
SIGNAL ROUTE (P.91).

Note:

When checking the RF part, Refer to **Check the RF part** (P.44)

13.10. Check Caller ID

BASE UNIT



Cross Reference:

Telephone Line Interface (P.74).

Calling Line Identification (Caller ID) (P.77).

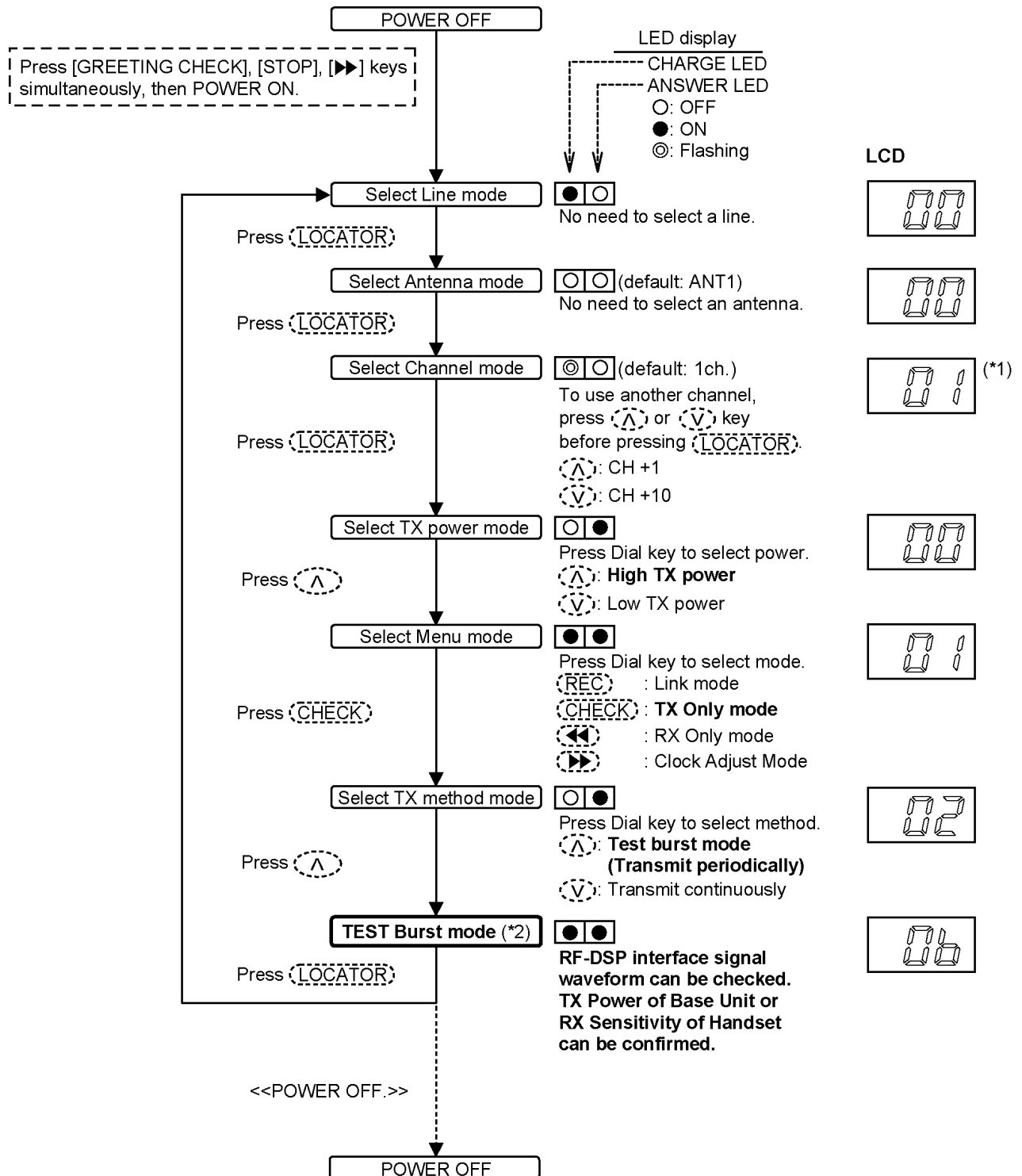
Note:

- Make sure the format of the Caller ID or Call Waiting Caller ID service of the Telephone company that the customer subscribes to.
- It is also recommended to confirm that the customer is really a subscriber of the service.

14 ADJUSTMENT AND TEST MODE

14.1. Test Mode Flow Chart for Base Unit

14.1.1. Test Burst Mode

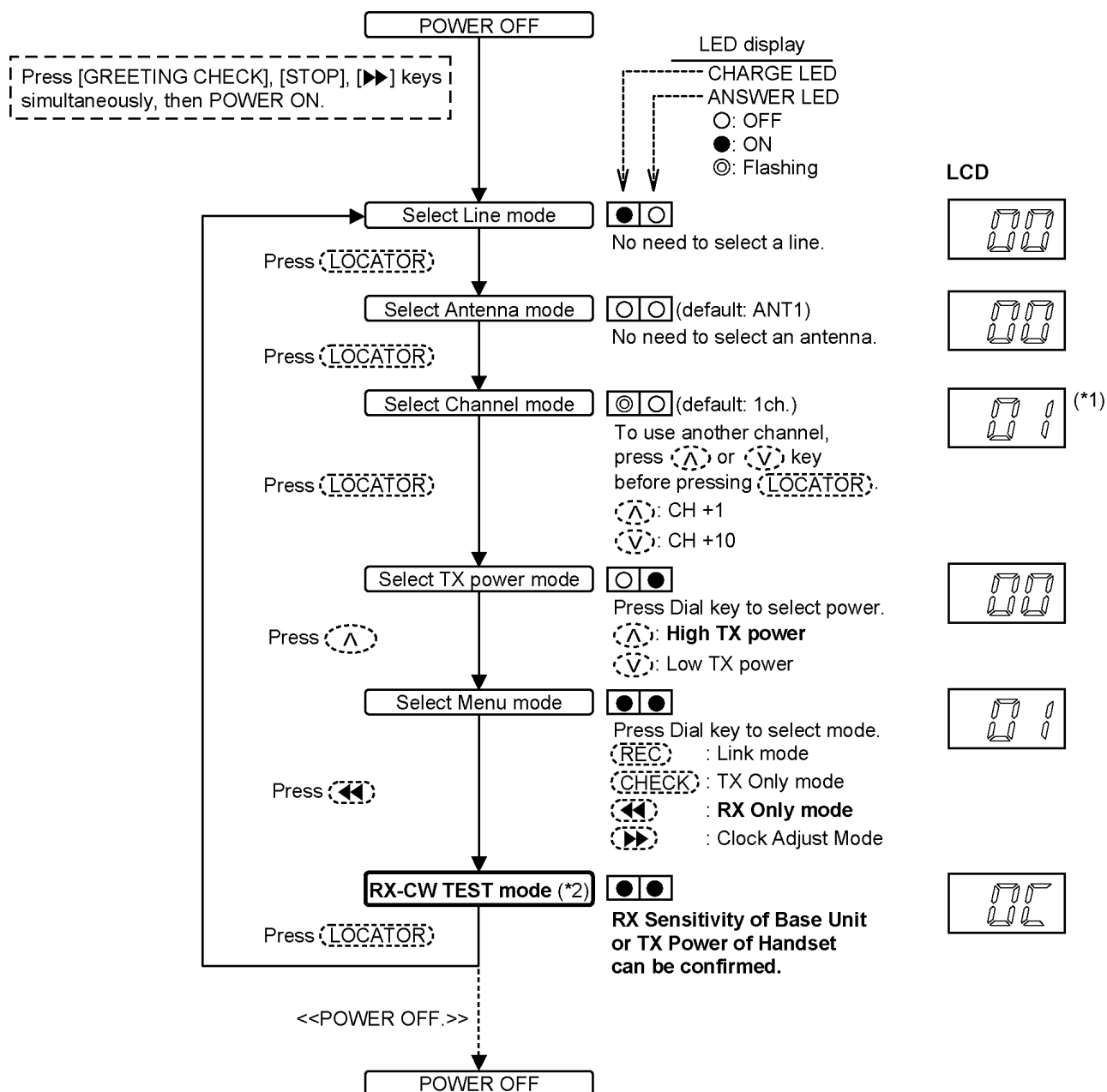


Note:

(*) LCD displays the Channel number.

(*)2 Refer to **Check Table for RF part** (P.46) and **RX-CW Test Mode** (P.56) for proper Handset settings.

14.1.2. RX-CW Test Mode

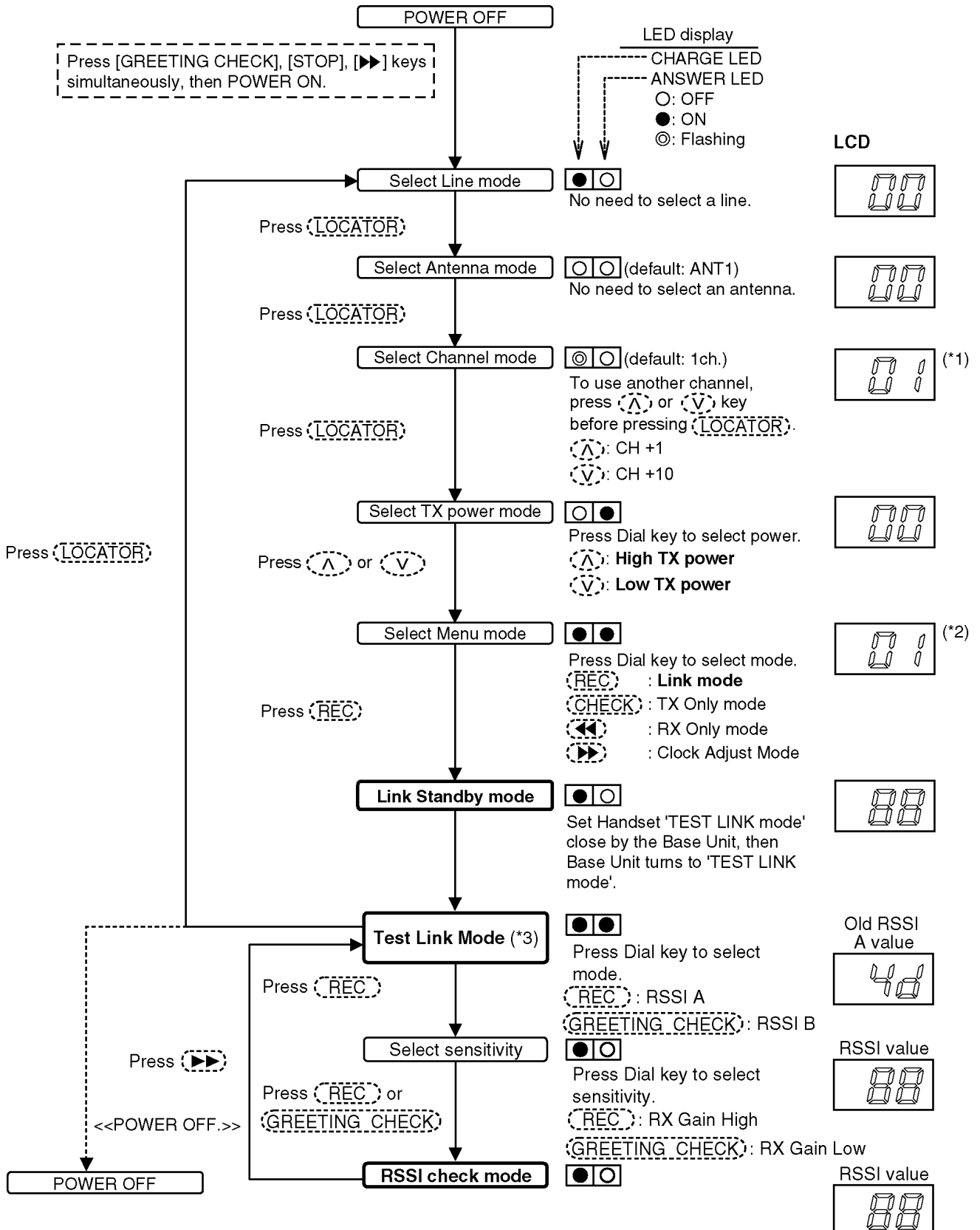


Note:

(*1) LCD displays the Channel number.

(*2) Refer to **Check Table for RF part** (P.46) and **Test Burst Mode** (P.55) for proper Handset settings.

14.1.3. Test Link Mode



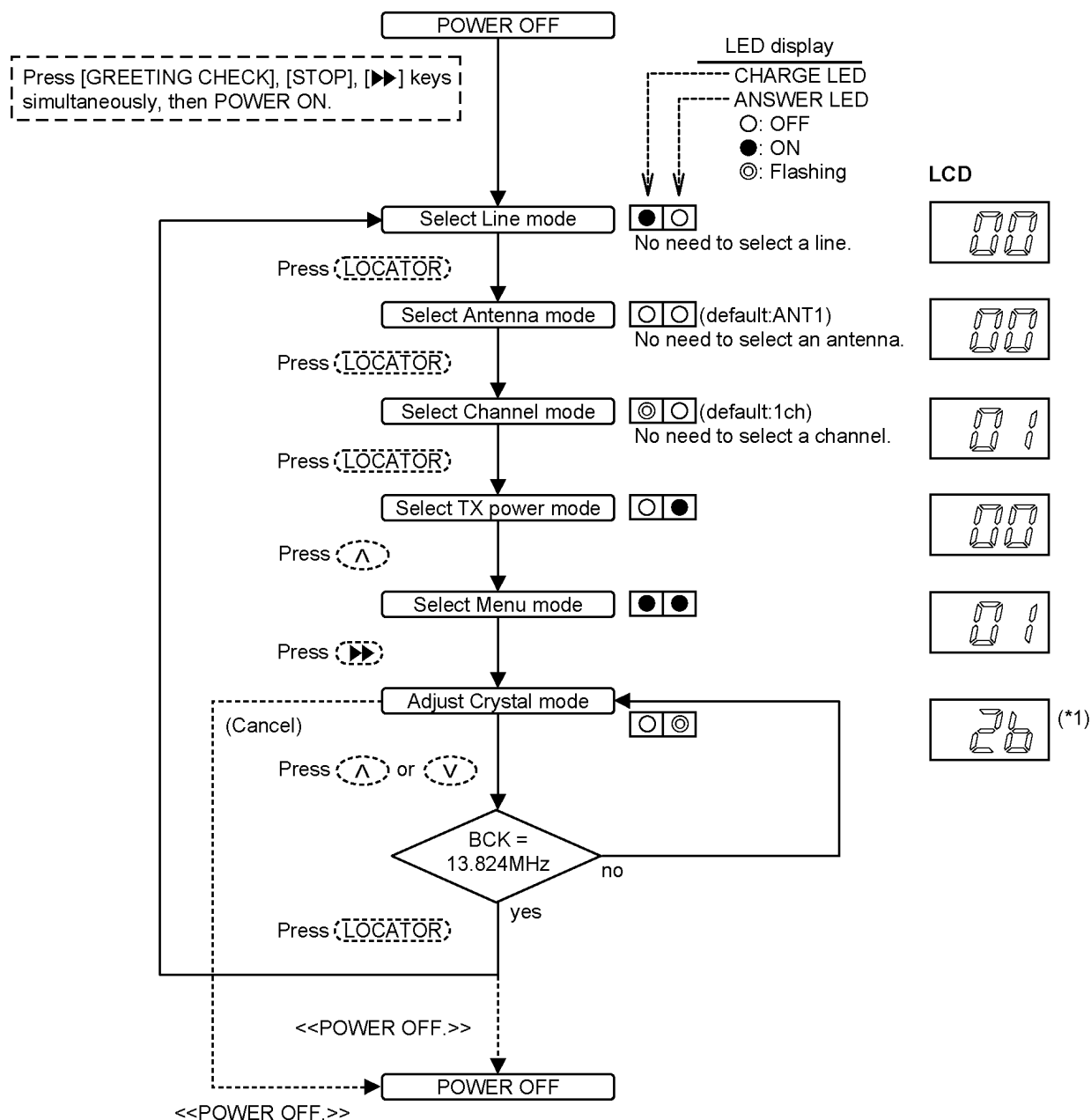
Note:

(*1) LCD displays the Channel number.

(*2) LCD displays the number of selected power.

(*3) Refer to **Check Table for RF part** (P.46) and **Test Link Mode** (P.57) for proper Handset settings.

14.1.4. Adjustment Mode



Cross Reference

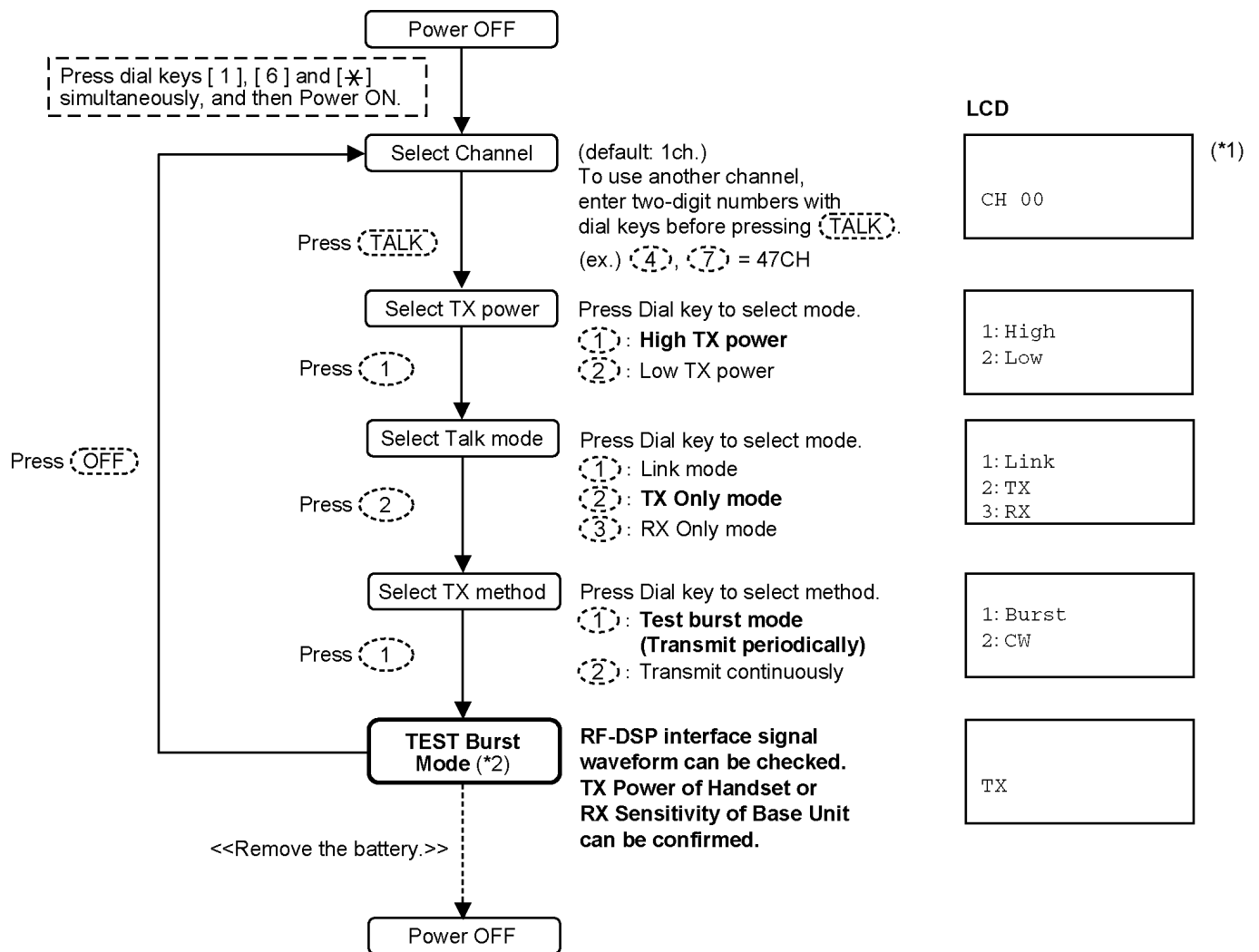
Check and Adjust X501 (Base Unit) Frequency (P.59)

Note:

(*) This is an adjustment value (hex.).

14.2. Test Mode Flow Chart for Handset

14.2.1. Test Burst Mode



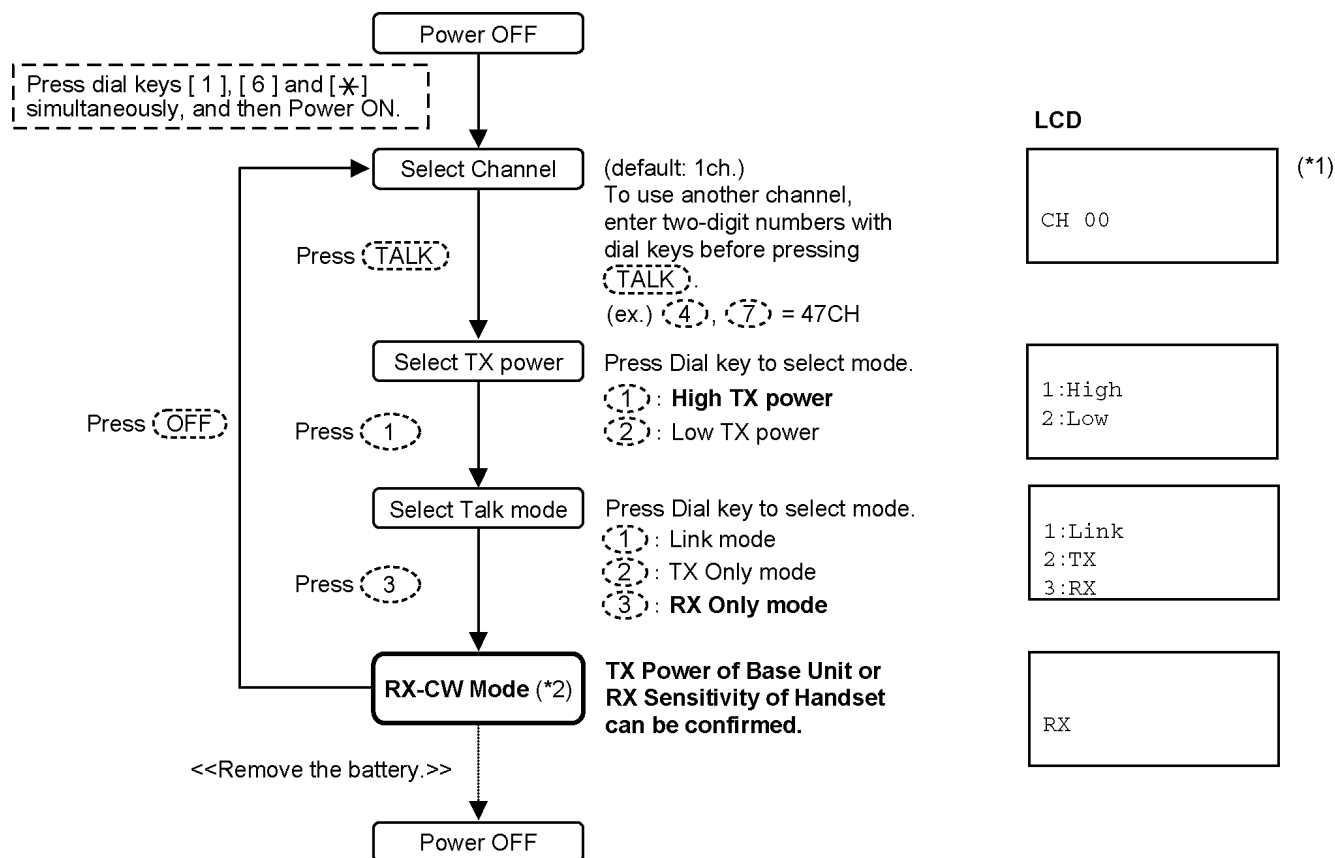
Note:

(*1) LCD displays the Channel number.

(exception: default/ CH00 = 1ch.)

(*2) Refer to **Check Table for RF part** (P.46) and **RX-CW Test Mode** (P.52) for proper Base Unit settings.

14.2.2. RX-CW Test Mode



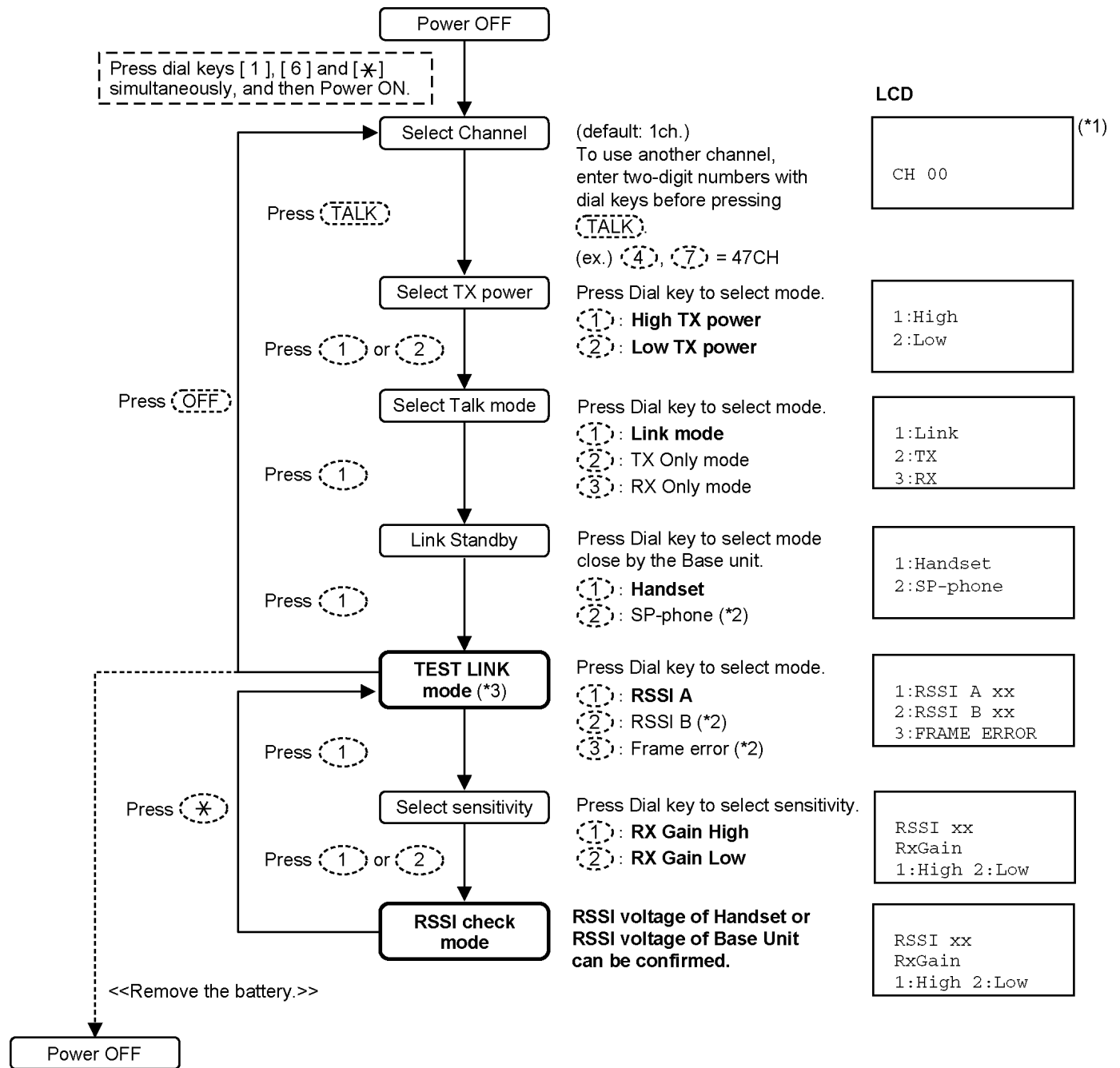
Note:

(*) LCD displays the Channel number.

(exception: default/ CH00 = 1ch.)

(*) Refer to **Check Table for RF part** (P.46) and **Test Burst Mode** (P.51) for proper Base Unit settings.

14.2.3. Test Link Mode



Note:

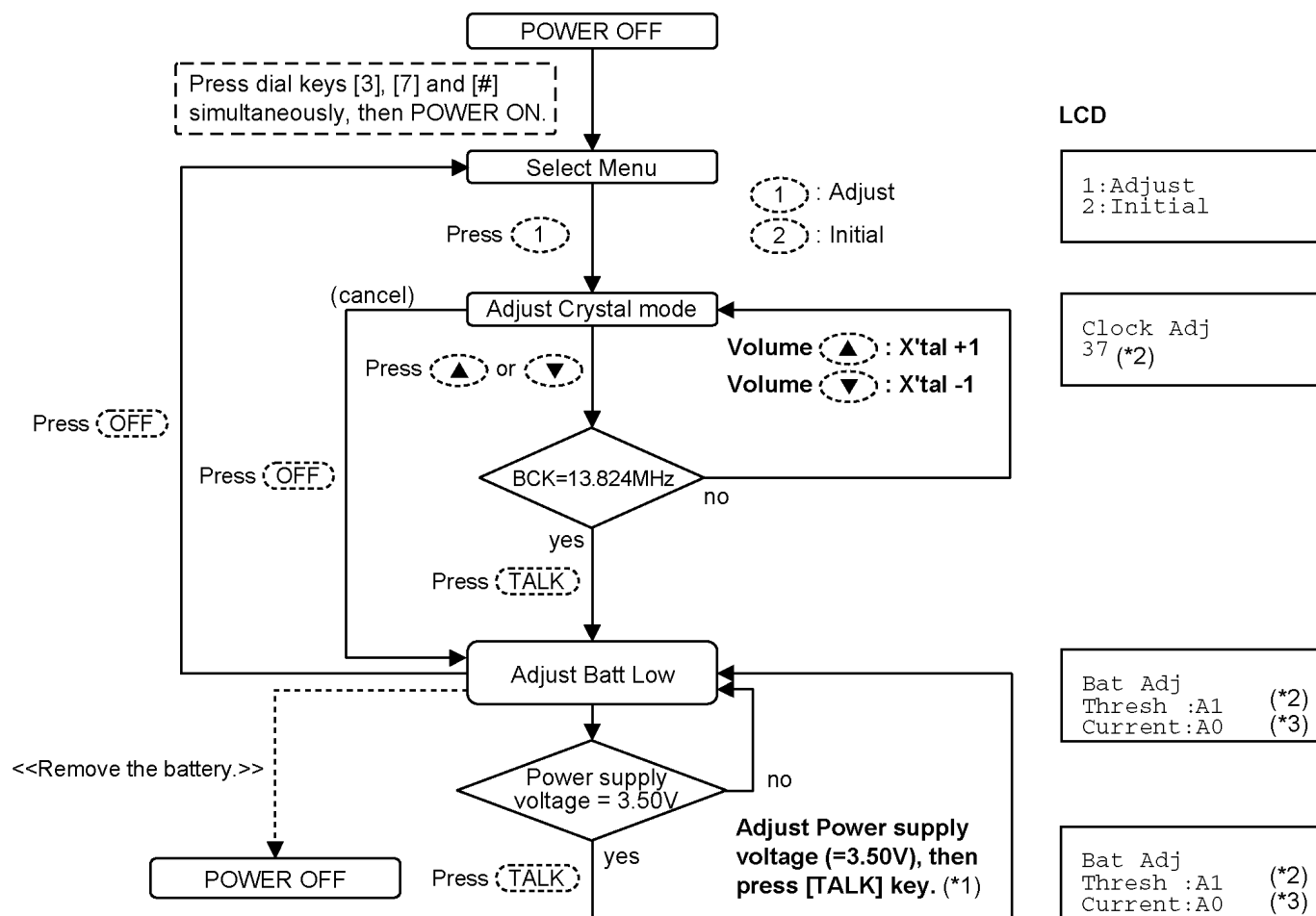
(*1) LCD displays the Channel number.

(exception: default/ CH00 = 1ch.)

(*2) for factory use only.

(*3) Refer to **Check Table for RF part** (P.46) and **Test Link Mode** (P.53) for proper Base Unit settings.

14.2.4. Adjustment Mode



Cross Reference

(*1) Adjust Battery Low Detector Voltage (Handset) (P.59)

Note:

(*2) These are the default values.

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

14.3. X501 (Base Unit), X201 (Handset) Check

Equipment: Frequency counter

Check Point for measurement: BCK

Checking tolerance: 13.824MHz \pm 270Hz (Base Unit)/13.824MHz \pm 100Hz (Handset)

14.3.1. Check and Adjust X501 (Base Unit) Frequency

1. Set up Base Unit in TEST mode.
2. Press following keys in order to Adjust Crystal mode. [LOCATOR], [LOCATOR], [LOCATOR], [Δ], [▶▶]. Check BCK frequency.
3. If the BCK frequency is out of the checking tolerance (\pm 270Hz), adjust to Adjustment tolerance (\pm 30Hz) by pressing [Δ] or [∇] key.
- Adjustment Tolerance: 13.824MHz \pm 30Hz
4. Press [LOCATOR] key to write the new frequency factor in Memory.
5. Turn the power off. Then this value is available.

When you have replaced IC501 and IC601, adjust X501 by the procedure above.

Cross Reference:

Adjustment Mode (P.54)

14.3.2. Check and Adjust X201 (Handset) Frequency

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

When you have replaced IC201 and IC241, adjust X201 by the procedure above.

Cross Reference:

Adjustment Mode (P.58)

14.4. Adjust Battery Low Detector Voltage (Handset)

After Handset's DSP (IC201) or EEPROM (IC241) replacement, Re-writing Battery Low voltage to EEPROM is required.

With following Handset Adjustment Flow, adjust DC power supply and DC voltmeter by the procedure below.

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

Note:

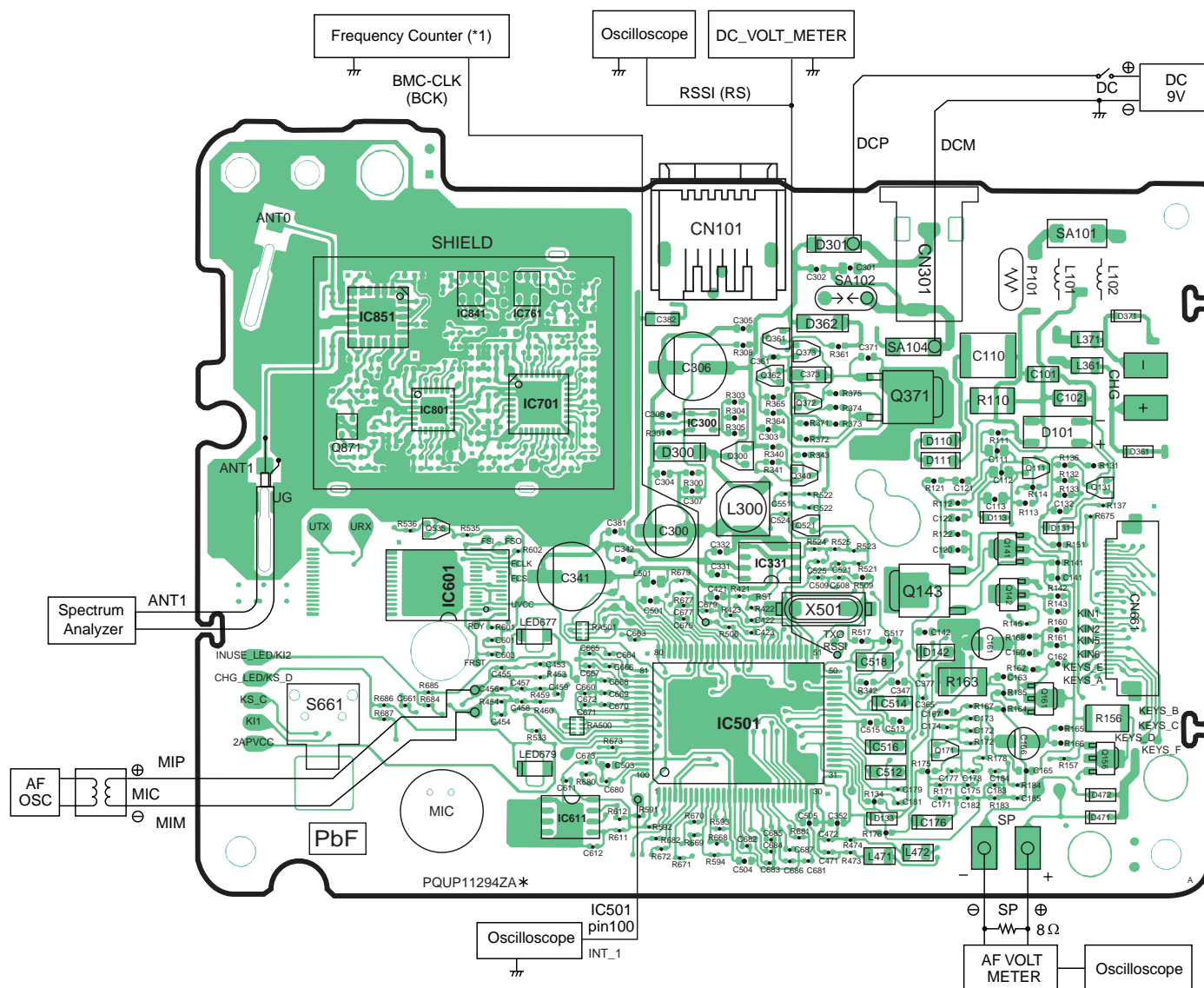
Refer to **Handset Reference Drawing** (P.61) for connection of DC power supply and voltmeter.

Cross Reference:

Adjustment Mode (P.58)

14.5. Base Unit Reference Drawing

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

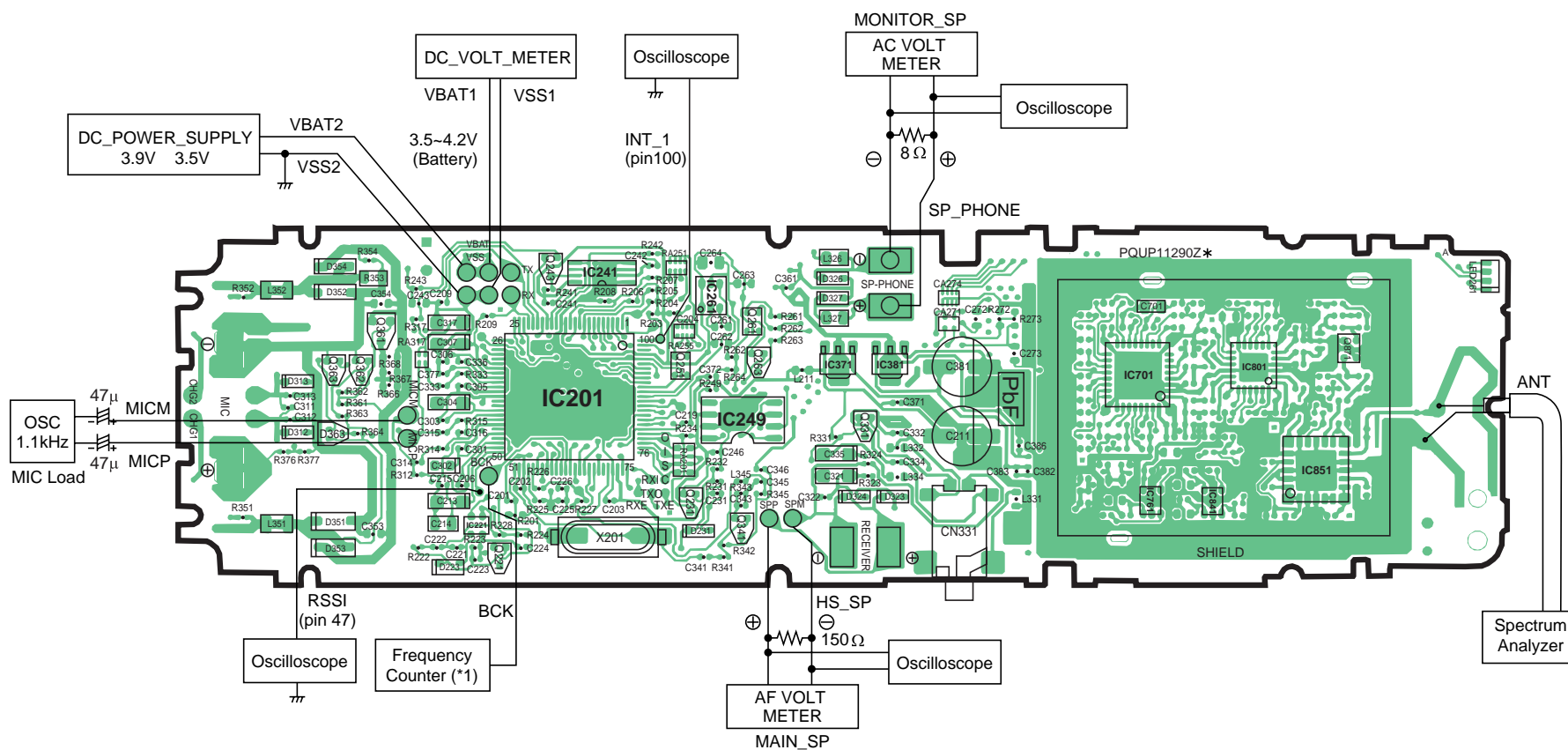


Note:

(*1) is referred to No.3 of **Check Table for RF part** (P.46)

14.6. Handset Reference Drawing

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



Note: (*1) is referred to No.3 of **Check Table for RF part** (P.46)

14.7. Frequency Table

14.7.1. Base Unit

Channel	TX/RX Frequency (MHz)	Channel	TX/RX Frequency (MHz)	Channel	TX/RX Frequency (MHz)
1	5759.702398	33	5788.242242	65	5816.782086
2	5760.592291	34	5789.132135	66	5817.671978
3	5761.486139	35	5790.025982	67	5818.565826
4	5762.376031	36	5790.915875	68	5819.455719
5	5763.269879	37	5791.809723	69	5820.349566
6	5764.159771	38	5792.699615	70	5821.239459
7	5765.053619	39	5793.593463	71	5822.133307
8	5765.943512	40	5794.483355	72	5823.023199
9	5766.837359	41	5795.377203	73	5823.917047
10	5767.727252	42	5796.267096	74	5824.806939
11	5768.621100	43	5797.160943	75	5825.700787
12	5769.510992	44	5798.050836	76	5826.590680
13	5770.404840	45	5798.944684	77	5827.484527
14	5771.294732	46	5799.834576	78	5828.374420
15	5772.188580	47	5800.728424	79	5829.268268
16	5773.078473	48	5801.618316	80	5830.158160
17	5773.972320	49	5802.512164	81	5831.052008
18	5774.862213	50	5803.402057	82	5831.941900
19	5775.756060	51	5804.295904	83	5832.835748
20	5776.645953	52	5805.185797	84	5833.725641
21	5777.539801	53	5806.079644	85	5834.619488
22	5778.429693	54	5806.969537	86	5835.509381
23	5779.323541	55	5807.863385	87	5836.403228
24	5780.213434	56	5808.753277	88	5837.293121
25	5781.107281	57	5809.647125	89	5838.186969
26	5781.997174	58	5810.537018		
27	5782.891021	59	5811.430865		
28	5783.780914	60	5812.320758		
29	5784.674762	61	5813.214605		
30	5785.564654	62	5814.104498		
31	5786.458502	63	5814.998346		
32	5787.348394	64	5815.888238		

14.7.2. Handset

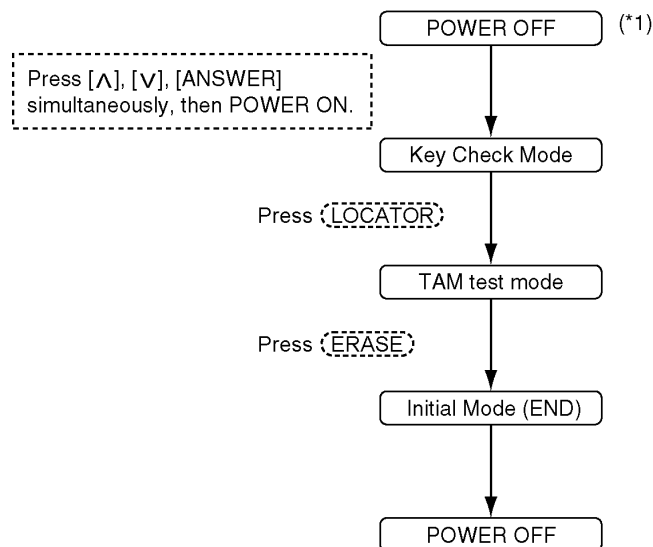
Channel	TX/RX Frequency (MHz)	Channel	TX/RX Frequency (MHz)	Channel	TX/RX Frequency (MHz)
1	5759.700425	33	5788.240269	65	5816.780113
2	5760.594273	34	5789.134117	66	5817.673960
3	5761.484165	35	5790.024009	67	5818.563853
4	5762.378013	36	5790.917857	68	5819.457701
5	5763.267906	37	5791.807749	69	5820.347593
6	5764.161753	38	5792.701597	70	5821.241441
7	5765.051646	39	5793.591490	71	5822.131333
8	5765.945494	40	5794.485337	72	5823.025181
9	5766.835386	41	5795.375230	73	5823.915074
10	5767.729234	42	5796.269078	74	5824.808921
11	5768.619126	43	5797.158970	75	5825.698814
12	5769.512974	44	5798.052818	76	5826.592662
13	5770.402867	45	5798.942710	77	5827.482554
14	5771.296714	46	5799.836558	78	5828.376402
15	5772.186607	47	5800.726451	79	5829.266294
16	5773.080455	48	5801.620298	80	5830.160142
17	5773.970347	49	5802.510191	81	5831.050035
18	5774.864195	50	5803.404039	82	5831.943882
19	5775.754087	51	5804.293931	83	5832.833775
20	5776.647935	52	5805.187779	84	5833.727623
21	5777.537828	53	5806.077671	85	5834.617515
22	5778.431675	54	5806.971519	86	5835.511363
23	5779.321568	55	5807.861412	87	5836.401255
24	5780.215415	56	5808.755259	88	5837.295103
25	5781.105308	57	5809.645152	89	5838.184996
26	5781.999156	58	5810.538999		
27	5782.889048	59	5811.428892		
28	5783.782896	60	5812.322740		
29	5784.672789	61	5813.212632		
30	5785.566636	62	5814.106480		
31	5786.456529	63	5814.996373		
32	5787.350376	64	5815.890220		

14.8. How to Clear User Setting

Units are reset to the Factory settings by this operation (Erase recorded Voice messages, stored Phone numbers, Caller list and etc.).

This operation should not be performed for a usual repair.

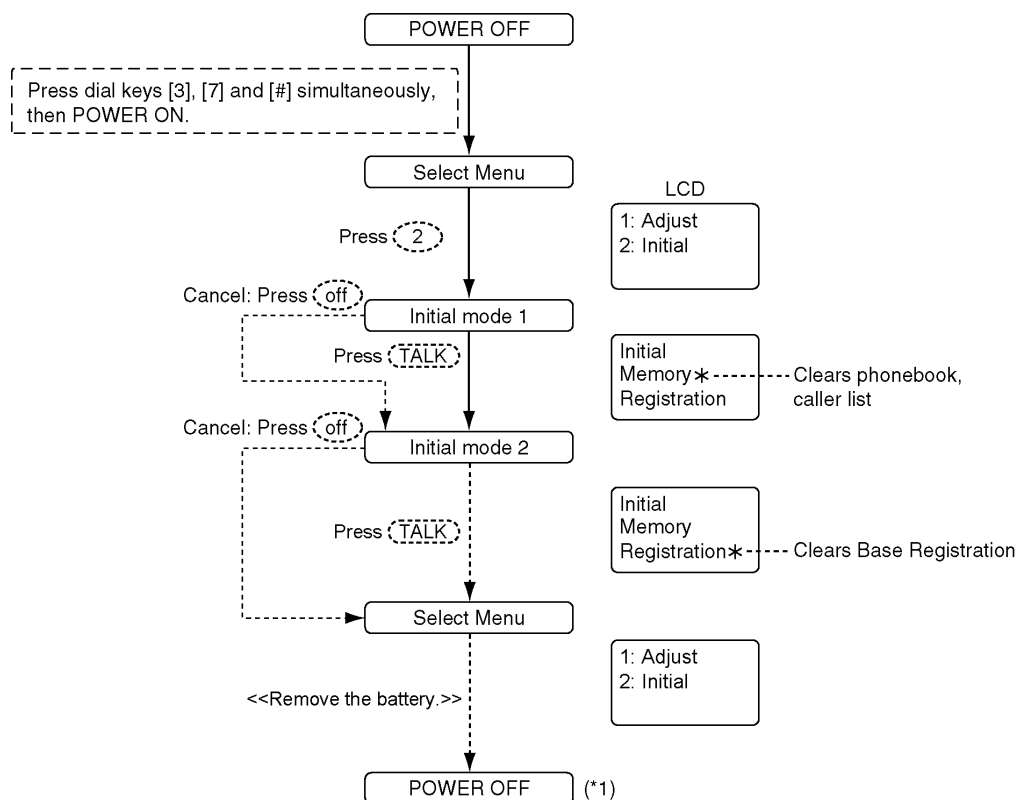
14.8.1. Base unit



Note:

(*1) Telephone line must be connected.

14.8.2. Handset



Note:

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

15 DESCRIPTION

15.1. Frequency

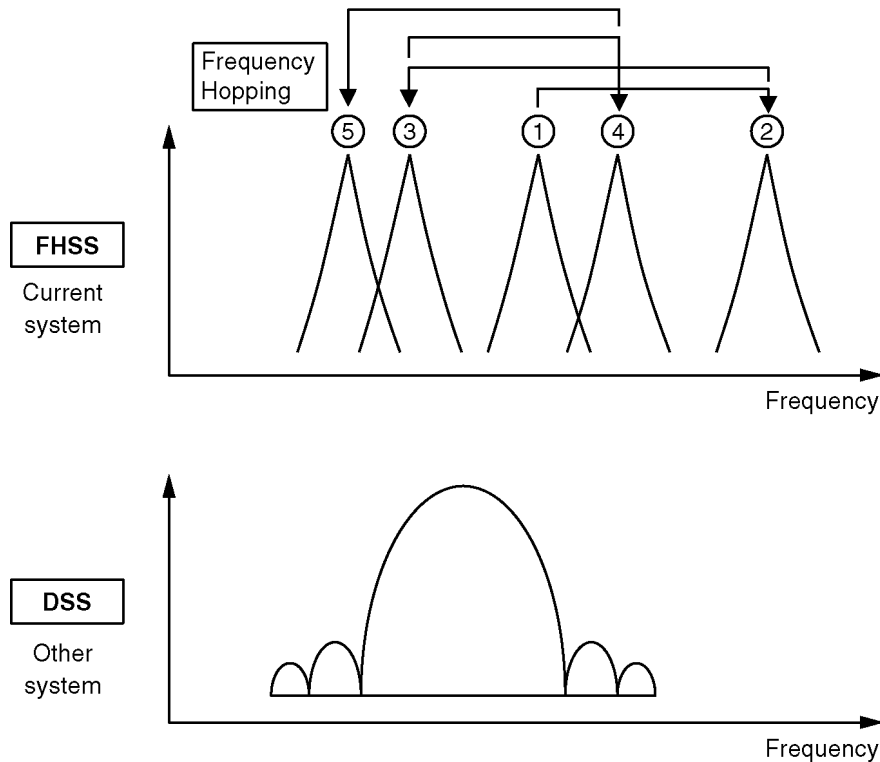
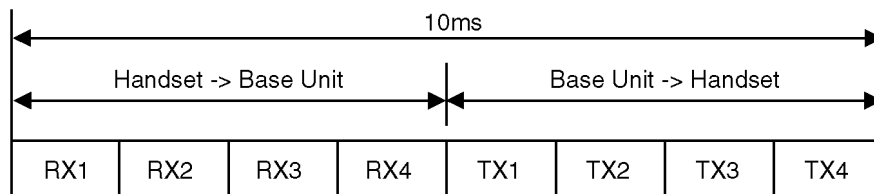
The frequency range of 5.76GHz-5.84GHz is used. Transmitting and receiving channel between Base Unit and Handset is same frequency. Refer to **Frequency Table** (P.62).

15.2. FHSS (Frequency Hopping Spread Spectrum)

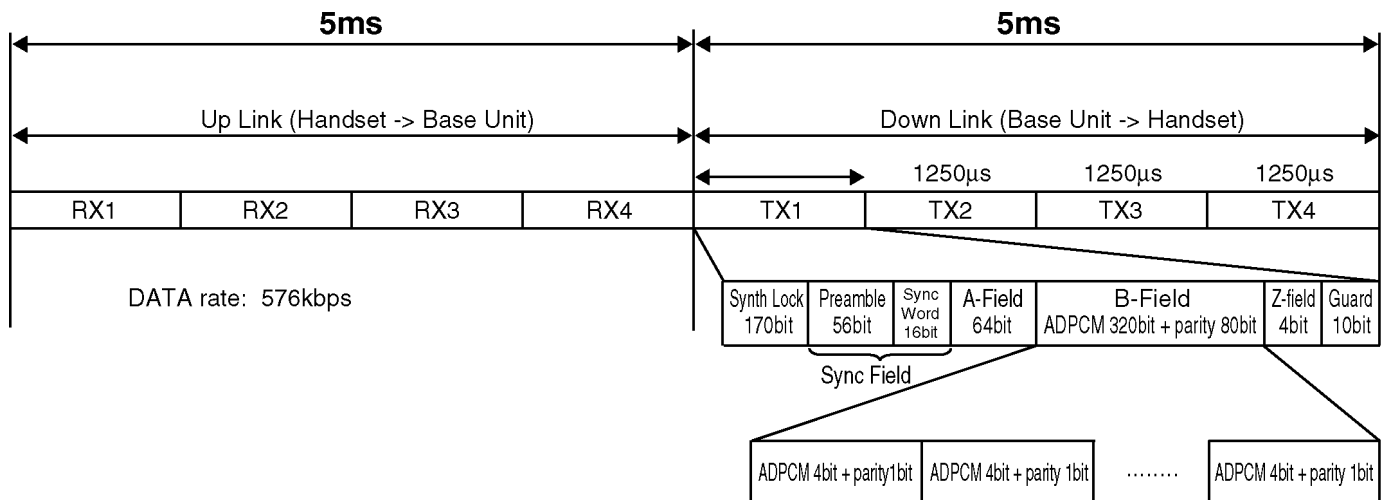
This telephone is using an IC chip which has similar specification to WDCT (World Digital Cordless Telephone) and is the telephone system that can use multiple portable unit simultaneously. The explanation of this system is mentioned below. This system uses a Time Division Multiple Access/Time Division Duplex (**TDMA/TDD**) scheme:

transmitting and receiving frequencies of the Base Unit and Handset are shared in the same frequency. The construction of RX/TX frequency data is shown below. It consists of 4 slots from the Base Unit to the Handset, and 4 slots from the Handset to the Base Unit, total 8 slots in 10ms. By this slot system, simultaneous air link and communication between 4 Handsets and the Base Unit can be realized. One communication between Handset and the Base Unit is done by one slot from the Base Unit to Handset, and another slot from Handset to the Base Unit.

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



15.2.1. TDD Frame Format



Sync Field (72bit): Preamble 56bit + SyncWord 16bit

Base Unit (Handset) adjusts the timing of reception so that reception of Base Unit (Handset) can correspond to transmission of Handset (Base Unit).

It is necessary for sync-field that Handset gets synchronization.

A - field (64bit): Each kinds of DATA: ch data, line condition, etc.

B - field (320bit + 80bit): Sound data + parity

Z - field (4bit): Parity Check

15.2.2. TDMA system

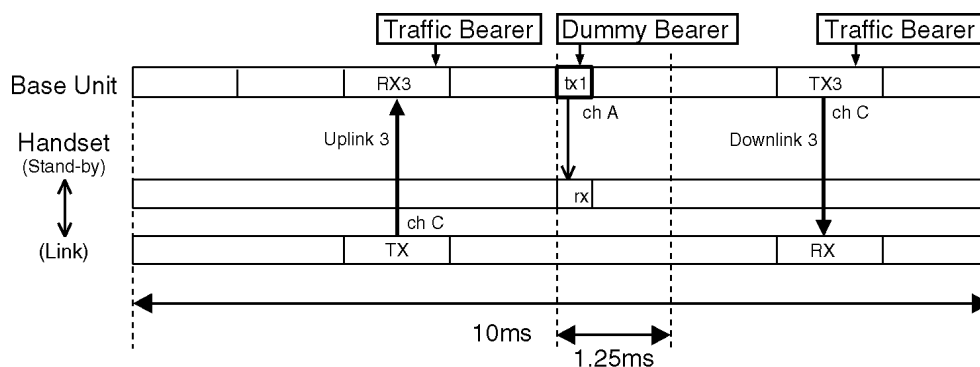
This system is the cycles of 10ms, and has four duplex paths, so it is possible to perform four duplex communications simultaneously.

In 1 slot 1.25ms, the 10ms of voice data is transmitted.

Each slot makes every frame frequency hop. (100hops/sec.)

Although each slot (UpLink3 and UpLink4) uses different frequency, UpLink3 and DownLink3 use the same frequency.

• Handset Link



Traffic Bearer

A link is established between Base Unit and Handset.

The state where duplex communication is performed.

The hopping pattern of a 3000hops (30 seconds) cycle.

Dummy Bearer

The Base Unit sends Dummy-data to the all stand-by state Handsets.

The Handsets receive that data for keeping synchronization and monitoring request from the Base Unit.

Dummy Bearer doesn't contain B-field (sound) data.

15.3. Signal Flowchart in the Whole System

Reception

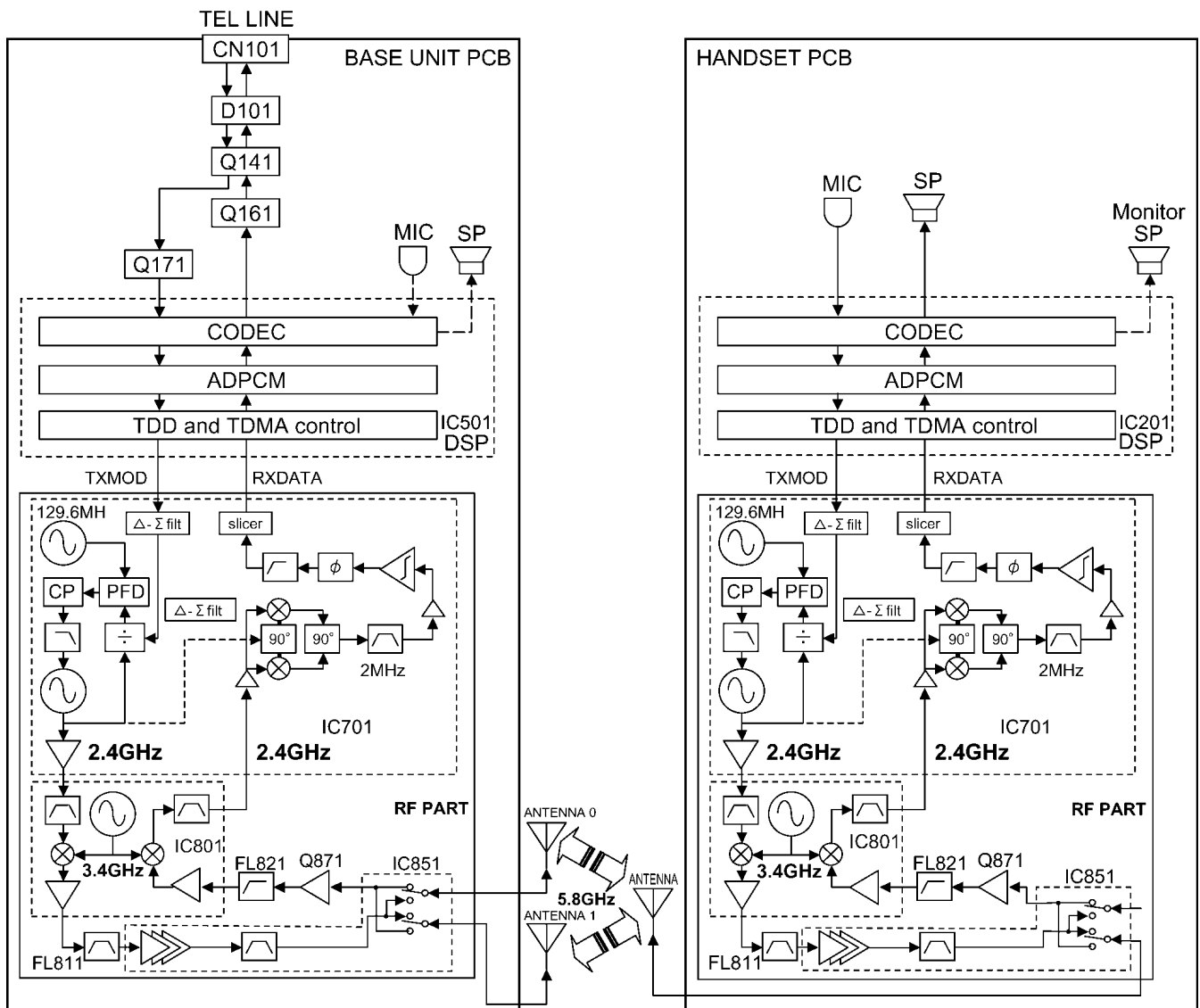
CN101 of the Base Unit is connected to the TEL line, and signal is enter through the bridge diode D101. While talking, the relay (Q141) is turned ON and amplified at the Q171, then led to DSP (IC501). The DSP encodes ADPCM and TDD/TDMA with FHSS to TXMOD. The TXMOD signal is enter to IC701 of RF PART, and modulated to 2.4GHz. The 2.4GHz signal is up-converted to 5.8GHz RF signal by IC801. The RF signal is amplified by the power amplifier (IC851) and fed to Antennas.

As for the Handset, RF signal from the antenna is amplified by LNA (Q871). The amplified signal is down-converted to 2.4GHz signal by IC801 and led to IC701. The 2.4GHz is down-converted to IF signal in IC701. The IF signal passing through internal filter is demodulated into RXDATA, then enter to DSP (IC201). The DSP performs TDD/TDMA and ADPCM decoding to convert the RXDATA into the voice signal, then it is output to the speaker.

Transmission

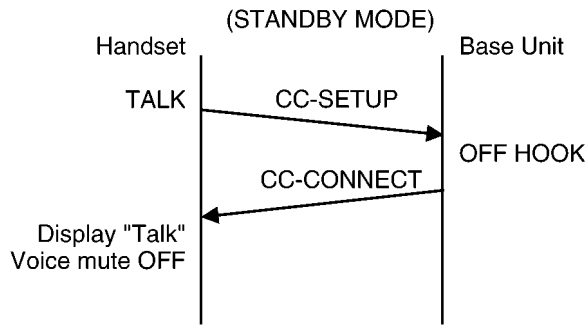
The voice signal entering from the Handset microphone is led to DSP (IC201). The DSP encodes ADPCM and TDD/TDMA with FHSS to TXMOD. The TXMOD signal is enter to IC701 of RF PART, and modulated to 2.4GHz. The 2.4GHz signal is up-converted to 5.8GHz RF signal by IC801. The RF signal is amplified by the power amplifier (IC851) and fed to Antenna.

As for the Base Unit, RF signal from the Antennas is amplified by LNA (Q871). The amplified signal is down-converted to 2.4GHz signal by IC801 and led to IC701. The 2.4GHz is down-converted to IF signal in IC701. The IF signal passing through internal filter is demodulated into RXDATA, then enter to DSP (IC501). The DSP performs TDD/TDMA and ADPCM decoding to convert the RXDATA into the voice signal. The voice signal is amplified at the TX amplifier (Q161), then output to the TEL line CN101 through the relay (Q141) and bridge (D101).



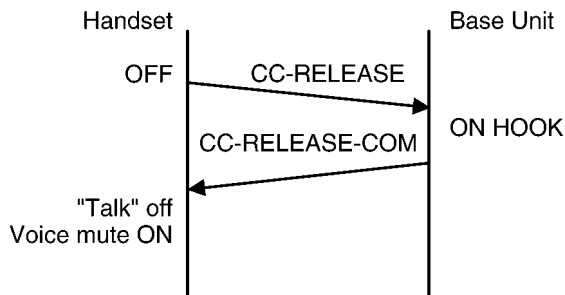
16 EXPLANATION OF LINK DATA COMMUNICATION

16.1. Calling



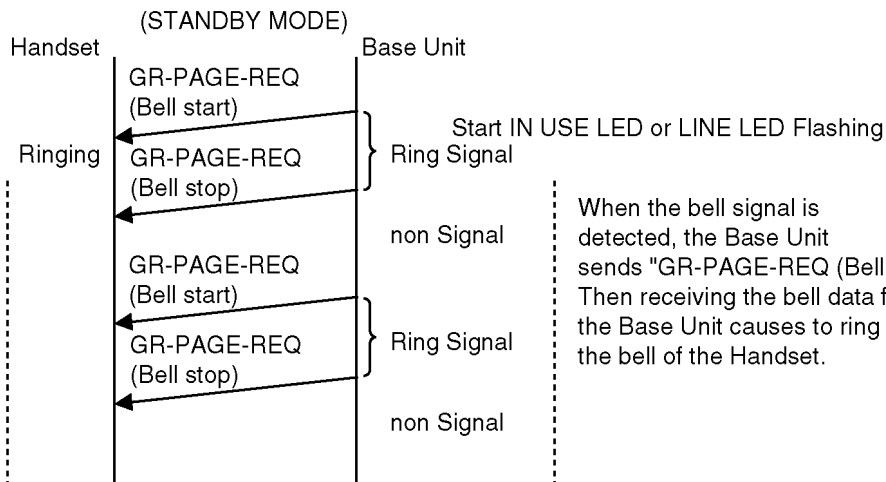
When calling, a communication request DATA (CC-SETUP) is transmitted from the Handset, and a permitting DATA (CC-CONNECT) is returned from the Base Unit to it. At that time the audio path opens.

16.2. To Terminate Communication



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

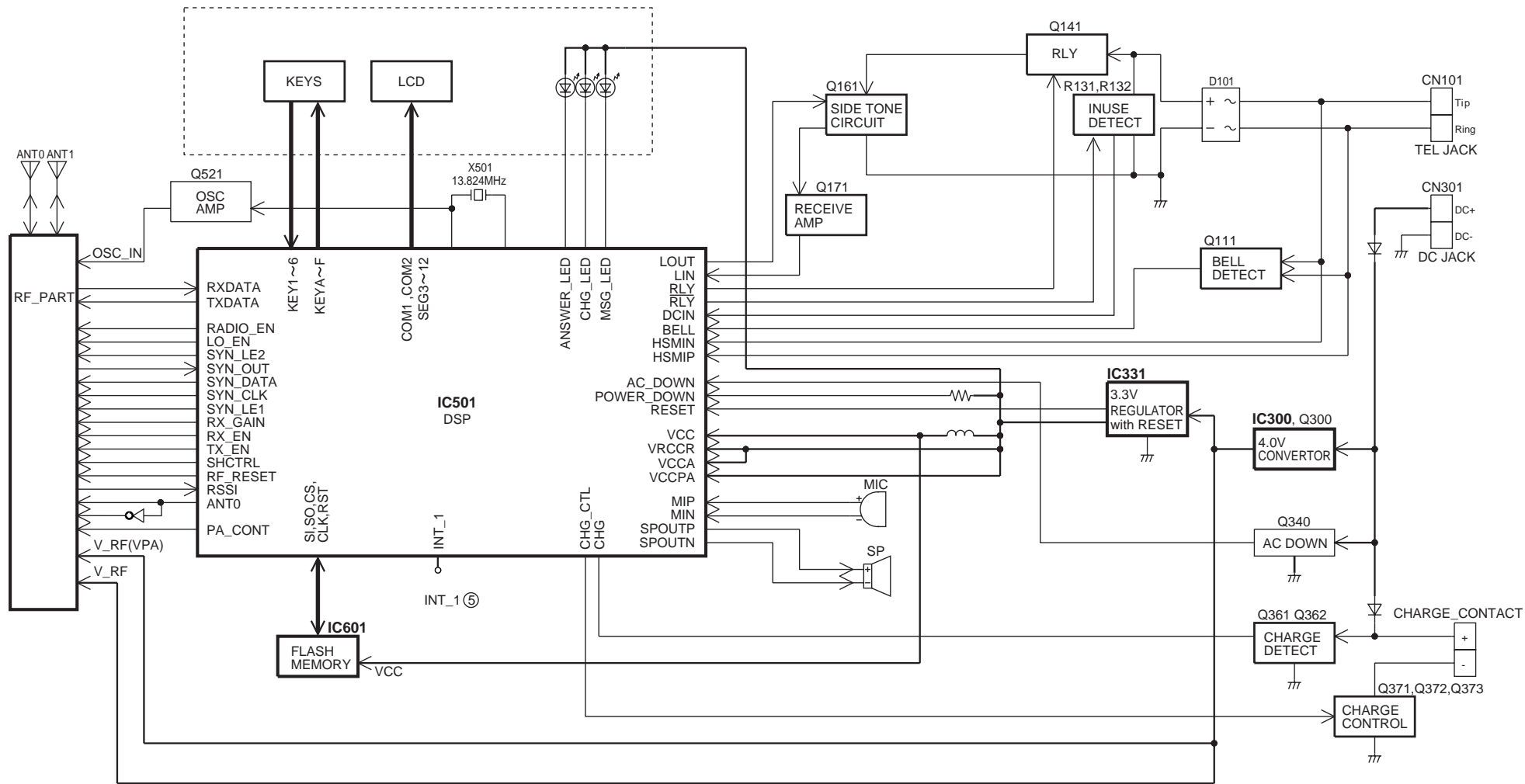
16.3. Ringing



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

17 BLOCK DIAGRAM (BASE UNIT_MAIN)

69



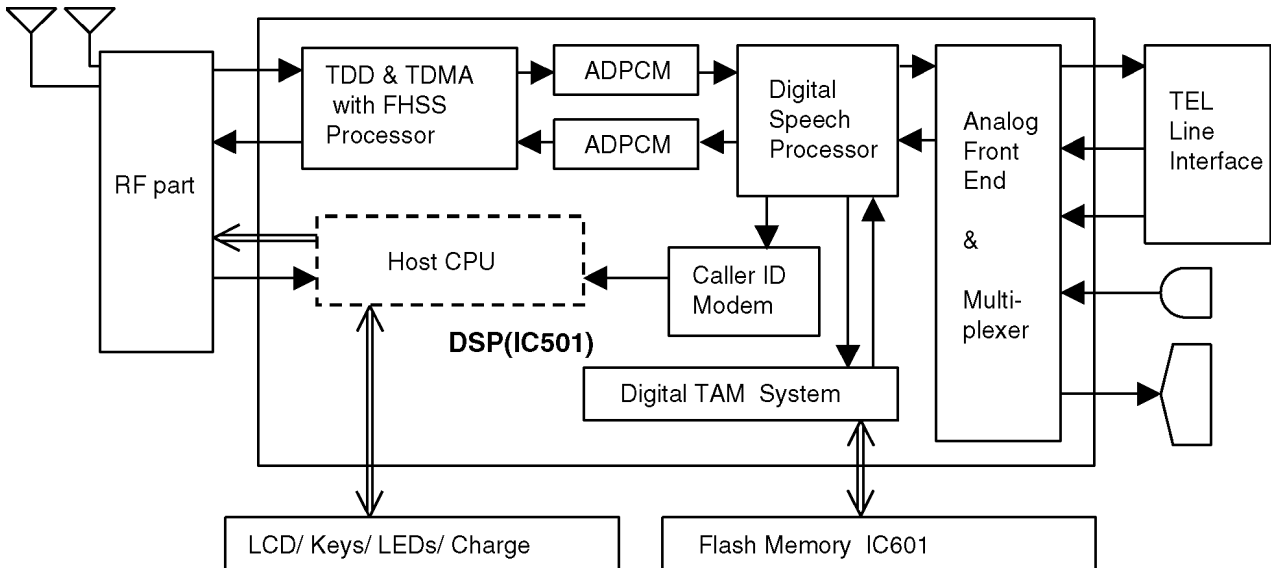
KX-TG5431 BLOCK DIAGRAM (Base Unit_Main)

18 CIRCUIT OPERATION (BASE UNIT_MAIN)

General Description:

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

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



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

• Voice Message Recording/Play back

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

• DTMF Detection/Generator

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

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

• Synthesized Voice (Pre-recorded message)

The DSP implements synthesized Voice, utilizing the built in speech detector and a Flash Memory, which stored the vocabulary.

• Caller ID and Call Waiting CID demodulation

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

• Analog Switching

The voice signal from 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 part, LED, Key scan, Speaker, Microphone, Telephone line, LCD.

18.2. Flash Memory (IC601)

Following information data is stored.

• Voice signal

ex: Pre-recorded Greeting message, Incoming message

• Settings

ex: message numbers, ID code, Flash Time, Tone/Pulse

18.3. Power Supply Circuit

Function:

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

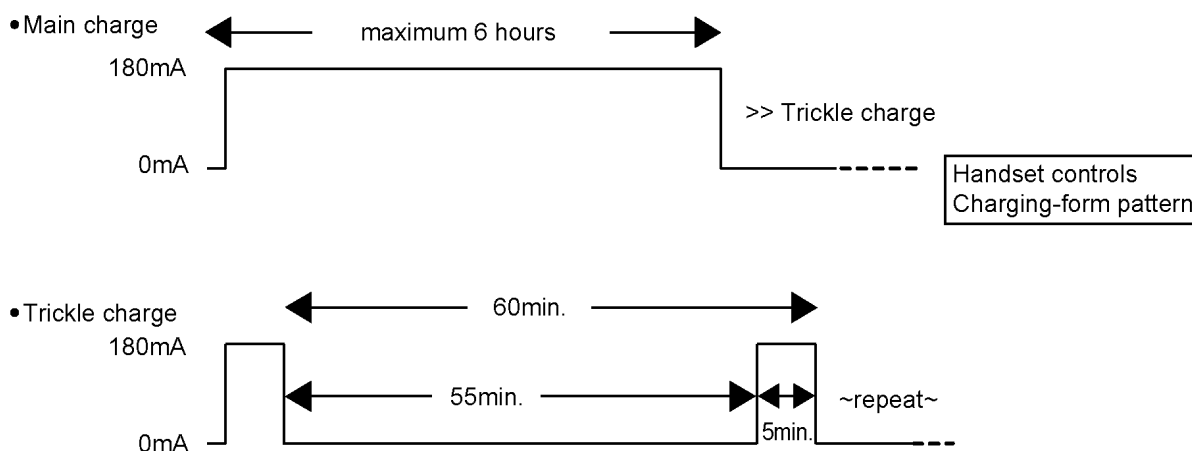
Circuit Operation:

- Q300 and IC300: 4.0V DCDC Converter
- IC331: 3.3V Regulator

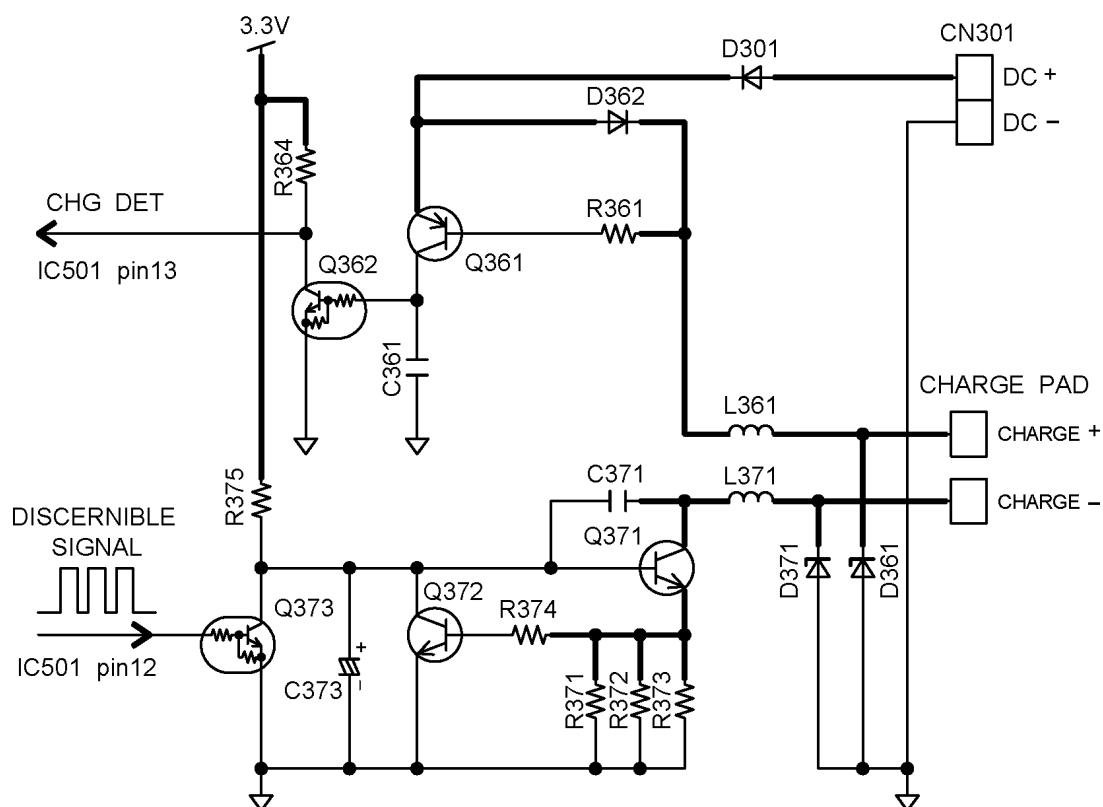
18.3.1. Charge Circuit

The voltage from the AC is supplied to the charge circuits. Main charge (180mA at the Battery) of maximum 6-hours is started soon after the Handset is placed on the Base Unit. Then it changes to Trickle charge to prevent from overcharging.

Charging-form



Q361 and Q362 detect the ON-HOOK state (Handset is placed on Base Unit).



Q371 and Q372 control the charge current.

Q373 sends a signal to the Handset for about 5 seconds soon after the Handset is placed on the Base Unit.

This signal tells that the Handset is being charged on the Base Unit.

When the signal is received: charged on the Base Unit

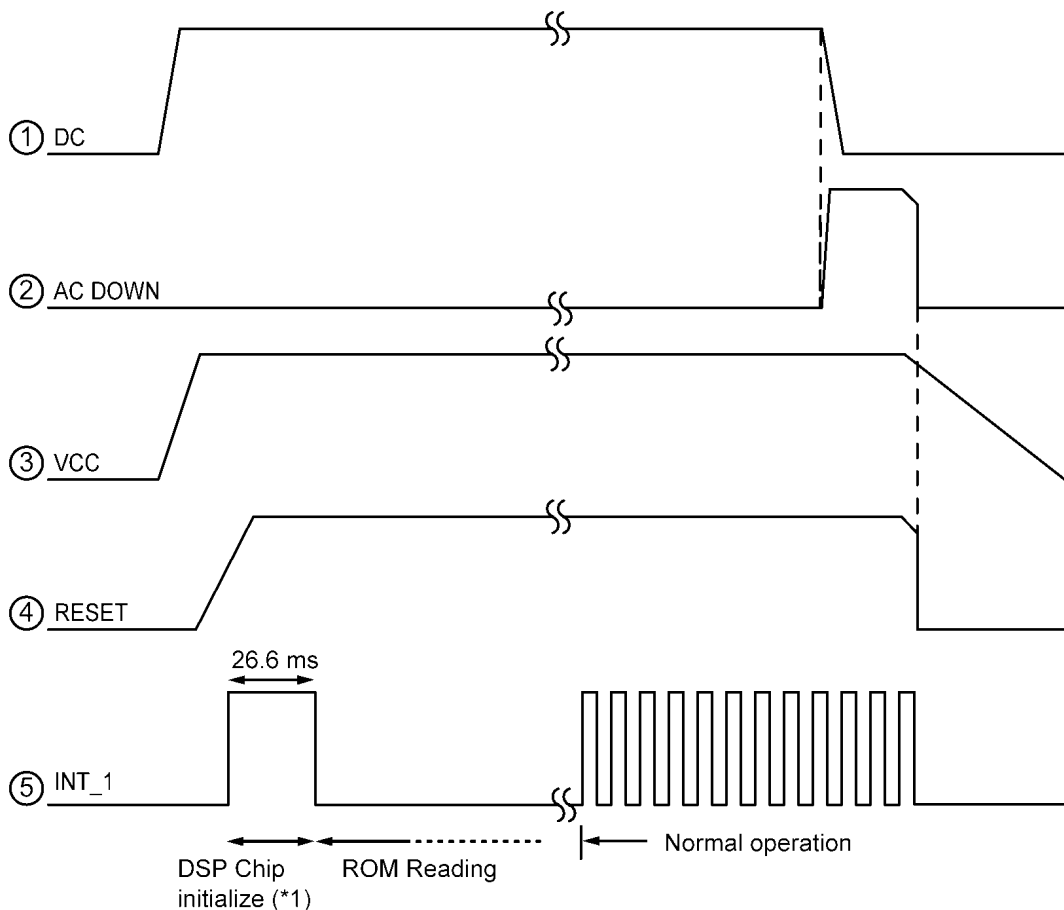
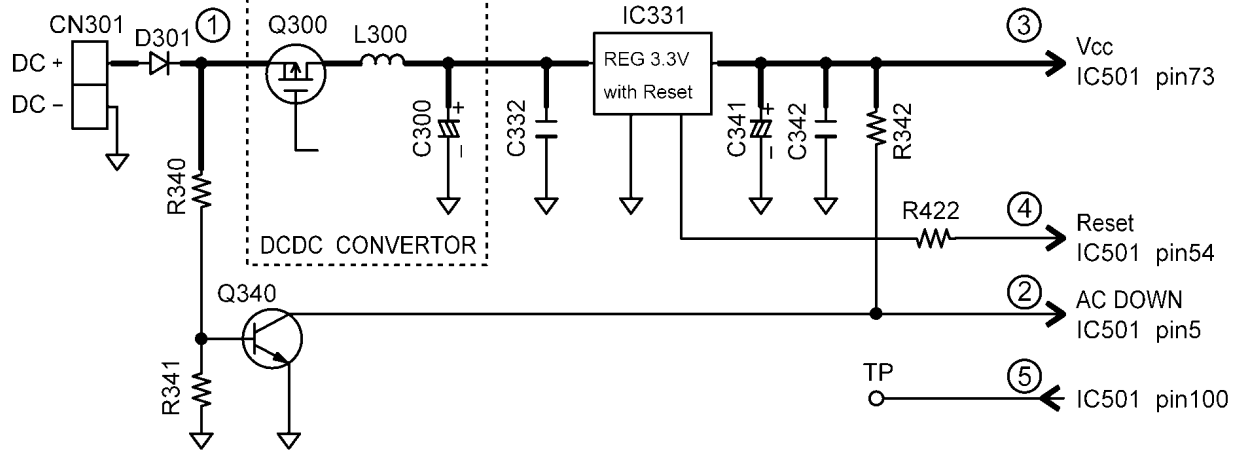
18.4. Reset Circuit

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 IC331 and power is supplied to the DSP. The set starts to operate when VCC goes up to 3.0V or more in the circuit voltage diagram.



Note:

(*1) The initializing time of the DSP chip is 26.6ms under normal conditions.

18.5. Locator/Intercom Mode

1. Press the Base Unit LOCATOR/INTERCOM button, then a call monitor signal (intercom sound) is output from pins 29 and 31 of IC501. Thus a monitor tone is heard from the speaker.
2. At the same time, the Handset ring. This status is called "Intercom stand-by".
3. Then press TALK button of the Handset, the status is changed to "Intercom mode".
4. The receiving signal flows:
 RF → pins 29 and 31 of IC501 → SP
 The transmission signal flows:
 MIC → C457, C458 → R459, R460 → pins 43 and 42 of IC501 → RF

18.6. Telephone Line Interface

Telephone Line Interface Circuit:

Function

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

Bell signal detection and OFF HOOK circuit:

In the idle mode, Q141 is open to cut the DC loop current and decrease the ring load. When ring voltage appears at the Tip (T) and Ring (R) leads (When the telephone rings), the AC ring voltage is transferred as follows:

T → L101 → R111 → C111 → Q111 → DSP pin 3 [BELL]

When the CPU (DSP) detects a ring signal, Q141 turns on, thus providing an off-hook condition (active DC current flow through the circuit). Following signal flow is the DC current flow.

T → L101 → D101 → Q141 → Q161 → R163 → D161 → D101 → L102 → P101 → R

ON HOOK Circuit:

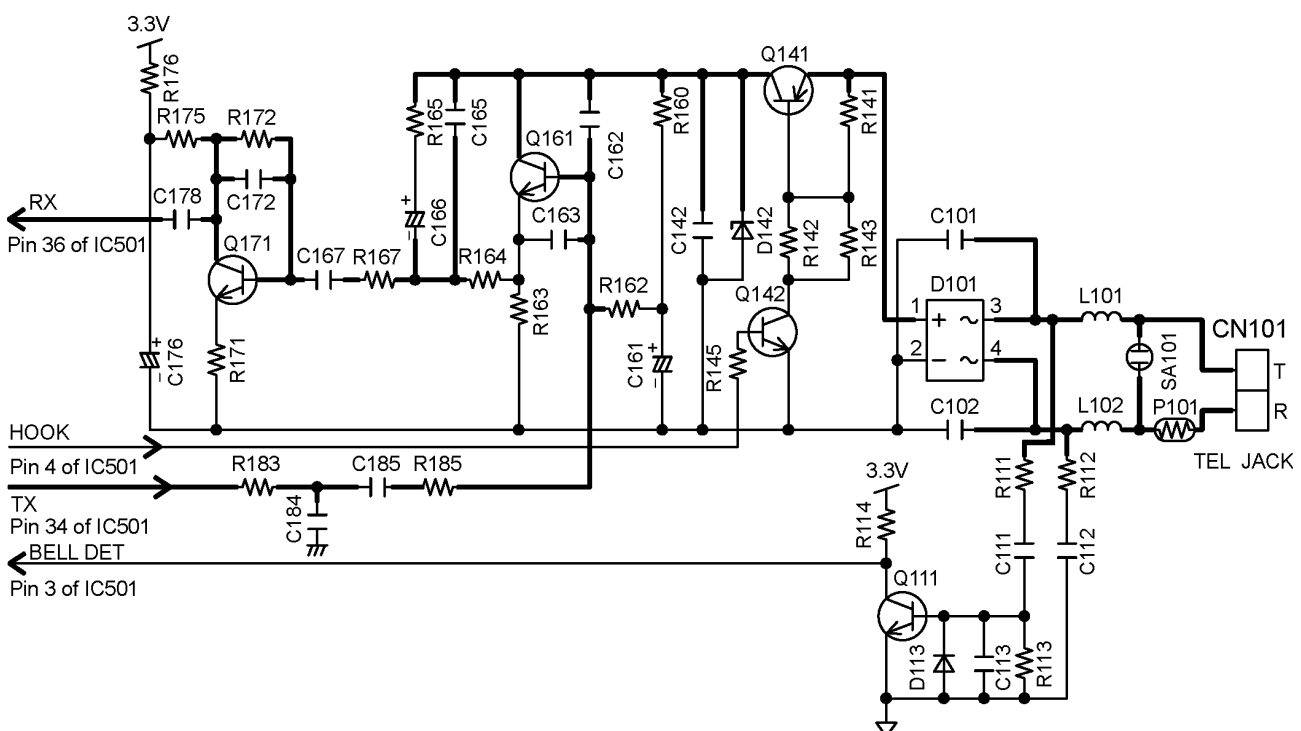
Q141 is open, Q141 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

Pulse Dial Circuit:

Pin 4 of DSP turns Q141 ON/OFF to make the pulse dialing.

Side Tone Circuit:

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



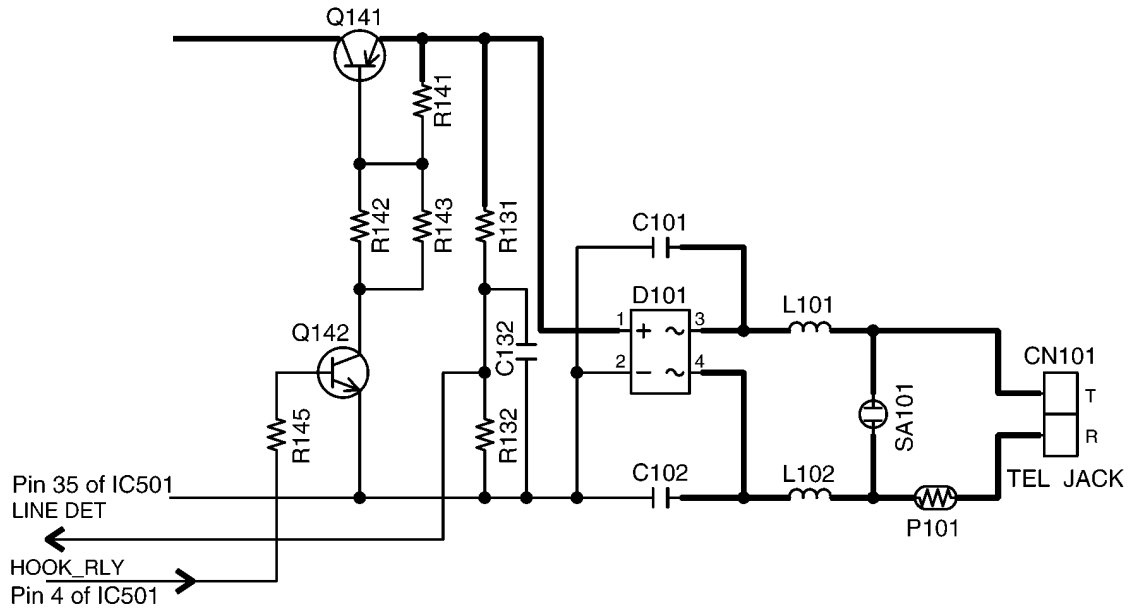
18.7. Auto Disconnect Circuit

Function:

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

Circuit Operation:

The voltage of pin 35 of IC501 is monitored. If a parallel-connected telephone is put into OFF HOOK status, the presence/absence of a parallel connection is determined when the voltage changes by 0.2V or more. When the set detects the parallel-connected telephone is OFF HOOK status, the line is disconnected.



You can enable or disable the Auto Disconnect function.

See **Check Record** (P.41)

18.8. Parallel Connection Detect Circuit

Function:

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

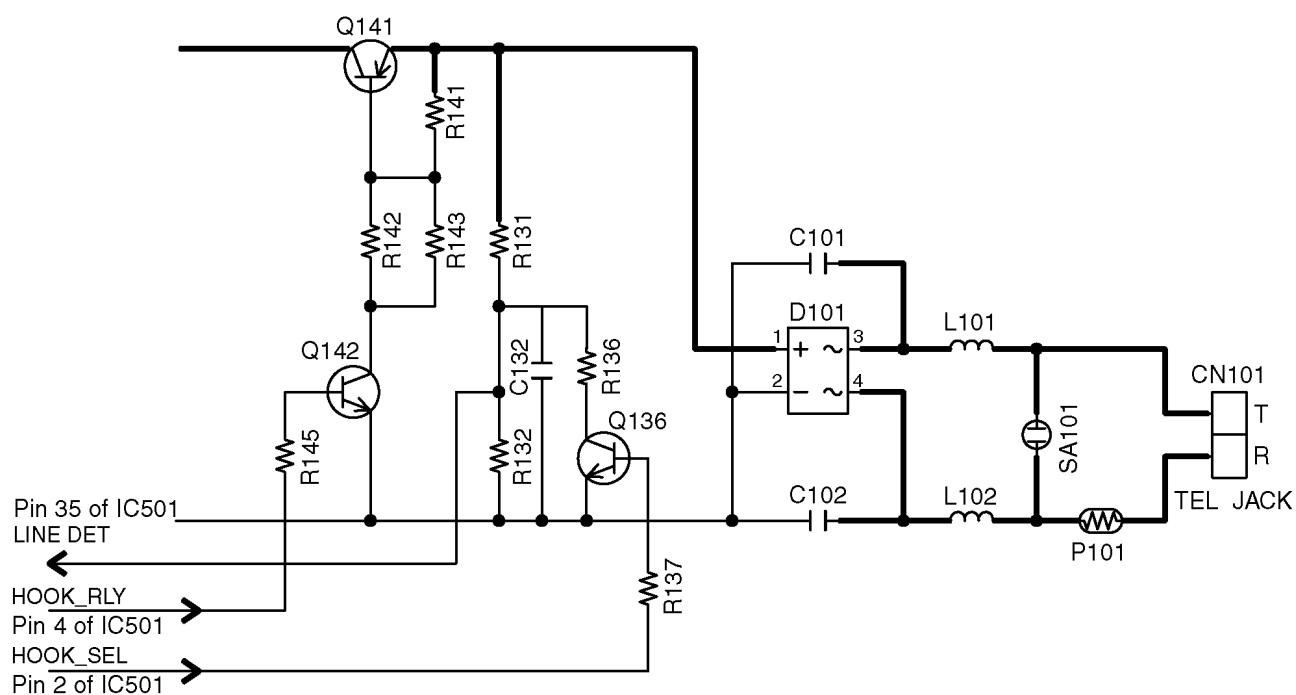
Circuit Operation:

Parallel connection detection when on hook:

When on hook Q136 is ON, the voltage is monitored at pin 35 of IC501. There is no parallel connection if the voltage is 1.65 V or higher, while a parallel connection is deemed to exist if the voltage is lower.

Parallel connection detection when off hook:

When off hook Q136 is OFF, the voltage is monitored at pin 35 of IC501; the presence/absence of a parallel connection is determined when the voltage changes by 0.2 V or more.



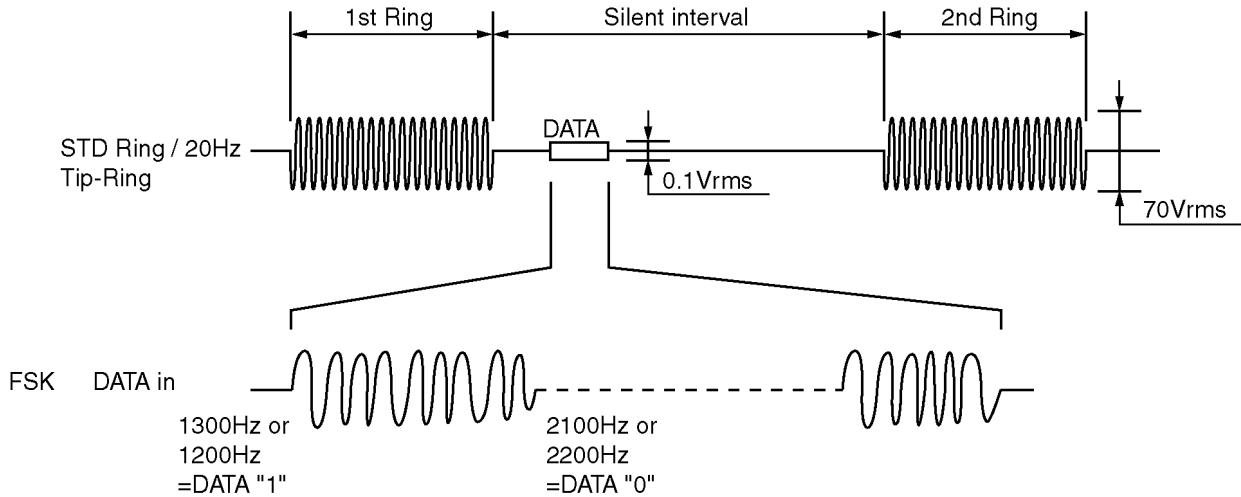
18.9. Calling Line Identification (Caller ID)

Function:

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

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

• FSK (Frequency Shift Keying) format

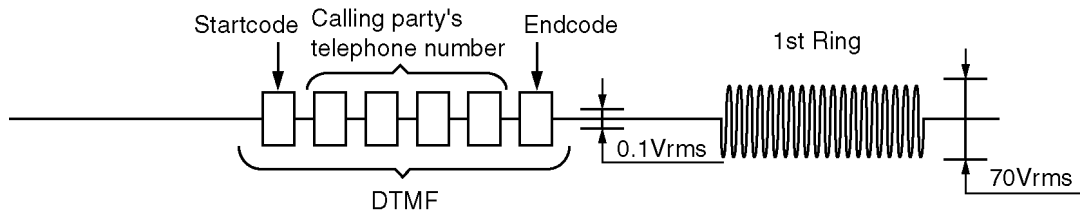


• DTMF format

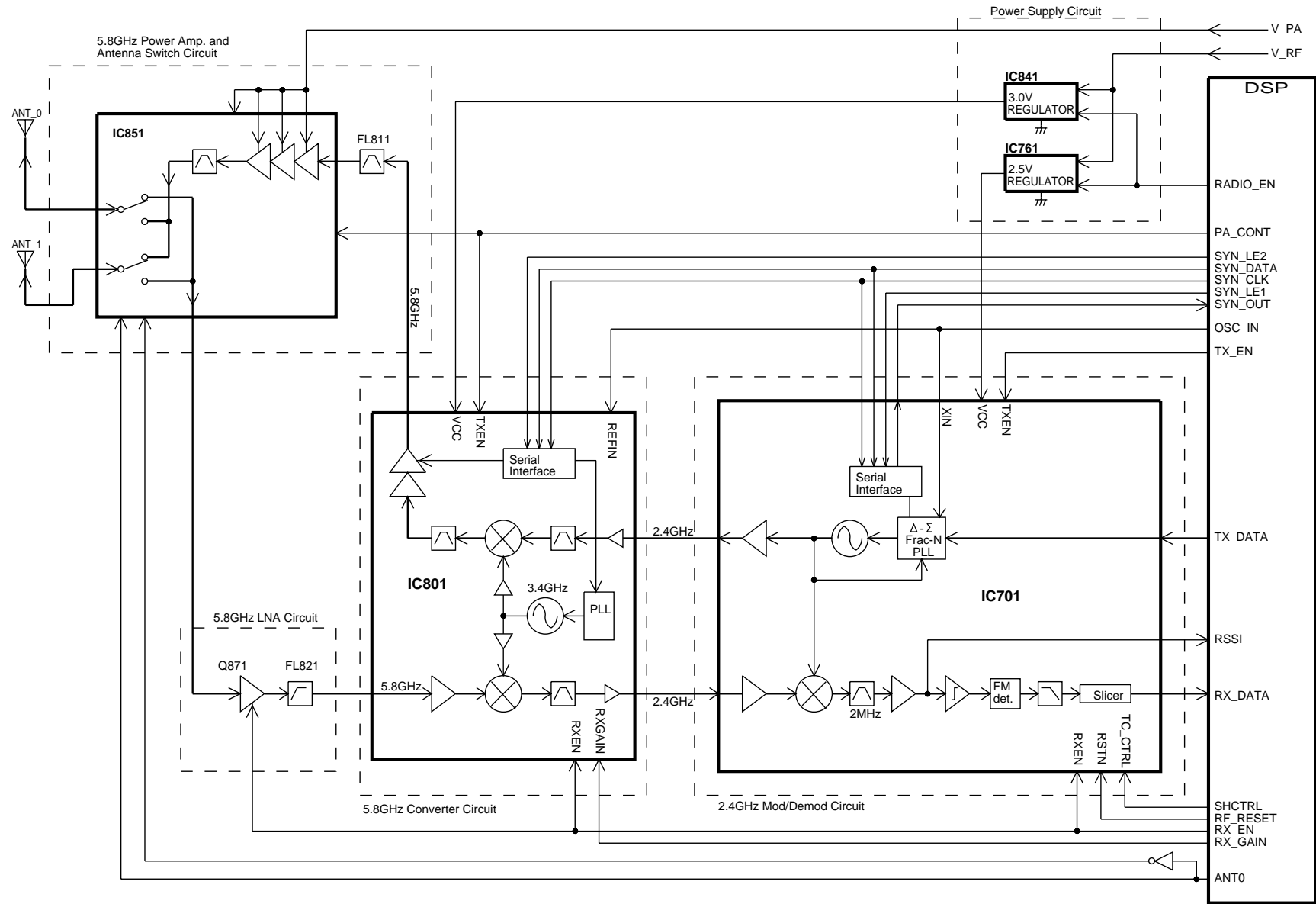
It is the method to send the telephone number of calling party with DTMF to the telephone. DTMF is sent before the first bell signal.

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

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

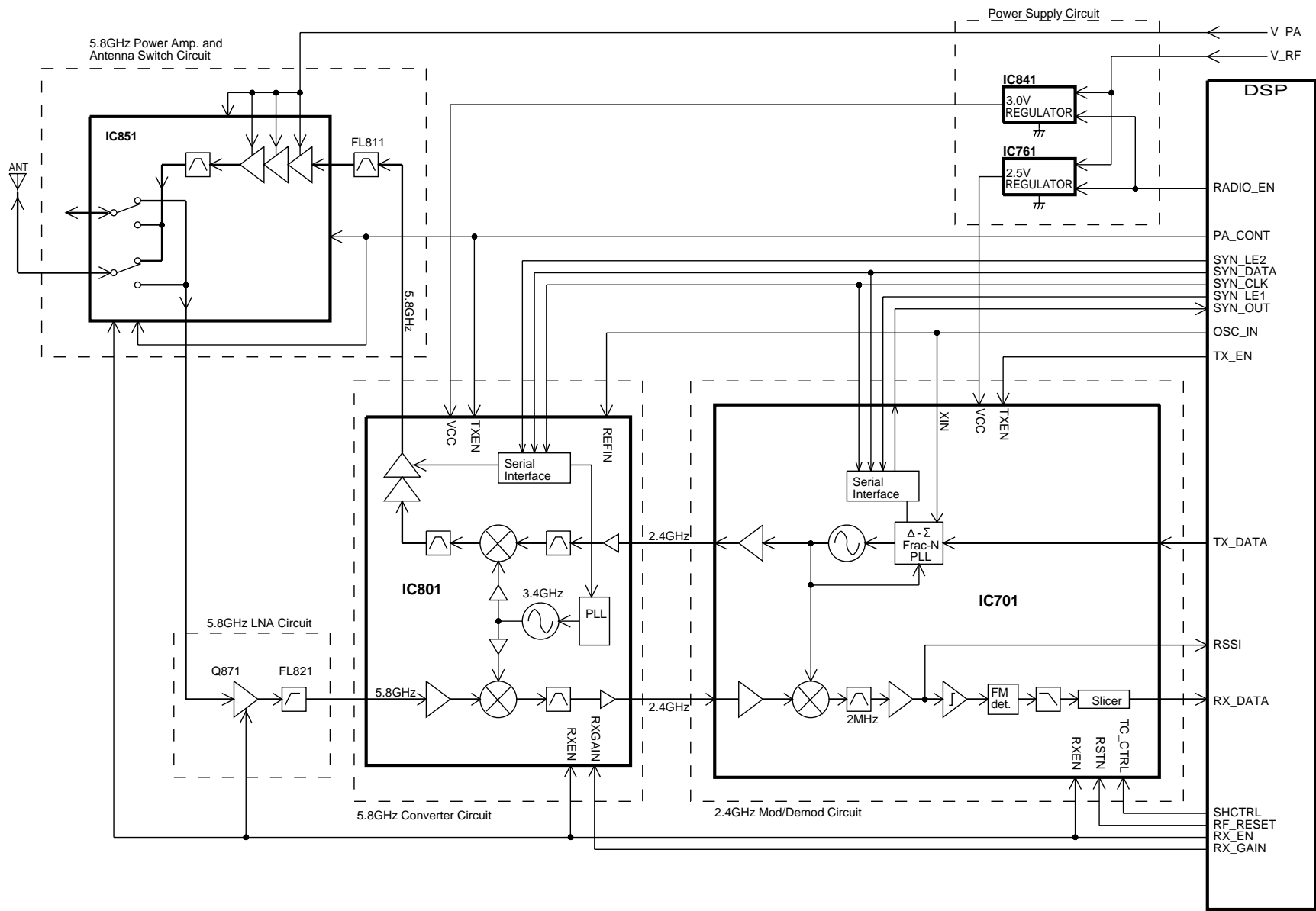


19 BLOCK DIAGRAM (BASE UNIT_RF PART)



KX-TG5431 BLOCK DIAGRAM (Base Unit_RF Part)

20 BLOCK DIAGRAM (HANDSET_RF PART)

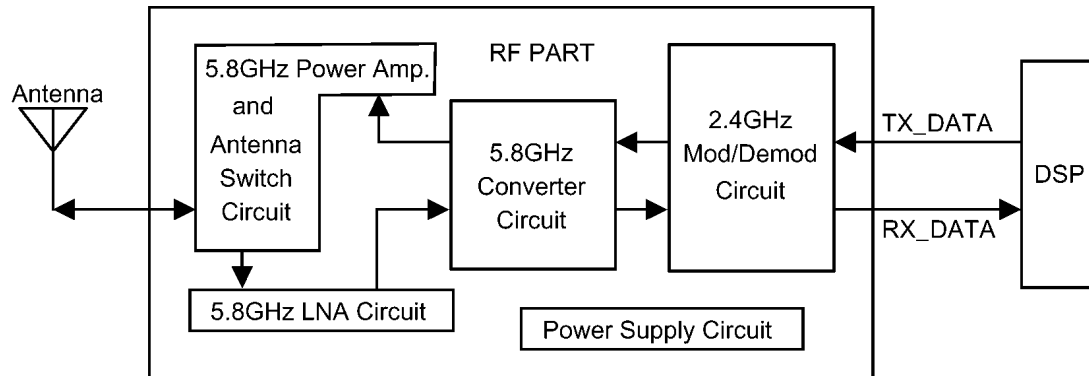


KX-TGA542 BLOCK DIAGRAM (Handset_RF Part)

21 CIRCUIT OPERATION (RF PART)

General Description:

RF part includes Transmitter and Receiver functions. Digital signals (Mainly voice data) that come from DSP, are modulated and are transmitted. On the other hand, received signals are demodulated and go out to DSP.



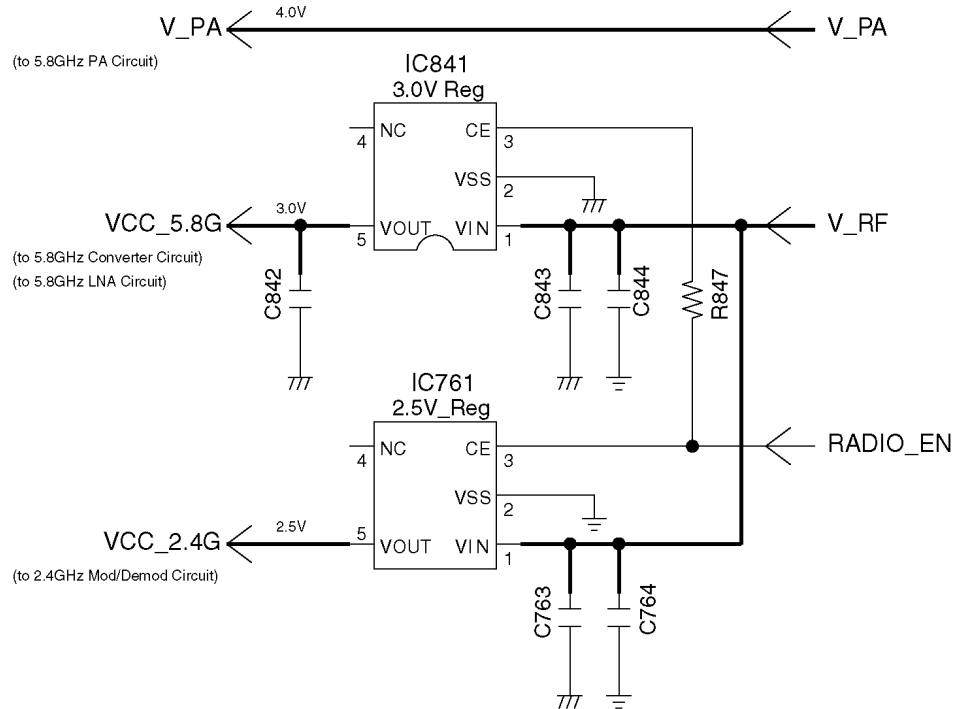
21.1. Power Supply Circuit

As indicated below, the various voltages are supplied to each block.

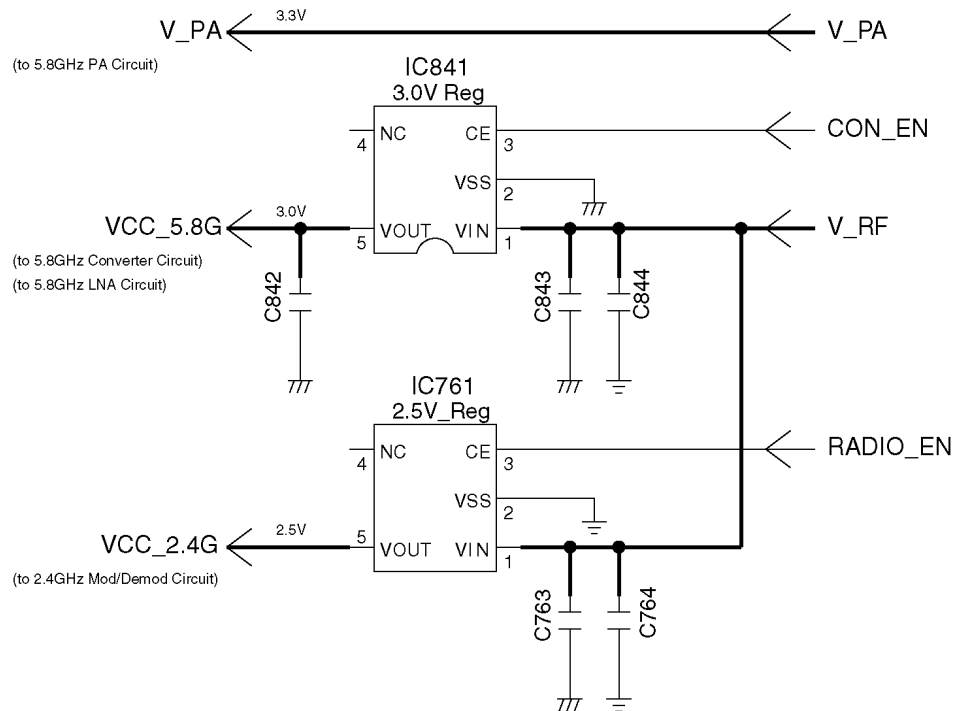
V_PA, about 4.0V at Base Unit or 3.3V at Handset, is supplied to the Power amplifier in 5.8GHz PA circuit.

IC841 is 3.0V Regulators, and IC761 is a 2.5V Regulator. They output Vcc_5.8GHz, and Vcc_2.4GHz respectively by order of RADIO_EN signal or CON_EN signal. V_RF is approximately 4.0V (Base Unit) or 3.6V (Handset).

<Base Unit>

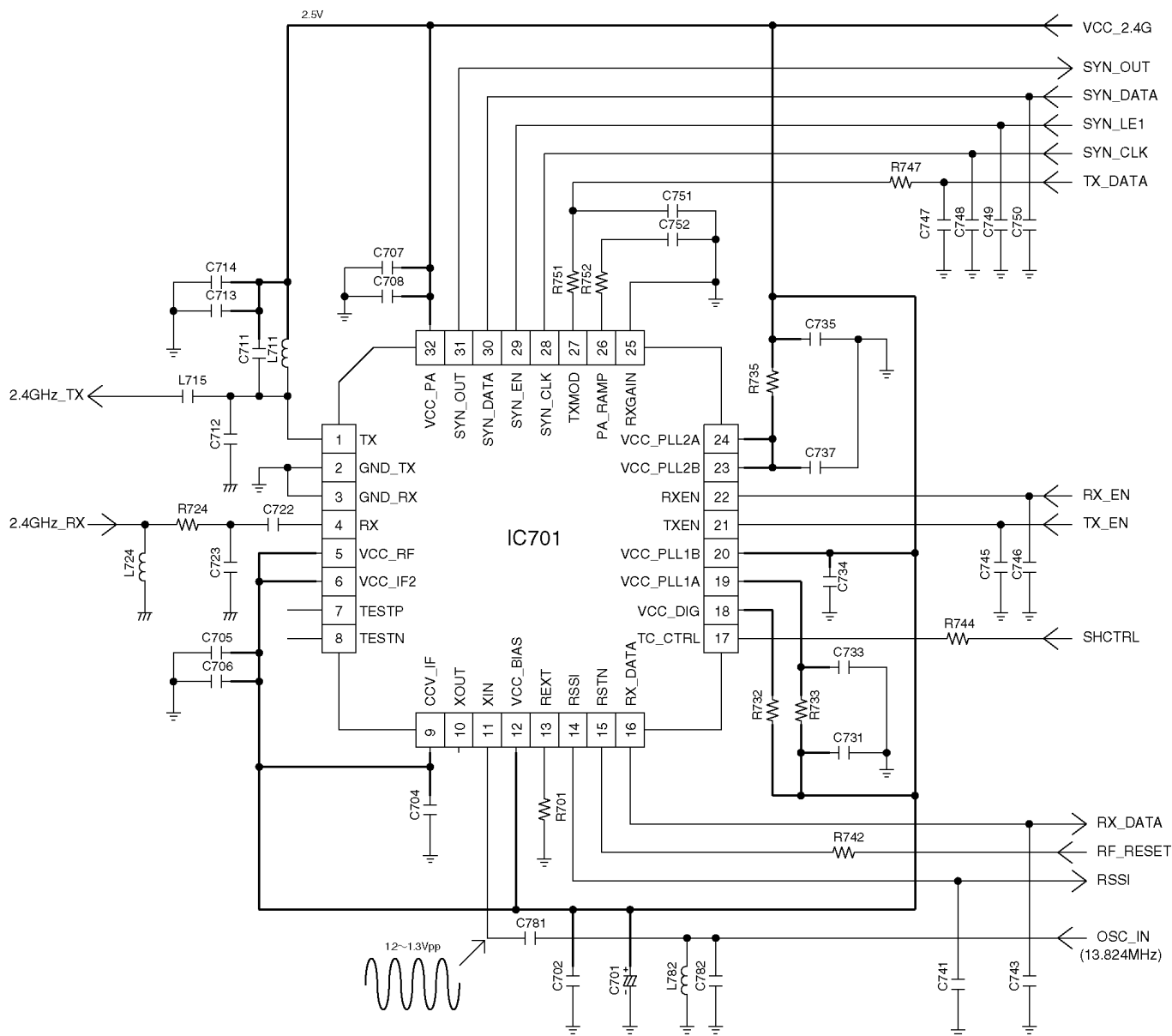


<Handset>



21.2. 2.4GHz Mod/Demod Circuit

IC701 incorporates all of the modulation and demodulation functions. TX Digital data (TX_DATA) from DSP is supplied to pin 27 of IC701, and then 2.4GHz TX modulated signal is output from pin1. This TX signal goes into the 5.8GHz Converter circuit. 2.4GHz RX signal from 5.8GHz Converter circuit is passed through matching circuit and supplied to pin4 of IC701, then demodulated signal (RX_DATA) comes out from pin 16. At the same time, RSSI (Received Signal Strength Indicator) outputs from the pin 14. Reference clock (13.824MHz) from DSP block is supplied to pin 11 of IC701. VCC_2.4G supplies 2.5V regulated voltage.



21.3. 5.8GHz Converter Circuit

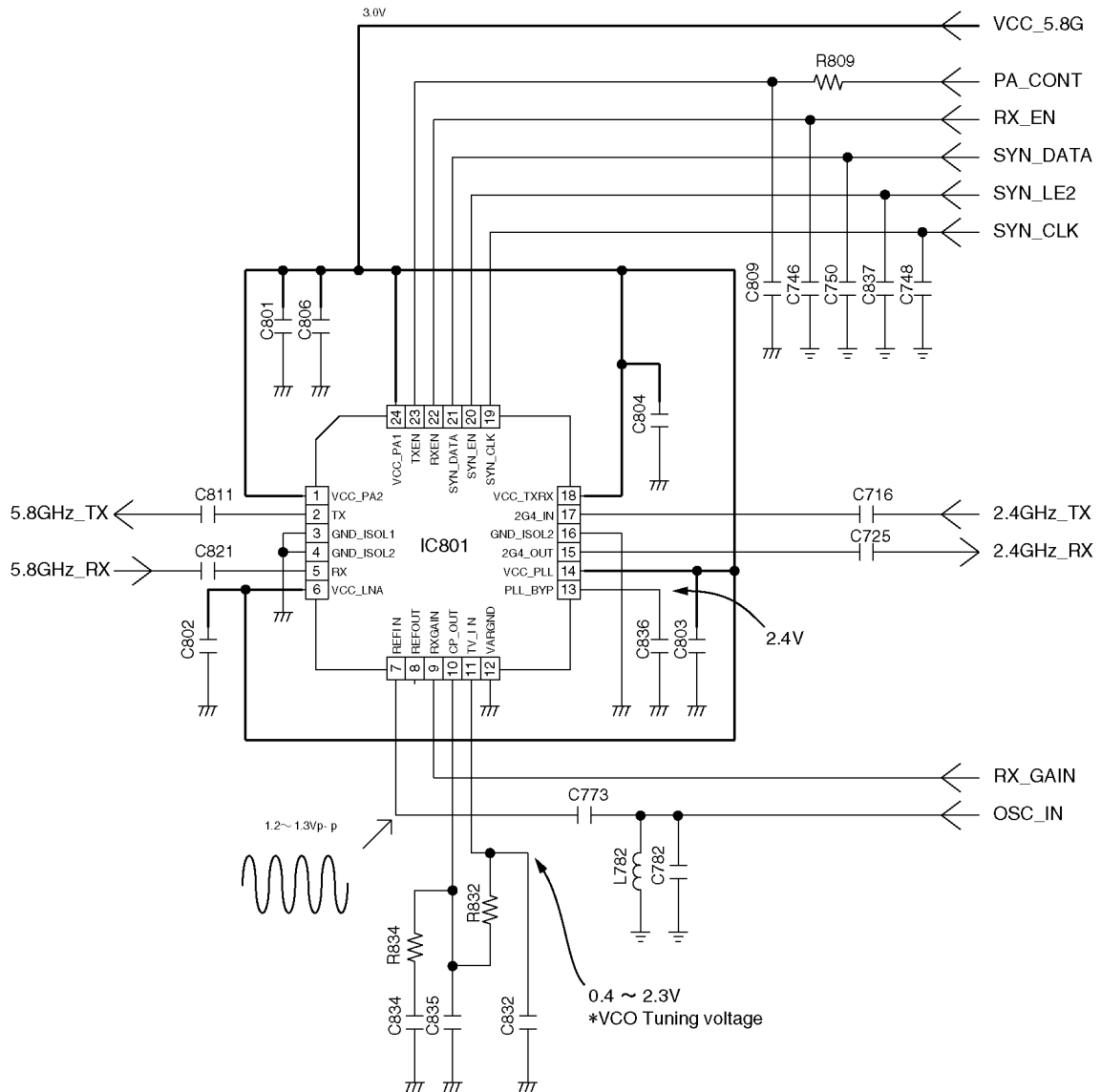
This block converts frequency of TX signal and RX signal.

IC801 includes TX-MIXER, RX-MIXER, PLL and VCO modules internally.

The VCO module is tuned by PLL synthesizer module, and generates 3.4GHz Local signal. Reference clock (13.824MHz) from DSP block is supplied to pin7 of IC701.

2.4GHz TX signal from 2.4GHz Mod/Demod circuit is supplied to pin 17 of IC801, and internal TX-MIXER multiplies it by 3.4GHz Local signal from internal VCO module, and up-converts into 5.8GHz TX signal. This 5.8GHz TX signal is output from pin 2, and goes into the 5.8GHz PA circuit.

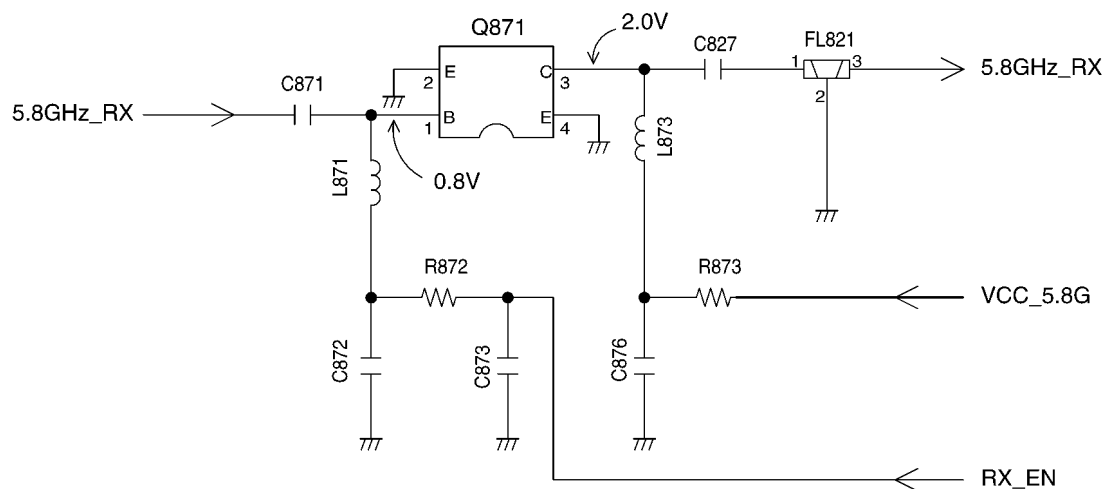
5.8GHz RX signal from 5.8GHz LNA circuit supplied to pin 5 of IC801, and internal RX-MIXER multiplies it by 3.4GHz Local signal from internal VCO module, and down-converts into 2.4GHz RX signal. This 2.4GHz RX signal is output from pin 15, and goes into the 2.4GHz Mod/Demod circuits.



21.4. 5.8GHz LNA (Low Noise Amplifier) Circuit

This block amplifies receiving 5.8GHz signal.

5.8GHz RX signal from Antenna Switch circuit amplified by LNA (Low Noise Amplifier) Q871 and filtered by HPF (FL821), and then supplied to 5.8GHz Converter circuit.



21.5. 5.8GHz Power Amplifier and Antenna Switch Circuit

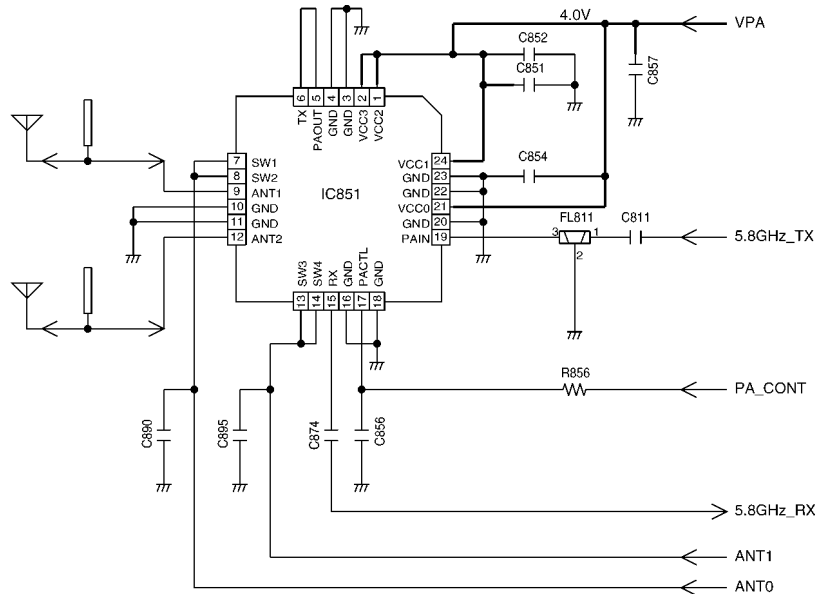
This block amplifies power of 5.8GHz TX signal.

5.8GHz TX signal from 5.8GHz Converter circuit is filtered by 5.8GHz-BPF FL811, and amplified by Power amplifier (PA) block of IC851, and then passes through internal 5.8GHz-BPF. After that, it is supplied to Antenna Switch block of IC851.

This block selects the TX 5.8GHz signal or RX 5.8G signal, and connect to Antenna terminal.

V_PA is approximately 4.0V at Base Unit, and 3.3V at Handset.

<Base Unit>

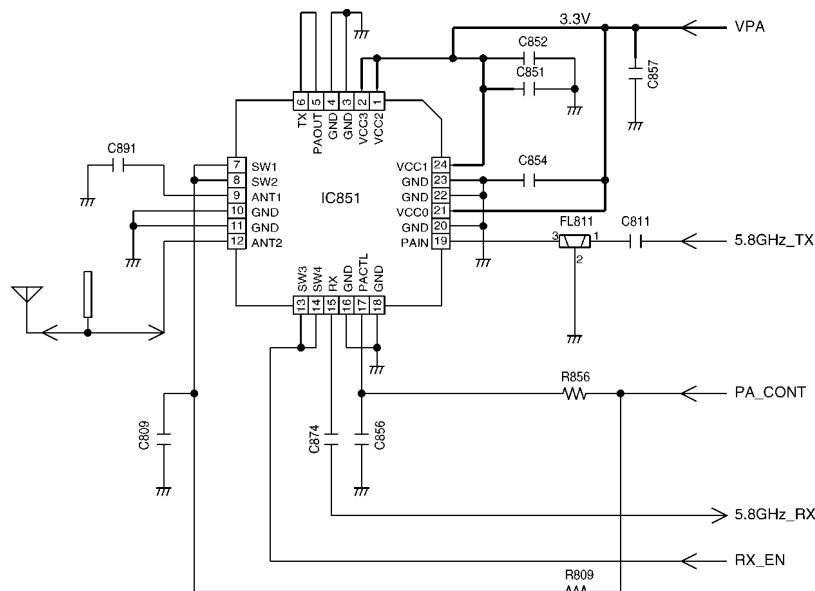


IC851 includes Switches for High frequency signals, and controlled by ANT0 signal and ANT 1 signal from DSP.

DSP is checking RSSI (Received Signal Strength Indicator) signal, and selects better condition Antenna from two antennas.

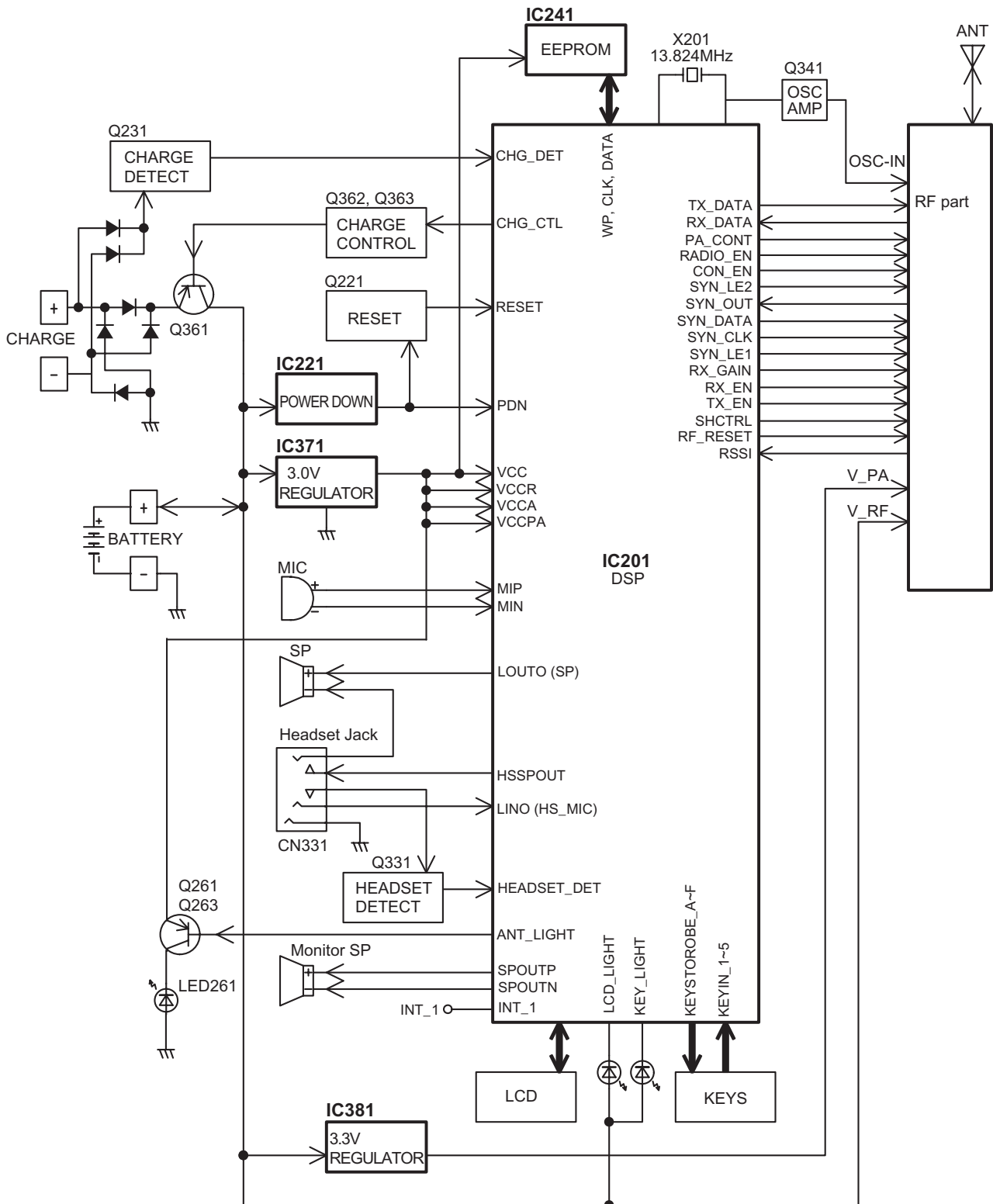
At the TX mode 5.8GHz TX signal from 5.8GHz PA block leads to selected Antenna terminal, at the RX mode 5.8GHz RX signal from selected Antenna terminal leads to 5.8GHz LNA circuit.

<Handset>



IC851 includes Switch for High frequency signals, and controlled by PA_CONT signal and RX_EN signal from DSP. At the TX mode 5.8GHz TX signal from 5.8GHz PA block leads to Antenna terminal, at the RX mode 5.8GHz RX signal from Antenna terminal leads to 5.8GHz LNA circuit.

22 BLOCK DIAGRAM (HANDSET)



KX-TGA542 BLOCK DIAGRAM (Handset)

23 CIRCUIT OPERATION (HANDSET)

23.1. Construction

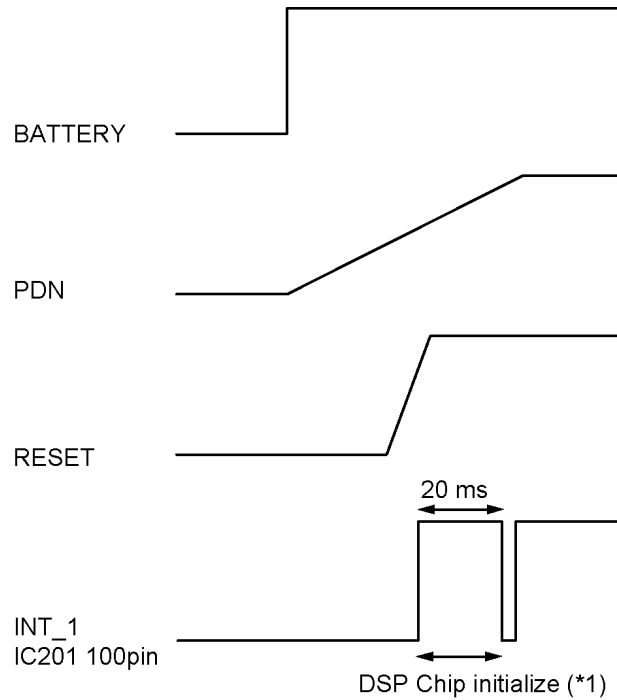
The circuit mainly consists of DSP and RF part as shown in the block diagram.

23.1.1. DSP: IC201

Function

- Battery Low, Power down detect circuit
 - Ringer Generation
 - Interface circuit
- RF part, Speaker, Mic, LED, Key scan, LCD, Headset

Initialize



Note:

(*1) The initializing time of the DSP chip is 20ms under normal conditions.

23.1.2. RF part

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

23.1.3. EEPROM: IC241

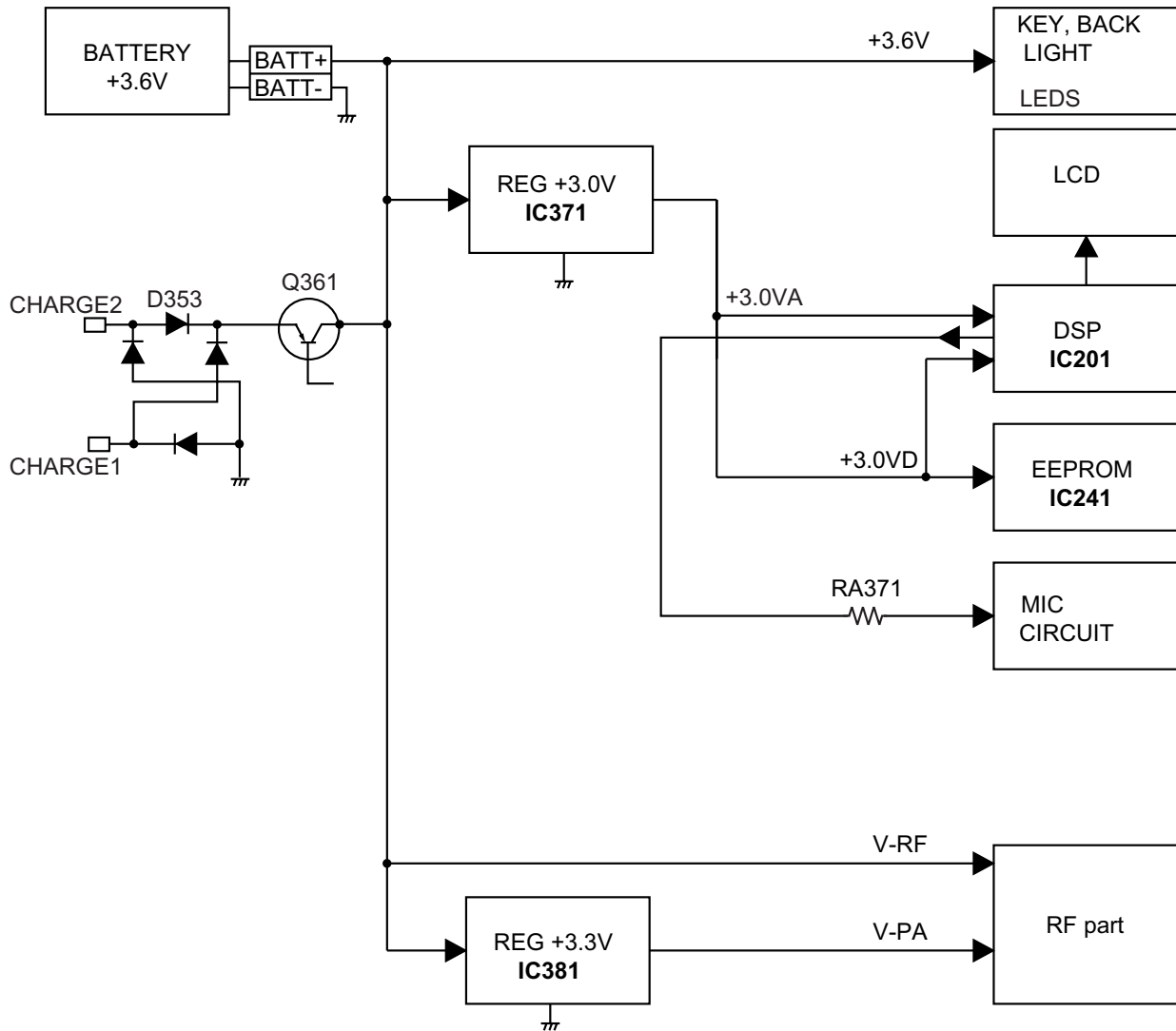
All setting data is stored.

ex: ID code, user setting (Phonebook, Caller ID data)

23.2. Power Supply Circuit

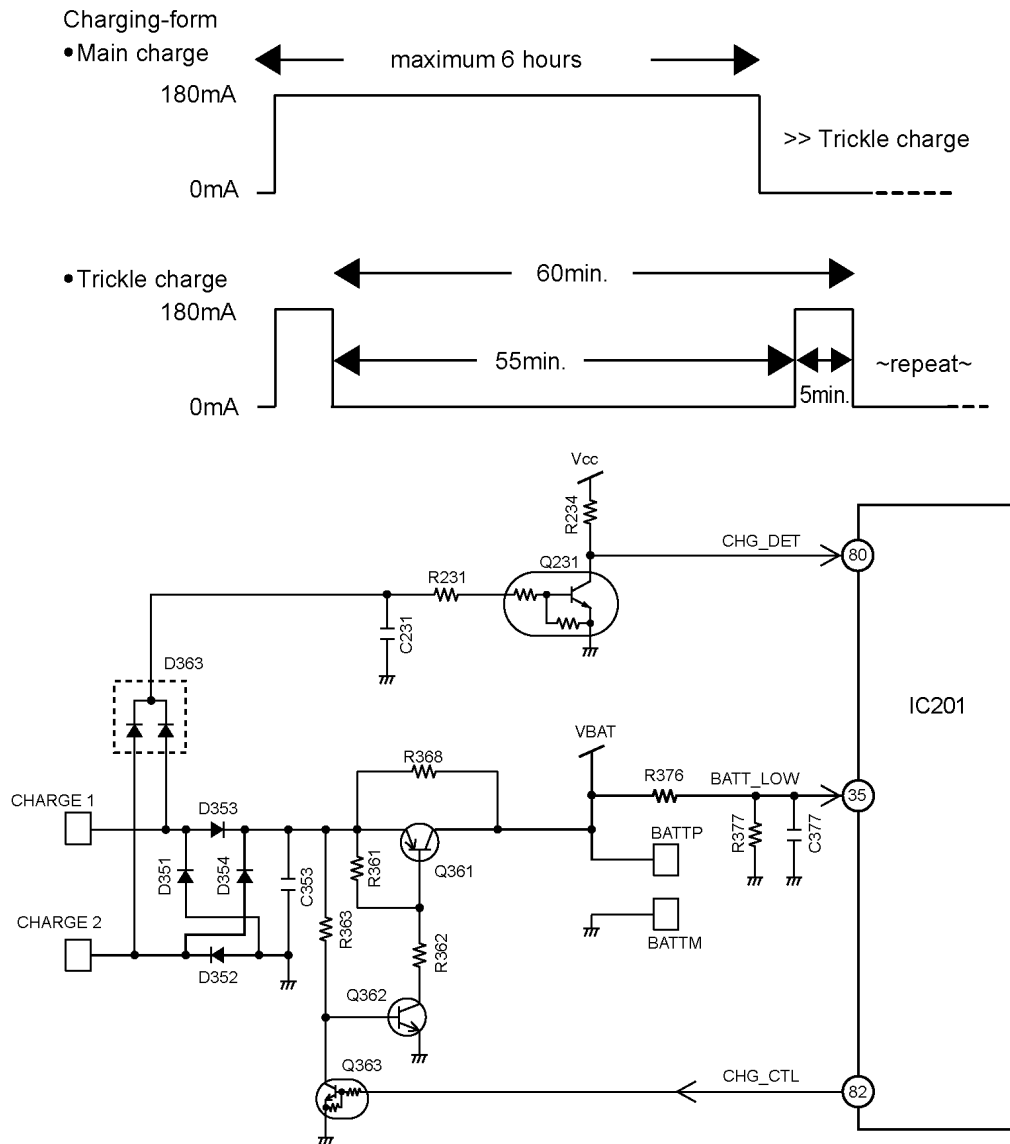
Voltage is supplied separately to each block.

Block Diagram (Handset Power)



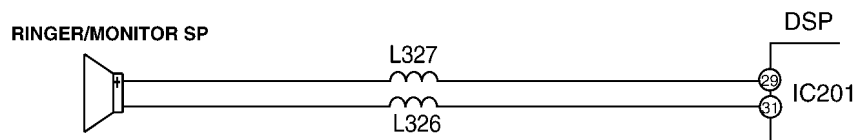
23.3. Charge Circuit

When the Handset is put on the cradle of the Base unit, the power is supplied from CHARGE+ and CHARGE- terminals to charge the battery via D353 and R368 or Q361. The voltage between CHARGE+ and CHARGE- flows R231 → Q231 → pin80 of IC201, where the charge is detected. Then IC201 calculates the battery consumption amount from the previous charge, and it controls Q361/Q362/Q363 by pin82 of IC201 until charging is complete. When charging is complete, the control pattern is switched to Trickle charging form from Operational charging form.



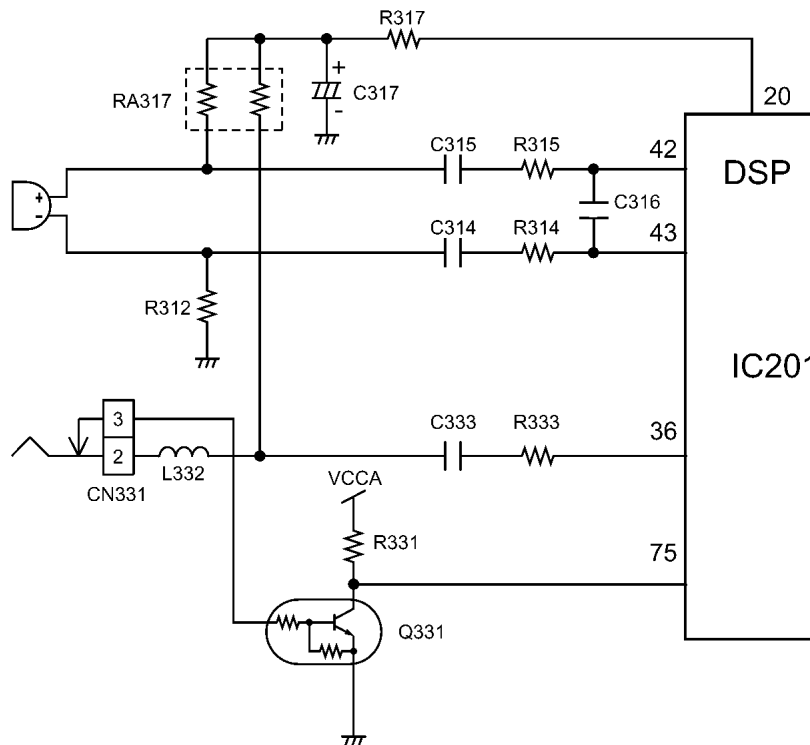
Pin 35 of IC201 monitors the battery voltage and detect BATT LOW at 3.50V.

23.4. Ringer and Handset SP-Phone



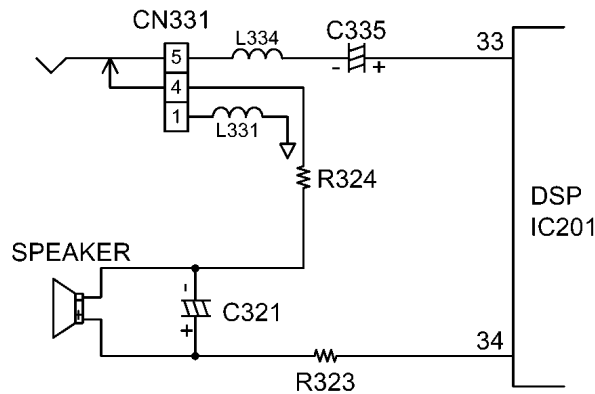
23.5. Sending Signal

The voice signal from the microphone is input to DSP (42, 43). CN331 is the headset jack. When the headphone is connected, the Q331 detect it. The input from the microphone of the Handset (MIN, MIP) is cut and the microphone signal from the headset is input to DSP (36). Also the power for the microphone is supplied from DSP (20) and the power is turned OFF on standby.



23.6. Reception Signal

The voice signal from the Base Unit is output to DSP (33) (HSSPOUT). This signal is led to the headset jack (CN331). The signal through the headset jack and the other signal output from DSP (34) drives 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.



24 SIGNAL ROUTE

Each signal route is as follows.

SIGNAL ROUTE	IN	→	ROUTE	→	OUT
HANDSET TX			HANDSET MIC - C314/C315 - R314/R315 - IC201(43/42 - 57) - <HANDSET_RF_TX_ROUTE> - ANT. ---		
			---ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(66 - 34) - R183- C185 - R185 - Q161 - Q141 - D101 - L101/L102 - CN101(TEL LINE)		
HANDSET RX			CN101(TEL LINE) - L101/L102 - D101 - Q141 - C165 - R167 - C167 - Q171 - C178 - R178 - IC501(36 - 57) - <BASE_UNIT_RF_TX_ROUTE> - ANT. ---		
			--- ANT. - <HANDSET_RF_RX_ROUTE> - IC201(66 - 33/34) - [C335 - L334 - HEADSET_JACK(5 - 4) - R324]/R323- HANDSET SPEAKER		
HEADSET TX			HEADSET_JACK(2) - L332 - C333 - R333 - IC201(36 - 57) - <HANDSET_RF_TX_ROUTE> - ANT. ---		
			---ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(66 - 34) - R183 - C185 - R185 - Q161- Q141 - D101 -L101/L102 - CN101(TEL LINE)		
HEADSET RX			CN101(TEL LINE) - L101/L102 - D101 - Q141 - C165 - R167 - C167 - Q171 - C178 - R178 - IC501(36 - 57) - <BASE_UNIT_RF_TX_ROUTE> - ANT. ---		
			--- ANT. - <HANDSET_RF_RX_ROUTE> - IC201(66 - 33) - C335 - L334 - HEADSET_JACK(5)		
HANDSET SP-Phone TX			HANDSET MIC - C314/C315 - R314/R315 - IC201(43/42 - 57) - <HANDSET_RF_TX_ROUTE> - ANT. ---		
			---ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(66 - 34) -R183 - C185 -R185 -Q161 -Q141 - D101 - L101/L102 -CN101(TEL LINE)		
HANDSET SP-Phone RX			CN101(TEL LINE) - L101/L102 - D101 - Q141 - C165 - R167 - C167 - Q171 - C178 -R178 - IC501(36 - 57) - <BASE_UNIT_RF_TX_ROUTE> - ANT. ---		
			--- ANT. -<HANDSET_RF_RX_ROUTE> - IC201(66 - 29/31) - L327/L326 - MONITOR SP		
INTERCOM HANDSET TO BASE UNIT			HANDSET MIC - C314/C315 - R314/R315 - IC201(43/42 - 57) - <HANDSET_RF_TX_ROUTE> - ANT. ---		
			--- ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(66 - 29/31) - R473/R474 - SPEAKER		
INTERCOM BASE UNIT TO HANDSET			MIC - C457/C458 - R459/R460 - IC501(43/42 - 57) - <BASE_UNIT_RF_TX_ROUTE> - ANT. ---		
			--- ANT. - <HANDSET_RF_RX_ROUTE> - IC201(66 - 33/34) - [C335 - L334 - HEADSET_JACK(5 - 4) - R324]/R323- HANDSET SPEAKER		
GREETING RECORDING			MIC - C457/C458 - R459/R460 - IC501(43/42 - 60/61) - IC601		
GREETING PLAY TO TEL LINE			IC601 - IC501(60/61 - 34) - R183 - C185 - R185 - Q161 - Q141 - D101 - L101/L102 - CN101(TEL LINE)		
ICM RECORDING			CN101(TEL LINE) - L101/L102 - D101 - Q141 - C165 - R167 - C167 - Q171 - C178 - R178 - IC501(36 - 60/61) - IC601		
ICM PLAY TO SPEAKER			IC601 - IC501(60/61 - 29/31) - R473/R474 - SPEAKER		

Note:

: inside of Handset

Each signal route is as follows.

SIGNAL ROUTE	IN	→	ROUTE	→	OUT
DTMF SIGNAL ——— TO TEL LINE	IC501(34)	-	R183 - C185 - R185 - Q161 - Q141 - D101 - L101/L102 - CN101(TEL LINE)		
DTMF DETECTION	CN101(TEL LINE)	-	L101/L102 - D101 - Q141 - C165 - R167 - C167 - Q171 - C178 - R178 - IC501(36)		
CALLER ID ———	CN101(TEL LINE)	-	L101/L102 - C121/122 - R121/122 - IC501(40/39)		
BELL DETECTION	CN101(TEL LINE)	-	L101/L102 - R111/R112 - C111/C112 - Q111 - IC501(3)		

RF part signal route

SIGNAL ROUTE	IN	→	ROUTE	→	OUT
HANDSET RF [TX_ROUTE]	< R747 - R751 - IC701(27 - 1) - L751 - C716 - IC801(17 - 2) - FL811 - IC851(19-12) >				
HANDSET RF [RX_ROUTE]	< IC851(12-15) - C874 - C871 - Q871(B - C)- C827 - FL821 - C821 - IC801(5 - 15) - C725 - R724 - C722 - IC701(4 - 16) >				
BASE UNIT RF [TX_ROUTE]	< R747 - R751 - IC701(27 - 1) - L751 - C716 - IC801(17 - 2) - FL811 - IC851(19 - 9/12) >				
HANDSET RF [RX_ROUTE]	< IC851(9/12 - 15) - C874 - C871 - Q871(B - C) - C827 - FL821 - C821 - IC801(5 - 15) - C725 - R724 - C722 - IC701(4 - 16) >				

Note:

: inside of Handset

25 CPU DATA (BASE UNIT)

25.1. IC501

PIN	Description	I/O	High	High_Z	Low
1	LINE_SZ	D.O	On	--	Off
2	NOT_RLY	D.O	On Hook	--	Off Hook
3	BELL	D.I	OFF	--	ON
4	RLY	D.O	Off Hook	--	On Hook
5	AC_DOWN_DET	D.I	High	--	Low
6	KEY_STB_F	D.O	Active	Not	--
7	KEY_STB_E	D.O	Active	Not	--
8	KEY_STB_D	D.O	Active	Not	--
9	KEY_STB_C	D.O	Active	Not	--
10	KEY_STB_B	D.O	Active	Not	--
11	KEY_STB_A	D.O	Active	Not	--
12	CHG_CTR	D.O	No Charge	--	Charge
13	CHG_DET	D.I	Off Charge	--	On Charge
14	VCC	VCC	VCC	--	--
15	GND	GND	--	--	GND
16	KEY_IN_6	D.I	Non	--	Key In
17	KEY_IN_5	D.I	Non	--	Key In
18	KEY_IN_4	D.I	Non	--	Key In
19	KEY_IN_3	D.I	Non	--	Key In
20	KEY_IN_2	D.I	Non	--	Key In
21	KEY_IN_1	D.I	Non	--	Key In
22	NC	D.O	--	--	--
23	SYN_DATA	D.O	High	--	Low
24	SYN_LE1	D.O	Not	--	Active
25	SYN_CLK	D.O	High	--	Low
26	SYN_DI	D.I	High	--	Low
27	SYN_LE2	D.O	Not	--	Active
28	GND	GND			
29	SPOUTP	A.O			
30	GNDPA	GND			
31	SPOUTN	A.O			
32	VCCPA	VCC			
33	HSSPOUT	A.O			
34	LOUT0	A.O			
35	DCIN0	A.I			
36	LIN0	A.I			
37	VCCA	VCC			
38	GND A	A.I			
39	HSMIP	A.I			
40	HSMIN	A.I			
41	VREF	A.O			
42	MIN	A.I			
43	MIP	A.I			
44	GNDR	GND			
45	TXMOD	A.O			
46	VREFR	A.O			
47	RSSI	A.I			
48	VCCR	VCC			
49	GNDPLL	GND			
50	VCCPLL	VCC			
51	XOUT	A.O			
52	XIN	A.I			
53	GND	GND			
54	Reset	D.I	Normal	--	Reset
55	Power Down	D.I	Normal	--	Power Down
56	FLASH_RST	*	High	Middle	Low
57	TX_OUT	D.O	High	--	Low
58	PA_CONT	D.O	Low Power	--	High Power
59	FLASH_SO	*	High	Middle	Low
60	FLASH_SI	*	High	Middle	Low
61	FLASH_CS	*	High	Middle	Low

PIN	Description	I/O	High	High_Z	Low
62	BMCCLK	D.O	High	--	Low
63	RXEN	D.O	Active	--	Off
64	TXEN	D.O	Active	--	Off
65	RXGAIN	D.O	High	--	Low
66	RXI	D.I	High	--	Low
67	CHG_LED	D.I.O	--	Off	On
68	INUSE_LED	D.I.O	--	Off	On
69	ANS_LED	D.I.O	--	Off	On
70	RF_RST	D.O	Normal	--	WakeUp
71	RADIO_EN	D.O	Active	--	Not
72	GND	GND	--	--	GND
73	VCC	VCC	VCC	--	--
74	SHCTRL	D.O	Active	--	Not
75	ANT0	D.O	On	--	Off
76	TCK	D.O	--	--	--
77	TMS	D.I	--	--	--
78	TDI	D.O	--	--	--
79	TD0	D.O	--	--	--
80	SEG12	D.O	High	--	Low
81	SEG11	D.O	High	--	Low
82	SEG10	D.O	High	--	Low
83	SEG9	D.O	High	--	Low
84	SEG8	D.O	High	--	Low
85	SEG7	D.O	High	--	Low
86	SEG6	D.O	High	--	Low
87	SEG5	D.O	High	--	Low
88	SEG4	D.O	High	--	Low
89	SEG3	D.O	High	--	Low
90	COM2	D.I.O	High	Middle	Low
91	COM1	D.I.O	High	Middle	Low
92	UART_TX	D.O	High	--	Low
93	UART_RX	D.I	High	--	Low
94	INT0	D.O	--	--	--
95	MSG_LED	D.I.O	--	Off	On
96	GND	GND	--	--	GND
97	VCC	VCC	VCC	--	--
98	NC	D.O	--	--	--
99	FLASH_SCK	*	High	Middle	Low
100	INT_1	D.O	--	--	--

Note:

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

26 CPU DATA (HANDSET)

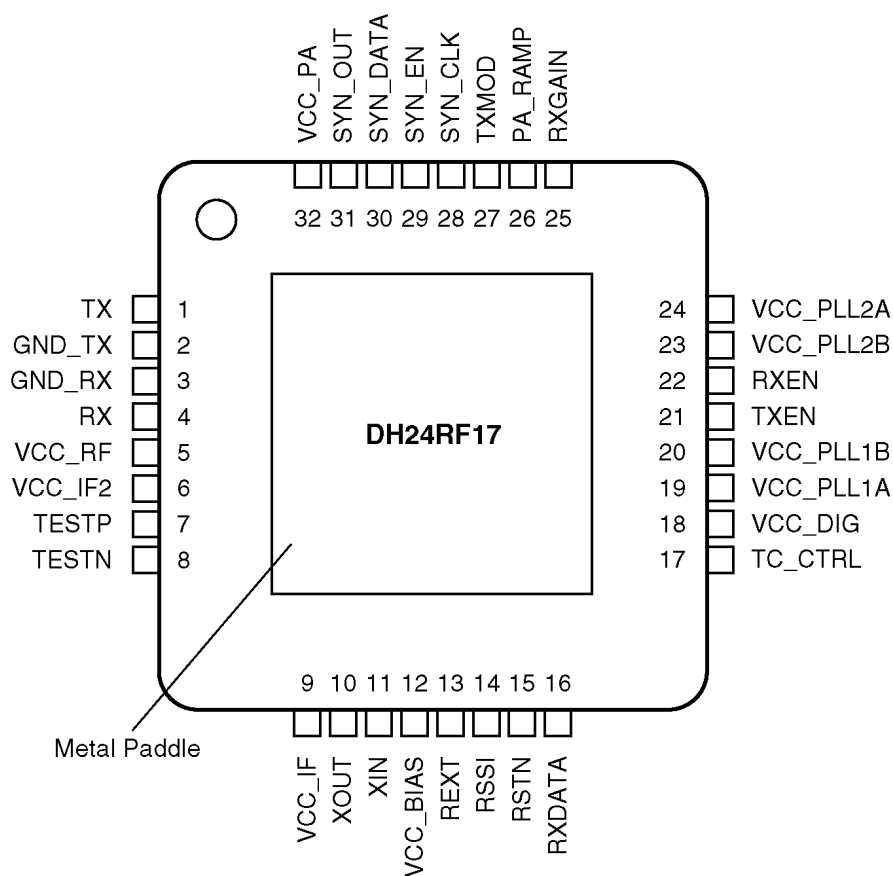
26.1. IC201

PIN	Description	I/O	High	High_Z	Low
1	NC(INT0)	D.O	--	--	Normal
2	NC(CV-hook)	D.O	--	--	Normal
3	DOT_LCD_RS	D.O	Data	--	Instruct
4	DOT_LCD_RW_WR	D.O	Read	--	Write
5	DOT_LCD_E_RD	D.O	Active	--	Not
6	DOT_LCD_D4	D.O	High	--	Low
7	DOT_LCD_D5	D.O	High	--	Low
8	DOT_LCD_D6	D.O	High	--	Low
9	DOT_LCD_D7	D.O	High	--	Low
10	DOT_LCD_POWER_SW	D.O	On	--	Off
11	DOT_LCD_RESET	D.O	Normal	--	Reset
12	ANT_LED1	D.O	Off	--	On
13	MIPS_CHANGE	D.I	73MIPS	--	65MIPS
14	VCC	VCC	VCC	--	--
15	GND	GND	--	--	GND
16	EEPROM_DATA	D.I.O	High	--	Low
17	EEPROM_CLK	D.O	High	--	Low
18	EEPROM_WP	D.O	WP	--	Write
19	ANT_LED2	D.O	Off	--	On
20	MIC POWER SW	D.O	Bias on	--	Bias off
21	UART_TX	D.O	High	--	Low
22	UART_RX	D.I	High	--	Low
23	SERIAL_DATA	D.O	High	--	Low
24	SERIAL_LE	D.O	High	--	Low
25	SERIAL_CLK	D.O	High	--	Low
26	SERIAL DI	D.I	High	--	Low
27	ANT_LED3	D.O	Off	--	On
28	GND	GND	--	--	GND
29	SPOUTP	A.O	--	--	--
30	GNDPA	GND	--	--	GND
31	SPOUTN	A.O	--	--	--
32	VCCPA	VCC	VCC	--	--
33	HSSPOUT	A.O	--	--	--
34	LOUT0	A.O	--	--	--
35	DCIN0	A.I	--	--	--
36	LIN0	A.I	--	--	--
37	VCCA	VCC	VCC	--	--
38	GND A	GND	--	--	GND
39	HSMIP	A.I	--	--	--
40	HSMIN	A.I	--	--	--
41	VREF	A.O	--	--	--
42	MIN	A.I	--	--	--
43	MIP	A.I	--	--	--
44	GNDR	GND	--	--	GND
45	TXMOD	A.O	--	--	--
46	VREFR	A.O	--	--	--
47	RSSI	A.I	--	--	--
48	VCCR	VCC	VCC	--	--
49	GNDPLL	GND	--	--	GND
50	VCCPLL	VCC	VCC	--	--
51	XOUT	A.O	--	--	--
52	XIN	A.I	--	--	--
53	GND	GND	--	--	GND
54	RESET	D.I	Normal	--	Reset
55	PDN	D.I	Power On	--	Power Down
56	(FLASH_RESET)	D.O	--	--	Normal
57	TX OUT	D.O	High	--	Low
58	PA_CONT	D.O	High	--	Low
59	(FLASH_SO)	D.O	--	--	Normal

PIN	Description	I/O	High	High_Z	Low
60	(FLASH_SI)	D.O	High	--	Low
61	(FLASH_CS)	D.O	--	--	Normal
62	BMCCLK	D.O	--	--	--
63	RXEN	D.O	Active	--	Off
64	TXEN	D.O	Active	--	Off
65	RXGAIN	D.O	High	--	Low
66	RXI	D.I	High	--	Low
67	OSC_BUF	D.O	--	--	On
68	CON_EN	D.O	High	--	Low
69	SYN_LE2	D.O	On	--	Off
70	LO_EN	D.O	High	--	Low
71	RADIOEN	D.O	On	--	Off
72	GND	GND	--	--	GND
73	VCC	VCC	VCC	--	--
74	SHCTRL	D.O	On	--	Off
75	HEADSET_DET	D.I	Headset In	--	Non
76	TEST_CLK	D.I	--	--	--
77	TEST_MODE_SELECT	D.I	--	--	--
78	TEST_DATA_IN	D.I	--	--	--
79	TEST_DATA_OUT	D.O	--	--	--
80	CHARGE_DET	D.I	Off Charge	--	On Charge
81	RF_RESET	D.O	Normal	--	Reset
82	CHARGE_CNT	D.O	Trickle	--	Normal
83	KEYIN5	D.I	Non	--	Key In
84	KEYIN4	D.I	Non	--	Key In
85	KEYIN3	D.I	Non	--	Key In
86	KEYIN2	D.I	Non	--	Key In
87	KEYIN1	D.I	Non	--	Key In
88	LED_REG	D.O	On	--	Off
89	KEY_LIGHT	D.O	On	--	Off
90	LCD_BACK_LIGHT	D.O	On	--	Off
91	KEYSTROBE_E	D.O	--	Not	Active
92	KEYSTROBE_D	D.O	--	Not	Active
93	KEYSTROBE_C	D.O	--	Not	Active
94	KEYSTROBE_B	D.O	--	Not	Active
95	KEYSTROBE_A	D.O	--	Not	Active
96	GND	GND	--	--	GND
97	VCC	VCC	VCC	--	--
98	NC	D.O	High	--	Normal
99	FLASH_SCK	D.O	High	--	Low
100	NC(INT1)	D.O	--	--	Normal

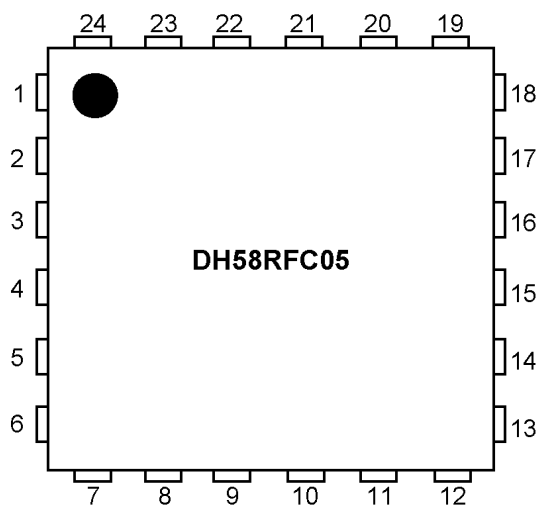
27 EXPLANATION OF IC TERMINALS (RF PART)

27.1. IC701



Pin	Description	I/O	Pin	Description	I/O
1	TX	O & VCC	18	VCC_DIG	VCC
2	GND_TX	GND	19	VCC_PLL1A	VCC
3	GND_RX	GND	20	VCC_PLL1B	VCC
4	RX	I	21	TXEN	I
5	VCC_RF	VCC	22	RXEN	I
6	VCC_IF2	VCC	23	VCC_PLL2B	VCC
7	TESTP	O	24	VCC_PLL2A	VCC
8	TESTN	O	25	RXGAIN	I
9	VCC_IF	VCC	26	PA_RAMP	I
10	XOUT	Xi/XO	27	TXMOD	I
11	XIN	Xi/XO	28	SYN_CLK	I
12	VCC_BIAS	VCC	29	SYN_EN	I
13	REXT	I	30	SYN_DATA	I
14	RSSI	O	31	SYN_OUT	O
15	RSTN	I	32	VCC_PA	VCC
16	RXDATA	O	PKG	PADDLE_GND	GND
17	TC_CTRL	I			

27.2. IC801

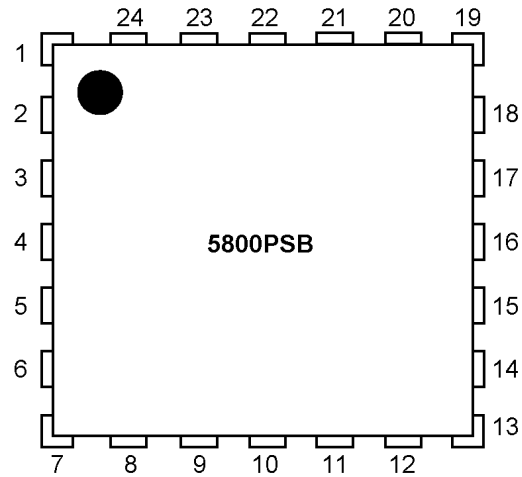


Pin	Description	I/O
1	VCC_PA2	VCC
2	TX	O
3	GND_ISOL1	GND
4	GND_ISOL2	GND
5	RX	I
6	VCC_LNA	VCC
7	REFIN	I
8	REFOUT	O
9	RXGAIN	I
10	CP_OUT	O
11	TV_IN	I
12	VARGND	GND

Pin	Description	I/O
13	PLL_BYP	O
14	VCC_PLL	VCC
15	2G4_OUT	O
16	GND_ISOL3	GND
17	2G4_IN	I
18	VCCTXR	VCC
19	SYN_CLK	I
20	SYN_EN	I
21	SYN_DATA	I
22	RXEN	I
23	TXEN	I
24	VCC_PA1	VCC

Backside Terminal: GND

27.3. IC851



Pin	Description	I/O
1	VCC2	VCC
2	VCC3	VCC
3	GND	GND
4	GND	GND
5	PA_OUT	O
6	TX_IN	I
7	SW1	I
8	SW2	I
9	ANT1_IN/OUT	I/O
10	GND	GND
11	GND	GND
12	ANT2_IN/OUT	I/O

Pin	Description	I/O
13	SW3	I
14	SW4	I
15	RX_OUT	O
16	GND	GND
17	PA_CTL	I
18	GND	GND
19	PA_IN	I
20	GND	GND
21	VCC0	VCC
22	GND	GND
23	GND	GND
24	VCC1	VCC

Backside Terminal: GND

28 HOW TO REPLACE THE FLAT PACKAGE IC

Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

28.1. 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)

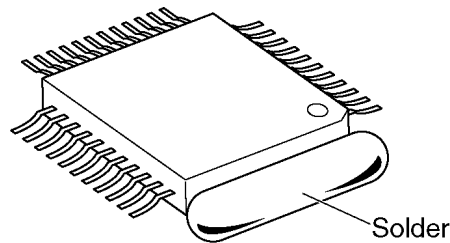
Note: See **ABOUT LEAD FREE SOLDER (PbF: Pb free)** (P.4)

28.2. FLAT PACKAGE IC REMOVAL PROCEDURE

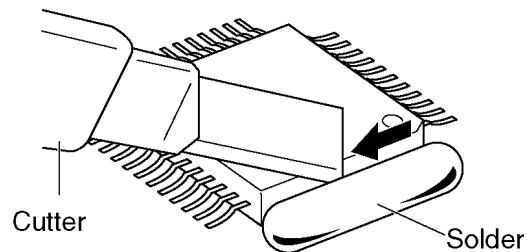
1. Put plenty of solder on the IC pins so that the pins can be completely covered.

Note:

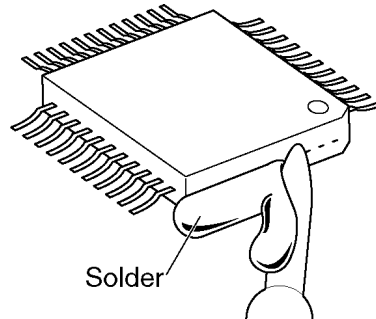
If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



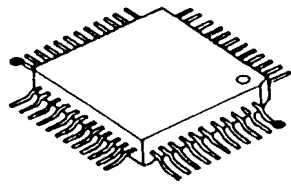
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

28.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

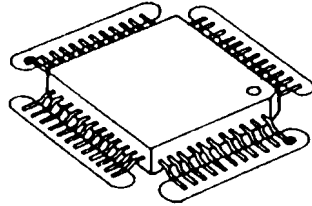
1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.



● - - - - - Temporary soldering point.

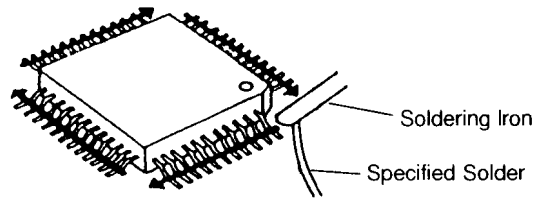
*Check the accuracy of the IC setting with the corresponding soldering foil.

2. Apply flux to all pins of the FLAT PACKAGE IC.



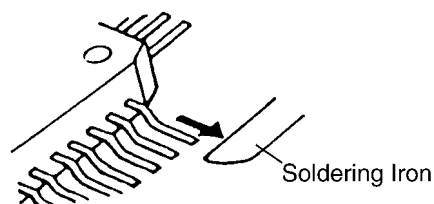
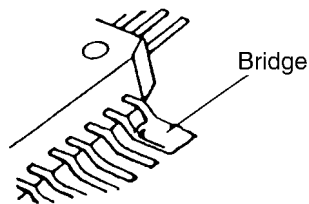
- - - - - Flux

3. Solder the pins, sliding the soldering iron in the direction of the arrow.

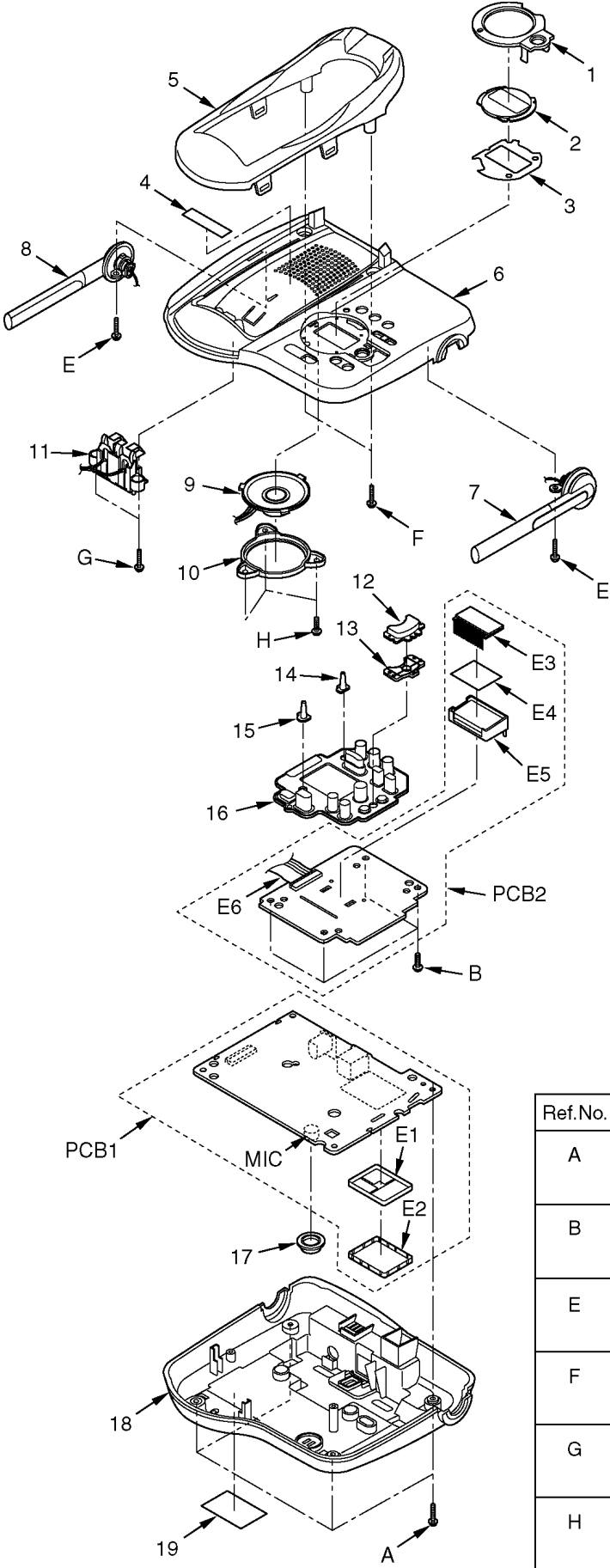




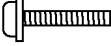
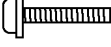
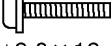
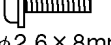
28.4. BRIDGE MODIFICATION PROCEDURE

1. Lightly resolder the bridged portion.
2. Remove the remaining solder along the pins using a soldering iron as shown in the figure below.

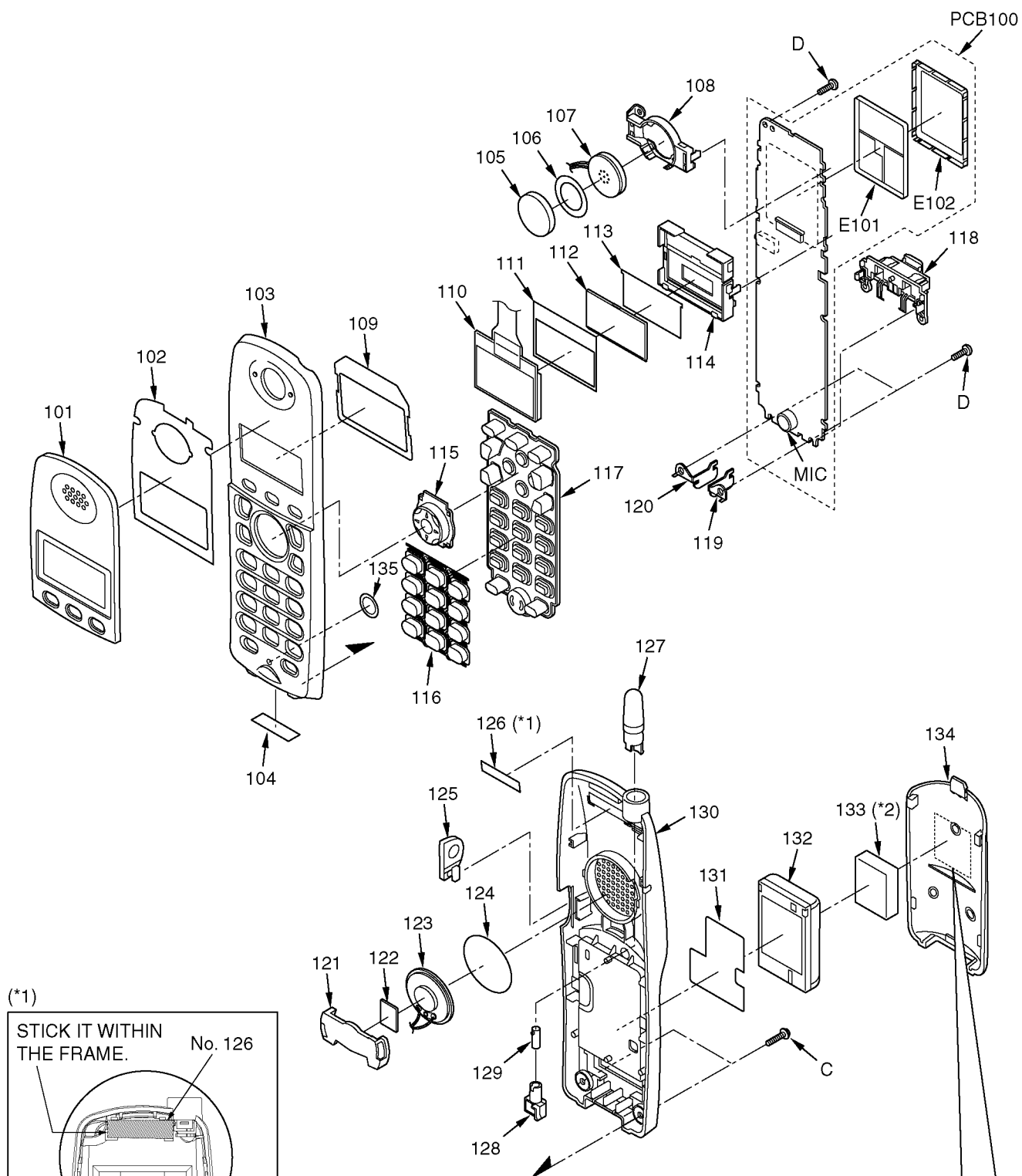


29 CABINET AND ELECTRICAL PARTS (BASE UNIT)



Ref.No.	Part No.	Figure
A	PQHV2612PJ65	 φ2.6 × 12mm
B	XTW26+8PFJ7	 φ2.6 × 8mm
E	PQHV2612PJ65	 φ2.6 × 12mm
F	PQHV2612PJ65	 φ2.6 × 12mm
G	PQHV2612PJ65	 φ2.6 × 12mm
H	XTW26+8PFJ7	 φ2.6 × 8mm

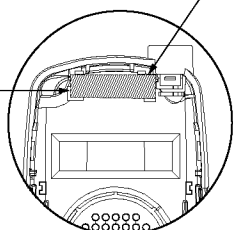
30 CABINET AND ELECTRICAL PARTS (HANDSET)





(*1)

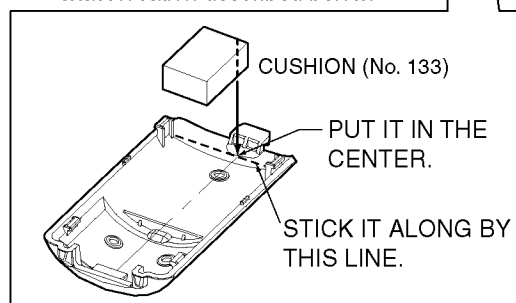
STICK IT WITHIN
THE FRAME.

No. 126



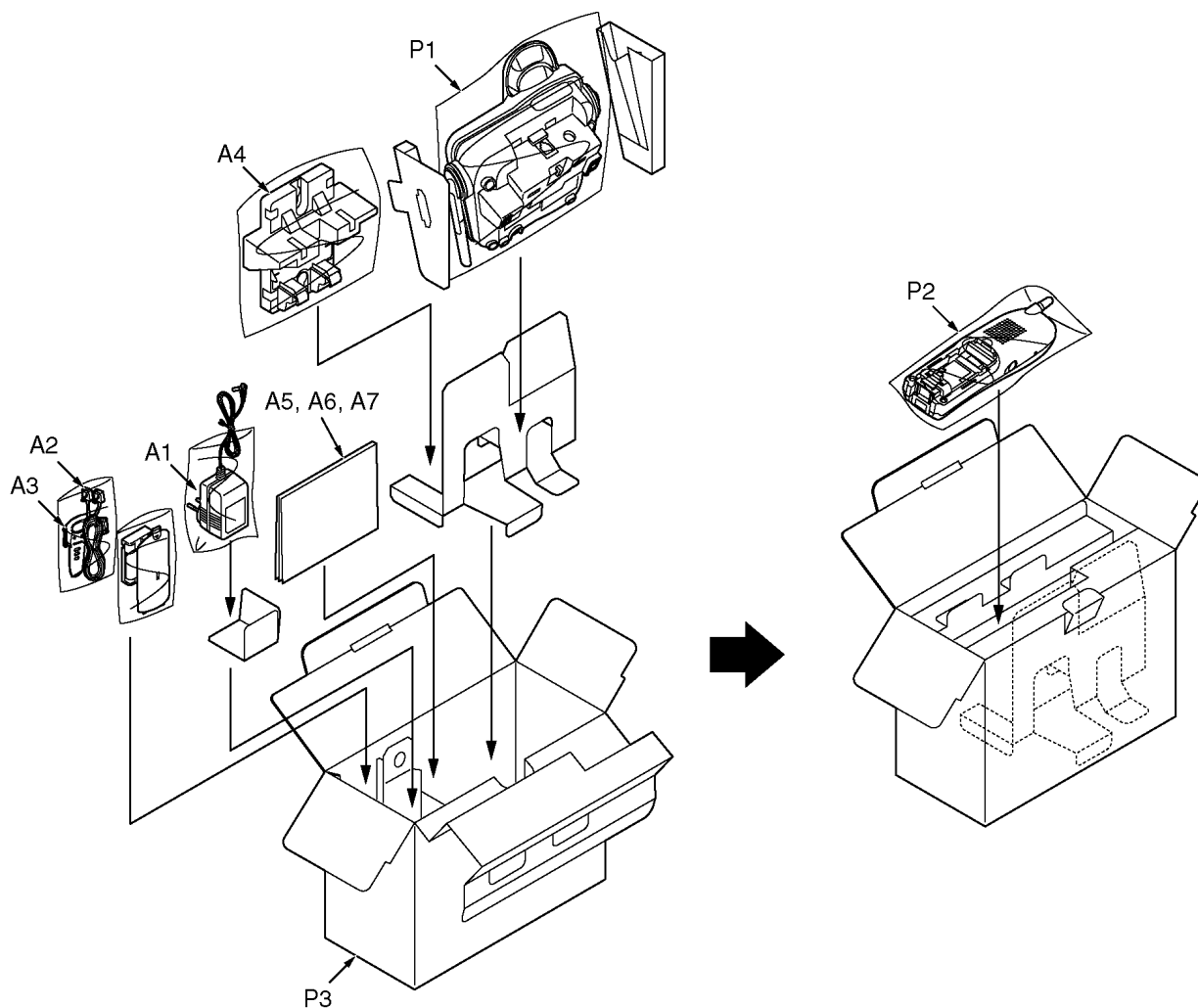
(*2) Attach the cushion (No. 133) to the exact location described below.

Ref.No.	Part No.	Figure
C	XTW2+R14PFJ	 $\phi 2 \times 14\text{mm}$
D	XTW2+R9PFJ	 $\phi 2 \times 9\text{mm}$



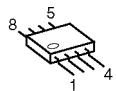
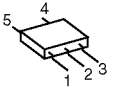
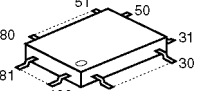
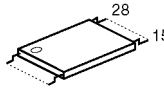
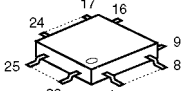
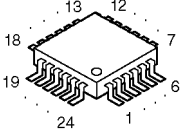
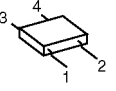
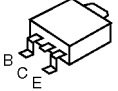
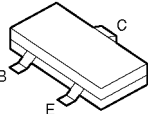
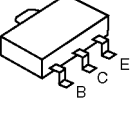
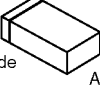
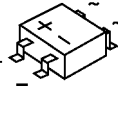

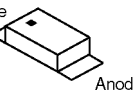
31 ACCESSORIES AND PACKING MATERIALS

31.1. KX-TG5431BXS

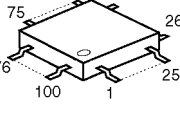
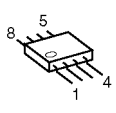
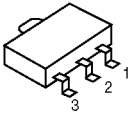
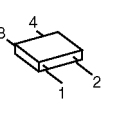
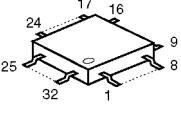
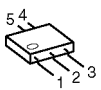
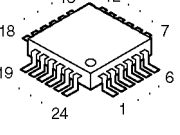
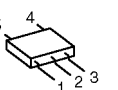
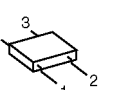
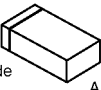
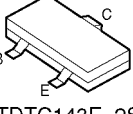
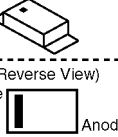
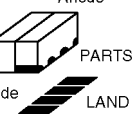
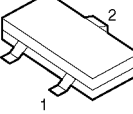


32 TERMINAL GUIDE OF THE ICs, TRANSISTORS AND DIODES

32.1. Base Unit

 <p>C0DBFGD00017</p>	 <p>C0DBAGZ00023 C0CBAAAC00083 C0CBABE00029</p>	 <p>C2HBBK000080</p>	 <p>PQWIG5431BXH</p>	 <p>C1CB00001657</p>
 <p>C1CB00001682 C1CB00001917</p>	 <p>B1ABAA000022</p>	 <p>2SD1758Q</p>	 <p>B1CHND000004, 2SD1819A PQVTDTC144TU, 2SC39300CL PQVTDTC114TU, 2SB1218A</p>	
 <p>B1ADGP000008 2SD0874AS B1BBAP000021</p>	 <p>Cathode Anode</p> <p>MA111, MA8220 B0JCME000035 B0ECKM000008</p>	 <p>MAZ805100L PQVDS1ZB60F1</p>	 <p>Anode Cathode</p> <p>PQVDRLZ20A</p>	 <p>Cathode Anode</p> <p>PQVDSML210L</p>

32.2. Handset

 <p>C2HBBK000077</p>	 <p>PQWIG5431BXR</p>	 <p>C0CBABD00019 C0CBABD00011</p>	 <p>C0EBF0000179</p>	 <p>C1CB00001657</p>
 <p>C0CBAAAC00083 C0CBABE00029</p>	 <p>C1CB00001682 C1CB00001917</p>	 <p>B1GHCFFEM0001 PSVTUMG11NTR</p>	 <p>B1ABAA000022</p>	 <p>Cathode Anode</p> <p>MA111 B0JCMD000010</p>
 <p>UN521, PQVTDTC143E, 2SC39300CL 2SD1819A, PQVTDTC123JU, 2SB1197KQ PQVTDTC114TU</p>		 <p>(Reverse View) Cathode Anode</p> <p>B3ACB0000133</p>	 <p>Anode Cathode PARTS LAND</p> <p>B3AZB0000032</p>	 <p>MA132WK</p>

33 REPLACEMENT PARTS LIST

Note:

1. RTL (Retention Time Limited)

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

After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability depends on the type of assembly and the laws governing parts and product retention.

At the end of this period, the assembly will no longer be available.

2. Important safety notice

Components identified by the Δ 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=1000 Ω , M=1000k Ω

All capacitors are in MICRO FARADS (μ F) P= μ F

*Type & Wattage of Resistor

Type

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

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
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*Type & Voltage Of Capacitor

Type

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

Voltage

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

33.1. Base Unit

33.1.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQGG10279Z1	GRILLE, LCD	ABS-HB
2	PQGF10273Z1	PANEL, LCD	AS-HB
3	PQHS10659Z	TAPE, DOUBLE SIDED (LCD PANEL)	
4	PQQT22880Z	LABEL, CHARGE	
5	PQGG10278Y1	GRILLE, CRADLE	PC-HB
6	PQKM10663T3	CABINET BODY	PS-HB
7	PQSA10157Y	ANTENNA (R)	
8	PQSA10158Y	ANTENNA (L)	
9	L0AA04A00028	SPEAKER	

Ref. No.	Part No.	Part Name & Description	Remarks
10	PQHR11082Z	GUIDE, SP HOLDER	POM-HB
11	PQWE10037Z	BATTERY TERMINAL	PS-HB
12	PQBC10423Z1	PUSH BUTTON, MESSAGE	AS-HB
13	PQHR11094Z	GUIDE, MESSAGE BUTTON	ABS-HB
14	PQHR11095Z	OPTIC CONDUCTIVE PARTS, LED LENDS (ANSWER ON)	PS-HB
15	PQHR11096Z	OPTIC CONDUCTIVE PARTS, LED LENDS (CHARGE)	PS-HB
16	PQSX10283X	KEYBOARD SWITCH	
17	PQMG10025Z	RUBBER PARTS, MIC	
18	PQYF10603Y1	CABINET COVER	PS-HB
19	PQGT17950Z	NAME PLATE	

33.1.2. Main P.C. Board Parts

Note:

(*1) When you have replaced IC501 or IC601, adjust X501.

Refer to **Check and Adjust X501 (Base Unit) Frequency** (P.59).

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWP15831BXH	MAIN P.C.BOARD ASS'Y (RTL)	
		(ICs)	
IC300	C0DBAGZ00023	IC	S
IC331	C0DBFGD00017	IC	
IC501	C2HBBK000080	IC (*1)	
IC601	PQWIG5431BXH	IC (*1)	
IC701	C1CB00001657	IC	
IC761	C0CBAAC00083	IC	
IC801	C1CB00001682	IC	
IC841	C0CBABE00029	IC	
IC851	C1CB00001917	IC	
		(TRANSISTORS)	
Q111	2SD1819A	TRANSISTOR(SI)	
Q131	2SD1819A	TRANSISTOR(SI)	
Q141	B1ADGP000008	TRANSISTOR(SI)	
Q142	B1BBAP000021	TRANSISTOR(SI)	
Q161	2SD0874AS	TRANSISTOR(SI)	
Q171	2SD1819A	TRANSISTOR(SI)	
Q300	B1CHND000004	TRANSISTOR(SI)	
Q340	2SD1819A	TRANSISTOR(SI)	
Q361	2SB1218A	TRANSISTOR(SI)	
Q362	PQVTDTC144TU	TRANSISTOR(SI)	S
Q371	2SD1758Q	TRANSISTOR(SI)	S
Q372	2SD1819A	TRANSISTOR(SI)	
Q373	PQVTDTC114TU	TRANSISTOR(SI)	S
Q521	2SC39300CL	TRANSISTOR(SI)	
Q535	2SD1819A	TRANSISTOR(SI)	
Q871	B1ABAA000022	TRANSISTOR(SI)	
Q871	B1ABAA000022	TRANSISTOR(SI)	
		(DIODES)	
D101	PQVDS1ZB60F1	DIODE(SI)	S
D113	MA111	DIODE(SI)	S
D133	MA111	DIODE(SI)	S
D142	PQVDRLZ20A	DIODE(SI)	S
D300	B0JCME000035	DIODE(SI)	
D301	B0JCME000035	DIODE(SI)	
D361	MA8220	DIODE(SI)	S
D362	B0ECKM000008	DIODE(SI)	
D371	MA8220	DIODE(SI)	S
D471	MAZ805100L	DIODE(SI)	
D472	MAZ805100L	DIODE(SI)	
		(COILS)	
L101	PQLQXF330K	COIL	S
L102	PQLQXF330K	COIL	S
L300	G1C220M00037	COIL	S
L361	G1C6R8MA0072	COIL	
L371	G1C6R8MA0072	COIL	
L471	G1C6R8MA0072	COIL	

Ref. No.	Part No.	Part Name & Description	Remarks
L472	GLC6R8MA0072	COIL	
L501	PQLQR2KA213	COIL	S
L711	MQLRF18NJFB	COIL	
L782	GLC1R0KA0096	COIL	
L871	MQLRF6N8JFB	COIL	
L873	MQLRF2N2DFB	COIL	
C723	MQLRF2N7DFB	COIL	
C874	MQLRF1N5DFB	COIL	
		(JACKS AND CONNECTOR)	
CN101	PQJJ1TA15Z	JACK	S
CN301	PQJJ1B4Y	JACK	S
CN661	KLMN32B00035	CONNECTOR	
		(LCR FILTERS)	
FL811	ELB1A001	LCR FILTER	
FL821	KNCFH165R8Z1	LCR FILTER	
		(COMPONENTS PARTS)	
RA500	DIH810440003	RESISTOR ARRAY	
RA501	DIH84724A013	RESISTOR ARRAY	
		(VARISTORS)	
SA101	J0LE00000047	VARISTOR (SURGE ABSORBER)	S
SA104	J0LE00000047	VARISTOR (SURGE ABSORBER)	S
		(RESISTORS)	
R111	ERJ3GEYJ104	100K	
R112	ERJ3GEYJ104	100K	
R113	ERJ3GEYJ103	10K	
R114	ERJ3GEYJ473	47K	
R121	ERJ3GEYJ394	390K	
R122	ERJ3GEYJ394	390K	
R131	ERJ3GEYJ106	10M	
R132	ERJ3GEYJ395	3.9M	
R134	ERJ3GEYJ102	1K	
R136	ERJ3GEYJ135	1.3M	
R137	ERJ2GEJ473	47K	
R141	ERJ3GEYJ104	100K	
R142	ERJ3GEYJ103	10K	
R143	ERJ3GEYJ103	10K	
R145	ERJ2GEJ103	10K	
R161	ERJ3GEYJ751	750	
R162	ERJ3GEYJ393	39K	
R163	ERJ12YJ330	33	
R164	ERJ3GEYJ470	47	
R165	ERJ3GEYJ431	430	
R167	ERJ2GEJ102	1K	
R168	ERJ3GEY0R00	0	
R171	ERJ2GEJ270	27	
R172	ERJ2GEJ104	100K	
R175	ERJ3GEYJ561	560	
R176	ERJ3GEYJ101	100	
R178	ERJ2GEJ102	1K	
R183	ERJ2GEJ222	2.2K	
R185	ERJ3GEYJ333	33K	
R303	ERJ3GEYJ221	220	
R304	ERJ3GEYJ221	220	
R308	ERJ3GEYJ121	120	
R340	ERJ3GEYJ123	12K	
R341	ERJ3GEYJ102	1K	
R342	ERJ3GEYJ473	47K	
R361	ERJ3GEYJ332	3.3K	
R364	ERJ3GEYJ103	10K	
R365	ERJ3GEYJ102	1K	
R371	ERJ3GEYJ100	10	
R372	ERJ3GEYJ100	10	
R373	ERJ3GEYJ100	10	
R374	ERJ3GEYJ101	100	
R375	ERJ3GEYJ561	560	
R421	ERJ2GEJ473	47K	
R422	ERJ2GEJ102	1K	
R423	ERJ2GEJ102	1K	
R453	ERJ2GEJ222	2.2K	
R454	ERJ2GEJ222	2.2K	
R459	ERJ2GEJ222	2.2K	
R460	ERJ2GEJ222	2.2K	
R473	ERJ2GEJ1R0	1	

Ref. No.	Part No.	Part Name & Description	Remarks
R474	ERJ2GEJ1R0	1	
R506	ERJ2GEJ121	120	
R521	ERJ2GEJ182	1.8K	
R522	ERJ2GEJ151	150	
R523	ERJ2GEJ393X	39K	
R524	ERJ2GEJ561	560	
R525	ERJ2GEJ681	680	
R533	ERJ2GEJ472X	4.7K	
R535	ERJ2GEJ102	1K	
R536	ERJ2GEJ222	2.2K	
R673	ERJ2GEJ821	820	
R675	ERJ2GEJ821	820	
R679	ERJ2GEJ821	820	
R701	ERJ2RKF103X	10K	
R724	ERJ2GE0R00	0	
R732	ERJ2GEJ100	10	
R733	ERJ2GEJ100	10	
R735	ERJ2GEJ4R7	4.7	
R742	ERJ2GEJ331	330	
R744	ERJ2GEJ102	1K	
R747	ERJ2GEJ102	1K	
R751	ERJ2GEJ102	1K	
R752	ERJ2GEJ102	1K	
R809	ERJ2GEJ223	22K	
R832	ERJ2GEJ562X	5.6K	
R834	ERJ2GEJ332	3.3K	
R847	ERJ2GE0R00	0	
R856	ERJ2GEJ103	10K	
R872	ERJ2GEJ473	47K	
R873	ERJ2GEJ121	120	
		(CAPACITORS)	
C101	ECUV2H681KB	680P	S
C102	ECUV2H681KB	680P	S
C111	FLJ2A473A024	0.047	
C112	FLJ2A473A024	0.047	
C113	PQCUV1A684KB	0.68	
C120	ECUV1H562KBV	0.0056	
C121	ECUV1H681JCV	680P	S
C122	ECUV1H681JCV	680P	S
C132	ECUV1H103KBV	0.01	
C142	ECUV1H103KBV	0.01	
C161	EEE1EA100WR	10	
C162	ECUV1H101JCV	100P	
C163	ECJ1VB1H472K	0.0047	
C165	ECUV1C473KBV	0.047	
C166	EEE1CA100SR	10	
C167	ECUV1A224KBV	0.22	
C172	F1G1H272A571	0.0027	
C176	ECST0JY226	22	
C178	F1G1A473A032	0.047	
C184	F1G1A473A032	0.047	
C185	F1G1C183A081	0.018	
C300	EEEFK1C470P	47	
C303	ECUV1H103KBV	0.01	
C304	ECUV1A105KBV	1	
C305	ECUV1H103KBV	0.01	
C306	F2G1E1010011	100	S
C308	ECUV1E104KBV	0.1	
C331	ECUV1C474KBV	0.47	
C332	ECUV1C104KBV	0.1	
C341	EEE0JA331P	330	
C342	ECUV1C104KBV	0.1	
C347	ECUV1C104KBV	0.1	
C352	ECUV1C104KBV	0.1	
C361	ECJ0EB1H102K	0.001	
C365	ECJ0EB1C103K	0.01	
C371	ECUV1C104KBV	0.1	
C373	F3F0J106A057	10	
C381	ECUV1A105KBV	1	
C382	F1K0J1060020	10	
C421	ECUV1C104KBV	0.1	
C422	F1G1A1040006	0.1	
C457	ECJ0EB1C223K	0.022	

Ref. No.	Part No.	Part Name & Description	Remarks
C458	ECJ0EB1C223K	0.022	
C459	F1G1C153A081	0.015	
C501	ECUV1C104KBV	0.1	
C503	ECUV1C104KBV	0.1	
C504	ECUV1C104KBV	0.1	
C508	ECJ0EC1H020C	2P	
C509	ECJ0EC1H020C	2P	
C513	ECUV1C104KBV	0.1	
C515	ECUV1A105KBV	1	
C516	F3F0J106A057	10	
C517	ECUV1C104KBV	0.1	
C518	ECUV1A106ZF	10	S
C521	ECJ0EC1H030C	3P	
C522	F1G1A1040006	0.1	
C524	F1G1A1040006	0.1	
C525	F1G1A1040006	0.1	
C551	ECJ0EB1C103K	0.01	
C601	F1G1A1040006	0.1	
C660	ECUV1C104KBV	0.1	
C663	ECJ0EB1H102K	0.001	
C664	ECJ0EB1H102K	0.001	
C665	ECJ0EB1H102K	0.001	
C666	ECJ0EB1H102K	0.001	
C667	ECJ0EB1H102K	0.001	
C668	ECJ0EB1H102K	0.001	
C669	ECJ0EB1H102K	0.001	
C670	ECJ0EB1H102K	0.001	
C671	ECJ0EB1H102K	0.001	
C672	ECJ0EB1H102K	0.001	
C682	F1G1H3310003	330P	
C683	F1G1H3310003	330P	
C684	F1G1H3310003	330P	
C685	F1G1H3310003	330P	
C686	F1G1H3310003	330P	
C687	F1G1H3310003	330P	
C701	PQCUV0J475MB	4.7	S
C702	F1G1A1040006	0.1	
C704	ECJ0EB1H102K	0.001	
C705	ECJ0EC1H100D	10P	
C706	ECJ0EB1C103K	0.01	
C707	ECJ0EB1H102K	0.001	
C708	ECJ0EC1H1R5C	1.5P	
C711	ECJ0EC1H010C	1P	
C712	ECJ0EC1H020C	2P	
C713	ECJ0EC1H100D	10P	
C714	ECJ0EB1H102K	0.001	
C716	ECJ0EC1H020C	2P	
C722	ECJ0EC1H020C	2P	
C725	ECJ0EC1H050C	5P	
C731	ECJ0EB1C103K	0.01	
C732	ECJ0EB1H102K	0.001	
C733	ECJ0EB1H102K	0.001	
C734	ECJ0EB1H102K	0.001	
C735	F1G1A1040006	0.1	
C737	ECJ0EB1H102K	0.001	
C741	ECJ0EB1H222K	0.0022	
C743	ECJ0EC1H221J	220P	
C745	ECJ0EC1H101J	100P	
C746	ECJ0EC1H101J	100P	
C747	ECJ0EC1H100D	10P	
C748	ECJ0EC1H101J	100P	
C749	ECJ0EC1H101J	100P	
C750	ECJ0EC1H101J	100P	
C751	ECJ0EC1H100D	10P	
C752	ECJ0EB1H471K	470P	
C763	ECUV1A474KBV	0.47	
C764	ECJ0EC1H020C	2P	
C773	ECJ0EC1H101J	100P	
C781	F1G1A1040006	0.1	
C782	ECJ0EC1H121J	120P	
C801	ECJ0EC1H030C	3P	
C802	ECJ0EC1H220J	22P	
C803	ECJ0EB1C103K	0.01	

Ref. No.	Part No.	Part Name & Description	Remarks
C804	ECJ0EC1H150J	15P	
C806	ECJ0EC1H100D	10P	
C809	ECJ0EB1H102K	0.001	
C811	ECJ0EC1H020C	2P	
C821	ECJ0EC1H100D	10P	
C827	ECJ0EC1H050C	5P	
C832	ECJ0EC1H221J	220P	
C833	ECJ0EC1H101J	100P	
C834	ECJ0EB1C103K	0.01	
C835	ECJ0EB1H471K	470P	
C836	ECUV1A105KBV	1	
C837	ECJ0EC1H101J	100P	
C842	ECUV1A105KBV	1	
C843	ECUV1A474KBV	0.47	
C844	ECJ0EC1H020C	2P	
C851	ECJ0EC1H101J	100P	
C852	ECJ0EB1C103K	0.01	
C854	ECJ0EB1H102K	0.001	
C856	ECJ0EB1H471K	470P	
C857	ECJ0EC1H0R5C	0.5P	
C871	ECJ0EC1H010C	1P	
C872	ECJ0EC1H010C	1P	
C873	ECJ0EC1H100D	10P	
C876	ECJ0EC1H010C	1P	
C890	ECJ0EC1H101J	100P	
C895	ECJ0EC1H101J	100P	
L715	ECJ0EC1H050C	5P	
		(OTHERS)	
MIC	L0CBAB000052	MICROPHONE	
E1	PQMC10492Z	MAGNETIC SHIELD, FRAME	
E2	PQMC10491Z	MAGNETIC SHIELD, COVER	
P101	PFRT002	THERMISTOR (POSISTOR)	S
X501	H0J138500003	CRYSTAL OSCILLATOR	

33.1.3. Operational P.C. Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PQWP2TG5431H	OPERATIONAL P.C.BOARD ASS'Y (RTL)	
		(DIODES)	
LED901	PQVDSML210L	LED	S
LED904	PQVDSML210L	LED	S
LED907	PQVDSML210L	LED	S
		(OTHERS)	
E3	L5DCBCB00016	LIQUID CRYSTAL DISPLAY	
E4	PQHS10327Z	TAPE, LCD	
E5	PQHR11022Z	GUIDE, LCD	PS-HB
E6	PQJE10142Z	LEAD WIRE, FFC	
CN901	K1MN32B00035	CONNECTOR	

33.2. Handset

33.2.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
101	PQGP10274Z1	PANEL, LCD	AS-HB
102	PQHS10660Y	TAPE, DOUBLE SIDED (PANEL)	
103	PQKM10664Z1	CABINET BODY	ABS-HB
104	PQGT17951Z	NAME PLATE	
105	PQHS10658Z	SPACER, RECEIVER	
106	PQHG10720Z	RUBBER PARTS, RECEIVER	
107	L0AD02A00023	RECEIVER	
108	PQHR11105Z	GUIDE, RECEIVER	ABS-HB
109	PQHS10670Y	SPACER, CUSHION LCD	
110	L5DCBDC00009	LIQUID CRYSTAL DISPLAY	
111	PQHX11289Z	COVER, LCD COVER SHEET	
112	PQHR11065Z	TRANSPARENT PLATE, LCD PLATE	PMMA-HB
113	PQHX11292Z	PLASTIC PARTS, LCD SHEET	
114	PQHR11064Z	GUIDE, LCD	ABS-HB
115	PQBC10425Z1	PUSH BUTTON, NAVI KEY	ABS-HB
116	PQBX10377X1	PUSH BUTTON, 12KEY	PMMA-HB

Ref. No.	Part No.	Part Name & Description	Remarks
117	PQSX10285Z	KEYBOARD SWITCH	
118	PQWE10033Z	BATTERY TERMINAL	ABS-HB
119	PQJT10225Z	CHARGE TERMINAL (L)	
120	PQJT10226Z	CHARGE TERMINAL (R)	
121	PQHR10778Z	GUIDE, SP HOLDER	ABS-HB
122	PQHG10703Z	RUBBER PARTS, SPEAKER	
123	L0AD02A00026	SPEAKER	
124	PQHS10622Z	SPACER, SPEAKER	
125	PQKE10395Z1	COVER, EARPHONE	
126	PQMC10499Z	MAGNETIC SHIELD, ANTENNA	
127	PQKE10394Z2	COVER, LED CAP	PC+ABS-HB
128	PQHR11081Z	GUIDE, LED CAP	ABS-HB
129	PQHR11080Z	OPTIC CONDUCTIVE PARTS, LED LENS	PMMA-HB
130	PQKF10658Z1	CABINET COVER	ABS-HB
131	PQHX11297S	PLASTIC PARTS, BATTERY COVER SHEET	
132	HHR-P104A	BATTERY	
133	PQHE10160Z	SPACER, BATTERY	
134	PQKK10588Z1	LID, BATTERY COVER	ABS-HB
135	PQHX11337Z	PLASTIC PARTS, PET SHEET	

33.2.2. Main P.C.Board Parts

Note:

(*1) When you have replaced IC201 or IC241, adjust X201.

Refer to **Check and Adjust X201 (Handset) Frequency** (P.59) and **Adjust Battery Low Detector Voltage (Handset)** (P.59).

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPG5431BXR	MAIN P.C.BOARD ASS'Y (RTL)	
		(ICs)	
IC201	C2HBBK000077	IC (*1)	
IC221	C0EBF0000179	IC	
IC241	PQWIG5431BXR	IC (*1)	
IC371	C0CBABD00019	IC	
IC381	C0CBABD00011	IC	
IC701	C1CB00001657	IC	
IC761	C0CBAAC00083	IC	
IC801	C1CB00001682	IC	
IC841	C0CBABE00029	IC	
IC851	C1CB00001917	IC	
		(TRANSISTORS)	
Q221	2SD1819A	TRANSISTOR(SI)	
Q231	UN521	TRANSISTOR(SI)	S
Q243	PQVTDTC114TU	TRANSISTOR(SI)	S
Q251	PSVTUMG11INTR	TRANSISTOR(SI)	S
Q261	B1GHCFEM0001	TRANSISTOR(SI)	S
Q263	PQVTDTC123JU	TRANSISTOR(SI)	S
Q331	PQVTDTC143E	TRANSISTOR(SI)	S
Q341	2SC39300CL	TRANSISTOR(SI)	
Q361	2SB1197KQ	TRANSISTOR(SI)	S
Q362	2SD1819A	TRANSISTOR(SI)	
Q363	PQVTDTC143E	TRANSISTOR(SI)	S
Q871	B1ABAA000022	TRANSISTOR(SI)	
		(DIODES)	
D223	MA111	DIODE(SI)	S
D351	B0JCMD000010	DIODE(SI)	S
D352	B0JCMD000010	DIODE(SI)	S
D353	B0JCMD000010	DIODE(SI)	S
D354	B0JCMD000010	DIODE(SI)	S
D363	MA132WK	DIODE(SI)	S
LED251	B3ACB0000133	LED	
LED252	B3ACB0000133	LED	
LED253	B3ACB0000133	LED	
LED254	B3ACB0000133	LED	
LED255	B3ACB0000133	LED	
LED256	B3ACB0000133	LED	
LED257	B3ACB0000133	LED	
LED261	B3AZB0000032	LED	

Ref. No.	Part No.	Part Name & Description	Remarks
		(COILS)	
L331	PQLQR2KB113T	COIL	S
L332	PQLQR2KB113T	COIL	S
L334	PQLQR2KB113T	COIL	S
L711	MQLRF18NJFB	COIL	
L782	G1C1R0KA0096	COIL	
L871	MQLRF6N8JFB	COIL	
L873	MQLRF2N2DFB	COIL	
C723	MQLRF2N7DFB	COIL	
C874	MQLRF1N5DFB	COIL	
		(CONNECTOR AND JACK)	
CN271	K1MN22B00101	CONNECTOR	
CN331	K2HD103D0001	JACK	
		(LCR FILTERS)	
FL811	ELB1A001	LCR FILTER	
FL821	KNCFH165R8Z1	LCR FILTER	
		(COMPONENTS PARTS)	
CA271	F5A424740002	CAPACITOR ARRAY	
CA274	F5A841040004	CAPACITOR ARRAY	
RA201	EXRV8V472JV	RESISTOR ARRAY	
RA251	D1H84714A013	RESISTOR ARRAY	
RA255	EXB28V221JX	RESISTOR ARRAY	S
RA317	D1H42222A006	RESISTOR ARRAY	
		(RESISTORS)	
R207	ERJ2GEJ104	100K	
R209	ERJ2GEJ104	100K	
R222	ERJ2GEJ223	22K	
R223	ERJ2GEJ224	220K	
R225	ERJ2GEJ102	1K	
R226	ERJ2GEJ223	22K	
R227	ERJ2GEJ183	18K	
R228	ERJ2GEJ104	100K	
R231	ERJ2GEJ223	22K	
R234	ERJ2GEJ103	10K	
R241	ERJ2GEJ103	10K	
R242	ERJ2GEJ102	1K	
R243	ERJ2GEJ274	270K	
R261	ERJ2GEJ470	47	
R262	ERJ2GEJ101	100	
R263	ERJ2GEJ101	100	
R264	ERJ2GEJ103	10K	
R272	D1BB4303A055	430K	
R273	D1BB8203A055	820K	
R312	ERJ2GEJ222	2.2K	
R314	ERJ2GEJ222	2.2K	
R315	ERJ2GEJ222	2.2K	
R317	ERJ2GEJ391	390	
R323	ERJ2GEJ180	18	
R324	ERJ2GEJ180	18	
R331	ERJ2GEJ103	10K	
R333	ERJ2GEJ102	1K	
R341	ERJ2GEJ182	1.8K	
R342	ERJ2GEJ393X	39K	
R343	ERJ2GEJ151	150	
R345	ERJ2GEJ561	560	
R361	ERJ2GEJ473	47K	
R362	ERJ2GEJ102	1K	
R363	ERJ2GEJ473	47K	
R368	ERJ3GEYJ332	3.3K	
R376	ERJ2GEJ225	2.2M	
R377	ERJ2GEJ225	2.2M	
R701	ERJ2RKF103X	10K	
R724	ERJ2GE0R00	0	
R732	ERJ2GEJ100	10	
R733	ERJ2GEJ100	10	
R735	ERJ2GEJ4R7	4.7	
R742	ERJ2GEJ331	330	
R744	ERJ2GEJ102	1K	
R747	ERJ2GEJ102	1K	
R751	ERJ2GEJ102	1K	
R752	ERJ2GEJ102	1K	
R809	ERJ2GEJ223	22K	
R832	ERJ2GEJ562X	5.6K	

Ref. No.	Part No.	Part Name & Description	Remarks
R834	ERJ2GEJ332	3.3K	
R856	ERJ2GEJ472X	4.7K	
R872	ERJ2GEJ473	47K	
R873	ERJ2GEJ121	120	
L326	ERJ6GEY0R00	0	
L327	ERJ6GEY0R00	0	
		(CAPACITORS)	
C201	ECJ0EC1H040C	4P	
C202	ECJ0EC1H040C	4P	
C203	F1G1A1040006	0.1	
C204	F1G1A1040006	0.1	
C206	ECJ0EB1C103K	0.01	
C211	EEEEGA331WP	330	
C213	ECST0JY226	22	
C214	F1G0J1060006	10	S
C215	F1G1A1040006	0.1	
C221	ECJ0EB1C103K	0.01	
C222	F1G1A1040006	0.1	
C224	F1G1A1040006	0.1	
C225	F1G1A1040006	0.1	
C226	F1G1A1040006	0.1	
C231	F1G1A1040006	0.1	
C241	F1G1A1040006	0.1	
C242	ECJ0EC1H101J	100P	
C246	F1G1A1040006	0.1	
C272	ECUV1C474KEV	0.47	
C273	ECUV1C104KEV	0.1	
C301	F1G0J1050007	1	S
C303	F1G0J1050007	1	S
C305	ECJ0EB1C103K	0.01	
C306	F1G1A1040006	0.1	
C314	F1G1C183A081	0.018	
C315	F1G1C183A081	0.018	
C316	F1G1C153A081	0.015	S
C317	ECST0JY226	22	
C321	ECST0JY335	3.3	
C333	ECJ0EB1C103K	0.01	
C335	ECST0JY226	22	
C341	ECJ0EC1H030C	3P	
C343	F1G1A1040006	0.1	
C345	ECJ0EB1H471K	470P	
C346	F1G1A1040006	0.1	
C353	ECUV1H103KEV	0.01	
C371	F1G1A1040006	0.1	
C377	F1G1A1040006	0.1	
C381	EEEEJA101SP	100P	
C386	F1G1A1040006	0.1	
C701	PQCUV0J475MB	4.7	S
C702	F1G1A1040006	0.1	
C704	ECJ0EB1H102K	0.001	
C705	ECJ0EC1H100D	10P	
C706	ECJ0EB1C103K	0.01	
C707	ECJ0EB1H102K	0.001	
C708	ECJ0EC1H1R5C	1.5P	
C711	ECJ0EC1H010C	1P	
C712	ECJ0EC1H020C	2P	
C713	ECJ0EC1H100D	10P	
C714	ECJ0EB1H102K	0.001	
C716	ECJ0EC1H020C	2P	
C722	ECJ0EC1H020C	2P	
C725	ECJ0EC1H050C	5P	
C731	ECJ0EB1C103K	0.01	
C732	ECJ0EB1H102K	0.001	
C733	ECJ0EB1H102K	0.001	
C734	ECJ0EB1H102K	0.001	
C735	F1G1A1040006	0.1	
C737	ECJ0EB1H102K	0.001	
C741	ECJ0EB1H222K	0.0022	
C743	ECJ0EC1H221J	220P	
C745	ECJ0EC1H101J	100P	
C746	ECJ0EC1H101J	100P	
C747	ECJ0EC1H100D	10P	
C748	ECJ0EC1H101J	100P	

Ref. No.	Part No.	Part Name & Description	Remarks
C749	ECJ0EC1H101J	100P	
C750	ECJ0EC1H101J	100P	
C751	ECJ0EC1H100D	10P	
C752	ECJ0EB1H471K	470P	
C763	ECUV1A474KEV	0.47	
C764	ECJ0EC1H020C	2P	
C773	ECJ0EC1H101J	100P	
C781	F1G1A1040006	0.1	
C782	ECJ0EC1H121J	120P	
C801	ECJ0EC1H030C	3P	
C802	ECJ0EC1H220J	22P	
C803	ECJ0EB1C103K	0.01	
C804	ECJ0EC1H150J	15P	
C806	ECJ0EC1H100D	10P	
C809	ECJ0EB1H102K	0.001	
C811	ECJ0EC1H020C	2P	
C821	ECJ0EC1H100D	10P	
C827	ECJ0EC1H050C	5P	
C832	ECJ0EC1H221J	220P	
C833	ECJ0EC1H101J	100P	
C834	ECJ0EB1C103K	0.01	
C835	ECJ0EB1H471K	470P	
C836	ECUV1A105KEV	1	
C837	ECJ0EC1H101J	100P	
C842	ECUV1A105KEV	1	
C843	ECUV1A474KEV	0.47	
C844	ECJ0EC1H020C	2P	
C851	ECJ0EC1H101J	100P	
C852	ECJ0EB1C103K	0.01	
C854	ECJ0EB1H102K	0.001	
C856	ECJ0EB1H102K	0.001	
C857	ECJ0EC1H0R5C	0.5P	
C871	ECJ0EC1H010C	1P	
C872	ECJ0EC1H010C	1P	
C873	ECJ0EC1H100D	10P	
C876	ECJ0EC1H010C	1P	
C891	F1G1HR20A561	0.2P	
L715	ECJ0EC1H050C	5P	
		(OTHERS)	
MIC	L0CBAB000052	MICROPHONE	
E101	PQMC10492Z	MAGNETIC SHIELD, FRAME	
E102	PQMC10491Z	MAGNETIC SHIELD, COVER	
X201	H0J138500003	CRYSTAL OSCILLATOR	

33.3. Accessories and Packing Materials

33.3.1. KX-TG5431BXS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV1BXY	AC ADAPTOR	△
A2	PQJA10075Z	CORD, TELEPHONE	
A3	PQKE10396Z1	HANGER, BELT CLIP	PC+ABS-HB
A4	PQKL10068Z1	STAND, WALL MOUNT	ABS-HB
A5	PQX14548Z	INSTRUCTION BOOK	
A6	PQQW13705Z	QUICK GUIDE (for Arabic)	
A7	PQQW13706Z	QUICK GUIDE (for Persian)	
P1	XZB21X35A03	PROTECTION COVER (for Base Unit)	
P2	XZB10X35A02	PROTECTION COVER (for Handset)	
P3	PQPK14822Y	GIFT BOX	

34 FOR SCHEMATIC DIAGRAM

34.1. Base Unit (SCHEMATIC DIAGRAM (BASE_UNIT_MAIN))

34.1.1. Acoustic Testing Mode

Press “STOP”, “▶▶” and “^” simultaneously, and insert the plug of AC adaptor.

- No beep sound.

It is easier to measure the transmit level with acoustic testing mode.

Notes:

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

Important Safety Notice:

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

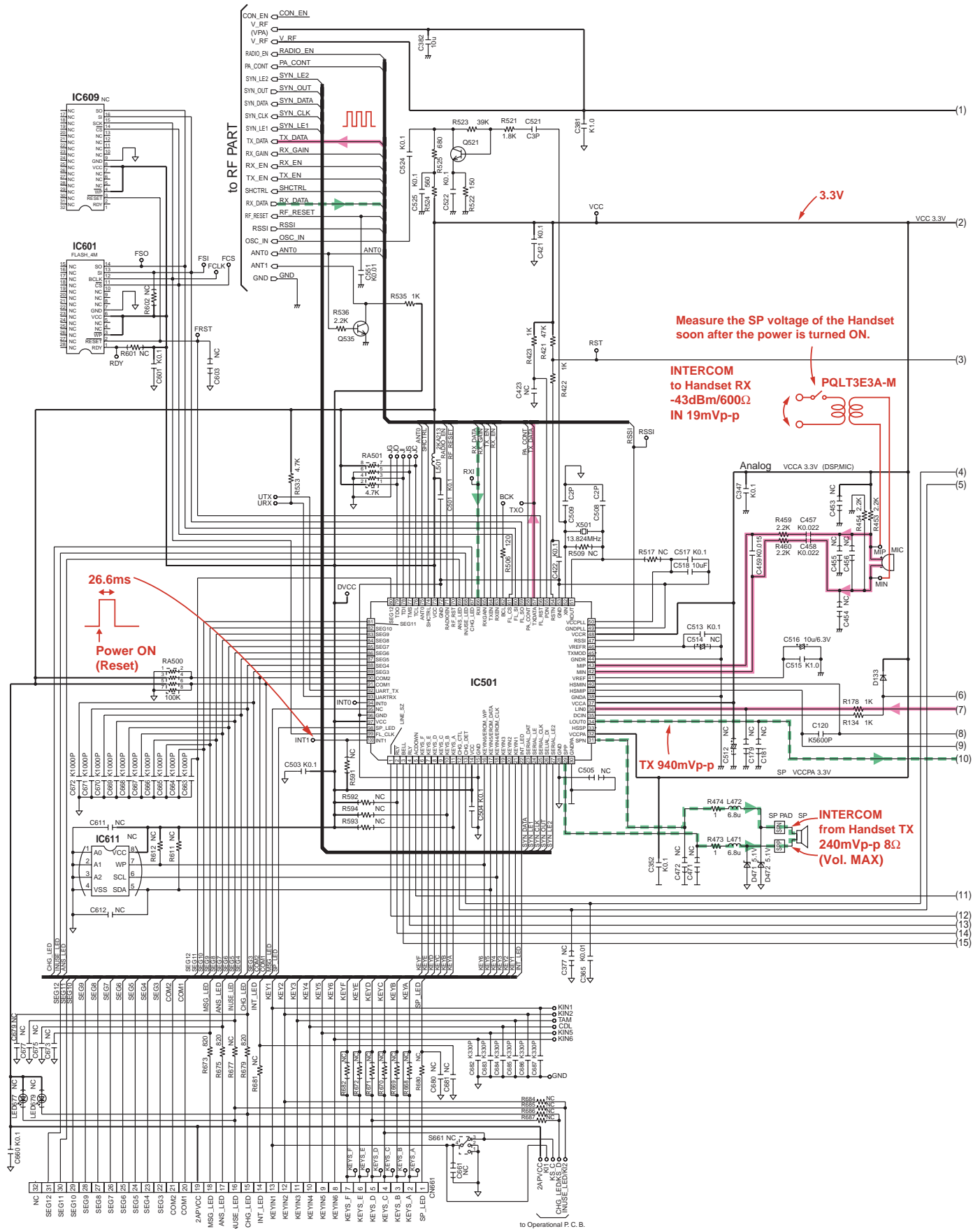
2. This schematic diagram may be modified at any time with the development of new technology.

34.2. Handset (SCHEMATIC DIAGRAM (HANDSET_MAIN))

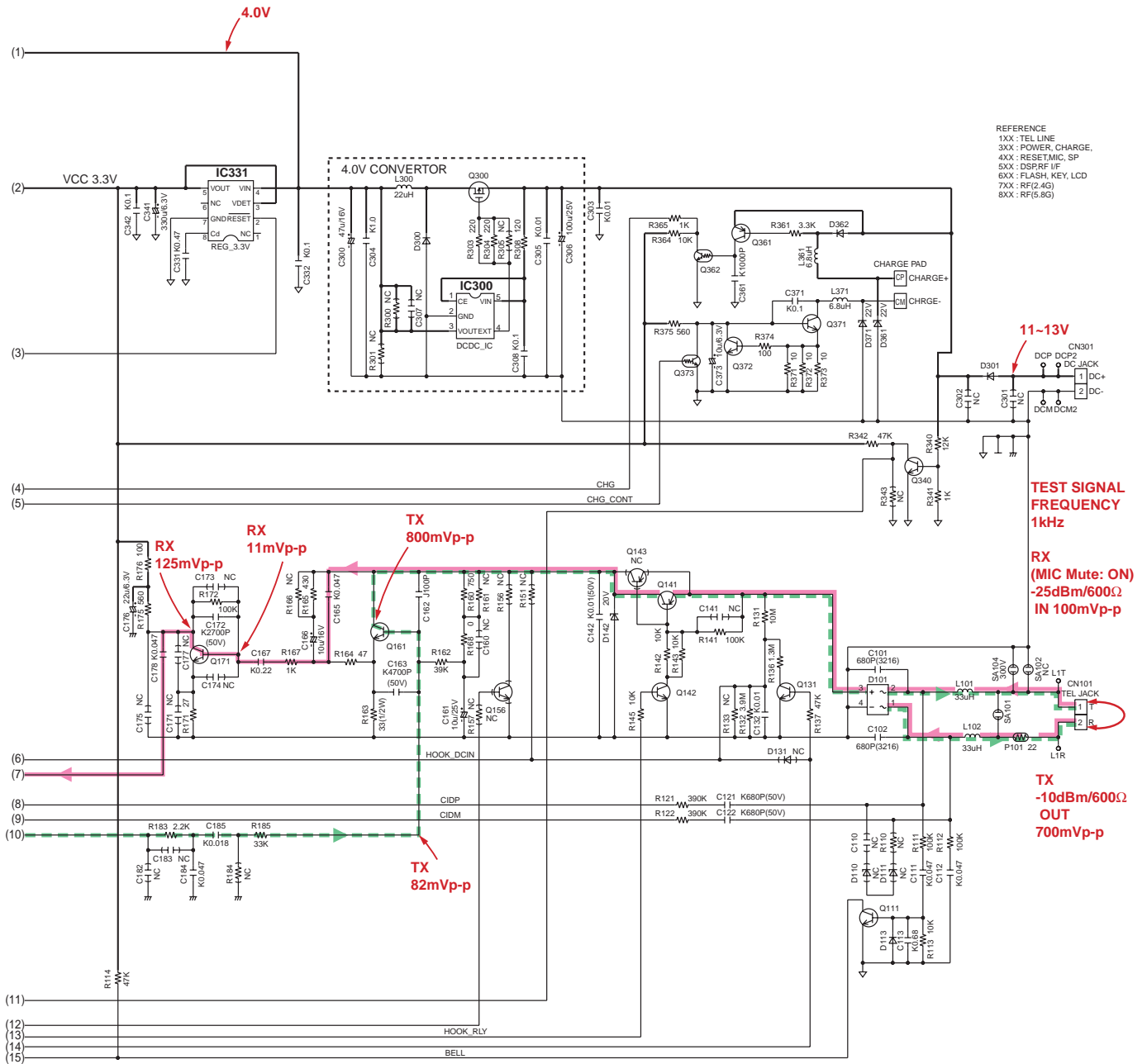
Notes:

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

35 SCHEMATIC DIAGRAM (BASE UNIT_MAIN)



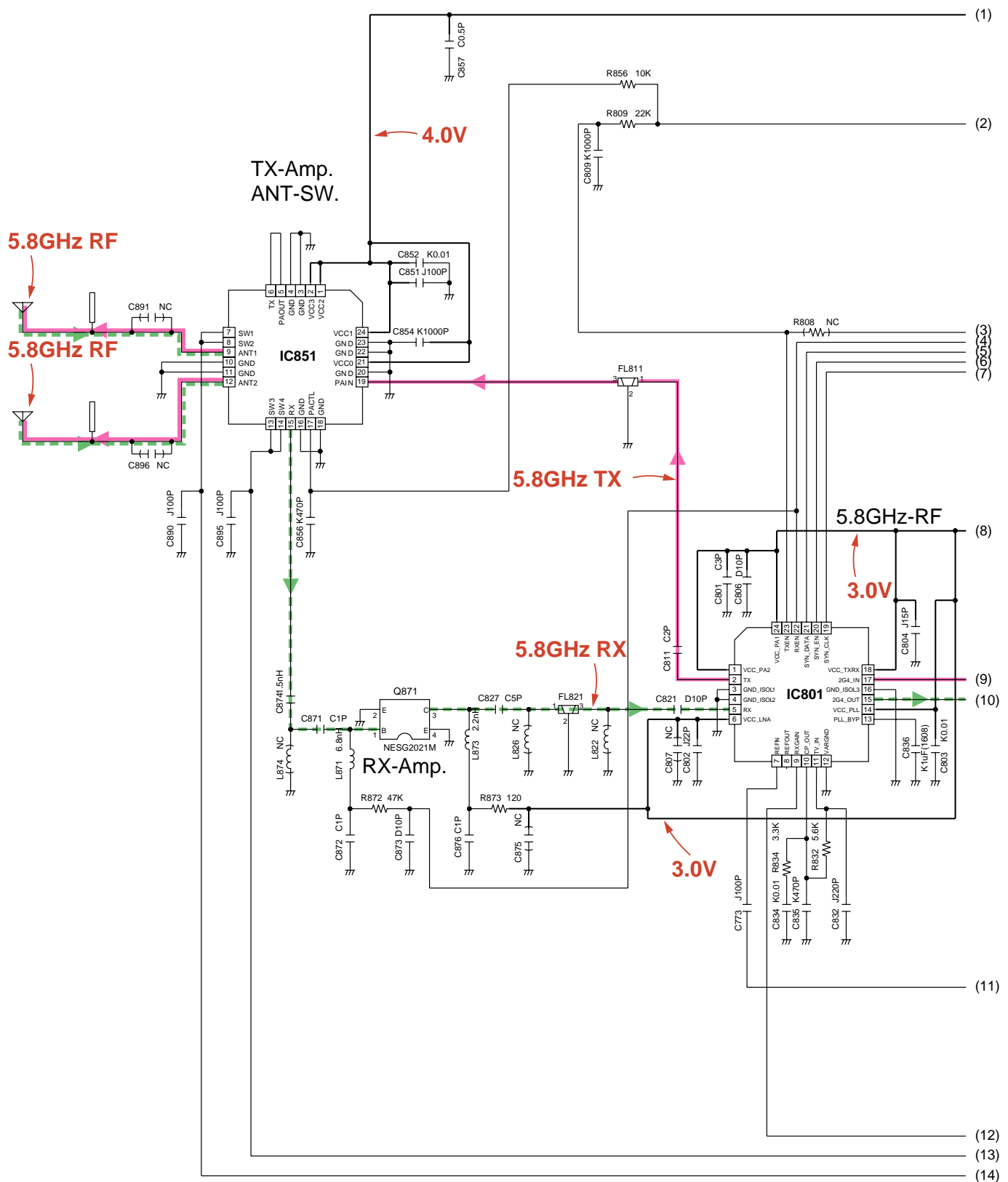
NC: No Components



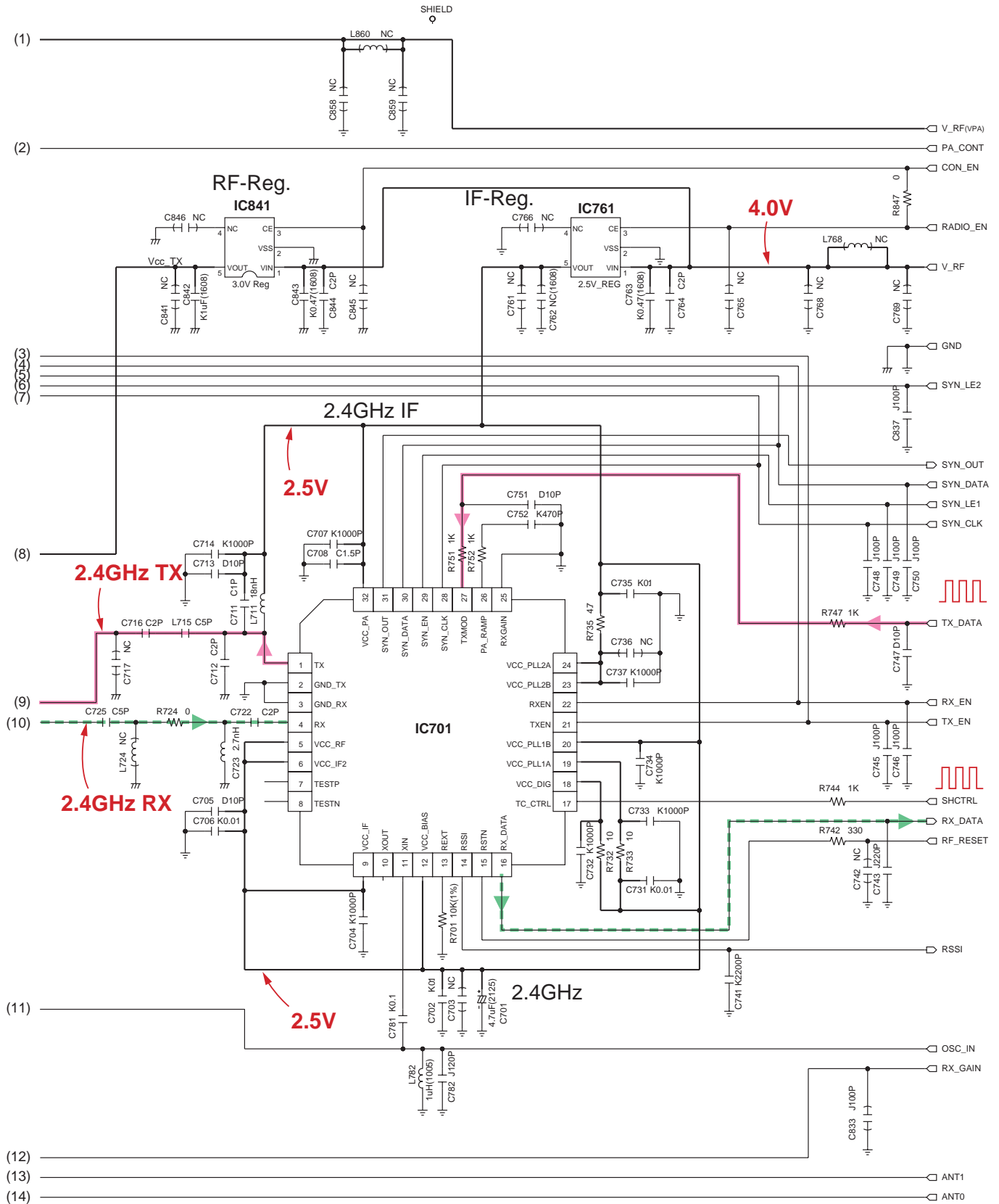
NC: No Components

KX-TG5431 SCHEMATIC DIAGRAM (Base Unit_Main)

36 SCHEMATIC DIAGRAM (BASE UNIT_RF PART)



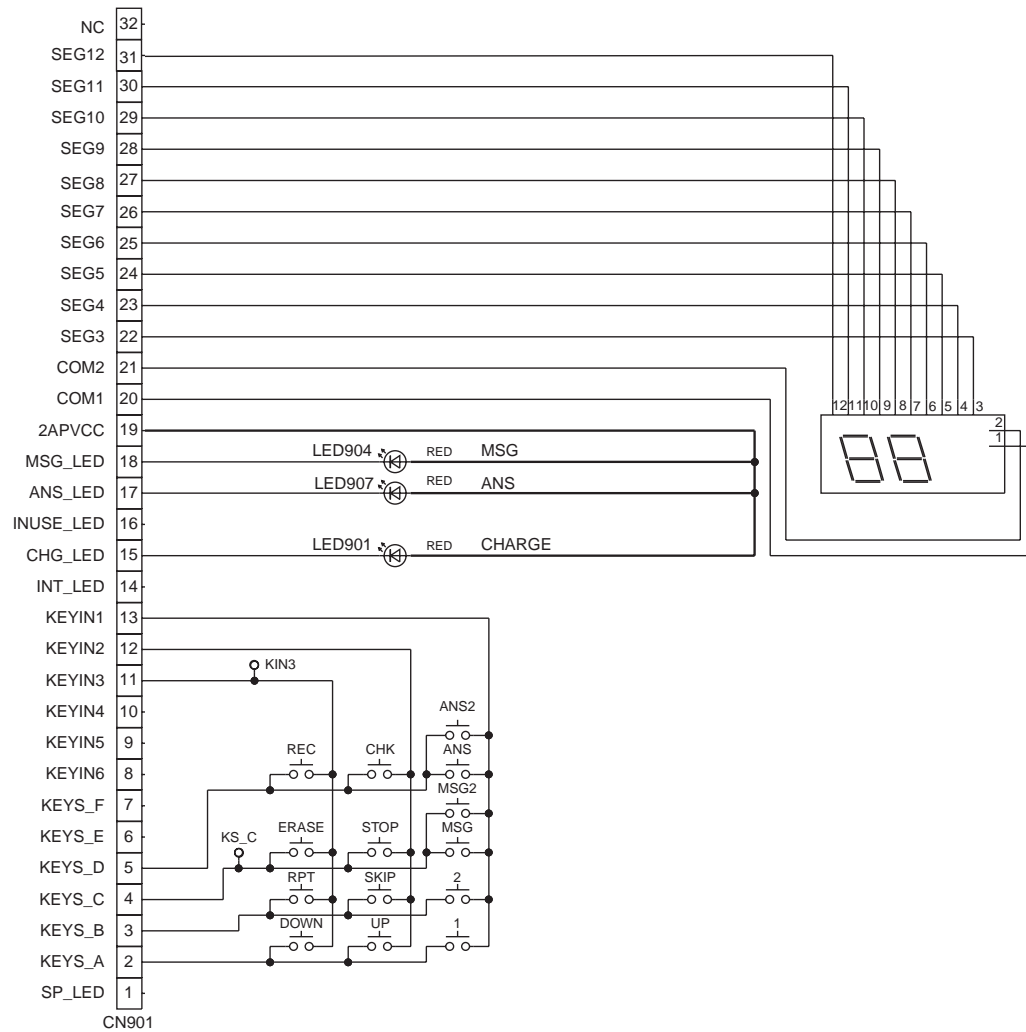
NC: No Components



NC: No Components

KX-TG5431 SCHEMATIC DIAGRAM (Base Unit_RF Part)

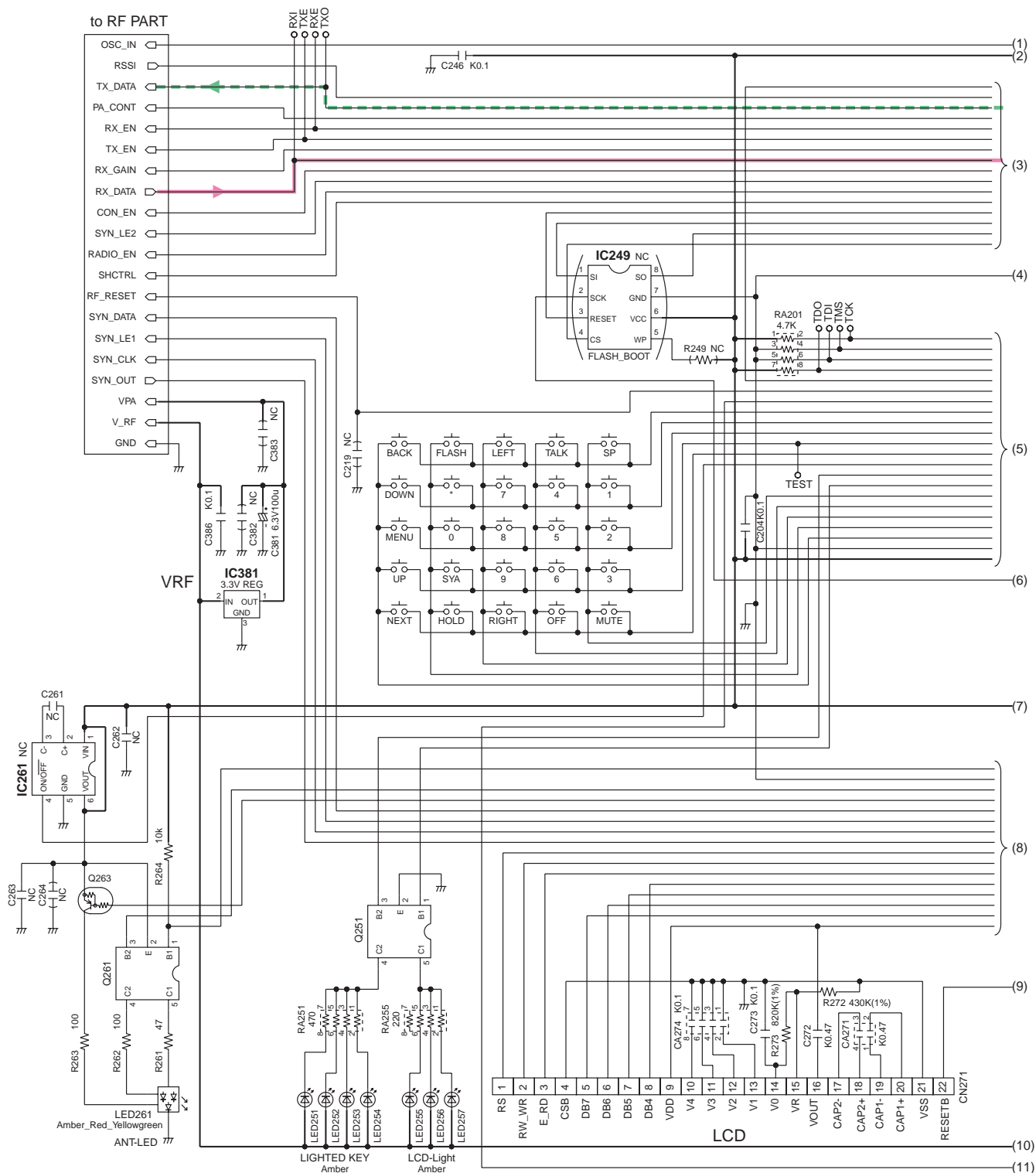
37 SCHEMATIC DIAGRAM (BASE UNIT_OPERATION)



KX-TG5431 SCHEMATIC DIAGRAM (Base Unit_Operation)

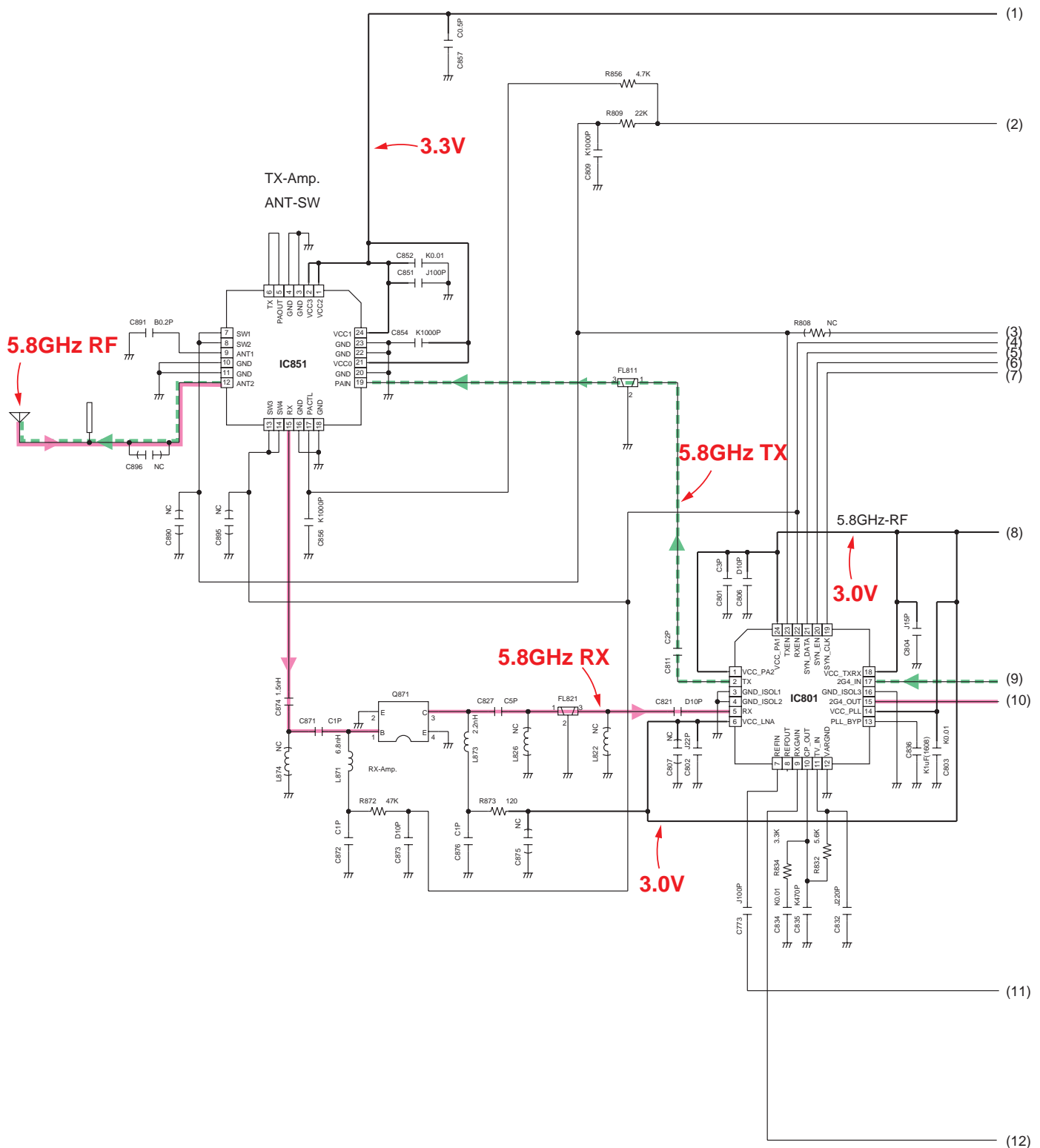
Memo

38 SCHEMATIC DIAGRAM (HANDSET_MAIN)

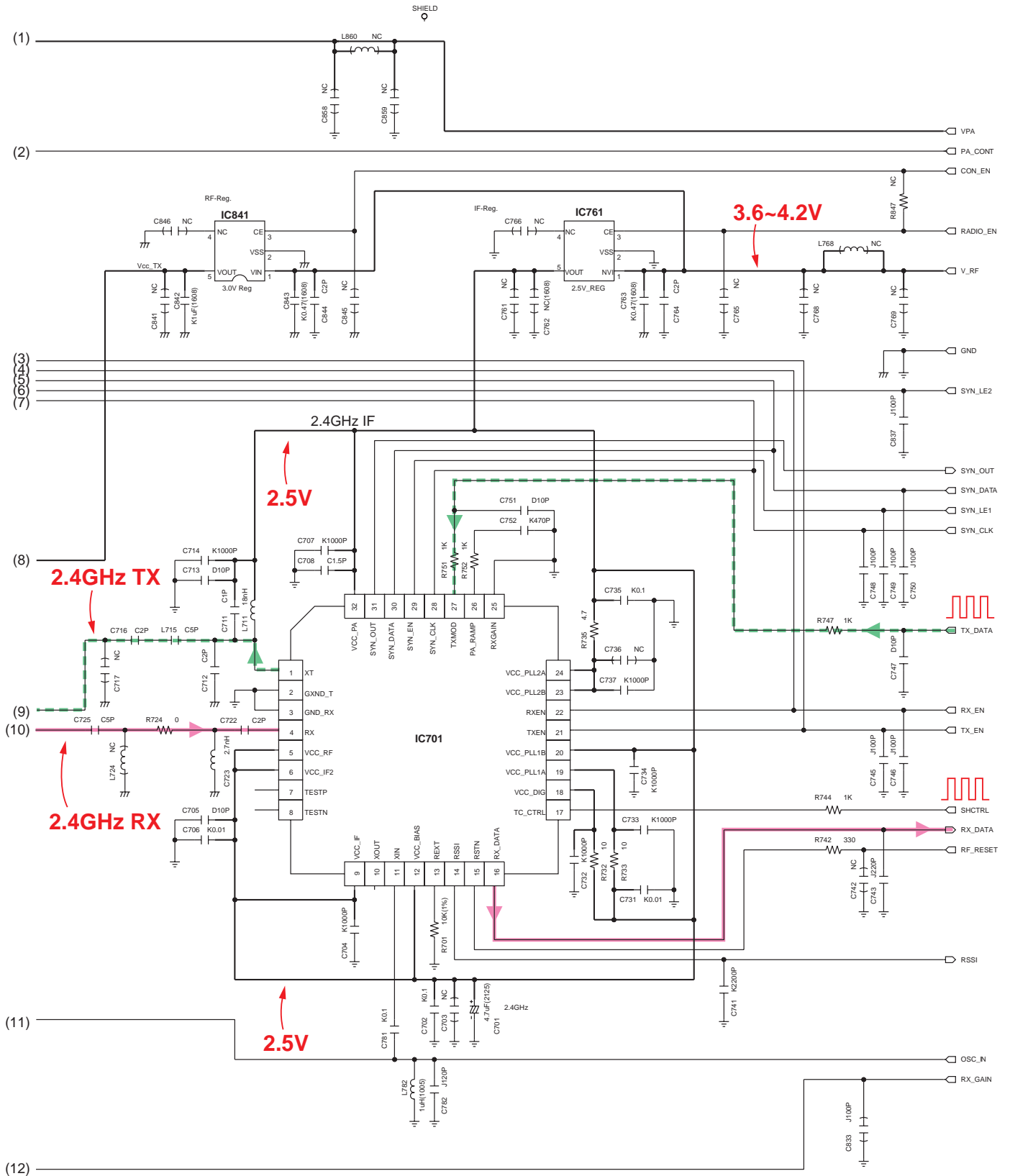




39 SCHEMATIC DIAGRAM (HANDSET_RF PART)



NC: No Components

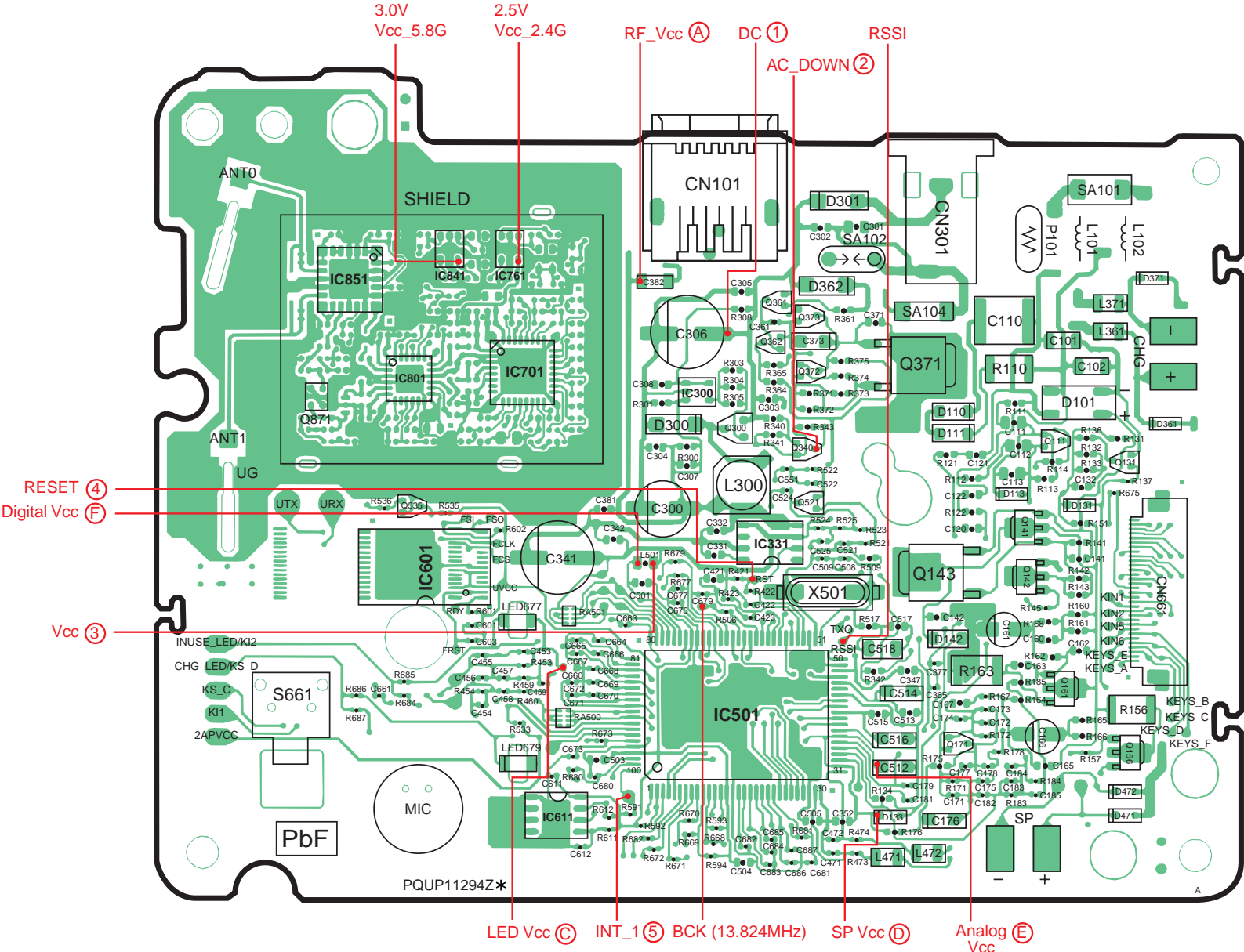


NC: No Components
KX-TGA542 SCHEMATIC DIAGRAM (Handset_RF Part)

Memo

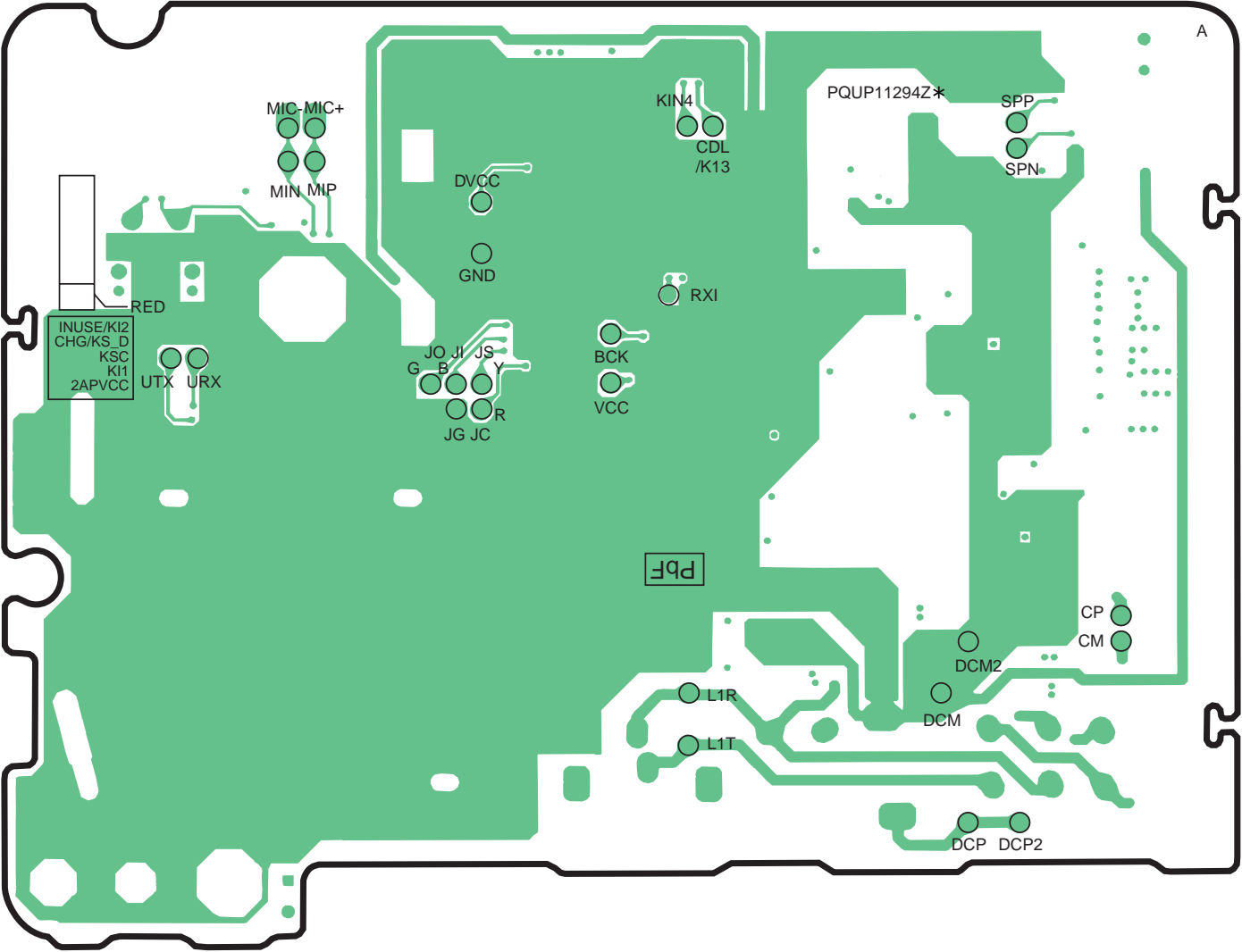
40 CIRCUIT BOARD (BASE UNIT_MAIN)

40.1. Component View



KX-TG5431 CIRCUIT BOARD (Base Unit_Main (Component View))

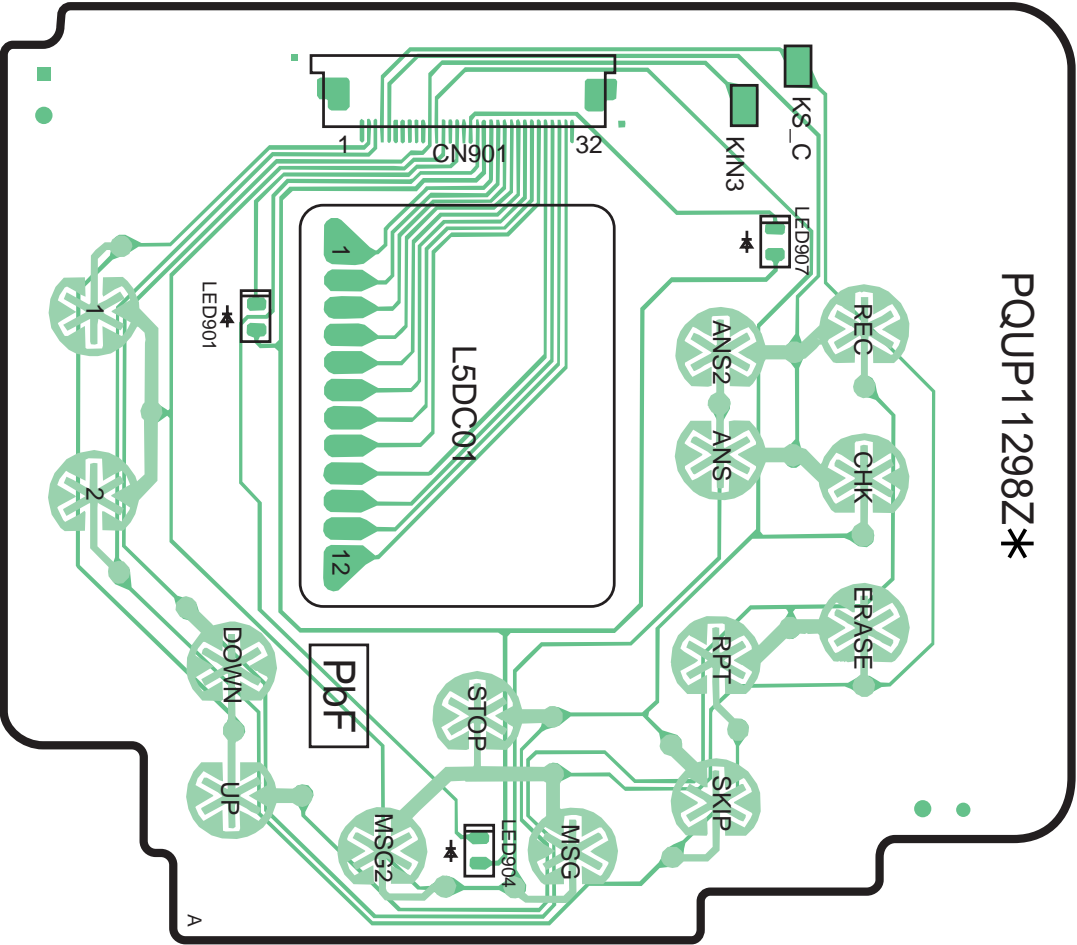
40.2. Flow Solder Side View



KX-TG5431 CIRCUIT BOARD (Base Unit_Main (Flow Solder Side View))

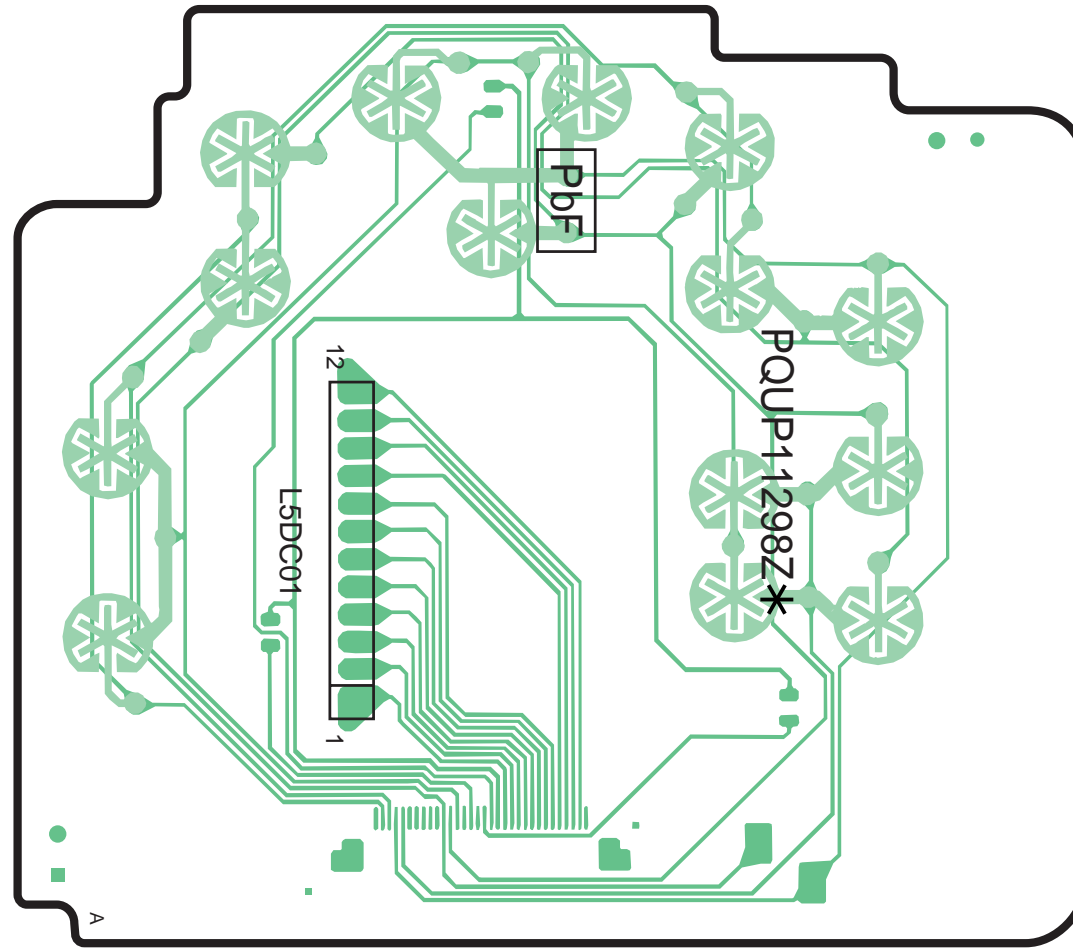
41 CIRCUIT BOARD (BASE UNIT_OPERATION)

41.1. Component View



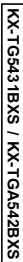
KX-TG5431 CIRCUIT BOARD (Base Unit_Operation (Component View))

41.2. Flow Solder Side View



KX-TG5431 CIRCUIT BOARD (Base Unit_Operation (Flow Solder Side View))

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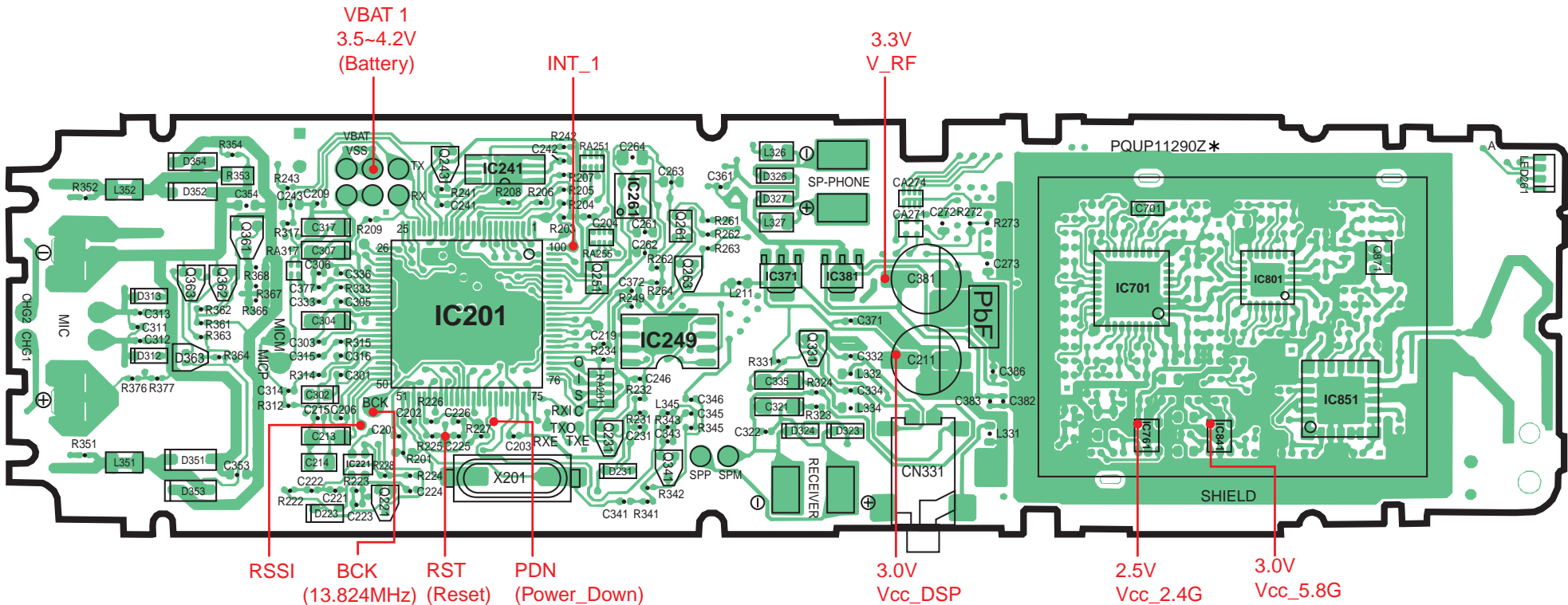


KX-TG5431 CIRCUIT BOARD (Base Unit_RF Part (Component View))

Memo

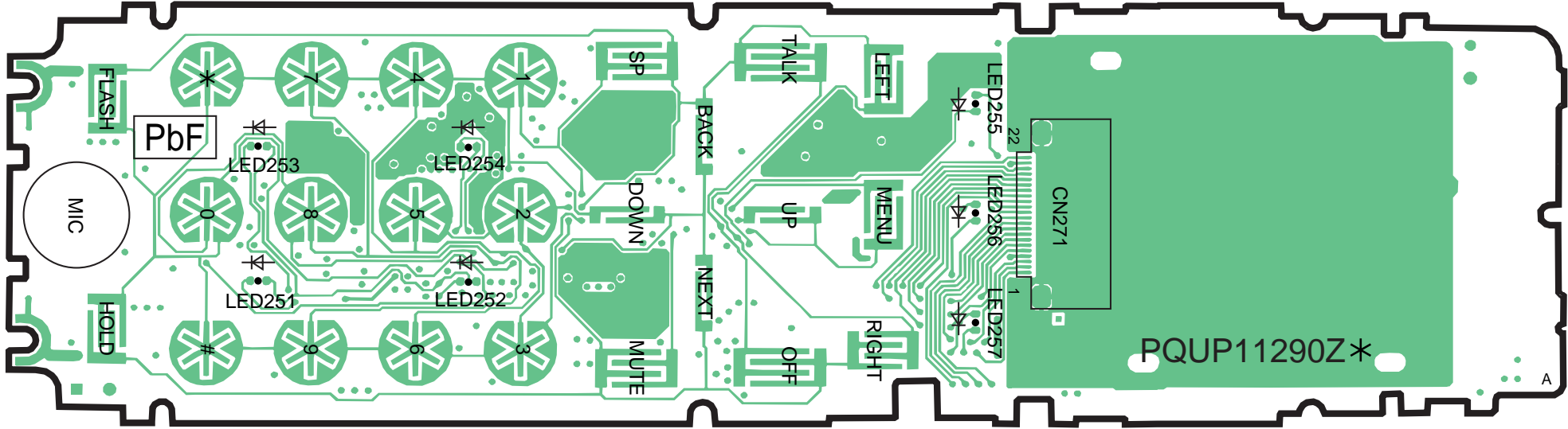
43 CIRCUIT BOARD (HANDSET_MAIN)

43.1. Component View



KX-TGA542 CIRCUIT BOARD (Handset_Main (Component View))

43.2. Flow Solder Side View



KX-TGA542 CIRCUIT BOARD (Handset_Main (Flow Solder Side View))

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