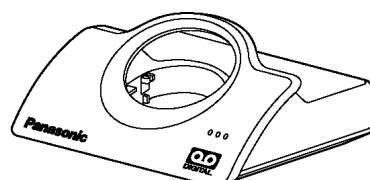


Service Manual

Telephone Equipment

Caller ID Compatible



KX-TCD445BXS/BXT/BXF
(BASE UNIT)



KX-A144BXS/BXT/BXF
(HANDSET)



(CHARGER UNIT)

Configuration for each model

Model No	Base Unit	Handset	Charger
KX-TCD445	1	1(A144)	
KX-A144*		1	1

*KX-A144 is also an optional accessory, which contains a handset and a charger.

KX-TCD445BXS

KX-TCD445BXT

KX-TCD445BXF

KX-A144BXS

KX-A144BXT

KX-A144BXF

Digital Cordless Answering System

New Silver Version

Titanium Black Version

Metallic Blue Version

(for Asia, Middle Near East and Other areas)

SPECIFICATION

Standard:	DECT (Digital Enhanced Cordless Telecommunications) GAP (Generic Access Profile)
Number of channels:	120 Duplex Channels
Frequency range:	1.88 GHz to 1.9 GHz
Duplex procedure:	TDMA (Time Division Multiple Access)
Channel spacing:	1728 kHz
Bit rate:	1152 kbit/s
Modulation:	GFSK (Gaussian Frequency Shift Keying)
RF Transmission Power:	Approx. 250 mW
Voice coding:	ADPCM 32 kbit/s
Operation range:	Up to 300 m outdoors, Up to 50 m indoors
Analog telephone connection:	Telephone Line
Power source:	AC Adaptor (220 V - 240 V AC, 50 Hz)

Power consumption, Base Unit:	Standby: Approx. 3.5 W/Maximum: Approx. 9.2 W
Charger Unit:	Standby: Approx. 2.3 W/Maximum: Approx. 6.8 W
Battery life, Handset (if batteries are fully charged):	Stand-by: Up to 200 hours (Ni-MH) Talk: Up to 10 hours (Ni-MH)
Operating conditions:	5 - 40 °C, 20 - 80 % relative air humidity (dry)
Dimensions, Base Unit (D x W x L):	Approx. 58 mm x 128 mm x 105 mm
Dimensions, Handset (D x W x L):	Approx. 143 mm x 48 mm x 32 mm
Dimensions, Charger Unit (D x W x L):	Approx. 60 mm x 86 mm x 84 mm
Mass (weight), Base Unit:	about 170 g
Mass (weight), Handset:	about 120 g
Mass (weight), Charger Unit:	about 113 g

Specifications are subject to change.

The illustrations used in this manual may differ slightly from the original device.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF.

Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.

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

Panasonic

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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 8 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:

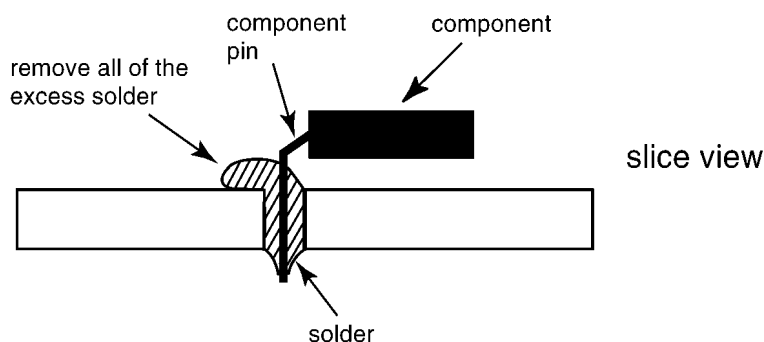
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

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

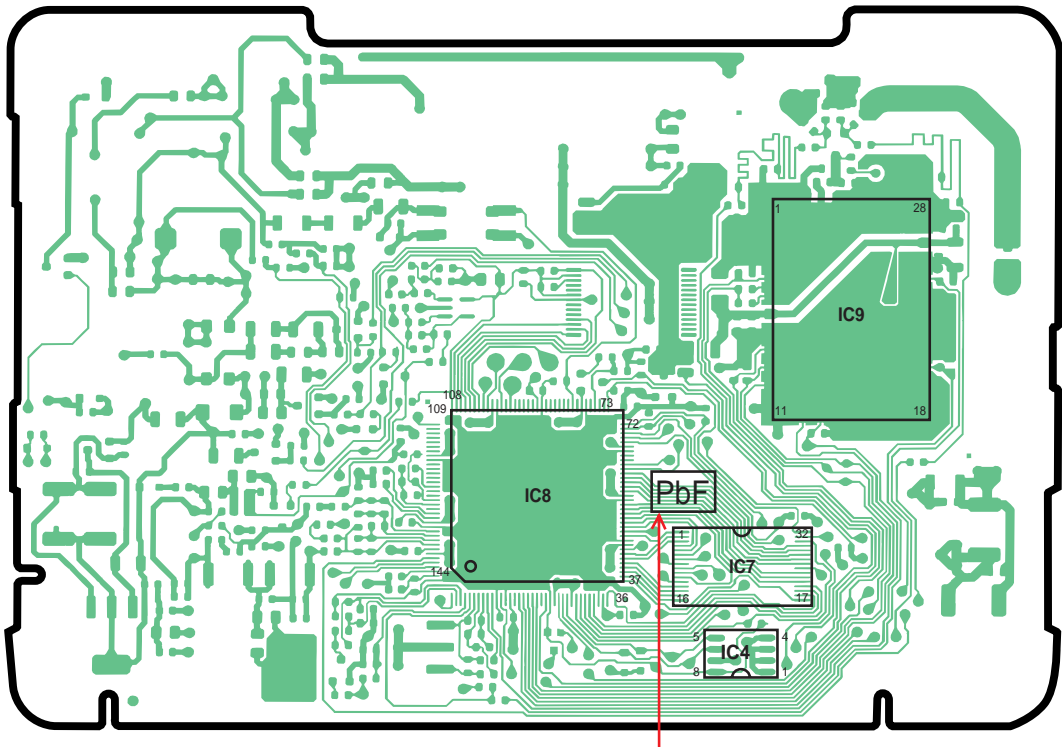
There are several types of PbF solder available commercially. While this product is manufactured using Tin, Silver, and Copper (Sn+Ag+Cu), you can also use Tin and Copper (Sn+Cu) or Tin, Zinc, and Bismuth (Sn+Zn+Bi). Please check the manufacturer's specific instructions for the melting points of their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

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

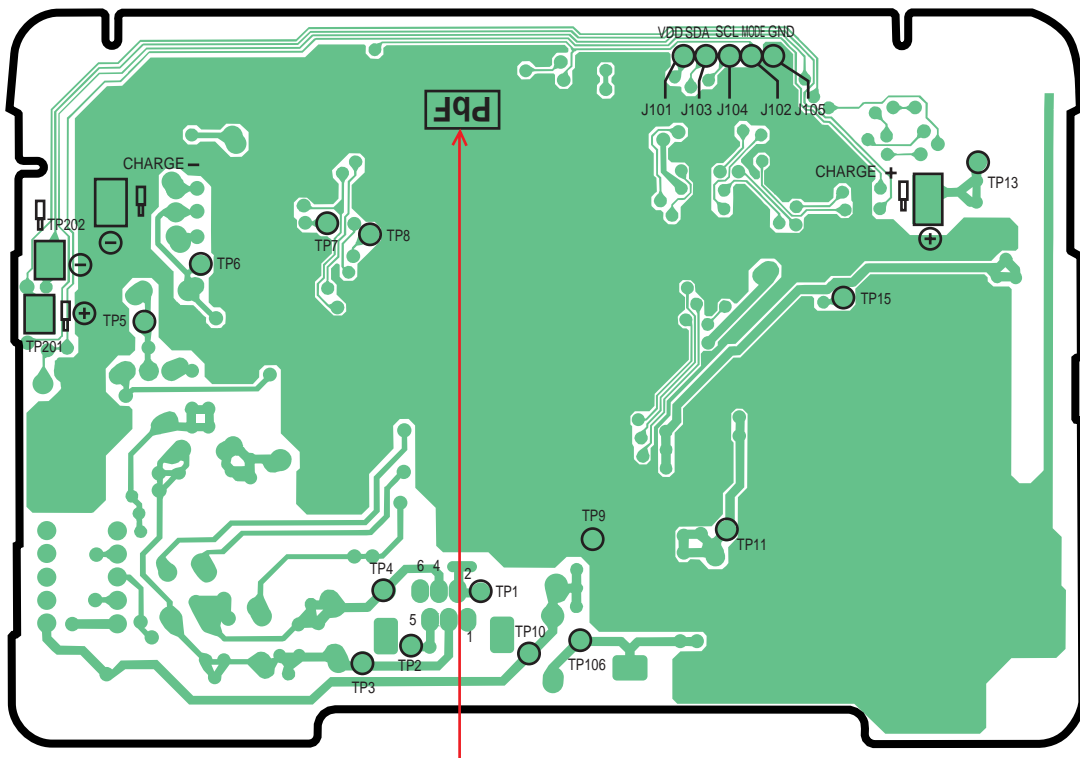
1.2. How to recognize that Pb Free solder is used

1.2.1. Base Unit PCB



Marked

(Component View)



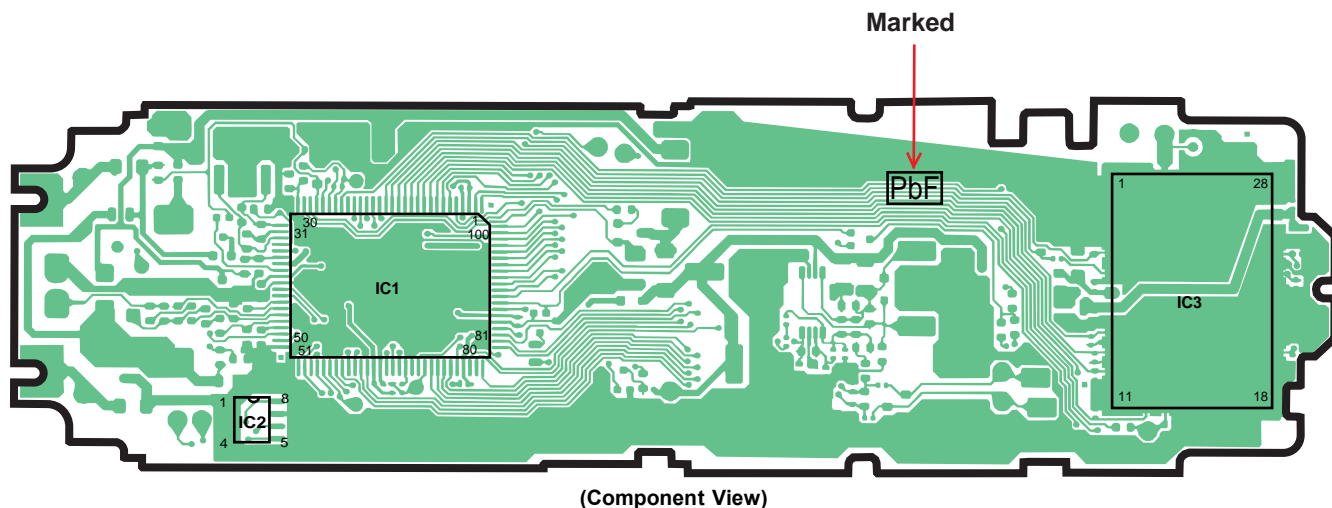
Marked

(Flow Solder Side View)

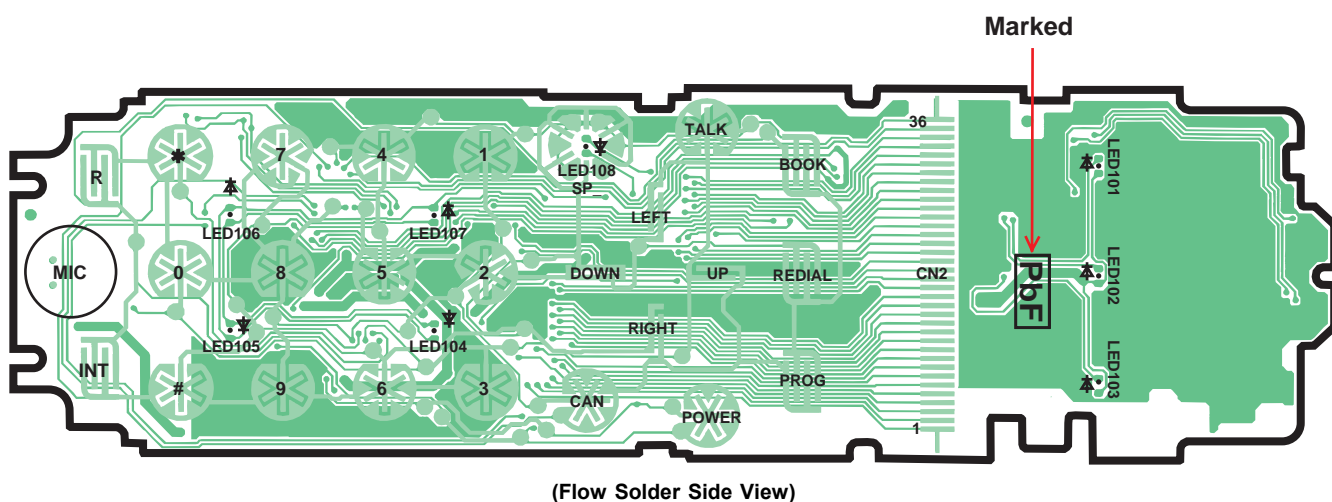
Note:

The locations of the "PbF" mark are subject to change without notice.

1.2.2. Handset PCB



(Component View)

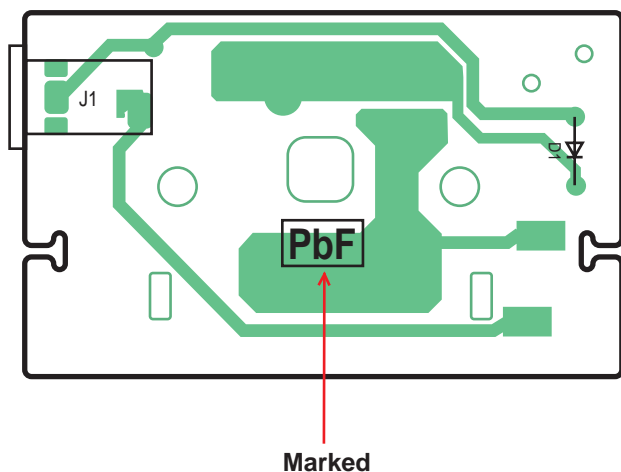


(Flow Solder Side View)

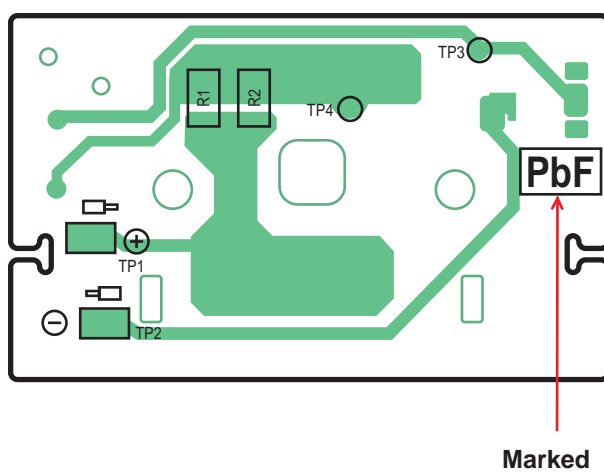
Note:

The locations of the "PbF" mark are subject to change without notice.

1.2.3. Charger Unit PCB



(Component View)



(Flow Solder Side View)

Note:

The locations of the "PbF" mark are subject to change without notice.

2 FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

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

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

3 CAUTION

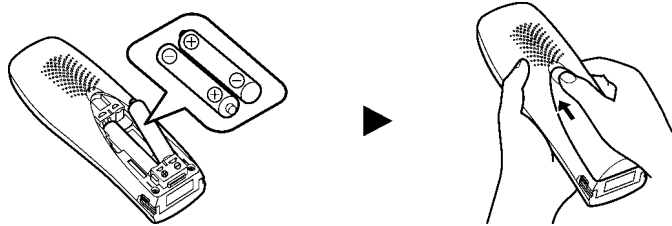
Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

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

4 BATTERY

4.1. Battery Installation

1. Insert the batteries negative (-) terminal first.
2. Close the battery cover.




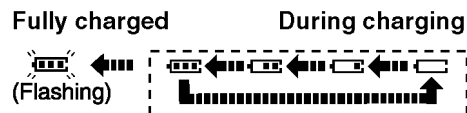
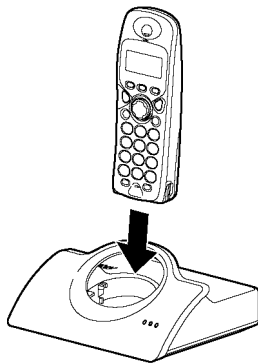
Note:





- Use only rechargeable HHR-4EPT (Ni-MH)/P-4NPT (Ni-Cd) batteries.

4.2. Battery Charge

Place the handset on the base unit for about 7 hours before initial use.

When the batteries are fully charged,  flashes. When charging, the battery icon is shown as follows.



Display icons	Battery strength
	High
	Medium
	Low
	Needs to be charged

Note:

- Clean the charge contacts of the handset and base unit with a soft, dry cloth, otherwise the batteries may not charge properly. Clean if the unit is exposed to grease, dust or high humidity.
- If the handset is turned off, it will be turned on automatically when it is placed 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.

4.3. Battery Life

After your Panasonic batteries are fully charged, you can expect the following performance:

Ni-MH batteries (typical 700 mAh)

Operation	Operating time
While in use (talking)	10 hours max.
While not in use (standby)	200 hours max.


Ni-Cd batteries (typical 250 mAh)

Operation	Operating time
While in use (talking)	4 hours max.
While not in use (standby)	60 hours max.

Note:

- The included batteries are Ni-MH batteries.
- Battery operating time may be shortened depending on usage conditions and ambient temperature.

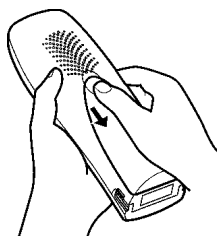
4.4. Replacing the Batteries

If  flashes even when the handset batteries have been fully charged, both batteries must be replaced.


Important:

- Please use only the Panasonic batteries HHR-4EPT (Ni-MH)/P-4NPT (Ni-Cd).
- Use only rechargeable batteries. If you install non-rechargeable batteries and start charging, the batteries may leak electrolyte.
- Do not mix old and new batteries.
- Use only 2 nickel metal hydride (Ni-MH) batteries or 2 nickel cadmium (Ni-Cd) batteries. Do not mix battery types.
- Ensure that the correct battery type is selected.

1. Press the notch on the cover firmly and slide it in the direction of the arrow.
2. Remove the batteries positive (+) terminal first. Replace both batteries.

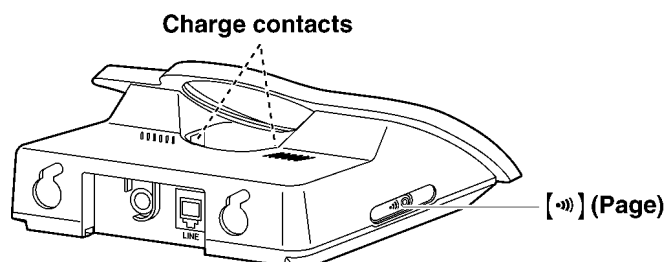


Note for Service:

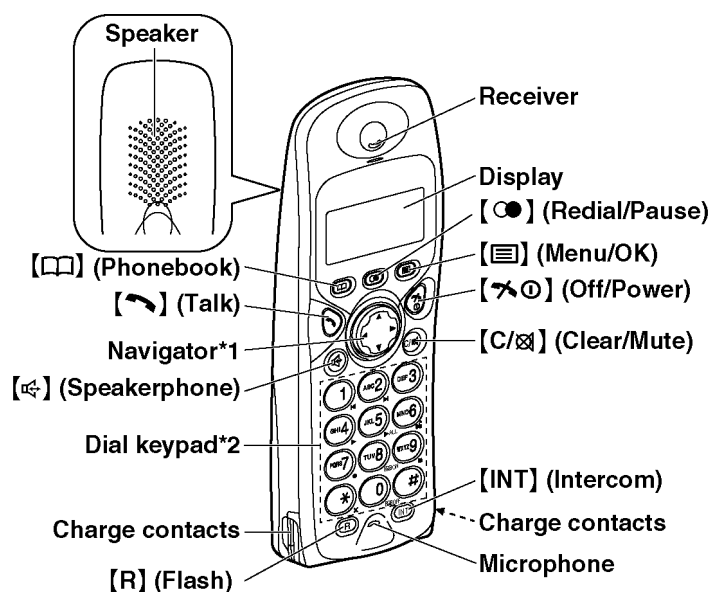
- When Ni-Cd batteries are fitted with the "BATTERY TYPE" setting in "Ni-MH",  icon might disappear and stop charging even if the handset is on the cradle for avoiding overcharge.

5 LOCATION OF CONTROLS

5.1. Base Unit



5.2. Handset



- *1: [▲][▼]: To search for the desired item in the setting menu, caller information or phonebook.
[▶]: To select the desired item or move the cursor to the right.
[◀]: To go back to the previous display or move the cursor to the left.
- *2: The icons printed below the dial keys shown in the illustration above (▶, ☎, ■ etc.) indicate answering system operations.

6 SETTINGS

Important Information

General

- Use only the power supply included with this product.
- Do not connect the AC adaptor to any AC outlet other than a standard 220-240 V AC outlet.
- This product is unable to make calls when:
 - The portable handset batteries need recharging or have failed.
 - There is a power failure.
 - The key lock feature is turned on.
 - The call bar feature is turned on (only numbers stored as emergency numbers can be called).
- Do not open the base unit or handset (other than to change the batteries).
- This product should not be used near emergency/intensive care medical equipment and should not be used by people with pacemakers.
- Care should be taken that objects do not fall onto, and liquids are not spilled into, the unit. Do not subject this product to excessive smoke, dust, mechanical vibration or shock.

Environment

- Do not use this product near water.
- This product should be kept away from heat sources such as radiators, cookers, etc. It should also not be placed in rooms where the temperature is less than 5°C or greater than 40°C.
- The AC adaptor is used as the main disconnect device. Ensure that the AC outlet is located/installed near the unit and is easily accessible.

Warning:

- To prevent the risk of electrical shock, do not expose this product to rain or any other type of moisture.

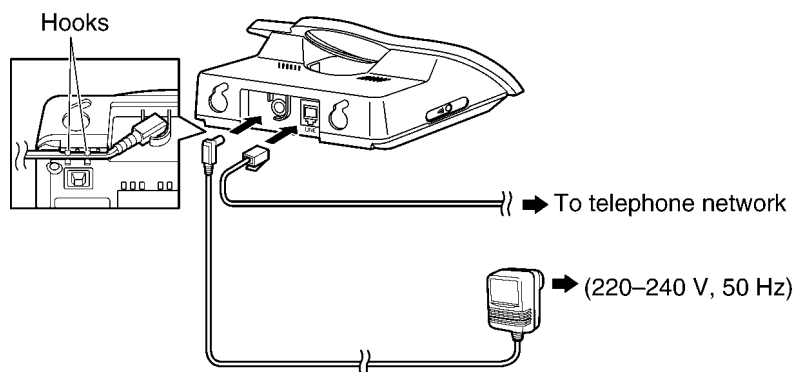
Location

For maximum distance and noise-free operation, place your base unit:

- Away from electrical appliances such as TVs, radios, personal computers or other phones.
- In a convenient, high and central location.

6.1. Connections

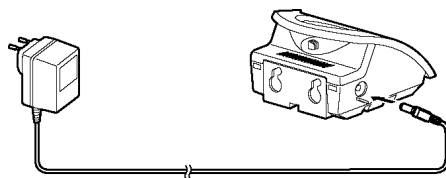
6.1.1. Base Unit



Note:

- If the handset is not charged, you cannot make or answer calls.
- Never install telephone wiring during a lightning storm.
- The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)
- Use only the AC adaptor PQLV19BXZ.

6.1.2. Charger Unit



- The AC adaptor must remain connected at all times (It is normal for the adaptor to feel warm during use).
- Use only the AC adaptor PQLV200BXZ.

6.2. Ringer Volume

6.2.1. Base Unit

4 levels (high to off) are available.

- 1 Press **[M]**.
- 2 Press **[▼]** repeatedly to display "SETTING BS", then press **[▶]**.
- 3 Press **[2]** 2 times.
- 4 Select the desired setting by pressing **[1]** for low, **[2]** for medium, **[3]** for high or **[0]** for off.
- 5 Press **[▶]**, then press **[✕⓪]**.

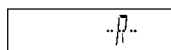
6.2.2. Handset

7 levels (high to off) are available.

- 1 Press **[M]**.
- 2 Press **[▼]** repeatedly to display "SETTING HS", then press **[▶]**.
- 3 Press **[▼]** repeatedly to display "RINGER OPT", then press **[▶]**.
- 4 Press **[▼]** repeatedly to display "RINGER VOL", then press **[▶]**.
- 5 Press **[▲]** or **[▼]** repeatedly to select the desired volume, then press **[▶]**.
- 6 Press **[✕⓪]**.

Note:





- When the ringer volume is set to off, the following will be displayed.




6.3. PIN Code

6.3.1. Base Unit

The base unit's default PIN is "0000".









- 1 Press .
- 2 Press  repeatedly to display "SETTING BS", then press .
- 3 Press **[5]**.
- 4* Enter the current 4-digit base unit PIN.
- 5 Enter the new 4-digit base unit PIN.
- 6 Enter the new 4-digit base unit PIN again.
- 7 Press .

For Service Hint:


*: If the current 4-digit PIN is forgotten, press  **7000** and you will be able to enter new PIN.

6.3.2. Handset

The handset's default PIN is "0000".






- 1 Press .
- 2 Press  repeatedly to display "SETTING HS", then press .
- 3 Press  repeatedly to display "OTHER OPT", then press .
- 4 Press  repeatedly to display "HSPIN CHANGE", then press .
- 5* Enter the current 4-digit handset PIN.
- 6 Enter the new 4-digit handset PIN.
- 7 Enter the new 4-digit handset PIN again.
- 8 Press .

For Service Hint:

*: If the current 4-digit PIN is forgotten, press  **7000** and you will be able to enter new PIN.

6.4. Reset

6.4.1. Base Unit

- 1 Press **[]**.
- 2 Press **[]** repeatedly to display "SETTING BS", then press **[]**.
- 3 Press **[0]**.
- 4 Enter "0000" (default base unit PIN).
 - If you changed PIN, enter it.
- 5 Press **[]**, then press **[]**.









Note:

- The emergency number and TAM setting will not be reset.

Base Unit Initial Settings

Function	Initial Setting	Remarks (selectable options)
Base Unit Ringer Volume	2	1 to 3, OFF
Ringer Mode	All Handsets	All Handsets/Specific Handset No.
Number of Rings (Ringer Mode)	3	Up to 6 rings
Number of Rings (TAM)	Auto	2 to 7, Auto
Dialling Mode	Tone	Tone/Pulse
Flash Time	600 msec	100 msec/600 msec/300 msec
Pause Length	3 seconds	3 seconds/5 seconds
Call Restricted Handsets	All Clear	Each Handset can be set individually.
Call Restriction Numbers	All Clear	Up to 10 numbers (up to 8 digits)
4-Digit Base Unit PIN	0000	-
Caller ID	All Clear	Up to 50 different callers.

6.4.2. Handset

- 1 Press **[]**, **[]**, **[]**, **[]** and **[]**.
- 2 Enter "0000" (default handset PIN).
 - If you changed PIN, enter it.
- 3 Press **[]**, **[]** and **[]**.

Note:

- Phonebook entries will not be erased.
- The battery type setting will not be reset.

Handset Initial Settings

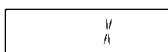
Function	Initial Setting	Remarks (selectable options)
Select Base Unit	Auto	-
Time Alarm Mode	OFF	OFF/Once/Daily
Alarm Time	Clear	-
Handset Ringer Volume	6	1 to 6, OFF
Handset External Ringer Pattern	1	20 patterns
Handset Internal Ringer Pattern	1	20 patterns
Handset Paging Tone Pattern	1	20 patterns
Handset Alarm Tone Pattern	1	20 patterns
Key Tone	ON	ON/OFF
Call Waiting Tone	ON	ON/OFF
Range Warning Alarm	OFF	OFF/ON
Battery Low Alarm	ON	ON/OFF
Standby Mode Display	Clock	Clock/OFF/Base No./Handset No.
Talk Mode Display	Talk Time	Talk Time/Phone No.
Display Language	English	10 languages
Call BAR	OFF	OFF/ON
Direct Call Mode	OFF	OFF/ON
Direct Call Number	Clear	Up to 24 digits
4-Digit Handset PIN	0000	-
Auto Talk	OFF	OFF/ON
Redial Memory	All Clear	Up to 10 numbers (Up to 24 digits)
Handset Receiver Volume	2	1 to 3
Handset Speaker Volume	3	1 to 6


6.5. Key Lock

The dial keys can be locked so that no calls can be made. Only incoming calls will be accepted while key lock is on.

To turn on key lock, press **[ for about 2 seconds.**

- A beep will sound and the following will be displayed.



To turn off key lock, press **[ for about 2 seconds.**

Note:

- Emergency calls cannot be made until key lock is turned off.
- Key lock is turned off when the handset is turned off.


6.6. R button to use the flash feature



[R] is used to access optional telephone services. Contact your service provider for details. If your unit is connected to a PBX (private branch exchange), pressing **[R]** can allow you to access certain features of your host PBX such as transferring an extension call.

6.7. Pause button for PBX (line/long distance service users)

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

Example: If you have to dial **[0]** before dialling outside numbers manually, you will probably pause after dialling **[0]** until you hear a dial tone.

- 1 Press **[0]**.
- 2 Press **[].








 - “P” will be displayed.**
- 3 Dial the phone number.
- 4 Press **[] or **[].****

Note:







- Pressing **[] once creates one pause. Press **[] repeatedly to create longer pauses.****

6.8. Setting Call Restriction

You can restrict selected handsets from dialling certain phone numbers. You can assign up to 10 phone numbers (memory locations 1-10) to be restricted per handset. If a restricted number is dialled, the call will not be connected and the restricted number will flash on the display. For example, storing an area code will prevent a handset from dialling a long distance call.











- 1 Press **[]**.
- 2 Press **[]** repeatedly to display "SETTING BS", then press **[]**.
- 3 Press **[6]**.
- 4 Enter "0000" (default base unit PIN).
 - If you changed PIN, enter it.
 - All the registered handset numbers will be displayed.
 - Flashing numbers indicate call restriction is turned on for the corresponding handset.
- 5 Press the desired handset numbers.
 - The selected handset numbers will flash.
 - To cancel a selected handset number, press the number again. The number will stop flashing.
- 6 Press **[]**.
- 7 Enter the phone number to be restricted (8 digits max.).
 - If you enter a number when a previously stored number is already displayed, the new number will erase the old number.
 - To select a different memory location, press **[]** repeatedly and enter a number.
- 8 Press **[]**.
- 9 Press **[]**.

6.9. Cancelling a Restricted Number

- 1 Press **[]**.
- 2 Press **[]** repeatedly to display "SETTING BS", then press **[]**.
- 3 Press **[6]**.
- 4 Enter "0000" (default base unit PIN).
 - If you changed PIN, enter it.
- 5 Press **[]** repeatedly to display the desired number.
- 6 Press **[C/ⓧ]**.
- 7 Press **[]**, then press **[]**.

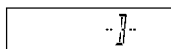
6.10. Setting Call BAR

This feature prohibits making outside calls. When call bar is turned on, only intercom calls and emergency calls can be made.

- 1 Press **[]**.
- 2 Press **[]** repeatedly to display "SETTING HS", then press **[]**.
- 3 Press **[]** repeatedly to display "CALL OPT", then press **[]**.
- 4 Press **[]** repeatedly to display "CALL BAR", then press **[]**.
- 5 Enter "0000" (default handset PIN).
 - If you changed PIN, enter it.
- 6 Press **[]** repeatedly to select "ON" or "OFF", then press **[]**.
- 7 Press **[]**.











Note:

- While this feature is turned on, the following will be displayed.



6.11. Selecting the Display Language

10 display languages are available.






- 1 Press **[]**.
- 2 Press **[]** repeatedly to display "SETTING HS", then press **[]**.
- 3 Press **[]** repeatedly to display "DISPLAY OPT", then press **[]**.
- 4 Press **[]** repeatedly to display "LANGUAGE", then press **[]**.
- 5 Press **[]** repeatedly to select the desired language, then press **[]**.
- 6 Press **[]**.

Note:

- If you select a language you cannot read, reset the handset to its default settings. Refer to **Handset (P.14)** in "Reset".






6.12. Setting Dialling Mode (Tone/Pulse)

- 1" (Tone): Select when you have a touch tone service.
 2" (Pulse): Select when you have pulse service.

- 1 Press **[]**.
- 2 Press **[]** repeatedly to display "SETTING BS", then press **[]**.
- 3 Press **[3]**.
- 4 Enter "0000" (default base unit PIN).
 - If you changed PIN, enter it.
- 5 Press **[1]**.
- 6 Select the desired setting by pressing **[1]** for tone dialling mode or **[2]** for pulse dialling mode.
- 7 Press **[]**, then press **[]**.















6.13. Setting Flash Time

Change the flash time if necessary to suit your PBX or service provider.


- 1 Press **[]**.
- 2 Press **[]** repeatedly to display "SETTING BS", then press **[]**.
- 3 Press **[3]**.
- 4 Enter "0000" (default base unit PIN).
 - If you changed PIN, enter it.
- 5 Press **[2]**.
- 6 Press **[1]**.
- 7 Select the desired setting by pressing **[1]** for 100 ms, **[2]** for 600 ms or **[3]** for 300 ms.
- 8 Press **[]**, then press **[]**.

7 DISPLAY

7.1. Handset Display

Icons	Meaning	Icons	Meaning
	Within range of base unit		Battery strength is high
	Out of range, no registration or no power on base unit		Answering system is on
	Paging, intercom mode or accessing base unit		Call bar is on
	Making or answering a call		Direct call is on
	Phonebook mode		Key lock is on
	Setting mode		Ringer volume is off
	Battery strength is low		Displayed when you press [M]

For Service Hint:

 icon will be displayed if the unit took a signal from Telephone Company as a Voice Message signal.

In that case, press the left button of the Navigator Key for a while.

7.2. Caller ID Display

Important:

This unit is Caller ID compatible. To display the caller's phone number, you must subscribe to Caller ID service. After subscribing to Caller ID service, this unit will display caller information.

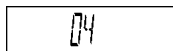
How Caller ID is displayed

The unit will display the calling party's phone number after the first ring. You can view the caller information of the last 50 different callers.

When new calls have been received, the display will show the number of new calls.






The number of new calls will be cleared after viewing all caller information.

Example: 4 new calls have been received.




Note:

- When you receive a call from the same phone number you stored with a name in the phonebook, the display will show the stored name.
- If the unit is connected to a PBX system, you may not receive the caller information.
- When the caller dialed from an area which does not provide Caller ID service, "OUT OF AREA" will be displayed.
- When the caller requested not to send caller information, either no information or "PRIVATE" will be displayed.
- The display will not show caller information while using the handset for an intercom call. However, the caller information will be stored.
- Certain service providers send caller information between the first and second ring. If the display does not show caller information after a few rings, follow these instructions to set DTMF mode.

- 1 Press **[]**.
- 2 Press **[]** repeatedly to display "SETTING BS", then press **[]**.
- 3 Press **[3]**.
- 4 Enter "0000" (default base unit PIN).
 - If you changed PIN, enter it.
- 5 Press **[4]**.
- 6 Select DTMF mode by pressing **[2]**.
- 7 Press **[]**, then press **[]**.
 - To cancel DTMF mode, press **[1]** in step 6.

7.3. Before Requesting Help (Troubleshooting)

If you still have difficulties after following the instructions in this section, disconnect the AC adaptor and turn off the handset, then reconnect the AC adaptor and turn on the handset.

 is flashing.

- The handset is not registered to the base unit. Register it. (*1)
- The handset is too far from the base unit. Move closer.
- The AC adaptor is not connected. Check the connections.

I cannot make or receive calls.

- The AC adaptor or telephone line cord is not connected. Check the connections.
- If you are using a splitter to connect the unit, remove the splitter and connect the unit to the wall socket directly. If the unit operates properly, check the splitter.
- Disconnect the base unit from the telephone line and connect the line to a known working telephone. If the working telephone does not operate properly, contact your service provider.
- The call bar feature is turned on. Turn it off. (*2)
- You dialled a call restricted number. (*3)
- The key lock feature is on. Turn it off. (*4)
- The dialling mode setting is incorrect. Set to "Tone" or "Pulse" as needed. (*5)

The unit does not ring.

- The ringer volume is turned off. Adjust the handset ringer volume and the base unit ringer volume. (*6)

The handset display is blank.

- The handset is not turned on. Turn the power on. (*7)

The handset will not turn on.

- Make sure that the batteries are installed correctly. (*8)
- Fully charge the batteries. (*9)
- Clean the charge contacts and charge again.

The battery should be charging but the battery icon does not change.

- Clean the charge contacts and charge again. (*9)
- The AC adaptor is disconnected. Plug in the AC adaptor.

A busy tone is heard when  or  is pressed.

- The handset is too far from the base unit. Move closer and try again.
- Another handset is on an outside call. Wait for the other user to complete the call.

Static, sound cuts in/out, fades. Interference from other electrical units.

- Locate the handset and the base unit away from other electrical appliances.
- Move closer to the base unit.

The handset stops working while being used.

- Disconnect the AC adaptor and turn off the handset. Connect the AC adaptor, turn on the handset and try again.

While storing an entry in the phonebook or assigning a hot key, the handset starts to ring.

- A call is being received. To answer the call, press  or . Programming will be cancelled. Start again.

Cross Reference:

- (*1) **Registering a Handset to a Base Unit** (P.25)
- (*2) **Setting Call BAR** (P.16)
- (*3) **Setting Call Restriction** (P.16)
- (*4) **Key Lock** (P.15)
- (*5) **Setting Dialling Mode (Tone/Pulse)** (P.17)
- (*6) **Ringer Volume** (P.12)
- (*7) **Turning the Power On/Off** (P.22)
- (*8) **Battery Installation** (P.8)
- (*9) **Battery Charge** (P.8)

Pressing [☎] does not display/dial the last number dialled.

- If the redialled number was more than 24 digits long, the number will not be redialled. Redial the number manually.

The handset beeps intermittently and/or  flashes.

- Fully charge the batteries. (*10)

I fully charged the batteries, but  still flashes.

- Clean the charge contacts and charge again.
- It is time to replace the batteries. (*11)

 disappears and the unit stops charging when the handset is on the base unit.

- Nickel cadmium batteries are inserted when the battery type is set to "NI-MH". Change the battery type setting to "NI-CD".

Caller information is not displayed.

- You must subscribe to Caller ID service. (*12)

While viewing caller information, the display returns to standby mode.

- Do not pause for over 60 seconds while searching.

I cannot register a handset to a base unit.

- The maximum number of base units (4) are already registered to the handset. Cancel unused base unit registrations from the handset. (*13)
- The maximum number of handsets (6) are already registered to the base unit. Cancel unused handset registrations from the base unit. (*13)
- You entered the wrong PIN number. If you forget your PIN, refer to "For Service Hint" in PIN Code. (*14)
- Locate the handset and the base unit away from other electrical appliances.

Answering System

The answering system is turned on, but caller messages are not recorded.

- The recording time is set to "GREET ONLY". Select "1MINUTE" or "UNLIMITED".
- Message memory is full. Erase unnecessary messages. (*15)

I cannot operate the answering system with the handset.

- Another handset user is using the answering system or changing base unit settings. Wait for the other user to finish.
- A caller is leaving a message. Wait for the caller to finish.
- The handset is too far from the base unit. Move closer.

I cannot operate the answering system remotely.

- You are entering the wrong remote access code. Turn remote operation on using the handset and select a new code. (*16)
- You are pressing the dial keys too quickly. Press each key firmly.
- The answering system is turned off. Turn it on.
- You are using a pulse telephone. Try again using a touch tone phone.

While recording a greeting message or listening to messages, the unit rings and recording stops.

- A call is being received. Answer the call and try again later.


Cross Reference:

- (*10) **Battery Charge** (P.8)
- (*11) **Replacing the Batteries** (P.9)
- (*12) **Caller ID Display** (P.18)
- (*13) **Registering a Handset to a Base Unit** (P.25)
- (*14) **PIN Code** (P.13)
- (*15) **Erasing All Messages** (P.27)
- (*16) **Remote Operation** (P.28)

8 OPERATIONS


8.1. Turning the Power On/Off

Power on

Press **[]** for about 1 second.

- The display will change to the standby mode.


Power off


Press **[]** for about 2 seconds.



- The display will go blank.

8.2. Setting the Time and Date

Important:

- Confirm that the AC adaptor is connected.
- Ensure that **[]** is not flashing.

1 Press **[]**.

2 Press **[]** repeatedly to display "SETTING BS", then press **[]**.

3 Press **[]**.

4 Enter the current hour and minute by selecting 2digits for each (24-hour time entry).

Example: 15:15

Press **[1][5] [1][5]**.

- If you make a mistake, press **[C/⌫]**. Digits will be cleared from the right.

5 Press **[]**.

- "SETTING BS" will be displayed.

6 Press **[]**, then press **[]** 2 times.

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

Example: 17 May, 2004

Press **[1][7] [0][5] [0][4]**.

- If you make a mistake, press **[C/⌫]**. Digits will be cleared from the right.

8 Press **[]**.

- "SETTING BS" will be displayed.

9 Press **[]**.


Note:

- If a power failure occurs, set the time and date again.

8.3. Redialling


8.3.1. Making a Call Using the Redial List

The last 10 phone numbers dialled are stored in the redial list.

1 Press **[]**.




- The last number dialled will be displayed.

2 Press **[]** repeatedly to select the number.

- To exit the list, press **[]**.

3 Press **[]** or **[]**.

8.3.2. Redialling the Last Number Dialled

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

8.4. Phonebook

8.4.1. Storing Phone Numbers and Names

Up to 20 phone numbers can be stored in the phonebook for quick access.

- 1 Press **[☐]** 2 times.
- 2 Enter a phone number (24 digits max.).
 - Each number stored in the phonebook will be given an index number (01–20). This number will be shown to the left of the stored phone number.
- 3 Press **[☐]**.
- 4 Enter the party's name (9 characters max.; see the character table).
- 5 Press **[☐]**.
 - To store other entries, repeat from step 2.
- 6 Press **[✕0]**.

Character Table

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

Note:

- To enter another character located on the same dial key, press **[▶]** to move the cursor to the next space.
- If there is no space to store new entries, "MEMORY FULL" will be displayed. Erase unnecessary entries.

Editing a Stored Entry

- 1 Press **[☐]**.
- 2 Press **[▲]** or **[▼]** repeatedly to display the desired entry, then press **[▶]**.
- 3 Press **[▼]** repeatedly to display "EDIT", then press **[▶]**.
 - If you do not need to edit the phone number, skip to step 5.
- 4 Edit the phone number.
- 5 Press **[☐]**.
 - If you do not need to edit the name, skip to step 7.
- 6 Edit the name. See the character table.
- 7 Press **[☐]**.

Erasing a Stored Entry

- 1 Press **[☐]**.
- 2 Press **[▲]** or **[▼]** repeatedly to display the desired entry, then press **[▶]**.
- 3 Press **[▼]** repeatedly to display "CLEAR", then press **[▶]**.
- 4 Press **[▼]** repeatedly to display "YES", then press **[▶]**.
 - To cancel erasing, select "NO".
 - To erase other entries, repeat from step 2.
- 5 Press **[✕0]**.

Making Calls Using the Phonebook

Before using this feature, store the desired phone numbers and names into the phonebook.

- 1 Press **[☐]**.
- 2 Press **[▲]** or **[▼]** repeatedly to display the desired entry.
- 3 Press **[↶]** or **[☎]**.

8.4.2. Storing a Number from the Caller ID List into the Phonebook

- 1 Press [▲] or [▼] repeatedly to display the desired entry, then press [▶].
- 2 Press [▼] repeatedly to display "SAVE TEL NO", then press [▶].
- 3 Press [≡].
- 4 Enter the party's name (9 characters max.).
- 5 Press [≡].
- 6 Press [✕].

8.4.3. Storing a Number from the Redial List into the Phonebook

- 1 Press [●].
- 2 Press [▼] repeatedly to select the number, then press [▶].
- 3 Press [▼] repeatedly to display "SAVE TEL NO", then press [▶].
- 4 Press [≡].
- 5 Enter the name (9 characters max.).
- 6 Press [≡].

8.4.4. Hot Key (: Quick Dial)

Dial keys [1] to [9] can each be used as a "hot key", allowing you to dial a number from the phonebook by simply pressing a dial key.

Assigning an Entry in the Phonebook to a Hot Key

- 1 Press [□].
- 2 Press [▲] or [▼] repeatedly to display the desired entry, then press [▶].
- 3 Press [▼] repeatedly to display "HOT KEY REG", then press [▶].
- 4 Press [▼] repeatedly to select the desired dial key ([1] to [9]), then press [▶].
 - If the dial key is already assigned as a hot key, the displayed number will flash.
- 5 Press [▼] repeatedly to display "YES", then press [▶].
 - To register other entries, repeat from step 2.
- 6 Press [✕].

Making Calls Using a Hot Key

- 1 Press and hold the desired hot key ([1] to [9]).
 - You can view other hot key registrations by pressing [▲] or [▼].
- 2 Press [📞] or [📞].

Erasing a Hot Key

- 1 Press and hold the desired hot key ([1] to [9]), then press [▶].
 - "CLEAR" will be displayed.
- 2 Press [▶].
- 3 Press [▼] repeatedly to display "YES", then press [▶].
- 4 Press [✕].

Note:

- The number erased from a hot key will not be deleted from the phonebook.

8.5. Registering a Handset to a Base Unit

To register an additional handset to a base unit (easy registration)

The included handset and base unit are preregistered. After purchasing an additional handset, register it to the base unit using the following method.

- 1 Lift the additional handset and press **[*0]**.
- 2 Press and hold **[M]** on the left side of the base unit for about 5 seconds, until the registration tone sounds.
- 3 Place the additional handset on the base unit. The registration tone continues to sound. With the handset still on the base unit, wait until a confirmation tone sounds and **Y** stops flashing.

Note:

- If an error tone sounds, or if **Y** is still flashing, register the handset manually (manual registration).
- If all registered handsets start ringing in step 2, press **[M]** to stop, then start again.
- Charge the batteries of your additional handset for about 7 hours before initial use.
- This registration method cannot be used for handsets that have already been registered to a base unit. Register the handset manually.

To register a handset to an additional base unit (manual registration)

You can register a handset to a base unit manually using the following method.

- 1 Press **[E]**.
- 2 Press **[▼]** repeatedly to display "SETTING HS", then press **[▶]**.
- 3 Press **[▼]** repeatedly to display "REGISTRATION", then press **[▶]**.
- 4 Press **[▼]** repeatedly to display "REGISTER HS", then press **[▶]**.
- 5 Press and hold **[M]** on the left side of the base unit for about 5 seconds, until the registration tone sounds.
 - After pressing **[M]**, the rest of the procedure must be completed within 1 minute.
- 6 Press **[▼]** repeatedly to select a base unit number, then press **[▶]**.
- 7 Wait until "BS PIN" is displayed, then enter "0000" (default base unit PIN).
 - If you changed PIN, enter it.
- 8 Press **[▶]**.
 - When the handset has been registered successfully, a confirmation tone will sound, and **Y** will stop flashing.

Note:

- If all registered handsets start ringing in step 5, press **[M]** to stop, then start again from step 1.

Cancelling a Handset

A maximum of 6 handsets can be registered to a base unit. A handset can cancel its own registration (or the registration of another handset) that is stored in the base unit. This will allow the base unit to “forget” the handset.

- 1 Press [≡].
- 2 Press [▼] repeatedly to display “SETTING BS”, then press [▶].
- 3 Press [7].
- 4 Enter “0000” (default base unit PIN).
 - If you changed PIN, enter it.
- 5 Press the desired handset number.
 - The selected handset number will flash.
- 6 Press [▶].
- 7 Wait until “SETTING BS” is displayed, then press [✕].

Cancelling a Base Unit

A handset can be registered to a maximum of 4 base units. A handset can cancel a base unit that it is registered to. This will allow the handset to “forget” that base unit.

- 1 Press [≡].
- 2 Press [▼] repeatedly to display “SETTING HS”, then press [▶].
- 3 Press [▼] repeatedly to display “REGISTRATION”, then press [▶].
- 4 Press [▼] repeatedly to display “CANCEL BS”, then press [▶].
- 5 Enter “0000” (default handset PIN).
 - If you changed PIN, enter it.
- 6 Press [▼] repeatedly to select the desired base unit number, then press [▶].
 - The selected base unit number will flash.
- 7 Press [▶].
- 8 Press [▼] repeatedly to select “YES”, then press [▶].
 - To stop cancelling, select “NO”.
- 9 Press [✕].

8.6. Selecting a Base Unit

When “AUTO” is selected, the handset will automatically use any available base unit it is registered to. When a specific base unit is selected, the handset will make and receive calls using that base unit only. If the handset is out of range of that base unit, no calls can be made.

- 1 Press [≡].
- 2 Press [▼] repeatedly to display “SETTING HS”, then press [▶].
- 3 Press [▼] repeatedly to display “SELECT BS”, then press [▶].
- 4 Press [▼] repeatedly to display “AUTO” or a specific base unit number, then press [▶].
 - The handset starts searching for the base unit.

Note:

- When a handset is registered to another base unit, this setting will automatically change to that base unit’s number even if “AUTO” was selected.

8.7. Answering System

The base unit contains an answering system which can answer and record calls for you when you are unavailable to answer the phone. You can also record your own voice memos and phone conversations.

Important:

- Only 1 handset 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 time and date have been set.

8.7.1. Listening to Messages

Messages are stored and played back chronologically, from oldest message to newest.

Listening to new/all messages

When you have new messages,  flashes.

- 1 Press **[INT]**.
 - The handset number will be displayed.
- 2 Press **[⇄]**.
- 3 After the beep, press **[4]** to play back new messages or **[5]** to play back all messages.
- 4 Press **[📞📞]**.

Note:

- To adjust the speaker volume during playback, press **[▲]** or **[▼]** repeatedly.
- While listening to messages, you can switch between the receiver and speaker by pressing **[📞📞]** or **[📞📞]**.

Repeating/skipping/stopping/erasing a message during playback

- To repeat a message during playback, press **[1]**. If pressed within the first 5 seconds of a message, the previous message will be played.
- To skip a message during playback, press **[2]**.
- To stop a message during playback, press **[9]**.
- To erase a message during playback, press **[✳]**, then press **[4]**.

8.7.2. Erasing All Messages

- 1 Press **[INT]**.
 - The handset number will be displayed.
- 2 Press **[⇄]**.
- 3 After the beep, press **[✳]**.
- 4 Press **[5]**.
- 5 Press **[📞📞]**.

Note:

- The greeting message is not erased.

8.7.3. Remote Operation

Using a touch tone phone, you can call your phone number from outside and access the unit to listen to messages or change answering system settings. 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 turn on remote operation by setting a remote access code. This code must be entered each time you operate the answering system remotely.

Turning remote operation on/off

A 3-digit remote access code must be entered when operating the answering system remotely. This code prevents unauthorised parties from listening to your messages remotely. After you store your remote access code, remote operation is possible.

- 1 Press **[☰]**.
- 2 Press **[▼]** repeatedly to display "SETTING BS", then press **[▶]**.
- 3 Press **[⇄]**.
- 4 Press **[1]**.
- 5 To turn on remote operation, enter a 3-digit remote access code.
 - To turn off remote operation, press **[✳]**.
- 6 Press **[▶]**, then press **[✕⓪]**.

Using the answering system remotely

- 1 Dial your phone number from a touch tone phone.
 - If the number of rings is set to "AUTO", the number of rings you hear will indicate whether or not you have new messages.
- 2 After the greeting message starts, enter your remote access code.
 - The unit will announce the number of new messages.
 - After 3 seconds, voice guidance starts.
- 3 Follow the voice guidance prompts as necessary.

Note:

- You can hang up at any time.
- You can ignore the voice guidance and control the unit using remote commands.

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
[6]	Play greeting message
[7]	Record greeting message
[9]	Stop (recording, playback)
[0]	Turn answering system off
[*][4]	Erase this message (during playback)
[*][5]	Erase all messages
[*][6]	Erase greeting message (during greeting message playback)
[*][#]	End remote operation (or hang up)

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

Turning on the answering system remotely

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

- 1** Dial your phone number from a touch tone phone.
- 2** Let the phone ring 20 times.
 - A long beep will be heard.
- 3** Enter your remote access code within 10 seconds of the long beep.
 - The greeting message is played back.
 - You can hang up, or enter your remote access code again and begin remote operation.

9 DISASSEMBLY INSTRUCTIONS

9.1. Base Unit

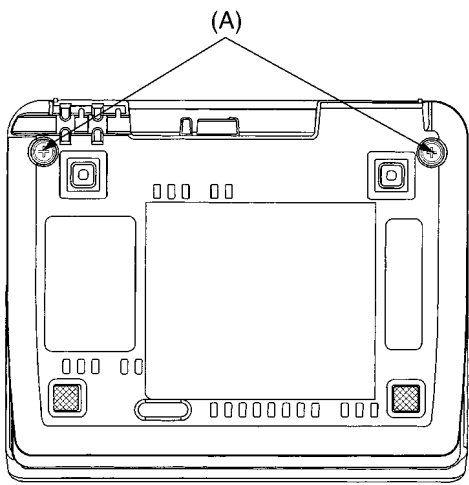


Fig. 1

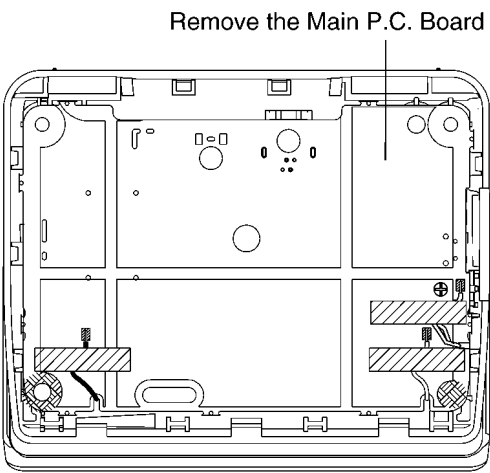


Fig. 2

Shown in Fig.-	To Remove	Remove
1	Lower Cabinet	Screws (2.6 × 12).....(A) × 2
2	Main P.C. Board	Main P.C. Board

9.3. Charger Unit

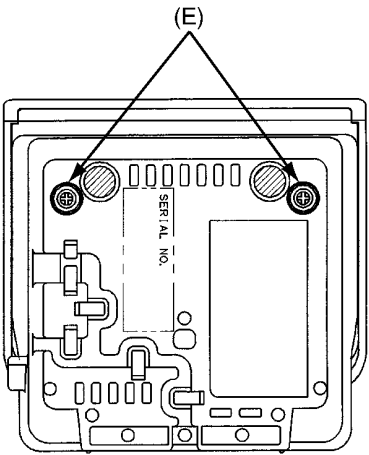


Fig. 6

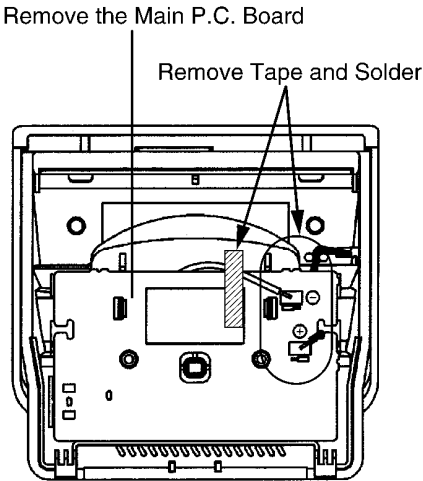


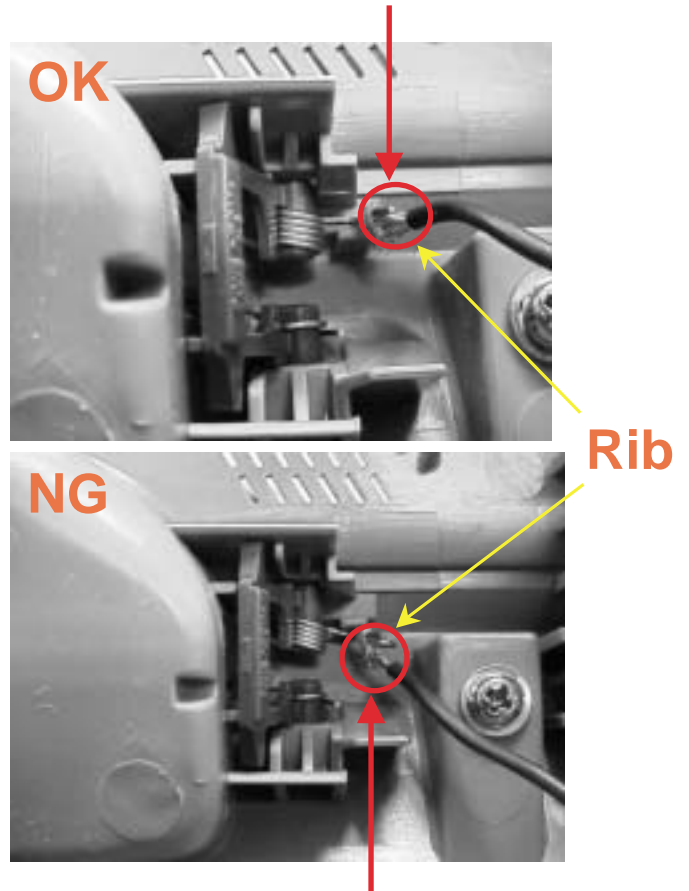
Fig. 7

Shown in Fig.-	To Remove	Remove
6	Lower Cabinet	Screws (2.6 × 14).....(E) × 2
7	Main P.C. Board	Tape and Solder
		Main P.C. Board

10 ASSEMBLY INSTRUCTIONS

10.1. Warning When Constructing the Base Unit

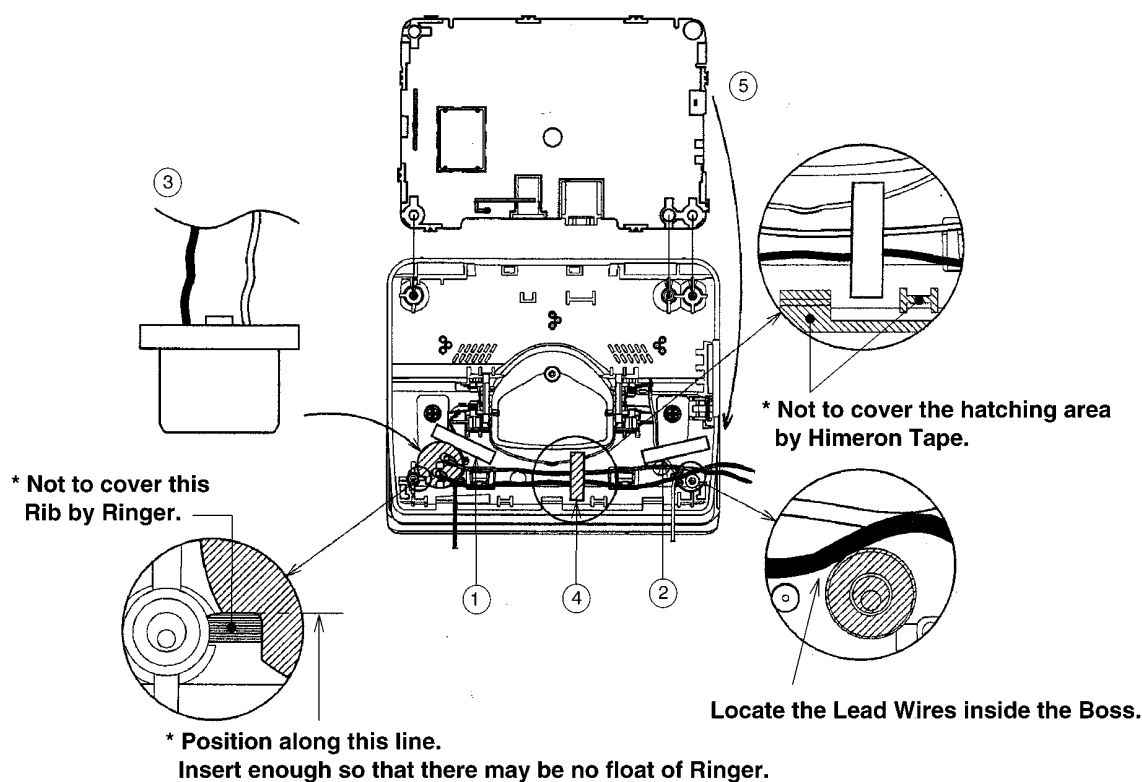
CHG terminal is properly fit in the cabinet.



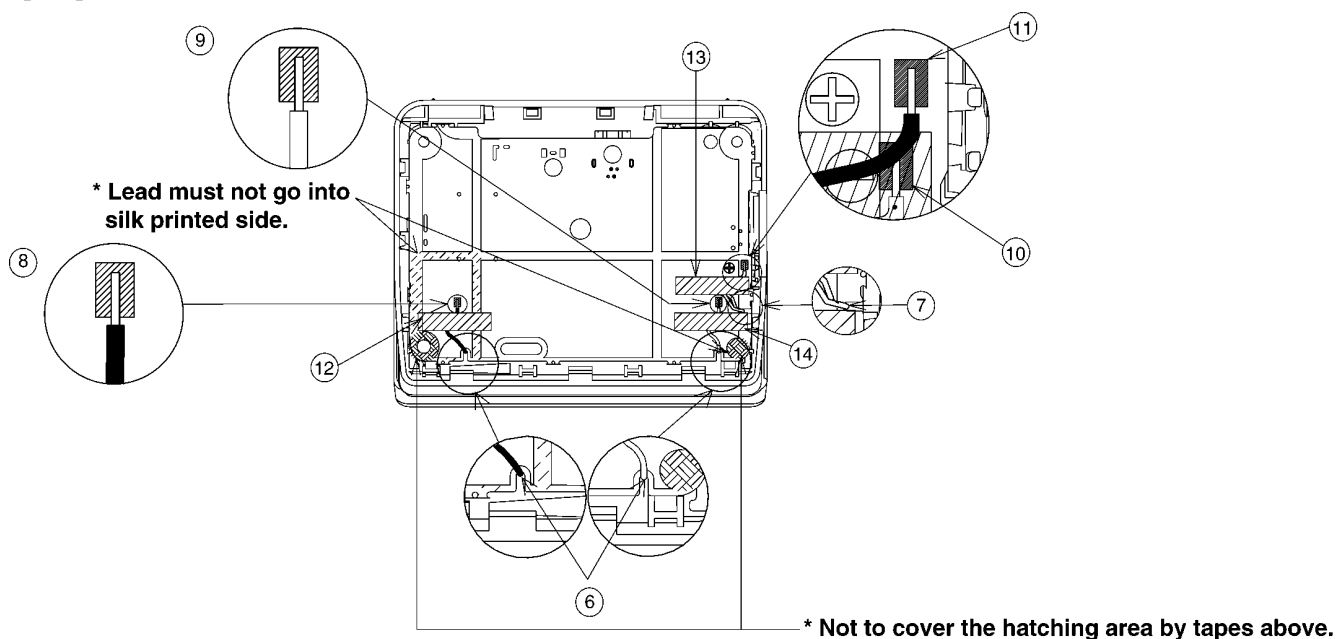
CHG terminal comes out of rib by pulling black lead wire when opening the cabinet and turning the PCB over. The terminal cannot have enough elastic force, cannot have good contact with handset, and it will result in charge problem.

10.2. Processing of Ringer/Charge Terminal Lead

- ① ~ ② Fix Charge Lead with Himeron Tape.
- ③ Attach Ringer to Cabinet.
- ④ Fix Charge Lead with Himeron Tape.
- ⑤ Attach P. C. B to Cabinet.

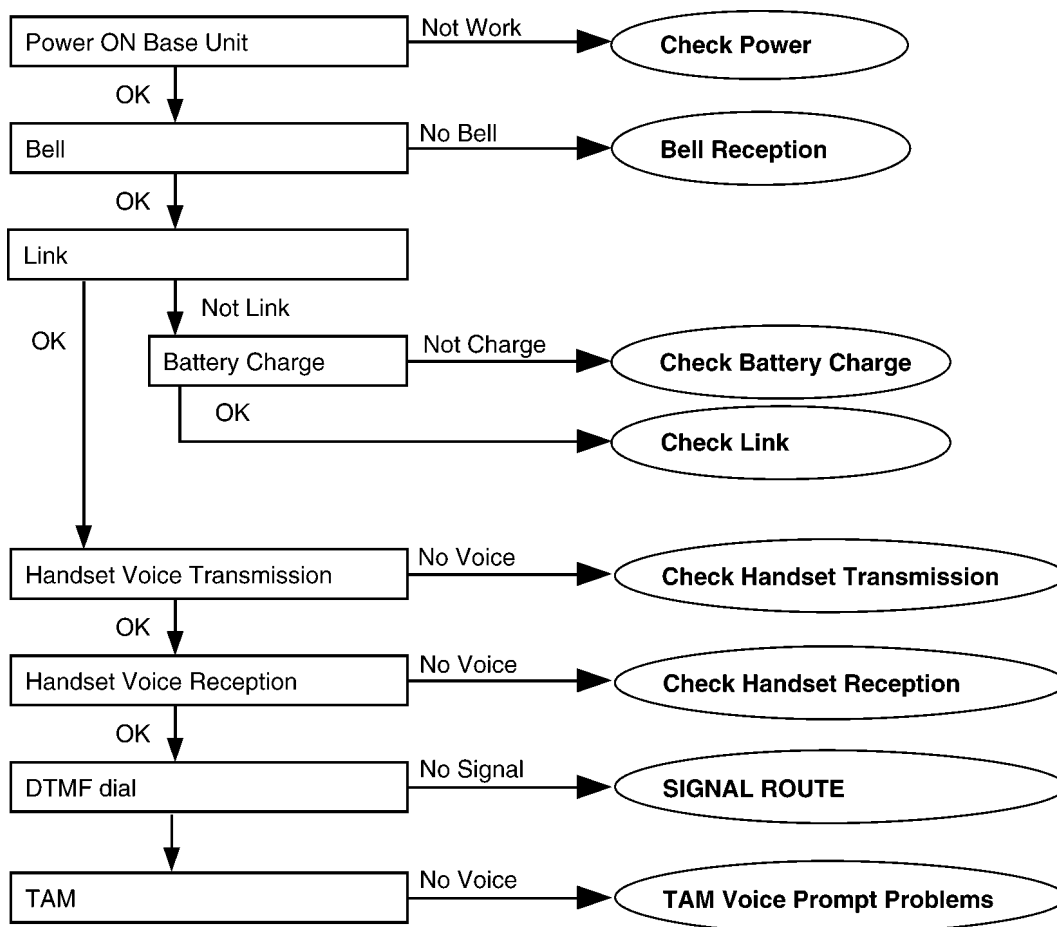


- ⑥ Pull out Charge Lead Wire through the slit of P. C. B.
- ⑦ Pull out Charge Lead Wires (2 pieces) through the slit of P. C. B.
- ⑧ ~ ⑪ Solder Lead Wires to P. C. B.
- ⑫ ~ ⑭ Fix Lead Wire with Himeron Tape.



11 TROUBLESHOOTING GUIDE

Flow Chart



Cross Reference:

Check Power (P.36)

Bell Reception (P.42)

Check Battery Charge (P.37)

Check Link (P.38)

Check Handset Transmission (P.40)

Check Handset Reception (P.40)

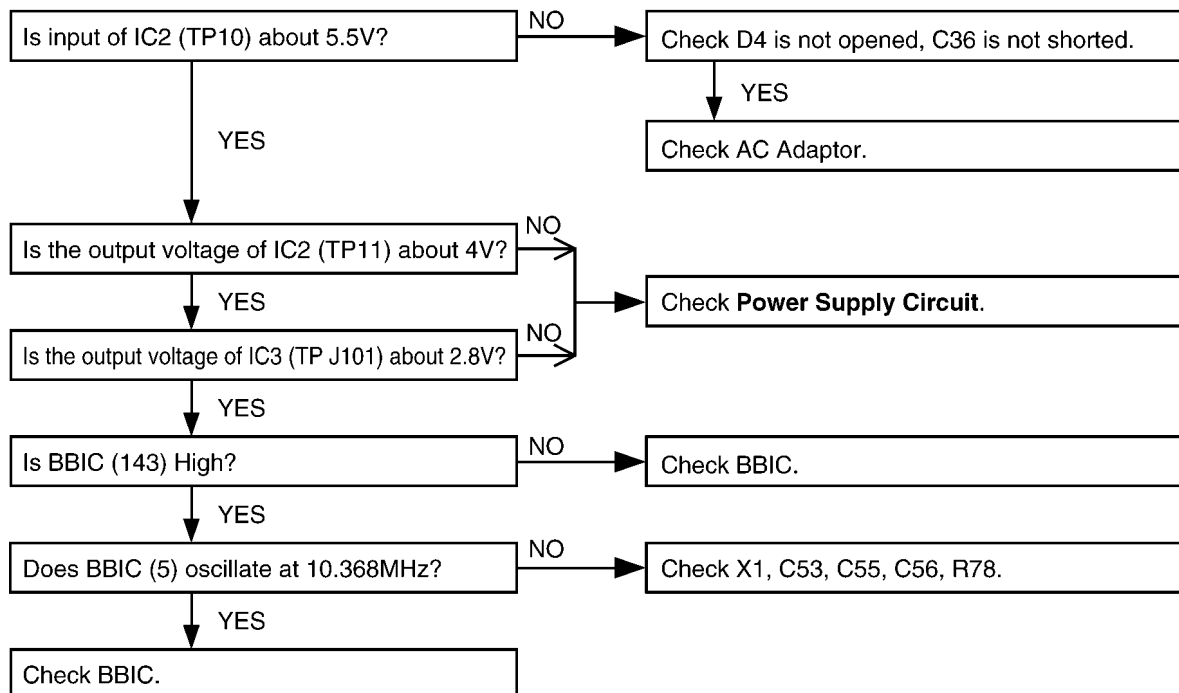
SIGNAL ROUTE (P.65)

TAM Voice Prompt Problems (P.41)

11.1. Check Power

11.1.1. Base Unit

Is the AC Adaptor inserted into AC outlet? (Check AC Adaptor's specification.)



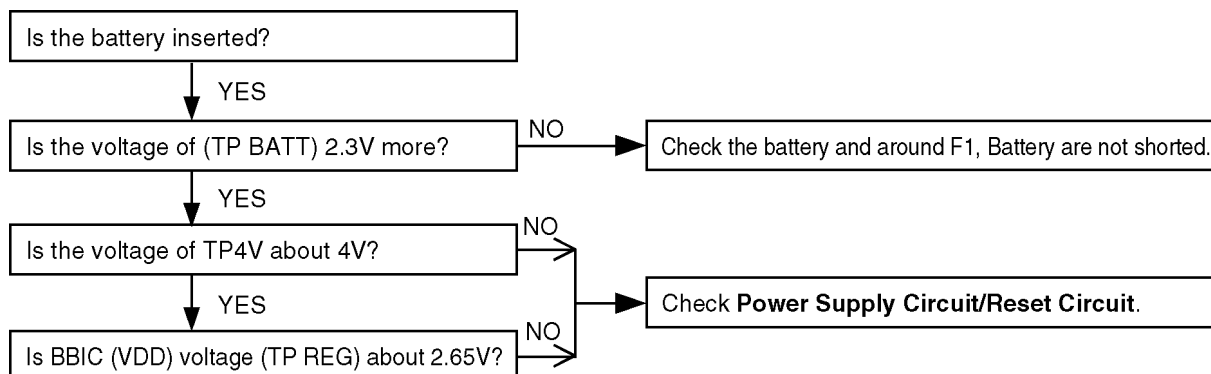
Cross Reference

Power Supply Circuit (P.60)

Note:

BBIC is IC8.

11.1.2. Handset



Cross Reference

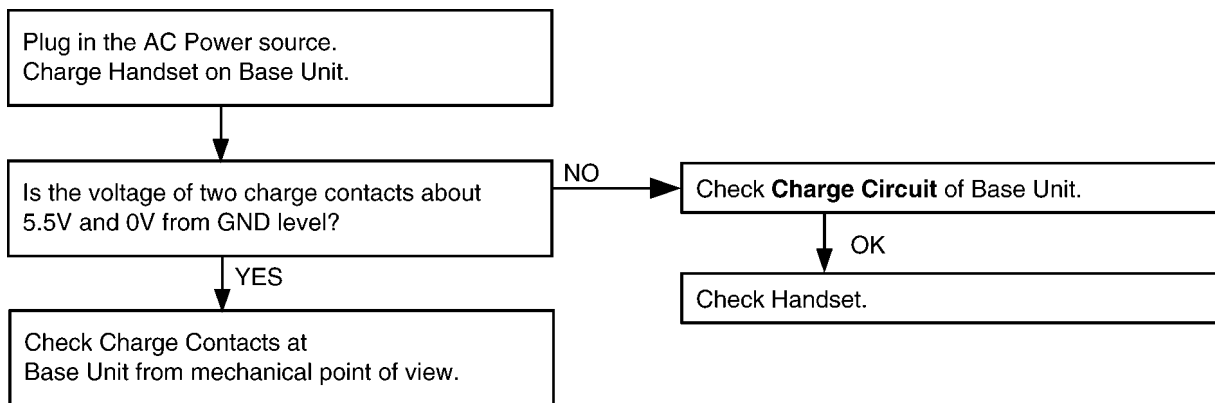
Power Supply Circuit/Reset Circuit (P.63)

Note:

BBIC is IC1.

11.2. Check Battery Charge

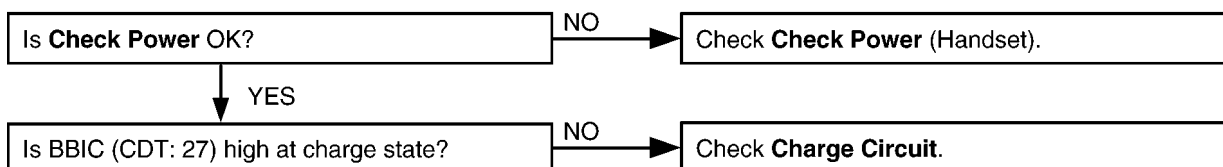
11.2.1. Base Unit



Cross Reference:

Charge Circuit (P.63)

11.2.2. Handset



Cross Reference:

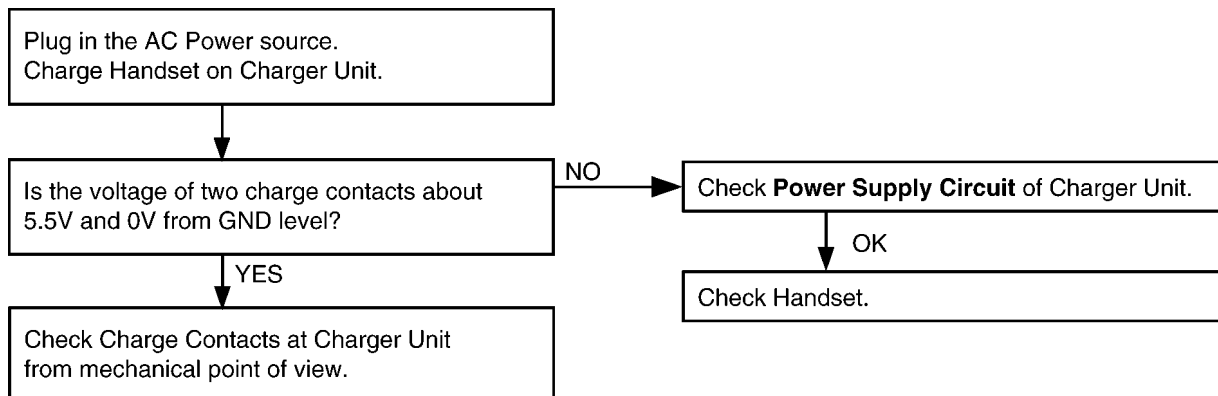
Check Power (P.36)

Charge Circuit (P.63)

Note:

BBIC is IC1.

11.2.3. Charger Unit

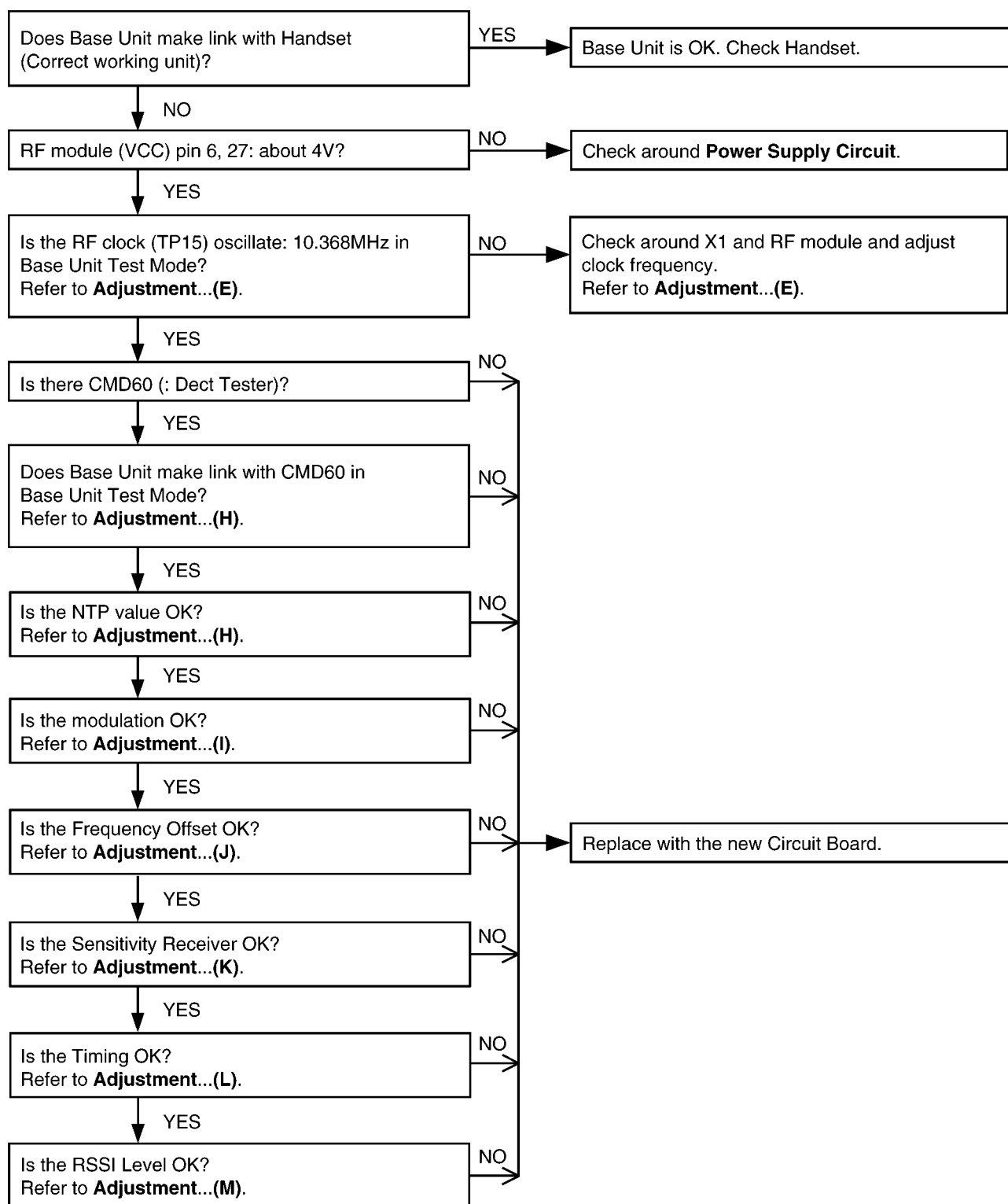


Cross Reference:

Power Supply Circuit (P.64)

11.3. Check Link

11.3.1. Base Unit



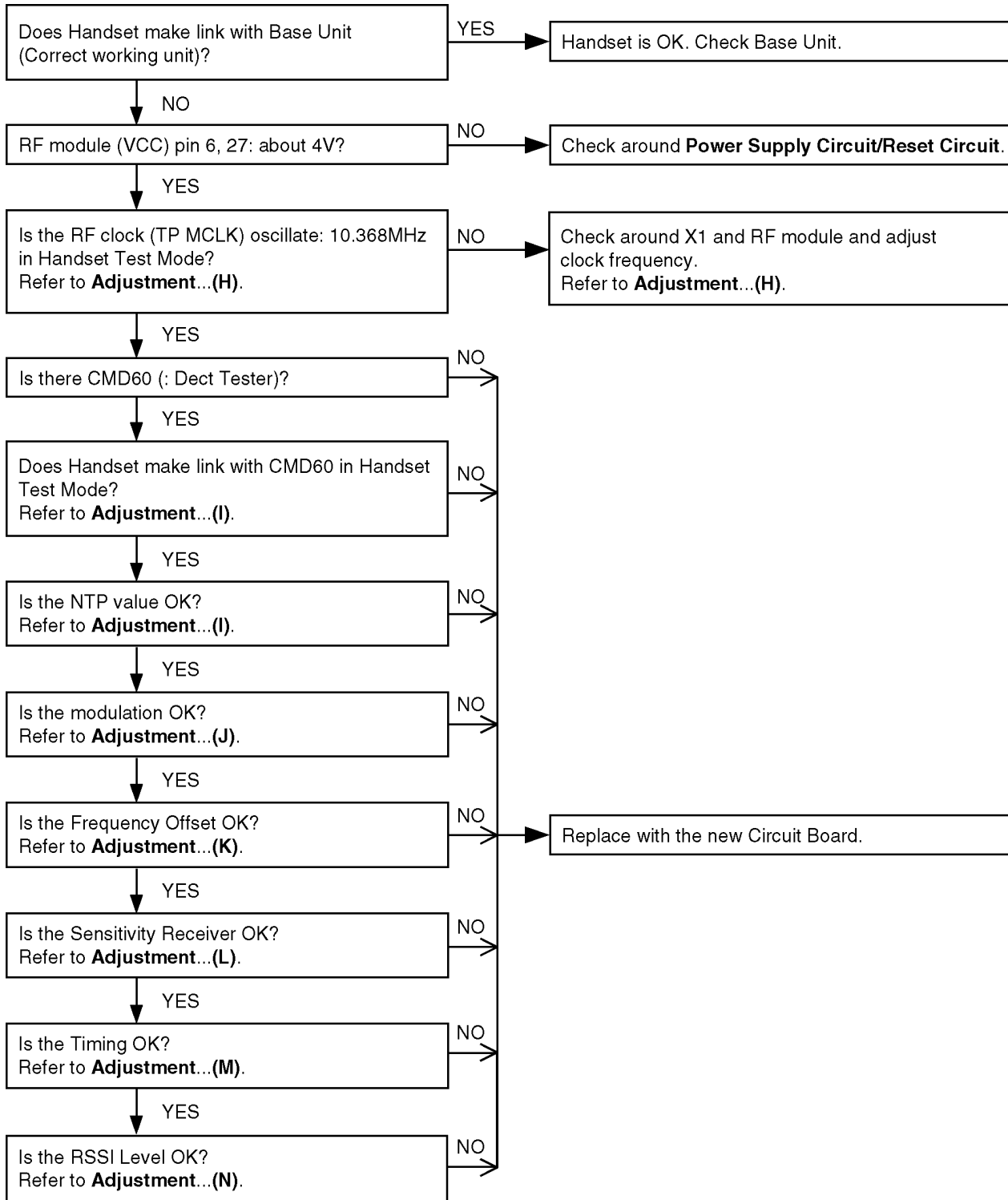
Cross Reference:

Power Supply Circuit (P.60)
Adjustment (Base Unit) (P.46)

Note:

RF module is IC9.

11.3.2. Handset



Cross Reference

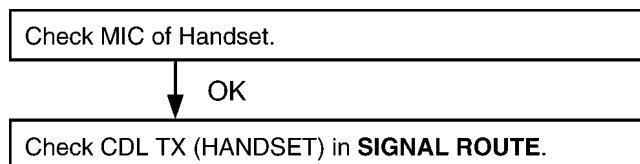
Power Supply Circuit/Reset Circuit (P.63)

Adjustment (Handset) (P.52)

Note:

RF module is IC3.

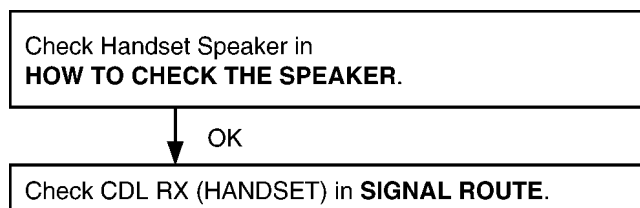
11.4. Check Handset Transmission



Cross Reference:

SIGNAL ROUTE (P.65)

11.5. Check Handset Reception



Cross Reference:

HOW TO CHECK THE HANDSET SPEAKER OR RECEIVER (P.56).

SIGNAL ROUTE (P.65)

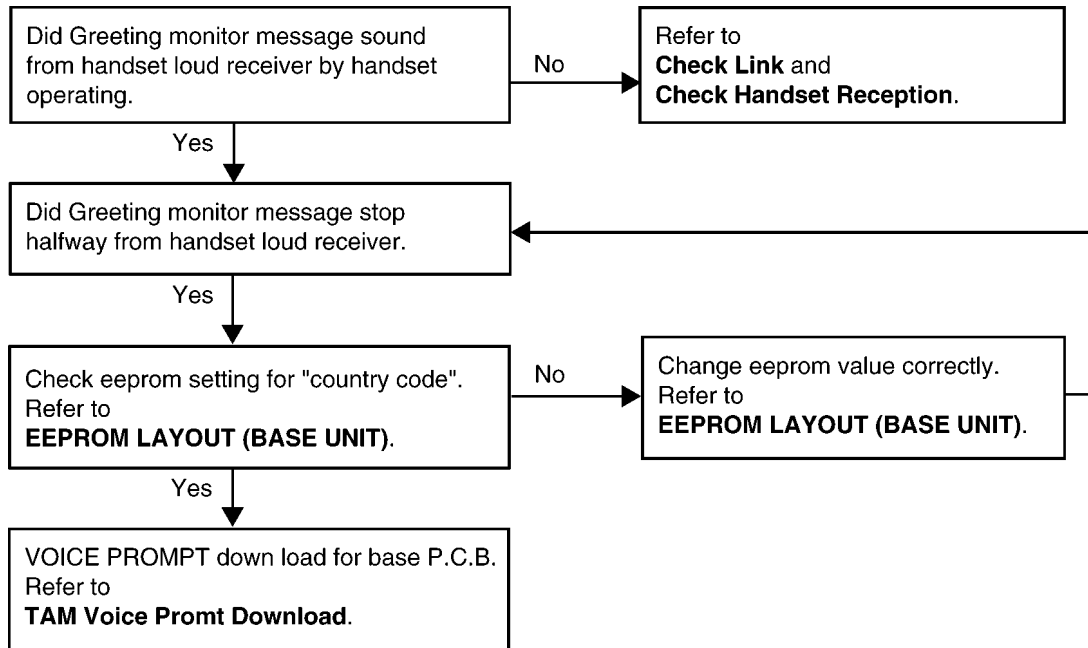
11.6. Check Caller ID



Cross Reference:

SIGNAL ROUTE (P.65)

11.7. TAM Voice Prompt Problems



Cross Reference:

Check Link (P.38)

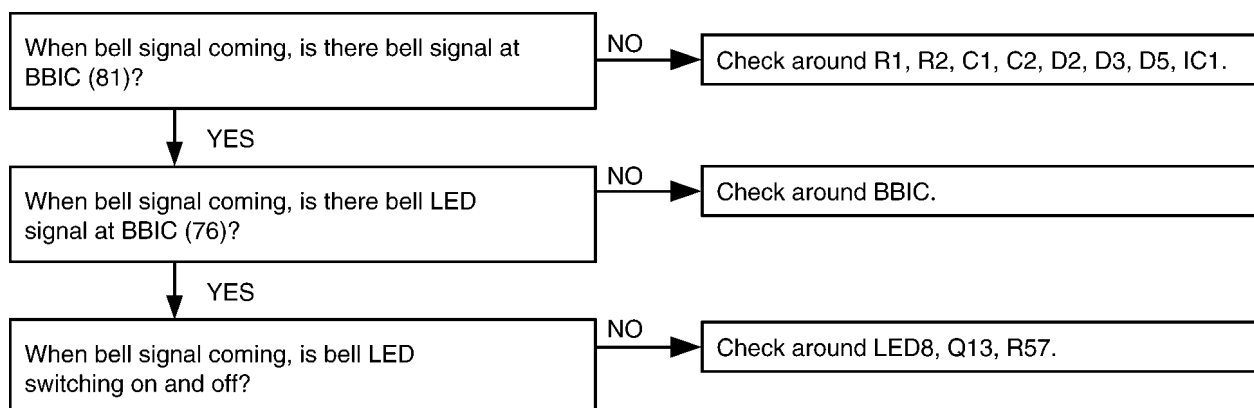
Check Handset Reception (P.40)

EEPROM LAYOUT (BASE UNIT) (P.71)

TAM Voice Prompt Download (P.44)

11.8. Bell Reception

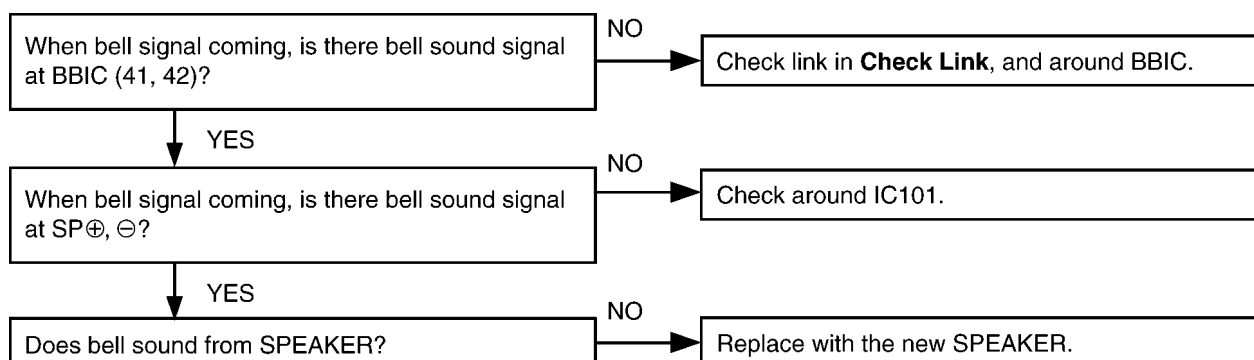
11.8.1. Base Unit



Note:

BBIC is IC8.

11.8.2. Handset



Cross Reference:

Telephone Line Interface (P.61)

Check Link (P.38)

Note:

BBIC is IC1.

12 CHECK PROCEDURE (BASE UNIT)

12.1. Preparation

12.1.1. Equipment Required

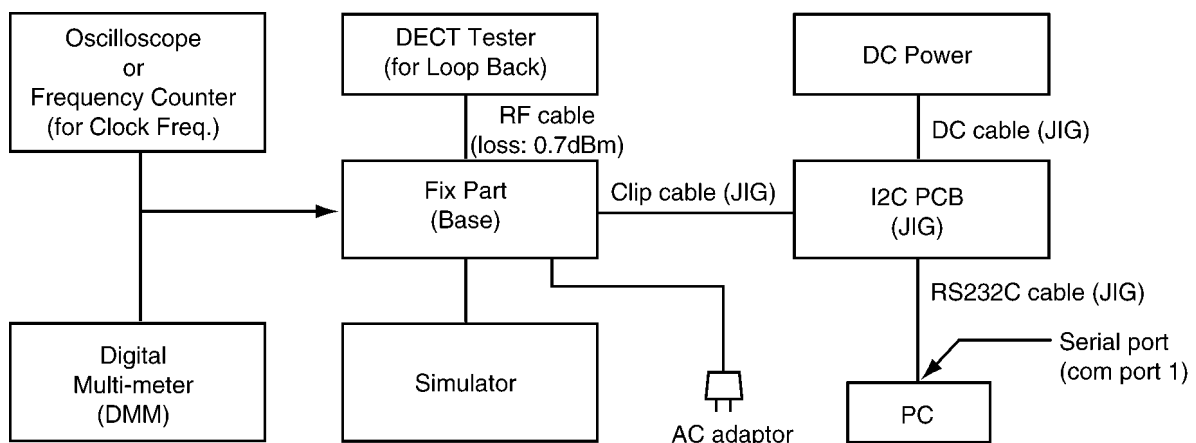
- DECT tester: Rohde & Schwarz, CMD 60 is recommended.
- Frequency counter: it must be precise to be able to measure 1Hz (precision; $\pm 4\text{ppm}$).
Hewlett Packard, 53131A is recommended.
- DC power: it must be able to output at least 1A current under 9V.
- Digital multi-meter (DMM): it must be able to measure voltage and current.
- Oscilloscope

12.1.2. JIGs and PC

- EEPROM serial JIGs
 1. I2C PCB: PQZZ1CD420BX
 2. RS232C cable: PQZZ1CD705BX
 3. Clip cable: PQZZ2CD705BX
 4. DC cable: PQZZ3CD705BX
- PC which runs in DOS mode
- **Batch file** for setting: PQZZTCD445BX

12.2. PC Setting

12.2.1. Connections



12.2.2. PC Setting

1. Open a window of MS-DOS mode from the start-up menu.
2. Change a directory to the one with "RTX_COM" contained.
3. Type "**SET RTX_COM=1**" from the keyboard (when COM port 1 is used for the connection).
4. Type "doskey".

Note:

See the table below for frequently used commands.

Command name	Function	Example
rdeeprom	Read the data of EEPROM	Type "rdeeprom 00 00 FF", and the data from address "00 00" to "FF" is read out.
readid	Read ID (RFPI)	Type "readid", and the registered ID is read out.
writeid	Write ID (RFPI)	Type "writeid 00 18 E0 0E 98", and the ID "0018 E0 0E 98" is written.
setfreq	adjust Frequency of RFIC	Type "setfreq nn nn".
hookoff	off-hook mode on Base	Type "hookoff".
hookon	on-hook mode on Base	Type "hookon".
Getchk	Read checksum	Type "getchk".
Wreeprom	write eeprom	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.

Command name	Function	Example
InitBsPIN.bat	Initial Base PIN to "0000"	Type "initBsPIN"

12.3. TAM Voice Prompt Download

1. Connect the parallel cable from the VOICE PROMPT DOWN LOADER to SDR, SDX, INT, CS and SCLK.
2. Connect the serial cable from the PROM DOWN LOADER to J103, J104 and J105 of base P.C.B.
3. Switch on the 6V supply.
4. Invoke "vloadenable" batch file from the PC
5. Invoke "go" batch file from the PC.

13 CHECK PROCEDURE (HANDSET)

13.1. Preparation

13.1.1. Equipment Required

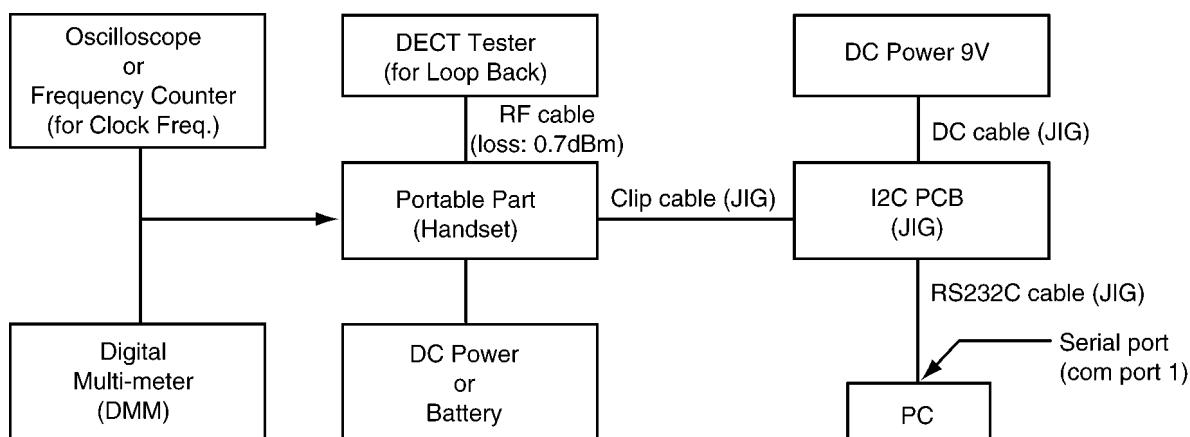
- DECT tester: Rohde & Schwarz, CMD 60 is recommended.
- Frequency counter: it must be precise to be able to measure 1Hz (precision; ± 4 ppm).
Hewlett Packard, 53131A is recommended.
- DC power: it must be able to output at least 1A current under 2.4V for Handset, 9V for JIG.
- Digital multi-meter (DMM): it must be able to measure voltage and current.
- Oscilloscope

13.1.2. JIGs and PC

- EEPROM serial JIGs
 1. I2C PCB: PQZZ1CD420BX
 2. RS232C cable: PQZZ1CD705BX
 3. Clip cable: PQZZ2CD705BX
 4. DC cable: PQZZ3CD705BX
- PC which runs in DOS mode.
- **Batch file** for PC setting: PQZZTCD445BX

13.2. PC Setting

13.2.1. Connections



13.2.2. PC Setting

1. Open a window of MS-DOS mode from the start-up menu.
2. Change a directory to the one with "RTX_COM" contained.
3. Type "**SET RTX_COM=1**" from the keyboard (when COM port 1 is used for the connection).
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Note:

See the table below for frequently used commands.

Command name	Function	Example
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readid	Read ID (RFPI)	Type "readid", and the registered ID is read out.
writeid	Write ID (RFPI)	Type "writeid 00 18 E0 0E 98", and the ID "0018 E0 0E 98" is written.
setfreq	adjust Frequency of RFIC	Type "setfreq nn nn".
Getchk	Read checksum	Type "getchk".
Wreeprom	write eeprom	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.

14 ADJUSTMENTS (BASE UNIT AND CHARGER UNIT)

If your unit have below symptoms, adjust or confirm each item using remedy column from the table.

Symptom	Remedy*
The base unit does not respond to a call from handset.	Make adjustments in item (A)~(F), (I)~(M)
The base unit does not transmit or the transmit frequency is off.	Make adjustments in item (A)~(E), (H)~(J), (L)
The transmit frequency is off.	Make confirmation in item (A)~(E), (H)~(J), (L)
The transmit power output is low, and the operating distance between base unit and handset is less than normal.	Make confirmation in item (H), (K)
The reception sensitivity of base unit is low with noise.	Make confirmation in item (K)
The transmit level is high or low.	Make adjustments in item (O)
The reception level is high or low.	Make adjustments in item (N)
The unit does not link.	Make confirmation in item (A)~(M)
The unit cannot charge.	Make confirmation in item (P)

*: Refer to **Adjustment (Base Unit)** (P.46)

14.1. Adjustment (Base Unit)

Please follow the items below when BBIC or EEPROM is replaced.

	Items	Procedure	Check or Replace Parts				
(A)	2.65V Supply Confirmation	1. Confirm that the voltage between J101 and GND is 2.65V ± 0.2V.	C40,C41,C42, C43,C44,IC3, C32,C33,C36, C37,C39				
(B)	4.0V Supply Confirmation	1. Confirm that the voltage between TP11 and GND is 4.0V ± 0.2V.	D4,C36,IC2, R61,R62,C37, C72,D14,R74, D9				
(C)	VBACK Status Confirmation	1. Confirm that the voltage between J102 and GND is 0V ± 0.4V.	IC8,C53,C54, C55,C56,X1, R78,R77,C52, R74,D9,R71, Q12				
(D)*	BBIC Confirmation	1. BBIC Confirmation (Execute the command "getchk"). 2. Confirm the returned checksum value. Connection of checksum value and program number is shown below. ex.) <table><tr><td>checksum value</td><td>program number</td></tr><tr><td>D684</td><td>D461ZA</td></tr></table>	checksum value	program number	D684	D461ZA	IC8,C53,C54, C55,C56,X1, R78
checksum value	program number						
D684	D461ZA						
(E)*	BBIC Clock Adjustment (Important)	1. Execute the command "deactmac". 2. Execute the command "contx". 3. Input Command "rdeeprom 00 00 02", then you can confirm the current value. 4. Adjust the frequency of TP15 executing the command "setfreq 00 xx (where xx is the value)" so that the reading of the frequency counter is 10.368000MHz ± 10Hz.	IC8,C53,C54, C55,C56,X1, R78,L2,L60, C95				
(F)*	Hookswitch Check with DC Characteristics	1. Connect J2 (Telephone Socket) to Tel-simulator which is connected with 600 Ω. 2. Set line voltage to 48V at on hook condition and line current to 40mA. 3. Execute the command "hookoff" 4. Confirm that the line current is 40mA ± 5mA. 5. Execute the command "hookon". 6. Confirm that the line current is 0mA ~ + 2mA.	IC8,R12,R13, R14,R15,Q2, Q4,D6,C6,C7, C11,JMP9				
(G)*	DTMF Generator Confirmation	1. Connect J2 (Telephone Socket) to DTMF tester. 2. Execute the command "hookoff" and "dtmf_up". 3. Confirm that the high frequency (1477.06Hz) group is -6 ± 2dBm. 4. Execute the command "dtmf_lo". 5. Confirm that the low frequency (852.05Hz) group is -8 ± 2dBm.	IC8,R55,C33, R30,C88,C19, R26,R25,Q9, R24,R27,C16, R20				

	Items	Procedure	Check or Replace Parts
(H)*	Transmitted Power Confirmation	<p>Remove the Antenna before starting steps from 1 to 4.</p> <p>1. Configure the DECT tester (CMD60) as follows;</p> <p><Setting></p> <ul style="list-style-type: none"> • Test mode: FP • Traffic Channel: 5 • Traffic Slot: 4 • Mode: Loopback • PMID: 00000 <p>2. Execute the command "testmode".</p> <p>3. Initiate connection from DECT tester. ("set up connect")</p> <p>4. Confirm that the NTP value at ANT is 20dBm ~ 25dBm.</p>	IC6,IC4,L2, C57,C61,C75, C77,C78,C76, C68,C69,R79, R80,C63,C64, R83,R84,C65, L3,C79,C67, C66,D10,C62
(I)	Modulation Check and Adjustment	<p>Follow steps 1 to 3 of (H) above.</p> <p>4. Confirm that the B-Field Modulation is 340kHz/div ~ 402kHz/div using data type Fig31.</p> <p>5. Adjust the B-Field Modulation if required. (Execute the command "readmod" and "wrtmod xx", where xx is the value.)</p>	IC6,IC4,L2, C57,C61,C75, C77,C78,C76, C68,C69,R79, R80,C63,C64, R83,R84,C65, L3,C79,C67, C66,D10,C62
(J)	Frequency Offset Confirmation	<p>Follow steps 1 to 3 of (H) above.</p> <p>4. Confirm that the frequency offset is -50KHz ~ +50KHz.</p>	IC6,IC4,L2, C57,C61,C75, C77,C78,C76, C68,C69,R79, R80,C63,C64, R83,R84,C65, L3,C79,C67, C66,D10,C62
(K)	Sensitivity Receiver Confirmation	<p>Follow steps 1 to 3 of (H) above.</p> <p>4. Set DECT tester power to -88dBm.</p> <p>5. Confirm that the BER is < 1000ppm.</p>	IC6,IC4,L2, C57,C61,C75, C77,C78,C76, C68,C69,R79, R80,C63,C64, R83,R84,C65, L3,C79,C67, C66,D10,C62
(L)	Timing Confirmation	<p>Follow steps 1 to 3 of (H) above.</p> <p>4. Confirm that the Timing accuracy is < ± 5.0ppm.</p>	IC6,IC4,L2, C57,C61,C75, C77,C78,C76, C68,C69,R79, R80,C63,C64, R83,R84,C65, L3,C79,C67, C66,D10,C62
(M)*	RSSI Level Confirmation	<p>Follow steps 1 to 3 of (H) above.</p> <p>4. Set DECT tester power to -70dBm.</p> <p>5. Execute the command "readrssi".</p> <p>6. Confirm: $59 \leq \text{returned value} \leq 77$ (0x68 ± F (hex))</p>	IC6,IC4,L2, C57,C61,C75, C77,C78,C76, C68,C69,R79, R80,C63,C64, R83,R84,C65, L3,C79,C67, C66,D10,C62

	Items	Procedure	Check or Replace Parts
(N)*	Receive Audio Check and Adjustment	<ol style="list-style-type: none"> 1. Configure the DECT tester (CMD60) as follows; <Setting> <ul style="list-style-type: none"> • Test mode: FP • Mode: Normal • PMID: 00000 2. Execute the command "testmode". 3. Initiate connection from DECT tester. 4. Execute the command "hookoff". 5. Execute the command "openau". 6. Connect J2 (Telephone Socket) to Tel-simulator which is connected with 600 Ω. 7. Set line voltage to 48V and line current to 40mA. 8. Connect DECT tester to Tel-simulator. 9. Input audio signal (200mVrms/1kHz tone) to Tel-simulator. <DECT tester setting> <ul style="list-style-type: none"> • Scramble: On • AF Gen. to ADPCM: Off • AF Meter Input: ADPCM • AF Gen. Frequency: 1000Hz • AF Gen. Level: 200mVrms 10. Confirm hearing tone: 300mVrms \pm 100mVrms 11. Adjust audio level if required. (Make sure current value using "getmicgain". And then execute the command "setmicgain xx", where xx is the value.) 12. Confirm that the B-field audio distortion with DECT tester is < 5 %. 	IC6,IC4,L2, C57,C61,C75, C77,C78,C76, C68,C69,R79, R80,C63,C64, R83,R84,C65, L3,C79,C67, C66,D10,C62, R20,C14,D7, R21,R22,R23, R85,C15,C30, R51,C92,R52, C32,Q2,R12, R13,Q4,R14, R15,D6,C6, C7,JMP9
(O)*	Transmit Audio Check and Adjustment	<ol style="list-style-type: none"> 1. Configure the DECT tester (CMD60) as follows; <Setting> <ul style="list-style-type: none"> • Test mode: FP • Mode: Normal • PMID: 00000 2. Execute the command "testmode". 3. Initiate connection from DECT tester. 4. Execute the command "hookoff". 5. Execute the command "openau". 6. Connect J2 (Telephone Socket) to Tel-simulator which is connected with 600 Ω. 7. Set line voltage to 48V and line current to 40mA. 8. Input audio signal (30mVrms/1kHz tone) to DECT tester. <DECT tester setting> <ul style="list-style-type: none"> • Scramble: On • AF Gen. to ADPCM: On • AF Meter Input: AF Voltm • AF Gen. Frequency: 1000Hz • AF Gen. Level: 30mVrms 9. Confirm hearing tone: 330mVrms \pm 100mVrms. 10. Adjust audio level if required. (Make sure current value using "getspkrgain". And then execute the command "setspkrgain xx", where xx is the value.) 11. Confirm that the audio distortion at 600R of Tel-simulator is < 5 %. 	IC6,IC4,L2, C57,C61,C75, C77,C78,C76, C68,C69,R79, R80,C63,C64, R83,R84,C65, L3,C79,C67, C66,D10,C62, R20,C14,D7, R21,R22,R23, R85,C15,C30, R51,C92,R52, C32,Q2,R12, R13,Q4,R14, R15,D6,C6, C7,JMP9
(P)	Charging Check	<ol style="list-style-type: none"> 1. Connect Charge Contact 12Ω/2W resistor between charge+ and charge-. 2. Measure and confirm voltage across the resistor is 2.3V \pm 0.2V. 	D4,R43,R44

Note:

After the measuring, sock up the solder of TP.

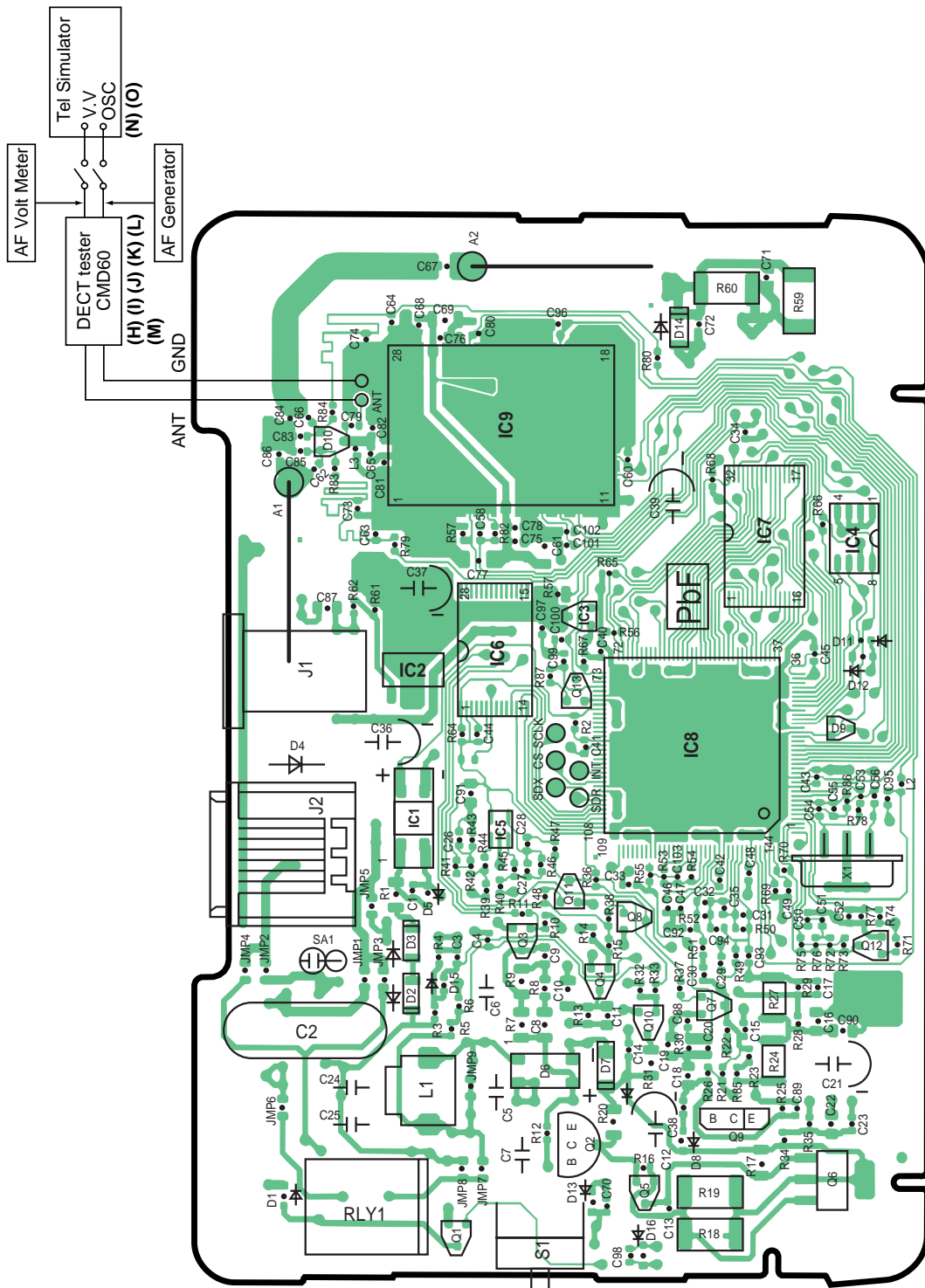
*: **PC Setting** (P.43) is required beforehand.

The connection of adjustment equipment are as shown in **Adjustment Standard (Base Unit)** (P.49).

14.2. Adjustment Standard (Base Unit)

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

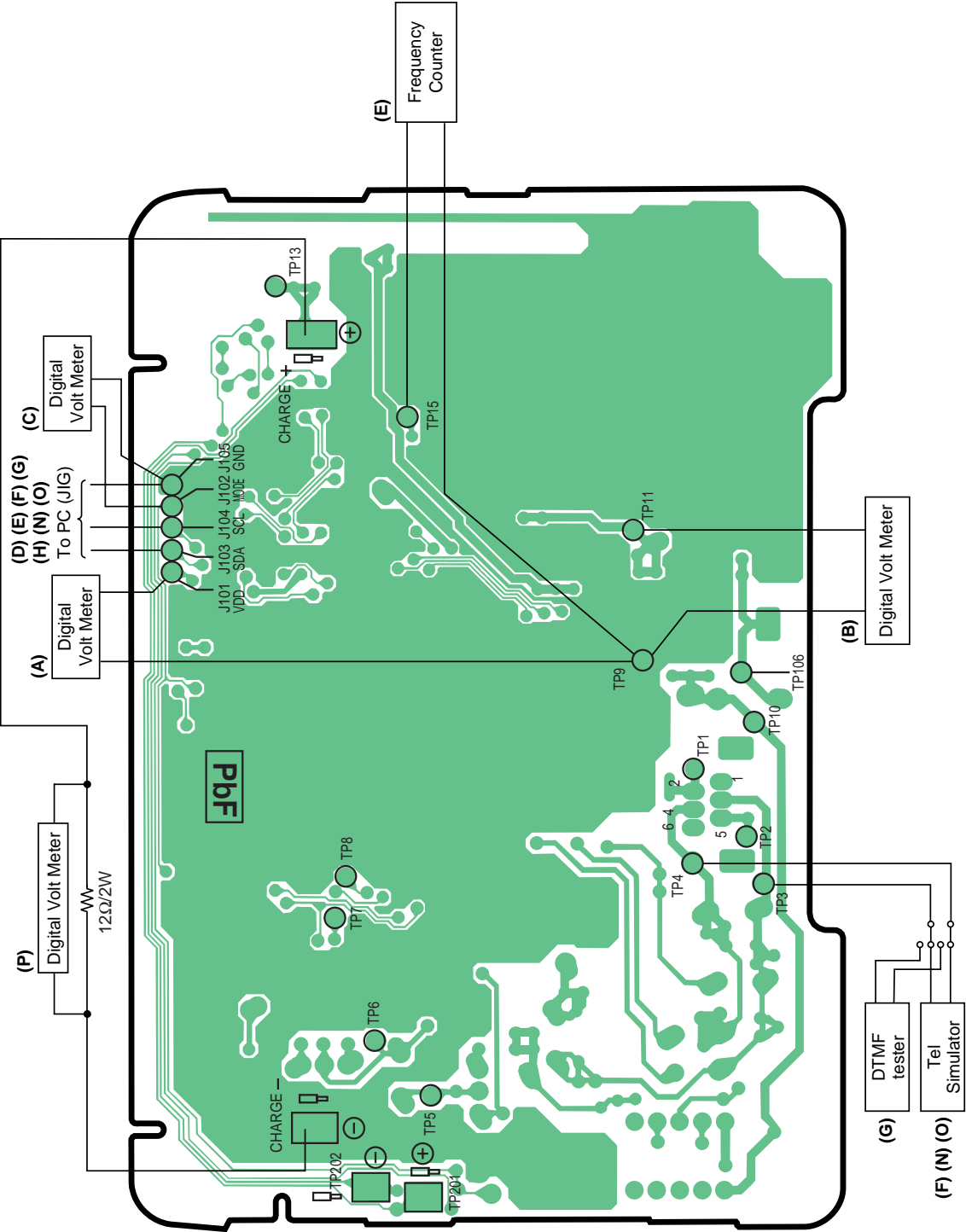
14.2.1. Component View



Note:

(H) - (O) is referred to Adjustment (Base Unit) (P.46)

14.2.2. Flow Solder Side View



Note:

(A) - (P) is referred to Adjustment (Base Unit) (P.46)

14.3. Adjustment (Charger Unit)

	Items	Adjustment Point	Procedure	Check or Replace Parts
(A)	Charging Check	-	1. Connect Charge Contact 12Ω/2W resistor between charge+ and charge-. 2. Measure and confirm voltage across the resistor is 2.7V ± 0.2V.	D1,R1,R2

Note:

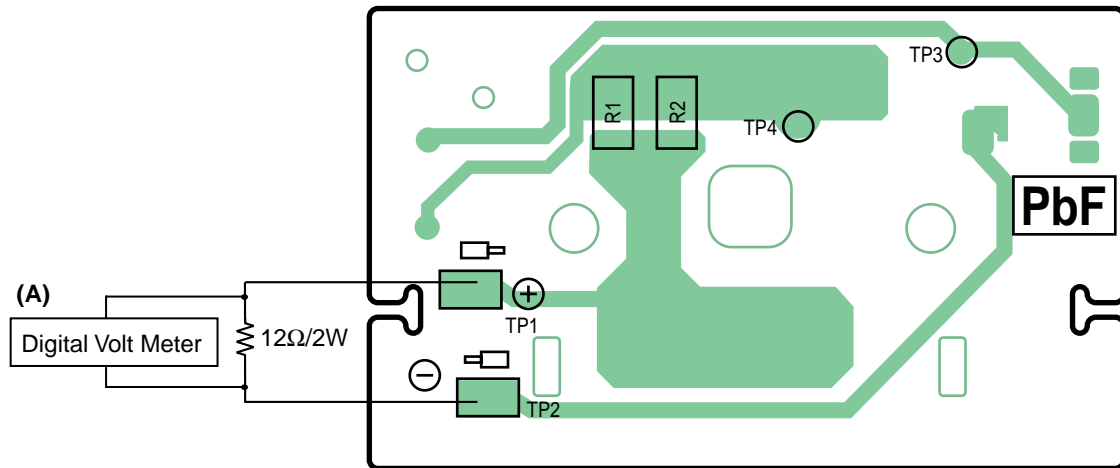
After the measuring, sock up the solder of TP.

The connection of adjustment equipment are as shown in **Adjustment Standard (Charger Unit)** (P.51).

14.4. Adjustment Standard (Charger Unit)

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

14.4.1. Flow Solder Side View



Note:

(A) is referred to **Adjustment (Charger Unit)** (P.51)

15 ADJUSTMENTS (HANDSET)

If your unit have below symptoms, adjust or confirm each item using remedy column from the table.

Symptom	Remedy*
The movement of Battery Low indicator is wrong.	Make confirmation in item (A)~(C), (F)~(G)
The handset does not respond to a call from base unit.	Make adjustments in item (A)~(C), (H), (J)~(N)
The handset does not transmit or the transmit frequency is off.	Make adjustments in item (A)~(C), (H)~(K), (M)
The transmit frequency is off.	Make confirmation in item (A)~(C), (H)~(K), (M)
The transmit power output is low, and the operating distance between base unit and handset is less than normal.	Make confirmation in item (I), (L)
The reception sensitivity of base unit is low with noise.	Make confirmation in item (L)
Does not link between base unit and handset.	Make confirmation in item (A)~(C), (H)~(N)
The reception level is high or low.	Make adjustments in item (O)
The transmit level is high or low.	Make adjustments in item (P)

*: Refer to **Adjustment (Handset)** (P.52)

15.1. Adjustment (Handset)

Please follow the items below when BBIC or EEPROM is replaced.

	Items	Procedure	Check or Replace Parts				
(A)	4.0V Supply Confirmation	1. Confirm that the consumption current is < 200mA, that is, there is no short circuit. 2. Confirm that the voltage between TP4V and GND is 3.9V ± 0.2V.	IC1,F1,R21, R4,C33,L2, D1,C15,C2, C14,Q1,R3, R2,D2,R22, C26,X1,C16, C17				
(B)	VBACK Status Confirmation	1. Confirm that the voltage between TPVBACK and GND is 0V ± 0.4V.	IC1,R11				
(C)	BBIC Confirmation	1. BBIC Confirmation (Execute the command "getchk"). 2. Confirm the returned checksum value. Connection of checksum value and program number is shown below. ex.) <table><tr><td>checksum value</td><td>program number</td></tr><tr><td>264D</td><td>D452ZB</td></tr></table>	checksum value	program number	264D	D452ZB	IC1,X1,C16, C17
checksum value	program number						
264D	D452ZB						
(D)	Charge Control Check & Charge Current Monitor Confirmation	1. Apply 6V between TPCHG(+) and TPCHG(-) with current limit of PSU to 250mA. 2. Confirm that the charge current is ON/OFF. 3. SW to decrease current limit of PSU to 100mA. 4. Confirm that the charge current is stable.	IC1,L4, L5,Q2,Q3, R6,D2,R22, C26,F1,R21, R4,C33				
(E)*	Charge Detection (OFF) Confirmation	1. Stop supplying 6V to TPCHG(+) and TPCHG(-). 2. Execute the command "charge". 3. Confirm that the returned value is 0x00 (hex).	IC1,L4, L5,Q2,Q3, R6,D2,R22, C26,F1,R21, R4,C33				
(F)*	Battery Monitor Confirmation & Adjustment (Important)	1. Apply 2.3V ± 0.005V between TPBATT(+) and TPBATT(-) with DC power. 2. Execute the command "deactmac" to stabilize the value. 3. Then, execute the command "readbatt". The returned value is XX. 4. Confirm that XX is between 98 and A8 98 < XX < A8 (Hex) (If XX is out of range, change BBIC)	IC1,L4, L5,Q2,Q3, R6,D2,R22, C26,F1,R21, R4,C33				
(G)	Battery low Confirmation (Important)	1. Apply 2.40V between TPBATT(+) and TPBATT(-). 2. Confirm that there is no Speaker sound (Battery low alarm). 3. Apply 2.20V between TPBATT(+) and TPBATT(-). 4. Confirm that there is Speaker sound (Battery low alarm).	IC1,F1,R21, R4,C33				
(H)*	BBIC Clock Adjustment (Important)	1. Apply 2.6V between TPBATT(+) and TPBATT(-) with DC power. 2. Execute the command "deactmac" . 3. Execute the command "contx" . 4. Input Command "rdepron 00 01 01", then you can confirm the current value. 5. Adjust the frequency of TPMCLK executing the command. "setfreq 00 xx (where xx is the value)" so that the reading of the frequency counter is 10.368000MHz ± 10Hz.	IC1,L3,C57, IC3,X1,C16, C17				

	Items	Procedure	Check or Replace Parts
(I)*	Transmitted Power Confirmation	<p>Remove the Antenna before starting steps from 1 to 5.</p> <p>1. Configure the DECT tester(CMD60) as follows;</p> <p><Setting></p> <ul style="list-style-type: none"> • Test mode: PP • RFPI: 0102030405 • Traffic Channel: 5 • Traffic Slot: 4 • Mode: Loopback <p>2. Execute the command "testmode".</p> <p>3. Execute the command "regcmd60"</p> <p>4. Initiate connection from DECT tester.</p> <p>5. Confirm that the NTP value at ANT is 20dBm ~ 25dBm</p>	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,C63,C64, C65,R18, L6,C67,C202, C208,C209
(J)	Modulation Check and Adjustment	<p>Follow steps 1 to 4 of (I) above.</p> <p>5. Confirm that the B-Field Modulation is 340kHz/div ~ 402kHz/div using data type Fig31.</p> <p>6. Adjust the B-Field Modulation if required. (Execute the command "Readmod" and "Writemod xx", where xx is the value.)</p>	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,C63,C64, C65,R18, L6,C67,C202, C208,C209
(K)	Frequency Offset Confirmation	<p>Follow steps 1 to 4 of (I) above.</p> <p>5. Confirm that the frequency offset is -50kHz ~ +50kHz.</p>	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,C63,C64, C65,R18, L6,C67,C202, C208,C209
(L)	Sensitivity Receiver Confirmation	<p>Follow steps 1 to 4 of (I) above.</p> <p>5. Set DECT tester power to -88dBm.</p> <p>6. Confirm that the BER is < 1000ppm.</p>	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,C63,C64, C65,R18, L6,C67,C202, C208,C209
(M)	Timing Confirmation	<p>Follow steps 1 to 4 of (I) above.</p> <p>5. Confirm that the Timing accuracy is < ± 10ppm.</p>	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,C63,C64, C65,R18, L6,C67,C202, C208,C209
(N)*	RSSI Level Confirmation	<p>Follow steps 1 to 4 of (I) above.</p> <p>5. Set DECT tester power to -70dBm.</p> <p>6. Execute the command "readrssi"</p> <p>7. Confirm: $52 \leq$ returned value ≤ 72 (hex) ($0x62 \pm 0x10$ (hex))</p>	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,C63,C64, C65,R18, L6,C67,C202, C208,C209

	Items	Procedure	Check or Replace Parts
(O)*	Receive Audio Check	<ol style="list-style-type: none"> 1. Configure the DECT tester (CMD60) as follows; <Setting> <ul style="list-style-type: none"> • Test mode: PP • Mode: Nomal • RFPI: 0102030405 2. Execute the command "testmode". 3. Execute the command "regcmd60" 4. Initiate connection from DECT tester. 5. Execute the command "openaudio". 6. Confirm that the value of EEPROM address "F3F" is "02". (If the value is not "02 (by User)", set "02" and power off and power on, and return to clause 2.) 7. Input audio signal (50mVrms/1kHz tone) from DECT tester. <DECT tester setting> <ul style="list-style-type: none"> • Scramble: On • AF Gen to ADPCM: On • AF Meter Input: AF Voltm • AF Gen Frequency: 1000Hz • AF Gen Level: 50mVrms 8. Confirm hearing tone: 300mV ± 250mV (Just check Audio path) 9. Confirm that the audio distortion with DECT tester is < 5 %. 	IC1,R17,R20, D7,D6, C12,C31,C115
(P)	Transmit Audio Check	<ol style="list-style-type: none"> 1. Configure the DECT tester (CMD60) as follows; <Setting> <ul style="list-style-type: none"> • Test mode: FP • Mode: Normal • RFPI: 0102030405 2. Execute the command "testmode". 3. Execute the command "regcmd60". 4. Initiate connection from DECT tester. 5. Execute the command "openaudio". 6. Confirm that the value of EEPROM address "F3F" is "02". (If the value is not "02 (by User)", set "02" and power off and power on, and return to clause 2.) 7. Input audio signal (30mVrms/1kHz tone) to DECT tester. <DECT tester setting> <ul style="list-style-type: none"> • Scramble: On • AF Gen to ADPCM: Off • AF Meter Input: ADPCM • AF Gen Frequency: 1000Hz • AF Gen Level: 30mVrms 8. Confirm hearing tone: 300mV ± 250mV (Just check Audio path) 9. Confirm that the audio distortion with DECT tester is < 5 %. 	IC1,C8,R7, R8,C6, C7,C5,R5, R1,C4

Note:

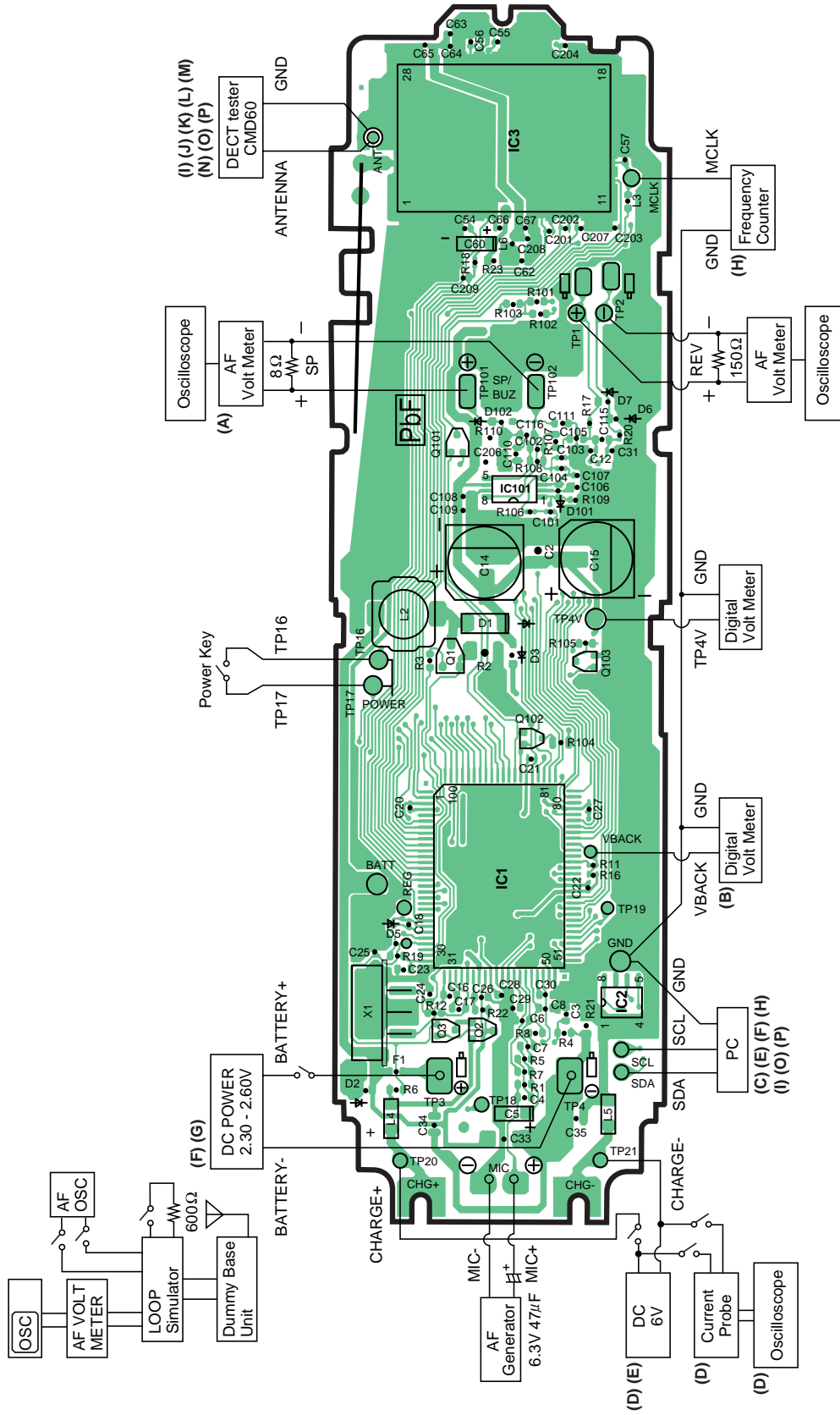
After the measuring, sock up the solder of TP.

*: **PC Setting** (P.43) is required beforehand.

The connections of the adjustment equipments are as shown in **Adjustment Standard (Handset)** (P.55).

15.2. Adjustment Standard (Handset)

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



Note:

(A) - (P) is referred to **Adjustment (Handset)** (P.52)

16 RF SPECIFICATION

16.1. Base Unit

Item	Value	Refer to -. *	Remarks
TX Power	More than 20 dBm ~ 25 dBm	Adjustment (Base Unit) (H)	
Modulation	340 kHz/div ~ 402 kHz/div	Adjustment (Base Unit) (I)	Data type: Fig31
Frequency Offset	-50 kHz ~ +50 kHz	Adjustment (Base Unit) (J)	
RX Sensitivity	< 1000 ppm	Adjustment (Base Unit) (K)	
Timing Accuracy	< ± 5.0 ppm	Adjustment (Base Unit) (L)	
RSSI Level	0x68 \pm F (hex)	Adjustment (Base Unit) (M)	

*: Refer to **Adjustment (Base Unit)** (P.46)

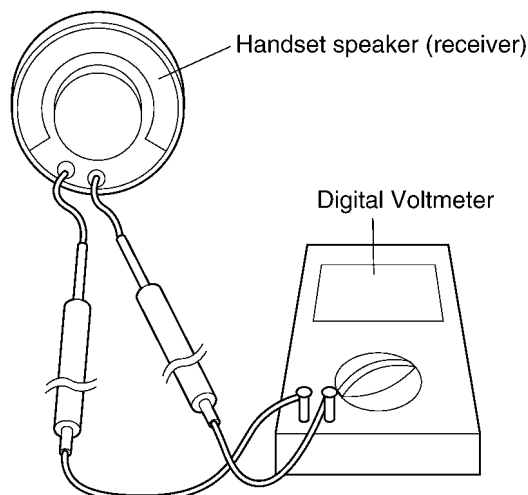
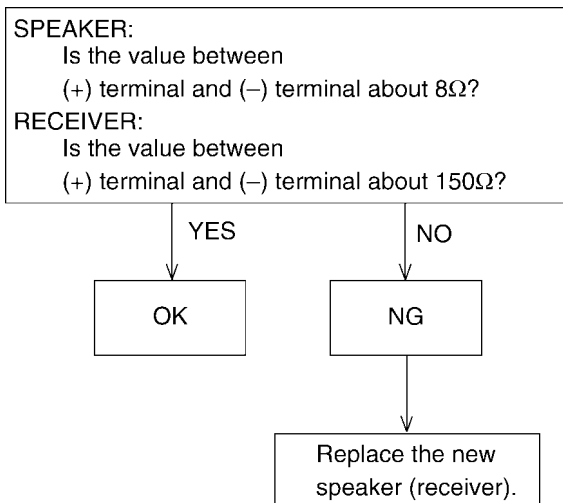
16.2. Handset

Item	Value	Refer to -. **	Remarks
TX Power	More than 20 dBm ~ 25 dBm	Adjustment (Handset) (I)	
Modulation	340 kHz/div ~ 402 kHz/div	Adjustment (Handset) (J)	Data type: Fig31
Frequency Offset	-50 kHz ~ +50 kHz	Adjustment (Handset) (K)	
RX Sensitivity	< 1000 ppm	Adjustment (Handset) (L)	
Timing Accuracy	< ± 10 ppm	Adjustment (Handset) (M)	
RSSI Level	0x62 \pm 0x10 (hex)	Adjustment (Handset) (N)	

: Refer to **Adjustment (Handset) (P.52)

17 HOW TO CHECK THE HANDSET SPEAKER OR RECEIVER

1. Prepare the digital voltmeter, and set the selector knob to ohm meter.
2. Put the probes at the speaker terminals as shown below.



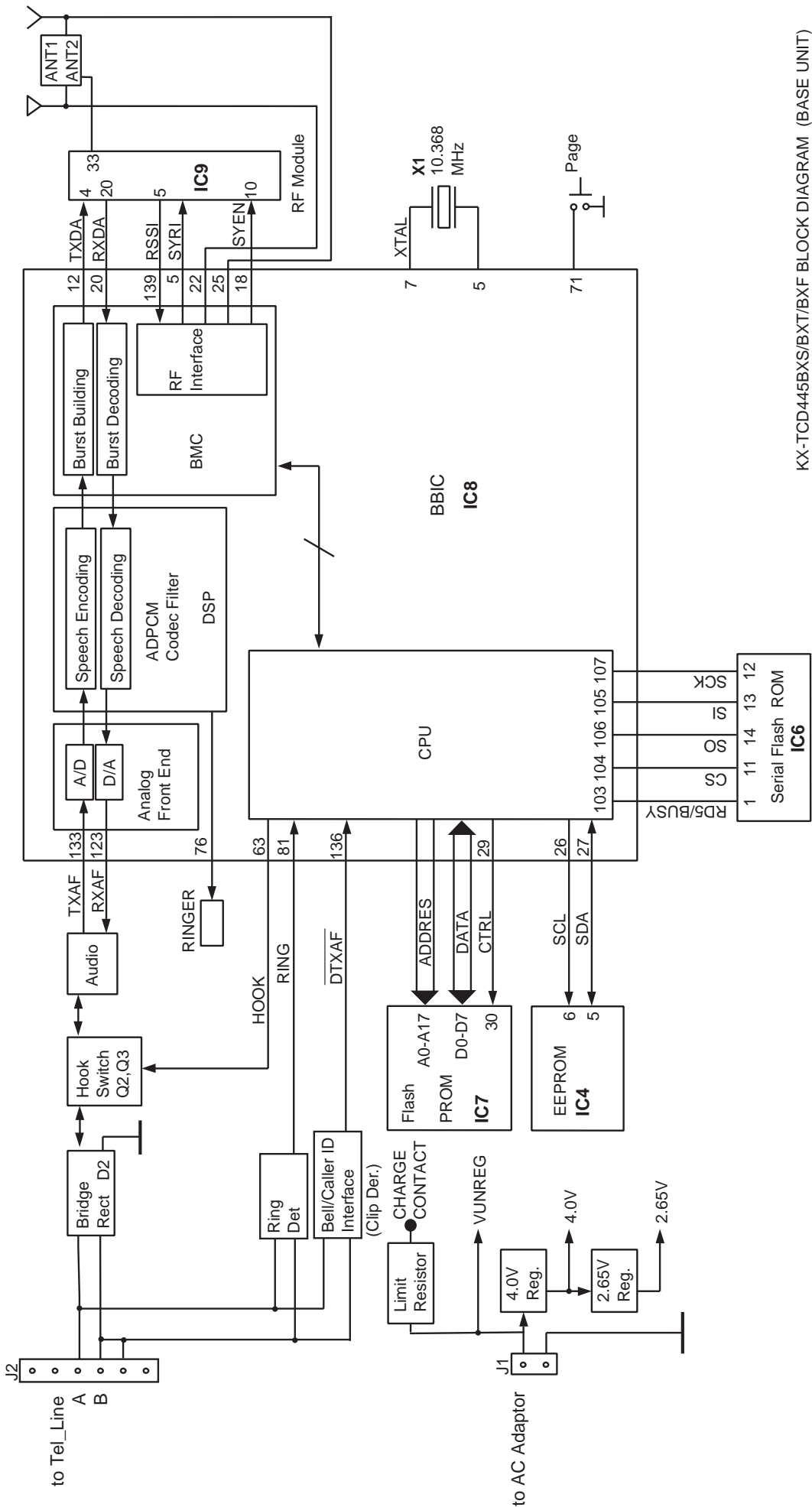
18 FREQUENCY TABLE (MHz)

Channel No	BASE UNIT		HANDSET	
	Transmit Frequency	Receive Frequency	Transmit Frequency	Receive Frequency
1	1897.344	1897.344	1897.344	1897.344
2	1895.616	1895.616	1895.616	1895.616
3	1893.888	1893.888	1893.888	1893.888
4	1892.160	1892.160	1892.160	1892.160
5	1890.432	1890.432	1890.432	1890.432
6	1888.704	1888.704	1888.704	1888.704
7	1886.976	1886.976	1886.976	1886.976
8	1885.248	1885.248	1885.248	1885.248
9	1883.520	1883.520	1883.520	1883.520
10	1881.792	1881.792	1881.792	1881.792

Note:

Channel No. 10: In the Test Mode on Base Unit and Handset.

19 BLOCK DIAGRAM (BASE UNIT)



KX-TCD445BXS/BXT/BXF BLOCK DIAGRAM (BASE UNIT)

20 CIRCUIT OPERATION (BASE UNIT)

20.1. Outline

Base Unit consists of the following ICs as shown in **BLOCK DIAGRAM (BASE UNIT)** (P.58).

- DECT BBIC (**B**ase **B**and IC): IC8
 - Handling all the audio, signal and data processing needed in a DECT base unit
 - Controlling the DECT specific physical layer and radio section (**B**urst **M**odule **C**ontroller section)
 - ADPCM codec filter for speech encoding and speech decoding (DSP section)
 - Echo-cancellation and Echo-suppression (DSP section)
 - Any tones (tone, sidetone, ringing tone, etc.) generation (DSP section)
 - DTMF receiver (DSP section)
 - Clock Generation for RF Module
 - ADC, DAC, timer, and power control circuitry
 - All interfaces (ex: RF module, EEPROM, RINGER, Analog Front End, etc.)
- RF Module: IC9
 - PLL Oscillator
 - Detector
 - Compress/Expander
 - First/Second Mixer
 - Amplifier for transmission and reception
- EEPROM: IC4
 - Temporary operating parameters (for RF, etc.)

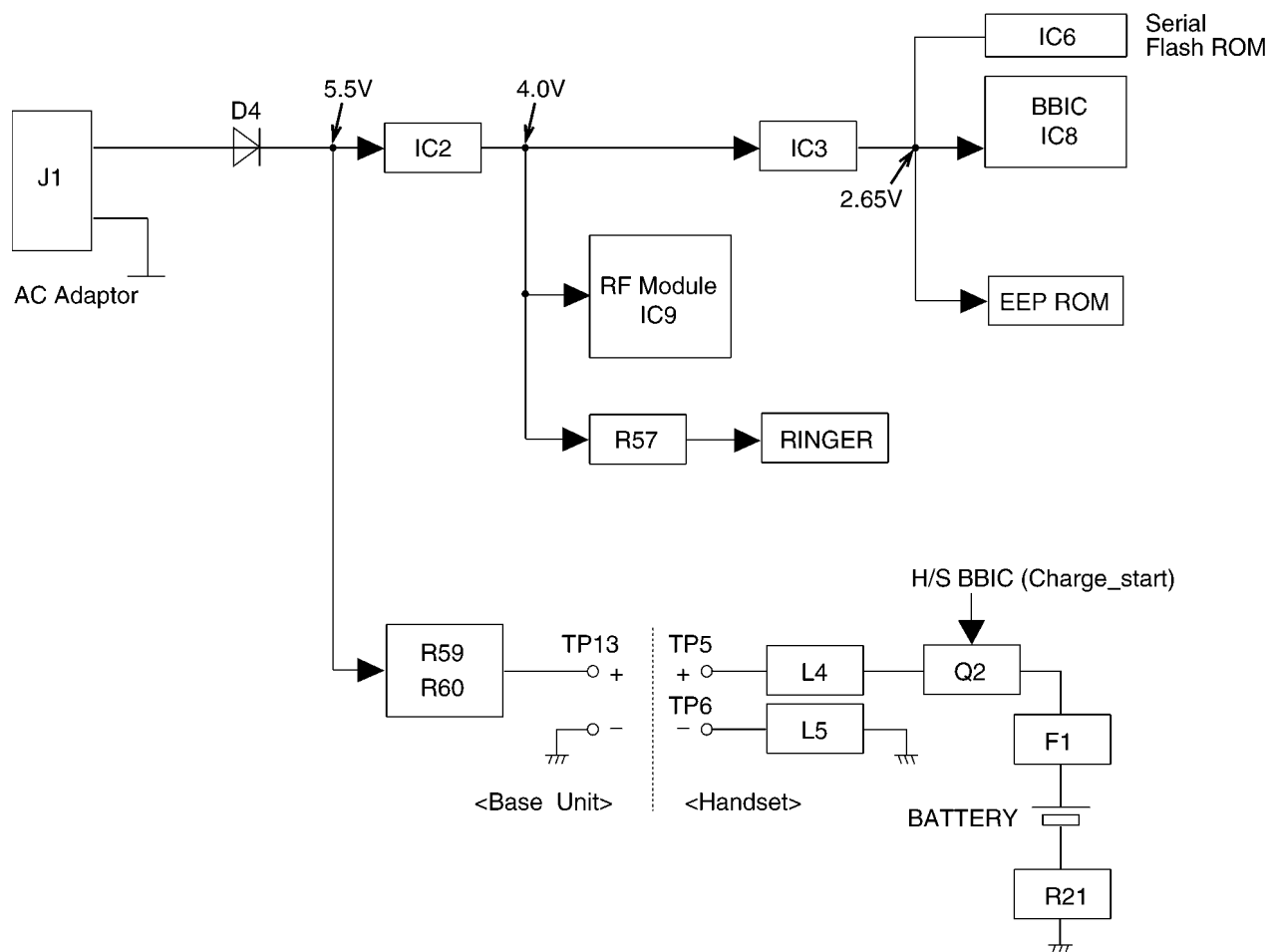
Note:

Refer to **EEPROM LAYOUT (BASE UNIT)** (P.71)
- Serial Flash ROM: IC6
 - 4M bit
 - Audio data for TAM operation
- Additionally,
 - Power Supply Circuit (+4.0V, +2.65V output)
 - Crystal Circuit (10.368MHz)
 - Charge Circuit
 - Telephone Line Interface Circuit

20.2. Power Supply Circuit

The power is supplied to the DECT BBIC, RF Module, EEPROM, Relay Coil, LED and Charge Contact from AC Adaptor (+6V) as shown in Fig.101. The power supply is as follows;

- DECT BBIC (IC8): J1(+6V) → D4 → IC2 → IC3 → IC8 → IC6
- RF Module (IC9): J1(+6V) → D4 → IC2 → IC9
- EEPROM (IC4): J1(+6V) → D4 → IC2 → IC3 → IC4
- LED (LED1): J1(+6V) → D4 → IC2 → R57 → LED1
- Charge Contact (TP13): J1(+6V) → D4 → R59, R60 → TP13



<Fig.101>

20.3. Telephone Line Interface

<Function>

- Bell signal detection
- Clip signal detection
- ON/OFF hook circuit
- Audio circuits

Bell & Clip (: Calling Line Identification Presentation: Caller ID) signal detection:

In the standby mode, Q2 is open to cut the DC loop current and decrease the ring load.

When ring voltage appears at the TP3 (A) and TP40 (B) leads (when the telephone rings), the signal is transferred as follows;

- A → C25 → R40 → R45 → IC5 → C28 → R47 → C29 → R49 → IC8 (136) [**CLIP**]
- B → C24 → R39 → R44 → IC5 → C28 → R47 → C29 → R49 → IC8 (136) [**CLIP**]
- A → C2 → IC1 → IC8 (81) [**BELL**]
- B → D2 → D3 → R1 → IC1 → IC8 (81) [**BELIL**]

ON/OFF hook circuit:

In the standby mode, Q2 is open, and connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an **off-hook condition**.

When IC8 detects a ring signal or press the TALK Key onto the handset, Q4 turns on and then Q2 turns on, thus providing an **off-hook condition** (active DC current flow through the circuit) and the following signal flow is for the loop current.

- A → JMP9 → D6 → Q2 → R13 → Q4 → D6 → B [**OFF HOOK**]

Audio Circuits:

Refer to **SIGNAL ROUTE (P.65)**.

20.4. Transmitter/Receiver

Base Unit and Handset mainly consist of RF Module and DECT BBIC.

Base Unit and Handset transmit/receive voice signal and data signal through the antenna on carrier frequency.

Signal Pass:

*Refer to **SIGNAL ROUTE (P.65)**.

20.4.1. Transmitter Block

The voice signal input from the TEL LINE interface goes to RF Module (IC9) through DECT BBIC (IC8) as shown in **BLOCK DIAGRAM (BASE UNIT) (P.58)**

The voice signal passes through the analog part of IC8 where it is amplified and converted to a digital audio stream signal. The burst switch controller processes this stream performing encryption and scrambling, adding the various other fields to produce the GAP (**Generic Access Profile**) standard DECT frame, assigning to a time slot and channel etc.

In IC3, the carrier frequency is changing, and frequency modulated RF signal is generated and amplified, and radiated from antenna. Handset detects the voice signal or data signal in the circuit same as the following explanation of Receiver Block.

20.4.2. Receiver Block

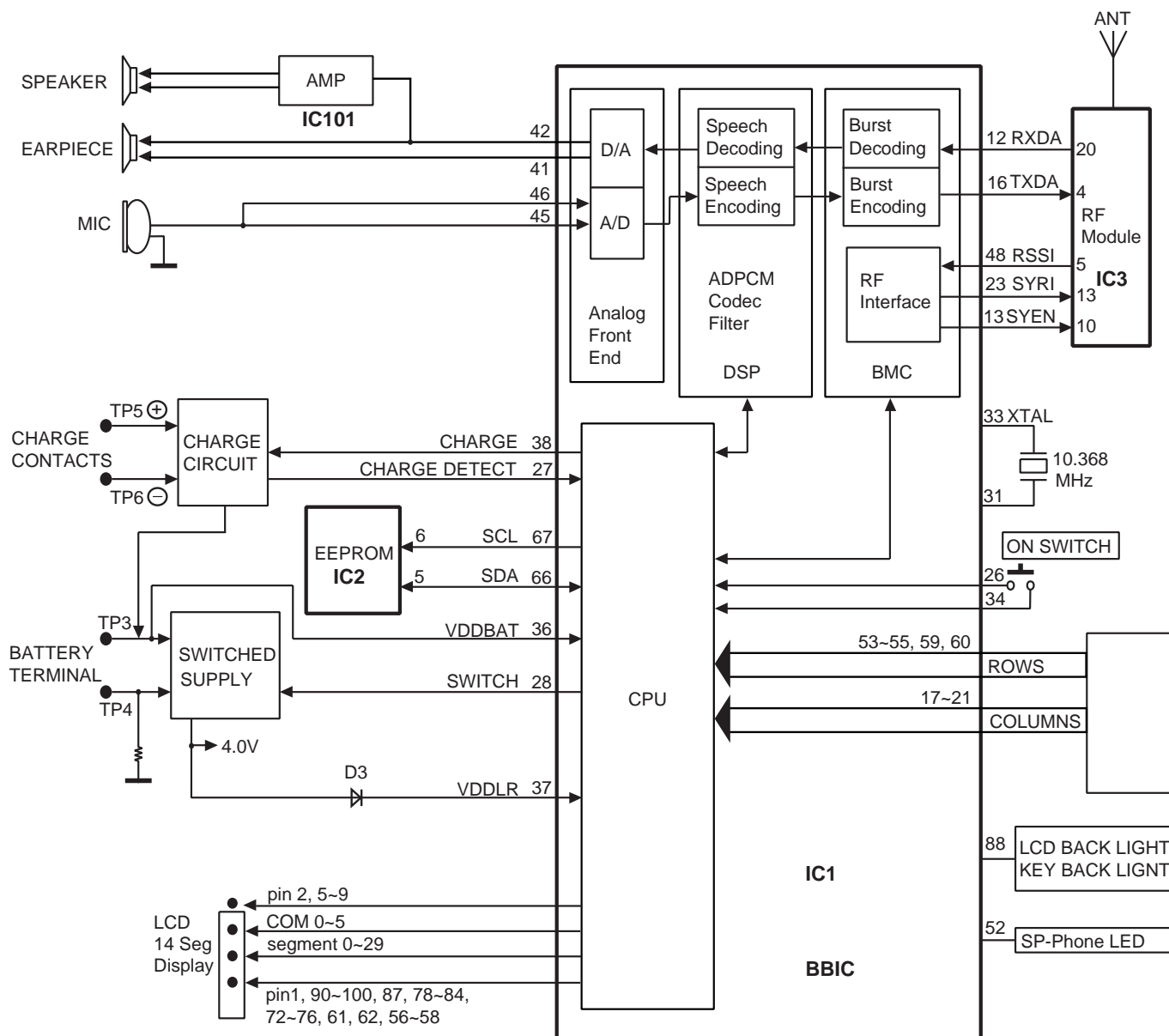
The signal of 1.152 MHz band (1.881792 MHz ~ 1.897344 MHz) which is input from antenna is input to IC9 as shown in **BLOCK DIAGRAM (BASE UNIT) (P.58)**.

In IC3, the signal of 1.152 MHz band is downconverted to 864 kHz signal and demodulated, and goes to IC2 as GAP (**Generic Access Profile**) standard DECT frames. It passes through the decoding section burst switch controller where it separates out the frame information and performs de-encryption and de-scrambling as required. It then goes to the DSP section where it is turned back into analog audio. This is amplified by the analog front end, and goes to the TEL LINE Interface.

20.5. Pulse Dialling

During pulse dialling the hookswitch (Q2, Q3) is used to generate the pulses using the HOOK control signal, which is set high during pulses. To force the line impedance low during the "pause" intervals between dial pulses, the PULSE_DIAL signal turns on Q10.

21 BLOCK DIAGRAM (HANDSET)



KX-A144BXS/BXT/BXF BLOCK DIAGRAM (HANDSET)

22 CIRCUIT OPERATION (HANDSET)

22.1. Outline

Handset consists of the following ICs as shown in **BLOCK DIAGRAM (HANDSET)** (P.62).

- DECT BBIC (Base Band IC): IC1
 - All data signals (forming/analyzing ACK or CMD signal)
 - All interfaces (ex: Key, Detector Circuit, Charge, DC/DC Converter, EEPROM, LCD)
- RF Module: IC3
 - PLL Oscillator
 - Detector
 - Compress/Expander
 - Amplifier for transmission and reception
- EEPROM: IC2
 - Temporary operating parameters (for RF, etc.)

Note:

Refer to **EEPROM LAYOUT (HANDSET)** (P.75).

22.2. Power Supply Circuit/Reset Circuit

Circuit Operation:

When power on the Handset, the voltage is as follows;

BATTERY(2.2 V ~ 2.6V: TP3) → TP14(4V) → IC3(6, 27), D3 → IC1(37) → IC1(39, 63) (2.65V)

The Reset signal generates R19, C23 and 2.65V.

22.3. Charge Circuit

Circuit Operation:

- **When charging the handset on the Base Unit, the charge current is as follows;**

DC+(5.5V ~ 6V) → D4 → R43, R44 → CHARGE+(Base) → CHARGE+(Handset) → L4 → Q2 → F1 → BATTERY+ ... Battery ... BATTERY- → R21 → GND → L5 → CHARGE-(Handset) → CHARGE-(Base) → GND → DC-(GND)

- **When charging the handset on the Charger Unit, the charge current is as follows;**

DC+(5.5V ~ 6V) → D1 → R1, R2 → CHARGE+(Charger Unit) → CHARGE+(Handset) → F1 → BATTERY+ ... Battery ... BATTERY- → R21 → GND → CHARGE-(Handset) → CHARGE-(Charger Unit) → GND → DC-(GND)

In this way, the BBIC on Handset detects the fact that the battery is charged.

The charge current is controlled by switching Q2 of Handset.

Refer to Fig.101 in **Power Supply Circuit** (P.60).

22.4. Battery Low/Power Down Detector

Circuit Operation:

"Battery Low" and "Power Down" are detected by BBIC which check the voltage from battery.

The detected voltage is as follows;

- **Battery Low**

Battery voltage: $V(\text{Batt}) < 2.3\text{V}$

The BBIC detects this level and "■" starts flashing and "battery alarm" starts ringing.

- **Power Down**

Battery voltage: $V(\text{Batt}) < 2.2\text{V}$

The BBIC detects this level and power down.

Note:

Refer to **ADJUSTMENTS (HANDSET)** (P.52).

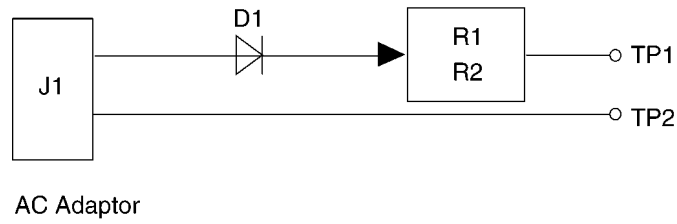
22.5. Speakerphone

The hands-free loudspeaker at SP+ and SP- is used to generate the ring alarm. IC101 is used to switch off the telephone loudspeaker and is used to amplify the signal to drive the hands-free loudspeaker. They are selected using the SP_AMP line from pin 49 of the BBIC.

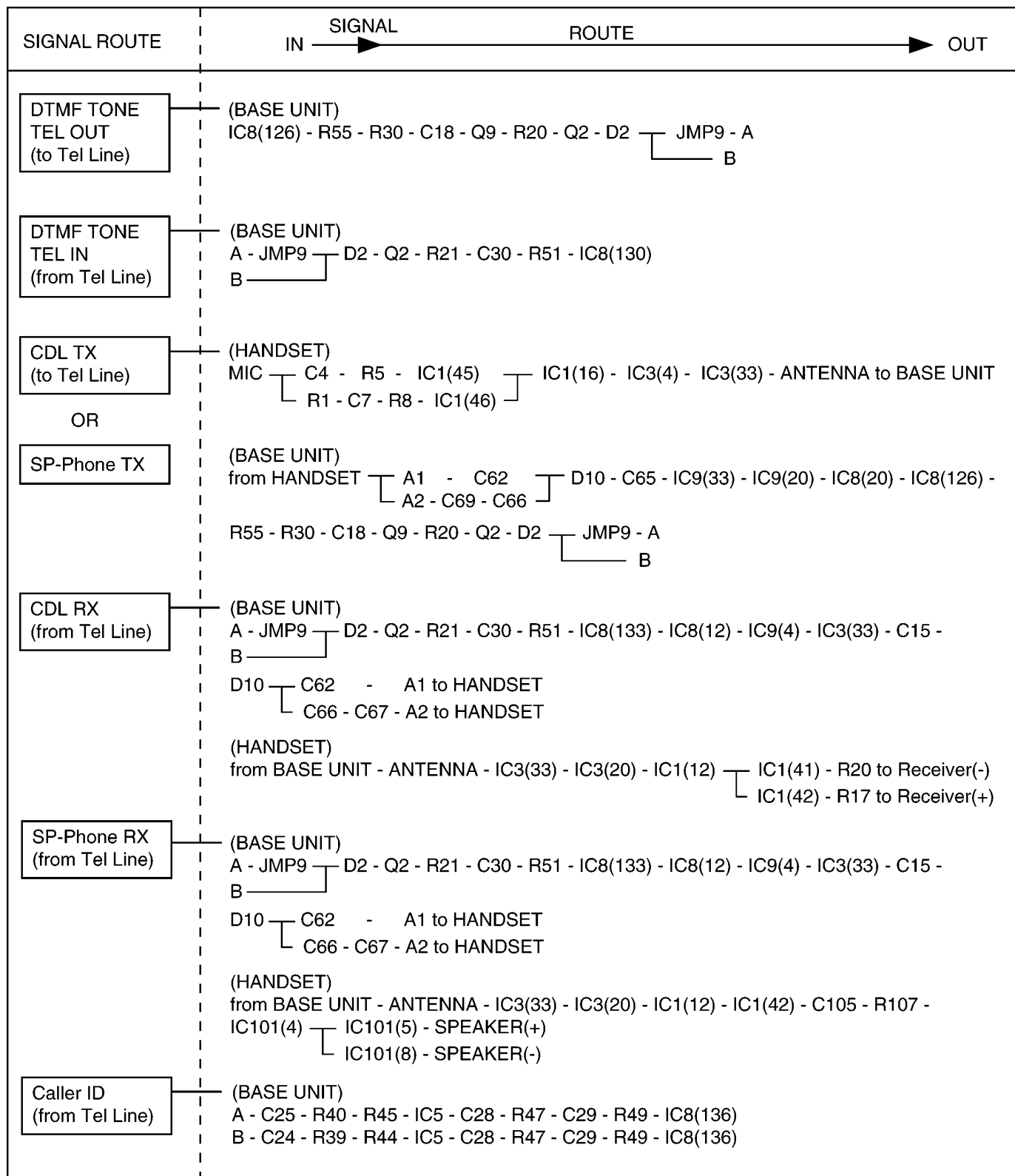
23 CIRCUIT OPERATION (CHARGER UNIT)

23.1. Power Supply Circuit

The power supply is as shown.



24 SIGNAL ROUTE



25 CPU DATA (BASE UNIT)

25.1. IC8 (BBIC)

Pin	Description	I/O	Hi	Hi-z	Low	Remarks
1	VSS	-	-	-	-	
2	DM1	D.I	-	-	-	for Down Load
3	DM2	D.I	-	-	-	for Down Load
4	DM3	D.I	-	-	-	for Down Load
5	SYRI	D.O	Active	-	Active	-
6	VSSO	A	-	-	-	-
7	XTAL	A	-	-	-	X'tal
8	LOAD	A	-	-	-	X'tal
9	VDDREG	D.O	-	-	-	-
10	RXDSG	D.O	Active	-	Active	-
11	VDDTXDA	D.I	-	-	-	-
12	TXDA	A	Active	-	Active	-
13	VDD	-	-	-	-	-
14	VSS	-	-	-	-	-
15	(NO USE)	D.O	-	-	-	-
16	DAON	D.O	PA-ON	-	PA-OFF	-
17	SYCL	D.O	Active	-	Active	-
18	SYEN	D.O	Normal	-	Latch	-
19	SYDA	D.I	Active	-	Active	-
20	RXDA	A	Active	-	Active	-
21	RXDB	A	-	-	-	-
22	ANT1	D.O	ANT1 ON	-	ANT1 OFF	-
23	VDD	-	-	-	-	-
24	VSS	-	-	-	-	-
25	ANT2	D.O	ANT2 ON	-	ANT2 OFF	-
26	I2CLK	D.O	Active	-	Active	-
27	I2DAT	D.I/O	Data	-	Data	-
28	VSS	-	-	-	-	-
29	CSROQ	D.O	-	-	Read IC7	for Flash Memory
30	BSCLO	D.O	-	-	-	for Flash Memory
31	BSCCL1	D.O	-	-	-	for Flash Memory
32	A0	D.O	-	-	-	for Flash Memory
33	A1	D.O	-	-	-	for Flash Memory
34	VDD	-	-	-	-	-
35	VSS	-	-	-	-	-
36	A2	D.O	-	-	-	for Flash Memory
37	A3	D.O	-	-	-	for Flash Memory
38	A4	D.O	-	-	-	for Flash Memory
39	A5	D.O	-	-	-	for Flash Memory
40	A6	D.O	-	-	-	for Flash Memory
41	A7	D.O	-	-	-	for Flash Memory
42	A8	D.O	-	-	-	for Flash Memory
43	A9	D.O	-	-	-	for Flash Memory
44	A10	D.O	-	-	-	for Flash Memory
45	VSS	-	-	-	-	-
46	VDD	-	-	-	-	-
47	A11	D.O	-	-	-	for Flash Memory
48	A12	D.O	-	-	-	for Flash Memory
49	A13	D.O	-	-	-	for Flash Memory
50	A14	D.O	-	-	-	for Flash Memory
51	A15	D.O	-	-	-	for Flash Memory
52	D0	D.O/I	-	-	-	for Flash Memory
53	D1	D.O/I	-	-	-	for Flash Memory
54	D2	D.O/I	-	-	-	for Flash Memory
55	VDD	-	-	-	-	-
56	VSS	-	-	-	-	-
57	D3	D.O/I	-	-	-	for Flash Memory
58	D4	D.O/I	-	-	-	for Flash Memory
59	D5	D.O/I	-	-	-	for Flash Memory
60	D6	D.O/I	-	-	-	for Flash Memory
61	D7	D.I/O	-	-	-	for Flash Memory
62	(NO USE)	D.O	-	-	-	-

Pin	Description	I/O	Hi	Hi-z	Low	Remarks
63	P0.6	D.O	Make		Break	-
64	(NO USE)	D.O	-	-	-	-
65	(NO USE)	D.O	-	-	-	-
66	VDD	-	-	-	-	-
67	VSS	-	-	-	-	-
68	(NO USE)	D.O	-	-	-	-
69	PULSE_CTRL	D.O	Q7_ON	-	Q7_OFF	-
70	P0.1	D.O	-	-	-	for Flash Memory
71	P0.0	D.O	No Key	-	Key	for Key
72	PX.2	D.O	-	-	Write IC4	for Flash Memory
73	PX.1	D.O	-	-	Read IC4	for Flash Memory
74	(NO USE)	D.O	-	-	-	-
75	(NO USE)	D.O	-	-	-	-
76	R1	D.O	RINGER ON	-	RINGER OFF	-
77	(NO USE)	D.O	-	-	-	-
78	VDD	-	-	-	-	-
79	VSS	-	-	-	-	-
80	(NO USE)	D.O	-	-	-	-
81	TONE	D.I	-	-	-	Ring Det
82	(NO USE)	D.O	-	-	-	-
83	(NO USE)	D.O	-	-	-	-
84	(NO USE)	D.O	-	-	-	-
85	(NO USE)	D.O	-	-	-	-
86	(NO USE)	D.O	-	-	-	-
87	(NO USE)	D.O	-	-	-	-
88	VDD	-	-	-	-	-
89	VSS	-	-	-	-	-
90	(NO USE)	D.O	-	-	-	-
91	(NO USE)	D.O	-	-	-	-
92	(NO USE)	D.O	-	-	-	-
93	(NO USE)	D.O	-	-	-	-
94	(NO USE)	D.O	-	-	-	-
95	MA5	D.O/I	-	-	-	for Voice Down Load
96	(NO USE)	D.O	-	-	-	-
97	MA3	D.O/I	-	-	-	for Voice Down Load
98	VDD	-	-	-	-	-
99	VSS	-	-	-	-	-
100	MA2	D.O/I	-	-	-	for Voice Down Load
101	MA1	D.O/I	-	-	-	for Voice Down Load
102	MA0	D.O/I	-	-	-	for Voice Down Load
103	FRDY	D.O	-	-	-	for Flash Memory
104	MD4	D.O	-	-	-	for Flash Memory
105	MD2	D.O	-	-	-	for Flash Memory
106	MD1	D.I	-	-	-	for Flash Memory
107	MD0	D.O	-	-	-	for Flash Memory
108	VDD	-	-	-	-	-
109	VSS	-	-	-	-	-
110	(NO USE)	A	-	-	-	-
111	(NO USE)	A	-	-	-	-
112	(NO USE)	A	-	-	-	-
113	(NO USE)	A	-	-	-	-
114	(NO USE)	A	-	-	-	-
115	(NO USE)	A	-	-	-	-
116	VSSA	-	-	-	-	-
117	VDDA	-	-	-	-	-
118	(NO USE)	A	-	-	-	-
119	(NO USE)	A.I	-	-	-	-
120	(NO USE)	A.I	-	-	-	-
121	(NO USE)	A	-	-	-	-
122	(NO USE)	A	-	-	-	-
123	SON	A	-	-	-	-
124	(NO USE)	A	-	-	-	-
125	(NO USE)	A	-	-	-	-
126	HOP	A	-	-	-	-
127	HOPI	A	-	-	-	-
128	(NO USE)	A	-	-	-	-
129	REFVH	A	-	-	-	-

Pin	Description	I/O	Hi	Hi-z	Low	Remarks
130	BREF	A	-	-	-	-
131	VSSA	-	-	-	-	-
132	VDDA	-	-	-	-	-
133	MIP	A	-	-	-	-
134	MFBN	A	-	-	-	-
135	MFBP	A	-	-	-	-
136	MIN	A	-	-	-	-
137	ADREFP	A	-	-	-	-
138	ADREFN	A	-	-	-	-
139	RSSI	A	-	-	-	-
140	AD3	A	-	-	-	-
141	AD4	A	-	-	-	-
142	MPCINP	A	-	-	-	-
143	RESETQ	A	Normal	-	Reset	-
144	VDD	-	-	-	-	-

Note:

I_PU; Internal Pull-Up, I_PD; Internal Pull-Down

26 CPU DATA (HANDSET)

26.1. IC1 (BBIC)

Pin	Description	I/O	Hi	Hi-z	Remarks
1	LCD_SEGMENT	D.O	Active	-	-
2	LCD_COMMON	D.O	Active	-	-
3	VDD	-	-	-	-
4	VSS	-	-	-	-
5	LCD_COMMON	D.O	Active	-	-
6	LCD_COMMON	D.O	Active	-	-
7	LCD_COMMON	D.O	Active	-	-
8	LCD_COMMON	D.O	Active	-	-
9	LCD_COMMON	D.O	Active	-	-
10	PA_SW	D.O	PA ON	-	-
11	T/R SW	D.O	Transmit	-	-
12	RX_DATA	D.I	Active	-	-
13	SYEN	D.O	Active	-	-
14	SYDA	D.O	Active	-	-
15	SYCL	D.O	Active	-	-
16	TX_DATA	A.O	Active	-	-
17	KEY_IN	D.I	No Key	-	-
18	KEY_IN	D.I	No Key	-	-
19	KEY_IN	D.I	No Key	-	-
20	KEY_IN	D.I	No Key	-	-
21	KEY_IN	D.I	No Key	-	-
22	(NO USE)	D.O	-	-	-
23	Reference clock	D.O	Active	-	-
24	VDD	-	-	-	-
25	VSS	-	-	-	-
26	POWER_SW	A.I	No Key	-	-
27	CHARGE_DET	A.I	Charge	-	-
28	DCDCDRV	D.O	Active	-	-
29	DCDCCMR	A.I	-	-	-
30	RESET	A.I	Normal	-	-
31	VSSO	-	-	-	-
32	LOAD	A.I	-	-	-
33	XTAL	A.I	-	-	-
34	VDDPM	A.O	-	-	-
35	VDDLO	A.O	-	-	-
36	VddbAT	A.I	-	-	-
37	VDDLr	-	-	-	-
38	CHARGE_START	A.O	-	-	for charge
39	VDDA	-	-	-	-
40	VSSA	-	-	-	-
41	LSRN	A.O	-	-	-
42	LSRP	A.O	-	-	-
43	BANDGAP_REF	A.O	-	-	-
44	MICS	A.O	-	-	-
45	MICP	A.I	-	-	-
46	MICN	A.I	-	-	-
47	Reference Voltage	A.O	-	-	-
48	RSSI	A.I	-	-	-
49	P0.4	D.I	-	-	-
50	AD4N	A.I	-	-	-
51	AD4P	A.I	-	-	-
52	(NO USE)	D.I	-	-	-
53	KEY_STRB	D.O	Active	-	-
54	KEY_STRB	D.O	Active	-	-
55	KEY_STRB	D.O	Active	-	-
56	LCD_SEGMENT	D.O	Active	-	-
57	LCD_SEGMENT	D.O	Active	-	-
58	LCD_SEGMENT	D.O	Active	-	-
59	KEY_STRB	D.O	Active	-	-
60	KEY_STRB	D.O	Active	-	-
61	LCD_SEGMENT	D.O	Active	-	-
62	LCD_SEGMENT	D.O	Active	-	-

Pin	Description	I/O	Hi	Hi-z	Remarks
63	VDD	-	-	-	-
64	VSS	-	-	-	-
65	VDD for EEPROM	D.O	-	-	-
66	I2DAT	D.I/O	Active	-	-
67	I2CLK	D.I/O	Active	-	-
68	MODE	D.I	-	-	-
69	R2	D.I	-	-	-
70	(NO USE)	D.O	-	-	-
71	VBACK/P0.7	D.I	-	-	-
72	LCD_SEGMENT	D.O	Active	-	-
73	LCD_SEGMENT	D.O	Active	-	-
74	LCD_SEGMENT	D.O	Active	-	-
75	LCD_SEGMENT	D.O	Active	-	-
76	LCD_SEGMENT	D.O	Active	-	-
77	VDDLI	-	-	-	-
78	LCD_SEGMENT	D.O	Active	-	-
79	LCD_SEGMENT	D.O	Active	-	-
80	LCD_SEGMENT	D.O	Active	-	-
81	LCD_SEGMENT	D.O	Active	-	-
82	LCD_SEGMENT	D.O	Active	-	-
83	LCD_SEGMENT	D.O	Active	-	-
84	LCD_SEGMENT	D.O	Active	-	-
85	VSS	-	-	-	-
86	VDD	-	-	-	-
87	LCD_SEGMENT	D.O	Active	-	-
88	(NO USE)	D.O	-	-	-
89	Power Select	D.O	Low Power	-	-
90	LCD_SEGMENT	D.O	Active	-	-
91	LCD_SEGMENT	D.O	Active	-	-
92	LCD_SEGMENT	D.O	Active	-	-
93	LCD_SEGMENT	D.O	Active	-	-
94	LCD_SEGMENT	D.O	Active	-	-
95	LCD_SEGMENT	D.O	Active	-	-
96	LCD_SEGMENT	D.O	Active	-	-
97	LCD_SEGMENT	D.O	Active	-	-
98	LCD_SEGMENT	D.O	Active	-	-
99	LCD_SEGMENT	D.O	Active	-	-
100	LCD_SEGMENT	D.O	Active	-	-

27 EEPROM LAYOUT (BASE UNIT)

27.1. Scope

The purpose of this section is to describe the layout of the EEPROM (IC4) for the KX-TCD445 Base Unit.

The EEPROM contains hardware, software, and user specific parameters. Some parameters are set during production of the base e.g. crystal frequency adjustment at address 0000 and 0001, some are set by the user configuration e.g. ringer volume at address 0220, and some are set during normal use of the phone.

27.2. Introduction

The base unit uses a 32K bit serial EEPROM (IC4) for storing volatile parameters. All parameters are set up before the base leaves the factory. Some of these are vital for the operation of the hardware so a set of default parameters is programmed before the actual hardware fine-tuning can be initiated. This document lists all default settings with a short description.

In the tables below values in a range that are similar are not repeated; i.e. Address 00 to 01 contains the value 00 simply means that the value 00 is repeated in all addresses in the range. All values in this document are in hexadecimal notation.

Type	Name	Description
D	default	The EEPROM location is preset to the Default value by the eeprom default loader.
A	adjust	The EEPROM location is set during the production test and should not be overwritten. The value is set by the eeprom default loader only if the location contains all 1's (byte: 0xFF, word FFFFh), i. e. it has never been set.
-		EEPROM location which is not set at all.

Country Setting	x	Default - no specific country setting, so revert to default value
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27.3. EEPROM Layout

27.3.1. General Setup

Address	Default	Name	Country Setting	Type	Description
0000-01	00 60	EepromOscillator	x	A	Frequency adjustment
0002	1B	ModulationDeviation	x	A	Modulation adjustment
0020-0024	-	RFPI (ID for Base Unit)	x	A	RFPI
0025-0026	00 00	AC (Base PIN code)	x	D	AC code
0028	00	TBR22Test	x	D	TBR22 test
0030-0034	FF .. FF	IPUI_1 (ID for H/S 1)	x	D	Ipui for handset 1. If set to FF .. FF (5bytes) the handset is not enrolled.
0035-0039	FF .. FF	IPUI_2 (ID for H/S 2)	x	D	Ipui for handset 2. If set to FF .. FF (5bytes) the handset is not enrolled.
003A-003E	FF .. FF	IPUI_3 (ID for H/S 3)	x	D	Ipui for handset 3. If set to FF .. FF (5bytes) the handset is not enrolled.
003F-0043	FF .. FF	IPUI_4 (ID for H/S 4)	x	D	Ipui for handset 4. If set to FF .. FF (5bytes) the handset is not enrolled.
0044-0048	FF .. FF	IPUI_5 (ID for H/S 5)	x	D	Ipui for handset 5. If set to FF .. FF (5bytes) the handset is not enrolled.
0049-004D	FF .. FF	IPUI_6 (ID for H/S 6)	x	D	Ipui for handset 6. If set to FF .. FF (5bytes) the handset is not enrolled.
004E-008F	-	Reserved	x	-	Protocol data
0090-009F	-	UAK_1	x	-	UAK for handset 1 (for factory use)
00A0-00AF	-	UAK_2	x	-	UAK for handset 2 (for factory use)
00B0-00BF	-	UAK_3	x	-	UAK for handset 3 (for factory use)
00C0-00CF	-	UAK_4	x	-	UAK for handset 4 (for factory use)
00D0-00DF	-	UAK_5	x	-	UAK for handset 5 (for factory use)
00E0-00EF	-	UAK_6	x	-	UAK for handset 6 (for factory use)

27.3.2. Switch Control

Address	Default	Name	Country Setting	Type	Description
09F1	00	HsRegInfo.RegFlags	x	U	<p>Handset registration info - registration ON/OFF</p> <p>bit 7 6 5 4 3 2 1 0</p> <p>1=reg, 0=no reg</p>

Address	Default	Name	Country Setting	Type	Description
09F2	00	HsRegInfo.EmcFlags	x	U	Handset registration info - EMC flags Bit 6..7: not used 0..5: handset 1..6 info, 1=known , 0=unknown
09F3	21	RingMode	x	D	Ring mode. Modes used in KAMMA4 are 20h and 21h. Bit 7..5: Mode (001=group) 4: Not used 3..0: Id (001= id of first group)

27.3.3. Flash Time setting

Address	Default	Name	Country Setting	Type	Description
0F0B	08	CalibBreakTime[0]	0A	D	Calibrated loop-break time for short break Unit: 10 ms, defaults to 80 ms
0F0C	14	CalibBreakTime[1]	3C	D	Calibrated loop-break time for long break Unit: 10 ms, defaults to 200 ms
0F0D	46	CalibBreakTime[2]	1E	D	Calibrated loop-break time for Extra-long break Unit: 10 ms, defaults to 700 ms

27.3.4. Clip (Caller ID) configuration

Address	Default	Name	Country Setting	Type	Description
0F1C	70	Detect	x	D	CLIP detect configuration Bit 0-2: Mode: 0: Learn mode, 1: DTMF only, 2: FSK only 3: Generic mod, 4: Russian CLIP only 3: Unused4 4: Onhook: 1=enable 0=disable 5: Offhook: 1=enable 0=disable 6: Msgwaiting: 1=enable 0=disable 7: Unused7
0F37..38	3D 01	Parse.Configuration	3D 08	D	Clip parse set configuration Bit 0: Etsi: 1=enable 0=disable 1: ForwardNumber: 1=enable 0=disable 2: Danish: 1=enable 0=disable 3: Dutch: 1=enable 0=disable 4: Canadian: 1=enable 0=disable 5: Swedish: 1=enable 0=disable 6: UserDefined: 1=enable 0=disable 7: KPN vmwi: 1=enable 0=disable 8: ProtocolPriority: If 2 mutual exclusive parameters occurs, the 1st in the protocol message has priority. 1=enable 0=disable 9: UseCallType: Verify the Call Type parameter, if available, when receiving Call Back CLIP at busy subscriber. 1=enable 0=disable 10:AddTop0IfNo0 Automatic addition of 0 if top of Caller ID is not 0. 1=enable 0=disable 11: DtmfDigitsOnly Parse DTMF clip without start and/or stop code. 1=enable 0=disable 12..15: Reserved12..Reserved15

27.3.5. TADTASK

Address	Default	Name	Country Setting	Type	Description
0F40	00	CountryCode	03	D	Country code 0: Germany 1: Greece 2: Turkey 3: England 4: Switzerland 5: Poland 7: France 8: Denmark A: Italy C: Czech D: Netherland E: Hungary F: Spain 12: Sweden 13: South Afric 14: Russia
0F41-0F60	FF	TamTagInfo	x	D	Message TAG information Bit 0-3 Odd number MSG, 4-7 Even number MSG 0: Reserve 1: 2WayInfo 0:Not 2WayRec/1:2WayRecMsg 2: New Info 0:OLD/1:NEW 3: OGM Info Not used 4: Reserve 5: 2WayInfo 0:Not 2WayRec/1:2WayRecMsg 6: New Info 0:OLD/1:NEW 7: OGM Info Not used
0F61	14	TamPrgInfo	x	D	TAM Current Setting data Bit 0: Answer ON/OFF 0:OFF/1:ON 1: ICM Record Time Mode1 0:OFF/1:Greeting Only 2: ICM Record Time Mode2 0:OFF/1:Unlimited Mode1=0&Mode2=0:ICM Record Time=1min 3: CPC time selection 0:time A/1:time B 4: Greeting Monitor mode ON/OFF 0:OFF/1:ON 5: Reserve 6: VOX sense selection 0: Normal /1: Low 7: DSC time selection 0: immediately/1: 1.6sec
0F62	00	TamPrgRings	x	D	Current number of rings for automatic answering Range:0(Auto), 2-7
0F63-0F64	FF	TamPrgRmtCode	x	D	Current Remote code e.g. 123 Address 0x0F63 0xF1 Address 0x0F64 0x23
0F65	10	CountryData	18	D	Each country data Bit 0: Remote Turn on Beep 0: 500 ms/1: 2.5 sec 1: Reserve 2: Max time in Line Remote Not Used 3: TimeData for voice prompt 0:24hour /1:12hour 4: VicMenuData 0: No VoiceMenu/1: VoiceMenu 5: LanguageInfo 0: Single Language/1: Dual Languages 6: Reserve 7: Reserve
0F66	08	DetData	18	D	Detection data Bit 0: Selection CPC A/B 0:OFF (A fixed)/1:ON(Select) 1: Reserve 2: Detect 1st Short Bell (300ms) for count 3: Cyclic Detection of VOX 0: OFF/1: ON(Detect) 4: Detection of DSC 0: OFF/1: ON(Detect) 5: Reserve 6: Reserve 7: Reserve

Address	Default	Name	Country Setting	Type	Description
0F67	06	OptionData	25	D	Each country data Bit 0: 2 Way Beep ON/OFF 0:OFF/1:ON 1: 2 Way Beep interval 0:15s per 400ms/1:20s per 160ms 2: 2 Way Rec ON/OFF 0:OFF/1:ON 3: Switching of VOX Sense ON/OFF 0:OFF/1:ON 4: Key Click Tone ON/OFF Not used 5: Select Compression Rate Menu 0:Not Active/ 1:Active 6: 2 Way Beep interval2 *For UK (15s per 400ms 1khz) 2wayBeepInterval=0 2wayBeepInterval2=0 *For FR (20s per 160ms 1khz) 2wayBeepInterval=1 2wayBeepInterval2=0 *For AL (15s per 420ms 1.4khz) 2wayBeepInterval=1 2wayBeepInterval2=1 7: Reserve
0F68	00	TamPrgWordMode	x	D	Language select data For Switzerland 0:Germany/1:French For Czech 0:Chezh/1:Slovakian
0F69	27	TamRingsSetNum	x	D	Number of rings select range for automatic answering 0x25: 2 ~ 5 Rings 0x27: 2 ~ 7 Rings
0F6A	00	TamRingsDefNum	x	D	Number of rings default data 0: Default is Automatically Turn on for Toll saver 2-7: Default of the number of rings for Turn on.

27.3.6. BsUiTask settings

Address	Default	Name	Country Setting	Type	Description
0F6E	01	Config	03	D	BsUiTask configuration (MSB) Bits 1=enable 0=disable 0: AmPmClockSettingEnabled, enabled 1: ClipDetectionSettingEnabled, disabled 2: AkzMenuEnabled, disabled 3: HakzMenuEnabled, disabled 4: RussianClipSttingEnabled, disabled 5: SmscSendNumberSettingEnabled, disabled 6: SMSPabxSupportSettingEnabled, disabled 7: ARSDisablePossible, disabled
0F6F	F7	Config	07	D	BsUiTask configuration (LSB) Bits 1=enable 0=disable 0: FlashTime1Enabled, enabled 1: FlashTime2Enabled, enabled 2: FlashTime3Enabled, enabled 3: KeyClicksEnable, disabled 4: ARSCarrierMenuEnabled, enabled 5: ARSIntDeletionMenuEnabled, enabled 6: ARSMultipleCarrierMenuEnabled, enabled 7: ARSMultipleAreaCodeMenuEnabled, enabled
0F70	00	Reserved	x	D	Reserved
0F71	FF	Config2	EF	D	BsUiTask configuration 2 Bits 1=enable 0=disable 0: RingerModeMenuEnabled, enabled 1: CallRestrictionMenuEnabled, enabled 2: CancelHandsetMenuEnabled, enabled 3: BaseToneMenusEnabled, enabled 4: ARSMenuEnabled, enabled 5: CallCostMenuEnabled, enabled 6: BasePINMenuEnabled, enabled 7: DialModeMenuEnabled, enabled

28 EEPROM LAYOUT (HANDSET)

28.1. Scope

The purpose of this section is to describe “the layout of the EEPROM (IC2) for the KX-A144 Handset”.

The EEPROM contains hardware, software, and user specific parameters. Some parameters are set during production of the handset e.g. crystal oscillator adjustment at 0000..01, some are set by the user when configuring the handset e.g. ringer volume at 0F3E, and some during normal use of the phone.

28.2. Introduction

The handset uses a 32k bit serial EEPROM (IC2) for storing volatile parameters. All parameters are set up before the handset the factory. Some of these are vital for the operation of the hardware so a set of default parameters is programmed before the actual hardware fine-tuning can be initiated. This document lists all default settings with a short description.

This document lists all default parameters with a short description.

In the tables below values in a range that are similar are not repeated; i.e. Address 00 to 01 contains the value 00 simply means that the value 00 is repeated in all addressee in the range.

Type	Name	Description
D	default	The EEPROM location is preset to the Default value by the eeprom default loader.
A	adjust	The EEPROM location is set during the production test and should not be overwritten. The value is set by the eeprom default loader only if the location contains 0xFF, i. e. it has never been set.
-		EEPROM location which is not set at all.

Country Setting	x	Default - no specific country setting, so revert to default value
-----------------	---	---

28.3. EEPROM contents

28.3.1. General Setup

Address	Default	Name	Country Setting	Type	Description
0000-0001	00 60	EepromOscillator	-	A	Frequency adjustment
0002	0A	ModulationDeviation	-	A	Modulation adjustment
0030-0034	00	IPEI (ID for Handset)	-	A	IPEI
0036-003A	-	PARK_1 (ID for Base 1)	-	-	PARK for registration 1
003B-003F	-	PARK_2 (ID for Base 2)	-	-	PARK for registration 2
0040-0044	-	PARK_3 (ID for Base 3)	-	-	PARK for registration 3
0045-0049	-	PARK_4 (ID for Base 4)	-	-	PARK for registration 4
004A-004D	FF	PLI_1-PLI_4	-	D	Pli for registration 1-4. If set to FF the registration is deleted.
0100-0104	-	RFPI_1 (Base 1)	-	-	RFPI for registration 1
0105	-	SerClass_1	-	-	Service class for registration 1
0106	-	LAL_1	-	-	Location area level for registration 1
0107	-	IPUI_LEN_1	-	-	IPUI length for registration 1
0108-0114	-	IPUI_1	-	-	IPUI for registration 1
0115	-	ZAP_1	-	-	ZAP for registration 1
0116	-	STATUS_1	-	-	Status for registration 1
0117-126	-	UAK_1	-	-	UAK for registration 1
0130-134	-	RFPI_2 (Base 2)	-	-	RFPI for registration 2
0135	-	SerClass_2	-	-	Service class for registration 2
0136	-	LAL_2	-	-	Location area level for registration 2
0137	-	IPUI_LEN_2	-	-	IPUI length for registration 2
0138-0144	-	IPUI_2	-	-	IPUI for registration 2
0145	-	ZAP_2	-	-	ZAP for registration 2
0146	-	STATUS_2	-	-	Status for registration 2
0147-0156	-	UAK_2	-	-	UAK for registration 2
0160-0164	-	RFPI_3 (Base 3)	-	-	RFPI for registration 3
0165	-	SerClass_3	-	-	Service class for registration 3
0166	-	LAL_3	-	-	Location area level for registration 3
0167	-	IPUI_LEN_3	-	-	IPUI length for registration 3
0168-0174	-	IPUI_3	-	-	IPUI for registration 3
0175	-	ZAP_3	-	-	ZAP for registration 3
0176	-	STATUS_3	-	-	status for registration 3
0177-0186	-	UAK_3	-	-	UAK for registration 3

Address	Default	Name	Country Setting	Type	Description
0190-0194	-	RFPI_4 (Base 4)	-	-	RFPI for registration 4
0195	-	SerClass_4	-	-	Service class for registration 4
0196	-	LAL_4	-	-	Location area level for registration 4
0197	-	IPUI_LEN_4	-	-	IPUI length for registration 4
0198-01A4	-	IPUI_4	-	-	IPUI for registration 4
01A5	-	ZAP_4	-	-	ZAP for registration 4
01A6	-	STATUS_4	-	-	Status for registration 4
01A7-01B6	-	UAK_4	-	-	UAK for registration 4
0450-0451	00 00	HSPinCode	x	D	4 BCD Digits
0462	00	Language	x	D	00 = English 01 = Spanish 02 = French 03 = Italian 04 = Dutch 05 = Turkish 06 = Hungarian 07 = Portuguese 08 = Polish 09 = UnUsed 0A = German
0467	00	FactoryLanguageSetting	x	D	Factory setting for language: 00 = English 01 = Spanish 02 = French 03 = Italian 04 = Dutch 05 = Turkish 06 = Hungarian 07 = Portuguese 08 = Polish 09 = UnUsed 0A = German
0469	07	MaxDigitsToMatch	06	D	Valid values: 01 - FF Digits above this value will not be evaluated, when matching.
046A	05	MinDigitsToMatch	x	D	Valid values: 01 - FF (-Must be lower than MaxDigitsToMatch). -If all digits of one of the numbers match completely, -with at least this number of digits, we have a match. (-Or if they match completely with less digits, we also have match.)

28.3.2. Battery Parameters

Address	Default	Name	Type	Description
0F04	9A	LowVoltage	A	Voltage on which to start battery low-indication. The voltage has to be measured under this value for 8 seconds before the handset start signaling low battery. LowVoltage[eeprom]=[ADC-steps]=LowVoltage[mV] (14.35[mV/step])

28.3.3. Volume Settings

Address	Default	Name	Country Setting	Type	Description
474	03	EESpPhVolume	x	D	Volume of the speakerphone
F29	60	RingVolumeLevel1	41	D	Setting for RingerVolume 1 (lowest)
F2A	50	RingVolumeLevel2	34	D	Setting for RingerVolume 2:
F2B	40	RingVolumeLevel3	31	D	Setting for RingerVolume 3:
F2C	30	RingVolumeLevel4	24	D	Setting for RingerVolume 4:
F2D	20	RingVolumeLevel5	21	D	Setting for RingerVolume 5:
F2E	10	RingVolumeLevel6	12	D	Setting for RingerVolume 6:
F35	1C	GX-index	x	A	Gain-transmit (values ranging from 0x00 to 0x30, each step representing 1 dB)
F36	46	GR-offset for volumestep 1	x	D	Bit7 : AOG Bit6: AOG2 Bit5 - bit0: Gain -receive offset to volumestep 2(values ranging from 0x00 to 0x30, each step representing 1 dB)

Address	Default	Name	Country Setting	Type	Description
F37	5F	GR-offset for volumestep 2	x	A	Bit7 : AOG Bit6: AOG2 Bit5 - bit0: Gain-receive (values ranging from 0x00 to 0x30, each step representing 1 dB)
F38	00	GR-offset for volumestep 3	x	D	Bit7 : AOG Bit6: AOG2 Bit5 - bit0: Gain-receive offset to volumestep 2(values ranging from 0x00 to 0x30, each step representing 1 dB)
F3E	06	EERingerVolume	x	D	Volume of the ringer (1 - 6)
F3F	02	EEVoiceVolume	x	D	Volume of the earpiece (1 - 3)
F57	60	CadenceVolumeLevel1	41	D	Setting for RingerVolume 1 (lowest)
F58	50	CadenceVolumeLevel2	34	D	Setting for RingerVolume 2
F59	40	CadenceVolumeLevel3	31	D	Setting for RingerVolume 3
F5A	30	CadenceVolumeLevel4	24	D	Setting for RingerVolume 4
F5B	20	CadenceVolumeLevel5	21	D	Setting for RingerVolume 5
F5C	10	CadenceVolumeLevel6	12	D	Setting for RingerVolume 6
F5D	11	SpPhGX-index	x	A	Gain -transmit for speakerphone (values ranging from 0x00 to 0x24, each step representing 1 dB). The index represent volumestep 3.
F5E	98	SpPhGR-index	x	D	Bit7 - AOG when speakerphone Bit6 - AOG2 when speakerphone Gain -receive for speakerphone (values ranging from 0x00 to 0x21, each step representing 1 dB). The index represent volumestep 3.

28.3.4. Menu Configuration

Address	Default	Name	Country Setting	Type	Description
0F53	FF	Menu Config	x	D	bit 0 - Registration menu on/off 1/0 bit 1 - Select base menu on/off 1/0 bit 2 - Internal ringer menu on/off 1/0 bit 3 - Page ringer menu on/off 1/0 bit 4 - Standby mode menu on/off 1/0 bit 5 - Battery select menu on/off 1/0 bit 6 - Call waiting menu on/off 1/0 bit 7 - Clip list on/off 1/0
0F54	01	RecVolStoreEnabled	x	D	00: Receiver volume will be reset to default value when hooking on. 01: Receiver volume will be stored in eeprom when set in conversation.

29 HOW TO REPLACE FLAT PACKAGE IC

29.1. 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

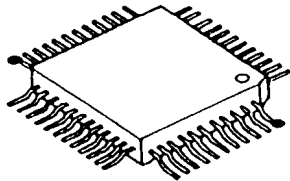
Recommended Flux: Specific Gravity → 0.82.

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

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

29.2. Procedure

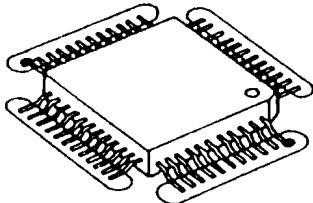
1. Tack the flat pack IC to the PCB by temporarily soldering two diagonally opposite pins in the correct positions on the PCB.



- - - - - - Temporary soldering point.

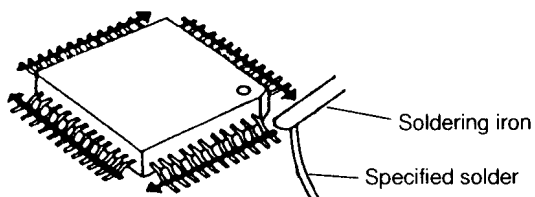
Be certain each pin is located over the correct pad on the PCB.

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



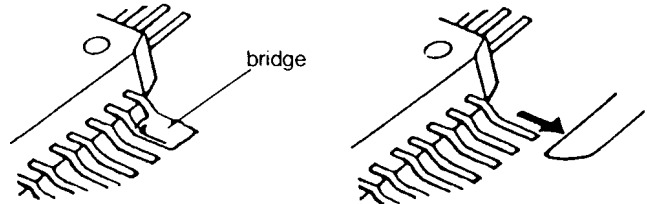
- - - - - - Flux

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

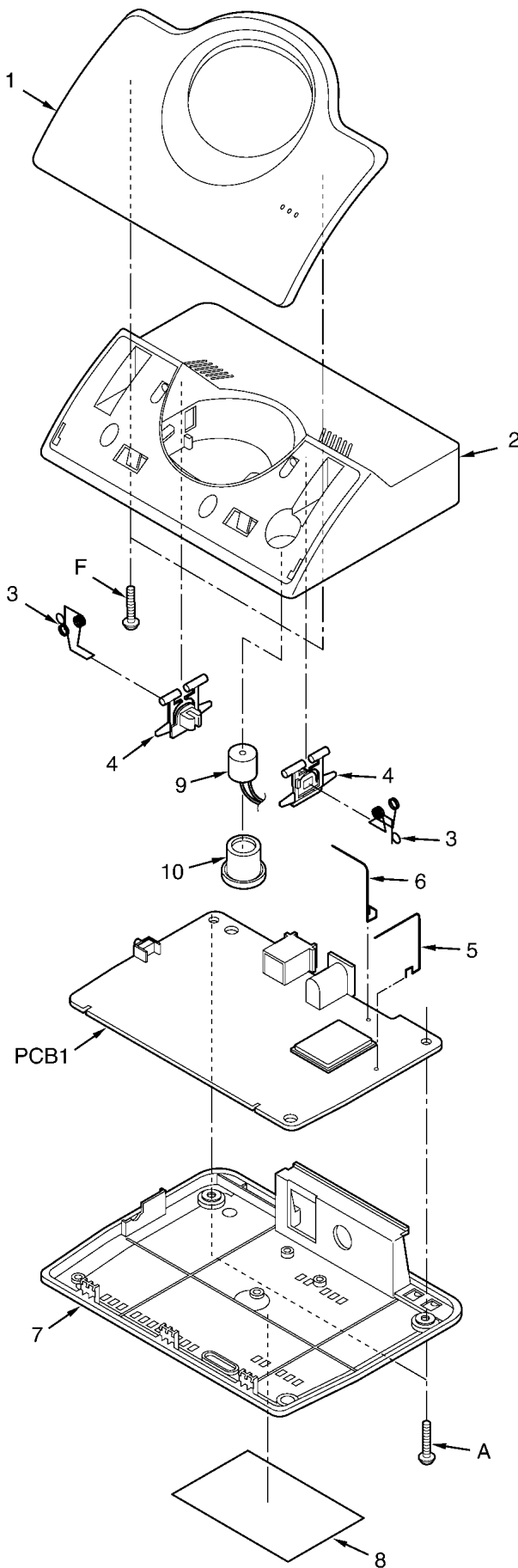


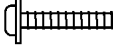
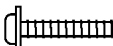
29.3. Modification Procedure of Bridge

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

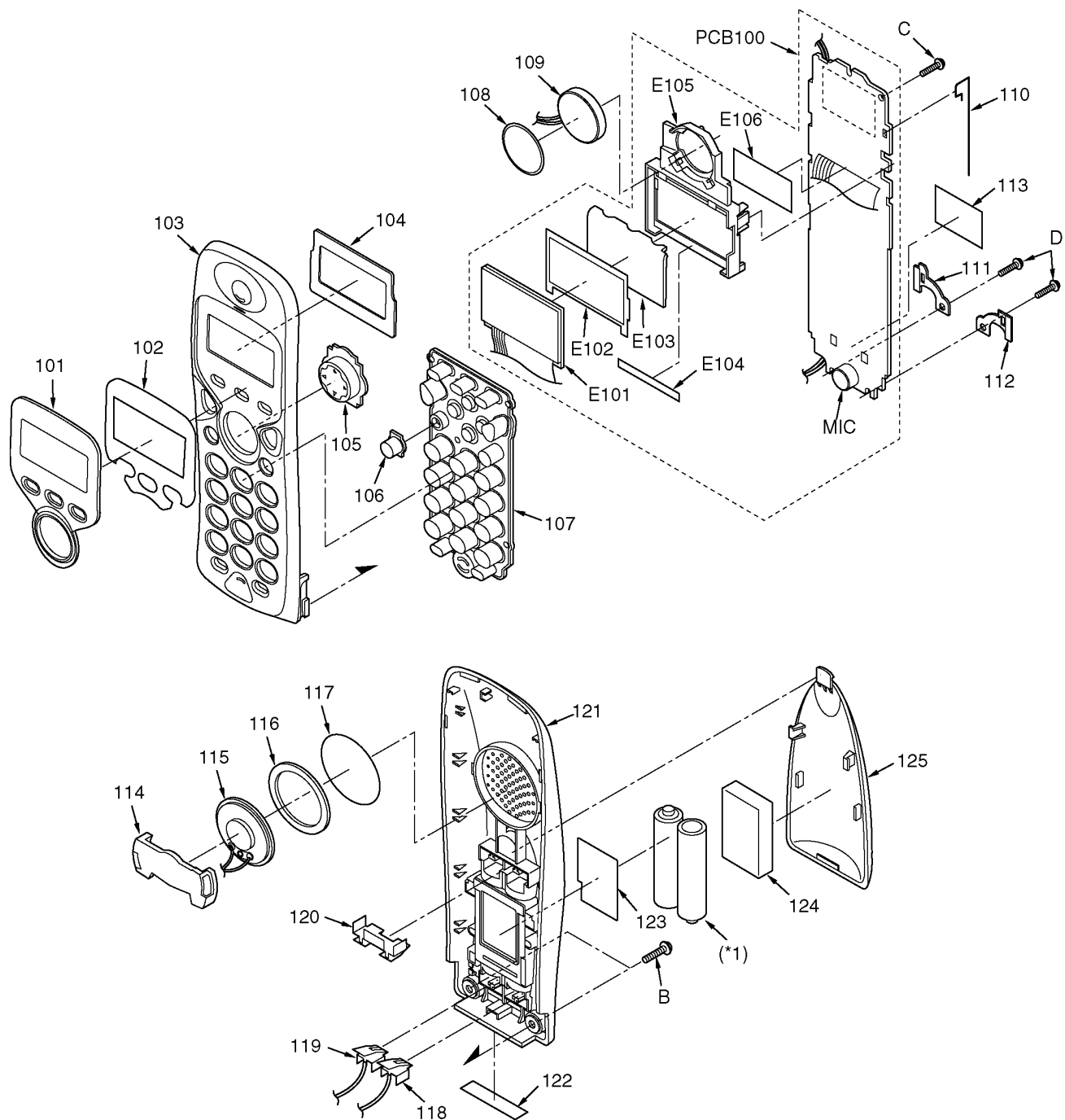





30 CABINET AND ELECTRICAL PARTS LOCATION (BASE UNIT)



Ref.No.	Part No.	Figure
A	XTW26+12P	 $\phi 2.6 \times 12\text{mm}$
F	XTW26+12P	 $\phi 2.6 \times 12\text{mm}$

31 CABINET AND ELECTRICAL PARTS LOCATION (HANDSET)

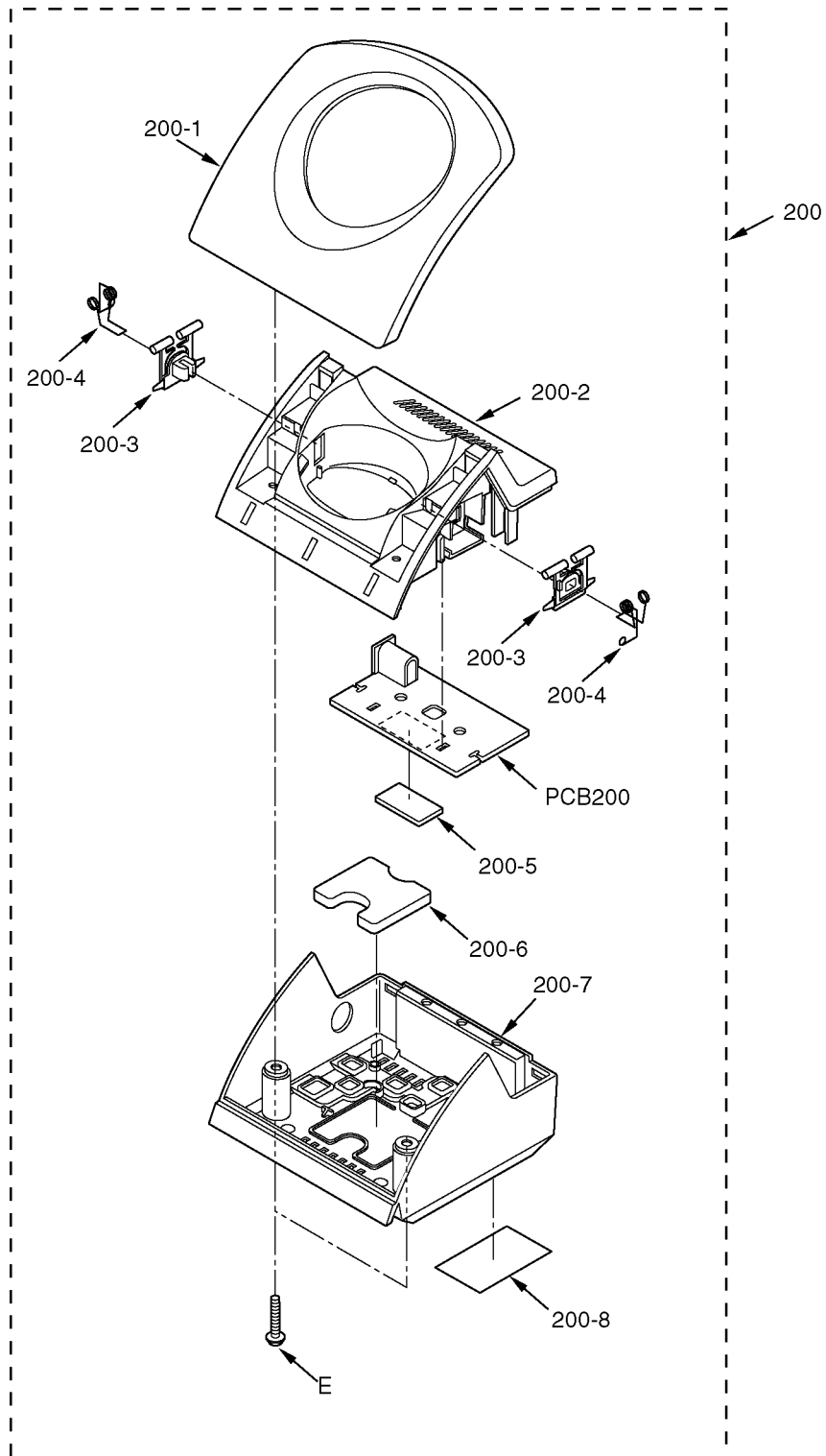



Ref.No.	Part No.	Figure
B	XTB2+10G	 φ2×10mm
C	XTB2+8G	 φ2×8mm
D	XTB2+8G	 φ2×8mm

Note:

(*1) The rechargeable Ni-MH battery HHR-4EPT and Ni-Cd battery P-4NPT are available through sales route of Panasonic.

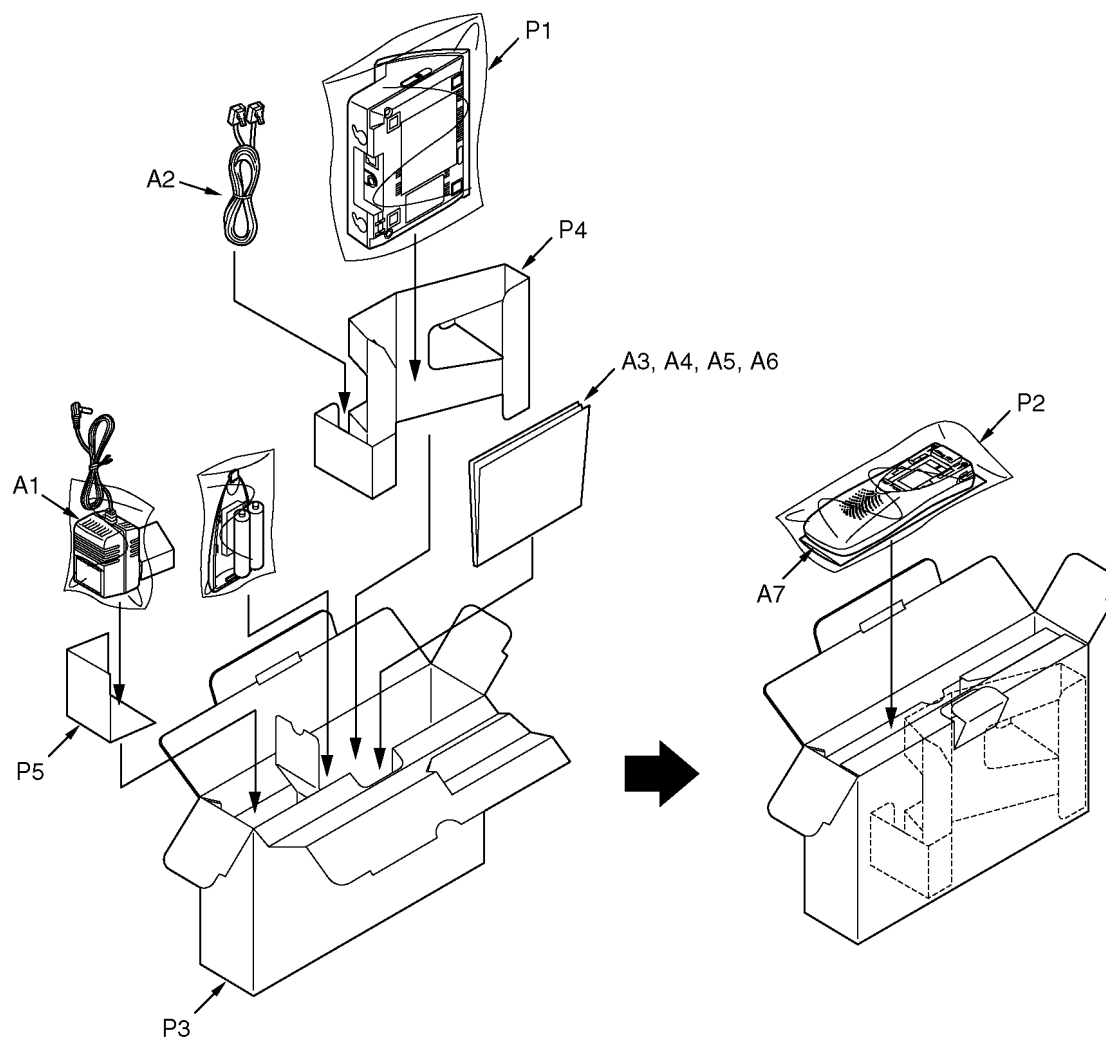
32 CABINET AND ELECTRICAL PARTS LOCATION (CHARGER UNIT)



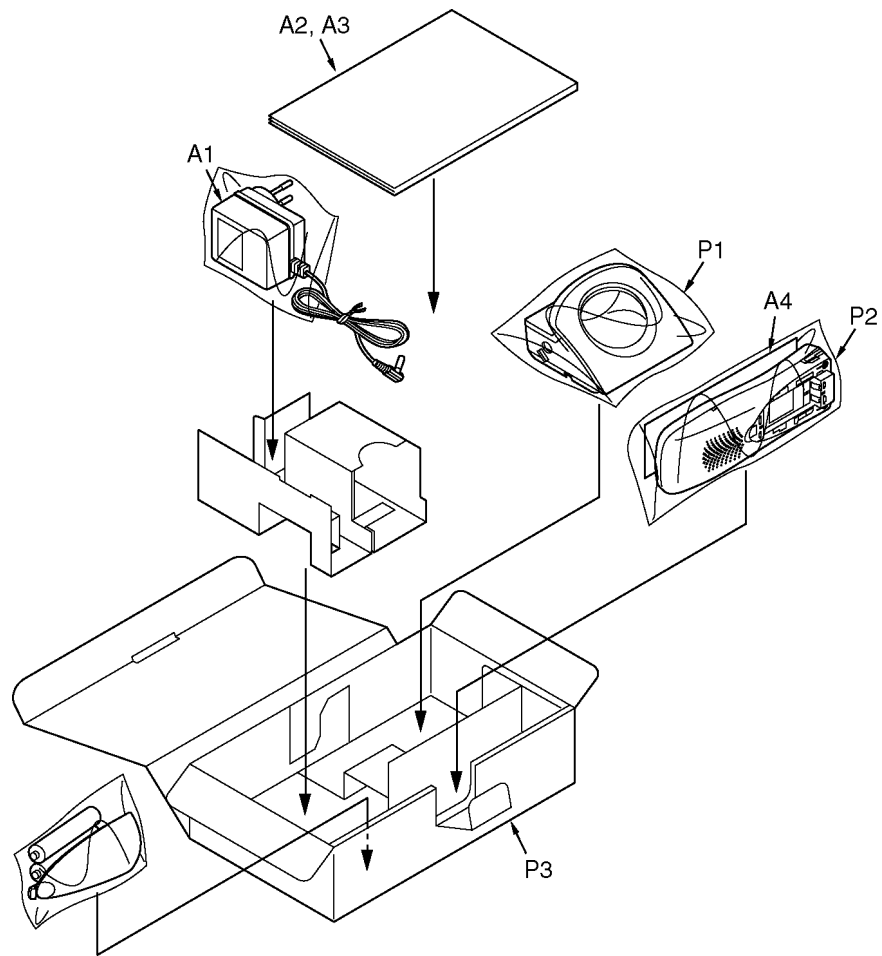
Ref.No.	Part No.	Figure
E	XTW26+14P	 $\phi 2.6 \times 14\text{mm}$

33 ACCESSORIES AND PACKING MATERIALS

33.1. KX-TCD445BXS/BXT/BXF

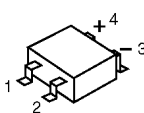
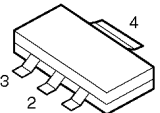
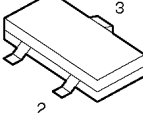
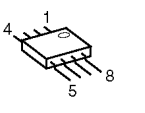
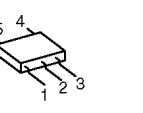
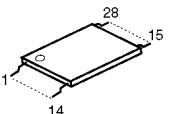
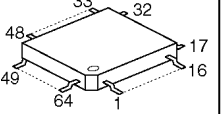
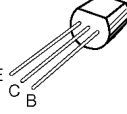
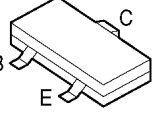
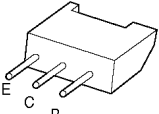

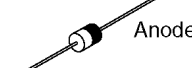
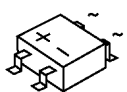
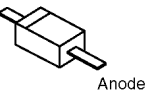
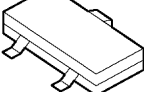


33.2. KX-A144BXS/BXT/BXF

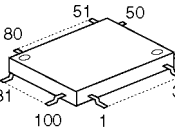
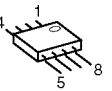
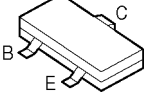
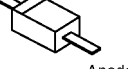
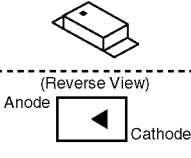



34 TERMINAL GUIDE OF THE ICs, TRANSISTORS AND DIODES

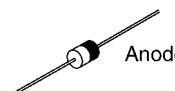
34.1. Base Unit

 <p>PQVIP357CN</p>	 <p>PQVILM1117MP</p>	 <p>PSVIXC62FP27</p>	 <p>PQWI1D440EH</p>	 <p>PQVILMV321M5</p>
 <p>PQWI2D445BXH</p>	 <p>C2HBAK000014</p>	 <p>2SA1625</p>	 <p>PQVTBF822T7 B1ABCE000009 B1ABGE000006</p>	 <p>2SD1994A</p>
 <p>PQVDBZV55C02</p>	 <p>B0JAME000085</p>	 <p>PQVDS1ZB60F1</p>	 <p>MA111, MA8047 MA1Z300</p>	 <p>B0DDCM000001</p>

34.2. Handset

 <p>C2HBAK000013</p>	 <p>PQWI1D440ER C1BB00000265</p>	 <p>B1ADGE000004 UN5216, B1CFMC000006, UN521</p>	 <p>MA8047 MA2Z74800L B0JCDD000002 B0JCME000035</p>
 <p>LNJ308G8JRA</p>	 <p>PQVDSML310MT PQVDBR1111C</p>		

34.3. Charger Unit

 <p>B0JAME000085</p>

35 REPLACEMENT PARTS LIST

Note:

1. RTL (Retention Time Limited)

Note:

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

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

2. Important safety notice

Components identified by the \triangle 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	ECEA,ECST,EEE: Electlytic
ECMS: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	

35.1. Base Unit

35.1.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQGG10154SA	GRILLE (for KX-TC445BXS)	ABS-HB
1	PQGG10154SB	GRILLE (for KX-TC445BXT)	ABS-HB
1	PQGG10154SC	GRILLE (for KX-TC445BXF)	ABS-HB
2	PQKM10586WA	CABINET BODY (for KX-TC445BXS)	ABS-HB
2	PQKM10586WB	CABINET BODY (for KX-TC445BXT)	ABS-HB

Ref. No.	Part No.	Part Name & Description	Remarks
2	PQKM10586WC	CABINET BODY (for KX-TC445BXF)	ABS-HB
3	PQJT10203Z	TERMINAL	
4	PQKE10356Z1	GUIDE, CHARGE TERMINAL CASE	POM-HB
5	PQSA10131Z	ANTENNA, MAIN	
6	PQSA10132Z	ANTENNA, SUB	
7	PQYF10560Z9	CABINET COVER (for KX-TC445BXS)	ABS-HB
7	PQYF10560Z6	CABINET COVER (for KX-TC445BXT)	ABS-HB
7	PQYF10560ZA	CABINET COVER (for KX-TC445BXF)	ABS-HB
8	PQGT16916Y	NAME PLATE (for KX-TC445BXS)	
8	PQGT16918Y	NAME PLATE (for KX-TC445BXT)	
8	PQGT16917Y	NAME PLATE (for KX-TC445BXF)	
9	L0DACA000023	BUZZER	
10	PQHG10690Z	RUBBER PARTS, RINGER RUBBER	

35.1.2. Main P.C.Board Parts

Note:

(*1) When replacing IC4, data need to be written to it with PQZZTCD445BX.

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWPLD445BXH	MAIN P.C.BOARD ASS'Y (RTL)	
		(ICs)	
IC1	PQVIP357CN	IC	
IC2	PQVILM1117MP	IC	S
IC3	PSVIXC62FP27	IC	
IC4	PQWILD440EH	IC (*1)	
IC5	PQVILMV321M5	IC	
IC6	PQWI2D445BXH	IC	
IC8	C2HBAK000014	IC	
		(TRANSISTORS)	
Q2	2SA1625	TRANSISTOR(SI)	S
Q4	PQVTFB822T7	TRANSISTOR(SI)	
Q7	BLABCE000009	TRANSISTOR(SI)	
Q8	BLABCE000009	TRANSISTOR(SI)	
Q9	2SD1994A	TRANSISTOR(SI)	
Q10	BLABCE000009	TRANSISTOR(SI)	
Q11	BLABCE000009	TRANSISTOR(SI)	
Q13	BLABGE000006	TRANSISTOR(SI)	
		(DIODES)	
D2	PQVDBZV55C02	DIODE(SI)	
D3	PQVDBZV55C02	DIODE(SI)	
D4	B0JAME000085	DIODE(SI)	
D5	MA111	DIODE(SI)	S
D6	PQVDS1ZB60F1	DIODE(SI)	S
D7	MA1Z300	DIODE(SI)	S
D10	B0DDCM000001	DIODE(SI)	
D11	MA8047	DIODE(SI)	S
D12	MA8047	DIODE(SI)	S
D13	MA8047	DIODE(SI)	S
D14	PQVDBZV55C02	DIODE(SI)	
D16	MA111	DIODE(SI)	S
		(COILS)	
L2	PQLQR4D4R7K	COIL	
L3	PQLQR2M33NKT	COIL	S
		(JACKS)	
J1	PQJJ1B4Y	JACK	S
J2	PFJJ1T007Z	JACK	S
		(RESISTORS)	
R1	PQ4R18XJ472	4.7K	S
R2	ERJ3GEYJ103	10K	
R6	ERJ3GEYJ184	180K	
R12	ERJ3GEYJ104	100K	
R13	PQ4R10XJ562	5.6K	S
R14	ERJ3GEYJ103	10K	
R15	ERJ3GEYJ222	2.2K	

Ref. No.	Part No.	Part Name & Description	Remarks
R20	PQ4R18XJ000	0	S
R21	ERJ3GEYJ333	33K	
R23	ERJ3GEYJ562	5.6K	
R24	ERJ12YJ220	22	
R25	ERJ3GEYJ104	100K	
R26	ERJ3GEYJ333	33K	
R27	ERJ12YJ560	56	
R28	ERJ3GEYJ474	470K	
R29	ERJ3GEYJ105	1M	
R30	ERJ3GEYJ221	220	
R31	PQ4R18XJ100	10	S
R32	ERJ3GEYJ103	10K	
R33	ERJ3GEYJ681	680	
R34	ERJ3GEYJ151	150	
R35	ERJ3GEYJ751	750	
R36	ERJ3GEYJ103	10K	
R37	ERJ3GEYJ102	1K	
R38	ERJ3GEYJ102	1K	
R39	ERJ3GEYJ684	680K	
R40	ERJ3GEYJ684	680K	
R41	ERJ3GEYJ473	47K	
R42	ERJ3GEYJ124	120K	
R43	ERJ3GEYJ473	47K	
R44	ERJ3GEYJ101	100	
R45	ERJ3GEYJ101	100	
R46	ERJ3GEYJ124	120K	
R47	ERJ3GEYJ823	82K	
R48	ERJ3GEYJ102	1K	
R49	ERJ3GEYJ822	8.2K	
R50	ERJ3GEYJ823	82K	
R51	ERJ3GEYJ123	12K	
R52	ERJ3GEYJ823	82K	
R53	ERJ3GEYJ683	68K	
R54	ERJ3GEYJ104	100K	
R55	ERJ3GEYJ101	100	
R56	ERJ3GEYJ103	10K	
R57	ERJ8GEYJ390	39	
R59	ERJ1WYJ330	33	
R60	ERJ1WYJ330	33	
R61	ERJ3GEYJ101	100	
R62	ERJ3GEYJ221	220	
R63	ERJ3GEYJ103	10K	
R64	ERJ3GEYJ103	10K	
R65	ERJ3GEYJ103	10K	
R66	ERJ3GEYJ103	10K	
R67	ERJ3GEYJ222	2.2K	
R68	ERJ3GEYJ472	4.7K	
R70	ERJ3GEYJ103	10K	
R77	ERJ3GEYJ102	1K	
R78	ERJ3GEYJ154	150K	
R79	ERJ3GEYJ390	39	
R80	ERJ3GEYJ390	39	
R82	ERJ3GEYJ330	33	
R83	ERJ3GEYJ181	180	
R84	ERJ3GEYJ181	180	
R85	ERJ3GEYJ271	270	
R86	ERJ3GEYJ155	1.5M	
R87	ERJ3GEYJ102	1K	
C42	ERJ3GEYJ472	4.7K	
C11	PQ4R10XJ562	5.6K	S
C50	ERJ3GEYJ102	1K	
C51	ERJ3GEYJ102	1K	
C56	ERJ3GEY0R00	0	
		(CAPACITORS)	
C1	ECUV1C104KBV	0.1	
C2	ECQE2E474KZ	0.47	S
C3	ECUV1H103KBV	0.01	
C4	ECUV1H103KBV	0.01	
C6	ECKD2H681KB	680P	S
C7	ECKD2H681KB	680P	S
C14	ECUV1H103KBV	0.01	
C15	ECUV1H103KBV	0.01	
C16	PQCUV1A105KB	1	

Ref. No.	Part No.	Part Name & Description	Remarks
C17	ECUV1H103KBV	0.01	
C18	PQCUV1A105KB	1	
C19	PQCUV1C104KB	0.1	
C21	ECEA1HKS100	10	S
C24	ECKD2H102KB2	0.001	S
C25	ECKD2H102KB2	0.001	S
C26	ECUV1C104KBV	0.1	
C27	ECUV1H151JCV	150P	S
C28	ECUV1C104KBV	0.1	
C29	ECUV1C104KBV	0.1	
C30	ECUV1C104KBV	0.1	
C31	ECUV1H100DCV	10P	
C32	ECUV1H100DCV	10P	
C33	ECUV1H100DCV	10P	
C34	ECUV1H100DCV	10P	
C35	ECUV1H100DCV	10P	
C36	ECEA1CK101	100	S
C37	ECEA0JKA331	330	
C39	ECEA0JKA331	330	
C40	ECUV1A105ZFBV	1	
C41	ECUV1C104KBV	0.1	
C43	ECUV1A105ZFBV	1	
C44	ECUV1C104KBV	0.1	
C45	ECUV1A105ZFBV	1	
C46	ECUV1H153KBV	0.015	
C47	ECUV1C823KBV	0.082	
C48	ECUV1C104KBV	0.1	
C49	ECUV1C333KBV	0.033	
C52	ECUV1C105ZFBV	1	
C53	ECUV1C823KBV	0.082	
C54	ECUV1H060DCV	6P	S
C55	ECUV1H270JCV	27P	
C57	ECUV1H100DCV	10P	
C58	ECUV1H100DCV	10P	
C60	ECUV1H330JCV	33P	
C61	ECUV1A475KB	4.7	
C62	ECUV1H060DCV	6P	S
C63	ECUV1H100DCV	10P	
C64	ECUV1H100DCV	10P	
C65	ECUV1H030CCV	3P	
C66	ECUV1H2R0CCV	2P	
C67	ECUV1H100DCV	10P	
C68	ECUV1H2R0CCV	2P	
C69	ECUV1A475KB	4.7	
C70	ECUV1H102KBV	0.001	
C71	ECUV1H101JCV	100P	
C72	ECUV1H102KBV	0.001	
C75	ECUV1H100DCV	10P	
C76	ECUV1H100DCV	10P	
C77	ECUV1H020CC	2P	
C78	ECUV1H2R0CCV	2P	
C79	ECUV1H100DCV	10P	
C80	ECUV1H2R0CCV	2P	
C88	ECUV1H100DCV	10P	
C89	ECUV1H220JCV	22P	
C90	PQCUV1C474KB	0.47	
C91	PQCUV1C104KB	0.1	
C92	ECUV1H100DCV	10P	
C96	ECUV1H100DCV	10P	
C97	ECUV1H102KBV	0.001	
C98	ECUV1H101JCV	100P	
C102	ECUV1H0R5CCV	0.5P	
C103	ECUV1H101JCV	100P	
R22	ECUV1H100DCV	10P	
R69	ECUV1H220JCV	22P	
		(OTHERS)	
IC9	J3FKK0000003	RF UNIT	
S1	K0H1BB000018	SPECIAL SWITCH	
SA1	J0LF00000026	VARISTOR (SURGE ABSORBER)	
X1	H0D103500003	CRYSTAL OSCILLATOR	

35.2. Handset

35.2.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
101	PQGP10226Y3	PANEL, LCD (for KX-A144BXS)	AS-HB
101	PQGP10226Y4	PANEL, LCD (for KX-A144BXT)	AS-HB
101	PQGP10226Y5	PANEL, LCD (for KX-A144BXF)	AS-HB
102	PQHS10553Z	TAPE, DOUBLE SIDED	
103	PQKM10587VD	CABINET BODY (for KX-A144BXS)	ABS-HB
103	PQKM10587VE	CABINET BODY (for KX-A144BXT)	ABS-HB
103	PQKM10587VF	CABINET BODY (for KX-A144BXF)	ABS-HB
104	PQHS10554Z	SPACER, LCD CUSHION	
105	PQBC10375Z1	BUTTON, NAVI KEY	
106	PQBC10376Z1	BUTTON, SP PHONE	
107	PQXS10225X	KEYBOARD SWITCH, 19 KEY	
108	PQHS10467Z	COVER, SP NET	
109	LOAD02A00021	SPEAKER	
110	PQSA10134Z	ANTENNA	
111	PQJT10204Z	TERMINAL (L)	
112	PQJT10205Z	TERMINAL (R)	
113	PQHX11202Z	INSULATOR	
114	PQHR10964Z	GUIDE, SPEAKER	
115	LOAD02A00010	SPEAKER	
116	PQHG10693Z	SPACER, SP RUBBER SHEET	
117	PQHS10457Z	COVER, SP NET	
118	PQJC10058Z	BATTERY TERMINAL (+)	
119	PQJC10057Z	BATTERY TERMINAL (-)	
120	PQJC10056Z	BATTERY TERMINAL	
121	PQKF10626Z1	CABINET COVER (for KX-A144BXS)	ABS-HB
121	PQKF10626Z2	CABINET COVER (for KX-A144BXT)	ABS-HB
121	PQKF10626Z3	CABINET COVER (for KX-A144BXF)	ABS-HB
122	PQGT17145Z	NAME PLATE (for KX-A144BXS)	
122	PQGT17146Z	NAME PLATE (for KX-A144BXT)	
122	PQGT17147Z	NAME PLATE (for KX-A144BXF)	
123	PQHX11271Y	PLASTIC PARTS, BATTERY COVER SHEET	
124	PQHS10561Y	SPACER, BATTERY COVER	
125	PQKK10134ZG	LID, BATTERY COVER (for KX-A144BXS)	ABS-HB
125	PQKK10134ZB	LID, BATTERY COVER (for KX-A144BXT)	ABS-HB
125	PQKK10134ZH	LID, BATTERY COVER (for KX-A144BXF)	ABS-HB

35.2.2. Main P.C.Board Parts

Note:

(*2) When replacing IC2, data need to be written to it with PQZZTCD445BX.

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPD1445BXR	MAIN P.C.BOARD ASS'Y (RTL) (for KX-TCDD445BXS/BXT/BXF)	
PCB100	PQWPD1444BXR	MAIN P.C.BOARD ASS'Y (RTL) (for KX-A144BXS/BXT/BXF)	
		(ICs)	
IC1	C2HBAK000013	IC	
IC2	PQWID1440ER	IC (*2)	
IC101	C1BB00000265	IC	
		(TRANSISTORS)	
Q1	B1CFMC000006	TRANSISTOR(SI)	
Q2	B1ADGE000004	TRANSISTOR(SI)	
Q3	UN5216	TRANSISTOR(SI)	S
Q101	UN521	TRANSISTOR(SI)	S
Q102	UN521	TRANSISTOR(SI)	S
Q103	UN521	TRANSISTOR(SI)	S
		(DIODES)	
D1	B0JCMF000035	DIODE(SI)	
D3	MA2Z74800L	DIODE(SI)	
D6	MA8047	DIODE(SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
D7	MA8047	DIODE(SI)	S
D101	B0JCDD000002	DIODE(SI)	
LED101	LNJ308G8JRA	LED	
LED102	LNJ308G8JRA	LED	
LED103	LNJ308G8JRA	LED	
LED104	PQVDSML310MT	LED	S
LED105	PQVDSML310MT	LED	S
LED106	PQVDSML310MT	LED	S
LED107	PQVDSML310MT	LED	S
LED108	PQVDBR1111C	LED	S
		(COILS)	
F1	PQLQR2M5N6K	COIL	S
L2	G1A470L00001	COIL	
L3	PQLQR4D4R7K	COIL	
L4	G1C100MA0072	COIL	
L5	G1C100MA0072	COIL	
L6	G1C2N7Z00008	COIL	
		(RESISTORS)	
R1	ERJ3GEYJ222	2.2K	
R2	ERJ8BQJR30	0.3	
R3	ERJ3GEYJ560	56	
R4	ERJ3GEYJ103	10K	
R5	ERJ3GEYJ471	470	
R6	ERJ3GEYJ332	3.3K	
R7	ERJ3GEYJ471	470	
R8	ERJ3GEYJ471	470	
R11	ERJ2GEY0R00	0	
R17	ERJ2GEYJ560	56	
R18	ERJ2GEYJ330	33	
R19	ERJ3GEYJ153	15K	
R20	ERJ2GEYJ560	56	
R21	ERJ6RSJR10V	0.1	
R22	ERJ3GEY0R00	0	
R23	ERJ3GEYJ2R2	2.2	
R101	ERJ3GEYJ820	82	
R102	ERJ3GEYJ820	82	
R103	ERJ3GEYJ820	82	
R104	PQ4R10XJ680	68	S
R105	ERJ3GEYJ391	390	
R107	ERJ3GEYJ563	56K	
R108	ERJ3GEYJ683	68K	
R109	ERJ2GEYJ103	10K	
		(CAPACITORS)	
C2	ECUV1A475KB	4.7	
C3	ECUV1C104KBV	0.1	
C4	ECUV1C104KBV	0.1	
C5	ECST0JY475	4.7	
C6	ECUV1H100DCV	10P	
C7	ECUV1C104KBV	0.1	
C8	ECUV1H100DCV	10P	
C12	ECUE1C100DCQ	10P	
C14	ECEV0JA331	330	
C15	ECEV0JA331	330	
C16	ECUV1H1R0CCV	1P	
C17	ECUV1H180JCV	18P	
C18	ECUE1A104KBQ	0.1	
C20	ECUE1A104KBQ	0.1	
C21	ECUE1A104KBQ	0.1	
C22	ECUE1A104KBQ	0.1	
C23	ECUV1C104KBV	0.1	
C24	ECUV1C104KBV	0.1	
C26	ECUV1C104KBV	0.1	
C27	ECUE1A104KBQ	0.1	
C28	ECUV1C104KBV	0.1	
C29	ECUV1C104KBV	0.1	
C30	ECUV1C104KBV	0.1	
C31	ECUE1C100DCQ	10P	
C33	ECUV1A225KB	2.2	
C54	ECUE1C100DCQ	10P	
C55	ECUE1H2R0CCQ	2P	
C56	ECUE1H2R0CCQ	2P	
C57	ECUE1H330JCQ	33P	
C60	ECST0JY475	4.7	

Ref. No.	Part No.	Part Name & Description	Remarks
C62	ECUV1A105KBV	1	
C64	ECUV1A105KBV	1	
C65	ECUE1C100DCQ	10P	
C66	ECUE1C100DCQ	10P	
C67	ECUE1H2R0CCQ	2P	
C102	ECUV1H222KBV	0.0022	
C103	ECUE1C100DCQ	10P	
C105	ECUV1C104KBV	0.1	
C106	ECUV1A105KBV	1	
C107	ECUE1A104KBQ	0.1	
C108	ECUV1H100DCV	10P	
C109	ECUV1C104KBV	0.1	
C110	ECUV1H100DCV	10P	
C111	ECUV1H100DCV	10P	
C115	ECUV1H100DCV	10P	
C116	ECUV1H100DCV	10P	
C202	ECUE1C0R5CCQ	0.5P	
C206	ECUV1A475KB	4.7	
C208	ECUE1C100DCQ	10P	
C209	ECUV1H100DCV	10P	
		(OTHERS)	
E101	PQWLA144EXR	LCD ASSEMBLY	
E102	PQHX11255Z	SPACER, DIFFUSION SHEET	
E103	PQHR11043Z	TRANSPARENT PLATE, LCD	
E104	PQHS10632Z	TAPE, DOUBLE SIDED (LCD)	
E105	PQHR11042Z	GUIDE, LCD	
E106	PQHS10486Z	HEAT SHIELD PARTS	
MIC	L0CBAB000052	MICROPHONE	
IC3	J3FFK0000003	RF UNIT	
X1	H0D103500002	CRYSTAL OSCILLATOR	

35.3. Charger Unit

35.3.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
200	PQLV30018ZS3	CHARGER UNIT (for KX-A144BXS)	
200	PQLV30018ZT3	CHARGER UNIT (for KX-A144BXT)	
200	PQLV30018ZF3	CHARGER UNIT (for KX-A144BXF)	
200-1	PQGG10155YD	GRILLE (for KX-A144BXS)	ABS-HB
200-1	PQGG10155YE	GRILLE (for KX-A144BXT)	ABS-HB
200-1	PQGG10155YF	GRILLE (for KX-A144BXF)	ABS-HB
200-2	PQKM10591Y9	CABINET BODY (for KX-A144BXS)	PS-HB
200-2	PQKM10591Y5	CABINET BODY (for KX-A144BXT)	PS-HB
200-2	PQKM10591Y0	CABINET BODY (for KX-A144BXF)	PS-HB
200-3	PQKE10356Z1	GUIDE, CHARGE TERMINAL CASE	POM-HB
200-4	PQJT10206Z	CHARGE TERMINAL	
200-5	PQHX10991Z	CUSHION, URETHANE FORM	
200-6	PQMH10426Z	WEIGHT	
200-7	PQYF10563Z9	CABINET COVER (for KX-A144BXS)	PS-HB
200-7	PQYF10563Z5	CABINET COVER (for KX-A144BXT)	PS-HB
200-7	PQYF10563Z0	CABINET COVER (for KX-A144BXF)	PS-HB
200-8	PQGT17279Z	NAME PLATE (for KX-A144BXS)	
200-8	PQGT17280Z	NAME PLATE (for KX-A144BXT)	
200-8	PQGT17278Z	NAME PLATE (for KX-A144BXF)	

35.3.2. Main P.C.Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB200	PQWPA142ESCH	MAIN P.C.BOARD ASS'Y (RTL)	
		(DIODE)	
D1	B0JAME000085	DIODE(SI)	
		(JACK)	
J1	PQJJ1B4Y	JACK	S
		(RESISTORS)	
R1	ERJ1WYJ220	22	
R2	ERJ1WYJ270	27	

35.4. Accessories and Packing Materials

35.4.1. KX-TCD445BXS/BXT/BXF

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV19BXZ	AC ADAPTOR	△
A2	PQJA10075Z	CORD, TELEPHONE	
A3	PQXX14165Z	INSTRUCTION BOOK	
A4	PQQW13352Z	QUICK GUIDE (for English)	
A5	PQQW13328Z	QUICK GUIDE (for Arabic)	
A6	PQQW13468Z	LEAFLET	
A7	PQQW12846W	LEAFLET, RECHARGE	
P1	PQPP10100Z	PROTECTION COVER (for Base Unit)	
P2	PQPP10084Z	PROTECTION COVER (for Handset)	
P3	PQPK14270Z	GIFT BOX	
P4	PQPD10603Z	CUSHION	
P5	PQPD10620Z	CUSHION	

35.4.2. KX-A144BXS/BXT/BXF

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV200BXZ	AC ADAPTOR	△
A2	PQXX14190Z	INSTRUCTION BOOK (for English)	
A3	PQXX14199Z	INSTRUCTION BOOK (for Arabic)	
A4	PQQW12846W	LEAFLET, RECHARGE	
P1	PQPP10086Z	PROTECTION COVER (for Charger Unit)	
P2	PQPP10084Z	PROTECTION COVER (for Handset)	
P3	PQPK14279Z	GIFT BOX	

35.5. Fixtures and Tools

Part No.	Part Name & Description	Remarks
PQZZ1CD420BX	I2C PCB	
PQZZ1CD705BX	RS232C CABLE	
PQZZ2CD705BX	CLIP CABLE	
PQZZ3CD705BX	DC CABLE	
PQZZTCD445BX	BATCH FILE	

Note:

See CHECK PROCEDURE (BASE UNIT) (P.43), and CHECK PROCEDURE (HANDSET) (P.45).

36 FOR SCHEMATIC DIAGRAM

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

Notes:

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

Important Safety Notice:

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

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

36.2. Handset (SCHEMATIC DIAGRAM (HANDSET))

Notes:

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

36.3. Charger Unit (SCHEMATIC DIAGRAM (CHARGER UNIT))

Notes:

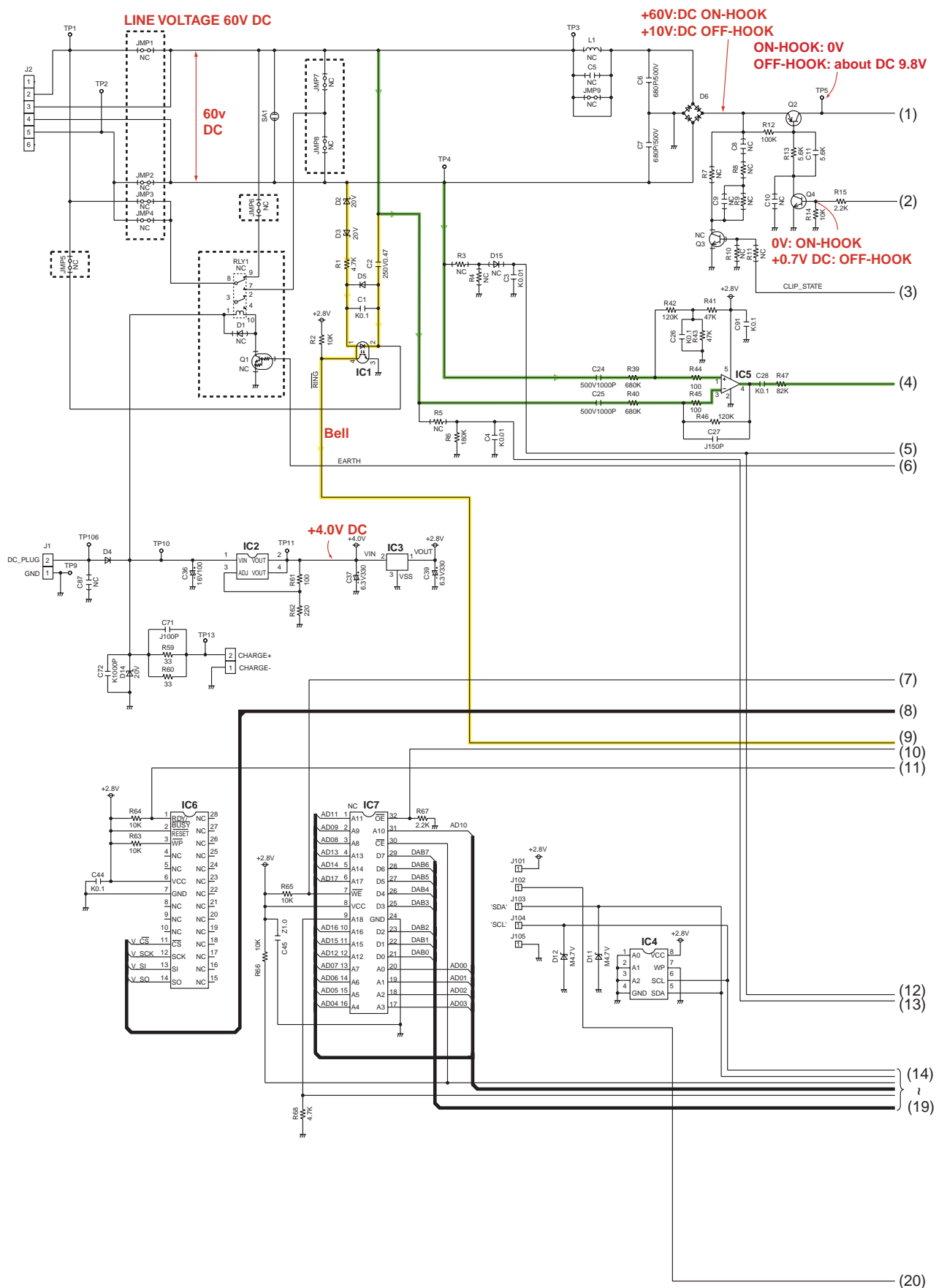
1. DC voltage measurements are taken with voltmeter from the negative voltage line.

Important Safety Notice:

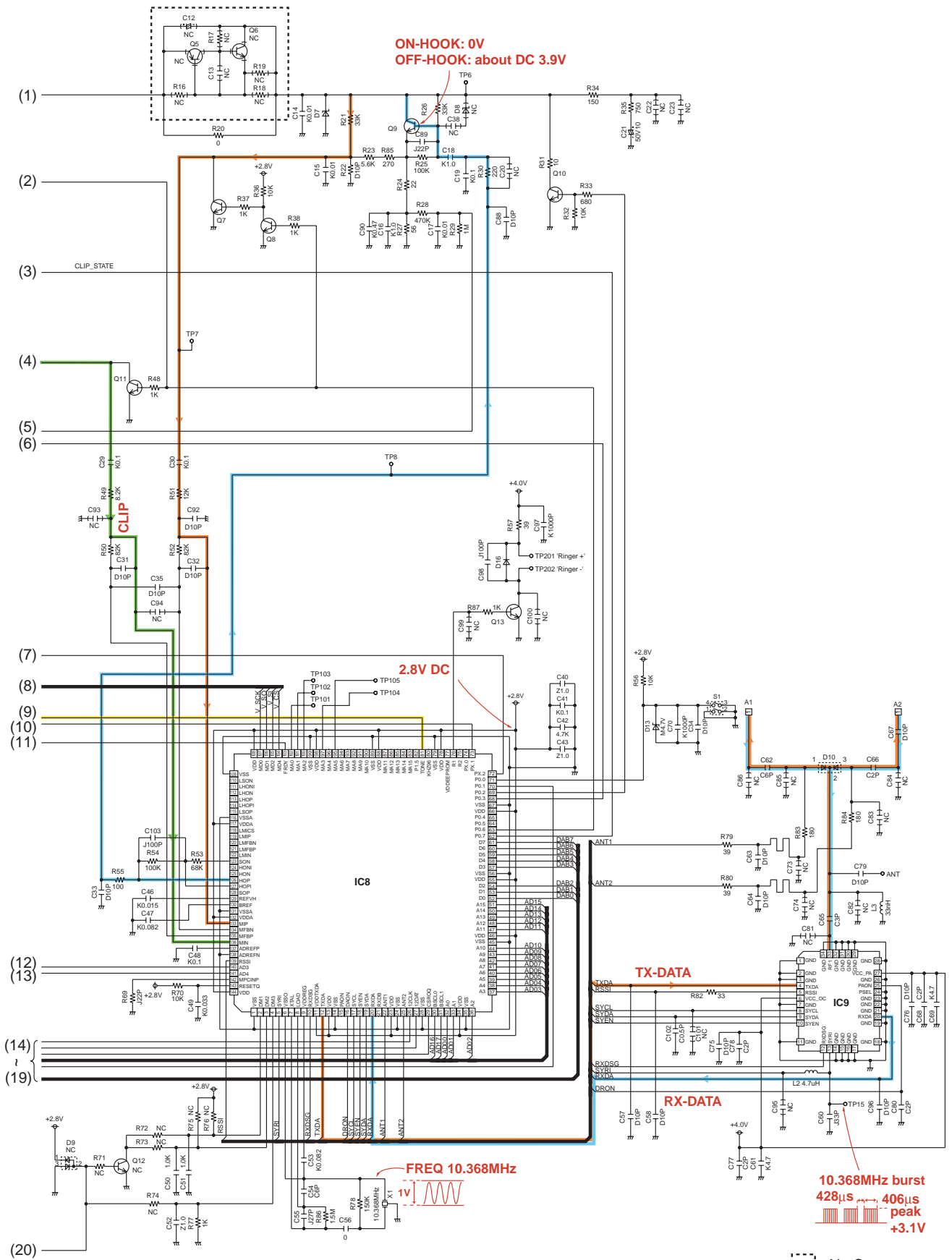
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

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

37 SCHEMATIC DIAGRAM (BASE UNIT)

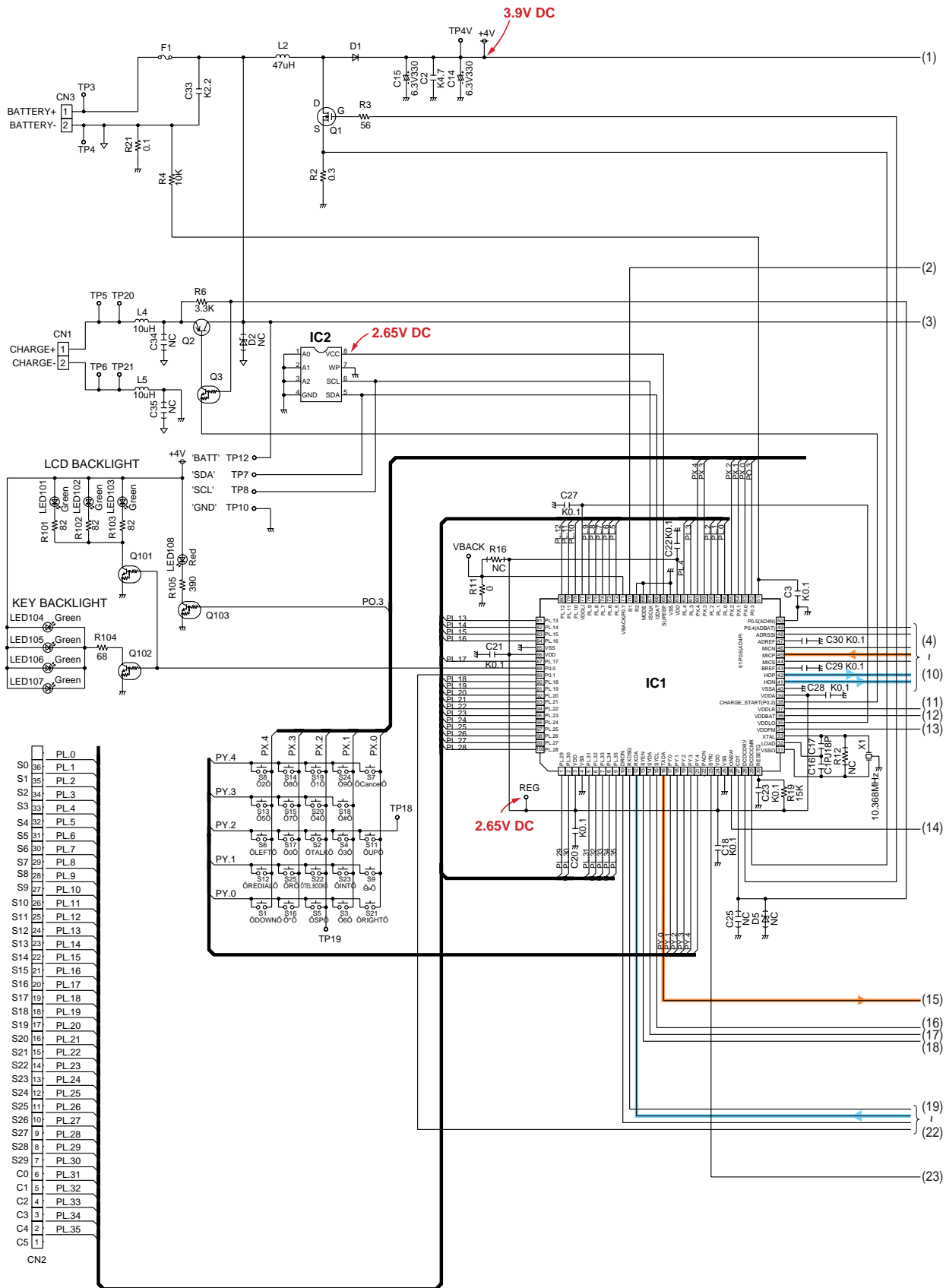


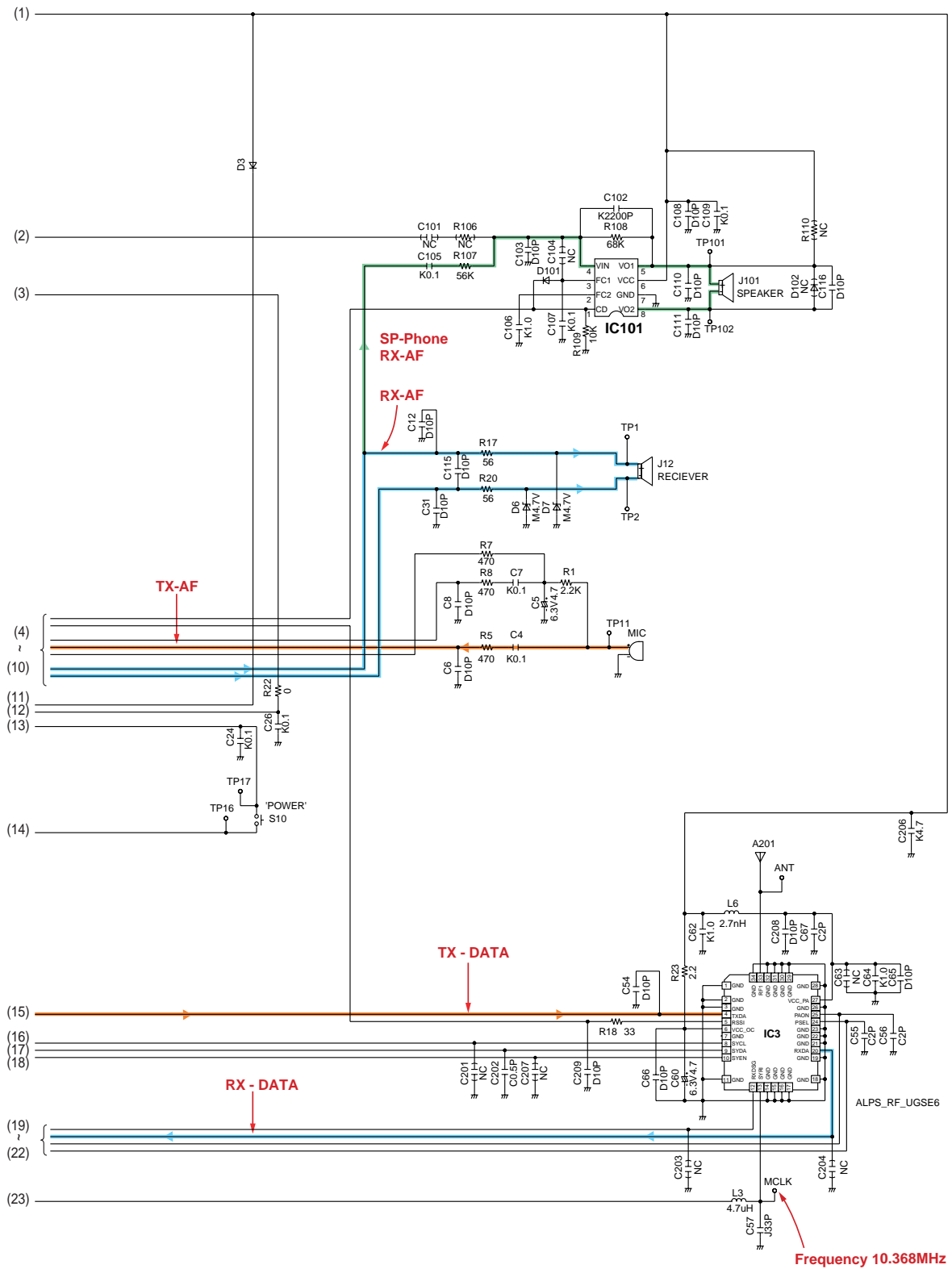
⌋ : No Components



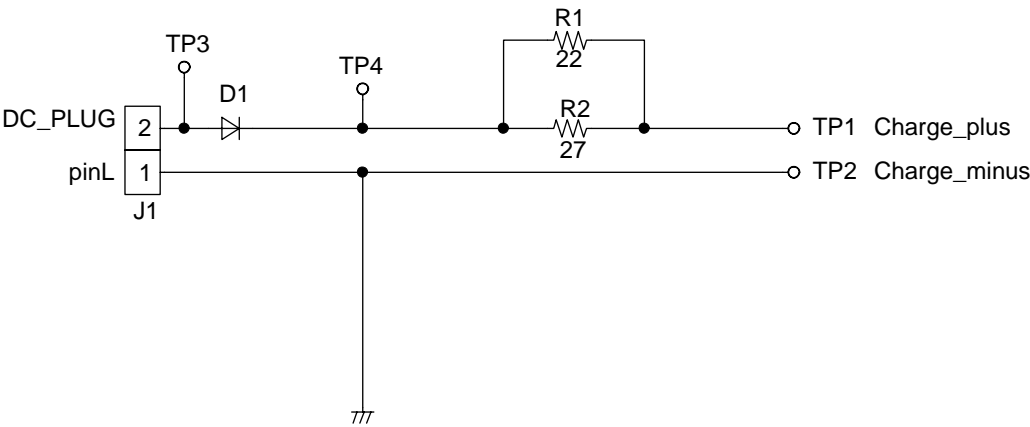
KX-TCDD445BXS/BXT/BXF SCHEMATIC DIAGRAM (BASE UNIT)

38 SCHEMATIC DIAGRAM (HANDSET)





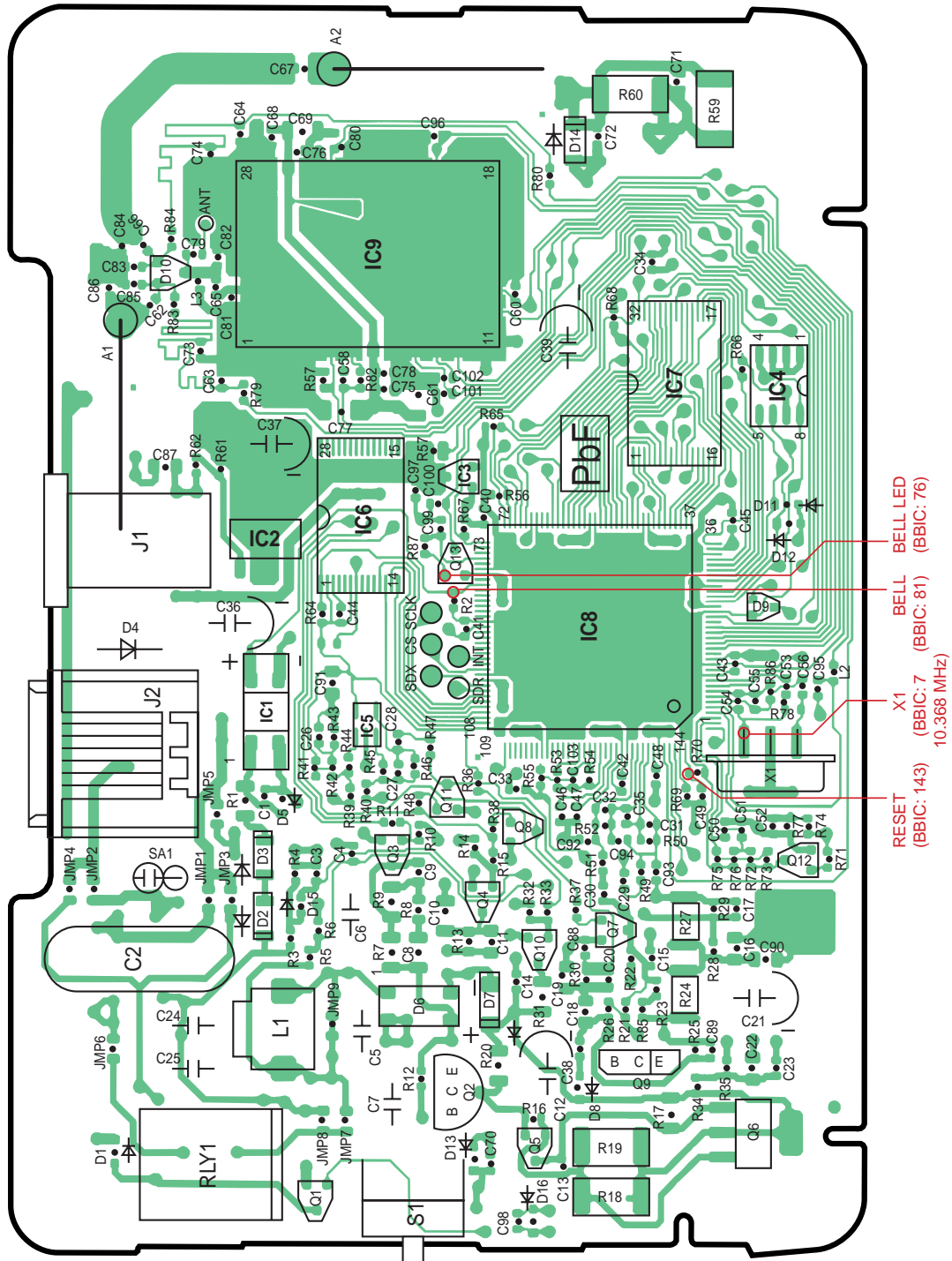
39 SCHEMATIC DIAGRAM (CHARGER UNIT)



SCHEMATIC DIAGRAM (CHARGER UNIT)

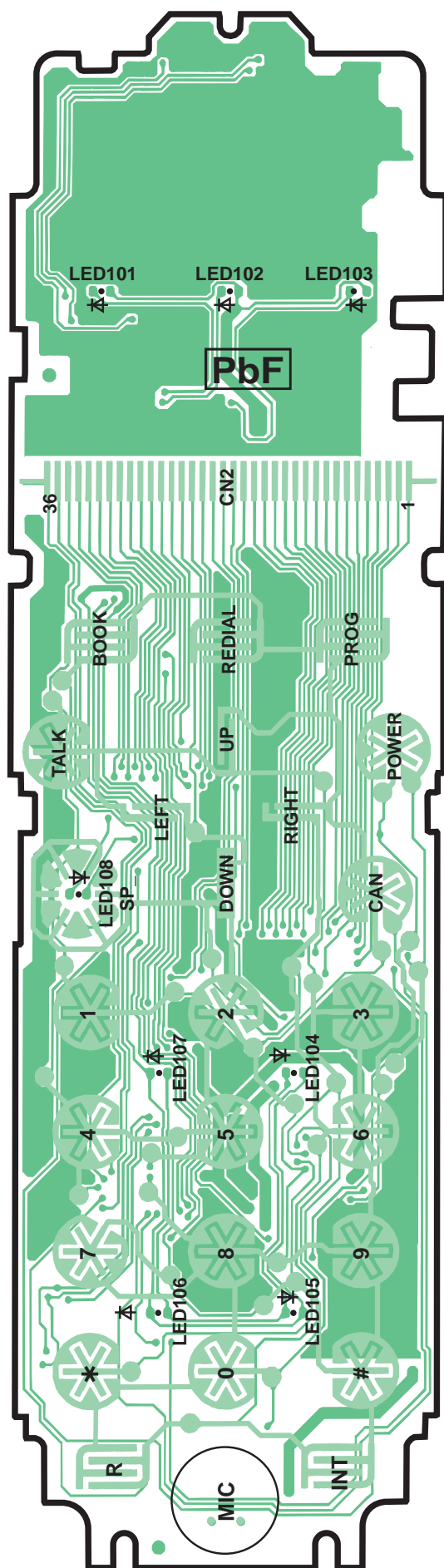
40 CIRCUIT BOARD (BASE UNIT)

40.1. Component View



KX-TC445BXS/BXT/BXF CIRCUIT BOARD (BASE UNIT) Component View

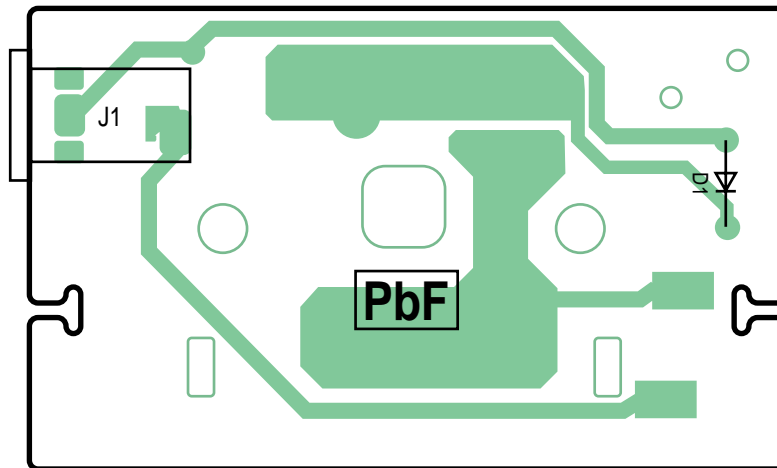




KX-A144XS/BXT/BXF CIRCUIT BOARD (HANDSET) Flow Solder Side View

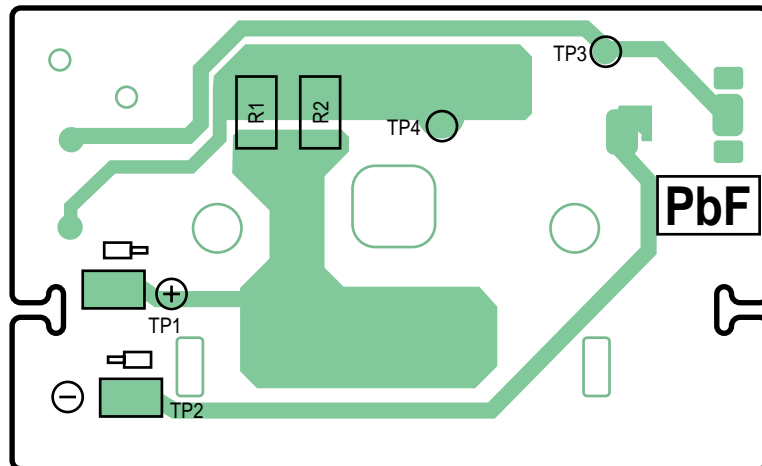
42 CIRCUIT BOARD (CHARGER UNIT)

42.1. Component View



CIRCUIT BOARD (CHARGER UNIT) Component View

42.2. Flow Solder Side View



CIRCUIT BOARD (CHARGER UNIT) Flow Solder Side View