# Service Manual

**Telephone Equipment**

**Model No.** **KX-TG6411BXS**
**KX-TG6411BXT**
**KX-TG6412BXS**
**KX-TG6412BXT**
**KX-TG6413BXS**
**KX-TG6413BXT**
**KX-TGA641BXS**
**KX-TGA641BXT**

Caller ID Compatible



KX-TGA641BXS/BXT
(Handset)

KX-TG6411BXS/BXT
(Base Unit)

(Charger Unit)

Digital Cordless Phone
S:Silver Version
T:Titanium Black Version
(for Asia, Middle Near East and other areas)

**Configuration for each model**

| Model No | Base Unit | Handset | Charger Unit |
|---|---|---|---|
| KX-TG6411 | 1 (TG6411) | 1 (TGA641) | |
| KX-TG6412 | 1 (TG6411) | 2 (TGA641) | 1 |
| KX-TG6413 | 1 (TG6411) | 3 (TGA641) | 2 |

# Panasonic®

## ⚠ WARNING

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

## IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

## 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.

- When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.
- The illustrations in this Service Manual may vary sllightly from the actual product.

# TABLE OF CONTENTS

# 1   Safety Precautions

## 1.1.   For Service Technicians

• **Repair service shall be provided in accordance with repair technology information such as service manual so as to prevent fires, injury or electric shock, which can be caused by improper repair work**.

   1. When repair services are provided, neither the products nor their parts or members shall be remodeled.

   2. If a lead wire assembly is supplied as a repair part, the lead wire assembly shall be replaced.

   3. FASTON terminals shall be plugged straight in and unplugged straight out.

• **ICs and LSIs are vulnerable to static electricity.**
  **When repairing, the following precautions will help prevent recurring malfunctions.**

   1. Cover plastic parts boxes with aluminum foil.

   2. Ground the soldering irons.

   3. Use a conductive mat on worktable.

   4. Do not grasp IC or LSI pins with bare fingers.

# 2   Warning

## 2.1.   Battery Caution

   1. Danger of explosion if battery is incorrectly replaced.

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

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

## 2.2.   About Lead Free Solder (Pbf: Pb free)

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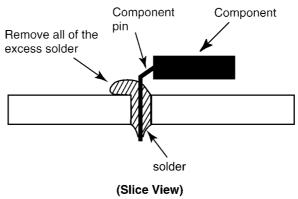
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

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.
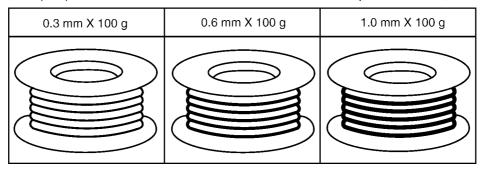
**Caution**

• 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).

• Exercise care while using higher temperature soldering irons.:
  Do not heat the PCB for too long time in order to prevent solder splash or damage to the PCB.

• PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100 °F (600 °C).

• 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).

**(Slice View)**

## 2.2.1. 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: 0.3 mm, 0.6 mm and 1.0 mm.

| 0.3 mm X 100 g | 0.6 mm X 100 g | 1.0 mm X 100 g |
|---|---|---|

# 2.3. Discarding of P.C. Board

When discarding P. C. Board, delete all personal information such as telephone directory and caller list or scrap P. C. Board.

# 3 Specifications

■ **Standard:**
DECT (Digital Enhanced Cordless Telecommunications),
GAP (Generic Access Profile)

■ **Number of channels:**
120 Duplex Channels

■ **Frequency range:**
1.88 GHz to 1.90 GHz

■ **Duplex procedure:**
TDMA (Time Division Multiple Access)

■ **Channel spacing:**
1,728 kHz

■ **Bit rate:**
1,152 kbit/s

■ **Modulation:**
GFSK (Gaussian Frequency Shift Keying)

■ **RF transmission power:**
Approx. 10 mW (average power per channel)

■ **Voice coding:**
ADPCM 32 kbit/s

■ **Power source (AC Adaptor):**
220–240V AC, 50/60 Hz
**Base unit:** PQLV219BXZ
**Charger:** PQLV219BXZ

■ **Power consumption**
**Base unit:**
Standby: Approx. 0.7 W
Maximum: Approx. 3.8 W
**Charger:**
Standby: Approx. 0.2 W
Maximum: Approx. 3.2 W

■ **Operating conditions:**
0 °C–40 °C, 20 %–80 % relative air humidity (dry)

■ **Dimensions:**
**Base unit:** Approx. 55 mm x 126 mm x 126 mm
**Handset:** Approx. 158 mm x 48 mm x 30 mm
**Charger:** Approx. 52 mm x 75 mm x 88 mm

■ **Mass (weight):**
**Base unit:** Approx. 140 g
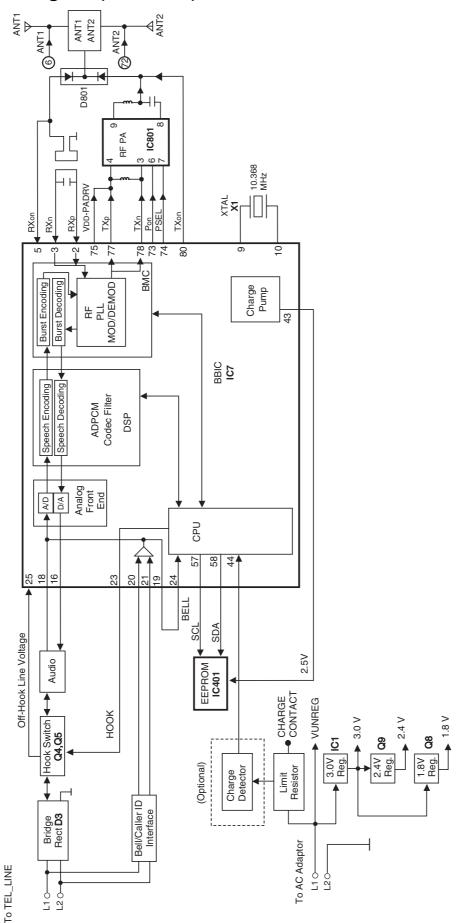**Handset:** Approx. 130 g
**Charger:** Approx. 60 g

**Note:**
• Design and specifications are subject to change without notice.

**Note for Service:**
• **Operation range:** Up to 300 m outdoors, Up to 50 m indoors, depending on the condition.
• **Analog telephone connection:** Telephone Line

# 4 Technical Descriptions

## 4.1. Block Diagram (Base Unit)



KX-TG6411/6412/6413 BLOCK DIAGRAM (BASE UNIT)

## 4.2.    Circuit Operation (Base Unit)

### 4.2.1.    Outline

Base Unit consists of the following ICs as shown in **Block Diagram (Base Unit)** (P.7).

• DECT BBIC (**B**ase **B**and IC): IC7
   - 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 code 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
   - PLL Oscillator
   - Detector
   - Compress/Expander
   - First Mixer
   - All interfaces (ex: RF Power Amp, EEPROM, LED, Analog Front End, etc.)
• RF Power Amp.: IC801
   - Amplifier for transmission and reception
• EEPROM: IC401
   - Temporary operating parameters (for RF, etc.)
• Additionally,
   - Power Supply Circuit (+3.0 V, +2.4 V, +1.8 V output)
   - Crystal Circuit (10.368 MHz)
   - Charge Circuit
   - Telephone Line Interface Circuit

## 4.2.2.  Power Supply Circuit

The power is supplied to the DECT BBIC, RF Module, EEPROM and Charge Contact from AC Adaptor (+6.5 V) as shown in Fig.101. The power supply is as follows;

• DECT BBIC (IC7):

DC Jack (+6.5 V) →D1→ IC1 → IC7

DC Jack (+6.5 V) →D1→ IC1 → Q9 → IC7

DC Jack (+6.5 V) →D1→ IC1 → Q8 → IC7

• RF Power Amp. (IC801):
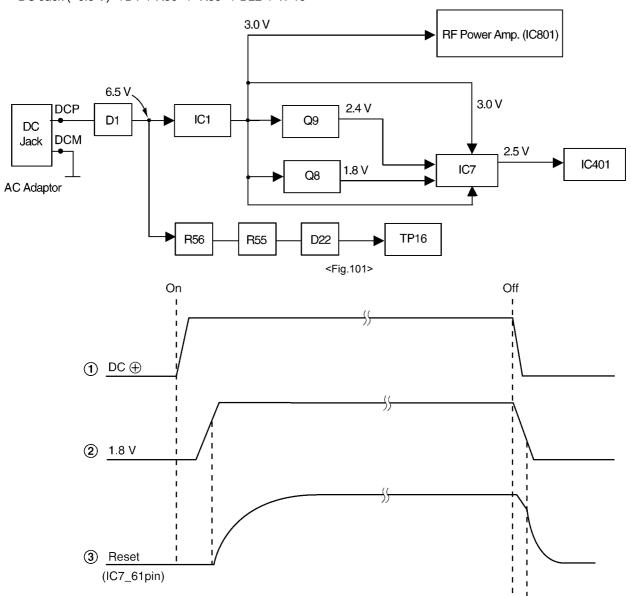
DC Jack (+6.5 V) →D1→ IC1 → IC801 (Power AMP)

• EEPROM (IC401):

DC Jack (+6.5 V) →D1→ IC1 → IC7→ IC401

• Charge Contact (TP16):

DC Jack (+6.5 V) →D1→ R56 →  R55 → D22→ TP16



<Fig.101>

## 4.2.3. Telephone Line Interface

**<Function>**
 • Bell signal detection
 • Clip signal detection
 • ON/OFF hook circuit

**Bell & Clip (: Calling Line Identification Presentation: Caller ID) signal detection:**
 In the standby mode, Q3 is open to cut the DC loop current and decrease the ring load.
 When ring voltage appears at the L1T (A) and L1R (B) leads (when the telephone rings), the AC ring voltage is transferred as follows;
 • B → L2 → C4 → R6 → R33 → IC7 Pin 21 (CID INp)
 • A → L1 → C3 → R4 → R35 → IC7 Pin 20 (CID INn)

**ON/OFF hook circuit:**
 In the standby mode, Q3 is open, and connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an **on-hook condition**.
 When IC7 detects a ring signal or press the TALK Key onto the handset, Q4 turns on and then Q3 turns on, thus providing an **off-hook condition** (DC current flows through the circuit) and the following signal flow makes the loop current.
 • B → L2 →D3 → Q3 → Q5 → R21 → R22 → D3 → L1 →A [**OFF HOOK**]

## 4.2.4. Transmitter/Receiver

 • Audio Circuits and DTMF tone signal circuits.
 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 Path:**
 *Refer to **Signal Route** (P.14).

### 4.2.4.1. Transmitter Block

 The voice signal input from the TEL LINE interface goes to RF Power Amp. (IC801) through DECT BBIC (IC7) as shown in **Block Diagram (Base Unit)** (P.7)
 The voice signal passes through the analog part of IC7 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 (**G**eneric **A**ccess **P**rofile) standard DECT frame, assigning to a time slot and channel etc.
 In IC7, the carrier frequency is changing, and frequency modulated RF signal is generated.In IC801,RF signal is amplified, and radiated from antenna. Handset detects the voice signal or data signal in the circuit same as the following explanation of Receiver Block.

### 4.2.4.2. Receiver Block
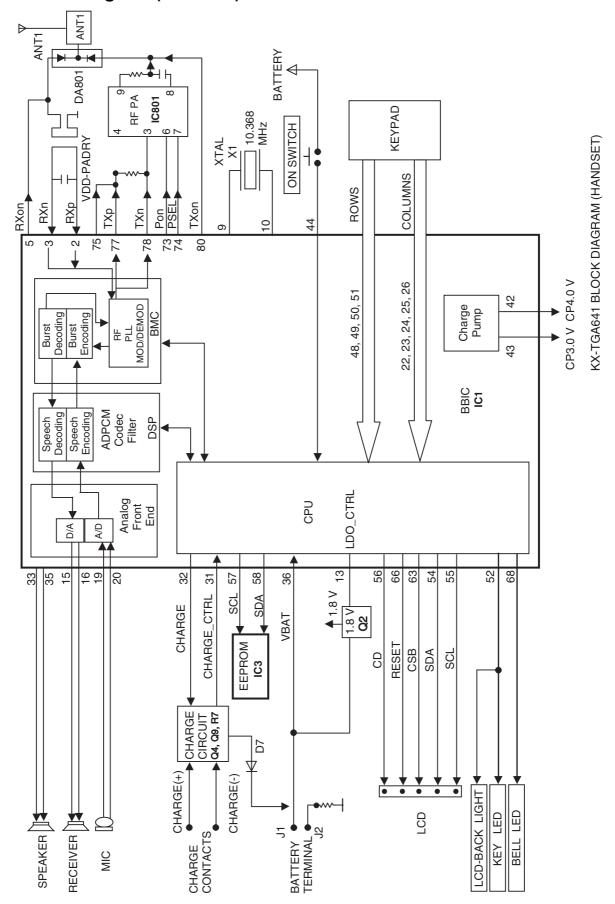
 The signal of 1900 MHz band (1881.792 MHz ~ 1897.344 MHz) which is input from antenna is input to IC7 as shown in **Block Diagram (Base Unit)** (P.7).
 In IC7, the signal of 1900 MHz band is downconverted to 864 kHz signal and demodulated, as GAP (**G**eneric **A**ccess **P**rofile) standard DECT frames. 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.

## 4.2.5. Pulse Dialling

 During pulse dialing the hookswitch (Q3, Q4) 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 Q2.

# 4.3. Block Diagram (Handset)

# 4.4. Circuit Operation (Handset)

## 4.4.1. Outline

Handset consists of the following ICs as shown in **Block Diagram (Handset)** (P.11).

• DECT BBIC (**B**ase **B**and IC): IC1
- All data signals (forming/analyzing ACK or CMD signal)
- All interfaces (ex: Key, Detector Circuit, Charge, DC/DC Converter, EEPROM, LCD, RF Power Amp.)
- PLL Oscillator
- Detector
- Compress/Expander
- Reception

• RF Power Amp: IC801
- Amplifier for transmission

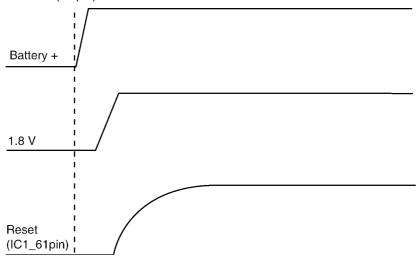• EEPROM: IC3
- Temporary operating parameters (for RF, etc.)

## 4.4.2. Power Supply Circuit/Reset Circuit

**Circuit Operation:**

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

BATTERY(2.2 V ~ 2.6 V: BATT+) $\rightarrow$ F1 $\rightarrow$ Q2 (1.8 V), IC1-43pin (2.5V)

The Reset signal generates IC1 (61 pin) and 1.8 V.



## 4.4.3. Charge Circuit

**Circuit Operation:**

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

DC+(6.5 V) $\rightarrow$ D1 $\rightarrow$ R56 $\rightarrow$ R55 $\rightarrow$ D22 $\rightarrow$ CHARGE+(Base) $\rightarrow$ CHARGE+(Handset) $\rightarrow$ Q4 $\rightarrow$ D7$\rightarrow$ F1 $\rightarrow$ BATTERY+... Battery...

BATTERY- $\rightarrow$ R45 $\rightarrow$ GND $\rightarrow$ CHARGE-(Handset)$\rightarrow$ CHARGE-(Base) $\rightarrow$ GND $\rightarrow$ DC-(GND)

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

The charge current is controlled by switching Q9 of Handset.

Refer to Fig.101 in **Power Supply Circuit** (P.9).

## 4.4.4. 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(Batt) $\leqq$ 2.25 V ± 50 mV

The BBIC detects this level and "⬛" starts flashing.

• Power Down

Battery voltage: V(Batt) $\leqq$ 2.0 V ± 50 mV

The BBIC detects this level and power down.
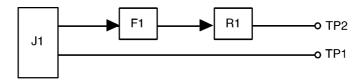
## 4.4.5. Speakerphone

The hands-free loudspeaker at SP+ and SP- is used to generate the ring alarm.

# 4.5. Circuit Operation (Charger Unit)

## 4.5.1. Power Supply Circuit

The power supply is as shown.

```
┌─────┐         ┌─────┐      ┌─────┐
│     │────────▶│ F1  │─────▶│ R1  │────────o TP2
│ J1  │         └─────┘      └─────┘
│     │                                o TP1
│     │──────────────────────────────
└─────┘
```

AC Adaptor

## 4.6. Signal Route

| SIGNAL ROUTE | SIGNAL ROUTE |
|---|---|
| | IN ⟶ ROUTE ⟶ OUT |

**DTMF TONE TEL OUT (to Tel Line)**

(BASE UNIT)
IC7 (16) - R116 - R29 - C22 - Q5 - Q3 - D3 ⊤ L1 - A
                                                             └ L2 - B

**DTMF TONE TEL IN (from Tel Line)**

(BASE UNIT)
A - L1 ⊤ D3 - Q3 - Q5 - R20 - C56 - R117 - IC7 (18)
B - L2 ┘

**CDL TX (to Tel Line)**

(HANDSET)
MIC (+) - R73 - C11 - RA4 - IC1 (20) ⊤ IC1(77) - IC801 (4) ⊤
MIC (–) - R74 - C13 - RA4 - IC1 (19) ┴ IC1(78) - IC801 (3) ┴ IC801(9) - L802 - C812 -
DA801 - C803 - C859 - ANT to BASE

(BASE UNIT)
from HANDSET   ANT1 - C851 ⊤ DA802 - C859 - C803 - DA801 - C826 ⊤ IC7 (3)
                   ANT2 - C853 ┘                                         └ IC7 (2)

⊤ IC7 (16) - R116 - R29 - C22 - Q5 - Q3 - D3 ⊤ L1 - A
┘                                                 └ L2 - B

**CDL RX (from Tel Line)**

(BASE UNIT)
A - L1 ⊤ D3 - Q3 - Q5 - R20 - C56 - R117 - IC7 (18) ⊤ IC7 (77) - IC801 (4) ⊤ IC801 (9) -
B - L2 ┘                                               └ IC7 (78) - IC801 (3) ┘
L802 - C812 - DA801 - C803 - C859 - DA802 ⊤ C851 - ANT1
                                                  └ C853 - ANT2  to HANDSET

(HANDSET)
from BASE UNIT   ANT - C859 - C803 - DA801 - C826 ⊤ IC1 (3)
                                                   └ IC1 (2)

⊓ IC (16) - L9 - RECEIVER (+)
⊔ IC (15) - RECEIVER (–)

**Caller ID (from Tel Line)**

(BASE UNIT)
B - L2 - C4 - R6 - R33 - IC7 (21) ⊓ IC7 (77) - R801 (4) ⊤ IC801 (9) - L802 - C812 -
A - L1 - C3 - R4 - R35 - IC7 (20) ⊔ IC7 (78) - R801 (3) ┘
DA801 - C803 - C859 - DA802 ⊤ C851 - ANT1
                                    └ C853 - ANT2  to HANDSET

**SP-PHONE TX (to Tel Line)**

(HANDSET)
MIC (+) - R73 - C11 - RA4 - IC1 (20) ⊓ IC1(77) - IC801 (4) ⊤
MIC (–) - R74 - C13 - RA4 - IC1 (19) ⊔ IC1(78) - IC801 (3) ┴ IC801(9) - L802 - C812 -
DA801 - C803 - C859 - ANT to BASE

(BASE UNIT)
from HANDSET   ANT1 - C851 ⊤ DA802 - C859 - C803 - DA801 - C826 ⊤ IC7 (3)
                   ANT2 - C853 ┘                                         └ IC7 (2)

⊤ IC7 (16) - R116 - R29 - C22 - Q5 - Q3 - D3 ⊤ L1 - A
┘                                                 └ L2 - B

**SP-PHONE RX (to Tel Line)**

(BASE UNIT)
A - L1 ⊤ D3 - Q3 - Q5 - R20 - C56 - R117 - IC7 (18) ⊤ IC7 (77) - IC801 (4) ⊤ IC801 (9)
B - L2 ┘                                               └ IC7 (78) - IC801 (3) ┘
L802 - C812 - DA801 - C803 - C859 - DA802 ⊤ C851 - ANT1
                                              └ C853 - ANT2  to HANDSET

(HANDSET)
from BASE UNIT   ANT - C859 - C803 - DA801 - C826 ⊤ IC1 (3)
                                                   └ IC1 (2)

⊓ IC1 (33) - R209 - SP (-)
⊔ IC1 (35) - R208 - SP (+)

# 5 Location of Controls and Components

Refer to the Operating Instructions.

**Note:**
You can download and refer to the Operating Instructions (Instruction book) on TSN Server.

# 6 Installation Instructions

Refer to the Operating Instructions.

**Note:**
You can download and refer to the Operating Instructions (Instruction book) on TSN Server.

# 7 Operating Instructions

Refer to the Operating Instructions.

**Note:**
You can download and refer to the Operating Instructions (Instruction book) on TSN Server.

## 7.1. For Service Hint

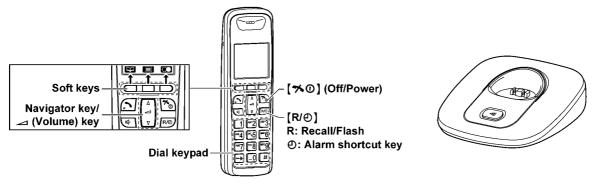| Items | Contents |
|---|---|
| Battery | You could use other rechargeable batteries sold in a market, but the unit is not guaranteed to work properly. |
| | The battery strength may not be indicated correctly if the battery is disconnected and connected again, even after it is fully charged. In that case, by recharging the battery as mentioned in **Battery Charge**, you will get a correct indication of the battery strength. |
| PIN Code | ● Change the PIN using the following method.<br>**1** ▣ (middle soft key)<br>**2** [▼]/[▲]: "Base Unit Setup" → OK<br>**3** [▼]/[▲]: "Base Unit PIN" → OK<br>**4** [✳][7][0][0][0]<br>**5** Enter the new 4-digit base unit PIN. → OK → [✆] |

# 8 Service Mode

## 8.1. Engineering Mode

### 8.1.1. Base Unit

**Important:**
  Make sure the address on LCD is correct when entering new data. Otherwise, you may ruin the unit.
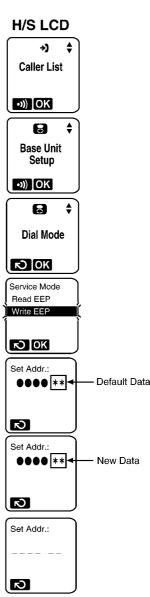


Soft keys

Navigator key/
⊿ (Volume) key

Dial keypad

【✂①】(Off/Power)

【R/☺】
R: Recall/Flash
☺: Alarm shortcut key

### H/S key operation

1). Register a Handset to a Base Unit.

2). Press 【▤】.

3). Select "Base Unit Setup" using 【▲】or【▼】
then press 【▤】.

4). Enter "7", "2", "6", "2", "7", "6", "6", "4".
**Note:** 7262 7664 = PANA SONI
(see letters printed on dial keys)

5). Select "Write EEPROM" using 【▲】or【▼】
then press 【▤】.

6). Enter "●", "●", "●", "●" (Address). (*1)

7). Enter "＊", "＊" (New Data). (*1)

8). Press 【▤】, a long confirmation beep
will be heard.

9). Press 【✂①】(off) to return to standby mode.
After that, turn the base unit power off and then power on.

### H/S LCD



Caller List

Base Unit
Setup

Dial Mode

Service Mode
Read EEP
Write EEP

Set Addr.:
●●●● ＊＊ ← Default Data

Set Addr.:
●●●● ＊＊ ← New Data

Set Addr.:
＿ ＿ ＿ ＿ ＿ ＿

16

**Frequently Used Items (Base Unit)**

ex.)

| Items | Address | Default Data | New Data | | Remarks |
|---|---|---|---|---|---|
| C-ID (FSK) sensitivity | 04 B6 | 00 | 01 (6 dB up) | 02 (12 dB up) | When hex changes from "00" to "01" or "02", gain increases by 6 dB or 12 dB. |
| C-ID (DTMF) sensitivity | 04 C4 | 50 | 60 (6 dB up) | 70 (12 dB up) | When hex changes from "50" to "60" or "70", gain increases by 6 dB or 12 dB. |
| Frequency | 00 02/00 01 | 02/70 | - | - | Use these items in a **READ-ONLY** mode to confirm the contents. Careless rewriting may cause serious damage to the computer system. |
| ID | 00 10~00 14 | Given value | - | - | |
| Bell length | 01 F7 | 32 (5 sec) (*2) | 1E (3 sec) | 14 (2 sec) | This is time until bell stops ringing. (Unit: 100 ms) |
| PULSE Dial speed (10PPS -> 20PPS) | 03 9F | 28 (40 msec) (*3) | 19 (20 msec) | - | This is pulse make time. (Unit: 1 ms) |
| | 03 A0 | 3C (60 msec) (*3) | 19 (30 msec) | - | This is pulse break time. (Unit: 1 ms) |
| | 01 E4 | 57 (870 msec) (*3) | 2C (440 msec) | - | This is inter-digit time in pulse mode. (Unit: 10 ms) |

**Note:**

(*1) When you enter the address or New Data, please refer to the table below.

| Desired Number (hex) | Input Keys | Desired Number (hex) | Input Keys |
|---|---|---|---|
| 0 | 0 | A | [R] + 0 |
| 1 | 1 | B | [R] + 1 |
| . | . | C | [R] + 2 |
| . | . | D | [R] + 3 |
| . | . | E | [R] + 4 |
| 9 | 9 | F | [R] + 5 |
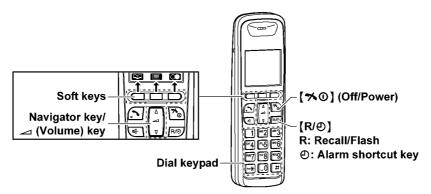
(*2)

| Bell length | 32(hex) = 50(dec) → 50 × 100 msec = 5000 msec (5 sec) |
|---|---|
| PULSE Dial speed (10PPS -> 20PPS) | 28 (hex) = 40 (dec) → 40 × 1 msec = 40 msec →28 (40 msec) |
| | 3C (hex) = 60 (dec) → 60 × 1 msec = 60 msec →3C (60 msec) |
| | 57 (hex) = 87 (dec) → 87 × 10 msec = 870 msec |

## 8.1.2. Handset

**Important:**

Make sure the address on LCD is correct when entering new data. Otherwise, you may ruin the unit.
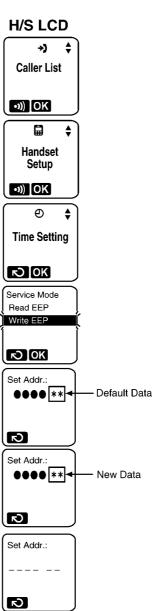
Soft keys

Navigator key/
◢ (Volume) key

Dial keypad

【✂①】 (Off/Power)

【R/☽】
R: Recall/Flash
☽: Alarm shortcut key

### H/S key operation

1). Press 【▤】.

2). Select "Handset Setup" using 【▲】or【▼】
then press 【▤】.

3). Enter "7", "2", "6", "2", "7", "6", "6", "4".
**Note:** 7262 7664 = PANA SONI
(see letters printed on dial keys)

4). Select "Write EEPROM" using 【▲】or【▼】
then press 【▤】 .

5). Enter "●", "●", "●", "●" (Address). (*1)

6). Enter " * ", " * " (New Data). (*1)

7). Press 【▤】, a long confirmation beep
will be heard.

8). Press 【✂①】 (off) to return to standby mode.
After that, remove and reinsert the batteries. Press the Power button for
about 1 second if the power is not turned on.

### H/S LCD

→) 
Caller List
●)) OK

▤ 
Handset
Setup
●)) OK

☽ 
Time Setting
↩ OK

Service Mode
Read EEP
Write EEP
↩ OK

Set Addr.:
●●●● **  ——— Default Data
↩

Set Addr.:
●●●● **  ——— New Data
↩

Set Addr.:
_ _ _ _  _ _
↩

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**Frequently Used Items (Handset)**

ex.)

| Items | Address | Default Data | New Data | Possible Adjusted Value MAX (hex) | Possible Adjusted Value MIN (hex) | Remarks |
|---|---|---|---|---|---|---|
| Sending level | 00 06 | Adjusted value | Given value | 6F | 00 | (*2) |
| Receiving level | 00 07 | Adjusted value | Given value | 00 | 3F | (*3) |
| Battery Low | 00 04 | 70 | - | - | - | (*4) |
| Frequency | 00 02/00 01 | 02/70 | - | - | - | |
| ID | 00 10~00 14 | Given value | - | - | - | |

**Note:**

(*1) When you enter the address or New Data, please refer to the table below.

| Desired Number (hex.) | Input Keys | Desired Number (hex.) | Input Keys |
|---|---|---|---|
| 0 | 0 | A | [R] + 0 |
| 1 | 1 | B | [R] + 1 |
| . | . | C | [R] + 2 |
| . | . | D | [R] + 3 |
| . | . | E | [R] + 4 |
| 9 | 9 | F | [R] + 5 |

(*2) When adding "01" (hex) to default value, sending level increases by 0.25 dB.

ex.)

| Item | Default Data | New Data | |
|---|---|---|---|
| | 35 | 39 | 31 |
| Sending level | -8.5dBm | -7.5dBm | -9.5dBm |

(*3) When reducing "01" (hex) from default value, receiving level increases by 0.25 dB.

ex.)

| Item | Default Data | New Data | |
|---|---|---|---|
| | 18 | 1C | 14 |
| Receiving level | -21dBm | -22dBm | -20dBm |
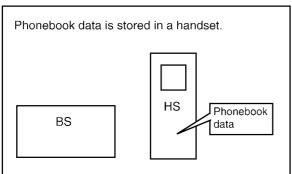
(*4) Use these items in a READ-ONLY mode to confirm the contents. Careless rewriting may cause serious damage to the handset.

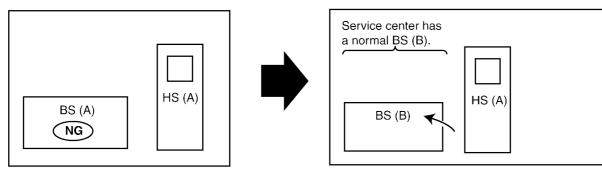# 8.2.    Copying Phonebook Items when Repairing

You can copy the handset phonebook to another (compatible Panasonic) handset. This will help to save the original phonebook data which the customer has registered.

Available models: KX-TG6411/KX-TG6412/KX-TG6413
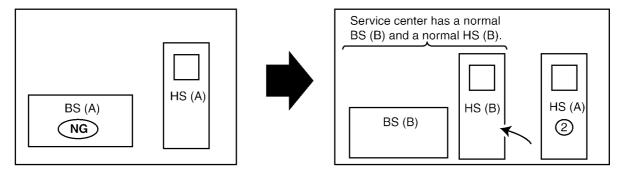
Refer to the following procedures.



**Case 1:** A base unit has a defect.
(Replacing a base unit PCB etc...)



1. Register  HS (A) to BS (B).
   HS (A) is normal, therefore no need to copy the phonebook data.

**Case 2:** A base unit has a defect.
(Replacing both a base unit and a handset)
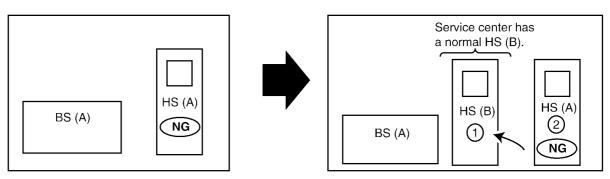


1. Register HS (A) to BS (B) as a handset no. 2.
2. Copy the phonebook data from HS (A) to HS (B).
3. Cancel the HS 2 (HS (A)).

**Note:**
• BS=Base Unit , HS=Handset
• If the max number of handsets are already registered to the base unit, a new handset cannot be registered.
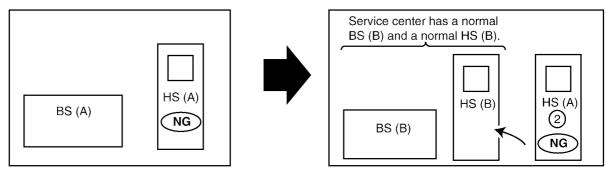
**Case 3:** A handset has a defect.
(Radio transmission is functioning.)

1. Cancel HS (A).
2. Register HS (B) as a handset no. 1.
3. Register HS (A) as a handset no. 2.
4. Copy the phonebook data from HS (A) to HS (B).
5. Cancel HS 2 (HS (A)).

**Case 4:** A handset has a defect.
(Radio transmission is functioning.)

1. Register HS (A) as a handset no. 2.
2. Copy the phonebook data from HS (A) to HS (B).
3. Cancel HS 2 (HS (A)).

**Note:**
 • BS=Base Unit , HS=Handset

 • If the max number of handsets are already registered to the base unit, a new handset cannot be registered.

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# 8.3. How to Clear User Setting
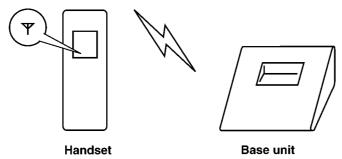
Units are reset to the Factory settings by this operation (stored Phone numbers, Caller list and etc.)

**Note:**
 • The reset menus differ depending on the following operations.
 • **This operation should not be performed for a usual repair.**

## 8.3.1. Resetting both base unit and handset

Both the base unit and the registered handset which you did the following steps ① to ④ are reset. Other registered handsets will not be reset.
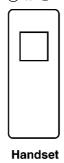


**Handset**                    **Base unit**

① Connect the AC adaptor to the base unit and install the charged batteries into the handset.

② Confirm the handset is registered to the base unit ( Y lights).
    If the handset is not registered to the base unit ( Y is flashing), register it.

③ Lift the handset and press 【✚☎】 to put the handset in standby mode.

④ Press ①, ⑤, ⑨ and ✳ key of the handset simultaneously until a confirmation tone is heard.

⑤ Disconnect the AC adaptor, then remove the battery.

## 8.3.2. Resetting only handset

The only handset is reset by doing the following steps ① to ④.



**Handset**

① Install the charged batteries into the handset.

② Lift the handset and press 【✚☎】 to put the handset in standby mode.

③ Press ③, ⑤, ⑦ and # key of the handset simultaneously until a confirmation tone is heard. (*1)
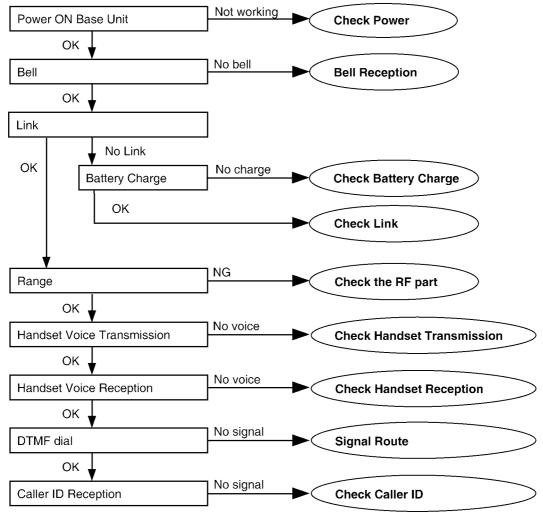
④ Remove the battery.

**Note:** (*1)
 • The handset registration to the base unit is cancelled.

 • If users do not bring the base unit with them, the registration procedure has to be done by users themselves.

# 9 Troubleshooting Guide

## 9.1. Troubleshooting Flowchart

**Flow Chart**

| | | |
|---|---|---|
| Power ON Base Unit | Not working → | Check Power |
| ↓ OK | | |
| Bell | No bell → | Bell Reception |
| ↓ OK | | |
| Link | | |
| OK ↓ | No Link ↓ | |
| | Battery Charge | No charge → Check Battery Charge |
| | ↓ OK | → Check Link |
| Range | NG → | Check the RF part |
| ↓ OK | | |
| Handset Voice Transmission | No voice → | Check Handset Transmission |
| ↓ OK | | |
| Handset Voice Reception | No voice → | Check Handset Reception |
| ↓ OK | | |
| DTMF dial | No signal → | Signal Route |
| ↓ OK | | |
| Caller ID Reception | No signal → | Check Caller ID |

**Cross Reference:**

**Check Power** (P.24)
**Bell Reception** (P.34)
**Check Battery Charge** (P.25)
**Check Link** (P.26)
**Check the RF part** (P.30)
**Check Handset Transmission** (P.33)
**Check Handset Reception** (P.33)
**Signal Route** (P.14)
**Check Caller ID** (P.33)
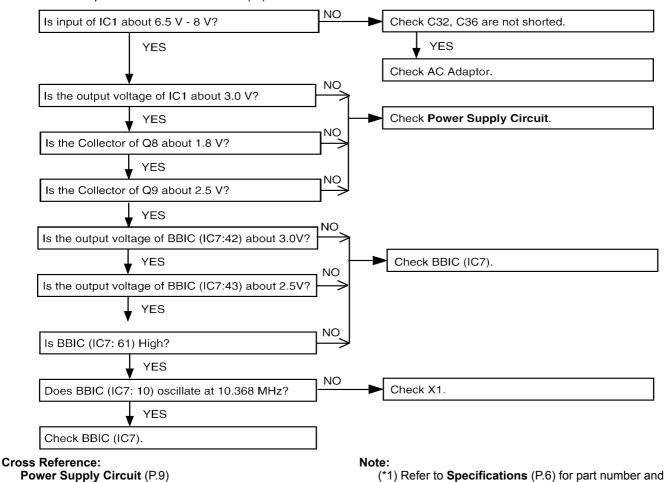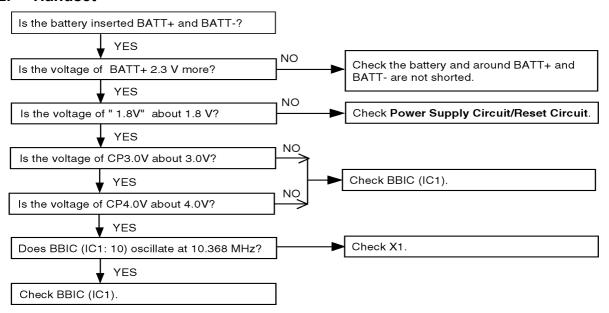
## 9.1.1. Check Power

### 9.1.1.1. Base Unit

Is the AC Adaptor inserted into AC outlet? (*1)

| Is input of IC1 about 6.5 V - 8 V? | —NO→ | Check C32, C36 are not shorted. |

YES ↓　　　　　　　　　　　　　　　　　　YES ↓

Check AC Adaptor.

| Is the output voltage of IC1 about 3.0 V? | —NO→ |

YES ↓

| Is the Collector of Q8 about 1.8 V? | —NO→ | Check **Power Supply Circuit**. |

YES ↓

| Is the Collector of Q9 about 2.5 V? | —NO→ |

YES ↓

| Is the output voltage of BBIC (IC7:42) about 3.0V? | —NO→ |

YES ↓

| Is the output voltage of BBIC (IC7:43) about 2.5V? | —NO→ | Check BBIC (IC7). |

YES ↓

| Is BBIC (IC7: 61) High? | —NO→ |

YES ↓

| Does BBIC (IC7: 10) oscillate at 10.368 MHz? | —NO→ | Check X1. |

YES ↓

Check BBIC (IC7).

**Cross Reference:**
**Power Supply Circuit** (P.9)

**Note:**
(*1) Refer to **Specifications** (P.6) for part number and supply voltage of AC Adaptor.

### 9.1.1.2. Handset

| Is the battery inserted BATT+ and BATT-? |

YES ↓

| Is the voltage of BATT+ 2.3 V more? | —NO→ | Check the battery and around BATT+ and BATT- are not shorted. |

YES ↓

| Is the voltage of " 1.8V" about 1.8 V? | —NO→ | Check **Power Supply Circuit/Reset Circuit**. |

YES ↓

| Is the voltage of CP3.0V about 3.0V? | —NO→ |

YES ↓

| Is the voltage of CP4.0V about 4.0V? | —NO→ | Check BBIC (IC1). |

YES ↓

| Does BBIC (IC1: 10) oscillate at 10.368 MHz? | —→ | Check X1. |

YES ↓

Check BBIC (IC1).

**Cross Reference:**
**Power Supply Circuit/Reset Circuit** (P.12)

## 9.1.2. Check Battery Charge

### 9.1.2.1. Base Unit

```
┌─────────────────────────────────────┐
│ Plug in the AC Power source.         │
│ Charge Handset on Base Unit.         │
└─────────────────────────────────────┘
                 │
                 ▼                          NO    ┌─────────────────────────────────────┐
┌─────────────────────────────────────┐  ──────▶ │ Check Charge Circuit of Base Unit.  │
│ Is the voltage of two charge contacts about │  └─────────────────────────────────────┘
│ 3 V or more?                         │                         │ OK
└─────────────────────────────────────┘                         ▼
                 │ YES                          ┌─────────────────────────────────────┐
                 ▼                               │ Check Handset.                      │
┌─────────────────────────────────────┐         └─────────────────────────────────────┘
│ Check Charge Contacts at             │
│ Base Unit from mechanical point of view. │
└─────────────────────────────────────┘
```
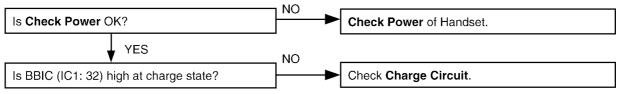
**Cross Reference:**
   **Charge Circuit** (P.12)

### 9.1.2.2. Handset

```
┌─────────────────────────────────────┐  NO    ┌─────────────────────────────────────┐
│ Is Check Power OK?                   │ ─────▶ │ Check Power of Handset.             │
└─────────────────────────────────────┘        └─────────────────────────────────────┘
                 │ YES
                 ▼                          NO    ┌─────────────────────────────────────┐
┌─────────────────────────────────────┐  ──────▶ │ Check Charge Circuit.               │
│ Is BBIC (IC1: 32) high at charge state? │      └─────────────────────────────────────┘
└─────────────────────────────────────┘
```
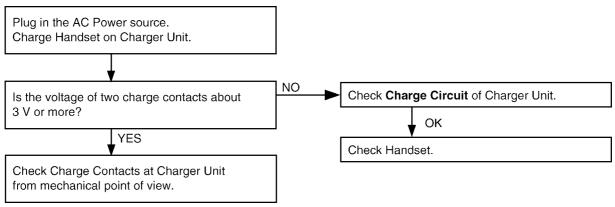
**Cross Reference:**
   **Check Power** (P.24)

   **Charge Circuit** (P.12)

### 9.1.2.3. Charger Unit

```
┌─────────────────────────────────────┐
│ Plug in the AC Power source.         │
│ Charge Handset on Charger Unit.      │
└─────────────────────────────────────┘
                 │
                 ▼                          NO    ┌─────────────────────────────────────┐
┌─────────────────────────────────────┐  ──────▶ │ Check Charge Circuit of Charger Unit. │
│ Is the voltage of two charge contacts about │  └─────────────────────────────────────┘
│ 3 V or more?                         │                         │ OK
└─────────────────────────────────────┘                         ▼
                 │ YES                          ┌─────────────────────────────────────┐
                 ▼                               │ Check Handset.                      │
┌─────────────────────────────────────┐         └─────────────────────────────────────┘
│ Check Charge Contacts at Charger Unit │
│ from mechanical point of view.        │
└─────────────────────────────────────┘
```

**Cross Reference:**
   **Charge Circuit** (P.12)

## 9.1.3. Check Link

## 9.1.3.1. Base Unit

| | |
|---|---|
| Does Base Unit make link with normal working Handset? | →YES→ Base Unit is OK. Check Handset. |

↓ NO

| | |
|---|---|
| Is the voltage of VDD3 about 3.0 V? Refer to **Check Point...(A)**. | →NO→ Check around **Power Supply Circuit**. |

↓ YES

| | |
|---|---|
| Is the voltage of VDD1 about 1.8 V? | →NO→ Adjust VDD1 voltage to 1.8 V. Refer to **Check Point...(B)**. |

YES ←————————————————— OK

↓

| | |
|---|---|
| Does the RF clock (CLK) oscillate at 10.368 MHz in Base Unit Test Mode? Refer to **Check Point...(G)**. | →NO→ Check around X1 and IC801 and adjust clock frequency. Refer to **Check Point...(G)**. |

↓ YES

| | |
|---|---|
| Is there CMD60 (: DECT Tester)? | →NO (*1)→ |

↓ YES

| | |
|---|---|
| Does Base Unit make link with CMD60 in Base Unit Test Mode? Refer to **Check Point...(J)**. | →NO→ |

↓ YES

| | |
|---|---|
| Is the NTP value OK? Refer to **Check Point...(J)**. | →NO→ Replace with a new Circuit Board. |

↓ YES

| | |
|---|---|
| Is the modulation OK? Refer to **Check Point...(K)**. | →NO→ |

↓ YES

| | |
|---|---|
| Is the Frequency Offset OK? Refer to **Check Point...(L)**. | →NO→ |

↓ YES

⋮ Continued to the next page.

**Note:**
   (*1) Refer to **Troubleshooting by Symptom (Base Unit and Charger Unit)** (P.35)
**Cross Reference:**
   **Check Point (Base Unit)** (P.35)
   **Power Supply Circuit** (P.9)

⋮

YES

| Is the Frequency Drift OK?<br>Refer to **Check Point**...**(M)**. | NO |

YES

| Is the Sensitivity Receiver OK?<br>Refer to **Check Point**...**(N)**. | NO |

YES

| Is the Timing OK?<br>Refer to **Check Point**...**(O)**. | NO | | Replace with a new Circuit Board. |

YES

| Is the Power RAMP OK?<br>Refer to **Check Point**...**(P)**. | NO |

**Cross Reference:**
  **Check Point (Base Unit)** (P.35)

## 9.1.3.2.  Handset

| | | |
|---|---|---|
| Does Handset make link with Base Unit? (Correct working unit) | YES → | Handset is OK. Check Base Unit. |

↓ NO

| | | |
|---|---|---|
| Is the voltage of "1.8V" about 1.8 V? Refer to **Check Point...(A)**. | NO → | Adjust C10 voltage to 1.8 V. Refer to **Check Point...(A)**. |

YES ←

OK / NO

Check around **Power Supply Circuit/Reset Circuit**.

↓ YES

| | | |
|---|---|---|
| Is the voltage of CP3.0V about 3.0 V? Refer to **Check Point...(Q)**. | NO → | |

↓ YES

Check BBIC (IC1)

| | | |
|---|---|---|
| Is the voltage of CP4.0V about 4.0 V? Refer to **Check Point...(R)**. | NO → | |

↓ YES

| | | |
|---|---|---|
| Does the RF clock (CLK) oscillate: 10.368 MHz in Handset Test Mode? Refer to **Check Point...(H)**. | NO → | Check around X1 and IC801 and adjust clock frequency. Refer to **Check Point...(H)**. |

↓ YES

| | |
|---|---|
| Is there CMD60 (: DECT Tester)? | NO (*1) → |

↓ YES

| | |
|---|---|
| Does Handset make link with CMD60 in Handset Test Mode? Refer to **Check Point...(I)**. | NO → |

↓ YES

| | | |
|---|---|---|
| Is the NTP value OK? Refer to **Check Point...(I)**. | NO → | Replace with a new Circuit Board. |

↓ YES

| | |
|---|---|
| Is the modulation OK? Refer to **Check Point...(J)**. | NO → |

↓ YES

| | |
|---|---|
| Is the Frequency Offset OK? Refer to **Check Point...(K)**. | NO → |

↓ YES

⋮ Continued to the next page.

**Note:**
(*1) Refer to **Troubleshooting by Symptom (Handset)** (P.39)
**Cross Reference:**
   **Check Point (Handset)** (P.39)
   **Power Supply Circuit/Reset Circuit** (P.12)

KX-TG6411BXS/KX-TG6411BXT/KX-TG6412BXS/KX-TG6412BXT/KX-TG6413BXS/KX-TG6413BXT/KX-TGA641BXS/KX-TGA641BXT

⋮

YES

Is the Frequency Drift OK?
Refer to **Check Point**...**(L)**.

NO →

YES

Is the Sensitivity Receiver OK?
Refer to **Check Point**...**(M)**.

NO →

YES

Is the Power RAMP OK?
Refer to **Check Point**...**(N)**.

NO →

Replace with a new Circuit Board.

**Cross Reference:**
    **Check Point (Handset)** (P.39)

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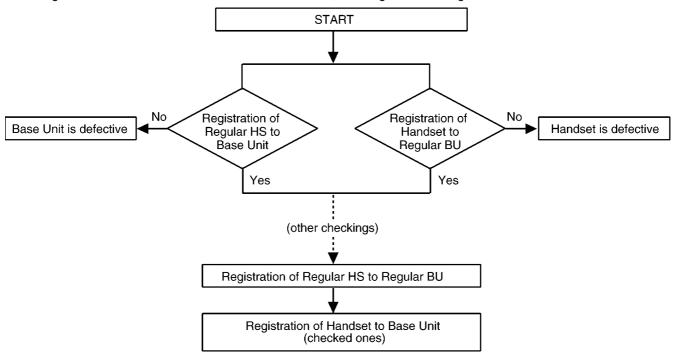
## 9.1.4.    Check the RF part

## 9.1.4.1.    Finding out the Defective part

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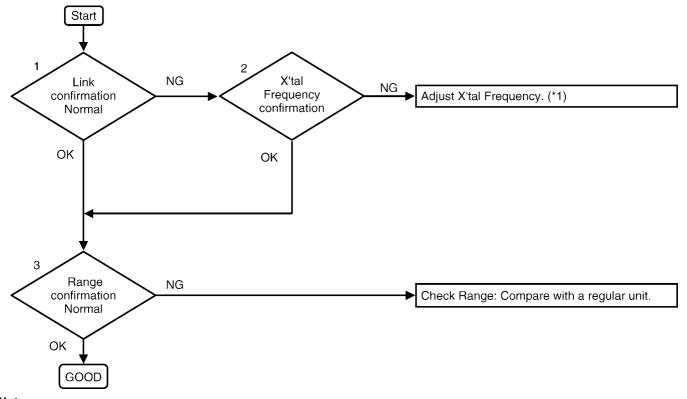
**After All the Checkings or Repairing**
1. Re-register the checked Handset to the checked Base Unit, and Regular HS to Regular BU.

## 9.1.4.2.    RF Check Flowchart

Each item (1 ~ 3) of RF Check Flowchart corresponds to **Check Table for RF part** (P.32).
Please refer to the each item.

```
                    ┌─────────┐
                    │  Start  │
                    └─────────┘
                         │
                         ▼
    1                                   2
      ◇─────────────┐    NG              ◇──────────────┐    NG    ┌──────────────────────────────────┐
    ◇   Link         ◇──────────────▶  ◇   X'tal         ◇──────▶ │ Adjust X'tal Frequency. (*1)      │
      ◇ confirmation ◇                   ◇ Frequency      ◇         └──────────────────────────────────┘
        ◇ Normal   ◇                       ◇ confirmation◇
          ◇       ◇                          ◇         ◇
            ◇   ◇                              ◇     ◇
             OK                                 OK
              │                                  │
              │   ◀──────────────────────────────┘
              ▼
    3
      ◇─────────────┐    NG                                        ┌──────────────────────────────────┐
    ◇   Range        ◇──────────────────────────────────────────▶ │ Check Range: Compare with a        │
      ◇ confirmation ◇                                             │ regular unit.                      │
        ◇ Normal   ◇                                               └──────────────────────────────────┘
          ◇       ◇
            ◇   ◇
             OK
              │
              ▼
         ┌─────────┐
         │  GOOD   │
         └─────────┘
```

**Note:**
(*1) Base unit - refer to (G) of **Check Point (Base Unit)** (P.35)
     Handset - refer to (H) of **Check Point (Handset)** (P.39)
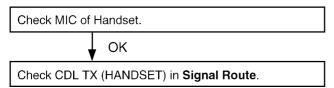
## 9.1.4.3.  Check Table for RF part

| No. | Item | BU (Base Unit) Check | HS (Handset) Check |
|-----|------|----------------------|---------------------|
| 1 | Link Confirmation Normal<br><br>HS, BU Mode: [Normal mode] | 1. Register Regular HS to BU (to be checked).<br>2. Press [Talk] key of the Regular HS to establish link. | 1. Register HS (to be checked) to Regular BU.<br>2. Press [Talk] key of the HS to establish link. |
| 2 | X'tal Frequency confirmation | 1. Check X'tal Frequency. (*1)<br>(10.368 MHz ± 100 Hz) | 1. Check X'tal Frequency. (*2)<br>(10.368 MHz ±100Hz) |
| 3 | Range Confirmation Normal<br><br>HS, BU Mode: [Normal mode] | 1. Register Regular HS to BU (to be checked).<br>2. Press [Talk] key of the Regular HS to establish link.<br>3. Compare the range of the BU (being checked) with that of the Regular BU. | 1. Register HS (to be checked) to Regular BU.<br>2. Press [Talk] key of the HS to establish link.<br>3. Compare the range of the HS (being checked) with that of the Regular HS. |

**Note:**

(*1) Refer to **Adjustment Standard (Base Unit)** (P.49)

(*2) Refer to **Adjustment Standard (Handset)** (P.53)

## 9.1.5. Check Handset Transmission

```
┌─────────────────────────────────────────────┐
│ Check MIC of Handset.                         │
└─────────────────────────────────────────────┘
                  │  OK
                  ▼
┌─────────────────────────────────────────────┐
│ Check CDL TX (HANDSET) in Signal Route.       │
└─────────────────────────────────────────────┘
```
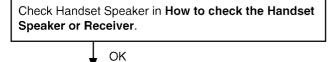
**Cross Reference:**
   **Signal Route** (P.14)

## 9.1.6. Check Handset Reception

```
┌─────────────────────────────────────────────┐
│ Check Handset Speaker in How to check the Handset │
│ Speaker or Receiver.                          │
└─────────────────────────────────────────────┘
                  │  OK
                  ▼
┌─────────────────────────────────────────────┐
│ Check CDL RX (HANDSET) in Signal Route.       │
└─────────────────────────────────────────────┘
```

**Cross Reference:**
   **How to Check the Handset Speaker or Receiver** (P.57)

   **Signal Route** (P.14)

## 9.1.7. Check Caller ID
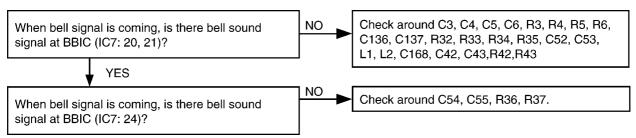
```
┌─────────────────────────────────────────────┐
│ Check Caller ID in Signal Route.              │
└─────────────────────────────────────────────┘
```

**Cross Reference:**
   **Signal Route** (P.14)
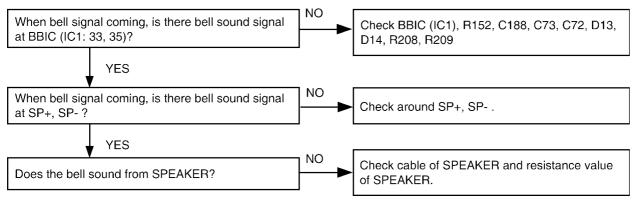
## 9.1.8. Bell Reception

### 9.1.8.1. Base Unit

| | |
|---|---|
| When bell signal is coming, is there bell sound signal at BBIC (IC7: 20, 21)? | **NO** → Check around C3, C4, C5, C6, R3, R4, R5, R6, C136, C137, R32, R33, R34, R35, C52, C53, L1, L2, C168, C42, C43,R42,R43 |

↓ YES

| | |
|---|---|
| When bell signal is coming, is there bell sound signal at BBIC (IC7: 24)? | **NO** → Check around C54, C55, R36, R37. |

### 9.1.8.2. Handset

| | |
|---|---|
| When bell signal coming, is there bell sound signal at BBIC (IC1: 33, 35)? | **NO** → Check BBIC (IC1), R152, C188, C73, C72, D13, D14, R208, R209 |

↓ YES

| | |
|---|---|
| When bell signal coming, is there bell sound signal at SP+, SP- ? | **NO** → Check around SP+, SP- . |

↓ YES

| | |
|---|---|
| Does the bell sound from SPEAKER? | **NO** → Check cable of SPEAKER and resistance value of SPEAKER. |

**Cross Reference:**
  **Telephone Line Interface** (P.10)
  **Check Link** (P.26)
  **How to Check the Handset Speaker or Receiver** (P.57)

# 9.2. Troubleshooting by Symptom (Base Unit and Charger Unit)

If your unit has below symptoms, follow the instructions in remedy column. Remedies depend on whether you have DECT tester (*1) or not.

| Symptom | Remedy (*2) | |
|---|---|---|
| | You don't have DECT Tester. | You have DECT Tester. (Model Number : CMD60) |
| **You cannot dial.** | Check item (**A**)-(**H**),(**T**). | Check item (**A**)-(**I**), (**J**)-(**P**),(**T**). |
| **You cannot hear the caller's voice.** | Check item (**A**)-(**G**),(**T**). | Check item (**A**)-(**G**), (**J**)-(**P**), (**Q**),(**T**). |
| **You cannot use handset a little away from base unit even if the handset is within range of the base unit.** | - | Check item (**I**)-(**O**). |
| **The acoustic transmit level is high or low.** | Check item (**P**). | Check item (**P**). |
| **The acoustic reception level is high or low.** | Check item (**P**). | Check item (**P**). |
| **Base unit and handset do not link each other.** | Check item (**A**)-(**H**). | Check item (**A**)-(**O**). |
| **The unit cannot charge.** | Check item (**Q**). | Check item (**Q**). |

**Note:**
(*1) A general repair is possible even if you don't have the DECT tester because it is for confirming the levels, such as Acoustic level in detail.
(*2) Refer to **Check Point (Base Unit)** (P.35)

## 9.2.1. Check Point (Base Unit)

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

**Note:**
After the measuring, suck up the solder of TP.
*: **Connections** (P.47) is required beforehand.
The connections of simulator equipments are as shown in **Adjustment Standard (Base Unit)** (P.49).

| | Items | Check Point | Procedure | Check or Replace Parts |
|---|---|---|---|---|
| (**A**) | 3.0 V Supply Confirmation | VDD3 | 1. Confirm that the voltage between test point VDD3 and GND is 3.0 V ± 0.2 V. | IC1, C31, C32, R38, R39, C36, F1, C37, D1 |
| (**B**) | 1.8 V Supply Confirmation | VDD1 | 1. Confirm that the voltage between test point VDD1 and GND is 1.8 V ± 0.02 V. 2. Execute the command "VDD", then check the current value. 3. Adjust the 1.8V voltage of VDD1 executing command "VDD XX"(XX is the value). | Q8, C75, C614, C61, IC7 |
| (**C**) | Charge Pump 2.5V Supply Confirmation | VDD5 | 1. Confirm that the voltage between test point VDD5 and GND is 2.5 V -0.1/+0.3 V. | IC7,C625,C631 |
| (**D**) | Charge Pump 3.0V Supply Confirmation | VDD4 | 1. Confirm that the voltage between test point VDD4 and GND is 3.0 V ± 0.2 V. | IC7,C616,C630 |
| (**E**)* | 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. <br> ex.) `| checksum value | program number |` `| 7723 | DBB1EN |` | IC7, X1, R77, RA80 |
| (**F**)* | EEPROM Confirmation | - | 1. EEP-ROM Confirmation (Execute the command "sendchar EPV"). 2. Confirm the returned Value(Value for reference is written at "EEPROM C/SUM" in Software_Version_Table.xls). | IC7, RA402, C51, R657, IC401 |
| (**G**)* | BBIC Clock Adjustment | CLK | 1. Input Command " sendchar WWD ff 48 IC 8006" 2. Confirm that the voltage between testpoint VDD4 and GND is less than 1.0 V. 3. Input Command " sendchar sfr", then you can confirm the current value. 4. Check X'tal Frequency. (10.368 MHz ± 100 Hz). 5. If the frequency is not 10.368MHz ± 100Hz, adjust the frequency of CLK executing the command "sendchar sfr xx xx (where xx is the value)" so that the reading of the frequency counter is 10.368000 MHz ± 5 Hz. | X1, IC7, R430, C305 |

| | Items | Check Point | Procedure | Check or Replace Parts |
|---|---|---|---|---|
| (H)* | Hookswitch Check with DC Characteristics | - | 1. Connect Telephone Socket to Tel-simulator which is connected with 600 Ω.<br>2. Set line voltage to 48 V and line current to 40mA at off-hook condition of normal telephone.<br>3. Execute the command "hookoff"<br>4. Confirm that the line current is 40 mA ± 5 mA.<br>5. Execute the command "hookon".<br>6. Confirm that the line current is less than + 0.8 mA. | L1, L2, Q3, R14, R15, Q4, R16, R17, D3, R18~R24, C15~C17, D21, Q5, R27, IC7 |
| (I) | DTMF Generator Check | - | 1. Connect Telephone Socket to DTMF tester. (Load=600 Ω)<br>2. Link Handset and push dial key.<br>3. Confirm DTMF character.<br>4. Confirm that the high Group is -4.0 dBm ~ -8.0 dBm.<br>5. Confirm that the low Group is -6.0 dBm ~ -10.0 dBm. | IC7, R116, C141, R29, C22, C23, Q5, D21 |
| (J)* | Transmitted Power Confirmation | -<br>ANTI_TP | Remove the Antenna before starting step from 1 to 7.<br>1. Configure the DECT tester (CMD60) as follows;<br>    <Setting><br>    • Test mode: FP<br>    • Traffic Carrier: 5<br>    • Traffic Slot: 4<br>    • Mode: Loopback<br>    • PMID: 00000<br>    • RF LEVEL = -70 dBm.<br>2. Execute the command "sendchar TST".<br>3. Execute the command "sendchar dmv 2 2".<br>4. Check that "Signalling Status" has been set to "Locked", then press "ACCEPT RFPI".<br>5. Initiate connection from Dect tester ("set up connect")<br>6. Execute the command "ANT1".<br>7. Confirm that the NTP value at ANT is 19.0 dBm ~ 25.0 dBm. | IC7, C802~C806, C808~C814, C820, C819, C822, C823, C825, C827, C826, C834, C851, C853, C859~C861, DA801, DA802, IC801, L801~L803, C855~C858, R801~R807, R106, R109, Q9, C617 |
| (K)* | Modulation Check and Adjustment | -<br>ANTI_TP | Follow steps 1 to 6 of (J).<br>7.Confirm that the B-Field Modulation is -370 ± 30/ +370± 30 kHz/div & Modulated width ≧ 690 kHz using data type Fig31.<br>8.Adjust the B-Field Modulation if required. (Execute the command "readmod" and "wrtmod xx", where xx is the value.) | IC7, C802~C806, C808~C814, C820, C819, C822, C823, C825, C827, C826, C834, C851, C853, C859~C861, DA801, DA802, IC801, L801~L803, C855~C858, R801~R807, R106, R109, Q9, C617 |
| (L)* | Frequency Offset Check | -<br>ANTI_TP | Follow steps 1 to 6 of (J).<br>7.Confirm that the frequency offset is < ± 50 kHz. | IC7, C802~C806, C808~C814, C820, C819, C822, C823, C825, C827, C826, C834, C851, C853, C859~C861, DA801, DA802, IC801, L801~L803, C855~C858, R801~R807, R106, R109, Q9, C617 |

| | Items | Check Point | Procedure | Check or Replace Parts |
|---|---|---|---|---|
| (M)* | Frequency Drift Confirmation | -<br>ANTI_TP | Follow steps 1 to 6 of **(J)**.<br>7.Confirm that the frequency drift is < ± 35 kHz/ms. | IC7,<br>C802~C806,<br>C808~C814,<br>C820, C819,<br>C822, C823,<br>C825, C827,<br>C826, C834,<br>C851, C853,<br>C859~C861,<br>DA801, DA802,<br>IC801,<br>L801~L803,<br>C855~C858,<br>R801~R807,<br>R106, R109,<br>Q9, C617 |
| (N)* | Sensitivity Receiver Confirmation | -<br>ANTI_TP | Follow steps 1 to 6 of **(J)**.<br>7.Set DECT tester power to -90 dBm.<br>8.Confirm that the BER is < 1000 ppm. | IC7,<br>C802~C806,<br>C808~C814,<br>C820, C819,<br>C822, C823,<br>C825, C827,<br>C826, C834,<br>C851, C853,<br>C859~C861,<br>DA801, DA802,<br>IC801,<br>L801~L803,<br>C855~C858,<br>R801~R807,<br>R106, R109,<br>Q9, C617 |
| (O)* | Timing Confirmation | -<br>ANTI_TP | Follow steps 1 to 6 of **(J)**.<br>7.Confirm that the Timing accuracy is<br>• ± 5.0 ppm (When adjust the frequency of CLK in item **(G)**).<br>• ± 15 ppm (When do not adjust the frequency of CLK in item **(A)**). | IC7,<br>C802~C806,<br>C808~C814,<br>C820, C819,<br>C822, C823,<br>C825, C827,<br>C826, C834,<br>C851, C853,<br>C859~C861,<br>DA801, DA802,<br>IC801,<br>L801~L803,<br>C855~C858,<br>R801~R807,<br>R106, R109,<br>Q9, C617 |
| (P)* | Power RAMP Confirmation | - | Follow steps 1 to 6 of **(J)**.<br>7.Confirm that Power RAMP is matching. | IC7,<br>C802~C806,<br>C808~C814,<br>C820, C819,<br>C822, C823,<br>C825, C827,<br>C826, C834,<br>C851, C853,<br>C859~C861,<br>DA801, DA802,<br>IC801,<br>L801~L803,<br>C855~C858,<br>R801~R807,<br>R106, R109,<br>Q9, C617 |

| | Items | Check Point | Procedure | Check or Replace Parts |
|---|---|---|---|---|
| (**Q**) | Audio Check | - | 1. Link with Handset.<br>2. Input -45dBm/1kHz to MIC of Handset.<br>   Measure the Level at Line I/F and distortion level.<br>3. Confirm that the level is -8.5 dBm ± 2 dBm and that the distortion level is < 5% at TEL Line (600 Ω Load).<br>4. Input -20 dBm/1 kHz to Line I/F.<br>   Measure the level at Receiver of Handset and distortion level<br>   (*Receive volume set to second position from minimum).<br>5. Confirm that the level is -21.0 dBm ± 2 dBm and that the distortion level is < 5% at Receiver (Volume Middle, 150 Ω Load). | IC7, SA1, L1, L2, D3, Q3, Q4, R14, R15, R16, R17, D21, Q5, R19, R20, C14, C56, R117, R116, C141, R9, C22, C23 |
| (**R**) | Charging Check | - | 1. Connect Charge Contact 12 Ω/2 W resistor between charge+ and charge-.<br>2. Measure and confirm voltage across the resistor is 3.10 V ± 0.3 V. | R55, R56, D22, D23 |
| (**S**) | 2.4V Supply Confirmation  VDD2 | VDD2 | 1. Confirm that the voltage between test point VDD2 and GND is 2.5V ± 0.2V. | IC7, Q9, C617 |

## 9.2.2.    Check Point (Charger Unit)

| | Items | Check Point | Procedure | Check or Replace Parts |
|---|---|---|---|---|
| (**A**) | Charging Check | - | 1. Connect Charge Contact 12Ω/2 W resistor between charge+ and charge-.<br>2. Measure and confirm voltage across the resistor is 3.1 V ± 0.3 V. | R1, F1 |

**Note:**

After the measuring, suck up the solder of TP.

The connection of adjustment equipment is as shown in **Adjustment Standard (Charger Unit)** (P.50).

# 9.3. Troubleshooting by Symptom (Handset)

If your unit has below symptoms, follow the instructions in remedy column. Remedies depend on whether you have DECT tester (*1) or not.

| Symptom | Remedy (*2) | |
| --- | --- | --- |
| | You don't have DECT Tester. | You have DECT Tester. (Model Number : CMD60) |
| **Battery strength is not indicated correctly by Battery icon.** | Check item (**A**)-(**D**), (**E**)-(**G**). | Check item (**A**)-(**D**), (**E**)-(**G**). |
| **You cannot hear the caller's voice.** | Check item (**A**)-(**C**), (**H**). | Check item (**A**)-(**C**), (**H**)-(**M**), (**O**). |
| **You cannot use handset a little away from base unit even if the handset is within range of the base unit.** | - | Check item (**I**)-(**M**). |
| **Does not link between base unit and handset.** | Check item (**A**)-(**C**), (**H**). | Check item (**A**)-(**C**), (**I**)-(**M**). |
| **The Audio level is high or low.** | Check item (**O**). | Check item (**O**). |
| **The SP-Phone level is high or low.** | Check item (**P**). | Check item (**P**). |

**Note:**
(*1) A general repair is possible even if you don't have the DECT tester because it is for confirming the levels, such as Acoustic level in detail.
(*2) Refer to **Check Point (Handset)** (P.39)

## 9.3.1. Check Point (Handset)

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

**Note:**
After the measuring, suck up the solder of TP.
*: **Connections** (P.51) is required beforehand.
The connections of adjustment equipments are as shown in **Adjustment Standard (Handset)** (P.53).

| | Items | Check Point | Procedure | Check or Replace Parts |
| --- | --- | --- | --- | --- |
| (**A**)* | 1.8 V Supply Adjustment | VDD1 | 1. Confirm that the voltage between test point VDD1 and GND is 1.8 V ± 0.02 V.<br>2. Execute the command "VDD", then check the current value.<br>3. Adjust the 1.8V voltage of VDD1 executing command "VDD XX"(XX is the value). | IC1, Q2, C48, D1, C1, C44, R12, R45, C40, C45, F1 |
| (**B**)* | BBIC Confirmation | - | 1. BBIC Confirmation (Execute the command "getchk").<br>2. Confirm the returned checksum value.<br>Connection of checksum value and program number is shown below.<br><br>ex.) \| checksum value \| program number \|<br>\| 88AE \| DBF2BA \| | IC1, X1, RA61, R64, R66 |
| (**C**)* | EEP-ROM Confirmation | - | 1. EEP-ROM Confirmation (Execute the command "sendchar EPV").<br>2. Confirm the returned Value (Value for reference is written at "EEPROM C/SUM" in Software_Version_Table.xls). | IC1, IC3, R40~R42, C172 |
| (**D**) | Charge Control Check & Charge Current Monitor Check | - | 1. Apply 3.5 V between CHG(+) and CHG(-) with DC power supply and set current limit to 250 mA.<br>Confirm the indication of "charging" on LCD.<br>2. Confirm that the current limit LED of DC power supply is ON/OFF.<br>Confirm it after waiting over 1 minute at least.<br>3. Decrease current limit of DC power supply to 100 mA.<br>4. Confirm that the current limit LED of DC power supply is stable. (Current limiter is ON.)<br>(If charge control cannot be confirmed by this procedure, please use battery to handset power supply and try again.) | IC1, Q4 Q9, D7, R6, R7, F1, C1, R2, R30, R31, R8, R45 |
| (**E**)* | Charge Detection (OFF) Check | - | 1. Stop supplying 3.5 V to CHG (+) and CHG (-).<br>2. Confirm the indication of "charging" has been cleared. | IC1, Q4 Q9, D7, R6, R7, F1, C1, R2, R30, R31, R8, R45 |

| | Items | Check Point | Procedure | Check or Replace Parts |
|---|---|---|---|---|
| (**F**)* | Battery Monitor Check | - | 1. Apply 2.25 V between BATT+ and BATT-.<br>2. Execute the command<br>　　sendchar PAD<br>　　sendchar LED 0<br>　　sendchar CRX 0 1<br>　　sendchar AD1<br>　　It assumes that the return value is XX.<br>　　a) $6c \leq XX \leq 71$: No need to adjust<br>　　b) XX: 6A ~ 6B: Need to adjust<br>　　XX: 72 ~ 74: Need to adjust<br>　　Write AD value of 2.25 V to EEPROM.<br>　　ex) read data: XX = 6A, write data: YY = 6A<br>　　read data: XX = 73, write data: YY = 73<br>　　EEPROM = 0004(Low Voltage) write "YY"<br>　　Execute the command "wreeprom 00 04 01 YY".<br>　　EEPROM = 0005(No Voltage) write ''YY - 1D''<br>　　Execute the command "×wreeprom 00 05 01 ZZ".<br>　　EEPROM = 000A(Low Voltage BL) write "YY - 16"<br>　　Execute the command "wreeprom 00 0A 01 WW".<br>　　**Note:**<br>　　　ZZ = YY - C<br>　　No Voltage writing data limit is '00'.<br>　　c) XX: 00 ~ 69: Reject<br>　　XX: 75 ~ FF: Reject | IC1, F1, C1, R12, R45 |
| (**G**) | Battery Low Confirmation | - | 1. Apply 2.40 V between BATT+ and BATT-.<br>2. Confirm that there is no flashing of Battery Icon.<br>3. Apply 2.25 V ± 0.08 V between BATT+ and BATT-.<br>4. Confirm that there is flashing of Battery Icon. | IC1, F1, C1, R12, R45 |
| (**H**)* | BBIC Clock Adjustment | CLK | 1. Apply 2.6 V between BATT+ and BATT- with DC power.<br>2. Input Command "sendchar sfr", then you can confirm the current value.<br>3. Check X'tal Frequency. (10.368 MHz ± 100 Hz).<br>4. If the frequency is not 10.368 MHz ± 100 Hz, adjust the frequency of CLK executing the command "sendchar sfr xx xx (where xx is the value)" so that the reading of the frequency counter is 10.368000 MHz ± 5 Hz.<br>Note:<br>　Clear the registered information for Base Unit before measurement, because the Frequency will not possibly get stable due to the registered information.<br>　Pressing the button of "3" "7" "9" "#" clears the registration.<br>　Register to it on Base Unit after measurement. | IC1, X1, C47 |
| (**I**)* | Transmitted Power Confirmation | - | Remove the Antenna before starting step from 1 to 4.<br>1. Configure the DECT tester (CMD60) as follows;<br>　　<Setting><br>　• Test mode: PP<br>　• RFPI: 0102030405<br>　• Traffic Carrier: 5<br>　• Traffic Slot: 4<br>　• Mode: Loopback<br>　• RF LEVEL = -70 dBm<br>　• PACKET: PP32Z<br>2. Execute the command "sendchar TST 01 02 03 04 05".<br>3. Initiate connection from DECT tester.<br>4. Confirm that the NTP value at ANT is 19 dBm ~ 25 dBm. | IC1, C802~C806, C808~C814, C819~C820, C822, C825~C827, C834, C859~C864, L801~L804, DA801, R801~R808 |
| (**J**)* | Modulation Check and Adjustment | - | Follow steps 1 to 3 of (**K**).<br>4. Confirm that the B-Field Modulation is -370±30/ +370±30 kHz/div & Modulated width $\geq$ 690 kHz using data type Fig 31. | IC1, C802~C806, C808~C814, C819~C820, C822, C825~C827, C834, C859~C864, L801~L804, DA801, R801~R808 |

| | Items | Check Point | Procedure | Check or Replace Parts |
|---|---|---|---|---|
| (**K**)* | Frequency Offset Confirmation | - | Follow steps 1 to 3 of **(I)**.<br>4.Confirm that the frequency Offset is < ± 50 kHz. | IC1, C802~C806, C808~C814, C819~C820, C822, C825~C827, C834, C859~C864, L801~L804, DA801, R801~R808 |
| (**L**)* | Frequency Drift Confirmation | - | Follow steps 1 to 3 of **(I)**.<br>4.Confirm that the frequency Drift is < ± 35 kHz/ms. | IC1, C802~C806, C808~C814, C819~C820, C822, C825~C827, C834, C859~C864, L801~L804, DA801, R801~R808 |
| (**M**)* | Sensitivity Receiver Confirmation | - | Follow steps 1 to 3 of **(I)**.<br>4.Set DECT tester power to -88 dBm.<br>5.Confirm that the BER is < 1000 ppm. | IC1, C802~C806, C808~C814, C819~C820, C822, C825~C827, C834, C859~C864, L801~L804, DA801, R801~R808 |
| (**N**)* | Power RAMP Confirmation | - | Follow steps 1 to 3 of **(I)**.<br>4.Confirm that Power RAMP is matching. | IC1, C802~C806, C808~C814, C819~C820, C822, C825~C827, C834, C859~C864, L801~L804, DA801, R801~R808 |
| (**O**) | Audio Check and Confirmation | - | 1. Link to BASE which is connected to Line Simulator.<br>2. Set line voltage to 48 V and line current to 40 mA.<br>3. Input -45 dBm/1KHz to MIC and measure Line output level.<br>4. Confirm that the level is -8.5 dBm ± 2 dBm and that the distortion level is < 5% at TEL Line (600 Ω Load).<br>5. Input -20 dBm/1KHz to Line I/F and measure Receiving level at REV+ and REV-.<br>6. Confirm that the level is -21 dBm ± 2 dBm and that the distortion level is < 5% at Receiver. (vol = 2) | IC1, C12, D19, D20, C96, C97, R215, R27, RA4, C11, C13, R28, D3, D4, MIC, L9, RA2, R73, R74 |
| (**P**) | SP phone Audio Check and Confirmation | - | 1. Link to Base which is connected to Line Simulator.<br>2. Set line voltage to 48 V and line current to 40 mA.<br>3. Set the handset off-hook using SP-Phone key.<br>4. Input -25 dBm/1KHz to Line I/F and measure Receiving level at SP+ and SP-.<br>5. Confirm that the level is -9.5 dBm ± 2 dBm and that the distortion level is < 5%. (vol = 3) | IC1, C12, C73, D13, D14, R152, R73, R74, RA2, MIC, C11, C13, RA4, R27, R28, R208, R209, C96, C97, R215, C72 |
| (**Q**) | Charge Pump 3.0V Supply Confirmation | CP3.0V | 1. Confirm that the voltage between testpoint CP3.0V and GND is 3.0V -0.1/+0.3V. | C52, C53, C49 |
| (**R**) | Charge Pump 4.0V Supply Confirmation | CP4.0V | 1. Confirm that the voltage between testpoint CP4.0V and GND is 4.0V -0.2V. | C50, C51 |

## 9.3.2. Troubleshooting for Speakerphone

When the customer's telephone line corresponds to the following conditions, and the transmission signal of SP-Phone is interrupted, performing the next set up to a cordless handset will improve it to some extent.

**Conditions**

1. When customer's line has less line loss.

   ex.) The customer is using optical fiber, ISDN terminal adaptor, or PBX.

   In this case, receiving signal is strong and it may affect transmission signal.

2. When the other party is talking from noisy place.

   ex.) The other party is using cellular phone. The background noise is very loud.

   In this case, the noise from the other party (i.e. surrounding noise) may affect transmission signal.
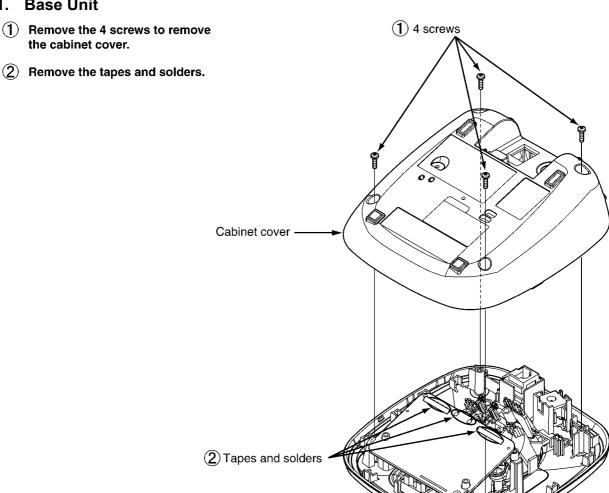
**Setting Method**

- Change the handset address of EEPROM (0129) from 00 to 01 by **Engineering Mode**.

# 10 Disassembly and Assembly Instructions
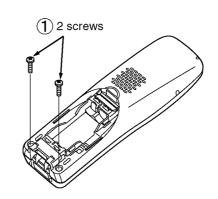
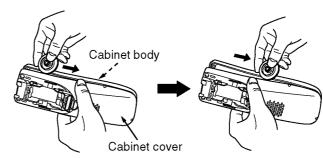## 10.1. Disassembly Instructions

### 10.1.1. Base Unit

① Remove the 4 screws to remove the cabinet cover.

② Remove the tapes and solders.

① 4 screws

Cabinet cover
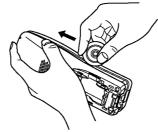
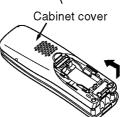② Tapes and solders

## 10.1.2. Handset

① **Remove the 2 screws.**

① 2 screws

② **Insert a JIG (PQDJ10006Y) between the cabinet body and the cabinet cover, then pull it along the gap to open the cabinet.**
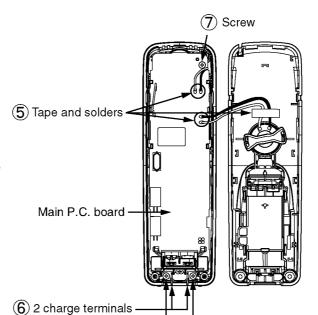
Cabinet body

Cabinet cover

③ **Likewise, open the other side of the cabinet.**

Cabinet cover

④ **Remove the cabinet cover by pushing it upward.**

⑦ Screw

⑤ **Remove the tape and solders.**

⑤ Tape and solders
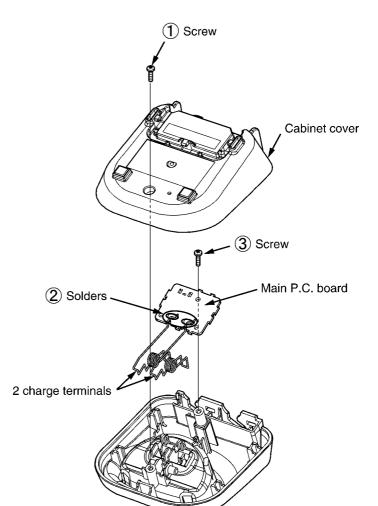
⑥ **Remove the 2 screws to remove the 2 charge terminals.**

Main P.C. board

⑦ **Remove the screw to remove the main P. C. board.**
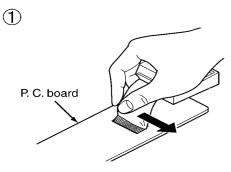
⑥ 2 charge terminals

⑥ 2 screws

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## 10.1.3.  Charger Unit

① **Remove the screw to remove the cabinet cover.**
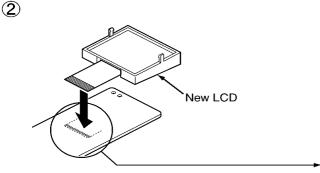
② **Remove the solders to remove the 2 charge terminals.**

③ **Remove the screw to remove the main P.C. board.**

① Screw

Cabinet cover

③ Screw

Main P.C. board

② Solders
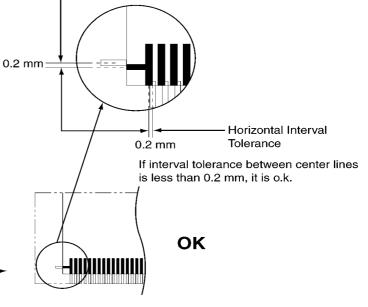
2 charge terminals

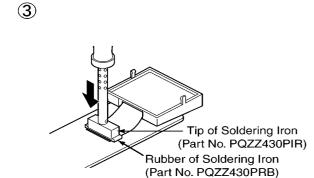# 10.2. How to Replace the Handset LCD

① 

P. C. board

Peel off the FFC (Flexible Flat Cable) from
the LCD, in the direction of the arrow. Take
care to ensure that the foil on the P.C. board
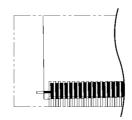is not damaged.
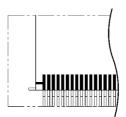
②

New LCD

Fit the heatseal of a new LCD.

③

Tip of Soldering Iron
(Part No. PQZZ430PIR)
Rubber of Soldering Iron
(Part No. PQZZ430PRB)

Heatweld with the tip of the soldering
iron about 5 to 8 seconds
(in case of 60W soldering iron).

Vertical Interval
Tolerance

0.2 mm

0.2 mm

Horizontal Interval
Tolerance

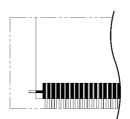If interval tolerance between center lines
is less than 0.2 mm, it is o.k.

**OK**

**NG**
(Inclined)

**NG**
(Vertical interval tolerance is
more than 0.2 mm.)

**NG**
(Horizontal interval tolerance is
more than 0.2 mm.)

# 11 Measurements and Adjustments

This chapter explains the measuring equipment, the JIG connection, and the PC setting method necessary for the measurement in **Troubleshooting Guide** (P.23)

## 11.1. Equipment Required

- Digital multi-meter (DMM): it must be able to measure voltage and current.
- Oscilloscope.
- Frequency counter: It must be precise enough to measure intervals of 1 Hz (precision; ±4 ppm)
  Hewlett Packard, 53131A is recommended.
- DECT tester: Rohde & Schwarz, CMD 60 is recommended.

  This equipment may be useful in order to precisely adjust like a mass production.

## 11.2. The Setting Method of JIG (Base Unit)

This section explains the PC setting to use command required in **Check Point (Base Unit)**(P.35).

<Preparation>
- Serial JIG cable: PQZZ1CD300E*
- PC which runs in DOS mode
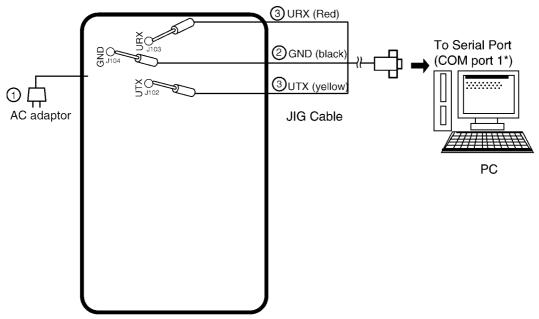- **Batch file CD-ROM** for setting: PNZZTG6411BX

**Note:**
*: If you have the JIG Cable for TCD500 series (PQZZ1CD505E), change the following values of resistance. Then you can use it as a JIG Cable for both TCD300 and TCD500 series. (It is an upper compatible JIG Cable.)

| Resistor | Old value (k$\Omega$) | New value (k$\Omega$) |
|----------|----------|----------|
| R2 | 22 | 3.3 |
| R3 | 22 | 3.3 |
| R4 | 22 | 4.7 |
| R7 | 4.7 | 10 |

### 11.2.1. Connections

① Connect the AC adaptor to DC-JACK (base unit).

② Connect the JIG Cable GND (black) to GND.

③ Connect the JIG Cable RX (red) to URX and TX (yellow) to UTX.



**Base unit P. C. board**

**Note:**
*: COM port names may vary depending on what your PC calls it.

## 11.2.2. How to install Batch file into P.C.

**1.** Insert the Batch file CD-ROM into CD-ROM drive and copy PNZZTG**** folder to your PC (example: D drive).

**2.** Open an MS-DOS mode window.

<Example for Windows>

On your computer, click **[Start]**, select **Programs** (**All Programs** for Windows XP/Windows Server 2003), then click
**MS-DOS Prompt**. (for Windows 95/Windows 98)
Or
**Accessories-MS-DOS Prompt**. (for Windows Me)
Or
**Command Prompt**. (for Windows NT 4.0)
Or
**Accessories-Command Prompt**.
(for Windows 2000/Windows XP/Windows Server 2003)

**3.** At the DOS prompt, type "**D:**" (for example) to select the drive, then press the **Enter** key.

**4.** Type "**CD ¥PNZZTG****"**, then press the **Enter** key.

<Example>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PQZZTG****
D: ¥PNZZTG**** >SET_COM=X
D: ¥PNZZTG****>READID
00 52 4F A8 A8
D: ¥PNZZTG****>DOSKEY
D: ¥PNZZTG****>▪
```

**5.** Type "**SET_COM=X**", then press the **Enter** key
(**X**: COM port number used for the serial connection on your PC).

**6.** Type "**READID**", then press the **Enter** key.
· If any error messages appear, change the port number or check the cable connection.
· If any value appear, go to next step.

**7.** Type "**DOSKEY**", then press the **Enter** key.

<Example: error happens>

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PNZZTG****
D: ¥PNZZTG**** >SET_COM=X
D: ¥PNZZTG****>READID
   CreateFile error
ERROR 10: Can't open serial port
D: ¥PNZZTG ****>▪
```

**Note:**
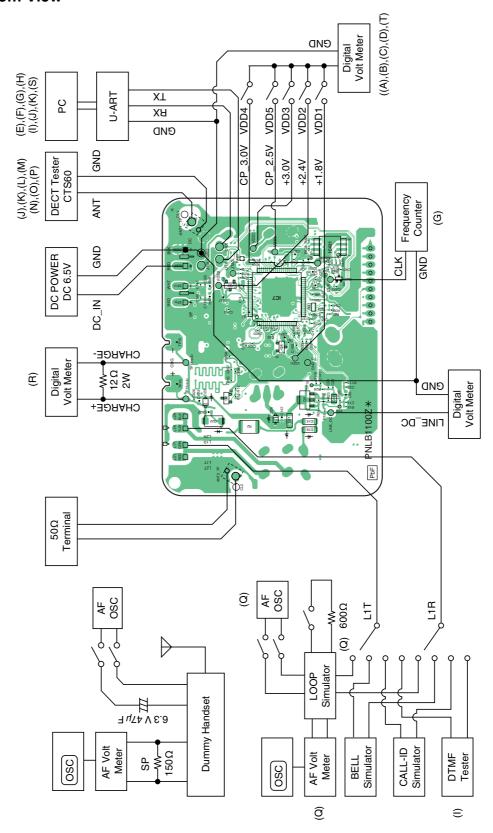• "*****" varies depending on the country or models.

## 11.2.3. Commands

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. |
| hookoff | Off-hook mode on Base | Type "hookoff". |
| hookon | On-hook mode on Base | Type "hookon". |
| getchk | Read checksum | Type "getchk". |
| wreeprom | Write the data of EEPROM | Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written. |

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# 11.3. Adjustment Standard (Base Unit)

When connecting the simulator equipment for checking, please refer to below.
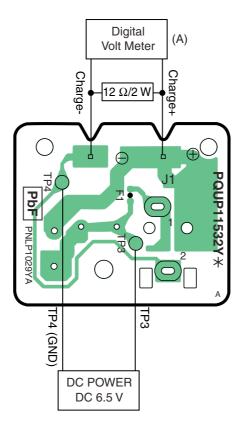
## 11.3.1. Bottom View



**Note:**
(**A**) - (**S**) is referred to **Check Point (Base Unit)** (P.35)

# 11.4. Adjustment Standard (Charger Unit)

When connecting the simulator equipment for checking, please refer to below.

## 11.4.1. Bottom View



**Note:**

(**A**) is referred to **Check Point (Charger Unit)** (P.38)

# 11.5.  The Setting Method of JIG (Handset)

This section explains the PC setting to use command required in **Check Point (Handset)**(P.39).

<Preparation>
  • Serial JIG cable: PQZZ1CD300E*
  • PC which runs in DOS mode
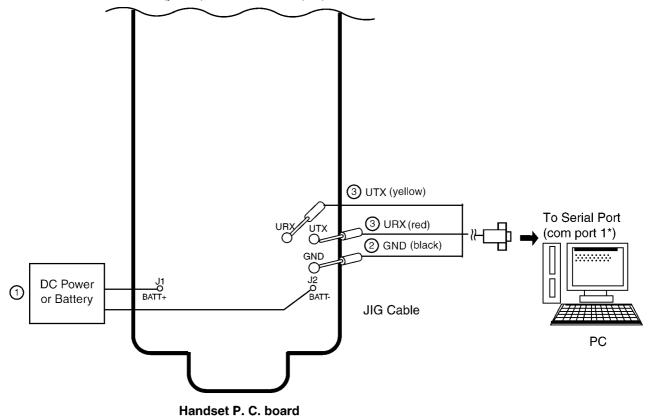  • **Batch file CD-ROM** for setting: PNZZTG6411BX

**Note:**
   *:  If you have the JIG Cable for TCD500 series (PQZZ1CD505E), change the following values of resistance. Then you can use it as a JIG Cable for both TCD300 and TCD500 series. (It is an upper compatible JIG Cable.)

| Resistor | Old value (kΩ) | New value (kΩ) |
|----------|----------------|----------------|
| R2 | 22 | 3.3 |
| R3 | 22 | 3.3 |
| R4 | 22 | 4.7 |
| R7 | 4.7 | 10 |

## 11.5.1.  Connections

① Connect the DC Power or Battery to BATT+ and BATT-.

② Connect the JIG cable GND (black) to GND.

③ Connect the JIG cable UTX (yellow) to UTX and URX (red) to URX.



**Handset P. C. board**

**Note:**
   *: COM port names may vary depending on what your PC calls it.

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## 11.5.2. How to install Batch file into P.C.

**1.** Insert the Batch file CD-ROM into CD-ROM drive and copy PNZZTG***** folder to your PC (example: D drive).

**<Example for Windows>**

**2.** Open an MS-DOS mode window.

On your computer, click **[Start]**, select **Programs**
(**All Programs** for Windows XP/Windows Server 2003), then click
**MS-DOS Prompt**. (for Windows 95/Windows 98)
Or
**Accessories-MS-DOS Prompt**. (for Windows Me)
Or
**Command Prompt**. (for Windows NT 4.0)
Or
**Accessories-Command Prompt**.
(for Windows 2000/Windows XP/Windows Server 2003)

**3.** At the DOS prompt, type "**D:**" (for example) to select the drive, then press the **Enter** key.

**4.** Type "**CD ¥PNZZTG*****"**, then press the **Enter** key.

**<Example>**

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PQZZTG*****
D: ¥PNZZTG***** >SET RTX_COM=X
D: ¥PNZZTG*****>READID
00 52 4F A8 A8
D: ¥PNZZTG*****>DOSKEY
D: ¥PNZZTG*****> ▄
```

**5.** Type "**SET RTX_COM=X**", then press the **Enter** key
(**X**: COM port number used for the serial connection on your PC).

**6.** Type "**READID**", then press the **Enter** key.
 • If any error messages appear, change the port number or check the cable connection.
 • If any value appear, go to next step.

**7.** Type "**DOSKEY**", then press the **Enter** key.

**<Example: Error happens>**

```
C: ¥Documents and Settings>D:
D: ¥>CD ¥PNZZTG*****
D: ¥PNZZTG***** >SET RTX_COM=X
D: ¥PNZZTG*****>READID
   CreateFile error
ERROR 10: Can't open serial port
D: ¥PNZZTG*****> ▄
```

**Note:**
 • "*****" varies depending on the country or models.

## 11.5.3. Commands

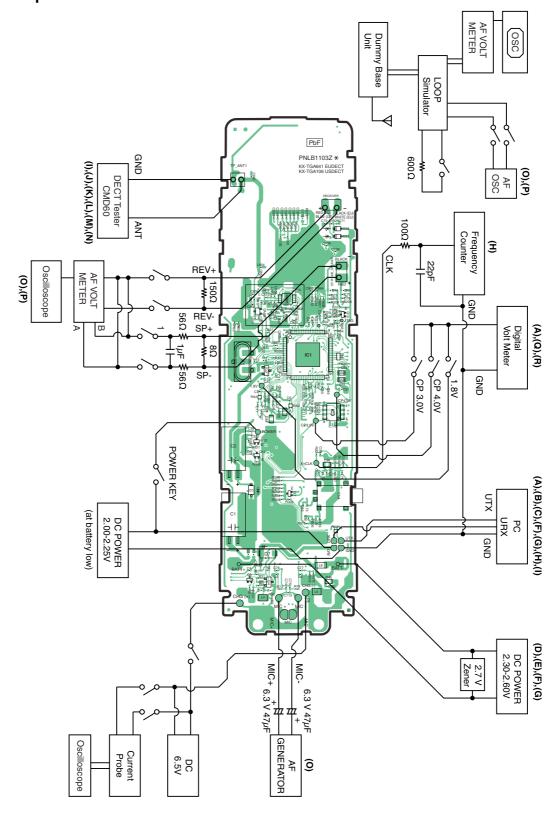See the table below for frequently used commands.

| 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. |
| getchk | Read checksum | Type "getchk". |
| wreeprom | Write the data of EEPROM | Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written. |

# 11.6. Adjustment Standard (Handset)

When connecting the simulator equipments for checking, please refer to below.

## 11.6.1. Component View



**Note:**

(**A**) - (**R**) is referred to **Check Point (Handset)** (P.39)

# 11.7.  Things to Do after Replacing IC or X'tal

If repairing or replacing BBIC (FLASH type), EEPROM and X'tal, it is necessary  to download the required data such as Programming data or adjustment data, etc in memory.
The set doesn't operate if it is not executed.

## 11.7.1.  How to download the data

### 11.7.1.1.  Base Unit

First, operate the PC setting according to **The Setting Method of JIG (Base Unit)**(P.47).
Then download the appropriate data according to the following procedures.

| | Items | How to download/Required adjustment |
|---|---|---|
| BBIC  (FLASH type) (IC7) | Programming data is stored in memory. | 1) Make sure to connect the JIG cable, then disconnect the DC Power in order to download the data. 2) Execute the command "flw480 *********.hex". 3) Connect the DC Power. 4) Press the PC Enter key once. 5) After a few minutes, "Successful upgrade" is displayed on the PC indicating downloading has finished. 6) Detach the JIG cable, then disconnect the DC Power. 7) Connect the DC Power. 8) Connect the JIG cable again, and execute the command "getchk", then confirm the checksum value is correct. • If the downloading fails, start again from step 1). 9) Default batch file: Execute the command "default.bat". 10) Country version batch file: Execute the command "TG6411XXrevYY.bat". (*1) 11) Clock adjustment: Refer to Check Point (G). (*2) |
| EEPROM (IC401) | Adjusted parameter data is stored in memory. (country version batch file, default batch file, etc.) | 1) Change the address "0000" of EEPROM to "00" to download the data. 2) Default batch file: Execute the command "default.bat". 3) Country version batch file: Execute the command "TG6411XXrevYY.bat". (*1) 4) Clock adjustment: Refer to Check Point (F). (*2) |
| X'tal (X1) | System clock | Clock adjustment data is in EEPROM, adjust the data again after replacing it. 1) Refer to Check Point (F). (*2) |

**Note:**

(*1) XX: country code, YY: revision number, ZZ: Voice Prompt

"XX", "YY" and "ZZ" vary depending on the country version. You can find them in the batch file, PNZZ- mentioned in **The Setting Method of JIG (Base Unit)** (P.47).

(*2) Refer to **Check Point (Base Unit)** (P.35)

## 11.7.1.2.  Handset

First, operate the PC setting according to **The Setting Method of JIG (Handset)(**P.51).

Then download the appropriate data according to the following procedures.

| Items | | How to download/Required adjustment |
|---|---|---|
| BBIC (FLASH type) (IC1) | Programming data is stored in memory. | 1) Make sure to connect the JIG cable, then disconnect the DC Power in order to download the data.<br>2) Execute the command "flw480 *********.hex".<br>3) Connect the DC Power.<br>4) Press and hold the handset Power key.<br>5) While holding down the handset Power key, press the PC Enter key once.<br>6) After a few minutes, "Successful upgrade" is displayed on the PC indicating downloading has finished.<br>7) Detach the JIG cable, then press the handset Power key to turn it on.<br>8) Connect the JIG cable again, and execute the command "getchk", then confirm the checksum value is correct.<br>    • If the downloading fails, start again from step 1).<br>10) Default batch file: Execute the command "default.bat".<br>11) Default batch file (remaining): Execute the command "TGA641DEFrevYY.bat". (*3).<br>12) Country version batch file: Execute the command "TGA641XXrevYY.bat". (*3).<br>13) Clock adjustment: Refer to Check Point (H). (*4).<br>14) 1.8 V setting and battery low detection: Refer to Check Point (A), (F) and (G). (*4). |
| EEPROM (IC3) | Adjusted parameter data is stored in memory. (country version batch file, default batch file, etc.) | 1) Default batch file: Execute the command "default.bat".<br>2) Default batch file (remaining): Execute the command "TGA641DEFrevYY.bat". (*3)<br>3) Country version batch file: Execute the command "TGA641XXrevYY.bat". (*3)<br>4) Clock adjustment: Refer to Check Point (J). (*4)<br>5) 1.8 V setting and battery low detection: Refer to Check Point (A), (F) and (G). (*4) |
| X'tal (X1) | System clock | Clock adjustment data is in EEPROM, adjust the data again after replacing it.<br>1) Refer to Check Point (H). (*4) |

**Note:**

(*3) XX: country code, YY: revision number

"XX" and "YY" vary depending on the country version. You can find them in the batch file, PNZZ- mentioned in **The Setting Method of JIG (Handset)** (P.51).

(*4) Refer to **Check Point (Handset)** (P.39)

# 11.8. RF Specification

## 11.8.1. Base Unit

| Item | Value | Refer to -. * |
|---|---|---|
| TX Power | 19 dBm ~ 25 dBm | **Check Point (Base Unit) (J)** |
| Modulation | -370±30/+370±30 kHz/div & Modulated width ≧ 690 kHz | **Check Point (Base Unit) (K)** |
| Frequency Offset | -50 kHz ~ +50 kHz | **Check Point (Base Unit) (L)** |
| Frequency Drift | < ± 35 kHz / ms | **Check Point (Base Unit) (M)** |
| RX Sensitivity | < 1000 ppm | **Check Point (Base Unit) (N)** |
| Timing Accuracy | < ± 5.0 ppm/<±15.0ppm | **Check Point (Base Unit) (O)** |
| Power RAMP | Power RAMP is matching | **Check Point (Base Unit) (P)** |

*: Refer to **Check Point (Base Unit)** (P.35)
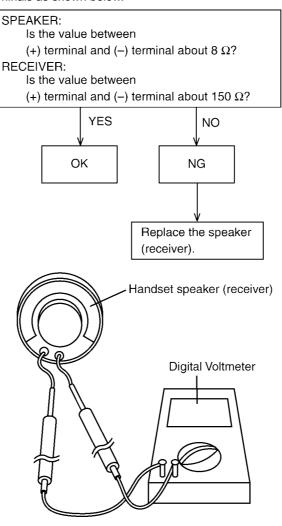
## 11.8.2. Handset

| Item | Value | Refer to -. ** |
|---|---|---|
| TX Power | 19 dBm ~ 25 dBm | **Check Point (Handset) (I)** |
| Modulation | -370±30/+370±30 kHz/div & Modulated width ≧ 690 kHz | **Check Point (Handset) (J)** |
| Frequency Offset | -50 kHz ~ +50 kHz | **Check Point (Handset) (K)** |
| Frequency Drift | < ± 35 kHz / ms | **Check Point (Handset) (L)** |
| RX Sensitivity | < 1000 ppm | **Check Point (Handset) (M)** |
| Power RAMP | Power RAMP is matching | **Check Point (Handset) (N)** |

**: Refer to **Check Point (Handset)** (P.39)

## 11.9.   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.

```
┌─────────────────────────────────────────────┐
│ SPEAKER:                                      │
│     Is the value between                      │
│     (+) terminal and (−) terminal about 8 Ω?  │
│ RECEIVER:                                     │
│     Is the value between                      │
│     (+) terminal and (−) terminal about 150 Ω?│
└─────────────────────────────────────────────┘
            YES              NO
             │                │
             ▼                ▼
        ┌────────┐       ┌────────┐
        │   OK   │       │   NG   │
        └────────┘       └────────┘
                              │
                              ▼
                    ┌────────────────────┐
                    │ Replace the speaker │
                    │ (receiver).         │
                    └────────────────────┘
```

Handset speaker (receiver)

Digital Voltmeter

## 11.10. 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.

# 12 Miscellaneous

## 12.1. How to Replace the Flat Package IC

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

### 12.1.1. 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)
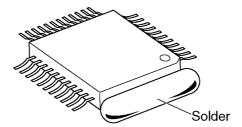
### 12.1.2. How to Remove the IC
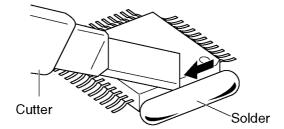
1. Put plenty of solder on the IC pins so that the pins can be completely covered.
   **Note:**
   If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.
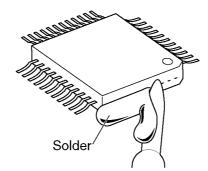


Solder

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



Cutter        Solder

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



Solder

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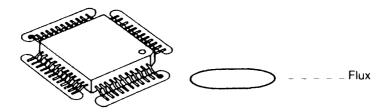
## 12.1.3.   How to Install the IC

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

● – – – – – –Temporary soldering point.
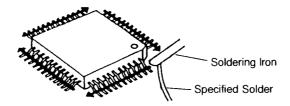
*Check the accuracy of the IC setting with the corresponding soldering foil.

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

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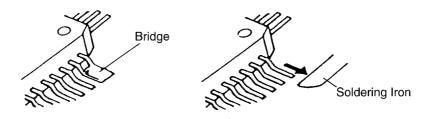
3. Solder the pins, sliding the soldering iron in the direction of the arrow.

Soldering Iron

Specified Solder

## 12.1.4.   How to Remove a Solder Bridge

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

Bridge

Soldering Iron

## 12.2. How to Replace the Shield Case

### 12.2.1. 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.
• Hot Air Desoldering Tool
  Temperature: 608°F ± 68°F (320°C ± 20°C)

### 12.2.2. Caution
• To replace the IC efficiently, choose the right sized nozzle of the hot air desoldering tool that matches the IC package.
• Be careful about the temperature of the hot air desoldering tool not to damage the PCB and/or IC.
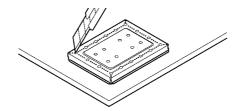
### 12.2.3. How to Remove the Shield Case
**Note:**
  If you don't have special tools (ex. Hot air disordering tool), conduct the following operations.
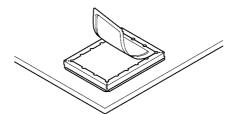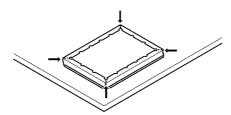
1. Cut the case along perforation.
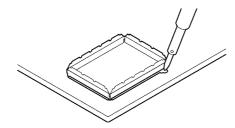
2. Remove the cut part.

3. Cut the four corners along perforation.
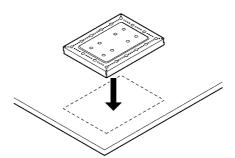
4. Remove the reminds by melting solder.
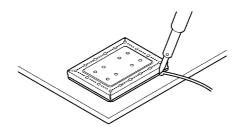
## 12.2.4.  How to Install the Shield Case

**Note:**
• If you don't have special tools (ex. Hot air disordering tool), conduct the following operations.
• Shield case's No. : PNMC1013Z


1. Put the shield case.
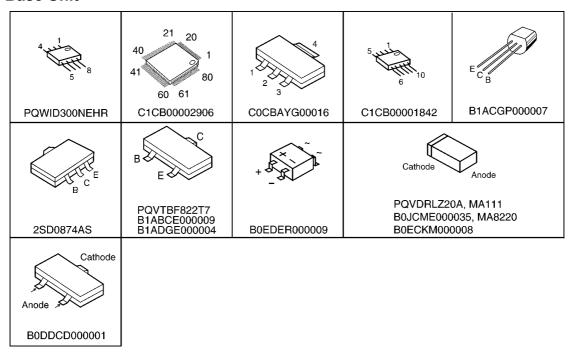
2. Solder the surroundings.
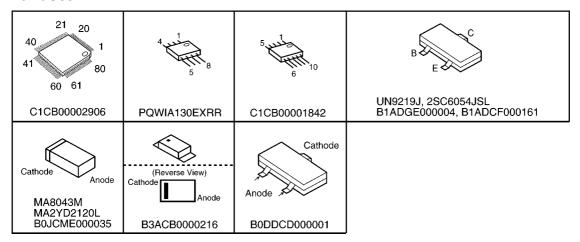
# 12.3. Terminal Guide of the ICs, Transistors and Diodes

## 12.3.1. Base Unit

| | | | | |
|---|---|---|---|---|
| PQWID300NEHR | C1CB00002906 | C0CBAYG00016 | C1CB00001842 | B1ACGP000007 |
| 2SD0874AS | PQVTBF822T7 B1ABCE000009 B1ADGE000004 | B0EDER000009 | PQVDRLZ20A, MA111 B0JCME000035, MA8220 B0ECKM000008 | |
| B0DDCD000001 | | | | |

## 12.3.2. Handset

| | | | |
|---|---|---|---|
| C1CB00002906 | PQWIA130EXRR | C1CB00001842 | UN9219J, 2SC6054JSL B1ADGE000004, B1ADCF000161 |
| MA8043M MA2YD2120L B0JCME000035 | B3ACB0000216 | B0DDCD000001 | |

# 13 Schematic Diagram

## 13.1.  For Schematic Diagram

### 13.1.1.  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. The schematic diagrams may be modified at any time with the development of new technology.

### 13.1.2.  Handset (Schematic Diagram (Handset))

**Notes:**

1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.

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

### 13.1.3.  Charger Unit (Schematic Diagram (Charger Unit))

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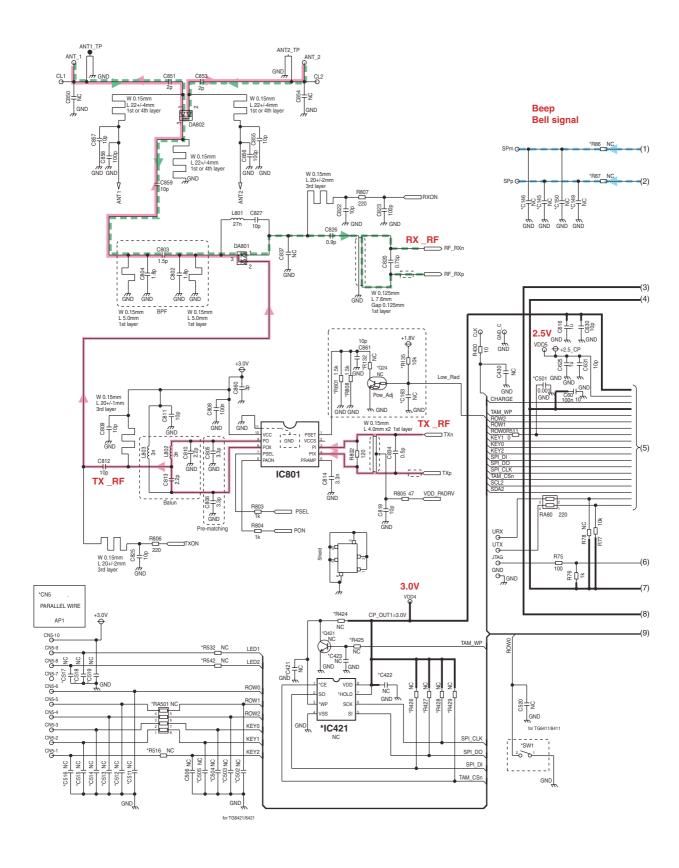
1. DC voltage measurements are taken with voltmeter from the negative voltage line.

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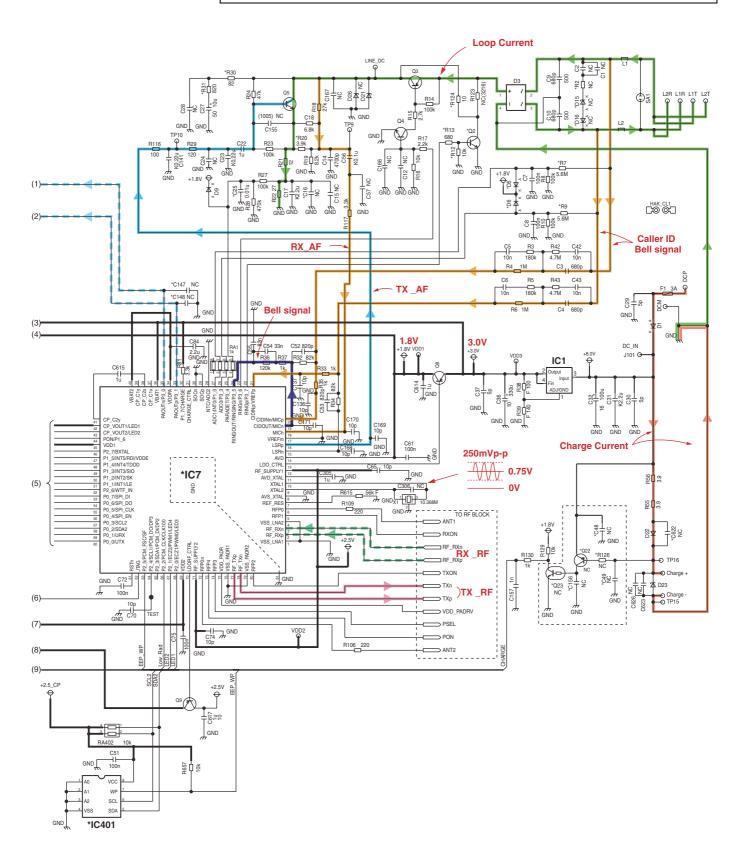
2. The schematic diagram may be modified at any time with the development of new technology.

# 13.2.  Schematic Diagram (Base Unit)



NC: No Components

Loop Current

Caller ID
Bell signal

RX_AF

TX _AF

Bell signal

1.8V

3.0V

Charge Current

250mVp-p
0.75V
0V

TO RF BLOCK

RX _RF

TX _RF

*IC7

*IC401

*IC1
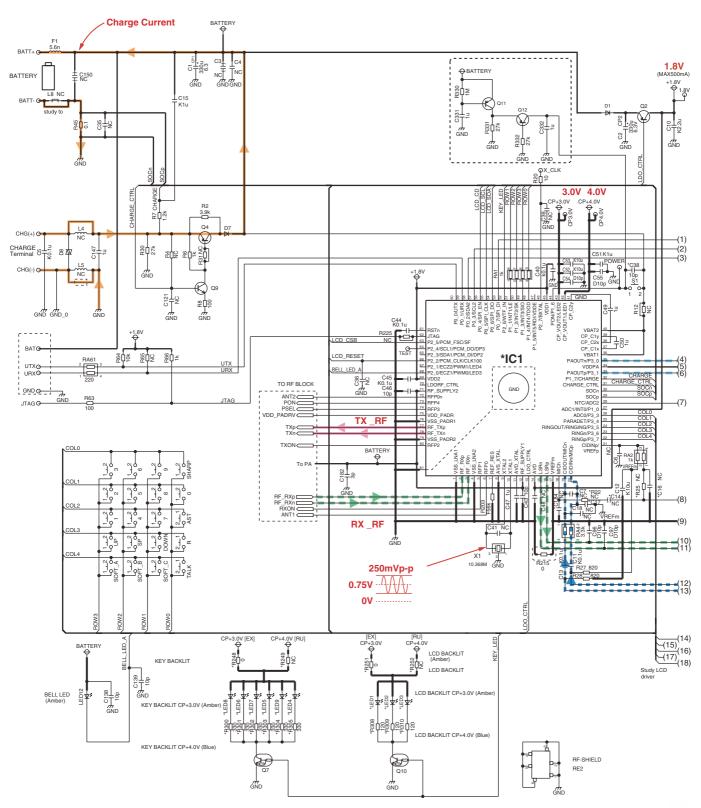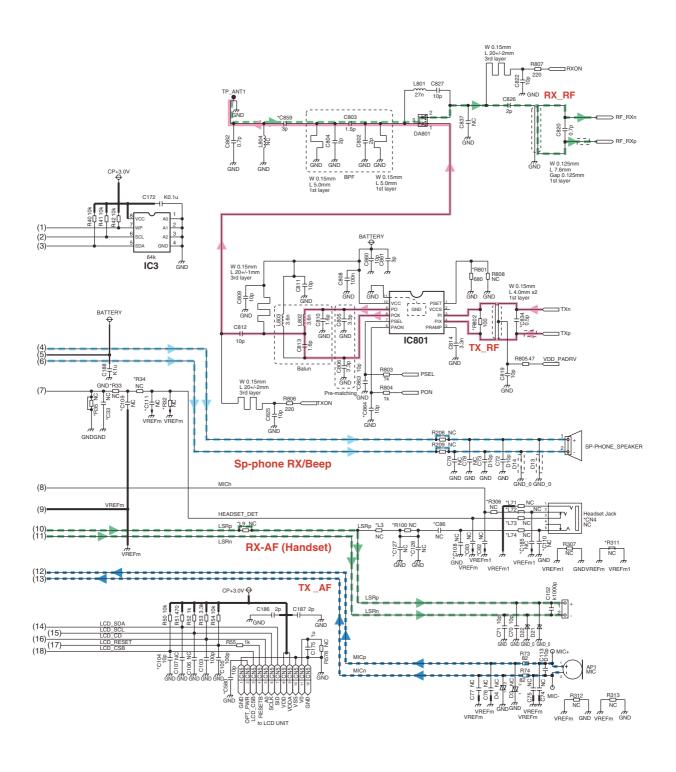
NC: No Components

KX-TG6411/6412/6413BX SCHEMATIC DIAGRAM (Base Unit)

# 13.3. Schematic Diagram (Handset)



NC: No Components

RX_RF

TX_RF

Sp-phone RX/Beep

RX-AF (Handset)

TX_AF
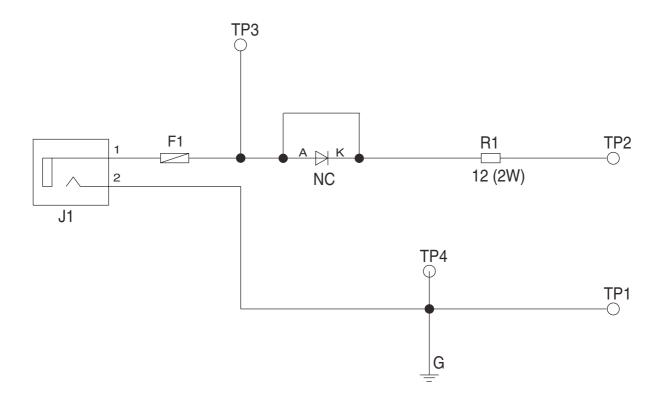
NC: No Components

KX-TGA641 SCHEMATIC DIAGRAM (Handset_Main)

# 13.4. Schematic Diagram (Charger Unit)
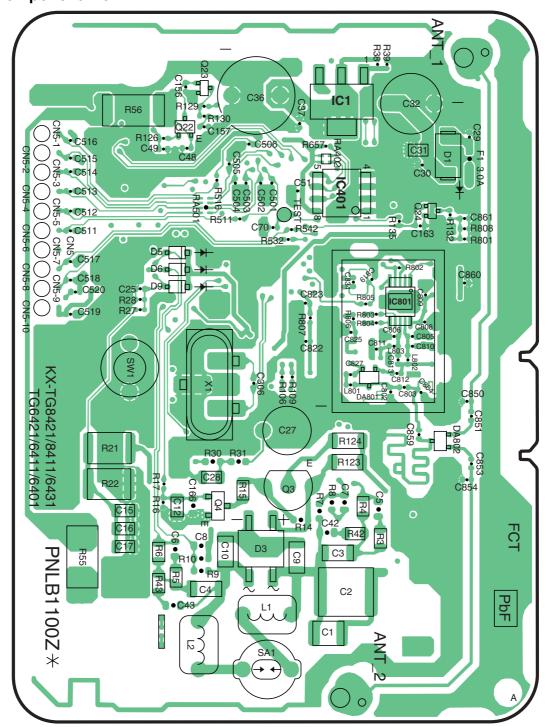


SCHEMATIC DIAGRAM (Charger Unit)

# 14 Printed Circuit Board
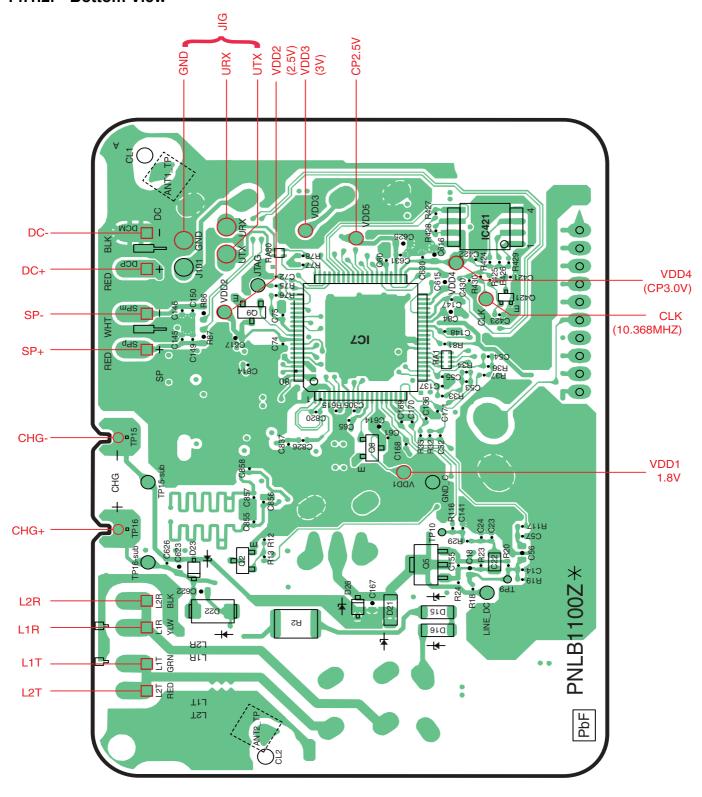
## 14.1. Circuit Board (Base Unit_Main)

### 14.1.1. Component View



KX-TG6411/6412/6413 CIRCUIT BOARD (Base Unit_Main (Component View))
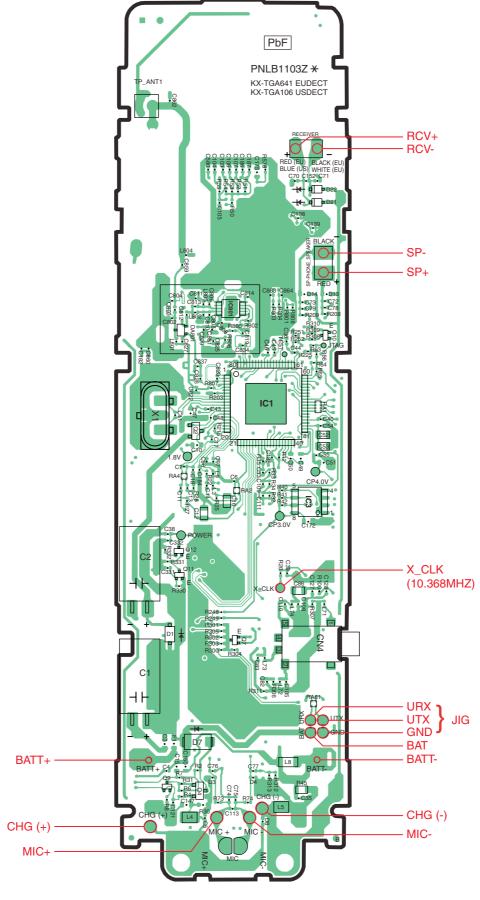
## 14.1.2.  Bottom View

KX-TG6411/6412/6413 CIRCUIT BOARD (Base Unit_Main (Bottom View))
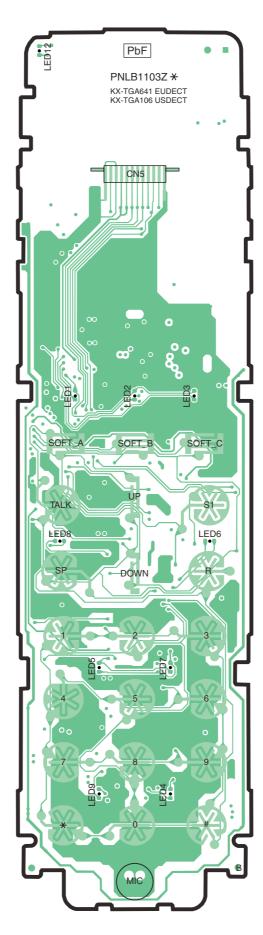
## 14.2. Circuit Board (Handset)

### 14.2.1. Component View

KX-TGA641 CIRCUIT BOARD (Handset_Main (Component View))

71
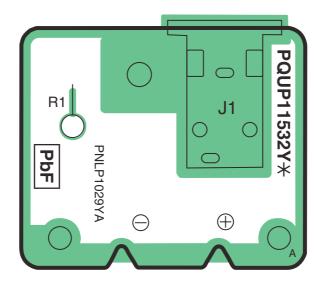
## 14.2.2. Bottom View



KX-TGA641 CIRCUIT BOARD (Handset_Main (Bottom View))
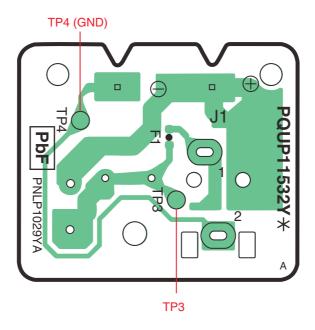
## 14.3. Circuit Board (Charger Unit)

### 14.3.1. Component View



CIRCUIT BOARD (Charger unit (Component View))
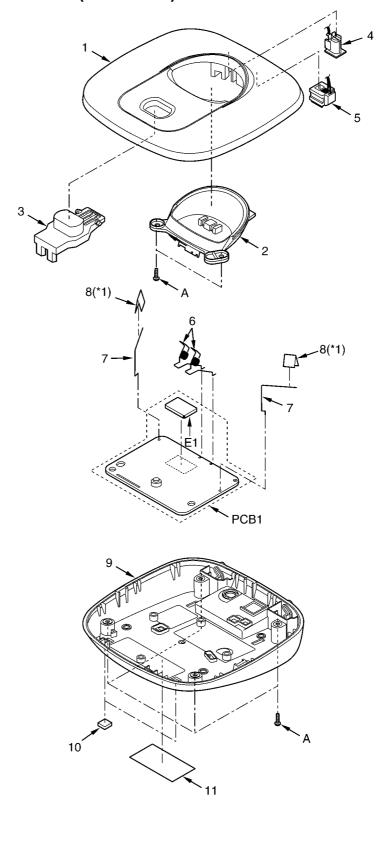
### 14.3.2. Bottom View



CIRCUIT BOARD (Charger unit (Bottom View))

# 15 Exploded View and Replacement Parts List

## 15.1.  Cabinet and Electrical Parts (Base Unit)
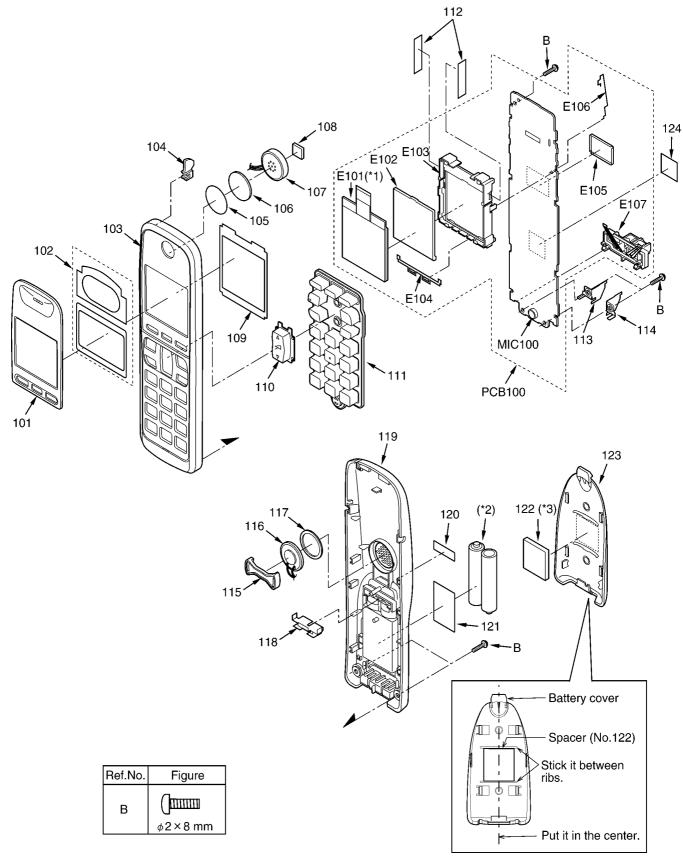
| Ref.No. | Figure |
|---------|--------|
| A | ⌀2.6 x 8 mm |

**Note:**

   (*1) Refer to the spacer (No. 109) of **Cabinet and Electrical Parts (Handset)** (P.75).
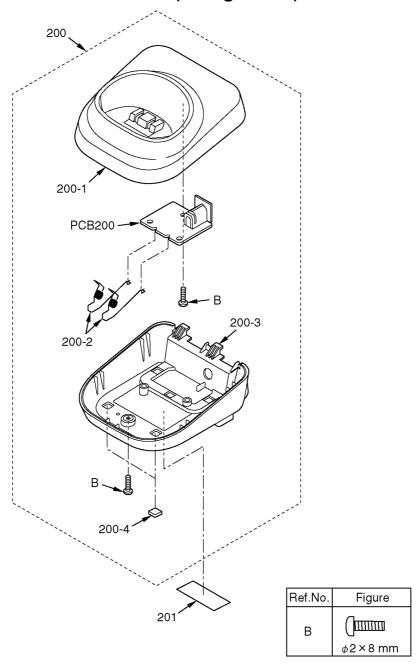
# 15.2. Cabinet and Electrical Parts (Handset)



| Ref.No. | Figure |
|---------|--------|
| B | ⌇▭▭▭▭ φ2 × 8 mm |

**Note:**
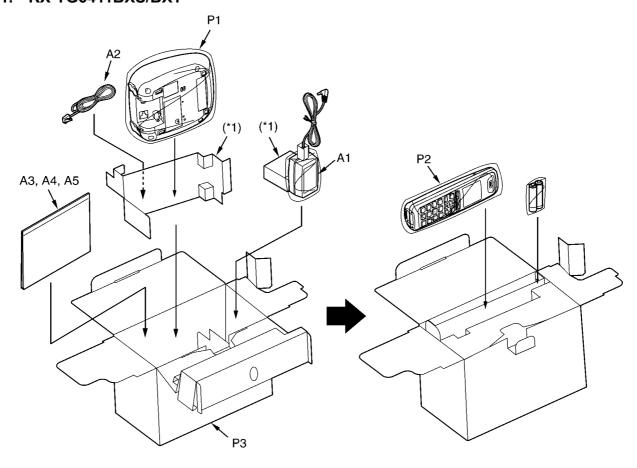
(*1) This cable is fixed by welding. Refer to **How to Replace the Handset LCD** (P.46).

(*2) The rechargeable Ni-MH battery HHR-4MPT is available through sales route of Panasonic.

(*3) Attach the spacer (No. 122) to the exact location described above.

## 15.3.  Cabinet and Electrical Parts (Charger Unit)



| Ref.No. | Figure |
|---------|--------|
| B | φ2 × 8 mm |

## 15.4. Accessories and Packing Materials
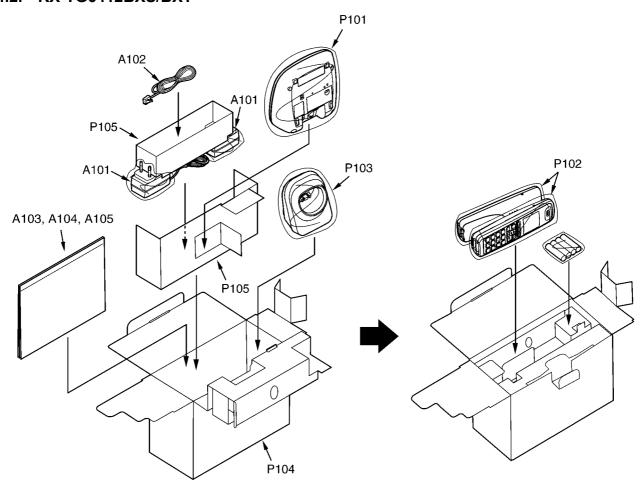
### 15.4.1. KX-TG6411BXS/BXT



**Note**:

(*1) These pads are pieces of Ref No. P3 (GIFT BOX).
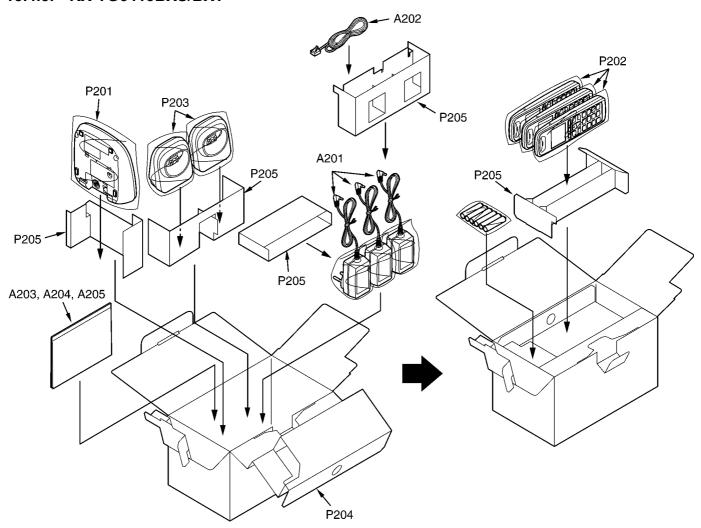
## 15.4.2. KX-TG6412BXS/BXT



**Note:**
(*1) These pads are pieces of Ref No. P104 (GIFT BOX).

## 15.4.3.  KX-TG6413BXS/BXT

# 15.5. Replacement Part List

1. RTL (Retention Time Limited)
   **Note:**
   The "RTL" marking indicates that its Retention Time is Limited.
   When production is discontinued, this item will continue to be available only for a specific period of time. This period of time depends on the type of item, and the local laws governing parts and product retention.
   At the end of this period, the item will no longer be available.

2. Important safety notice

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

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

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

5. RESISTORS & CAPACITORS
   Unless otherwise specified;
   All resistors are in ohms (Ω) k=1000 Ω, M=1000 kΩ
   All capacitors are in MICRO FARADS (μF)p=μμF
   *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 |

*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 |
| ECQMS:Mica | ECQP:Polypropylene |

Voltage

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

## 15.5.1. Base Unit

## 15.5.1.1. Cabinet and Electrical Parts

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | 1 | PNKM1073Y4 | CABINET BODY (for KX-TG6411BXS) | PS-HB |
| | 1 | PNKM1073Y1 | CABINET BODY (for KX-TG6411BXT) | PS-HB |
| | 2 | PNKE1030Z3 | CASE, CHARGE TERMINAL (for KX-TG6411BXS) | PS-HB |
| | 2 | PNKE1030Z1 | CASE, CHARGE TERMINAL (for KX-TG6411BXT) | PS-HB |
| | 3 | PNBC1268Z1 | BUTTON, LOCATOR | ABS-HB |
| | 4 | K2ECYZ000001 | JACK, DC | |
| | 5 | PQJJ1T039Y | JACK, MODULAR | |
| | 6 | PNJT1025Z | CHARGE TERMINAL | |
| | 7 | PNLA1002Z | ANTENNA | |

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | 8 | PNYE1009Z | SPACER, ANTENNA | |
| | 9 | PNKF1055Z2 | CABINET COVER (for KX-TG6411BXS) | PS-HB |
| | 9 | PNKF1055Z1 | CABINET COVER (for KX-TG6411BXT) | PS-HB |
| | 10 | PQHA10023Z | RUBBER PARTS, FOOT CUSHION | |
| | 11 | PNGT2240Y | NAME PLATE (for KX-TG6411BXS) | |
| | 11 | PNGT2240Z | NAME PLATE (for KX-TG6411BXT) | |

## 15.5.1.2. Main P.C.Board Parts

**Note:**
(*1) When replacing IC7, IC401 or X1, make the adjustment using PNZZTG6411BX. Refer to **How to download the data** (P.54) of **Things to Do after Replacing IC or X'tal.**
(*2) When you removing E1, use special tools (ex. Hot air disordering tool).
(*3) Backside of this IC has a ground plate.
(*4) Supplied IC is Flat Package Type.

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | PCB1 | PNWPG6411BXH | MAIN P.C.BOARD ASS'Y (RTL) | |
| | | | (ICs) | |
| | IC1 | C0CBAYG00016 | IC | S |
| | IC7 | C1CB00002906 | IC (BBIC(FLASH)) (*1) (*3) (*4) | |
| | IC401 | PQWID300NEHR | IC (EEPROM) (*1) | |
| | IC801 | C1CB00001842 | IC (*3) | |
| | | | (TRANSISTORS) | |
| | Q2 | B1ABCE000009 | TRANSISTOR(SI) | |
| | Q3 | B1ACGP000007 | TRANSISTOR(SI) | |
| | Q4 | PQVTBF822T7 | TRANSISTOR(SI) | |
| | Q5 | 2SD0874AS | TRANSISTOR(SI) | |
| | Q8 | B1ADGE000004 | TRANSISTOR(SI) | |
| | Q9 | B1ADGE000004 | TRANSISTOR(SI) | |
| | | | (DIODES) | |
| | D1 | B0JCME000035 | DIODE(SI) | |
| | D3 | B0EDER000009 | DIODE(SI) | |
| | D5 | MA111 | DIODE(SI) | S |
| | D6 | MA111 | DIODE(SI) | S |
| | D9 | MA111 | DIODE(SI) | S |
| | D21 | PQVDRLZ20A | DIODE(SI) | S |
| | D22 | B0ECKM000008 | DIODE(SI) | |
| | D23 | MA8220 | DIODE(SI) | S |
| | DA801 | B0DDCD000001 | DIODE(SI) | |
| | DA802 | B0DDCD000001 | DIODE(SI) | |
| | | | (COILS) | |
| | L1 | PQLQXF330K | COIL | S |
| | L2 | PQLQXF330K | COIL | S |
| | L801 | G1C27NJ00010 | COIL | |
| | L802 | G1C3N0ZA0063 | COIL | |
| | L803 | G1C3N0ZA0063 | COIL | |
| | | | (COMPONENT PARTS) | |
| | RA1 | D1H810240004 | RESISTOR ARRAY | S |
| | RA402 | D1H410320002 | RESISTOR ARRAY | |
| | RA80 | D1H422120001 | RESISTOR ARRAY | |
| | | | (VARISTOR) | |
| | SA1 | J0LF00000026 | VARISTOR (SURGE ABSORBER) | |
| | | | (RESISTORS) | |
| | R3 | PQ4R10XJ184 | 180k | S |
| | R4 | PQ4R10XJ105 | 1M | S |
| | R5 | PQ4R10XJ184 | 180k | S |
| | R6 | PQ4R10XJ105 | 1M | S |
| | R7 | ERJ3GEYJ565 | 5.6M | |
| | R8 | ERJ3GEYJ104 | 100k | |
| | R9 | ERJ3GEYJ565 | 5.6M | |
| | R10 | ERJ3GEYJ104 | 100k | |
| | R12 | ERJ2GEJ103 | 10k | |

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | R13 | ERJ2GEJ681 | 680 | |
| | R14 | ERJ3GEYJ104 | 100k | |
| | R15 | PQ4R10XJ272 | 2.7k | S |
| | R16 | ERJ2GEJ103 | 10k | |
| | R17 | ERJ2GEJ222 | 2.2k | |
| | R18 | ERJ2GEJ273X | 27k | |
| | R19 | ERJ2GEJ822 | 8.2k | |
| | R20 | ERJ2GEJ392 | 3.9k | |
| | R21 | ERJ12YJ120 | 12 | |
| | R22 | ERJ12YJ270 | 27 | |
| | R23 | ERJ2GEJ104 | 100k | |
| | R24 | ERJ2GEJ473 | 47k | |
| | R27 | ERJ2GEJ104 | 100k | |
| | R28 | ERJ2GEYJ474 | 470k | S |
| | R29 | ERJ2GEJ121 | 120 | |
| | R30 | ERJ3GEYJ820 | 82 | |
| | R31 | ERJ3GEYJ821 | 820 | |
| | R32 | ERJ2GEJ823 | 82k | |
| | R33 | ERJ2GEJ102 | 1k | |
| | R34 | ERJ2GEJ823 | 82k | |
| | R35 | ERJ2GEJ102 | 1k | |
| | R36 | ERJ2GEJ124 | 120k | |
| | R37 | ERJ2GEJ102 | 1k | |
| | R38 | ERJ2RKF1000 | 100 | |
| | R39 | ERJ2RKF1400 | 140 | |
| | R42 | PQ4R10XJ475 | 4.7M | S |
| | R43 | PQ4R10XJ475 | 4.7M | S |
| | R55 | ERJ1TYJ3R9U | 3.9 | |
| | R56 | ERJ1TYJ3R9U | 3.9 | |
| | R75 | ERJ2GEJ101 | 100 | |
| | R76 | ERJ2GEJ102 | 1k | |
| | R77 | ERJ2GEJ103 | 10k | |
| | R81 | ERJ2GEJ332 | 3.3k | |
| | R106 | ERJ2GEJ221 | 220 | |
| | R109 | ERJ2GEJ221 | 220 | |
| | R116 | ERJ2GEJ101 | 100 | |
| | R117 | ERJ2GEJ332 | 3.3k | |
| | R124 | PQ4R18XJ100 | 10 | S |
| | R129 | ERJ2GEJ103 | 10k | |
| | R130 | ERJ2GEJ102 | 1k | |
| | R135 | ERJ2GEJ103 | 10k | |
| | R430 | ERJ2GEJ100 | 10 | |
| | R511 | ERJ2GE0R00 | 0 | |
| | R615 | D0GA563ZA006 | 56k | |
| | R657 | ERJ2GEJ103 | 10k | |
| | R801 | ERJ2GEJ152 | 1.5k | |
| | R802 | ERJ2GEJ121 | 120 | |
| | R803 | ERJ2GEJ102 | 1k | |
| | R804 | ERJ2GEJ102 | 1k | |
| | R805 | ERJ2GEJ470 | 47 | |
| | R806 | ERJ2GEJ221 | 220 | |
| | R807 | ERJ2GEJ221 | 220 | |
| | R808 | ERJ2GEJ152 | 1.5k | |
| | | | (CAPACITORS) | |
| | C3 | F1K2H681A008 | 680p | |
| | C4 | F1K2H681A008 | 680p | |
| | C5 | ECUV1C103KBV | 0.01 | |
| | C6 | ECUV1C103KBV | 0.01 | |
| | C7 | ECUV1C104KBV | 0.1 | |
| | C8 | ECUV1C104KBV | 0.1 | |
| | C9 | F1K2H681A008 | 680p | |
| | C10 | F1K2H681A008 | 680p | |
| | C14 | ECUE1E472KBQ | 0.0047 | |
| | C17 | PQCUV1A225KB | 2.2 | |
| | C18 | ERJ3GEYJ682 | 6.8k | |
| | C22 | PQCUV1A105KB | 1 | |
| | C23 | ECJ0EB0J224K | 0.22 | S |
| | C25 | ECUE1C103KBQ | 0.01 | |
| | C27 | F2A1H100B132 | 10 | |
| | C29 | F1G1H5R0A480 | 5p | |
| | C30 | F1G1H5R0A480 | 5p | |
| | C31 | PQCUV1A225KB | 2.2 | |
| | C32 | F2A1C1010119 | 100 | |

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | C36 | F2A1A3310040 | 330 | |
| | C37 | F1G1H5R0A480 | 5p | |
| | C42 | ECUV1C103KBV | 0.01 | |
| | C43 | ECUV1C103KBV | 0.01 | |
| | C51 | ECUE1A104KBQ | 0.1 | |
| | C52 | ECUE1H821KBQ | 820p | |
| | C53 | ECUE1H821KBQ | 820p | |
| | C54 | ECUE1A333KBQ | 0.033 | |
| | C55 | ECUE1A823KBQ | 0.082 | |
| | C56 | ECUV1C104KBV | 0.1 | |
| | C60 | ECUE1A104KBQ | 0.1 | |
| | C61 | ECUE1A104KBQ | 0.1 | |
| | C65 | ECUE1H100DCQ | 10p | |
| | C70 | ECUE1H100DCQ | 10p | |
| | C72 | ECUE1A104KBQ | 0.1 | |
| | C74 | ECUE1H100DCQ | 10p | |
| | C75 | ECUE1A104KBQ | 0.1 | |
| | C84 | ECUV1A225KB | 2.2 | |
| | C136 | ECUE1H100DCQ | 10p | |
| | C137 | ECUE1H100DCQ | 10p | |
| | C141 | ECJ0EB0J224K | 0.22 | S |
| | C157 | ECUE1H102KBQ | 0.001 | |
| | C168 | ECUE1H100DCQ | 10p | |
| | C169 | ECUE1H100DCQ | 10p | |
| | C170 | ECUE1H100DCQ | 10p | |
| | C171 | ECUE1H100DCQ | 10p | |
| | C305 | ECUE0J105KBQ | 1 | |
| | C501 | ECUE1H102KBQ | 0.001 | |
| | C614 | ECUV1A105KBV | 1 | |
| | C615 | ECUV1A105KBV | 1 | |
| | C616 | ECUV1A105KBV | 1 | |
| | C617 | ECUV1A105KBV | 1 | |
| | C625 | ECUV1A105KBV | 1 | |
| | C630 | ECUE1H100DCQ | 10p | |
| | C631 | ECUE1H100DCQ | 10p | |
| | C802 | F1G1H1R8A480 | 1.8p | |
| | C803 | F1G1H1R5A480 | 1.5p | |
| | C804 | F1G1H1R8A480 | 1.8p | |
| | C805 | F1G1H3R3A480 | 3.3p | |
| | C806 | F1G1H3R3A480 | 3.3p | |
| | C808 | ECUE1A104KBQ | 0.1 | |
| | C809 | ECUE1H100DCQ | 10p | |
| | C810 | F1G1H2R2A480 | 2.2p | |
| | C811 | ECUE1H100DCQ | 10p | |
| | C812 | ECUE1H100DCQ | 10p | |
| | C813 | F1G1H2R2A480 | 2.2p | |
| | C814 | ECUE1H332KBQ | 0.0033 | |
| | C819 | ECUE1H100DCQ | 10p | |
| | C820 | F1G1HR75A480 | 0.75p | |
| | C822 | ECUE1H100DCQ | 10p | |
| | C823 | ECUE1H101JCQ | 100p | |
| | C825 | ECUE1H100DCQ | 10p | |
| | C826 | F1G1HR90A480 | 0.9p | |
| | C827 | ECUE1H100DCQ | 10p | |
| | C834 | F1G1HR50A480 | 0.5p | |
| | C851 | F1G1H2R0A480 | 2p | |
| | C853 | F1G1H2R0A480 | 2p | |
| | C855 | ECUE1H100DCQ | 10p | |
| | C856 | ECUE1H101JCQ | 100p | |
| | C857 | ECUE1H100DCQ | 10p | |
| | C858 | ECUE1H101JCQ | 100p | |
| | C859 | ECUE1H100DCQ | 10p | |
| | C860 | F1G1H3R0A480 | 3p | |
| | C861 | ECUE1H100DCQ | 10p | |
| | | | (OTHERS) | |
| | E1 | PNMC1013Z | CASE, MAGNETIC SHIELD (*2) | |
| | X1 | H0J103500027 | CRYSTAL OSCILLATOR (*1) | |
| | F1 | K5H302Y00003 | FUSE | |
| | SW1 | K0H1BA000259 | SPECIAL, SWITCH | |

## 15.5.2. Handset

### 15.5.2.1. Cabinet and Electrical Parts

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | 101 | PNGP1048Z3 | PANEL, LCD (for KX-TGA641BXS) | PMMA-HB |
| | 101 | PNGP1048Z1 | PANEL, LCD (for KX-TGA641BXT) | PMMA-HB |
| | 102 | PNYE1008Z | TAPE, DOUBLE SIDED | |
| | 103 | PNKM1080Y7 | CABINET BODY (for KX-TGA641BXS) | PS-HB |
| | 103 | PNKM1080Y4 | CABINET BODY (for KX-TGA641BXT) | PS-HB |
| | 104 | PNHR1105Z | OPTIC CONDUCTIVE PARTS, LED LENS | PS-HB |
| | 105 | PNHS1072Z | SPACER, RECEIVER NET | |
| | 106 | PQHS10467Z | COVER, SPEAKER NET | |
| | 107 | L0AD02A00028 | RECEIVER | |
| | 108 | PQHG10729Z | RUBBER PARTS, RECEIVER | |
| | 109 | PNYE1009Z | SPACER, CUSHION LCD | |
| | 110 | PNBC1265Z1 | BUTTON, VOLUME KEY | ABS-HB |
| | 111 | PNJK1050T | KEYBOARD SWITCH | |
| | 112 | PNHX1165Z | COVER, LCD SHEET | |
| | 113 | PNJT1027Z | CHARGE TERMINAL (L) | |
| | 114 | PNJT1026Z | CHARGE TERMINAL (R) | |
| | 115 | PQHR11315Z | GUIDE, SPEAKER HOLDER | ABS-HB |
| | 116 | L0AA02A00095 | SPEAKER | |
| | 117 | PQHS10784Y | SPACER, SPEAKER NET | |
| | 118 | PNJC1014Z | BATTERY TERMINAL | |
| | 119 | PNKF1057Z3 | CABINET COVER (for KX-TGA641BXS) | ABS-HB |
| | 119 | PNKF1057Z1 | CABINET COVER (for KX-TGA641BXT) | ABS-HB |
| | 120 | PQQT23182Z | LABEL, ATTENTION | |
| | 121 | PNGT2251Y | NAME PLATE (for KX-TGA641BXS) | |
| | 121 | PNGT2251Z | NAME PLATE (for KX-TGA641BXT) | |
| | 122 | PNHS1079Z | SPACER, BATTERY COVER | |
| | 123 | PNKK1027Z3 | LID, BATTERY COVER (for KX-TGA641BXS) | ABS-HB |
| | 123 | PNKK1027Z1 | LID, BATTERY COVER (for KX-TGA641BXT) | ABS-HB |
| | 124 | PNHX1219Z | PET SHEET | |

### 15.5.2.2. Main P.C.Board Parts

**Note:**

(*1) Reconfirm the model No. written on the handset's name plate when replacing PCB100. Because the model No. of the optional handset may differ from the included handset.

(*2) When replacing IC1, IC3 or X1, make the adjustment using PNZZTG6411BX. Refer to **Handset** (P.55) of **Things to Do after Replacing IC or X'tal.**

(*3) When you removing E105, use special tools (ex. Hot air disordering tool).

(*4) When replacing the handset LCD, See **How to Replace the Handset LCD**(P.46).

(*5) Backside of this IC has a ground plate.

(*6) Supplied IC is Flat Package Type.

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | PCB100 | PNWPGA641BXR | MAIN P.C.BOARD ASS'Y (RTL) (*1) | |
| | | | (ICs) | |
| | IC1 | C1CB00002906 | IC (BBIC (FLASH)) (*2) (*5) (*6) | |
| | IC3 | PQWIA130EXRR | IC (EEPROM) (*2) | |
| | IC801 | C1CB00001842 | IC (*5) | |
| | | | (TRANSISTORS) | |
| | Q2 | B1ADGE000004 | TRANSISTOR(SI) | |

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | Q4 | B1ADGE000004 | TRANSISTOR(SI) | |
| S | Q7 | UN9219J | TRANSISTOR(SI) | S |
| | Q9 | 2SC6054JSL | TRANSISTOR(SI) | |
| S | Q10 | UN9219J | TRANSISTOR(SI) | S |
| | Q11 | B1ADCF000161 | TRANSISTOR(SI) | |
| | Q12 | B1ADCF000161 | TRANSISTOR(SI) | |
| | | | (DIODES) | |
| | D1 | MA2YD2120L | DIODE(SI) | |
| | D7 | B0JCME000035 | DIODE(SI) | |
| | D21 | MA8043M | DIODE(SI) | S |
| | D22 | MA8043M | DIODE(SI) | S |
| | DA801 | B0DDCD000001 | DIODE(SI) | |
| | LED1 | B3ACB0000216 | LED | |
| | LED2 | B3ACB0000216 | LED | |
| | LED3 | B3ACB0000216 | LED | |
| | LED4 | B3ACB0000216 | LED | |
| | LED5 | B3ACB0000216 | LED | |
| | LED6 | B3ACB0000216 | LED | |
| | LED7 | B3ACB0000216 | LED | |
| | LED8 | B3ACB0000216 | LED | |
| | LED9 | B3ACB0000216 | LED | |
| | LED12 | B3ACB0000216 | LED | |
| | | | (COILS) | |
| | L801 | G1C27NJ00010 | COIL | |
| | L802 | G1C3N6ZA0063 | COIL | |
| | L803 | G1C3N6ZA0063 | COIL | |
| | F1 | PQLQR2M5N6K | COIL | S |
| | | | (COMPONENTS PARTS) | |
| | RA1 | D1H810240004 | RESISTOR ARRAY | S |
| | RA2 | D1H410220001 | RESISTOR ARRAY | |
| | RA4 | D1H433220001 | RESISTOR ARRAY | |
| | RA61 | D1H422120001 | RESISTOR ARRAY | |
| | | | (VARISTORS) | |
| | D8 | D4ED1270A014 | VARISTOR | |
| | D13 | D4ZZ00000024 | VARISTOR | |
| | D14 | D4ZZ00000024 | VARISTOR | |
| | | | (RESISTORS) | |
| | R2 | ERJ2GEJ392 | 3.9k | |
| | R6 | ERJ2GEJ102 | 1k | |
| | R7 | ERJ2GEJ122 | 1.2k | |
| | R8 | ERJ2GEJ101 | 100 | |
| | R20 | ERJ2GEJ100 | 10 | |
| | R27 | ERJ2GEJ821 | 820 | |
| | R28 | ERJ2GEJ821 | 820 | |
| | R30 | ERJ3GEYJ273 | 27k | |
| | R40 | ERJ2GEJ103 | 10k | |
| | R41 | ERJ2GEJ103 | 10k | |
| | R42 | ERJ2GEJ103 | 10k | |
| | R45 | ERJ6RSJR10V | 0.1 | |
| | R50 | ERJ2GEJ103 | 10k | |
| | R51 | ERJ2GEJ471 | 470 | |
| | R52 | ERJ2GEJ102 | 1k | |
| | R53 | ERJ2GEJ332 | 3.3k | |
| | R54 | ERJ2GEJ103 | 10k | |
| | R55 | ERJ2GEJ102 | 1k | |
| | R63 | ERJ2GEJ101 | 100 | |
| | R64 | ERJ2GEJ103 | 10k | |
| | R66 | ERJ2GEJ102 | 1k | |
| | R73 | ERJ2GEJ820 | 82 | |
| | R74 | ERJ2GEJ820 | 82 | |
| | R203 | D0GA563ZA006 | 56k | |
| | R215 | ERJ2GE0R00 | 0 | |
| | R248 | ERJ2GE0R00 | 0 | |
| | R251 | ERJ2GE0R00 | 0 | |
| | R300 | ERJ2GEJ331 | 330 | |
| | R301 | ERJ2GEJ331 | 330 | |
| | R302 | ERJ2GEJ331 | 330 | |
| | R303 | ERJ2GEJ331 | 330 | |
| | R304 | ERJ2GEJ331 | 330 | |
| | R305 | ERJ2GEJ331 | 330 | |
| | R308 | ERJ2GEJ121 | 120 | |
| | R309 | ERJ2GEJ121 | 120 | |
| | R310 | ERJ2GEJ121 | 120 | |

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | R330 | ERJ2GEJ105X | 1M | |
| | R331 | ERJ2GEJ273X | 27k | |
| | R332 | ERJ2GEJ273X | 27k | |
| | R801 | ERJ2GEJ681 | 680 | |
| | R802 | ERJ2GEJ101 | 100 | |
| | R803 | ERJ2GEJ102 | 1k | |
| | R804 | ERJ2GEJ102 | 1k | |
| | R805 | ERJ2GEJ470 | 47 | |
| | R806 | ERJ2GEJ221 | 220 | |
| | R807 | ERJ2GEJ221 | 220 | |
| | | | (CAPACITORS) | |
| | C1 | F2A0J3310067 | 330 | |
| | C2 | F2A0J3310067 | 330 | |
| | C5 | ECUE1A104KBQ | 0.1 | |
| | C10 | ECUV1A225KB | 2.2 | |
| | C11 | ECUE1A104KBQ | 0.1 | |
| | C12 | PQCUV0J106KB | 10 | |
| | C13 | ECUE1A104KBQ | 0.1 | |
| | C15 | ECUV1A105KBV | 1 | |
| | C38 | ECUE1H100DCQ | 10p | |
| | C40 | ECUE1A104KBQ | 0.1 | |
| | C43 | ECUE1H100DCQ | 10p | |
| | C44 | ECUE1A104KBQ | 0.1 | |
| | C45 | ECUE1A104KBQ | 0.1 | |
| | C46 | ECUE1H100DCQ | 10p | |
| | C47 | ECUV1A105KBV | 1 | |
| | C49 | ECUV1A105KBV | 1 | |
| | C50 | ECUV1A105KBV | 1 | |
| | C51 | ECUV1A105KBV | 1 | |
| | C52 | PQCUV0J106KB | 10 | |
| | C53 | PQCUV0J106KB | 10 | |
| | C54 | ECUE1H100DCQ | 10p | |
| | C55 | ECUE1H100DCQ | 10p | |
| | C70 | ECUE1H100DCQ | 10p | |
| | C71 | ECUE1H100DCQ | 10p | |
| | C72 | ECUE1H100DCQ | 10p | |
| | C73 | ECUE1H100DCQ | 10p | |
| | C96 | ECUE1H100DCQ | 10p | |
| | C97 | ECUE1H100DCQ | 10p | |
| | C103 | ECUE1H101JCQ | 100p | |
| | C104 | ECUE1H100DCQ | 10p | |
| | C105 | ECUE1H101JCQ | 100p | |
| | C113 | ECUE1H100DCQ | 10p | |
| | C138 | ECUE1H100DCQ | 10p | |
| | C139 | ECUE1H100DCQ | 10p | |
| | C147 | ECUV1C105KBV | 1 | |
| | C152 | ECUE1H102KBQ | 0.001 | |
| | C172 | ECUV1C104KBV | 0.1 | |
| | C175 | ECUV1C105KBV | 1 | |
| | C182 | F1G1H3R0A480 | 3p | |
| | C186 | F1G1H2R0A480 | 2p | |
| | C187 | F1G1H2R0A480 | 2p | |
| | C188 | ECUE0J105KBQ | 1 | |
| | C331 | ECUE0J105KBQ | 1 | |
| | C332 | ECUE0J105KBQ | 1 | |
| | C580 | ECUE1H100DCQ | 10p | |
| | C802 | F1G1H2R0A480 | 2p | |
| | C803 | F1G1H1R5A480 | 1.5p | |
| | C804 | F1G1H2R0A480 | 2p | |
| | C805 | F1G1H3R3A480 | 3.3p | |
| | C806 | F1G1H3R3A480 | 3.3p | |
| | C808 | ECUE1A104KBQ | 0.1 | |
| | C809 | ECUE1H100DCQ | 10p | |
| | C810 | F1G1H1R6A480 | 1.6p | |
| | C811 | ECUE1H100DCQ | 10p | |
| | C812 | ECUE1H100DCQ | 10p | |
| | C813 | F1G1H1R6A480 | 1.6p | |
| | C814 | ECUE1H332KBQ | 0.0033 | |
| | C819 | ECUE1H100DCQ | 10p | |
| | C820 | F1G1HR70A480 | 0.7p | |
| | C822 | ECUE1H100DCQ | 10p | |
| | C825 | ECUE1H100DCQ | 10p | |
| | C826 | F1G1H2R0A480 | 2p | |

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | C827 | ECUE1H100DCQ | 10p | |
| | C834 | F1G1HR50A480 | 0.5p | |
| | C859 | F1G1H3R0A480 | 3p | |
| | C860 | ECUE1H100DCQ | 10p | |
| | C861 | F1G1H3R0A480 | 3p | |
| | C862 | F1G1HR70A480 | 0.7p | |
| | C863 | ECUE1H100DCQ | 10p | |
| | C864 | ECUE1H100DCQ | 10p | |
| | | | (OTHERS) | |
| | MIC100 | L0CBAY000032 | MICROPHONE | |
| | E101 | L5DYBYY00001 | LIQUID CRYSTAL DISPLAY (*4) | |
| | E102 | PNHR1114Z | TRANSPARENT PLATE, LCD PLATE | PMMA-HB |
| | E103 | PNHR1113Z | GUIDE, LCD HOLDER | ABS-HB |
| | E104 | PNHX1136Z | COVER, LCD COVER SHEET | |
| | E105 | PNMC1013Z | CASE,MAGNETIC SHIELD (*3) | |
| | E106 | PNLA1020Z | ANTENNA | |
| | E107 | PNVE1002Z | BATTERY TERMINAL | |
| | X1 | H0J103500034 | CRYSTAL OSCILLATOR (*2) | |

## 15.5.3.  Charger Unit

## 15.5.3.1.  Cabinet and Electrical Parts

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | 200 | PNLC1008YS | CHARGER UNIT ASS'Y without NAME PLATE (RTL) (for KX-TG6412BXS) (for KX-TG6413BXS) | |
| | 200 | PNLC1008ZT | CHARGER UNIT ASS'Y without NAME PLATE (RTL) (for KX-TG6412BXT) (for KX-TG6413BXT) | |
| | 200-1 | PNKM1077Z4 | CABINET BODY (for KX-TG6412BXS) (for KX-TG6413BXS) | PS-HB |
| | 200-1 | PNKM1077Z1 | CABINET BODY (for KX-TG6412BXT) (for KX-TG6413BXT) | PS-HB |
| | 200-2 | PNJT1010Z | CHARGE TERMINAL | |
| | 200-3 | PNKF1012Z8 | CABINET COVER (for KX-TG6412BXS) (for KX-TG6413BXS) | PS-HB |
| | 200-3 | PNKF1012Z1 | CABINET COVER (for KX-TG6412BXT) (for KX-TG6413BXT) | PS-HB |
| | 200-4 | PQHA10023Z | RUBBER PARTS, FOOT CUSHION | |
| | 201 | PNGT1838Y | NAME PLATE (for KX-TG6412BXS) (for KX-TG6413BXS) | |
| | 201 | PNGT1838Z | NAME PLATE (for KX-TG6412BXT) (for KX-TG6413BXT) | |

## 15.5.3.2.  Main P.C.Board Parts

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | PCB200 | PNWPTGA641CH | MAIN P.C.BOARD ASS'Y (RTL) | |
| | | | (JACK) | |
| | J1 | K2ECYB000001 | JACK | S |
| | | | (RESISTOR) | |
| | R1 | ERG2SJ120 | 12 | |
| | | | (FUSE) | |
| | F1 | K5H302Y00003 | FUSE | |

## 15.5.4. Accessories and Packing Materials

**Note:**

(*1) You can download and refer to the Operating Instructions (Instruction book) on TSN Server.

### 15.5.4.1. KX-TG6411BXS/BXT

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| ⚠ | A1 | PQLV219BXZ | AC ADAPTOR | |
| | A2 | PQJA10075Z | CORD, TELEPHONE | |
| | A3 | PNQX1690Z | INSTRUCTION BOOK (*1) | |
| | A4 | PNQW1538Z | LEAFLET, QUICK GUIDE (for Arabic) | |
| | A5 | PNQW1539Z | LEAFLET, QUICK GUIDE (for Persian) | |
| | P1 | PQPP10152Z | PROTECTION COVER (for Base Unit) | |
| | P2 | XZB08X25B02 | PROTECTION COVER (for Handset) | |
| | P3 | PNPK2315Z | GIFT BOX | |

### 15.5.4.2. KX-TG6412BXS/BXT

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| ⚠ | A101 | PQLV219BXZ | AC ADAPTOR | |
| | A102 | PQJA10075Z | CORD, TELEPHONE | |
| | A103 | PNQX1690Z | INSTRUCTION BOOK (*1) | |
| | A104 | PNQW1538Z | LEAFLET, QUICK GUIDE (for Arabic) | |
| | A105 | PNQW1539Z | LEAFLET, QUICK GUIDE (for Persian) | |
| | P101 | PQPP10152Z | PROTECTION COVER (for Base Unit) | |
| | P102 | XZB08X25B02 | PROTECTION COVER (for Handset) | |
| | P103 | XZB13X19C03 | PROTECTION COVER (for Charger Unit) | |
| | P104 | PNPK2324Z | GIFT BOX | |
| | P105 | PNPD1296Z | CUSHION | |

### 15.5.4.3. KX-TG6413BXS/BXT

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| ⚠ | A201 | PQLV219BXZ | AC ADAPTOR | |
| | A202 | PQJA10075Z | CORD, TELEPHONE | |
| | A203 | PNQX1690Z | INSTRUCTION BOOK (*1) | |
| | A204 | PNQW1538Z | LEAFLET, QUICK GUIDE (for Arabic) | |
| | A205 | PNQW1539Z | LEAFLET, QUICK GUIDE (for Persian) | |
| | P201 | PQPP10152Z | PROTECTION COVER (for Base Unit) | |
| | P202 | XZB08X25B02 | PROTECTION COVER (for Handset) | |
| | P203 | XZB13X19C03 | PROTECTION COVER (for Charger Unit) | |
| | P204 | PNPK2330Z | GIFT BOX | |
| | P205 | PNPD1297Z | CUSHION | |

## 15.5.5. Screws

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | A | XTB26+8GFJ | TAPPING SCREW | |
| | B | XTB2+8GFJ | TAPPING SCREW | |

## 15.5.6. Fixtures and Tools

**Note:**

(*1) See **Equipment Required** (P.47), and **The Setting Method of JIG (Handset)** (P.51).

(*2) When replacing the Handset LCD, See **How to Replace the Handset LCD** (P.46).

| Safety | Ref. No. | Part No. | Part Name & Description | Remarks |
|---|---|---|---|---|
| | | PQZZ1CD300E | JIG CABLE (*1) | |
| | | PNZZTG6411BX | BATCH FILE CD-ROM (*1) | |
| | | PQZZ430PIR | TIP OF SOLDERING IRON (*2) | |
| | | PQZZ430PRB | RUBBER OF SOLDERING IRON (*2) | |

K.T
KXTG6411BXS
KXTG6411BXT
KXTG6412BXS
KXTG6412BXT
KXTG6413BXS
KXTG6413BXT
KXTGA641BXS
KXTGA641BXT