Service Manual

Telephone Equipment

Caller ID Compatible | **2 LINE**

DECT
6.0

KX-TGA939T
(Portable)

KX-TG9391T
(Base Unit)

(Charger Unit)

Model No. KX-TG9391T
KX-TG9392T
KX-TGA939T

Digital Corded/Cordless Answering System
Titanium Black Version
(for U.S.A.)

Configuration for each model

Model No	Base Unit	Handset	Charger Unit	Expandable
KX-TG9391	1 (TG9391)	1 (TGA939)	1	Up to 6
KX-TG9392	1 (TG9391)	2 (TGA939)	2	Up to 6
KX-TGA939*		1 (TGA939)	1	

* KX-TGA939 is also an optional accessory, which contains a handset and a charger.

Panasonic®

KX-TG9391T/KX-TG9392T/KX-TGA939T

⚠ 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 slightly from the actual product.

Note for TABLE OF CONTENTS:
Because sections 5, 6 and 7 of this manual are the extracts from the operating instructions for this model, they are subject to change without notice. You can download and refer to the original operating instructions on TSN Server for further information.

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 manufacturer's Instructions.

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

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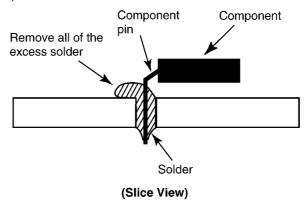
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

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
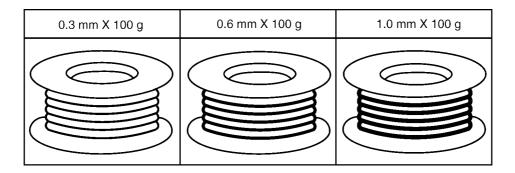
- PbF solder has a melting point that is 50 °F ~ 70 ° F (30 °C ~ 40 °C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700 °F ± 20 ° F (370 °C ± 10 °C).
- Exercise care while using higher temperature soldering irons.:
  Do not heat the PCB for too long time 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 6.0 (Digital Enhanced Cordless
Telecommunications 6.0)
■ **Number of channels:**
60 Duplex Channels
■ **Frequency range:**
1.92 GHz to 1.93 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:**
115 mW (Max.)
■ **Voice coding:**
ADPCM 32 kbit/s

	Base Unit	Portable	Charger
Power source	AC Adaptor (PQLV207T, 120 V AC, 60 Hz)	Rechargeable Ni-MH battery AAA (R03) size (1.2 V 630 mAh)	AC Adaptor (PQLV209T, 120 V AC, 60 Hz)
Receiving Method	Super Heterodyne	Super Heterodyne	——
Oscillation Method	PLL synthesizer	PLL synthesizer	——
Detecting Method	Quadrature Discriminator	Quadrature Discriminator	——
Tolerance of OSC Frequency	13.824 MHz ±100 Hz	13.824 MHz ±100 Hz	——
Modulation Method	Frequency Modulation	Frequency Modulation	——
ID Code	40 bit	40 bit	——
Ringer Equivalence No. (REN)	0.1B	——	——
Dialing Mode	Tone (DTMF)/Pulse	Tone (DTMF)/Pulse	——
Redial	Up to 48 digits	Up to 48 digits	——
Speed Dialer	Up to 24 digits (Phonebook)	Up to 24 digits (Phonebook)	——
Power Consumption	Standby: Approx. 1.1 W Maximum: Approx. 2.0 W	11 days at Standby, 5 hours at Talk	Standby: Approx. 0.6 W, Maximum: Approx. 3.6 W
Operating Conditions	5 °C - 40 °C (41 °F – 104 °F) 20 % – 80 % relative air humidity (dry)	5 °C - 40 °C (41 °F – 104 °F) 20 % – 80 % relative air humidity (dry)	5 °C - 40 °C (41 °F – 104 °F) 20 % – 80 % relative air humidity (dry)
Dimensions (H x W x D)	Approx. 127mm × 216 mm × 155 mm (5 × 8 $^1/_2$" × 6 $^3/_{32}$")	Approx. 156 mm × 49 mm × 32 mm (6 $^1/_8$" × 1 $^{15}/_{16}$" × 1 $^1/_4$")	Approx. 51 mm × 75 mm × 88 mm (2 " × 2 $^{15}/_{16}$" × 3 $^{15}/_{32}$")
Mass (Weight)	Approx. 720 g (1.59 lb)	Approx. 130 g (0.29 lb)	Approx. 60 g (0.13 lb)

Note:
 • Design and specifications are subject to change without notice.
Note for service:
 • Optional headset: KX-TCA60, KX-TCA86, KX-TCA92, KX-TCA93, KX-TCA94, KX-TCA95
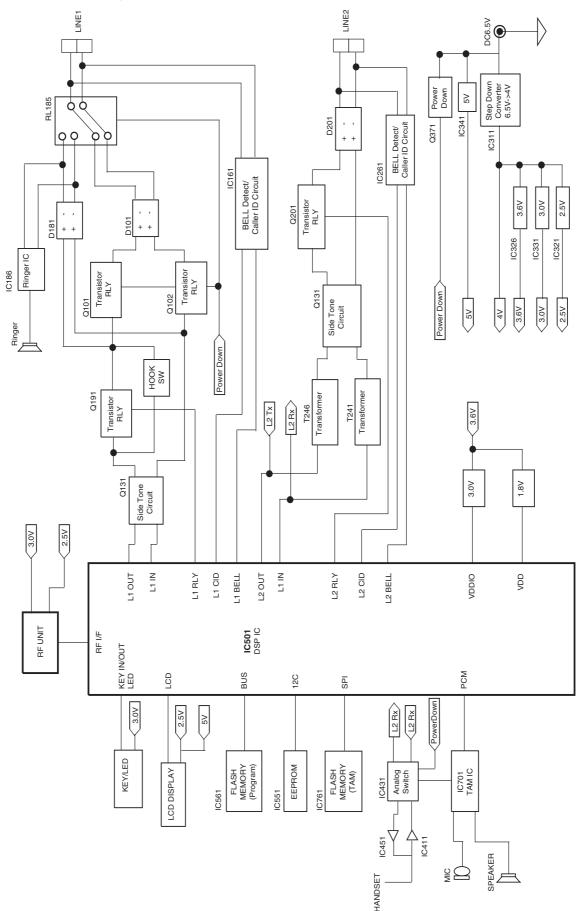
4 Technical Descriptions

4.1. Block Diagram (Base Unit)

KX-T9391/9392 BLOCK DIAGRAM (Base Unit_Main)

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): IC501
    - Handling all the audio, signal and data processing needed in a US DECT base unit
    - Controlling the US 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
    - All interfaces (ex: RF module, EEPROM, LED, Analog Front End, etc.)
- RF Module: IC801
    - PLL Oscillator
    - Detector
    - Compress/Expander
    - First Mixer
    - Amplifier for transmission and reception
- EEPROM: IC551
    - Temporary operating parameters (for RF, etc.)
- FLASH MEMORY 1: IC761
    - Voice Prompt (TAM) D/L Area
    - ICM/OGM/MEMO Recording Area
- TAM Companion: IC701
    - Voice data compression and decompression
    - Speaker Amp
- Additionally,
    - Power Supply Circuit (+4.0 V, +3.3 V, +2.5 V, +1.8 V output)
    - Crystal Circuit (10.368 MHz)
    - Charge Circuit
    - Telephone Line Interface Circuit
- FLASH MEMORY 2: IC561
    - Program DL
- LED Driver: IC641
- LCD Driver: IC641
- Key Matrix: IC631
- Handset Amplified
    - MIC Amp: IC441
    - Receiver Amp: IC451
    - Analog sw: IC431

4.2.2.   Power Supply Circuit

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

• DECT BBIC (IC501):
CN301 (+6.5 V) → F301 → D301→ IC311 → IC326 → D382 →Q386 → IC501
CN301 (+6.5 V) → F301 → D301→ IC311 → IC326 → D382 →Q381 → IC501

• RF Module (IC801):
CN301 (+6.5 V) → F301 → D301→ IC311 → IC321 → IC801 (PLL) (Power AMP)

• EEPROM (IC551)/FLASH MEMORY 1 (IC761)/FLASH MEMORY 2 (IC561)/Latch (IC631/641)/OP Amp (IC441/451):
Analog SW (IC431)
CN301 (+6.5 V) → F301 → D301 → IC311 → IC326 → D382 → Q381 → IC761, IC561, IC431, IC631, IC641, IC411, IC451, IC551

• TAM Companion (IC701):
CN301 (+6.5 V) → F301 → D301 → IC311 → IC326 → D382 → IC701
CN301 (+6.5 V) → F301 → D301 → IC311 → IC326 → D382 → Q386 → IC701
CN301 (+6.5 V) → F301 → D301 → IC311 → IC326 → D382 → Q381 → IC701
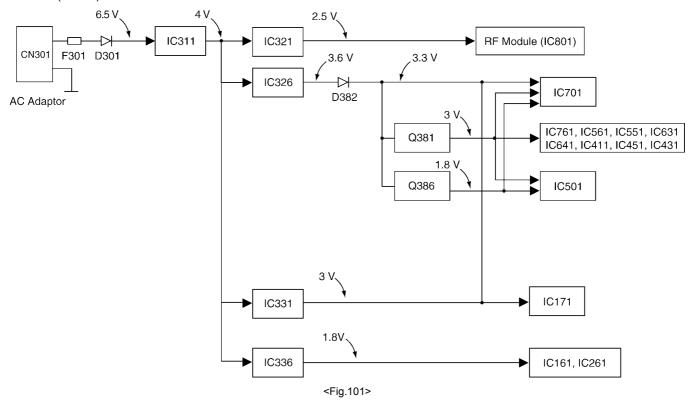
• OP Amp (IC161, IC261):
CN301 (+6.5 V) → F301 → D301 → IC311 → IC336 → IC161/IC261

• OP Amp (IC171):
CN301 (+6.5 V) → F301 → D301 → IC311 → IC331 → IC171

<Fig.101>

4.2.3. Telephone Line Interface

Note:
[   ]: Line 2

<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, Q101 [Q201] is open to cut the DC loop current and decrease the ring load.

When ring voltage appears at the L1T (A) [L2T (C)] and L1R (B) [L2R (D)] leads (when the telephone rings), the AC ring voltage is transferred as follows;

A [C] - C153 [C253] - R153 [R253] - IC161 (6) [IC261 (6)] ┬ IC161 (7) [IC261 (7)] -
B [D] - C158 [C258] - R156 [R256] - IC161 (5) [IC261 (5)] ┘

Bell
├─ R171 [R271] - R172 [R272] - IC171 (2) [IC171 (6)] - IC171 (1) [IC171 (7)] - IC501 (11) [IC501 (12)]
└─ R167 [R268] - IC501 (101) [IC501 (114)]
Clip

ON/OFF hook circuit:

In the standby mode, Q101 [Q201] 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 IC501 detects a ring signal or press the TALK Key onto the portable, Q103 [Q203] turns on and then Q101, PC102, Q102 [Q201, PC202] turns on, thus providing an **off-hook condition** (DC current flows through the circuit) and the following signal flow makes the loop current.

A [C] → D101 [D201] → Q101 [Q201] → Q191 [-] → Q131 [Q231] → R124 [R224] → R125 [R225] → D125[D225]→ Q102 [-] → D101 [D201] → B [D]

4.2.4. Transmitter/Receiver

- Audio Circuits and DTMF tone signal circuits.

Base unit and portable mainly consist of RF Module and DECT BBIC.

Base unit and portable 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 Module (IC801) through DECT BBIC (IC501) as shown in **Block Diagram (Base Unit)** (P.7)

The voice signal passes through the analog part of IC501 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 IC801, the carrier frequency is changing, and frequency modulated RF signal is generated and amplified, and radiated from antenna. Portable detects the voice signal or data signal in the circuit same as the following explanation of Receiver Block.
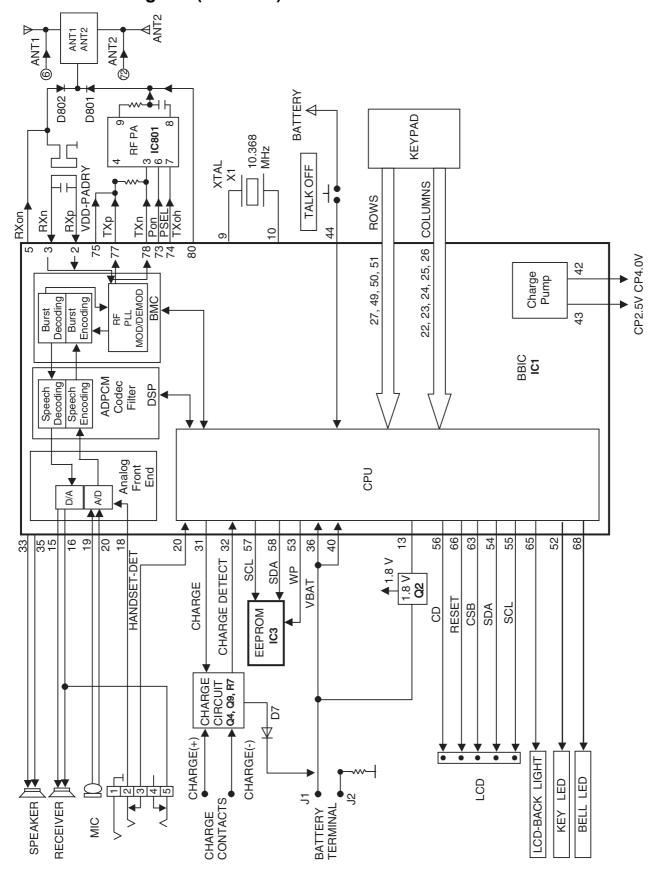
4.2.4.2. Receiver Block

The signal of 1900 MHz band (1920 MHz ~ 1930 MHz) which is input from antenna is input to IC801 as shown in **Block Diagram (Base Unit)** (P.7).

In IC801, the signal of 1900 MHz band is downconverted to 864 kHz signal and demodulated, and goes to IC501 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.

4.3. Block Diagram (Portable)

KX-TGA939 BLOCK DIAGRAM (PORTABLE)

ANT1

ANT2

ANT1
ANT2

ANT2

D802

D801

RF PA IC801

9

8

4

3 6 7

VDD-PADRY

RXon

RXn

RXp

TXp

TXn

Pon

PSEL

TXoh

XTAL
X1

10.368
MHz

BATTERY

TALK OFF

KEYPAD

ROWS

COLUMNS

5

3

2

75

77

78

73

74

80

9

10

44

27, 49, 50, 51

22, 23, 24, 25, 26

Burst
Decoding

Burst
Encoding

RF
PLL
MOD/DEMOD

BMC

Charge
Pump

42

43

CP2.5V CP4.0V

Speech
Decoding

Speech
Encoding

ADPCM
Codec
Filter

DSP

BBIC
IC1

Analog
Front
End

CPU

D/A

A/D

33

35

15

16

19

20

18

20

31

32

SCL 57

SDA 58

WP 53

VBAT

36

40

13

56

66

63

54

55

65

52

68

1.8 V

1.8 V Q2

SPEAKER

RECEIVER

MIC

1 2 3 4 5

HANDSET-DET

CHARGE

CHARGE DETECT

EEPROM
IC3

CD

RESET

CSB

SDA

SCL

LCD-BACK LIGHT

KEY LED

BELL LED

CHARGE
CIRCUIT
Q4, Q9, R7

D7

CHARGE(+)

CHARGE(-)

CHARGE
CONTACTS

J1

J2

BATTERY
TERMINAL

LCD

11

4.4. Circuit Operation (Portable)

4.4.1. Outline

Portable consists of the following ICs as shown in **Block Diagram (Portable)** (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
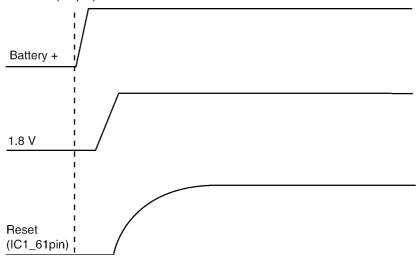- Temporary operating parameters (for RF, etc.)

4.4.2. Power Supply Circuit/Reset Circuit

Circuit Operation:

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

BATTERY(2.2 V ~ 2.6 V: BATT+) → F1 → 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 portable on the Base Unit, the charge current is as follows;

DC+(6.5 V) → R57 → D22 → R56 → R55 → CHARGE+(Base) → CHARGE+(Portable) → L4 → Q4 → D7→ F1 → BAT-TERY+... Battery...

BATTERY- → L8 → R45 → GND → L5 → CHARGE-(Portable)→ CHARGE-(Base) → GND → DC-(GND)

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

The charge current is controlled by switching Q9 of Portable.

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) ≦ 2.25 V ± 50 mV

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

• Power Down

Battery voltage: V(Batt) ≦ 2.0 V ± 50 mV

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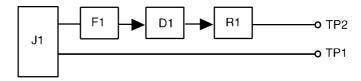
4.4.5. Speakerphone

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

4.5. Circuit Operation (Charger Unit)
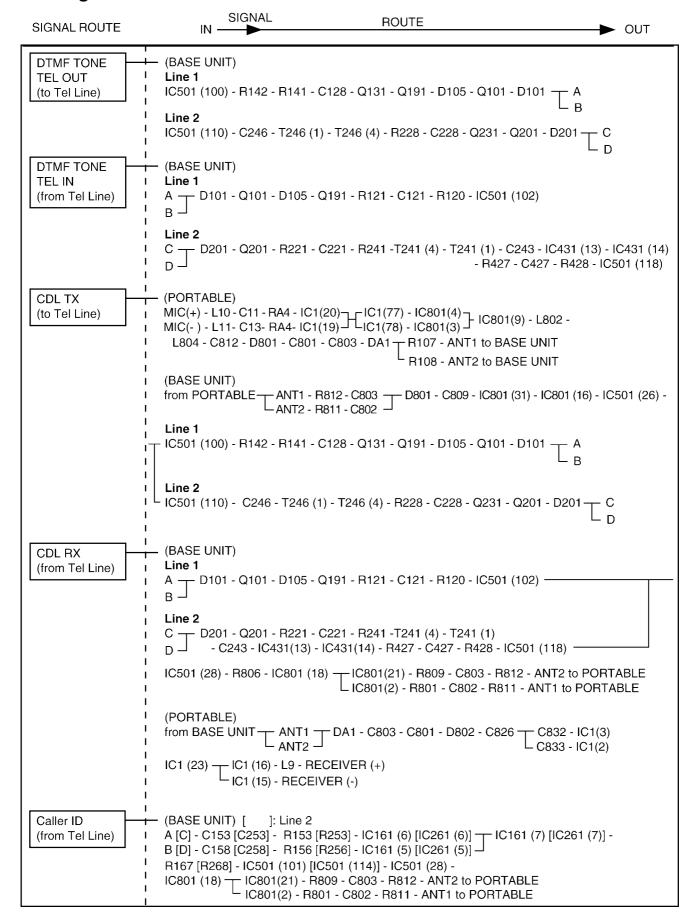
4.5.1. Power Supply Circuit

The power supply is as shown.

```
          ┌──────┐   ┌────┐      ┌────┐      ┌────┐
          │      │   │ F1 │      │ D1 │      │ R1 │─────────o TP2
          │  J1  │───┤    ├─────▶│    ├─────▶│    │
          │      │   └────┘      └────┘      └────┘─────────o TP1
          │      │──────────────────────────────────
          └──────┘
```

AC Adaptor

4.6. Signal Route

SIGNAL ROUTE   IN → SIGNAL   ROUTE   → OUT

DTMF TONE TEL OUT (to Tel Line)

(BASE UNIT)
Line 1
IC501 (100) - R142 - R141 - C128 - Q131 - Q191 - D105 - Q101 - D101 ⊤ A
                                                                                 └ B
Line 2
IC501 (110) - C246 - T246 (1) - T246 (4) - R228 - C228 - Q231 - Q201 - D201 ⊤ C
                                                                                    └ D

DTMF TONE TEL IN (from Tel Line)

(BASE UNIT)
Line 1
A ⊤ D101 - Q101 - D105 - Q191 - R121 - C121 - R120 - IC501 (102)
B ┘

Line 2
C ⊤ D201 - Q201 - R221 - C221 - R241 -T241 (4) - T241 (1) - C243 - IC431 (13) - IC431 (14)
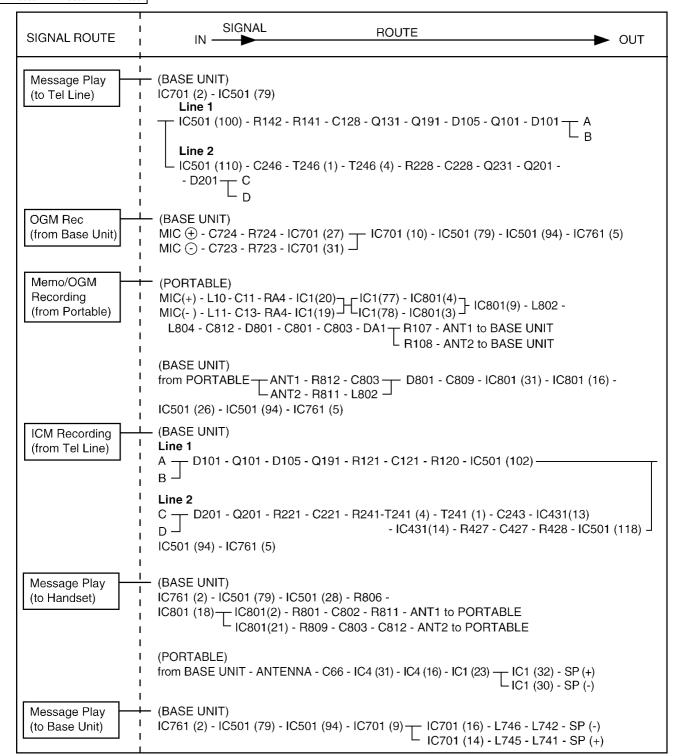D ┘   - R427 - C427 - R428 - IC501 (118)

CDL TX (to Tel Line)

(PORTABLE)
MIC(+) - L10 - C11 - RA4 - IC1(20) ⊤ ⊤ IC1(77) - IC801(4) ⊤ IC801(9) - L802 -
MIC(-) - L11- C13- RA4- IC1(19) ┘ └ IC1(78) - IC801(3) ┘
  L804 - C812 - D801 - C801 - C803 - DA1 ⊤ R107 - ANT1 to BASE UNIT
                                        └ R108 - ANT2 to BASE UNIT

(BASE UNIT)
from PORTABLE ⊤ ANT1 - R812 - C803 ⊤ D801 - C809 - IC801 (31) - IC801 (16) - IC501 (26) -
                └ ANT2 - R811 - C802 ┘

Line 1
⊤ IC501 (100) - R142 - R141 - C128 - Q131 - Q191 - D105 - Q101 - D101 ⊤ A
│   └ B

Line 2
└ IC501 (110) - C246 - T246 (1) - T246 (4) - R228 - C228 - Q231 - Q201 - D201 ⊤ C
                                                                         └ D

CDL RX (from Tel Line)

(BASE UNIT)
Line 1
A ⊤ D101 - Q101 - D105 - Q191 - R121 - C121 - R120 - IC501 (102) ────────┐
B ┘

Line 2
C ⊤ D201 - Q201 - R221 - C221 - R241 -T241 (4) - T241 (1)
D ┘   - C243 - IC431(13) - IC431(14) - R427 - C427 - R428 - IC501 (118) ──────┘

IC501 (28) - R806 - IC801 (18) ⊤ IC801(21) - R809 - C803 - R812 - ANT2 to PORTABLE
                                 └ IC801(2) - R801 - C802 - R811 - ANT1 to PORTABLE

(PORTABLE)
from BASE UNIT ⊤ ANT1 ⊤ DA1 - C803 - C801 - D802 - C826 ⊤ C832 - IC1(3)
                 └ ANT2 ┘   └ C833 - IC1(2)

IC1 (23) ⊤ IC1 (16) - L9 - RECEIVER (+)
        └ IC1 (15) - RECEIVER (-)

Caller ID (from Tel Line)

(BASE UNIT) [   ]: Line 2
A [C] - C153 [C253] - R153 [R253] - IC161 (6) [IC261 (6)] ⊤ IC161 (7) [IC261 (7)] -
B [D] - C158 [C258] - R156 [R256] - IC161 (5) [IC261 (5)] ┘
R167 [R268] - IC501 (101) [IC501 (114)] - IC501 (28) -
IC801 (18) ⊤ IC801(21) - R809 - C803 - R812 - ANT2 to PORTABLE
        └ IC801(2) - R801 - C802 - R811 - ANT1 to PORTABLE

SIGNAL ROUTE	SIGNAL ROUTE
	IN ─→ ROUTE ──────────────→ OUT

Base Unit SP-PHONE TX (to Tel Line)

(BASE UNIT)
MIC (+) - C724 - R724- IC701 (27) ─┬─ IC701 (10) - IC501 (79) -
MIC (-) - C723 - R723- IC701 (31) ─┘

Line 1
IC501 (100) - R142 - R141 - C128 - Q131- Q191 - D105 - Q101 - D101 ─┬─ A
                                                                     └─ B

Line 2
IC501 (110) - C246 - T246 (1) - T246 (4) - R228 - C228 - Q231 -Q201 - D201 ─┬─ C
                                                                            └─ D

Base Unit SP-PHONE RX (from Tel Line)

(BASE UNIT)
Line 1
A ─┬─ D101 - Q101 - D105 - Q191 - R121 - C121 - R120 - IC501 (102) ─────────────┐
B ─┘   │
Line 2   │
C ─┬─ D201 - Q201 - R221 - C221 - R241 -T241 (4)   │
D ─┘   - T241 (1) - C243 - IC431(13) - IC431 (14) - R427 - C427 - R428 - IC501 (118) ─┘

IC501 (94) - IC701 (9) ─┬─ IC701 (16) - L746 - L742 - SP (-)
                        └─ IC701 (14) - L745 - L741 - SP (+)

Portable SP-PHONE TX (to Tel Line)

(PORTABLE)
MIC(+) - L10 - C11 - RA4 - IC1(20) ─┬─ IC1(77) - IC801(4) ─┬─ IC801(9) - L802 -
MIC(-) - L11- C13- RA4- IC1(19) ──┴─ IC1(78) - IC801(3) ─┘
L804 - C812 - D801 - C801 - C803 - DA1   R107 ─┬─ ANT1 to BASE UNIT
                                                └─ R108 - ANT2 to BASE UNIT

(BASE UNIT)
from PORTABLE ─┬─ ANT1 - R812 - C803 ─┬─ D801 - C809 - IC801 (31) - IC801 (16) - IC501 (26) -
               └─ ANT2 - R811 - C802 ─┘

Line 1
IC501 (100) - R142 - R141 - C128 - Q131 - Q191 - D105 - Q101 - D101 ─┬─ A
                                                                     └─ B

Line 2
IC501 (110) - C246 - T246 (1) - T246 (4) - R228 - C228 - Q231 - Q201 - D201 ─┬─ C
                                                                             └─ D

Portable SP-PHONE RX (from Tel Line)

(BASE UNIT) [   ]: Line 2
A [C] - C153 [C253] - R153 [R253] - IC161 (6) [IC261 (6)] ─┬─ IC161 (7) [IC261 (7)] -
B [D] - C158 [C258] - R156 [R256] - IC161 (5) [IC261 (5)] ─┘
R167 [R268] - IC501 (101) [IC501 (114)] - IC501 (28) -
IC801 (18) ─┬─ IC801(21) - R809 - C803 - R812 - ANT2 to PORTABLE
            └─ IC801(2) - R801 - C802 - R811 - ANT1 to PORTABLE

(PORTABLE)
from BASE UNIT - ANT1 - R107 ─┬─ DA1
                  ANT2 - R108 ─┘
- C803 - C801 - D802 - C826 ─┬─ C832 - IC1(3) ─┬─ IC1(33) - SP(+)
                             └─ C833 - IC1(2) ─┴─ IC1(35) - SP(-)

SIGNAL ROUTE	SIGNAL ROUTE
	IN → ROUTE → OUT

Message Play (to Tel Line)

(BASE UNIT)
IC701 (2) - IC501 (79)
Line 1
┌ IC501 (100) - R142 - R141 - C128 - Q131 - Q191 - D105 - Q101 - D101 ┬ A
│   └ B
│
│ **Line 2**
└ IC501 (110) - C246 - T246 (1) - T246 (4) - R228 - C228 - Q231 - Q201 -
   - D201 ┬ C
           └ D

OGM Rec (from Base Unit)

(BASE UNIT)
MIC ⊕ - C724 - R724 - IC701 (27) ┬ IC701 (10) - IC501 (79) - IC501 (94) - IC761 (5)
MIC ⊖ - C723 - R723 - IC701 (31) ┘

Memo/OGM Recording (from Portable)

(PORTABLE)
MIC(+) - L10 - C11 - RA4 - IC1(20) ┬ ┬ IC1(77) - IC801(4) ┬ IC801(9) - L802 -
MIC(-) - L11 - C13 - RA4 - IC1(19) ┘ └ IC1(78) - IC801(3) ┘
   L804 - C812 - D801 - C801 - C803 - DA1 ┬ R107 - ANT1 to BASE UNIT
                                            └ R108 - ANT2 to BASE UNIT

(BASE UNIT)
from PORTABLE ┬ ANT1 - R812 - C803 ┬ D801 - C809 - IC801 (31) - IC801 (16) -
               └ ANT2 - R811 - L802 ┘
IC501 (26) - IC501 (94) - IC761 (5)

ICM Recording (from Tel Line)

(BASE UNIT)
Line 1
A ┬ D101 - Q101 - D105 - Q191 - R121 - C121 - R120 - IC501 (102) ─────────┐
B ┘   │
                                                                             │
Line 2   │
C ┬ D201 - Q201 - R221 - C221 - R241 - T241 (4) - T241 (1) - C243 - IC431(13) │
D ┘   - IC431(14) - R427 - C427 - R428 - IC501 (118) ┘
IC501 (94) - IC761 (5)

Message Play (to Handset)

(BASE UNIT)
IC761 (2) - IC501 (79) - IC501 (28) - R806 -
IC801 (18) ┬ IC801(2) - R801 - C802 - R811 - ANT1 to PORTABLE
            └ IC801(21) - R809 - C803 - C812 - ANT2 to PORTABLE

(PORTABLE)
from BASE UNIT - ANTENNA - C66 - IC4 (31) - IC4 (16) - IC1 (23) ┬ IC1 (32) - SP (+)
                                                                 └ IC1 (30) - SP (-)

Message Play (to Base Unit)

(BASE UNIT)
IC761 (2) - IC501 (79) - IC501 (94) - IC701 (9) ┬ IC701 (16) - L746 - L742 - SP (-)
                                                 └ IC701 (14) - L745 - L741 - SP (+)

Powered

SIGNAL ROUTE		SIGNAL → ROUTE → OUT
	IN	

(Corded) Handset TX (to Tel Line)

MIC ⊕ (P)- C413 - R413 - IC411 (3) ┐ IC411 (1) - IC728 - R728 - IC701 (28)
MIC ⊖ (N)- C412 - R412 - IC411 (2) ┘

- IC701 (10) - IC501 (79)

Line 1
IC501 (100) - R142 - R141 - C128 - Q131 - Q191 - D105 - D101 - RL185 (3)(5)
      - RL185 (7)(2) - L101 (L102) - PO101 ┬ A
Line 2   └ B
IC501 (110) - C246 - T246 (1) - T246 (4) - R228 - C228 - Q231 - Q201
      - D201 - C201 (L202) - PO201 ┬ C
                  └ D

(Corded) Handset RX (from Tel Line)

Line 1
A - PO101 - L101 - RL185 (7) - RL185 (5) ┬ D101 - D105 - Q191 - R121 - C121
B ———— L102 - RL185 (2) - RL185 (3) ┘   - R120 - IC501 (102) ┐

Line 2
C - PO201 - L201 ┬ D201 - Q201 - R221 - C221 - R241-T241 (4) - T241 (1) - C243
D ———— L202 ┘   - IC431 (13) - IC431(14) - R247 - C247 - R428 - IC501 (118) ┘

- IC501 (94) - IC701 (9) - IC701 (26) - IC431 (3) - IC431 (4) - IC457

- IC451 (5) - IC451 (7) ┬ R451 - IC451 (2) - IC451 (4) - C452 - R454 - SP (N)
                                 └———— C451 - R453 - SP (P)

Power Failed

SIGNAL ROUTE		SIGNAL → ROUTE → OUT
	IN	

(Corded) Hanset TX (to Tel Line)

MIC ⊕ (P)- C413 - R413 - IC411 (3) ┐ IC411 (1) - R420 - C426 - R426
MIC ⊖ (N)- C412 - R412 - IC411 (2) ┘

- IC431 (12) - IC431 (14) - R427 - C427 - R428 - IC501 (118)

Line 1 only
IC501 (100) - R142 - R141 - C128 - Q131 - Q191 - D181 - RL185 (7)(2)
                - RL185 (6)(3) - L101 (L102) - PO101 ┬ A
                                     └ B

(Corded) Handset RX (from Tel Line)

A,B - PO101 - L101(L102) - RL185 (6)(3) - RL185 (7)(2) - D181 - Q191 - R121 - C121 - R120
- IC501 (102) - IC501 (110) - IC431 (5) - IC431 (4) - C457 - IC451 (5) - IC451 (7)
┬ R451 - IC451 (2) - IC451 (1) - C452 - R454 - SP (N)
└———————— C451 - R453 - SP (P)

5 Location of Controls and Components

5.1. Controls

5.1.1. Base Unit

❶ Corded handset
❷ Receiver
❸ Speaker
❹ [LINE 1]
   LINE1 indicator
❺ [LINE 2]
   LINE2 indicator
❻ [HOLD]
❼ [REDIAL] [PAUSE]
❽ [FLASH] [CALL WAIT]
❾ Display
❿ Soft keys
⓫ MIC (Microphone)
⓬ Dial keypad
   ([✳]: TONE)
⓭ [SP-PHONE] (Speakerphone)
   SP-PHONE indicator
⓮ [►] (Play)
   Message indicator
⓯ [ERASE]
⓰ [■] (STOP) (EXIT)
⓱ [ANSWER SELECT]
⓲ ANSWER ON indicator
⓳ [ANSWER ON]
⓴ [LOCATOR] [INTERCOM]
㉑ Navigator key ([▲]/[▼]/[◄◄]/[►►])
   VOL. (Volume: [▲]/[▼])

5.1.2. Portable

❶ Speaker
❷ Soft keys
❸ Headset jack
❹ [➰] (TALK)
❺ [◁⊦] (SP-PHONE: Speakerphone)
❻ Dial keypad
   ([✳]: TONE)
❼ [FLASH] [CALL WAIT]
❽ Charge indicator
   Ringer indicator
❾ Receiver
❿ Display
⓫ [OFF]
⓬ Navigator key ([▲]/[▼]/[◄]/[►])
   ⊿ (Volume: [▲]/[▼])
⓭ [PAUSE] [REDIAL]
⓮ [HOLD] [INTERCOM]
⓯ Microphone
⓰ Charge contacts

6 Installation Instructions
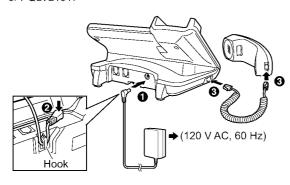
6.1. Connections

6.1.1. Connecting the AC Adaptor/Corded Handset

Connect the AC adaptor cord (❶) by pressing the plug firmly (❷). Connect the corded handset cord (❸) to the corded handset and the base unit.
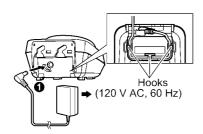
Base unit

● Use only the supplied Panasonic AC adaptor PQLV207T or PQLV219T.

→ (120 V AC, 60 Hz)

Hook

Charger

● Use only the supplied Panasonic AC adaptor PQLV209T or PQLV219T.

Hooks
→ (120 V AC, 60 Hz)

Note:
• The AC adaptor must remain connected at all times. (It is normal for the adaptor to feel warm during use.)
• The AC adaptor should be connected to a vertically oriented or floor-mounted AC outlet. Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.

During a power failure
   The base unit will work as a standard telephone using power from the telephone line. Line 1 on the corded handset can be used to make and answer calls. The base unit speakerphone and the cordless handset will not function during a power failure.
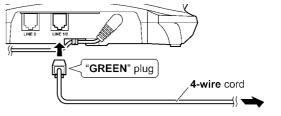
6.1.2. Connecting the Telephone Line Cord

Refer to one of the following methods depending on your situation:
   - **To connect to a 2-line telephone jack**
   - **To connect to 2 single-line telephone jacks**
   - **If you use the unit as a single-line telephone only**
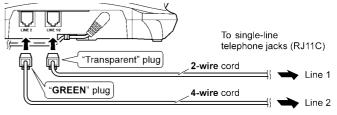
Connect the telephone line cord until it clicks into the base unit and telephone line jack.

To connect to a 2-line telephone jack

"**GREEN**" plug

4-wire cord

To 2-line telephone jack (RJ14C)

To connect to 2 single-line telephone jacks

To single-line telephone jacks (RJ11C)

"Transparent" plug
2-wire cord   Line 1
"**GREEN**" plug
4-wire cord   Line 2

If you use the unit as a single-line telephone only

Be sure to connect the telephone line cord to LINE 1/2 to allow usage of the unit during a power failure.
Change the line selection mode from "Auto" to "Line1".

"Transparent" plug

2-wire cord

To single-line telephone jack (RJ11C)

Note:
• "Check tel line 2" is displayed on the unit. To erase it, see **Error Messages (P.28)**

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If you subscribe to a DSL/ADSL service
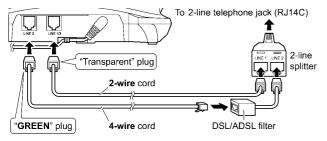
Please attach a DSL/ADSL filter (contact your DSL/ADSL provoder) to the telephone line between the base unit and the telephone line jack in the event of the following:

-noise is heard during conversations.

-Caller ID features do not function properly.

To connect to a 2-line telephone jack
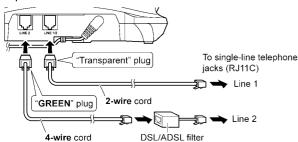
For this connection, please purchase a Panasonic 2-line splitte.

Example: DSL/ADSL line is line 2

To connect to 2 single-line telephone jacks

Example: DSL/ADSL line is line 2

6.2. Battery
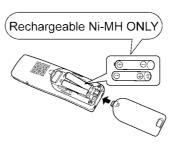
6.2.1. Battery Installation and Replacement

Important:

• Use only the supplied rechargeable batteries (Part No. HHR-55AAABU).

• When installing the batteries:

-Wipe the battery ends ($\oplus$, $\ominus$) with a dry cloth.

-Avoid touching the battery ends ($\oplus$, $\ominus$)or the unit contacts.

-Confirm correct polarities ($\oplus$, $\ominus$).

• When replacing the batteries:

-USE ONLY rechargeable Ni-MH batteries AAA (R03) size.

-Do NOT use Alkaline/Manganese/Ni-Cd batteries.

-We recommend using the panasonic rechargeable batteries HHR-4DPA.

1 Press the notch on the handset cover firmly and slide it in the direction of the arrow.

2 Insert the batteries negative ($\ominus$) end first. Close the handset cover.

Rechargeable Ni-MH ONLY

Note:

● When replacing batteries, remove the old batteries.

Attention:

A nickel metal hydride battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY (1-800-822-8837) or information on how to recycle this battery.

6.2.2. Battery Charge

Place the portable on the base unit or charger for about 7 hours before initial use.

When charging, "`Charging`" is displayed and the charge indicator on the portable lights up.

When the batteries are fully charged, "`Charge Completed`" is displayed.

Charger

Note:
• It is normal for the portable to feel warm during charging.
• If you want to use the portable immediately, charge the batteries for at least 15 minutes.
• Clean the charge contacts of the portable and charger with a soft, dry cloth. Clean if the unit is exposed to grease, dust, or high humidity.

6.2.3. Battery Level

Battery icon	Battery level
▯▮▮▮	High
▯▮▮	Medium
▯▮	Low ● When flashing: Needs to be charged.
▯	Empty

Note:
• The batteries need to be charged if the portable beeps while you are engaged in a call or operating the answering system remmotely.

6.2.4. Panasonic Ni-MH Battery Performance (supplied batteries)

Operation	Operating time
In continuous use	12 hours max.
Not in use (standby)	6 days max.

Note:
• Actual battery performance depends on a combination of how often the handset is in use and how often it is not in use (standby).
• Even after the handset is fully charged, the handset can be left on the charger without any ill effect on the batteries.
• The battery level may not be displayed correctly after you replace the batteries. In this case, place the handset on the charger and let it charge for at least 7 hours.

7 Operating Instructions

7.1. Programmable settings

You can customize the unit by programming the following features.
To access the features, there are 2 methods:
- scrolling through the display menus.
- using the direct commands.

Programming by scrolling through the display menus

📠 Base unit / 🖉 Portable

1 【MENU】

2 Proceed with the operation for your unit.
   Base unit: Press 【▼】, 【▲】, 【I◄◄】, or 【►►I】 to select the desired main menu. ⟶ 【SELECT】
   Handset: Press 【▼】, 【▲】, 【◄】, or 【►】 to select the desired menu. ⟶ 【SELECT】

3 Press 【▼】 or 【▲】 to select the desired item in sub-menu 1. ⟶ 【SELECT】
   ● In some cases, you may need to select from sub-menu 2. ⟶ 【SELECT】

4 Press 【▼】 or 【▲】 to select the desired setting. ⟶ 【SAVE】
   ● This step may vary depending on the feature being programmed.
   ● To exit the operation, press 【■】(EXIT) on the base unit or 【OFF】 on the handset.

Note:
● See **Programming using the direct commands** for the default settings.
Base unit

Menu	Sub-menu 1	Sub-menu 2
View Caller ID ➔)	—	—
Phonebook 📖	—	—
Set answering 📼⚙	Record greeting	Line1&Line2
		Line1
		Line2
	Play greeting	Line1&Line2
		Line1
		Line2
	Ring count[*1]	—
	Recording time[*1]	—
	Remote code[*1]	—
	Call screening	—
Ringer settings ♪	Ringer volume	Line1
		Line2
	Ringer tone	Line1
		Line2
	Interrupt tone	—
	Night mode	Start/End
		On/Off
Initial settings ⚬—⚬	Set date & time	Date and time[*1]
		Time adjustment[*1]
	Contrast	—
	Line select	—
	Set tel line	Caller ID edit
		Set dial mode[*1]
		Set flash time[*1]
		— Line1
		— Line2
		Set line mode[*1]
		— Line1
		— Line2
		VM tone detect[*1]
	Change language	Display language
		Voice prompt[*1]
Customer support ?🌐	—	—

*1 If you program these settings using the base unit, you do not need to program the same item using a handset.

Portable

Menu	Sub-menu 1	Sub-menu 2
View Caller ID ➜)	—	—
Phonebook 📖	—	—
Answering device ⚏	Play new msg.	—
	Play all msg.	—
	Erase all	—
	Settings	Ring count[*1]
		Recording time[*1]
		Remote code[*1]
		Call screening
Ringer settings ♪	Ringer volume	Line1
		Line2
	Ringer tone	Line1
		Line2
	Interrupt tone	—
	Night mode	Start/End
		On/Off
Initial settings ⚒	Set date & time	Date and time[*1]
		Alarm
		Time adjustment[*1]
	Contrast	—
	Key tone	—
	Auto talk	—
	Line select	—
	Set tel line	Caller ID edit
		Set dial mode[*1]
		Set flash time[*1] — Line1 — Line2
		Set line mode[*1] — Line1 — Line2
		VM tone detect[*1]
	Registration	HS registration
		Deregistration
	Change language	Display language
		Voice prompt[*1]
Customer support ❓🌐	—	—

*1 If you program these settings using one of the handsets, you do not need to program the same item using another unit.

Cross Reference:
  Programming using the Direct Commands (P.24)

7.1.1. Programming using the Direct Commands

1 [MENU] → [♯]

2 Enter the desired feature code.

3 [▼]/[▲]: Select the desired setting. → [SAVE]
- This step may vary depending on the feature being programmed.
- To exit the operation, press [■](EXIT) on the base unit or [OFF] on the portable.

Note:
- The operating unit column shows the unit(s) that can be used to program the item.
  - 📠 : Only the base unit can program the item.
  - 📱 : Only the portable can program the item.
  - 📠/📱 : Both the base unit and portable can program the item.
- In the following table, < > indicates the default settings.

Operating unit	Feature	Feature code	Setting	System setting[1]
📱	Alarm	[7][2][0]	<Off> Once Daily	−
📱	Auto talk[2]	[2][0][0]	On <Off>	−
📠/📱	Caller ID edit (Caller ID number auto edit)	[2][1][4]	<On> Off	−
📠/📱	Call screening	[3][1][0]	<On> Off	−
📠/📱	Contrast (Display contrast)	[1][4][5]	Level 1–6 <3>	−
📠/📱	Customer support	[6][8][0]	−	−
📠/📱	Date and time	[1][0][1]	−	●
📱	Deregistration	[1][3][1]	−	−
📠/📱	Display language	[1][1][0]	<English> Español	−
📱	Erase all (Erasing all messages)	[3][2][5]	−	−
📱	HS registration (Handset registration)	[1][3][0]	−	−
📠/📱	Interrupt tone[3]	[2][0][1]	<On> Off	−
📱	Key tone[4]	[1][6][5]	<On> Off	−
📠/📱	Line select	[2][5][0]	<Auto> Line1 Line2	−
📠/📱	Night mode (On/Off)	[2][3][8]	On <Off>	−

Operating unit	Feature	Feature code	Setting		System setting[*1]
📱/🖥	Night mode (Start/End)	[2][3][7]	<11:00 PM/06:00 AM>		—
📱/🖥	Phonebook	[2][8][0]	—		—
🖥	Play all msg.	[3][2][4]	—		—
📱	Play greeting	[3][0][3]	—		—
🖥	Play new msg.	[3][2][3]	—		—
📱	Record greeting	[3][0][2]	—		—
📱/🖥	Recording time	[3][0][5]	1min 2min <3min>		●
📱/🖥	Remote code	[3][0][6]	<111>		●
📱/🖥	Ring count	[2][1][1]	Toll saver 2–7 rings <4>		●
📱/🖥	Ringer tone[*5, *6]	[1][6][1]	Line 1 Line 2	Line 1: <Tone 1> Line 2: <Tone 2> **Base unit:** Tone 1–3 Melody 1–3 **Handset:** Tone 1–5 Melody 1–10	—
📱/🖥	Ringer volume[*7]	[1][6][0]	Line 1 Line 2	**Base unit:** Level 1–<3>, Off **Handset:** Level 1–<6>, Off	—
📱/🖥	Set dial mode	[1][2][0]	<Tone> Pulse		●
📱/🖥	Set flash time[*8]	[1][2][1]	Line 1 Line 2	80ms 90ms 100ms 110ms 160ms 200ms 250ms 300ms 400ms 600ms <700ms> 900ms	●
📱/🖥	Set line mode[*9]	[1][2][2]	Line 1 Line 2	A <B>	●
📱/🖥	Time adjustment[*10] (Caller ID subscribers only)	[2][2][6]	<Caller ID[auto]> Manual		●
📱/🖥	View Caller ID	[2][1][3]	—		—
📱/🖥	VM tone detect	[3][3][2]	<On> Off		●
📱/🖥	Voice prompt	[1][1][2]	<English> Español		●

*1 If "System setting" column is checked, you do not need to program the same item using another unit.

*2 If you subscribe to Caller ID service and want to view the caller's information after lifting up the handset to answer a call, turn off this feature.

*3 This tone lets you know when you receive an outside call while you are on the other line or an intercom call. If you select "On", the tone sounds 2 times.

*4 Turn this feature off if you prefer not to hear key tones while you are dialing or pressing any keys, including confirmation tones and error tones.

*5 If you subscribe to a distinctive ring service (such as IDENTA-RING), select a tone (base unit: tone 1 to 3/handset: tone 1 to 5). If you select a melody, you cannot distinguish lines by their ringers.

*6 If you select one of the melody ringer tones, the ringer tone will continue to play for several seconds even if the caller has already hung up. You may either hear a dial tone or no one on the line when you answer the call.

*7 When the ringer volume is turned off, 🔕 is displayed followed by the selected line number(s) and the base unit and/or handset do not ring for outside calls.

*8 The flash time depends on your telephone exchange or host PBX. Contact your PBX supplier if necessary. The setting should stay at "700ms" unless pressing [FLASH] fails to pick up the waiting call.

*9 Generally, the line mode setting should not be adjusted. If the LINE1 indicator or LINE2 indicator does not light when another phone connected to the same line is in use, you need to change the line mode to "A".

*10 This feature allows the unit to automatically adjust the date and time setting when caller information is received. To use this feature, set the date and time first.

7.1.2. Answering System Settings

Setting (default setting)	Remarks (Selectable options)
Answering system on/off (`Answer On`)	Answer On/Answer Off
Remote access code (111)	000~999
Number of rings (`4 Rings`)	Toll saver/2 to 7 Rings
Caller's recording time (`3 Minutes`)	1 Minute/2 Minutes/3 Minutes
Call screening (`On`)	On/Off

7.2. Registering a Portable to the Base Unit

The supplied handset and base unit are pre-registered. If for some reason the handset is not registered to the base unit, register the handset.

1 **Portable:**
[MENU] → [♯][1][3][0]

2 **Base unit:**
Press and hold [LOCATOR] for 5 seconds until the registration tone sounds.
● If all registered handsets start ringing, press the same button to stop. Then repeat this step.
● The next step should be completed within 90 seconds.

3 **Portable:**
Press [OK], then wait until a long beep sounds.

Note:
● When you purchase an additional handset, refer to the additional handset's installation manual for registration.

7.2.1. Deregistering a Portable

A handset can cancel its own registration (or the registration of another handset) that is stored in the base unit. This allows the handset to end its wireless connection with the system.

 Portable

1 [MENU] → [♯][1][3][1]
2 [3][3][5] → [OK]
3 Select the handset you want to cancel by pressing the desired handset(s) number.
● The selected handset number(s) flashes.
● To cancel a selected handset number, press the number again. The number will stop flashing.
4 [OK] → [▼]/[▲]: "Yes" → [SELECT]
● When you cancel a different handset than the one you are now using, press [OFF] to exit.

7.3. Copying Phonebook Entries

You can copy phonebook entries from the base unit to a portable or vice versa.
Important:
• Group ringer tones are not copied.
• You cannot copy the phonebook entries between portables.

7.3.1. Copying All Entries

 Base unit

1 [📖] → [MENU]
2 [▼]/[▲]: "Copy all" → [SELECT]
3 [▼]/[▲]: Enter the handset number to copy to.
● When all entries have been copied, "Completed" is displayed.
4 [■] (EXIT)

 Portable

1 [MENU] → [♯][2][8][0] → [MENU]
2 [▼]/[▲]: "Copy all to base" → [SELECT]
● When all entries have been copied, "Completed" is displayed.
3 [OFF]

7.4. Dialing Mode

If you cannot make calls, change this setting according to your telephone line service.
The default setting is "Tone".
"Tone": For tone dial service.
"Pulse": For rotary/pulse dial service.
Program this setting using either the base unit or one of the handsets.

📠 Base unit / 🖉 Portable

1 [MENU] → [♯][1][2][0]

2 [▼]/[▲]: Select the desired setting.

3 [SAVE]

4 Proceed with the operation for your unit.
Base unit: [■] (EXIT)
Handset: [OFF]

7.5. Error Messages

If the unit detects a problem, one of the following messages is shown on the display.

Display message	Cause/solution
Busy	• The called handset or base unit is in use. • Other units are in use and the system is busy. Try again later. • Privacy mode is on for the call you tried to join. • The handset you are using is too far from the base unit. Move closer and try again. • The handset's registration may have been canceled. Re-register the handset.
Check tel line 1 Check tel line 2	• The supplied telephone line cord has not been connected yet or not connected properly. Check the connections. • If you use the unit as a single-line telephone only, erase the message as follows: To erase "Check tel line 1", press [MENU]. → [♯][1][8][9] To erase "Check tel line 2", press [MENU]. → [♯][1][9][0] When a power failure occurs, the message is displayed again. Erase again as above.
Error!!	• The handset's registration has failed. Move the base unit and handset away from all electrical appliances and try again. • Recording was too short. Try again.
Failed	• Phonebook copy failed. Confirm the other unit (the receiver) is in standby mode and try again.
Incomplete	• Phonebook copy is incomplete. The receiver's phonebook memory is full. Erase the unnecessary phonebook entries from the other unit (the receiver) and try again.
Memory full	• The phonebook memory is full. Erase unnecessary entries. • Message memory is full. Erase unnecessary messages.
Messages full	• Message memory is full. Erase unnecessary messages.
No link to base. Reconnect AC adaptor.	• The handset has lost communication with the base unit. Move closer to the base unit and try again. • Unplug the base unit's AC adaptor to reset the unit. Reconnect the adaptor and try again. • The handset's registration may have been canceled. Re-register the handset.
Use rechargeable battery.	• A wrong type of batteries such as Alkaline or Manganese was inserted. Use only the rechargeable Ni-MH batteries.
You must first subscribe to Caller ID.	• You must subscribe to Caller ID service. Once you receive caller information after subscribing to Caller ID service, this message will not be displayed.

7.6. Troubleshooting

If you still have difficulties after following the instructions in this section, disconnect the base unit's AC adaptor, then reconnect the base unit's AC adaptor. Remove the batteries from the portable, and then insert the batteries into the portable again.

General use

Problem	Cause/solution
The unit does not work.	● Make sure the batteries are installed correctly. ● Fully charge the batteries. ● Check the connections. ● Unplug the base unit's AC adaptor to reset the unit. Reconnect the adaptor and try again. ● The handset has not been registered to the base unit. Register the handset.
I cannot hear a dial tone.	● The base unit's AC adaptor or telephone line cord is not connected. Check the connections. ● If you are using a splitter to connect the unit, remove the splitter and connect the unit to the wall jack directly. If the unit operates properly, check the splitter. ● Disconnect the base unit from the telephone line and connect the line to a known working telephone. If the working telephone operates properly, contact our service personnel to have the unit repaired. If the working telephone does not operate properly, contact your service provider/telephone company.
Ψ is flashing.	● The handset has not been registered to the base unit. Register the handset. ● The handset is too far from the base unit. Move closer. ● The base unit's AC adaptor is not connected. Check the connections. ● You are using the base unit or handset in an area with high electrical interference. Re-position the base unit and use the handset away from interference sources.

Programmable settings

Problem	Cause/solution
I have changed the display language to a language I cannot read.	● Change the display language.
While programming, the unit starts to ring.	● A call is being received. Answer the call and start again after hanging up.
I cannot register a handset to a base unit.	● The maximum number of handsets (6) is already registered to the base unit. Cancel unused handset registrations from the base unit. ● Place the handset and the base unit away from other electrical appliances.

Battery recharge

Problem	Cause/solution
The handset beeps and/or ▭■ flashes.	● Battery charge is low. Fully charge the batteries .
I fully charged the batteries, but ▭■ still flashes or ▭ is displayed.	● Clean the charge contacts and charge again. ● It is time to replace the batteries.
I fully charged the batteries, but the operating time seems to be shorter.	● Clean the battery ends ($\oplus$, $\ominus$) and the charge contacts with a dry cloth, and charge again.

Making/answering calls, intercom

Problem	Cause/solution
Noise is heard, sound cuts in and out.	● You are using the base unit or handset in an area with high electrical interference. Re-position the base unit and use the handset away from sources of interference. ● Move closer to the base unit. ● If you use a DSL/ADSL service, we recommend connecting a DSL/ADSL filter between the base unit and the telephone line jack. Contact your DSL/ADSL provider for details.
The base unit and/or handset does not ring.	● The ringer volume is turned off. Adjust the ringer volume. ● Night mode is turned on. Turn it off.
I cannot make a call.	● The dialing mode may be set incorrectly. Change the setting. ● The handset is too far from the base unit. Move closer and try again.
I cannot make long distance calls.	● Make sure that you have long distance service.

Caller ID

Problem	Cause/solution
Caller information is not displayed.	● You must subscribe to Caller ID service. Contact your service provider/telephone company for details. ● If your unit is connected to any additional telephone equipment such as a Caller ID box or cordless telephone line jack, plug the unit directly into the wall jack. ● If you use a DSL/ADSL service, we recommend connecting a DSL/ADSL filter between the base unit and the telephone line jack. Contact your DSL/ADSL provider for details. ● The name display service may not be available in some areas. Contact your service provider/telephone company for details. ● Other telephone equipment may be interfering with this unit. Disconnect the other equipment and try again.

Problem	Cause/solution
Caller information is displayed late.	● Depending on your service provider/telephone company, the unit may display the caller's information at 2nd ring or later. ● Move closer to the base unit.
The caller list/incoming phone numbers are not edited automatically.	● The Caller ID number auto edit feature is turned off. Turn it on and try again. ● You need to call back the edited number to activate Caller ID number auto edit.
I cannot dial the phone number edited in the caller list.	● The phone number you dialed might have been edited incorrectly (for example, the long distance "1" or the area code is missing). Edit the phone number with another pattern.
Time on the unit is shifted.	● Incorrect time information from incoming Caller ID changes the time. Set the time adjustment to "Manual" (off).
The 2nd caller's information is not displayed during an outside call.	● In order to use Caller ID, call waiting, or Call Waiting Caller ID (CWID), you must first contact your service provider/telephone company and subscribe to the desired service. After subscribing, you may need to contact your service provider/telephone company again to activate this specific service, even if you already subscribed to both Caller ID and Call Waiting with Caller ID services (CWID).

Answering system

Problem	Cause/solution
The unit does not record new messages.	● The answering system is not turned on for the line you wish to record messages from. Select the desired line or both lines, then turn the answering system on. ● The message memory is full. Erase unnecessary messages. ● The answering system is activated for both lines, and the 1st caller is leaving a voice message. The 2nd caller cannot leave a message, but the caller information will be stored. ● If you subscribe to the voice mail service, messages are recorded by your service provider/telephone company not your telephone. Change the unit's number of rings setting or contact your service provider/telephone company.
I cannot operate the answering system.	● Someone is using the unit. Wait for the other user to finish. ● A caller is leaving a message. Wait for the caller to finish. ● The handset is too far from the base unit. Move closer.
I cannot operate the answering system remotely.	● You are entering the wrong remote access code. If you forgot the remote access code, store a new remote access code. ● Press each key firmly. ● The answering system is turned off. Turn it on. ● You are using a rotary/pulse telephone. Try again using a touch-tone phone.
While recording a greeting message or listening to messages, the unit rings and recording stops.	● A call is being received. Answer the call and try again later.

Liquid damage

Problem	Cause/solution
Liquid or other form of moisture has entered the base unit/handset.	● Disconnect the AC adaptor and telephone line cord from the base unit. Remove the batteries from the handset and leave to dry for at least 3 days. After the base unit/handset are completely dry, reconnect the AC adaptor and telephone line cord. Insert the batteries and charge fully before use.

Caution:
● To avoid permanent damage, do not use a microwave oven to speed up the drying process.
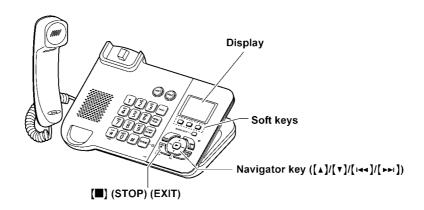
8 Service Mode

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.

Display

Soft keys

Navigator key ([▲]/[▼]/[◄◄]/[►►])

[■] (STOP) (EXIT)

B/U key operation	B/U LCD
1). Press " **MENU** " (middle soft key).	View Caller ID / BACK SELECT
2). Enter "7", "2", "6", "2", "7", "6", "6", "4". **Note:** 7262 7664 = PANA SONI (see letters printed on dial keys)	LINE 1 LINE 2 Engineering Mode **Read EEPROM** Write EEPROM BACK SELECT
3). Select "Write EEPROM" by Navigator key.	LINE 1 LINE 2 Engineering Mode Read EEPROM **Write EEPROM** BACK SELECT
4). Press "**SELECT**" (middle soft key).	LINE 1 LINE 2 Set Address: ____ __ BACK
5). Enter "●", "●", "●", "●" (Address). (*2)	LINE 1 LINE 2 Set Address: ●●●●|✱✱| ◄— Default Data BACK OK
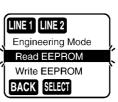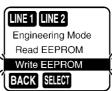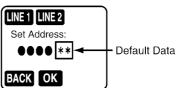
32
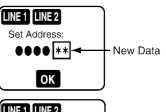
6). Enter "∗", "∗" (New Data). (*2)

7). Press " OK " (middle soft key).
A long confirmation beep will be heard.

8). Press "[■] (STOP) (EXIT) " to return to standby mode.
After that, turn the base unit power off and then power on.

Frequently Used Items (Base Unit)
ex.)

Items	Address(*1)	Default Data	New Data		Remarks
Frequency	00 01	75	-	-	Use these items in a **READ-ONLY** mode to confirm
ID	00 10~00 14	Given value	-	-	the contents. Careless rewriting may cause serious damage to the computer system.

Note:
(*1) When you enter the address or New Data, please refer to the table below.
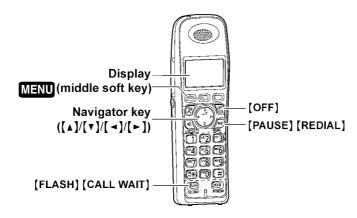
Desired Number (hex.)	Input Keys	Desired Number (hex.)	Input Keys
0	0	A	[FLASH] + 0
1	1	B	[FLASH] + 1
.	.	C	[FLASH] + 2
.	.	D	[FLASH] + 3
.	.	E	[FLASH] + 4
9	9	F	[FLASH] + 5

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8.1.2. Portable

Important:

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

Display
[MENU] (middle soft key)
Navigator key
([▲]/[▼]/[◄]/[►])
[OFF]
[PAUSE] [REDIAL]
[FLASH] [CALL WAIT]

H/S key operation   **H/S LCD**

1). Press "[MENU]" (middle soft key).

View Caller ID
BACK SELECT

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

Engineering Mode
Read EEPROM
Write EEPROM
BACK SELECT

3). Select "Write EEPROM" by Navigator key.

Engineering Mode
Read EEPROM
Write EEPROM
BACK SELECT

4). Press "[SELECT]" (middle soft key).

Set Address:
____ __
BACK

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

Set Address:
●●●●[**] ◄— Default Data
BACK OK

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

Set Address:

●●●● ✳✳ ← New Data

BACK OK

7). Press " OK " (middle soft key).
A long confirmation beep will be heard.

Set Address:

＿＿＿＿ ＿＿

BACK

8). Press " 〔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.

Frequently Used Items (Portable)
ex.)

Items	Address	Default Data	New Data	Possible Adjusted Value MAX (hex)	Possible Adjusted Value MIN (hex)	Remarks
Battery Low	00 04	70	-	-	-	
Frequency	00 01~00 02	F6 02	-	-	-	(*2)
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	[FLASH] + 0
1	1	B	[FLASH] + 1
.	.	C	[FLASH] + 2
.	.	D	[FLASH] + 3
.	.	E	[FLASH] + 4
9	9	F	[FLASH] + 5

(*2) Use these items in a READ-ONLY mode to confirm the contents. Careless rewriting may cause serious damage to the por-
table.
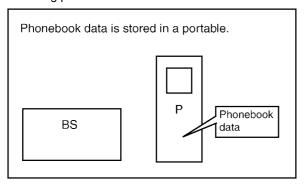
8.2. Copying Phonebook Items when Repairing

You can copy the base unit (Maximum number of contacts is 100.) phonebook to another (compatible Panasonic) portable. This will help to save the original phonebook data which the customer has registered.
* You cannot copy the base unit phonebook to another base unit.
Available models: KX-TG9391/KX-TG9392
Refer to the following procedures.
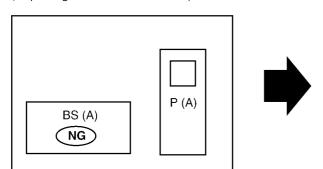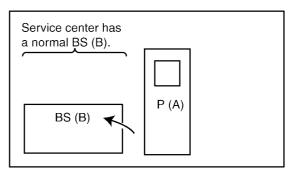
Phonebook data is stored in a portable.

BS

P

Phonebook data

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

BS (A)
NG

P (A)

Service center has a normal BS (B).

BS (B)

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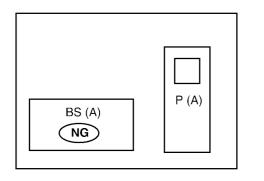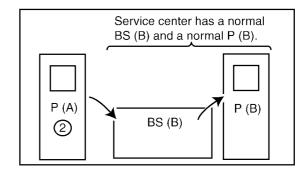
1. Register P (A) to BS (B).
   P (A) is normal, therefore no need to copy the phonebook data.

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

BS (A)
NG

P (A)

Service center has a normal BS (B) and a normal P (B).

P (A)
②

BS (B)

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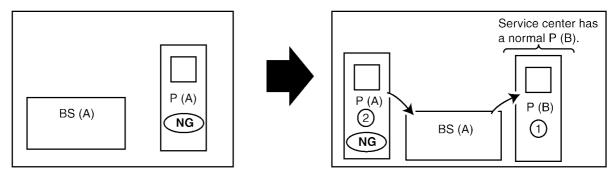
1. Register P (A) to BS (B) as a handset no. 2.
2. Copy the phonebook data from P (A) to BS (B) then copy the phonebook data from BS (B) to P (B).
3. Cancel the P 2 (P (A)).

Note:
• BS=Base Unit , P=Portable
• If the max number of portables are already registered to the base unit, a new portable cannot be registered.
• To register the portable, refer to **Registering a Portable to the Base Unit** (P.27)
• To cancel the portable, refer to **Deregistering a Portable** (P.27)
• To copy the portable phonebook, refer to **Copying Phonebook Entries** (P.27)

Case 3: A Portable has a defect.
   (Radio transmission is functioning.)

Service center has
a normal P (B).

P (A)
②
NG

BS (A)

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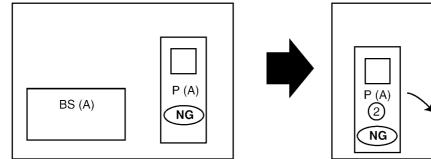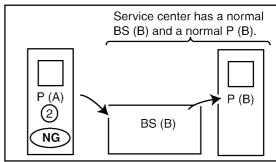
1. Cancel P (A).
2. Register P (B) as a handset no. 1.
3. Register P (A) as a handset no. 2.
4. Copy the phonebook data from P (A) to BS (A)
   then copy the phonebook data from BS (A) to P (B).
5. Cancel P 2 (P (A)).

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

Service center has a normal
BS (B) and a normal P (B).

P (A)
②
NG

BS (B)

P (B)

1. Register P (A) as a portable no. 2.
2. Copy the phonebook data from P (A) to BS (B)
   then copy the phonebook data from BS (B) to P (B).
3. Cancel P 2 (P (A)).

Note:
• BS=Base Unit , P=Portable
• If the max number of portables are already registered to the base unit, a new portable cannot be registered.
• To register the portable, refer to **Registering a Portable to the Base Unit** (P.27)
• To cancel the portable, refer to **Deregistering a Portable** (P.27)
• To copy the portable phonebook, refer to **Copying Phonebook Entries** (P.27)

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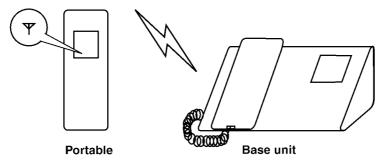
Units are reset to the Factory settings by this operation (Erase recorded voice messages, stored Phone numbers, Caller list and etc.)

Note:
- Some menus are not reset. Refer to **Operating Instructions** (P.22).
- 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 portable

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

Portable   **Base unit**
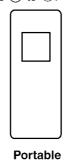
① Connect the AC adaptor to the base unit and install the charged batteries into the portable.

② Confirm the handset is registered to the base unit (Ψ lights).
   If the portable is not registered to the base unit (Ψ is flashing), register it. (*1)

③ Lift the portable and press 【OFF】 to put the portable in standby mode.

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

⑤ Disconnect the AC adaptor, then remove the battery.

Note:
(*1) Refer to **Registering a Portable to the Base Unit** (P.27).

8.3.2. Resetting only portable

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

Portable

① Install the charged batteries into the Portable.

② Lift the portable and press 【OFF】 to put the portable in standby mode.

③ Press ③, ⑤, ⑦ and # key of the portable simultaneously until a confirmation tone is heard. (*2)

④ Remove the battery.
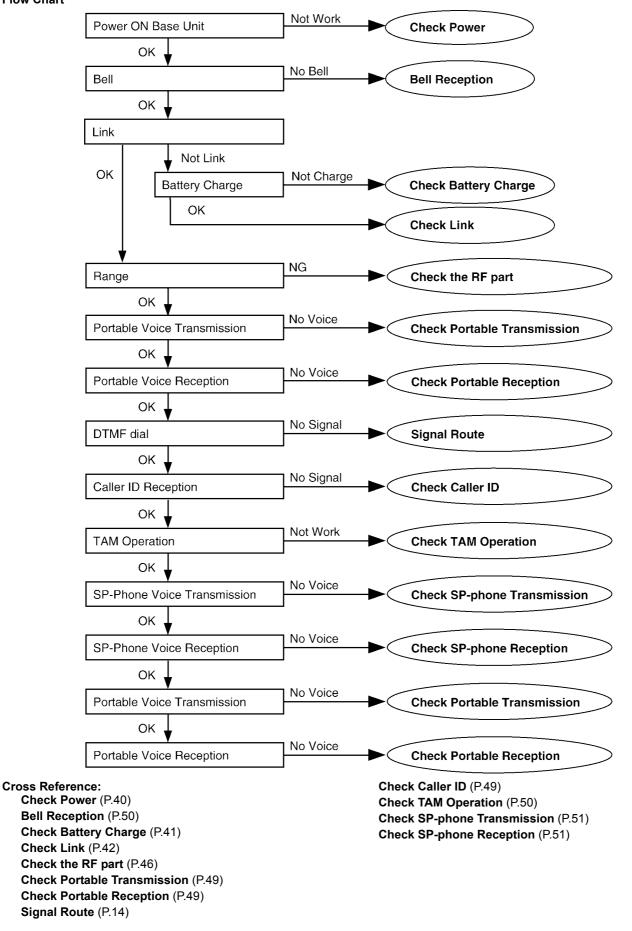
Note: (*2)
- The portable registration to the base unit is cancelled.
- If the portable needs to be registered to the base unit, refer to **Registering a Portable to the Base Unit** (P.27).
- If users do not bring the base unit with them, the registration procedure has to be done by users themselves.

9 Troubleshooting Guide

9.1. Troubleshooting Flowchart

Flow Chart

Power ON Base Unit	Not Work →	**Check Power**
↓ OK		
Bell	No Bell →	**Bell Reception**
↓ OK		
Link		
	Not Link	
OK	Battery Charge	Not Charge → **Check Battery Charge**
	↓ OK	→ **Check Link**
Range	NG →	**Check the RF part**
↓ OK		
Portable Voice Transmission	No Voice →	**Check Portable Transmission**
↓ OK		
Portable Voice Reception	No Voice →	**Check Portable Reception**
↓ OK		
DTMF dial	No Signal →	**Signal Route**
↓ OK		
Caller ID Reception	No Signal →	**Check Caller ID**
↓ OK		
TAM Operation	Not Work →	**Check TAM Operation**
↓ OK		
SP-Phone Voice Transmission	No Voice →	**Check SP-phone Transmission**
↓ OK		
SP-Phone Voice Reception	No Voice →	**Check SP-phone Reception**
↓ OK		
Portable Voice Transmission	No Voice →	**Check Portable Transmission**
↓ OK		
Portable Voice Reception	No Voice →	**Check Portable Reception**

Cross Reference:
Check Power (P.40)
Bell Reception (P.50)
Check Battery Charge (P.41)
Check Link (P.42)
Check the RF part (P.46)
Check Portable Transmission (P.49)
Check Portable Reception (P.49)
Signal Route (P.14)

Check Caller ID (P.49)
Check TAM Operation (P.50)
Check SP-phone Transmission (P.51)
Check SP-phone Reception (P.51)

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9.1.1. Check Power

9.1.1.1. Base Unit

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

```
┌────────────────────────────────┐   NO   ┌──────────────────────────────────────────┐
│ Is the input voltage of IC311: 5 about │ ─────► │ Check C301, C302, C303, C311 are not shorted. │
│ 5.5 V - 11 V?                    │        └──────────────────────────────────────────┘
└────────────────────────────────┘                         │ OK
              │ YES                                         ▼
              │                                ┌──────────────────────────────┐
              ▼                                │ Check AC Adaptor.             │
┌────────────────────────────────┐   NO       └──────────────────────────────┘
│ Is the output voltage of IC311: 3 about 4 V? │ ─────►
└────────────────────────────────┘
              │ YES
              ▼
┌────────────────────────────────┐   NO
│ Is the output voltage of IC326: 3 about 3.6 V? │ ─────►
└────────────────────────────────┘                         ┌──────────────────────────────┐
              │ YES                                         │ Check Power Supply Circuit.   │
              ▼                                              └──────────────────────────────┘
┌────────────────────────────────┐   NO
│ Is the Collector of Q381 about 3 V? │ ─────►
└────────────────────────────────┘
              │ YES
              ▼
┌────────────────────────────────┐   NO
│ Is the Collector of Q386 about 1.8 V? │ ─────►
└────────────────────────────────┘
              │ YES
              ▼
┌────────────────────────────────┐   NO   ┌──────────────────────────────┐
│ Is BBIC (IC501: 120) High?       │ ─────► │ Check BBIC (IC501), Q541.     │
└────────────────────────────────┘        └──────────────────────────────┘
              │ YES
              ▼
┌────────────────────────────────┐   NO   ┌──────────────────────────────┐
│ Does BBIC (IC501: 21) oscillate at 10.368 MHz? │ ─────► │ Check X501, C512, C511, R511. │
└────────────────────────────────┘        └──────────────────────────────┘
              │ YES
              ▼
┌────────────────────────────────┐
│ Check BBIC (IC501) and FLASH MEMORY 2 │
│ (IC561).                          │
└────────────────────────────────┘
```

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. Portable

```
┌────────────────────────────────────────────┐
│ Is the battery inserted to J1 (BATT+) and J2 (BATT-)? │
└────────────────────────────────────────────┘
              │ YES
              ▼
┌────────────────────────────────┐   NO   ┌──────────────────────────────────────────┐
│ Is the voltage of J1 over 2.3 V? │ ─────► │ Check the battery and around J1 (BATT+)   │
└────────────────────────────────┘        │ and J2 (BATT-) are not shorted.           │
              │                            └──────────────────────────────────────────┘
              │                                         │ OK
              │                                         ▼
              │                            ┌──────────────────────────────┐
              │                            │ Check the battery.            │
              │ YES                        └──────────────────────────────┘
              ▼
┌────────────────────────────────┐   NO   ┌──────────────────────────────────────────┐
│ Is the voltage of +1.8 about 1.8 V? │ ─────► │ Check Power Supply Circuit/Reset Circuit. │
└────────────────────────────────┘        └──────────────────────────────────────────┘
              │ YES
              ▼
┌────────────────────────────────┐   NO   ┌──────────────────────────────┐
│ Is the voltage of CP2.5 about 2.5 V? │ ─────► │ Check BBIC (IC1).             │
└────────────────────────────────┘        └──────────────────────────────┘
              │ YES
              ▼
┌────────────────────────────────┐   NO   ┌──────────────────────────────┐
│ Does BBIC (IC1: 10) oscillate at 10.368 MHz? │ ─────► │ Check X1.                 │
└────────────────────────────────┘        └──────────────────────────────┘
              │ YES
              ▼
┌────────────────────────────────┐
│ Check BBIC (IC1).                 │
└────────────────────────────────┘
```
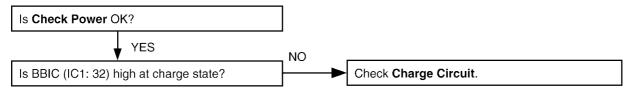
Cross Reference:
  Power Supply Circuit/Reset Circuit (P.12)

9.1.2. Check Battery Charge

9.1.2.1. Portable

Is **Check Power** OK?

↓ YES

Is BBIC (IC1: 32) high at charge state?	NO →	Check **Charge Circuit**.
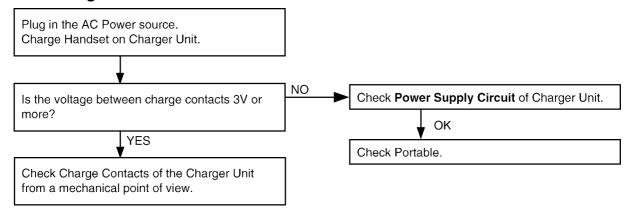
Cross Reference:
  Check Power (P.40)

  Charge Circuit (P.12)

9.1.2.2. Charger Unit

Plug in the AC Power source. Charge Handset on Charger Unit.

↓

Is the voltage between charge contacts 3V or more?	NO →	Check **Power Supply Circuit** of Charger Unit.

↓ YES   ↓ OK

Check Charge Contacts of the Charger Unit from a mechanical point of view.		Check Portable.

Cross Reference:
  Power Supply Circuit (P.9)

9.1.3. Check Link

9.1.3.1. Base Unit

```
Does Base Unit make link with normal working      YES
Handset?                                            ───────►  Base Unit is OK. Check Portable.
         │ NO
         ▼
Is the voltage of TP3.6 V about 3.6 V?             NO
Refer to Check Point...(B).                         ───────►  Check around Power Supply Circuit.
         │ YES
         ▼
Is the voltage of TP2.5 V about 2.5 V?             NO
Refer to Check Point...(C).
         │ YES
         ▼
Is the voltage of TP1.8 V about 1.8 V?             NO
                                                    ───────►  Adjust TP1.8 V voltage to 1.8 V.
         │ YES                                                Refer to Check Point...(E).
         ▼                                                                   │ OK
                                                              ◄──────────────┘
         ▼
Does the RF clock (CLK) oscillate at 10.368 MHz in NO          Check around X501 and RF module and adjust
Base Unit Test Mode?                                ───────►   clock frequency.
Refer to Check Point...(H).                                    Refer to Check Point...(H).
         │ YES
         ▼
Is there CMD60 (: DECT Tester)?                    NO (*1)
                                                    ───────►
         │ YES
         ▼
Does Base Unit make link with CMD60 in             NO
Base Unit Test Mode?                                ───────►
Refer to Check Point...(K).
         │ YES
         ▼
Is the NTP value OK?                               NO
Refer to Check Point...(K).                         ───────►  Replace with a new Circuit Board.
         │ YES
         ▼
Is the modulation OK?                              NO
Refer to Check Point...(L).                         ───────►
         │ YES
         ▼
Is the Frequency Offset OK?                        NO
Refer to Check Point...(M).                         ───────►
         │ YES
         ▼
      Continued to the next page.
```

Cross Reference:
 Power Supply Circuit (P.9)
 Check Point (Base Unit) (P.52)
Note:
 (*1) Refer to **Troubleshooting by Symptom (Base Unit and Charger Unit)** (P.52).

⋮

↓ YES

| Is the Frequency Drift OK? Refer to **Check Point...(N)**. | NO → |

↓ YES

| Is the Sensitivity Receiver OK? Refer to **Check Point...(O)**. | NO → |

↓ YES

| Is the Timing OK? Refer to **Check Point...(P)**. | NO → | → | Replace with a new Circuit Board. |

↓ YES

| Is the RSSI Level OK? Refer to **Check Point...(Q)**. | NO → |

↓ YES

| Is the Power RAMP OK? Refer to **Check Point...(R)**. | NO → |

Cross Reference:
    Check Point (Base Unit) (P.52)

9.1.3.2. Portable

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

↓ NO

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

↓ YES ←OK— │ NO ↓

Is the voltage of CP2.5 about 2.5 V?
Refer to **Check Point...(B)**. Check around **Power Supply Circuit/Reset Circuit**.

—NO→

↓ YES Check BBIC (IC1).

Is the voltage of CP4.0 over 4.0 V? —NO→

↓ YES

Does the RF clock (CLK) oscillate at 10.368 MHz in Portable Test Mode?
Refer to **Check Point...(J)**. —NO→ Check around X1 and RF module and adjust clock frequency.
Refer to **Check Point...(J)**.

↓ YES

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

↓ YES

Does Portable make link with CMD60 in Portable Test Mode?
Refer to **Check Point...(K)**. —NO→

↓ YES

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

↓ YES

Is the modulation OK?
Refer to **Check Point...(L)**. —NO→

↓ YES

Is the Frequency Offset OK?
Refer to **Check Point...(M)**. —NO→

↓ YES

⋮ Continued to the next page.

Cross Reference:
   Power Supply Circuit/Reset Circuit (P.12)
   Check Point (Portable) (P.56)
Note:
   (*1) Refer to **Troubleshooting by Symptom (Portable)** (P.56).

⋮

YES

Is the Frequency Drift OK? Refer to **Check Point**...**(N)**.	NO →

YES

Is the Sensitivity Receiver OK? Refer to **Check Point**...**(O)**.	NO →

YES

Is the Timing OK? Refer to **Check Point**...**(P)**.	NO →

Replace with a new Circuit Board.

YES

Is the RSSI Level OK? Refer to **Check Point**...**(Q)**.	NO →

YES

Is the Power RAMP OK? Refer to **Check Point**...**(R)**.	NO →

Cross Reference:
    Check Point (Portable) (P.56)
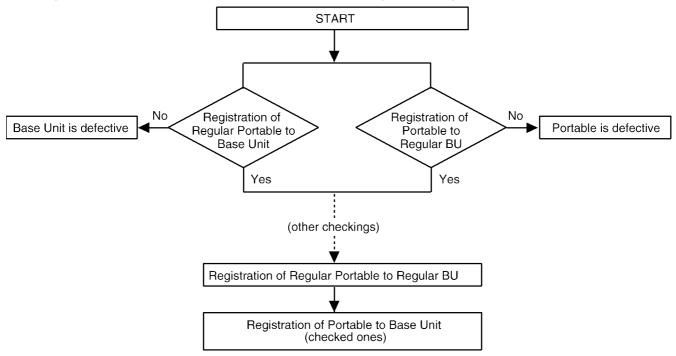
9.1.4. Check the RF part

9.1.4.1. Finding out the Defective part

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

After All the Checkings or Repairing
1. Re-register the checked Portable to the checked Base Unit, and Regular P to Regular BU.

```
                          ┌─────────────────────────┐
                          │          START          │
                          └─────────────────────────┘
                                      │
                                      ▼
          No    ╱ Registration of ╲           ╱ Registration of ╲    No
┌──────────────────┐  Regular Portable to      Portable to     ┌──────────────────┐
│ Base Unit is     │◄──   Base Unit      ╲   ╱   Regular BU   ──►│ Portable is      │
│ defective        │      ╲             ╱     ╲             ╱    │ defective        │
└──────────────────┘       ╲   Yes    ╱         ╲   Yes   ╱      └──────────────────┘

                              (other checkings)
                                      │
                                      ▼
                   ┌──────────────────────────────────────┐
                   │ Registration of Regular Portable to   │
                   │ Regular BU                            │
                   └──────────────────────────────────────┘
                                      │
                                      ▼
                   ┌──────────────────────────────────────┐
                   │ Registration of Portable to Base Unit │
                   │          (checked ones)               │
                   └──────────────────────────────────────┘
```
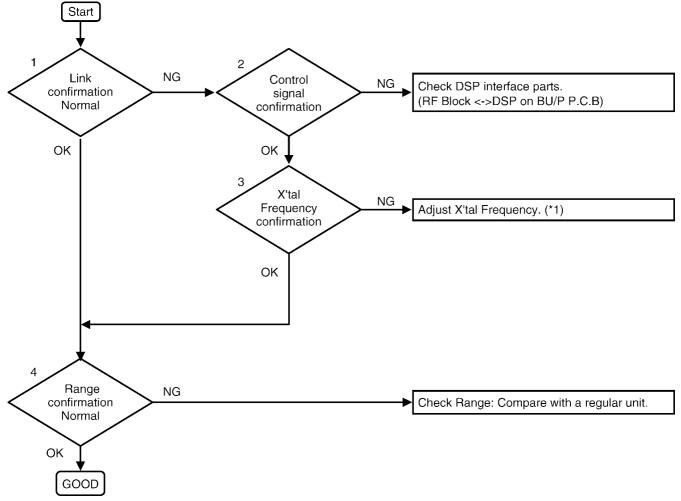
Note:
If you need to register a Portable, refer to **Registering a Portable to the Base Unit** (P.27)50

9.1.4.2. RF Check Flowchart

Each item (1 ~ 4) of RF Check Flowchart corresponds to **Check Table for RF part** (P.48).
Please refer to the each item.

```
                    ┌────────┐
                    │ Start  │
                    └────────┘
                         │
                         ▼
      1 ◇ Link               2 ◇ Control
        confirmation  ─NG─▶    signal      ─NG─▶  ┌──────────────────────────────┐
        Normal                 confirmation        │ Check DSP interface parts.   │
                                                    │ (RF Block <->DSP on BU/P P.C.B) │
        │OK                     │OK                └──────────────────────────────┘
        │                       ▼
        │              3 ◇ X'tal
        │                Frequency   ─NG─▶  ┌──────────────────────────────┐
        │                confirmation       │ Adjust X'tal Frequency. (*1)  │
        │                                   └──────────────────────────────┘
        │                       │OK
        │◀──────────────────────┘
        ▼
      4 ◇ Range
        confirmation  ─NG───────────────────▶  ┌──────────────────────────────────────┐
        Normal                                  │ Check Range: Compare with a regular unit. │
                                                └──────────────────────────────────────┘
        │OK
        ▼
   ┌────────┐
   │ GOOD   │
   └────────┘
```

Note:
   (*1) Base unit - refer to (H) of **Check Point (Base Unit)** (P.52)
   (*2) Portable - refer to (J) of **Check Point (Portable)** (P.56)
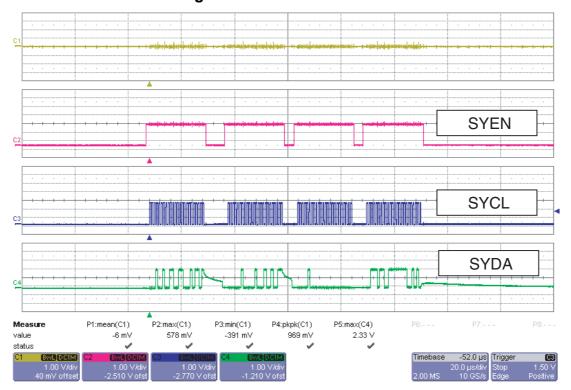
9.1.4.3. Check Table for RF part

No.	Item	BU (Base Unit) Check	P (Portable) Check
1	Link Confirmation Normal	1. Register Regular P to BU (to be checked). (*1) 2. Press [Talk] key of the Regular HS to establish link.	1. Register P (to be checked) to Regular BU. (*1) 2. Press [Talk] key of the P to establish link.
2	Control signal confirmation	1. Check BBIC interface. (*2)	1. Check BBIC interface. (*2)
3	X'tal Frequency confirmation	1. Check X'tal Frequency. (*3) (10.368 MHz ± 100 Hz)	1. Check X'tal Frequency. (*4) (10.368 MHz ±100 Hz)
4	Range Confirmation Normal	1. Register Regular P to BU (to be checked). (*1) 2. Press [Talk] key of the Regular P to establish link. 3. Compare the range of the BU (being checked) with that of the Regular BU.	1. Register P (to be checked) to Regular BU. (*1) 2. Press [Talk] key of the P to establish link. 3. Compare the range of the P (being checked) with that of the Regular P.
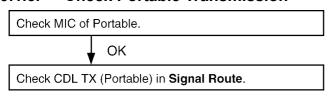
Note:
  (*1) Refer to **Registering a Portable to the Base Unit** (P.27)
  (*2) Refer to **RF-BBIC Interface Signal Wave Form** (P.49)
  (*3) Refer to **Adjustment Standard (Base Unit)** (P.69)
  (*4) Refer to **Adjustment Standard (Portable)** (P.73)

9.1.4.4. RF-BBIC Interface Signal Wave Form

9.1.5. Check Portable Transmission

Check MIC of Portable.

↓ OK

Check CDL TX (Portable) in **Signal Route**.
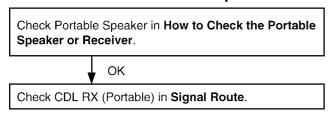
Cross Reference:
Signal Route (P.14)

9.1.6. Check Portable Reception

Check Portable Speaker in **How to Check the Portable Speaker or Receiver**.

↓ OK

Check CDL RX (Portable) in **Signal Route**.

Cross Reference:
How to Check the Portable Speaker or Receiver (P.77).
Signal Route (P.14)

9.1.7. Check Caller ID
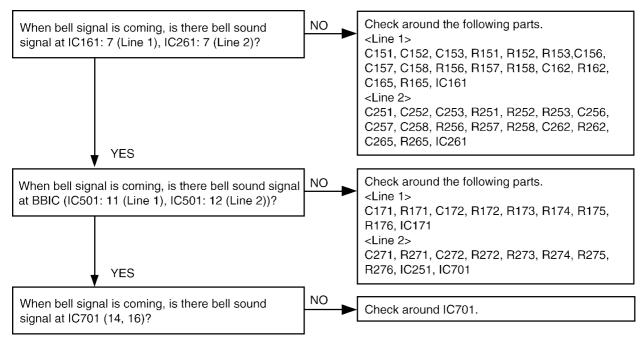
Check Caller ID in **Signal Route**.

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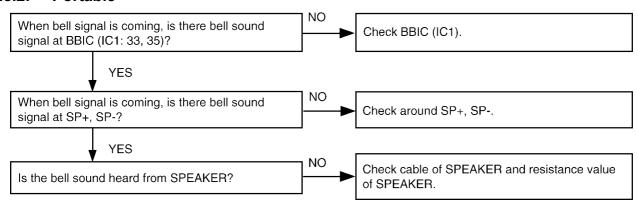
9.1.8. Bell Reception

9.1.8.1. Base Unit

When bell signal is coming, is there bell sound signal at IC161: 7 (Line 1), IC261: 7 (Line 2)?	NO →	Check around the following parts. <Line 1> C151, C152, C153, R151, R152, R153,C156, C157, C158, R156, R157, R158, C162, R162, C165, R165, IC161 <Line 2> C251, C252, C253, R251, R252, R253, C256, C257, C258, R256, R257, R258, C262, R262, C265, R265, IC261

↓ YES

When bell signal is coming, is there bell sound signal at BBIC (IC501: 11 (Line 1), IC501: 12 (Line 2))?	NO →	Check around the following parts. <Line 1> C171, R171, C172, R172, R173, R174, R175, R176, IC171 <Line 2> C271, R271, C272, R272, R273, R274, R275, R276, IC251, IC701

↓ YES

When bell signal is coming, is there bell sound signal at IC701 (14, 16)?	NO →	Check around IC701.

9.1.8.2. Portable

When bell signal is coming, is there bell sound signal at BBIC (IC1: 33, 35)?	NO →	Check BBIC (IC1).

↓ YES

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

↓ YES

Is the bell sound heard from SPEAKER?	NO →	Check cable of SPEAKER and resistance value of SPEAKER.

Cross Reference:
Telephone Line Interface (P.10)
Check Link (P.42)
How to Check the Portable Speaker or Receiver (P.77)

9.1.9. Check TAM Operation

Is there a TAM icon on the Handset display?	NO →	Turn on the Answering System.

↓ YES

Is the voltage of TP3.0 V of Base Unit about 3.0 V and TP1.8 V about 1.8 V?	NO →	Check **Power Supply Circuit**.

↓ YES

Check IC502, FLASH MEMORY 1 (IC761), FLASH MEMORY 2 (IC561), IC701 and BBIC (IC501) of Base Unit. (*1)	
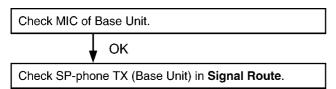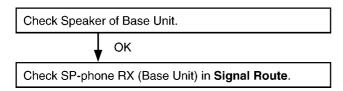
Cross Reference:
Power Supply Circuit (P.9)
Note:
(*1) When replacing FLASH MEMORY 1 (IC761), TAM data needs to be written to it. Refer to **Base Unit** (P.74) of **Things to Do after Replacing IC**.

9.1.10. Check SP-phone Transmission

```
┌─────────────────────────────────────────┐
│ Check MIC of Base Unit.                   │
└─────────────────────────────────────────┘
                  │ OK
                  ▼
┌─────────────────────────────────────────┐
│ Check SP-phone TX (Base Unit) in Signal Route. │
└─────────────────────────────────────────┘
```

Cross Reference:
   Signal Route (P.14)

9.1.11. Check SP-phone Reception

```
┌─────────────────────────────────────────┐
│ Check Speaker of Base Unit.               │
└─────────────────────────────────────────┘
                  │ OK
                  ▼
┌─────────────────────────────────────────┐
│ Check SP-phone RX (Base Unit) in Signal Route. │
└─────────────────────────────────────────┘
```

Cross Reference:
   Signal Route (P.14)

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

9.2.1. Check Point (Base Unit)

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

Note:

After the measuring, suck up the solder of TP.

*: **PC Setting** (P.67) is required beforehand.

The connections of simulator equipments are as shown in **Adjustment Standard (Base Unit)** (P.69).

	Items	Check Point	Procedure	Check or Replace Parts
(A)	4.0 V Supply Confirmation	TP4V	1. Confirm that the voltage between test point TP4V and GND is 4.0 V ± 0.2 V.	IC311, Q311, R311, R312, R313, D311, L311, C315
(B)	3.6 V Supply Confirmation	TP3.6 V	1. Confirm that the voltage between test point TP3.6 V and GND is 3.3 V ± 0.2 V.	IC326, C326, C327
(C)	2.5 V Supply Confirmation	TP2.5 V	1. Confirm that the voltage between test point TP2.5 V and GND is 2.5 V ± 0.2 V.	IC321, C321, R322, R321
(D)	3.0 V Supply Confirmation	TP3.0 V	1. Confirm that the voltage between test point TP3.0 V and GND is 3 V ± 0.2 V.	Q381, R381, R382, R383, C382
(E)	1.8 V Supply Confirmation	TP1.8 V	1. Confirm that the voltage between test point TP1.8 V and GND is 1.8 V ± 0.1 V.	Q386, R386, C388
(F)*	BBIC Confirmation	-	1. BBIC Confirmation (Execute the command "getchk"). 2. Confirm the returned checksum value. Connection of checksum value and program number is shown below. ex.〉 | checksum value | program number | | C8D7 | DB01AC |	IC501, X501, R511, C511, C512, IC561, Q502
(G)*	EEPROM Confirmation	-	1. EEPROM Confirmation (Execute the command "ChkTG9391XXrevYY.bat"). XX: country code YY: revision number 2. Confirm the returned checksum value. 3. The checksum is displayed in the last output line. **Note:** "XX" "YY" and "checksum" vary depending on the country version. You can find them in the batch file, PNZZ- mentioned in **JIG and PC** (P.67).	IC551, R552, R553, R554, C551
(H)*	BBIC Clock Adjustment	CLK	1. Check X'tal Frequency. (10.368 MHz ± 100 Hz). Input Command "rdeeprom 00 01 01", then you can confirm the current value. 2. If the frequency is not 10.368 MHz ± 100 Hz, Adjust the frequency of CLK executing the command "setfreq xx (where xx is the value)" so that the reading of the frequency counter is 10.368000 MHz ± 20 Hz.	IC501, X501, R511, C511, C512
(I)*	Hookswitch Check with DC Characteristics	-	1. Connect CN101 (Line 1)/CN201 (Line 2) (Telephone Socket) to Tel-simulator which is connected with 600 Ω. 2. Set line voltage to 48 V and line current to 40 mA at off-hook condition of normal telephone. 3. Execute the command "hookoff" 4. Confirm that the line current is 40 mA ± 5 mA. 5. Execute the command "hookon". 6. Confirm that the line current is less than + 0.8 mA.	\<Line 1\> PO101, L101, L102, RL185, D101, Q101, R102, PC102, Q102, D105, Q191, Q131, R124, R125, D125, C126 \<Line 2\> PO201, L201, L202, D201, Q201, D202, PC202, D231, R224, R225, D225, C226
(J)	DTMF Generator Check	-	1. Connect CN101 (Line 1)/CN201 (Line 2) (Telephone Socket) to DTMF tester. (Road=600 Ω) 2. Link Portable and push dial key. 3. Confirm DTMF character. 4. Confirm that the high Group is -6 dBm ± 2 dBm. 5. Confirm that the low Group is -8 dBm ± 2 dBm.	\<Line 1\> IC501, R141, R142, C128, Q131, R136, R134, R133 \<Line 2\> IC501, C246, T246, R228, C228, Q231, R236, R232, R234, R233

	Items	Check Point	Procedure	Check or Replace Parts

(**K**)*	Transmitted Power Confirmation	-	Remove the Antenna before starting step from 1 to 7.
			1. Configure the DECT tester (CMD60) as follows;
			    <Setting>
			    • Short A_1 and GND.
			    • Test mode: FP
			    • Traffic Carrier: 5
			    • Traffic Slot: 4
			    • Mode: Loopback
			    • PMID: 00000
			    • RF LEVEL = -70 dBm.
			2. Execute the command "testmode".
			3. Execute the command "sendchar dmv 2 2".
			4. Check that "Signalling Status" has been set to "Locked", then press "ACCEPT RFPI".
			5. Initiate connection from Dect tester ("set up connect")
			6. Execute the command "ANT1".
			7. Confirm that the NTP value at ANT is 20 dBm ~ 25 dBm.
				IC501, IC801, R807, R806, R804, R808, C809, D801, R801, R804, L803, L812, C802, C811

(**L**)*	Modulation Check and Adjustment	-	Follow steps 1 to 6 of (**K**). 7.Confirm that the B-Field Modulation is -350 ~ -400/+320 ~ +370 kHz/div using data type Fig31. 8.Adjust the B-Field Modulation if required. (Execute the command "readmod" and "wrtmod xx", where xx is the value.)	IC501, IC801, R807, R806, R804, R808, C809, D801, R801, R804, L803, L812, C802, C811
(**M**)*	Frequency Offset Check	-	Follow steps 1 to 6 of (**K**). 7.Confirm that the frequency offset is < ± 45 kHz.	IC501, IC801, R807, R806, R804, R808, C809, D801, R801, R804, L803, L812, C802, C811
(**N**)*	Frequency Dirft Confirmation	-	Follow steps 1 to 6 of (**K**). 7.Confirm that the frequency drift is < ± 30 kHz/ms.	IC501, IC801, R807, R806, R804, R808, C809, D801, R801, R804, L803, L812, C802, C811
(**O**)*	Sensitivity Receiver Confirmation	-	Follow steps 1 to 6 of (**K**). 7.Set DECT tester power to -90 dBm. 8.Confirm that the BER is < 1000 ppm.	IC501, IC801, R807, R806, R804, R808, C809, D801, R801, R804, L803, L812, C802, C811
(**P**)*	Timing Confirmation	-	Follow steps 1 to 6 of (**K**). 7.Confirm that the Timing accuracy is < ± 2.0 ppm.	IC501, IC801, R807, R806, R804, R808, C809, D801, R801, R804, L803, L812, C802, C811
(**Q**)*	RSSI Level Confirmation	-	Follow steps 1 to 6 of (**K**). 7.Execute the command "readrssi". 8. Confirm that the returned value is 22 ± A (hex).	IC501, IC801, R807, R806, R804, R808, C809, D801, R801, R804, L803, L812, C802, C811
(**R**)*	Power RAMP Confirmation	-	Follow steps 1 to 6 of (**K**). 7.Confirm that Power RAMP is matching.	IC501, IC801, R807, R806, R804, R808, C809, D801, R801, R804, L803, L812, C802, C811

	Items	Check Point	Procedure	Check or Replace Parts

(S)	Audio Check	-	1. Link with Portable.
			2. Input -45 dBm/1kHz to MIC of Portable.
			   Measure the Level at Line I/F and distortion level.
			3. Confirm that the level is -8 dBm ± 2 dBm and that the distortion level is < 5 % at TEL Line (600 Ω Load).
			4. Input -20 dBm/1 kHz to Line I/F.
			   Measure the level at Receiver of Portable and distortion level
			   (*Receive volume set to second position from minimum).
			5. Confirm that the level is -25 dBm ± 2 dBm and that the distortion level is < 5 % at Receiver (Volume Middle, 150 Ω Load).
				<Line 1>
				PO101, L101, L102, RL185, D101, Q101, R102, PC102, Q102, D105, Q191, Q131, R124, R125, D125, C126
				<Line 2>
				PO201, L201, L202, D201, Q201, D202, PC202, D231, R224, R225, D225, C226

(U)*	TAM Operation Confirmation	-	1. TAM Confirmation (Execute the command "sendchar_VPI") 2. Confirm the returned Value (Value is "DB07AA 01").	IC701, IC761, Q772, Q773

9.2.2. Check Point (Charger Unit)

	Items	Check Point	Procedure	Check or Replace Parts
(A)	Charging Check	-	1. Connect Charge Contact 12 Ω/2 W resistor between charge+ and charge-. 2. Measure and confirm voltage across the resistor is 3.3 V ± 0.2 V.	R2, R1, R3, R4

Note:

After the measuring, suck up the solder of TP.

The connection of adjustment equipment is as shown in **Adjustment Standard (Charger Unit)** (P.70).

9.3. Troubleshooting by Symptom (Portable)

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

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 (Portable)** (P.56)

9.3.1. Check Point (Portable)

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

Note:

After the measuring, suck up the solder of TP.

*: **PC Setting** (P.71) is required beforehand.

The connections of adjustment equipments are as shown in **Adjustment Standard (Portable)** (P.73).

	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. 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).	IC1, Q2, C48, D1, C1, C44, R12, C3, R45, C40, C45, F1, L8
(**B**)*	BBIC Confirmation	-	1. BBIC Confirmation (Execute the command "getchk"). 2. Confirm the returned checksum value. Connection of checksum value and program number is shown below. ex.) checksum value: EB48 program number: DB02AA	IC1, X1, RA61, R64, R66

(**C**)*	EEP-ROM Confirmation	-	1. EEP-ROM Confirmation (Execute the command "ChkTGA939XXrevYY.bat").
			   XX: country code
			   YY: revision number
			2. Confirm the returned checksum value.
			Note:
			  "XX", "YY", and "checksum" vary depending on the country version. You can find them in the batch file, PQZZ- mentioned in **JIG and PC** (P.71).
				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.
			   Confirm the indication of "charging" on LCD.
			2. Confirm that the current limit LED of DC power supply is ON/OFF.
			   Confirm it after waiting over 1 minute at least.
			3. Decrease current limit of DC power supply to 100 mA.
			4. Confirm that the current limit LED of DC power supply is stable. (Current limiter is ON.)
			(If charge control cannot be confirmed by this procedure, please use battery to portable power supply and try again.)
				IC1, Q4 Q9, D7, D8, L4, L5, R6, R7, F1, C1, C3, R2, R30, R31, R8, C147, R45, C15, L8

(E)*	Charge Detection (OFF) Check	-	1. Stop supplying 3.5 V to CHG (+) and CHG (-). 2. Confirm the indication of "charging" has been cleared.	IC1, Q4 Q9, D7, D8, L4, L5, R6, R7, F1, C1, C3, R2, R30, R31, R8, C147, R45, C15

	Items	Check Point	Procedure	Check or Replace Parts

(F)*	Battery Monitor Check	-	1. Apply 2.25 V between BATT+ and BATT-.
			2. Execute the command
			   sendchar PAD
			   sendchar LED 0
			   sendchar CRX 0 1
			   sendchar AD1
			   It assumes that the return value is XX.
			   a) 6c $\leqq$ XX $\leqq$ 71: No need to adjust
			   b) XX: 6A ~ 6B: Need to adjust
			   XX: 72 ~ 74: Need to adjust
			   Write AD value of 2.25 V to EEPROM.
			   ex) read data: XX = 6A, write data: YY = 6A
			   read data: XX = 73, write data: YY = 73
			   EEPROM = 0004(Low Voltage) write "YY"
			   Execute the command "wreeprom 00 04 01 YY".
			   EEPROM = 0005(No Voltage) write ''YY - 1D''
			   Execute the command "×wreeprom 00 05 01 ZZ".
			   EEPROM = 000A(Low Voltage BL) write "YY - 16"
			   Execute the command "wreeprom 00 0A 01 WW".
			   Note:
			      ZZ = YY - C
			   No Voltage writing data limit is '00'.
			   c) XX: 00 ~ 69: Reject
			   XX: 75 ~ FF: Reject
				IC1, F1, C1
				C3, R12, R45

(G)	Battery Low Confirma-tion	-	1. Apply 2.40 V between BATT+ and BATT-. 2. Confirm that there is no flashing of Battery Icon. 3. Apply 2.25 V ± 0.08 V between BATT+ and BATT-. 4. Confirm that there is flashing of Battery Icon.	IC1, F1, C1 C3, R12, R45

(H)*	BBIC Clock Adjustment	CLK	1. Apply 2.6 V between BATT+ and BATT- with DC power.
			2. Input Command "sendchar sfr", then you can confirm the current value.
			3. Check X'tal Frequency. (10.368 MHz ± 100 Hz).
			4. If the frequency is not 10.368 MHz ± 100 Hz, adjust the frequency of CLK exe-cuting 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.
			Note:
			  Clear the registered information for Base Unit before measurement, because the Frequency will not possibly get stable due to the registered information.
			  Pressing the button of "3" "7" "9" "#" clears the registration.
			  Register to it on Base Unit after measurement.
				IC1, X1, C47

(I)*	Transmitted Power Con-firmation	-	Remove the Antenna before starting step from 1 to 4.
			1. Configure the DECT tester (CMD60) as follows;
			   <Setting>
			   • Test mode: PP
			   • RFPI: 0102030405
			   • Traffic Carrier: 5
			   • Traffic Slot: 4
			   • Mode: Loopback
			   • RF LEVEL = -70 dBm
			   • PACKET: PP32Z
			2. Execute the command "sendchar TST 01 02 03 04 05".
			3. Initiate connection from DECT tester.
			4. Confirm that the NTP value at ANT is 19 dBm ~ 25 dBm.
				IC1,
				C808~C814,
				L802~L804,
				C825, C834,
				C819, IC801,
				R107, R108,
				C117, C118,
				C841, C125,
				C842, DA1,
				C801~C804,
				D801,D802,
				C837, C826,
				C822, C820,
				C832, C833,
				R801~R807

(J)*	Modulation Check and Adjustment	-	Follow steps 1 to 3 of **(K)**. 4.Confirm that the B-Field Modulation is -370±30/ +370±30 kHz/div & Modulated width $\geqq$ 690 kHz using data type Fig 31.	IC1, C808~C814, L802~L804, C825, C834, C819, IC801, R107, R108, C117, C118, C841, C125, C842, DA1, C801~C804, D801,D802, C837, C826, C822, C820, C832, C833, R801~R807

Items	Check Point	Procedure	Check or Replace Parts
(K)* Frequency Offset Confirmation	-	Follow steps 1 to 3 of **(I)**. 4.Confirm that the frequency Offset is < ± 50 kHz.	IC1, C808~C814, L802~L804, C825, C834, C819, IC801, R107, R108, C117, C118, C841, C125, C842, DA1, C801~C804, D801,D802, C837, C826, C822, C820, C832, C833, R801~R807
(L)* Frequency Drift Confirmation	-	Follow steps 1 to 3 of **(I)**. 4.Confirm that the frequency Drift is < ± 35 kHz/ms.	IC1, C808~C814, L802~L804, C825, C834, C819, IC801, R107, R108, C117, C118, C841, C125, C842, DA1, C801~C804, D801,D802, C837, C826, C822, C820, C832, C833, R801~R807
(M)* Sensitivity Receiver Confirmation	-	Follow steps 1 to 3 of **(I)**. 4.Set DECT tester power to -88 dBm. 5.Confirm that the BER is < 1000 ppm.	IC1, C808~C814, L802~L804, C825, C834, C819, IC801, R107, R108, C117, C118, C841, C125, C842, DA1, C801~C804, D801,D802, C837, C826, C822, C820, C832, C833, R801~R807
(N)* Power RAMP Confirmation	-	Follow steps 1 to 3 of **(I)**. 4.Confirm that Power RAMP is matching.	IC1, C808~C814, L802~L804, C825, C834, C819, IC801, R107, R108, C117, C118, C841, C125, C842, DA1, C801~C804, D801,D802, C837, C826, C822, C820, C832, C833, R801~R807
(O) Audio Check and Confirmation	-	1. Link to BASE which is connected to Line Simulator. 2. Set line voltage to 48 V and line current to 40 mA. 3. Input -45 dBm/1KHz to MIC and measure Line output level. 4. Confirm that the level is -8 dBm ± 2 dBm and that the distortion level is < 5% at TEL Line (600 Ω Load). 5. Input -20 dBm/1KHz to Line I/F and measure Receiving level at REV+ and REV-. 6. Confirm that the level is -22 dBm ± 2 dBm and that the distortion level is < 5% at Receiver. (vol = 2)	IC1, R23, C12, D19, D20, C96, C97, R215, R27, RA4, C11, C13, R28, D3, D4, L10, L11, MIC, L9

	Items	Check Point	Procedure	Check or Replace Parts
(P)	SP phone Audio Check and Confirmation	-	1. Link to Base which is connected to Line Simulator. 2. Set line voltage to 48 V and line current to 40 mA. 3. Set the portable off-hook using SP-Phone key. 4. Input -25 dBm/1KHz to Line I/F and measure Receiving level at SP+ and SP-. 5. Confirm that the level is -14 dBm ± 2 dBm and that the distortion level is < 5%. (vol = 3)	IC1, R23, C12, C73, D13, D14, R152, C80, L10, L11, MIC, C11, C13, RA4, R27, R28, R208, R209, C96, C97, R215, C72
(Q)	Charge Pump 2.5V Supply Confirmation	CP2.5V	1. Confirm that the voltage between testpoint and CP2.5V and GND is 2.5V -0.1/ +0.3V.	C52, C53, C49
(R)	Change Pump 4.0V Supply Confirmation	CP4.0V	1. Confirm that the voltage between testpoint CP4.0V and GND is 4.0V I0.2V.	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 portable 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 portable address of EEPROM (0129) from 00 to 01 by **Engineering Mode**.
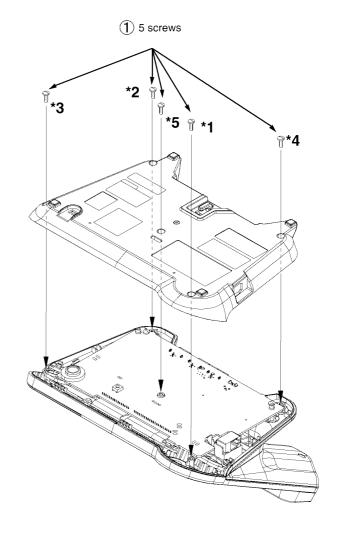
10 Disassembly and Assembly Instructions

10.1. Disassembly Instructions

10.1.1. Base Unit

① 5 screws
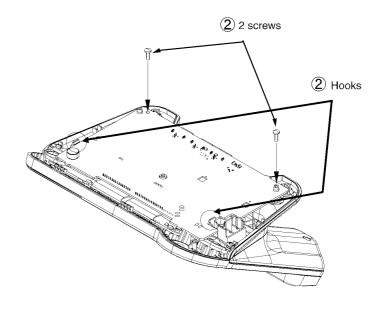
① Remove the 5 screws to remove the cabinet cover.

*1~*5 is the order to remove the screws.

*2
*3
*5 *1
*4
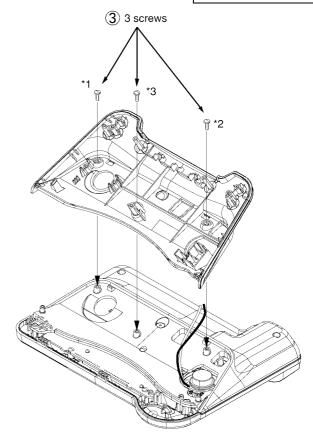
② Remove 2 screws, then unhook the P.C. Board.

② 2 screws

② Hooks

③ 3 screws
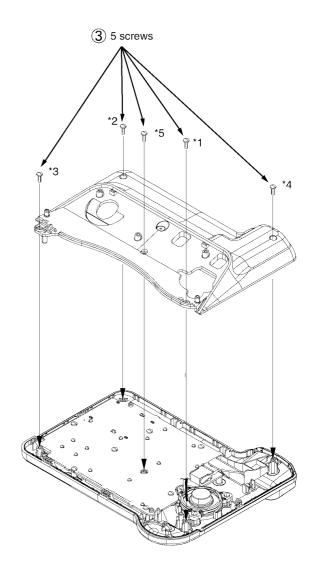
③ Remove the 3 screws to remove
the cabinet cover.

*1~*3 is the order to remove the screws.

*1   *3

*2

③ 5 screws

③ Remove the 5 screws to remove
the cabinet cover.

*1~*5 is the order to remove the screws.

*2   *5   *1

*3

*4

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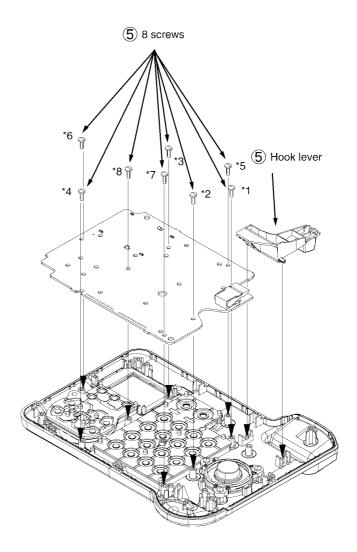
⑤ **Remove the hook lever and the 8 screws to remove the operational P.C. Board.**

*1~*8 is the order to remove the screws.

⑤ 8 screws

*6

⑤ Hook lever

*8   *7   *3   *5

*4   *2   *1
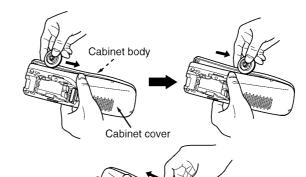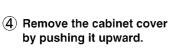
10.1.2. Portable

① **Remove the 2 screws.**

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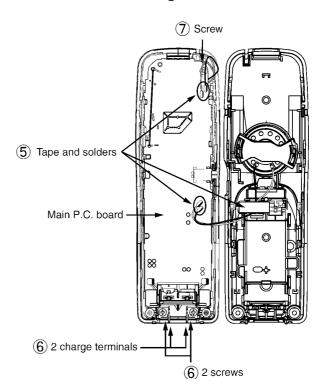
③ **Likewise, open the other side of the cabinet.**

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

Cabinet cover

⑦ Screw
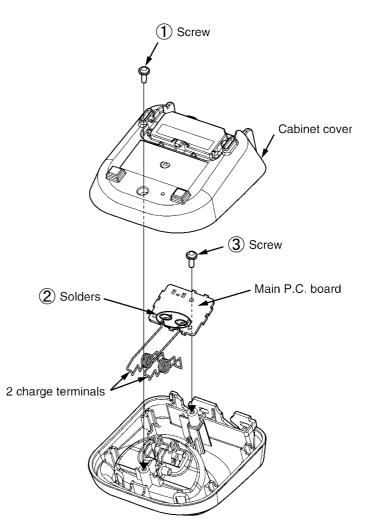
⑤ **Remove the tapes and solders.**

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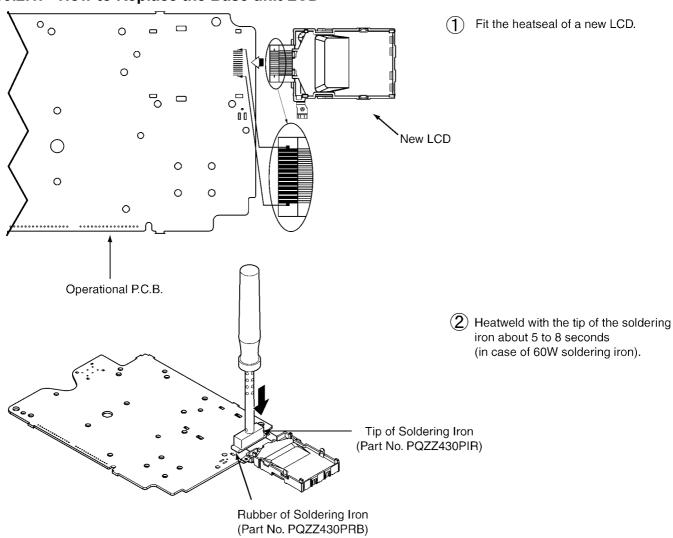
① **Remove the screw to remove the cabinet cover.**
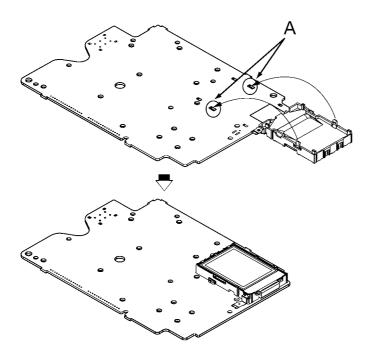
② **Remove the solders to remove the 2 charge terminals.**

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. Assembly Instructions

10.2.1. How to Replace the Base unit LCD

① Fit the heatseal of a new LCD.

New LCD

Operational P.C.B.

② Heatweld with the tip of the soldering iron about 5 to 8 seconds
(in case of 60W soldering iron).

Tip of Soldering Iron
(Part No. PQZZ430PIR)

Rubber of Soldering Iron
(Part No. PQZZ430PRB)

A
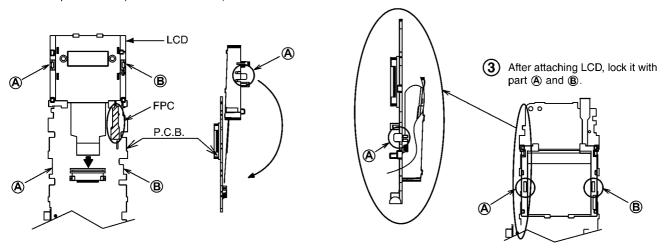
③ Attach the hooks to A.

65
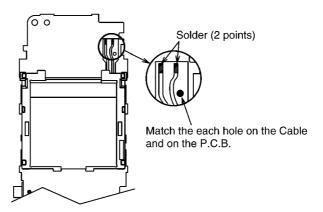
10.2.2. How to Replace the Portable LCD
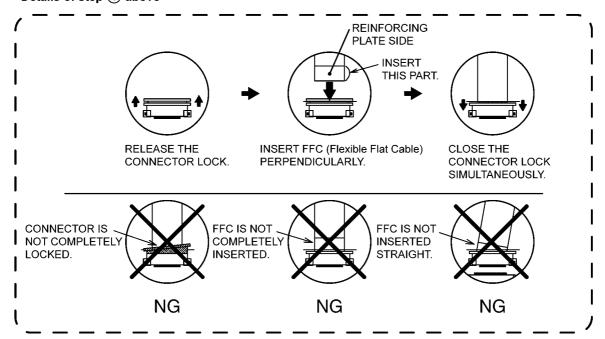
① Attach LCD to P.C.B.
*When attaching the LCD holder,
don't pull the FPC (Flexible Print Circuit).

② Locate the Flat Cable inside
as shown.

③ After attaching LCD, lock it with
part Ⓐ and Ⓑ.

LCD
Ⓐ
Ⓑ
FPC
P.C.B.
Ⓐ
Ⓑ
Ⓐ
Ⓐ
Ⓐ
Ⓑ

④ Solder the narrow Cable to the P.C.B.
*When soldering, don't give the load to the FPC.

Solder (2 points)

Match the each hole on the Cable
and on the P.C.B.

<Details of step ① above>

REINFORCING
PLATE SIDE
INSERT
THIS PART.

RELEASE THE
CONNECTOR LOCK.

INSERT FFC (Flexible Flat Cable)
PERPENDICULARLY.

CLOSE THE
CONNECTOR LOCK
SIMULTANEOUSLY.

CONNECTOR IS
NOT COMPLETELY
LOCKED.

FFC IS NOT
COMPLETELY
INSERTED.

FFC IS NOT
INSERTED
STRAIGHT.

NG   NG   NG

11 Measurements and Adjustments

11.1. The Setting Method of JIG (Base Unit)

11.1.1. Preparation

11.1.1.1. Equipment Required

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

11.1.1.2. JIG and PC

• Serial JIG
  JIG Cable: PQZZ1CD300E*
• PC which runs in DOS mode
• **Batch file CD-ROM** for setting: PNZZTG9391T

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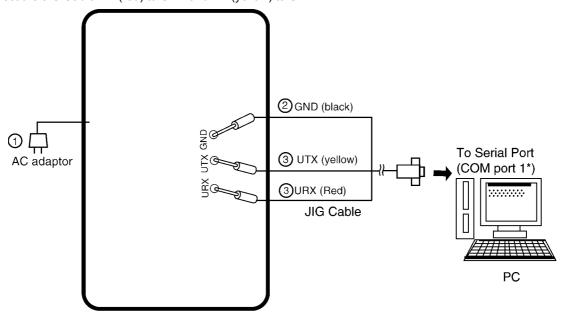
Resistor	Old value (kΩ)	New value (kΩ)
R2	22	3.3
R3	22	3.3
R4	22	4.7
R7	4.7	10

11.1.2. PC Setting

11.1.2.1. 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.

11.1.2.2. Batch file Setting

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.

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: correct setting>

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

<Example: incorrect setting>

```
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.

11.1.2.3. Commands
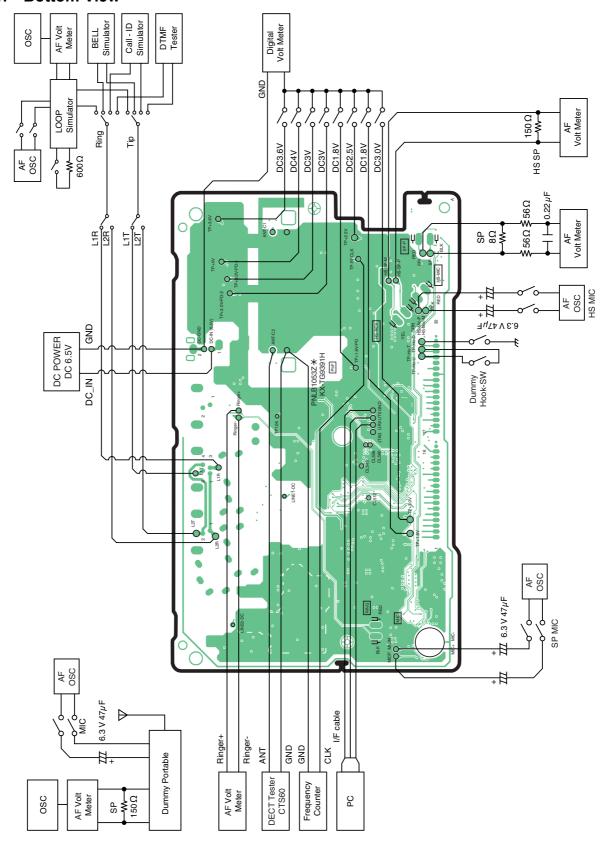
See the table below for frequently used commands.

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.
setfreq	Adjust Frequency of RFIC	Type "setfreq nn".
hookoff1/hookoff2	Off-hook mode on Base Line1 & Line2	Type "hookoff1" for Line1.
hookon1/hookon2	On-hook mode on Base Line1 & Line2	Type "hookon1" for Line1.
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.
bursttx	Burst TX mode	Type "bursttx"
textrx	Test RX mode	Type "testrx"
tph	High TX mode	Type "tph"
tpl	Low TX mode	Type "tpl"

11.2. Adjustment Standard (Base Unit)

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

11.2.1. Bottom View
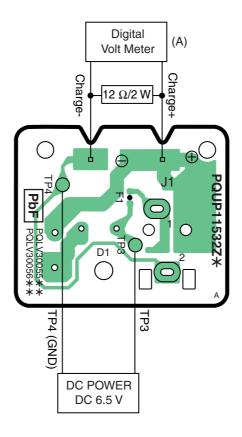
Note:
(**A**) - (**S**) is referred to **Check Point (Base Unit)** (P.52)

11.3. Adjustment Standard (Charger Unit)

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

11.3.1. Bottom View

Note:

(**A**) is referred to **Check Point (Charger Unit)** (P.55)

11.4. The Setting Method of JIG (Portable)

11.4.1. Preparation

11.4.1.1. Equipment Required

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

11.4.1.2. JIG and PC

- Serial JIG
  JIG Cable: PQZZ1CD300E*
- PC which runs in DOS mode.
- **Batch file CD-ROM** for setting: PNZZTG9391T

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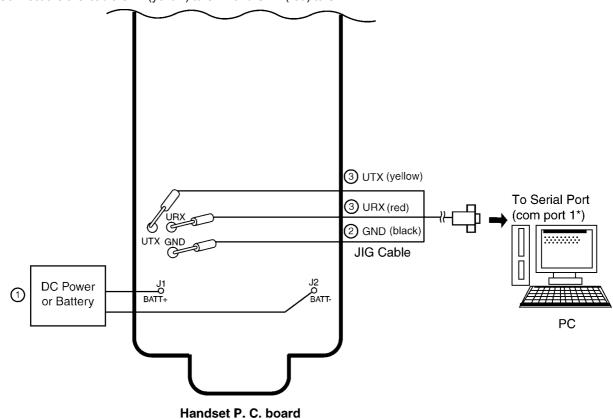
Resistor	Old value (kΩ)	New value (kΩ)
R2	22	3.3
R3	22	3.3
R4	22	4.7
R7	4.7	10

11.4.2. PC Setting

11.4.2.1. 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.

11.4.2.2. Batch file Setting

1. Insert the Batch file CD-ROM into CD-ROM drive and copy PQZZTG***** 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 ¥PQZZTG*****", then press the **Enter** key.

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: correct setting>

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

<Example: incorrect setting>

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

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

11.4.2.3. Commands
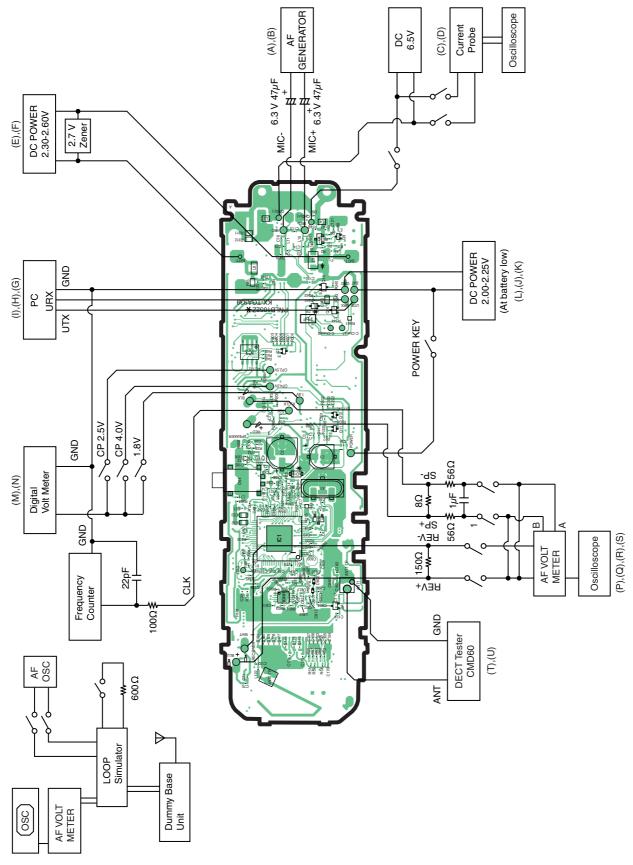
See the table below for frequently used commands.

Command name	Function	Example
rdeeprom	Read the data of FLASH	Type "rdeeprom 00 00 FF", and the data from address "00 00" to "FF" is read out.
readid	Read ID (RFPI)	Type "readid", and the registered ID is read out.
writeid	Write ID (RFPI)	Type "writeid 00 18 E0 0E 98", and the ID "0018 E0 0E 98" is written.
setfreq	Adjust Frequency of RFIC	Type "setfreq nn".
getchk	Read checksum	Type "getchk".
wreeprom	Write the data of FLASH	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.
bursttx	Burst TX mode	Type "bursttx"
textrx	Test RX mode	Type "testrx"
tph	High TX mode	Type "tph"
tpl	Low TX mode	Type "tpl"

11.5. Adjustment Standard (Portable)

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

11.5.1. Component View

Note:

(**A**) - (**R**) is referred to **Check Point (Portable)** (P.56)

11.6. Things to Do after Replacing IC or X'tal

Cautions:

Some of the content on this page may not apply to models from some countries.

11.6.1. Base Unit

Before making the following adjustment, ensure you have carried out **PC Setting** (P.67) in **The Setting Method of JIG (Base Unit)**.

Items		Necessary Adjustment
BBIC (IC501)	Programs for Voice processing, interface for RF and EEPROM	1. Clock adjustment: Refer to Check Point (D). (*1)
EEPROM (IC551)	Adjustment parameter data (country version batch file, default batch file, etc.)	
X'tal (X501)	System clock	

Note:

(*1) Refer to **Check Point (Base Unit)** (P.52)

11.6.2. Portable

Before making the following adjustment, ensure you have carried out **PC Setting** (P.71) in **The Setting Method of JIG (Portable)**.

Items		Necessary Adjustment
BBIC (IC1)	Programs for Voice processing, interface for RF and EEPROM	1. Clock adjustment: Refer to Check Point (F). (*2) 2. 1.8 V setting and battery low detection: Refer to Check Point (A), (B) and (C). (*2).
EEPROM (IC3)	Adjustment parameter data (country version batch file, default batch file, etc.)	
X'tal (X1)	System clock	

Note:

(*1) Refer to **Check Point (Portable)** (P.56)

11.7. RF Specification

11.7.1. 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.52)
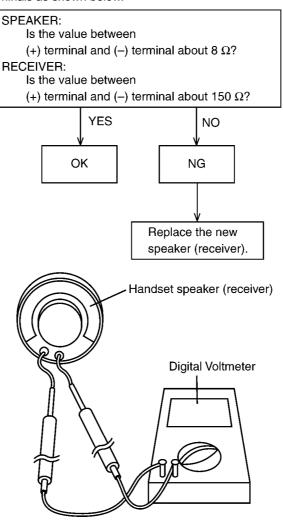
11.7.2. Portable

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

: Refer to **Check Point (Portable) (P.56)

11.8. How to Check the Portable 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 new
speaker (receiver).
```

Handset speaker (receiver)

Digital Voltmeter

11.9. Frequency Table (MHz)

	Ch. (hex)	TX/RX Frequency (MHz)
Channel 0	00	1928.448
Channel 1	01	1926.720
Channel 2	02	1924.992
Channel 3	03	1923.264
Channel 4	04	1921.536
Channel 5	05	1919.808
Channel 6	06	1918.080
Channel 7	07	1916.352
Channel 8	08	1914.624
Channel 9	09	1912.896

12 Schematic Diagram

12.1. For Schematic Diagram

12.1.1. Base Unit (Schematic Diagram (Base Unit_Main))
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.

12.1.2. Portable (Schematic Diagram (Portable))
Notes:
1. DC voltage measurements are taken with an oscilloscope or a tester with a ground.
2. The schematic diagrams may be modified at any time with the development of new technology.

12.1.3. Charger Unit (Schematic Diagram (Charger Unit))
Notes:
1. DC voltage measurements are taken with voltmeter from the negative voltage line.
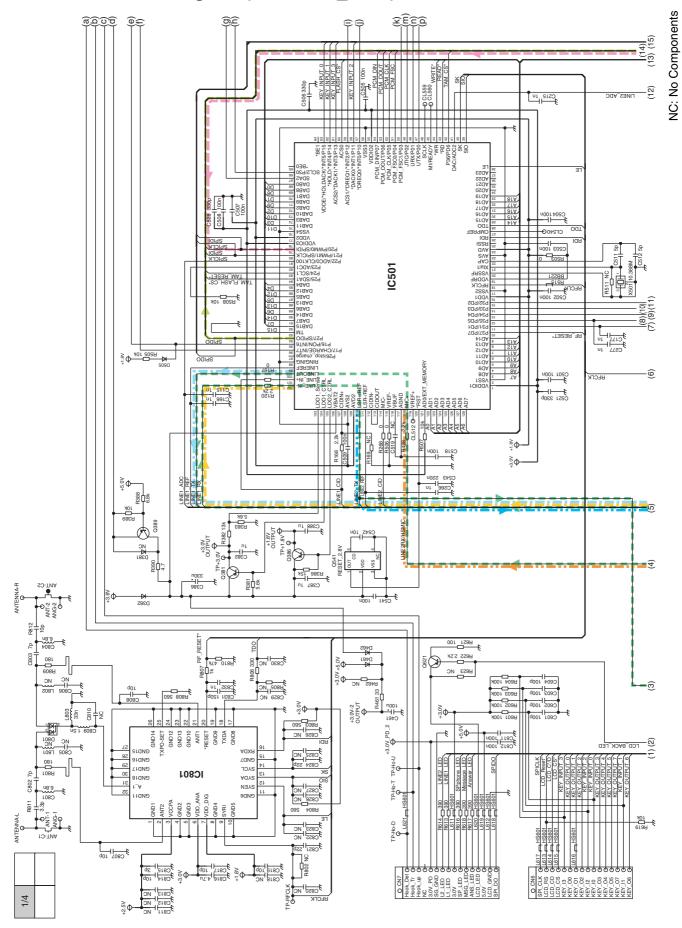
> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

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

Memo

12.2. Schematic Diagram (Base Unit_Main)
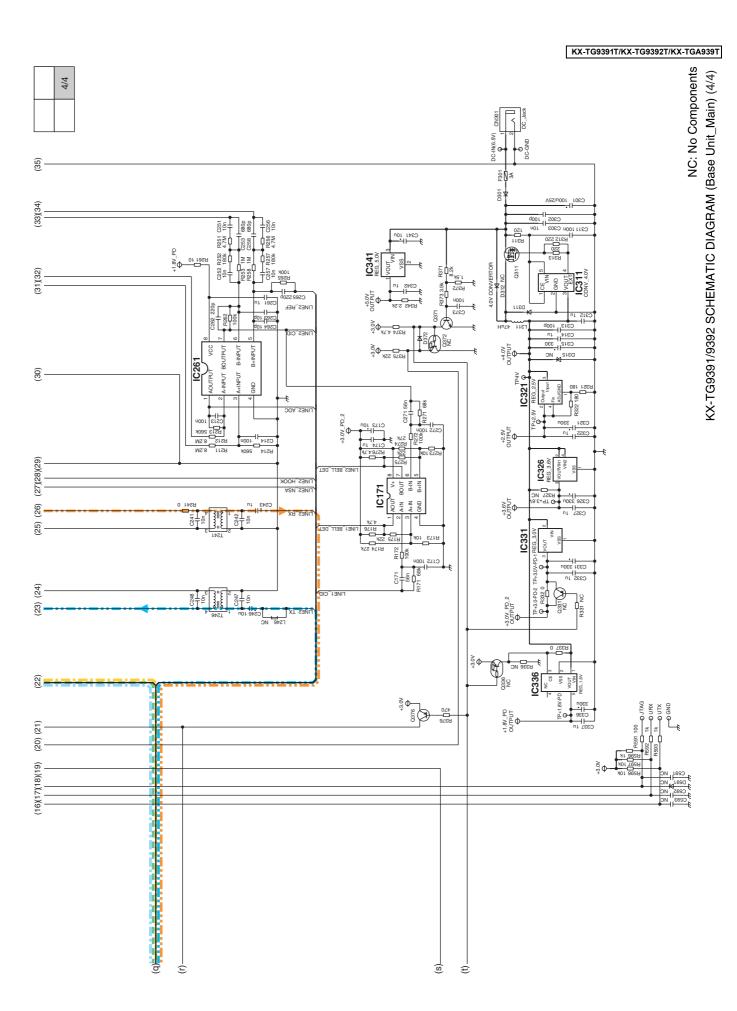
NC: No Components

KX-TG9391/9392 SCHEMATIC DIAGRAM (Base Unit_Main) (1/4)

NC: No Components

KX-TG9391/9392 SCHEMATIC DIAGRAM (Base Unit_Main) (2/4)

L1 RX	
L1 TX	
L2 RX	
L2 TX	
(Powered)	
H/S SP RX	
H/S Mic TX	
H/S (Powered)	
H/S SP RX	
H/S Mic TX	
H/S (Power Failed)	

IC561
8M_FLASH

IC631

IC641

IC761

IC431

IC411

IC701

IC451

IC771

TO HANDSET

MIC

SP+   SP-

2/4

81

NC: No Components

KX-TG9391/9392 SCHEMATIC DIAGRAM (Base Unit_Main) (3/4)

NC: No Components

KX-TG9391/9392 SCHEMATIC DIAGRAM (Base Unit_Main) (4/4)

4/4
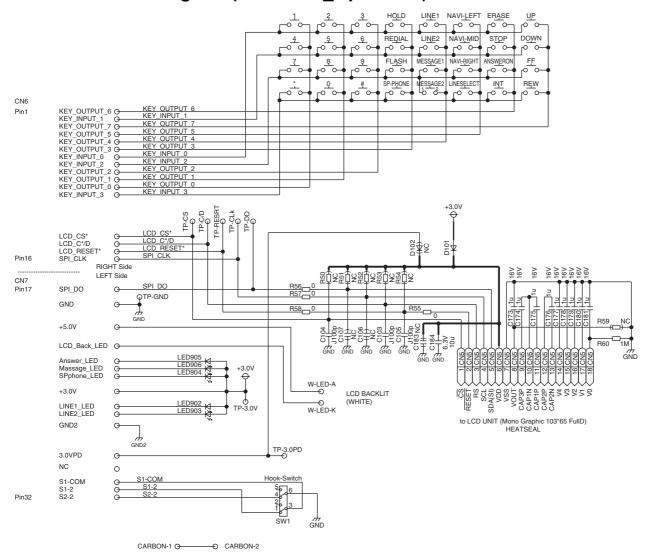
12.3. Schematic Diagram (Base Unit_Operation)

NC: No Components
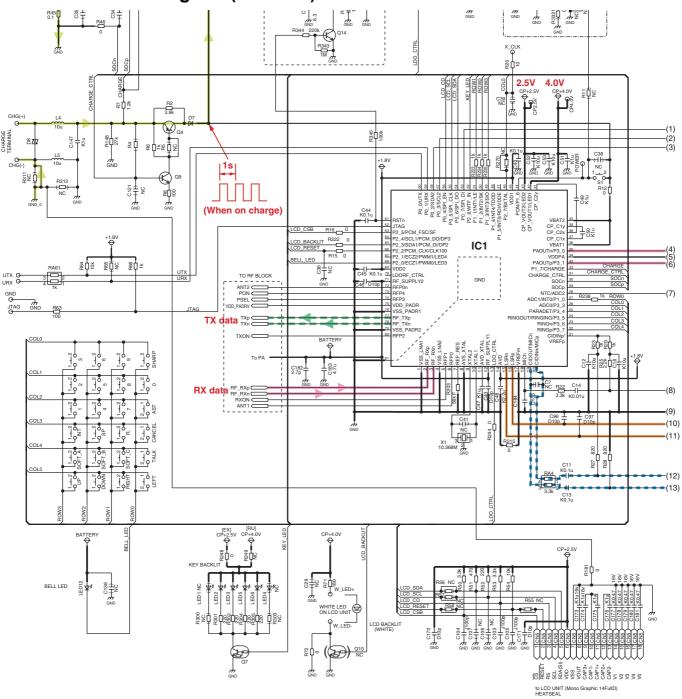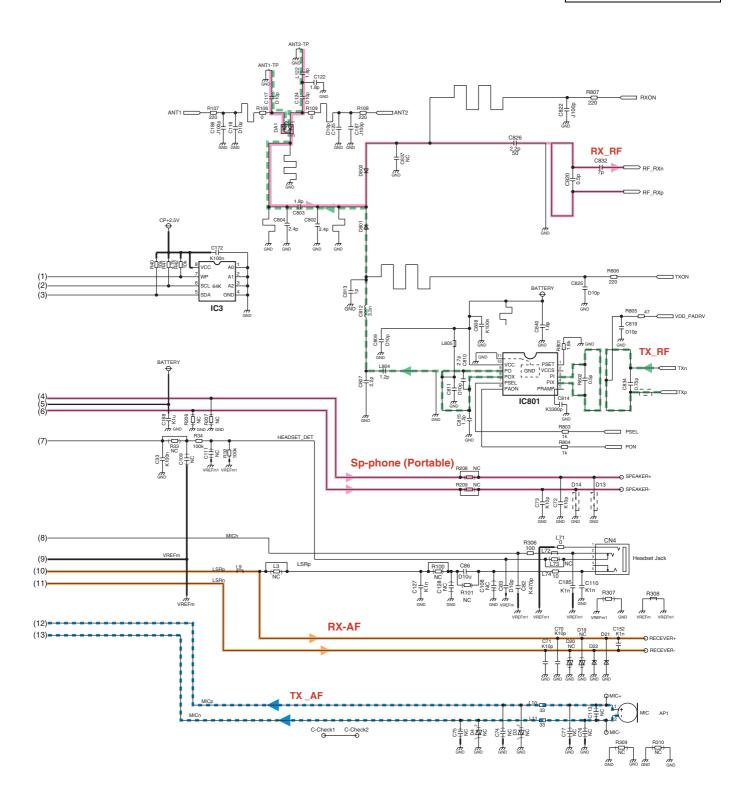
KX-TG9391/9392 SCHEMATIC DIAGRAM (Base Unit_Operation)

Memo

12.4. Schematic Diagram (Portable)

RX_RF

TX_RF

Sp-phone (Portable)

RX-AF

TX _AF
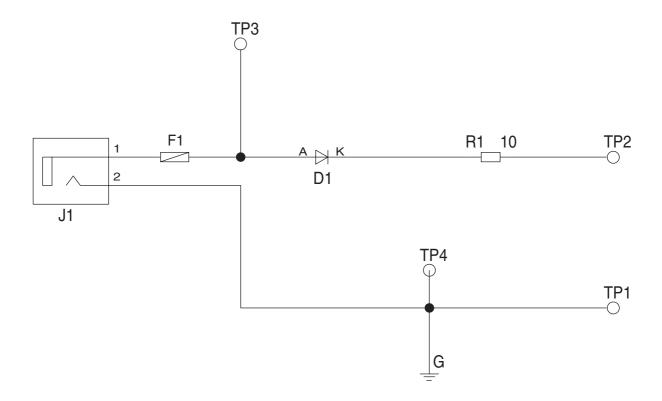
NC: No Components

KX-TGA939 SCHEMATIC DIAGRAM (Portable_Main)

12.5. Schematic Diagram (Charger Unit)

TP3

F1   A   K   R1   10   TP2

1   D1

2

J1

TP4

TP1

G
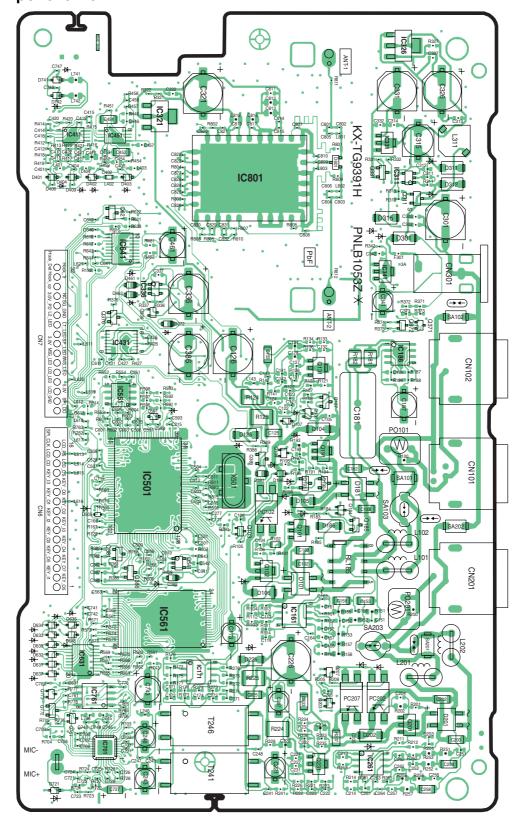
SCHEMATIC DIAGRAM (Charger Unit)

13 Printed Circuit Board
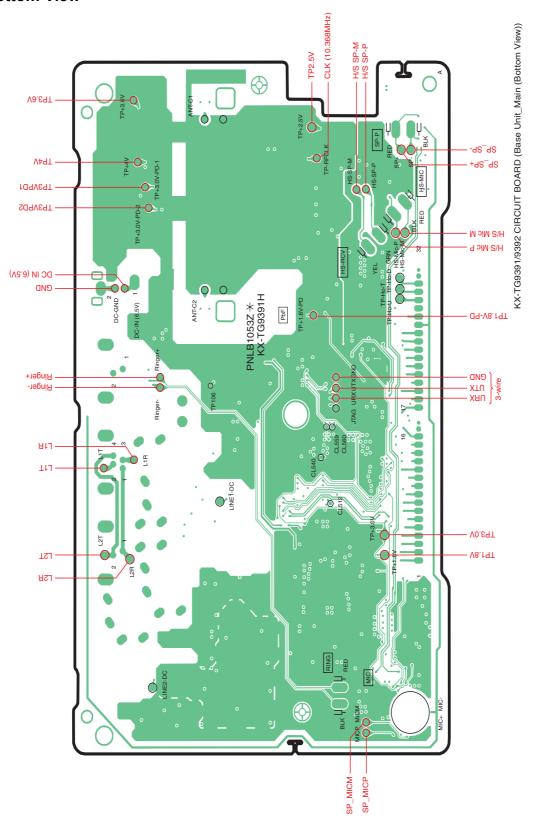
13.1. Circuit Board (Base Unit_Main)

13.1.1. Component View
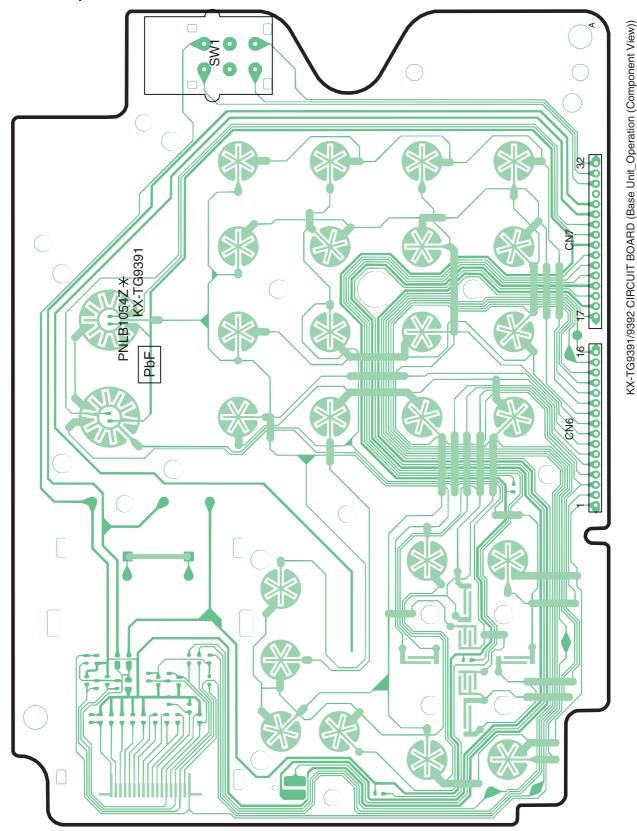
KX-TG9391/9392 CIRCUIT BOARD (Base Unit_Main (Component View))

13.1.2.   Bottom View

KX-TG9391/9392 CIRCUIT BOARD (Base Unit_Main (Bottom View))

TP3.6V

TP2.5V

CLK (10.368MHz)

H/S SP-M

H/S SP-P

TP4V

TP3VPD1

TP3VPD2

DC IN (6.5V)

GND

SP-SP-

SP-SP+

H/S Mic M

H/S Mic P

TP1.8V-PD

GND

UTX

URX

3-wire

TP3.0V

TP1.8V

SP_MICM

SP_MICP

PNLB1053Z
KX-TG9391H

PbF

13.2. Circuit Board (Base Unit_Operation)

13.2.1. Component View

KX-TG9391/9392 CIRCUIT BOARD (Base Unit_Operation (Component View))
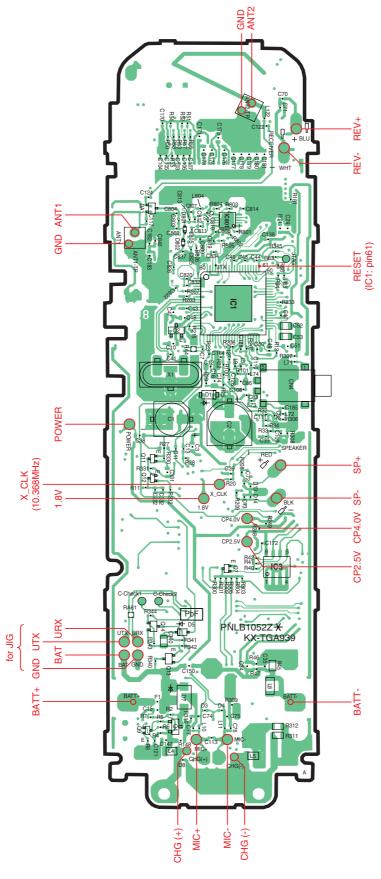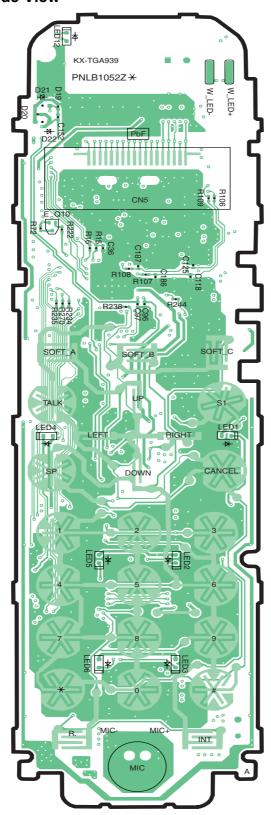
13.3. Circuit Board (Portable)

13.3.1. Component View

KX-TGA939 CIRCUIT BOARD (Portable_Main (Component View))
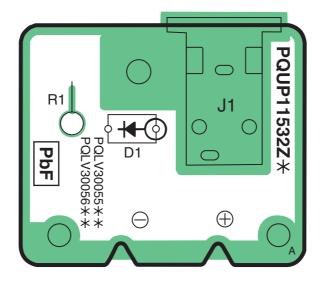
13.3.2. Flow Solder Side View

KX-TGA939 CIRCUIT BOARD (Portable_Main (Bottom View))
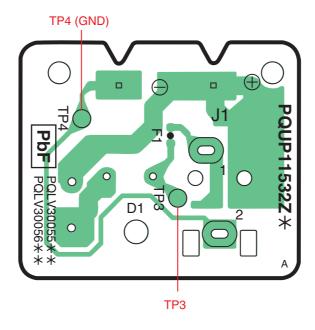
13.4. Circuit Board (Charger Unit)

13.4.1. Component View

CIRCUIT BOARD (Charger unit (Component View))

13.4.2. Bottom Side View

CIRCUIT BOARD (Charger unit (Bottom View))

14 Appendix Information of Schematic Diagram

14.1. CPU Data (Base Unit)

14.1.1. IC501 (BBIC)

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
1	VDDIO	-	VDDIO	-	-
2	VSS	-	VSS	-	-
3	AD8	D_O	AD8	O_0/1	O_0/1
4	AD9	D_O	AD9	O_0/1	O_0/1
5	AD10	D_O	AD10	O_0/1	O_0/1
6	AD11	D_O	AD11	O_0/1	O_0/1
7	AD12	D_O	AD12	O_0/1	O_0/1
8	AD13	D_O	AD13	O_0/1	O_0/1
9	AD14	D_O	AD14	O_0/1	O_0/1
10	P3[7]/PD7	D_O	P3[7]	O_0/1	O-Hi-Z
11	P3[1]/PD1	D_I	P3[1]	I(Digital)	O-Hi-Z
12	P3[5]/PD5	D_I	P3[5]	I(Digital)	O-Hi-Z
13	P3[4]/PD4	D_O	P3[4]	O_0/1	O-Hi-Z
14	P3[3]/PD3	D_I	P3[3]	I(Digital)	O-Hi-Z
15	P3[2]/PD2	D_O	P3[2]	O_0/1	O-Hi-Z
16	VDD	-	VDD	-	-
17	VSS	-	VSS	-	-
18	RFCLK	D_O	RFCLK	O_0/1	O-0
19	VDDRF	-	VDDRF	-	-
20	VSSRF	-	VSSRF	-	-
21	Xtal1	A_I	Xtal1	-	I
22	CAP	A_I	CAP	-	I
23	AVS	-	AVS	-	-
24	AVD	-	AVD	-	-
25	RSSI	I	RSSI	-	I
26	RDI	D_I	RDI	I(Digital)	I(dig)
27	CMPREF	A_I	CMPREF	-	I
28	TDO	DO/AO	TDO	O(Analog)	Hi-Z(dig)
29	AD15	D_O	AD15	O_0/1	O-0/1
30	AD16	D_O	AD16	O_0/1	O-0/1
31	AD17	D_O	AD17	O_0/1	O-0/1
32	AD18	D_O	AD18	O_0/1	O-0/1
33	AD19	D_O	AD19	O_0/1	O-0/1
34	AD20	D_O	AD20	-	O-0/1
35	AD21	D_O	AD21	-	O-0/1
36	AD22	D_O	AD22	-	O-0/1
37	AD23	D_O	AD23	-	O-0/1
38	LE	D_O	LE	O_0/1	O-0
39	SIO	D_O	SIO	I/O(Dig)	O-Hi-Z
40	SK	D_O	SK	O_0/1	O-0
41	DAC/ADC2	A_I	ADC2	I(Ana)	I
42	P3[6]/PD6	D_O	P3[6]	O_0/1	O-Hi-Z
43	RDN	D_O	RDN	O_0/1	O-1
44	WRN	D_O	WRN	O_0/1	O-1
45	MI/READY	D_IPU	READY	I_PU	I-PU
46	SCLK	D_O	SCLK	O_0/1	O-1
47	UTX/P0[0]	D_O	UTX	O_0/1	I-PU
48	URX/P0[1]	D_I	URX	I(Digital)	I
49	JTIO/P0[2]	D_IPU	JTIO	I/O(Dig)	I-PU
50	PCM_FSC1/P0[3]	D_I/O	P0[3]	O_0/1	I-PU
51	PCM_FSC0/P0[4]	D_I/O	PCM_FSC0	O_0/1	I-PU
52	PCM_CLK/P0[5]	D_I/O	PCM_CLK	O_0/1	I-PU
53	PCM_DOUT/P0[6]	D_I/O	PCM_DOUT	O_0/1	I-PU
54	PCM_DIN/P0[7]	D_I/O	PCM_DIN	I(Digital)	I-PU
55	VDDIO	-	VDDIO	-	-
56	VSS	-	VSS	-	-
57	DREQ0n/INT0n/P1[0]	D_O	P1[0]	O_0/1	I-PU
58	DACK0n/INT1n/P1[1]	D_I	P1[1]	I(Digital)	I-PU
59	ACS1/DREQ1n/INT2n/P1[2]	D_O	ACS1	O_0/1	I-PU

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
60	ACS0	D_O	ACS0	O_0/1	O-1
61	ACS2/DACK1n/INT3n/P1[3]	D_O	P1[3]	I(Digital)	I-PU
62	HOLDn/INT4n/P1[4]	D_I	P1[4]	I(Dig)	I-PU
63	VDDE/HOLDACKn/INT5n/P1[5]	D_I/O	P1[5]	I(Dig)	O-1
64	BE1n	D_O	BE1n	O_0/1	O-1
65	BE0n	D_O	BE0n	O_0/1	O-1
66	SCL2/P3[0]	D_I/O	SCL2	O_0/1	O-1
67	SDA2	D_I/O	SDA2	I/O(Dig)	I
68	DAB0	D_I/O	D0	O_0/1	O-1
69	DAB8	D_I/O	D8	O_0/1	O-1
70	DAB1	D_I/O	D1	O_0/1	O-1
71	DAB9	D_I/O	D9	O_0/1	O-1
72	DAB2	D_I/O	D2	O_0/1	O-1
73	DAB10	D_I/O	D10	O_0/1	O-1
74	DAB3	D_I/O	D3	O_0/1	O-1
75	DAB11	D_I/O	D11	O_0/1	O-1
76	VSS	-	VSS	-	-
77	VDD	-	VDD	-	-
78	VDDIO	-	VDDIO	-	-
79	P2[0]/PWM0/SPIDI	D_I	SPIDI	I(Dig)	I
80	P2[1]/PWM1/SPICLK	D_I/O	SPICLK	O_0/1	I
81	P2[2]/ADC0/CLK100	A_I	ADC0	I(Ana)	I
82	P2[3]/ADC1	D_O	Reset_Val	O_0	I
83	P2[4]/SCL1	D_O	P2[4]	O_0/1	I
84	P2[5]/SDA1	D_O	P2[5]	O_0/1	I
85	DAB4	D_I/O	DAB4	O_0/1	O-1
86	DAB12	D_I/O	DAB12	O_0/1	O-1
87	DAB5	D_I/O	DAB5	O_0/1	O-1
88	DAB13	D_I/O	DAB13	O_0/1	O-1
89	DAB6	D_I/O	DAB6	O_0/1	O-1
90	DAB14	D_I/O	DAB14	O_0/1	O-1
91	DAB7	D_I/O	DAB7	O_0/1	O-1
92	DAB15	D_I/O	DAB15	O_0/1	O-1
93	TM	D_I/O	TM	O_0	O-0
94	P2[7]/DC_CTRL/SPIDO	D_O	SPIDO	O_0/1	O-Hi-Z
95	P1[6]/PON/INT6	D_O	P1[6]	O_0/1	I-PD(160k pull down)
96	P1[7]/CHARTGE/INT7	A_I	INT7	A_I(160k_PD)	I-PD(160k pull down)
97	P2[6]/stop_charge	D_O	P2[6]	O_0	O-0
98	VBAT3/RINGING	A_I	VBAT3	I(Dig)	I
99	LINEREF	A_O	LINEREF	O	O
100	LINEOUT	A_O	LINEOUT	O	O
101	LINEIN+	A_I	LINEIN+	I	I
102	LINEIN-	A_I	LINEIN-	I	I
103	LDO1_Sense	A_I	LDO1_Sense	I	I
104	LDO1_CTRL	A_I	LDO1_CTRL	O	O-1
105	LDO2_CTRL	A_I	LDO2_CTRL	O	O-0
106	VBAT2	A_I	VBAT2	I	I
107	CIDIN+	A_I	CIDIN+	I	I
108	AVS2	A_O	AVS2	-	-
109	AVD2	A_O	AVD2	-	-
110	LSR+/REF	A_O	LSR+	O	O
111	LSR-/REF	A_I	LSR-	O	O
112	LSR_HS/CIDIN-	A_I	/CIDIN-	I	I
113	VREF_HS/CIDOUT	A_O	CIDOUT	I	O
114	MIC-	A_I	MIC-	I	I
115	VREF-	A_O	VREF-	-	-
116	VBUF	A_O	VBUF	HIGH_IMP	O
117	AGND	A_O	AGND	HIGH_IMP	O
118	MIC+	A_I	MIC+	HIGH_IMP	I
119	VREF+	O	VREF+	HIGH_IMP	I
120	RSTn	O	RSTn	I	I-PU(80k pull up)
121	AD0/EXT_MEMORY	I	EXT_MEMORY	I(Dig)	I_PD
122	AD1	D_O	AD1	O_0/1	O-0/1
123	AD2	D_O	AD2	O_0/1	O-0/1
124	AD3	D_O	AD3	O_0/1	O-0/1
125	AD4	D_O	AD4	O_0/1	O-0/1
126	AD5	D_O	AD5	O_0/1	O-0/1

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
127	AD6	D_O	AD6	O_0/1	O-0/1
128	AD7	D_O	AD7	O_0/1	O-0/1

14.2. CPU Data (Portable)

14.2.1. IC1 (BBIC)

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
1	VSS_LNA1	-	GND	-	-
2	RF_RXp	A.I	RF_RXp	A.I	A.I
3	RF_RXn	A.I	RF_RXn	A.I	A.I
4	VSS_LNA2	-	GND	-	-
5	RFP1	D.O	RXON	O_0/1	Hi-Z
6	RFP0	D.O	ANT1	O_0/1	Hi-Z
7	REF_RES	A.O	REF_RES	A.O	A.O
8	AVS_XTAL	-	GND	-	-
9	XTAL2	A.I	XTAL2	A.I	A.I
10	XTAL1	A.I	XTAL1	A.I	A.I
11	AVD_XTAL	-	AVD_XTAL	-	-
12	RF_SUPPLY1	-	RF_SUPPLY1	-	-
13	LDO_CTRL	A.O	LDO_CTRL	A.O	O-1
14	AVD	-	+1.8V	-	-
15	LSRn	A.O	LSRn	A.O	A.O
16	LSRp	A.O	LSRp	A.O	A.O
17	VREFm	-	GND	-	-
18	MICh	A.I	MICh	A.I	A.I
19	CIDOUT/MICn	A.I	MICn	A.I	A.I
20	CIDINn/MICp	A.I	MICp	A.I	A.I
21	CIDINp/VREFp	A.O	VREFp	A.O	A.I
22	RINGp/P3_7	D.O	COL4	O_0/1	A.I
23	RINGn/P3_6	D.O	COL3	O_0/1	A.I
24	RINGOUT/RINGING/P3_5	D.O	COL2	O_0/1	A.I
25	PARADET/P3_4	D.O	COL1	O_0/1	A.I
26	ADC0/P3_3	D.O	COL0	O_0/1	A.I
27	ADC1/INT0/P1_0	D.I	ROW0	I_0/1	I-PU
28	NTC/ADC2	A.I	ADC2	I_0	A.I
29	SOCp	A.I	SOCp	A.I	A.I
30	SOCn	A.I	SOCn	A.I	A.I
31	CHARGE_CTRL	A.O	CHARGE_CTRL	A.O	O-0
32	P1_7/CHARGE	A.I	CHARGE	A.I	I-PD
33	PAOUTp/P3_1	A.O	PAOUTp	A.O	O-0
34	VDDPA	-	VDDPA	-	-
35	PAOUTn/P3_0	A.O	PAOUTn	A.O	O-0
36	VBAT1	-	VBAT1	-	-
37	CP_C1x	A.I/O	CP_C1x	A.I/O	A.I
38	CP_C2x	A.I/O	CP_C2x	A.I/O	A.I
39	CP_C1y	A.I/O	CP_C1y	A.I/O	A.I
40	VBAT2	-	VBAT2	-	-
41	CP_C2y	A.I/O	CP_C2y	A.I/O	A.I
42	CP_VOUT1/LED1	A.O	CP_VOUT1	A.O	A.I
43	CP_VOUT2/LED2	A.O	CP_VOUT2	A.O	A.I
44	PON/P1_6	A.I	PON	A.I	I-PD
45	VDD1	-	+1.8V	-	-
46	P2_7/BXTAL	D.O	COL5	O_0/1	I-PU
47	P1_5/INT5/RDI/VDDE	D.O	N.C.	O_0	O-1
48	P1_4/INT4/TDOD	D.O	N.C.	O_0	I-PD
49	P1_3/INT3/SIO	D.I	ROW3	I_0/1	I-PD
50	P1_2/INT2/SK	D.I	ROW2	I_0/1	I-PU
51	P1_1/INT1/LE	D.I	ROW1	I_0/1	I-PU
52	P2_6/WTF_IN	D.O	KEY_LED	O_0/1	I-PU
53	P0_7/SPI_DI	D.O	EEPROM_WP	O_0/1	I-PU
54	P0_6/SPI_DO	D.O	LCD_SDA	O_0/1	I-PU
55	P0_5/SPI_CLK	D.O	LCD_SCL	O_0/1	I-PU
56	P0_4/SPI_EN	D.O	LCD_CD	O_0/1	I-PU
57	P0_3/SCL2	D.O	SCL	O_0/1	I-PU
58	P0_2/SDA2	D.I/O	SDA	I/O_0/1	I-PU
59	P0_1/URX	D.I	URX	I_0/1	I-PU
60	P0_0/UTX	D.O	UTX	O_0/1	I-PU
61	RSTn	D.O	RSTn	O_0/1	I-PU
62	JTAG	D.I/O	JTAG	I/O_0/1	I-PU

Pin No.	Description	I/O	Connection	at Normal mode	at Reset mode
63	P2_5/PCM_FSC/SF	D.O	LCD_CSB	O_0/1	I-PU
64	P2_4/SCL1/PCM_DO/DP3	D.O	N.C.	O_0	I-PU
65	P2_3/SDA1/PCM_DI/DP2	D.O	LCD_BACKLIT	O_0	I-PU
66	P2_2/PCM_CLK/CLK100	D.O	LCD_RESET	O_0/1	I-PU
67	P2_1/ECZ2/PWM1/LED4	D.I	N.C.	O_0	A.I
68	P2_0/ECZ1/PWM0/LED3	D.O	BELL_LED	A.I	A.I
69	VDD2	-	+1.8V	-	-
70	LDORF_CTRL	A.I	N.C.	A.I	A.I
71	RF_SUPPLY2	-	RF_SUPPLY2	-	-
72	RF0n	D.O	ANT2	O_0/1	Hi-Z
73	RFP4	D.O	PON	O_0/1	Hi-Z
74	RFP3	D.O	PSEL	O_0/1	Hi-Z
75	VDD_PADR	A.O	VDD_PADRV	A.O	A.O
76	VSS_PADR1	-	GND	-	-
77	RF_TXp	A.O	TXp	A.O	A.O
78	RF_TXn	A.O	TXn	A.O	A.O
79	VSS_PADR2	-	GND	-	-
80	RFP2	D.O	TXON	O_0/1	Hi-Z
81	GND	-	GND	-	-

14.3. 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.

14.3.1. 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).
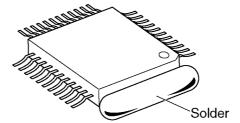
14.3.2. How to Remove the IC
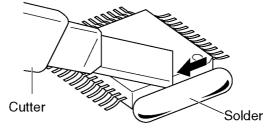
1. Put plenty of solder on the IC pins so that the pins can be completely covered.
   Note:
     If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.
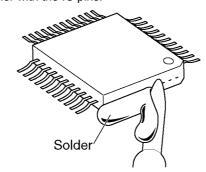
Solder

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

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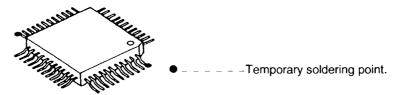
3. While the solder melts, remove it together with the IC pins.

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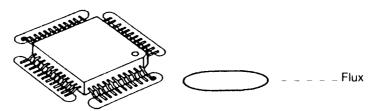
When you attach a new IC to the board, remove all solder left on the board with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

14.3.3. How to Install the IC
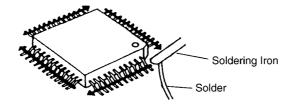
1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.

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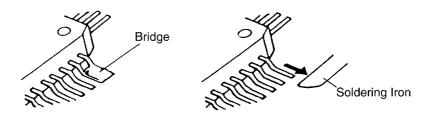
3. Solder the pins, sliding the soldering iron in the direction of the arrow.

Soldering Iron

Solder

14.3.4. 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

101

14.4. How to Replace the LLP (Leadless Leadframe Package) IC

14.4.1. 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)
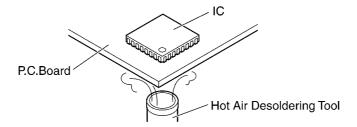
14.4.2. Caution

• 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.

14.4.3. How to Remove the IC
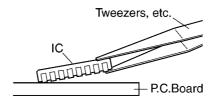
1. Heat the IC with a hot air desoldering tool through the P.C.Board.
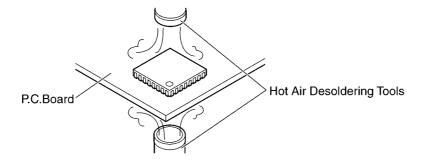
2. Pick up the IC with tweezers, etc. when the solder is melted completely.
   Note:
   • Be careful not to touch the peripheral parts with tweezers, etc. They are unstable.
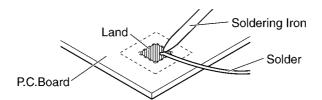
When it is hard to melt the solder completely, heat it with a hot air desoldering tool through the IC besides through the P.C.Board.
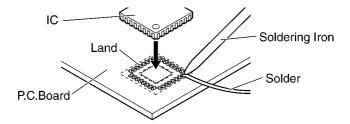
3. After removing the IC, clean the P.C.Board of residual solder.

14.4.4. How to Install the IC
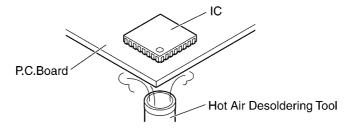
1. Place the solder a little on the land where the radiation GND pad on IC bottom is to be attached.

2. Place the solder a little on the land where IC pins are to be attached, then place the IC.
   Note:
   • When placing the IC, the positioning should be done very carefully.
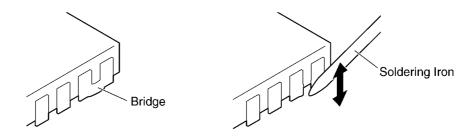
3. Heat the IC with a hot air desoldering tool through the P.C.Board until the solder on IC bottom is melted.
   Note:
   • Be sure to place it precisely, controlling the air volume of the hot air desoldering tool.

4. After soldering, confirm there are no short and open circuits with visual inspection.
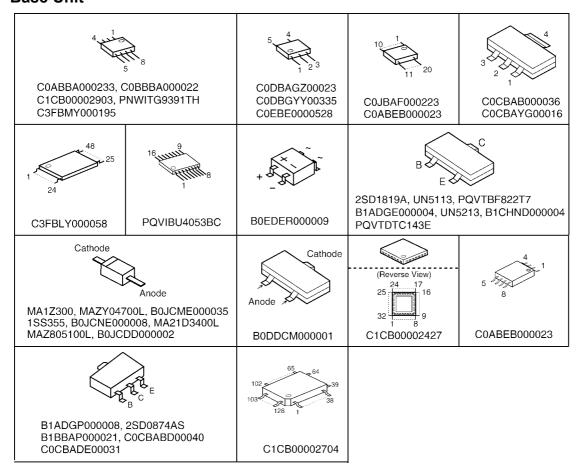
14.4.5. How to Remove a Solder Bridge

When a Solder Bridge is found after soldering the bottom of the IC, remove it with a soldering iron.
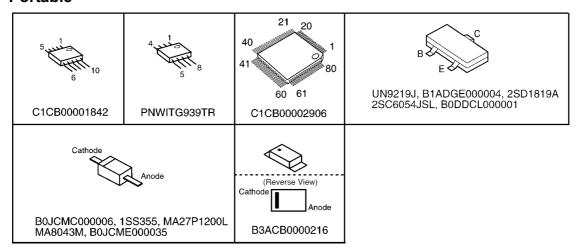
14.5. Terminal Guide of the ICs, Transistors and Diodes

14.5.1. Base Unit

C0ABBA000233, C0BBBA000022 C1CB00002903, PNWITG9391TH C3FBMY000195	C0DBAGZ00023 C0DBGYY00335 C0EBE0000528	C0JBAF000223 C0ABEB000023	C0CBAB000036 C0CBAYG00016

C3FBLY000058	PQVIBU4053BC	B0EDER000009	2SD1819A, UN5113, PQVTBF822T7 B1ADGE000004, UN5213, B1CHND000004 PQVTDTC143E

MA1Z300, MAZY04700L, B0JCME000035 1SS355, B0JCNE000008, MA21D3400L MAZ805100L, B0JCDD000002	B0DDCM000001	C1CB00002427	C0ABEB000023

B1ADGP000008, 2SD0874AS B1BBAP000021, C0CBABD00040 C0CBADE00031	C1CB00002704

14.5.2. Portable

C1CB00001842	PNWITG939TR	C1CB00002906	UN9219J, B1ADGE000004, 2SD1819A 2SC6054JSL, B0DDCL000001

B0JCMC000006, 1SS355, MA27P1200L MA8043M, B0JCME000035	B3ACB0000216

14.5.3. Charger

B0JAME000095

15 Exploded View and Replacement Parts List

15.1. Cabinet and Electrical Parts (Base Unit)

Ref.No.	Figure
A	ϕ2.6 × 8 mm
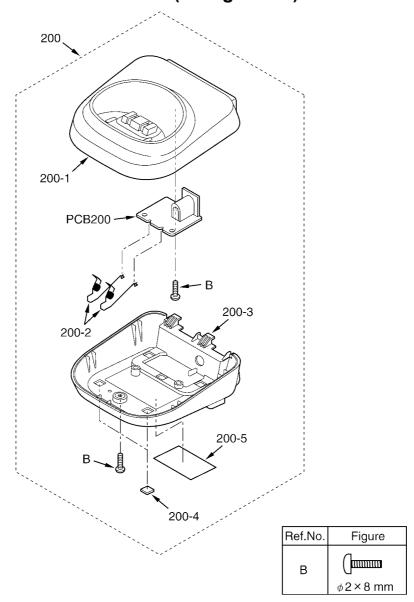
15.2. Cabinet and Electrical Parts (Portable)

Ref.No.	Figure
B	⌀2 × 8 mm
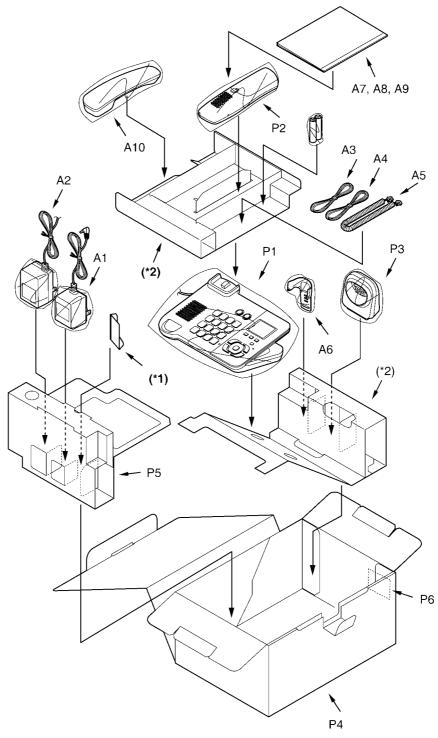
Note:

(*1) This cable is fixed by soldering. Refer to **How to Replace the Portable LCD** (P.66).

(*2) Attach the spacer (No. 127) to the exact location described above.

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

15.3. Cabinet and Electrical Parts (Charger Unit)

200
200-1
PCB200
B
200-2
200-3
200-5
B
200-4

Ref.No.	Figure
B	$\phi 2 \times 8$ mm

15.4. Accessories and Packing Materials
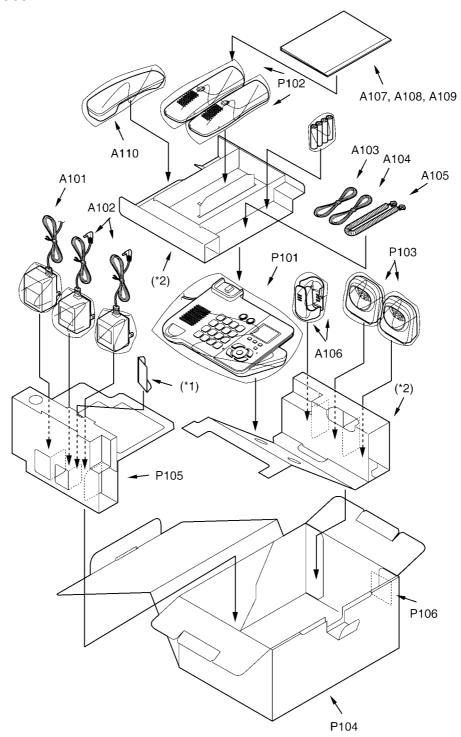
15.4.1. KX-TG9391T

Note:
(*1) This pad is a piece of Ref No. P4 (GIFT BOX).
(*2) These pads are pieces of Ref No. P5 (CUSHION).
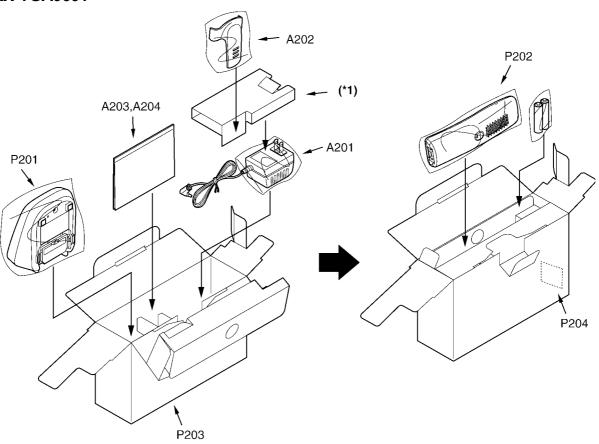
15.4.2. KX-TG9392T

Note:
(*1) This pad is a piece of Ref No. P104 (GIFT BOX).
(*2) These pads are pieces of Ref No. P105 (CUSHION).

15.4.3. KX-TGA939T

A202

(*1)

A203,A204

P202

P201

A201

P203

P204

Note:
 (*1) These pads are pieces of Ref No. P203 (GIFT BOX).

15.5. Replacement Parts 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=1000Ω, M=1000kΩ
   All capacitors are in MICRO FARADS (μF) p=μμF
   *Type & Wattage of Resistor

Type

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

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage Of Capacitor

Type

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

Voltage

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

15.5.1. Base Unit

15.5.1.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	1	PNGP1034Y1	PANEL	AS-HB
	2	PNHS1055Z	TAPE, DOUBLESIDED	
	3	PNKM1054Z1	UPPER CABINET	PS-HB
	4	PNBH1007Z1	HOOKLEVER	ABS-HB
	5	L0AA04A00028	SPEAKER	
	6	PQHR11082Z	GUIDE, SPEAKER	POM-HB
	7	PNBC1002Z2	BUTTON, NAVIGATOR	ABS-HB
	8	PNBC1004Y2	BUTTON, ANSWER ON	ABS-HB
	9	PNBC1005Y2	BUTTON, ERASE	ABS-HB
	10	PNBC1006Y2	BUTTON, STOP	ABS-HB
	11	PNBC1007Y2	BUTTON, LOCATOR	ABS-HB

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	12	PNHR1001Z	GUIDE, BUTTON	PS-HB
	13	PNBC1001Z2	BUTTON, MESSAGE	AS-HB
	14	PNJK1033Z	KEYBOARD SWITCH	
	15	PNHR1063Z	GUIDE, BUTTON	PS-HB
	16	PNBC1246Z1	BUTTON, LINE1	AS-HB
	17	PNBC1247Z1	BUTTON, LINE2	AS-HB
	18	PNHR1066Z	PLASTIC PARTS, LENS	PS-HB
	19	PNBX1028Z1	RUBBER, SWITCH	PMMA-HB
	20	PNJK1032Z	KEYBOARD SWITCH	
	21	PNHS1030Z	LCD, CUSHION	
	22	PNKF1040Z1	CABINET COVER	PS-HB
	23	PNKM1053Z1	CABINET BODY	PS-HB
	24	L0DDFD000002	SPEAKER	
	25	PQMG10025W	RUBBER PARTS, MIC COVER	
	26	PNKF1039Z1	CABINET COVER	PS-HB
	27	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	
	28	PQXDZLDRS1	MAGNET ELECTRIC TRANSCUCER, SECURITY TAG	
	29	PQSH2B105Z	PUSH SWITCH	S
	30	PQHG10734Z	CUSHION	
	31	PQJJ1T030W	JACK, SOCKET	

15.5.1.2. Main P.C.Board Parts

Note:
(*1) Whren replacing IC551, IC561, IC761 or X501, data needs to be written to them with PNZZTG9391T. Refer to **Base Unit** (P.74) of **Things to Do after Replacing IC or X'tal** (P.74).

(*2) When replacing IC701, refer to **How to Replace the LLP (Leadless Leadframe Package) IC** (P.102).

(*3) IC561 and IC761 need software downloading. Refer to **Base Unit** (P.74) of **Things to Do after Replacing IC or X'tal**.

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB1	PNWPTG9391TH	MAIN P.C.BOARD ASS'Y (RTL)	
			(ICs)	
	IC161	C0ABBA000233	IC	
	IC171	C0BBBA000022	IC	
	IC186	C1CB00002903	IC	
	IC261	C0ABBA000233	IC	
	IC311	C0DBAGZ00023	IC	S
	IC321	C0CBAYG00016	IC	
	IC326	C0CBABD00036	IC	
	IC331	C0CBABD00040	IC	
	IC336	C0DBGYY00335	IC	
	IC341	C0CBADE00031	IC	
	IC411	C0ABEB000023	IC	
	IC431	PQVIBU4053BC	IC	
	IC451	C0ABEB000023	IC	
	IC501	C1CB00002704	IC	
	IC551	PNWITG9391TH	IC (EEPROM) (*1)	
	IC561	C3FBLY000058	IC (FLASH MEMORY 1) (*1) (*3)	
	IC631	C0JBAF000223	IC	
	IC641	C0JBAF000223	IC	
	IC701	C1CB00002427	IC (*2)	
	IC761	C3FBMY000195	IC (FLASH MEMORY 2) (*1) (*3)	
	Q541	C0EBE0000528	IC	
			(TRANSISTORS)	
	Q101	B1ADGP000008	TRANSISTOR(SI)	
	Q102	B1BBAP000021	TRANSISTOR(SI)	
	Q103	UN5113	TRANSISTOR(SI)	S
	Q131	2SD0874AS	TRANSISTOR(SI)	
	Q184	UN5213	TRANSISTOR(SI)	S
	Q185	PQVTBF822T7	TRANSISTOR(SI)	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks	Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	Q191	B1ADGP000008	TRANSISTOR(SI)			L745	PQLQR1RS241	COIL	S
	Q192	PQVTBF822T7	TRANSISTOR(SI)			L746	PQLQR1RS241	COIL	S
	Q194	UN5213	TRANSISTOR(SI)			L803	ELJRF33NJFB	COIL	S
	Q201	B1ADGP000008	TRANSISTOR(SI)			C801	MQLRF6N8JFB	COIL	
	Q203	UN5113	TRANSISTOR(SI)	S		C804	MQLRF6N8JFB	COIL	
	Q231	2SD0874AS	TRANSISTOR(SI)	S		C809	ELJRF1N5ZFB	COIL	S
	Q311	B1CHND000004	TRANSISTOR(SI)					(COMPONENTS PARTS)	
	Q371	2SD1819A	TRANSISTOR(SI)			L101	EXCELDR35	COMPONENTS PARTS	
	Q376	B1ADGE000004	TRANSISTOR(SI)			L102	EXCELDR35	COMPONENTS PARTS	
	Q381	B1ADGE000004	TRANSISTOR(SI)			L201	EXCELDR35	COMPONENTS PARTS	
	Q386	B1ADGE000004	TRANSISTOR(SI)			L202	EXCELDR35	COMPONENTS PARTS	
	Q389	B1ADGE000004	TRANSISTOR(SI)					(PHOTO ELECTRIC TRANSDUC-ERS)	
	Q621	B1ADGE000004	TRANSISTOR(SI)	S		PC102	B3PBB0000039	PHOTO ELECTRIC TRANSDUCER	
	Q761	PQVTDTC143E	TRANSISTOR(SI)	S		PC202	B3PBB0000039	PHOTO ELECTRIC TRANSDUCER	
	Q772	B1ADGE000004	TRANSISTOR(SI)					(VARISTORS)	
	Q773	UN5213	TRANSISTOR(SI)			SA101	J0LE00000047	VARISTOR (SURGE ABSORBER)	
			(DIODES)			SA102	J0LE00000047	VARISTOR (SURGE ABSORBER)	
	D101	B0EDER000009	DIODE(SI)			SA201	J0LE00000047	VARISTOR (SURGE ABSORBER)	
	D104	MA1Z300	DIODE(SI)	S		SA202	J0LE00000047	VARISTOR (SURGE ABSORBER)	
	D105	B0JCME000035	DIODE(SI)					(TRANSFORMERS)	
	D106	B0JCME000035	DIODE(SI)			T241	G5AZA0000001	TRANSFORMER	
	D125	MAZY04700L	DIODE(SI)			T246	G5AZA0000001	TRANSFORMER	
	D181	B0EDER000009	DIODE(SI)					(RESISTORS)	
	D185	B0JCME000035	DIODE(SI)			R101	ERJ3GEYJ104	100k	
	D196	1SS355	DIODE(SI)	S		R102	PQ4R10XJ222	2.2k	S
	D201	B0EDER000009	DIODE(SI)			R103	ERJ3GEYJ106	10M	
	D202	MA1Z300	DIODE(SI)	S		R104	ERJ3GEYJ106	10M	
	D225	MAZY04700L	DIODE(SI)			R105	ERJ2GEJ222	2.2k	
	D301	B0JCME000035	DIODE(SI)	S		R106	ERJ3GEYJ104	100k	
	D311	B0JCNE000008	DIODE(SI)			R111	ERJ3GEYJ825	8.2M	
	D372	MA21D3400L	DIODE(SI)			R112	ERJ3GEYJ825	8.2M	
	D382	MA21D3400L	DIODE(SI)			R113	ERJ3GEYJ564	560k	
	D401	MAZ805100L	DIODE(SI)			R114	ERJ3GEYJ564	560k	
	D402	MAZ805100L	DIODE(SI)			R120	ERJ2GEJ222	2.2k	
	D403	MAZ805100L	DIODE(SI)			R121	ERJ3GEYJ273	27k	
	D404	MAZ805100L	DIODE(SI)			R122	ERJ3GEYJ472	4.7k	
	D461	MA21D3400L	DIODE(SI)			R123	ERJ3GEYJ822	8.2k	
	D462	MA21D3400L	DIODE(SI)			R124	ERJ12YJ120	12	
	D505	B0JCDD000002	DIODE(SI)			R125	ERJ12YJ270	27	
	D631	1SS355	DIODE(SI)	S		R126	ERJ3GEYJ104	100k	
	D632	1SS355	DIODE(SI)	S		R133	ERJ3GEYJ820	82	
	D633	1SS355	DIODE(SI)	S		R134	ERJ3GEYJ821	820	
	D634	1SS355	DIODE(SI)	S		R136	ERJ3GEYJ682	6.8k	
	D636	1SS355	DIODE(SI)	S		R141	ERJ3GEYJ560	56	
	D637	1SS355	DIODE(SI)	S		R142	ERJ3GEYJ180	18	
	D638	1SS355	DIODE(SI)	S		R151	PQ4R10XJ475	4.7M	S
	D645	1SS355	DIODE(SI)	S		R152	PQ4R10XJ184	180k	S
	D741	MAZ805100L	DIODE(SI)			R153	PQ4R10XJ105	1M	S
	D742	MAZ805100L	DIODE(SI)			R156	PQ4R10XJ475	4.7M	S
	D801	B0DDCM000001	DIODE(SI)			R157	PQ4R10XJ184	180k	S
			(JACKS)			R158	PQ4R10XJ105	1M	S
	CN101	K2LB1YYB0001	JACK, MODULAR			R161	ERJ2GEJ100	10	
	CN201	K2LB102B0053	JACK, MODULAR			R162	ERJ3GEYJ104	100k	
	CN301	K2ECYB000001	JACK, DC			R165	ERJ3GEYJ104	100k	
			(COILS)			R167	ERJ2GE0R00	0	
	L311	G1C470M00025	COIL			R168	ERJ2GEJ222	2.2k	
	L401	PQLQR2KA20T	COIL	S		R171	ERJ3GEYJ683	68k	
	L402	PQLQR2KA20T	COIL	S		R172	ERJ3GEYJ104	100k	
	L403	PQLQR2KA20T	COIL	S		R173	ERJ3GEYJ103	10k	
	L404	PQLQR2KA20T	COIL	S		R174	ERJ3GEYJ273	27k	
	L611	PQLQR4F601ST	COIL	S		R175	ERJ3GEYJ223	22k	
	L612	PQLQR4F601ST	COIL	S		R176	ERJ3GEYJ472	4.7k	
	L613	PQLQR4F601ST	COIL	S		R181	D0GG682JA007	6.8k	
	L614	PQLQR4F601ST	COIL	S		R183	ERJ2GEJ472X	4.7k	
	L615	PQLQR4F601ST	COIL	S		R184	ERJ2GEJ103	10k	
	L616	PQLQR4F601ST	COIL	S		R185	ERJ2GE0R00	0	
	L617	PQLQR4F601ST	COIL	S		R186	ERJ3GEYJ153	15k	
	L618	PQLQR4F601ST	COIL	S		R187	ERJ3GEYJ183	18k	
	L619	PQLQR4F601ST	COIL	S		R188	ERJ3GEYJ152	1.5k	
	L620	PQLQR4F601ST	COIL	S					
	L621	PQLQR4F601ST	COIL	S					
	L741	PQLQR1WT	COIL	S					
	L742	PQLQR1WT	COIL	S					

Safety	Ref. No.	Part No.	Part Name & Description	Remarks		Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R191	ERJ3GEYJ104	100k				R420	ERJ2GEJ101	100	
	R192	ERJ3GEYJ104	100k				R421	ERJ2GEJ473	47k	
	R193	PQ4R10XJ472	4.7k	S			R422	ERJ2GEJ473	47k	
	R194	ERJ3GEYJ473	47k				R426	ERJ2GEJ222	2.2k	
	R195	ERJ3GEYJ103	10k				R427	ERJ2GEJ222	2.2k	
	R196	ERJ3GEYJ103	10k				R428	ERJ2GEJ222	2.2k	
	R197	ERJ3GEYJ183	18k				R446	ERJ3GEYJ224	220k	
	R198	ERJ3GEY0R00	0				R451	ERJ2GEJ472X	4.7k	
	R201	ERJ3GEYJ104	100k				R452	ERJ2GEJ472X	4.7k	
	R202	PQ4R10XJ472	4.7k	S			R453	ERJ2GEJ100	10	
	R203	ERJ3GEYJ106	10M				R454	ERJ2GEJ100	10	
	R204	ERJ3GEYJ106	10M				R457	ERJ2GEJ223	22k	
	R205	ERJ2GEJ222	2.2k				R458	ERJ2GEJ223	22k	
	R211	ERJ3GEYJ825	8.2M				R461	ERJ3GEYJ330	33	
	R212	ERJ3GEYJ825	8.2M				R503	ERJ2GE0R00	0	
	R213	ERJ3GEYJ564	560k				R505	ERJ2GEJ103	10k	
	R214	ERJ3GEYJ564	560k				R506	ERJ2GE0R00	0	
	R221	ERJ3GEYJ103	10k				R507	ERJ3GEYJ103	10k	
	R222	ERJ3GEYJ102	1k				R508	ERJ2GEJ103	10k	
	R224	ERJ12YJ120	12				R516	ERJ2GEJ271	270	
	R225	ERJ12YJ270	27				R552	ERJ3GEYJ222	2.2k	
	R226	ERJ3GEYJ104	100k				R553	ERJ2GEJ222	2.2k	
	R228	ERJ3GEY0R00	0				R554	ERJ2GEJ104	100k	
	R232	ERJ3GEY0R00	0				R561	ERJ2GEJ101	100	
	R233	ERJ3GEYJ820	82				R562	ERJ2GEJ101	100	
	R234	ERJ3GEYJ821	820				R563	ERJ2GEJ101	100	
	R236	ERJ3GEYJ103	10k				R564	ERJ2GEJ101	100	
	R241	ERJ3GEY0R00	0				R565	ERJ2GEJ101	100	
	R251	PQ4R10XJ475	4.7M	S			R566	ERJ2GEJ101	100	
	R252	PQ4R10XJ184	180k	S			R567	ERJ2GEJ101	100	
	R253	PQ4R10XJ105	1M	S			R568	ERJ2GEJ101	100	
	R256	PQ4R10XJ475	4.7M	S			R569	ERJ2GEJ101	100	
	R257	PQ4R10XJ184	180k	S			R570	ERJ2GEJ101	100	
	R258	PQ4R10XJ105	1M	S			R571	ERJ2GEJ101	100	
	R261	ERJ2GEJ100	10				R572	ERJ2GEJ101	100	
	R262	ERJ3GEYJ104	100k				R573	ERJ2GEJ101	100	
	R265	ERJ3GEYJ104	100k				R574	ERJ2GEJ101	100	
	R268	ERJ2GE0R00	0				R575	ERJ2GEJ101	100	
	R271	ERJ3GEYJ683	68k				R576	ERJ2GEJ101	100	
	R272	ERJ3GEYJ104	100k				R591	ERJ3GEYJ101	100	
	R273	ERJ3GEYJ103	10k				R592	ERJ3GEYJ102	1k	
	R274	ERJ3GEYJ273	27k				R593	ERJ3GEYJ102	1k	
	R275	ERJ3GEYJ223	22k				R596	ERJ3GEYJ102	1k	
	R276	ERJ3GEYJ472	4.7k				R597	ERJ3GEYJ103	10k	
	R311	ERJ3GEYJ121	120				R598	ERJ3GEYJ103	10k	
	R312	ERJ3GEYJ221	220				R601	ERJ2GEJ104	100k	
	R313	ERJ3GEYJ221	220				R602	ERJ2GEJ104	100k	
	R321	ERJ2GEJ181	180				R603	ERJ2GEJ104	100k	
	R322	ERJ2GEJ181	180				R604	ERJ2GEJ104	100k	
	R332	ERJ2GE0R00	0				R613	ERJ3GEYJ391	390	
	R337	ERJ2GE0R00	0				R614	ERJ3GEYJ391	390	
	R342	ERJ2GEJ222	2.2k				R616	ERJ3GEYJ391	390	
	R371	ERJ3GEYJ822	8.2k				R617	ERJ3GEYJ391	390	
	R372	ERJ3GEYJ152	1.5k				R618	ERJ3GEYJ391	390	
	R373	ERJ3GEYJ392	3.9k				R619	ERJ2GEJ103	10k	
	R374	ERJ2GEJ472X	4.7k				R621	ERJ3GEYJ101	100	
	R375	ERJ2GEJ223	22k				R622	ERJ2GEJ222	2.2k	
	R376	ERJ2GEJ471	470				R641	ERJ2GEJ103	10k	
	R381	ERJ2GEJ562X	5.6k				R642	ERJ2GEJ103	10k	
	R382	ERJ3GEYF133	13k	S			R703	ERJ2GEJ104	100k	
	R383	ERJ3EKF5601	5.6k				R704	ERJ3GEYJ102	1k	
	R386	ERJ2GEJ153	15k				R705	ERJ2GEJ473	47k	
	R388	ERJ2GEJ682	6.8k				R706	ERJ2GEJ473	47k	
	R389	ERJ2GEJ103	10k				R721	ERJ3GEYJ222	2.2k	
	R390	ERJ3GEYJ4R7	4.7				R722	ERJ3GEYJ222	2.2k	
	R412	ERJ2GEJ222	2.2k				R723	ERJ2GEJ222	2.2k	
	R413	ERJ2GEJ222	2.2k				R724	ERJ2GEJ222	2.2k	
	R414	ERJ2GEJ472X	4.7k				R726	ERJ2GE0R00	0	
	R415	ERJ2GEJ472X	4.7k				R727	ERJ2GEJ331	330	
	R416	ERJ2GEJ101	100				R728	ERJ2GEJ222	2.2k	
	R417	ERJ2GEJ222	2.2k				R743	ERJ3GEYJ6R8	6.8	
	R418	ERJ2GEJ222	2.2k				R764	ERJ2GEJ561	560	
	R419	ERJ2GEJ101	100				R765	ERJ2GEJ473	47k	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks	Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R776	ERJ2GEJ473	47k			C528	ECUE1H331KBQ	330p	
	R777	ERJ2GEJ223	22k			C601	ECUE1H101JCQ	100p	
	R801	ERJ3GEYJ181	180			C603	ECUE1H101JCQ	100p	
	R803	ERJ2GEJ561	560			C604	ECUE1H101JCQ	100p	
	R804	ERJ2GEJ561	560			C611	ECUE1A104KBQ	0.1	
	R806	ERJ2GEJ331	330			C612	ECUE1A104KBQ	0.1	
	R807	ERJ2GEJ102	1k			C631	ECUE1A104KBQ	0.1	
	R808	ERJ2GEJ561	560			C802	ECUE1H7R0CCQ	7p	
	R809	ERJ3GEYJ181	180			C807	ECUE1H100DCQ	10p	
	R810	ERJ2GEJ473	47k			C808	ECUE1H100DCQ	10p	
	R811	F1G1H3R3A562	1k			C815	ECUE1H3R0CCQ	3p	
	R812	ECUE1H100DCQ	10p			C816	PQCUV0J475MB	4.7	
	C123	ERJ3GEYJ562	5.6k			C817	ECUE1H100DCQ	10p	
	PO101	PFRT002	0k	S		C106	ECUV1A224KBV	0.22	
	PO201	PFRT002	0k	S		C113	ECUV1C104KBV	0.1	
			(CAPACITORS)			C114	ECUV1C104KBV	0.1	
	C102	F1K2J681A006	680p			C115	ECUE1H102KBQ	0.001	
	C103	F1K2J681A006	680p			C126	EEE0JA331P	330	
	C105	ECUV1H103KBV	0.01			C127	ECUV1H472KBV	0.0047	
	C121	ECUE1A104KBQ	0.1			C131	ECUE1H100DCQ	10p	
	C122	ECUV1H472KBV	0.0047			C156	ECUV1C103KBV	0.01	
	C124	ECUV1H100DCV	10p			C157	ECUV1C103KBV	0.01	
	C125	F1K1C2250005	2.2			C158	F1K2J681A006	680p	
	C128	PQCUV1A105KB	1			C163	ECUE1H100DCQ	10p	
	C133	F1K1C4750023	10			C164	ECUE1H100DCQ	10p	
	C141	ECUV1C563KBV	0.056			C165	ECUV1H221JCV	220p	
	C143	ECJ0EB1A563K	0.056	S		C166	ECUE1H102KBQ	0.001	
	C151	ECUV1C103KBV	0.01			C183	F1K2J681A006	680p	
	C152	ECUV1C103KBV	0.01			C186	ECUV1C563KBV	0.056	
	C153	F1K2J681A006	0.056			C187	F2G1H4R70017	4.7	S
	C161	ECUV1A105KBV	1			C206	ECUV1A224KBV	0.22	
	C162	ECUV1H221JCV	220p			C213	ECUV1C104KBV	0.1	
	C171	ECUV1C563KBV	0.056			C214	ECUV1C104KBV	0.1	
	C172	ECUV1C104KBV	0.1			C215	ECUE1H102KBQ	0.001	
	C173	EEE1CA100SR	10			C221	EEE1CA100SR	10	
	C174	ECUV1A105KBV	1			C226	EEE0JA331P	330	
	C177	ECUE1H102KBQ	0.001			C227	ECUV1H472KBV	0.0047	
	C181	F0C2E1050004	0.056			C231	ECUE1H100DCQ	10p	
	C182	F1K2J681A006	0.1			C243	EEE1HA010SR	1	
	C202	F1K2J681A006	680p			C246	EEE1CA100SR	10	
	C203	F1K2J681A006	680p			C247	ECUE1C103KBQ	0.01	
	C205	ECUV1H103KBV	0.01			C248	ECUE1C103KBQ	0.01	
	C222	ECUV1H472KBV	0.0047			C251	ECUV1C103KBV	0.01	
	C224	ECUV1H100DCV	10p			C252	ECUV1C103KBV	0.01	
	C225	F1K1C2250005	1			C253	F1K2J681A006	680p	
	C228	PQCUV1A105KB	1			C256	ECUV1C103KBV	0.01	
	C233	F1K1C4750023	10			C257	ECUV1C103KBV	0.01	
	C237	EEE1HA010SR	1			C258	F1K2J681A006	680p	
	C241	ECUE1C103KBQ	0.01			C263	ECUE1H100DCQ	10p	
	C242	ECUE1C103KBQ	0.01			C265	ECUV1H221JCV	220p	
	C261	ECUV1A105KBV	1			C266	ECUE1H102KBQ	0.001	
	C262	ECUV1H221JCV	220p			C311	ECUV1C104KBV	0.1	
	C264	ECUE1H100DCQ	10p			C312	ECUV1A105KBV	1	
	C271	ECUV1C563KBV	0.056			C313	ECUV1H101JCV	100p	
	C272	ECUV1C104KBV	0.1			C314	ECUV1A105KBV	1	
	C277	ECUE1H102KBQ	0.001			C315	F2G0J3310025	330	
	C301	F2G1E1010011	100	S		C321	EEE0JA331P	330	
	C302	ECUV1H101JCV	100p			C326	EEE0JA331P	330	
	C303	ECUV1H103KBV	0.01			C327	ECUV1A105KBV	1	
	C322	ECUV1A105KBV	1			C341	EEE1CA100SR	10	
	C331	EEE0JA331P	330			C342	ECUV1A105KBV	1	
	C332	ECUV1A105KBV	1			C373	ECUV1C104KBV	0.1	
	C336	EEE0JA331P	330			C382	ECUV1A105KBV	1	
	C337	ECUV1A105KBV	1			C386	EEE0JA331P	330	
	C501	ECUE1A104KBQ	0.1			C387	ECUV1A105KBV	1	
	C503	ECUE1A104KBQ	0.1			C388	ECUV1A105KBV	1	
	C504	ECUE1H104KBQ	0.1			C401	ECUE1H102KBQ	0.001	
	C507	ECUE1A104KBQ	0.1			C402	ECUE1H681KBQ	680p	
	C508	ECUE1A104KBQ	0.1			C403	ECUE1H681KBQ	680p	
	C509	ECUE1A104KBQ	0.1			C404	ECUE1H102KBQ	0.001	
	C511	ECUE1H5R0CCQ	5p			C411	ECUE1H331KBQ	330p	
	C512	ECUE1H5R0CCQ	5p			C412	ECUE1A104KBQ	0.1	
	C521	ECUE1H331KBQ	330p			C413	ECUE1A104KBQ	0.1	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C414	ECUE1H331KBQ	330p	
	C415	ECUE1H331KBQ	330p	
	C416	PQCUV0J475MB	4.7	
	C418	ECUE1H101JCQ	100p	
	C419	ECUE1H100DCQ	10p	
	C420	ECUE1H100DCQ	10p	
	C421	ECUE1A104KBQ	0.1	
	C422	ECUE0J105KBQ	1	
	C426	ECUE1A104KBQ	0.1	
	C427	ECUE1A104KBQ	0.1	
	C431	ECUE1A104KBQ	0.1	
	C446	ECUV1A105KBV	1	
	C451	F1K1C4750023	4.7	
	C452	F1K1C4750023	4.7	
	C453	ECUE1C183KBQ	0.018	
	C454	ECUV1A105KBV	1	
	C457	ECUV1A105KBV	1	
	C458	ECUE1H100DCQ	10p	
	C461	EEE0JA101WR	100	
	C502	ECUE1A104KBQ	0.1	
	C505	ECUE1A104KBQ	0.1	
	C506	ECUE1H331KBQ	330p	
	C518	ECUE1A104KBQ	0.1	
	C541	ECUE1A104KBQ	0.1	
	C542	ECUV1H103KBV	0.01	
	C543	ECUE1A224KBQ	0.22	
	C551	ECUE1A104KBQ	0.1	
	C561	ECUE1A104KBQ	0.1	
	C562	ECUE1H101JCQ	100p	
	C563	ECUE1H101JCQ	100p	
	C602	ECUE1H101JCQ	100p	
	C641	ECUE1A104KBQ	0.1	
	C701	ECUE1A104KBQ	0.1	
	C702	ECUE1H100DCQ	10p	
	C703	ECUE1A104KBQ	0.1	
	C704	ECUE1H102KBQ	0.001	
	C705	ECUE1A104KBQ	0.1	
	C706	ECUE1A104KBQ	0.1	
	C707	ECUE1A104KBQ	0.1	
	C708	ECUE1A104KBQ	0.1	
	C721	ECUE1H102KBQ	0.001	
	C723	ECUE1A104KBQ	0.1	
	C724	ECUE1A104KBQ	0.1	
	C726	ECUE1A104KBQ	0.1	
	C727	ECST0JY106	10	S
	C728	ECUE1A104KBQ	0.1	
	C741	ECUE1H100DCQ	10p	
	C742	ECUE1H100DCQ	10p	
	C743	EEE0JA101WR	100	
	C744	ECUE0J105KBQ	1	
	C747	ECUE1H331KBQ	330p	
	C748	ECUE1H331KBQ	330p	
	C761	ECUE1A104KBQ	0.1	
	C765	ECUE1A104KBQ	0.1	
	C776	ECUE1H222KBQ	0.0022	
	C803	ECUE1H7R0CCQ	7p	
	C814	ECUE1H100DCQ	10p	
	C819	ECUE1H100DCQ	10p	
	C821	ECUE1H220JCQ	22p	
	C824	ECUE1H220JCQ	22p	
	C831	ECUE1H151JCQ	150p	
	C832	ECUE1H102KBQ	0.001	
			(OTHERS)	
	IC801	PQLP10293Z	RF UNIT	
	MIC1	L0CBAB000052	MICROPHONE	
	E1	PNLA1016Z	ANTENNA	
	E2	PNWHK16SS05N	PARALLEL LEADWIRE	
	F301	K5H302Y00003	FUSE	
	R515	J0JCC0000275	IC FILTER	
	X501	H0J103500020	CRYSTAL OSCILLATOR (*1)	
	RL185	PSSLG6K2FYZ	RELAY	S

15.5.1.3. Operational P.C.Board parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB2	PNLP2083Z	OPERATIONAL P.C.BOARD ASS'Y (RTL)	
			(DIODES)	
	D101	MA21D3400L	DIODE(SI)	
	LED902	LNJ826W83RA	DIODE(SI)	
	LED903	LNJ826W83RA	DIODE(SI)	
	LED904	LNJ826W83RA	DIODE(SI)	
	LED905	LNJ826W83RA	DIODE(SI)	
	LED906	LNJ826W83RA	DIODE(SI)	
			(RESISTORS)	
	R55	ERJ3GEY0R00	0	
	R56	ERJ3GEY0R00	0	
	R57	ERJ3GEY0R00	0	
	R58	ERJ3GEY0R00	0	
	R60	ERJ3GEYJ105	1M	
			(CAPACITORS)	
	C103	ECUV1H101JCV	100p	
	C104	ECUV1H101JCV	100p	
	C105	ECUV1H101JCV	100p	
	C173	ECUV1C105KBV	1	
	C174	ECUV1C105KBV	1	
	C175	ECUV1C105KBV	1	
	C176	ECUV1C105KBV	1	
	C177	ECUV1C105KBV	1	
	C178	ECUV1C105KBV	1	
	C179	ECUV1C105KBV	1	
	C180	ECUV1C105KBV	1	
	C181	ECUV1C105KBV	1	
	C184	PQCUV0J106KB	10	
			(OTHERS)	
	E3	L5DZBYY00015	LIQUID CRYSTAL DISPLAY	
	E4	PNHX1080Z	COVER, LCD SHEET	
	E5	PNHX1124Z	COVER, DIFFUSION SHEET	
	E6	PNJE1014Z	LEAD WIRE, FPC	
	E7	B3AFB0000211	LED	
	E8	PNHR1065Z	LCD PLATE	PMMA-HB
	E9	PNHR1064Z	GUIDE, LCD	ABS-HB

15.5.2. Portable

15.5.2.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	101	PNGP1002X1	PANEL	AS-HB
	102	PNHS1002Z	TAPE, DOUBLE SIDED	
	103	PNKM1052Z1	CABINET BODY	PS-HB
	104	PNHR1005Z	OPTIC CONDUCTIVE PARTS, LED LENS	PS-HB
	105	PQHS10722Y	SPACER, LCD	
	106	PNHS1001Z	COVER, SP NET	
	107	L0AD02A00043	RECEIVER	
	108	PQHG10756Z	RUBBER PARTS, RECEIVER	
	109	PNBC1008Y2	BUTTON, TALK	ABS-HB
	110	PNBC1009Y2	BUTTON, OFF	ABS-HB
	111	PNBC1010Y2	BUTTON, SP	ABS-HB
	112	PNBC1011Y2	BUTTON, PAUSE	ABS-HB
	113	PNBC1003X4	BUTTON, NAVIGATOR	ABS-HB
	114	PNBX1027Z1	KEYBOARD SWITCH	PMMA-HB
	115	PNJK1031Z	RUBBER SWITCH	
	116	PNJT1002Z	CHARGE TERMINAL (R)	
	117	PNJT1001Z	CHARGE TERMINAL (L)	
	118	PQHR11313Z	GUIDE, SPEAKER	ABS-HB
	119	PQHG10729Z	RUBBER PARTS, SPEAKER	
	120	L0AD02A00026	SPEAKER	
	121	PQHS10622Z	SPACER, NET	
	122	PNLA1005Z	ANTENNA	
	123	PNKE1002Z2	COVER, E/P	
	124	PQJC10056X	BATTERY TERMINAL	
	125	PNKF1006Z1	CABINET COVER	ABS-HB

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	126	PNQT1230Y	LABEL, BATTERY	
	127	PQHS10561Y	SPACER, BATTERY COVER	
	128	PNKK1001Z2	LCD, BETTERY	ABS-HB
	129	PNGT1490Z	NAME PLATE	
	130	PNYNTGA430BR	BATTERY COVER ASS'Y	
	131	PNHX1036Z	COVER, LCD SHEET	

15.5.2.2. Main P.C.Board Parts

Note:

(*1) When replacing IC1, IC3 or X1, data needs to be written to them with PNZZTG9391T. Refer to **Portable** (P.75) of **Things to Do after Replacing IC or X'tal** (P.74).

(*2) Flash type of BBIC needs software downloading. Refer to **Portable** (P.75) of **Things to Do after Replacing IC or X'tal** (P.74).

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB100	PNWPTGA939TR	MAIN P.C.BOARD ASS'Y (RTL)	
			(ICs)	
	IC1	C1CB00002906	IC (BBIC (FLASH)) (*1) (*2)	
	IC3	PNWITGA939TR	IC (EEPROM) (*1)	
	IC801	C1CB00001842	IC	
			(TRANSISTORS)	
	Q2	B1ADGE000004	TRANSISTOR(SI)	
	Q4	B1ADGE000004	TRANSISTOR(SI)	
	Q7	UN9219J	TRANSISTOR(SI)	S
	Q9	2SC6054JSL	TRANSISTOR(SI)	S
	Q13	2SD1819A	TRANSISTOR(SI)	
	Q14	2SD1819A	TRANSISTOR(SI)	
			(DIODES)	
	D1	B0JCMC000006	DIODE(SI)	
	D5	1SS355	DIODE(SI)	S
	D7	B0JCME000035	DIODE(SI)	
	D21	MA8043M	DIODE(SI)	S
	D22	MA8043M	DIODE(SI)	S
	D801	MA27P1200L	DIODE(SI)	
	D802	MA27P1200L	DIODE(SI)	
	DA1	B0DDCL000001	DIODE(SI)	
	LED2	B3ACB0000216	DIODE(SI)	
	LED3	B3ACB0000216	DIODE(SI)	
			(LEDS)	
	LED5	B3ACB0000216	LED	
	LED6	B3ACB0000216	LED	
	LED12	B3ACB0000216	LED	
			(JACK)	
	CN4	K2HD103D0001	JACK	
			(COILS)	
	L4	G1C100MA0072	COIL	
	L5	G1C100MA0072	COIL	
	L805	PQLQR4F121ST	COIL	S
	C812	ELJRF3N3ZFB	COIL	
	F1	PQLQR2M5N6K	COIL	S
			(IC FILTERS)	
	L9	J0JCC0000287	IC FILTER	
	L72	J0JCC0000276	ICFILTER	
	R308	J0JCC0000286	ICFILTER	
			(VARISTORS)	
	D8	D4ED1270A014	VARISTOR	
	D13	D4ZZ00000032	VARISTOR	
	D14	D4ZZ00000032	VARISTOR	
			(RESISTORS)	
	R2	ERJ2GEJ392	3.9k	
	R6	ERJ2GEJ102	1k	
	R7	ERJ2GEJ122	1.2k	
	R8	ERJ2GEJ101	100	
	R12	ERJ2GE0R00	0	
	R15	ERJ2GE0R00	0	
	R16	ERJ2GE0R00	0	
	R20	ERJ2GEJ100	10	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R22	ERJ2GEJ332	3.3k	
	R23	ERJ2GEJ102	1k	
	R25	ERJ2GEJ222	2.2k	
	R27	ERJ3GEYJ821	820	
	R28	ERJ2GEJ821	820	
	R29	ERJ2GEJ102	1k	
	R32	ERJ2GEJ104	100k	
	R34	ERJ2GEJ104	100k	
	R40	ERJ2GEJ103	10k	
	R41	ERJ2GEJ472X	4.7k	
	R42	ERJ2GEJ103	10k	
	R45	ERJ6RSJR10V	0.1	
	R46	ERJ2GE0R00	0	
	R50	ERJ2GEJ332	3.3k	
	R51	ERJ2GEJ471	470	
	R52	ERJ2GEJ221	220	
	R53	ERJ2GEJ332	3.3k	
	R54	ERJ2GEJ103	10k	
	R63	ERJ2GEJ101	100	
	R64	ERJ2GEJ103	10k	
	R66	ERJ2GEJ102	1k	
	R71	ERJ3GEYJ181	180	
	R72	ERJ2GE0R00	0	
	R106	ERJ2GE0R00	0	
	R107	ERJ2GEJ221	220	
	R108	ERJ2GEJ221	220	
	R109	ERJ2GE0R00	0	
	R148	ERJ3GEYJ273	27k	
	R181	ERJ2GE0R00	0	
	R203	D0GA563ZA006	56k	
	R215	ERJ2GE0R00	0	
	R222	ERJ2GE0R00	0	
	R233	ERJ2GEJ102	1k	
	R234	ERJ2GEJ102	1k	
	R235	ERJ2GEJ102	1k	
	R238	ERJ2GEJ102	1k	
	R244	ERJ2GE0R00	0	
	R248	ERJ2GE0R00	0	
	R301	ERJ2GEJ221	220	
	R302	ERJ2GEJ221	220	
	R304	ERJ2GEJ221	220	
	R305	ERJ2GEJ221	220	
	R306	ERJ2GEJ101	100	
	R340	ERJ2GEJ222	2.2k	
	R341	ERJ2GEJ473	47k	
	R343	ERJ2GEJ105X	1M	
	R344	ERJ2GEJ224	220k	
	R345	ERJ2GEJ104	100k	
	R801	ERJ2GEJ182	1.8k	
	R802	F1G1HR50A480	0.5p	
	R803	ERJ2GEJ102	1k	
	R804	ERJ2GEJ102	1k	
	R805	ERJ2GEJ470	47	
	R806	ERJ2GEJ221	220	
	R807	ERJ2GEJ221	220	
	RA4	D1H433220001	3.3k	
	RA61	D1H410220001	1k	
	L10	ERJ2GEJ330	33	
	L11	ERJ2GEJ330	33	
	L71	ERJ2GE0R00	0	
	L74	ERJ2GEJ100	10	
			(CAPACITORS)	
	C1	EEE0JA221WP	220	
	C2	EEE0JA331P	330	
	C3	ECUV1A105KBV	1	
	C11	ECUE1A104KBQ	0.1	
	C12	PQCUV0J106KB	10	
	C13	ECUE1A104KBQ	0.1	
	C14	ECUE1C103KBQ	0.01	
	C16	PQCUV0J106KB	10	
	C33	ECUE1A104KBQ	0.1	
	C40	ECUE1A104KBQ	0.1	
	C43	ECUE1H100DCQ	10p	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C44	ECUE1A104KBQ	0.1	
	C45	ECUE1A104KBQ	0.1	
	C46	ECUE1H100DCQ	10p	
	C47	ECUV1A105KBV	1	
	C48	ECUV1A225KB	2.2	
	C49	ECUV1A105KBV	1	
	C50	ECUV1A105KBV	1	
	C51	ECUV1A105KBV	1	
	C52	PQCUV0J106KB	10	
	C53	PQCUV0J106KB	10	
	C70	ECUE1H100DCQ	10p	
	C71	ECUE1H100DCQ	10p	
	C72	ECUE1H100DCQ	10p	
	C73	ECUE1H100DCQ	10p	
	C82	ECUE1H471KBQ	470p	
	C83	ECUE1H100DCQ	10p	
	C86	PQCUV0J106KB	10	
	C96	ECUE1H100DCQ	10p	
	C97	ECUE1H100DCQ	10p	
	C103	ECUE1H101JCQ	100p	
	C104	ECUE1H101JCQ	100p	
	C105	ECUE1H101JCQ	100p	
	C110	ECUE1H102KBQ	0.001	
	C117	ECUE1H100DCQ	10p	
	C118	ECUE1H100DCQ	10p	
	C122	F1G1H1R8A480	1.8p	
	C124	ECUE1H100DCQ	10p	
	C125	ECUE1H100DCQ	10p	
	C127	ECUE1H102KBQ	0.001	
	C147	ECUV1A105KBV	1	
	C152	ECUE1H102KBQ	0.001	
	C170	ECUE1H100DCQ	10p	
	C171	ECUV1H100DCV	10p	
	C172	ECUV1C104KBV	0.1	
	C173	ECUV1C105KBV	1	
	C174	ECUV1C105KBV	1	
	C175	ECUV1C105KBV	1	
	C176	ECUV1C105KBV	1	
	C177	ECUV1C474KBV	0.47	
	C178	ECUV1C474KBV	0.47	
	C179	ECUV1C474KBV	0.47	
	C180	ECUV1C474KBV	0.47	
	C181	ECUV1C474KBV	0.47	
	C182	F1G1H2R7A480	2.7p	
	C183	F1H0J4750002	4.7	
	C184	ECUE1H100DCQ	10p	
	C185	ECUE1H102KBQ	0.001	
	C186	ECUE1H101JCQ	100p	
	C187	ECUE1H101JCQ	100p	
	C188	ECUE0J105KBQ	1	
	C340	F1J0J2260004	22	
	C802	F1G1H2R4A480	2.4p	
	C803	F1G1H1R8A480	1.8p	
	C804	F1G1H2R4A480	2.4p	
	C807	F1G1H2R2A480	2.7p	
	C808	ECUE1A104KBQ	0.1	
	C809	ECUE1H100DCQ	10p	
	C810	F1G1H2R7A480	1.8p	
	C811	ECUE1H100DCQ	10p	
	C813	ECUE1H1R0BCQ	1	
	C814	ECUE1H332KBQ	0.0033	
	C815	F1G1H1R2A480	1.2p	
	C819	ECUE1H100DCQ	10p	
	C820	F1G1HR50A480	0.5p	
	C822	ECUE1H101JCQ	100p	
	C825	ECUE1H100DCQ	10p	
	C826	F1G1H2R2A480	1.2p	
	C832	F1G1H7R0A480	7p	
	C834	F1G1HR75A480	0.75p	
	C840	F1G1H1R8A480	1.8p	
	L804	F1G1H1R2A480	1.2p	
	L122	F1G1H1R8A480	1.8p	
			(OTHERS)	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	MIC100	L0CBAY000016	MICROPHONE	
	E101	L5DZBYY00013	LIQUID CRYSTAL DISPLAY (*3)	
	E102	PQHR11279Z	TRANSPARENT PLATE	PMMA-HB
	E103	PNHR1006Z	GUIDE, LCD	ABS-HB
	E104	PNHX1004Z	LCD COVER SHEET	
	E105	PQJE10179V	LEAD WIRE, FPC	
	E106	B3AFB0000211	LED	
	E107	PQWE10050Z	BATTERY TERMINAL	
	E108	PNMC1003Z	MAGNETICSHIELD, CASE	
	X1	H0J103500033	CRYSTAL OSCILLATOR (*1)	

15.5.3. Charger Unit

15.5.3.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	200	PNLC1001YT	CHARGER UNIT (RTL)	
	200-1	PNKM1015Y2	CABINET BODY	PS-HB
	200-2	PNJT1010Z	CHARGE TERMINAL	
	200-3	PNKF1012Z1	CABINET COVER	PS-HB
	200-4	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	
	200-5	PNGT1728Z	NAME PLATE (for KX-TG9391/92T)	
	200-5	PNGT1044Y	NAME PLATE (for KX-TGA939T)	

15.5.3.2. Main P.C.Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB200	PQWPTGA721CH	MAIN P.C.BOARD ASS'Y (RTL)	
			(DIODE)	
	D1	B0JAME000095	DIODE(SI)	
			(JACK)	
	J1	K2ECYB000001	JACK	S
			(RESISTOR)	
	R1	ERG2SJ100E	10	
			(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-TG9391T

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A1	PQLV207T	AC ADAPTOR (for Base Unit)	
⚠	A2	PQLV209T	AC ADAPTOR (for Charger Unit)	
	A3	PQJA10075Z	CORD, TELEPHONE (for Line 1)	
	A4	PQJA10088Z	CORD, TELEPHONE (for Line 2)	
	A5	PQJA212V	CORD, HANDSET	
	A6	PNKE1004Z1	HANGER, BELT CLIP	ABS-HB
	A7	PNQX1454Z	INSTRUCTION BOOK (*1)	
	A8	PNQW1340Z	LEAFLET, QUICK GUIDE (for English)	
	A9	PNQW1341Z	LEAFLET, QUICK GUIDE (for Spanish)	
	A10	PNLXP1001Z	HANDSET	
	P1	PQPH89Y	PROTECTION COVER (for Base Unit)	
	P2	XZB08X25B02	PROTECTION COVER (for Portable)	
	P3	XZB13X19C03	PROTECTION COVER (for Charger Unit)	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	P4	PNPK1512Z	GIFT BOX	
	P5	PNPD1148Z	CUSHION	
	P6	PQXDDS400-8	MAGNET ELECTRIC TRANSDUCER	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
		PQZZ430PRB	RUBBER OF SOLDERING IRON (*2)	

15.5.4.2. KX-TG9392T

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A101	PQLV207T	AC ADAPTOR (for Base Unit)	
⚠	A102	PQLV209T	AC ADAPTOR (for Charger Unit)	
	A103	PQJA10075Z	CORD, TELEPHONE (for Line 1)	
	A104	PQJA10088Z	CORD, TELEPHONE (for Line 2)	
	A105	PQJA212V	CORD, HANDSET	
	A106	PNKE1004Z1	HANGER, BELT CLIP	ABS-HB
	A107	PNQX1454Z	INSTRUCTION BOOK (*1)	
	A108	PNQW1340Z	LEAFLET, QUICK GUIDE (for English)	
	A109	PNQW1341Z	LEAFLET, QUICK GUIDE (for Spanish)	
	A110	PNLXP1001Z	HANDSET	
	P101	PQPH89Y	PROTECTION COVER (for Base Unit)	
	P102	XZB08X25B02	PROTECTION COVER (for Portable)	
	P103	XZB13X19C03	PROTECTION COVER (for Charger Unit)	
	P104	PNPK1836Z	GIFT BOX	
	P105	PNPD1148Z	CUSHION	
	P106	PQXDDS400-8	MAGNET ELECTRIC TRANS-DUCER	

15.5.4.3. KX-TGA939T

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A201	PQLV209T	AC ADAPTOR	
	A202	PNKE1004Z1	HANGER, BELT CLIP	ABS-HB
	A203	PNQX1455Z	INSTRUCTION BOOK (*1)	
	A204	PQQW15385Z	LEAFLET	
	P201	XZB13X19C03	PROTECTION COVER (for Charger Unit)	
	P202	XZB08X25B02	PROTECTION COVER (for Portable)	
	P203	PNPK1513Z	GIFT BOX	
	P204	PQXDDS400-8	MAGNET ELECTRIC TRANS-DUCER	

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 **The Setting Method of JIG (Base Unit)** (P.67), and **The Setting Method of JIG (Portable)** (P.71).

(*2) When replacing the Base unit and Portable LCD, See **Assembly Instructions** (P.65) .

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
		PQZZ1CD300E	JIG CABLE (*1)	
		PNZZTG9391T	BATCH FILE CD-ROM (*1)	
		PQZZ430PIR	TIP OF SOLDERING IRON (*2)	

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