

Service Manual

Telephone Equipment

Caller ID Compatible

DECT
6.0

 **Bluetooth®**

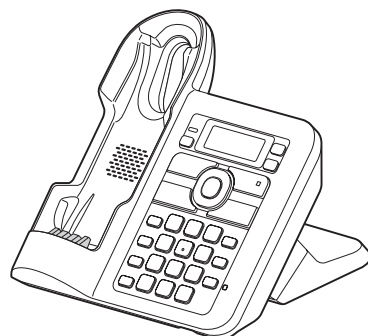
Model No. **KX-TG155SK**
KX-TGA660M

Link-to-Cell Cellular Convergence
Solution

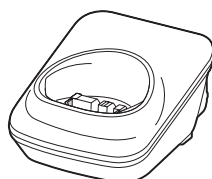
M: Metallic Grey Version
(for U.S.A.)



KX-TGA660M
(Handset)



KX-TG7641M
(Base Unit)



(Charger Unit)

Configuration for each model

Model No	Base Unit	Handset	Charger Unit	Expandable
KX-TG155	1 (TG7641)	5 (TGA660)	4	Up to 6
KX-TGA660*		1 (TGA660)	1	

*KX-TGA660 is also an optional accessory, which contains a handset and a charger.

Information for optional accessories

You can expand your phone system by registering optional handsets (KX-TGA410) to a single base unit. Optional handsets and the supplied handset are different model so that some functions may not be available. Refer to each Operating Instruction for details.

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 WARNING

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

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.

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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

Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

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

Note:

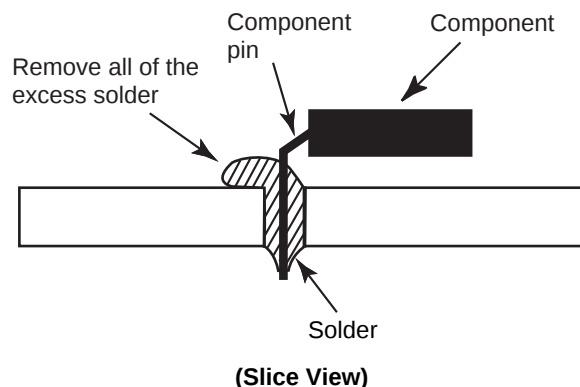
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

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

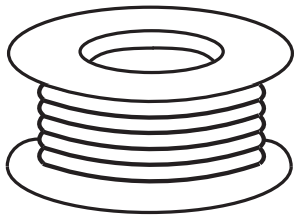
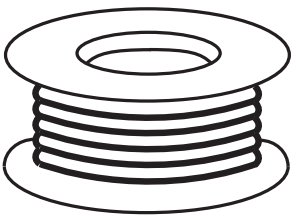
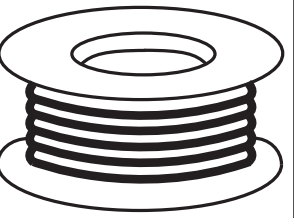
- PbF solder has a melting point that is 50 °F ~ 70 °F (30 °C ~ 40 °C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700 °F ± 20 °F (370 °C ± 10 °C).
- Exercise care while using higher temperature soldering irons.:
Do not heat the PCB for too long time in 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).



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)
Bluetooth wireless technology 2.0

■ Number of channels:

60 Duplex Channels (DECT 6.0)
79 Duplex channels (Bluetooth)

■ Frequency range:

1.92 GHz to 1.93 GHz (DECT 6.0)
2.402 GHz to 2.48 GHz (Bluetooth)

■ Duplex procedure:

TDMA (Time Division Multiple Access)

■ Channel spacing:

1.728MHz (DECT 6.0)
1.0MHz (Bluetooth)

■ Bit rate:

1.152Mbit/s (DECT 6.0)
1.0 Mbit/s (Bluetooth)

■ Modulation:

GFSK (Gaussian Frequency Shift Keying)

■ RF transmission power:

115 mW (max/DECT6.0)

■ Voice coding:

ADPCM 32 kbit/s (DECT 6.0)
CVSD/PCM 64kbit/s (Bluetooth)
PCM 64kbit/s (BT_IC)

	Base Unit	Handset	Charger
Power source	AC Adaptor (PNLV226Z, 120 V AC, 60 Hz)	Rechargeable Ni-MH battery AAA (R03) size (1.2 V 550 mAh)	AC Adaptor (PNLV226Z, 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	10.368 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)	_____
Power Consumption	Standby: Approx. 1.5 W Maximum: Approx. 4.8 W	11 days at Standby, 13 hours at Talk	Standby: Approx. 0.1 W Maximum: Approx. 2.0 W
Operating Conditions	0 °C - 40 °C (32 °F - 104 °F) 20 % - 80 % relative air humidity (dry)	0 °C - 40 °C (32 °F - 104 °F) 20 % - 80 % relative air humidity (dry)	0 °C - 40 °C (32 °F - 104 °F) 20 % - 80 % relative air humidity (dry)
Dimensions (H x W x D)	Approx. 134 mm x 159 mm x 180 mm	Approx. 173 mm x 48 mm x 32 mm	Approx. 44 mm x 73 mm x 79 mm
Mass (Weight)	Approx. 380 g	Approx. 140 g	Approx. 50 g

Note:

- Design and specifications are subject to change without notice.

Note for Service:

- **Operation range:** Up to 300 m outdoors, Up to 50 m indoors, depending on the condition.
- **Analog telephone connection:** Telephone Line
- **Optional headset:** KX-TCA60, KX-TCA93, KX-TCA94, KX-TCA400, KX-TCA430
- **Optional Range extender:** KX-TGA405

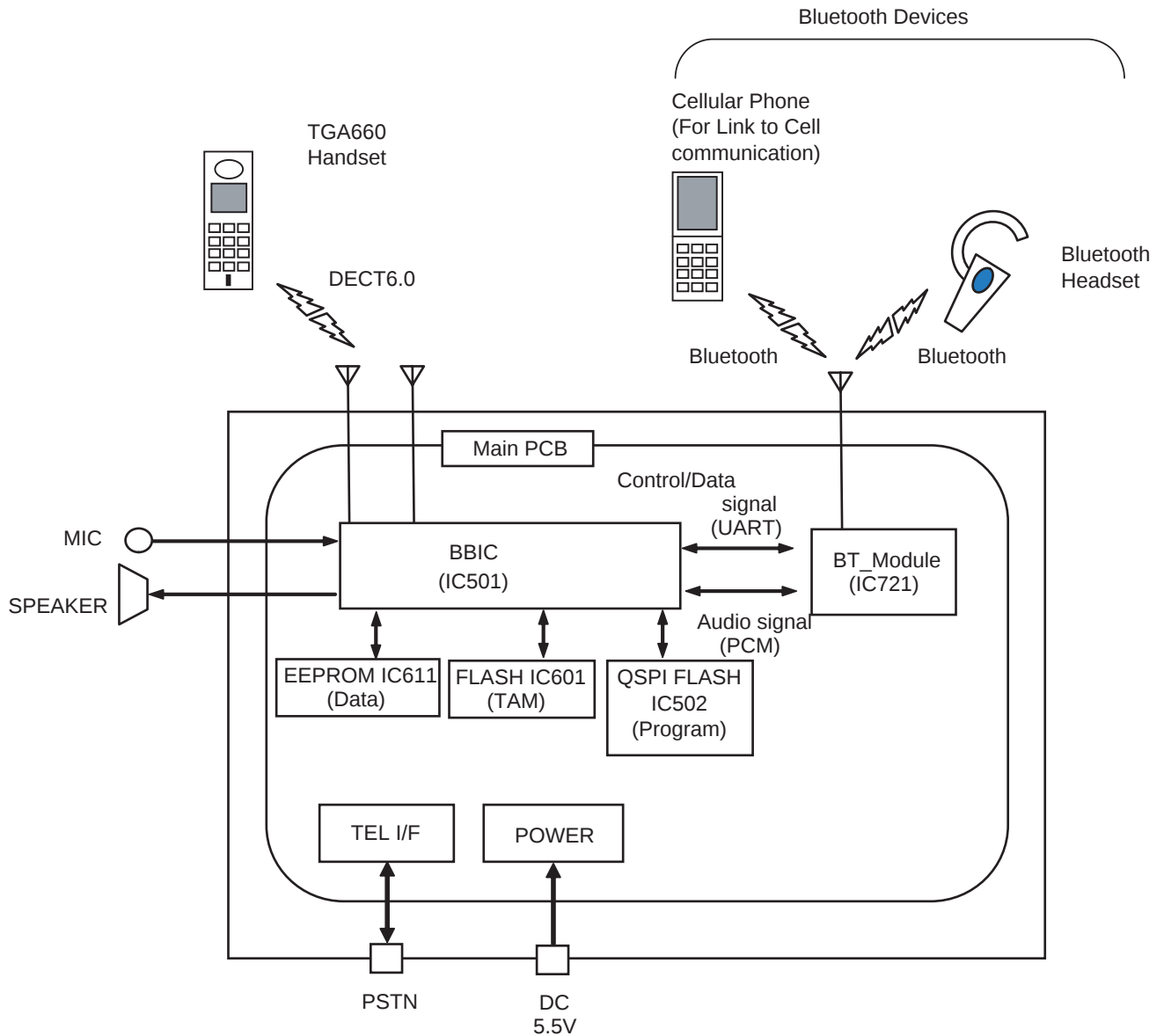
4 Technical Descriptions

4.1. Circuit Configuration of TG764x Series Phones

TG764x consists of DECT cordless telephone and Bluetooth Module.

Both voices of transmission and reception are transferred by PCM.

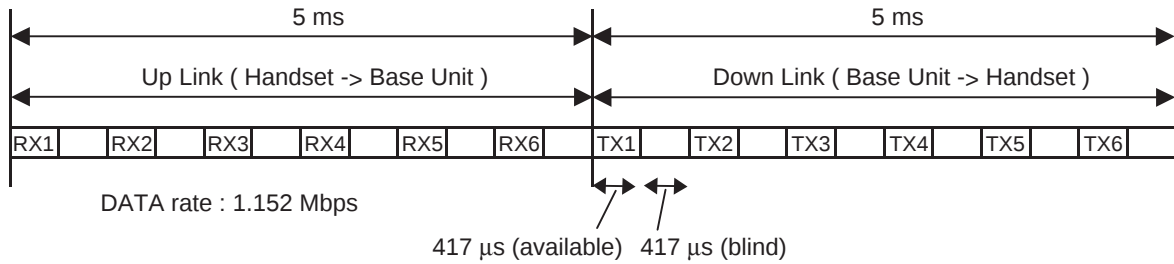
BBIC on DECT side controls the cordless telephone system, which makes control data communication with BT_IC on BT Module in serial data.



4.2. US-DECT Description

The frequency range of 1.92 GHz-1.93 GHz is used. Transmitting and receiving carrier between base unit and handset is same frequency. Refer to **Frequency Table** (P.66).

4.2.1. TDD Frame Format

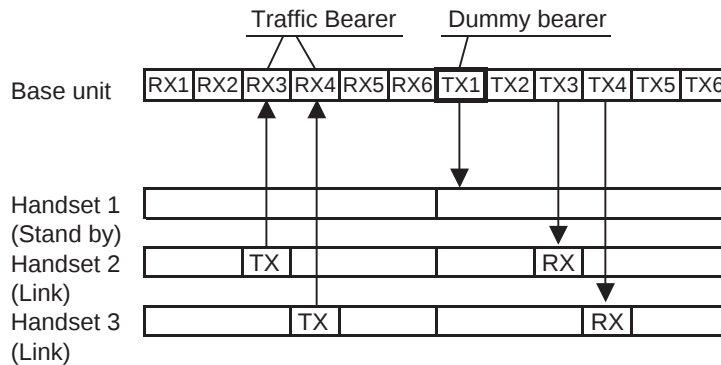


4.2.2. TDMA system

This system is the cycles of 10 ms, and has 6 duplex paths, but maximum duplex communication path is 5 because of dummy bearer use.

In 1 slot 417 μ s, the 10 ms of voice data is transmitted.

• 2 - Handsets Link



Traffic Bearer

A link is established between base unit and handset.

The state where duplex communication is performed.

Handset doesn't make up duplex in no free RF channels because of interference. (*1)

Dummy Bearer

Base unit sends Dummy-data to the all stand-by state handsets.

Handsets receive that data for synchronization and monitoring request from the base unit.

Base unit doesn't send Dummy bearer in no free RF channels because of interference. (*1)

Note:

(*1) It is a feature under FCC 15 regulation and for interference avoidance.

In the case of checking RF parts, it is better in least interference condition.

4.2.3. Signal Flowchart in the Radio Parts

Reception

Base unit:

A voice signal from TEL line is encoded to digital data and converted into a 1.9GHz modulated radio signal by BBIC(IC501). The RF signal, after which is amplified in BBIC, is fed to selected antenna.

Handset:

As for a handset RF, RF signal is received in one antenna.

BBIC down-converts to 864 kHz IF signal from RX signal and demodulates it to digital data "RXDATA".

BBIC (IC1) converts RXDATA into a voice signal and outputs it to speaker.

Transmission

Handset:

A voice signal from microphone is encoded to digital data and converted into a 1.9GHz modulated radio signal by BBIC(IC1). The RF signal, after which is amplified in BBIC, is fed to an antenna.

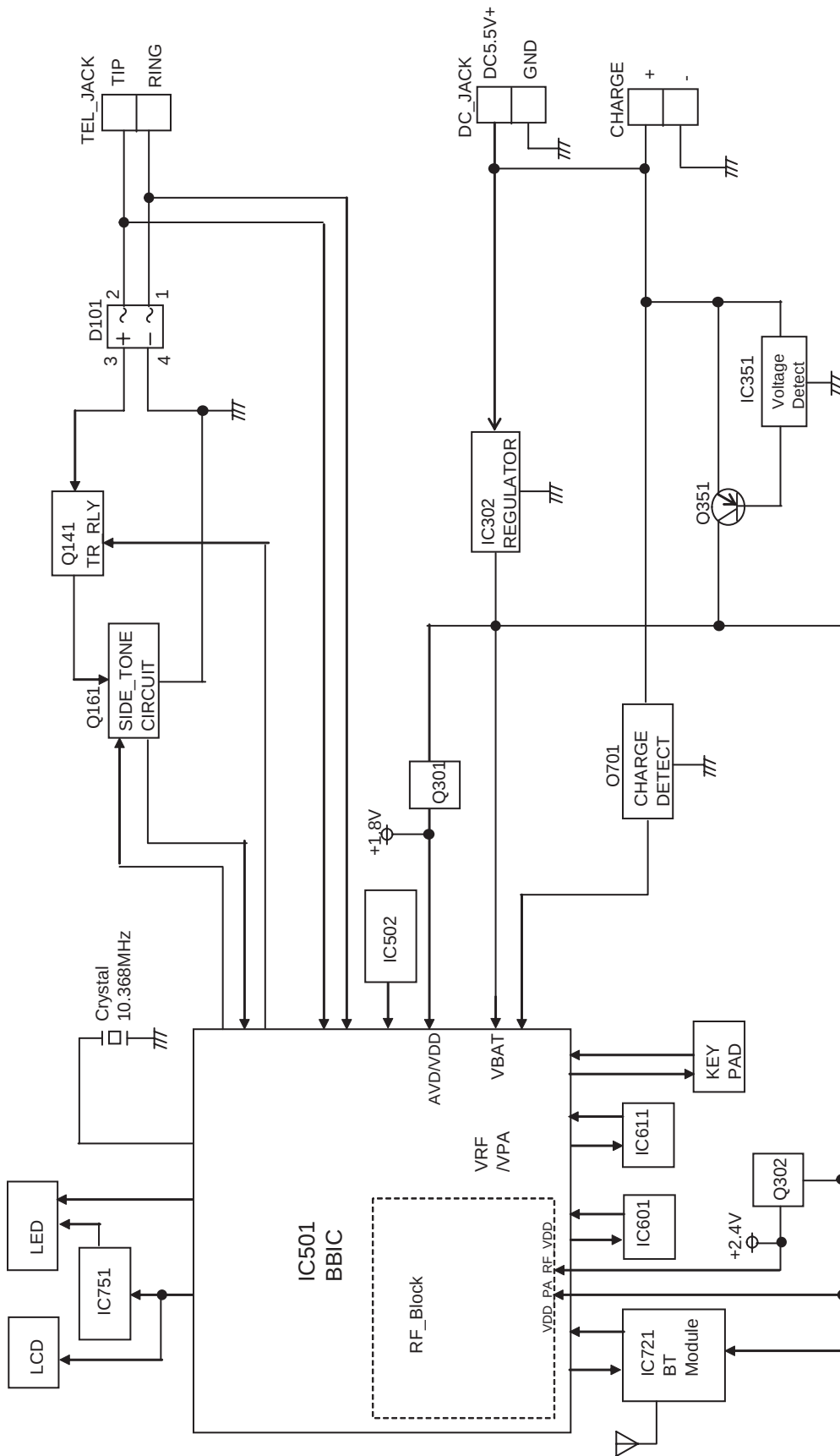
Base unit:

As for a base unit RF, RF signal is received in two antennas.

BBIC (IC501) compares RF signal levels and selects the antenna to be used. Then BBIC down-converts to 864 kHz IF signal from RX signal in the selected antenna, and demodulates it to digital data "RXDATA".

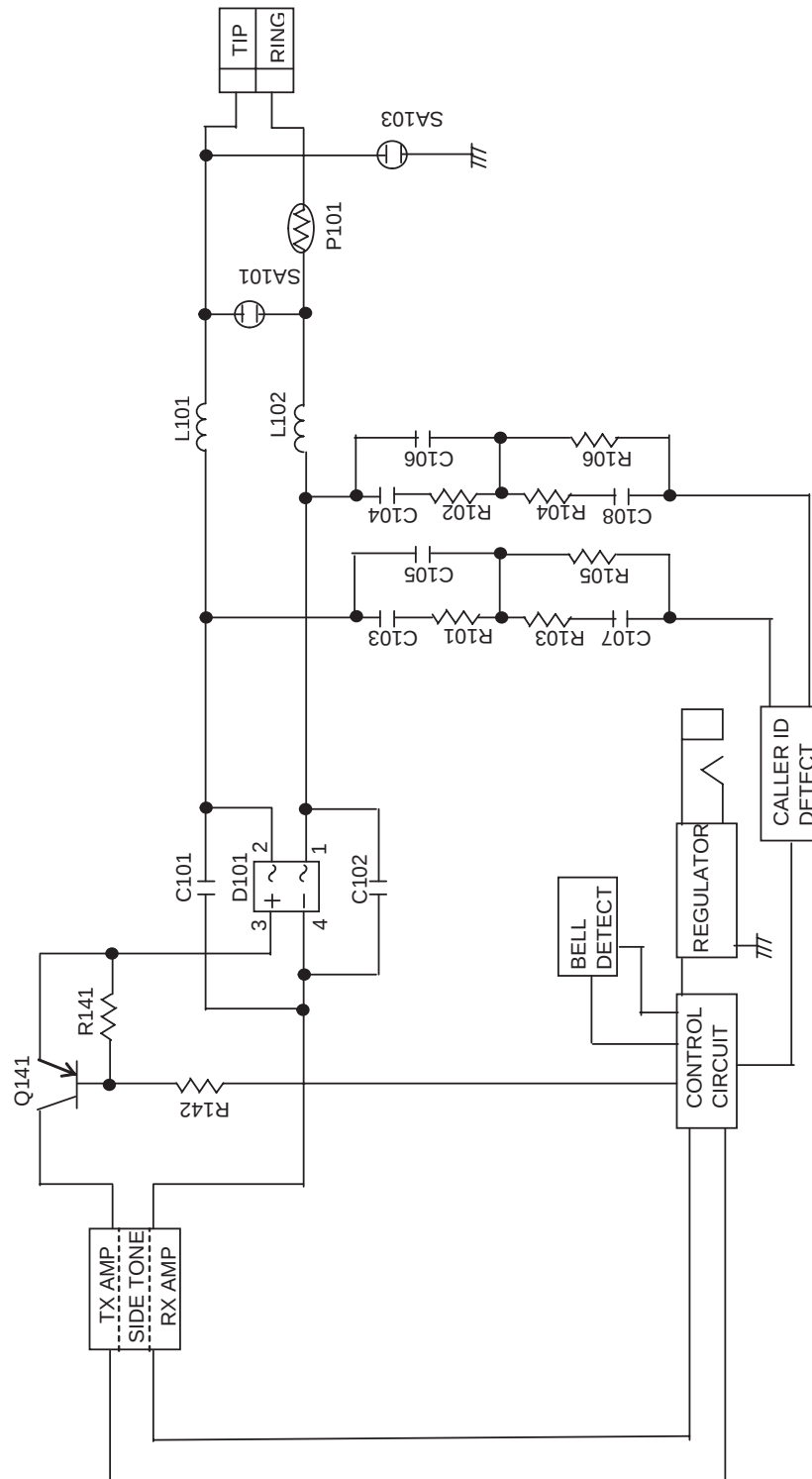
BBIC (IC501) converts RXDATA into a voice signal and outputs it to TEL line.

4.3. Block Diagram (Base Unit_Main)

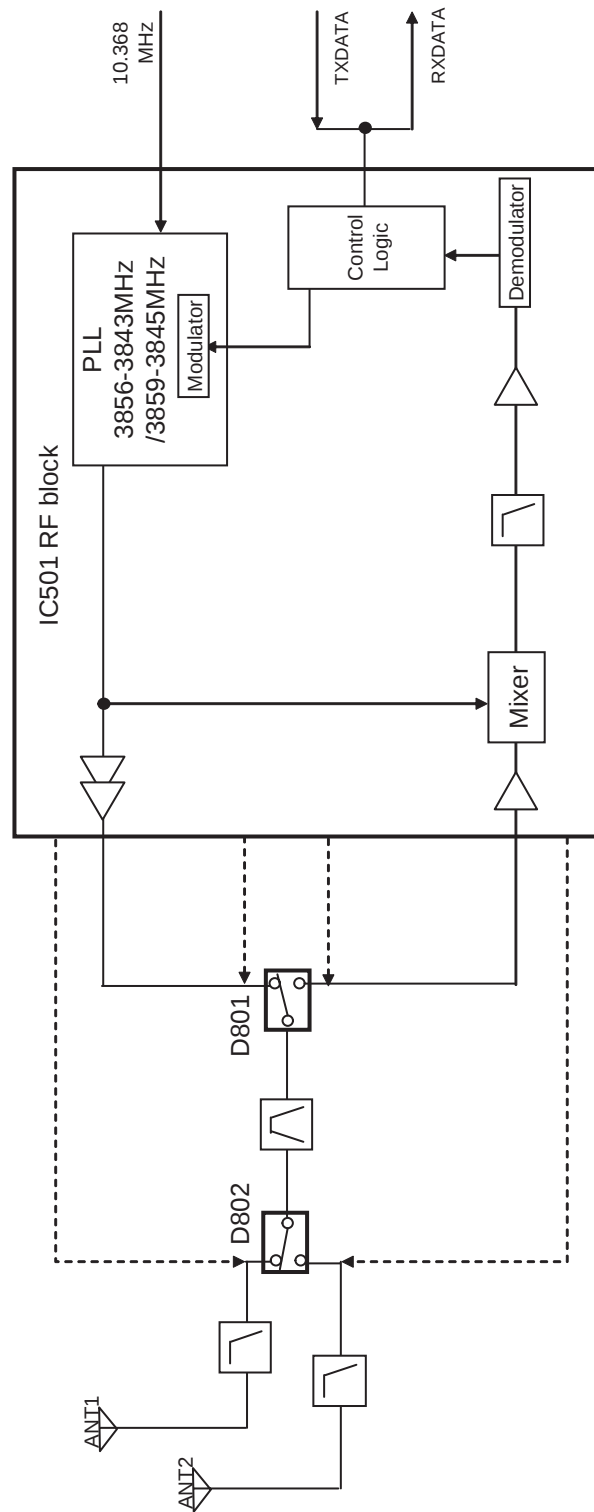


KX-TG155 BLOCK DIAGRAM (Base Unit_Main)

4.4. Tel Interface Circuit



4.5. Block Diagram (Base Unit_RF Part)



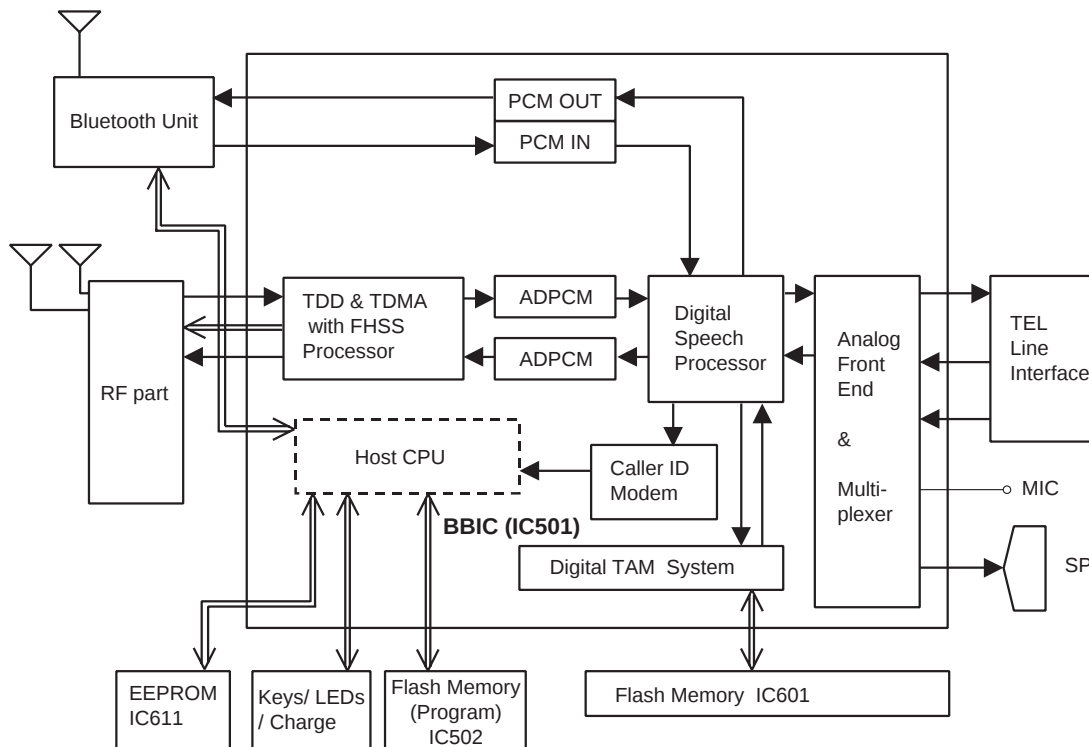
KX-TG155 BLOCK DIAGRAM (Base Unit_RF Part)

4.6. Circuit Operation (Base Unit)

General Description:

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

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



4.6.1. BBIC (Base Band IC: IC501)

- **Voice Message Recording/Play back**

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

- **DTMF Generator**

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

- **Synthesized Voice (Pre-recorded message)**

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

- **Caller ID demodulation**

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

- **Digital Switching**

The voice signal from telephone line is transmitted to the handset or the voice signal from the handset is transmitted to the Telephone line, etc. They are determined by the signal path route operation of voice signal.

- **Block Interface Circuit**

RF part, LED, Key scan, Speaker, Telephone line.

4.6.2. Flash Memory (IC502)

Main program data is stored.

4.6.3. Flash Memory (IC601)

Following information data is stored.

- **Voice signal**

ex: Pre-recorded Greeting message, Incoming message

4.6.4. EEPROM (IC611)

Following information data is stored.

- **Settings**

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

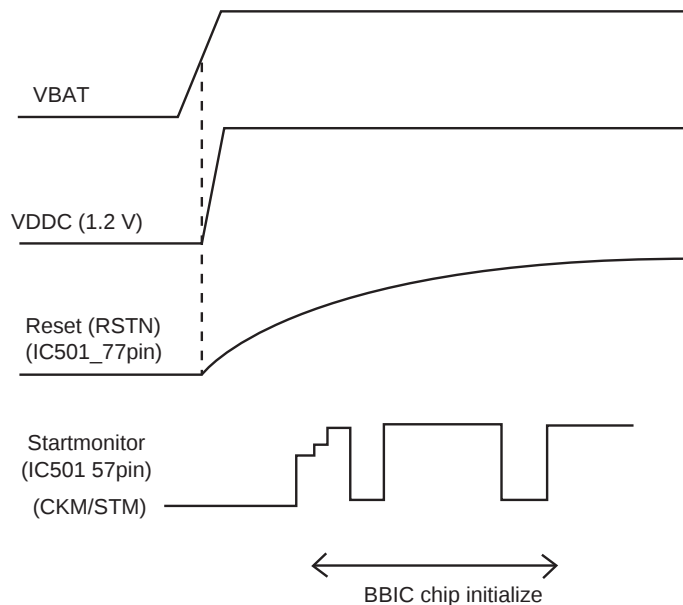
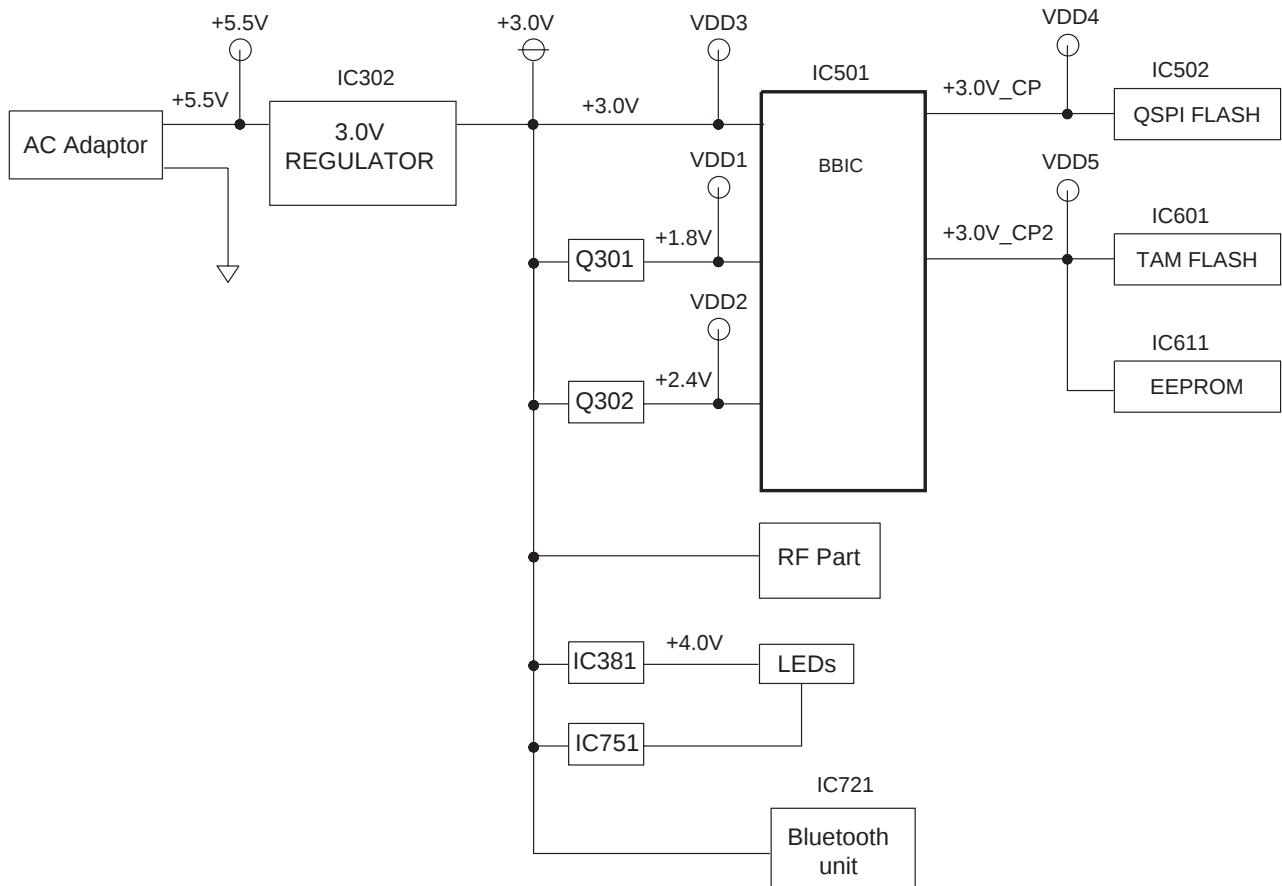
4.6.5. Bluetooth Unit (IC721)

Use for Bluetooth communication.

4.6.6. Power Supply Circuit/Reset Circuit

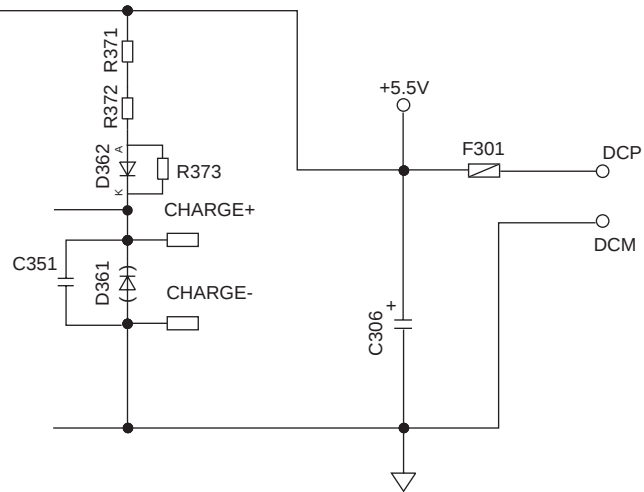
The power supply voltage from AC adaptor is converted to VBAT (3.0V) in IC302. And +3.0V for peripherals and analog part is insulated from VBAT by Doubler of BBIC.

Circuit Operation:



4.6.6.1. Charge Circuit

The voltage from the AC adaptor is supplied to the charge circuits.



4.6.7. Telephone Line Interface

Telephone Line Interface Circuit:

Function

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

Bell (RINGING) signal detection and OFF HOOK circuit:

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

L1T→L101→C105→R105→R110→R111→R112→BBIC pin18(RINGING)

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

T → L101 → D101 → Q141 → Q161 → R163 → R167 → D101 → L102 → P101 → R

ON HOOK Circuit:

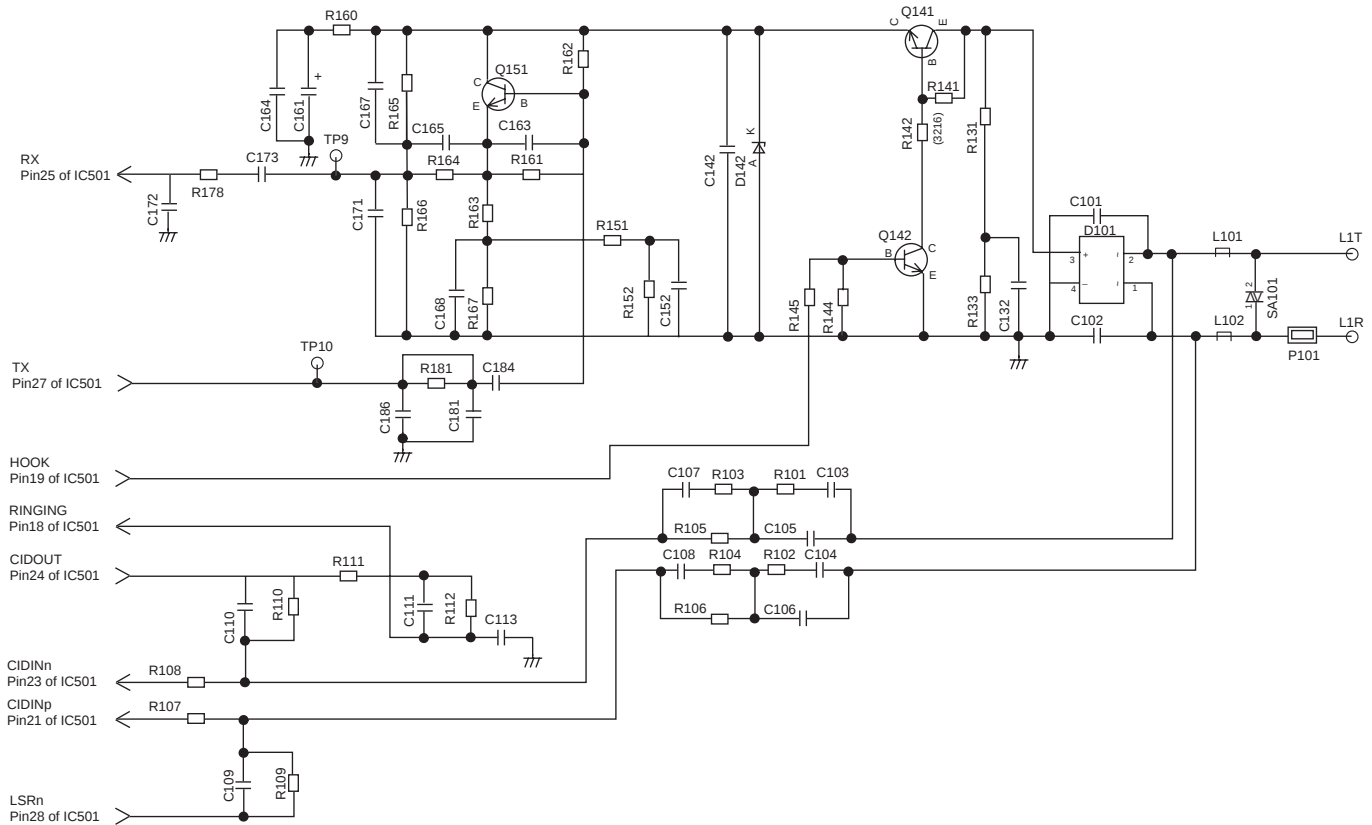
Q141 is open, Q141 is connected as to cut the DC loop current and to cut the voice signal. The unit is consequently in an on-hook condition.

Pulse Dial Circuit:

Pin 19 of BBIC turns Q141 ON/OFF to make the pulse dialing.

Side Tone Circuit:

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



4.6.8. Parallel Connection Detect Circuit/Auto Disconnect Circuit

Function:

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

Circuit Operation:

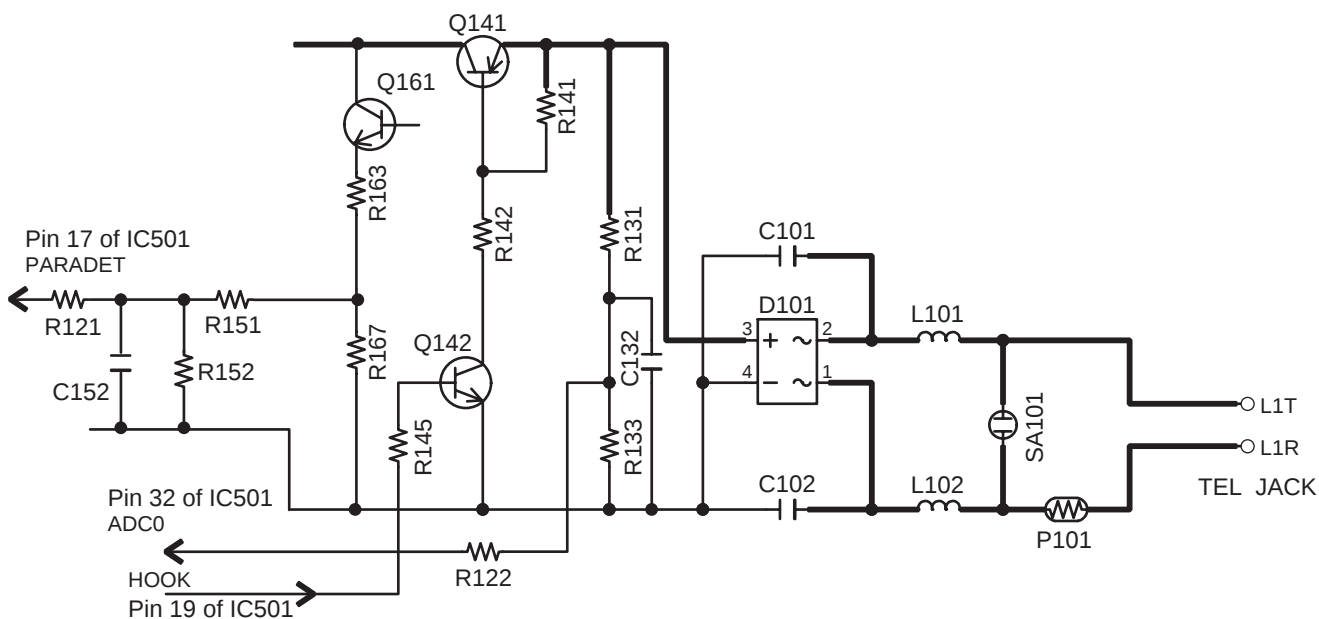
Parallel connection detection when on hook:

When on hook, the voltage is monitored at pin 32 of IC501. There is no parallel connection if the voltage is 0.54 V or higher, while a parallel connection is deemed to exist if the voltage is lower.

Parallel connection detection when off hook:

When off hook, the voltage is monitored at pin 17 of IC501; the presence/absence of a parallel connection is determined by detecting the voltage changes.

If the Auto disconnect function is ON and statuses are Hold, receiving ICM, OGM transmitting, BBIC disconnects the line after detecting parallel connection is off hook.



4.6.9. Calling Line Identification (Caller ID)/Call Waiting Caller ID

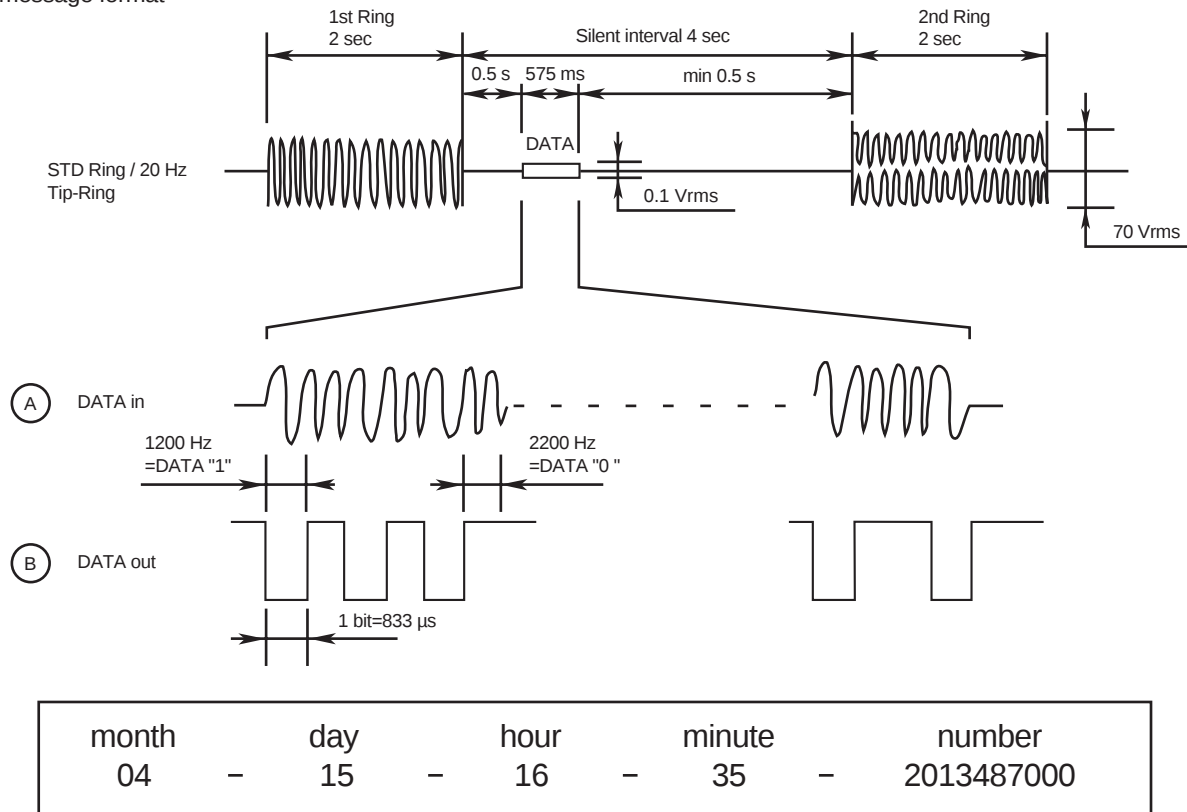
Function:

Caller ID

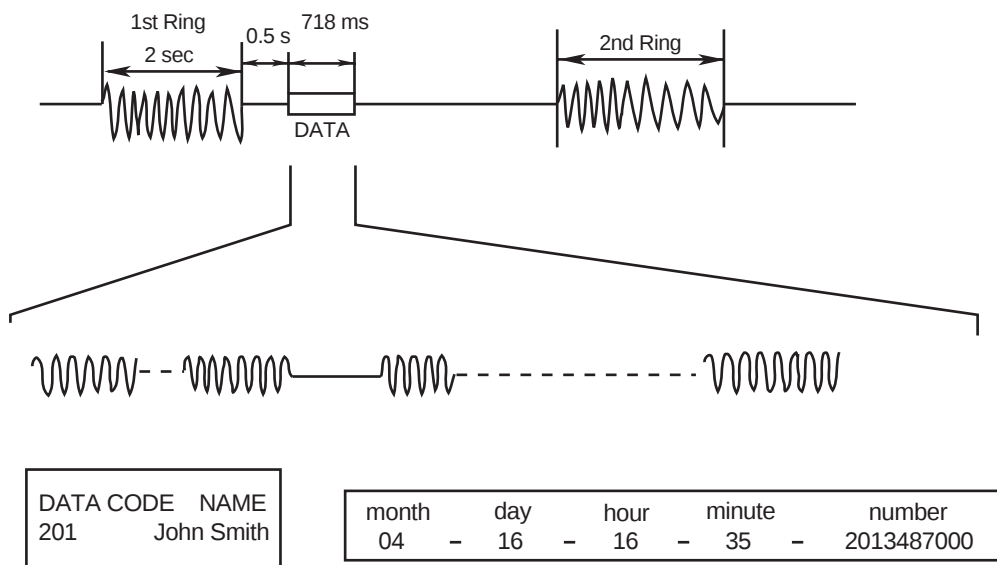
The caller ID is a chargeable ID which the user of a telephone circuit obtains by entering a contract with the telephone company to utilize a caller ID service. For this reason, the operation of this circuit assumes that a caller ID service contract has been entered for the circuit being used. The data for the caller ID from the telephone exchange is sent during the interval between the first and second rings of the bell signal. The data from the telephone exchange is a modem signal which is modulated in an FSK (Frequency Shift Keying) * format. Data "1" is a 1200 Hz sine wave, and data "0" is a 2200 Hz sine wave. There are two types of the message format which can be received: i.e. the single message format and plural message format. The plural message format allows to transmit the name and data code information in addition to the time and telephone number data.

*: Also the telephone exchange service provides other formats.

● Single message format



● Plural message format



Call Waiting Caller ID

Calling Identity Delivery on Call Waiting (CIDCW) is a CLASS service that allows a customer, while off-hook on an existing call, to receive information about a calling party on a waited call. The transmission of the calling information takes place almost immediately after the customer is alerted to the new call so he/she can use this information to decide whether to take the new call.

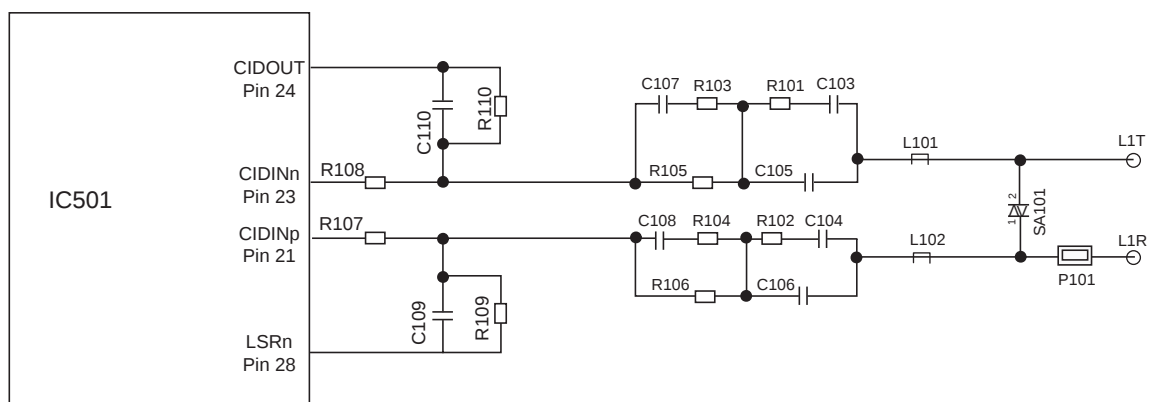
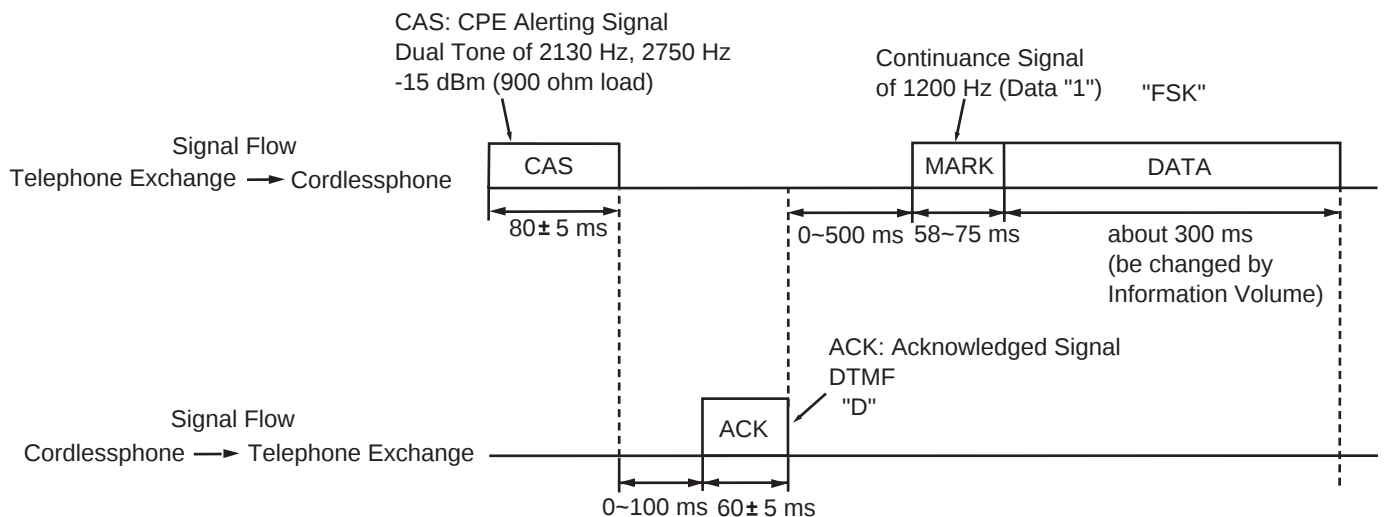
Function:

The telephone exchange transmits or receives CAS and ACK signals through each voice RX/TX route. Then FSK data and MARK data pass the following route.

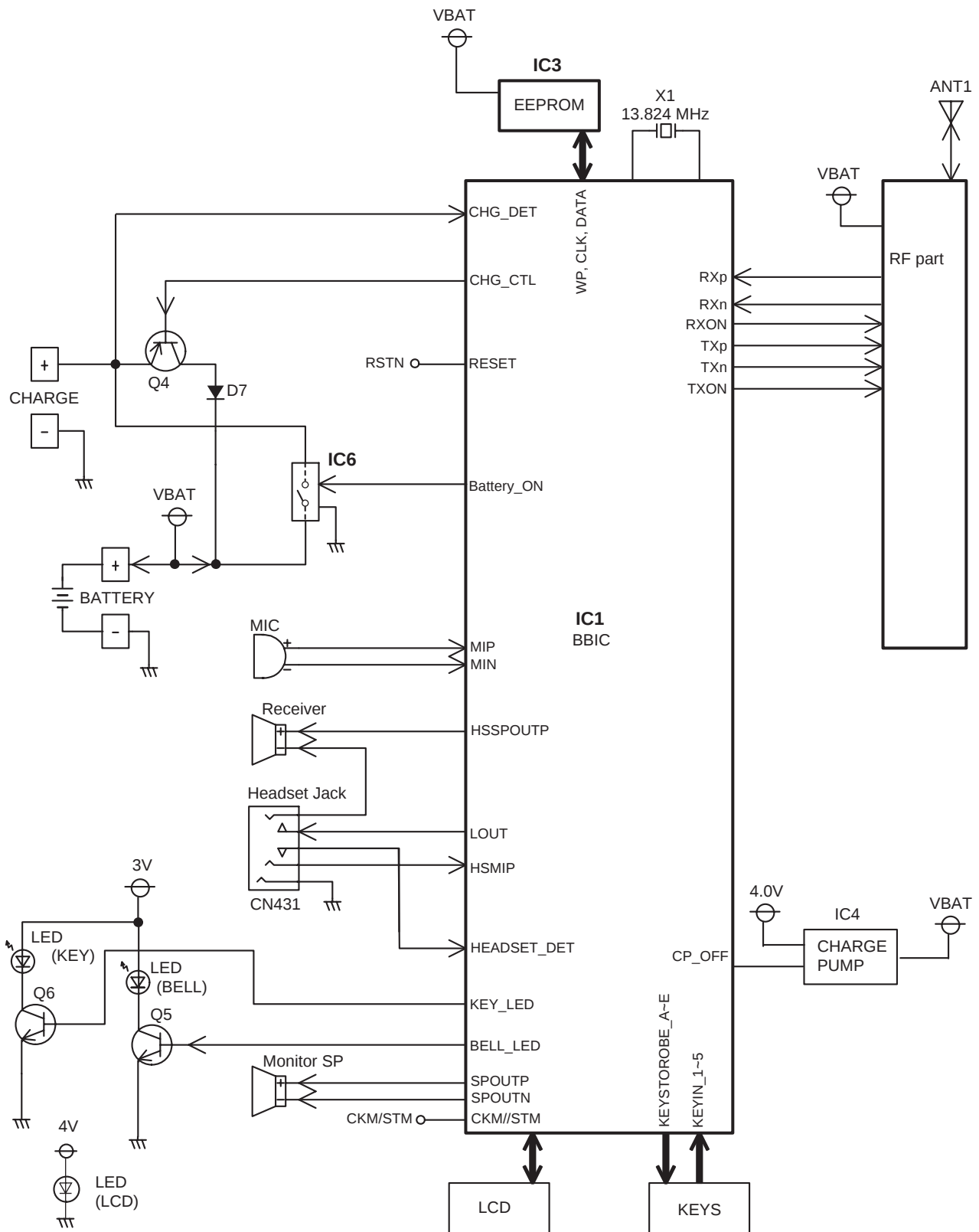
Telephone Line → P101 → L101, L102 → C105, C106 → R105, R106 → R108, R107 → IC501(23, 21).

If the unit deems that a telephone connected in parallel is in use, ACK is not returned even if CAS is received, and the information for the second and subsequent callers is not displayed on the portable handset display.

Call Waiting Format

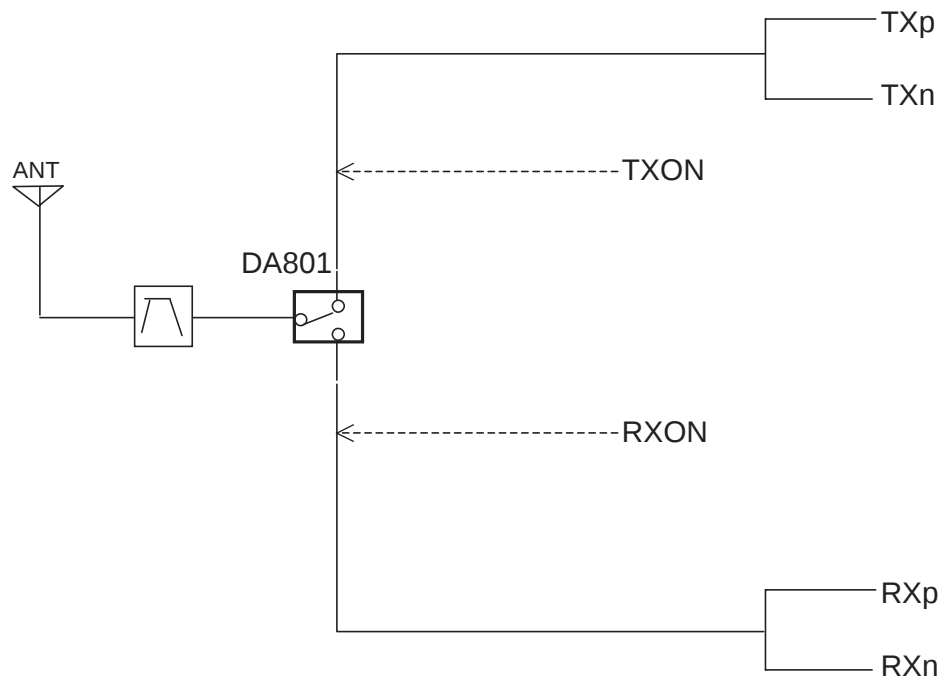


4.7. Block Diagram (Handset)



KX-TGA660 BLOCK DIAGRAM (Handset)

4.8. Block Diagram (Handset_RF Part)



KX-TGA660 BLOCK DIAGRAM (Handset_RF Part)

4.9. Circuit Operation (Handset)

4.9.1. Outline

Handset consists of the following ICs as shown in **Block Diagram (Handset)** (P.20).

- DECT BBIC (**B**ase **B**and IC): IC1
 - All data signals (forming/analyzing ACK or CMD signal)
 - All interfaces (ex: Key, Detector Circuit, Charge, EEPROM, LCD)
- EEPROM: IC3
 - Setting data is stored. (e.g. ID, user setting)

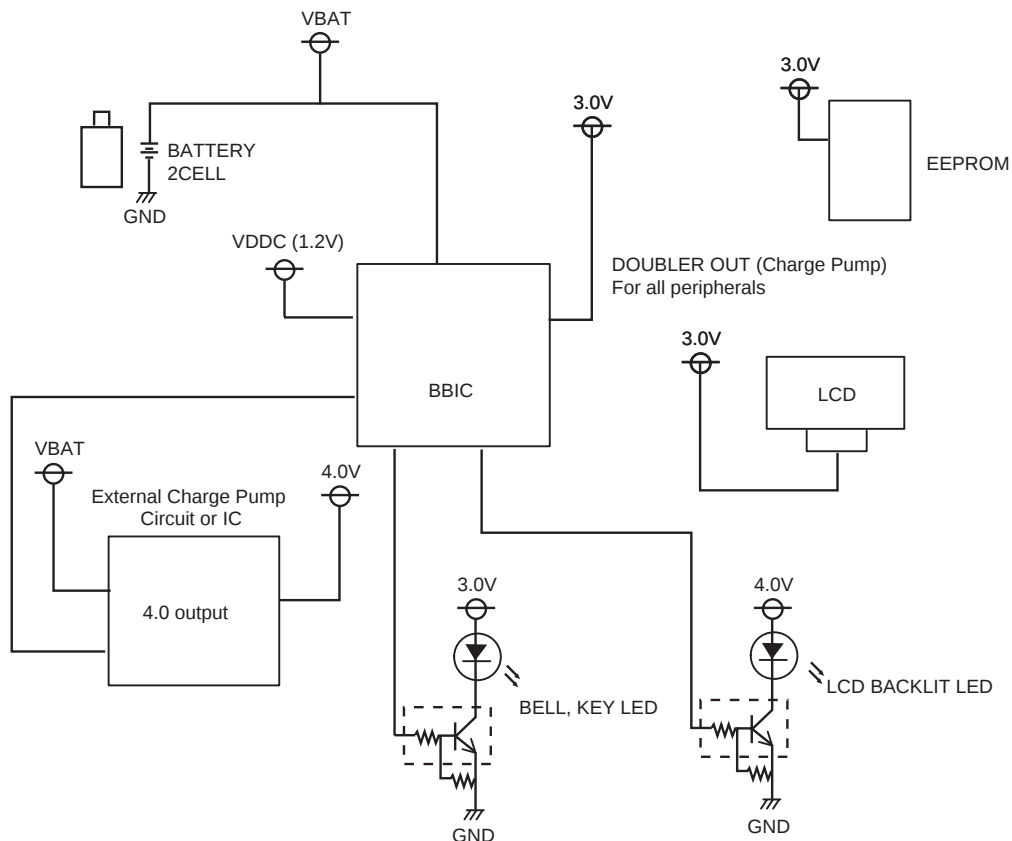
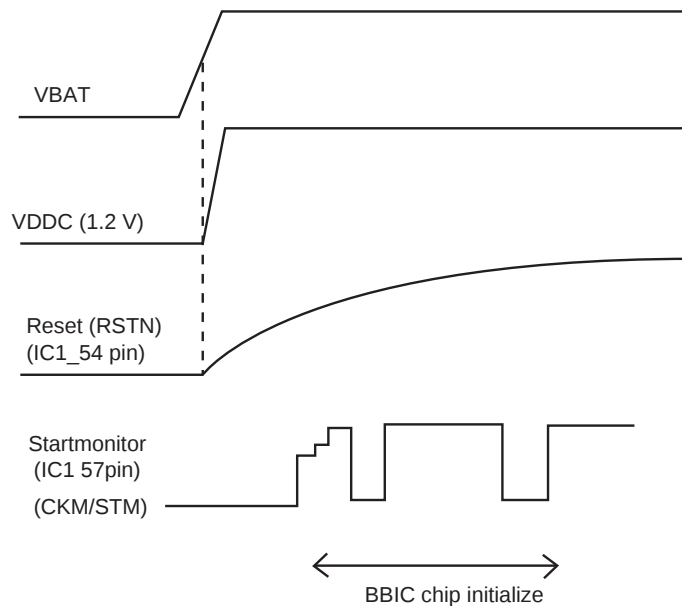
4.9.2. Power Supply Circuit/Reset Circuit

Circuit Operation:

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

BATTERY(2.2 V ~ 2.6 V: BATT+) → F1 → BBC1 (IC1) 10 pin

The Reset signal generates IC1 (54 pin) and 1.8 V.



4.9.3. Charge Circuit

Circuit Operation:

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

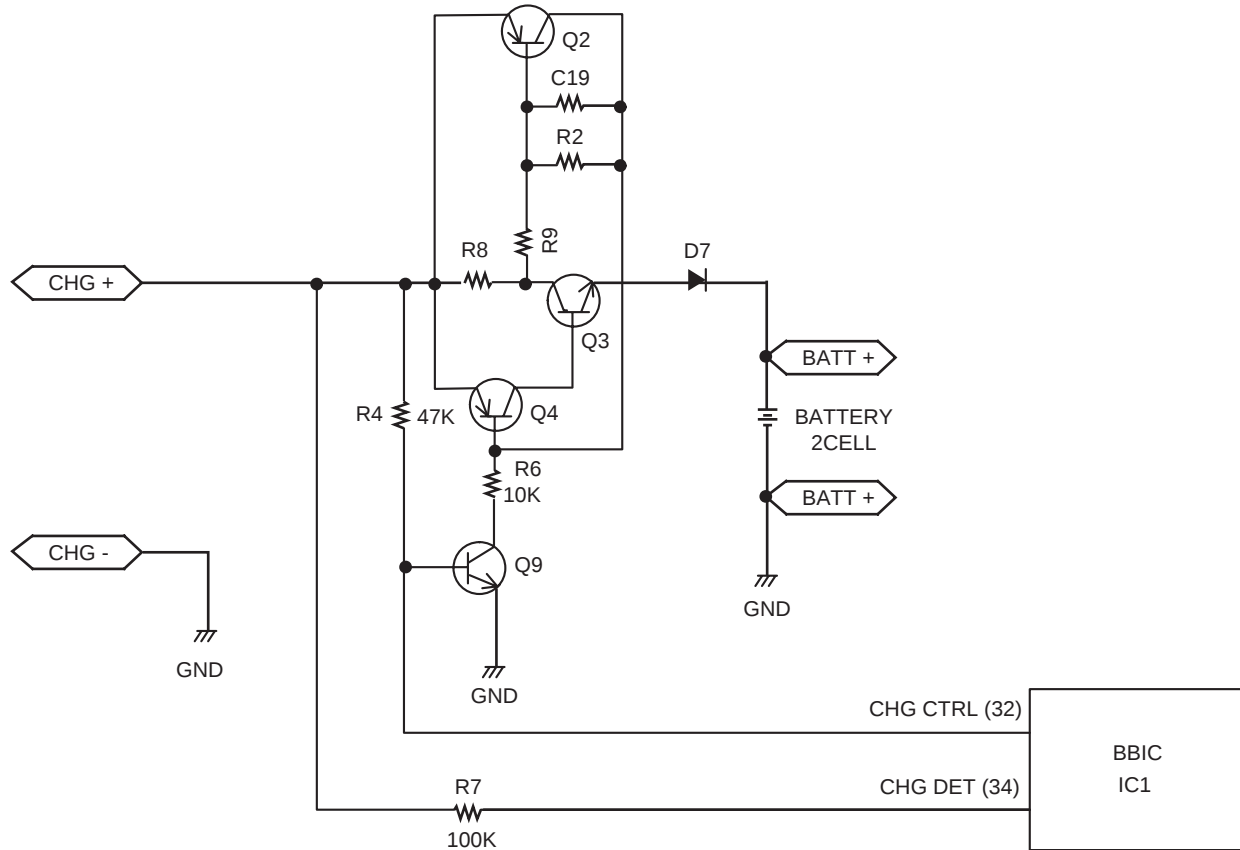
DC+(6.5 V) → F301 → R371 → R372 → CHARGE+(Base) → CHARGE+(Handset) → Q4 → D7 → F1 → BATTERY+... Battery...

BATTERY- → R45 → GND → CHARGE-(Handset) → CHARGE-(Base) → GND → DC-(GND)

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

The charge current is controlled by switching Q9 of Handset.

Refer to Fig.101 in **Power Supply Circuit/Reset Circuit** (P.14).



4.9.4. Battery Low/Power Down Detector

Circuit Operation:

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

The detected voltage is as follows;

- Battery Low

Battery voltage: $V(\text{Batt}) \leq 2.35 \text{ V} \pm 50 \text{ mV}$

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

- Power Down

Battery voltage: $V(\text{Batt}) \leq 2.1 \text{ V} \pm 50 \text{ mV}$

The BBIC detects this level and power down.

4.9.5. Speakerphone

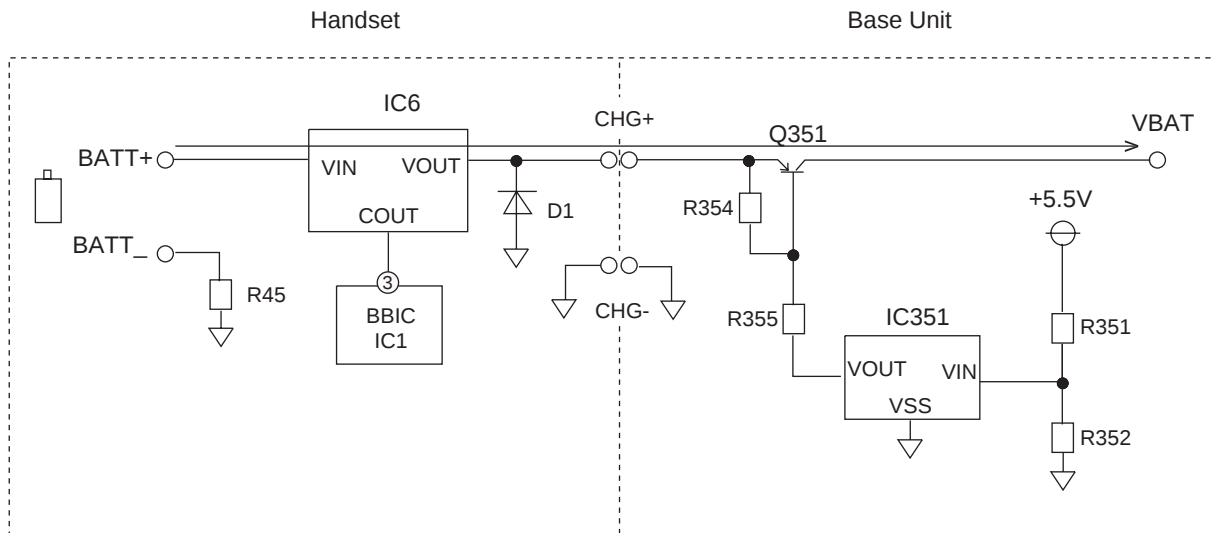
The hands-free loudspeaker at SP+ and SP- is used to generate the ring alarm.

4.10. Behavior of Electric Power Failure

In case that the power from AC adaptor is lost and lose radio waves, BBIC (IC1) turns IC6 ON since handset presumes that base unit's power is failed.

Base unit detects that power voltage of AC adaptor +5.5V is OFF at IC351, then turns Q351 ON.

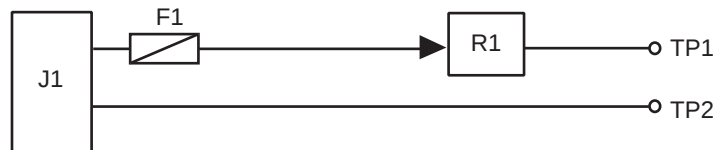
It's possible to use the units during the power failure, supplying power to VBAT of base unit from battery of handset through IC6, CHG terminal and Q351.



4.11. Circuit Operation (Charger Unit)

Charge control is executed at handset side so that the operation when using charger is also controlled by handset.

Refer to **Circuit Operation (Handset)** (P.22)



AC Adaptor

The route for this is as follows: DC+pin of J1(+) → F1 → R1 → CHARGE+pad → Handset → CHARGE-pad → DC-pin of J1(-).

4.12. Signal Route

SIGNAL ROUTE	IN	→	ROUTE	→	OUT
HANDSET TX	HANDSET MIC - R73/74 - C11/13 - RA4 - IC1(22/23) - <HANDSET_RF_TX_ROUTE> - ANT. --- ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(2/3 - 27) - C184 - Q161 - Q141 - D101 - L101/[L102-P101] - T/R (TEL LINE)				
HANDSET RX	T/R (TEL LINE) - L101/[P101-L102] - D101 - Q141 - R165 - C173 - R178 - IC501(25 - 94/95) - <BASE_UNIT_RF_TX_ROUTE> - ANT --- ANT. - <HANDSET_RF_RX_ROUTE> - IC1(28/27) - C86 - L74 - HEADSET_JACK(5 - 4) - R11 - HANDSET SPEAKER				
HEADSET TX	HEADSET_JACK(2) - R306 - C14 - R22 - IC1(25) - <HANDSET_RF_TX_ROUTE> - ANT. --- ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(2/3 - 27) - C184 - Q161 - Q141 - D101 - L101/[L102-P101] - T/R (TEL LINE)				
HEADSET RX	T/R (TEL LINE) - L101/[P101-L102] - D101 - Q141 - R165 - C173 - R178 - IC501(25 - 94/95) - <BASE_UNIT_RF_TX_ROUTE> - ANT --- ANT. - <HANDSET_RF_RX_ROUTE> - IC1(28) - C86 - L74 - HEADSET_JACK(5)				
HANDSET SP-Phone TX	HANDSET MIC - R73/74 - C11/13 - RA4 - IC1(22/23) - <HANDSET_RF_TX_ROUTE> - ANT. --- ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(2/3 - 27) - C184 - Q161 - Q141 - D101 - L101/[L102-P101] - T/R (TEL LINE)				
HANDSET SP-Phone RX	T/R (TEL LINE) - L101/[P101-L102] - D101 - Q141 - R165 - C173 - R178 - IC501(25 - 94/95) - <BASE_UNIT_RF_TX_ROUTE> - ANT --- ANT. - <HANDSET_RF_RX_ROUTE> - IC1(29/31) - Backside SP				
BASE SP-Phone TX	MIC - C457/C458 - RA452 - IC501(37/38 - 27) - C184 - Q161 - Q141 - D101 - L101/[L102-P101] - T/R (TEL LINE)				
BASE SP-Phone RX	T/R (TEL LINE) - L101/[P101-L102] - D101 - Q141 - R165 - C173 - R178 - IC501(25 - 41/43) - SPEAKER				
CELLULAR TX	HANDSET MIC - R73/74 - C11/13 - RA4 - IC1(22/23) - <HANDSET_RF_TX_ROUTE> - ANT. --- ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(2/3 - 80) - IC721(31 - 19) - R781 - ANT_BT - CELL PHONE				
CELLULAR RX	CELL PHONE - ANT_BT - R781 - IC721(19 - 3) - IC501(81 - 94/95) - <BASE_UNIT_RF_TX_ROUTE> - ANT ---ANT. - <HANDSET_RF_RX_ROUTE> - IC1(28/27) - C86 - L74 - HEADSET JACK(5-4) - R11 - HANDSET SPEAKER				
Bluetooth Headset Sound TX(to Tel Line)	from BT Headset - ANT_BT - R781 - IC721(19 - 3) - IC501(81 - 27) - C184 - Q161 - Q141 - D101 - L101/[L102-P101] - T/R (TEL LINE)				
Bluetooth Headset Sound RX(from Tel Line)	T/R (TEL LINE) - L101/[P101-L102] - D101 - Q141 - R165 - C173 - R178 - IC501(25 - 80) - IC721(31 - 19) - R781 - ANT_BT - to BT Headset				

Note:

: inside of Handset

RF part signal route

SIGNAL ROUTE	IN	→	ROUTE	→	OUT
INTERCOM — HANDSET TO BASE UNIT	HANDSET MIC - R73/74 - C11/13 - RA4 - IC1(22/23) - <HANDSET_RF_TX_ROUTE> - ANT. --- ANT - <BASE_UNIT_RF_RX_ROUTE> - IC501(2/3 - 41/43) - SPEAKER				
INTERCOM — BASE UNIT TO HANDSET	MIC - C457/C458 - RA452 - IC501(37/38 - 94/95) - <BASE_UNIT_RF_TX_ROUTE> - ANT --- ANT. - <HANDSET_RF_RX_ROUTE> - IC1(28/27) - C86 - L74 - HEADSET_JACK(5 - 4) - R11 - HANDSET SPEAKER				
GREETING — RECORDING	HANDSET MIC - R73/74 - C11/13 - RA4 - IC1(22/23) - <HANDSET_RF_TX_ROUTE> - ANT. --- ANT - <BASE_UNIT_RF_RX_ROUTE> - IC501(2/3 - 69/70) - IC601				
GREETING PLAY — TO TEL LINE	IC601 - IC501(69/70 - 27) - C184 - Q161 - Q141 - D101 - L101/[L102-P101] - T/R (TEL LINE)				
ICM RECORDING —	T/R (TEL LINE) - L101/[P101-L102] - D101 - Q141 - R165 - C173 - R178 - IC501(25 - 69/70) - IC601				
ICM PLAY TO — SPEAKER	IC601 - IC501(69/70 - 41/43) - SPEAKER				
DTMF SIGNAL — TO TEL LINE	IC501(27) - C184 - Q161 - Q141 - D101 - L101/[L102-P101] - T/R (TEL LINE)				
CALLER ID —	T/R(TEL LINE) - L101/[P101 - L102] - C105/C106 - R105/R106 - R108/R107 - IC501(23/21)				
BELL DETECTION —	T/R(TEL LINE) - L101 - C105 - R105 - R110 - R111 - R112 - IC501(18)				
HANDSET RF [TX_ROUTE]	IC1(44/45) - L809 - C812 - DA801 - C895 - ANT				
HANDSET RF [RX_ROUTE]	ANT - C895 - DA801 - C826 - IC1(46/47)				
BASE UNIT RF [TX_ROUTE]	IC501(95/94) - L802/C813 - C812 - DA801 - C803 - DA802 - C851/C853 - ANT1/ANT2				
BASE UNIT RF [RX_ROUTE]	ANT1/ANT2 - C851/C853 - DA802 - C803 - DA801 - C826 - C854/C853 - IC501(3/2)				

Note:

 : inside of Handset

5 Location of Controls and Components

Refer to the Operating Instructions.

Note:

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

6 Installation Instructions

Refer to the Operating Instructions.

Note:

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

7 Operating Instructions

Refer to the Operating Instructions.

Note:

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

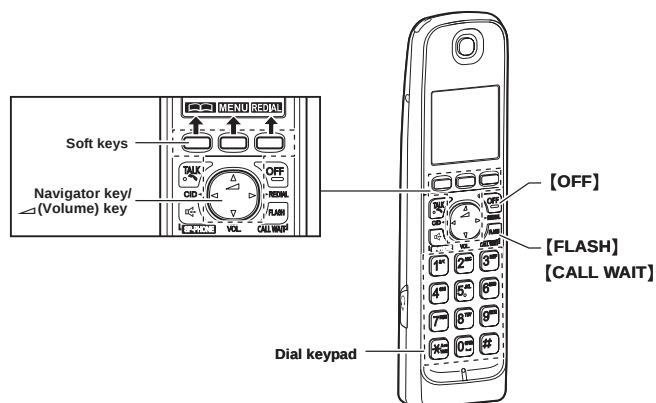
8 Test Mode

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.

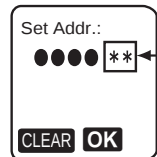
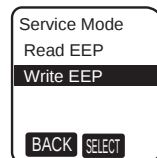
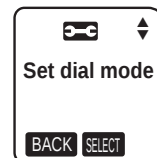
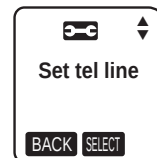
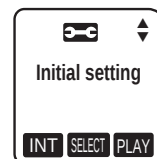


H/S key operation

- 1). Press **MENU**.
- 2). Select "Initial Setting" using **▲** or **▼** then press **SELECT** or **▶**.

Select "Set tel line" using **▲** or **▼** then press **SELECT** or **▶**.
- 3). Enter "7", "2", "6", "2", "7", "6", "6", "4".
Note: 7262 7664 = PANA SONI
(see letters printed on dial keys)
- 4). Select "Write EEP" using **▲** or **▼** then press **SELECT** or **▶**.
- 5). Enter "0", "0", "0", "0" (Address). (*1)
- 6). Enter "*", "*" (New Data). (*1)

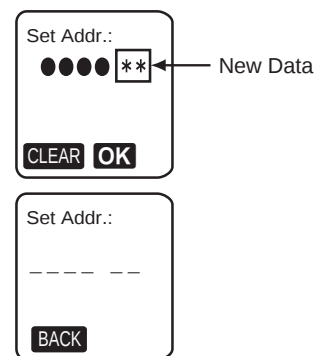
H/S LCD



See next page

- 7). Press **OK** , a long confirmation beep will be heard.

- 8). Press **[OFF]** to return to standby mode.
After that, turn the base unit power off and then power on.



Note: * To enter "Set dial mode", press **SELECT** or **[▶]** at " Set tel line".
It is necessary to turn on the power of base unit.

* "Set tel line" isn't appeared at Cell line only mode.

To back normal mode, execute the following procedure:

- 1 **[MENU] → [#][1][5][7]**
- 2 **[▼]/[▲]**: Select "off "→ **[SELECT]**
- 3 **[OFF]**

Frequently Used Items (Base Unit)

ex.)

Items	Address	Default Data	New Data		Remarks
Frequency	00 07 / 00 08	70/02	-	-	Use these items in a READ-ONLY mode to confirm the contents. Careless rewriting may cause serious damage to the computer system.
ID	00 02 ~ 00 06	Given value	-	-	

Note:

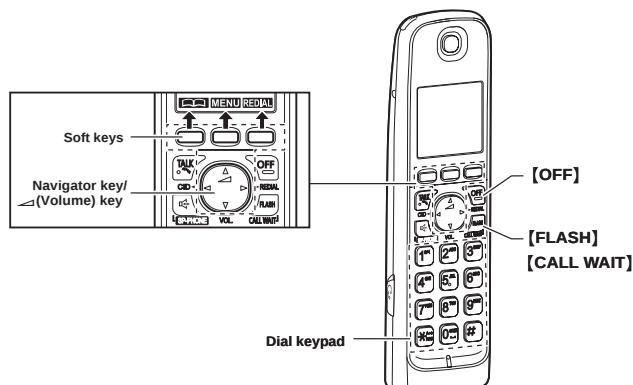
(*1) When you enter the address or New Data, please refer to the table below.

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

8.1.2. Handset

Important:

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



H/S key operation

- 1). Press **MENU**.
- 2). Select "Initial Setting" using **[▲]** or **[▼]** then press **SELECT** or **[▶]**.
- 3). Enter "7", "2", "6", "2", "7", "6", "6", "4".
Note: 7262 7664 = PANA SONI
 (see letters printed on dial keys)
- 4). Select "Write EEP" using **[▲]** or **[▼]** then press **SELECT** or **[▶]**.

- 5). Enter "0", "0", "0", "0" (Address). (*1)

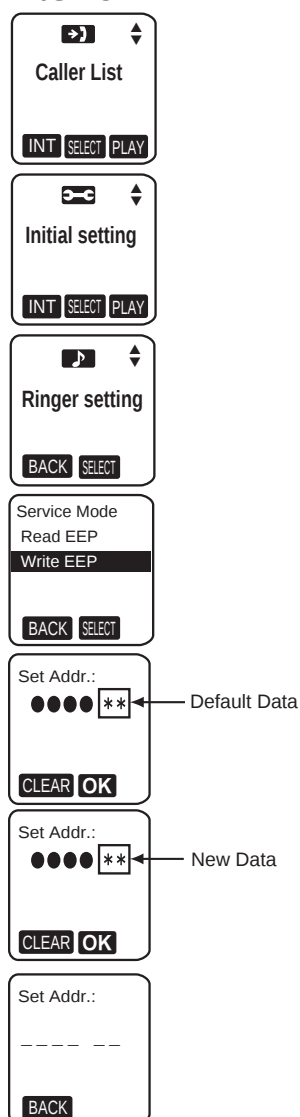
- 6). Enter "*", "*" (New Data). (*1)

- 7). Press **OK**, a long confirmation beep will be heard.

- 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.

H/S LCD



Frequently Used Items (Handset)

ex.)

Items	Address	Default Data	New Data	Possible Adjusted Value MAX (hex)	Possible Adjusted Value MIN (hex)	Remarks
Battery Low	00 12/00 13	00 / 00	-	-	-	(*2)
Frequency	00 07 / 00 08	00 / 01	-	-	-	
ID	00 02 ~ 00 06	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 handset.

9 Service Mode

9.1. How to Clear User Setting (Handset Only)

Handset

Press **[2]**, **[5]**, **[8]**, **[0]** simultaneously until a beep sound is heard. Then single handset is initialized.

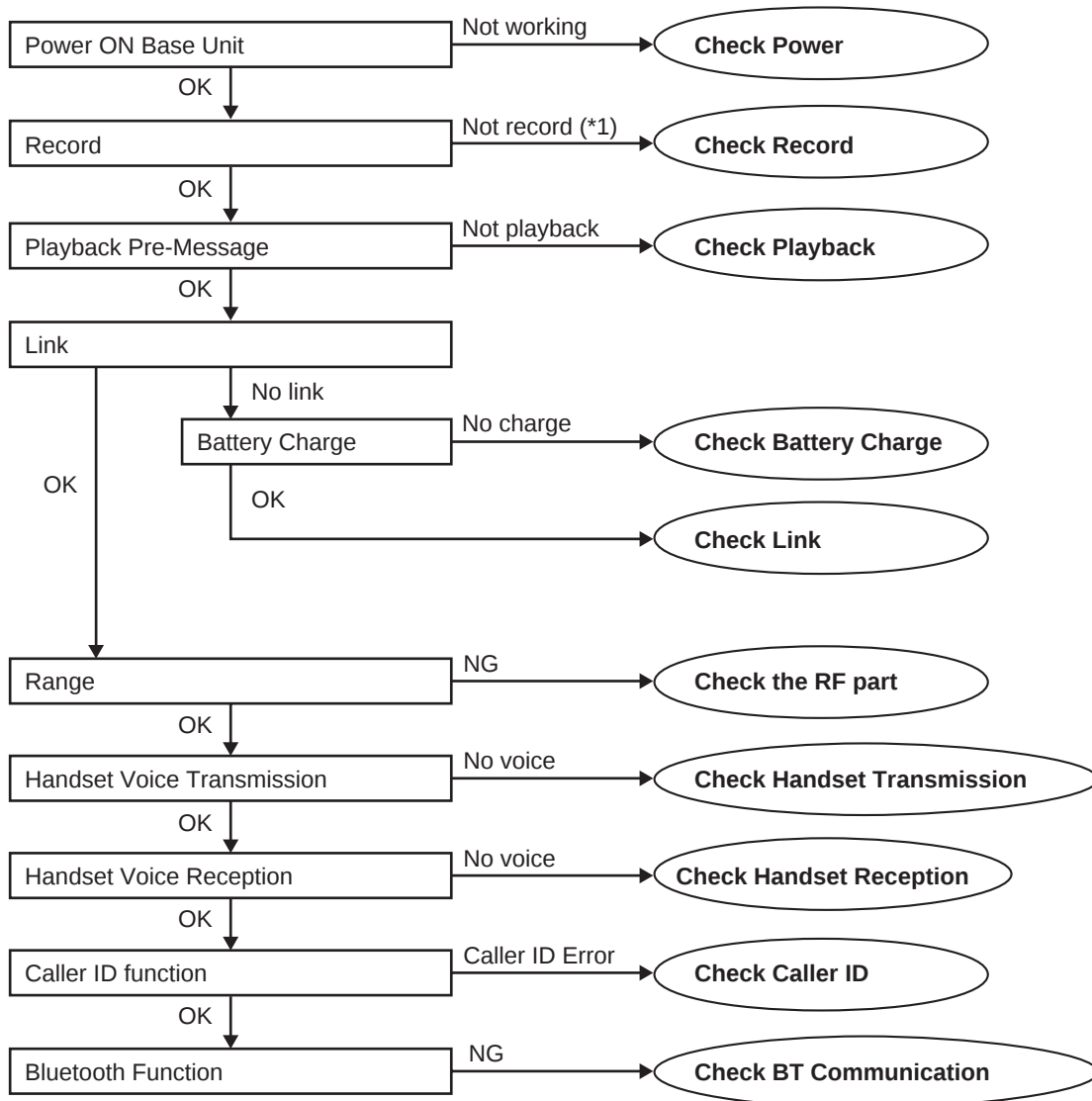
(The contents of user setting are reset to factory default)

*Usage time is not cleared.

10 Troubleshooting Guide

10.1. Troubleshooting Flowchart

FLOW CHART



Cross Reference:

Check Power (P.34)

Check Record (P.35)

Check Playback (P.38)

Check Battery Charge (P.38)

Check Link (P.39)

Check the RF part (P.41)

Check Handset Transmission (P.46)

Check Handset Reception (P.46)

Check Caller ID (P.46)

Check BT Communication (P.47)

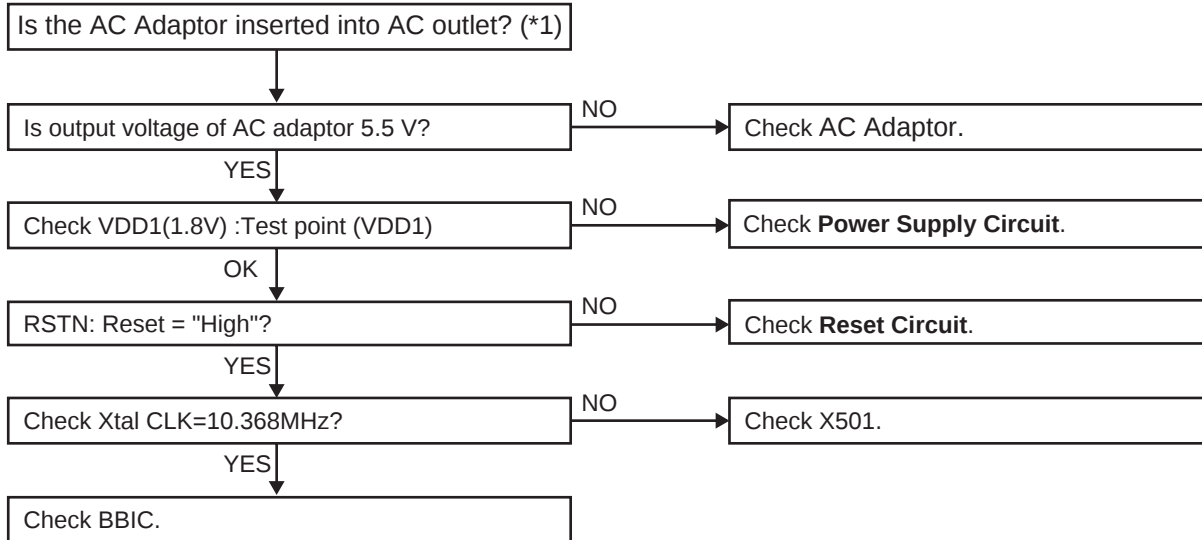
Note:

(*1) When a user claims that the unit disconnects a call right after the greeting message and no incoming messages can be recorded, this symptom can not be reappeared with TEL simulator in the service center. In this case, try to change the Auto disconnect activation time and Vox level.

<How to change the Auto Disconnect activation time and VOX level> (P.36) item (A) and (B).

10.1.1. Check Power

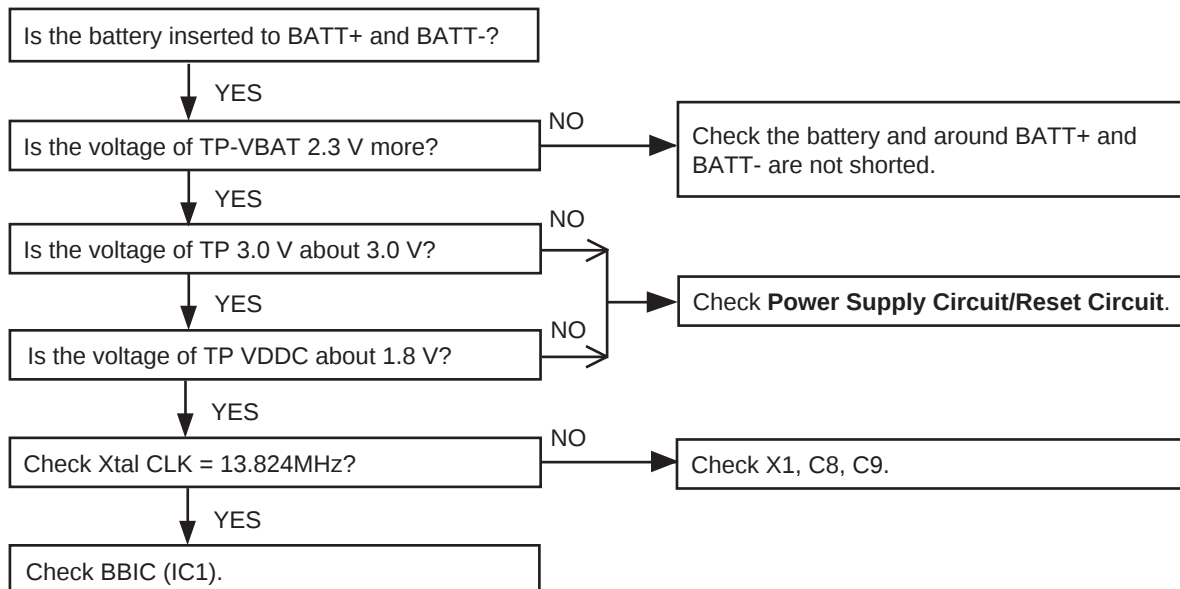
10.1.1.1. Base Unit



Cross Reference:
Power Supply Circuit/Reset Circuit (P.14)

Note:
 BBIC is IC501.
 (*1) Refer to **Specifications** (P.6) for part number and supply voltage of AC adaptor.
 (*2) Refer to **Circuit Board (Base Unit_Main)** (P.85).

10.1.1.2. Handset

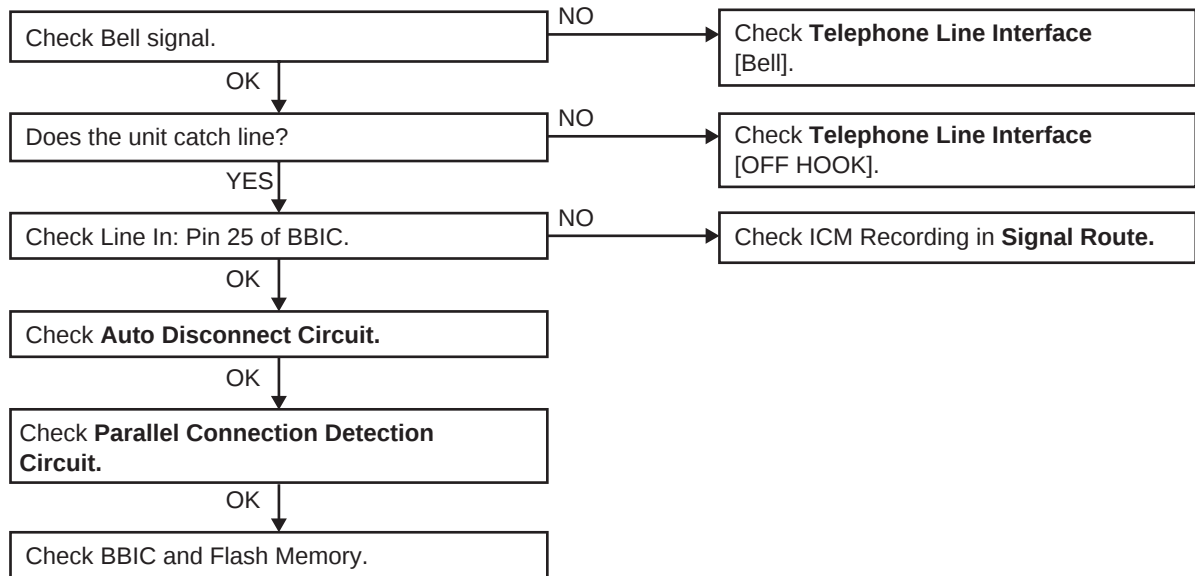


Cross Reference:
Power Supply Circuit/Reset Circuit (P.22)

10.1.2. Check Record

10.1.2.1. Base Unit

Not record Incoming Message



Cross Reference:

Signal Route (P.25)

Telephone Line Interface (P.16)

Parallel Connection Detect Circuit/Auto Disconnect Circuit (P.17)

Note:

Flash Memory is IC601.

BBIC is IC501.

<How to change the Auto Disconnect activation time and VOX level>

A) Auto Disconnect activation time:

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

- 1) Press "MENU " key at standby Mode and "#" key.

Note: The set must power on and be linked.

- 2) Press "9", "0", "0", "0", " *".

LCD (H/S)

Service ready
 : _____

BACK

- 3) Press "7", "3", "1".

Service ready
 : 7 3 1 _

CLEAR

- 4) Then enter the below last digit;

last digit	"0"	Auto disconnect & CPC (*1) : enable . . . [default]
	"1"	Auto disconnect : enable(*1) CPC : disable
	"2"	Auto disconnect & CPC : disable(*2)

Note:

(*1) Both Auto Disconnect and CPC don't detect for the first 2 seconds.

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

- 5) Back to "standby" mode automatically after step 4).
You can hear beep sound which is a confirmation tone.

B) Vox level:

It makes easier to detect a small voice (caller) by raising the sensitivity of VOX level. Therefore, the recording of TAM is not turned off during a detection.

1) ~ 2) are same as (A).

3) Press "5","1","1".

Service ready :5 1 1 _ CLEAR

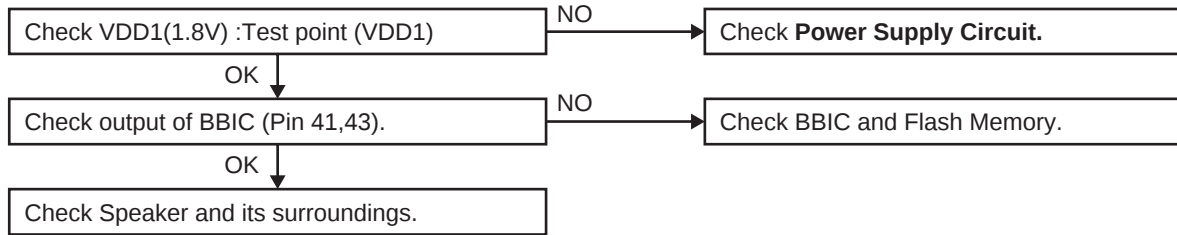
4) Then enter the below last digit;

last digit	"0"	default setting : normal
	"1"	6dB up

5) Back to "standby" mode automatically after step 4).
You can hear beep sound which is a confirmation tone.

10.1.3. Check Playback

10.1.3.1. Base Unit

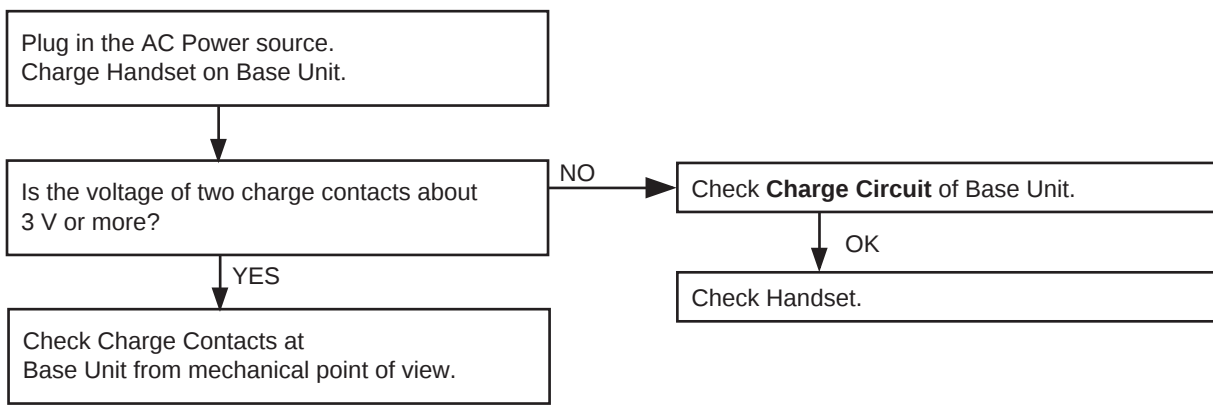


Cross Reference:
Power Supply Circuit/Reset Circuit (P.14)

Note:
 Flash Memory is IC601.
 BBIC is IC1.
 (*1) Refer to **Circuit Board (Base Unit_Main)** (P.85).

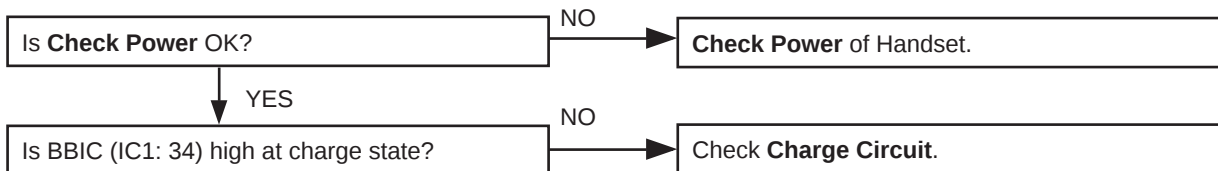
10.1.4. Check Battery Charge

10.1.4.1. Base Unit



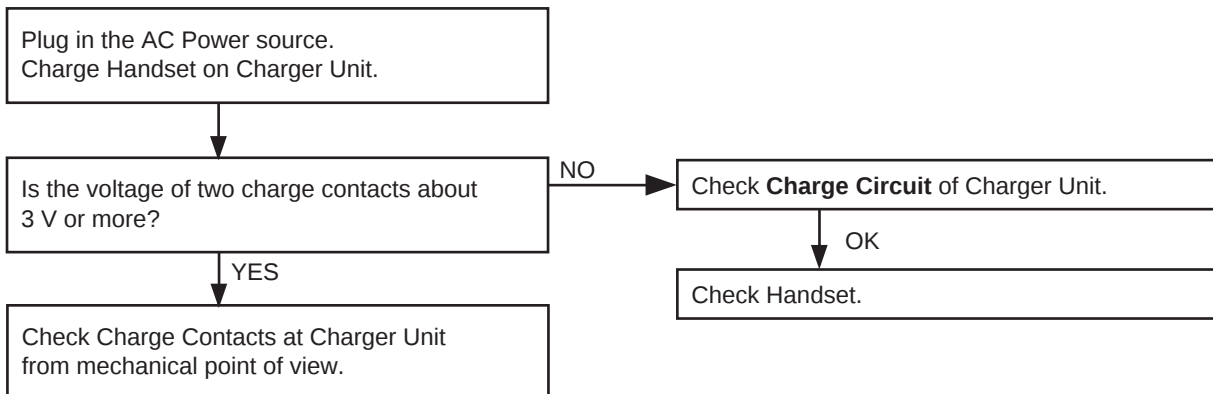
Cross Reference:
Charge Circuit (P.15)

10.1.4.2. Handset



Cross Reference:
Check Power (P.34)
Charge Circuit (P.23)

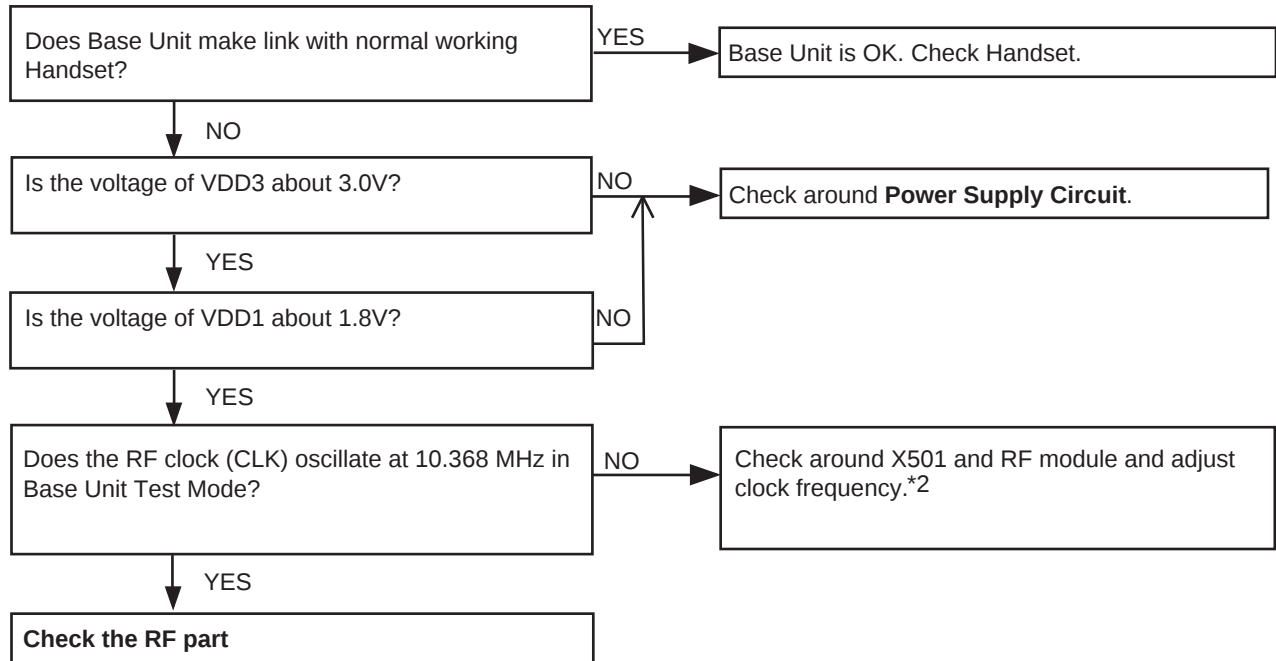
10.1.4.3. Charger Unit



Cross Reference:
Charge Circuit (P.23)

10.1.5. Check Link

10.1.5.1. Base Unit



Cross Reference:

Power Supply Circuit/Reset Circuit (P.14)

Check the RF part (P.41)

Note:

*1 How to adjust +3.0V:

Execute the command "VDA"

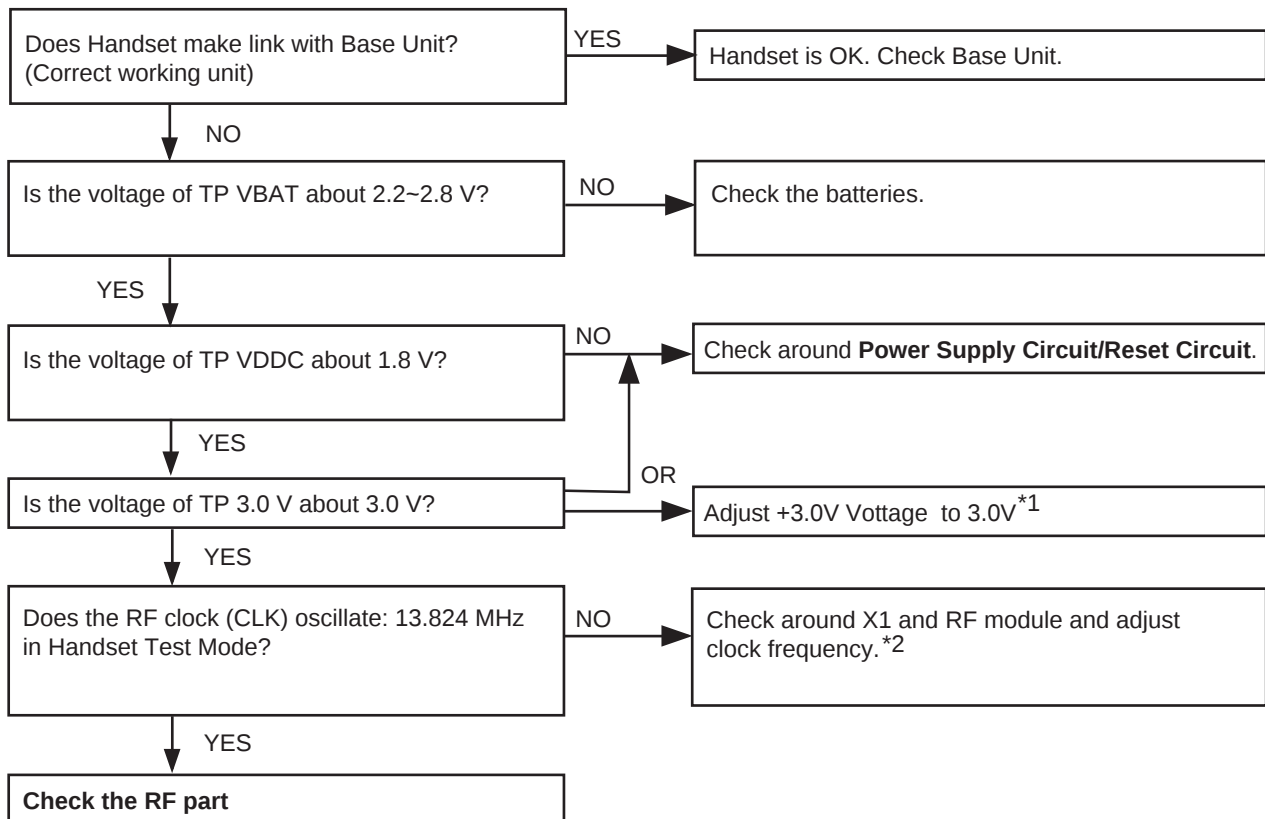
Refer to **Things to Do after Replacing IC or X'tal** (P.64) for Base Unit.

*2 How to adjust the frequency of X501:

To see the frequency, execute the command "SFR", then check the TP_CKM (IC501-57pin).

To adjust frequency, send command "SFR □○○□○○" until the frequency counter becomes 13.824 MHz±55HZ.

10.1.5.2. Handset



Cross Reference:

Power Supply Circuit/Reset Circuit (P.22)

Check the RF part (P.41)

Note:

*1 How to adjust +3.0V:

Execute the command "VDA"

Refer to **Things to Do after Replacing IC or X'tal (P.65)** for Handset.

*2 How to adjust the frequency of X1:

To see the frequency, execute the command "SFR", then check the TP_CKM (IC1-57pin).

To adjust frequency, send command "SFR □○○□○○" until the frequency counter becomes 13.824 MHz±55HZ.

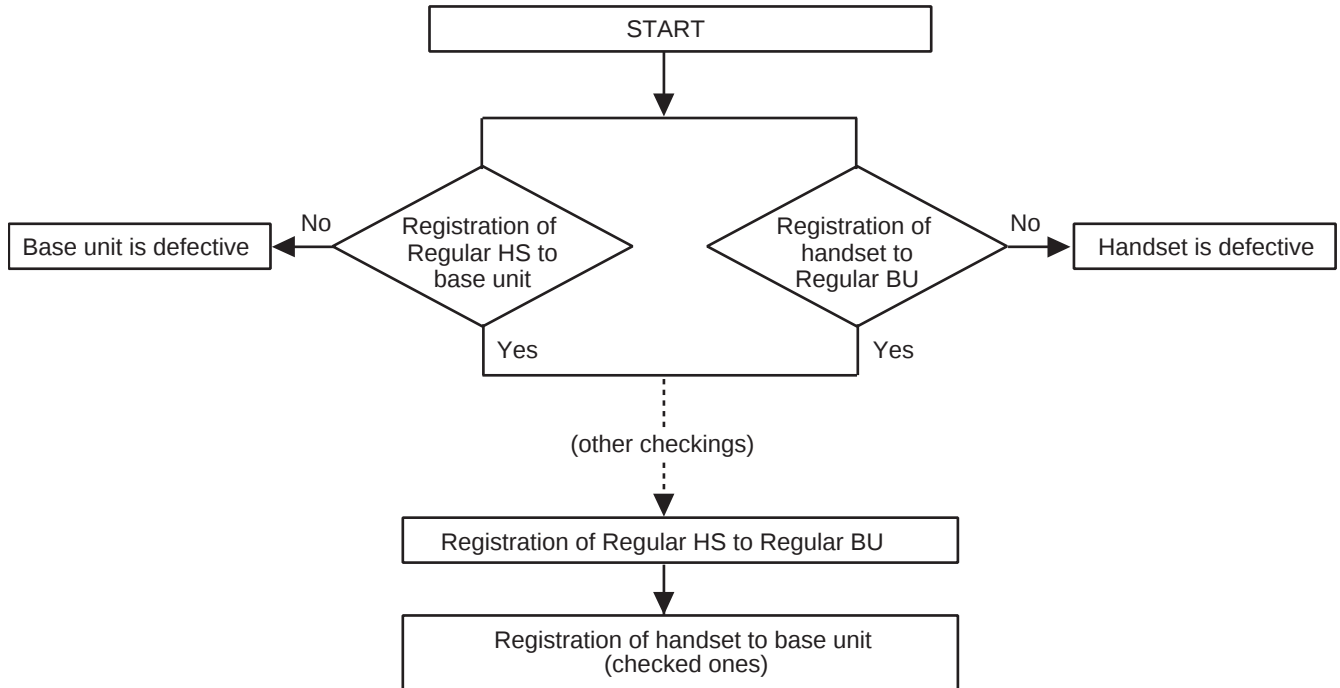
10.1.6. Check the RF part

10.1.6.1. Finding out the Defective part

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

After All the Checkings or Repairing

1. Re-register the checked handset to the checked base unit, and Regular HS to Regular BU.



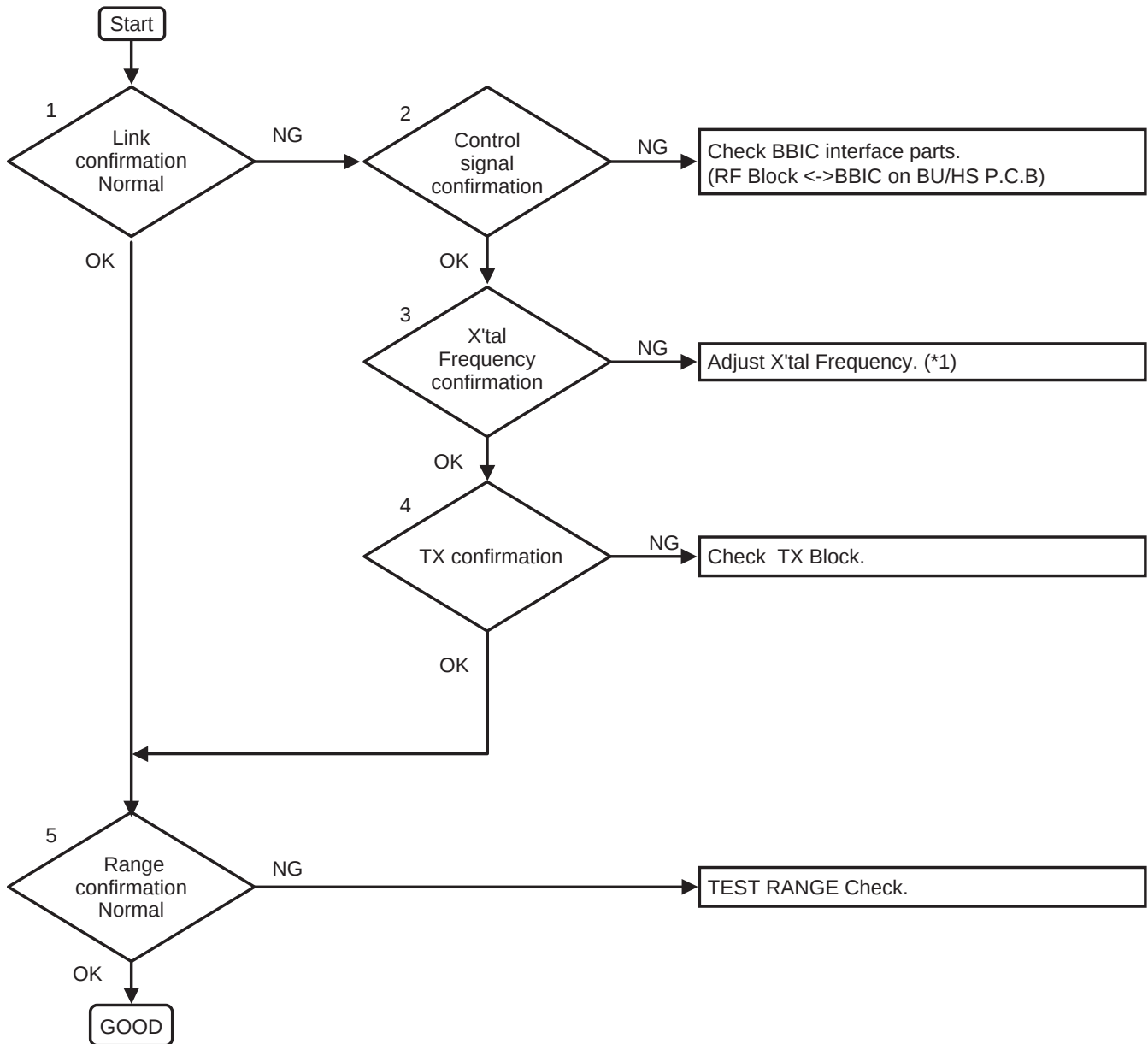
Note:

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

10.1.6.2. RF Check Flowchart

Each item (1 ~ 5) of RF Check Flowchart corresponds to **Check Table for RF part** (P.43).

Please refer to the each item.



Note:

(*1) Refer to **Check Link** (P.39).

10.1.6.3. Check Table for RF part

No.	Item	BU (Base Unit) Check	HS (Handset) Check
1	Link Confirmation Normal HS, BU Mode [Normal Mode]	1. Register Regular HS to BU (to be checked). 2. Press [Talk] key of the Regular HS to establish link.	1. Register HS (to be checked) to Regular BU. 2. Press [Talk] key of the HS to establish link.
2	X'tal Frequency confirmation HS, BU Mode: [Adjustment]	Check X'tal Frequency. (10.368 MHz $\pm$ 100Hz)	Check X'tal Frequency. (13.824 MHz $\pm$ 100 Hz)
3	TX confirmation HS Mode: HS_Burst Mode] (*1) BS Mode: BS_Burst Mode] (*1)	1. Remove wire antenna 2 and connect spectrum analyzer to TP. (*2) 2. Confirm TX power whether spec. is satisfied. Power $\geq$ 13.5dBm	1. Connect spectrum analyzer to TP. (*3) 2. Confirm TX power whether satisfied spec. Power $\geq$ 16.0dBm
4	Range Confirmation Normal HS, BU Mode: [Normal Mode]	1. Register Regular HS to BU (to be checked). 2. Press [Talk] key of the Regular HS to establish link. 3. Compare the range of the BU (being checked) with that of the Regular BU.	1. Register HS (to be checked) to Regular BU. 2. Press [Talk] key of the HS to establish link. 3. Compare the range of the HS (being checked) with that of the Regular HS.

Note:

(*1) Refer to **Commands** (P.60)

(*2) **Adjustment Standard (Base Unit)** (P.61)

(*3) **Adjustment Standard (Handset)** (P.63)

10.1.6.4. TEST RANGE Check

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

Item	BU (Base Unit) Check	HS (Handset) Check
Range Confirmation TX TEST (TX Power check) HS, BU setting Checked unit: Low TX power (*1) Regular unit: High TX power (*1)	1. Register Regular HS to BU (to be checked). 2. Set TX Power of the BU and the Regular HS according to CHART1. 3. At distance of about 20m between HS and BU, Link OK = TX Power of the BU is OK. No Link = TX Power of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set TX Power of the HS and the Regular BU according to CHART1. 3. At distance of about 20m between HS and BU, Link OK = TX Power of the HS is OK. No Link = TX Power of the HS is NG.
Range Confirmation RX TEST (RX sensitivity check) HS, BU setting Checked unit: High TX power (*1) Regular unit: Low TX power (*1)	1. Register Regular HS to BU (to be checked). 2. Set TX Power of the BU and the Regular HS according to CHART1. 3. At distance of about 20m between HS and BU, Link OK= RX Sensitivity of the BU is OK. No Link = RX Sensitivity of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set TX Power of the Checking HS and the Regular BU according to CHART1. 3. At distance of about 20m between HS and BU, Link OK= RX Sensitivity of the HS is OK. No Link = RX Sensitivity of the HS is NG

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

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

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

Note:

(*1) Refer to **Commands** (P.60).

10.1.7. Registering a Handset 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, re-register the handset.

- 1 **Handset:**
[MENU] → **# 1 3 0**
- 2 **Base unit:**
 Press and hold **MLOCATOR** for about 5 seconds until the registration tone sounds.
 - If all registered handsets start ringing, press **[LOCATOR]** again to stop, then repeat this step.
 - The next step must be completed within 90 seconds.
- 3 **Handset:**
 Press **[OK]**, then wait until a long beep sounds.

Note:

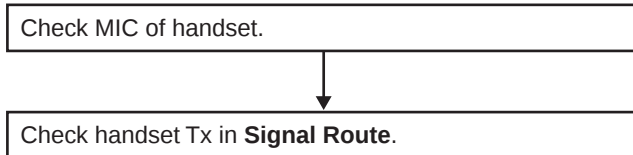
- While registering, “**Base in registering**” is displayed on all registered handsets.
- When you purchase an additional handset, refer to the additional handset's installation manual for registration.

10.1.8. Deregistering a Handset

A handset can cancel its own registration to the base unit, or other handsets registered to the same base unit. This allows the handset to end its wireless connection with the system.

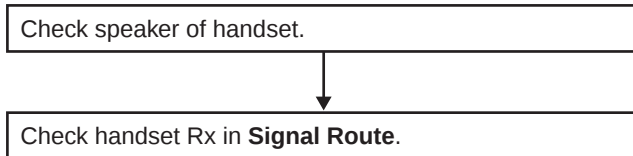
- 1 **[MENU]** → **# 1 3 1**
 - All handsets registered to the base unit are displayed.
- 2 **[↓]**: Select the handset you want to cancel. → **[SELECT]**
- 3 **[↓]**: “Yes” → **[SELECT]**
- 4 **[OFF]**

10.1.9. Check Handset Transmission



Cross Reference:
Signal Route (P.25)

10.1.10. Check Handset Reception

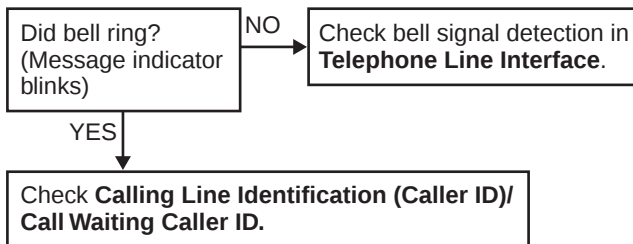


Cross Reference:
Signal Route (P.25)

Note:
 When checking the RF part, Refer to **Check the RF part** (P.41).

10.1.11. Check Caller ID

BASE UNIT

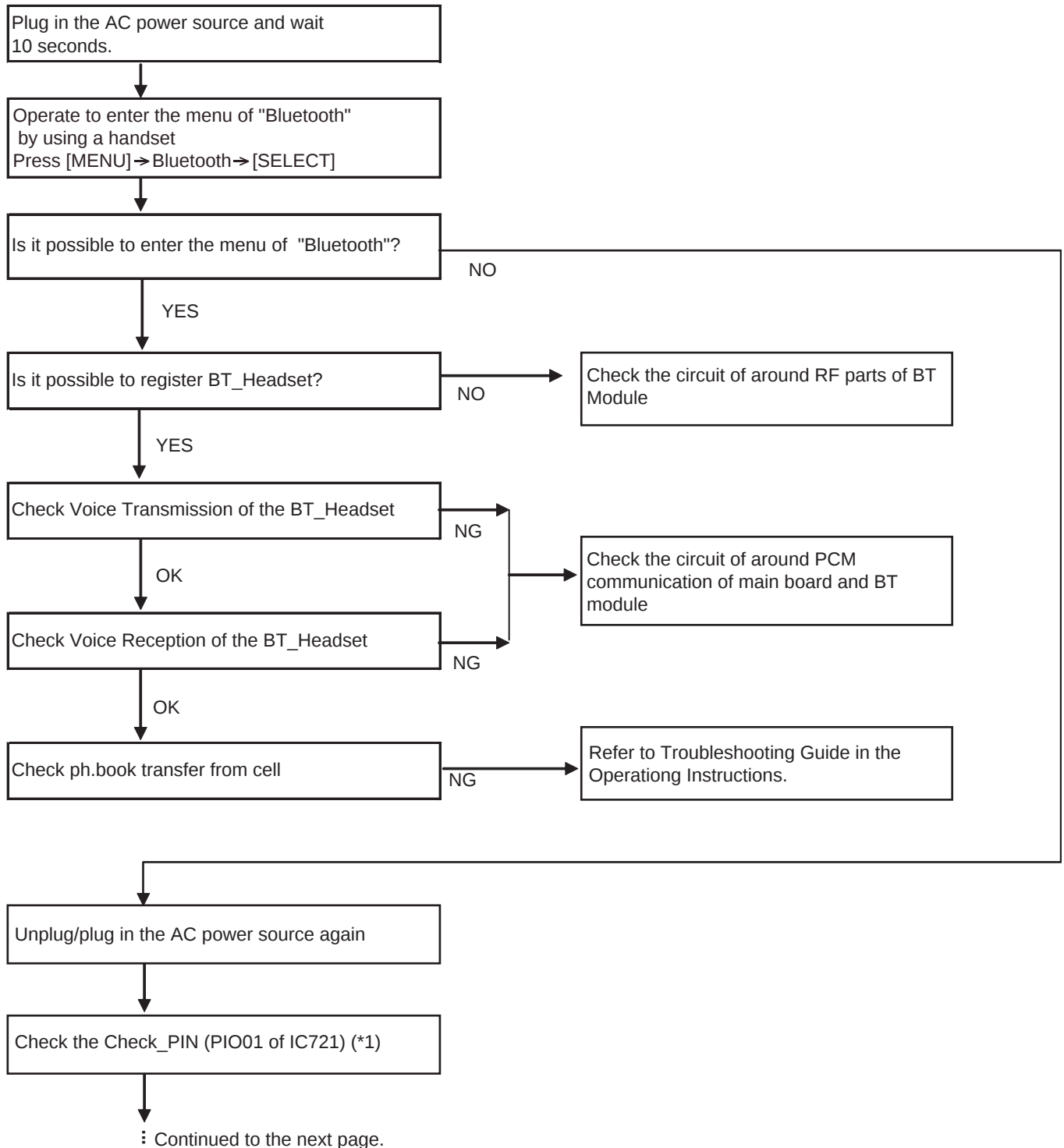


Cross Reference:
Telephone Line Interface (P.16)
Calling Line Identification (Caller ID)/Call Waiting Caller ID (P.18)

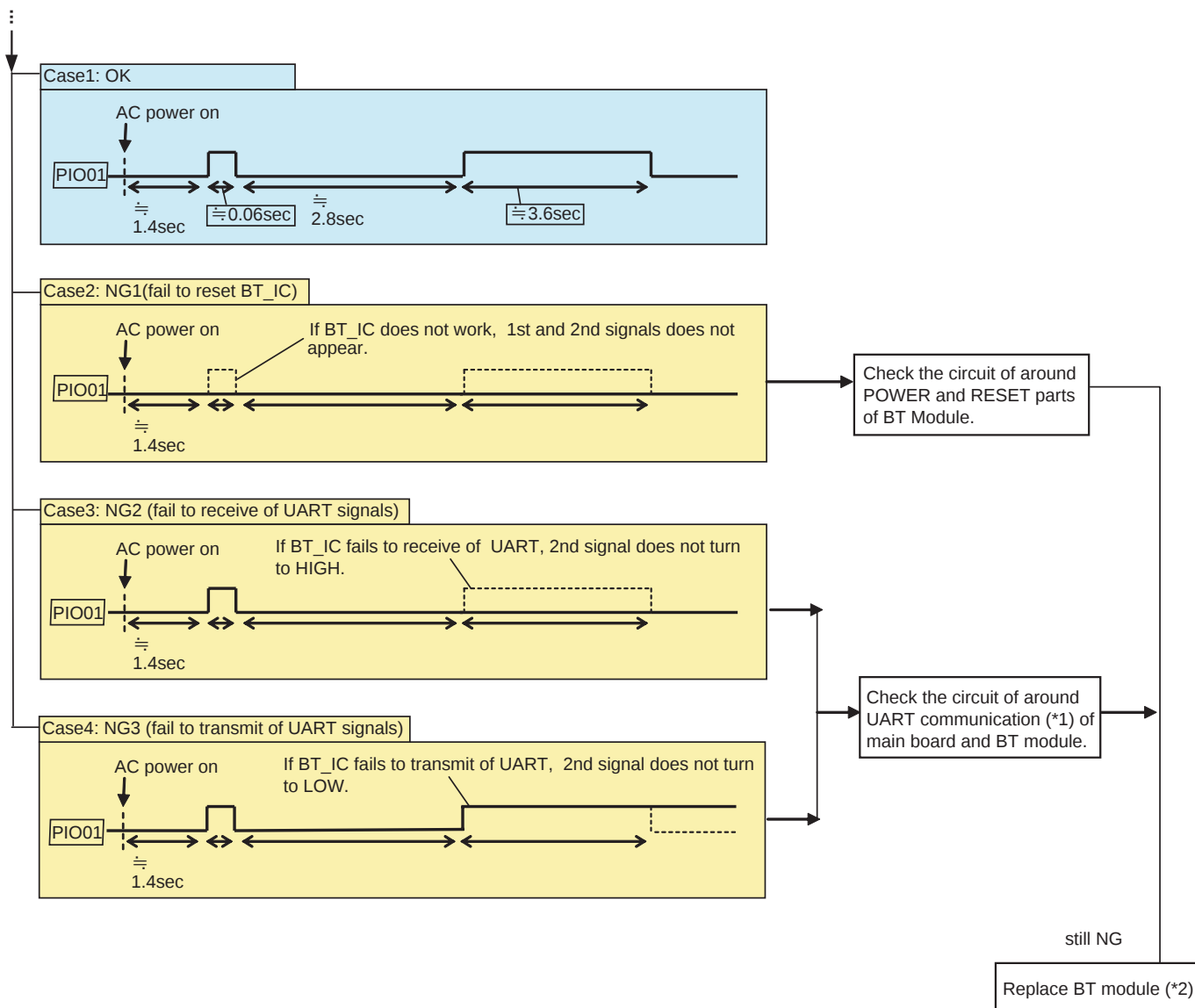
Note:

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

10.1.12. Check BT Communication



Cross Reference:
Bottom View (P.86)



Cross Reference:

Schematic Diagram (Base Unit_RF) (P.76)

Note:

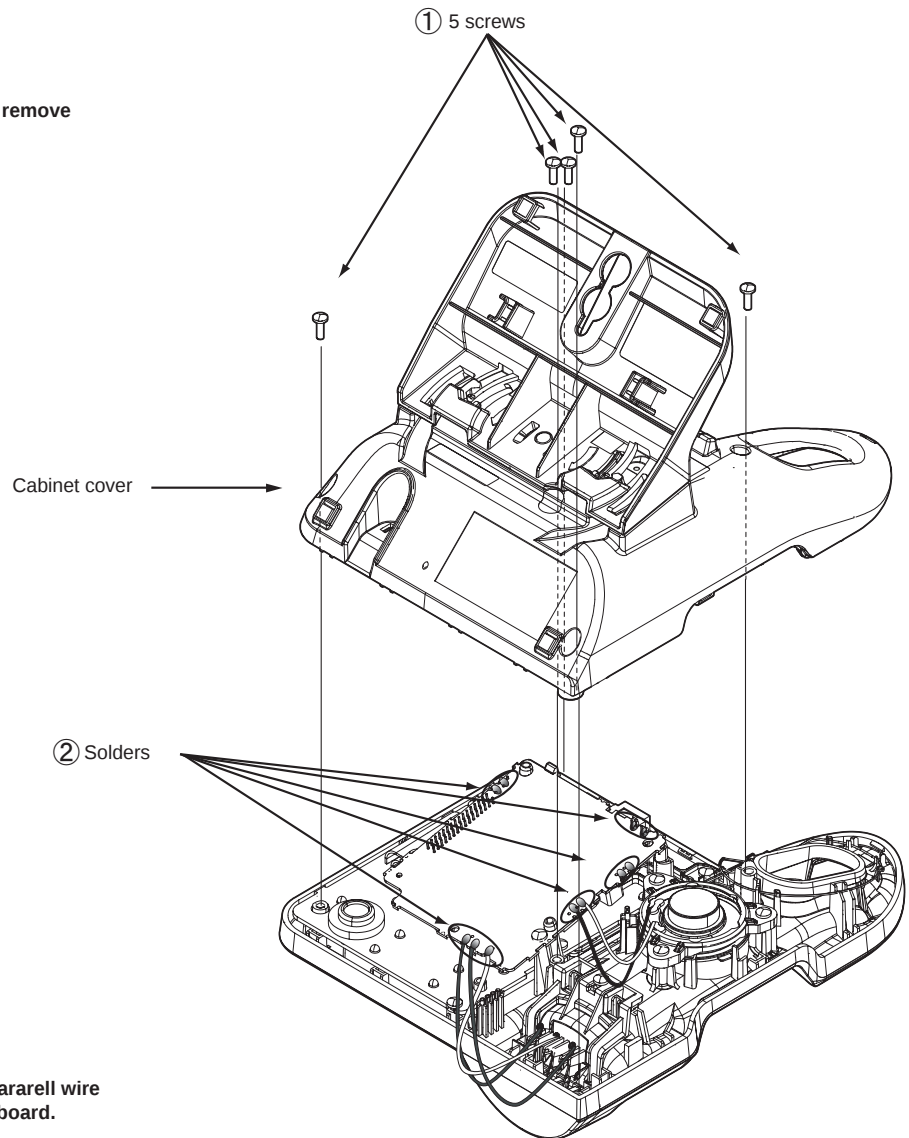
(*2) After replacing, need to adjust the frequency of BT.
Refer to **Things to Do after Replacing IC or X'tal** (P.64)

11 Disassembly and Assembly Instructions

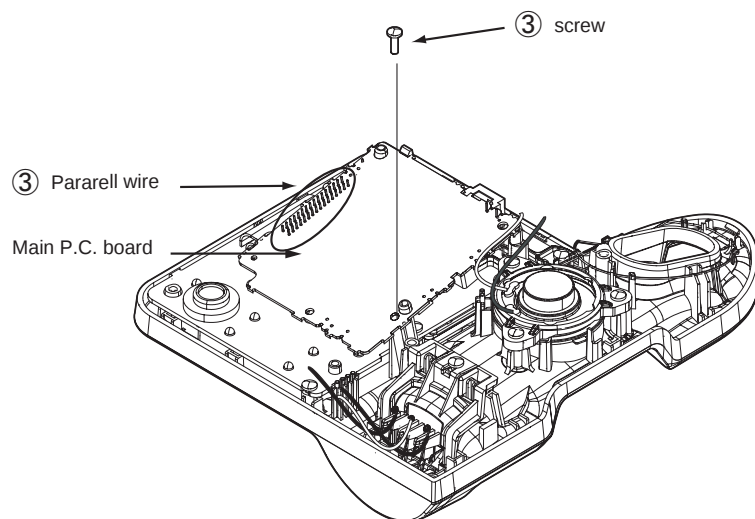
11.1. Disassembly Instructions

11.1.1. Base Unit

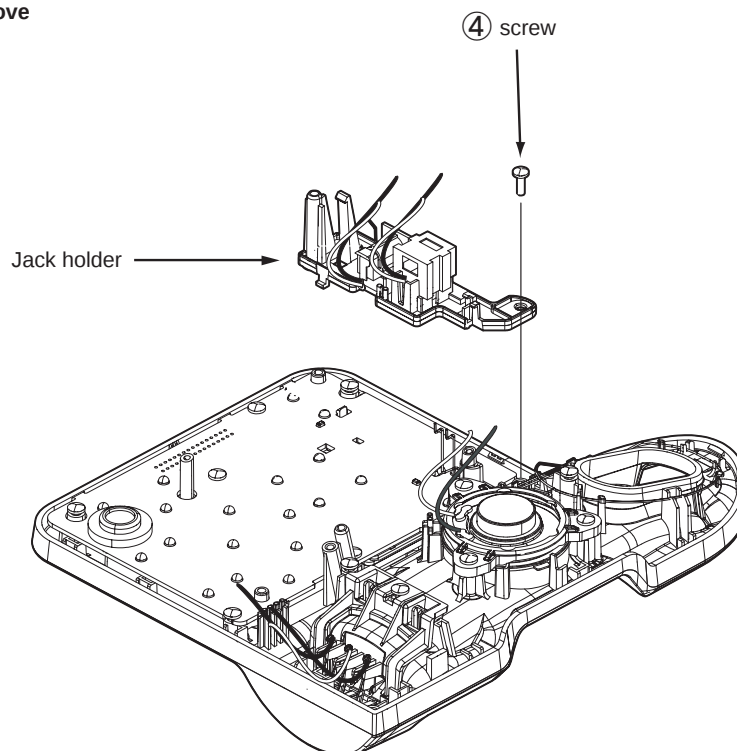
- ① Remove the 5 screws to remove the cabinet cover.
- ② Remove the solders.



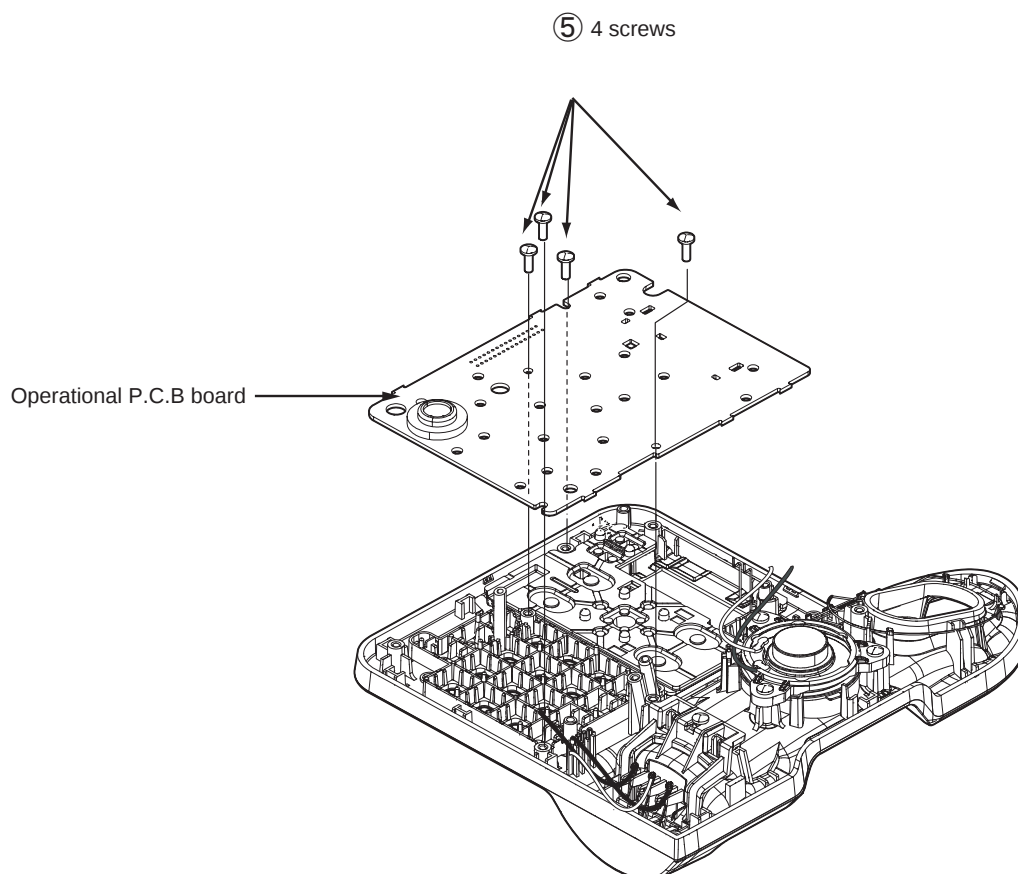
- ③ Remove the screw and parallel wire to remove the main P.C. board.



- ④ Remove the screw to remove the Jack holder.

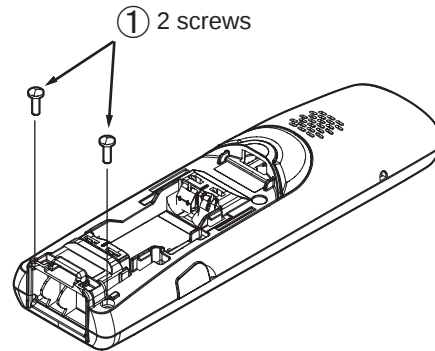


- ⑤ Remove the 4 screws and parallel wire to remove the operational P.C.B board.

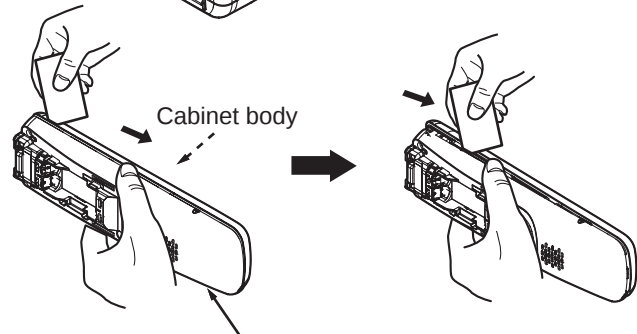


11.1.2. Handset

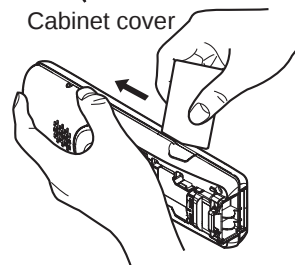
- ① Remove the 2 screws.



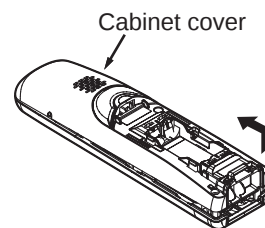
- ② Insert a plastic card. (Ex. Used SIM card etc.) between the cabinet body and the cabinet cover, then pull it along the gap to open the cabinet.



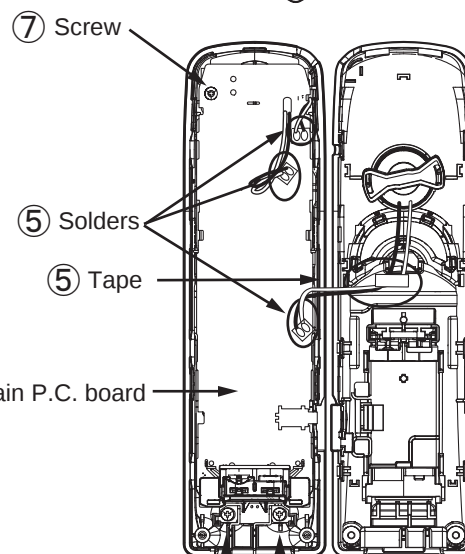
- ③ Likewise, open the other side of the cabinet.



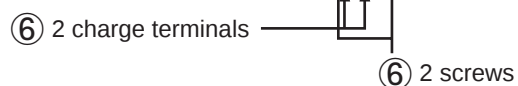
- ④ Remove the cabinet cover by pushing it upward.



- ⑤ Remove the solders and tape.



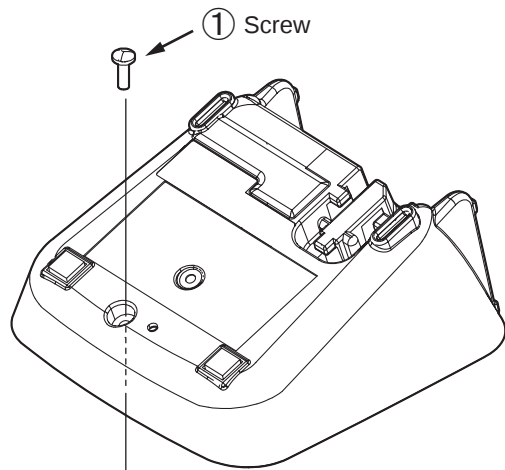
- ⑥ Remove the 2 screws to remove the 2 charge terminals.



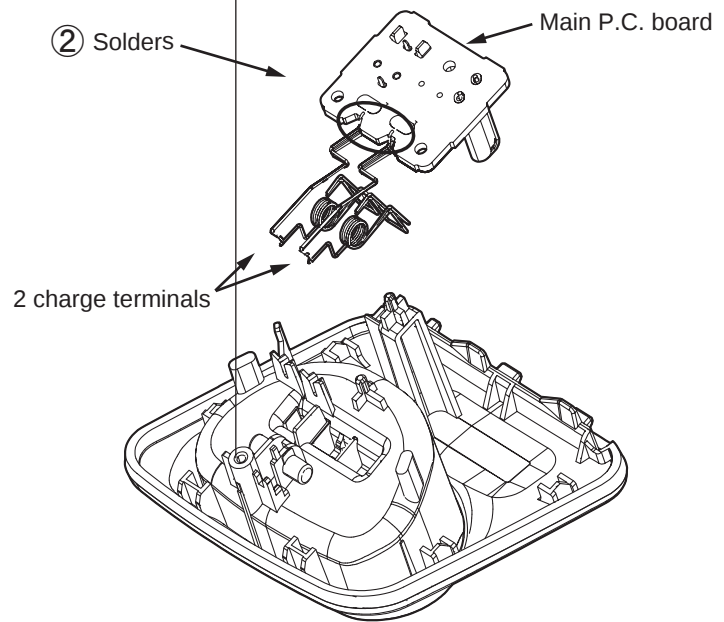
- ⑦ Remove the screw to remove the main P. C. board.

11.1.3. Charger Unit

- ① Remove the screw to remove the cabinet cover.



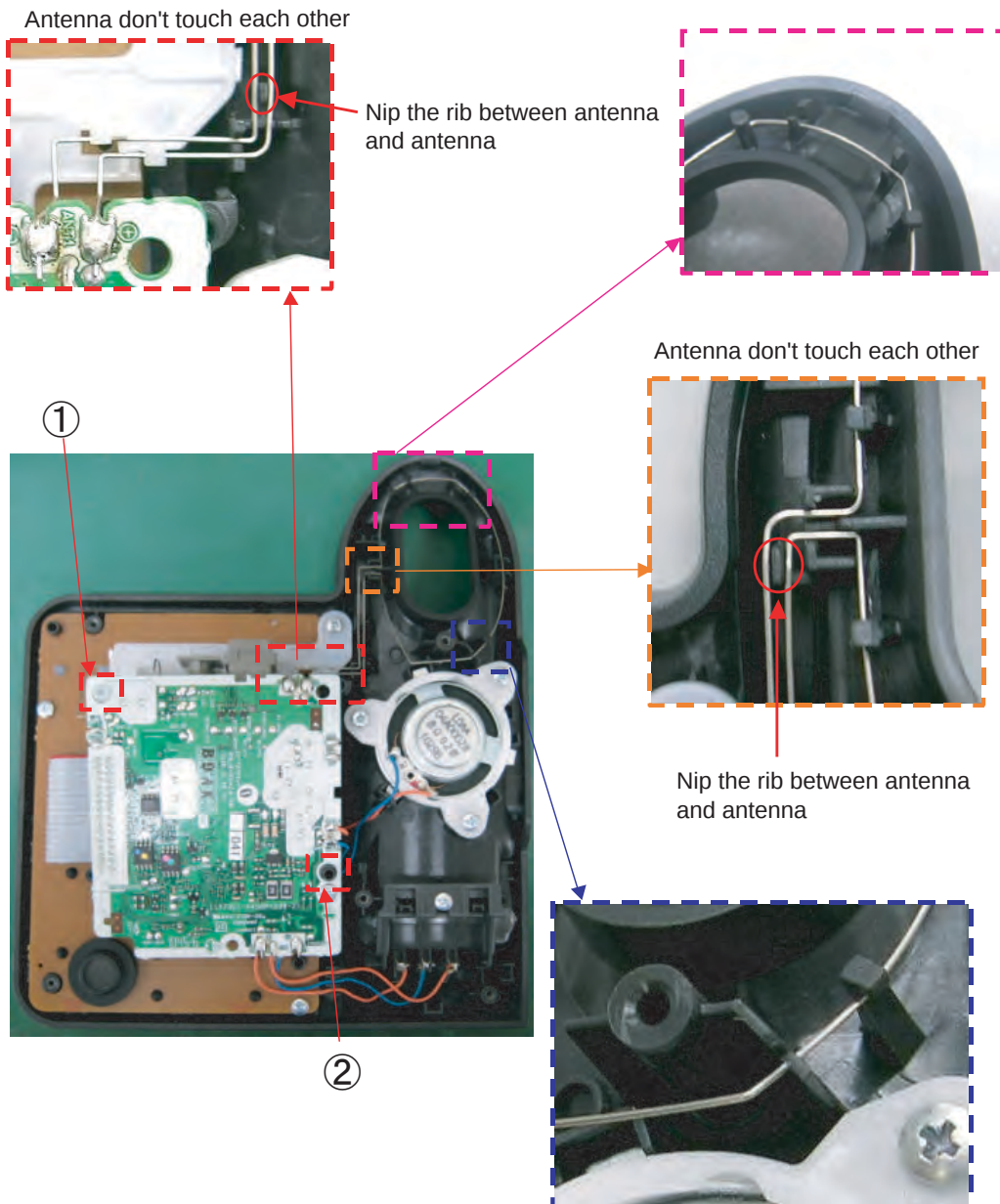
- ② Remove the solders to remove the 2 charge terminals.



11.2. How to Attach the Antenna

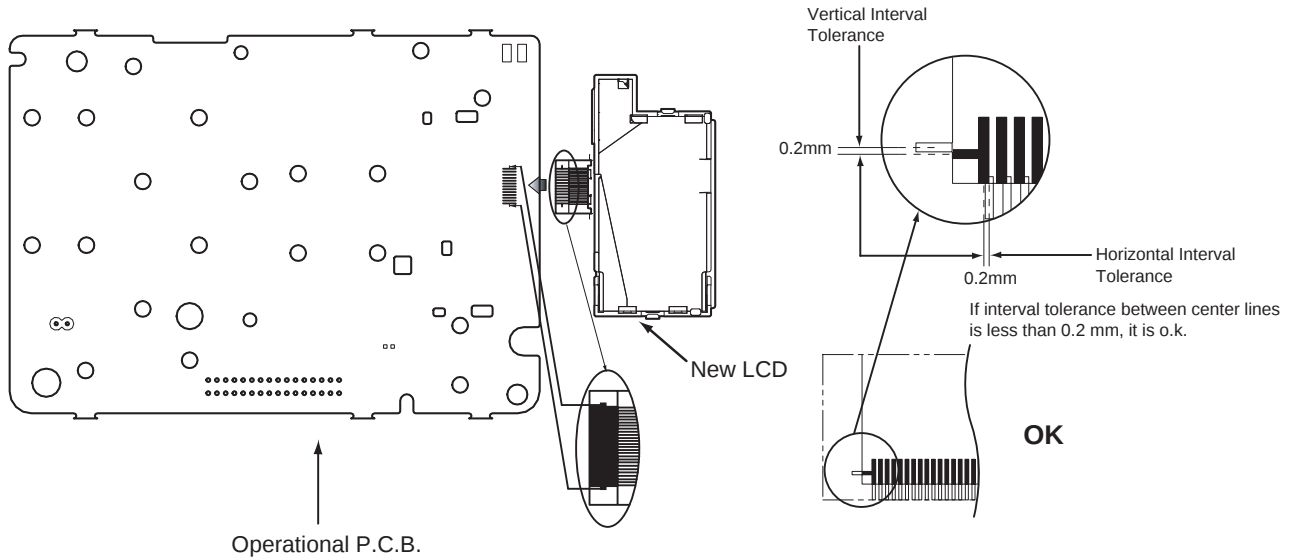
Locate as the following figure

- ① Fix by hook.
- ② Insert to boss

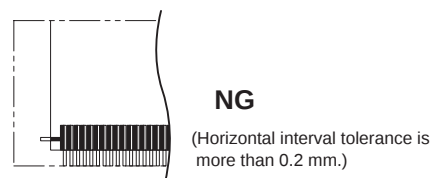
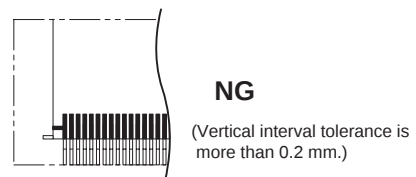
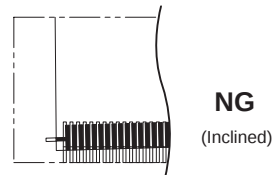
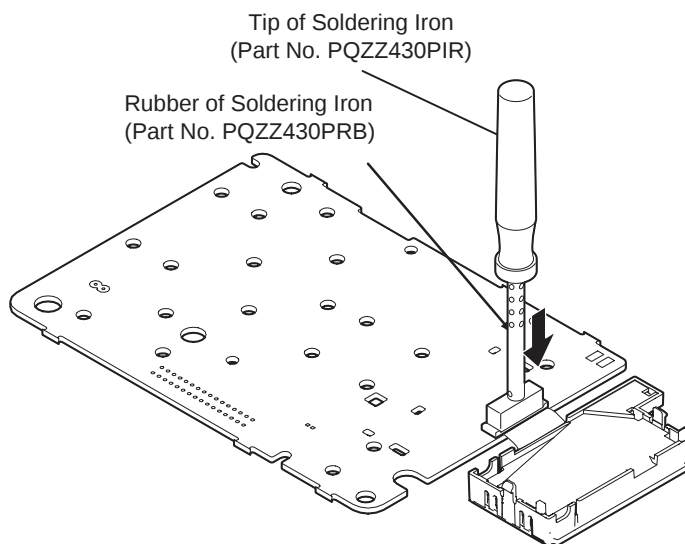


11.3. How to Replace the Base unit LCD

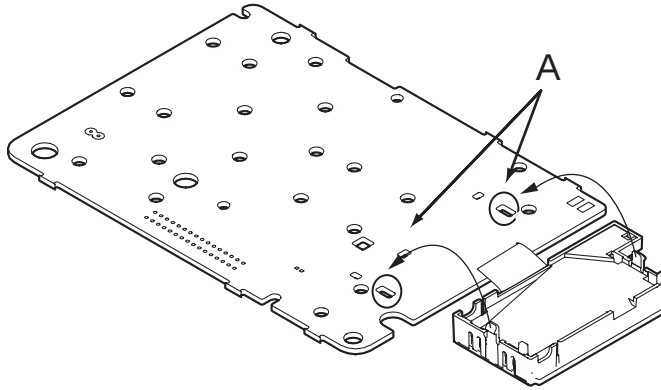
- ① Fit the heatseal of a new LCD.



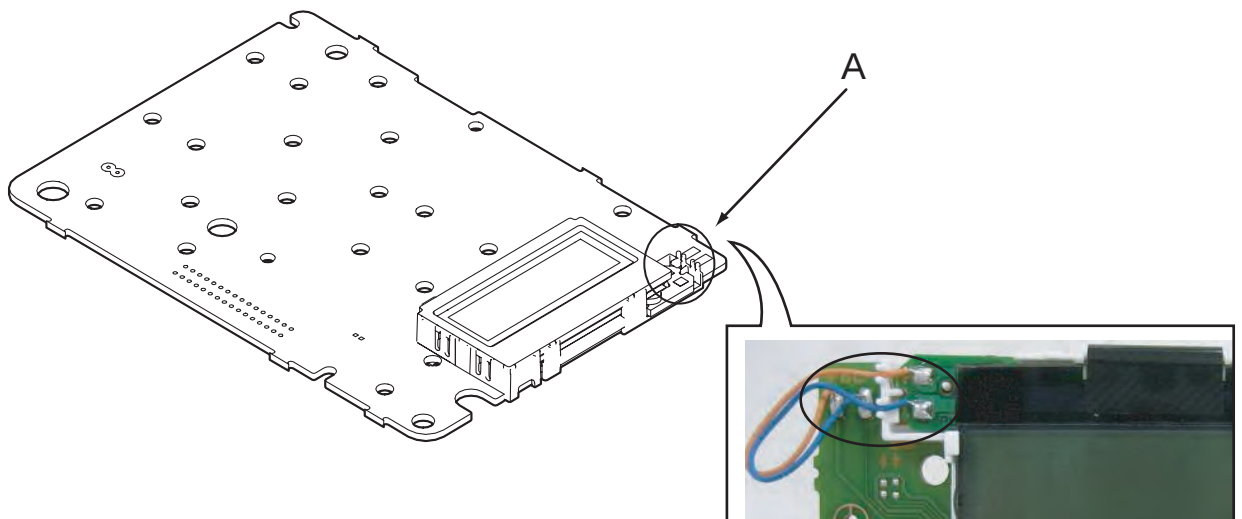
- ② Heatweld with the tip of the soldering iron about 5 to 8 seconds (in case of 60W soldering iron).



- ③ Attach the LCD and fix by hook A (two points).



- ④ Solder the wires.

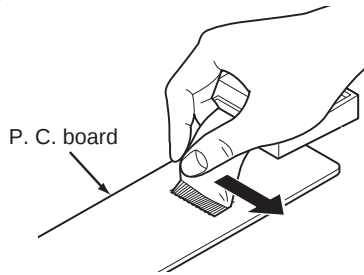


11.4. How to Replace the Handset LCD

Note:

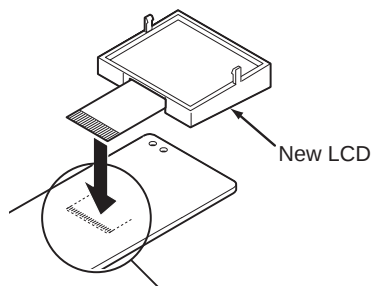
The illustrations are simplified in this page.
They may differ from the actual product.

①

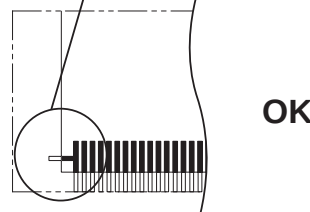
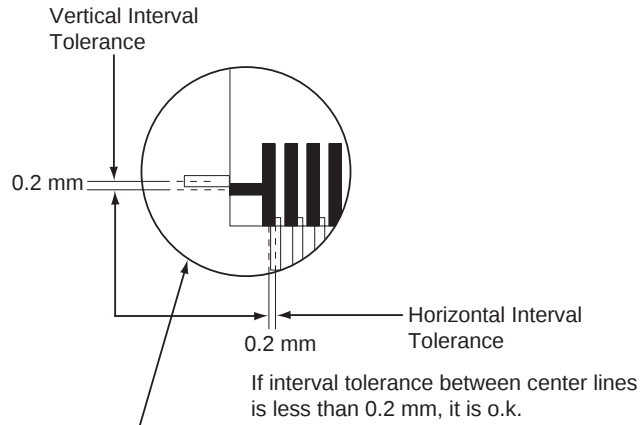


Peel off the FFC (Flexible Flat Cable) from the LCD, in the direction of the arrow. Take care to ensure that the foil on the P.C. board is not damaged.

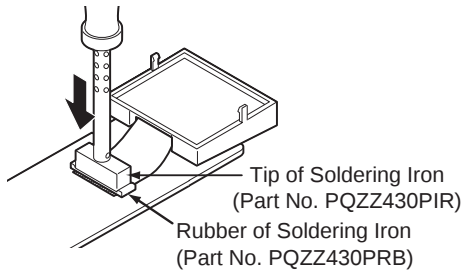
②



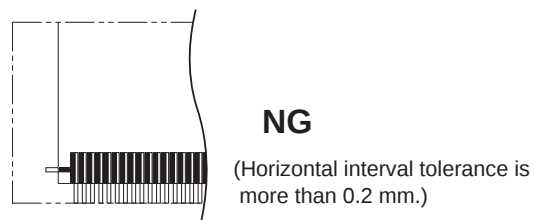
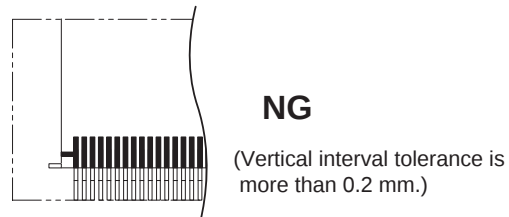
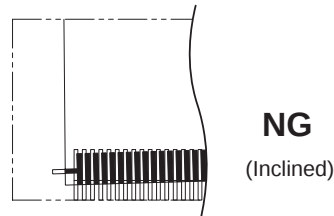
Fit the heatseal of a new LCD.



③



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



12 Measurements and Adjustments

This chapter explains the measuring equipment, the JIG connection, and the PC setting method necessary for the measurement in **Troubleshooting Guide** (P.33)

12.1. Equipment Required

- Digital multi-meter (DMM): it must be able to measure voltage and current.
 - Oscilloscope.
 - Frequency counter: It must be precise enough to measure intervals of 1 Hz (precision; ± 4 ppm)
Hewlett Packard, 53131A is recommended.
 - DECT tester: Rohde & Schwarz, CMD 60 is recommended.
- This equipment may be useful in order to precisely adjust like a mass production.

12.2. The Setting Method of JIG

<Preparation>

- Serial JIG cable: PQZZ1CD300E*
- PC which runs in DOS mode
- **Batch file CD-ROM** for setting: PNZZTG7621M

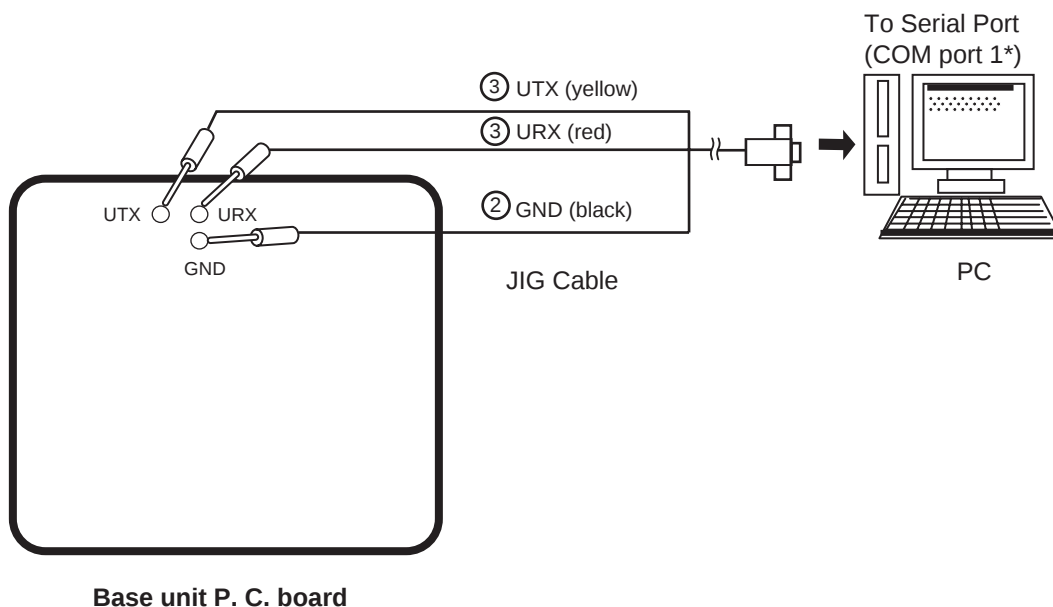
Note:

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

Resistor	Old value (k Ω)	New value (k Ω)
R2	22	3.3
R3	22	3.3
R4	22	4.7
R7	4.7	10

12.2.1. Connections (Base Unit)

- ① Connect the AC adaptor.
- ② Connect the JIG Cable GND (black).
- ③ Connect the JIG Cable RX (red) and TX (yellow).

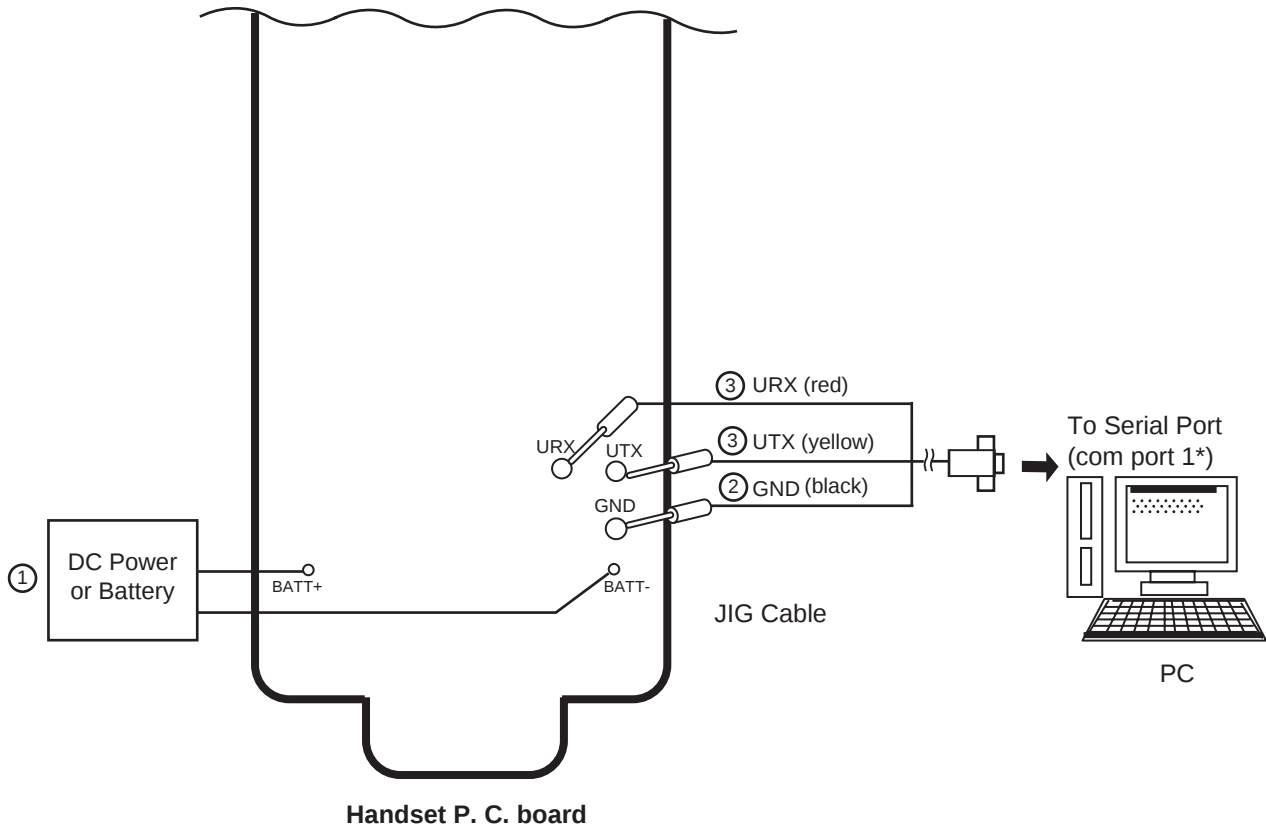


Note:

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

12.2.2. Connections (Handset)

- 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.



Note:

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

12.2.3. How to install Batch file into P.C.

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

2. Open an MS-DOS mode window.

<Example for Windows>

On your computer, click **[Start]**, select **Programs** (**All Programs** for Windows XP/Windows Server 2003), then click

MS-DOS Prompt. (for Windows 95/Windows 98)

Or

Accessories-MS-DOS Prompt. (for Windows Me)

Or

Command Prompt. (for Windows NT 4.0)

Or

Accessories-Command Prompt.

(for Windows 2000/Windows XP/Windows Server 2003)

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

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

<Example>

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

5. Type "**SET_COM=X**", then press the **Enter** key

(X: COM port number used for the serial connection on your PC).

6. Type "**READID**", then press the **Enter** key.

- If any error messages appear, change the port number or check the cable connection.
- If any value appear, go to next step.

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

<Example: error happens>

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

Note:

- "*****" varies depending on the country or models.

12.2.4. Commands

See the table below for frequently used commands.

Command name		Function	Example
XBT 0		Base unit only. For excluding failure of command response. Please send this command at first before other command is executed. *However, if you want to execute "#X" command then DO NOT USE this command.	Type "sendchar XBT 0".
rdeeprom		Read the data of EEPROM	Type "rdeeprom 00 00 FF", and the data from address "00 00" to "FF" is read out.
readid		Read ID (RFPI)	Type "readid", and the registered ID is read out.
writeid		Write ID (RFPI)	Type "writeid 00 18 E0 0E 98", and the ID "0018 E0 0E 98" is written.
hookoff		Off-hook mode on Base	Type "hookoff".
hookon		On-hook mode on Base	Type "hookon".
getchk (Base unit)		Read checksum	Type "getchk".
How to use of "getchk" in Handset	1.rdeeprom	Read EEPROM	Type "RdEeprom 03 7D 04", and the data from address "03 7D" to "03 80" is read out *This command gets 4 byte "WW", "XX", "YY", "ZZ". *Please NEVER forget these 4 byte data!
	2.sendchar epw	Write EEPROM	Type "sendchar epw 03 7D 04 FF FF FF FF"
	3.sendchar RST	Reset baseset	Type "sendchar RST"
	4.getchk	Read checksum	Type "getchk".
	5.sendchar epw	Write EEPROM	Type "sendchar epw 03 7D 04 WW XX YY ZZ" *WW", "XX", "YY", "ZZ" is 4 byte data that already read from same address.
wreeprom		Write the data of EEPROM	Type "wreeprom 01 23 45". "01 23" is address and "45" is data to be written.
hs_burst		Handset outputs RF power in burst test mode	Type "hs_burst"
bs_burst		Base unit outputs RF power in burst test mode on antenna 2	Type "bs_burst"
tx_high		Keep TX power high	Type "tx_high"
tx_low		Keep TX power low	Type "tx_low"
How to using "#X" command for base unit			
XBT		Enter this command before using following command "#X", "bs_burst", tx_high" tx_low" for Base Unit.	Type "sendchar XBT 1" and then "OK" is back when it succeeds. (caution) Before entering this command, wait 10 seconds after power on the base unit
#X (Attention) When type "sendchar #X" command, must be the "X" must be capital letter.		Read and Write BT parameters	[Read MAC address] Type "sendchar #X sme" and MAC address is read out (exp. sendchar #XXsme 0080 F08C FFD1)
			[Write MAC address] Type "sendchar #X sme **** *" and (note) part of **** should be set correct MAC address
			[Read the data of crystal of BT] Type "sendchar #X nc" and adjustment parameter of crystal of BT is read out (exp. #XXnc=0x1D)
			[Write the data of crystal of BT] Type "sendchar #X nc *" and adjustment parameter of crystal of BT is read out (note) part of ** should be set the adjusted value.

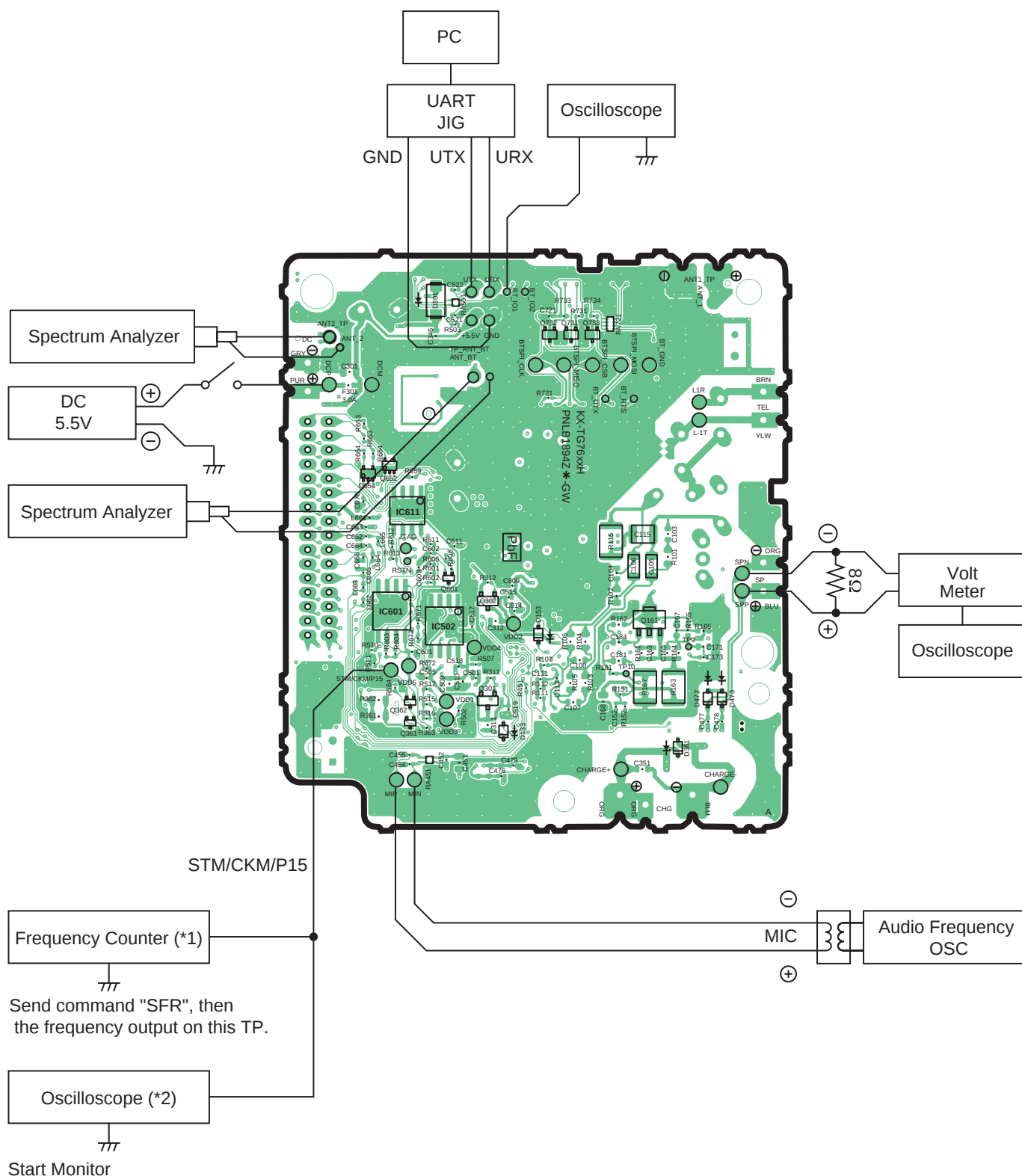
Note:

For the command related with BT XBT and #X, the example of this, refer to **Things to Do after Replacing IC or X'tal** (P.64)

12.3. Adjustment Standard (Base Unit)

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

12.3.1. Bottom View



Note:

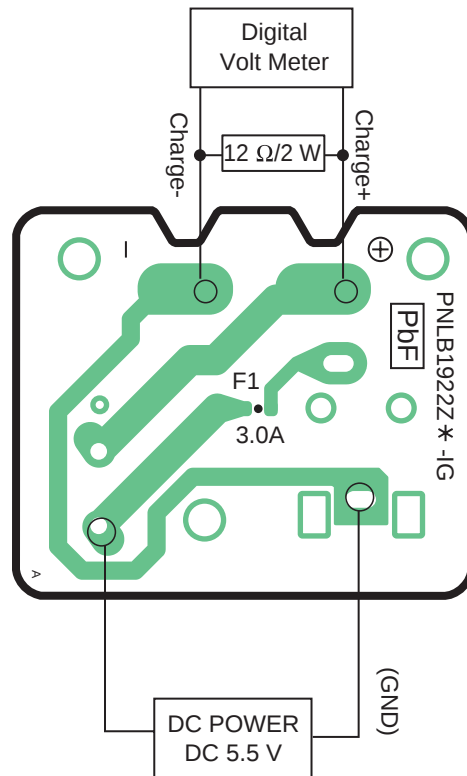
(*1) is referred to No.2 of Check Table for RF part (P.43)

(*2) is referred to Power Supply Circuit/Reset Circuit (P.14)

12.4. Adjustment Standard (Charger Unit)

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

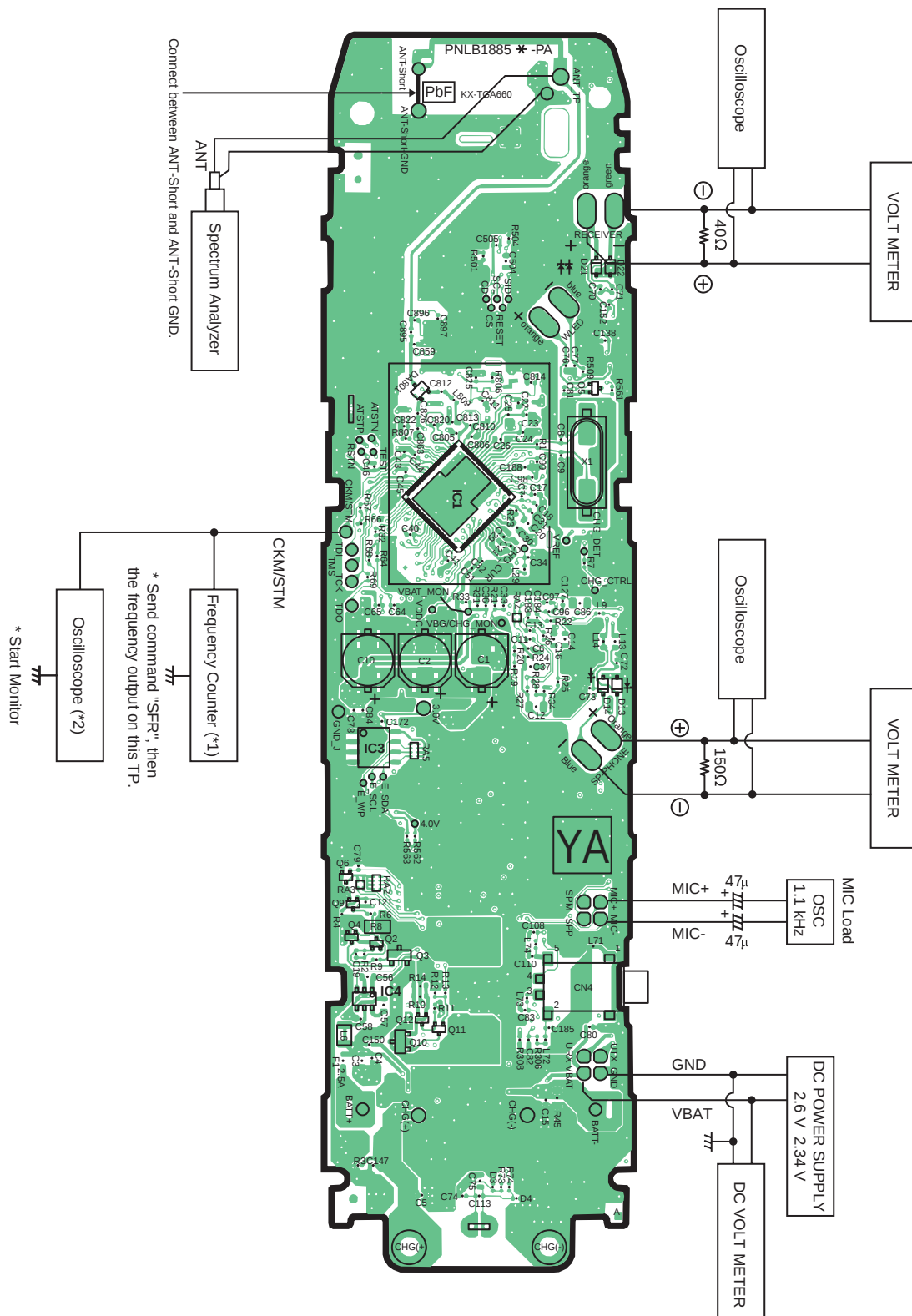
12.4.1. Bottom View



12.5. Adjustment Standard (Handset)

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

12.5.1. Component View



Note:

(*1) is referred to No.2 of Check **Check Table for RF part** (P.43)

(*2) is referred to **Power Supply Circuit/Reset Circuit** (P.22)

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

If repairing or replacing EEPROM and X'tal, it is necessary to download the required data such as Programming data or adjustment data, etc. in memory.

The set doesn't operate if it is not executed.

12.6.1. How to download the data

12.6.1.1. Base Unit

First, operate the PC setting according to **The Setting Method of JIG** (P.57).

Then download the appropriate data according to the following procedures.

Items		How to download/Required adjustment
BBIC(IC501)	Programming data is stored in memory.	1) Clock adjustment: Refer to Check Point (H).(*2)
EEPROM (IC611)	Adjusted parameter data is stored in memory. (country version batch file, default batch file, etc.)	1) Change the address "0001" of EEPROM to "AA" to download the data. 2) Default batch file: Execute the command "default.bat". 3) Country version batch file: Execute the command "TG7641US_US_RevXXX_YYY.bat". (*1) 4) Clock adjustment
FLASH1 (IC601)	Voice prompt data is stored in memory. (vary depending on country version)	1) Wait more than 15 seconds after connecting the JIG Cable. 2) Execute the command "VPDL2011 -AA ZZZ.bin" (*1). (writing time: approx. 1 min (115200 bps).)
FLASH2 (IC502)	Program D/L	1) Make sure to connect the JIG cable and disconnect the DC Power in order to download the data. 2) Execute the command "flw441 *****.hex". 3) Connect the DC Power. 4) Press the PC Enter key once. 5) After a few minutes, "Successful upgrade" is displayed on the PC indicating downloading has finished. 6) Detach the JIG cable, then disconnect the DC Power. 7) Connect the DC Power. 8) Connect the JIG cable again, and execute the command "getchk", then confirm the checksum value is correct. . If the downloading fails, start again from step 1). 9) Default batch file: Execute the command "default.bat". 10) Country version batch file: Execute the command "TG7641US_US_RevXXX_YYY.bat". (*1) 11) Clock adjustment: Refer to Check Point (H). (*2)
X'tal (X1)	System clock	Clock adjustment data is in EEPROM, adjust the data again after replacing it. 1) Apply 5.5V between DCP and DCM with DC power. 2) Input Command "sendchar sfr", then you can confirm the current value. 3) Check X'tal Frequency.(10.368MHz $\pm$ 41Hz). 4) If the frequency is not 10.368MHz $\pm$ 41Hz, adjust the frequency of CLK executing the command "sendchar sfr xx xx (where xx is the value)" so that the reading of the frequency counter is 10.368MHz $\pm$ 5Hz.

Note:

(*1) XXX_YYY: revision number, ZZZ:Voice prompt, AA: Baud rate(9600/19200/57600/115200)

"XXX_YYY" and "ZZZ" vary depending on the country version. You can find them in the batch file, PNZZ- mentioned in **The Setting Method of JIG** (P.57).

When adjust the frequency the BT Unit or write the MAC address to the BT Unit.

	Item	Test command		Description
		Input	Echo back	
1	Power on	-	-	Wait 10seconds and connect JIG
2	Test mode	sendchar XBT 1 ↵ sendchar #X ts ↵	OK #XXTEST	Enter "XBT 1" and then "OK" is back when it succeeds to enter test mode.
3	Confirm a default value	sendchar #X nc ↵	#XXnc=0x1A	Confirm a default value before adjusting the frequency.
4	Adjust the frequency	sendchar #X b3 39 19 ↵ sendchar nc,, ↵	#XXTS ch=2441 pwr=19 #XXnc=0x,,	Adjust the frequency to "2441MHz $\pm$ 10kHz" by changing the value of,, Test Point: ANT-C3, refer to Bottom View (P.86)

Note:

↵: Enter key

12.6.1.2. Handset

First, operate the PC setting according to **The Setting Method of JIG** (P.57).

Then download the appropriate data according to the following procedures.

Items		How to download/Required adjustment
EEPROM (IC3)	Adjusted parameter data is stored in memory. (country version batch file, default batch file, etc.)	1) Default batch file: Execute the command "default.bat". 2) Default batch file (remaining): Execute the command "TGA660US_DEF_RevXXX_YYY.bat". (*2) 3) Country version batch file: Execute the command "TGA660US_US_RevXXX_YYY.bat". (*2) 4) Clock adjustment 5) 2.35 V setting and battery low detection
X'tal (X1)	System clock	1) Apply 2.6V between BATT+ and BATT- with DC power. 2) Input Command " sendchar sfr", then you can confirm the current value. 3) Check X'tal Frequency.(13.824 MHz $\pm$ 100 Hz). 4) If the frequency is not 13.824 MHz $\pm$ 100 Hz, adjust the frequency of CLK executing the command "sendchar sfr xx xx (where xx is the value)" so that the reading of the frequency counter is 13.824000 MHz $\pm$ 5 Hz.

Note:

(*2) XXX_YYY: revision number

"XXX_YYY" vary depending on the country version. You can find them in the batch file, PNZZ- mentioned in **The Setting Method of JIG** (P.57).

12.7. Frequency Table

	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

12.8. Bluetooth Frequency Table

Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
0	2402	33	2435	66	2468
1	2403	34	2436	67	2469
2	2404	35	2437	68	2470
3	2405	36	2438	69	2471
4	2406	37	2439	70	2472
5	2407	38	2440	71	2473
6	2408	39	2441	72	2474
7	2409	40	2442	73	2475
8	2410	41	2443	74	2476
9	2411	42	2444	75	2477
10	2412	43	2445	76	2478
11	2413	44	2446	77	2479
12	2414	45	2447	78	2480
13	2415	46	2448		
14	2416	47	2449		
15	2417	48	2450		
16	2418	49	2451		
17	2419	50	2452		
18	2420	51	2453		
19	2421	52	2454		
20	2422	53	2455		
21	2423	54	2456		
22	2424	55	2457		
23	2425	56	2458		
24	2426	57	2459		
25	2427	58	2460		
26	2428	59	2461		
27	2429	60	2462		
28	2430	61	2463		
29	2431	62	2464		
30	2432	63	2465		
31	2433	64	2466		
32	2434	65	2467		

13 Miscellaneous

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

Note:

This description is only applied on the model with Shield case.

13.1.1. Preparation

- PbF (: Pb free) Solder
- Soldering Iron
Tip Temperature of 700 °F ± 20 °F (370 °C ± 10 °C)

Note:

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

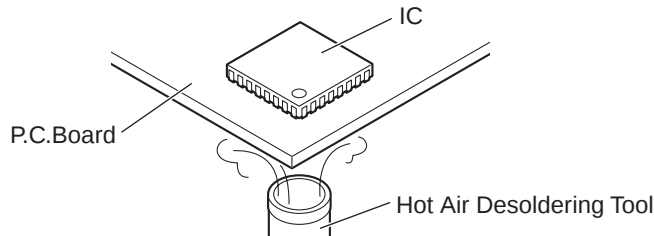
- Hot Air Desoldering Tool
Temperature: 608 °F ± 68 °F (320 °C ± 20 °C)

13.1.2. 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.

13.1.3. How to Remove the IC

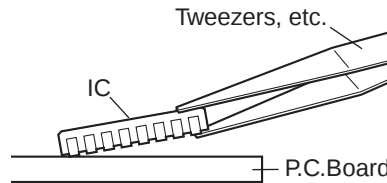
1. Heat the IC with a hot air desoldering tool through the P.C.Board.



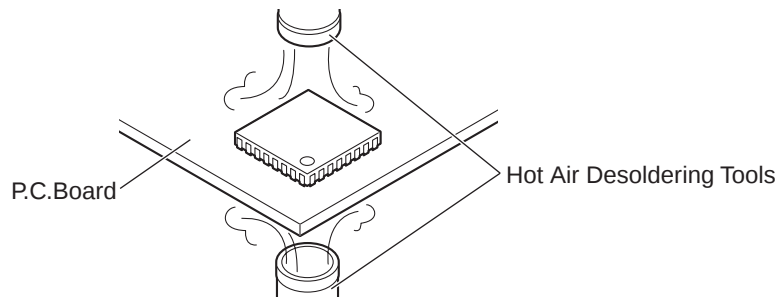
2. Pick up the IC with tweezers, etc. when the solder is melted completely.

Note:

- Be careful not to touch the peripheral parts with tweezers, etc. They are unstable.



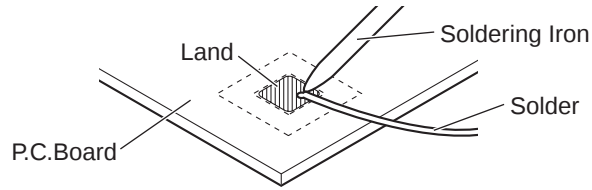
When it is hard to melt the solder completely, heat it with a hot air desoldering tool through the IC besides through the P.C.Board.



3. After removing the IC, clean the P.C.Board of residual solder.

13.1.4. How to Install the IC

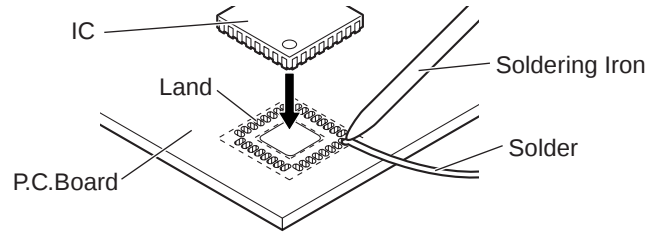
1. Place the solder a little on the land where the radiation GND pad on IC bottom is to be attached.



2. Place the solder a little on the land where IC pins are to be attached, then place the IC.

Note:

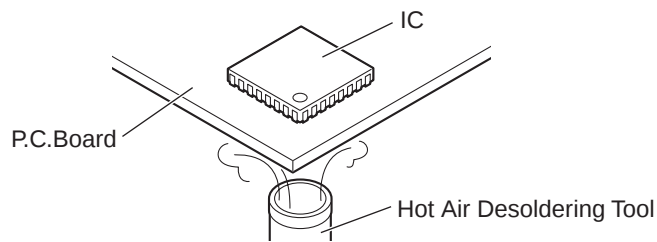
- When placing the IC, the positioning should be done very carefully.



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.

13.2. 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.

13.2.1. Preparation

- PbF (: Pb free) Solder

- Soldering Iron

Tip Temperature of 700 °F ± 20 °F (370 °C ± 10 °C)

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

- Flux

Recommended Flux: Specific Gravity → 0.82.

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

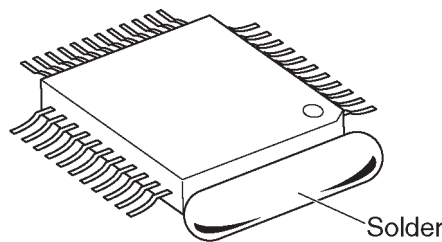
Note: See **About Lead Free Solder (PbF: Pb free)** (P.4)

13.2.2. How to Remove the IC

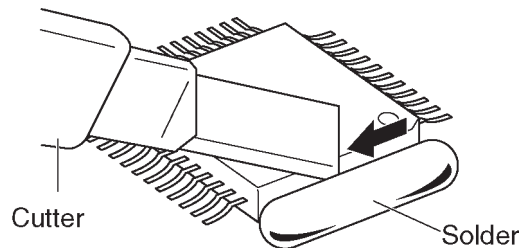
1. Put plenty of solder on the IC pins so that the pins can be completely covered.

Note:

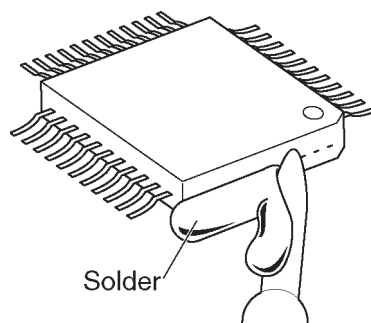
If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



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



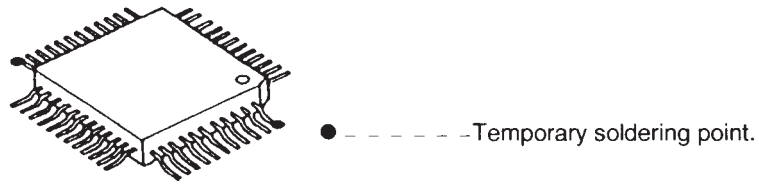
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the 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.

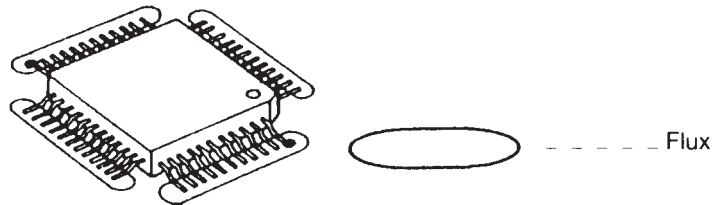
13.2.3. How to Install the IC

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

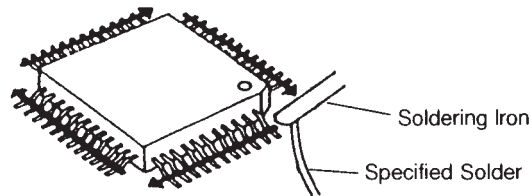


*Check the accuracy of the IC setting with the corresponding soldering foil.

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

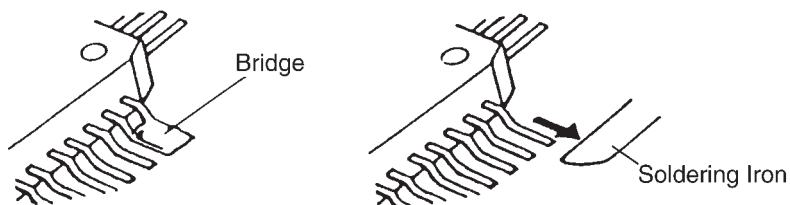


3. Solder the pins, sliding the soldering iron in the direction of the arrow.



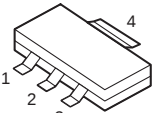
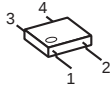
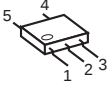
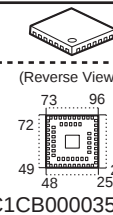
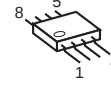
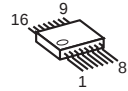
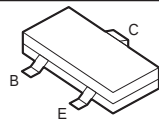
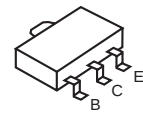
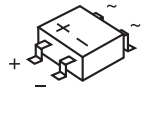
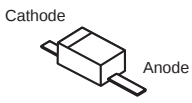
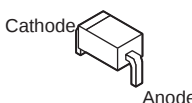
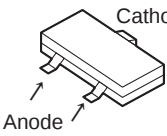
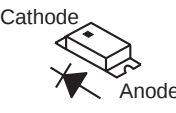
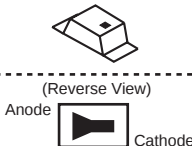
13.2.4. How to Remove a Solder Bridge

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

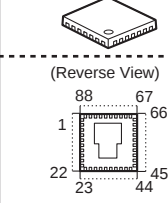
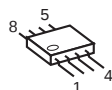
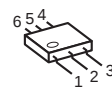
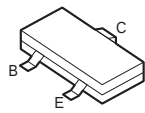
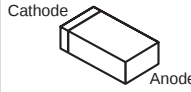
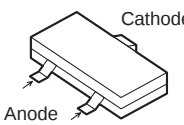
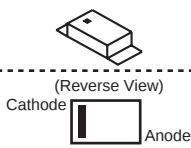


13.3. Terminal Guide of the ICs, Transistors and Diodes

13.3.1. Base Unit

 C0CBAYG00016	 C0EBE0000124	 C0CBCCC00103 B1GFCFEN0011	 C1CB00003542	 PNWI1TG7641H PNWI2TG7621H PNWI3TG7621H
 C0JBAQ000247	 B1ACGP000008	 B1ABDM000001, B1ADGE000012 B1ADNB000003, B1ABDF000017 B1GBCFYY0010, B1GBCFYY0020 2SA1576S, PQVTDTC114TU	 DSC7003S0L	
 PQVDMD5S	 1SS355	 PQVDPTZT2530	 B0ECKM000008	 B0DDCD000001
 LNJ237W82RA	 B3ABB0000331			

13.3.2. Handset

 C2HBCY000081	 PNWITGA660BR	 C0DBZYY00357	 B1ADCF000040 B1GBCFYY0010 B1ABDF000017 B1ADNB000003 B1ABGE000011	
 B0BC4R3A0006	 B0DDCD000001	 B3ACB0000216		

14 Schematic Diagram

14.1. For Schematic Diagram

14.1.1. 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 manufacture's specified parts.

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

14.1.2. Handset (Schematic Diagram (Handset_Main))

Notes:

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

14.1.3. Charger Unit (Schematic Diagram (Charger Unit))

Notes:

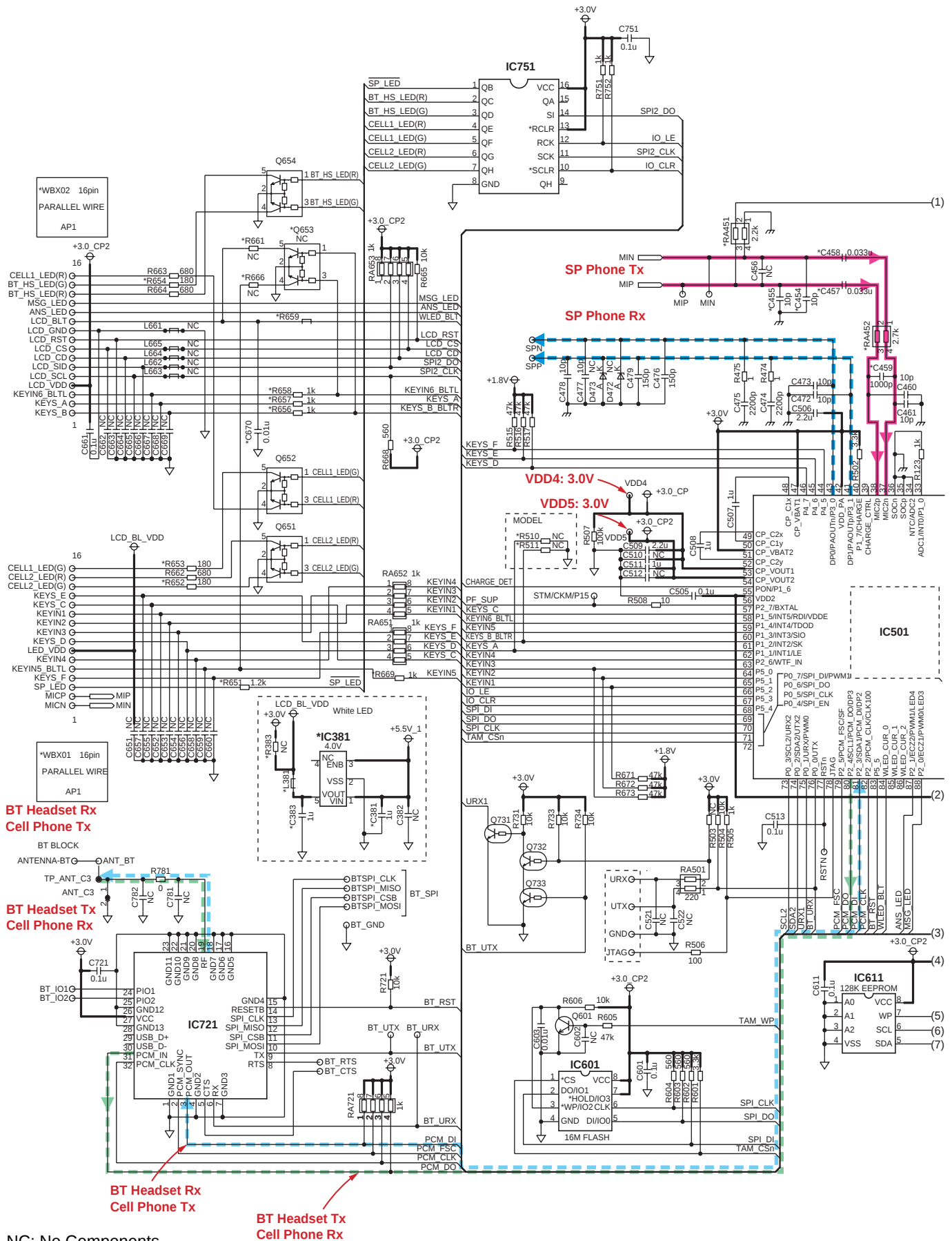
1. DC voltage measurements are taken with voltmeter from the negative voltage line.

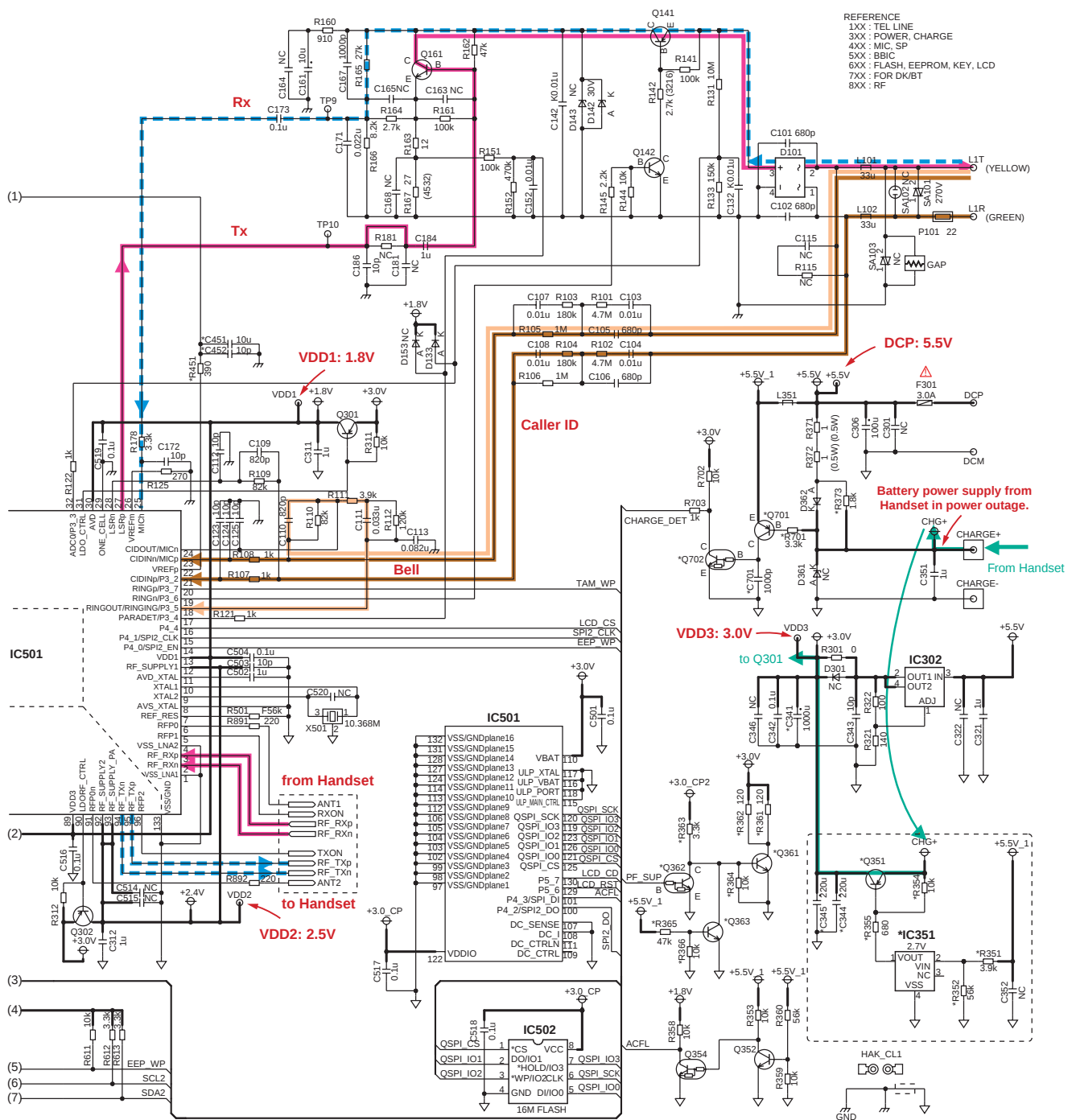
Important Safety Notice:

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

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

14.2. Schematic Diagram (Base Unit_Main)

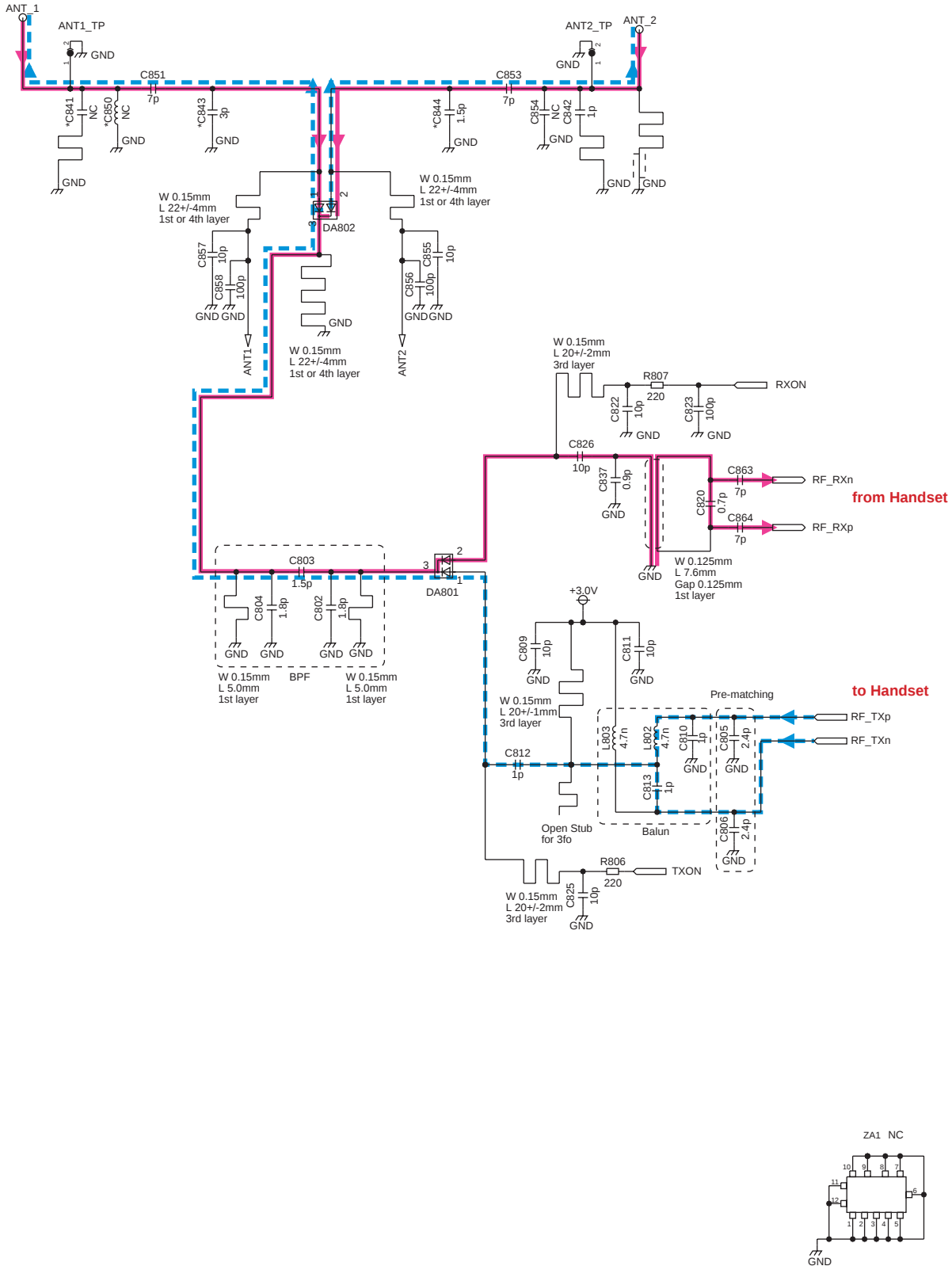




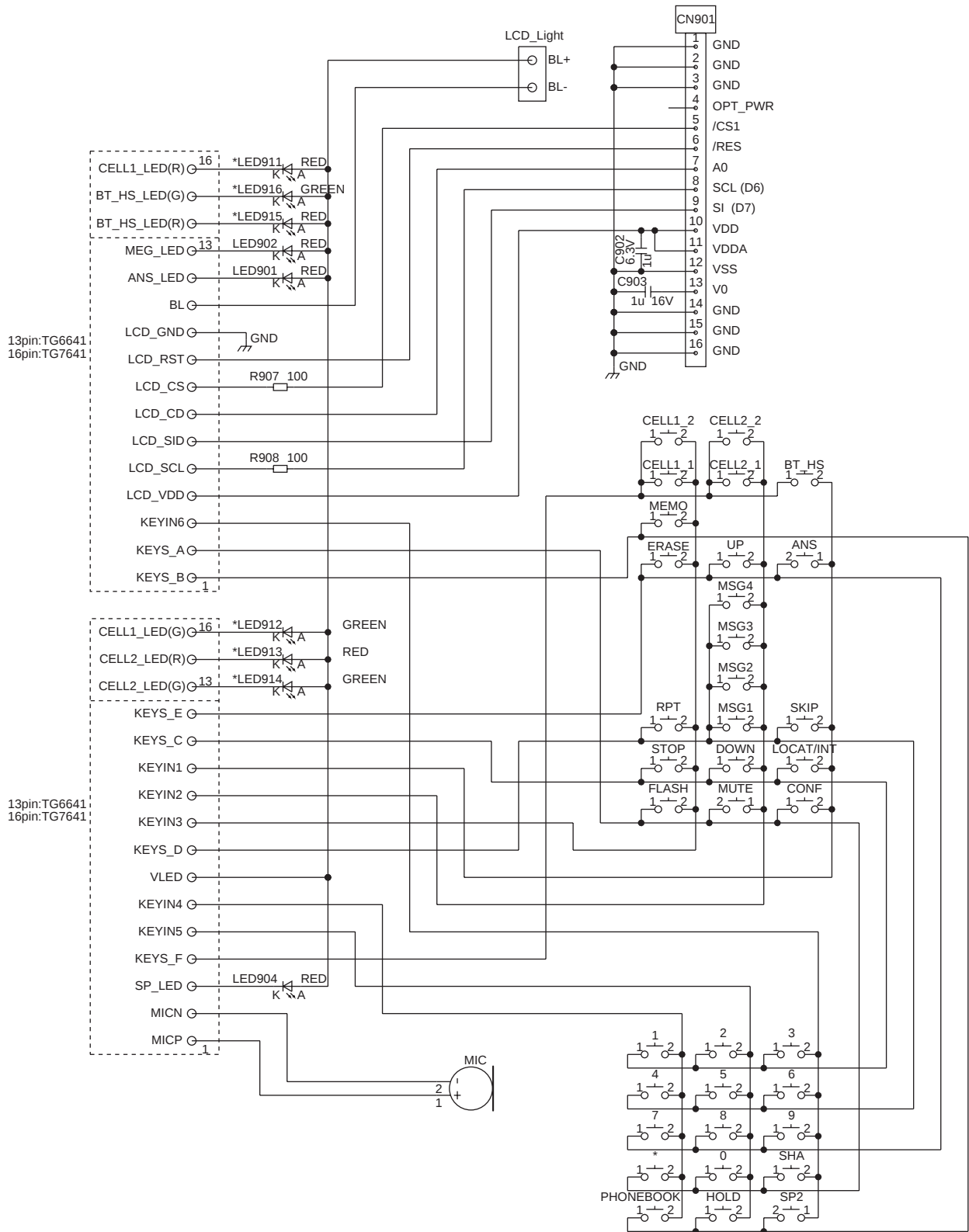
NC: No Components

KX-TG155 SCHEMATIC DIAGRAM (Base Unit_Main)

14.3. Schematic Diagram (Base Unit_RF)



14.4. Schematic Diagram (Base Unit_Operation)



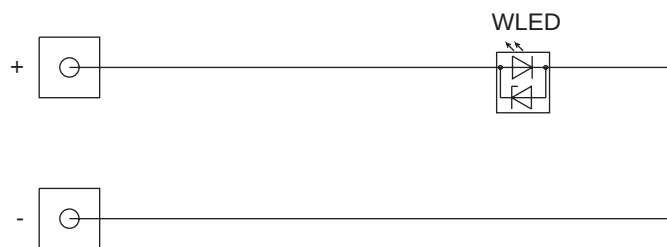
CT2 CT1 CARBON_TEST

FOR TG6641, TG7641

NC: No Components

KX-TG155 SCHEMATIC DIAGRAM (Base Unit_Operation)

14.5. Schematic Diagram (Base Unit_LED)

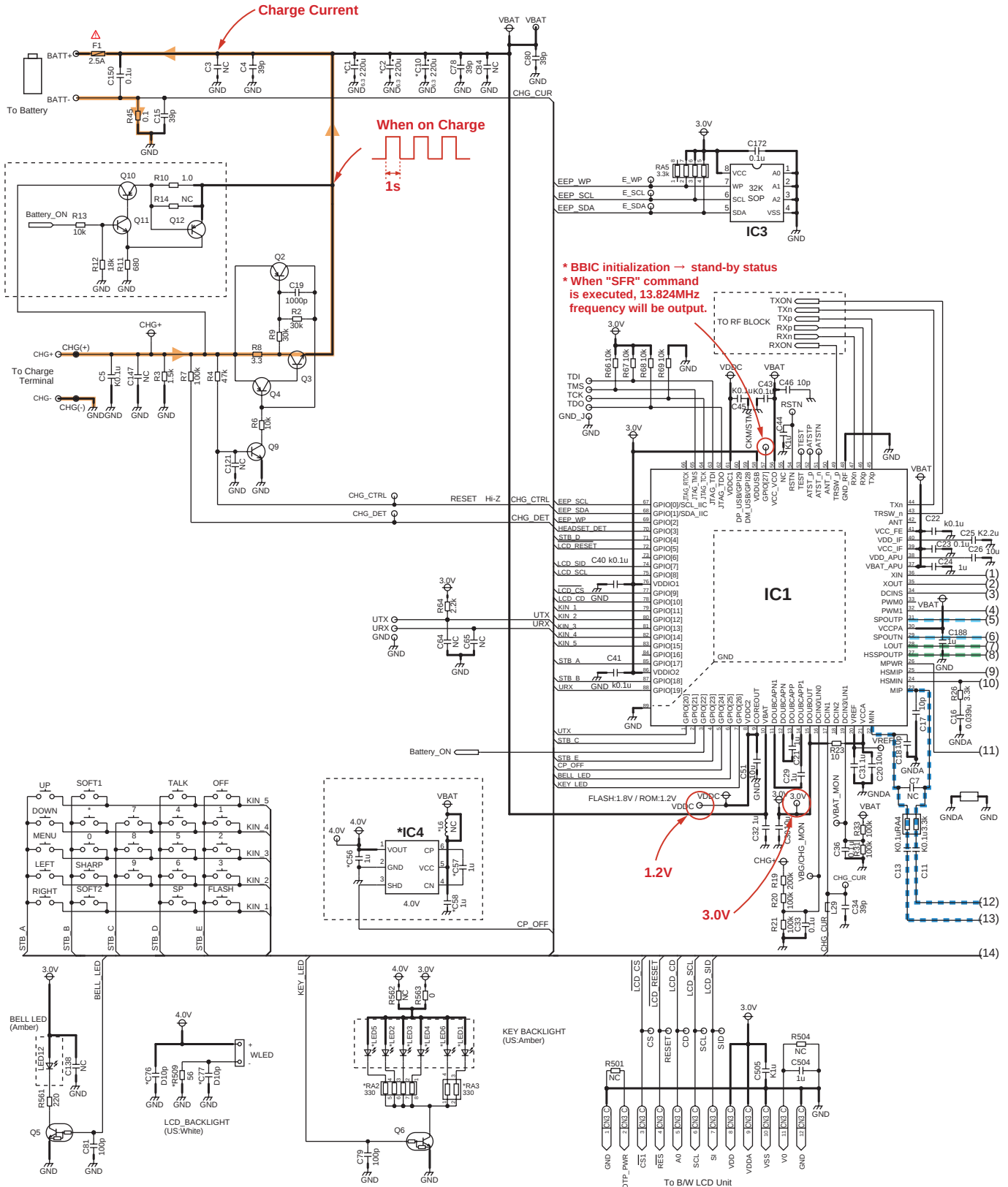


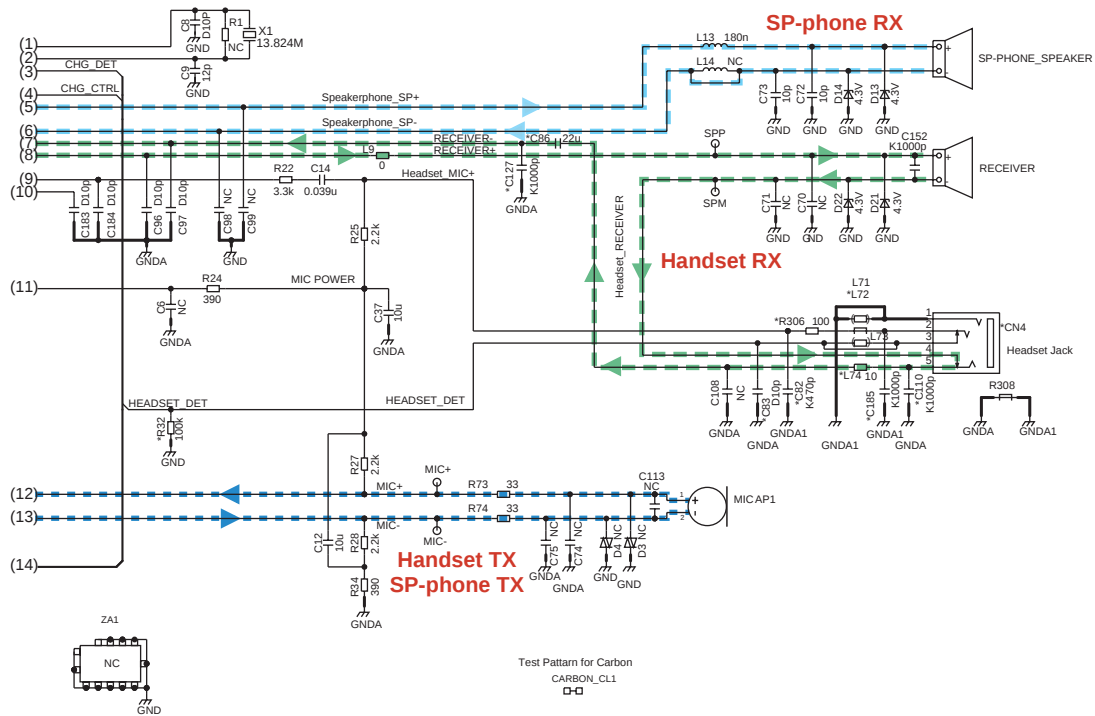
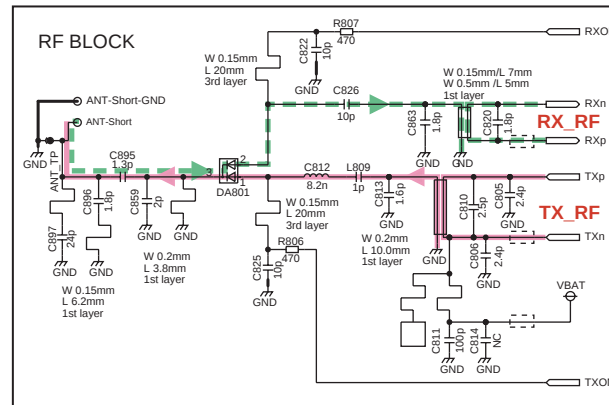
NC: No Components

KX-TG155 SCHEMATIC DIAGRAM (Base Unit_LED)

Memo

14.6. Schematic Diagram (Handset_Main)

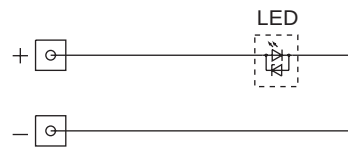




NC: No Components

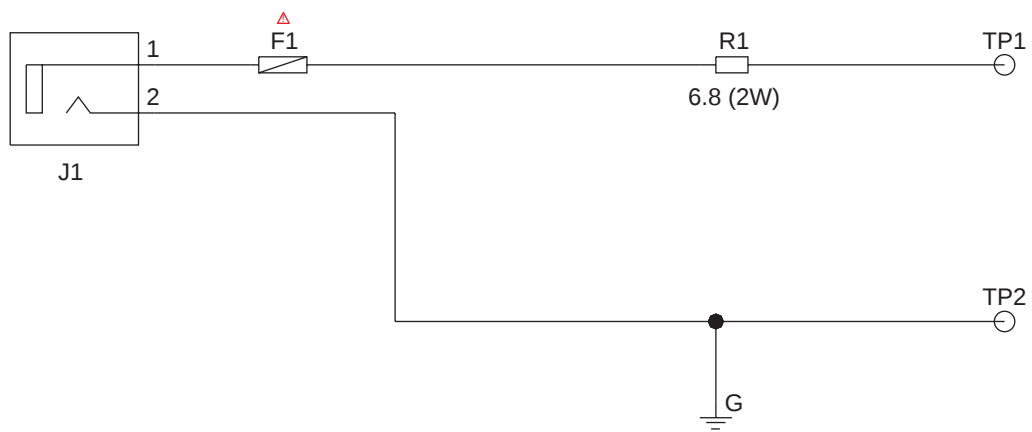
KX-TGA660 SCHEMATIC DIAGRAM (Handset_Main)

14.7. Schematic Diagram (Handset_LED)



KX-TGA660 SCHEMATIC DIAGRAM (Handset_LED)

14.8. Schematic Diagram (Charger Unit)



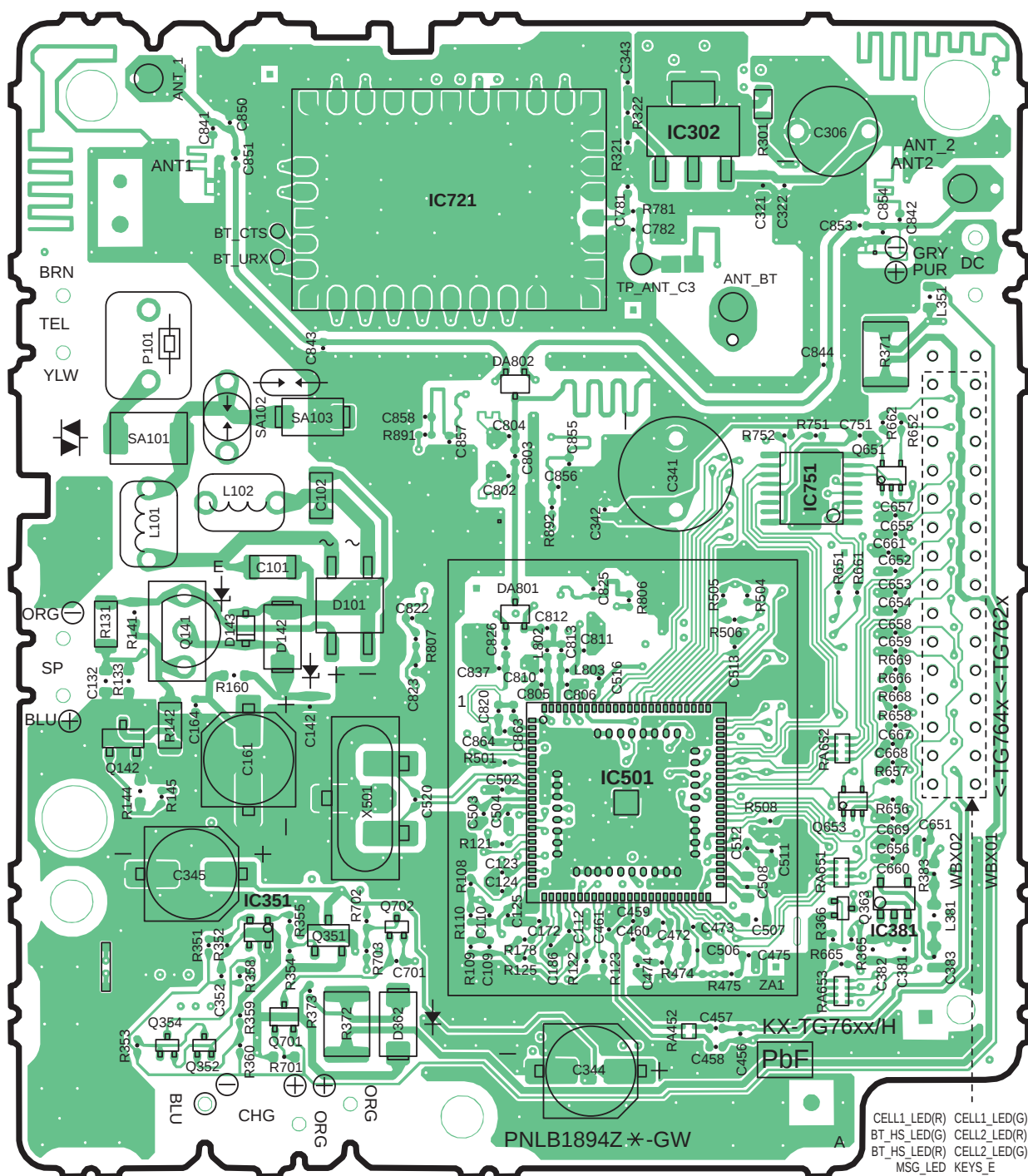
SCHEMATIC DIAGRAM (Charger Unit)

Memo

15 Printed Circuit Board

15.1. Circuit Board (Base Unit_Main)

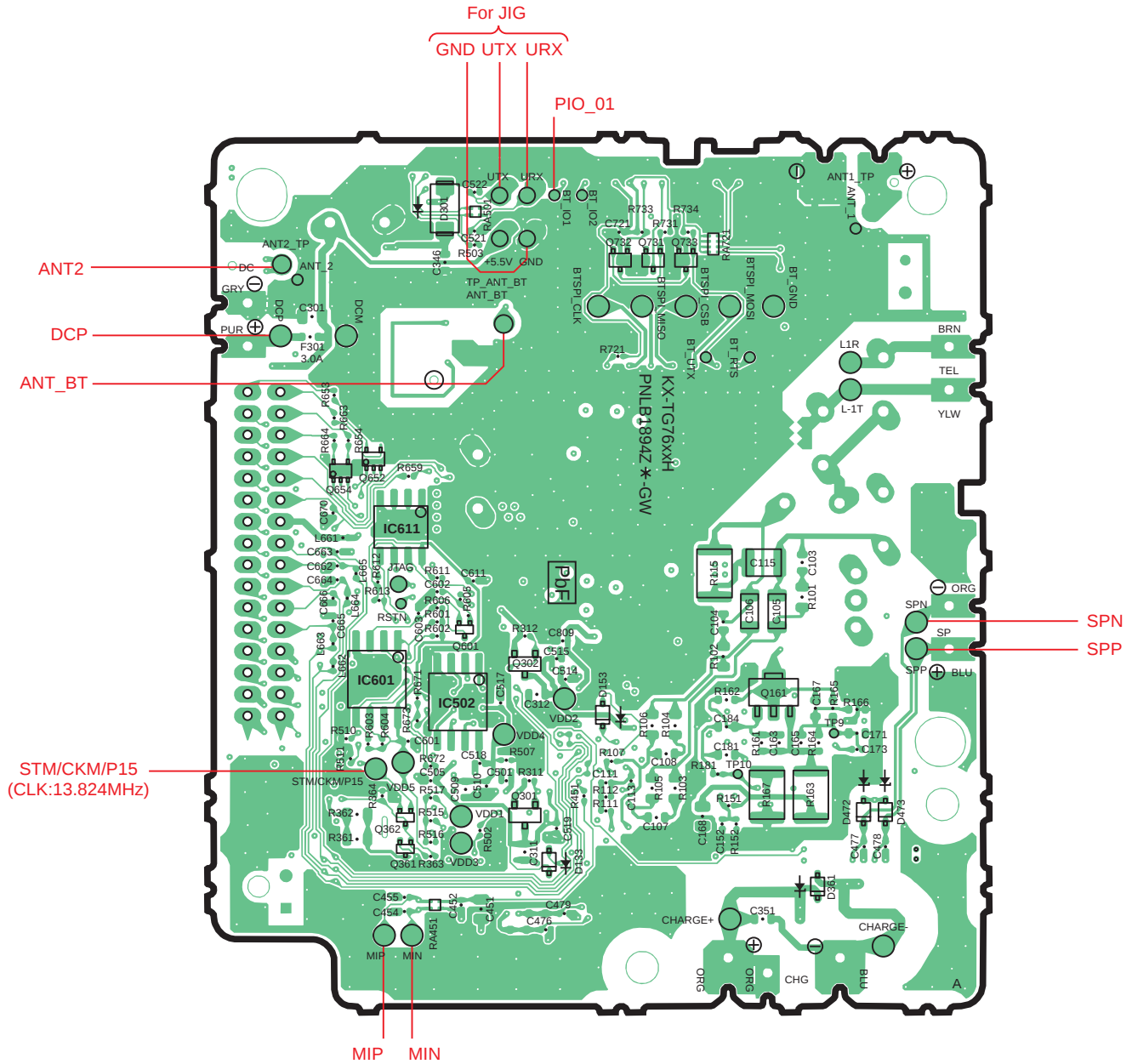
15.1.1. Component View



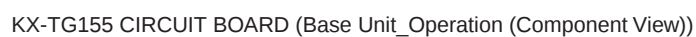
KX-TG155 CIRCUIT BOARD (Base Unit_Main (Component View))

CELL1_LED(R)	CELL1_LED(G)
BT_HS_LED(G)	CELL2_LED(R)
BT_HS_LED(R)	CELL2_LED(G)
MSG_LED	KEY5_E
ANS_LED	KEY5_C
LCD_BLT	KEYIN1
LCD_GND	KEYIN2
LCD_RST	KEYIN3
LCD_CS	KEY5_D
LCD_CD	LED_VDD
LCD_SID	KEYIN4
LCD_SCL	KEYIN5_BTLT
LCD_VDD	KEY5_F
KEYIN6_BTLT	SP_LED
KEY5_A	MICN
KEY5_B	MICP

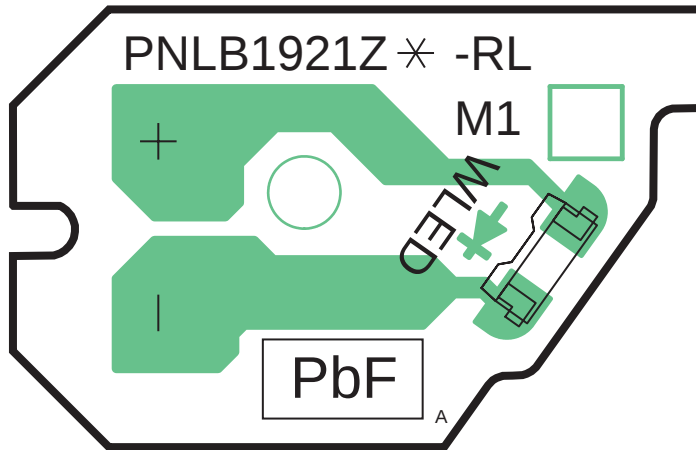
15.1.2. Bottom View



KX-TG155 CIRCUIT BOARD (Base Unit_Main (Bottom View))



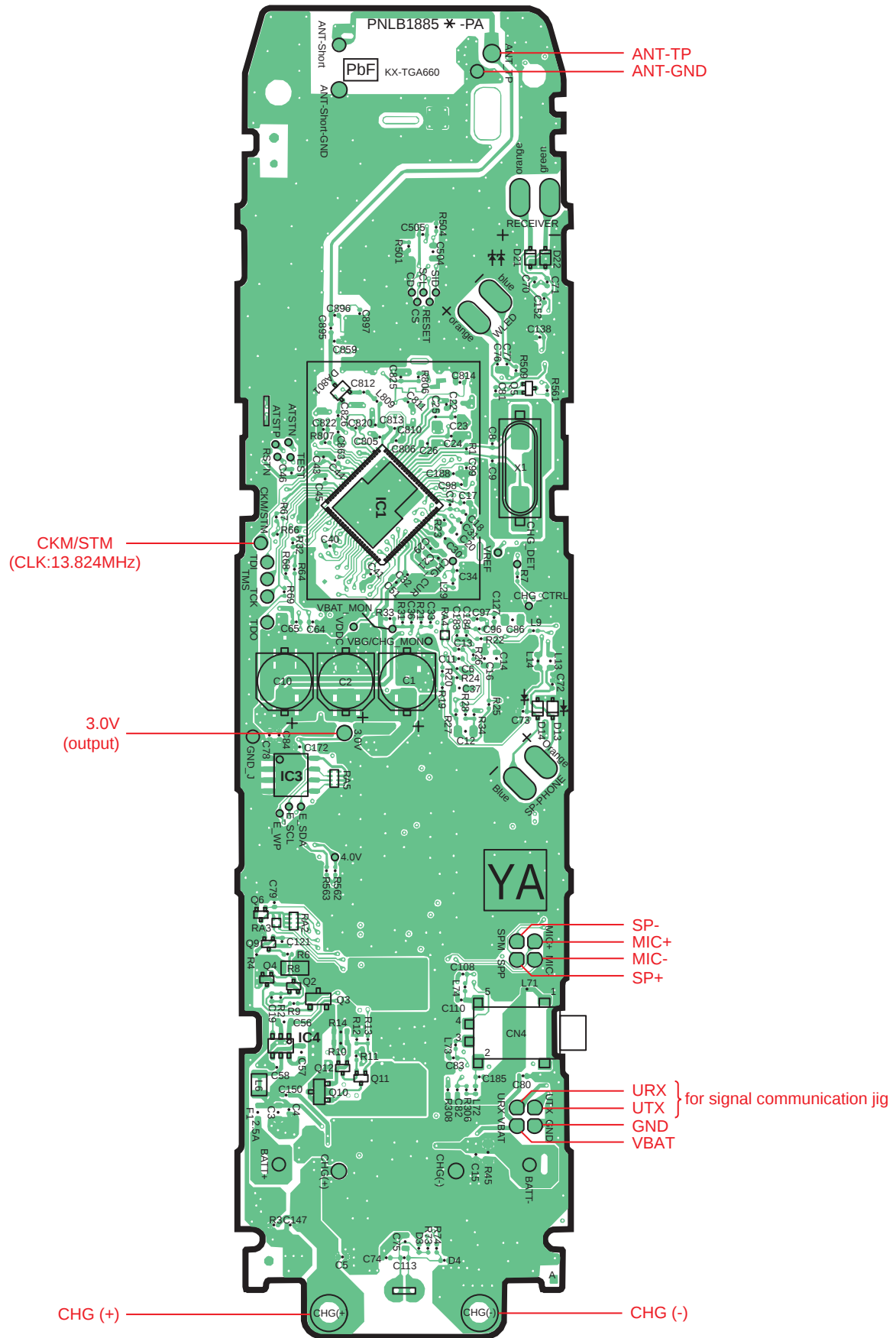
15.3. Circuit Board (Base Unit_LED)



KX-TG155 CIRCUIT BOARD (Base Unit_LED (Component View))

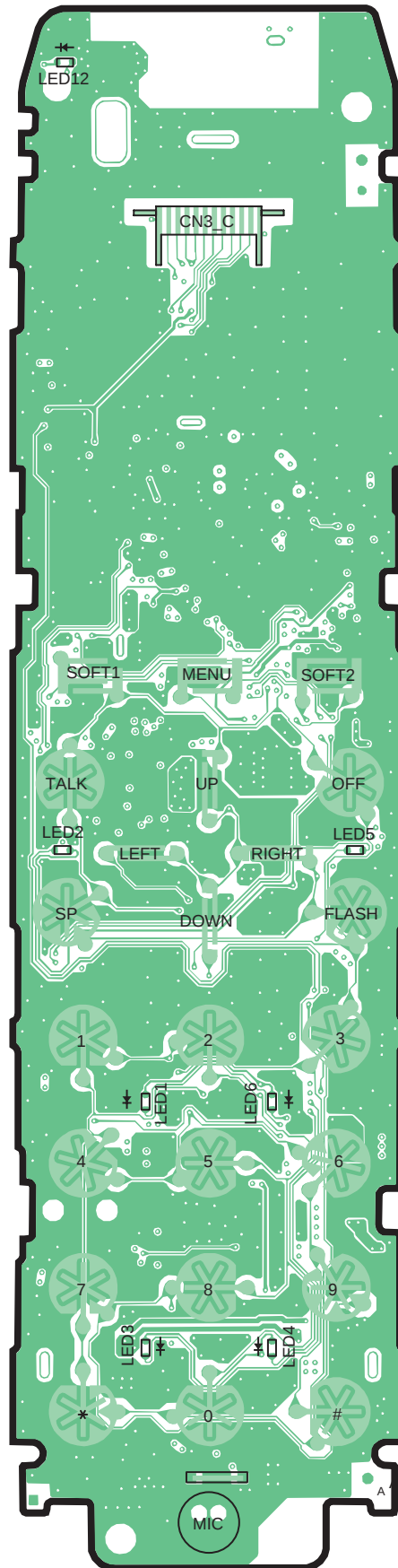
15.4. Circuit Board (Handset_Main)

15.4.1. Component View



KX-TGA660 CIRCUIT BOARD (Handset_Main (Component View))

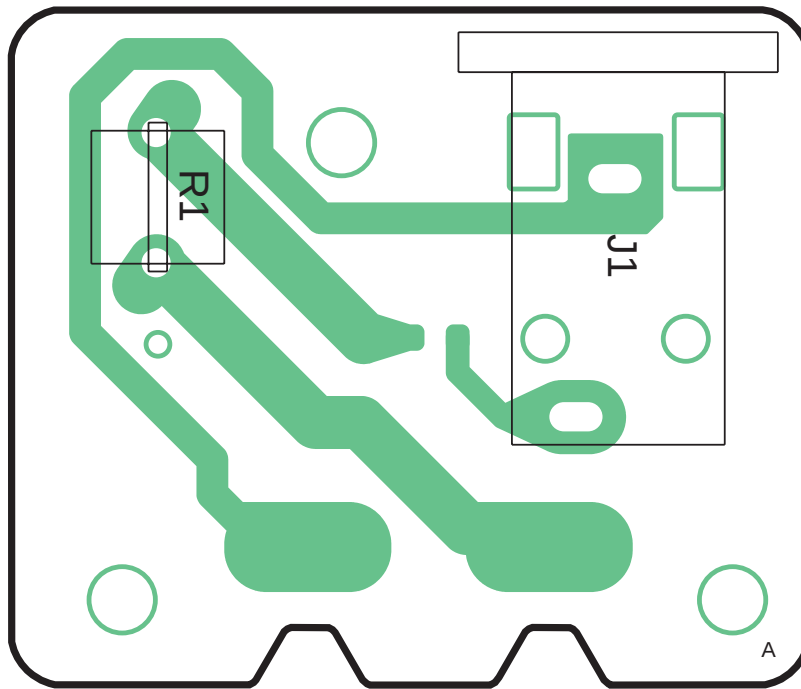
15.4.2. Bottom View



KX-TGA660 CIRCUIT BOARD (Handset_Main (Bottom View))

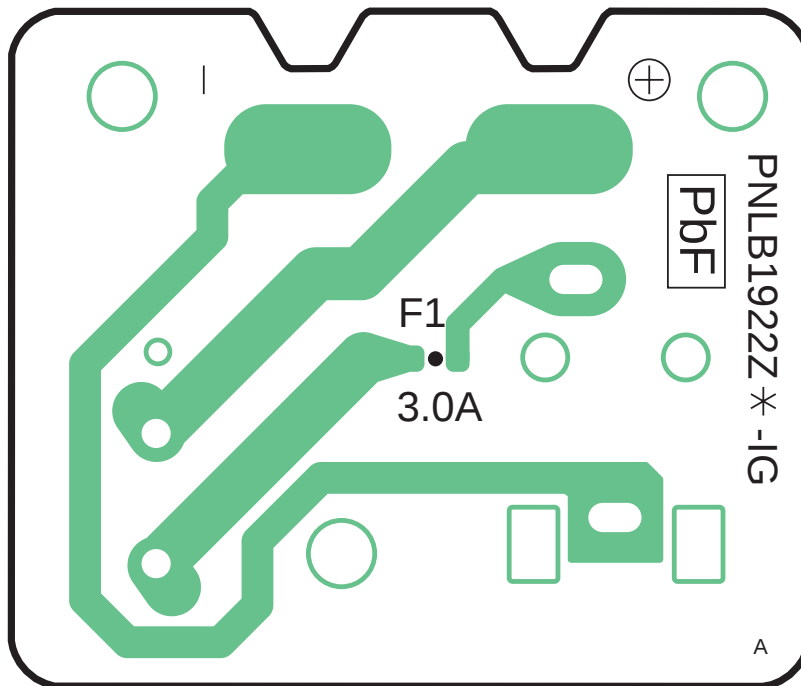
15.6. Circuit Board (Charger Unit)

15.6.1. Component View



CIRCUIT BOARD (Charger Unit (Component View))

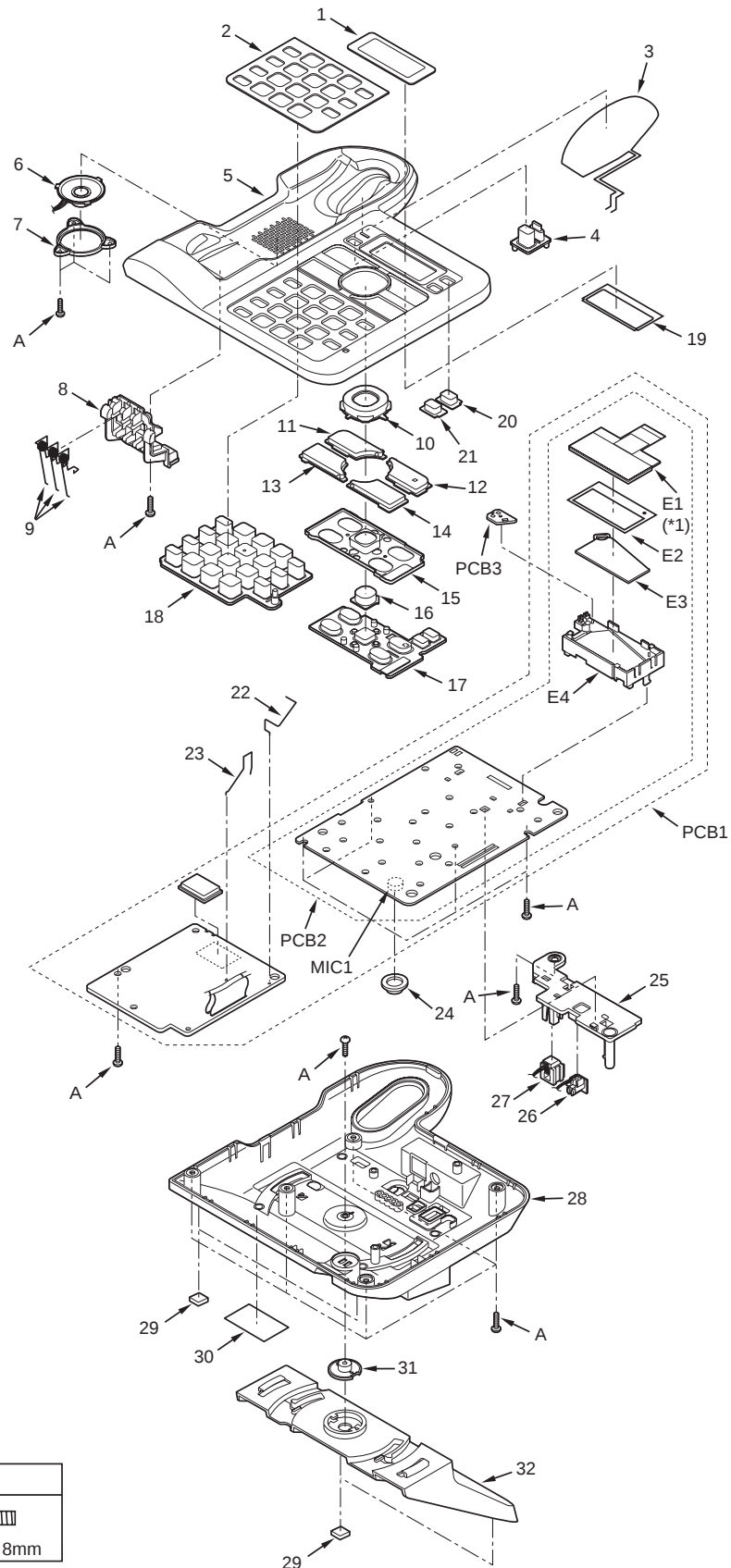
15.6.2. Bottom View



CIRCUIT BOARD (Charger Unit (Bottom View))

16 Exploded View and Replacement Parts List

16.1. Cabinet and Electrical Parts (Base Unit)

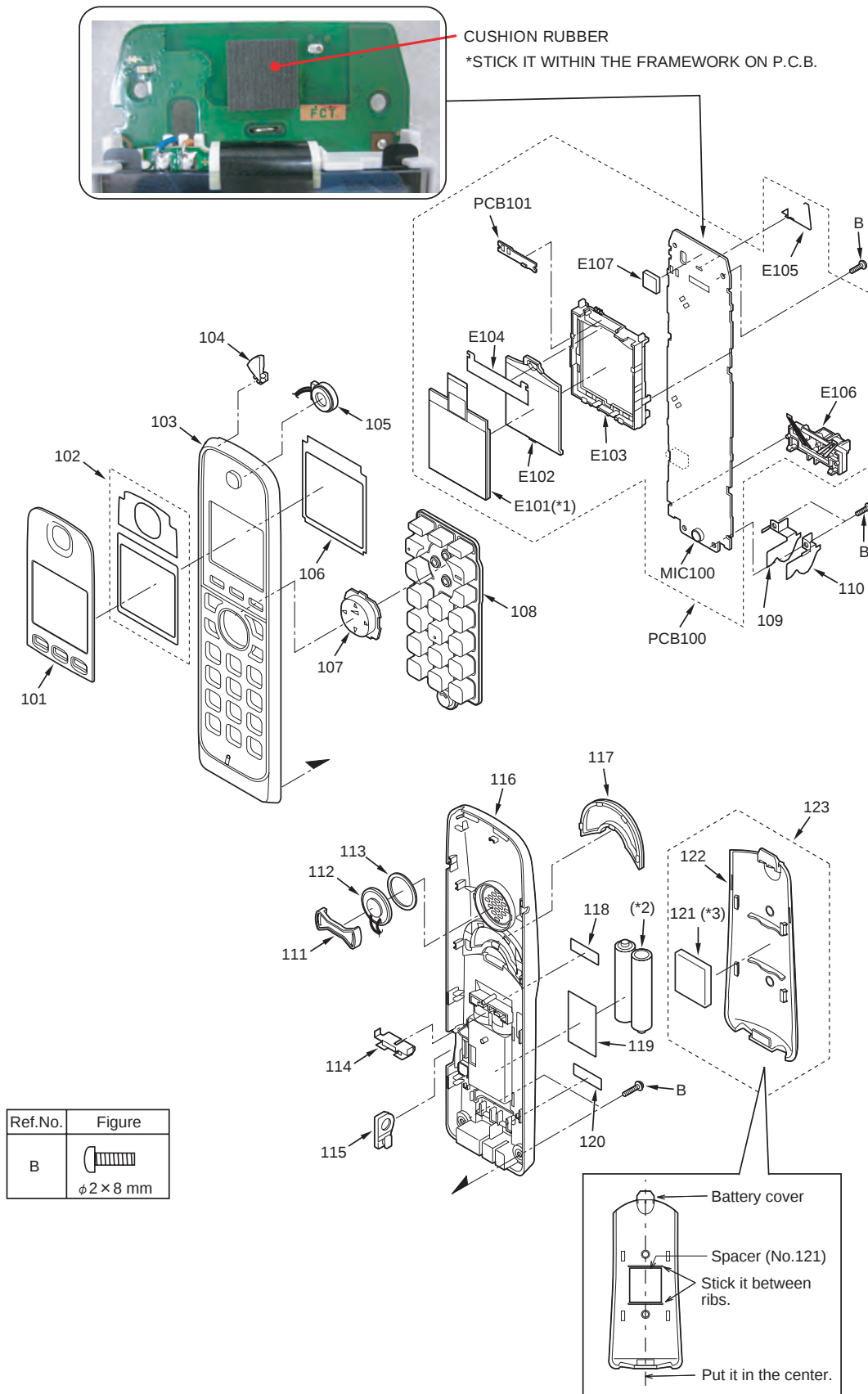


Ref.No.	Figure
A	 φ 2.6 x 8mm

Note:

(*1) This cable is fixed by welding. Refer to **How to Replace the Base unit LCD** (P.54).

16.2. Cabinet and Electrical Parts (Handset)



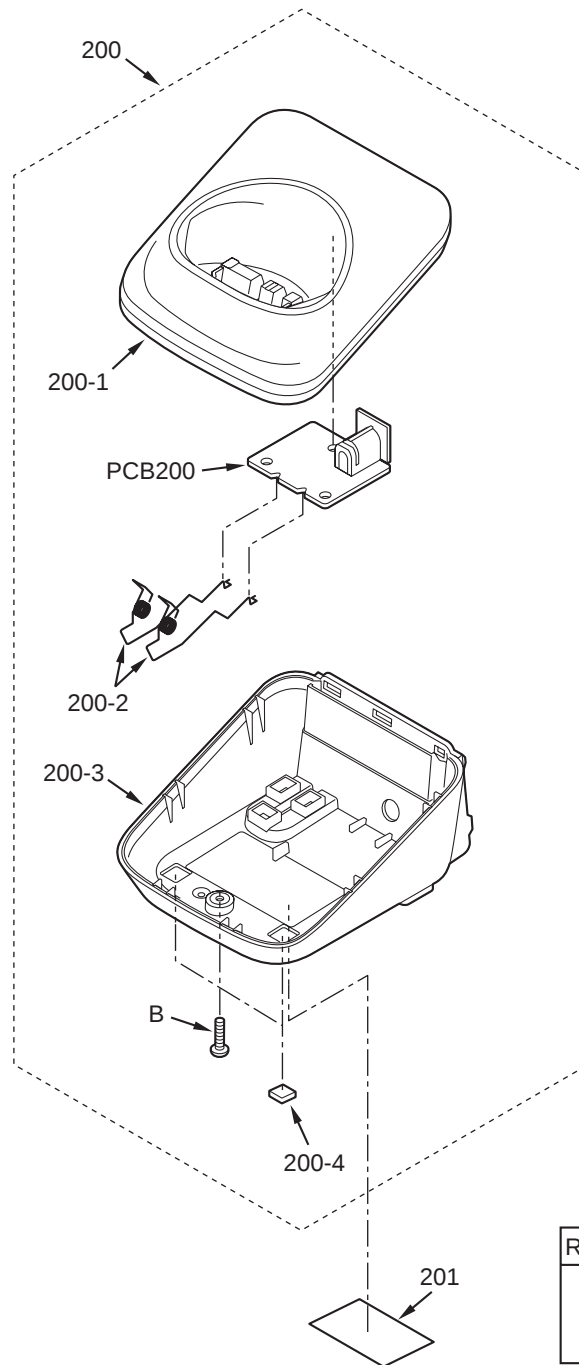
Note:

(*1) This cable is fixed by welding. Refer to **How to Replace the Handset LCD (P.56)**.

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

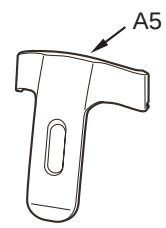
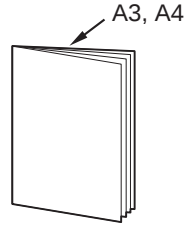
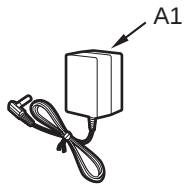
(*3) Attach the SPACER (No. 121) to the exact location described above.

16.3. Cabinet and Electrical Parts (Charger Unit)



Ref.No.	Figure
B	 φ 2 × 8 mm

16.4. Accessories



16.5. 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 Δ mark indicates special characteristics important for safety. When replacing any of these components, only use specified manufacture's parts.

3. The S mark means the part is one of some identical parts.

For that reason, it may be different from the installed part.

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

5. RESISTORS & CAPACITORS

Unless otherwise specified;

All resistors are in ohms (Ω) k=1000 Ω , M=1000k Ω

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

*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	

16.5.1. Base Unit

16.5.1.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	1	PNGP1133Z1	PANEL, LCD	PC-HB
	2	PNGP1134Z1	PANEL, UPPER	PC-HB
	3	PNLA1046Z	ANTENNA, LOOP	
	4	PNJK1102Z	KEYBOARD SWITCH, HEAD-SET	
	5	PNKM1181Y2	CABINET BODY	PS-HB
	6	L0AA04A00028	SPEAKER	
	7	PQHR1108Z2	GUIDE, SPEAKER	POM-HB
	8	PNKE1089Z2	CASE, CHARGE TERMINAL	PS-HB
	9	PNJT1061Z	CHARGE TERMINAL	
	10	PNBC1346Z1	BUTTON, NAVIGATOR KEY	ABS-HB
	11	PNBC1348Z1	BUTTON, ERASE	PS-HB

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	12	PNBC1347Z1	BUTTON, ANSWER ON	PS-HB
	13	PNBC1349Z1	BUTTON, STOP	PS-HB
	14	PNBC1350Z1	BUTTON, LOCATOR	PS-HB
	15	PNHR1381Z	GUIDE, BUTTON	PS-HB
	16	PNBC1345Z1	BUTTON, MESSAGE	PS-HB
	17	PNJK1101Z	KEYBOARD SWITCH, TAM	
	18	PNJK1100Z	KEYBOARD SWITCH, DIAL	
	19	PNYE1038Z	SPACER, CUSHION LCD	
	20	PNBC1351Z1	BUTTON, CELL 1	PS-HB
	21	PNBC1352Z1	BUTTON, CELL 2	PS-HB
	22	PNLA1047Z	ANTENNA, SUB	
	23	PNLA1052Z	ANTENNA, BT	
	24	PQMG10025W	RUBBER PARTS, MIC	
	25	PNHR1383Z	GUIDE, JACK	PS-HB
	26	K2ECYZ000001	JACK, DC	
	27	PQJJ1T039L	JACK, MODULAR	
	28	PNKF1131Z1	CABINET COVER	PS-HB
	29	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	
	30	PNGT5518Z	NAME PLATE	
	31	PNHR1249Z	PLASTIC PARTS	POM-HB
	32	PNKL1027Z1	STAND, WALL MOUNT	PS-HB

16.5.1.2. Main P.C. Board Parts

Note:

(*1) When replacing IC611 or X501, make the adjustment using PNZZTG7621M. Refer to **How to download the data** (P.64) of Things to Do after Replacing IC or X'tal.

(*2) When replacing the base unit LCD, See **How to Replace the Base unit LCD** (P.54).

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB1	PNWP1TG7641H	MAIN P.C.BOARD ASS'Y (RTL) (ICs)	
	IC302	C0CBAYG00016	IC	
	IC351	C0EBE0000124	IC	
	IC381	C0CBCCC00103	IC	
	IC501	C1CB00003542	IC	
	IC502	PNWI2TG7621H	IC (FLASH)	
	IC601	PNWI3TG7621H	IC (FLASH)	
	IC611	PNWI1TG7641H	IC (EEPROM) (*1)	
	IC751	C0JBAQ000247	IC	
			(TRANSISTORS)	
	Q141	B1ACGP000008	TRANSISTOR(SI)	
	Q142	B1ABDM000001	TRANSISTOR(SI)	
	Q161	DSC7003S0L	TRANSISTOR(SI)	
	Q301	B1ADGE000012	TRANSISTOR(SI)	
	Q302	B1ADGE000012	TRANSISTOR(SI)	
	Q351	B1ADNB000003	TRANSISTOR(SI)	
	Q352	B1ABDF000017	TRANSISTOR(SI)	
	Q354	B1GBCFY0010	TRANSISTOR(SI)	
	Q361	B1ABDF000017	TRANSISTOR(SI)	
	Q362	B1GBCFY0020	TRANSISTOR(SI)	
	Q363	B1ABDF000017	TRANSISTOR(SI)	
	Q601	B1ABDF000017	TRANSISTOR(SI)	
	Q651	B1GFCFEN0011	TRANSISTOR(SI)	
	Q652	B1GFCFEN0011	TRANSISTOR(SI)	
	Q654	B1GFCFEN0011	TRANSISTOR(SI)	
	Q701	2SA1576S	TRANSISTOR(SI)	S
	Q702	B1GBCFY0020	TRANSISTOR(SI)	
	Q731	PQVTDTC114TU	TRANSISTOR(SI)	S
	Q732	PQVTDTC114TU	TRANSISTOR(SI)	S
	Q733	PQVTDTC114TU	TRANSISTOR(SI)	S
			(DIODES)	
	D101	PQVMD5S	DIODE(SI)	
	D133	1SS355	DIODE(SI)	S
	D142	PQVDPZT2530	DIODE(SI)	S
	D362	B0ECKM000008	DIODE(SI)	
	DA801	B0DDCD000001	DIODE(SI)	
	DA802	B0DDCD000001	DIODE(SI)	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
			(COILS)	
	L101	PQLQXF330K	COIL	S
	L102	PQLQXF330K	COIL	S
	L351	PQLQR2KA113	COIL	S
	L381	PQLQR2KA113	COIL	S
	L802	G1C4N7200006	COIL	
	L803	G1C4N7200006	COIL	
			(RESISTOR ARRAYS)	
	RA451	D1H422220001	RESISTOR ARRAY	
	RA452	D1H427220001	RESISTOR ARRAY	
	RA501	D1H422120001	RESISTOR ARRAY	
	RA651	D1H81024A024	RESISTOR ARRAY	
	RA652	D1H81024A024	RESISTOR ARRAY	
	RA653	D1H81024A024	RESISTOR ARRAY	
	RA721	D1H81024A024	RESISTOR ARRAY	
			(IC FILTER)	
	R659	J0JCC0000286	IC FILTER	
			(BT UNIT)	
	IC721	PNWP3TG7621H	BT UNIT	
			(VARISTOR)	
	SA101	J0LF00000048	VARISTOR (SURGE ABSORBER)	
			(RESISTORS)	
	R101	PQ4R10XJ475	4.7M	S
	R102	PQ4R10XJ475	4.7M	S
	R103	PQ4R10XJ184	180k	S
	R104	PQ4R10XJ184	180k	S
	R105	PQ4R10XJ105	1M	S
	R106	PQ4R10XJ105	1M	S
	R107	D0GA102JA021	1k	
	R108	D0GA102JA021	1k	
	R109	ERJ2GEJ823	82k	S
	R110	ERJ2GEJ823	82k	S
	R111	D0GA392JA015	3.9k	
	R112	D0GA124JA015	120k	
	R121	D0GA102JA021	1k	
	R122	D0GA102JA021	1k	
	R123	D0GA102JA021	1k	
	R125	D0GA271JA015	270	
	R131	PQ4R18XJ106	10M	S
	R133	ERJ3GEYJ154	150k	S
	R141	D0GB104JA057	100k	
	R142	PQ4R18XJ272	2.7k	S
	R144	D0GB103JA057	10k	
	R145	D0GA222JA021	2.2k	
	R151	D0GA104JA021	100k	
	R152	ERJ2GEJ474X	470k	S
	R160	ERJ3GEYJ911	910	
	R161	D0GB104JA057	100k	
	R162	D0GB473JA057	47k	
	R163	ERJ12YJ120	12	
	R164	D0GB272JA057	2.7k	
	R165	ERJ3GEYJ273	27k	S
	R166	ERJ3GEYJ822	8.2k	S
	R167	ERJ12YJ270	27	
	R178	D0GA332JA015	3.3k	
	R301	PQ4R10XJ000	0	S
	R311	D0GA103JA021	10k	
	R312	D0GA103JA021	10k	
	R321	ERJ2RKF1400	140	
	R322	ERJ2RKF1000	100	
	R351	D0GA392JA015	3.9k	
	R352	ERJ2GEJ563	56k	S
	R353	D0GA103JA021	10k	
	R354	D0GA103JA021	10k	
	R355	D0GA681JA021	680	
	R358	D0GA103JA021	10k	
	R359	D0GA103JA021	10k	
	R360	ERJ2GEJ563	56k	S
	R361	PQ4R10XJ121	120	S
	R362	PQ4R10XJ121	120	S
	R363	D0GA332JA015	3.3k	
	R364	D0GA103JA021	10k	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R365	D0GA473JA021	47k	
	R366	D0GA103JA021	10k	
	R371	ERJ12YJ1R0	1	
	R372	ERJ12YJ1R0	1	
	R373	D0GA182JA015	1.8k	
	R451	ERJ2GEYJ391	390	S
	R474	D0GA1R0JA014	1	
	R475	D0GA1R0JA014	1	
	R501	D0GA563ZA006	56k	
	R502	D0GA332JA015	3.3k	
	R504	D0GA103JA021	10k	
	R505	D0GA102JA021	1k	
	R506	D0GA101JA021	100	
	R507	D0GA104JA021	100k	
	R508	ERJ2GEJ100	10	S
	R515	D0GA473JA021	47k	
	R516	D0GA473JA021	47k	
	R517	D0GA473JA021	47k	
	R601	D0GA332JA015	3.3k	
	R602	D0GA561JA021	560	
	R603	D0GA561JA021	560	
	R604	D0GA561JA021	560	
	R605	D0GA473JA021	47k	
	R606	D0GA103JA021	10k	
	R611	D0GA103JA021	10k	
	R612	D0GA332JA015	3.3k	
	R613	D0GA332JA015	3.3k	
	R651	D0GA122JA015	1.2k	
	R652	D0GA181JA021	180	
	R653	D0GA181JA021	180	
	R654	D0GA181JA021	180	
	R656	D0GA102JA021	1k	
	R657	D0GA102JA021	1k	
	R658	D0GA102JA021	1k	
	R662	D0GA681JA021	680	
	R663	D0GA681JA021	680	
	R664	D0GA681JA021	680	
	R665	D0GA103JA021	10k	
	R668	D0GA561JA021	560	
	R669	D0GA102JA021	1k	
	R671	D0GA473JA021	47k	
	R672	D0GA473JA021	47k	
	R673	D0GA473JA021	47k	
	R701	ERJ3GEYJ332	3.3k	S
	R702	D0GA103JA021	10k	
	R703	D0GA102JA021	1k	
	R721	ERJ2GEJ474X	470k	S
	R731	D0GA103JA021	10k	
	R733	D0GA103JA021	10k	
	R734	D0GA103JA021	10k	
	R751	D0GA102JA021	1k	
	R752	D0GA102JA021	1k	
	R781	ERJ2GE0R00	0	S
	R806	D0GA221JA021	220	
	R807	D0GA221JA021	220	
	R891	D0GA221JA021	220	
	R892	D0GA221JA021	220	
			(CAPACITORS)	
	C101	F1K2H681A008	680p	
	C102	F1K2H681A008	680p	
	C103	ECUV1C103KBV	0.01	
	C104	ECUV1C103KBV	0.01	
	C105	F1K2H681A008	680p	
	C106	F1K2H681A008	680p	
	C107	ECUV1C103KBV	0.01	
	C108	ECUV1C103KBV	0.01	
	C109	ECUE1H821KBQ	820p	
	C110	ECUE1H821KBQ	820p	
	C111	ECUE1A333KBQ	0.033	S
	C112	ECUE1H100DCQ	10p	S
	C113	ECUE1A823KBQ	0.082	S
	C123	ECUE1H100DCQ	10p	S
	C124	ECUE1H100DCQ	10p	S

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C125	ECUE1H100DCQ	10p	S
	C132	ECUV1H103KBV	0.01	
	C142	ECUV1H103KBV	0.01	
	C152	ECUE1C103KBQ	0.01	S
	C161	EEE1HA100SP	10	
	C167	ECUV1H102KBV	0.001	
	C171	ECUV1C223KBV	0.022	
	C172	ECUE1H100DCQ	10p	S
	C173	ECUE1A104KBQ	0.1	
	C184	ECUV1C105KBV	1	
	C186	ECUE1H100DCQ	10p	S
	C306	F2A1C1010119	100	
	C311	ECUV1C105KBV	1	
	C312	ECUV1C105KBV	1	
	C321	ECUV1A105KBV	1	
	C341	F2A0J1020031	1000	
	C342	ECUE1A104KBQ	0.1	
	C343	ECUE1H100DCQ	10p	S
	C344	EEE0JA221WP	220	
	C345	EEE0JA221WP	220	
	C351	ECUV1C105KBV	1	
	C381	ECUV1C105KBV	1	
	C383	ECUV1C105KBV	1	
	C451	PQCUV0J106KB	10	S
	C452	ECUE1H100DCQ	10p	S
	C454	ECUE1H100DCQ	10p	S
	C455	ECUE1H100DCQ	10p	S
	C457	ECUE1C333KBQ	0.033	S
	C458	ECUE1C333KBQ	0.033	S
	C459	ECUE1H102KBQ	0.001	S
	C460	ECUE1H100DCQ	10p	S
	C461	ECUE1H100DCQ	10p	S
	C472	ECUE1H100DCQ	10p	S
	C473	ECUE1H100DCQ	10p	S
	C474	ECUE1H222KBQ	0.0022	S
	C475	ECUE1H222KBQ	0.0022	S
	C476	ECUE1H151JCQ	150p	
	C477	ECUE1H100DCQ	10p	S
	C478	ECUE1H100DCQ	10p	S
	C479	ECUE1H151JCQ	150p	
	C501	ECUE1A104KBQ	0.1	
	C502	ECUE0J105KBQ	1	
	C503	ECUE1H100DCQ	10p	S
	C504	ECUE1A104KBQ	0.1	
	C505	ECUE1A104KBQ	0.1	
	C506	ECUV1A225KBV	2.2	S
	C507	ECUV1A105KBV	1	
	C508	ECUV1A105KBV	1	
	C509	ECUV0J225KBV	2.2	S
	C511	ECUV1A105KBV	1	
	C513	ECUE1A104KBQ	0.1	
	C516	ECUE1A104KBQ	0.1	
	C517	ECUE1A104KBQ	0.1	
	C518	ECUE1A104KBQ	0.1	
	C519	ECUE1A104KBQ	0.1	
	C601	ECUE1A104KBQ	0.1	
	C603	ECUE1C103KBQ	0.01	S
	C611	ECUE1A104KBQ	0.1	
	C661	ECUE1A104KBQ	0.1	
	C670	ECUE1C103KBQ	0.01	S
	C701	ECUE1H102KBQ	0.001	S
	C721	ECUE1A104KBQ	0.1	
	C751	ECUE1A104KBQ	0.1	
	C802	F1G1H1R8A480	1.8p	
	C803	F1G1H1R5A480	1.5p	
	C804	F1G1H1R8A480	1.8p	
	C805	F1G1H2R4A480	2.4p	
	C806	F1G1H2R4A480	2.4p	
	C809	ECUE1H100DCQ	10p	S
	C810	F1G1H1R0A480	1p	
	C811	ECUE1H100DCQ	10p	S
	C812	F1G1H1R0A480	1p	
	C813	F1G1H1R0A480	1p	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C820	F1G1HR70A480	0.7p	
	C822	ECUE1H100DCQ	10p	S
	C823	ECUE1H101JCQ	100p	
	C825	ECUE1H100DCQ	10p	S
	C826	ECUE1H100DCQ	10p	S
	C837	F1G1HR90A480	0.9p	
	C842	F1G1H1R0A480	1p	
	C843	F1G1H3R0A480	3p	
	C844	F1G1H1R5A480	1.5p	
	C851	F1G1H7R0A480	7p	
	C853	F1G1H7R0A480	7p	
	C855	ECUE1H100DCQ	10p	S
	C856	ECUE1H101JCQ	100p	
	C857	ECUE1H100DCQ	10p	S
	C858	ECUE1H101JCQ	100p	
	C863	F1G1H7R0A480	7p	
	C864	F1G1H7R0A480	7p	
			(OTHERS)	
	E1	L5DYBYY00020	LIQUID CRYSTAL DISPLAY (*2)	
	E2	PNHX1379Z	COVER, LCD	
	E3	PNHR1384Z	TRANSPARENT PLATE, LCD	PMMA-HB
	E4	PNHR1382Z	GUIDE, LCD	ABS-HB
	P101	D4DAY220A022	THERMISTOR (POSISTOR)	
	F301	K5H302Y00003	FUSE	
	X501	H0J103500037	CRYSTAL OSCILLATOR (*1)	

16.5.1.3. Operational P.C. Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB2	PNWP2TG7641H	OPERATIONAL P.C.BOARD ASS'Y (RTL)	
			(LEDS)	
	LED901	LNJ237W82RA	LED	
	LED902	LNJ237W82RA	LED	
	LED904	LNJ237W82RA	LED	
	LED911	LNJ237W82RA	LED	
	LED912	B3ABB0000331	LED	
	LED913	LNJ237W82RA	LED	
	LED914	B3ABB0000331	LED	
	LED915	LNJ237W82RA	LED	
	LED916	B3ABB0000331	LED	
			(RESISTORS)	
	R907	ERJ3GEYJ101	100	S
	R908	ERJ3GEYJ101	100	S
			(CAPACITORS)	
	C902	ECUE0J105KBQ	1	
	C903	ECUV1C105KBV	1	
			(OTHER)	
	MIC1	L0CBAY000018	MICROPHONE	

16.5.1.4. LED Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB3	PNWP3TG6641H	LED P.C.BOARD ASS'Y (RTL)	
			(LED)	
	WLED	B3AFB0000370	LED	

16.5.2. Handset

16.5.2.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	101	PNGP1136Z1	PANEL, LCD	PMMA-HB
	102	PNYE1041Z	TAPE, DOUBLE SIDED	
	103	PNKM1184Y2	CABINET BODY	ABS-HB
	104	PNHR1390Z	OPTIC CONDUCTIVE PARTS, LED LENS	PS-HB

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	105	L0AD01A00026	RECEIVER	
	106	PNYE1040Z	SPACER, CUSHION LCD	
	107	PNBC1354Z1	BUTTON, NAVIGATOR KEY	ABS-HB
	108	PNJK1104Y	KEYBOARD SWITCH	
	109	PNJT1057Z	CHARGE TERMINAL (L)	
	110	PNJT1058Z	CHARGE TERMINAL (R)	
	111	PQHR11315Z	GUIDE, SPEAKER	ABS-HB
	112	L0AA02A00095	SPEAKER	
	113	PQHS10784Y	SPACER, SPEAKER NET	
	114	PQJC10056W	BATTERY TERMINAL	
	115	PNKE1091Z2	COVER, EP CAP	
	116	PNKF1133Y2	CABINET COVER	ABS-HB
	117	PNKE1092Z2	COVER, RUBBER GRIP	
	118	PNQT2006Z	LABEL, ATTENTION	
	119	PNQT2062Z	LABEL, BATTERY	
	120	PNGT5515Y	NAME PLATE	
	121	PNHS1079Z	SPACER, BATTERY	
	122	PNKK1052Y2	LID, BATTERY	ABS-HB
	123	PNYNTGA660MR	LID, BATTERY ASS'Y	ABS-HB

16.5.2.2. Main P.C. Board Parts

Note:

- (*1) Reconfirm the model No. written on the handset's name plate when replacing PCB100. Because the model No. of the optional handset may differ from the included handset.
- (*2) When replacing IC3 or X1, make the adjustment using PNZZTG7621M. Refer to **Handset** (P.65) of Things to Do after Replacing IC or X'tal.
- (*3) When replacing the handset LCD, See **How to Replace the Handset LCD** (P.56).

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB100	PNWP1TGA660R	MAIN P.C.BOARD ASS'Y (RTL) (*1)	
			(ICs)	
	IC1	C2HBCY000081	IC	
	IC3	PNWITGA660BR	IC (EEPROM) (*2)	
	IC4	C0DBZYY00357	IC	
			(TRANSISTORS)	
	Q2	B1ADCF000040	TRANSISTOR (SI)	
	Q3	B1ABGE000011	TRANSISTOR (SI)	
	Q4	B1ADCF000040	TRANSISTOR (SI)	
	Q5	B1GBCFY00010	TRANSISTOR (SI)	
	Q6	B1GBCFY00010	TRANSISTOR (SI)	
	Q9	B1ABDF000017	TRANSISTOR (SI)	
	Q10	B1ADNB000003	TRANSISTOR (SI)	
	Q11	B1ABDF000017	TRANSISTOR (SI)	
	Q12	B1ADCF000040	TRANSISTOR (SI)	
			(DIODES)	
	D13	B0BC4R3A0006	DIODE (SI)	S
	D14	B0BC4R3A0006	DIODE (SI)	S
	D21	B0BC4R3A0006	DIODE (SI)	S
	D22	B0BC4R3A0006	DIODE (SI)	S
	DA801	B0DDCD000001	DIODE (SI)	
			(LEDS)	
	LED1	B3ACB0000216	LED	
	LED2	B3ACB0000216	LED	
	LED3	B3ACB0000216	LED	
	LED4	B3ACB0000216	LED	
	LED5	B3ACB0000216	LED	
	LED6	B3ACB0000216	LED	
	LED12	B3ACB0000216	LED	
			(COILS)	
	C812	PQLQR4C8N2J	COIL	S
	L13	G1CR18J00004	COIL	
			(RESISTOR ARRAYS)	
	RA2	D1H83314A013	RESISTOR ARRAY	S
	RA3	D1H433120001	RESISTOR ARRAY	
	RA4	D1H433220001	RESISTOR ARRAY	
	RA5	EXB28V332JX	RESISTOR ARRAY	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
			(IC FILTERS)	
	L29	J0JDC0000045	IC FILTER	
	L72	J0JCC0000276	IC FILTER	
	R308	J0JCC0000286	IC FILTER	
			(RESISTORS)	
	R2	ERJ26EJ303	30k	S
	R3	ERJ26EJ152	1.5k	S
	R4	ERJ26EJ473	47k	S
	R6	ERJ26EJ103	10k	S
	R7	ERJ26EJ104	100k	S
	R8	ERJ86EYJ3R3	3.3	S
	R9	ERJ26EJ303	30k	S
	R10	ERJ36EYJ1R0	1	S
	R11	ERJ26EJ681	680	S
	R12	ERJ26EJ183	18k	S
	R13	ERJ26EJ103	10k	S
	R19	ERJ2RKF2003	200k	
	R20	ERJ2RKF1003	100k	
	R21	ERJ2RKF1003	100k	
	R22	ERJ26EJ332	3.3k	S
	R23	ERJ26EJ100	10	S
	R24	ERJ26EJ391	390	S
	R25	ERJ26EJ222	2.2k	S
	R26	ERJ26EJ332	3.3k	S
	R27	ERJ26EJ222	2.2k	S
	R28	ERJ26EJ222	2.2k	S
	R31	ERJ2RKF1003	100k	
	R32	ERJ26EJ104	100k	S
	R33	ERJ2RKF1003	100k	
	R34	ERJ26EJ391	390	S
	R45	ERJ6RSJR10V	0.1	
	R64	ERJ26EJ222	2.2k	S
	R66	ERJ26EJ103	10k	S
	R67	ERJ26EJ103	10k	S
	R68	ERJ26EJ103	10k	S
	R69	ERJ26EJ103	10k	S
	R73	ERJ26EJ330	33	S
	R74	ERJ26EJ330	33	S
	R306	ERJ26EJ101	100	S
	R509	ERJ26EJ560X	56	S
	R561	ERJ26EJ221	220	S
	R563	ERJ26E0R00	0	S
	R806	ERJ26EJ471	470	S
	R807	ERJ26EJ471	470	S
	L9	ERJ26E0R00	0	S
	L74	ERJ26EJ100	10	S
			(CAPACITORS)	
	C1	EEE0JA221WP	220	
	C2	EEE0JA221WP	220	
	C4	ECUE1H390JCQ	39p	
	C5	ECUE1A104KBQ	0.1	
	C8	ECUE1H100DCQ	10p	
	C9	ECUE1H120JCQ	12p	
	C10	EEE0JA221WP	220	
	C11	ECUE1A104KBQ	0.1	
	C12	PQCUV0J106KB	10	
	C13	ECUE1A104KBQ	0.1	
	C14	ECUV1C393KBV	0.039	
	C15	ECUE1H390JCQ	39p	
	C16	ECUV1C393KBV	0.039	
	C17	ECUE1H100DCQ	10p	
	C18	ECUE1H100DCQ	10p	
	C19	ECUE1H102KBQ	0.001	
	C20	ECJ1VB0G106M	10	S
	C21	ECUV1A105KBV	1	
	C22	ECUE1A104KBQ	0.1	
	C23	ECUE1A104KBQ	0.1	
	C24	ECUE0J105KBQ	1	
	C25	ECUV1A225KBV	2.2	
	C26	ECJ1VB0G106M	10	S
	C29	ECUV1A105KBV	1	
	C30	ECJ1VB0G106M	10	S
	C31	ECUE0J105KBQ	1	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C32	ECUE0J105KBQ	1	
	C33	ECUE1A104KBQ	0.1	
	C34	ECUE1H390JCQ	39p	
	C36	ECUE1A104KBQ	0.1	
	C37	ECJ1VB0G106M	10	S
	C40	ECUE1A104KBQ	0.1	
	C41	ECUE1A104KBQ	0.1	
	C43	ECUE1A104KBQ	0.1	
	C44	ECUE0J105KBQ	1	
	C45	ECUE1A104KBQ	0.1	
	C46	ECUE1H100DCQ	10p	S
	C51	ECJ1VB0G106M	10	S
	C56	ECUV1A105KBV	1	
	C57	ECUV1A105KBV	1	
	C58	ECUE0J105KBQ	1	
	C72	ECUE1H100DCQ	10p	
	C73	ECUE1H100DCQ	10p	
	C76	ECUE1H100DCQ	10p	
	C77	ECUE1H100DCQ	10p	
	C78	ECUE1H390JCQ	39p	
	C79	ECUE1H101JCQ	100p	
	C80	ECUE1H390JCQ	39p	
	C81	ECUE1H101JCQ	100p	
	C82	ECUE1H471KBQ	470p	
	C83	ECUE1H100DCQ	10p	
	C86	F1J0J2260002	22	
	C96	ECUE1H100DCQ	10p	
	C97	ECUE1H100DCQ	10p	
	C110	ECUE1H102KBQ	0.001	
	C127	ECUE1H102KBQ	0.001	
	C150	ECUE1A104KBQ	0.1	
	C152	ECUE1H102KBQ	0.001	
	C172	ECUE1A104KBQ	0.1	
	C183	ECUE1H100DCQ	10p	
	C184	ECUE1H100DCQ	10p	
	C185	ECUE1H102KBQ	0.001	
	C188	ECUE0J105KBQ	1	
	C504	ECUV1C105KBV	1	
	C505	ECUE0J105KBQ	1	
	C805	F1G1H2R4A480	2.4p	
	C806	F1G1H2R4A480	2.4p	
	C810	F1G1H2R5A480	2.5p	
	C811	ECUE1H101JCQ	100p	S
	C813	F1G1H1R6A480	1.6p	
	C820	F1G1H1R8A480	1.8p	
	C822	ECUE1H100DCQ	10p	S
	C825	ECUE1H100DCQ	10p	S
	C826	ECUE1H100DCQ	10p	S
	C859	F1G1H2R0A480	2p	
	C863	F1G1H1R8A480	1.8p	
	C895	F1G1H1R3A480	1.3p	
	C896	F1G1H1R8A480	1.8p	
	C897	F1G1H240A557	24p	
	L809	F1G1H1R0A480	1p	
		(OTHERS)		
	MIC100	L0CBAY000053	MICROPHONE	
	E101	L5DYBY00001	LIQUID CRYSTAL DISPLAY (*3)	
	E102	PNHR1295Z	TRANSPARENT PLATE, LCD	PMMA-HB
	E103	PNHR1389Z	GUIDE, LCD	ABS-HB
	E104	PNHX1407Z	COVER, LCD	
	E105	PNLA1049Z	ANTENNA	
	E106	PNVE1002Z	BATTERY TERMINAL	ABS-HB
	E107	PQH610729Z	RUBBER PARTS, RECEIVER	
	CN4	K2HD103D0001	JACK	
⚠	F1	K5H252Y00002	FUSE	
	X1	H0J138500003	CRYSTAL OSCILLATOR (*2)	S

16.5.2.3. LED Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB101	PNWP2TGA660R	LED P.C.BOARD ASS'Y (RTL)	
			(LED)	
	WLED	B3AFB0000370	LED	

16.5.3. Charger Unit

16.5.3.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	200	PNLC1017ZM	CHARGER UNIT ASS'Y without NAME PLATE (RTL)	
	200-1	PNKM1201Y2	CABINET BODY	PS-HB
	200-2	PNJT1065Z	CHARGE TERMINAL	
	200-3	PNKF1147Z1	CABINET COVER	PS-HB
	200-4	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	
	201	PNGT5532Z	NAME PLATE	

16.5.3.2. Main P.C. Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB200	PNWPTGA660CH	MAIN P.C.BOARD ASS'Y (RTL)	
			(JACK)	
	J1	K2ECYB000001	JACK	S
			(RESISTOR)	
	R1	ERX2S36R8	6.8	
			(FUSE)	
⚠	F1	K5H302Y00003	FUSE	

16.5.4. Accessories

Note:

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

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A1	PNLV226Z	AC ADAPTOR	
	A2	PQJA10075Z	CORD, TELEPHONE	
	A3	PNQX3168X	INSTRUCTION BOOK (*1)	
	A4	PNQW2594Y	LEAFLET, QUICK GUIDE	
	A5	PNKE1098Z2	HANGER, BELT CLIP	ABS-HB

16.5.5. Screws

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

16.5.6. Fixtures and Tools

Note:

- (*1) See **Equipment Required** (P.57), and **The Setting Method of JIG** (P.57)
- (*2) When replacing the Handset LCD, See **How to Replace the Handset LCD** (P.56)

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
		PQZZ1CD300E	JIG CABLE (*1)	
		PNZZTG7621M	BATCH FILE CD-ROM (*1)	
		PQZZ430PIR	TIP OF SOLDERING IRON (*2)	
		PQZZ430PRB	RUBBER OF SOLDERING IRON (*2)	

Service Manual

Telephone Equipment

Model No. **KX-TG155SK**
KX-TGA660M

Link-to-Cell Cellular Convergence
Solution

M: Metallic Grey Version
(for U.S.A.)

Supplement-1

Please file and use this supplement manual together with the service manual for Model No.KX-TG155SK/
KX-TGA660M, Order No. KM41201535CE.

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.

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1 REPLACEMENT PARTS LIST

1.1. REFERENCE CHART

Reason for Change	
*The following items (1-8) indicate the reason for change. See the "Notes" column for each part in ORIGINAL AND NEW PARTS COMPARISON LISTS .	
1. Improve performance	Remarks: *c: To share the parts with other models.
2. Change of material or dimension	
3. To meet approved specification	
4. Standardization	
5. Addition	
6. Deletion	
7. Correction	
8. Other	

Interchangeability Code		
**The following items (V-Z) indicate the Interchangeability. See the "Notes" column for each part in ORIGINAL AND NEW PARTS COMPARISON LISTS .		
V	Original  Early (before change) New  Late (after change)	Original or new parts may be used in early or late production sets. Use original parts until exhausted, then stock new parts.
W	Original  Early (before change) New  Late (after change)	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.
X	Original  Early (before change) New  Late (after change)	New parts only may be used in early or late production sets. Stock new parts.
Y	Original  Early (before change) New  Late (after change)	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
Z	Other	

Note:

Alphabets in the "Remarks" column in the following lists correspond to the alphabets in the "Remarks" in REFERENCE CHART.

1.2. ORIGINAL AND NEW PARTS COMPARISON LISTS

Ref. No.	Part No.		Part Name & Description	Pcs/ Set	Remarks	Notes		Time of Change (Suffix)	
	Original (Old)	New							
Main P.C.Board Parts (Handset) (For PNLPTGA660R1ZA)									
C1	EEE0JA221WP	-----	CAPACITOR, 220μF		0	*c	6	-	---
C10	EEE0JA221WP	-----	CAPACITOR, 220μF		0	*c	6	-	---
Main P.C.Board Parts (Handset) (For PNLPTGA660R1YA)									
C1	EEE0JA221WP	-----	CAPACITOR, 220μF		0	*c	6	-	---
C10	EEE0JA221WP	-----	CAPACITOR, 220μF		0	*c	6	-	---

Service Manual

Telephone Equipment

Model No. **KX-TG155SK**
KX-TGA660M

Link-to-Cell Cellular Convergence
Solution

M: Metallic Grey Version
(for U.S.A.)

Supplement-2

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KX-TGA660M, Order No. KM41201535CE.

WARNING

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1 REPLACEMENT PARTS LIST

1.1. REFERENCE CHART

Reason for Change	
*The following items (1-8) indicate the reason for change. See the "Notes" column for each part in ORIGINAL AND NEW PARTS COMPARISON LISTS .	
1. Improve performance	Remarks: *j : To meet the standards.
2. Change of material or dimension	
3. To meet approved specification	
4. Standardization	
5. Addition	
6. Deletion	
7. Correction	
8. Other	

Interchangeability Code		
**The following items (V-Z) indicate the Interchangeability. See the "Notes" column for each part in ORIGINAL AND NEW PARTS COMPARISON LISTS .		
V	Original  Early (before change) New  Late (after change)	Original or new parts may be used in early or late production sets. Use original parts until exhausted, then stock new parts.
W	Original  Early (before change) New  Late (after change)	Original parts may be used in early production sets only. New parts may be used in early or late production sets. Use original parts where possible, then stock new parts.
X	Original  Early (before change) New  Late (after change)	New parts only may be used in early or late production sets. Stock new parts.
Y	Original  Early (before change) New  Late (after change)	Original parts may be used in early production sets only. New parts may be used in late production sets only. Stock both original and new parts.
Z	Other	

Note:

Alphabets in the "Remarks" column in the following lists correspond to the alphabets in the "Remarks" in REFERENCE CHART.

1.2. ORIGINAL AND NEW PARTS COMPARISON LISTS

Ref. No.	Part No.		Part Name & Description	Pcs/ Set	Remarks	Notes	Time of Change (Suffix)
	Original (Old)	New					
Cabinet and Electrical Parts (Handset)							
120	PNGT5515Y	PNGT7240Y	NAME PLATE	1	*j	4 Y	---