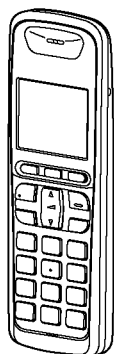


Service Manual

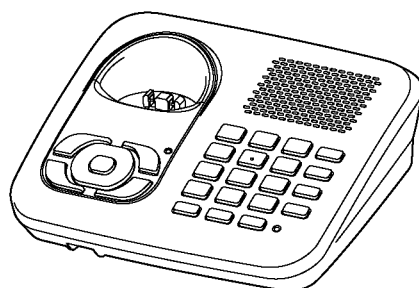
Telephone Equipment

Caller ID Compatible

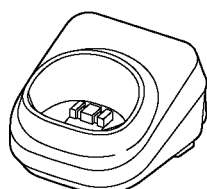
DECT
6.0



KX-TGA641T
(Handset)



KX-TG6441T
(Base Unit)



(Charger Unit)

Model No. **KX-TG6441T**
KX-TG6442T
KX-TG6443T
KX-TG6444T
KX-TG6445T
KX-TGA641T

Expandable Digital Cordless Answering
System

T: Black Metallic Version
(for U.S.A.)

Configuration for each model


Model No	Base Unit	Handset	Charger Unit	Expandable
KX-TG6441	1 (TG6441)	1 (TGA641)		Up to 6
KX-TG6442	1 (TG6441)	2 (TGA641)	1	Up to 6
KX-TG6443	1 (TG6441)	3 (TGA641)	2	Up to 6
KX-TG6444	1 (TG6441)	4 (TGA641)	3	Up to 6
KX-TG6445	1 (TG6441)	5 (TGA641)	4	Up to 6
KX-TGA641*		1 (TGA641)	1	

* KX-TGA641 is also an optional accessory, which contains a handset and a charger.

**WARNING**

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

IMPORTANT SAFETY NOTICE

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

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

If lead free solder was used in the manufacture of this product, the printed circuit boards will be marked PbF. Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.

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

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

Note for TABLE OF CONTENTS:

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

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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:

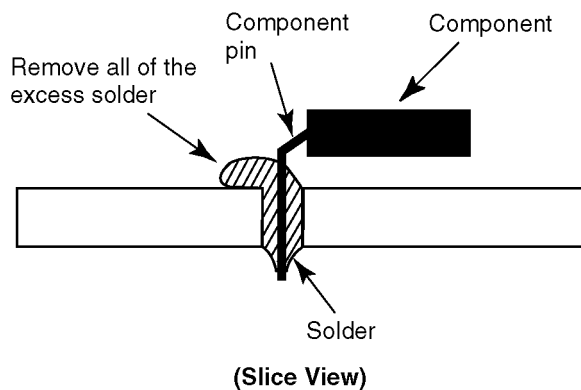
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

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

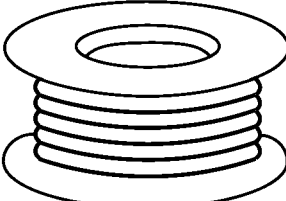
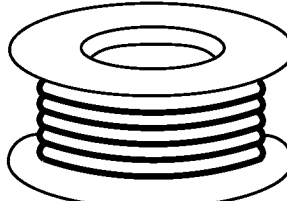
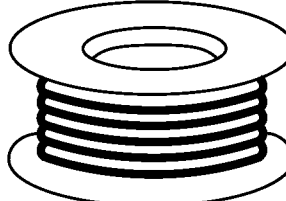
- PbF solder has a melting point that is 50 °F ~ 70 °F (30 °C ~ 40 °C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700 °F ± 20 °F (370 °C ± 10 °C).
- Exercise care while using higher temperature soldering irons.:
Do not heat the PCB for too long time in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

■ Number of channels:

60 Duplex Channels

■ Frequency range:

1.92 GHz to 1.93 GHz

■ Duplex procedure:

TDMA (Time Division Multiple Access)

■ Channel spacing:

1,728 kHz

■ Bit rate:

1,152 kbit/s

■ Modulation:

GFSK (Gaussian Frequency Shift Keying)

■ RF transmission power:

115 mW (Max.)

■ Voice coding:

ADPCM 32 kbit/s

	Base Unit	Handset	Charger
Power source	AC Adaptor (PQLV219Z, 120 V AC, 60 Hz)	Rechargeable Ni-MH battery AAA (R03) size (1.2 V 630 mAh)	AC Adaptor (PQLV219Z, 120 V AC, 60 Hz)
Receiving Method	Super Heterodyne	Super Heterodyne	_____
Oscillation Method	PLL synthesizer	PLL synthesizer	_____
Detecting Method	Quadrature Discriminator	Quadrature Discriminator	_____
Tolerance of OSC Frequency	13.824 MHz \pm 100 Hz	13.824 MHz \pm 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	_____
Redial	_____	Up to 48 digits	_____
Speed Dialer	_____	Up to 32 digits (Phonebook)	_____
Power Consumption	Standby: Approx. 1.1 W Maximum: Approx. 4.4 W	11 days at Standby, 5 hours at Talk	Standby: Approx. 0.1 W Maximum: Approx. 2.6 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. 58 mm x 154 mm x 136 mm	Approx. 158 mm x 48 mm x 32 mm	Approx. 52 mm x 75 mm x 87 mm
Mass (Weight)	Approx. 270 g	Approx. 130 g	Approx. 60 g

Note:

- Design and specifications are subject to change without notice.

Note for Service:

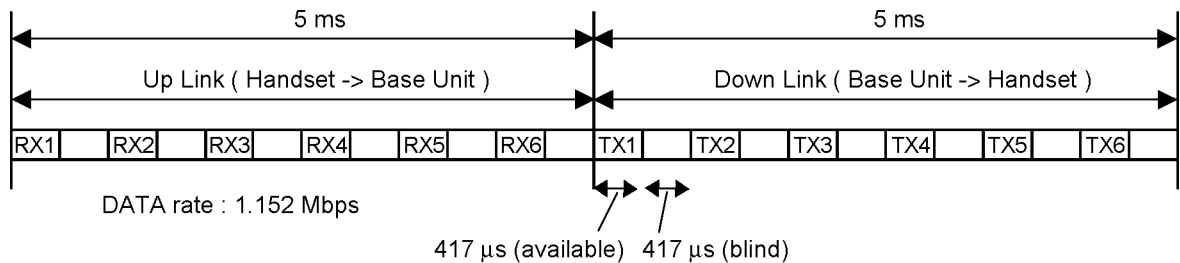
- **Optional headset:** KX-TCA60, KX-TCA86, KX-TCA92, KX-TCA93, KX-TCA94
- **Operation range:** Up to 300 m outdoors, Up to 50 m indoors, depending on the condition.
- **Analog telephone connection:** Telephone Line

4 Technical Descriptions

4.1. 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.73).

4.1.1. TDD Frame Format

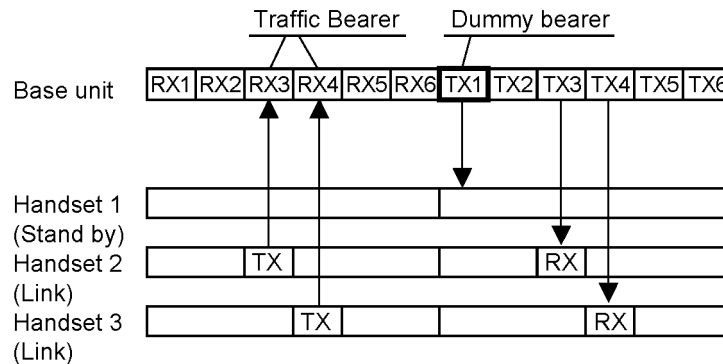


4.1.2. TDMA system

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.

4.1.3. Signal Flowchart in the Radio Parts

Reception

A voice signal from TEL line is encoded to digital data "TXDATA" by DSP (IC501) in a base unit.
Then TXDATA goes to RF PART, and it's modulated to 1.9 GHz. The RF signal is amplified and fed to a selected antenna.

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

RFIC (IC701) compares RF signal levels and selects the antenna to be used. Then RFIC down-converts to 864 kHz IF signal from RX signal in the selected antenna, and demodulates it to digital data "RXDATA".

DSP (IC501) converts RXDATA into a voice signal and outputs it to speaker.

Transmission

A voice signal from microphone is encoded to digital data "TXDATA" by DSP (IC501) in a handset.
Then TXDATA goes to RF PART, and it's modulated to 1.9 GHz. The RF signal is amplified and fed to a selected antenna.

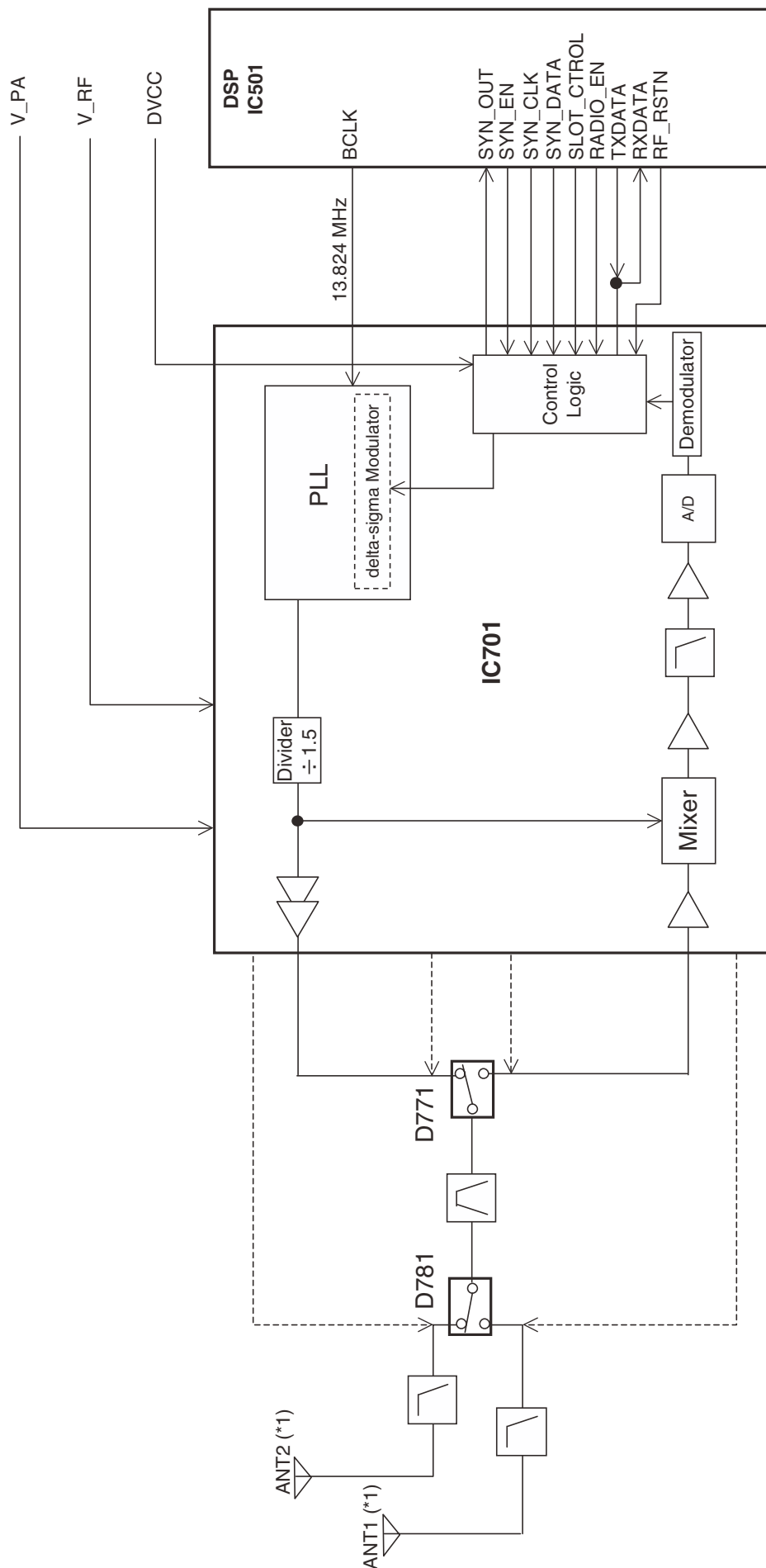
As for a base unit RF, RF signal is received in two antennas.

RFIC (IC701) compares RF signal levels and selects the antenna to be used. Then RFIC down-converts to 864 kHz IF signal from RX signal in the selected antenna, and demodulates it to digital data "RXDATA".

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



4.3. Block Diagram (Base Unit_RF Part)



Note:

(*1) Antenna Type: wired monopole antenna

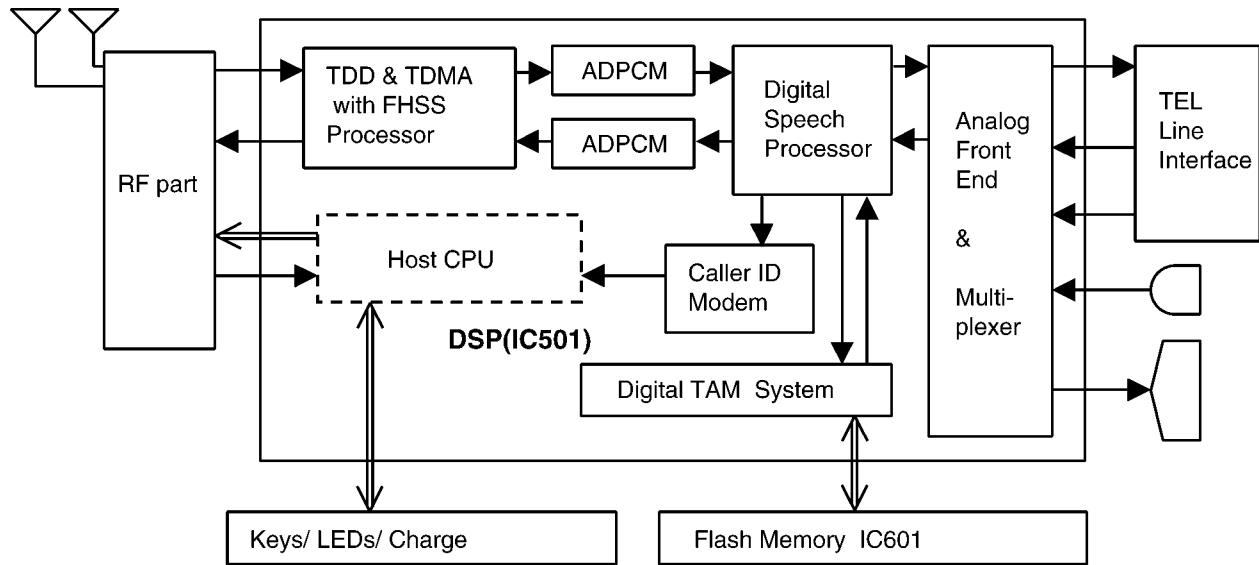
KX-TG6441/6442/6443/6444/6445 BLOCK DIAGRAM (Base Unit_RF Part)

4.4. Circuit Operation (Base Unit)

General Description:

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

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



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

- **Voice Message Recording/Play back**

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

- **Caller ID demodulation**

The DSP 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, Microphone, Telephone line.

4.4.2. Flash Memory (IC601)

Following information data is stored.

- **Voice signal**

ex: Pre-recorded Greeting message, Incoming message

- **Settings**

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

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

- IC321: 3.0 V Regulator
- IC331: 3.3 V Regulator



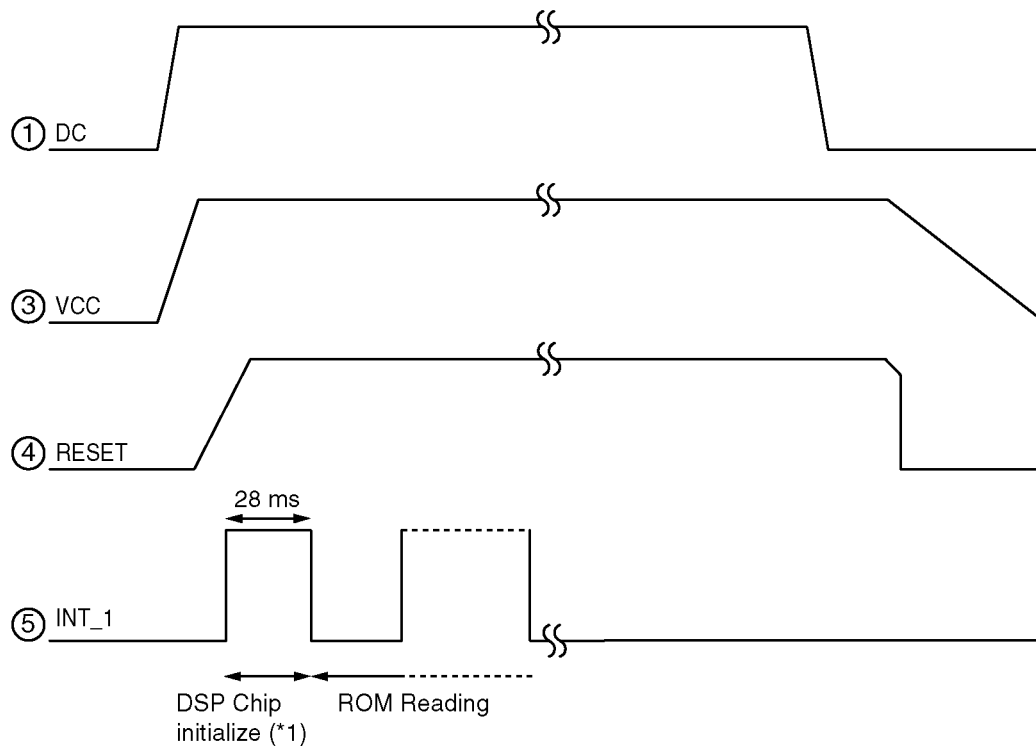
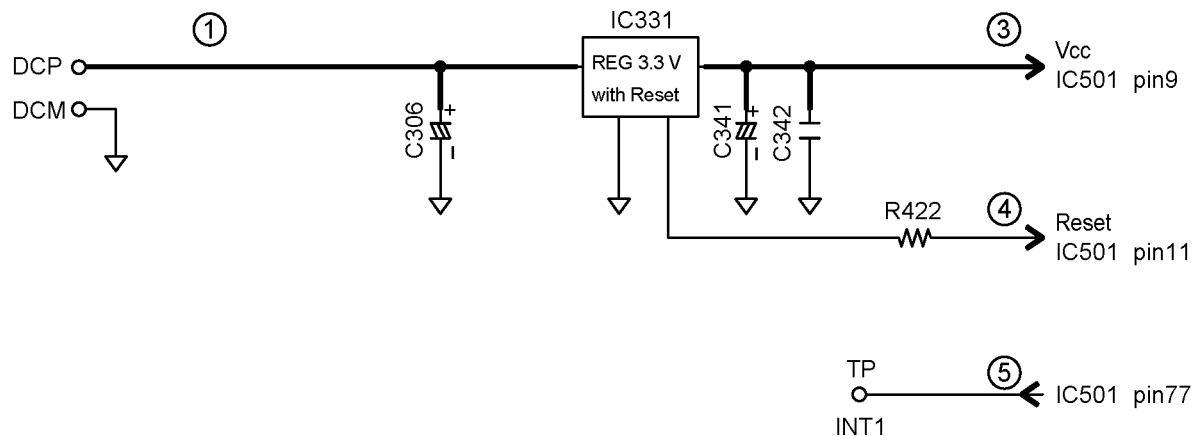
4.4.4. Reset Circuit

Function:

This circuit is used to initialize the microcomputer when it incorporates an AC adaptor.

Circuit Operation:

When the AC Adaptor is inserted into the unit, then the voltage is shifted by IC331 and power is supplied to the DSP. The set starts to operate when VCC goes up to 3.0 V or more in the circuit voltage diagram.



Note:

(*1) The initializing time of the DSP chip is 28 ms under normal conditions.

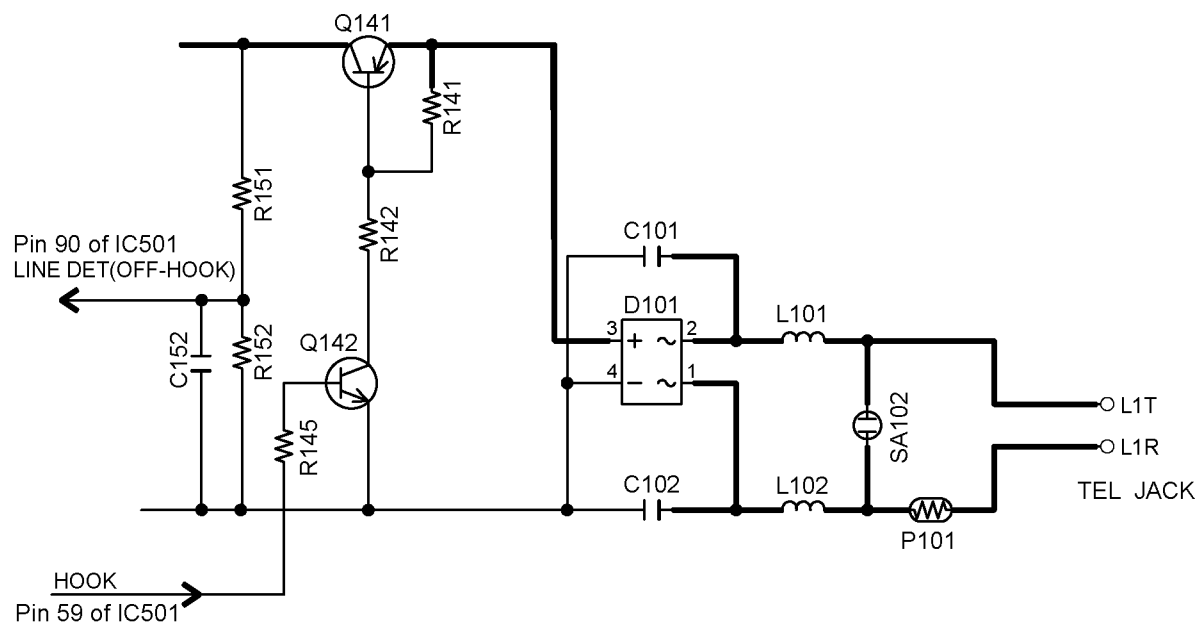
4.4.6. Auto Disconnect Circuit

Function:

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

Circuit Operation:

The voltage of pin 90 of IC501 is monitored. If a parallel-connected telephone is put into OFF HOOK status, the presence/absence of a parallel connection is determined when the voltage changes by 0.2 V or more. When the set detects the parallel-connected telephone is OFF HOOK status, the line is disconnected.



You can enable or disable the Auto Disconnect function.

See **Check Record** (P.54)

4.4.7. Parallel Connection Detect Circuit

Function:

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

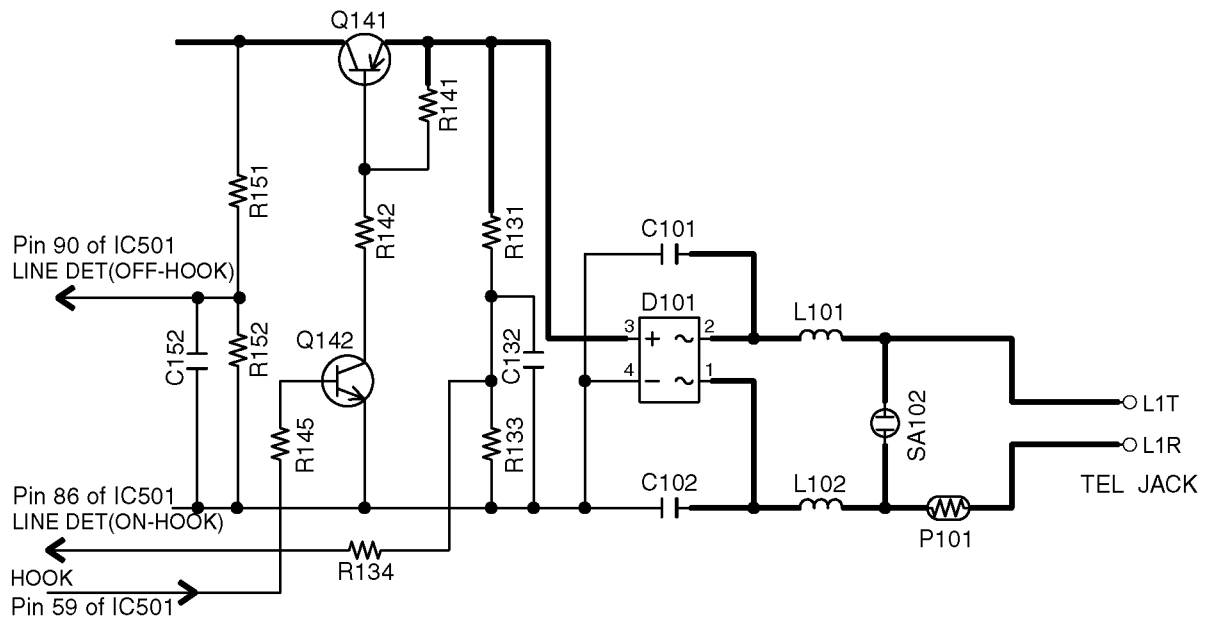
Circuit Operation:

Parallel connection detection when on hook:

When on hook, the voltage is monitored at pin 86 of IC501. There is no parallel connection if the voltage is 1.65 V or higher, while a parallel connection is deemed to exist if the voltage is lower.

Parallel connection detection when off hook:

When off hook, the voltage is monitored at pin 90 of IC501; the presence/absence of a parallel connection is determined when the voltage changes by 0.2 V or more.



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

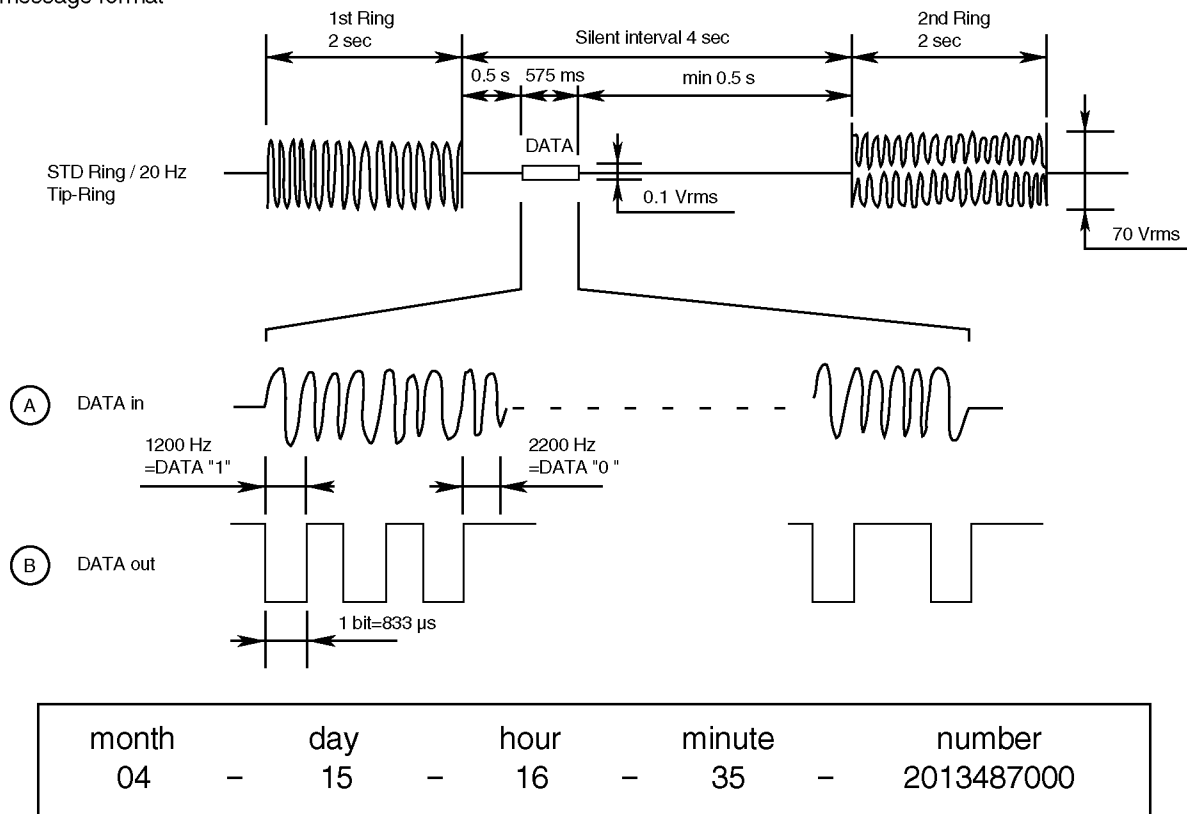
Function:

Caller ID

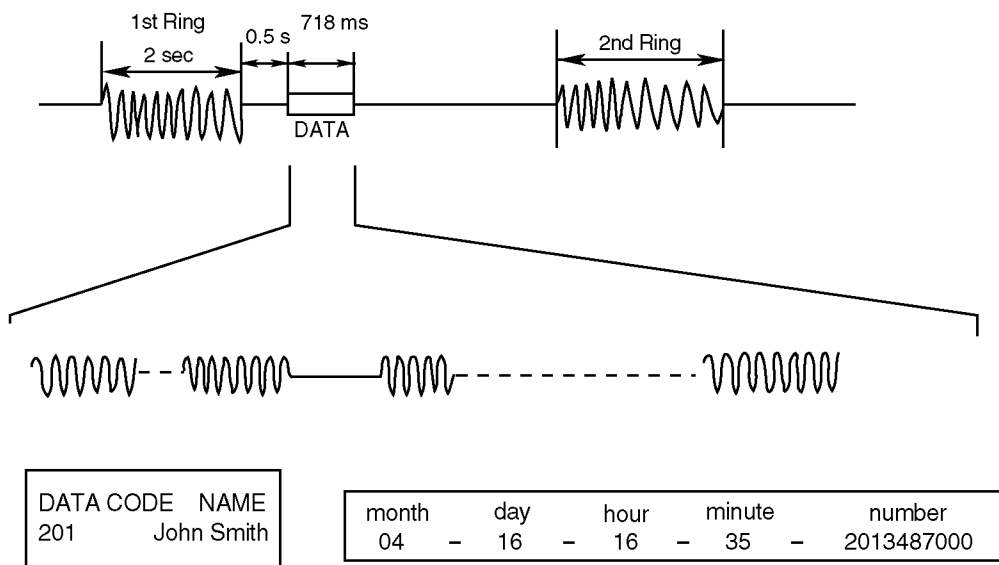
The caller ID is a chargeable ID which the user of a telephone circuit obtains by entering a contract with the telephone company to utilize a caller ID service. For this reason, the operation of this circuit assumes that a caller ID service contract has been entered for the circuit being used. The data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

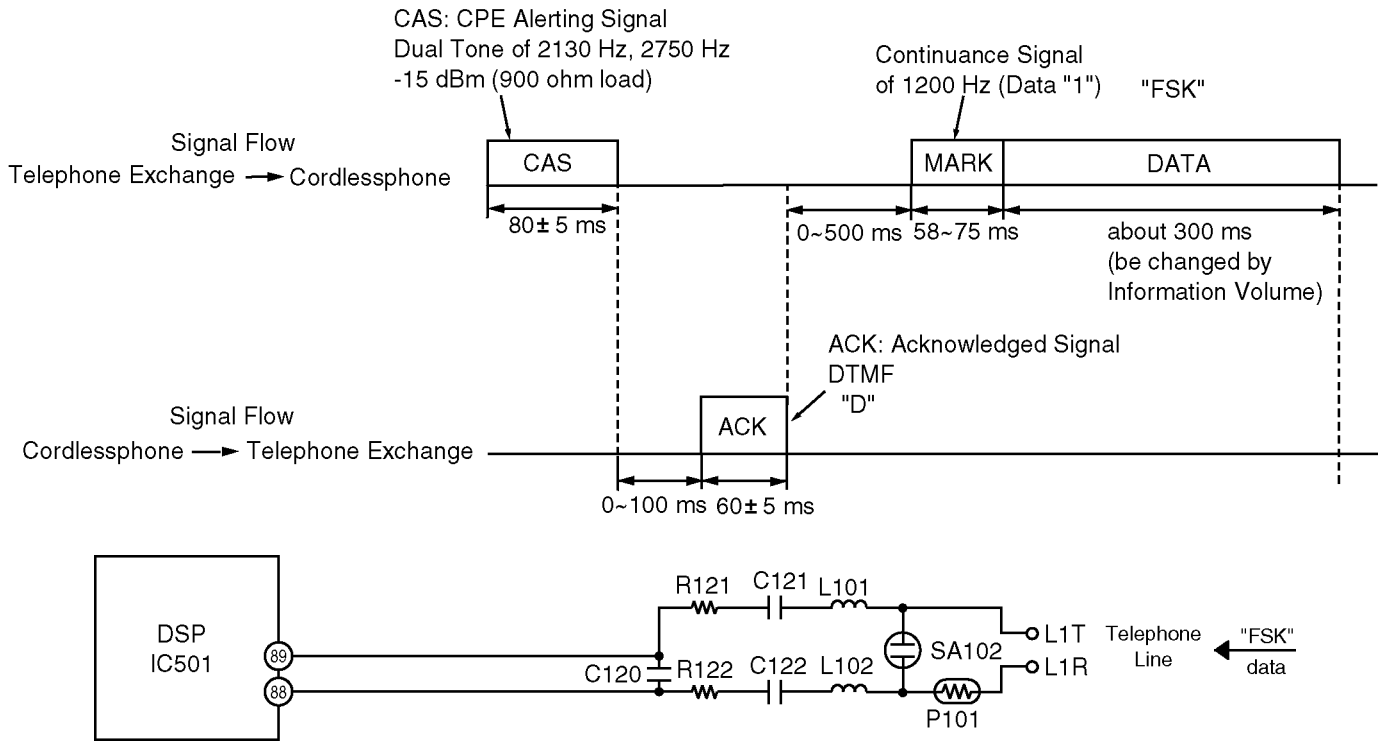
Function:

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.

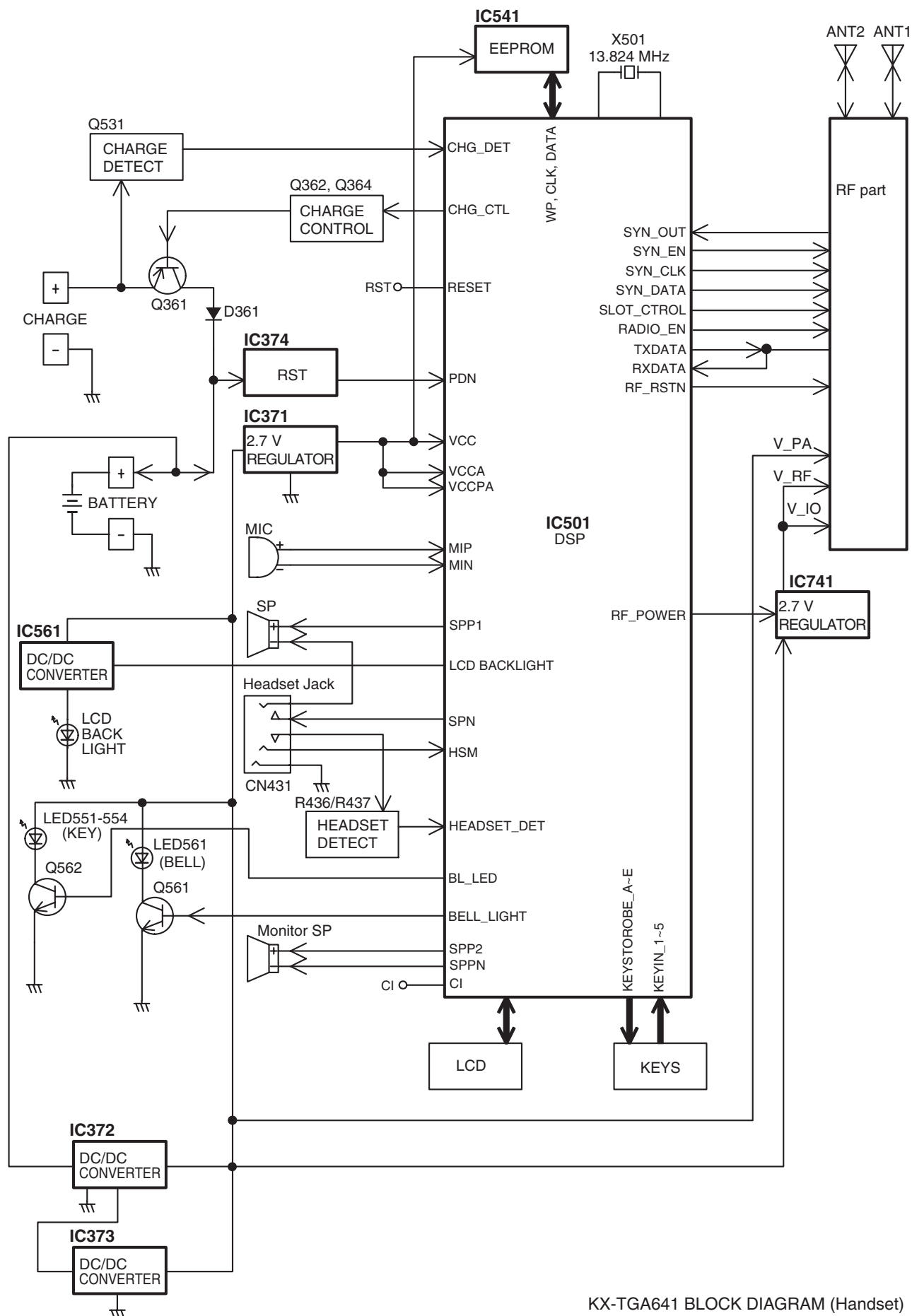
Telephone Line → CN101 (T, R) → P101 → L101, L102 → C121, C122 → R121, R122 → IC501 (89, 88).

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

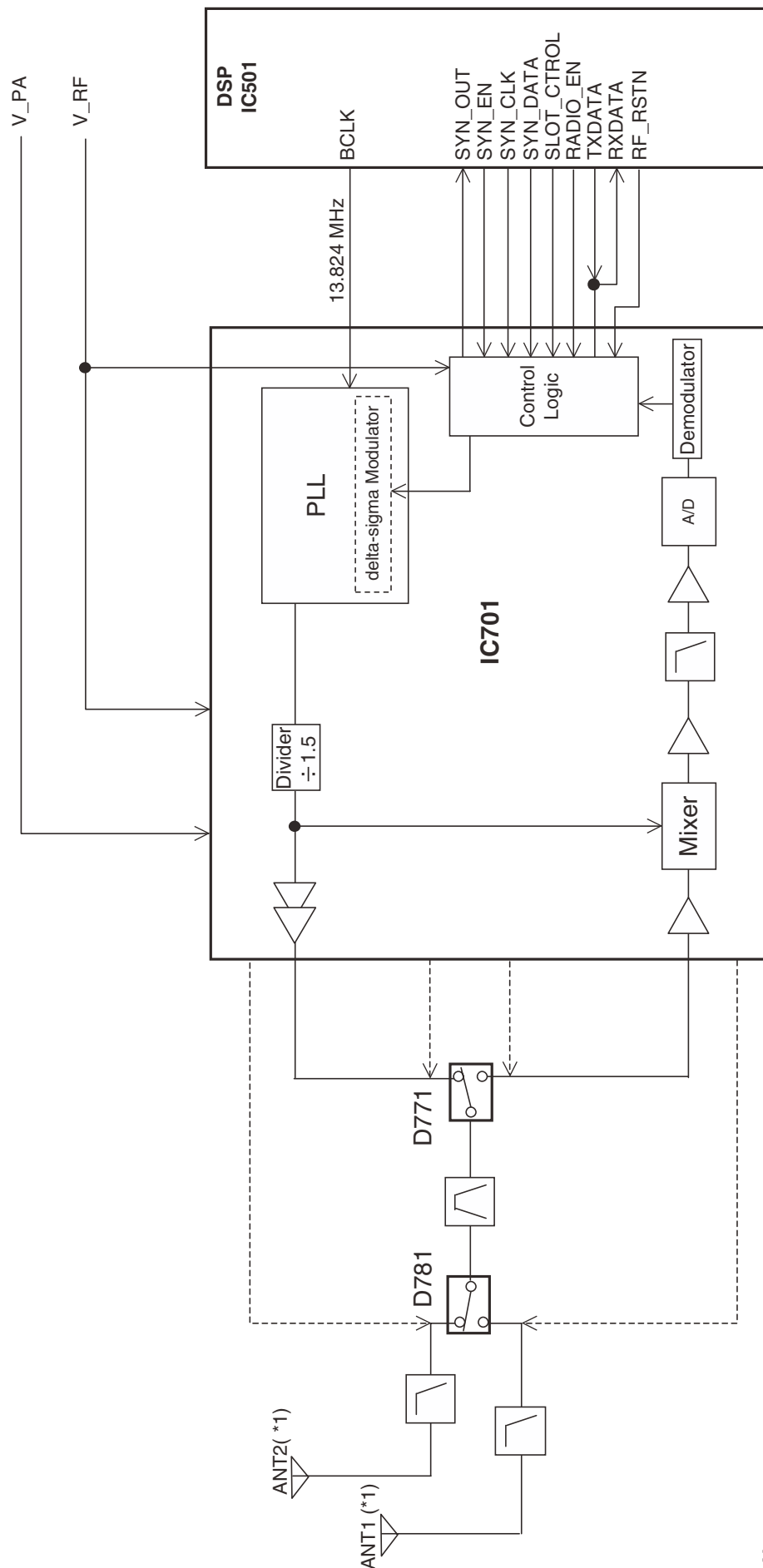


4.5. Block Diagram (Handset)



KX-TGA641 BLOCK DIAGRAM (Handset)

4.6. Block Diagram (Handset_RF Part)



Note:

(*1) Antenna Type (difference between base unit and handset in Radio parts)

ANT1: patterned antenna

ANT2: wired monopole antenna

KX-TGA641 BLOCK DIAGRAM (Handset_RF Part)

4.7. Circuit Operation (Handset)

4.7.1. Construction

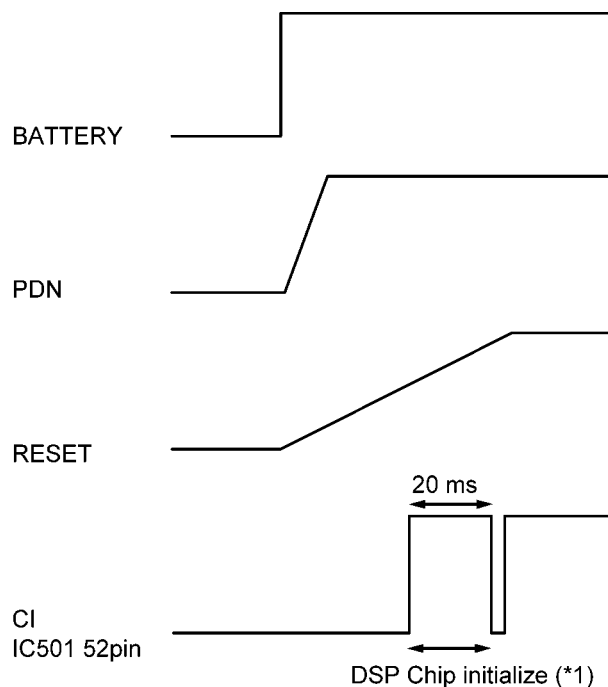
The circuit mainly consists of DSP and RF part as shown in the block diagram.

4.7.1.1. DSP: IC501

Function

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

Initial waves



Note:

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

4.7.1.2. RF part

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

4.7.1.3. EEPROM: IC541

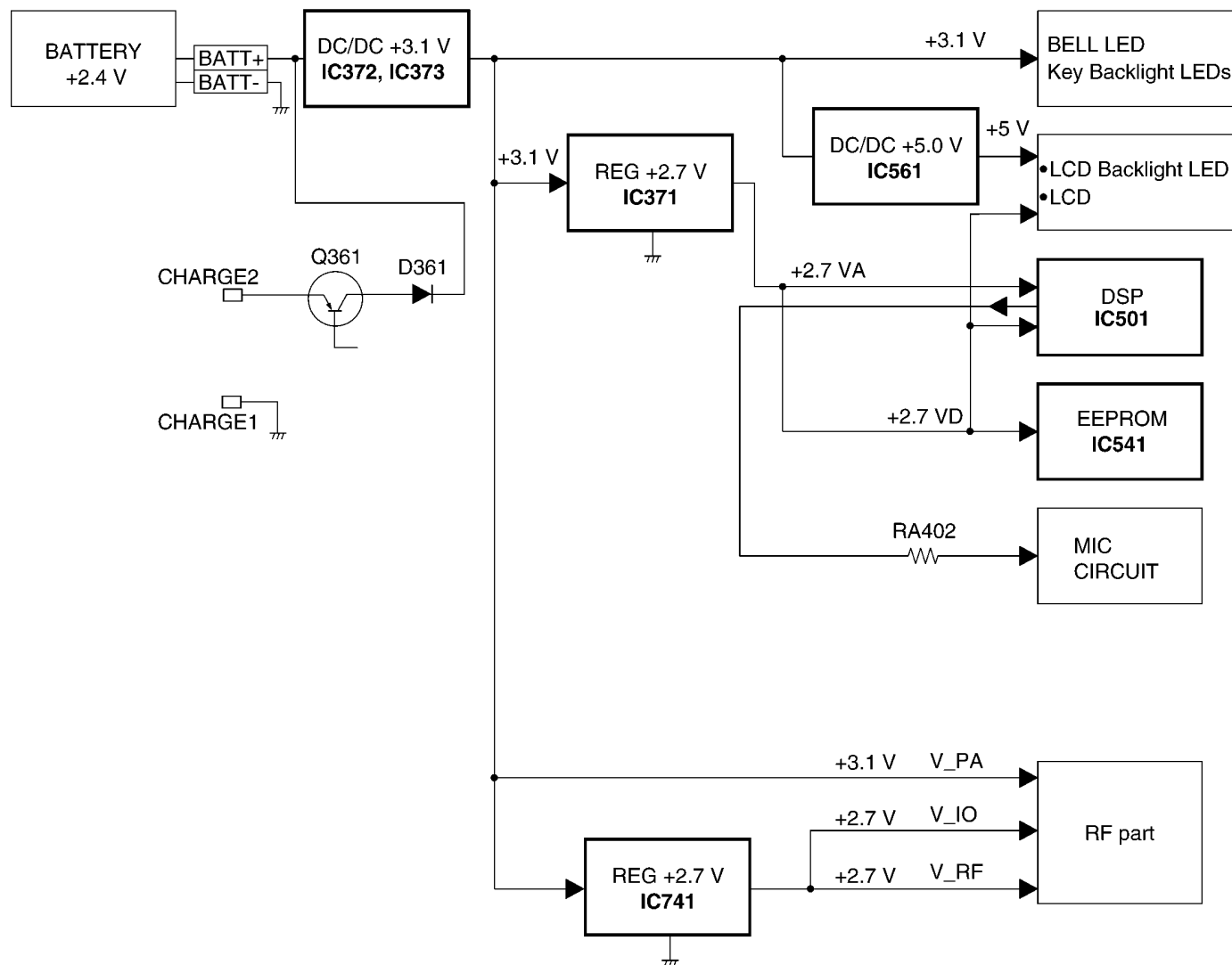
Setting data is stored.

ex: ID code, user setting

4.7.2. Power Supply Circuit

Voltage is supplied separately to each block.

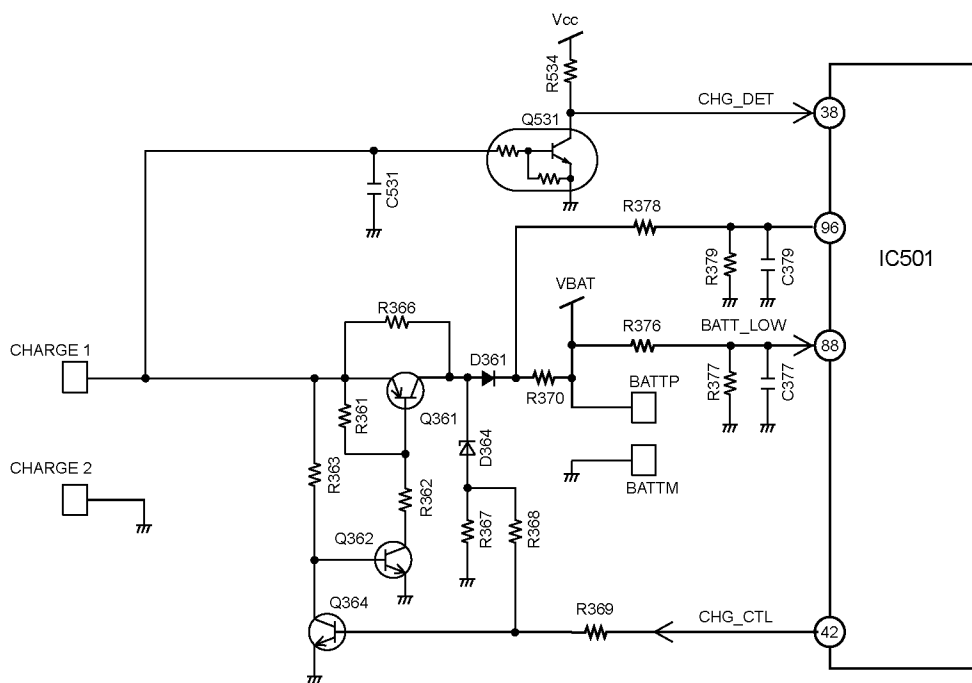
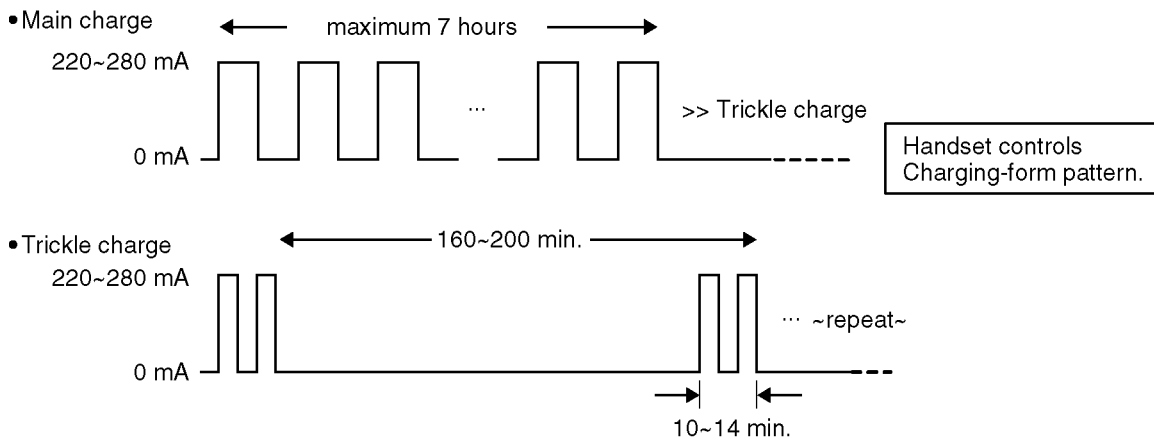
Block Diagram (Handset Power)



4.7.3. Charge Circuit

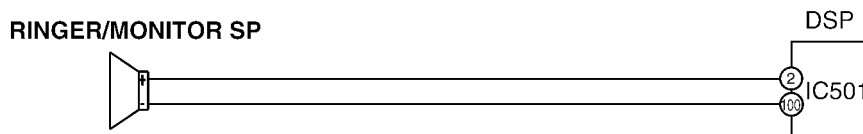
When the handset is put on the cradle of the base unit, the power is supplied from CHARGE+ and CHARGE- terminals to charge the battery via R366 or Q361. The voltage between CHARGE+ and CHARGE- flows Q531 → pin 38 of IC501, where the charge is detected. Then IC501 calculates the battery consumption amount from the previous charge, and it controls Q361/Q362/Q364 by pin 42 of IC501 until charging is complete. When charging is complete, the control pattern is switched to Trickle charging form from Operational charging form.

Charging form



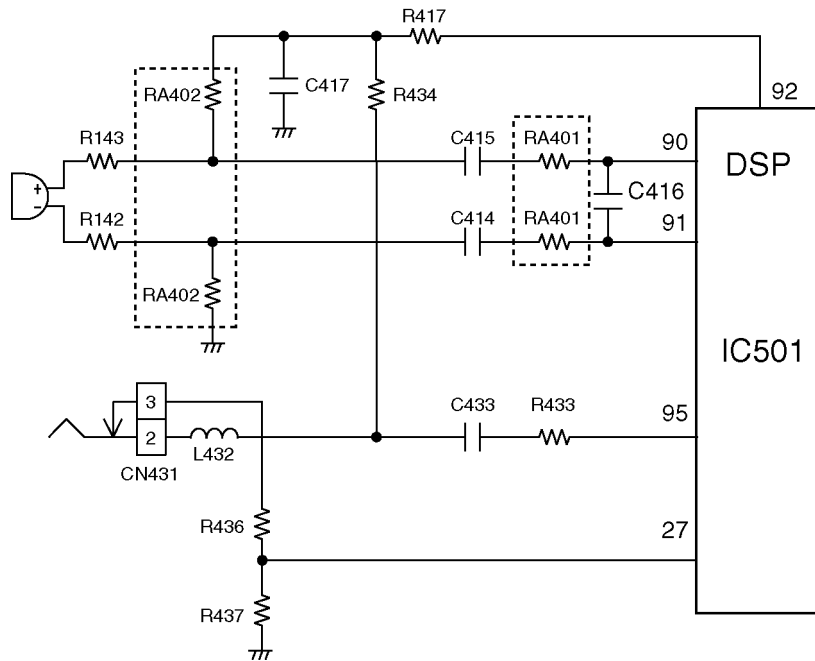
Pin 88 of IC501 monitors the battery voltage and detect BATT LOW at 2.34 V.

4.7.4. Ringer and Handset SP-Phone



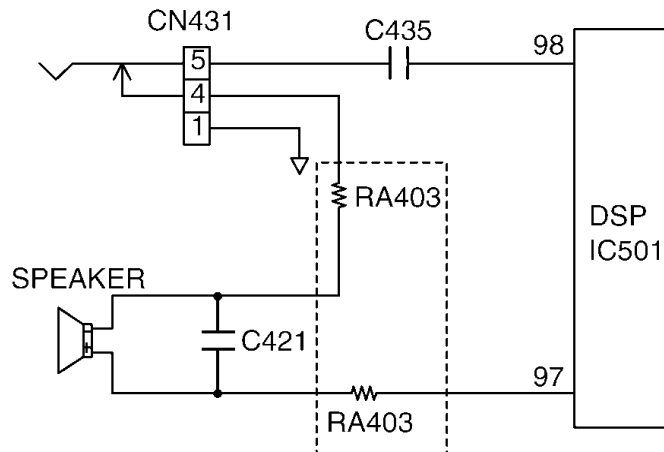
4.7.5. Sending Signal

The voice signal from the microphone is input to DSP (90, 91). CN431 is the headset jack. When the headphone is connected, the R436/R437 detects it. The input from the microphone of the handset (MIM, MIP) is cut and the microphone signal from the headset is input to DSP (95). Also the power for the microphone is supplied from DSP (92) and the power is turned OFF on standby.



4.7.6. Reception Signal

The voice signal from the base unit is output to DSP (98). This signal is led to the headset jack (CN431). The signal through the headset jack and the other signal output from DSP (97) drives the speaker. When the headset is inserted to the jack, the voice signal is cut at the jack, so the sound does not come out from the speaker, but from the headset only.



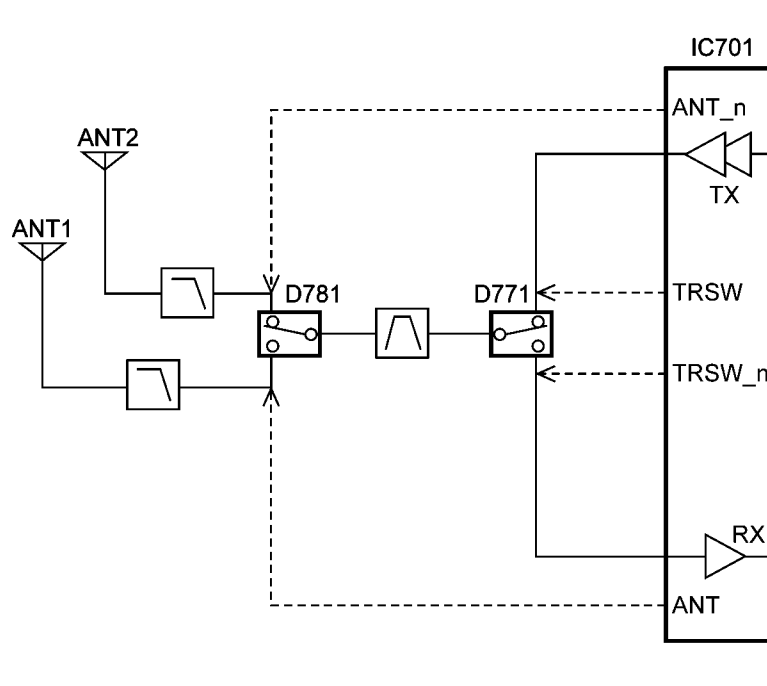
4.8. Circuit Operation (RF Part)

General Description:

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

4.8.1. Antenna-switch Circuit

IC701 controls D771 by TRSW/TRSW_n signals and carries out the switching of TX-mode/RX-mode. In the same way, IC701 controls D781 by ANT/ANT_n signals and carries out the switching of Antenna1 (ANT1)/Antenna2 (ANT2).



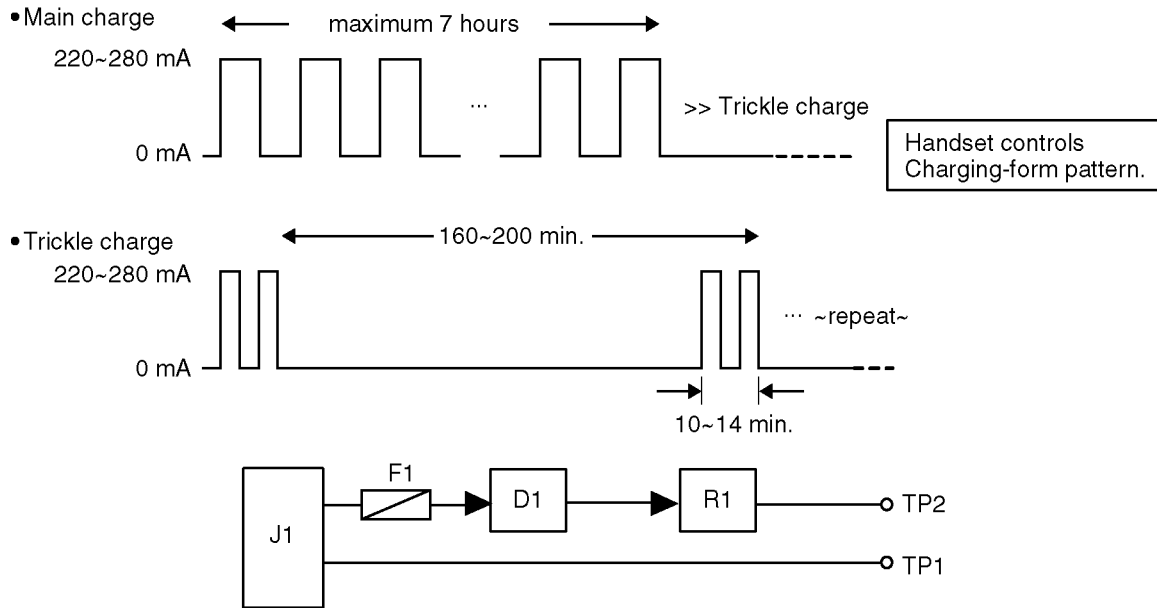
D771Control (TX/RX switch)		TRSW	
		High	Low
TRSW_n	High	---	RX-mode
	Low	TX-mode	---

D781Control (Antenna switch)		ANT	
		High	Low
ANT_n	High	---	ANT2
	Low	ANT1	---

4.9. Circuit Operation (Charger Unit)

The voltage from the AC adaptor is supplied to the charge circuits. Main charge (220~280 mA at the Battery) of maximum 7-hours is started soon after the handset is placed on the charger unit. Then it changes to Trickle charge to prevent from over-charging.

Charging form



AC Adaptor

The route for this is as follows: DC+pin of J1(+) → F1 → D1 → R1 → CHARGE+pad → Handset → CHARGE-pad → DC-pin of J1(-).

4.10. Signal Route

SIGNAL ROUTE	IN → ROUTE → OUT
HANDSET TX	<div>HANDSET MIC - R412/R413 - RA401 - IC501(91/90 - 20)</div> <div>- <HANDSET_RF_TX_ROUTE> - ANT. ---</div> <div>---ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(34 - 97) - R181 - R182 - C184 - Q161 - Q141</div> <div>- D101 - L101/[L102 - P101] - T/R(TEL LINE)</div>
HANDSET RX	<div>T/R(TEL LINE) - L101/[P101 - L102] - D101 - Q141 - R165 - C173 - Q171 - C178 - R178</div> <div>- IC501(96 - 18) - <BASE_UNIT_RF_TX_ROUTE> - ANT. ---</div> <div>--- ANT. - <HANDSET_RF_RX_ROUTE> - IC501(36 - 98/97)</div> <div>- [C435 - L434 - HEADSET_JACK(5 - 4) - RA403]/RA403 - HANDSET SPEAKER</div>
HEADSET TX	<div>HEADSET_JACK(2) - C433 - R433 - IC501(95 - 20) - <HANDSET_RF_TX_ROUTE> - ANT. ---</div> <div>---ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(34 - 97) - R181 - R182 - C184 - Q161 - Q141</div> <div>- D101 - L101/[L102 - P101] - T/R(TEL LINE)</div>
HEADSET RX	<div>T/R(TEL LINE) - L101/[P101 - L102] - D101 - Q141 - R165 - C173 - Q171 - C178 - R178</div> <div>- IC501(96 - 18) - <BASE_UNIT_RF_TX_ROUTE> - ANT. ---</div> <div>--- ANT. - <HANDSET_RF_RX_ROUTE> - IC501(36 - 98) - C435 - L434 - HEADSET_JACK(5)</div>
HANDSET SP-Phone TX	<div>HANDSET MIC - R412/R413 - RA401 - IC501(91/90 - 20)</div> <div>- <HANDSET_RF_TX_ROUTE> - ANT. ---</div> <div>---ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(34 - 97) - R181 - R182 - C184 - Q161 - Q141</div> <div>- D101 - L101/[L102 - P101] - T/R(TEL LINE)</div>
HANDSET SP-Phone RX	<div>T/R(TEL LINE) - L101/[P101 - L102] - D101 - Q141 - R165 - C173 - Q171 - C178 - R178</div> <div>- IC501(96 - 18) - <BASE_UNIT_RF_TX_ROUTE> - ANT. ---</div> <div>--- ANT. - <HANDSET_RF_RX_ROUTE> - IC501(36 - 2/100) - MONITOR SP</div>
BASE SP-Phone TX	<div>MIC - C457/C458 - RA452 - IC501 (93/94 - 97) - R181 - R182 - C184 - Q161 - Q141</div> <div>- D101 - L101/[L102 - P101] - T/R(TEL LINE)</div>
BASE SP-Phone RX	<div>T/R(TEL LINE) - L101/[P101 - L102] - D101 - Q141 - R165 - C173 - Q171 - C178 - R178</div> <div>- IC501(96) - IC501 (96 - 2/100) - L476/L477 - SPEAKER</div>
INTERCOM HANDSET TO BASE UNIT	<div>HANDSET MIC - R412/R413 - RA401 - IC501(91/90 - 20)</div> <div>- <HANDSET_RF_TX_ROUTE> - ANT. ---</div> <div>--- ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(34 - 2/100) - L476/L477 - SPEAKER</div>
INTERCOM BASE UNIT TO HANDSET	<div>MIC - C457/C458 - RA452 - IC501(93/94 - 18) - <BASE_UNIT_RF_TX_ROUTE> - ANT. ---</div> <div>--- ANT. - <HANDSET_RF_RX_ROUTE> - IC501(36 - 98/97)</div> <div>- [C435 - L434 - HEADSET_JACK(5 - 4) - RA403]/RA403 - HANDSET SPEAKER</div>
GREETING RECORDING	<div>HANDSET MIC - R412/R413 - C414/C415 - RA401 - IC501(91/90 - 20)</div> <div>- <HANDSET_RF_TX_ROUTE> - ANT. ---</div> <div>---ANT. - <BASE_UNIT_RF_RX_ROUTE> - IC501(34 - 13/14) - IC601</div>
GREETING PLAY TO TEL LINE	<div>IC601 - IC501(13/14 - 97) - R181 - R182 - C184 - Q161 - Q141 - D101 - L101/[L102 - P101]</div> <div>- T/R(TEL LINE)</div>
ICM RECORDING	<div>T/R(TEL LINE) - L101/[P101 - L102] - D101 - Q141 - R165 - C173 - Q171 - C178 - R178</div> <div>- IC501(96 - 13/14) - IC601</div>
ICM PLAY TO SPEAKER	<div>IC601 - IC501(13/14 - 2/100) - L476/L477 - SPEAKER</div>

Note:

: inside of Handset

SIGNAL ROUTE	IN	→	ROUTE	→	OUT
DTMF SIGNAL TO TEL LINE	IC501(97)	-	R181 - R182 - C184 - Q161 - Q141 - D101 - L101/[L102 - P101]	-	T/R(TEL LINE)
CALLER ID	T/R(TEL LINE)	-	L101/[P101 - L102] - C121/C122 - R121/R122 - IC501(89/88)		
BELL DETECTION	T/R(TEL LINE)	-	L101/[P101 - L102] - R111/R112 - C111/C112 - Q111 - IC501(58)		

RF part signal route

SIGNAL ROUTE	IN	→	ROUTE	→	OUT
HANDSET RF [TX_ROUTE]	R736 - IC701(20 - 9/10) - L751/C751 - C765 - L754 - D771 - C776 - D781 - L795/L791 - C797/C793 - ANT1/ANT2				
HANDSET RF [RX_ROUTE]	ANT1/ANT2 - C797/C793 - L795/L791 - D781 - C776 - D771 - C773 - IC701(7/8 - 20)				
BASE UNIT RF [TX_ROUTE]	R736 - IC701(20 - 9/10) - L751/C751 - C765 - L754 - D771 - C776 - D781 - L795/L791 - C797/C793 - ANT1/ANT2				
BASE UNIT RF [RX_ROUTE]	ANT1/ANT2 - C797/C793 - L795/L791 - D781 - C776 - D771 - C773 - IC701(7/8 - 20)				

Note:

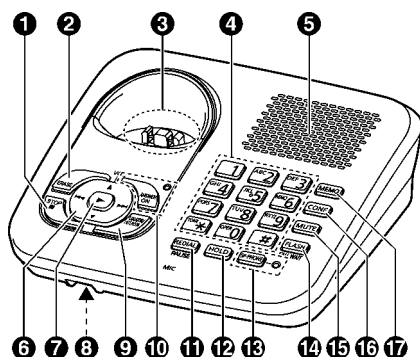
: inside of Handset

5 Location of Controls and Components

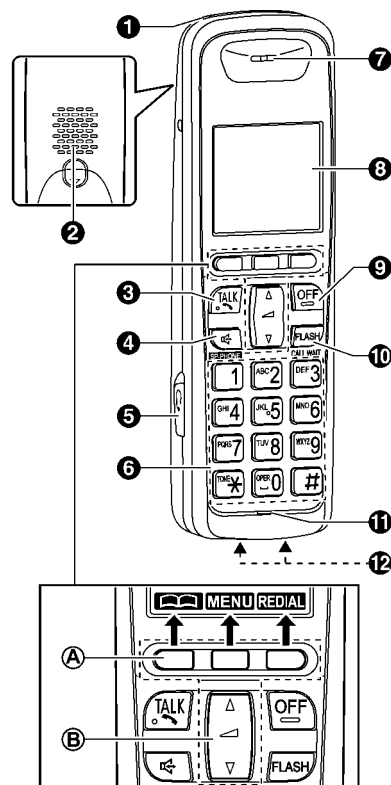
5.1. Controls

5.1.2. Handset

5.1.1. Base Unit



- 1 [■] (STOP)
- 2 [ERASE]
- 3 Charge contacts
- 4 Dial keypad ([*]: TONE)
- 5 Speaker
- 6 [▲]/[▼] (VOL.: Volume up/down)
[◀◀]/[▶▶] (Repeat/Skip)
- 7 [▶] (Play)
Message indicator
- 8 MIC (Microphone)
- 9 [LOCATOR] [INTERCOM]
- 10 [ANSWER ON]
ANSWER ON indicator
- 11 [REDIAL] [PAUSE]
- 12 [HOLD]
- 13 [SP-PHONE] (Speakerphone)
SP-PHONE indicator
- 14 [FLASH] [CALL WAIT]
- 15 [MUTE]
- 16 [CONF] (Conference)
- 17 [MEMO]



- 1 Charge indicator
Ringer indicator
Message indicator
- 2 Speaker
- 3 [↶] (TALK)
- 4 [↷] (SP-PHONE: Speakerphone)
- 5 Headset jack
- 6 Dial keypad ([*]: TONE)
- 7 Receiver
- 8 Display
- 9 [OFF]
- 10 [FLASH] [CALL WAIT]
- 11 Microphone
- 12 Charge contacts

Control type

A Soft keys

The handset features 3 soft keys. By pressing a soft key, you can select the feature shown directly above it on the display.












B Navigator key/ ▲ (Volume) key

By pressing this key ([▲] or [▼]) repeatedly, you can:

- scroll through (up or down) various lists or items
- adjust the receiver or speaker volume (up or down) while talking
- move the cursor (left or right) to edit number or name

5.2. Display

Handset display items

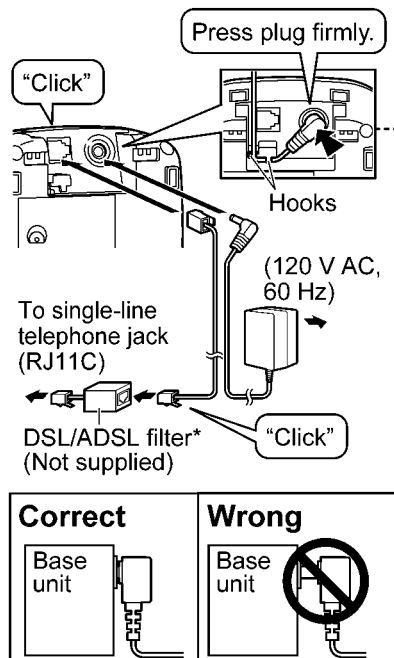
Item	Meaning
	Within range of a base unit
	Out of range of a base unit
	<p>The line is in use.</p> <ul style="list-style-type: none"> When flashing: <ul style="list-style-type: none"> The call is put on hold. The answering system is answering a call. When flashing rapidly: <p>An incoming call is now being received.</p>
	Speaker is on.
	Ringer volume is off.
	Silent mode is on.
	Clarity booster is on.
	Alarm is on.
	Handset number
	Battery level
	Blocked call

6 Installation Instructions

6.1. Connections

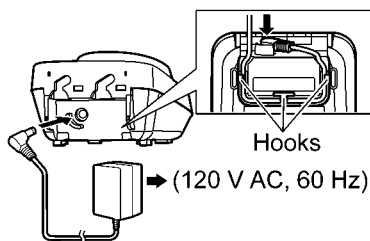
- Use only the supplied Panasonic AC adaptor PQLV219Z.

Base unit



*For DSL/ADSL service users

Charger



Note:

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

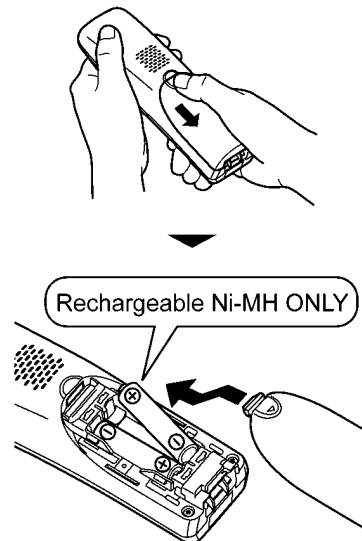
During a power failure

The unit will not work during a power failure. We recommend connecting a corded-type telephone (without AC adaptor) to the same telephone line or to the same telephone line jack using a Panasonic T-adaptor. Emergency power can be supplied to the unit by connecting a Panasonic battery back-up power supply.

6.2. Battery

6.2.1. Battery Installation

- USE ONLY Ni-MH batteries AAA (R03) size.
- Do NOT use Alkaline/Manganese/Ni-Cd batteries.
- Confirm correct polarities (\oplus , \ominus).



Note:

- Use the supplied rechargeable batteries. For replacement, we recommend using the Panasonic rechargeable batteries HHR-4DPA.
- Wipe the battery ends (\oplus , \ominus) with a dry cloth.
- Avoid touching the battery ends (\oplus , \ominus) or the unit contacts.

Attention:

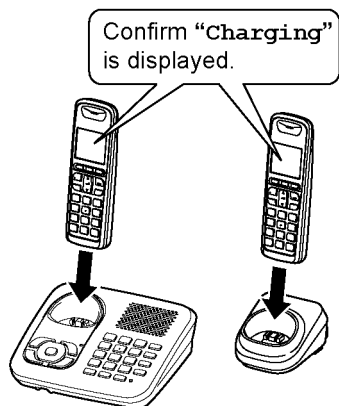


A nickel metal hydride battery that is recyclable powers the product you have purchased. Please call 1-800-8-BATTERY (1-800-822-8837) for information on how to recycle this battery.

6.2.2. Battery Charge

Charge for about 7 hours.

- When the batteries are fully charged, the charge indicator goes off.



Note:

- It is normal for the handset to feel warm during charging.
- Clean the charge contacts of the handset, base unit, and charger with a soft and dry cloth. Clean if the unit is exposed to grease, dust, or high humidity.

Note for service:

The battery strength may not be indicated correctly if the battery is disconnected and connected again, even after it is fully charged. In that case, by recharging the battery as mentioned above, you will get a correct indication of the battery strength.

6.2.3. Battery Level

Icon	Battery level
	High
	Medium
	Low
	Needs charging.
	Empty

Note:

- The batteries need to be charged if:
 - the handset alerts you with a voice announcement (**talking battery alert**) after you finish talking or listening to a message.
 - the handset beeps while you are engaged in a call or operating the answering system remotely.

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

Operation	Operating time
In continuous use	5 hours max.* ¹
Not in use (standby)	11 days max.

*1 When the clarity booster feature is turned on:
3 hours max.

Note:

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

7 Operating Instructions

7.1. Programmable Settings

You can customize the unit by programming the following features using the handset.



To access the features, there are 2 methods:

- scrolling through the display menus
- using the direct commands
- Direct command is the main method used in this service manual.

7.1.1. Programming by Scrolling through the Display Menus

- 1 **[MENU]**
- 2 Press **[▼]** or **[▲]** to select the desired main menu. → **[SELECT]**
- 3 Press **[▼]** or **[▲]** to select the desired item in sub-menu 1. → **[SELECT]**
 - In some cases, you may need to select from sub-menu 2. → **[SELECT]**
- 4 Press **[▼]** or **[▲]** to select the desired setting. → **[SAVE]**
 - This step may vary depending on the feature being programmed.
 - To exit the operation, press **[OFF]**.

Main menu	Sub-menu 1	Sub-menu 2
Caller list →)	–	–
Answering device ☎	Play new msg.	–
	Play all msg.	–
	Erase all msg. ^{*1}	–
	Greeting	Record greeting ^{*1}
		Check greeting
		Pre-recorded ^{*1}
	Settings	Ring count ^{*1}
		Recording time ^{*1}
		Remote code ^{*1}
V.M. access ☎	Answer on ^{*1}	–
	Answer off ^{*1}	–
Intercom •))	–	–

Main menu	Sub-menu 1	Sub-menu 2
Initial setting 	Ringer setting	Ringer volume
		Ringer tone
		Silent mode – On / Off – Start / End
	Set date / time	Date and time ^{*1}
		Alarm
		Time adjust ^{*1}
	Talking CallerID	Handset
		Base unit ^{*1}
	Voice Mail	Store V.M. no. ^{*1}
		VM tone detect ^{*1}
	Call block ^{*1}	–
	Message alert	–
	Display setting	LCD contrast
	Key tone	–
	Auto talk	–
	Caller ID edit ^{*1}	–
	Set tel line	Set dial mode ^{*1}
		Set flash time ^{*1}
		Set line mode ^{*1}
	Registration	Register handset
		Deregistration
	Change language	Display
		Voice prompt ^{*1}
Customer support 	–	–

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

7.1.2. Programming using the Direct Commands

- 1 **[MENU] → [⇐]**
- 2 Enter the desired feature code.
- 3 Enter the desired setting code. → **[SAVE]**
 - This step may vary depending on the feature being programmed.
 - To exit the operation, press **[OFF]**.

Note:

- In the following table, < > indicates the default settings.

Feature	Feature code	Setting code	System setting ^{*1}
Alarm	[7][2][0]	[1]: Once [2]: Daily [0]: <Off>	—
Answer off	[3][2][8]	—	●
Answer on	[3][2][7]	—	●
Auto talk ^{*2}	[2][0][0]	[1]: On [0]: <Off>	—
Block w/o num. (Block calls without phone number)	[2][4][0]	[1]: On [0]: <Off>	●
Call block	[2][1][7]	—	●
Caller ID edit (Caller ID number auto edit)	[2][1][4]	[1]: <On> [0]: Off	●
Caller list	[2][1][3]	—	—
Check greeting	[3][0][3]	—	—
Customer support ^{*3}	[6][8][0]	—	—
Date and time	[1][0][1]	—	●
Deregistration	[1][3][1]	—	—
Display (Change language)	[1][1][0]	[1]: <English> [2]: Español	—
Erase all msg. (msg.: messages)	[3][2][5]	—	●
Intercom	[2][7][4]	—	—
Key tone ^{*4}	[1][6][5]	[1]: <On> [0]: Off	—
LCD contrast (Display contrast)	[1][4][5]	[1]–[6]: Level 1–6 <3>	—
Message alert	[3][4][0]	[1]: <On> [0]: Off	—
Play all msg. (msg.: messages)	[3][2][4]	—	—
Play new msg. (msg.: messages)	[3][2][3]	—	—
Pre-recorded (Reset to pre-recorded greeting)	[3][0][4]	—	●
Record greeting	[3][0][2]	—	●
Recording time	[3][0][5]	[1]: 1min [2]: 2min [3]: <3min> [0]: Greeting only	●
Register handset	[1][3][0]	—	—
Remote code	[3][0][6]	<111>	●
Ring count	[2][1][1]	[2]–[7]: 2–7 rings <4> [0]: Toll saver	●
Ringer tone ^{*5, *6} (Handset)	[1][6][1]	[1]–[3]: Tone <1>–3 [4]–[7]: Melody 1–4	—
Ringer volume ^{*7} (Handset)	[1][6][0]	[1]: Low [2]: Medium [3]: <High> [0]: Off	—

Feature	Feature code	Setting code	System setting ^{*1}
Set dial mode	[1][2][0]	[1]: Pulse [2]: <Tone>	●
Set flash time ^{*8}	[1][2][1]	[0]: 900ms [1]: <700ms> [2]: 600ms [3]: 400ms [4]: 300ms [5]: 250ms [*]: 200ms [†]: 160ms [6]: 110ms [7]: 100ms [8]: 90ms [9]: 80ms	●
Set line mode ^{*9}	[1][2][2]	[1]: A [2]: 	●
Silent mode (On/Off)	[2][3][8]	[1]: On [0]: <Off>	—
Silent mode (Start/End)	[2][3][7]	<11:00 PM/06:00 AM>	—
Store V.M. no. (V.M.: Voice mail)	[3][3][1]	—	●
Talking CallerID (Handset)	[1][6][2]	[1]: <On> [0]: Off	—
Talking CallerID (Base unit)	[*][1][6] [2]	[1]: On [0]: <Off>	●
Time adjust ^{*10} (Caller ID subscribers only)	[2][2][6]	[1]: <Caller ID auto> [0]: Manual	●
V.M. access (V.M.: Voice mail)	[3][3][0]	—	—
VM tone detect (VM: Voice mail)	[3][3][2]	[1]: <On> [0]: Off	●
Voice prompt (Change language)	[1][1][2]	[1]: <English> [2]: Español	●

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

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

*3 The handset can display the Internet address where you can download the operating instructions or get further information for this product, using your computer.

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

*5 If you subscribe to a distinctive ring service (such as IDENT-A-RING), select a tone (tone 1 to 3). If you select a melody, you cannot distinguish lines by their ringers.

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

*7 When the ringer volume is turned off, \mathcal{R} is displayed and the handset does not ring for outside calls.

However even when the ringer volume is set to off, the handset rings at the low level for alarm, intercom calls, and paging.

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

*9 Generally, the line mode setting should not be adjusted. If **IN USE** is not displayed when another phone connected to the same line is in use, you need to change the line mode to "A".

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

7.2. Error Messages

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

Display message	Cause/solution
Busy or System busy. Try again later.	<ul style="list-style-type: none"> • The called unit is in use. • Other units are in use and the system is busy. Try again later. • The handset you are using is too far from the base unit. Move closer and try again. • The handset's registration may have been canceled. Re-register the handset.
Check tel line	<ul style="list-style-type: none"> • The supplied telephone line cord has not been connected yet or not connected properly. Check the connections.
Use rechargeable battery.	<ul style="list-style-type: none"> • A wrong type of battery such as Alkaline or Manganese was inserted. Use only the rechargeable Ni-MH batteries.
Error!!	<ul style="list-style-type: none"> • The handset's registration has failed. Move the handset and base unit away from all electrical appliances and try again.
Invalid	<ul style="list-style-type: none"> • There is no handset registered to the base unit matching the handset number you entered. • The handset is not registered to the base unit. Register the handset.
No link. Reconnect base AC adaptor.	<ul style="list-style-type: none"> • The handset has lost communication with the base unit. Move closer to the base unit and try again. • Unplug the base unit's AC adaptor to reset the unit. Reconnect the adaptor and try again. • The handset's registration may have been canceled. Re-register the handset.
Requires subscription to Caller ID.	<ul style="list-style-type: none"> • You must subscribe to a Caller ID service. Once you receive caller information after subscribing to a Caller ID service, this message will not be displayed.
Store V.M. no.	<ul style="list-style-type: none"> • You have not stored the voice mail access number. Store the number.

7.3. Troubleshooting

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




General use

Problem	Cause/solution
The unit does not work.	<ul style="list-style-type: none"> • Make sure the batteries are installed correctly. • Fully charge the batteries. • Check the connections. • Unplug the base unit's AC adaptor to reset the unit. Reconnect the adaptor and try again. • The handset has not been registered to the base unit. Register the handset.
I cannot hear a dial tone.	<ul style="list-style-type: none"> • The base unit's AC adaptor or telephone line cord is not connected. Check the connections. • If you are using a splitter to connect the unit, remove the splitter and connect the unit to the wall jack directly. If the unit operates properly, check the splitter. • Disconnect the base unit from the telephone line and connect the line to a known working telephone. If the working telephone operates properly, contact our service personnel to have the unit repaired. If the working telephone does not operate properly, contact your service provider/telephone company.
The indicator on the handset flashes slowly.	<ul style="list-style-type: none"> • New messages have been recorded. Listen to the new messages. • New voice mail messages have been recorded. Listen to the new voice mail messages.


Programmable settings

Problem	Cause/solution
I have changed the display language to a language I cannot read.	<ul style="list-style-type: none"> • Change the display language.
While programming, the handset starts to ring.	<ul style="list-style-type: none"> • A call is being received. Answer the call and start again after hanging up.
I cannot register a handset to a base unit.	<ul style="list-style-type: none"> • The maximum number of handsets (6) is already registered to the base unit. Cancel unused handset registrations from the base unit. • Place the handset and the base unit away from other electrical appliances.

Battery recharge

Problem	Cause/solution
The handset beeps and/or  flashes.	<ul style="list-style-type: none"> • Battery charge is low. Fully charge the batteries.
I fully charged the batteries, but  still flashes or  is displayed.	<ul style="list-style-type: none"> • Clean the charge contacts and charge again. • It is time to replace the batteries.
I fully charged the batteries, but the operating time seems to be shorter.	<ul style="list-style-type: none"> • Clean the battery ends (\oplus, \ominus) and the charge contacts with a dry cloth and charge again.

Making/answering calls, intercom

Problem	Cause/solution
 is displayed.	<ul style="list-style-type: none"> • The handset is too far from the base unit. Move closer. • The base unit's AC adaptor is not properly connected. Reconnect AC adaptor to the base unit. • You are using the handset or base unit in an area with high electrical interference. Re-position the base unit and use the handset away from sources of interference. • The handset is not registered to the base unit. Register it.
Noise is heard, sound cuts in and out.	<ul style="list-style-type: none"> • You are using the handset or base unit in an area with high electrical interference. Re-position the base unit and use the handset away from sources of interference. • Move closer to the base unit. • If you use a DSL/ADSL service, we recommend connecting a DSL/ADSL filter between the base unit and the telephone line jack. Contact your DSL/ADSL provider for details.
The handset and/or base unit does not ring.	<ul style="list-style-type: none"> • The ringer volume is turned off. Adjust the ringer volume. • Silent mode is turned on. Turn it off.
I cannot make a call.	<ul style="list-style-type: none"> • The dialing mode may be set incorrectly. Change the setting. • The handset is too far from the base unit. Move closer and try again.
I cannot make long distance calls.	<ul style="list-style-type: none"> • Make sure that you have long distance service.

Caller ID/Talking Caller ID

Problem	Cause/solution
Caller information is not displayed.	<ul style="list-style-type: none"> You must subscribe to Caller ID service. Contact your service provider/telephone company for details. If your unit is connected to any additional telephone equipment such as a Caller ID box or cordless telephone line jack, plug the unit directly into the wall jack. If you use a DSL/ADSL service, we recommend connecting a DSL/ADSL filter between the base unit and the telephone line jack. Contact your DSL/ADSL provider for details. The name display service may not be available in some areas. Contact your service provider/telephone company for details. Other telephone equipment may be interfering with this unit. Disconnect the other equipment and try again.
Caller information is not announced.	<ul style="list-style-type: none"> The handset or base unit's ringer volume is turned off. Adjust it. The Talking Caller ID feature is turned off. Turn it on. The number of rings for the answering system is set to "2" or "Toll saver". Select a different setting. If the base unit and another handset are having an intercom call, your handset does not announce caller information.
Caller information is displayed or announced late.	<ul style="list-style-type: none"> Depending on your service provider/telephone company, the unit may display or announce the caller's information at the 2nd ring or later. Move closer to the base unit.
The caller list/incoming phone numbers are not edited automatically.	<ul style="list-style-type: none"> The Caller ID number auto edit feature is turned off. Turn it on and try again. You need to call back the edited number to activate Caller ID number auto edit.
I cannot dial the phone number edited in the caller list.	<ul style="list-style-type: none"> The phone number you dialed might have been edited incorrectly (for example, the long distance "1" or the area code is missing). Edit the phone number with another pattern.
Time on the unit has shifted.	<ul style="list-style-type: none"> Incorrect time information from incoming Caller ID changes the time. Set the time adjustment to "Manual" (off).
The 2nd caller's information is not displayed during an outside call.	<ul style="list-style-type: none"> In order to use Caller ID, call waiting, or Call Waiting Caller ID (CWID), you must first contact your service provider/telephone company and subscribe to the desired service. After subscribing, you may need to contact your service provider/telephone company again to activate this specific service, even if you already subscribed to both Caller ID and Call Waiting with Caller ID services (CWID).

Answering system

Problem	Cause/solution
The unit does not record new messages.	<ul style="list-style-type: none"> • The answering system is turned off. Turn it on. • The message memory is full. Erase unnecessary messages. • The recording time is set to "Greeting only". Change the setting. • If you subscribe to the voice mail service, messages are recorded by your service provider/telephone company, not your telephone. Change the unit's number of rings setting or contact your service provider/telephone company.
I cannot operate the answering system.	<ul style="list-style-type: none"> • Someone is using the unit. Wait for the other user to finish. • A caller is leaving a message. Wait for the caller to finish. • The handset is too far from the base unit. Move closer.
I cannot operate the answering system remotely.	<ul style="list-style-type: none"> • You are entering the wrong remote access code. If you forgot the remote access code, store a new remote access code. • Press each key firmly. • The answering system is turned off. Turn it on. • You are using a rotary/pulse telephone. Try again using a touch-tone phone.
While recording a greeting message or listening to messages, the unit rings and the operation stops.	<ul style="list-style-type: none"> • A call is being received. Answer the call and try again later.

Liquid damage

Problem	Cause/solution
Liquid or other form of moisture has entered the handset/base unit.	<ul style="list-style-type: none"> • Disconnect the AC adaptor and telephone line cord from the base unit. Remove the batteries from the handset and leave to dry for at least 3 days. After the handset/base unit are completely dry, reconnect the AC adaptor and telephone line cord. Insert the batteries and charge fully before use. If the unit does not work properly, contact an authorized service center.

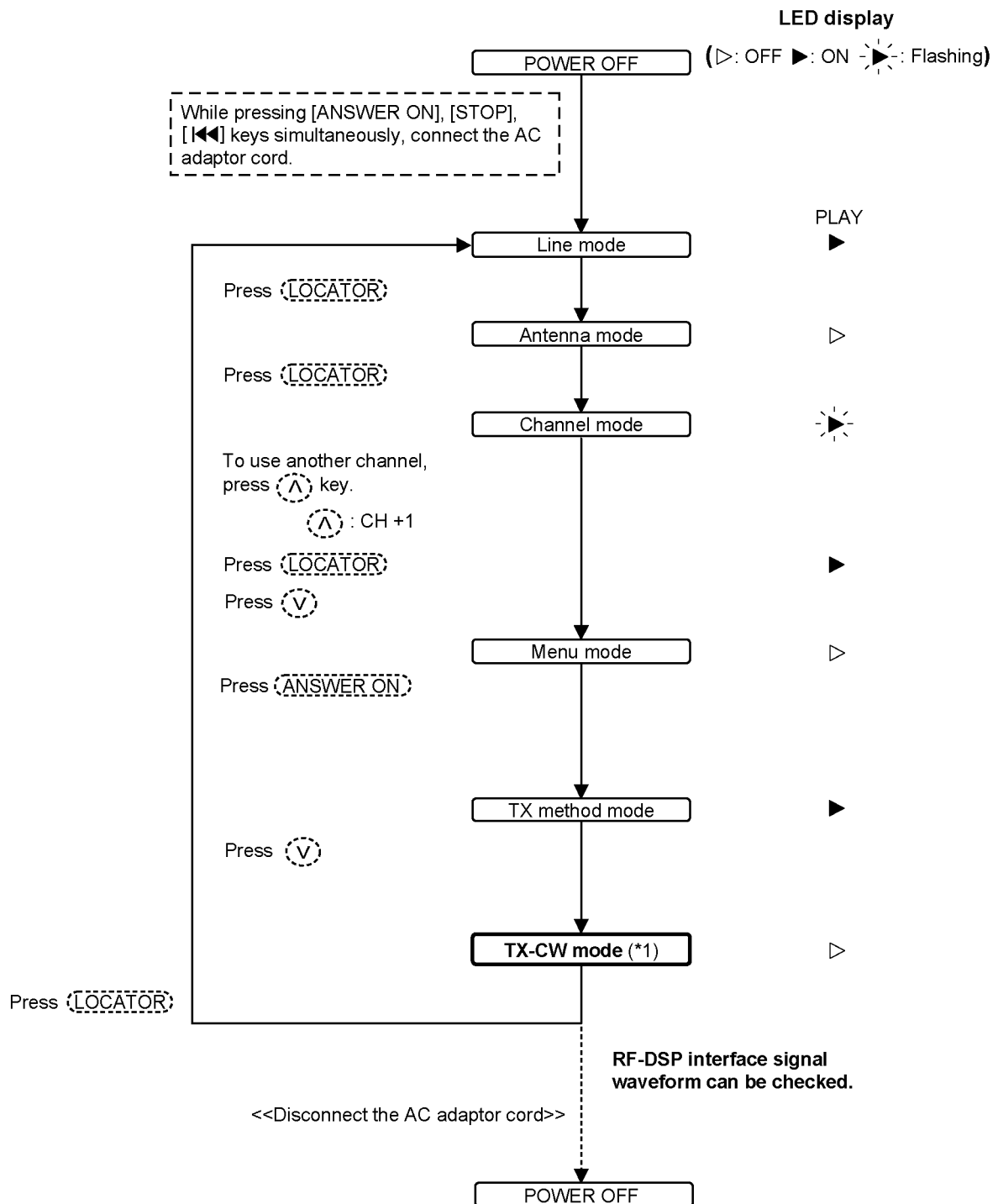
Caution:

- To avoid permanent damage, do not use a microwave oven to speed up the drying process.

8 Test Mode

8.1. Adjustment and Test Mode Flow Chart

8.1.1. TX-CW Mode for Base Unit



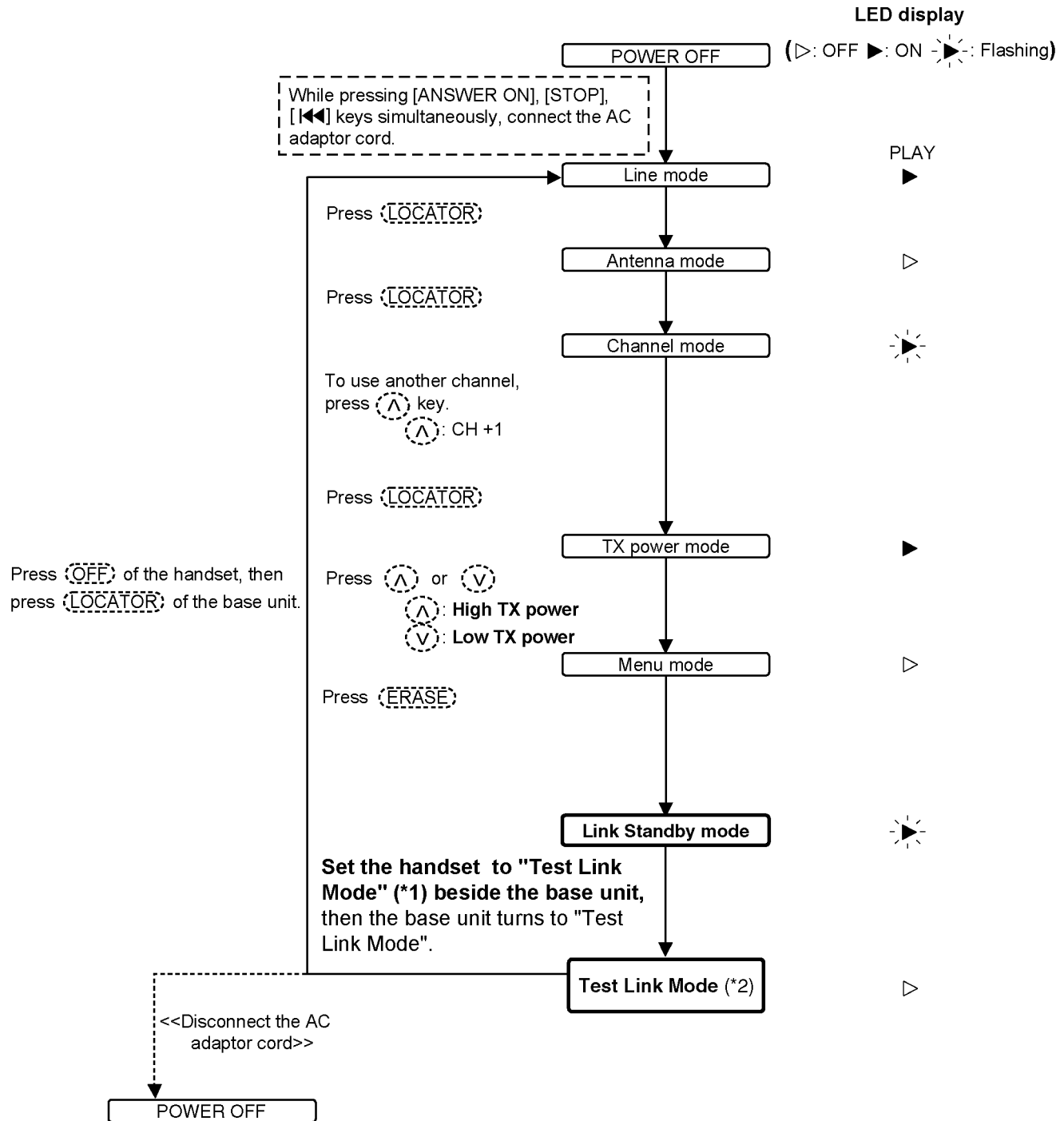
Note:

(*1) Refer to **Check Table for RF part** (P.60).

8.1.2. Test Link Mode for Base Unit

LED display

(▷: OFF ▷: ON -▷: Flashing)

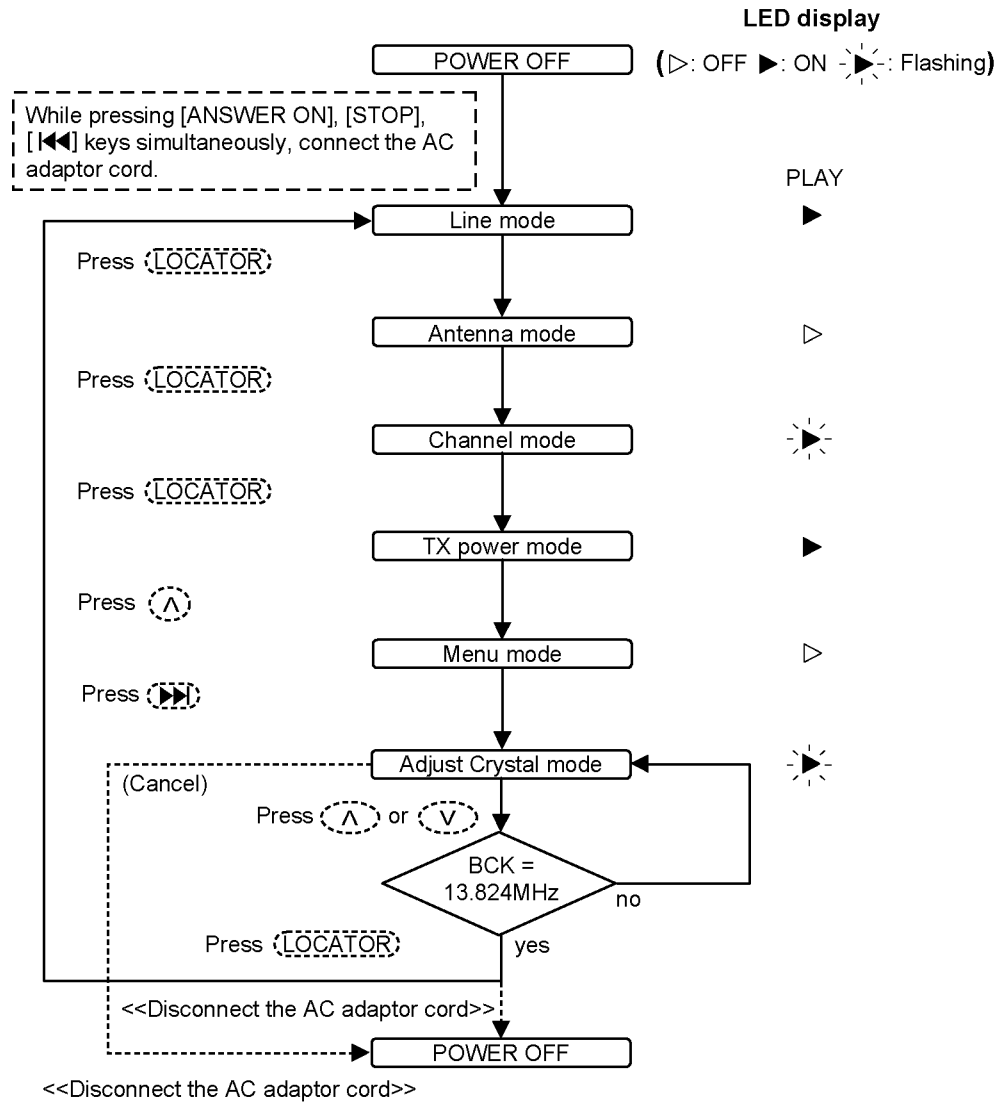


Note:

(*1) Refer to **Test Link Mode for Handset** (P.48). If you can not proceed to the next step, refer to **Registering a Handset to a Base Unit** (P.58).

(*2) Refer to **Check Table for RF part** (P.60).

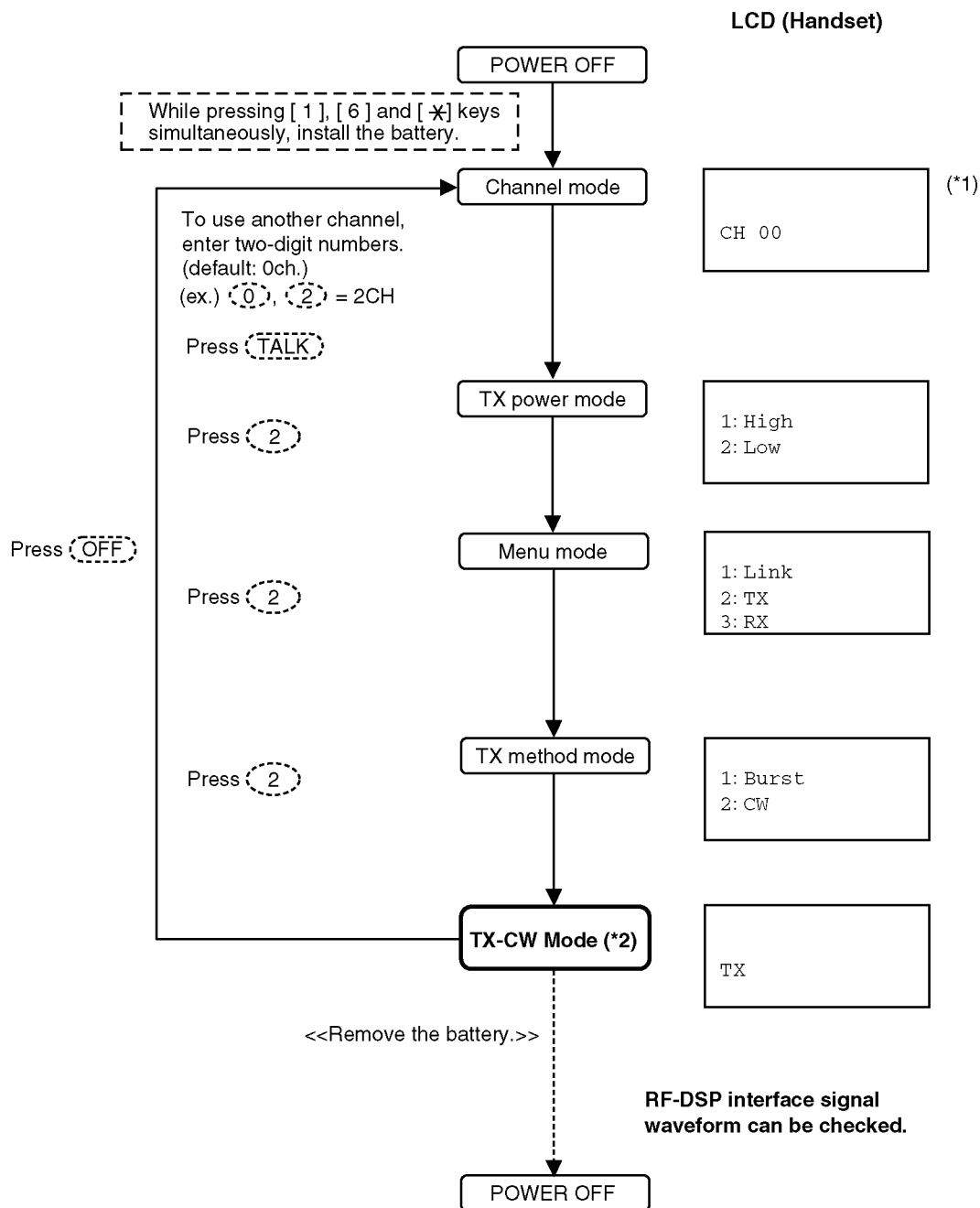
8.1.3. Adjustment Mode for Base Unit



Cross Reference

Check and Adjust Frequency (Base Unit) (P.70)

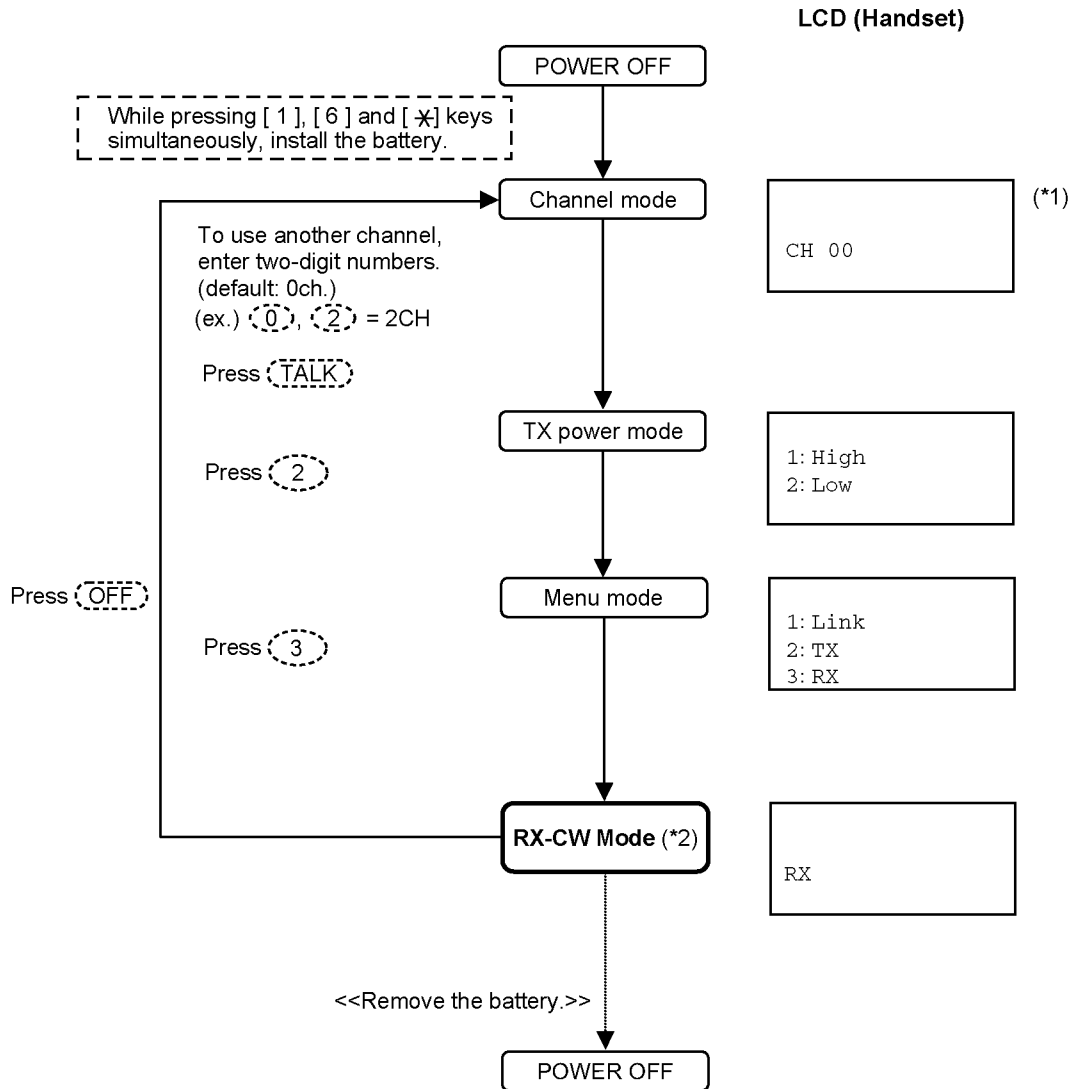
8.1.4. TX-CW Mode for Handset



Note:

- (*1) LCD displays the Channel number.
(exception: default/ CH00 = 0ch.)
- (*2) Refer to **Check Table for RF part** (P.60).

8.1.5. RX-CW Test Mode for Handset

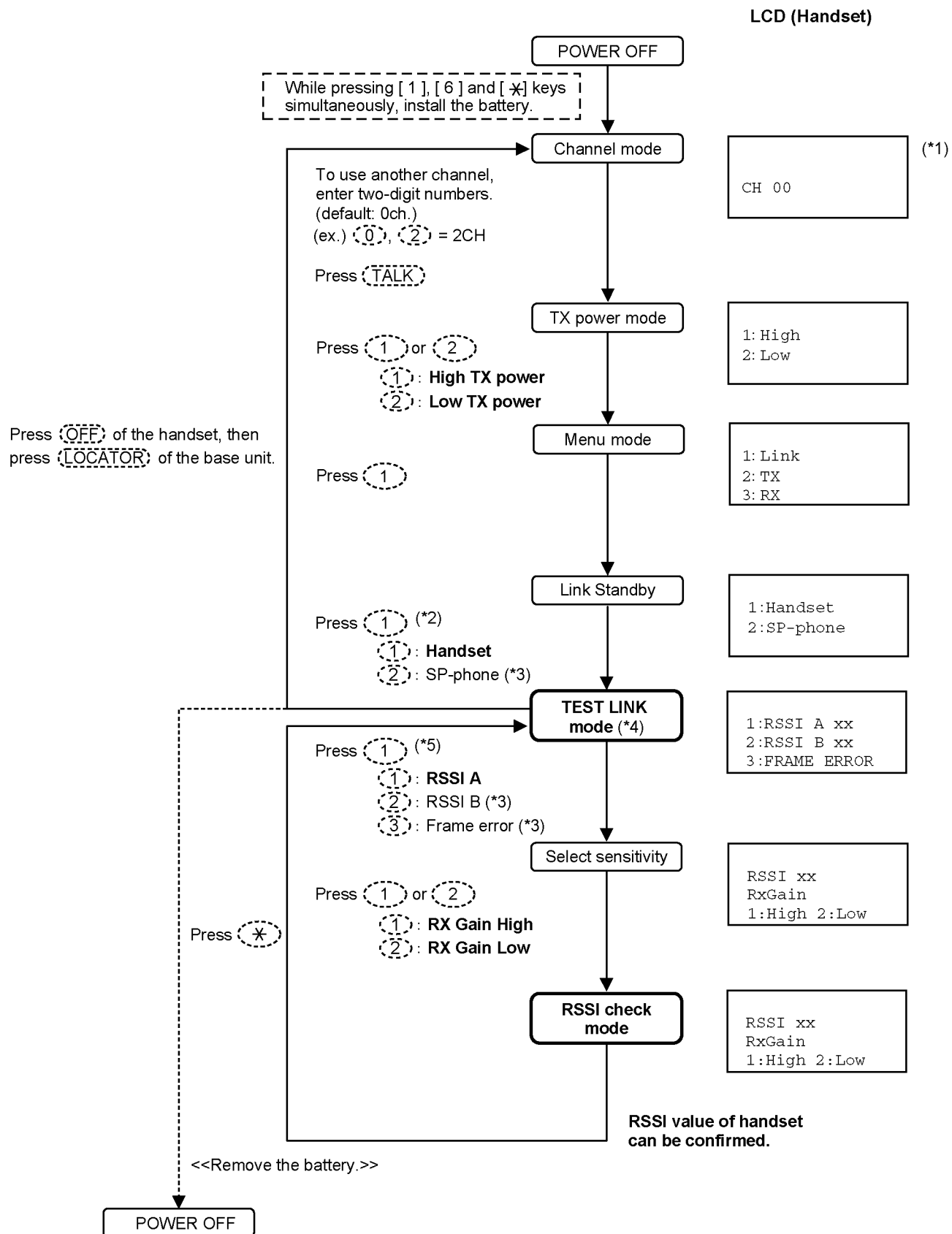


Note:

(*1) LCD displays the Channel number.
(exception: default/ CH00 = 0ch.)

(*2) Refer to **Check Table for RF part** (P.60).

8.1.6. Test Link Mode for Handset



Note:

(*1) LCD displays the Channel number.

(exception: default/ CH00 = 0ch.)

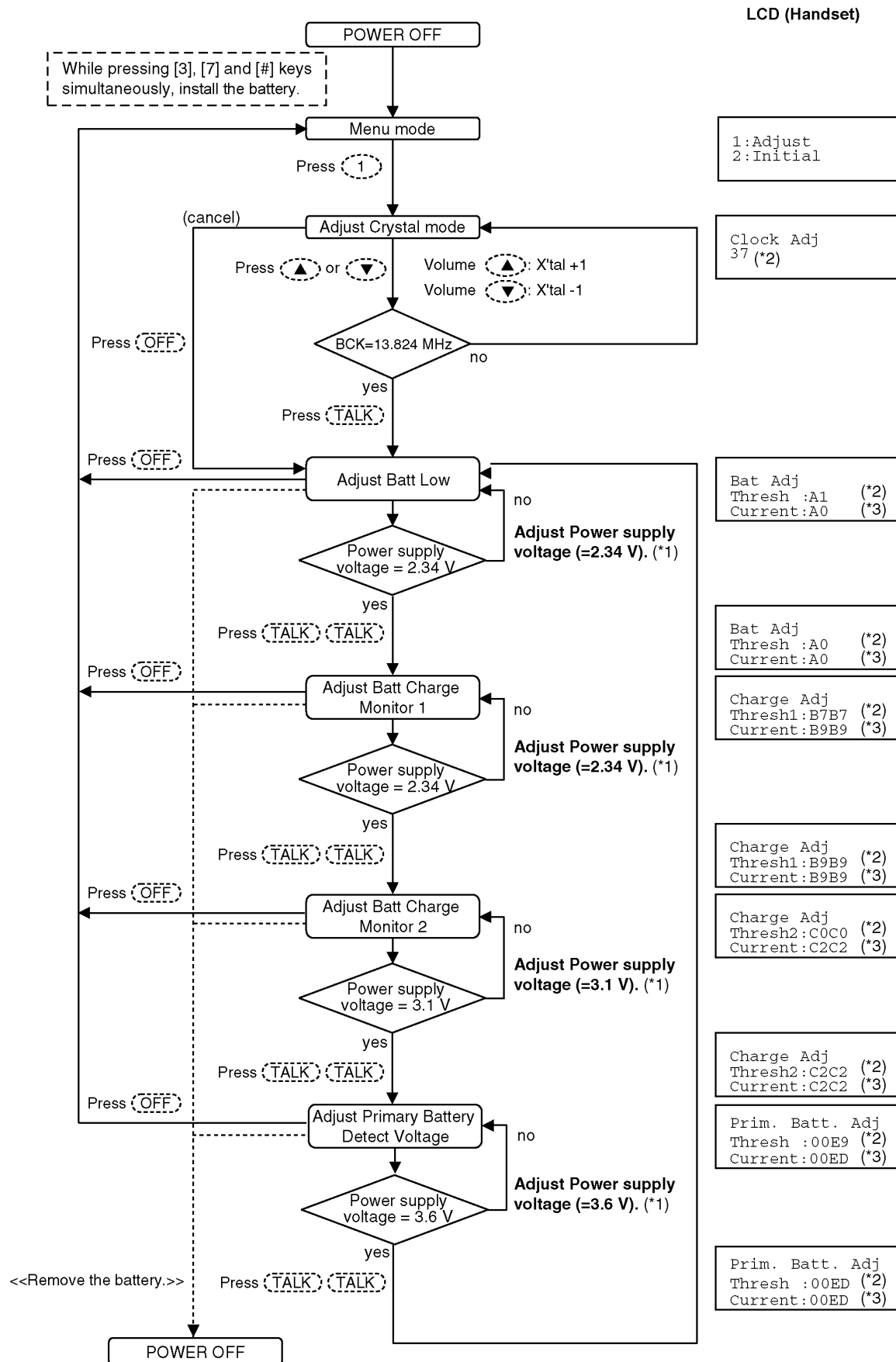
(*2) If can not proceed to the next step, refer to **Registering a Handset to a Base Unit** (P.58).

(*3) for factory use only.

(*4) Refer to **Check Table for RF part** (P.60).

(*5) Operation for regular base unit. Refer to **CHART1** in the **TEST RANGE Check** (P.61).

8.1.7. Adjustment Mode for Handset



Cross Reference

(*1) **Adjust Battery Low Detector Voltage (Handset)** (P.70)

Note:

(*2) These are the default values.

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

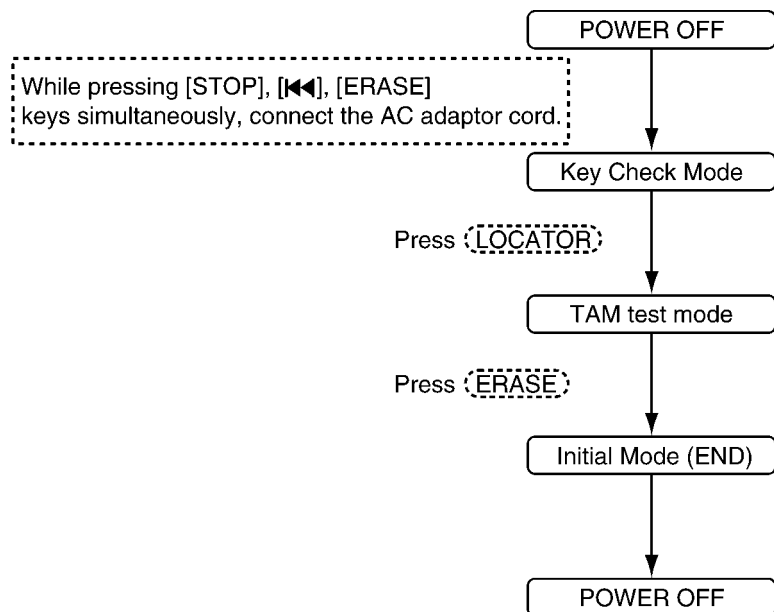
9 Service Mode

9.1. How to Clear User Setting

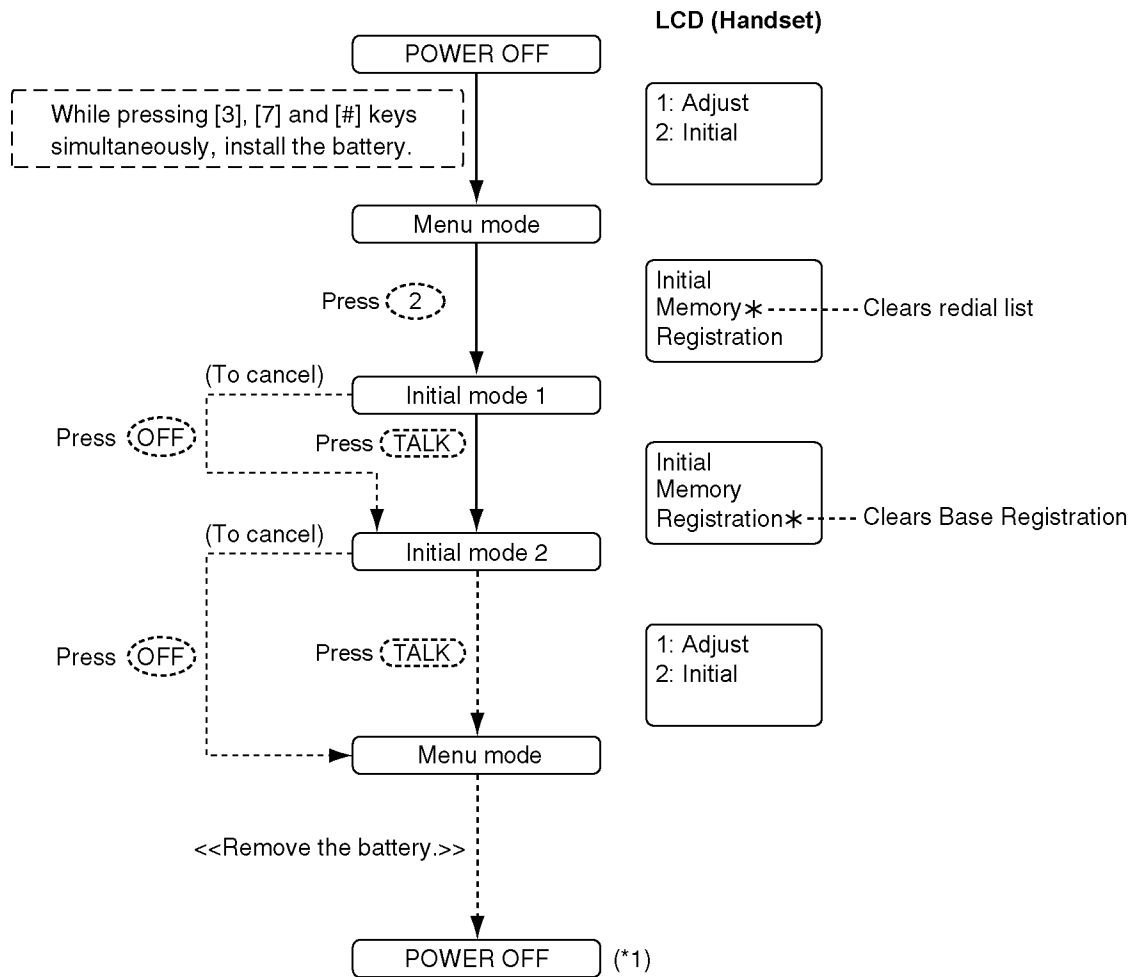
Units are reset to the Factory settings by this operation (Erase recorded Voice messages, stored Phone numbers, Caller list and etc.).

This operation should not be performed for a usual repair.

9.1.1. Base Unit



9.1.2. Handset



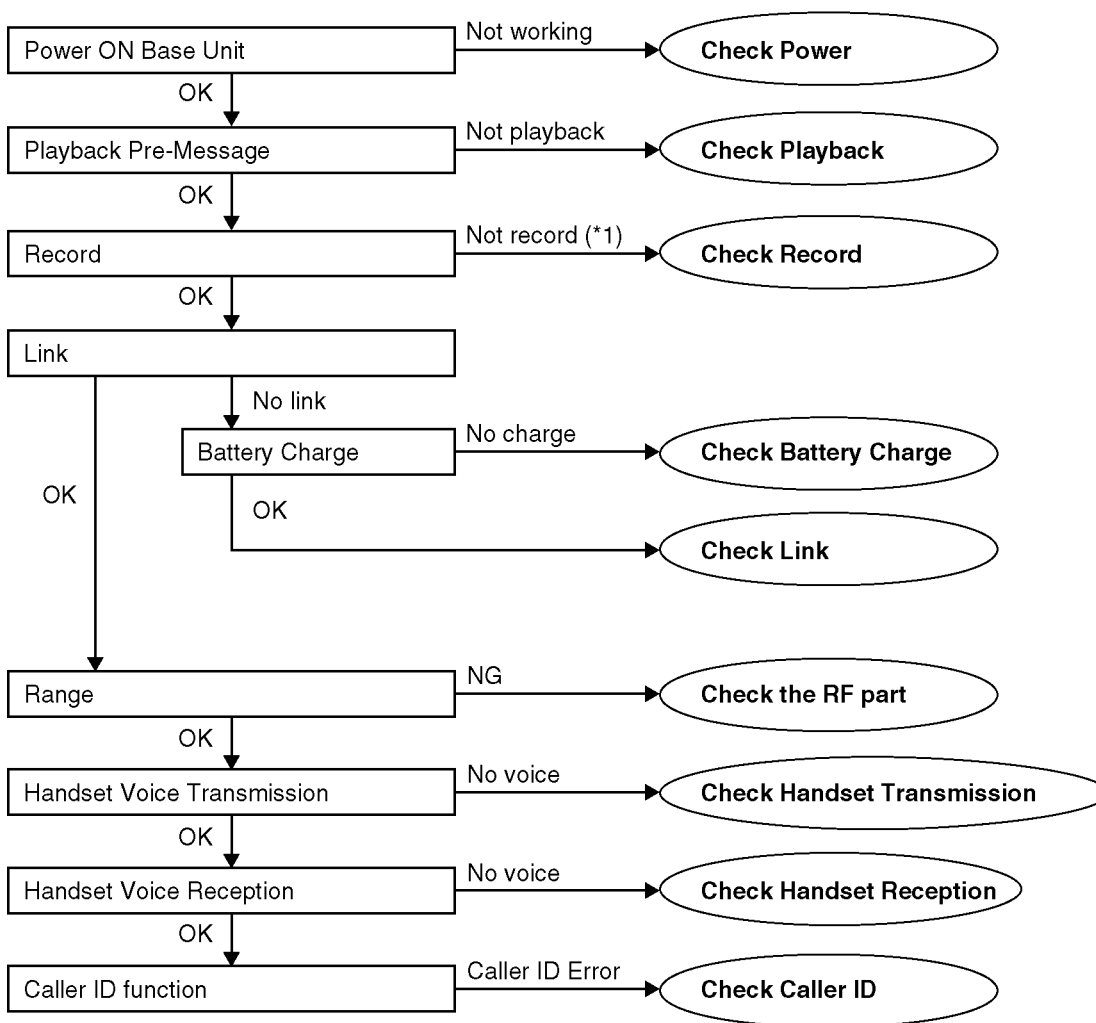
Note:

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

10 Troubleshooting Guide

10.1. Troubleshooting Flowchart

FLOW CHART



Cross Reference:

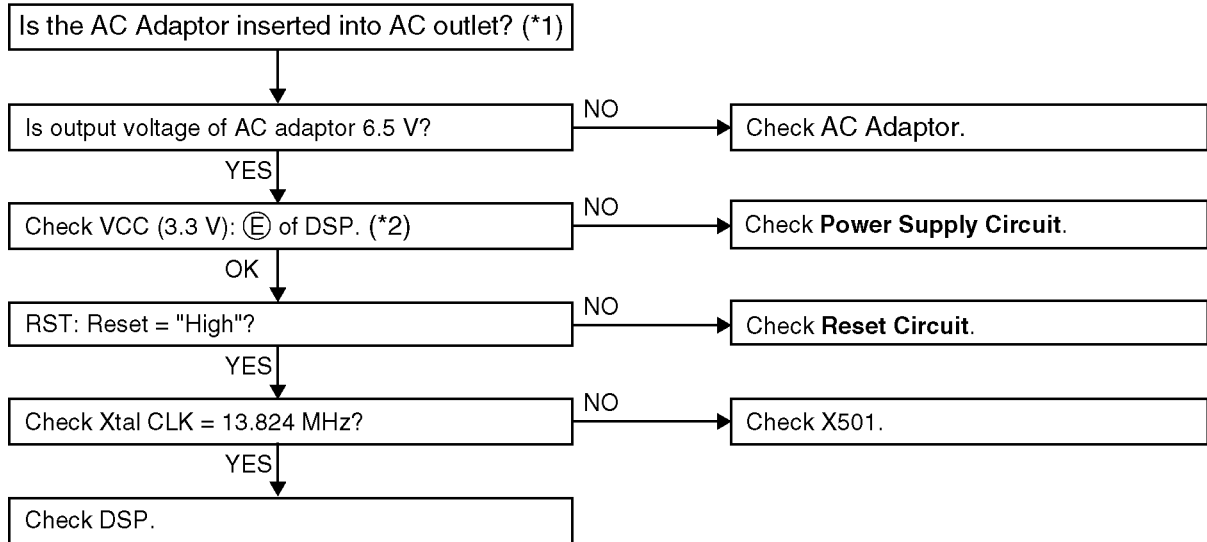
Check Power (P.53)
Check Playback (P.55)
Check Record (P.54)
Check Battery Charge (P.55)
Check Link (P.56)
Check the RF part (P.57)
Check Handset Transmission (P.64)
Check Handset Reception (P.64)
Check Caller ID (P.64)

Note:

(*1) When a user claims that the unit disconnects a call right after the greeting message and no incoming messages can be recorded, this symptom can not be reappeared with TEL simulator in the service center. In this case, try **Check Record** (P.54) item (B), (C).

10.1.1. Check Power

BASE UNIT



Cross Reference:

Power Supply Circuit (P.12)

Reset Circuit (P.14)

Note:

Flash Memory is IC601.

DSP is IC501.

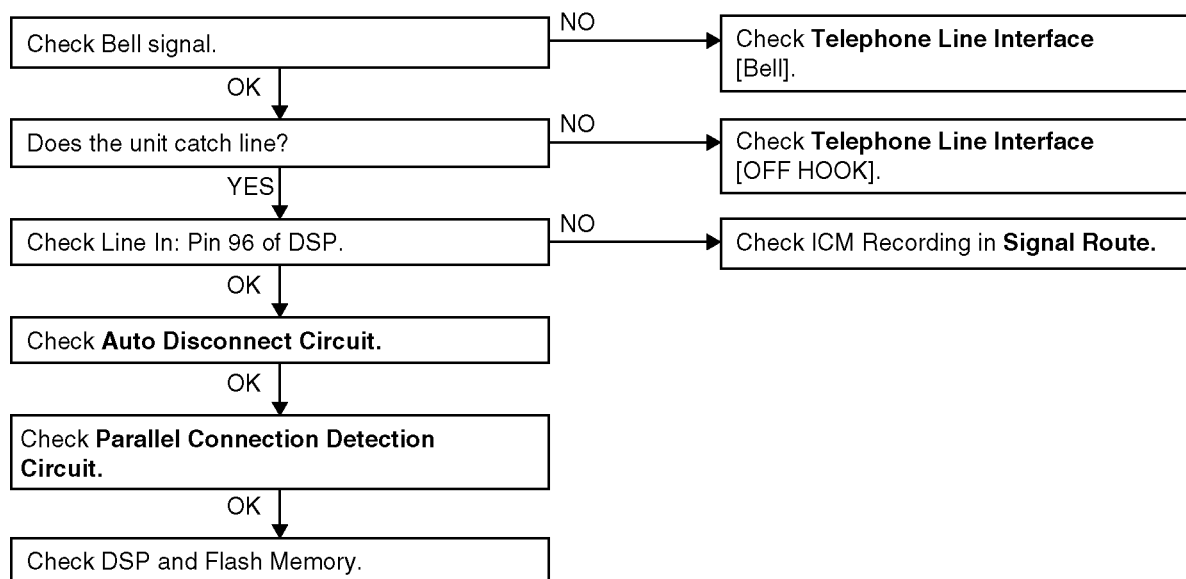
(*1) Refer to **Specifications** (P.6) for part number and supply voltage of AC adaptor.

(*2) Refer to **Circuit Board (Base Unit_Main)** (P.95).

10.1.2. Check Record

BASE UNIT

A) Not record Incoming Message



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

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

- If successful, a long beep sounds.
- If the "STOP" key is pressed, stand-by mode is activated.

Auto Disconnect detect	CPC detect	PROCEDURE at Stand-by mode
Enable*1 [default]		"ERASE"+"LOCATOR"+"PLAY [▶]" simultaneously
Enable*1	Disable	"ERASE"+"LOCATOR"+"VOL. [Λ]" simultaneously
Disable*2		"ERASE"+"LOCATOR"+"VOL. [v]" simultaneously

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.

C) How to change the 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.

- If successful, a long beep sounds.
- If the "STOP" key is pressed, stand-by mode is activated.

VOX Level sensitivity	PROCEDURE at Stand-by mode
Normal [default]	"STOP"+"LOCATOR"+"VOL. [Λ]" simultaneously
6 dB Up	"STOP"+"LOCATOR"+"VOL. [v]" simultaneously

Cross Reference:

Signal Route (P.28)

Telephone Line Interface (P.15)

Auto Disconnect Circuit (P.16)

Parallel Connection Detect Circuit (P.17)

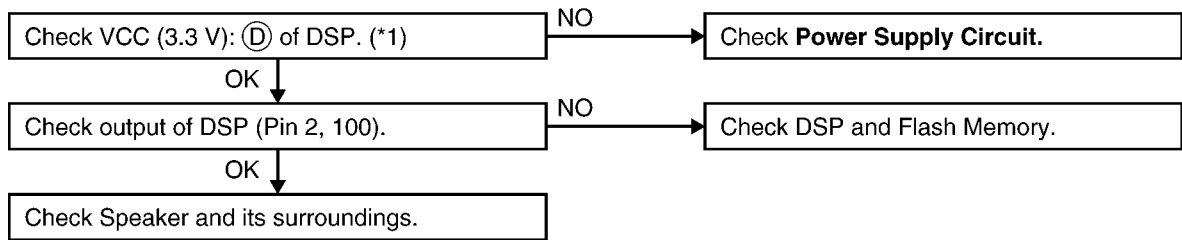
Note:

Flash Memory is IC601.

DSP is IC501.

10.1.3. Check Playback

BASE UNIT

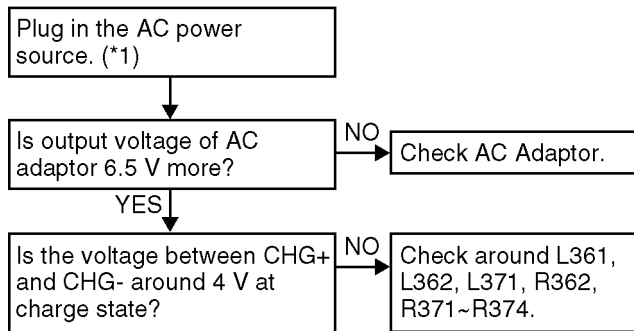


Cross Reference:
Power Supply Circuit (P.12)

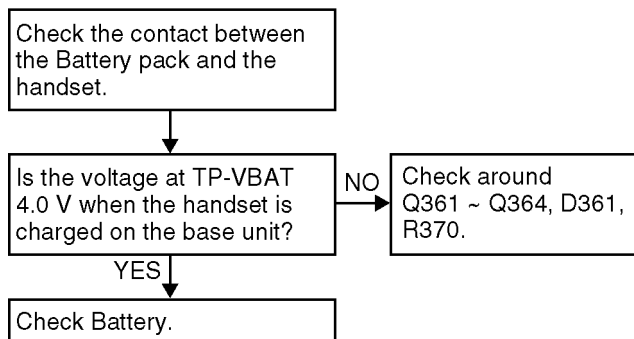
Note:
Flash Memory is IC601.
DSP is IC501.
(*1) Refer to **Circuit Board (Base Unit_Main)** (P.95).

10.1.4. Check Battery Charge

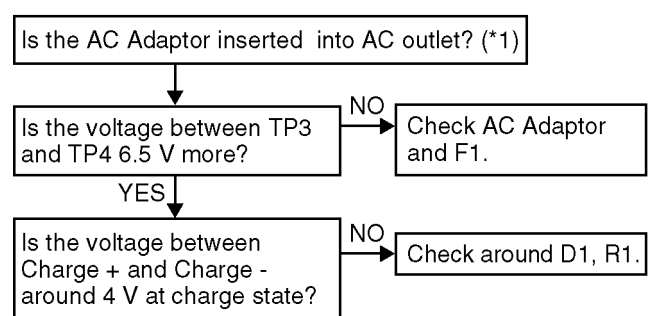
BASE UNIT



HANDSET



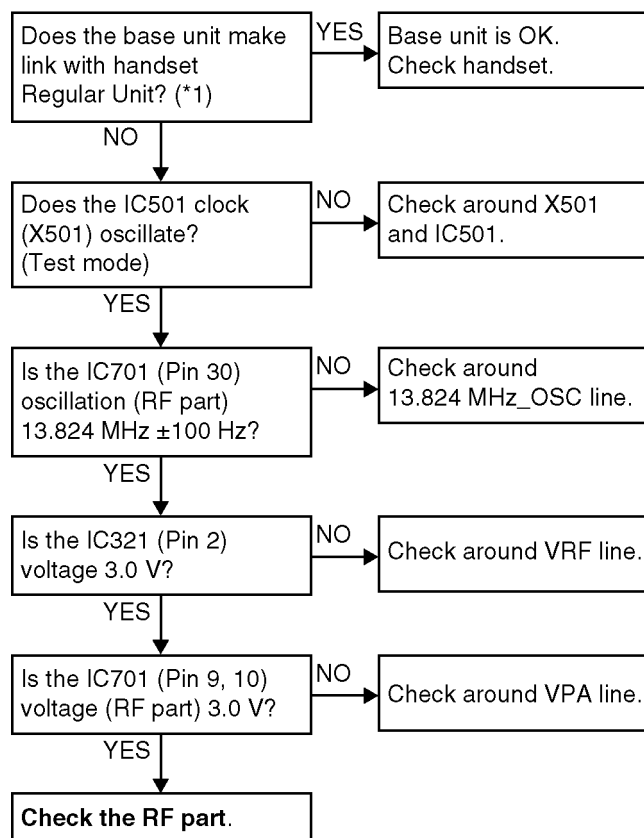
CHARGER UNIT



Note:
Flash Memory is IC601.
(*1) Refer to **Specifications** (P.6) for part number and supply voltage of AC adaptor.

10.1.5. Check Link

BASE UNIT

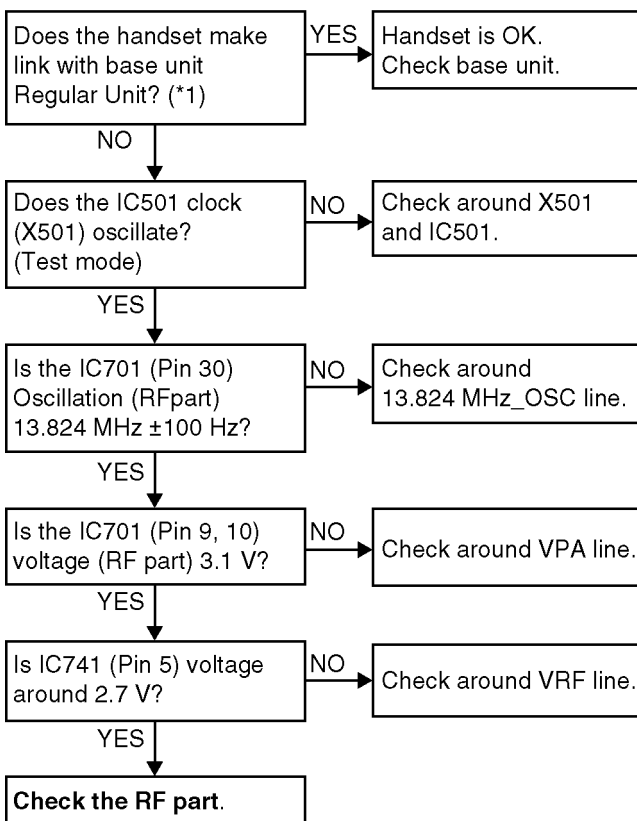


Note:

Flash Memory is IC601.
DSP is IC501.

(*1) Refer to **Finding out the Defective part** (P.57).

HANDSET



Cross Reference:

Check the RF part (P.57)

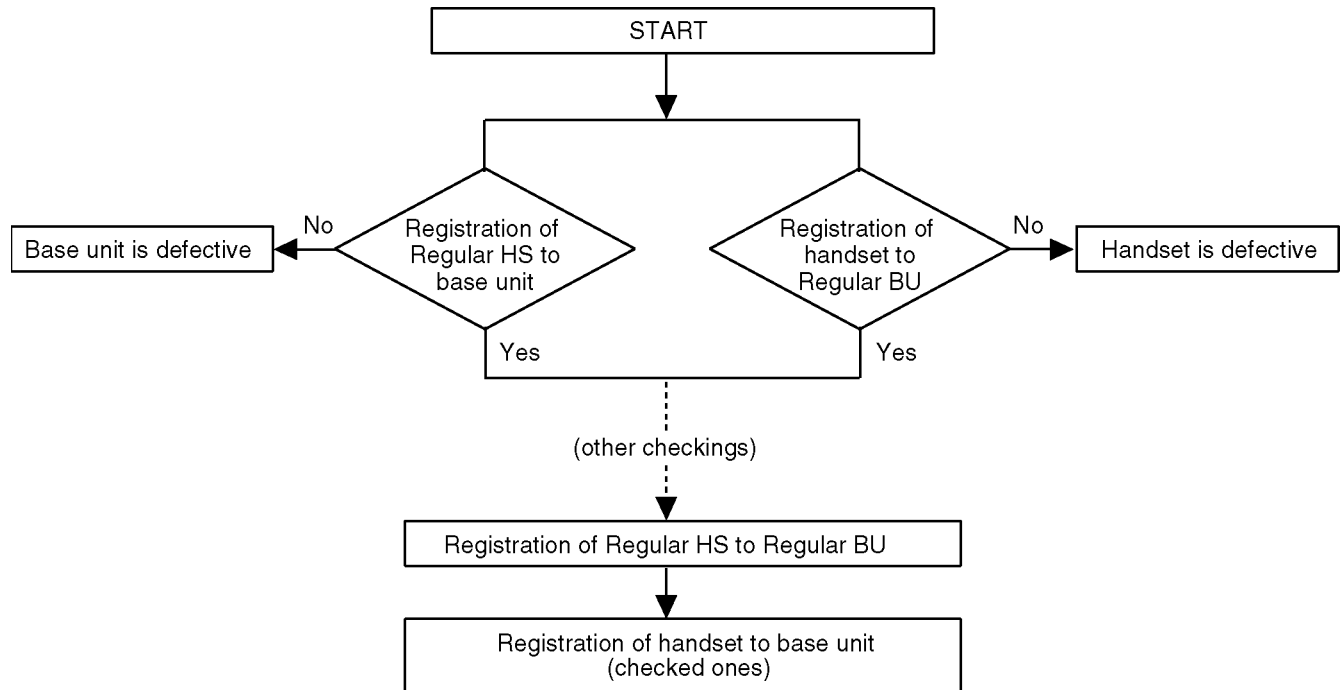
10.1.6. Check the RF part

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

10.1.6.1.1. Registering a Handset to a 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 [LOCATOR] for 4 seconds until the registration tone sounds.
 - If all registered handsets start ringing, press the same button to stop. Then repeat this step.
 - The next step must be completed within 90 seconds.
- 3 Handset:**
Press [OK], then wait until a long beep sounds.
- 4 [OFF]**

Note:

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

10.1.6.1.2. Deregistering a Handset

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

- 1 [MENU] → [⏏][1][3][1]**
- 2 [3][3][5] → [OK]**
- 3** Select the handset you want to cancel by pressing the desired handset number.
- 4 [▼]/[▲]: “Yes” → [SELECT]**

10.1.6.1.3. Deregistering All Handsets by the Base Unit

Base unit:

- 1** Connect the AC adaptor cord while pressing [LOCATOR/INTERCOM].
- 2** Press and hold [LOCATOR/INTERCOM] again until a long beep sounds.

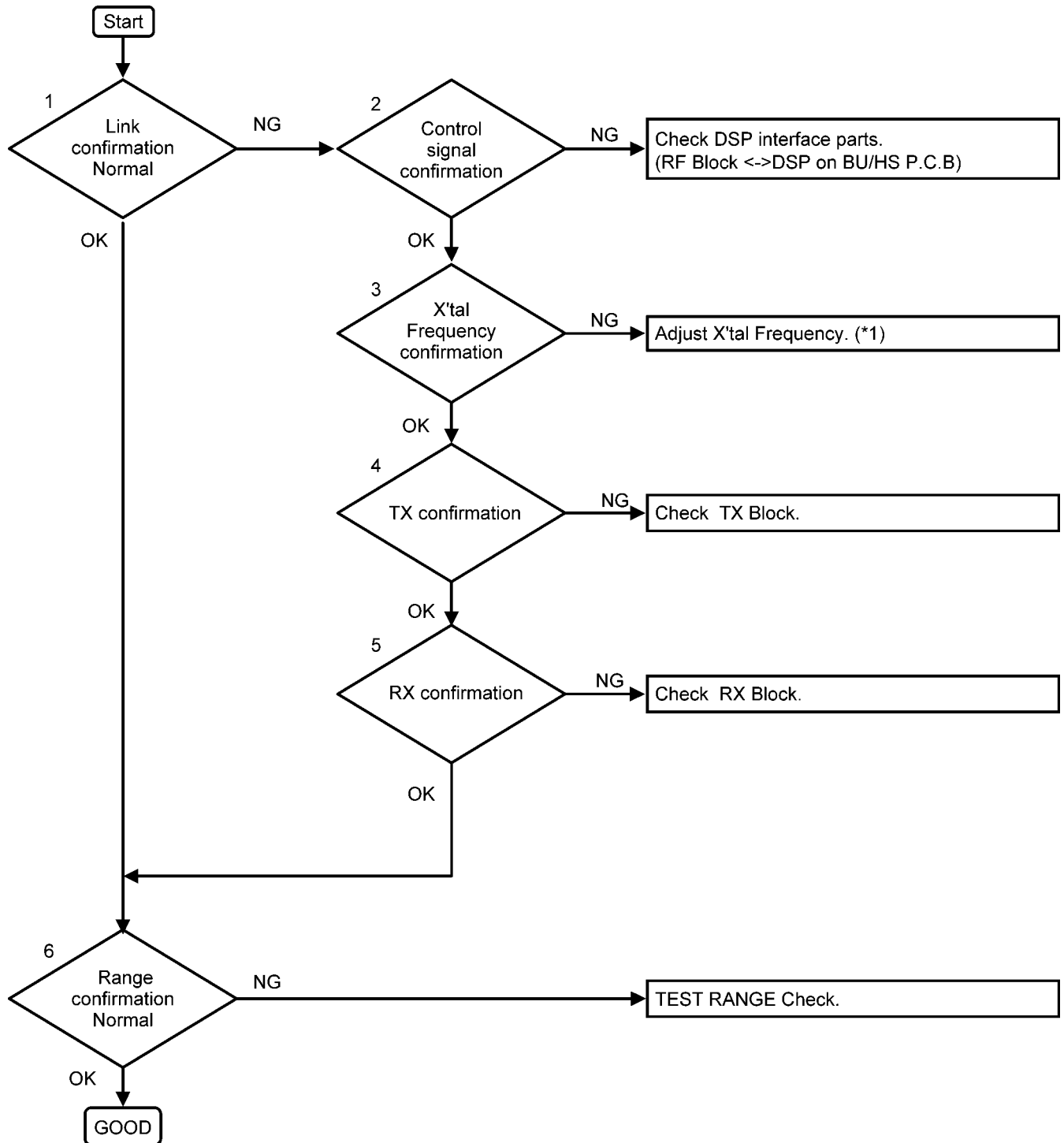
Important:

When deregistering all handsets by the base unit, the registration information of all handsets in the base unit is erased.

However the registration information in each handset will still remain.

10.1.6.2. RF Check Flowchart

Each item (1 ~ 6) of RF Check Flowchart corresponds to **Check Table for RF part** (P.60).
Please refer to the each item.



Note:

(*1) Refer to **Things to Do after Replacing IC or X'tal** (P.70).

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	Control signal confirmation HS, BU Mode: [Normal Mode] (*1)	Check DSP interface. (*2)	Check DSP interface. (*3) Check signal at power-on.
3	X'tal Frequency confirmation (*7) HS, BU Mode: [Adjustment] (*4)	Check X'tal Frequency. (13.824000 MHz \pm 100 Hz)	Check X'tal Frequency. (13.824000 MHz \pm 100 Hz)
4	TX confirmation Regular HS (BU) Mode: [Test RX Mode] BU (HS) Mode: [Test TX_Burst Mode]	1. Place Regular HS 15 cm away from a checked BU. 2. Confirm "TXDATA" waveform of BU (*6) and "RXDATA" waveform of Regular HS by Digital Oscilloscope.	1. Place Regular BU 15 cm away from a checked HS. 2. Confirm "TXDATA" waveform of HS (*5) and "RXDATA" waveform of Regular BU by Digital Oscilloscope.
5	RX confirmation Regular HS (BU) Mode: [Test TX_Burst Mode] BU (HS) Mode: [Test RX Mode]	1. Place Regular HS 15 cm away from a checked BU. 2. Confirm "RXDATA" waveform of BU (*6) and "TXDATA" waveform of Regular HS by Digital Oscilloscope.	1. Place Regular BU 15 cm away from a checked HS. 2. Confirm "RXDATA" waveform of HS (*5) and "TXDATA" waveform of Regular BU by Digital Oscilloscope.
6	Range Confirmation Normal HS, BU Mode: [Normal Mode]	1. Register Regular HS to BU (to be checked). 2. Press [Talk] key of the Regular HS to establish link. 3. Compare the range of the BU (being checked) with that of the Regular BU.	1. Register HS (to be checked) to Regular BU. 2. Press [Talk] key of the HS to establish link. 3. Compare the range of the HS (being checked) with that of the Regular HS.

Note:

 (*1)(*4) **Adjustment and Test Mode Flow Chart** (P.43)

 (*2)(*3) **RF-DSP Interface Signal Wave Form** (P.62)

 (*5) **Handset Reference Drawing** (P.72)

 (*6) **Base Unit Reference Drawing** (P.71)

 (*7) **Things to Do after Replacing IC or X'tal** (P.70)

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 Mode: [Test Link Mode] (*1)	1. Register Regular HS to BU (to be checked). 2. Set BU to "Test Link mode". 3. Set Regular HS to "Test Link mode". *Set TX Power and RX Sensitivity of the BU and the Regular HS by CHART1. * At distance of about 5 m between HS and BU, Link OK = TX Power of the BU is OK. No Link = TX Power of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set Regular BU to "Test Link mode". 3. Set HS to "Test Link mode". *Set TX Power and RX Sensitivity of the HS and the Regular BU by CHART1. * At distance of about 20 m between HS and BU, Link OK = TX Power of the HS is OK. No Link = TX Power of the HS is NG.
Range Confirmation RX TEST (RX sensitivity check) HS, BU Mode: [Test Link Mode] (*1)	1. Register Regular HS to BU (to be checked). 2. Set BU to "Test Link mode". 3. Set Regular HS to "Test Link mode". *Set TX Power and RX Sensitivity of the BU and Regular HS by CHART1. * At distance of about 5 m between HS and BU, Link OK= RX Sensitivity of the BU is OK. No Link = RX Sensitivity of the BU is NG.	1. Register HS (to be checked) to Regular BU. 2. Set Regular BU to "Test Link mode". 3. Set HS to "Test Link mode". * Set TX Power and RX Sensitivity of Checking_HS and Regular_BU by CHART1. * At distance of about 5 m between HS and BU, Link OK= RX Sensitivity of the HS is OK. No Link = RX Sensitivity of the HS is NG

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

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

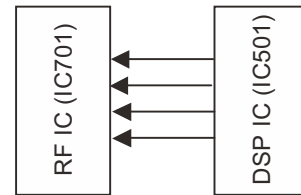
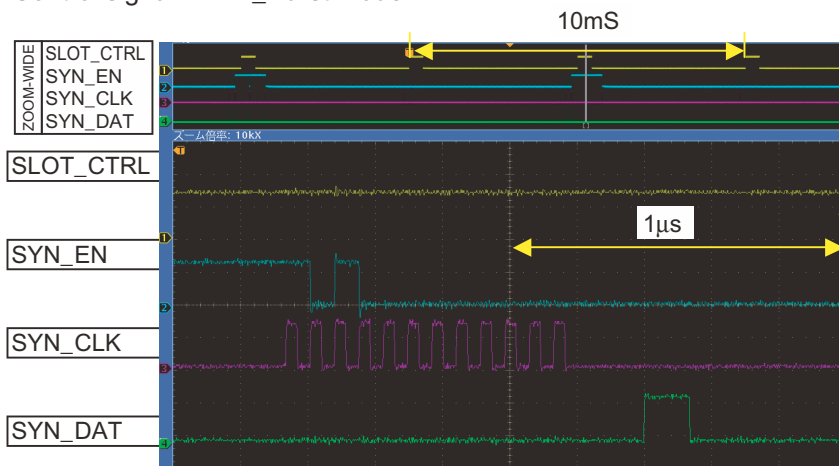
	HS (to be checked)		Regular_BU	
	TX Power	RX Sens.	TX Power	RX Sens.
HS (Handset) TX Power Check	High	High	High	High
HS (Handset) RX Sensitivity Check	High	High	Low	High

Note:

(*1) **Adjustment and Test Mode Flow Chart (P.43)**

10.1.6.5. RF-DSP Interface Signal Wave Form

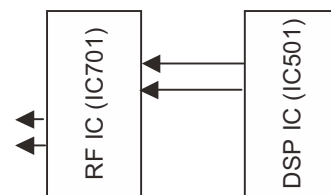
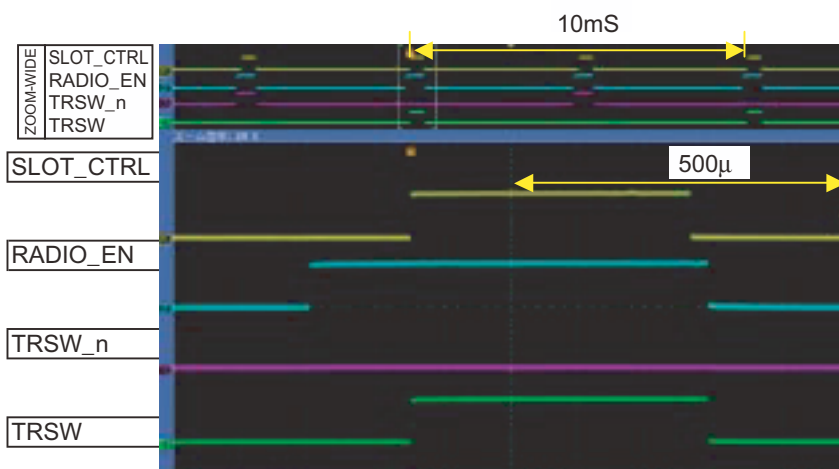
Control signal in TX_Burst mode



Pin Number

Signal	IC701	IC501	
	BS/HS	BS	HS
SLOT_CTRL	22	19	21
SYN_EN	25	28	30
SYN_CLK	24	29	31
SYN_DAT	23	30	32

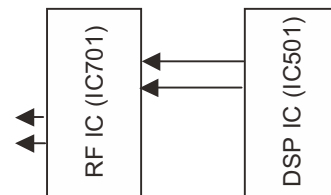
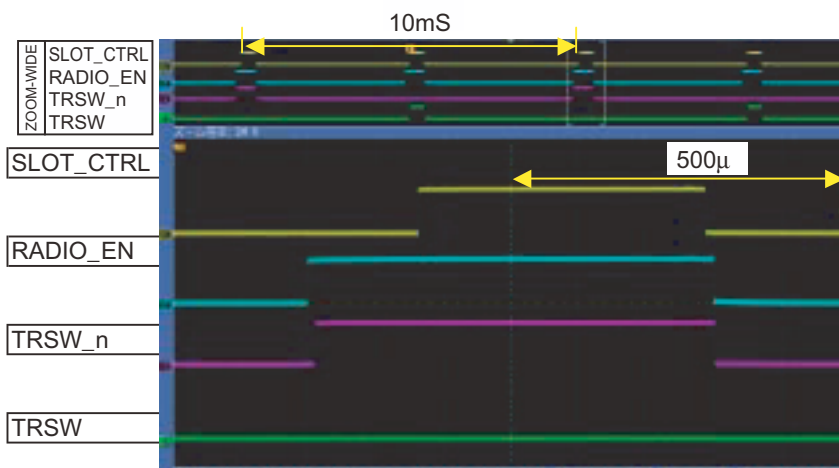
TRSW signal of TX zone in TX_Burst mode



Pin Number

Signal	IC701	IC501	
	BS/HS	BS	HS
SLOT_CTRL	22	19	21
RADIO_EN	21	24	26
TRSW_n	11	-	-
TRSW	6	-	-

TRSW signal of RX zone in TX_Burst mode



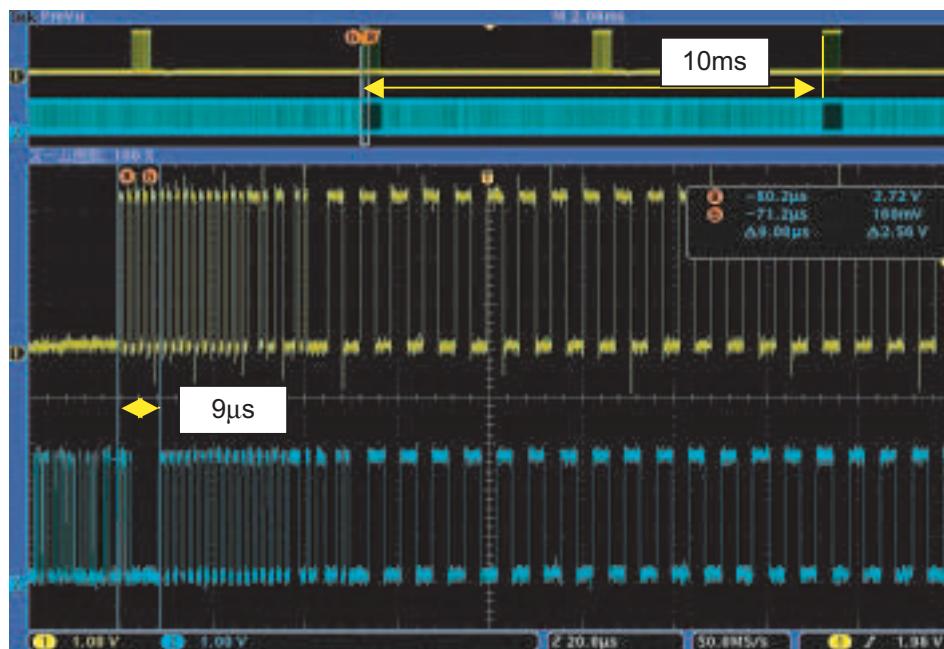
Pin Number

Signal	IC701	IC501	
	BS/HS	BS	HS
SLOT_CTRL	22	19	21
RADIO_EN	21	24	26
TRSW_n	11	-	-
TRSW	6	-	-

Handset RXDATA

Base Unit TXDATA

Handset RXDATA



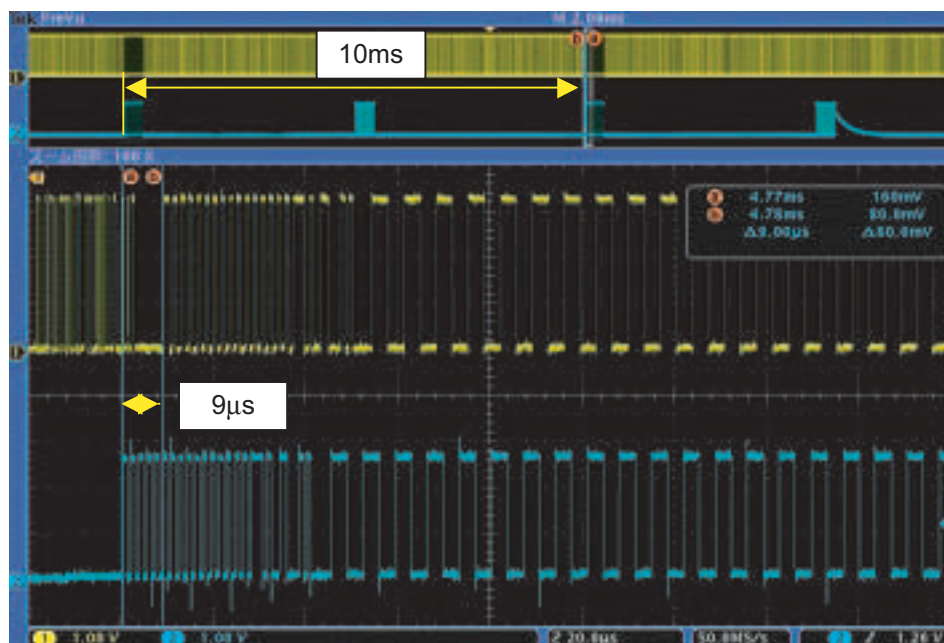
Handset TXDATA and Base unit RXDATA on TXO signal-line
(RX Confirmation of BS or TX confirmation of HS)

Base Unit RXDATA

Handset TXDATA

Base Unit RXDATA

Handset TXDATA



10.1.7. Check Handset Transmission

Check MIC of handset.



Check handset Tx in **Signal Route**.

Cross Reference:

Signal Route (P.28)

10.1.8. Check Handset Reception

Check speaker of handset.



Check handset Rx in **Signal Route**.

Cross Reference:

Signal Route (P.28)

Note:

When checking the RF part, Refer to **Check the RF part** (P.57).

10.1.9. Check Caller ID

BASE UNIT

Did bell ring?
(Message indicator
blinks)

NO

Check bell signal detection in
Telephone Line Interface.

YES

Check **Calling Line Identification (Caller ID)/
Call Waiting Caller ID**.

Cross Reference:

Telephone Line Interface (P.15)

Calling Line Identification (Caller ID)/Call Waiting Caller ID (P.18)

Note:

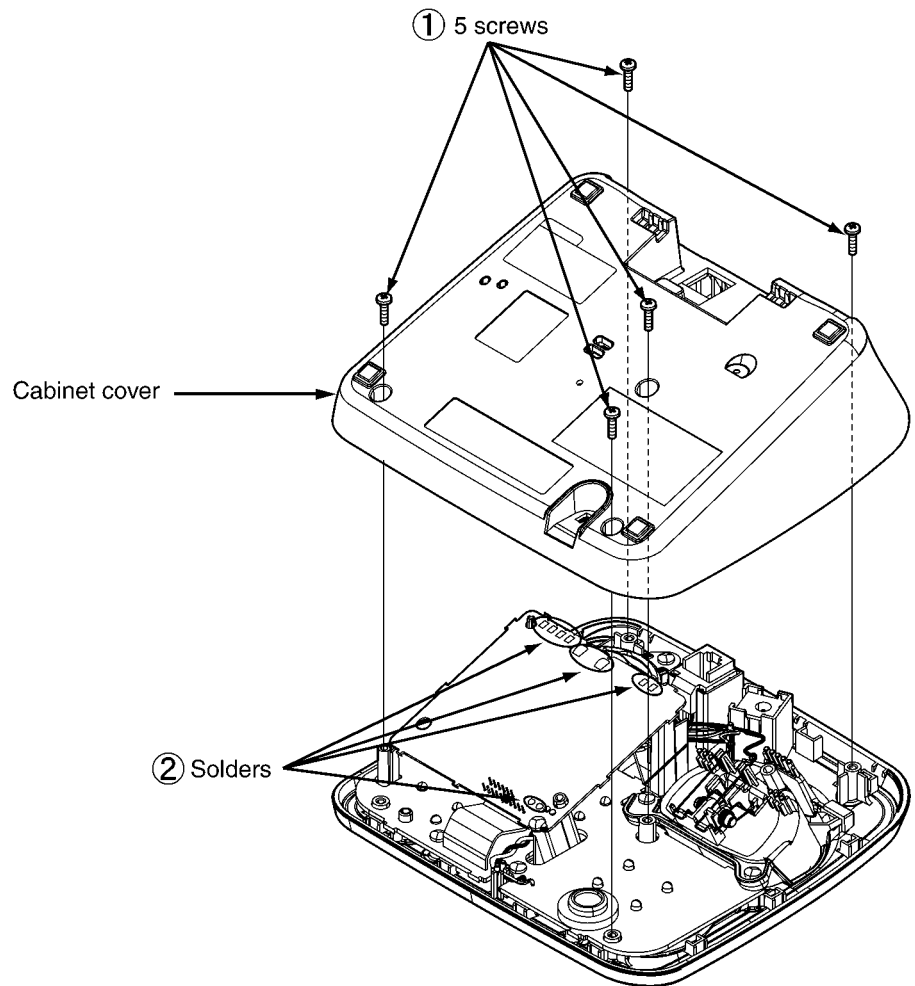
- Make sure the format of the Caller ID service of the Telephone company that the customer subscribes to.
- It is also recommended to confirm that the customer is really a subscriber of the service.

11 Disassembly and Assembly Instructions

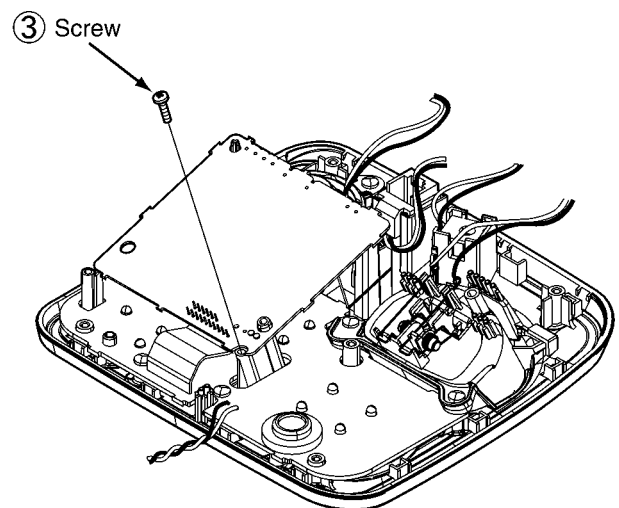
11.1. Disassembly Instructions

11.1.1. Base Unit

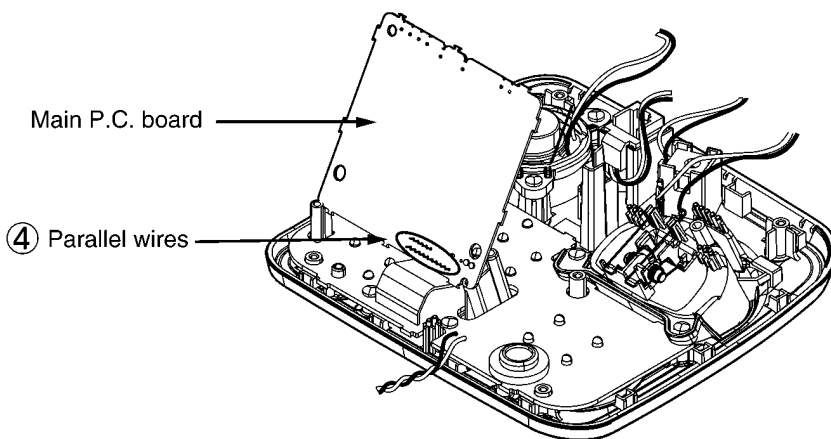
- ① Remove the 5 screws to remove the cabinet cover.
- ② Remove the solders.



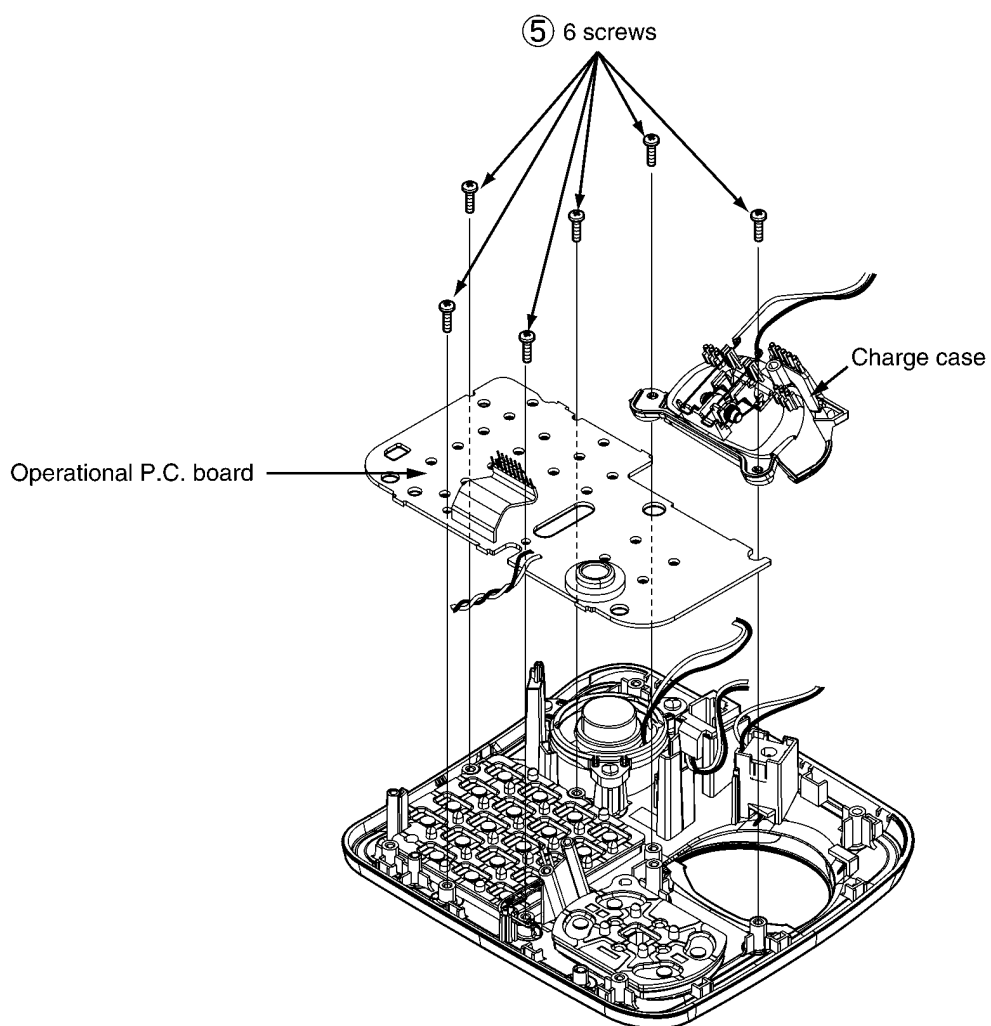
- ③ Remove the screw.



- ④ Remove the parallel wires to remove the main P.C. board.

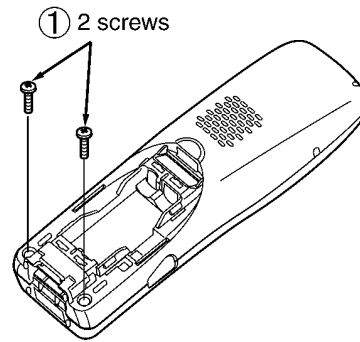


- ⑤ Remove the 6 screws to remove the charge case and the operational P.C. board.

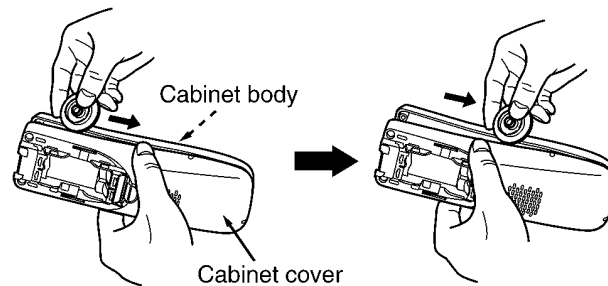


11.1.2. Handset

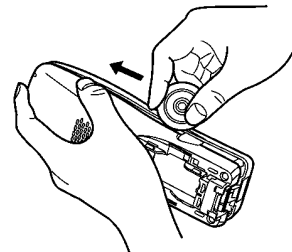
- ① Remove the 2 screws.



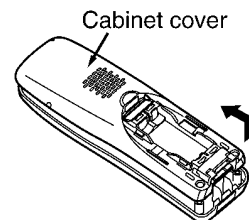
- ② Insert a JIG (PQDJ10006Y) between the cabinet body and the cabinet cover, then pull it along the gap to open the cabinet.



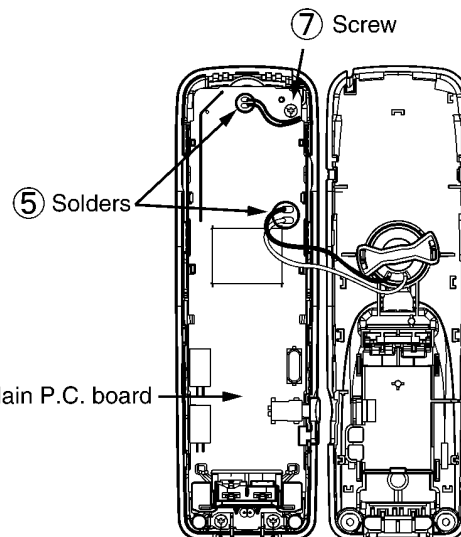
- ③ Likewise, open the other side of the cabinet.



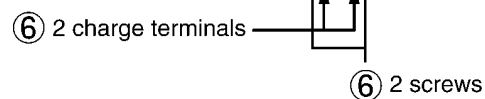
- ④ Remove the cabinet cover by pushing it upward.



- ⑤ Remove the solders.



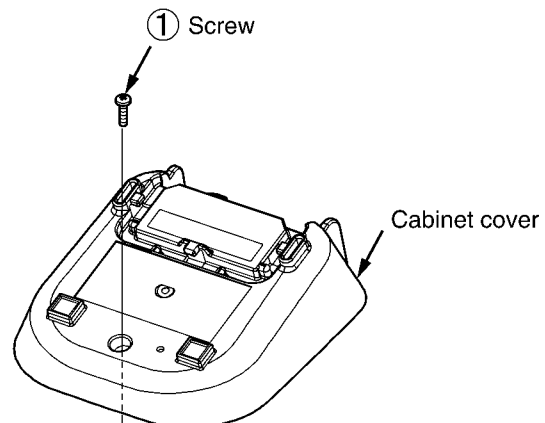
- ⑥ Remove the 2 screws to remove the 2 charge terminals.



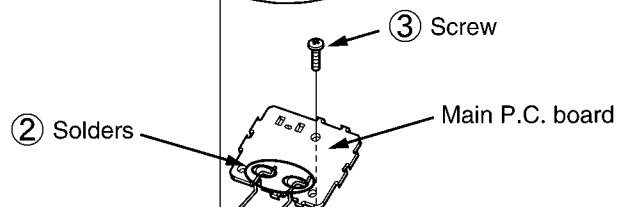
- ⑦ Remove the screw to remove the main P. C. board.

11.1.3. Charger Unit

- ① Remove the screw to remove the cabinet cover.

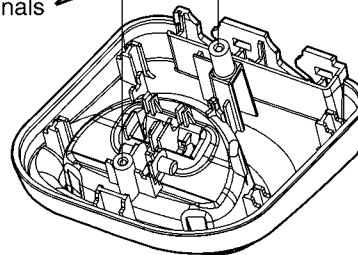


- ② Remove the solders to remove the 2 charge terminals.



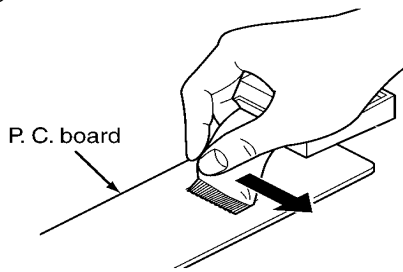
- ③ Remove the screw to remove the main P.C. board.

2 charge terminals



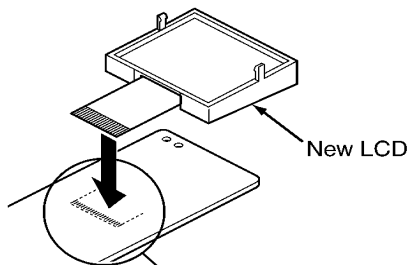
11.2. How to Replace the Handset LCD

①

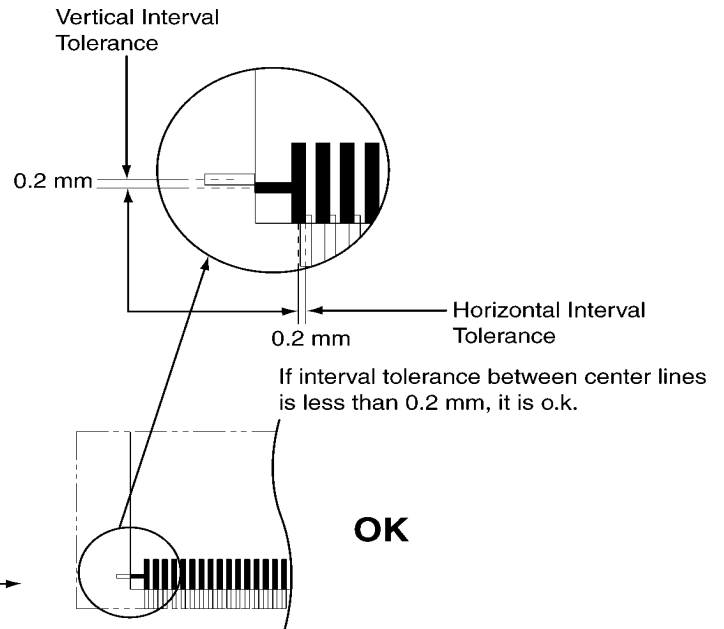


Peel off the FFC (Flexible Flat Cable) from the LCD, in the direction of the arrow. Take care to ensure that the foil on the P.C. board is not damaged.

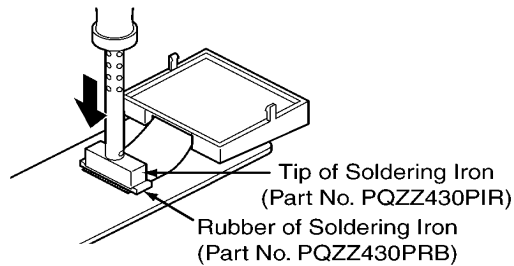
②



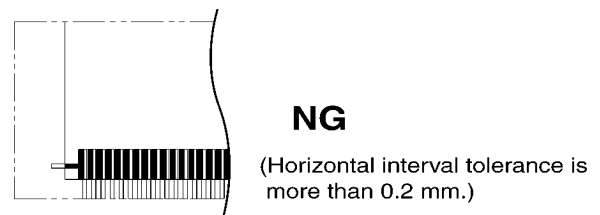
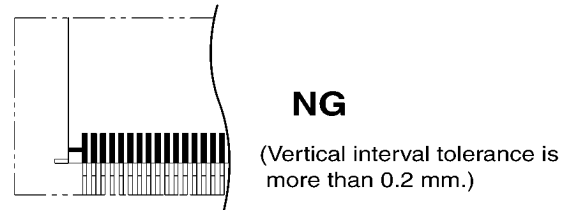
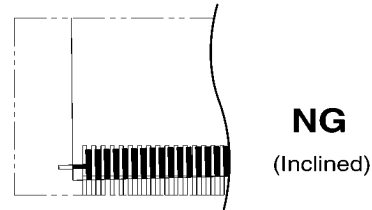
Fit the heatseal of a new LCD.



③



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



12 Measurements and Adjustments

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

12.1.1. Preparation

Equipment: Frequency counter

Check Point for measurement: BCK

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

12.1.2. Check and Adjust Frequency (Base Unit)

1. Set up base unit in TEST mode.
2. Press following keys in order to Adjust Crystal mode. [LOCATOR], [LOCATOR], [LOCATOR], [\wedge], [▶▶]. Check BCK frequency.
3. If the BCK frequency is out of the checking tolerance (\pm 100 Hz), adjust to Adjustment tolerance (\pm 30 Hz) by pressing [\wedge] or [▼] key.
Adjustment Tolerance: 13.824 MHz \pm 30 Hz
4. Press [LOCATOR] key to write the new frequency factor in Memory.
5. Turn the power off. Then this value is available.

Cross Reference:

Adjustment Mode for Base Unit (P.45)

12.1.3. Check and Adjust Frequency (Handset)

1. Set DC power supply to 2.6 V.
2. Set up handset in TEST mode (Adjustment flow).
3. Press [1] key to Adjust Crystal mode ("Clock Adj." is displayed on LCD). Check BCK frequency.
4. If the BCK frequency is out of the checking tolerance (\pm 100 Hz), adjust to Adjustment tolerance (\pm 30 Hz) by pressing [\blacktriangle] or [▼] key.
Adjustment Tolerance: 13.824 MHz \pm 30 Hz
5. Press [TALK] key to write the new frequency factor in EEPROM.
6. Turn the power off. Then this value is available.

Cross Reference:

Adjustment Mode for Handset (P.49)

12.1.4. Adjust Battery Low Detector Voltage (Handset)

After handset's DSP (IC501) or EEPROM (IC541) replacement, Re-writing Battery Low voltage to EEPROM is required.
With following handset Adjustment Flow, adjust DC power supply and DC voltmeter by the procedure below.

1. Set DC power supply to 2.6 V.
2. Set up handset in TEST mode (Adjustment flow).
3. Press [1] key and [OFF] key to Adjust Batt Low mode. ("Bat Adj." is displayed on LCD)
4. Change the voltage of the DC power supply to 2.34 V accurately. Check the voltage at P.C. board pads because some voltage drops occur due to the usage of long or thin cables.
5. Press [TALK] key twice to write voltage value in EEPROM.
6. Press [TALK] key twice to write charge value 1 in EEPROM.
7. Change the voltage of the DC power supply to 3.1 V accurately.
8. Press [TALK] key twice to write charge value 2 in EEPROM.
9. Change the voltage of the DC power supply to 3.6 V accurately.
10. Press [TALK] key twice to write primary battery detect value in EEPROM.
11. Turn the power off. Then this value is available.

Note:

Refer to **Handset Reference Drawing** (P.72) for connection of DC power supply and voltmeter.

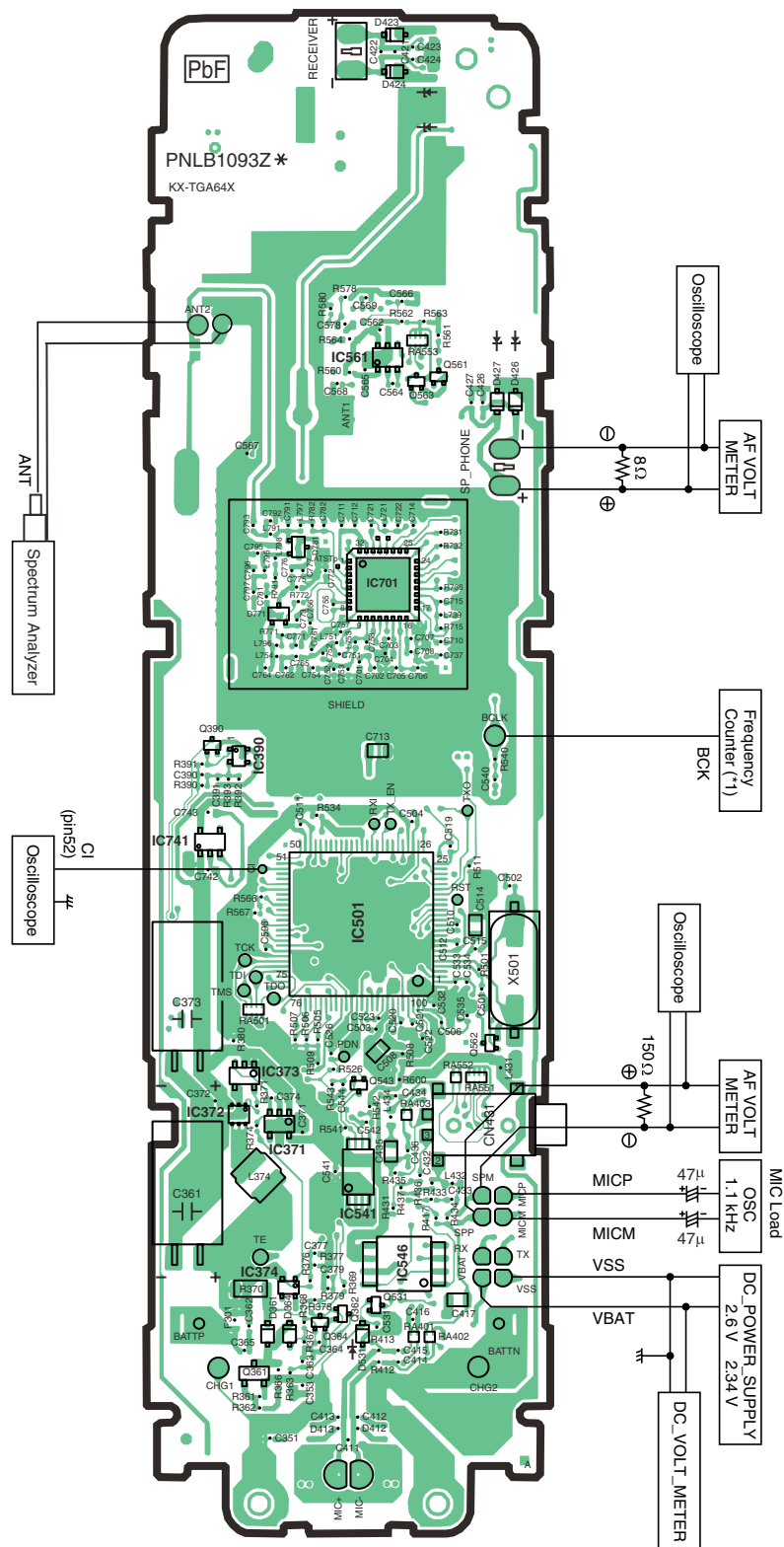
Cross Reference:

Adjustment Mode for Handset (P.49)

71

12.3. Handset Reference Drawing

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



Note:

(*1) is referred to No.3 of Check Table for RF part (P.60).

12.4. 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

13 Miscellaneous

13.1. CPU Data (Base Unit)

13.1.1. IC501

PIN	Description	I/O	High	High_Z	Low
1	GNDPA	GND	--	--	--
2	SPOUTP	A.O	--	--	--
3	BCLK	A.O	--	--	--
4	TXMOD	A.O	--	--	--
5	NC	A.I	--	--	--
6	XIN	A.I	--	--	--
7	XOUT	A.O	--	--	--
8	VDD	D.O	--	--	--
9	VCCIN	VCC	--	--	--
10	GND	GND	--	--	GND
11	Reset	D.I	Normal	--	Reset
12	FLASH_RST	*	High	Middle	Low
13	FLASH_SO	*	High	Middle	Low
14	FLASH_SI	*	High	Middle	Low
15	FLASH_CS	*	High	Middle	Low
16	NC	D.O	--	--	--
17	SYN_OUT	D.I	High	--	Low
18	TX_DATA	D.O	High	--	Low
19	SLOT_CTRL	D.O	High	--	Low
20	NC	D.O	--	--	--
21	NC	D.O	--	--	--
22	NC	D.O	--	--	--
23	NC	D.O	--	--	--
24	RADIO_EN	D.O	Active	--	Not
25	NC	D.O	--	--	--
26	GND	GND	--	--	GND
27	VCC	VCC	VCC	--	--
28	SYN_LE1	D.O	Not	--	Active
29	SYN_CLK	D.O	High	--	Low
30	SYN_DATA	D.O	High	--	Low
31	RXEN	D.O	Active	--	Off
32	TXEN	D.O	Active	--	Off
33	NC	D.O	--	--	--
34	RXI	D.I	High	--	Low
35	NC	D.O	--	--	--
36	NC	D.O	--	--	--
37	NC	D.O	--	--	--
38	RF_RST	D.O	Normal	--	WakeUp
39	NC	D.O	--	--	--
40	NC	D.O	--	--	--
41	NC	D.O	--	--	--
42	NC	D.O	--	--	--
43	NC	D.O	--	--	--
44	NC	D.O	--	--	--
45	NC	D.O	--	--	--
46	GND	GND	--	--	GND
47	VCC	VCC	VCC	--	--
48	NC(INT0)	D.I.O	--	--	--
49	FLASH_SCK	*	High	Middle	Low
50	NC	D.O	--	--	--
51	KEY_STB_E	D.O	Active	Not	--
52	KEY_STB_D	D.O	Active	Not	--
53	KEY_STB_C	D.O	Active	Not	--
54	KEY_STB_B	D.O	Active	Not	--
55	KEY_STB_A	D.O	--	--	--
56	NC	D.O	--	--	--
57	NC	D.O	--	--	--
58	BELL	D.I	OFF	--	ON
59	RLY	D.O	Off Hook	--	On Hook

PIN	Description	I/O	High	High_Z	Low
60	KEY_IN6	D.I	Non	--	Key In
61	KEY_IN5	D.I	Non	--	Key In
62	KEY_IN4	D.I	Non	--	Key In
63	KEY_IN3	D.I	Non	--	Key In
64	KEY_IN2	D.I	Non	--	Key In
65	KEY_IN1	D.I	Non	--	Key In
66	GND	GND	--	--	GND
67	VCC	VCC	VCC	--	--
68	TCK	D.O	--	--	--
69	TMS	D.I	--	--	--
70	TDI	D.O	--	--	--
71	TD0	D.O	--	--	--
72	SP_LED	D.O	--	Off	On
73	CHG_DET	D.O	Off Charge	--	On Charge
74	NC	D.O	--	--	--
75	NC	D.O	--	--	--
76	ANS_LED	D.I.O	--	Off	On
77	NC(INT1)	D.O	--	--	--
78	NC	D.O	--	--	--
79	NC	D.O	--	--	--
80	NC	D.O	--	--	--
81	UART_TX	D.O	High	--	Low
82	UART_RX	D.I	High	--	Low
83	MSG_LED	D.I.O	--	Off	On
84	GND	GND	--	--	GND
85	PDN	A.I	--	--	--
86	DCIN1	A.I	--	--	--
87	VREF	A.O	--	--	--
88	MIP	A.I	--	--	--
89	MIN	A.I	--	--	--
90	DCIN2	A.I	--	--	--
91	NC	A.I	--	--	--
92	GNDA	GND	--	--	--
93	HSMIP	A.I	--	--	--
94	HSMIN	A.I	--	--	--
95	VCCA	VCC	--	--	--
96	LIN0	A.I	--	--	--
97	LOUT0	A.O	--	--	--
98	NC	A.O	--	--	--
99	VCCPA	VCC	--	--	--
100	SPOUTN	A.O	--	--	--

Note:

- The mark "*" in the I/O column means the port is controlled by the firmware.

13.2. CPU Data (Handset)

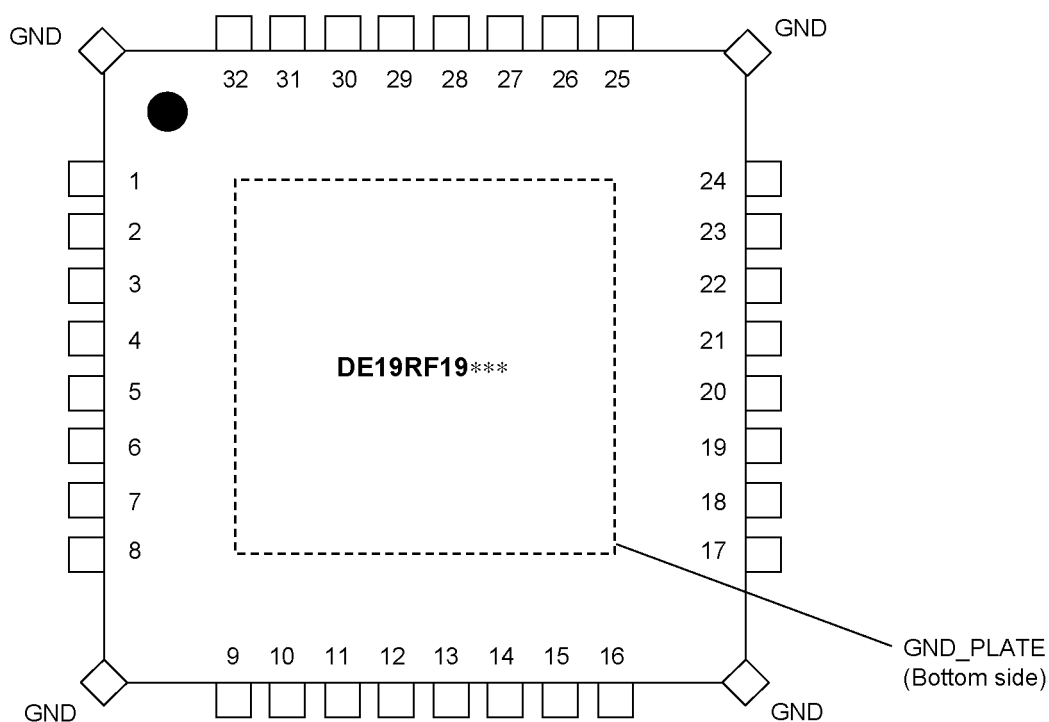
13.2.1. IC501

PIN	Description	I/O	High	High_Z	Low
1	GND1(GNDPA)	GND	--	--	--
2	SPP2	A.O	--	--	--
3	BCLK	A.O	--	--	--
4	(NC)	-	--	--	--
5	XIN	A.I	--	--	--
6	XOUT	A.O	--	--	--
7	VDD	VDD	--	--	--
8	VCCIN	VCC	--	--	--
9	GND2	GND	--	--	--
10	GND3	GND	--	--	--
11	GND4	A.I	--	--	--
12	GND5	A.O	--	--	--
13	RST	A.O	Nonactive	--	Active
14	(FL_RST)	D.O	Active	--	--
15	(FL_SO)	D.O	--	--	--
16	(FL_DI)	D.O	--	--	--
17	(FL_CS)	D.O	--	--	--
18	(NC)	D.O	--	--	--
19	SYN_OUT	D.I	--	--	--
20	TX_DATA	D.O	--	--	--
21	SLOT_CTRL	D.O	--	--	--
22	(NC)	D.O	--	--	--
23	RF_POWER	D.O	--	--	--
24	(NC)	D.O	--	--	--
25	RF_RSTN	D.O	Active	--	Nonactive
26	RADIO_EN	D.O	--	--	--
27	HEAD_DET	D.I	Nonactive	--	Active
28	GND6	GND	--	--	--
29	VCC1	VCC	--	--	--
30	SYN_LE	D.O	--	--	--
31	SYN_CLK	D.O	--	--	--
32	SYN_DATA	D.O	--	--	--
33	(NC)	D.O	--	--	--
34	TX_EN	D.O	Active	--	Nonactive
35	KEY_BL_LED	D.O	Active	--	--
36	RX_DATA	D.I	--	--	--
37	(NC)	D.I	--	--	--
38	CHG_DET	D.I	Nonactive	--	Active
39	(NC)	D.I	--	--	--
40	LCD_BACK_LIGHT	D.O	Active	--	Nonactive
41	(NC)	D.O	--	--	--
42	CHG_CTL	D.O	Active	Nonactive	--
43	(NC)	D.O	--	--	--
44	(NC)	D.O	--	--	--
45	(NC)	D.O	--	--	--
46	SCL	D.O	--	--	--
47	SID	D.O	--	--	--
48	GND7	GND	--	--	--
49	VCC2	VCC	--	--	--
50	RESET	D.O	Nonactive	--	Active
51	(FL_CLK)	D.O	--	--	--
52	CI	D.O	--	--	--
53	(NC)	D.O	--	--	--
54	(NC)	D.O	--	--	--
55	ANT_LED	D.O	Active	--	Nonactive
56	A0	D.O	--	--	--
57	(NC)	D.O	--	--	--
58	(NC)	D.O	--	--	--
59	LCD_POWER	D.O	Active	--	Nonactive
60	(NC)	D.O	--	--	--
61	CS1	D.O	--	--	--
62	(NC)	D.O	--	--	--

PIN	Description	I/O	High	High_Z	Low
63	KEYSTROBE_E	D.O	--	Nonactive	Active
64	KEYSTROBE_D	D.O	--	Nonactive	Active
65	KEYSTROBE_C	D.O	--	Nonactive	Active
66	KEYSTROBE_B	D.O	--	Nonactive	Active
67	KEYSTROBE_A	D.O	--	Nonactive	Active
68	GND8	GND	--	--	--
69	VCC3	VCC	--	--	--
70	TEST_CLK	D.I	--	--	--
71	TEST_MODE_SELECT	D.I	--	--	--
72	TEST_DATA_IN	D.I	--	--	--
73	TEST_DATA_OUT	D.O	--	--	--
74	KEYIN_1	D.I	Nonactive	--	Active
75	KEYIN_2	D.I	Nonactive	--	Active
76	KEYIN_3	D.I	Nonactive	--	Active
77	KEYIN_4	D.I	Nonactive	--	Active
78	KEYIN_5	D.I	Nonactive	--	Active
79	FB1	D.O	--	--	--
80	FB2	D.O	--	--	--
81	EEPROM_CLK	D.O	--	--	--
82	EEPROM_DATA	D.I.O	--	--	--
83	UART_TX	D.O	--	--	--
84	UART_RX	D.I	--	--	--
85	EEPROM_WP	D.O	Active	--	Nonactive
86	GND9	GND	--	--	--
87	PDN	A.I	--	--	--
88	IBAT1	A.I	--	--	--
89	VREF	A.O	--	--	--
90	MIP	A.I	--	--	--
91	MIN	A.I	--	--	--
92	MICBIAS	A.I	--	--	--
93	GND10 (GNDA)	GND	--	--	--
94	VCCA	VCC	--	--	--
95	HS_MIC_IN	A.I	--	--	--
96	IBAT2	A.I	--	--	--
97	SPP1	A.O	--	--	--
98	SPN	A.O	--	--	--
99	VCC4 (VCCPA)	VCC	--	--	--
100	SP_OUT_N	A.O	--	--	--

13.3. Explanation of IC Terminals (RF Part)

13.3.1. IC701



Pin	Description	I/O
1	VCC_VCO	VCC
2	PAEN	O
3	ATST_p	O
4	ATST_n	O
5	ANT_n	O
6	TRSW	O
7	RXp	I
8	RXn	I
9	TX_p	O
10	TX_n	O
11	TRSW_n	O
12	ANT	O
13	VCC_FE	VCC
14	VDD_IF	VCC
15	VCC_IF	VCC
16	VDD_DIG_b	VCC
17	VCC_DIG	VCC

Pin	Description	I/O
18	RSTN	I
19	VCC_IO	VCC
20	TR_DATA	I/O
21	RADIOEN	I
22	SLOT_CTRL	I
23	SYN_DAT	I
24	SYN_CLK	I
25	SYN_EN	I
26	SYN_OUT	O
27	VDD_DIG_t	VCC
28	DTEST	O
29	DTST1	O
30	REF_IN	I
31	VCC_DIV	VCC
32	VCC_PLL	VCC
GND_PLATE		GND

13.4. How to Replace the Flat Package IC

13.4.1. Preparation

- PbF (: Pb free) Solder
- Soldering Iron

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

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

- Flux

Recommended Flux: Specific Gravity → 0.82.

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

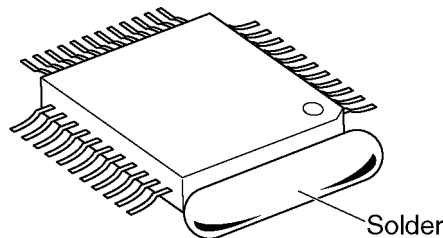
Note: See **About Lead Free Solder (PbF: Pb free)** (P.4).

13.4.2. How to Remove the IC

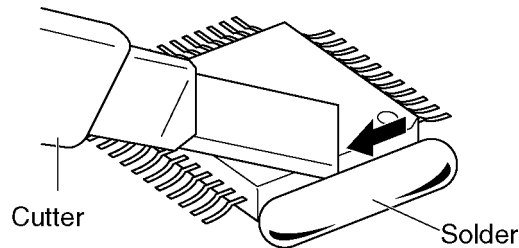
1. Put plenty of solder on the IC pins so that the pins can be completely covered.

Note:

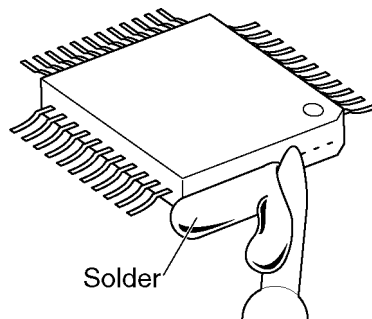
If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



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



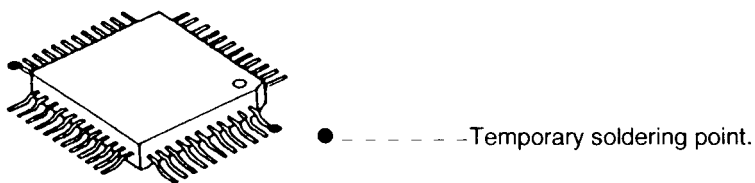
3. While the solder melts, remove it together with the IC pins.



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.

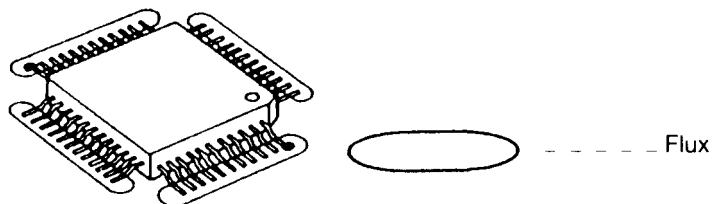
13.4.3. How to Install the IC

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

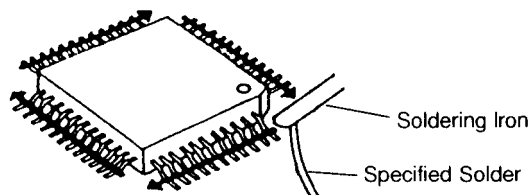


*Check the accuracy of the IC setting with the corresponding soldering foil.

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

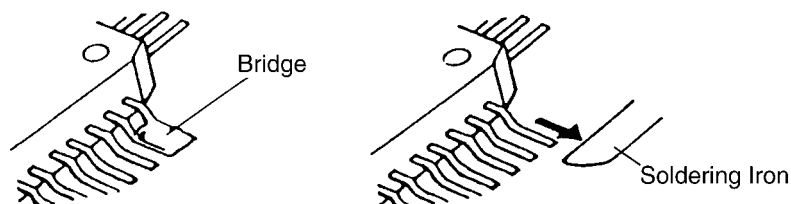


3. Solder the pins, sliding the soldering iron in the direction of the arrow.



13.4.4. 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.



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

13.5.1. 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)

13.5.2. Caution

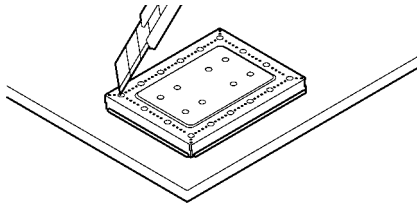
- To replace the IC efficiently, choose the right sized nozzle of the hot air desoldering tool that matches the IC package.
- Be careful about the temperature of the hot air desoldering tool not to damage the PCB and/or IC.

13.5.3. How to Remove the Shield Case

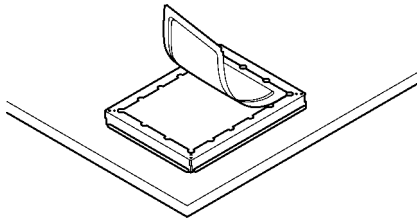
Note:

If you don't have special tools (ex. Hot air disordering tool), conduct the following operations.

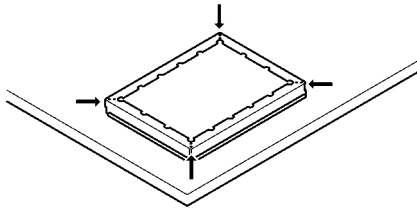
1. Cut the case along perforation.



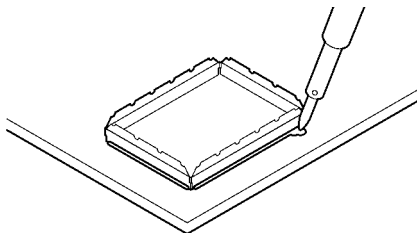
2. Remove the cut part.



3. Cut the four corners along perforation.



4. Remove the remains by melting solder.

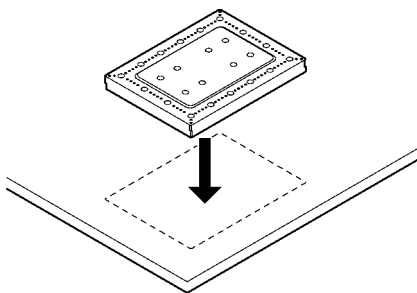


13.5.4. How to Install the Shield Case

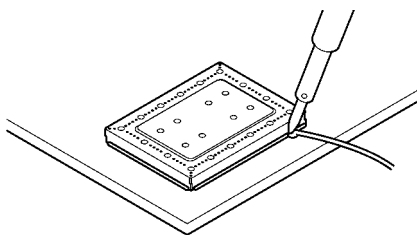
Note:

- If you don't have special tools (ex. Hot air disordering tool), conduct the following operations.
- Shield case's No. : PNMC1014Z

1. Put the shield case.

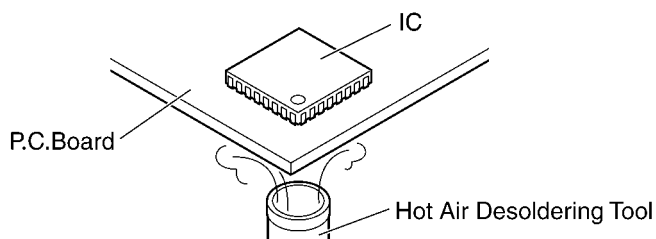


2. Solder the surroundings.



13.5.5. How to Remove the IC

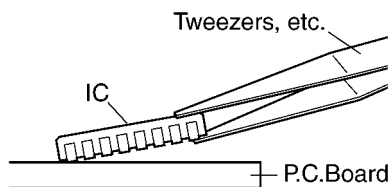
1. Heat the IC with a hot air desoldering tool through the P.C.Board.



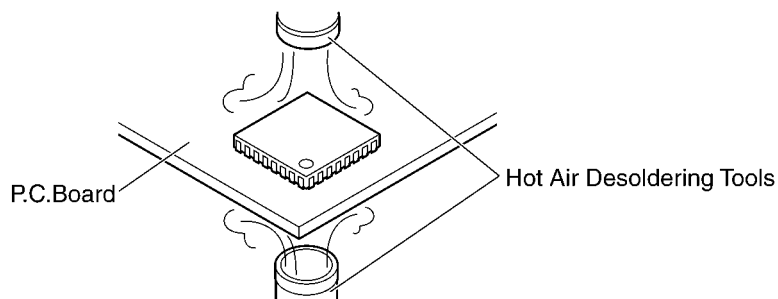
2. Pick up the IC with tweezers, etc. when the solder is melted completely.

Note:

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



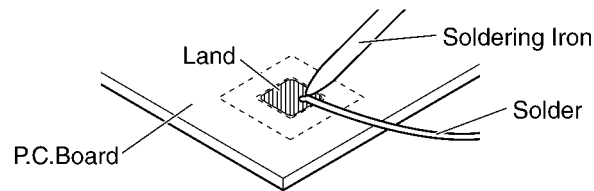
When it is hard to melt the solder completely, heat it with a hot air desoldering tool through the IC besides through the P.C.Board.



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

13.5.6. How to Install the IC

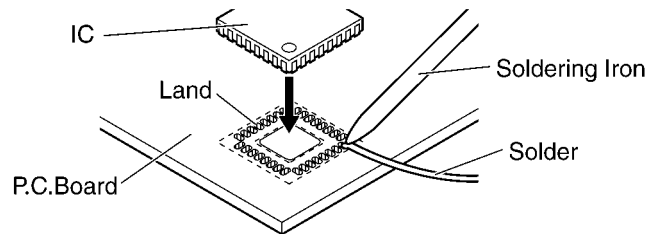
1. Place the solder a little on the land where the radiation GND pad on IC bottom is to be attached.



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

Note:

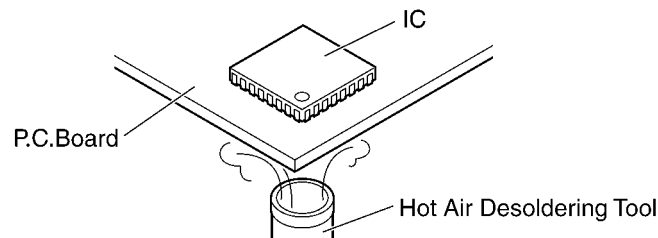
- When placing the IC, the positioning should be done very carefully.



3. Heat the IC with a hot air desoldering tool through the P.C.Board until the solder on IC bottom is melted.

Note:

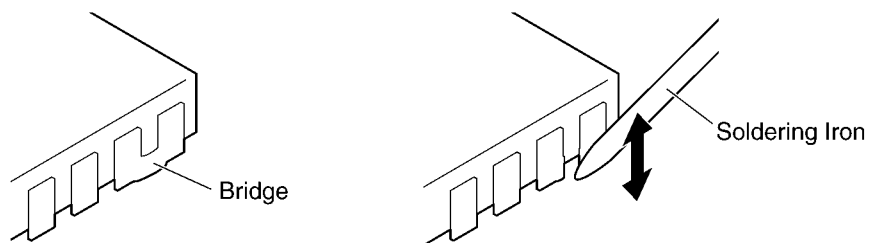
- Be sure to place it precisely, controlling the air volume of the hot air desoldering tool.



4. After soldering, confirm there are no short and open circuits with visual inspection.

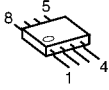
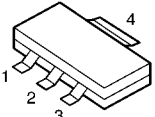
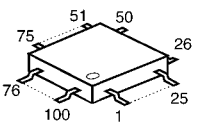
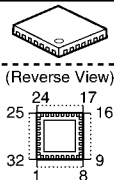
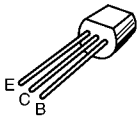
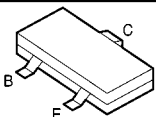
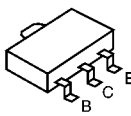
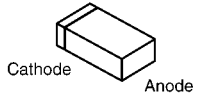
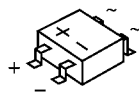
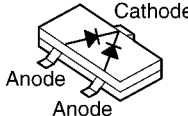
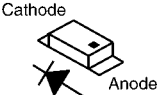
13.5.7. How to Remove a Solder Bridge

When a Solder Bridge is found after soldering the bottom of the IC, remove it with a soldering iron.

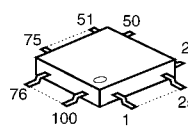
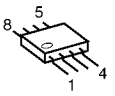
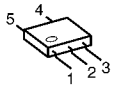
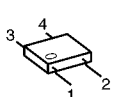
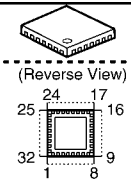
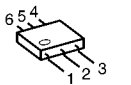
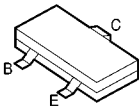
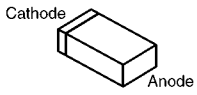
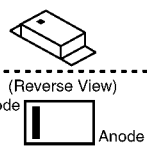
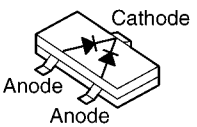


13.6. Terminal Guide of the ICs, Transistors and Diodes

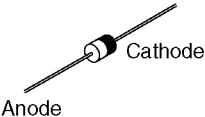
13.6.1. Base Unit

 <p>PNWITG6441TH C0DBFGD00017</p>	 <p>C0CBAYG00016</p>	 <p>C2HBBY000101</p>	 <p>(Reverse View) C1CB00003088</p>	 <p>B1ACGP000008</p>
 <p>UNR92A2J0L 2SB1218A PQVTBF822T7 2SC6054JSL</p>	 <p>2SD0874AS</p>	 <p>Cathode Anode MA111, MANV250GEL, B0JCME000035 MA8220, B0ECKM000008, MAZ805100L</p>	 <p>PQVDMD5S</p>	
 <p>B0DDCD000001</p>	 <p>PQVDBR1111C</p>			

13.6.2. Handset

 <p>C2HBBY000102</p>	 <p>PNWITGA641TR</p>	 <p>C0DBGYY00297 C0CBCAC00252 C0DBAYY00067</p>	 <p>C0EBD0000355</p>	 <p>(Reverse View) C1CB00003088</p>
 <p>C0DBZHA00012 MTM767200LBF</p>	 <p>B1ADGE000004, 2SC6054JSL UNR921MJ0L, UNR921EJ0L UNR9215J0L, UNR92AVJ0L</p>	 <p>Cathode Anode MA8043L MA2ZD0200L</p>	 <p>(Reverse View) Cathode Anode B3ACB0000216</p>	
 <p>B0DDCD000001</p>				

13.6.3. Charger Unit

 <p>Anode Cathode BOJAME000095</p>

14 Schematic Diagram

14.1. For Schematic Diagram

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

14.1.1.1. Acoustic Testing Mode

Press “STOP”, “▶▶” and “▶” simultaneously, and insert the plug of AC adaptor.
It is easier to measure the transmit level with acoustic testing mode.

Notes:

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

Important Safety Notice:

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

2. 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.

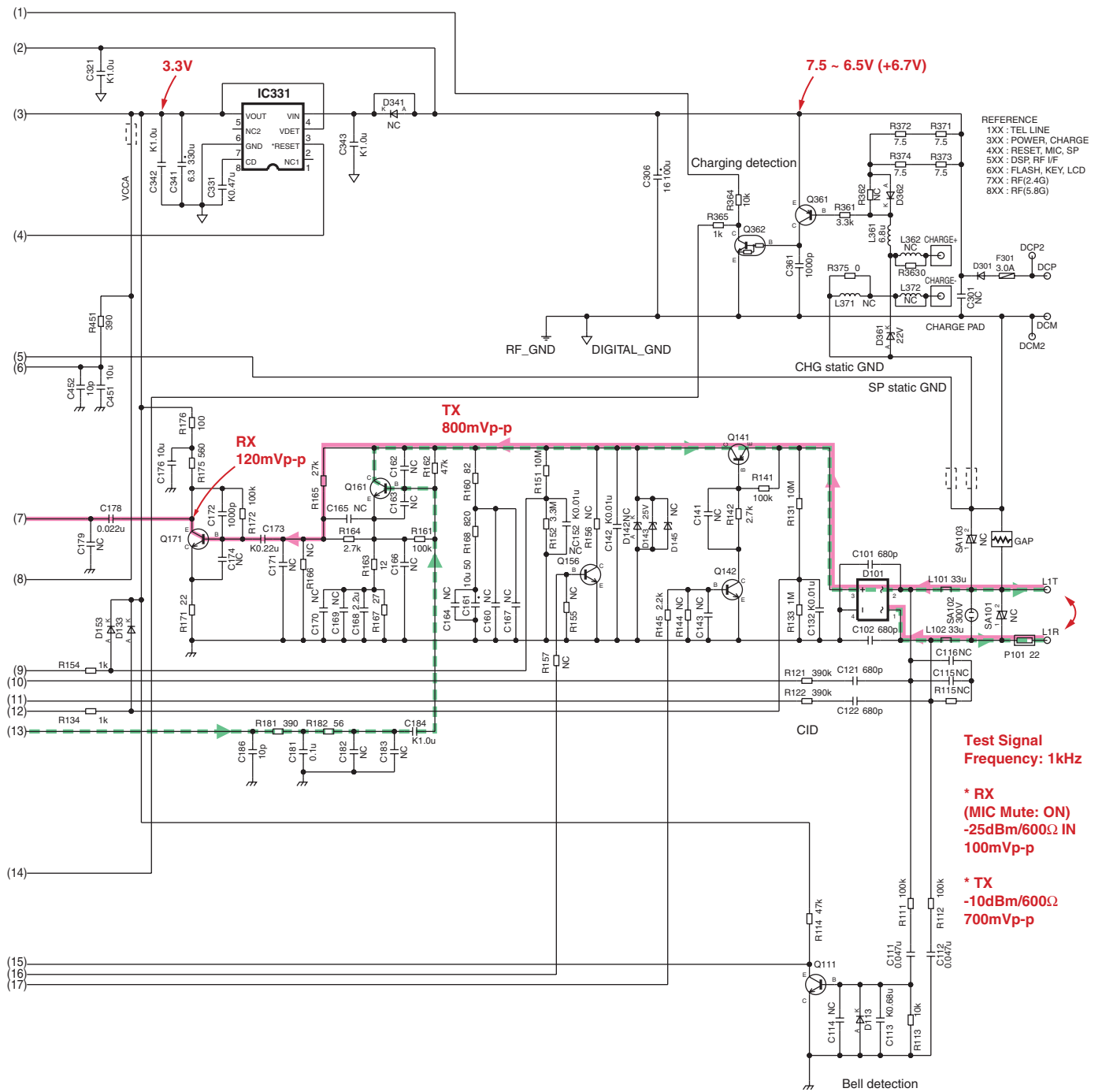
Important Safety Notice:

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

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



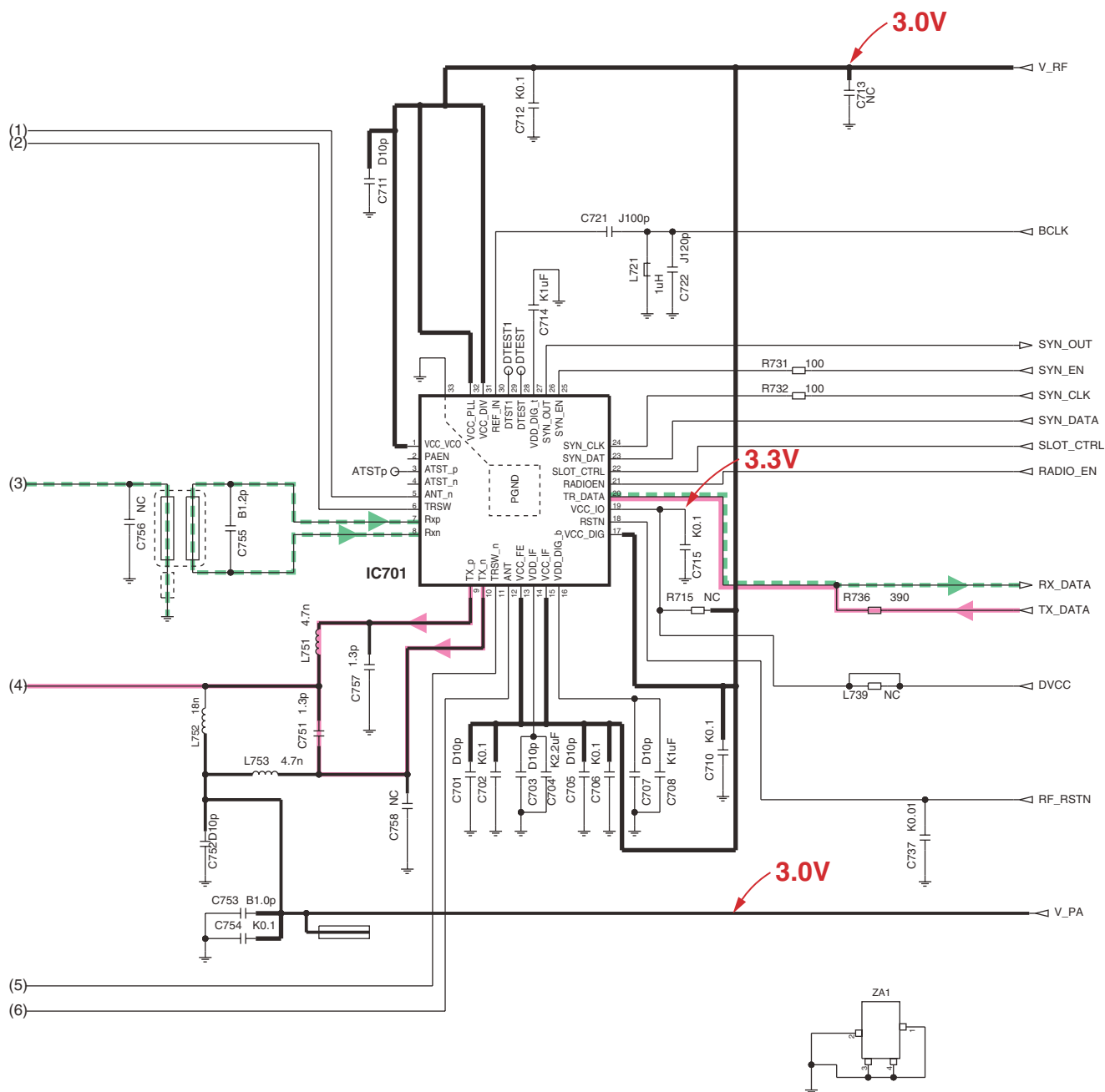
Operation unit interface



NC: No Components

KX-TG6441/6442/6443/6444/6445 SCHEMATIC DIAGRAM (Base Unit_Main)

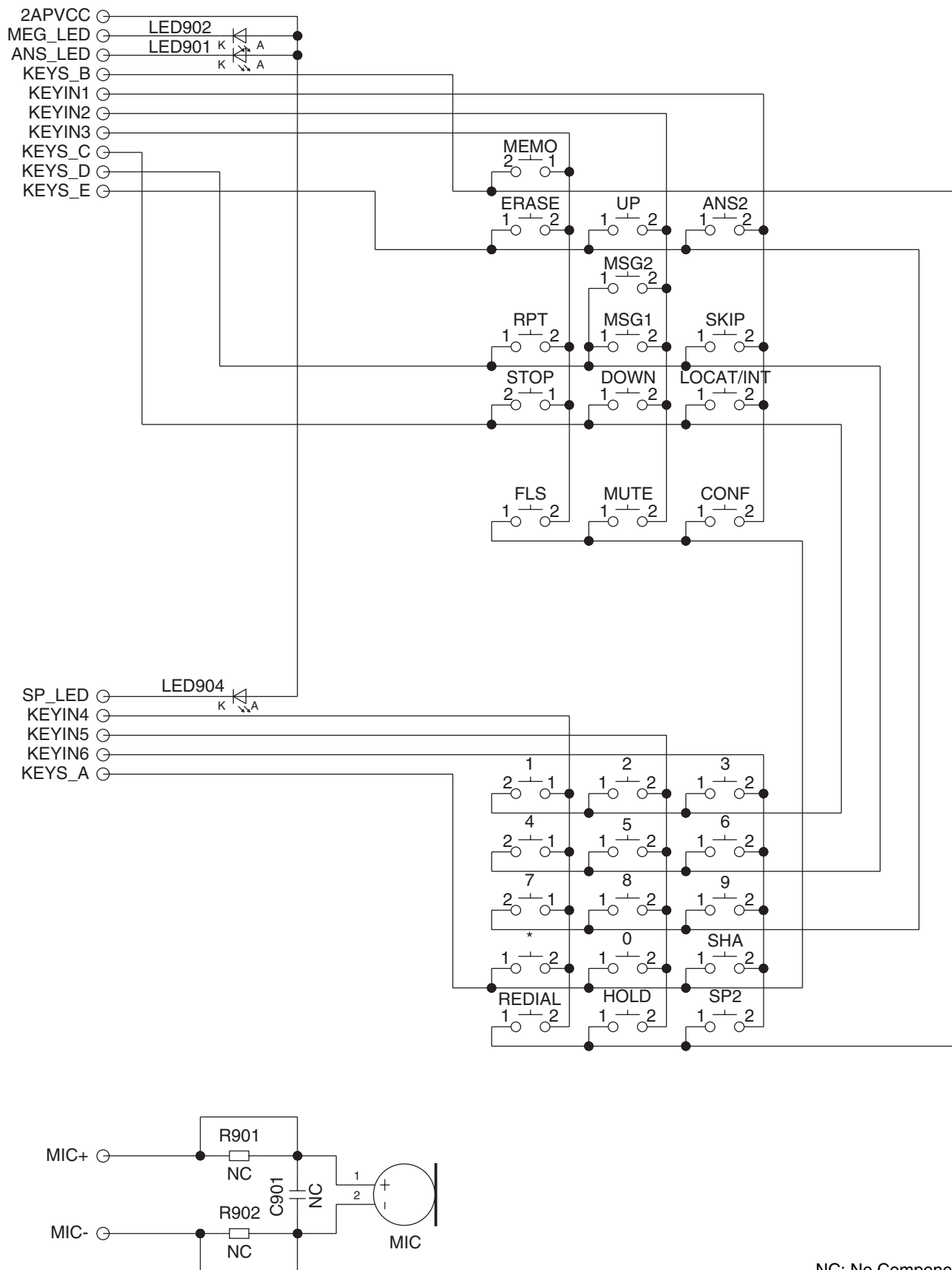




NC: No Components

KX-TG6441/6442/6443/6444/6445 SCHEMATIC DIAGRAM (Base Unit_RF Part)

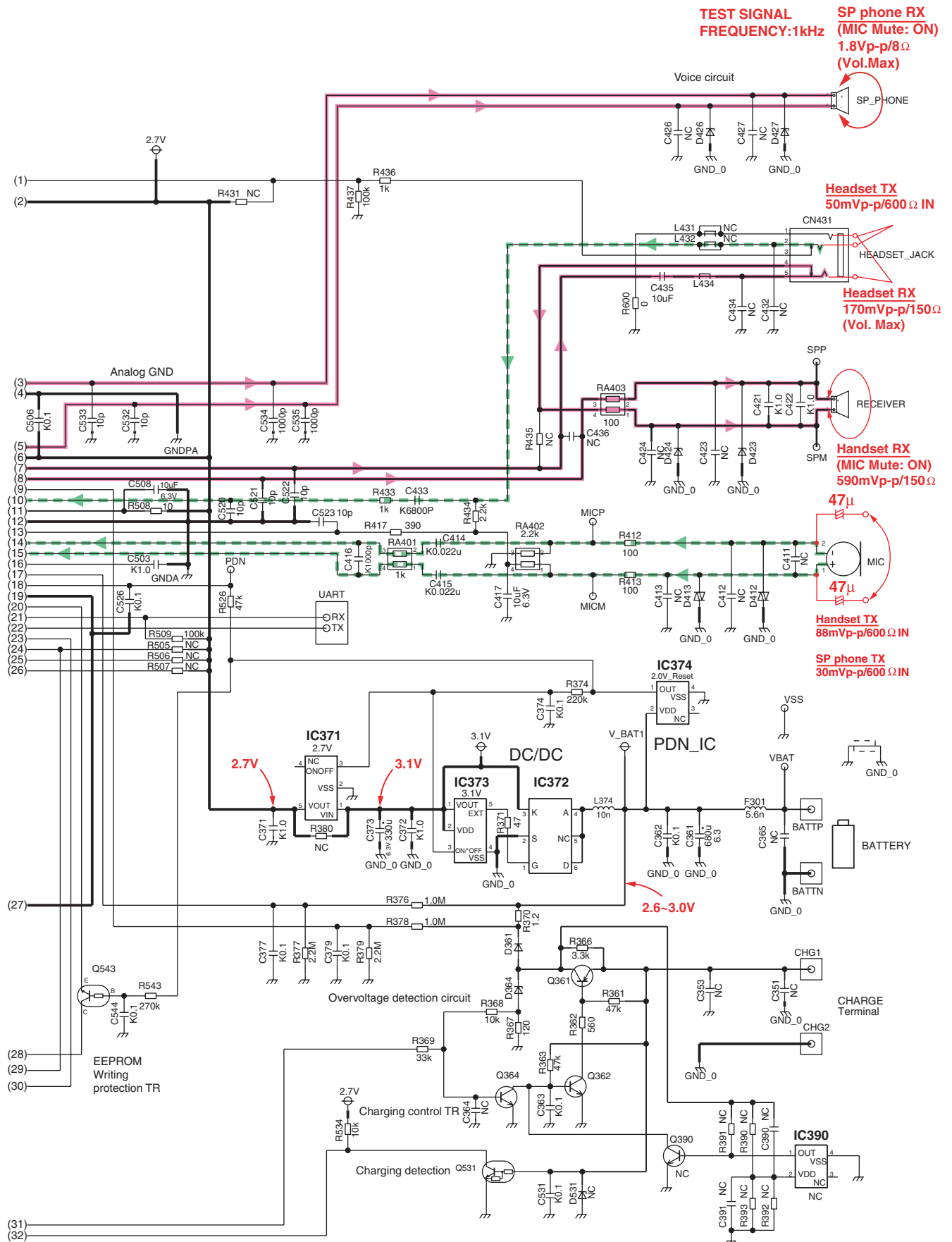
14.4. Schematic Diagram (Base Unit_Operation)



KX-TG6441/6442/6443/6444/6445 SCHEMATIC DIAGRAM (Base unit_Operation)

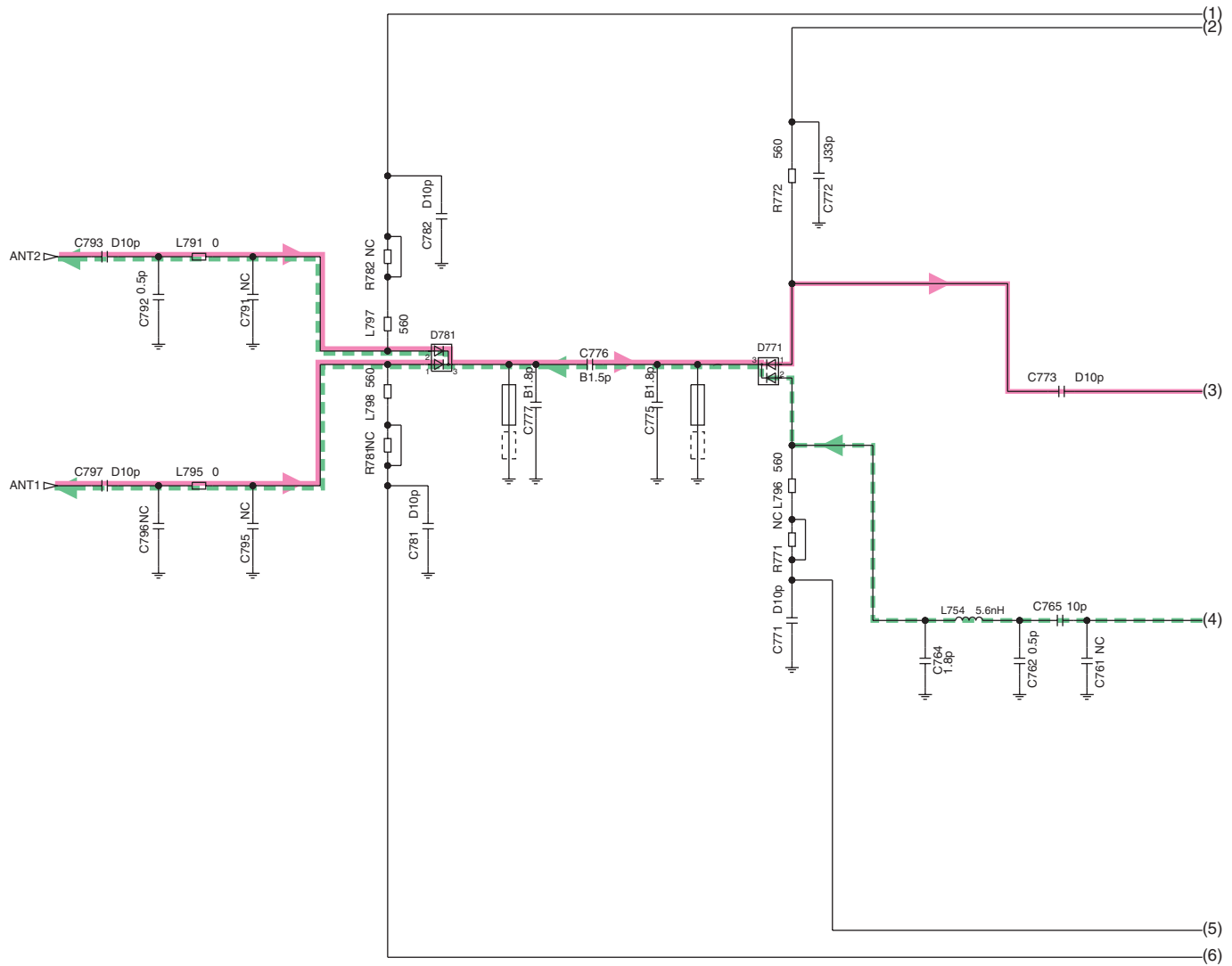
Memo





NC: No Components
KX-TGA641 SCHEMATIC DIAGRAM (Handset Main)

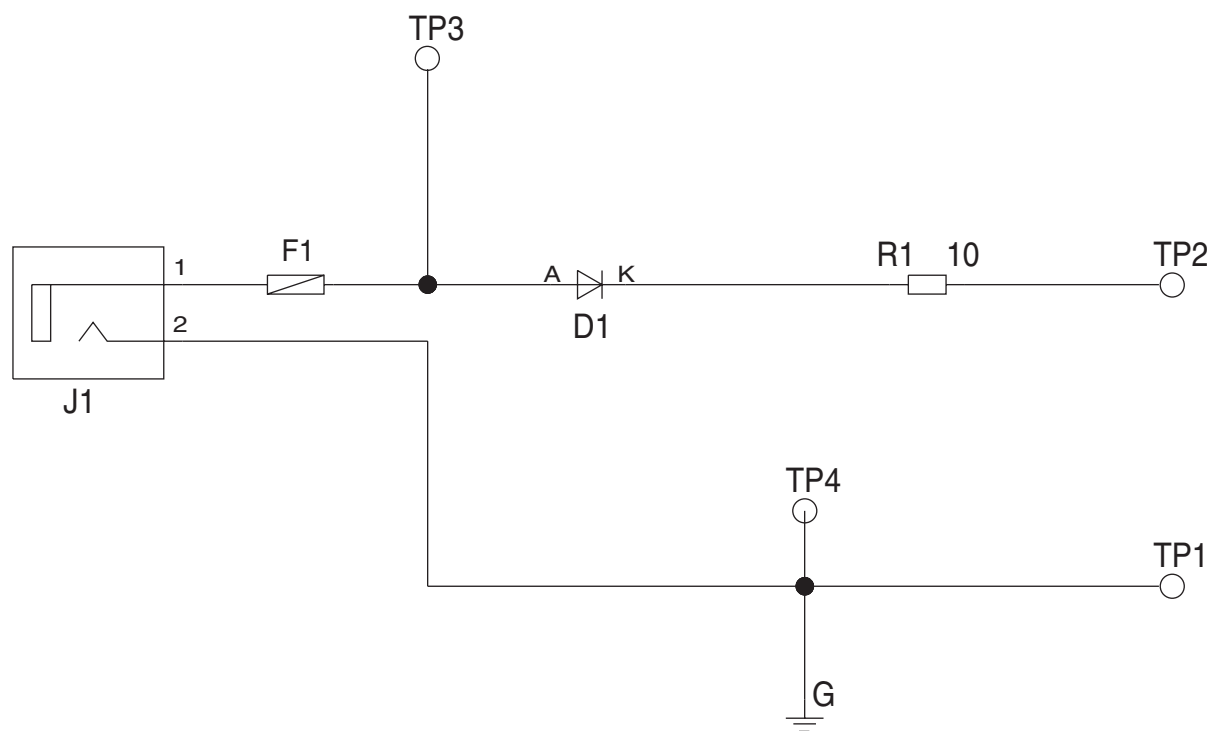
14.6. Schematic Diagram (Handset_RF Part)



NC: No Components



14.7. Schematic Diagram (Charger Unit)

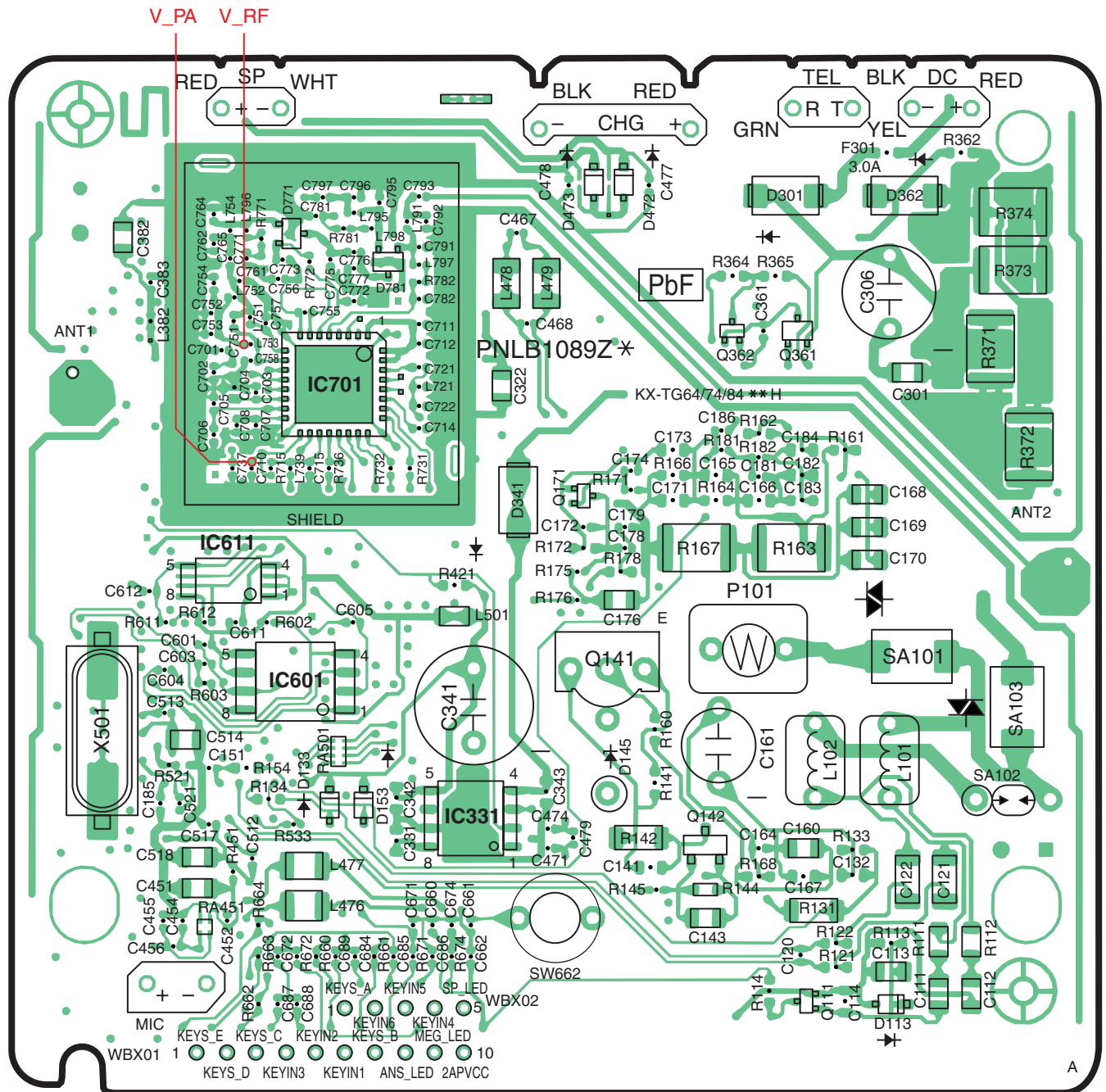


SCHEMATIC DIAGRAM (Charger Unit)

15 Printed Circuit Board

15.1. Circuit Board (Base Unit_Main)

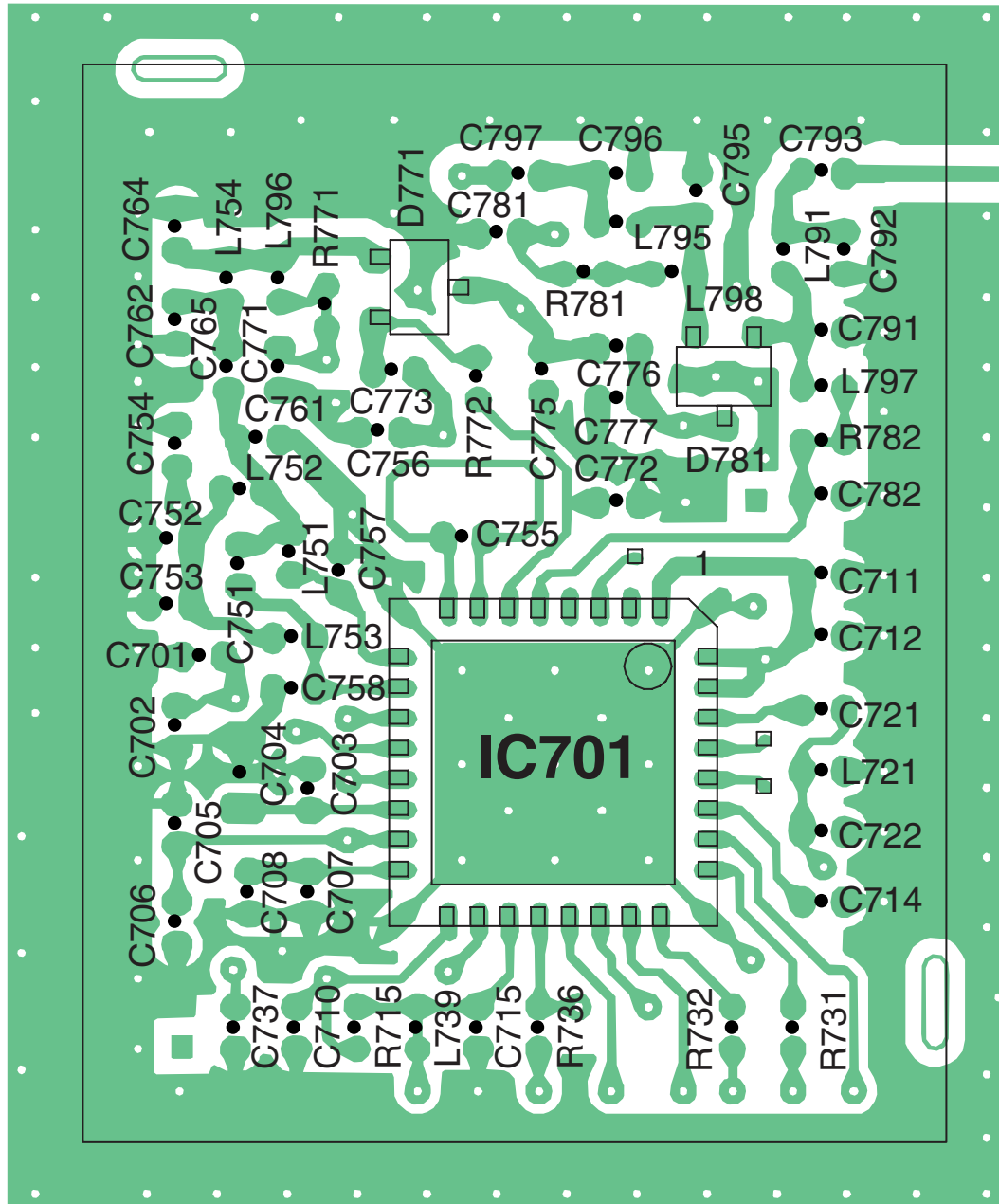
15.1.1. Component View



KX-TG6441/6442/6443/6444/6445 CIRCUIT BOARD (Base Unit_Main (Component View))

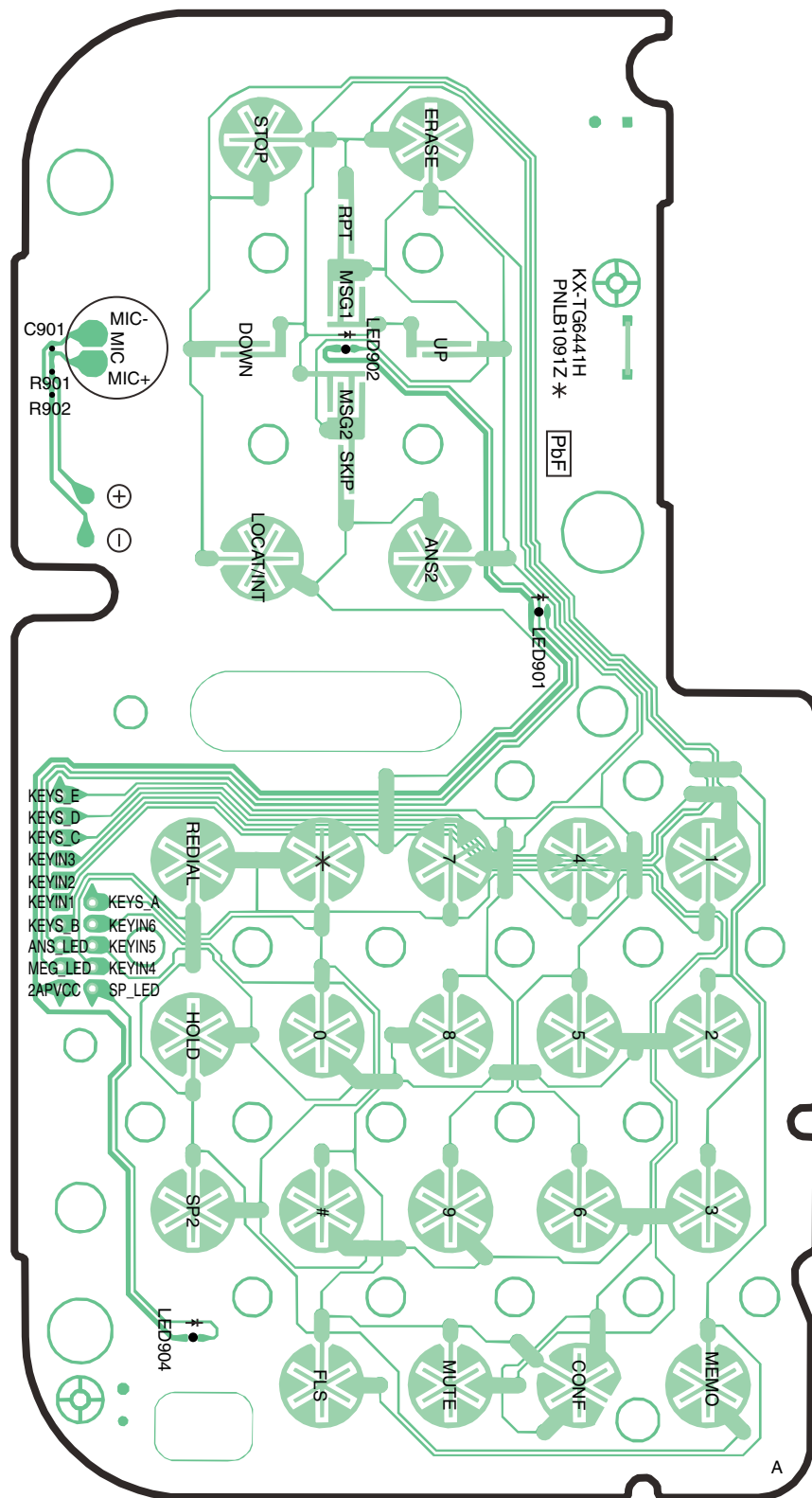


15.2. Circuit Board (Base Unit_RF Part)



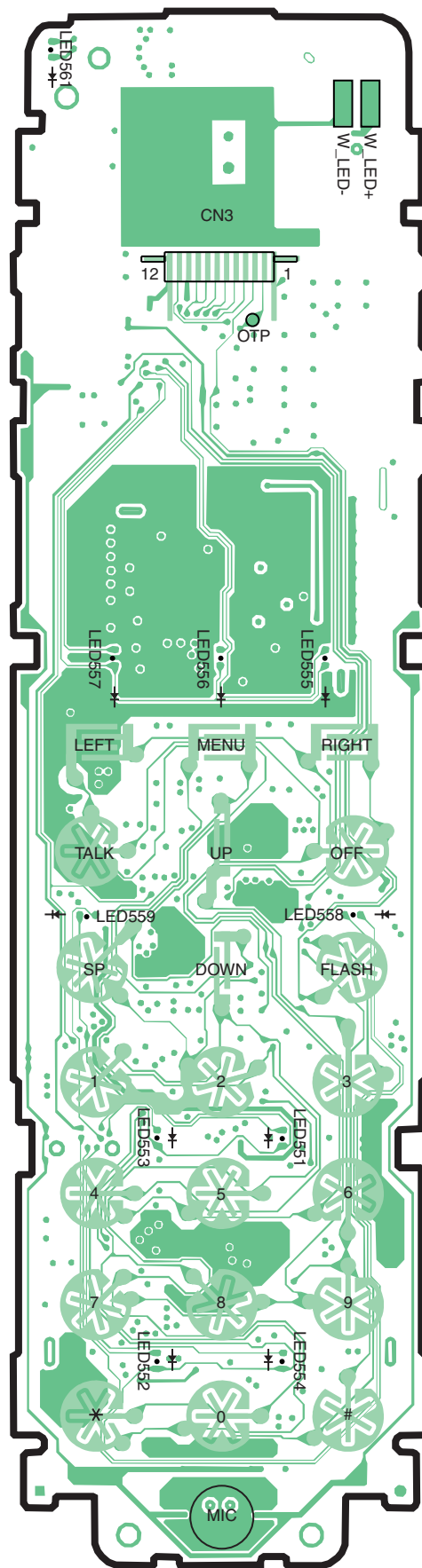
KX-TG6441/6442/6443/6444/6445 CIRCUIT BOARD (Base Unit_RF Part (Component View))

15.3. Circuit Board (Base Unit_Operation)



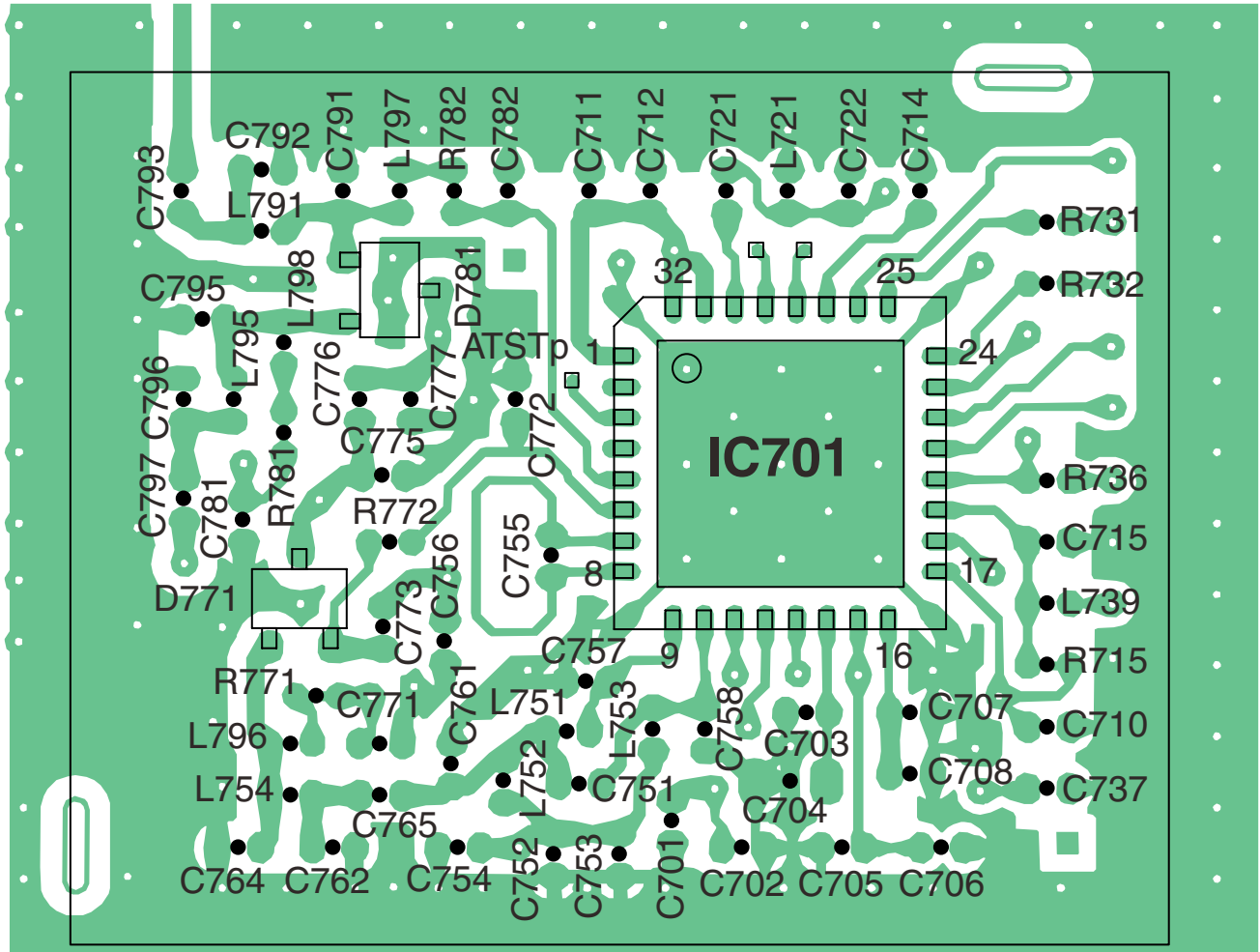
KX-TG6441/6442/6443/6444/6445 CIRCUIT BOARD (Base Unit_Operation (Component View))

15.4.2. Bottom View



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

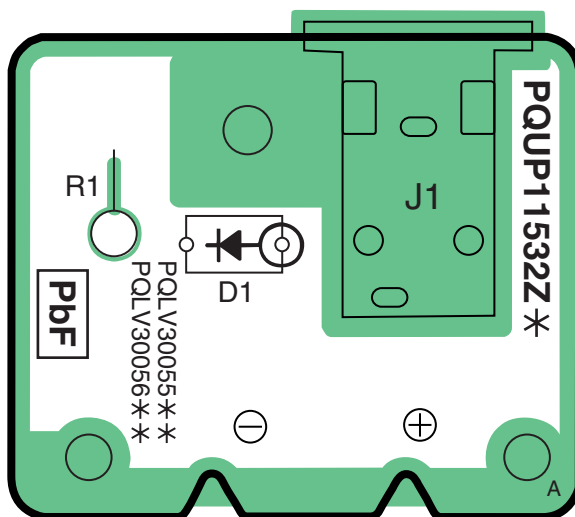
15.5. Circuit Board (Handset_RF Part)



KX-TGA641 CIRCUIT BOARD (Handset_RF Part (Component View))

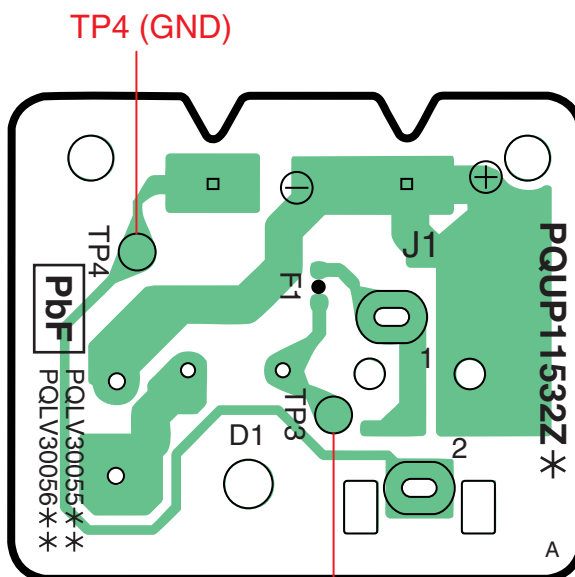
15.6. Circuit Board (Charger Unit)

15.6.1. Component View



CIRCUIT BOARD (Charger Unit (Component View))

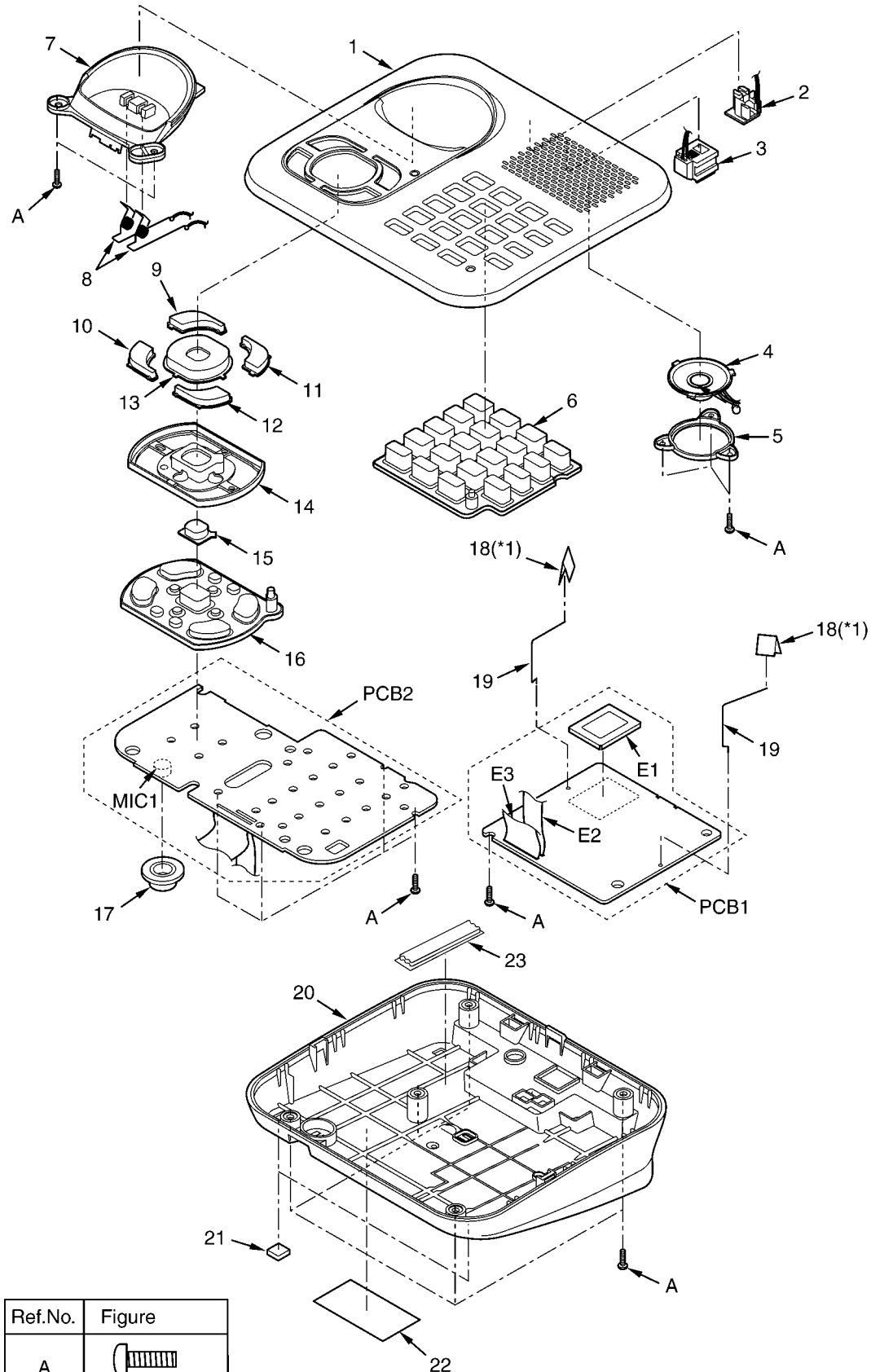
15.6.2. Bottom View




CIRCUIT BOARD (Charger Unit (Bottom View))

16 Exploded View and Replacement Parts List

16.1. Cabinet and Electrical Parts (Base Unit)

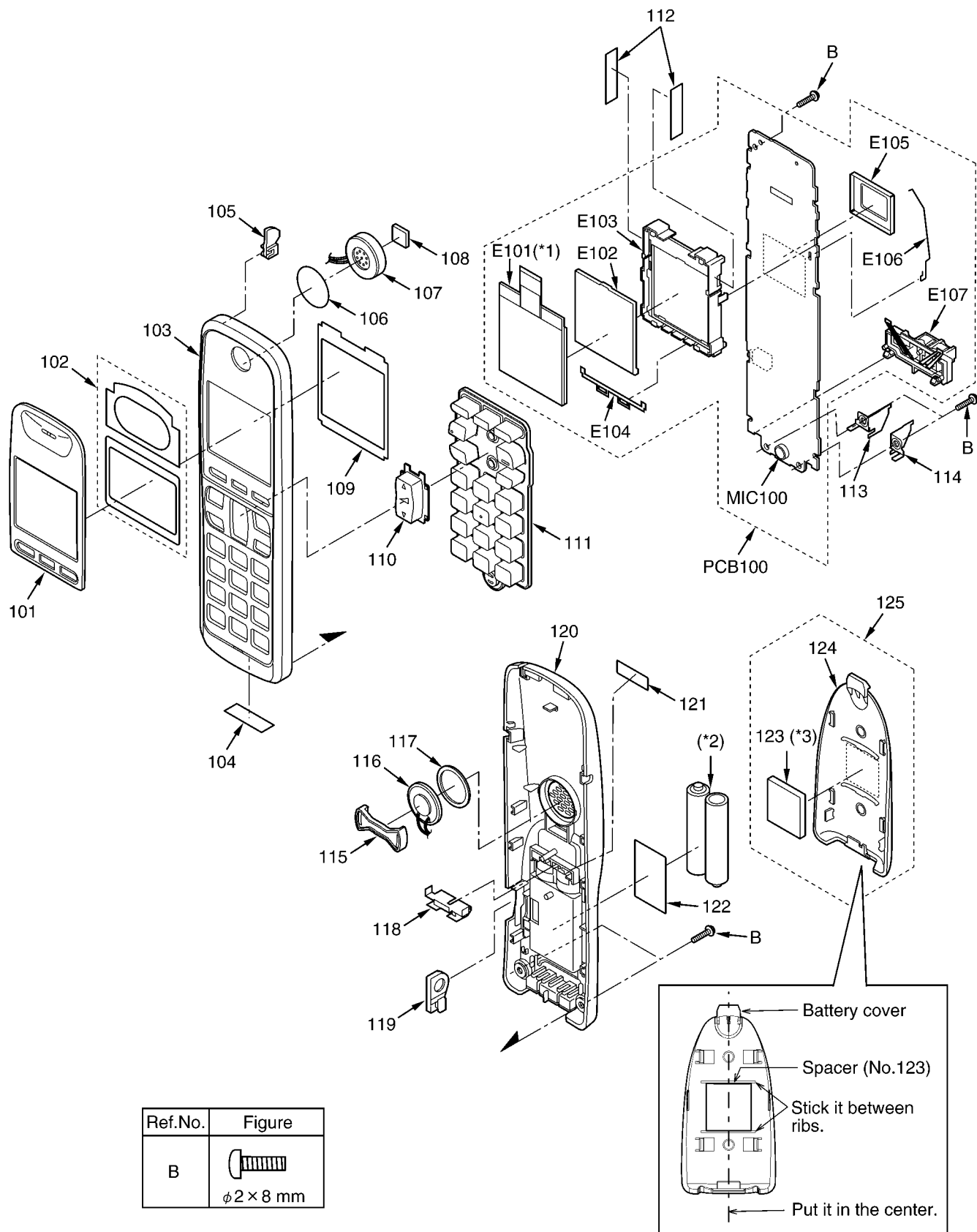


Ref.No.	Figure
A	 φ 2.6 x 8mm

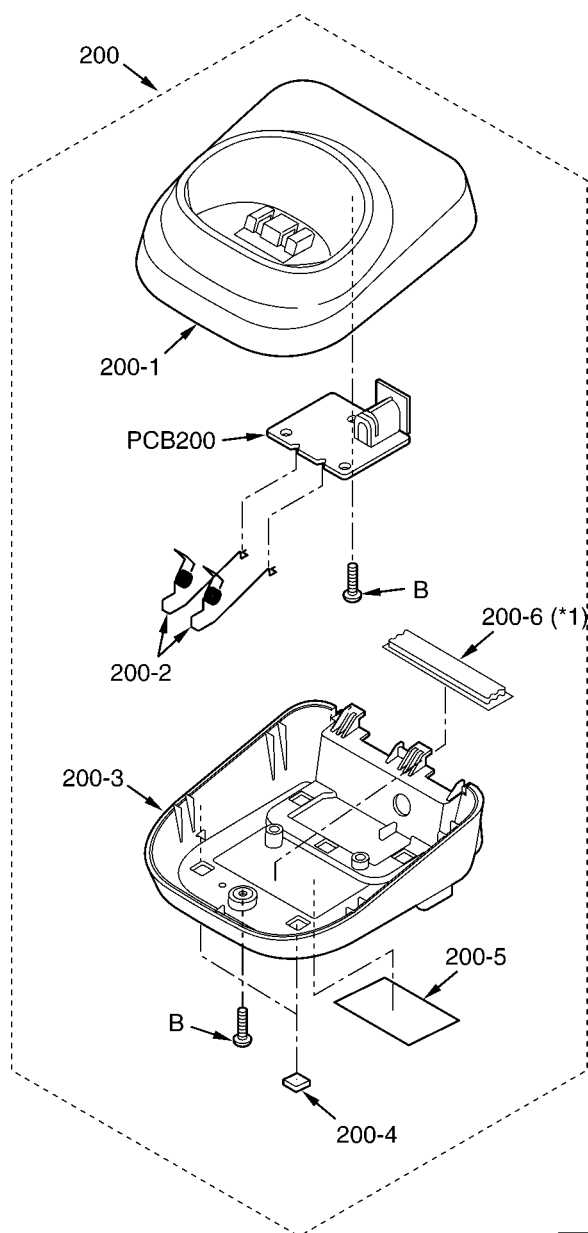
Note:

(*1) Refer to the spacer (No. 109) of Cabinet and Electrical Parts (Handset) (P.104).


16.2. Cabinet and Electrical Parts (Handset)



16.3. Cabinet and Electrical Parts (Charger Unit)

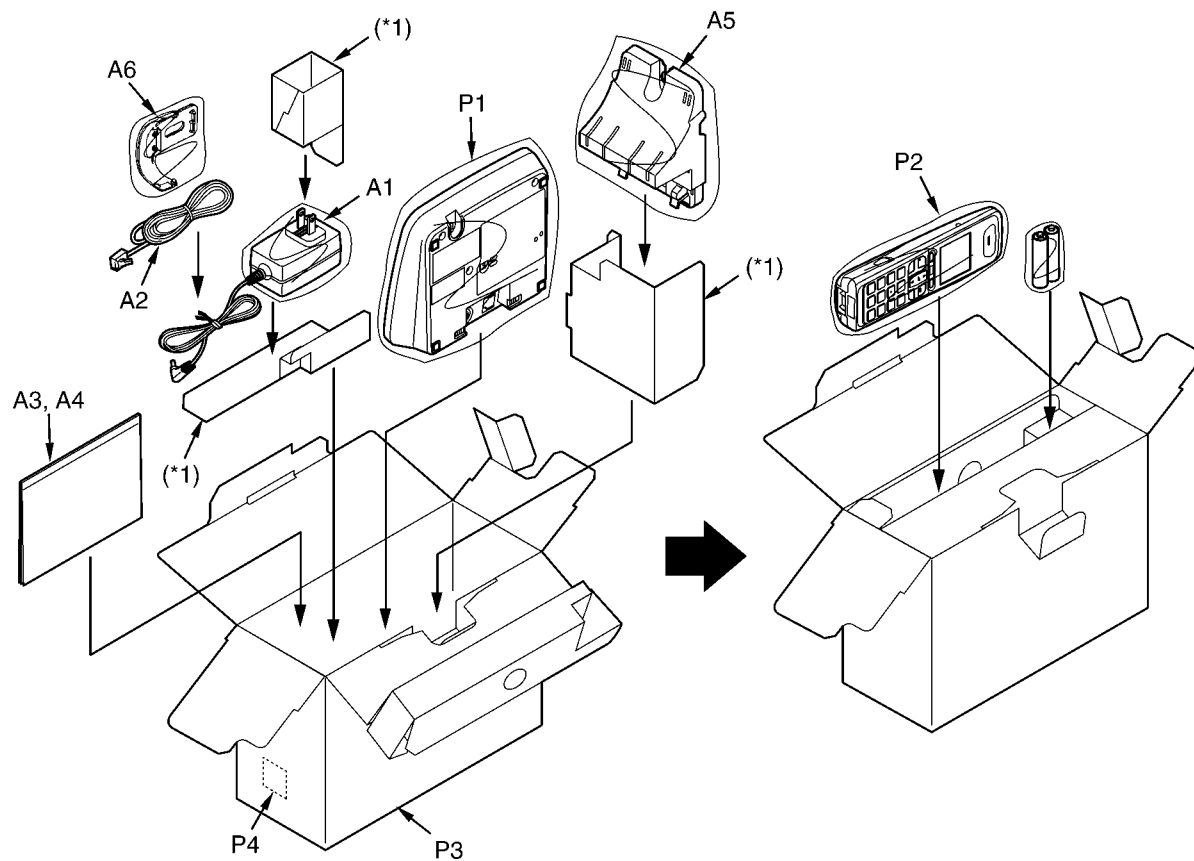


Note:
(*1) for KX-TGA641T.

Ref.No.	Figure
B	 φ2 × 8 mm

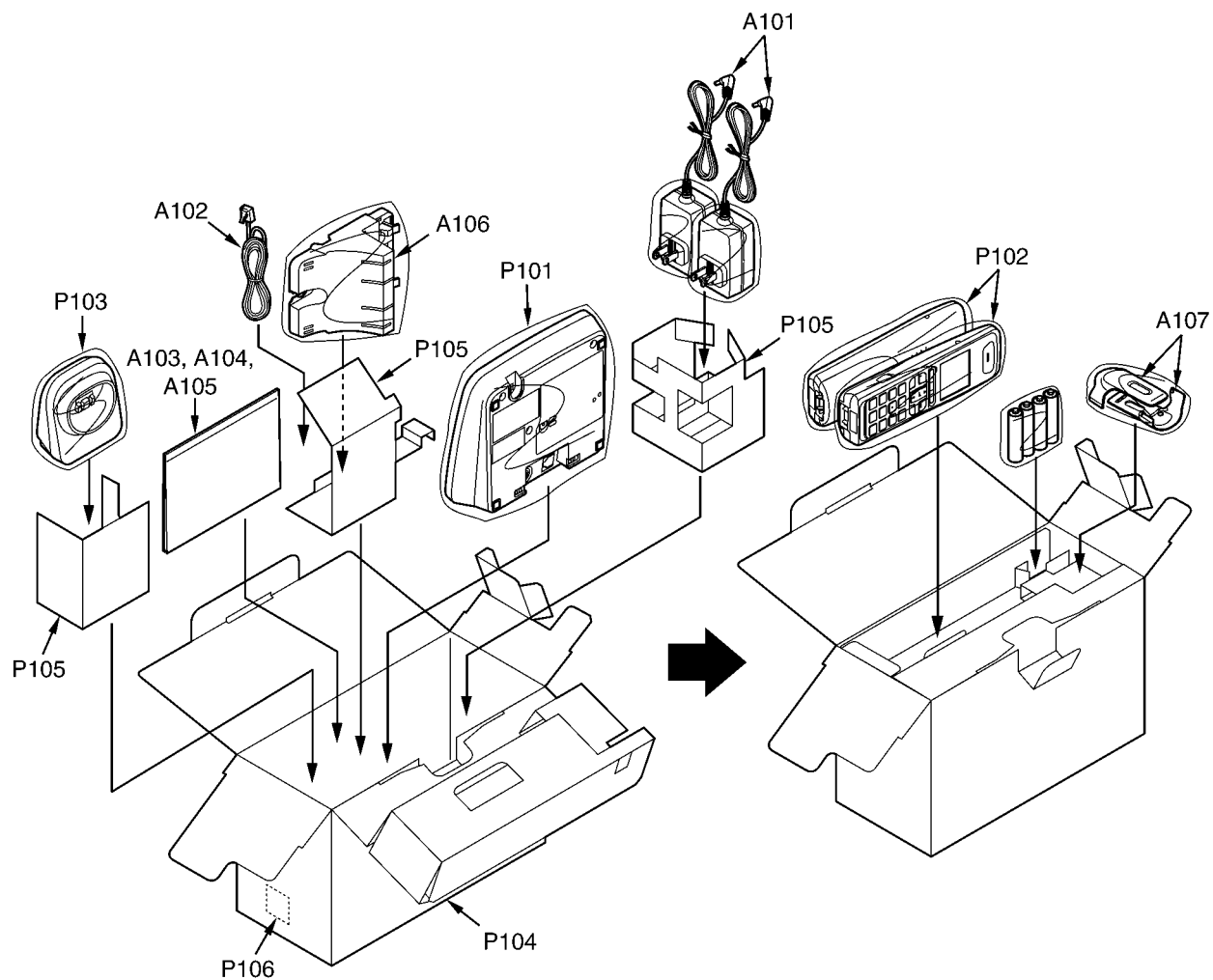
16.4. Accessories and Packing Materials

16.4.1. KX-TG6441T

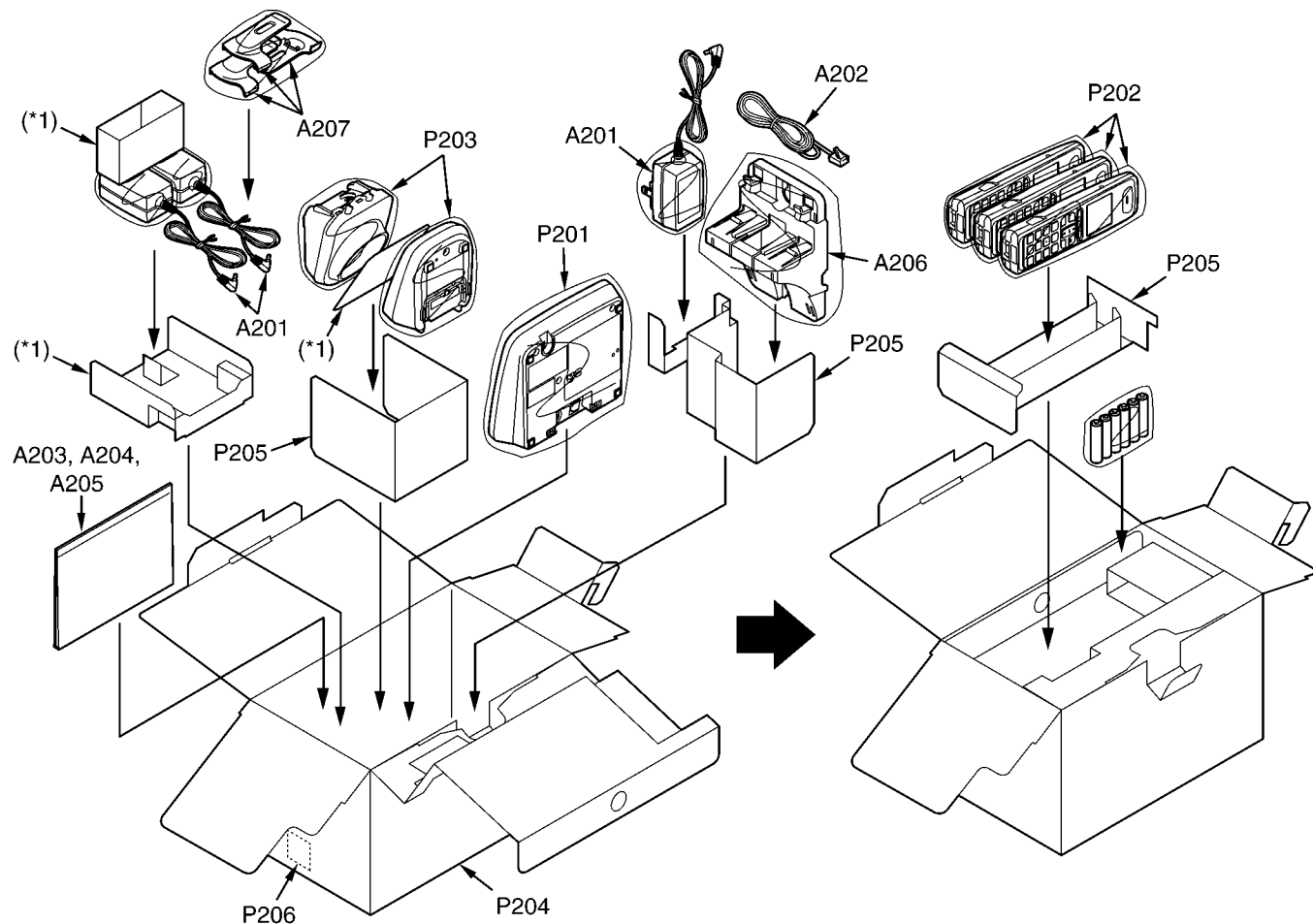


Note:

(*1) These pads are pieces of Ref No. P3 (GIFT BOX).

16.4.2. KX-TG6442T

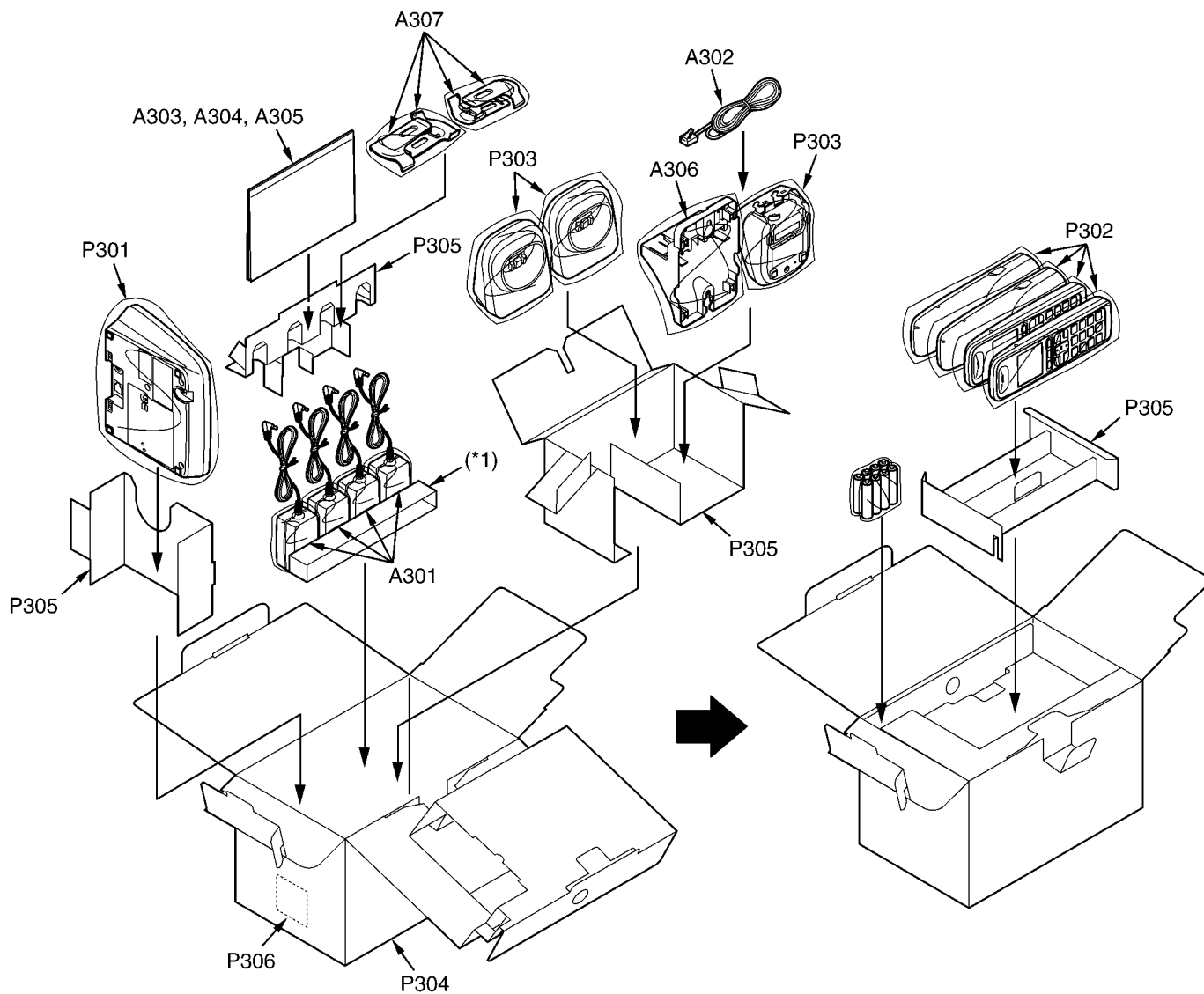
16.4.3. KX-TG6443T



Note:

(*1) These pads are pieces of Ref No. P204 (GIFT BOX).

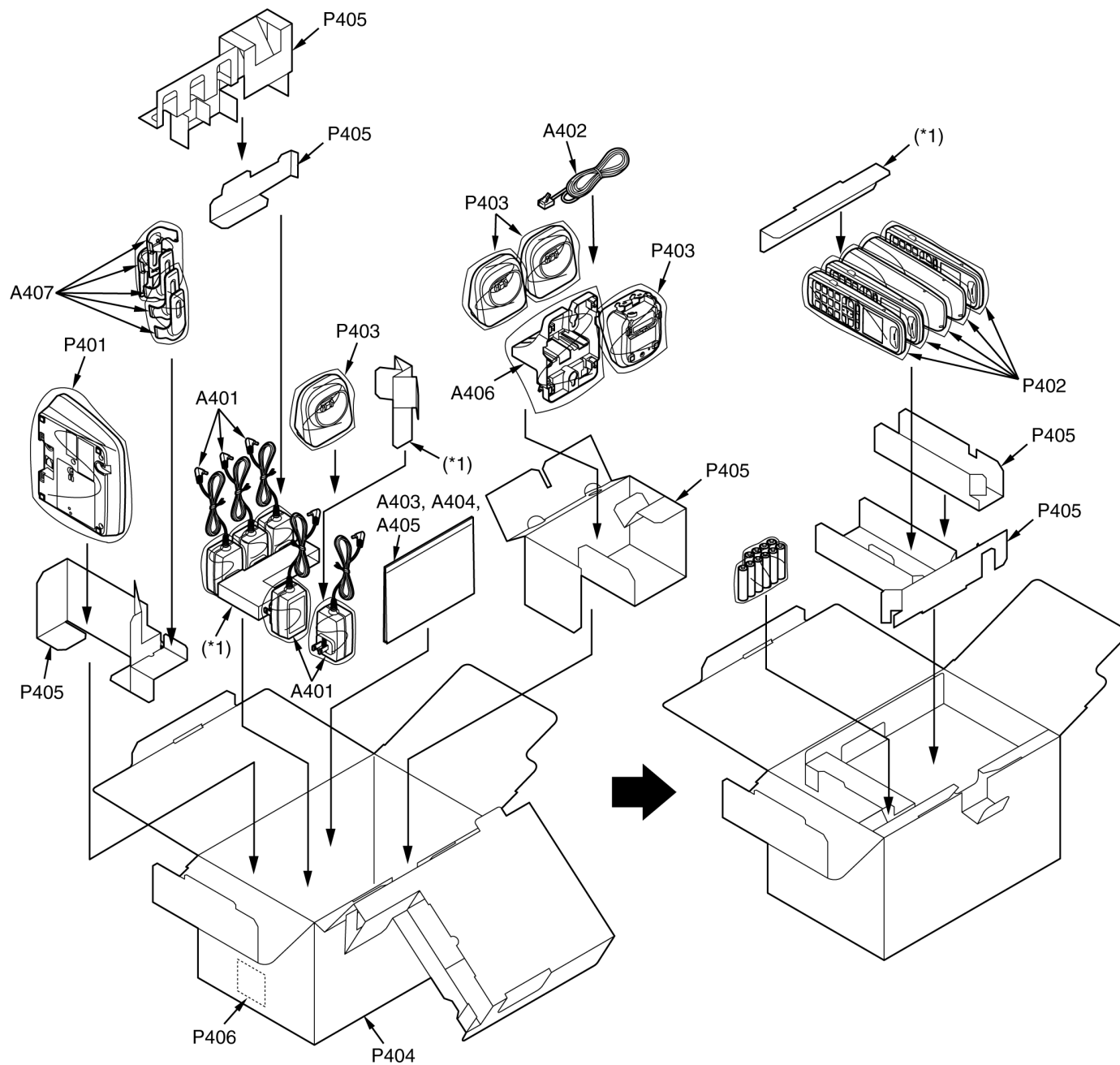
16.4.4. KX-TG6444T



Note:

(*1) This pad is a piece of Ref No. P304 (GIFT BOX).

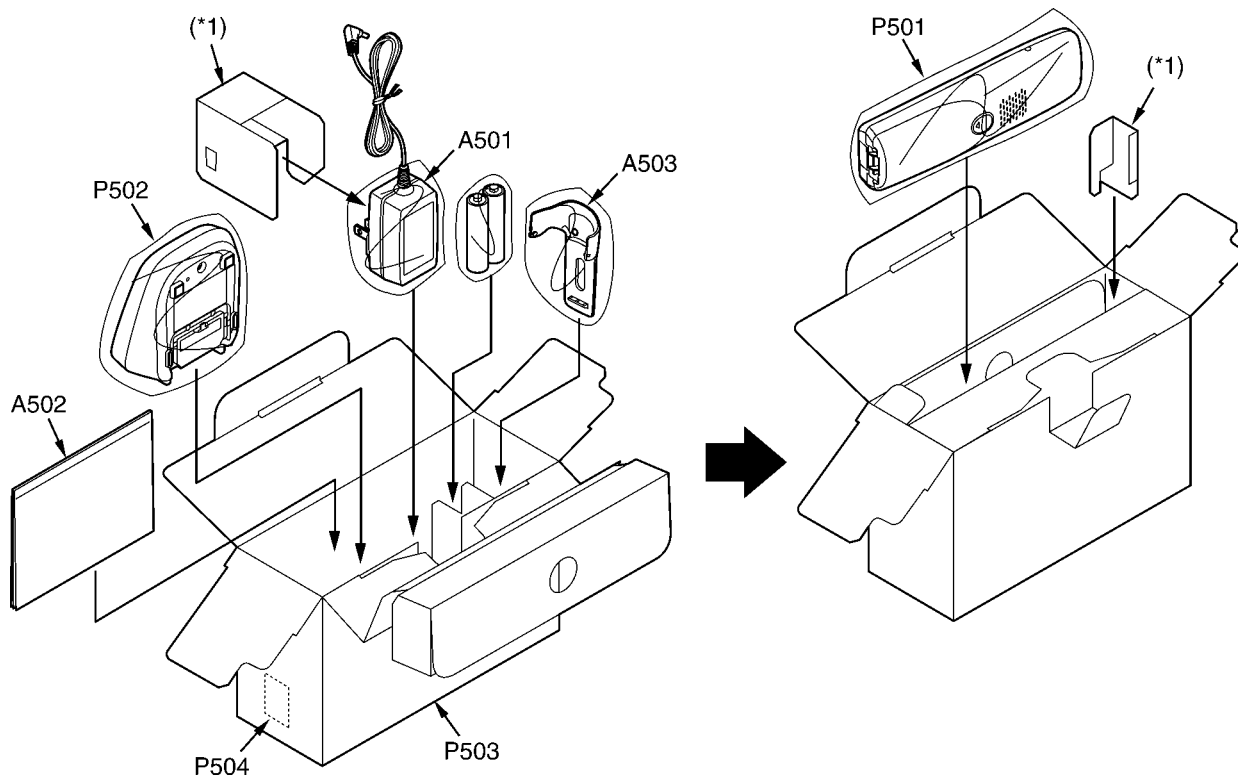
16.4.5. KX-TG6445T



Note:

(*1) These pads are pieces of Ref No. P404 (GIFT BOX).

16.4.6. KX-TGA641T



Note:

(*1) These pads are pieces of Ref No. P503 (GIFT BOX).

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 F

*Type & Wattage of Resistor

Type

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

Wattage

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

*Type & Voltage Of Capacitor

Type

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

Voltage

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

16.5.1. Base Unit

16.5.1.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	1	PNKM1084Z1	CABINET BODY	PS-HB
	2	K2ECYZ000001	JACK, DC	
	3	PQJJ1T039T	JACK, MODULAR	
	4	L0AA04A00028	SPEAKER	
	5	PQHR11082Z	GUIDE, SPEAKER HOLDER	POM-HB
	6	PNJK1051Z	KEYBOARD SWITCH, DIAL	
	7	PNKE1030Z1	CASE, CHARGE TERMINAL	PS-HB
	8	PNJT1030Z	CHARGE TERMINAL	
	9	PNBC1005Y1	BUTTON, ERASE	ABS-HB
	10	PNBC1006Y1	BUTTON, STOP	ABS-HB
	11	PNBC1004Y1	BUTTON, ANSWER ON	ABS-HB
	12	PNBC1007Y1	BUTTON, LOCATOR	ABS-HB
	13	PNBC1002Z2	BUTTON, NAVIGATOR KEY	ABS-HB

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	14	PNHR1001Z	GUIDE, BUTTON HOLDER	PS-HB
	15	PNBC1001Z2	BUTTON, MESSAGE	AS-HB
	16	PNJK1046Z	KEYBOARD SWITCH, TAM	
	17	PQMG10025W	RUBBER PARTS, MIC	
	18	PNYE1009Z	SPACER, ANTENNA	
	19	PNLA1002Z	ANTENNA	
	20	PNKF1059Z1	CABINET COVER	PS-HB
	21	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	
	22	PNGT1928Z	NAME PLATE	
	23	PQXDZLDRS1	MAGNET ELECTRIC TRANS-DUCER, SECURITY TAG	

16.5.1.2. Main P.C. Board Parts

Note:

(*1) When you have replaced IC501, IC601 or X501, make adjustments. Refer to **Check and Adjust Frequency (Base Unit)** (P.70).

(*2) When replacing IC701, refer to **How to Replace the LLP (Leadless Leadframe Package) IC** (P.79).

(*3) When you removing E1, use special tools (ex. Hot air disordering tool).

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB1	PNWP1TG6441H	MAIN P.C.BOARD ASS'Y (RTL)	
			(ICs)	
	IC321	C0CBAYG00016	IC	S
	IC331	C0DBFGD00017	IC	
	IC501	C2HBBY000101	IC (DSP) (*1)	
	IC601	PNWITG6441TH	IC (FLASH) (*1)	
	IC701	C1CB00003088	IC (*2)	
			(TRANSISTORS)	
	Q111	2SC6054JSL	TRANSISTOR (SI)	
	Q141	B1ACGP000008	TRANSISTOR (SI)	
	Q142	PQVTBF822T7	TRANSISTOR (SI)	
	Q161	2SD0874AS	TRANSISTOR (SI)	
	Q171	2SC6054JSL	TRANSISTOR (SI)	
	Q361	2SB1218A	TRANSISTOR (SI)	
	Q362	UNR92A2J0L	TRANSISTOR (SI)	
			(DIODES)	
	D101	PQVMD5S	DIODE (SI)	
	D113	MA111	DIODE (SI)	S
	D133	MA111	DIODE (SI)	S
	D143	MANV250GEL	DIODE (SI)	
	D153	MA111	DIODE (SI)	S
	D301	B0JCME000035	DIODE (SI)	
	D361	MA8220	DIODE (SI)	S
	D362	B0ECKM000008	DIODE (SI)	
	D472	MAZ805100L	DIODE (SI)	
	D473	MAZ805100L	DIODE (SI)	
	D771	B0DDCD000001	DIODE (SI)	
	D781	B0DDCD000001	DIODE (SI)	
			(COILS)	
	L101	PQLQXF330K	COIL	S
	L102	PQLQXF330K	COIL	S
	L361	G1C6R8MA0072	COIL	
	L476	G1C6R8MA0072	COIL	
	L477	G1C6R8MA0072	COIL	
	L721	G1C1R0KA0096	COIL	
	L751	ELJRF4N7ZFB	COIL	S
	L752	MQLRF18NJFB	COIL	
	L753	ELJRF4N7ZFB	COIL	S
	L754	MQLRF5N6ZFB	COIL	
			(COMPONENTS PARTS)	
	RA451	D1H422220001	RESISTOR ARRAY	
	RA452	D1H427220001	RESISTOR ARRAY	
	RA501	D1H84724A013	RESISTOR ARRAY	S
			(VARISTOR)	
	SA102	PQVDDSS301L	VARISTOR (SURGE ABSORBER)	S

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
			(RESISTORS)	
	R111	PQ4R10XJ104	100k	S
	R112	PQ4R10XJ104	100k	S
	R113	ERJ3GEYJ103	10k	
	R114	ERJ3GEYJ473	47k	
	R121	ERJ3GEYJ394	390k	
	R122	ERJ3GEYJ394	390k	
	R131	PQ4R18XJ106	10M	S
	R133	ERJ3GEYJ105	1M	
	R134	ERJ3GEYJ102	1k	
	R141	ERJ3GEYJ104	100k	
	R142	PQ4R18XJ272	2.7k	S
	R145	ERJ2GEJ222	2.2k	
	R151	ERJ3GEYJ106	10M	
	R152	ERJ3GEYJ335	3.3M	
	R154	ERJ3GEYJ102	1k	
	R160	ERJ3GEYJ820	82	
	R161	ERJ3GEYJ104	100k	
	R162	ERJ3GEYJ473	47k	
	R163	ERJ12YJ120	12	
	R164	ERJ3GEYJ272	2.7k	
	R165	ERJ3GEYJ273	27k	
	R167	ERJ12YJ270	27	
	R168	ERJ3GEYJ821	820	
	R171	ERJ2GEJ220	22	
	R172	ERJ3GEYJ104	100k	
	R175	ERJ2GEJ561	560	
	R176	ERJ2GEJ101	100	
	R178	ERJ3GEYJ102	1k	
	R181	ERJ2GEJ391	390	
	R182	ERJ2GEJ560X	56	
	R321	ERJ2RKF1400	140	
	R322	ERJ2RKF1000	100	
	R361	ERJ3GEYJ332	3.3k	
	R363	ERJ3GEY0R00	0	
	R364	ERJ3GEYJ103	10k	
	R365	ERJ3GEYJ102	1k	
	R371	ERJ12YJ7R5	7.5	
	R372	ERJ12YJ7R5	7.5	
	R373	ERJ12YJ7R5	7.5	
	R374	ERJ12YJ7R5	7.5	
	R375	ERJ3GEY0R00	0	
	R421	ERJ3GEYJ473	47k	
	R422	ERJ2GEJ102	1k	
	R451	ERJ2GEJ391	390	
	R509	ERJ3GEYJ105	1M	
	R533	ERJ2GEJ472X	4.7k	
	R671	ERJ2GEJ331	330	
	R672	ERJ2GEJ221	220	
	R674	ERJ2GEJ271	270	
	R731	ERJ2GEJ101	100	
	R732	ERJ2GEJ101	100	
	R736	ERJ2GEJ391	390	
	R772	ERJ2GEJ561	560	
	L791	ERJ2GE0R00	0	
	L795	ERJ2GE0R00	0	
	L796	ERJ2GEJ561	560	
	L797	ERJ2GEJ561	560	
	L798	ERJ2GEJ561	560	
			(CAPACITORS)	
	C101	F1K2H681A008	680p	
	C102	F1K2H681A008	680p	
	C111	F1J2A473A024	0.047	
	C112	F1J2A473A024	0.047	
	C113	PQCUV1A684KB	0.68	
	C120	ECUE1H102KBQ	0.001	
	C121	F1K2H681A008	680p	
	C122	F1K2H681A008	680p	
	C132	ECUV1H103KBV	0.01	
	C142	ECUV1H103KBV	0.01	
	C152	ECUV1H103KBV	0.01	
	C161	ECEA1HKA100	10	
	C168	PQCUV1A225KB	2.2	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C172	ECUE1H102KBQ	0.001	
	C173	ECUV1A224KBV	0.22	
	C176	PQCUV0J106KB	10	
	C178	ECUE1C223KBQ	0.022	
	C181	ECUE1A104KBQ	0.1	
	C184	ECUV1A105KBV	1	
	C185	ECUE1H100DCQ	10p	
	C186	ECUE1H100DCQ	10p	
	C306	F2A1C1010119	100	
	C321	ECUV1A105KBV	1	
	C322	PQCUV0J106KB	10	
	C331	ECUV1A474KBV	0.47	
	C341	ECEA0JSJ331	330	S
	C342	ECUV0J105KBV	1	
	C343	ECUV1A105KBV	1	
	C352	ECUE1H100DCQ	10p	
	C361	ECUE1H102KBQ	0.001	
	C383	ECUE0J105KBQ	1	
	C422	ECUE1A104KBQ	0.1	
	C451	PQCUV0J106KB	10	
	C452	ECUE1H100DCQ	10p	
	C454	ECUE1H100DCQ	10p	
	C455	ECUE1H100DCQ	10p	
	C457	ECUE1C333KBQ	0.033	
	C458	ECUE1C333KBQ	0.033	
	C459	ECUE1H102KBQ	0.001	
	C471	ECUE1H100DCQ	10p	
	C473	ECUE1H100DCQ	10p	
	C474	ECUE1H100DCQ	10p	
	C475	ECUE1H102KBQ	0.001	
	C476	ECUE1H100DCQ	10p	
	C477	ECUE1H100DCQ	10p	
	C478	ECUE1H100DCQ	10p	
	C501	ECUE1A104KBQ	0.1	
	C503	ECUE1A104KBQ	0.1	
	C504	ECUE1A104KBQ	0.1	
	C508	ECUE1H100DCQ	10p	
	C509	ECUE1H100DCQ	10p	
	C513	ECUE1A104KBQ	0.1	
	C514	PQCUV0J106KB	10	
	C515	ECUV0J105KBV	1	
	C516	PQCUV0J106KB	10	
	C517	ECUE1A104KBQ	0.1	
	C518	PQCUV0J106KB	10	
	C521	ECUE1A104KBQ	0.1	
	C531	ECUE1A104KBQ	0.1	
	C601	ECUE1A104KBQ	0.1	
	C660	ECUE1A104KBQ	0.1	
	C701	ECUE1H100DCQ	10p	
	C702	ECUE1A104KBQ	0.1	
	C703	ECUE1H100DCQ	10p	
	C704	ECUV1A225KB	2.2	
	C705	ECUE1H100DCQ	10p	
	C706	ECUE1A104KBQ	0.1	
	C707	ECUE1H100DCQ	10p	
	C708	ECUE0J105KBQ	1	
	C710	ECUE1A104KBQ	0.1	
	C711	ECUE1H100DCQ	10p	
	C712	ECUE1A104KBQ	0.1	
	C714	ECUE0J105KBQ	1	
	C715	ECUE1A104KBQ	0.1	
	C721	ECUE1H101JCQ	100p	
	C722	ECUE1H121JCQ	120p	
	C737	ECUE1C103KBQ	0.01	
	C751	F1G1H1R3A561	1.3p	
	C752	ECUE1H100DCQ	10p	
	C753	F1G1H1R0A561	1.0p	
	C754	ECUE1A104KBQ	0.1	
	C755	F1G1H1R2A561	1.2p	
	C757	F1G1H1R3A561	1.3p	
	C762	F1G1HR50A561	0.5p	
	C764	F1G1H1R8A561	1.8p	
	C765	ECUE1H100DCQ	10p	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C771	ECUE1H100DCQ	10p	
	C772	ECUE1H330JCQ	33p	
	C773	ECUE1H100DCQ	10p	
	C775	F1G1H1R8A561	1.8p	
	C776	F1G1H1R5A561	1.5p	
	C777	F1G1H1R8A561	1.8p	
	C781	ECUE1H100DCQ	10p	
	C782	ECUE1H100DCQ	10p	
	C793	ECUE1H100DCQ	10p	
	C796	F1G1HR50A561	0.5p	
	C797	ECUE1H100DCQ	10p	
			(OTHERS)	
	E1	PNMC1014Z	MAGNETIC SHIELD, CASE (*3)	
	E2	PNWHK05SH3EN	LEAD WIRE, PARALLEL WIRE	
	E3	WBX10SH-3.5G	LEAD WIRE, PARALLEL WIRE	
	P101	PFRT002	THERMISTOR (POSISTOR)	S
	F301	K5H302Y00003	FUSE	
	X501	H0J138500011	CRYSTAL OSCILLATOR (*1)	

16.5.1.3. Operational P.C. Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB2	PNWP2TG6441H	OPERATIONAL P.C.BOARD ASS'Y (RTL)	
			(DIODES)	
	LED901	PQVDBR1111C	LED	S
	LED902	PQVDBR1111C	LED	S
	LED904	PQVDBR1111C	LED	S
			(OTHERS)	
	MIC1	L0CBAY000018	MICROPHONE	

16.5.2. Handset

16.5.2.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	101	PNGP1048Z1	PANEL, LCD	AS-HB
	102	PNYE1008Z	TAPE, DOUBLE SIDED	
	103	PNKM1074Z1	CABINET BODY	PS-HB
	104	PNGT1930Z	NAME PLATE	
	105	PNHR1105Z	OPTIC CONDUCTIVE PARTS, LED LENS	PS-HB
	106	PNHS1001Z	SPACER, RECEIVER NET	
	107	LOAD02A00043	RECEIVER	
	108	PQHG10729Z	RUBBER PARTS, RECEIVER	
	109	PNYE1009Z	SPACER, CUSHION LCD	
	110	PNBC1265Z1	BUTTON, VOLUME KEY	ABS-HB
	111	PNJK1048Z	KEYBOARD SWITCH	
	112	PNHX1165Z	COVER, LCD	
	113	PNJT1027Z	CHARGE TERMINAL (L)	
	114	PNJT1026Z	CHARGE TERMINAL (R)	
	115	PQHR11315Z	GUIDE, SPEAKER HOLDER	ABS-HB
	116	L0AA02A00095	SPEAKER	
	117	PQHS10784Y	SPACER, SPEAKER NET	
	118	PQJC10056X	BATTERY TERMINAL	
	119	PNKE1027Z1	COVER, EP CAP	
	120	PNKF1053Z1	CABINET COVER	ABS-HB
	121	PNQT1001Z	LABEL, ATTENTION	
	122	PNQT1374Z	LABEL, BATTERY	
	123	PNHS1079Z	SPACER, BATTERY COVER	
	124	PNKK1027Z1	LID, BATTERY COVER	ABS-HB
	125	PNYNTGA641TR	LID, BATTERY COVER ASS'Y	ABS-HB

16.5.2.2. Main P.C. Board Parts

Note:

(*1) When you have replaced IC501, IC541 or X501, make adjustments. Refer to **Check and Adjust Frequency (Handset)** (P.70) and **Adjust Battery Low Detector Voltage (Handset)** (P.70).

(*2) When replacing IC701, refer to **How to Replace the LLP (Leadless Leadframe Package) IC** (P.79).

(*3) When replacing the handset LCD, See **How to Replace the Handset LCD** (P.69).

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

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB100	PNWPTGA641TR	MAIN P.C.BOARD ASS'Y (RTL)	
			(ICs)	
	IC371	C0DBGYY00297	IC	
	IC373	C0DBAYY00067	IC	
	IC374	C0EBD0000355	IC	
	IC501	C2HBBY000102	IC (DSP) (*1)	
	IC541	PNWITGA641TR	IC (EEPROM) (*1)	
	IC561	C0DBZHA00012	IC	
	IC701	C1CB00003088	IC (*2)	
	IC741	C0CBCAC00252	IC	
			(TRANSISTORS)	
	Q361	B1ADGE000004	TRANSISTOR (SI)	
	Q362	2SC6054JSL	TRANSISTOR (SI)	
	Q364	2SC6054JSL	TRANSISTOR (SI)	
	Q531	UNR921EJ0L	TRANSISTOR (SI)	
	Q543	UNR9215J0L	TRANSISTOR (SI)	
	Q561	UNR921MJ0L	TRANSISTOR (SI)	
	Q562	UNR92AVJ0L	TRANSISTOR (SI)	
	IC372	MTM767200LBF	TRANSISTOR (SI)	
			(DIODES)	
	D361	MA2ZD0200L	DIODE (SI)	
	D364	MA8043L	DIODE (SI)	S
	D423	MA8043L	DIODE (SI)	S
	D424	MA8043L	DIODE (SI)	S
	D426	MA8043L	DIODE (SI)	S
	D427	MA8043L	DIODE (SI)	S
	D771	B0DDCD000001	DIODE (SI)	
	D781	B0DDCD000001	DIODE (SI)	
	LED551	B3ACB0000216	LED	
	LED552	B3ACB0000216	LED	
	LED553	B3ACB0000216	LED	
	LED554	B3ACB0000216	LED	
	LED558	B3ACB0000216	LED	
	LED559	B3ACB0000216	LED	
	LED561	B3ACB0000216	LED	
			(COILS)	
	L374	G1C100MA0395	COIL	
	L434	PQLQR2KB113T	COIL	S
	L721	G1C1R0KA0096	COIL	
	L751	ELJRF4N7ZFB	COIL	S
	L752	MLRF18NJFB	COIL	
	L753	ELJRF4N7ZFB	COIL	S
	L754	MLRF5N6ZFB	COIL	
	F301	PQLQR2M5N6K	COIL	S
			(VARISTORS)	
	D412	D4ED1180A013	VARISTOR	
	D413	D4ED1180A013	VARISTOR	
			(COMPONENTS PARTS)	
	RA401	D1H410220001	RESISTOR ARRAY	
	RA402	D1H422220001	RESISTOR ARRAY	
	RA403	D1H410120001	RESISTOR ARRAY	
	RA501	D1H84724A013	RESISTOR ARRAY	S
	RA551	D1H83314A013	RESISTOR ARRAY	S
	RA552	D1H433120001	RESISTOR ARRAY	
			(RESISTORS)	
	R361	ERJ2GEJ473	47k	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R362	ERJ2GEJ561	560	
	R363	ERJ2GEJ473	47k	
	R366	ERJ3GEYJ332	3.3k	
	R367	ERJ2GEJ121	120	
	R368	ERJ2GEJ103	10k	
	R369	ERJ2GEJ333	33k	
	R370	ERJ8GEYJ1R2	1.2	
	R371	ERJ2GEJ470	47	
	R374	ERJ2GEJ224	220k	
	R376	ERJ2GEJ105X	1M	
	R377	ERJ2GEJ225	2.2M	
	R378	ERJ2GEJ105X	1M	
	R379	ERJ2GEJ225	2.2M	
	R412	ERJ2GEJ101	100	
	R413	ERJ2GEJ101	100	
	R417	ERJ2GEJ391	390	
	R433	ERJ2GEJ102	1k	
	R434	ERJ2GEJ222	2.2k	
	R436	ERJ2GEJ102	1k	
	R437	ERJ2GEJ104	100k	
	R501	ERJ2GEJ105X	1M	
	R508	ERJ3GEYJ100	10	
	R509	ERJ2GEJ104	100k	
	R526	ERJ2GEJ473	47k	
	R534	ERJ2GEJ103	10k	
	R541	ERJ2GEJ103	10k	
	R542	ERJ2GEJ222	2.2k	
	R543	ERJ2GEJ274	270k	
	R561	ERJ2GEJ101	100	
	R563	ERJ2GE0R00	0	
	R564	ERJ3GEYJ101	100	
	R567	ERJ2GE0R00	0	
	R600	ERJ3GEY0R00	0	
	R731	ERJ2GEJ101	100	
	R732	ERJ2GEJ101	100	
	R736	ERJ2GEJ391	390	
	R772	ERJ2GEJ561	560	
	L791	ERJ2GE0R00	0	
	L795	ERJ2GE0R00	0	
	L796	ERJ2GEJ561	560	
	L797	ERJ2GEJ561	560	
	L798	ERJ2GEJ561	560	
			(CAPACITORS)	
	C361	F2A0J6810012	680	
	C362	ECUE1A104KBQ	0.1	
	C363	ECUE1A104KBQ	0.1	
	C371	ECUE0J105KBQ	1	
	C372	ECUE0J105KBQ	1	
	C373	F2A0J3310068	330	
	C374	ECUE1A104KBQ	0.1	
	C377	ECUE1A104KBQ	0.1	
	C379	ECUE1A104KBQ	0.1	
	C414	ECUE1C223KBQ	0.022	
	C415	ECUE1C223KBQ	0.022	
	C416	ECUE1H102KBQ	0.001	
	C417	PQCUV0J106KB	10	
	C421	ECUE0J105KBQ	1	
	C422	ECUE0J105KBQ	1	
	C433	ECUE1E682KBQ	0.0068	
	C435	PQCUV0J106KB	10	
	C501	ECUE1H100DCQ	10p	
	C502	ECUE1H120JCQ	12p	
	C503	ECUE0J105KBQ	1	
	C504	ECUE1A104KBQ	0.1	
	C506	ECUV1C104KBV	0.1	
	C508	PQCUV0J106KB	10	
	C510	ECUE0J105KBQ	1	
	C512	ECUE1C103KBQ	0.01	
	C514	PQCUV0J106KB	10	
	C515	ECUE1A104KBQ	0.1	
	C520	ECUE1H100DCQ	10p	
	C521	ECUE1H100DCQ	10p	
	C522	ECUE1H100DCQ	10p	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	C523	ECUE1H100DCQ	10p	
	C526	ECUE1A104KBQ	0.1	
	C531	ECUE1A104KBQ	0.1	
	C532	ECUE1H100DCQ	10p	
	C533	ECUE1H100DCQ	10p	
	C534	ECUE1H102KBQ	0.001	
	C535	ECUE1H102KBQ	0.001	
	C540	ECUE1A104KBQ	0.1	
	C541	ECUE1A104KBQ	0.1	
	C542	ECUE1H101JCQ	100p	
	C544	ECUE1A104KBQ	0.1	
	C562	ECUV1A105KBV	1	
	C564	ECUE1A104KBQ	0.1	
	C565	ECUE0J105KBQ	1	
	C567	ECUE1H100DCQ	10p	
	C578	ECUV1C105KBV	1	
	C596	ECUE1A104KBQ	0.1	
	C701	ECUE1H100DCQ	10p	
	C702	ECUE1A104KBQ	0.1	
	C703	ECUE1H100DCQ	10p	
	C704	ECUV1A225KB	2.2	
	C705	ECUE1H100DCQ	10p	
	C706	ECUE1A104KBQ	0.1	
	C707	ECUE1H100DCQ	10p	
	C708	ECUE0J105KBQ	1	
	C710	ECUE1A104KBQ	0.1	
	C711	ECUE1H100DCQ	10p	
	C712	ECUE1A104KBQ	0.1	
	C713	PQCUV0J106KB	10	
	C714	ECUE0J105KBQ	1	
	C715	ECUE1A104KBQ	0.1	
	C721	ECUE1H101JCQ	100p	
	C722	ECUE1H121JCQ	120p	
	C737	ECUE1C103KBQ	0.01	
	C742	ECUV1A474KBV	0.47	
	C743	ECUV1A105KBV	1	
	C751	F1G1H1R3A561	1.3p	
	C752	ECUE1H100DCQ	10p	
	C753	F1G1H1R0A561	1p	
	C754	ECUE1A104KBQ	0.1	
	C755	F1G1H1R2A561	1.2p	
	C757	F1G1H1R3A561	1.3p	
	C762	F1G1HR50A561	0.5p	
	C764	F1G1H1R8A561	1.8p	
	C765	ECUE1H100DCQ	10p	
	C771	ECUE1H100DCQ	10p	
	C772	ECUE1H330JCQ	33p	
	C773	ECUE1H100DCQ	10p	
	C775	F1G1H1R8A561	1.8p	
	C776	F1G1H1R5A561	1.5p	
	C777	F1G1H1R8A561	1.8p	
	C781	ECUE1H100DCQ	10p	
	C782	ECUE1H100DCQ	10p	
	C792	F1G1HR50A561	0.5p	
	C793	ECUE1H100DCQ	10p	
	C797	ECUE1H100DCQ	10p	
			(OTHERS)	
	MIC100	L0CBAY000032	MICROPHONE	
	E101	L5DYBY00001	LIQUID CRYSTAL DISPLAY (*3)	
	E102	PNHR1107Z	TRANSPARENT PLATE, LCD	PMMA-HB
	E103	PNHR1106Z	GUIDE, LCD HOLDER	
	E104	PNHX1135Z	COVER, LCD COVER SHEET	
	E105	PNMC1014Z	MAGNETIC SHIELD, CASE (*4)	
	E106	PNLA1018Z	ANTENNA	
	E107	PNVE1002Z	BATTERY TERMINAL	ABS-HB
	CN431	K2HD103D0001	JACK	
	X501	H0J138500003	CRYSTAL OSCILLATOR (*1)	S

16.5.3. Charger Unit

16.5.3.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	200	PNWETG6432T	CHARGER UNIT ASS'Y (RTL) (for KX-TG6442T) (for KX-TG6443T) (for KX-TG6444T) (for KX-TG6445T)	
	200	PNWETGA641T	CHARGER UNIT ASS'Y (RTL) (for KX-TGA641T)	
	200-1	PNKM1077Z1	CABINET BODY	PS-HB
	200-2	PNJT1010Z	CHARGE TERMINAL	
	200-3	PNKF1012Z1	CABINET COVER	PS-HB
	200-4	PQHA10023Z	RUBBER PARTS, FOOT CUSHION	
	200-5	PNGT1854Z	NAME PLATE (for KX-TG6442T) (for KX-TG6443T) (for KX-TG6444T) (for KX-TG6445T)	
	200-5	PNGT1878Z	NAME PLATE (for KX-TGA641T)	
	200-6	PQXDZLDRS1	MAGNET ELECTRIC TRANS-DUCER, SECURITY TAG (for KX-TGA641T)	

16.5.3.2. Main P.C. Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB200	PQWPTGA721CH	MAIN P.C.BOARD ASS'Y (RTL)	
			(DIODE)	
	D1	B0JAME000095	DIODE (SI)	
			(JACK)	
	J1	K2ECYB000001	JACK	
			(RESISTOR)	
	R1	ERG2SJJ100E	10	
			(FUSE)	
	F1	K5H302Y00003	FUSE	

16.5.4. Accessories and Packing Materials

Note:

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

16.5.4.1. KX-TG6441T

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A1	PQLV219Z	AC ADAPTOR	
	A2	PQJA10075Z	CORD, TELEPHONE	
	A3	PNQX1624Y	INSTRUCTION BOOK (*1)	
	A4	PNQW1485Y	LEAFLET, QUICK GUIDE	
	A5	PNKL1010Z1	STAND, WALL MOUNT	ABS-HB
	A6	PNKE1029Z1	HANGER, BELT CLIP	ABS-HB
	P1	PQPP10152Z	PROTECTION COVER (for Base Unit)	
	P2	XZB08X25B02	PROTECTION COVER (for Handset)	
	P3	PNPK1950Z	GIFT BOX	
	P4	PQXDDS400-8	MAGNET ELECTRIC TRANS-DUCER, SECURITY TAG	

16.5.4.2. KX-TG6442T

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A101	PQLV219Z	AC ADAPTOR	
	A102	PQJA10075Z	CORD, TELEPHONE	
	A103	PNQX1624Y	INSTRUCTION BOOK (*1)	
	A104	PNQW1485Y	LEAFLET, QUICK GUIDE	
	A105	PQQV10494Z	CARD, CCP	
	A106	PNKL1010Z1	STAND, WALL MOUNT	ABS-HB
	A107	PNKE1029Z1	HANGER, BELT CLIP	ABS-HB
	P101	PQPP10152Z	PROTECTION COVER (for Base Unit)	
	P102	XZB08X25B02	PROTECTION COVER (for Handset)	
	P103	XZB13X19C03	PROTECTION COVER (for Charger Unit)	
	P104	PNPK1953Z	GIFT BOX	
	P105	PNPD1184Z	CUSHION	
	P106	PQXDDS400-8	MAGNET ELECTRIC TRANS-DUCER, SECURITY TAG	

16.5.4.3. KX-TG6443T

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A201	PQLV219Z	AC ADAPTOR	
	A202	PQJA10075Z	CORD, TELEPHONE	
	A203	PNQX1624Y	INSTRUCTION BOOK (*1)	
	A204	PNQW1485Y	LEAFLET, QUICK GUIDE	
	A205	PQQV10494Z	CARD, CCP	
	A206	PNKL1010Z1	STAND, WALL MOUNT	ABS-HB
	A207	PNKE1029Z1	HANGER, BELT CLIP	ABS-HB
	P201	PQPP10152Z	PROTECTION COVER (for Base Unit)	
	P202	XZB08X25B02	PROTECTION COVER (for Handset)	
	P203	XZB13X19C03	PROTECTION COVER (for Charger Unit)	
	P204	PNPK1954Z	GIFT BOX	
	P205	PNPD1185Z	CUSHION	
	P206	PQXDDS400-8	MAGNET ELECTRIC TRANS-DUCER, SECURITY TAG	

16.5.4.4. KX-TG6444T

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A301	PQLV219Z	AC ADAPTOR	
	A302	PQJA10075Z	CORD, TELEPHONE	
	A303	PNQX1624Y	INSTRUCTION BOOK (*1)	
	A304	PNQW1485Y	LEAFLET, QUICK GUIDE	
	A305	PQQV10494Z	CARD, CCP	
	A306	PNKL1010Z1	STAND, WALL MOUNT	ABS-HB
	A307	PNKE1029Z1	HANGER, BELT CLIP	ABS-HB
	P301	PQPP10152Z	PROTECTION COVER (for Base Unit)	
	P302	XZB08X25B02	PROTECTION COVER (for Handset)	
	P303	XZB13X19C03	PROTECTION COVER (for Charger Unit)	
	P304	PNPK1955Z	GIFT BOX	
	P305	PNPD1186Z	CUSHION	
	P306	PQXDDS400-8	MAGNET ELECTRIC TRANS-DUCER, SECURITY TAG	

16.5.4.5. KX-TG6445T

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A401	PQLV219Z	AC ADAPTOR	
	A402	PQJA10075Z	CORD, TELEPHONE	
	A403	PNQX1624Y	INSTRUCTION BOOK (*1)	
	A404	PNQW1485Y	LEAFLET, QUICK GUIDE	
	A405	PQQV10494Z	CARD, CCP	
	A406	PNKL1010Z1	STAND, WALL MOUNT	ABS-HB
	A407	PNKE1029Z1	HANGER, BELT CLIP	ABS-HB
	P401	PQPP10152Z	PROTECTION COVER (for Base Unit)	
	P402	XZB08X25B02	PROTECTION COVER (for Handset)	
	P403	XZB13X19C03	PROTECTION COVER (for Charger Unit)	
	P404	PNPK2086Z	GIFT BOX	
	P405	PNPD1210Z	CUSHION	
	P406	PQXDDS400-8	MAGNET ELECTRIC TRANS-DUCER, SECURITY TAG	

16.5.4.6. KX-TGA641T

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
⚠	A501	PQLV219Z	AC ADAPTOR	
	A502	PNQX1634Z	INSTRUCTION BOOK (*1)	
	A503	PNKE1029Z1	HANGER, BELT CLIP	ABS-HB
	P501	XZB08X25B02	PROTECTION COVER (for Handset)	
	P502	XZB13X19C03	PROTECTION COVER (for Charger Unit)	
	P503	PNPK1914Z	GIFT BOX	
	P504	PQXDDS400-8	MAGNET ELECTRIC TRANS-DUCER, SECURITY TAG	

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:

When replacing the Handset LCD, See **How to Replace the Handset LCD** (P.69).

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
		PQZZ430PIR	TIP OF SOLDERING IRON	
		PQZZ430PRB	RUBBER OF SOLDERING IRON	

Y.M/N
 KXTG6441T
 KXTG6442T
 KXTG6443T
 KXTG6444T
 KXTG6445T
 KXTGA641T