ORDER NO. KM40507819CE

Service Manual

Telephone Equipment

Caller ID Compatible

KX-TCD150FXB
KX-TCD150FXC
KX-TCD152FXB
KX-TCA115EXB
KX-TCA115EXC

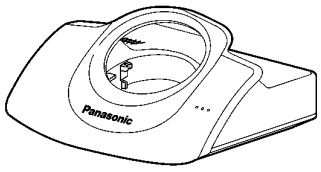
Digital Cordless Phone

Black Version

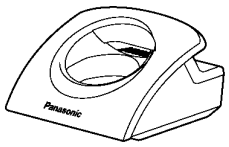
Dark Blue Version

(for Central Europe)

KX-TCA115EXB/EXC
(HANDSET)



KX-TCD150FXB/FXC
(BASE UNIT)



(CHARGER UNIT)

Configuration for each model

Model No	Base Unit	Handset	Charger
KX-TCD150	1	1 (TCA115)	
KX-TCD152	1	2 (TCA115)	1

SPECIFICATION

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

Power consumption,	
Base Unit:	Standby: 3.5 W / Maximum: 9.2 W
Charger Unit:	Standby: 2.3 W / Maximum: 6.8 W
Battery life, Handset (if batteries are fully charged):	Stand-by: Up to 120 hours (Ni-MH) Talk: Up to 10 hours (Ni-MH)
Operating conditions:	5 - 40 °C, 20 - 80 % relative air humidity (dry)
Dimensions, Base Unit (D x W x L):	58 mm x 123 mm x 115 mm
Dimensions, Handset (D x W x L):	143 mm x 48 mm x 32 mm
Dimensions, Charger Unit (D x W x L):	60 mm x 86 mm x 84 mm
Weight, Base Unit:	about 185 g
Weight, Handset:	about 115 g
Weight, Charger Unit:	about 113 g

- Specifications are subject to change.
- The illustrations used in this manual may differ slightly from the actual product.

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING
If lead free solder was used in the manufacture of this product the printed circuit boards will be marked PbF.
Standard leaded, (Pb), solder can be used as usual on boards without the PbF mark.
When this mark does appear please read and follow the special instructions described in this manual on the use of PbF and how it might be permissible to use Pb solder during service and repair work.

Panasonic

⚠ WARNING

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

When you note the serial number, write down all 11 digits. The serial number may be found on the bottom of the unit.

Note:

Because CONTENTS 4 is the extract from the Operating Instructions of this model, it is subject to change without notice. You can download and refer to the original Operating Instructions on TSN Server for further information.

CONTENTS

1 ABOUT LEAD FREE SOLDER (PbF: Pb free)

Note:

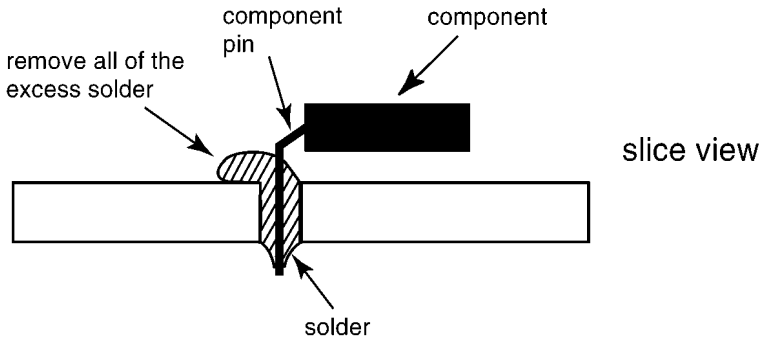
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

We will use PbF solder when discussing the lead free solder used in our manufacturing process which is made from Tin (Sn), Silver (Ag), and Copper (Cu).

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder although, with some precautions, standard Pb solder can also be used.

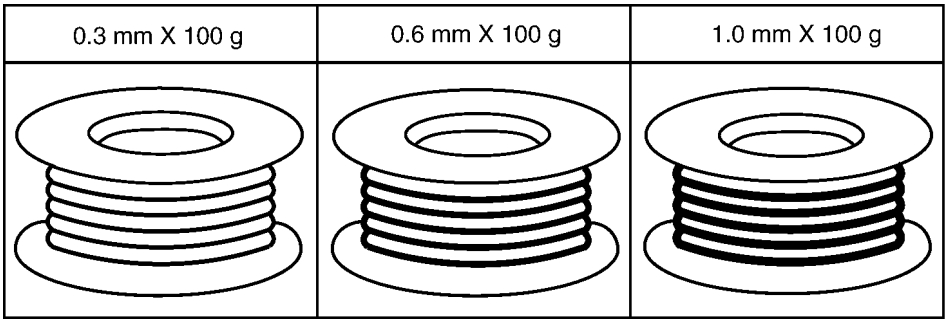
Caution

- PbF solder has a melting point that is 50°F ~70°F (30°C ~ 40°C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700°F ± 20°F (370°C ± 10°C). In case of using high temperature soldering iron, please be careful not to heat too long.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100°F (600°C).
- If you must use Pb solder on a PCB manufactured using PbF solder, remove as much of the original PbF solder as possible and be sure that any remaining is melted prior to applying the Pb solder.
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See the figure below).



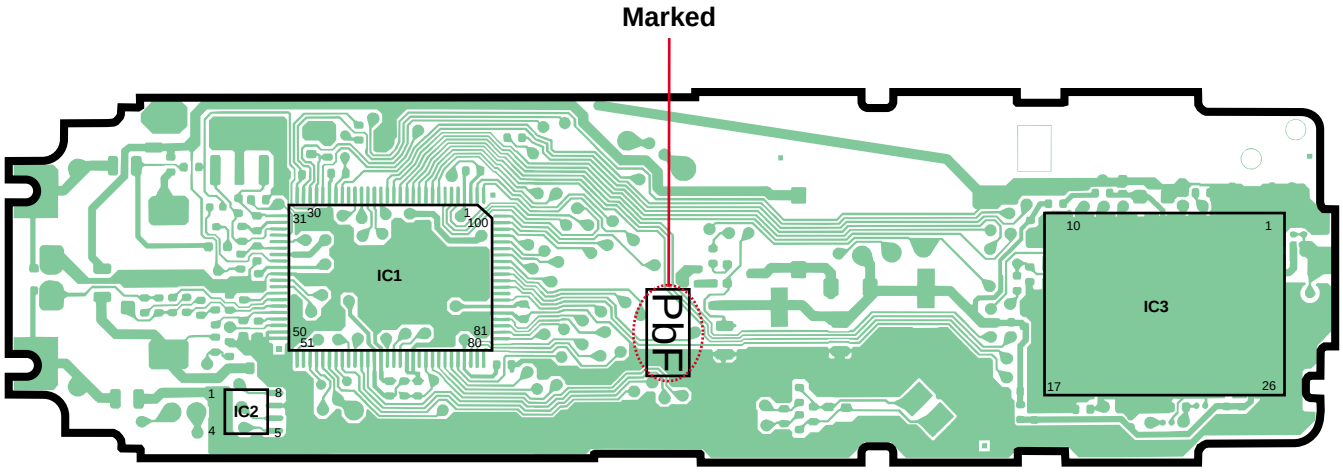
1.1. Suggested PbF Solder

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



1.2. How to recognize that Pb Free solder is used

(Example: Handset P.C.B.)



(Component View)

Note:

The location of the “PbF” mark is subject to change without notice.

2 FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

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

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

3 CAUTION

1. Danger of explosion if battery is incorrectly replaced.
2. Replace only with the same or equivalent type recommended by the manufacturer.
3. Dispose of used batteries according to the manufacture’s Instructions.

4 OPERATING INSTRUCTIONS

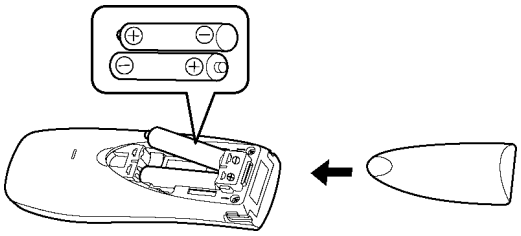
4.1. BATTERY

4.1.1. Battery Installation

Insert the batteries negative (⊖) terminal first. Close the handset cover.

Note:

・Use only rechargeable P03P (HHR-4EPT) batteries.



4.1.2. Battery Charge

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

Battery icon	Battery strength
	Fully charged.
	High
	Medium
	Low
	Needs to be charged.

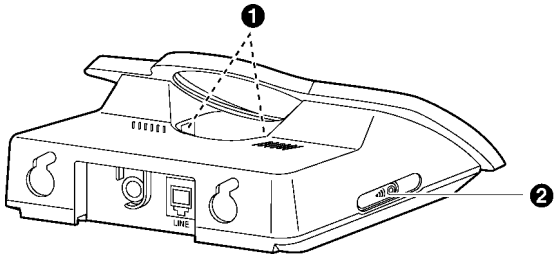
4.1.3. Battery Life

Panasonic Ni-MH batteries (700 mAh)

Operation	Operating time
While in use (talking)	10 hours max.
While not in use (standby)	120 hours max.

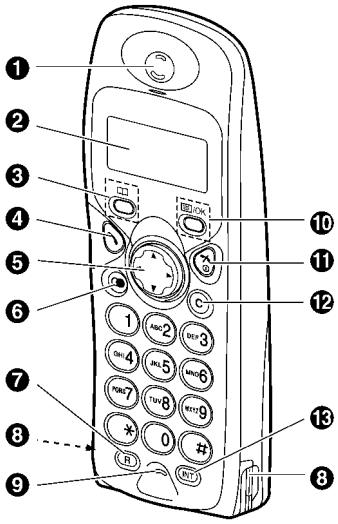
4.2. LOCATION OF CONTROLS

4.2.1. Base Unit



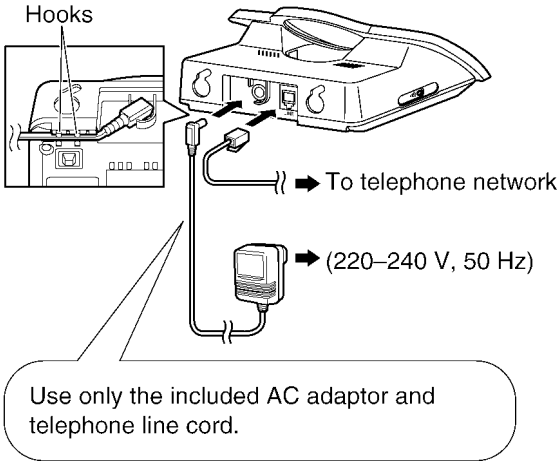
❶ Charge contacts
❷ 【•))】(Page)

4.2.2. Handset



❶ Receiver
❷ Display
❸ 【📖】(Phonebook)
❹ 【📞】(Talk)
❺ Navigator (【▲】/【▼】/【▶】/【◀】)
❻ 【○●】(Redial/Pause)
❼ 【R】(Recall)
❽ Charge contacts
❾ Microphone
❿ 【☰/OK】(Menu/OK)
⓫ 【⏻】(Off/Power)
⓬ 【C】(Clear)
⓭ 【INT】(Intercom)

4.3. Connection



Note:

- Never install telephone wiring during a lightning storm.
- Do not connect the AC adaptor to a ceiling-mounted AC outlet, as the weight of the adaptor may cause it to become disconnected.
- To turn the power on, press 【⏻】 for about 1 second.
- To turn the power off, press 【⏻】 for about 2 seconds.

4.4. Guide to Settings

4.4.1. Base Unit

To customise the base unit:

1 【▤/OK】 → "SETTING BS" → 【▸】
- "INPUT CODE" is displayed.

2 Enter the desired code number. Follow the instructions in the "Feature" column of the chart.
- To exit the operation, press 【✂⏻】.

Code No.	Feature (Default setting)	Remarks (selectable options)
【0】	Reset base unit to its default settings.*1 – Enter base unit PIN (default: "0000"). → 【▸】	–
【2】【2】	Base unit ringer volume (Medium) – Select the desired setting by pressing 【1】 for low, 【2】 for medium, 【3】 for high or 【0】 for off. → 【▸】	0 to 3
【3】	Dialling mode (Tone)	【1】 Tone/【2】 Pulse
	Flash time (600 ms)*2 – Enter base unit PIN (default: "0000"). → 【2】 → 【1】 – Select the desired setting by pressing 【1】 for 100 ms, 【2】 for 600 ms or 【3】 for 300 ms. → 【▸】	【1】 100ms/【2】 600ms/ 【3】 300ms
	DTMF mode (Off)	【1】 Learn mode (off)/ 【2】 DTMP CLIP (on)/ 【3】 FSK CLIP/ 【4】 Russian CLIP
【5】	Change base unit PIN ("0000").*3 – Enter the current 4-digit base unit PIN. – Enter the new 4-digit base unit PIN. – Enter the new 4-digit base unit PIN again.	–
【6】	Call restriction*4 ■ **Setting call restriction** – Enter base unit PIN (default: "0000"). → 【1】 → 【▸】 – Enter the phone number to be restricted (8 digits max.). ● To select a different memory location, press 【▸】 repeatedly and enter a number. – 【▸】 ■ **Turning on/off call restriction** – Enter base unit PIN (default: "0000"). ● Handset number will be displayed. Flashing number indicates call restriction is on; non-flashing number indicates call restriction is off. – Press 【1】 to turn on/off. → 【▸】	Up to 10 numbers
	Emergency number*5 – Enter base unit PIN (default: "0000"). → 【✳】 ■ **Storing:** – Enter the emergency number (8 digits max.). ● To select a different memory location, press 【▸】 and enter a number. – 【▸】 ■ **Editing:** Display the desired number (【▸】). → 【C】 → Enter the new emergency number. → 【▸】	Up to 4 numbers
【✳】	Time and date	–

*1 Only the emergency number setting will not be reset.
*2 Change the flash time if necessary to suit your PBX or service provider. For further information, See "**For Service Hint**".
*3 If you change the PIN, please write down your new PIN as the unit will not reveal the PIN to you. If you forget your PIN, See "**For Service Hint**".
*4 Call restriction feature restricts the handset from dialling certain phone numbers. You can assign up to 10 phone numbers (memory locations 0–9) to be restricted.
*5 Emergency number feature determines which phone numbers may be dialled while the call bar feature is turned on. A total of 4 emergency numbers (memory locations 1–4) can be stored.

Cross Reference:

For Service Hint (P.10)

4.4.2. Handset

To customise the handset:

1 【▤/OK】 → "SETTING HS" → 【▶】

2 Select the desired item in the handset settings menu (【▼】). → 【▶】

3 Select the desired item in sub-menu (【▼】). → 【▶】

4 Select the desired setting (【▼】) or follow the instructions in the "Feature" column of the chart.
- To exit the operation, press 【✆】.

Handset settings menu	Sub-menu	Feature (default setting)	Remarks (selectable options)
TIME ALARM	SET TIME	Set time alarm. – Enter the desired hour and minute (24-hour time entry). → 【▶】 – Select the desired setting. → 【▶】	–
	SET ALARM	Change alarm frequency ("OFF").	OFF/ONCE/REPEAT DAILY
RINGER OPT	RINGER VOL	Handset ringer volume (level 6)*1	RINGER OFF/1 to 6, ✳6 (step up)
	EXT RINGER	Ringer type for external calls ("RING TYPE 1")	1 to 20 (6 Bells and 14 Melodies)
	INT RINGER	Ringer type for internal calls ("RING TYPE 1")	1 to 20 (6 Bells and 14 Melodies)
	PAGING	Ringer type for page ("RING TYPE 1")	1 to 20 (6 Bells and 14 Melodies)
	ALARM	Ringer type for alarm ("RING TYPE 1")	1 to 20 (6 Bells and 14 Melodies)
TONE OPT	KEY TONE	Keytones on/off ("ON")	ON/OFF
	CALL WAITING	Call waiting tone on/off ("ON")	ON/OFF
	RANGE ALARM	Range alarm on/off ("OFF")	ON/OFF
	BATTERY LOW	Battery low alarm on/off ("ON")	ON/OFF
DISPLAY OPT	STANDBY MODE	Standby mode display ("CLOCK")	CLOCK/OFF/BS NO/HS NO
	TALK MODE	Talk mode display ("TALK TIME")	TALK TIME/PHONE NO
	LANGUAGE	Display language ("ENGLISH")	10 languages selectable
CALL OPT	CALL BAR	Call bar on/off ("OFF")*2 – Enter handset PIN (default: "0000"). – Select the desired setting. → 【▶】	ON/OFF
	DIRECT NO	Store direct call number.*3 – Enter a phone number (24 digits max.). – 【▤/OK】 2 times → "ON"	Up to 1 number
	SET DIRECT	Direct call on/off ("OFF")	ON/OFF
OTHER OPT	HSPIN CHANGE	Change handset PIN ("0000").*4 – Enter the current 4-digit handset PIN. – Enter the new 4-digit handset PIN. – Enter the new 4-digit handset PIN again.	–
	AUTO TALK	Auto talk on/off ("OFF")*5	ON/OFF
RESET HS	————	Reset handset to its default settings. – Follow steps 1 and 2. – Enter handset PIN (default: "0000"). – 【▼】 → 【▶】	–

*1 If you set to level 3 to 6 or ✳6, each ringer will start ringing with lower volume, then gradually increase in volume when receiving a call. Levels 6 and ✳6 are the highest settings. Their ringing methods are slightly different.

*2 Call bar feature prohibits making outside calls. When call bar is turned on, only emergency calls can be made.

*3 Direct call feature allows you to dial a preset phone number simply by pressing 【✆】. No dialling is necessary.

*4 If you change the PIN, please write down your new PIN as the unit will not reveal the PIN to you. If you forget your PIN, See "**For Service Hint**".

*5 Auto talk feature allows you to answer calls simply by lifting the handset off the base unit. You do not need to press 【✆】.

Cross Reference:

For Service Hint (P.10)

4.5. For Service Hint

Items	Contents
Battery	You could use other rechargeable batteries sold in a market, but the unit is not guaranteed to work properly.
PIN Code	If you forget Base Unit or Handset PIN code, press ✱7000 as a PIN code. This is called "super password" and is effective when you have forgotten the PIN code.

5 DISASSEMBLY INSTRUCTIONS

5.1. Base Unit

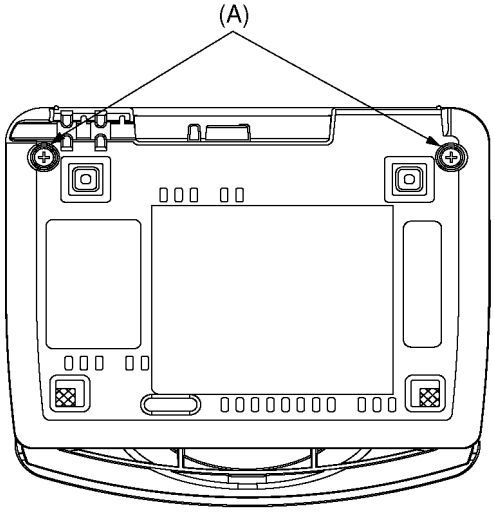


Fig. 1

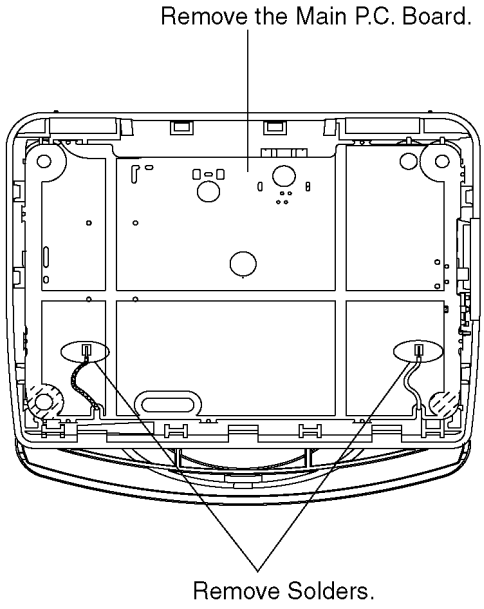


Fig. 2

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

5.2. Handset

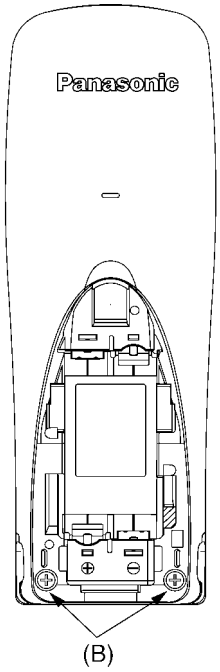


Fig. 3

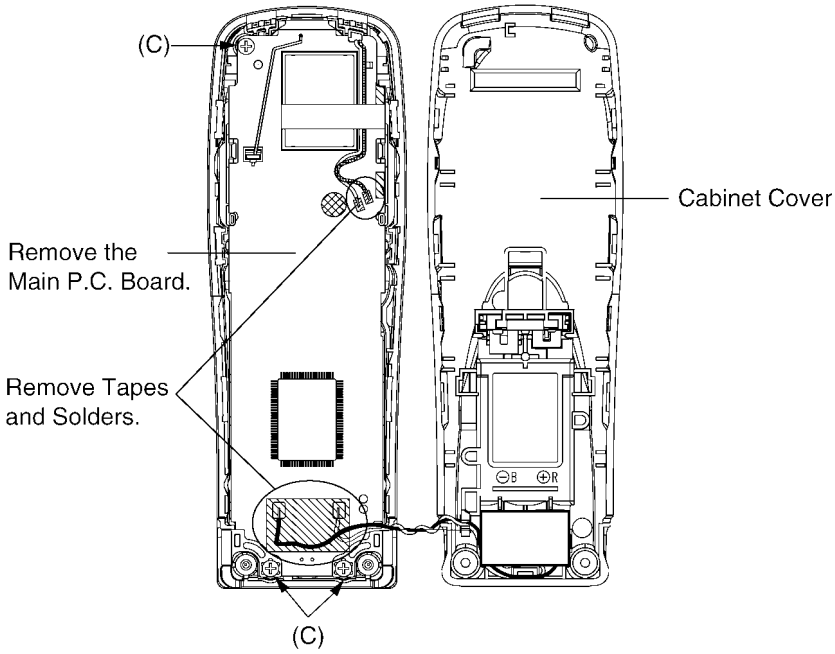
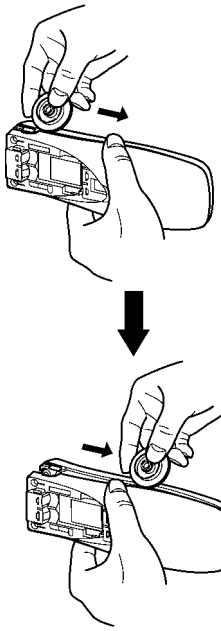
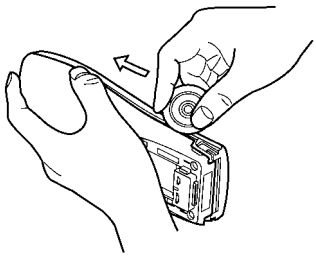


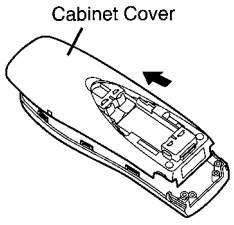
Fig. 5



Insert a JIG (PQDJ10006Y) between the Cabinet Body and the Cabinet Cover, then pull it along the gap to open the Cabinet.



Likewise, open the other side of the Cabinet.



Remove the Cabinet Cover by pushing it upward.

Fig. 4

Shown in Fig.-	To Remove	Remove
3	Cabinet Cover	Screws (2 × 8).....(B) × 2
4		Follow the procedure.
5	Main P.C. Board	Screw (2 × 8).....(C) × 3
		Tapes and Solders
		Main P.C. Board

5.3. Charger Unit

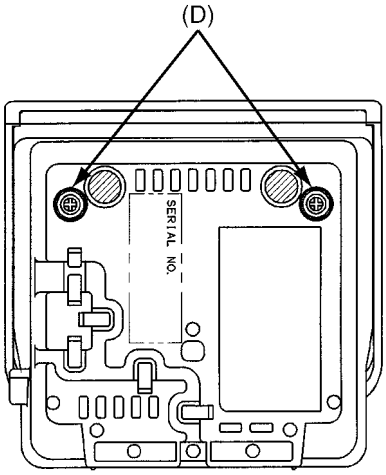


Fig. 6

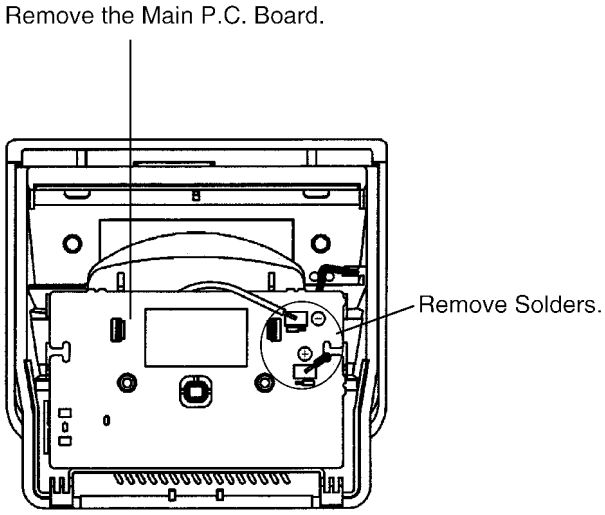


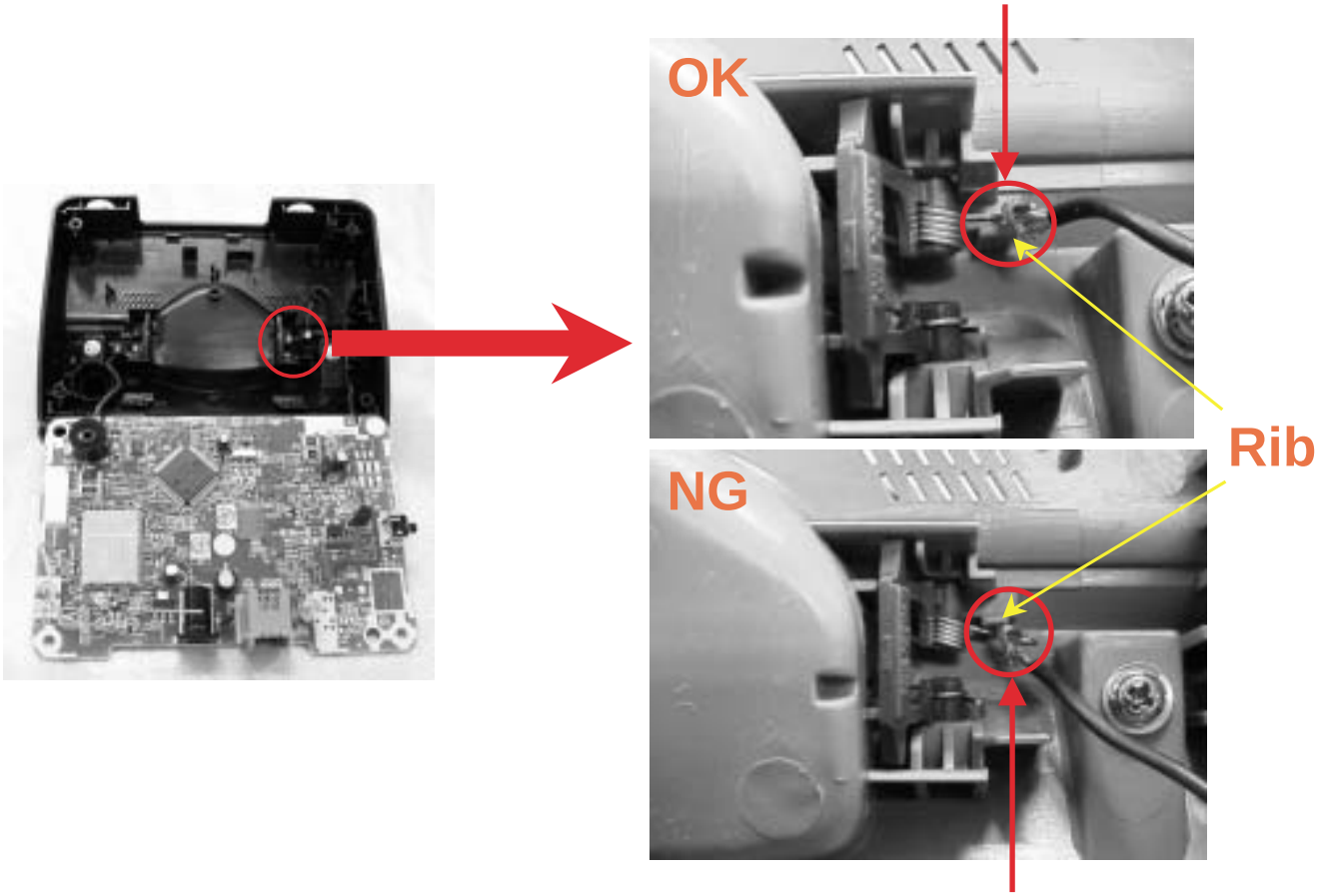
Fig. 7

Shown in Fig.-	To Remove	Remove
6	Lower Cabinet	Screws (2.6 × 14).....(D) × 2
7	Main P.C. Board	Solders
		Main P.C. Board

6 ASSEMBLY INSTRUCTIONS

6.1. Warning When Constructing the Base Unit

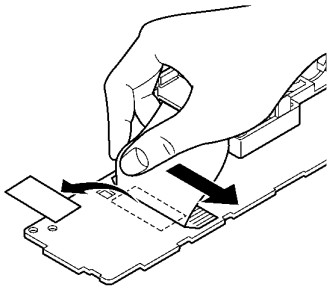
CHG terminal is properly fit in the cabinet.



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

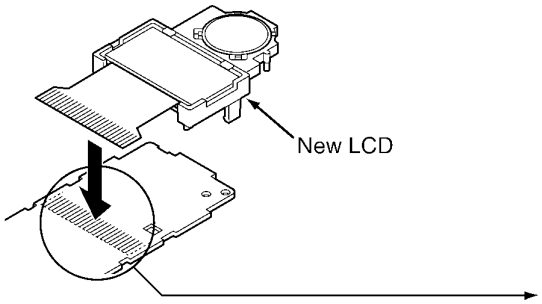
6.2. How to Replace the Handset LCD

①

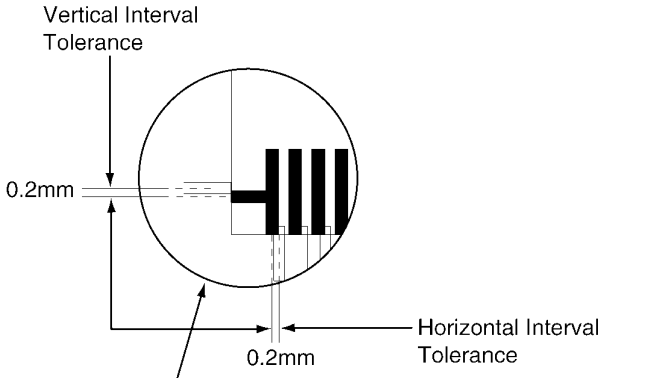


Remove the tape, and then peel off the FFC (Flexible Flat Cable) of LCD in the direction of the arrow not to damage the foil on the P.C. Board.

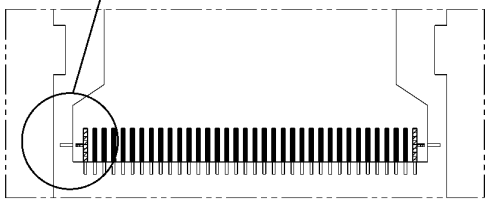
②



Fit the Heatseal of a New LCD to the P.C. Board.

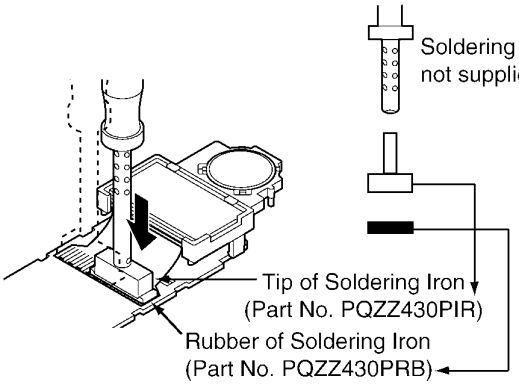


If interval tolerance between center lines is less than 0.2mm, it is o.k.

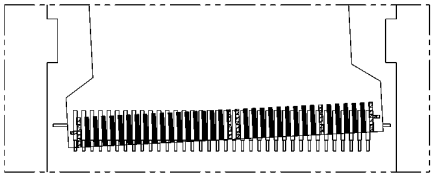


OK

③



Press the whole heatseal some times with the Tip of Soldering Iron, not to unstick the heatseal, and it should be pressed for 5 to 8 seconds at a time (in case of 60W soldering iron).



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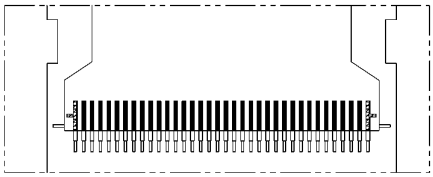
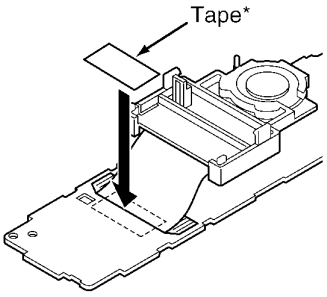
(Inclined)

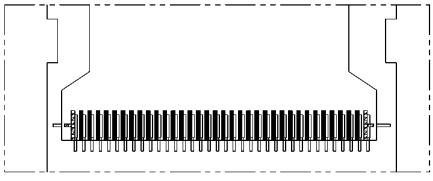


NG
(Vertical interval tolerance is more than 0.2 mm.)

④



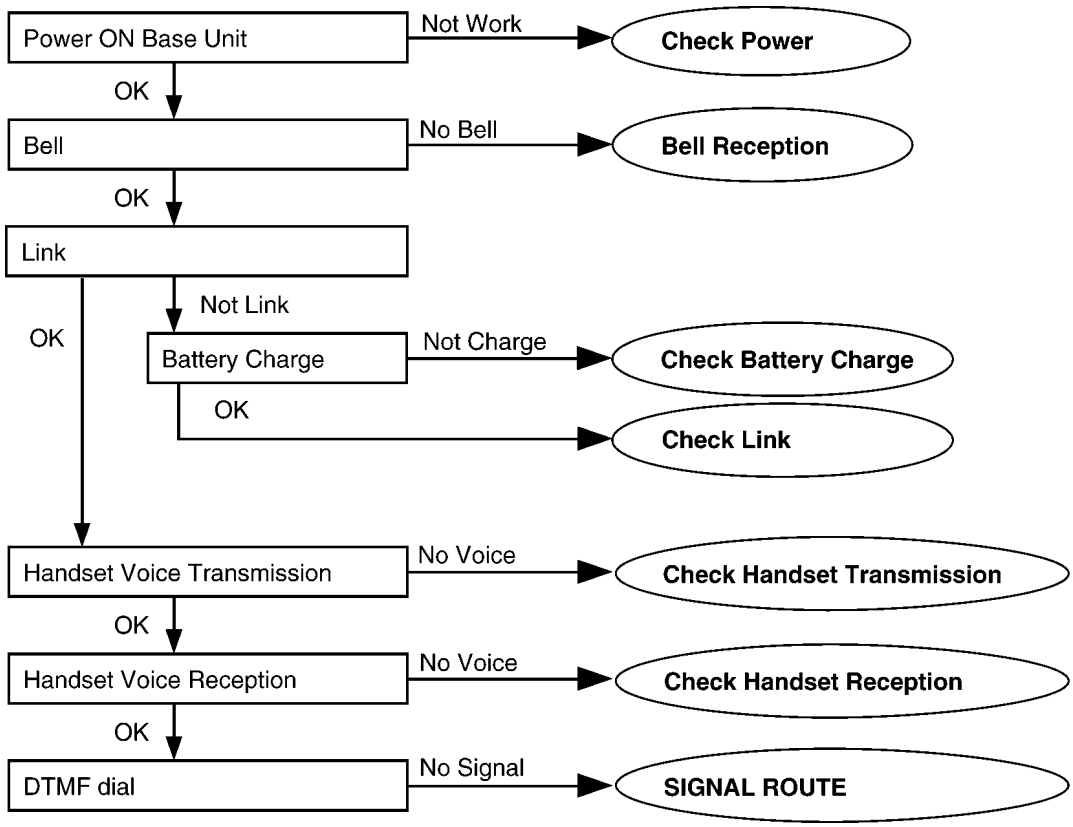
Stick the Tape* over the FFC.
* Use the Tape which was removed first.



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

7 TROUBLESHOOTING GUIDE

Flow Chart



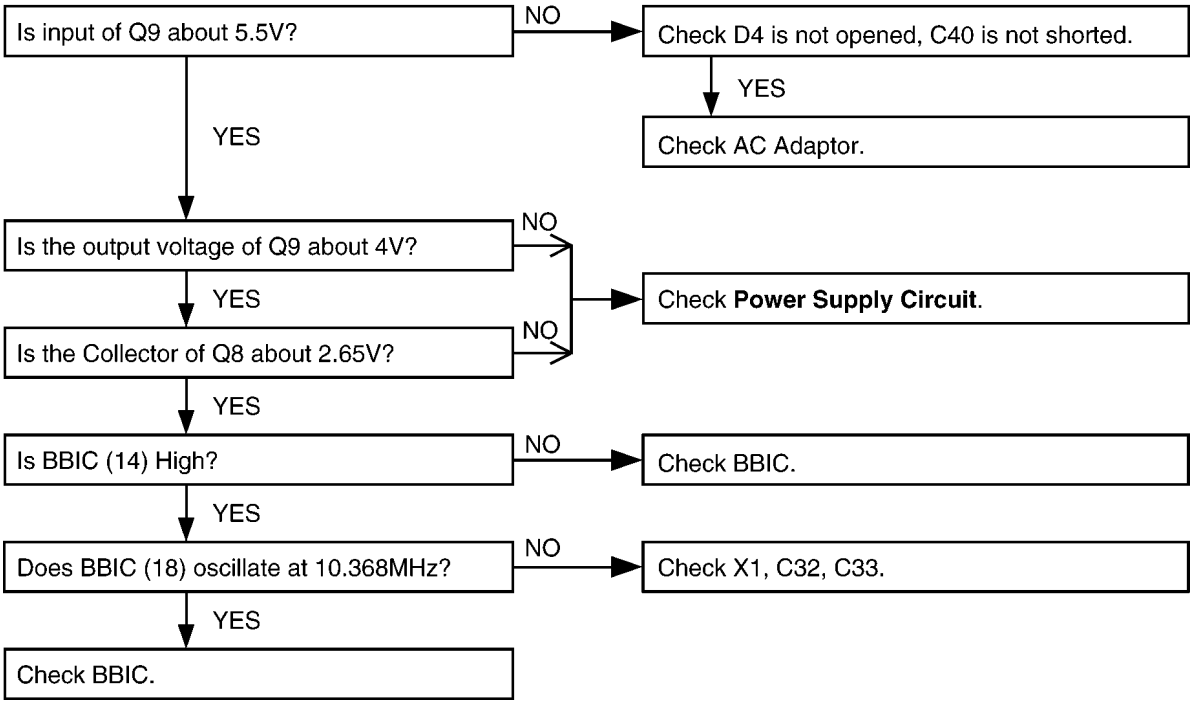
Cross Reference:

Check Power (P.17)
Bell Reception (P.22)
Check Battery Charge (P.18)
Check Link (P.19)
Check Handset Transmission (P.21)
Check Handset Reception (P.21)
SIGNAL ROUTE (P.46)

7.1. Check Power

7.1.1. Base Unit

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



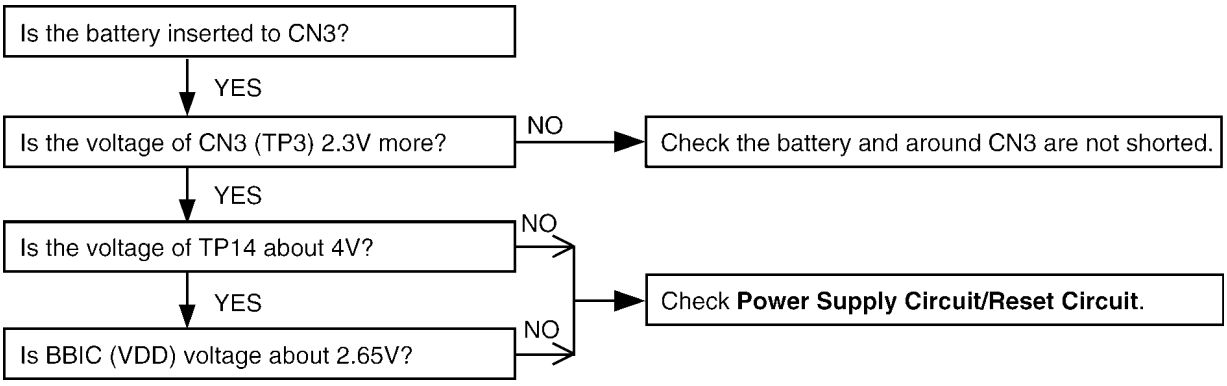
Cross Reference

Power Supply Circuit (P.41)

Note:

BBIC is IC2.

7.1.2. Handset



Cross Reference

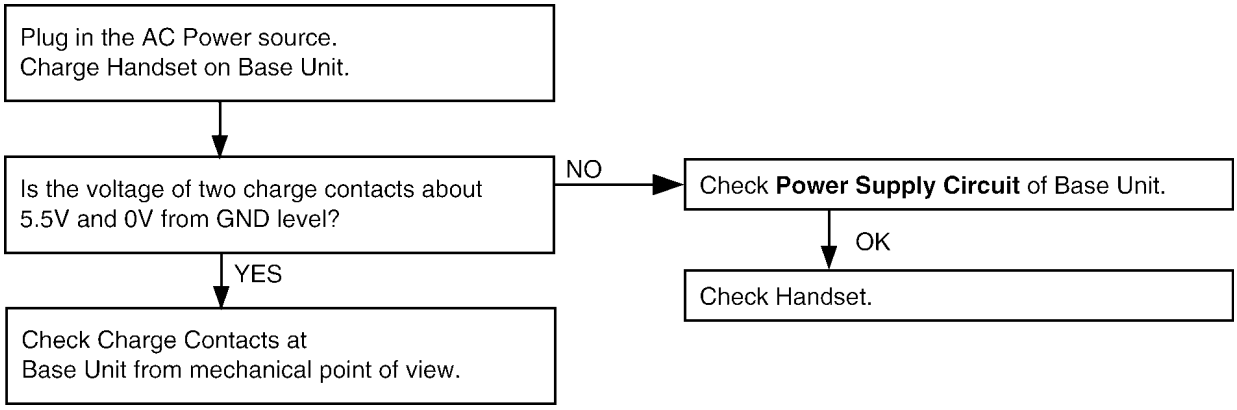
Power Supply Circuit/Reset Circuit (P.44)

Note:

BBIC is IC1.

7.2. Check Battery Charge

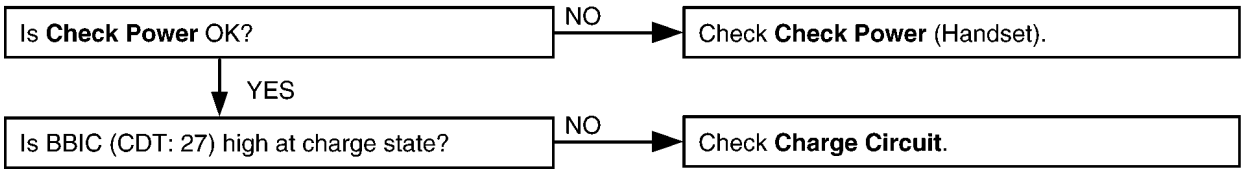
7.2.1. Base Unit



Cross Reference:

Power Supply Circuit (P.41)

7.2.2. Handset



Cross Reference:

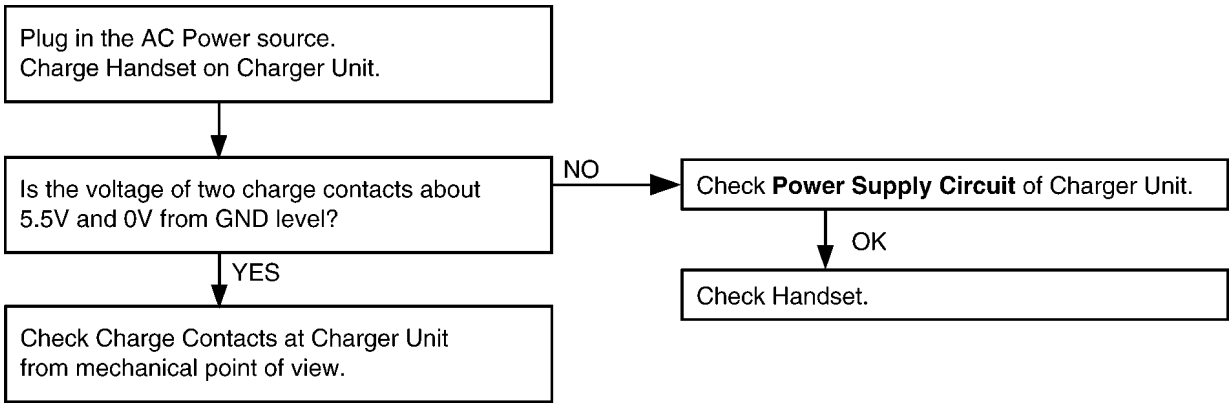
Check Power (P.17)

Charge Circuit (P.44)

Note:

BBIC is IC1.

7.2.3. Charger Unit

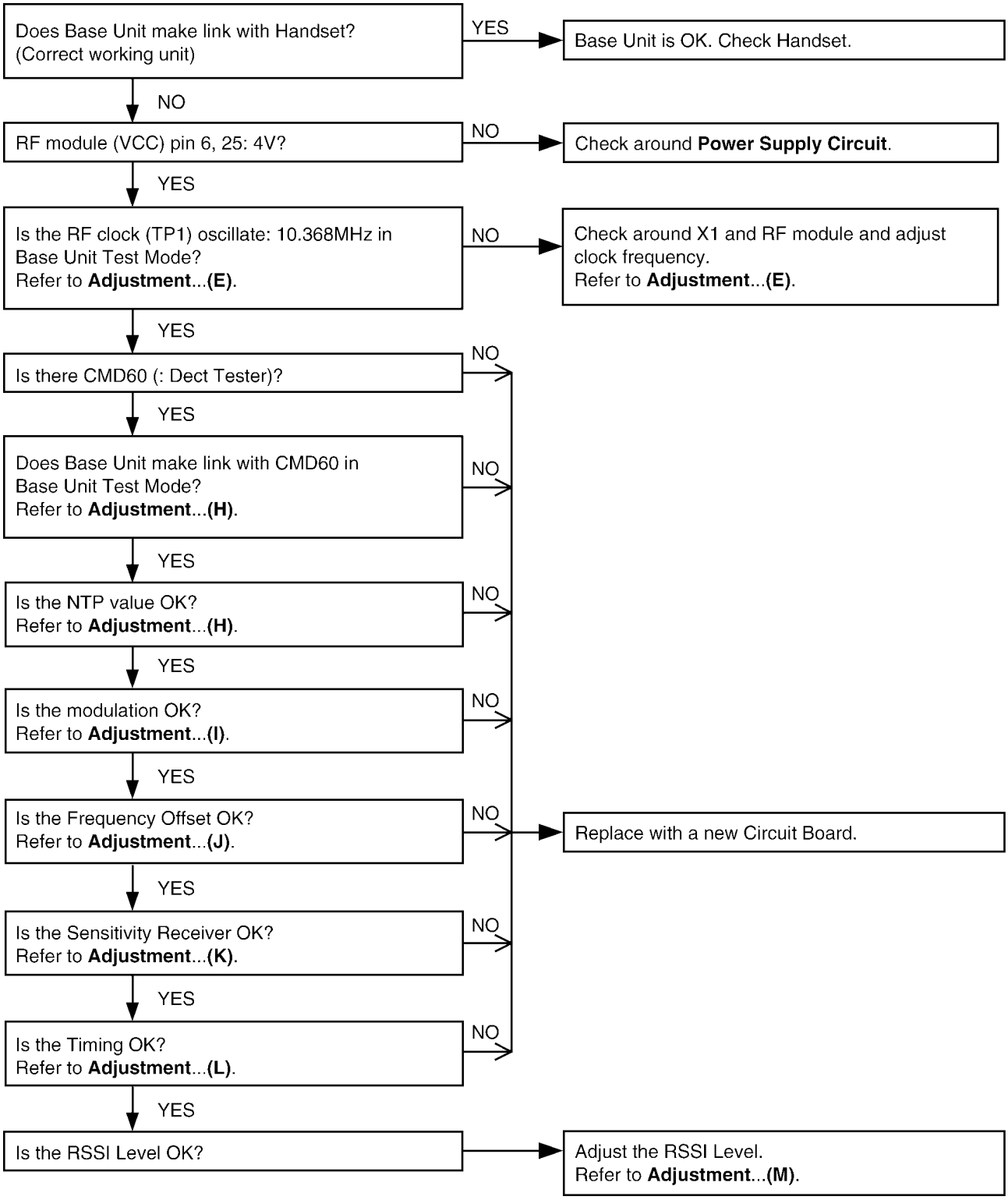


Cross Reference:

Power Supply Circuit (P.45)

7.3. Check Link

7.3.1. Base Unit

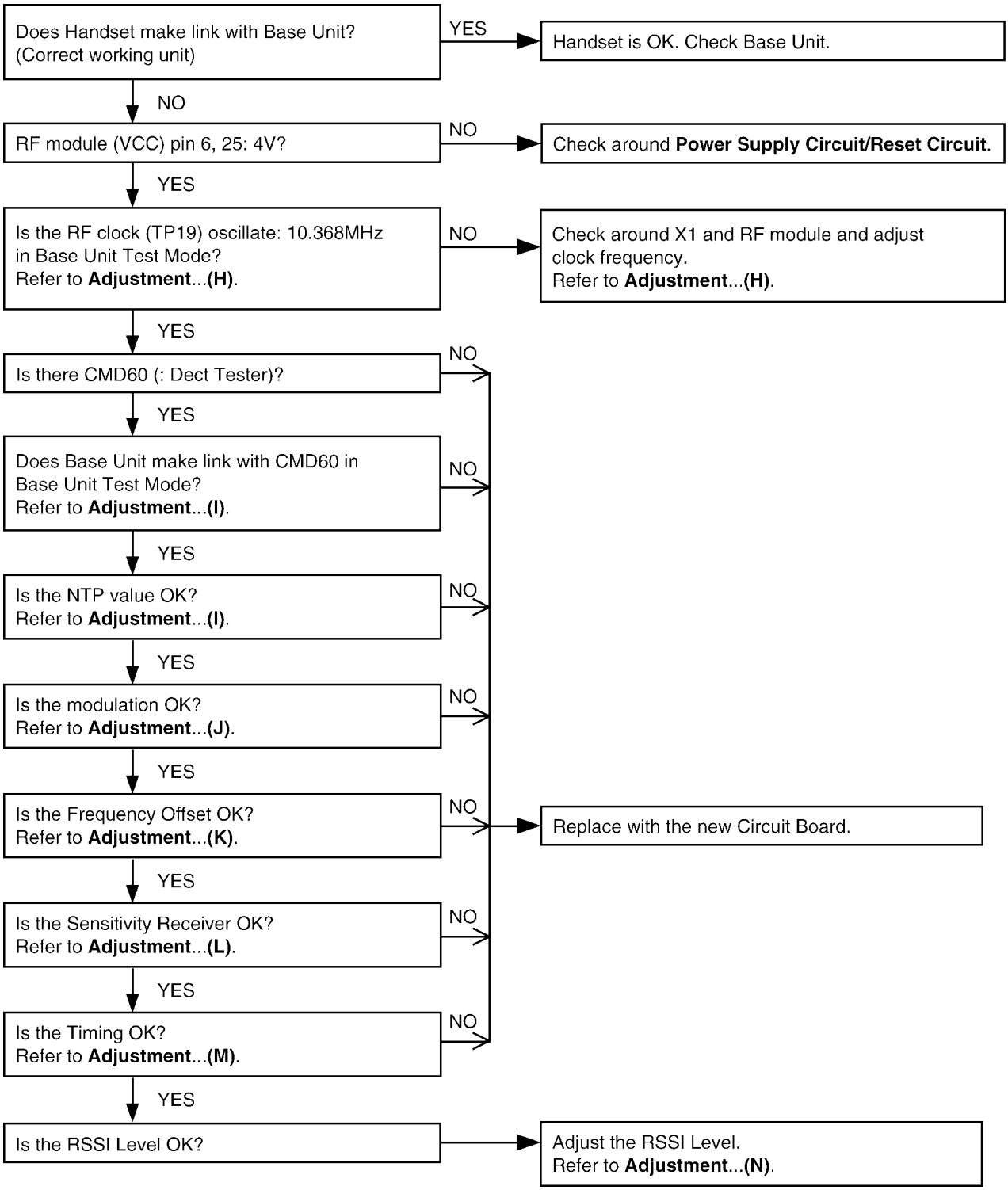


Cross Reference:

Power Supply Circuit (P.41)

Check Point (Base Unit) (P.23)

7.3.2. Handset

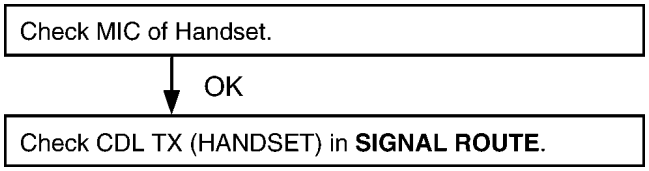


Cross Reference

Power Supply Circuit/Reset Circuit (P.44)

Check Point (Handset) (P.31)

7.4. Check Handset Transmission



Cross Reference:

SIGNAL ROUTE (P.46)

7.5. Check Handset Reception

Cross Reference:

HOW TO CHECK THE HANDSET SPEAKER (P.37).

SIGNAL ROUTE (P.46)

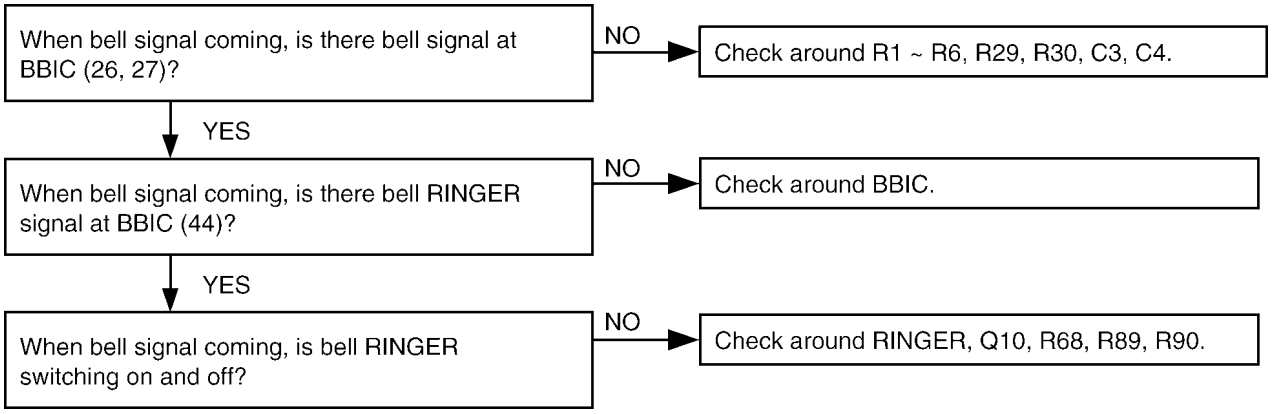
7.6. Check Caller ID

Cross Reference:

SIGNAL ROUTE (P.46)

7.7. Bell Reception

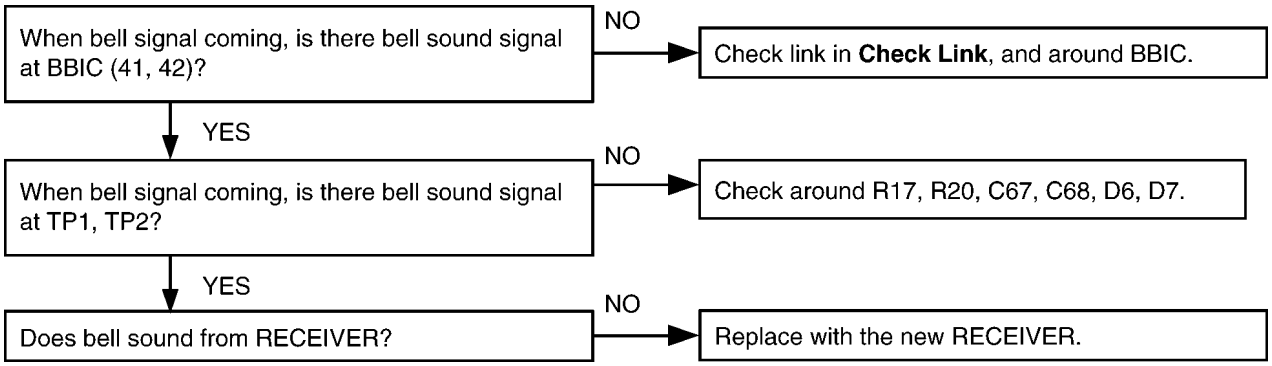
7.7.1. Base Unit



Note:

BBIC is IC2.

7.7.2. Handset



Cross Reference:

Telephone Line Interface (P.42)

Check Link (P.19)

Note:

BBIC is IC1.

8 TROUBLESHOOTING BY SYMPTOM (BASE UNIT AND CHARGER UNIT)

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

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

Note:

(*1) A general repair is possible even if you don't have the DECT tester because it is for confirming the levels, such as Acoustic level in detail.

(*2) Refer to **Check Point (Base Unit)** (P.23)

8.1. Check Point (Base Unit)

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

Note:

After the measuring, sock up the solder of TP.

*: **PC Setting** (P.27) is required beforehand.

The connections of simulator equipments are as shown in **Adjustment Standard (Base Unit)** (P.28).

	Items	Adjustment Point	Procedure	Check or Replace Parts
(**A**)	2.65V Supply Confirmation	-	1. Confirm that the voltage between TP187 and GND is 2.65V ± 0.2V.	IC2,Q8,C23, C24,C25, C26,C27,C38, R33,R36, D5,C41,R41, R42,Q9, C40,D4,X1, C32,C33, C36,C37
(**B**)	4.0V Supply Confirmation	-	1. Confirm that the voltage between TP91 and GND is 4.0V ± 0.2V.	D4,C40,Q9, R41,R42, C41,D5,C75, C78,C69, C66,C67,C76, IC3
(**C**)	VBACK Status Confirmation	-	1. Confirm that the voltage between J102 and GND is 0V ± 0.4V.	IC2,Q8,C23, C24,C25, C26,C27,C38, R33,R36, D5,C41,R41, R42,Q9, C40,D4,R33, X1,C32, C33

	Items	Adjustment Point	Procedure	Check or Replace Parts
(**D**)*	BBIC Confirmation	-	1. BBIC Confirmation (Execute the command “getchk”). 2. Confirm the returned checksum value. Connection of checksum value and program number is shown below. ex.) checksum value: B1E8 / program number: D441ZB; checksum value: 4604 / program number: D471ZA	IC2,X1,C32, C33
(**E**)*	BBIC Clock Adjustment (Important)	TP1	1. Execute the command “deactmac”. 2. Execute the command “conttx”. 3. Input Command “rdeeprom 00 00 02”, then you can confirm the current value. 4. Adjust the frequency of TP1 executing the command “setfreq 00 xx (where xx is the value)” so that the reading of the frequency counter is 10.368000MHz ± 10Hz.	IC2,IC3,L1, C48,X1,C32, C33
(**F**)*	Hookswitch Check with DC Characteristics	-	1. Connect J1 (Telephone Socket) to Tel-simulator which is connected with 600 Ω. 2. Set line voltage to 48V at on-hook condition and line current to 40mA at off-hook condition of normal telephone. 3. Execute the command “hookoff” 4. Confirm that the line current is 40mA ± 5mA. 5. Execute the command “hookon”. 6. Confirm that the line current is 0mA + 2mA.	IC2,R7,R8, R9,R10,R77, Q2,Q3,D2, C1,C2
(**G**)*	DTMF Generator Confirmation	-	1. Connect J1 (Telephone Socket) to DTMF tester. 2. Execute the command “hookoff” and “dtmf_up”. 3. Confirm that the high frequency (1477.06Hz) group is -6.5dBm ~ -9.5dBm. 4. Execute the command “dtmf_lo”. 5. Confirm that the low frequency (852.05Hz) group is -9.0dBm ~ -12.0dBm.	IC2,R32,C22, R23,C80, C14,C13,Q6, R22,R21, R19,R20,C12, D2,C1, C2,R77,D3, R12,Q2, R7,R8,R9, R10,Q3
(**H**)*	Transmitted Power Confirmation	-	Remove the Antenna before starting steps from 1 to 5. 1. Configure the DECT tester (CMD60) as follows; <Setting> ・Short TP10 and GND ・Test mode: FP ・Traffic Channel: 5 ・Traffic Slot: 4 ・Mode: Loopback ・PMID: 00000 2. Execute the command “testmode”. 3. Initiate connection from DECT tester. (“set up connect”) 4. Execute the command “ANT 1”. 5. Confirm that the NTP value at ANT is 20dBm ~ 25dBm.	IC2,IC3,L1, C43,C78, C75,C69,C48, C72,C66, C67,C76,C57, C73,L3, DA1,R66,R67, C55,C56, R78,R79,C54, C58,C86, R38
(**I**)	Modulation Check and Adjustment	ANT	Follow steps 1 to 3 of **(H)** above. 4. Confirm that the B-Field Modulation is 340kHz/div ~ 402kHz/div using data type Fig31. 5. Adjust the B-Field Modulation if required. (Execute the command “readmod” and “wrtmod xx”, where xx is the value.)	IC2,IC3,L1, C43,C78, C75,C69,C48, C72,C66, C67,C76,C57, C73,L3, DA1,R66,R67, C55,C56, R78,R79,C54, C58,C86, R38
(**J**)	Frequency Offset Confirmation	-	Follow steps 1 to 3 of **(H)** above. 4. Confirm that the frequency offset is -50kHz ~ +50kHz.	IC2,IC3,L1, C43,C78, C75,C69,C48, C72,C66, C67,C76,C57, C73,L3, DA1,R66,R67, C55,C56, R78,R79,C54, C58,C86, R38

	Items	Adjustment Point	Procedure	Check or Replace Parts
(**K**)	Sensitivity Receiver Confirmation	-	Follow steps 1 to 3 of **(H)** above. 4. Set DECT tester power to -88dBm. 5. Confirm that the BER is < 1000ppm.	IC2,IC3,L1, C43,C78, C75,C69,C48, C72,C66, C67,C76,C57, C73,L3, DA1,R66,R67, C55,C56, R78,R79,C54, C58,C86, R38
(**L**)	Timing Confirmation	-	Follow steps 1 to 3 of **(H)** above. 4. Confirm that the Timing accuracy is < ± 2.0ppm.	IC2,IC3,L1, C43,C78, C75,C69,C48, C72,C66, C67,C76,C57, C73,L3, DA1,R66,R67, C55,C56, R78,R79,C54, C58,C86, R38
(**M**)*	RSSI Level Confirmation	-	Follow steps 1 to 3 of **(H)** above. 4. Set DECT tester power to -88dBm. 5. Execute the command “readrssi”. 6. Confirm: 25 < returned value < 43 (hex) (0x34 ± F (hex))	IC2,IC3,L1, C43,C78, C75,C69,C48, C72,C66, C67,C76,C57, C73,L3, DA1,R66,R67, C55,C56, R78,R79,C54, C58,C86, R38
(**N**)*	Receive Audio Check and Adjustment	ANT J1	1. Configure the DECT tester (CMD60) as follows; <Setting> ・Test mode: FP ・Mode: Normal ・PMID: 00000 2. Execute the command “testmode”. 3. Initiate connection from DECT tester. 4. Execute the command “hookoff”. 5. Execute the command “openau”. 6. Connect J1 (Telephone Socket) to Tel-simulator which is connected with 600 Ω. 7. Set line voltage to 48V and line current to 40mA. 8. Connect DECT tester to Tel-simulator. 9. Input audio signal (200mVrms/1kHz tone) to Tel-simulator. <DECT tester setting> ・Scramble: On ・AF Gen. to ADPCM: Off ・AF Meter Input: ADPCM ・AF Gen. Frequency: 1000Hz ・AF Gen. Level: 200mVrms 10. Confirm hearing tone: 300mVrms ± 100mVrms 11. Adjust audio level if required. (Make sure current value using “getmicgain”. And then execute the command “setmicgain xx”, where xx is the value.) 12. Confirm that the B-field audio distortion with DECT tester is < 5%.	IC2,C21,R31, C20,C11, R18,R16,D3, R12,Q2, R7,R8,Q3, R9,R10, D2,C1,C2, R77,IC3, L1,C43,C78, C75,C69, C48,C72,C66, C67,C76, C57,C73,L3, DA1,R66, R67,C55,C56, R78,R79, C54,C58,C86, R38

	Items	Adjustment Point	Procedure	Check or Replace Parts
(**O**)*	Transmit Audio Check and Adjustment	ANT J1	1. Configure the DECT tester (CMD60) as follows; <Setting> ・Test mode: FP ・Mode: Normal ・PMID: 00000 2. Execute the command “testmode”. 3. Initiate connection from DECT tester. 4. Execute the command “hookoff”. 5. Execute the command “openau”. 6. Connect J1 (Telephone Socket) to Tel-simulator which is connected with 600 Ω. 7. Set line voltage to 48V and line current to 40mA. 8. Input audio signal (30mVrms/1kHz tone) to DECT tester. <DECT tester setting> ・Scramble: On ・AF Gen. to ADPCM: On ・AF Meter Input: AF Voltm ・AF Gen. Frequency: 1000Hz ・AF Gen. Level: 30mVrms 9. Confirm hearing tone: 330mVrms ± 100mVrms. 10. Adjust audio level if required. (Make sure current value using “getspkrgain”. And then execute the command “setspkrgain xx”, where xx is the value.) 11. Confirm that the audio distortion at 600R of Tel-simulator is < 5%.	IC2,R32,C22, R23,C80, C14,C13,R22, R21,Q6, R18,R19,R20, C12,D2, C1,C2,R77, R16,D3, R12,Q2,R7,R8 ,R9, R10,Q3,IC3, L1,C43, C78,C75,C69, C48,C72, C66,C67,C76, C57,C73, L3,DA1,R66, R67,C55, C56,R78,R79, C54,C58, C86,R38
(**P**)	Charging Check	-	1. Connect Charge Contact 12Ω/2W resistor between charge+ and charge-. 2. Measure and confirm voltage across the resistor is 2.3V ± 0.2V.	D4,R43,R44
(**Q**)*	Audio Check	-	1. Link with Handset. 2. Set line voltage to 48V and line current to 40mA. 3. Input -45dBm/1kHz to MIC of Handset. Measure the Level at Line I/F and distortion level. 4. Confirm that the level is -23 ± 2dBm and that the distortion level is < 5% at TEL Line (600Ω Load). 5. Input -20dBm/1kHz to Line I/F. Measure the level at Receiver of Handset and distortion level (*Receive volume set to second position from minimum). 6. Confirm that the level is -9 ± 2dBm and that the distortion level is < 5% at Receiver (Volume Middle, 150Ω Load).	

8.2. The Setting Method of JIG (Base Unit)

8.2.1. Preparation

8.2.1.1. Equipment Required

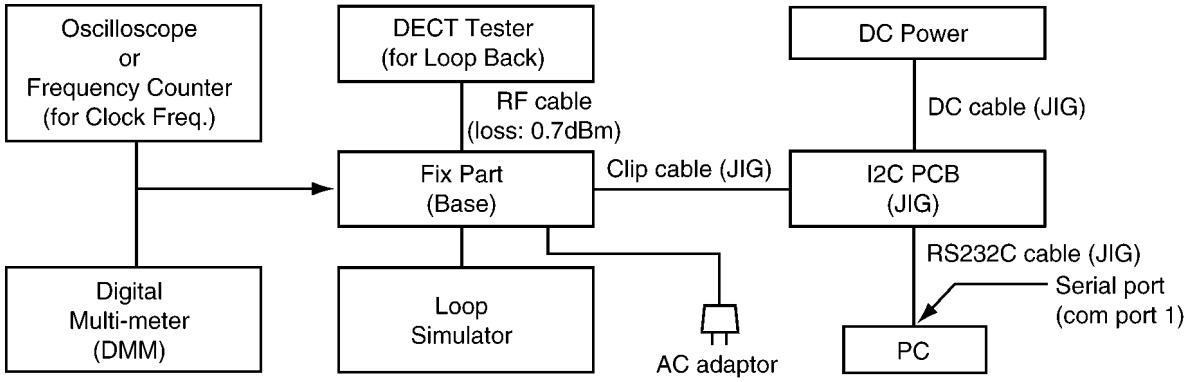
- DECT tester: Rohde & Schwarz, CMD 60 is recommended.
- Frequency counter: it must be precise to be able to measure 1Hz (precision; ±4ppm).
  Hewlett Packard, 53131A is recommended.
- DC power: it must be able to output at least 1A current under 9V.
- Digital multi-meter (DMM): it must be able to measure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

8.2.1.2. JIGs and PC

- EEPROM serial JIGs
  1. I2C PCB: PQZZTCD420BX
  2. RS232C cable: PQZZ1CD705BX
  3. Clip cable: PQZZ2CD705BX
  4. DC cable: PQZZ3CD705BX
- PC which runs in DOS mode
- **Batch file CD-ROM** for setting: PQZZTCD150FX

8.2.2. PC Setting

8.2.2.1. Connections



8.2.2.2. PC Setting

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

Note:

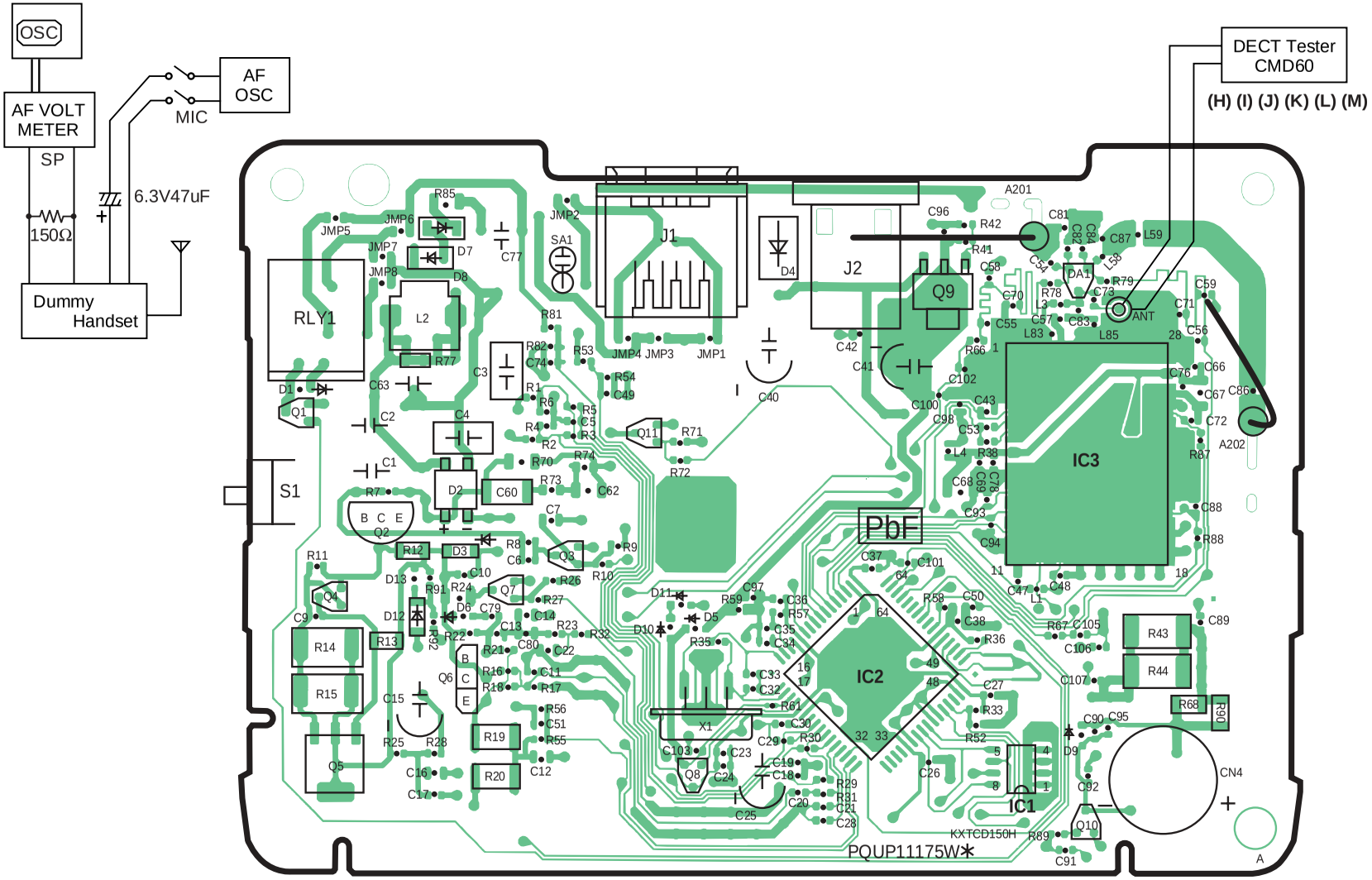
See the table below for frequently used commands.

Command name	Function	Example
rdeeprom	Read the data of EEPROM	Type “rdeeprom 00 00 FF”, and the data from address “00 00” to “FF” is read out.
readid	Read ID (RFPI)	Type “readid”, and the registered ID is read out.
writeid	Write ID (RFPI)	Type “writeid 00 18 E0 0E 98”, and the ID “0018 E0 0E 98” is written.
setfreq	adjust Frequency of RFIC	Type “setfreq nn nn”.
hookoff	off-hook mode on Base	Type “hookoff”.
hookon	on-hook mode on Base	Type “hookon”.
Getchk	Read checksum	Type “getchk”.
Wreeprom	write eeprom	Type “wreeprom 01 23 45". “01 23" is address and “45” is data to be written.
InitBsPIN.bat	Initial Base PIN to “0000”	Type “initBsPIN”

8.3. Adjustment Standard (Base Unit)

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

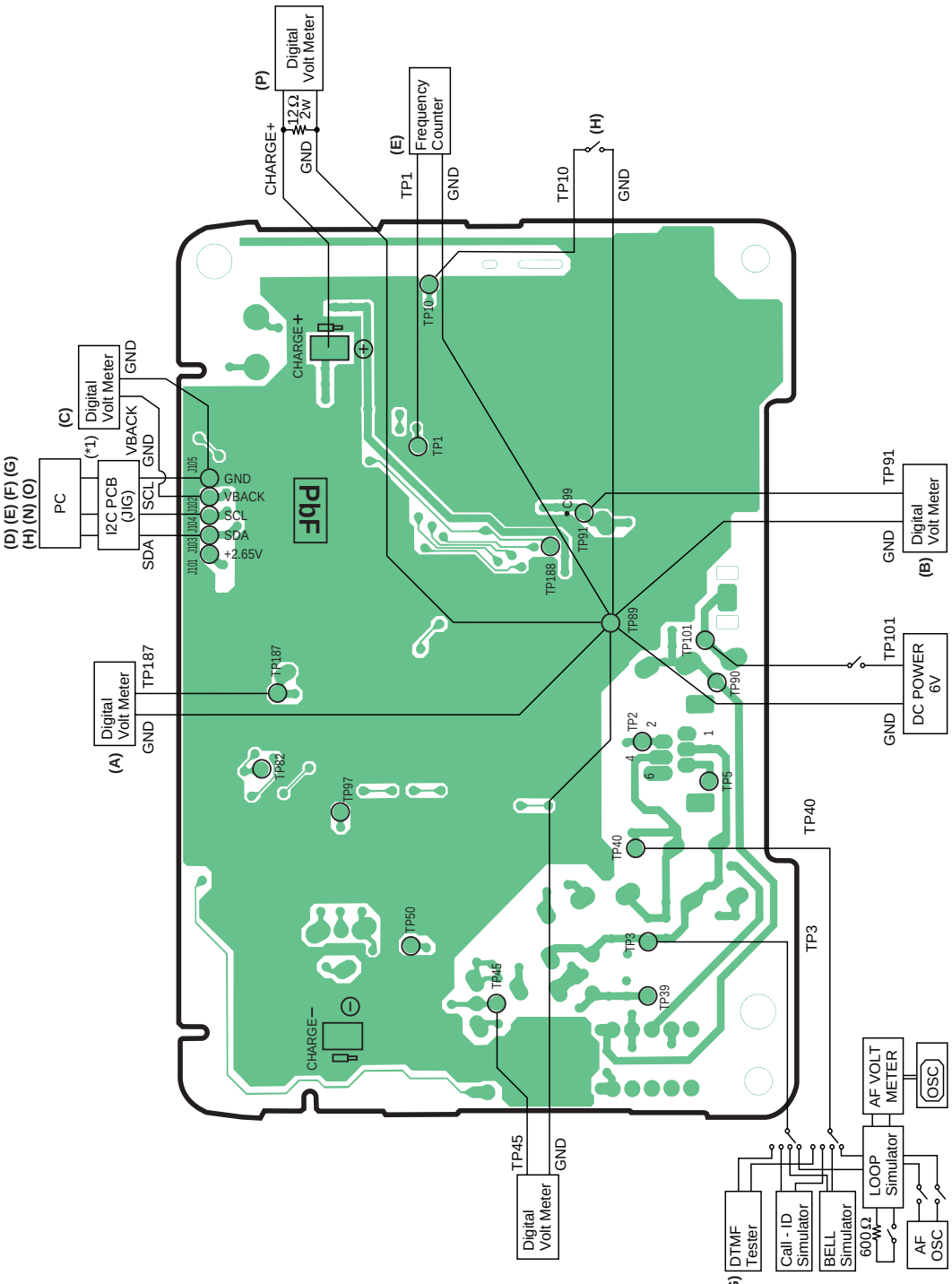
8.3.1. Component View



Note:

(**H**) - (**M**) is referred to **Check Point (Base Unit)** (P.23)

8.3.2. Flow Solder Side View



Note:

(A) - **(P)** is referred to **Check Point (Base Unit)** (P.23)

(*1) Refer to **Connections** (P.27)

8.4. Check Point (Charger Unit)

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

Note:

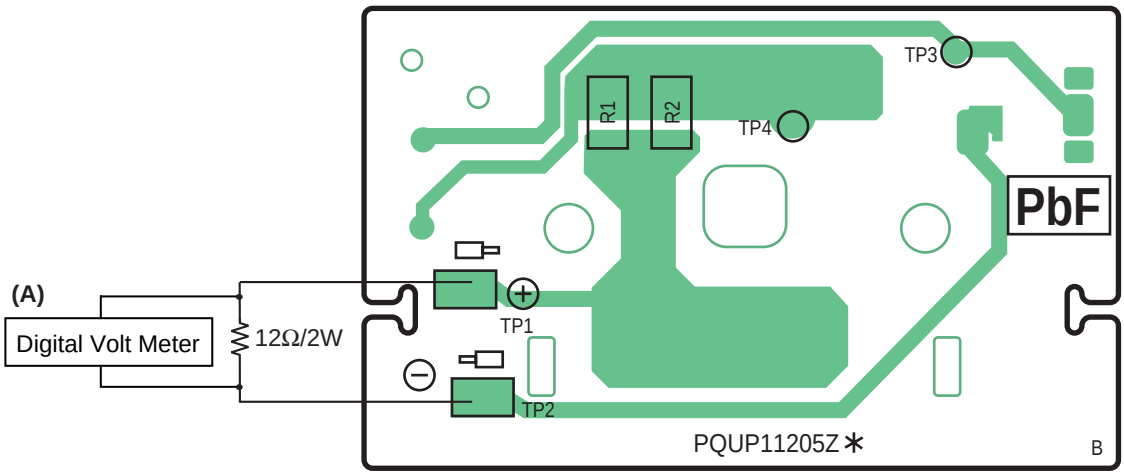
After the measuring, sock up the solder of TP.

The connection of adjustment equipment are as shown in **Adjustment Standard (Charger Unit)** (P.30).

8.5. Adjustment Standard (Charger Unit)

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

8.5.1. Flow Solder Side View



Note:

(**A**) is referred to **Check Point (Charger Unit)** (P.30)

9 TROUBLESHOOTING BY SYMPTOM (HANDSET)

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

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

Note:

(*1) A general repair is possible even if you don't have the DECT tester because it is for confirming the levels, such as Acoustic level in detail.

(*2) Refer to **Check Point (Handset)** (P.31)

9.1. Check Point (Handset)

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

Note:

After the measuring, sock up the solder of TP.

*: **PC Setting** (P.34) is required beforehand.

The connections of simulator equipments are as shown in **Adjustment Standard (Handset)** (P.35).

	Items	Adjustment Point	Procedure	Check or Replace Parts
(**A**)	4.0V Supply Confirmation	-	1. Confirm that the consumption current is < 200mA, that is, there is no short circuit. 2. Confirm that the voltage between TP14 and GND is 4.1V ± 0.2V.	IC1,F1,R21, R4,C33,L2, D1,C15,C2, C14,Q1,R3, R2,D2,R22, C26,X1,C16, C17
(**B**)	VBACK Status Confirmation	-	1. Confirm that the voltage between TP18 and GND is 0V ± 0.4V.	IC1,F1,R21, R4,C33,L2, D1,C15,C2, C14,Q1,R3, R2,D2,R22, C26,R16,X1, C16,C17
(**C**)	BBIC Confirmation	-	1. BBIC Confirmation (Execute the command "getchk"). 2. Confirm the returned checksum value. Connection of checksum value and program number is shown below. ex.) checksum value: 264D / program number: D452ZB	IC1,X1,C16, C17
(**D**)	Charge Control Check & Charge Current Monitor Confirmation	-	1. Apply 6V between TP20(+) and TP21(-) with current limit of PSU to 250mA. 2. Confirm that the charge current is ON/OFF. 3. SW to decrease current limit of PSU to 100mA. 4. Confirm that the charge current is stable.	IC1,D4,L4, L5,Q2,Q3, R6,D2,R22, C26,F1,R21, R4,C33
(**E**)*	Charge Detection (OFF) Confirmation	-	1. Stop supplying 6V to TP20(+) and TP21(-). 2. Execute the command "charge". 3. Confirm that the returned value is 0x00 (hex).	IC1,D4,L4, L5,Q2,Q3, R6,D2,R22, C26,F1,R21, R4,C33

	Items	Adjustment Point	Procedure	Check or Replace Parts
(**F**)*	Battery Monitor Confirmation & Adjustment (Important)	-	1. Apply 2.3V ± 0.005V between TP3(+) and TP4(-) with DC power. 2. Execute the command “deactmac” to stabilize the value. 3. Then,execute the command “readbatt”.The returned value is XX. 4. Confirm that XX is between 98 and A8. 98 < XX < A8(Hex) (If XX is out of range,change BBIC)	IC1,D4,L4, L5,Q2,Q3, R6,D2,R22, C26,F1,R21, R4,C33
(**G**)	Battery low Confirmation (Important)	-	1. Apply 2.40V between TP3(+) and TP4(-). 2. Confirm that there is no Speaker sound (Battery low alarm). 3. Apply 2.20V between TP3(+) and TP4(-). 4. Confirm that there is Speaker sound (Battery low alarm).	IC1,F1,R21, R4,C33, C12,C31,R17, R20,C10, C11,D6,D7
(**H**)*	BBIC Clock Adjustment (Important)	TP19	1. Apply 2.6V between TP 3(+) and TP 4(-) with DC power. 2. Execute the command “deactmac”. 3. Execute the command “conttx”. 4. Input Command “rdeeprom 00 01 01",then you can confirm the current value. 5. Adjust the frequency of TP19 executing the command “setfreq 00 xx (where xx is the value)”. so that the reading of the frequency counter is 10.368000MHz ± 10Hz.	IC1,L3,C57, IC3,X1,C16, C17
(**I**)*	Transmitted Power Confirmation	TP15	Remove the Antenna before starting steps from 1 to 5. Replace C58 with RESISTOR (0Ω). Be sure to mount C58 back to the same place after checking. 1. Configure the DECT tester(CMD60) as follows; <Setting> ・Test mode: PP ・RFPI: 0102030405 ・Traffic Channel: 5 ・Traffic Slot: 4 ・Mode: Loopback 2. Execute the command “testmode”. 3. Execute the command “regcmd60” 4. Initiate connection from DECT tester. 5. Confirm that the NTP value at A201 (TP15) is 20dBm ~ 25dBm	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,R24,C63, C64,C65, R18
(**J**)	Modulation Check and Adjustment	TP15	Follow steps 1 to 4 of **(I)** above. 5. Confirm that the B-Field Modulation is 340kHz/div ~ 402kHz/div using data type Fig31. 6. Adjust the B-Field Modulation if required. (Execute the command “Readmod” and “Writemod xx”, where xx is the value.)	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,R24,C63, C64,C65, R18
(**K**)	Frequency Offset Confirmation	-	Follow steps 1 to 4 of **(I)** above. 5. Confirm that the frequency offset is -50kHz ~ +50kHz.	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,R24,C63, C64,C65, R18
(**L**)	Sensitivity Receiver Confirmation	-	Follow steps 1 to 4 of **(I)** above. 5. Set DECT tester power to -88dBm. 6. Confirm that the BER is < 1000ppm.	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,R24,C63, C64,C65, R18
(**M**)	Timing Confirmation	-	Follow steps 1 to 4 of **(I)** above. 5. Confirm that the Timing accuracy is < ± 2.0ppm.	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,R24,C63, C64,C65, R18
(**N**)*	RSSI Level Confirmation	-	Follow steps 1 to 4 of **(I)** above. 5. Set DECT tester power to -88dBm. 6. Execute the command “readrssi” 7. Confirm: 25 < returned value < 43 (hex) (0x34 ± F (hex))	IC1,IC3,C54, C66,C60, L3,C57,C55, C56,C62, R23,R24,C63, C64,C65, R18

	Items	Adjustment Point	Procedure	Check or Replace Parts
(**O**)*	Receive Audio Check and Confirmation	TP15	1. Configure the DECT tester (CMD60) as follows; <Setting> ・Test mode: PP ・Mode: Normal ・RFPI: 0102030405 2. Execute the command “testmode”. 3. Execute the command “regcmd60” 4. Initiate connection from DECT tester. 5. Execute the command “openaudio”. 6. Confirm that the value of EEPROM address “F3F” is “02”. (If the value is not “02 (by User)”, set “02” and power off and power on, and return to clause 2.) 7. Input audio signal (50mVrms/1kHz tone) from DECT tester. <DECT tester setting> ・Scramble: On ・AF Gen. to ADPCM: On ・AF Meter Input: AF Voltm ・AF Gen. Frequency: 1000Hz ・AF Gen. Level: 50mVrms 8. Confirm hearing tone: 300mVrms ± 250mVrms (Just check Audio path) 9. Confirm that the audio distortion with DECT tester is < 5%.	IC1,C67,C68, R17,R20, D7,D6,IC3, C54,C66, C60,L3,C57, C55,C56, C62,R23,R24, C63,C64, C65,R18
(**P**)	Transmit Audio Check and Confirmation	TP15	1. Configure the DECT tester (CMD60) as follows; <Setting> ・Test mode: FP ・Mode: Normal ・RFPI: 0102030405 2. Execute the command “testmode”. 3. Execute the command “regcmd60”. 4. Initiate connection from DECT tester. 5. Execute the command “openaudio”. 6. Confirm that the value of EEPROM address “F3F” is “02”. (If the value is not “02 (by User)”, set “02” and power off and power on, and return to clause 2.) 7. Input audio signal (30mVrms/1kHz tone) to DECT tester. <DECT tester setting> ・Scramble: On ・AF Gen. to ADPCM: Off ・AF Meter Input: ADPCM ・AF Gen. Frequency: 1000Hz ・AF Gen. Level: 30mVrms 8. Confirm hearing tone: 300mVrms ± 250mVrms (Just check Audio path) 9. Confirm that the audio distortion with DECT tester is < 5%.	IC1,C8,R7, R8,C6, C7,C5,R5, R1,C4, IC3,C54,C66, C60,L3, C57,C55,C56, C62,R23, R24,C63,C64, C65,R18
(**Q**)	Audio Check and Confirmation	-	1. Link to BASE which is connected to Line Simulator. 2. Set line voltage to 48V and line current to 40mA. 3. Input -45dBm/1KHz to MIC and measure Line output level. 4. Confirm that the level is -23 ± 2dBm and that the distortion level is < 5% at TEL Line (600Ω Load). 5. Input -20dBm/1KHz to Line I/F and measure Receiving level at SP+ and SP-. 6. Confirm that the level is -9 ± 2dBm and that the distortion level is < 5% at Receiver. (vol = middle, 150Ω Load)	

9.2. The Setting Method of JIG (Handset)

9.2.1. Preparation

9.2.1.1. Equipment Required

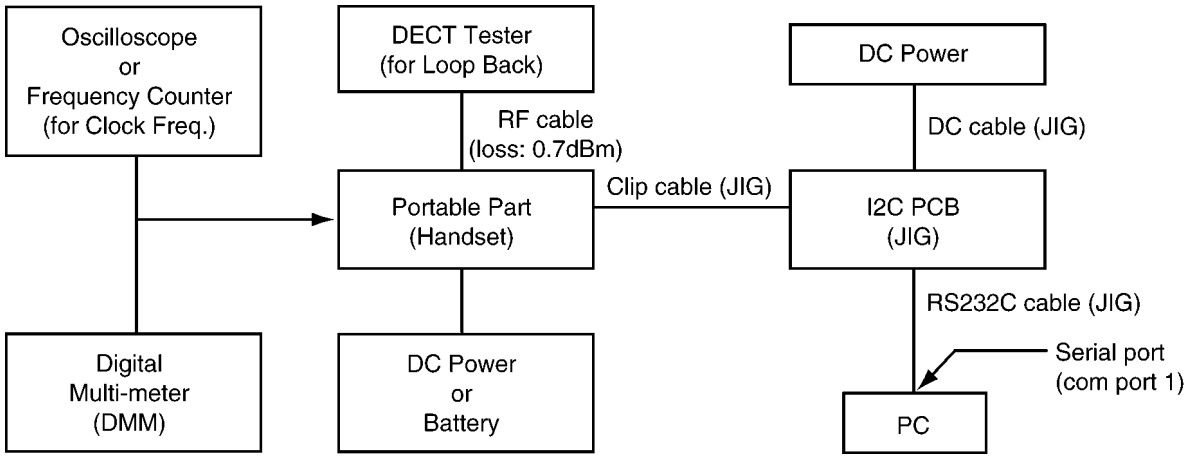
- DECT tester: Rohde & Schwarz, CMD 60 is recommended.
- Frequency counter: it must be precise to be able to measure 1Hz (precision; ± 4ppm).
  Hewlett Packard, 53131A is recommended.
- DC power: it must be able to output at least 1A current under 2.4V for Handset, 9V for JIG.
- Digital multi-meter (DMM):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

9.2.1.2. JIGs and PC

- EEPROM serial JIGs
  1. I2C PCB: PQZZTCD420BX
  2. RS232C cable: PQZZ1CD705BX
  3. Clip cable: PQZZ2CD705BX
  4. DC cable: PQZZ3CD705BX
- PC which runs in DOS mode.
- **Batch file CD-ROM** for setting: PQZZTCD150FX

9.2.2. PC Setting

9.2.2.1. Connections



9.2.2.2. PC Setting

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

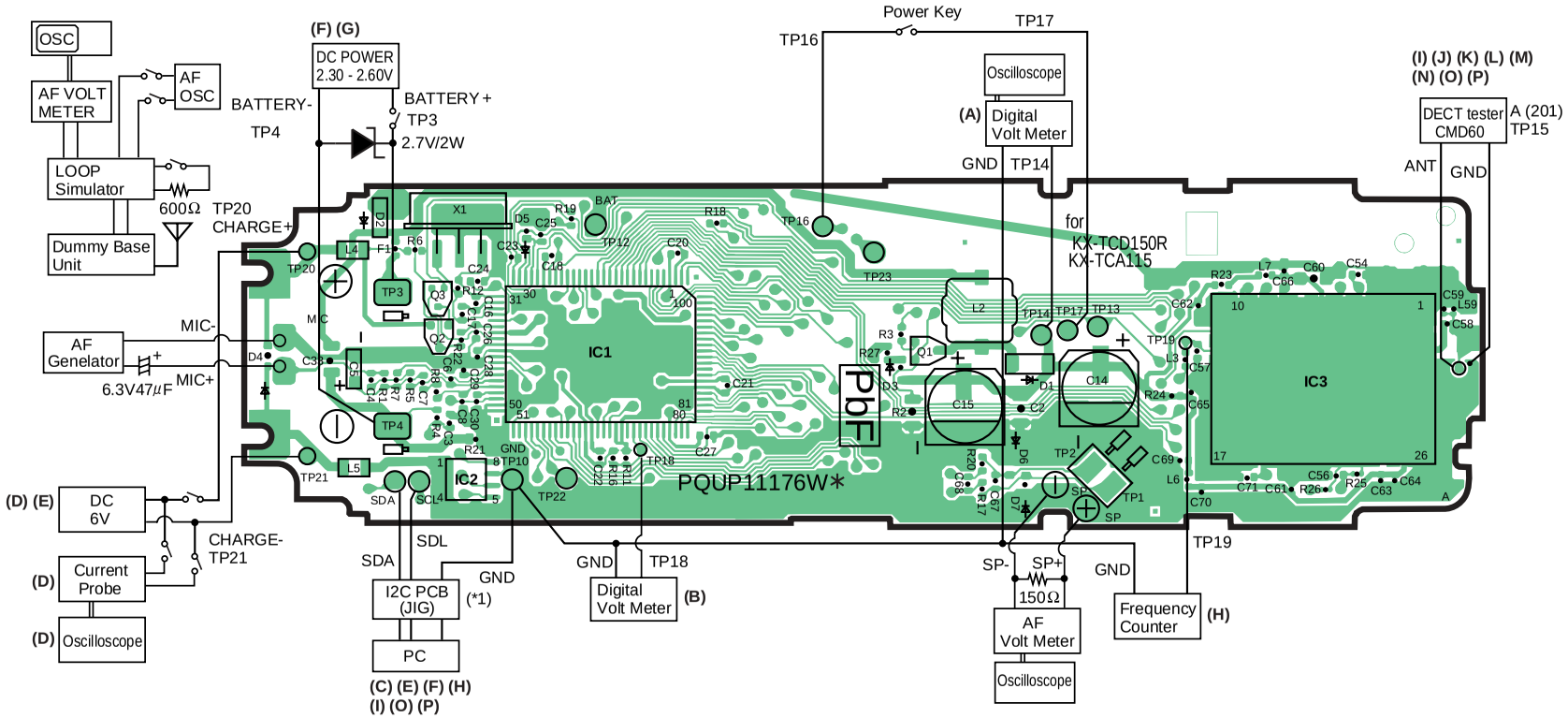
Note:

See the table below for frequently used commands.

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

9.3. Adjustment Standard (Handset)

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



Note:

(**A**) - (**P**) is referred to **Check Point (Handset)** (P.31)

(*1) Refer to **Connections** (P.34)

10 THINGS TO DO AFTER REPLACING IC

Cautions:

Since this page is common to each country, it may not apply to some models in your country. The contents below are the minimum adjustments required for operation.

10.1. Base Unit

IC		Necessary Adjustment
BBIC	Programs for Voice processing, interface for RF and EEPROM	1. Clock adjustment: Refer to Check Point (E). (*1)
EEPROM	Adjustment parameter data (country version batch file, default batch file, etc.)	1. Default batch file: Execute the command “Default4KB”. 2. Country version batch file: Execute the command “150XXvYY”. (*2) 3. Clock adjustment: Refer to Check Point (E). (*1)

Note:

(*1) Refer to **Check Point (Base Unit)** (P.23)

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

“XX” and “YY” vary depending on the country version. You can find them in the batch file, PQZZ- mentioned in **JIGs and PC** (P.27).

10.2. Handset

IC		Necessary Adjustment
BBIC	Programs for Voice processing, interface for RF and EEPROM	1. Clock adjustment: Refer to Check Point (H). (*3) 2. 4.0 V setting and battery low detection: Refer to Check Point (A), (F) and (G). (*3)
EEPROM	Adjustment parameter data (country version batch file, default batch file, etc.)	1. Default batch file: Execute the command “Default”. 2. Default batch file (remaining); Execute the command “115ADJvYY”. (*4) 3. Melody Initialize batch file; Execute the Command “InitMelodies143vYY” 4. Country version batch file: Execute the command “115XXvYY”. (*4) 5. Clock adjustment: Refer to Check Point (H). (*3) 6. 4.0 V setting and battery low detection: Refer to Check Point (A), (F) and (G). (*3)

Note:

(*3) Refer to **Check Point (Handset)** (P.31)

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

“XX” and “YY” vary depending on the country version. You can find them in the batch file, PQZZ- mentioned in **JIGs and PC** (P.34).

11 RF SPECIFICATION

11.1. Base Unit

Item	Value	Refer to -. *
TX Power	More than 20 dBm ~ 25 dBm	**Check Point (Base Unit) (H)**
Modulation	340 kHz/div ~ 402 kHz/div	**Check Point (Base Unit) (I)**
Frequency Offset	-50 kHz ~ +50 kHz	**Check Point (Base Unit) (J)**
RX Sensitivity	< 1000 ppm	**Check Point (Base Unit) (K)**
Timing Accuracy	< ± 2.0 ppm	**Check Point (Base Unit) (L)**
RSSI Level	0x34 hex ± F hex	**Check Point (Base Unit) (M)**

*: Refer to **Check Point (Base Unit)** (P.23)

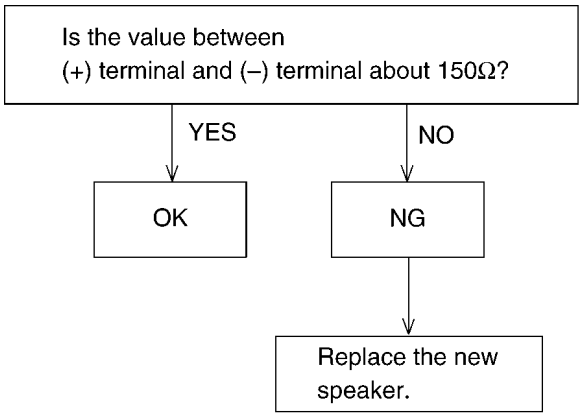
11.2. Handset

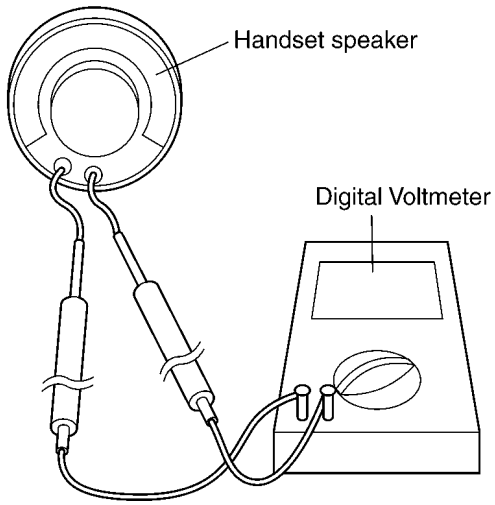
Item	Value	Refer to -. **
TX Power	More than 20 dBm ~ 25 dBm	**Check Point (Handset) (I)**
Modulation	340 kHz/div ~ 402 kHz/div	**Check Point (Handset) (J)**
Frequency Offset	-50 kHz ~ +50 kHz	**Check Point (Handset) (K)**
RX Sensitivity	< 1000 ppm	**Check Point (Handset) (L)**
Timing Accuracy	< ± 2.0 ppm	**Check Point (Handset) (M)**
RSSI Level	0x34 hex ± F hex	**Check Point (Handset) (N)**

: Refer to **Check Point (Handset) (P.31)

12 HOW TO CHECK THE HANDSET SPEAKER

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





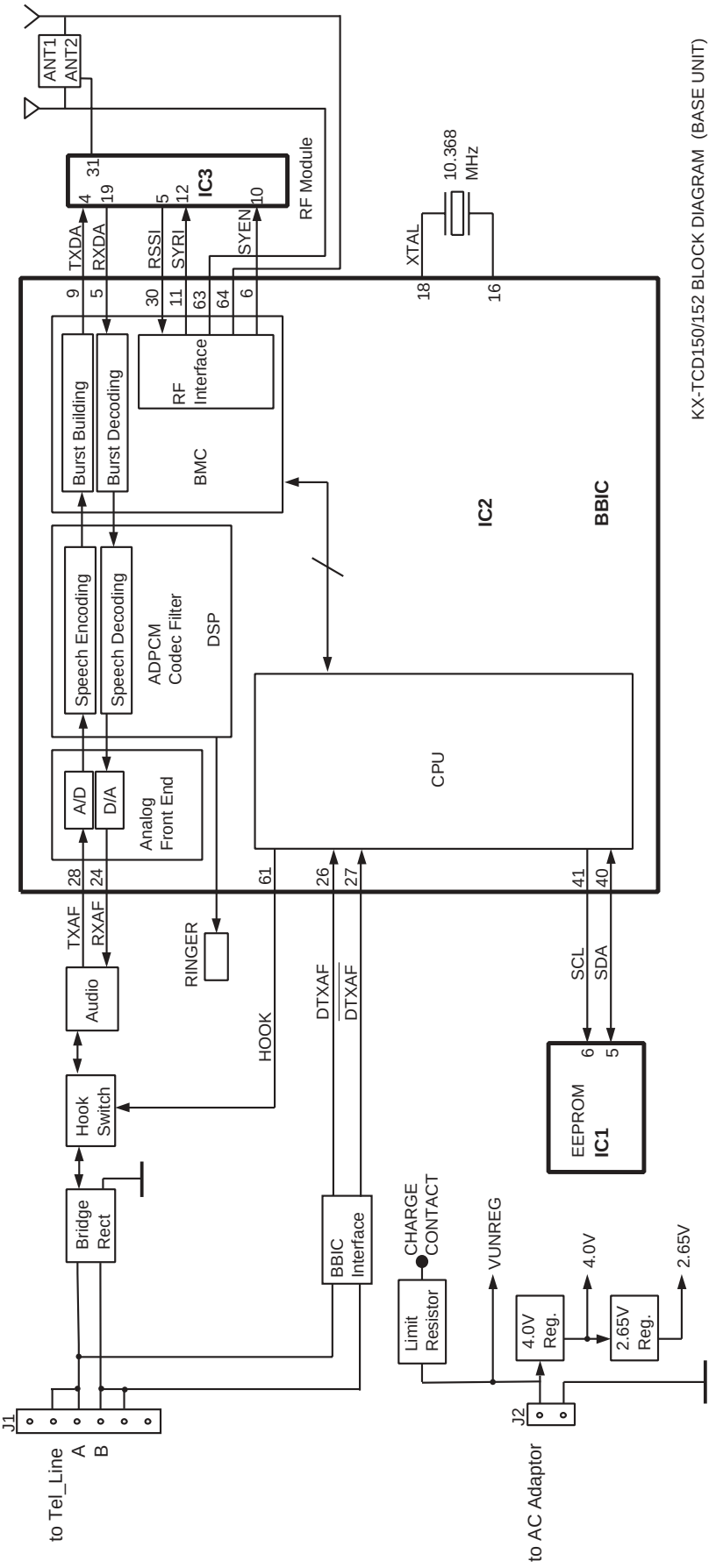
13 FREQUENCY TABLE (MHz)

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

Note:

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

14 BLOCK DIAGRAM (BASE UNIT)



15 CIRCUIT OPERATION (BASE UNIT)

15.1. Outline

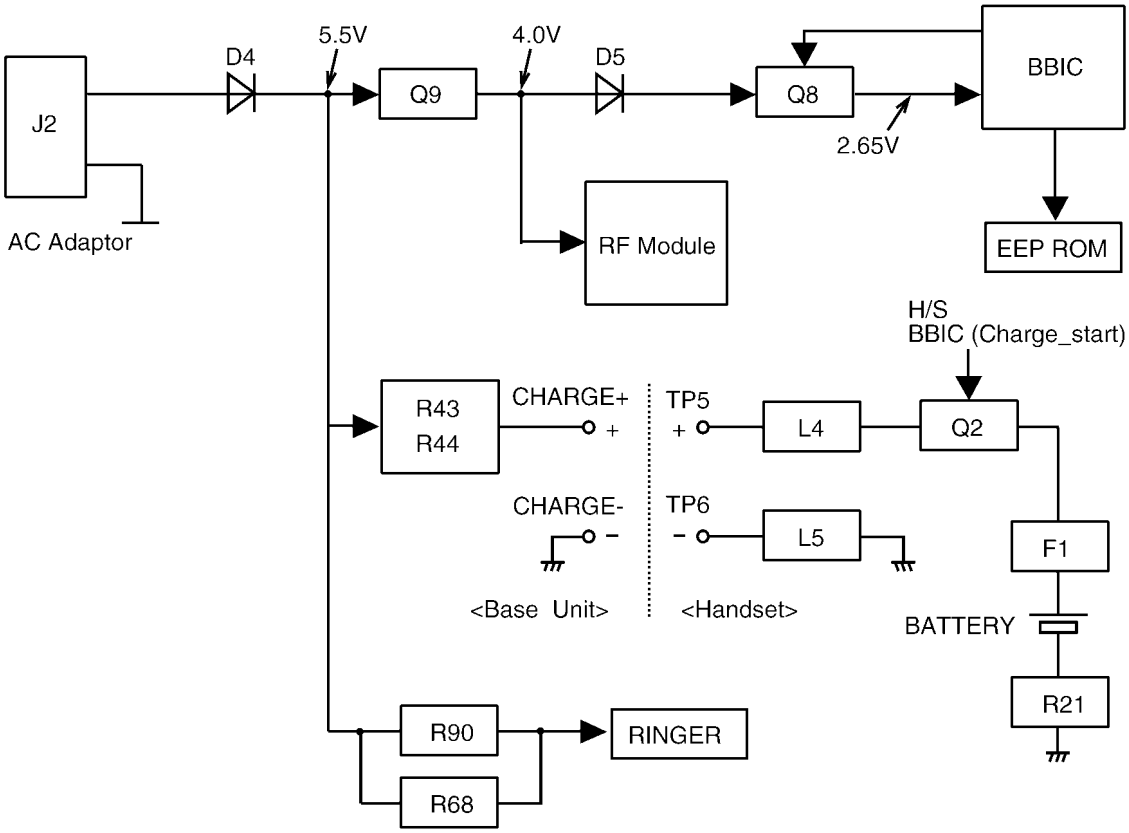
Base Unit consists of the following ICs as shown in **BLOCK DIAGRAM (BASE UNIT)** (P.39).

- DECT BBIC (**B**ase **B**and IC): IC2
  - Handling all the audio, signal and data processing needed in a DECT base unit
  - Controlling the DECT specific physical layer and radio section (**B**urst **M**odule **C**ontroller section)
  - ADPCM codec filter for speech encoding and speech decoding (DSP section)
  - Echo-cancellation and Echo-suppression (DSP section)
  - Any tones (tone, sidetone, ringing tone, etc.) generation (DSP section)
  - DTMF receiver (DSP section)
  - Clock Generation for RF Module
  - ADC, DAC, timer, and power control circuitry
  - All interfaces (ex: RF module, EEPROM, LED, Analog Front End, etc.)
- RF Module: IC3
  - PLL Oscillator
  - Detector
  - Compress/Expander
  - First/Second Mixer
  - Amplifier for transmission and reception
- EEPROM: IC1
  - Temporary operating parameters (for RF, etc.)
- Additionally,
  - Power Supply Circuit (+4.0V, +2.65V output)
  - Crystal Circuit (10.368MHz)
  - Charge Circuit
  - Telephone Line Interface Circuit

15.2. Power Supply Circuit

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

- DECT BBIC (IC2): J2(+6V) → D4 → Q9 → D5 → Q8 → IC2
- RF Module (IC3): J2(+6V) → D4 → Q9 → IC3
- EEPROM (IC1): J2(+6V) → D4 → Q9 → D5 → Q8 → IC2 → IC1
- RINGER: J2(+6V) → D4 → R68 → RINGER
  R90
- Charge Contact (CHARGE+): J2(+6V) → D4 → R43, R44 → CHARGE+



<Fig.101>

15.3. Telephone Line Interface

<Function>

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

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

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

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

- A → C4 → R2 → R29 → IC2 (DLP) [**BELL & CLIP**]
- B → C3 → R1 → R30 → IC2 (DLP) [**BELL & CLIP**]

ON/OFF hook circuit:

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

When IC2 detects a ring signal or press the TALK Key onto the handset, Q3 turns on and then Q2 turns on, thus providing an **off-hook condition** (active DC current flow through the circuit) and the following signal flow is for the loop current.

- A → D2 → Q2 → R8 → Q6 → R19 → R20 → D2→ B [**OFF HOOK**]

Audio circuits:

Refer to **SIGNAL ROUTE** (P.46).

15.4. Transmitter/Receiver

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

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

Signal Path:

*Refer to **SIGNAL ROUTE** (P.46).

15.4.1. Transmitter Block

The voice signal input from the TEL LINE interface goes to RF Module (IC3) through DECT BBIC (IC2) as shown in **BLOCK DIAGRAM (BASE UNIT)** (P.39)

The voice signal passes through the analog part of IC2 where it is amplified and converted to a digital audio stream signal. The burst switch controller processes this stream performing encryption and scrambling, adding the various other fields to produce the GAP (**G**eneric **A**ccess **P**rofile) standard DECT frame, assigning to a time slot and channel etc.

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

15.4.2. Receiver Block

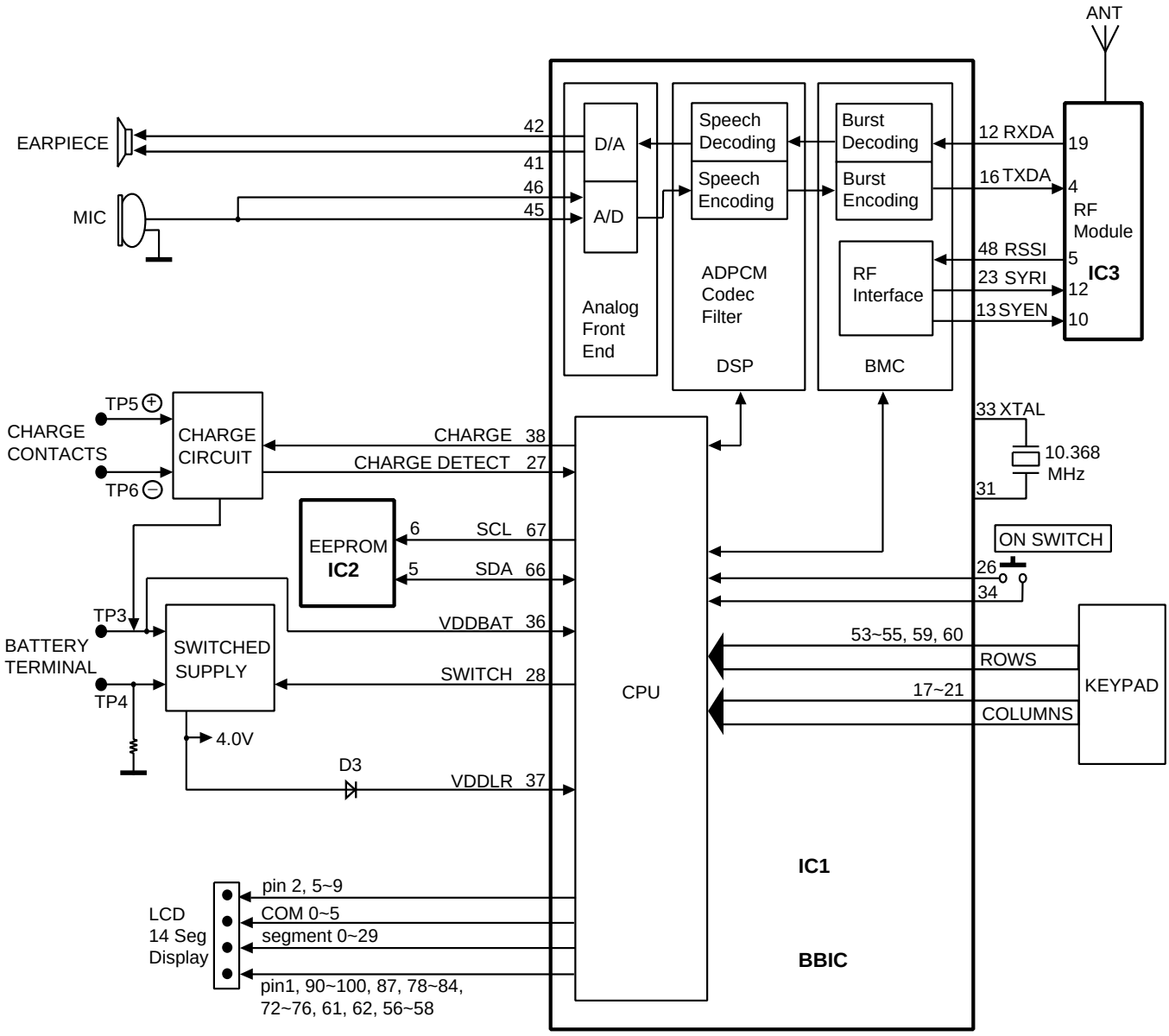
The signal of 1.9 GHz band (1.881792 GHz ~ 1.897344 GHz) which is input from antenna is input to IC3 as shown in **BLOCK DIAGRAM (BASE UNIT)** (P.39).

In IC3, the signal of 1.9 GHz band is demodulated, and goes to IC2 as GAP (**G**eneric **A**ccess **P**rofile) standard DECT frames. It passes through the decoding section burst switch controller where it separates out the frame information and performs de-encryption and de-scrambling as required. It then goes to the DSP section where it is turned back into analog audio. This is amplified by the analog front end, and goes to the TEL LINE Interface.

15.5. Pulse Dialling

During pulse dialing the hookswitch (Q4,Q5) is used to generate the pulses using the HOOK control signal, which is set high during pulses. To force the line impedance low during the “pause” intervals between dial pulses, the PULSE_DIAL signal turns on Q12.

16 BLOCK DIAGRAM (HANDSET)



KX-TCA115 BLOCK DIAGRAM (HANDSET)

17 CIRCUIT OPERATION (HANDSET)

17.1. Outline

Handset consists of the following ICs as shown in **BLOCK DIAGRAM (HANDSET)** (P.43).

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

17.2. Power Supply Circuit/Reset Circuit

Circuit Operation:

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

BATTERY(2.2 V ~ 2.6V: TP3) → TP14(4V) → IC3(6, 25), D3 → IC1(37) → IC1(39, 63) (2.65V)

The Reset signal generates R19, C23 and 2.65V.

17.3. Charge Circuit

Circuit Operation:

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

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

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

The charge current is controlled by switching Q2 of Handset.

Refer to Fig.101 in **Power Supply Circuit** (P.41).

17.4. Battery Low/Power Down Detector

Circuit Operation:

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

The detected voltage is as follows;

- Battery Low

  Battery voltage: V(Batt) < 2.3V

  The BBIC detects this level and "▭" starts flashing and “battery alarm” starts ringing.
- Power Down

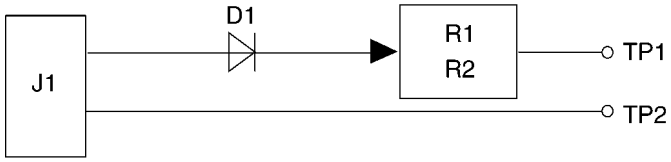
  Battery voltage: V(Batt) < 2.2V

  The BBIC detects this level and power down.

18 CIRCUIT OPERATION (CHARGER UNIT)

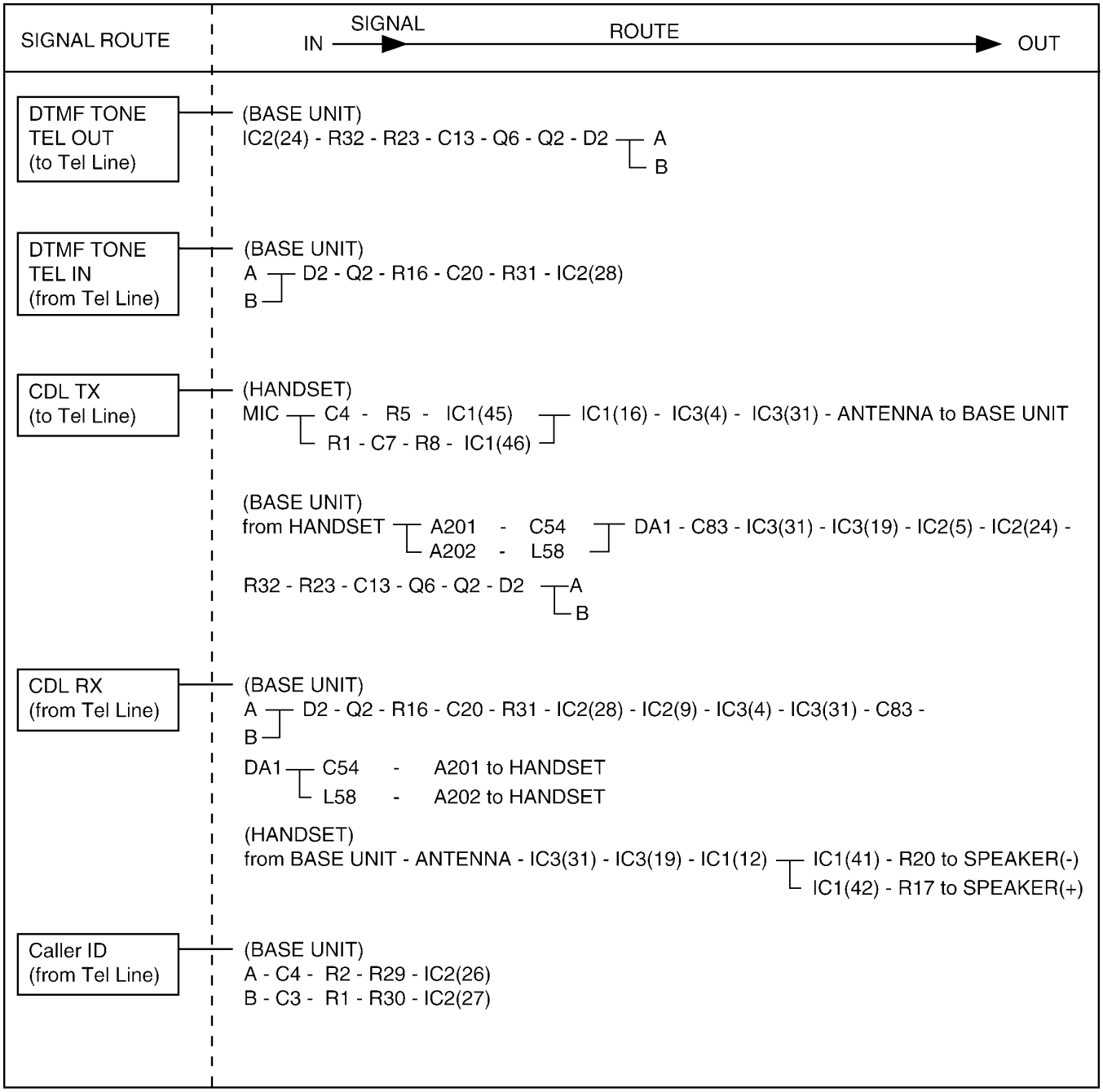
18.1. Power Supply Circuit

The power supply is as shown.



AC Adaptor

19 SIGNAL ROUTE



20 CPU DATA (BASE UNIT)

20.1. IC2 (BBIC)

Pin	Description	I/O	Hi	Hi-z	Low	Remarks
1	VDD	-	-	-	-	-
2	VSS	-	-	-	-	-
3	PA_Driver_Amp	D.O	PA_ON	-	PA_OFF	-
4	TX/RX SW	D.O	TX	-	RX	-
5	RX_Data	D.I	Data	-	Data	-
6	PLL_Strobe	D.O	Latch	-	Normal	-
7	PLL_Data	D.O	-	-	-	-
8	PLL_Clk	D.O	-	-	-	-
9	TX_Data	D.O	-	-	-	-
10	(NO USE)	D.O	-	-	-	-
11	RF_System_Clk	D.O	-	-	-	-
12	VDD	-	-	-	-	-
13	VSS	-	-	-	-	-
14	RESETQ	A.I	Normal	-	Reset	-
15	VDDPM	D.O	-	-	-	-
16	VSSO	D.I	-	-	-	-
17	LOAD	A.I	-	-	-	-
18	XTAL	A.I	-	-	-	10.368 MHz
19	VDDLR	A.I	-	-	-	-
20	LRB	A.I	-	-	-	-
21	VDDA	-	-	-	-	-
22	VSSA	-	-	-	-	-
23	Audio_Out_N	A.O	-	-	-	-
24	Audio_Out_P	A.O	-	-	-	-
25	Bandgap_Ref	A.I	-	-	-	-
26	Differential_Line_P	A.I	-	-	-	for Bell Clip
27	Differential_Line_N	A.I	-	-	-	for Bell Clip
28	Audio_In_N	A.I	-	-	-	-
29	ADC_Ref	A.I	-	-	-	-
30	RSSI	A.I	-	-	-	-
31	AD2(MPCINP)	A.I	-	-	-	for Polarity
32	AD3	A.I	-	-	-	for Polarity
33	(NO USE)	D.I	(I_PU)	-	-	-
34	(NO USE)	D.I	(I_PU)	-	-	-
35	(NO USE)	D.I	(I_PU)	-	-	-
36	(NO USE)	D.I	(I_PU)	-	-	-
37	VDD	-	-	-	-	-
38	VSS	-	-	-	-	-
39	Supply_EEP	D.O	(Fixed)	-	-	-
40	Serial_Data(I2C)	D.I/O	-	-	-	-
41	Serial_Clk(I2C)	D.O	-	-	-	-
42	MODE	D.I	-	-	(Fixed)	-
43	(NO USE)	D.O	-	-	(Fixed)	-
44	BELL/PAGING	D.O	RINGER_ON	-	RINGER_OFF	-
45	VBACK	A.I	-	-	-	-
46	(NO USE)	-	-	-	(I_PD)	-
47	(NO USE)	D.I	-	-	(Fixed)	-
48	VDD	-	-	-	-	-
49	(NO USE)	D.I	-	-	(Fixed)	-
50	(NO USE)	D.I	(Fixed)	-	-	-
51	(NO USE)	D.I	-	-	(Fixed)	-
52	(NO USE)	D.I	-	-	(Fixed)	-
53	VSS	-	-	-	-	-
54	VDD	-	-	-	-	-
55	KEY_IN	D.I	No Key	-	Key	-
56	(NO USE)	D.I/O	-	-	(I_PD)	-
57	PULSE_CTRL	D.I/O	Q7_ON	-	Q7_OFF	-
58	(NO USE)	D.I/O	-	-	(I_PD)	-
59	(NO USE)	D.I/O	-	-	(I_PD)	-
60	(NO USE)	D.I/O	-	-	(I_PD)	-
61	HOOK_CTRL	D.O	Make	-	Break	-
62	(NO USE)	D.I/O	-	-	(I_PD)	-

Pin	Description	I/O	Hi	Hi-z	Low	Remarks
63	ANT1	D.O	ANT1_ON	-	ANT1_OFF	-
64	ANT2	D.O	ANT2_ON	-	ANT2_OFF	-

Note:

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

21 CPU DATA (HANDSET)

21.1. IC1 (BBIC)

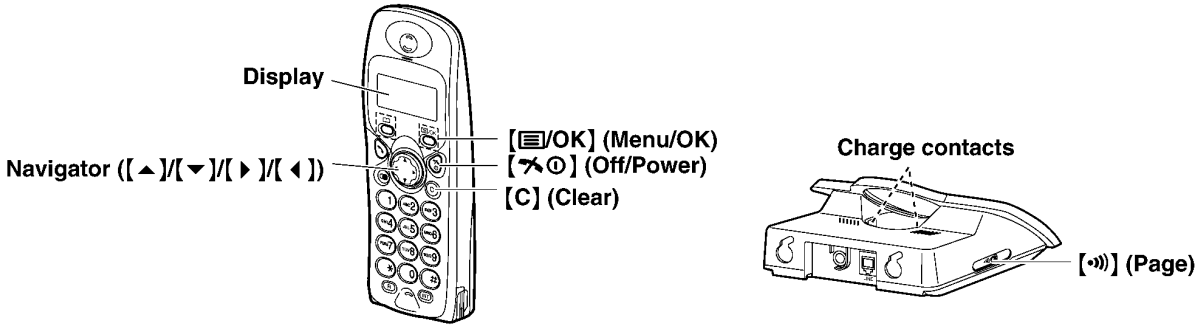
Pin	Description	I/O	Hi	Hi-z	Low	Remarks
1	LCD_SEGMENT	D.O	-	-	-	-
2	LCD_COMMON	D.O	-	-	-	-
3	VDD	-	-	-	-	-
4	VSS	-	-	-	-	-
5	LCD_COMMON	D.O	-	-	-	-
6	LCD_COMMON	D.O	-	-	-	-
7	LCD_COMMON	D.O	-	-	-	-
8	LCD_COMMON	D.O	-	-	-	-
9	LCD_COMMON	D.O	-	-	-	-
10	PA_SW	D.O	PA ON	-	PA OFF	-
11	T/R SW	D.O	Transmit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

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

22 ENGINEERING MODE

22.1. Base Unit

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



H/S key operation	H/S LCD
1). Register a Handset to a Base Unit.	
2). Press 【/OK】(menu/ok) key.	NEW PHONE
3). Select "SETTING BS" using 【▼】key.	SETTING BS
4). Press 【▶】(OK) key.	INPUT CODE
5). Press "5" and "0000". ("0000" is default PIN code)	5 _ _ _ _
6). Press "0163", "3811", then "E" is displayed on LCD.	5 _ _ _ _ _ _ _ _
7). Press "2".	E2 _ _ _ _ _ _
8). Press "XXXX" (Address) and "YY" (New Data).*	E2 XXXX YY
9). Press 【▶】(OK) key.	
10). Press【◀】key and repeat from Step 8.	

If press 【/】(off/power) twice anytime, return to stanby mode.

Note:

*: When you enter the address, please refer to the table below.

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

ex.)

Items (*2)	**Address**	**Default Data**	**New Data**		**Remarks**
C-ID (FSK) sensitivity	0A1D~0A1E	00 6D	(3dB up) 00 A4	(6dB up) 00 E7	When hex changes from “006D” to “00A4” or “00E7”, gain increases by 3dB or 6dB.
C-ID (DTMF) sensitivity	0A 2D	34	(3dB up) 38	(6dB up) 3C	When hex changes from “34” to “38” or “3C”, gain increases by 3dB or 6dB.
Frequency	00 00~00 01	00 60	-	-	Use these items in a **READ-ONLY** mode to confirm the contents. Careless rewriting may cause serious damage to the computer system.
ID	00 20~00 24	Given value	-	-	
Bell length	0F 12	64 (10sec) (*1)	1E (3sec)	14 (2sec)	This is time until bell stops ringing. (Unit: 100ms)
PULSE Dial speed (10PPS -> 20PPS)	0F 06	28 (40msec) (*1)	14 (20msec)	-	This is pulse make time. (Unit:1ms)
	0F 07	3C (60msec) (*1)	1E (30msec)	-	This is pulse break time. (Unit:1ms)
	0F 0A	4A (740msec) (*1)	2C (440msec)	-	This is inter-digit time in pulse mode. (Unit:10ms)

(*1)

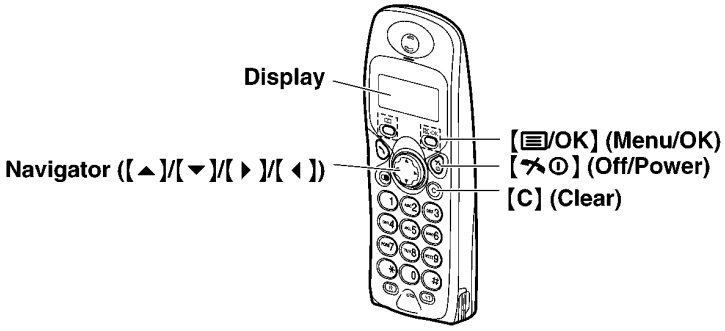
Bell length	64(hex) = 100(dec) → 100 × 100msec = 10000msec (10sec)
PULSE Dial speed (10PPS -> 20PPS)	28(hex) = 40(dec) → 40 × 1msec = 40msec
	3C(hex) = 60(dec) → 60 × 1msec = 60msec
	4A(hex) = 74(dec) → 74 × 10msec = 740msec

(*2)

Items	Description
C-ID (FSK) sensitivity	FSKGain_shiftgain
C-ID (DTMF) sensitivity	Foutgains:HPFilter Foutgains
Frequency	Setting value of FREQ_TRIM_REG
ID	ID
Bell length	Time until it stops bell.
PULSE Dial speed (10PPS -> 20PPS)	Pulse MakeTime and BreakTime. bMakeTime:Pulse MakeTime Unit: 1ms bBreakTime:Pulse Break Time Unit: 1ms
	Inter-digit time in Pulse mode. Unit:10ms

22.2. Handset

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



H/S key operation	H/S LCD
1). Press [/OK] (menu/ok) key.	NEW PHONE
2). Select "HANDSET" using [▼]key, then Press [►] (OK) key.	SETTING HS
3). Select "OTHER OPT" using [▼] key, then Press [►] (OK) key.	OTHER OPT
4). When "HSPIN CHANGE" is displayed, Press [►] (OK) key.	HSPIN CHANGE
5). Press "0000" as a old PIN code. (This is default PIN code.)	OLD PIN _ _ _ _
6). Press "0163" as a new PIN code.	NEW PIN _ _ _ _
7). Press "3811", then "E" is displayed on LCD.	VERIFY _ _ _ _
8). Press "2".	E2 _ _ _ _ _ _
9). Press "XXXX" (Address) and "YY" (New Data).*	E2 XXXX YY
10). Press [►] (OK) key.	
11). Press [◄]key and repeat from Step 9.	

If press [/] (off/power) twice anytime, return to stanby mode.

Note:

*: When you enter the address, please refer to the table in **Note:** (P.51) of **ENGINEERING MODE**.

ex.)

Items (*4)	**Address**	**Default Data**	**New Data**	**Possible Adjusted Value MAX (hex)**	**Possible Adjusted Value MIN (hex)**	**Remarks**
Sending level	0F 35	Adjusted value	Given value	30	00	(*1)
Receiving level	0F 37	Adjusted value	Given value	70	40	(*2)
Battery Low	0F 04	9A	-	-	-	(*3)
Frequency	00 00~00 01	00 60	-	-	-	
ID	00 30~00 34	Given value	-	-	-	

(*1) When adding “01” (hex) to default value, sending level increases by 1.0dB.

ex.)

Item	**Default Data**	**New Data**	
	1C	1D	1B
Sending level	-9.0dBm	-8.0dBm	-10.0dBm

(*2) When reducing “01” (hex) from default value, receiving level increases by 1.0dB.

ex.)

Item	**Default Data**	**New Data**	
	5B	5A	5C
Receiving level	-23.0dBm	-24.0dBm	-22.0dBm

(*3) Use these items in a READ-ONLY mode to confirm the contents. Careless rewriting may cause serious damage to the Handset.

(*4)

Items	**Description**
Sending level	Analog Front End MIC Setting for Handset Mode
Receiving level	Analog Front End LSR Setting for Handset Mode
Battery Low	ADC value for battery low detection
Frequency	Setting value of FREQ_TRIM_REG
ID	International Portable Part Equipment Identities

23 HOW TO REPLACE THE FLAT PACKAGE IC

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

23.1. 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)

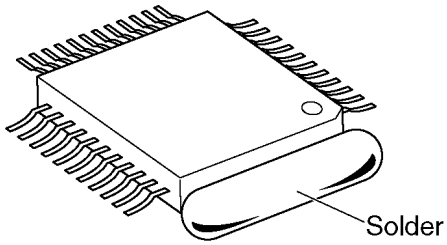
  Note: See **ABOUT LEAD FREE SOLDER (PbF: Pb free)** (P.4).

23.2. FLAT PACKAGE IC REMOVAL PROCEDURE

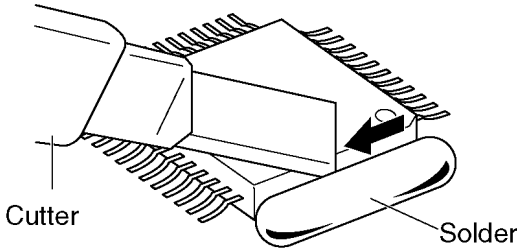
1. Put plenty of solder on the IC pins so that the pins can be completely covered.

   Note:

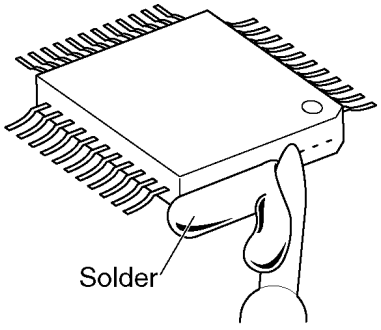
   If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



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



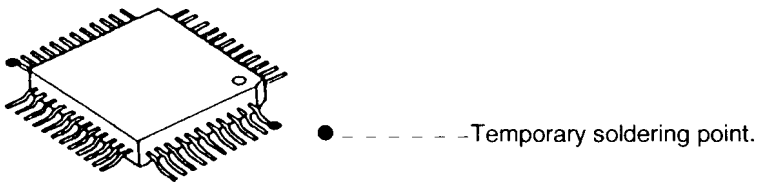
3. While the solder melts, remove it together with the IC pins.



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

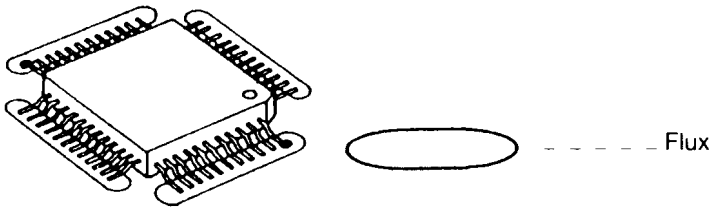
23.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

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

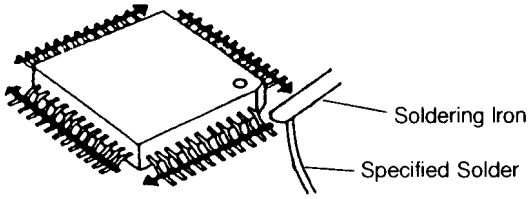


*Check the accuracy of the IC setting with the corresponding soldering foil.

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

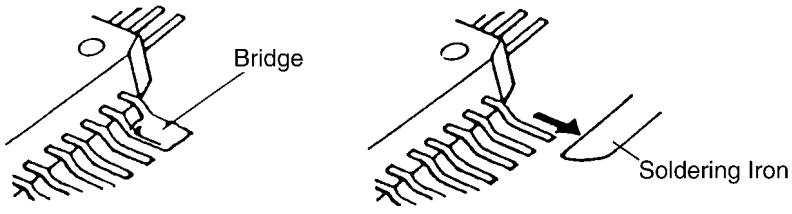


3. Solder the pins, sliding the soldering iron in the direction of the arrow.

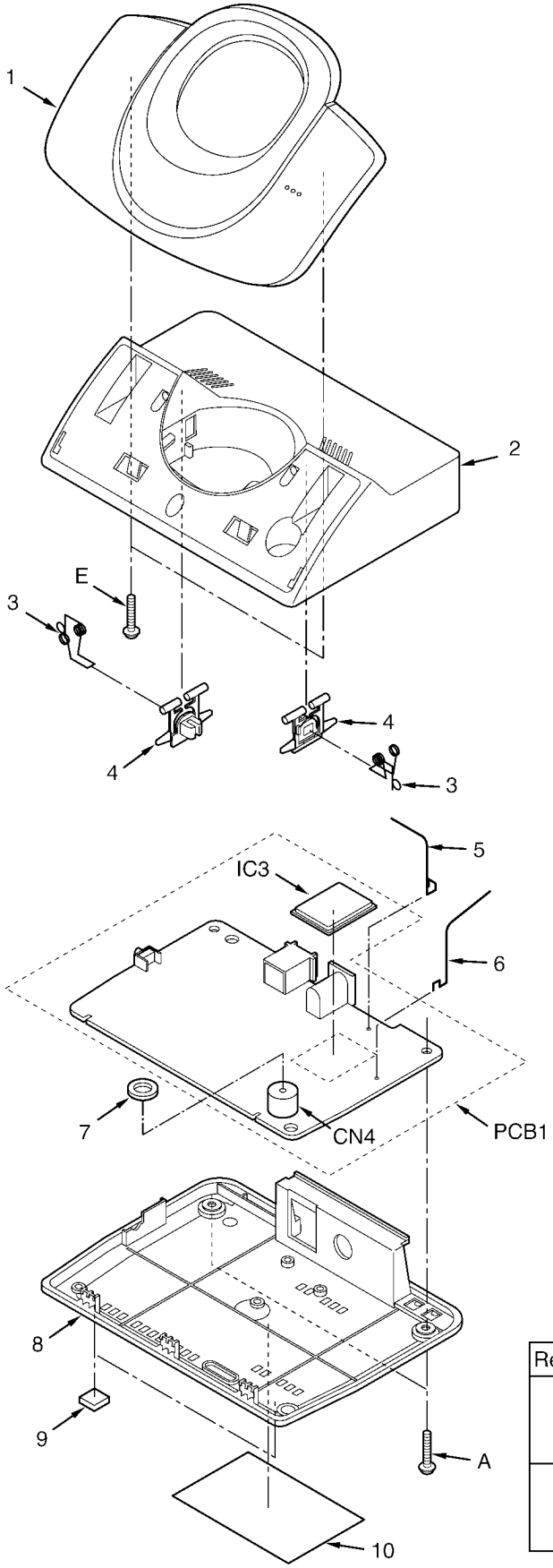


23.4. BRIDGE MODIFICATION PROCEDURE

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

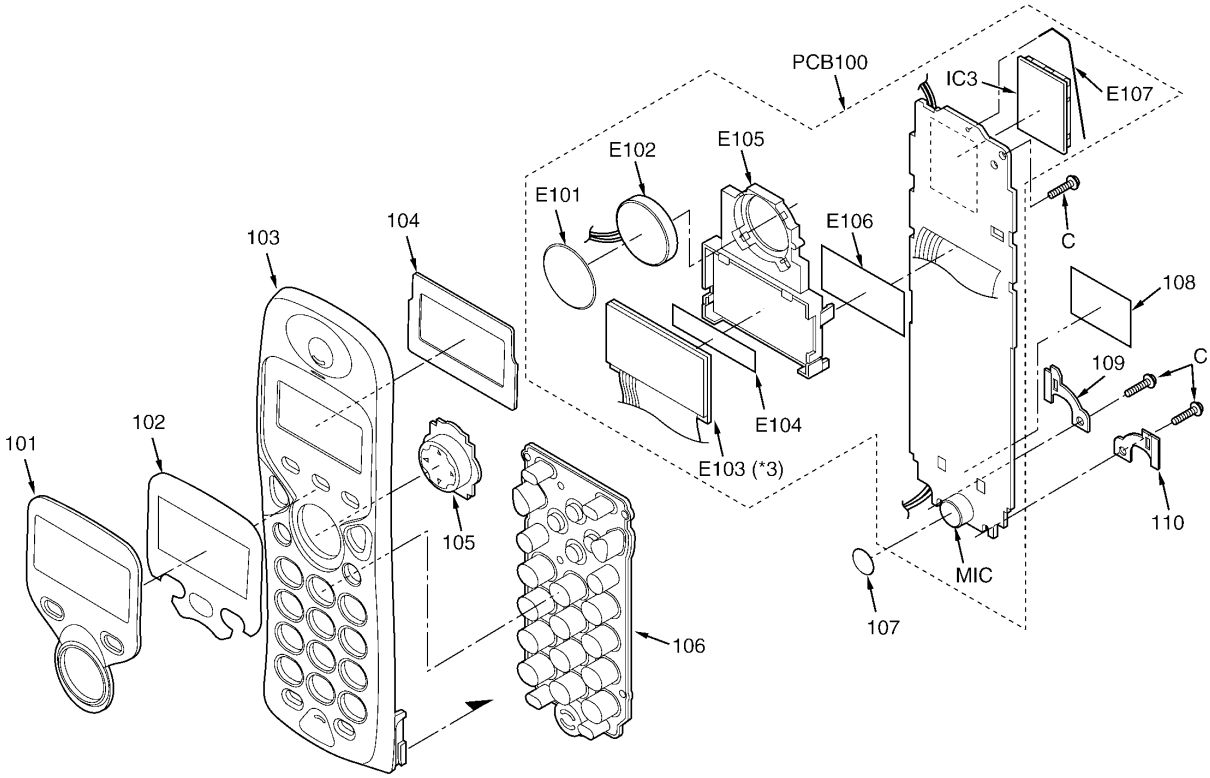


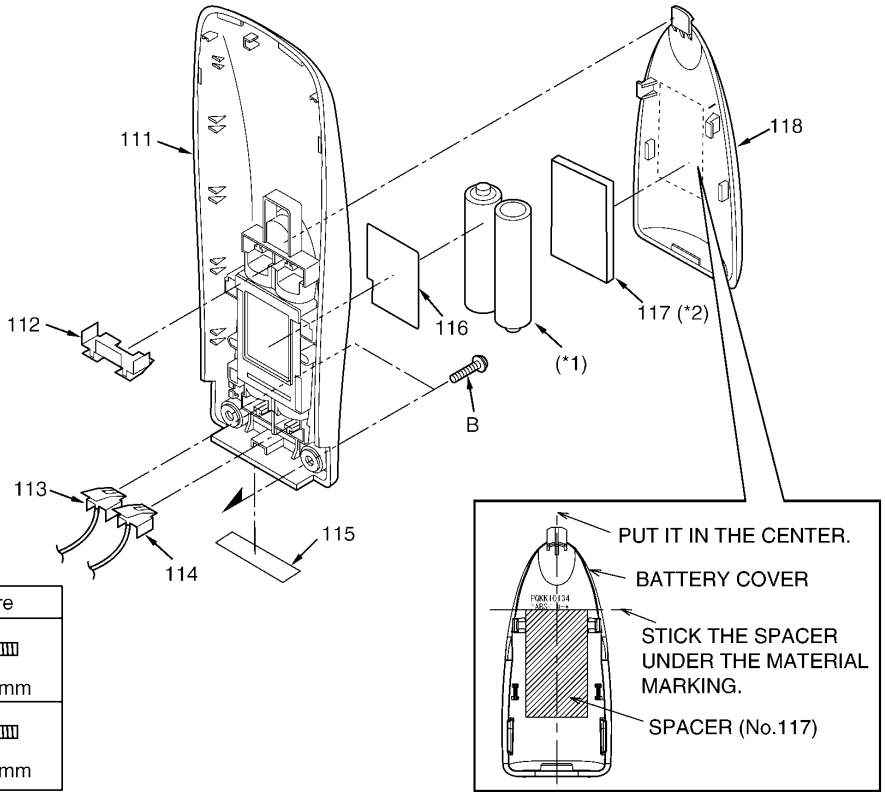
24 CABINET AND ELECTRICAL PARTS (BASE UNIT)



Ref.No.	Part No.	Figure
A	PQHV2612PJ65	 ϕ2.6 × 12mm
E	PQHV2612PJ65	 ϕ2.6 × 12mm

25 CABINET AND ELECTRICAL PARTS (HANDSET)





Ref.No.	Part No.	Figure
B	XTB2+8GFJ	ϕ2×8mm
C	XTB2+8GFJ	ϕ2×8mm

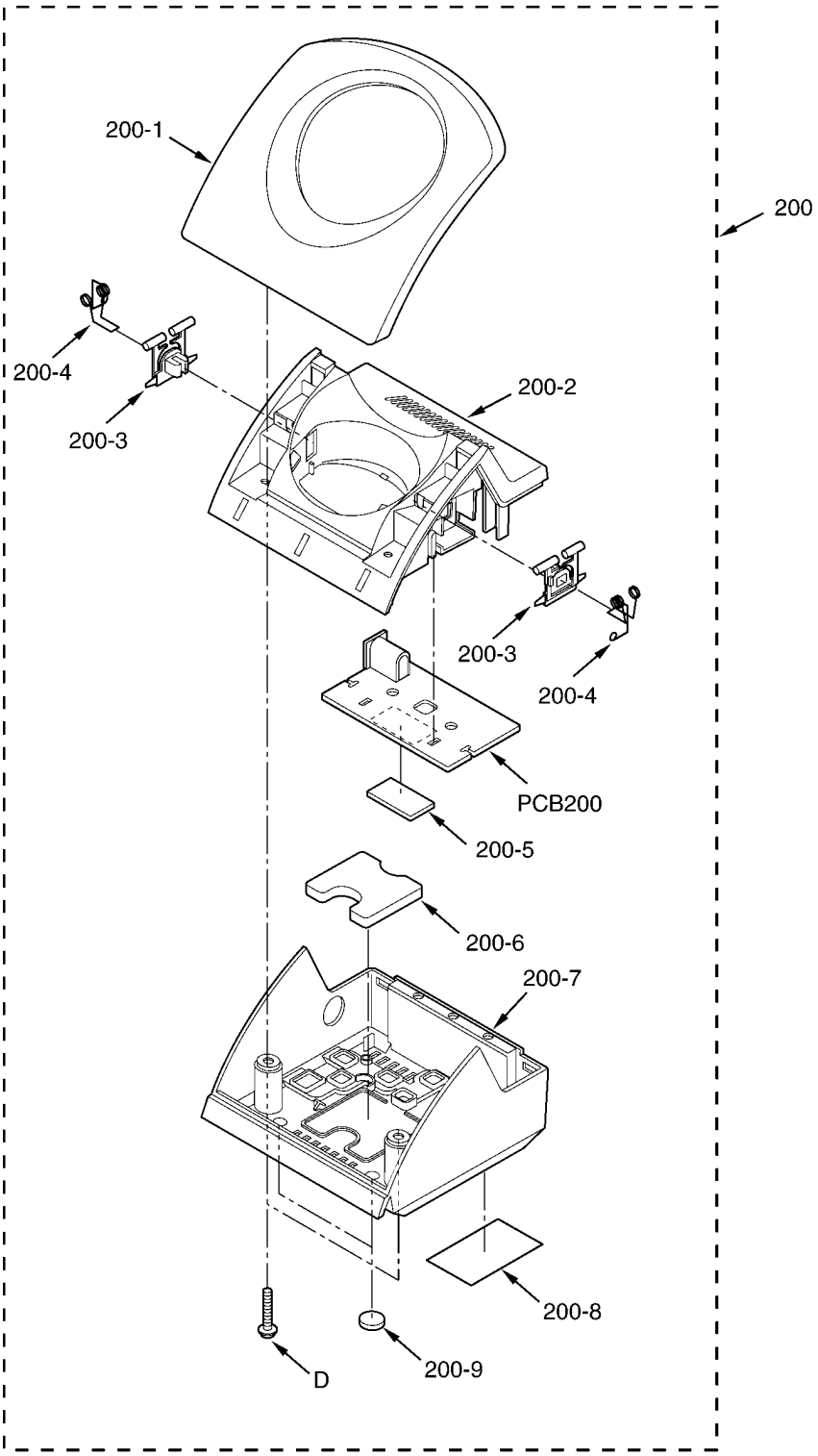
Note:

(*1) The rechargeable Ni-MH battery P03P (HHR-4EPT) is available through sales route of Panasonic.

(*2) Attach the spacer (No. 117) to the exact location described above.

(*3) This cable is fixed by welding. Refer to **How to Replace the Handset LCD** (P.15).

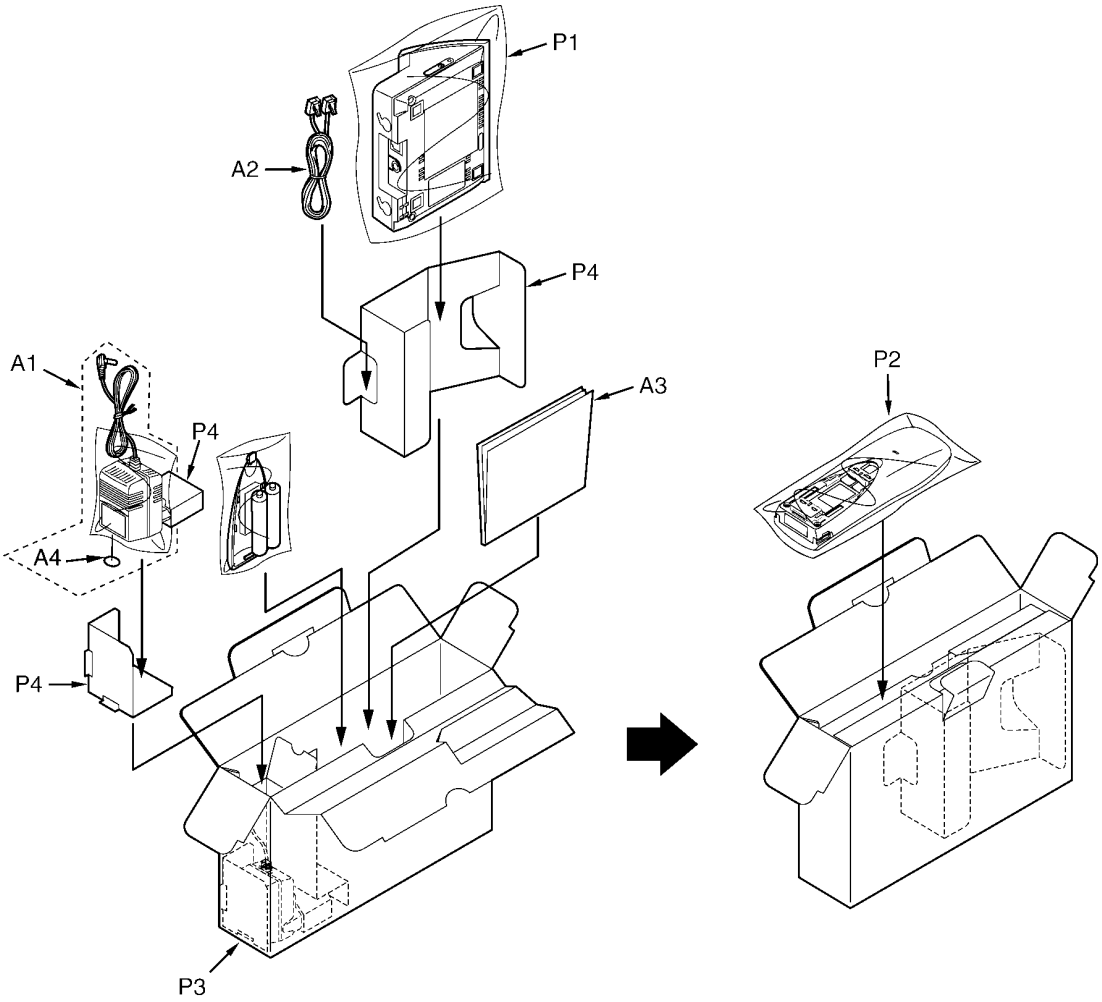
26 CABINET AND ELECTRICAL PARTS (CHARGER UNIT)



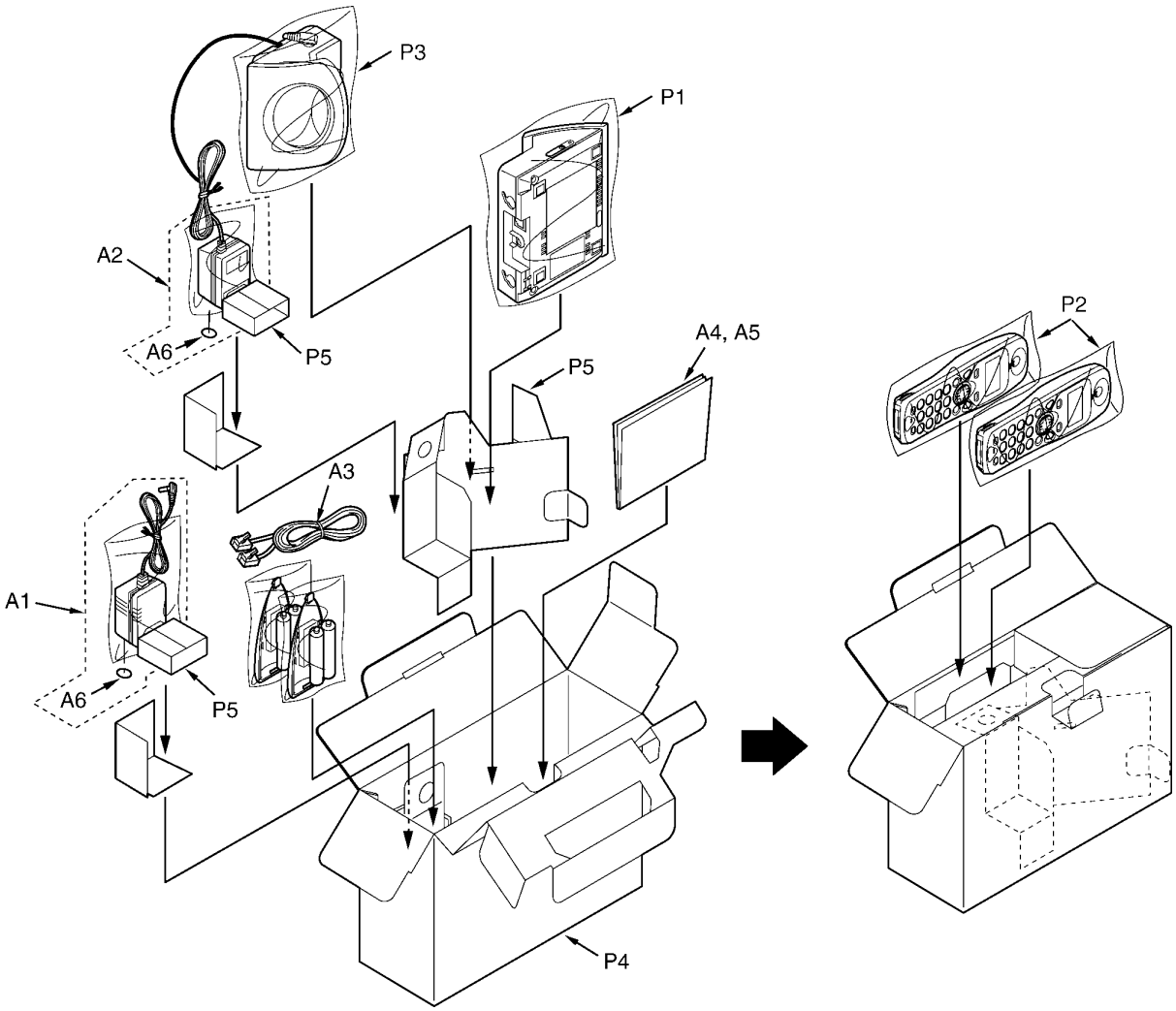
Ref.No.	Part No.	Figure
D	XTW26+14PFJ7	 ϕ2.6 × 14mm

27 ACCESSORIES AND PACKING MATERIALS

27.1. KX-TCD150FXB/FXC

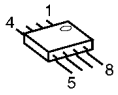


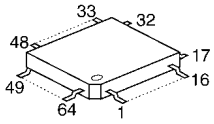
27.2. KX-TCD152FXB



28 TERMINAL GUIDE OF THE ICs, TRANSISTORS AND DIODES

28.1. Base Unit

<table>
<tr>
<td> 

PQWICD150EH</td>
<td> 

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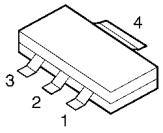
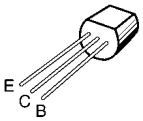
<td> 

C0CBAYF00016</td>
<td> 

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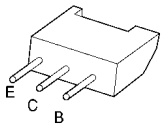
<td> 

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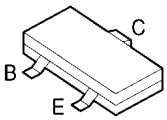
<td colspan="2"> 

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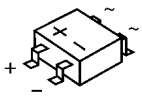
<td> 

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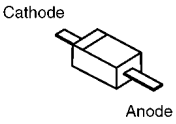
<td> 

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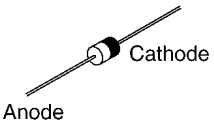
<td> 

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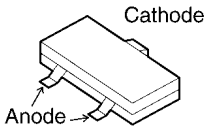
<td> 

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28.2. Handset

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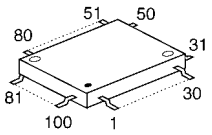
<td> 

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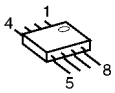
<td> 

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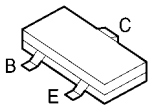
<td> 

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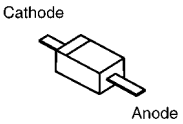
UN5216, B1CFMC000006</td>
<td> 

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MAZ83900ML</td>
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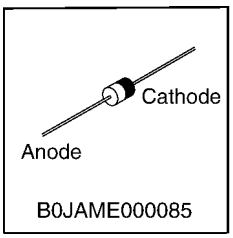
28.3. Charger Unit



B0JAME000085

29 REPLACEMENT PARTS LIST

1. RTL (Retention Time Limited)

Note:

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

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

2. Important safety notice

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

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

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

5. RESISTORS & CAPACITORS

Unless otherwise specified;

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

All capacitors are in MICRO FARADS (μF)P=μμF

*Type & Wattage of Resistor

Type

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

Wattage

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

*Type & Voltage Of Capacitor

Type

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

Voltage

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

29.1. Base Unit

29.1.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQGG10245W3	GRILLE (for KX-TCD150FXB) (for KX-TCD152FXB)	ABS-HB
1	PQGG10245W4	GRILLE (for KX-TCD150FXC)	ABS-HB
2	PQKM10586W2	CABINET BODY	ABS-HB
3	PQJT10203Z	CHARGE TERMINAL	
4	PQKE10356Z2	GUIDE, CHARGE TERMINAL	POM-HB
5	PQSA10182Z	ANTENNA, MAIN	
6	PQSA10132Z	ANTENNA, SUB	
7	PQHG10728Z	RUBBER PARTS, BUZZER	
8	PQKF10581Z2	CABINET COVER	ABS-HB
9	PQHA10023Z	FOOT RUBBER	
10	PQGT18084Z	NAME PLATE (for KX-TCD150FXB) (for KX-TCD152FXB)	
10	PQGT18084Y	NAME PLATE (for KX-TCD150FXC)	

29.1.2. Main P.C.Board Parts

Note:

(*1) When replacing IC1 and IC2, data need to be written to it with PQZZTCD150FX.

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWP1D150FXH	MAIN P.C.BOARD ASS´Y (RTL)	
		(ICs)	
IC1	PQWICD150EH	IC (EEPROM) (*1)	S
IC2	C2HBAK000012	IC (BBIC) (*1)	
Q9	C0CBAYF00016	IC	
		(TRANSISTORS)	
Q2	B1ACGP000007	TRANSISTOR(SI)	
Q3	PQVTBF822T7	TRANSISTOR(SI)	
Q6	2SD1994A	TRANSISTOR(SI)	
Q7	B1ABCE000009	TRANSISTOR(SI)	
Q8	B1ADGE000004	TRANSISTOR(SI)	
Q10	B1ABGE000006	TRANSISTOR(SI)	
		(DIODES)	
D2	B0EDER000009	DIODE(SI)	
D3	PQVDRLZ20A	DIODE(SI)	S
D4	B0JAME000095	DIODE(SI)	
D5	MA2Z74800L	DIODE(SI)	
D9	MA111	DIODE(SI)	S
DA1	B0DDCM000001	DIODE(SI)	
		(COILS)	
L1	PQLQR4D4R7K	COIL	
L3	G1C4N7Z00007	COIL	
L4	G1C2N7Z00008	COIL	
		(JACKS)	
J1	PFJJ1T007Z	JACK, MODULATOR	S
J2	PQJJ1B4Y	JACK, DC	
		(RESISTORS)	
R1	ERJ3GEYJ155	1.5M	
R2	ERJ3GEYJ155	1.5M	
R3	ERJ3GEYJ224	220K	
R4	ERJ3GEYJ184	180K	
R5	ERJ3GEYJ224	220K	
R6	ERJ3GEYJ184	180K	
R7	ERJ3GEYJ104	100K	
R8	ERJ3GEYJ272	2.7K	
R9	ERJ3GEYJ103	10K	
R10	ERJ3GEYJ222	2.2K	
R16	ERJ3GEYJ133	13K	
R18	ERJ3GEYJ392	3.9K	
R19	ERJ12YJ220	22	
R20	ERJ12YJ560	56	
R21	ERJ3GEYJ104	100K	
R22	ERJ3GEYJ333	33K	
R23	ERJ3GEYJ560	56	
R24	PQ4R18XJ100	10	S
R25	ERJ3GEYJ391	390	
R26	ERJ3GEYJ103	10K	
R27	ERJ3GEYJ681	680	
R28	ERJ3GEYJ751	750	
R29	ERJ3GEYJ101	100	
R30	ERJ3GEYJ101	100	
R31	ERJ3GEYJ101	100	
R32	ERJ3GEYJ560	56	
R38	ERJ3GEYJ330	33	
R41	ERJ3GEYJ101	100	
R42	ERJ3GEYJ221	220	

Ref. No.	Part No.	Part Name & Description	Remarks
R43	ERJ1WYJ330	33	
R44	ERJ1WYJ330	33	
R52	ERJ3GEY0R00	0	
R53	ERJ3GEYJ565	5.6M	
R54	ERJ3GEYJ184	180K	
R57	ERJ3GEYJ103	10K	
R58	ERJ3GEYJ103	10K	
R59	ERJ3GEYJ471	470	
R61	ERJ2GEJ470	47	
R66	ERJ3GEYJ180	18	
R67	ERJ3GEYJ151	150	
R68	PQ4R18XJ221	220	S
R78	ERJ3GEYJ151	150	
R79	ERJ3GEYJ180	18	
R81	ERJ3GEYJ565	5.6M	
R82	ERJ3GEYJ184	180K	
R89	ERJ3GEYJ102	1K	
R90	PQ4R18XJ221	220	S
C57	ERJ3GEY0R00	0	
L59	ERJ3GEY0R00	0	
		(CAPACITORS)	
C1	ECKD2H681KB	680P	S
C2	ECKD2H681KB	680P	S
C3	ECQE2223KF	0.022	
C4	ECQE2223KF	0.022	
C7	PQCUV1A225KB	2.2	
C11	ECUV1C223KBV	0.022	
C12	PQCUV1C474KB	0.47	
C13	ECUV1A105KBV	1	
C14	PQCUV1C224KB	0.22	
C15	ECEA1HKA100	10	
C16	PQCUV1H154KR	0.15	
C18	ECUV1H100DCV	10P	
C19	ECUV1H100DCV	10P	
C20	ECUV1C104KBV	0.1	
C21	ECUV1H100DCV	10P	
C22	PQCUV1C224KB	0.22	
C23	ECUV1C104KBV	0.1	
C24	ECUV1C104KBV	0.1	
C25	ECEA1CKS100	10	S
C26	ECUV1C104KBV	0.1	
C27	ECUV1C104KBV	0.1	
C28	ECUV1C683KBV	0.068	
C29	ECUV1C683KBV	0.068	
C30	ECUV1H182KBV	0.0018	
C32	ECUV1H270JCV	27P	
C33	ECUV1H1R0CCV	1	
C34	ECUV1C104KBV	0.1	
C35	ECUV1C333KBV	0.033	
C36	ECUV1C104KBV	0.1	
C37	ECUV1C104KBV	0.1	
C38	ECUV1C104KBV	0.1	
C40	ECEA1CK101	100	S
C41	ECEA0JKA101	100	
C42	ECUV1H030CCV	3P	
C48	ECUV1H330JCV	33P	
C49	ECUV1H103KBV	0.01	
C50	ECUV1H100DCV	10P	
C53	ECUV1H100DCV	10P	
C54	ECUV1H060DCV	6P	S
C56	ECUV1H100DCV	10P	
C58	ECUV1H100DCV	10P	
C59	ECUV1H100DCV	10P	
C66	ECUV1H020CCV	2P	
C67	ECUV1A475KB	4.7	
C69	ECUV1H100DCV	10P	
C72	ECUV1H020CCV	2P	
C73	ECUV1H100DCV	10P	
C74	ECUV1H103KBV	0.01	
C76	ECUV1H060DCV	6P	S
C78	ECUV1H020CCV	2P	
C83	ECJ1VC1H1R5C	1.5P	
C89	ECUV1H102KBV	0.001	
C90	ECUV1H101JCV	100P	
C94	ECUV1H0R5CCV	0.5P	
C96	ECUV1H100DCV	10P	
C97	ECUV1H100DCV	10P	
C98	PQCUV1H0R5CC	0.5P	
C100	ECUV1H100DCV	10P	
C101	ECUV1H100DCV	10P	
C105	ECUV1H030CCV	3P	
C106	ECUV1H030CCV	3P	
L58	ECUV1H020CCV	2P	
		(OTHERS)	
IC3	PQLP10268Z	RF UNIT	
CN4	L0DACA000024	BUZZER	
S1	K0H1BB000018	SPECIAL SWITCH, TACTILE	
SA1	J0LF00000026	VARISTOR (SURGE ABSORBER)	S
X1	H0D103500003	CRYSTAL OSCILLATOR	

29.2. Handset

29.2.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
101	PQGP10225V2	PANEL, LCD	AS-HB
102	PQHS10553Z	TAPE, DOUBLE SIDE	
103	PQKM10587Z3	CABINET BODY (for KX-TCD150FXB) (for KX-TCD152FXB)	ABS-HB
103	PQKM10587Z2	CABINET BODY (for KX-TCD150FXC)	ABS-HB
104	PQHS10554Y	SPACER, LCD	
105	PQBC10375Z1	PUSH BUTTON, NAVI	ABS-HB
106	PQSX10310Z	KEYBOARD SWITCH	
107	PQHS10719Z	NET, MIC	
108	PQHX11202Z	INSULATOR	
109	PQJT10204Z	TERMINAL (L)	
110	PQJT10205Z	TERMINAL (R)	
111	PQKF10582Z3	CABINET COVER (for KX-TCD150FXB) (for KX-TCD152FXB)	ABS-HB
111	PQKF10582Z2	CABINET COVER (for KX-TCD150FXC)	ABS-HB
112	PQJC10056Y	BATTERY TERMINAL	
113	PQJC10057Z	BATTERY TERMINAL (-)	
114	PQJC10058Z	BATTERY TERMINAL (+)	
115	PQGT18093Z	NAME PLATE (for KX-TCD150FXB) (for KX-TCD152FXB)	
115	PQGT18093Y	NAME PLATE (for KX-TCD150FXC)	
116	PQHX11253X	PLASTIC PARTS, BATTERY COVER SHEET	
117	PQHS10561Y	SPACER, BATTERY COVER	
118	PQKK10134X3	LID, BATTERY COVER (for KX-TCD150FXB) (for KX-TCD152FXB)	ABS-HB
118	PQKK10134X2	LID, BATTERY COVER (for KX-TCD150FXC)	ABS-HB

29.2.2. Main P.C.Board Parts

Note:

(*1) When replacing IC1 and IC2, data need to be written to it with PQZZTCD150FX.

(*2) When replacing the Handset LCD, See **How to Replace the Handset LCD** (P.15).

Ref. No.	Part No.	Part Name & Description	Remarks
PCB100	PQWPCA115FXR	MAIN P.C.BOARD ASS´Y (RTL)	
		(ICs)	
IC1	C2HBAK000013	IC (BBIC) (*1)	
IC2	PQWICA115EXR	IC (EEPROM) (*1)	S
		(TRANSISTORS)	
Q1	B1CFMC000006	TRANSISTOR(SI)	
Q2	B1ADGE000004	TRANSISTOR(SI)	
Q3	UN5216	TRANSISTOR(SI)	S
		(DIODES)	

Ref. No.	Part No.	Part Name & Description	Remarks
D1	B0JCME000035	DIODE(SI)	
D3	MA2Z74800L	DIODE(SI)	
D4	MAZ83900ML	DIODE(SI)	
D6	MA2Z74800L	DIODE(SI)	
D7	MA2Z74800L	DIODE(SI)	
		(COILS)	
L2	G1C470M00025	COIL	
L3	PQLQR4D4R7K	COIL	
L4	G1C100MA0072	COIL	
L5	G1C100MA0072	COIL	
L6	PQLQR2M8N2JT	COIL	S
L7	PQLQR2M8N2JT	COIL	S
F1	PQLQR2M5N6K	COIL	S
		(RESISTORS)	
R1	ERJ3GEYJ222	2.2K	
R2	ERJ8BQJR30	0.3	
R3	ERJ3GEYJ560	56	
R4	ERJ3GEYJ103	10K	
R5	ERJ3GEYJ331	330	
R6	ERJ3GEYJ332	3.3K	
R7	ERJ3GEYJ331	330	
R8	ERJ3GEYJ331	330	
R11	ERJ3GEY0R00	0	
R17	ERJ3GEY0R00	0	
R18	ERJ3GEYJ330	33	
R19	ERJ3GEYJ153	15K	
R20	ERJ3GEY0R00	0	
R21	ERJ6RSJR10V	0.1	
R22	ERJ3GEY0R00	0	
R23	ERJ3GEYJ2R2	2.2	
R25	ERJ2GEJ561	560	
R26	ERJ2GEJ561	560	
R27	ERJ3GEY0R00	0	
		(CAPACITORS)	
C2	ECUV1A475KB	4.7	
C3	ECUV1C104KBV	0.1	
C4	ECUV1C104KBV	0.1	
C5	ECST0JY475	4.7	
C6	ECUV1H100DCV	10P	
C7	ECUV1C104KBV	0.1	
C8	ECUV1H100DCV	10P	
C14	EEE1AA221P	220P	
C15	EEE1AA221P	220P	
C16	ECUV1H1R0CCV	1	
C17	ECUV1H180JCV	18P	
C18	ECUV1C104KBV	0.1	
C20	ECUV1C104KBV	0.1	
C21	ECUV1C104KBV	0.1	
C22	ECUV1C104KBV	0.1	
C23	ECUV1C104KBV	0.1	
C24	ECUV1C104KBV	0.1	
C26	ECUV1C104KBV	0.1	
C27	ECUV1C104KBV	0.1	
C28	ECUV1C104KBV	0.1	
C29	ECUV1C104KBV	0.1	
C30	ECUV1C104KBV	0.1	
C33	ECUV1A225KB	2.2	
C54	ECUV1H100DCV	10P	
C56	ECUV1H020CCV	2P	
C57	ECUV1H330JCV	33P	
C58	F1G1H1R2A561	10P	
C60	ECST0JY475	4.7	
C62	ECUV1A105KBV	1	
C63	ECUV1H100DCV	10P	
C64	ECUV1A105KBV	1	
C65	ECUV1H020CCV	2P	
C67	ECUV1H100DCV	10P	
C68	ECUV1H100DCV	10P	
C69	ECUV1H030CCV	3P	
C70	ECUV1H030CCV	3P	
C71	ECUV1H100DCV	10P	
		(OTHERS)	
MIC	L0CBAB000069	MICROPHONE	
E101	PQHS10467Z	COVER, SP NET	
E102	L0AD02A00021	SPEAKER	
E103	L5ACADC00022	LIQUID CRYSTAL DISPLAY (*2)	
E104	PQHS10594Z	TAPE, DOUBLE SIDE	
E105	PQHR10963Z	GUIDE, LCD HOLDER	ABS-HB
E106	PQWEA144EXR	PLASTIC PARTS, HEATSEAL TAPE	
E107	PQSA10177Z	ANTENNA	
IC3	PQLP10268Z	RF UNIT	
X1	H0D103500006	CRYSTAL OSCILLATOR	

29.3. Charger Unit

29.3.1. Cabinet and Electrical Parts

Ref. No.	Part No.	Part Name & Description	Remarks
200	PQLV30018ZB1	ACCESSORY PARTS, CHARGER UNIT	
200-1	PQGG10155ZH	GRILLE	ABS-HB
200-2	PQKM10591Y1	CABINET BODY	PS-HB
200-3	PQKE10356Z2	GUIDE, CHARGE TERMINAL CASE	POM-HB
200-4	PQJT10206Z	CHARGE TERMINAL	
200-5	PQHX10991Z	CUSHION, URETHANE FORM	
200-6	PQMH10426X	WEIGHT	
200-7	PQKF10586Z1	CABINET COVER	PS-HB
200-8	PQGT18290Y	NAME PLATE	
200-9	PQHG316Z	FOOT RUBBER	

29.3.2. Main P.C.Board Parts

Ref. No.	Part No.	Part Name & Description	Remarks
PCB200	PQWPA142ESCH	MAIN P.C.BOARD ASS´Y (RTL)	
		(DIODE)	
D1	B0JAME000085	DIODE(SI)	
		(JACK)	
CN1	PQJJ1B4Y	JACK	S
		(RESISTORS)	
R1	ERJ1WYJ220	22	
R2	ERJ1WYJ270	27	

29.4. Accessories and Packing Materials

Note:

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

29.4.1. KX-TCD150FXB/FXC

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV19CEX	AC ADAPTOR	⚠
A2	PQJA10075Z	CORD, TELEPHONE	
A3	PQQX14847Z	INSTRUCTION BOOK (*1)	
A4	PQQT23002Z	WEEE LABEL	
P1	PFPH1018Z	PROTECTION COVER (for Base Unit)	
P2	PQPP10084Z	PROTECTION COVER (for Handset)	
P3	PQPK14943Z	GIFT BOX	
P4	PQPD10672Z	CUSHION	

29.4.2. KX-TCD152FXB

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQLV19CEX	AC ADAPTOR (for Base Unit)	⚠
A2	PQLV200CEX	AC ADAPTOR (for Charger)	⚠
A3	PQJA10075Z	CORD, TELEPHONE	
A4	PQQX14847Z	INSTRUCTION BOOK (*1)	
A5	PQQW14890Z	LEAFLET, 2 PACK	
A6	PQQT23002Z	WEEE LABEL	

Ref. No.	Part No.	Part Name & Description	Remarks
P1	PFPH1018Z	PROTECTION COVER (for Base Unit)	
P2	PQPP10084Z	PROTECTION COVER (for Handset)	
P3	PQPP10086Z	PROTECTION COVER (for Charger)	
P4	PQPK14954Z	GIFT BOX	
P5	PQPD10667Z	CUSHION	

29.5. Fixtures and Tools

Note:

(*1) See **The Setting Method of JIG (Base Unit)** (P.27), and **The Setting Method of JIG (Handset)** (P.34).

(*2) When replacing the Handset LCD, See **How to Replace the Handset LCD** (P.15).

Part No.	Part Name & Description	Remarks
PQZZTCD420BX	I2C PCB (*1)	
PQZZ1CD705BX	RS232C CABLE (*1)	
PQZZ2CD705BX	CLIP CABLE (*1)	
PQZZ3CD705BX	DC CABLE (*1)	
PQZZTCD150FX	BATCH FILE CD-ROM (*1)	
PQZZ430PIR	TIP OF SOLDERING IRON (*2)	
PQZZ430PRB	RUBBER OF SOLDERING IRON (*2)	

Memo

30 FOR SCHEMATIC DIAGRAM

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

Notes:

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

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

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

30.2. Handset (SCHEMATIC DIAGRAM (HANDSET))

Notes:

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

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

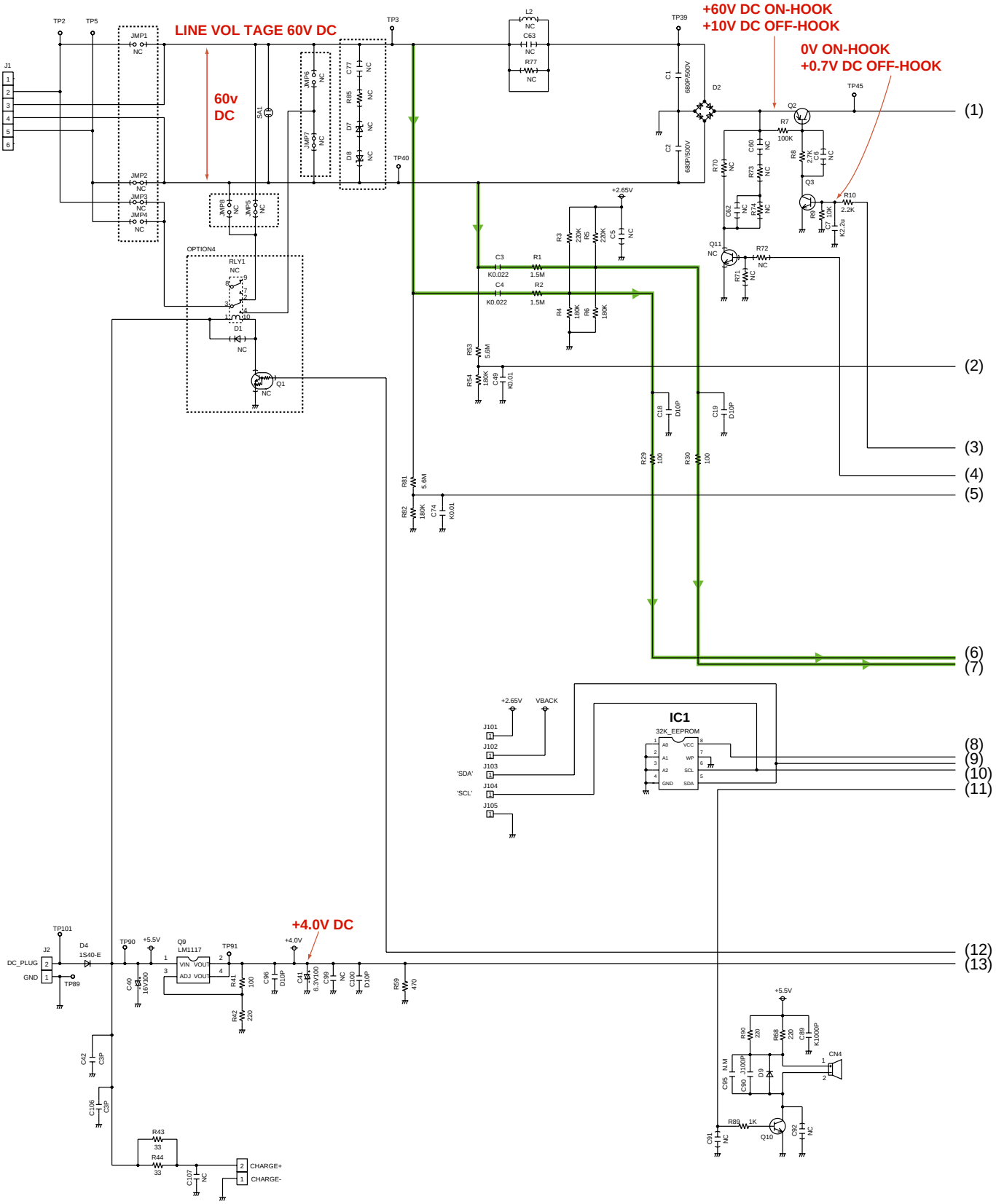
Notes:

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

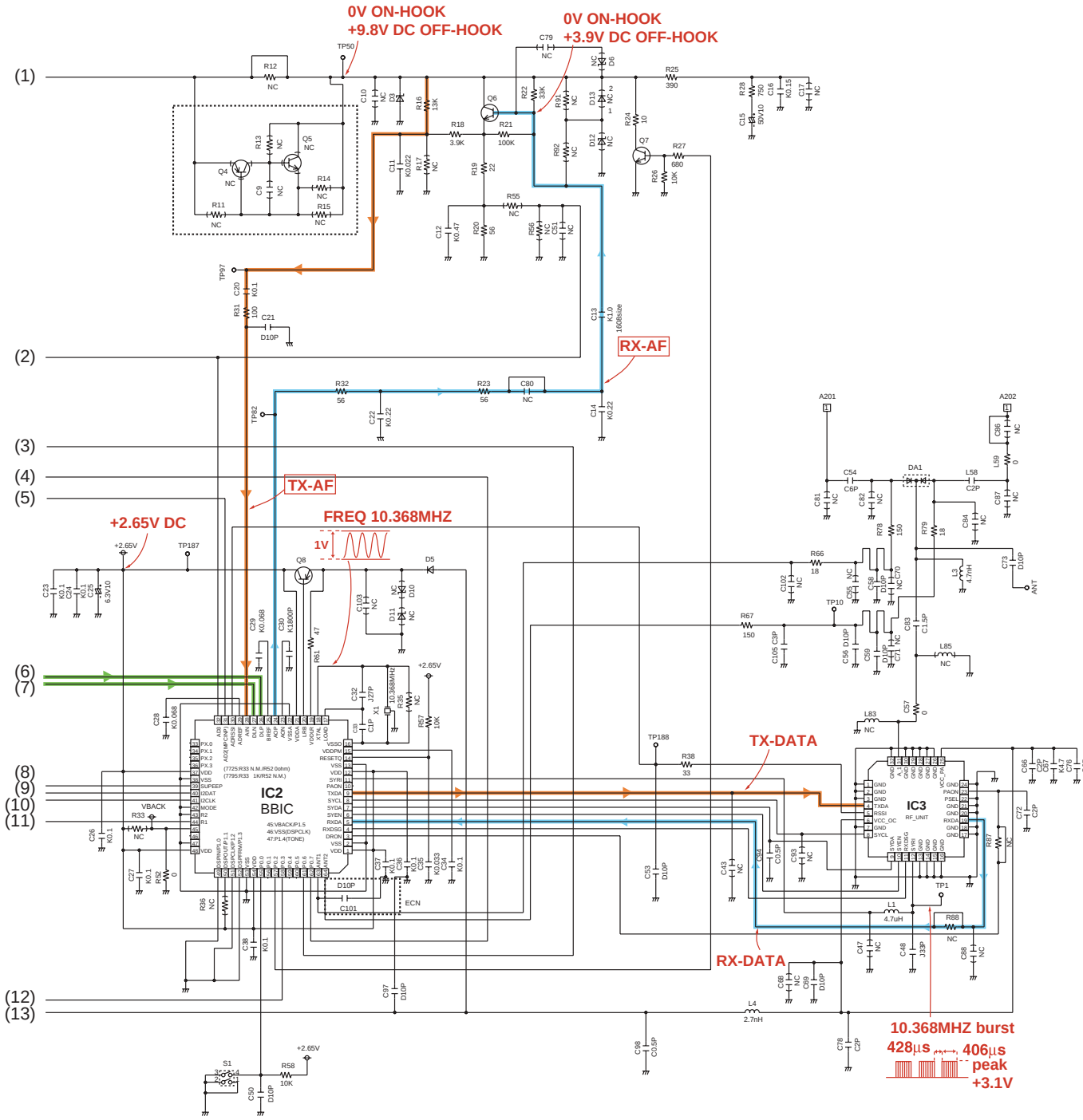
> Important Safety Notice:
> Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

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

31 SCHEMATIC DIAGRAM (BASE UNIT)



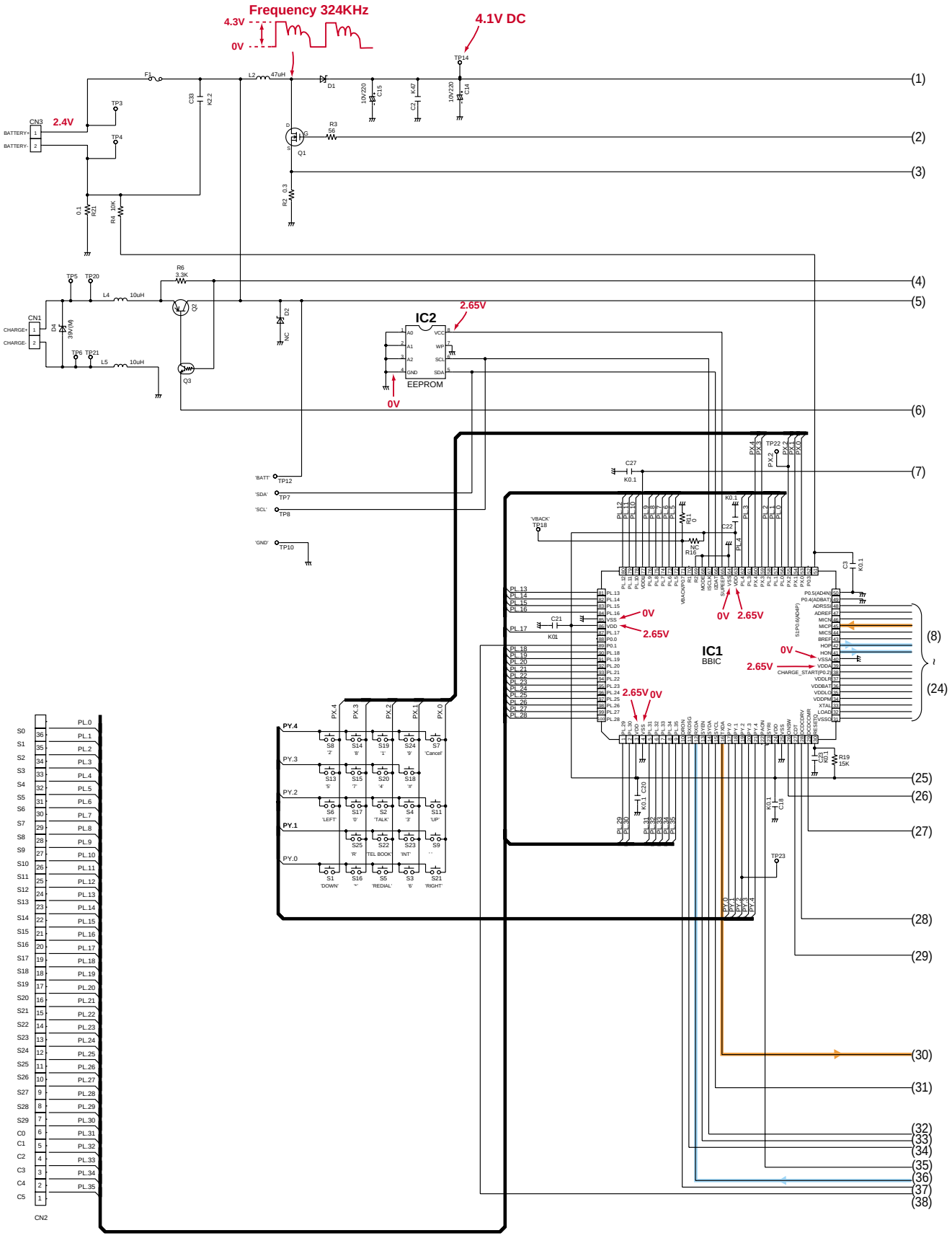
, NC: No Components



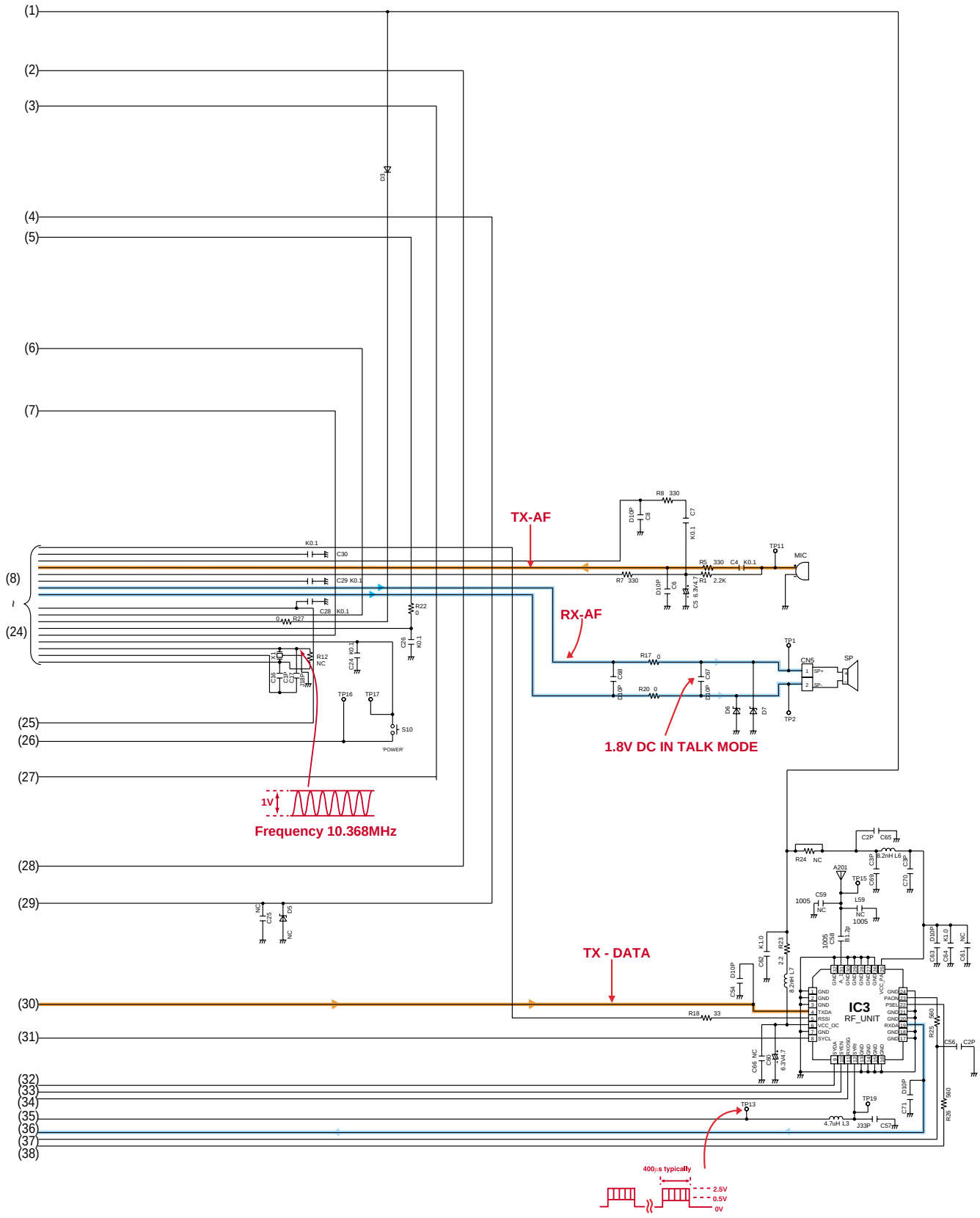
NC: No Components

KX-TCD150/152 SCHEMATIC DIAGRAM (BASE UNIT)

32 SCHEMATIC DIAGRAM (HANDSET)



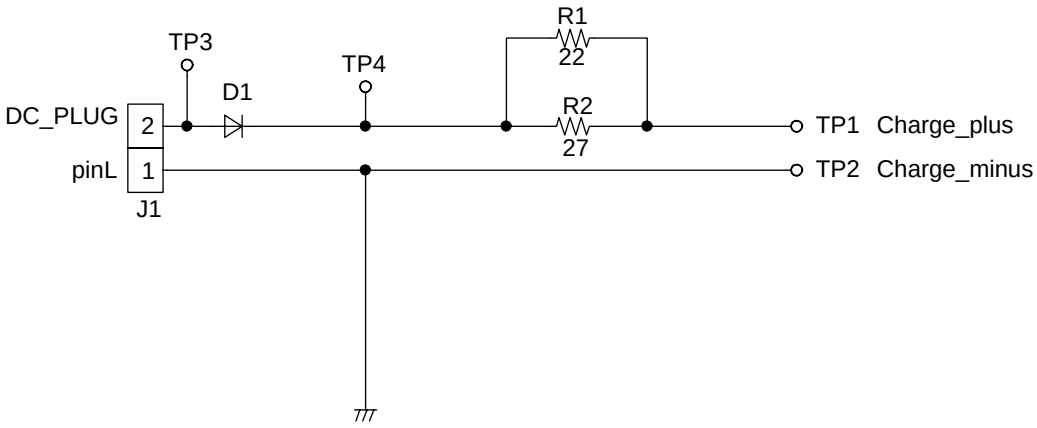
NC: No Components



NC: No Components

KX-TCA115 SCHEMATIC DIAGRAM (HANDSET)

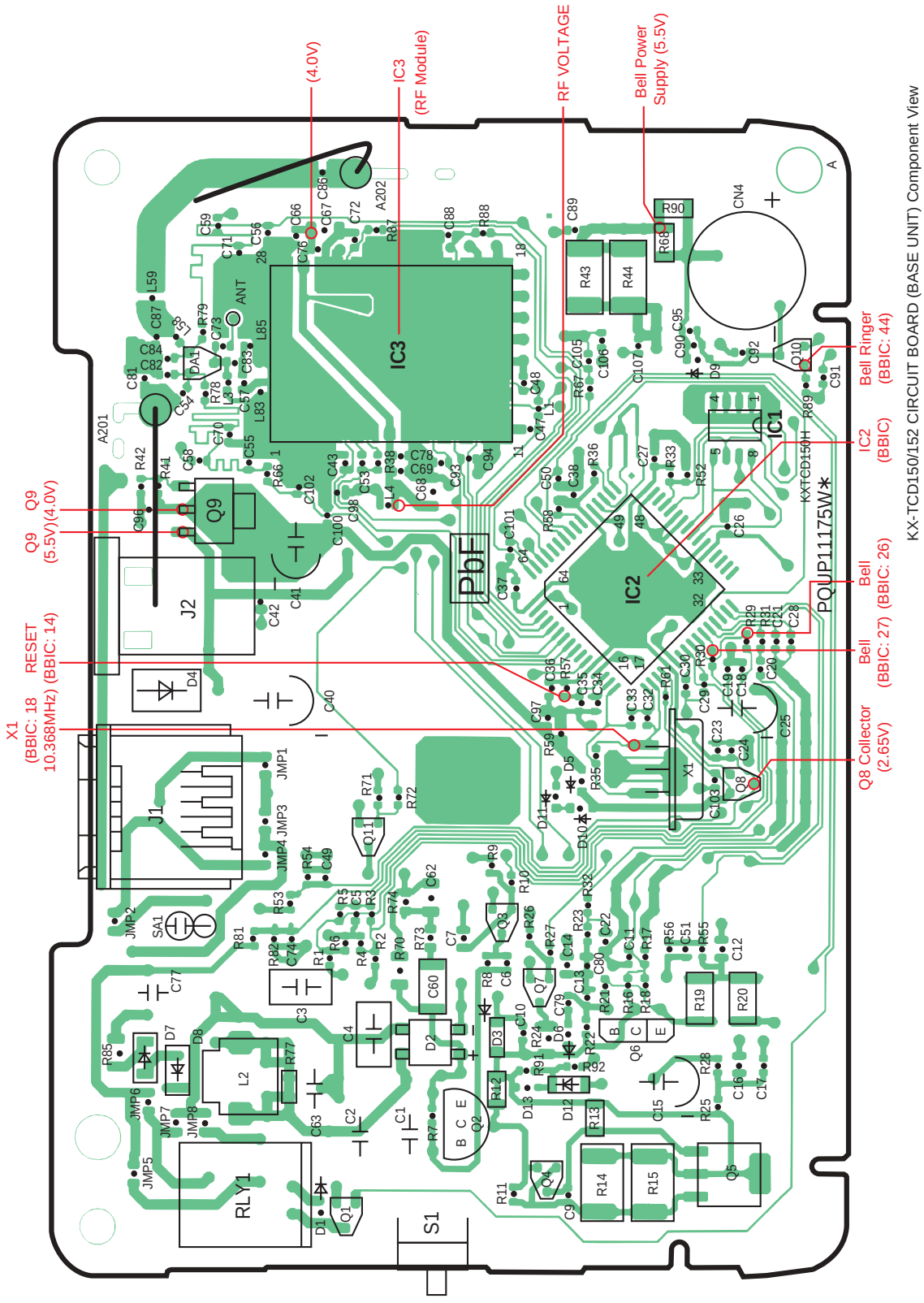
33 SCHEMATIC DIAGRAM (CHARGER UNIT)



SCHEMATIC DIAGRAM (CHARGER UNIT)

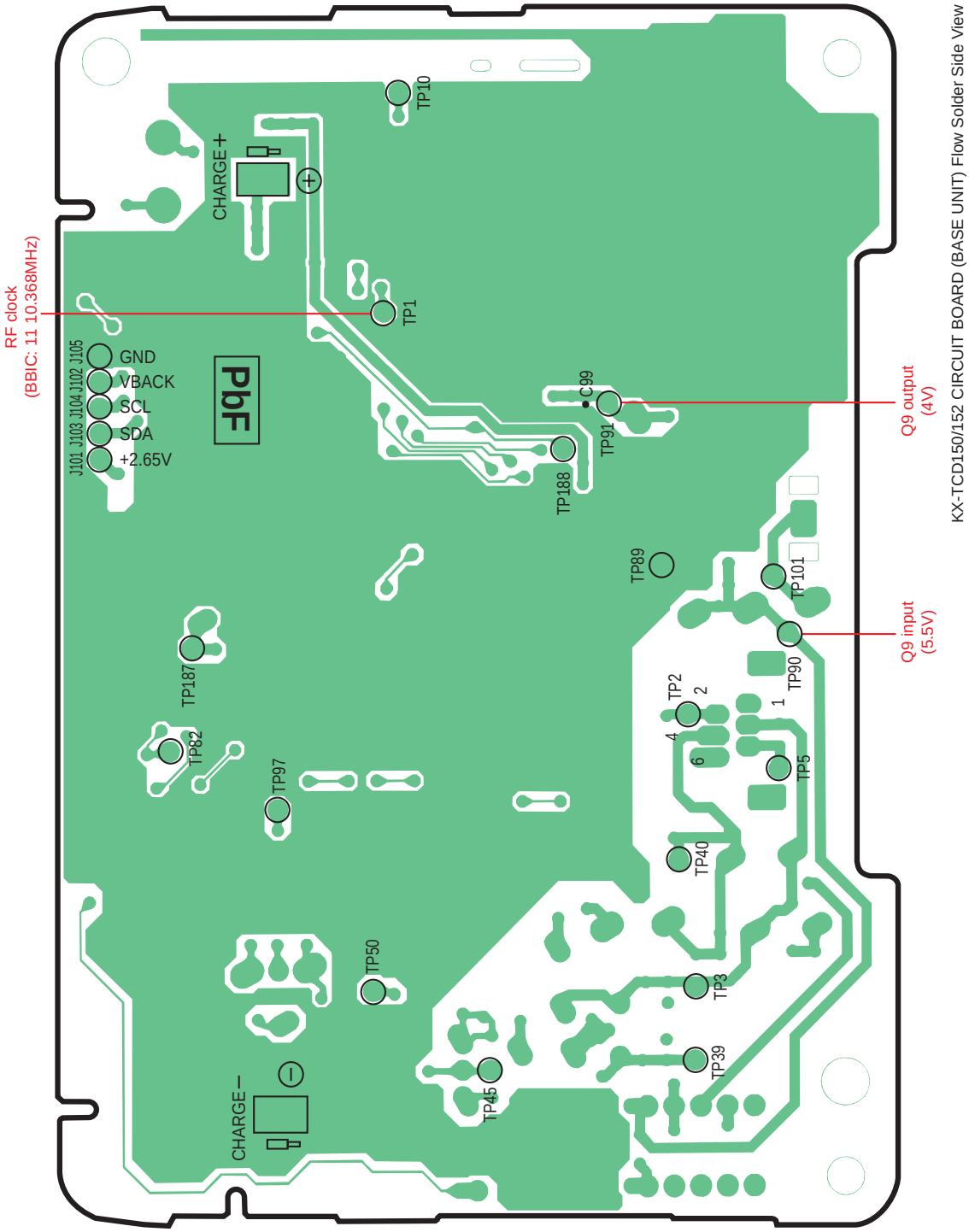
34 CIRCUIT BOARD (BASE UNIT)

34.1. Component View



KX-TCD150/152 CIRCUIT BOARD (BASE UNIT) Component View

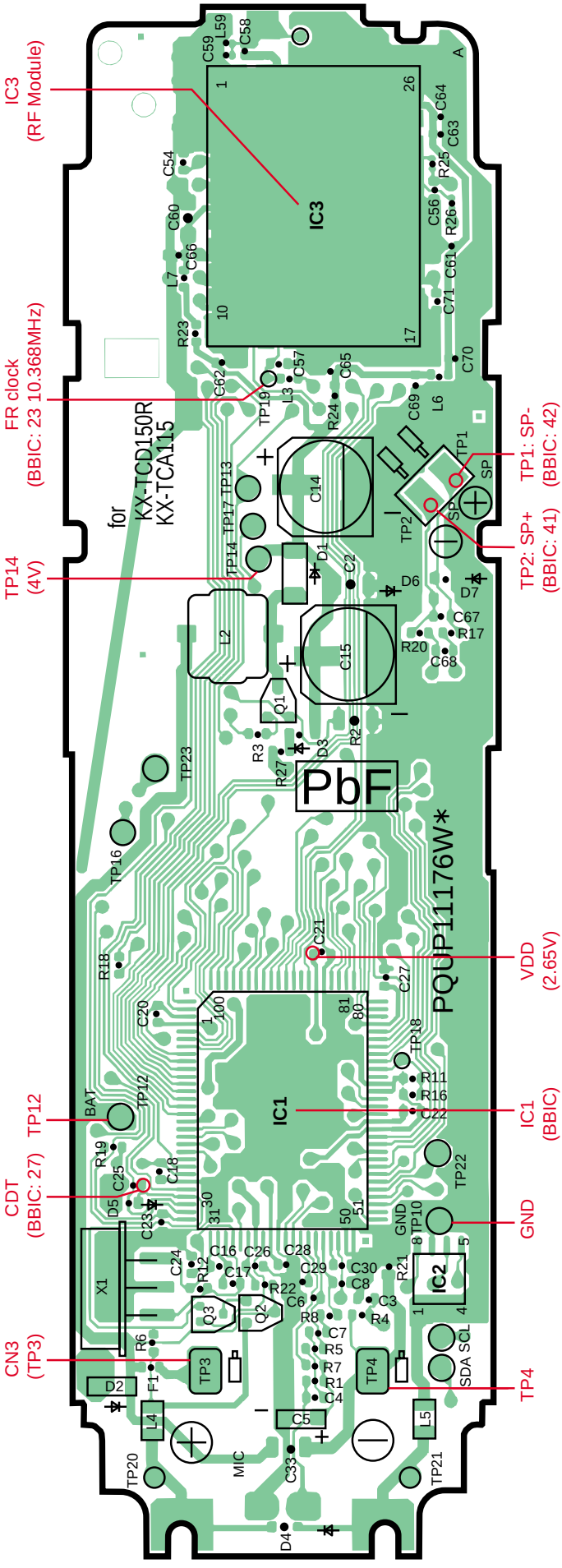
34.2. Flow Solder Side View



KX-TCD150/152 CIRCUIT BOARD (BASE UNIT) Flow Solder Side View

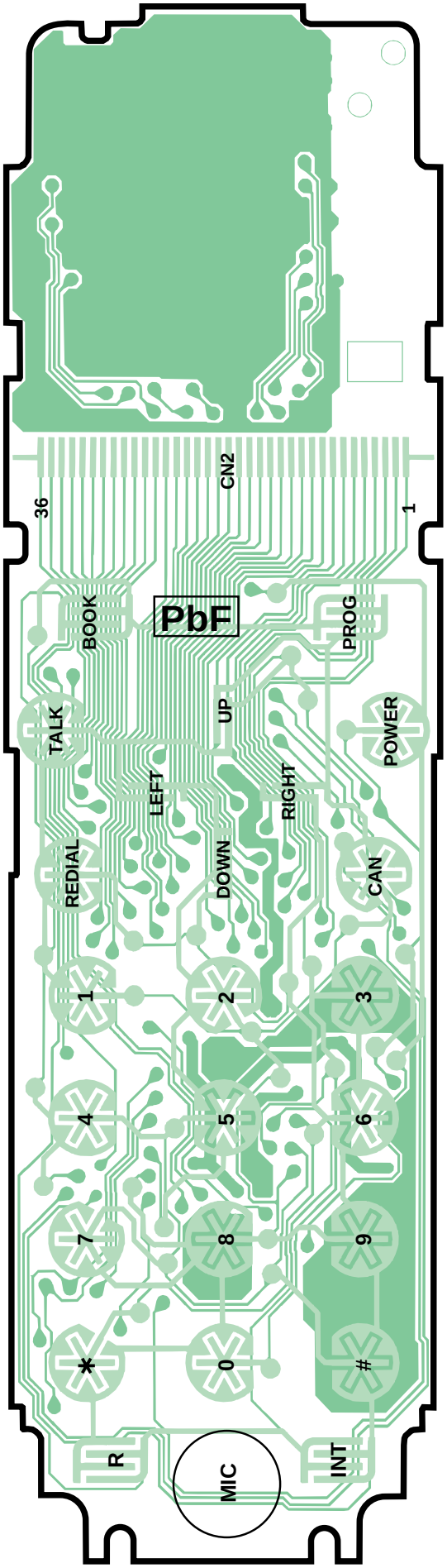
35 CIRCUIT BOARD (HANDSET)

35.1. Component View



KX-TCA115 CIRCUIT BOARD (HANDSET) Component View

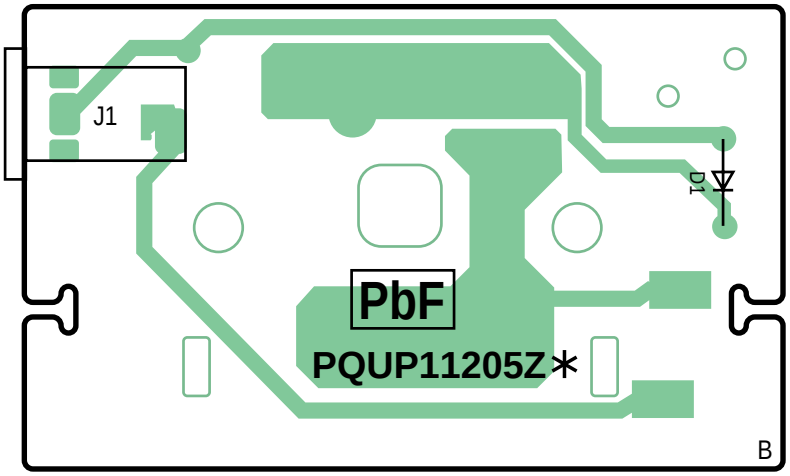
35.2. Flow Solder Side View



KX-TCA115 CIRCUIT BOARD (HANDSET) Flow Solder Side View

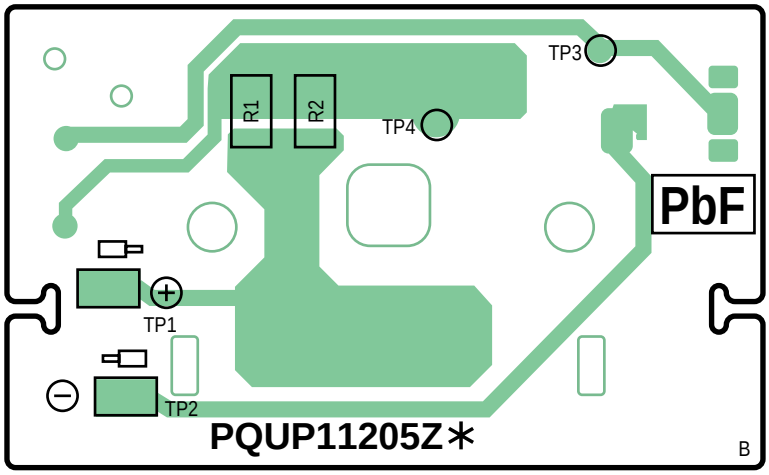
36 CIRCUIT BOARD (CHARGER UNIT)

36.1. Component View



CIRCUIT BOARD (CHARGER UNIT) Component View

36.2. Flow Solder Side View



CIRCUIT BOARD (CHARGER UNIT) Flow Solder Side View