

Service Manual

Telephone Equipment

Model No. **KX-TS820MXB**

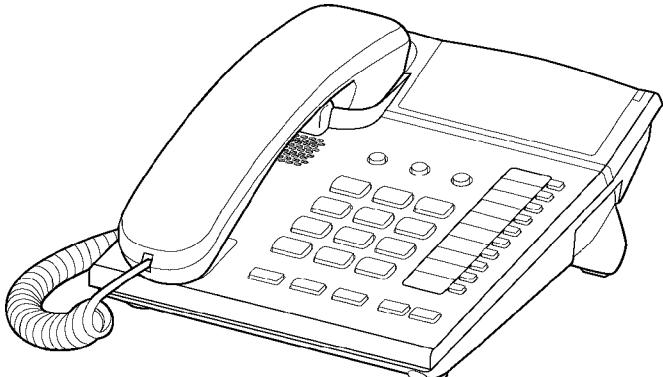
KX-TS820MXW

Integrated Telephone System

B: Black Version

W: White Version

(for Asia, Middle Near East and other areas)



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⚠ WARNING

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

IMPORTANT SAFETY NOTICE

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

IMPORTANT INFORMATION ABOUT LEAD FREE, (PbF), SOLDERING

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

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

TABLE OF CONTENTS

	PAGE
1 Safety Precautions	4
1.1. For Service Technicians	4
2 Warning	4
2.1. About Lead Free Solder (Pbf: Pb free)	4
3 Specifications	6
4 Technical Descriptions	7
4.1. Block Diagram	7
4.2. Circuit Operation	8
5 Location of Controls and Components	9
6 Installation Instructions	9
7 Operating Instructions	9
7.1. For Service Hint	9
8 Troubleshooting Guide	10
8.1. Service Hints	10
8.2. Pulse Dialing Problems	10
8.3. Tone Dialing Problems	11
8.4. No Ringing Sound When Ring Signal is Input	11
9 Disassembly and Assembly Instructions	12
9.1. Disassembly Instructions	12
10 Miscellaneous	14
10.1. How to Replace the Flat Package IC	14
10.2. Terminal Guide of the ICs, Transistors and Diodes	16
11 Schematic Diagram	17
11.1. For Schematic Diagram	17
11.2. Schematic Diagram (Main)	18
11.3. Schematic Diagram (Operation)	20
12 Printed Circuit Board	21
12.1. Circuit Board (Main)	21
12.2. Circuit Board (Operation)	23
13 Exploded View and Replacement Parts List	25
13.1. Cabinet and Electrical Parts	25
13.2. Accessories and Packing Materials	26
13.3. Replacement Part List	27

1 Safety Precautions

1.1. For Service Technicians

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

1. When repair services are provided, neither the products nor their parts or members shall be remodeled.
2. If a lead wire assembly is supplied as a repair part, the lead wire assembly shall be replaced.
3. FASTON terminals shall be plugged straight in and unplugged straight out.

- ICs and LSIs are vulnerable to static electricity.

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

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

2 Warning

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

Note:

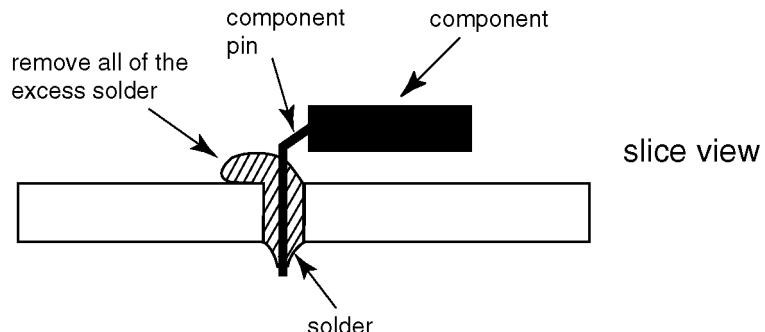
In the information below, Pb, the symbol for lead in the periodic table of elements, will refer to standard solder or solder that contains lead.

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

This model, and others like it, manufactured using lead free solder will have PbF stamped on the PCB. For service and repair work we suggest using the same type of solder.

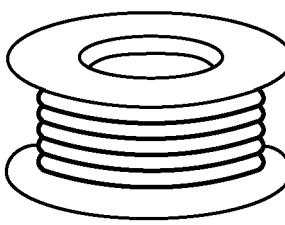
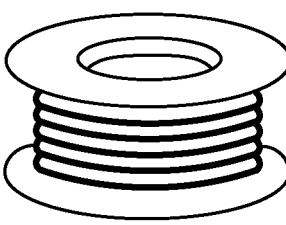
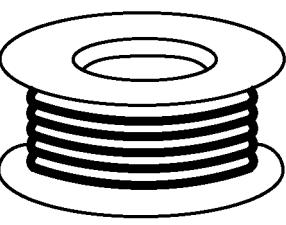
Caution

- PbF solder has a melting point that is 50 °F ~ 70 °F (30 °C ~ 40 °C) higher than Pb solder. Please use a soldering iron with temperature control and adjust it to 700 °F ± 20 °F (370 °C ± 10 °C).
- Exercise care while using higher temperature soldering irons.: Do not heat the PCB for too long time in order to prevent solder splash or damage to the PCB.
- PbF solder will tend to splash if it is heated much higher than its melting point, approximately 1100 °F (600 °C).
- When applying PbF solder to double layered boards, please check the component side for excess which may flow onto the opposite side (See the figure below).



2.1.1. 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 manufacturer's specific instructions for the melting points of their products and any precautions for using their product with other materials. The following lead free (PbF) solder wire sizes are recommended for service of this product: 0.3 mm, 0.6 mm and 1.0 mm.

0.3mm X 100g	0.6mm X 100g	1.0mm X 100g
		

2.1.2. Discarding of P. C. Board

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

3 Specifications

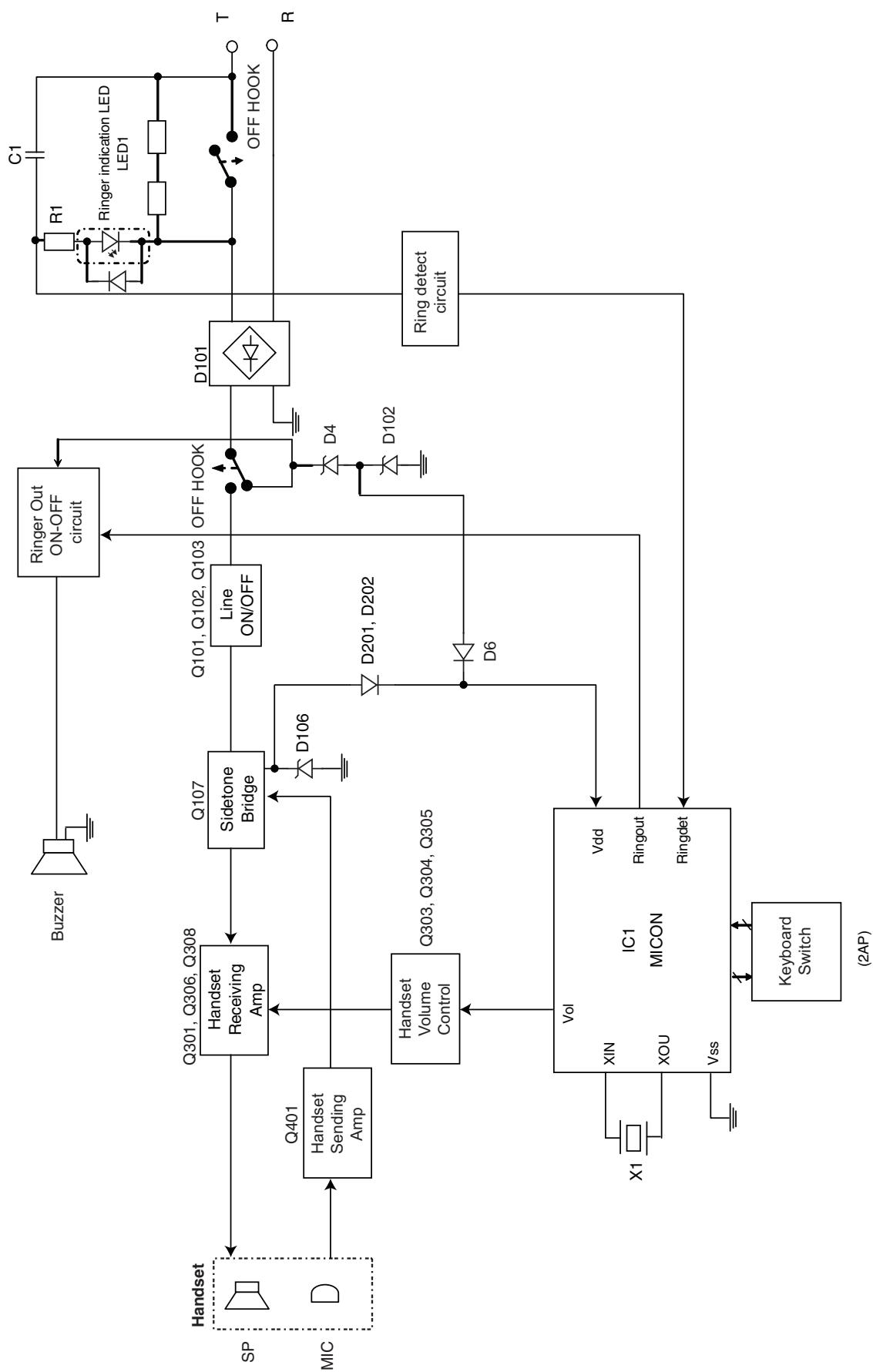
Power Source:	From telephone line
Redial:	The unit redials the last dialed number
Speaker Unit:	Handset: 3 cm (1 13/16") PM dynamic type 150 Ω
Microphone:	Electric condenser microphone
Input Jack:	Telephone Line
Dimensions (H x W x D):	Approx. 93 mm x 172 mm x 220 mm
Mass (weight):	Approx. 426 g
Operating Environment:	0 °C - 40 °C, 20 % - 80 % relative air humidity (dry)

Note:

- Design and specifications are subject to change without notice.

4 Technical Descriptions

4.1. Block Diagram



4.2. Circuit Operation

4.2.1. Power supply circuit

The set is powered from the line, 48V/24V.

- **Off hook**

LINE → Q101 → Q107 → R119 → D106 → D201 → D203 → Vdd (pin7 of IC1)

- **On hook**

LINE → R101 → R102 → D101 → SW1(pin 5-6) → R13 → D102 → D6 → Vdd (pin7 of IC1)

4.2.2. Bell Ringer Circuit

When the bell signal is input from LINE to T/R (when the telephone rings), the signal is detected and output by micon to the buzzer via the following path :

- **Bell Detection circuit**

T / R → C1 → D2 → R2 → Q1 → RINGDET (pin 27 of IC1)

- **Bell Output circuit**

Pin 15 of IC1 → Q3 → Q2 → R9 → SW2/3 → Buzzer

4.2.3. Telephone Line Interface

4.2.3.1. Circuit operation

- **On hook**

Q101 is OFF, on-hook condition where DC loop is disconnected and voice signal flow is cut.

- **Off hook**

During Off-Hook, pin 4_6 of SW1. Q101 is ON, providing an off-hook condition (active DC current flow through the circuit) and the following is the signal flow :

T → POS101 → L101 → D101(+) → Q101 → Q107 → R119 → D106 → D101(-) → L102 → R

- **Receiving signal flows:**

LINE → Q101 → C114 → C301 → R301 → Q301 → C305 → R307 → C306 → Q306 → C310 → R315 → Q308 → C315 → R318 → SP (handset)

- **Transmission signal flows:**

MIC (handset) → C402 → R402 → R405 → C405 → Q401 → R409 → C410 → Q107 → Q101 → LINE

- **Pulse Dial**

A pulse signal switches repeatedly between high and low logic is output from IC1 (pin 11), on and off the line loop, generating the pulse dial signal.

5 Location of Controls and Components

Refer to the Operating Instructions.

Note:

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

6 Installation Instructions

Refer to the Operating Instructions.

Note:

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

7 Operating Instructions

Refer to the Operating Instructions.

Note:

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

7.1. For Service Hint

7.1.1. To Release the Establishment of Dial Lock

If the current password is forgotten, follow this procedure, you will be able to establish a new password.

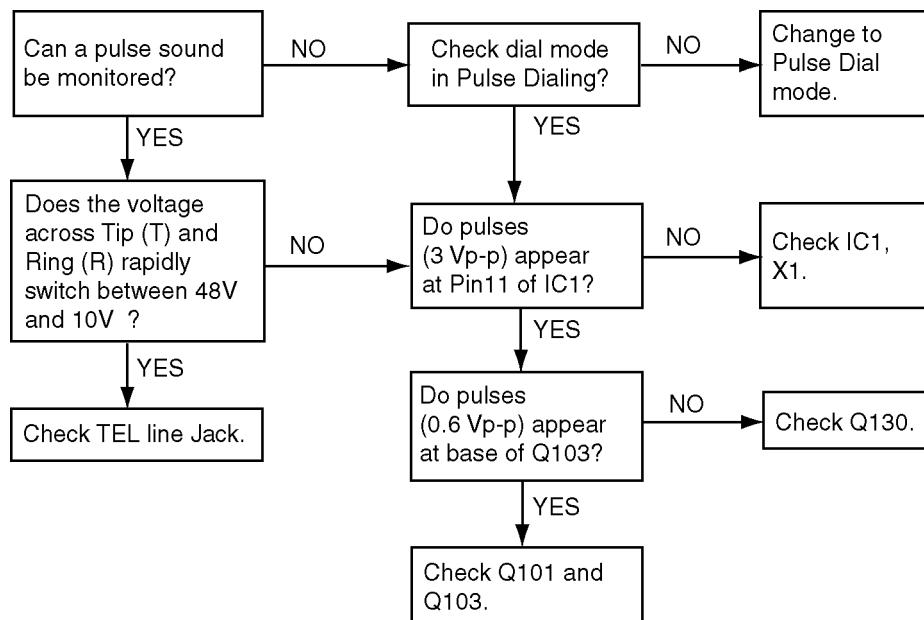
- 1** Lift the handset.
- 2** **[PROGRAM] → [REDIAL] → [5]**
- 3** Enter *7000 → **[PROGRAM]**
 - A beep sounds
- 4** Enter the new 4-digit password (0 to 9) → **[PROGRAM]**
 - A long beep sounds.
- 5** When finished, hang up.

8 Troubleshooting Guide

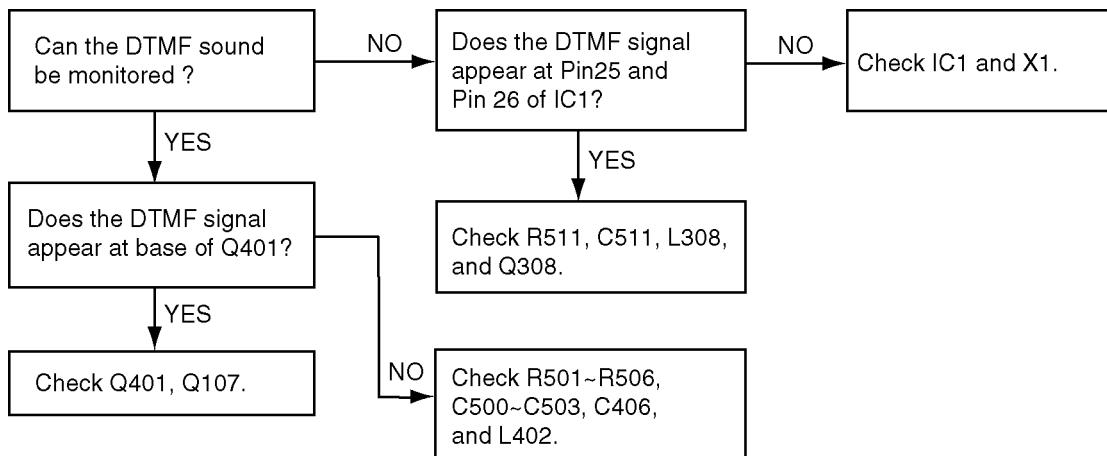
8.1. Service Hints

SYMPTOM	CURE
Dead.	Check IC1, X1.
Can't hear the voice from handset.	Check Q107, Q301, Q306, Q308.
No voice transmit.	Check Q401, Q107.
Can't tone dial.	Check IC1 (Pin 25, 26), R500~R506, C500~C503, C406.
Can't pulse dial.	Check Q101, Q103, Q130.
No rings.	Check IC1, C1, R1, Q1, Q2, Q3.
Can't speak with the handset.	Check Handset jack.
Can't change the volume for Handset.	Check IC1, Q303~Q305, R309~R311.

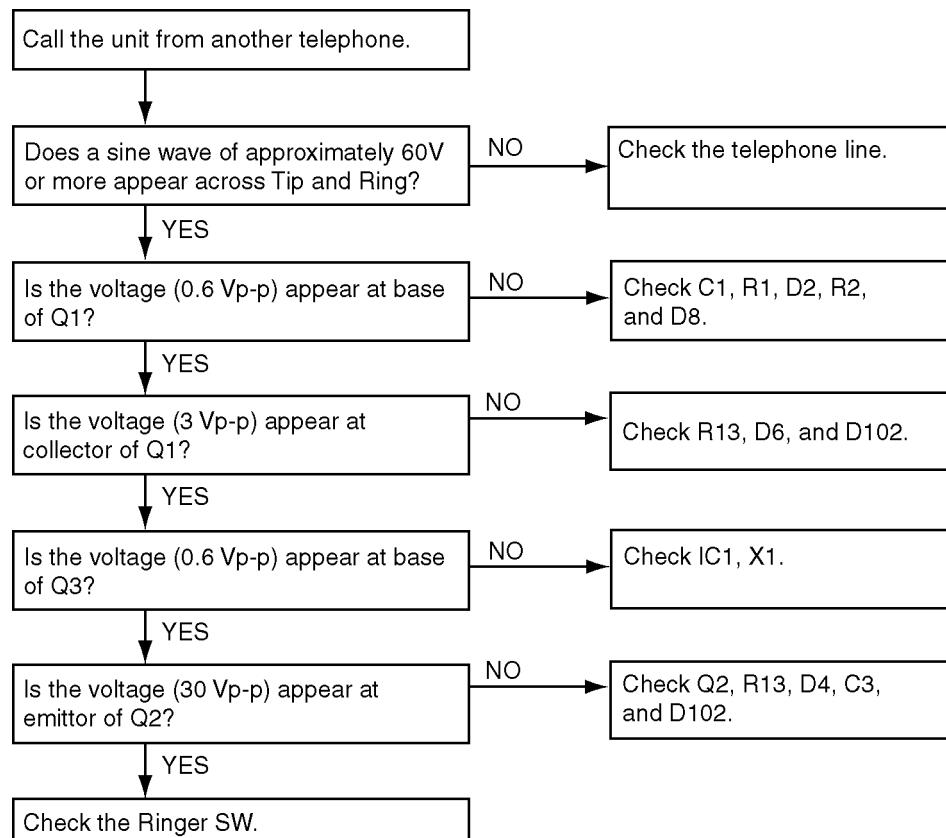
8.2. Pulse Dialing Problems



8.3. Tone Dialing Problems



8.4. No Ringing Sound When Ring Signal is Input



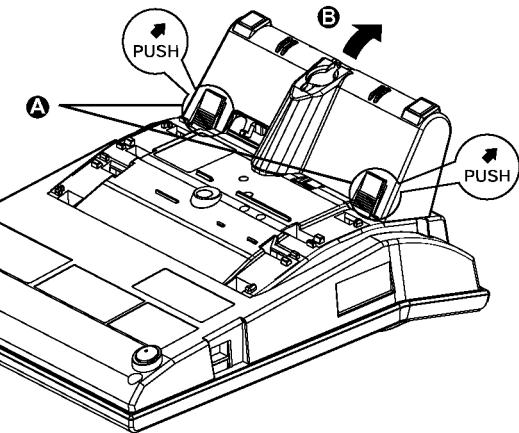
9 Disassembly and Assembly Instructions

9.1. Disassembly Instructions

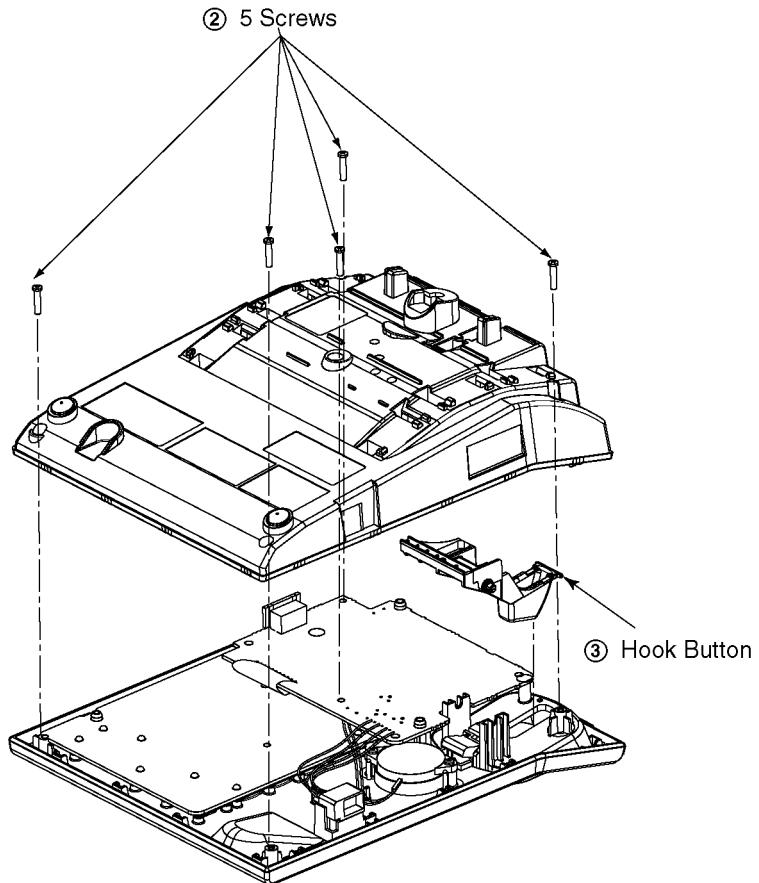
① Press the catches (A) and rotate the stand in the direction (B) to remove the Stand.

Note:

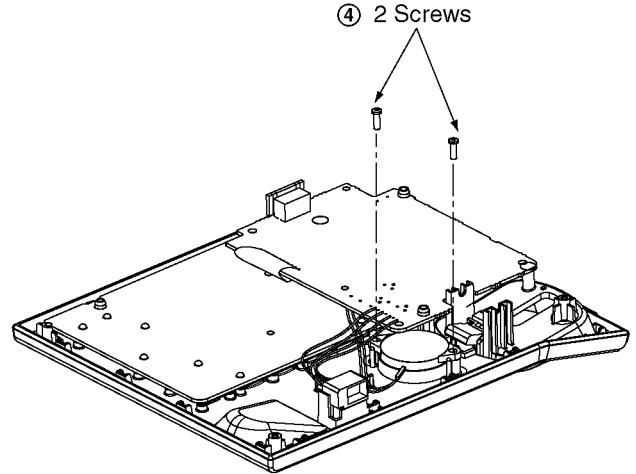
When the Stand is in Low position, the screws can be taken out just as it is.



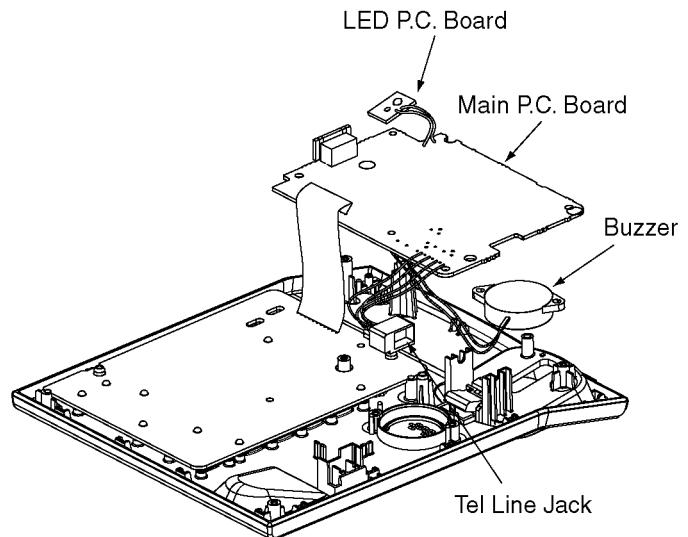
② Remove 5 Screws to remove the Cabinet Cover.



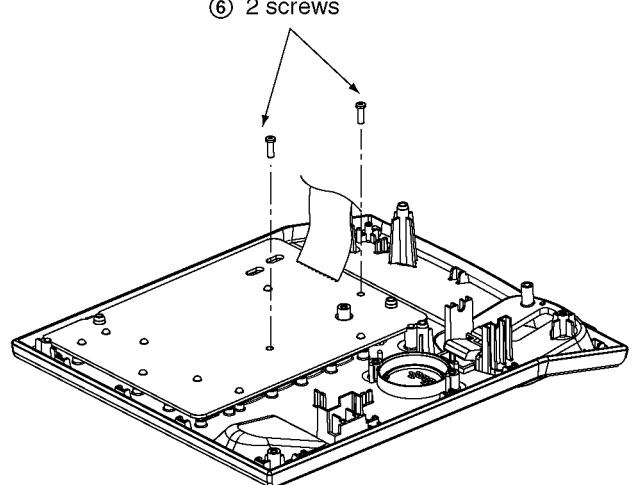
④ Remove the 2 Screws of the Buzzer.



⑤ Remove the Buzzer and Tel Line Jack, then unhook the Main P.C. Board and LED P.C. Board.



⑥ Remove the 2 screws to remove the Operational P.C. Board.



10 Miscellaneous

10.1. How to Replace the Flat Package IC

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

10.1.1. Preparation

- PbF (: Pb free) Solder

- Soldering Iron

Tip Temperature of $700^{\circ}\text{F} \pm 20^{\circ}\text{F}$ ($370^{\circ}\text{C} \pm 10^{\circ}\text{C}$)

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 $\rightarrow 0.82$.

Type \rightarrow RMA (lower residue, non-cleaning type)

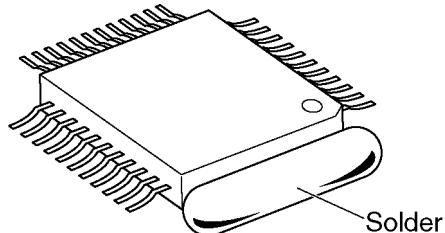
Note: See **About Lead Free Solder (Pbf: Pb free)** (P.4).

10.1.2. How to Remove the IC

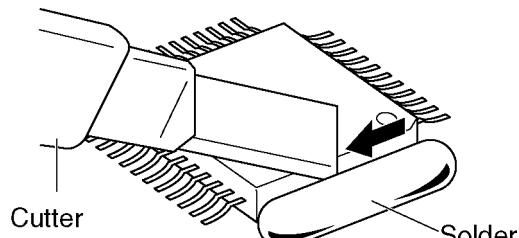
1. Put plenty of solder on the IC pins so that the pins can be completely covered.

Note:

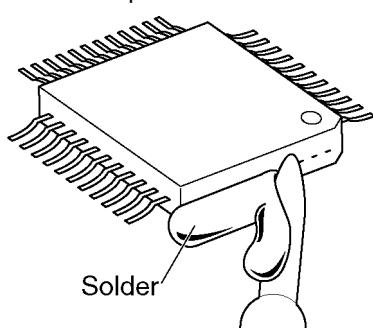
If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



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



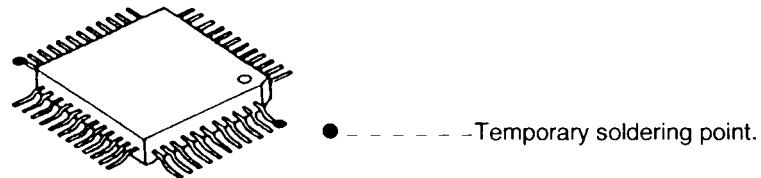
3. While the solder melts, remove it together with the IC pins.



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.

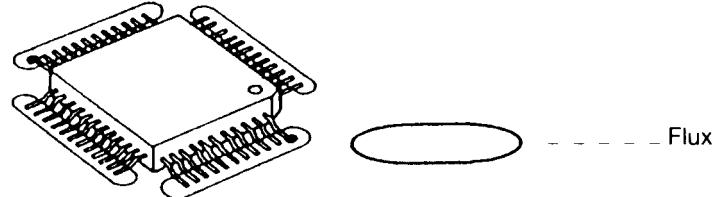
10.1.3. How to Install the IC

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

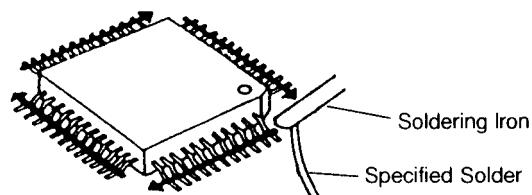


*Check the accuracy of the IC setting with the corresponding soldering foil.

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

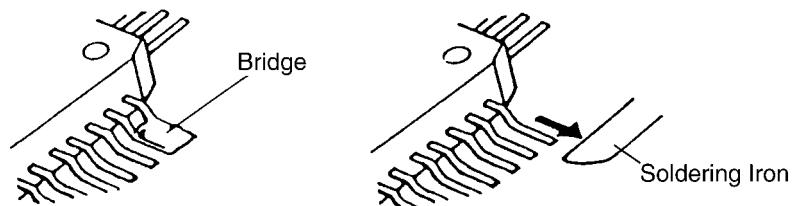


3. Solder the pins, sliding the soldering iron in the direction of the arrow.

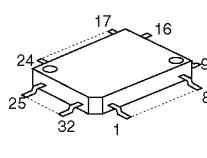
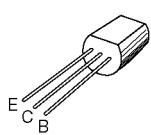
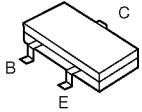
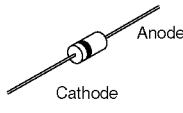
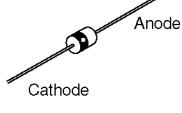
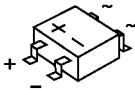
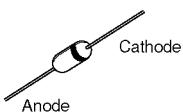
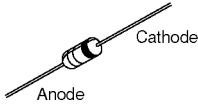
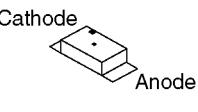


10.1.4. How to Remove a Solder Bridge

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



10.2. Terminal Guide of the ICs, Transistors and Diodes

 <p>PNWITS820MXH</p>	 <p>PQVT2N6517CA, B1AAJC000010</p>	 <p>UNR5213J0L, 2SC4081S, 2SC4081R, B1ABDF000026, B1GBJCJJ0003, B1ABDF000025</p>
 <p>PQVDMZJ3R9A</p>	 <p>MA723, B0AACK000011</p>	 <p>BOEDER000009</p>
 <p>MA165</p>	 <p>MA4240, MA4056</p>	 <p>PSVD1SRCT</p>

11 Schematic Diagram

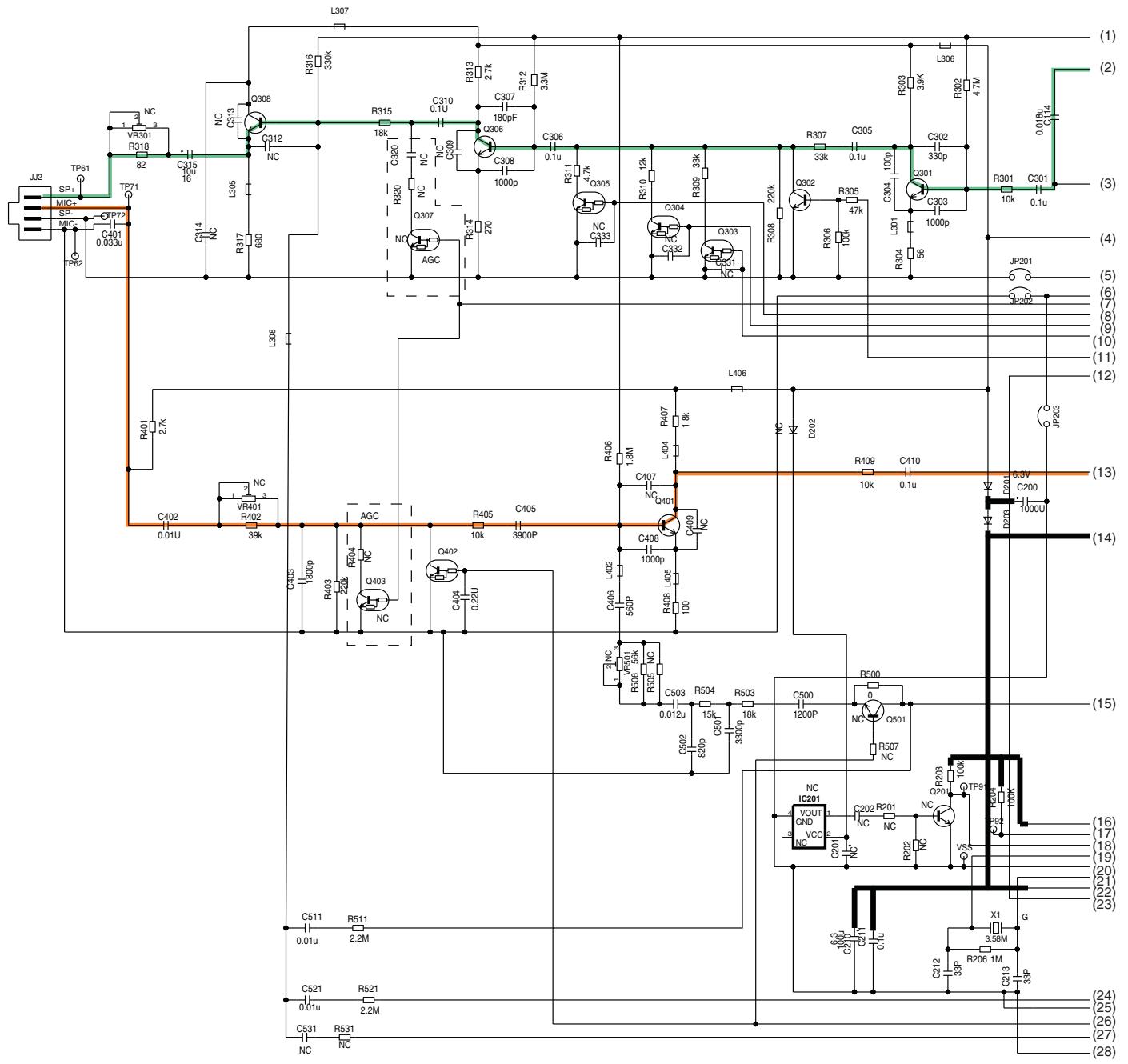
11.1. For Schematic Diagram

1. DC voltage measurements are taken with electronic voltmeter from negative terminal.
2. This schematic diagram may be modified at any time with the development of new technology.

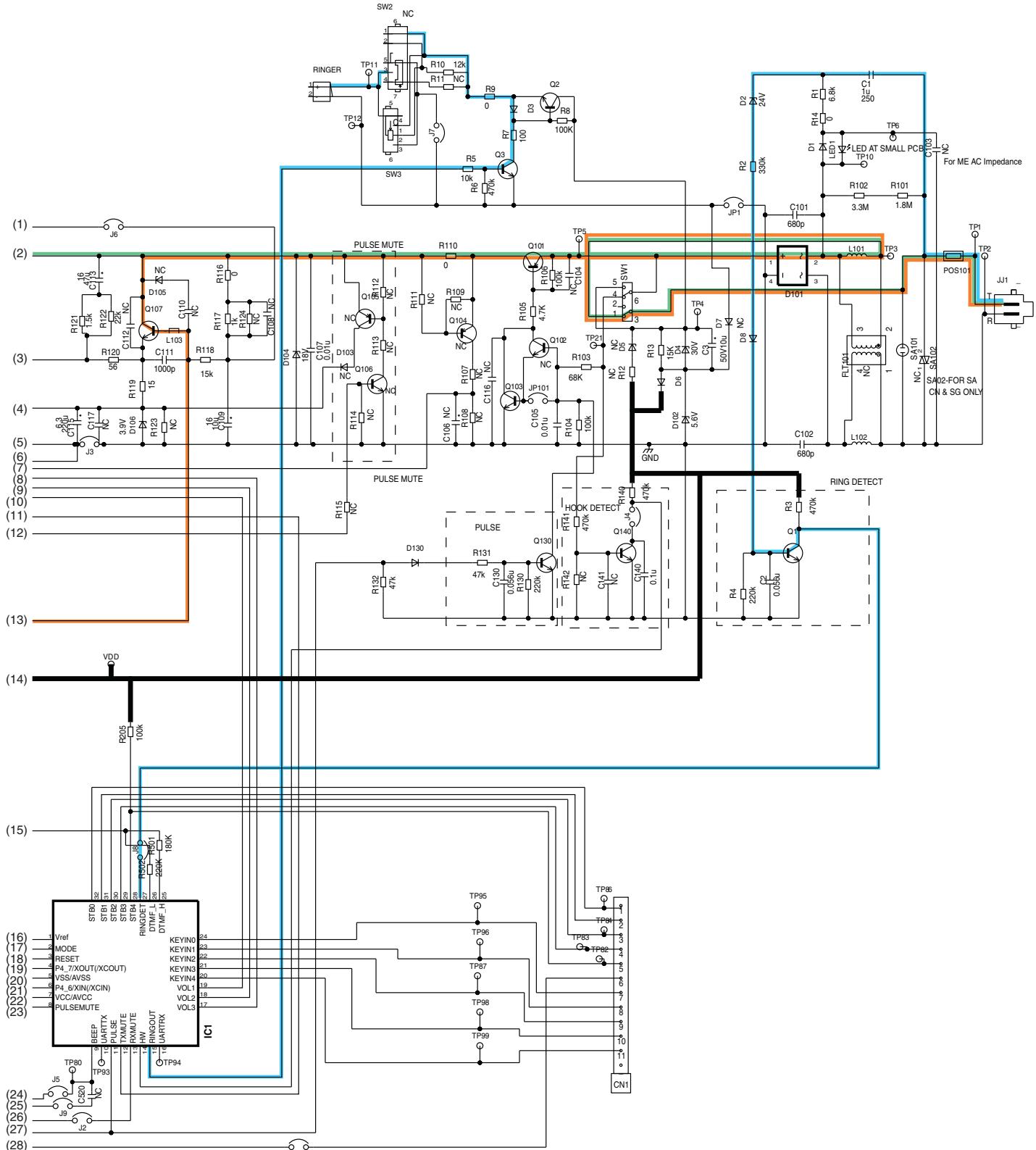
Important Safety Notice:

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

11.2. Schematic Diagram (Main)



NC: No Components



— Ringer

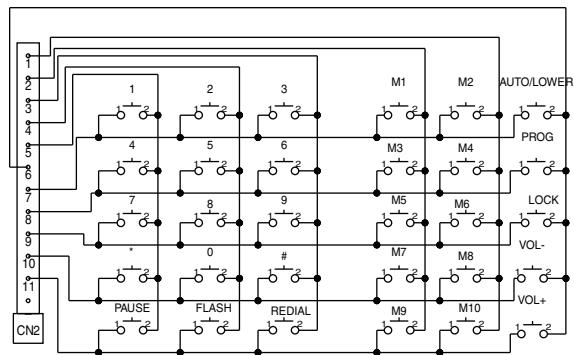
— Handset Receiving

— Handset Sending

NC: No Components

KX-TS820MX SCHEMATIC DIAGRAM (Main)

11.3. Schematic Diagram (Operation)

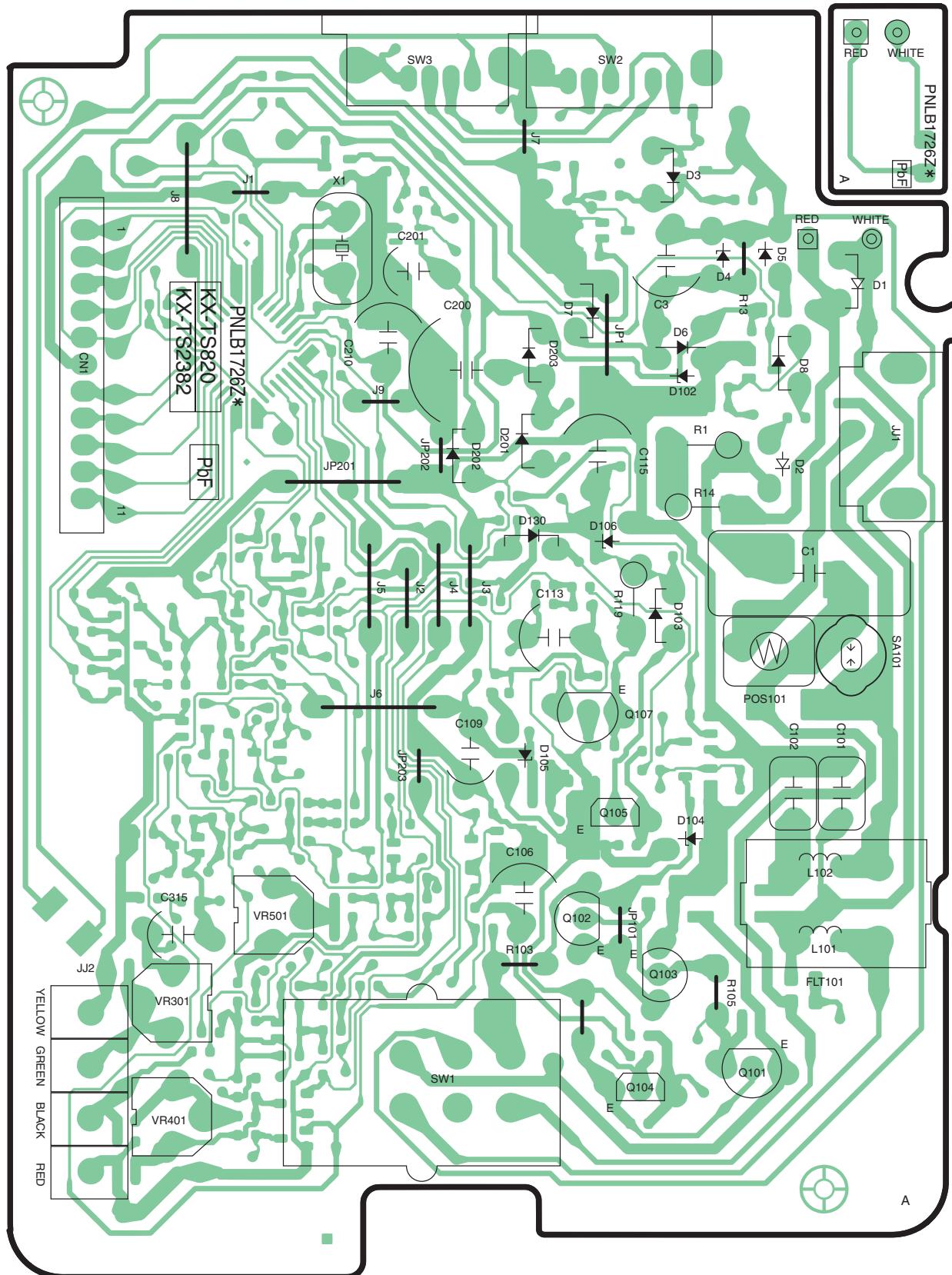


NC: No Components
KX-TS820MX SCHEMATIC DIAGRAM (Operation)

12 Printed Circuit Board

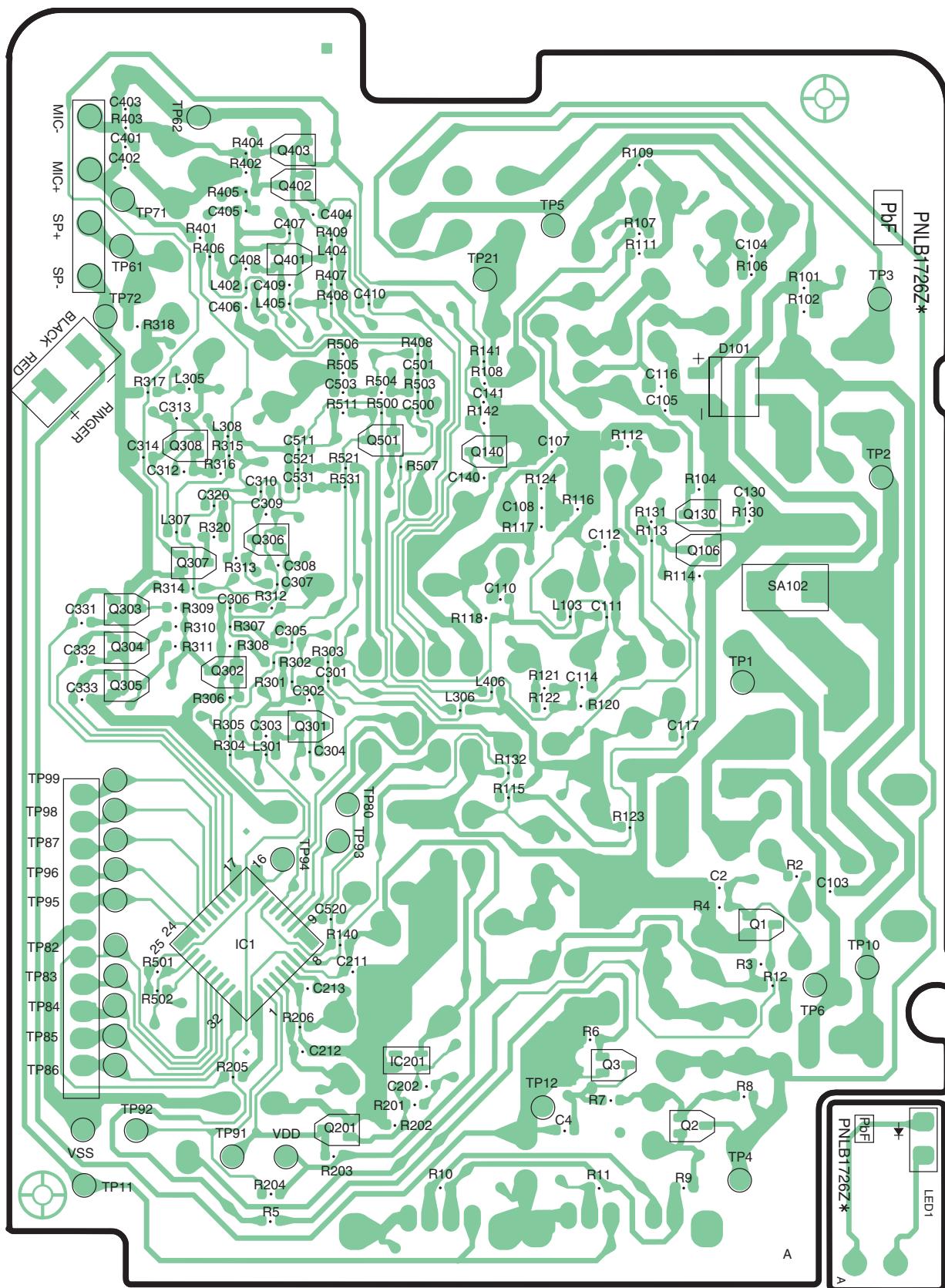
12.1. Circuit Board (Main)

12.1.1. Component View



KX-TS820/2382 CIRCUIT BOARD (Main (Component View))

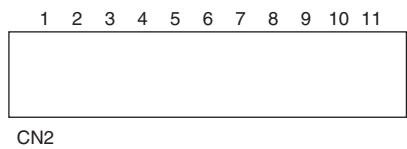
12.1.2. Bottom View



KX-TS820/2382 CIRCUIT BOARD (Main (Bottom View))

12.2. Circuit Board (Operation)

12.2.1. Component View

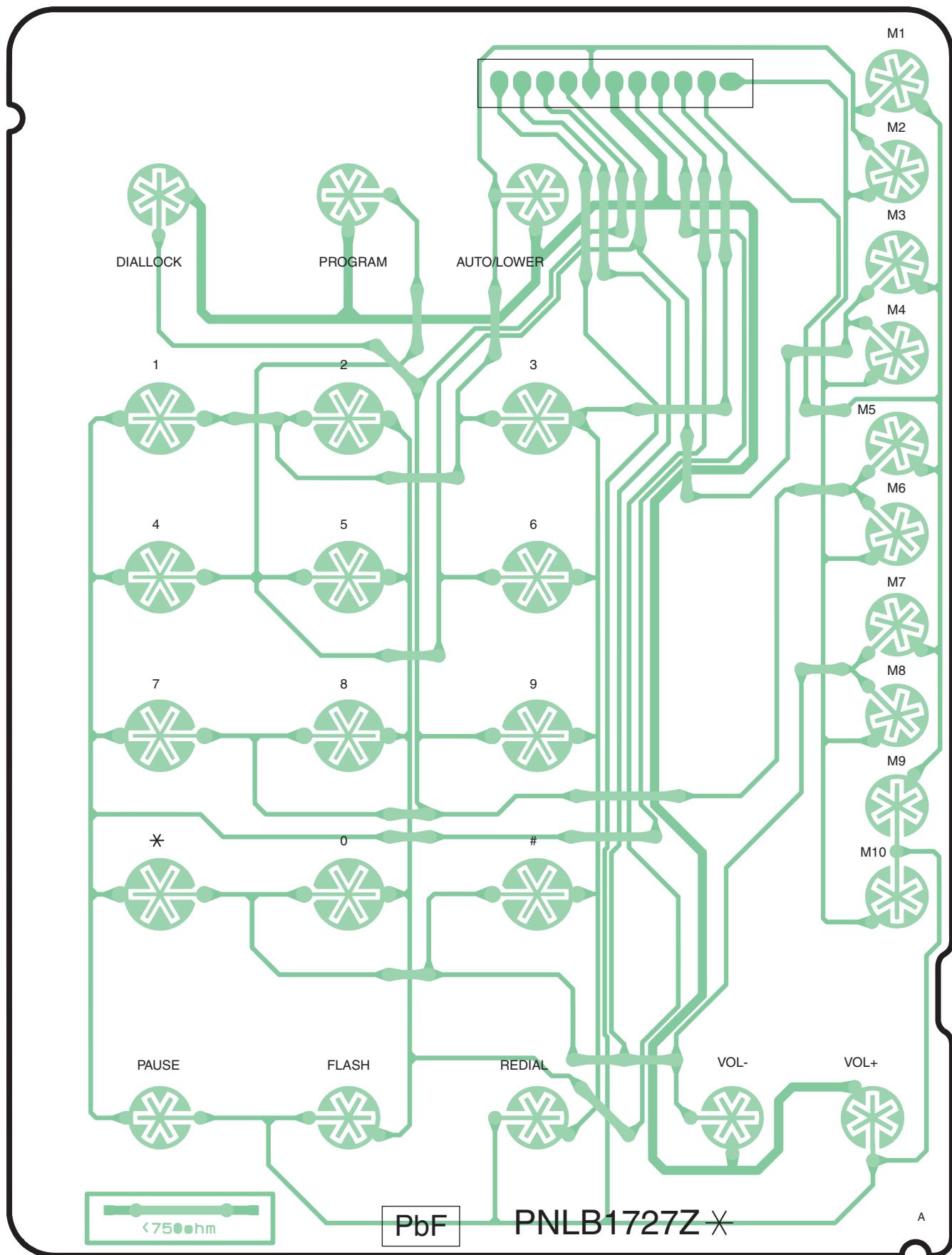


PNLB1727Z*

PbF

A

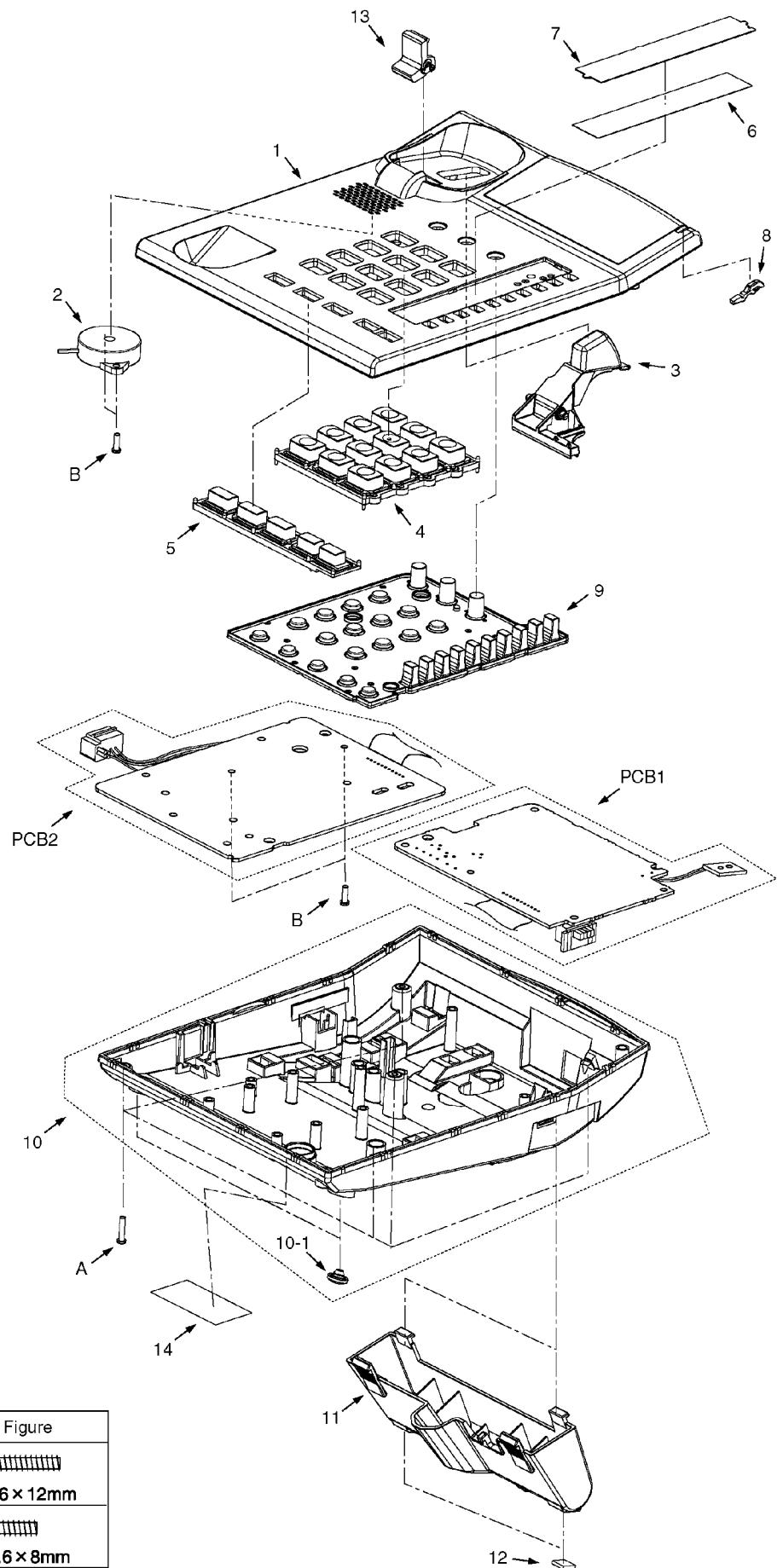
12.2.2. Bottom View



KX-TS820/2382 CIRCUIT BOARD (Operation (Bottom View))

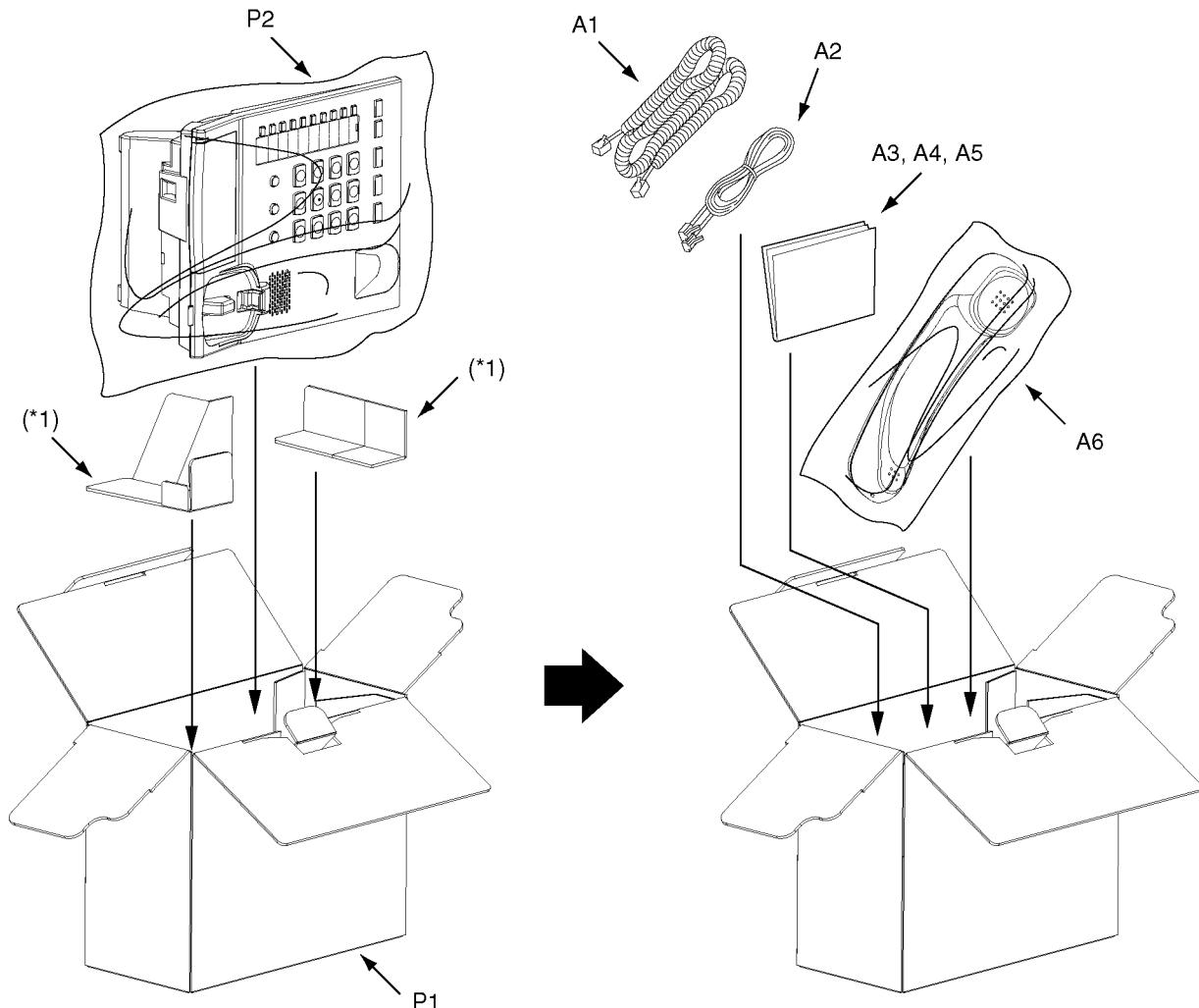
13 Exploded View and Replacement Parts List

13.1. Cabinet and Electrical Parts



Ref.No.	Figure
A	 φ2.6 × 12mm
B	 φ2.6 × 8mm

13.2. Accessories and Packing Materials

**Note:**

(*1) This pad is a piece of Ref. No. P1 (GIFT BOX).

13.3. Replacement Part List

1. RTL (Retention Time Limited)

Note:

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

2. Important safety notice

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

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

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

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

5. RESISTORS & CAPACITORS

Unless otherwise specified;

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

All capacitors are in MICRO FARADS (μF) $p=\mu\mu F$

*Type & Wattage of Resistor

Type

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

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W
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*Type & Voltage Of Capacitor

Type

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

Voltage

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

13.3.1. Base Unit

13.3.1.1. Cabinet and Electrical Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
1	PNKM1118Z2	CABINET BODY (for KX-TS820MXB)		PS-HB
1	PNKM1118Z1	CABINET BODY (for KX-TS820MXW)		PS-HB
2	L0DDFD000002	BUZZER		
3	PNBH1011Z2	BUTTON, HOOK (for KX-TS820MXB)		ABS-HB
3	PNBH1011Z1	BUTTON, HOOK (for KX-TS820MXW)		ABS-HB
4	PNBX1078Z2	KEYBOARD SWITCH, KEYS (for KX-TS820MXB)	12	ABS-HB
4	PNBX1078Z1	KEYBOARD SWITCH, KEYS (for KX-TS820MXW)	12	ABS-HB
5	PNBX1079Z2	KEYBOARD SWITCH, KEYS (for KX-TS820MXB)	5	ABS-HB

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
5	PNBX1079Z1	KEYBOARD SWITCH, KEYS (for KX-TS820MXW)	5	ABS-HB
6	PNGD1018Z	CARD, TEL		
7	PNGV1009Z	TEL CARD COVER		
8	PNHR1243Z	LED LENS		
9	PNJK1069Y	KEYBOARD SWITCH, RUBBER KEY (for KX-TS820MXB)		
9	PNJK1069Z	KEYBOARD SWITCH, RUBBER KEY (for KX-TS820MXW)		
10	PNYF1026Z2	CABINET COVER (for KX-TS820MXB)		PS-HB
10	PNYF1026Z1	CABINET COVER (for KX-TS820MXW)		PS-HB
10-1	PQHA10011Z	FOOT RUBBER		
11	PNKL1013Z2	STAND, WALL MOUNT (for KX-TS820MXB)		PS-HB
11	PNKL1013Z1	STAND, WALL MOUNT (for KX-TS820MXW)		PS-HB
12	PNHA1002Y	FOOT RUBBER		
13	PQKE100702Z1	KNOB, HOOK (KX-TS820MXB)		ABS-HB
13	PQKE100702Z3	KNOB, HOOK (KX-TS820MXW)		ABS-HB
14	PNGT2809Z	NAME PLATE (KX-TS820MXB)		
14	PNGT2808Z	NAME PLATE (KX-TS820MXW)		

13.3.1.2. Main P.C. Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB1	PNWP1S820MXH	MAIN P.C. BOARD ASS'Y (RTL)	
			(IC)	
IC1	PNWITS820MXH	IC		
			(TRANSISTORS)	
Q1	2SC4081S	TRANSISTOR(SI)		S
Q2	B1ABDF000025	TRANSISTOR(SI)		
Q3	B1ABDF000025	TRANSISTOR(SI)		
Q101	B1BCAP000026	TRANSISTOR(SI)		
Q103	PQVT2N6517CA	TRANSISTOR(SI)		S
Q107	B1AAJC000010	TRANSISTOR(SI)		
Q130	2SC4081S	TRANSISTOR(SI)		S
Q140	2SC4081S	TRANSISTOR(SI)		S
Q301	2SC4081R	TRANSISTOR(SI)		S
Q302	2SC4081S	TRANSISTOR(SI)		S
Q303	UNR5213J0L	TRANSISTOR(SI)		S
Q304	UNR5213J0L	TRANSISTOR(SI)		S
Q305	UNR5213J0L	TRANSISTOR(SI)		S
Q306	2SC4081R	TRANSISTOR(SI)		S
Q308	B1ABDF000026	TRANSISTOR(SI)		
Q401	2SC4081R	TRANSISTOR(SI)		S
Q402	B1GBJCJJ0003	TRANSISTOR(SI)		
			(DIODES)	
D1	MA165	DIODE(SI)		S
D2	MA4240	DIODE(SI)		S
D3	MA165	DIODE(SI)		S
D4	MA4300	DIODE(SI)		S
D6	MA165	DIODE(SI)		S
D8	B0AACK000011	DIODE(SI)		
D101	BOEDER000009	DIODE(SI)		
D102	MA4056	DIODE(SI)		S
D104	MA4180	DIODE(SI)		S
D106	PQVDMZJ3R9A	DIODE(SI)		S
D130	MA165	DIODE(SI)		S
D201	MA723	DIODE(SI)		S
D203	MA723	DIODE(SI)		S
LED1	PSVD1SRCT	DIODE(SI)		S
			(JACKS)	
JJ1	PFJJ1T01Z	JACK/SOCKET		S

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	JJ2	PQJJ1T030P	JACK/SOCKET	
			(SWITCHES)	
SW1		PQSH2B105Z	PUSH SWITCH	
SW3		K0D113B00082	SLIDE SWITCH	
			(VARISTOR)	
SA101		J0LF00000026	VARISTOR	
			(RESISTORS)	
R1		ERDS1VJ682	6.8k	
R2		ERJ3GEYJ334	330k	
R3		ERJ3GEYJ474	470k	
R4		ERJ3GEYJ224	220k	
R5		ERJ3GEYJ103	10k	
R6		ERJ3GEYJ474	470k	
R7		ERJ3GEYJ101	100	
R8		ERJ3GEYJ104	100k	
R9		ERJ3GEY0R00	0	
R10		ERJ3GEYJ123	12k	
R13		ERDS2TJ153	15k	
R101		PQ4R10XJ185	1.8M	S
R102		PQ4R10XJ335	3.3M	S
R103		ERDS2TJ683	68k	
R104		ERJ3GEYJ104	100k	
R105		ERDS2TJ472	4.7k	
R106		ERJ3GEYJ104	100k	
R116		ERJ3GEY0R00	0	
R117		ERJ3GEYJ102	1k	
R118		ERJ3GEYJ153	15k	
R119		ERDS1TJ150	15	S
R120		ERJ3GEYJ560	56	
R121		ERJ3GEYJ152	1.5k	
R122		ERJ3GEYJ223	22k	
R130		ERJ3GEYJ224	220k	
R131		ERJ3GEYJ473	47k	
R132		ERJ3GEYJ473	47k	
R140		ERJ3GEYJ474	470k	
R141		ERJ3GEYJ474	470k	
R203		ERJ3GEYJ104	100k	
R204		ERJ3GEYJ104	100k	
R205		ERJ3GEYJ104	100k	
R206		ERJ3GEYJ105	1M	
R301		ERJ3GEYJ103	10k	
R302		ERJ3GEYJ475	4.7M	
R303		ERJ3GEYJ392	3.9k	
R304		ERJ3GEYJ560	56	
R305		ERJ3GEYJ473	47k	
R306		ERJ3GEYJ104	100k	
R307		ERJ3GEYJ333	33k	
R308		ERJ3GEYJ224	220k	
R309		ERJ3GEYJ333	33k	
R310		ERJ3GEYJ123	12k	
R311		ERJ3GEYJ472	4.7k	
R312		ERJ3GEYJ335	3.3M	
R313		ERJ3GEYJ272	2.7k	
R314		ERJ3GEYJ271	270	
R315		ERJ3GEYJ183	18k	
R316		ERJ3GEYJ334	330k	
R317		ERJ3GEYJ681	680	
R318		ERJ3GEYJ820	82	
R401		ERJ3GEYJ272	2.7k	
R402		ERJ3GEYJ393	39k	
R403		ERJ3GEYJ224	220k	
R405		ERJ3GEYJ103	10k	
R406		ERJ3GEYJ185	1.8M	
R407		ERJ3GEYJ182	1.8k	
R408		ERJ3GEYJ101	100	
R409		ERJ3GEYJ103	10k	
R500		ERJ3GEY0R00	0	
R501		ERJ3GEYJ184	180k	
R502		ERJ3GEYJ224	220k	
R503		ERJ3GEYJ183	18k	
R504		ERJ3GEYJ153	15k	
R506		ERJ3GEYJ563	56k	
R511		ERJ3GEYJ225	2.2M	

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	R521	ERJ3GEYJ225	2.2M	
	L103	ERJ3GEY0R00	0	
	L301	ERJ3GEY0R00	0	
	L305	ERJ3GEY0R00	0	
	L306	ERJ3GEY0R00	0	
	L307	ERJ3GEY0R00	0	
	L308	ERJ3GEY0R00	0	
	L402	ERJ3GEY0R00	0	
	L404	ERJ3GEY0R00	0	
	L405	ERJ3GEY0R00	0	
	L406	ERJ3GEY0R00	0	
			(CAPACITORS)	
	C1	F0C2E1050005	250	
	C2	ECUV1C563KBV	0.056	
	C3	ECEA1HKA100	10	
	C101	F1B2H681A070	680p	
	C102	F1B2H681A070	680p	
	C105	ECUV1H103KBV	0.01	
	C107	ECUV1H103KBV	0.01	
	C109	ECEA1CKS100	10	S
	C111	ECUV1H102KBV	0.001	
	C113	ECEA1CKS470	47	S
	C114	ECUV1H183KBV	0.018	
	C115	ECEA0JKA221	220	
	C130	ECUV1C563KBV	0.056	
	C140	ECUV1C104KBV	0.1	
	C200	ECA0JM102	0.001	S
	C210	ECEA0JKA101	100	
	C211	ECUV1C104KBV	0.1	
	C212	ECUV1H330JCV	33p	
	C213	ECUV1H330JCV	33p	
	C301	ECUV1C104KBV	0.1	
	C302	ECUV1H331JCV	330p	S
	C303	ECUV1H102KBV	0.001	
	C304	ECUV1H101JCV	100p	
	C305	ECUV1C104KBV	0.1	
	C306	ECUV1C104KBV	0.1	
	C307	ECUV1H181JCV	180p	
	C308	ECUV1H102KBV	0.001	
	C310	ECUV1C104KBV	0.1	
	C315	ECEA1CKS100	10	
	C401	ECUV1C333KBV	0.033	
	C402	ECUV1H103KBV	0.01	
	C403	ECUV1H182KBV	0.0018	
	C404	ECUV1A224KBV	0.22	
	C405	ECUV1H392KBV	0.0039	
	C406	ECUV1H561JCV	560p	
	C408	ECUV1H102KBV	0.001	
	C410	ECUV1C104KBV	0.1	
	C500	ECUV1H122KBV	0.0012	
	C501	ECUV1H332KBV	0.0033	
	C502	ECUV1H821JCV	820p	
	C503	ECUV1H123KBV	0.012	
	C511	ECUV1H103KBV	0.01	
	C521	ECUV1H103KBV	0.01	
			(CRYSTAL OSCILLATOR)	
	X1	PQVBZTA3.58M	CRYSTAL OSCILLATOR	

13.3.1.3. Operational P.C. Board Parts

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	PCB2	PNWP2S820MXH	OPERATIONAL P.C. BOARD ASS'Y (RTL)	

13.3.2. Accessories and Packing Materials

Note:

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

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	A1	PQJA10152W	CORD, HANDSET (KX-TS820MXB)	
	A1	PQJA10152Z	CORD, HANDSET (KX-TS820MXW)	
	A2	PQJA10075Z	CORD, TELEPHONE	
	A3	PNQX2233Z	OPERATING INSTRUCTION (ENGLISH/TRADITIONAL CHINESE)	
	A4	PNQX2234Z	OPERATING INSTRUCTION (ARABIC/PERSIAN)	
	A5	PNQX2307Z	OPERATING INSTRUCTION (THAI/VIETNAM)	
	A6	PQJXF0101Z	HANDLE/HANDSET (KX-TS820MXB)	
	A6	PQJXF0102Z	HANDLE/HANDSET (KX-TS820MXW)	
	P1	PNEPK2553Z	GIFTBOX	
	P2	PQPH10076Y	PROTECTION COVER	

13.3.3. Screws

Safety	Ref. No.	Part No.	Part Name & Description	Remarks
	A	XTB26+12GFJ	TAPPING SCREW	
	B	XTB26+8GFJ	TAPPING SCREW	

YK/N
KXTS820MXB
KXTS820MXW