

Service Manual

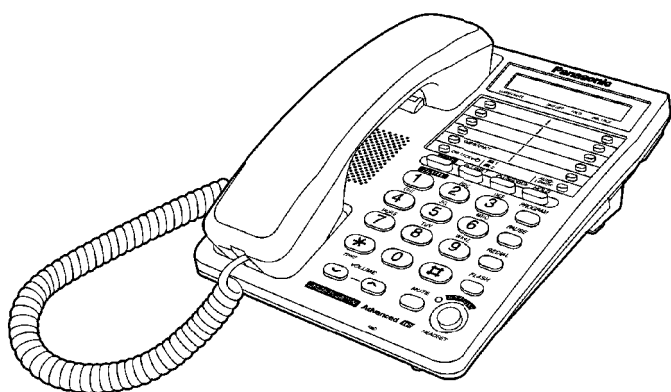
Telephone Equipment

2 LINE
KX-T2378JXW

Intergrated Telephone System

White Version

(for Asia, Middle Near East and Other Areas)



■ SPECIFICATIONS

Power Source:	Telephone line voltage
Dial Speed:	Tone(DTMF)/Pulse(10pps)
Redial:	Last dialed telephone number
Speaker Unit:	5.7cm (2.5") PM magnetic type 32Ω Handset; 3 cm (1 13/16) PM dynamic type, 150 Ω
Microphone:	Electret condenser microphone
Input Jack:	Telephone Line, Data port
Dimensions:	6 ⁹ / ₁₆ " × 8 ¹³ / ₁₆ " × 3 ³ / ₄ " (167 × 224 × 95 mm)
Weight:	1.61 lbs. (730g)

Design and specifications are subject to change without notice.

Panasonic

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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.

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

FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.

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

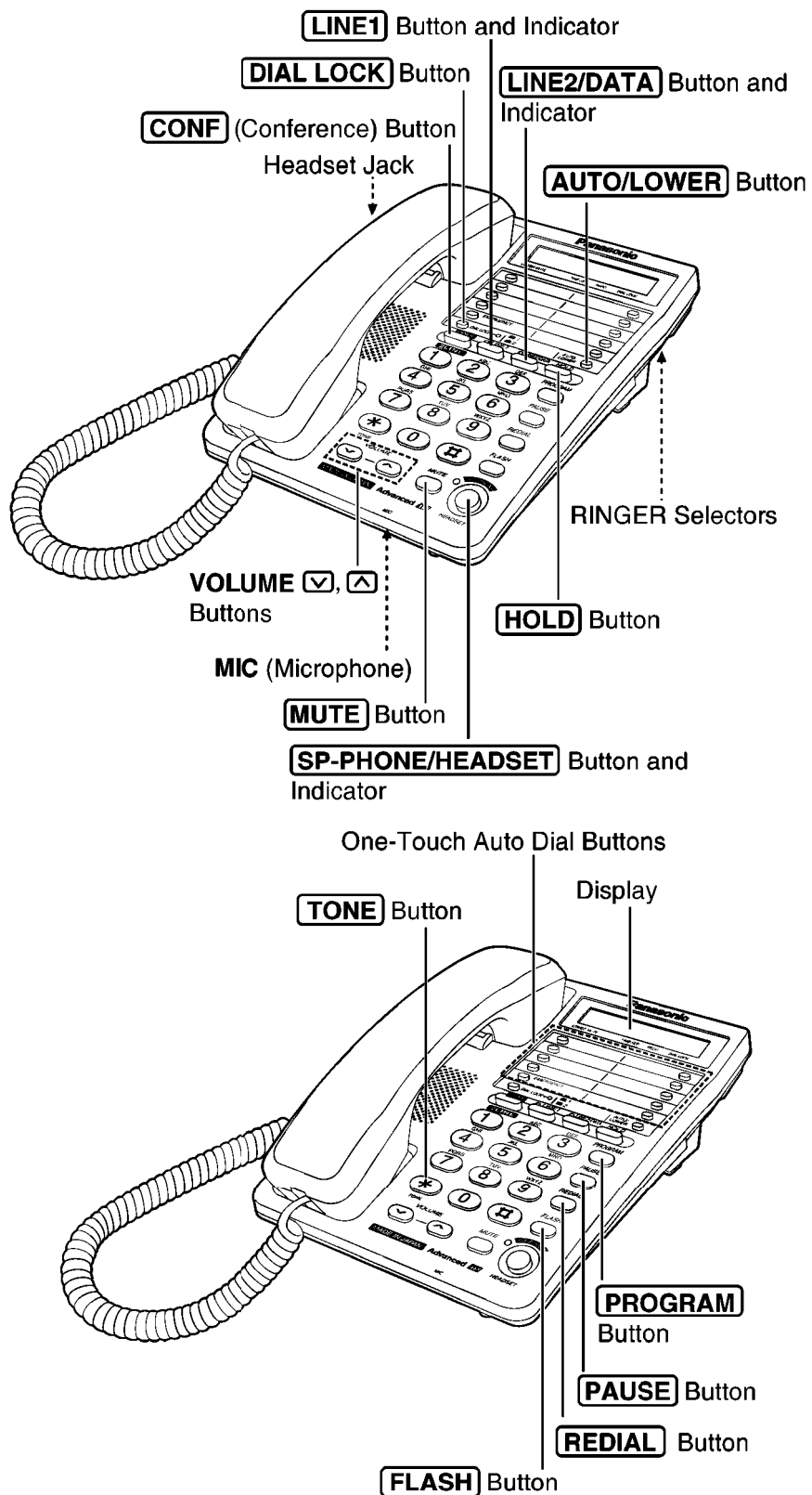
1. Cover plastic parts boxes with aluminum foil.
2. Ground the soldering irons.
3. Use a conductive mat on worktable.
4. Do not grasp IC or LSI pins with bare fingers.

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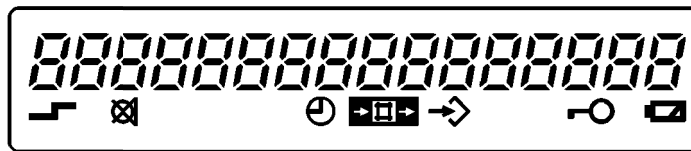
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1 LOCATION OF CONTROLS



2 DISPLAY



(This display shows all of the possible configurations.)

12-000 : In the standby mode, the display shows the current time.
(Ex. 12:00AM)

02-14-30 : During a conversation, the call duration is displayed.
(Ex. 2 hours, 14 minutes, 30 seconds)

F : **FLASH** was pressed.

P : **PAUSE** was pressed while storing phone numbers.

✳ : ***** was pressed while dialing.

: **#** was pressed while dialing.

: **AUTO/LOWER** was pressed.

: **MUTE** was pressed during a conversation.

: The unit is in the clock setting mode.

: The unit is in the programming mode.

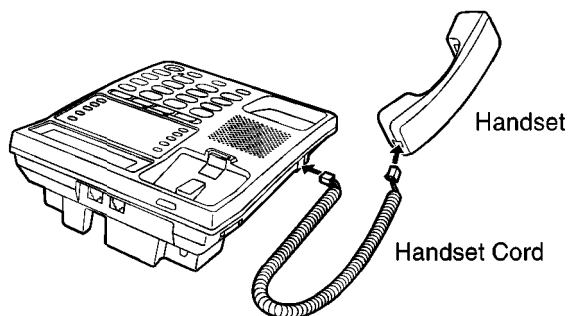
: The dial lock mode is set.

: This display flashes, when the battery power is low.

3 CONNECTION

3.1. Connecting the Handset

Connect the handset as shown below.

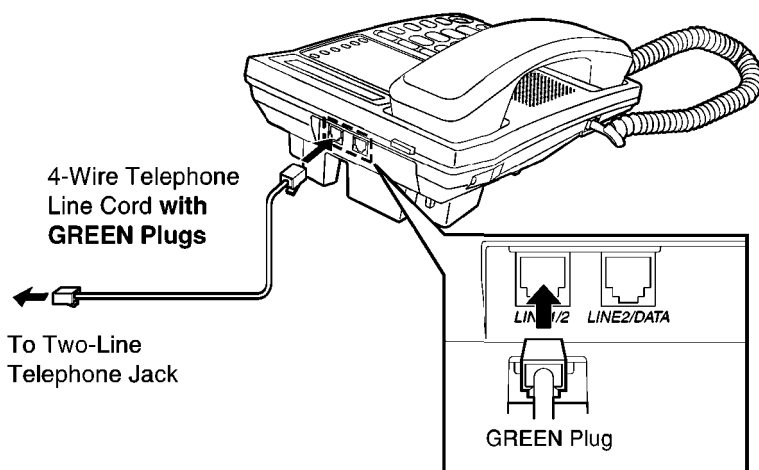


- Use only a Panasonic Handset for the KX-T2378JXW.

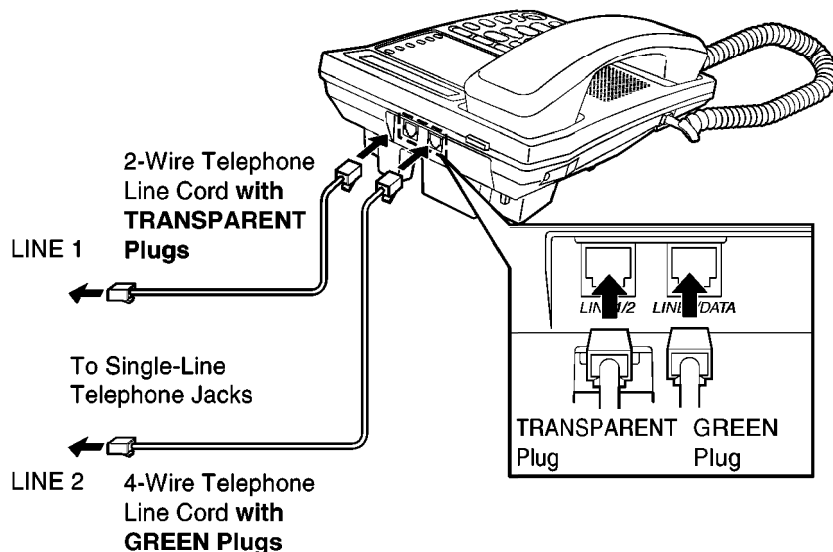
3.2. Connecting the Telephone Line Cord

Connect the telephone line cord(s) to the unit as follows.

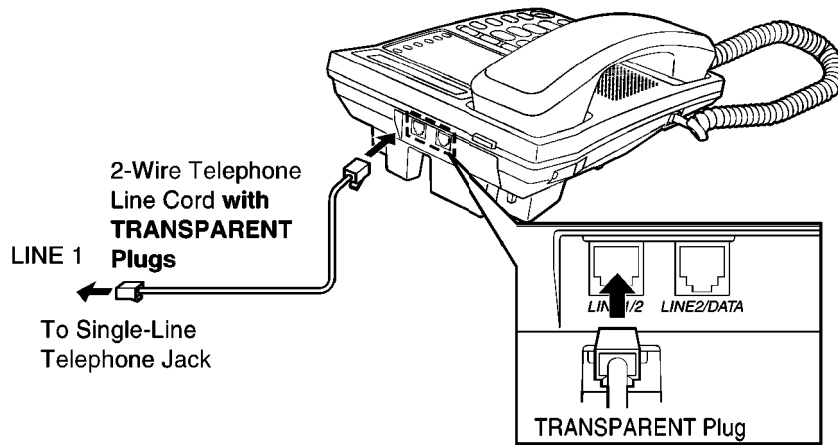
To connect a two-line telephone jack



To connect two single-line telephone jacks

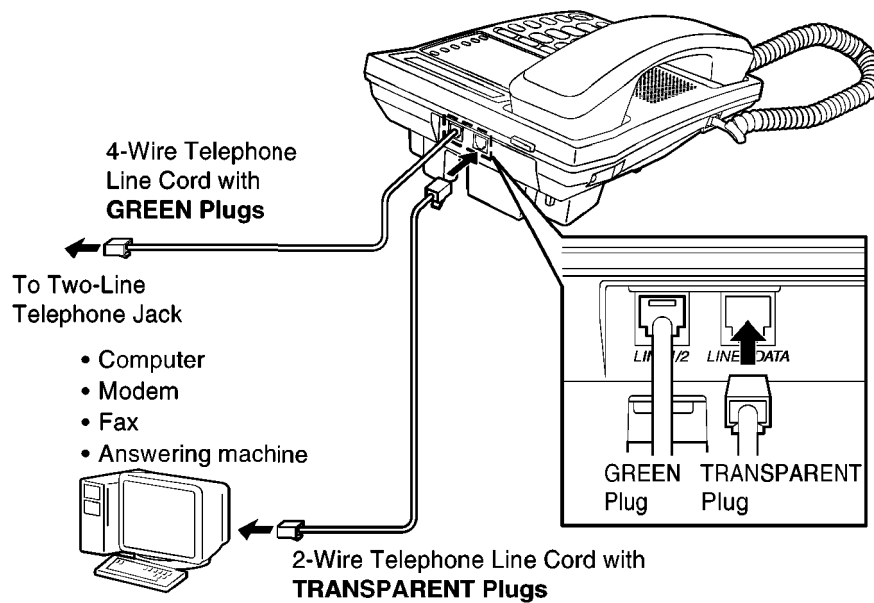


If you use the unit only as a single-line telephone



3.3. Connecting a Communication Device

After connecting the telephone line cord to a two-line telephone jack, you can connect a communication device (computer, modem, fax, answering machine, etc.) through this unit using the LINE2/DATA jack.



- If the LINE2/DATA indicator lights red, the communication device is in use. Use LINE1 to make or answer other calls. Otherwise the communication device may not operate properly.

4 SETTINGS

* To Set the Each Settings (4.1. ~ 4.4.) Back to the Factory Default < for Service >

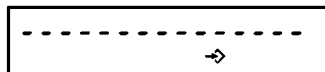
You can set the each settings (4.1. ~ 4.4.) back to the factory default by taking off the battery and leave the unit for a while (about 3 minutes).

4.1. Selecting the Dialing Mode

You can select the dialing mode by programming. If you have touch tone service, set to "Tone". If rotary or pulse service is used, set to "Pulse". Your phone comes from the factory set to "Tone".

Make sure that a call is not put on hold.

1 Press **PROGRAM**.



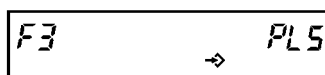
2 Press **MUTE**.



3 Press **3**.
•The current setting is displayed.



4 To select "Pulse", press **2**.
OR
To select "Tone", press **1**.



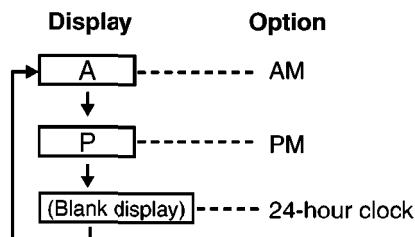
5 Press **PROGRAM**.
•A long beep sounds.
•The unit will return to the standby mode.

4.2. Time Adjustment

You can select AM/PM or 24-hour clock by programming.

Make sure that a call is not put on hold.

- 1 Press **PROGRAM**.
- 2 Press **MUTE**.
- 3 Press **6**.
- 4 Enter the current time (hour and minute) using a 4-digit number.
(Ex. To set 9:30, enter "0930".)
- 5 Press **#** to select AM, PM or 24-hour clock.
(Ex. You select PM.)



- Each time you press **#**, the selection will change on the display.

- 6 Press **PROGRAM**.
 - A long beep sounds.
 - The clock starts working.
 - If an alarm sound is heard when entering the time and pressing **PROGRAM**, the time entered are not correct. Enter the correct time and press **PROGRAM**.
 - The unit will return to the standby mode.

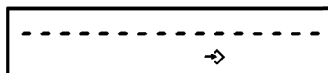
If the batteries installed in the unit have expired, the time will be shown as "12-00" and "⌚" will flash. Readjust the time.

4.3. Setting the LCD Contrast

You can select the LCD contrast level from 1 to 4 by programming. Your phone comes from the factory set to 3.

Make sure that a call is not put on hold.

1 Press **PROGRAM**.



2 Press **MUTE**.



3 Press **7**.
•The current setting is displayed.

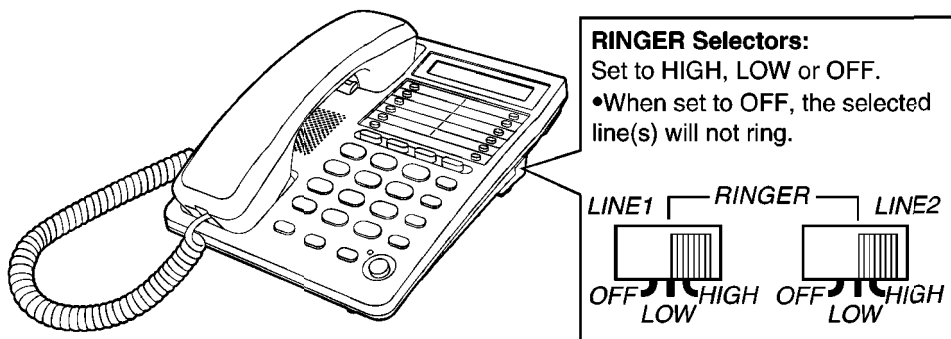


4 Press **1** to **4**.
•Each time you press a button, the level will change on the display.

5 Press **PROGRAM**.
•A long beep sounds.
•The unit will return to the standby mode.

4.4. Selecting the Ringer Volume

You can select the ringer volume of each line to HIGH, LOW or OFF. Your phone comes from the factory set to HIGH.



5 SPECIAL FEATURES

* To Set the Each Settings (5.1. ~ 5.6.) Back to the Factory Default < for Service >

You can set the each settings (5.1. ~ 5.6.) back to the factory default by taking off the battery and leave the unit for a while (about 3 minutes).

5.1. FLASH Button

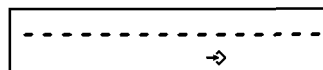
Pressing **FLASH** allows you to use special features of your host PBX such as transferring an extension call or accessing special telephone services (optional) such as call waiting.

5.2. Selecting the Flash Time

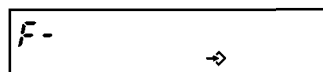
The flash time depends on your telephone exchange or host PBX. You can select the following flash times: "80, 90, 100, 110, 200, 250, 300, 400, 600, 700 ms (milliseconds)". Your phone comes from the factory set to "600 ms".

Make sure that a call is not put on hold.

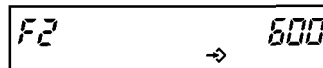
1 Press **PROGRAM**.



2 Press **MUTE**.



3 Press **2**.
•The current setting is displayed.



4 Press a dialing button (**1** to **0**).

1 : 80 ms	2 : 90 ms	3 : 100 ms	4 : 110 ms
5 : 200 ms	6 : 250 ms	7 : 300 ms	8 : 400 ms
9 : 600 ms	0 : 700 ms		

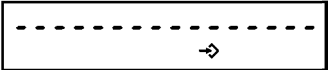
5 Press **PROGRAM**.
•A long beep sounds.
•The unit will return to the standby mode.

- If you are connected via a PBX, a longer flash time may be necessary to use PBX functions (transferring a call, etc.). Consult your PBX installer for the correct setting.

5.3. Setting the Pin Code

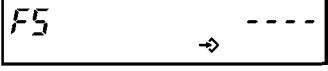
A 4-digit PIN Code (Personal Identification Number) prevents unauthorized persons from using your unit. The PIN Code is required for the dial lock and call restriction to be set or canceled. The factory preset PIN code is "1111".

Make sure that a call is not put on hold.

- 1 Press **PROGRAM**.

- 2 Press **MUTE**.

- 3 Press **5**.

- 4 Enter the current PIN code.
 (Ex. "1111" is entered.)

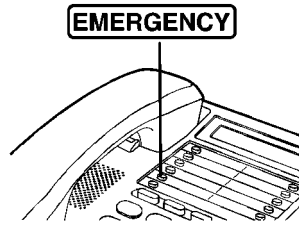
- 5 Press **PROGRAM**.
 - If a correct PIN code is entered, a beep will sound.
 - If a wrong PIN code is entered, 3 beeps will sound. Enter the correct PIN code and press **PROGRAM**.
 - To return to the standby mode, lift the handset and hang up.
- 6 Enter a new PIN code using a 4-digit number.
 (Ex. "1234" is entered.)

- 7 Press **PROGRAM**.
 - A long beep sounds.
 - The unit will return to the standby mode.

5.4. Dial Lock

You can prevent others from making a call to any number except the one pre-programmed in the memory of the EMERGENCY button. Once you locked the dialing buttons, even emergency numbers cannot be dialed. Only incoming calls are accepted until the dial lock is canceled.

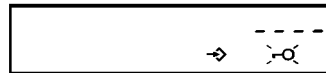
Before using this feature, we recommend storing an emergency number in the memory of the EMERGENCY button. Even if the dialing buttons are locked, the number stored in the button can be dialed.



- If you choose not to program emergency numbers, but plan to use the dial lock, any number programmed into the EMERGENCY button can be accessed.

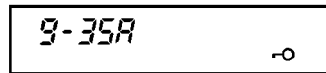
5.4.1. To Set the Dial Lock

- 1 Press **DIAL LOCK**.
• “” flashes on the display.



- 2 Enter the PIN code.

- 3 Press **PROGRAM**.
• “” is displayed.
• A long beep sounds.
• If a wrong PIN code is entered, 3 beeps will sound. Enter a correct PIN code and press **PROGRAM**.
• The unit will return to the standby mode.



You can use the following features while the dialing buttons are locked.

- Dialing a number you programmed into the memory of the EMERGENCY buttons.
- Adjusting the handset and speakerphone volumes.
- Muting the conversation.
- Answering the second call by pressing **FLASH**.

5.4.2. To Cancel the Dial Lock

Follow steps 1 through 3 above again.

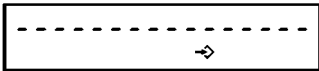
- “” will disappear, and the unit will return to the standby mode.

5.5. Call Restriction

You can prevent the unit from dialing phone numbers beginning with specified digit(s) (1 digit or 2 digits). Phone numbers with the restricted leading digits cannot be dialed out.

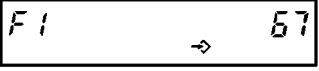
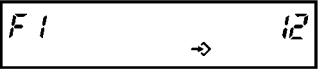
5.5.1. To Set the Call Restriction

Make sure that a call is not put on hold.

- 1 Press **PROGRAM**.

- 2 Press **MUTE**.

- 3 Press **1**.

 - If you use "1111" as a PIN code (factory set), the display on the right will be shown. There is no need to enter a PIN code.
 - After the PIN code is changed, "- - - -" will be displayed.
- 4 Enter the PIN code.
 (Ex. Your PIN code is "1234".)

- 5 Press **PROGRAM**.

 - If a wrong PIN code is entered, 3 beeps will sound. Enter a correct PIN code and press **PROGRAM**.
 - The current setting is displayed. (Ex. "67" is entered as the restricted digits.)
- 6 Enter the number(s) (1 digit or 2 digits) you want to restrict (**0** to **9**). (Ex. "12" is entered as the restricted digits.)

 - If you enter a wrong number, enter a correct number.
 - To change restricted digits from 2 digits to 1 digit, press ***** for 2 digits to change to "- -" and enter 1 digit.
- 7 Press **PROGRAM**.
 - A long beep sounds.
 - The unit will return to the standby mode.

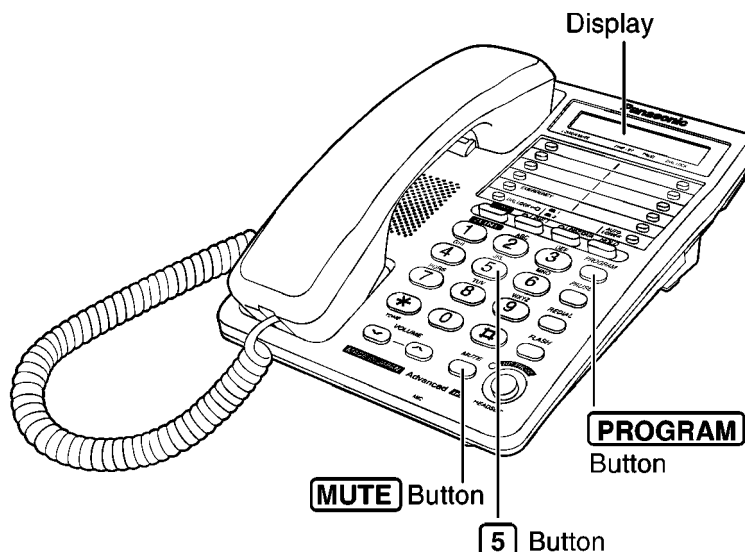
• If your unit is connected to a PBX, this function may not operate. Contact your PBX supplier for more information.

5.5.2. To Cancel the Call Restriction

Follow steps 1 through 5 of **5.5.1. To Set the Call Restriction**. In step 6, press ***** to cancel call restriction ("- -" is displayed) and press **PROGRAM**.

•A long beep will sound and the unit will return to the standby mode.

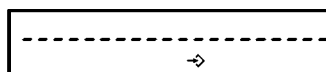
5.6. How to Release the Establishment of Dial Lock



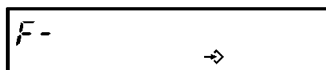
After this procedure, you will be able to establish a new password.

How to release the establishment of dial lock.

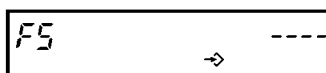
1 Press **PROGRAM**.



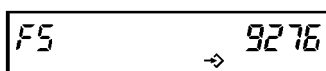
2 Press **MUTE**.



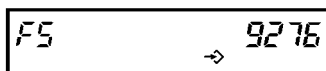
3 Press **5**.



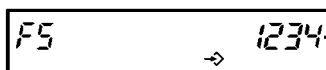
4 Enter "10349276" for initialling of password.



5 Press **PROGRAM**.

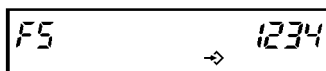


6 Enter a new password 4 digits code by dial key pad (ex. "1234").



If you want to set the password for "DIAL LOCK" to "1 1 1 1" (factory set), you should enter "1 1 1 1".

7 Press **PROGRAM**.



After this procedure, the password for "DIAL LOCK" will be returned to "1 2 3 4".

8 To cancel the Dial Lock, follow 5.4.2. To Cancel the Dial Lock.

6 DISASSEMBLY INSTRUCTIONS

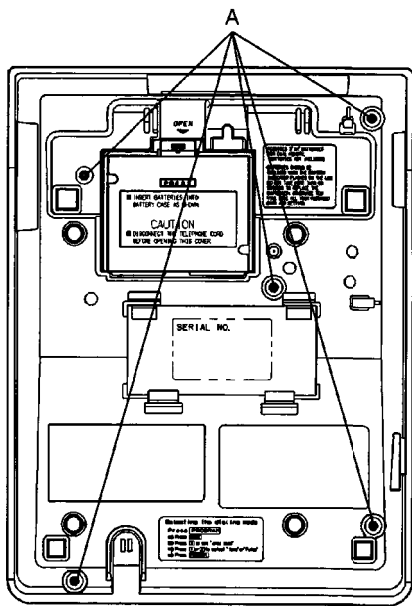


Fig 1

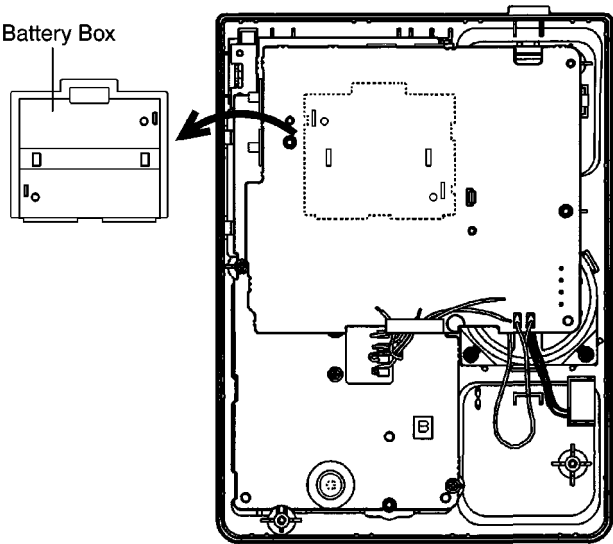


Fig 2

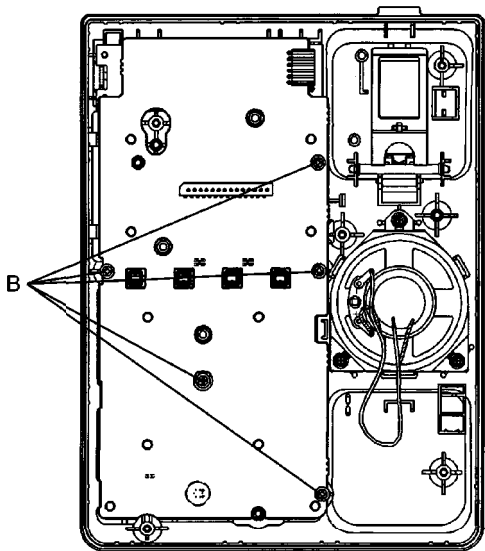


Fig 3

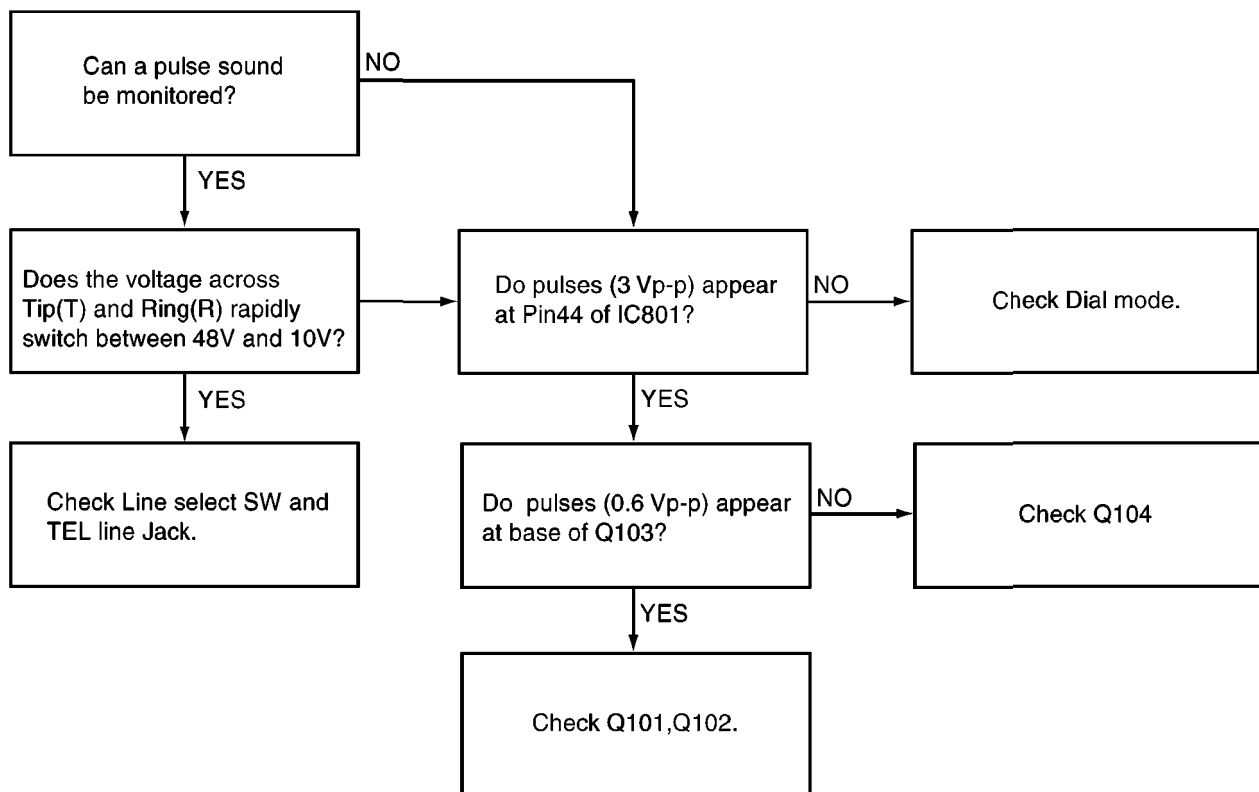
Shown in Fig —.	To remove —.	Remove —.
1	Lower Cabinet	Screws (2.6 × 12).....(A) × 5
2	Main P. C. Board	The Main P.C. Board
	Battery Box	The Battery Box
3	Operational P.C. Board	Screws (2.6 × 8).....(B) × 5

7 TROUBLE SHOOTING GUIDE

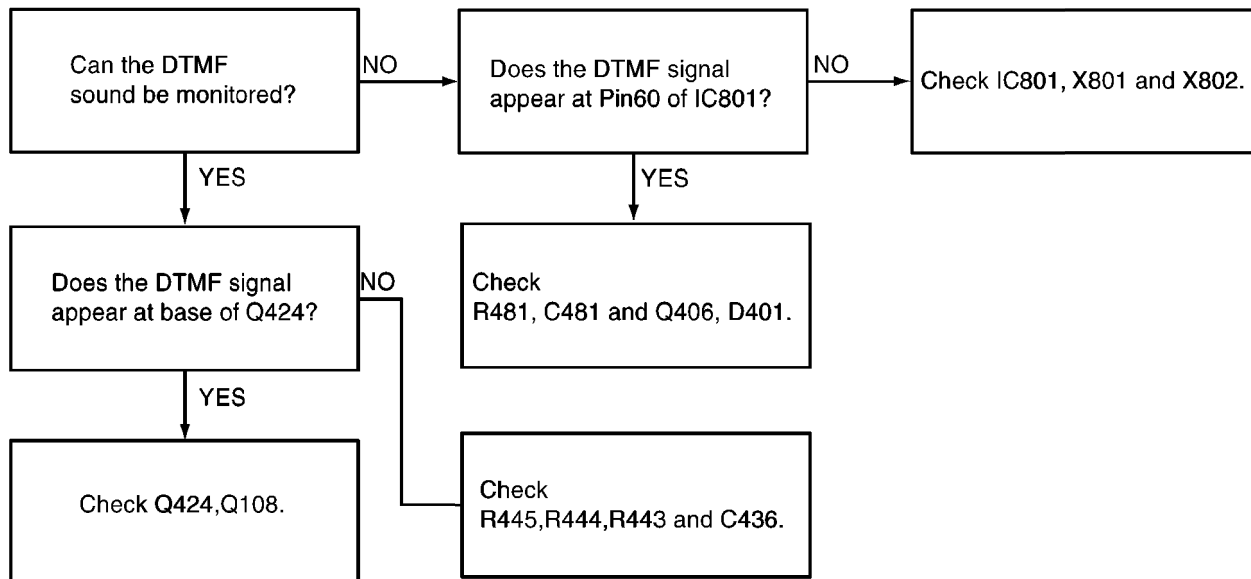
7.1. Service Hints

SYMPTOM	CURE
Dead	Check IC801, X801, X802
Can't hear the voice from handset.	Check Q109, Q405, Q406.
No voice transmit.	Check Q421, Q424, Q108.
Can't tone dial.	Check IC801, R445, R444, R443, C436.
Can't pulse dial	Check Q101, Q103, Q104.
Can't auto redial	Check IC201, Q201.
No rings.	Check D1, IC1 and SW1 (Line1), D21, IC22 and SW21 (Line 2).
can't speak with the speakerphone.	Check IC601.
Can't hold.	Check SW510, Q501, Q551.
Can't speak with the handset.	Check handset jack
Can't speak with the headset.	Check headset jack
Can't change the volume for speakerphone.	Check IC801, IC601
Can't change the volume for handset.	Check IC801, Q405
No volume handset or speakerphone.	Check IC801, Q108, Q401.

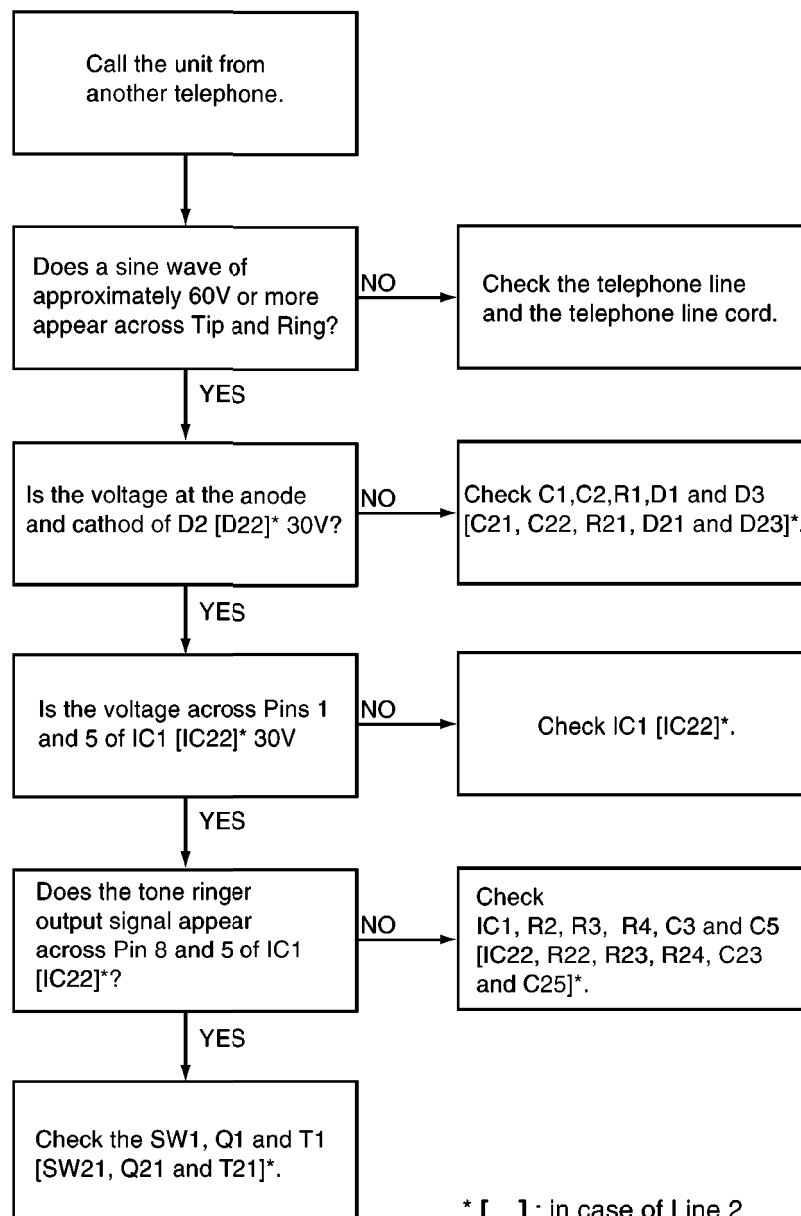
7.2. Pulse Dialing Problems



7.3. Tone Dialing Problems (Handset)

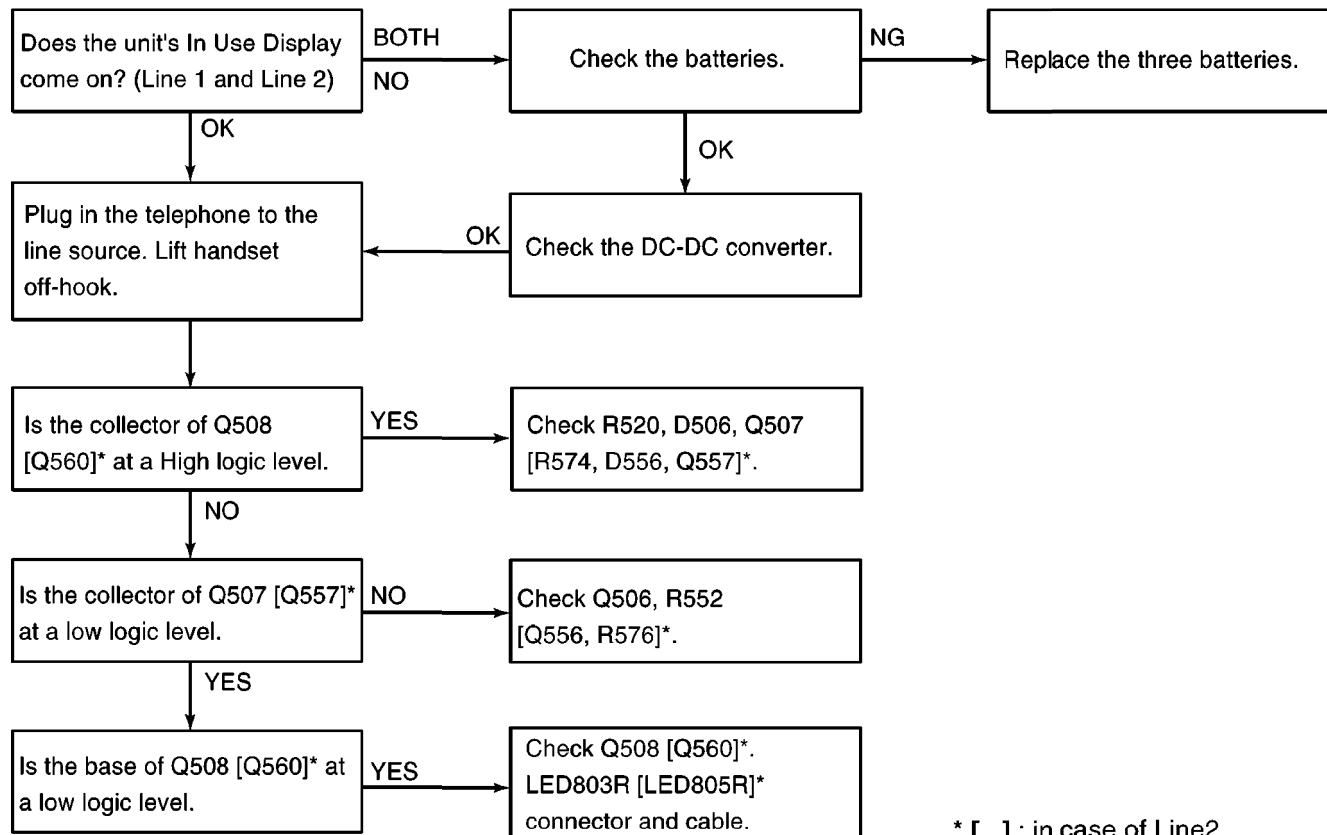


7.4. No Ringing Sound When Ring Signal is Input.

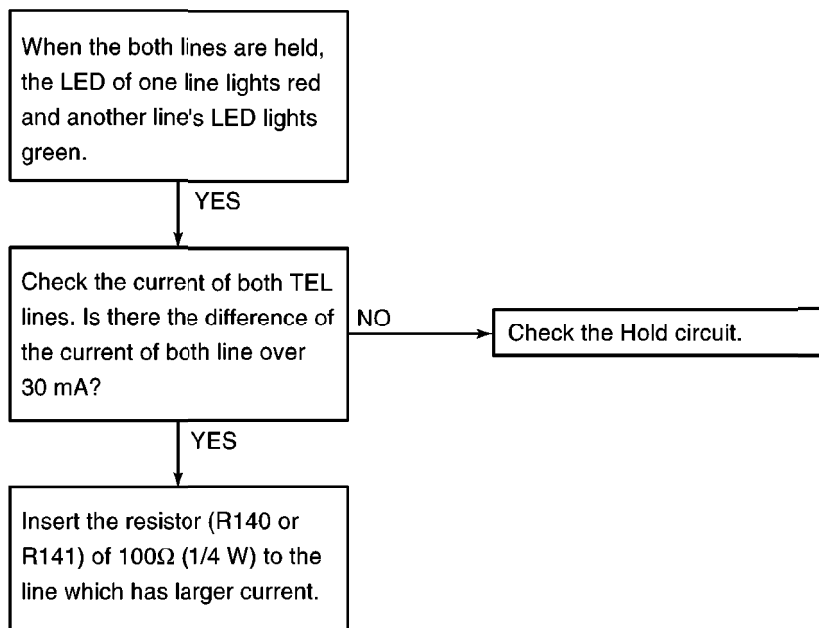


* [] : in case of Line 2

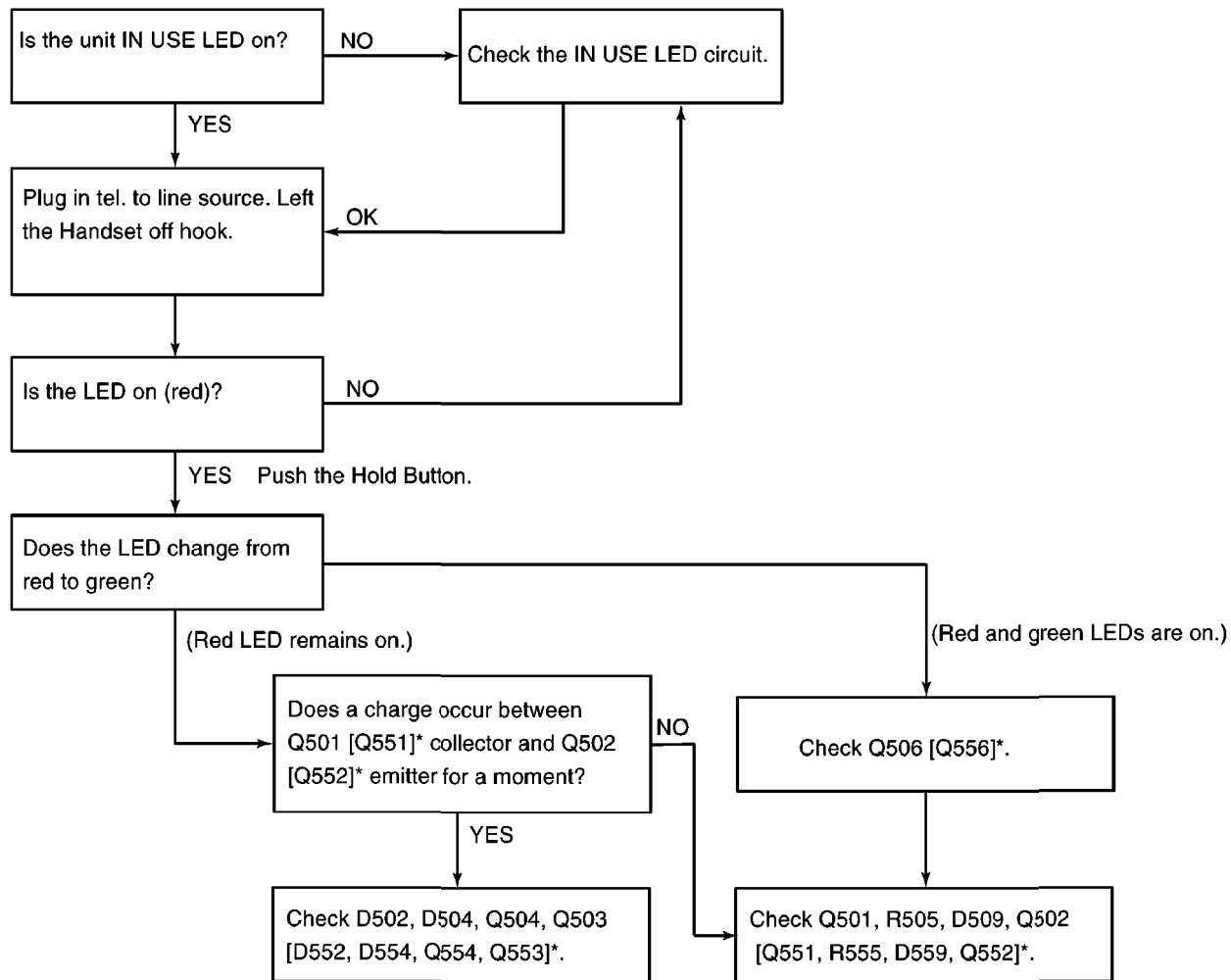
7.5. In Use LED is Not On



7.6. When the both lines are held in the Conference mode; Line LED are not Green

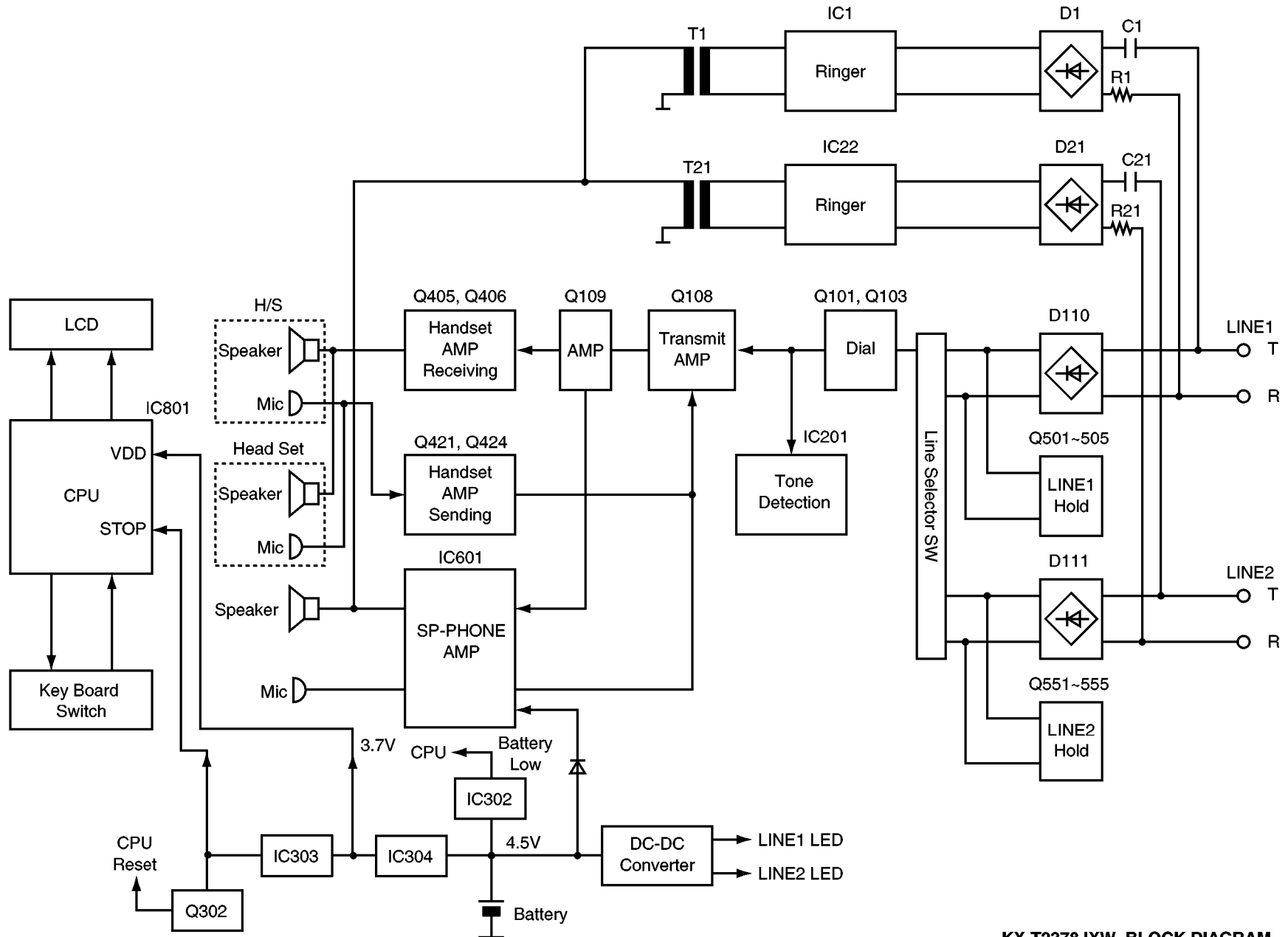


7.7. Does Not Hold



* [] : in case of Line2

8 BLOCK DIAGRAM



KX-T2378JXW BLOCK DIAGRAM

9 CIRCUIT OPERATION

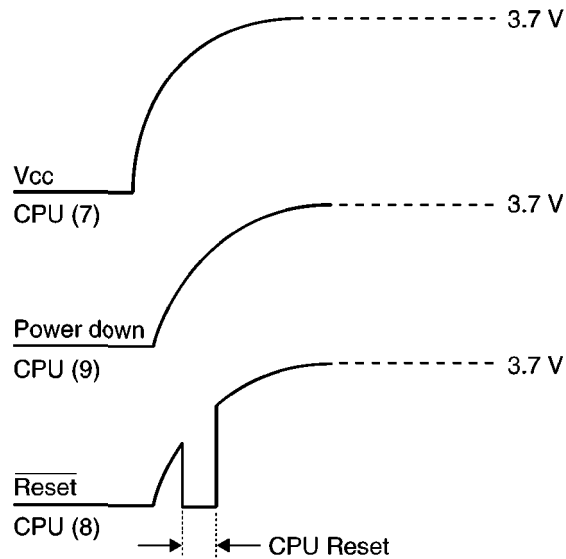
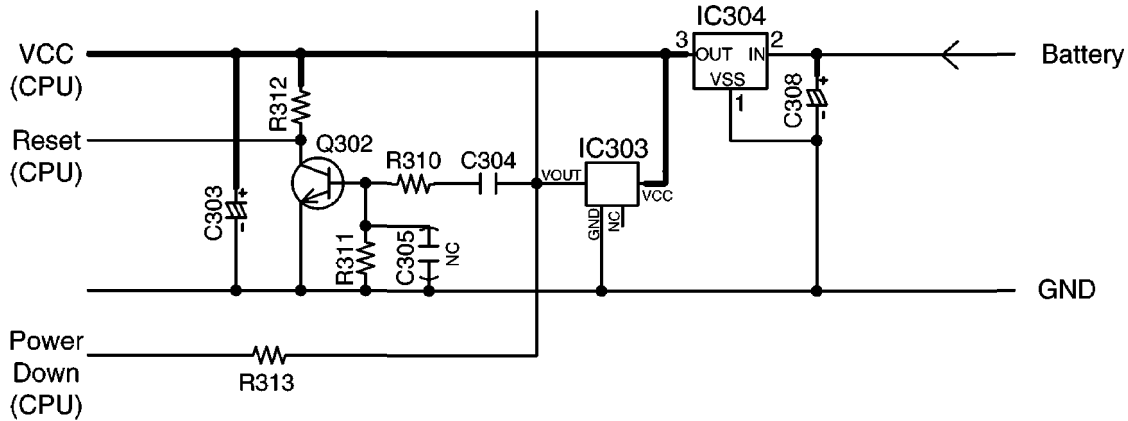
9.1. Reset Circuit

9.1.1. Function

This circuit is used for to reset the microcomputer when inserting batteries.

9.1.2. Circuit operation

When the batteries is inserted into the unit, then the voltage is shifted by D304 and power is supplied to the CPU as shown below.



9.2. Telephone Line Interface

9.2.1. Circuit operation

- **On hook**

Q101 is open, Q101 is connected as to cut DC loop current and cut the voice signal.

- **Off hook (in case of Line 1)**

In talk status, RLY output from IC801 (45) changes to low level, causing Q103, Q101 to turn on and resulting in a line loop.

Q101 turns on thus providing an off-hook condition (active DC current flow through the circuit) and the following signal flow is for the DC loop current.

(Line 1) Tip → POS101 → D110 → SW110 → Q101 → Q108 → R124 → D106 → D110 → (Line 1) Ring

- **Pulse mode**

A pulse signal that repeated switches between high and low logic is output from IC801 (44).

This switches the line loop on and off, generating the dial pulse signal.

- **The receiving signal flows: (in case of Line 1)**

TEL line → POS101 → SW110 → Q101 → C113 → R125 → C108 → Q109 → Q405 → Q406 → CN401 → CN402 → Speaker (H/S)

- **The transmission signal flows: (in case of Line 1)**

Mic → Q421 → Q424 → C435 → R437 → Q108 → SW110 → Pos101 → Tel Line

9.3. Ringer Circuit

When the bell signal is input between telephone line, the signal are output at the speaker via the following path:

Tel line → R1/C1 [R21/C21] → D1 [D21] → IC1 (1) [IC22 (1)] → IC1 (8) [IC22 (8)] → C5 [C35] → T1 [T21] → C625 → Speaker

[] : in case of Line2

9.4. Tone Detect

This circuit is used to sense the status of the line (busy tone or dial tone) during Auto Redial.

9.4.1. Circuit operation

D110 → Q101 → C201 → R201 → R205 → IC201 (5) → IC201 (1) → D202 → R208 → Q201 → IC801 (50)

When the subscriber hangs-up, check the intermittent tone. If cycle tone is detected, the collector of Q201 goes to a low logic.

9.5. In Use Detector Circuit

9.5.1. Function:

This circuit is designed to automatically provide an LED indication when either one telephone or another telephone which is connected in parallel across the line is engaged.

9.5.2. Circuit Description

Battery → T351 (6) → T351 (5) → collector of Q351
 ↳ R351 → base of Q351

Q351 turns ON. Then the DC is converted at T351 (9 pin → +, 8 pin → -). Q352 base becomes (High) and Q352 turns ON. When Q352 is ON, Q351 base becomes (Low) and Q351 turns OFF. And no electric current flows in the collector of Q351. Thus Q351 starts oscillating.

In this circumstance voltage is generated at T351 (1, 2) as well as T351 (3, 4).

This output voltage is then rectified by D351 and D352, and smoothed by C351, C352 thus supplied to the IN USE circuits of Line 1 and Line 2 respectively.

• Off hook

When the circuit voltage is less than 18 V (unit and telephone are on-hook).

Telephone Line → D110 [D111] → D506 [D556] OFF → R520 [R570] → Q506 [Q506] base a low level. →

Q506 [Q556] OFF → Q507 [Q557] base a high level. →

Q507 [Q557] ON → Q508 [Q560] ON → D507 [D557] → R821 [R823] → LED D803-R [LED D805-R] ON.

• On hook

When the circuit voltage is more than 18 V (unit and telephone are on-hook).

Telephone Line → D110 [D111] → D506 [D556] ON → R520 [R570] → Q506 [Q506] base a high level. →

Q506 [Q556] ON → Q507 [Q557] base a low level. →

Q507 [Q557] OFF → Q508 [Q560] OFF → LED D803-R [LED D805-R] OFF.

[] : in case of Line2

9.6. Hold Circuit

9.6.1. Function

The HOLD circuit holds the line from the talk condition.

The green LED light at the time of holding.

9.6.2. Circuit Description

- **Hold on**

When line 1 [line 2] is selected with HOLD switch and the handset is off-hook, Q508 [Q560] goes ON and IN USE LED D803-R [D805-R] lights. At this time, C507 [C557] is charged. When the Hold key is depressed, Q501 [Q551] is triggered and the hold circuit comes on.

R118 → D103 → C507 [C557] is charged. When the Hold key is depressed, current flows as follows → C507 [C557] → SW110 [SW120] → SW510 [SW510] → D509 [D559] → R505 [R555] → Q502 [Q552] ON.

Telephone Line → Q501 [Q551] ON → Q505 [Q555] ON → D502 [D552] → Q503 [Q553] ON → D508 [D558] →

└→ D503 [D553] ON → Q504 [Q554] ON ┘

R504 [R554] → Q502 [Q552] ON.

At this time, the LED D803-R [D805-R] for the IN USE indicator goes out and green LED D803-G [D805-G] for Hold indicator lights.

Q501 [Q551] collector → D803-G [D805-G] ON.

- **Hold Cancellation**

When the line select switch is pressed ON and the voltage drops because of the handset going off-hook or another telephone connected in parallel has been raised (off-hook), Q504 [Q554] goes OFF → Q503 [Q553] goes OFF → Q502 [Q552] goes OFF, and hold is cancelled.

[] : in case of Line2

9.7. Speakerphone Circuit

9.7.1. Function

The circuit controls the automatic switching of the transmitted and received signals, to and from the telephone line, when the unit is used in the hands -free mode.

9.7.2. Circuit Operation

The speakerphone can only provide a one-way communication path.

In other words, it can either transmit an outgoing signal or receive an incoming signal at a given time, but cannot do both simultaneously. Therefore, a switching circuit is necessary to control the flow of the outgoing and incoming signals.

This switching circuit is contained in IC601 and consists of a Voice Detector, TX Attenuator, RX Attenuator, Comparator and Attenuator Control. The circuit analyzes whether the TX(transmit) or the RX(receive) signal is louder, and then it processed the signals such that the louder signal is given precedence.

The Voice Detector provides a DC input to the Attenuator Control corresponding to the TX signal.

The Comparator receives a TX and a RX signal, and supplies a DC input to the Attenuator Control corresponding to the RX signal.

The Attenuator Control provides a control signal to the TX and the RX attenuator to switch the appropriate signals on and off. The Attenuator Control also detects the level of the volume control to automatically adjust for changing ambient conditions.

1. Transmission signal path:

The input signal from the microphone is sent through the circuit via the following path:

MIC → IC601 (9 → 10 → 3 → 4) → R601 → C602 → Q108 → Tel line.

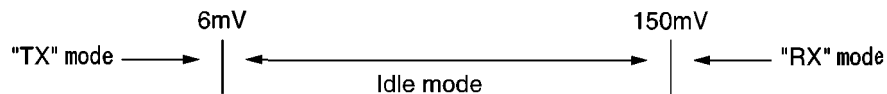
2. Reception signal path:

Signals receive from the telephone line are outputted at the speaker via the following path:

Tel line → Q108 → Q109 → C112 → R600 → C603 → IC601 (27 → 26 → 19 → 15) → Speaker.

3. Transmission/Reception switching

The comparison result between TX and RX outputs as a DC level of IC601 (25), In short the voltage difference between IC601 (20) and IC601 (25) switches TX/RX.



4. Voice detector

The output of the Mic Amp (IC601 (10)) is supplied to IC601 (13) as a control signal for the voice detector.

5. Attenuator control

The attenuator control detects the setting of the volume control through IC601 (24) to automatically adjust for changing ambient conditions.

10 HOW TO SET THE FLASH TIME AND REDIAL TIME

*Refer to **Flow Solder Side View (Operation)** (P.56)

10.1. Flash Time

D801—D804 are used for default setting.

When you change the flash time, do the following procedure.

In case the program should be set frequency, change the default at D801—D804, then set the program.

FLASH TIME	700 msec.	600 msec.	400 msec.	300 msec.	250 msec.	200 msec.	110 msec.	100 msec.	90 msec.	80 msec.
D801	1	0	0	0	0	0	0	0	0	1
D802	1	0	0	0	0	1	1	1	1	0
D803	1	0	0	1	1	0	0	1	1	0
D804	1	0	1	0	1	0	1	0	1	0

0= Without

1= With

10.2. Redial Time

Auto Redial Times	15	10	4	Once
D805	0	0	1	1
D806	0	1	0	1

0= Without

1= With

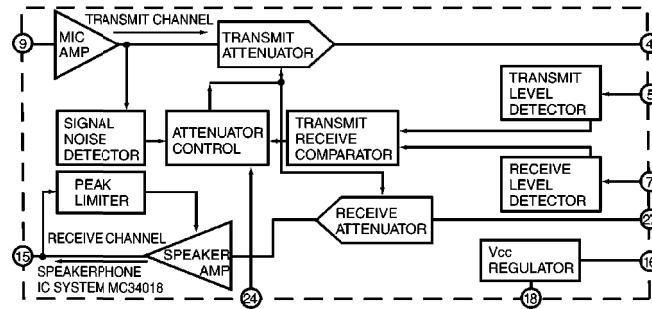
11 IC BLOCK DIAGRAM

11.1. IC801

Pin	Description	I/O	High	Hi-z	Low
1	X1	-	Active	-	Active
2	X2	-	Active	-	Active
3	GND	-	-	-	Fixed
4	OSC2	-	Active	-	Active
5	OSC1	-	Active	-	Active
6	TEST terminal	-	-	-	Fixed
7	Power supply	-	Fixed	-	-
8	RESET	D.I	Normal	-	Reset
9	STOP input	D.I	Normal	-	Stop
10	LCD_CLK	D.O	Active	-	Active
11	LCD_CS	D.O	Normal	-	Active
12	LCD_DATA	D.O	DATA	-	DATA
13	NC	D.I	-	-	Fixed
14	TX_VOL_DOWN	D.O	-	Normal	Vol Down
15	RX_VOL_DOWN	D.O	-	Normal	Vol Down
16	HOOK_SW	D.I	On-Hook	-	Off-Hook
17	LCD_CNT2	D.O	Bright	-	Dark
18	LCD_CNT1	D.O	Bright	-	Dark
19	MUTE_LED	D.O	-	OFF	ON
20	SP_LED	D.O	-	OFF	ON
21	SP_TXMUTE	D.O	Mute	-	Unmute
22	RXMUTE	D.O	Mute	-	Unmute
23	BEEP OUTPUT	D.O	Active	-	Active
24	HS_TXMUTE	D.O	Mute	-	Unmute
25	GAIN_CTL	D.O	Handset	-	Headset
26	NC	D.O	-	-	Fixed
27	TEST_MODE	D.I	Normal	-	TEST_MODE
28	Key In	D.I	Non Active	-	Active
29	Key In	D.I	Non Active	-	Active
30	Key In	D.I	Non Active	-	Active
31	Key In	D.I	Non Active	-	Active
32	Key In	D.I	Non Active	-	Active

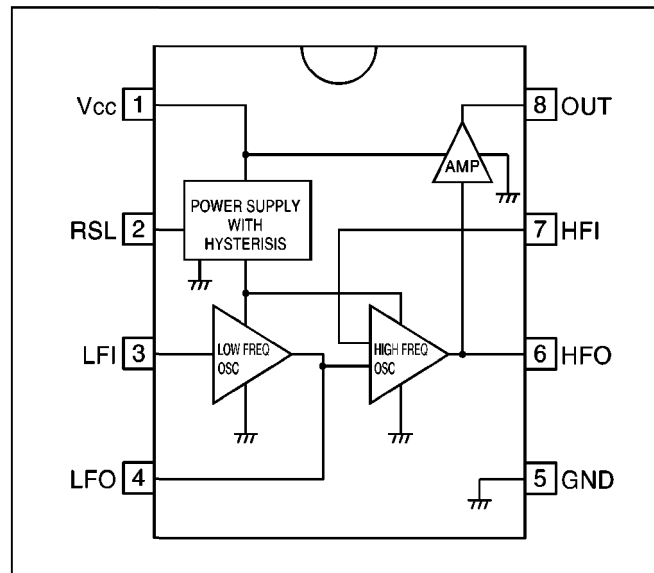
Pin	Description	I/O	High	Hi-z	Low
33	Key In	D.I	Non Active	-	Active
34	Key In	D.I	Non Active	-	Active
35	BATT.OUT	D.I	Battery provided	-	None
36	Strobe	D.O	-	Non Active	Active
37	Strobe	D.O	-	Non Active	Active
38	Strobe	D.O	-	Non Active	Active
39	Strobe	D.O	-	Non Active	Active
40	Strobe	D.O	-	Non Active	Active
41	Strobe	D.O	-	Non Active	Active
42	Strobe	D.O	-	Non Active	Active
43	Strobe	D.O	-	Non Active	Active
44	PULSE	D.O	Break	-	Make
45	RLY	D.O	ON	-	OFF
46	L_SEZ/P_MUT	D.O	ON	-	OFF
47	HOLD_MUSIC	D.O	Music output	-	Music stop
48	BATT.LOW	D.I	NORMAL	-	BATT.LOW
49	HEAD_DET	D.I	Headset on	-	Headset off
50	TONE_DET	D.I	None	-	Tone
51	NC	D.O	-	-	Fixed
52	SP_VOL1	D.O	-	High	Low
53	SP_VOL2	D.O	-	High	Low
54	SP_VOL3	D.O	-	High	Low
55	HS_VOL1	D.O	Low	-	Hi
56	HS_VOL2	D.O	Low	-	Hi
57	HS_VOL3	D.O	Low	-	Hi
58	NC	D.O	-	-	Fixed
59	SP_CS	D.O	Off	-	On
60	DTMF	D.O	Active	-	Active
61	Vtref	D.O	-	-	-
62	Loop	A.I	-	-	-
63	EX_HOOK	D.I	ON->OFF_HOOK	-	Normal
64	CVCC	D.O	-	-	-

11.2. Speakerphone IC Data (IC601)



Pin NO.	Name	Description
1	RR	A resistor to ground provides a reference current for the transmit and receive attenuators.
2	RTX	A resistor to ground determines the nominal gain of the transmit attenuator. The transmit channel gain is inversely proportional to the RTX resistance.
3	TXI	Input to the transmit attenuator. Input resistance is nominally 5.0 kohms.
4	TXO	Output to the transmit attenuator. The TXO output signal drives the input of the transmit level detector, as well as the external circuit which drives the telephone line.
5	TLI	Input of the transmit level detector. An external resistor ac coupled to the TLI pin sets the detection level. Decreasing this resistor increases the sensitivity to transmit channel signals.
6	TLO	Output of the transmit level detector. An external resistor and capacitor set the time the comparator will hold the system in the transmit mode after speech ceases.
7	RLI	Input of the receive level detector. An external resistor ac coupled to the RLI pin sets the detection level. Decreasing this resistor increases the sensitivity to receive channel signals.
8	RLO	Output of the receive level detector. An external resistor and capacitor set the time the comparator will hold the system in the receive mode after the receive signal ceases.
9	MCI	Microphone amplifier input. Input impedance is nominally 10 kohms and the dc bias voltage is approximately equal to VB.
10	MCO	Microphone amplifier output. The mic amp gain is internally set at 34 dB (50 V/V).
11	CP1	A parallel resistor and capacitor connected between this pin and Vcc holds a voltage corresponding to the background noise level. The transmit detector compares the CP1 voltage with the speech signal from CP2.
12	CP2	A capacitor at this pin peak detects the speech signals for comparison with the background noise level held at CP1.
13	XDI	Input to the transmit detector system. The microphone amplifier output is ac coupled to the XDI pin through an external resistor.
14	SKG	High current ground pin for the speaker amp output stage. The SKG voltage should be within 10 mV of the ground voltage at pin 22.
15	SKO	Speaker amplifier output. The SKO pin will source and sink up to 100 mA when ac coupled to the speaker. The speaker amp gain is internally set at 34 dB (50 V/V).
16	V+	Input dc supply voltage. V+ can be powered from Tip and Ring if an ac decoupling inductor is used to prevent loading ac line signals. The required V+ voltage is 6.0 to 11 V (7.5 V nominal) at 7.0 mA.
17	AGC	A capacitor from this pin to VB stabilizes the speaker amp gain control loop, and additionally controls the attack and decay time of this circuit. The gain control loop limits the speaker amp input to prevent clipping at SKO. The internal resistance at the AGC pin is nominally 110 kohms.
18	CS	Digital chip select input. When at a Logic "0" (<0.7 V) the Vcc regulator is enabled. When at a Logic "1" (>1.6 V), the chip is in the standby mode drawing 0.5 mA. An open CS pin is a Logic "0". Input impedance is nominally 140 kohms. The input voltage should not exceed 11 V.
19	SKI	Input to the speaker amplifier. Input impedance is nominally 20 kohms.
20	Vcc	A 5.4 V regulated output which powers all circuit except the speaker amplifier output stage. Vcc can be used to power external circuitry such as a microprocessor (3.0 mA max). A filter capacitor is required. The MC 34018 can be powered by a separate regulated supply by connecting V+ and Vcc to a voltage between 4.5 V and 6.5 V while maintaining CS at a Logic "1".
21	VB	An output voltage equal to approximately Vcc/2 which serves as an analogue ground for the speakerphone system. Up to 1.5 mA of external load current may be sourced from VB. Output impedance is 250 ohms. A filter capacitor is required.
22	Gnd	Ground pin for the IC (except the speaker amplifier).
23	XDC	Transmit detector output. A resistor and capacitor at this pin hold the system in the transmit mode during pauses between words or phrases. When the XDC pin voltage decays to ground, the attenuators switch from the transmit mode to the idle mode. The internal resistor at XDC is nominally 2.6 kohms.
24	VLC	Volume control input. Connecting this pin to the slider of a variable resistor provides receive mode volume control. The VLC pin voltage should be less than or equal to VB.
25	ACF	Attenuator control filter. A capacitor connected to this pin reduces noise transients as the attenuator control switches levels of attenuation.
26	R XO	Output of the receive attenuator. Normally this pin is ac coupled to the input of the speaker amplifier.
27	R XI	Input of the receive attenuator. Input resistance is nominally 5.0 kohms.
28	RRX	A resistor to ground determines the nominal gain of the receive attenuator. The receive channel gain is directly proportional to the RRX resistance.

11.3. Ringer IC Data (IC1, IC22)

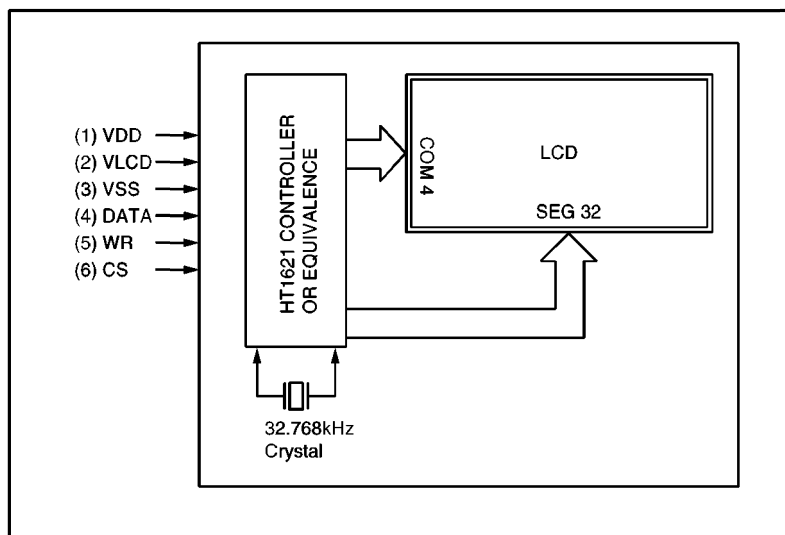


Pin descriptions

Pin No.	Pin name	Name	Function
1	Vcc	Power supply pin	This is the power supply pin for the IC. It is connected to the ($\oplus$) pin of the diode bridge.
2	RSL	RSL pin	This is used to change the operation initiation current when connected to the GND pin.
3	LFI	Low-frequency time constant connector pin	This is connected to the time constant that determines the oscillation frequency on the warble.
4	LFO		
5	GND	GND pin	This pin has the lowest potential on the IC. It is connected to the ($\ominus$) pin of the diode bridge.
6	HFO	High-frequency time constant connector pin	This is connected to the time constant that determines the oscillation frequency on the tone side (the audible frequency side).
7	HFI		
8	OUT	Output pin	This is used to connect a piezoelectric buzzer, or to connect a dynamic speaker through a transformer.

12 MODULE BLOCK DIAGRAM

12.1. LCD MODULE BLOCK



12.2. CONNECTOR PIN ASSIGNMENT

Pin no.	signal	Function	Enable
1	VDD	Power Supply (5V)	—
2	VLCD	LCD Power Input	—
3	VSS	Power Gnd (0V)	—
4	DATA	Serial Data Input	H/L
5	WR	Write Data	L → H
6	CS	Chip Selection	Low Active

13 HOW TO REPLACE FLAT PACKAGE IC

13.1. Preparation

- SOLDER

Sparkle Solder 115A-1, 115B-1 or Almit Solder KR-19, KR-19RMA

- Soldering iron

Recommended power consumption will be between 30 W to 40 W.

Temperature of Copper Rod $662 \pm 50^{\circ}\text{F}$ ($350 \pm 10^{\circ}\text{C}$)

(An expert may handle between 60 ~ 80 W iron, but beginner might damage foil by overheating.)

- Flux

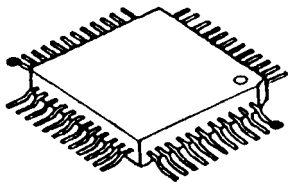
HI115 Specific gravity 0.863

(Original flux will be replaced daily.)

13.2. Procedure

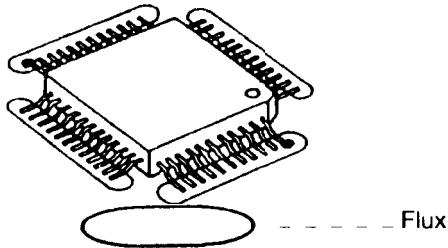
1. Temporary fix FLAT PACKAGE IC by soldering on two marked 2 pins.

*Most important matter is accurate setting of IC to the corresponding soldering foil.

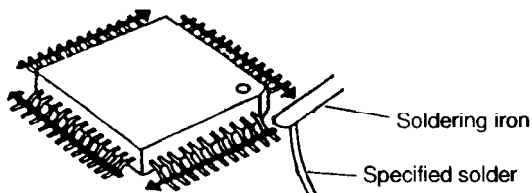


● - - - - - Temporary soldering point.

2. Apply flux for all pins of FLAT PACKAGE IC.



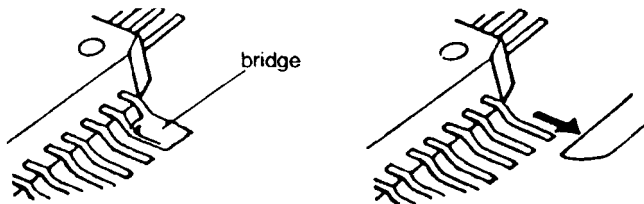
3. Solder employing specified solder to direction of arrow, as sliding the soldering iron.



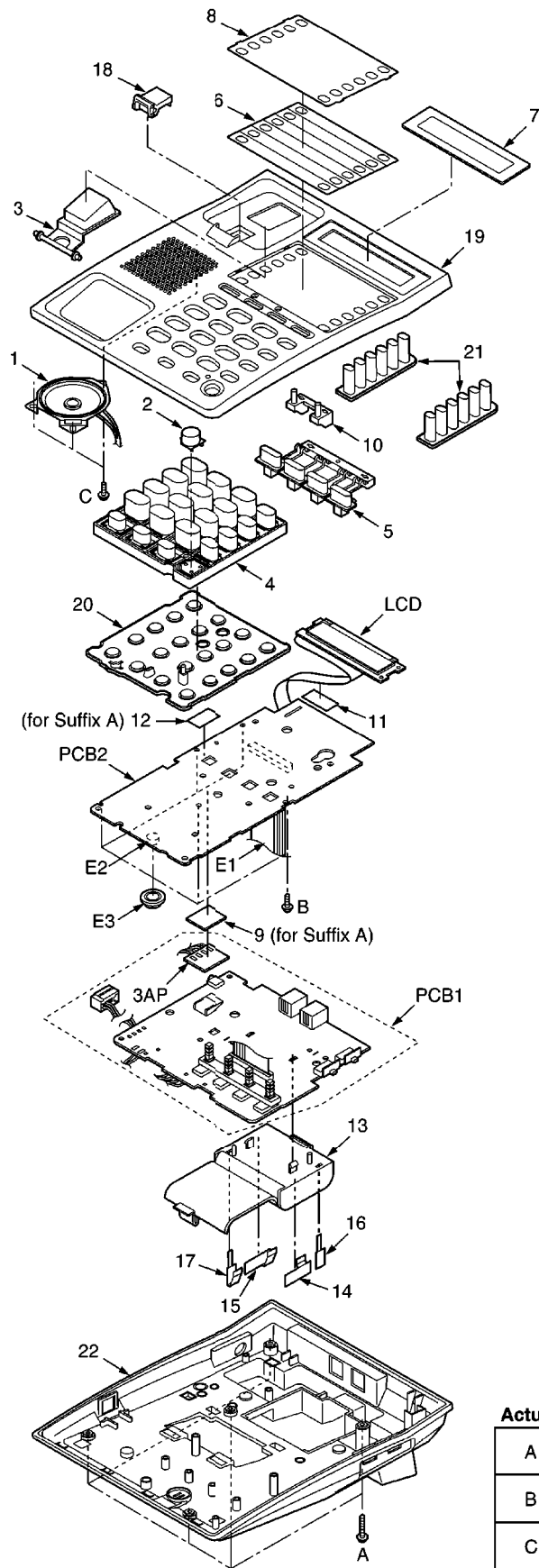
13.3. Modification Procedure of Bridge

1. Re-solder slightly on bridged portion.

2. Remove remained solder along pins employing soldering iron as shown in below figure.



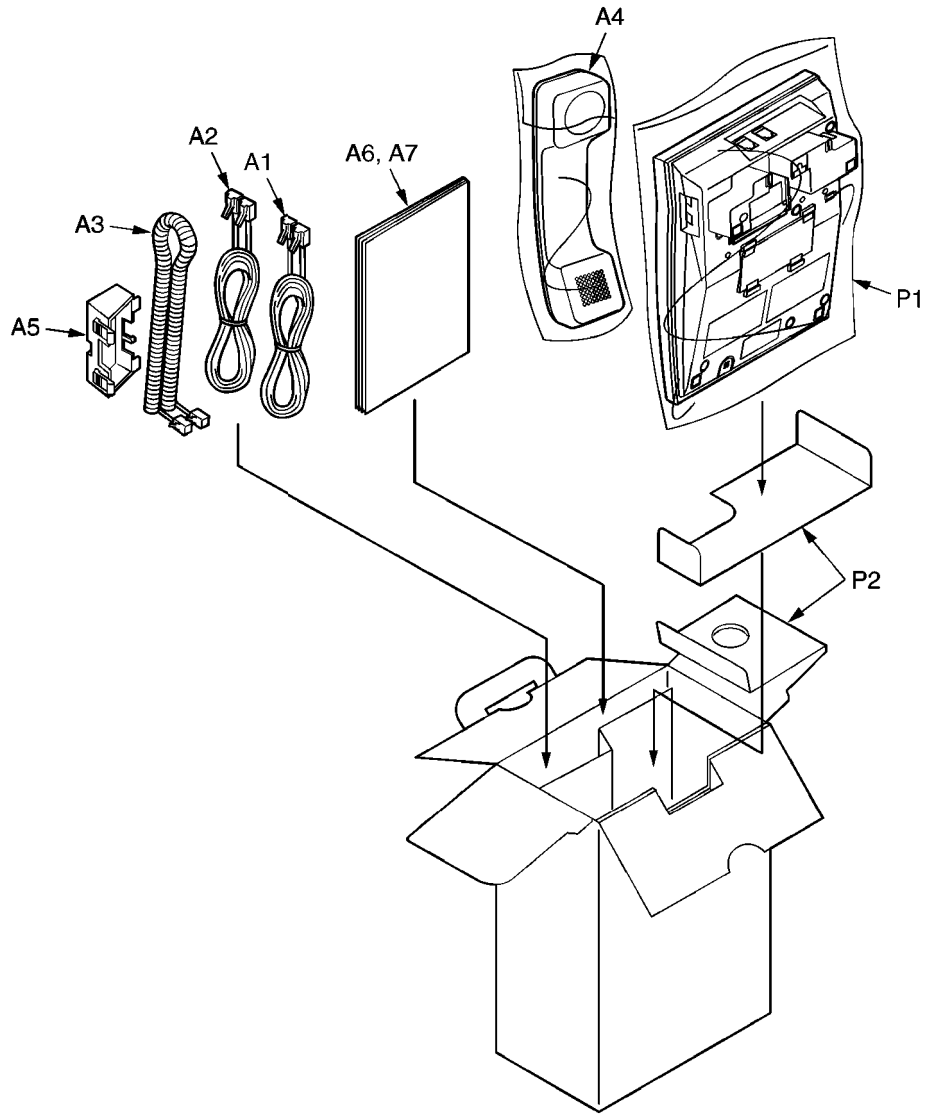
14 CABINET AND ELECTRICAL PARTS LOCATION



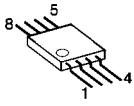
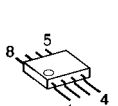
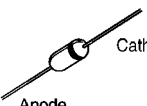
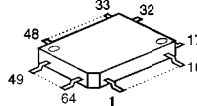
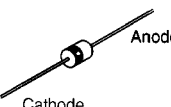
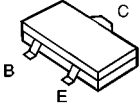
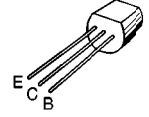
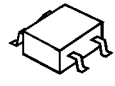
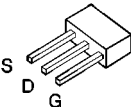
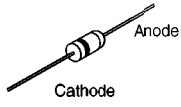
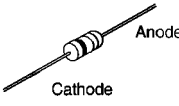
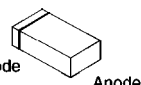
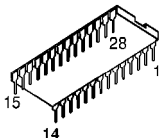
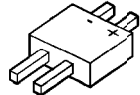
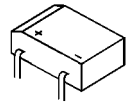
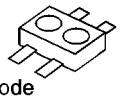
Actual Size of Screws

A	XTW26+12P	
B	XTW26+8P	
C	XTW26+8P	

15 ACCESSORIES AND PACKING MATERIALS



16 TERMINAL GUIDE OF THE ICs TRANSISTORS AND DIODES

 PQVINJM2904F	 PQVIBA8206F	 MA7062	 C2CBFE000007
 PQVDS5688G, 1SS119	 PQVTDTC144TU, 2SD1819A UN5113, PQVTFB1J3P 2SB1218A, 2SD1328		 PQVT2N6517CA 2SA1625 PQVTKSD261CY
 PQVIPS3327UT, PQVIXCF3702P	 2SK1398, PQVTFB1A4M	 C0EBG6000102	 MA4360
 MA4180 MA4036	 MA111	 PQVISC77655S	 PQVDS1ZB60F1
 PQVDS1YB60F1	 PQVD1SRCT	 PQVDBRPY1204	

17 REPLACEMENT PARTS LIST

Note:

1. RTL (Retention Time Limited)

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 depends on the type of assembly and the laws governing parts and product retention.

At the end of this period, the assembly will no longer be available.

2. Important safety notice

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

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

4. RESISTORS & CAPACITORS

Unless otherwise specified;

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

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

*Type & Wattage of Resistor

Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattege

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,PQCBC: Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG: Polyester
PQCUV:Chip	ECEA,ECSZ: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 :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

17.1. Base Unit

17.1.1. CABINET AND ELECTRICAL PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
1	PQAS57P03Z	SPEAKER	
2	PQBC10347Z1	SP PHONE KEY	S
3	PQBH10023Y3	HOOK BUTTON	S
4	PQBX10351Z1	19 KEY BUTTON	S
5	PQBX10352Z1	4 KEY BUTTON	S
6	PQGD10162Y	TEL CARD	
7	PQGP10190Z1	LCD PANEL	S
8	PQGV10039Z	TEL CARD COVER	
9	PQHE10132Z	SHEET/SPONGE (for Suffix A)	

Ref. No.	Part No.	Part Name & Description	Remarks
10	PQHR10891Z	LED LENS	
11	PQHX11104Z	PET SHEET	
12	PQHX11118Z	PET SHEET (for Suffix A)	
13	PQJB3002Z8	CHARGE CASE	S
14	PQJC313Z	CHARGE TERMINAL	
15	PQJC314Z	CHARGE TERMINAL	
16	PQJC317Y	CHARGE TERMINAL	
17	PQJC318Y	CHARGE TERMINAL	
18	PQKE10070Z3	H/S HOLDER	S
19	PQKM10518Z1	UPPER CABINET	S
20	PQSX10195Z	RUBBER SWITCH, 20 KEY	
21	PQSX10196Z	RUBBER SWITCH	
22	PQYF10530Z1	LOWER CABINET	S

17.1.2. MAIN P.C.BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PQWP1T2378JX	MAIN P.C.BOARD ASS'Y (RTL)	
		(ICS)	
IC1	PQVIBA8206F	IC	S
IC22	PQVIBA8206F	IC	S
IC201	PQVINJM2904F	IC	S
IC601	PQVISC77655S	IC	S
		(TRANSISTORS)	
Q1	2SD1819A	TRANSISTOR(SI)	
Q21	2SD1819A	TRANSISTOR(SI)	
Q101	2SA1625	TRANSISTOR(SI)	S
Q103	PQVT2N6517CA	TRANSISTOR(SI)	S
Q104	2SK1398	TRANSISTOR(SI)	S
Q108	PQVTKSD261CY	TRANSISTOR(SI)	S
Q109	2SD1819A	TRANSISTOR(SI)	
Q201	UN5213	TRANSISTOR(SI)	S
Q303	2SB1218A	TRANSISTOR(SI)	
Q351	2SD1328	TRANSISTOR(SI)	
Q352	2SD1819A	TRANSISTOR(SI)	
Q401	PQVTFB1J3P	TRANSISTOR(SI)	S
Q405	2SD1819A	TRANSISTOR(SI)	
Q406	2SD1819A	TRANSISTOR(SI)	
Q421	2SD1819A	TRANSISTOR(SI)	
Q423	PQVTFB1A4M	TRANSISTOR(SI)	S
Q424	2SD1819A	TRANSISTOR(SI)	
Q426	2SD1819A	TRANSISTOR(SI)	
Q491	UN5213	TRANSISTOR(SI)	S
Q492	UN5213	TRANSISTOR(SI)	S
Q493	UN5213	TRANSISTOR(SI)	S
Q501	2SA1625	TRANSISTOR(SI)	S
Q502	PQVT2N6517CA	TRANSISTOR(SI)	S
Q503	2SB1218A	TRANSISTOR(SI)	
Q504	2SD1819A	TRANSISTOR(SI)	
Q505	PQVTKSD261CY	TRANSISTOR(SI)	S
Q506	2SD1819A	TRANSISTOR(SI)	
Q507	2SD1819A	TRANSISTOR(SI)	
Q508	UN5113	TRANSISTOR(SI)	S
Q551	2SA1625	TRANSISTOR(SI)	S
Q552	PQVT2N6517CA	TRANSISTOR(SI)	S
Q553	2SB1218A	TRANSISTOR(SI)	
Q554	2SD1819A	TRANSISTOR(SI)	
Q555	PQVTKSD261CY	TRANSISTOR(SI)	S
Q556	2SD1819A	TRANSISTOR(SI)	
Q557	2SD1819A	TRANSISTOR(SI)	
Q558	UN5113	TRANSISTOR(SI)	S
Q559	2SD1819A	TRANSISTOR(SI)	
Q560	UN5113	TRANSISTOR(SI)	S
Q602	UN5213	TRANSISTOR(SI)	S
Q603	UN5113	TRANSISTOR(SI)	S
		(DIODES)	
D1	PQVDS1ZB60F1	DIODE (SI)	S
D2	MA4360	DIODE (SI)	
D3	1SS119	DIODE (SI)	S
D21	PQVDS1ZB60F1	DIODE (SI)	S
D22	MA4360	DIODE (SI)	
D23	1SS119	DIODE (SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
D102	MA111	DIODE (SI)	
D103	MA111	DIODE (SI)	
D104	MA4180	DIODE (SI)	
D106	MA7062	DIODE (SI)	
D110	PQVDS1YB60F1	DIODE (SI)	S
D111	PQVDS1YB60F1	DIODE (SI)	S
D113	PQVDS5688G	DIODE (SI)	S
D114	PQVDS5688G	DIODE (SI)	S
D202	MA111	DIODE (SI)	
D203	MA111	DIODE (SI)	
D308	MA111	DIODE (SI)	
D309	1SS119	DIODE (SI)	S
D351	MA111	DIODE (SI)	
D352	MA111	DIODE (SI)	
D353	MA111	DIODE (SI)	
D354	MA111	DIODE (SI)	
D355	MA111	DIODE (SI)	
D401	MA111	DIODE (SI)	
D502	MA111	DIODE (SI)	
D503	MA111	DIODE (SI)	
D504	MA4036	DIODE (SI)	
D505	MA111	DIODE (SI)	
D506	MA4180	DIODE (SI)	
D507	MA111	DIODE (SI)	
D508	MA111	DIODE (SI)	
D509	MA111	DIODE (SI)	
D552	MA111	DIODE (SI)	
D553	MA111	DIODE (SI)	
D554	MA4036	DIODE (SI)	
D555	MA111	DIODE (SI)	
D556	MA4180	DIODE (SI)	
D557	MA111	DIODE (SI)	
D558	MA111	DIODE (SI)	
D559	MA111	DIODE (SI)	
D560	MA4036	DIODE (SI)	
D561	MA111	DIODE (SI)	
D601	MA111	DIODE (SI)	
D602	1SS119	DIODE (SI)	S
		(CONNECTORS)	
CN101	PQJJ1T023Y	CONNECTOR	S
CN102	PQJJ1T008X	CONNECTOR	S
CN401	PQJJ1C001Z	CONNECTOR	S
CN402	PQJJ1T030Y	CONNECTOR	
CN403	PQJS28X54Z	CONNECTOR	
		(PHOTO ELECTRIC TRANSDUCERS)	
PC1	PQVIPC817K	PHOTO ELECTRIC TRANSDUCER	S
PC2	PQVIP27011M3	PHOTO ELECTRIC TRANSDUCER	S
PC21	PQVIPC817K	PHOTO ELECTRIC TRANSDUCER	S
PC22	PQVIP27011M3	PHOTO ELECTRIC TRANSDUCER	S
		(SWITCHES)	
SW1	PQSS3A17W	SLIDE SWITCH	
SW21	PQSS3A17W	SLIDE SWITCH	
SW101	PQSH2B105Z	HOOK SWITCH	
SW110	PQSHX046Z	PUSH SWITCH	S
		(TRANSFORMERS)	
T1	PQLT2D2A	TRANSFORMER	S
T21	PQLT2D2A	TRANSFORMER	S
T351	PQLT9Z1A	TRANSFORMER	
		(VARISTORS)	
SA101	PQVDDSS301L	VARISTOR	S
SA102	PQVDDSS301L	VARISTOR	S
		(OTHER)	
E1	PQJE10117Z	FFC	
		(RESISTORS)	
R1	ERDS1TJ682	6.8k	S
R2	ERJ3GEYJ123	12k	
R3	ERJ3GEYJ334	330k	
R5	ERJ3GEY0R00	0	
R6	ERJ3GEYJ104	100k	
R7	ERJ3GEYJ333	33k	
R8	ERJ3GEYJ103	10k	
R11	ERJ3GEYJ473	47k	
R13	ERJ3GEYJ103	10k	

Ref. No.	Part No.	Part Name & Description	Remarks
R21	ERDS1TJ682	6.8k	S
R22	ERJ3GEYJ123	12k	
R23	ERJ3GEYJ334	330k	
R26	ERJ3GEYJ823	82k	
R27	ERJ3GEYJ333	33k	
R28	ERJ3GEYJ103	10k	
R31	ERJ3GEYJ473	47k	
R33	ERJ3GEYJ103	10k	
R101	ERDS2TJ563	56k	S
R102	ERDS2TJ104	100k	S
R103	ERJ3GEYJ104	100k	
R104	ERJ3GEYJ473	47k	
R105	ERJ3GEYJ155	1.5M	
R108	ERDS2TJ472	4.7k	S
R109	ERDS2TJ222	2.2k	S
R118	ERJ3GEYJ152	1.5k	
R120	ERJ3GEYJ152	1.5k	
R121	ERJ3GEYJ103	10k	
R123	ERJ3GEYJ330	33	
R124	ERDS1TJ150	15	S
R125	ERJ3GEYJ103	10k	
R126	ERJ3GEYJ335	3.3M	
R127	ERJ3GEYJ392	3.9k	
R128	ERDS2TJ470	47	S
R129	ERJ3GEYJ334	330k	
R130	ERJ3GEYJ821	820	
R201	ERJ3GEYJ103	10k	
R202	ERJ3GEYJ124	120k	
R203	ERJ3GEYJ103	10k	
R204	ERJ3GEYJ394	390k	
R205	ERJ3GEYJ562	5.6k	
R206	ERJ3GEYJ183	18k	
R207	ERJ3GEYJ103	10k	
R208	ERJ3GEYJ472	4.7k	
R320	ERJ3GEYJ103	10k	
R351	ERJ3GEYJ224	220k	
R352	ERJ3GEYJ472	4.7k	
R353	ERJ3GEYJ224	220k	
R354	ERJ3GEYJ471	470	
R401	ERJ3GEYJ333	33k	
R403	ERJ3GEYJ473	47k	
R404	ERJ3GEYJ183	18k	
R405	ERJ3GEYJ333	33k	
R406	ERJ3GEYJ335	3.3M	
R407	ERDS2TJ222	2.2k	S
R408	ERJ3GEYJ561	560	
R409	ERJ3GEYJ223	22k	
R410	ERJ3GEYJ474	470k	
R411	ERJ3GEYJ681	680	
R412	ERJ3GEYJ682	6.8k	
R421	ERJ3GEYJ182	1.8k	
R422	ERJ3GEYJ153	15k	
R423	ERJ3GEY0R00	0	
R425	ERJ3GEYJ225	2.2M	
R426	ERJ3GEYJ272	2.7k	
R427	ERJ3GEYJ121	120	
R428	ERJ3GEYJ562	5.6k	
R429	ERJ3GEY0R00	0	
R430	ERJ3GEYJ473	47k	
R432	ERJ3GEYJ223	22k	
R434	ERJ3GEYJ155	1.5M	
R435	ERJ3GEYJ182	1.8k	
R436	ERJ3GEYJ681	680	
R437	ERJ3GEYJ153	15k	
R439	ERJ3GEYJ153	15k	
R440	ERJ3GEYJ473	47k	
R442	ERJ3GEYJ104	100k	
R443	ERJ3GEYJ104	100k	
R444	ERJ3GEYJ103	10k	
R445	ERJ3GEYJ103	10k	
R481	ERJ3GEYJ474	470k	
R482	ERJ3GEYJ155	1.5M	
R483	ERJ3GEYJ275	2.7M	

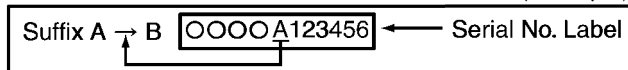
Ref. No.	Part No.	Part Name & Description	Remarks
R501	ERJ3GEYJ104	100k	
R502	PQ4R10XJ272	2.7k	S
R503	ERJ3GEYJ104	100k	
R504	ERJ3GEYJ472	4.7k	
R505	ERDS2TJ153	15k	S
R506	ERJ3GEYJ153	15k	
R507	ERJ3GEYJ153	15k	
R508	ERJ3GEYJ473	47k	
R509	ERJ3GEYJ103	10k	
R510	ERJ3GEYJ474	470k	
R511	ERJ3GEYJ472	4.7k	
R512	ERDS2TJ330	33	S
R513	ERJ3GEYJ333	33k	
R514	ERJ3GEYJ222	2.2k	
R515	ERJ3GEYJ272	2.7k	
R516	ERJ3GEYJ103	10k	
R517	ERJ3GEYJ273	27k	
R518	ERJ3GEYJ475	4.7M	
R519	ERJ3GEYJ101	100	
R520	ERDS2TJ825	8.2M	S
R521	ERJ3GEYJ335	3.3M	
R522	ERJ3GEYJ335	3.3M	
R523	ERDS2TJ334	330k	S
R551	ERJ3GEYJ104	100k	
R552	PQ4R10XJ272	2.7k	S
R553	ERJ3GEYJ104	100k	
R554	ERJ3GEYJ472	4.7k	
R555	ERJ3GEYJ153	15k	
R556	ERJ3GEYJ153	15k	
R557	ERJ3GEYJ153	15k	
R558	ERJ3GEYJ473	47k	
R559	ERJ3GEYJ103	10k	
R560	ERJ3GEYJ474	470k	
R561	ERJ3GEYJ472	4.7k	
R562	ERDS2TJ330	33	S
R563	ERJ3GEYJ333	33k	
R564	ERJ3GEYJ222	2.2k	
R565	ERJ3GEYJ272	2.7k	
R566	ERJ3GEYJ103	10k	
R567	ERJ3GEYJ273	27k	
R568	ERJ3GEYJ475	4.7M	
R569	ERJ3GEYJ101	100	
R570	ERDS2TJ106	10M	S
R571	ERJ3GEYJ335	3.3M	
R573	ERDS2TJ334	330k	S
R574	ERDS2TJ106	10M	S
R575	ERJ3GEYJ335	3.3M	
R576	ERJ3GEYJ335	3.3M	
R577	ERJ3GEYJ104	100k	
R600	ERJ3GEYJ472	4.7k	
R601	ERJ3GEYJ822	8.2k	
R602	ERJ3GEYJ272	2.7k	
R603	ERJ3GEYJ332	3.3k	
R604	ERJ3GEYJ472	4.7k	
R605	ERJ3GEYJ225	2.2M	
R606	ERJ3GEYJ303	30k	
R607	ERJ3GEYJ683	68k	
R608	ERJ3GEYJ682	6.8k	
R609	ERDS2TJ335	3.3M	S
R610	ERJ3GEYJ104	100k	
R611	ERJ3GEYJ183	18k	
R612	ERJ3GEYJ472	4.7k	
R613	ERJ3GEYJ104	100k	
R614	ERJ3GEYJ473	47k	
R615	ERJ3GEYJ103	10k	
R617	ERJ3GEYJ472	4.7k	
R618	ERJ3GEYJ222	2.2k	
R619	ERJ3GEYJ103	10k	
R664	ERJ3GEYJ474	470k	
R665	ERJ3GEYJ225	2.2M	
R666	ERJ3GEYJ475	4.7M	
R667	ERJ3GEYJ120	12	
R668	ERJ3GEYJ224	220k	

Ref. No.	Part No.	Part Name & Description	Remarks
C600	ERJ3GEY0R00	0	
J82	ERJ3GEY0R00	0	
J83	PQ4R10XJ000	0	S
J84	PQ4R18XJ000	0	S
L401	PQ4R18XJ000	0	S
		(CAPACITORS)	
C1	F0C2E105A051	1	
C2	ECEA1HKS4R7	4.7	
C3	ECEA1HKS2R22	0.22	
C4	ECUV1H682KBV	0.0068	
C5	ECEA1HKA4R7	4.7	
C21	F0C2E105A051	1	
C22	ECEA1HKS4R7	4.7	
C23	ECEA1HKS2R22	0.22	
C24	ECUV1H682KBV	0.0068	
C35	ECEA1HKA4R7	4.7	
C103	ECUV1H103KBV	0.01	S
C105	ECEA1CKA100	10	
C106	ECEA1CKA100	10	
C107	ECEA1AU331	330	
C108	ECUV1C104KBV	0.1	S
C109	ECUV1H103KBV	0.01	S
C111	ECUV1H103KBV	0.01	S
C112	ECUV1C104KBV	0.1	S
C113	ECUV1H333KBV	0.033	S
C114	ECEA1EK470	47	S
C120	ECKD2H681KB	680p	S
C121	ECKD2H681KB	680p	S
C123	ECKD2H681KB	680p	S
C124	ECKD2H681KB	680p	S
C201	ECUV1C473KBV	0.047	
C202	ECEA1CKS470	47	S
C203	ECUV1H222KBV	0.0022	
C204	ECUV1C473KBV	0.047	
C205	PQCUV1C224KB	0.22	
C306	ECUV1C104KBV	0.1	S
C351	ECEA1CKA100	10	
C352	ECEA1CKA100	10	
C353	ECUV1H561JCV	560p	S
C354	ECUV1H471JCV	470p	S
C355	ECUV1H222KBV	0.0022	
C356	ECUV1H102KBV	0.001	
C357	ECEA1HKA010	1	
C358	ECUV1H103KBV	0.01	S
C359	ECEA1CKS470	47	S
C404	ECUV1C104KBV	0.1	S
C405	ECUV1C104KBV	0.1	S
C406	ECUV1H181JCV	180p	
C408	ECUV1H223KBV	0.022	S
C414	ECEA1CKA100	10	
C415	ECUV1H103KBV	0.01	S
C421	ECUV1H333KBV	0.033	S
C422	ECUV1E223KBV	0.022	
C423	ECUV1H682KBV	0.0068	
C424	ECUV1E183KBV	0.018	S
C425	ECUV1C104KBV	0.1	S
C426	ECUV1C104KBV	0.1	S
C435	ECUV1C104KBV	0.1	S
C436	ECUV1H222KBV	0.0022	
C438	ECUV1C104KBV	0.1	S
C439	ECUV1H152KBV	0.0015	
C440	ECUV1H332KBV	0.0033	
C481	ECUV1H103KBV	0.01	S
C501	ECUV1H103KBV	0.01	S
C502	ECEA1CKS470	47	S
C503	ECEA1HKS2R2	2.2	S
C504	ECEA1EU101	100	S
C505	ECEA1CKA100	10	
C506	ECUV1H103KBV	0.01	S
C507	ECEA1HKS2R33	0.33	S
C551	ECUV1H103KBV	0.01	S
C552	ECEA1CKS470	47	S
C553	ECEA1HKS2R2	2.2	S

Ref. No.	Part No.	Part Name & Description	Remarks
C554	ECEA1EU101	100	S
C555	ECEA1CKA100	10	
C556	ECUV1H103KBV	0.01	S
C557	ECEA1HKS33	0.33	S
C601	ECA0JM102B	0.001	
C602	ECUV1C473KBV	0.047	
C603	ECUV1C563KBV	0.056	
C605	ECUV1H682KBV	0.0068	
C606	ECUV1C473KBV	0.047	
C607	ECUV1C273KBV	0.027	
C608	ECUV1E153KBV	0.015	
C609	ECUV1C104KBV	0.1	S
C610	ECEA1HKA010	1	
C611	ECUV0J105KBV	1	
C612	ECEA1VKS4R7	4.7	S
C613	ECUV1C683KBV	0.068	
C614	ECEA1CKS470	47	S
C615	ECEA0JKS220	22	S
C616	ECUV1C104KBV	0.1	S
C617	ECEA0JKA101	100	
C618	ECEA1AKS330	33	S
C619	ECEA1VKS4R7	4.7	S
C620	ECUV1H123KBV	0.012	S
C621	ECEA0JKA221	220	
C622	ECUV1C104KBV	0.1	S
C624	ECUV1H103KBV	0.01	S
C625	ECEA1CKA100	10	
C626	ECUV1H103KBV	0.01	
		(for Suffix A)*	
	3AP	SUB P.C.BOARD ASS'Y (RTL)	
		(DIODES)	
D701	MA111	DIODE (SI)	
D702	MA111	DIODE (SI)	
D703	MA111	DIODE (SI)	
		(RESISTORS)	
R701	ERJ3GEYJ104	100k	
R703	ERJ3GEYJ104	100k	
		(CAPACITORS)	
C701	ECUV0J105KBV	1	
C702	ECUV0J105KBV	1	
		(for Suffix B)*	
Q604	UN5213	TRANSISTOR (SI)	S
D402	MA111	DIODE (SI)	
		(RESISTORS)	
J85	ERJ3GEY0R00	0	
R441	ERJ3GEYJ104	100k	
C437	ERJ3GEYJ155	1.5M	
		(CAPACITORS)	
C441	ECUV1C104KBV	0.1	
C630	ECUV1A105ZFFV	1	

* : Serial No. Label tells you the suffix code as follows

(Example)



17.1.3. OPERATIONAL P.C.BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PQWP2T2378JX	OPERATIONAL P.C.BOARD ASS'Y (RTL)	
		(ICS)	
IC302	C0EBG0000102	IC	
IC303	PQVIP33327UT	IC	
IC304	PQVIXCF3702P	IC	
IC801	C2CBFE000007	IC	
		(TRANSISTORS)	
Q302	2SD1819A	TRANSISTOR (SI)	
Q801	PQVTDTC144TU	TRANSISTOR (SI)	S
Q802	PQVTDTC144TU	TRANSISTOR (SI)	S
Q803	UN5213	TRANSISTOR (SI)	S

Ref. No.	Part No.	Part Name & Description	Remarks
		(DIODES)	
D301	MA111	DIODE (SI)	
D302	MA111	DIODE (SI)	
D304	MA111	DIODE (SI)	
D305	MA111	DIODE (SI)	
D807	MA111	DIODE (SI)	
D817	MA111	DIODE (SI)	
D822	MA111	DIODE (SI)	
		(LEDs)	
LED801	PSVD1SRCT	LED	S
LED803	PQVDBRPY1204	LED	
LED805	PQVDBRPY1204	LED	
		(CRYSTAL OSCILLATORS)	
X801	PQVBCST80MG6	CRYSTAL OSCILLATOR	S
X802	PFVCCFS32Z	CRYSTAL OSCILLATOR	
		(OTHERS)	
CN1	PQJS28X54Z	CONNECTOR SOCKET	
E2	PQJMI22Z	MICROPHONE	
E3	PQMG10025Z	CUSHION RUBBER, MIC	
LCD	L5DCBJC00001	LIQUID CRYSTAL DISPLAY	
		(RESISTORS)	
R301	ERJ3GEYJ225	2.2M	
R302	ERJ3GEYJ685	6.8M	
R303	ERJ3GEYJ225	2.2M	
R304	ERJ3GEYJ475	4.7M	
R305	ERJ3GEYJ221	220	
R310	ERJ3GEYJ223	22k	
R311	ERJ3GEYJ104	100k	
R312	ERJ3GEYJ104	100k	
R313	ERJ3GEYJ104	100k	
R314	ERJ3GEYJ474	470k	
R315	PQ4R10XJ560	56 (for Suffix A)	S
R315	PQ4R10XJ220	22 (for Suffix B)	S
R801	ERJ3GEYJ105	1M	
R802	ERJ3GEYJ104	100k	
R809	ERJ3GEYJ104	100k	
R811	ERJ3GEYJ103	10k	
R812	ERJ3GEYJ683	68k	
R813	ERJ3GEYJ393	39k	
R814	ERJ3GEYJ104	100k	
R821	ERJ3GEYJ681	680	
R822	ERJ3GEYJ391	390	
R823	ERJ3GEYJ681	680	
R824	ERJ3GEYJ391	390	
R861	ERJ3GEYJ683	68k	
R862	ERJ3GEYJ333	33k	
R863	ERJ3GEYJ153	15k	
R891	ERJ3GEYJ102	1k	
J801	ERJ3GEY0R00	0	
J802	ERJ3GEY0R00	0	
		(CAPACITORS)	
C301	ECA0JM102	0.001	S
C303	ECEA0JSJ331	330	S
C304	ECUV1H333KBV	0.033	S
C308	ECEA0JKA221	220	
C309	ECUV1H103KBV	0.01	
C801	ECUV1H103KBV	0.01	
C802	ECUV1H120JCV	12p	
C803	ECUV1H150JCV	15p	
C804	ECUV1C104ZFFV	0.1	
C805	ECUV1C104ZFFV	0.1	
C806	ECUV1H102KBV	0.001	
C824	ECUV1H102KBV	0.001	

17.2. ACCESSORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PQJA10075Z	TEL CORD	
A2	PQJA10088Z	TEL CORD	
A3	PQJA212M	CURL CORD	
A4	PQJXC0102Z	HANDSET	
A5	PQKL10035Z2	WALL MOUNT ADAPTOR	S
A6	PQQW12513Z	QUICK GUIDE (for Arabic)	
A7	PQQX13204Y	INSTRUCTION BOOK	
P1	PQPH89Y	POLY BAG	
P2	PQPK13539Z	GIFT BOX	

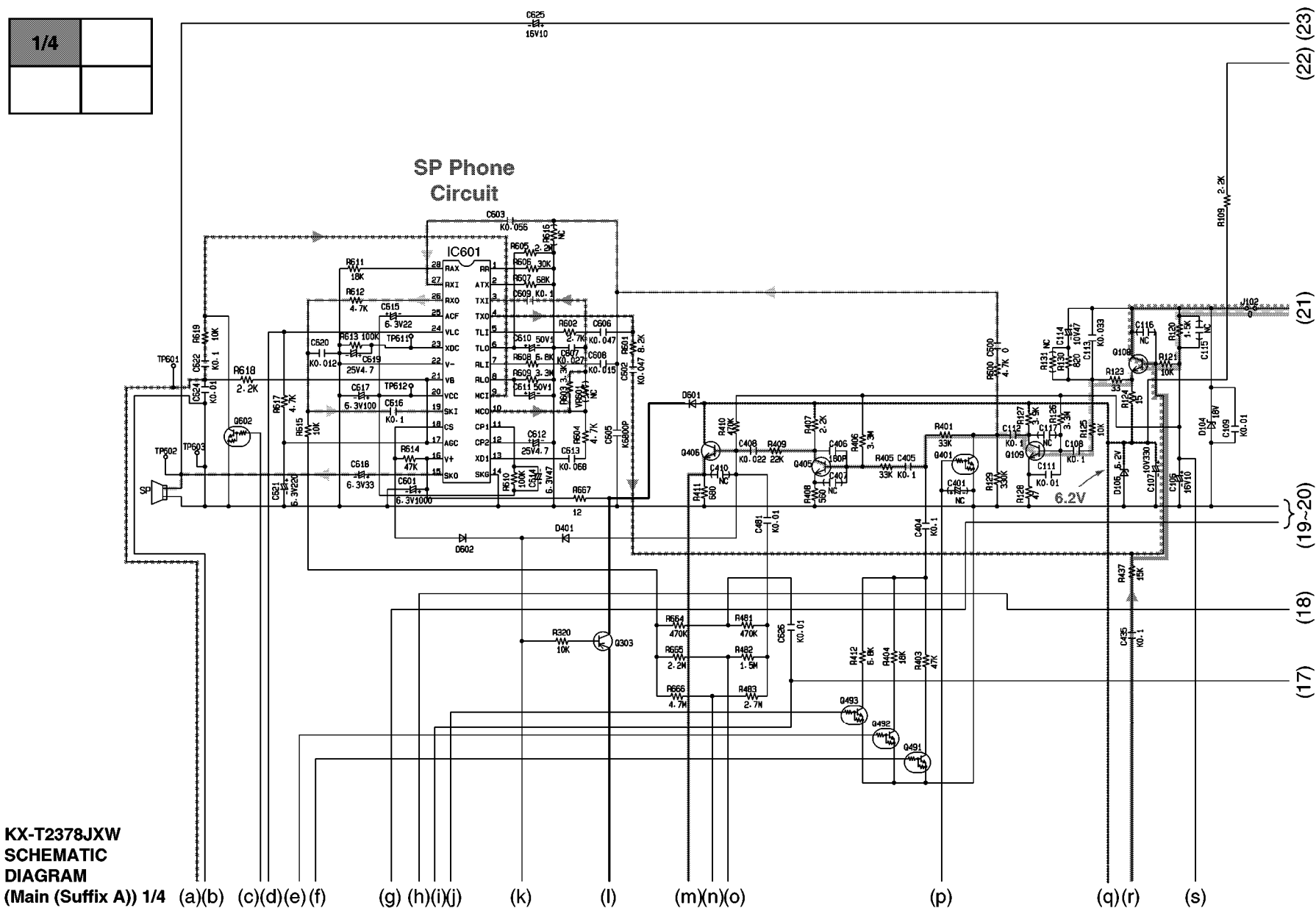
18 FOR SCHEMATIC DIAGRAM (SCHEMATIC DIAGRAM (BASE UNIT))

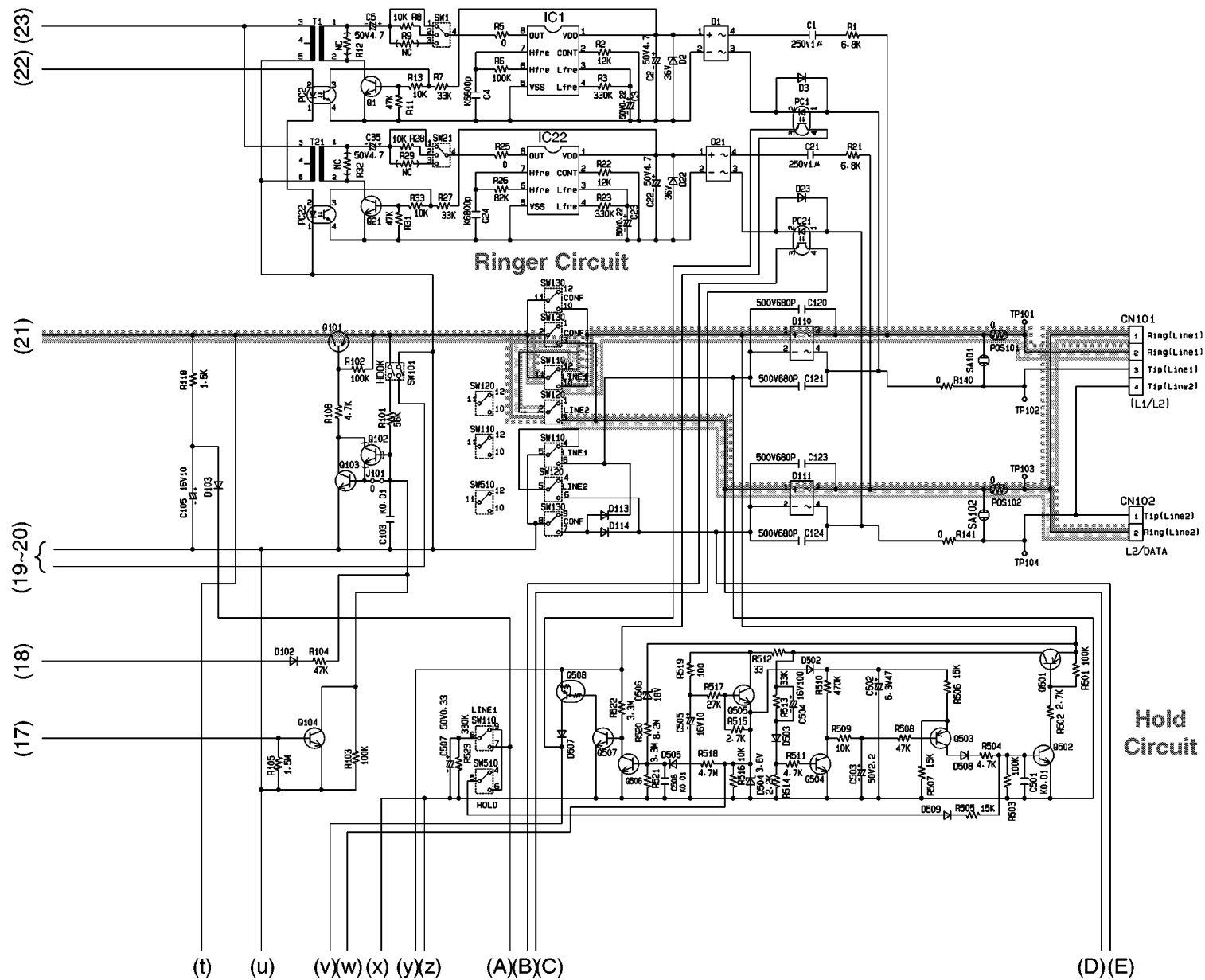
1. DC voltage measurements are taken with electronic voltmeter from negative terminal.
(Add 40 mA to telephone line from the loop simulator.)
2. This schematic diagram may be modified at any time with the development of new technology.

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.

19.1. Main (Suffix A)

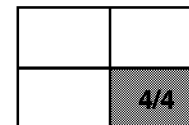




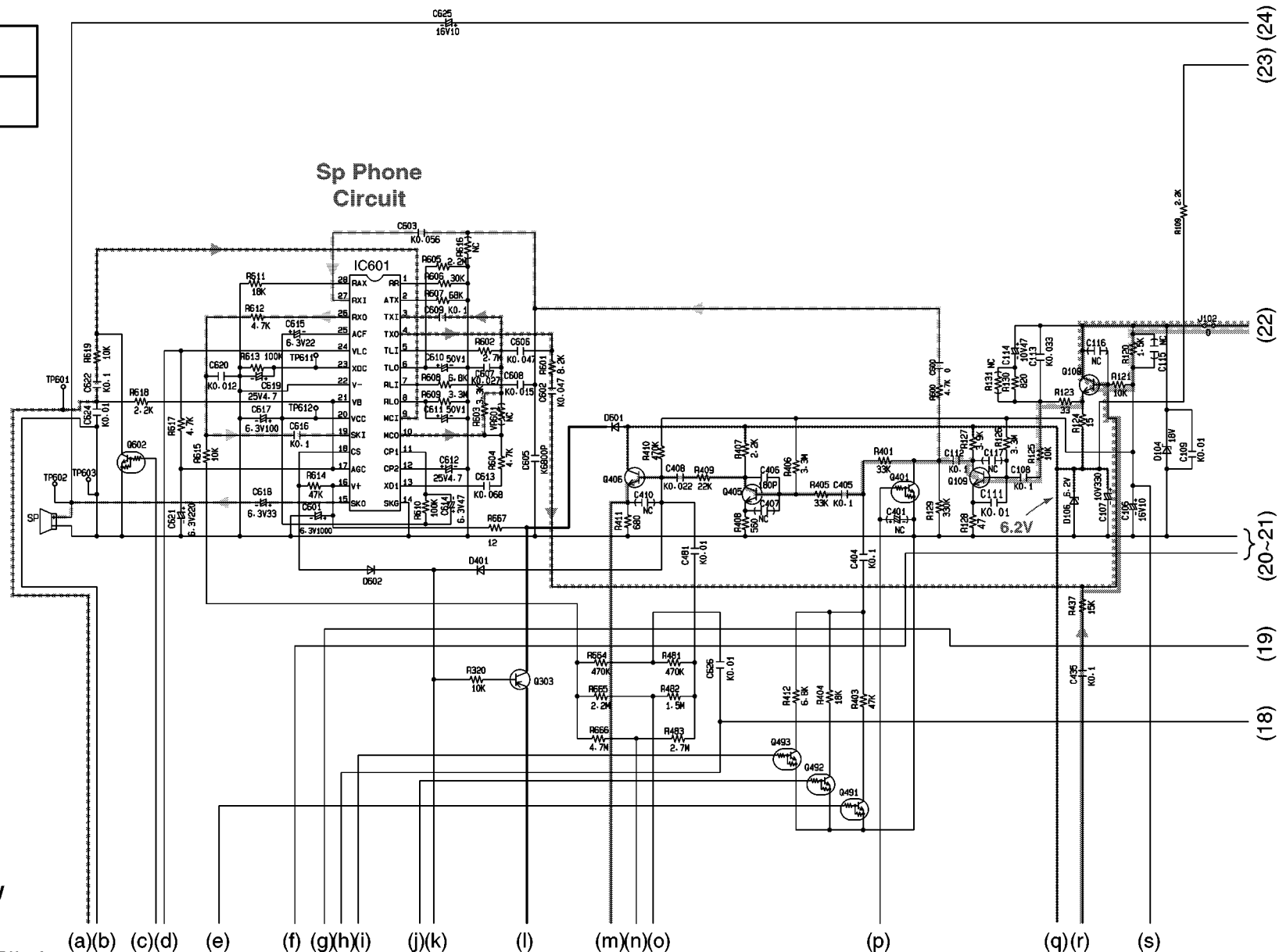
KX-T2378JXW
SCHEMATIC
DIAGRAM
(Main (Suffix A)) 2/4

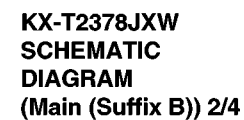


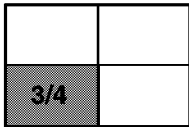
KX-T2378JXW SCHEMATIC DIAGRAM (Main (Suffix A)) 3/4



KX-T2378JXW SCHEMATIC DIAGRAM (Main (Suffix A)) 4/4



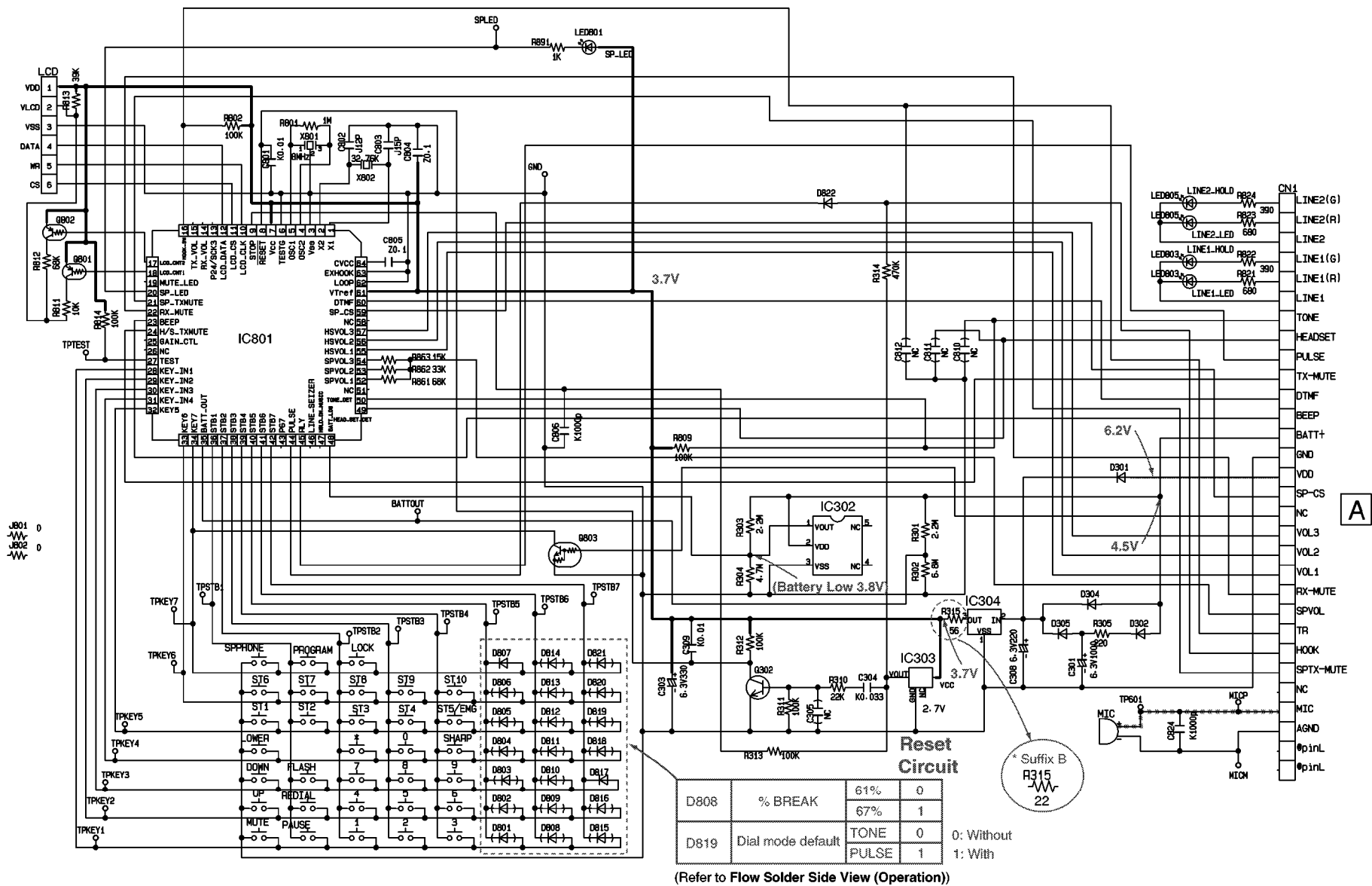




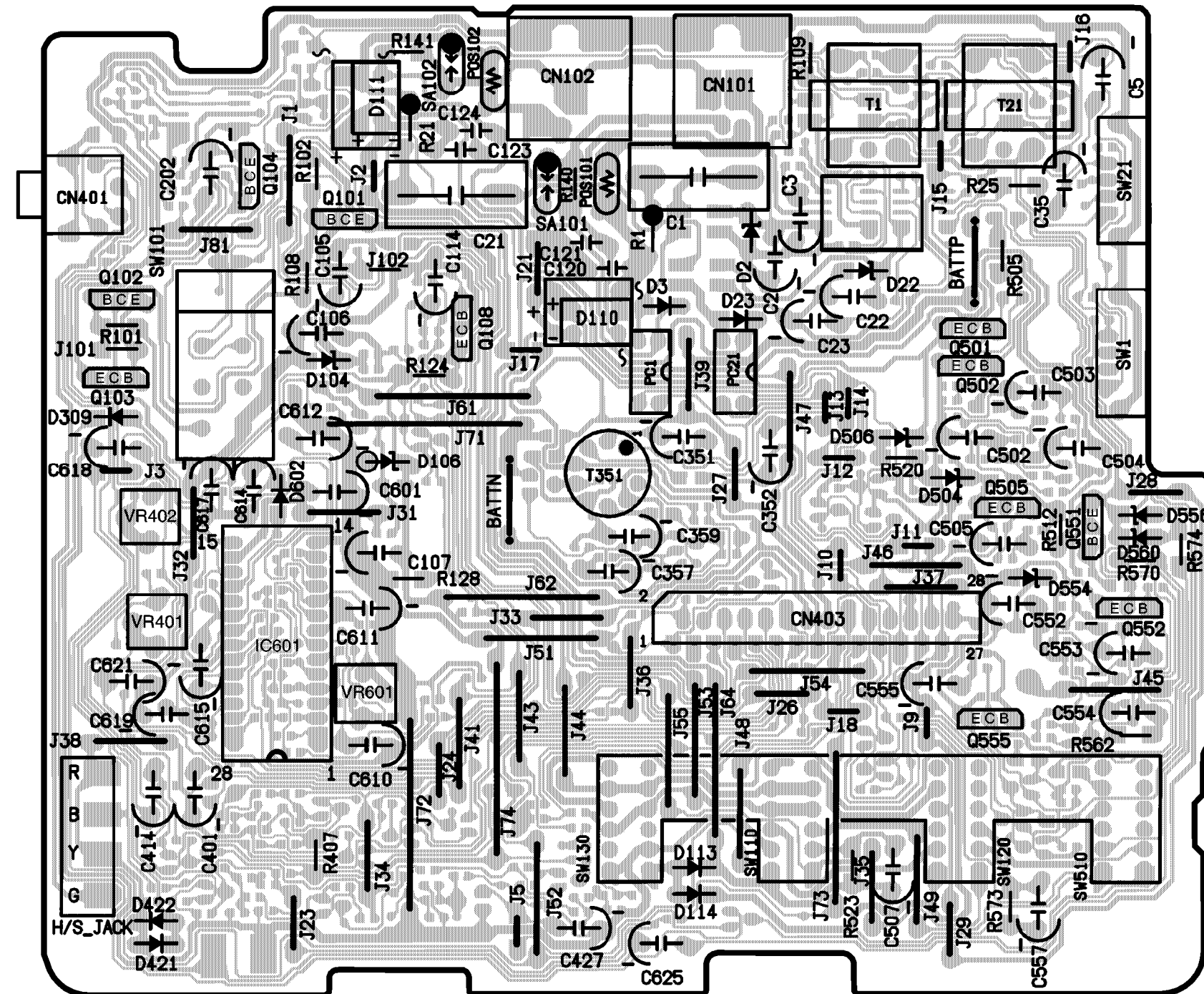
KX-T2378JXW SCHEMATIC DIAGRAM (Main (Suffix B)) 3/4

19.3. Operation

50

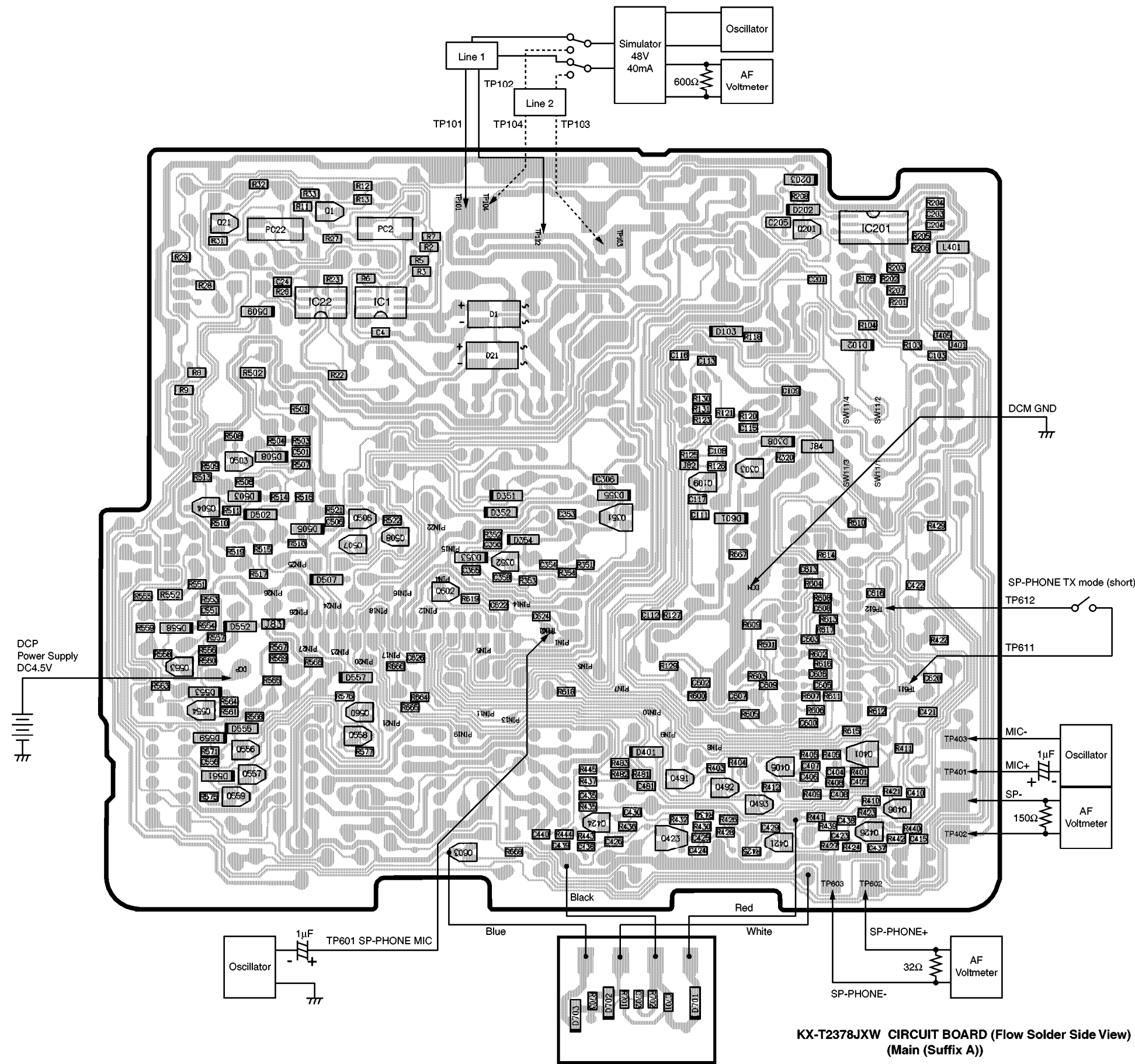


KX-T2378JXW SCHEMATIC DIAGRAM (Operation)



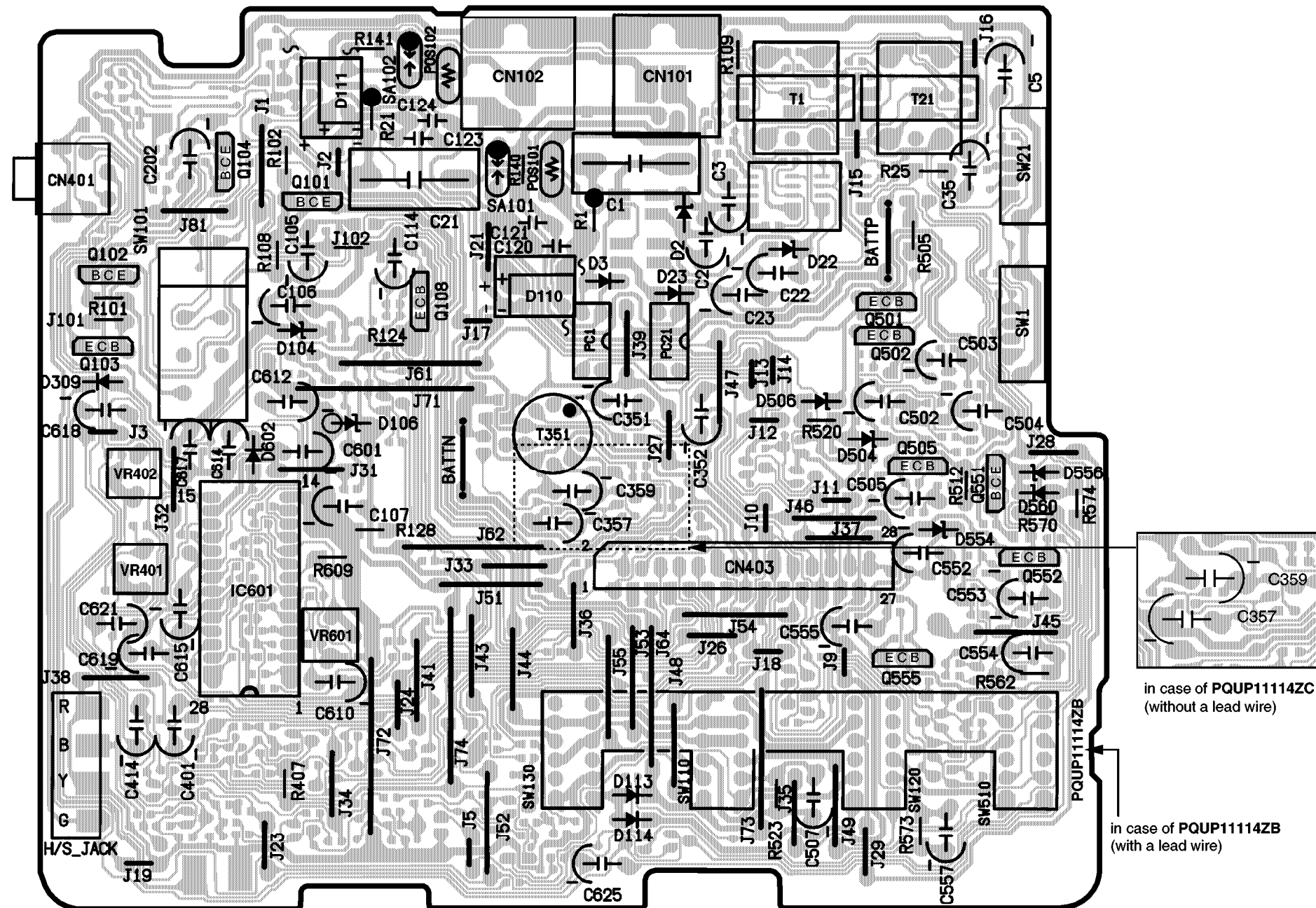
51

20.2. Flow Solder Side View (Main (Suffix A))



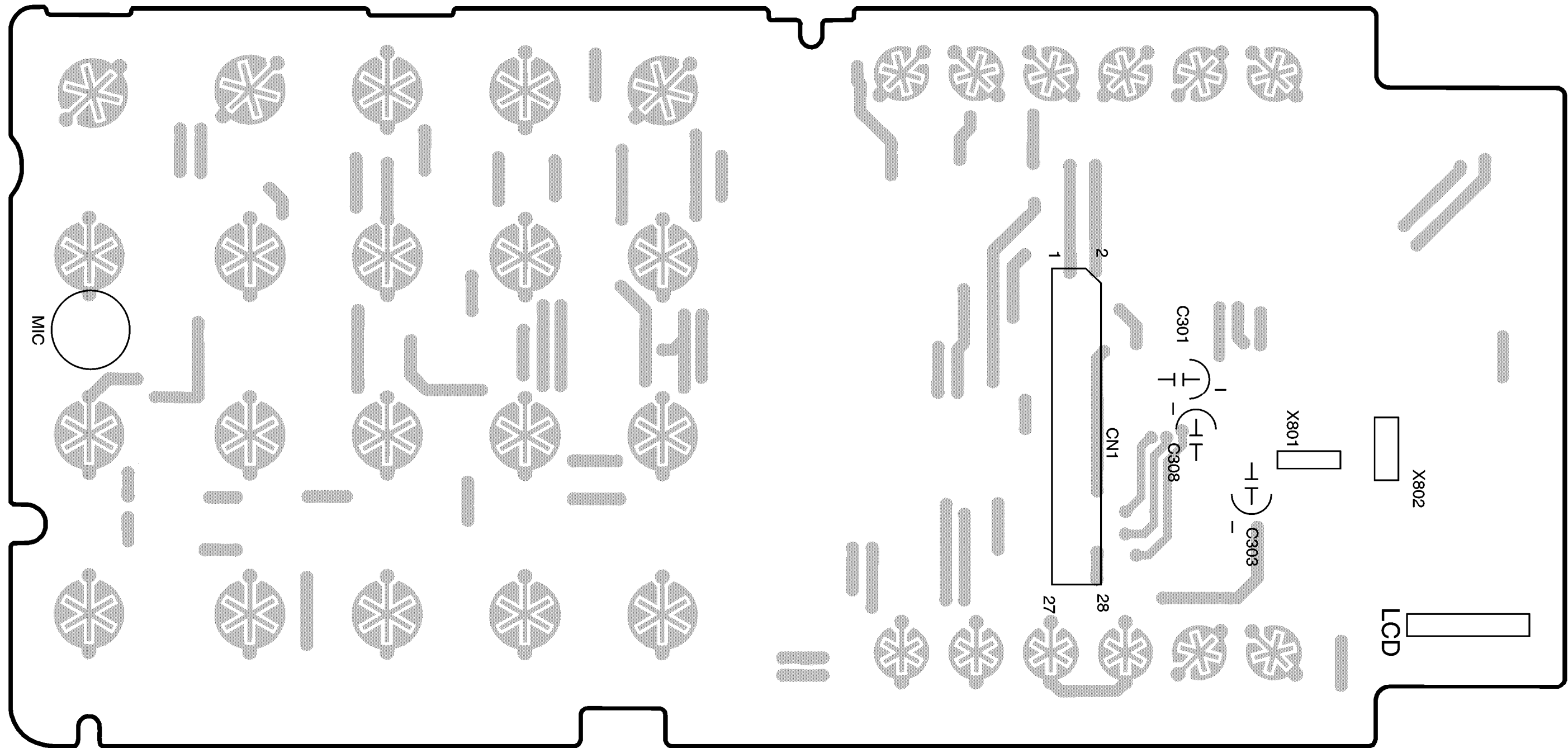
KX-T2378JXW CIRCUIT BOARD (Flow Solder Side View)
(Main (Suffix A))

20.3. Component View (Main (Suffix B))

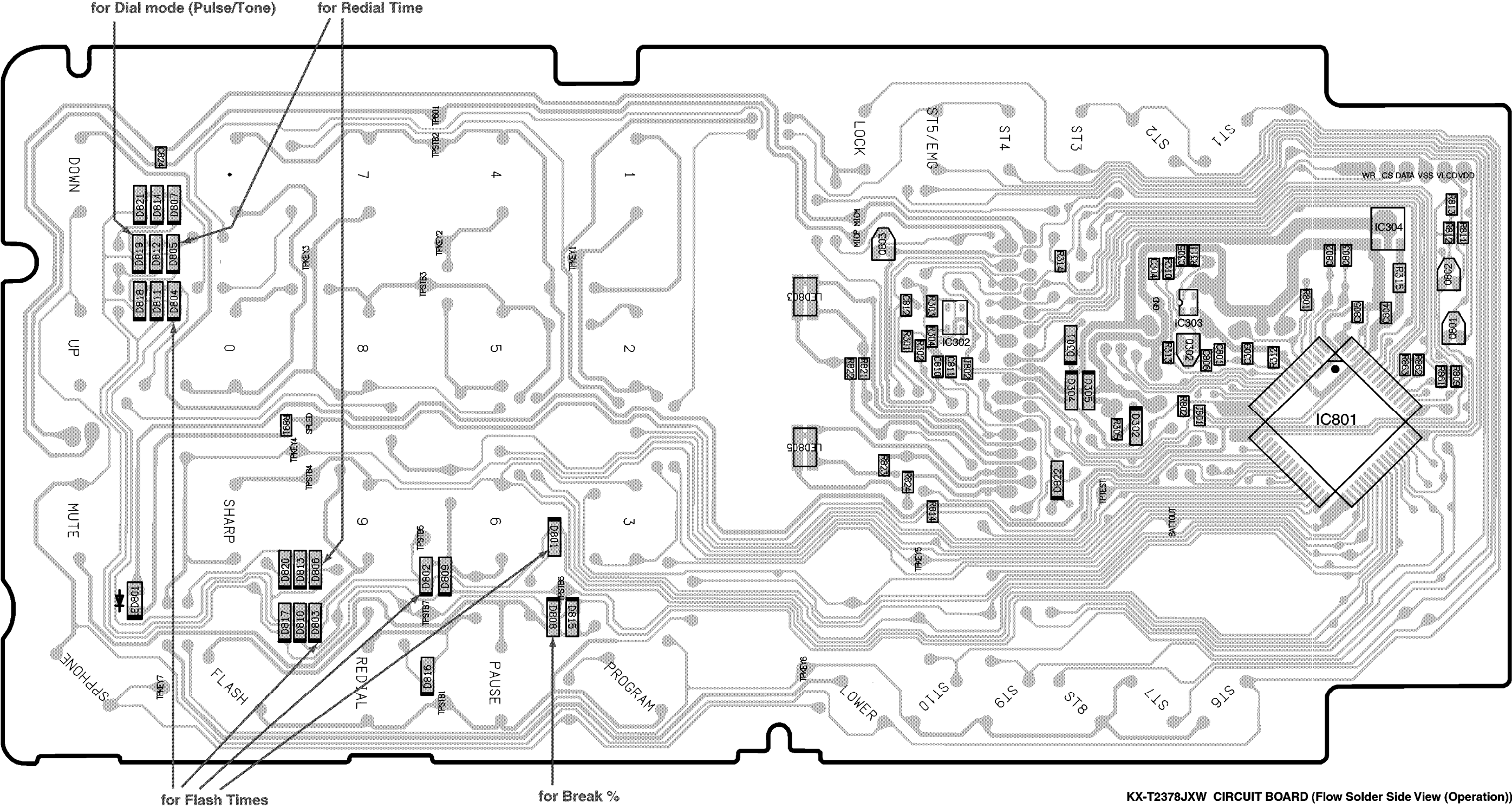




20.5. Component View (Operation)



KX-T2378JXW CIRCUIT BOARD (Component View (Operation))



KX-T2378JXW CIRCUIT BOARD (Flow Solder Side View (Operation))

