

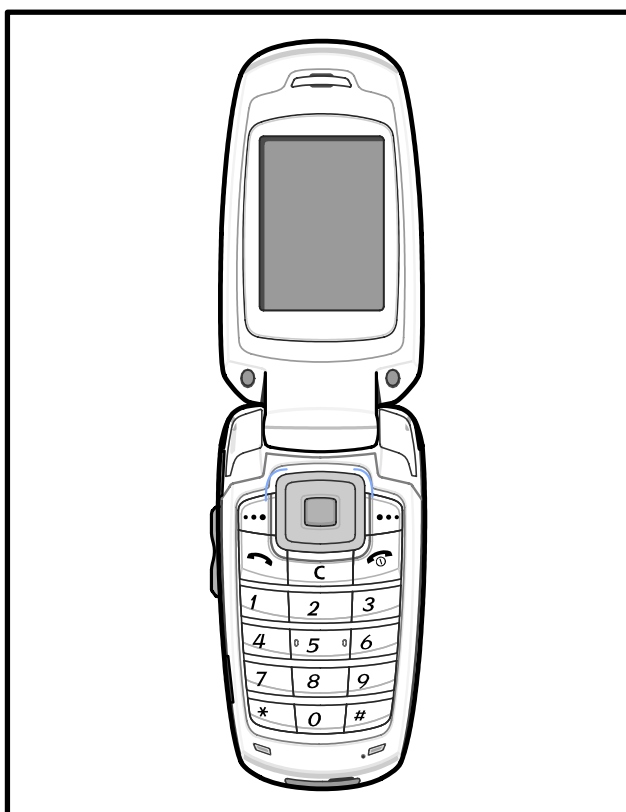
SAMSUNG

GSM TELEPHONE

SGH-X510

SERVICE *Manual*

GSM TELEPHONE



CONTENTS

1. Safety Precautions
2. Specification
3. Product Function
4. Array course control
5. Exploded View and Parts list
6. MAIN Electrical Parts List
7. Block Diagrams
8. PCB Diagrams
9. Flow Chart of Troubleshooting
10. Reference data

Contents

1. Safety Precautions

- 1-1. Repair Precaution1-1
- 1-2. ESD(Electrostatically Sensitive Devices) Precaution1-2

2. Specification

- 2-1. GSM General Specification2-1
- 2-2. GSM TX power Level2-2

3. Product Function

4. Array course control

- 4-1. Downloading Binary Files4-2
- 4-2. Pre-requisite for Downloading4-2
- 4-3. S/W Downloader Program4-3

5. Exploded View and Parts list

- 5-1. Cellular phone Exploded View5-1
- 5-2. Cellular phone Parts list5-2
- 5-3. Disassembly5-4
- 5-4. Assembly5-6

6. MAIN Electrical Parts List

7. Block Diagrams

8. PCB Diagrams

Contents

9. Flow Chart of Troubleshooting

9-1. Baseband	9-1
9-1-1. Power ON	9-1
9-1-2. Initial	9-4
9-1-3. SIM Part	9-6
9-1-4. Microphone Part	9-7
9-1-5. Speaker Part_1(MP3, SPEAKER PHONE)	9-8
9-1-6. Speaker Part_2(RECEIVER)	9-10
9-1-7. Charging Part	9-11
9-2. RF	9-13
9-2-1. EGSM RX	9-13
9-2-2. DCS RX	9-15
9-2-3. PCS RX	9-16
9-2-4. EGSM TX	9-17
9-2-5. DCS TX	9-18
9-2-6. PCS TX	9-19

10. Reference data

1. Safety Precautions

1-1. Repair Precaution

- Repair in Shield Box, during detailed tuning.
Take specially care of tuning or test,
because specipicty of cellular phone is sensitive for surrounding interference(RF noise).
- Be careful to use a kind of magnetic object or tool,
because performance of parts is damaged by the influence of manetic force.
- Surely use a standard screwdriver when you disassemble this product,
otherwise screw will be worn away.
- Use a thicken twisted wire when you measure level.
A thicken twisted wire has low resistance, therefore error of measurement is few.
- Repair after separate Test Pack and Set because for short danger (for example an
overcurrent and furious flames of parts etc) when you repair board in condition of
connecting Test Pack and tuning on.
- Take specially care of soldering, because Land of PCB is small and weak in heat.
- Surely tune on/off while using AC power plug, because a repair of battery charger is
dangerous when tuning ON/OFF PBA and Connector after disassembling charger.
- Don't use as you pleases after change other material than replacement registered on SEC
System.
Otherwise engineer in charge isn't charged with problem that you don't keep this rules.

1-2. ESD(Electrostatically Sensitive Devices) Precaution

Several semiconductor may be damaged easily by static electricity. Such parts are called by ESD(Electrostatically Sensitive Devices), for example IC,BGA chip etc. Read Precaution below. You can prevent from ESD damage by static electricity.

- Remove static electricity remained your body before you touch semiconductor or parts with semiconductor. There are ways that you touch an earthed place or wear static electricity prevention string on wrist.
- Use earthed soldering steel when you connect or disconnect ESD.
- Use soldering removing tool to break static electricity. , otherwise ESD will be damaged by static electricity.
- Don't unpack until you set up ESD on product. Because most of ESD are packed by box and aluminum plate to have conductive power,they are prevented from static electricity.
- You must maintain electric contact between ESD and place due to be set up until ESD is connected completely to the proper place or a circuit board.

2. Specification

2-1. GSM General Specification

	GSM900 Phase 1	EGSM 900 Phase 2	DCS1800 Phase 1	PCS1900
Freq. Band[MHz] Uplink/Downlink	890~915 935~960	880~915 925~960	1710~1785 1805~1880	1850~1910 1930~1990
ARFCN range	1~124	0~124 & 975~1023	512~885	512~810
Tx/Rx spacing	45 MHz	45 MHz	95 MHz	80 MHz
Mod. Bit rate/ Bit Period	270.833 kbps 3.692 us	270.833 kbps 3.692 us	270.833 kbps 3.692 us	270.833 kbps 3.692 us
Time Slot Period/Frame Period	576.9 us 4.615 ms	576.9 us 4.615 ms	576.9 us 4.615 ms	576.9 us 4.615 ms
Modulation	0.3GMSK	0.3 GMSK	0.3 GMSK	0.3 GMSK
MS Power	33 dBm~13 dBm	33 dBm~5 dBm	30 dBm~0 dBm	30 dBm~0 dBm
Power Class	5 pcl ~ 15 pcl	5 pcl ~ 19 pcl	0 pcl ~ 15 pcl	0 pcl ~ 15 pcl
Sensitivity	-102 dBm	-102 dBm	-100 dBm	-100 dBm
TDMA Mux	8	8	8	8
Cell Radius	35 Km	35 Km	2 Km	-

2-2. GSM Tx Power Class

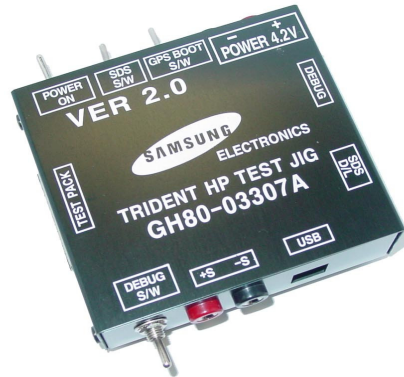
TX Power control level	GSM900	TX Power control level	DCS1800	TX Power control level	PCS1900
5	33±2 dBm	0	30±3 dBm	0	30±3 dBm
6	31±2 dBm	1	28±3 dBm	1	28±3 dBm
7	29±2 dBm	2	26±3 dBm	2	26±3 dBm
8	27±2 dBm	3	24±3 dBm	3	24±3 dBm
9	25±2 dBm	4	22±3 dBm	4	22±3 dBm
10	23±2 dBm	5	20±3 dBm	5	20±3 dBm
11	21±2 dBm	6	18±3 dBm	6	18±3 dBm
12	19±2 dBm	7	16±3 dBm	7	16±3 dBm
13	17±2 dBm	8	14±3 dBm	8	14±3 dBm
14	15±2 dBm	9	12±4 dBm	9	12±4 dBm
15	13±2 dBm	10	10±4 dBm	10	10±4 dBm
16	11±3 dBm	11	8±4 dBm	11	8±4 dBm
17	9±3 dBm	12	6±4 dBm	12	6±4 dBm
18	7±3 dBm	13	4±4 dBm	13	4±4 dBm
19	5±3 dBm	14	2±5 dBm	14	2±5 dBm
		15	0±5 dBm	15	0±5 dBm

3. Product Function

Main Function

- Speed dial
- Network services
- Send SMS or MMS messages
- Voicemail
- Broadcast, Push, SOS message
- Web browser
- Camera
- IrDA

4. Array course control



Test Jig (GH80-03307A)



Test Cable (GH39-00127A)



RF Test Cable (GH39-00283A)

4-1. Downloading Binary Files (1)

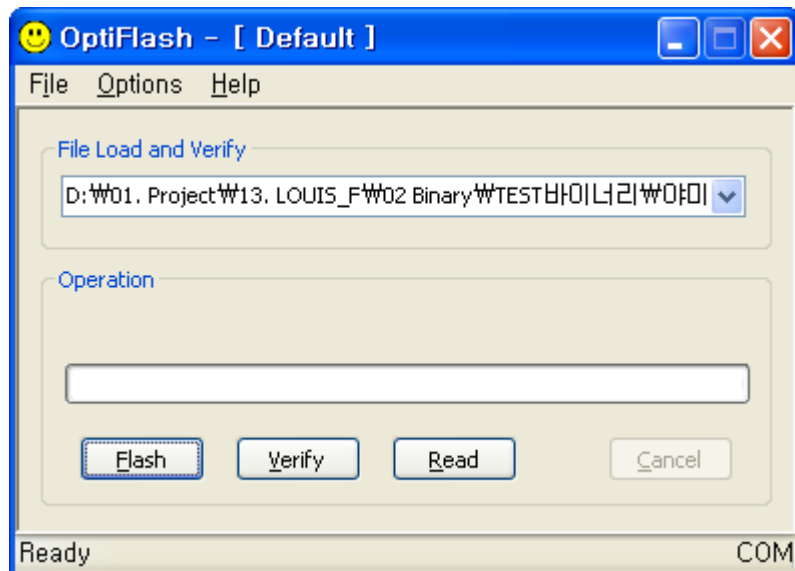
- Swift Model firmware is composed of 2 files
- *.s3 : Main source code binary.

4-2. Prerequisite

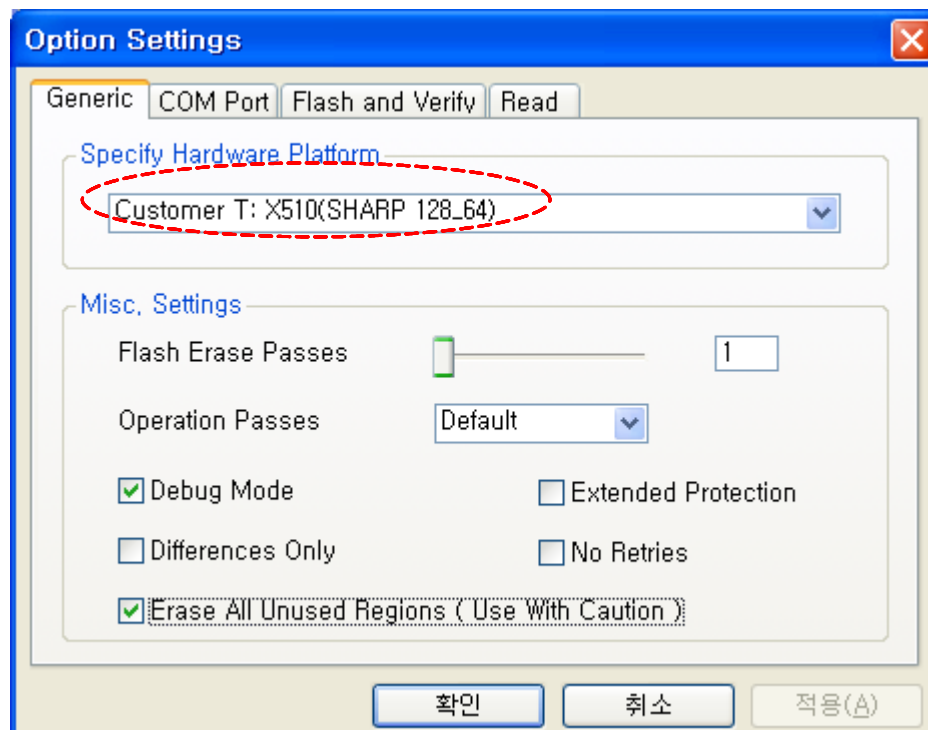
- Downloader program(Optiflash.exe)
- X510 Moblie Phone
- Data Cable
- Binary Files

4-3. S/W Downloader Program

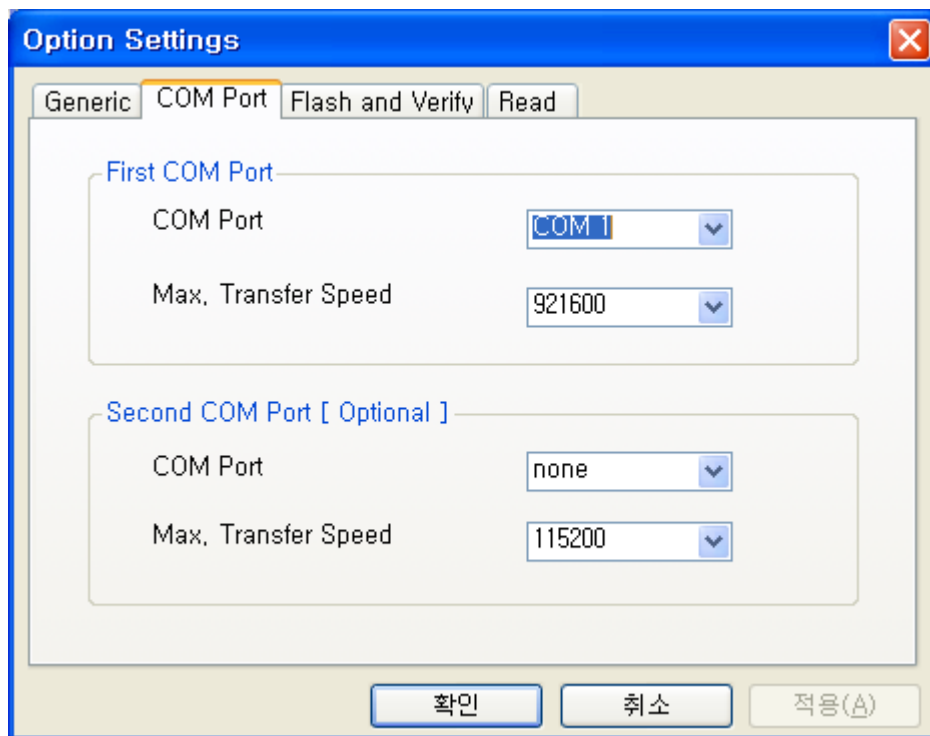
1. Load the binary download program by execution the "OptiFlash.exe"



2. Select the "Options" -> "Settings" -> "Generic" -> "Specify hardware platform".
Choose hardware platform for the downloader file setting.
Set the everything else as the default values which are shown below



3. Select the **COM port** where the download cable is connected

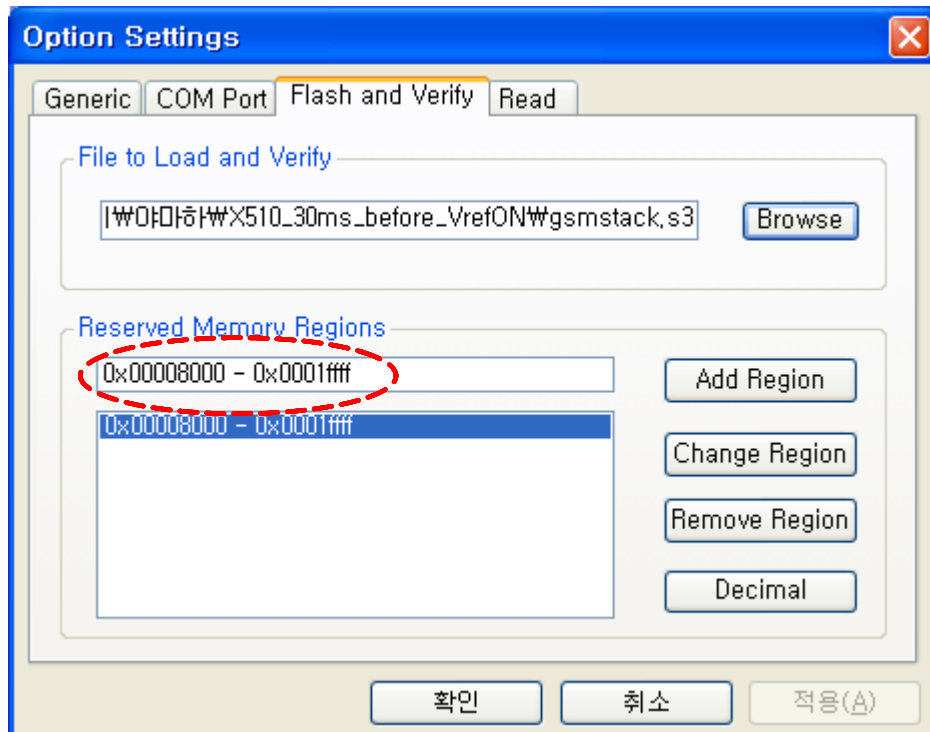


Only COM1 is supported. Additionally you can select the maximum transfer speed OptiFlash will use to communicate with the phone. However, Optiflash will use a slower speed if either the PC's or the phone's serial hardware is incapable of handling the selected speed.

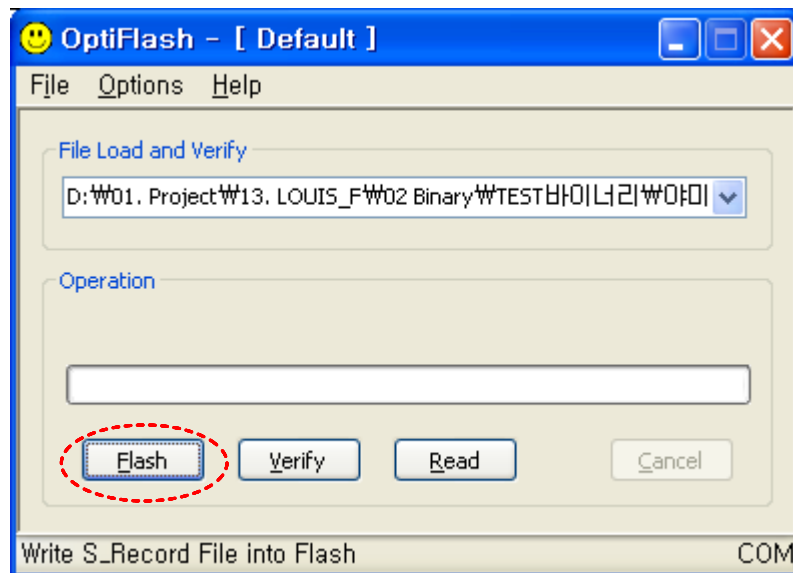
4. Select the "Flash&Verify" -> "Browse"

Set the directory path and choose the latest S/W binary, for example "gsmstack.s3", for the downloader binary setting.

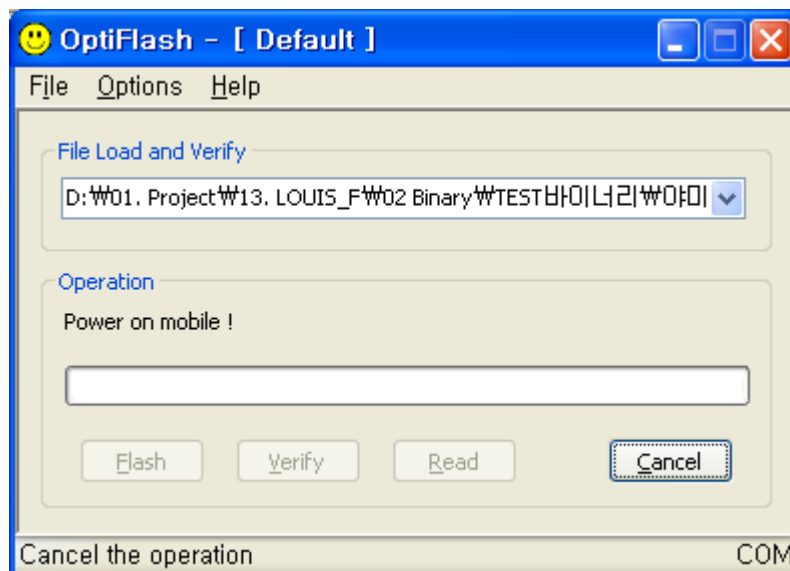
And Check "Reserved Memory Regions" - **0x00008000 - 0x0001ffff**



5. 1st. Press “Flash”.



2nd. Turn on Power of mobile



6. When downloading is finished successfully, there is a “All is well” message.

7. After finishing downloading, Certain memory resets should be done to guarantee the normal performance.

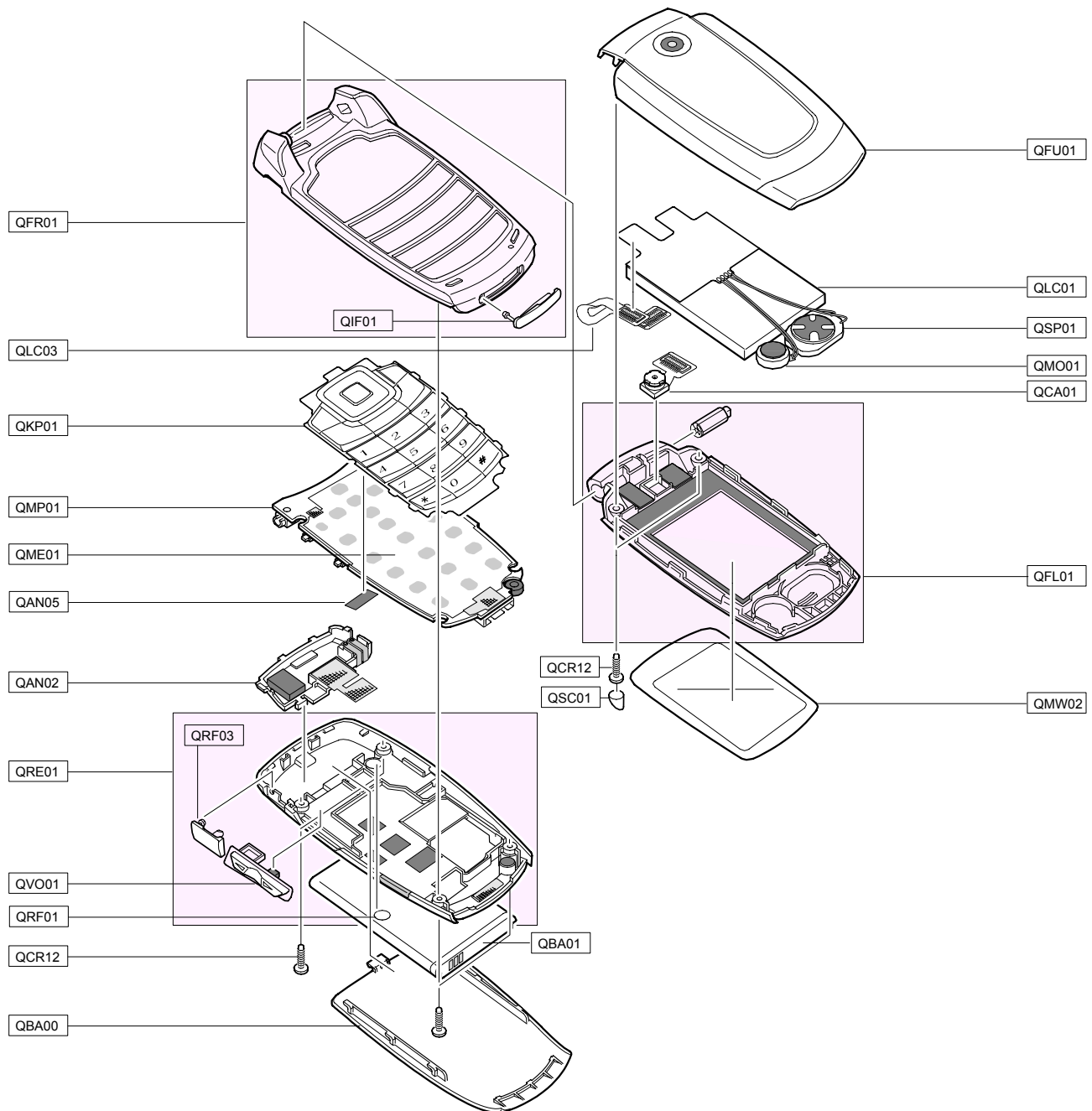
8. Confirm the downloaded version name by key-string(***#1234#**)

Memory reset will be done by pressing the following key-strings.

Full Reset : “***2767*3855#**” will reboot the phone automatically.

5. Exploded View and Parts List

5-1. Cellular phone Exploded View



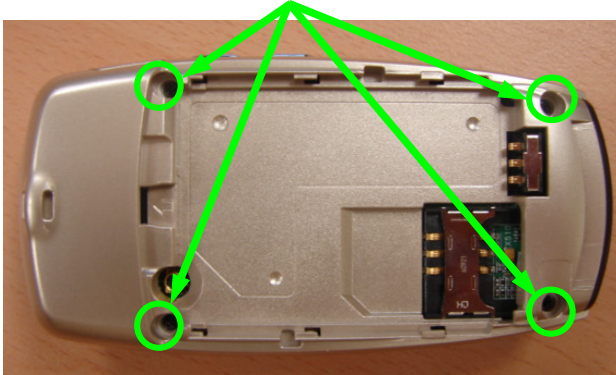
5-2. Cellular phone Parts list

Design LOC		Discription	SEC CODE
QAN02		INTENNA-SGHX510	GH42-01012A
QAN05		ASSY MEC-INTENNA CONTACT	GH75-08168A
QBA00		PMO-COVER BATT	GH72-30639H
QBA01		INNER BATTERY PACK-800MAH,MAIN	GH43-02589A
QCA01		UNIT-CAMERA MODULE	GH59-03512A
QCR12		SCREW-MACHINE	6001-001530
QCR12		SCREW-MACHINE	6001-001530
QFL01		ASSY CASE-LOWER	GH98-01865A
QFU01		ASSY CASE-UPPER	GH98-01866A
QKP01		ASSY KEYPAD-(XEF/CDA)	GH98-02513A
QLC01		ELA UNIT-SGHX510 LCD MODULE (S	GH96-02319A
QLC03		UNIT-LCD CON TO CON FPCB	GH59-03598A
QME01		UNIT-DOMESHEET	GH59-03601A
QMO01		MOTOR DC-SGHX510	GH31-00285A
QMP01		PBA MAIN-SGHX510 (PBA MAIN)	GH92-02982A
QMW02		PMO-COVER MAIN WINDOW	GH72-35770A
QRF01		MPR-TAPE RF	GH74-22888H
QSC01		RMO-RUBBER FOLDER SCREW	GH73-07904A
QSP01		SPEAKER	3001-002065
QVO01		ASSY KEY-VOLUME	GH98-01510A
QFR01		ASSY CASE-FRONT	GH98-01864A
	QIF01	PMO-COVER IF	GH72-33320A
QRE01		ASSY CASE-REAR	GH98-01867A
	QRF03	PMO-COVER EARJACK V2	GH72-30586H

Discription	SEC CODE
BAG PE	6902-000297
ADAPTOR-SGHN288 TAD	GH44-00184A
LABEL(P)-WATER SOAK	GH68-02026A
LABEL(P)-WATER SOAK	GH68-02026A
MANUAL USERS-EU GERMAN	GH68-12387A
LABEL(R)-MAIN(EU)	GH68-12592A
BOX(P)-UNIT MAIN(EU)	GH69-04492A
MPR-BOHO VINYL LCD CONN	GH74-15350A
MPR-TAPE MAIN WINDOW	GH74-22893A
MPR-VINYL BOHO MAIN WINDOW	GH74-23229A
MPR-CUSHION INTENNA	GH74-24320A
MPR-TAPE IF COVER	GH74-24740A
MPR-TAPE GASKET REAR	GH74-25901A
MPR-TAPE FPCB HOLE	GH74-26351A
MPR-TAPE GASKET PCB 1	GH74-26353A
MPR-TAPE GASKET PCB 2	GH74-26354A
MPR-TAPE GASKET PCB 3	GH74-26355A
MPR-SPONGE INTENNA	GH74-27227A
MPR-INSU TAPE	GH74-27268A
MPR-INSU TAPE	GH74-27589A
MPR-TAPE WIRE	GH74-27590A

5-3. Disassembly

1

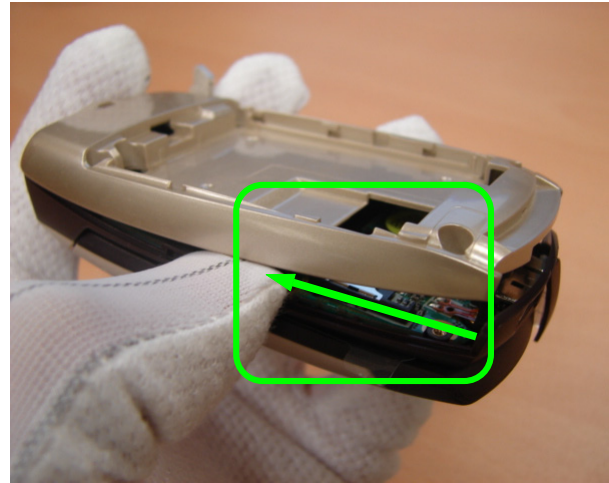


1) Unscrew 4point in the rear case

※ **caution**

1) Be care of Shooting out damage and scratch not to occur.

2

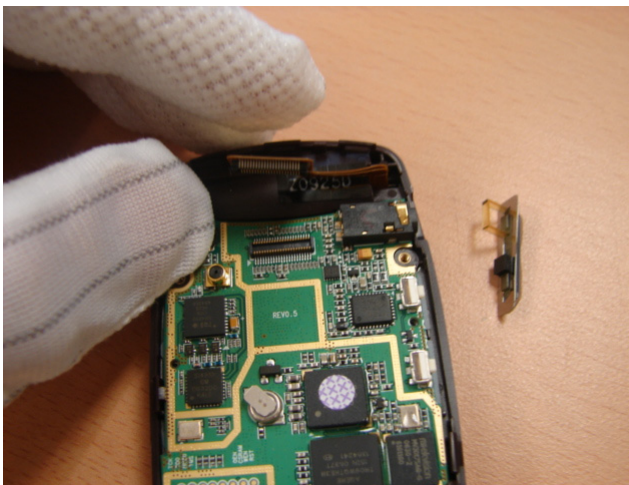


1) Disjoint from left lower part to upper part for rear case

※ **caution**

1) When you disjoint a rear case, be care of Shooting out damage and scratch not to occur.
2) It should be disjointed for rear case after Ear-jack cover be opened

3



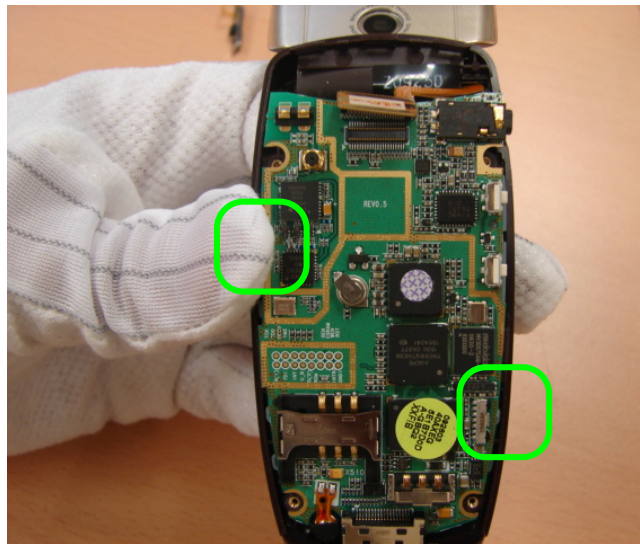
1) Remove the Volume key.

2) Disconnect the LCD connector.

※ **caution**

1) During disconnecting the LCD connector, pay attention not to tear the FPCB.

4



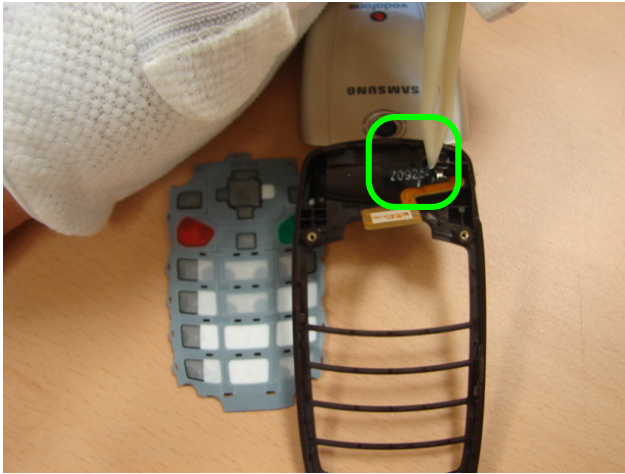
1) Open the folder.

2) While pressing the Locker of left and right side of Front case with your finger, disjoint the PBA.

※ **caution**

1) Pay attention not to damage PAB & Front locker.

5

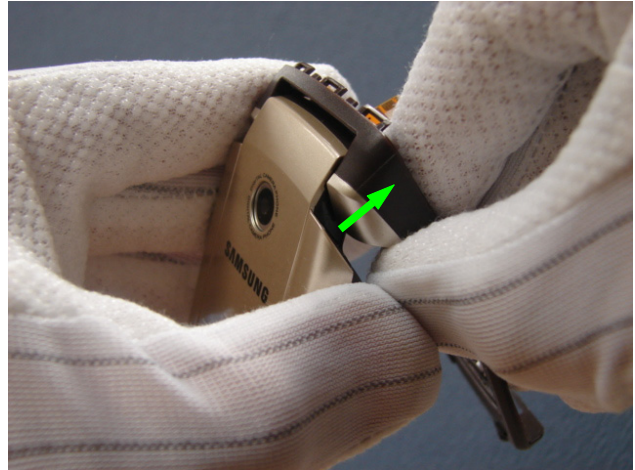


- 1) Remove the key pad.
- 2) Remove the dust protection tape using tweezers.

※ **caution**

- 1) Pay attention not to damage for FPCB during removal of the dust protection tape.

6

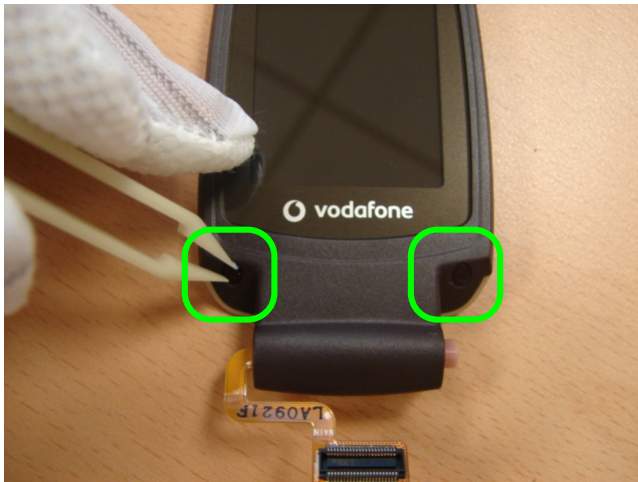


- 1) After fling a folder upper with arrow direction, disjoint from folder ass'y.

※ **caution**

- 1) Be careful not to tear the FPCB during disjoint.

7



- 1) Remove screw cover using tweezers.

※ **caution**

- 1) Be care of Shooting out damage and scratch not to occur.

8

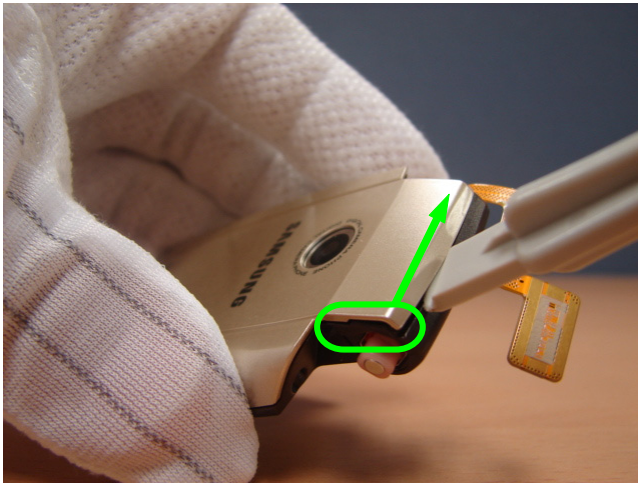


- 1) Unscrew at the folder upper using a screwdriver

※ **caution**

- 1) Be care of Shooting out damage and scratch not to occur.

9



- 1) Disjoint FOLDER ASS'Y along the displayed direction from the mechanic disjoint hole.

※ **caution**

- 1) Be care of Shooting out damage and scratch not to occur.

10



- 1) Disjoint a side part of Folder assy' as same way.
- 2) Disjoint opposite side as a same way.

※ **caution**

- 1) Be care of Shooting out damage and scratch not to occur.

11



- 1) Hold FOLDER UPPER as a picture below with two hand grapping.

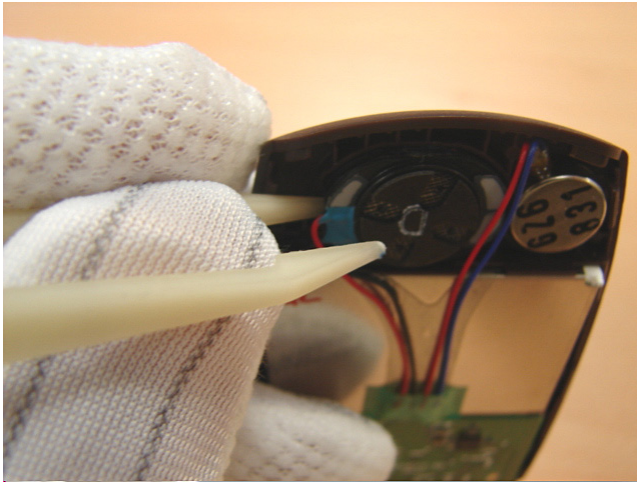
※ **caution**

- 1) Be care of harmful of locker wehn disjoint Upper case.

12



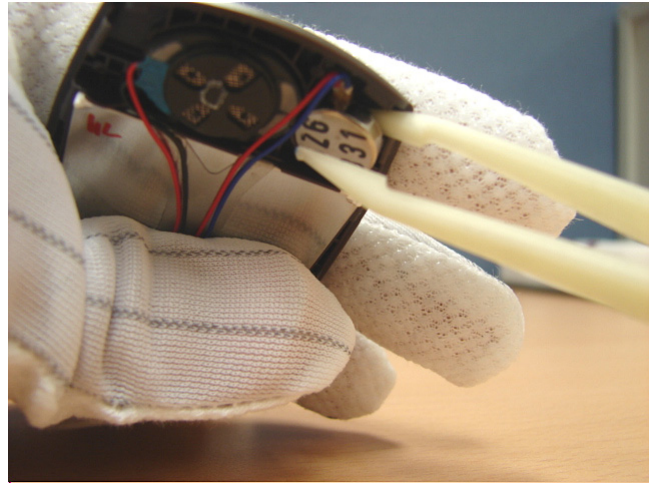
- 1) UPPER disjointed view.

13

1) remove SPEAKER.

※ **caution**

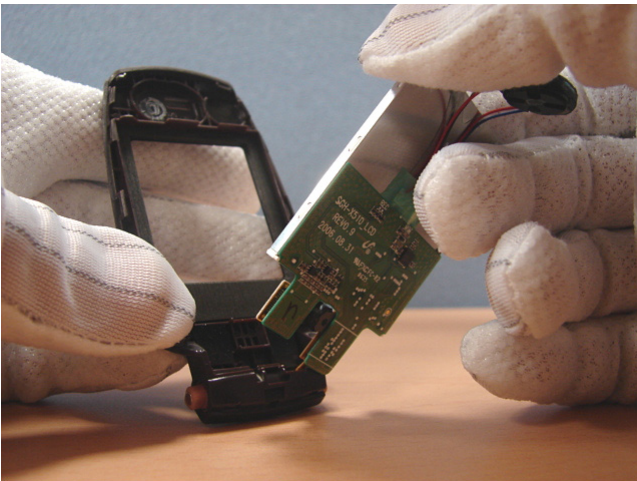
1) Be care of SPEAKER cracking or damage.

14

1) Remove MOTOR.

※ **caution**

1) Be care of MOTOR cracking or damage.

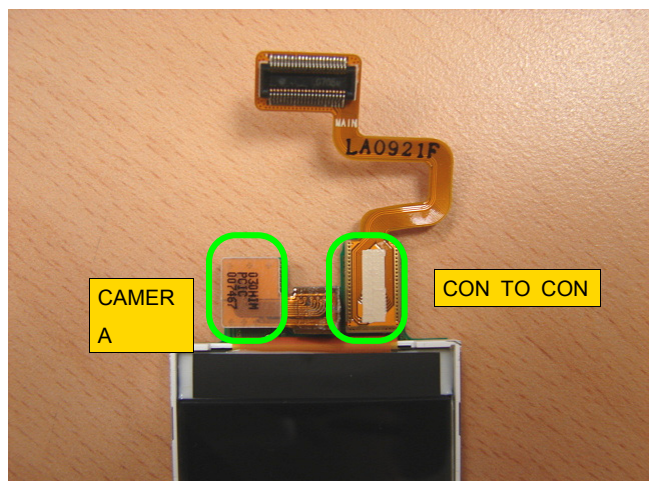
15

1) Remove LCD module.

※ **caution**

1) Be are of touching FPCB with the bottom side of FOLDER LOWER.

2) Remove LCD module with Camera.

16

1) Remove CAMERA.

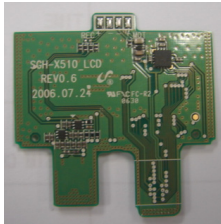
2) Remove LCD CON TO CON

※ **caution**

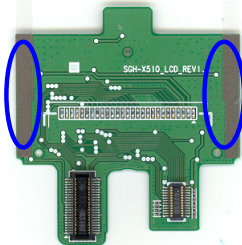
1) Be care of damage in Connector.

5-4. Assembly

1



<LCD PCB BOTTOM>



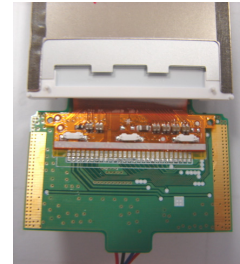
<LCD PCB TOP>



<LCD Backside>



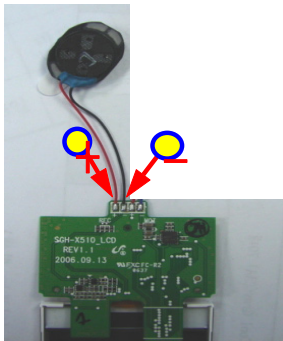
<LCD frontside>



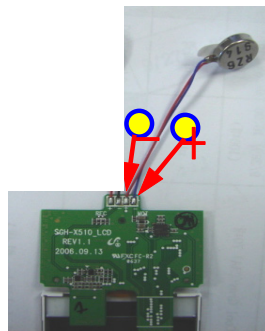
<LCD HOTBAR>

a. Confirm [LCD HARD PCB](#) tape was attached in correct region at the end of both side.

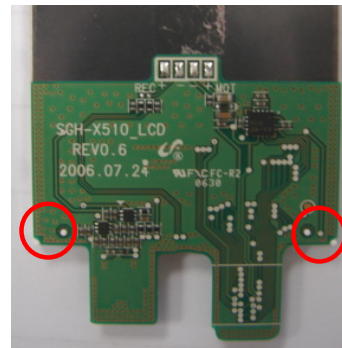
2



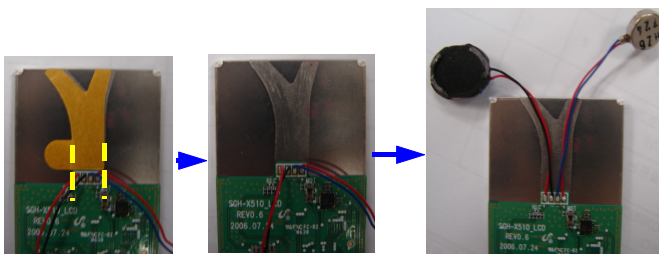
<PIC 1>



<PIC 2>



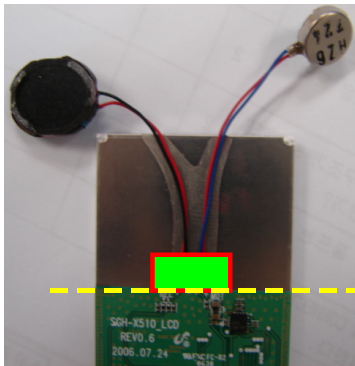
<PIC 3>



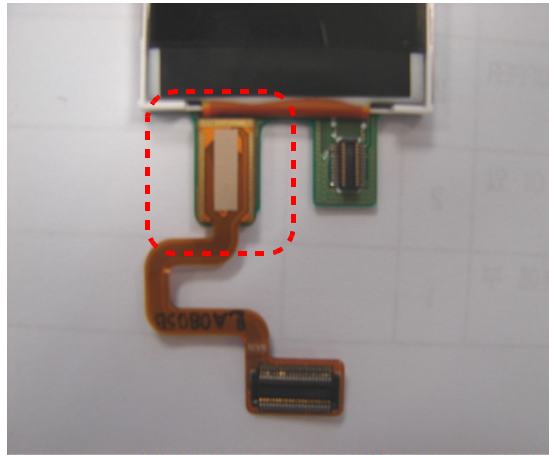
<PIC4>

- Sloder [SPEAKER wire](#) as a PIC1.
- Sloder [SPEAKER wire](#) as a PIC1.
- Assemble LCD panel as a PIC3 using reference RIB in the bottomsides.
- Fix the SPK/MOT wire to the tape on the LCD module.

3



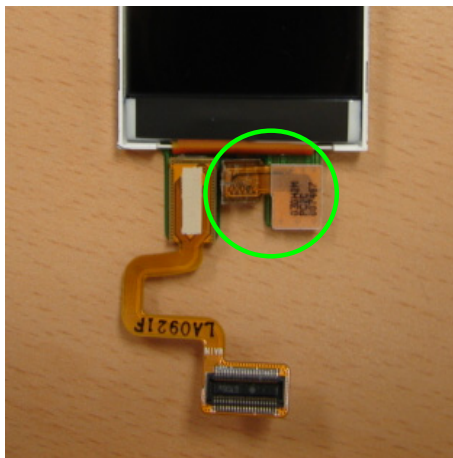
<PIC 1>



<PIC 2>

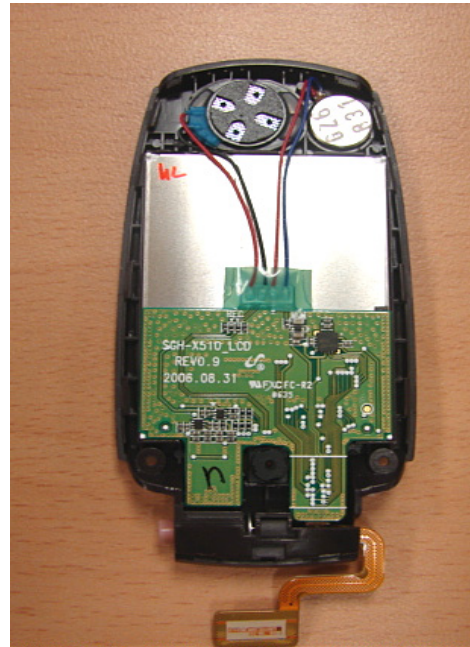
- a. Attach a anti-conductivity tape on the LCD as a PIC1.
- b. Lock the [CON TO CON](#) as a PIC2.

4



<PIC1>

5



- a. Let the LCD assy' on the Lower Case.

※ **caution**

- a. Be care of SPEAKER/MOTOR power line arrangement.

- a. Lock the CAM connetor as a pic1.

6

1



2



3



a. Let the LCD assy' on the Lower Case.

※ **caution**

a. Be care of SPEAKER/MOTOR power line arrangement.

7



a. Screw two point of FOLDER Assy'.

※ **caution**

a. SCREW with proper pressure.

8



a. Assemble a SCREW COVER with pinset.

※ **caution**

a. Be care of damage on the SCREW COVER.

9



a. Remove CAMERA.

b. Remove LCD CON TO CON

※ **caution**

a. Be care of damage in Connector.

10



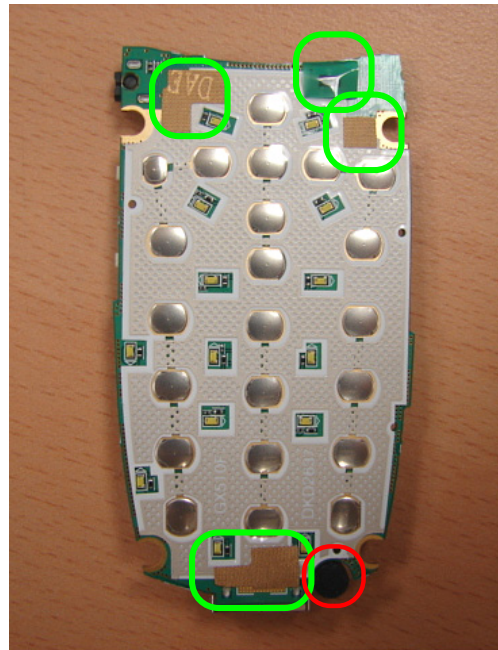
- a. Attach anti-dust TAPE on the LCD hole.
- ※ **caution**
- a. Confirm LCD is assembled well after opening/closing FOLDER several times.

12



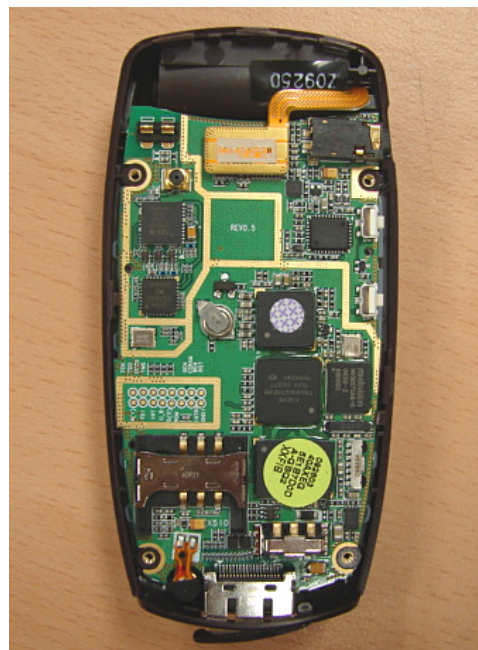
- a. Let a KEY PAD on front assy.
- ※ **caution**
- a. Confirm the KEY PAD hole in upper side is in same locatio with reference RIB on the front assy.

11

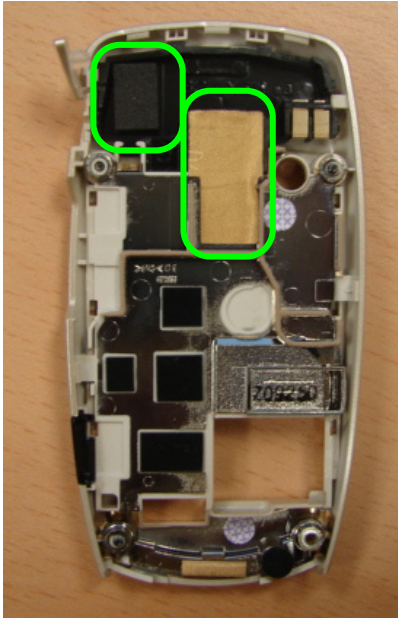


- a. Confirm the PBA tapes were still attached.
- ※ **caution**
- a. Confirm the PBA tapes were still attached.

13



- a. Assemble PBA
- b. Lock a LCD CONNECTOR to PBA
- ※ **caution**
- a. Be care of damage on CONNECTOR PIN.

14

a. Confirm all the tape/Intenna were attached correctly on a Rear case.

※ **caution**

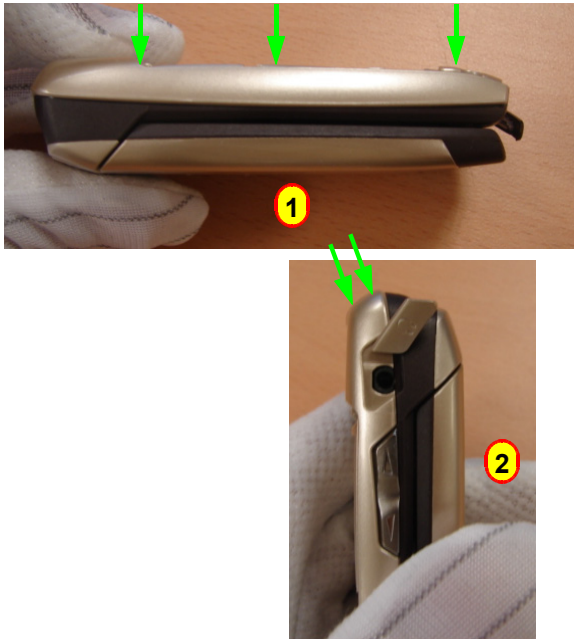
a. Confirm the INTENNA status.

15

a. Assemble Rear Case after set the VOLUME KEY on a TACT S/W.

※ **caution**

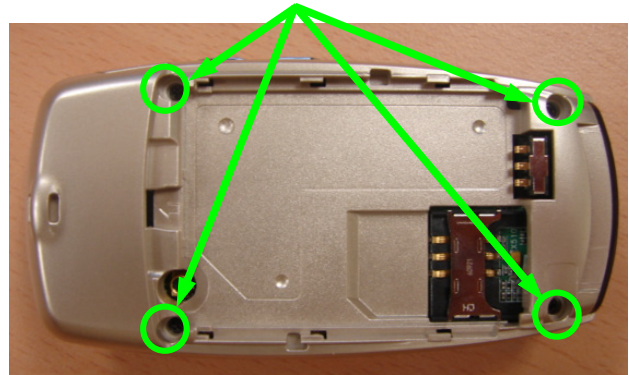
a. Confirm the PBA tapes were still attached.

16

a. REAR Case assembling order.

※ **caution**

a. Be care of damage on LOCKER.

17

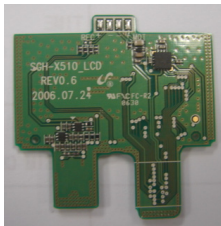
a. Screw 4 point on REAR assy'

※ **caution**

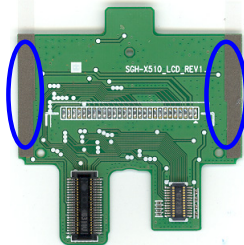
a. Be care of Shooting out damage and scratch not to occur.

5-5. LCD Kit

1



<LCD PCB BOTTOM>



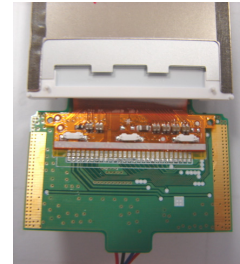
<LCD PCB TOP>



<LCD Backside>



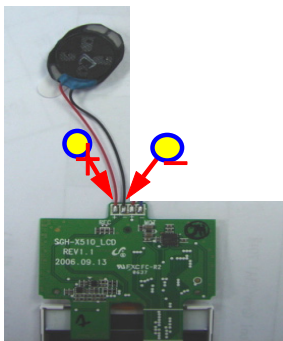
<LCD frontside>



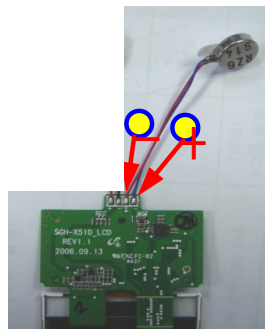
<LCD HOTBAR>

- A. In LCD Hard PCB the both faces TAPE should be attached at right & left side edge correctly.
 B. Check the protection vinyl should be attached in the LCD PANNEL.
 C. Execute LCD HOTBAR work.

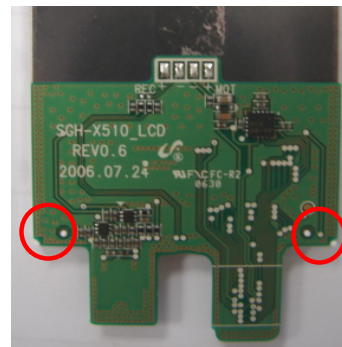
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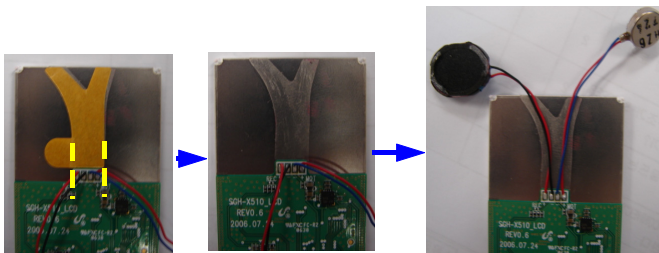
<PIC 1>



<PIC 2>

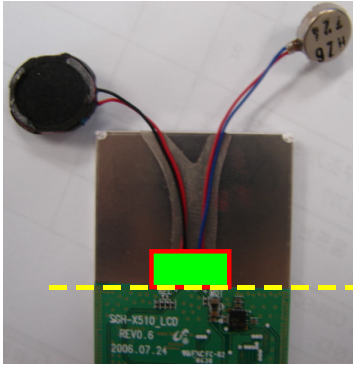


<PIC 3>

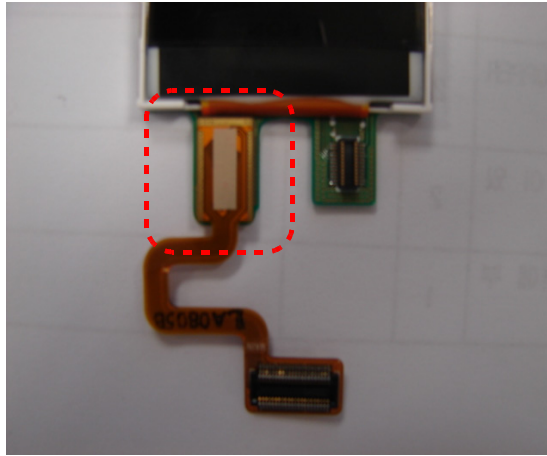


<PIC4>

- A. Solder the SPEAKER like fig.1
 B. Solder the MOTOR like fig.2
 C. The PCB & LCD should be fixed at guide rib in the lower part of the LCD and assembled like fig.3
 D. Like fig.4 after attached both faces TAPE, you should attach SPEAKER & MOTOR WIRE.

3

<fig.5>



<fig.6>

- A. Attach the insulation tape like fig.5
- B. Unite the CON TO CON FPCB like fig.6

6. MAIN Electrical Parts List

SEC CODE	Design LOC	Discription	STATUS
0403-001547	D101	DIODE-ZENER	SA
0406-001197	ZD101	DIODE-TVS	SA
0406-001197	ZD102	DIODE-TVS	SA
0406-001231	ZD103	DIODE-TVS	SA
0406-001231	ZD104	DIODE-TVS	SA
0406-001260	ZD201	DIODE-TVS	SA
0501-000225	TR302	TR-SMALL SIGNAL	SA
0504-000168	TR300	TR-DIGITAL	SA
0601-002278	LED201	LED	SA
0601-002278	LED202	LED	SA
0601-002278	LED203	LED	SA
0601-002278	LED204	LED	SA
0601-002278	LED205	LED	SA
0601-002278	LED206	LED	SA
0601-002278	LED207	LED	SA
0601-002278	LED208	LED	SA
0601-002278	LED209	LED	SA
0601-002278	LED210	LED	SA
0601-002278	LED211	LED	SA
0601-002278	LED212	LED	SA
0601-002278	LED213	LED	SA
0601-002278	LED214	LED	SA
0604-001306	IRD201	PHOTO-IRDA	SA
0801-002529	U103	IC-CMOS LOGIC	SA
0801-003031	U105	IC-CMOS LOGIC	SA
1001-001358	U303	IC-ANALOG MULTIPLEX	SA
1009-001024	U304	IC-HALL EFFECT S/W	SA
1108-000010	UME200	IC-MCP	SA
1201-002278	U101	IC-POWER AMP	SA
1203-003304	UCP301	IC-POWER SUPERVISOR	SA
1203-003663	U102	IC-BATTERY	SA
1204-001811	U302	IC-MELODY	SA
1205-002683	U100	IC-TRANSCIEVER	SA
1209-001219	U203	IC-SENSOR	SA
1405-001082	V101	VARISTOR	SA
1405-001082	V102	VARISTOR	SA

SEC CODE	Design LOC	Discription	STATUS
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1405-001082	V201	VARISTOR	SA
1405-001082	V203	VARISTOR	SA
1405-001082	V204	VARISTOR	SA
1405-001082	V206	VARISTOR	SA
1405-001082	V208	VARISTOR	SA
1405-001082	V210	VARISTOR	SA
1405-001082	V211	VARISTOR	SA
1405-001082	V301	VARISTOR	SA
1405-001082	V302	VARISTOR	SA
1405-001082	V303	VARISTOR	SA
1405-001082	V304	VARISTOR	SA
1405-001082	V305	VARISTOR	SA
1405-001082	V306	VARISTOR	SA
1405-001082	V307	VARISTOR	SA
1405-001177	V202	VARISTOR	SA
1405-001177	V205	VARISTOR	SA
1405-001177	V207	VARISTOR	SA
1405-001177	V209	VARISTOR	SA
1405-001177	V212	VARISTOR	SA
1405-001177	V213	VARISTOR	SA
2007-000070	R335	R-CHIP	SA
2007-000070	R336	R-CHIP	SA
2007-000138	R210	R-CHIP	SA
2007-000140	R119	R-CHIP	SA
2007-000140	R317	R-CHIP	SA
2007-000142	R330	R-CHIP	SA
2007-000144	R301	R-CHIP	SA
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SEC CODE	Design LOC	Discription	STATUS
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2007-001292	R220	R-CHIP	SA

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2007-008548	R100	R-CHIP	SA
2007-008587	R101	R-CHIP	SA
2007-009160	R123	R-CHIP	SA
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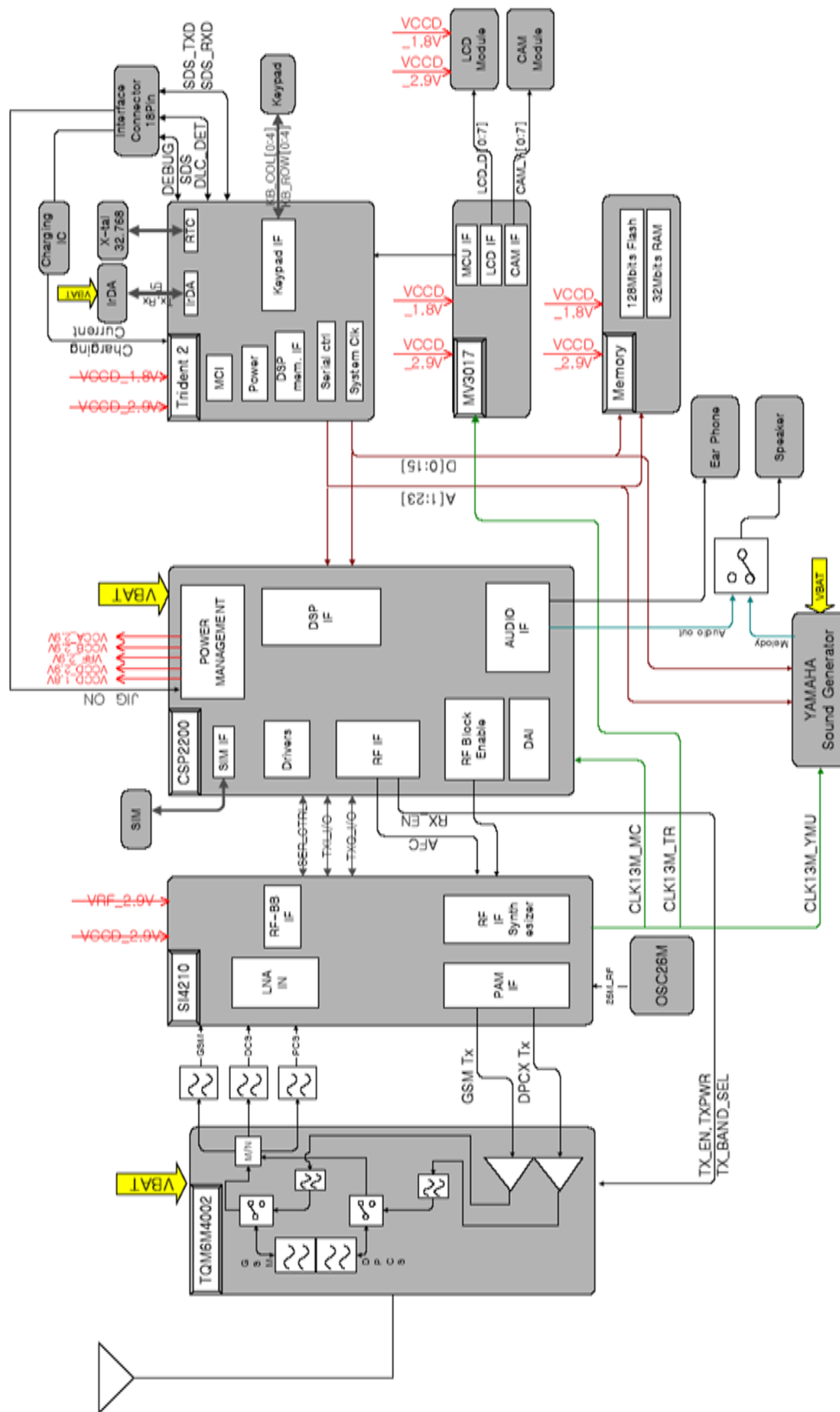
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2203-006048	C325	C-CER,CHIP	SA
2203-006048	C331	C-CER,CHIP	SA
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2203-006121	C304	C-CER,CHIP	SA
2203-006194	C106	C-CER,CHIP	SA
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2203-006556	C148	C-CER,CHIP	SA
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2203-006556	C160	C-CER,CHIP	SA
2203-006562	C146	C-CER,CHIP	SA
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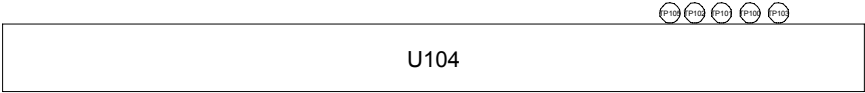
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2203-006824	C230	C-CER,CHIP	SA
2203-006824	C313	C-CER,CHIP	SA
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2203-006846	C113	C-CER,CHIP	SA
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2404-001374	TA101	C-TA,CHIP	SA
2404-001406	TA102	C-TA,CHIP	SA
2404-001414	TA301	C-TA,CHIP	SA
2404-001414	TA306	C-TA,CHIP	SA
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2703-002485	L100	INDUCTOR-SMD	SA
2703-002544	L106	INDUCTOR-SMD	SA
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2801-004285	OSC301	CRYSTAL-SMD	SA
2801-004426	OSC101	CRYSTAL-SMD	SA
2904-001592	F101	FILTER-SAW	SA
2904-001599	F102	FILTER-SAW	SA
2904-001600	F103	FILTER-SAW	SA
3301-001659	L302	BEAD-SMD	SA
3301-001729	L201	BEAD-SMD	SA
3301-001729	L301	BEAD-SMD	SA
3404-001152	SW1	SWITCH-TACT	SA
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3705-001358	RFS101	CONNECTOR-COAXIAL	SA

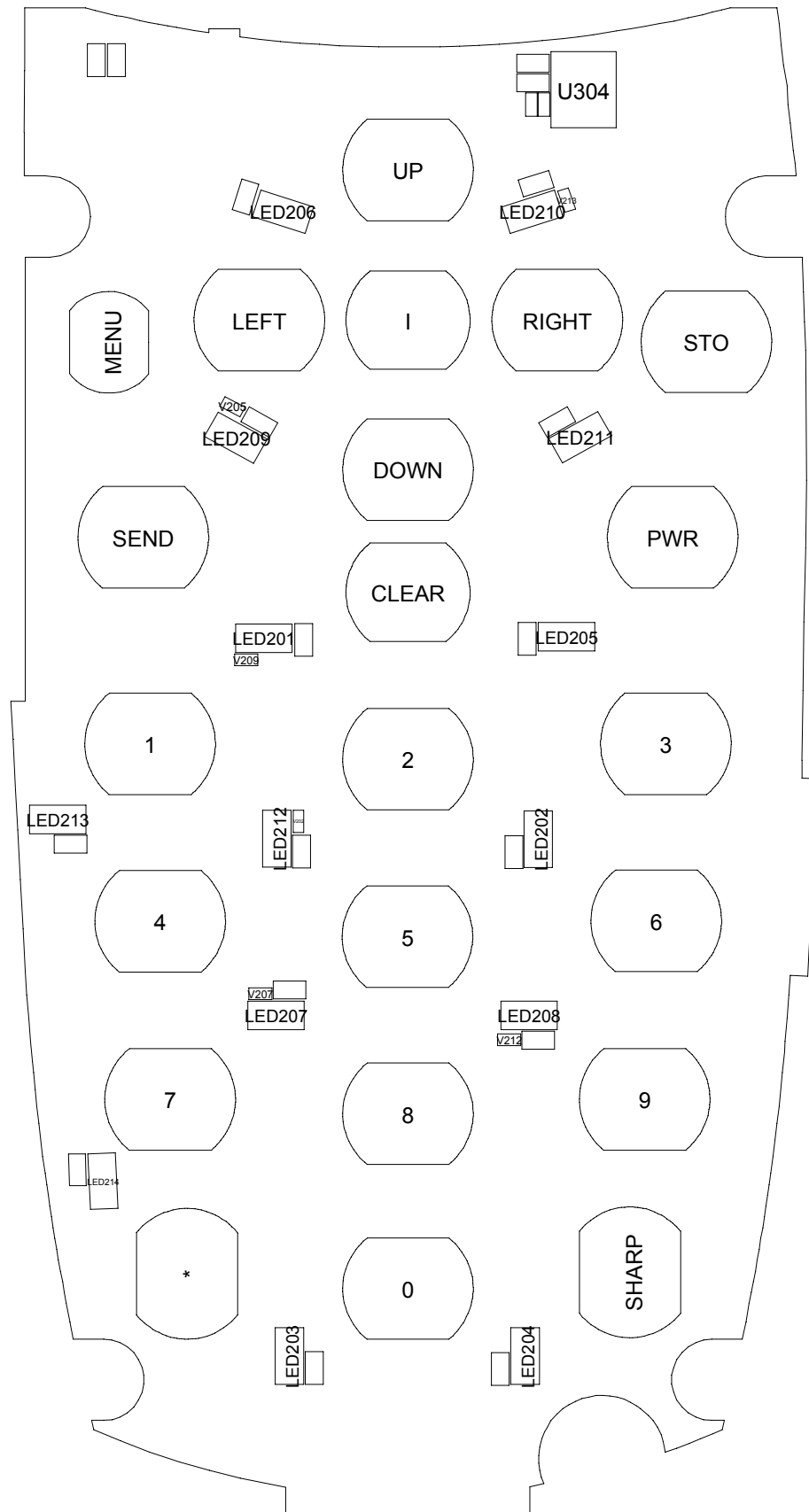
SEC CODE	Design LOC	Discription	STATUS
3709-001384	SIM300	CONNECTOR-CARD EDGE	SA
3710-001611	IFC101	CONNECTOR-INTERFACE	SA
3711-006101	HEA101	HEADER-BOARD TO BOARD	SA
3711-006228	BTC104	HEADER-BATTERY	SA
3722-002067	EAR300	JACK-EAR PHONE	SA
4302-001130	BAT300	BATTERY-LI(2ND)	SA
GH09-00036A	UCP201	IC MICOM-SGHX480	SA
GH13-00036A	U301	IC ASIC-SGHX670	SA
GH30-00313A	MIC301	MICROPHONE-ASSY-SGHX510	SA
GH71-06338A	ANT100	NPR-BRACKET ANT CONTACT	SA
GH71-06338A	ANT101	NPR-BRACKET ANT CONTACT	SA

7. Block Diagrams



8. PCB Diagrams

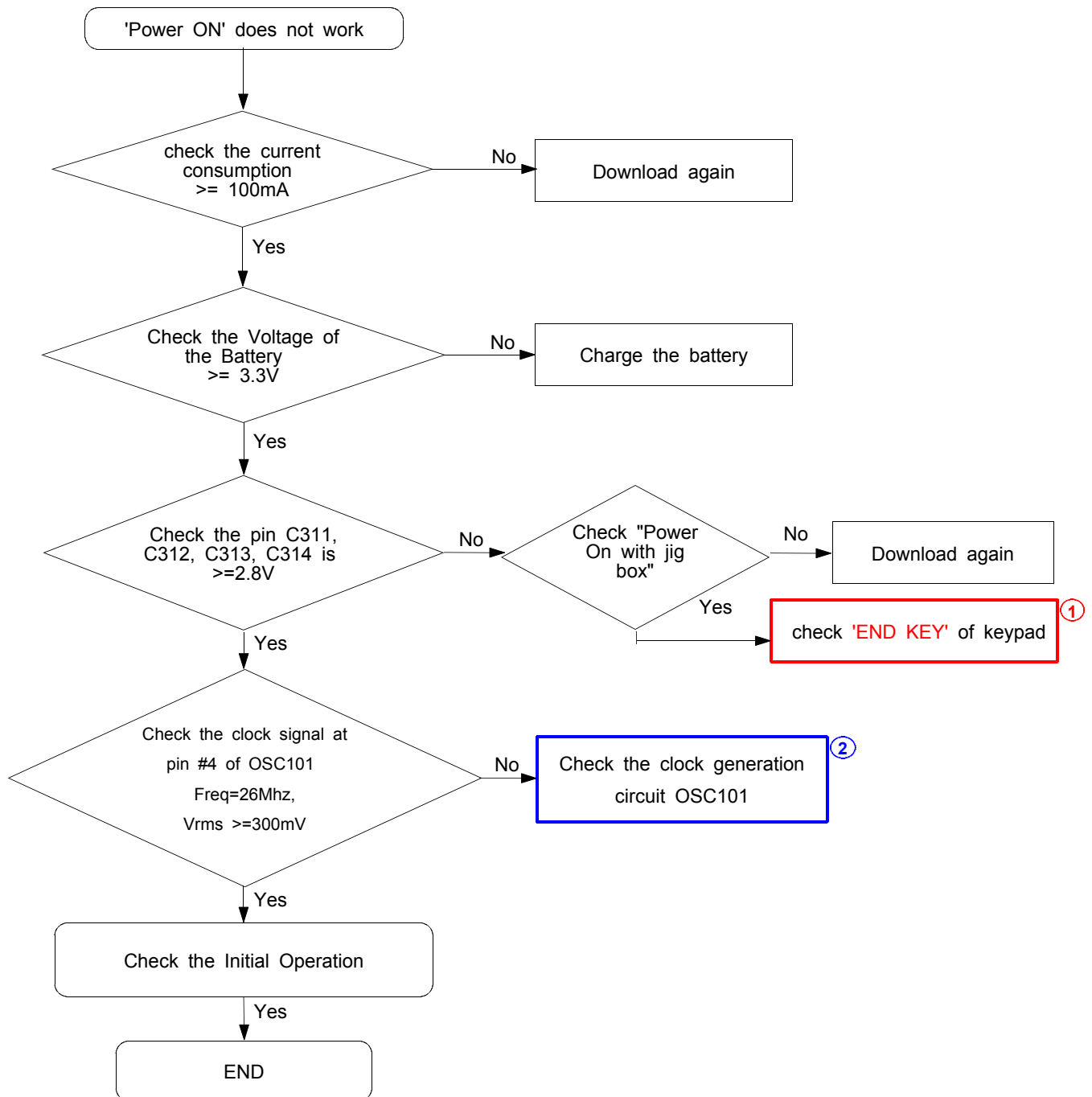


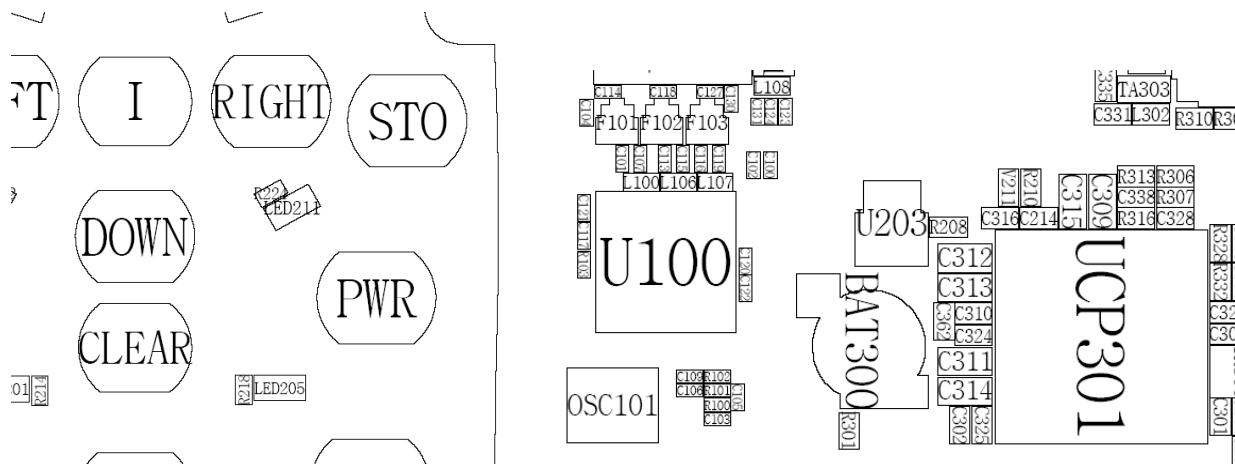
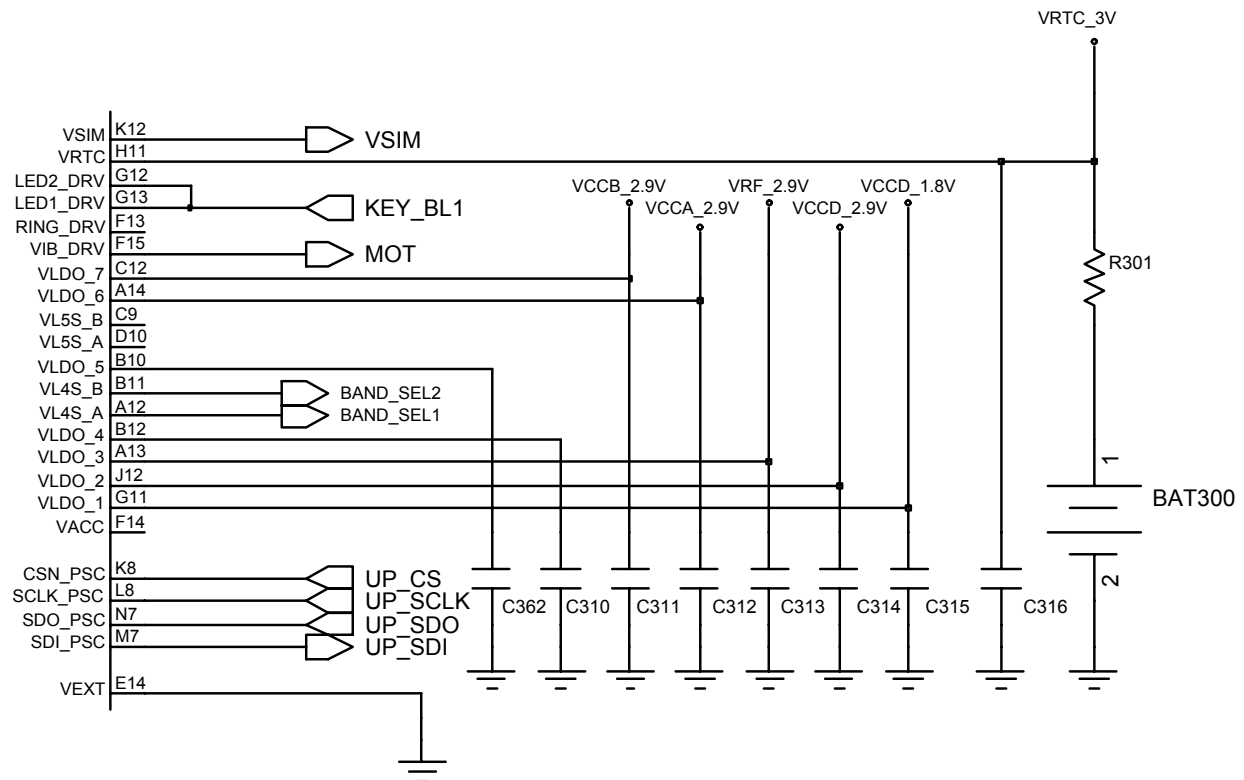


9. Flow Chart of Troubleshooting

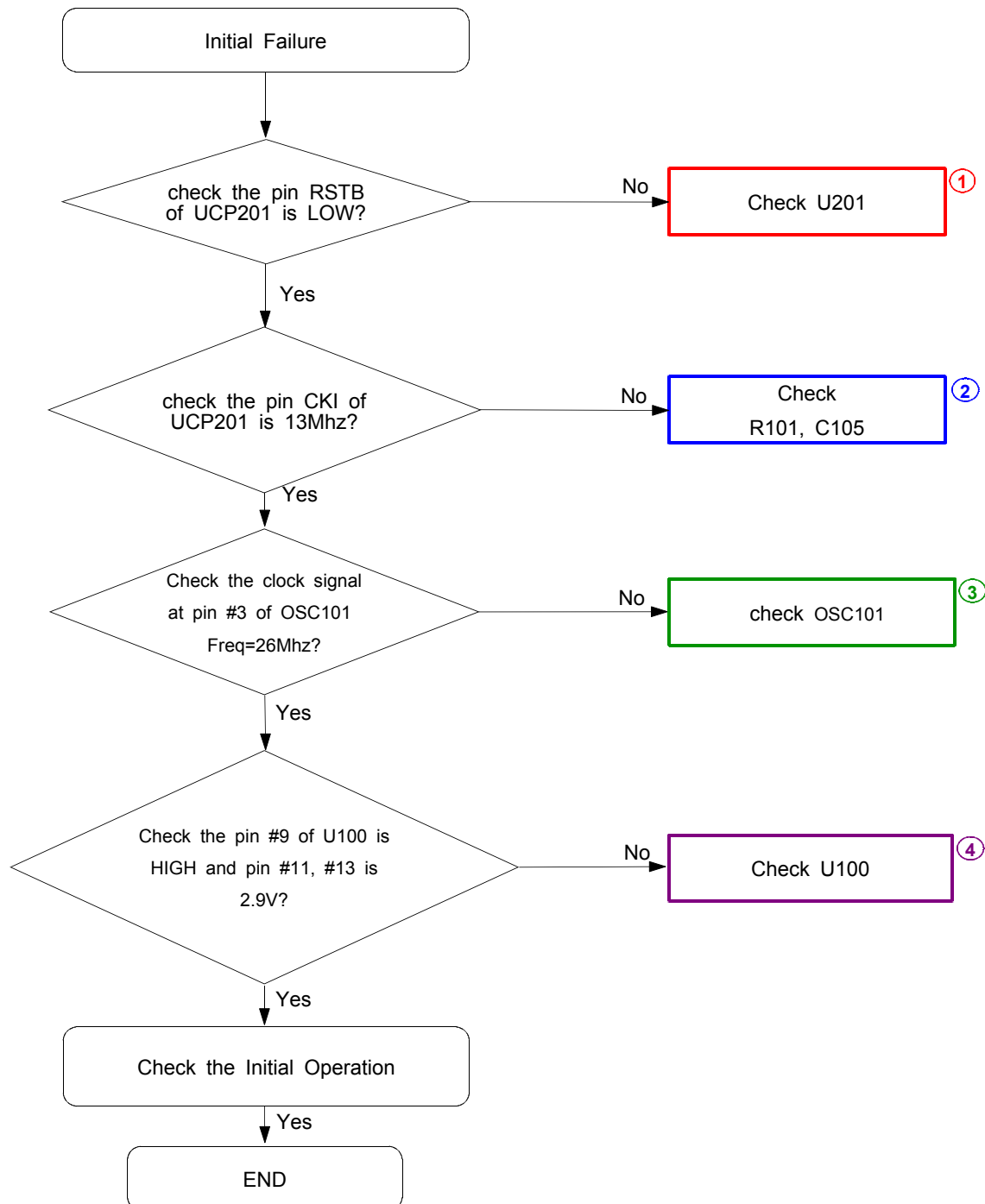
9-1. Baseband

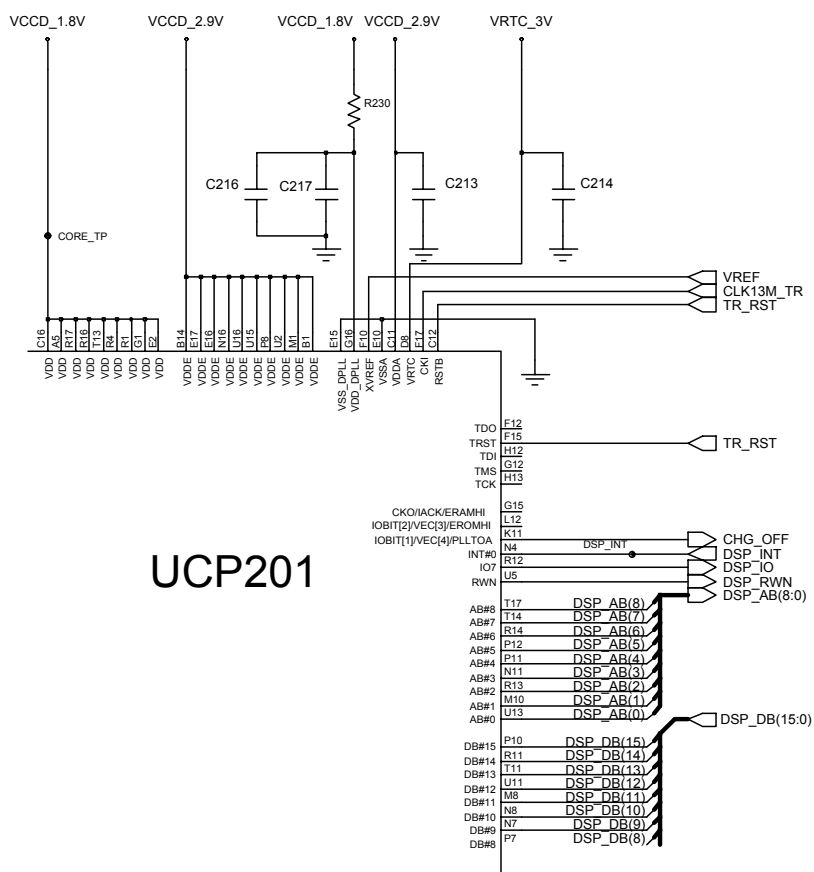
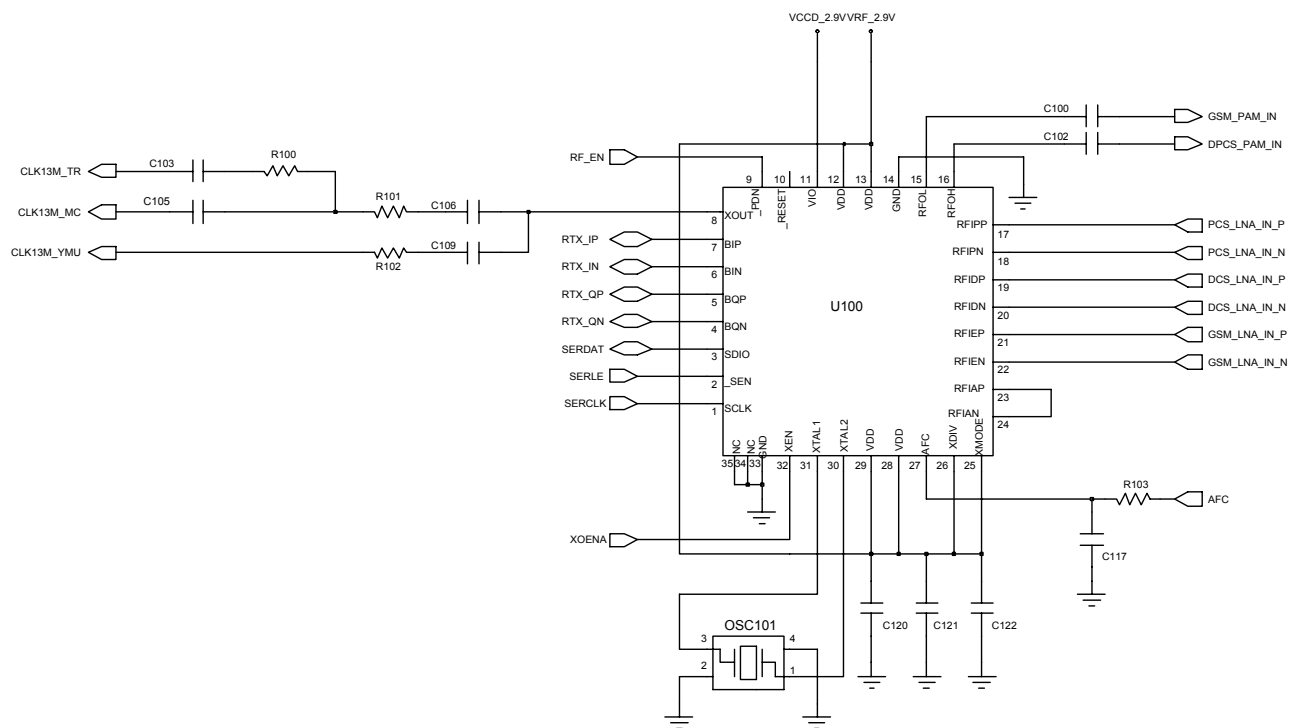
9-1-1. Power ON





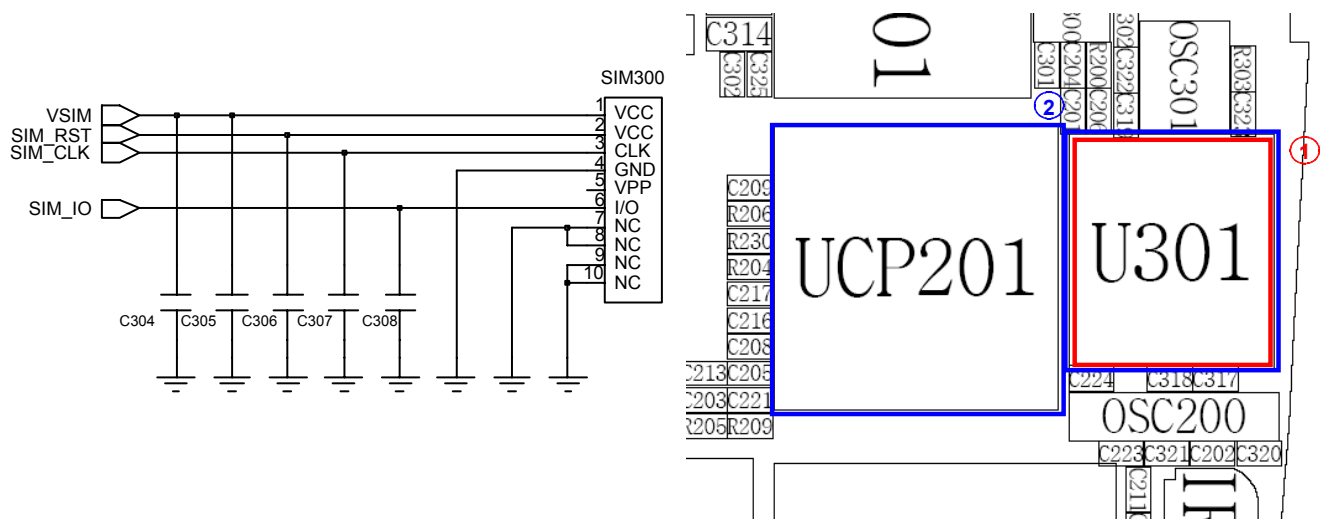
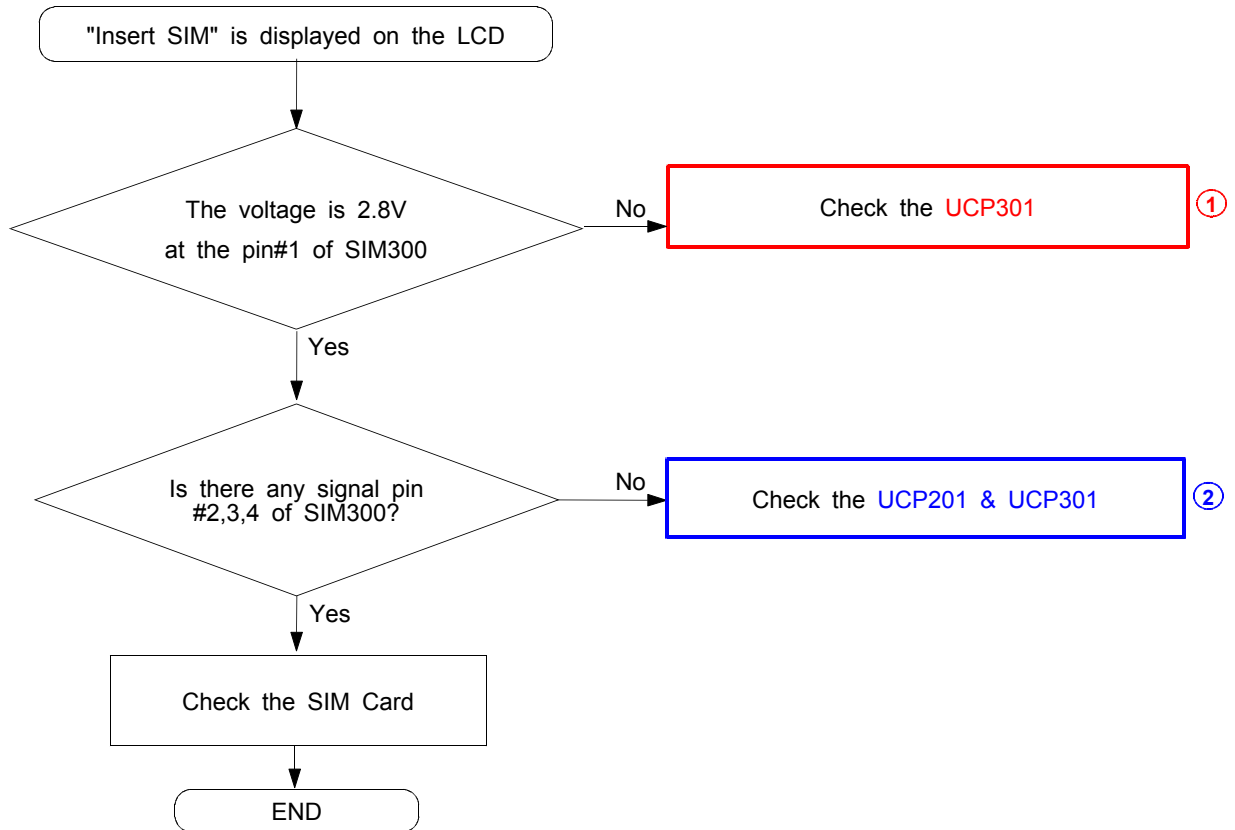
9-1-2. Initial





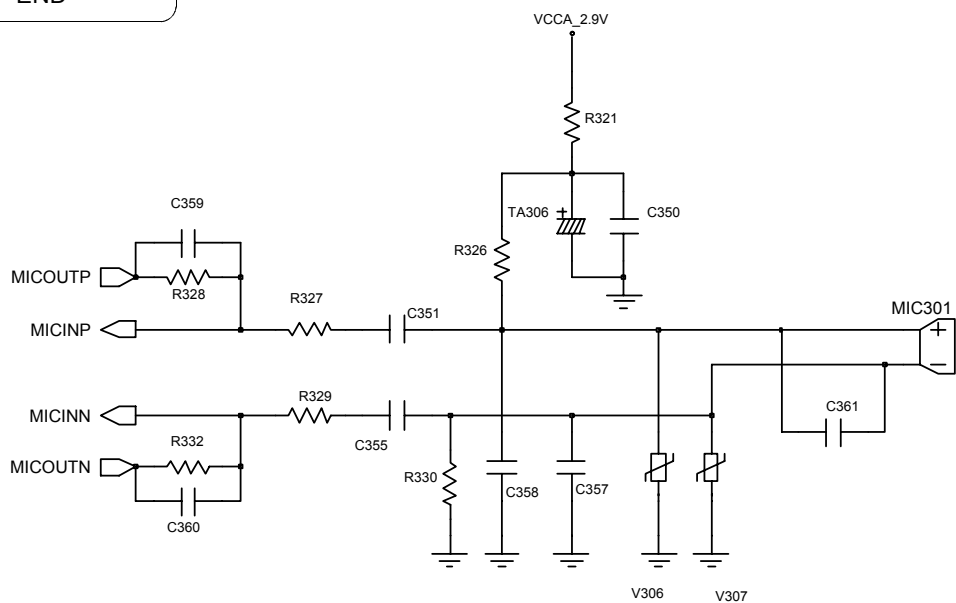
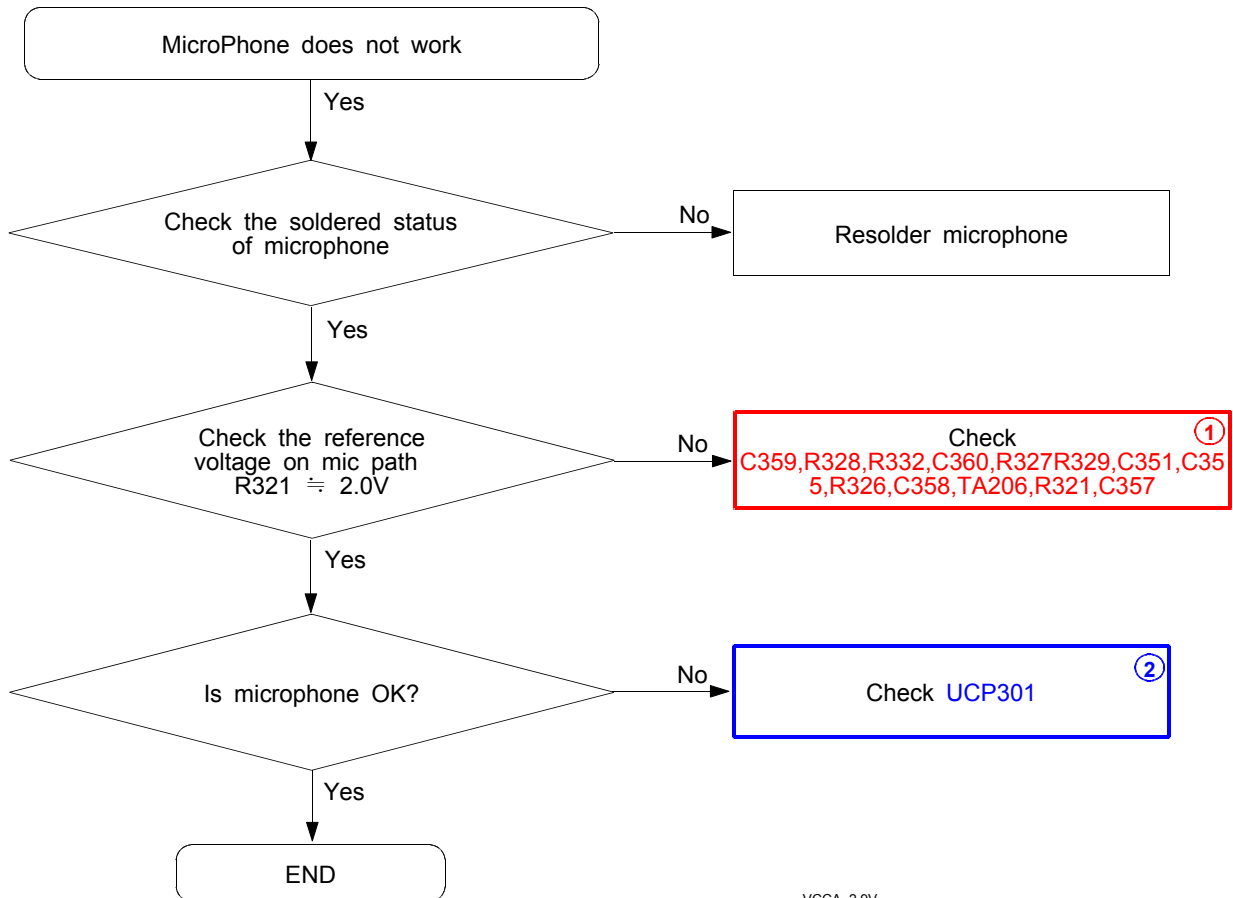
UCP201

9-1-3. Sim Part

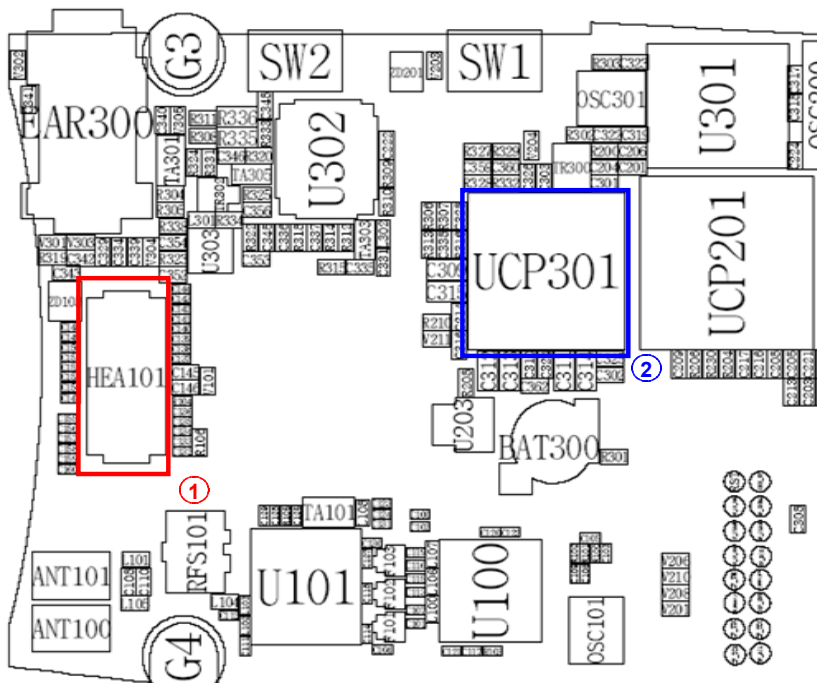
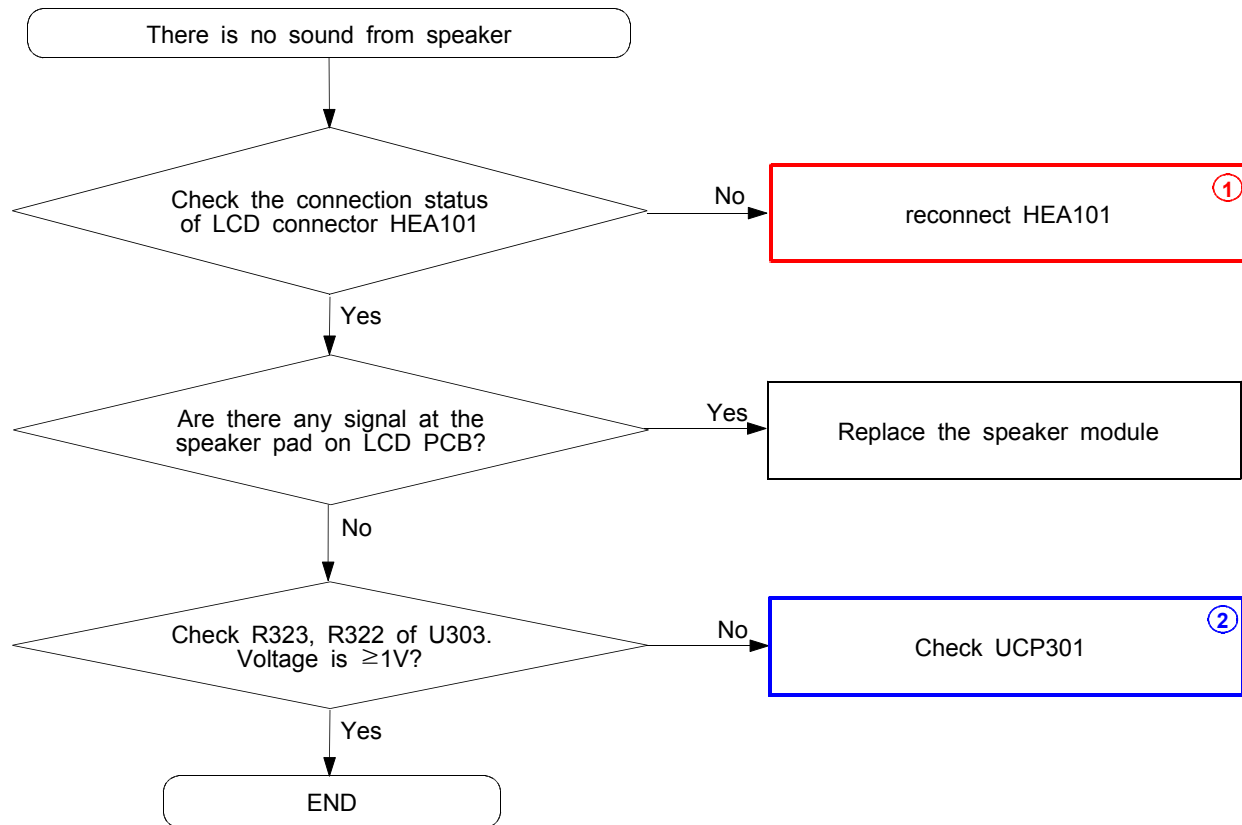


9-1-4. Microphone Part

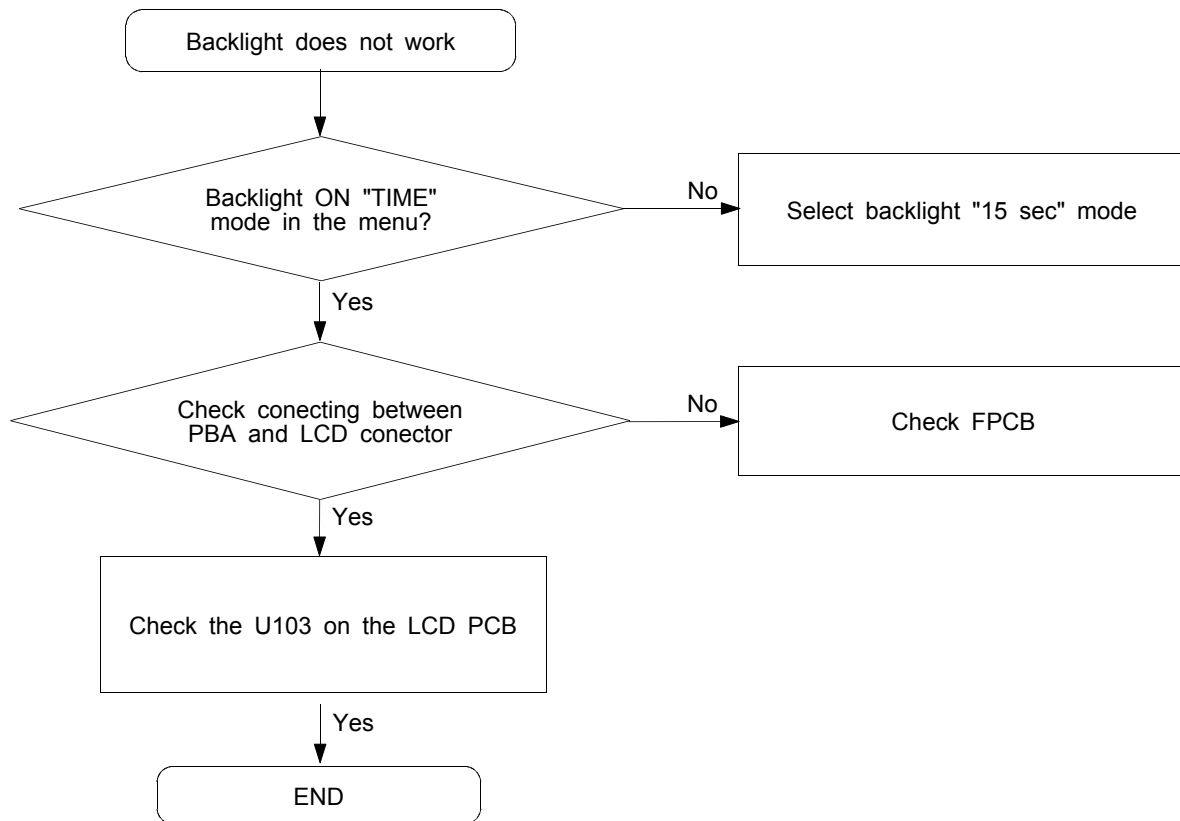
* Call with Sim before testing.



9-1-5. Speaker Part

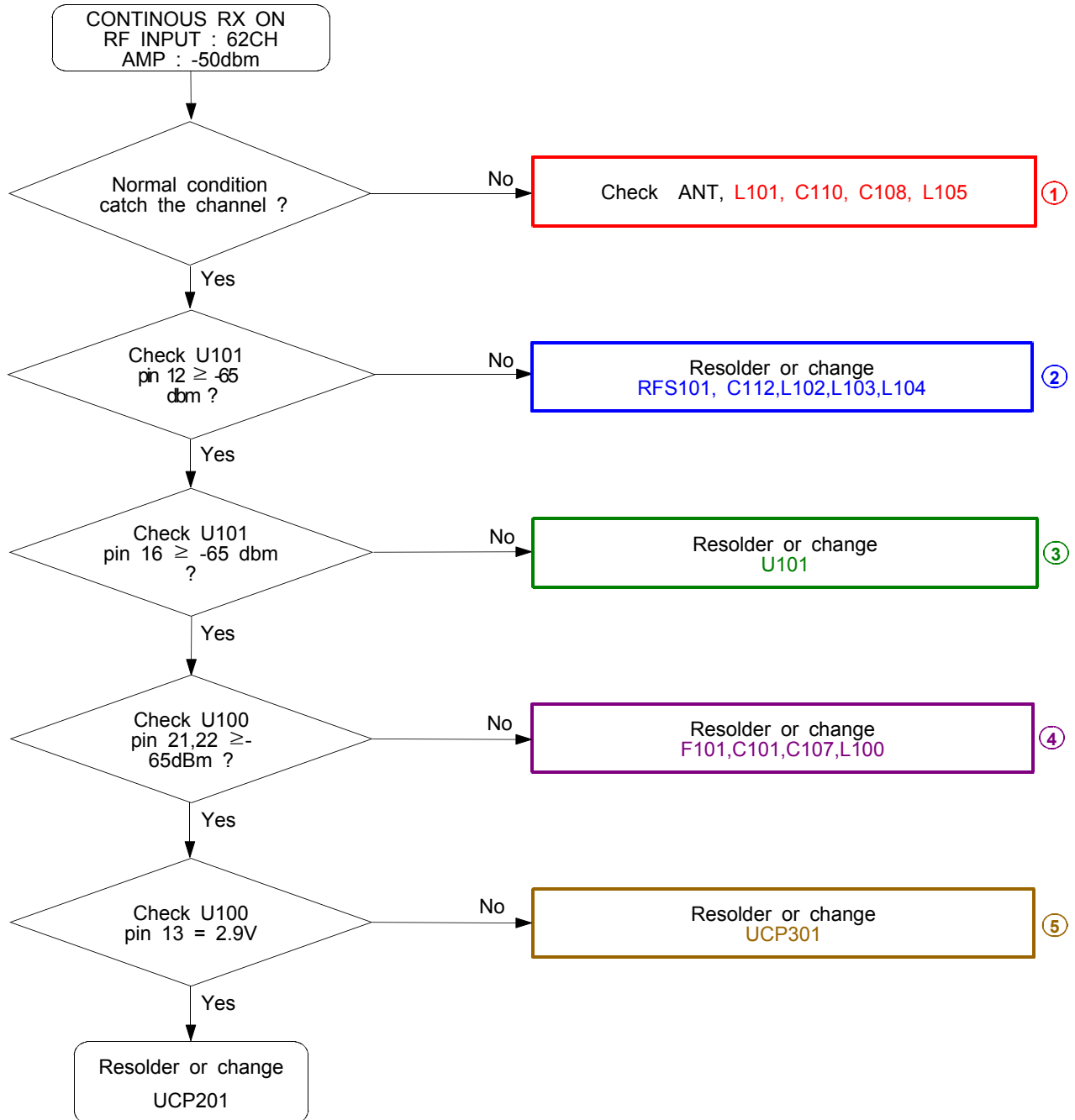


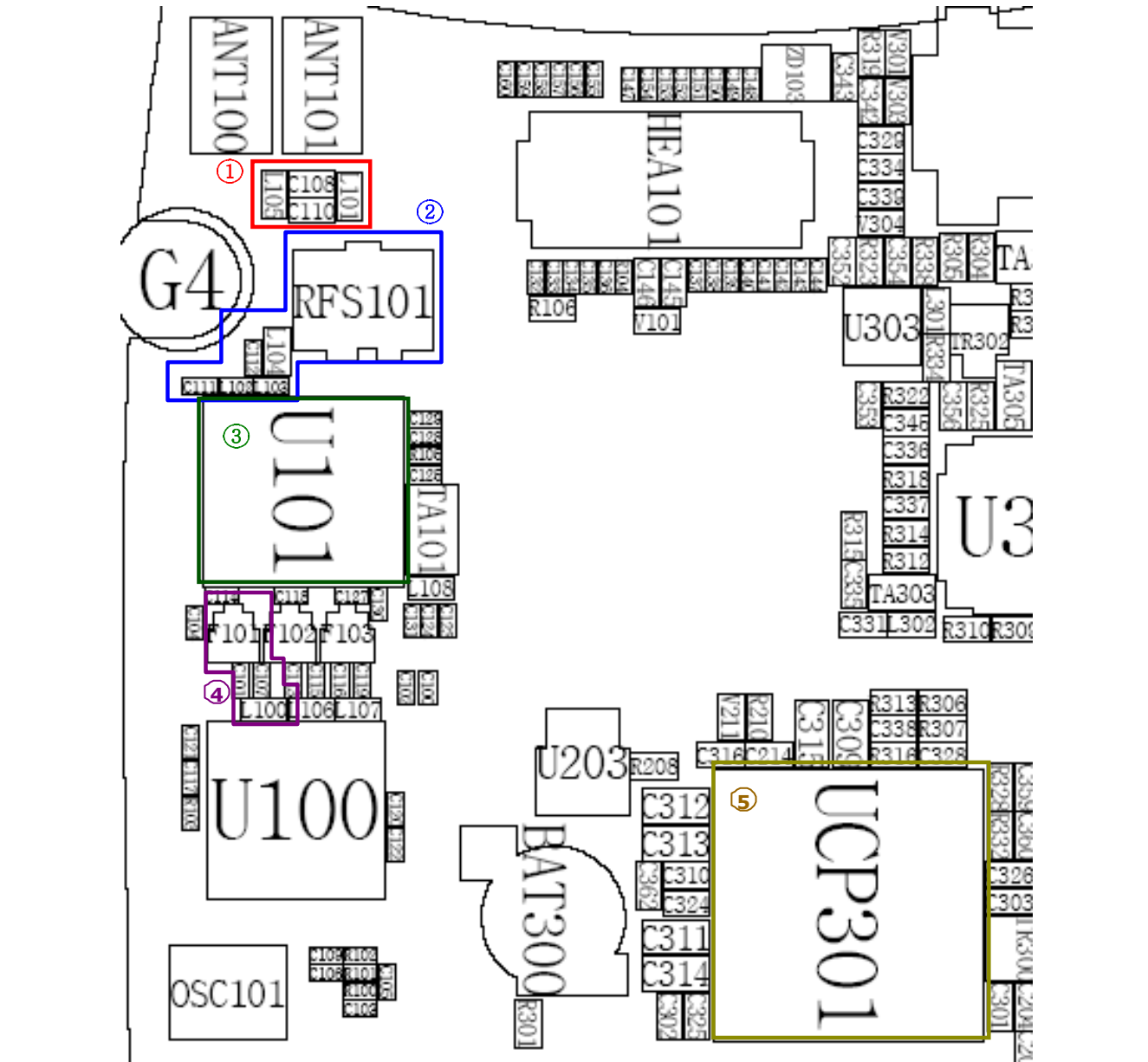
9-1-6. LCD backlight



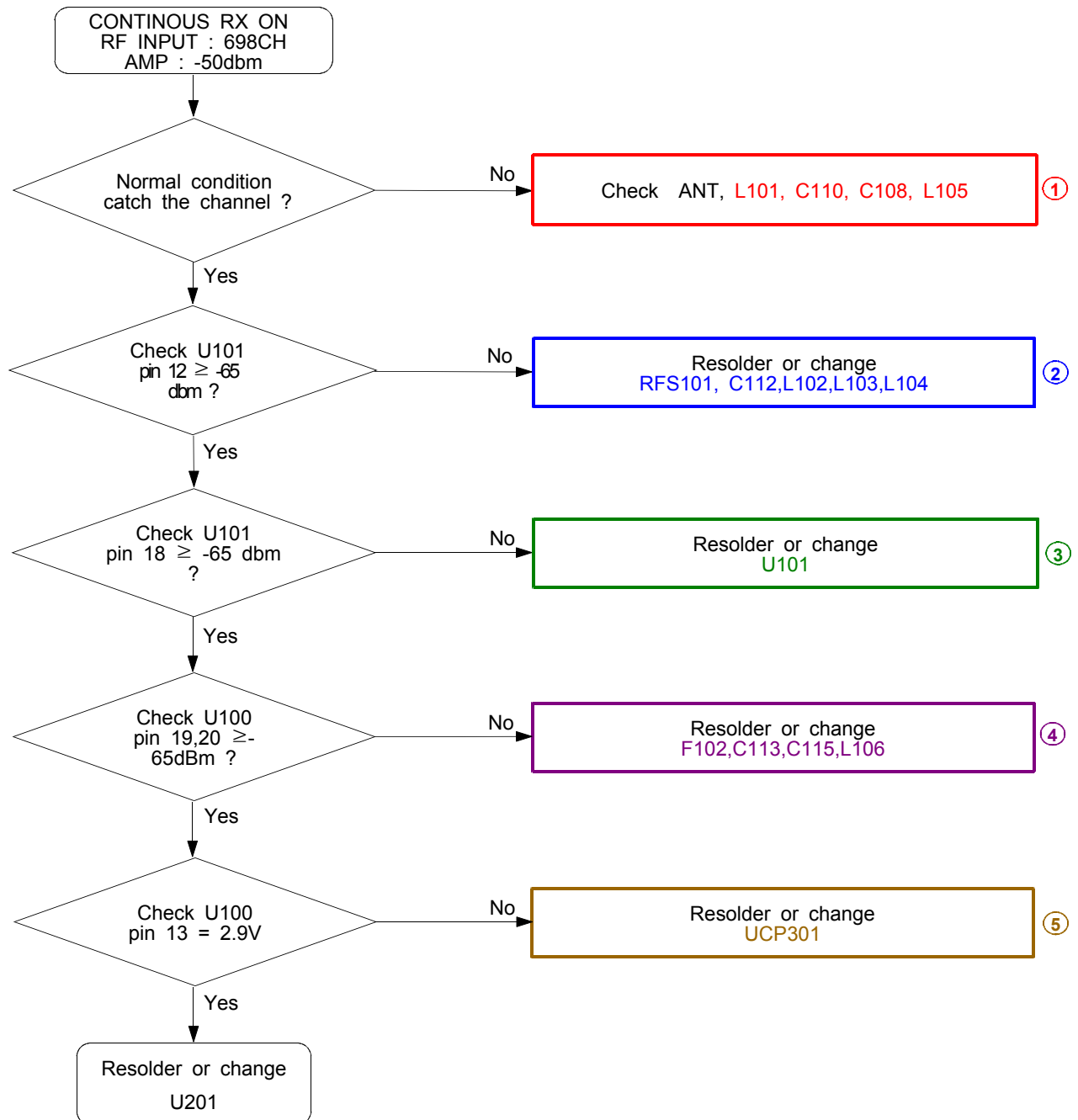
9-2. RF

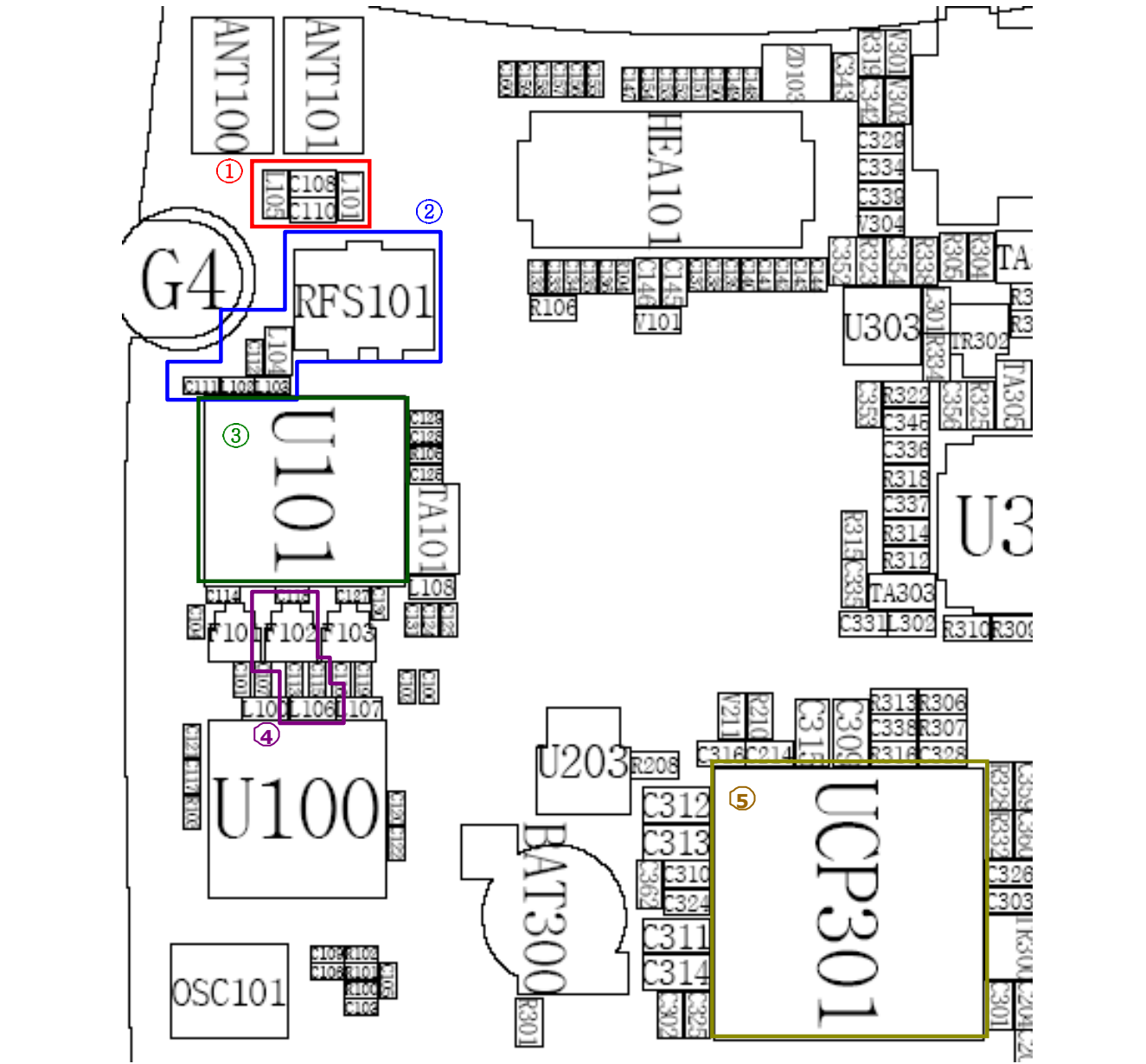
9-2-1. GSM Rx



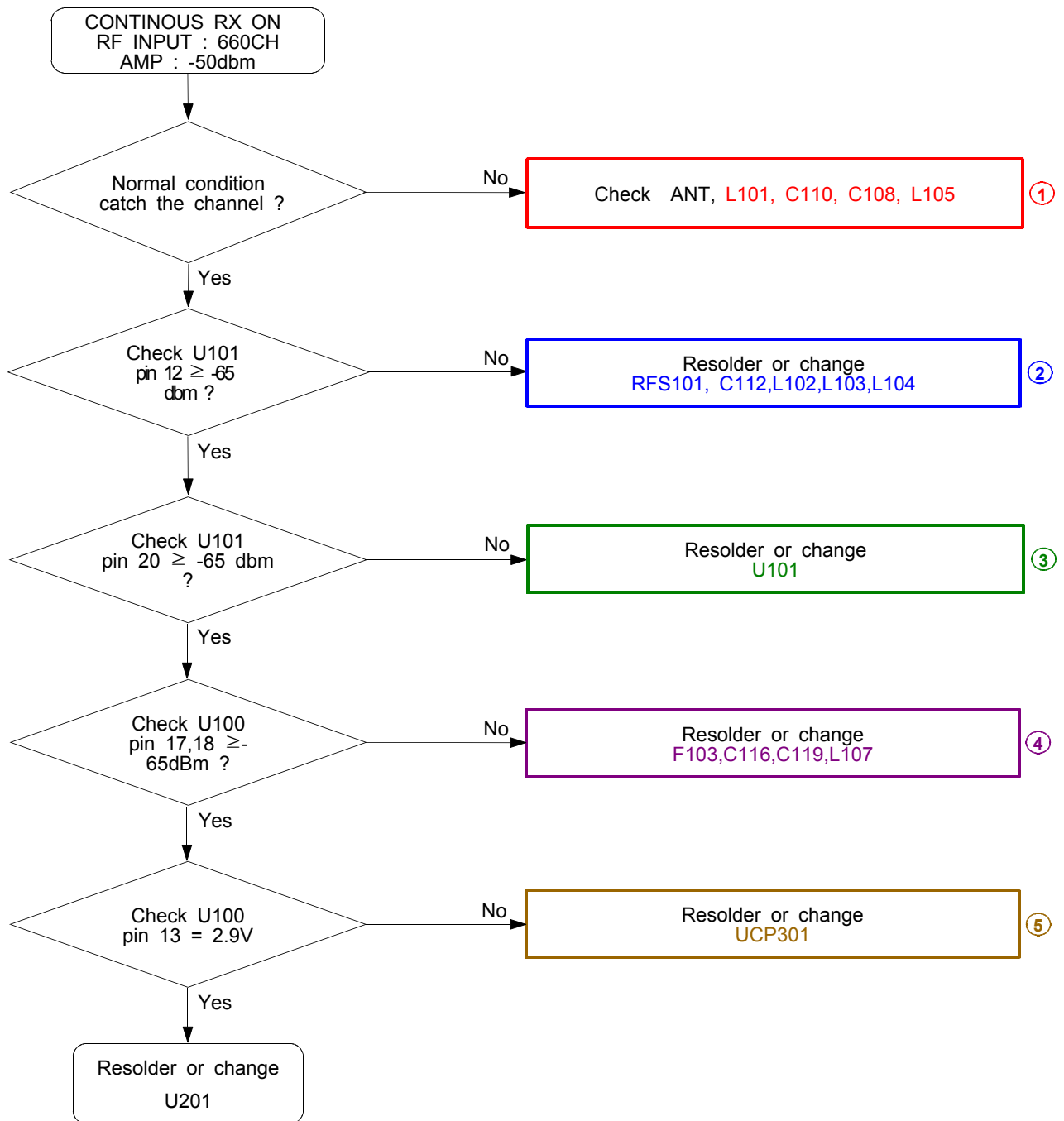


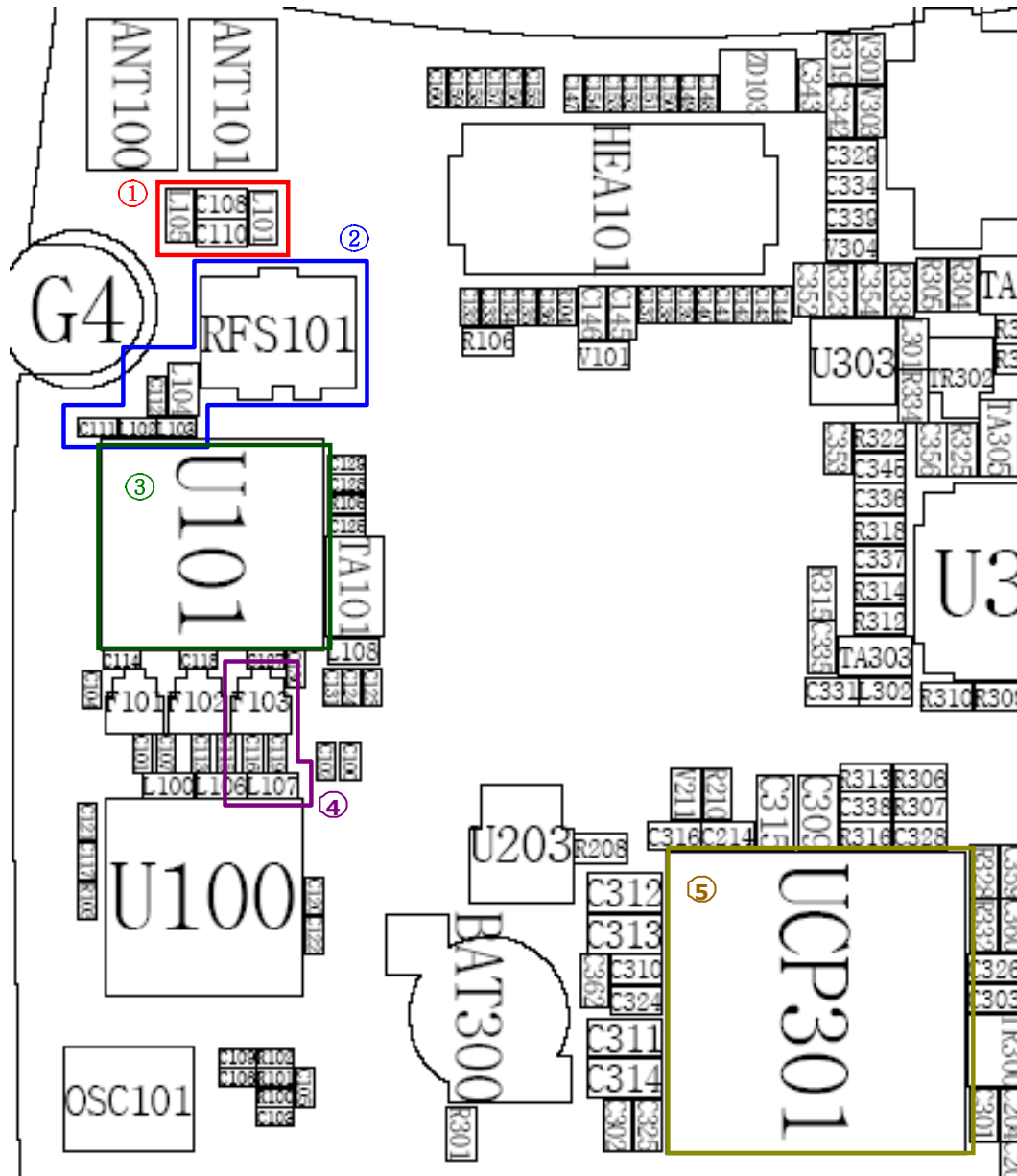
9-2-2. DCS Rx

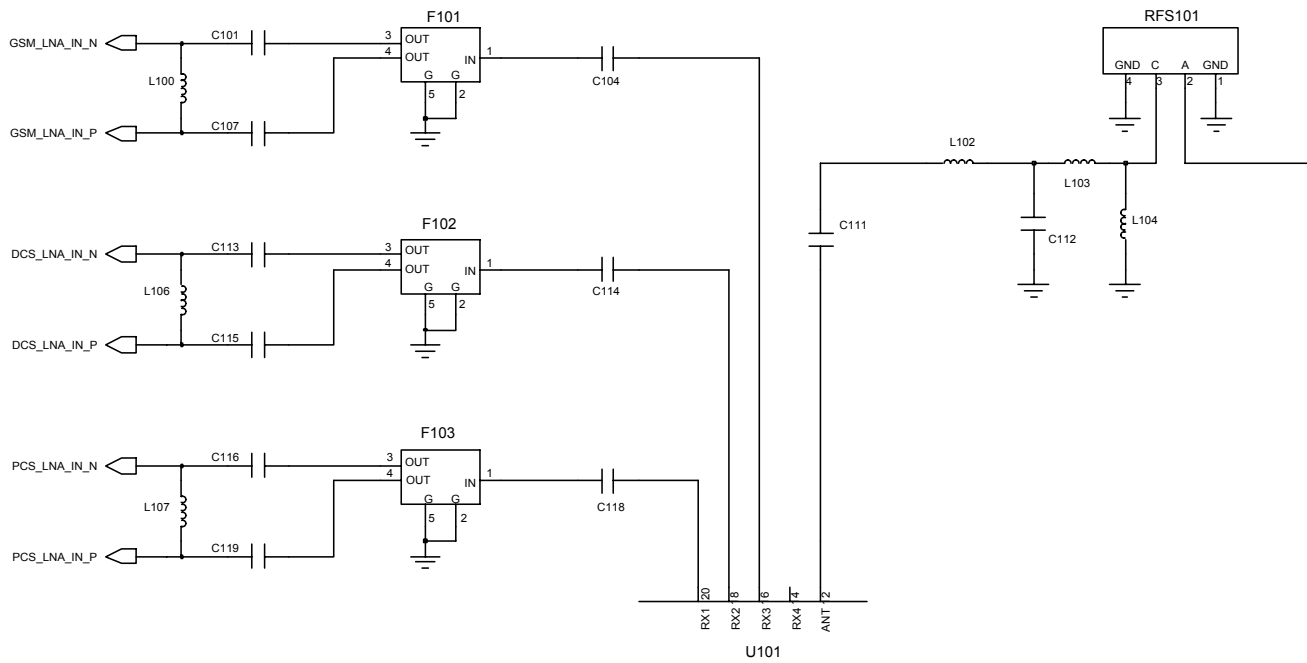




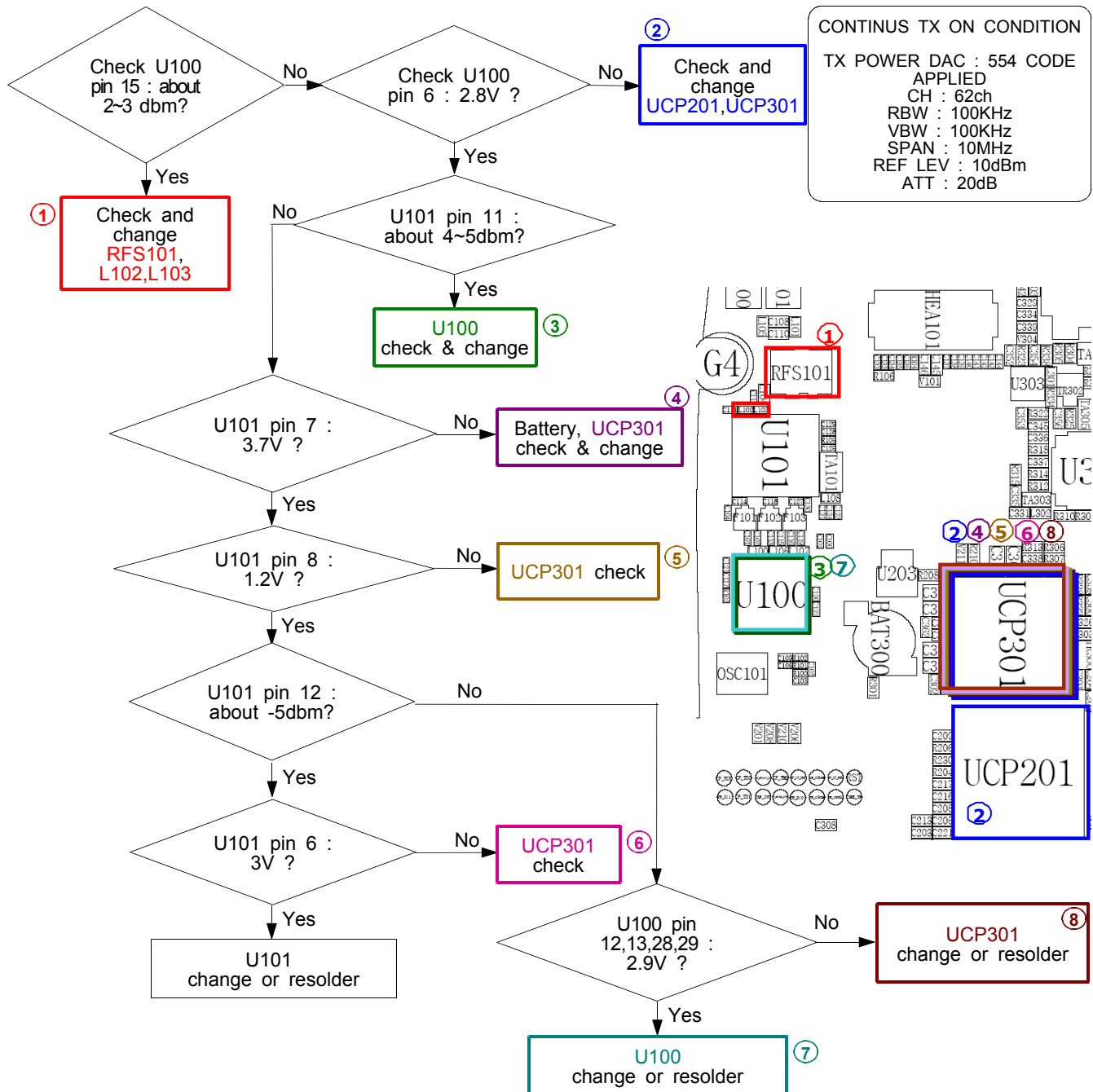
9-2-3. PCS Rx



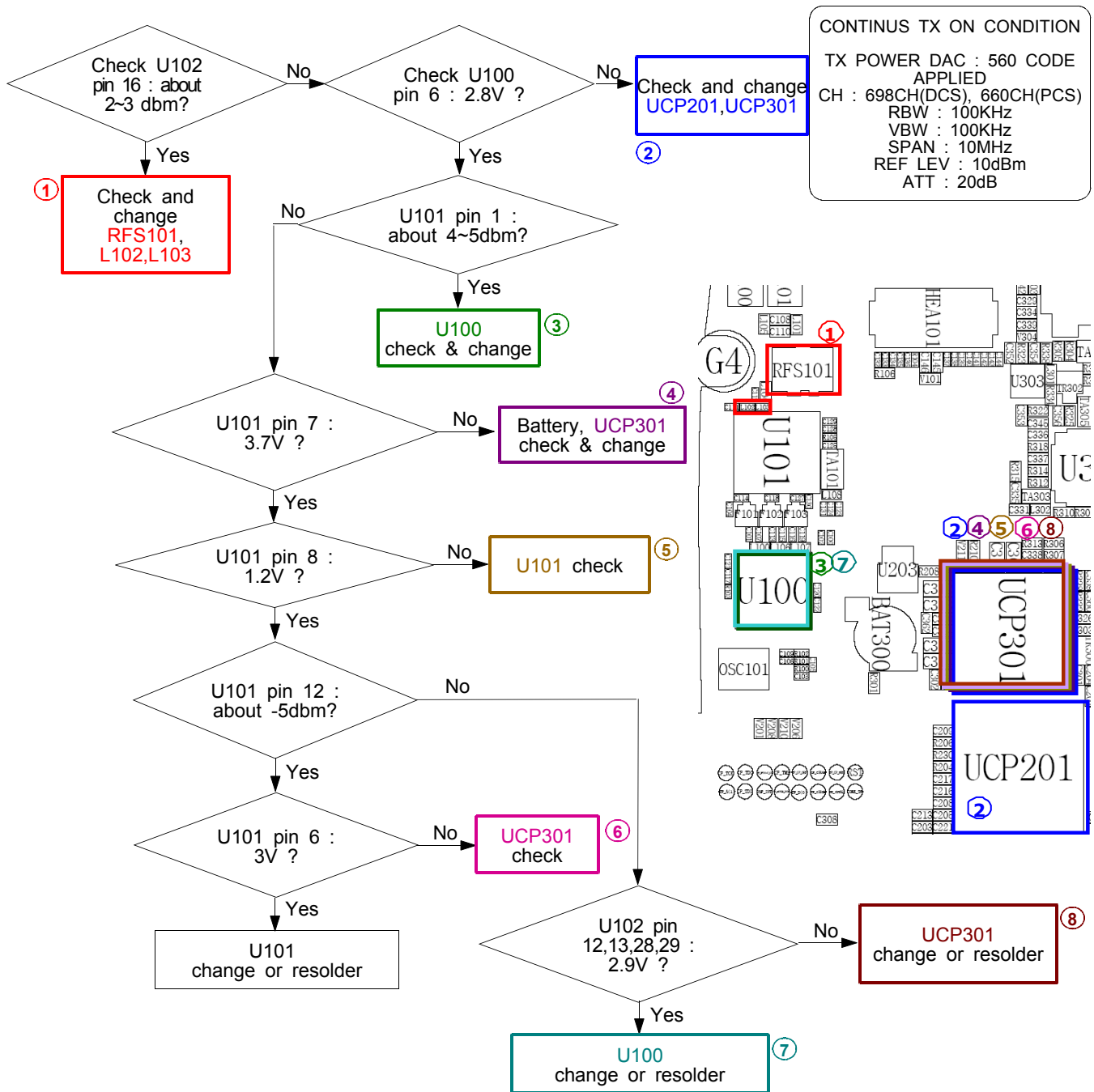




9-2-4. GSM Tx



9-2-5. DCS/PCS Tx



10. Reference data

10-1. Reference Abbreviate

AAC: Advanced Audio Coding.
AVC : Advanced Video Coding.
BER : Bit Error Rate
BPSK: Binary Phase Shift Keying
CA : Conditional Access
CDM : Code Division Multiplexing
C/I : Carrier to Interference
DMB : Digital Multimedia Broadcasting
EN : European Standard
ES : Elementary Stream
ETSI: European Telecommunications Standards Institute
MPEG: Moving Picture Experts Group
PN : Pseudo-random Noise
PS : Pilot Symbol
QPSK: Quadrature Phase Shift Keying
RS : Reed-Solomon
SI : Service Information
TDM : Time Division Multiplexing
TS : Transport Stream

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