SAMSUNG

GSM TELEPHONE
SGH-X160

SERVICE Manual

GSM TELEPHONE

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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 disassembing 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 easilly 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
Freq. Band[MHz] Uplink/Downlink	890~915 935~960	880~915 925~960	1710~1785 1805~1880
ARFCN range	1~124	0~124 & 975~1023	512~885
Tx/Rx spacing	45 MHz	45 MHz	95 MHz
Mod. Bit rate/ Bit Period	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
Modulation	0.3 GMSK	0.3 GMSK	0.3 GMSK
MS Power	33 dBm~13 dBm	33 dBm~5 dBm	30 dBm~0 dBm
Power Class	5 pcl ~ 15 pcl	5 pcl ~ 19 pcl	0 pcl ~ 15 pcl
Sensitivity	-102 dBm	-102 dBm	-100 dBm
TDMA Mux	8	8	8
Cell Radius	35 Km	35 Km	2 Km

2-2. GSM Tx Power Class

TX Power control level	GSM900
5	33±2 dBm
6	31±2 dBm
7	29±2 dBm
8	27±2 dBm
9	25±2 dBm
10	23±2 dBm
11	21±2 dBm
12	19±2 dBm
13	17±2 dBm
14	15±2 dBm
15	13±2 dBm
16	11±3 dBm
17	9±3 dBm
18	7±3 dBm
19	5±3 dBm

TX Power control level	DCS1800
0	30±3 dBm
1	28±3 dBm
2	26±3 dBm
3	24±3 dBm
4	22±3 dBm
5	20±3 dBm
6	18±3 dBm
7	16±3 dBm
8	14±3 dBm
9	12±4 dBm
10	10±4 dBm
11	8±4 dBm
12	6±4 dBm
13	4±4 dBm
14	2±5 dBm
15	0±5 dBm

3. Product Function

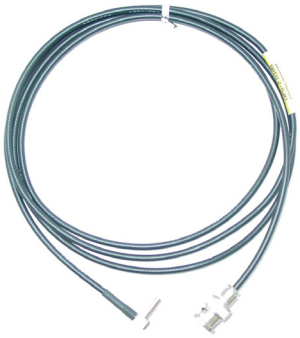
Main Function

-Network services
-Sound settings
-Messages
(SMS, MSM, Push messages)
-WAP browser
-Alarm, Calculator, Calendar, Time & Date, Voice mail

4. Array course control

Test Jig (GH80-00865A)

Test Cable (GH39-00127A)



RF Test Cable (GH39-00397A)

Software Downloading

4-1. Downloading Binary Files

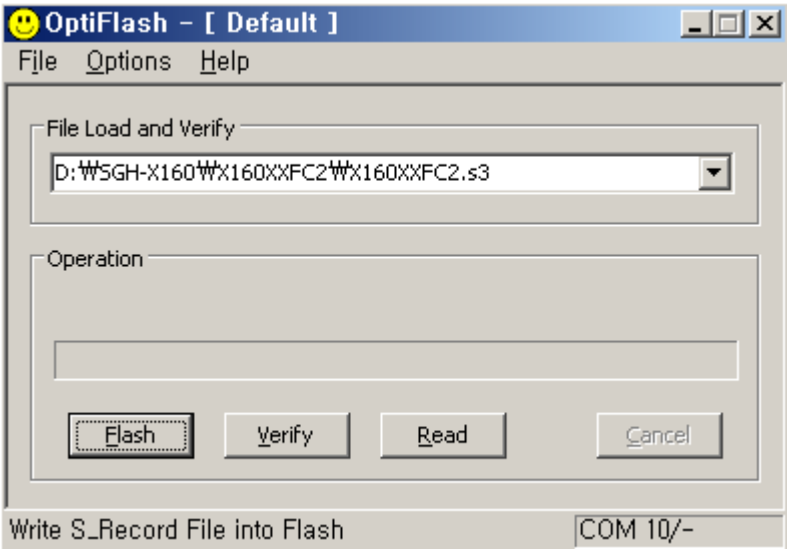
- Three binary files for downloading X160.
  – X160XXYY.s3 : Main source code binary.

4-2. Pre-requsite for Downloading

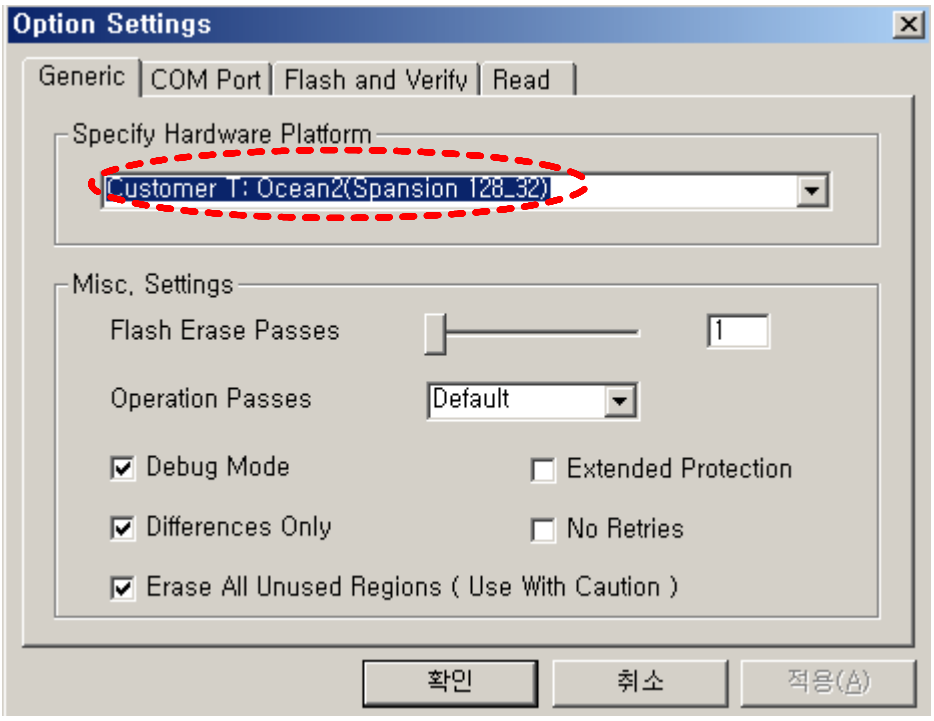
- Downloader Program(OptiFlash.exe)
- X160 Mobile Phone
- Data Cable
- Binary files

4-3. S/W Downloader Program

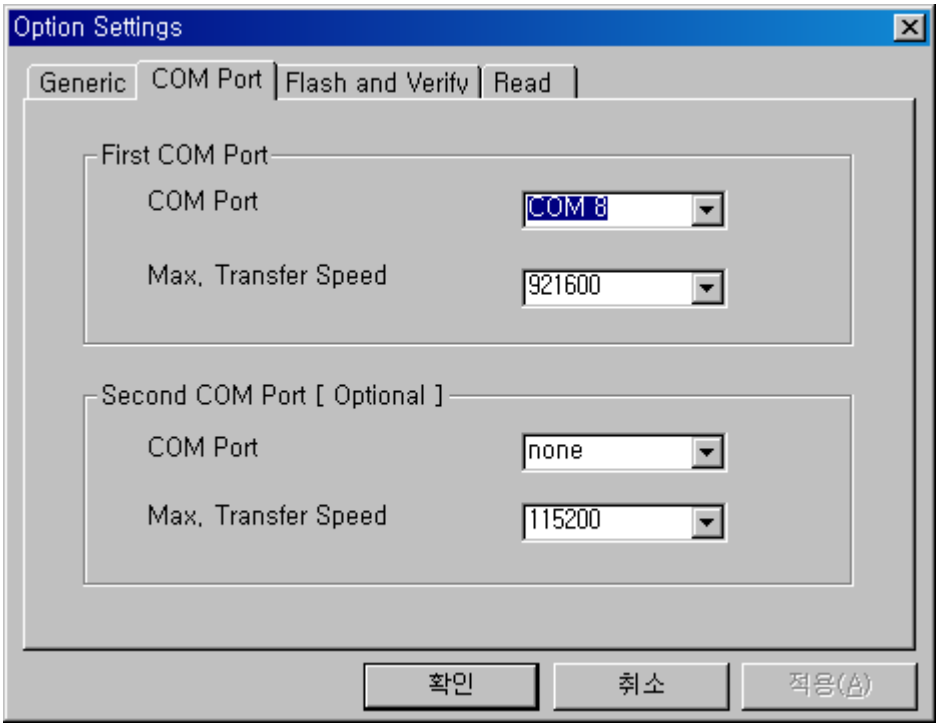
1. Load the binary download program♪by executing the "**OptiFlash.exe**"



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



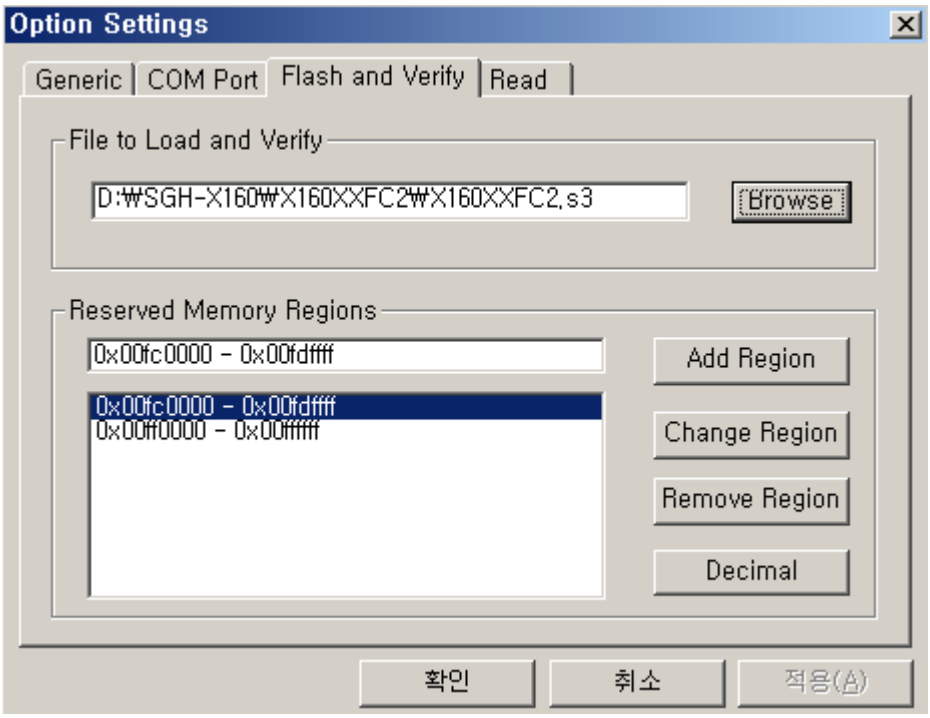
3. Select the **COM port** when the download cable is connected



Up to twelve ports are 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 "X160XXYY.s3",♪for the downloader binary setting.



Make sure that not to change the reserved memory regions.♪

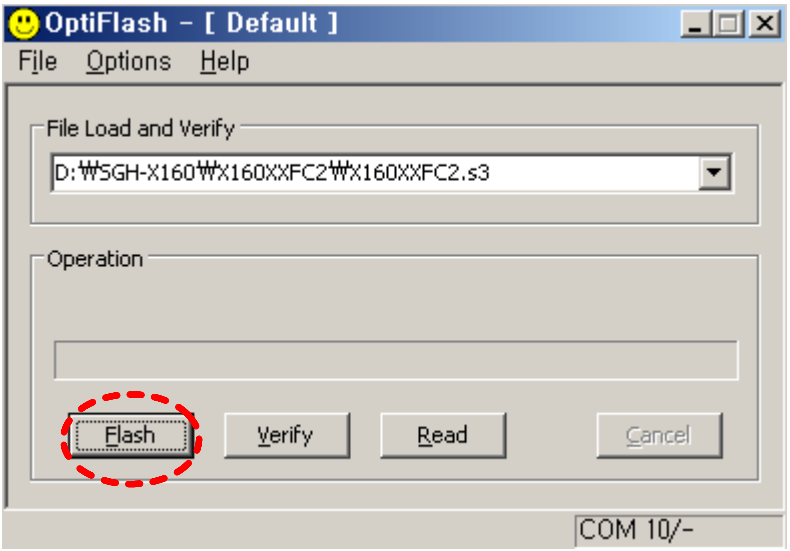
In case of X160 the reserved memory regions are :♪

-0x00fc0000 – 0x00fdffff

-0x00ff0000– 0x00ffffff

5. Click "**OK**" button then press "**Flash**".♪
(Before pressing 'Flash' button, push the button **'*'and 'END' at the same time**. Then press 'Flash'.)♪

Downloader will upload the binary file as below for the downloading. ♪



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 and etc. :♪

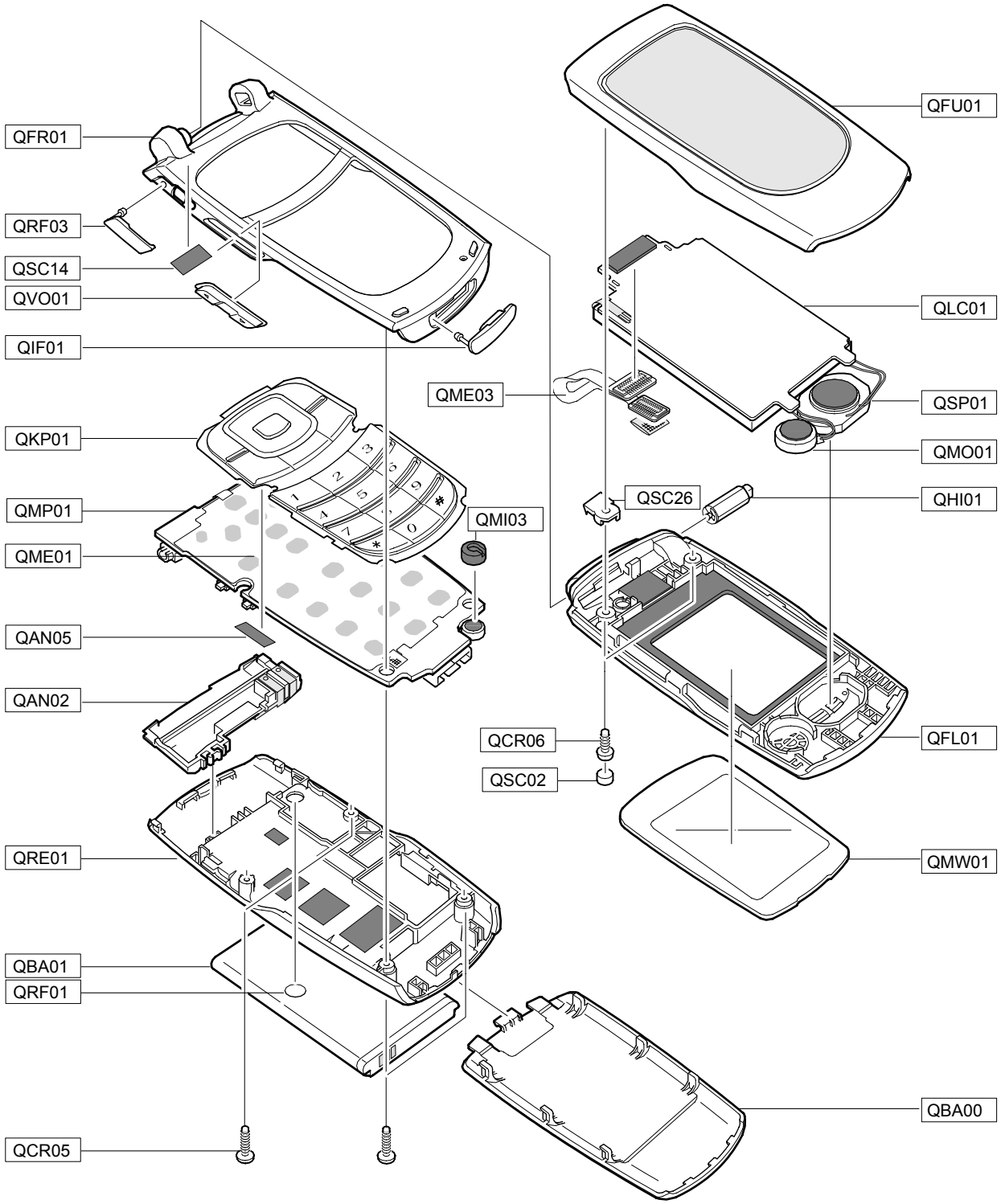
***#5002*8376263#♪**

Full Reset : ♪

***2767*3855#**

5. Exploded View and Parts List

5-1. Cellular phone Exploded View



5-2. Cellular phone Parts list

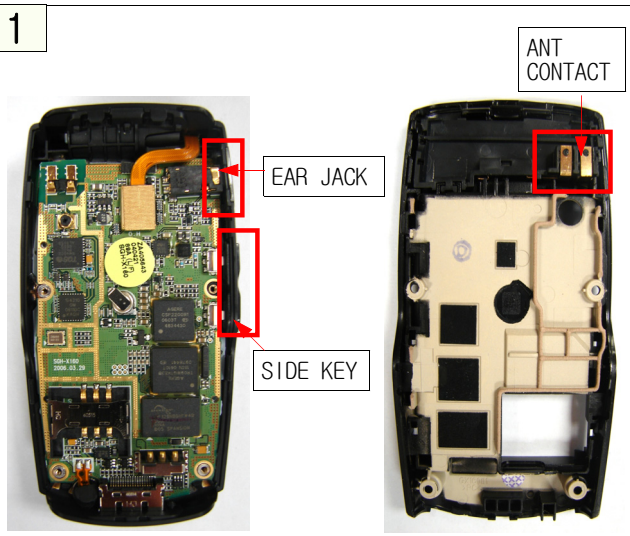
Design LOC		Discription	SEC CODE
QAN02		INTENNA-SGHX160	GH42-00819A
QAN05		MEC-INTENNA CONN RUBBER	GH75-08200A
QBA00		MEC-COVER BATT	GH75-09621B
QBA01		INNER BATTERY PACK-800MAH,BLK,	GH43-01850A
QCR05		SCREW-MACHINE	6001-001478
QCR06		SCREW-MACHINE	6001-001155
QFU01		ASSY-CASE-UPPER FOLDER	GH98-00716A
QKP01		ASSY-KEY-KEYPAD(SKA/SER)	GH98-01132A
QLC01		ELA UNIT-SGHX160 LCD MODULE SV	GH96-02196A
QME01		UNIT-METAL DOME	GH59-03135A
QME03		UNIT-CON TO CON	GH59-03136A
QMI01		MICROPHONE-ASSY-6.25MM	GH30-00177F
QMI03		RMO-MIC HOLDER	GH73-05342A
QMO01		MOTOR DC-SGHZ130	GH31-00154A
QMP01		PBA MAIN-SGHX160	GH92-02684A
QMW01		PMO-COVER LCD	GH72-30220A
QRE01		ASSY-CASE-REAR	GH98-00719A
QRF01		MPR-RF SHEET	GH74-17894B
QSC02		RMO-FOLDER SCREW COVER	GH73-05511A
QSC14		MPR-TAPE FRONT HOLE	GH74-23661A
QSC26		PMO-COVER FPCB HOLE	GH72-30082A
QSP01		SPEAKER	3001-001954
QVO01		MEC-VOL KEY	GH75-09622B
QFL01		ASSY-CASE-LOWER FOLDER	GH98-00717A
	QHI01	MEC-HINGE (CAN TYPE)	GH75-09075A
QFR01		ASSY-CASE-FRONT	GH98-00718A
	QIF01	PMO-COVER IF	GH72-30078A
	QRF03	PMO-COVER EAR	GH72-30077B

Discription	SEC CODE
BAG PE	6902-000297
ADAPTOR-SGHN288 TAD	GH44-00184A
LABEL(P)-WATER SOAK	GH68-02026A
MANUAL-WARRANTY CARD	GH68-02623A
MANUAL-SFC	GH68-04336A
LABEL(P)-BARCODE RUSSIA	GH68-08494A
MANUAL USERS-EU RUSSIAN	GH68-09790A
LABEL(R)-MAIN(SER)	GH68-10842B
CUSHION-CASE (EU)	GH69-03548A
BOX(P)-UNIT MAIN(SER)	GH69-03926B
IPR-MAGNETIC	GH70-01448A
RMO-BGA RUBBER T	GH73-05471A
RMO-BGA RUBBER M	GH73-05472A
RMO-BGA RUBBER B	GH73-05473A
RMO-YAMAHA RUUBBER	GH73-05641A
RMO-CUSHION B2B CON	GH73-06773A
MPR-MAIN LCD BOHO VINYL(S)	GH74-05008A
MPR-BOHO VINYL LCD CONN	GH74-15350A
MPR-MAIN CON GASKET	GH74-17892A
MPR-BOHO VINYL UPPER	GH74-18028A
MPR-FPCB PORON	GH74-18593A
MPR-VINYL BOHO REAR	GH74-19864A
MPR-TAPE SLIDE CON LCD	GH74-20646A
MPR-TAPE DOME SHEET	GH74-22759A
MPR-TAPE J TAG MASKING	GH74-22760A
MPR-TAPE DOME SHEET TOP	GH74-23945A
MPR-TAPE LCD	GH74-24168A

6. Disassembly and Assembly instructions

6-1. Disassembly

1



1. loosen the four screws at the rear cover
2. Open the rear cover from the bottom-side hook

※ **caution**

1. Handle the HOOK with care, and check No bending the board and front cover
2. MIC RUBBER is the proper place
3. Do not touch antenna contact with fingers

2

1. Disconnect LCD CONN from the Main Board
2. Take off the main board from the case after taking out the IF cover
3. Take off the Key pad

※ **caution**

1. Handle with care LCD CONN itself and dust

3

1. Take out the FRONT HOLE TAPE
2. Take off the Hinge with widening the left side gap with front cover.
3. Carefully take out the LCD FPCB through FRONT HOLE

※ **caution**

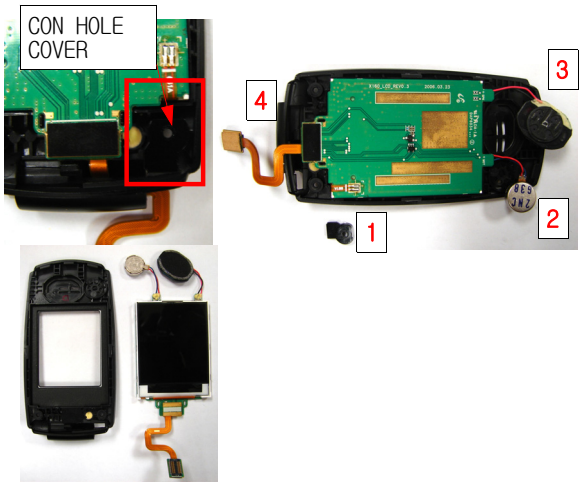
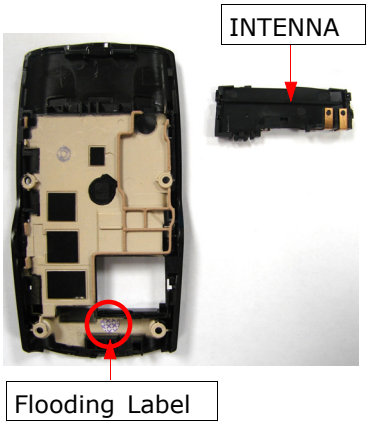
1. LCD FPCB is easy to break

4

1. Pull up the SCREW CAP with pinset.
2. Loosen the screws from cover(2 POINT)
3. Open the FOLDER UPPER

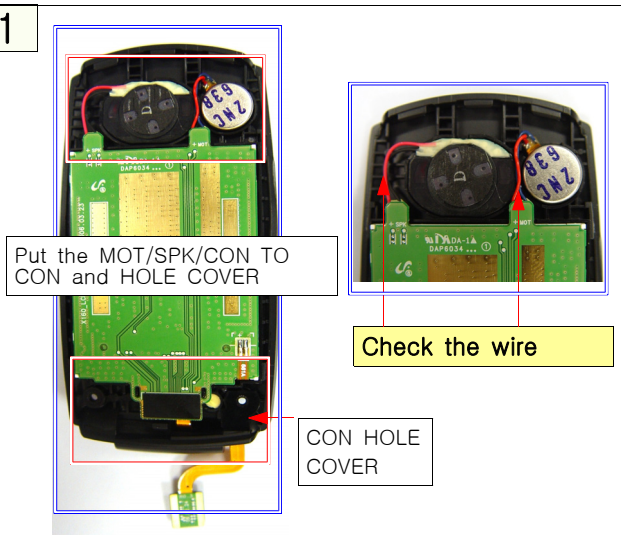
※ **caution**

1. Do not Scratch with the JIG to open
2. Handle the HOOK with care, and check No bending the board and front cover

5	6
	
1. Take out the CON HOLE COVER 2. Take out MOTOR/FPCB/SPEAKER/LCD ※ **caution** 1.Handle with care LCD CONN itself and dust. 2.Handle with care MOTOR / SPEAKER WIRE and LCD	1. Take out INTENNA with using a PINSET ※ **caution** 1.Take care of INTENNA damage. 2.Flooding Label check 3.Do not touch antenna contact with fingers.

6-2. Assembly

1

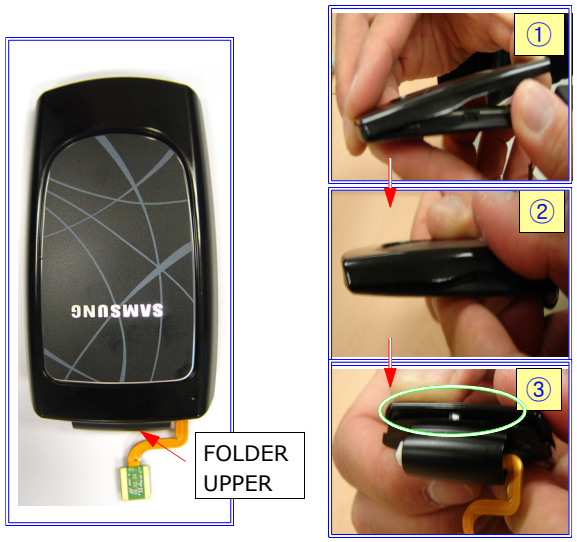


1. insert CON TO CON to LOWER CON HOLE
2. PUT the LCD / MOT / SPK / CON HOLE COVER in order

※ **caution**

1. Handle wires and CON TO CON with care
2. Check every thing is proper place and conformed
3. Do not touch front side of LCD (fingerprint)

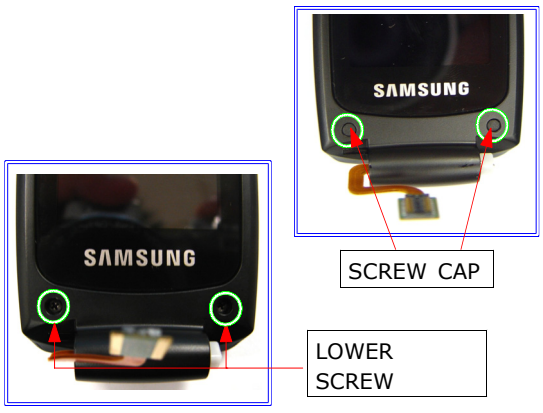
2



1.Assemble FOLDER UPPER, Follow the picture 1-2-3

※ **caution**

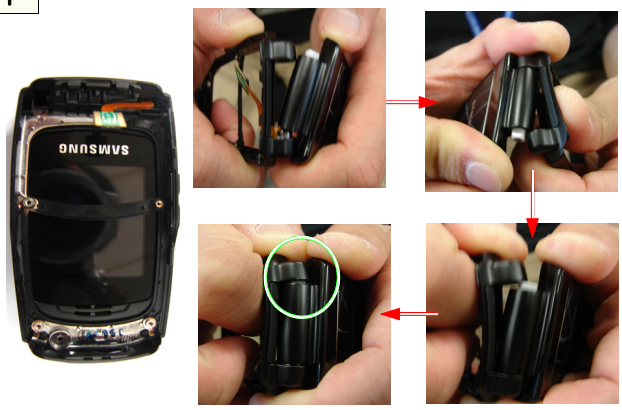
3



1. Tighten LOWER SCREW (2 POINT)
2. Insert the SCREW CAPS

※ **caution**

4

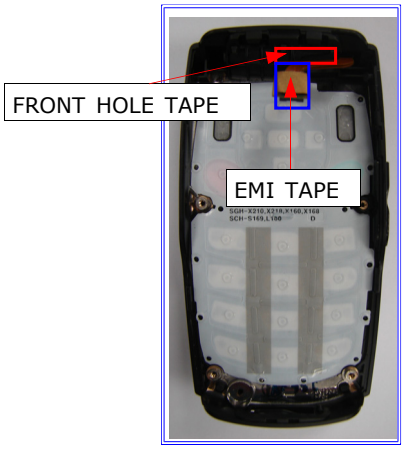


1. Put the LCD CON TO CON through the hole and insert to HINGE HOUSING
2. After finishing left side, bend front cover to make space and push the hinge in.
3. Repeat open and close to place the hinge and connector

※ **caution**

1. Handle the CON TO CON with care.
2. Do not make scratch at the hinge insertion
3. Check the FOLDER tension is good enough.

5



1. Set the FRONT HOLE TAPE at the line
2. Set the F-PCB GASKET TAPE
2. Put the KEY PAD

※ caution

1. No scratch
2. The tapes are proper place.
3. key pad does not get loose

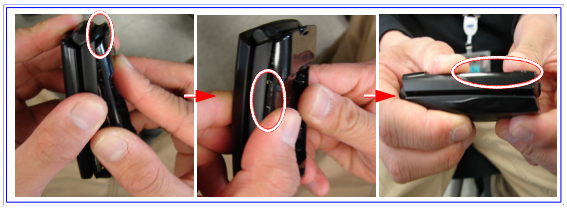
6

1.PUT the PBA after Air Blow
2.Connect LCD CONN

※ caution

1. Take care the components on the board
2. Check the LCD CON is conformed
3. No dust should be inside.

7



1. Assemble the REAR ASS'Y from the upper Hook
2. Tighten REAR SCREW (4 POINT)

HOLE

※ caution

1. No Scratch.
2. Check there is no gap

8

7. MAIN Electrical Parts List

SEC Code	Design LOC	Discription	SEC CODE
0403-001547	ZD300	DIODE-ZENER	SA
0406-001083	ZD302	DIODE-TVS	SA
0406-001083	ZD303	DIODE-TVS	SA
0406-001083	ZD304	DIODE-TVS	SA
0501-000225	Q300	TR-SMALL SIGNAL	SA
0504-000168	Q103	TR-DIGITAL	SA
0601-002070	LED300	LED	SA
0601-002070	LED301	LED	SA
0601-002070	LED302	LED	SA
0601-002070	LED303	LED	SA
0601-002070	LED304	LED	SA
0601-002070	LED305	LED	SA
0601-002070	LED306	LED	SA
0601-002070	LED307	LED	SA
0601-002070	LED308	LED	SA
0601-002070	LED309	LED	SA
0601-002070	LED310	LED	SA
0601-002070	LED311	LED	SA
0601-002070	LED315	LED	SA
0601-002070	LED316	LED	SA
0801-002529	U109	IC-CMOS LOGIC	SA
1001-001306	U300	IC-ANALOG MULTIPLEX	SA
1009-001020	U203	IC-HALL EFFECT S/W	SA
1108-000070	UME201	IC-MCP	SA
1201-002063	U301	IC-AUDIO AMP	SA
1201-002278	PAM100	IC-POWER AMP	SA
1203-003304	UCD107	IC-POWER SUPERVISOR	SA
1203-003328	U204	IC-DC/DC CONVERTER	SA
1203-003663	U105	IC-BATTERY	SA
1204-001811	UCD106	IC-MELODY	SA
1205-002683	UCD101	IC-TRANSCEIVER	SA
1209-001219	U202	IC-SENSOR	SA
1405-001082	VR300	VARISTOR	SA
1405-001082	VR301	VARISTOR	SA
1405-001082	VR302	VARISTOR	SA
1405-001082	VR303	VARISTOR	SA
1405-001082	VR304	VARISTOR	SA
1405-001082	VR309	VARISTOR	SA
1405-001082	VR310	VARISTOR	SA
1405-001082	VR311	VARISTOR	SA
1405-001082	VR312	VARISTOR	SA
1405-001082	VR313	VARISTOR	SA
1405-001082	VR314	VARISTOR	SA
1405-001082	VR315	VARISTOR	SA

SEC Code	Design LOC	Discription	SEC CODE
1405-001082	VR316	VARISTOR	SA
1405-001082	VR317	VARISTOR	SA
1405-001082	VR318	VARISTOR	SA
1405-001082	VR319	VARISTOR	SA
1405-001082	VR320	VARISTOR	SA
2007-000140	R183	R-CHIP	SA
2007-000140	R305	R-CHIP	SA
2007-000140	R306	R-CHIP	SA
2007-000140	R307	R-CHIP	SA
2007-000140	R308	R-CHIP	SA
2007-000140	R309	R-CHIP	SA
2007-000140	R310	R-CHIP	SA
2007-000140	R311	R-CHIP	SA
2007-000140	R312	R-CHIP	SA
2007-000140	R313	R-CHIP	SA
2007-000140	R314	R-CHIP	SA
2007-000140	R315	R-CHIP	SA
2007-000140	R316	R-CHIP	SA
2007-000140	R344	R-CHIP	SA
2007-000143	R241	R-CHIP	SA
2007-000148	R157	R-CHIP	SA
2007-000148	R339	R-CHIP	SA
2007-000148	R342	R-CHIP	SA
2007-000148	R358	R-CHIP	SA
2007-000148	R363	R-CHIP	SA
2007-000153	R117	R-CHIP	SA
2007-000157	R188	R-CHIP	SA
2007-000157	R204	R-CHIP	SA
2007-000157	R260	R-CHIP	SA
2007-000157	R349	R-CHIP	SA
2007-000157	R366	R-CHIP	SA
2007-000161	R341	R-CHIP	SA
2007-000161	R343	R-CHIP	SA
2007-000161	R359	R-CHIP	SA
2007-000161	R364	R-CHIP	SA
2007-000162	R172	R-CHIP	SA
2007-000162	R182	R-CHIP	SA
2007-000162	R209	R-CHIP	SA
2007-000162	R213	R-CHIP	SA
2007-000164	R155	R-CHIP	SA
2007-000170	R214	R-CHIP	SA
2007-000171	R166	R-CHIP	SA
2007-000171	R177	R-CHIP	SA
2007-000171	R178	R-CHIP	SA

SEC Code	Design LOC	Discription	SEC CODE
2007-000171	R187	R-CHIP	SA
2007-000171	R335	R-CHIP	SA
2007-000171	R337	R-CHIP	SA
2007-000171	R350	R-CHIP	SA
2007-000171	R351	R-CHIP	SA
2007-000171	R361	R-CHIP	SA
2007-000172	R200	R-CHIP	SA
2007-000172	R201	R-CHIP	SA
2007-000172	R242	R-CHIP	SA
2007-000173	R357	R-CHIP	SA
2007-000173	R365	R-CHIP	SA
2007-000242	R340	R-CHIP	SA
2007-000242	R354	R-CHIP	SA
2007-000242	R355	R-CHIP	SA
2007-000566	R300	R-CHIP	SA
2007-000566	R301	R-CHIP	SA
2007-000566	R302	R-CHIP	SA
2007-000566	R303	R-CHIP	SA
2007-000566	R304	R-CHIP	SA
2007-000775	R156	R-CHIP	SA
2007-000775	R158	R-CHIP	SA
2007-000831	R348	R-CHIP	SA
2007-001119	R347	R-CHIP	SA
2007-001119	R353	R-CHIP	SA
2007-001292	R321	R-CHIP	SA
2007-001292	R322	R-CHIP	SA
2007-001292	R323	R-CHIP	SA
2007-001292	R334	R-CHIP	SA
2007-001301	R317	R-CHIP	SA
2007-001301	R318	R-CHIP	SA
2007-001301	R319	R-CHIP	SA
2007-001301	R320	R-CHIP	SA
2007-001301	R331	R-CHIP	SA
2007-001307	R325	R-CHIP	SA
2007-001307	R327	R-CHIP	SA
2007-001307	R330	R-CHIP	SA
2007-001307	R332	R-CHIP	SA
2007-001307	R333	R-CHIP	SA
2007-001308	R133	R-CHIP	SA
2007-001323	R345	R-CHIP	SA
2007-001325	R159	R-CHIP	SA
2007-001335	R360	R-CHIP	SA
2007-002797	R131	R-CHIP	SA
2007-007107	R356	R-CHIP	SA

SEC Code	Design LOC	Discription	SEC CODE
2007-007107	R362	R-CHIP	SA
2007-007573	R207	R-CHIP	SA
2007-007573	R216	R-CHIP	SA
2007-008137	R170	R-CHIP	SA
2007-008516	R118	R-CHIP	SA
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2007-008542	R346	R-CHIP	SA
2007-009160	R171	R-CHIP	SA
2203-000233	C175	C-CER,CHIP	SA
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2203-000233	L102	C-CER,CHIP	SA
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2203-000254	C153	C-CER,CHIP	SA
2203-000254	C165	C-CER,CHIP	SA
2203-000254	C201	C-CER,CHIP	SA
2203-000254	C204	C-CER,CHIP	SA
2203-000254	C206	C-CER,CHIP	SA
2203-000254	C207	C-CER,CHIP	SA
2203-000254	C208	C-CER,CHIP	SA
2203-000254	C210	C-CER,CHIP	SA
2203-000254	C212	C-CER,CHIP	SA
2203-000278	C216	C-CER,CHIP	SA
2203-000278	C217	C-CER,CHIP	SA
2203-000278	C319	C-CER,CHIP	SA
2203-000330	C305	C-CER,CHIP	SA
2203-000330	C307	C-CER,CHIP	SA
2203-000386	C127	C-CER,CHIP	SA
2203-000386	C326	C-CER,CHIP	SA
2203-000386	C327	C-CER,CHIP	SA
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2203-000438	C318	C-CER,CHIP	SA
2203-000438	C323	C-CER,CHIP	SA
2203-000489	C315	C-CER,CHIP	SA
2203-000489	C320	C-CER,CHIP	SA
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2203-006183	C225	C-CER,CHIP	SA
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SEC Code	Design LOC	Discription	SEC CODE
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2203-006318	C118	C-CER,CHIP	SA
2203-006423	C100	C-CER,CHIP	SA
2203-006423	C112	C-CER,CHIP	SA
2203-006423	C150	C-CER,CHIP	SA
2203-006423	C151	C-CER,CHIP	SA
2203-006438	C222	C-CER,CHIP	SA
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2203-006562	C182	C-CER,CHIP	SA
2203-006562	C224	C-CER,CHIP	SA
2203-006626	C304	C-CER,CHIP	SA
2203-006626	C310	C-CER,CHIP	SA
2203-006648	C147	C-CER,CHIP	SA
2203-006708	C172	C-CER,CHIP	SA
2203-006708	C174	C-CER,CHIP	SA
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2404-001225	C335	C-TA,CHIP	SA
2404-001339	C163	C-TA,CHIP	SA
2404-001343	C177	C-TA,CHIP	SA
2404-001352	C336	C-TA,CHIP	SA
2404-001374	C111	C-TA,CHIP	SA
2404-001381	C186	C-TA,CHIP	SA
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2404-001406	C332	C-TA,CHIP	SA
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2703-002313	L101	INDUCTOR-SMD	SA
2703-002313	L303	INDUCTOR-SMD	SA
2703-002313	L304	INDUCTOR-SMD	SA
2703-002485	L104	INDUCTOR-SMD	SA
2703-002558	L110	INDUCTOR-SMD	SA
2703-002603	L105	INDUCTOR-SMD	SA
2703-002767	L201	INDUCTOR-SMD	SA
2703-002842	L100	INDUCTOR-SMD	SA

SEC Code	Design LOC	Discription	SEC CODE
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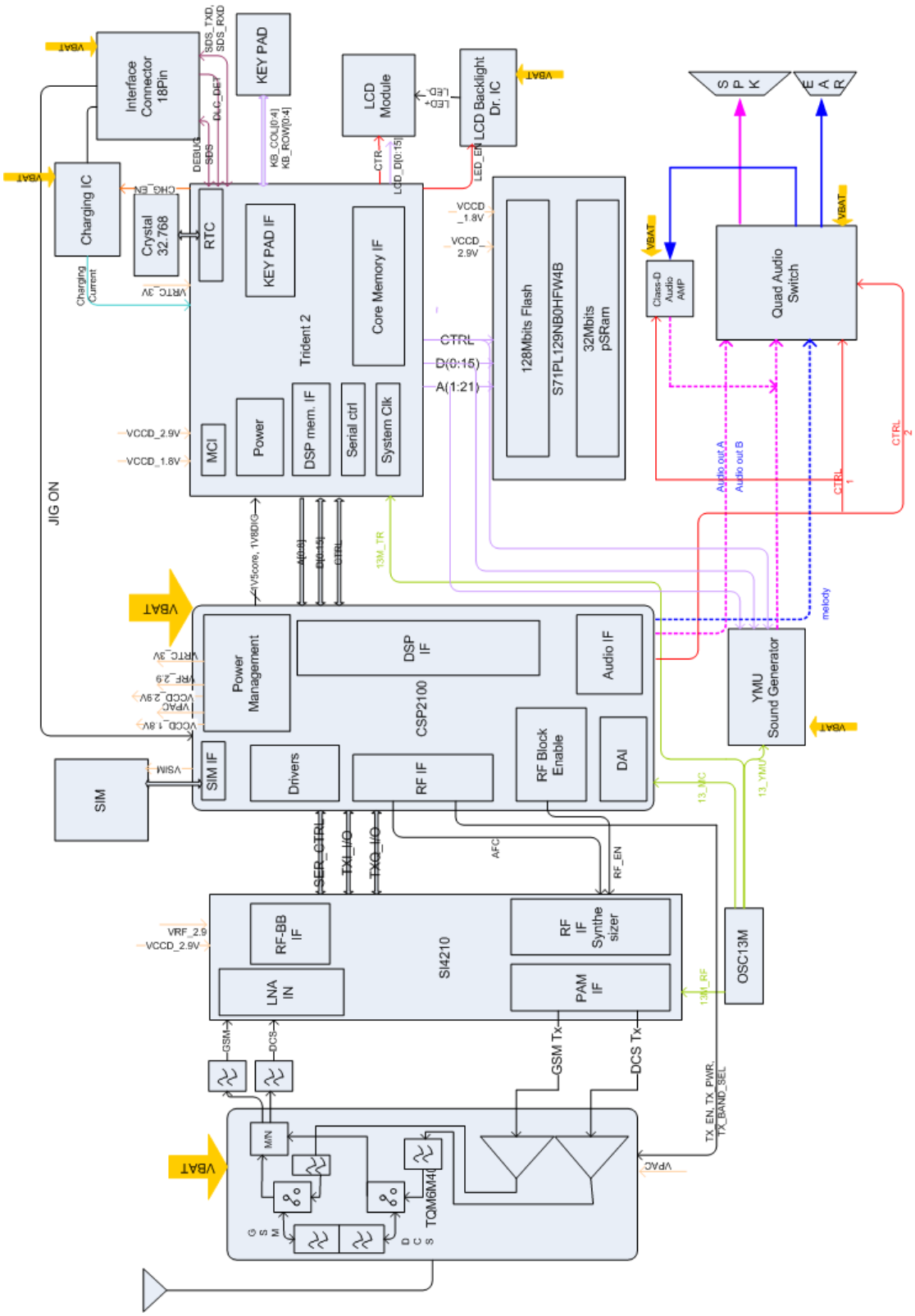
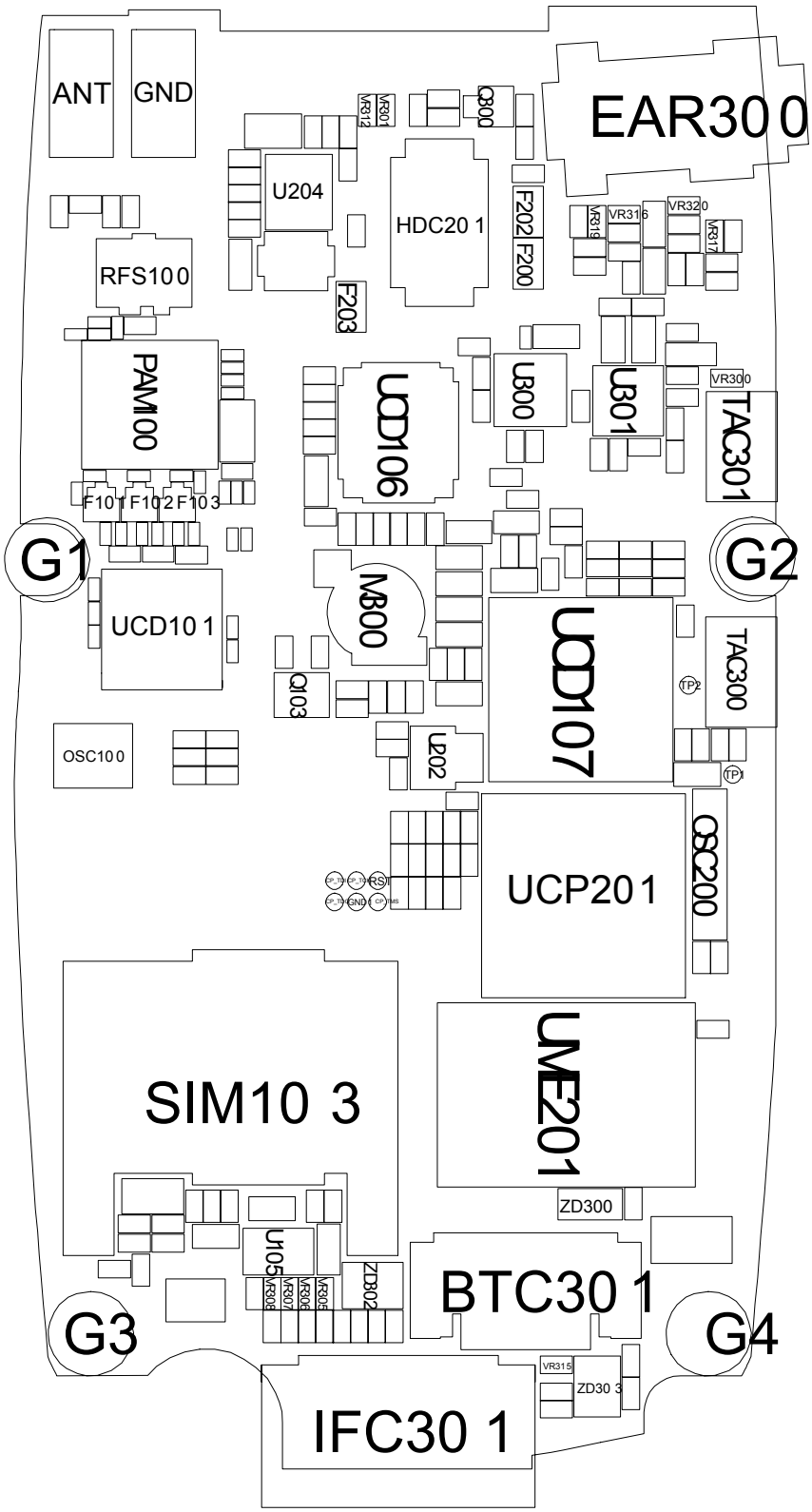
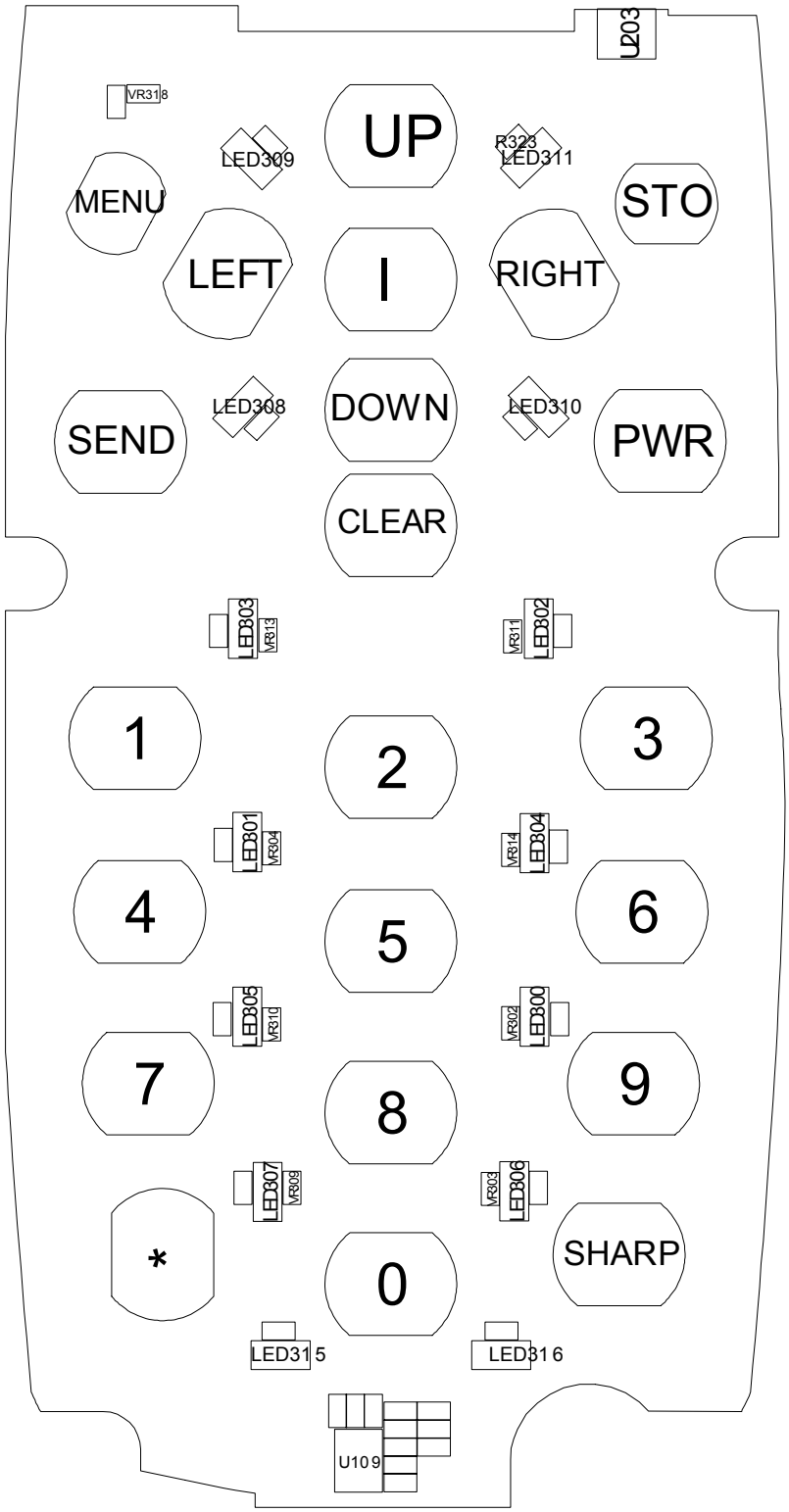
2801-003856	OSC200	CRYSTAL-SMD	SA
2801-004426	OSC100	CRYSTAL-SMD	SA
2901-001296	F200	FILTER-EMI SMD	SA
2901-001296	F202	FILTER-EMI SMD	SA
2901-001296	F203	FILTER-EMI SMD	SA
2904-001592	F101	FILTER-SAW	SA
2904-001599	F102	FILTER-SAW	SA
3301-001158	L300	BEAD-SMD	SA
3301-001158	L302	BEAD-SMD	SA
3301-001342	L200	BEAD-SMD	SA
3404-001152	TAC300	SWITCH-TACT	SA
3404-001152	TAC301	SWITCH-TACT	SA
3705-001358	RFS100	CONNECTOR-COAXIAL	SA
3709-001384	SIM103	CONNECTOR-CARD EDGE	SA
3710-001611	IFC301	CONNECTOR-INTERFACE	SA
3711-005728	HDC201	HEADER-BOARD TO BOARD	SA
3711-006228	BTC301	HEADER-BATTERY	SA
3722-002067	EAR300	JACK-EAR PHONE	SA
4302-001130	M300	BATTERY-LI(2ND)	SA
GH09-00036A	UCP201	IC MICOM-SGHX480	SA
GH71-04813A	ANT	NPR-ANTENNA CONTACT	SA
GH71-04813A	GND	NPR-ANTENNA CONTACT	SA

8. Block Diagrams



9. PCB Diagrams

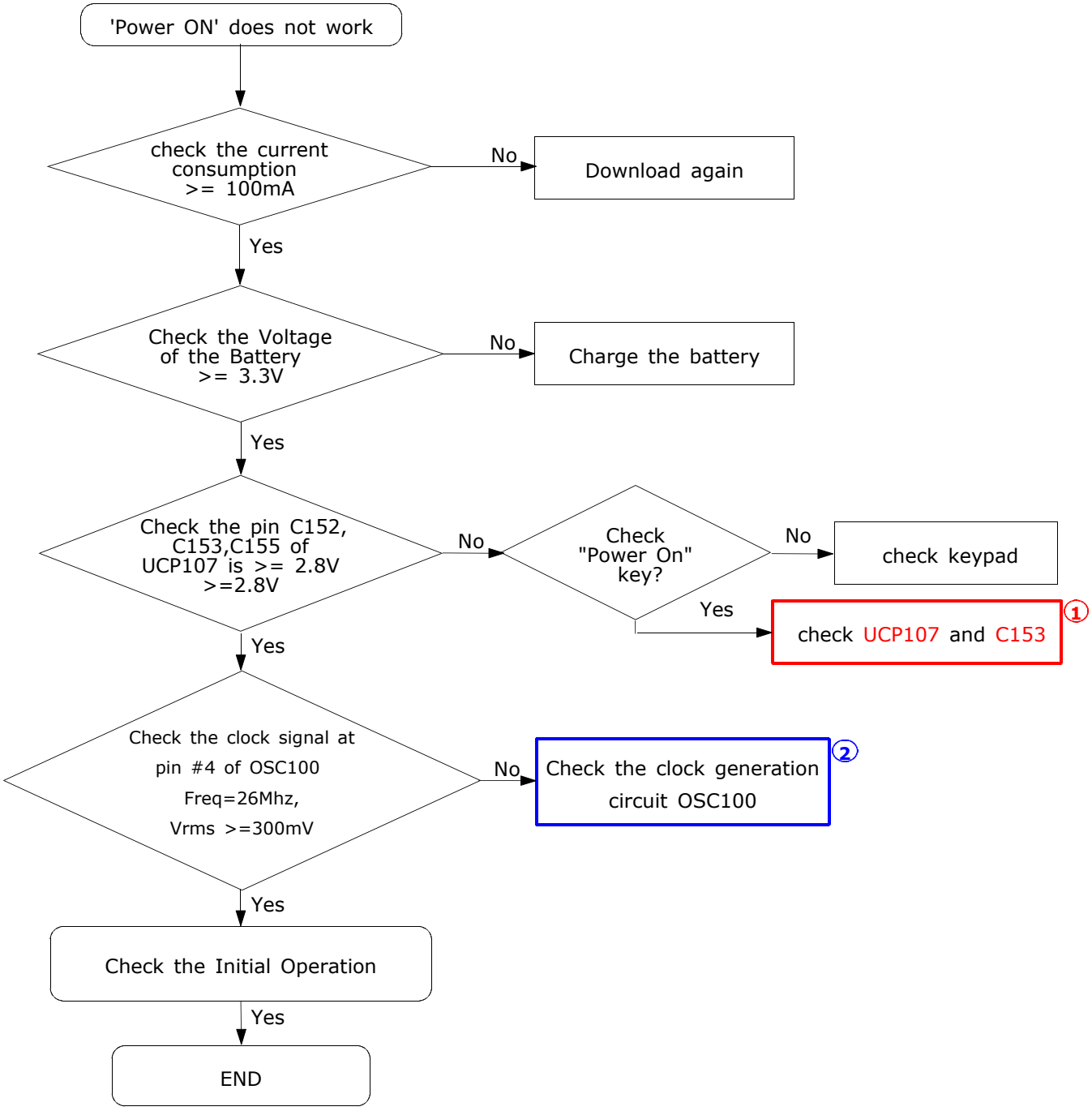


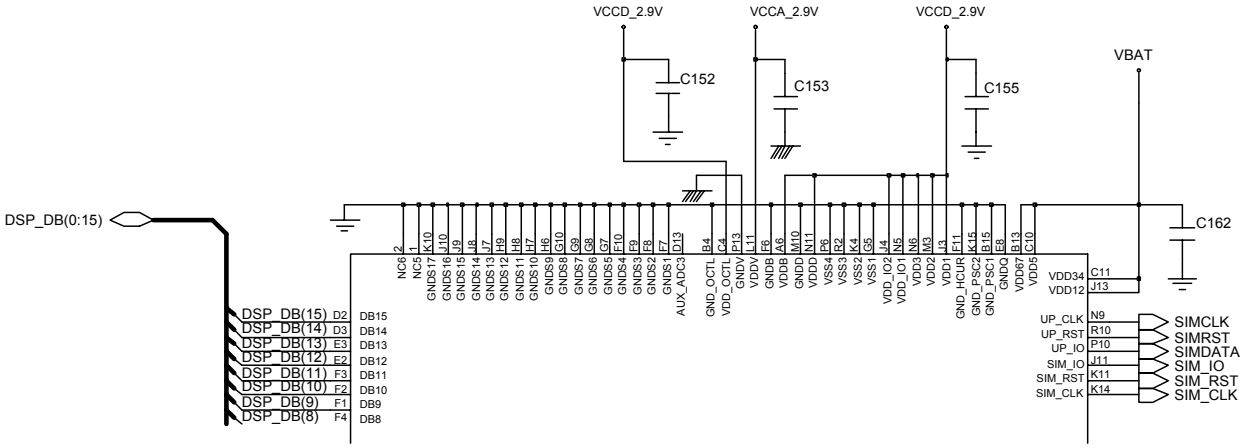


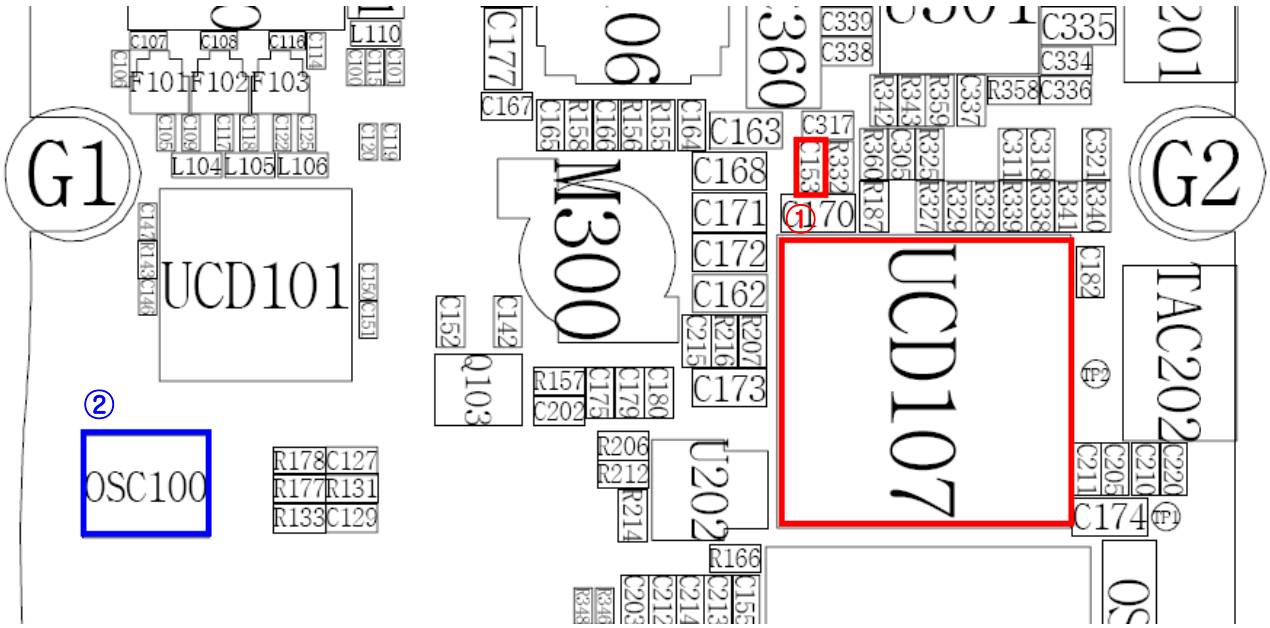
10. Flow Chart of Troubleshooting

10-1. Baseband

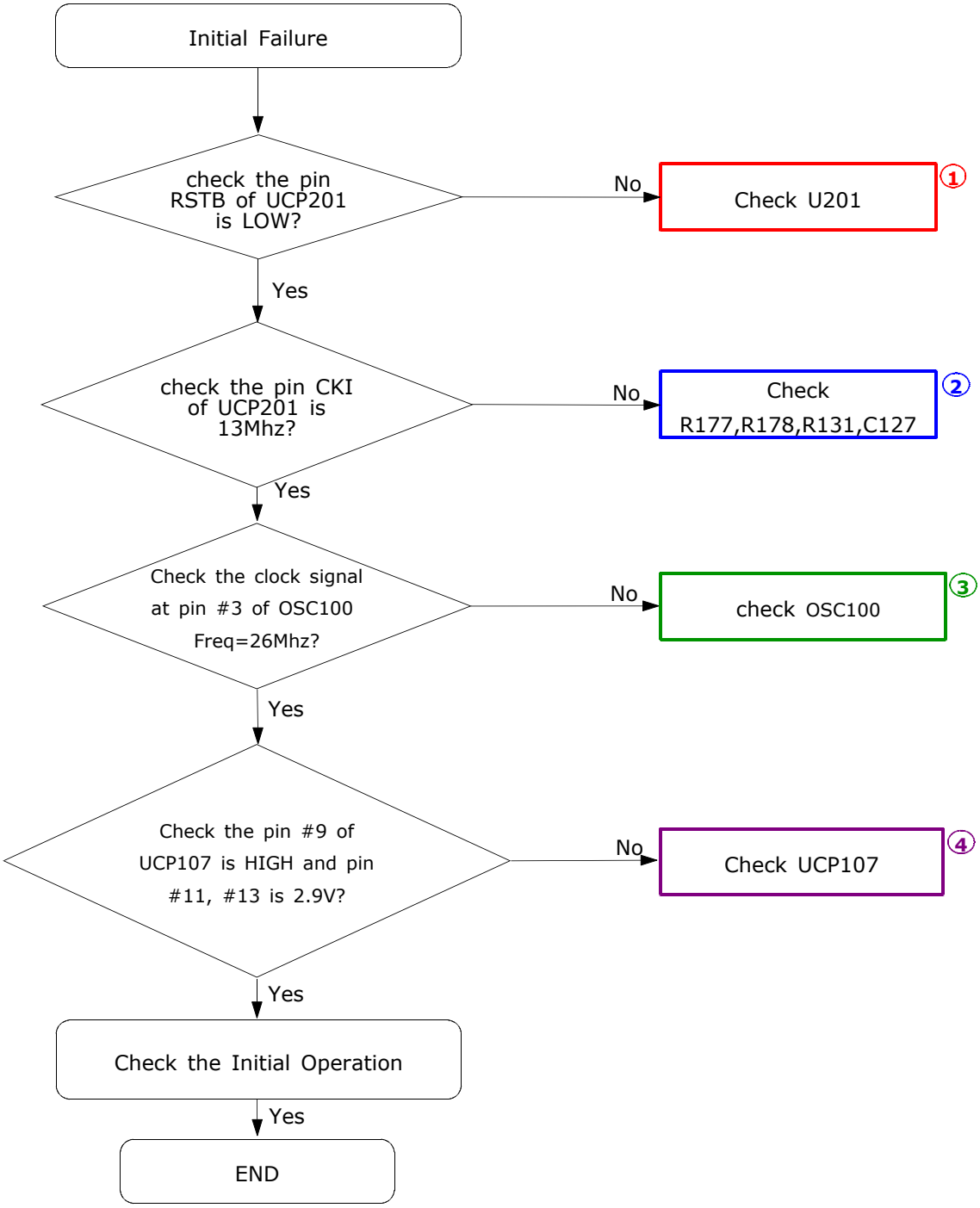
10-1-1. Power ON

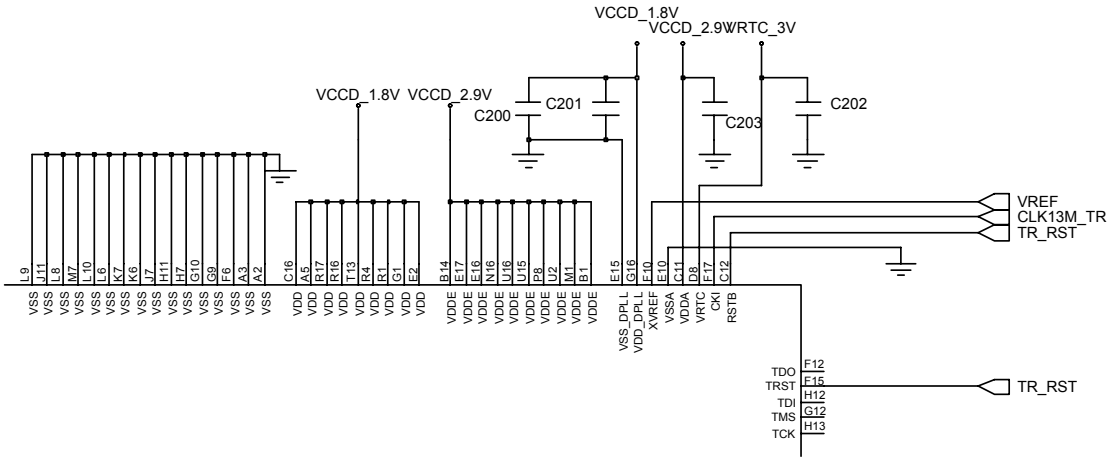


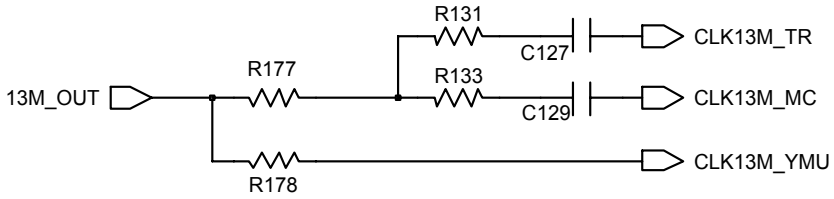


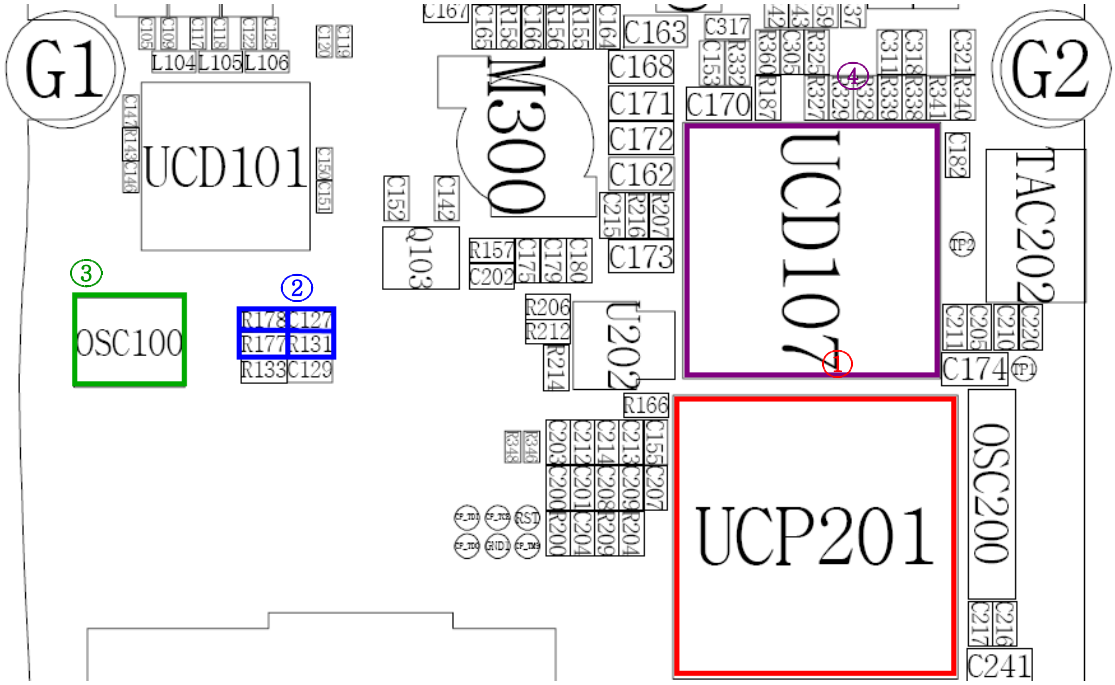


10-1-2. Initial

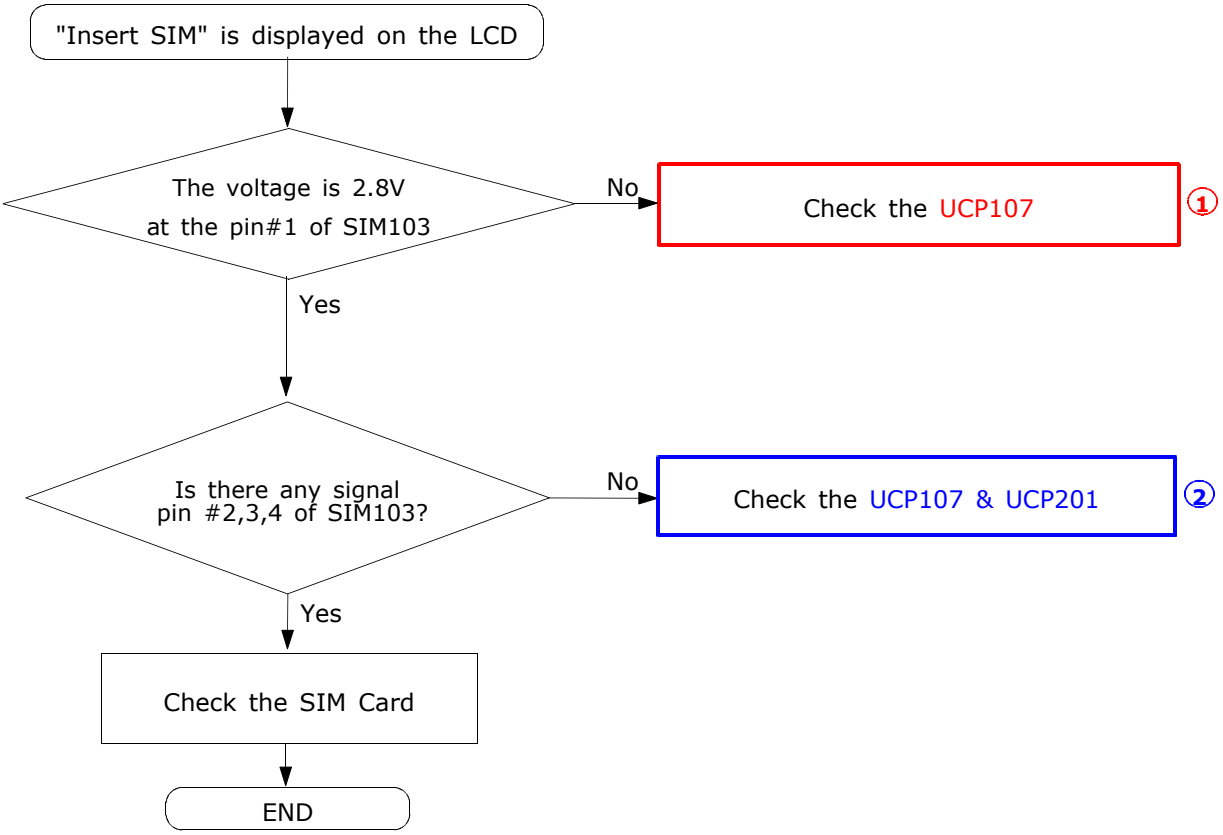


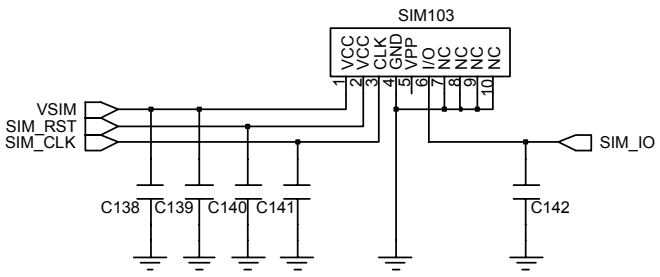


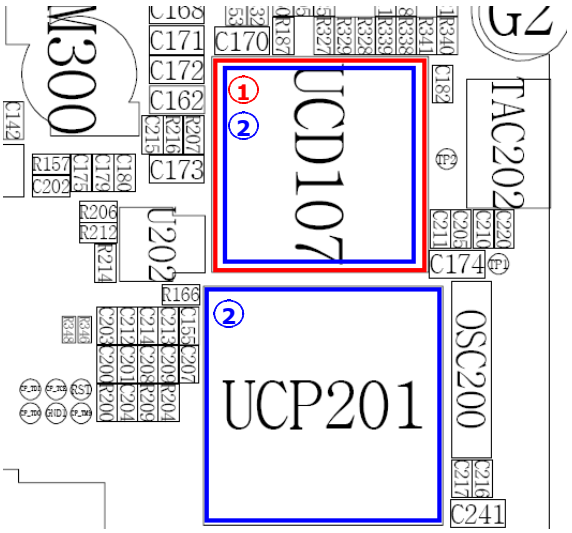




10-1-3. Sim Part

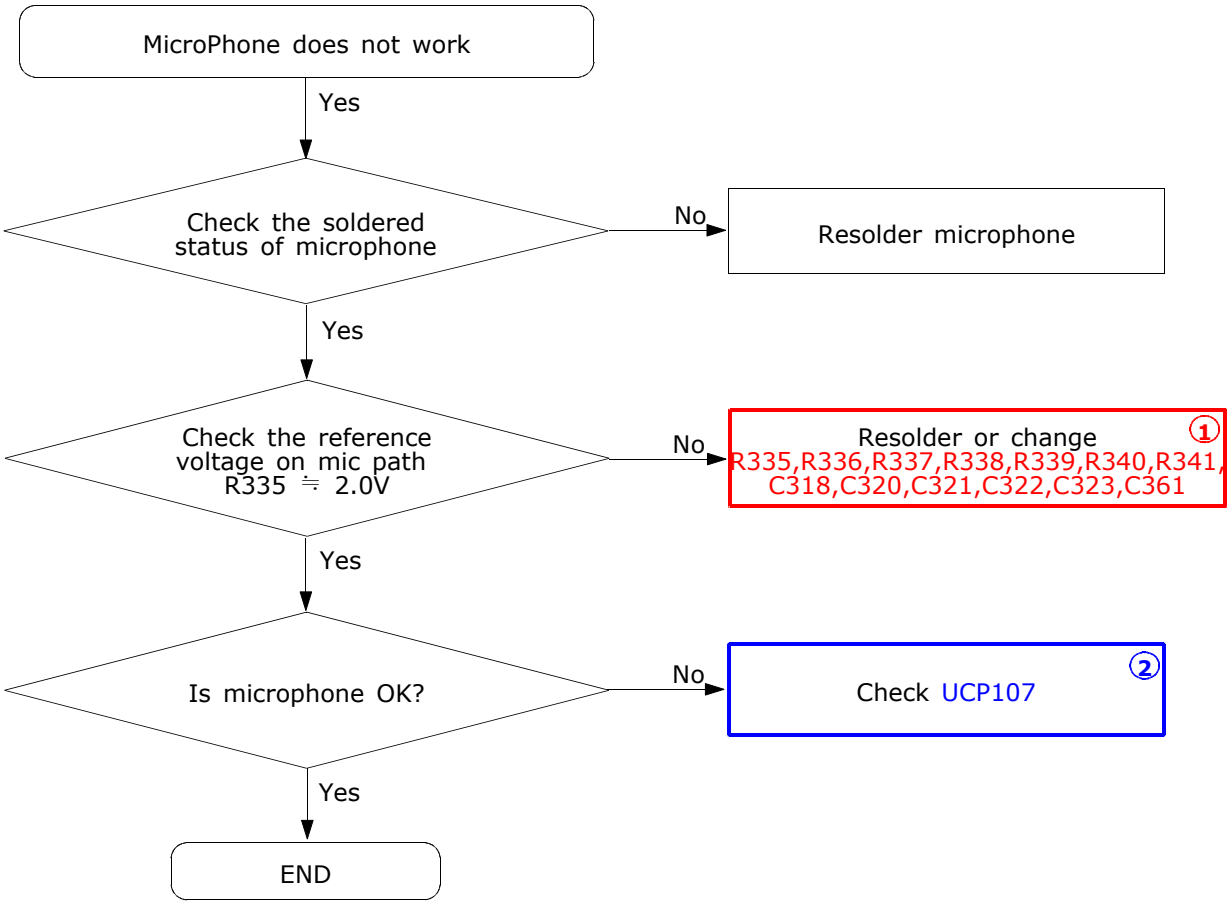


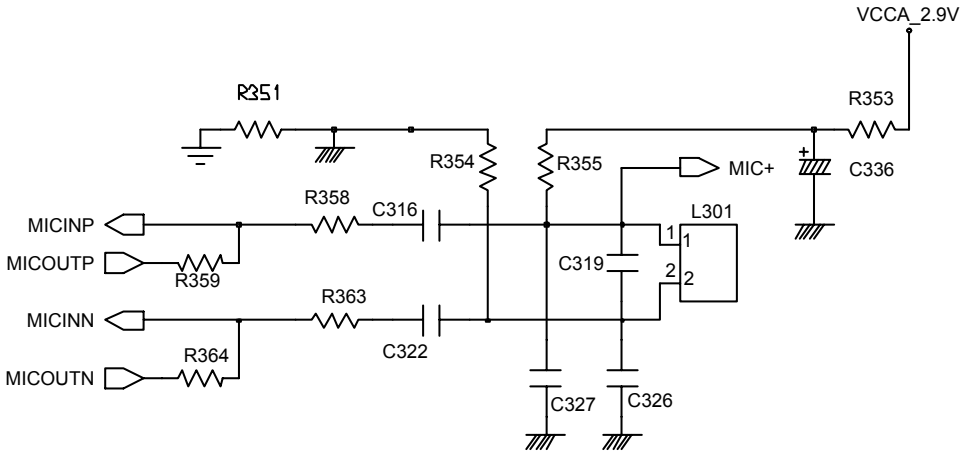


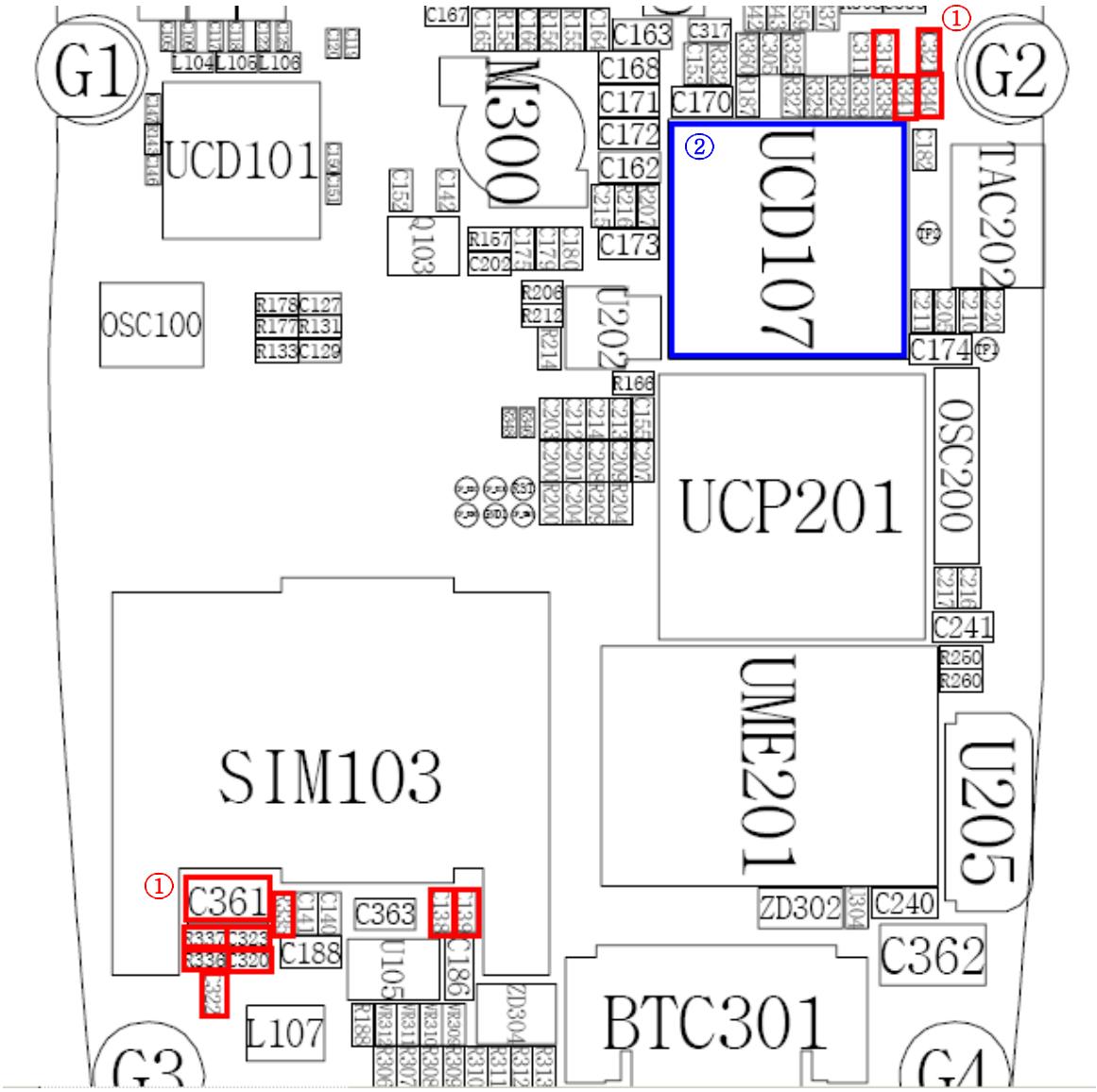


10-1-4.Microphone Part

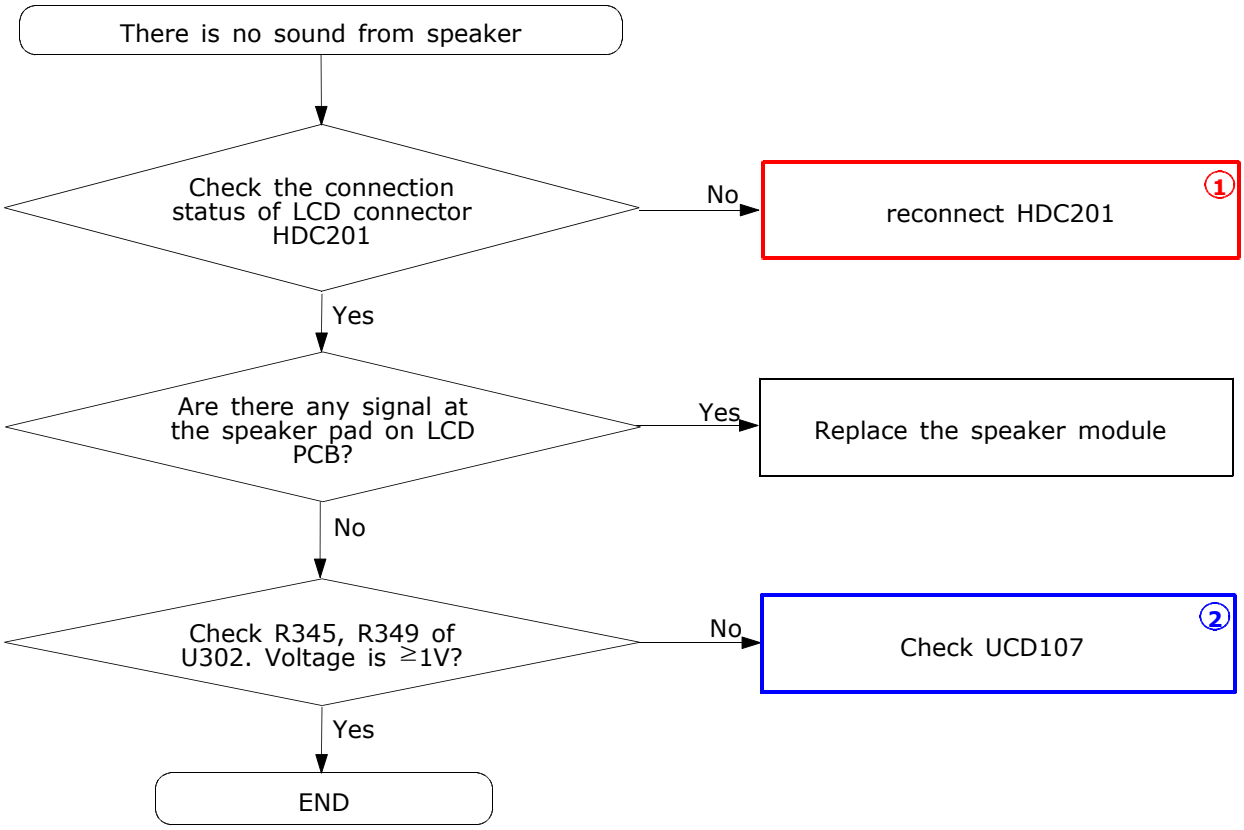
* Call with Sim before testing.

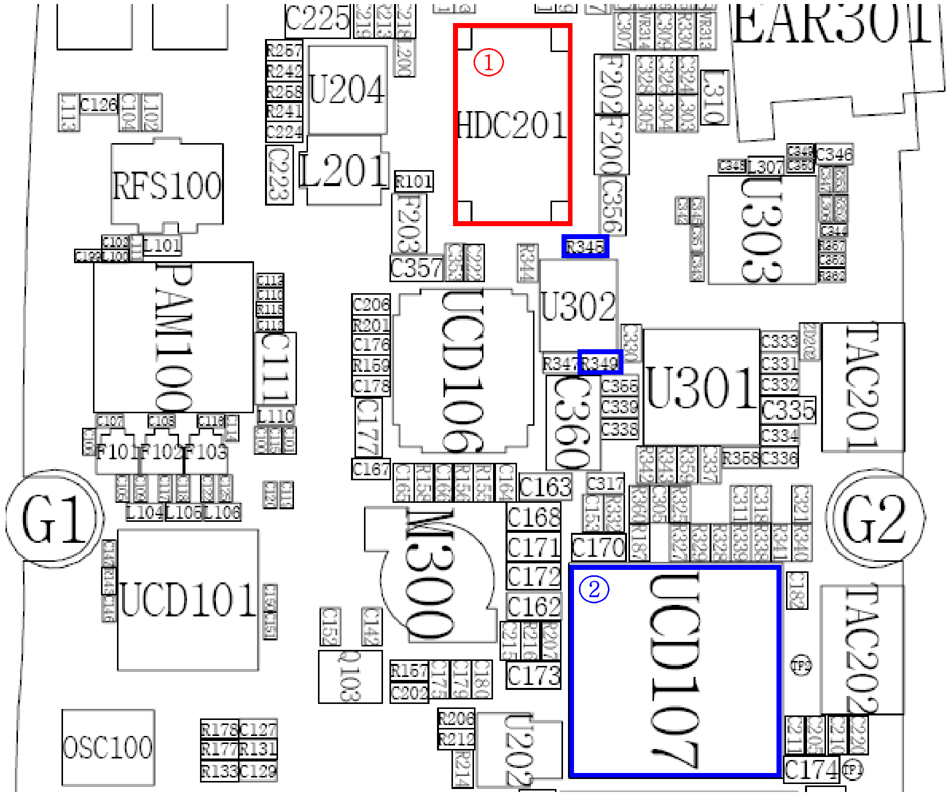




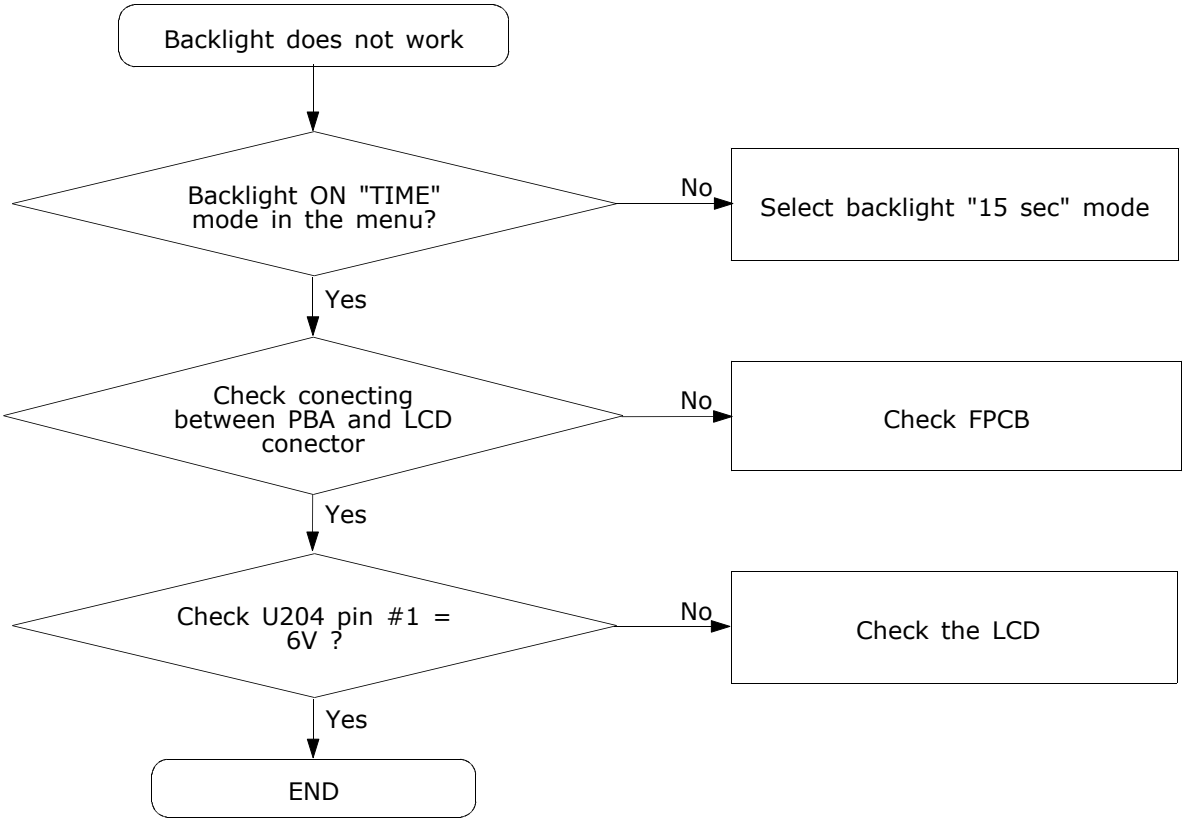


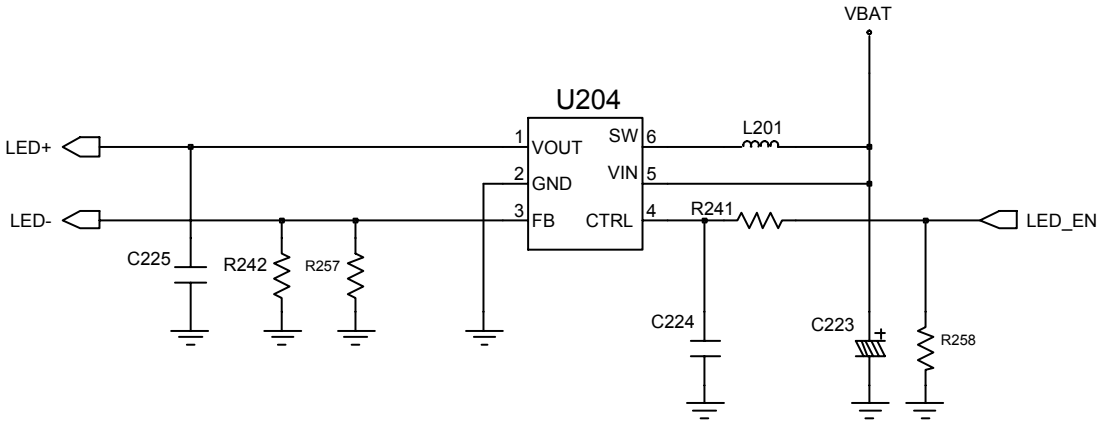
10-1-5. Speaker Part





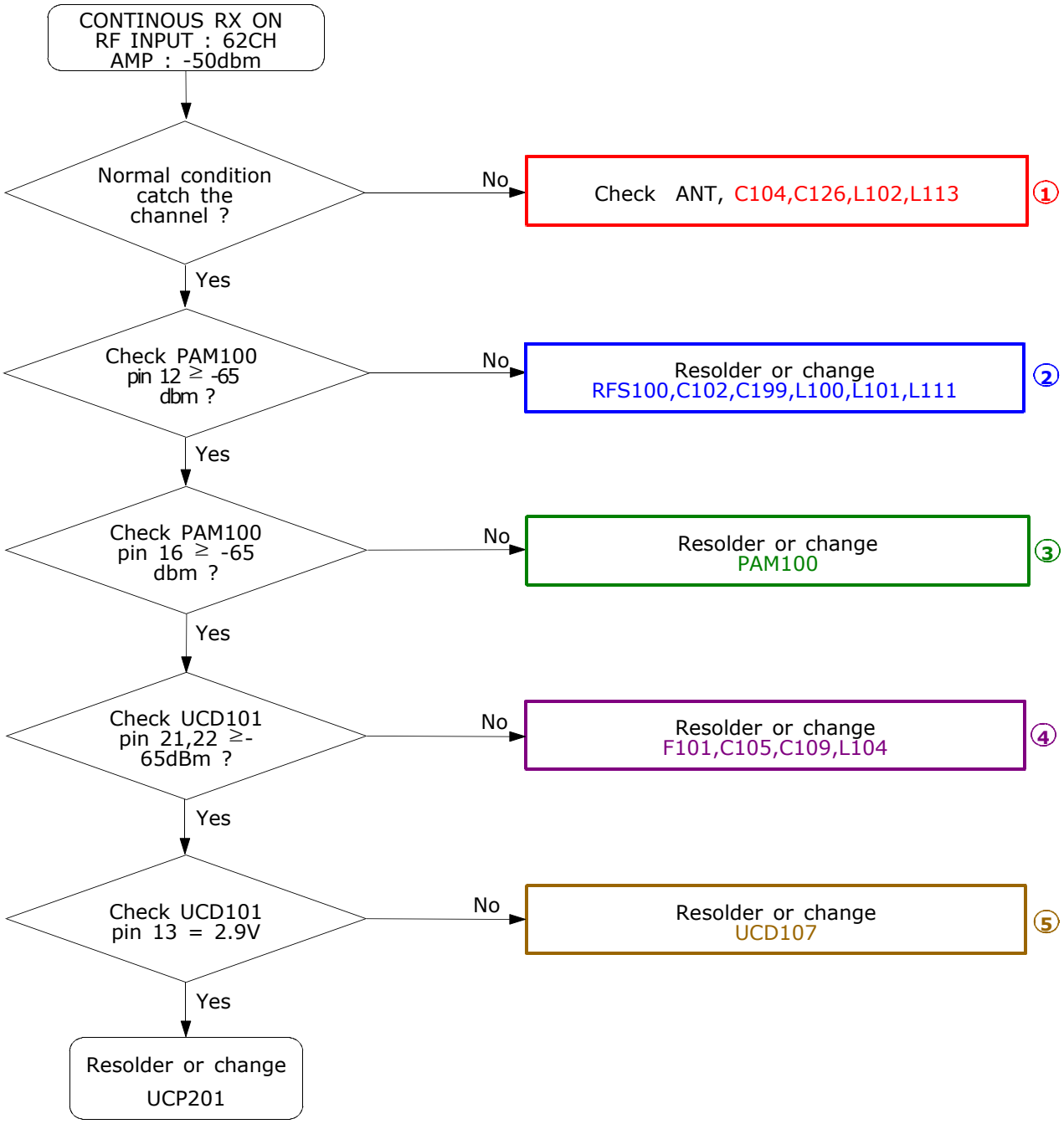
10-1-6. LCD backlight

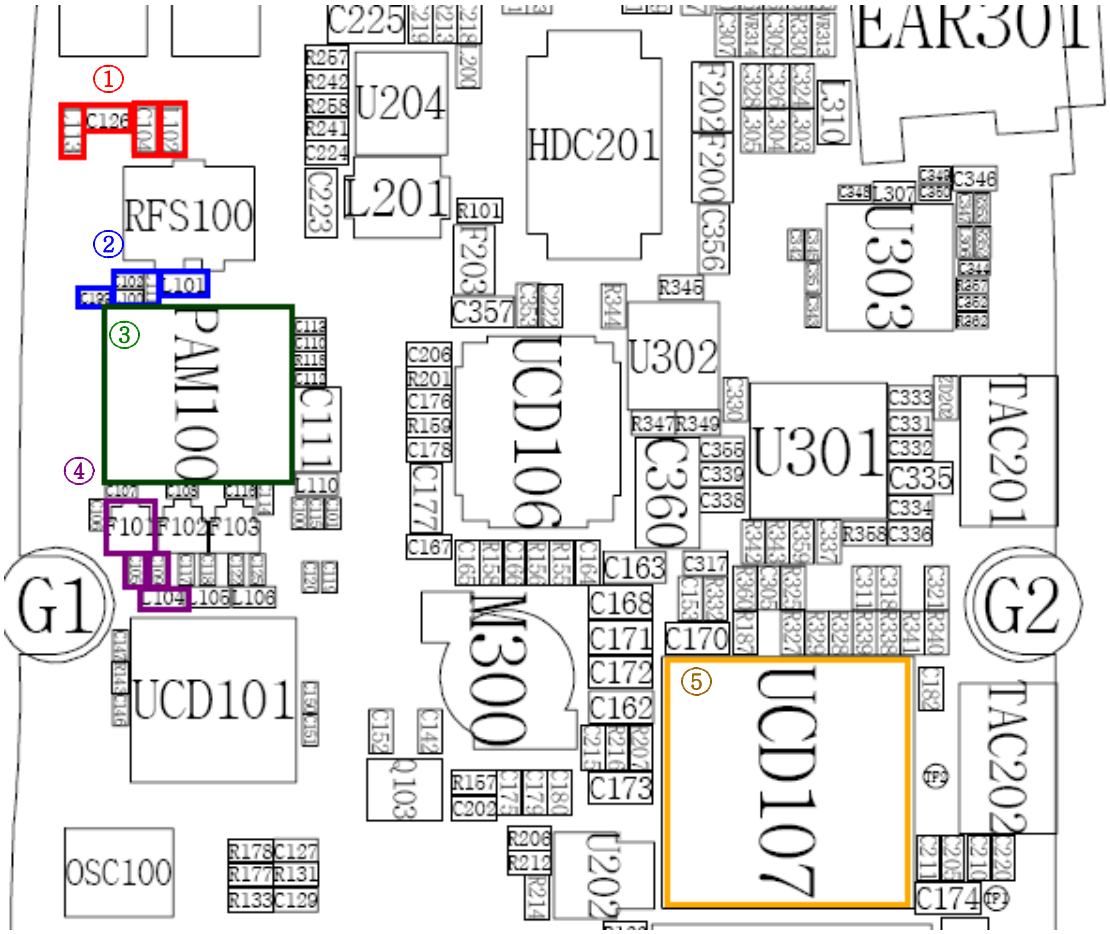




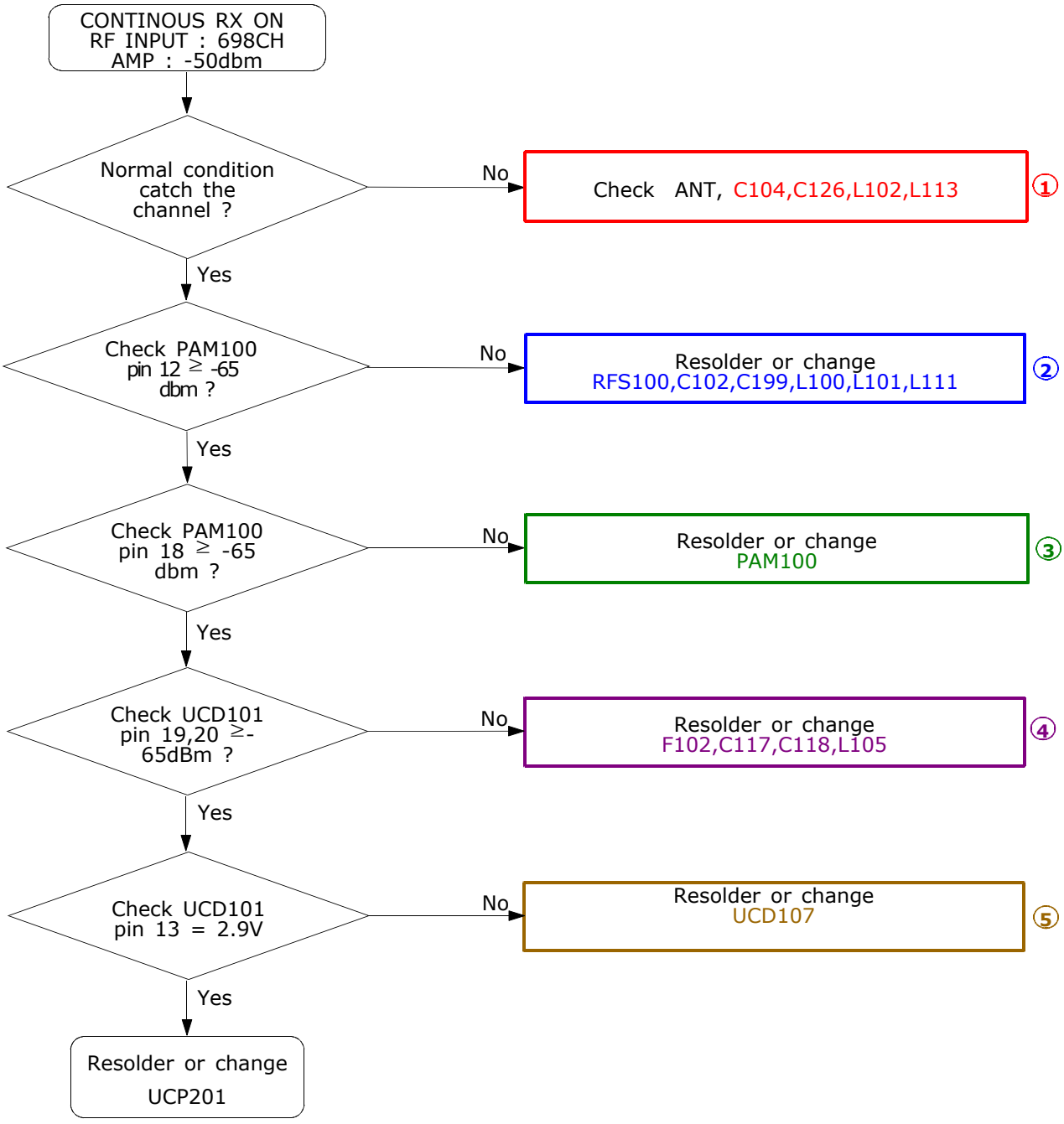
10-2. RF

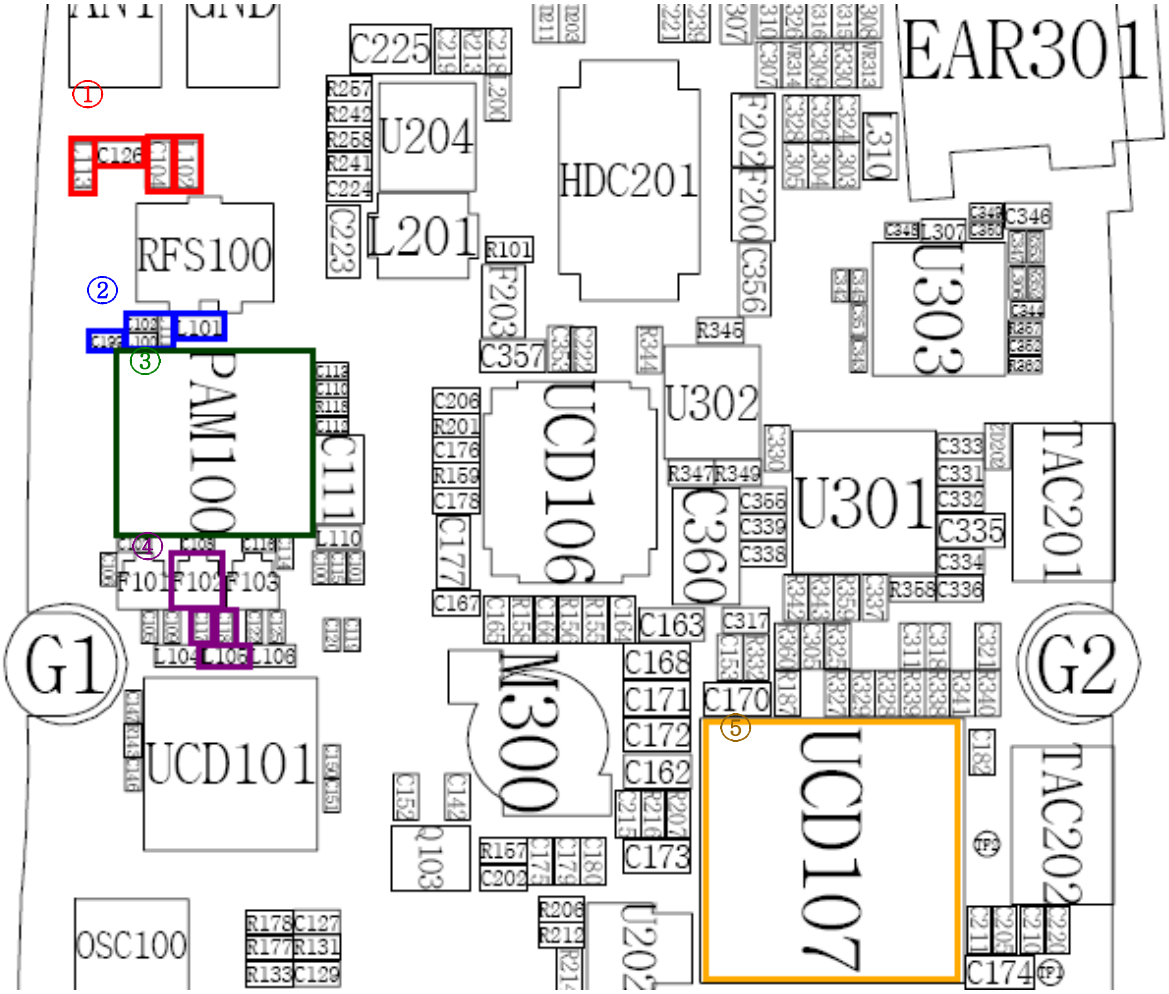
10-2-1. GSM Rx

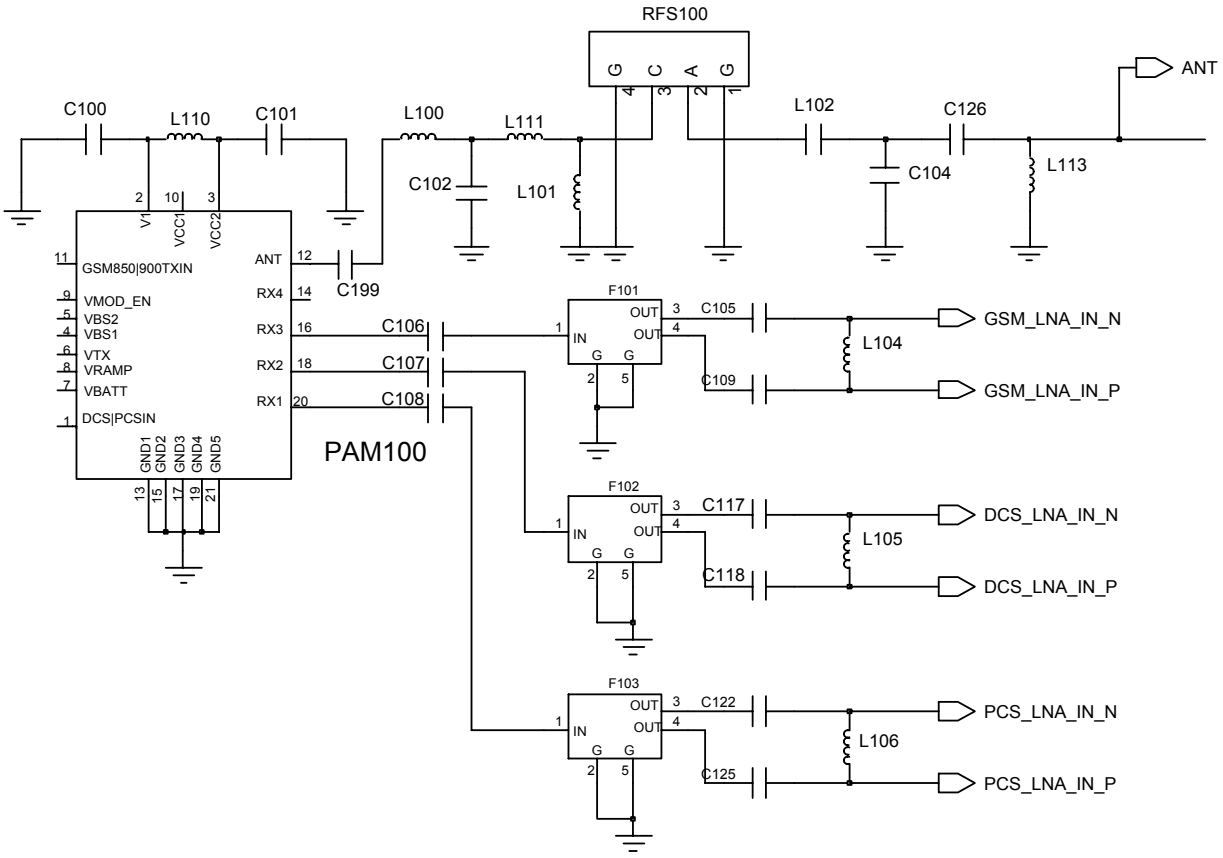




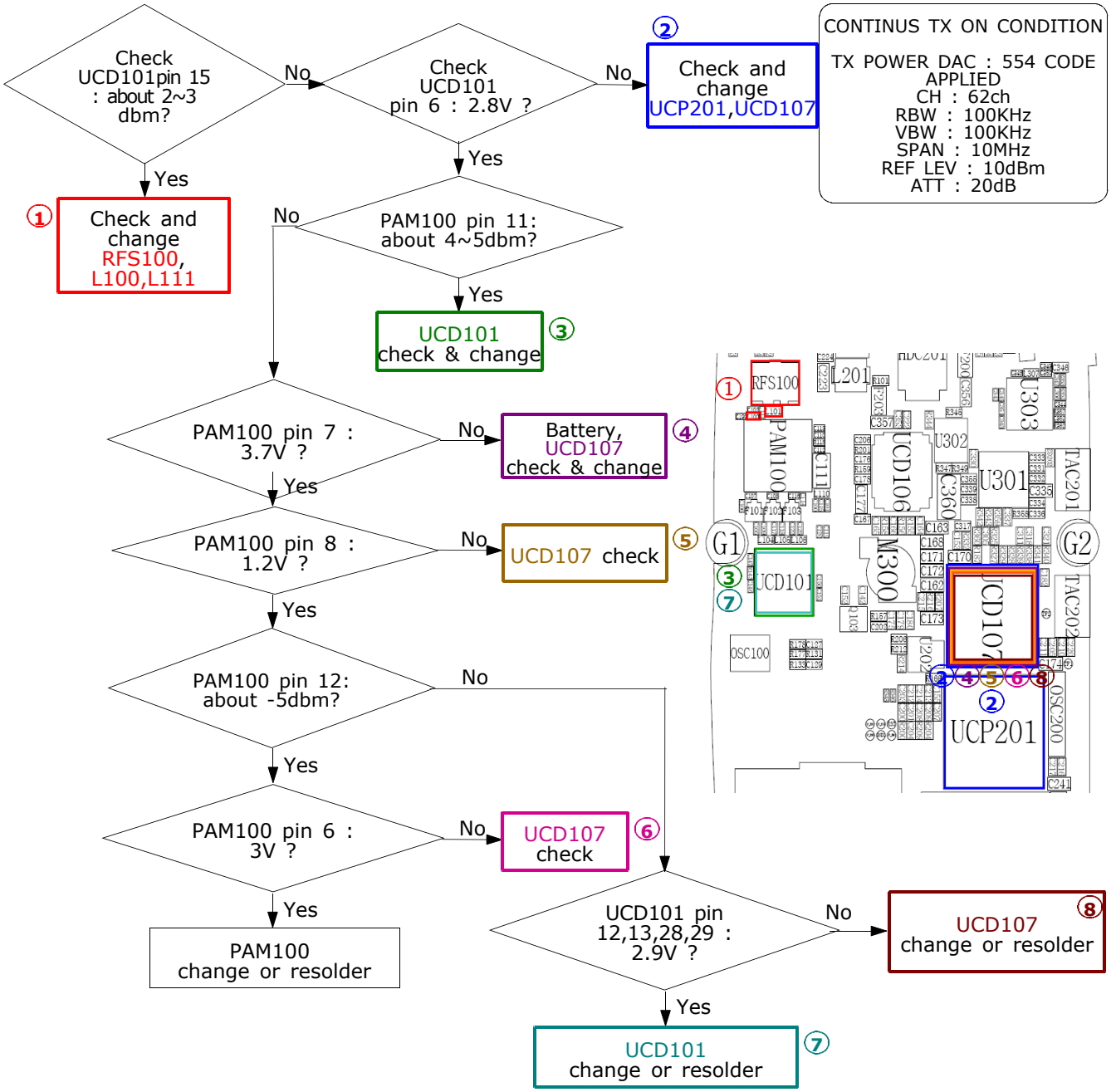
10-2-2. DCS Rx



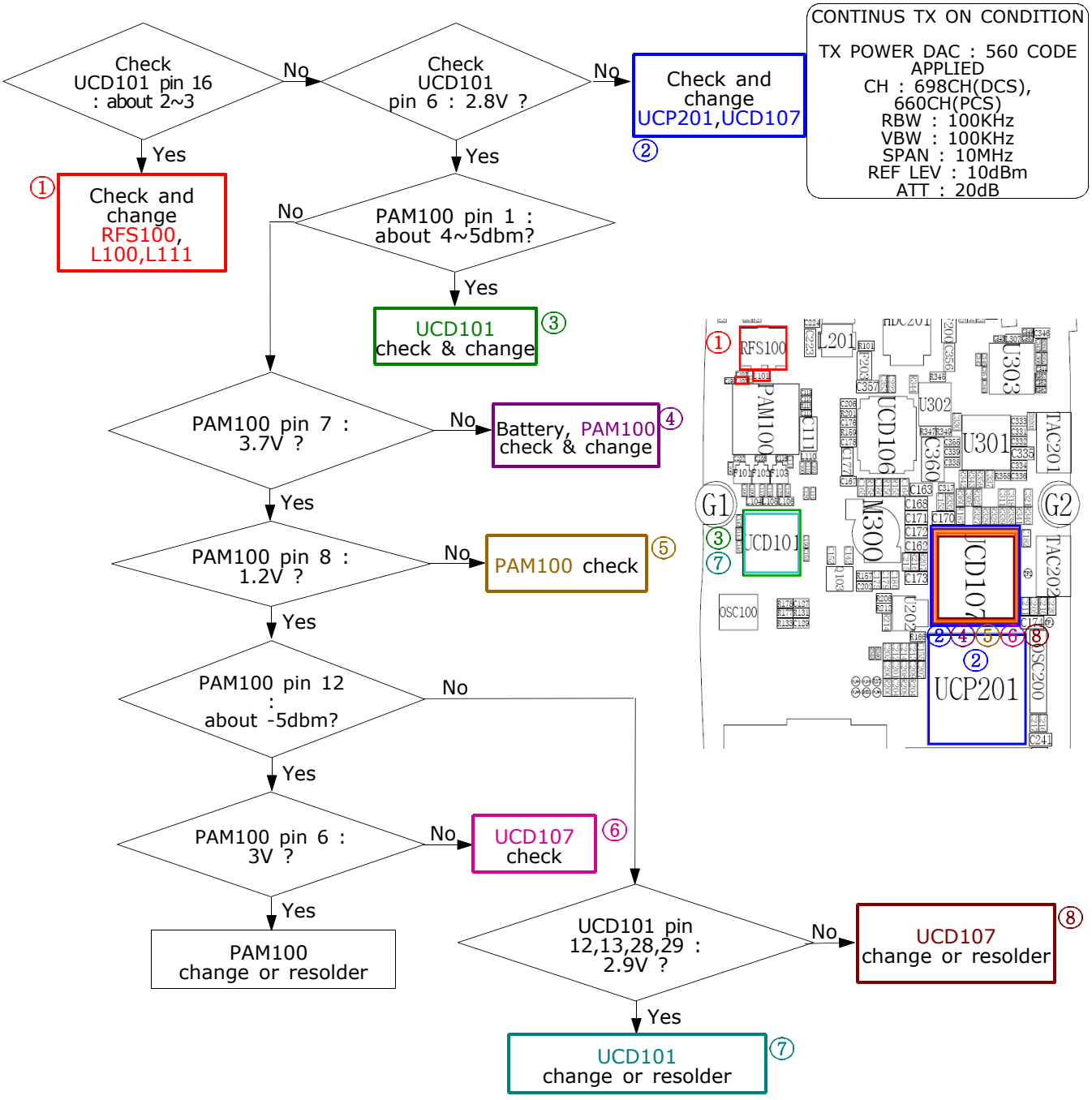




10-2-3. GSM Tx



10-2-4. DCS Tx



11. Reference data

11-1. 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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