

**SAMSUNG**

# UMTS TELEPHONE

## SGH-i600

# ***SERVICE*** *Manual*

### UMTS TELEPHONE



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## 10. Reference data

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# 1. Safety Precautions

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## 1-1. Repair Precaution

- Repair in Shield Box, during detailed tuning.  
Take specially care of tuning or test, because the specification 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 magnetic 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.

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## 2. Specification

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### 2-1. GSM General Specification

	<b>EGSM 900</b>	<b>DCS 1800</b>	<b>PCS 1900</b>	<b>W-CDMA 2100</b>
Freq. Band[MHz] Uplink/Downlink	880~915 925~960	1710~1785 1805~1880	1850~1910 1930~1990	1920~1980 2110~2170
ARFCN range	0~124 & 975~1023	512~885	512~810	UL:9612~9888 DL:10562~10838
Tx/Rx spacing	45MHz	95MHz	80MHz	190MHz
Mod. Bit rate/ Bit Period	270.833kbps 3.692us	270.833kbps 3.692us	270.833kbps 3.692us	3.84Mcps (chip rate)
Time Slot Period / Frame Period	576.9us 4.615ms	576.9us 4.615ms	576.9us 4.615ms	Frame length : 10ms Slot length : 0.667ms
Modulation	0.3GMSK	0.3GMSK	0.3GMSK	QPSK (DL) HPSK (UL)
MS Power	33dBm ~ 5dBm	30dBm ~ 0dBm	30dBm ~ 0dBm	24dBm ~ -50dBm
Power Class	4 (max +33dBm)	1 (max +30dBm)	1 (max +30dBm)	3 (max +24dBm)
Sensitivity	-102dBm	-100dBm	-100dBm	-106.7dBm
TDMA Mux	8	8	8	
Cell Radius	35Km	2Km	2Km	2Km

## 2-2. GSM TX power class

<b>TX Power control level</b>	<b>GSM900</b>	<b>TX Power control level</b>	<b>DCS1800</b>	<b>TX Power control level</b>	<b>PCS1900</b>
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

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## 3. Product Function

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### Main Function

- Homescreen - Card Wheel
- PIM - Calendar, Contacts, Tasks, Voice Notes
- Messaging - SMS, MMS, Postcard, E-Mail, Pocket MSN
- Video Telephony
- ActiveSync
- Multimedia capability - Windows Media Player, Camera, Camcorder
- Wireless capability - Bluetooth, Wireless LAN
- Internet Explorer
- Internet Sharing
- Accessary Applications - Alarms, Calculator, D-Day, Notepad, Smart Converter, Stopwatch, World Clock, Smart Search, Task Manager, OBEX FTP
- RSS Reader, Podcast
- Pictel Viewer
- File Explorer, My Items
- Voice Assist (only for germany, france, england, russia)
- Speaker Phone capability
- Games (Bubble Breaker, Solitaire)





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## 4. Array course control

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### 4-1. Software Adjustments

- There are 2 set to download the binary image into your device.

[First set]



1. JIG (GH80-03308A)
2. USB Cable
3. Test Cable(GH39-00558A): JIG to phone
4. Power Cable: JIG to power supply
5. Serial Cable: PC to JIG
6. Power Supply

**[Second Set]**



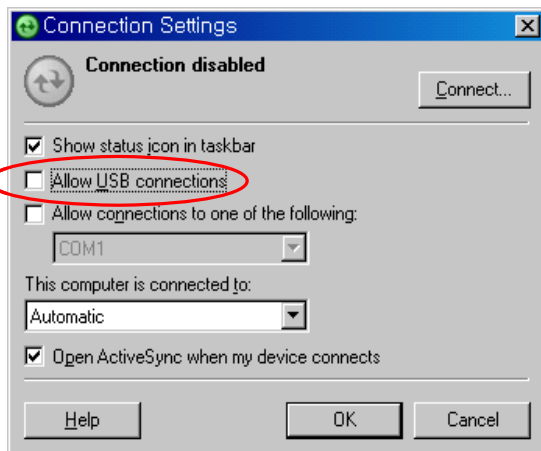
1. USB DATA Link Cable(PCB200BBE)
2. Battery

## 4-2. Software Download

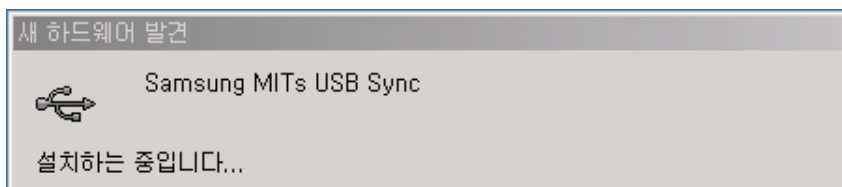
### 4-2-1. Pre-requisite for Download

- Downloader Program (there are 3 ways to download.)
  - [WCEDownloader v1.1Single.exe](#)
  - [WCEDownloader v1.1.exe \(multidownloader\)](#)
  - [\[unknown\].exe](#)
- SGH\_I600 Mobile Device
- Binary files
- Active sync Setting
- Driver Installation.

### 4-2-2. Active sync setting and Driver Installation



- Make sure that the active sync program is checked before connecting your device to the host computer.
- If the active sync program is working in your computer, Make sure that check box, **Allow USB connection** at the Connection Setting, is released.
- Press 'OK' button to save a configuration.

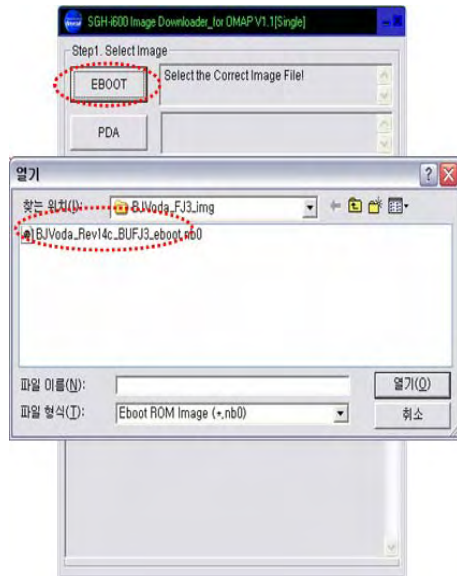


- You can see the next picture if usb driver is not installed when you try to connect the device to the host computer.
- You have to install the file which is name of '**wceusbsh.inf**' when you select the driver.

### 4-2-3. S/W Download Process

#### Single Download (WCEDownloader v1.1Single.exe)

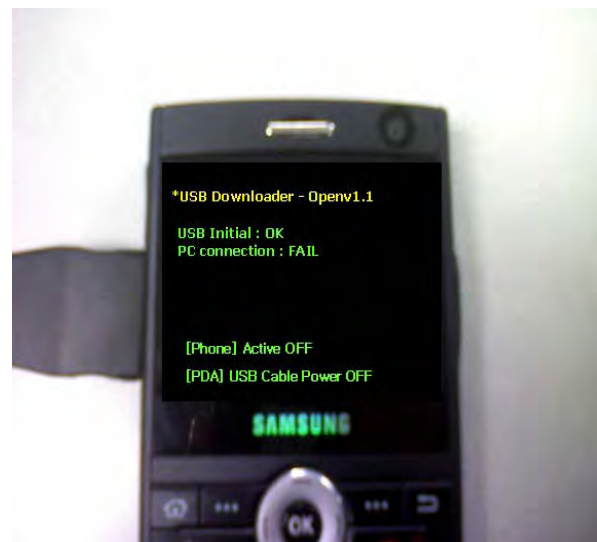
- How to connect the device to your host computer.



- Make sure that '**SAMSUNG Composite USB Driver**' should be installed in your computer.
- Connect your device to the host computer by using **MSM USB cable**.
- Select the binary files by using Eboot, PDA and PHONE buttons.



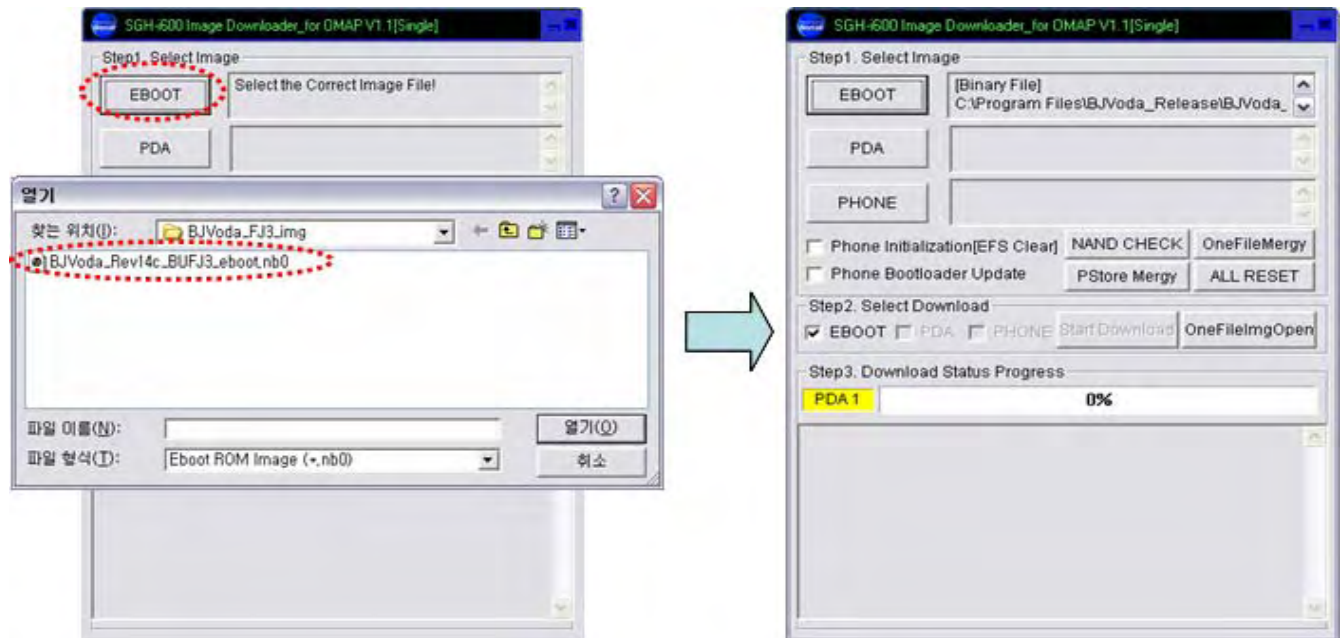
- Turn on your device to enter download mode when you press Function key and Soft 2 key simultaneously.



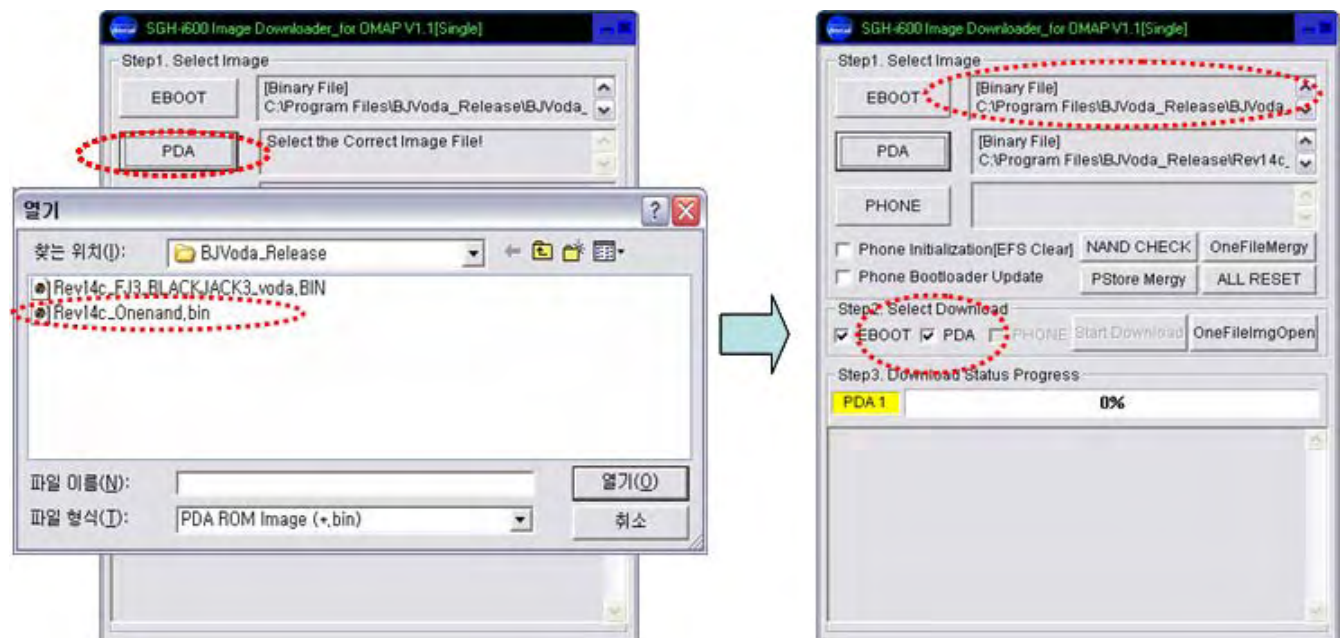
- You can see the upper picture when the connection is failed.
- Retry to connect the device with your host computer.

- Load the binary download program by executing the  
 “WCEDownloader v1.1Single.exe”

1. First select the bootloader image by clicking the EBOOT button. The Eboot Checkbox will be activated.

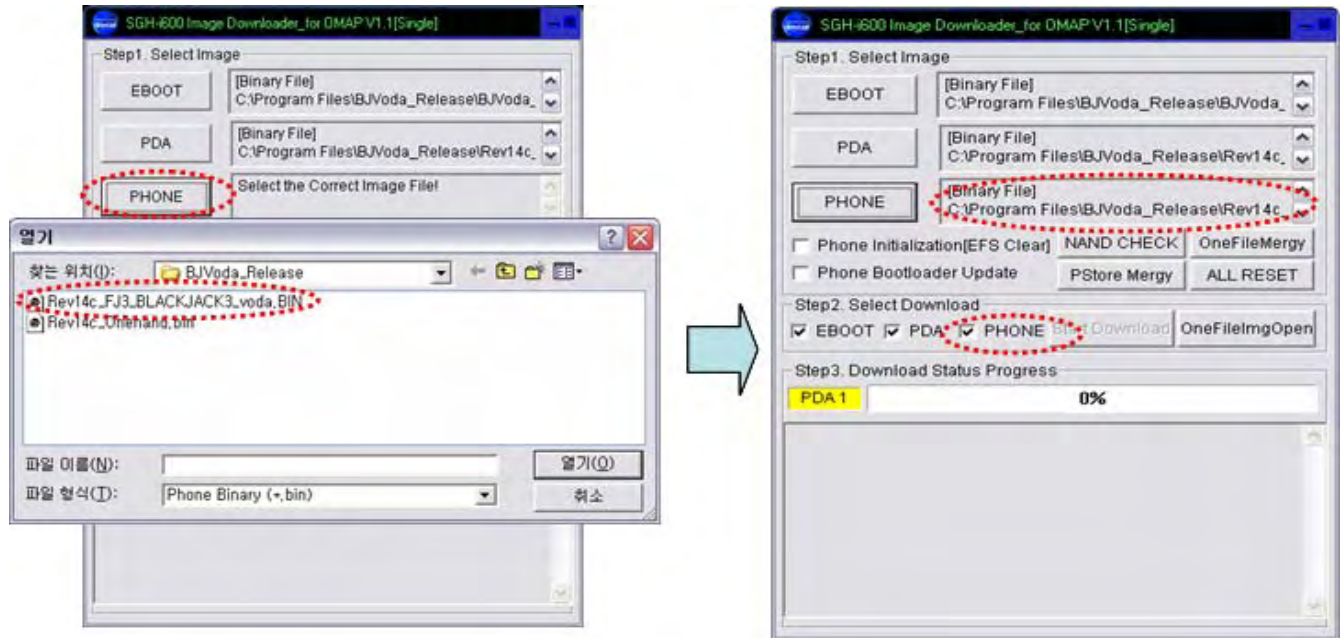


2. Click the PDA Button to select the PDA image, then the PDA checkbox will be activated.

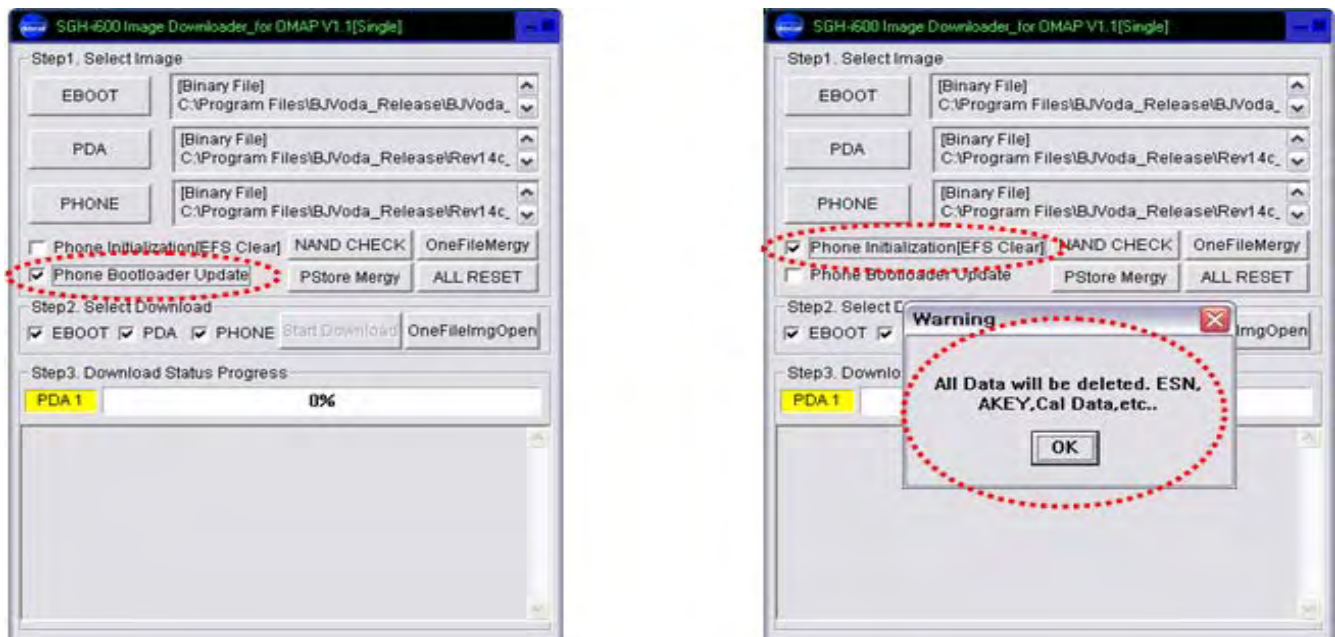




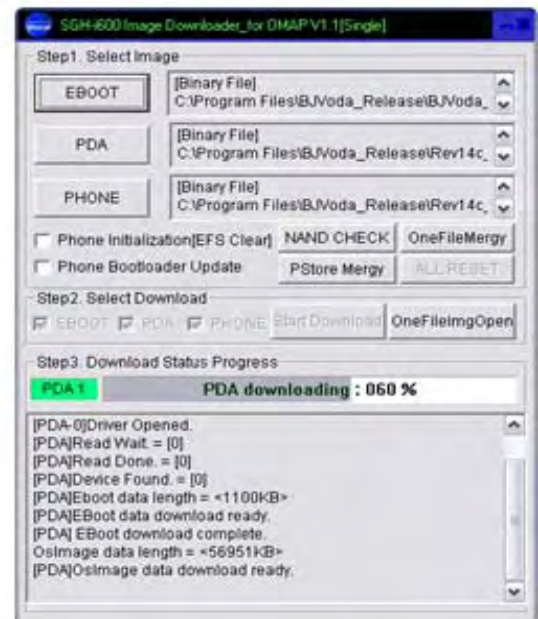
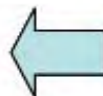
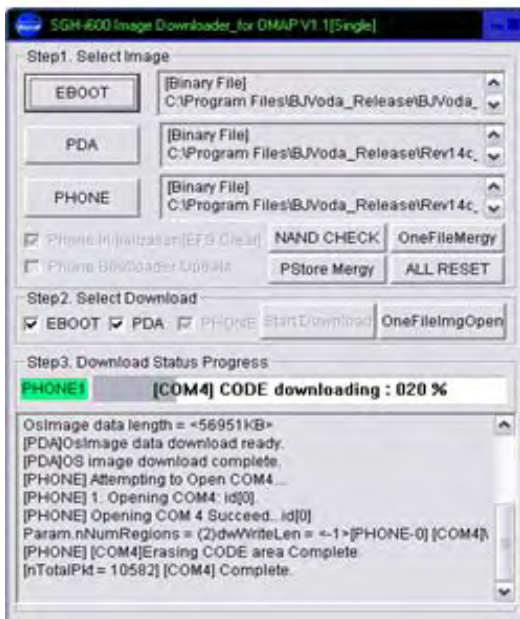
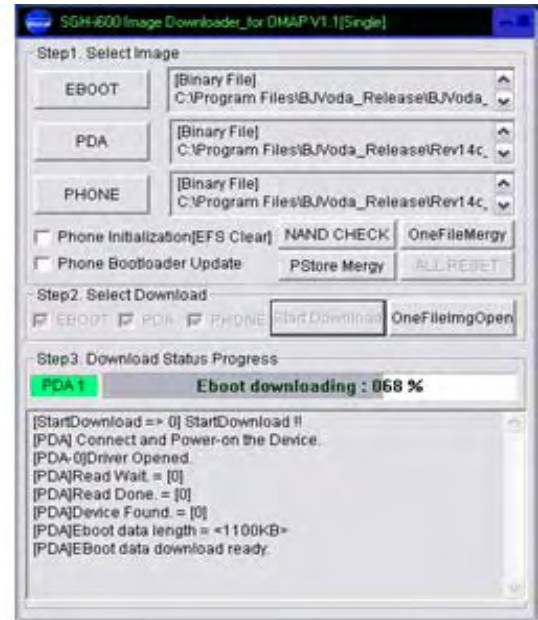
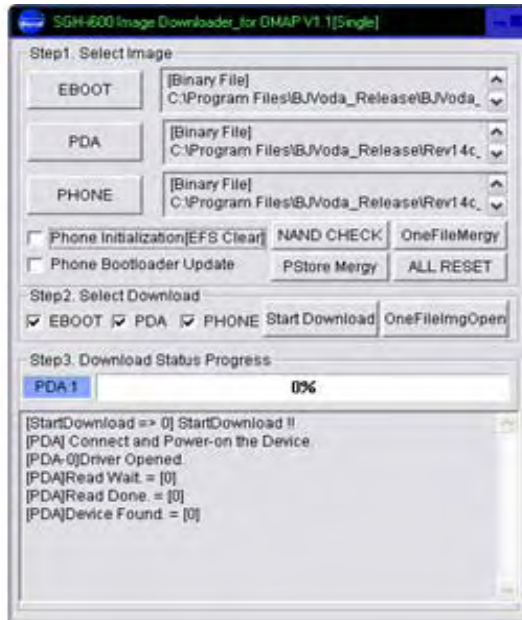
- Click the PHONE Button to select the PHONE image, then the PHONE checkbox will be activated.



- If you need to update phone bootloader, you should check the 'Phone Bootloader Update' checkbox. So does 'EFS Clear'.

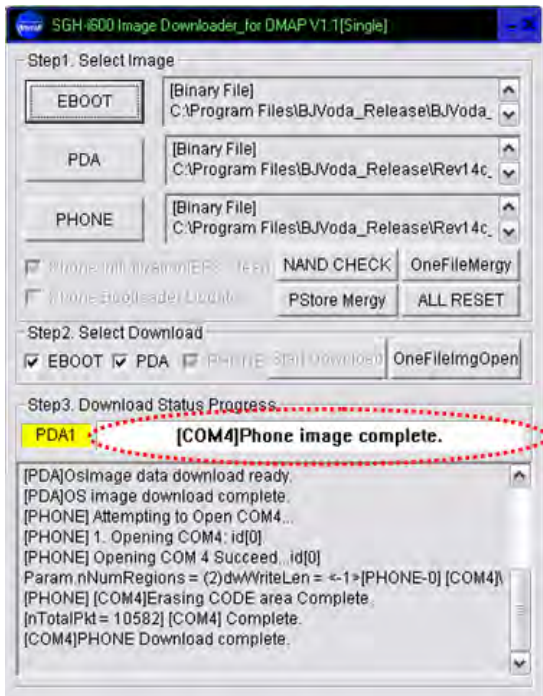


5. If the device connected with the host PC, the color of progress bar will be changed with blue. In that time, You can push the start button to download the binary image.

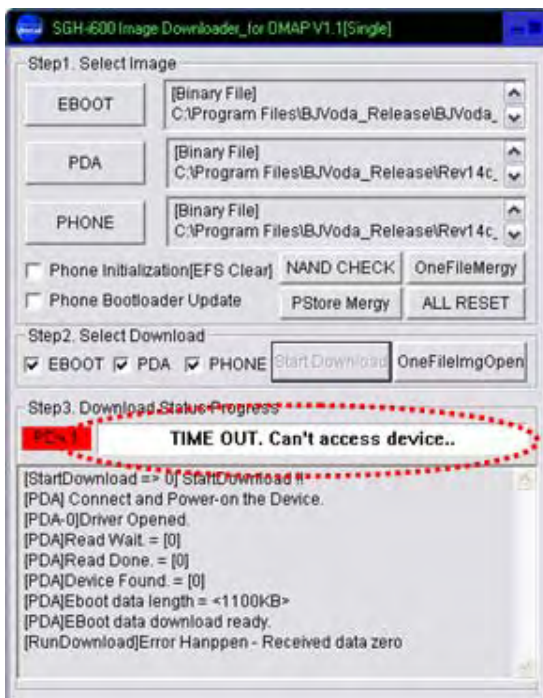




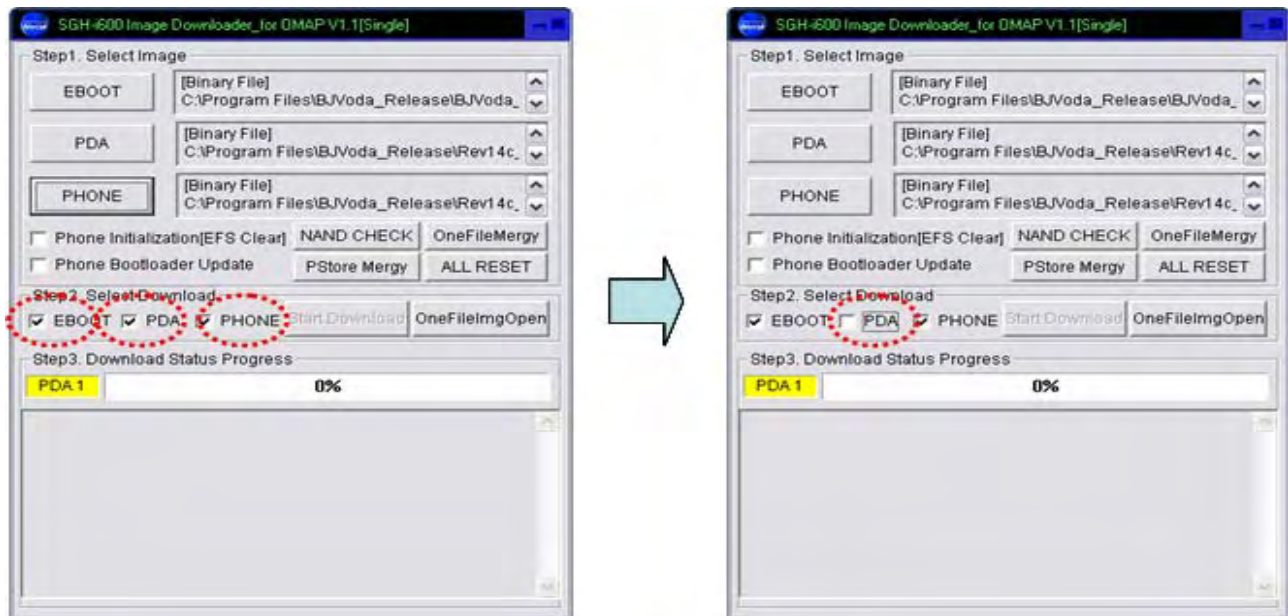
6. You can see the below picture, when it is done. And the device will be rebooted. If your device is turned on successfully, every downloading procedure is finished.



7. If some error occurs, You have to restart download program or push the all reset button.

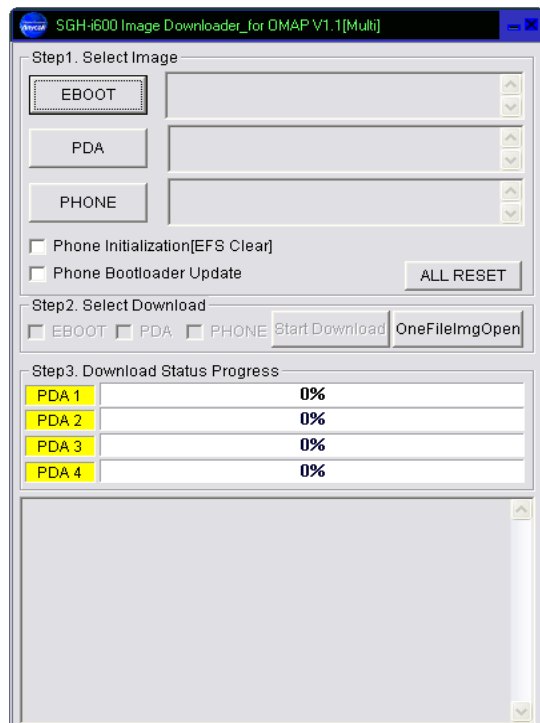


8. If you want to omit to download PDA image, you can release the PDA check box. And Eboot, Phone download are the same as this.



#### 4-2-4. Multi Download ([WCEDownloader v1.1.exe \(multidownloader\)](#))

■ Multi-download is almost same as single download.

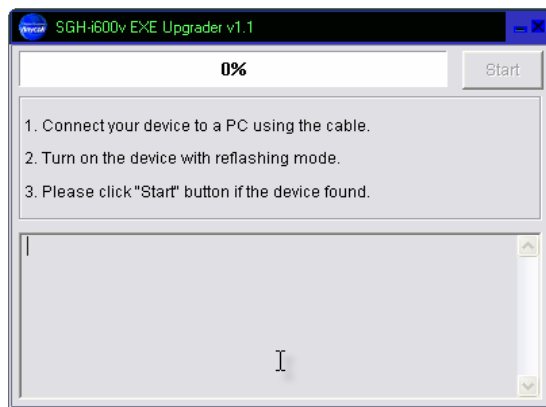


■ The difference is below.

1. There are four progress bars. It means you can download four devices at once.
2. The device will be rebooted automatically after download. In that time, 'MITs USB RNDIS Driver' is not detected in the host PC. It means you can't use the active sync program. So Make sure that you have to restart the device after first booting.

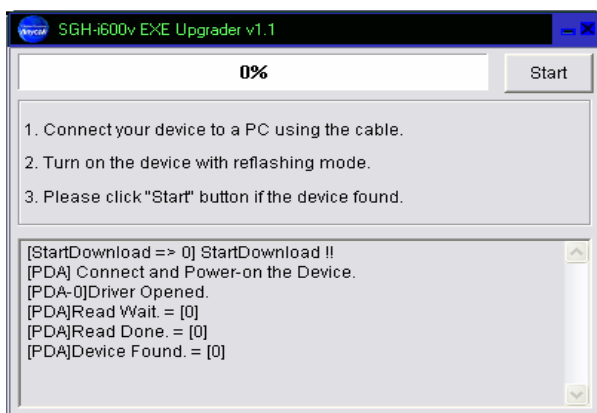
#### 4-2-5. USER ROM Upgrader ([unknown].exe)

■ This program is to update user's device.



■ Execute the "[unknown].exe"

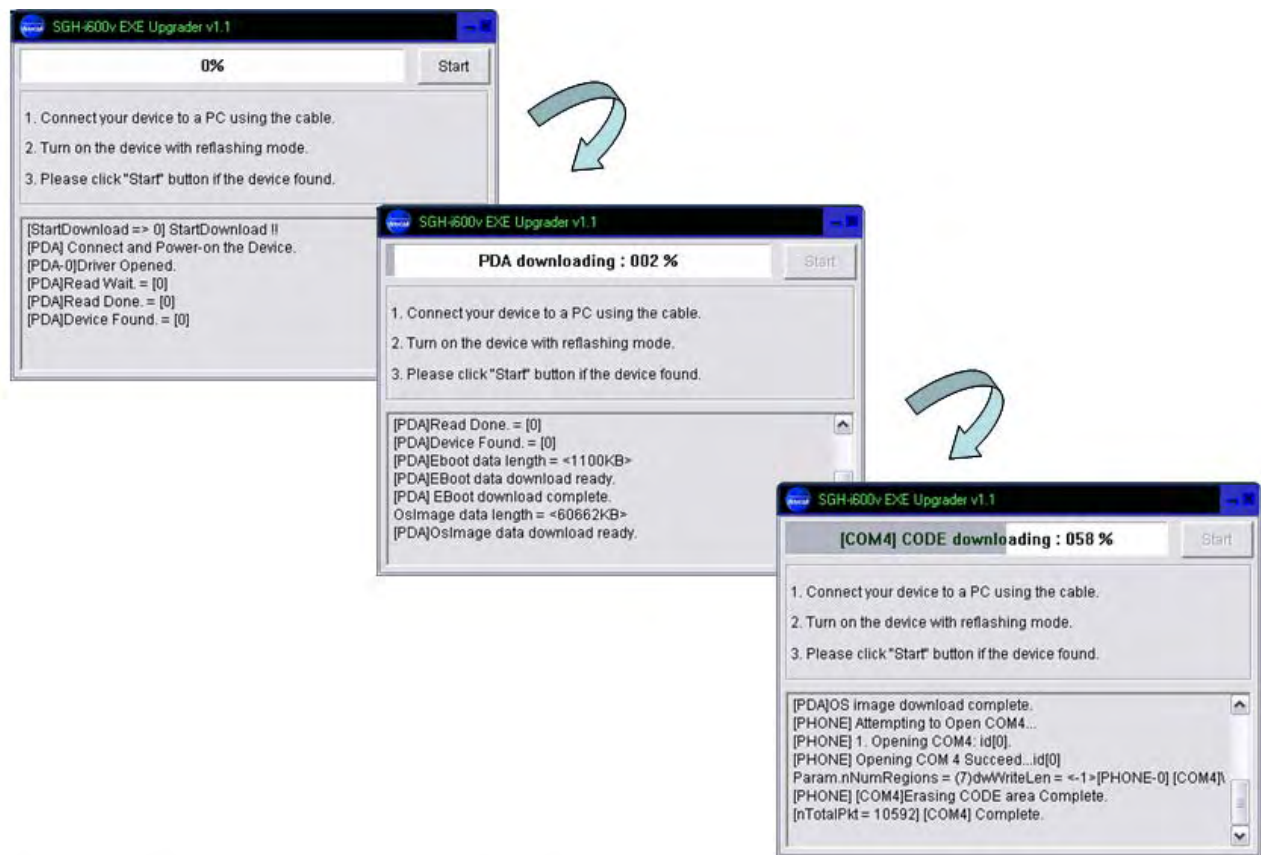
1. Connect with the host PC.



• If the connection is succeeded, 'Start' button will be activated.

• Press 'Start' button to upgrade your ROM image.

## 2. Download Procedure

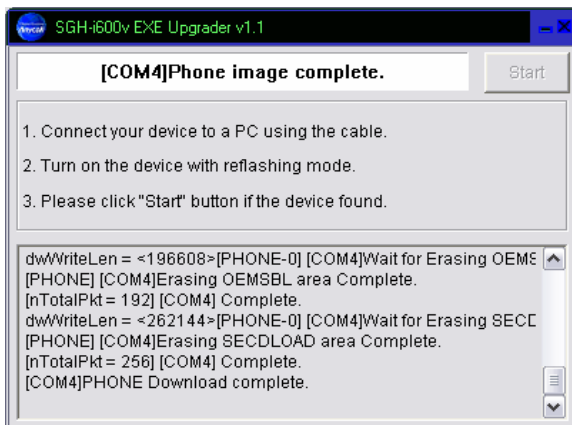


1. EBOOT downloading

2. PDA downloading

3. Phone downloading

**\*If some error happens, you must download again**



• You can see the next picture when it is done. And the Device will be rebooted.

• If your device is turned on successfully, every downloading procedure is finished.

## 3. Download is completed.

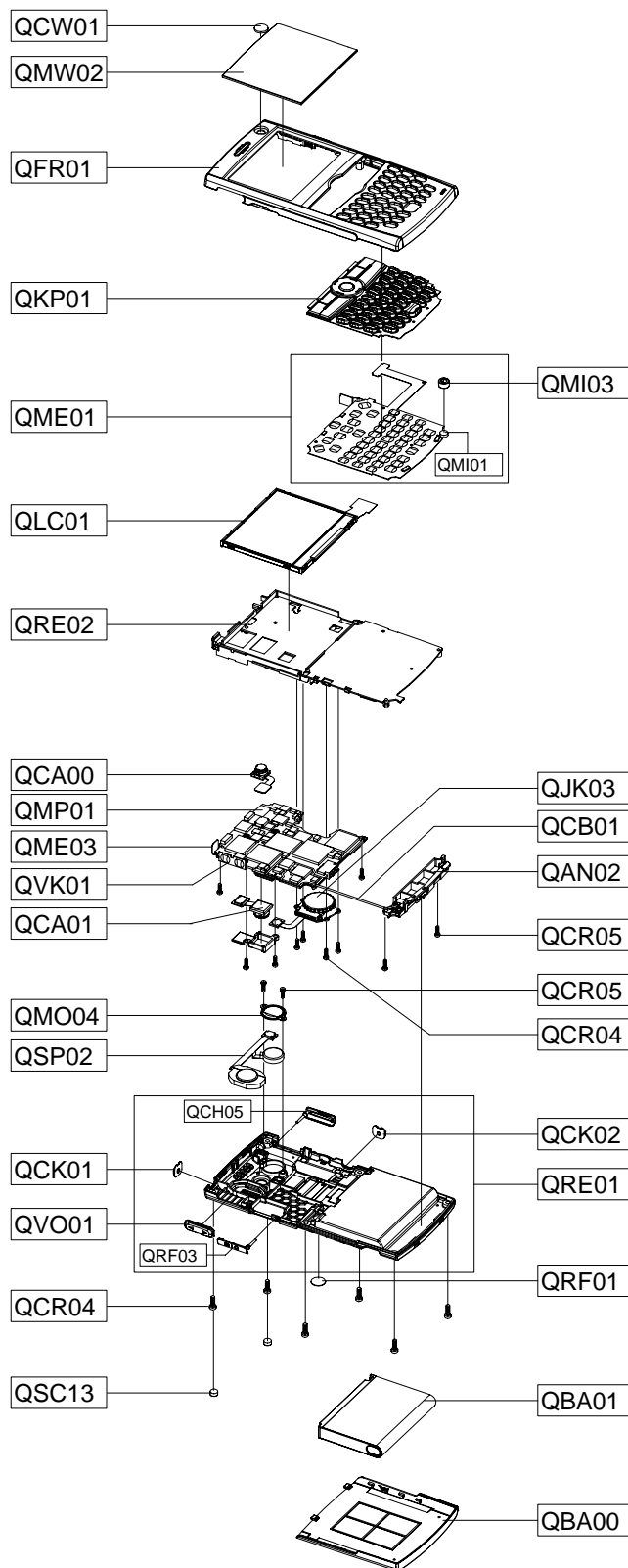


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## 5. Exploded View/Disassembly&Assembly Instructions

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### 5-1. Cellular phone Exploded View



## 5-2. Cellular phone Parts list





Design LOC		Description	SEC CODE
QAN02		INTENNA-SG-I600	GH42-00964A
QBA00		ASSY COVER-BATTERY	GH98-02934A
QBA01		INNER BATTERY PACK-1200MAH,BLK	GH43-02624A
QCA00		UNIT-CAMERA(SELF)	GH59-03477A
QCA01		UNIT-CAMERA(REC)	GH59-03632A
QCB01		CBF COAXIAL CABLE	GH39-00671A
QCK01		PMO-POWER KEY	GH72-34384A
QCK02		PMO-BACK KEY V2	GH72-33475A
QCR04		SCREW-MACHINE	6001-001479
QCR04		SCREW-MACHINE	6001-001479
QCR05		SCREW-MACHINE	6001-001478
QCR05		SCREW-MACHINE	6001-001478
QCW01		PCT-COVER VGA CAM WINDOW	GH72-30530A
QFR01		ASSY ACCE-FRONT	GH98-00866A
QJK03		UNIT-JOG SWITCH ASSY	GH59-03503A
QKP01		ASSY KEYPAD-(XEC/BLK)	GH98-03373A
QLC01		LCD-MODULE	GH07-00985A
QME03		UNIT-F.P.C (P/K ) ASSY	GH59-03562A
QMI03		RMO-MIC HOLDER	GH73-05342A
QMO04		ICT-BRACKET MOTOR	GH70-01901A
QMP01		PBA MAIN-SGHI600	GH92-03297A
QMW02		PCT-COVER MAIN WINDOW	GH72-30531A
QRE02		ASSY BRACKET-REAR SHIELD V3	GH98-02552A
QRF01		MPR-TAPE RF PC SHEET	GH74-24522A
QSC13		RMO-RUBBER COVER REAR SCREW	GH73-07404A
QSP02		UNIT-SPEAKER,MOTOR FPCB ASSY	GH59-03527A
QVK01		UNIT-F.P.C(V/K)ASSY	GH59-03475A
QVO01		PMO-VOL KEY V2	GH72-33476A
QRE01		ASSY ACCE-REAR	GH98-00867A
	QRF03	PMO-COVER EAR V3	GH72-33478A
	QCH05	PMO-COVER T FLASH V2	GH72-33479A
QME01		UNIT-KEY FPCB ASSY	GH59-03510A
	QMI01	AS-SGHI607 MIC	GH81-06077A

<b>Description</b>	<b>SEC CODE</b>
AUDIO-RECEIVER	3009-001252
BAG PE	6902-000634
CBF INTERFACE-DATA LINK CABLE	GH39-00444A
ADAPTOR-SGHE690,BLK,EU,A_TYPE	GH44-01361A
S/W CD-SGHI600V USER GUIDE CD	GH46-00342A
S/W CD-SGHI600V COMPANION CD	GH46-00349A
UNIT-EARPHONE,20P,B-TYPE	GH59-03883A
LABEL(P)-WATER SOAK	GH68-02026A
LABEL(P)-WATER SOAK	GH68-02026A
MANUAL USERS-SGHI600V QSG	GH68-13001A
LABEL(R)-MAIN(EU)	GH68-13200A
BOX-UNIT(VODA)	GH69-04770A
CUSHION-CASE(VODA)	GH69-04771A
NDC-BRACKET CAMERA	GH71-06903A
MPR-TAPE MASKING HALL IC	GH74-22078A
MPR-TAPE MAIN WINDOW	GH74-22812A
MPR-VINYL BOHO WINDOW BOTTOM	GH74-26788A
MPR-VINYL BOHO VGA	GH74-26791A
MPR-TAPE	GH74-27381A
MPR-VINYL BOHO MAIN WINDOW	GH74-29217A
MPR-VINYL BOHO MAIN WINDOW B	GH74-30059A



## 5-3. Disassembly and Assembly Instructions

### — Disassembly

<p><b>1</b></p> <p>1) Disassemble the screw caps using the tweezers.</p> 	<p><b>2</b></p> <p>1) Unscrew six points in the Rear Case.</p> 
<p>1) Notice that the Rear Case should not be in damage.</p>	<p>1) Notice that the Rear Case should not be in damage.</p> <p>※ Rear screw specification : M1.4, L4</p>
<p><b>3</b></p> <p>1) Disjoint the Rear Case from the lower part of the set.</p> 	<p><b>4</b></p> <p>1) Disjoint SPK-MOTOR connector.</p> 
<p>1) Disjoint shaking to right and left as the Cases can be damaged in case of take off strongly.</p>	<p>1) Notice that the F-PCB should not be in damage.</p>

5

1) Detach POWER KEY, VOLUME KEY, and FUNCTION KEY.



1) Notice that the Front Case and other components should not be in damage.

6

1) Disjoint the RECEIVER connector.



1) Notice that connector pin should not get bent.

7

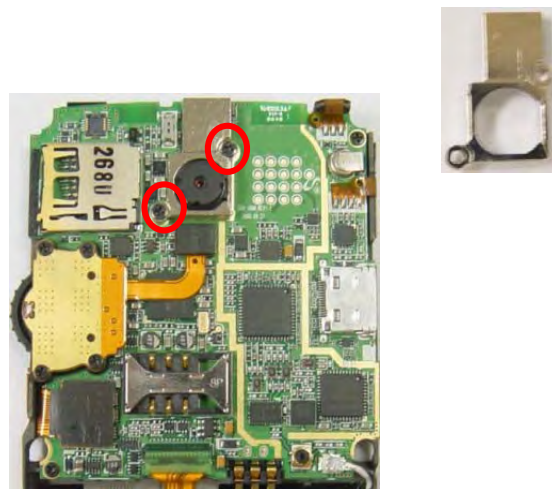


1) Separate the Front Case and the PBA catches and lifts below antenna.

1) Notice that other material should not be inserted to LCD and WINDOW.

8

1) Unscrew 1.3M CAMERA BRACKET and separate the BRACKET from the PBA.

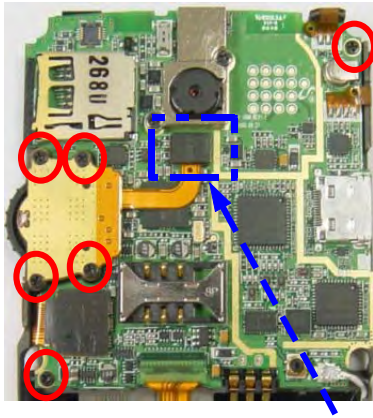


1) Notice that components around the screw should not be in damage.

※ 1.3M CAMERA BRACKET screw spec. : M1.4, L4

9

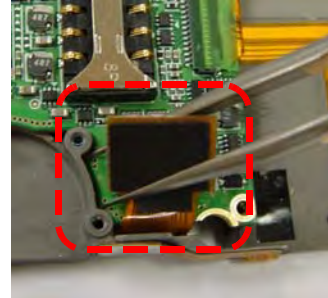
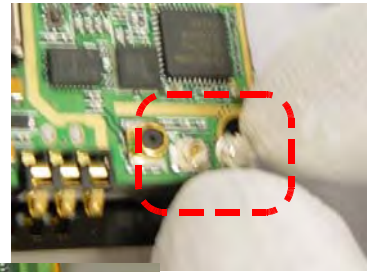
1) Unscrew six points in the WHEEL KEY and the PBA.



2) Disjoint the WHEEL KEY connector.

10

1) Disjoint the INTENA connector.  
2) Disjoint the LCD connector.



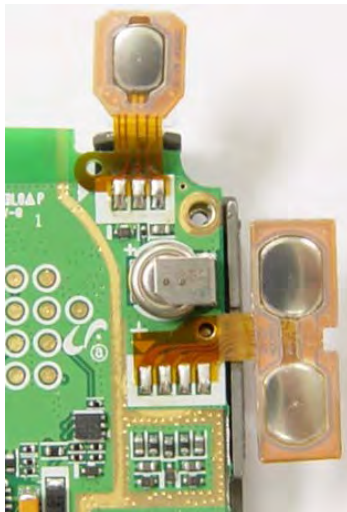
1) Notice that components around the screw should not be in damage.  
2) Notice that the WHEEL KEY F-PCB should not be in damage.

※ WHEEL, PBA screw spec. : M1.4, L3

1) Notice that the connectors and other components should not be in damage.

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1) Detach the POWER KEY and VOLUME KEY F-PCB using the tweezers.



1) Notice that the double-side tapes and shield-can should not be in damage.  
2) Notice that the F-PCBs should not be in damage.

12

1) Detach the KEY F-PCB connector insulation tape using the tweezers.  
2) Disjoint the KEY F-PCB connector.

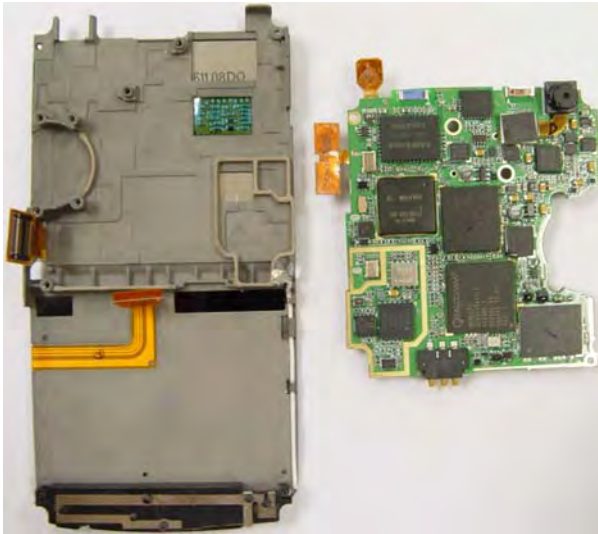


1) Notice that the KEY F-PCB should not be in damage.



13

1) Separate the shield-can and the PBA.



14

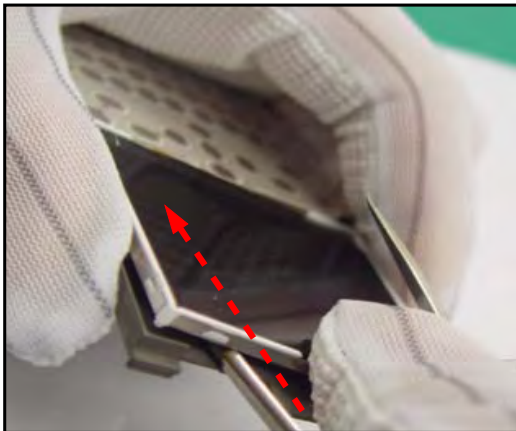
1) Unscrew two points in the INTENNA.  
2) Detach the INTENNA Wire from the shield-can.



1) Notice that components of the PBA should not be in damage

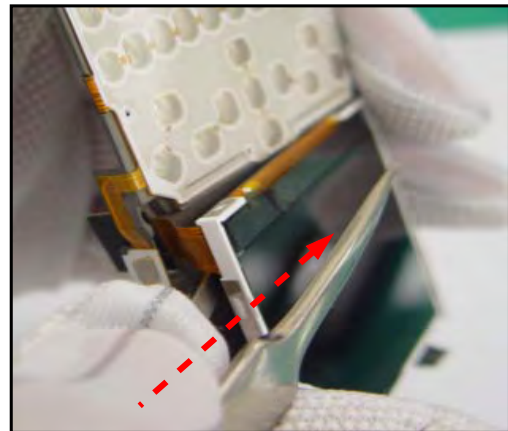
15

1) Insert tweezers into the backside of the LCD module and detach the double-stick tape as shown in the figure.



16

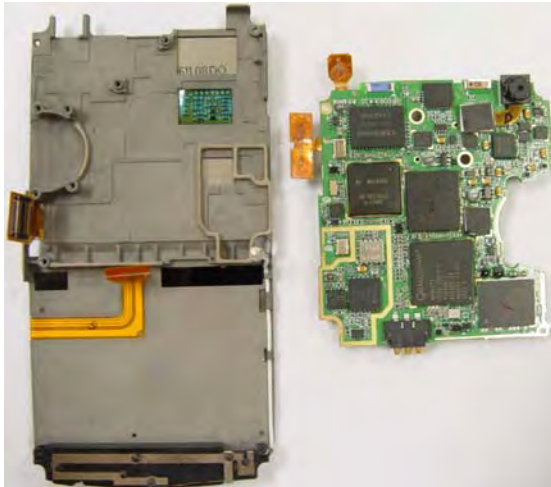
1) Insert tweezers into the backside of the LCD module and detach the double-stick tape as shown in the figure.  
2) Disjoint LCD module.



## — Assembly

1

1) Connect the 1.3M and VGA CAMERA to connector on the PBA.



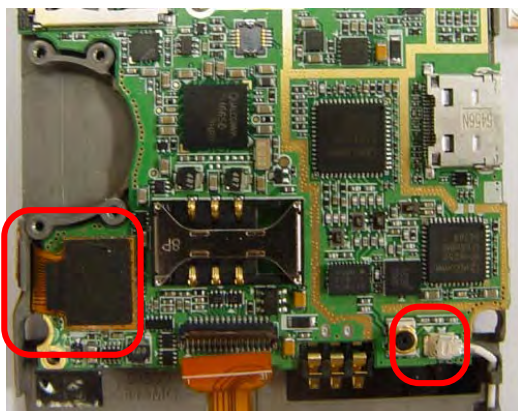
2

1) Put PBA for shield-can.



1) Notice that KEY connector, INTENNA cable, and LCD connector should not enter through PBA and shield-can.

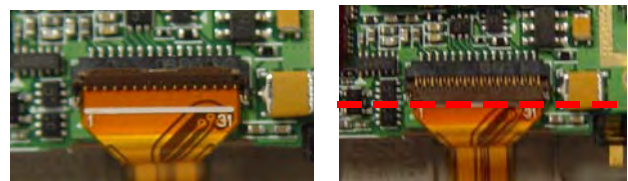
3



1) Attach the LCD connector and the INTENNA connector.

1) Notice that components around the connector should not be in damage.  
2) Press connector so that is sonant 'Exactly' vertically.

4

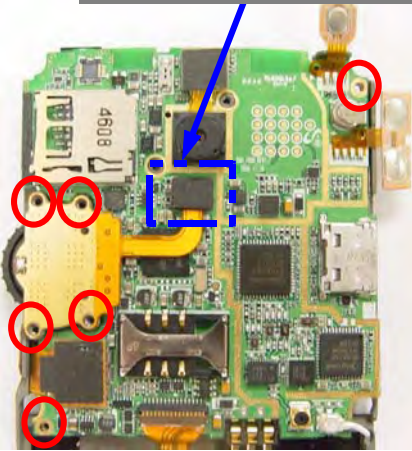


1) Connect the KEY F-PCB and attach the insulation tape on the connector.

1) Put deeply KEY connector so that reach to white line.  
2) Insulation tape covers whole so that connector may not come out.

5

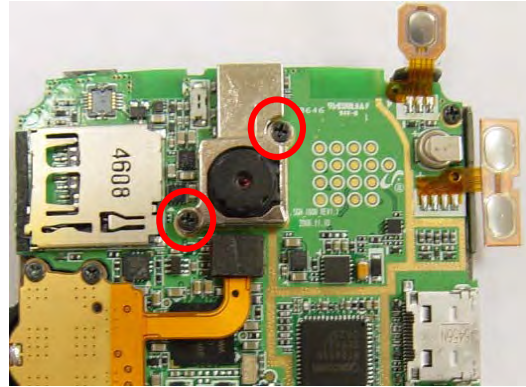
1) Connect the WHEEL KEY to the connector on the PBA.



2) Screw six points in the WHEEL KEY and the PBA.

6

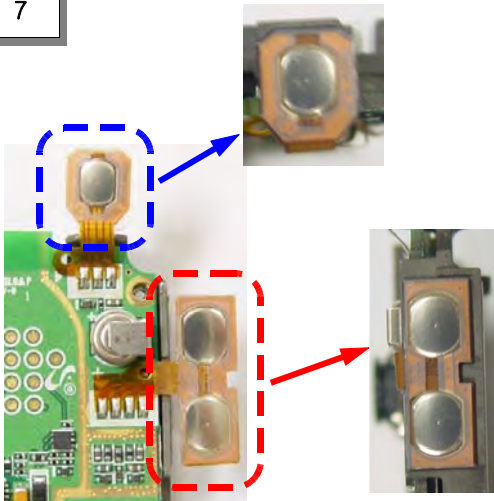
1) Assemble the 1.3M CAMERA BRACKET.  
2) Screw two points in the CAMERA BRACKET.



1) Press WHEEL KEY connector so that is sonant 'Exactly' vertically.  
2) Notice that components around the screw should not be in damage.  
※ WHEEL, PBA screw spec. : M1.4, L3

1) Notice that components around the screw should not be in damage.  
※ 1.3M CAMERA BRACKET screw spec. : M1.4, L4

7



1) Attach the VOLUME KEY and POWER KEY F-PCB in accordance with the groove.

1) Observe as KEY tension can grow worse in case of escapes and attaches groove.

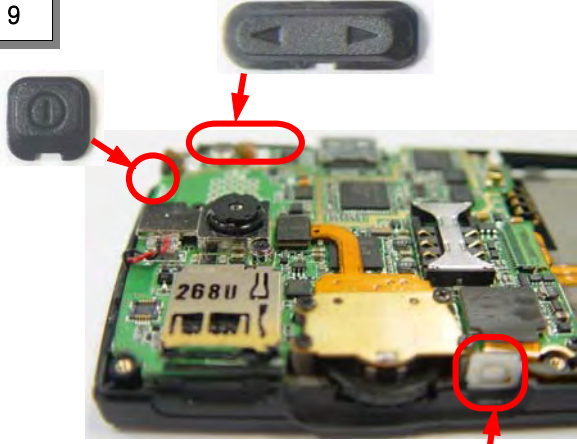
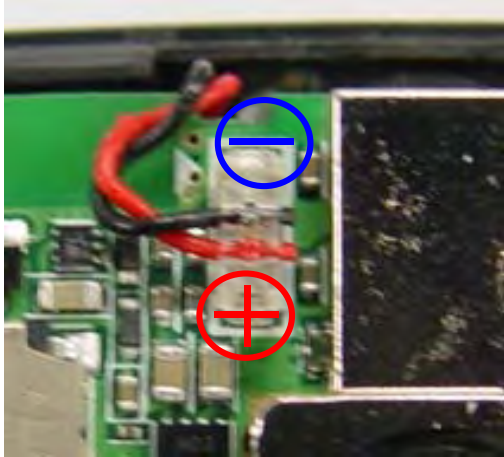


8



1) Check the Front Case and the PBA set.

1) Check the RECEIVER and KEY PAD setting.



<p>9</p>  <p>1) Put PBA inside the Front Case. 2) Attach POWER KEY, VOLUME KEY, and FUNCTION KEY.</p>	<p>10</p> <p>1) Joint the RECEIVER connector.</p> 
<p>1) Notice that other material should not be inserted to LCD and WINDOW. 2) KEY's groove does so that head toward down and assembles. 3) Assemble POWER KEY, FUNCTION KEY carving a seal after is rapidly.</p>	<p>1) Make the RECEIVER wire groove that gouge the PBA. 2) Observe in polarity of the RECEIVER connector.</p>
<p>11</p> <p>1) Joint SPK-MOTOR connector.</p> 	<p>12</p> <p>1) Assemble the Rear Case with the Front Case.</p> 
<p>1) Press SPK-MOTOR connector so that is sonant 'Exactly' vertically.</p>	<p>1) First, assemble top portion Locker, and both side. 2) Press with hand in case of the top portion does not fit certainly after assembly.</p>

13

1) Screw six points in the Rear Case.



14

1) Assemble the screw caps using the tweezers.



1) Notice that the Rear Case should not be in damage.

※ Rear screw specification : M1.4, L4

1) Notice that the Rear Case should not be in damage.





## 6. MAIN Electrical Parts List

Design LOC	Description	SEC Code	STATUS
ANT1	ANTENNA-CHIP	4202-001230	SA
ANT2	ANTENNA-CHIP	4202-001031	SA
ANT701	CONNECTOR-COAXIAL	3705-001225	SA
BAT407	BATTERY-LI(2ND)	4302-001181	SA
BTC506	HEADER-BATTERY	3711-006217	SA
C100	C-CER,CHIP	2203-000550	SA
C101	C-CER,CHIP	2203-000550	SA
C102	C-CER,CHIP	2203-006194	SA
C103	C-CER,CHIP	2203-006194	SA
C104	C-CER,CHIP	2203-006423	SA
C105	C-CER,CHIP	2203-006423	SA
C106	C-CER,CHIP	2203-006423	SA
C107	C-CER,CHIP	2203-006423	SA
C108	C-CER,CHIP	2203-006423	SA
C109	C-CER,CHIP	2203-006423	SA
C110	C-CER,CHIP	2203-006423	SA
C111	C-CER,CHIP	2203-006423	SA
C112	C-CER,CHIP	2203-006423	SA
C113	C-CER,CHIP	2203-006562	SA
C114	C-CER,CHIP	2203-006423	SA
C115	C-CER,CHIP	2203-006423	SA
C116	C-CER,CHIP	2203-005806	SNA
C117	C-CER,CHIP	2203-006423	SA
C118	C-CER,CHIP	2203-006423	SA
C119	C-CER,CHIP	2203-006562	SA
C120	C-CER,CHIP	2203-006647	SA
C121	C-CER,CHIP	2203-005731	SA
C122	C-CER,CHIP	2203-005731	SA
C123	C-CER,CHIP	2203-000550	SA
C124	C-CER,CHIP	2203-006423	SA
C125	C-CER,CHIP	2203-006305	SA
C126	C-CER,CHIP	2203-006712	SA
C200	C-CER,CHIP	2203-000233	SA
C202	C-CER,CHIP	2203-005682	SA
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C204	C-CER,CHIP	2203-006423	SA
C205	C-CER,CHIP	2203-006324	SA
C206	C-CER,CHIP	2203-000386	SA
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C208	C-CER,CHIP	2203-001259	SA
C212	C-CER,CHIP	2203-006423	SA
C213	C-CER,CHIP	2203-006423	SA
C214	C-CER,CHIP	2203-000330	SA
C215	C-CER,CHIP	2203-006423	SA
C216	C-CER,CHIP	2203-000386	SA
C218	C-CER,CHIP	2203-006562	SA
C219	C-CER,CHIP	2203-006838	SA
C220	C-CER,CHIP	2203-006838	SA
C222	C-CER,CHIP	2203-005683	SA
C223	C-CER,CHIP	2203-005395	SA
C224	C-CER,CHIP	2203-006423	SA
C225	C-CER,CHIP	2203-000386	SA
C226	INDUCTOR-SMD	2703-002365	SA

Design LOC	Description	SEC Code	STATUS
C227	C-CER,CHIP	2203-006562	SA
C229	C-CER,CHIP	2203-006824	SA
C230	C-CER,CHIP	2203-006824	SA
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C232	C-CER,CHIP	2203-000330	SA
C233	C-CER,CHIP	2203-000386	SA
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C257	C-CER,CHIP	2203-000812	SA
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C264	C-CER,CHIP	2203-002487	SA
C265	C-CER,CHIP	2203-000812	SA
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C325	C-CER,CHIP	2203-006423	SA

Design LOC	Description	SEC Code	STATUS
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C458	C-CER,CHIP	2203-006824	SA
C461	C-CER,CHIP	2203-006562	SA

Design LOC	Description	SEC Code	STATUS
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C469	C-CER,CHIP	2203-006824	SA
C471	C-CER,CHIP	2203-006824	SA
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C476	C-CER,CHIP	2203-000627	SNA
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C539	C-CER,CHIP	2203-006194	SA
C540	C-CER,CHIP	2203-006838	SA
C541	C-CER,CHIP	2203-001259	SA
C542	C-CER,CHIP	2203-000812	SA
C543	C-CER,CHIP	2203-000812	SA
C544	C-CER,CHIP	2203-001259	SA

Design LOC	Description	SEC Code	STATUS
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C605	C-CER,CHIP	2203-006194	SA
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C608	C-CER,CHIP	2203-006562	SA
C609	C-CER,CHIP	2203-006423	SA
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C618	C-CER,CHIP	2203-006194	SA
C620	C-CER,CHIP	2203-006562	SA
C621	C-CER,CHIP	2203-006562	SA
C622	C-CER,CHIP	2203-006423	SA
C623	C-CER,CHIP	2203-006423	SA
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C664	C-CER,CHIP	2203-006091	SA
C665	C-CER,CHIP	2203-005482	SA
C666	C-CER,CHIP	2203-005482	SA
C667	C-CER,CHIP	2203-006091	SA

Design LOC	Description	SEC Code	STATUS
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C670	C-CER,CHIP	2203-000628	SA
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C701	C-CER,CHIP	2203-006423	SA
C702	C-CER,CHIP	2203-006194	SA
C703	C-CER,CHIP	2203-006712	SA
C704	C-CER,CHIP	2203-005682	SA
C705	C-CER,CHIP	2203-005682	SA
C706	C-CER,CHIP	2203-005736	SA
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C710	C-CER,CHIP	2203-006194	SA
C711	C-CER,CHIP	2203-000836	SA
C712	C-CER,CHIP	2203-005288	SA
C713	C-CER,CHIP	2203-001072	SA
C714	C-CER,CHIP	2203-006194	SA
C715	C-CER,CHIP	2203-006712	SA
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C719	C-CER,CHIP	2203-005682	SA
C720	INDUCTOR-SMD	2703-002208	SA
C721	C-CER,CHIP	2203-000812	SA
C722	C-CER,CHIP	2203-005682	SA
C723	C-CER,CHIP	2203-006838	SA
C724	C-CER,CHIP	2203-006556	SA
C726	C-CER,CHIP	2203-005682	SA
C727	C-CER,CHIP	2203-000854	SA
C728	C-CER,CHIP	2203-005682	SA
C729	C-CER,CHIP	2203-006194	SA
C730	C-CER,CHIP	2203-005682	SA
C731	C-CER,CHIP	2203-000995	SA
C732	C-CER,CHIP	2203-000854	SA
C733	C-CER,CHIP	2203-000995	SA
C734	C-CER,CHIP	2203-005052	SA
C735	C-CER,CHIP	2203-002982	SA
C736	C-CER,CHIP	2203-001124	DNA
C737	C-CER,CHIP	2203-006194	SA
C738	C-CER,CHIP	2203-006194	SA
C740	C-CER,CHIP	2203-006556	SA
C741	C-CER,CHIP	2203-006423	SA
C742	C-CER,CHIP	2203-005288	SA
C743	C-CER,CHIP	2203-005732	SA
C800	C-CER,CHIP	2203-002968	SA
C801	C-CER,CHIP	2203-006324	SA
C802	C-CER,CHIP	2203-000254	SA
C803	C-CER,CHIP	2203-005682	SA
C804	C-CER,CHIP	2203-006824	SA
C805	C-CER,CHIP	2203-006423	SA
C806	C-CER,CHIP	2203-005382	SA
C807	C-CER,CHIP	2203-000330	SA
C808	C-CER,CHIP	2203-001033	SA

Design LOC	Description	SEC Code	STATUS
C809	C-CER,CHIP	2203-002443	SA
C810	C-CER,CHIP	2203-000233	SA
C811	C-CER,CHIP	2203-005732	SA
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C813	C-CER,CHIP	2203-006423	SA
C814	C-CER,CHIP	2203-005725	SA
C815	C-CER,CHIP	2203-005729	SA
C816	C-CER,CHIP	2203-006194	SA
C817	C-CER,CHIP	2203-000330	SA
C818	C-CER,CHIP	2203-005234	SA
C819	C-CER,CHIP	2203-005446	SA
C821	C-CER,CHIP	2203-006194	SA
C822	C-CER,CHIP	2203-006712	SA
C823	C-CER,CHIP	2203-006423	SA
C824	C-CER,CHIP	2203-006194	SA
C825	C-CER,CHIP	2203-005736	SA
C826	C-CER,CHIP	2203-006194	SA
C827	C-CER,CHIP	2203-005736	SA
C828	C-CER,CHIP	2203-000438	SA
C829	C-CER,CHIP	2203-000438	SA
C830	C-CER,CHIP	2203-006423	SA
C831	C-CER,CHIP	2203-000386	SA
C832	C-CER,CHIP	2203-000330	SA
C833	C-CER,CHIP	2203-006824	SA
C834	C-CER,CHIP	2203-005736	SA
C835	C-CER,CHIP	2203-005736	SA
C836	C-CER,CHIP	2203-005736	SA
C837	C-CER,CHIP	2203-005736	SA
C838	C-CER,CHIP	2203-006423	SA
C839	C-CER,CHIP	2203-000438	SA
C840	C-CER,CHIP	2203-006423	SA
C841	C-CER,CHIP	2203-005736	SA
C842	C-CER,CHIP	2203-005736	SA
C843	C-CER,CHIP	2203-005736	SA
C844	C-CER,CHIP	2203-006824	SA
C845	C-CER,CHIP	2203-001124	DNA
C846	C-CER,CHIP	2203-006562	SA
C847	C-CER,CHIP	2203-006562	SA
C848	C-CER,CHIP	2203-006562	SA
C849	C-CER,CHIP	2203-006562	SA
CD401	CONNECTOR-CARD EDGE	3709-001448	SA
D400	DIODE-ARRAY	0407-001002	SA
D401	DIODE-TVS	0406-001231	SA
D402	DIODE-SWITCHING	0401-001144	SA
D403	DIODE-ZENER	0403-001547	SA
D500	DIODE-TVS	0406-001231	SA
D501	DIODE-TVS	0406-001231	SA
D502	DIODE-TVS	0406-001231	SA
D503	DIODE-TVS	0406-001231	SA
D504	DIODE-ARRAY	0407-000115	SA
D505	DIODE-TVS	0406-001231	SA
D506	DIODE-TVS	0406-001231	SA
D507	DIODE-TVS	0406-001231	SA



Design LOC	Description	SEC Code	STATUS
D508	DIODE-TVS	0406-001231	SA
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D510	DIODE-TVS	0406-001231	SA
D511	DIODE-ZENER	0403-001547	SA
D512	DIODE-TVS	0406-001231	SA
F300	FILTER-EMI SMD	2901-001283	SA
F500	FILTER-EMI SMD	2901-001286	SA
F501	FILTER-EMI SMD	2901-001286	SA
F502	FILTER-EMI/ESD	2901-001353	SA
F503	FILTER-EMI SMD	2901-001286	SA
F504	FILTER-EMI SMD	2901-001286	SA
F505	FILTER-EMI/ESD	2901-001353	SA
F506	FILTER-EMI SMD	2901-001286	SA
F507	FILTER-EMI SMD	2901-001286	SA
F700	FILTER-SAW	2904-001550	SA
F701	FILTER-SAW	2904-001570	SA
F702	FILTER-SAW	2904-001571	SA
F800	FILTER-SAW	2904-001665	SA
F801	DUPLEXER-FBAR	2910-000004	SA
F802	FILTER-SAW	2904-001623	SA
HDC500	HEADER-BOARD TO BOARD	3711-006119	SA
HDC501	HEADER-BOARD TO BOARD	3711-005954	SA
HDC502	HEADER-BOARD TO BOARD	3711-005954	SA
HDC503	HEADER-BOARD TO BOARD	3711-005550	SA
HDC507	HEADER-BOARD TO BOARD	3711-005550	SA
IFC505	SOCKET-INTERFACE	3710-002442	SA
L200	BEAD-SMD	3301-001438	SA
L201	BEAD-SMD	3301-001438	SA
L202	BEAD-SMD	3301-001438	SA
L203	BEAD-SMD	3301-001438	SA
L204	BEAD-SMD	3301-001208	SA
L205	BEAD-SMD	3301-001208	SA
L206	BEAD-SMD	3301-001438	SA
L207	BEAD-SMD	3301-001438	SA
L400	INDUCTOR-SMD	2703-002782	SA
L401	INDUCTOR-SMD	2703-002782	SA
L402	BEAD-SMD	3301-001208	SA
L403	INDUCTOR-SMD	2703-002775	SA
L404	INDUCTOR-SMD	2703-002768	SNA
L405	INDUCTOR-SMD	2703-002768	SNA
L500	INDUCTOR-SMD	2703-002768	SNA
L501	BEAD-SMD	3301-001729	SA
L502	BEAD-SMD	3301-001729	SA
L503	BEAD-SMD	3301-001729	SA
L700	INDUCTOR-SMD	2703-002207	SA
L701	INDUCTOR-SMD	2703-002201	SA
L702	INDUCTOR-SMD	2703-002200	SA
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L704	C-CER,CHIP	2203-002677	SA
L705	C-CER,CHIP	2203-000812	SA
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L708	INDUCTOR-SMD	2703-002203	SA

Design LOC	Description	SEC Code	STATUS
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L717	INDUCTOR-SMD	2703-002819	SA
L718	INDUCTOR-SMD	2703-002819	SA
L719	INDUCTOR-SMD	2703-002176	SA
L720	INDUCTOR-SMD	2703-002267	SA
L721	INDUCTOR-SMD	2703-002176	SA
L722	INDUCTOR-SMD	2703-002176	SA
L800	INDUCTOR-SMD	2703-002368	SA
L801	INDUCTOR-SMD	2703-002369	SA
L802	INDUCTOR-SMD	2703-002208	SA
L803	INDUCTOR-SMD	2703-002267	SA
L804	INDUCTOR-SMD	2703-002205	SA
L805	INDUCTOR-SMD	2703-002313	SA
MOD205	W-LAN MODULE	4709-001448	SA
MOD206	BLUETOOTH MODULE	4709-001413	SA
OSC100	CRYSTAL-SMD	2801-004318	SA
OSC101	CRYSTAL-SMD	2801-004466	SA
OSC400	CRYSTAL-SMD	2801-004466	SA
OSC600	RESONATOR-CERAMIC	2802-001182	SA
PAM702	IC-POWER AMP	1201-002288	SA
PAM800	IC-POWER AMP	1201-002347	SA
Q800	TR-DIGITAL	0504-001151	SA
R101	R-CHIP	2007-000566	SA
R102	R-CHIP	2007-000242	SA
R103	R-CHIP	2007-000242	SA
R104	R-CHIP	2007-008516	SA
R105	R-CHIP	2007-008531	SA
R106	R-CHIP	2007-008055	SA
R107	R-CHIP	2007-000167	SA
R108	R-CHIP	2007-008055	SA
R110	R-CHIP	2007-008055	SA
R111	R-CHIP	2007-008055	SA
R112	R-CHIP	2007-008052	SA
R113	R-CHIP	2007-008052	SA
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R125	R-CHIP	2007-008542	SA
R200	R-CHIP	2007-008544	SA
R201	R-CHIP	2007-008516	SA
R202	R-CHIP	2007-008478	SA
R203	R-CHIP	2007-008478	SA

Design LOC	Description	SEC Code	STATUS
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R205	R-CHIP	2007-008483	SA
R206	R-CHIP	2007-008544	SA
R207	R-CHIP	2007-008478	SA
R208	R-CHIP	2007-008478	SA
R209	R-CHIP	2007-000148	SA
R210	R-CHIP	2007-008544	SA
R211	R-CHIP	2007-000148	SA
R212	R-CHIP	2007-000148	SA
R214	R-CHIP	2007-000831	SA
R216	R-CHIP	2007-000831	SA
R217	R-CHIP	2007-000165	SA
R218	C-CER,CHIP	2203-000812	SA
R219	C-CER,CHIP	2203-000812	SA
R220	R-CHIP	2007-008647	SA
R221	R-CHIP	2007-008647	SA
R300	R-CHIP	2007-008055	SA
R301	R-CHIP	2007-008055	SA
R302	R-CHIP	2007-008055	SA
R303	R-CHIP	2007-008055	SA
R304	R-CHIP	2007-008516	SA
R305	R-CHIP	2007-008055	SA
R306	R-CHIP	2007-008055	SA
R307	R-CHIP	2007-000162	SA
R308	R-CHIP	2007-000173	SA
R309	R-CHIP	2007-007528	SA
R310	R-CHIP	2007-007107	SA
R311	R-CHIP	2007-000173	SA
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R315	R-CHIP	2007-007489	SA
R316	R-CHIP	2007-007107	SA
R317	R-CHIP	2007-007107	SA
R318	R-CHIP	2007-008055	SA
R401	R-CHIP	2007-007142	SA
R403	R-CHIP	2007-000157	SA
R404	R-CHIP	2007-009155	SNA
R405	R-CHIP	2007-008052	SA
R406	R-CHIP	2007-008055	SA
R407	R-CHIP	2007-008055	SA
R408	R-CHIP	2007-001298	SA
R409	R-CHIP	2007-007468	SA
R410	R-CHIP	2007-008542	SA
R411	R-CHIP	2007-007316	SA
R412	R-CHIP	2007-008616	SA
R413	R-CHIP	2007-001119	SA
R414	R-CHIP	2007-008055	SA
R415	R-CHIP	2007-007013	SA
R418	R-CHIP	2007-008055	SA
R419	R-CHIP	2007-008516	SA
R420	R-CHIP	2007-000162	SA
R421	R-CHIP	2007-000165	SA
R422	R-CHIP	2007-000168	SA

Design LOC	Description	SEC Code	STATUS
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R424	R-CHIP	2007-000170	SA
R425	R-CHIP	2007-008516	SA
R426	R-CHIP	2007-008483	SA
R428	R-CHIP	2007-008483	SA
R430	R-CHIP	2007-008135	SA
R431	R-CHIP	2007-007334	SA
R500	R-CHIP	2007-007189	SA
R501	R-CHIP	2007-000162	SA
R503	R-CHIP	2007-000148	SA
R504	R-CHIP	2007-000148	SA
R505	R-CHIP	2007-000148	SA
R506	R-CHIP	2007-008055	SA
R507	R-CHIP	2007-009170	SA
R508	R-CHIP	2007-008211	SNA
R509	R-CHIP	2007-008211	SNA
R510	R-CHIP	2007-007137	SA
R511	R-CHIP	2007-008588	SA
R512	R-CHIP	2007-008588	SA
R513	R-CHIP	2007-000166	SA
R600	R-CHIP	2007-007107	SA
R601	R-CHIP	2007-007107	SA
R602	R-CHIP	2007-000137	SA
R603	R-CHIP	2007-000140	SA
R604	R-CHIP	2007-001298	SA
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R620	R-CHIP	2007-000162	SA
R700	R-CHIP	2007-009212	SA
R701	R-CHIP	2007-001325	SA
R702	R-CHIP	2007-000145	SA
R703	R-CHIP	2007-008045	SA
R704	R-CHIP	2007-008542	SA
R705	R-CHIP	2007-008531	SA
R706	R-CHIP	2007-007491	SA
R707	R-CHIP	2007-008213	SA
R708	R-CHIP	2007-007136	SA
R709	R-CHIP	2007-008588	SA
R800	R-CHIP	2007-008542	SA
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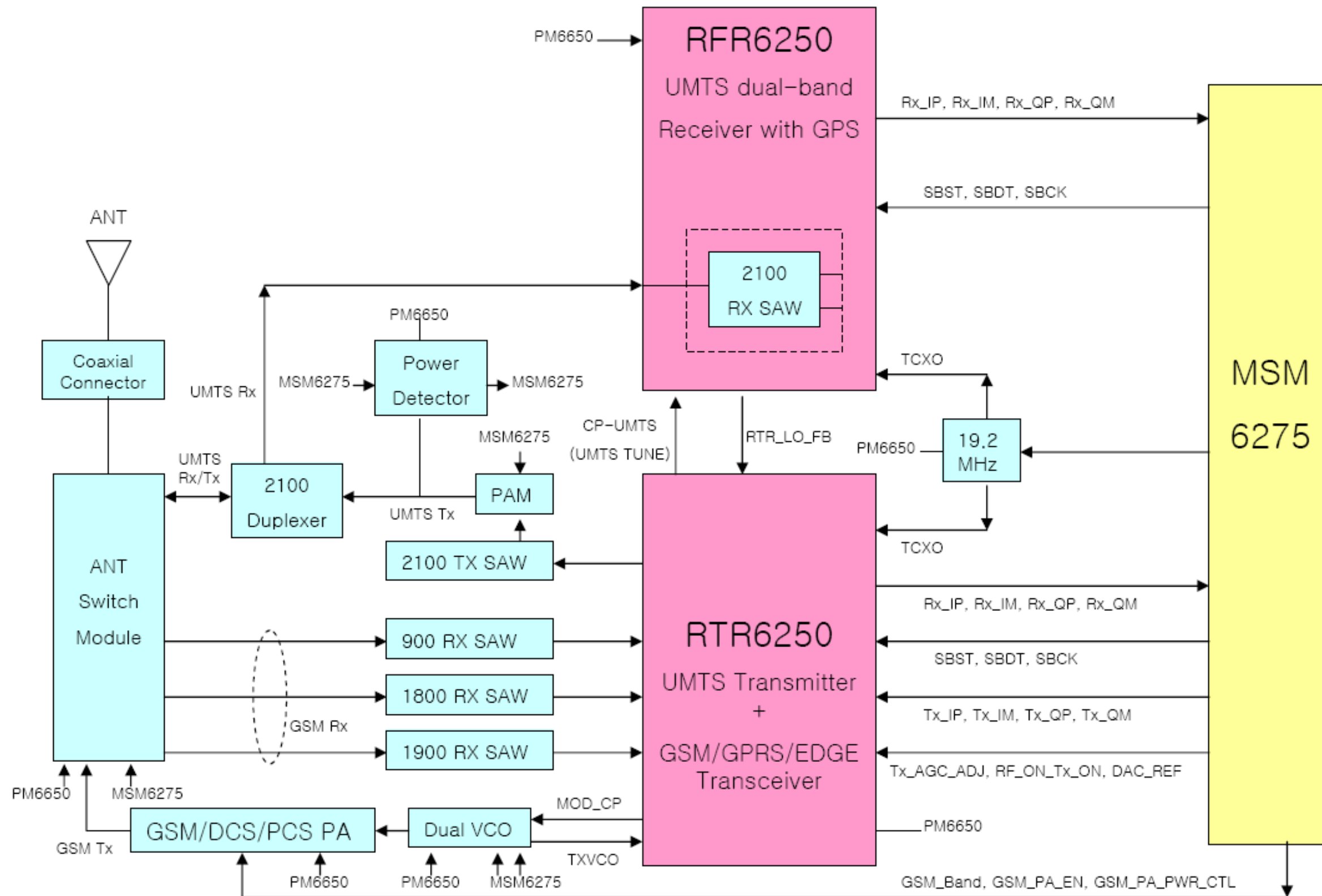
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R809	R-CHIP	2007-008579	SA
R810	R-CHIP	2007-008579	SA
R811	R-CHIP	2007-008045	SA
R812	R-CHIP	2007-008806	SA
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R815	R-CHIP	2007-007491	SA
R816	R-CHIP	2007-007318	SA
R817	R-CHIP	2007-008531	SA
R818	R-CHIP	2007-001217	SA
R819	R-CHIP	2007-008531	SA
R820	R-CHIP	2007-000171	SA
R822	R-CHIP	2007-009155	SNA
R823	R-CHIP	2007-009170	SA
R824	R-CHIP	2007-008055	SA
RFS700	CONNECTOR-COAXIAL	3705-001358	SA
SIM400	CONNECTOR-CARD EDGE	3709-001474	SA
SLC504	CONNECTOR-FPC/FFC/PIC	3708-002162	SA
SOC508	SOCKET-BOARD TO BOARD	3710-002081	SA
TA201	C-TA,CHIP	2404-001377	SA
TA209	C-TA,CHIP	2404-001352	SA
TA210	C-TA,CHIP	2404-001281	SA
TA211	C-TA,CHIP	2404-001281	SA
TA221	C-TA,CHIP	2404-001377	SA
TA228	C-TA,CHIP	2404-001352	SA
TA256	C-TA,CHIP	2404-001474	SA
TA401	C-TA,CHIP	2404-001474	SA
TA459	C-TA,CHIP	2404-001474	SA
TA460	C-TA,CHIP	2404-001474	SA
TA462	C-TA,CHIP	2404-001281	SA
TA474	C-TA,CHIP	2404-001474	SA
TA475	C-TA,CHIP	2404-001396	SA
TA480	C-TA,CHIP	2404-001281	SA
TA521	C-TA,CHIP	2404-001474	SA
TA532	C-TA,CHIP	2404-001381	SA
TA739	C-TA,CHIP	2404-001474	SA
TCX801	OSCILLATOR-VCTCXO	2809-001277	SA
TH301	THERMISTOR-NTC	1404-001221	SA
TH701	THERMISTOR-NTC	1404-001221	SA
TR401	FET-SILICON	0505-001165	SA
TR402	TR-DIGITAL	0504-001171	SA
TR403	TR-DIGITAL	0504-001171	SA
TR404	TR-DIGITAL	0504-001171	SA
U100	IC-EXPANDER	1205-003075	SA
U201	IC-ANALOG SWITCH	1001-001354	SA
U202	IC-ANALOG SWITCH	1001-001354	SA
U203	IC-AUDIO AMP	1201-002304	SA
U204	IC-ANALOG SWITCH	1001-001394	SA

Design LOC	Description	SEC Code	STATUS
U302	IC-CMOS LOGIC	0801-003016	SA
U303	IC-CMOS LOGIC	0801-003022	SA
U304	IC-CMOS LOGIC	0801-003052	SA
U305	IC-CMOS LOGIC	0801-002529	SA
U306	IC-CMOS LOGIC	0801-002321	SA
U307	IC-TRANSCEIVER	1205-002272	SA
U308	IC-D/A CONVERTER	1002-001488	SA
U309	IC-ANALOG SWITCH	1001-001221	SA
U310	IC-SWITCH	1205-002784	SA
U400	IC-POWER SUPERVISOR	1203-004102	SA
U401	IC-BATTERY	1203-003823	SA
U402	IC-LEVEL DRIVER	1003-001984	SA
U403	IC-DC/DC CONVERTER	1203-004416	SA
U404	IC-RESET	1203-004142	SA
U405	IC-VOL. DETECTOR	1203-003924	SA
U406	IC-POS.FIXED REG.	1203-003787	SA
U407	IC-POS.FIXED REG.	1203-004458	SA
U408	IC-POS.FIXED REG.	1203-004419	SA
U409	IC-MULTI REG.	1203-004340	SA
U410	IC-POS.FIXED REG.	1203-003688	SA
U411	IC-ANALOG SWITCH	1001-001359	SA
U413	IC-MULTI REG.	1203-004120	SA
U414	IC-MULTI REG.	1203-004447	SA
U415	IC-DC/DC CONVERTER	1203-003538	SA
U416	IC-VOL. DETECTOR	1203-002716	SA
U417	IC-DC/DC CONVERTER	1203-003919	SA
U418	IC-MULTI REG.	1203-004120	SA
U500	IC-DC/DC CONVERTER	1203-004172	SA
U501	IC-CMOS LOGIC	0801-003136	SA
U602	IC-CMOS LOGIC	0801-003016	SA
U700	IC-TRANSCEIVER	1205-002645	SA
U701	IC-SWITCH	1205-002724	SA
U801	IC-DETECTOR	1209-001577	SA
U802	IC-RECEIVER	1205-002781	SA
U804	IC-SWITCH	1205-002874	SNA
U805	R-CHIP	2007-000162	SA
UCD200	IC-CODEC	1205-002719	SA
UCP101	IC-DSP	0904-002074	SA
UCP600	IC-MODEM	1205-002790	SA
UME300	IC-SRAM	1106-001511	SA
UME301	IC-MCP	1108-000043	SA
UME601	IC-MCP	1108-000088	SA
VCO800	OSCILLATOR-VCO	2806-001377	SA
ZD500	DIODE-TVS	0406-001210	SA
ZD501	DIODE-TVS	0406-001210	SA
ZD502	DIODE-TVS	0406-001210	SA
ZD503	DIODE-TVS	0406-001210	SA
ZD504	DIODE-TVS	0406-001190	SA
ZD505	DIODE-TVS	0406-001167	SA
ZD506	DIODE-TVS	0406-001167	SA
ZD507	DIODE-TVS	0406-001167	SA
ZD508	DIODE-TVS	0406-001167	SA
ZD509	DIODE-ZENER	0403-001446	SA

<b>Design LOC</b>	<b>Description</b>	<b>SEC Code</b>	<b>STATUS</b>
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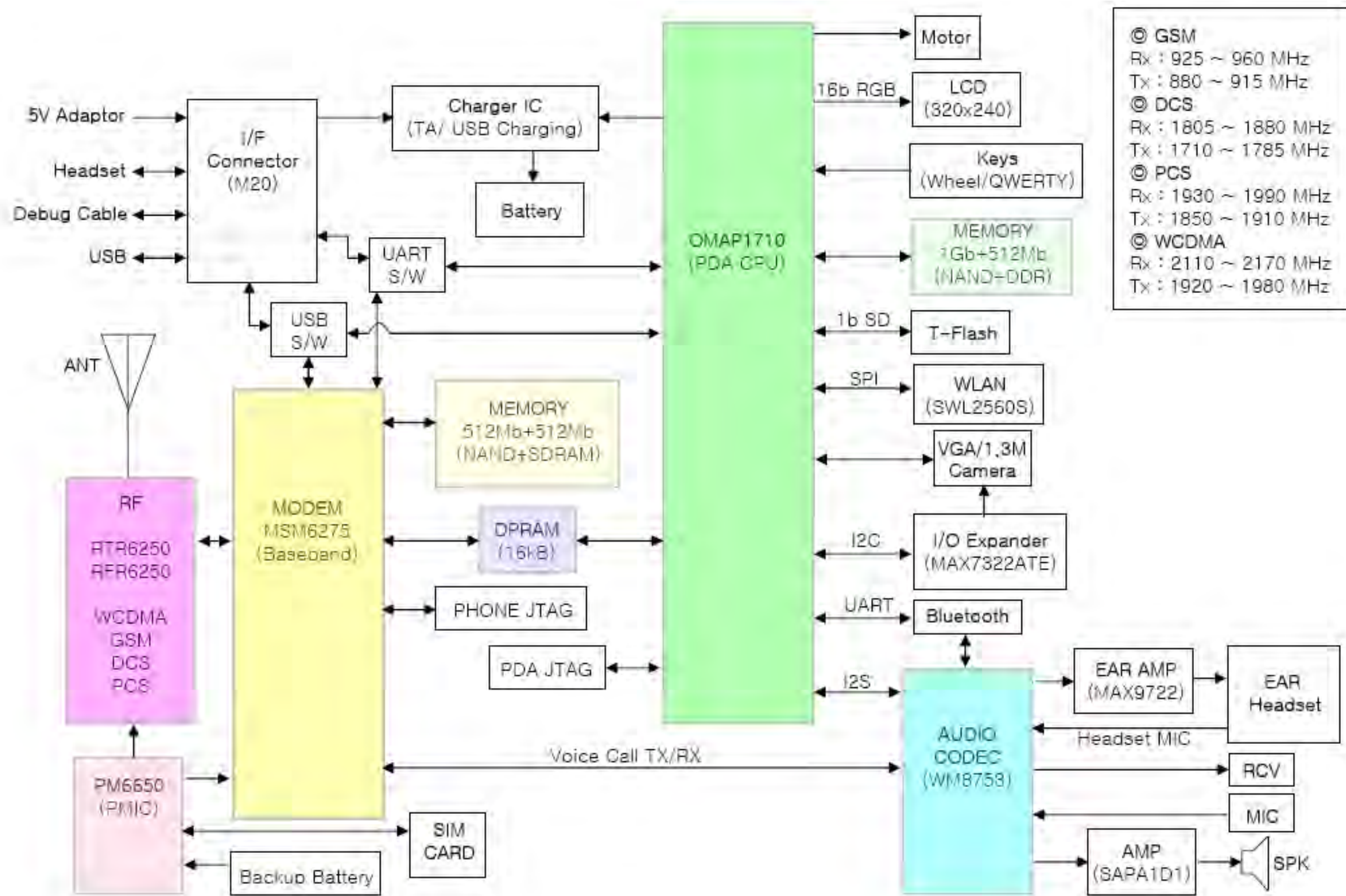
## 7. Block Diagrams

7-1. RF Solution Block Diagram



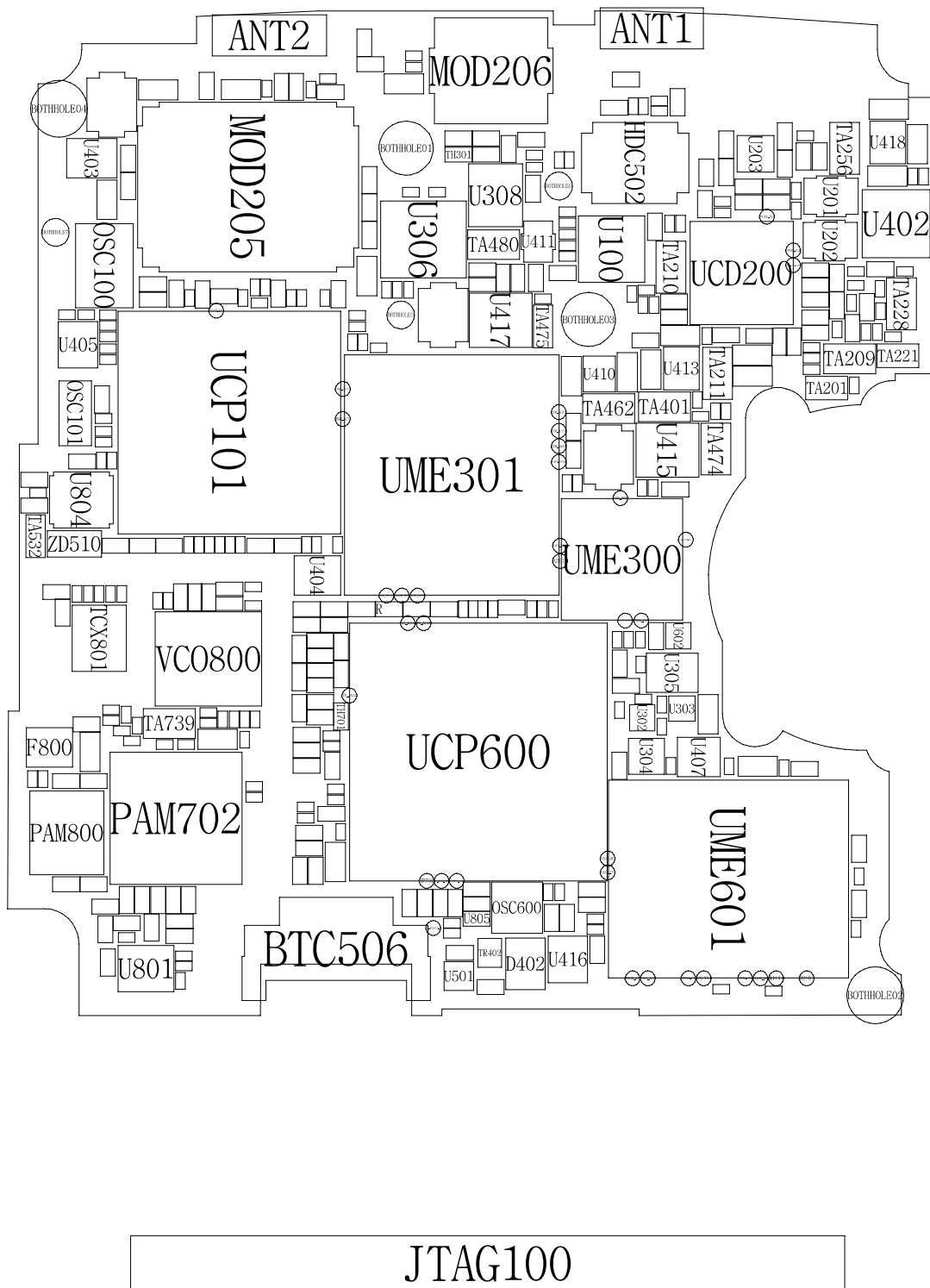


## 7-2. Base Band Solution Block Diagram

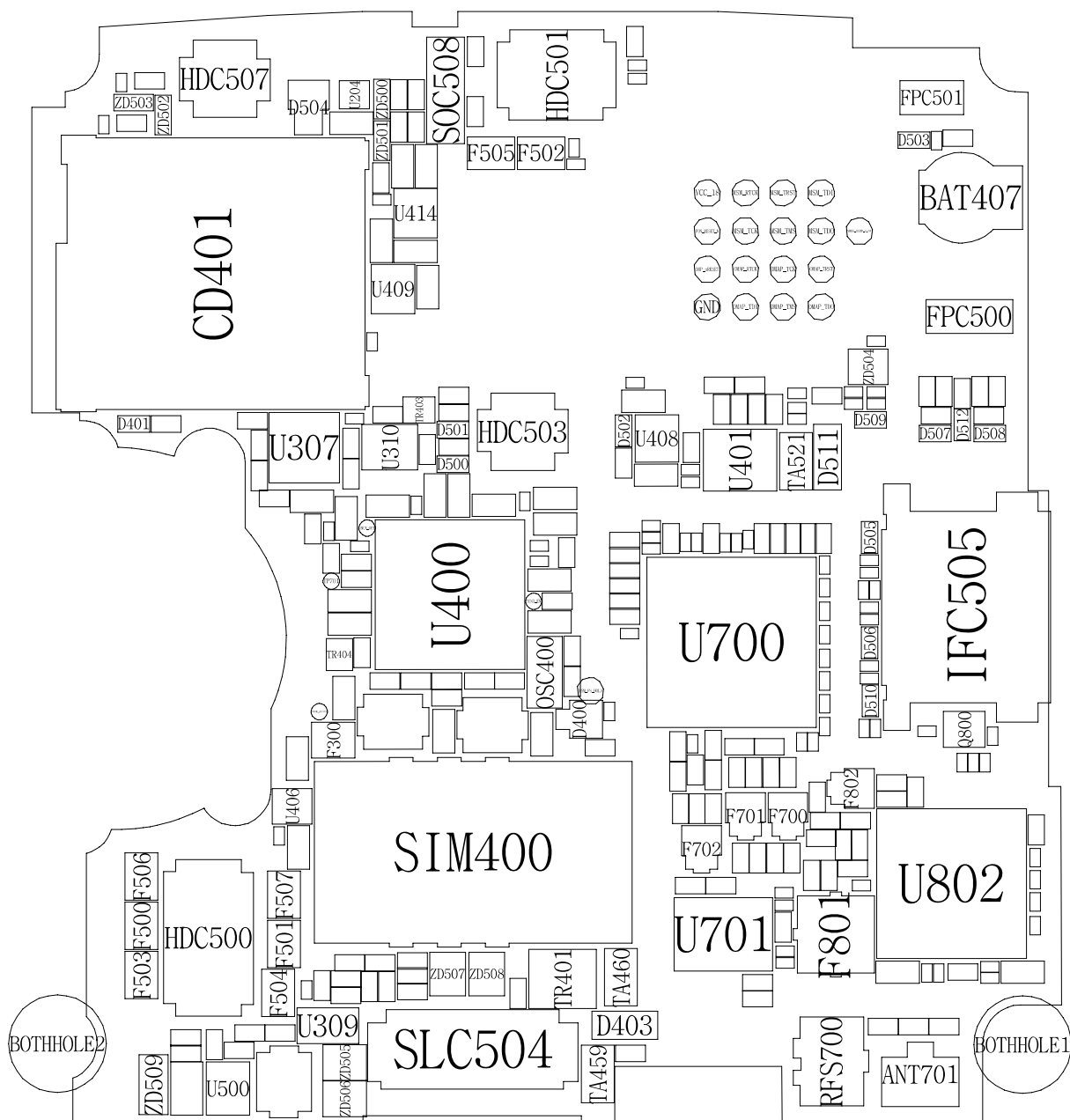


## 8. PCB Diagrams

Top



JTAG100



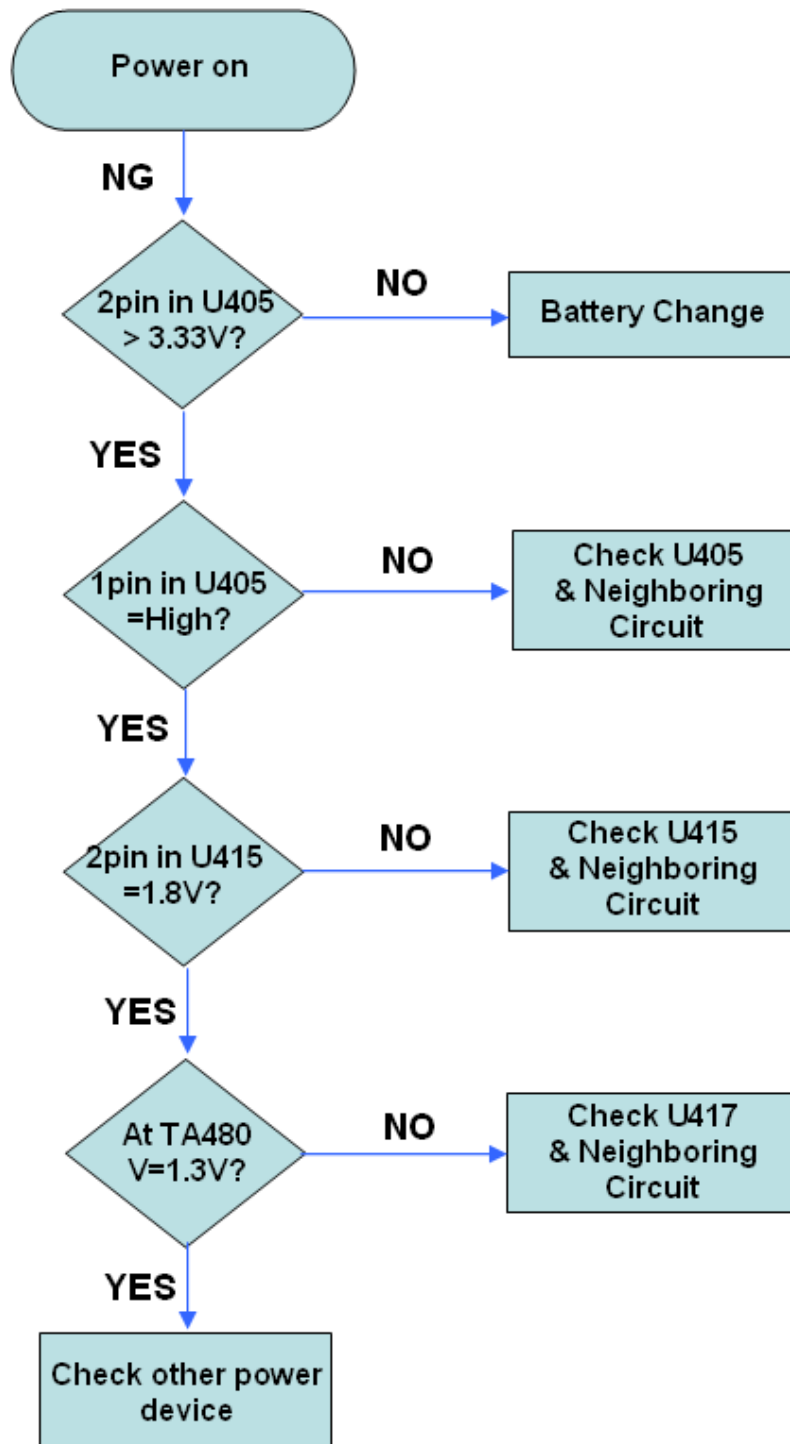
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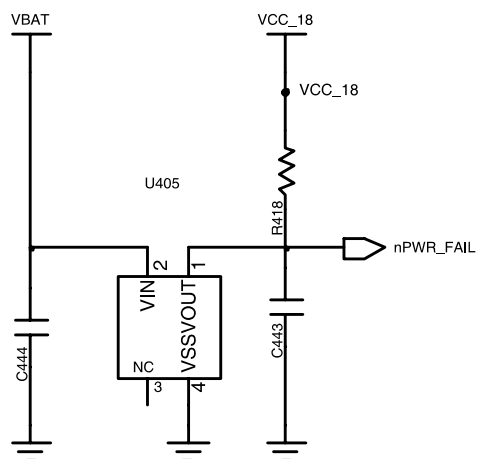
## 9. Flow Chart of TroubleShooting

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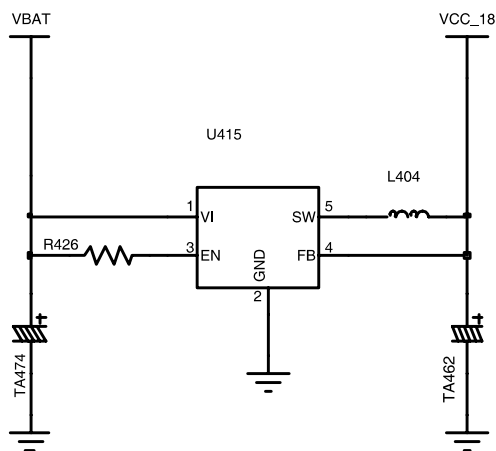
### 9-1. Power On

- PDA Part

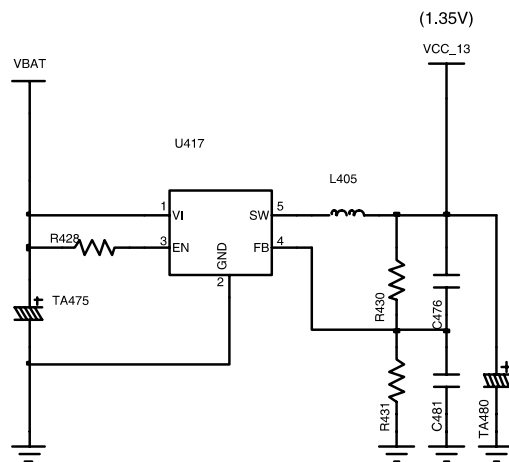




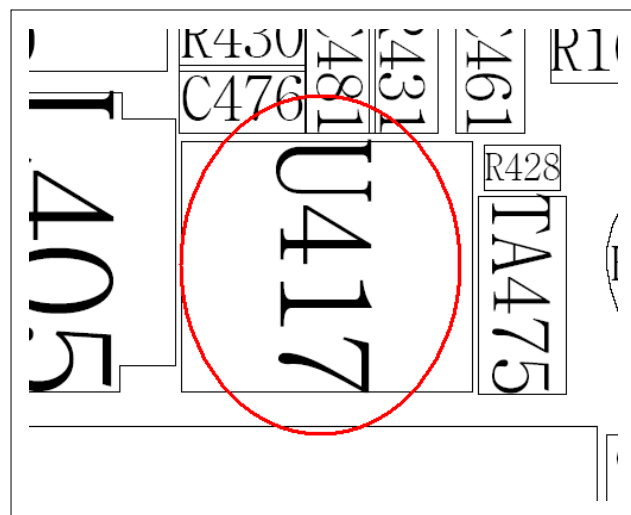
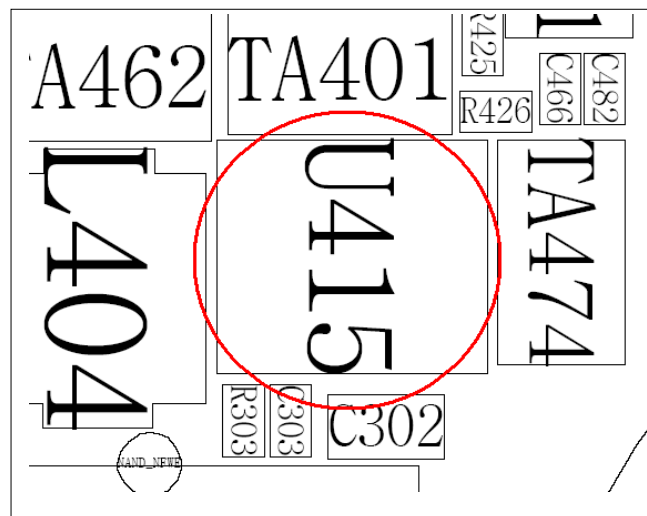
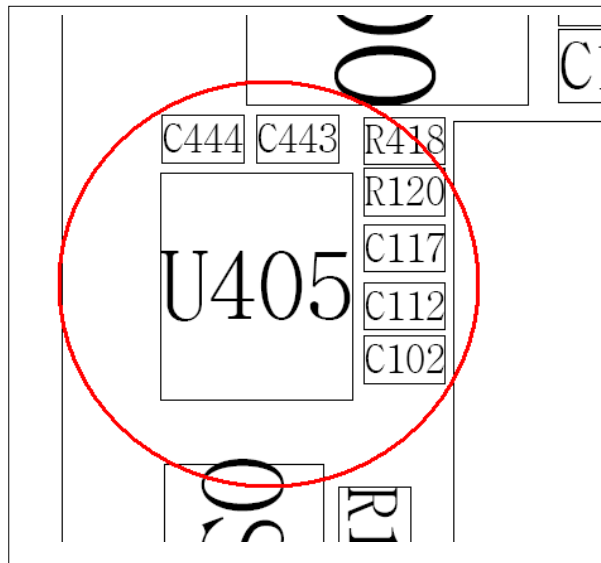
**U405 & neighboring circuits**



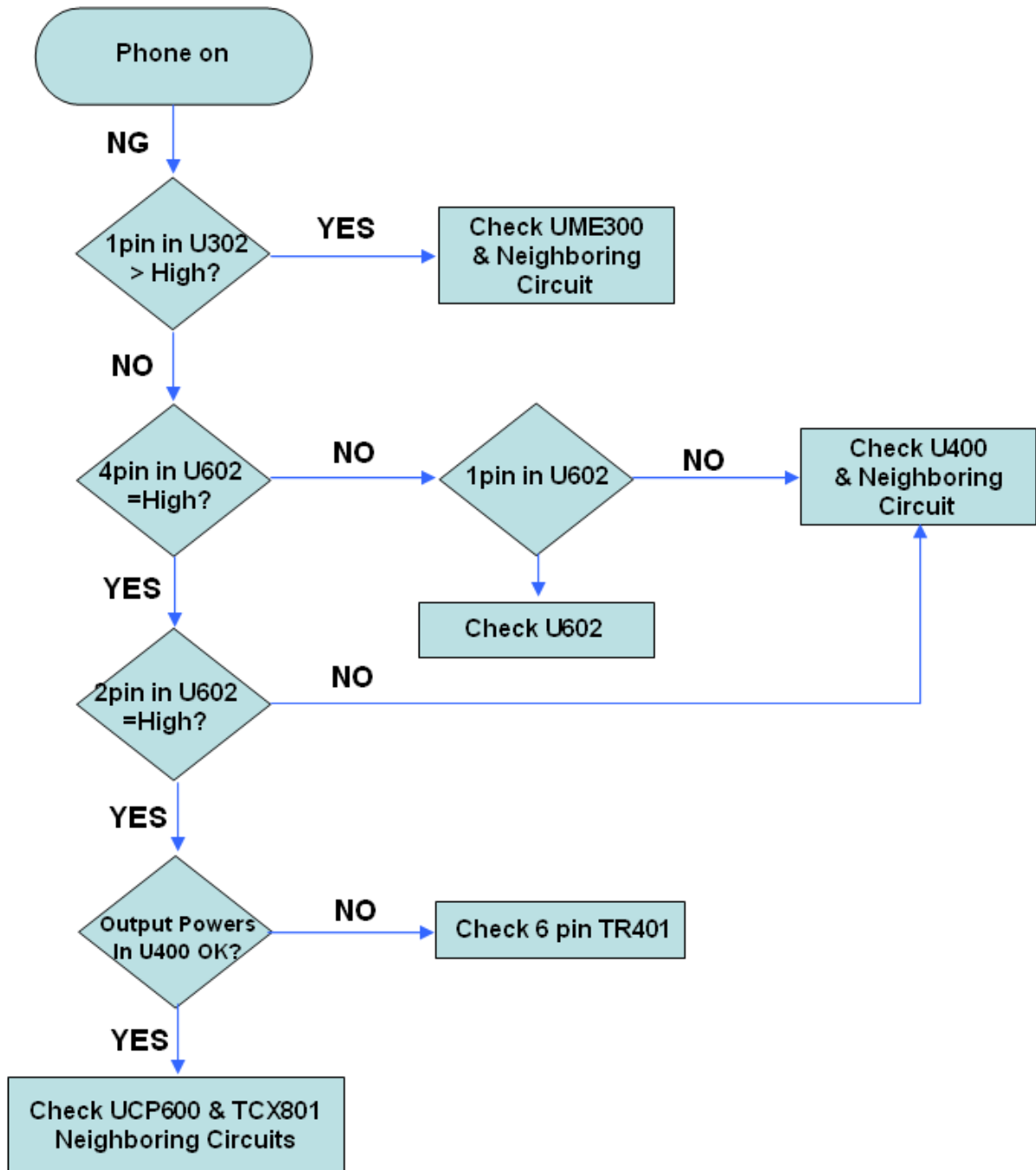
**U415 & neighboring circuits**

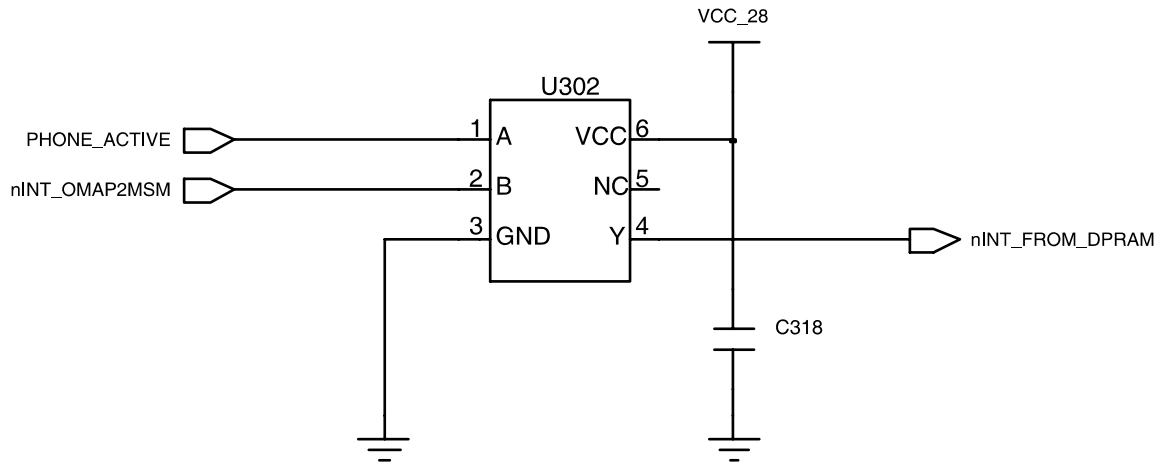


**U417 & neighboring circuits**



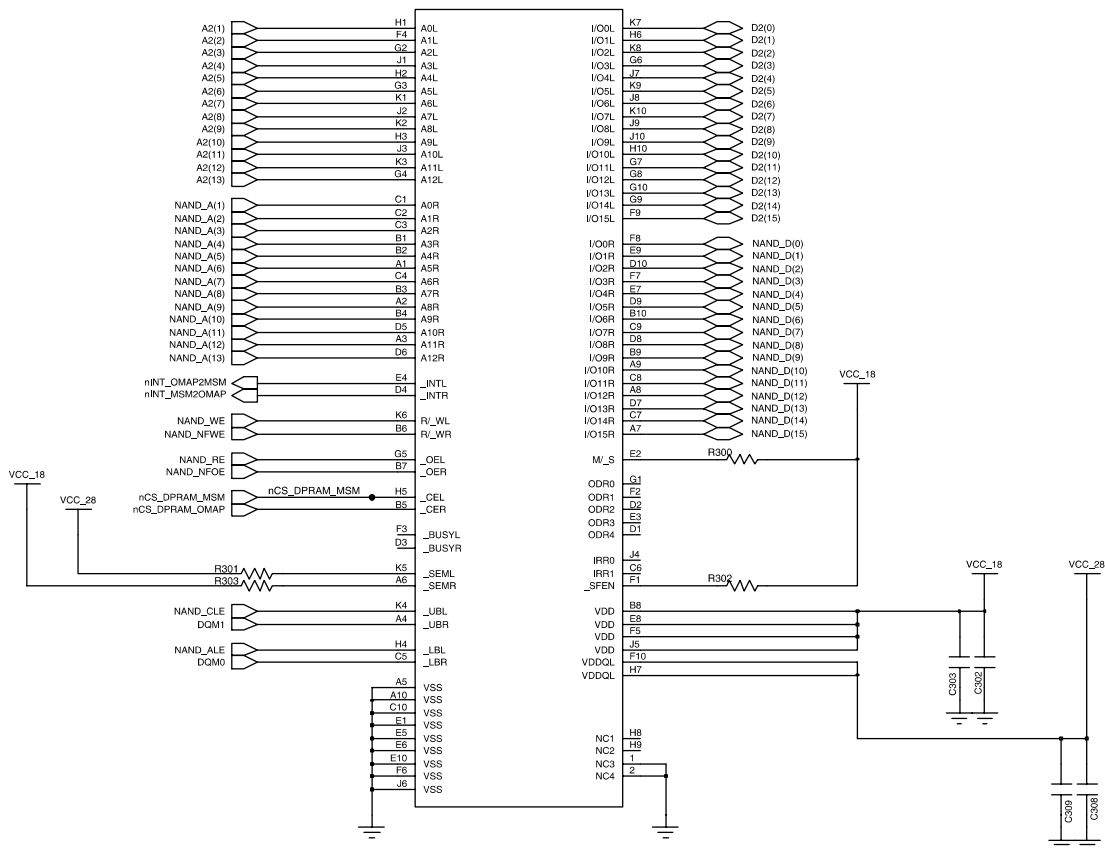
● PHONE Part





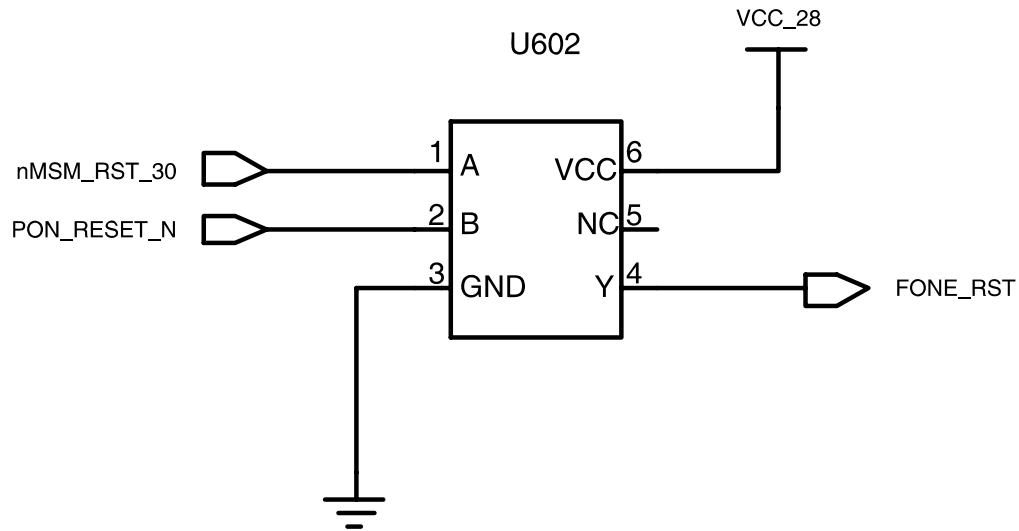
U302 & neighboring circuits

< DPRAM >  
UME300

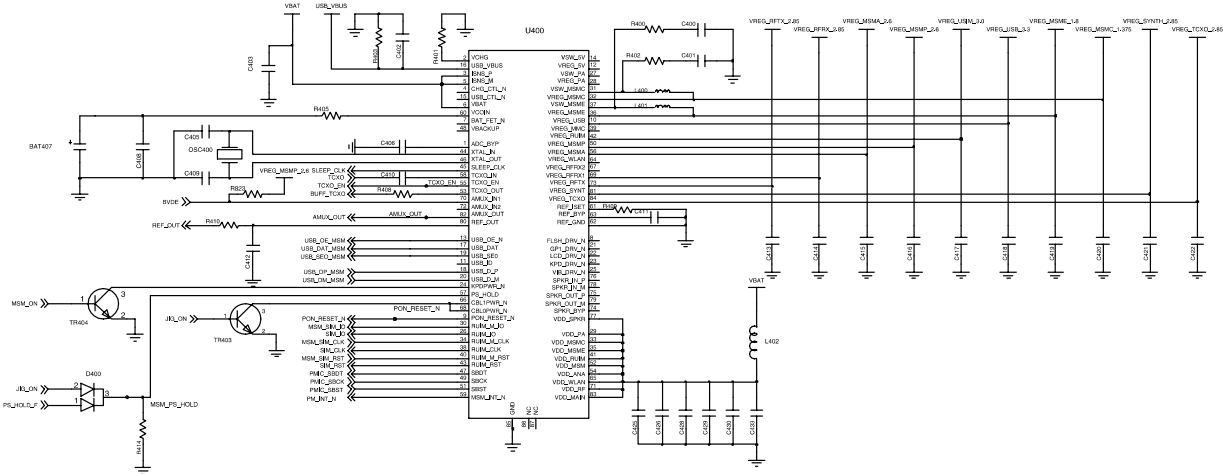


UME300 & neighboring circuits



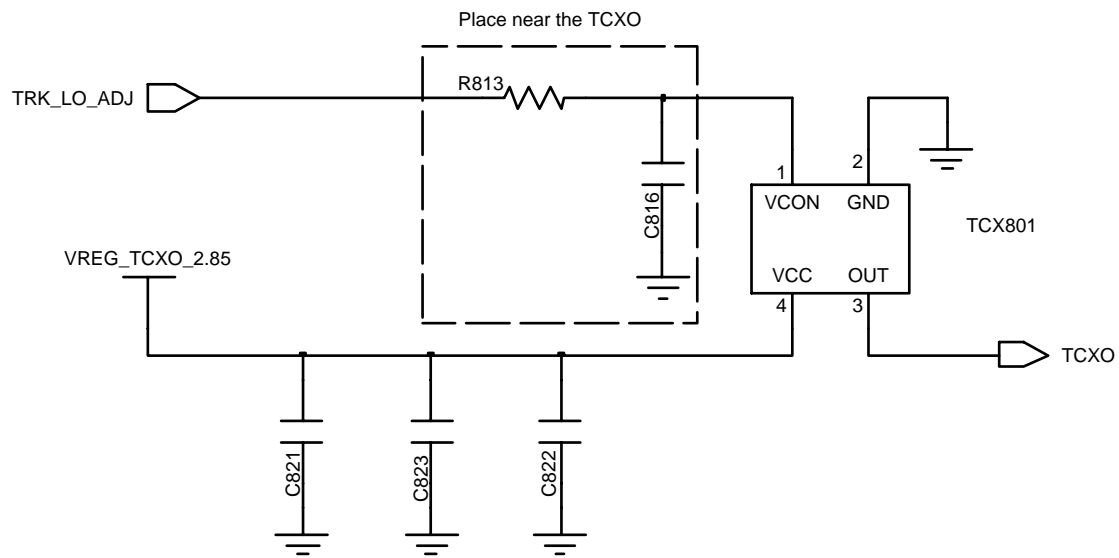


**U602 & neighboring circuits**

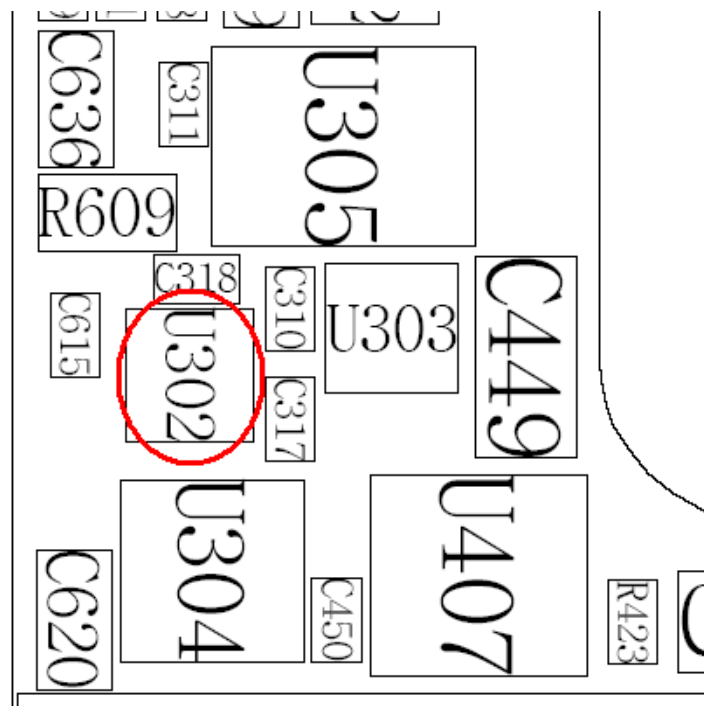


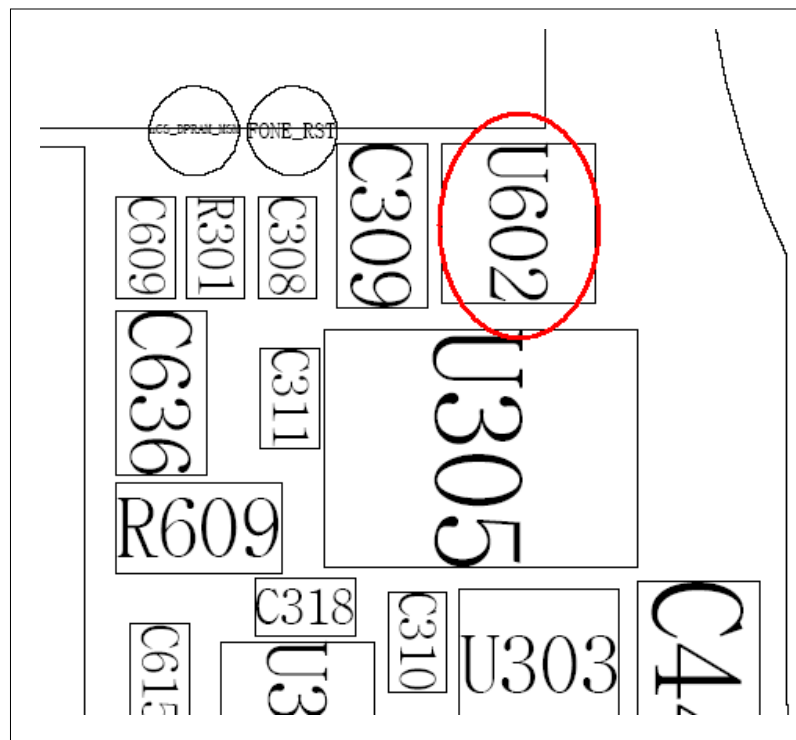
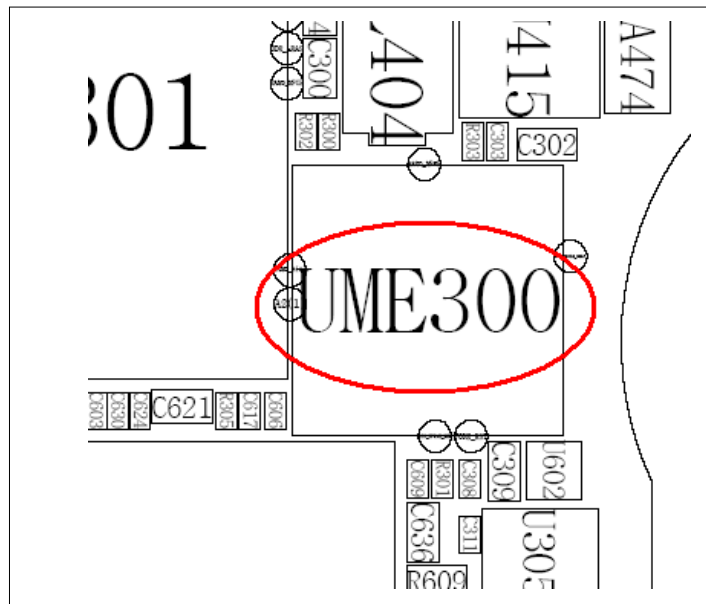
**U400 & neighboring circuits**

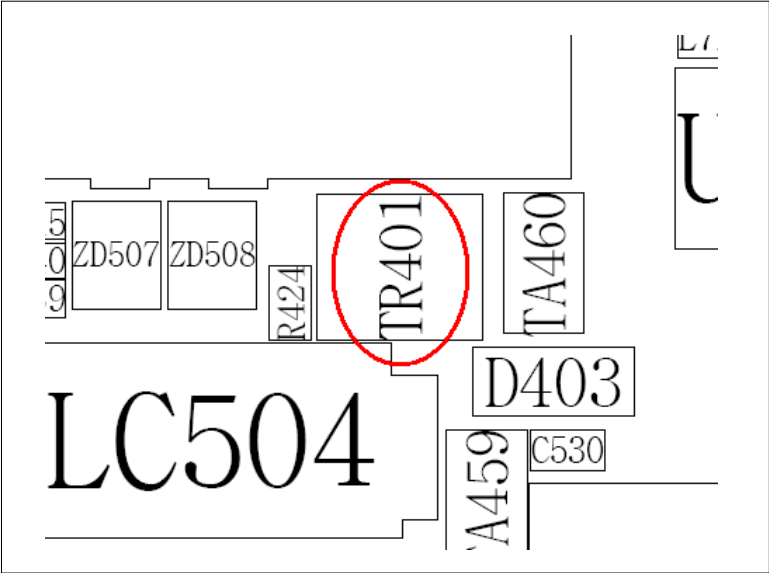
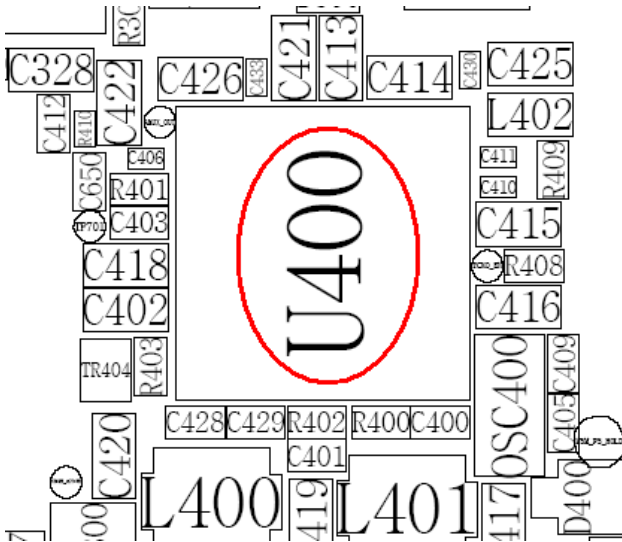




TCX801 & neighboring circuits

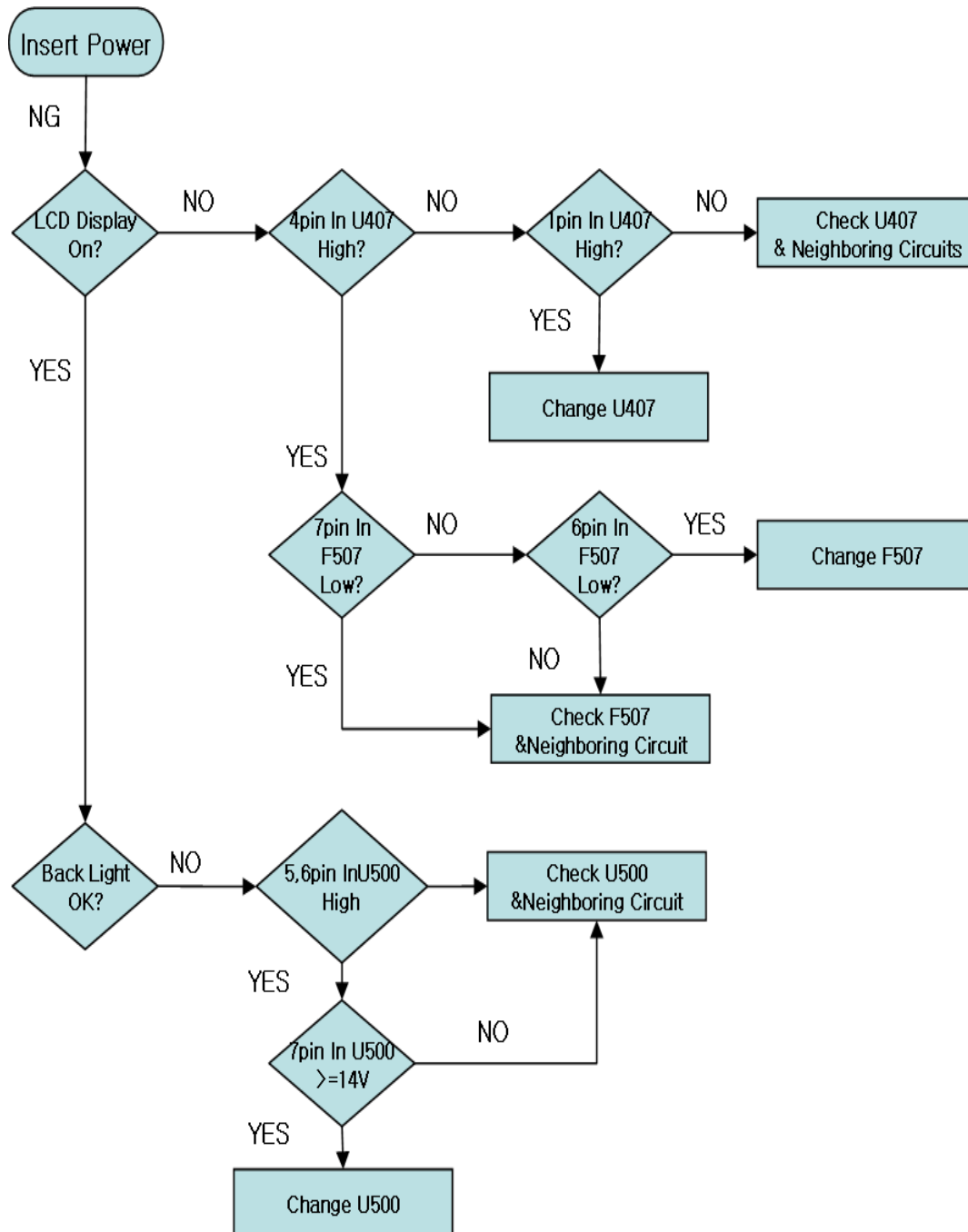




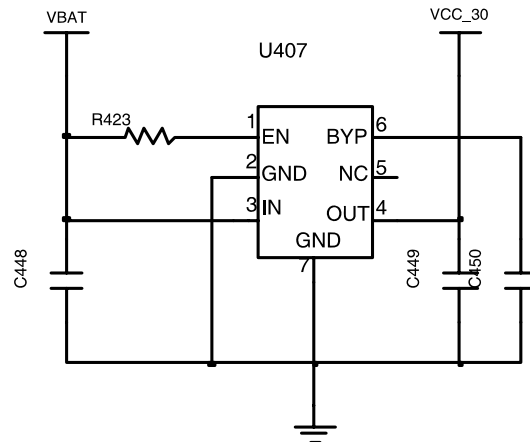




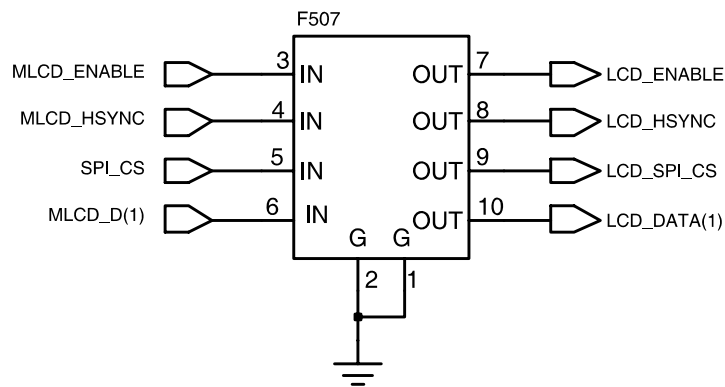
## 9-2. LCD Working



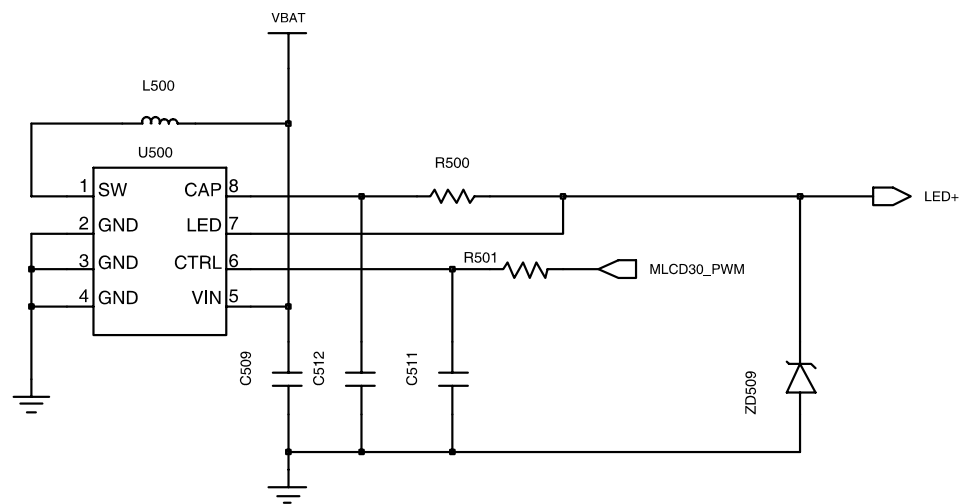




**U407 & neighboring circuits**

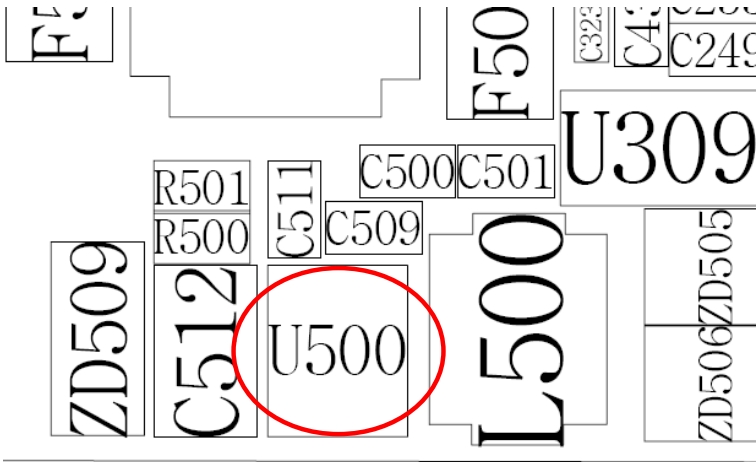
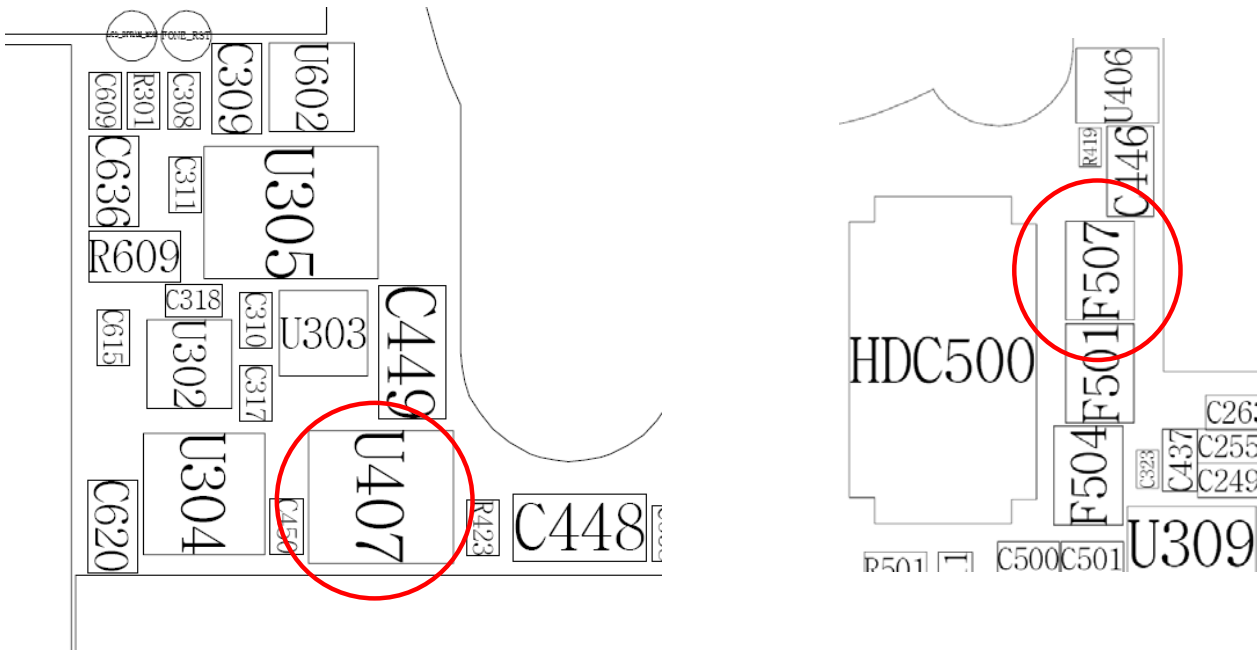


**F507 & neighboring circuits**



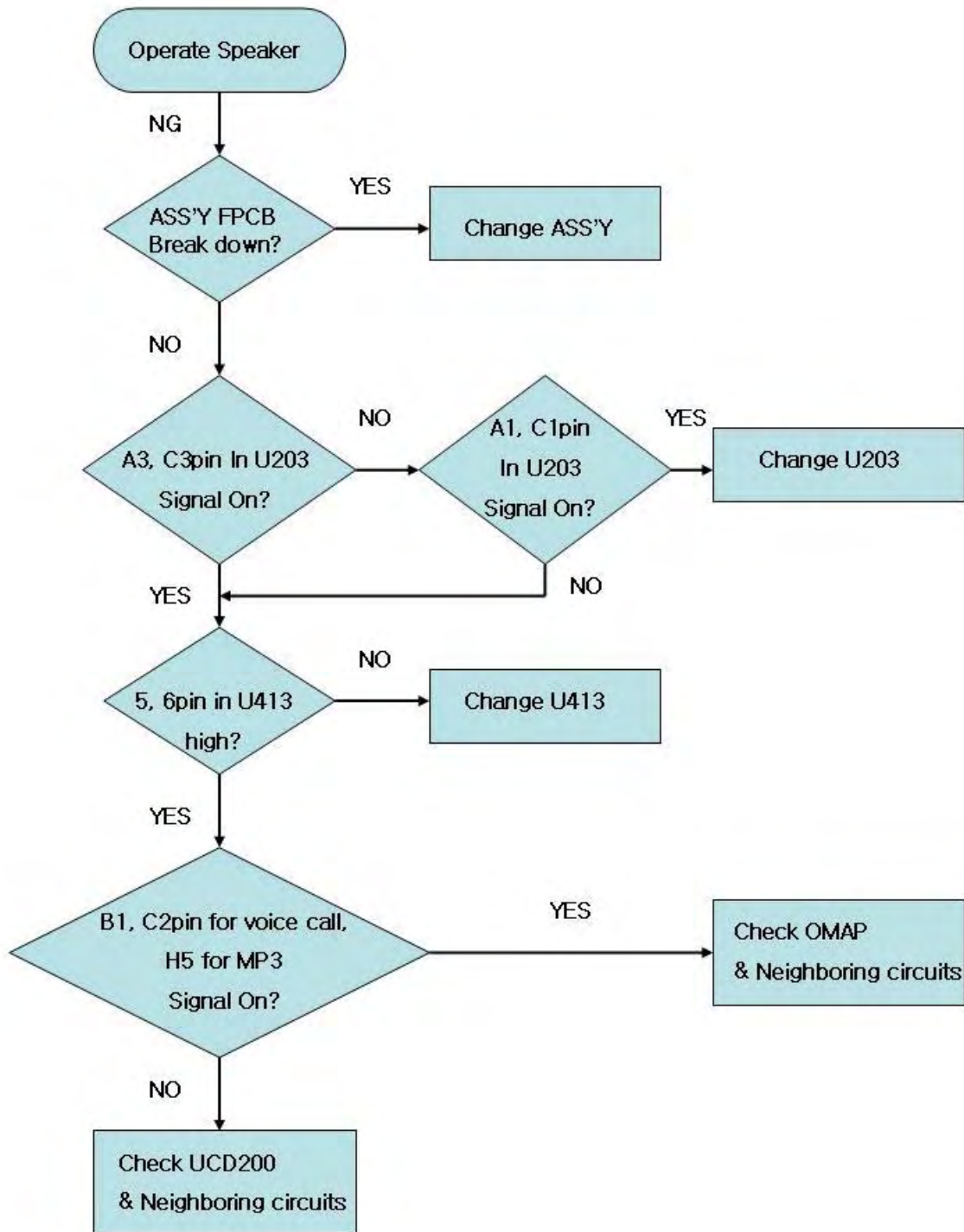
**LCD BACKLIGHT**

**U500 & neighboring circuits**

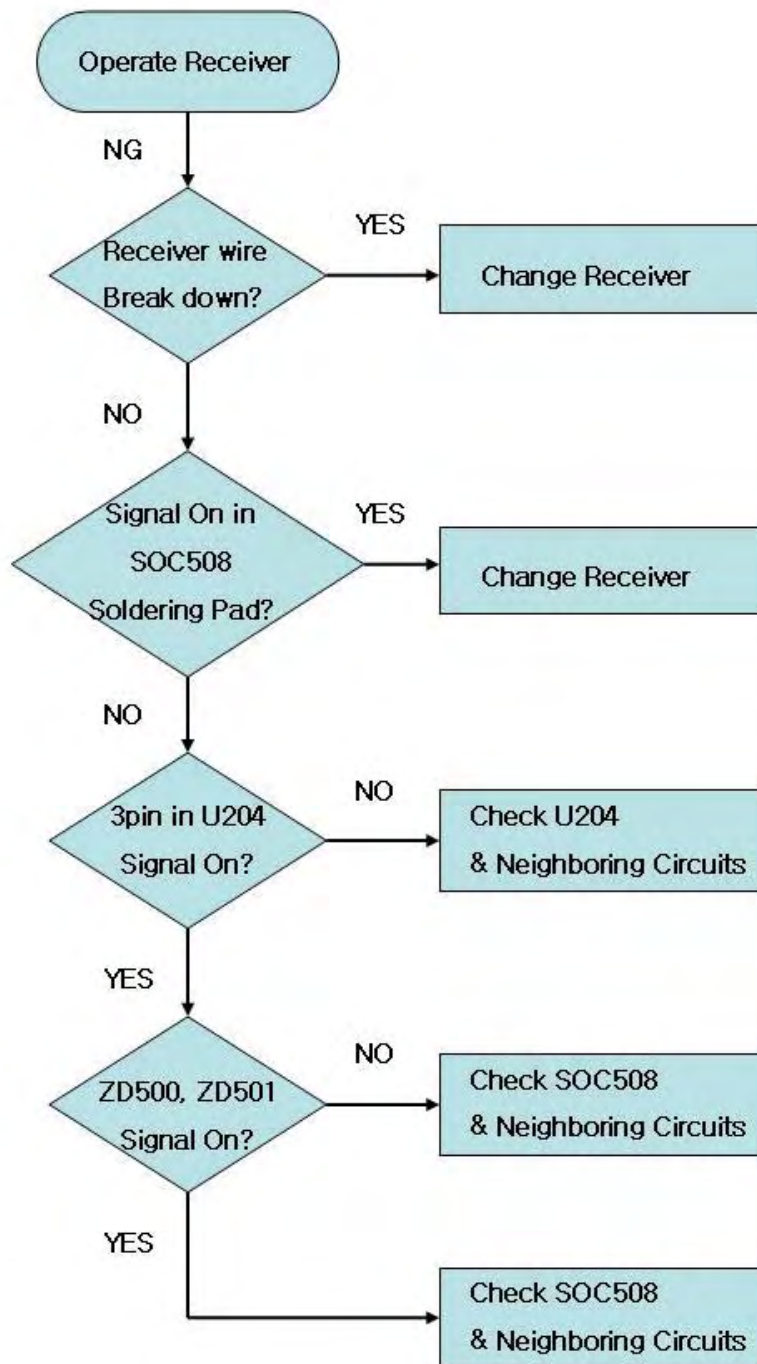


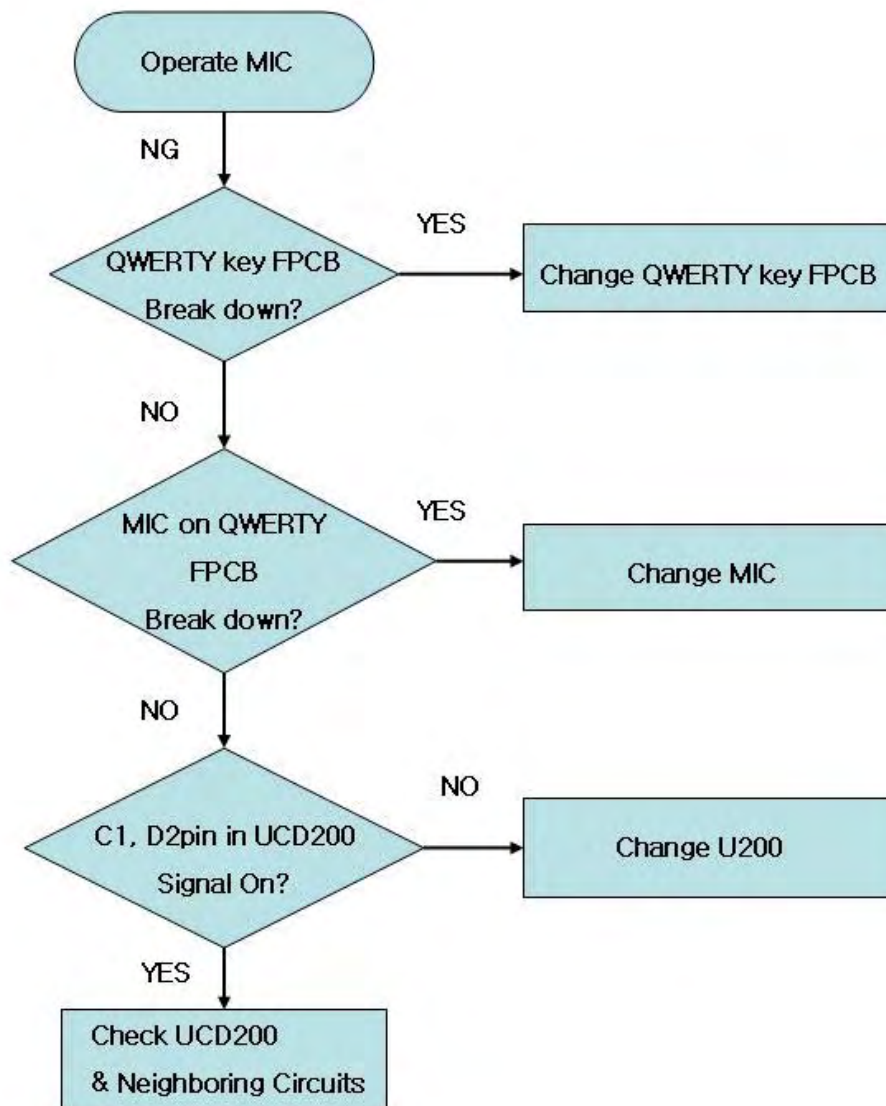
### 9-3. Audio Working

- Speaker Working

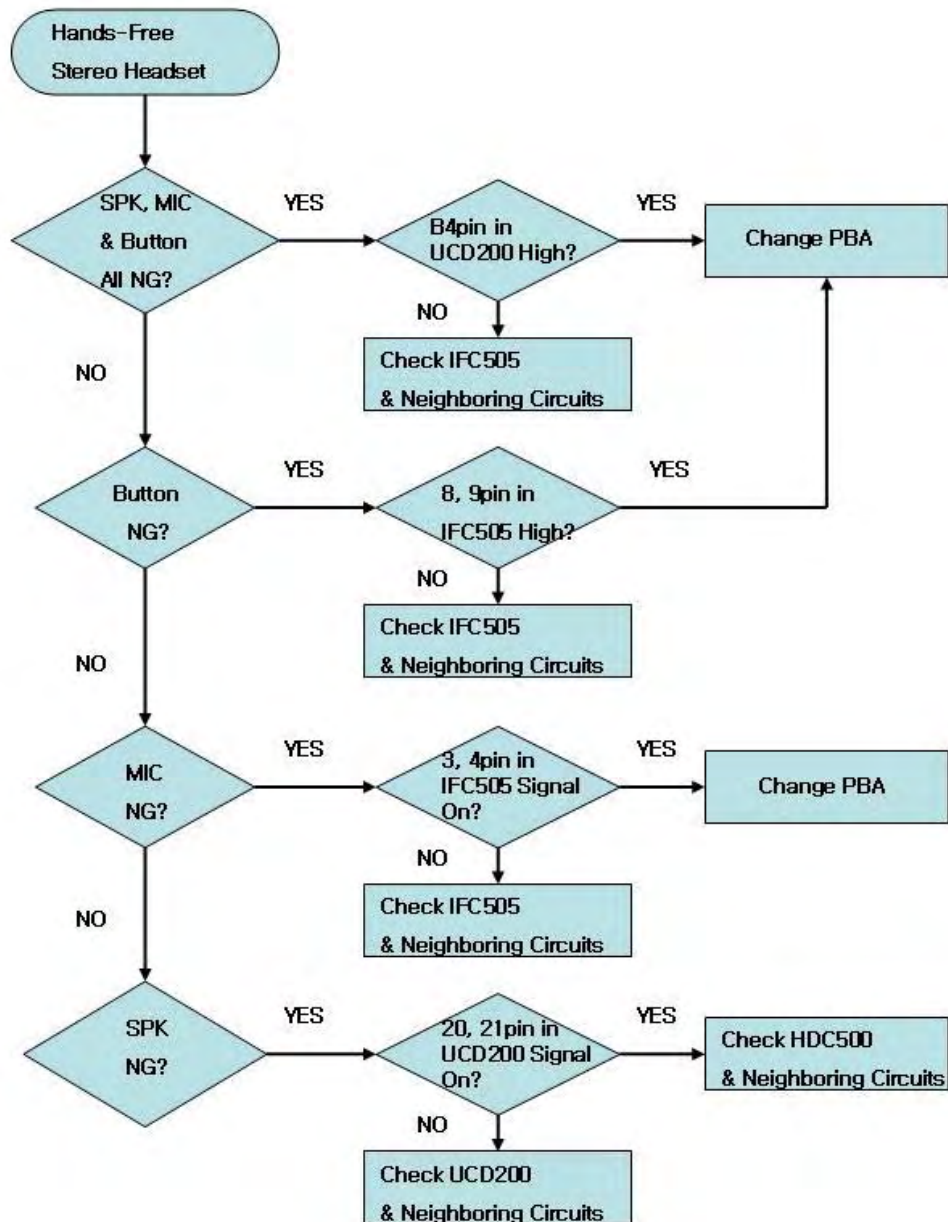


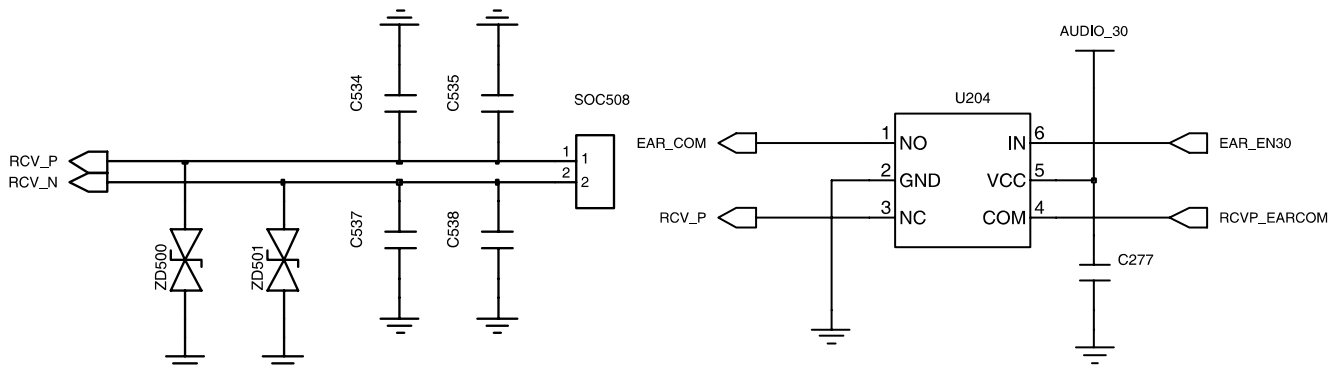
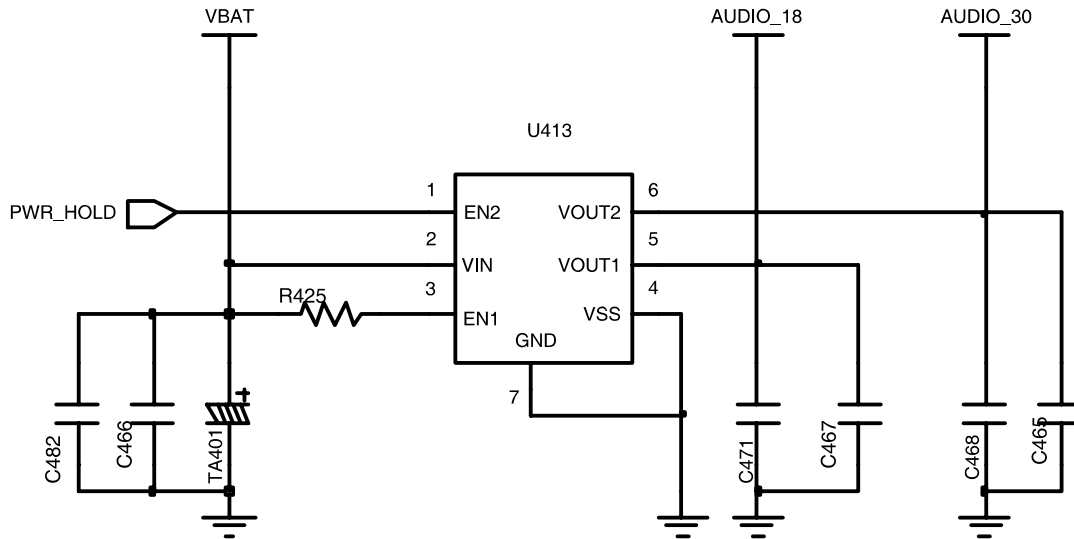
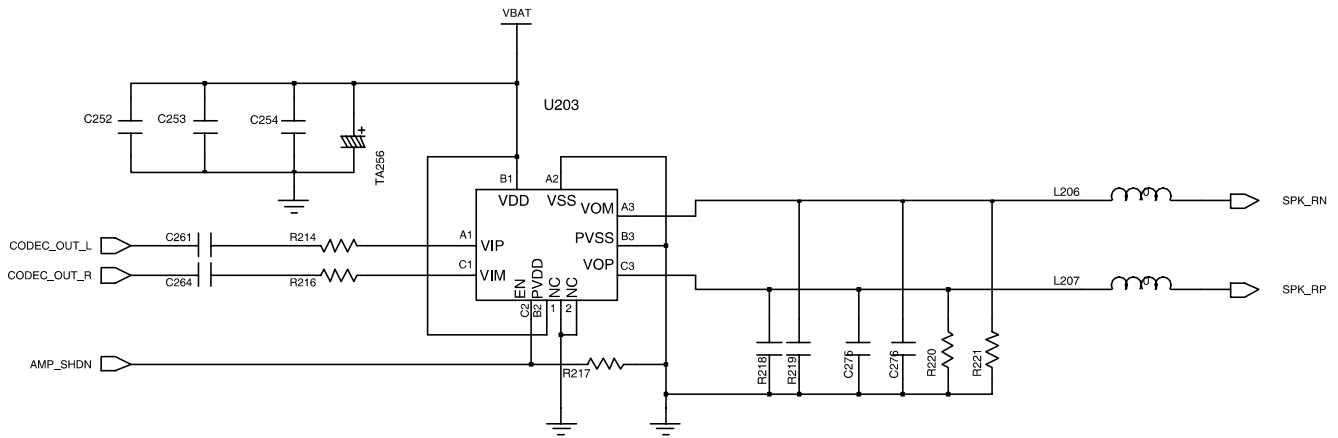
- Receiver Working

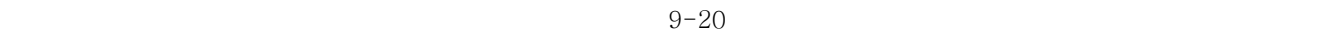


● MIC Working

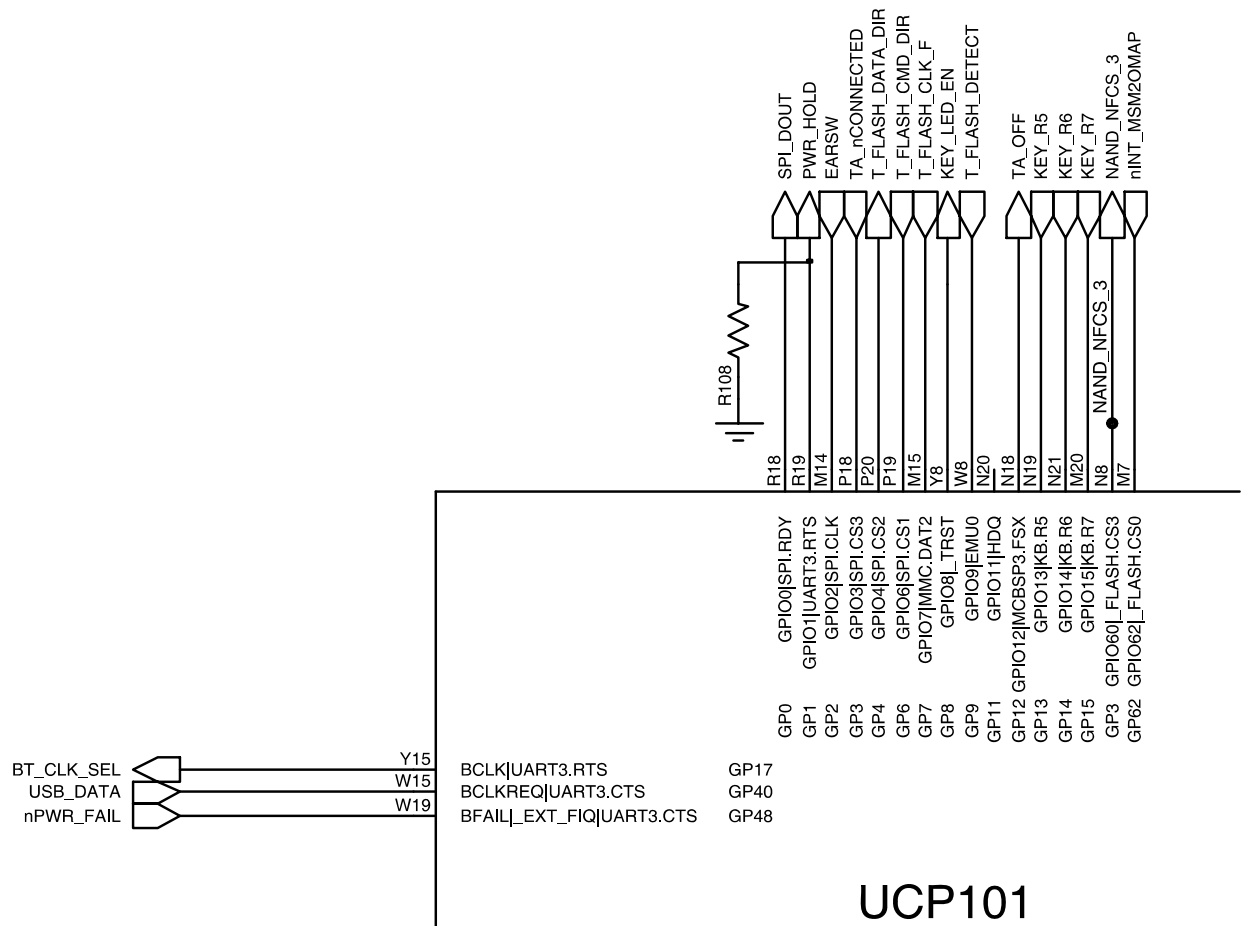
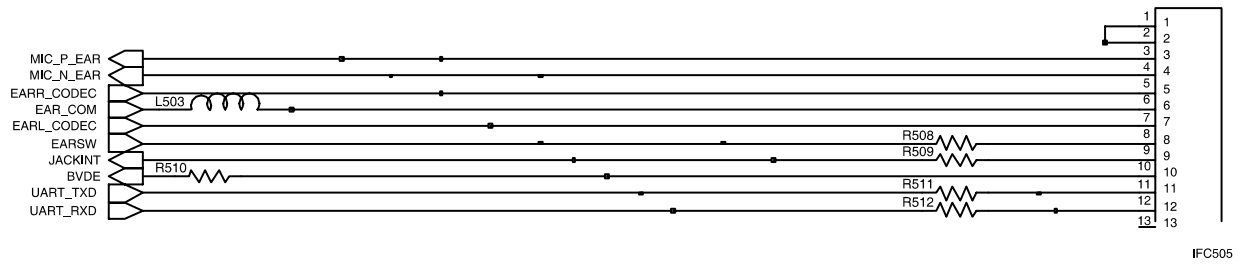
● Hands-Free Stereo Headset Working

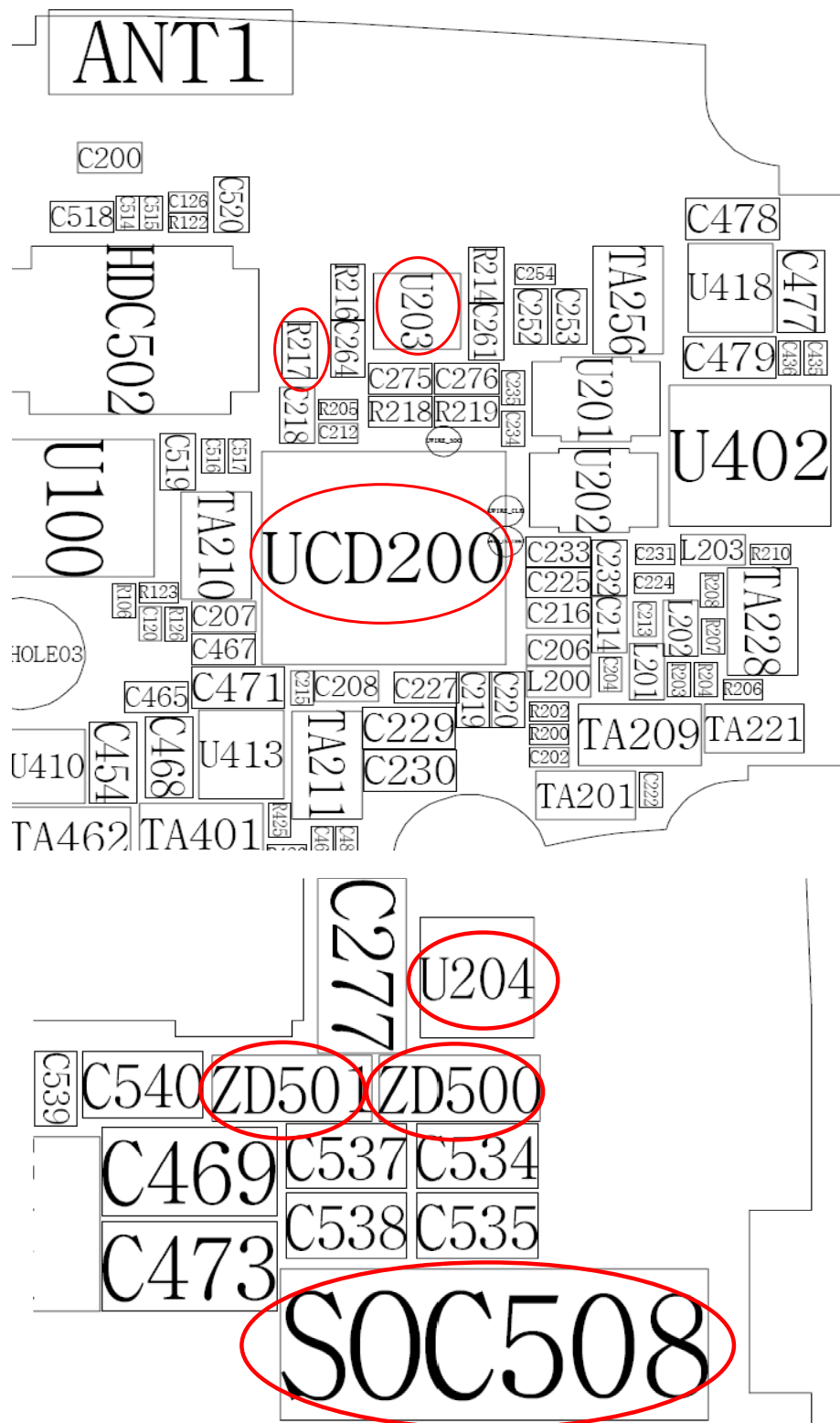


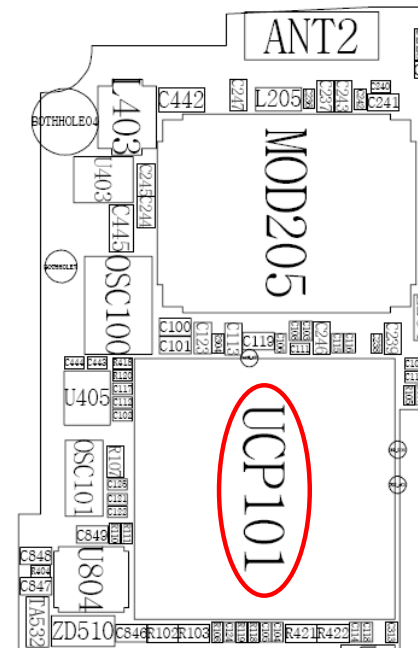
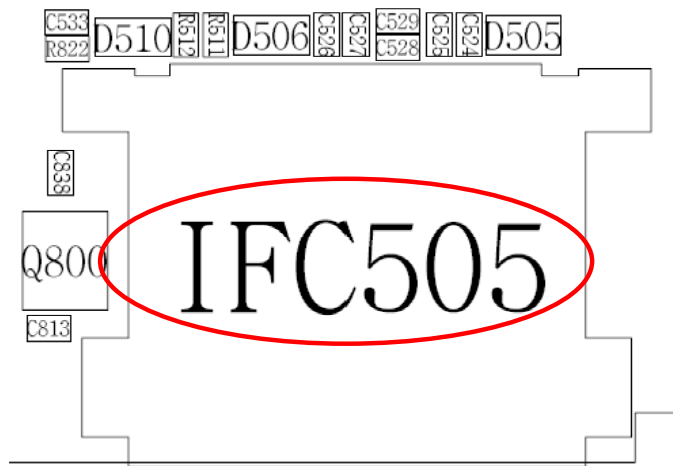




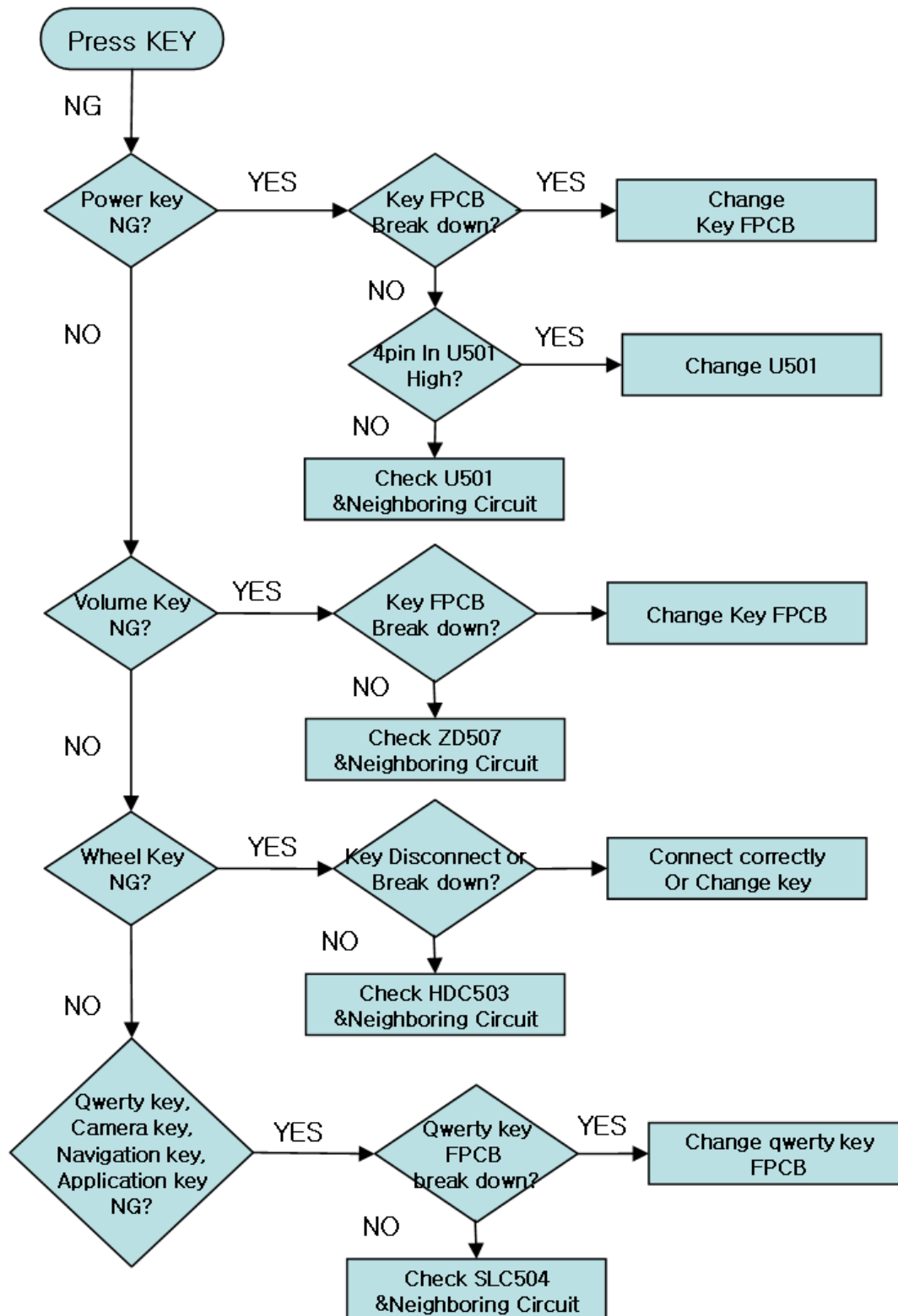


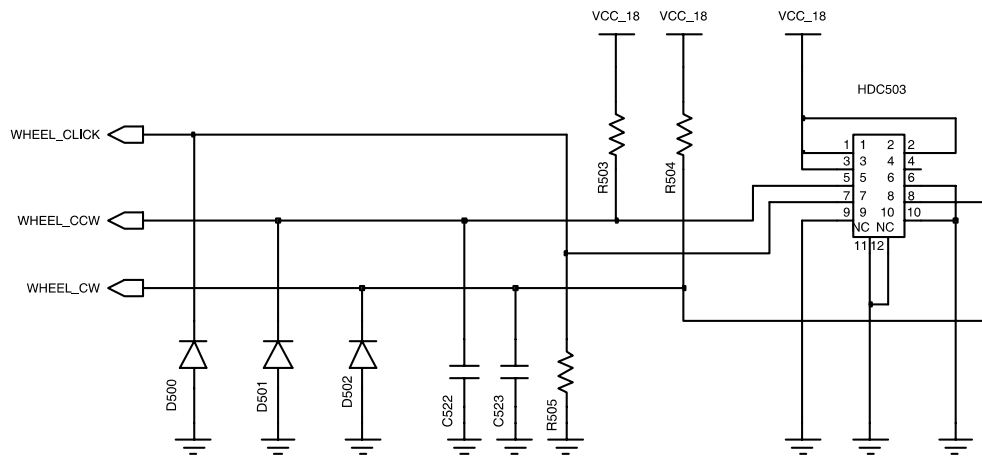
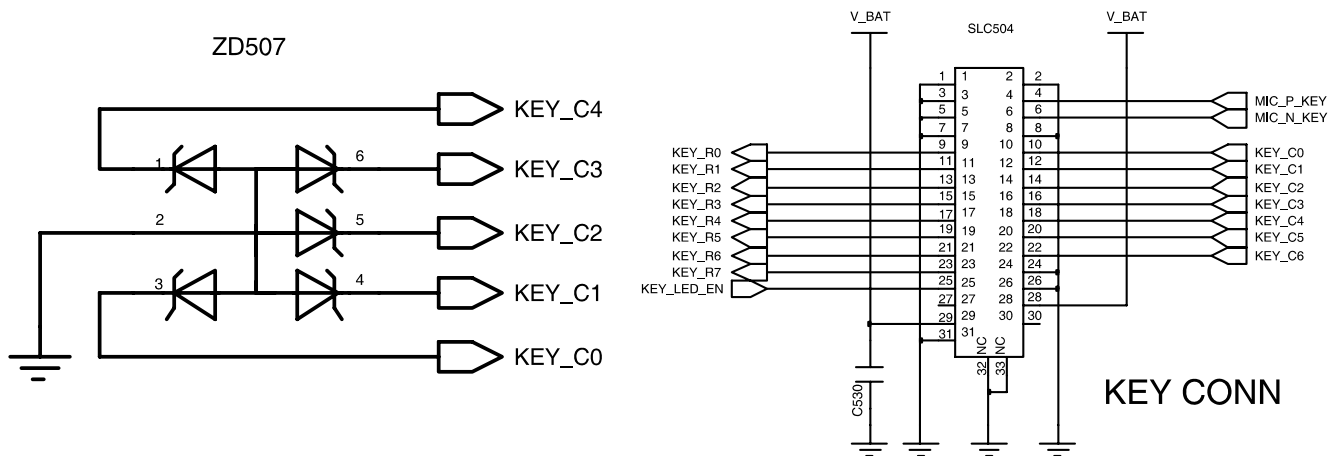




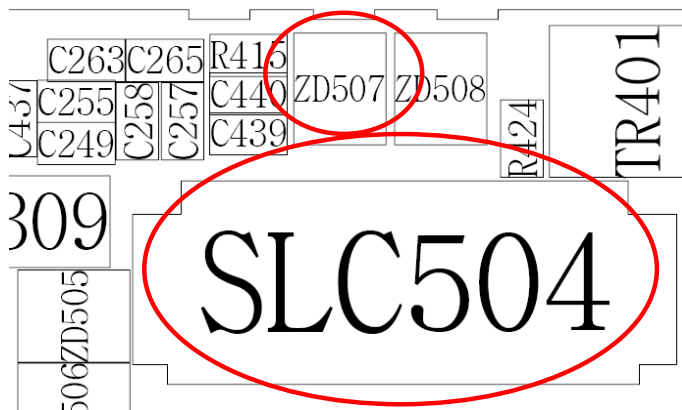


## 9-4. KEY Working

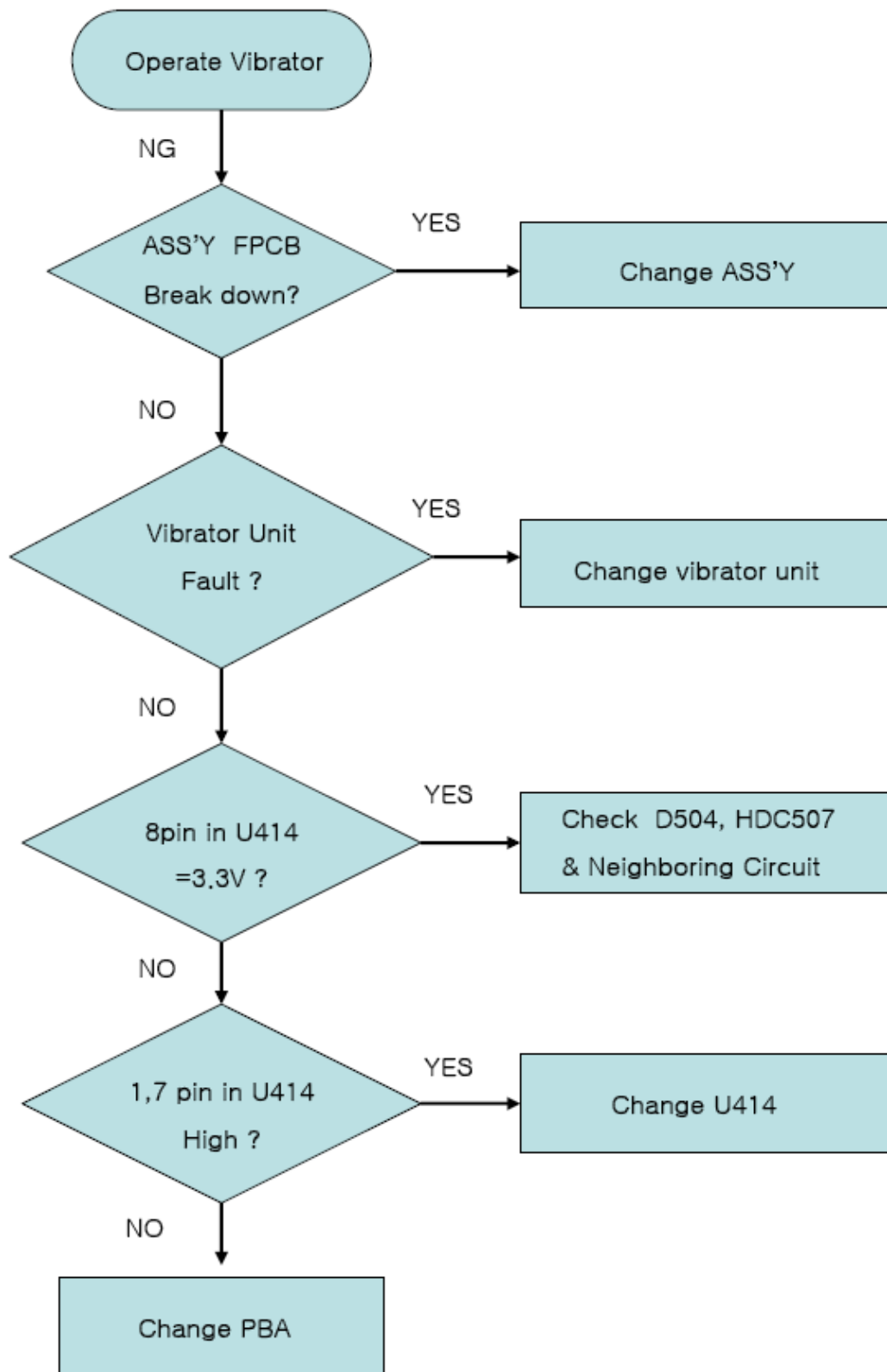


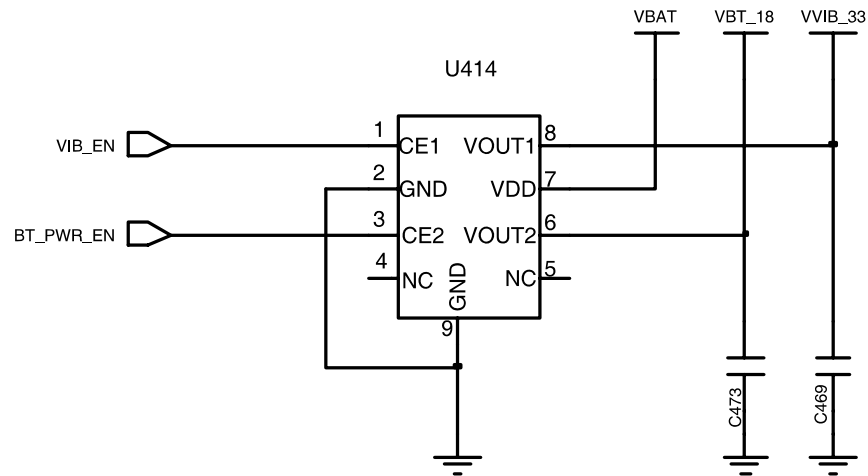


WHEEL KEY Conn

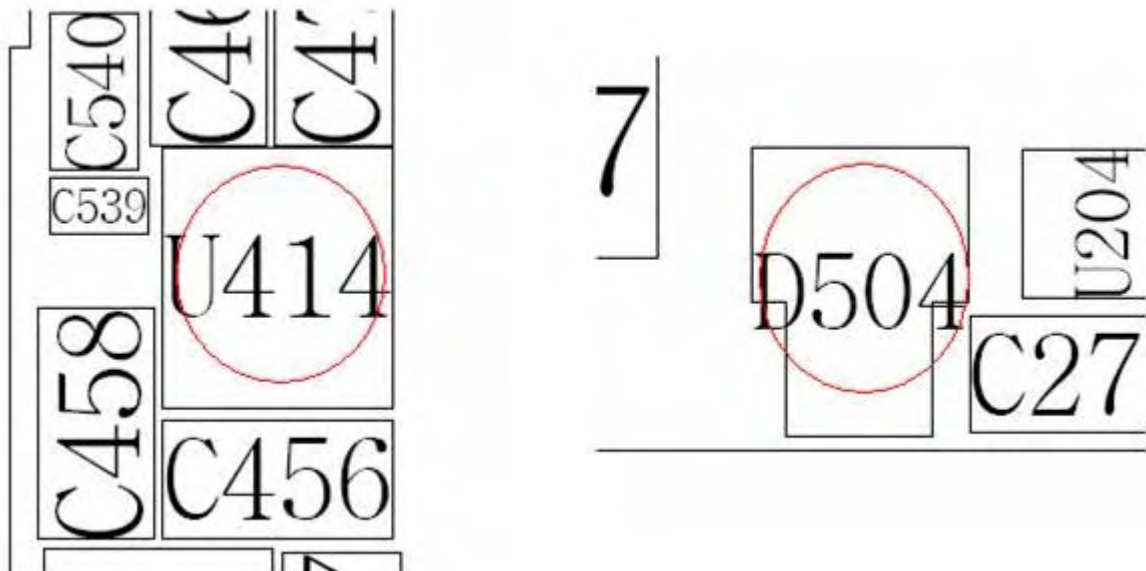
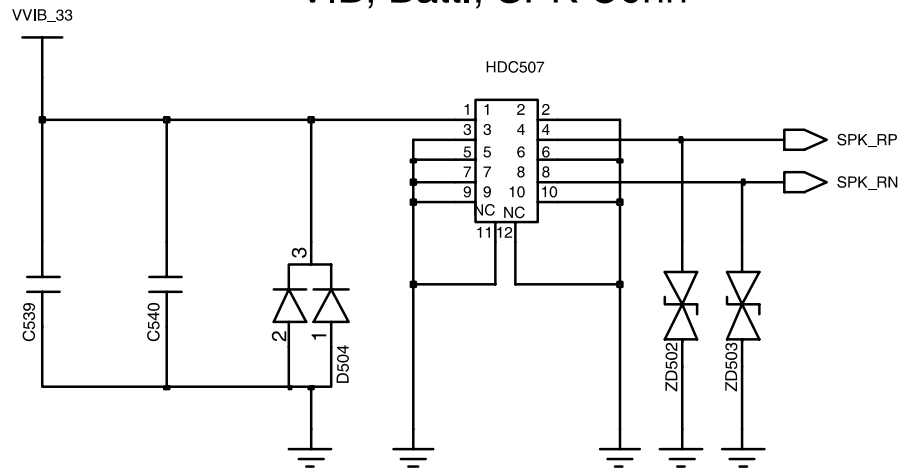


### 9-5. Vibrator Working

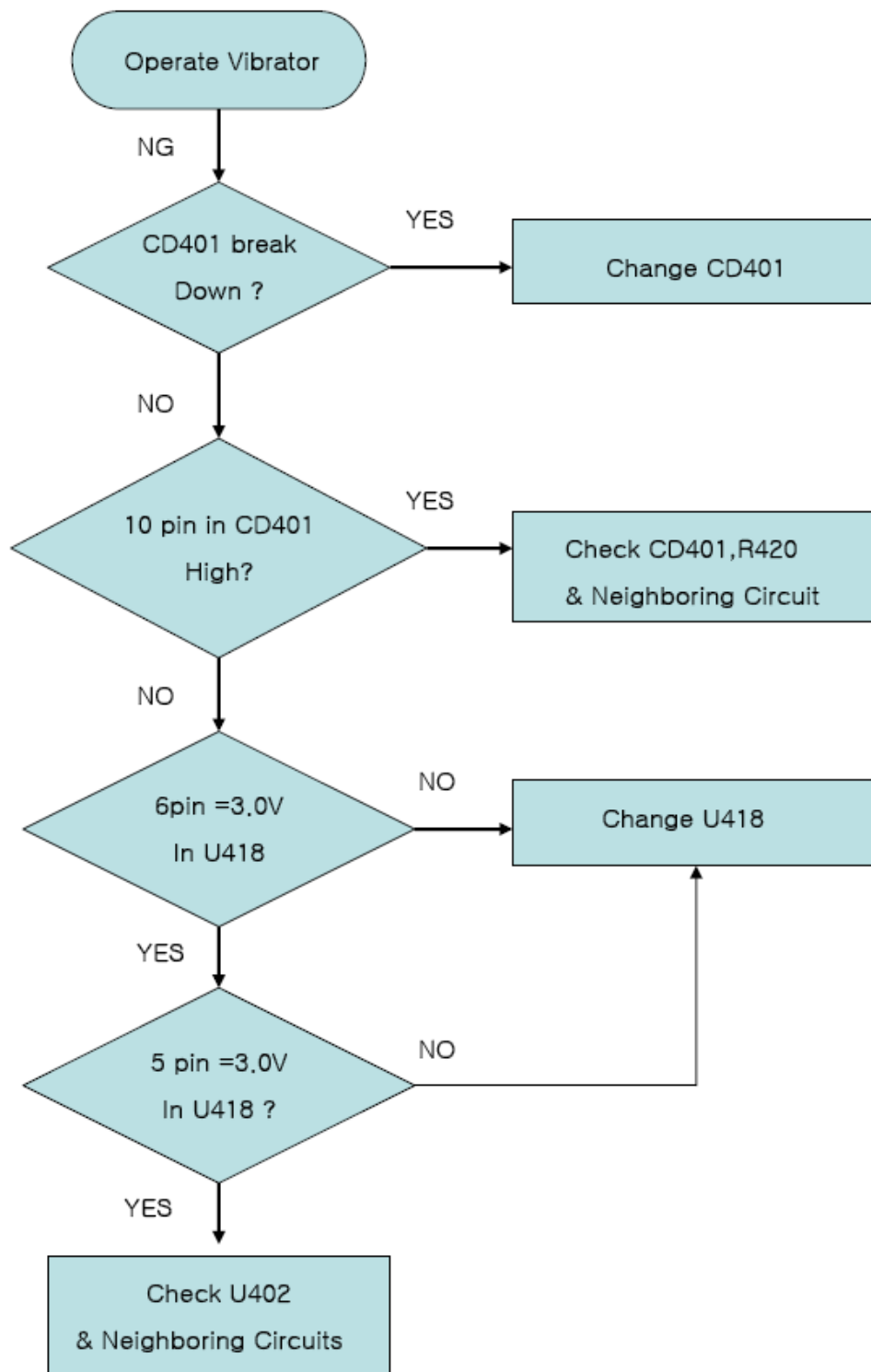




VIB, Batt., SPK Conn



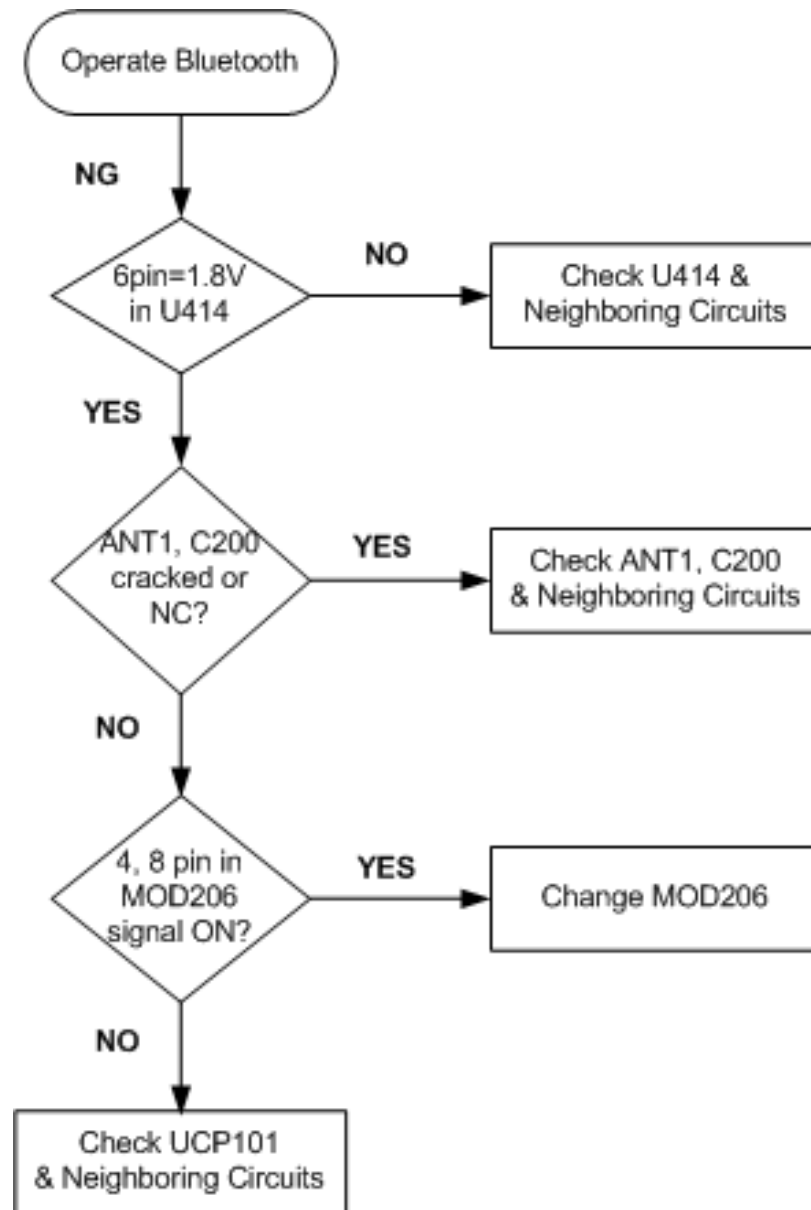
## 9-6. T-Flash Card Working

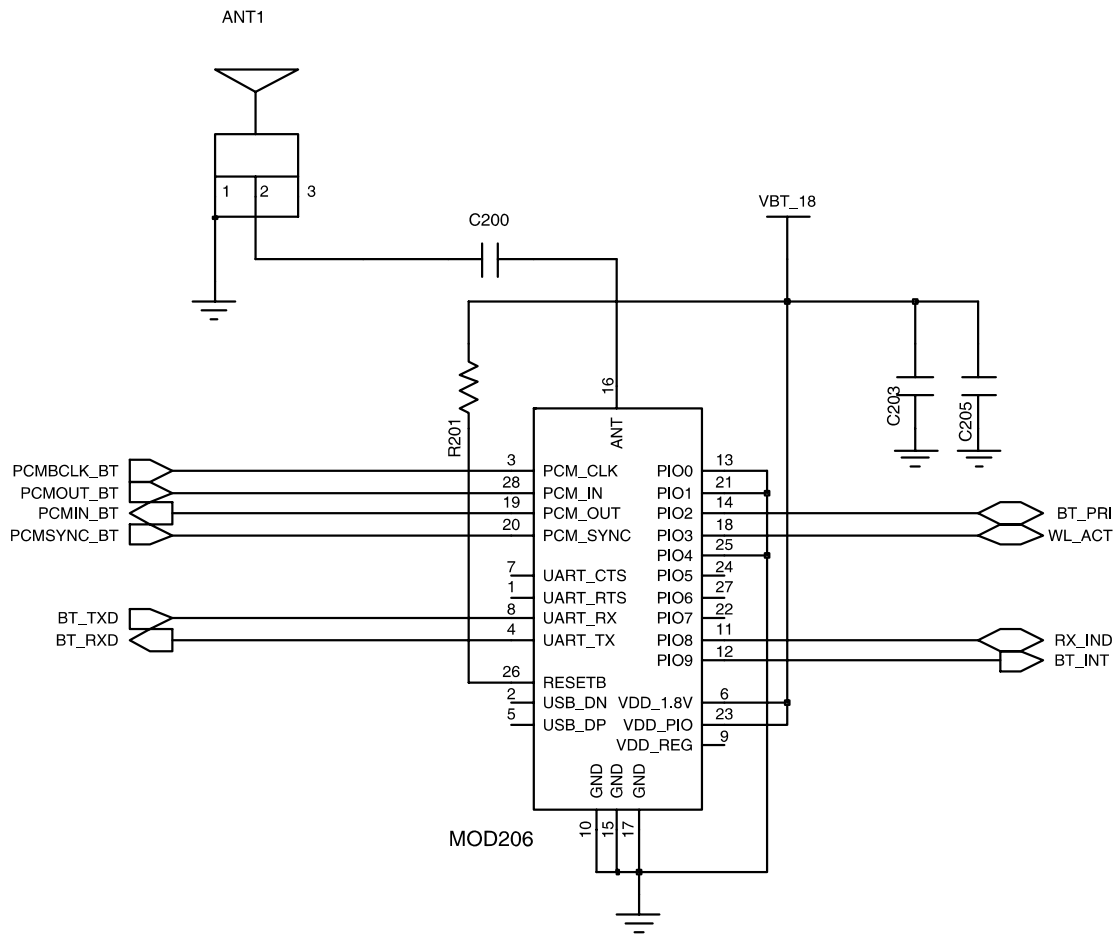




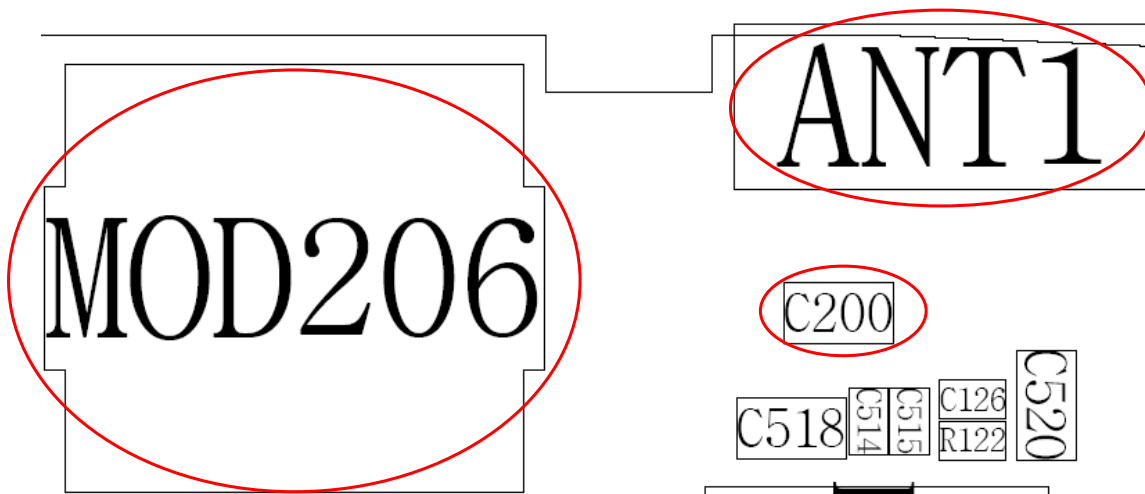


## 9-7. Bluetooth Working

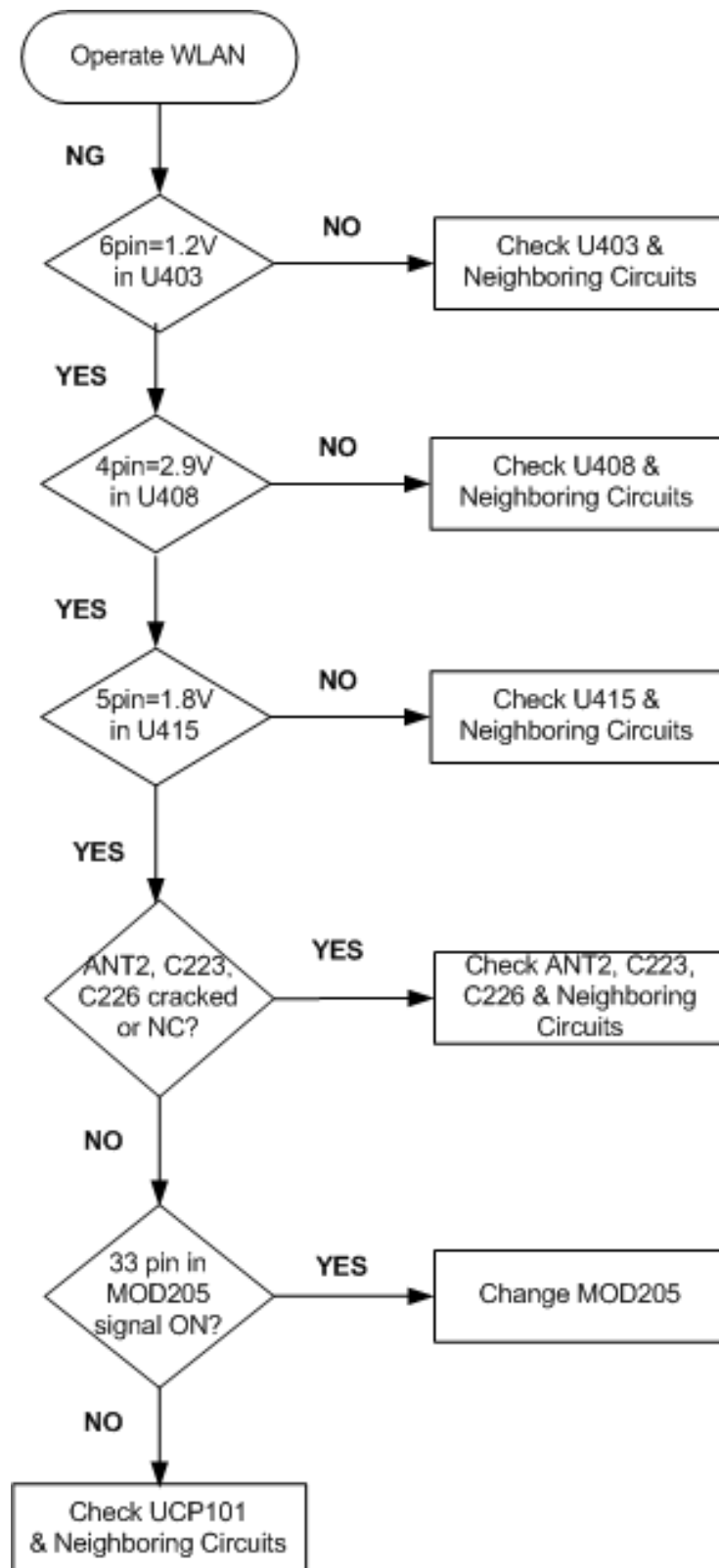


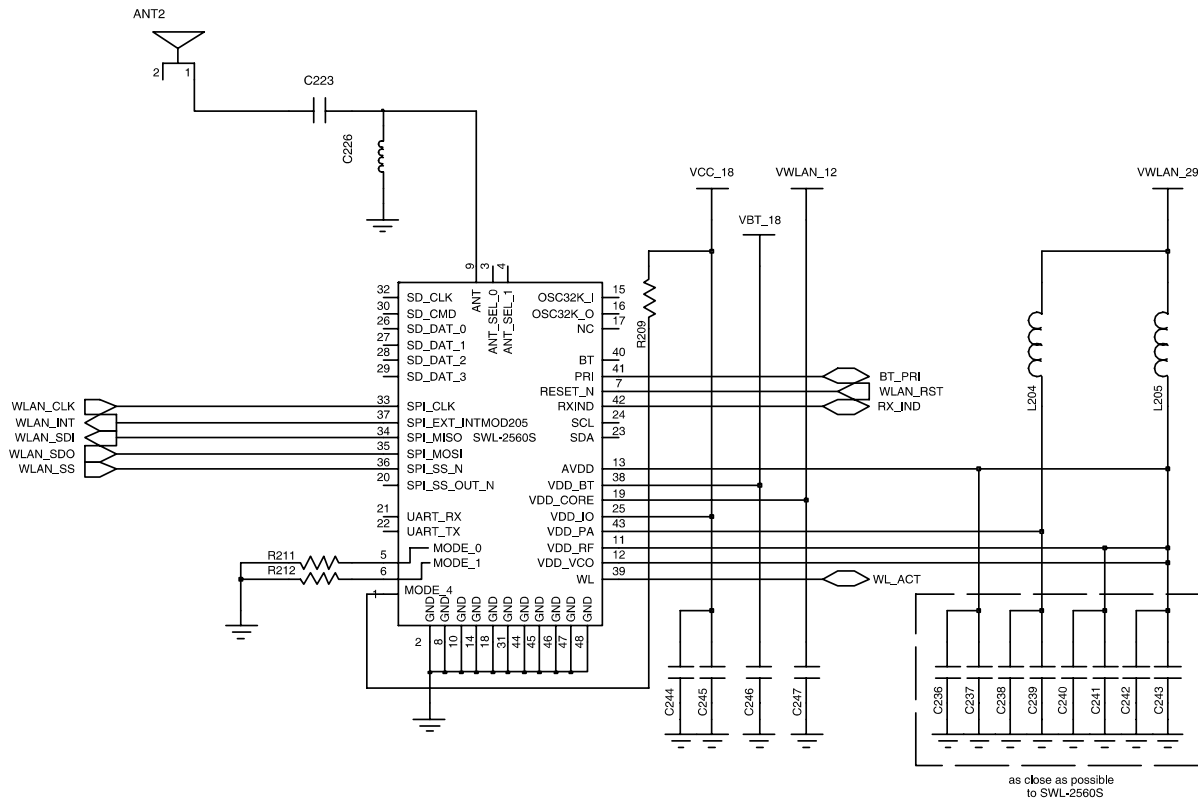


## BLUETOOTH

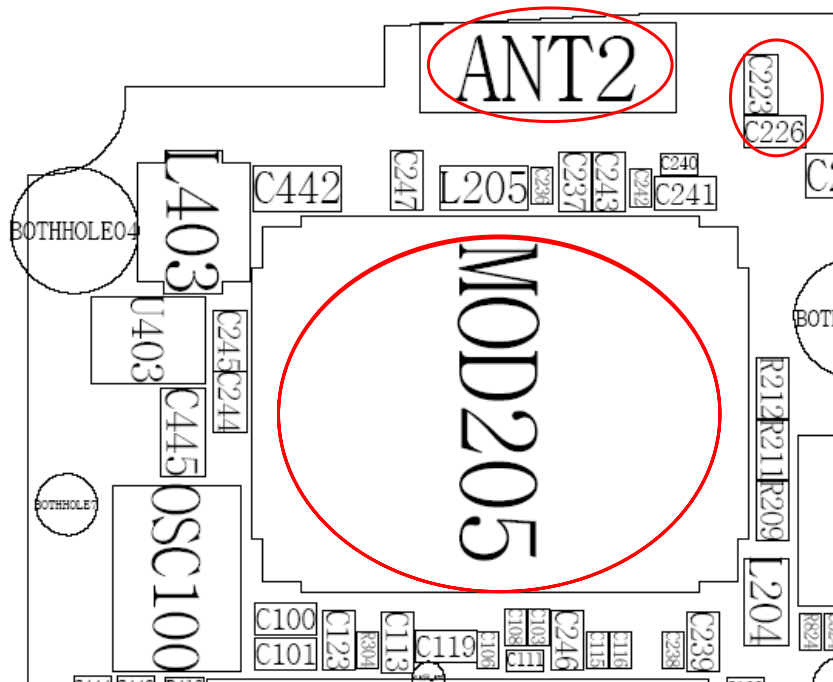


## 9-8 Wireless LAN (WLAN) Working

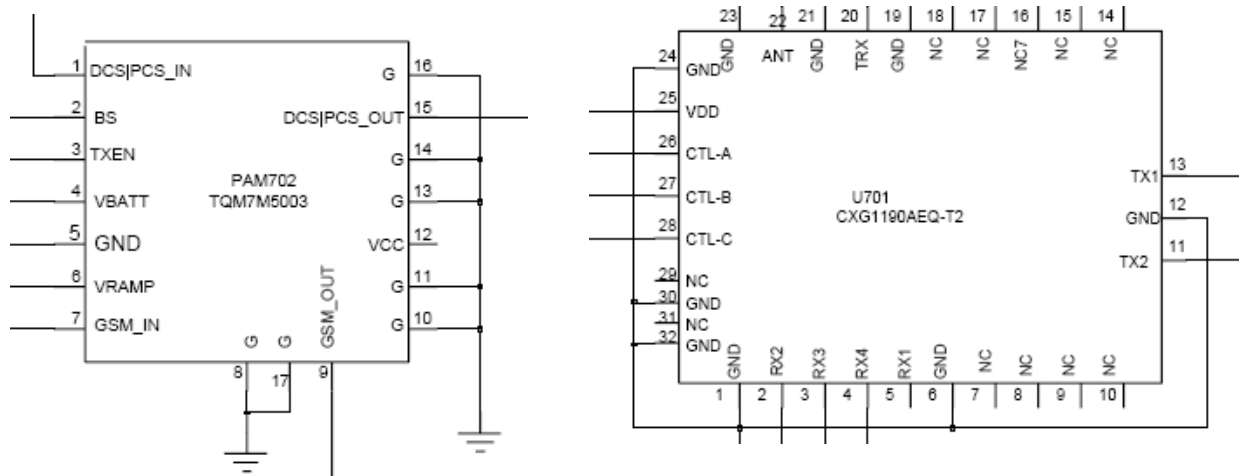
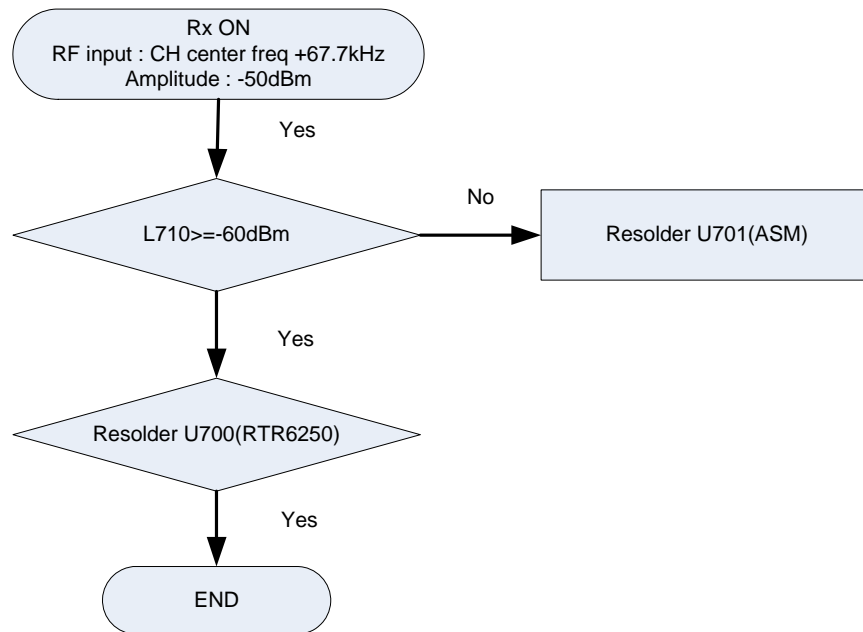


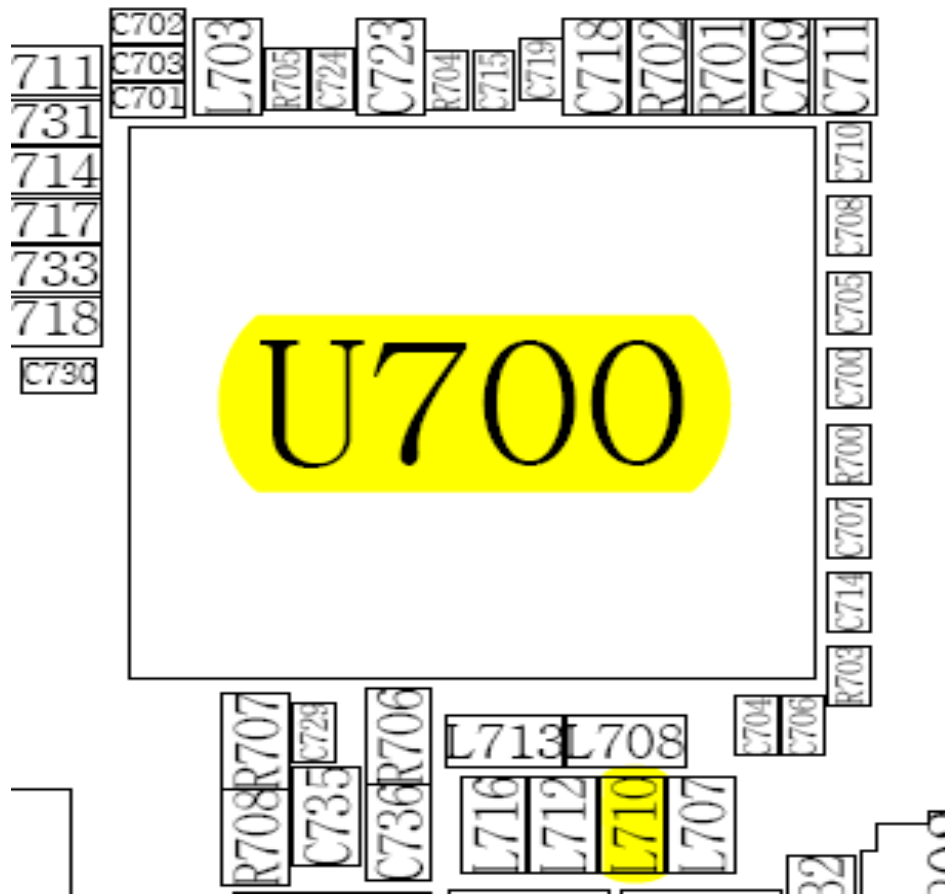


## WLAN (802.11 b/g)

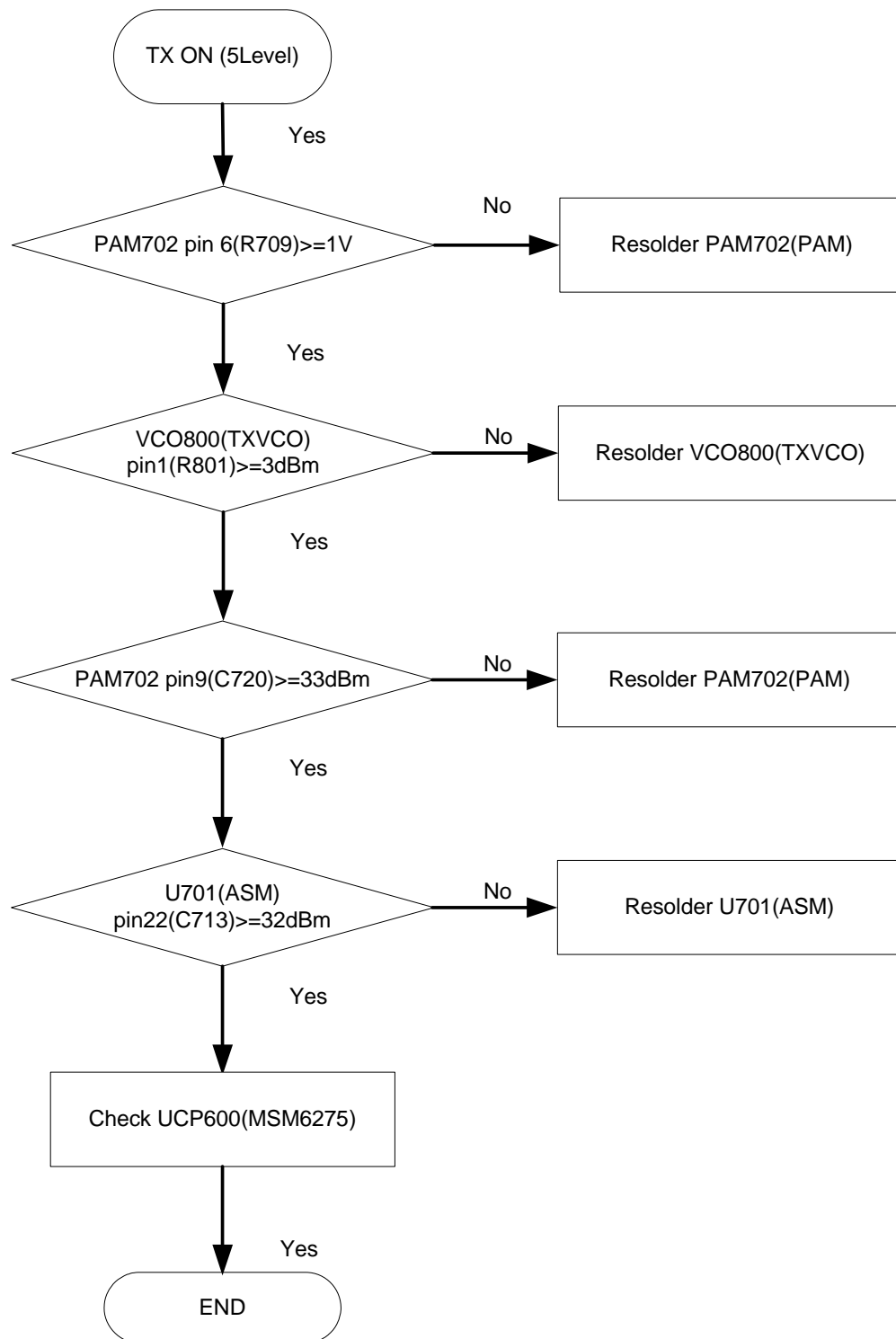


## 9-9. GSM Receiver

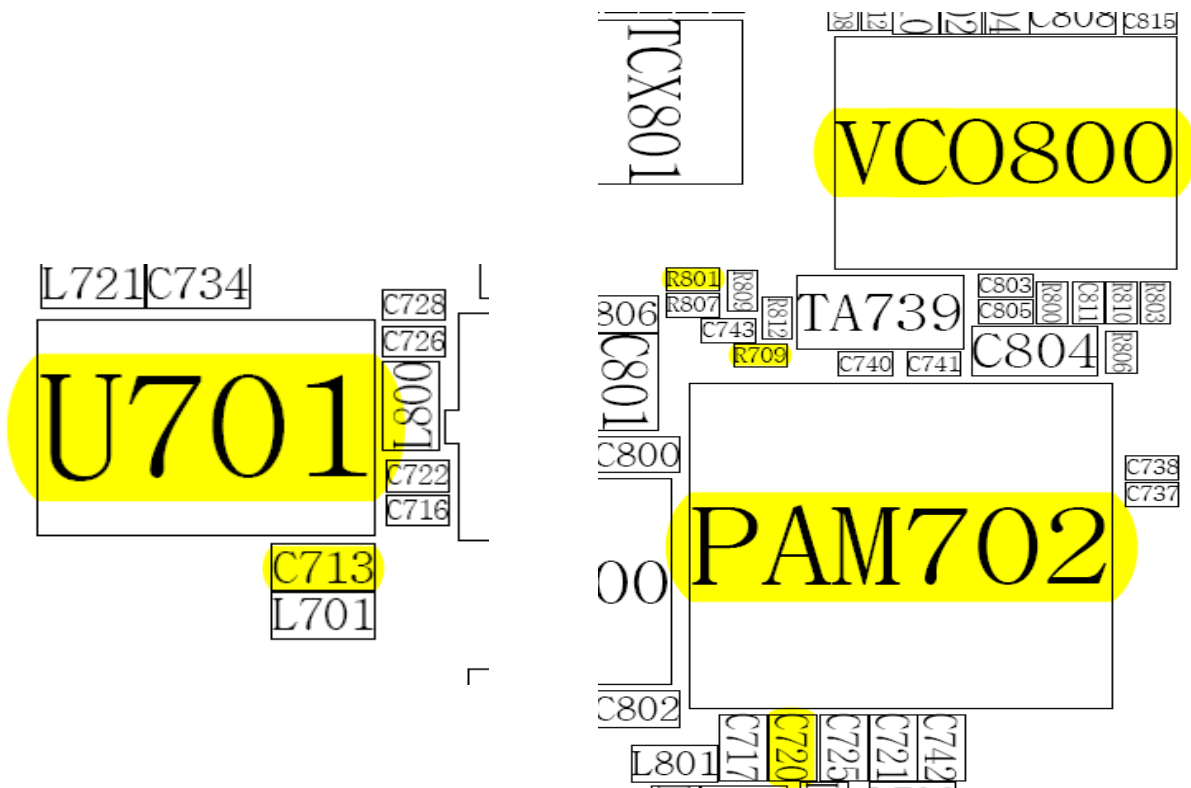
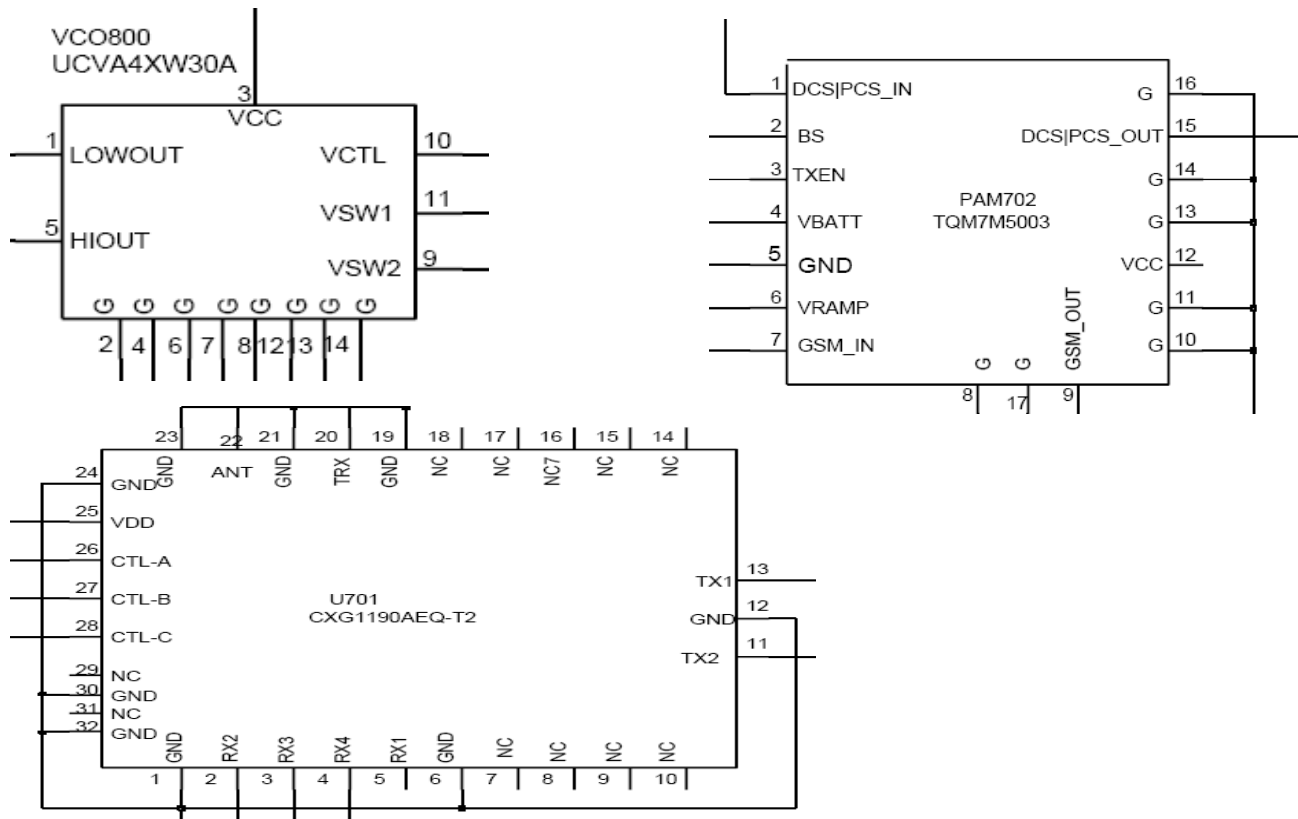




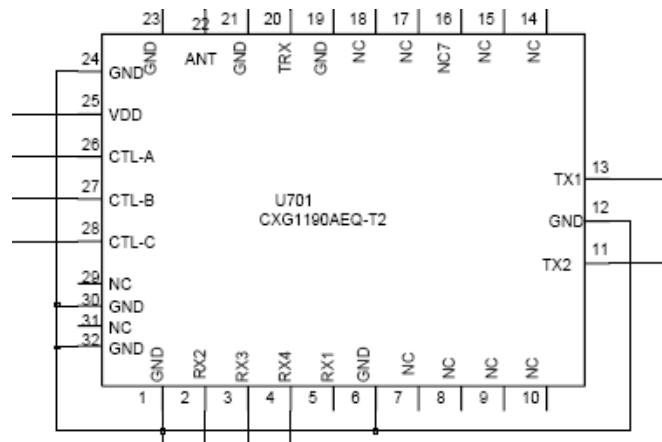
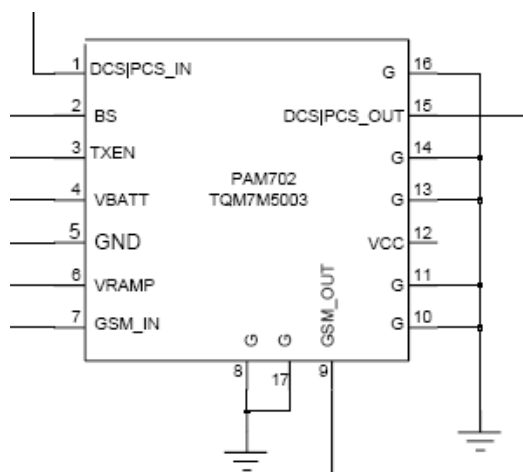
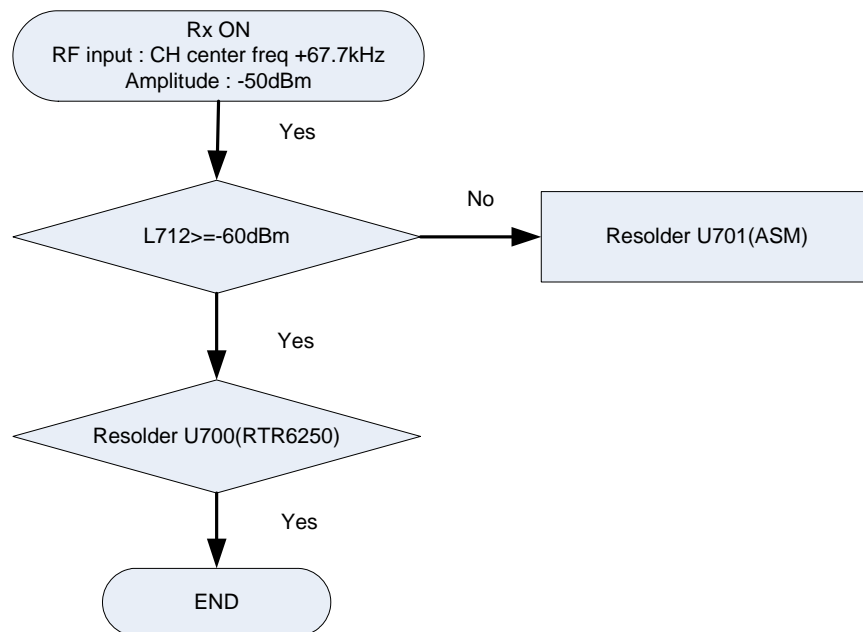
## 9-10. GSM Transmitter

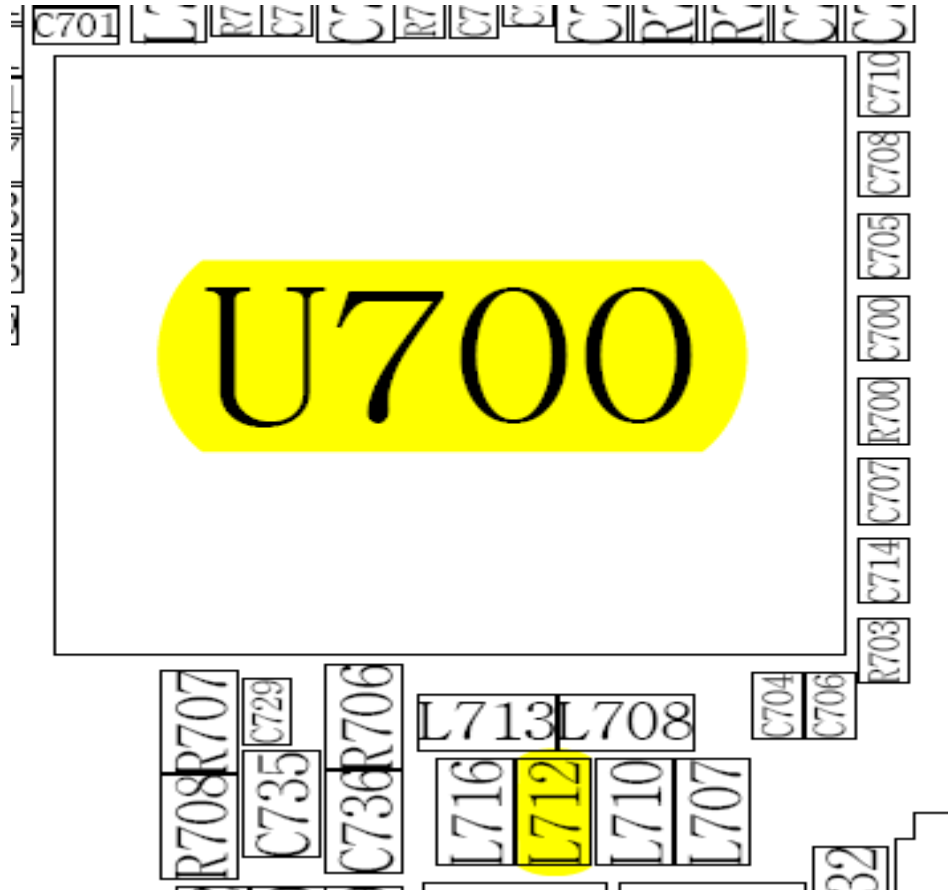




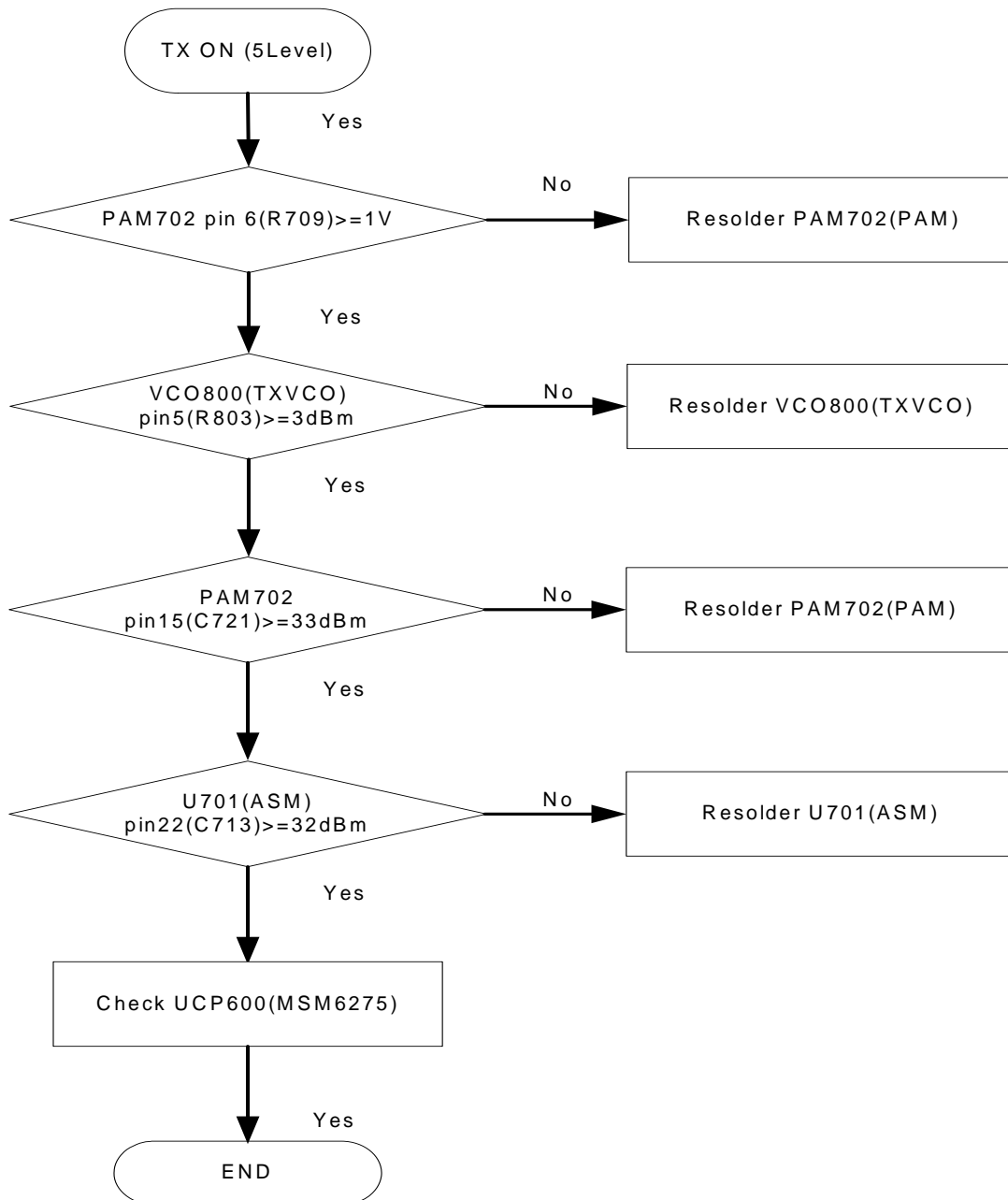


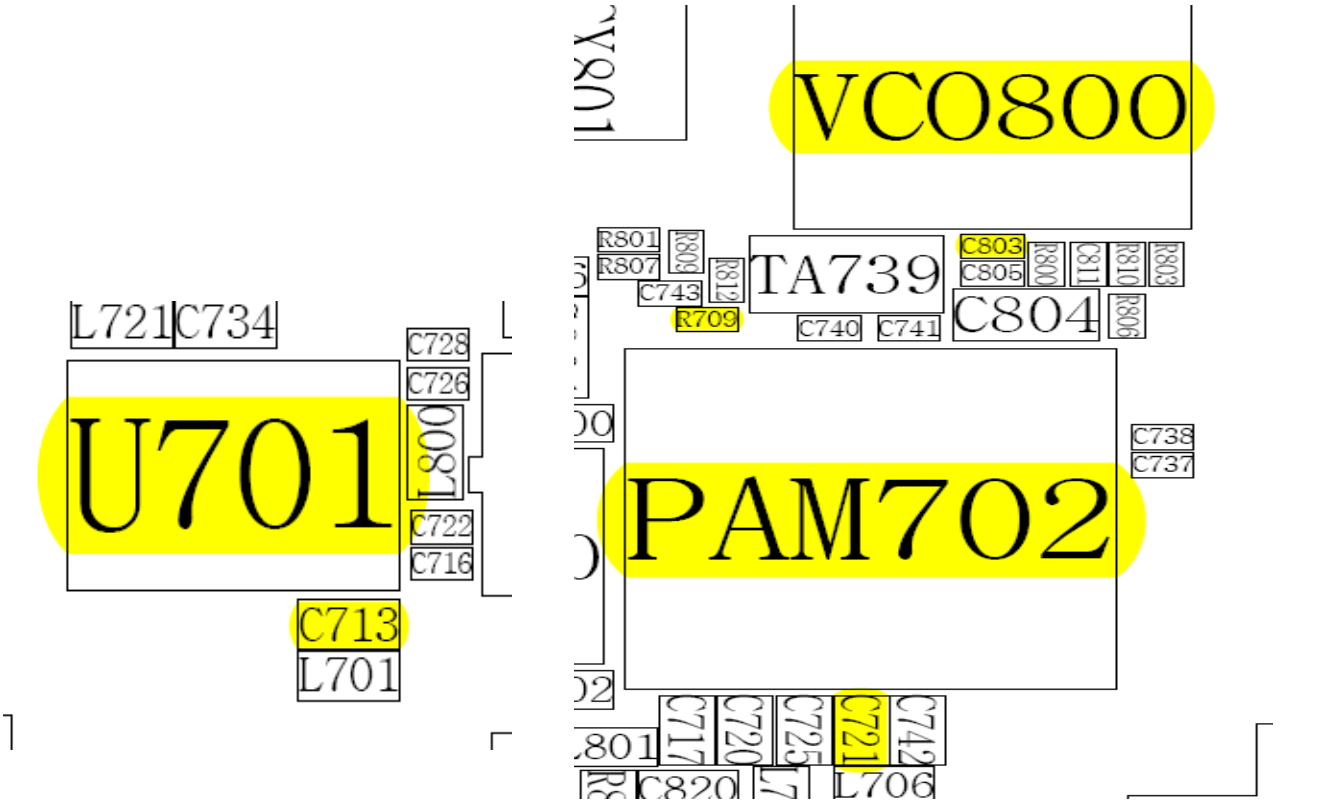
## 9-11. DCS Receiver



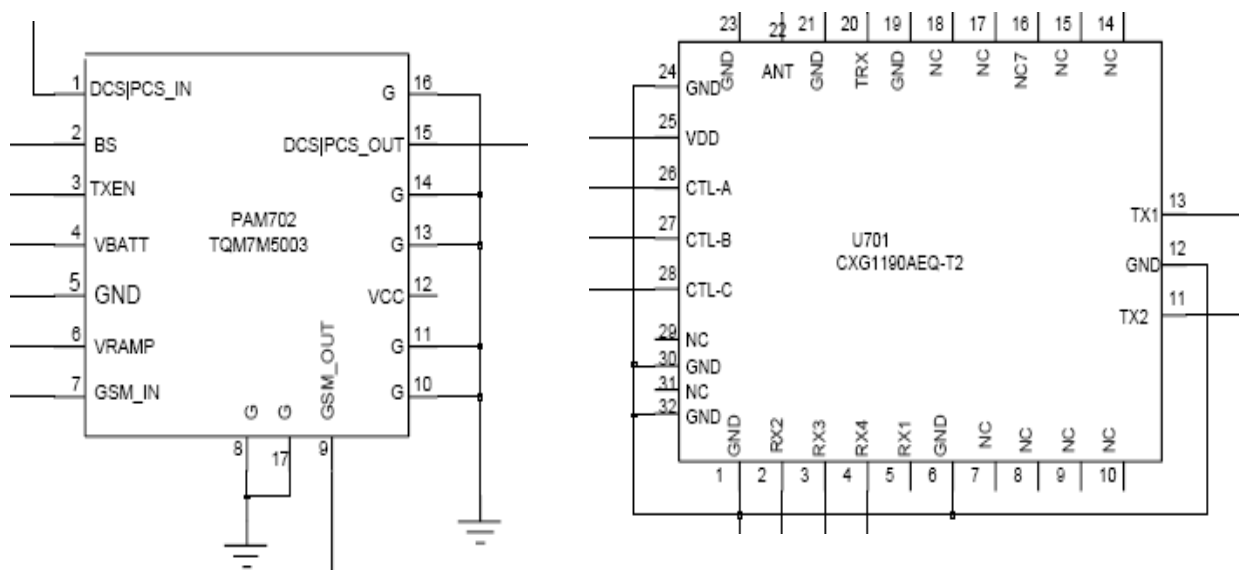
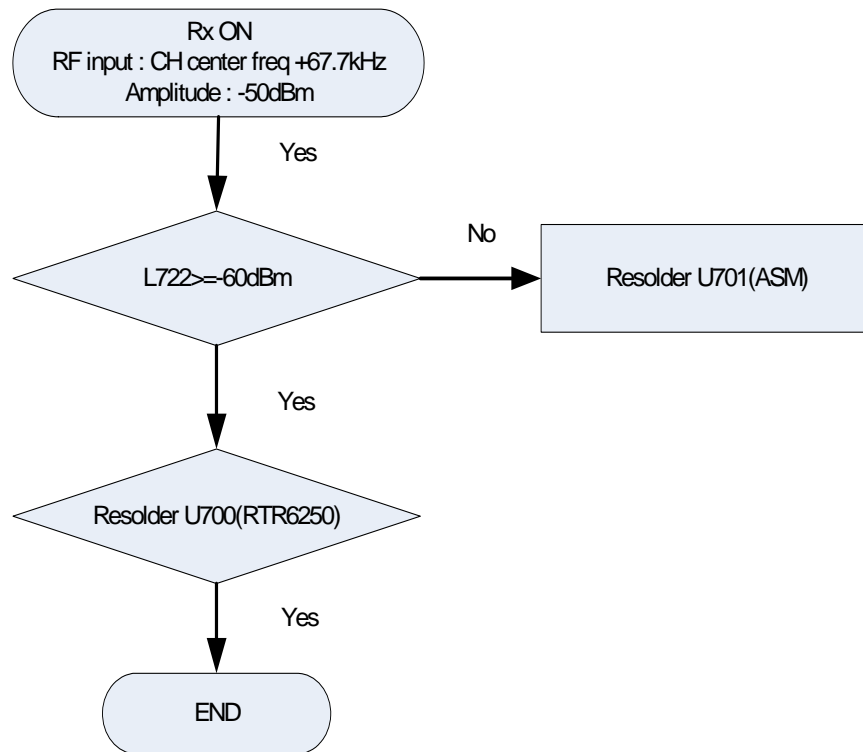


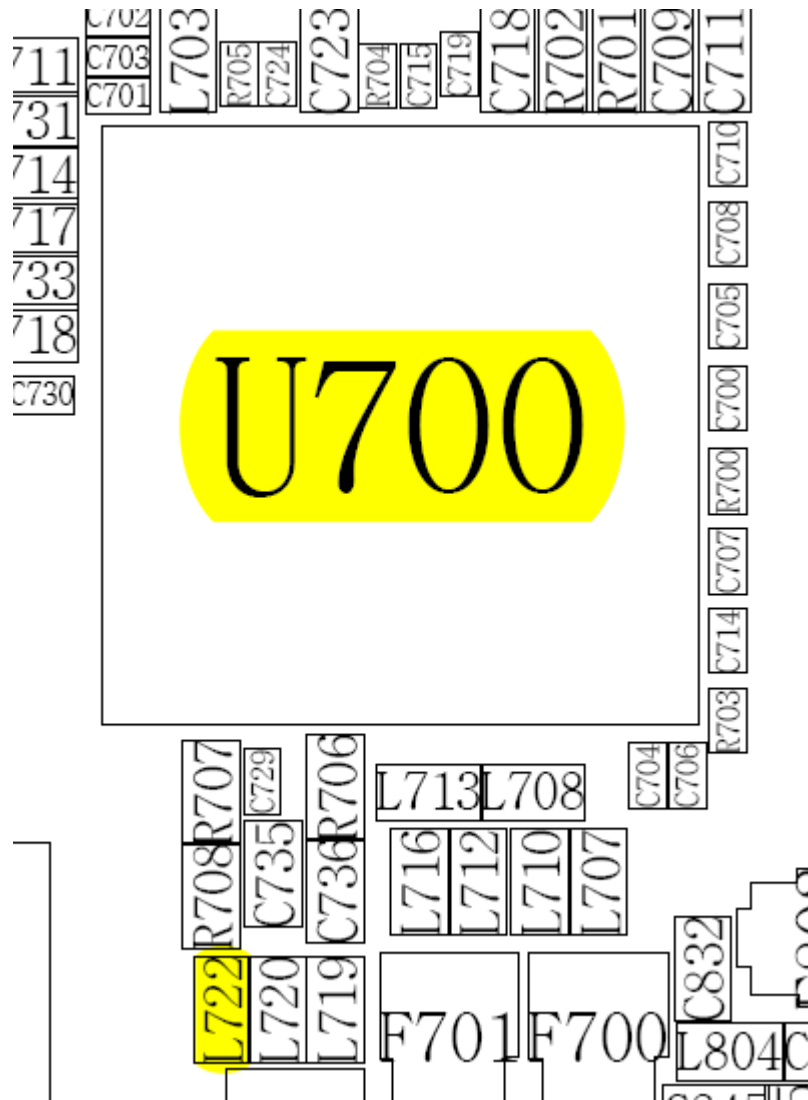
## 9-12. DCS Transmitter



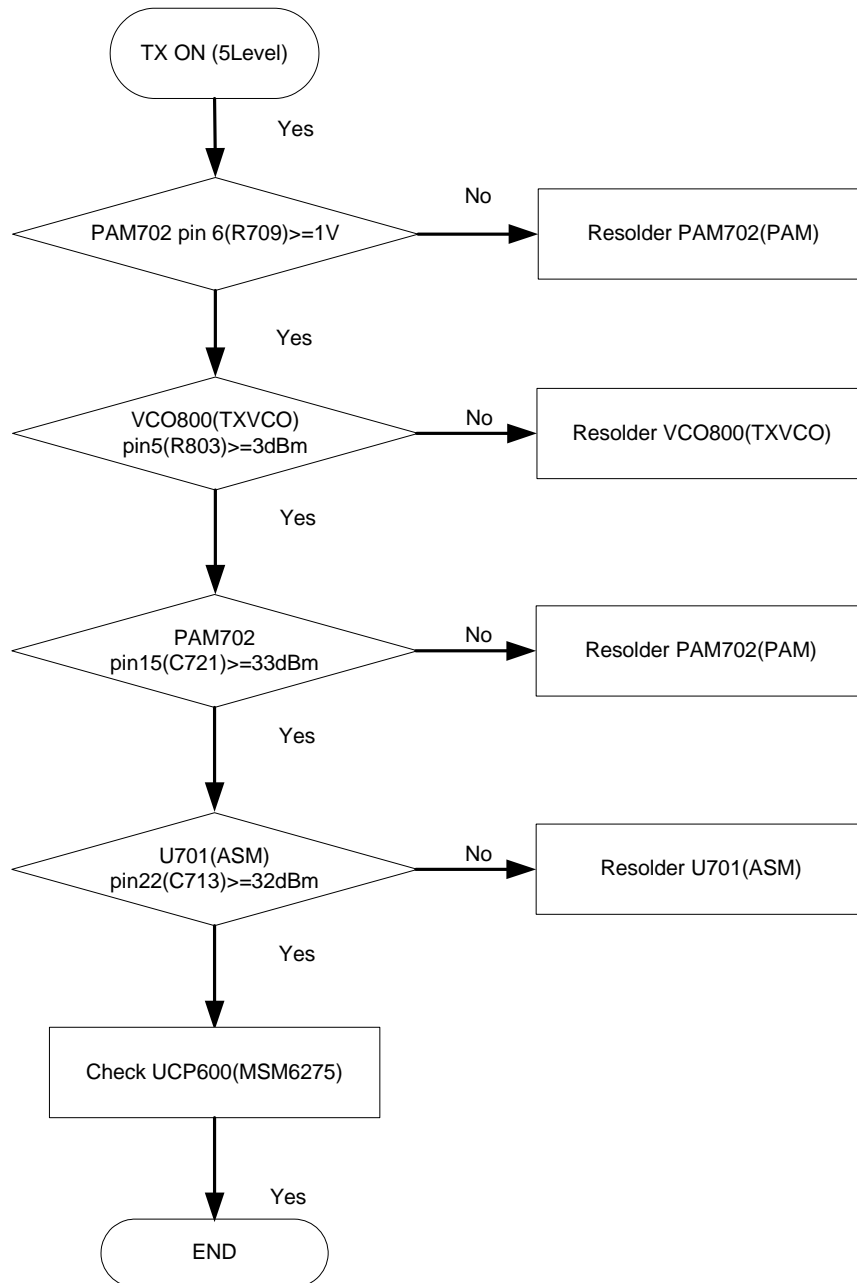


### 9-13. PCS Receiver

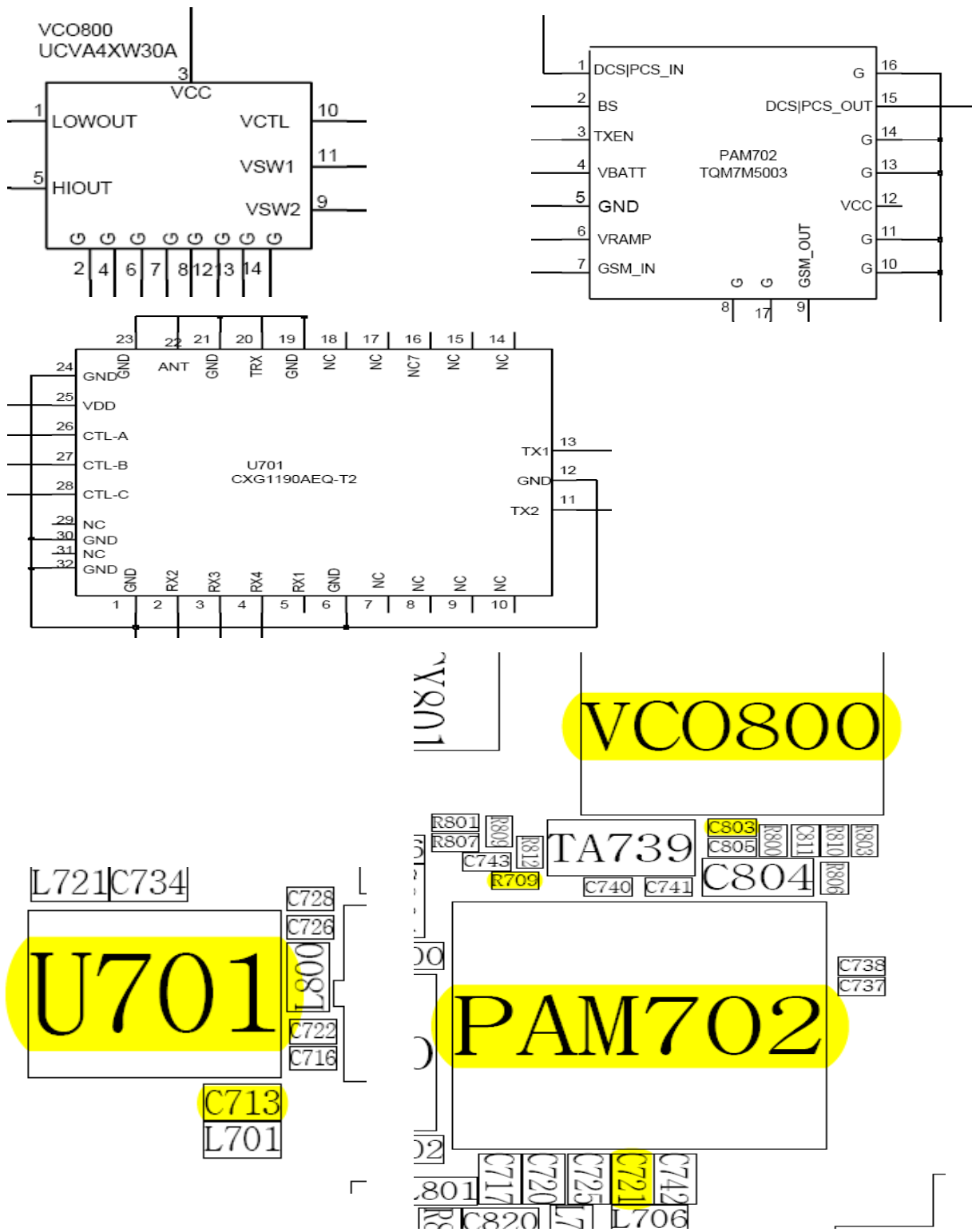




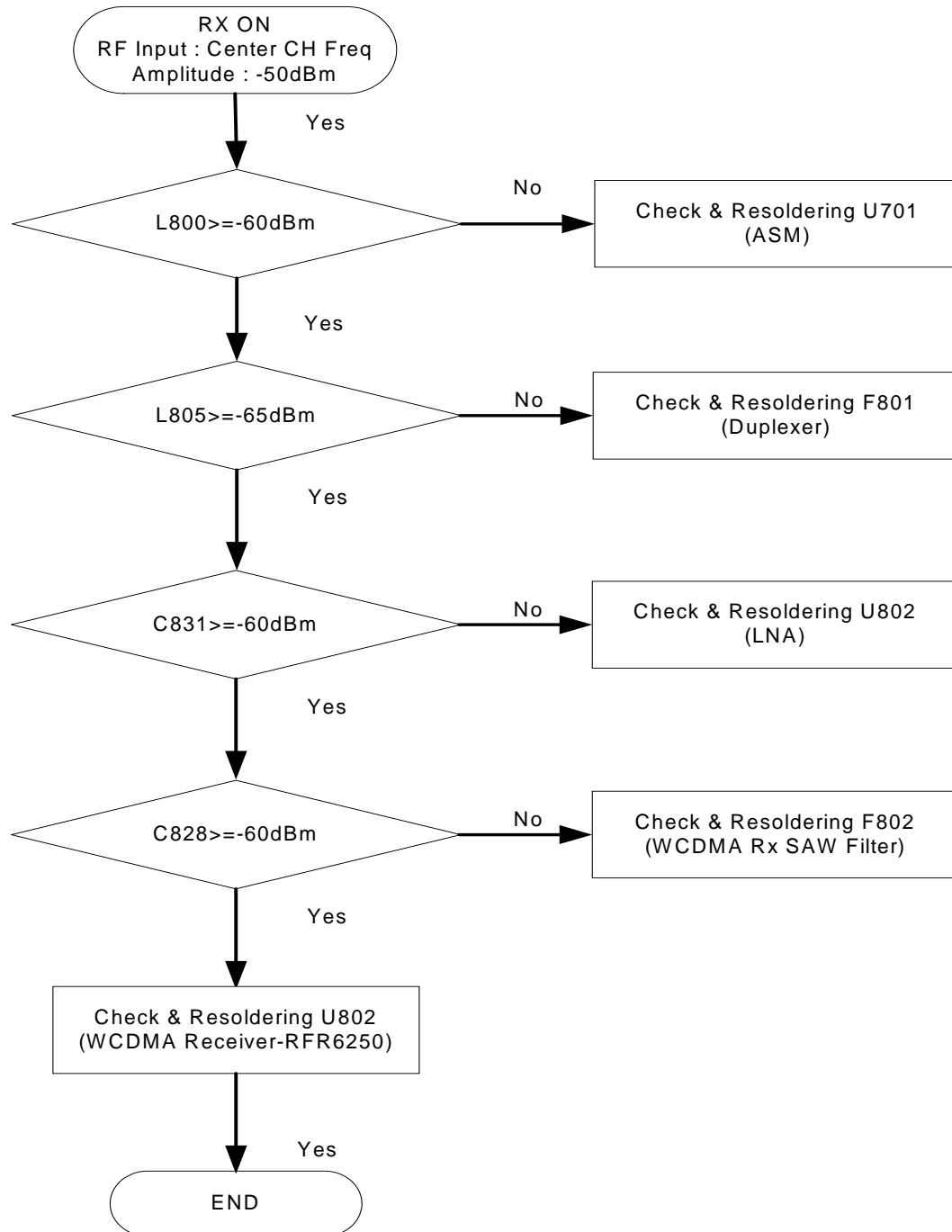
9-14. PCS Transmitter (same as DCS)

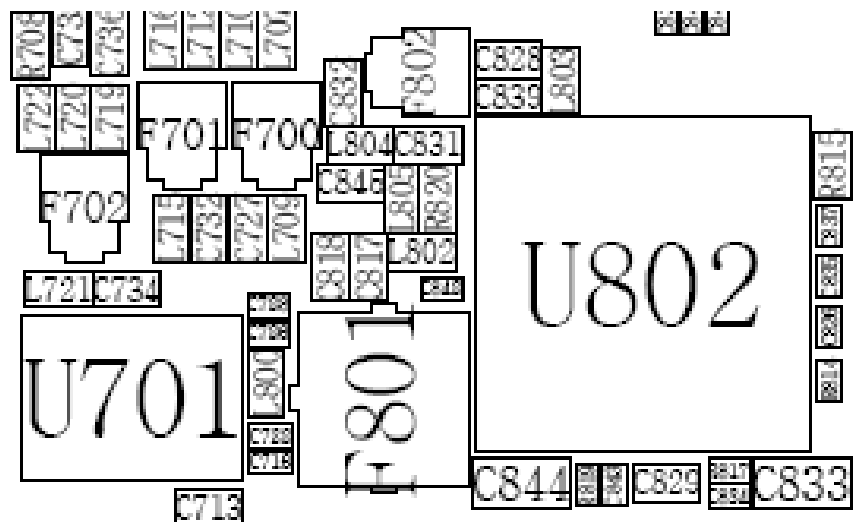
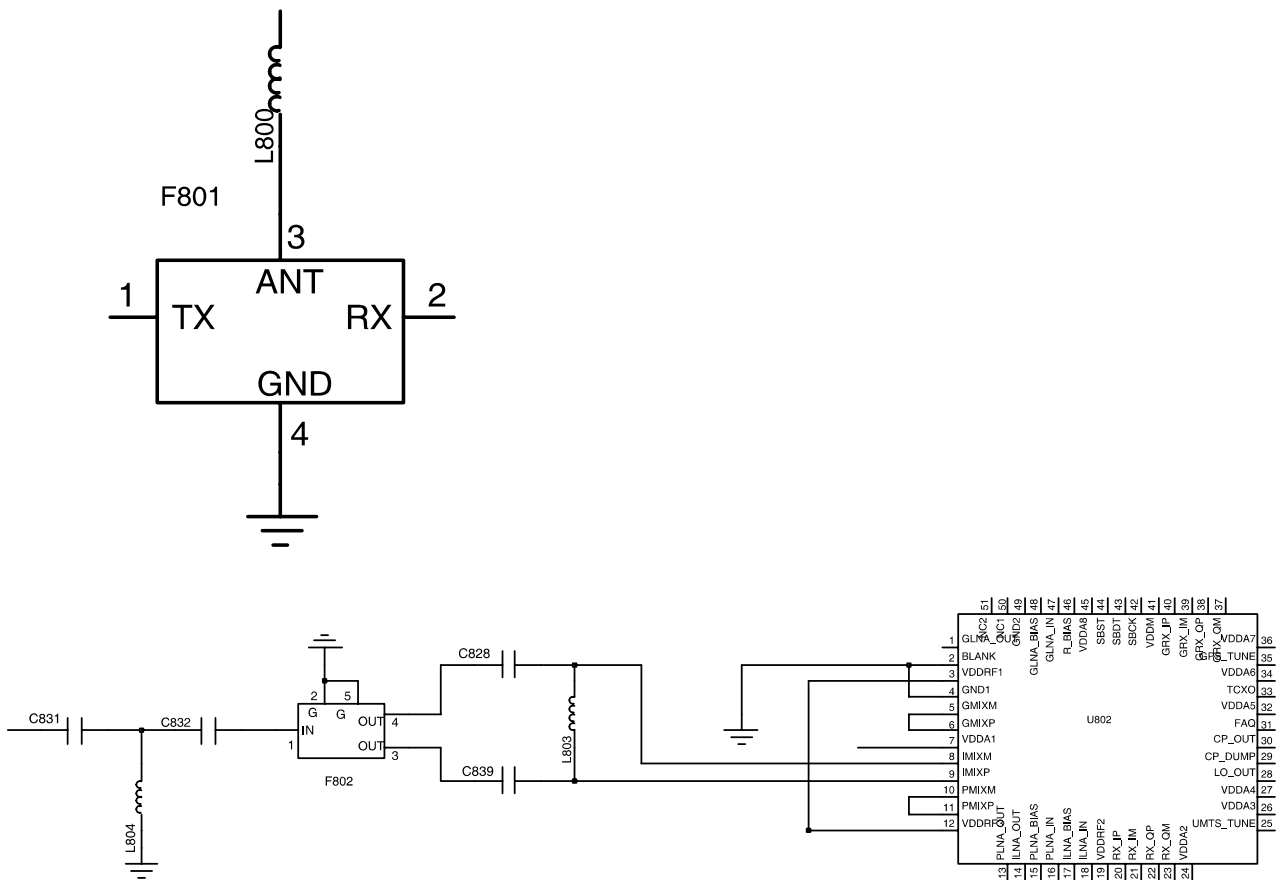




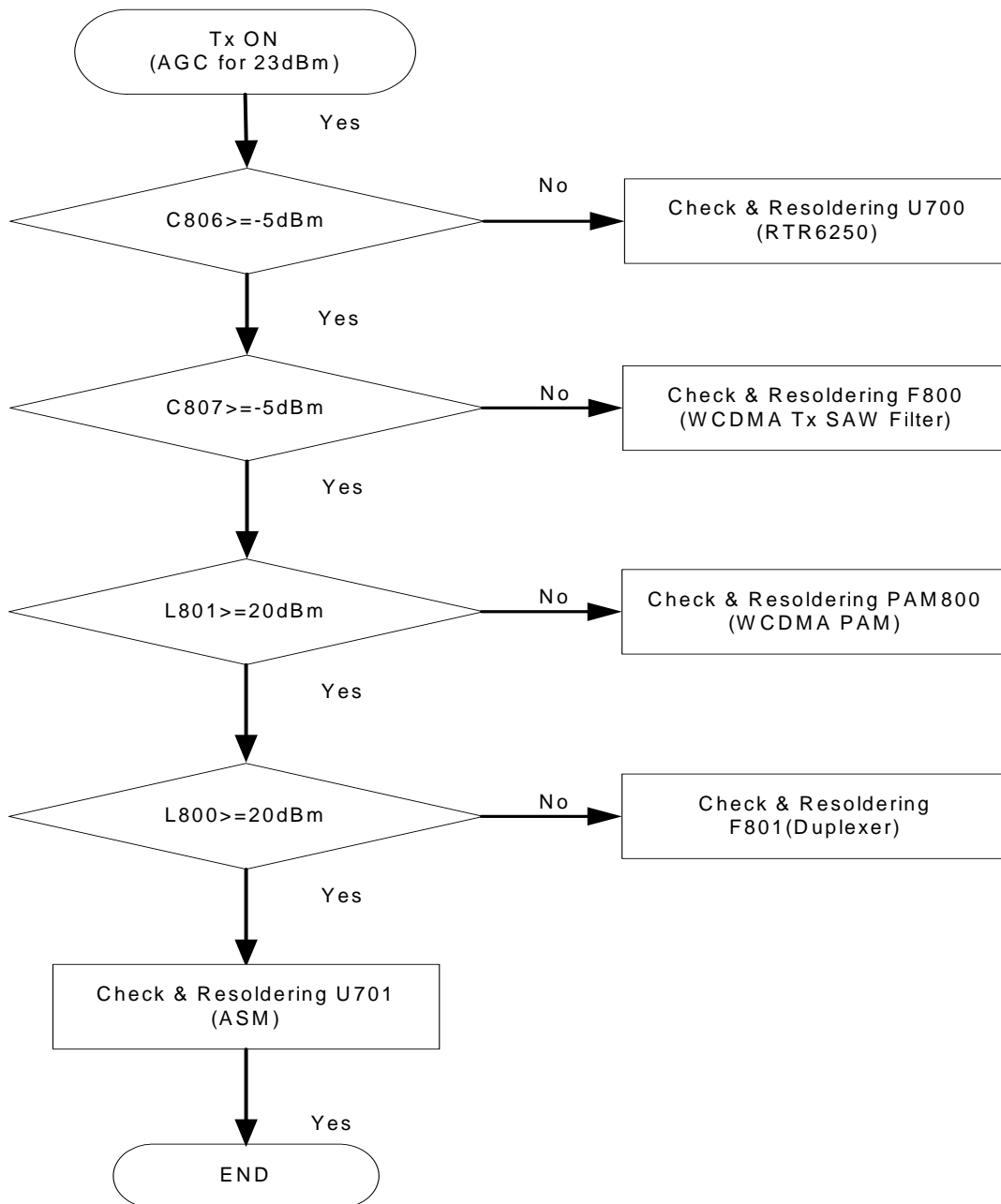


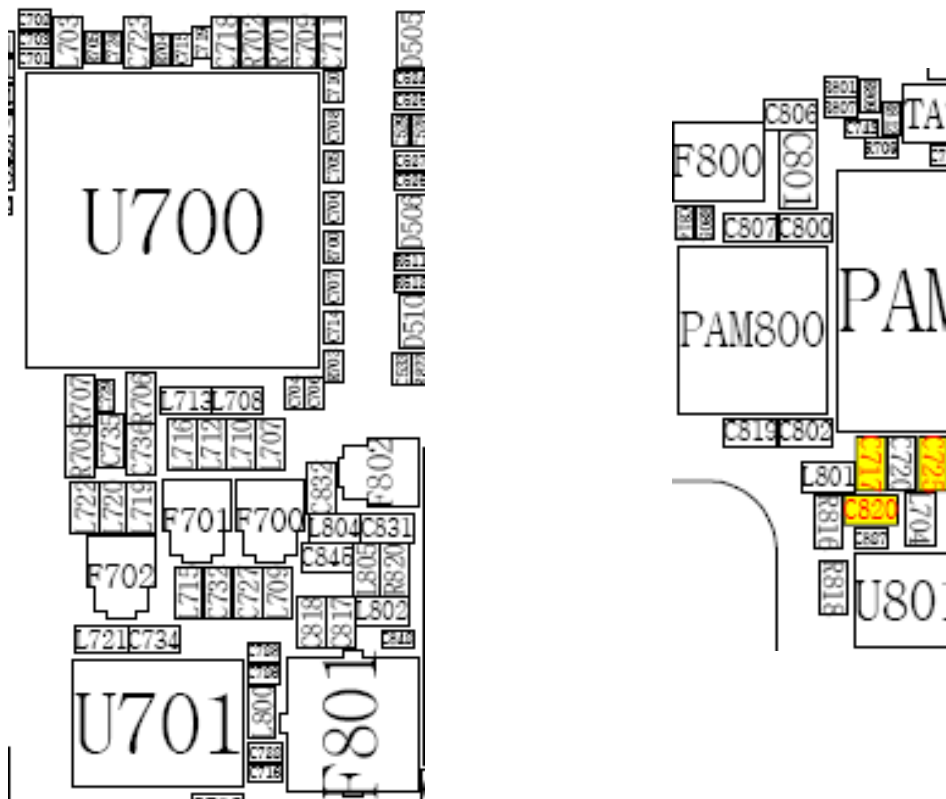
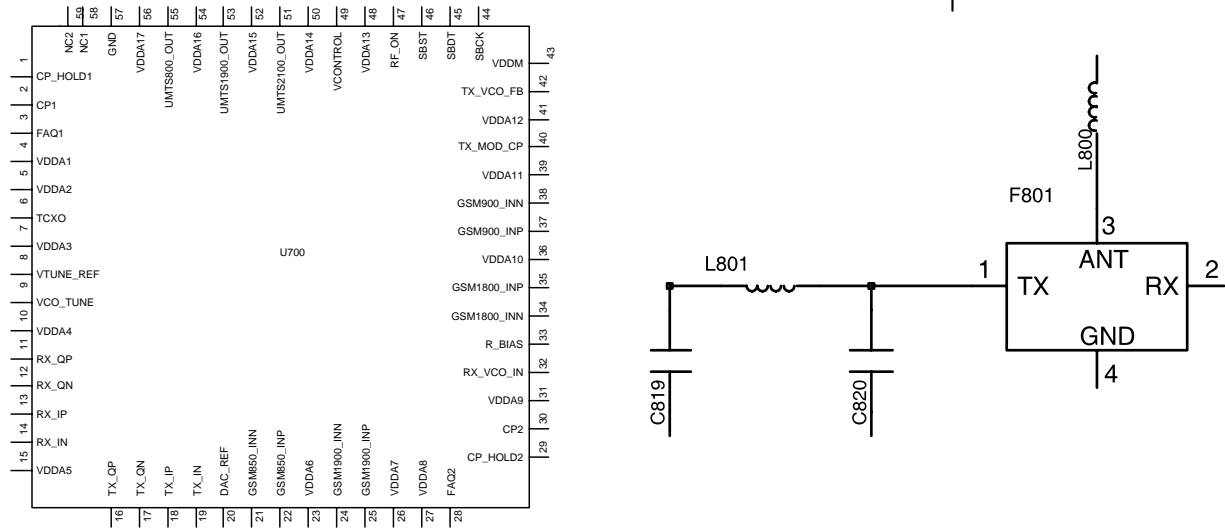
9-15. WCDMA 2100 Receiver





## 9-16. WCDMA 2100 Transmitter







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## 10. Reference data

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### Reference Abbreviate

- **ARFCN** : Absolute Radio Frequency Channel Number
- **BGA** : Ball Grid Array
- **DCS** : Digital Communications System
- **DL** : Downlink
- **EFS** : Embaded File System
- **EGSM** : Enhanced Global System for Mobile Communications
- **FTP** : File Transfer Protocol
- **HPSK** : Hybrid Phase Shift Keying
- **Mcps** : Mega-chips per second
- **MMS** : Multimedia Messaging Service
- **MSK** : Minimum Shift Keying
- **OBEX** : OBject EXchange
- **PBA** : Panel Board Assembly
- **PCS** : Personal Communication System
- **PIM(S)** : Personal Information Management (System)
- **QPSK** : Quadrature Phase Shift Keying
- **RNDIS** : Remote Network Driver Interface Specification
- **RSS** : Received Signal Strength
- **SAW** : Surface Acoustic Wave
- **SMS** : Short Message Service
- **UL** : Uplink
- **USB** : Universal Serial Bus
- **WCDMA** : Wideband Code Division Multiple Access





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