

**SAMSUNG**

# GSM TELEPHONE

## SGH-M110

# ***SERVICE*** *Manual*

### GSM TELEPHONE



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**SAMSUNG  
ELECTRONICS**



GSPN (Global Service Partner Network)

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|------------------|---------------------------|
| North America    | service.samsungportal.com |
| Latin America    | latin.samsungportal.com   |
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| China            | china.samsungportal.com   |
| Asia             | asia.samsungportal.com    |
| Mideast & Africa | mea.samsungportal.com     |

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## 2. Specification

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### 2-1. GSM General Specification

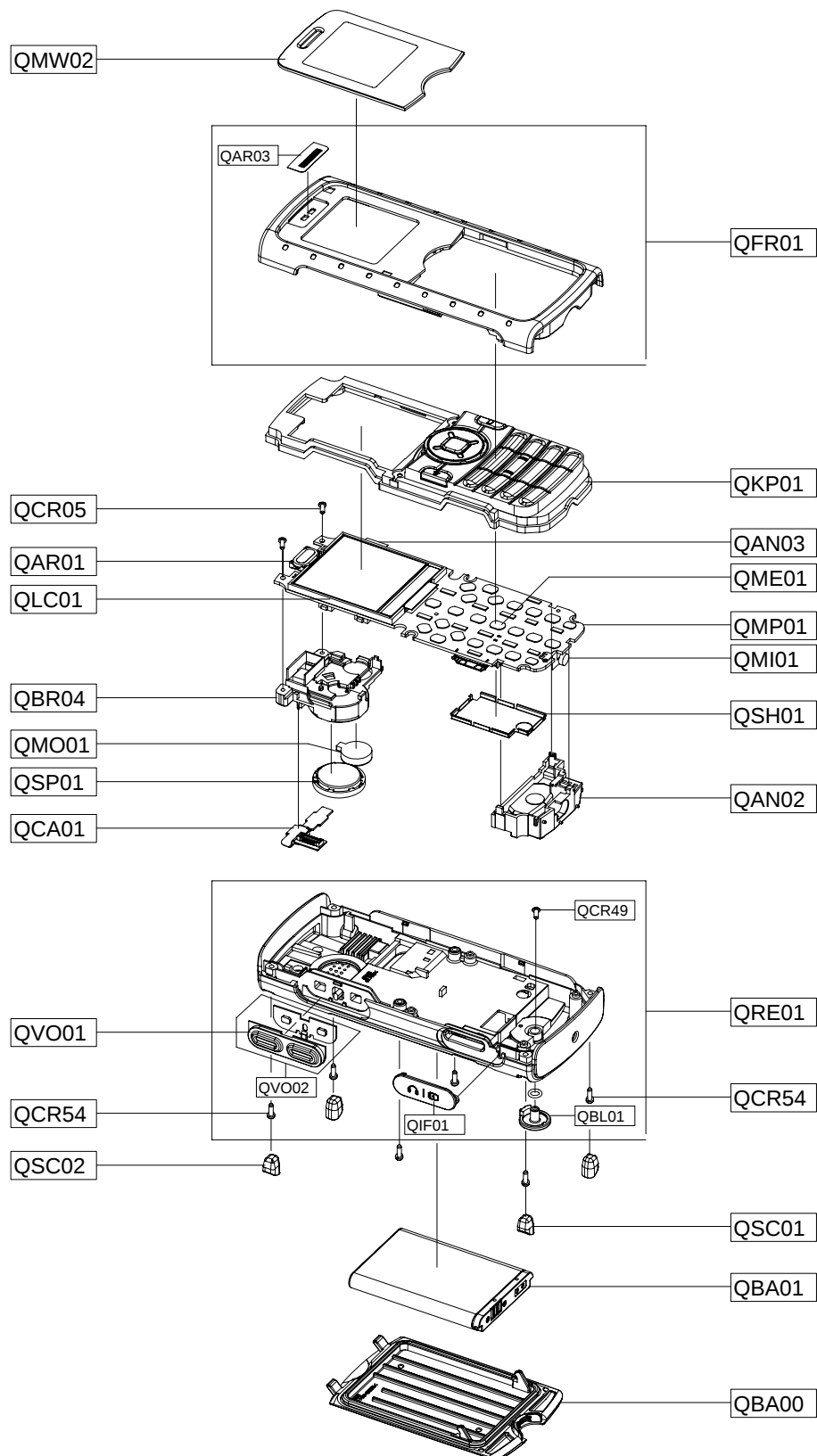
|                                       | GSM850                 | DCS1800                | PCS1900                |
|---------------------------------------|------------------------|------------------------|------------------------|
| Freq.<br>Band[MHz]<br>Uplink/Downlink | 824~849<br>869~894     | 1710~1785<br>1805~1880 | 1850~1910<br>1930~1990 |
| ARFCN range                           | 128~251                | 512~885                | 512~810                |
| Tx/Rx spacing                         | 45MHz                  | 95MHz                  | 80MHz                  |
| Mod. Bit rate/<br>Bit Period          | 270.833kbps<br>3.692us | 270.833kbps<br>3.692us | 270.833kbps<br>3.692us |
| Time Slot Period/Frame<br>Period      | 576.9us<br>4.615ms     | 576.9us<br>4.615ms     | 576.9us<br>4.615ms     |
| Modulation                            | 0.3GMSK                | 0.3GMSK                | 0.3GMSK                |
| MS Power                              | 33dBm~5dBm             | 30dBm~0dBm             | 30dBm~0dBm             |
| Power Class                           | 5pcl ~ 19pcl           | 0pcl ~ 15pcl           | 0pcl ~ 15pcl           |
| Sensitivity                           | -102dBm                | -100dBm                | -100dBm                |
| TDMA Mux                              | 8                      | 8                      | 8                      |
| Cell Radius                           | 35Km                   | 2Km                    | -                      |

## 2-2. GSM Tx Power Class

| TX Power control level | GSM850   | TX Power control level | DCS1800  | TX Power control level | PCS1800  |
|------------------------|----------|------------------------|----------|------------------------|----------|
| 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±4dBm   | 11                     | 8±4dBm   |
| 17                     | 9±3dBm   | 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  |

## 5. Exploded View and Parts List

### 5-1. Cellular phone Exploded View



## 5-2. Cellular phone Parts List

| Design LOC | Description                    | SEC CODE    |
|------------|--------------------------------|-------------|
| QAN02      | INTENNA-SGHM110                | GH42-01418A |
| QAN03      | INTENNA-SGHM110 BT             | GH42-01468A |
| QAN05      | ASSY RUBBER-INTENNA CONTACT    | GH98-03564A |
| QAR01      | AUDIO-RECEIVER                 | 3009-001306 |
| QAR03      | ASSY DECO-RCV IN               | GH98-06922A |
| QBA00      | PMO COVER-BATT                 | GH72-44472B |
| QBA01      | INNER BATTERY PACK-1000MAH,BLA | GH43-02424A |
| QBL01      | NDC COVER-BATT LOCKER          | GH71-07797A |
| QBR04      | ASSY BRACKET-SPK CARRIER       | GH98-07330A |
| QCA01      | CAMERA MODULE-1/7.4" VGA       | GH59-05094A |
| QCR05      | SCREW-MACHINE                  | 6001-001478 |
| QCR49      | SCREW-MACHINE                  | 6001-001823 |
| QCR54      | SCREW-MACHINE                  | 6001-001645 |
| QCR54      | SCREW-MACHINE                  | 6001-001645 |
| QFR01      | ASSY CASE-FRONT                | GH98-06901B |
| QIF01      | PMO COVER-IF                   | GH72-45415A |
| QKP01      | ASSY KEYPAD-(EU/BLK)           | GH98-06436A |
| QLC01      | LCD-LCD MODULE                 | GH07-01056A |
| QME01      | DOMESHEET-SGHM110 METAL DOME   | GH59-05178A |
| QMI01      | MICROPHONE-ASSY-SGHM110        | GH30-00440A |
| QMO01      | MOTOR DC-SGH-M110              | GH31-00402A |
| QMP01      | PBA MAIN-SGHM110               | GH92-04272A |
| QMW02      | PCT WINDOW-MAIN                | GH72-45454A |
| QRE01      | ASSY CASE-REAR                 | GH98-06902B |
| QSC01      | RMO RUBBER-SCREW BOT           | GH73-11197B |
| QSC02      | RMO RUBBER-SCREW TOP           | GH73-11198B |
| QSH01      | ICT SHIELD-BRACKET             | GH70-03060A |
| QSP01      | MICRO SPEAKER                  | 3001-002304 |
| QVO01      | PMO KEY-VOLUME                 | GH72-45427A |
| QVO02      | ASSY KEY-VOLUME                | GH98-06900A |

| Description                   | SEC CODE    |
|-------------------------------|-------------|
| ADAPTOR-ATADS10EBE,BLK,EU     | GH44-01702A |
| EARPHONE-SGHE210,AAEP405MBE,A | GH59-04535A |
| MPR-TAPE MAIN DOME EMI        | GH74-23675A |
| SPONGE-MIC OUT                | GH74-36983A |
| MPR-SPONGE PCB 1              | GH74-28596A |
| TAPE INSU-LCD ESD             | GH74-37043A |
| MPR-TAPE SUB DOME SHEET       | GH74-20121A |
| TAPE INSU-MIC                 | GH74-37365A |
| LABEL(R)-WATER SOAK           | GH68-09361A |
| RMO RUBBER-MIC 2              | GH73-11371A |
| VINYL-BOHO MAIN WINDOW        | GH74-36710A |
| ASSY ACCE-FINGER STRAP_KER    | GH98-02362A |
| MANUAL USERS-EU FRENCH        | GH68-16694A |
| BAG PE                        | 6902-000634 |
| LABEL(P)-UNIT SEAL            | GH68-00518B |
| LABEL(R)-MASTER_FANCE_BOG     | GH68-13691B |
| LABEL(R)-MAIN(FRAN)           | GH68-16879B |
| BOX-UNIT(EU)                  | GH69-06212A |
| CUSHION-CASE(EU)              | GH69-06215A |



## 11. Disassembly and Assembly Instructions

### 11-1. Disassembly Instructions

1

- 1) Remove 4 screw-caps on the rear cover.
- 2) Unscrew 6 bolts.



- 1) Be careful not to make any scratch or damage on the exterior.

2

- 1) Unlock the lockers forcibly following the directions below.



- 1) Be careful not to make any scratch or damage on the exterior.
- 2) Make no distortion of the rear cover while disassembling.

3

- 1) Disassemble the volume keys.



- 1) Be careful not to make any scratch or damage on the exterior.

4

- 1) Disassemble the keypad

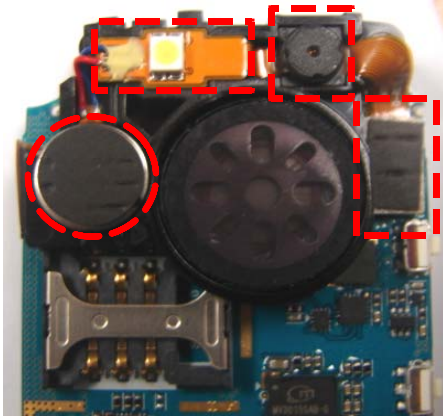


- 1) Be careful not to make a damage to the keypad

|                                                                                                                                                                          |                                                                                                                                                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div data-bbox="168 197 797 262" data-label="Text"> <p>5 1) Separate the PBA from the rear</p> </div> <div data-bbox="378 373 561 787" data-label="Image"> </div>        | <div data-bbox="833 197 1459 300" data-label="Text"> <p>6 1) Pull out the mike from antenna<br/>2) Disassemble antenna from the pba</p> </div> <div data-bbox="852 306 1266 472" data-label="Image"> </div> <div data-bbox="1055 504 1385 814" data-label="Image"> </div> |
| <p>1) Be careful not to make any damage to the pba</p>                                                                                                                   | <p>1) Be careful not to make any damage to the antenna</p>                                                                                                                                                                                                                |
| <div data-bbox="168 911 797 976" data-label="Text"> <p>7 1) Disassemble shield can from the pba</p> </div> <div data-bbox="321 1167 673 1642" data-label="Image"> </div> | <div data-bbox="833 911 1459 1043" data-label="Text"> <p>8 1) Separate the window slowly.<br/>2) Detach the lcd module after resoldering lcd module f-pcb</p> </div> <div data-bbox="954 1199 1336 1581" data-label="Image"> </div>                                       |
| <p>1) Be careful not to make any damage to the pba</p>                                                                                                                   | <p>1) Separate slowly with no damage to the LCD module.</p>                                                                                                                                                                                                               |

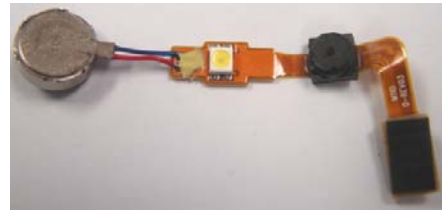
9

- 1) Separate the camera connector
- 2) Separate the camera and motor from speaker module



10

- 1) Detach motor after resoldering 2 points
- 2) Unscrew 2 bolts
- 3) Detach receiver from speaker module

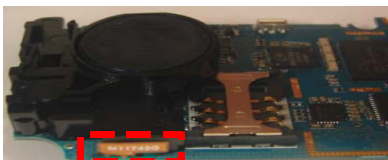


- 1) Separate slowly with no damage to f-pcb

- 1) Be careful not to make any damage to the F-PCB.

11

- 1) Detach BT antenna from speaker module
- 2) Detach speaker module from pba
- 3) Resolder receiver and speaker module



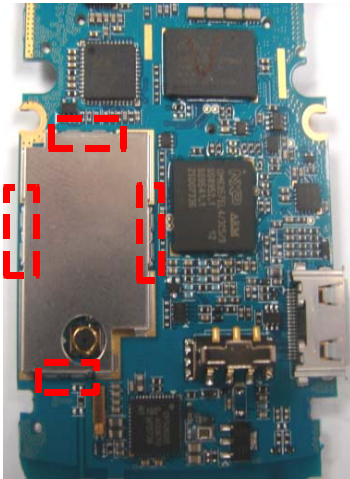
- 1) Be careful not to make any damage to the BT antenna

## 11-2. Assembly Instructions

|                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div data-bbox="167 296 240 348" data-label="Text">1</div> <div data-bbox="256 296 797 422" data-label="List-Group"> <ol style="list-style-type: none"> <li>1) solder receiver and speaker module.</li> <li>2) Assemble speaker module to the pba</li> <li>2) Place the BT ANTENNA on the correct position in the picture below.</li> </ol> </div> <div data-bbox="177 453 745 999" data-label="Image"> </div> | <div data-bbox="828 296 901 348" data-label="Text">2</div> <div data-bbox="917 296 1458 369" data-label="List-Group"> <ol style="list-style-type: none"> <li>1) Solder the mike with camera f-pcb.</li> <li>2) bond the soldering part.</li> </ol> </div> <div data-bbox="883 428 1281 848" data-label="Image"> </div> |
| <p>1) Handle the BT F-PCB with care not to be torn.</p>                                                                                                                                                                                                                                                                                                                                                        | <p>1) Check the polarity of motor</p>                                                                                                                                                                                                                                                                                  |
| <div data-bbox="167 1161 240 1213" data-label="Text">3</div> <div data-bbox="256 1161 797 1255" data-label="List-Group"> <ol style="list-style-type: none"> <li>1) Put camera and motor into speaker module</li> <li>2) Connect the camera connector.</li> </ol> </div> <div data-bbox="285 1377 667 1724" data-label="Image"> </div>                                                                          | <div data-bbox="828 1161 901 1213" data-label="Text">4</div> <div data-bbox="917 1161 1458 1255" data-label="List-Group"> <ol style="list-style-type: none"> <li>1) Solder a lcd module.</li> <li>2) attach the lcd into PBA</li> </ol> </div> <div data-bbox="932 1314 1273 1698" data-label="Image"> </div>          |
| <p>1) Handle the F-PCB with care not to be torn.</p>                                                                                                                                                                                                                                                                                                                                                           | <p>1) Handle the key F-PCB with care not to be torn while assembling.</p>                                                                                                                                                                                                                                              |

5

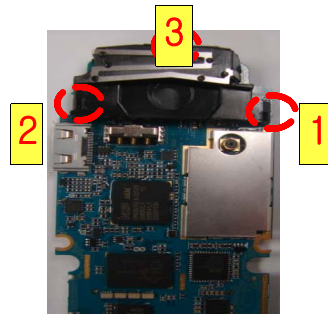
1) Assemble shield can



1) 4 clip must be assembled properly

6

1) Assemble the antenna  
2) put the mike f-pcb into antenna



1) Handle the F-PCB with care not to be torn.

7

1) Assemble the PBA with rear  
2) After assembling the PBA and rear, press them properly.



1) Be careful not to make any scratch or damage on the exterior.

8

1) Assemble the keypad with rear  
2) After assembling the keypad and rear, press them properly.



1) Be careful not to make any scratch or damage on the exterior.

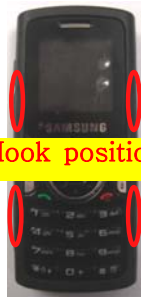
9

- 1) Attach the volumekey to the front cover.
- 2) Assemble front to the rear
- 3) Screw 6 bolts.
- 4) Put the screw 4 caps

Be caution with  
direction



Hook position



Cap



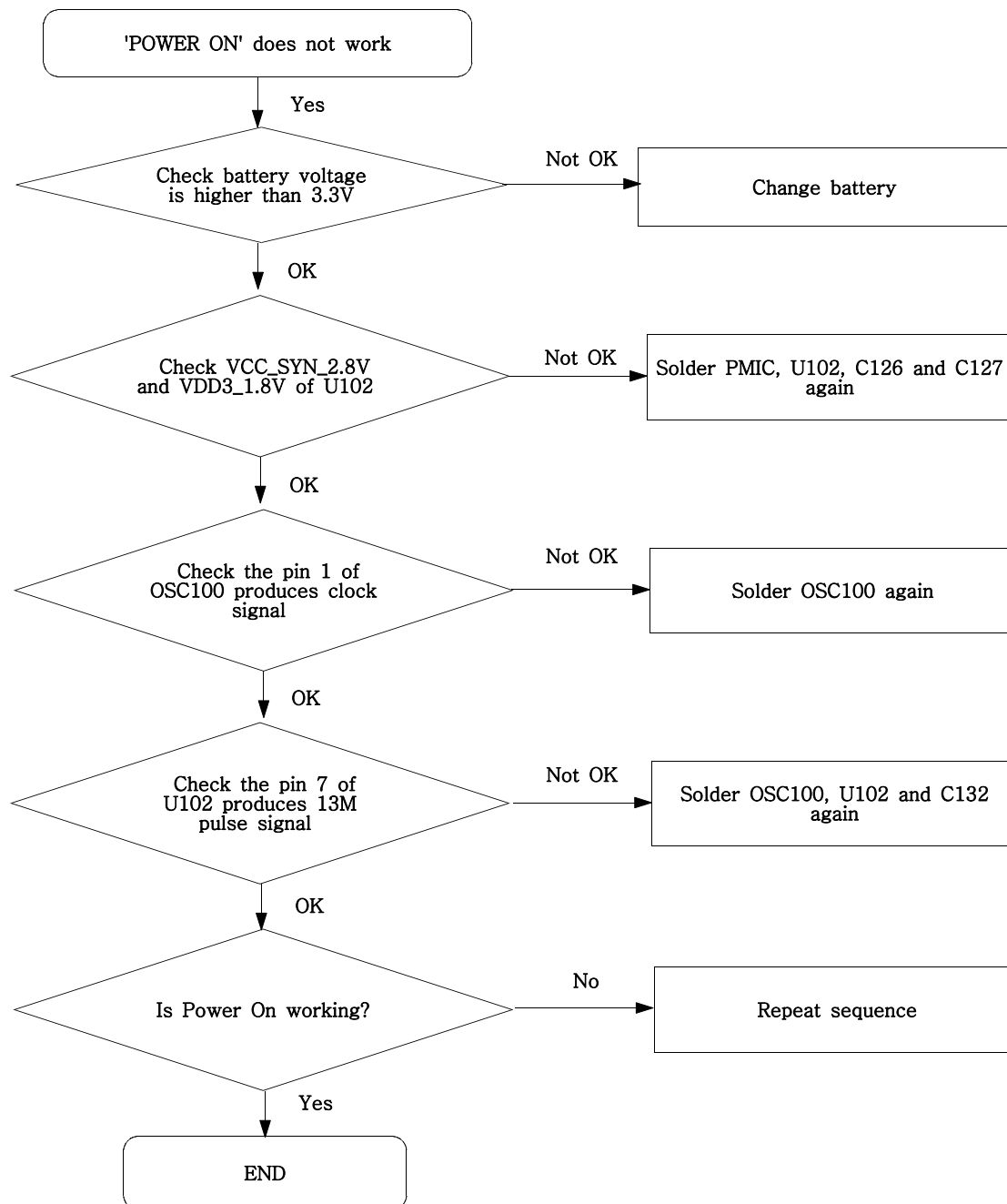
- 1) Check dust and dirt on the LCD and the window.
- 2) Check the front cover and the window completely assembled without an unnecessary gap.

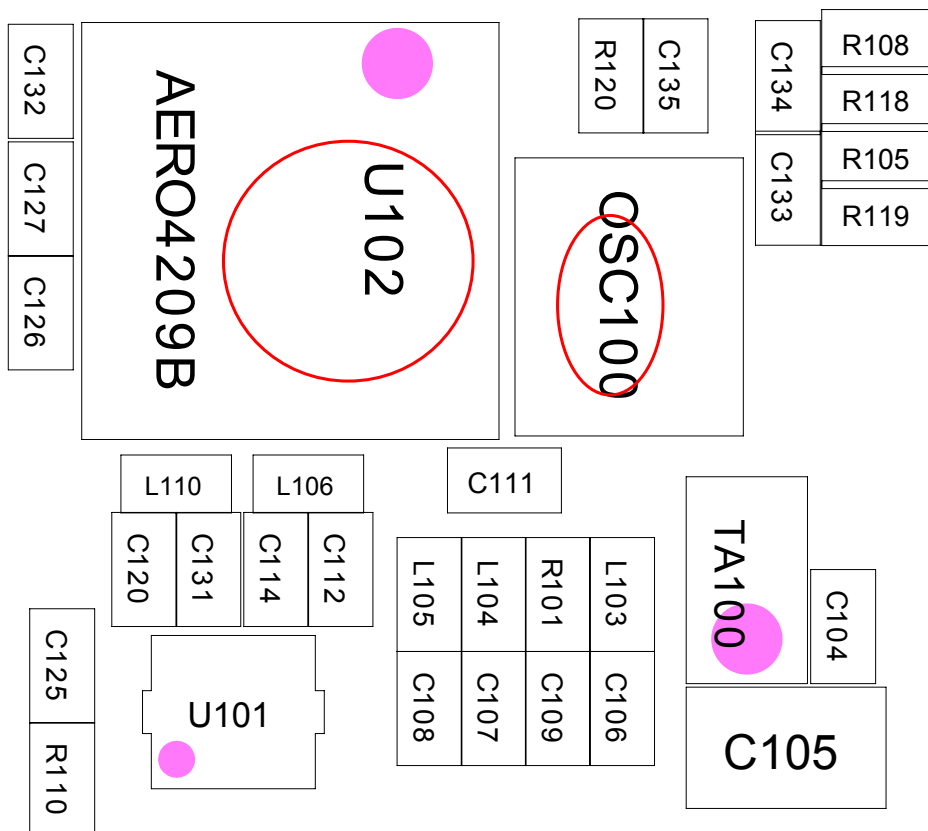
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## 9. Flow Chart of Troubleshooting

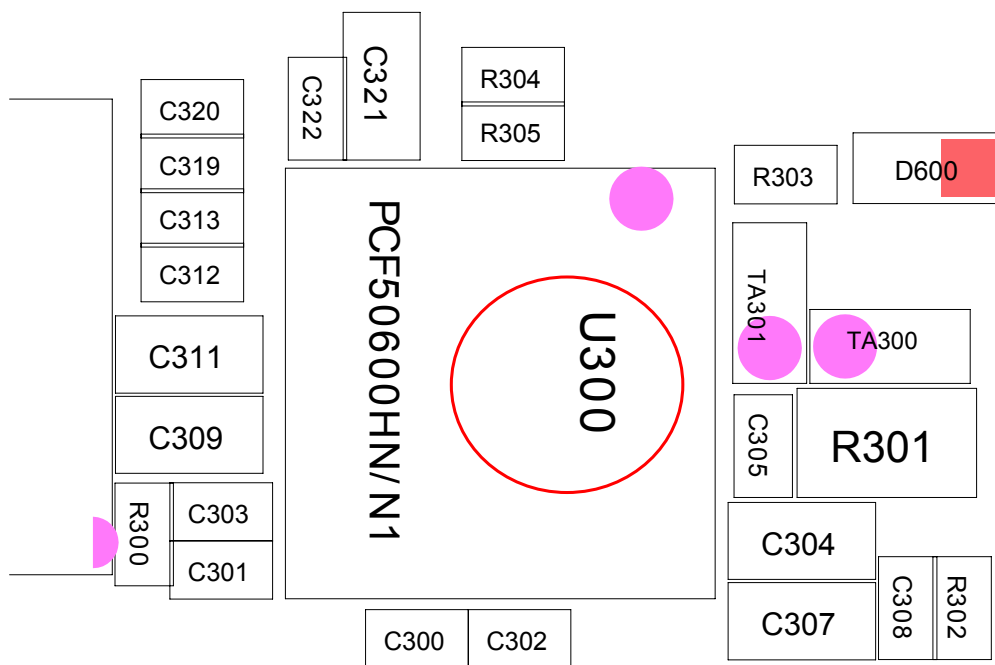
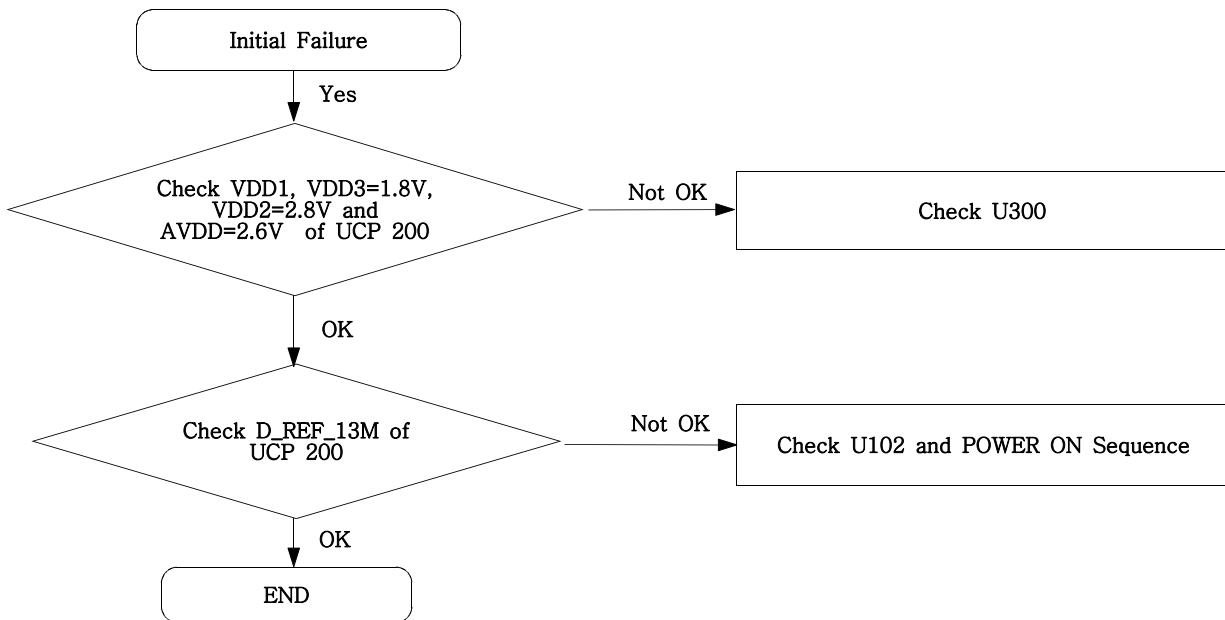
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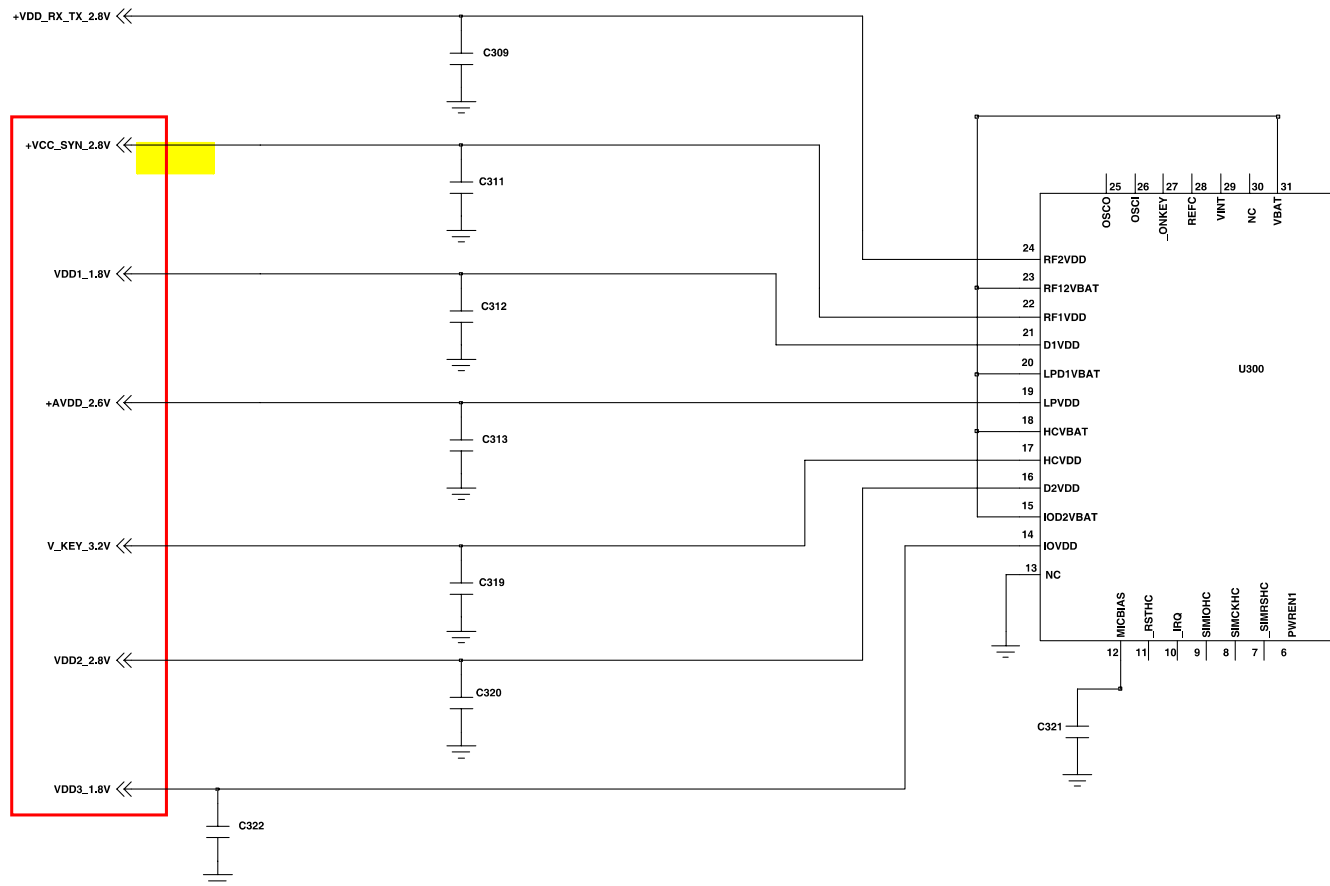
### 9-1. Power On





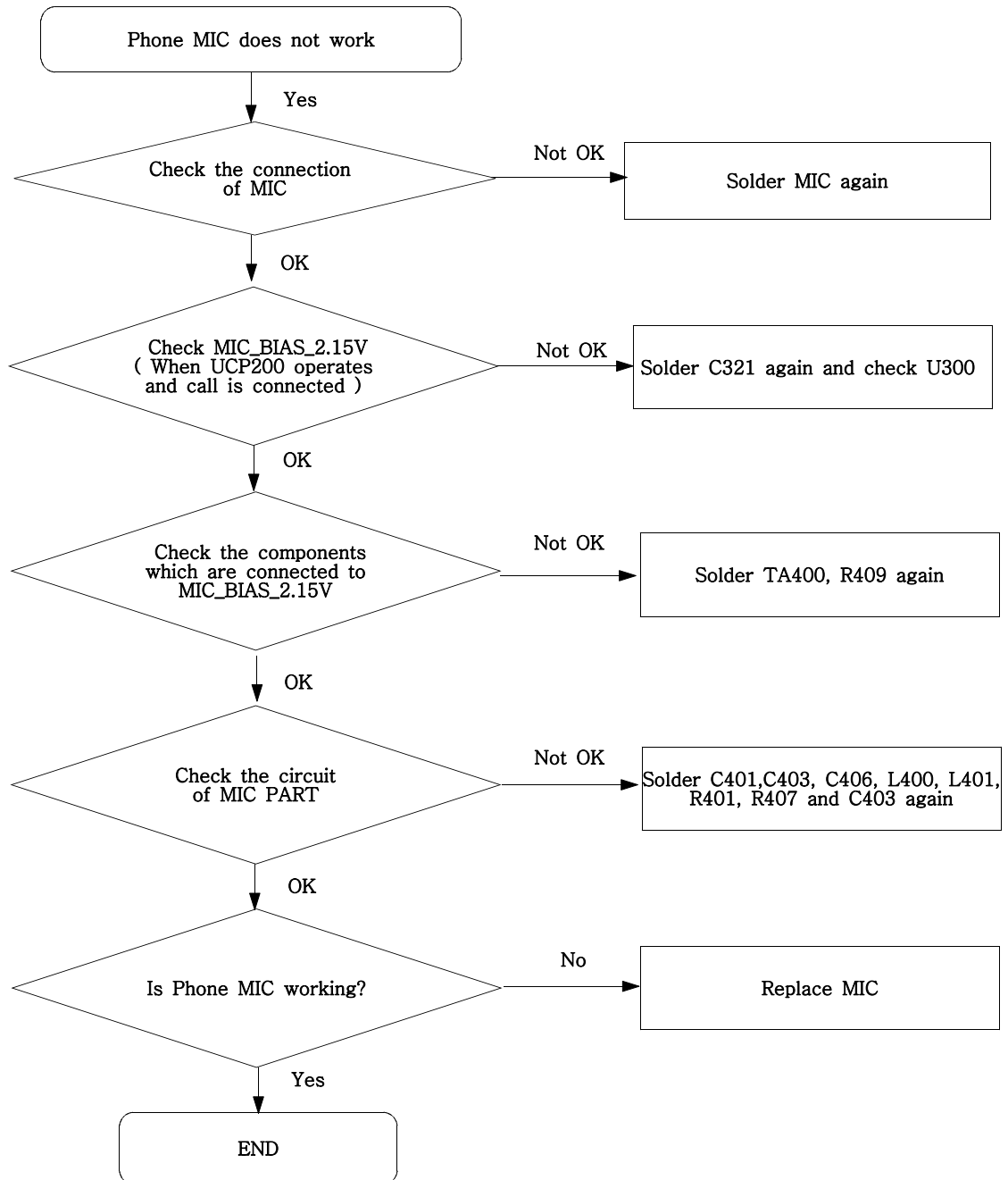
## 9-2. Initial

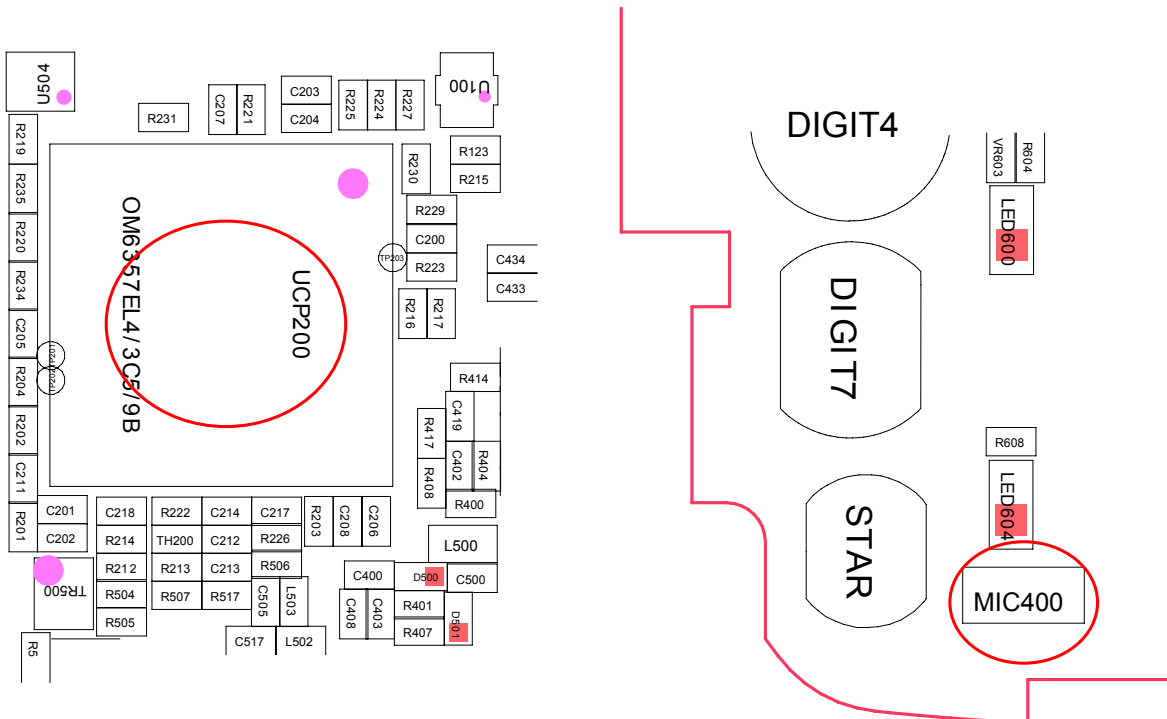
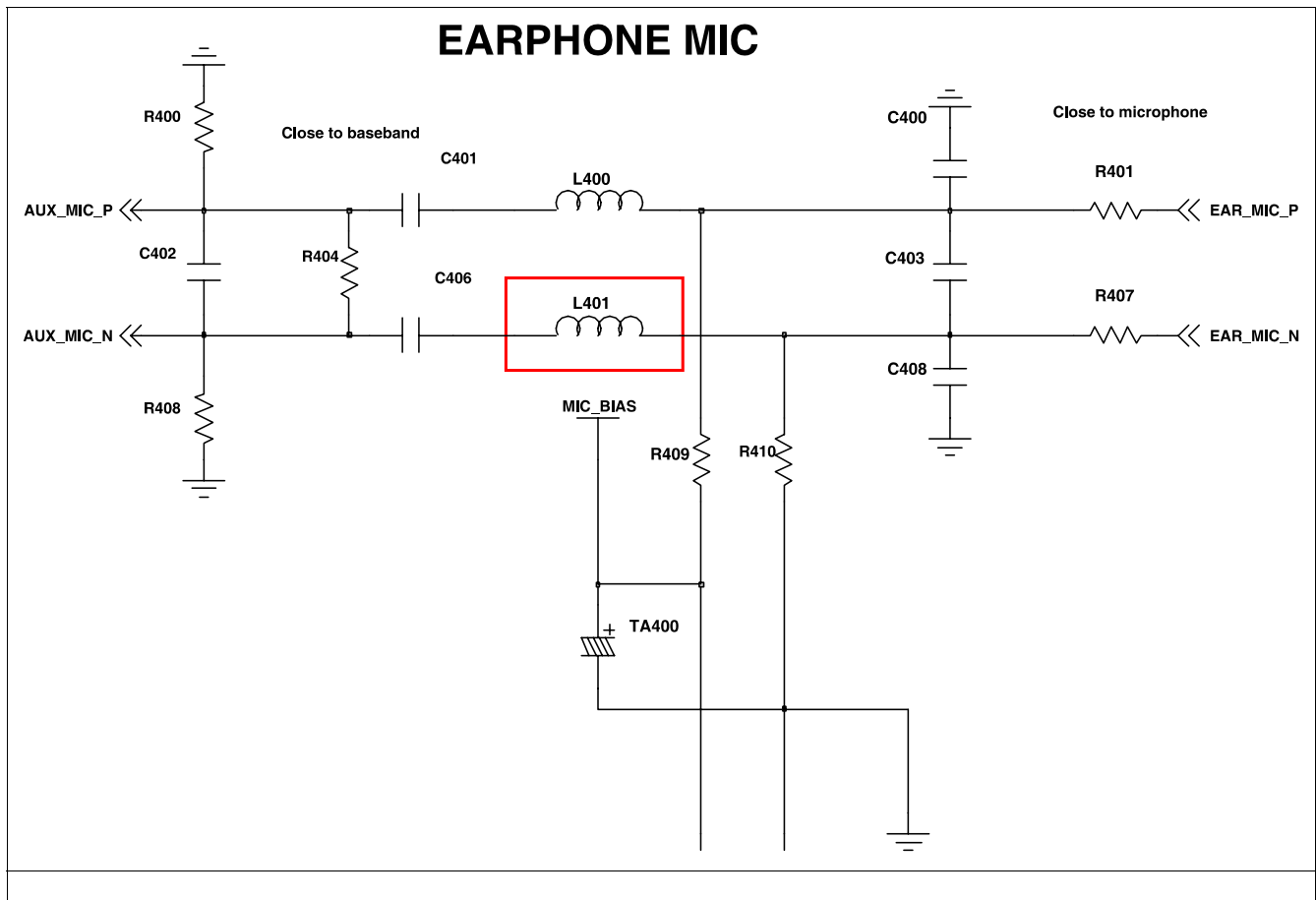




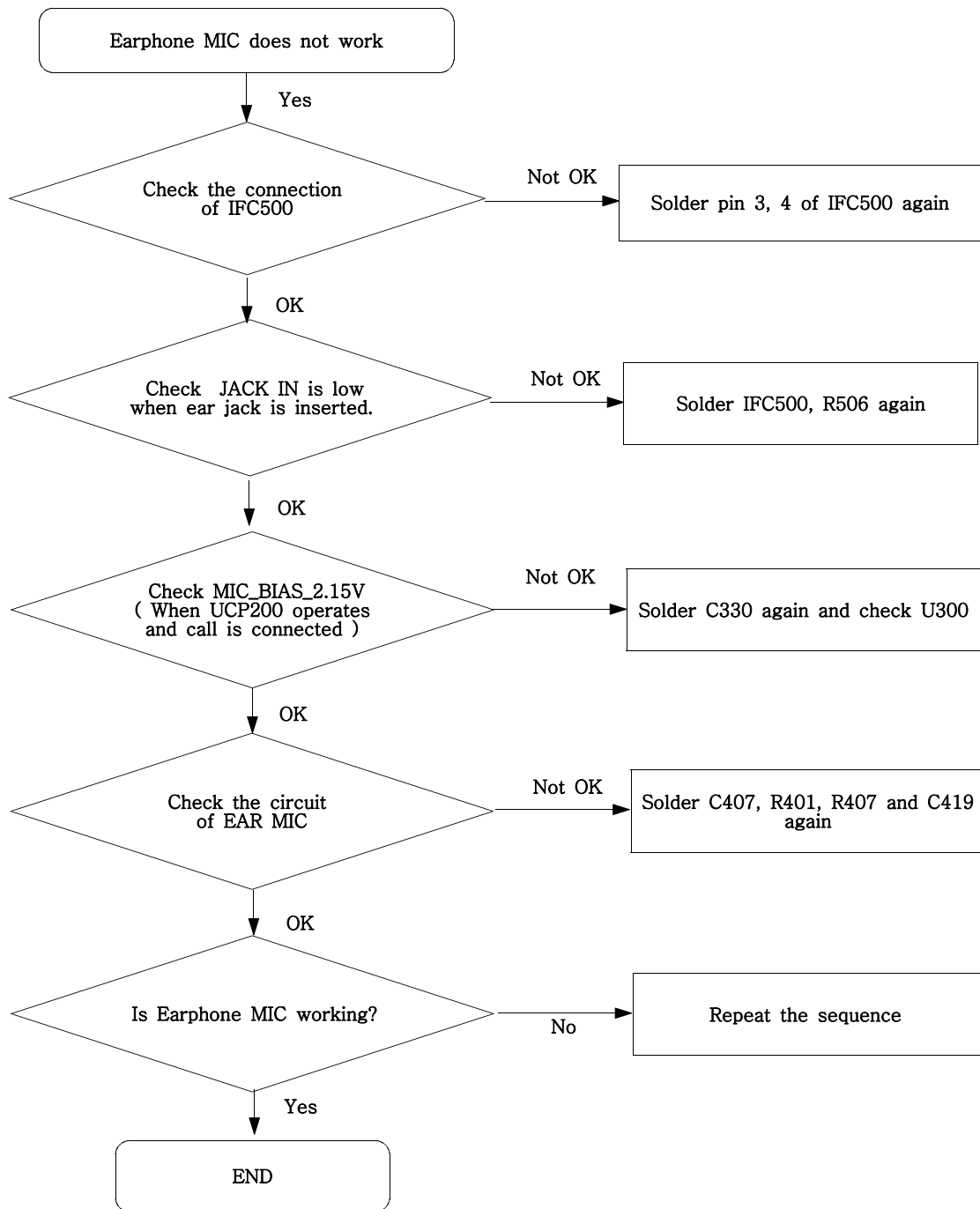


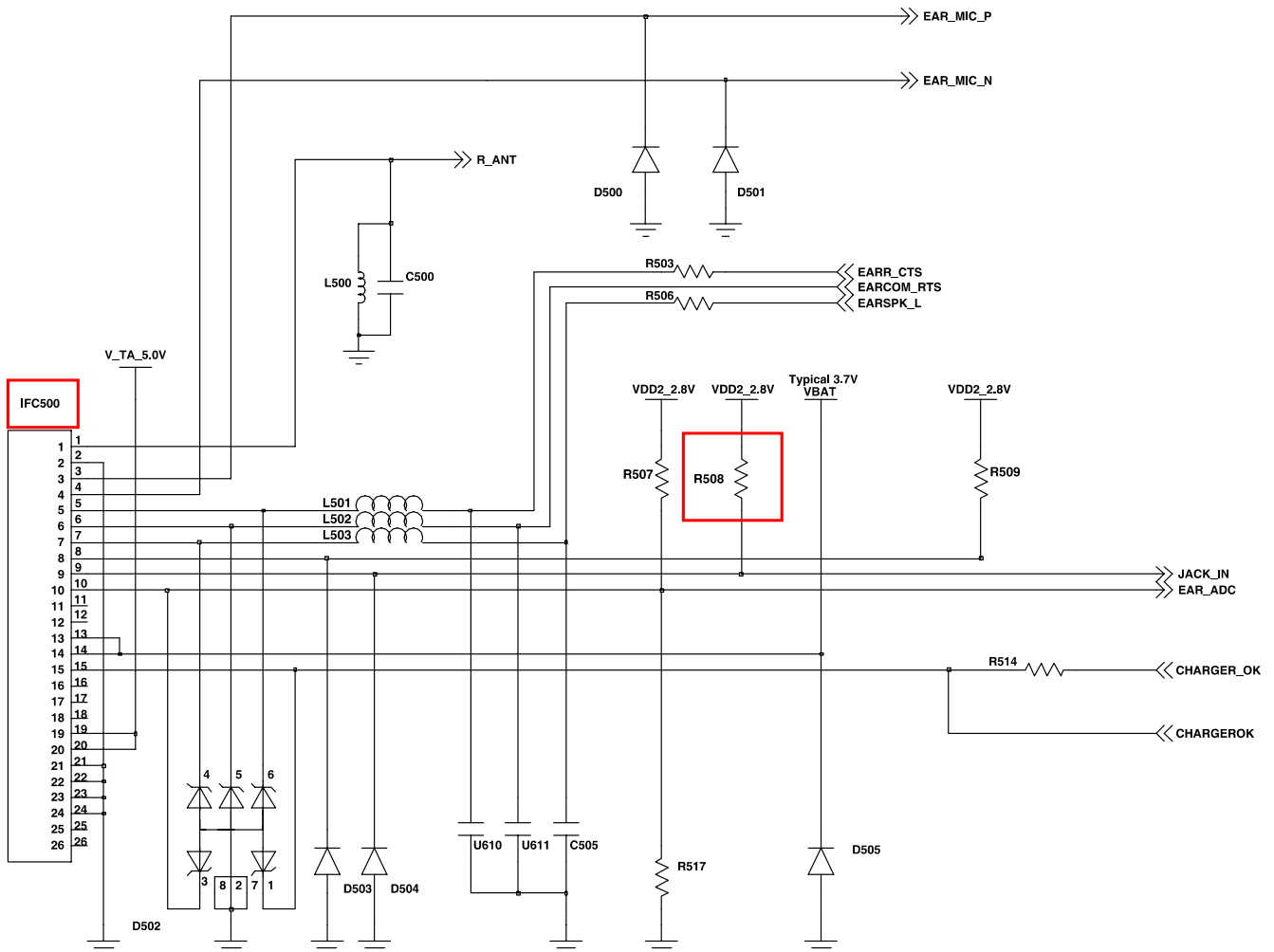
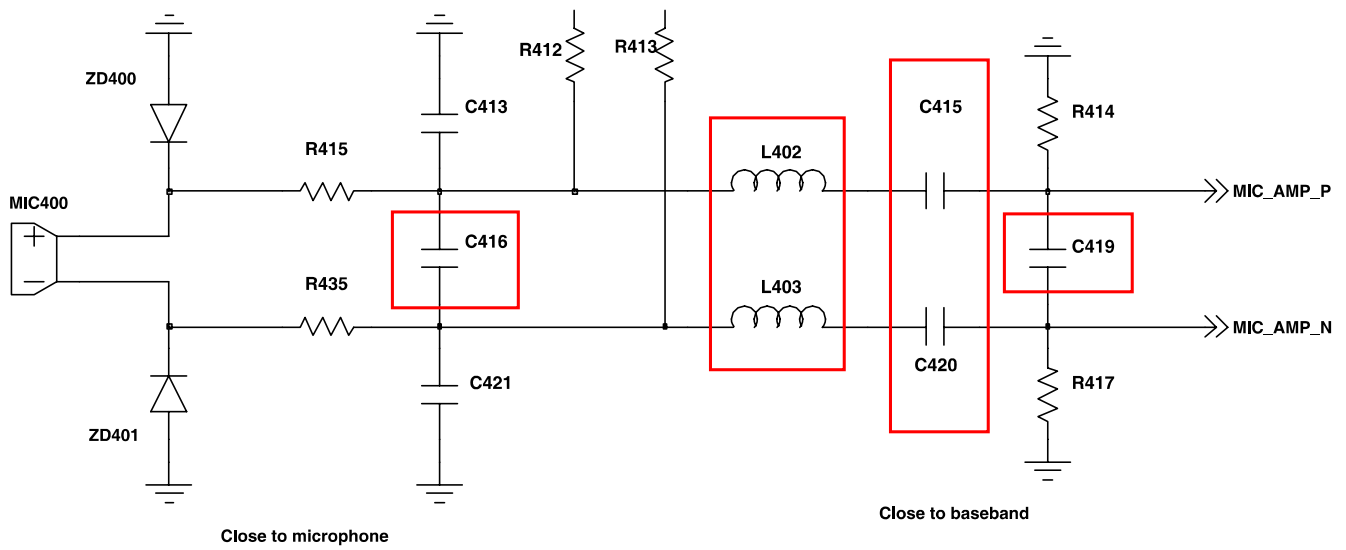
## 9-4. Microphone Part - Phone MIC

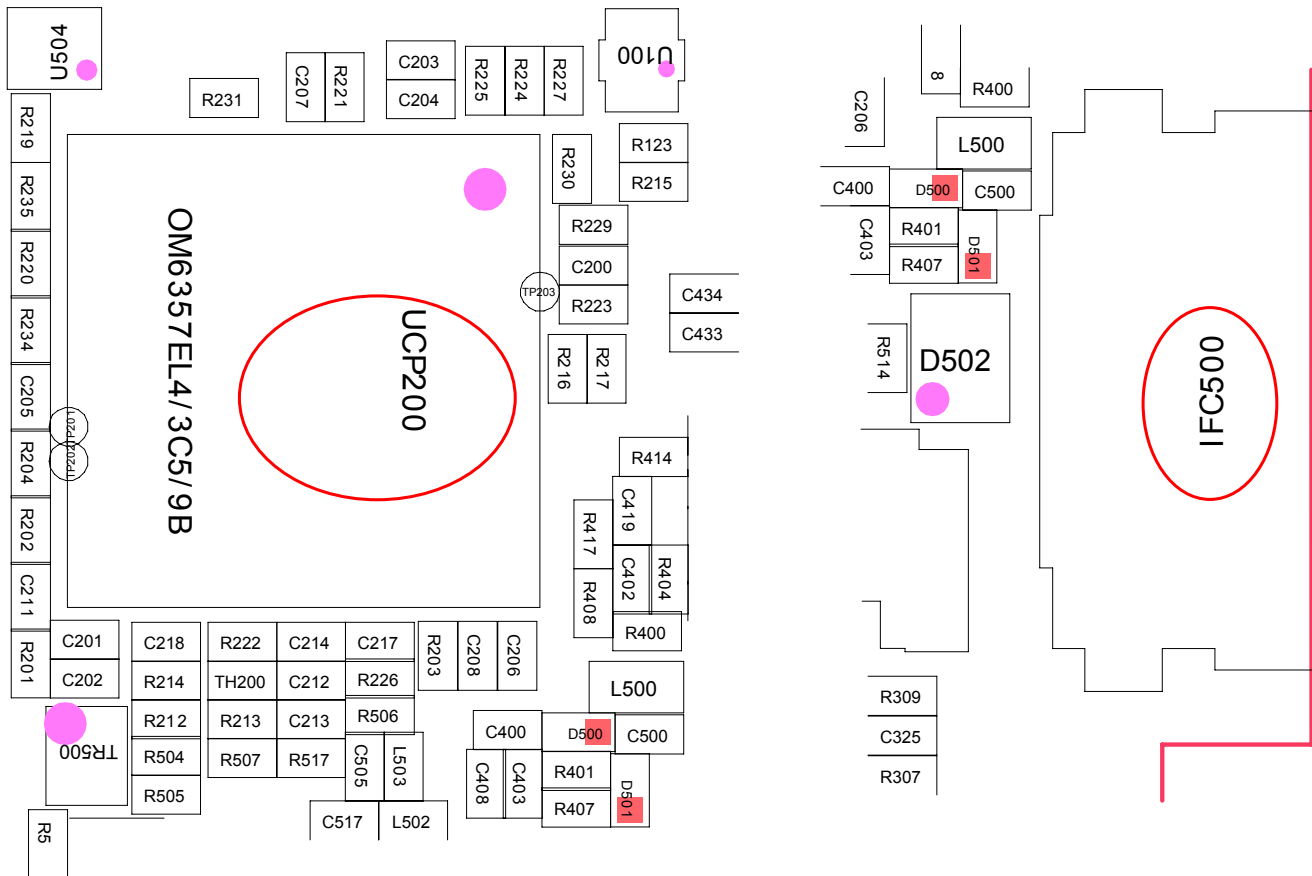




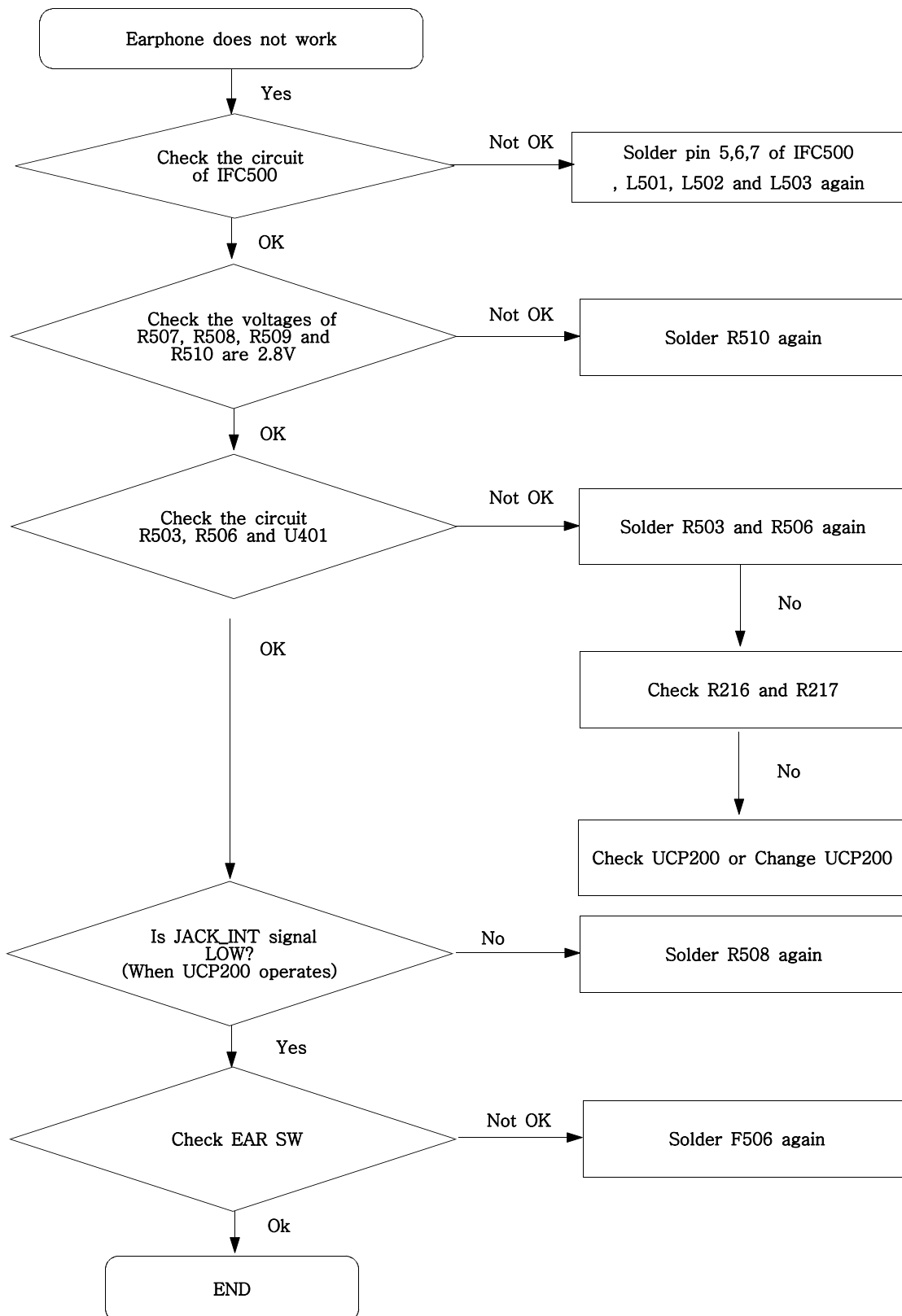
## 9-5. Microphone Part - Earphone MIC

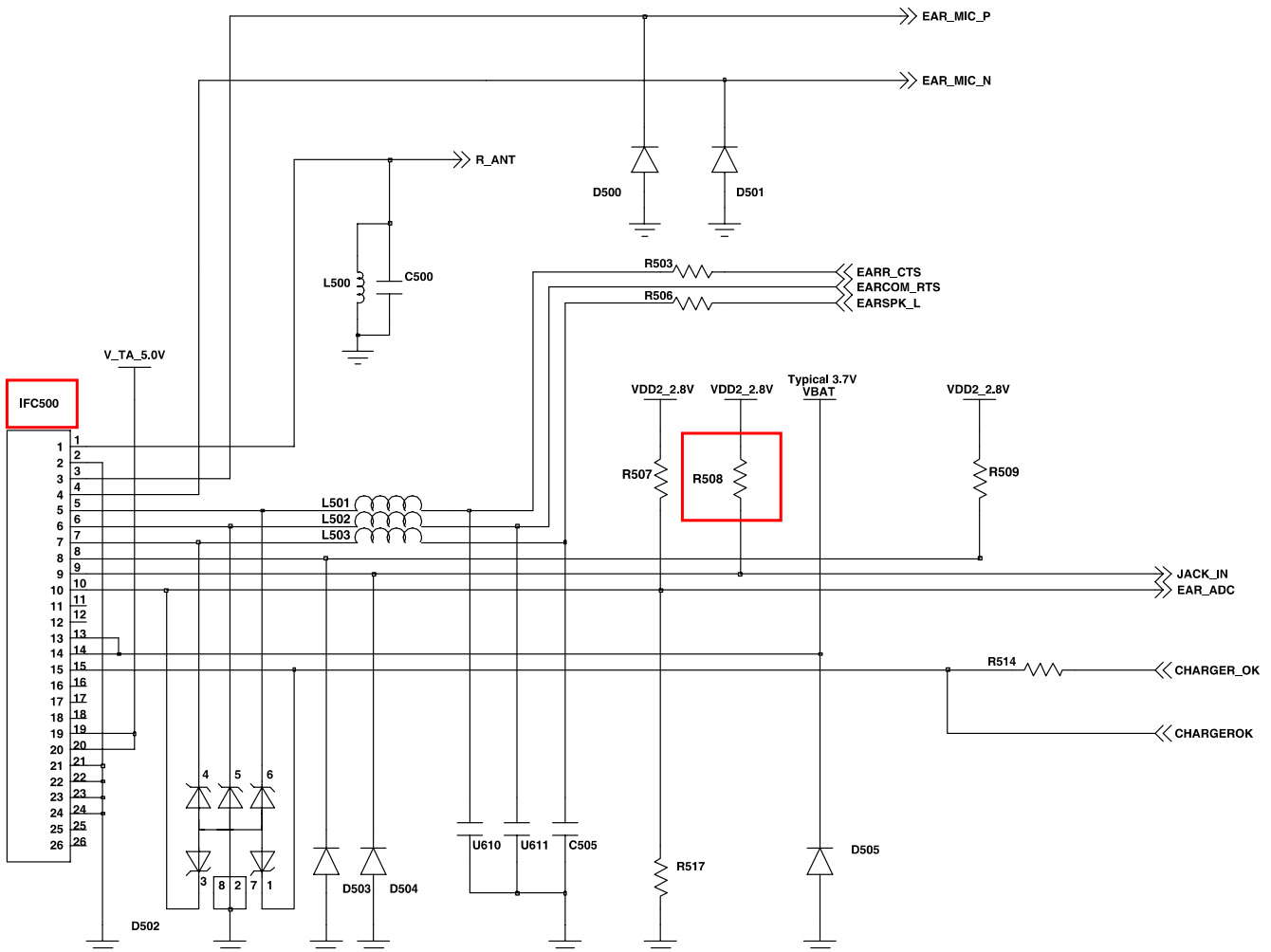
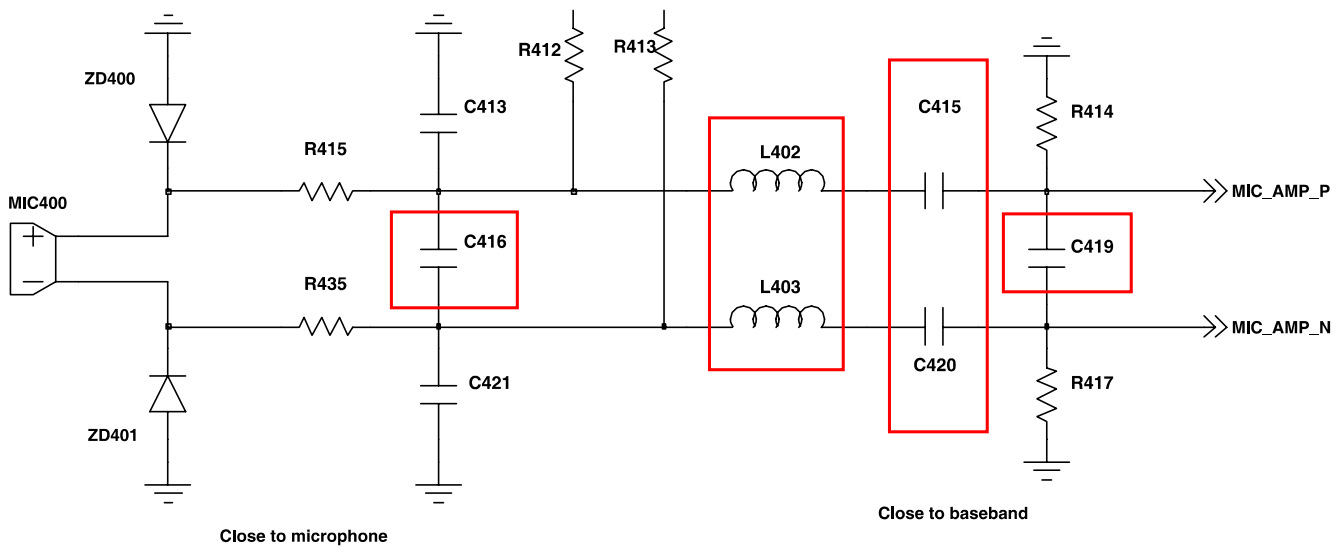






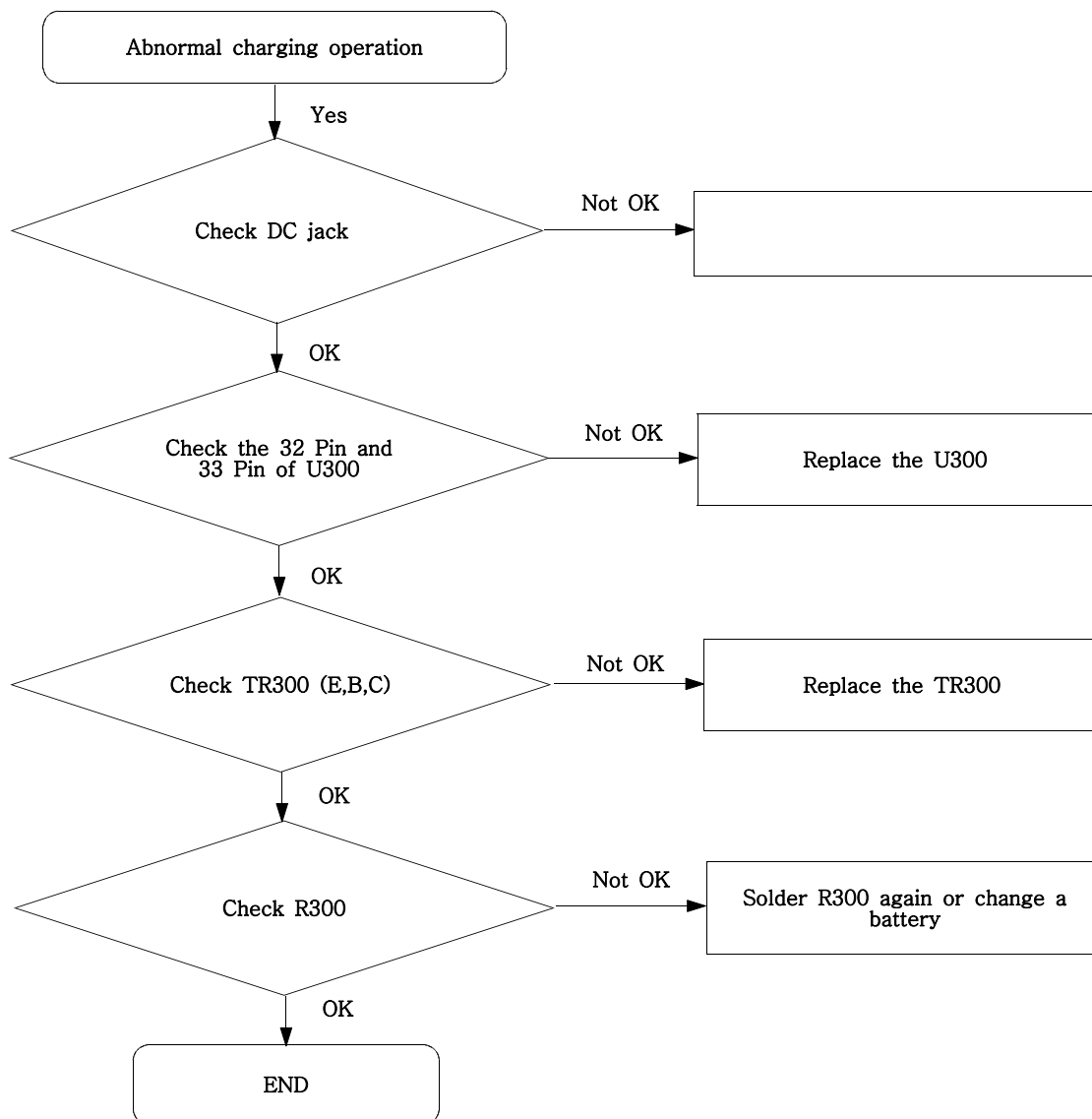
## 9-6. Earphone Part

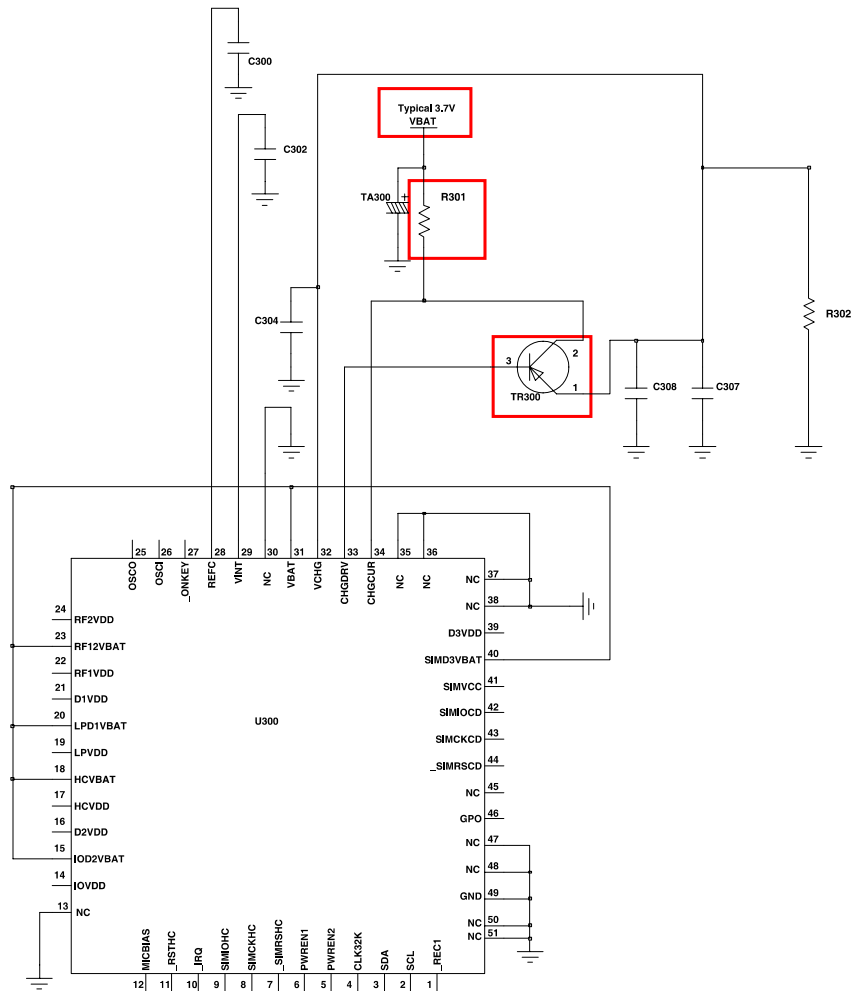
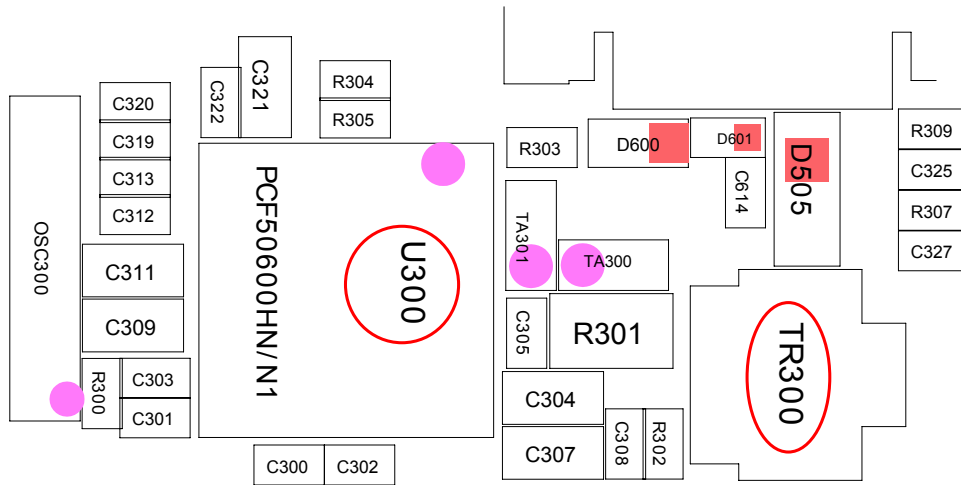




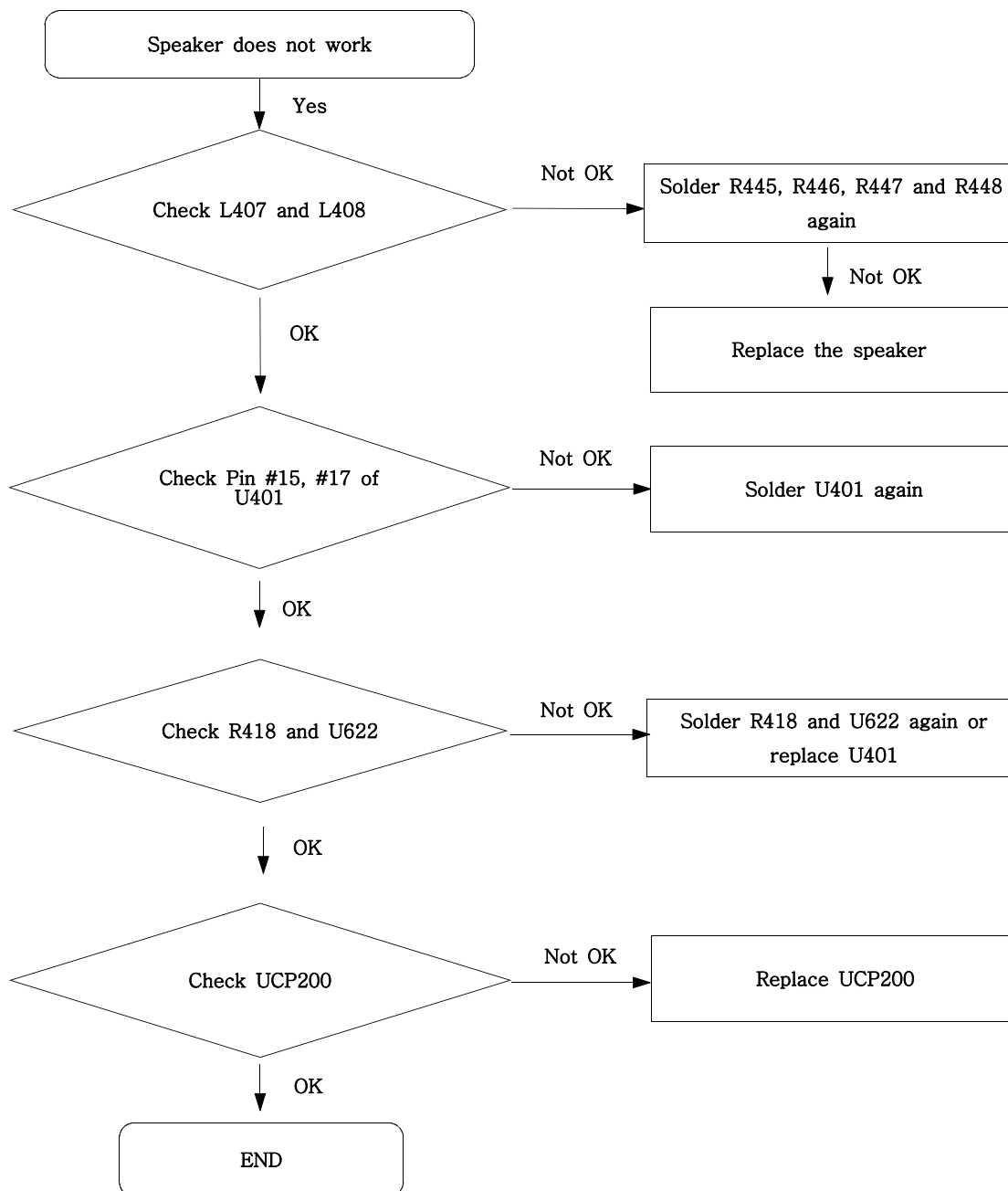


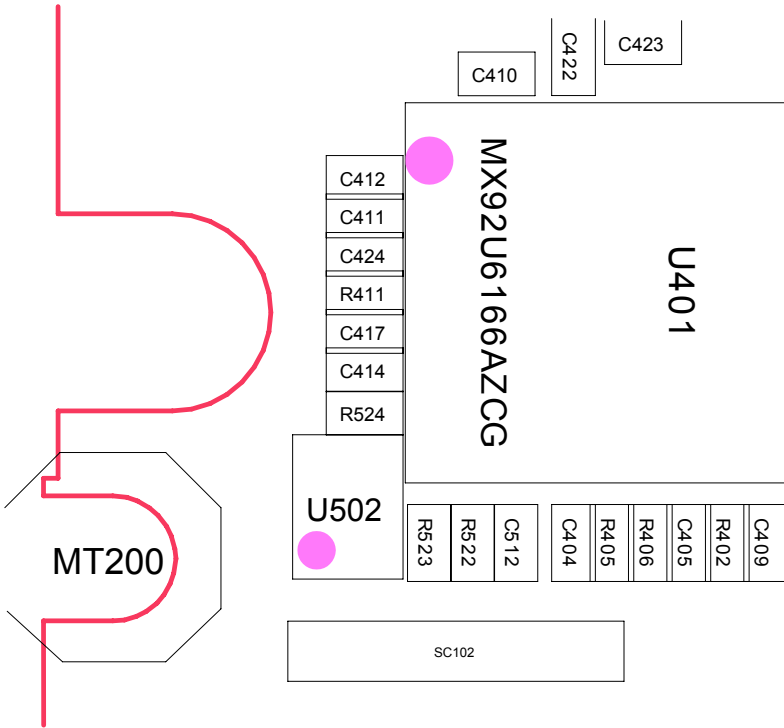
## 9-7. Charging Part



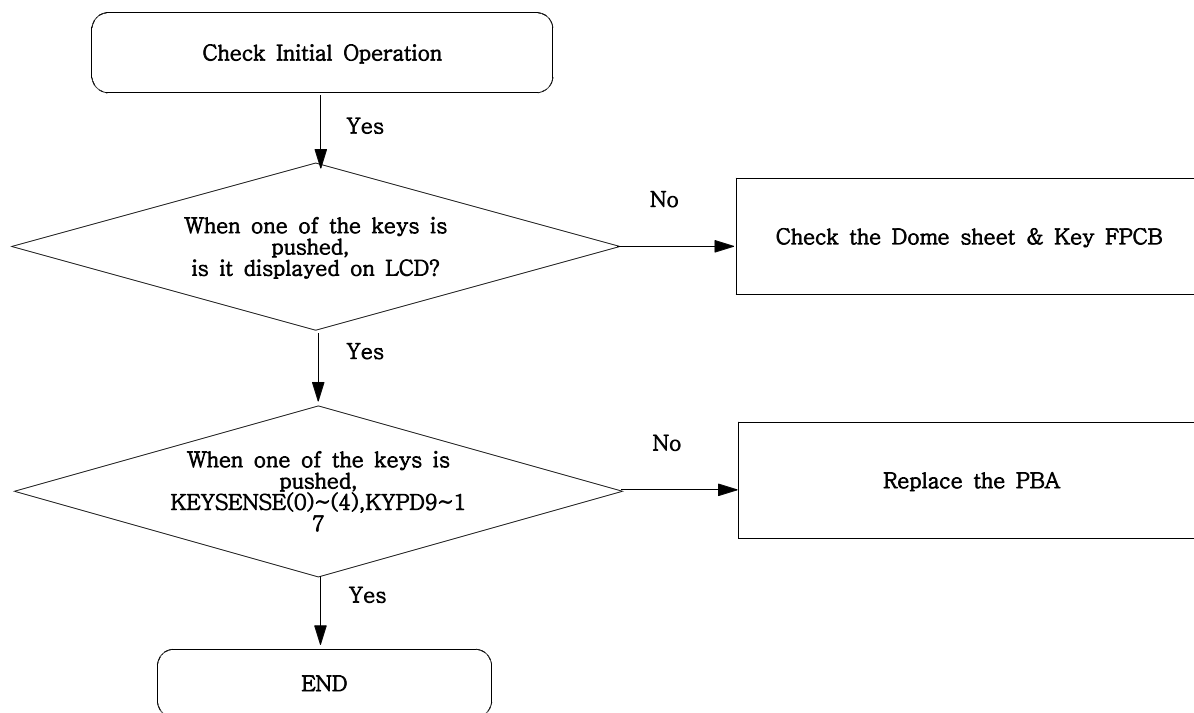


## 9-8. Speaker Part

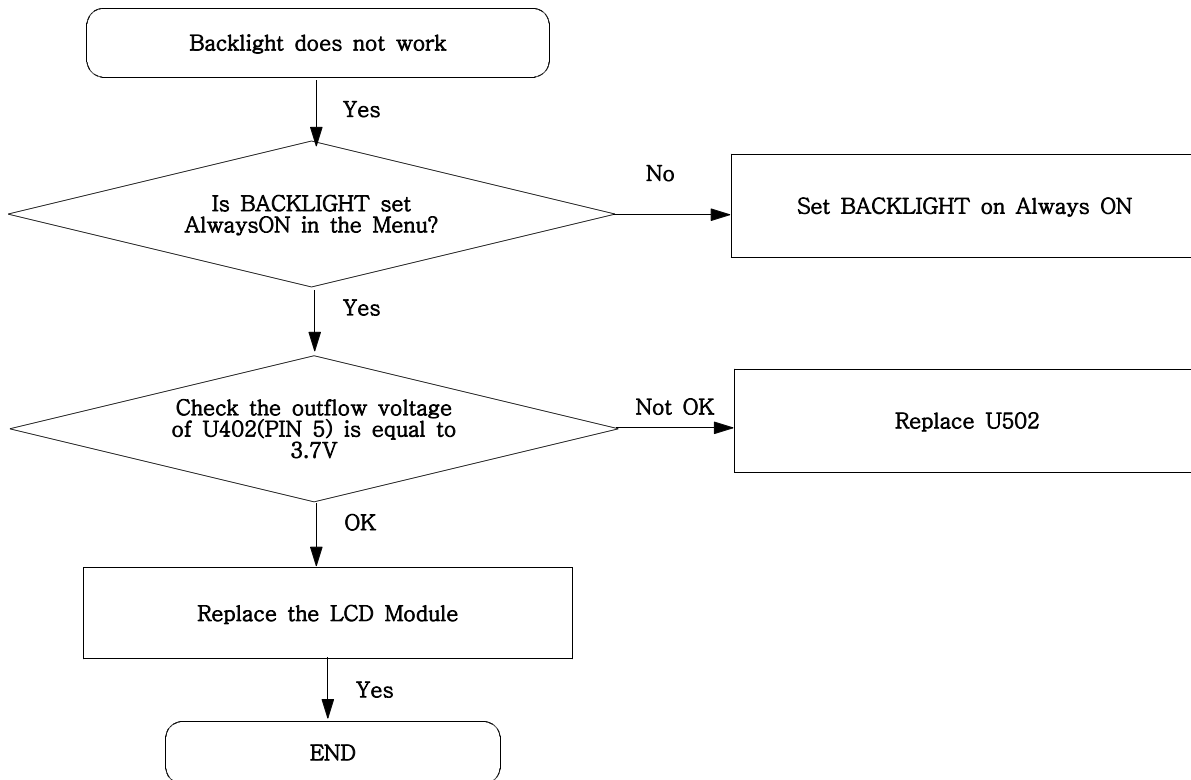


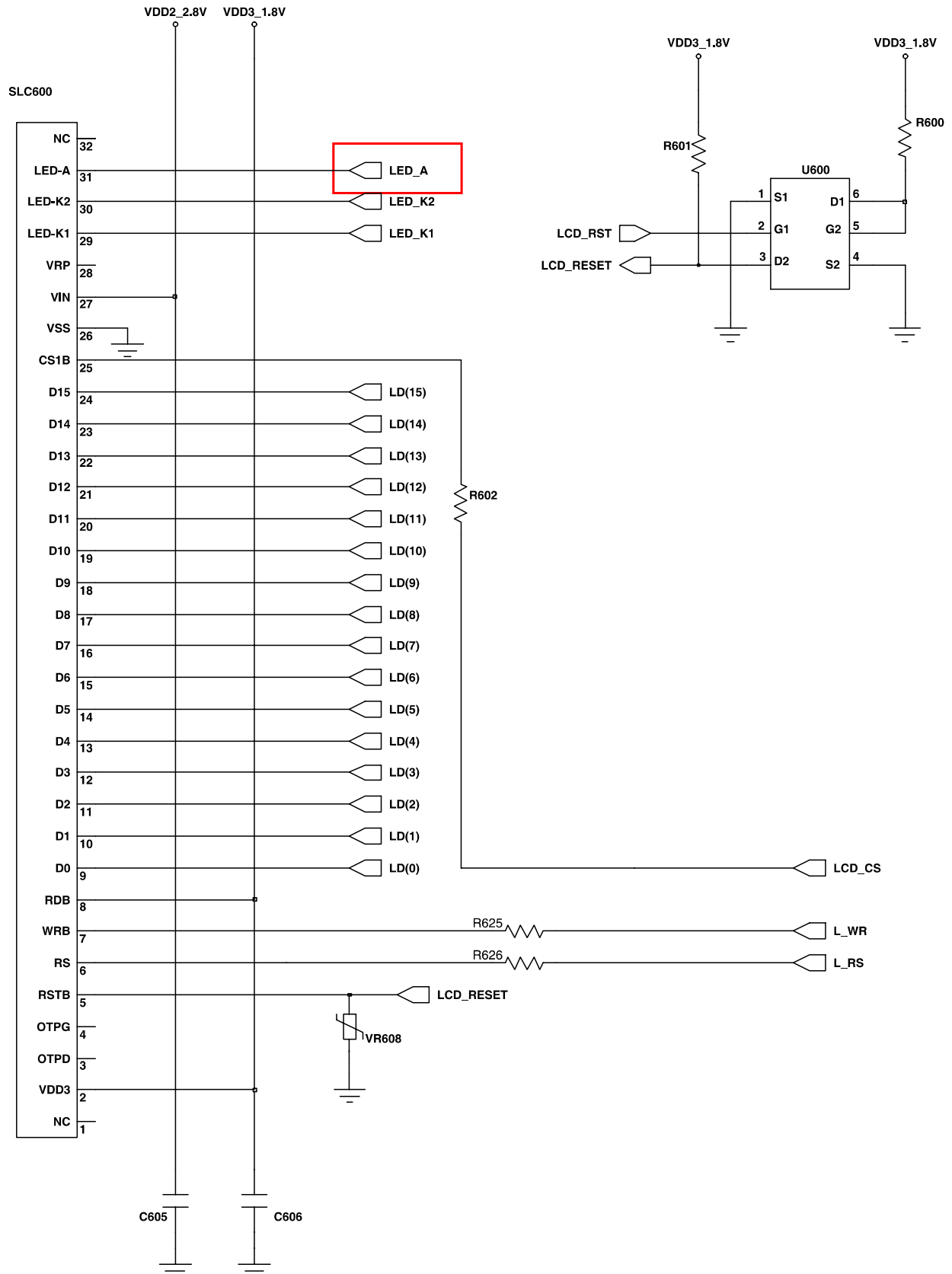


## 9-9. Key Data Input

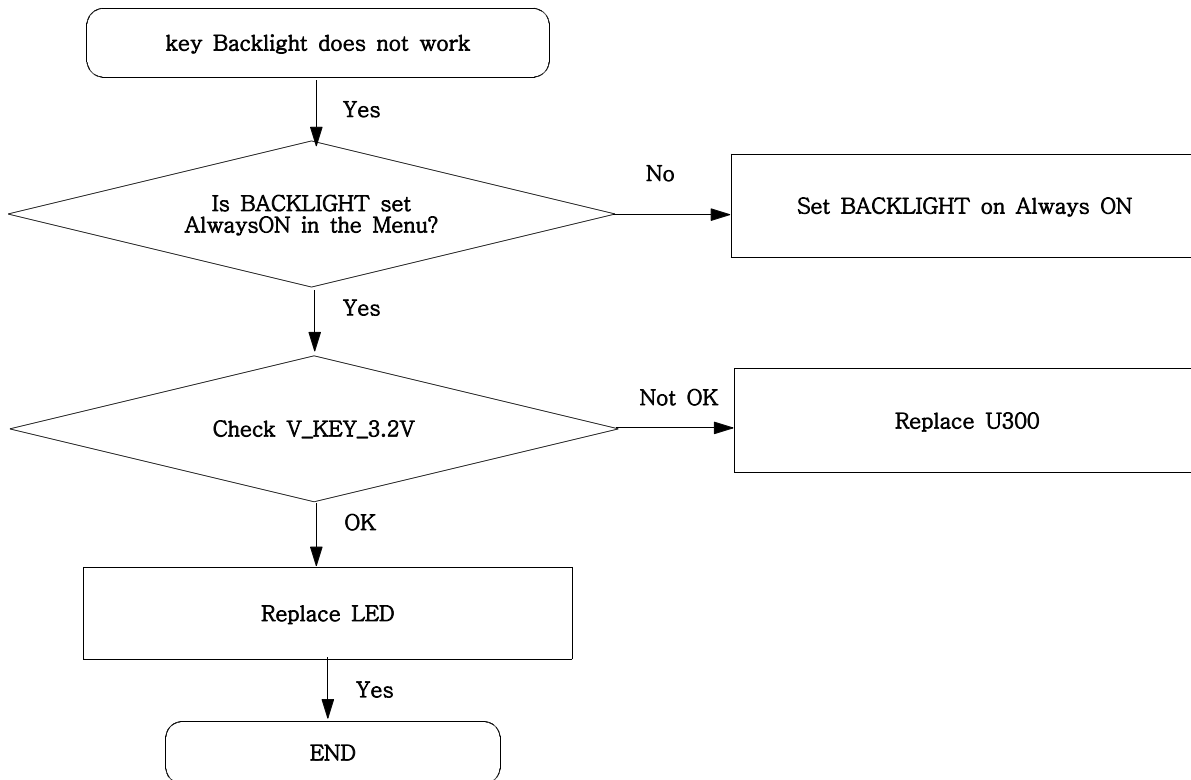


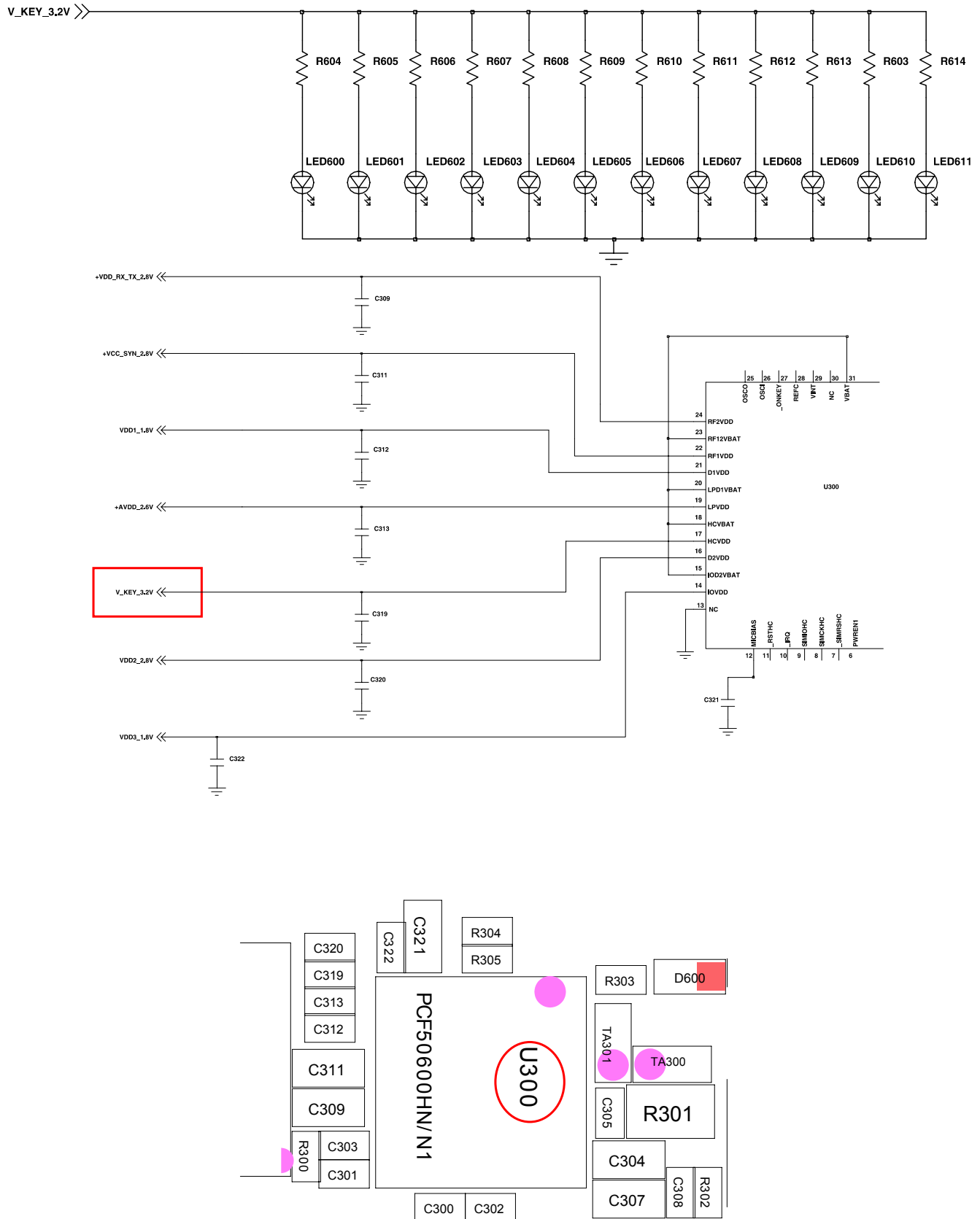
## 9-10. Back Light (for Color Main LCD)

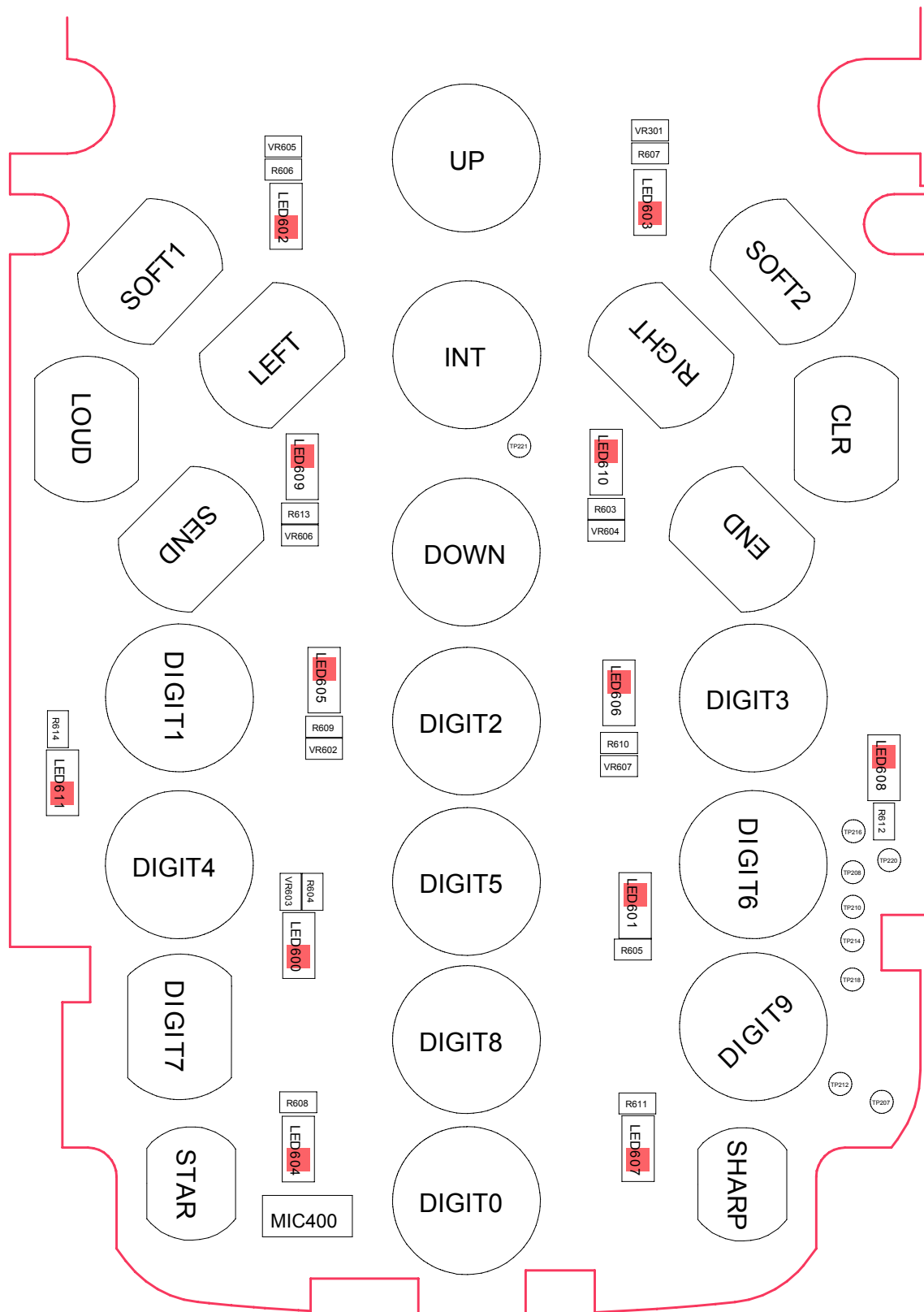




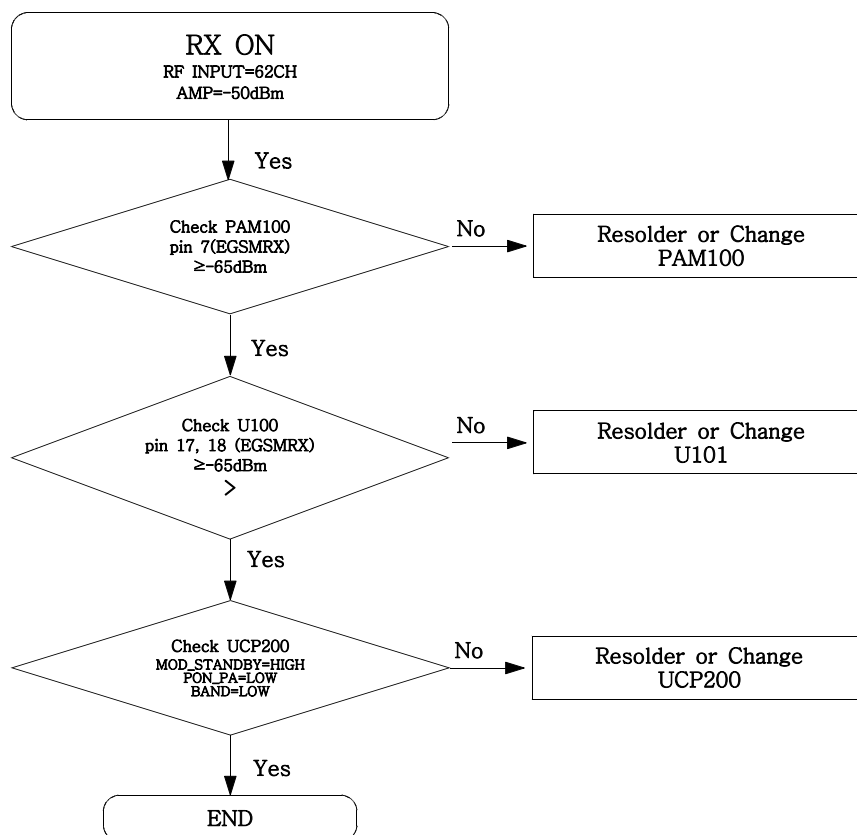
## 9-11. Key Back Light

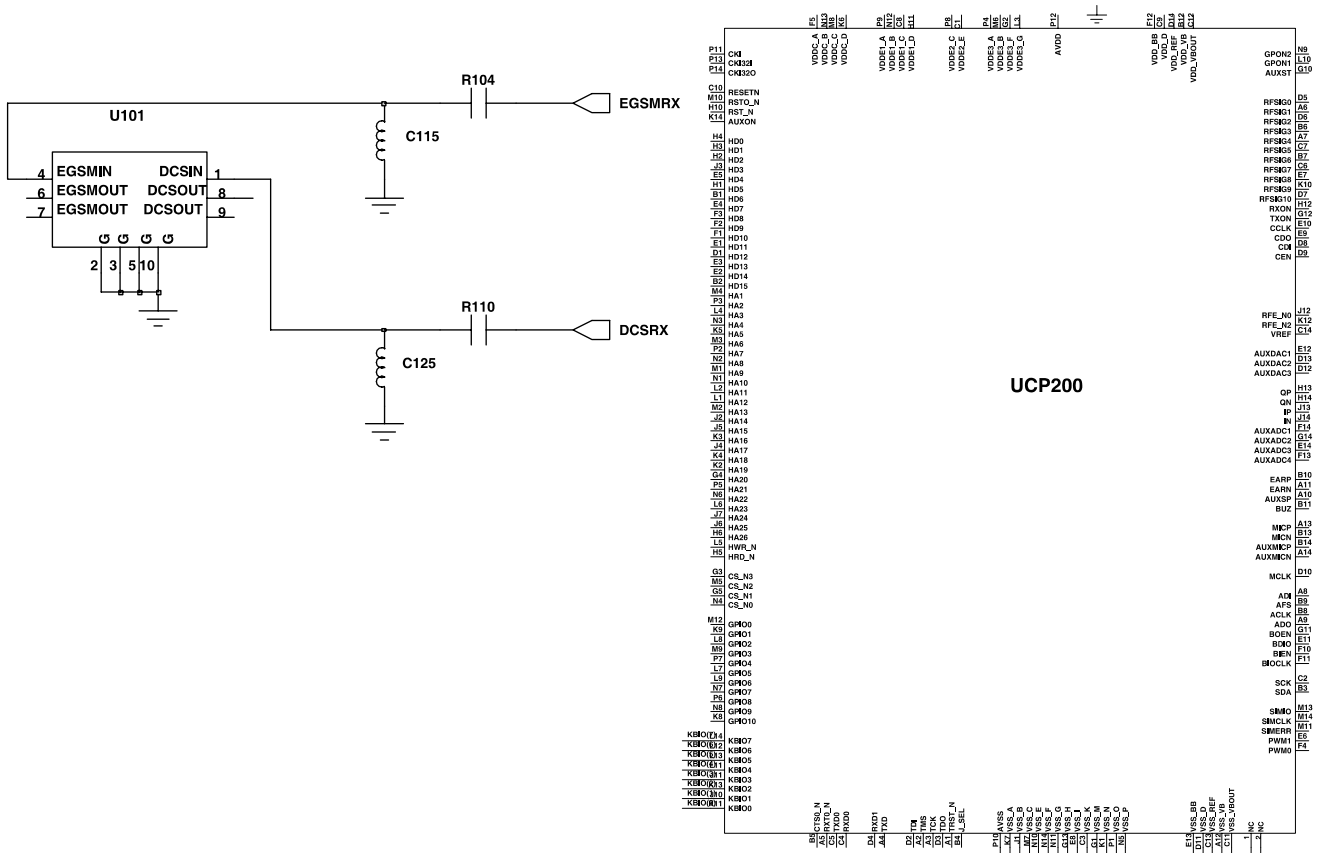
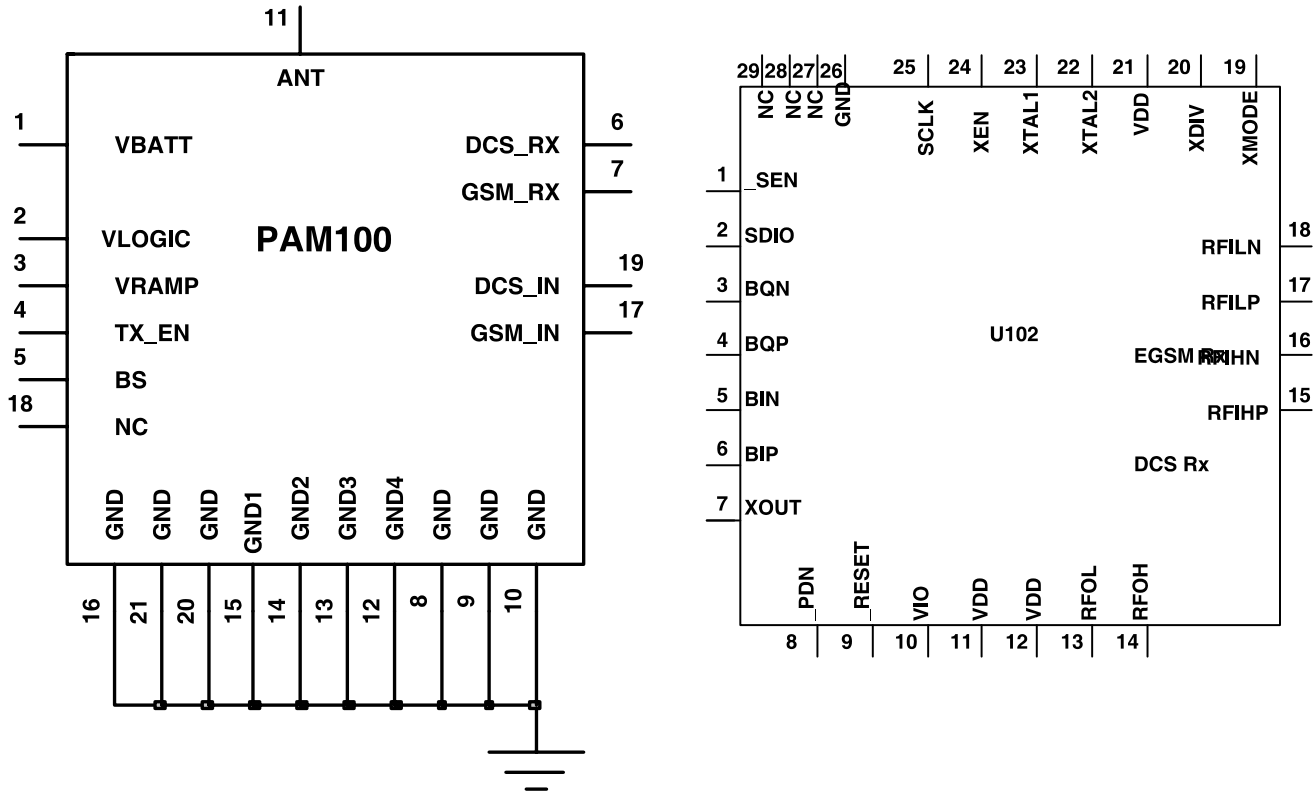


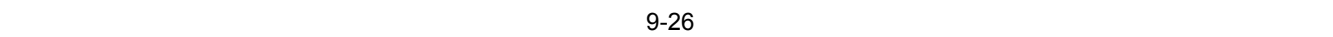




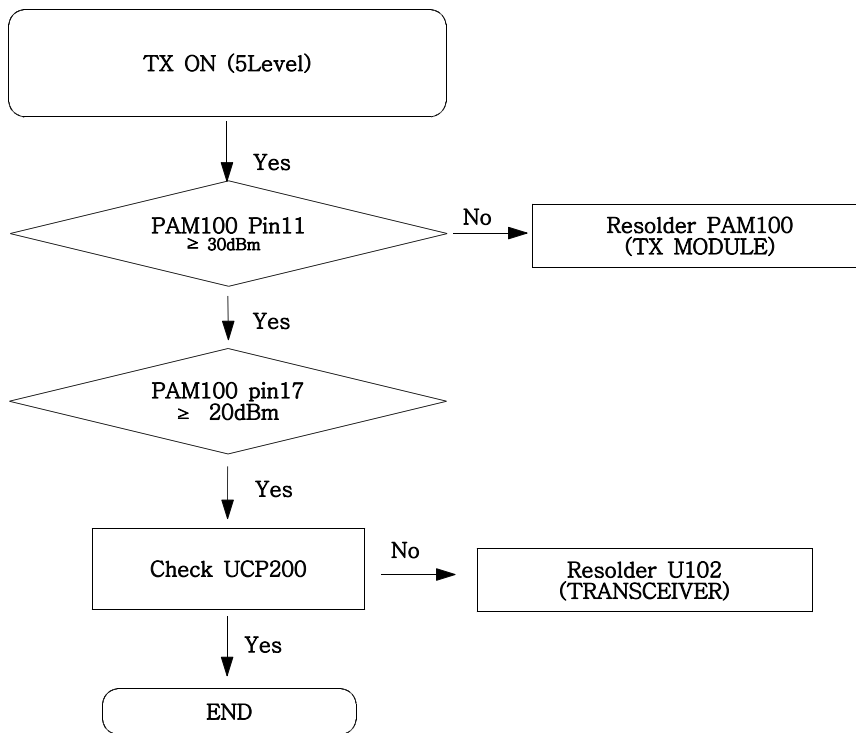
## 9-12. GSM Receiver

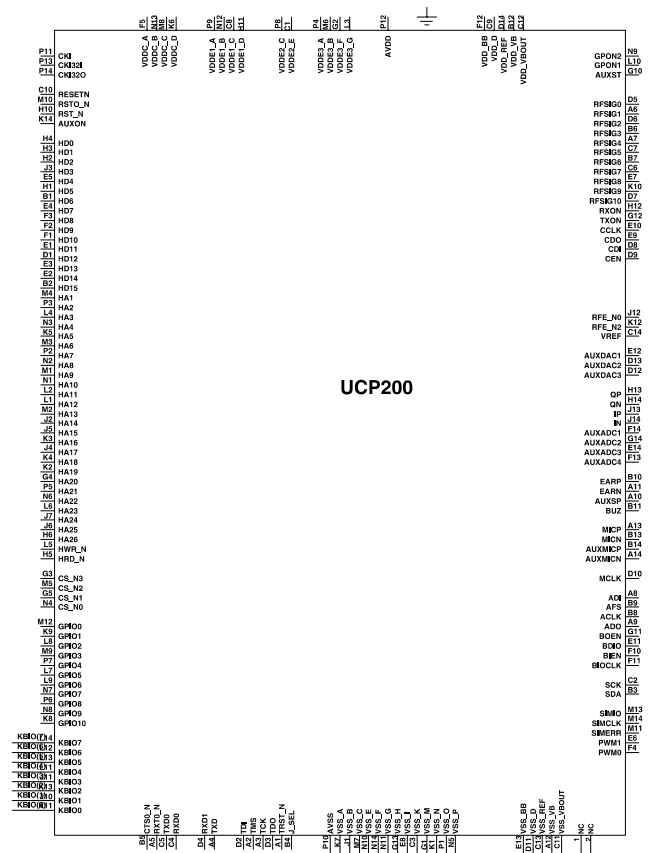
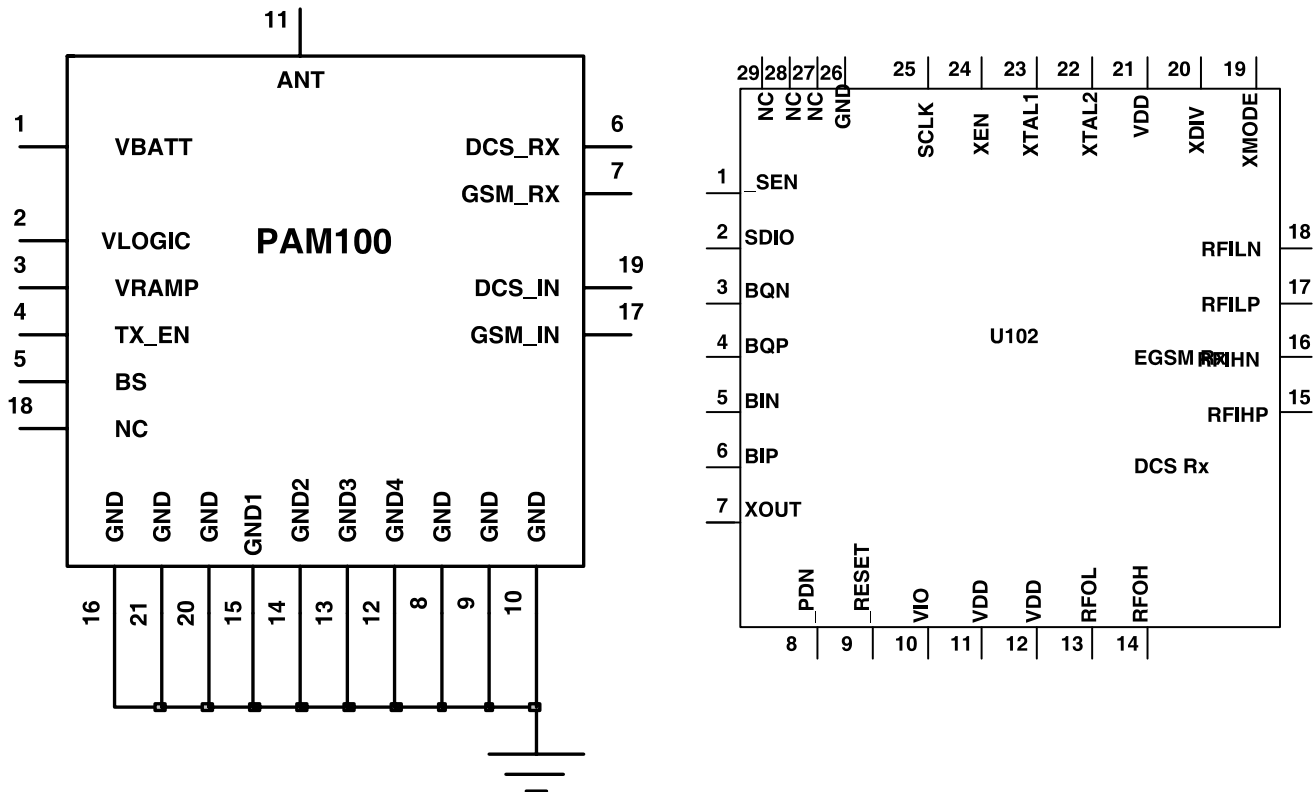






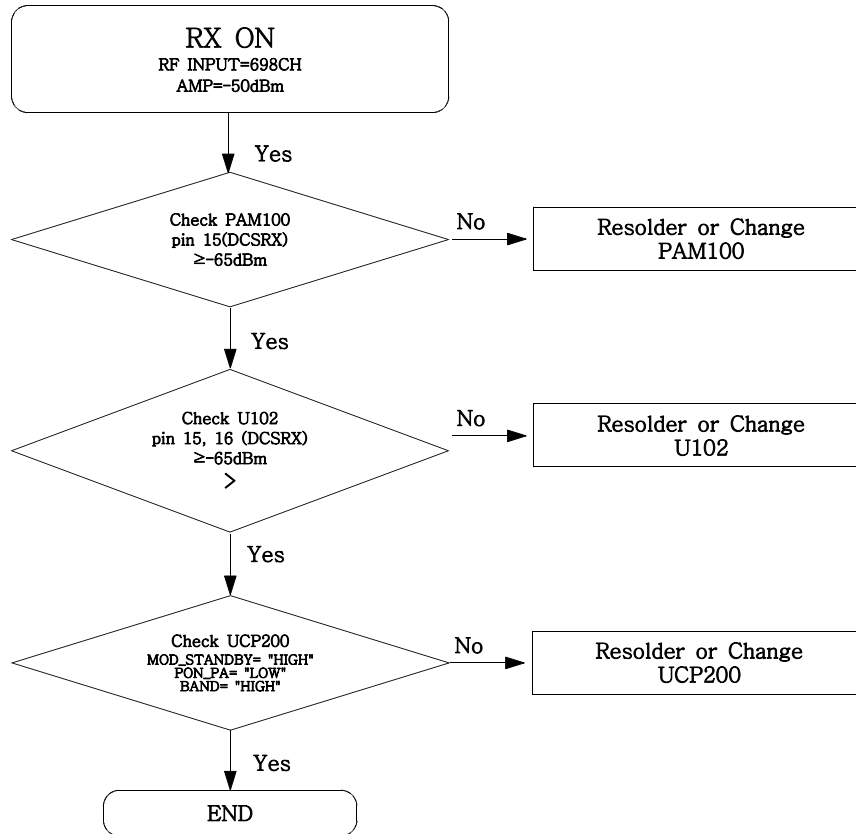
## 9-13. GSM Transmitter

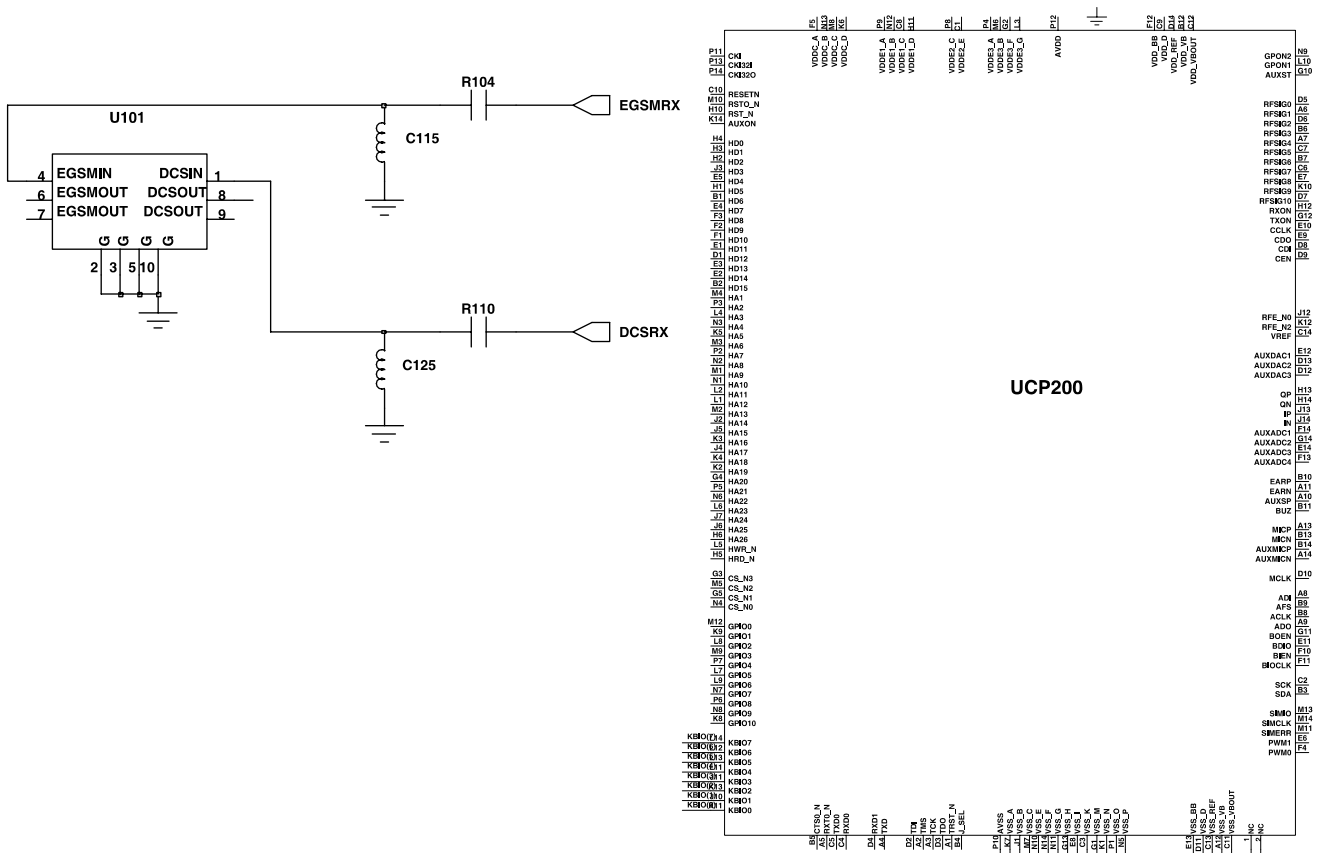
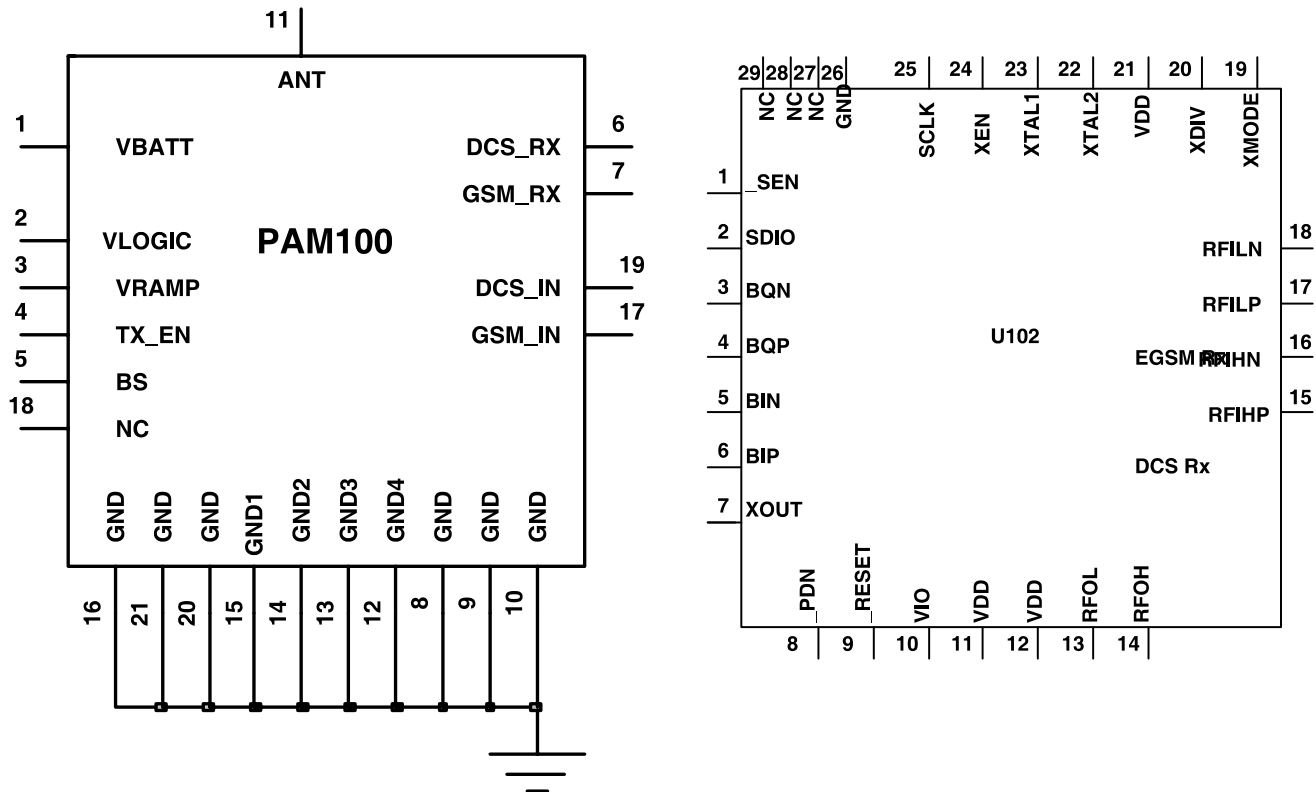


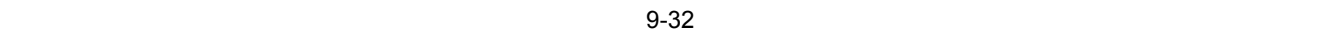




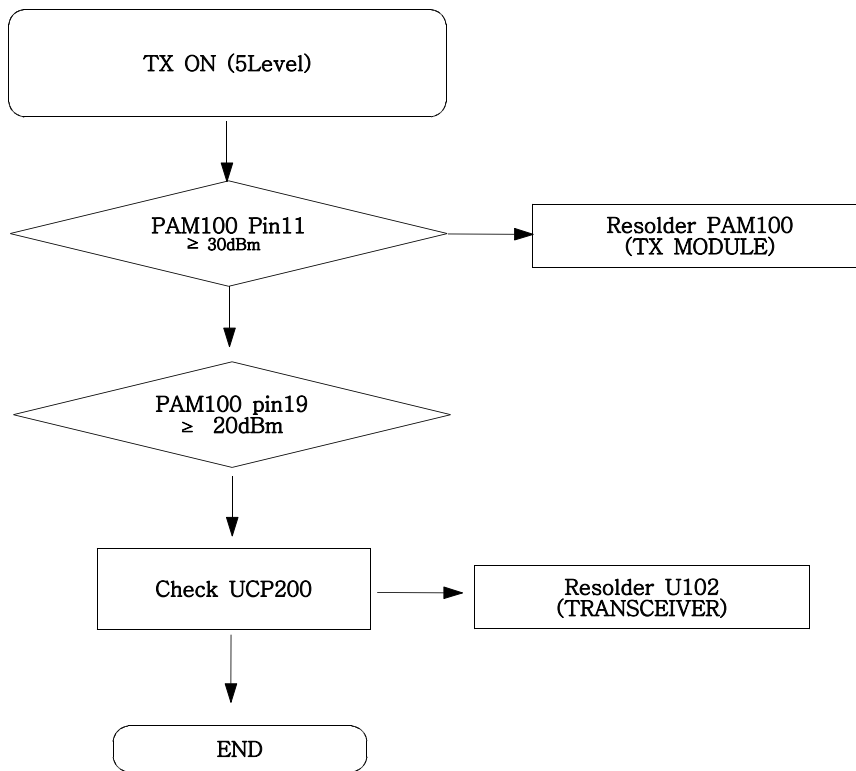
## 9-14. DCS Receiver

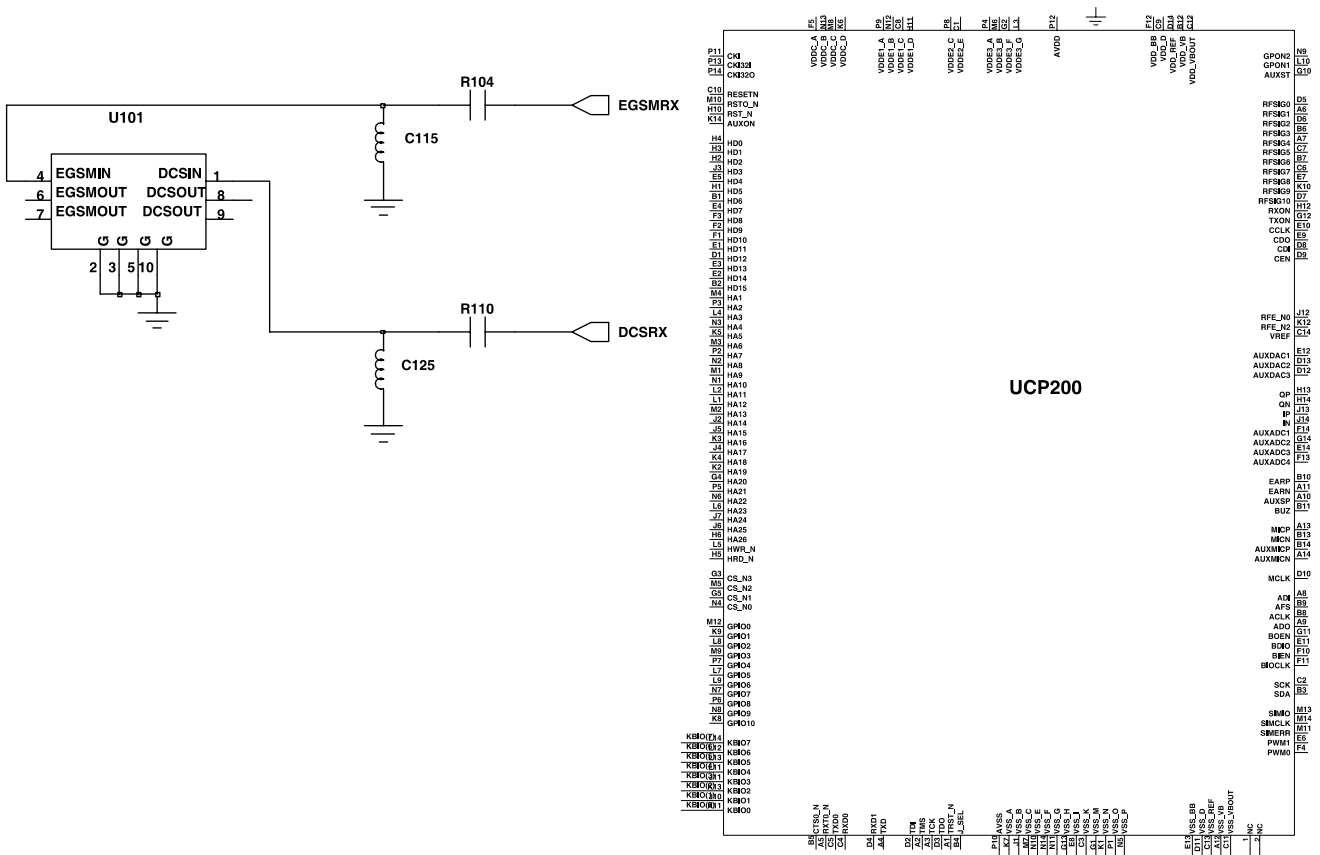
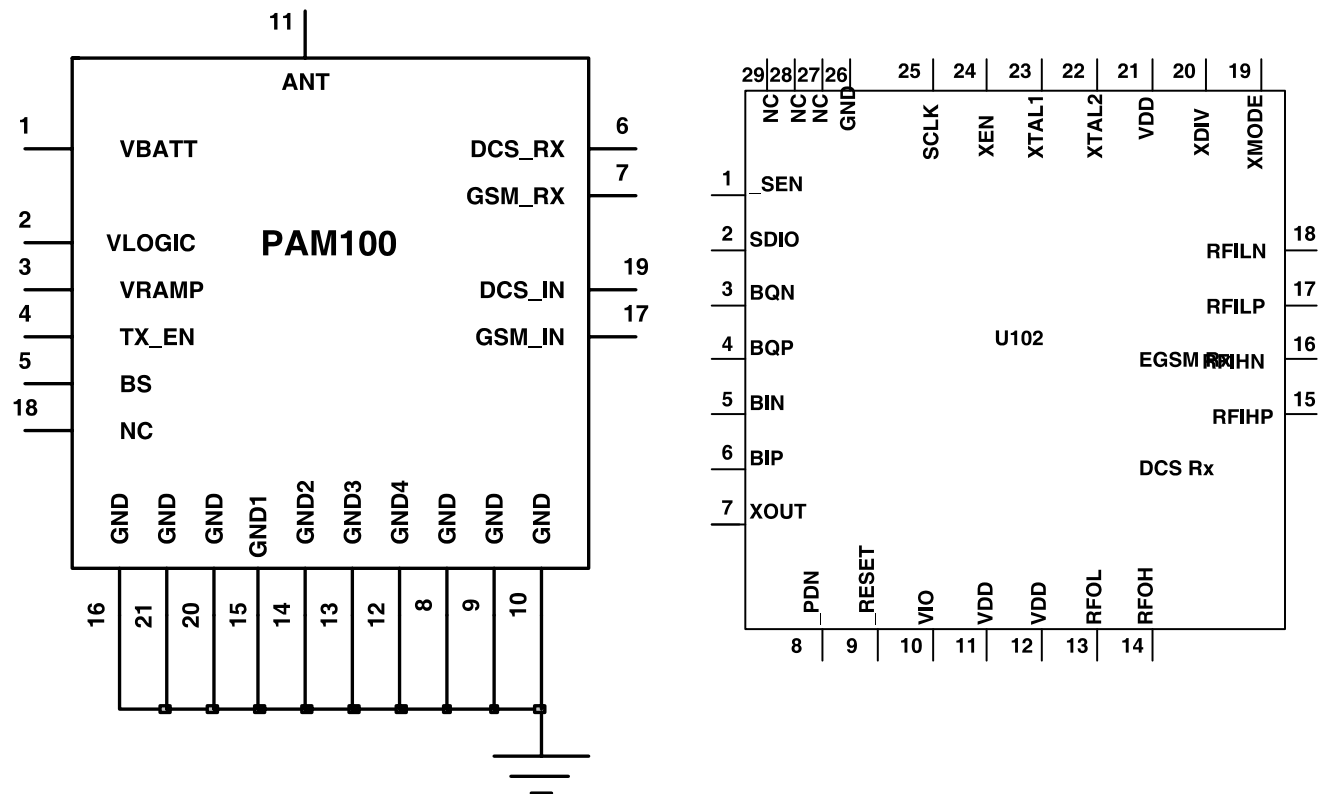






## 9-15. DCS Transmitter









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## 4. Array course control

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### 4-1. Software Adjustments



1. JIG Box([GH80-01909A](#)) : Download, Trace, Calibration, etc
2. RF test cable([GH39-00397A](#)) : RF test
3. TA(Travel Adaptor) ([GH39-00919A](#))
4. Serial cable: PC to JIG
5. Test cable([GH39-00854A](#)) : JIG to phone

## **4-2. Software Downloading**

### **4-2-1. Downloading Binary Files**

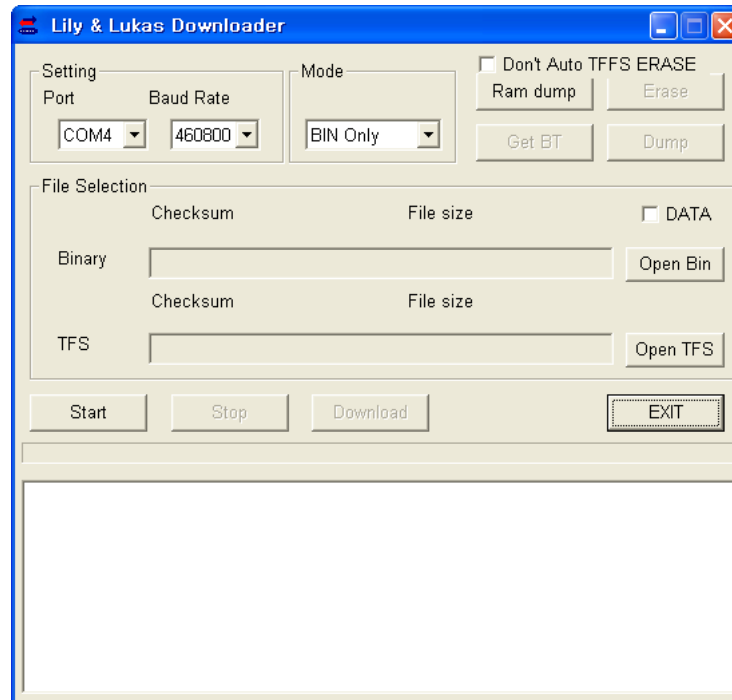
- 2 binary files for downloading M110.
  - M110XAGH2.cla
  - M110XAGH2.tfs

### **4-2-2. Pre-requisite for Downloading**

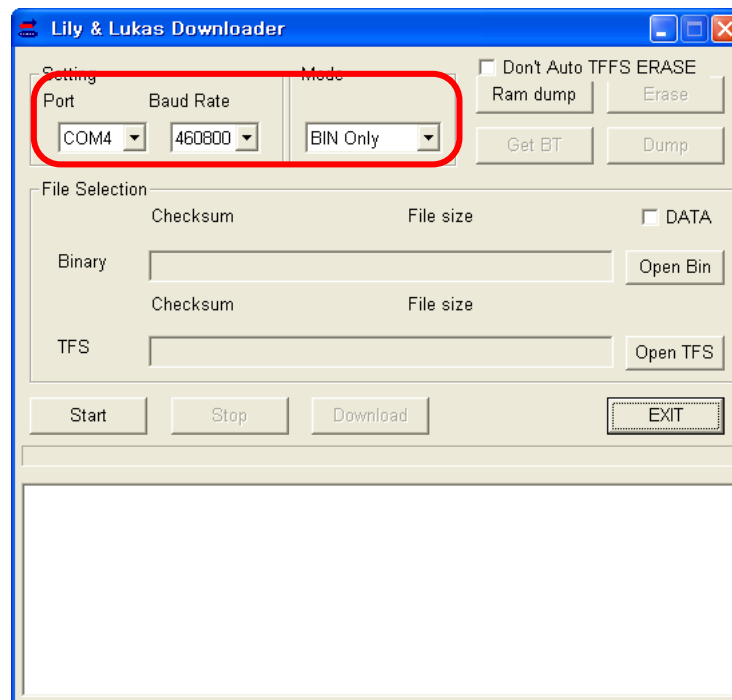
- Downloader Program(C450 Downloader 2.0NEW)
- SGH-M110 Mobile Phone
- JIG BOX
- Test Cable
- Serial Cable
- Binary files

### 4-2-3. S/W Downloader Program

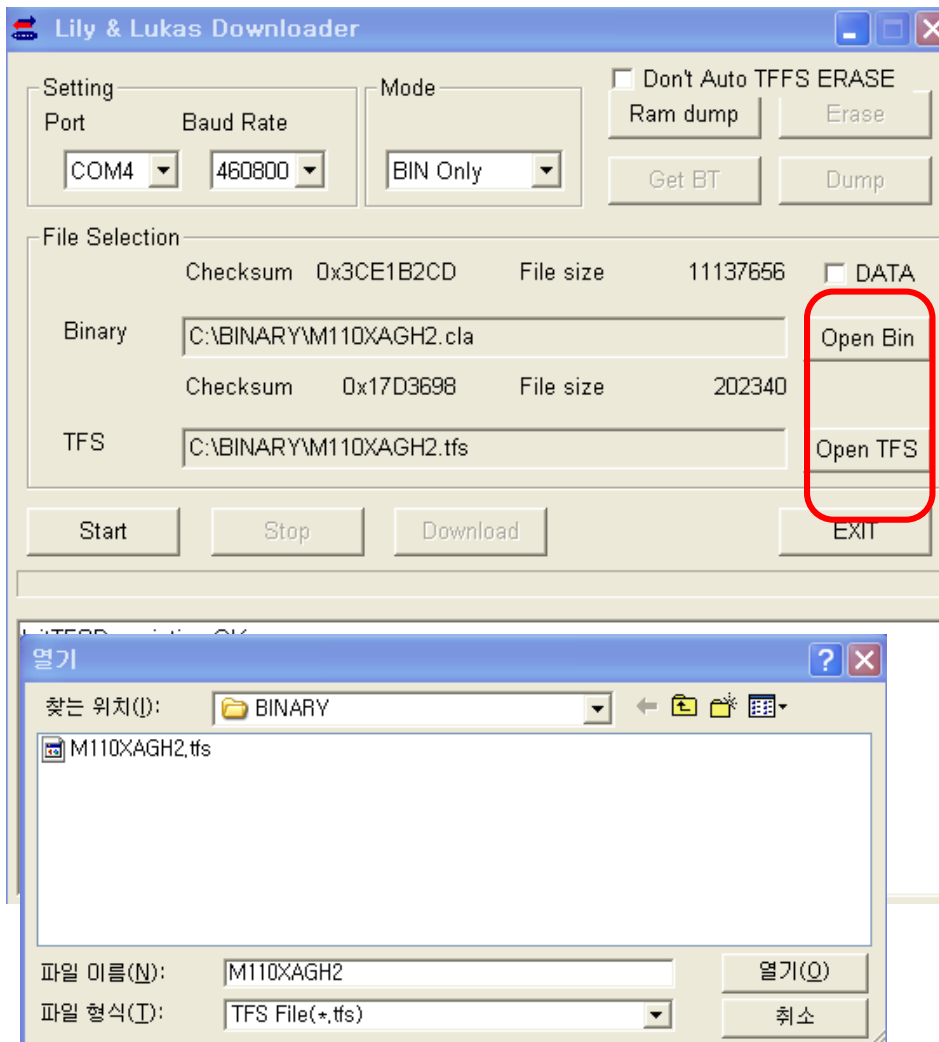
1. Load the binary download program by executing the "C450 Downloader 2.0NEW".



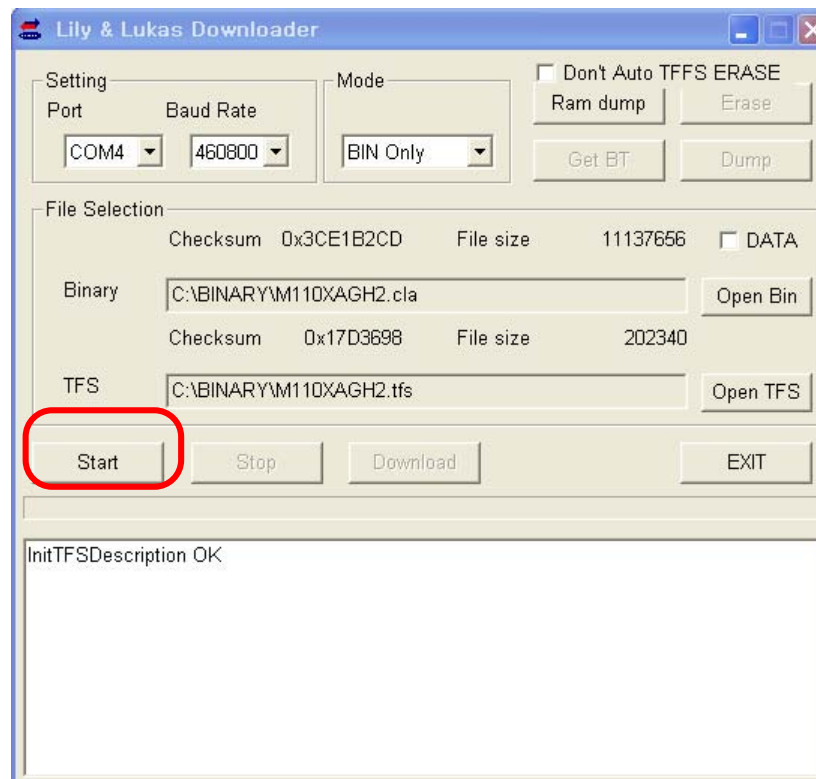
2. Select the Port, Baud Rate and Mode.



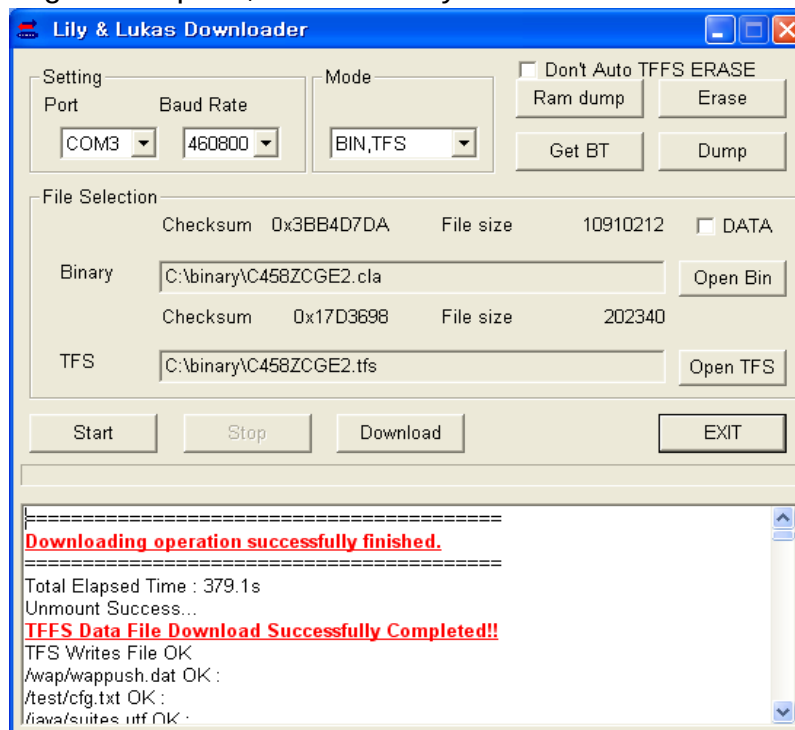
### 3. Select the binary files what you want to download



4. Press the "Start" button and connect the Handset



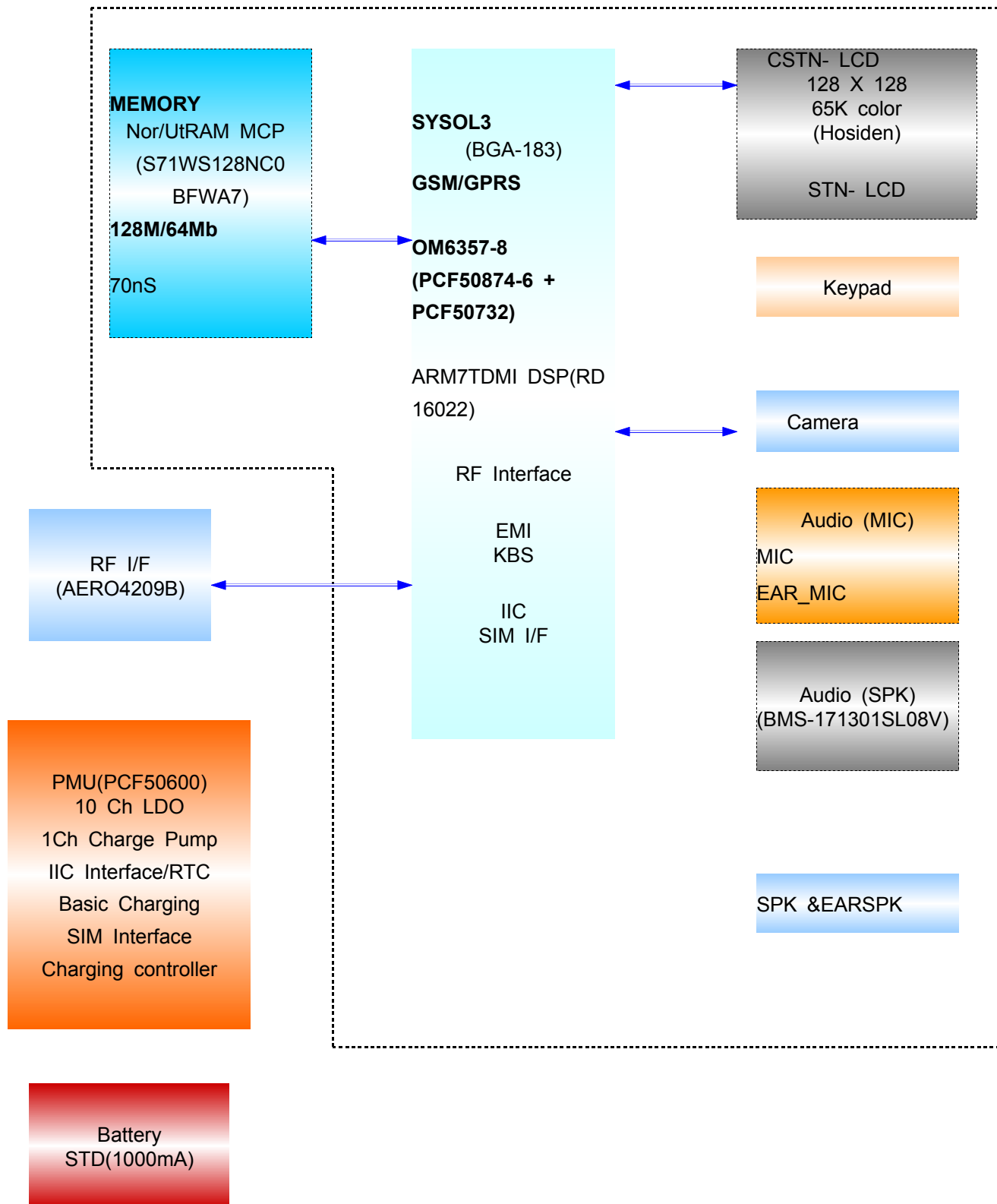
5. When downloading is complete, automatically the small window was showed up..



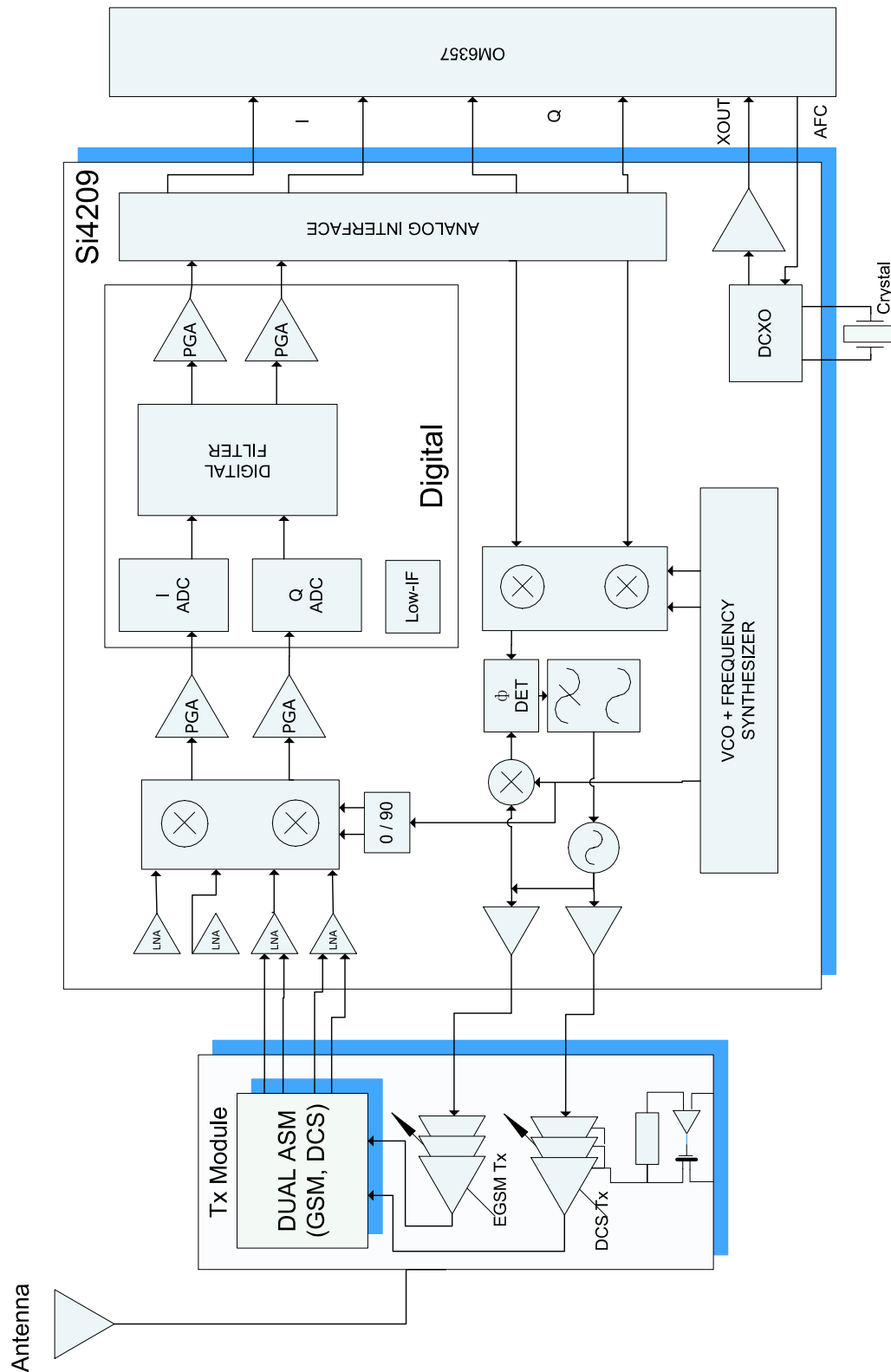


## 7. Block Diagrams

### 7-1. Main Block Diagram

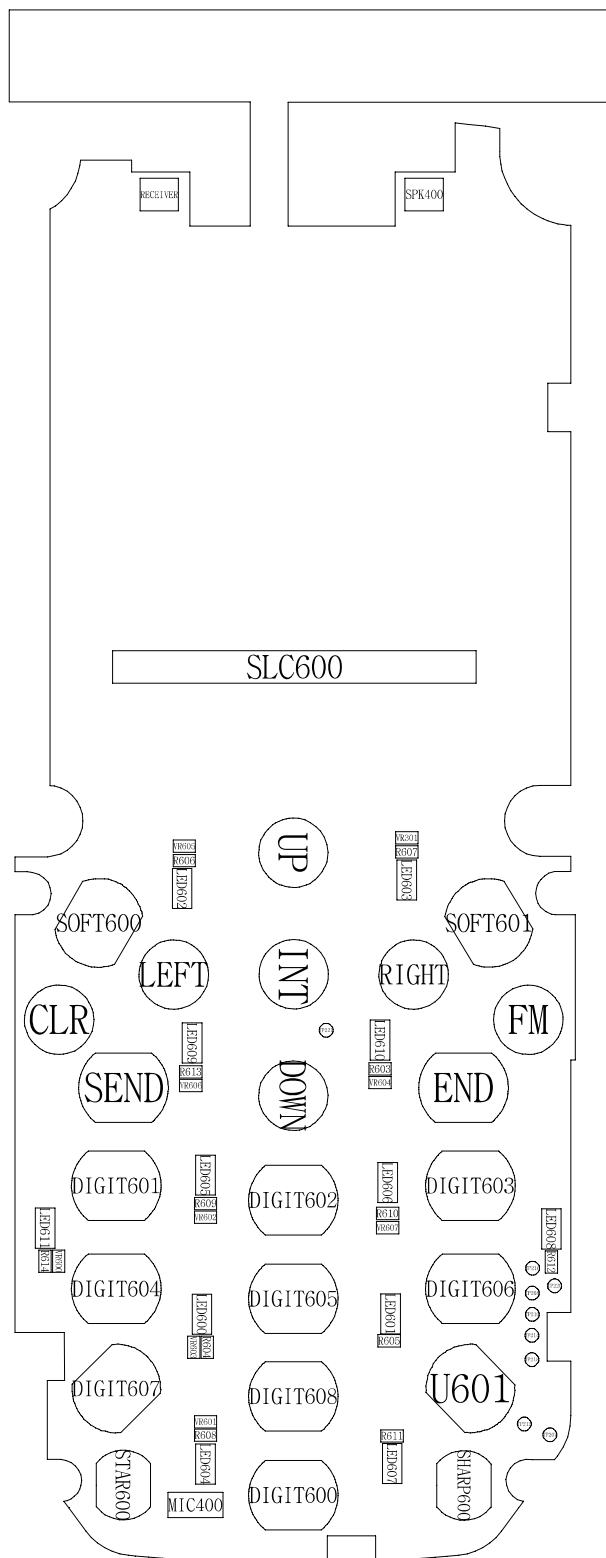


## 7-2. RF Solution Block Diagram

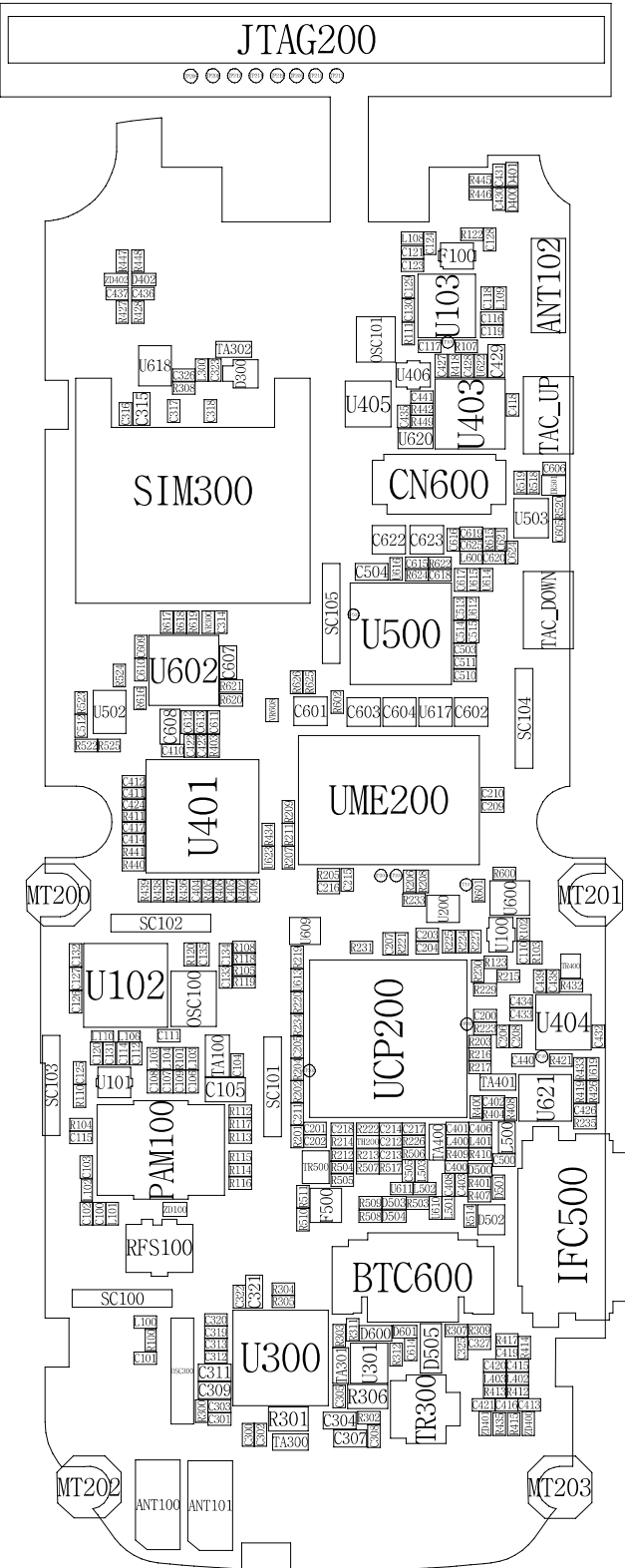


## 8. PCB Diagrams

### — Main top view



– Main bottom biew



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### 3. Product Function

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#### Main Function

**S20 Pin TA**

**No Java**

**No MMS**

**FM radio**

**WAP 2.0**

**16 Poly S/W MIDI**

**Dual band(900/1800MHz)**

**GPRS Class 10**

**VGA camera**

**Bluetooth**

**Waterproof**



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## 10. Reference data

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### 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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# 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 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 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.

## 6. Main Electrical Parts List

| SEC Code    | Design LOC | Description         | STATUS |
|-------------|------------|---------------------|--------|
| 0406-001104 | D502       | DIODE-TVS           | SA     |
| 0406-001150 | D600       | DIODE-TVS           | SA     |
| 0406-001254 | D404       | DIODE-TVS           | SA     |
| 0406-001254 | D405       | DIODE-TVS           | SA     |
| 0406-001279 | D300       | DIODE-TVS           | SA     |
| 0406-001279 | D400       | DIODE-TVS           | SA     |
| 0406-001279 | D401       | DIODE-TVS           | SA     |
| 0406-001279 | D402       | DIODE-TVS           | SA     |
| 0406-001279 | D403       | DIODE-TVS           | SA     |
| 0406-001279 | D500       | DIODE-TVS           | SA     |
| 0406-001279 | D501       | DIODE-TVS           | SA     |
| 0406-001279 | D503       | DIODE-TVS           | SA     |
| 0406-001279 | D504       | DIODE-TVS           | SA     |
| 0406-001279 | D601       | DIODE-TVS           | SA     |
| 0502-001116 | TR300      | TR-POWER            | SA     |
| 0504-001197 | TR500      | TR-DIGITAL          | SA     |
| 0505-001469 | U503       | FET-SILICON         | SA     |
| 0505-001469 | U600       | FET-SILICON         | SA     |
| 0505-001923 | U504       | FET-SILICON         | SA     |
| 0505-002088 | TR400      | FET-SILICON         | SA     |
| 0505-002088 | TR501      | FET-SILICON         | SA     |
| 0601-002361 | LED600     | LED                 | SA     |
| 0601-002361 | LED601     | LED                 | SA     |
| 0601-002361 | LED602     | LED                 | SA     |
| 0601-002361 | LED603     | LED                 | SA     |
| 0601-002361 | LED604     | LED                 | SA     |
| 0601-002361 | LED605     | LED                 | SA     |
| 0601-002361 | LED606     | LED                 | SA     |
| 0601-002361 | LED607     | LED                 | SA     |
| 0601-002361 | LED609     | LED                 | SA     |
| 0601-002361 | LED610     | LED                 | SA     |
| 0601-002361 | LED611     | LED                 | SA     |
| 0801-002237 | U502       | IC-CMOS LOGIC       | SA     |
| 1001-001231 | U200       | IC-ANALOG SWITCH    | SA     |
| 1001-001349 | U402       | IC-ANALOG MULTIPLEX | SA     |
| 1001-001447 | U100       | IC-ANALOG MULTIPLEX | SA     |
| 1001-001447 | U406       | IC-ANALOG MULTIPLEX | SA     |
| 1108-000163 | UME200     | IC-MCP              | SA     |
| 1201-002490 | PAM100     | IC-POWER AMP        | SA     |
| 1201-002492 | U403       | IC-AUDIO AMP        | SA     |
| 1203-004155 | U602       | IC-DC/DC CONVERTER  | SA     |
| 1203-004338 | U302       | IC-POS.FIXED REG.   | SA     |
| 1203-004550 | U300       | IC-POWER SUPERVISOR | SA     |
| 1204-002700 | U404       | IC-TUNER            | SA     |
| 1204-002783 | U401       | IC-SOUND GENERATOR  | SA     |
| 1205-003064 | U103       | IC-DATA COMM./GEN.  | SA     |
| 1205-003192 | UCP200     | IC-COMM. CONTROLLER | SA     |
| 1205-003278 | U102       | IC-TRANSCEIVER      | SA     |
| 1404-001221 | TH200      | THERMISTOR-NTC      | SA     |
| 1405-001082 | VR301      | VARISTOR            | SA     |
| 1405-001082 | VR602      | VARISTOR            | SA     |
| 1405-001082 | VR603      | VARISTOR            | SA     |
| 1405-001082 | VR604      | VARISTOR            | SA     |

| SEC Code    | Design LOC | Description | STATUS |
|-------------|------------|-------------|--------|
| 1405-001082 | VR605      | VARISTOR    | SA     |
| 1405-001082 | VR606      | VARISTOR    | SA     |
| 1405-001082 | VR607      | VARISTOR    | SA     |
| 1405-001121 | VR608      | VARISTOR    | SA     |
| 2007-000138 | R103       | R-CHIP      | SA     |
| 2007-000138 | R233       | R-CHIP      | SA     |
| 2007-000138 | R442       | R-CHIP      | SA     |
| 2007-000138 | R449       | R-CHIP      | SA     |
| 2007-000140 | R519       | R-CHIP      | SA     |
| 2007-000140 | R601       | R-CHIP      | SA     |
| 2007-000141 | R224       | R-CHIP      | SA     |
| 2007-000141 | R225       | R-CHIP      | SA     |
| 2007-000141 | R409       | R-CHIP      | SA     |
| 2007-000141 | R410       | R-CHIP      | SA     |
| 2007-000141 | R412       | R-CHIP      | SA     |
| 2007-000141 | R413       | R-CHIP      | SA     |
| 2007-000143 | R105       | R-CHIP      | SA     |
| 2007-000143 | R108       | R-CHIP      | SA     |
| 2007-000143 | R118       | R-CHIP      | SA     |
| 2007-000143 | R119       | R-CHIP      | SA     |
| 2007-000143 | R120       | R-CHIP      | SA     |
| 2007-000143 | R229       | R-CHIP      | SA     |
| 2007-000143 | R501       | R-CHIP      | SA     |
| 2007-000143 | R502       | R-CHIP      | SA     |
| 2007-000148 | R308       | R-CHIP      | SA     |
| 2007-000148 | R421       | R-CHIP      | SA     |
| 2007-000157 | R111       | R-CHIP      | SA     |
| 2007-000157 | R617       | R-CHIP      | SA     |
| 2007-000157 | R618       | R-CHIP      | SA     |
| 2007-000159 | R212       | R-CHIP      | SA     |
| 2007-000160 | R406       | R-CHIP      | SA     |
| 2007-000162 | R202       | R-CHIP      | SA     |
| 2007-000162 | R203       | R-CHIP      | SA     |
| 2007-000162 | R206       | R-CHIP      | SA     |
| 2007-000162 | R207       | R-CHIP      | SA     |
| 2007-000162 | R208       | R-CHIP      | SA     |
| 2007-000162 | R209       | R-CHIP      | SA     |
| 2007-000162 | R211       | R-CHIP      | SA     |
| 2007-000162 | R215       | R-CHIP      | SA     |
| 2007-000162 | R219       | R-CHIP      | SA     |
| 2007-000162 | R220       | R-CHIP      | SA     |
| 2007-000162 | R221       | R-CHIP      | SA     |
| 2007-000162 | R226       | R-CHIP      | SA     |
| 2007-000162 | R227       | R-CHIP      | SA     |
| 2007-000162 | R230       | R-CHIP      | SA     |
| 2007-000162 | R231       | R-CHIP      | SA     |
| 2007-000162 | R234       | R-CHIP      | SA     |
| 2007-000162 | R235       | R-CHIP      | SA     |
| 2007-000162 | R303       | R-CHIP      | SA     |
| 2007-000162 | R432       | R-CHIP      | SA     |
| 2007-000162 | R518       | R-CHIP      | SA     |
| 2007-000162 | R520       | R-CHIP      | SA     |
| 2007-000162 | R600       | R-CHIP      | SA     |

| SEC Code    | Design LOC | Description | STATUS |
|-------------|------------|-------------|--------|
| 2007-000162 | R615       | R-CHIP      | SA     |
| 2007-000162 | R619       | R-CHIP      | SA     |
| 2007-000170 | R302       | R-CHIP      | SA     |
| 2007-000171 | L300       | R-CHIP      | SA     |
| 2007-000171 | R100       | R-CHIP      | SA     |
| 2007-000171 | R125       | R-CHIP      | SA     |
| 2007-000171 | R204       | R-CHIP      | SA     |
| 2007-000171 | R216       | R-CHIP      | SA     |
| 2007-000171 | R217       | R-CHIP      | SA     |
| 2007-000171 | R402       | R-CHIP      | SA     |
| 2007-000171 | R415       | R-CHIP      | SA     |
| 2007-000171 | R435       | R-CHIP      | SA     |
| 2007-000171 | R509       | R-CHIP      | SA     |
| 2007-000171 | R514       | R-CHIP      | SA     |
| 2007-000174 | R201       | R-CHIP      | SA     |
| 2007-000758 | R305       | R-CHIP      | SA     |
| 2007-000932 | R112       | R-CHIP      | SA     |
| 2007-000932 | R113       | R-CHIP      | SA     |
| 2007-000932 | R115       | R-CHIP      | SA     |
| 2007-000932 | R116       | R-CHIP      | SA     |
| 2007-001301 | R606       | R-CHIP      | SA     |
| 2007-001301 | R607       | R-CHIP      | SA     |
| 2007-001303 | R524       | R-CHIP      | SA     |
| 2007-001303 | R603       | R-CHIP      | SA     |
| 2007-001303 | R608       | R-CHIP      | SA     |
| 2007-001303 | R613       | R-CHIP      | SA     |
| 2007-001308 | R605       | R-CHIP      | SA     |
| 2007-001325 | R411       | R-CHIP      | SA     |
| 2007-001339 | R102       | R-CHIP      | SA     |
| 2007-001339 | R123       | R-CHIP      | SA     |
| 2007-001339 | R304       | R-CHIP      | SA     |
| 2007-001339 | R507       | R-CHIP      | SA     |
| 2007-001339 | R508       | R-CHIP      | SA     |
| 2007-001339 | R510       | R-CHIP      | SA     |
| 2007-001339 | R511       | R-CHIP      | SA     |
| 2007-003001 | R114       | R-CHIP      | SA     |
| 2007-003001 | R117       | R-CHIP      | SA     |
| 2007-003006 | R503       | R-CHIP      | SA     |
| 2007-003006 | R506       | R-CHIP      | SA     |
| 2007-003015 | R107       | R-CHIP      | SA     |
| 2007-003030 | R604       | R-CHIP      | SA     |
| 2007-007001 | R223       | R-CHIP      | SA     |
| 2007-007008 | R614       | R-CHIP      | SA     |
| 2007-007014 | R522       | R-CHIP      | SA     |
| 2007-007014 | R523       | R-CHIP      | SA     |
| 2007-007092 | R101       | R-CHIP      | SA     |
| 2007-007100 | R300       | R-CHIP      | SA     |
| 2007-007107 | R213       | R-CHIP      | SA     |
| 2007-007107 | R222       | R-CHIP      | SA     |
| 2007-007107 | R504       | R-CHIP      | SA     |
| 2007-007107 | R505       | R-CHIP      | SA     |
| 2007-007107 | R517       | R-CHIP      | SA     |
| 2007-007132 | R620       | R-CHIP      | SA     |

| SEC Code    | Design LOC | Description | STATUS |
|-------------|------------|-------------|--------|
| 2007-007141 | R205       | R-CHIP      | SA     |
| 2007-007141 | R609       | R-CHIP      | SA     |
| 2007-007141 | R610       | R-CHIP      | SA     |
| 2007-007141 | R611       | R-CHIP      | SA     |
| 2007-007142 | R214       | R-CHIP      | SA     |
| 2007-007306 | L502       | R-CHIP      | SA     |
| 2007-007308 | R405       | R-CHIP      | SA     |
| 2007-007310 | R621       | R-CHIP      | SA     |
| 2007-007334 | R309       | R-CHIP      | SA     |
| 2007-007573 | R307       | R-CHIP      | SA     |
| 2007-009874 | R301       | R-CHIP      | SA     |
| 2203-000233 | C136       | C-CER,CHIP  | SA     |
| 2203-000233 | C432       | C-CER,CHIP  | SA     |
| 2203-000233 | C503       | C-CER,CHIP  | SA     |
| 2203-000233 | C512       | C-CER,CHIP  | SA     |
| 2203-000254 | C118       | C-CER,CHIP  | SA     |
| 2203-000254 | C119       | C-CER,CHIP  | SA     |
| 2203-000254 | C121       | C-CER,CHIP  | SA     |
| 2203-000254 | C132       | C-CER,CHIP  | SA     |
| 2203-000254 | C202       | C-CER,CHIP  | SA     |
| 2203-000254 | C205       | C-CER,CHIP  | SA     |
| 2203-000254 | C208       | C-CER,CHIP  | SA     |
| 2203-000254 | C611       | C-CER,CHIP  | SA     |
| 2203-000254 | C624       | C-CER,CHIP  | SA     |
| 2203-000254 | C625       | C-CER,CHIP  | SA     |
| 2203-000278 | C127       | C-CER,CHIP  | SA     |
| 2203-000278 | C130       | C-CER,CHIP  | SA     |
| 2203-000278 | R104       | C-CER,CHIP  | SA     |
| 2203-000386 | C123       | C-CER,CHIP  | SA     |
| 2203-000386 | C615       | C-CER,CHIP  | SA     |
| 2203-000386 | C616       | C-CER,CHIP  | SA     |
| 2203-000386 | C617       | C-CER,CHIP  | SA     |
| 2203-000386 | C618       | C-CER,CHIP  | SA     |
| 2203-000438 | C417       | C-CER,CHIP  | SA     |
| 2203-000489 | C109       | C-CER,CHIP  | SA     |
| 2203-000627 | C301       | C-CER,CHIP  | SNA    |
| 2203-000627 | C303       | C-CER,CHIP  | SNA    |
| 2203-000627 | C413       | C-CER,CHIP  | SNA    |
| 2203-000627 | C421       | C-CER,CHIP  | SNA    |
| 2203-000679 | C214       | C-CER,CHIP  | SA     |
| 2203-000812 | C106       | C-CER,CHIP  | SA     |
| 2203-000812 | C107       | C-CER,CHIP  | SA     |
| 2203-000812 | C108       | C-CER,CHIP  | SA     |
| 2203-000812 | C305       | C-CER,CHIP  | SA     |
| 2203-000812 | C327       | C-CER,CHIP  | SA     |
| 2203-000812 | C419       | C-CER,CHIP  | SA     |
| 2203-000812 | C627       | C-CER,CHIP  | SA     |
| 2203-000812 | C628       | C-CER,CHIP  | SA     |
| 2203-000812 | C629       | C-CER,CHIP  | SA     |
| 2203-000854 | C213       | C-CER,CHIP  | SA     |
| 2203-000854 | C402       | C-CER,CHIP  | SA     |
| 2203-000854 | C430       | C-CER,CHIP  | SA     |
| 2203-000854 | C431       | C-CER,CHIP  | SA     |

| SEC Code    | Design LOC | Description | STATUS |
|-------------|------------|-------------|--------|
| 2203-000854 | C436       | C-CER,CHIP  | SA     |
| 2203-000854 | C437       | C-CER,CHIP  | SA     |
| 2203-000995 | C133       | C-CER,CHIP  | SA     |
| 2203-000995 | C134       | C-CER,CHIP  | SA     |
| 2203-000995 | R414       | C-CER,CHIP  | SA     |
| 2203-000995 | R417       | C-CER,CHIP  | SA     |
| 2203-001017 | R110       | C-CER,CHIP  | SA     |
| 2203-001153 | C505       | C-CER,CHIP  | SA     |
| 2203-001153 | C516       | C-CER,CHIP  | SA     |
| 2203-001153 | C517       | C-CER,CHIP  | SA     |
| 2203-001201 | C100       | C-CER,CHIP  | SA     |
| 2203-001383 | C128       | C-CER,CHIP  | SA     |
| 2203-002709 | C200       | C-CER,CHIP  | SA     |
| 2203-002709 | C201       | C-CER,CHIP  | SA     |
| 2203-002709 | C203       | C-CER,CHIP  | SA     |
| 2203-002709 | C204       | C-CER,CHIP  | SA     |
| 2203-002709 | C206       | C-CER,CHIP  | SA     |
| 2203-002709 | C207       | C-CER,CHIP  | SA     |
| 2203-002709 | C209       | C-CER,CHIP  | SA     |
| 2203-002709 | C210       | C-CER,CHIP  | SA     |
| 2203-002709 | C323       | C-CER,CHIP  | SA     |
| 2203-002709 | C401       | C-CER,CHIP  | SA     |
| 2203-002709 | C406       | C-CER,CHIP  | SA     |
| 2203-002709 | C415       | C-CER,CHIP  | SA     |
| 2203-002709 | C420       | C-CER,CHIP  | SA     |
| 2203-003054 | C416       | C-CER,CHIP  | SA     |
| 2203-005052 | C124       | C-CER,CHIP  | SA     |
| 2203-005052 | C129       | C-CER,CHIP  | SA     |
| 2203-005056 | C418       | C-CER,CHIP  | SA     |
| 2203-005234 | C103       | C-CER,CHIP  | SA     |
| 2203-005234 | C112       | C-CER,CHIP  | SA     |
| 2203-005234 | C114       | C-CER,CHIP  | SA     |
| 2203-005234 | C120       | C-CER,CHIP  | SA     |
| 2203-005234 | C131       | C-CER,CHIP  | SA     |
| 2203-005481 | C433       | C-CER,CHIP  | SA     |
| 2203-005481 | C434       | C-CER,CHIP  | SA     |
| 2203-005482 | C111       | C-CER,CHIP  | SA     |
| 2203-005482 | C126       | C-CER,CHIP  | SA     |
| 2203-005482 | C135       | C-CER,CHIP  | SA     |
| 2203-005482 | C211       | C-CER,CHIP  | SA     |
| 2203-005482 | C212       | C-CER,CHIP  | SA     |
| 2203-005482 | C217       | C-CER,CHIP  | SA     |
| 2203-005482 | C218       | C-CER,CHIP  | SA     |
| 2203-005482 | C300       | C-CER,CHIP  | SA     |
| 2203-005482 | C316       | C-CER,CHIP  | SA     |
| 2203-005482 | C325       | C-CER,CHIP  | SA     |
| 2203-005482 | C438       | C-CER,CHIP  | SA     |
| 2203-005482 | C510       | C-CER,CHIP  | SA     |
| 2203-005482 | C511       | C-CER,CHIP  | SA     |
| 2203-005482 | C515       | C-CER,CHIP  | SA     |
| 2203-005482 | C518       | C-CER,CHIP  | SA     |
| 2203-005503 | C405       | C-CER,CHIP  | SA     |
| 2203-006048 | C104       | C-CER,CHIP  | SA     |

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|-------------|------------|-------------|--------|
| 2203-006048 | C117       | C-CER,CHIP  | SA     |
| 2203-006048 | C326       | C-CER,CHIP  | SA     |
| 2203-006048 | C409       | C-CER,CHIP  | SA     |
| 2203-006048 | C410       | C-CER,CHIP  | SA     |
| 2203-006048 | C412       | C-CER,CHIP  | SA     |
| 2203-006048 | C422       | C-CER,CHIP  | SA     |
| 2203-006137 | C404       | C-CER,CHIP  | SA     |
| 2203-006137 | C439       | C-CER,CHIP  | SA     |
| 2203-006137 | C440       | C-CER,CHIP  | SA     |
| 2203-006137 | C519       | C-CER,CHIP  | SA     |
| 2203-006208 | C309       | C-CER,CHIP  | SA     |
| 2203-006208 | C311       | C-CER,CHIP  | SA     |
| 2203-006208 | C321       | C-CER,CHIP  | SA     |
| 2203-006257 | C302       | C-CER,CHIP  | SA     |
| 2203-006257 | C312       | C-CER,CHIP  | SA     |
| 2203-006257 | C313       | C-CER,CHIP  | SA     |
| 2203-006257 | C319       | C-CER,CHIP  | SA     |
| 2203-006257 | C320       | C-CER,CHIP  | SA     |
| 2203-006257 | C322       | C-CER,CHIP  | SA     |
| 2203-006324 | C429       | C-CER,CHIP  | SA     |
| 2203-006348 | C304       | C-CER,CHIP  | SA     |
| 2203-006348 | C307       | C-CER,CHIP  | SA     |
| 2203-006361 | C105       | C-CER,CHIP  | SA     |
| 2203-006562 | C110       | C-CER,CHIP  | SA     |
| 2203-006562 | C219       | C-CER,CHIP  | SA     |
| 2203-006562 | C411       | C-CER,CHIP  | SA     |
| 2203-006562 | C414       | C-CER,CHIP  | SA     |
| 2203-006562 | C423       | C-CER,CHIP  | SA     |
| 2203-006562 | C424       | C-CER,CHIP  | SA     |
| 2203-006562 | C435       | C-CER,CHIP  | SA     |
| 2203-006562 | C441       | C-CER,CHIP  | SA     |
| 2203-006562 | C513       | C-CER,CHIP  | SA     |
| 2203-006562 | C514       | C-CER,CHIP  | SA     |
| 2203-006562 | C605       | C-CER,CHIP  | SA     |
| 2203-006562 | C606       | C-CER,CHIP  | SA     |
| 2203-006562 | C609       | C-CER,CHIP  | SA     |
| 2203-006562 | C610       | C-CER,CHIP  | SA     |
| 2203-006562 | C612       | C-CER,CHIP  | SA     |
| 2203-006562 | C613       | C-CER,CHIP  | SA     |
| 2203-006562 | C614       | C-CER,CHIP  | SA     |
| 2203-006562 | C619       | C-CER,CHIP  | SA     |
| 2203-006562 | C621       | C-CER,CHIP  | SA     |
| 2203-006681 | C116       | C-CER,CHIP  | SA     |
| 2203-006681 | C308       | C-CER,CHIP  | SA     |
| 2203-006824 | C504       | C-CER,CHIP  | SA     |
| 2203-007165 | C607       | C-CER,CHIP  | SA     |
| 2203-007165 | C608       | C-CER,CHIP  | SA     |
| 2203-007165 | C631       | C-CER,CHIP  | SA     |
| 2203-007165 | C632       | C-CER,CHIP  | SA     |
| 2404-001240 | TA401      | C-TA,CHIP   | SA     |
| 2404-001377 | TA400      | C-TA,CHIP   | SA     |
| 2404-001381 | TA300      | C-TA,CHIP   | SA     |
| 2404-001381 | TA301      | C-TA,CHIP   | SA     |

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|-------------|------------|-----------------------|--------|
| 2404-001381 | TA302      | C-TA,CHIP             | SA     |
| 2404-001496 | TA100      | C-TA,CHIP             | SA     |
| 2503-001053 | C600       | C-NETWORK             | SA     |
| 2503-001053 | C602       | C-NETWORK             | SA     |
| 2503-001053 | C603       | C-NETWORK             | SA     |
| 2503-001053 | C604       | C-NETWORK             | SA     |
| 2503-001053 | C622       | C-NETWORK             | SA     |
| 2503-001053 | C623       | C-NETWORK             | SA     |
| 2703-001673 | L500       | INDUCTOR-SMD          | SA     |
| 2703-001750 | C138       | INDUCTOR-SMD          | SA     |
| 2703-001750 | L102       | INDUCTOR-SMD          | SA     |
| 2703-002199 | C115       | INDUCTOR-SMD          | SA     |
| 2703-002203 | L101       | INDUCTOR-SMD          | SA     |
| 2703-002204 | L108       | INDUCTOR-SMD          | SA     |
| 2703-002204 | L109       | INDUCTOR-SMD          | SA     |
| 2703-002267 | C125       | INDUCTOR-SMD          | SA     |
| 2703-002313 | L103       | INDUCTOR-SMD          | SA     |
| 2703-002313 | L104       | INDUCTOR-SMD          | SA     |
| 2703-002313 | L105       | INDUCTOR-SMD          | SA     |
| 2703-002558 | L106       | INDUCTOR-SMD          | SA     |
| 2703-003277 | L110       | INDUCTOR-SMD          | SA     |
| 2801-004353 | OSC300     | CRYSTAL-SMD           | SA     |
| 2801-004426 | OSC100     | CRYSTAL-SMD           | SA     |
| 2801-004659 | OSC101     | CRYSTAL-SMD           | SA     |
| 2901-001349 | F500       | FILTER-EMI/ESD        | SA     |
| 2904-001731 | U101       | FILTER-SAW            | SA     |
| 2909-001283 | F100       | FILTER-LC             | SA     |
| 3301-001438 | L400       | BEAD-SMD              | SA     |
| 3301-001438 | L401       | BEAD-SMD              | SA     |
| 3301-001438 | L402       | BEAD-SMD              | SA     |
| 3301-001438 | L403       | BEAD-SMD              | SA     |
| 3301-001659 | R418       | BEAD-SMD              | SA     |
| 3301-001659 | R419       | BEAD-SMD              | SA     |
| 3301-001659 | R447       | BEAD-SMD              | SA     |
| 3301-001659 | R448       | BEAD-SMD              | SA     |
| 3301-001729 | L501       | BEAD-SMD              | SA     |
| 3301-001729 | L503       | BEAD-SMD              | SA     |
| 3301-001729 | L600       | BEAD-SMD              | SA     |
| 3301-001729 | R401       | BEAD-SMD              | SA     |
| 3301-001729 | R407       | BEAD-SMD              | SA     |
| 3404-001152 | TAC DOWN   | SWITCH-TACT           | SA     |
| 3404-001152 | TAC UP     | SWITCH-TACT           | SA     |
| 3705-001358 | RFS100     | CONNECTOR-COAXIAL     | SA     |
| 3709-001355 | SIM300     | CONNECTOR-CARD EDGE   | SA     |
| 3710-002462 | CN600      | SOCKET-BOARD TO BOARD | SA     |
| 3710-002499 | IFC500     | SOCKET-INTERFACE      | SA     |
| 3711-006084 | BTC600     | HEADER-BATTERY        | SA     |
| GH13-00057A | U500       | IC ASIC-SGHC420       | SA     |
| GH70-02640A | SC100      | ICT SHIELD-CAN CLIP   | SA     |
| GH70-02640A | SC101      | ICT SHIELD-CAN CLIP   | SA     |
| GH70-02640A | SC102      | ICT SHIELD-CAN CLIP   | SA     |
| GH70-02640A | SC103      | ICT SHIELD-CAN CLIP   | SA     |
| GH71-04813A | ANT100     | NPR-ANTENNA CONTACT   | SA     |

| SEC Code    | Design LOC | Description         | STATUS |
|-------------|------------|---------------------|--------|
| GH71-04813A | ANT101     | NPR-ANTENNA CONTACT | SA     |

Please consult the GSPN website (Samsung Portal) for the most recent version of the product's part list.