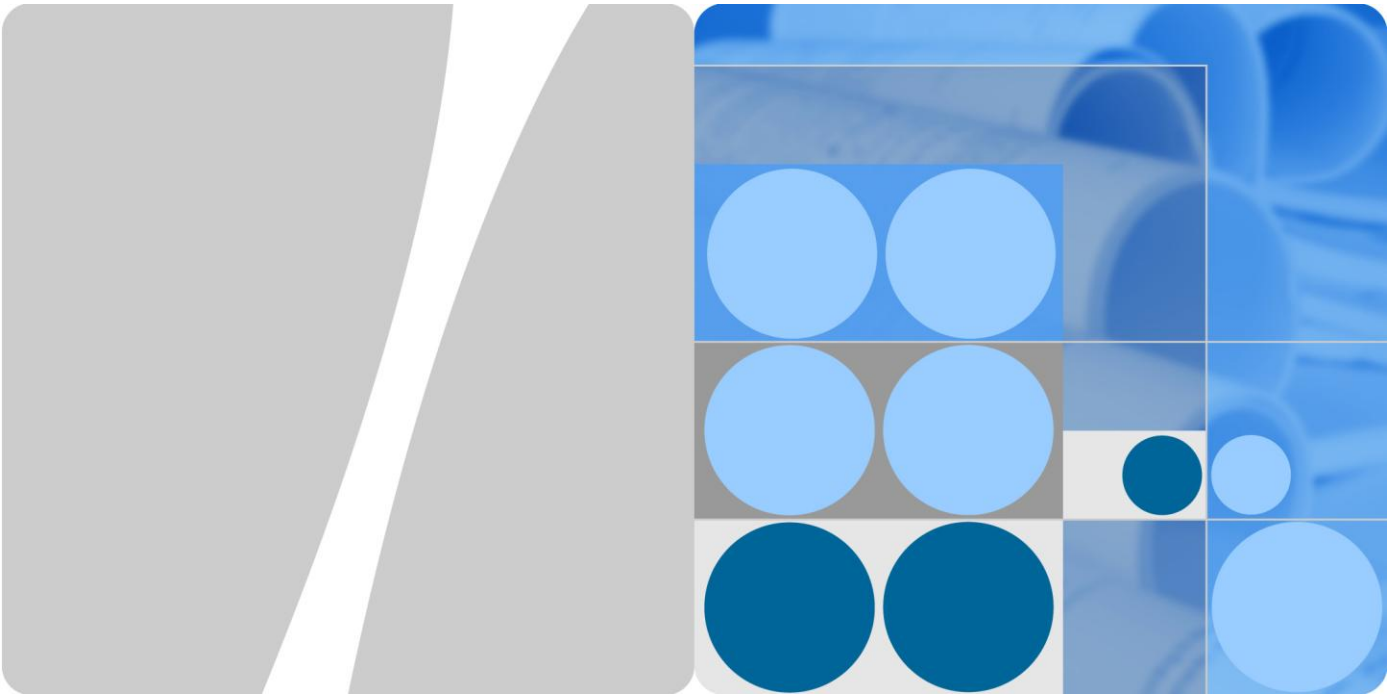

U8860
Maintenance Manual

Issue	**1.0**
Date	**2011-11-14**

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About This Document

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Reviewed by	Maintenance support engineer	**Date**	2011-11-14
Approved by	Service representative	**Date**	2011-11-14

Change History

Date	Version	Change Reason	Revised Chapter	Description	Author
2011-11-12	V1.0	Released the first issue.			R&D

Contents

1 Product Introduction

1.1 Appearance

1.2 Specifications

Item	Descriptions
Dimensions (H x W x D)	122 mm x 61.5 mm x 10.9 mm

Item	Descriptions	
Technical standard	WCDMA/HSDPA/HSUPA: 3GPP FDD Release 7	
Band	WCDMA: 2100 MHz/900 MHz GSM: 850 MHz/900 MHz/1800 MHz/1900 MHz	
Weight	About 140 g with battery	
Appearance	Bar	
Antenna	Built-in	
SIM/USIM	Standard 6-pin SIM card, supporting 1.8 /3 V USIM card	
Charger	5 V, 1 A	
Battery	1930 mAh	standby time: 380 hours (3G) Talk time: 400 minutes (3G)
Camera	Primary Camera	8 MP AF HD
	Secondary camera	0.3 MP FF
Display	Resolution	854 x 480 (FWVGA)
	Type	TFT-LCD
	Color	16 M
	Size	4.0 inch
Connectors	Charger port	Micro-USB connector
	USB port	Micro-USB connector
	MicroSD	MicroSD card (up to 32 GB)
	Headphone jack	3.5 mm
Bluetooth	V2.1 + EDR	
WiFi	802.11 b/g/n, supporting WiFi	
USB	USB 2.0,480 Mbit/s	
FM radio	Built-in FM radio	
GPS	GPS/AGPS/GPS XTRA	
Storage space	ROM: 4 GB (the available space is about 2.5 GB); RAM: 512 MB (the available space is about 300 MB)	
Maximum transmit power	WCDMA 2100 MHz/900 MHz: +24 dBm (Power Class 3) GSM 850 MHz/900 MHz: +32.5 dBm (Power Class 4) GSM 1800 MHz/1900 MHz: +29.5 dBm (Power Class 1) EDGE 850 MHz/900 MHz: 26 dBm(+/-3 dBm) EDGE 1800 MHz/1900 MHz: 25 dBm(+/-3 dBm)	

Item	Descriptions
Static sensitivity	WCDMA 900 MHz: better than -103.7 dBm/3.84 MHz WCDMA 2100 MHz: better than-106 dBm/3.84 MHz GSM 850 MHz: better than -102 dBm/200 KHz GSM 900 MHz: better than -102 dBm/200 KHz DCS 1800 MHz: better than -102 dBm/200 KHz PCS 1900 MHz: better than -102 dBm/200 KHz
Temperature	Operating temperature: –10 °C to 45 °C (without charger) Storage temperature: –40°C to 70°C
Humidity	Operating humidity: 5% to 95% RH

2 Applicable Scope and Precautions

2.1 Applicable Scope

This document provides maintenance instructions for technicians at service centers authorized by Huawei. This service manual is confidential and can be accessed by authorized service sites or companies only. Although every effort has been made to ensure the accuracy of the document, errors may still exist. If you find any error or have any suggestions, please contact Huawei's customer service center.

2.2 Maintenance Precautions

- Only qualified technicians are allowed to perform the repair and calibration.
- Perform all operations in electrostatic discharge (ESD) rooms and wear electrostatic wrist straps throughout the operations.
- Ensure that all the components, screws, and insulators are properly installed after repair and calibration. Ensure that all cables and wires are installed and connected correctly.
- Ensure that the soldering is pb-free and compliant with the environmental-friendly requirements.

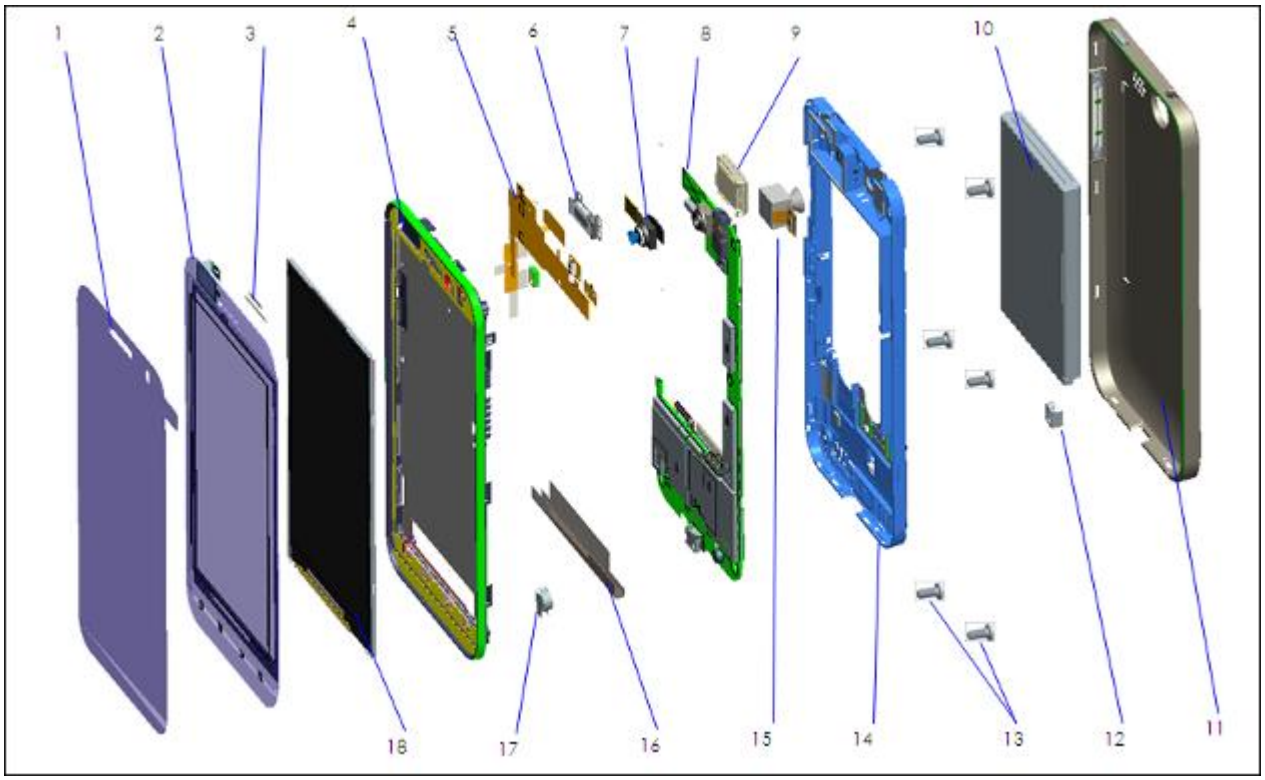
ESD is the major cause of damages to electrostatic-sensitive components, so every service center must pay high attention to avoid ESD discharge and comply with the ESD protection requirements of this manual.

2.3 How to Obtain Product and Maintenance Information

To obtain relevant product and maintenance information, you can visit Huawei website at

http://www.huaweidevice.com/cn/technicaIndex.do

3 Explosive View



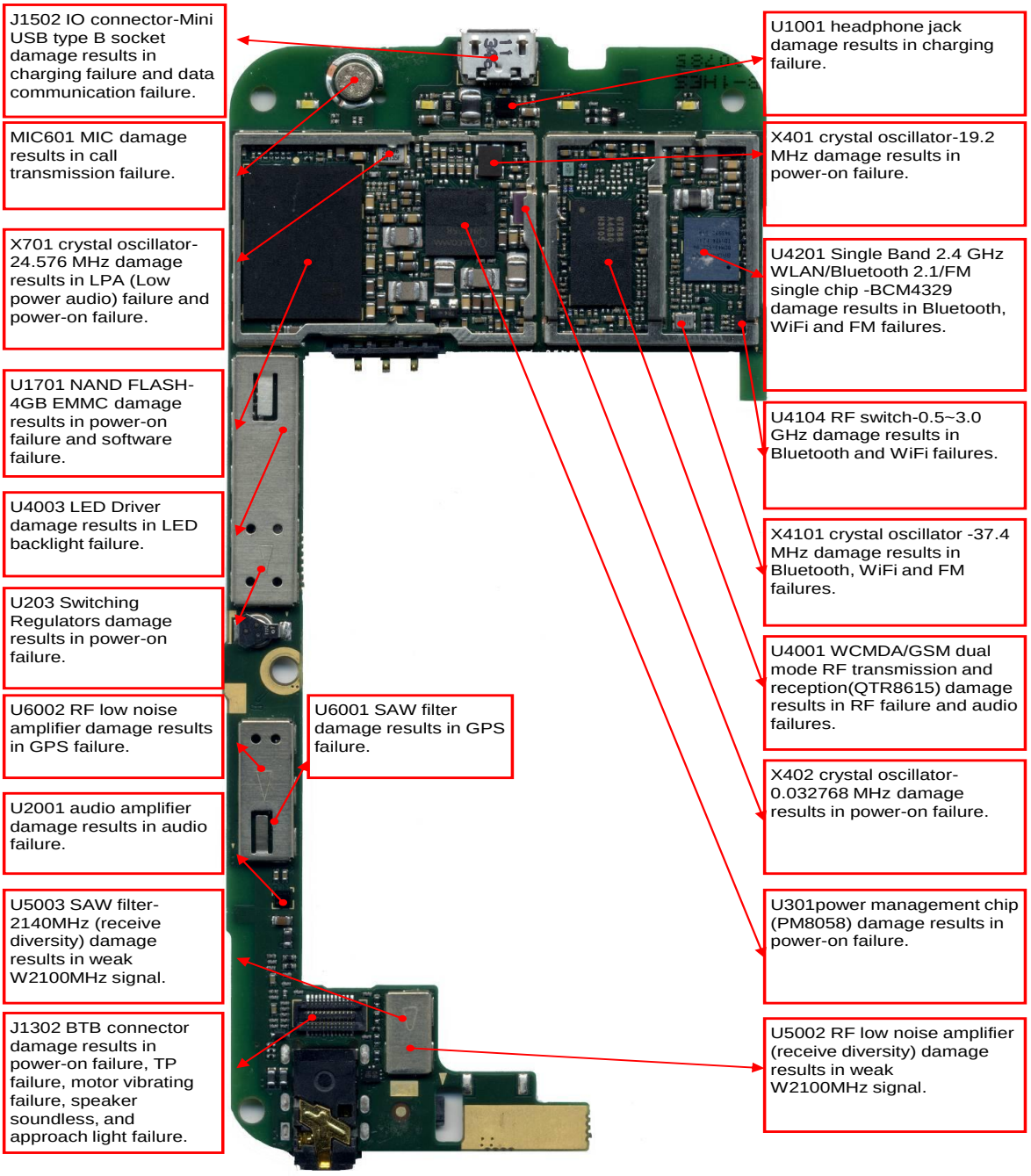
List of components in the explosive view drawing

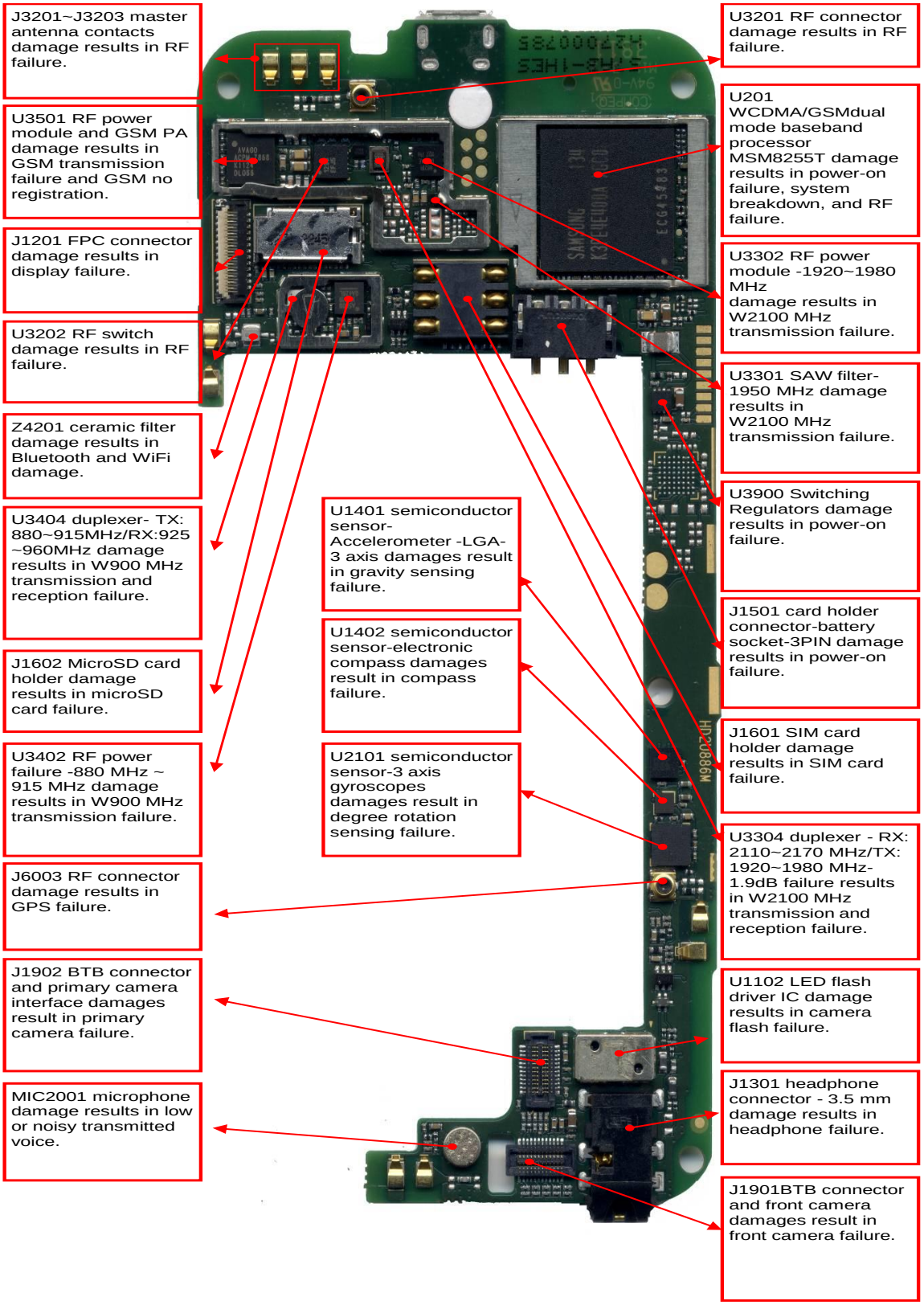
Note: The components listed in the following table are structural parts of the phone, and cannot be used as reference when applying for spare parts.

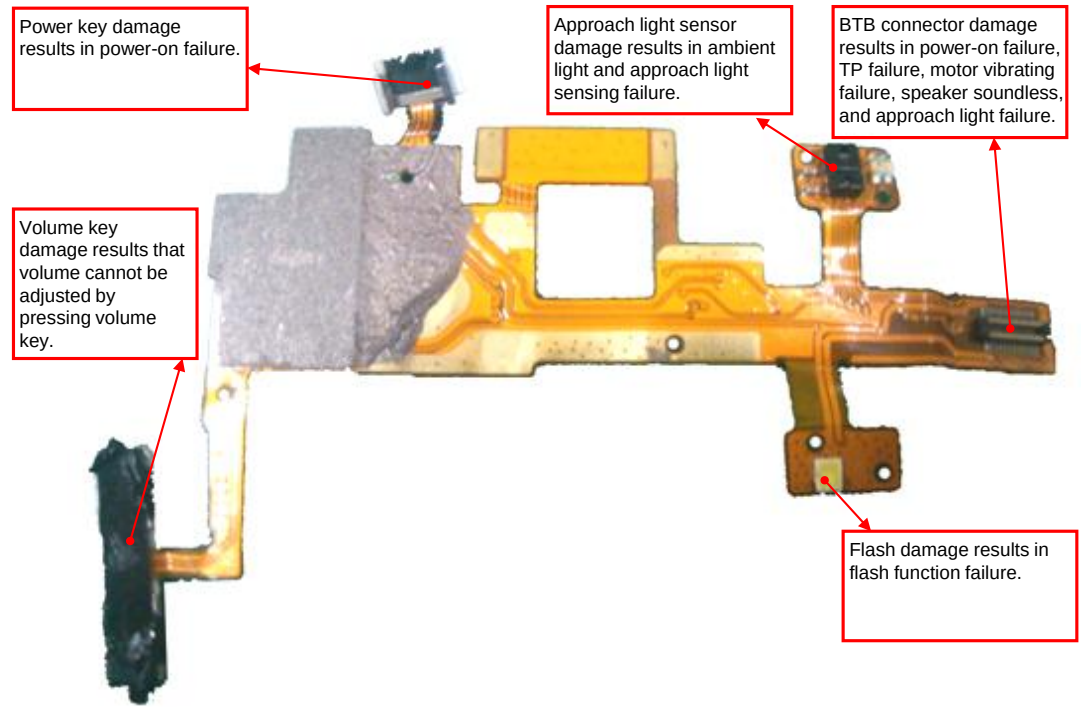
No.	Description	Quantity
1	U8860 touch panel protective film	1
2	U8860 touch panel	1
3	U8860 receiver decorating items	1

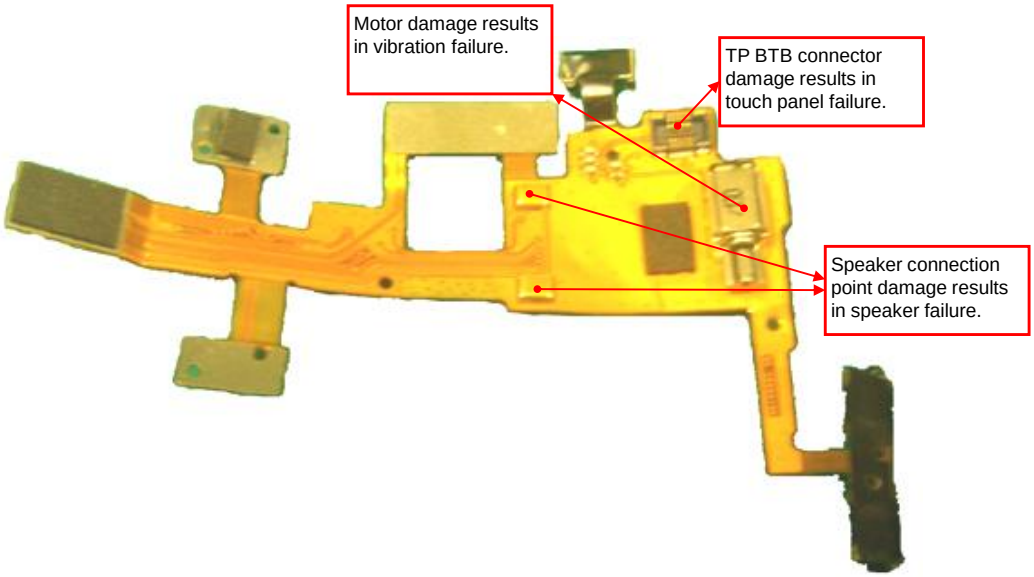
No.	Description	Quantity
4	U8860 cover A assembly	1
5	U8860 main FPC	1
6	U8860 receiver	1
7	U8860 front camera	1
8	U8860 main PCB	1
9	U8860 speaker	1
10	U8860 battery	1
11	U8860 battery cover	1
12	U8860 test point protection jacket	1
13	U8860 screws	6
14	U8860 cover B assembly	1
15	U8860 rear camera	1
16	U8860 LCD shielding film	1
17	U8860 microphone	1
18	U8860 LCD module	1

4 Components on PCBA









BOM Code	Description	Bit
15040208	Transient voltage suppression diode-6.8 V-11.4 V-75 W-7 A-SOT-363	D1301, D1601
15040238	Transient voltage suppression diode-6 V-14 V-10 W-12 A-SOD882/0402	D1501

BOM Code	Description	Bit
15020099	Lighting diode-0.045 cd-White-25 mA-0603, SMD	D1502, D1503, D1504, D1505
15010251	Schottky diode-30 V-0.2 A-0.5 V-SOD523	D2001, D4001
19040121	Fast Blowout Fuse-32 V-2 A-IEC Spec-0.03 ohm-0.100 A*A*Sec-UL/CSA/ANSI 248 Certificated	F1501
14090079	FPC connector -27pin-0.6 mm-0.3 mm-horizontal-0.2 mm	J1201
14240246	Headphone Connector, 3.5 mm, 6 pin, Side plugging, SMT, Mid Mount, 1.85 mm Height from PCB Top Side, Arc type	J1301
14240100	Card holder connector—battery socket-3PIN-side contact-2.8 mm-1.4 mm-with positioning peg	J1501
14240272	IO connector-Micro_B-Female-5pin-bend-SMT	J1502
14240207	Card holder connector-SIM card socket-6 Pin-horizontal-2.54 mm-without clip-without positioning peg-SMT-spherical structure-height-2.0 mm	J1601
14240243	Card holder connector-Micro SD Receptacle-10 Pin-bend-1.1 mm-without clip-without positioning peg	J1602
14240181	BTB connector-female-24-0.4 mm-1 mm-SMT	J1302, J1901, J1902
13010265	SAW filter -1574.42 MHz/1605.89 MHz-2.2 dB-50 V-1411-Balance	J4105
14240004	RF connector-straight-female-SMT	J6003, U3201
22050053	Microphone-44 dB.-D4.0 mm*1.3 mm-SMT	MIC2001, MIC601
15060150	MOSFET-P channel—12 V-2.4 A-0.112 ohm-8 V-SOT-23	Q301
15050170	Triode-NPN bias resistor transistor	Q1501
07050063	NTC-150000 ohms-SMT-0402	RT301
07040061	Varistor-12 V-99999 V-5A-25V-SMT-0402-50pF@1 KHz	RV1501, RV2001, RV2002, RV2003, RV2004
07040071	Varistor-90 V-45 V-1 A-300 V-SMT-0402-3pF@100 MHz	RV1502, RV1503
07040075	Varistor-18 V-14 V-10 A-40 V-SMT-0402-82pF@1 KHz	RV1504
39200306	CPU-WCDMA/GSM dual mode baseband processor MSM8255T	U201
39110566	Switching Regulators-1~4 V-1.5 A-SMT	U203, U3900
39200177	Terminal Dedicated IC, Power Management IC of QUALCOMM MSM7x30 Series (PM8058)	U301
39110531	DCDC charging control chip-20-Pin WCSP	U1001
39110523	LED flash driver IC-QFN16	U1102

BOM Code	Description	Bit
38140023	Semiconductor sensor-accelerometer -LGA-3 axis	U1401
38140024	Semiconductor sensor – Electronic compass-WL-CSP (pb-free)-3 axis	U1402
40060276	NAND FLASH-4GB EMMC V4.4-52 MHz-1024 KB	U1701
39080127	Audio amplifier --2.5 V~5.5 V-differential-Micro SMD 9pin (pb free BGA)	U2001
38020046	Analog switch-DUAL SPDT-2.7-4.2V-0.6 ohm-16 MHz-QFN10L	U2002
38140020	Semiconductor sensor—3 axis gyroscope-SMT	U2101
47140073	RF switch -824-2170 MHz	U3202
13010147	SAW filter-881.5 MHz-2.2 dB-50 V-00241564	U3203
13010186	SAW filter – 1950 MHz-2.9-QCS5I	U3301
47100397	RF power module-1920~1980 MHz-28.2 dB-3*3 QFN-1000 V	U3302
13080038	Duplexer-RX: 2110~2170 MHz/TX: 1920~1980 MHz	U3304
13010189	SAW filter-897.5 MHz-2.7 dB-100V(MM)-SFLT5-0101	U3401
47100387	RF power module-880 MHz~915 MHz-28/18/11-QFN-1000 V	U3402
13080067	Duplexer-TX: 880~915 MHz/RX: 925~960 MHz	U3404
47100307	RF power module-824-849 MHz; 880-915 MHz; 1710-1785 MHz; 1850-1910 MHz	U3501
39110552	Switching Regulators-0.4~3.4 V-	U3800
39200249	Terminal dedicated baseband IC-WCMDA/GSM Radio Transceiver (QTR8615)	U4001
39110626	Switching Regulators- LED Driver	U4003
47140049	RF switch	U4104
39200222	Single Band 2.4 GHz WLAN/Bluetooth 2.1/FM single chip-BCM4329-2.3~5.5 V-WLBGA182 (pb free)	U4201
47090037	RF low-noise amplifier-1.5 G-3 GHz-15 dB-1.1 dB-QFN-200 V	U5002
13010176	SAW filter-2140 MHz-1.9 dB-1.4*1.1 mm	U5003
13010264	SAW filter-1590.16 MHz-1.8 dB-50 V-1411	U6001
47090042	RF low-noise amplifier-0.5~3 GHz-16.8 dB-0.87-QFN-250 V	U6002
12020141	Crystal oscillator-19.2 MHz-7pF-+/-10 ppm-70 ohm-3.2*2.5*0.6 mm	X401
12020125	Crystal oscillator-0.032768 MHz	X402
12020162	Crystal oscillator-24.576 MHz-12 pF-+/-30 ppm-100 ohm-3225	X701

BOM Code	Description	Bit
12020168	Crystal oscillator -37.4 MHz-10pF-+/-10 ppm-80 ohm-2016	X4101
07040064	Varistor—8 V-4 V-30 V-SMT-0405-ESD + EMI component	Z1301
13030048	Ceramic filter-2450 MHz-2.9 dB-2.0*1.25*1.05 mm	Z4201
13010148	SAW filter-2140 MHz-50 V-00231804	Z5001
40020162	SDRAM-4Gb LPDDR2-333 MHz-32 bit-1.8 V-240 Ball	U201_POP

5 Software Upgrade

5.1 Upgrade Preparation

Category	Contents	Remarks
Upgrade environment	Computer	To copy upgrade software
	MicroSD card	More than 512 M
	Battery	With at least 30% power remaining.
Upgrade file	Main upgrade pack	dload/UPDATE.APP
	Vendor upgrade pack	vendor_XXX_XXX/UPDATE.APP
Upgrade method	Upgrade using SD cards	Normal upgrade
		Forcible upgrade

5.2 Normal Upgrade

Step 1 Format the microSD card.

Step 2 Create a folder named **dload** in the root directory of the microSD card.

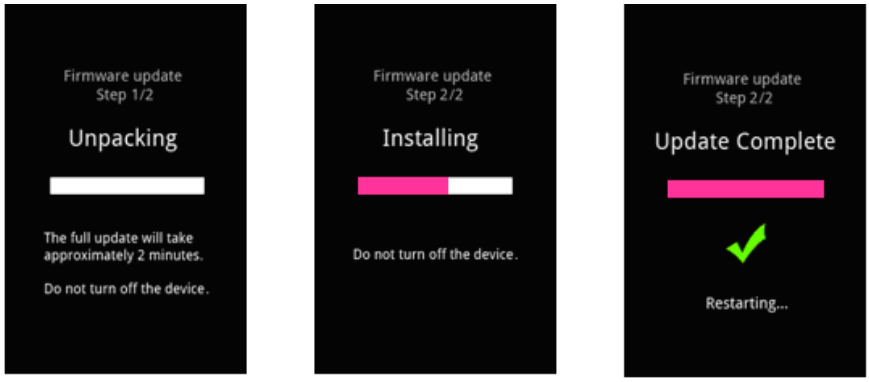
Step 3 Copy the upgrade file to the **dload** folder.

Step 4 Install the microSD card to the phone. Power the phone on, and enter ***#*#2846579#*#*** in the idle screen.

Select **SD card upgrade** then press **Confirm** to start the upgrade.

Step 5 Before the upgrade, NV items backup is performed (if the phone has not been backed up before). Then the phone restarts and the upgrade starts.

Step 6 The upgrade progress is displayed on the LCD.



Step1 Step2 Step3

Step 7 After the upgrade is completed, the phone restarts and the NV items are restored.

Step 8 After the main upgrade pack is upgraded, upgrade the vendor upgrade pack using the same upgrade methods.

----End

If the phone cannot be properly powered on, follow the following two methods to forcibly upgrade the phone.

- Install the battery to the phone (if the screen is splashing, remove the battery and wait for five seconds before installing the battery again). Press Volume + and Volume –, and press Power key, the phone will start SD forcible upgrade. The specific download process is similar to the project menu download.
- When the phone is not installed with a battery. Press Volume + and Volume –, and connect the phone to a charger, the phone can also start the SD forcible upgrade. It is recommended that you use charger to perform forcible upgrade. If the download still fails, replace the SD card and try forcible upgrade again.

5.3 Troubleshooting

Failure	Solution
Failed to upgrade the phone using the microSD card.	1. Check whether the upgrade file is correct. 2. Check whether the upgrade method is correct. 3. Check whether the microSD functions properly. 4. Perform the upgrade again.

6 Maintenance Tools

	Name: constant-temperature heat gun Usage: to heat components
	Name: constant-temperature heat gun Usage: to heat components
	Name: soldering iron Usage: to maintain and solder components
	Name: DC regulated power supply Usage: to supply DC current
	Name: soldering table Usage: to secure the main PCBA

	Name: pb-free solder wire Usage: soldering
	Name: digital multimeter Usage: to measure during repair
	Name: toolkit Usage: to assemble and disassemble components
	Name: electric screwdriver Usage: to fasten and remove screws

7 Disassembly Procedure

1. Ensure that the ESD wrist strap is well grounded

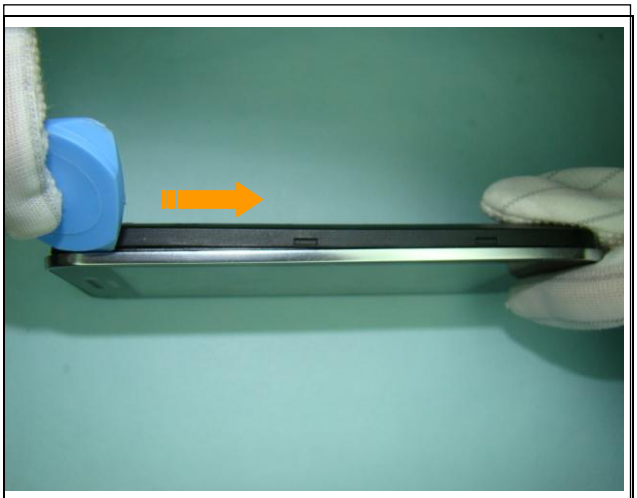
2. Start to disassemble the U8860.

U8860 disassembly guide:

1. Remove the battery cover.

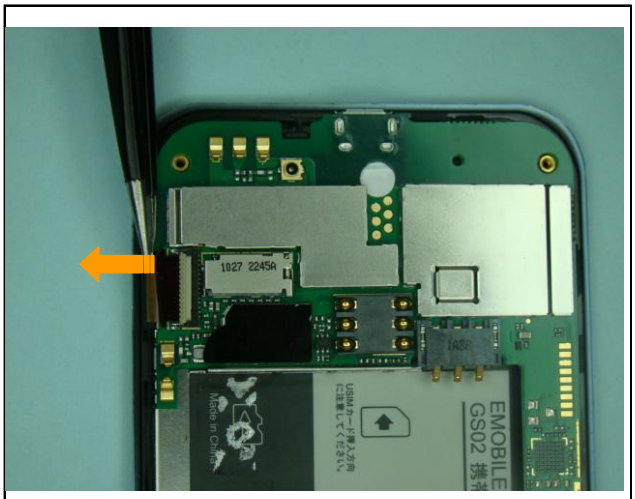
2. Remove the battery.

3. Remove the six screws from cover B.

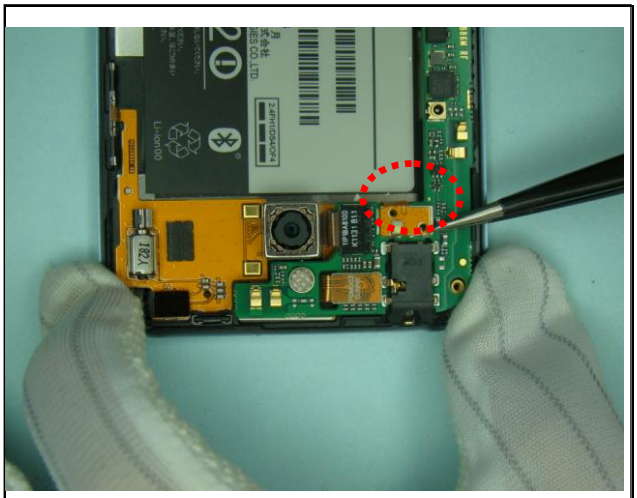


4. Use a cover opener to loosen the buckle between cover A and cover B.

5. Turn over the buckle in the ZIF interface.

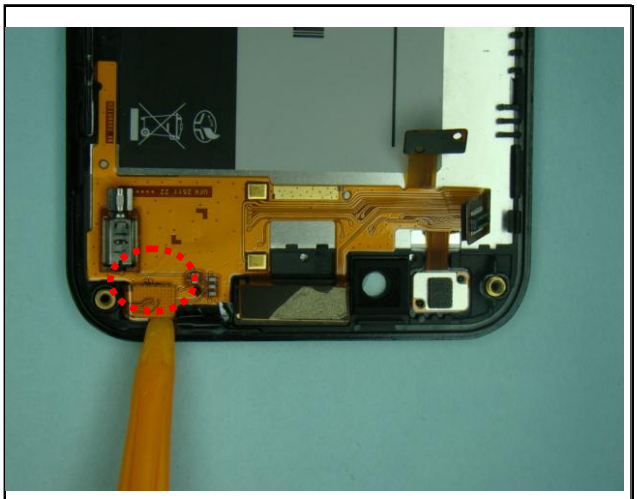


6. Carefully take out the FPC cable.

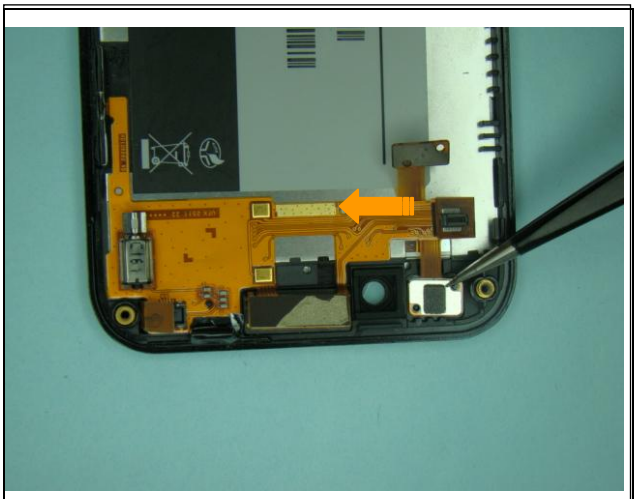


7. Separate the FPC and the main board (Note: there is double-sided tape between FPC and shielding cover, carefully perform the operation to avoid damaging the FPC)

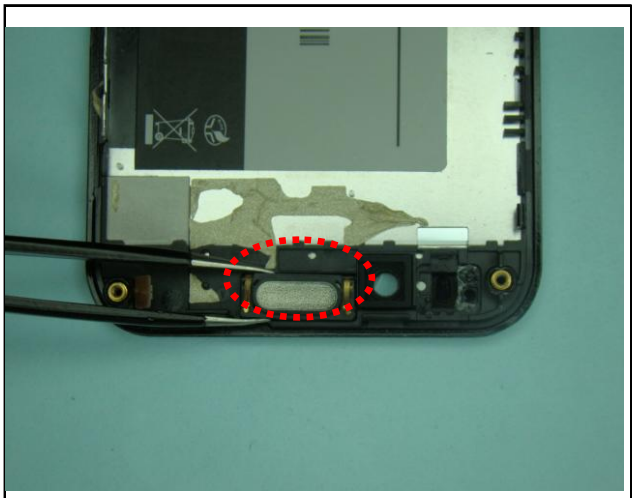
8. Turn over the main board and loosen the BTB connector.



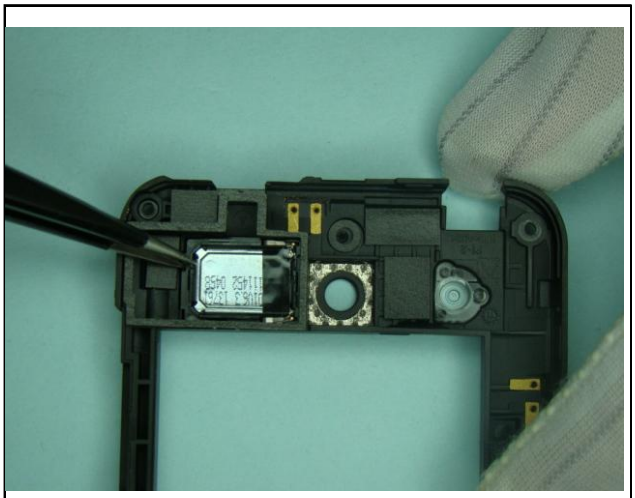
9. Loosen the BTB connector.



10. Carefully separate the FPC and cover B (Note: there is double-sided tape between the FPC and shielding cover, carefully perform the operation to avoid damaging the FPC).



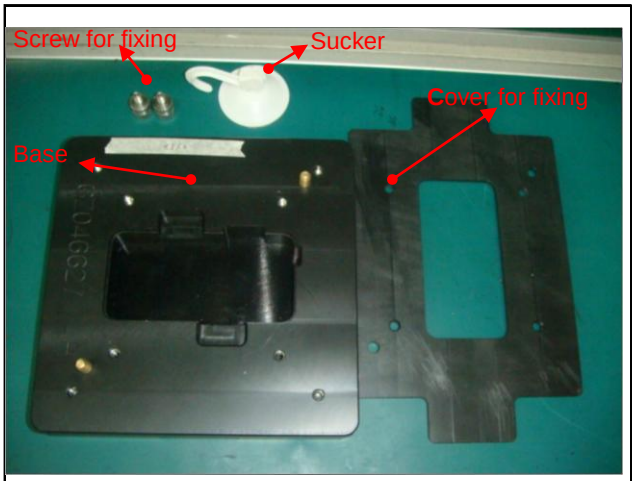
11. Remove the receiver.



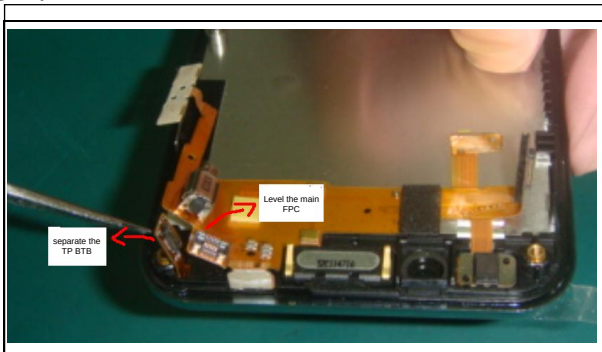
12. Remove the speaker.

13. The phone is now disassembled.

Disassembly guide to touch panel and LCD:

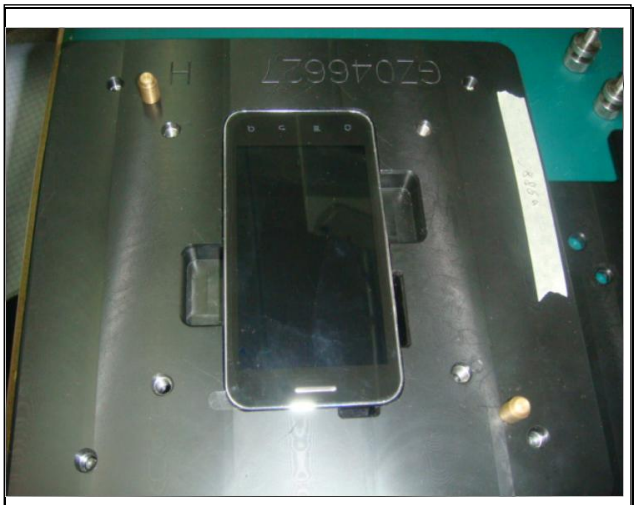


1. Introduction to the disassembly tools

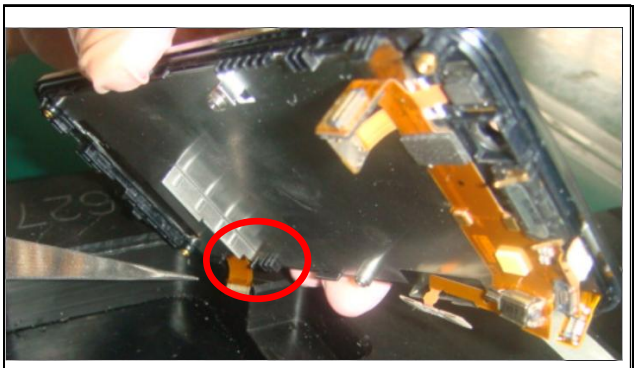


2. Disassemble the phone and separate the components from the front cover. The main FPC does not have to be separated.

3. Separate the BTB that the touch panel connects to main FPC, and lever the part of the main FPC that blocks the TP BTB.

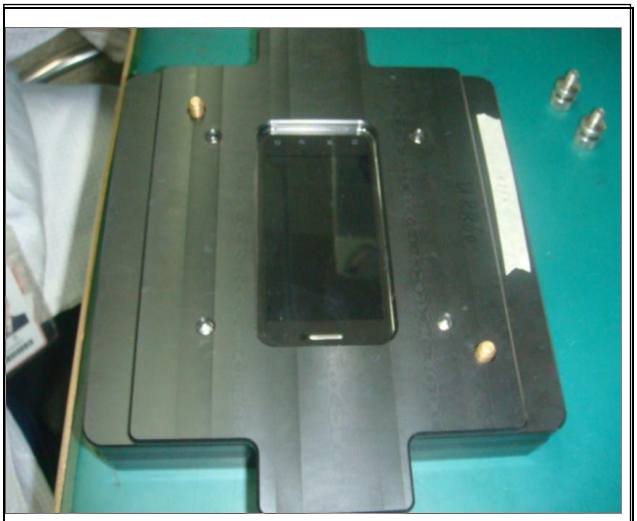


4. Put the front cover components into the jig base. The placing direction is as shown in this Figure (See procedure 4-1 and 4-2 for precautions).



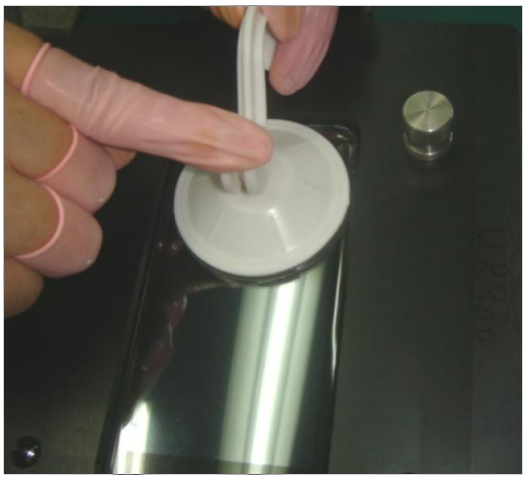
4-1. Note: Do not press LCD FPC.

4-2. Note: Do not press TP BTB.

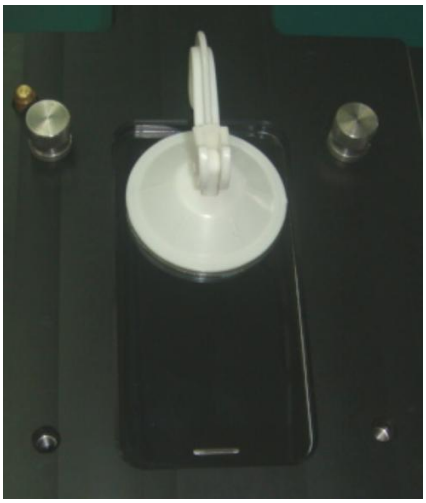


5. Fasten the cover.

6. Tighten the two screws (Note: The screws lie in the position where the sucker sucks the TP BTB).



7. Put the sucker in the middle of the TP Icon and press the sucker tightly.



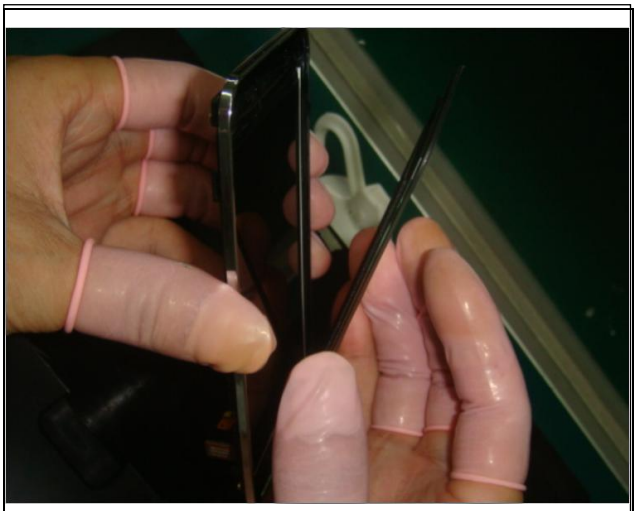
7-1. Note: Put the sucker in the opposite direction of the receiver.

8. Slowly suck up the TP and stop sucking until half of the TP is sucked up.

8-1. Note: Slowly suck the TP because the FPC of the TP BTB will be broken if the TP is sucked up too fast.

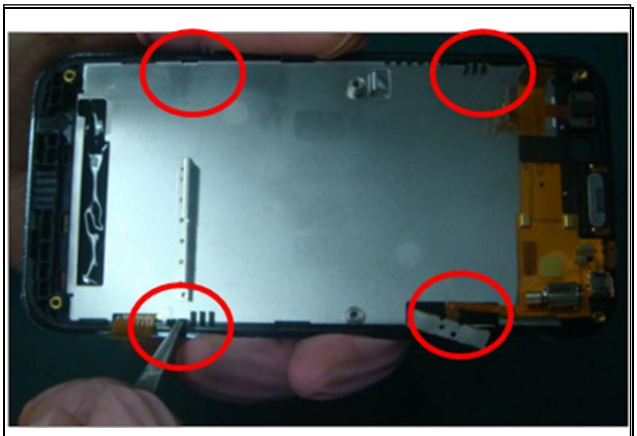
9. Remove the sucker. Note: the TP will easily be removed by opening the sucker edge with your finger nail and letting the air in.

10. Unfasten the screw and gently remove the cover.



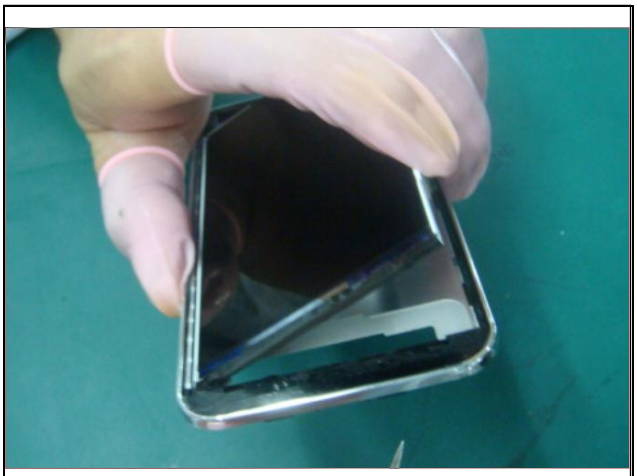
11-1. Take out the component and remove the TP gently.

11-2. Take out the component and remove the TP gently.



12-1. After removing the TP, use a tweezers to lift the four buckles of the LCD front cover (one of the buckles lies under the side key FPC). Usually after removing three buckles, the LCD can be removed (see Figure 12-2 for precautions).

12-2. Note: the LCD glass is thin and easy to be broken. During disassembly, place the tweezers against the buckle instead of the glass. The LCD must not be distorted.



13. Remove the LCD. The disassembly is completed.

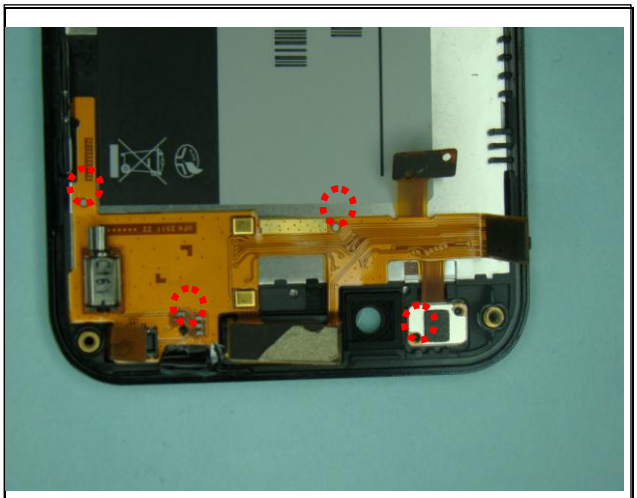
8 Assembly Procedure

1. Ensure that the ESD wrist strap is well grounded.

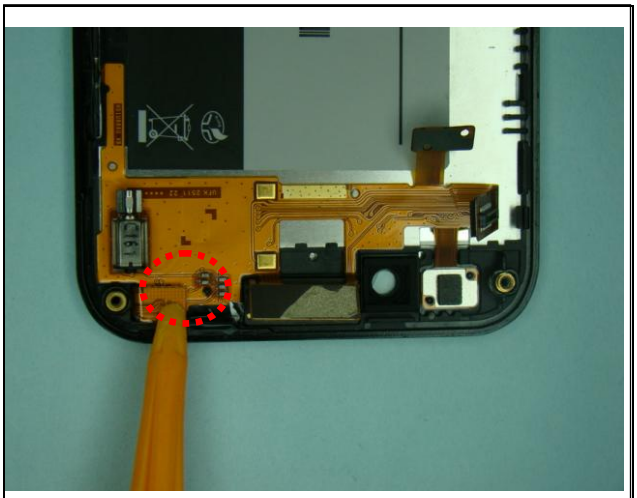
2. Start to assemble the U8860.

3. Install the speaker.

4. Install the receiver.



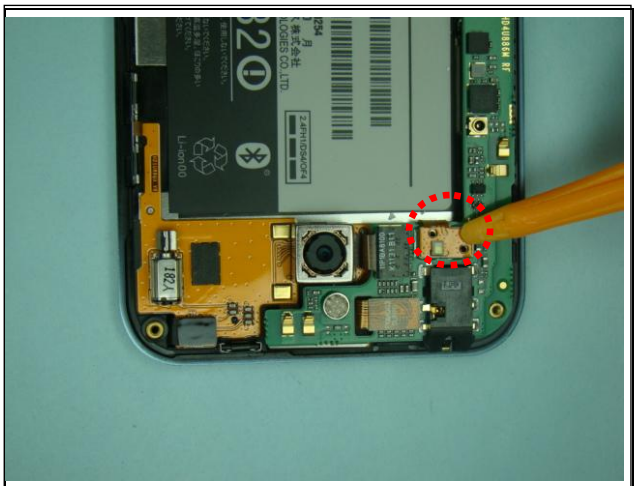
5. Install the FPC and ensure that the FPC aligns the positioning rod.



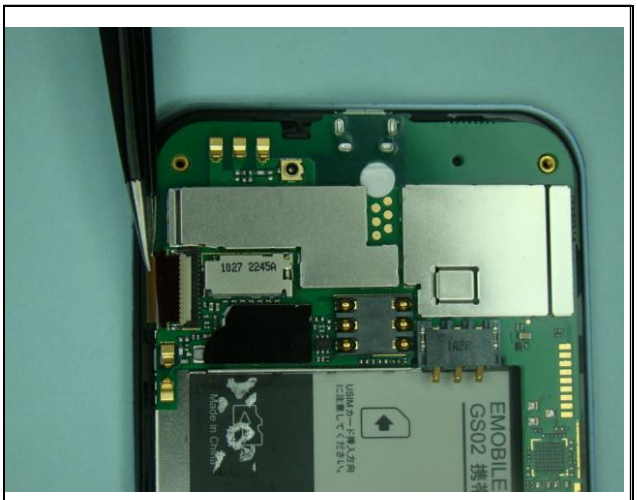
6. Connect the BTB connector.

7. Connect the BTB connector.

8. Install the main board.

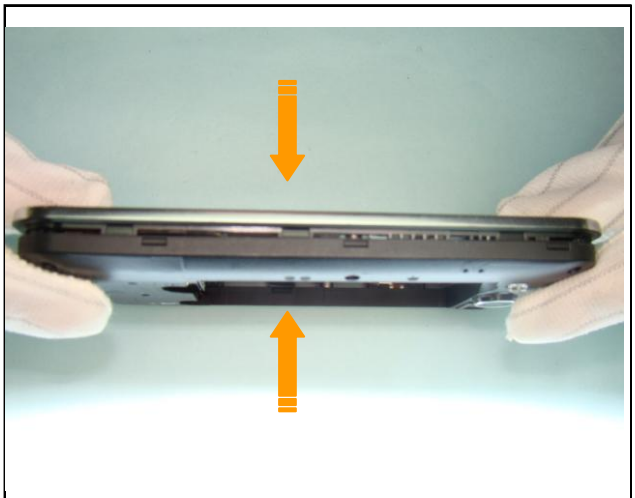


9. Paste the FPC on the main board and ensure that the FPC aligns the positioning hole.



10. Insert the FPC into the ZIF interface.

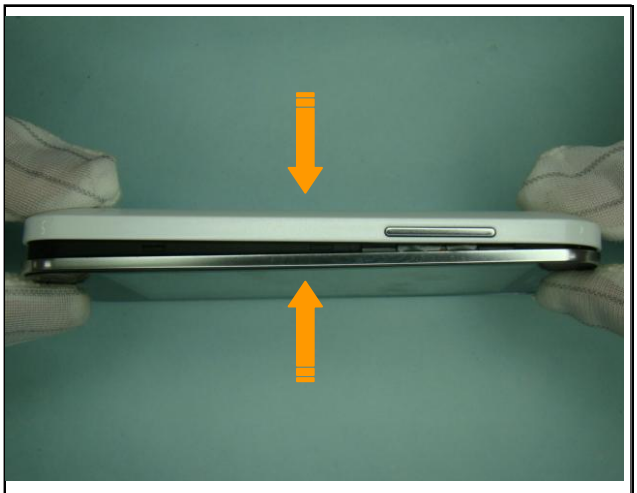
11. Clip the buckle of the ZIF interface.



12. Install cover B.

13. Install the six crews in cover B.

14. Install battery.



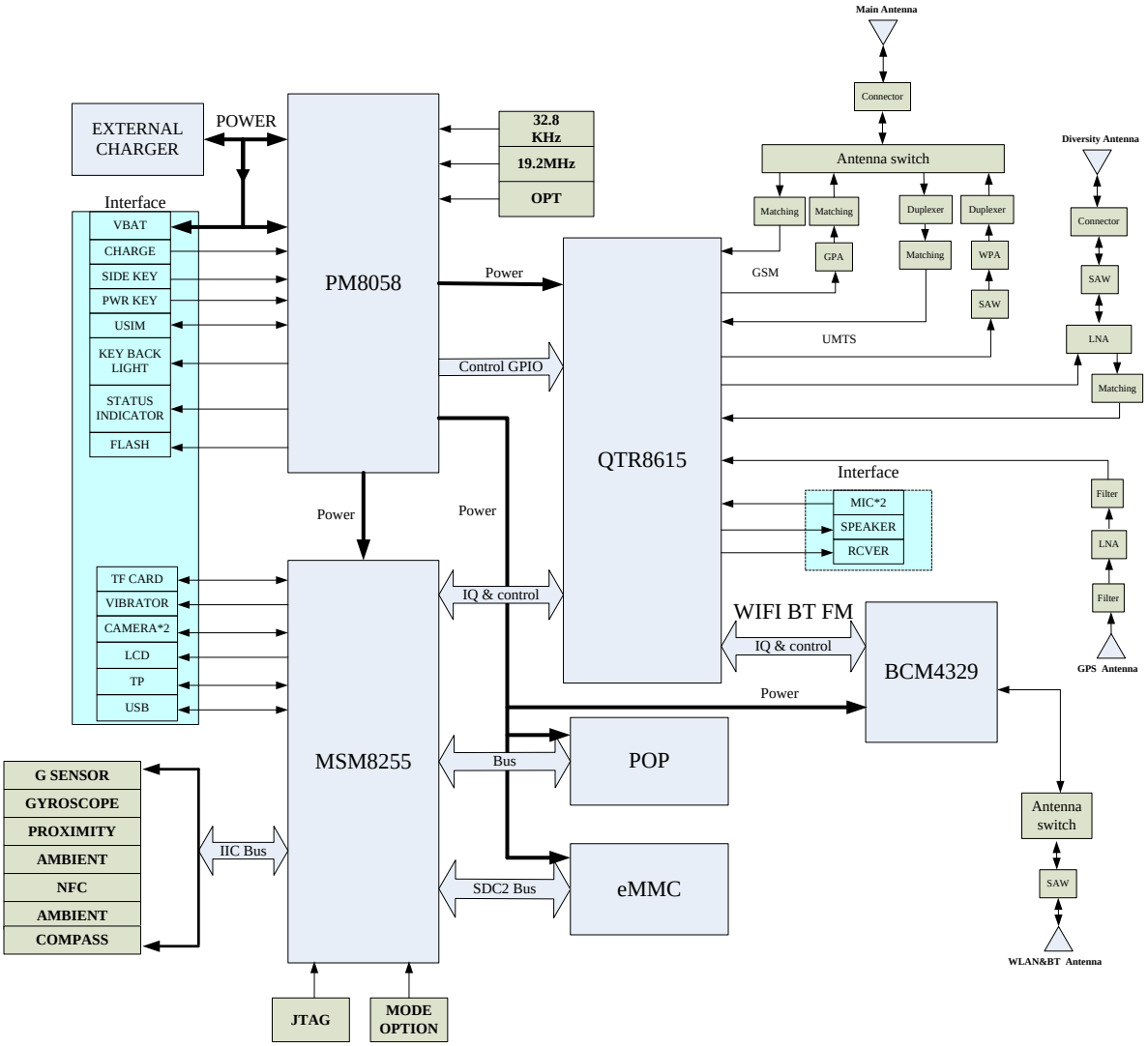
15. Install battery cover.

16. The U8860 is now assembled.

9 Principles and Troubleshooting

Before repairing a phone, ensure that the failure of the phone is not caused by environmental factors or incorrect functional settings, it is recommended that you restore the phone to its factory defaults.

9.1 Block Diagram and Phone Introduction



MSM8255 is the baseband signal processing chip, mainly performing the signal input and output of IMAGE, VIDEO, AUDIO, RF INTERFACES, CONECTIVITY. The baseband interface provides interfaces of keypad, LCD, SD card, Bluetooth, camera, and MIC.

PM8058 provides analog multi-channel switch, real-time clock circuit, TCXO clock circuit, motor driver circuit, and programmable current source.

The QTR8615 is the RF signal processing chip, performing the uplink and downlink RF signal conversion.

According to logic functions, boards are categorized into four sub-systems, including baseband, RF, power supply, and user interfaces. The following table describes modules and units of each sub-system and supported functions.

Subsystem	Module	Unit	Function
Baseband subsystem	MSM8255	Modem subsystem	As a MODEM processor, the ARM11 is 400 MHz, performing the modulation and demodulation of WCDMA, GPS, and GSM. The subsystem includes ARM11 processor, modem DSP, modem AHB bus, interruption controller, and sleep controller.
		Application subsystem	The Scorpion processor is 1400 MHz, supporting function modules such as microSD card, EBI2, UART/USIM, I2C, GPIO, and clock. The subsystem includes ARM11 processor, application DSP, and dedicated data mover.
		User interface processing unit	Camera interface, PCM interface, broadband CODEC, Vocoder, RF interface, HKADC, LCD interface, SD interface, USB interface, UART interface, USIM card interface, SBI interface, GPIO, JTAG/ETM interface, and keypad interface
		Multimedia and game engine	The multimedia and game engine of the MSM8255 runs Mpeg/jpeg hardware engine and game engine, JAVA accelerator, and provides MP3/MMS/MIDI functions.
	Environment monitoring (PM8058)	Power supply voltage monitoring	Lists monitoring targets, such as external power input, battery, button battery, VDD-phone, and important LDO.
		Temperature monitoring	Battery temperature, PA temperature, and 19.2 MHz crystal oscillator temperature
	EMMC	EMMC feature, power consumption, file system support	Stores programs and NV items, 4 GB
	DDR2 RAM (POP)	Memory	RAM for program running, 2 GB (64M×32)
RF subsystem	Transmission and receiving of WCDMA and GSM/DCS	AFC circuit, APC circuit, AGC circuit, each component	Performs the RF function of WCDMA receiving and transmission, mainly includes QTR8615 RF chip and its peripheral circuit.
	GPS	GPS receiving	Receives and processes GPS signals, mainly including QTR8615 chip and its peripheral circuit.
	BT interface	BT module	Transmits and receives the baseband function and RF signal of Bluetooth and WLAN, mainly includes BT + WiFi module and its peripheral circuit
	WiFi interface	WiFi chip	Uses BCM4329 chip to perform the WiFi function.

Subsystem	Module	Unit	Function
	Oscillator and frequency synthesizer	Use crystal oscillator instead of temperature compensated oscillator	Generates highly accurate TCXVCO of 19.2 MHz local reference clock. The QTR8615 embeds LO for WCDMA and GPS.
	Antenna	External antenna, internal interface component, antenna protection	The phone provides internal antenna for signal transmission and supports WCDMA high and low frequency band. U8860-92 phone antennas include main antenna, diversity antenna, WiFi/BT antenna, GPS antenna, FM antenna (headphone)
	Coupler	Power coupler	Couples part of the output power of WCDMA power amplifier to QTR8615 for power monitoring.
User interface subsystem	UART interface		The UART1 interface of the MSM8255 subsystem is used for Bluetooth and the UART3 is used for testing.
	USB interface	Driver, protection circuit, output interface component	Indicates the peripheral circuits of USB interface in MSM8255 subsystem, and unit circuits such as protection circuit and interface connectors. It is the major data service channel for the engineering sample, and can be used to debug and test devices during R&D.
	USIM card interface	Power supply, protection circuit, USIM card holder	Mainly includes USIM card holder and related connection circuits.
	Keypad and backlight	Keypad driver circuit, external keypad, backlight LED control circuit	Supports GPIO for keypad scanning and provides backlight LED. When a key is pressed, the backlight is on. By connecting with PM8058, it provides brightness adjustment function.
	Color LCD and backlight	LCD driver, interface mode, and backlight control	The main LCD is of 16 mega colors. The brightness of the LCD backlight can be controlled by users.
	TEMMC card	Power supply, protection circuit, connector	Mainly includes TEMMC card connector and related interface circuits
	Speaker that plays back MIDI	Driver mode, connection mode, speaker component	The power of the speaker that plays polyphonic ringtones when there is an incoming call can be 500 mW. It has sound frequency function that can play back 20 – 20 KHz ringtones. It can also play mono-audio MP3 files.
	Receiver	Driver mode, connection mode, receiver component	Receiver during a call

Subsystem	Module	Unit	Function
	MIC	Interface circuit, connection mode, MIC component	The phone has a dual built-in MIC to eliminate the environment noise.
	Earphone	Earphone, headphone interface circuit, MIC interface circuit	The phone provides a headphone jack to output audio or mp3. The MIC on the headphone cable inputs audio.
	Vibrator interface	Driver mode, connection mode, vibrator	When there is an incoming call, the vibrator vibrates.
	NFC	I2C interface control	Performs approach sensing function
	Gyroscopes	I2C interface control	Realizes the sensing of three directions to perform the game function.
	Compass	I2C interface control	Senses the magnetic field to help indicate the direction.
	Accelerometer	I2C interface control	Acceleration sensing helps perform the game function
Power Supply Subsystem	Internal backup battery	Li-ion battery, interface component	Li-ion battery with standard output of 3.7 V/1950 mAh. It is required that the charge/discharge lifecycle is over 500 times. The battery should pass the following authentication: GB18287 safety requirements (Li-ion battery)
	External power supply (travel charger)	Adaptor and interface component	The charger meets the requirements of China, Europe, the USA, and Australia: 90–240 V, 45–55 Hz, AC input. The model differs with different markets. The output voltage of the charger is 5 ± 0.25 V. The charger must pass CE and CCC authentication. The output current of the charger should be able to charge the battery and support the normal operation of the phone at the same time. The charging current requirement is 1 A.
	Power distribution network and power management function	Power distribution network	It includes filter networks and cabling of the power supply.
		Backup battery management, charge circuit, charge mode, and charge protection	It manages battery charging and discharging, overcharging and over-discharging protection. The battery that maintains RTC current can also be charged.
		Board circuit power management (power-on/off analysis)	It mainly indicates LDO, which manages power supply flexibly. Based on protocols and power-save analysis requirements, the board software manages the power supply of unit circuits according to service status to decrease power consumption of devices. A 32.768 KHz sleep clock is provided.

Subsystem	Module	Unit	Function
	PM8058 enhanced function	RTC	It has a built-in RTC circuit and uses a sleep clock of 32.768 KHz that provides precise time.
		HKADC	The 12 MPP interfaces can be provided by PM8058 internally.
		TCXO driver and other controls	The PM8058 has a built-in TCXO driver, two-channel analog signals, and two-channel data signal output.
		UVLO	Low-voltage power-off function. When the input voltage is lower than the threshold for a specific period, the phone powers off.
		WDT reset	Supports WDT counter overflow reset function.
		Over temperature protection	When the on-chip junction temperature exceeds 150°C, the phone powers off.
		Internal driver circuit	Provides four LED drivers, one vibrator driver, and one speaker driver.
		Interruption management	PM8058 has a built-in interruption manager to process related interrupted signals.
		USB driver	Supports USB 2.0 and A/B interface type and does not support OTG function.

9.2 Baseband Unit

9.2.1 Power-on Management Circuits

Power-on failures are classified into three types: no current, weak current and excessive current. Many failures are caused by abnormal power supply. If these types of failures occur, troubleshoot them according to the circuit fault troubleshooting methods.

Troubleshooting Process

To troubleshoot the power-on failure, firstly check whether the I/O connector (battery connector) is damaged. If the I/O connector (battery connector) is not damaged, use a DC regulated power supply to supply the phone with power, and test the faulty phone current.

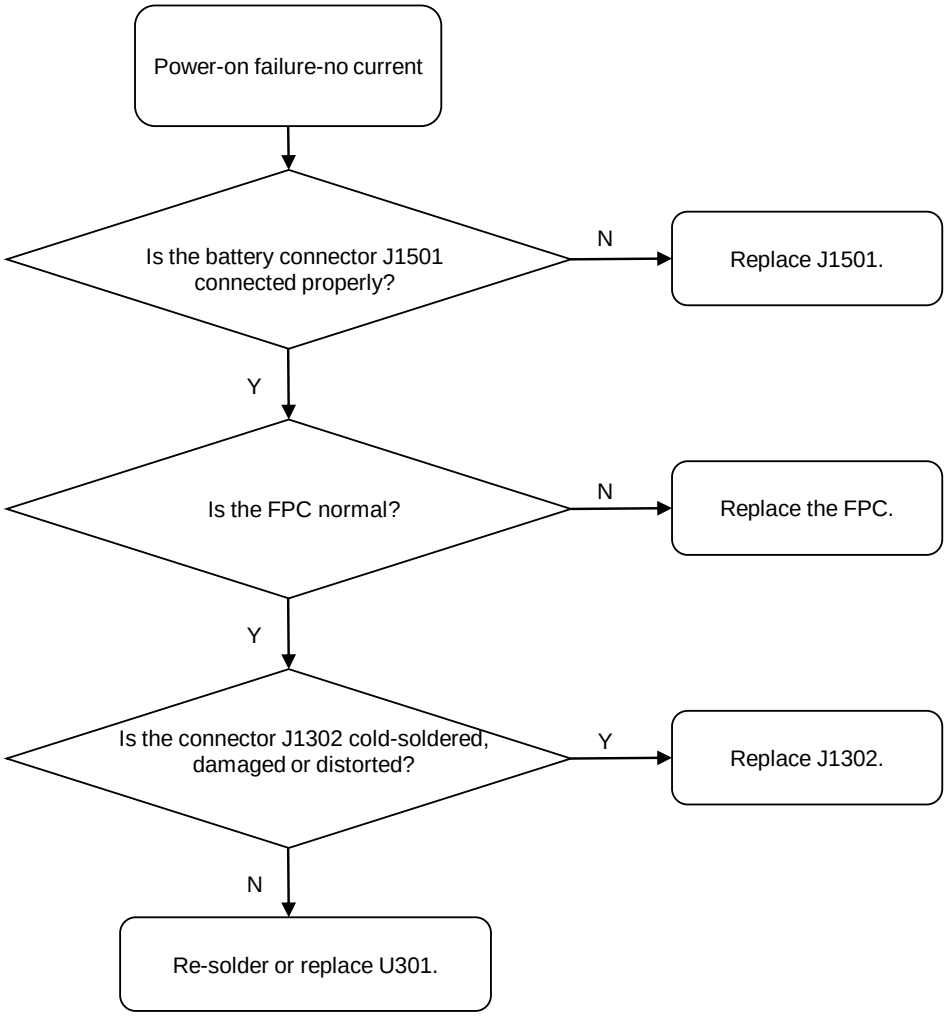
The power-on failure may be caused by any of the following conditions:

- No current (DC power supply)

  Generally, no current may be caused by any of the three reasons:

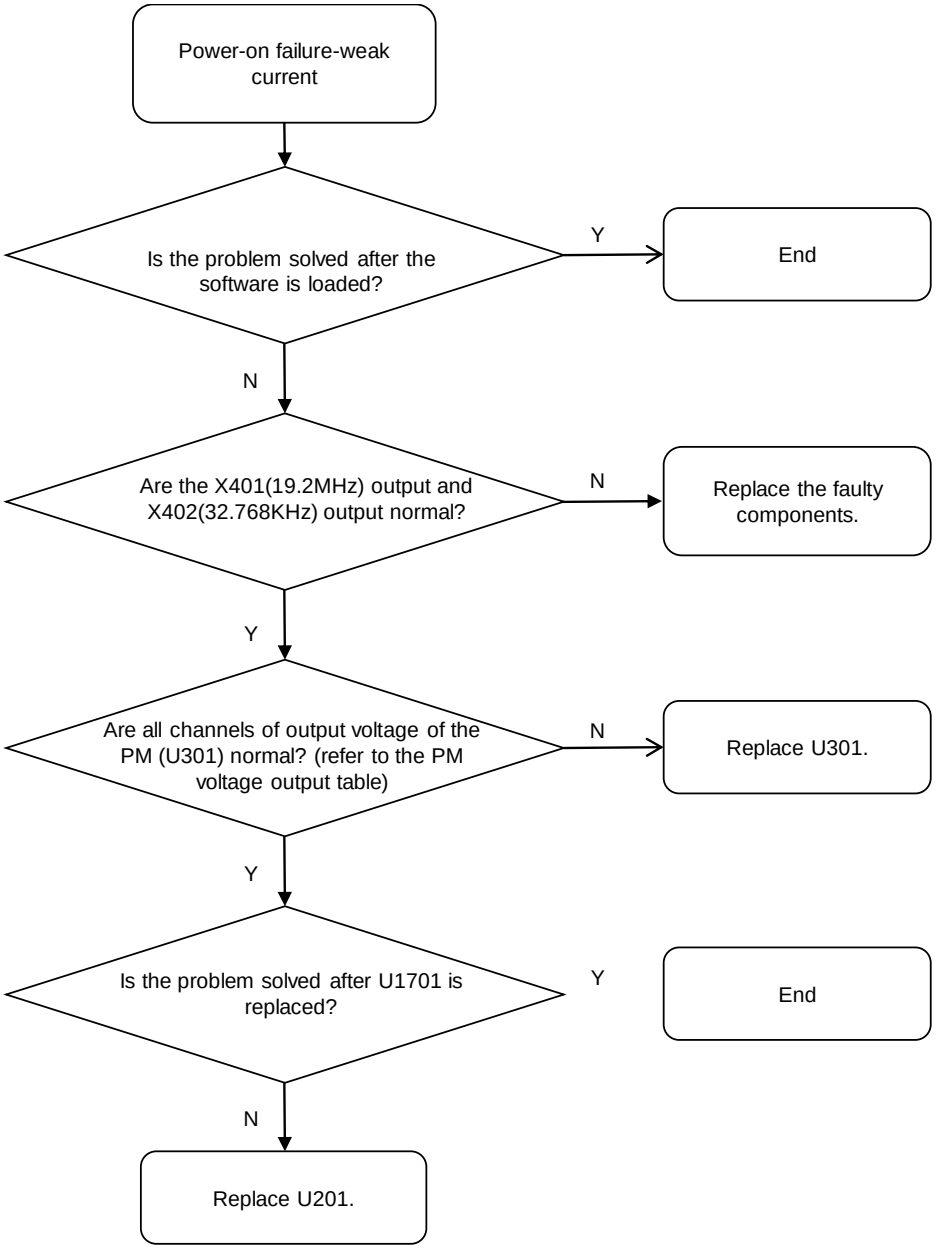
  - No power supply channel is set up or the components in the power supply channel are damaged or fall-off.
  - The main components are cold-soldered; therefore, the system does not operate normally. In this case, the current is less than 100 mA.

- The relevant circuits of the power key are faulty, which results in power-on failures.



- Weak current (DC power supply)

  Generally, weak current may be caused by any of the two reasons:
  - Software faults (Upgrading or reloading the software may solve the problem.)
  - The PM output circuit is short-circuited.



PM voltage output table:

Signal	Reference Value for the Output Voltage	Test Point
VREG_L3_1P8/3P3	1.8/3.0V	C449
VREG_MSM_USB3V3	3.0V	C469
VREG_MSM_USB1V8	1.8V	C470
VREG_CAM_2P85	2.85V	R4411
VREG_MSM_A2_2V05	2.85V	C456

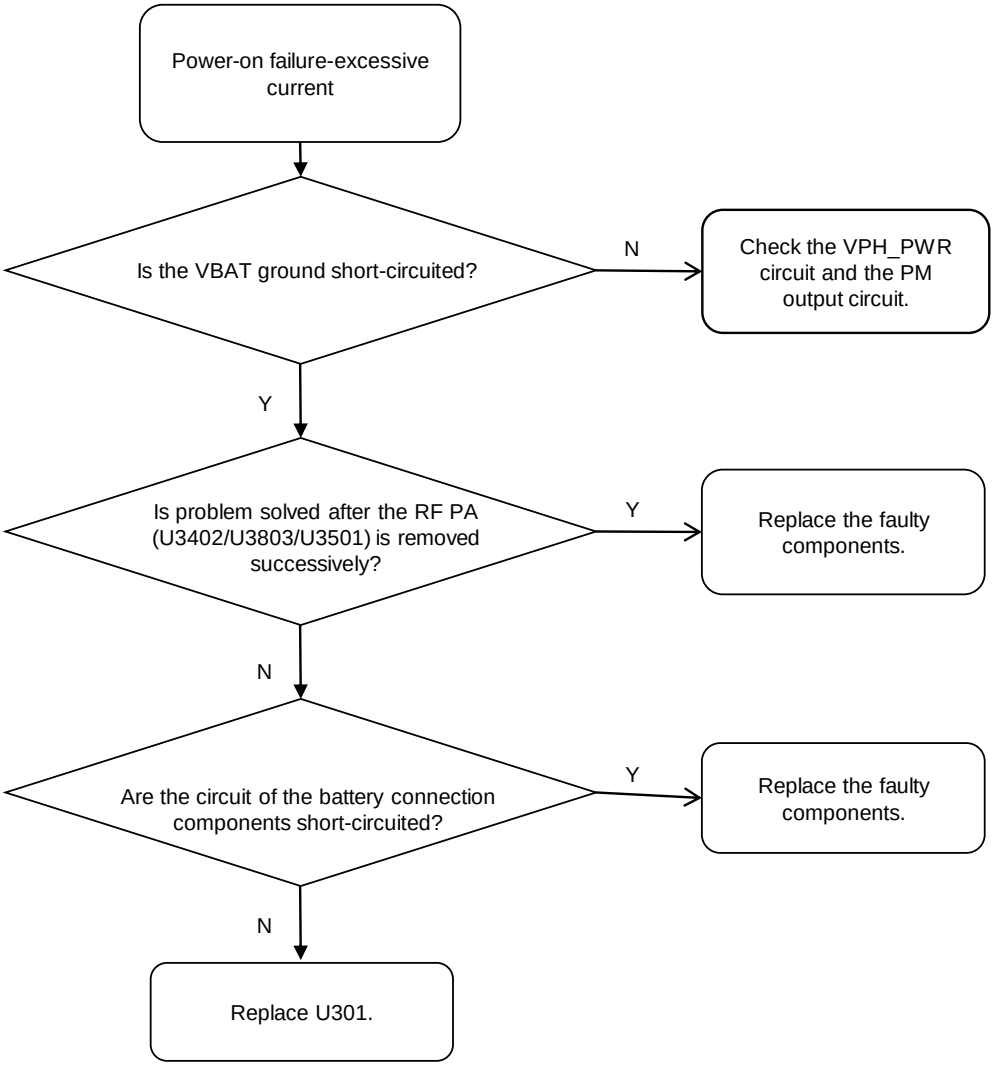
Signal	Reference Value for the Output Voltage	Test Point
VREG_L10_2P7	2.7V	C457
VREG_L11_1P8	1.8V	C458
VREG_L14_2P85	2.85V	C473
VREG_MSM_QFUSE_PRG	1.8V	C445
VREG_L18_2P2	2.2V	C465
VRGE_F6	2.6V	C1308
VREG_MSM_L20_1V8	1.8V	C441
VREG_MSM_MPLL	1.1V	C466
VREG_L24_1P2	1.2V	C442
VREG_POP_VDDQ_1P2	1.2V	C443
VREG_NCP_1V8	-1.8V	C464
VREG_S0_1V1_C1	1.1V	C418
VREG_S1_1V1_C2	1.1V	C450
VREG_S2_1V35_A1	1.3V	C447
VREG_S3_1V8	1.8V	C424
VREG_S4_2V2	2.2V	C426

- Excessive current (DC power supply)

  There are two types of excessive currents:

  - Excessive current occurs after the Power key is pressed.
  - The phone has current (greater than 1 mA) when it has been powered off.

Excessive current is caused by short circuits. The main reason is ground short circuits of VBAT.

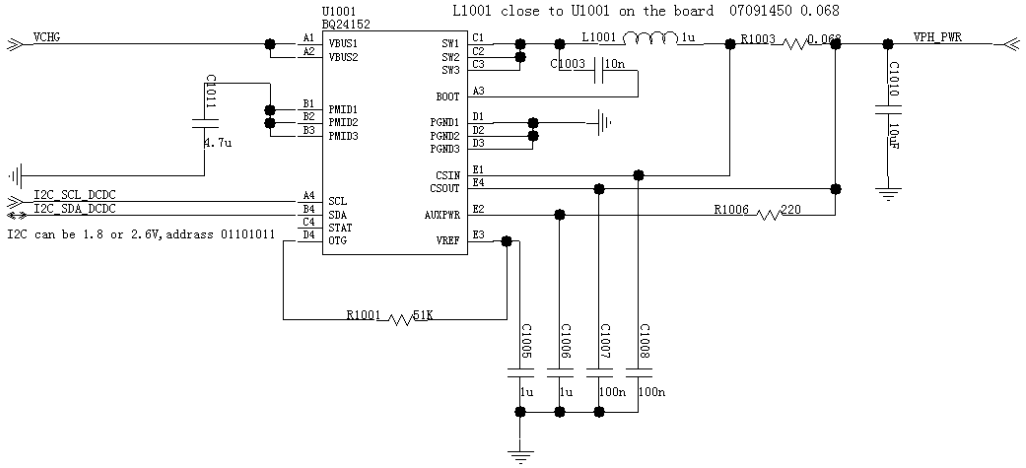


9.2.2 Charging Management Circuits

Circuit schematic diagram

The power supply of MSM8255 supports two external charging modes: charger mode and USB mode.

The schematic diagram is shown as follows:



The dedicated power supply chip bq24152 is adopted to charge the phone with 1A power. *The I2C is adopted to perform communication and control GPIO149 and GPIO150.* The charging management chip obtains power from the VCHAG of the USB port. The chip is controlled by the I2C. The output VPH_PWR supplies power for the PM and charges the battery.

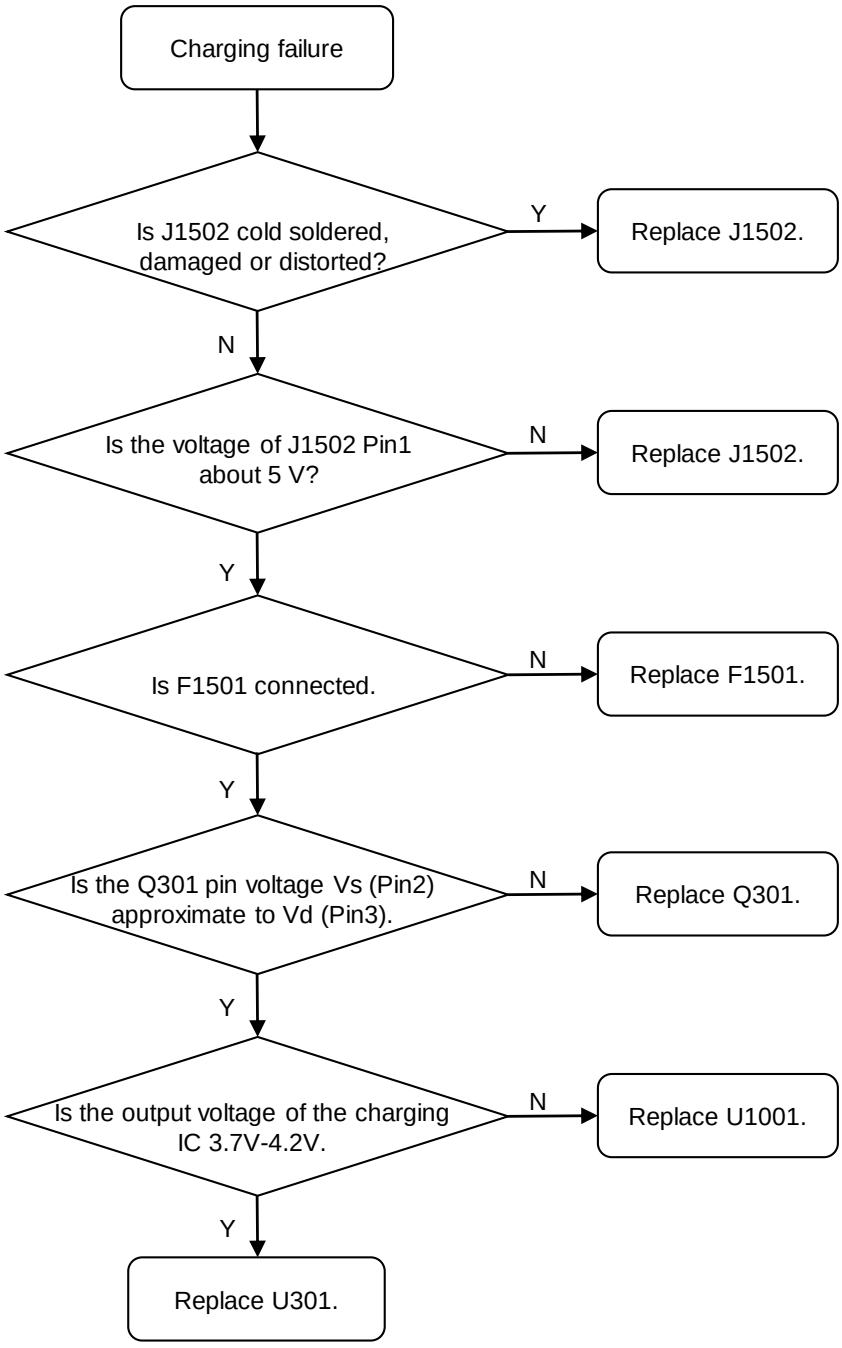
This chip supports three modes: charging mode, boost mode and high resistance mode. The charging mode is normal charging process. The boost mode is USB-OTG mode. The high resistance mode is power-saving mode (standby mode) without charging.

Troubleshooting process

There are two types of common charging failures:

- The phone has no response after a charger is connected to it.
- The phone displays an animated icon indicating that it is charging, but actually, the battery is not charged.

To troubleshoot charging failure, firstly check whether the battery connector is damaged.



9.2.3 Clock Circuit

Clock	Effect	Remarks
VCTCXO in 19.2 MHz	Supporting master clock for the MSM8255	

Clock	Effect	Remarks
32.768 K crystal for platform use	MSM8255 sleep clock signal	
BT&WiFi in 37.4 MHz	BCM4329 clock	BCM4329

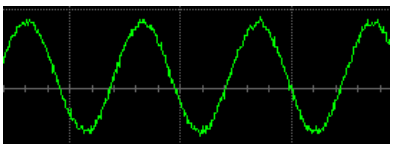
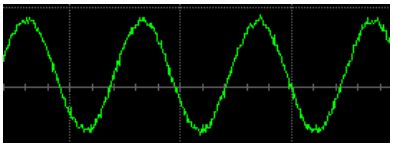
Troubleshooting process

Failures:

The phone cannot be powered on or frequently freezes. X401's test result shows that X401 has no outputs or its output frequencies are unstable.

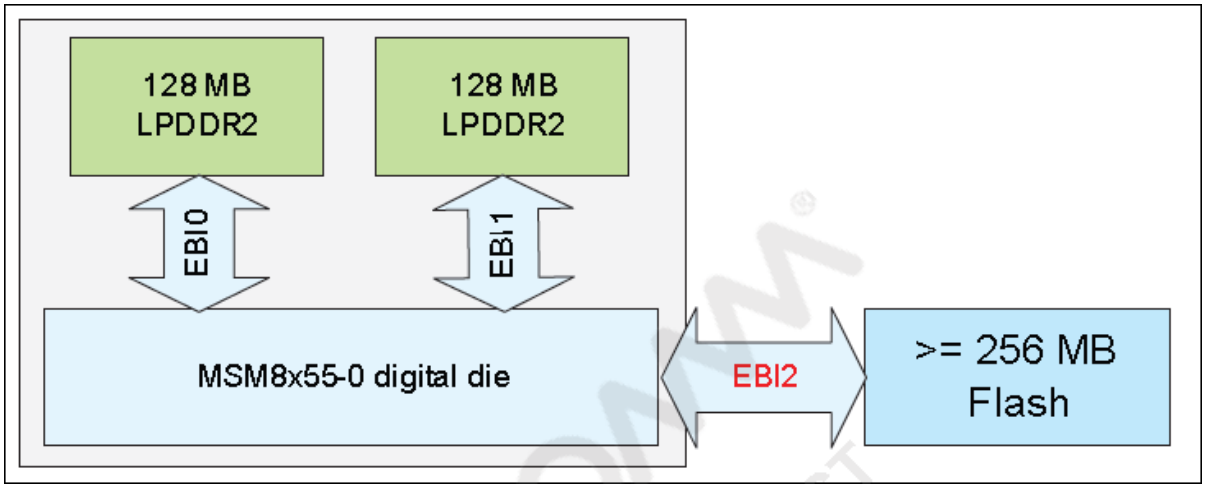
Solution: Replace X401.

Description of the signals in the circuit diagram in this section

Signal	Description	Reference Measurement or Wave Form
XTAL_19M _OUT	Output from the 19.2 MHz main clock	
XTAL_19M _IN	Input to the 19.2 MHz main clock	

9.2.4 Flash Memory Circuit

The MSM8255-0 is able to visit the LPDDR2 through two high-speed buses (EBI0/EBI1). The LPDDR2 is connected to the MSM8255-0 in PoP (Package-on-package) mode. Meanwhile, the MSM8255-0 also can visit the external storage eMMC through a low-speed bus (EBI2), as shown in the following figure.



9.3 RF Unit

The power supplies of the RF unit are as follows:

Signal	Voltage	Description
VREG_S2_1V35_A1	1.3 V	Supplies power for QTR8615
VREG_S4_2V2	2.2 V	Supplies power for QTR8615
VREG_S3_1V8	1.8 V	Supplies power for QTR8615
VBAT	3.7 V	Supplies 3.7 V voltage for WiFi and BT
VREG_L14_2P85	2.85 V	Single pole, 10 throw power switch
VCC2	3.4 V	PA VCC2

Troubleshooting process:

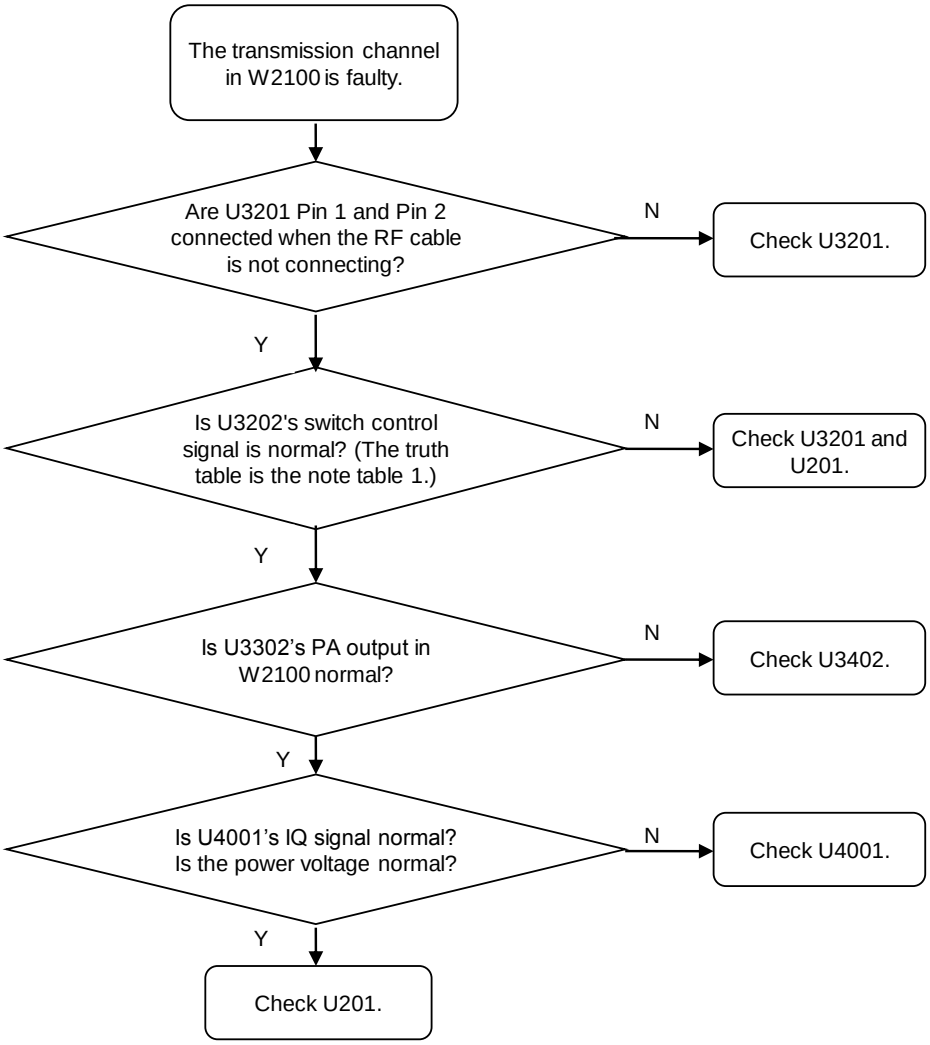
Failure: The phone cannot initiate a call or be called.

Solution:

Maintenance procedure for transmission failure in W2100, W900, GSM900, and GSM1800

Maintenance procedure for transmission failure in W2100:

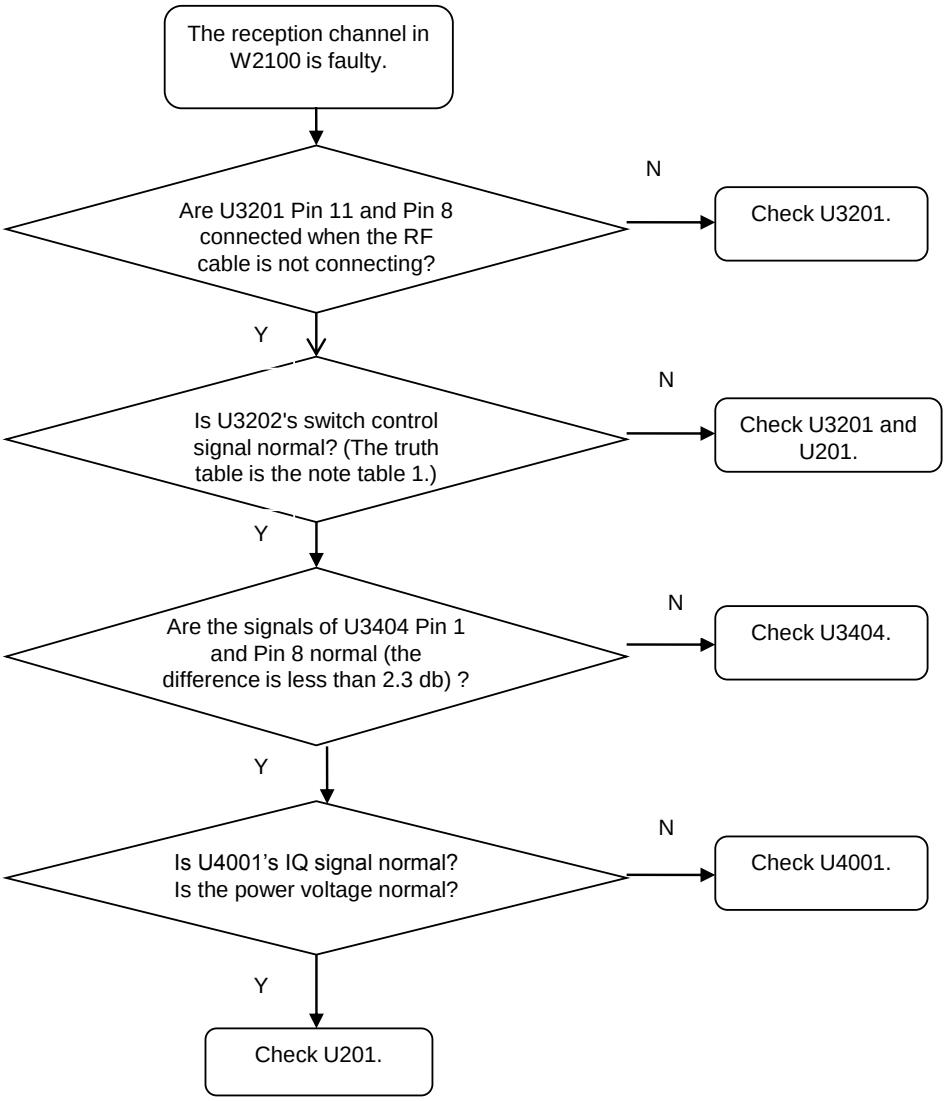
Firstly, ensure that the SIM card and antenna are installed properly, and then detect the phone according to the following procedure.



In W900, just replace the U3302 detection with U3402 detection.

In GSM900 and GSM1800, just replace the U3302 detection with U3502 detection.

Maintenance procedure for reception failure in W2100:



Note: Check the control signals of U3202 switch using a multimeter or oscilloscope. The truth table for control signals is as follows:

Note table 1:

	VC1	VC2	VC3	VC4
TRX_W2100	1	0	1	0
TRX_W900	1	1	1	0
GSM900 Rx	1	0	0	0
GSM1800 Rx	0	0	1	0

In W900, just replace the U3404 detection with U3804 detection.

In GSM, just replace the U3404 detection with U3304 detection.

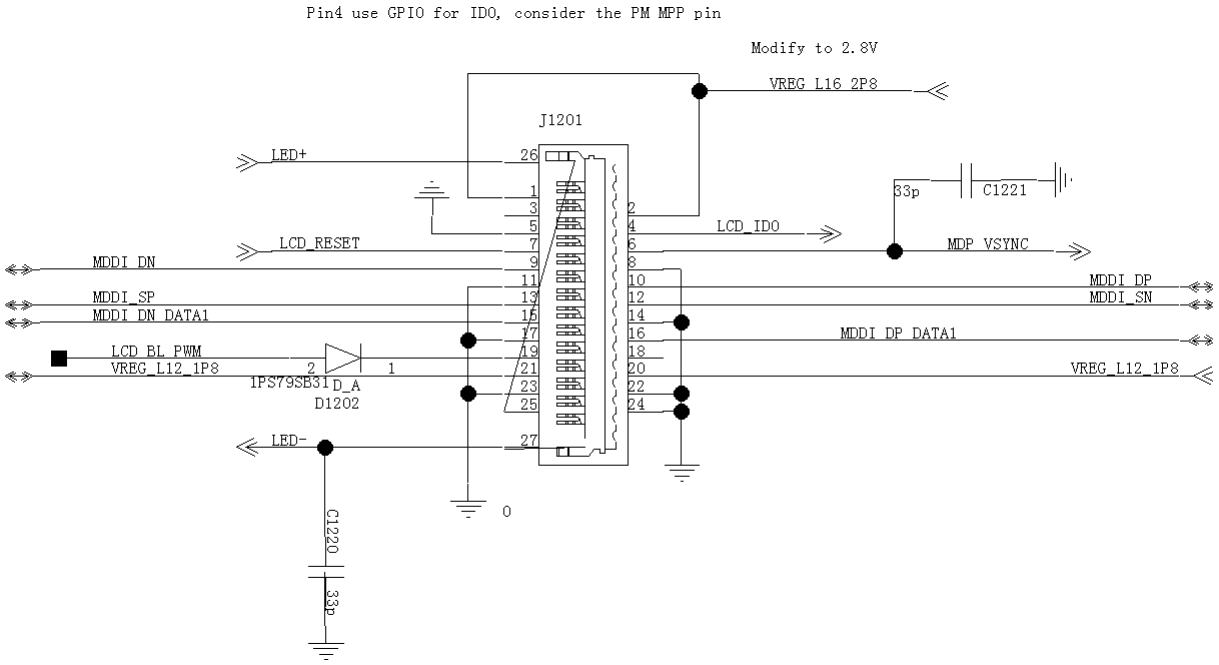
9.4 Peripheral Circuits

9.4.1 Display

The MSM8255 employs the MDDI interface to transmit command and data to the LCD. The U8860 uses Toshiba's LCD. The U8860 uses Toshiba's LCD LT040MDT9000. It is a TFT module with a point matrix of 480RGB x 854, supporting MDDI interface. Its features are:

- 16.7 M colors, TFT-LCD module
- Display mode: RGB Stripe

The schematic diagram of the MSM8255 and LCD interface is as follows:



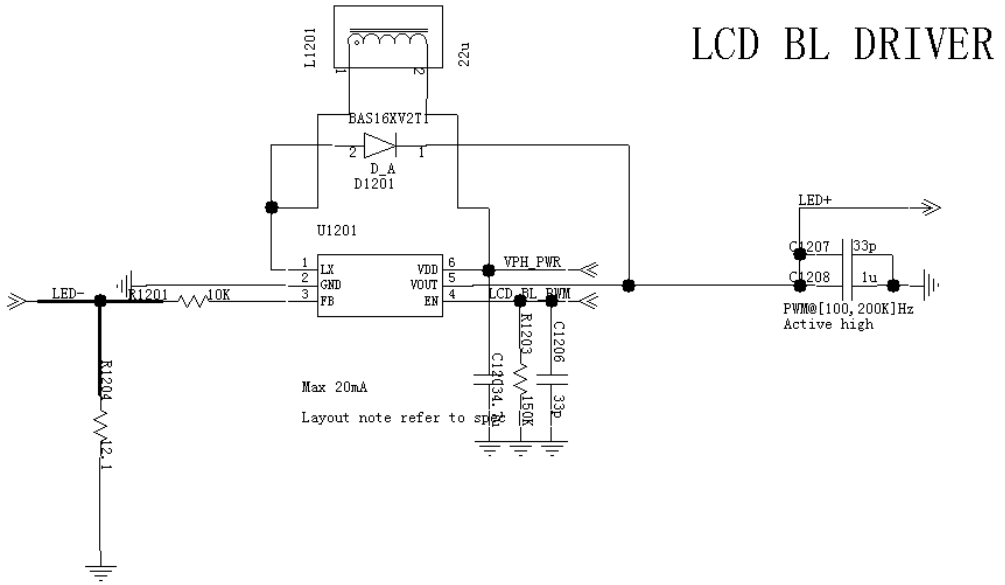
The U8860's LCD employs the MDDI-type2 interface. It requires only two pairs of low voltage differential signal (LVDS) cables and a pair of power cables, and supports 60 Hz refreshment rate. With frame synchronization function, the LCD uses MDP_VSYNC of GPIO_030 as the data transmission synchronization signal to avoid LCD breakage.

A diode composes the PWM signal (pull-up) reflected by environment light detection and the PWM signal reflected by LCD's dynamic backlight adjustment function to a signal and performs computation to control the backlight brightness.

The signal definitions are as follow:

Signal	Description
VREG_L16_2P8	LCD analog voltage, 2.8 V
VREG_L12_1P8	I/O connector digit voltage, 1.8 V
MDDI_SP	LVDS + signal
MDDI_SN	LVDS - signal

Signal	Description
MDDI_DP	LVDS + signal
MDDI_DN	LVDS - signal
MDDI_DN_DATA1	MDDI_DATA+
MDDI_DP_DATA1	MDDI_DATA-
LCD_RESET	LCD power-on reset signal
MDP_VSYNC	Longitudinal frame synchronization signal
LCD_ID0	Supplier ID
LED+	The anode of the backlight LED
LED-	The cathode of the backlight LED



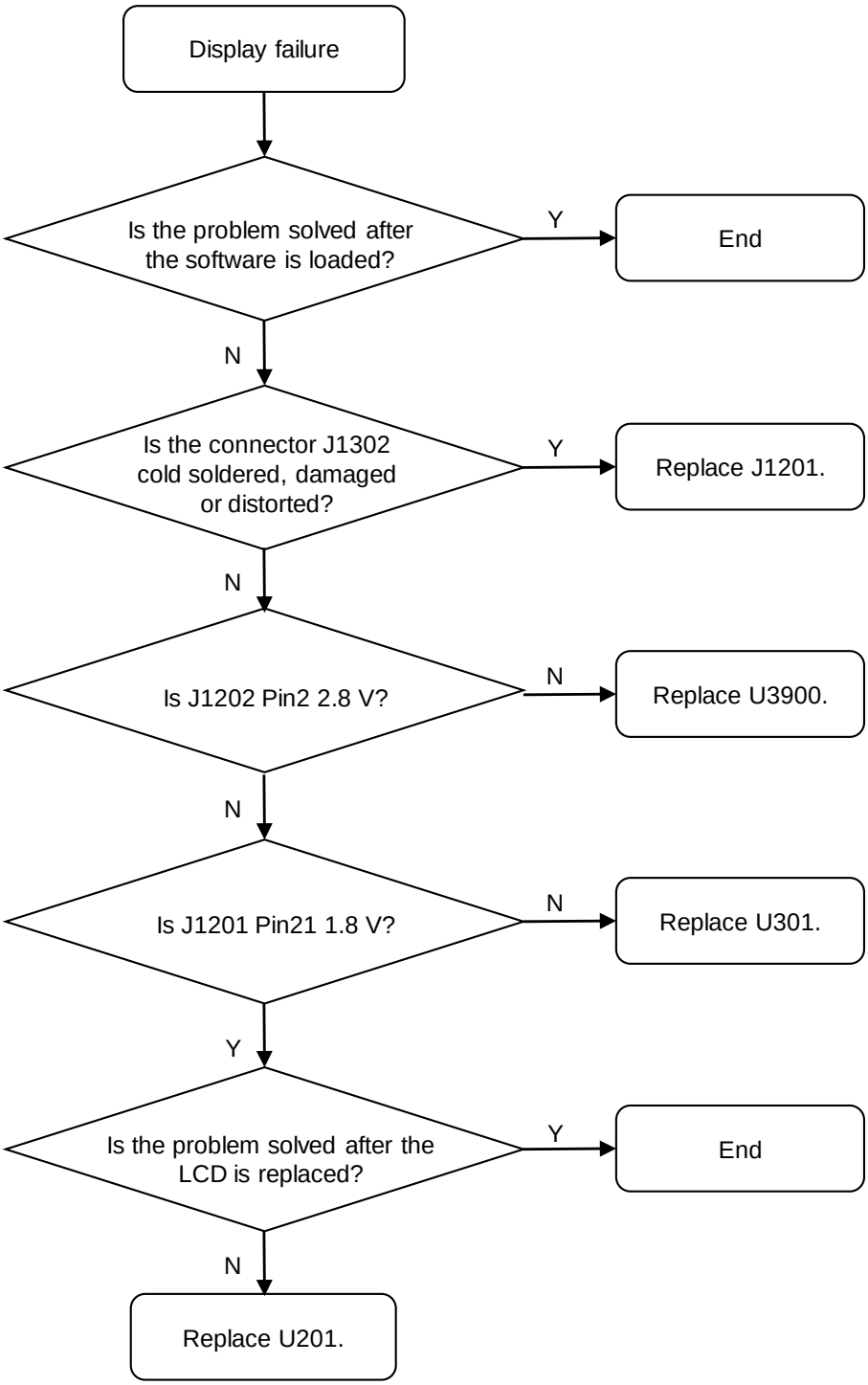
The U8860 adopts 4.02 inches LCD. The backlight adopts six serial LED lights, which are controlled by the backlight LED-driving chip RT9293BGJ6.

Troubleshooting process

Failure: The phone can be powered on, but its LCD is blank.

Solutions:

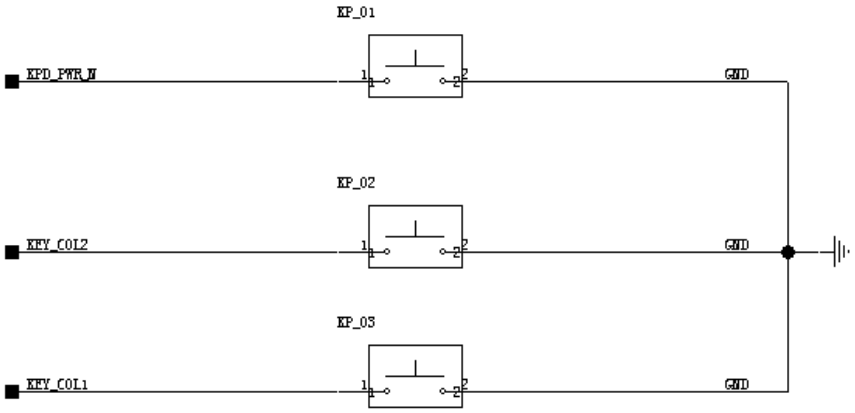
1. If the phone displays a black screen, it may be LCD backlight fault.
2. If it is LCD fault, refer to the following troubleshooting process.



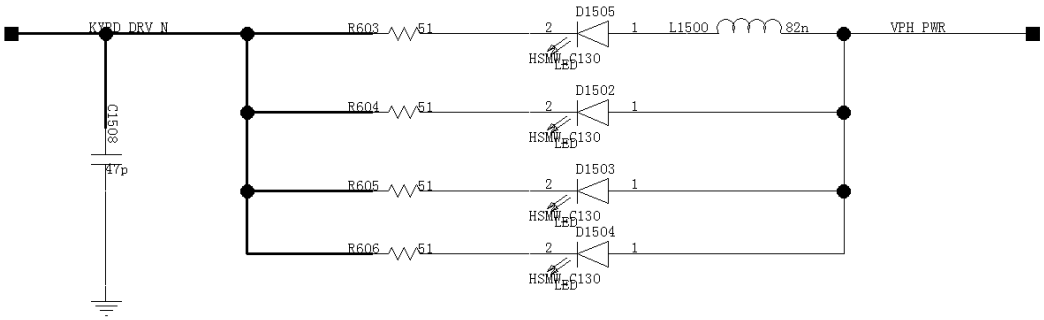
9.4.2 Keypads

The U8860 has seven keys. Four of them are on the touch panel. You can answer a call, hang up a call, view the menu and back the previous operation by touching them. The GPIO_01

and GPIO_02 on the side of the PM8058 are Volume+ key and Volume- key. The Power key is detected by KYPD_PWR_N on the PM8058 side instead of the scanning mode.

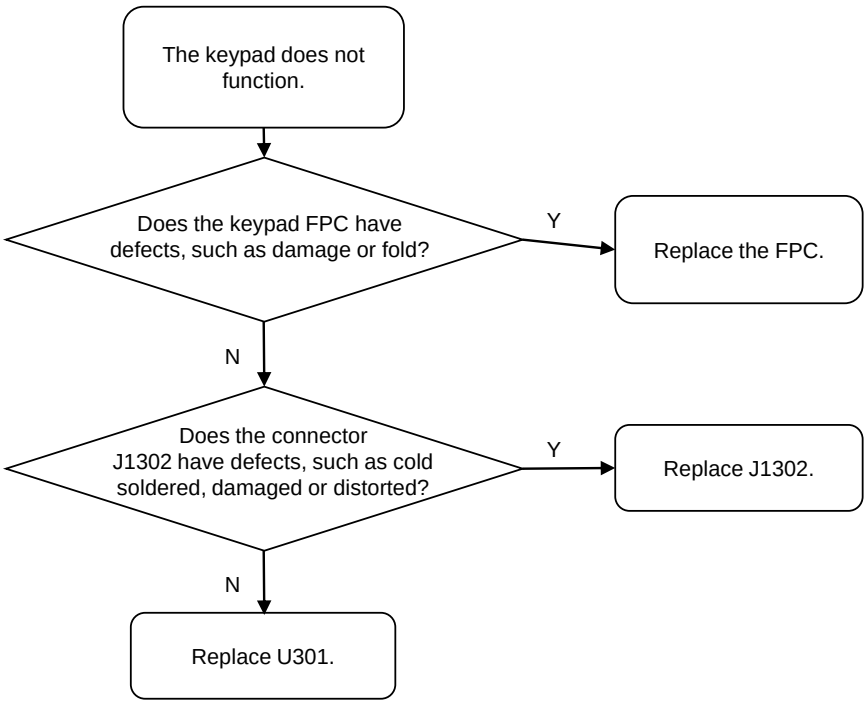


The brightness of the keypad's backlight LEDs can be adjusted by KYPD_DRV_N (PM8058), and it is supplied with power by VPH_PWR. The keypad LEDs are the four LEDs on the LCD.



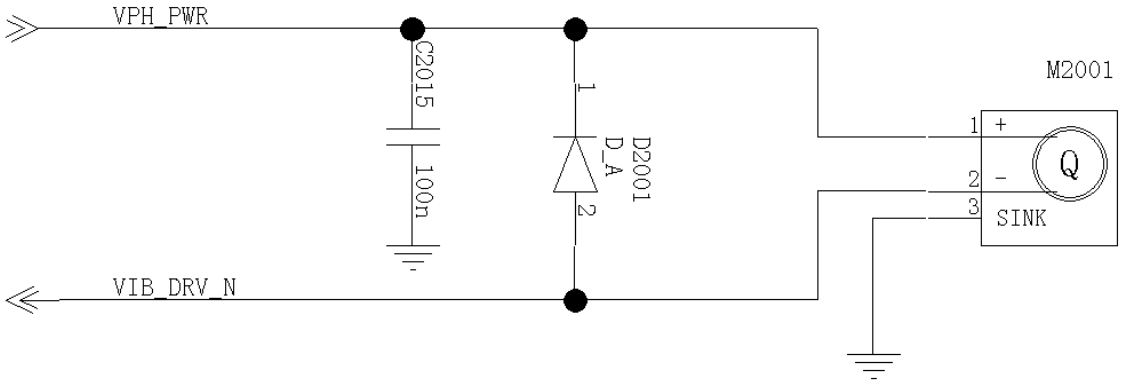
Keypad backlight driver		
Signal	**Description**	**Remarks**
VPH_PWR	Power supply	Backlight power supply
KPD_DRV_N	Backlight driver pin	When the level is low, the four backlight LEDs light.

Troubleshooting process



9.4.3 Vibration

Circuit schematic diagram



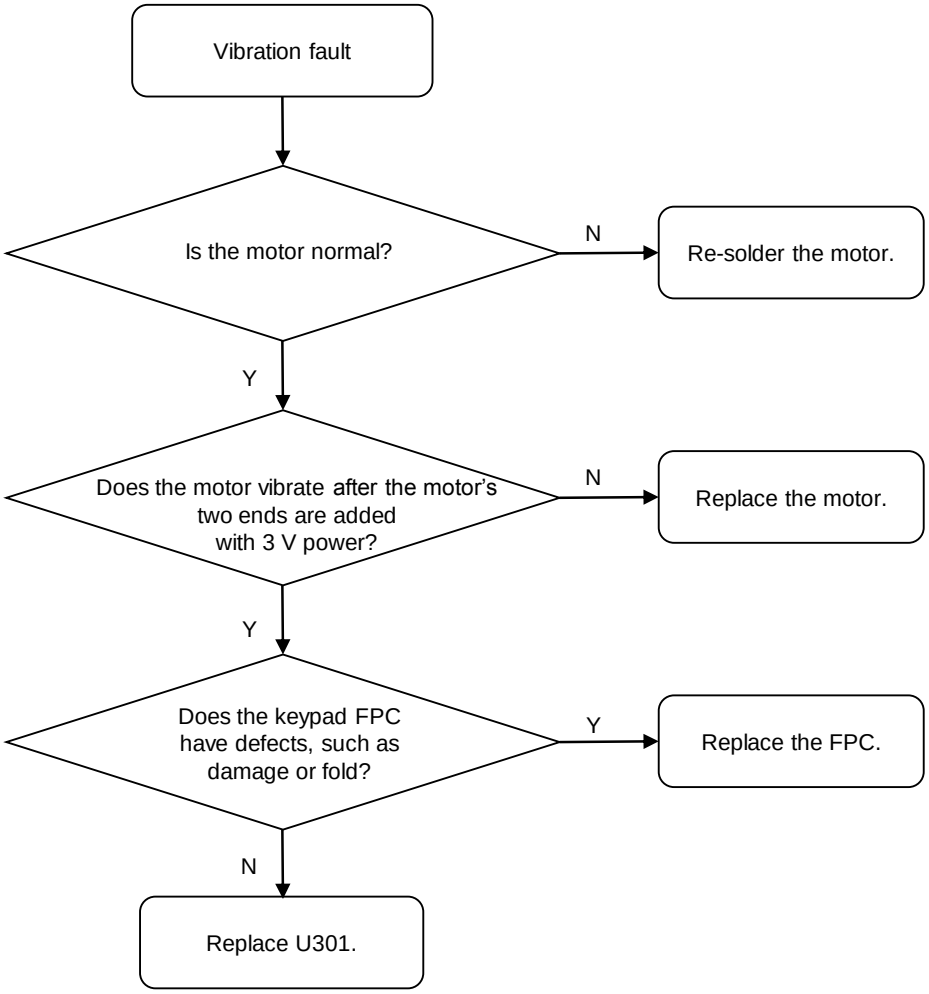
Analysis

The PM VIB_DRV_N controls the vibrator's driving voltage. The VIB_DRV_N controls the motor vibration by setting high level or low level. When the VIB_DRV_N is in low level, the motor vibrates.

Troubleshooting process

Failure: The motor fails to vibrate.

Solution:

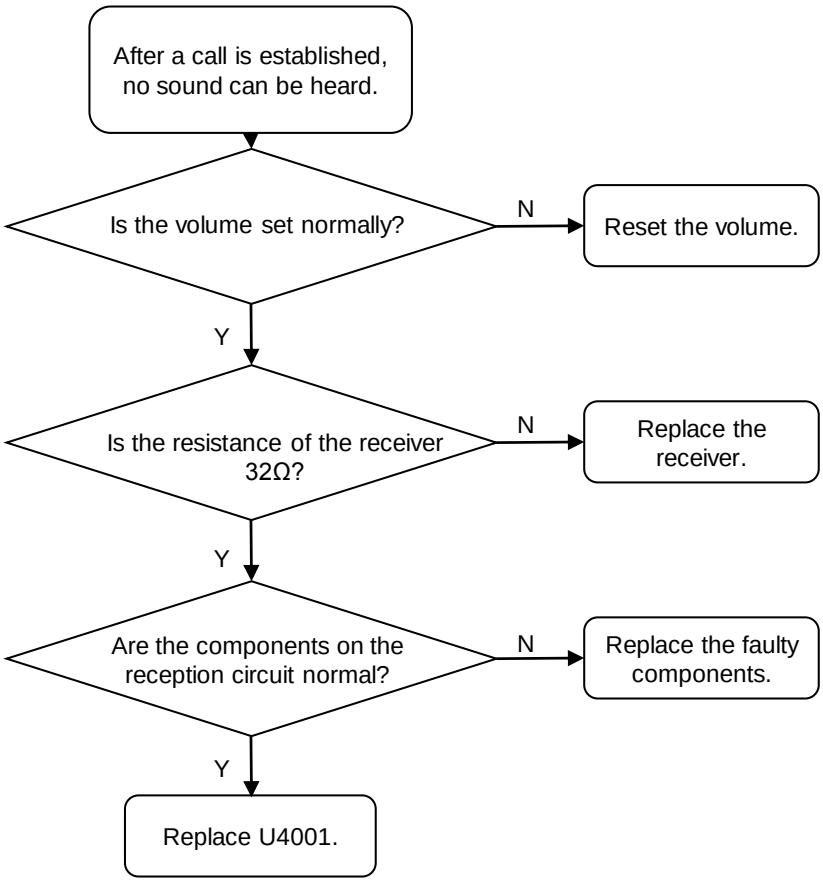


9.4.4 Call Reception

Troubleshooting process

Failure: After a call is established, no sound can be heard or noises are heard.

Solution: For audio fault, check whether the phone is set properly. Generally, the reception faults are caused by earpiece fault or poor earpiece contact.

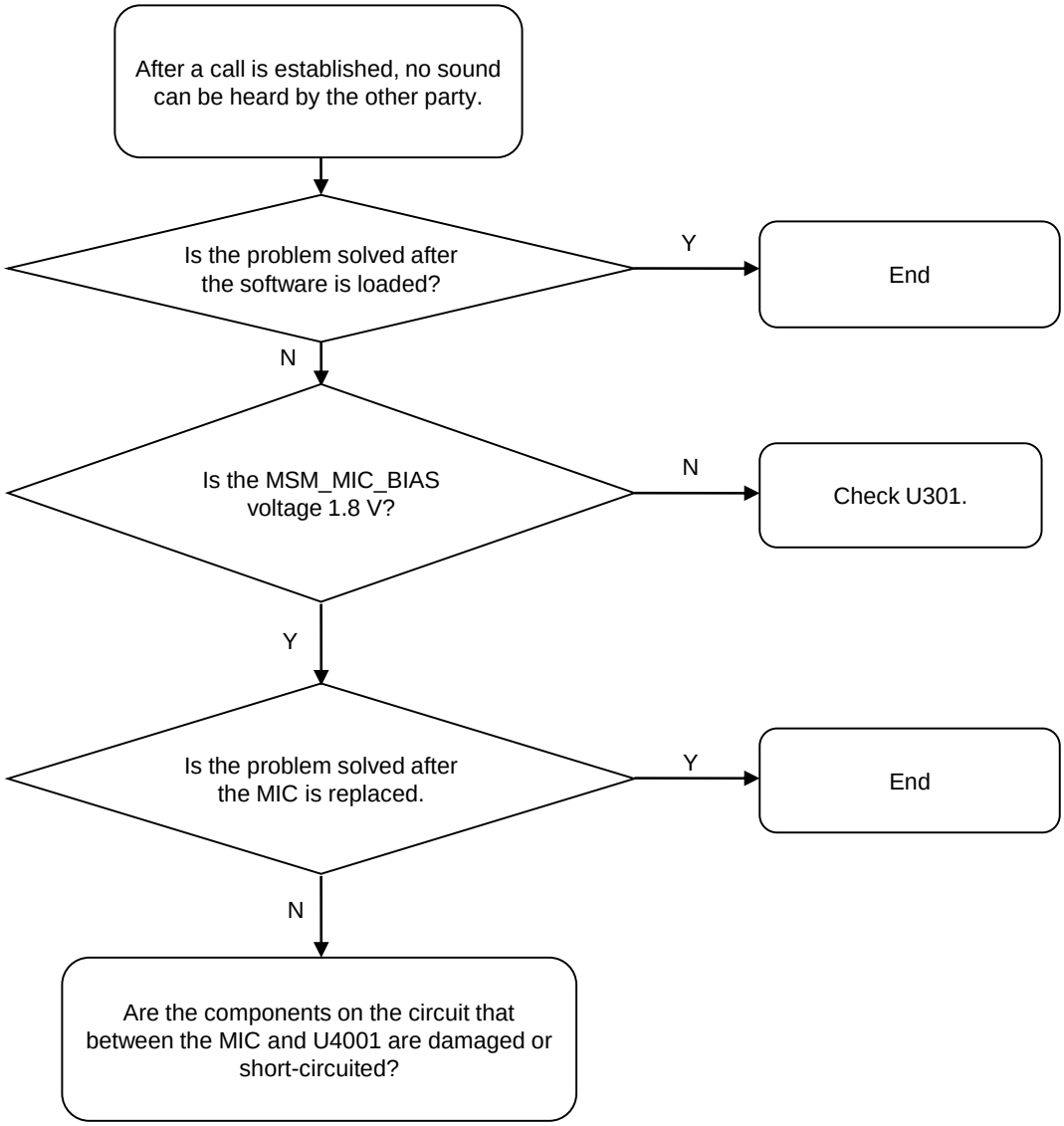


9.4.5 Call Transmission

Troubleshooting process

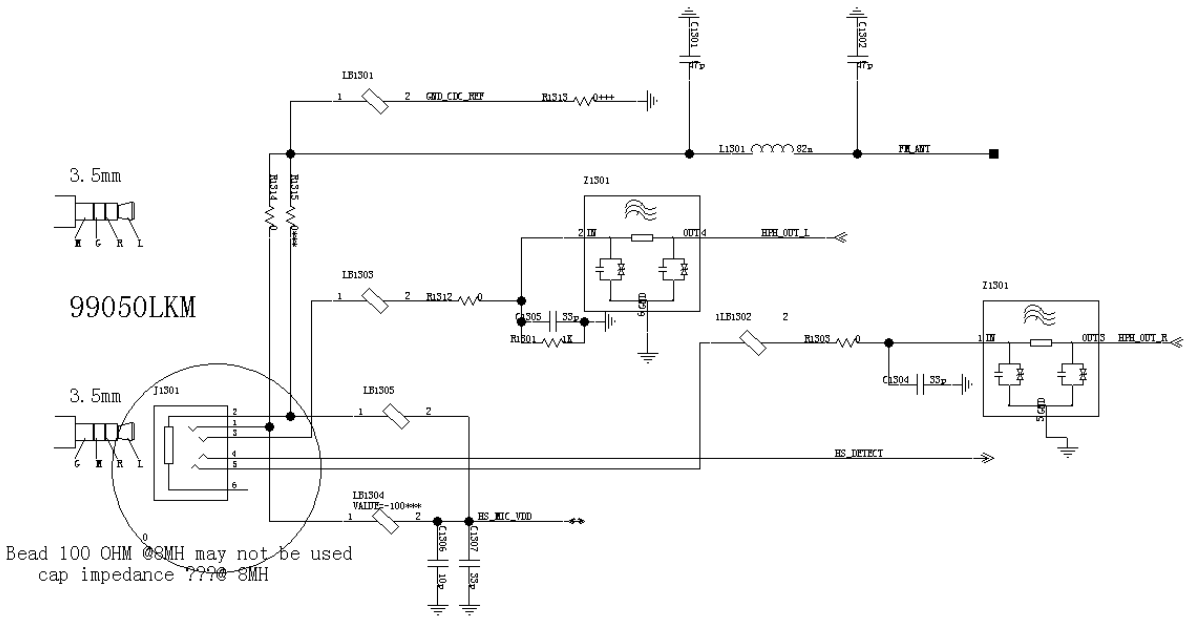
Failure: No sound is heard by the other party during a call.

Solution: Check whether the phone is set properly.



9.4.6 Headphone

Circuit schematic diagram



The headphone connect status is identified according to the HS_DETECT_N (GPIO_026).

Before connecting the headphone, HS_DETECT_N is pulled up to high level by VREG_MSM_L20_1V8.

After connecting the headphone, HS_DETECT_N is dropped down to low level by the resistor R902.

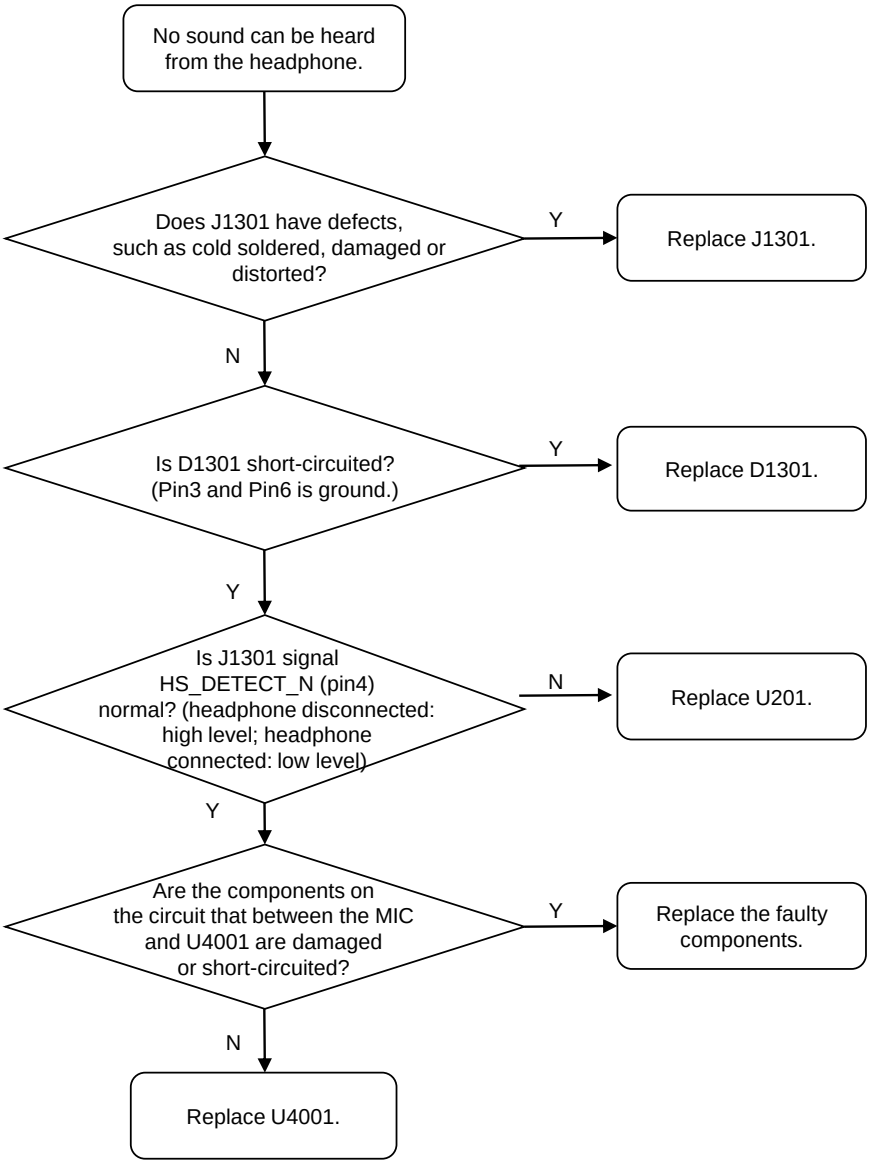
The headphone MIC is supplied with power by MIC_BIAS1 (PM8058/HSED_BIAS1), and it is used for headphone answer detection.

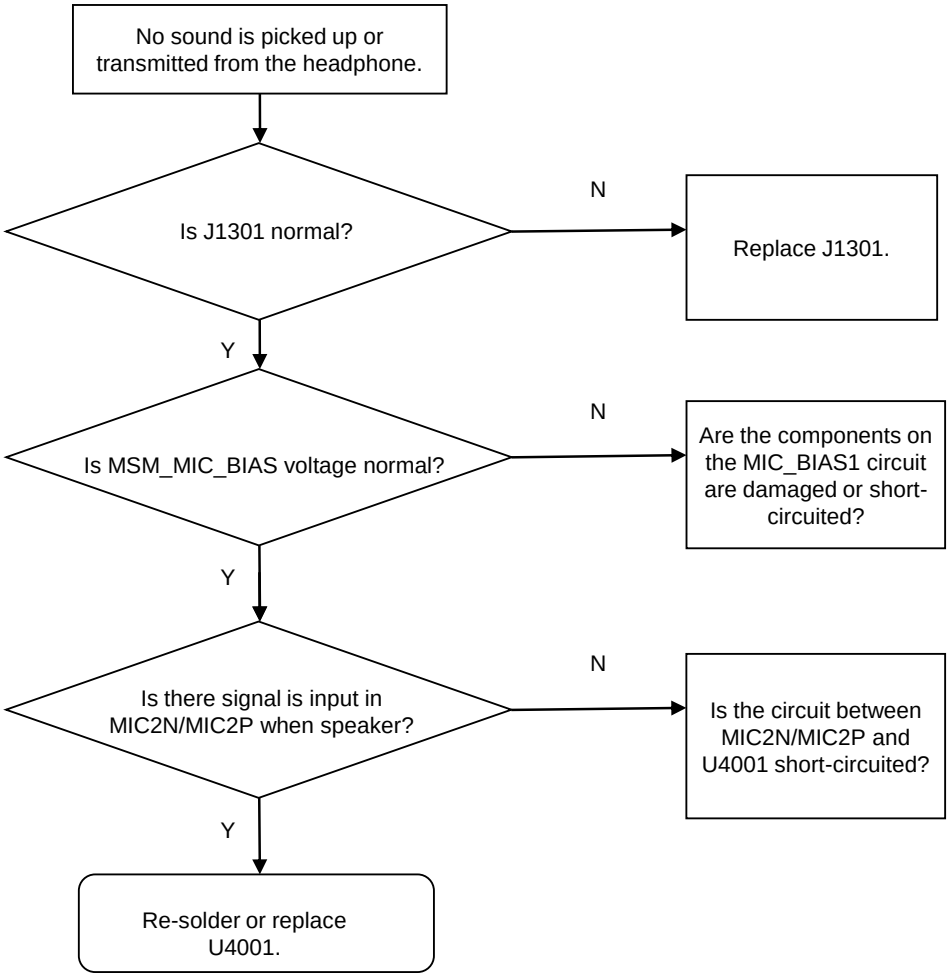
U8860's headphone is compatible with two line sequences. The iphone's headphone line sequence is compatible by default.

Troubleshooting process

Failure: Perform the test using a normal headphone, and no sound is heard.

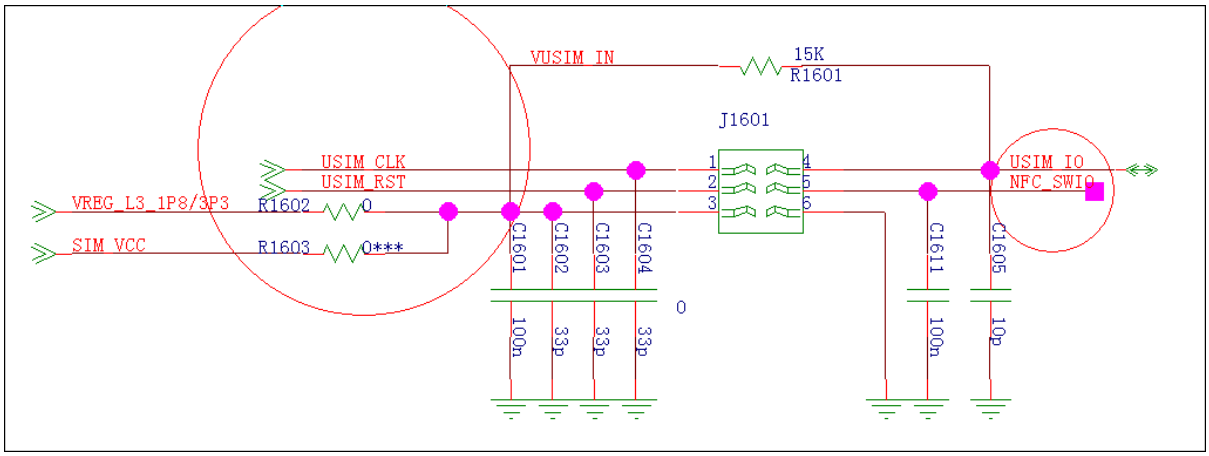
Solution:





9.4.7 SIM Card

Circuit schematic diagram



USIM interface of the MSM8255

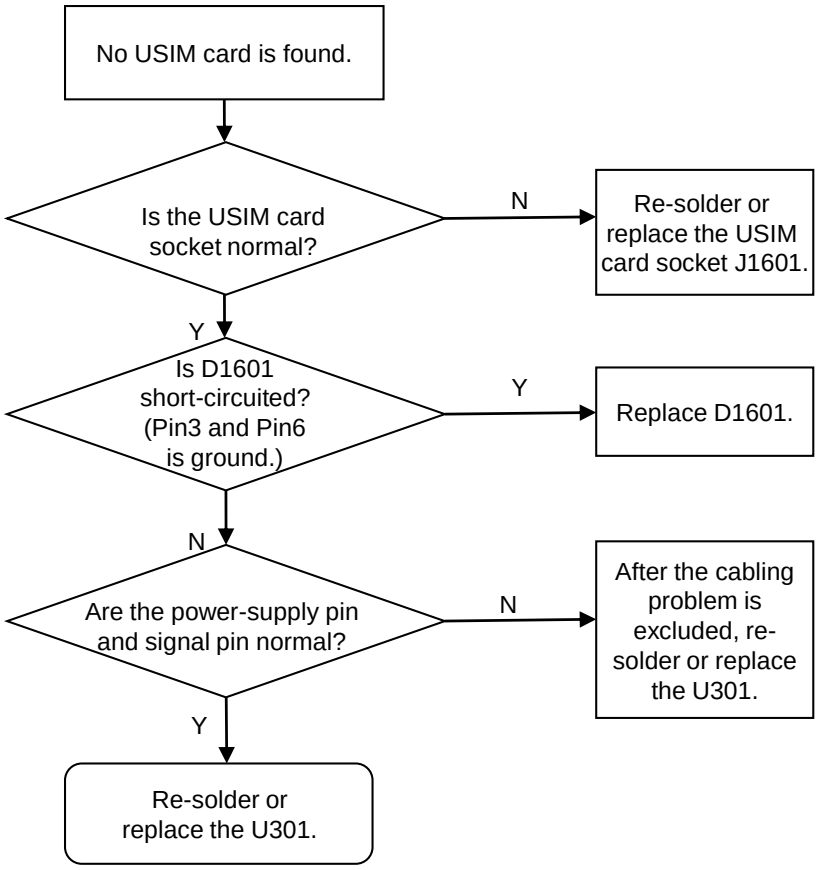
Signal	Description
USIM_IO	SIM data line
USIM_RST	SIM reset signal
USIM_CLK	SIM clock
USIM_VCC	SIM power supply, 1.8 V/3.0 V

After is phone is powered on, it will detect the SIM card. If the SIM card is found, it will start data communication, and the preceding pins will perform power clock and data transmission. If the SIM card is not found, the system does not detect SIM card status. Therefore, it does not support hot swap.

Troubleshooting process

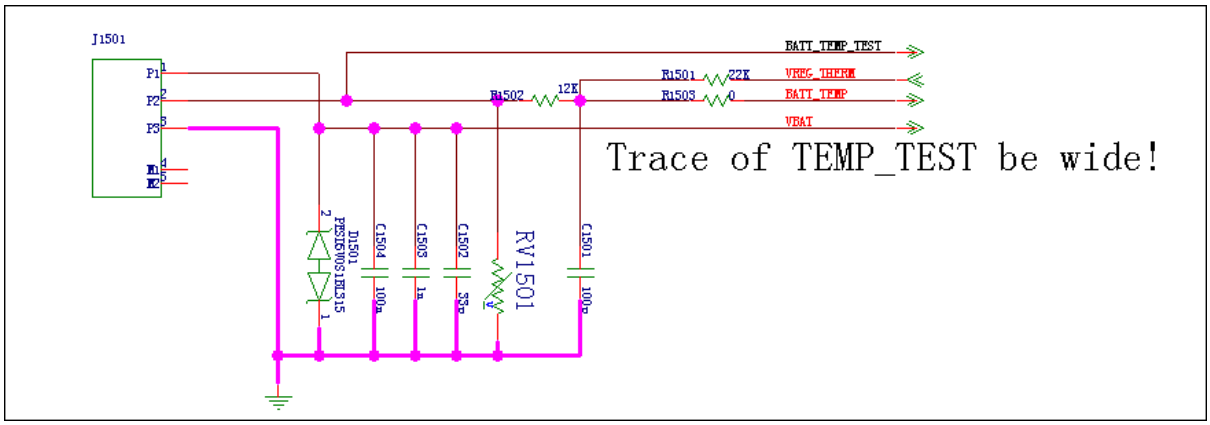
Failure: The USIM card cannot be detected.

Solution: Firstly, check whether the software is faulty or the USIM card is damaged. If the card is not damaged, perform the following procedure.



9.4.8 I/O Connector

Circuit schematic diagram



Analysis

When a charger connected to the I/O connector (USB connector), the charger provides charging voltage to charge the battery.

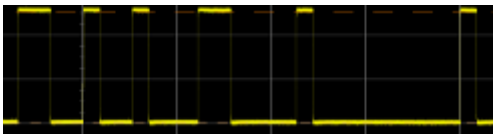
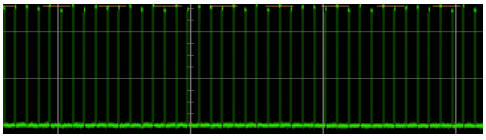
When the phone is connected to a computer using a USB cable, USB_DM and USB_DP are used for communication (for upgrading the phone's firmware, reading information from the phone…) between the phone and the computer.

Troubleshooting process

Failure: The phone cannot be charged or detected by a computer.

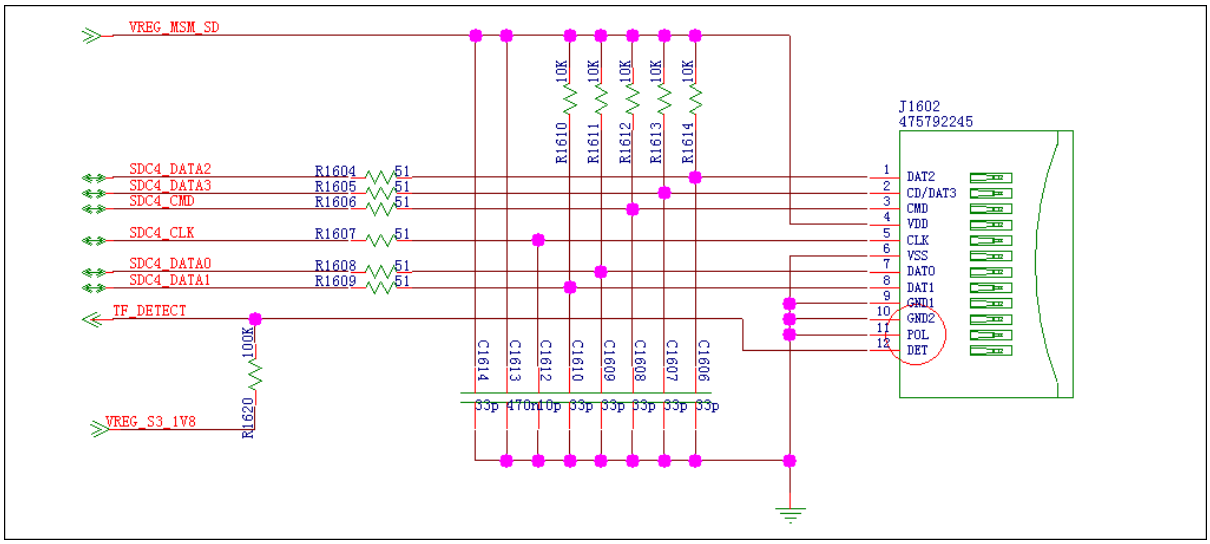
Solution: Clean, re-solder or replace the USB connector.

Description of the signals in the circuit diagram in this section

Signal	Description	Reference Measurement or Wave Form
VEXT_DC	Charging current input	High level, 5 V
USB_DM	Digital signal	
USB_DP	Digital signal	

9.4.9 microSD Card Connector

Circuit schematic diagram



The SDIO4 connector is adopted to connect the MSM8255 and the T-FLASH card.

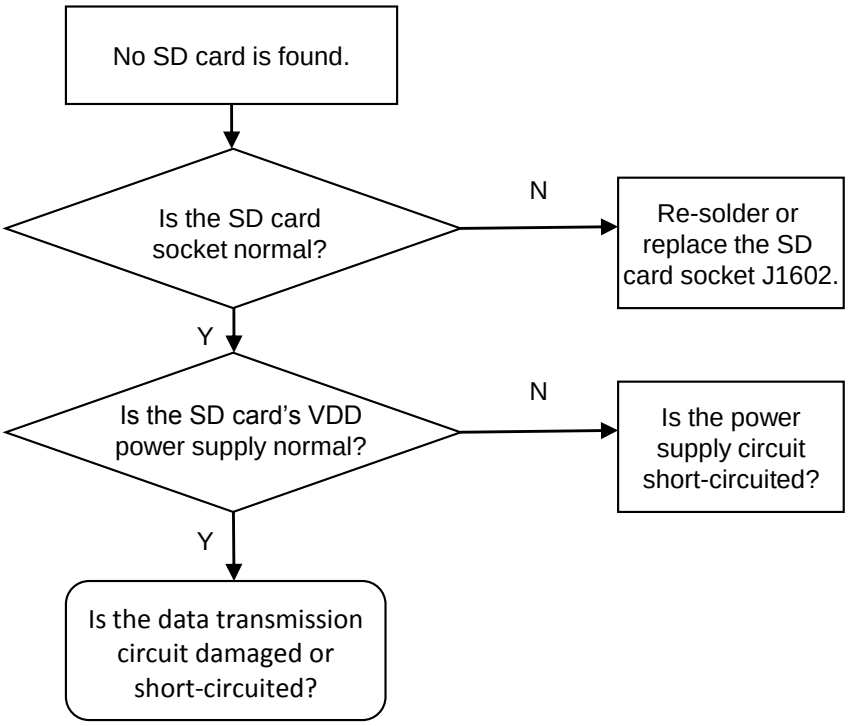
Signal	Description
SDC4_DATA0~ SDC4_DATA3	Data line
SDC4_CLK	Clock
SDC4_CMD	Control signal
SD_PWR_EN_N	Presence detection

After the phone is powered on, the system will periodically detect the SD card through the pin of the SD_PWR_EN_N. After the SD card is found, the system will establish communication with the SD card through the pin. SDC4_CLK controls SD card data transmission and clock process. The data cable transmits data.

Troubleshooting process

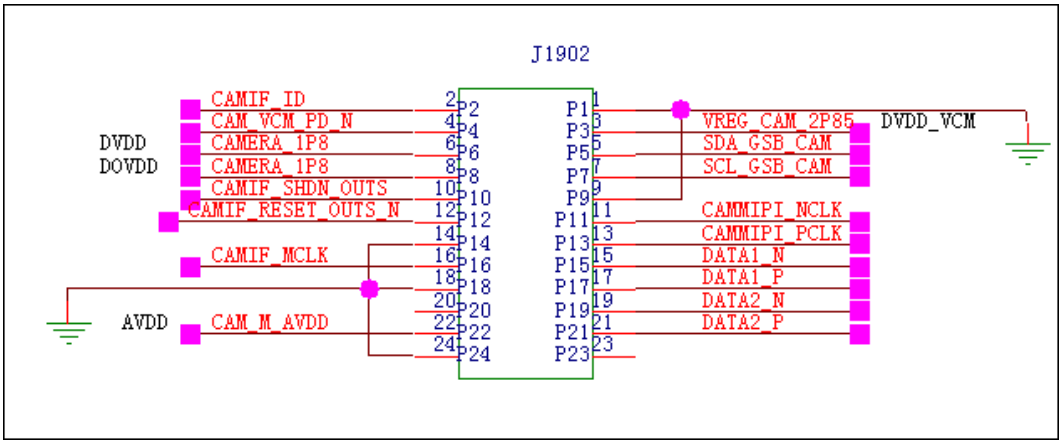
Failure: The microSD cards cannot be detected or read.

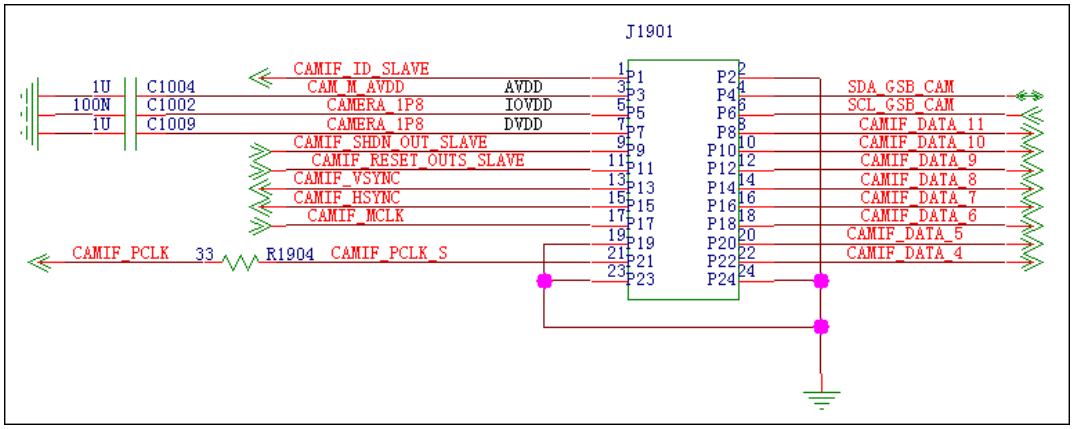
Solution:



9.4.10 Camera

Circuit schematic diagram





The 8-megapixel primary camera uses the 24 pin BTB connector and is controlled by the I2C bus. The data is transmitted in MIPI mode.

Signal	Remarks
VREG_L11_1P8	1.8 V
VREG_L11_1P8	1.8 V
VREG_CAM_2P85	2.85 V
CAMIF_MCLK	Camera's reference clock MSM->CAMERA
CAMMIPI_PCLK	MIPI clock
CAMMIPI_NCLK	MIPI clock
CAM_SHDN_OUTS	Close signal
SCL_GSB_CAM	I2C control signal
SDA_GSB_CAM	I2C control signal
CAMIF_ID	Module supplier identification
CAMIF_RESET_OUTS_N	Reset signal
CAM_VCM_PD_N	VCM motor control signal
VREG_CAM_2P85	VCM motor power supply signal
DATA1_P	Data communication signal
DATA1_N	Data communication signal
DATA2_P	Data communication signal
DATA2_N	Data communication signal

After the camera functions are enabled and the camera is powered on, the system establishes control communication with the camera through the I2C bus to control the camera. The camera communication is implemented depending on the MIPI interface. The data is synchronously provided by two CAMMIPI clocks, and is transmitted by data interface.

During focal length adjustment, the internal motor is supplied with power by VREG_CAM_2P85, and the control signal is provided by CAMIF_RESET_OUTS_N.

The 0.3-megapixel secondary camera shares the I2C bus with the 8-megapixel primary camera. The data is transmitted in RAW mode. The interface definitions are as follows:

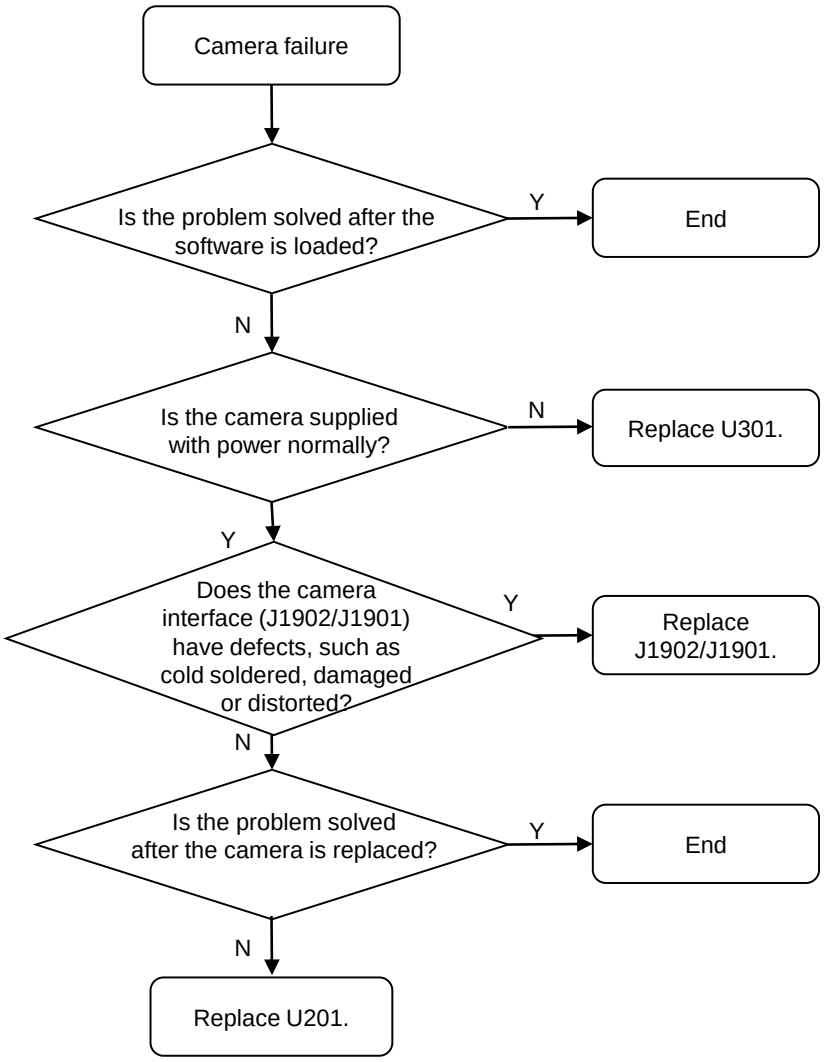
Signal	Remarks
VREG_L11_1P8	1.8 V
VREG_L13_2P85	2.85 V
CAMIF_MCLK	Camera's reference clock MSM->CAMERA
CAMIF_PCLK	CAMRA->MSM 96MHz max
CAMIF_DATA[11:4]	8-bit USB cable
CAMIF_HSYNC	Line synchronizing signal
CAMIF_VSYNC	Frame synchronizing signal
SCL_GSB_CAM	I2C control signal
SDA_GSB_CAM	
CAMIF_RESET_OUTS_SLAVE	Reset signal

The function implementation method for the secondary camera is same as that for the primary camera while their data transmission modes are different.

Troubleshooting process:

Failure: No image can be captured.

Solution:



9.4.11 BT&WiFi

The BT functions are implemented depending on the BCM4329, and the BT data of the MSM8255 and BCM4329 are transmitted by UART and PCM. The signal definitions are as follows:

Signal	Remarks
QTR_BT_UART_CTS	The ready to receive information sent to the Slave by the Host
QTR_BT_UART_RTS	The clear to send information sent to the Host by the Slave
QTR_BT_UART_TXD	Sending signal
QTR_BT_UART_RXD	Receiving signal
QTR_BT_PCM_DIN	PCM input
QTR_BT_PCM_DOUT	PCM output

Signal	Remarks
QTR_BT_PCM_SYNC	PCM synchronization
QTR_BT_PCM_BCLK	PCM clock
QTR_BT_HOST_WAKE	Waking up the host
QTR_BT_EXT_WAKE	Waking up the peripherals

After the BT module is enabled, you can perform BT communication. You can know whether the host or peripherals is woken up based on QTR_BT_HOST_WAKE or QTR_BT_EXT_WAKE. The signal interfaces of QTR_BT_UART_TXD and QTR_BT_UART_RXD control data transmission, determining to receive or transmit data. QTR_BT_UART_CTS and QTR_BT_UART_RTS transmit status signals, and you can know the BT status according to these two pins. Data transmission is performed by the four pins of PCM.

The Wifi functions are implemented depending on the BCM4329, the communication of the MSM8255 and BCM4329 adopts the SDIO bus of the SDIO3 interface. The signal definitions are as follows:

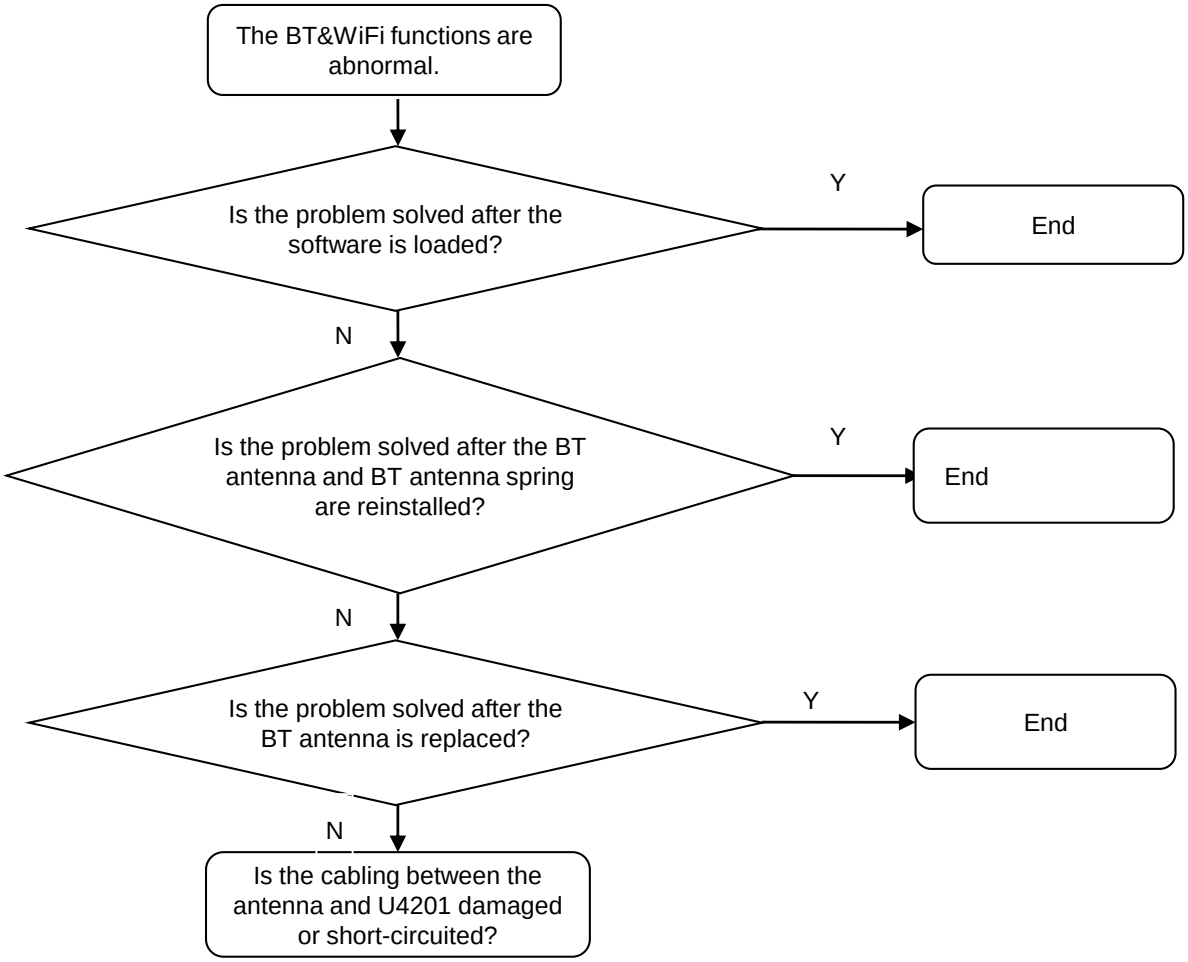
Signal	Description
SDC3_DATA3	Data line
SDC3_DATA2	
SDC3_DATA1	
SDC3_DATA0	
SDC3_CLK	Clock
SDC3_CMD	Control signal

After the WiFi function is enabled, the data transmission is controlled by SDC3_CLK and SDC3_CMD, and is performed by the four data control pins.

Troubleshooting process

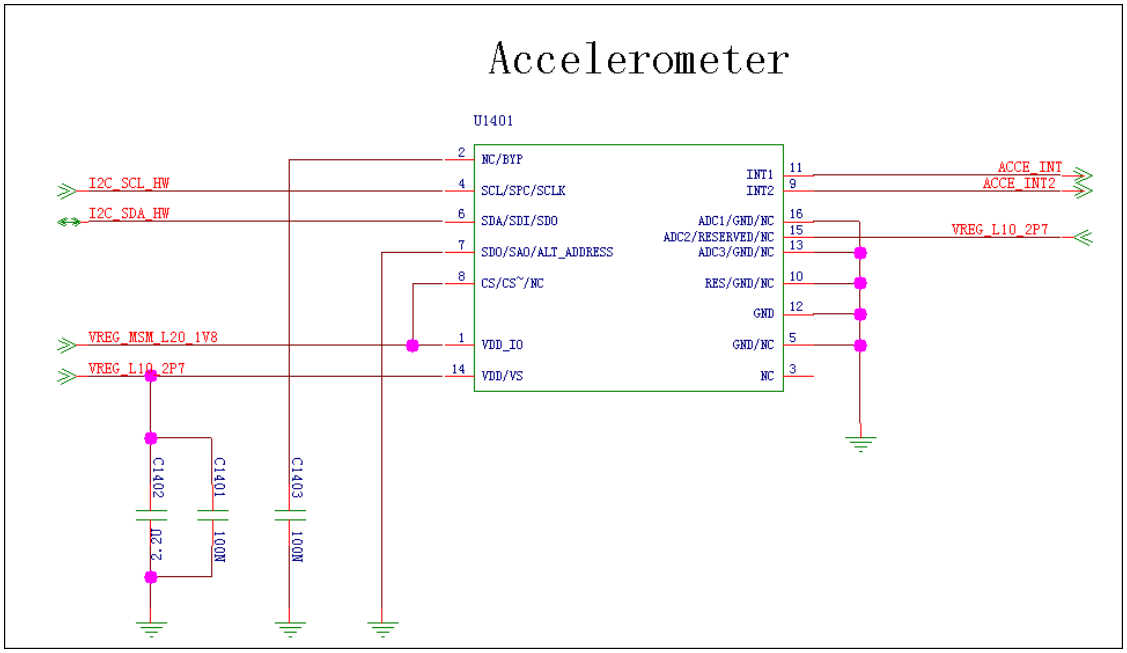
Failure: the BT and WiFi functions are abnormal.

Solution:



9.4.12 Accelerometer

Circuit schematic diagram



Signal	Description
I2C_SCL_HW	I2C bus
I2C_SDA_HW	
ACCE_INT	Accelerometer interrupt signal
ACCE_INT2	Accelerometer interrupt signal (sleep)——

Analysis

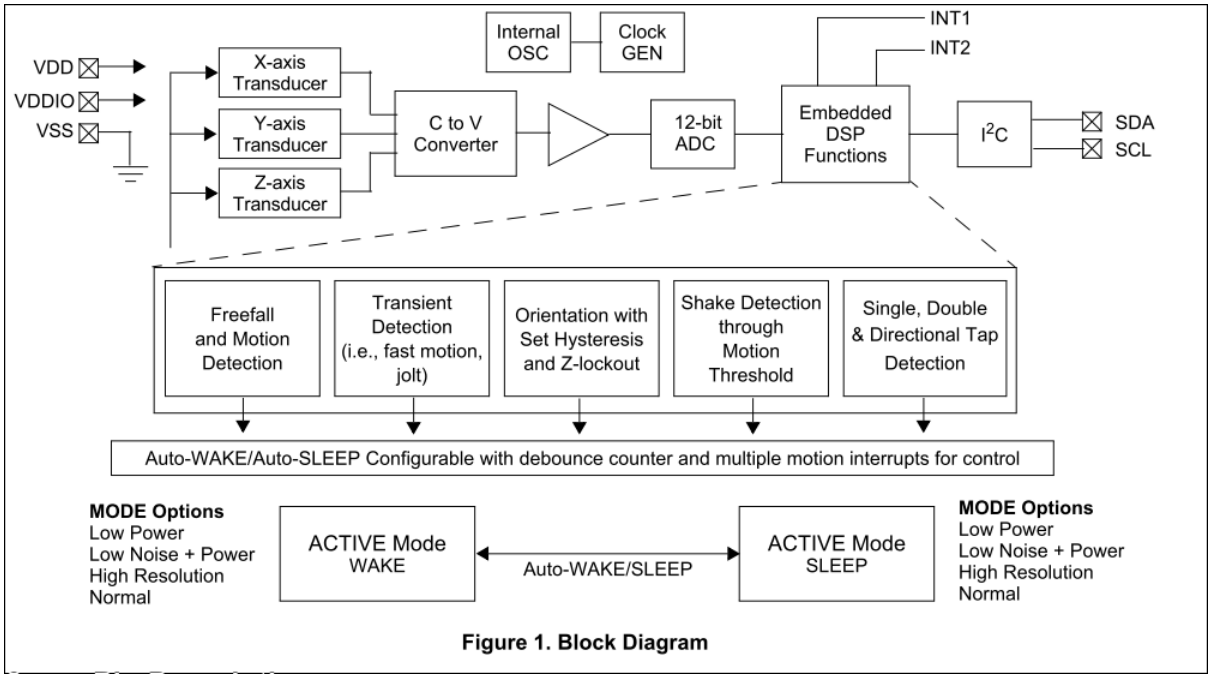


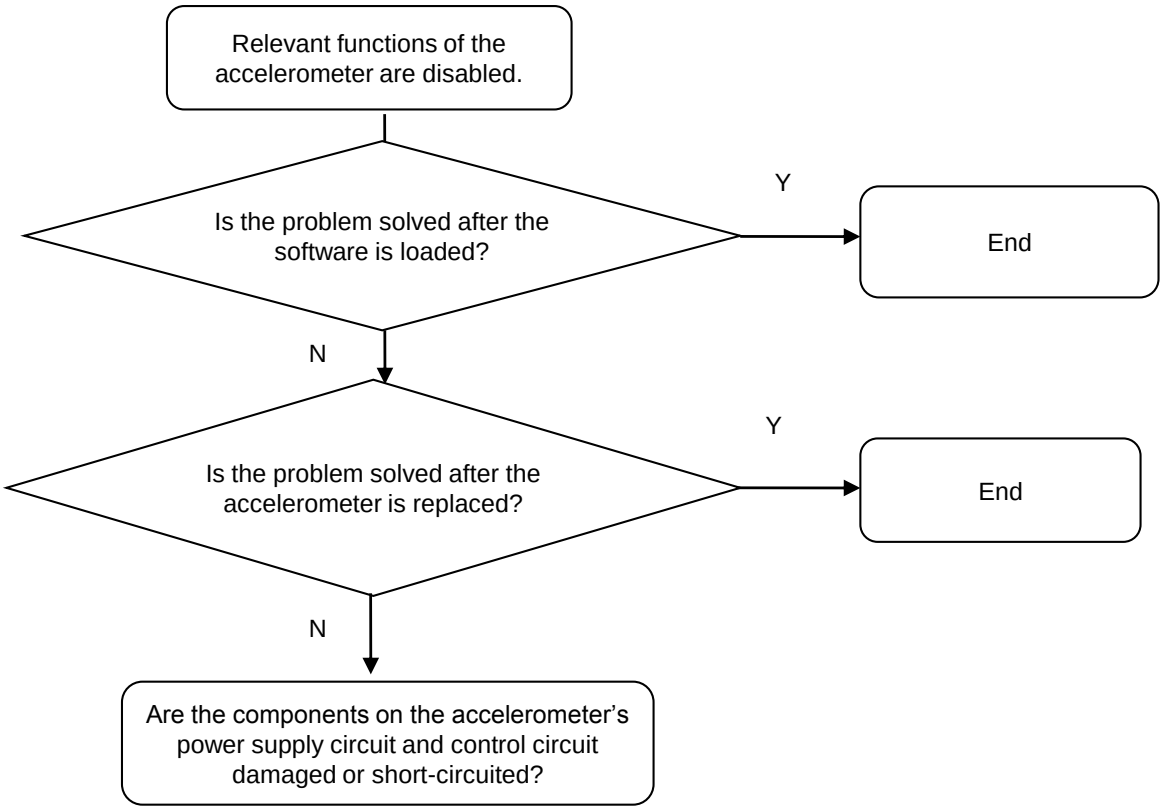
Figure 1. Block Diagram

Firstly, the internal micro mechanical structure of the accelerometer detects the accelerometer position. The position is reflected as the three-axis-electric charge amount inside the accelerometer. The voltage conversion device for the internal electric charge converts the voltage to voltage signal and amplifies it. Then the amplified signal is converted to digit signal through the 12-bit ADC, and is transmitted to the chip's DSP for data processing. The interrupt signal and data signal are outputted for data transmission with the main chip.

Troubleshooting process:

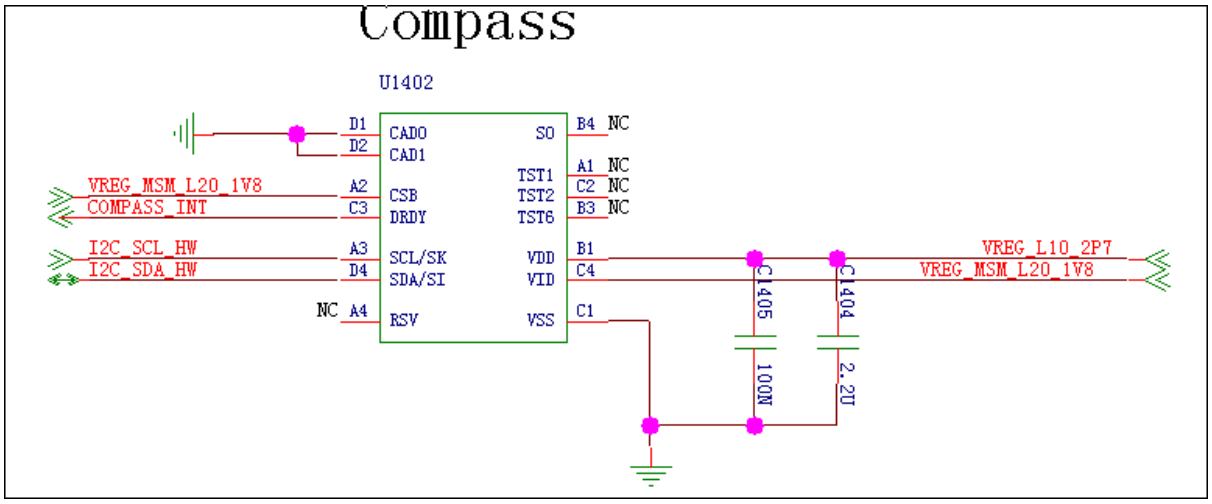
Failure: Relevant functions of the accelerometer are disabled.

Solution:



9.4.13 Compass

Circuit schematic diagram



Signal	Description
I2C_SCL_HW	I2C bus

Signal	Description
I2C_SDA_HW	
COMPASS_INT	Compass interrupt signal

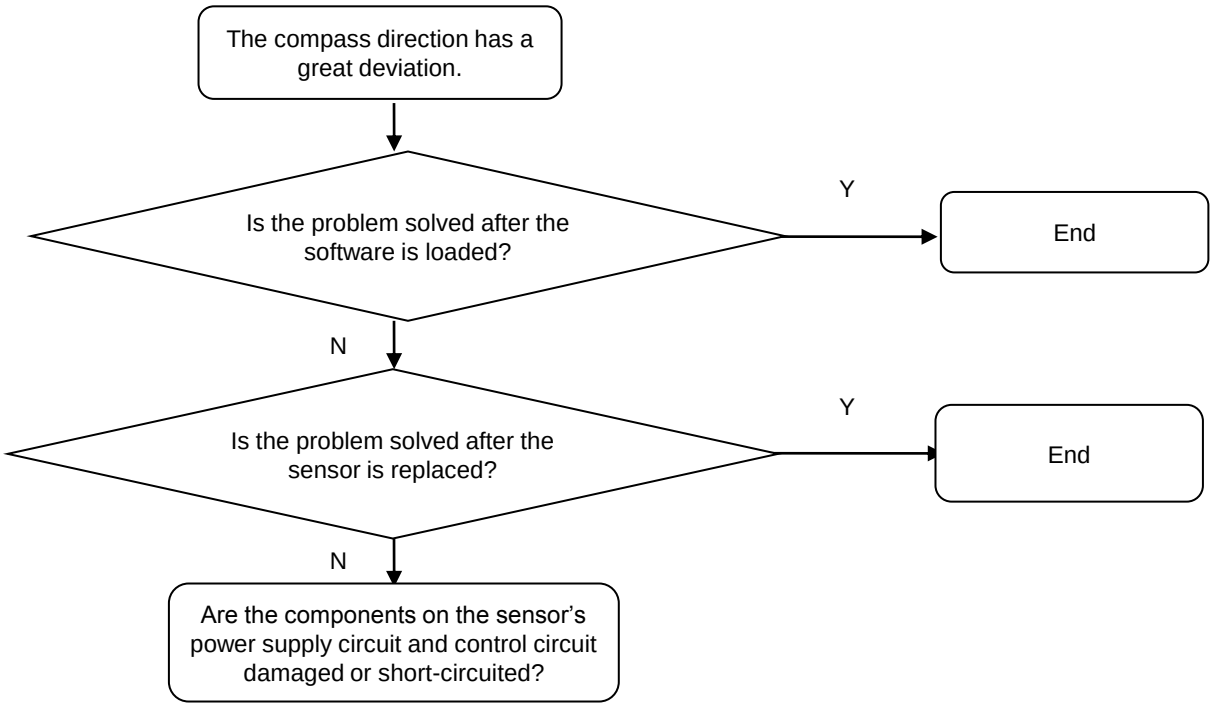
The compass is a three-axis-Hall sensor. Because of the earth's magnetic field, the chip generates electricity components on the three axes. After three components are processed inside the chip, the direction of the earth's magnetic field relative to the chip is obtained. Through the I2C bus, the chip communicates with the main chip. Through data processing, the main chip can obtain the relationship of the earth's magnetic field direction and the phone position.

When the compass is operating, the compass direction variation is reported to the main chip, but in the map program, the compass direction is related to GPS. As a result, the unstable GPS signal may cause compass direction error.

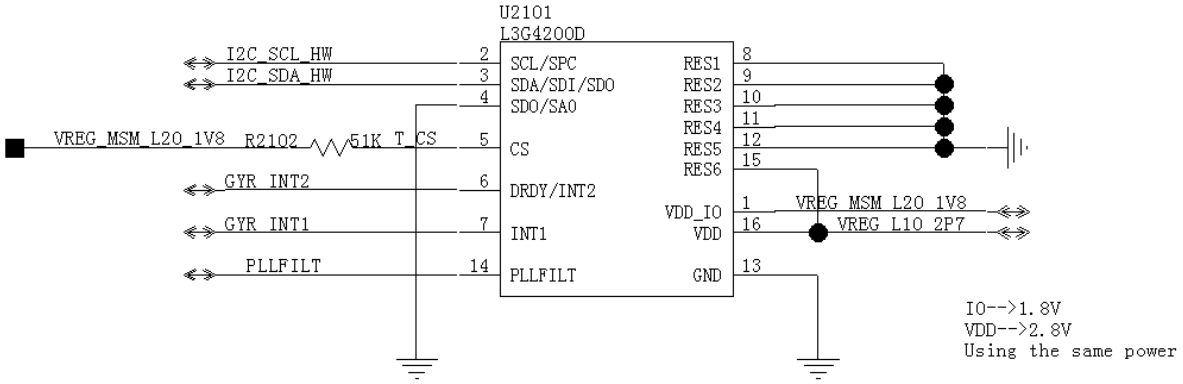
Troubleshooting process:

Failure: Relevant functions of the compass are disabled.

Solution:

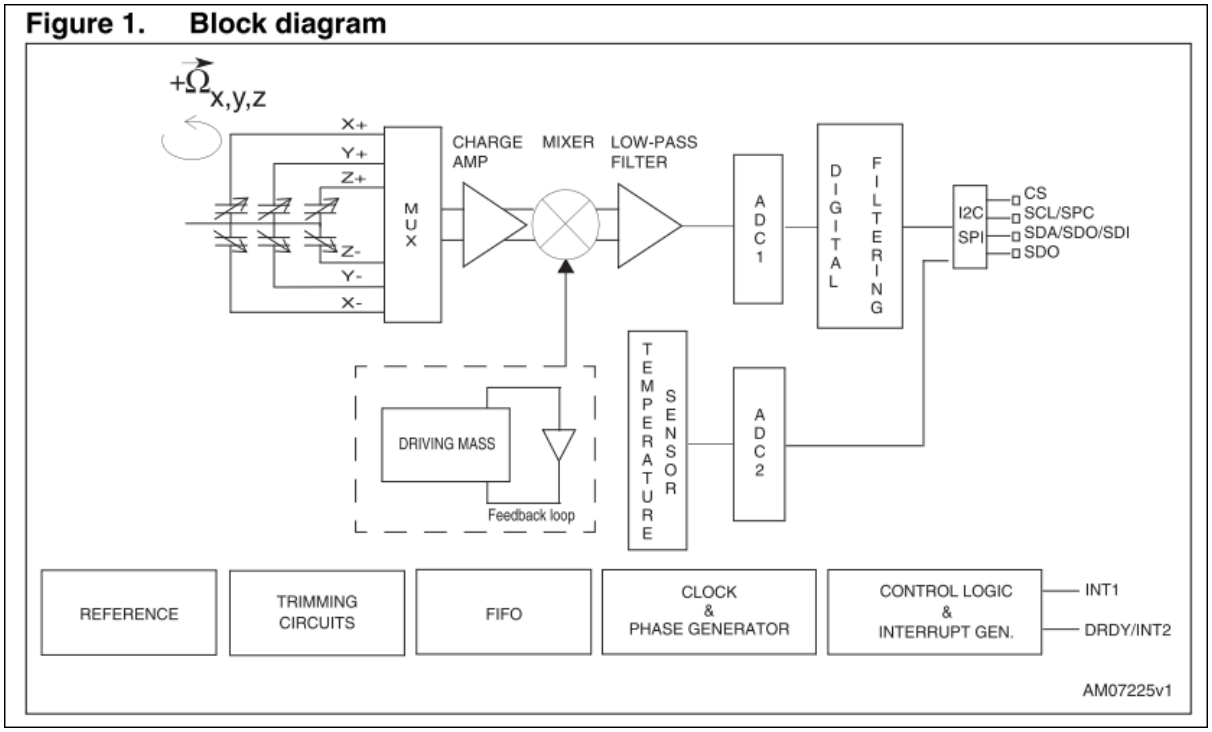


9.4.14 Gyroscope



Signal	Description
I2C_SCL_HW	I2C bus
I2C_SDA_HW	
GYR_INT1	Gyroscope interrupt signal
GYR_INT2	Gyroscope interrupt signal (sleep)

The gyroscope's internal architecture is as follows:



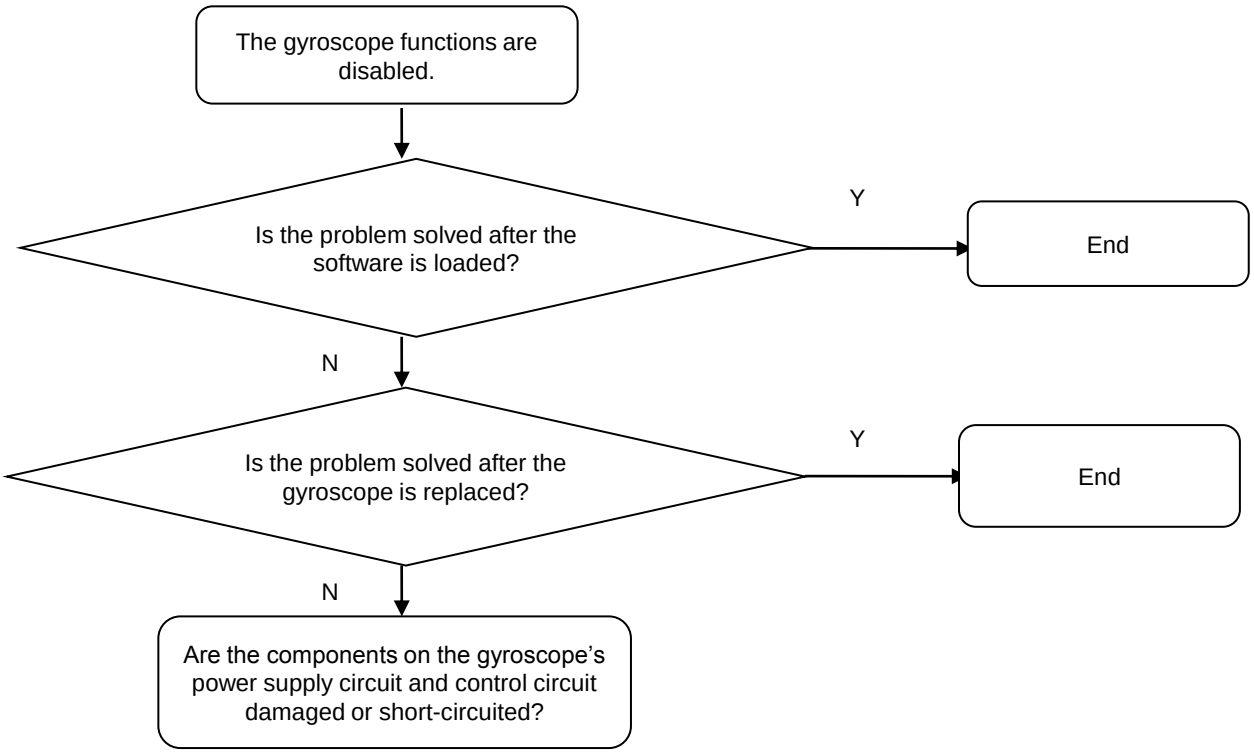
The gyroscope's core is a dipole. When the gyroscope is working, the core vibrates on the three axes' directions. If the phone rotates, because of the Coriolis force, the rotation will be

reflected as the variation of the corresponding electric signal of the internal circuit. After processing the result, you can obtain the rotation direction.

Troubleshooting process:

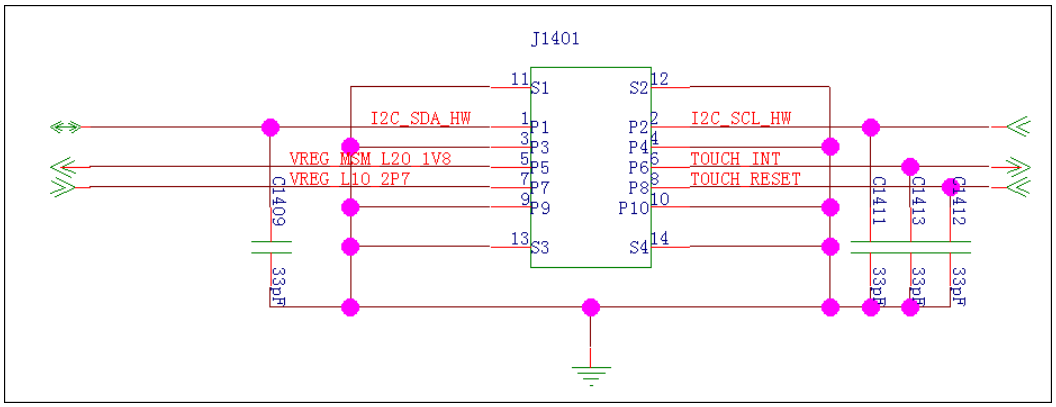
Failure: Relevant functions of the gyroscope are disabled.

Solution:



9.4.15 Touch Panel

- Touch panel's circuit unit is a module fixed inside the touch panel. Its interface circuits are as follows:



The principle of capacitive touch panel is: Attaching a layer of transparent metal conductive materials on the glass. When the finger touches the touch panel, the capacity on the touching point varies, which causes the oscillator frequency to vary. Then system can obtain the touching position according to the frequency variation.

As the touch panel module is integrated on the touch panel, the main board and touch panel must be connected by a BTB connector. The connector can be damaged easily. In addition, you must power on the touch panel according to the power-on sequence. First supply the 2.7 V power, and then supply the 1.8 V power; otherwise, the touch panel is disabled. When the touch panel is operating, the I2C controls data transmission.

Four touching key fields are added to the U8860's 4-inch capacitive touch panel, and four backlight LEDs for the four keys are added to the touch panel module.

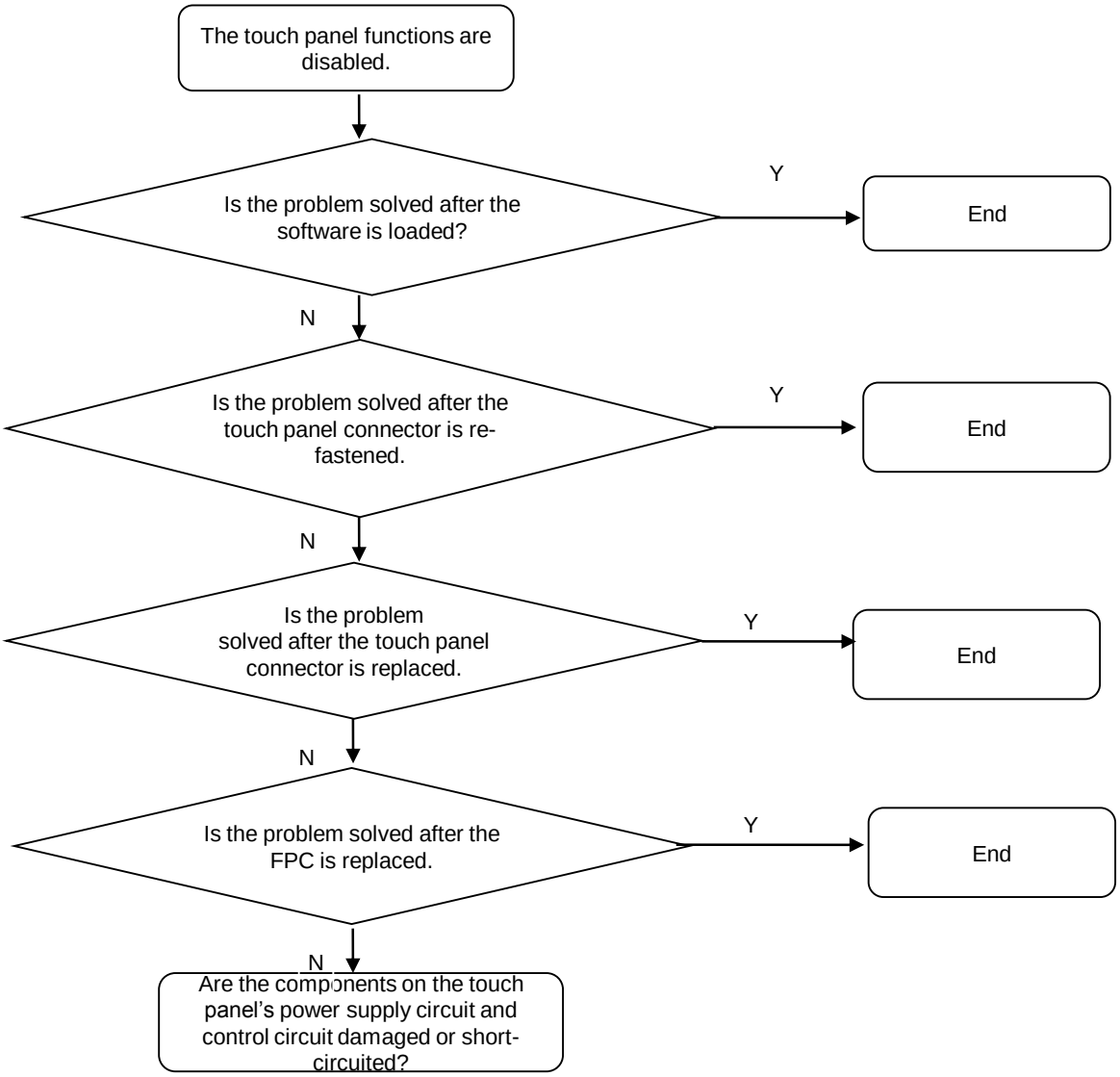
The definitions of the interfaces for touch panel and MSM8255 and touch panel and PM8058 are as follow:

Signal	Description
VREG_L10_2P7	Touch panel analog power supply, 2.7 V
VREG_MSM_L20_1V8	Touch panel digit power supply and I/O connector power supply, 1.8 V
TOUCH_INT	Touch panel interrupt signal
I2C_SCL_HW	Touch panel' I2C clock cable
I2C_SDA_HW	Touch panel' I2C data cable
TOUCH_RESET	Touch panel reset signal

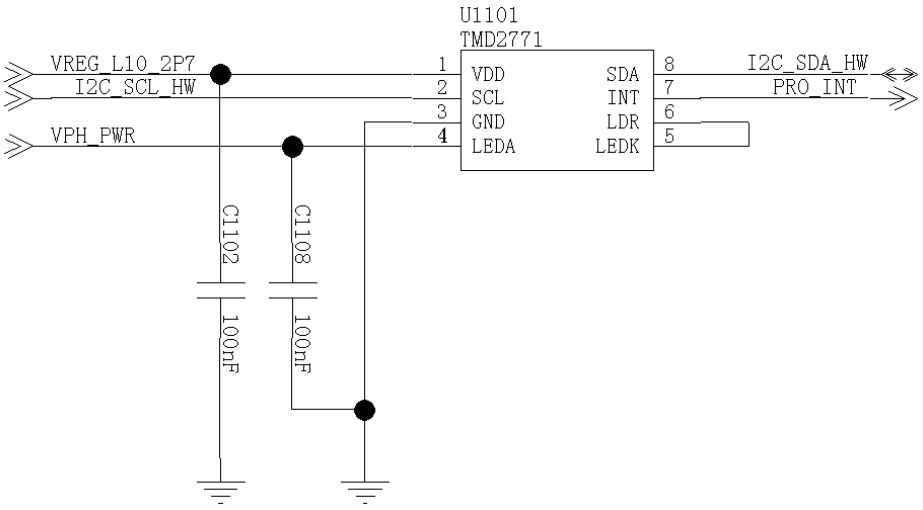
- Troubleshooting process:

Failure: The touch panel is faulty.

Solution:



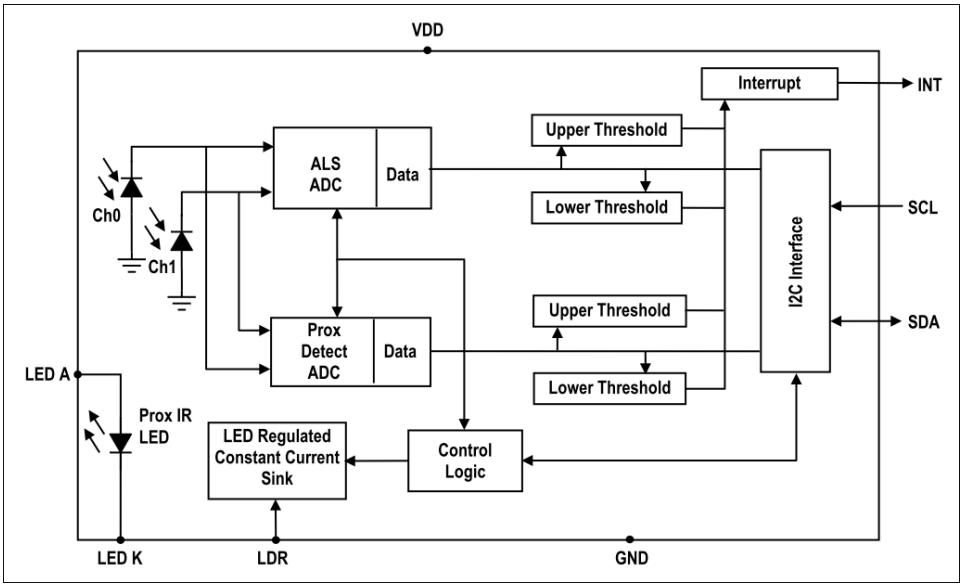
9.4.16 Approach Sensor



Signal	Description
I2C_SCL_HW	I2C bus
I2C_SDA_HW	
PRO_INT	Three-in-one interrupt signal

The approach sensor has two functions. One is for screen brightness adjustment. The other is for misoperation prevention. If you select automatic adjustment, the system will enable the approach sensor's environment light detection function to detect the brightness of the environment light, and then adjust the screen brightness accordingly. The approach sensor realizes the approach status of the phone and other objects depending on the internal infrared sensor. If the approach status achieves a certain threshold, the system will shut down the screen forcibly to prevent it from misoperation. The I2C bus controls the approach sensor components and data transmission. The interrupt pin provides the interrupt signal.

The approach's internal structure is shown in the following figure.

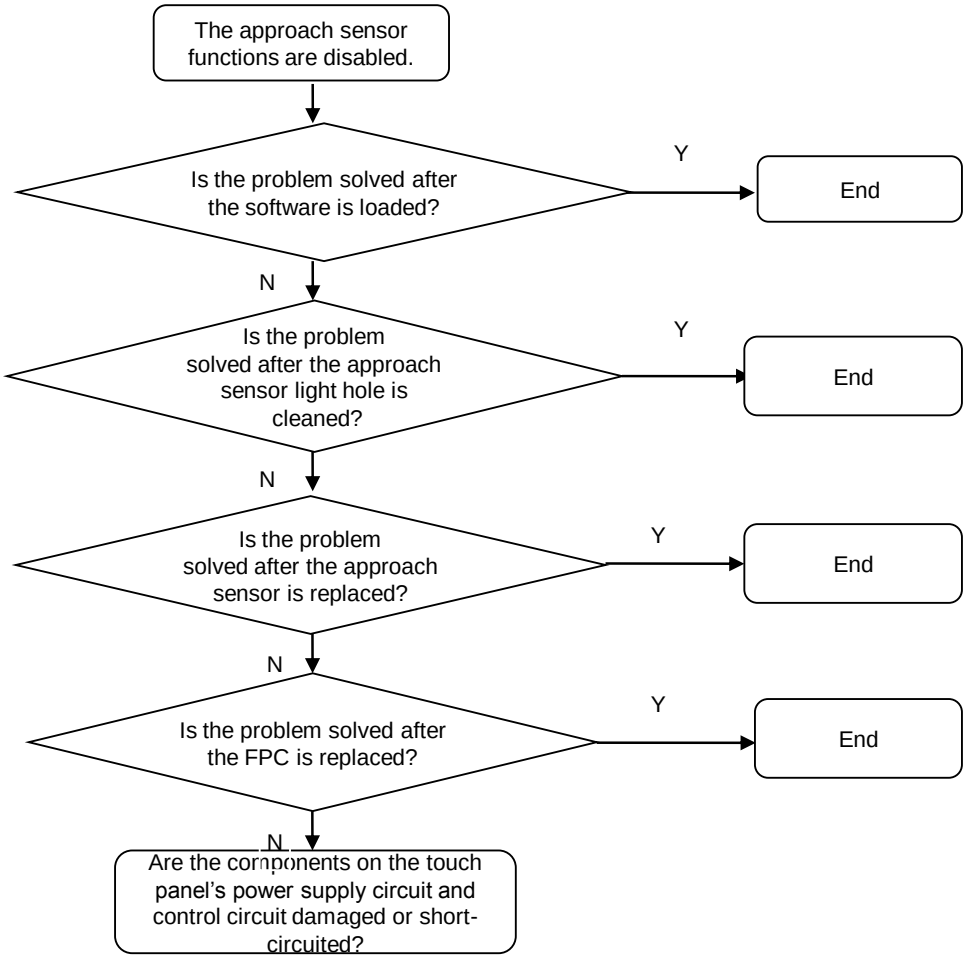


The CH0/CH1 receives environment light and generates environment light value by processing the data internally. Then the system automatically adjusts the LCD brightness according to the environment light value. The approach sensor is to prevent the phone from misoperations caused by the contact of the face and touch panel. As a result, if the inferred emitted by the LED inside the chip is blocked, it will be reflected. Then the sensor will receive the reflected light through the photodiode and identify the obstacle position. When the approach status achieves a certain threshold, the system triggers the operation to shut down the touch panel.

Troubleshooting process

Failure: The approach sensor is faulty.

Solution:

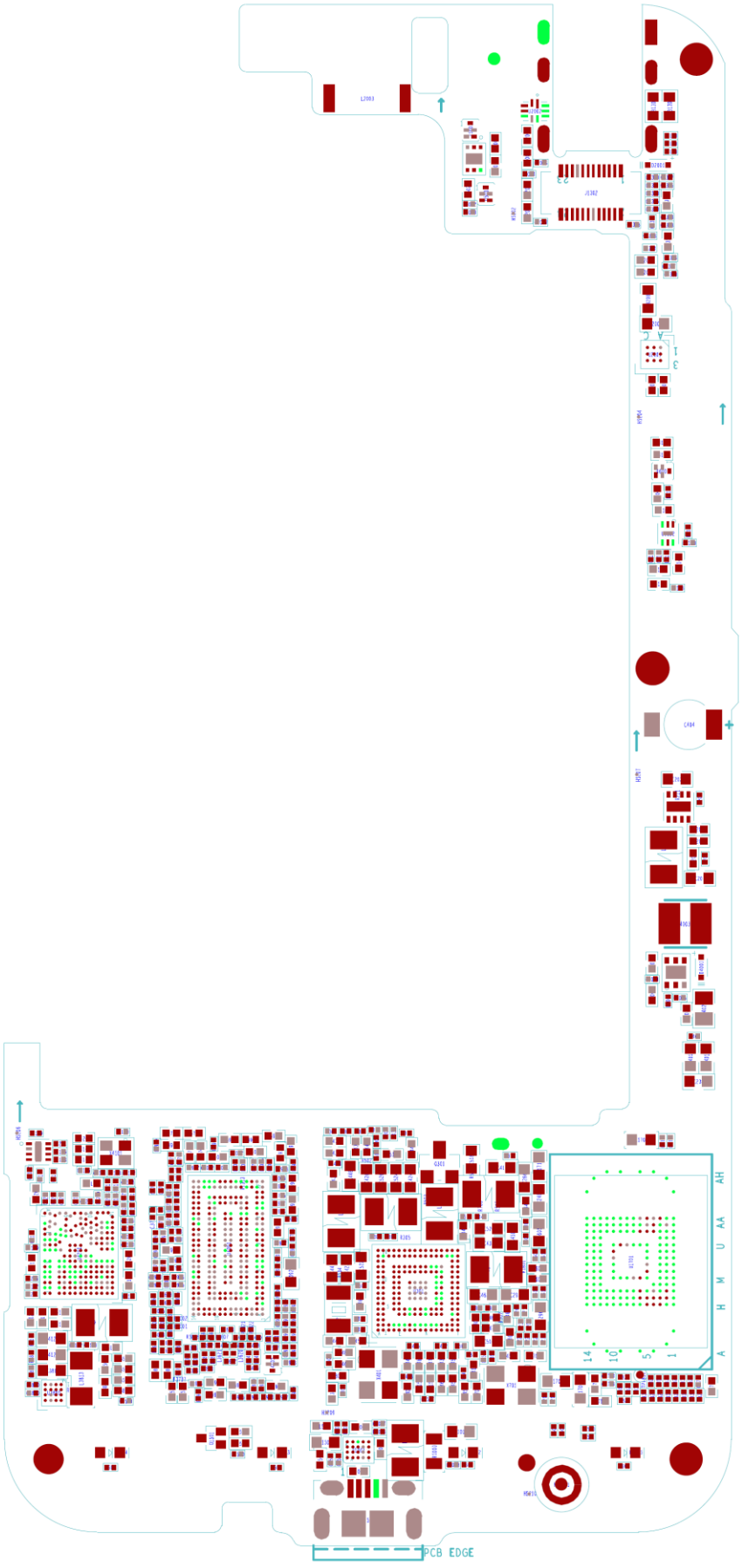


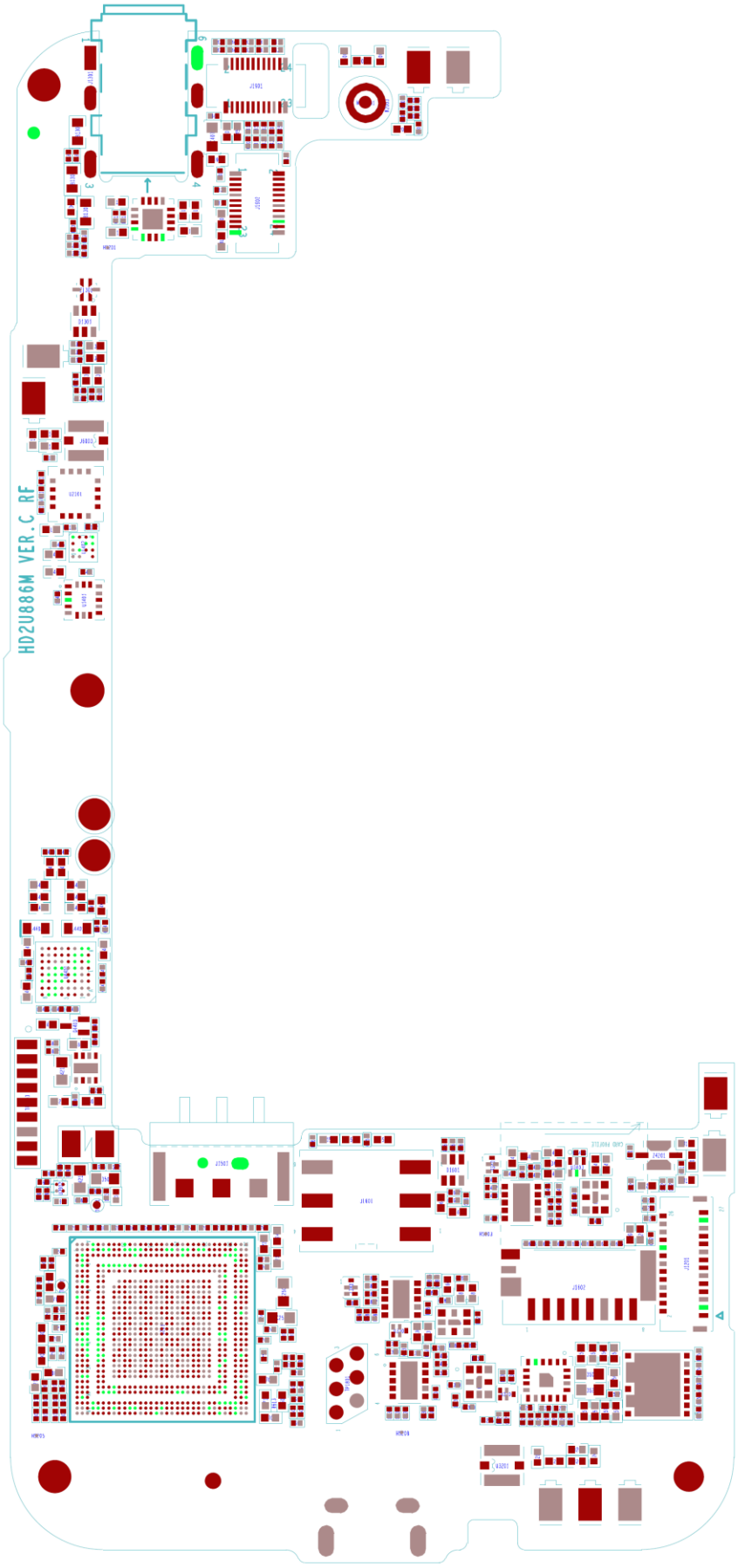
10 Solder Points on the PCB and BGA Chip

Red (R:255,G:0,B:0)  :Solder point

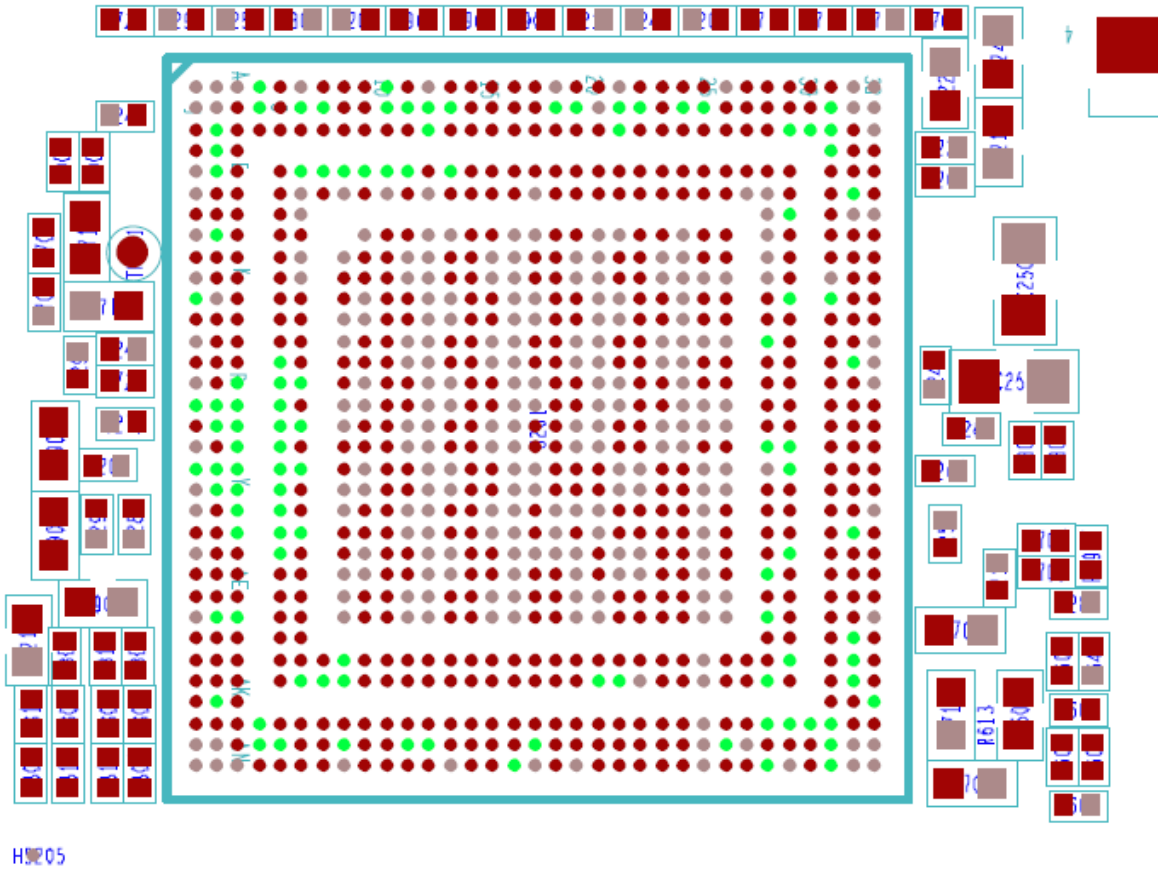
Green (R:0,G:255,B:0)  :Vacant point

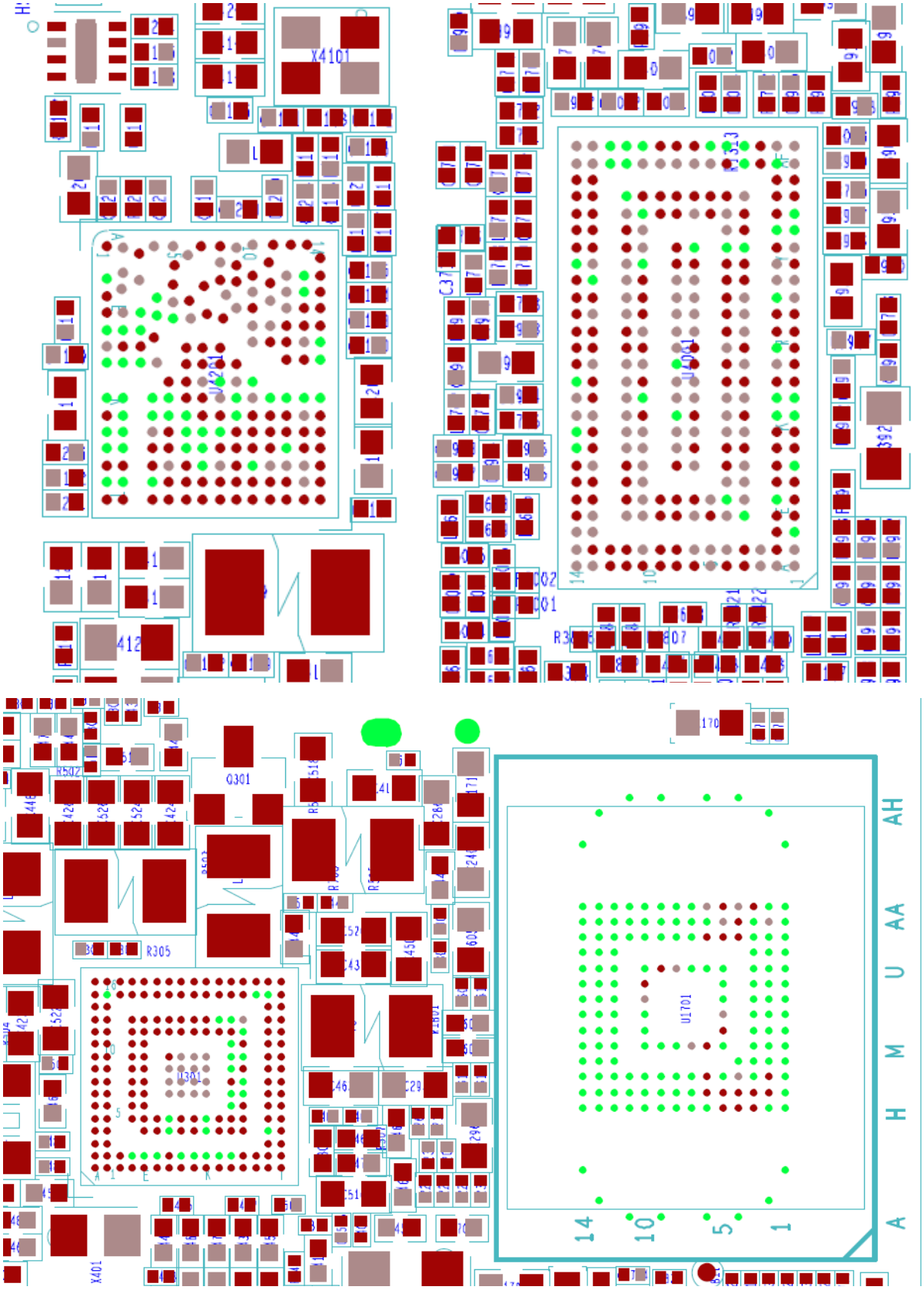
Main board diagram:





Partial amplified figure:





11 Functional Tests

11.1 Keys

11.2 MMI Test

On the idle screen after the phone is powered on, press *#*#2846579#*#* to enter the MMI test mode. Press the Volume- key to perform a test. Touch the Menu icon to skip the current test and go to the next step. Press the Back key to return to the previous test.

No.	Item	Step	Contents	Test Method and Precautions
1	SD card test	1	Testing SD card	Test the microSD card functions. If a microSD card is found and is available, the test succeeds. Otherwise, the information indicating the test fails. Then press the Volume- to perform the next test.
2	SIM card test	2	Testing SIM card	Check whether the SIM card can be found.
3	Keypad test	3	Testing keys	Press a key, and the color of its corresponding icon on the LCD is changed. After all keys are tested, press the Volume- to perform the next test.
4	LCD test	4	White screen Black screen Color screen	Press the Volume- to display the white screen. Press the Volume- to display the black screen. Press the Volume- to display a triple color bar (red, green and blue).
5	LCD backlight test	5	Testing LCD backlight functions	If the LCD backlight blinks continuously, the test succeeds. Press the Volume- to perform the next test.
6	8M camera test	6	Testing 8M camera functions	After the phone displaying the preview screen, press the Volume+ to capture the image. If the LED flash blinks one time, the test succeeds. Press the Volume- to perform the next test.
7	0.3M camera test	7	Testing 0.3M camera functions	After the phone displaying the preview screen, press the Volume- to perform the next test.
8	Touch panel test	8	Testing touch panel functions	Touch around the touch panel. After the edge of the touch panel displays red totally, the test succeeds. Press the Volume- to perform the next test.
9	Approach test	9	Testing approach sensor function	Place the shielding board above the touch panel and keep it away from the photic hole for about 4 mm. If a phone icon is displayed nearby the portrait, the function is normal.
10	Environmen t light test	10	Testing the approach sensor's environment light sensing function.	Check whether the environment light data is detected. When you cover the approach sensor with hand, the number displayed on the LCD should be around 10.

No.	Item	Step	Contents	Test Method and Precautions
11	Vibration test	11	Testing the motor functions	If the motor vibrates continuously, the test succeeds. Press the Volume- to perform the next test.
12	Speaker test	12	Testing the speak function	If music is heard from the speaker, the test succeeds. Press the Volume- to perform the next test.
13	Mobile phone MIC loopback test	13	Testing the MIC functions	Press Record, speak at the MIC, and then press Play. If the recorded voice is heard from the receiver, the test succeeds. Perform master MIC test , secondary MIC test, dual-MIC test, and then perform headphone loopback test. Connect the headphone, press record, speak at the headphone MIC, and then press play. If the recorded voice is heard from the headphone receiver, the test succeeds. Press the Volume- to perform the next test.
14	FM test	14	Testing FM functions	Search FM channels, if program voice is heard, the test succeeds. Press the Volume- to perform the next test.
15	Headphone cable control test	15	Testing the headphone cable	According to the prompt, first disconnect the headphone, and reconnect the headphone, then the In icon should turn green. Then disconnect the headphone, the Out icon should turn green. Press the Volume- to perform the next test.
16	BT Test	16	Testing BT functions	Check whether the BT functions are normal. If a BT device is found, the test succeeds. Press the Volume- to perform the next test. (Note: A terminal with BT function enabling is required to assist this test.)
17	Gravity sensing test	17	Testing gravity sensing functions	Move the phone to ensure that the phone exists in a three-dimensional space. If the phone and the X, Y and Z plates at an angle of 45 degrees respectively, the test succeeds.
18	Compass test	18	Testing compass functions	If the compass is immobile, sway it.
19	WiFi test	19	Testing WiFi functions	If signal is received normally, the test succeeds. (Note: A terminal with WiFi function enabling is required to assist this test.)
The MMI test is complete, and the test results are displayed on the LCD.				

11.3 Voice Call Test

- Install a UIM card and battery to the phone.
- Press the power key to Power the phone on.
- Check whether the signal strength displayed on the LCD is normal.
- Make a call to a fixed-line phone, and check the voice quality during the call.
- If no problems are found during the test, finish the voice call test. If any problems are found, troubleshoot the phone or send it to an advanced service site for repair.