

# YU220 advanced edition maintain service V1.0

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## Revise record

Date	Revised version	Revise reason	Amend chapters and sections	Amend describe	Author
2013-08-05	V1.0	First draft issue			R&D



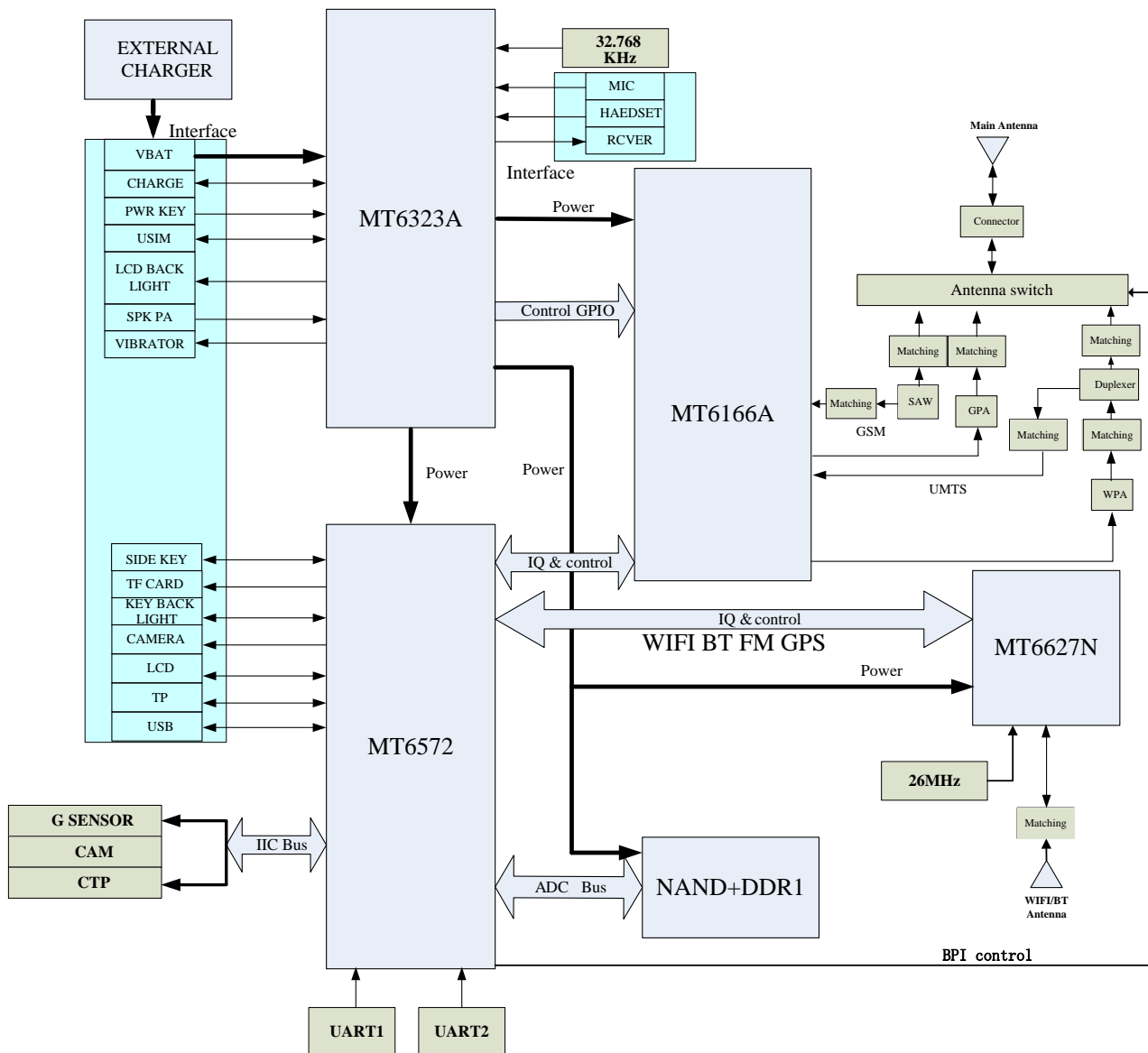
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# CHAPTER 1 MAINBOARD OPERATING PRINCIPLE

## MOBILE PHONE FUNCTIONAL BLOCK DIAGRAM INTRODUCTION



MT6572 is baseband signal processing chip, which in charge of IMAGE, VIDEO, AUDIO, RF INTERFACES, CONECTIVITY signal input and output dispose. Baseband Interface section provides SIDEKEY、 LCD、 SD card、 Bluetooth、 CAMERA、 TP connector and so on.

MT6323 provide frequency including PA,VBAT input switch, output DC-DC,LDO ,



SIM card , LCD backlight and so on ;

MT6166 is radio-frequency signal transceiver chip. Complete up and down RF signal transformation.

According to logical function, veneer can be divided into base band、RF、 power and user interface including four subsystem. Each subsystem including module and cell and realized function as show in picture.

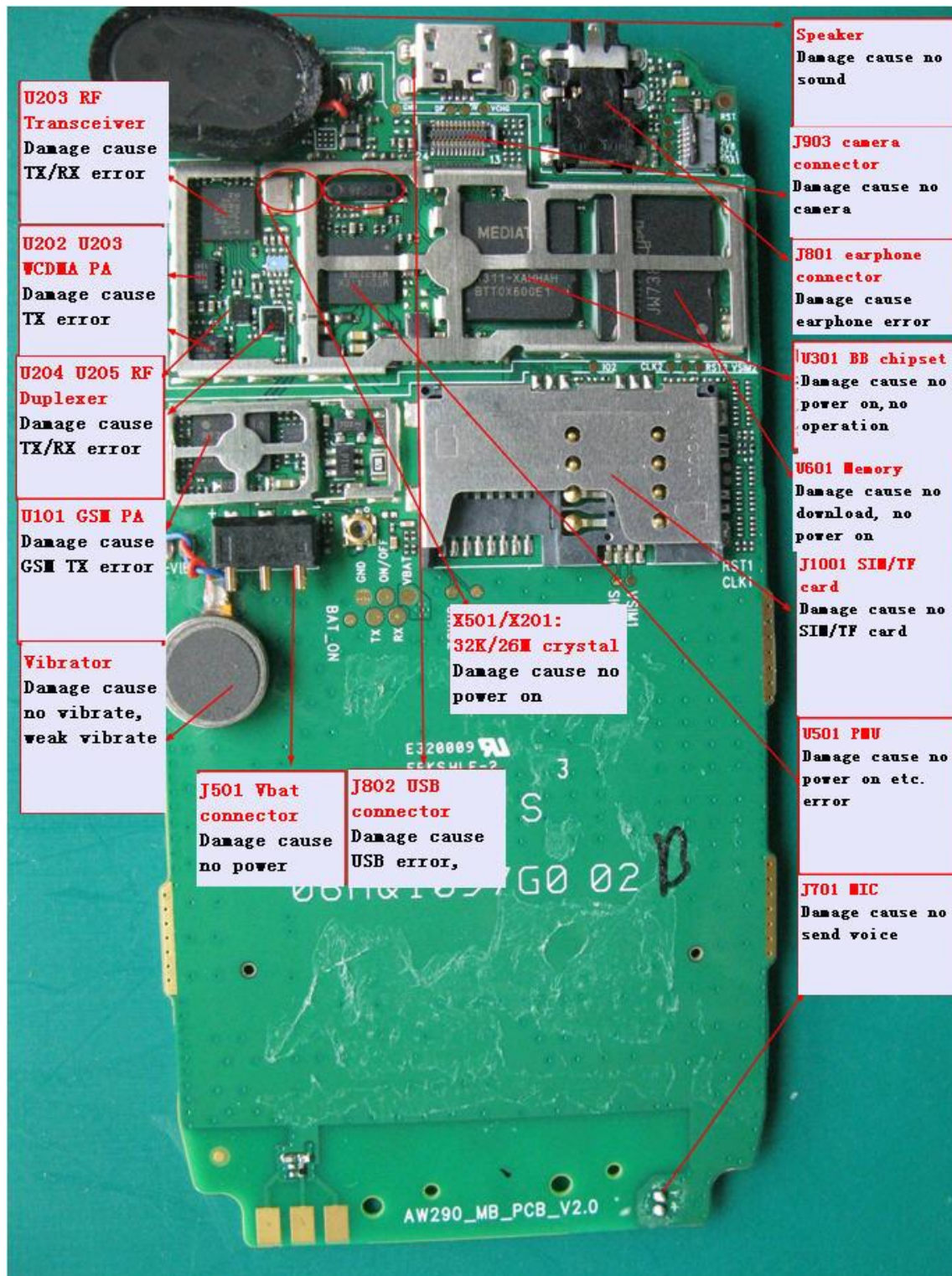
subsystem	Module	Unit	Function
Baseband subsystem	MT6572	Modem subsystem	ARM Cortex-R4 service as MODEM treater , 1.2GHZ, complete WCDMA , GPS , GSM modulation-demodulation function, subsystem includes ARM treater , modem DSP , modem AHB trunk, interrupt controller, and dormant controller and so on.
		Application subsystem	NEON media processing engine, support SD card, UART / USIM, I2C, GPIO, clock and other functional modules, subsystems, including ARM processors, application DSP, dedicated data mover and so on.
		User interface processing unit	Camera connector 、 broadband CODEC 、 Vocoder、 RF connector、 LCD connector、 SD connector、 USB connector、 UART connector、 USIM card connector、 GPIO、 keypad connector and so on.
		Multi-media and game engine	Multimedia and game engine running Mpeg / jpeg hardware engine, MP3/MMS/MIDI function;
	power management (MT6323)	Power voltage supervisory	External power input, battery, VDD, so important for the LDO
		Temperature monitoring	Battery temperature、 PA temperature
	NAND	NAND features consumption、 file system support.	Stored program and some NV,4Gb
	DDR1 RAM (POP)	Storage	RAM space run, 2Gb (64M × 32)
	WCDMA and GSM/DCS launch receiver	AFC circuit, APC circuit , AGC circuit , each device	Complete WCDMA receive and transmit RF section functions. Mainly contains additional MT6166 RF chip and peripheral circuits.
RF subsystem	GPS	GPS receive	GPS signal receiving and processing, including its peripheral additional circuitryMT6627
	BT connector	BT module	Bluetooth and WLAN complete baseband functionality and

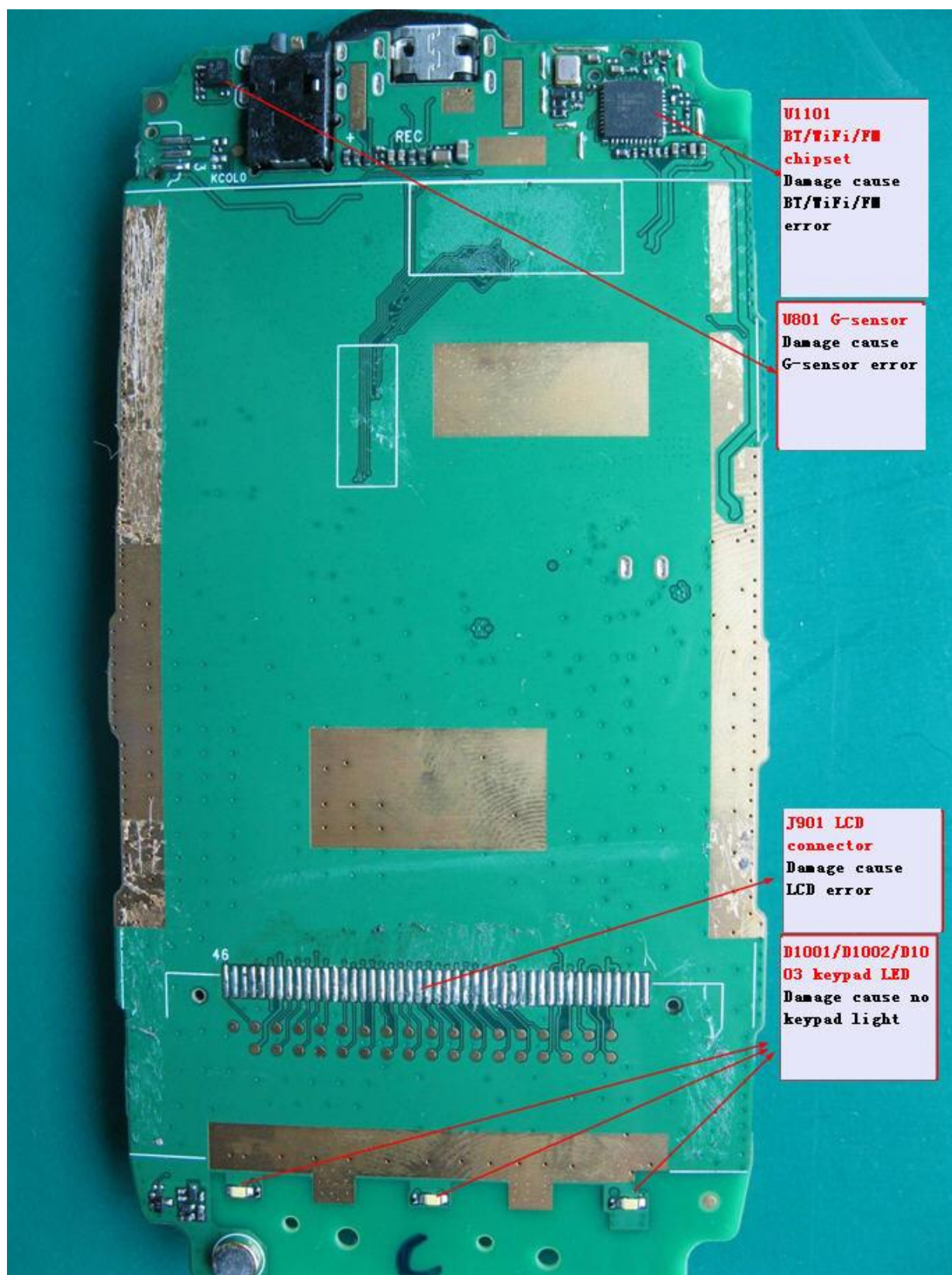


subsystem	Module	Unit	Function
			RF signal transmission and reception. Including BT + WIFI module and the external additional circuitry.
	WIFI connector	Wifi chip	Adopt MT6627 chip complete
	Crystal oscillator and frequency synthetizer	Adopt to crystal oscillator, not previous warm oscillator	Local produce precision 26MHz reference clock TCXOC;
	antenna	External antenna, interior connector device, antenna fence	Phone offers a built-in antenna, in order to complete the communication, support WCDMA and low frequency bands. U8860-42 mobile phone antenna comprising: a main antenna diversity antenna, wifi / BT antenna, GPS antenna, FM antenna(headset).
	coupler	Power device coupler	The WCDMA power amplifier output power coupled in part to the MT6166 power detection performed.



# Chapter 1 MAINBOARD DEVICE LOCATION PLAN AND MATERIAL BOM INFORMATION





BOM list below for information purposes only, to change without notice, To apply, please Huaqin company T project management system queries BOM latest information.

**Mainboard BOM information:**

Bit NO	Material describe	BOM coding
U201	RF transceiver _GGE/WCDMA/TD-SCDMA+MT6166A	39200537
U202	RF power amplifier _1920-1980MHz	SKY77761
U203	3G RF power amplifier _W900	SKY77768
U204	Electromagnetic interference two-way stopband filters _band8_W900_difference	SAYFH897MH C0F0A
U205	Electromagnetic interference two-way stopband filters _band1_W2100_difference	SAYRF1G95H Q0F0A
U101	RF amplifier module _900/1800	RF7182DTR13
马达	Shake device	
J501	Battery connector _3pin_4.0H _3.0 PITCH	PAN30-03402 -S113
J802	IO connector _MicroUSB _5pin	UAF95-05164- 1522
X501	Crystal _32.768K_20ppm_12.5pF	SSP-T7-F
X201	Crystal_26M_10ppm_7.4pF_3225	X1E000021043 400
J701	Mic	
U501	Power management chip +MT6323GA	39200536
J1001	3 in 1 connector _H4.15mm_2sim+TF	WKSM022-41 01
U601	MCP_4Gb-NAND_2Gb-DDR	MT29C4G48M AAHBAKS-5 WT
U301	Baseband chip _WCDMA+MT6572A/X	39200562
J801	Earphone jack _height 4.2mm	JAF00-05164- S137
J903	Board to board connector_24pin_double row_socket_1.0H_0.4pitch	DF37NC-24DS -0.4V(51)
SPK	Speaker	
U1101	WIFI-BT-FM-GPS 4 in 1 chip+MT6627N	39210152



U801	Acceleration sensor IC chip _3 axle	BMA220
D1001~D1003	LED white _HUE_N1,N3,CAE Contains only charge Q	LTW-C193SN5
J901	LCD pad	

Attachment: maintain circuit diagram and bitmap



AW290\_MB\_V2.0\_130 AW290A\_MB\_器件位  
515\_final.pdf 号图\_V2.04\_1

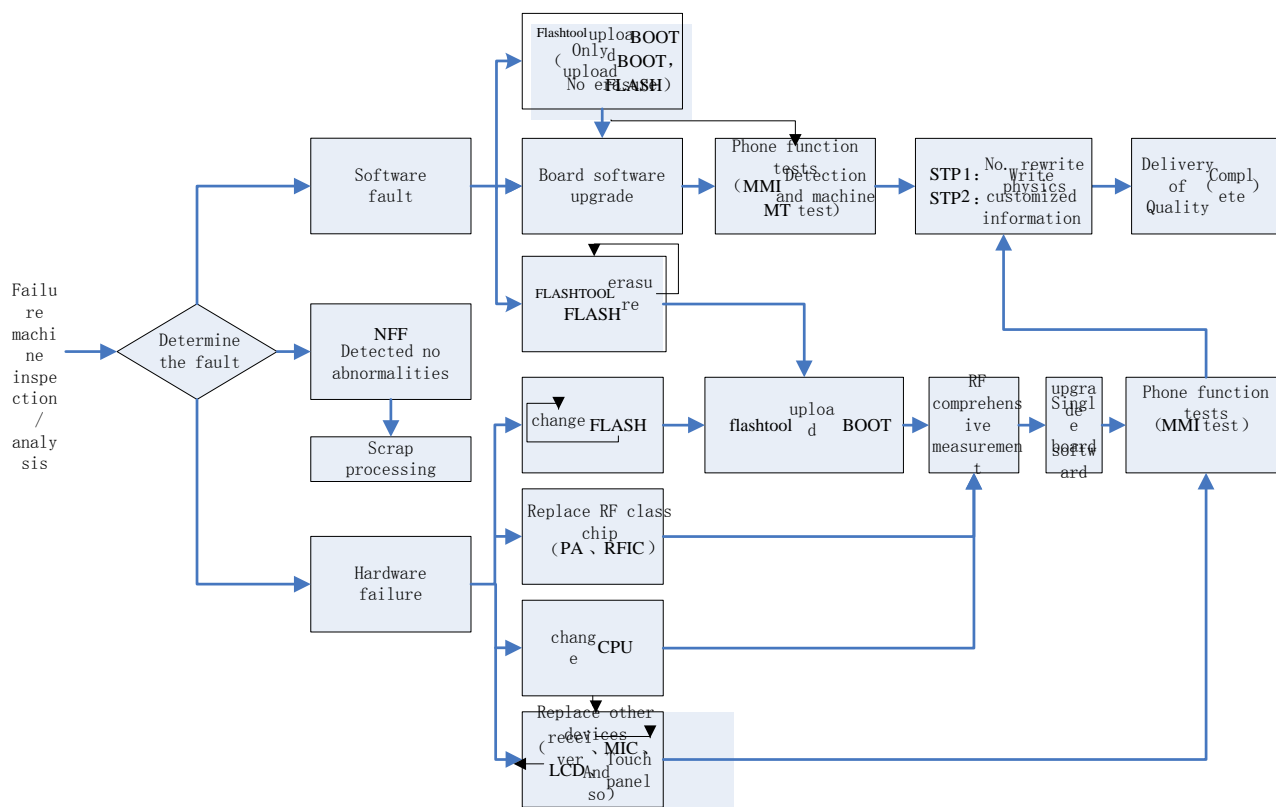




# Chapter 1 maintain flow direction



## Host machine maintain flow



### Step explain :

FLASHTOOL half-erasure FLASH : FLASHTOOL half-erasure FLASH no erasure FLASH , information of intrinsic RF correct will not lost, it doesn' t need to correct. Specific loading method can refer to below FLASHTOOL loading guidance.

FLASHTOOL erasure FLASH : After erasure FLASH, all information in FLASH will be erasure and empty.

Specific erasure method can refer to below FLASHTOOL load guidance.

MMI test : MMI test is phone system comes with function self-test software, pass MMI test can simple and fast judge mobile phone function whether good. The specific test method can refer to primary service manual.

Complete machine MT test : Complete machine MT test is Part of the whole antenna signal test, pass MT test can judge mobile signal whether good. Specific operational approach can refer to RF test guidance.

Rewrite physics NO. : Rewrite IMEI、SN、BT、MAC address information. This



section needs please refer to your local service policy to decide whether you need to rewrite the original IMEI, if not ask for a change IMEI, then use the original IMEI, this step can be skipped. Please refer to the following specific steps guiding tool to write numbers.

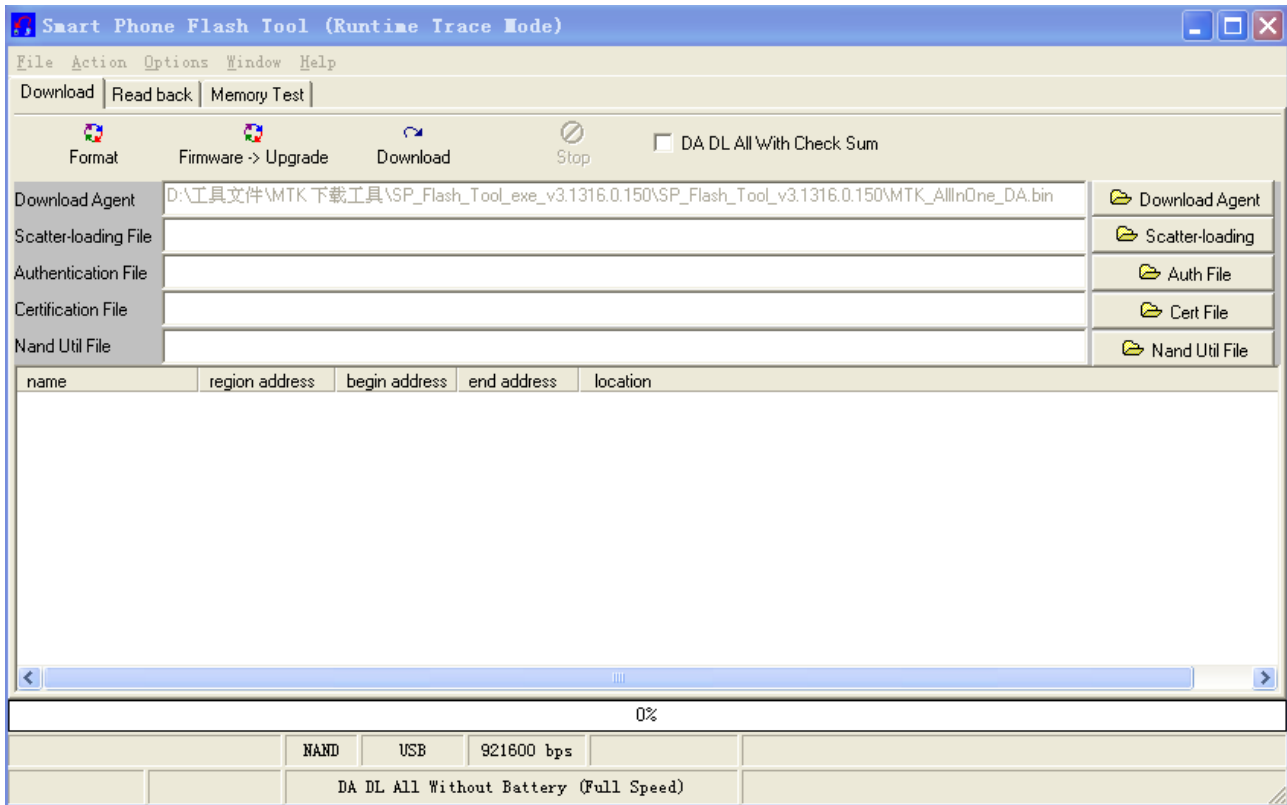
Write custom-tailor information : Write lock network, national, and run the business information. This section needs please refer to the machine's original information operations, if the original version without lock nets and other customized information, this step can be skipped. Specific methods of operation please refer to the following guidelines to write customized information.

RF calibration measurement: RF calibration and RF functional test, pass RF calibration can make mobile RF performance to reach the best state; RF functional test can detect whether the indicators of RF compliance. Specific test methods can refer to measurement guidance and supply by other document.

Mainrboard repair process description: mainboard repair process, please refer to the host repair processes, the difference is that recognize it not need to make the host MT test after fault repairing.

## 1.1 FLASHTOOL loading guidance (half-erasure FLASH or whole erasure FLASH)

### 1. Open FLASHTOOL



## 2. In accordance with the following configuration properties

- 1) Click **scatter-loading choice box button**, choose SCATTER.TEX document in YU220 software to load.

Attention : firstly need to delete check sum document in software. Click Firmware->update, Press the volume up key to insert phone USB an enter into the FLASH semi erasure upgrade





- 2) Click Download , Press the volume up key to insert phone USB an enter into the FLASH whole erasure download, download complete as follow:





## Chapter 2 Senior Maintenance Environment

### Tools List

	<p>Name : GPIB cable</p> <p>Purpose : use for RF calibration</p>
	<p>Name: programmable power supply</p> <p>Purpose: use for mainboard power supply when RF calibration</p>
	<p>Name : CMU200</p> <p>Purpose : RF calibration</p>
	<p>Name : Multimeter</p> <p>Purpose: measuring voltage and current</p>



## Chapter 2 mobile principle and fault analysis

In accordance with the following guidelines before the operation and maintenance to ensure the phone is not a factor in environmental factors and feature set. It recommends that you should backup customer information, and then restore the factory settings for fault recognition.

### 1. 4 **Fail to start up.**

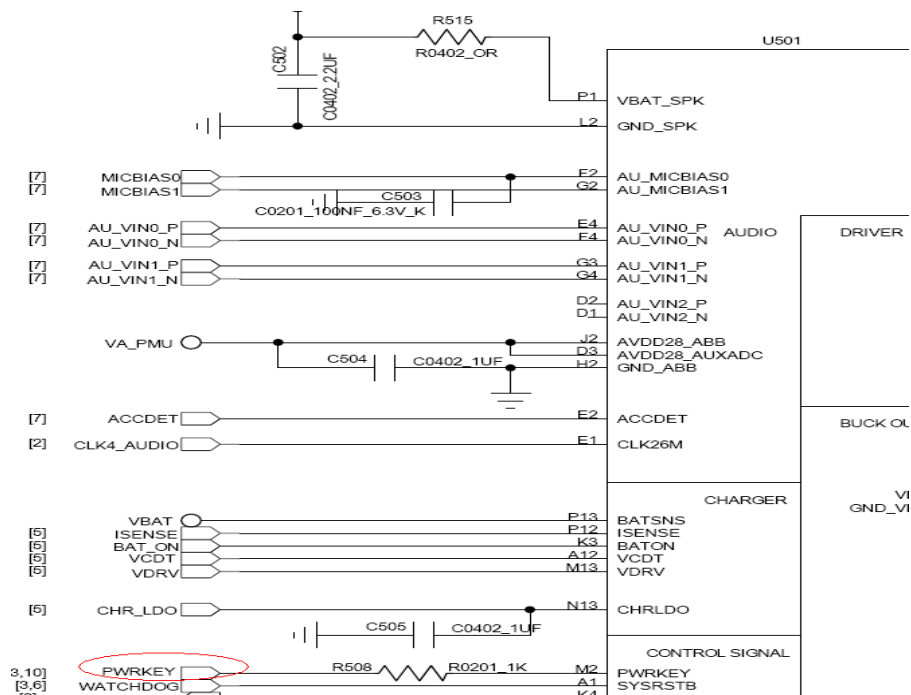
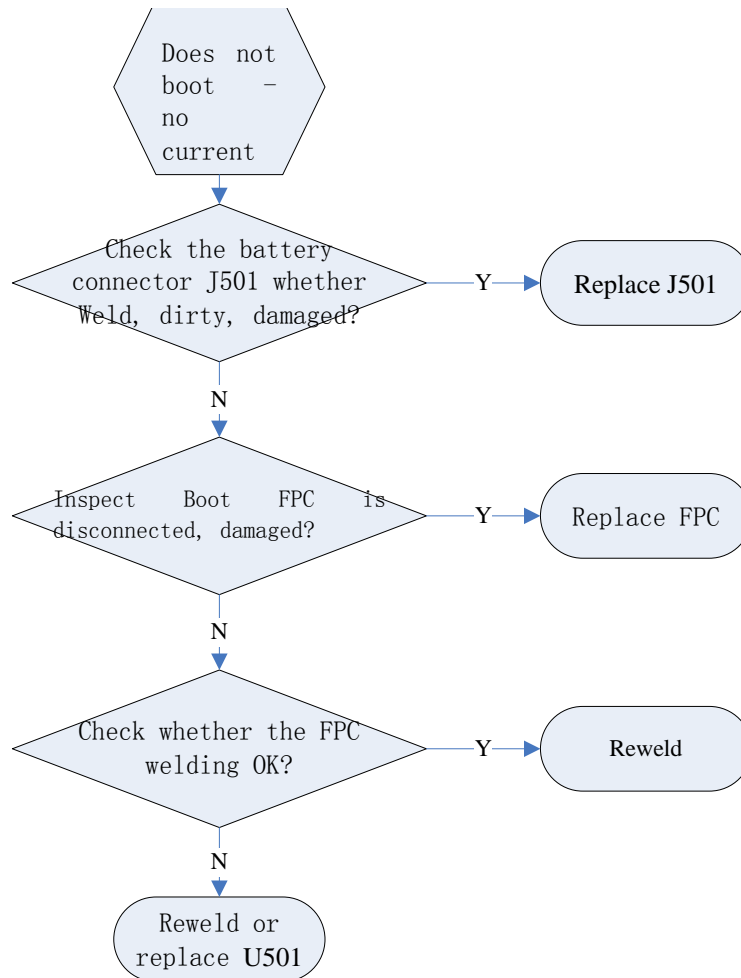
Fault analysis treatment scheme :

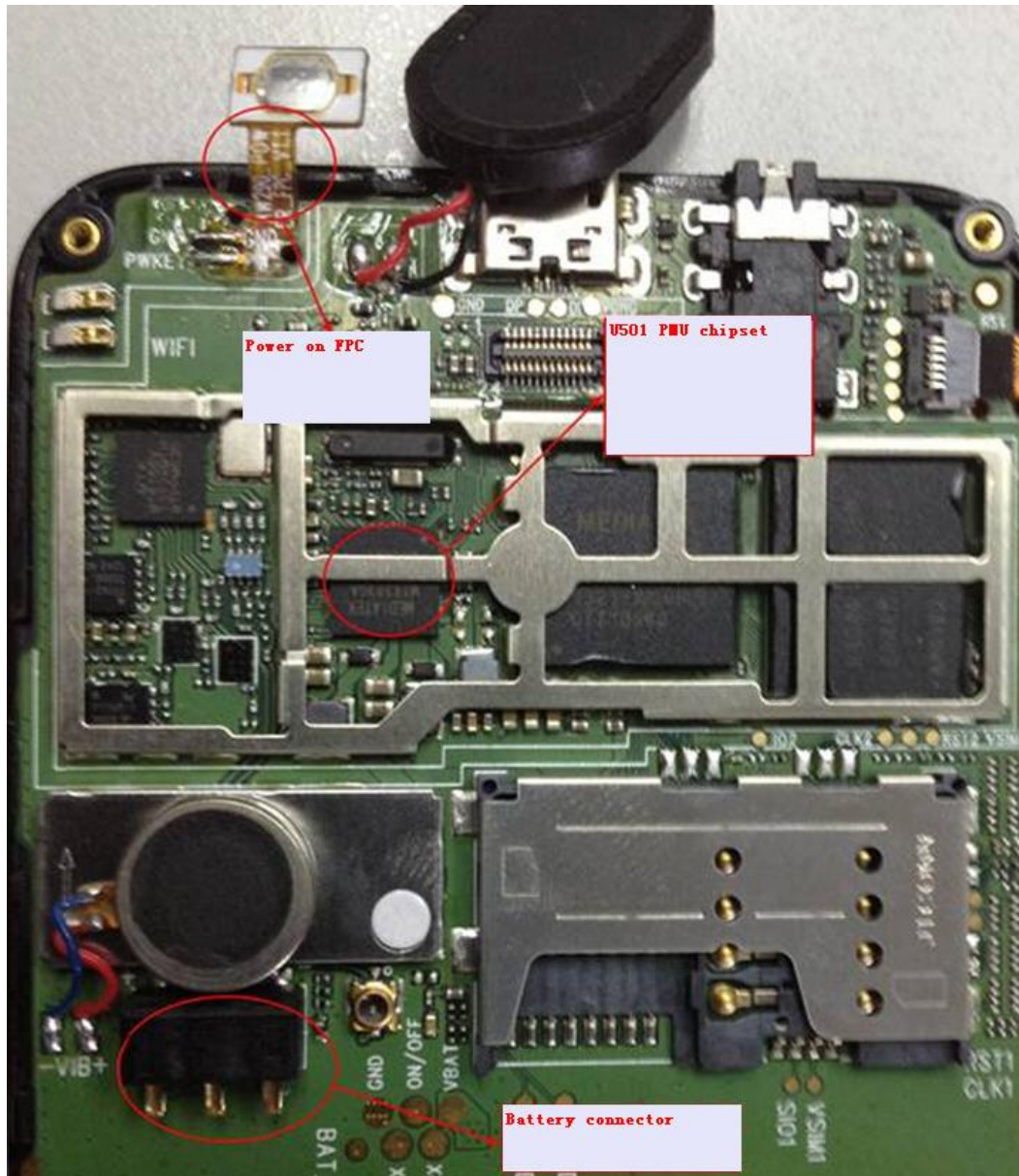
For those fault phones which could not start up, please firstly check I/O connector (battery connector) whether have apparent damage. If I/O connector (battery connector) is OK, it can use DC stabilized power to supply power for phone, check the current of the fault phones. No boot fault can be divided into the boot, no current, low current, high current. In maintenance, please according to the following specific methods for operation.

#### 1. 4. 1 No current (direct-current main power supply)

No current ordinary have three probable reasons : 1. Battery connector dry joint ; 2. Power key damage ; 3. Power key relevance circuit or power manage chip damage.

Maintain flow :





#### 1.4.2 Low current (direct-current main power supply)

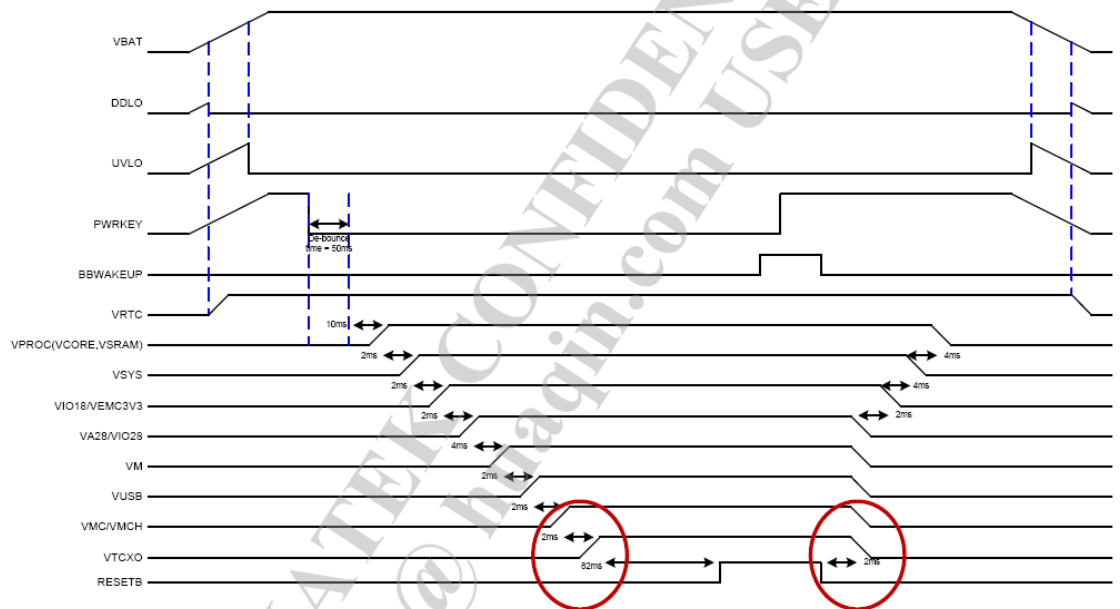
Appear lower current after press power key ( 15—80MA ) ordinary below reason :

- a) Software fault : Ordinary force upgrade.
- b) PM chip damage cause part of voltage without output.
- c) CPU or FLASH damage.

Boot sequence diagram on electricity :

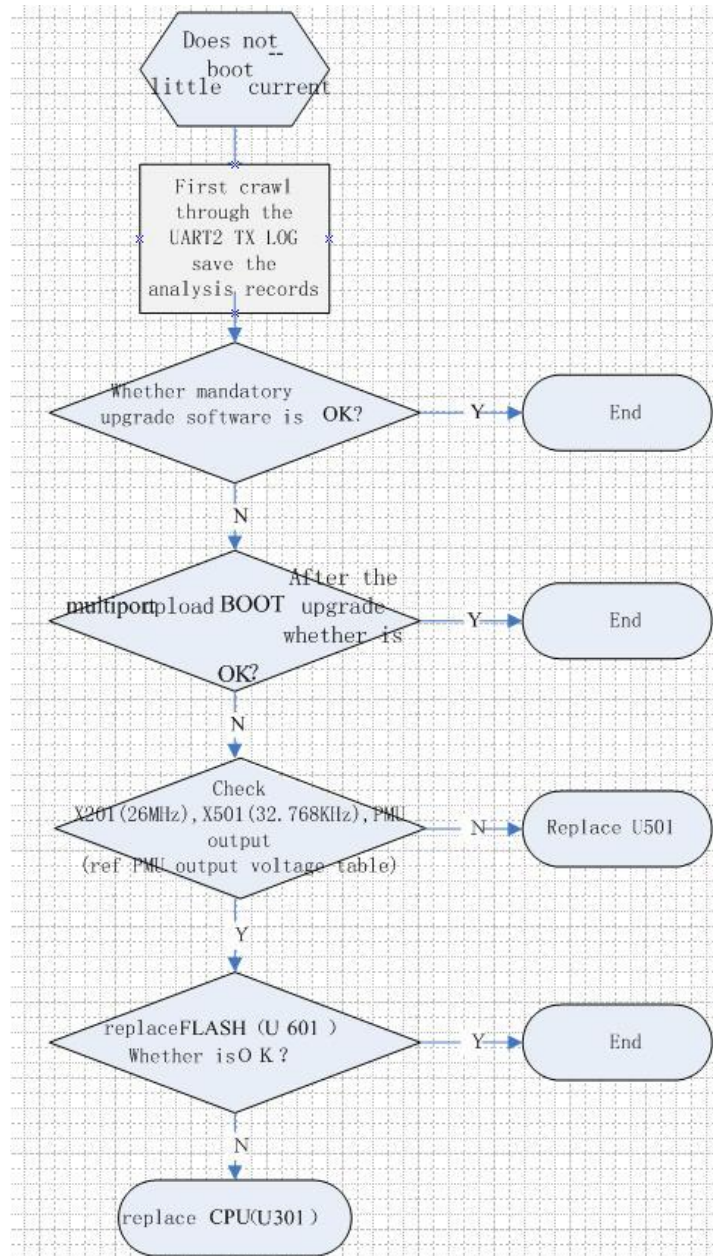


## Power on/off Sequence / 32K (by PWRKEY)



Boot sequence diagram on electricity

Maintain flow :



PM voltage output list :

Signal name	Output reference value	Test point
VPROC_PMU	0.7~1.4V	L501
VPA	0.5~3.4V	L502
VSYS_PMU	2.2V	L503
VRF18_PMU	1.8V	C216



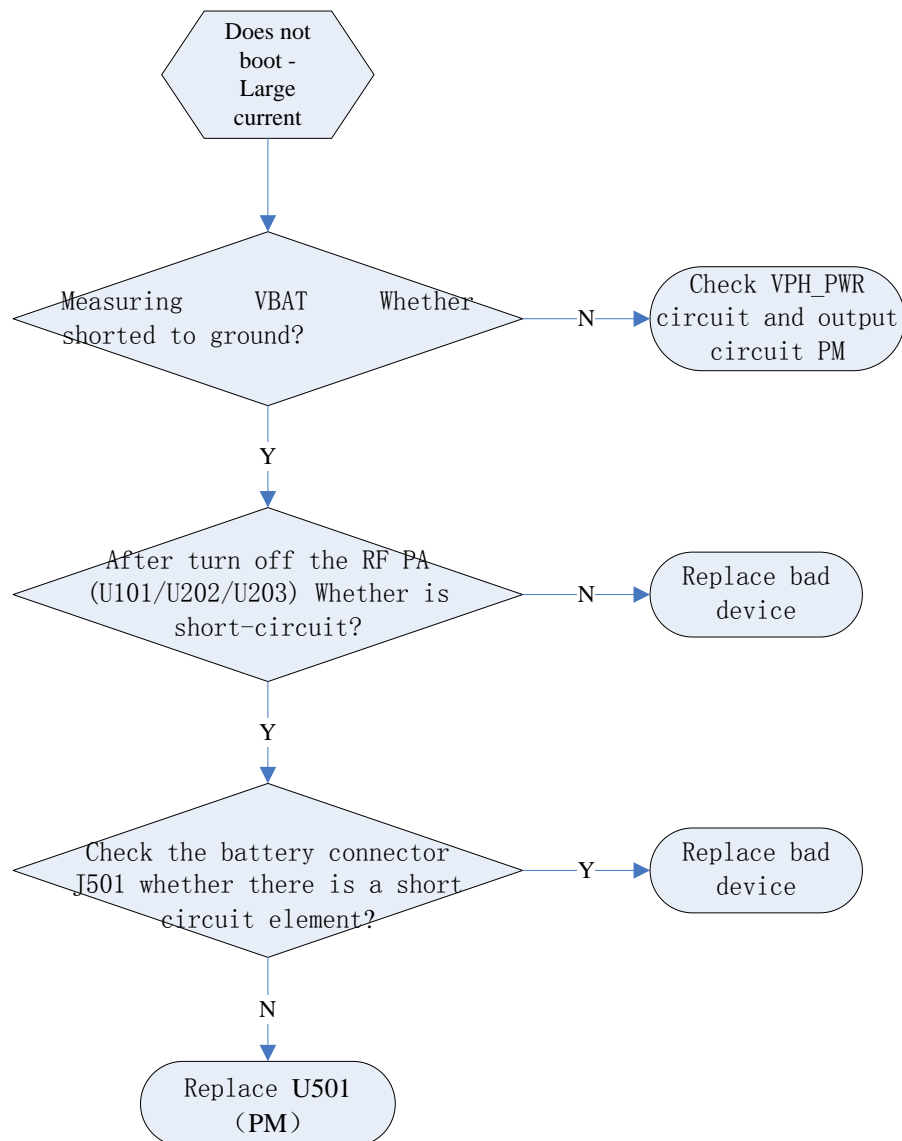
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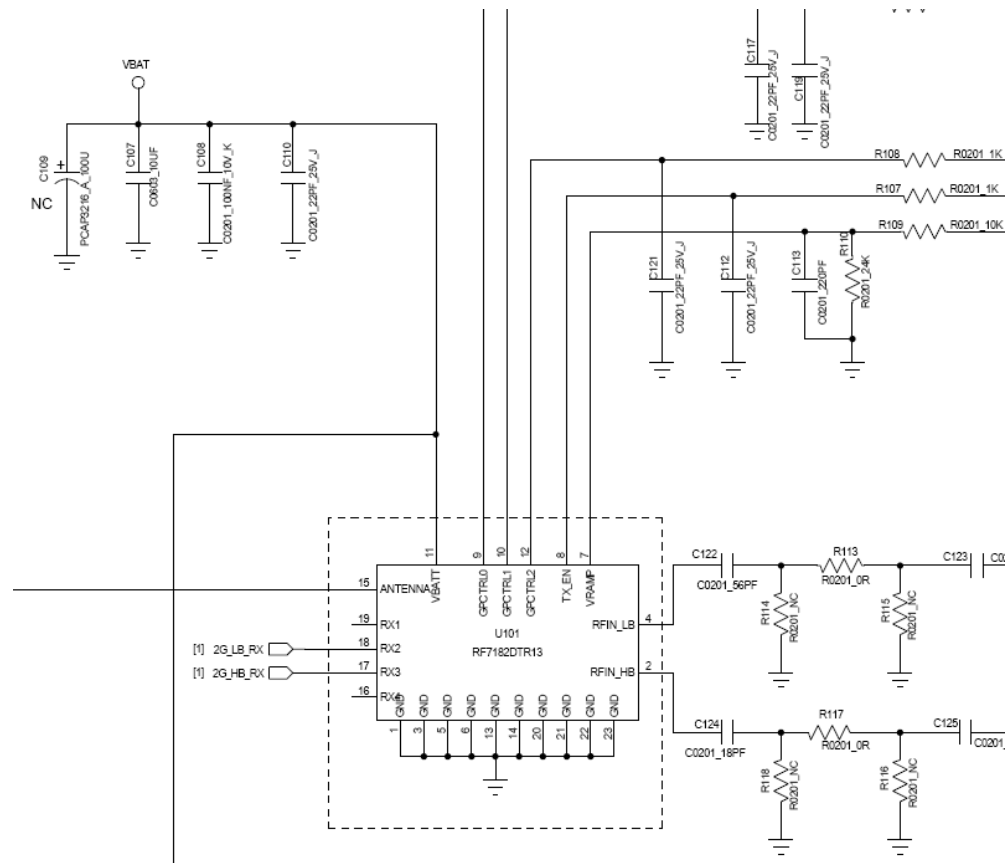
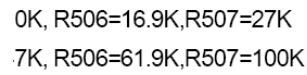


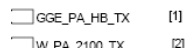
### 1. 4. 3 Large current (direct-current main power supply)

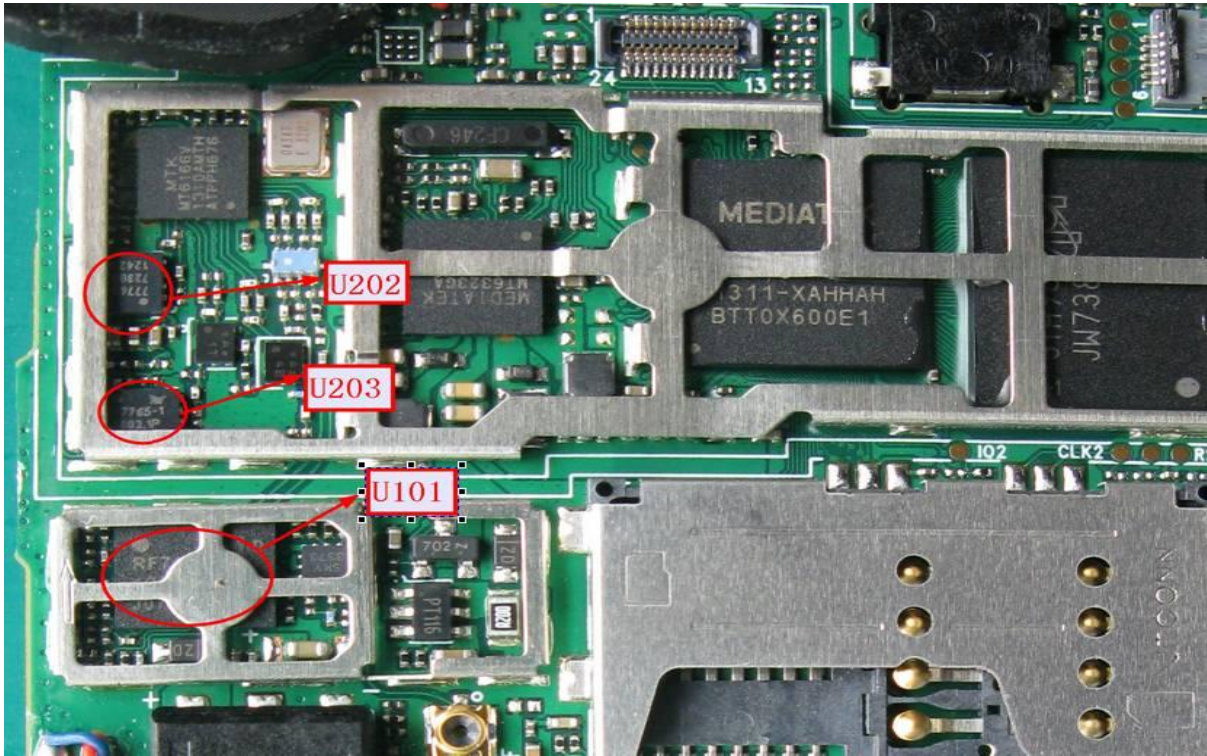
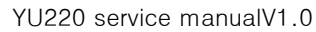
Large current ( current greater than 500MA ) divide 2 situation :

- 1 ) press power key appear large current ; This type of situation mainly is due to PM damage or PM output current short circuit cause.
- 2 ) too large current (off-state current is greater than 500MA). VBAT is mainly caused by short circuit to ground



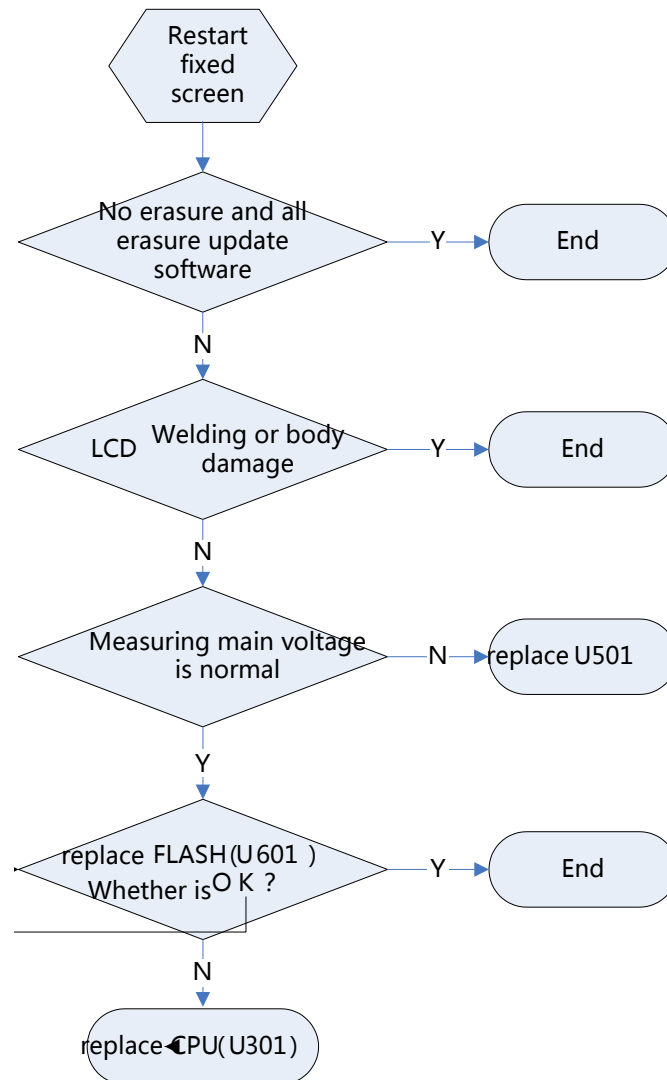




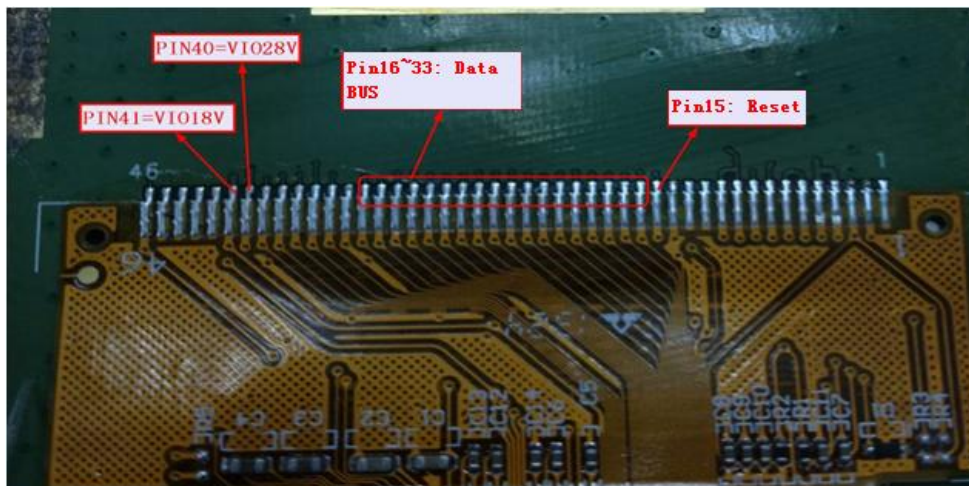
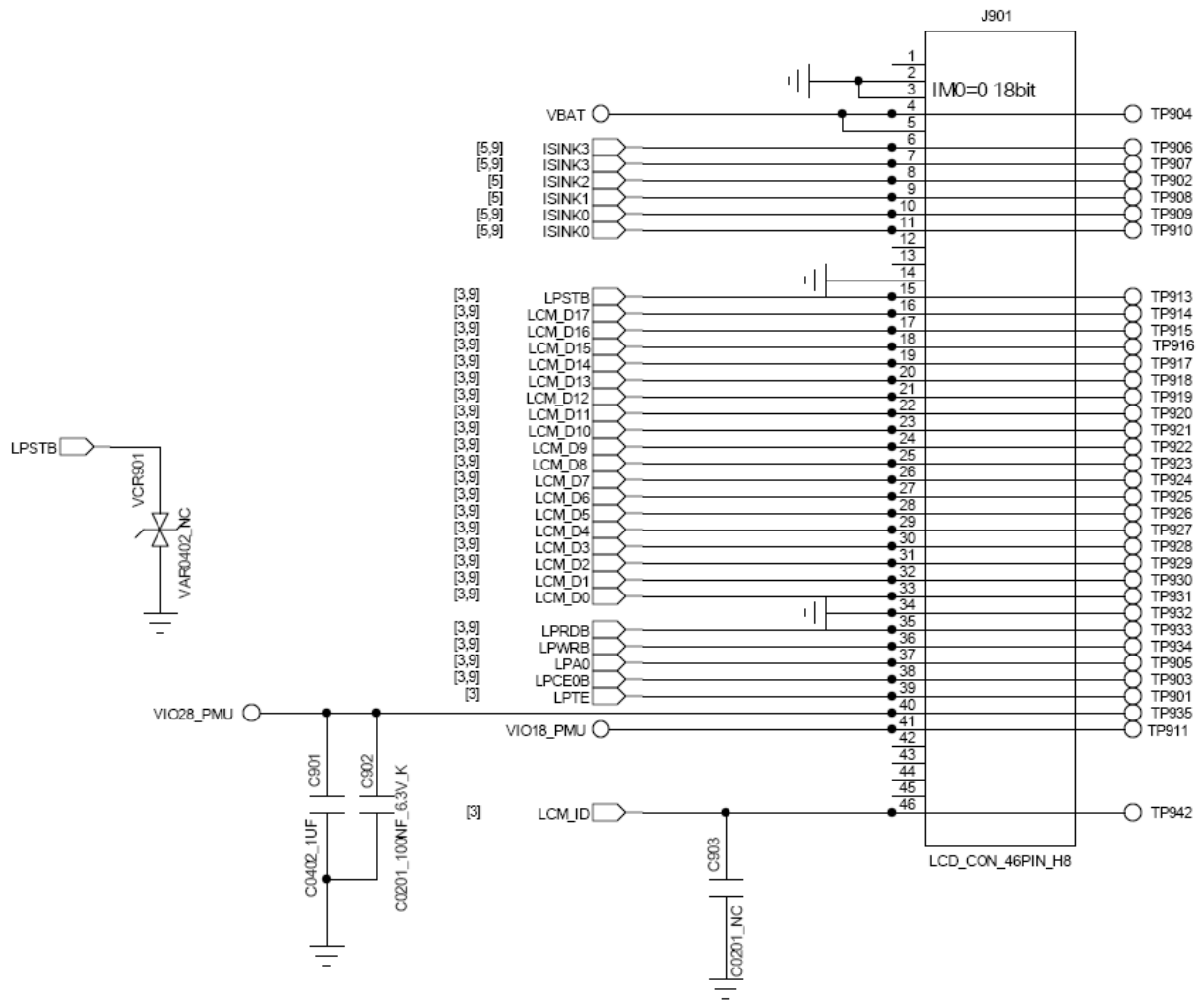


## 1.5 Restart fix screen

Boot a start to the LCD light up but can't start, HOLD on huawei LOG, or restart, after a certain time on the LOG is to HOLD on the LOG. First consider the software bugs, reload the brush (not all) after boot, if not, need to erase all download experimental boot again. Ruled out after a software problem still on screen or restart, consider whether the LCD welding problems, or LCD damage of ontology. Finally parallel consider main power output is normal and CPU/FLASH, if the power output of OK, consider the CPU/FLASH welding or damaged.



Main supply voltage see 5.1.2 picture , part of LCD see below picture mark :



## 1.6 Mobile phone automatically shut and crash.

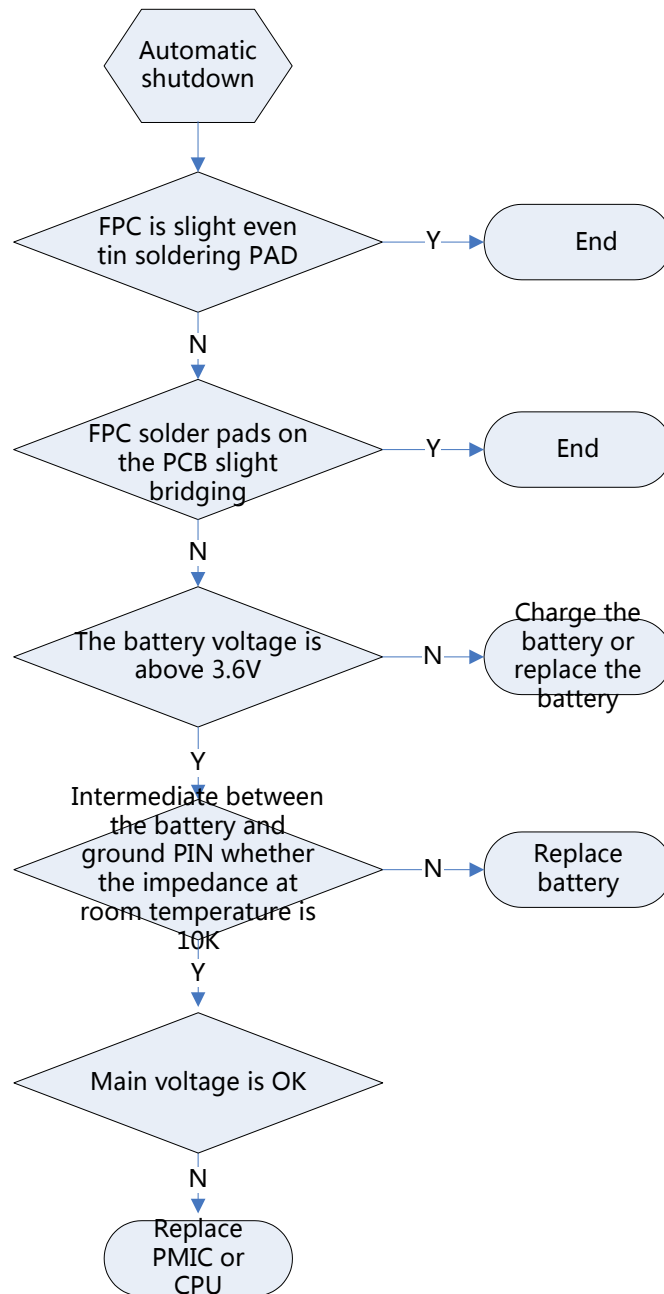
### 1.6.1 Automatic shut

For automatic shut phenomenon, firstly judge whether power key have



problem :

- 1) Start up , FPC' PAD welding is slight short circuit link tin
- 2) Start up, pad on the FPC welded PCB whether slight short circuit link tin
- 3) Judge cell voltage whether above than 3.6V
- 4) Judge PIN in the middle of battery and among earth impedance whether 10K in the normal temperature.
- 5) Above is OK , can check key power supply whether have short circuit phenomenon, thus can judge whether PMIC and BB chip etc and affiliated RC device cause.



### 1. 6. 2 Crash

The phenomenon of death is for a cell phone stuck in boot screen or stay in one of the user's screen, the phone cannot use, the touch panel cannot t slide, and some need to disconnect the battery to reboot the only solution, and some cannot. Mainly in the following analysis of the reasons

- 1) Whether CTP has already null and void, lead to user take for mobile



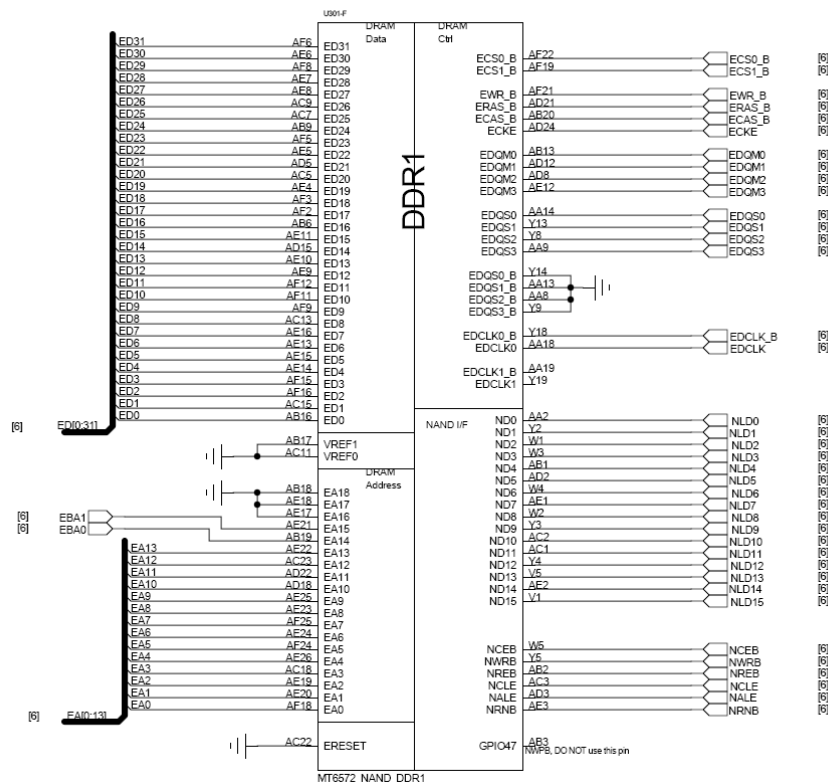
system has dead, in fact, it is CTP noumenon break down, so cannot touch.

2) In most cases, because FLASH breaks down, FLASH weld reason or FLASH noumenon break down, need to :

a) Firstly, try to refresh software again.

b) If refresh software cannot solve, it must change FLASH , in view of the machine on the FLASH point of glue, so weld will be more difficult.

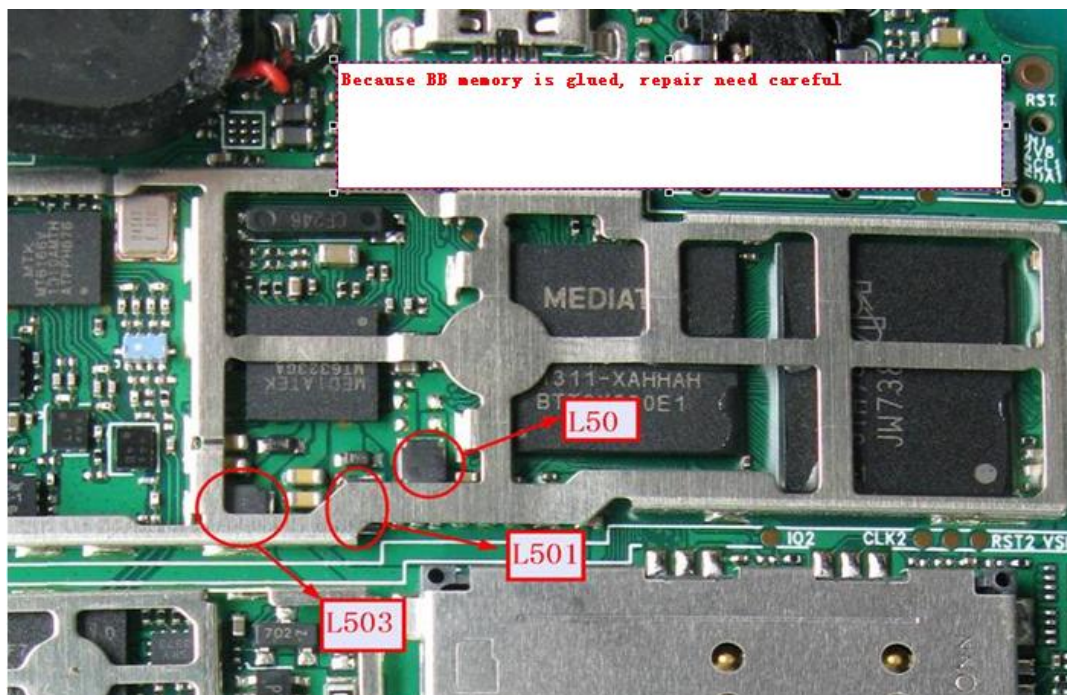
3) And then, consider CPU chip problem, CPU noumenon break down or weld cause FLASH corresponding data as well as order place mistake, it may be take place crash phenomenon.







For several other main power short circuit phenomenon, refer to 5.1.2 analytical process to determine whether these power shorted to ground, the processing method is to remove several inductors L501, L502, L503, and testing the two PAD inductive impedance to ground. If the PAD near PMIC shorted to ground, which means that the PMIC is bad, on the contrary, it means the back of a short circuit inductance.



In brief, for L501 inductance, if close to PAD of PMIC over the ground short circuit, it can judge PMIC is bad, if another PAD short circuit, it can see link to CPU from internet, CPU is bad, this phenomenon is in the majority. ;

For L502 inductance, if close to PAD of PMIC over the ground short circuit, it can judge PMIC is bad, if another PCD short circuit, it can see U202 , U203 linked to internet is bad.



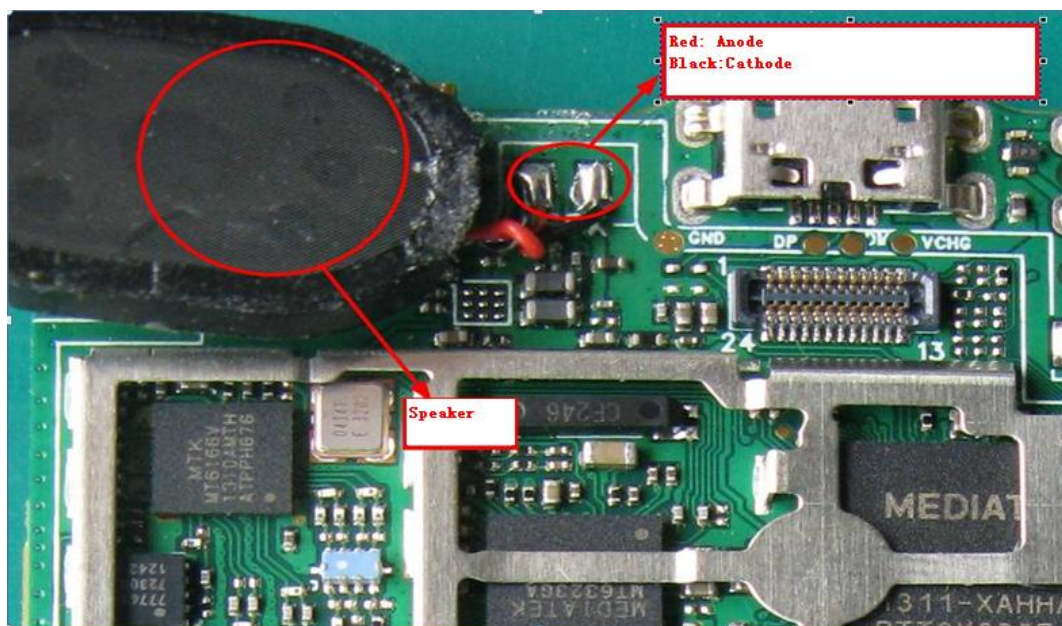
For L503 inductance , if close to PAD of PMIC over the ground short circuit, it can judge PMIC bad.

Other power also adopt to this similar way, to find short circuit hot location, find relevant internet, and find short circuit location.

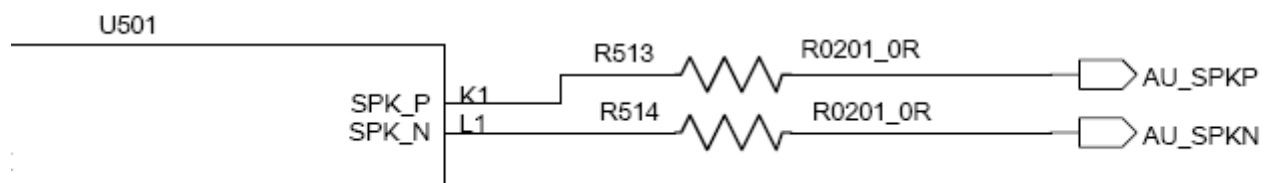
## 1.8 No Ring.

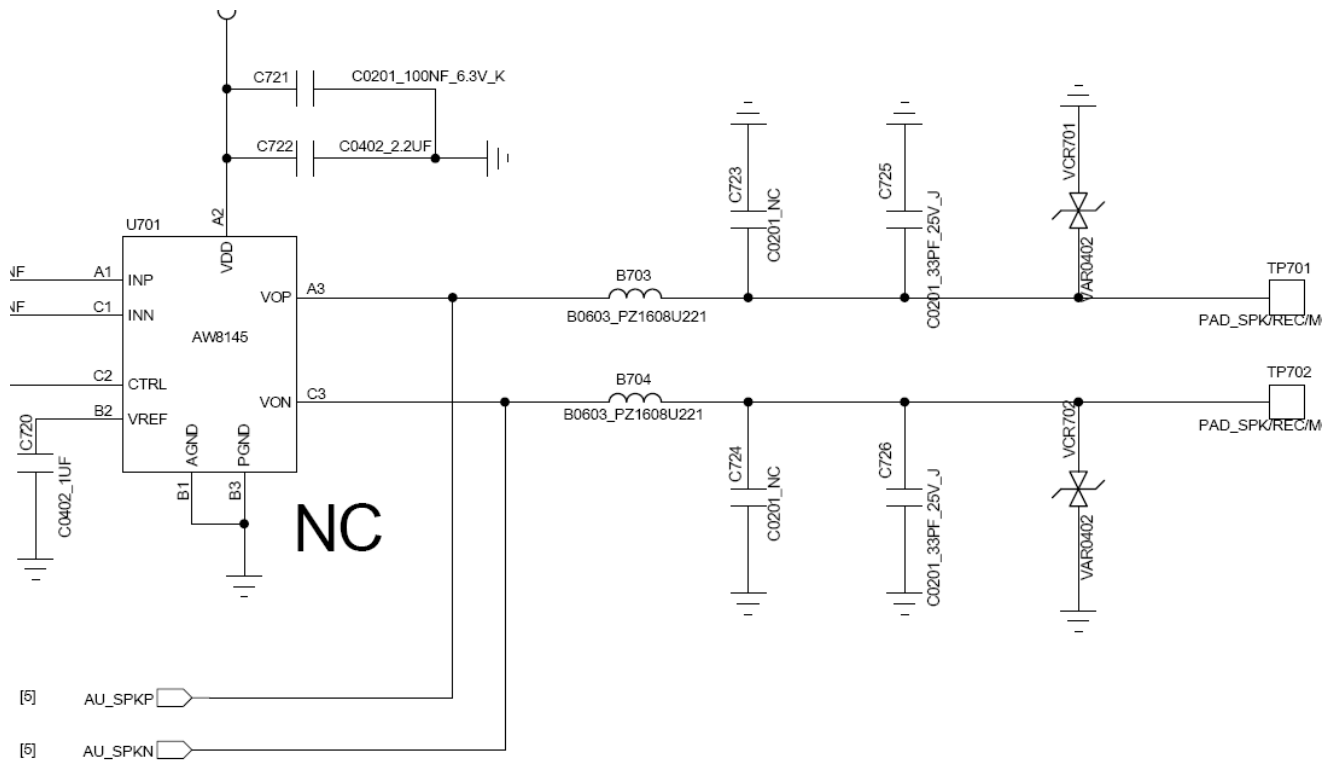
### 1.8.1 Speaker is bad.

Can change another speaker to check, speaker location :



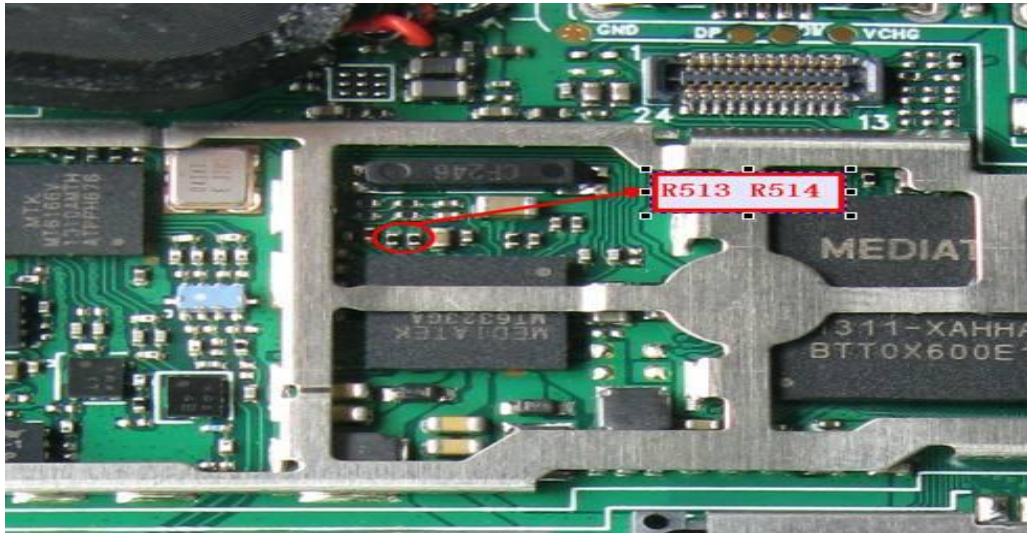
### 1.8.2 Speaker access



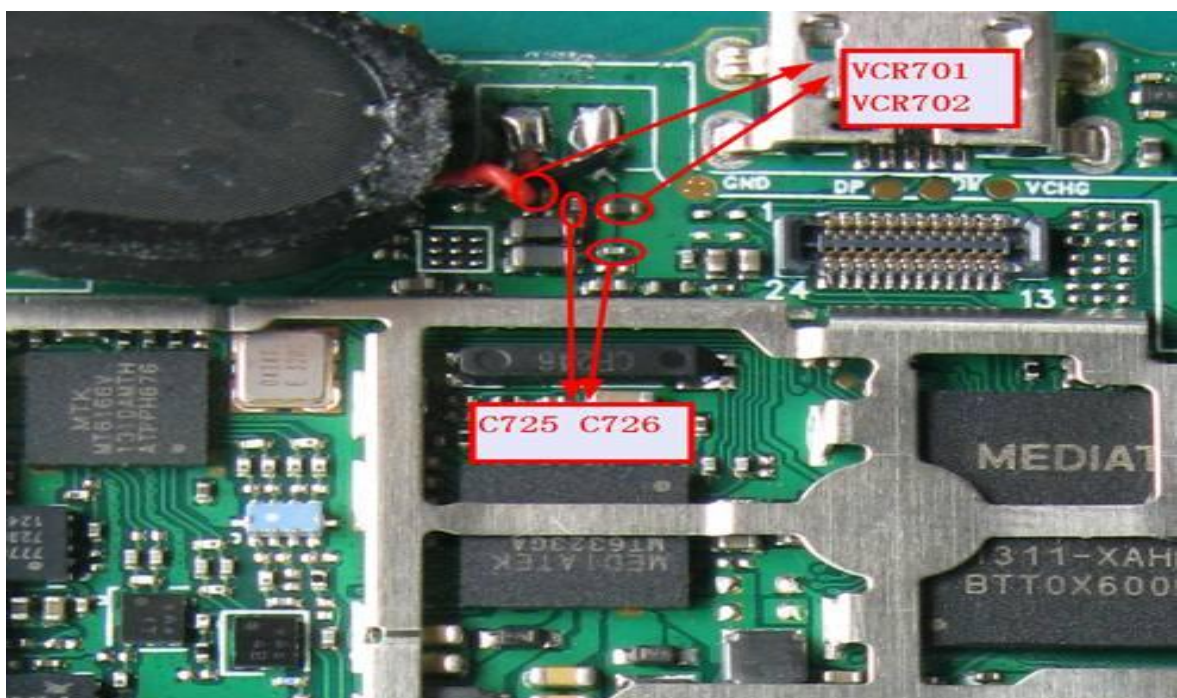


From above principle part, we can see speaker access from U501, R513,R541' s  
OR set out , and pass B703 , B704 to reach speaker, so need to make sure the  
resistance and magnetic bead whether is OK. :





All of are OK, need to CHECK C725,C726 , VCR701 , VCR702 whether have over the ground short circuit phenomenon :

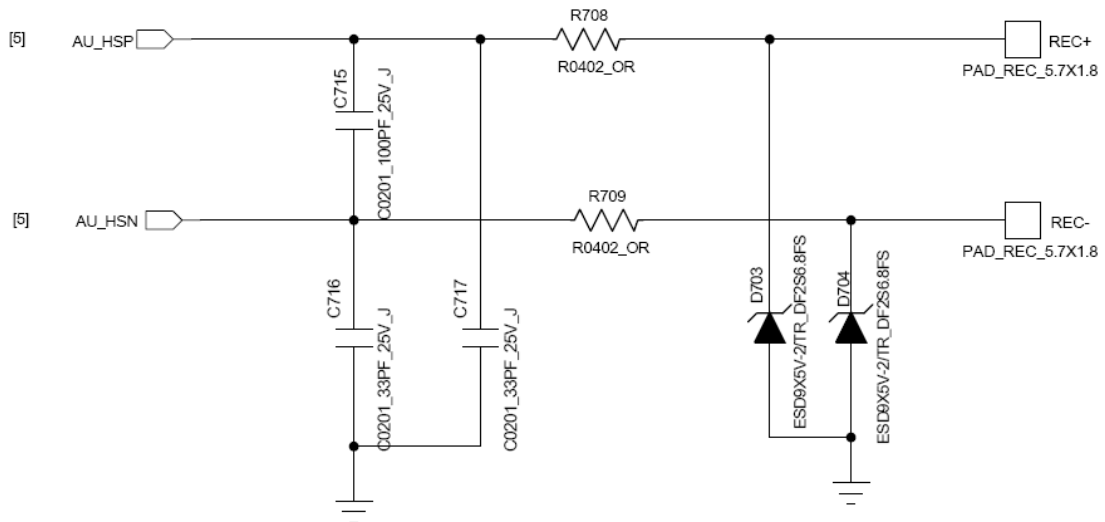


Last, above is OK, it can judge PMIC U501 chip bad.



## 1.9 No Receiver.

# Receiver



receiver circuit as shown in picture, REC +、REC - for baseband chip exporting receiver signal, output for RECEIVER.

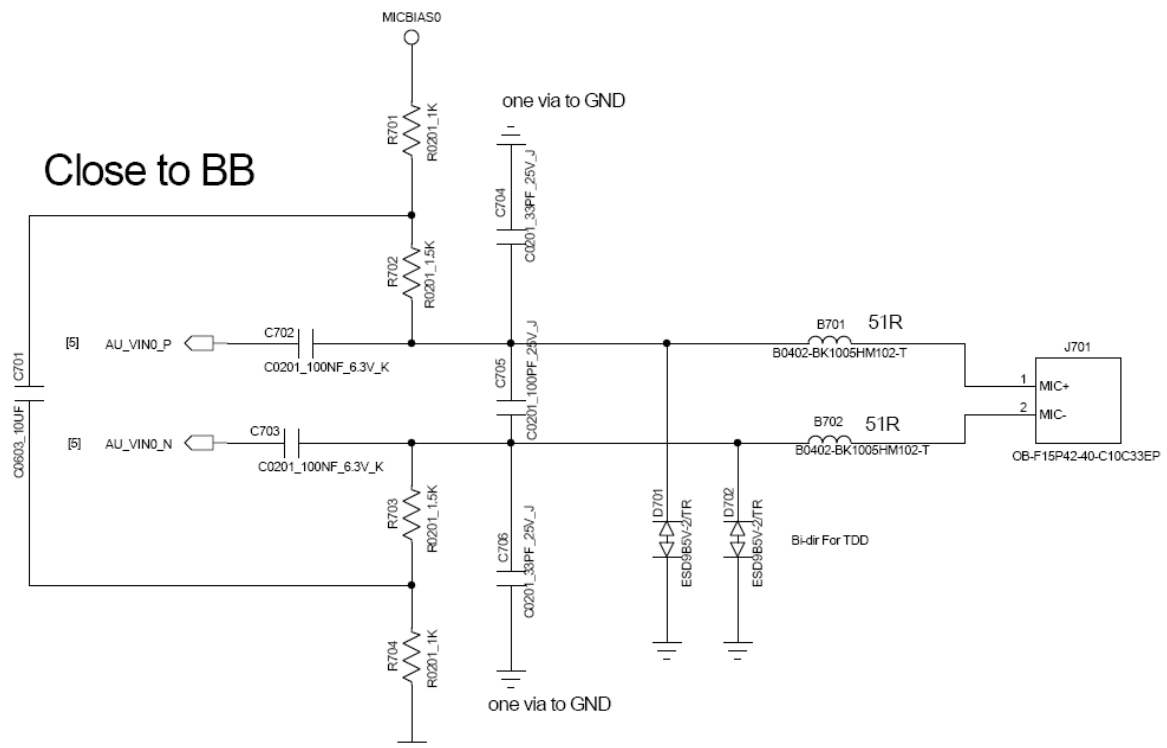
Repair process: check whether the welding RECEIVER is good; checks around the earpiece device (R708, R709, C715, C716, C717, D703, D704) for damage or short circuit, Weld, as described above are silent under normal circumstances, the handset can be judged to baseband chip U301 welding problems.

## 1.10 No Receiver, receiver voice small.

### ➤ circuit schematics :



# Main MIC



## ➤ circuit schematics analysis :

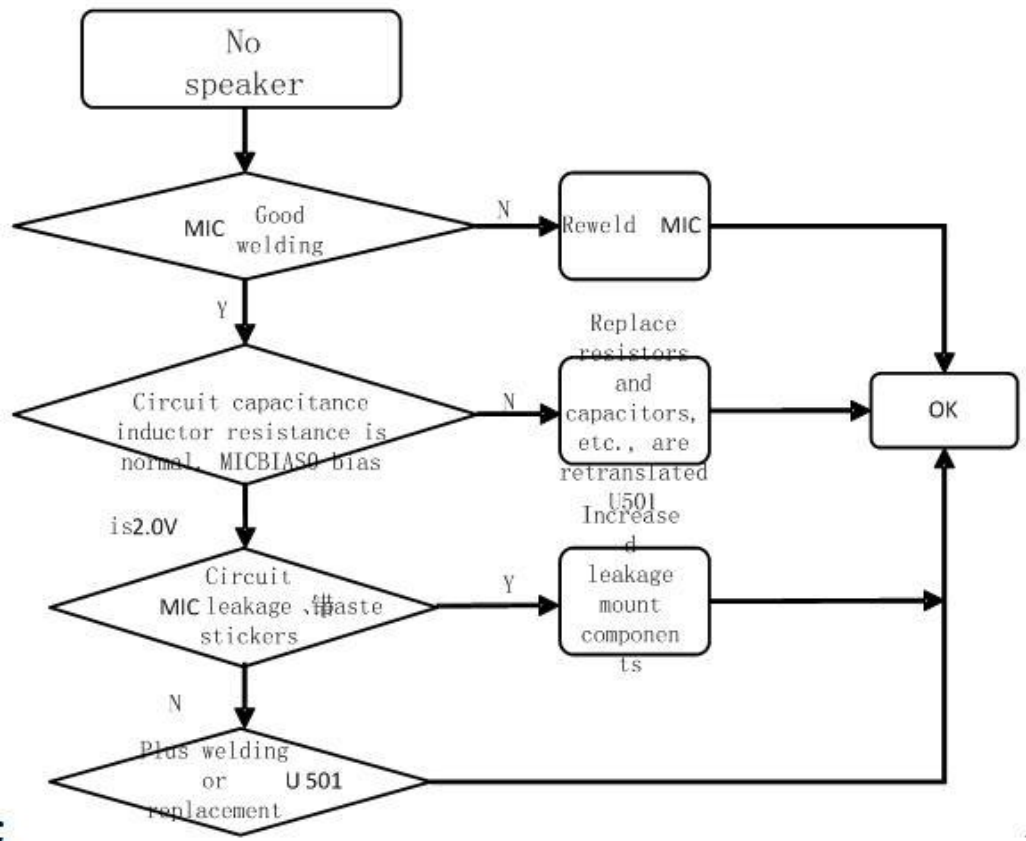
Part of receiver circuit as show in picture, MIC audio input signal is differential signal, then the baseband chip MIC input channels, VMICBIAS0 work for the MIC bias voltage.

## ➤ failure analysis processes :

Fault : Call opposite cannot listen to voice ;

Overhaul flow : check MIC weld whether is OK, can change MIC test; put through telephone, measure mainboard MIC circuit magnetic bead capacitance weld whether is completed ;

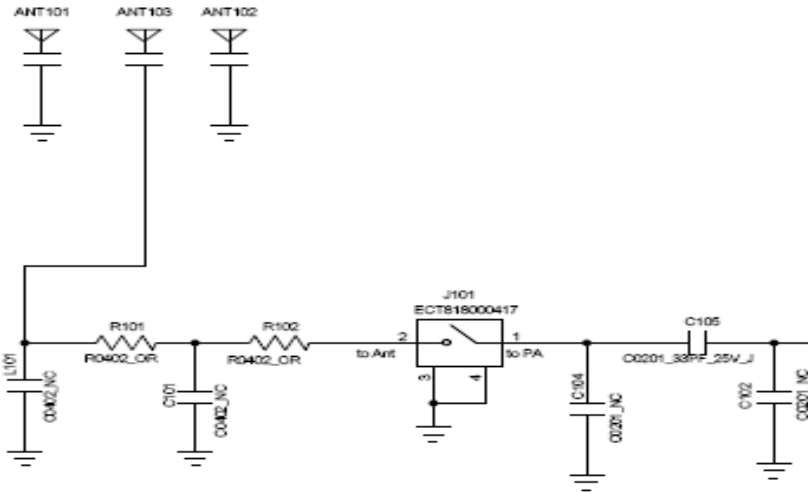
MICBIAS0 whether have 2.0v bias; check MIC circuit whether have tainted stickers, stickers wrong question; additional welding baseband chip U301;



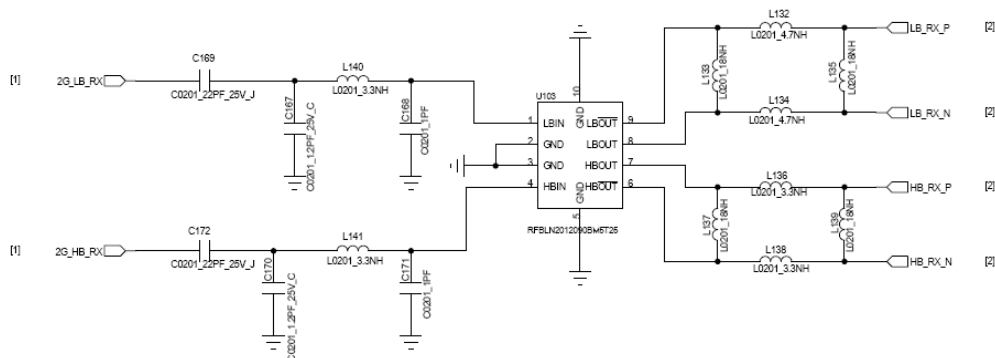
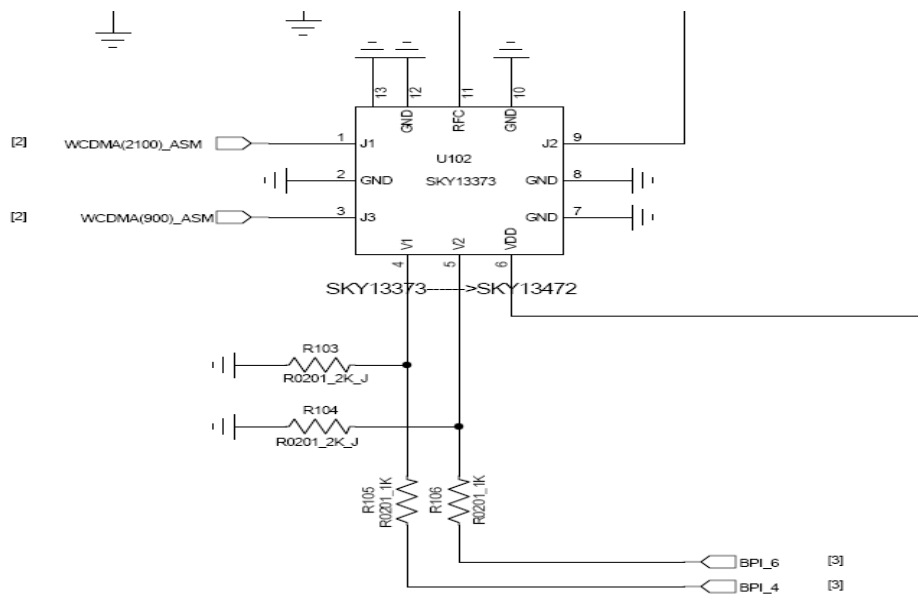
## 1. 11 No signal, weak signal.

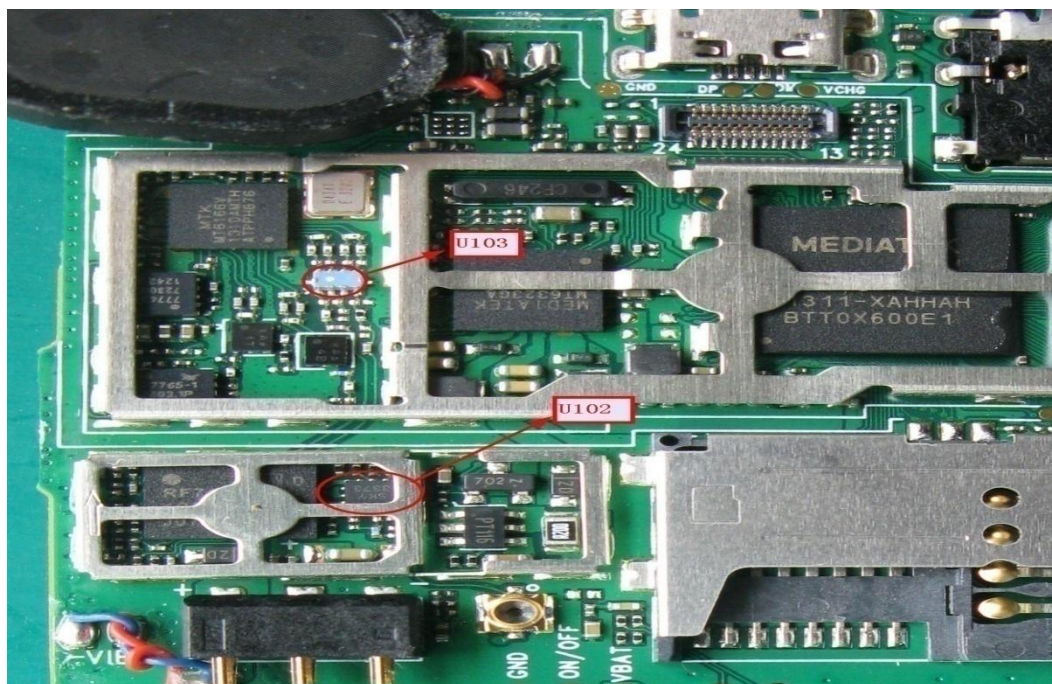
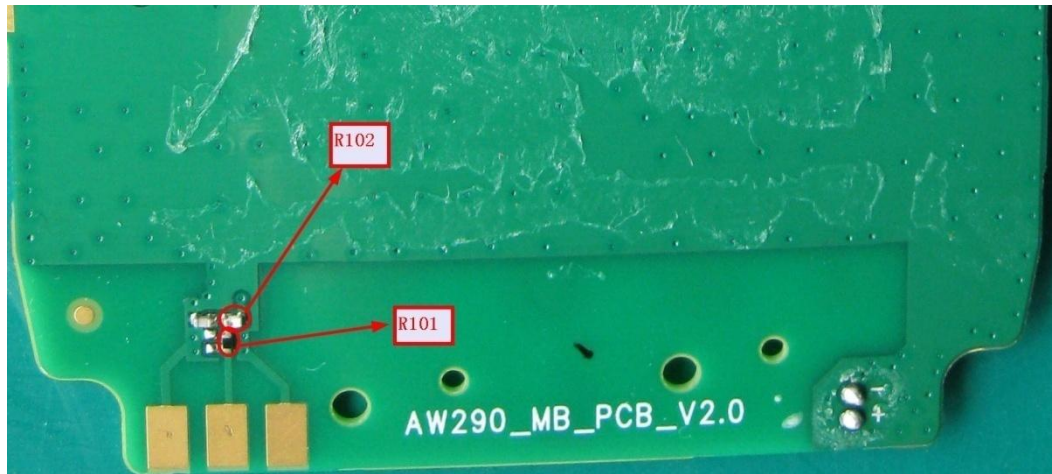
No signal/weak signal is ordinary because of RF access barrier, or antenna contact is not good cause, there have three reasons as follow:

- 1) Firstly check whether the antenna shrapnel contact pins bending or breakage, change it if have.
- 2) And then, check R101、 R102 device whether have leak stick or dry joint phenomenon.



3) Check U102、U103 whether have dry joint.



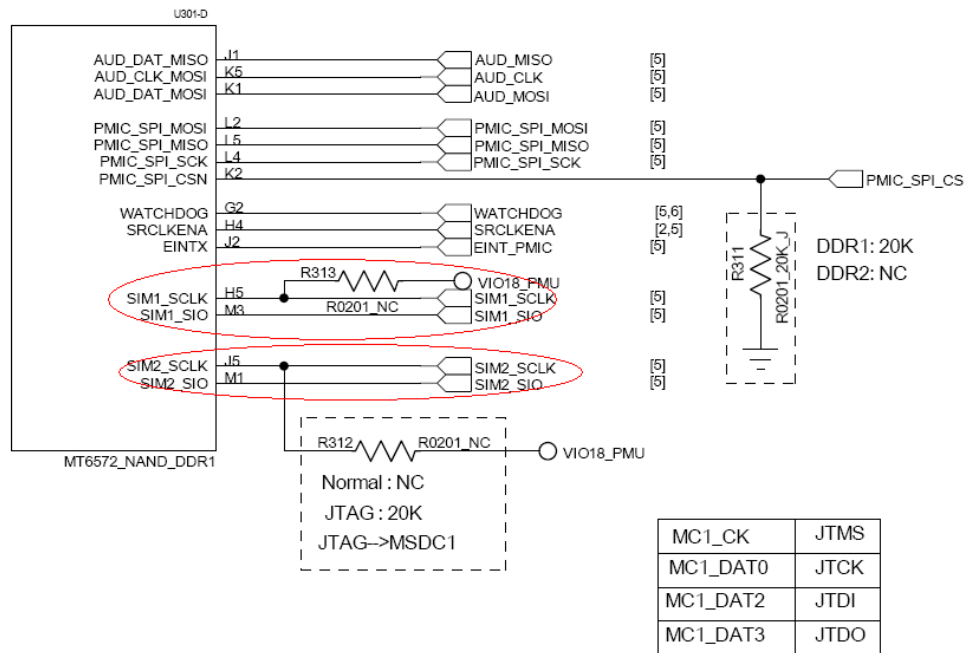


## 1. 12 No recognize card.

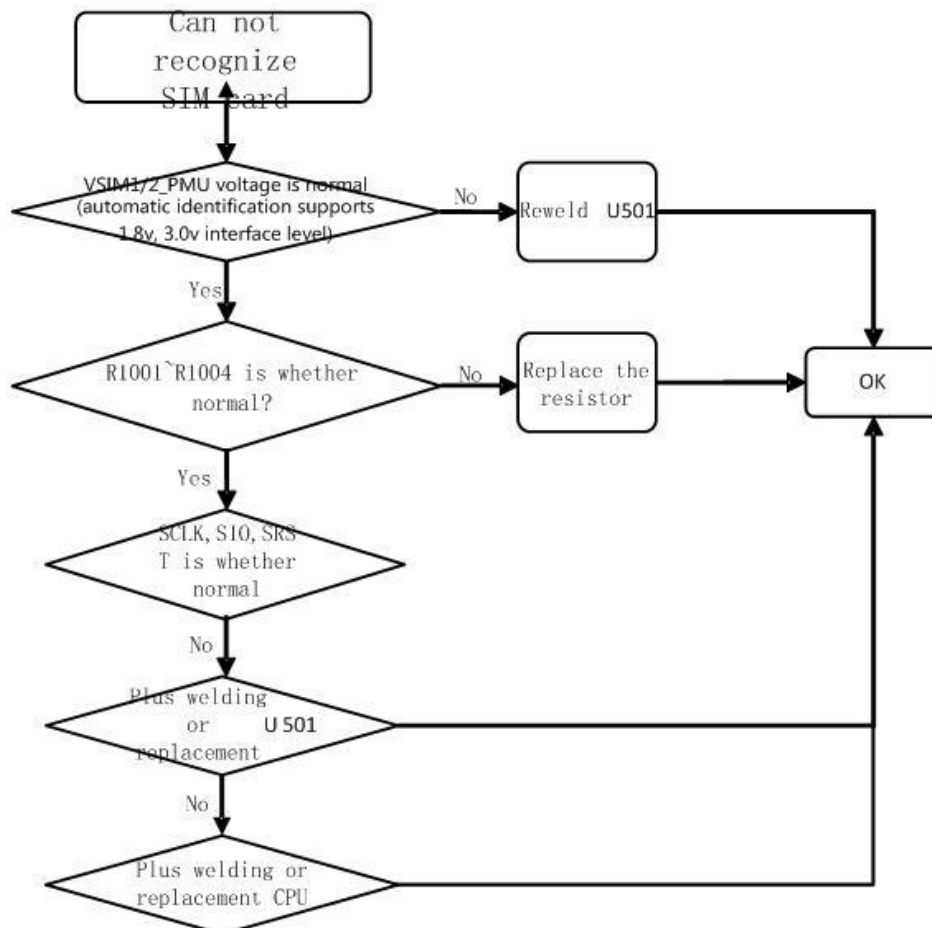
### 1. 12. 1 SIM card fail to recognize.

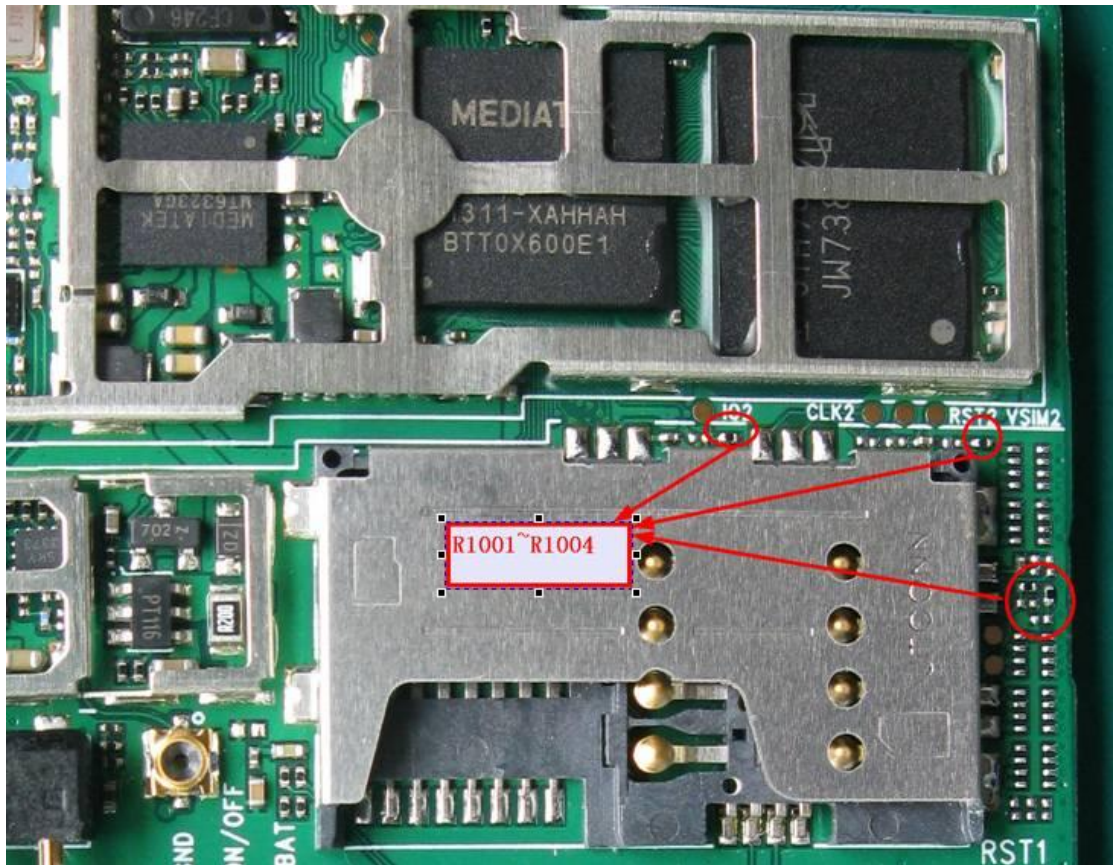
SIM card , T card circuit :





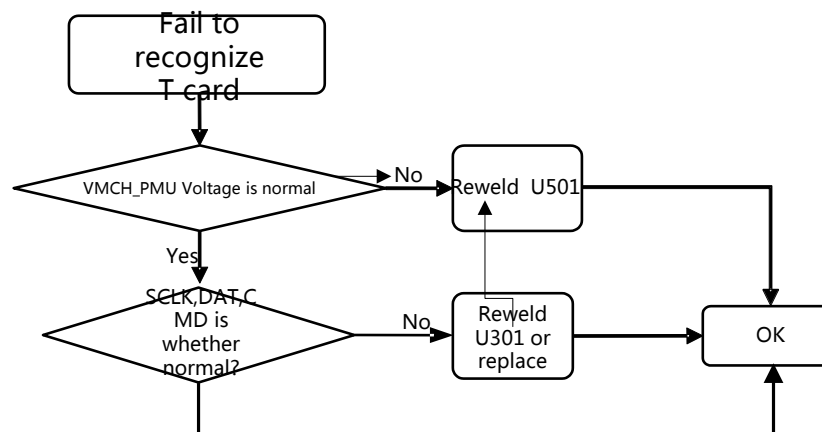
Analysis process :





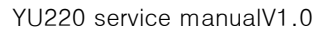
### 1. 12. 2 Fail to recognize T card.

T card in the signal path and no series resistance, analytical process is as follows :



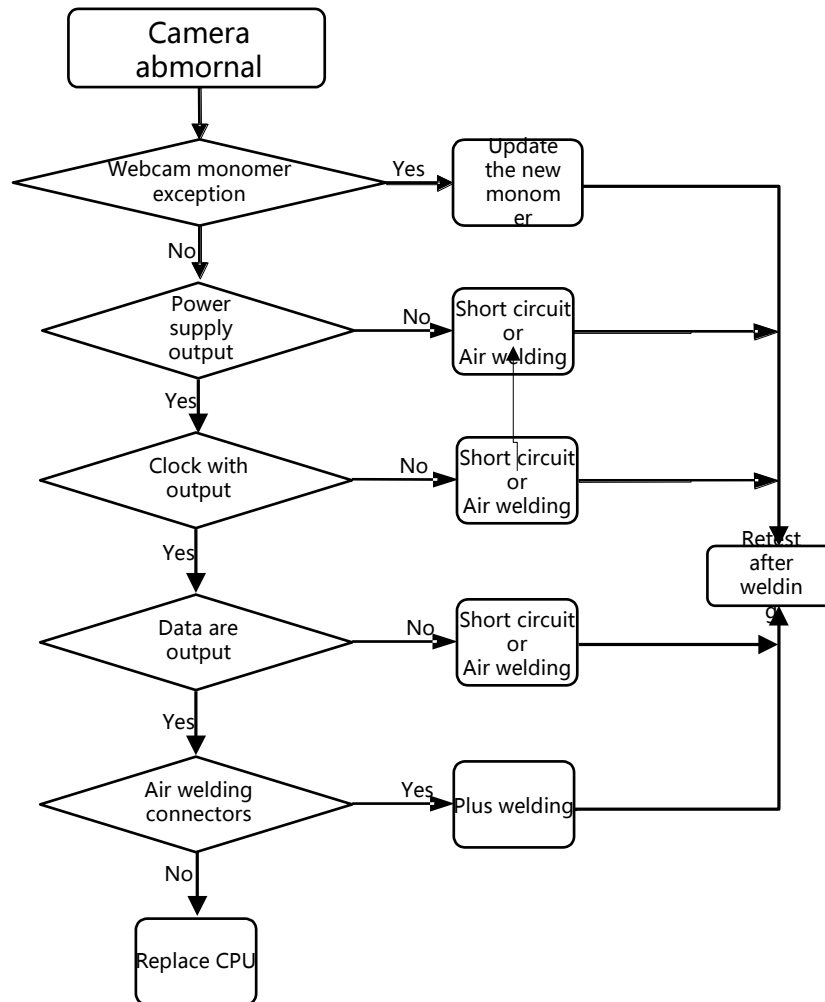
### 1. 13 No camera

Schematic diagram. :



Detection flow :

General phone camera without image, there are four possibilities: firstly get rid of LCD failures. 1. Camera bad; 2, camera and the socket bad contact; 3, connector dry joint. 4, CPU chip U301 exception. So first determine whether there is power cord, if the power cord abnormalities, first determine whether a short circuit, short circuit, please remove the appropriate path if the capacitance, if not short-circuit the plus welding PMU circuit; look at whether there is a clock signal output without output, you can first add welding CPU chip; see if there is signal signal line, if not, then the CPU exception, can be welded CPU retest. If the external signal has, then we can conclude that the connector is bad, can be welded in the test.

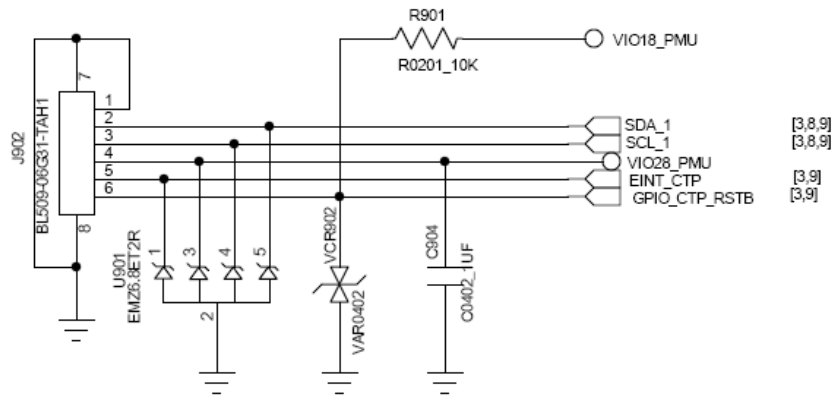


## 1.14 Touch panel not work

Schematic diagram :



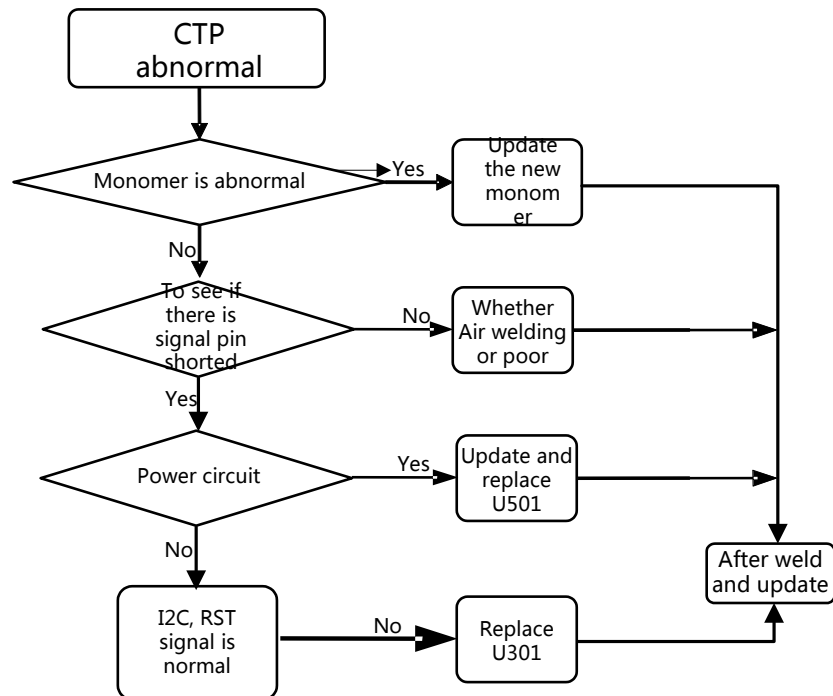
# CTP



## Fault analysis process :

CTP failure is generally unresponsive touch, unresponsive, touch point bounce, etc., please replace the new CTP, see if you can solve the problem, if it still cannot be solved, according to the following steps :

- 1、 Input power is normal, if the input voltage is abnormal, first determine whether a short circuit, remove the capacitors on the line after the short circuit. Measurement, there may be chips and connectors J902 U501 causing a short circuit can be re-welded and then measuring
- 2 、 Reset signal is pulled up, if the working time is low, the CPU exception, can be welded and then measuring.
- 3、 Is there a control signal output, use the oscilloscope to measure whether there SDA0 and SCL0 signal output, if abnormal, U301 body bad.

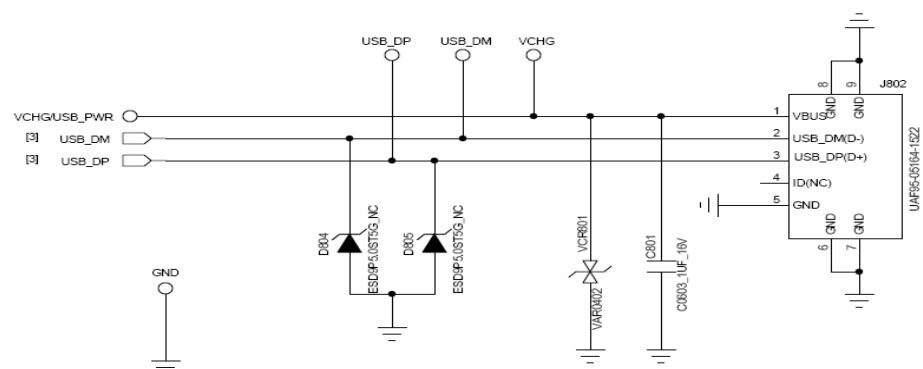


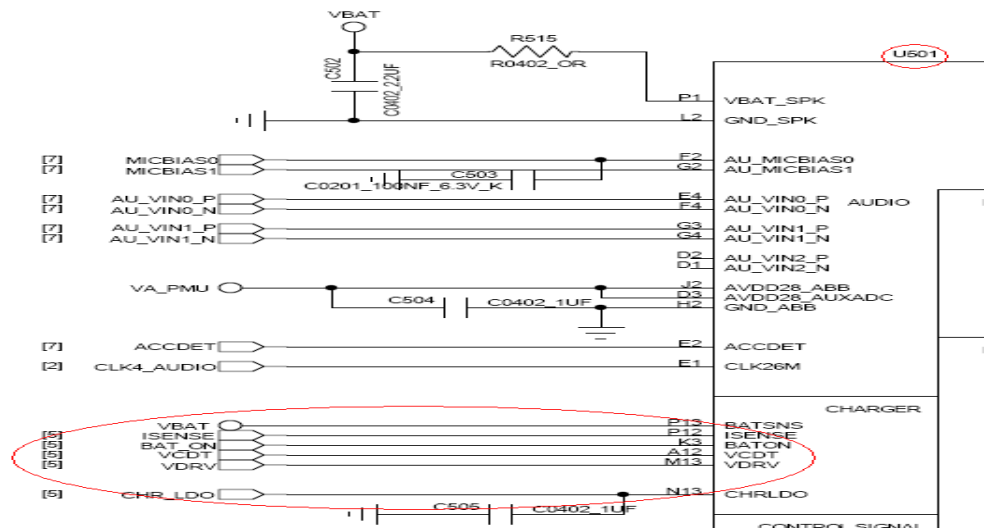
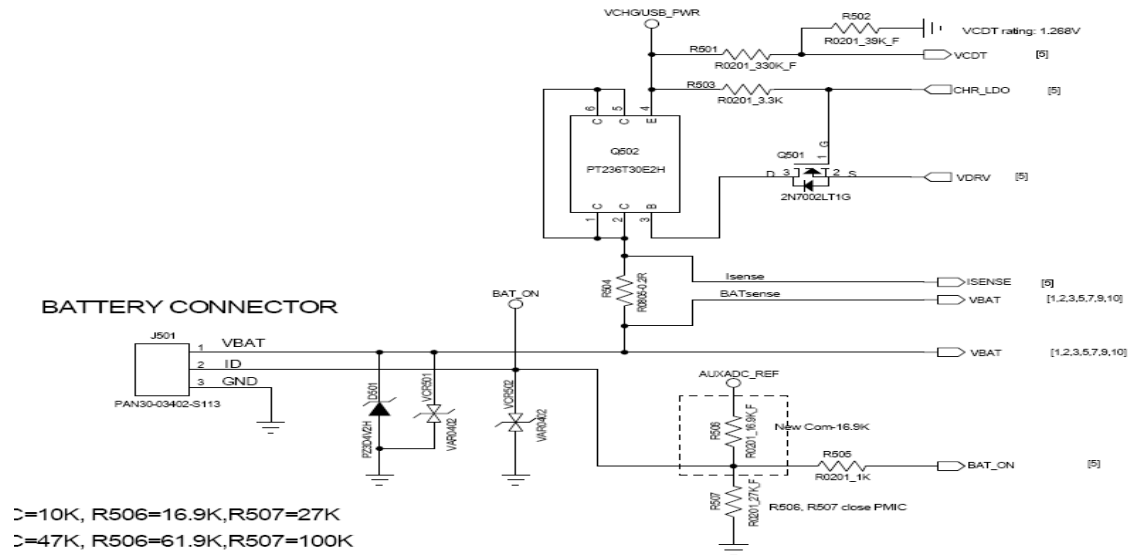
## 1.15 Charge fault

Failure Analysis: The phone cannot charge. The failure are usually two situations: First, connect the charger to the phone, the phone did not respond;

The other one is a mobile phone while charging display, but cannot charge the battery. For non-charging fault plane, first test I / O interface, see if there is visible damage

Maintain process :



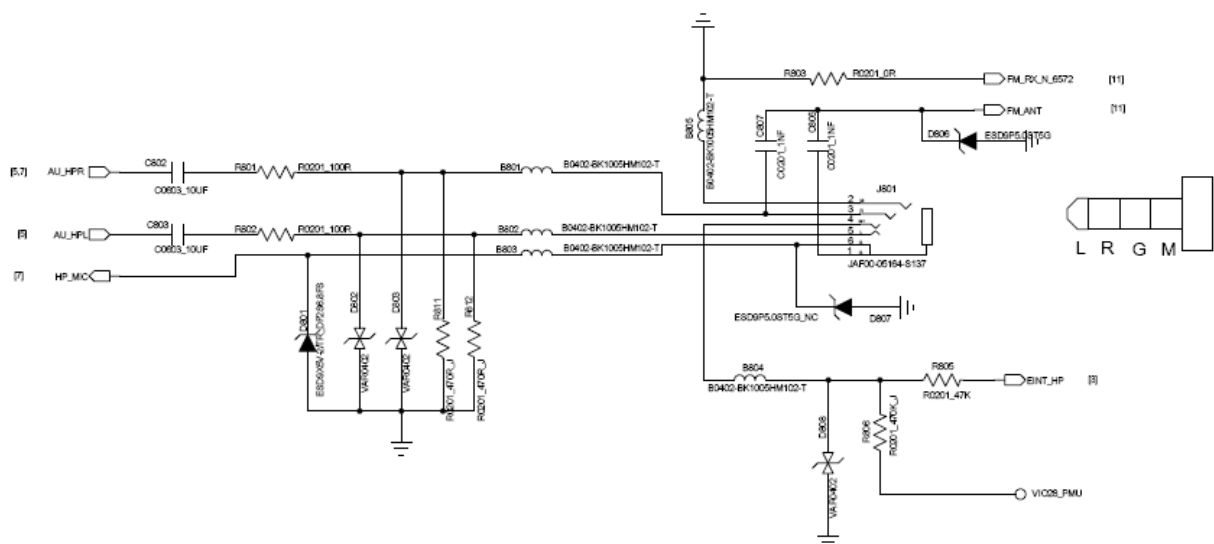


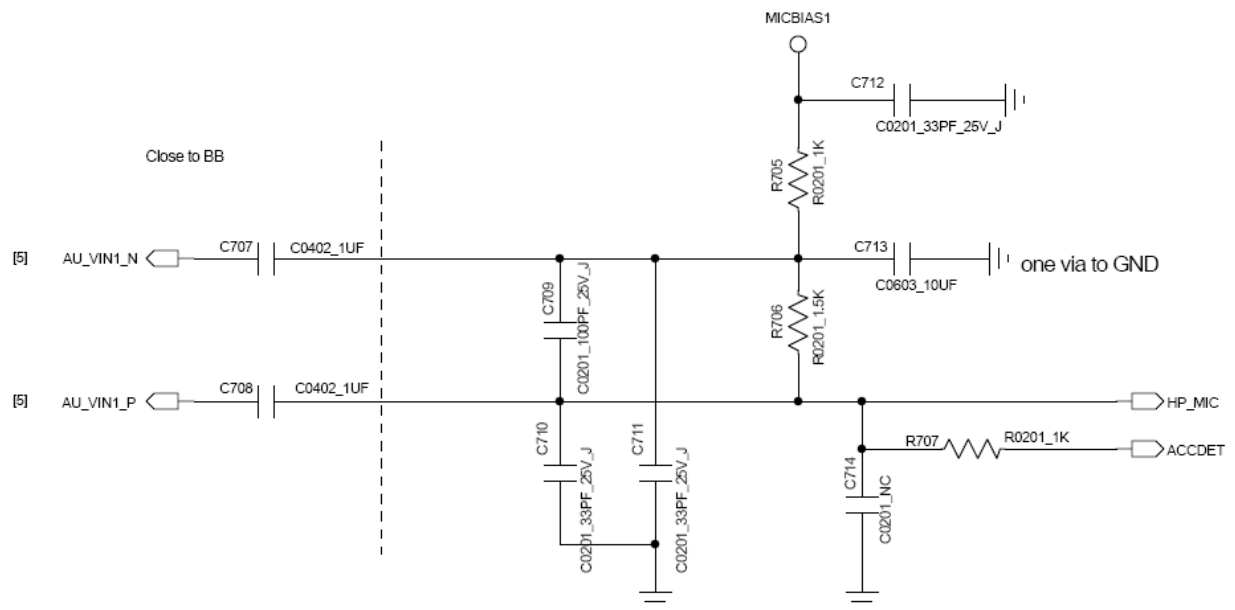


### 1.16 Earphone problem

Earphone schematic diagram :

## Audio Jack





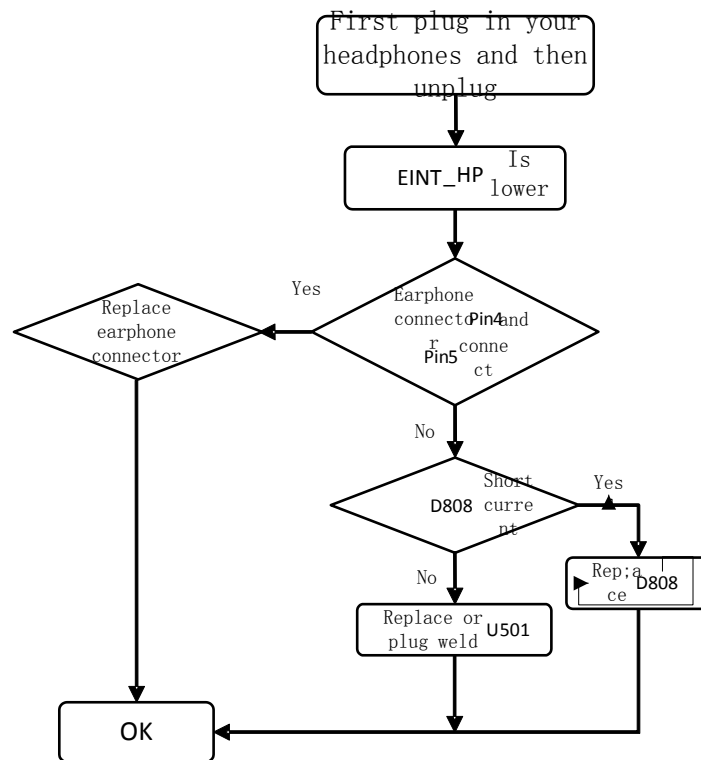
### ➤ Failure analysis process:

Fault 1: Insert the headset, silent, unable to detect headphones plugged;

Repair process: First, replace with a new headset first to see if the recovery exclusion headphone monomer problem, if not the headphones monomer confirm the problem, then the headset is plugged into, whether measured EINT\_HP signal is pulled low, not pulled low and then sequentially detects R805 whether Weld, B804 bead inductors are Weld, headphone socket is soldered, the headset is bad;

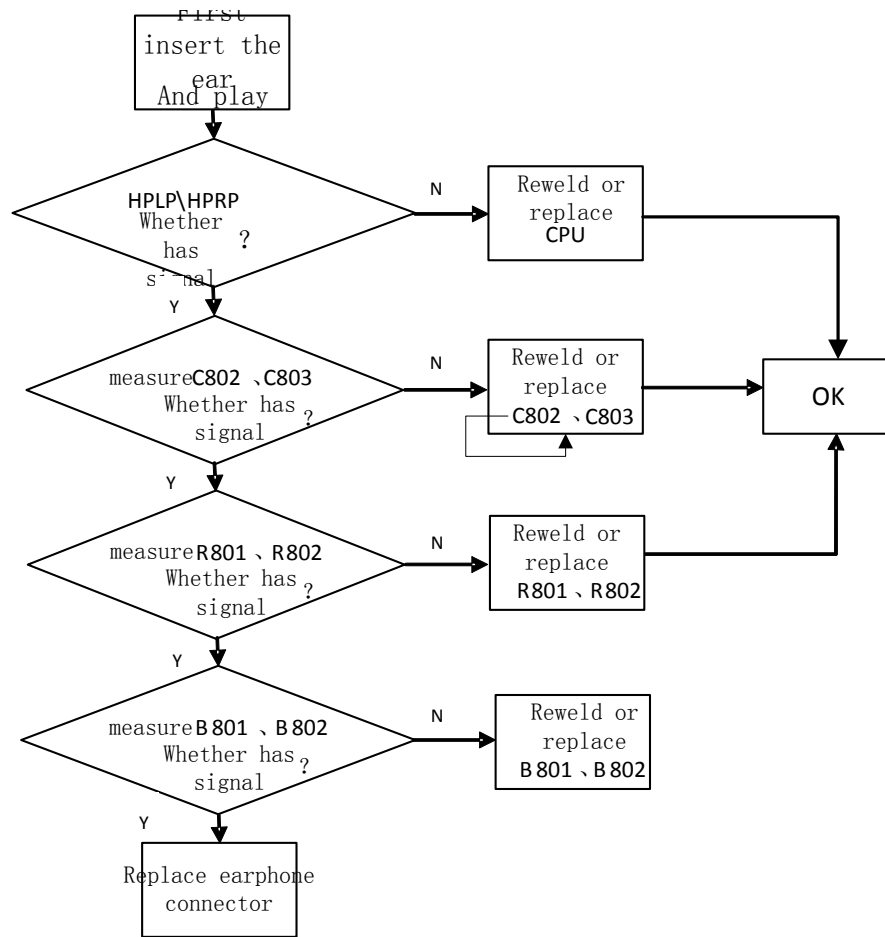
Fault 2: always show headset is plugged, unplug the headset cannot be detected;

Repair process: first rule headset monomer problem, if not the headphones own fault, then plug in your headphones and then pull out after the first measurement EINT\_HP whether the signal has been low, if the test has been low, respectively, B801, B802, short circuit (may be sequentially removed B801, B802 look headset unplugged, EINT\_HP signal is set high)



Fault 3: plug in your headphones, there are tips, but no sound headphones;

Repair process: first rule headset monomer problem, then plug in your headphones and play the ring tone and other audio signals with an oscilloscope measurement HPLP \ HPRP out from the baseband chip signal, and then followed by measurement of C802, C803, R801, R802 side, then B801, B802-side, then turn the investigation where the problem.

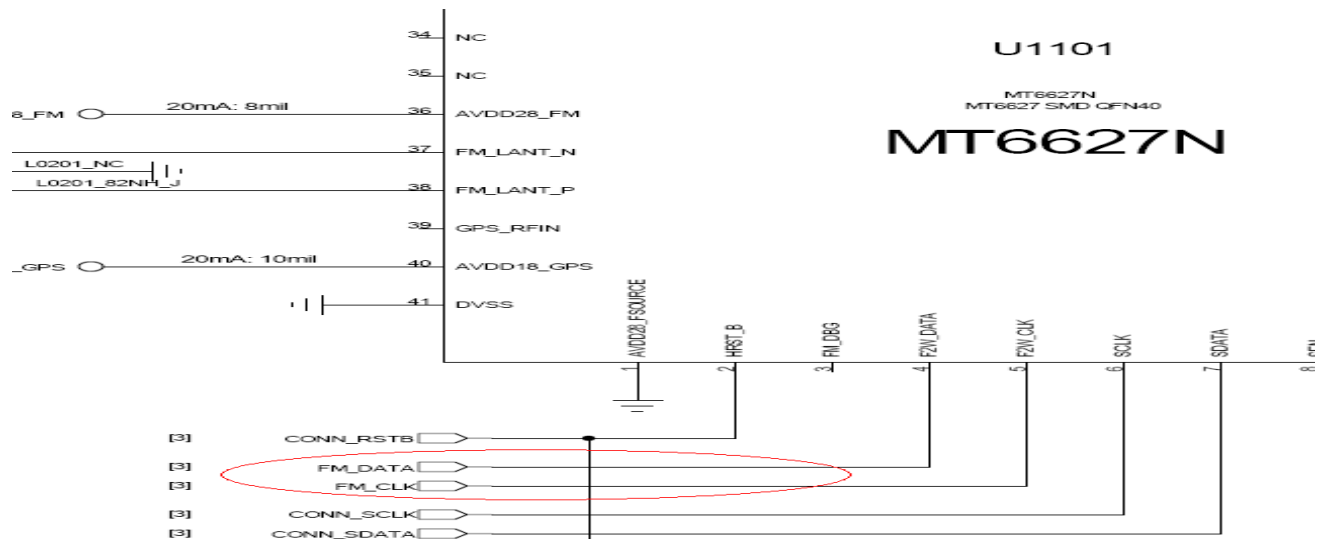


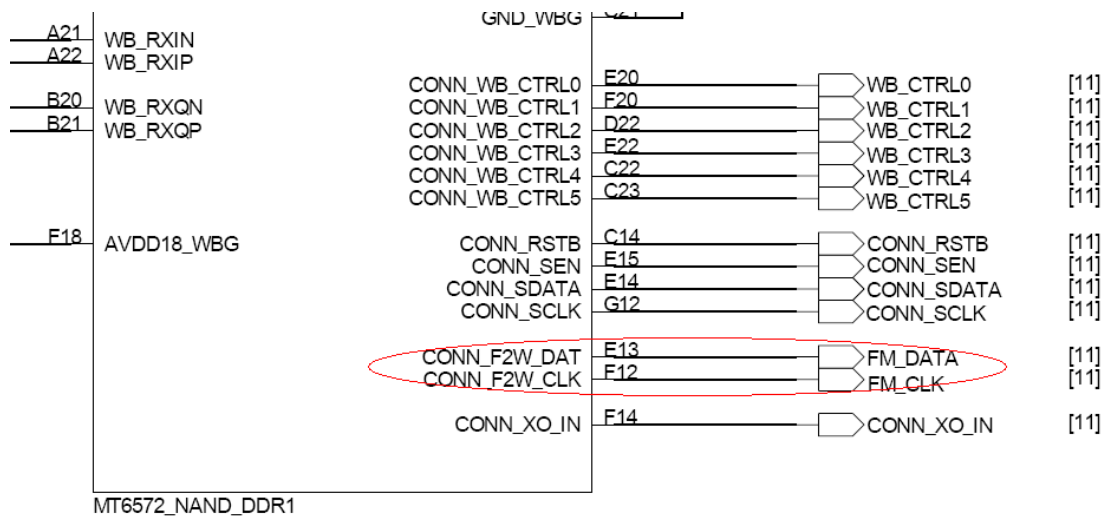
Fault 4: plug in your headphones, there are tips, but the headset MIC invalid ;

Repair process: First, replacement headphones headset monomer exclude issues such as the problem itself is not a headset, insert the headset call state when speaking on the MIC signal voltage measuring MICBIAS1 whether 2V, the case of 2V, then measure whether MICP signal if AU\_VIN1\_N / P a signal, it indicates that the U501 Weld.

## 1.17 FM

Schematic diagram:





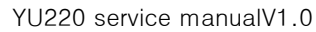
External supply its 26M working clock CONN\_XO\_IN, FM chip is powered by the PMIC LDO 2.8V power output AVDD28\_FM. Headset as the FM antenna, FM demodulation chip receives the output audio signal (FM\_DATA, FM\_CLK), two channel audio signal is connected to baseband chip, the baseband chip to do the switching process.

FM do not work or abnormal:

Repair process: FM function in the open state, see the headphone port antenna PIN correctly. Measuring AVDD28\_FM voltage is normal, if not normal instructions powered PMIC Weld or damage, such as normal and then measuring FM\_DATA, FM\_CLK signal is correct, if not correct the problem is U301; signal if the above is correct then to see whether the FM chip U1101 Weld or damaged.

## 1. 18 GPS WIFI BT

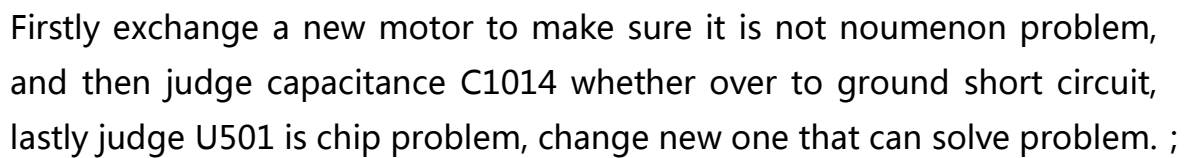
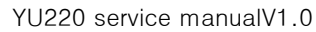
This is a functional relationship with the U1101 and U301 large, first determine several voltage is normal, if not normal, then re-change U501 :



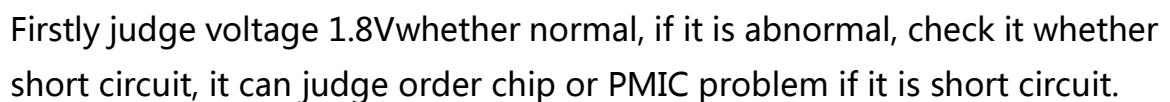
The schematic diagram shows the PMU power supply circuit. The 7L26002015 voltage regulator (X1101) is connected to the VCN\_2V8\_PMU. The output of the regulator (pin 4) is connected to the VCN\_2V8\_PMU. A capacitor C1103 and a capacitor C0402\_1UF are connected to the output. A resistor R1102 (R0201\_0R) is connected between the output and the CONN\_XO\_IN pin. A resistor R1103 (R0201\_NC) is connected between the CONN\_XO\_IN pin and the SYSCLK\_WCN pin.

Finally if the U1101 correctly after changing or abnormal, consider U301 chip issues, the need for U301, problem solving.

Motor circuit :



### G-SENSOR circuit :



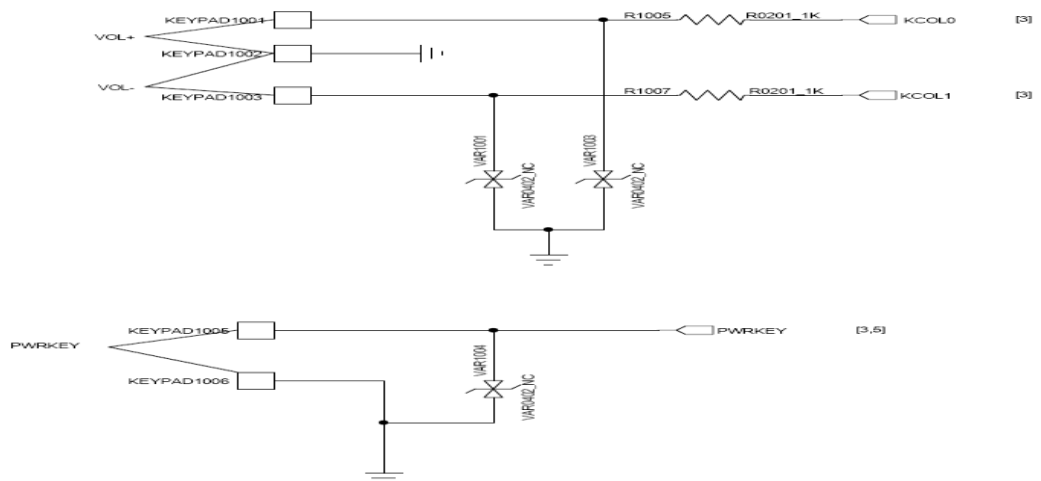
If the voltage is normal, you need to determine whether the normal I2C signal output, and whether there ENIT, the final judgment this bad chip

If it still have problem then can make sure U301 bad, change new one can solve problem.



### 1. 19. 3 Side key

Side key circuit :



Side key include volume key and power key.

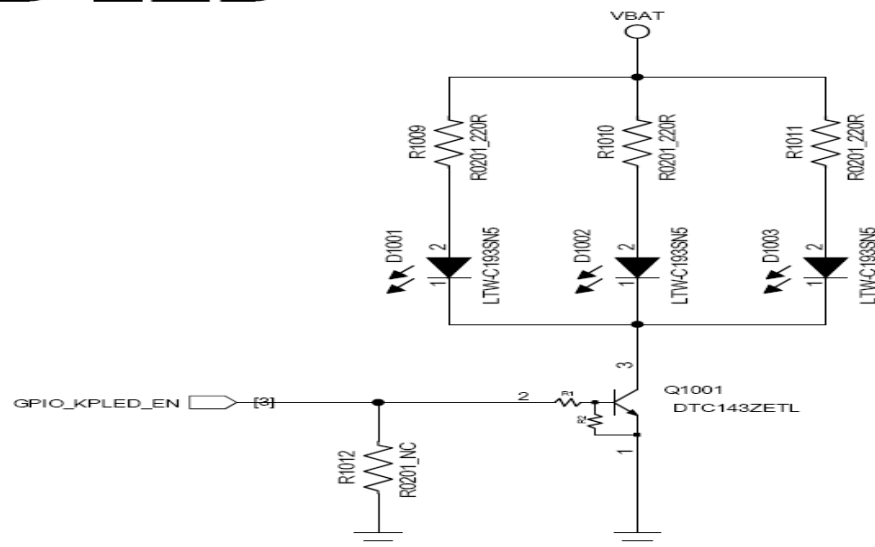
Up and down keys to communicate with the U301, the first rule out side-FPC monomer and welding no problem, consider two resistors R1006, R1007 are OK, and then determine when pressing the upper or lower button when the upper or lower key is shorted to ground, if it means short-circuit the normal, not short-circuit the problem can be determined U301 chip, the chip can be changed. Power button is on the U501 communication, first rule out FPC and welding monomer no problem, consider whether short varsities, and then consider the U501 problem can be.

### 1. 20 Keyboard light

Keyboard light circuit :



# 'PAD LED



U301 keyboard lighting is by issuing an enable signal GPIO\_KPLED\_EN makes transistor Q1001 is turned on, then the three keyboard lights.


Firstly judge the keyboard light paster whether have problem, dry joint or short circuit, or reverse weld problem, it need to affirm welding series resistor whether unusual if the light have no problem.

Finally, whether the transistor is installed is damaged, or does not turn-on voltage.


Finally, whether the enable signal when the keyboard light should not to be pulled, not pushed, it indicates a problem U301, U301 can be changed again.



## Chapter 2 PCB board and BGA chip welding spot indicator diagram

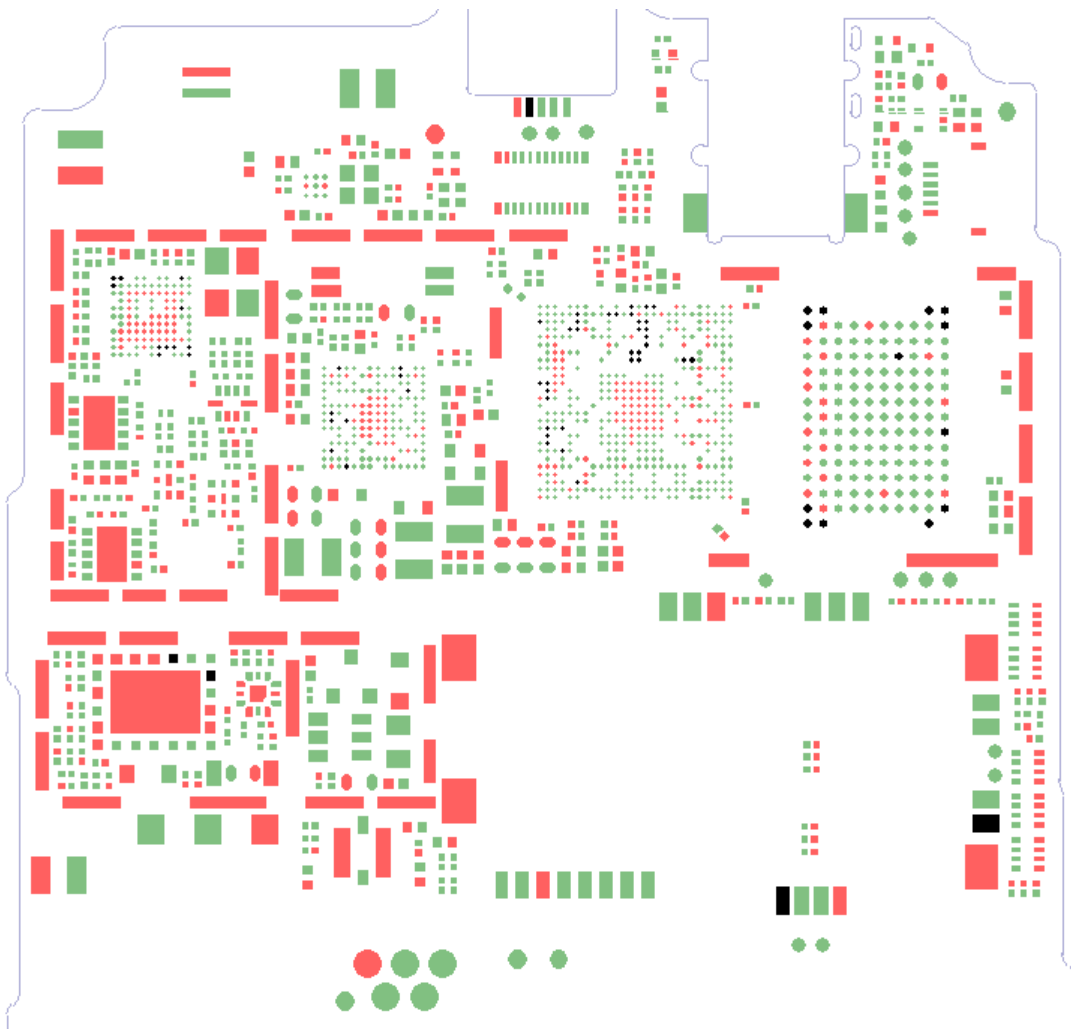
Red (R:255,G:0,B:0) :hollow dot

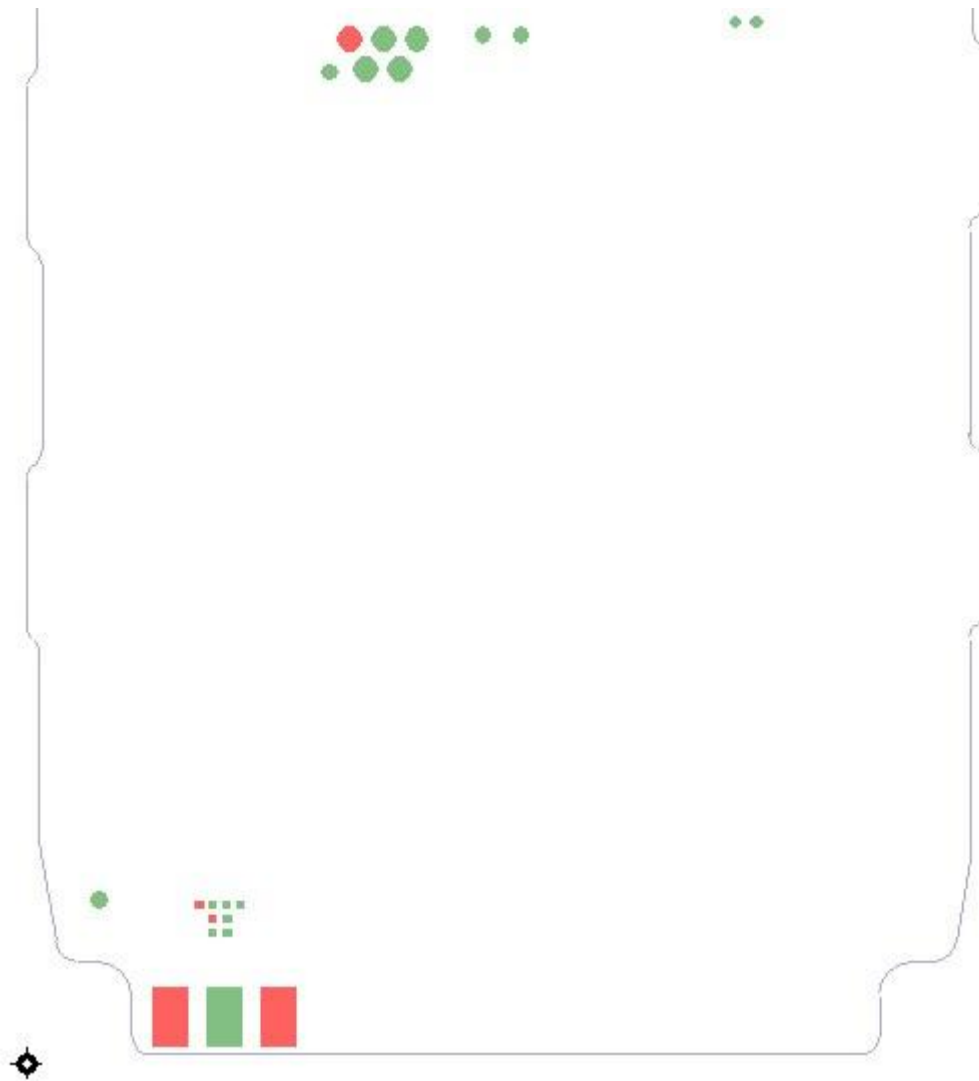
Green (R:0,G:255,B:0) :touch down point

Blue (R:0,G:0,B:255) :welding spot

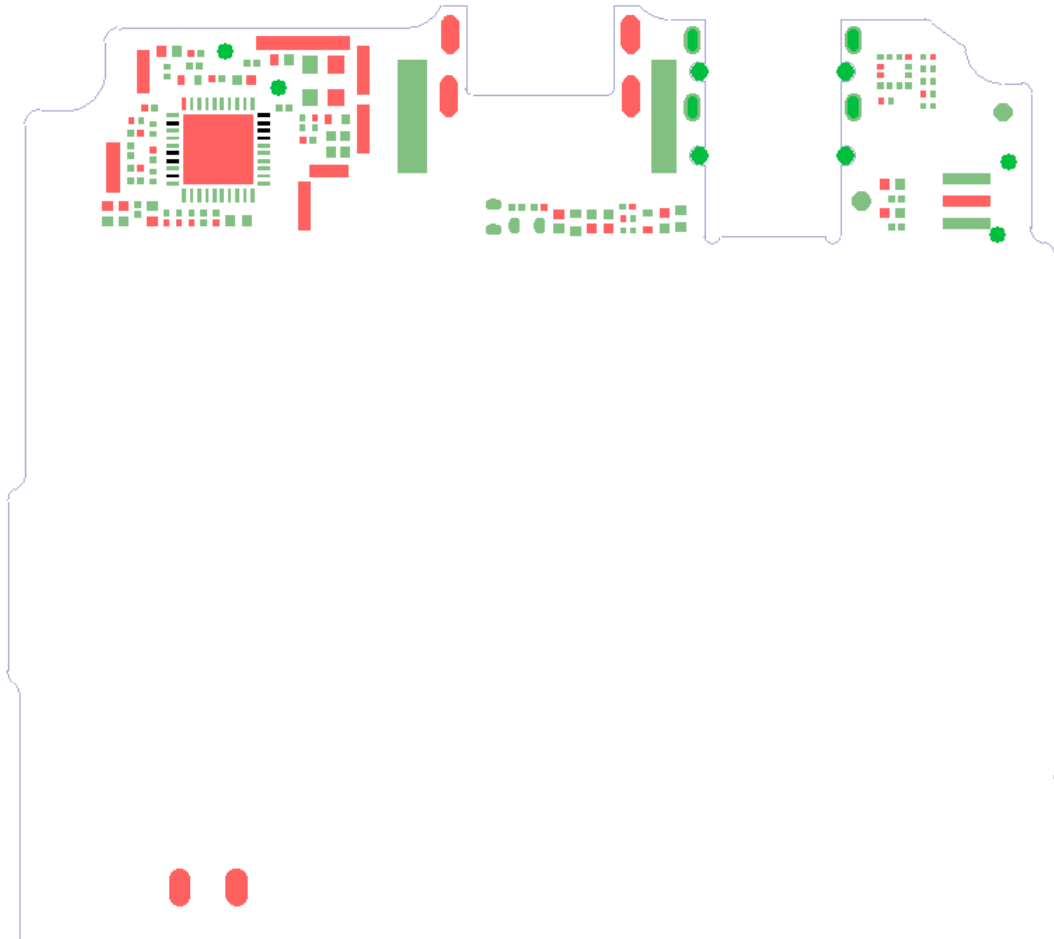
Mainboard graph:

Front :



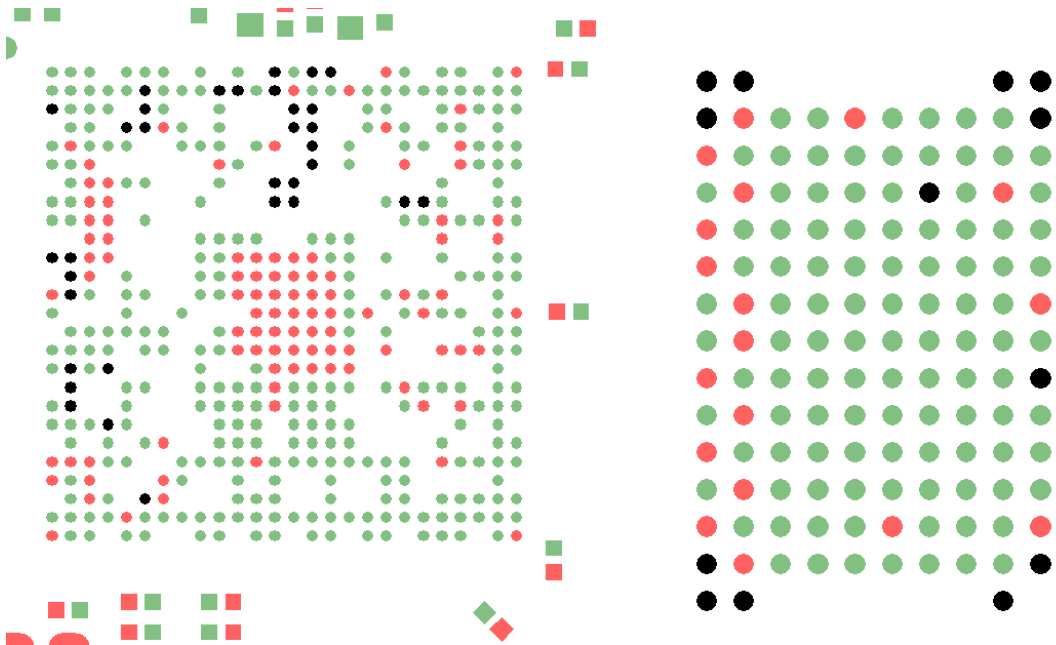


Reverse side :

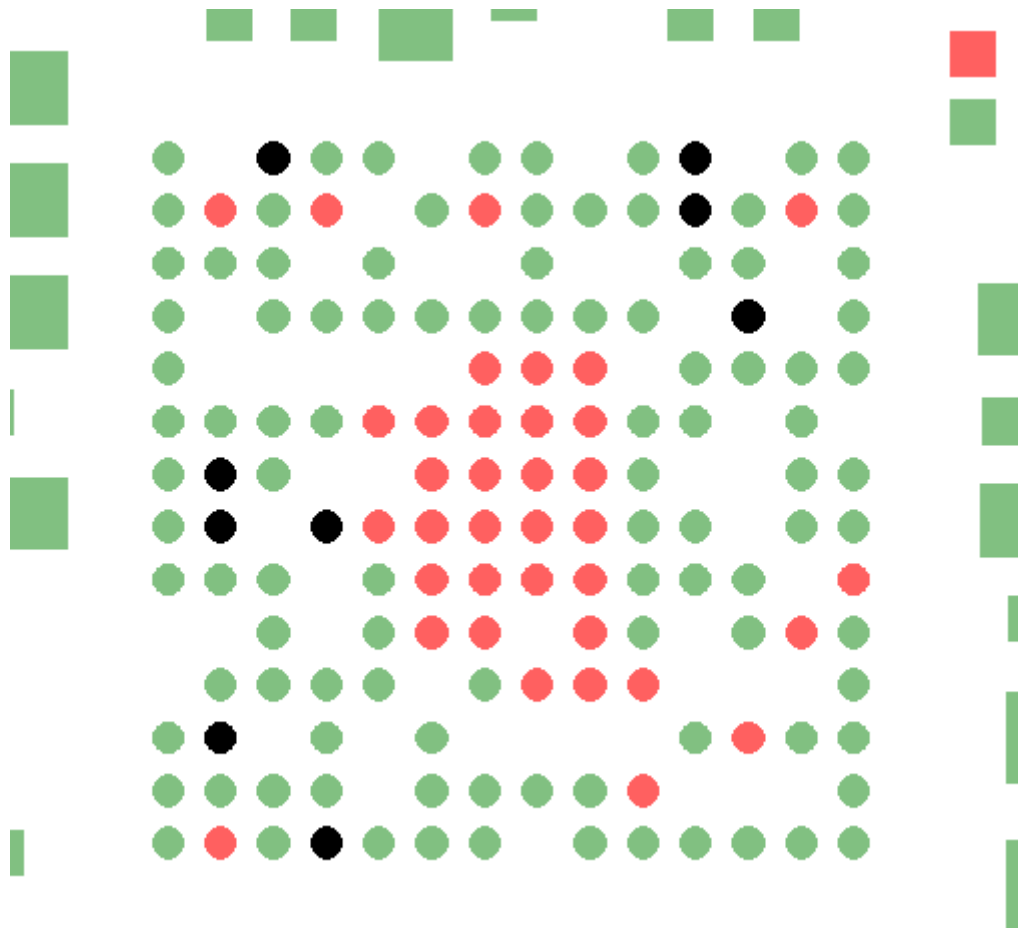




MT6572+FLASH:



PMIC\_MT6323:



MT6166:

