

# **PAP4040DUO Maintenance Manual**

Document Name : PAP4040DUO Maintenance Manual

Version: V1.0

Draft date: 2012-09-10

Document code:

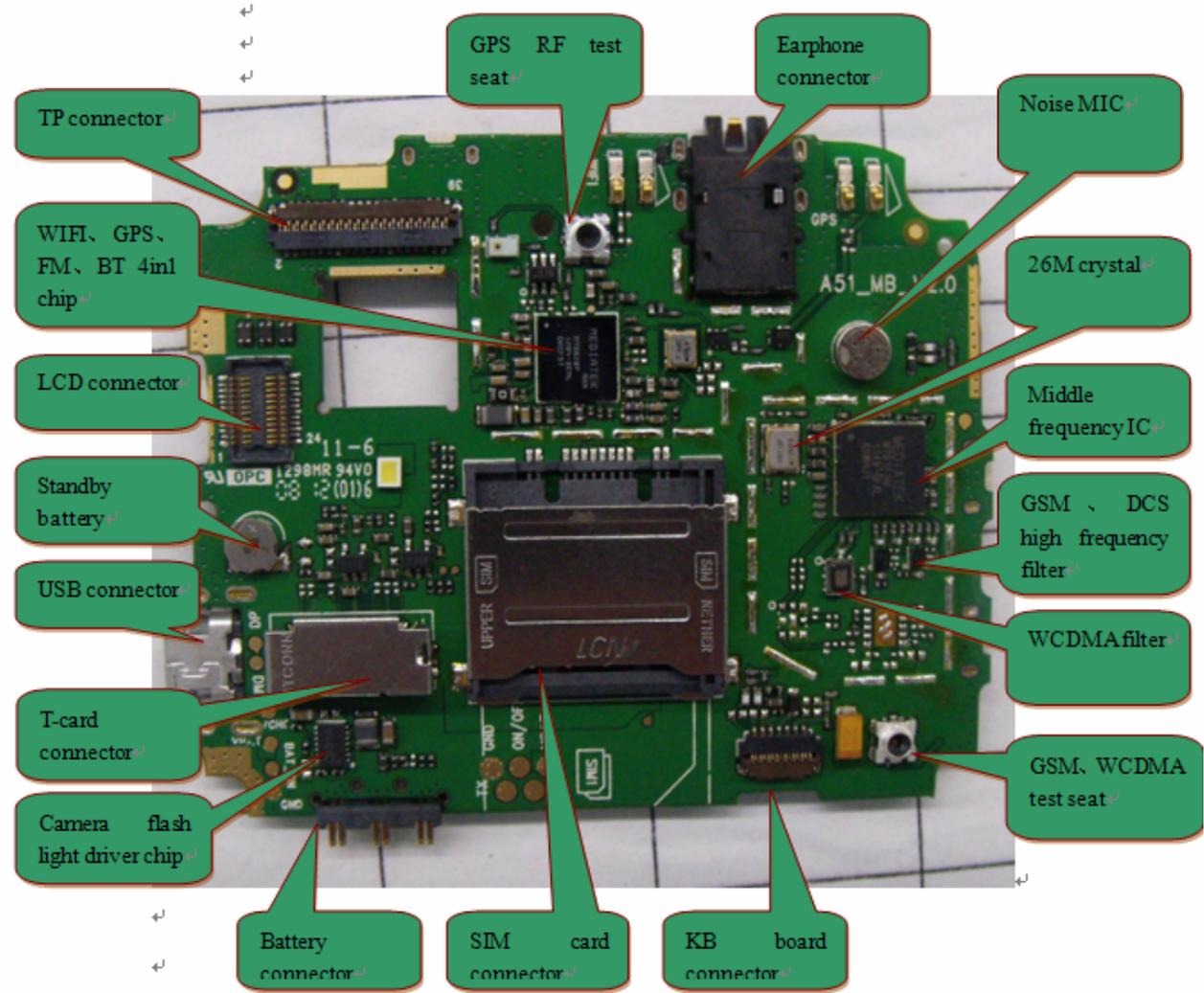
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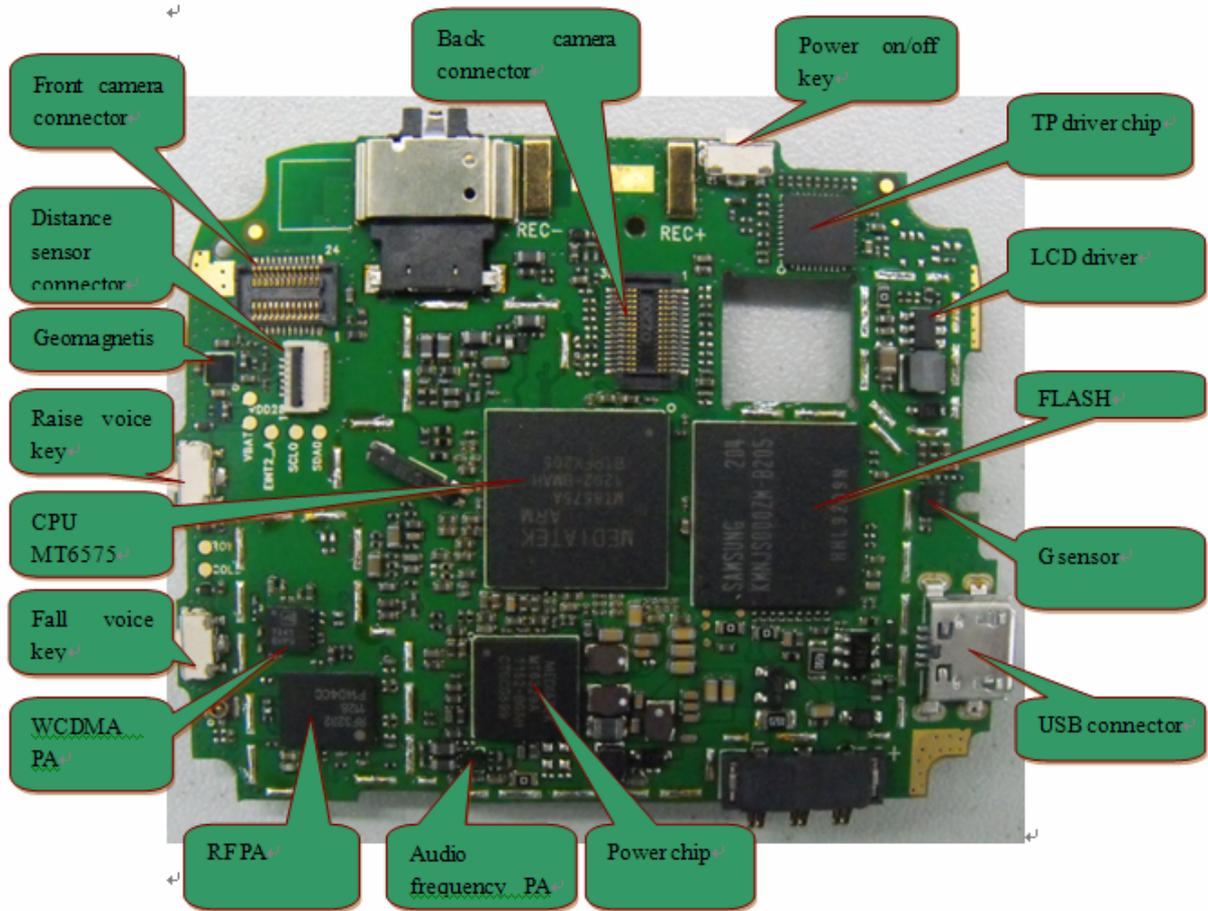
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# 1. Circuit diagram instruction

## 1.1 Main board explored view



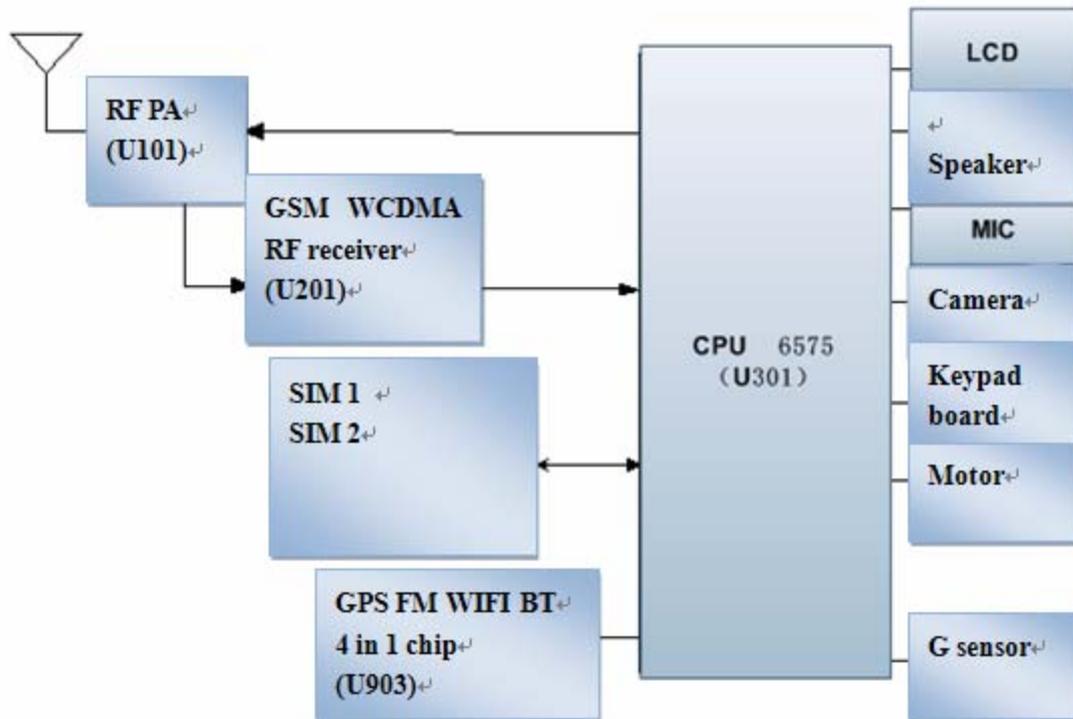


## 1.2 Detailed Description of Circuit Chart

Support rich multimedia high-end specifications include 720p high resolution video playback and recording a 8 million pixel camera and conformity Imagination Technologies – Power VRTM SGX Series5 3D GPU, support qHD (960x540) display. Complete solution promotion 35% efficiency in a browser application, also at on line game and other popular application, on response speed of 3D graphics processing MT6575 super high performance also lead, high above 20% and it greatly enhance the user experience. Besides, MT6575 integrates the latest windows processing ability of 3D and world-class digital television platform, related technology of MTK, for which, MT6575 have advanced image processing operation technology and design capabilities also the image quality fine smooth to the digital TV.

Besides, MT6575 highly integrated system design also realize the dual card dual standby and the lowest power consumption. MTK unique dual SIM card technology

support user need not worry about missing the call on data transfer, and it also support to change the SIM card on power on condition.



### 1.3 RF circuit

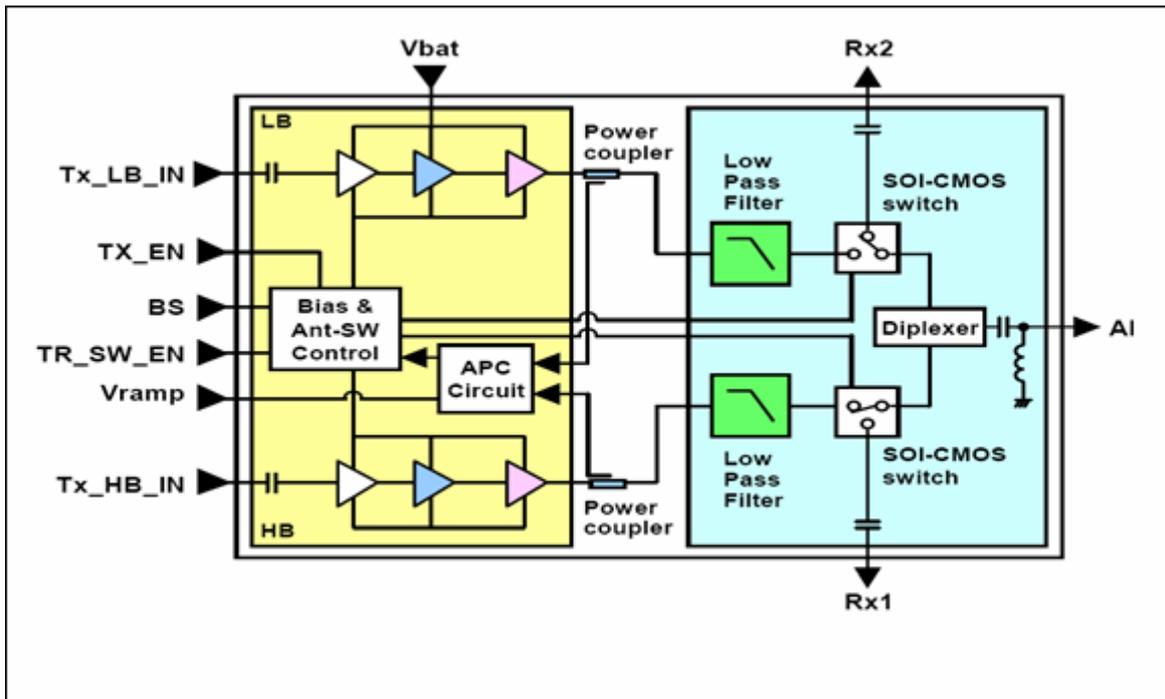
RF failure occurs in calibration

- Diagnosis: 1, check if the corresponding components were shifted, false soldered and missed;  
 2, measure if the working voltage of Transceiver and RF PA are normal, Transceiver's working voltage is 2.8V, battery voltage is RF PA's working voltage;  
 3, VAPC is approximate 1.8V under maximum power, check if the VAPC is normal;  
 4, RF PA TX-Enable should be high level (typical power is 2.8V), measure if it is;  
 5, all normal, the chip is wrong, replacing RF PA and Transceiver in turn is needed.

Receiving failure: RF failure occurs in calibration

Diagnosis:

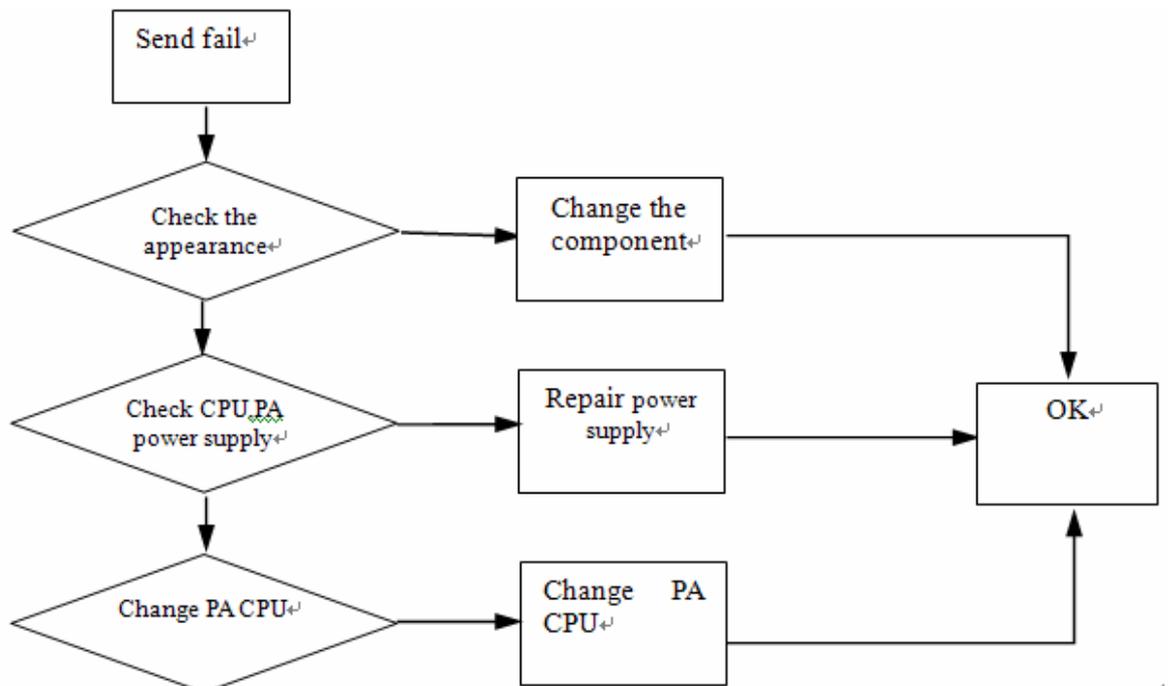
- 1, check if the corresponding components were shifted, false soldered and missed;
- 2, measure if Transceiver working voltage is normal, it should be 2.8V;
- 3, RF PA TX-Enable is supposed to be low level, check if it is normal;
- 4, all normal, the chip is wrong, replacing saw filter, RF PA and Transceiver in turn is needed.



Receiving failure: RF failure occurs in calibration

Diagnosis:

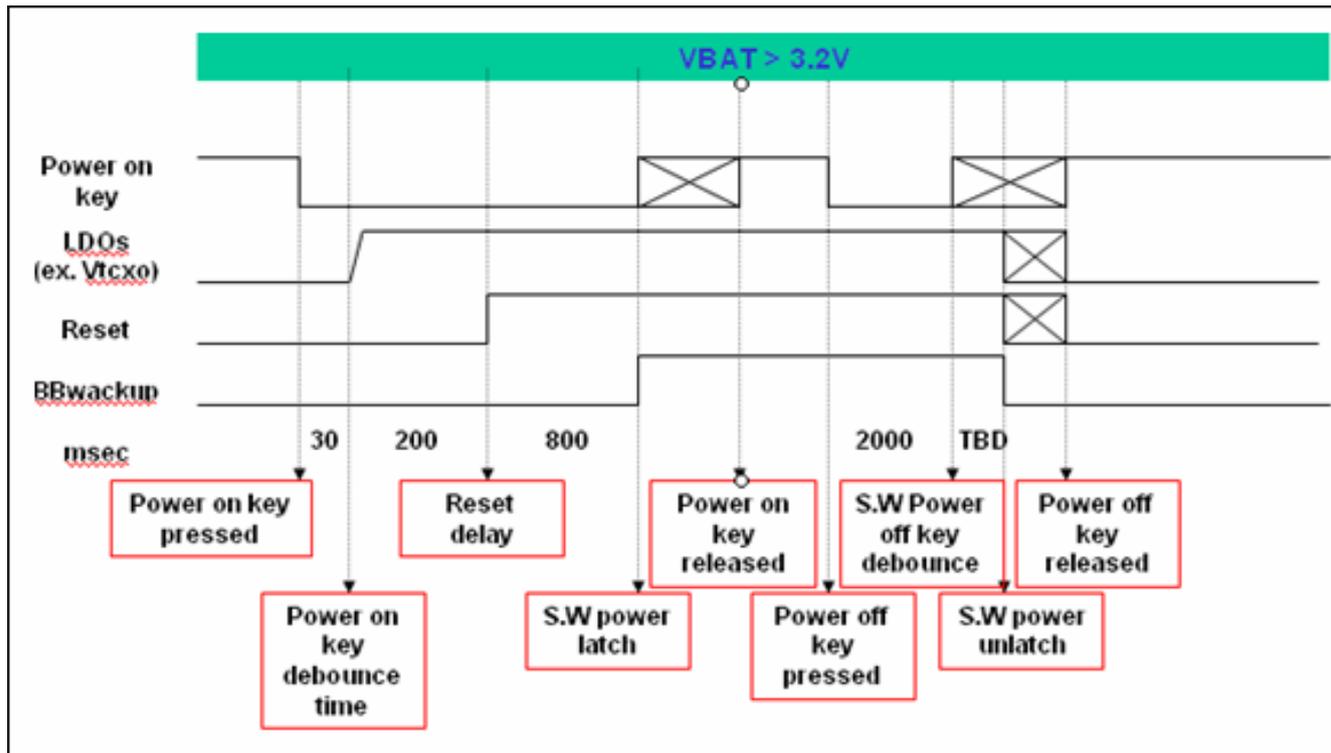
- 1, check if the corresponding components were shifted, false soldered and missed;
- 2, measure if Transceiver working voltage is normal, it should be 2.8V;
- 3, RF PA TX-Enable is supposed to be low level, check if it is normal;
- 4, all normal, the chip is wrong, replacing saw filter, RF PA and Transceiver in turn is needed.



## 1.4 No Power On

**Analyzing:** High current is caused by the short of power supply circuit, when use the DC power supply, the current is about 800mA or more. This fault consist of major reasons, the VBAT is short with ground.

### Reference Figure



## 1.5 Function circuit

### FM circuit

**Analyzing:** Fault 1: FM does not work;

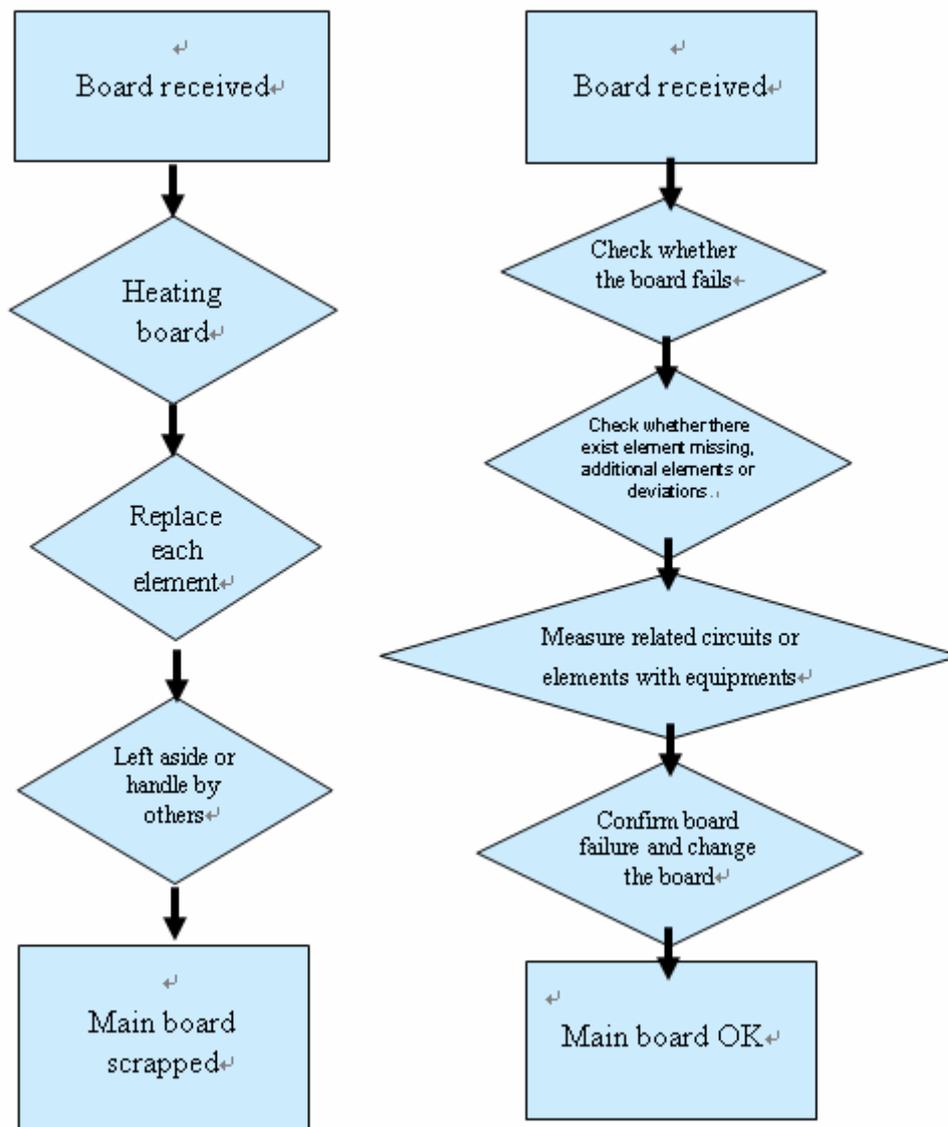
Maintenance Process: Run FM, measuring VDD voltage, if not normal that is the main baseband chip MT6575 Weld or damage, if normal, then measure the I2S\_CLK signal ,if not ok, modify U301, if all the above are correct, then check the FM chip U1101 Whether Weld or damage.

Fault 2: FM work, but no sound;

Maintenance Process: Run FM, measuring FM\_OUTL / R audio output signal, if signal is normal, then the fault lies in the baseband chip U301, if FM\_OUTL / R signal abnormalities or no signal, then the problem is On the FM chip U1101.

### Reference Figure





## 2.1 fault repair

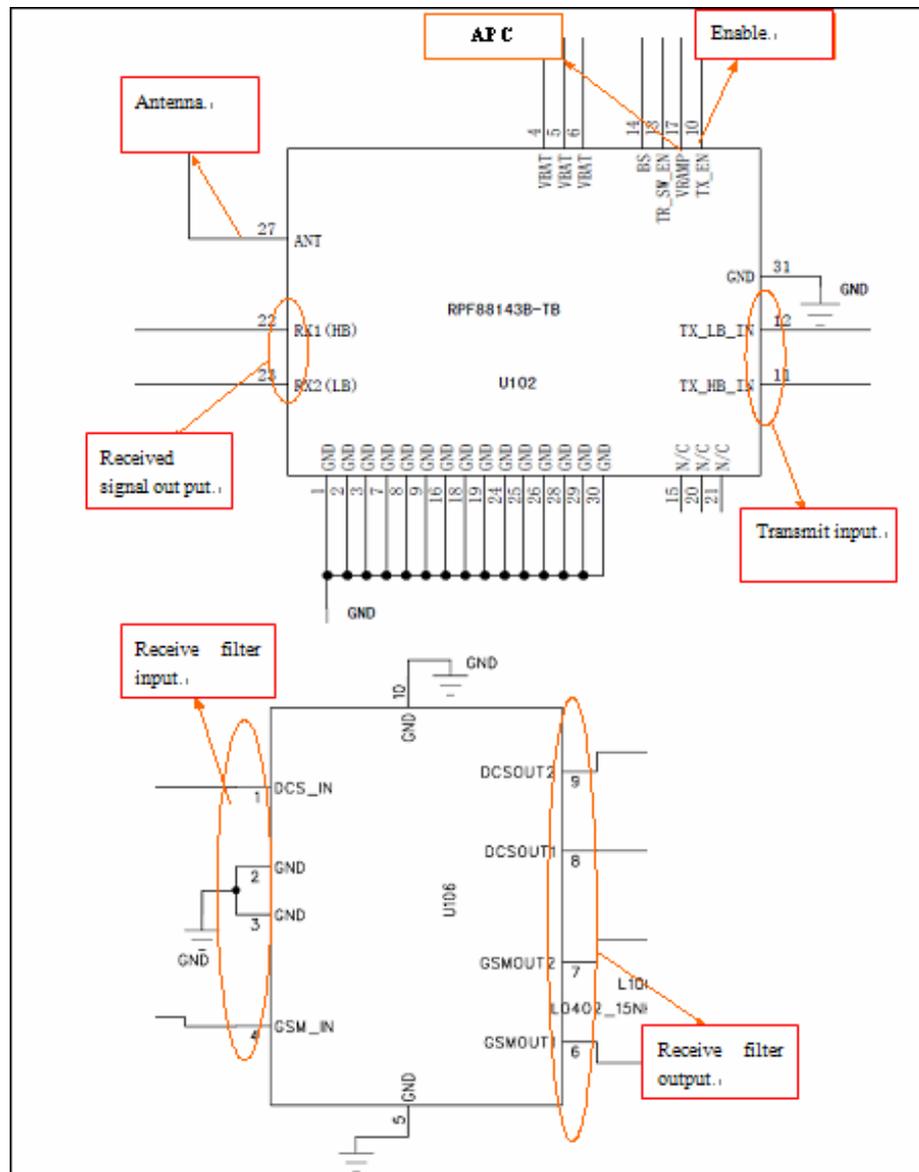
### RF part

#### Receiving abnormality

The GSM or DCS signal received from a base station via antenna is inputted from the pin U102 27, and sent to U106. The signals are amplified by their own low-noise amplifier (LNA). The amplified signal is sent to a down converter, where the signal is mixed with local oscillation (LO) output from RX VCO to generate zero intermediate frequency (ZIF) signals. The zero-IF signal passes through a filter and is amplified by

programmable gain amplifier (PGA), then the signal is outputted to I and Q demodulator to generate I/Q base band signals. The demodulated I and Q base band signals are outputted to the base band part for further processing.

### Consult circuit:



### Repair procedure:

- (1) Test again and make sure that there is no disoperation. Observe the failure carefully.
- (2) Analyze the probable circuit related to the failure to minimize the failure detection range.
- (3) Perform visual detection to related circuits to find obvious failure cause, such as missing or deviation.
- (4) Measure/analyze/repair according to flowchart.

### Transmitting circuit

A transmitter consists of I/Q modulation circuit, up-conversion mixer circuit, power amplifier and duplex switch. The I/Q signal is inputted to be performed signal

modulation as the modulation signal. The modulated TXIF signal restrains its third harmonic by harmonic suppression filter. The follow-up TXIF signal will be sent to a discriminator on the offset frequency phase lock loop (OPLL). Then perform frequency discrimination to this signal and the mixed signal of TXVCO signal and RFVCO output signal. The discriminator outputs the signal control RFVCO and RFVCO phase is enabled to lock at the phase of TXIF signal. TXVCO output RF is still decided by RFVCO frequency. The phases of RFVCO and IFVCO signals lock at the phase of VCTXO reference signal. The TX signal outputted by U101 pin 10/11 is transmitted to the antenna via antenna switch to launch.

#### **Repair procedure:**

- (1) Test again and make sure that there is no disoperation. Observe the failure carefully.
- (2) Analyze the probable circuit related to the failure to minimize the failure detection range.
- (3) Perform visual detection to related circuits to find obvious failure cause, such as element missing or deviation.
- (4) Measure/analyze/repair according to flowchart.

## **AFC Fail**

AFC—Automatic Frequency Control

VCO signal is compared in phase discriminator with the reference clock signal generated by 26M crystal oscillator. Then output error signal AFC to adjust the both end voltage of VCO Variable-Capacitance Diode, which finally leads to the adjustment of VCO oscillation frequency. If AFC fails during calibration, the failure appearance will be that the device fails to detect any frequency conformant to the requirements. There are several occasions:

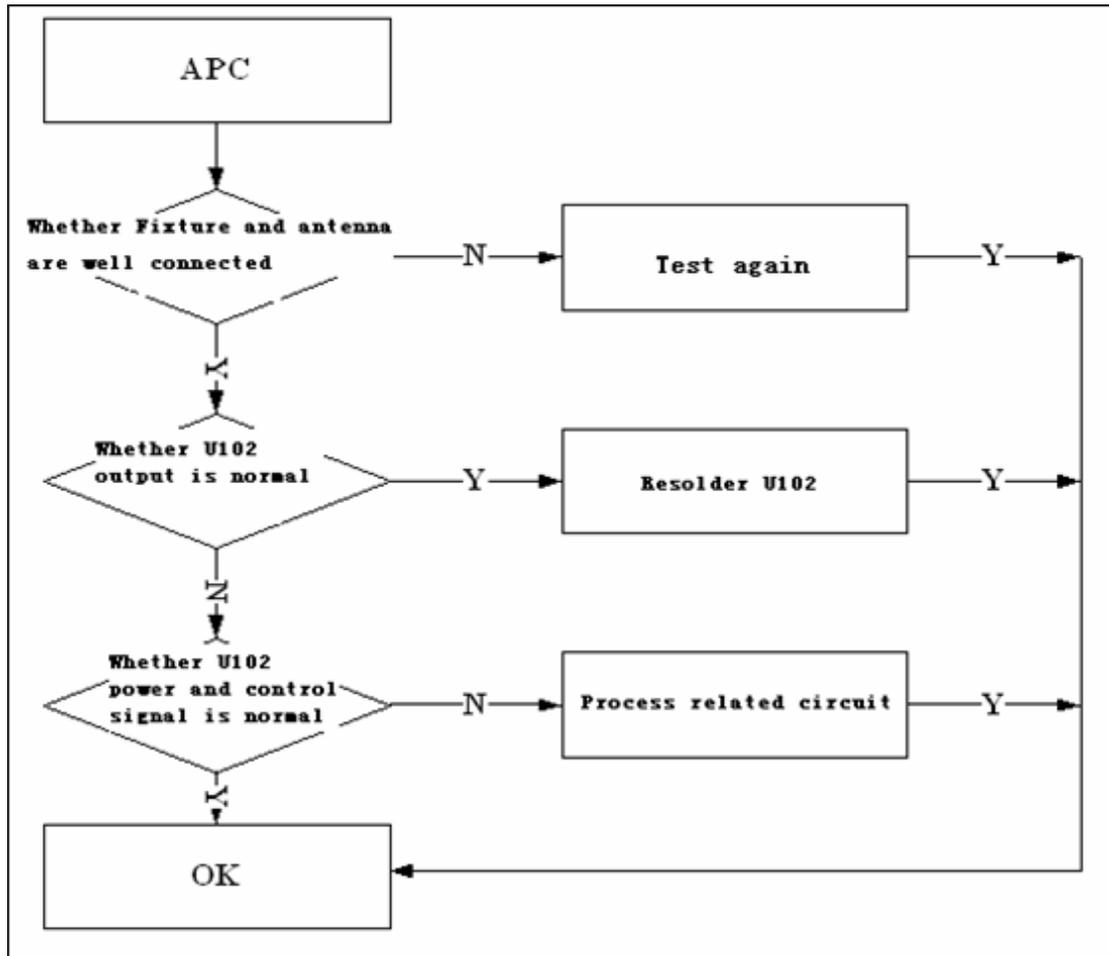
- (1) No signal output can also be reported as AFC Fail.
- (2) Device connection failure can lead to signal attenuation.
- (3) Transmission frequency is not stable or frequency deviates.

## **APC Fail (GSM)**

APC---Automatic Power Control

APC signal functions to assign phone transmission power grade for communication system in different environments. APC directly influences PA. APC Failure is reported when the signal power doesn't reach or exceed the required power during calibration.

Check all the elements in the transmission path and see whether there is any incomplete soldering. If not, check PA or FEM. The check process is as follows. First, use META to control the main board to transmit independent 900/1800 frequency band. If the current at the maximum power is about 250mA in 900 frequency band and the current at the maximum power in 1800 frequency band is about 200mA, PA can be judged as normal. If the current deviates a lot from the values above, PA must fail. The repair procedure is shown in the figure below.



## Base band

MTK uses relatively high integration and has limited peripheral independent elements. Check whether there is any additional element, missing or wrong element before hot air gun is used. If visual detection fails to find problem, use some equipments to find failure positions.

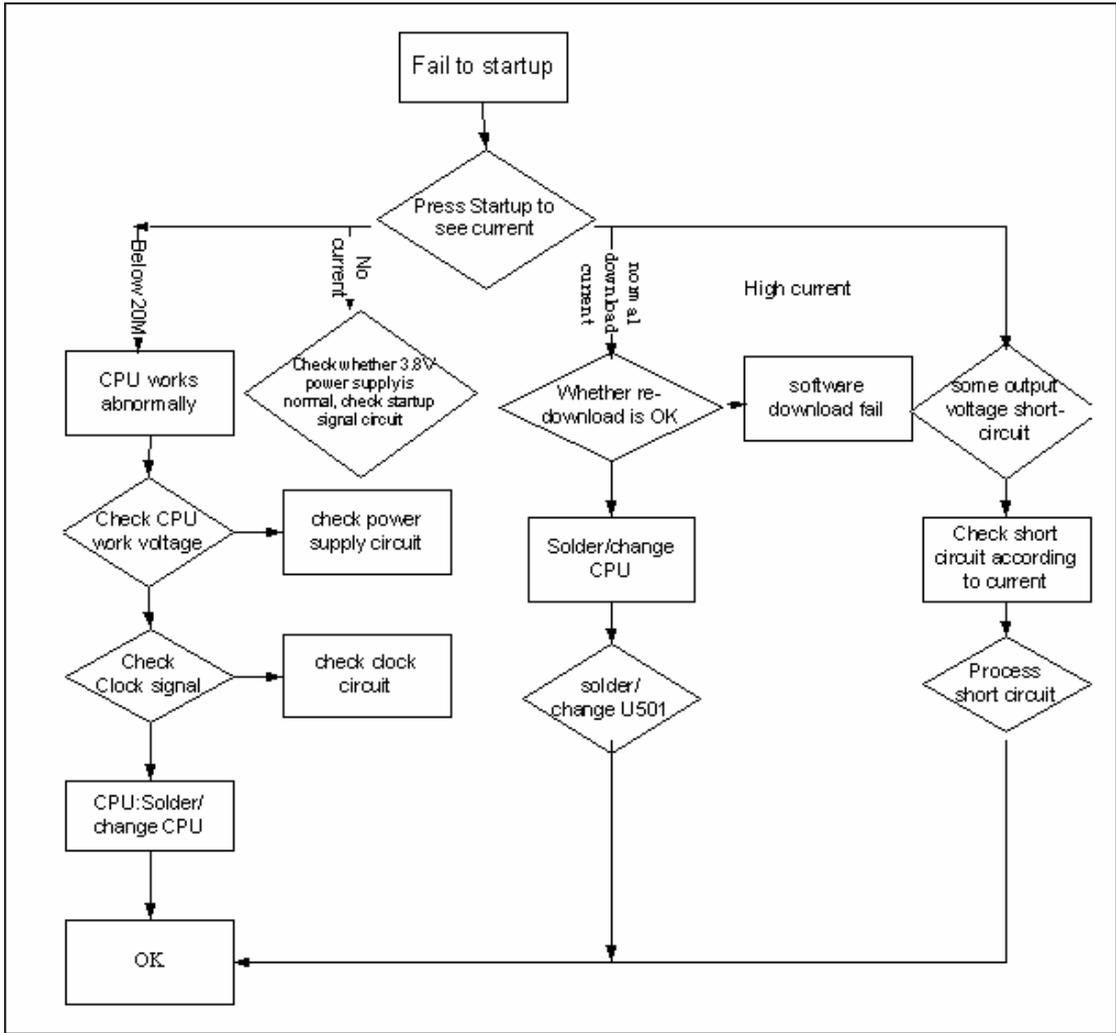
(1) Below 20MA: indicates that power starts working but the next action is not performed. The cause can be incomplete soldering or damage in power management, CPU or 26M circuit.

(2) 20~25MA: the cause can be: there is no download software; software functions abnormally; or, CPU cannot read or execute software normally.

(3) 30~90MA: if the software, 26M and 32K are all normal, the cause can be incomplete soldering. Check U201 and U401

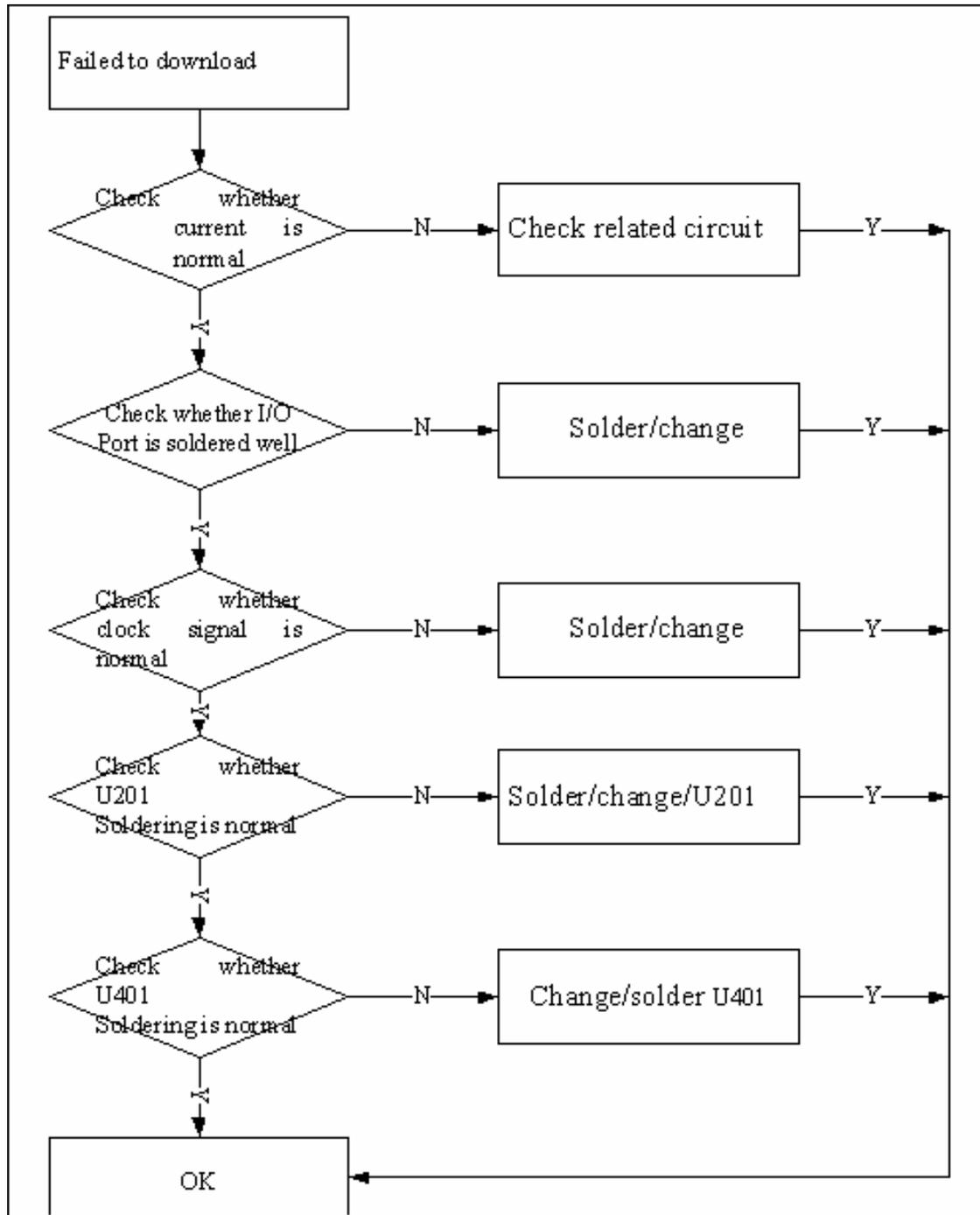
Startup process:

When the Power-On button is pressed, PWRKEY will detect a low voltage. The internal PMIC will turn on the LDOs which provide power-supply to base band 30ms later; then the RESET circuit of the PMIC will generate the reset signal 200ms later to make the base band chip run the power-on software



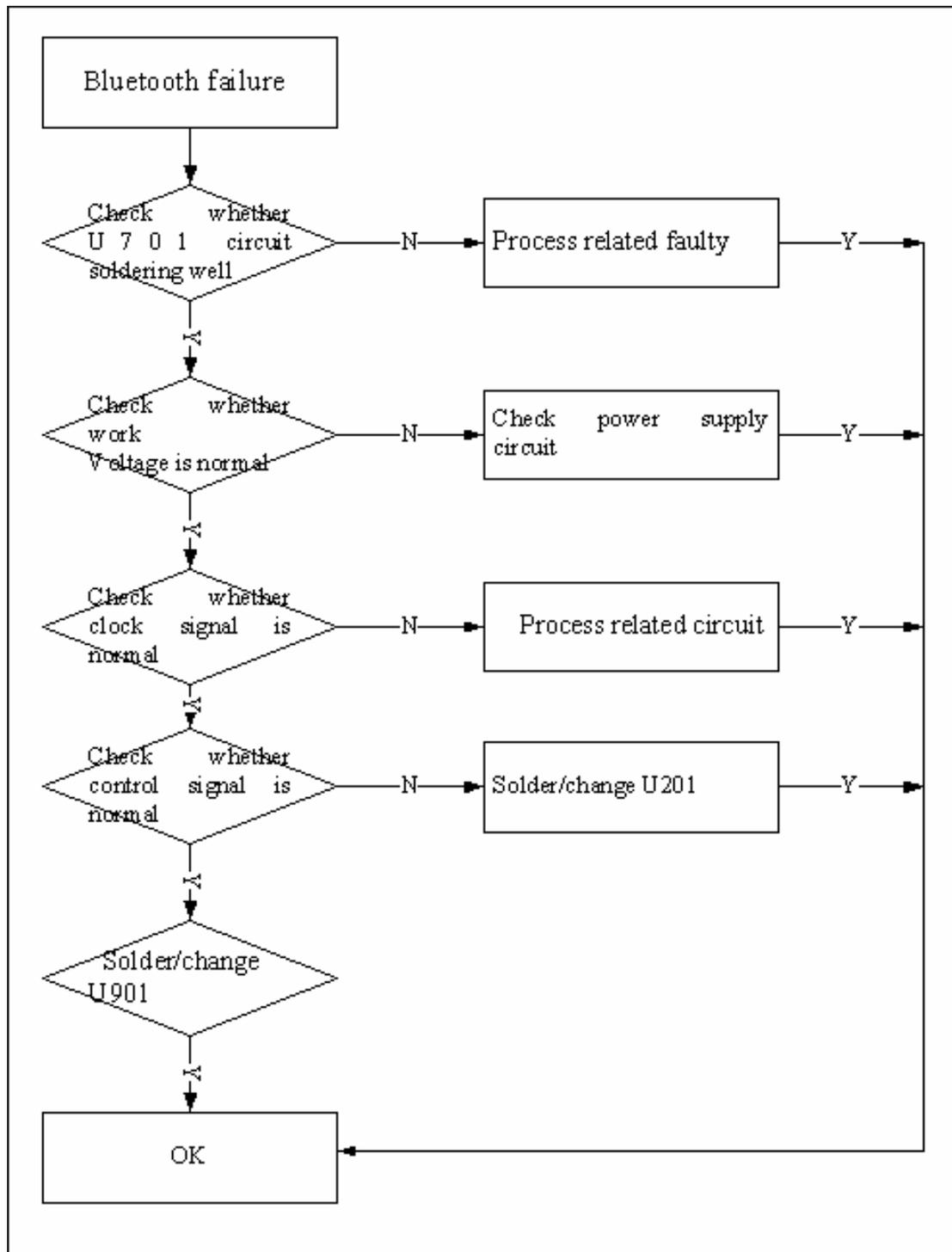
## Fail to download

Make sure that the download current of main board is normal and important I/O interfaces including J501/CPU and U201/Flash U401 are normal.



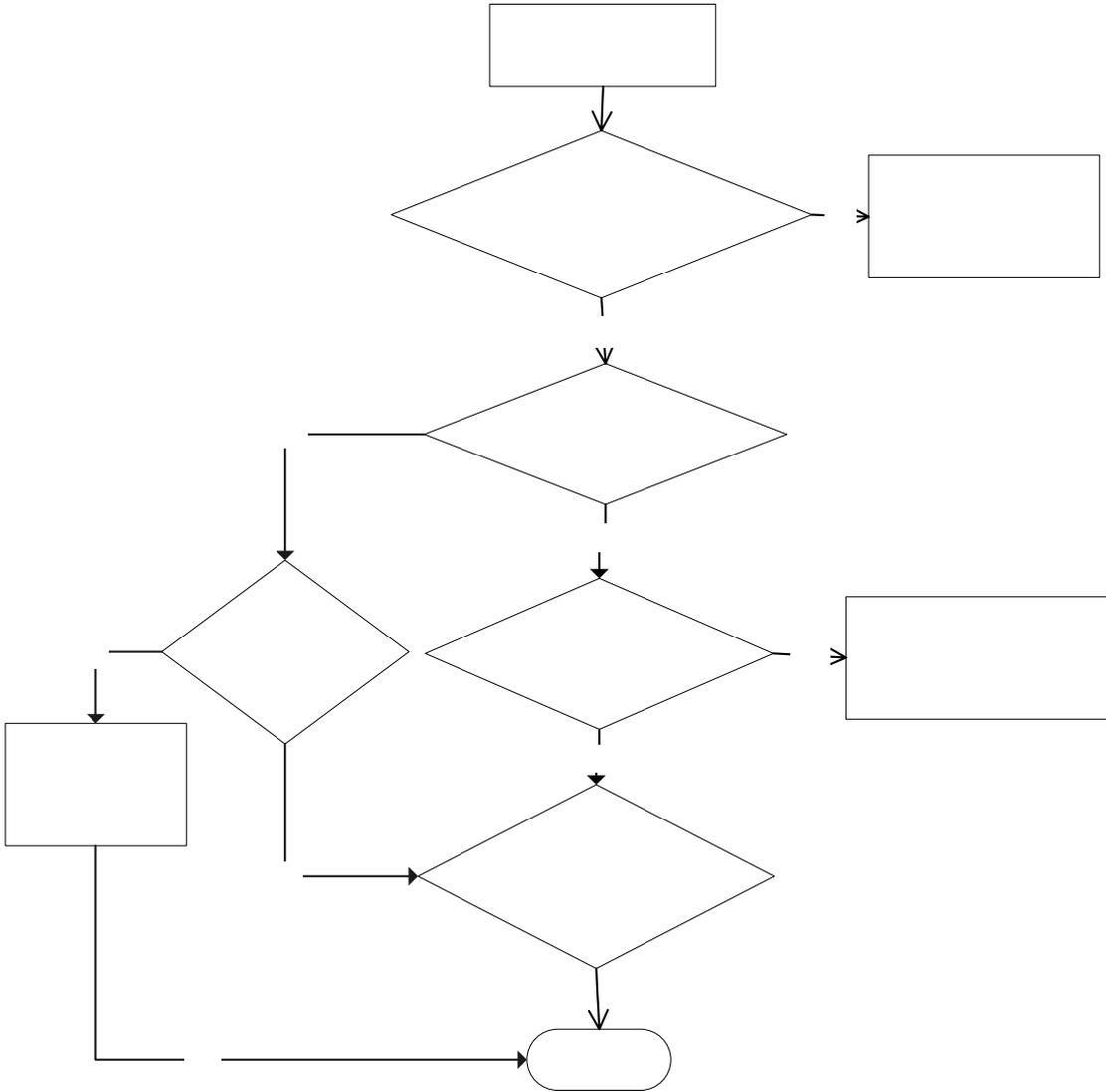
## Bluetooth failure

Please refer to the details of Bluetooth circuit description in Part 1. First perform visual examination to check whether there are missing pieces on related circuits or significant deviation. Then perform circuit analysis according to the maintenance process.



# 3 Trouble shooting and flow chart

## 3.1 Unable to power on the handset



Fai

Check batt  
batte

Yes

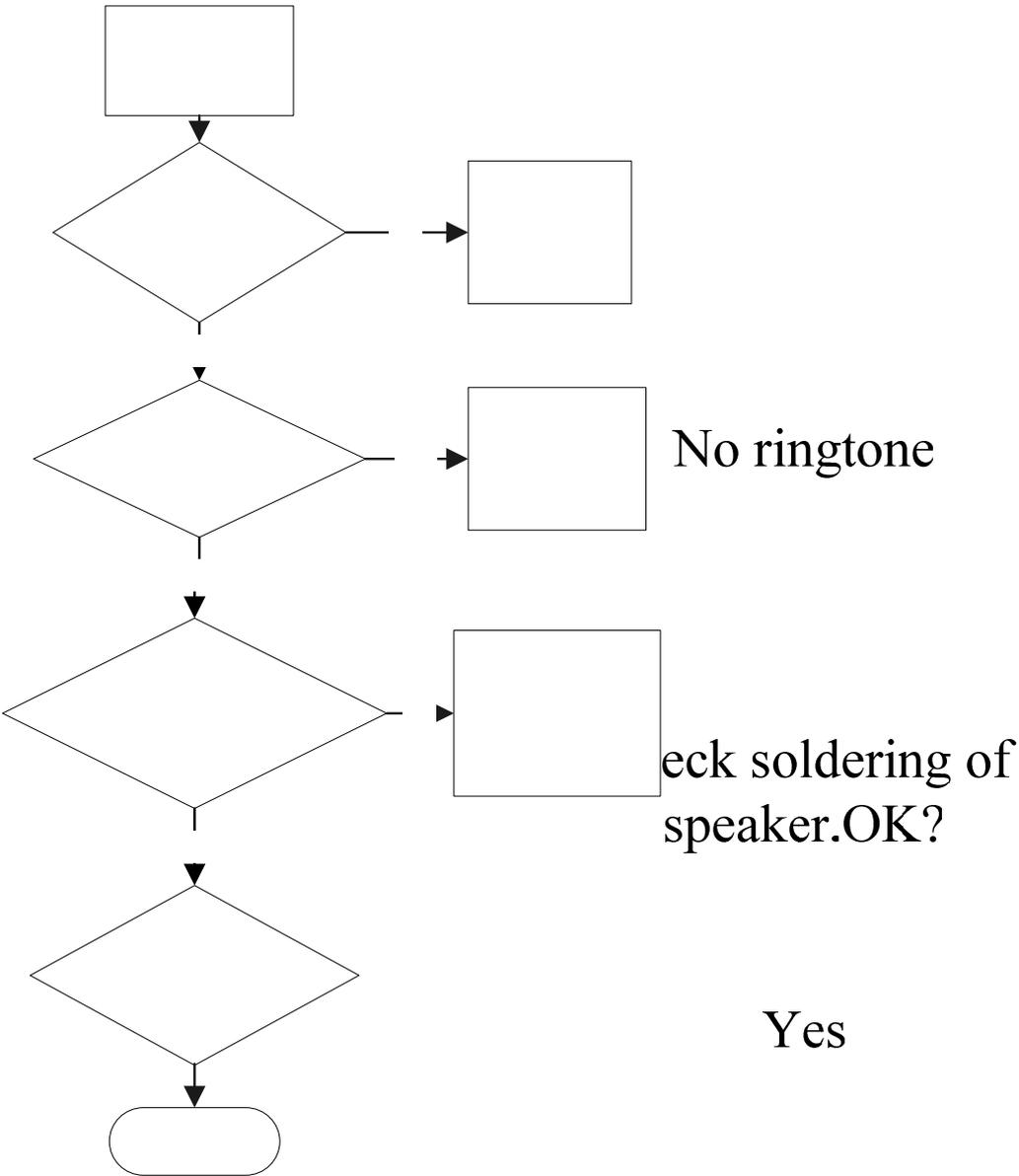
Check

No

Check if LCD is

Down

### 3.2 No ring tone

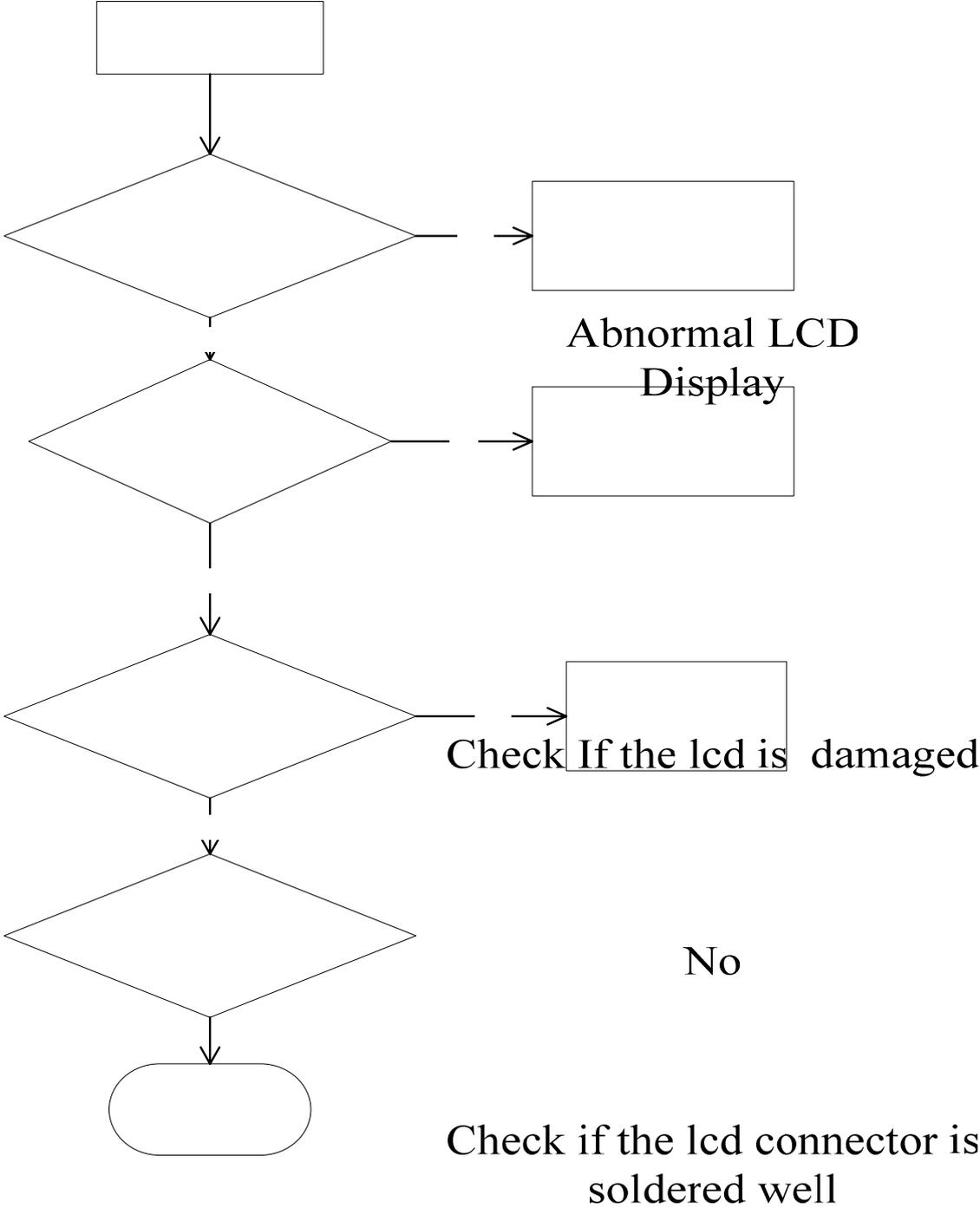


Yes  
Replace speaker and test

No

Check the speaker circuit  
no short circuit or open  
circuit

### 3.3 LCD display fault



Abnormal LCD Display

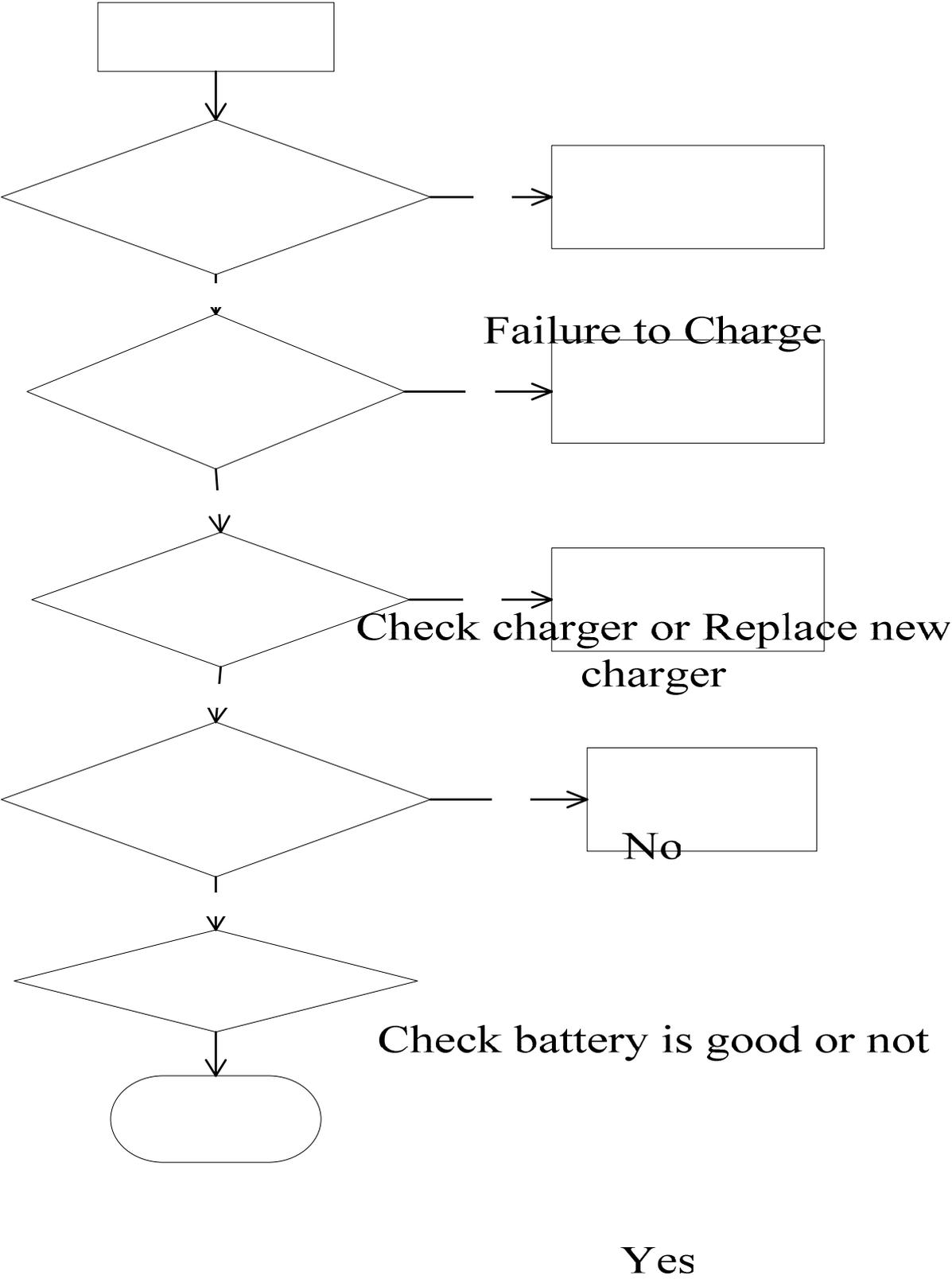
Check If the lcd is damaged

No

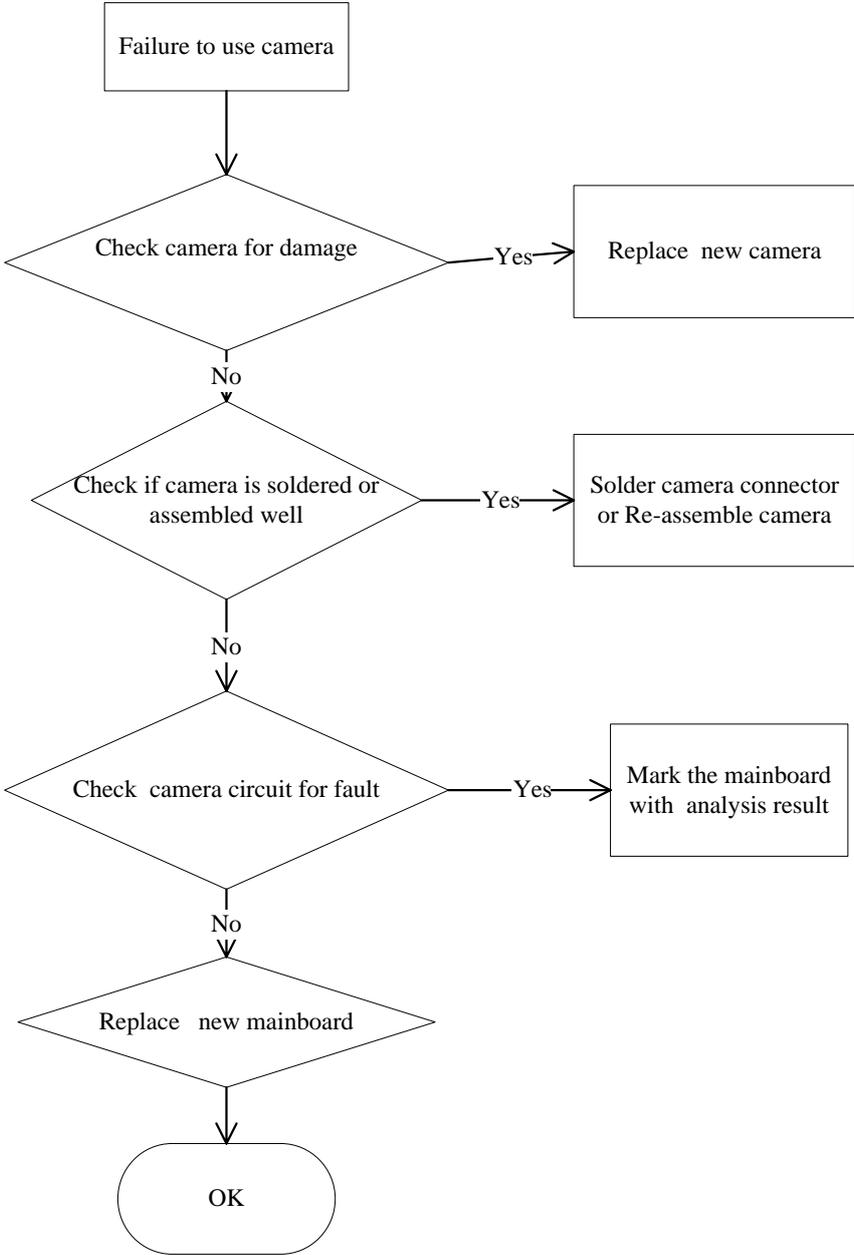
Check if the lcd connector is soldered well

Yes

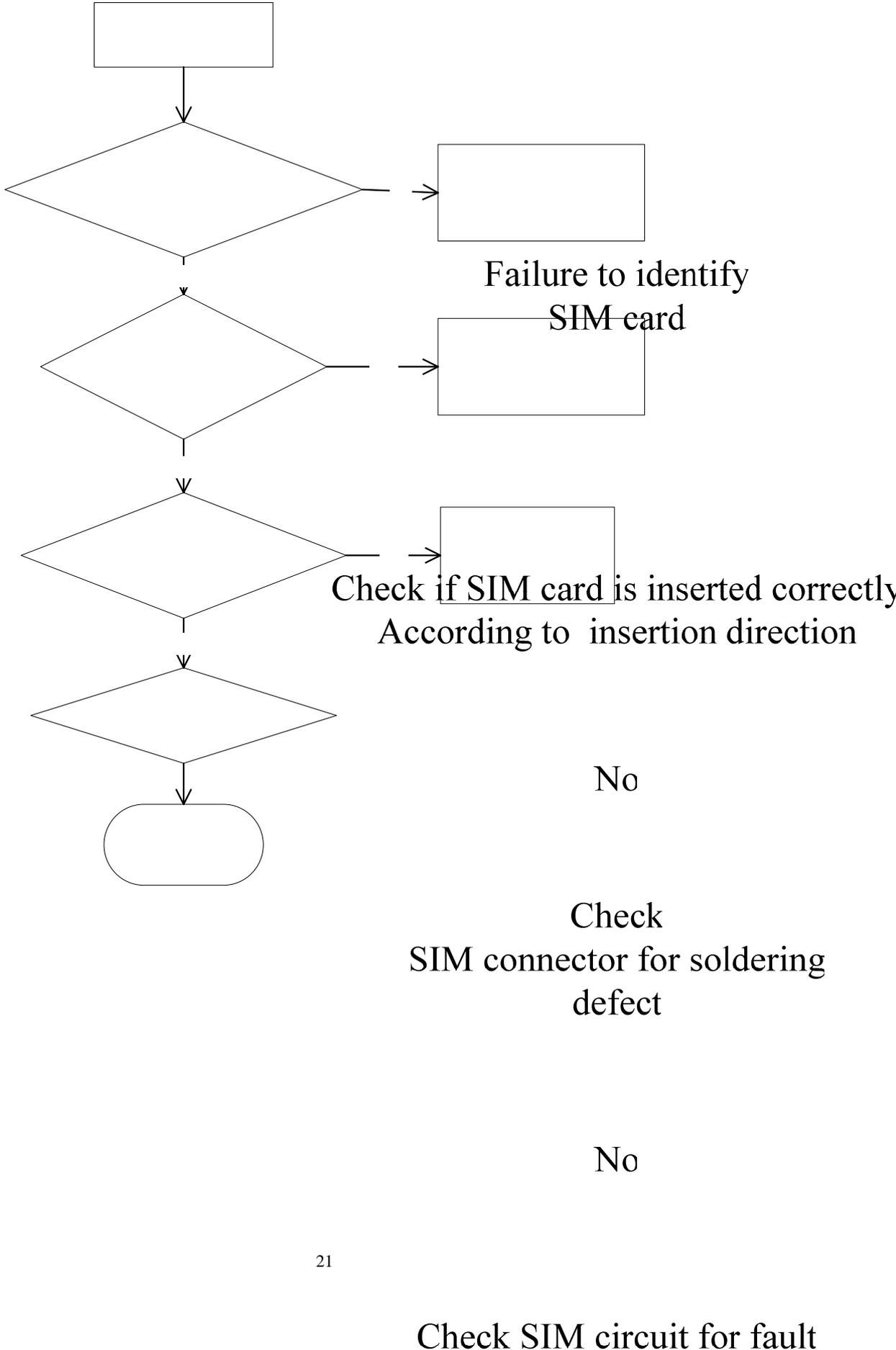
### 3.4 Charging fault



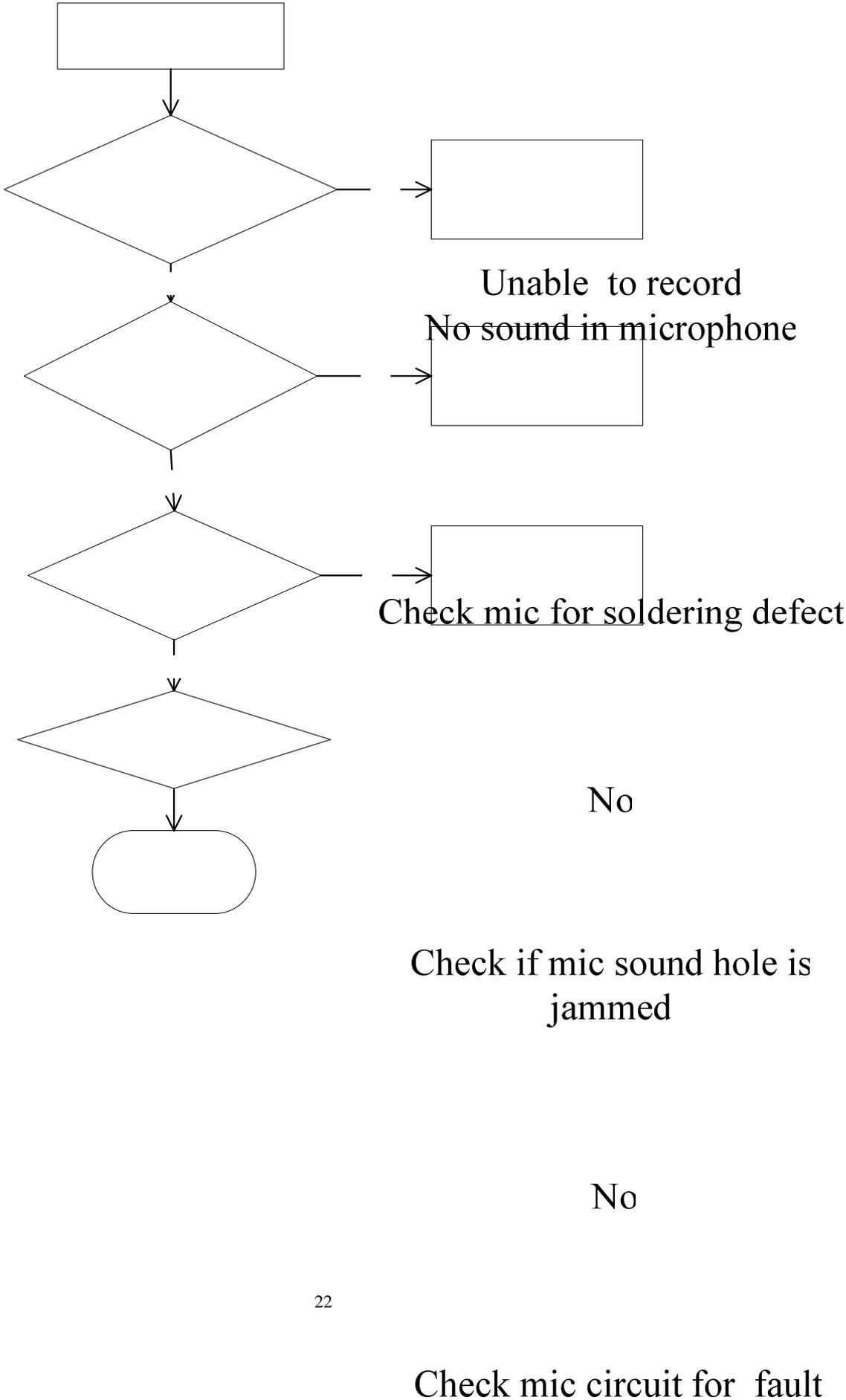
### 3.5 Camera fault



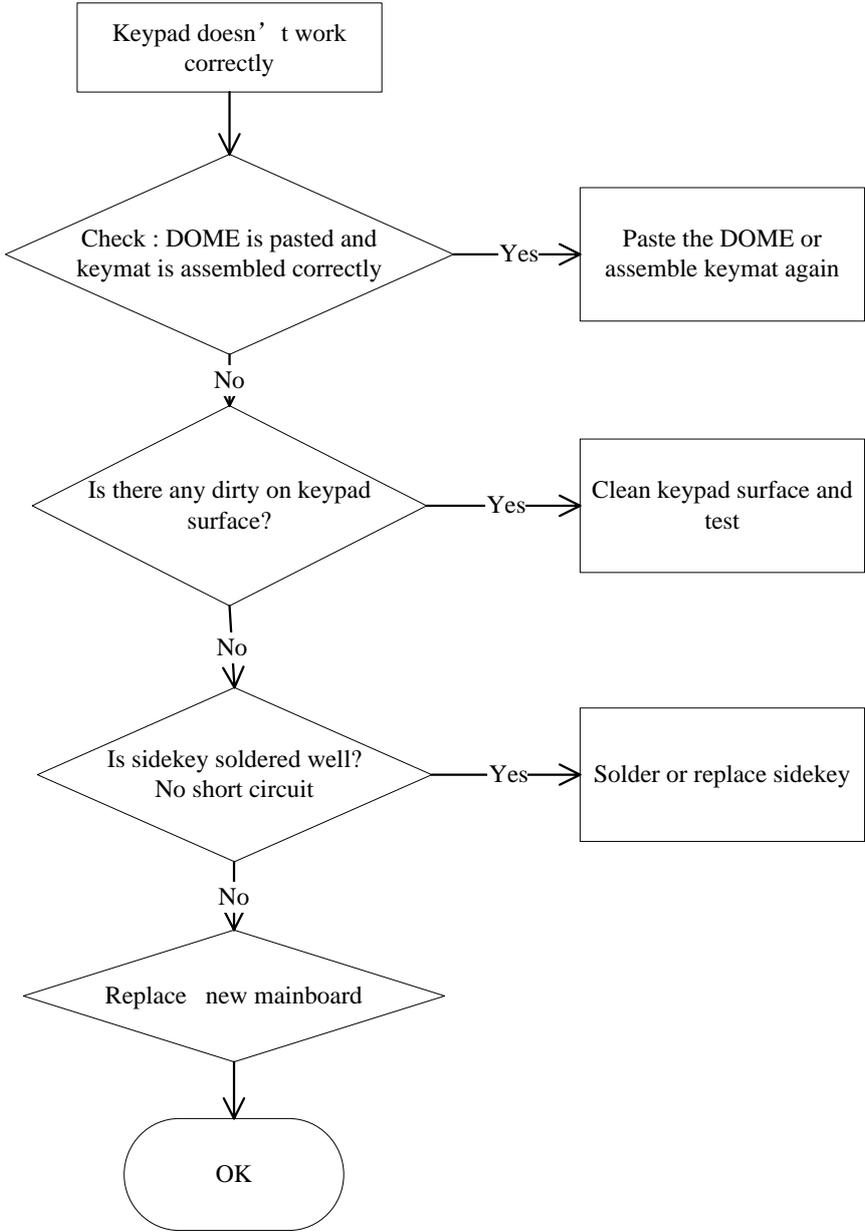
### 3.6 Fail to identify SIM card



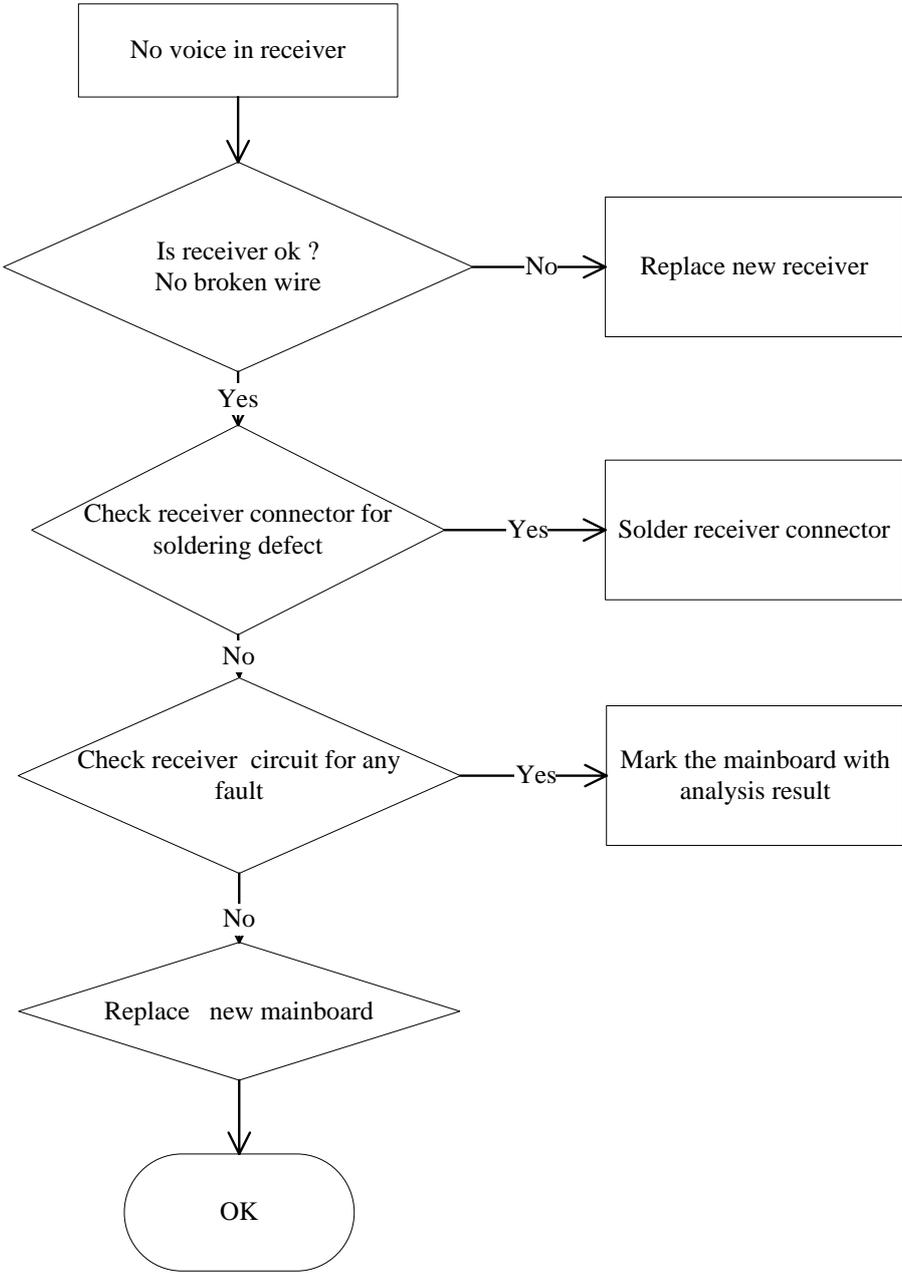
### 3.7 MIC fault



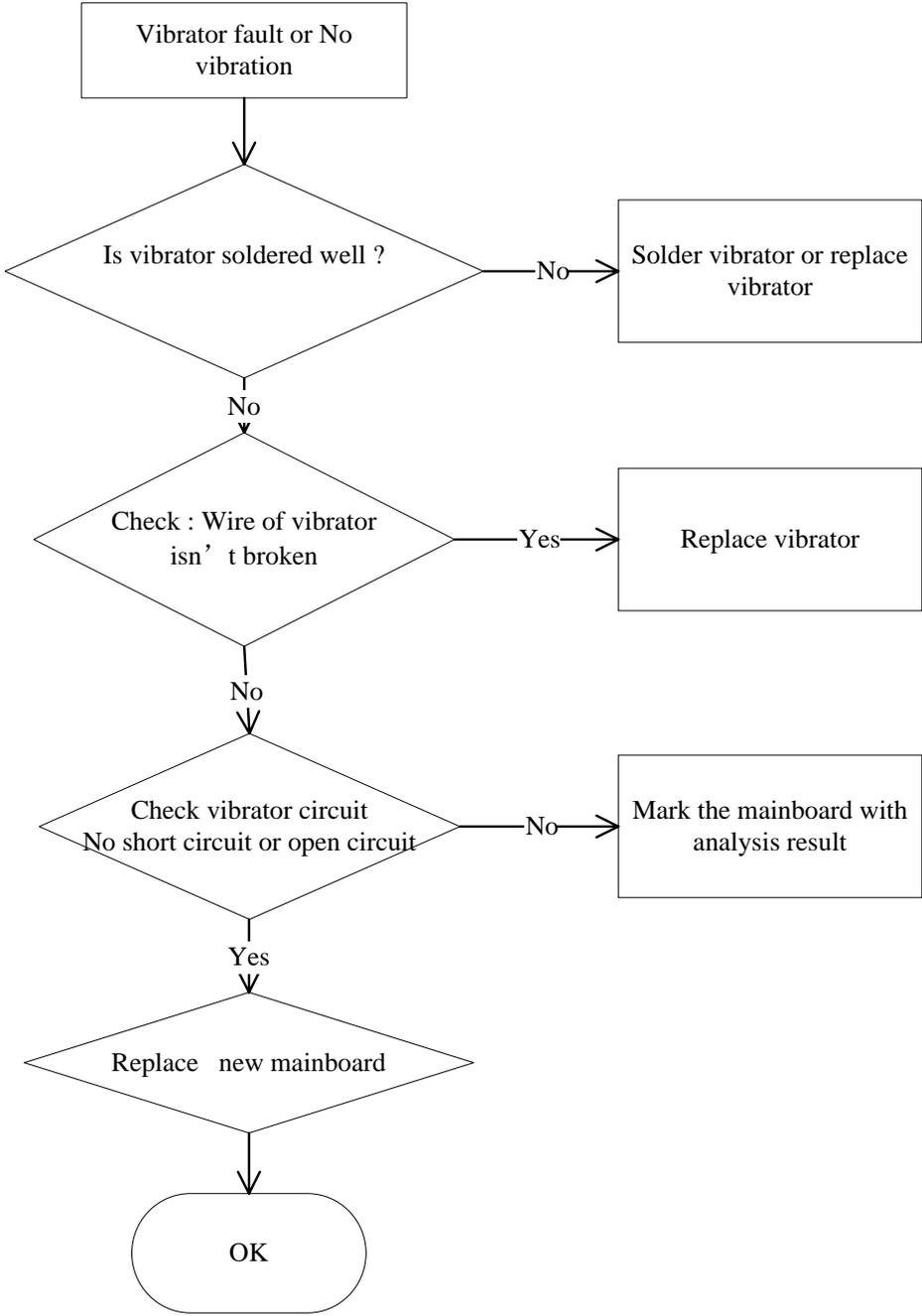
### 3.8 Keypad fault



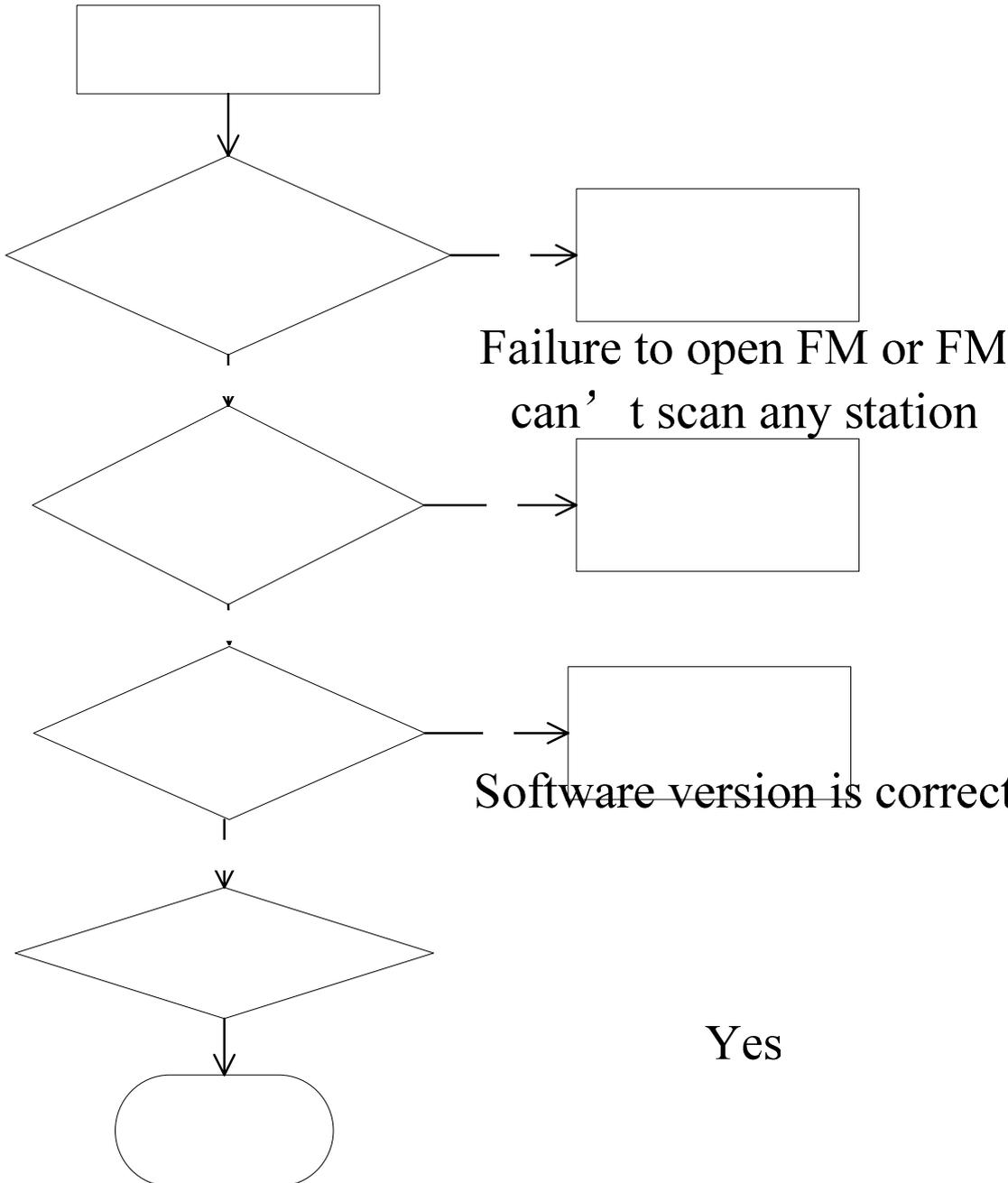
### 3.9 Receiver fault



### 3.10 Vibrate fault



**3.11 FM fault**



Failure to open FM or FM can't scan any station

Software version is correct

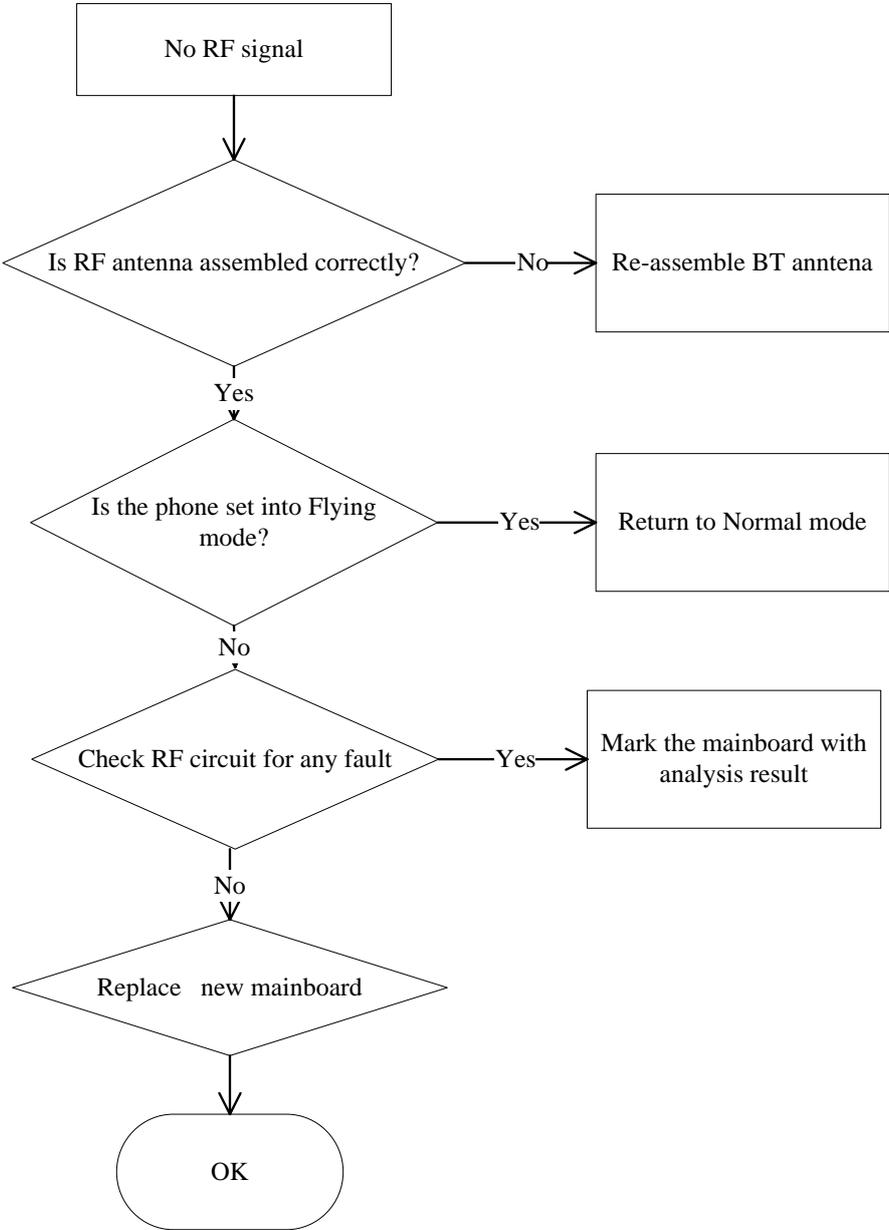
Yes

Earphone can be detected and audio output is ok

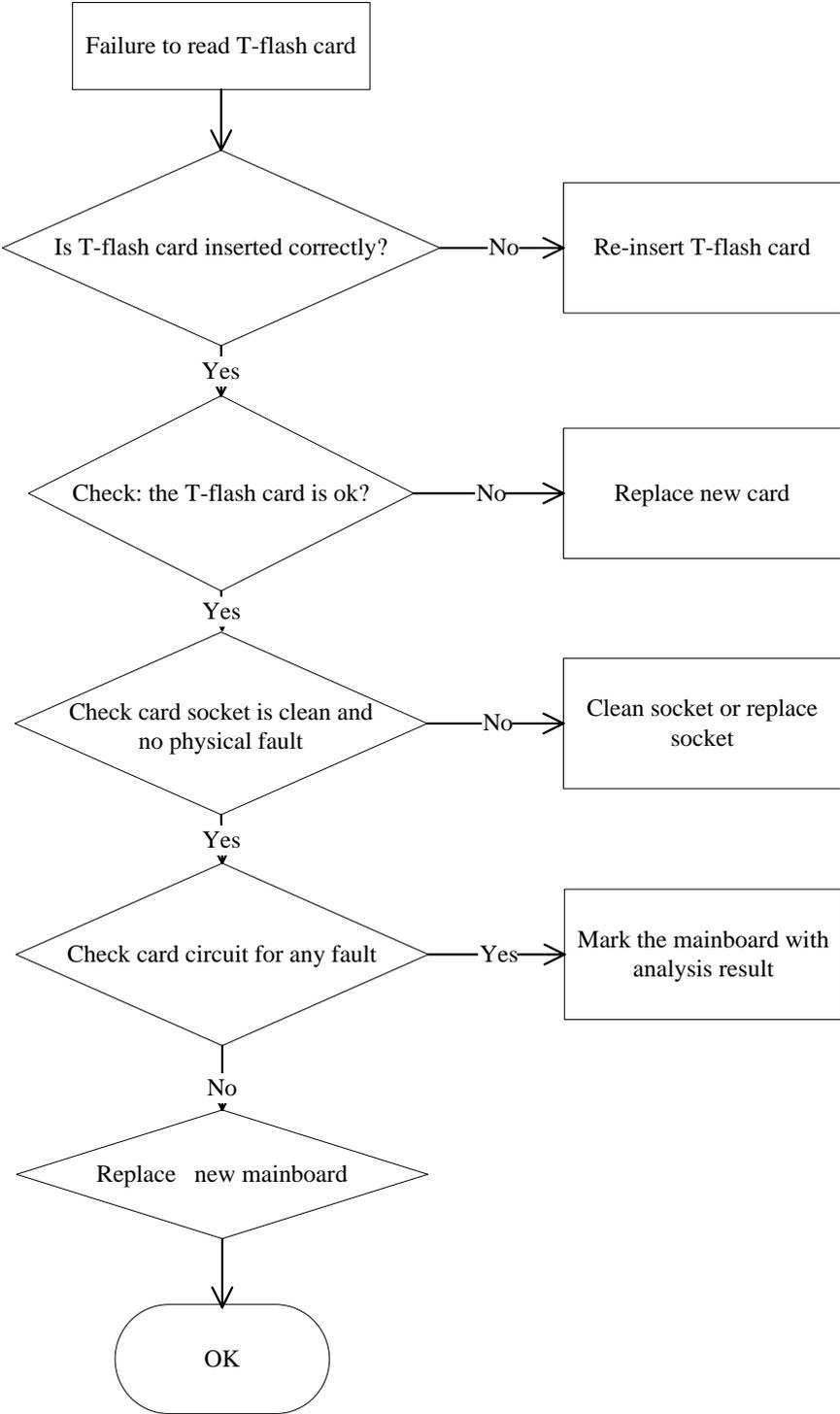
Yes

Check FM circuit

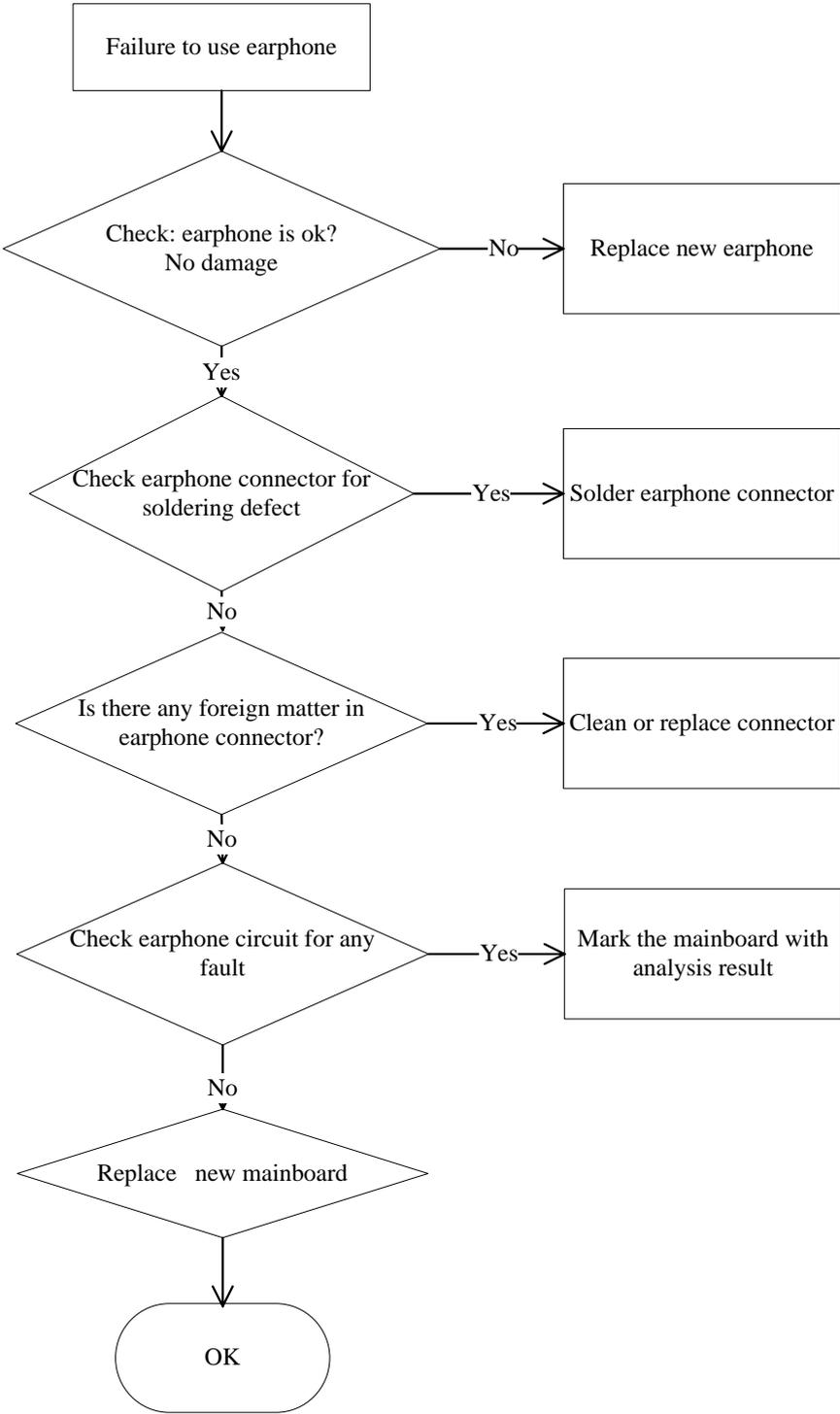
### 3.12 No signal



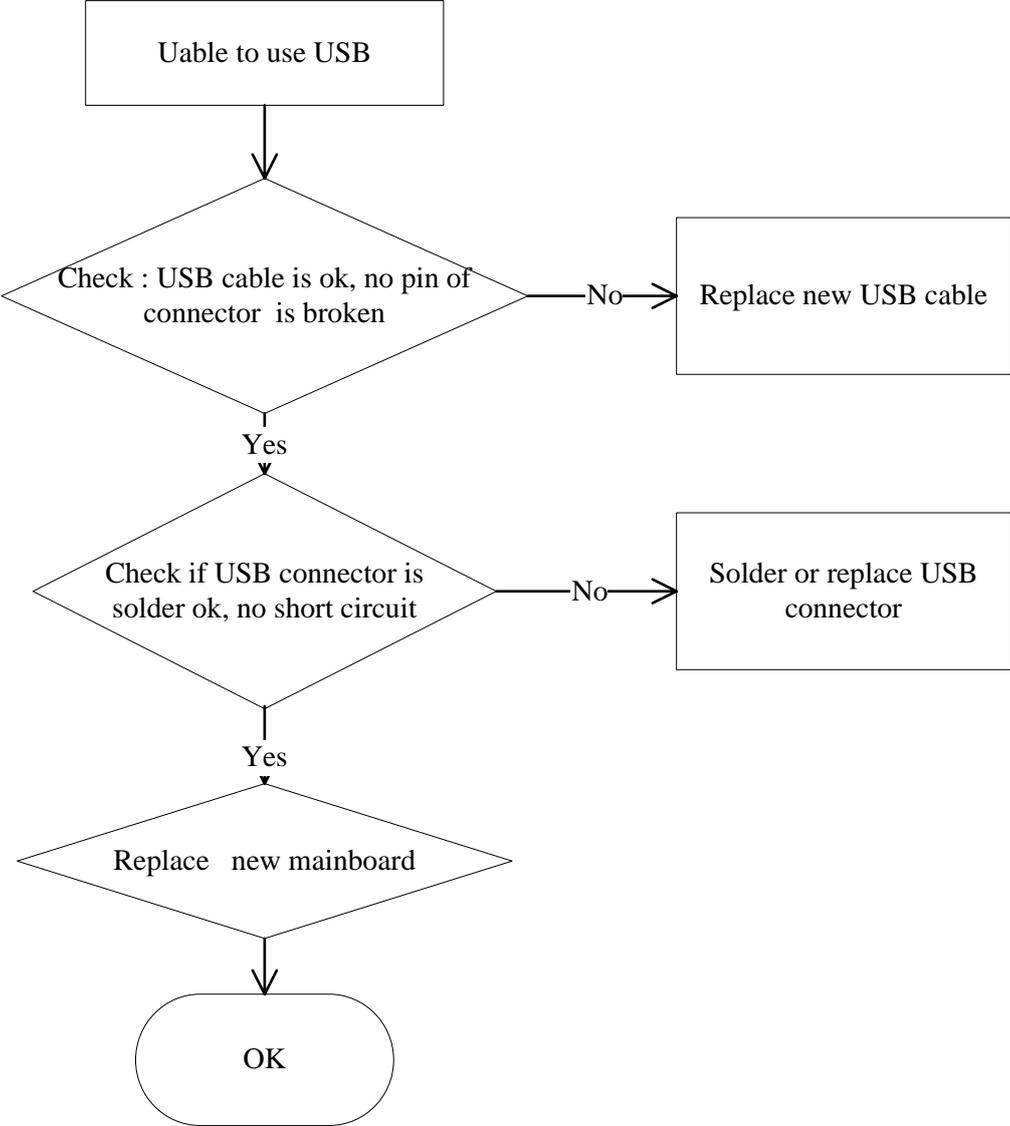
### 3.13 Failure to identify T-flash card



### 3.14 Earphone fault



### 3.15 Unable to use USB



**END**