



Topic 7: _____

Repair of Common Mobile Phone Faults

What is a fault?

A fault is a defect (a failure in a circuit) or an electronic device.

What causes faults or failures in mobile phones?

Failures can be caused by any of the following:

- excess temperature,
- excess current or voltage,
- ionizing radiation,
- mechanical shock,
- stress or impact,
- contamination,
- mechanical stress,
- short circuits,
- imperfect connections,
- poor insulation or wiring caused by grounding.

There are three types of mobile phone faults:

- (i) Hardware faults: occur due to hardware malfunctioning
- (ii) Software faults: occur due to problems with software
- (iii) Settings faults: occur due to wrong/invalid settings

Let us discuss each type of faults and how they can be repaired.

Hardware Faults

There are many hardware faults that can occur in a mobile phone, but in this section we shall discuss the following:

- a) Battery charging faults/problems
- b) Mobile phone battery problem (faults)
- c) Network not working problem
- d) Overheating problem
- e) Sound faults
- f) Ear piece, ringer and microphone problem
- g) Display problems
- h) Lighting or LED problems
- i) Touchscreen problems

- j) Keypad problems
- k) SIM faults
- l) WiFi problem and internet connectivity problems

a) Battery Charging Faults/Problems

Battery charging faults manifest in a number of ways:

- The battery is not charge at all,
- There is a sign of battery charging but the battery does not get charged.
- When the charger is inserted, it shows 'Not Charging'.
- When the charger is connected it shows 'Bad Connecting Charging'.
- When the charger is inserted the mobile phone gets hot.

Solutions to Battery charging faults

1. Change the charger and check. The voltage must be between 5 and 7 Volts.
2. Clean, resold or change the charger Connector.
3. If the phone shows "FALSE CHARGING" then use a 3.6 Volt Zenor Diode and do direct charging as shown in Figure 32.
4. If the problem is not solved then change the battery and check again
5. Check the voltage of the battery connector using a Multimeter. The voltage should be between 1.5 and 3.7 Volts.
6. If there is no voltage in the connector check the track of the charging section. Refer to the diagram of the particular model of the mobile phone.
7. If the problem still persists, check the fuse, coil and regulator one by one and change the faulty part.
8. If the problem is still not solved then heat or change the charging IC.
9. Finally heat, re-ball or change the Power IC.

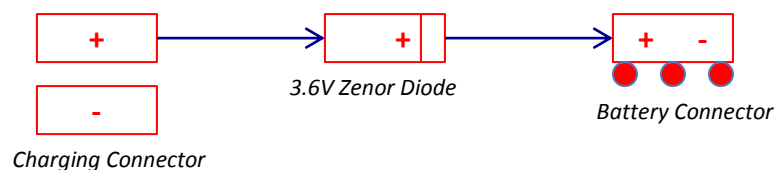


Figure 32: Charging the battery of a phone using a zenordiode

b) Mobile Phone Battery problem

A mobile cell phone can have any of the following battery problems:

- Low Battery
- Battery Drains Fast
- Battery Backup Low,
- Battery Not charging

Solutions to Battery faults

1. Check the battery connector and charger plug to see if there is any problem.
2. Check if there is any dust or corrosion in the connector or any broken pin. Clean the points using IPA or cleaning swabs.
3. Check the Interface Connector to see if there is any dust. If there is dust clean or replace the interface connector.
4. If the battery problem is not solved then upgrade the software or operating system to latest version
5. If the problem is still not solved then check the Mobile Phone PBA current consumption.
6. Check for any short circuit.
7. If there is serious problem at the board level then it is better to replace the whole Logic Board of the Mobile Cell Phone.

c) Network Not Working Problem

The common issues related to this problem include the following:

- There is no network in the mobile phone
- There is less or weak network signal
- Sometimes there is a signal and sometimes there is no network signal.

Solutions to Network fault

1. Manually search for the network. If the 'no network problem' persists, then there is a problem with the Antenna Switch. Repair or replace it.
2. If the network resumes after manual search but the home network cannot be selected, then there is a problem with the PFO. Repair or change the PFO.
3. If the Network gets disconnected during phone calls then you should repair or change the Network IC.
4. Clean the antenna tips and point.
5. If the network problem persists, heat or change the 26MHz Crystal Oscillator.
6. If the problem is still not solved then heat or change the Antenna Switch. You can also jumper if the Antenna Switch is not available.
7. Heat, Change or Jumper the PFO if the problem still persists.
8. Heat, re-ball or change the Network IC.
9. Heat, re-ball or change the Power IC.
10. Heat, re-ball or change the CPU.



Take Note: If the problem is not solved by hardware interventions, then reload the PM File in the mobile phone using the software box.

d) Network Signal and Call Drop Problem

If a mobile phone is having network problems and dropping calls, then you should use the following steps to solve it:

1. Check the SIM Card. Insert the SIM card in other mobile phone and see if the network problem or the 'call drop' problem is still there.
2. Alternatively, try to insert another SIM card inside the mobile phone that has the network problem.
3. If the problem is caused by the SIM card, then you should change or replace it.
4. If the problem is still not resolved then upgrade the operating system to the latest version. You can also rewrite the IMEI Number of the mobile cell phone.
5. If the problem is not solved then you may have to change the mobile phone.

e). Mobile Phone Overheating

A mobile phone may overheat either inside or on the body. To solve this problem you should proceed as follows:

1. Check if the mobile phone overheats when a particular application is running or if the overheating happens all the time.
2. Upgrade the mobile phone software operating system to the latest version. This may solve the overheating problem.
3. Smartphone's overheat if too many applications are running at the same time. Close all the applications and try to run 1 application at a time
4. If overheating persists, then there is some internal hardware problem. Change the PCB or Logic Board to solve the heating problem.

f). Sound Faults

We shall consider the following types of sound faults:

- Earpiece or ear speaker problem
- Mobile phone speaker problem
- Ringer problem
- Vibration problem
- Microphone problem

i). Earpiece or Ear Speaker Problem

The Earpiece or speaker is the electronic component or part that helps us to listen to sound during a phone call. It is controlled by Audio IC or Power IC (UEM). See Figure 27 for a picture of an ear speaker.



Figure 33: Ear speaker

The common problems associated with the ear speaker are:

- No sound during phone call
- Low sound during phone call
- Sound has interruptions.

How to Solve Earpiece or Speaker Fault

1. Check the speaker volume during a phone call.
2. If speaker volume is fine, then check the earpiece by keeping the multimeter in buzzer mode. The value must be between 25~35 Ohm. If the value is not between 25~35 Ohm then change the earpiece.
3. If the problem is not solved then check the Circuit Track of the earpiece section. Do jumper wherever required.
4. If the problem persists heat, reball or change the UEM/Audio IC.
5. If the problem is still not solved then heat, reball or change the CPU.



Take Note: If the sound is low or not clear during a phone call, then you should change the speaker.

ii. Ringer Problem

A Ringer is any type of electronic component that rings or plays a loud sound. It is also called the I.H.F Speaker, buzzer, melody, etc. Figure 28 shows a picture of a ringer.



Figure 34: Cell phone ringers

The following are the types of problems associated with the ringer:

- Ringer not working
- Low sound from the Ringer
- Sound coming from Ringer but with interruption
- Sound not clear

How to Solve Ringer Faults

1. Check the ringer settings in the mobile phone. Check Ringer volume and silent mode. Adjust or change the volume and /or mode if required.
2. If the problem is not solved then open the mobile phone and clean the ringer point and ringer connector.
3. If the problem is not solved then check the ringer by keeping the multimeter in buzzer mode. The value must be between 8 ~ 10 Ohm. If the value is not between 8~10 Ohm then change the Ringer.
4. If the problem is not solved then check the track of ringer section. Do jumper wherever required.
5. If the problem is not solved then check the Ringer IC. Heat or change the IC.
6. If the problem is not solved then heat, reball or change the UEM / Logic IC.
7. If the problem is still not solved then heat, reball or change the CPU.



Take Note:

- If there is less sound from the Ringer then change the Ringer.
- If the problem is not solved then heat or change the Ringer IC.

iii. Vibration Problem

The vibrator is an electronic device that generates vibrations. It is controlled by the Logic IC or Power IC.

The common types of faults associated with the vibrator are:

- Vibrator not working
- Vibration has an interruption
- Vibration Hangs.

How to solve Mobile Vibrator faults

1. Check the Vibrator settings in the mobile phone. Check if the Vibrator is ON or OFF.
2. If the problem is not solved then open the mobile cell phone and clean the vibrator tips and connector.
3. If the problem is not solved then check the vibrator with the multimeter in Buzzer Mode. The value must be between 8~16 Ohm. If the value is not between 8~16 Ohm then change the Vibrator or Motor.
4. If the problem is not solved then check the track of the vibrator section. Do jumper wherever required.

5. If the problem is not solved then heat, reball or change the UEM/Logic IC /Power IC.
6. If the problem is still not solved then heat, reball or change the CPU.

iv. Microphone Problem

The Microphone is an electronic component that helps to transmit sound during phone call. A microphone is controlled by Audio IC or Power IC (UEM).

The common types of problems associated with the microphone are:

- Low sound during phone call
- Sound has interruption
- Change in sound.

How to Solve Microphone Fault

1. Check the Microphone settings.

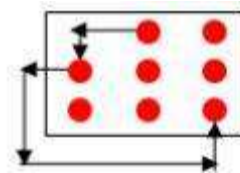


Figure 35: Jumper Setting For Microphone

2. If all the settings are normal, then check and clean the Microphone tips and connector.
3. If the problem is not solved then check the Microphone with the multimeter in Buzzer Mode. The value must be between 600~1800 Ohm. If the value is not in between that range, then change the Microphone. Note that only one side will give a value.
4. If the problem is not solved then check the track of the Microphone section. Do Jumper wherever required.
5. If the problem is not solved then heat or change the Microphone IC.
6. If the problem is not solved then heat, reball, or change the UEM / Audio IC /Power IC.
7. If the problem is still not solved then heat, reball or change the CPU.

g) Display Not Working

This is the part that displays information in a mobile phone. It is controlled by the CPU. In some cell phones there is an Interface IC called the Display IC situated between the Display and the CPU.

The following are the common types of problems associated with the display:

- Display is blank.
- Display not working properly.
- Only half the display works.
- White display.

- Display is upside down.
- Display is broken.
- When the mobile phone is switched ON, the Logo appears and then the display disappears

How to Solve Display Faults in a Mobile Cell Phone

1. Clean the display tips and display connector.
2. Resold the display connector
3. Change the display
4. Check the display Track.
5. Resold or change the display IC.
6. Heat, reball or change the CPU.



Take Note:

- In the slider mobile phone handset, the display problem is mainly due to a faulty display track. Change the track to solve the problem.
- If the Display is upside down, broken or it displays information on half the screen then you should change the display
- If the Display is white even after changing it, then you should reload the software.

h) Mobile Light or LED Problem and Solution

The LED is the electronic component that generates light in the mobile phone. There are 2 types of connections in the light section of a mobile phone:

- Series Connection;
- Parallel Connection.

Figure 36 shows a diagram of series and parallel connections.

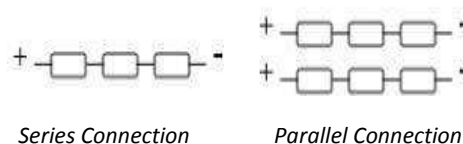


Figure 36: Diagram Showing Series and Parallel Connections

The common symptoms of LED problems are:

- No Light.
- Light only in the Keypad or Display.
- Some lights not working

How to Solve a LED problem

1. Check the light settings.
2. If the settings are normal then resold all the LED.
3. If the problem is not solved then change the display or the screen.
4. Next check all the LEDs with the multimeter on Buzzer mode. If the LED is good then it will glow. If the LED is faulty then it will not glow.
5. Change the LED or jumper if required.
6. If the problem is not solved then check the Track of the light section of the PCB and jumper if required.
7. Next check the Boosting Coil and change if required.
8. If the problem is not solved then heat or change the Light IC.
9. If the problem is still not solved then heat, reball or change the Power IC.

i) Phone Touch Screen (PDA) fault

A Touch Screen (PDA) is an electronic component that allows you to input data or control your mobile phone by touching the screen. It normally has 4 Points namely:

- (+),
- (-),
- (RX),
- (TX).

The touch screen is normally controlled by the CPU. In some mobile phones there is an Interface IC called PDA IC or Screen Touch IC.

The following are the faults associated with the Touch Screen

- Touch Screen not working.
- Only half the Touch Screen works.
- When one key is pressed another key works.

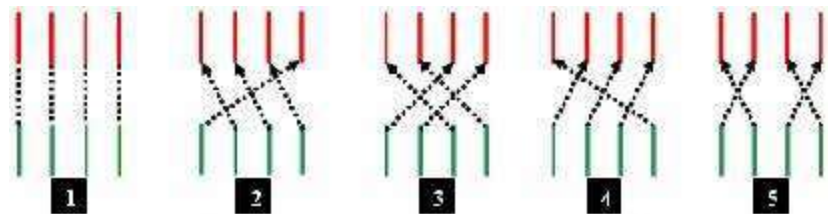
How to Solve Touch Screen (PDA) Faults

1. Check the settings if the mobile phone has both a keypad and a touch screen.
2. Clean and resold the PDA Pins and PDA connector.
3. Change the PDA.
4. Check the Track of the PDA section and Jumper if required.
5. Heat or change the PDA IC
6. Heat, reball or change the CPU



Take Note:

- If the PDA problem is not solved by hardware solutions, then reload the software to solve the problem.
- Any PDA of the same size will fit in any mobile phone. Any one of the 5 Jumper Settings shown in figure 37 below will work:



5 Types of PDA jumper solution

Figure 37: Jumper settings for PDA

(h) Keypad Problems

The keypad enables you to enter data, such as, phone numbers and names in your mobile phone.

The main types of problems associated with the keypad are:

- Some keys not working.
- Keys need more pressure to work.
- When a key is pressed it works continuously.
- When one key is pressed, some other key works
- When one key is pressed, some other key works simultaneously.

How to Solve a Keypad Faults

1. Check the facial of the keypad.
2. Clean the keypad and keypad points shown in Figure 38 below.



Figure 38: Keypads and keypad points

3. Using the multimeter in Buzzer Mode and check the Row and Column of the Keypad. If there is a beeping sound then the keypad is working.
4. If there is no improvement, heat or change the Keypad IC or the Interface IC.
5. If still no change, heat, reball or change the CPU.



Take Note:

- If you press a key and it takes a long time to work, then you should reload the software to solve this problem.
- In all Nokia mobile phones, if none or only a few keys are working, then you should change the keypad IC to solve the problem.

(i) Mobile Phone SIM faults

A Subscriber Identify Module (SIM) card is an integrated circuit that securely stores information about the number of the cell phone line, password, and information related to your local network service. It has a unique serial number.

The following are the common problems associated with the SIM card:

- SIM is inserted but still there is a message saying “Insert SIM”.
- The mobile phone goes OFFLINE when the SIM card is inserted.
- The SIM works for sometime and then stops working.
- There is a message that says “Invalid SIM”

How to Solve SIM Card Fault

1. Check settings and see if the mobile phone is in Flight Mode. If it is in “Flight Mode” then change it to Normal mode.
2. Clean the SIM Card Tips and SIM Connector.
3. If the problem is not solved then change the SIM card and check.
4. If the problem still persists then change the SIM connector.
5. If you still do not find a solution to the problem, check the Track of the SIM section.
6. If the problem is still not solved then heat or change the SIM IC.
7. Finally, if there is no change, heat, reball or change the Power IC.

**Take Note:**

- Check if the IMEI number is good or is corrupt by dialling the number, *#06#. If the response reads as follows:
35826*****220 OR *****???
*****000? OR *****?
Then the IMEI number is corrupt.
- Reload the IMEI Number to solve the SIM Problem.
- Check the BSI Point of the battery. The middle Pin is the BSI point. Change the battery and check. If the display shows “Not Charging” and at the same time there is a SIM card problem, then it could be either due to a BSI Problem of the Battery or the BSI Track of the PCB.
- If you need to change the SIM IC and the SIM IC is not available then you can do Jumper. The function of the SIM IC is just to complete the circuit.

(j) Mobile Wi-Fi Wireless Internet Connection Problem:

This problem may present in the following ways:

- No internet
- Low Wi-Fi signal
- Wi-Fi cannot be enabled

How to Solve Wi-Fi problem

1. Enable Wi-Fi and check if it is working or not. Make sure you are connected to a wireless network. Make sure the password is correct.
2. If the Wi-Fi cannot be enabled and you are not able to use or access the internet, then there could be problem with the mobile phone PCB and you may have to replace it.
3. If the Wi-Fi can be enabled then there is no problem with the PCB. Just upgrade the software of the mobile phone to the latest version.

You now know the common hardware problems found in mobile cell phones. Next let us discuss the software problems and how to solve them.