LEARN CELL PHONE REPAIRING



Acknowledgements

We appreciate the author and Institute who provided relevant information during the design and development of this book. In particular, we want to thank the following:

- 1. Mobile Repairing Online the Training Institute
- 2. Muhammad Asif Azeemi Writer

Instructional Design:	Saman Azeemi	
Layout & Graphics:	Muhammad Asif	
Note:		

In this Learn Cell Phone Repairing the Feature phone, smartphones pictures, flowchart and PDF block diagrams have been carefully choosing by the mobile repairing online.

All information in Learn Cell Phone Repairing book is in English language only! To fully use it you need to have basic mobile phone repairing knowledge!

Contant

Learn Cell Phone Repairing	5
Introduction	5
Learning Outcomes of Cell Phone Repairing	5
Topic 1: Cell Phones	6
What is a Mobile Phone?	6
Types of Cell Phones	6
Feature phone	7
Smartphone	7
Topic 2: Potential Hazards Associated with Cell Phone Repair	8
What is a hazard?	8
Topic 3: Parts of a Conventional Cell Phone	9
inside the cell phone, there are several important parts or components	9
Topic 4: Cell Phone Repair Tools	11
Tools for Cell Phone Repairing	11
Topic 5: Disassembling and Assembling a Cell Phone	16
What is to disassemble?	16
What is to assemble?	16
Disassembling a Mobile Phone	16
Internal Parts of a Cell Phone	17
Assembling a Cell Phone	18
Topic 6: Diagnosing and Repairing Cell Phone Faults	19
Skills Needed to Diagnose and Repair a Mobile Phone	19
Soldering	19
what is soldering and why we do it?	22
Iron Tip Care and Maintenance:	23
Hand Soldering and Micro Soldering	24
Hand soldering is done for repairing of faulty mobile printed circuit boards and components. sometimes repairing and replacement of SMD components is also done by hand in mobile rep jobs.hand soldering basic is done during PCB rework in a production unit when a smartphone smash crash damage.by hand, soldering is also done for repairing and servicing printed circuit by the mobile technician. hand soldering is useful when replacing components on PCB with ot 24	airing PCB gets boards her PCB.
Demonstrate how to sold micro components with the soldering iron	24
Micro Soldering For iPhone Cell Phone Mobile SMT Repair Right Now	27
Desoldering	30
Steps in desoldering	30
Testing a phone using a multimeter	31
Direct Current and Alternating Current Voltage Checking	34
DC Current Measuring	34
AC Current Measuring	36
How Do You Check Continuity Beep on Cell Phone PCB	38

How Do You Test and Trace Prints on a Cell Phone PCB	39
The Ground Line in Cell Phone PCB (GND)	39
How to Measure Ground Resistance with a Digital Multimeter	40
Jumper setting	41
Why do Jumpering	41
How to Jumper	41
Cell Phone Jumper Setting	41
Step 1 Check Shorting on Cell Phone Battery Connector	43
Reasons for Shorting in Smartphone Motherboard How Does a Phone Get short?	43
Step 2 Checking Cell Phone PCB Ground Resistance with a Multimeter	44
Schematic Circuit Diagram	46
+VBAT (battery voltage) on Cell Phone PCBs	46
Step 3 Checking +VBAT(battery voltage) in Cell Phone Circuit	47
Cell Phone Diagnosis	49
The Cold Testing Method:	49
Hot Testing:	50
Topic 7: Repair of Common Cell Phone Faults	51
What is a fault?	51
Hardware Faults	52
Solutions to Battery charging faults	52
Solutions to Battery faults	53
Procedure To Remove Shortage In Smartphones	53
Solutions to Network fault	54
d) Network Signal and Call Drop Problem	55
e). Mobile Phone Overheating	55
f). Sound Faults	55
i). Earpiece or Ear Speaker Problem	56
How to Solve Earpiece or Speaker Fault	56
How to Solve Ringer Faults	57
How to solve Mobile Vibrator faults	58
How to Solve Microphone Fault	59
How to Solve Display Faults in a Cell Phone	60
How to Solve a LED problem	61
How to Solve Touch Screen Faults	61
How to Solve a Keypad Faults	62
How to Solve SIM Card Fault	63
How to Solve Wi-Fi problem	65
Software Faults	65
What Do You Do When a Smartphone Won't Turn On?	65
How to solve these problem:	68
Summary	69
Glossary	69
Abbreviations	70

Learn Cell Phone Repairing

Introduction

Welcome to the cell phone repairing. cell phone is a portable telephone that can make and receive calls over a radio frequency link while the user is moving within a telephone service area. The radio frequency link establishes a connection to the switching systems of a mobile phone operator, which provides access to the public switched telephone network (PSTN). nowadays cell phone can perform several communication functions. Mobile technology has become one of the fastest growing technologies in the world. Today people use smartphones to stay in touch with friends and family, to share stories and photographs in social media, and to carry out financial transactions.

This widespread ownership and use of cell phones has created a need for professionals who can repair and service mobile phones. This book has been developed to address that need. The book targets those people who want to begin a mobile repair and servicing business. By the end of reading and doing you should be able to disassemble and assemble a cell phone, diagnose the problem, service and repair a mobile phone with the help of proper tools.

This book is provided through distance learning and we trust that you will find the material useful both for studying and as future reference. We welcome your feedback on any issue relating to this book and wish you all the best. Happy Learning!

Learning Outcomes of Cell Phone Repairing

Upon completion of this book reading you will be able to:

- Identify different types of mobile phones
- Recognise potential hazards in the repair of cell phones
- Identify the parts of a cell phones
- Use the correct hardware tools to repair mobile phones
- Assembly and disassembly a cell phone
- Identify cell phone faults and solve them.



Topic 1: Cell Phones

Before we discuss the types of cell phones, let us first look at the meaning of a mobile phone.

What is a Mobile Phone?

Combination of Rx and Tx Radio System is called cell phone. Rx (Receive signal) in schematic diagram color code is blue Tx (Transmit signal) in schematic diagram color code is orange Radio System (Radio frequency) signal refers to a wireless electromagnetic signal that also used in radio

Types of Cell Phones

There are many different types of mobile phones available in the market. The types are following:

- Bar
- Brick
- Touch screen
- Flip
- Slider
- Swivel watch
- Taco
- Mixed flip and swivel



There are two types of cell phones that are very famous. Take a look at the each form in further detail starting with the Feature phone.



Feature phone

Feature phone is a term typically used as a retronym to describe a class of mobile phone handheld computers. This cell phone also known as the "basic mobile phone" or "dumbphone". Feature phones tend to use a proprietary, custom-designed software and user interface, and lack the capabilities of smartphones. Feature phones typically provide voice calling and text messaging functionality, in addition to basic multimedia and Internet capabilities, and other services offered by the user's wireless service provider.

Smartphone



A smartphone is a handheld personal computer. It possesses extensive computing capabilities, including high-speed access to the Internet using both Wi-Fi and mobile broadband. Modern smartphones have a touchscreen color display with a graphical user interface that covers the front surface and enables the user to use a virtual keyboard to type and press onscreen icons. Interaction is mostly done using touch, besides a few physical buttons. Smartphones are typically pocket-sized, with somewhat larger sizes being called phablets; they are generally smaller than tablet computers.

Smartphones use a mobile operating system, and are able to process a variety of software components, known as "apps". Apps can receive bug fixes and gain additional functionality through software updates; similarly, operating systems are able to update. A smartphone also supports several other functions, such as money transfer, banking, and so on.

We hope you now understand the various types of mobile phones. Let us now look at the potential hazards that are associated the repair of a cell phone.

Your physical well-being is important not only to yourself, but also to others. Therefore, as you embark on cell phone repair, you should be aware of all the potential hazards and how to prevent them.

Topic 2: Potential Hazards Associated with Cell Phone Repair

What is a hazard?

A hazard is anything that has the potential to cause harm to yourself or those around you. Before you learn the different types of hazards, let's start by defining some of the terms associated with hazards.

Flammable	Easily set on fire or capable of burning quickly
Corrosive	Causing damage or gradual destruction of metal or skin by chemical action
Тохіс	Poisonous
Fumes	Smoke, vapour or gas that may be dangerous or irritating to smell

Let us now look at the various types of hazards that you could encounter when repairing cell phone?

There are quite a number of potential hazards that one can encounter when servicing or repairing a cell phone. These are listed in Table 1 together with the preventive actions that you could take to avoid them.

Hazard	Preventive Actions
Burns	Use of well insulated tools, Use of gloves
	Keeping the soldering iron in the right place
	Unplugging equipment when not in use
Pricks by sharp objects	Appropriate storage of equipment
	Proper disposal of sharp objects
	Use of appropriate tools and equipment
Environmental pollution	Proper disposal of electronic wastes
Trailing electrical cables	Make sure electrical equipment is unplugged while not
	in use Safe storage of cables
Falls	Keep all tools, bins etc. in the right place

Table 1: Potential	hazards	durina	cell	phone	repair	and	their	prevent	ion
rubic 1. rotentiur	mazaras	uunig	cen	prioric	repun	unu	unen	prevent	0.11

Having looked at potential hazards and how to protect ourselves during cell phone repair, let us now consider the parts of a mobile phone.

Topic 3: Parts of a Conventional Cell Phone

inside the cell phone, there are several important parts or components

It is compulsory to know the parts and understand their functions so that you can easily diagnose to solve problems. A conventional cell phone is made up of many parts. Table 2 below explains the functions of the main parts.

Parts of a mobile cell phone	Functions
Keypad	Used for inputting or entering data into the phone. It is connected directly to the CPU
Ear piece	Converts the electric signal to a sound signal
Mouth piece	Transmits sound from one phone to another
Battery	Source of power supply to a mobile phone
Power switch	Switches the phone on and off
Power IC	It takes power from the battery and supplies to all other parts of a mobile phone
Oscillator	It creates frequency during outgoing calls
Screen or display	Displays data. It is connected to the CPU to receive following signals: LCD Data Signal, LCD Reset Signal, LCD WR Signal, LCD RD Signal, LCD FLM Signal, LCD HSYN Signal etc.
Flash IC	Stores the software and other programs installed in the mobile phone
Charging IC	Takes the current from the charger and charges the battery
CPU	Controls all sections of a mobile phone
Antenna	Receives and transmit radio frequencies and helps the phone to connect to the cellular network

Table 2: Parts of a mobile phone and their functions

Figure below shows a printed circuit board (PCB) of a cell phone showing the different internal parts. As you can see from this diagram the PCB is divided into two parts, the network section and the power section. The network section controls the incoming and outgoing phone calls, while the power section controls the memory and power related functions of the phone.



Cell Phone Power Section

The top portion near to antenna of the cell phone circuit is called the networks section, and the bottom portion in the PCB is called the power section. If phone wont turn On then check the cell phone power section polar and non-polar capacitors, coils, or the power clock oscillator function-specific components near the power IC when cell phone won't switch on. hopefully you might be know the different parts of a cell phone and their functions. Make sure that you learn them well and are able to locate them easily before you move on to the next section. Let us now look at the tools that you need to repair cell phones.

Topic 4: Cell Phone Repair Tools

There are hundreds of tools for mobile phone repairing available in the market. It is important to select the best tool that enables you to repair the phone easily.

Selection of Mobile Phone Repair tools

When selecting tools and equipment for repairing cell phones, you should consider the following factors:

- 1. Cost
- 2. Brand
- 3. Quality/ Durability
- 4. Availability
- 5. Suitability

Tools for Cell Phone Repairing

Below are the list of concern repairing tools.

1. Soldering Iron: Used to solder small components like capacitor, resistor, diode, transistor, regulator, speaker, microphone, display etc.



2. PCB Holder: Suitable for fixed maintenance of smartphone circuit board and small essential for mobile phone maintenance easy to use, make your repairing work smoothly. PCB Holder



http://www.mobilerepairingonline.com

3. *Solder Wire*: used to solder electronic components. Tin-lead solder wire with soldering 2% flux is good for doing mobile phone repairing jobs.



- 4. Jumper Wire: This is a thin laminated or coated copper wire used to jumper from one point to another on the track of a mobile phone during repair. Copper Soldering Wire 0.1mm is best for doing Jumping on mobile phone circuit.
- 5. Point Cutter: It is used for cutting.Use this Point Cutter for cutting soft wire, like a jumper wire.
- 6. Blade Cutter: This is used to remove lamination from jumper wire. It can also be used for several other purposes.

7. *Mini Needle Nose Pliers*: this is used for pulling the stuck screw out form the cell phones.









- Precision Screwdriver: It is used to remove and tighten screws while assembling and dissembling a mobile phone. Precision screwdrivers of sizes T4, T5, T6 and forehead are good for most mobile repairing job.
- 9. *Tweezers:* These are needed to hold electronic components, ICs, jumper wire etc.while soldering and Desoldering on the mobile phone circuit.

10. *Brush:* These are used for cleaning the PCB of a mobile phone when it is being repaired. It is important to buy only ESD-Safe cleaning brushes.

11. Multimeter: an electronic

phone.

measuring device that has the ability to measure voltage, current and resistance. It is used to test and check the readings of various parts and components of a mobile











- 12. Hot Air Blower: It is also called SMD (Surface Mount Device) rework system and SMD repair system. It has control to regulate or manage temperature and flow or hot air. Always buy a good quality ESD-Safe hot air blower.

 Battery Booster: It is used to boost the power of battery of a mobile phone.when the phone doesn't switch on technician use this adapter to boot the battery cells.



14. Screwdriver Kit: It has several screwdrivers of different shapes and sizes to disassemble and assemble a mobile phone.



15. Microscope: It is used to see a magnified view of PCB or electronic components. These are available in different zoom options. Many microscopes can also be connected to a computer or a monitor.



16. Battery Tester: This device is used to test and analyze the status or condition of the battery of a mobile cell phone.



17. Cleaning Sponge: this is used to clean the tip of soldering iron while soldering. if your tip of soldering iron is not tining proper the soldered was not fine.



You now know the main tools that are used to repair a mobile phone. In the next topic we shall discuss how to disassemble and assemble a cell phone.



Topic 5: Disassembling and Assembling a Cell Phone

What is to disassemble?



To disassemble is to take cell phone apart or to break it down into pieces.

What is to assemble?



To assemble is to fit together all the separate pieces in order to form one whole cell phone.

Disassembling a Mobile Phone

The following are the steps that you should take when disassembling a mobile phone:

- 1. Switch off the phone
- 2. Remove the battery cover
- 3. Remove the battery, SIM card memory card (if any)
- 4. Remove all the screws from the phone
- 5. Lift back the cover with the help of a flat screwdriver
- 6. Remove the strips (buzzer strip, display, camera, volume and speaker button strips)
- 7. Remove the antennae wire from the outside
- 8. Remove the motherboard and vibrator.

To successfully disassemble a phone, you need to understand the various internal sections of a cell phone and how they are connected to the CPU. Let us look at that next.

Internal Parts of a Cell Phone

Table 3 below outlines the main sections and how they are connected.

Internal Section	Connections
SIM card section	SIM Card Interface section is directly connected with the CPU in most cell phones. If there is no power supply in a mobile phone then the SIM section is connected with the CPU through the Power IC.
Memory card section	In most phones the micro SD card holder is connected through a 8-pin socket. The memory card section is found inside the CPU
Ear Speaker Section	In modern cell phones which have a separate ear speaker, the speaker is directly connected to the CPU. It receives sound via signals directly from the CPU of from the audio section inbuilt within the CPU. In some mobile phones, these sound signals are received via coil / resistance. Some mobile phones have audio IC in the audio section, while others have audio amplifier.
Speaker/Ringer Section	The ringer, buzzer or speaker in most mobile phones are connected to the audio amplifier IC to obtain loud sound. The amplifier IC amplifies the sound or audio signal received from the CPU of the audio section.
Key Backlight Section	LED Lights are connected according to the parallel circuit in the key backlight section. Anode ends of all the LEDS are connected to each other and all the cathode ends to each other. 3 to 3.3 V is supplied for the functioning of these key LED Lights.

Table 3: Internal parts of a mobile phone

LCD Backlight Section	LCD Backlight in mobile cell phones is made according to the series circuit. A Boost Voltage Generator section is built for the supply of high voltage (10 to 18V) for the functioning of the LCD LED. Boost coil, Boost Volt Driver IC, Rectifier Diode are present in this section.
Vibrator Motor Section	Positive power supply is given to this section directly from the positive end of the battery. Negative power supply is given through a NPN transistor or from the ground of any circuit.
Network Section	Antenna, External Antenna Socket, RX-Band Pass Filter, RF Crystal, FEM, PFO, TX-Band Pass Filter, RF IC, CPU are connected in the Network Section.
Battery Charging Section	Charger and system interface connector is made together in most modern mobile cell phones. Regulator section is made separately for the battery charging section. In some mobile phones, the battery charging section is made inside the Power IC.
FM Radio Section	FM Radio Driver IC, FM Antenna, Signal and Supply Components are made in the FM Radio Section.
Bluetooth Section	Bluetooth Antenna, Bluetooth RF Signal Filter, Bluetooth Driver IC, Supply and Signal Components are found in this section. The Bluetooth section functions like the Network Section. The RF-CLK signal is given to the Bluetooth driver IC during signal processing.
Hands free (Earphone) Section:	The hands free jack, hands free MIC, speaker signal component and hands free audio amplifier are present in this section. Hands free symbol is displayed after connecting the Hands free jack.

Assembling a Cell Phone

The following are the steps that you should take when assembling a mobile phone:

- 1. Fix the vibrator strips of speaker and volume button
- 2. Fix the motherboard
- 3. Connect the antenna with wire
- 4. Place the camera and connect it
- 5. Place the buzzer
- 6. Put the camera cover
- 7. Make sure that the LCD is working before you place the screen
- 8. Put battery and battery cover

you have already learnt about the hazards of cell phone repair, the parts of a mobile phone, the tools to use and how to assemble and disassemble a mobile phone. Now let us look at how to diagnose and repair a mobile phone.

Topic 6: Diagnosing and Repairing Cell Phone Faults

The correct diagnosing of cell phone faults is the key to success and cost-effective repair of the phone. Let us start by looking at the skills that you need to have to be able to diagnose and repair a mobile phone.

Skills Needed to Diagnose and Repair a Mobile Phone

Before you can diagnose and repair a phone, there are some skills that you need to learn. These skills are:

- Soldering
- Desoldering
- Testing using a multimeter
- Jumper setting

Let us briefly discuss each skill in turn.

Soldering

This is the basic skill for a show you the tips and techniques of the skills involved with your mobile phone repair jobs today will going over the basic and advanced skills of Micro soldering. There are many kinds of mobile phone circuit soldering, but this book is designed to teach you the basics to advance smartphone and iPhone logical broad soldering. most repairs require you to have basic tools like a screwdriver or a sponge and others might involve more exciting tools like a soldering iron.

Now Review the Tools for Soldering Microelectronic Components

Soldering Iron: A soldering iron is a pen-shaped fine tip that heats up. one of the ways soldering irons is measured in the electrical and electronic market by is wattage. for laptop and smartphone electronics components work, a low-power iron 35 watts is used. Some irons are temperature-controlled, running at a fixed temperature in the same way as a soldering station. For



most basic soldering, a 35 Watt soldering iron will work without any problems. but it is also possible to buy advanced solder stations where you can set the tip temperature with a dial or knob.



http://www.mobilerepairingonline.com

Iron Tip: Most electronics soldering iron and soldering station have interchangeable tips, the iron tip is also known as the bit.

Apart from Micro soldering tools, you may also need few other tools like sponge, iron stand, safety goggles, PCB holder, solder wire rosin core, desoldering wick remover wire and soldering flux paste. how can you actually use this?

Get A Free PDF Catalog on mobile repairing tools name list: you can view it before downloading click the link <u>mobile repairing tools</u> the page contains all the best Products and its Reviews for buying the



top Resource.

Sponge: Something with which to clean your tip like a wet water sponge or a wet cotton.



Iron Stand: A soldering iron stand is used to keeps the hot iron tip away from burning flammable

Iron Stand

Safety Goggles



http://www.mubilorepairingonline.com

materials when you set the soldering iron down after soldering. iron stand purchased separately with 30 to 40 watts soldering irons, but most budget higher end soldering models include the iron stand. click here to review the price and buy the best Mini Portable Electric Soldering Iron Stand with Tip Cleaner Sponge

Safety Goggles: Especially if you're the beginner, you should be wearing safety goggles. buy affordable safety goggle that suit for your anti-fog soldering here



http://www.mobiloropairingonline.com

Solder Wire Rosin Core: For a good solder joint between two components, you need the best quality



Solder Wire Rosin Core

http://www.mobilerepairingonline.com

of solder wire. solder wires are available in different diameters. Solder wire rosin core is the most common and widely used solder wire.



Soldering Flux Paste: Apply a best quality solder flux on the area of the leads of microelectronic components to be soldered. soldering flux paste will help to remove any deposited oxides from the surface of the microelectronic metals thus leading to better solder joints.



what is soldering and why we do it?

Soldering is a method of connecting electronic component and its copper print on a PCB together by melting another filler metal in between them. Why would you need to join two copper layers together? Typically, the common uses of solder are when a copper wire or component print gets cut and needs to be "fused" jumper back into the circuit.



Now we have all the tools we need to start doing soldering by hand so let's jump into it right now. The best part?

Cleaning: When the iron tip burnt flux accumulated on it, solder no longer wets the iron tip,

flux on solder wire don't get wet

then impending heat transfer and making soldering SMD components with soldering iron difficult or impossible.

iron tips problems

the tip must be periodically cleaned when using. Such problems happen with all kinds of soldering iron tips, A wetted water sponge or cotton can be used to wipe the tip for more aggressive cleaning move the tip at a sponge



Iron Tip Care and Maintenance:

For soldering iron coated with a thin of solder.allow iron for transfer the heat to the workpiece on the PCB.This procedure is called iron tip tinning.

Hand Soldering and Micro Soldering



Hand soldering is done for repairing of faulty mobile printed circuit boards and components. sometimes repairing and replacement of SMD components is also done by hand in mobile repairing jobs.hand soldering basic is done during PCB rework in a production unit when a smartphone PCB gets smash crash damage.by hand, soldering is also done for repairing and servicing printed circuit boards by the mobile technician. hand soldering is useful when replacing components on PCB with other PCB.



Smartphone motherboards, tablet, Mac, iPod, iPad, and iPhone logical boards are filled with basic electronic components, many of these components such as coils, resistors, capacitors, and FPC, LVDS connectors are specification different models and brands. sometimes those components get failed due to water damage or phone dropped by the customer's basic electronic get disconnect from the copper prints. When these components disconnected from the iPhone logical broad or have been damaged by the user then you will need to perform micro soldering repairs.

Demonstrate how to sold micro components with the soldering iron

Make sure the soldering iron is hot. Do not touch it. Hold the soldering iron properly in one hand and component on the other hand with the help of tweezer. Maintain proper angle between component and PCB. by joining two surfaces allows the DC current to flow from one component to another microelectronic by print. Place the component at the copper track on the PCB with the help of the tweezer.



works quickly

Apply heat where the lead of the component meets the copper track on the PCB. and hold the component with the tweezer.

step two use solder wire if needs.





step three

Flux and Solder Paste Residue Remover for Smartphone PCB and BGA Repairing : when you finish soldering, do you find there is solder flux residue on the PCB? The flux residue is not easy to remove by brush. It is important to buy best quality PCB cleaner liquid as poor quality cleaners can damage the board prints.

micro soldering flux



Anti Static ESD Brush for Cleaning Mobile Phone Tablet PCB BGA Repair

Soldering: Antistatic brush is best for cleaning all Dusting and Dirt form sensitive components and

Anti Static ESD Brush for Cleaning Mobile Phone PCB



http://www.mobilerepairingouline.co

FPC connector with safely. suitable for cleaning, washing and removes any liquid from the surface of iPhone and Samsung mobile phone PCB. The brush cleans those areas which are hard to reach in PCB, with its long handle and soft hair brush are easy to use.

Cleaning Mobile Tablet PCB

that's not all...

You can also use soldering tweezers iron an advanced tool for soldering, resoldering basic electronics For soldering and desoldering small surface-mount components like resistors, polar or non-polar capacitors, and Zener diodes, tweezer style soldering iron can be used, with two terminals and free-standing or controlled from a soldering station. soldering tweezers iron is also called

tweezer soldering iron SMD. The tweezers have two heated tips applied to the two ends of the PCB component. The main purpose of the soldering tweezers is to melt solder around the components.in

this new era of smartphone repairing at your mobile repair shop, you need to perform micro soldering repairs at the microscopic level.



remember one thing the best solder joint should look shiny. the backlight fuse is a commonly replaced component in every single Apple motherboard backlight fault. SMT (Surface Mount Technology) IC soldering method is different. the solder joint quality depends on the soldering tools you used. The better the quality of tools the better you get a result, the better will be the life and performance of the smartphone after repair.



Micro Soldering For iPhone Cell Phone Mobile SMT Repair Right Now

With the latest tools and the right knowledge, it is possible to repair costly iPhone, Samsung, and tablet motherboards at the component and chip level. This process is called "micro soldering" Once you are ready with all the tools needed for Micro soldering, you are ready to start the iPhone repair job.

iPhone Board Level Repair



So, what does it take to learn hand soldering microelectronics and component level repair? The best place to start is with the micro soldering flux and soldering micro resistor. start by making sure the



iPhone logical broad and the leads of the components are clean and free from any dust or grease. microelectronic components which are not clean may have deposited oxides that can lead to the bad solder joints.

What is Micro Soldering Jobs?

During your repair process, you would perform an initial examination of the device motherboard, inspect for damage externally, then proceed to view the board with the components under a microscope to see problems.anything repaired and soldered under a microscope would be also considered "micro soldering jobs". the iPhone logical broad components and IC's get to a smaller size often times a soldering on micro circuits is needed, typically working with the smaller components using standard tools is very difficult. you can't learn to solder all microscopic and tweezers iron, as well as



http://www.mobilerepairingonline.com

everything else you will need to learn micro soldering jobs and take your smartphone repair business to the next level.let's suppose you are earning an average \$70 per repair on a cell phone and you do 10 FP(feature phone) repairs each week, that's revenues of \$700 weekly. when you do

Microscope with Magnifier

SP(smartphone) repairing you can earn an average \$90 per repair on a smartphone, tablet, Mac, iPad, iPod, and iPhone logical boards by micro soldering repair. your weekly business revenue percentage can increase 100%

hand soldering micro electronics

Microscope with Magnifier: Microscope used to see a magnified view of Device PCB, FPC connectors or microelectronic components.with the microscope can easily see and work with iPhone and other smartphone motherboards, generally, eyepieces provide with the microscope to see the magnification. magnifier available in different zoom options. the best quality microscope eyepieces can be swapped for higher or lower magnification.There are different attachable light sources available for a microscope as well. Ring lights source can attach to the bottom of the microscope and provide lighting around the workspace.

microscope smartphone magnification view



you can add a camera to your microscope. the camera is a great way to showing customers exactly what sort of repairs need to be made on their smartphone circuit as well as teach other technicians logic board level repair. The most important feature of the microscope is the glass. microscopes can be connected to a computer LED.



camera view feature

you can found sharpest and clearest view form Amscope and Nikon lenses. In practice, the scope it's fine for all smartphone motherboard micro soldering work I've done.

you can buy Magnification Endoscope 8 LED Digital Microscope a less expensive and affordable one. click to review the price here

I hope all the board level repair images are always useful enough to explain Micro Soldering Repair.

Desoldering

Desoldering is the removal of solder and components from a printed circuit board for troubleshooting, repair, replacement, and salvage.

Desoldering Wick Remover Wire: Desoldering wick wire is used to remove excess solder from the component tracks and mobile phone PCB. Wick Remover Desoldering Braid Wire is also used for Suck solder form BGA iC prints.



Steps in desoldering

- 1. Use a solder wick (finely braided copper) to wick away excess solder from a de-soldered connection.
- 2. Apply the solder wick and use the soldering iron to the de-soldered connection. The solder wick will draw the excess solder off the PCB pad.



Testing a phone using a multimeter

We hope you still remember that a <u>multimeter</u> is a device that is used to measure the voltage, current and resistance of various components of a mobile phone. Picture below shows the various parts of a multimeter



We shall now discuss how to measure resistance, voltage and current using a multimeter. the device you can see in the picture is a digital multimeter. the reason why we call this a digital multimeter is that of its measures and gives you the results in the form of digits as you can see in the picture



the digits are very clearly displayed on the picture and that is one of the reasons why this is called a digital multimeter because digits will help you understand the results of whatever you are checking very easily



Multimeter Probes



now, first of all, you need to understand what probes are as you can see there are two probes which are commonly used with analog and digital multimeters the first one is a black colored one the second one is a red colored one



http://www.mobilerepairingonline.com

and these two probes have very specific positions where you need to place them on the multimeter now the first one is a black probe now the black probe has to be placed at a point where it is written as Com which basically signifies a common range so the black probe has to be placed only in the common range



place it there and press it and it will fit in tightly there right above that you will see a symbol where it is written as voltage-ampere M a this is where you take readings of voltage-ampere etc and you place the red probe here press it tightly so it can fit in right above that is another point where you can check higher values of electricity with the meter however commonly in a multimeter we normally use the red and black probes and that is more than enough to measure a lot of the electronic components. Right now let us try and understand what are these other readings that are displayed on the multimeter

Direct Current and Alternating Current Voltage Checking

now on the left-hand side top, you will see something written as V followed by a dash and a few dots there now this is the symbol for DC so on the left-hand side basically when you turn the Range Switch to the left you will be able to check the DC voltage somewhere ranges in the where



check DC voltage here

the range is between 20 volts two thousand words so you can check DC voltage by placing the Range Switch at the respective voltage point if you have a smaller voltage to be checked like cell phone battery you can place it at 20 volts

DC Current Measuring

now let's try and understand how we can check DC we are going to be using a battery booster to test this so we switched on the 12 volts DC adapter with Ampere.



for repair cell phone battery

this is a device that is used to boost cell phone batteries and we are going to connect the output wire of this to the probes and we are going



boost mobile phone battery

to be testing the voltage of the output now we connect the two output wires of the booster to the two probes of the multimeter make sure that you connect it to the right and so the black and the



black red in the red and you can see this is around three point eight (3.8) volts so this is the DC



voltage

voltage that we have measured and you can measure DC

by placing it at the Range Switch at the right position on the DC voltage set so whenever this is typically how you do your measurements of AC and DC voltage

whenever you are done with using the multimeter please switch it off because typically all these multimeters have a battery inside, so the battery is what gives the power to the multimeter to display the digits on the reading scale so if you beep it switched on the battery can drain off very easily and you may not be able to use it when you need it on the right-hand side, you see something like a V followed by an ampersand sign now this is where on the right-hand side, you check the AC voltage requires 200 volts or less requires the Range Switch to be placed at the 200 volts points higher value equipment can be measured using the 750-volt point so these are the two most important ways of measuring AC and DC voltage using a multimeter the range is between 200 volts to 750 volts

range switch of ac

AC Current Measuring



http://www.mobilerepairingonline.com

now let's try checking at home typically the voltage that we have is between 120 or 230 volts we will turn the range switch now and place it at the 750 volt AC point and we will connect this to the main power plug to check the voltage now in many of the houses is between 220 volts voltage is usually available at the circuit boards electricity at your house and whenever you want to check whether you are getting the right voltage or not you use the multimeter place it place the Range Switch at the 750 volt position and we try and place the two probes in two points on the plug point you can see



measure ac voltage with a multimeter

the wires are being plugged in into two points on your plug point and this is exactly where you get 120 to 230 volts once the probes are placed there and as you can see we can see the reading here it shows 120 now going further down you will see a few more micro readings on the right-hand side which is for smaller readings that can be measured using the multimeter, however, let us focus on those readings that are very important that we commonly use using a multimeter so let us go ahead and try and understand a few more checking cell phone components checking cell phone basic electronic components at multimeter ohms now right below the DC voltage you will see a few ohm reading is given there



understanding ohm readings

this is where you place the Range Switch to check the value of resistance when you check cell phone basic electronic components (resistance) which ranges from 200 ohms to 2000 kilo ohms and that is how you turn the Range Switch there you can place it at the respective point and check the resistance value





How Do You Check Continuity Beep on Cell Phone PCB

the next one that we will understand is where we the continuity or beep testing comes now this is a very essential component when you do when it is an essential test when you are doing tracing or testing of cell phone PCBs or laptop motherboard for that matter this reading or this point is called the buzzer or continuity testing



when you place it here and that's the probes together you will hear a beep sound now the beep sound is very distinct here but let us try and understand what is the reason behind this beep sound Q: why do we use this continuity test now the reason why we do this beep testing? A: when we are checking a wire and we want to check whether the wire is broken in between typically broken wires are called open wires so if you want to check whether the wire is broken from inside now you will not be able to find it out looking at it from the outside so in order to check the continuity we use the beep or continuity testing

which means you touch the two ends of the probe using the two ends of the wire using the black and red probe and if you hear a beep sound which means that the circuit is not open the wire is proper but if you don't hear a beep that means that the circuit is broken somewhere and you need to fix it this is also used while doing tracing on a cell phone printed circuit board to check whether two points are connected properly



How Do You Test and Trace Prints on a Cell Phone PCB

testing power supply in prints

Now we will try and understand how we can test or trace a Prints on a cell phone PCB circuit system testing or tracing in a PCBs essentially is to find out whether the power supply is properly reaching different parts or components of a cell phone and as you all know we will be using the digital multimeter to try and test this whole process so once we switch on the multimeter we place it in the beep or continuity testing position and we will touch the probes to check it up if we here the beep which means the continuity testing position is working perfectly and the probes are in proper condition using these probes we will be able to test the circuitry in a cell phone PCB

The Ground Line in Cell Phone PCB (GND)

so, first of all, we will check the negative line in a cell phone PCB as you all know a power comes with a positive and a negative line, a negative line is what is also called a ground line or the baseline and this is signified by the yellow strip that you see all across the phone PCB



GND in mobile circuit

so this entire yellow strip that you see in the picture right now brightly colored strip is what signifies the negative line on the cell phone



How to Measure Ground Resistance with a Digital Multimeter

in order to test this negative line, you can place the probes tips in the multiple points across this entire circuit and check whether the continuity is intactor not so let's try and first check the probes and try and start off with the tracing of the negative line in all Phone PCB so every board typically will have a very prominent line like this the negative line or the grounding line as we call it in order to test if you place the probe on any 2 on the grounding line and you can hear the beep so when we do this testing you'll be able to check whether the circuit is broken at any point in time if it's a closed circuit which means it's perfectly all right all the points are connected very well and the negative line is intact if it's an open circuit you will not hear a beep sound when you place the probe at the respective point.

Jumper setting

Jumpering means to temporarily complete a circuit or to bypass a break in a circuit by making a connection from one point to another.

A good conductor wire is used to make a jumper which by-passes the components and passes on a signal or supply line for further uses.

When wire is used as a jumper, it must have some special specifications as required. These jumper wires can mainly be of two types i.e. insulated and non-insulated. In the mobile phone insulated wires are used for jumpers. The length of a jumper depends on the two points connected in between.

testing ground resistance with multimeter

Why do Jumpering

While repairing mobile phones, we find that certain faulty components are very difficult to get from the market. To repair such mobile phones the only immediate option is the use of jumpers. By use of jumpers we will bypass the faulty components specifically.

How to Jumper

- 1. Disassemble mobile phone and place it on a PCB holder.
- 2. Using a multimeter, check track and find the fault or the missing track that need jumper.
- 3. Apply liquid soldering flux to the points where you need to solder jumper wire.
- 4. Cut jumper wire to desired length and remove its lamination using blade cutter.
- 5. Hold one end of the jumper wire and solder it to one point of the faulty circuit track. Use a good quality tweezers to hold the wire and good quality of soldering iron and solder wire to solder.
- 6. Now hold the other end of the jumper wire and solder to the other point of the track
- 7. Using a multimeter check the jumper.

Cell Phone Jumper Setting

jumper setting is typically best when you need to connect two different points on a cell phone there could be internal disturbances in the circuit of the handset which are connecting these two points and

because of the internal disturbance or a breakage in the circuit, the father or data may not be traveling

from one point to the other easily and in those cases, we use jumper setting to try and connect those two points directly thereby ensuring the correct transmission of power, data, and piles voltage from one end to the other end but in order to determine whether you need to do jumper setting. for example, if you're checking a battery connector you may need to first verify whether the battery connector is working properly or not before you decide to make any changes or test any connections on the cell phones

Tracing & Testing VCC main and GND points of a iPhone PCB



iphone 6 battery connector

now in this iPhone, the first aspect that we were going to be checking is the connectivity between the battery connector and two other important basic electronic components that transmit power to the rest of the circuit of the cell phone now in order to test out the connectivity in the phone PCB you need to use the multimeter!



best multimeter for home use

place the multimeter switch range on the Buzzer continuity testing mode to check whether the two probes are connected things the means a



multimeter probe types

and you can hear the beep and once you hear the beep the multimeter is perfectly alright let's go ahead and test the connectivity on the board now typically we are going to be starting off with checking the battery connector





positive negative bsi

Battery Connector connects the battery positive and negative to the mobile PCB internal plus and minus copper wire prints. if your smartphone is short, it can have various issues like it may not turn on (dead), it may overheat (although it is normal in some smartphone models!), its battery may drain and discharge very fast, it may hang or auto restart and freeze frequently, it may auto turn off sometimes, etc. It is called short-circuit PCB.

Reasons for Shorting in Smartphone Motherboard How Does a Phone Get short?



If the smartphone gets dropped on the floor or on some hard surface. or the phone gets wet or is dropped in rain or swimming pool water. phone overheating. Trying to use the faulty charger for



charging in the smartphone Electric Sparks or smoke coming out of the Phone due to any reason form Handset charging port.

all phone Short finding method is the same. you can use a Digital Multimeter to find the shortage in smartphone motherboards.

Set multimeter on CONTINUITY

Scenior1: Connect Black probe to Circuit's +VE print. and Red probe to Circuit's -VE print shows some reading.

Scenior2: Connect Black probe to Circuit's -VE print and Red probe to Circuit's +VE print shows no reading.

Note: IF reading shows in BOTH scenarios it means circuit has Shortage.

Step 2 Checking Cell Phone PCB Ground Resistance with a Multimeter

you need to identify the positive and the negative points on a battery and we already know that the negative point on the battery is what is the background connection as you see the yellow color line is the GND line of the battery that is traveling all through the mobile PCB so let's keep the probes on one end and connected and now we can hear the beep this basically means that the battery connector negative point is here. if two GND points are connected you will hear the beep sound if not you will not be able to hear a beep sound in these points by segmenting the entire negative line into smaller parts you will be able to exactly trace where the breakages in the entire negative line once the breakage is identified you will then need to use the jumper setting option and try and ensure that the wire is or the circuit is reconnected and is properly functioning



ground testing

Positive Line VBB or VCC Main in iPhone PCB



NOKIA 3310/3330 Mobile Phone Circuit Diagram

now this is how we check the negative line now let's move on to the next part which is a positive line now a positive line cannot be very clearly seen like the negative line the positive line is typically connected to very specific components or ICS and supplies power to each of those components so it's not very easy to identify and it's not open unlike the negative line hence you need to ensure that you are able to trace the positive line effectively after reading through the circuit diagram of the respective iPhone PCB

Schematic Circuit Diagram



unless you have a Schematic Circuit Diagram in hand you may not exactly know how the positive ways is weaved it into the iPhone PCB or into the specific components of the Printed Circuit Broad so please ensure that you pick up their respective surface circuit diagram of the while phone that you



are working on understand the VCC main connections that exist in it and then try and trace the connections

+VBAT (battery voltage) on Cell Phone PCBs

now one of the common things that we can do to check the positive ways is to touch the positive terminal +VBAT of the battery connector to this layup capacitor now this component is a very common component that you will find in most cell phone PCBs and this is a common place where the positive ways is usually connected you may be able to identify that in different cell phone PCBs



once you identify and able to detect that you will be able to touch the positive direct ways in the PCB the positive connector of the battery a connecting point to the specific non polar capacitors, resistance and other components and you can check whether the direct positive ways is intact or not that if there is a breakage here you may not be able to connect or connect the jumper wire from the battery connector VBAT

Step 3 Checking +VBAT(battery voltage) in Cell Phone Circuit use the back end of the cell phone battery connector as you can see here in the pictures



back point is connected to the power point

there's a small point at the back of the battery connector which is connected to the front of the battery connector so you place the one end of the meter prob tip on the back side of the battery connector point and the other on the other connecting point in the pcb and check whether you are

able to get a beep sound now here you will be able to connect the jumper clearly without any issues like I just said before in the article the back point is connected to the power point you can hear the beep and from here you can connect the jumper wire to the next point for you to be able to take the positive ways ahead but you need to ensure that you read the phone circuit diagram clearly before you attempt any of this



power supply system in phone

so, in short, the first step that you would do while you're testing or tracing the negative and positive ways in a cell phone circuit is to understand whether the power supply system in tact and to check

Checking VBAT and GND both Power Supply in Your Cell Phone PCB



Mobile Phone Schematic Circuit Diagram

pcb diagram of mobile phone

that the first thing that you would do is check the negative line(GND) or ground which is signified by the yellow strip that you see all through you can place the probes of the multimeter at two different points or smaller segments of each of these and try and see if the connectivity is intact once that is done you can move on to the positive terminal VBAT of the battery connecting point and try and place it at the respective positive terminals of each of the components to check whether the connectivity to the positive terminal from the VBAT of the battery connector to the individual positive terminals of components are intact or not if these two are intact then the entire circuitry power supply in your cell phone is working absolutely fine once you do this checking you can then move on to do further detailed

I hope you would have understood how to test positive and negative power supply in your cell phone PCB and we hope that you will continue to keep learning more about how to repair cell phone prints

performing a Google search by typing (mobile phone name) and (service manual) to find the phone schematic diagram. then check VBAT and GND both Power Supply in smartphone PCB with the help of the schematic diagram.

You now know the skills that you need in order to diagnose and repair a mobile phone. Let us now learn how to diagnose and repair cell phones.

Cell Phone Diagnosis

There are two methods that you can use to find out faulty or damaged components in a mobile phone. These are:

- The cold testing method
- The hot testing method

The Cold Testing Method:



Cold testing is when we use a multimeter to check the value of resistance at the time of repairing a fault in a mobile phone. During cold testing do not power the phone from any equipment. Use the diode range and beep sound from the multimeter to find fault in the mobile phone. During cold testing, you should connect the RED probe of the multimeter to the ground of the mobile phone PCB, and use the BLACK probe to touch the testing points of the mobile phone component prints. During the fault-finding and repairing process of each part, component or section, you should receive the following correct values:

- 1. Ear Phone Connector Tip (+ , -): 500 to 700
- 2. Loud Speaker / Ringer Connector Tip (+,-): 300 to 600
- 3. Battery Connector Tip (+): 300 to 500
- 4. Battery Connector Tip (Sense): above 800
- 5. Display Connector Supply Pins: 250 to 400
- 6. Display Connector Signal Pins: 500 to 800
- 7. Camera Connector Supply Pins: 250 to 400
- 8. Camera Connector Signal Pins: 600 to 900
- 9. Key Tip (Row and Column): 400 to 800
- 10. Charger Connector Tip: 600 to 700
- 11. Vibrator Motor Connector: 40 to 500
- 12. Power ON / OFF Switch Point (+): 600 to 900
- 13. MIC Connector Tip (Analog MIC) (+,-): 700 to 900
- 14. Battery Charging Out Point (+,-): 300 to 400
- 15. SIM Card Connector Pin 1 (VSim): 500 to 700
- 16. SIM Card Connector Pin 2,3,6: 400 to 800
- 17. SIM Card Connector Pin 4 (GND): 00 (Beep)
- 18. Micro SD Card Connector Pin 4: 500 to 600
- 19. Micro Card Connector Pin 6 (GND): 00 (Beep)
- 20. Micro Card Connector Pin 1,2,3,5,7,8: 600 to 800
- 21. RTC: 400 to 500
- 22. Data RX and TX Pins: 600 to 700

Hot Testing:



The hot testing method is adopted when the fault cannot be found or when the cell phone cannot be repaired using the cold testing method. In this method, the VOLTAGE of the damaged part or component is checked. The fault is found by powering the mobile phone with a battery which has a DC power supply. Once you power the phone, you should select the DCV (DC Volt) range of the Multimeter. Then you should connect the BLACK probe of the Multimeter to the ground of the phone's PCB and ensure the RED Probe touches the Testing Points. During hot testing, the voltage of different part or sections should be as follows (all values in Volt):

- 1. Ear Phone Connector Tip (+ , -) when working: 0 to 2.5
- 2. Loud Speaker / Ringer Connector Tip (+,-) when working: 0 to 2.5
- 3. Battery Connector Tip (+): 3.7
- 4. Display Connector Supply Pins: 1.8 to 2.9
- 5. Display Connector Signal Pins when working: 0 to 1.8
- 6. Camera Connector Supply Pins: 1.8 to 2.9
- 7. Camera Connector Signal Pins when working: 0 to 1.8
- 8. Key Tip (Row and Column) One Side: 1.8 to 2.8
- 9. Charger Connector Tip: 5 to 6
- 10. Vibrator Motor Connector Tip when Working: 1.9 to 3.6
- 11. Power ON / OFF Switch Point (+): 3 to 3.6
- 12. MIC Connector Tip (Analog MIC) (+,-): 1.8 to 3.0
- 13. Battery Charging Out Point (+,-): 3.7 to 4.2
- 14. SIM Card Connector Pin 1 (VSim) when SIM Connected: 1.8 to 3.0
- 15. SIM Card Connector Pin 2,3,6 when working: 0 to 2.8
- 16. Micro SD Card Connector Pin: 2.8
- 17. Micro Card Connector Pin 1,2,3,5,7,8: 0 to 2.8
- 18. Data RX and TX Pins: 1.8 to 2.8

You now know how to diagnose a fault in a mobile phone using the hot and cold testing method. In the next section we shall learn about the common mobile phone faults.

Topic 7: Repair of Common Cell Phone Faults

What is a fault?

A fault is a defect (a failure in a circuit) of 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,
- stress or impact,
- contamination,
- 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

when we think about hardware faults mainly we want to know more about main ICs in the mobile phones. smartphones had ICs more than the feature phones. However, when you get complete idea about that ICs will be able to find the solution faster in mobile phones. Now 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:

- a) Battery charging faults
- b) Mobile phone battery problem (faults)
- c) Network not working problem
- d) Overheating problem
- e) Sound faults
- f) Earpiece, ringer and microphone faults
- g) LCD or Display problems
- h) Lighting or LED problems
- i) Touchscreen problems
- j) Keypad problems
- k) SIM faults
- I) 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 picture.



- 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 Cell 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.

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 in smartphones
- 5. If the problem is still not solved then check the Mobile Phone PBA current consumption.
- 6. Check for any short circuit.

Before removing shortage you should know whether your smartphone motherboard is short or not. To repair a short smartphone, you have to follow the procedure to remove it, especially in dead Smartphones.

Procedure To Remove Shortage In Smartphones

1. disassemble your Smartphone and get out the printed circuit board (PCB). Be careful, so that you do not damage it! I suggest you watch the disassembling video on youtube first then remove LCD, camera, etc because we just need the motherboard.

2. Clean the entire motherboard thoroughly with any circuit cleaner like Philips contact cleaner spray, alcohol, thinner etc. Now dry it completely. After each cleaning step, you have to check if the shortage is not gone proceed to the next step.

3. Now try to deep clean the Phone Circuit Board. There is a liquid called Elma used by smartphone repair technicians in the Eastern Europe countries named Elma.

Elma procedure: Dip the Circuit Board in Elma for 1 to 2 hours. Remove the Circuit Board and clean it thoroughly with a toothbrush. Dry the Circuit Board completely with cotton or ultrasonic cleaner machine, not even a droplet of water remains. For drying, you can use direct sunlight or 100-watt yellow bulb.

- 7. If there is serious problem at the board level then it is better to replace the whole Logic Board of the 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. Antenna switch helps to filter frequency Bands as 900Mhz, 1800Mhz and connect Rx, Tx(Receiver and Transmitter).if this IC damage Signal Drop.
- 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 (signal 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 cell 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 in smartphone also.
- 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. Clean the entire motherboard thoroughly with any circuit cleaner like Philips contact cleaner spray, alcohol, thinner etc. For drying, you can use direct sunlight or 100-watt yellow bulb
- 5. If overheating persists, 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 3 for a picture of an 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 of change the UEM/Audio IC.
- 5. If the problem is still not solved then heat, reball or change the CPU.



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 below shows a picture of a ringer.



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.

- 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.

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.

iii.

Vibration Problem

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 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.
- 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 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 5 shows a diagram of 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) Smartphone touch screen fault
- A Touch Screen is an electronic component that allows you to input data or control your smartphone by touching the screen.
- The touch screen is normally controlled by the CPU. In some smatphones there is an Interface IC called Touch Controller I C.

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 Faults

- 1. Check the settings if the mobile phone has both a keypad and a touch screen.
- 2. Make sure that your hands are clean and dry, then try these steps.
- 3. If you have a case or screen protector on your device, try removing it
- 4. Clean the screen with a soft, slightly damp, lint-free cloth.
- 5. Restart your device. If you can't restart it, you can force restart your device. sometimes restart your smartphone fix software glitches that may prevent the screen from functioning.
- 6. To restart android device with the touch screen not working Press and hold the power button until the screen becomes black; After 1 minute or so, hold the power button again to power on the device. In many cases, the touchscreen will respond normally after the device reboots.
- 7. Sometimes, faulty memory card or SIM card should take the blame. Therefore, Power off your device (keep holding power button if the screen is totally unresponsive); Remove back cover of your Android device and take off memory & SIM card; Reboot the device and see if the problem is gone.
- 8. Corrupted or troublesome third-party apps could also cause touchscreen problem on Android phone or tablet. Under the safe mode, all third-party apps that you download will be disabled. So if the touch screen works well in safe mode, then you should uninstall some of the third-party apps, especially those that were installed recently before the touch screen problem starts.
- 9. There are apps in the Google Play Store that can calibrate your phone/tablet touchscreen and improve its accuracy and responsiveness. These apps are especially helpful if your touchscreen responds too slow or inaccurately. Type "touchscreen calibration" on the search bar in the Play Store and you should get quite a few results. Read the reviews carefully before download.
- 10. Try clean and re connector touch penal.
- 11. Change the touch penal.

- 12. Check the Track of the Touch Controller section and Jumper if required.
- 13. Heat or change the Touch Controller IC
- 14. Heat, reball or change the CPU
- (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.



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 Identity 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 some time 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.



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 you are using android o s check your phone is rooted or not.
- 3. 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.
- 4. 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 cell phones. Next let us discuss the software problems and how to solve them.

Software Faults

A software is a set of programs, routines and symbolic language that control the functions of hardware and directs its operations.

What Do You Do When a Smartphone Won't Turn On?

in a smartphone, this is a common issue. to fix this in smartphone try to long press the Power Button. in many cases, the power button won't work because the phone is basically frozen or Historically, the solution is to remove the battery, wait for 10 seconds, then reinsert the phone battery and press the power button again. This removes all the power internally form the smartphone circuit. first, try this to fix the problem. just hold down the power button for ten seconds. If this method doesn't work, try to press the power button for a bit longer. ten seconds should be suitable for most smartphones, Many smartphones have a method to restart usually by holding down specific keys or buttons on the phone. Much like the Sony Experia and Motorola battery pull where you hold the volume down key and power key simultaneously while the mobile is powered off. Try using a laptop or car charger instead can put a quick charge on phone battery and get it to respond as well. If you have tried these methods and phone isn't responsive due to its battery drained 100% Try charging it using a battery booster(12 volts DC adopter with Ampare) this device is used to boost mobile phone batteries.



phone turn on vibrate

If smartphone power on after you boost the phone battery with the battery booster, but boot process fails,



stuck on logo samsung

the phone is freezes on the startup screen, or it immediately reboots or shuts off there is a problem with device's software. In this case, you have to perform a factory reset of your Android smartphone from recovery mode. Note that will erase the data of customer phone to reset it back to phone default software state. you can also use this method when someone smartphone is unusable due to crashing or freezing software.

to perform the factory reset from recovery mode turn the phone off then boot it up with one of the following button combinations:

Hold Volume Up + Volume Down + Power.

Hold Volume Down + Home + Power.

Hold Home + Power.

If none of these button combinations work, try performing a Google search by typing android phone name and hard reset keys to find the correct key combination of customer device. for example (Samsung s3 hard reset keys)



android boot recovery mode

press the key combination until the Recovery mode option appears on the phone screen.



samsung factory reset code

then Select the wipe data/factory reset option.



performing hard reset

Select the Yes to continue.



hard reset screen

if smartphone refuses to switch on normally after performing hard reset try to flash it.



The common software problems are:

- Display problems
- No signal messages

- Dead phone set
- Phone on test mode

Phone not charging

- Phone has message to contact service provider
- Phone hangs, goes off, freezes or has slow processing

How to solve these problem:

- 1. Check the downloaded applications and note when the problem happened.
- 2. Note whether the problem is happening when a certain application is running.
- 3. Remove the application that is causing the problem
- 4. If the problem is still not solved then reset the factory settings of the mobile phone and update the software.

This is the end of our topic on common mobile phone problems or faults.

Congratulations! You have finished the book on cell phone repair and maintenance. Let us review what you have learnt.

Summary

We started this study by identifying the different types of mobile phones. We saw that they include the bar, touch screen, and flip phones to name just a few. We also considered the key hazards and safety precautions associated with the mobile phone repair and servicing. The hazards included: burns, pricks, environmental pollution and falls. We also discussed the factors to consider when selecting tools for mobile phone repair. These factors included cost, suitability and quality of the tools. In addition, we examined the tools used for mobile phone repair, such as solder wire, PCB holder, jump wire, and screw driver. Next we determined the steps that you should follow to disassemble and assemble a mobile phone and how to diagnose mobile phone faults. Lastly, we discussed common hardware and software faults and how to solve them.

Glossary

Hazard

Anything that has potential to cause harm to yourself and all those around you.

A fault	A defect (a failure in a circuit) of an electronic component
Switch	An electrical component that can break an electrical circuit, thereby interrupting the current or diverting it from one conductor to another.
Jumper	Jumpers are small blocks on a circuit board with two or more pins emerging from them.
Boot	To start or restart a mobile device.
Bluetooth	A wireless technology standard for exchanging data over short distances
Driver	A program that operates or controls a particular type of device.
Motherboard	The main board that holds electronic components of the system, (CPU) and memory, and provides connectors for other peripherals.
Diagnose	To identify the nature of a problem by examining the symptoms.
Soldering	A process in which two or more metal items are joined together by melting and flowing a filler metal (solder) into the joint. The filler metal has a lower melting point than the adjoining metal.
Soldering Iron	A tool normally used for applying heat to two or more adjoining metal parts in order for the solder to melt and bind them securely and conductively.
Solder	A fusible metal alloy with a melting point or melting range of 90 to 450 degree Celsius, used in a process called soldering where it is melted to join metallic surfaces.
Disassemble	To take something apart; or to disconnect the pieces of something.
Assemble	To bring things together for a common purpose.
Voltage	The difference in charge between two points or amount of potential energy between two points Voltage is measured in volts which uses the symbol V.
Current	How much electricity is flowing through the circuit. A current is measured in amperes. The symbol for amperes or amps in short is described by the symbol A.
Resistance	How difficult it is for electricity to flow through something. Resistance is measured in ohms.
Reballing	A process where the defective chip is lifted off and repaired by applying lead based solder on the chip and placing it back on the board or replacing the component with a new one while also applying lead based solder on it before soldering it back on the circuit board.

Abbreviations

3G:	3Rd Generation in Mobile Telephony
AC:	Alternate Current.
BGA:	Ball Grid Array
BSI:	Battery Status Indicator
CDMA:	Code Division Multiple Access
CPU:	Central Processing Unit
DCT:	Digital Core Technology
DC:	Direct Current

ESD:	Electro Static Discharge
FM:	Frequency Modulation
GSM:	Global System For Mobile phones
IC:	Integrated Circuit
IMEI:	The International Mobile Station Equipment Identity
LCD:	Liquid Crystal Device
LED:	Light Emitting Diode
MIC:	Microphone
PDA:	Personal Digital Assistant
PCB:	Printed Circuit Board
PFO:	Power Frequency Oscillator
RAM:	Random Access Memory
RTC:	Real Time Clock
SMD:	Surface Mount Device
SIM:	Subscriber identification module