Skill India
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GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP

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National Skill Development Corporation
Transforming the skill landscape

Telecom Sector Skill Council

Facilitator Guide



Handheld Devices (Mobile & Accessories) Technician

Sector
Telecom

Sub-Sector
Handset

Occupation
Customer Service-Handset Segment

Reference ID: TEL/Q2201, Version 5.0
NSQF Level: 4

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“Skilling is building a better India. If we have to move India towards development then Skill Development should be our mission.”

Shri Narendra Modi
Prime Minister of India

Acknowledgements

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The preparation of this guide would not have been possible without the Telecom Industry’s support. Industry feedback has been extremely encouraging from inception to conclusion and it is with their input that we have tried to bridge the skill gaps existing today in the Industry.

This facilitator guide is dedicated to the aspiring youth who desire to achieve special skills which will be a lifelong asset for their future endeavors.

About this Guide

India is the second-largest telecom market globally, with over 1.20 billion (120 crore) subscribers as of May 2025. The sector continues to witness strong growth, driven by rising smartphone penetration, rapid rollout of 5G services, and various government-led digital initiatives.

The telecom sector is also a major employment generator in the country. While employment figures are dynamic, the draft National Telecom Policy envisions the creation of nearly 10 lakh (1 million) new jobs by 2030. With the expansion of 5G networks and adoption of emerging technologies, employment opportunities in this sector are expected to further increase. Consistently, telecom remains among the top five sectors contributing to employment generation in India.

This Facilitator Guide supports the delivery of training for the Handheld Devices (Handset & Tablet) Repair Technician role. The programme is designed to impart both theoretical knowledge and practical skills required to meet industry standards. Learners trained under this programme are expected to competently handle:

The training content is aligned with the Handheld Devices (Handset & Tablet) Repair Technician Qualification Pack (TEL/Q2201) and covers the following National Occupational Standards (NOSs):

1. TEL/N2213 – Perform basic hardware and software repair of Android mobile phones and iPhones
2. TEL/N2214 – Perform basic hardware and software repair of Android tablets and iPads
3. TEL/N2218 – Perform basic hardware and software repair of Windows laptops, MacBook, and mobile accessories
4. TEL/N9108 – Follow sustainability practices in telecom operations
5. DGT/VSQ/N0102 – Employability Skills (60 Hours)

The Key Learning Outcomes (KLOs) and skill requirements are clearly defined within their respective units. Facilitators should ensure that participants gain adequate hands-on exposure alongside conceptual understanding.

This programme aims to equip trainees with industry-relevant competencies and support facilitators in guiding learners towards building a sustainable and attractive career in the telecom industry.

Symbols Used


Steps


Time


Tips


Notes


Objectives


Do

Ask


Explain


Elaborate


Field Visit


Practical


Lab


Demonstrate


Exercise


Team Activity


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Learning Outcomes


Say


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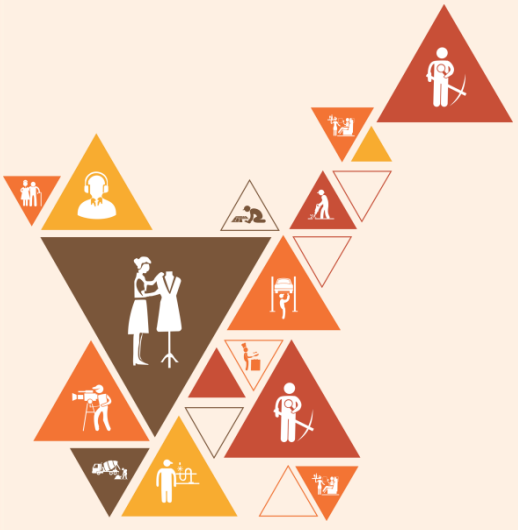
1. Roles and Responsibilities of a Handheld Devices (Handset & Tablet)Technician

Unit 1.1 – About telecom Industry

Unit 1.2 – About cell phones



Key Learning Outcomes

Key Learning Outcomes

At the end of this module, you will be able to:

1. Know your fellow participants and understand training norms
2. Know about the telecom market in the country and some mobile phone vendors
3. Learn about the evolution of cell phones
4. Know and understand about how mobile communication and cell phones work
5. Learn about the role of a handset repair engineer

Unit 1. Role & Responsibilties of a Handheld Devices(Handset & Tablet Technician

Unit Objectives

At the end of this unit, you will be able to:

1. Introduce each other
2. Build rapport with fellow students and the trainer
3. Map participant's expectation from the training program
4. Share program agenda

Resources to be Used

- Available objects such as a duster, pen, notebook, etc.
- Flip charts.

Say

- A very good day to all of you.
- As you all know, we have got together here to attend a training designed especially for helping you to be a successful 'Handset Repair Engineer'.
- Before that let us introduce ourselves.

Do

- Make the students stand in a circle, close enough to each other so that they can pass the parcel quickly.
- Say 'Stop' when the students least expect it. The person who has the parcel at that time should get out.
- Those who get out should introduce themselves by providing their names and a little additional information such as favorite hobbies, likes and dislikes.
- The winner of the game should stand and introduce himself/herself at the end of the game.

Say

- Thank the students for their participation.
- Introduce your-self to the students.
- At the start of any journey it is natural to have expectations.
- Hence let us capture your expectations from the program.

Notes for Facilitation

- You could ask the students who get out during the game to be the music keepers. They can start and stop the music as the game progresses.
- Encourage shy students to provide information about themselves by prompting them with questions such as ‘what do you enjoy doing the most’, ‘what is your favorite movie or book’, etc.
- While introducing ensure the following guidelines - work experience, industry, etc.

Do

- This is a team exercise and each team needs to prepare a presentation (using a flip chart).
- Each team presentation should cover; what as a team they expect to gain from the workshop?
- Teams to use flip-chart for their presentation.
- Share program outline with the participants.

Notes for Facilitation

- Each team to take not more than 5 minutes to prepare their respective presentations.
- Each team to take not more than 2-3 minutes to present.
- Share the program outline with the participants and link it with program expectations.
- This helps in creating an interest in the participants.

UNIT 1.1: About Telecom Industry

Unit Objectives

At the end of this unit, you will be able to:

1. Explain and outline the growth and opportunities in the Indian telecom industry
2. List some popular mobile phone vendors in the country
3. Explain and outline the role of a handset repair engineer

Notes for Facilitation

- You could ask the students what they know about telecom industry in India.
- Give students some time to think about how the telecom industry has changed in the last five years.
- Set the context and describe the industry trends in telecom industry.
- Allow the students to list some popular mobile handset companies in India.

UNIT 1.1.: Telecom Industry at a glance

Say

- Before we learn the skills, which will help us, do our jobs really well. It is essential that we understand the telecom market and the history of telecom growth in India.
- India today is the second fastest growing economy in the world
- Liberalization in the 1990s resulted in an improved business climate and an increased investment across the country.
- India has more than 700 million subscribers with a tele-density of more than 60%.
- Telecom is still a high potential sector, and hence requires more attention and policy frame-work

Do

- Refer to the relevant pages in the hand book and share it with the participants.-1.1.1
- Share with the participants about telecom Industry Growth – benefits accrued-1.1.1
- Share with the participants about Indian telecom history.
- Share with the participants about Indian telecom history – growth.
- Share with the participants about Indian Telecom Growth – urban & rural.
- Share with the participants about Indian Telecom – drivers of affordability.
- Share with the participants about Indian Telecom model.
- Share with the participants about key merger and acquisitions by Indian firms.
- Share with the participants about Indian Telecom Regulatory Authority - TRAI.

UNIT 1.2: About Cell Phones

Unit Objectives

At the end of this unit, you will be able to:

1. List and outline the changes in technology of a cell phone over the years
2. Explain and outline how a mobile phone work over a network
3. Explain what goes on inside the handset during mobile communication
4. List and explain common features and uses of mobile phone
5. List and explain some popular mobile phone platforms

Say

- Mobile phone design, utility and their popularity has witnessed a sea-change over the years.
- There has been a revolution of sorts in the mobile phone industry as the handsets moved from having simple features like call and text, to the smartphones of today.
- Even consumer demands have also undergone a sea-change from a simple voice, SMS requirement to mobile phones loaded with camera, and data handling capabilities. Today the consumer demands something new almost on a daily basis.

Notes for Facilitation

- You could ask the students what they know about history of growth of mobile phones.
- Set the context and enquire what do you think goes inside a mobile handset.
- Set the context and enquire about the functioning of a mobile phone.
- Set the context and enquire about the common features and uses of a mobile phone.
- Enquire about some of the popular and common mobile phone platforms.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Refer to the relevant sections on page 10 and 11 of the participant's hand book.
- Conduct a quick quiz in order to test the participants understanding and move on to the next section.

Answers to exercises for PHB

1. Which of the following phone uses iOS:

Ans : d. All of the above

2. Which is not a mobile handset vendor in the list below:

Ans. a.Maruti (its a car brand)

3. The National Telecom Policy aimed at making available:

Ans a. Telephone on demand

4. Which of the following attributes are required for a handset repair engineer:

Ans: d. All of the above

5. Handset repair engineer is responsible for:

Ans d. Both a & b

6. Which of these is not part of the KRA of a handset repair engineer:

Ans: b. Pay customer bills

7. What gets affected in a handset because of poor network connectivity:

Ans c. Ringer

8. Identify the incorrect statement about SMS:

Ans a. Max permissible length is 160 characters

9. Which of the following is true about TDMA:

Ans b. A certain portion of time is assigned to each cell on a designated frequency

10. Which of the following is true about CDMA:

Ans c. Spreads each call over the available frequencies after giving it a unique code.

Answers to Exercises for PHB

11. Mention the KRA of Handheld Devices(Handset & Tablet) Technician
Ans: Refer Page No. 14, KRA of a Handset Repair Engineer

12. Explain the concept of CDMA
Ans: Refer Page No.18 CDMA

13. what happens when we make a mobile call?
Ans: Refer Page No. 17 How a cell phone work.

14. Write briefly about the four popular mobile platforms.
Ans: Refer Page No. 22 Popular mobile platforms

15. Explain the concept of TDMA.
Ans: Refer Page No. 18 TDMA

16. Name a few mobile phone vendors in India
Ans: Refer Page No. 11 Handset Vendors in India

17. What is mobile banking?
Ans: Refer Page No. 20 Popular uses of mobiles phones

18. Write about some features of a cell phone.
Ans: Refer Page No. 19 common features of mobiles phones

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2. Basic Hardware and Software Repair of Android Mobile Phones, Tablets, iPhones and iPads

Unit 2.1 – Prepare for repairing a handset

Unit 2.2 – Basic electronics of a mobile phone

Unit 2.3 – Resetting a phone

Unit 2.4 – Fixing the firmware

Unit 2.5 – Hardware repair tools

Unit 2.6 – Basic trouble shooting

Unit 2.7 – Safety guidelines

Unit 2.8 – Report and document daily activities

TEL/N2213

Key Learning Outcomes

Key Learning Outcomes

At the end of this module, students will be able to:

1. prepare handsets for repairing
2. Identify and understand the basic electronics of a cell phone
3. Identify the various parts and components that make up a mobile handset
4. Identify and use common handset repair tools
5. Disassemble a mobile phone
6. Troubleshoot a handset for common problems
7. Identify and understand various safety precautions to take while repairing a handset
8. Learn about the radiation safety laws for mobile handsets in India

UNIT 2.1: Prepare for repairing a handset

Unit Objectives

At the end of this unit, students will be able to:

1. Identify the faulty devices
2. Assist your supervisor in analyzing problems reported by the customer team
3. Understand the importance of adhering to the SLA
4. Identify the costs of repair
5. Understand the formation of alternating and direct current

Resources to be Used

- Available objects such as white board, duster, marker pen, notebook, projector and other teaching aids, multimedia kit
- Presentation slides

Notes

- In this unit, we will discuss about how to prepare the handset for repairing

Say

- Good morning and welcome back to this training program on Handheld Devices(handset & Tablet)Technician

Ask

- Ask the students if they have ever visited a repair centre for repairing their mobile phones
- what kind of problems they have faced with their phones.

Say

- Tell them that in this chapter they will learn how to prepare for repairing a handset
- while repairing they have to adhere to the safety guidelines and the standard operating procedure for repairing as per the manufacturer
- wear safety protective kit while repairing the mobile devices.

Notes for Facilitation

- give the steps for fault rectification to the students.
- first step is to identity the fault in the device and record the information
- follow the standard procedure for fault rectification.
- Adhere to the recommended practices listed by the mobile phone manufacturer for each
- model.
- Wear ESD wrist straps or aprons and take anti-static precautions before working.
- adhere to standard operating procedures while handling PCB.
- Use the brand's suggested tools for repairing

Elaborate

- Explain to the participants about the SLA(Service Level Agreements)
- Importance of adhering to the SLA's and prioritizing the activities related to delivery timeline
- explain the priority matrix to students
- explain price standardization and the term BER (beyond economic repair)
- importance of recording customer details
- inspect the repair area and keep it clean
- equipment calibration process
- software versions/modules and basic software commands

UNIT 2.2: Basic Electronics of a Mobile Phone

Unit Objectives

At the end of this unit, students will be able to:

1. Identify and classify various electronic components that are used in mobile handsets

Notes

- In this unit, we will discuss about the different components of a mobile handsets

Say

- Good morning and welcome back to this training program on Handheld Devices(handset & Tablet)Technician

Ask

- Ask the students if they can name the different parts of the mobile phone.

Notes for Facilitation

- You could ask the students what they know about the basic electronics of a mobile phone.
- Give students some time to think about the various card level parts and their function.
- Set the context and enquire about the PCB that is there in a mobile phone.
- Give students some time to think about the various types of electric circuit.
- Give students some time to think about the SMD (Surface Mounted Device) resistor, capacitor IC etc., which are mounted.
- Give students time to think about the various circuit symbols, electric power and earthing.

2.2.1: Architecture of a Mobile Handset

Ask

- Ask the students about their understanding of a mobile phone's architecture.
- Ask them to work in their respective teams and identify the various component of a mobile phone.

Say

- Having understood the telecom industry and the handsets, it's time to discuss the architecture of a mobile handset.
- Handset comprises of various components and we will talk about the same.

Do

- Share with the help of the hand book the architecture of a mobile phone.
- Microprocessor, ROM, RAM, digital signal processor, radio module.
- Microphone and speaker, hardware interfaces and LCD display.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the positioning of various parts and sections in detail.
- Refer to the relevant sections on page 24, 25 and 26 of the participant's hand book.
- Conduct a quick quiz in order to test the participants understanding and move on to the next section.

Demonstrate

- Demonstrate the architecture of a mobile set to the students.
- Demonstrate the various components like RAM, ROM digital signal processor, radio module.
- Demonstrate microphone and speaker, hardware interfaces and LCD display.

2.2.2: The PCB

Ask

- Ask the students about what do you understand by PCB in a mobile phone.
- Ask the students what does the word PCB stands for.

Say

- In this session we would learn about the PCB with respect to the mobile phones.
- The word PCB stands for – Printed Circuit Board.

Do

- Share with the help of the hand book the positioning of the various parts and sections of PCB in detail.
- Antenna point and switch.
- Network section and Power Frequency Oscillator (PFO) and network IC.
- Power section and power IC, CPU.
- Flash IC, Logic IC, charging IC and audio IC.
- SMD - Resistor, Capacitor, Coil and Transformer.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the positioning of various parts and sections in detail.
- How each section is connected and how do they get power, etc., in detail.
- Refer to the relevant sections on page 26 and 27 of the participant's hand book.
- Conduct a quick quiz in order to test the participants understanding and move on to the next section.

Demonstrate

- Demonstrate Antenna point and switch.
- Demonstrate power section and power IC, CPU.
- Demonstrate flash IC, logic IC, charging IC and audio IC.
- Demonstrate SMD - Resistor, Capacitor, Coil and Transformer.

2.2.3: Card Level Parts

Ask

- Ask the students about what do you understand by the various card level parts in a mobile.
- Ask the students what are card level parts.

Say

- In this session we would learn about the various card level parts inside the mobile phone.
- The word card level parts include – speaker, microphone, vibrator, etc.

Do

- Share with the participants details about the various card level parts.
- Front fascia, back fascia and internal fascia.
- Ringer or loudspeaker, speaker also called earpiece and microphone.
- Vibrator, Light Emitting Diode (LED), charging connector.
- Headphone or earphone connector, data cable connector, battery and battery connector.
- Memory card connector, camera and camera connector.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the positioning of various parts and sections in detail.
- How each section is connected and how do they get power etc. in detail.
- Refer to page 28-29 of the participant's hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate front fascia, back fascia and internal fascia.
- Demonstrate ringer or loudspeaker, speaker also called earpiece and microphone.
- Demonstrate vibrator, Light Emitting Diode (LED), charging connector.
- Demonstrate headphone, connector, data cable connector, battery and battery connector.
- Demonstrate memory card connector, camera and camera connector.

2.2.4: The Big Parts and Functions

Ask

- Ask the students about what do you understand by the various big parts in a mobile.
- Ask the students what are the function of big parts.

Say

- In this session we would learn about the various big parts inside the mobile phone.
- In this session we would learn about the functions of the big parts inside the mobile phone.
- We will also learn what happens when these parts become faulty.

Do

- Share with the participants details about the various big parts and their functions and what if they become faulty.
- Antenna Switch is found in the Network Section of a mobile phone. It searches network and passes forward after tuning. Faulty Antenna Switch means no network in the mobile phone.
- P.F.O is found near the Antenna Switch. It filters and amplifies network frequency and selects the home network. Faulty PFO means no network in the mobile phone. If it gets short then the mobile phone will turn dead.
- RF IC / Network IC is found near the PFO and works as transmitter and receiver of audio and radio waves, as per instructions from the CPU. Faulty RF IC means network problem in the mobile phone. Sometimes the mobile phone can even get dead.
- 26 MHz Crystal Oscillator is found near the PFO and creates frequency during outgoing calls. Faulty crystal means no outgoing calls and no network.
- VCO: It is found near the Network IC and sends time, date and voltage to the RF IC and the CPU. Faulty VCO means no network in the mobile phone and it will display “Call End” or “Call Failed”.
- RX Filter: It is found in the Network Section of a Mobile Phone and filters frequency during incoming calls. Faulty filter means network problem during incoming calls.
- TX Filter is found in the Network Section of a Mobile Phone and filters frequency during outgoing calls. Faulty filter means network problem during outgoing calls.
- ROM is found in the Power Section of a Mobile Phone and loads current operating program in a Mobile Phone. Faulty ROM means software problem in the mobile phone and it will turn dead.

Do (Cont.)

- RAM is found in the Power Section of a Mobile Phone - sends & receives commands of the operating program in a mobile phone. Faulty RAM means software problem in the mobile phone and it will frequently get hanged or even get dead.
- Flash IC is found in the Power Section of a Mobile Phone. Mobile phone software is installed in the Flash IC. Faulty flash means the mobile phone will malfunction and can turn dead.
- Power IC is found in the Power Section of a Mobile Phone. It takes power from the battery and supplies to all other parts of a mobile phone. Faulty Power IC means then the set will turn dead.
- Charging IC is found in the Power Section near R22. It takes current from the charger and charges the battery. Faulty Charging IC means the set will not get charged, it will even turn dead if the Charging IC is short.
- RTC (Simple Silicon Crystal) - Real Time Clock is found in the Power Section near Power IC. It helps to run date & time in a mobile phone. Faulty RTC means there will be no date or time in the mobile phone and the set can even turn dead.
- CPU is found in the Power Section and controls all sections of a mobile phone. Faulty CPU means the mobile phone will turn dead.
- Logic IC / UI (user interface) IC is found in the power section of a mobile phone & controls the Ringer, Vibrator and LED. Faulty Logic IC means Ringer, Vibrator and LED of mobile phone will malfunction.
- Audio IC is found in Power Section of a mobile phone & controls Speaker and Microphone of a mobile phone. Faulty Audio IC means Speaker and Microphone of a mobile phone will malfunction or can even turn dead.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the positioning of various big parts and their functions in detail.
- What happens when a big part fails?
- Refer to page 30-31 of the participant's hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate antenna switch and PFO of a mobile.
- Demonstrate network IC and 26 MHz crystal oscillator of a mobile.
- Demonstrate VCO and RX Filter of a mobile.
- Demonstrate TX filter, RAM, ROM and flash IC of a mobile.
- Demonstrate power & charging IC, RTC, CPU and logic & audio IC of a mobile.

2.2.5: The Small Parts and Functions

Ask

- Ask the students about what do you understand by the various card small parts in a mobile.
- Ask the students what are the function of small parts.

Say

- In this session we would learn about the various small parts inside the mobile phone.
- In this session we would learn about the functions of the small parts inside the mobile.

Do

- Share with the participants details about the various small parts and their functions and what if they become faulty.
- Coil is found in any section of a mobile phone - filters & decreases Current, Voltage.
- Boost Coil is a little bigger than coil, its function is to increase current.
- Coupler is found in the Network Section of a Mobile Phone & filters network.
- Non-Electrolytic Capacitor is found in any section of a mobile phone and filters DC current.
- Electrolytic Capacitor is found in any section of a mobile phone & filters and stores current.
- Network Capacitor is found in any section of a mobile phone.
- Rectifier Diode is found in black color and converts AC Current to DC Current.
- LED is found in white or light yellow color and emits light.
- Zener Diode is found in charging section and acts as voltage regulator.
- Photo Diode is used for Infrared.
- Chip Resistance is found in any section of a mobile phone. It decreases current and passes forward.
- Network Resistance can be found in any section of a mobile phone.

Do (Cont.)

- Regulator component is found in any section of a mobile phone. It filters current and regulates voltage.
- Transistor is found in any section of a mobile phone and does the work of switching.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the positioning of various small parts and their functions in detail.
- Refer to page 32-33 of the participant's hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate Coil, coupler and capacitor of a mobile.
- Demonstrate various diodes and LED of a mobile.
- Demonstrate Resistor of a mobile.
- Demonstrate Regulator and transistor of a mobile.

2.2.6: Electrical Circuits and its Types

Ask

- Ask the students about what are the various electrical power, electrical earthing.
- Ask the students what are the different types of electrical circuits.

Say

- In this session we would learn about electrical circuit.
- In this session we would learn about different types of electrical circuits.

Do

Share with the participants details about the electrical circuits and their types:

- Electrical power.
- Electrical earthing.
- Types of electrical circuits - close circuit, open Circuit, short circuit, series circuit and parallel circuit.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the electrical power & earthing, and also different types of electrical circuits.
- Refer to page 34-35 of the participant's hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

2.2.7: Surface Mounted Device - Resistor

Ask

- Ask the students about what do you understand by SMD.
- Ask the students what are the different types of SMD device - resistor.

Say

- In this session we would learn about SMDs.
- In this session we would learn about different types of SMD device - resistor.

Do

- Share with the participants details about the SMD resistor.
- It is the obstruction created by any matter in the flow of electric current.
- Unit of resistance is Ohm and the unit of power rating is Watt.
- Share a few important things about resistor like – a resistor never gets short, it can be open.
- Also share that the value of resistor can be high and is available mostly without code in mobile phones). R and E denotes Ohms.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss SMD resistors.
- Refer to page 36 of the participant's hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate SMD resistors.
- Demonstrate different types of SMD resistors that are used in mobile phones.

2.2.7.1: Resistor Rating

Ask

- Ask the students about what do you understand by the rating of a resistor.
- Ask the students what are the ways of rating a resistor.

Say

- In this session we would learn about how the resistor ratings are marked and interpreted.
- In this session we would learn about different standard practices used for the purpose.

Do

- Share with the participants details about the marking and interpretation of ratings.
- < 1000 ohms or 1K with an ''R'' indicates a decimal point - “R.
- Resistors have a three-digit code marked, the first two digits represent two significant digits value and the third digit represents power of 10.
- "000" and "0000" sometimes appear as values on surface-mount zero-ohm links.
- Resistances less than 100 ohms are written: 100, 220, 470. The final zero represents ten to the power zero.
- Resistances < 10 ohms have 'R' to indicate decimal point’s position.
- Precision resistors are marked with a four-digit code, in which the first three digits are the significant figures and fourth is the power of 10.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss how the resistor ratings are marked interpreted.
- Refer to page 37 of the participant’s hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

2.2.8: Surface Mounted Device - Capacitor

Ask

- Ask the students about what do you understand by SMD.
- Ask the students what are the different types of SMD device - capacitor.

Say

- In this session we would learn about SMDs.
- In this session we would learn about different types of SMD device - capacitor.

Do

- Share with the participants details about the SMD capacitor.
- A capacitor is an electronic component made up of an insulator between two conductors.
- Its main function is to store electrical energy and resupply, its unit is ‘farad’.
- Types of capacitors – polarized, non-polarized and their respective characteristics.
- The use of polarized, non-polarized capacitors.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss SMD capacitors.
- Refer to page 38 of the participant’s hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate SMD resistors.
- Demonstrate different types of SMD resistors that are used in mobile phones.

2.2.9: Surface Mounted Device – Integrated Circuit

Ask

- Ask the students about what do you understand by SMD.
- Ask the students what are the different types of SMD device – ICs (Integrated Circuits).

Say

- In this session we would learn about SMDs – ICs (Integrated Circuits).
- In this session we would learn about different types of SMD device – ICs (Integrated Circuits).

Do

- Share with the participants details about the SMD ICs (Integrated Circuits).
- An IC is an electronic component made up of combination of several other electronic components like resistor, capacitor, transistor, etc.
- Types of capacitors – leg types and ball types.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss SMD ICs (Integrated Circuits).
- Share the methodology of counting of leg type IC and counting of ball type IC.
- Refer to page 39 of the participant's hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate SMD ICs (Integrated Circuits).
- Demonstrate different types of SMD ICs (Integrated Circuits) that are used in mobile phones.
- Demonstrate to the participants the counting of leg type IC and Ball type IC.

2.2.10: Surface Mounted Device - Filters

Ask

- Ask the students about what do you understand by SMD – Filters.
- Ask the students what are the different types of SMD device - Filters.

Say

- In this session we would learn about SMDs - Filters.
- In this session we would learn about different types of SMD device - Filters.

Do

- Share with the participants details about the SMD Filters.
- Filters are analogue circuits which perform signal processing functions, specifically to remove unwanted frequency components from the signal, to enhance wanted ones, or both.
- There are various types of filters – low pass, high pass, band pass and band stop filters.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss SMD filters.
- Discuss with the participants the different types of filters.
- Refer to page 40 of the participant's hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate SMD Filters.
- Demonstrate different types of SMD Filters that are used in mobile phones.

2.2.11: Identifying Circuit Symbols

Ask

- Ask the students about what do you understand by circuit symbols.
- Ask the students what are the different types of circuit symbols.

Say

- In this session we would learn about common circuit symbols.

Do

- Share with the participants details about the common circuit symbols.
- Share symbols such as diode, capacitor, inductor, resistor, AC or DC voltage source.
- Share symbols such as AND gate, NAND gate, OR gate, NOR gate, XOR gate, inverter gate.
- Share about coil, crystal, LED, transistor, fuse, regulator.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss common circuit symbols.
- Discuss with the participants the different types of circuit symbols.
- Refer to page 41 of the participant's hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

2.2.12: Electrical Power and Earthing

Ask

- Ask the students about what do you understand by electrical power.
- Ask the students, what do you understand by earthing.

Say

- In this session we would learn about electrical power.
- In this session we would learn about earthing.

Do

- Share with the participants, details about the electrical power that it is a function of voltage multiplied by current.
- In three pin plug two pins are used for phase and neutral, the third central pin is used for earthing. Earthing pin is fitted to the upper part of the device and sends current leakage into the earth, unwanted frequency components from the signal, to enhance wanted ones, or both.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss electrical power and earthing.
- Discuss with the participants the use of earth pin.
- Refer to page 42 of the participant's hand book.
- Conduct a quick quiz to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate a three pin plug and the earth-pin.
- Demonstrate the movement of electrical meter (both analogue and digital) to ensure understanding of electrical power.

UNIT 2.3: Resetting a phone

Unit Objectives

At the end of this unit, students will be able to:

1. reset a phone to its original factory settings
2. download apps and set-up email accounts on a handset

Resources to be Used

- Available objects such as white board, duster, marker pen, notebook, projector and other teaching aids, multimedia kit
- Presentation slides

Notes

- In this unit, we will discuss about how to reset a phone to its original factory settings and also download apps and set up e-mail accounts

Say

- Good morning and welcome back to this training program on Handheld Devices(handset & Tablet)Technician

Ask

- Ask the students if they have ever restored the phone to factory settings
- what kind of apps they have downloaded in their android or IoS phones.
- Are they accessing their mails using their handset, if yes, then how? what software they are using

Say

- Tell them that in this chapter they will learn the need for resetting a phone and how to restore the factory settings.
- tell them that they will also learn from where and how to download apps safely and install them in their handsets

Notes for Facilitation

- Elaborate the need for resetting a phone.
- explain what will happen to the data, and the apps when the phone is restored to its factory settings.
- give them the steps for resetting different phones like apple, android phones, blackberry phones and windows phones.
- explain what are mobile apps, and from where they can download the apps which they need, as the different phones use different locations to access the apps. like android phones can download from google playstore and apple phones from applestore etc.
- Explain some are free apps and some are paid apps.

Elaborate

- You may need to reset cell phone to correct malfunctions e.g., freezing, slowness, etc., to restore the phone to its original state.
- Steps for resetting a mobile will vary based on the make and model of the mobile.
- All personal data will invariably be removed if a mobile is reset.
- It will restore the phone back to its original factory settings, and the phone will be in a state like how it was when they bought the new phone.
- once the handset is restored to factory settings all the apps will get removed.
- or when you purchase a new phone, you may need these apps. Hence they are downloaded from google play store(for android phones) and applestore(for apple phones) as the case may be.
- explain the steps for downloading apps and creating their login credentials with an easy to remember password

UNIT 2.4: Fixing the firmware

Unit Objectives

At the end of this unit, students will be able to:

1. Outline and explain the role of firmware in a handset
2. Demonstrate the steps to install a new firmware

Resources to be Used

- Available objects such as white board, duster, marker pen, notebook, projector and other teaching aids, multimedia kit
- Presentation slides

Notes

- In this unit, we will discuss about how what is a firmware, how is it important for a handset functioning and how to install the same.

Say

- Good morning and welcome back to this training program on Handheld Devices(handset & Tablet)Technician

Ask

- Ask the students if they have ever heard about the files in ROM of a laptop/desktop computer.
- ask them what they think is making the programs work in a laptop/desktop or a handset?

Say

- Tell them that firmware is Firmware is a software that controls individual parts of the phone.
- Each mobile phones has a unique firmware version and a specific software is used to access it
- Firmware reside in the RoM of a handset (i.e read only memory)
- it requires a technical skills to remove or install the software programs installed in a RoM

Notes for Facilitation

- Explain the firmware, software, RoM and RAM.
- Explain the phone software is useless without the firmware
- the process of installing a firmware is called flashing
- give them a demo of how to install the firmware

Elaborate

- every handset requires the firmware for smoothly running the hardware and software of the handset
- explain what is firmware, and show them the demo of installing it
- steps to flash a mobile phone

UNIT 2.5: Hardware Repair Tools

Unit Objectives

At the end of this unit, students will be able to:

1. Use common tools to repair mobile handsets

Notes for Facilitation

- You could ask the students what they know about the basic tools to repair a mobile phone.
- Give students some time to think about the various tools and their function.
- Set the context and at the same time ask the students to prepare a list of tools.

2.5.1: List of Common Repair Tools

Ask

- Ask the students about their understanding of tools that are used to repair a mobile phone.
- Ask them to work in their respective teams and identify the various and their respective functions in repairing a mobile phone.

Say

- Having understood the telecom industry, handsets, and the architecture of a mobile handset let us identify and list the tools used and their respective purpose.

Do

- Share with the help of the hand book the tools used in repairing of a mobile phone.
- Soldering Iron, Soldering Station, Solder Wire.
- PCB Cleaner, Jumper Wire, Blade Cutter, Point Cutter, Nose Cutter.
- Precision screwdriver, Tweezers, Brush, Multi-meter, Battery Booster, Ultrasonic Cleaner.
- Magnifying Lamp, Mobile Opener, DC Power Supply, Liquid Flux & Paste Flux, Solder Paste.
- Cleaning Sponge, De-soldering Wire, Screwdriver Kit, LCD Tester, Microscope, Test JIG Box.
- Wrist Strap, antistatic Hand Gloves, Antistatic Mat & Apron, Smoke Absorber, Battery tester.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the various tools and their use in detail.
- Refer to page 43 of the hand book.
- Conduct a quiz in order to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate the various tools to the students.
- Demonstrate their use and explain their purpose.
- Also ask the students to demonstrate the appropriate use of tools in groups.

2.5.2: Soldering Iron

Ask

- Ask the students about their understanding of the tool- soldering iron.
- Ask them to work in their respective teams and identify the use of a soldering iron.

Say

- Having understood the various tools let us identify a soldering iron along with its purpose.

Do

- Share with the help of the hand book the tool - soldering iron.
- Also share with the students the purpose of a soldering iron.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the positioning of various tools and discuss their use in detail.
- Refer to page 44 of the hand book.
- Conduct a quiz in order to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate soldering iron to the students.
- Demonstrate its use and explain their purpose.
- Also ask the students to demonstrate the appropriate use of a soldering iron.

2.5.4.1: Soldering

Do

- Welcome and greet the participants. Revise the learning of the previous sessions and ask them if they have any doubts.

Say

- Having understood soldering iron and its purpose let us see how soldering is performed.
- Also let us see the use of soldering while repairing a mobile phone.

Do

- Soldering is a process in which two or more metal items are joined together.
- Joining happens by melting and flowing a filler metal into the joint.
- The filler metal has a relatively lower melting point and helps in joining the two together.

Demonstrate

- Demonstrate the benefits of soldering to the students.
- Demonstrate to the students the five steps of soldering.
- Share with the students the basic precautions while performing soldering.

Steps: Soldering

STEP 1– Clean the soldering iron tip, till it shines by melting solder on it and wiping it off with the damp sponge.
STEP 2– Touch the tip of the soldering iron to the connection to be soldered for a few seconds to heat it up. Make sure the iron touches both the connector pin and the circuit board trace.
STEP 3– Touch the solder wire to the heated connection and allow it to flow onto it. Do not touch the solder directly to the soldering iron itself.
STEP 4– Let the connection cool. Blow on it to cool it faster.
STEP 5– Clean any excess flux or residue from the solder joint with the non-metallic brush solvent.

Summarise

- Refer to page 81 of the hand book.

2.5.4.2: De-Soldering

Do

- Welcome and greet the participants. Revise the learning of the previous sessions and ask them if they have any doubts.

Say

- Having understood soldering and its purpose let us see how de-soldering is performed.
- Also let us see the use of de-soldering while repairing a mobile phone.

Do

- De-soldering is the removal of solder and components from a printed circuit board.
- De-soldering is often performed for troubleshooting and replacement.

Demonstrate

- Demonstrate the benefits of de-soldering to the students.
- Demonstrate to the students the steps of de-soldering.
- Share with the students the basic precautions while performing de-soldering.

Steps: De-Soldering

STEP 1– Use a solder wick (finely braided copper) to wick away excess solder from a de-soldered connection.

STEP 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.

Summarise

- Refer to page 82 of the hand book.

2.5.5: Access, Cutting and Cleaning Tools

Ask

- Ask the students about their understanding of the access, cutting and cleaning tools.
- Ask them to work in their respective teams and identify the use of these tools.

Say

- Having understood the previous section let's now understand access, cutting and cleaning tools.

Do

- Share with the help of the hand book access, cutting and cleaning tools.
- PCB holder.
- Blade cutter, point cutter and nose cutter.
- Precision screw driver, tweezers and brush.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the access, cutting and cleaning tools and discuss their use in detail.
- Refer to page 46-47 of the hand book.
- Conduct a quiz in order to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate access, cutting and cleaning tools to the students.
- Demonstrate its use and explain their purpose.
- Also ask the students to demonstrate the appropriate use of these tools.

2.5.6: Multi-Meter

Ask

- Ask the students about their understanding of the multi-meter.
- Ask them to work in their respective teams and identify the use of multi-meter.

Say

- Having understood the previous section let's now understand multi-meter.

Do

- Share with the help of the hand book multi-meter.
- Multimeter is a device with the ability to measure voltage, current and resistance.
- It is used to test and check readings of various parts and components of a cell phone.
- A multimeter whether digital or analog has two wires (also called probes).
- In electronics, always red is positive and black is negative.
- Precautions while using a multi-meter.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the multi-meter and its use in detail.
- Refer to page 48 of the hand book.
- Conduct a quiz in order to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate multi-meter to the students.
- Demonstrate its use and explain their purpose.
- Also ask the students to demonstrate the appropriate use of multi-meter Also ask the students to demonstrate the appropriate use of these tools.

2.5.6.1: How to Check Battery with a Multimetre?

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- Having understood multimetre and its purpose.
- Also let us see the use of mutimeter in checking the battery of a mobile phone.

Demonstrate

- Demonstrate to the students the steps of checking a battery.
- Demonstrate to students in case the phone is not powering on or the battery drains quickly.
- Share with the students the basic while performing checking the battery of mobile phones.

Steps: Checking Battery with a Multi-Meter

STEP 1– Switch off the cell phone and remove the battery.

STEP 2– Read the label of the battery for its given voltage. Most cell phone batteries and tablets are of either 3.7V or 3.8V.

STEP 3– Place the battery such that its terminals face you.

STEP 4– Put the multi-meter on DC Volt setting. Keep the setting on the number above the actual voltage of the battery.

STEP 5– Touch the tip of the red probe of the multi-meter on the terminal of the battery named '+'and touch the tip of the black probe on the terminal named '-'

STEP 6– Keep touching the probes touched until you see a stable reading on the multi-meter display. And check the reading to diagnose the problem whether the battery is drained, faulty or charged.

Summarise

- Refer to page 86 of the hand book.

2.5.6.2: How to Measure DC Current with a Multimetre?

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- Having understood multimetre and its purpose.
- Also let us see the use of mutimeter in measuring DC current.

Demonstrate

- Demonstrate to the students the steps of measuring a DC current with the help of a multi-meter.
- Share with the students the basic while performing measuring the DC current in mobile phones.

Steps: Measuring DC Current with a Multi-Meter

STEP 1–Fit BLACK probe in COM and RED probe in mÃ/Ã plug.
STEP 2–Select current position in DCA range by rotary selector switch.
STEP 3–Switch OFF the power supply of the circuit.
STEP 4–Connect the probe of the meter with the circuit in series.
STEP 5–Switch ON the power supply of the circuit and read the ampere value on the display.

Summarise

- Refer to page 87 of the hand book.

2.5.6.3: How to Check Shorting with a Multimetre?

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- Having understood multimetre and its purpose.
- Also let us see the use of mutimeter in order to check shorting in a mobile phone.

Demonstrate

- Demonstrate to the students the steps to check shorting with the help of a multi-meter in case the mobile phone is dead.
- Share with the students the basics in order to check shorting in mobile phones.

Steps: Check Shorting with a Multi-Meter

STEP 1– Keep the multimeter on continuity setting (also called diode setting).
STEP 2– Identify the positive and negative terminals of the battery connector.
STEP 3– Touch the red probe (+) of the multimeter on the GND pin and black probe (-) on vBat pin.
STEP 4– If you see any reading on the multimeter or hear a continuous beep sound, then the motherboard is short i.e., your mobile phone is short. If there is no reading or no continuous beep sound, the board is not short.

Summarise

- Refer to page 88 of the hand book.

2.5.6.4: How to Check Ringer with a Multimetre?

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- Having understood multimetre and its purpose, let us see the use of mutimeter in order to check ringer in a mobile phone.

Demonstrate

- Demonstrate to the students the steps to check ringer with the help of a multi-meter.
- Share with the students the basics in order to check ringer in mobile phones.

Steps: Check Ringing with a Multi-Meter

STEP 1– Switch off the phone and dismantle it.
STEP 2– Remove the ringer.
STEP 3– Keep the multimeter on continuity setting.
STEP 4–Touch the tip of the 2 probes of the multimeter (the red and the black wires) to the 2 terminals (pins) of the ringer. If you hear a beep sound, ringer is good. In case you are unable to hear any beep sound, then the ringer is faulty.

Summarise

- Refer to page 89 of the hand book.

2.5.6.5: How to Check Microphone with a Multimeter?

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- Having understood multimetre and its purpose.
- Also let us see the use of mutimeter in order to check microphone in a mobile phone.

Demonstrate

- Demonstrate to the students the steps to check the microphone with the help of a multi-meter.
- Share with the students the basics in order to check microphone in mobile phones, in case the while talking on mobile phone the other party is unable to your voice.

Steps: Check Microphone with a Multi-Meter

STEP 1– Switch off the phone and dismantle it.
STEP 2– Remove the microphone.
STEP 4– Keep the multimeter on resistance setting (indicated by Ω). Chose 20K or 20KΩ setting.
STEP 5– Touch the tip of the 2 probes of the multimeter (the red and the black wires) to the 2 terminals (pins) of the microphone. Now move your mouth close to the microphone and blow air into its hole. If the reading on the screen increases rapidly, the microphone is good. If the reading is still 1, the microphone is faulty.

Summarise

- Refer to page 89 of the hand book.

2.5.6.6: How to Measure Frequency & Logic with a Multimeter?

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- Having understood multimetre and its purpose.
- Also let us see the use of mutimeter in order to measure frequency and logic in a mobile phone.

Demonstrate

- Demonstrate to the students the steps to measure frequency and logic with the help of a multi-meter.
- Share with the students the basics in order to check frequency and logic.

Steps: Check Frequency with a Multi-Meter

STEP 1– Fit the BLACK probe in COMMON plug and RED probe in V plug.
STEP 2– Select KHz range by rotary selector switch.
STEP 3– Touch the point with the probe where frequency is to be checked.
STEP 4– Read the value on the display.

Steps: Check Logic with a Multi-Meter

STEP 1– Fit the BLACK probe in COMMON plug and RED probe in V plug.
STEP 2– Select logic range by rotary selector switch.
STEP 3– Place the BLACK probe on the ground terminal of the circuit and RED probe at the testing point.
STEP 4– High for logic 1, low for logic 0 and pulse reading, will be displayed.

Summarise

Refer to page 90 of the hand book.

2.5.7: How to Work with a Hot Air Rework Station?

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- Having understood hot air rework station and its purpose.
- Also let us see the use of hot air rework station.

Demonstrate

- Demonstrate to the students the steps to work with a hot air work station.
- Share with the students the basics in order to work with a hot air work station.

Steps: How to Work With a Hot Air Rework Station

STEP 1– Set the temperature and air flow at the required setting.
STEP 2– Identify the faulty IC and gradually give hot air to it.
STEP 3– When the solder paste melts; remove the faulty IC using a tweezer or IC pick up tool. Clean the track properly.
STEP 4– Dispense fresh solder paste on the track and place the new IC.
STEP 5– Give heat starting from some height & gradually decreasing the height of the hand piece of the hot air blower.
STEP 6– When the solder melts, remove blower, new IC is soldered.

Summarise

- Refer to page 91 of the hand book.

2.5.8: Other Tools

Ask

- Ask the students about their understanding of other tools required to repair a mobile phone.
- Ask them to work in their respective teams and identify other tools and their respective use.

Say

- Having understood the previous section let's now understand other tools required to repair a mobile phone.

Do

- Share with the help of the hand book other tools.
- Battery Booster is used to boost the power of battery of a mobile phone.
- Battery tester is used to test and analyze status or condition of battery of a mobile cell phone.
- Ultrasonic Cleaner is used to clean PCB of a mobile phone and electronic components.
- Ultrasonic Cleaner is used to clean PCB of a mobile phone and electronic components.
- DC Power Supply is regulated DC (Direct Current) power supply is used to supply DC current to a mobile phone.
- Microscope is used to see a magnified view of PCB or electronic components. These are available in different zoom options.
- Liquid Flux is used to clean PCB track and legs or pins of electronic components while soldering.
- Paste Flux is used while soldering.
- Solder Paste is solder in molted semi-solid form and is used while re-balling the ICs.
- De-soldering Wire is used to remove excess solder from the track of PCB.
- Screwdriver Kit has several screwdrivers of different shapes and sizes to dissemble and assemble a mobile phone.
- Wrist Strap works in the wrist of the person who is repairing a mobile phone and helps in discharging electrostatic current.
- Torque screw driver.
- Cleaning Sponge is used to clean tip of the soldering iron while soldering.
- Antistatic Hand Gloves are important to wear as they are ESD-safe and avoid a lot of damages.
- Mobile Opener is used to open the housing or body of a mobile phone.
- Antistatic Mat is laid or placed on the table or workbench where mobile repairing is done.

Do (Cont.)

- Antistatic Apron is a dress worn by people who repair mobile phones. Like the antistatic mat, it helps saves the mobile handsets from dangerous static electricity.
- Smoke Absorber is like an exhaust fan that helps to filter smoke.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss other tools and their respective use in detail.
- Refer to page 63 - 67 of the hand book.
- Conduct a quiz in order to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate the various tools to the students.
- Demonstrate its use and explain their purpose.
- Also ask the students to demonstrate the appropriate use these ‘other tools’.

2.5.9: Concepts of Embedded Multimedia Card (EMMC) chip off, Re-balling and Soldering

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- Having understood about the various other tools, lets learn about the concepts of Embedded Multimedia Card(EMMC) chip off, Re-balling and Soldering

Elaborate

Embedded Multimedia Card, sometimes known as eMMC, is a type of flash memory used by mobile applications.
Flash memory is almost often used to store content in embedded applications such as digital cameras, smartphones, and tablets nowadays.
The non-volatile storage found in smartphones, tablets, and mini PCs is called eMMC. Usually, it might be 8 GB, 16 GB, 32 GB, or even 64 GB.

Summarise

- Refer to page 96 of the hand book.

UNIT 2.6: Basic Troubleshooting

Unit Objectives

At the end of this unit, students will be able to:

1. Disassemble a mobile phone using the common hardware repair tools
2. Identify and fix common handset problems

Notes for Facilitation

- You could ask the students what they know about the basic trouble shooting of a mobile phone.
- Give students some time to think about basic trouble shooting.
- Set the context and at the same time ask the students to prepare for the same.

2.6.1: Dis-Assembling a Mobile Phone

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- In the previous session we learnt about the various tools required to repair a mobile phone.
- In this session we will learn the dis-assembling of a mobile phone.

Demonstrate

- Demonstrate to the students the steps to dis-assemble a mobile phone.
- Share with the students that the process of taking a cell phone apart is basically the same but can vary slightly depending on the type and model of phone that you have.
- Tools required for the purpose are a screw driver and a mobile opener.

Steps: How to Dis-assemble a Mobile Phone?

STEP 1– Remove your back cover (using a mobile opener tool), battery, sim and memory card.
STEP 2– Try the battery compartment off. The volume and camera buttons will also come loose.
STEP 3– The micro switches for the lock button and volume button are to be carefully peeled away from the side of the phone, but still attached to the circuit board.
STEP 4– Pull the circuit board towards you and lever up and remove the ribbon connector
STEP 5– Detach the ribbons, just lever each one up to unplug.
STEP 6–Lift the circuit board away from the phone, another ribbon connector (green circle) will disconnect as you remove the circuit board. Now remove the respective screws, antenna.
STEP 7– Carefully peel the identification sticker off and push your screwdriver to release the keypad.
STEP 8–Just flick the black latch up, opposite to the side the ribbon enters its socket. The ribbon will now be loose. Now pull the front cover so that the front cover separates from the black metal plate.
STEP 9– Now slide a sharp mobile opener tool all the way under the LCD screen to release it. Pull the circuit board towards you and lever up and remove the ribbon connector.
STEP 10– De You should now have the LCD screen removed. Reverse the whole process to assemble the phone back to its original state.

Summarise

- Refer to page 96-103 of the hand book.

2.6.2: Solutions to Battery Related Problem

Do

- Welcome and greet the participants. Revise the learning of the previous session and ask them if they have any doubts.

Say

- In the previous session we learnt to dis-assemble a mobile phone.
- In this session we will learn the solutions to battery related problem.

Demonstrate

- Demonstrate to the students the solutions to battery related problems.
- Share with the students solutions can be tried in case of low battery, battery drains fast, low battery back-up or battery not charging.

Steps: Solutions to Battery Related Problem

STEP 1– Check the battery connector and charger plug to see if there is any problem.
STEP 2– Check if there is any dust or corrosion in the connector or any broken pin. Clean the points using cleaning swabs.
STEP 3– Check the interface connector to see if there is any dust. If dust present, clean or replace the interface connector.
STEP 4– If the battery problem is not solved then upgrade the software or operating system to latest version.
STEP 5– If the problem remains then check the current consumption of mobile phone.
STEP 6–Check for any short-circuit.
STEP 7– If there is serious problem at the board level then it is better to replace the whole logic-board of the mobile phone.

Summarise

- above were the steps for rectifying battery related problems.
- Refer to page 104 of the hand book for more detail.

2.6.3: Solutions to Network Not Working

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to battery related problems.
- In this session we will learn the solutions to network not working.

Demonstrate

- Demonstrate to the students the solutions to network not working.
- Share with the student solutions can be tried in case, there is no network in the mobile phone, less or weak network signal or the signal is intermittent.

Steps: Solutions to Network Not Working

STEP 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.

STEP 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.

STEP 3– If the network gets disconnected during phone calls then you should repair or change the network IC.

STEP 4– Clean the antenna tips and point

STEP 5– If the network problem persists, heat or change the 26MHz crystal oscillator.

STEP 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.

STEP 7– Heat, change or jumper the PFO if the problem still persists.

STEP 8 - Heat, re-ball or change the network IC.

STEP 9 – Heat, re-ball or change the power IC.

STEP 10 - Heat, re-ball or change the CPU.

Summarise

- above were the steps for rectifying network related problems.
- Refer to page 105 of the hand book for more detail.

2.6.4: Solutions to Network Signals and Call Drops

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to network not working.
- In this session we will learn the solutions to network signals and call drops.

Demonstrate

- Demonstrate to the students the solutions to network not working.
- Share with the student solutions that can be tried, in case the mobile phone is having network related problem or call drops.

Steps:Solution to Network signal or call drop

STEP 1– Check the SIM Card. Insert the SIM card in other mobile phone and see if the network problem or the call drop problem persists.
STEP 2– Alternatively; try to insert another SIM card inside the mobile phone that has the network problem.
STEP 3– If the problem is caused by the SIM card, then you should change or replace it.
STEP 4– If the problem is still not resolved then upgrade the operating system to the latest version.
STEP 5– If the problem is not solved then the mobile phone is to be changed.

Summarise

- Refer to page 106 of the hand book for more details on Network signal/ call drop

2.6.5: Solutions to Mobile Phone Overheating

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to network signals and call drops.
- In this session we will learn the solutions to mobile phone overheating.

Demonstrate

- Demonstrate to the students the solutions to mobile phone overheating.
- Share with the student solutions that can be tried, in case the mobile phone overheats either inside or outside the body.

Steps: Solutions to Mobile Overheating Problems

STEP 1– If the software troubleshooting fails to resolve the issue then there is some internal hardware problem. Change the PCB or logic-board to solve the heating problem.

Summarise

- Refer to page 106 of the hand book for more details on Mobile Overheating problems

2.6.6: Solutions to Earpiece Problem

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to mobile phone overheating.
- In this session we will learn the solutions to mobile earpiece problems.

Demonstrate

- Demonstrate to the students the solutions to mobile phone earpiece problems.
- Share with the student solutions that can be tried in case, of no sound during the phone call, low sound during the call or if sound has interruptions.

Steps: Solutions to Mobile Overheating Problems

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

Summarise

- Refer to page 107 of the hand book.

2.6.7: Solutions to Ringer Problem

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to mobile earpiece problems.
- In this session we will learn the solutions to mobile ringer problems.

Demonstrate

- Demonstrate to the students the solutions to mobile phone ringer problems.
- Share with the student solutions that can be tried in case, ringer is not working, low sound from the ringer, sound has interruptions or sound is not clear.

Steps: Solutions to Mobile Overheating Problems

STEP 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.
STEP 2– If the problem is not solved then open the mobile phone and clean the ringer point and ringer connector.
STEP 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.
STEP 4– If the problem is not solved then check the track of ringer section. Do jumper wherever required.
STEP 5– If the problem is not solved then check the ringer IC. Heat or change the IC.
STEP 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.

Summarise

- Refer to page 108 of the hand book.

2.6.8: Solutions to Vibrator Problem

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to mobile ringer problems.
- In this session we will learn the solutions to mobile vibrator problems.

Demonstrate

- Demonstrate to the students the solutions to mobile phone vibrator problems.
- Share with the student solutions that can be tried in case, vibrator is not working, vibrator hangs, if vibrator has interruptions.

Steps: Solutions to Mobile Overheating Problems

STEP 1– Check the Vibrator settings in the mobile phone. Check if the Vibrator is ON or OFF.
STEP 2– If the problem is not solved then open the mobile cell phone and clean the vibrator tips and connector.
STEP 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.
STEP 4– If the problem is not solved then check the track of the vibrator section. Do jumper wherever required.
STEP 5– If the problem is not solved then heat, reball or change the UEM/Logic IC /Power IC.
STEP 6– If the problem is still not solved then heat, reball or change the CPU.

Summarise

- Refer to page 109 of the hand book.

2.6.9: Solutions to Microphone Problem

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to vibrator problems.
- In this session we will learn the solutions to mobile microphone problems.

Demonstrate

- Demonstrate to the students the solutions to mobile microphone problems.
- Share with the student solutions that can be tried in case there is low sound during calls, sound has interruptions, change in sound.

Steps: Solutions to Mobile Overheating Problems

STEP 1– Check the Vibrator settings in the mobile phone. Check if the Vibrator is ON or OFF.
STEP 2– If the problem is not solved then open the mobile cell phone and clean the vibrator tips and connector.
STEP 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.
STEP 4– If the problem is not solved then check the track of the vibrator section. Do jumper wherever required.
STEP 5– If the problem is not solved then heat, reball or change the UEM/Logic IC /Power IC.
STEP 6– If the problem is still not solved then heat, reball or change the CPU.

Summarise

- Refer to page 110 of the hand book.

2.6.10: Solutions to Mobile Phone Display Problem

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to microphone problems.
- In this session we will learn the solutions to mobile phone display problems.

Demonstrate

- Demonstrate to the students the solutions to mobile phone display problems.
- Share with the student solutions that can be tried in case display is blank or white or not working properly, only half the display works, display is inverted, display is broken, when the mobile phone is switched on the logo appears and then the display is blank.

Steps: Solutions to Display Problem

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

Summarise

- Refer to page 111 of the hand book.

2.6.11: Solutions to LED Problem

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to display problems.
- In this session we will learn the solutions to mobile phone LED problems.

Demonstrate

- Demonstrate to the students the solutions to mobile phone LED problems.
- Share with the student solutions that can be tried in case of no light, light only in keypad or display, some lights are not working.

Steps: Solutions to Display Problem

STEP 1– check the light settings.
STEP 2– If the settings are normal then resolder all the LED.
STEP 3– If the problem is not solved then change the display or the screen.
STEP 4– 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.
STEP 5– Change the LED or jumper if required.
STEP 6– If the problem is not solved then check the Track of the light section of the PCB and jumper if required.
STEP 7– Next check the boosting coil and change if required.
STEP 8– If the problem is not solved then heat or change the Light IC.
STEP 9– If the problem is still not solved then heat, reball or change the Power IC.

Summarise

- Refer to page 112 of the hand book.

2.6.12: Solutions to Touch Screen Problem

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to LED problems.
- In this session we will learn the solutions to mobile phone touch screens problems.

Demonstrate

- Demonstrate to the students the solutions to mobile phone touch screen problems.
- Share with the student solutions that can be tried in case touch screen not working, only half of the touch screen is working, one key is pressed and the other key works.

Steps: Solutions to Touch Screen Problem

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

Summarise

- Refer to page 113 -119 of the hand book.

2.6.12.1: Steps to Replace Touch Screen

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to touch screen problems.
- In this session we will learn the solutions to mobile phone touch screens problems.

Demonstrate

- Demonstrate to the students the solutions to mobile phone touch screen problems.
- Share with the student solutions that can be tried in case touch screen is broken, too many scratches warrant replacement.

Steps: Solutions to Touch Screen Problem

STEP 1– Remove any cover, battery, SIM and SD cards.

STEP 2–Now remove screws from the base around the battery cover. If in doubt it's a good idea to photograph your device as you go along.

STEP 3– Remove the back cover using the pry tool. These are tricky to use but start at a corner and try and work the pry tool under the edge. Work along the edges popping out the clips and lift away the cover. In this particular model only the top camera cover needs the pry tool.

STEP 4– Remove any more screws that are revealed. Any visible connections can also be unclipped.

STEP 5– We can now carefully "push" the main device out of the metal chassis screen first. Be careful here to bend up the lower PCB, as it'll catch on the rear of the chassis. You should not need to force it at all.

STEP 6– Remove any more screws at the top or bottom and remove the plastic bracket that this releases. It'll just lift away.

STEP 7– At this point we are working towards separating the display elements from the phone motherboard. On this particular model the two ribbon cables coming in to the side are the digitizer and display connections. Using the pry tool remove any tape but save this. Lift up the white locking element and using the help of a small screw driver remove the ribbons.

Steps: Solutions to Touch Screen Problem (Cont.)

STEP 10–This is the hardest part of the whole tear-down. An adhesive gasket binds the digitizer to the display chassis. This needs to be heated to loosen the adhesive and using the pry tool separate the digitizer from the display. Use a hot-air gun but be extra careful, use the lowest setting and keep it moving. A hair dryer can also be used.

STEP 11–Start on just the bottom edge or the least broken section. Use the pry tool to test how "sticky" the adhesive is and reheat, repeat until it starts coming away. Move on to the next small section and repeat. Eventually you will lift the entire digitizer out. The process takes a while but if you can save the gasket it'll help avoid the next step.

STEP 12–If you have damaged the adhesive gasket, this will need to be replaced with 1mm or 2mm adhesive tape designed for phones. If any area of the digitizer touches the display or chassis it will short and you will get false-positive touches.

STEP 13–Remove any protective film on either side, feed the new digitizer's ribbon through the lower hole and carefully from the base, angle it back into place firmly pushing it down to make sure the adhesive holds well. Feed the ribbon along the back of the display and reverse this process to carefully rebuild your phone.

STEP 14–Press the power button now. If all has gone well your phone will come back to life and the display will be sensing your touch again.

2.6.13: Solutions to Key Pad Problem

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to touch screen problems.
- In this session we will learn the solutions to key pad problems.

Demonstrate

- Demonstrate to the students the solutions to mobile key pad problems.
- Share with the student solutions that can be tried in case some keys not working, keys need more pressure to work, when a key is pressed it works continuously, when a key is pressed some other key starts working, when a key is pressed some other key works simultaneously.

Steps: Solutions to Key Pad Problem

STEP 1– Check the facial of the keypad.
STEP 2– Clean the keypad and keypad points shown in figure.
STEP 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.
STEP 4– If there is no improvement, heat or change the Keypad IC or the Interface IC.
STEP 5– If still no change, heat, reball or change the CPU.
STEP 8– We are now free to part the display and the motherboard. As with many phones these are glued together, using the pry tool carefully and slowly start to separate the two, the glue will give you just need to take your time and work around the edge.
STEP 9– Carefully fold open the phone and disconnect the final two connecting elements. This leaves you with the display section and the motherboard section.

Summarise

- Refer to page 120 of the hand book.

2.6.14: Solutions to SIM Problem

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions to key pad problems.
- In this session we will learn the solutions to SIM problems.

Demonstrate

- Demonstrate to the students the solutions to mobile SIM problems.
- Share with the student solutions that can be tried in case SIM is inserted but the message says “Insert SIM”, the mobile phone goes OFFLINE when the SIM card is inserted, the SIM works for some time and then stops working and there is a message that says “Invalid SIM”.

Steps: Solutions to SIM Problem

STEP 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.
STEP 2– Clean the SIM card tips and SIM connector.
STEP 3– If the problem is not solved then change the SIM card and check.
STEP 4– If the problem remains then change the SIM connector.
STEP 5– If you still do not find a solution to the problem, check the track of the SIM section.
STEP 6– If the problem is still not solved then heat or change the SIM IC.
STEP 7– Finally, if there is no change, heat, reball or change the Power IC.

Summarise

- Refer to page 121 of the hand book.

2.6.15: Common Software Problems and Solutions

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt solutions sim problems.
- In this session we will learn about some common software problems and solutions

Elaborate

Battery issues
Sometimes resource hungry apps drain the mobile battery and also cause the phone to become slow. Search and locate such apps and delete if not important.

Bluetooth issues
Try switching the phone off and on. If it doesn't work, go to Settings > Apps > Scroll over to All ->Select Bluetooth Share > Clear Cache (Android phones)

Cellular Data Issues
This is a common problem amongst Android phones. To fix this problem, simply go to Settings->More-> Cellular networks. Turn it back on after 30 seconds or so and see if the connection is back. If it is not, try rebooting your smartphone.

Camera Glitches
Try to reset your device and make sure the OS is up to date. Rebooting the device may fix the problem and the camera might start functioning again.

Summarise

- Refer to page 122 of the hand book.

2.6.16: Steps to update a phone

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt about common software problems and solutions
- In this session we will learn how to update the phone

Demonstrate

- Demonstrate to the students how to update the phone.
- Let the students practice how to update the phone.

Steps: Solutions to update a phone

Android

Step 1– Go to and select the Settings menu of the mobile.

Step 2– Scroll down and click on 'About Phone'. In case of a tabbed settings menu this will be found in the 'general' section.

Step 3– Select 'Software Update' or a similar option.

Step 4– The mobile software is programmed to automatically search the company web site for an update. Some applications may take you to another menu and display the updates and expect you to check a button displayed in front of the software name. A confirmation will be taken before downloading the update, if available. On confirmation the update is downloaded, installed and the mobile rebooted.

iPhone

From the phone directly

Step 1– Plug your phone in to power and connect to the Internet with Wi-Fi.

Step 2– Tap Settings > General > Software Update.

Step 3– Tap Download and Install.

Step 4– To update now, tap Install.

Step 5– If prompted, enter your passcode.

Steps: Solutions to Touch Screen Problem (Cont.)

Through iTunes

Step 1– The latest version of iTunes is first installed on a PC.

Step 2– Connect the phone to your computer.

Step 3– Open iTunes and select your iPhone.

Step 4– Click “ummary, then click 'Check for Update'.

Step 5– Click Download and Update.

Windows

Step 1– Tap Settings.

Step 2– Tap 'phone update'.

Step 3– Tap the button 'check for updates'.

Step 4– You can choose to install the update immediately or postpone the update for a more convenient time.

Blackberry

Step 1– Visit the http://www.blackberry.com/update web site.

Step 2– Click 'Check for Updates'.

Step 3– Follow the on-screen instructions to reload the software.

UNIT 2.7: Safety Guidelines

Unit Objectives

At the end of this unit, students will be able to:

1. Understand and follow standard safety precautions while repairing a handset
2. Understand and follow radiation compliance standards for mobile phones in India

Notes for Facilitation

- You could ask the students what they know about the safety guidelines while repairing mobile.
- Give students some time to think about basic safety guidelines.
- Set the context and at the same time ask the students to prepare a list of such guidelines.

2.7.1: Safety Tips and Precautions

Ask

- Ask the students about their understanding of safety tips and precaution to be followed while repairing a mobile phone.
- Ask them to work in their respective teams and identify a list of safety tips and precautions.

Say

- Having understood the previous section let's now understand the various safety tips and precautions to be followed while repairing a mobile phone.

Do

- Share with the help of the hand book safety tips and precautions.
- Use ESD-Safe Mat, ESD-Safe Clothing like ESD-Safe Apron, ESD-Safe Slippers, ESD-Safe Hand Gloves and Anti-static wrist strap. This prevents the gadget or mobile phone from any potential damage to sensitive electronic components due to static electricity.
- Use only dedicated tools for particular device you want to repair and fix. Tools should be well organized.
- Machines and equipment must be used and handled carefully.
- In case you have to perform a factory reset in a mobile phone, make sure to backup all data first.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the safety tips and precautions to be followed while repairing mobile phones in detail.
- Refer to page 84 of the hand book.
- Conduct a quiz in order to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate various safety tips, aids and precautions to the students.
- Demonstrate its use and explain their purpose.
- Also ask the students to demonstrate the appropriate use of various safety tips and aids.

2.7.2: Radiation Compliance for Mobile Handsets

Ask

- Ask the students about their understanding of radiation compliance for mobile phone.
- Ask them to work in their respective teams and identify compliance for mobile phones.

Say

- Having understood the previous section let's now understand the radiation compliance for mobile phone.

Do

- Share with the help of the hand book safety tips and precautions against 'Electro Magnetic Field Exposure' by the government of India.
- India has adopted the most stringent international norms for mobile handsets.
- All the new designs of mobile handsets shall comply with the SAR values of 1.6 W/kg averaged over 1 gram of human tissue w.e.f. 1st Sept. 2012.
- The mobile handsets with existing designs which are compliant with 2.0 W/kg averaged over 10 gram of human tissue, continue to co-exist up to 31st August 2013. From 1st Sept. 2013, only the mobile handsets with revised SAR value of 1.6 W/kg would be permitted to be manufactured or imported in India.
- Specific Absorption Rate (SAR) value information display on the mobile handsets like IMEI (International Mobile Equipment Identity) display. The information on SAR values to be made available to the consumer at the point of sale.
- Mobile hand set manufactured and sold in India or imported from other countries shall be checked on random basis for compliance of SAR limit after TEC SAR Laboratory is set up by end of year 2012. Test results from International accredited labs shall be acceptable in the interim period.
- All cell phone handsets sold in the market in India shall comply with relevant standards and shall be available in hand free mode.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the radiation compliance for mobile handsets in detail.
- Refer to page 85 of the hand book.
- Conduct a quiz in order to test the participants understanding and move to the next section.

Demonstrate

- Demonstrate radiation compliance for mobile handsets in detail to the students.
- Demonstrate its use and explain their purpose.
- Also ask the students to demonstrate radiation compliance for mobile handsets in detail.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into four teams - Team 1 - Torque Screw driver, Magnifying Lamp, Team 2 - Multimeter, Battery Booster & Tester, Team 3 - DC Power Supply, Hot Air SMD re-work machine and Team 4 - Ultrasonic Cleaner, LCD Tester, Microscope.
- Ask participants to practice tools that are there under the supervision of a professional instructor.
- There after let the teams interchange each tool set as mentioned above till every team and therefore every participant is completely thorough with each and every tool.
- Make sure that all the tools are used keeping in mind the precautions related to handling as well as health and safety of participants.

Activity (Cont.)

Skill Practice	Time	Resources
Mobile Handset Repair Tools	5 hours	• Torque Screw driver
		• Magnifying Lamp
		• Multimeter
		• Battery Booster & Tester
		• DC Power Supply, Hot Air SMD re-work machine and Ultrasonic Cleaner
		• LCD Tester and Microscope

Do

- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

UNIT 2.8:Report and document daily activities

Unit Objectives

At the end of this unit, students will be able to:

1. Identify and fill up a job-card, a daily activity report, and a customer feedback form

Resources to be Used

- Available objects such as white board, duster, marker pen, notebook, projector and other teaching aids, multimedia kit
- Presentation slides

Notes

- In this unit, we will discuss about how to fill the job card, daily activity report and get the customer feedback form.

Say

- Good morning and welcome back to this training program on Handheld Devices(handset & Tablet)Technician

Ask

- Ask the students if they have ever seen or filled a daily activity report or a job sheet.
- if they know about feedback forms?

Say

- Job card or job sheet needs to be filled by everybody who is into this segment of work be it telecom or automobile sector
- process of filling the daily activity report
- what is customer's feedback form

Elaborate

- Explain to the participants the importance of job sheet and how to fill them.
- what are the basic information that the job card or sheet records
- explain the daily activity report.
- explain how to fill the daily activity report.
- process of collecting feedback from the customers.

Exercises

1. What identifies a mobile subscriber to a network:

Ans a. SIM Card

2. SIM card does the following:

Ans. d. All of the above

3. Compact Flash, Multimedia Card, Secure Digital are types of:

Ans a. Memory card

4. Earthing pin, connected with the body of the equipment:

Ans a. Passes current leakage to the earth

5. Which of the following is antistatic clothing :

Ans d. All of the above

6. Please identify the right statement:

Ans d. All of the above

7. Which of the following is not an electric circuit:

Ans c. Blocked circuit

8. If the mobile phone overheats, change:

Ans a. PCB or logic-board

9. Removal of solder and components from a PCB is known as:

Ans c. Desoldering

10. If the Multimeter is showing faulty reading what all should you check?

Ans d. All of the above

Exercises (Cont.)

11. You may need to reset cell phone to:

Ans d. All of the above

12. Resetting a cell phone:

Ans d. Both b & c

13. One of the most important precautions that we should undertake while resetting a mobile phone is

Ans c.Take a back-up of the data (mandatory) to avoid losing it

14. What all medium can you use to transfer data between mobile and a computer:

Ans d. All of the above

15. A damaged firmware in a mobile phone means it will:

Ans d. All of the above

16. "Half Flash" & "Full Flash" are terms related to:

Ans a. Flashing:

17. Steps to reset iPhone are:
And d. Both b & c

18. Which of the following is anti static clothing
Ans d. All of the above

19. For Soft Formatting of your Nokia Mobile type:
Ans a. *#7370# followed by 12345

20. For Hard Formatting of your Nokia Mobile type:
Ans a. *#7780# followed by 12345

21. Reporting helps:
And a. Supervisor get a detailed status of a handset repair engineer's (HRE) work

22. Reporting is a:
Ans: b. Software

Exercises (Cont.)

23. Mention a few parts on a mobile phone PCB.

Ans: Page 49 Unit 2.2.2 The Printed Circuit Board or PCB

24. What all constitutes a hands-free section?

Ans: Page 50 Unit 2.2.2 Ear Section

25. Briefly explain the soldering process.

Ans: Page 80 Unit 2.5.2 Soldering Iron

26. What steps are involved in checking a faulty ringer with a multimeter?

Ans: Page 89 Unit 2.5.6.4 How to check a faulty ringer

27. What is a PFO?

Ans: Page 53 Unit 2.2.4 The Big parts and its functions (2 para)

28. What is the role of an RX Filter?

Ans: Page 53 Unit 2.2.4 The Big parts and its functions (3 para)

29. What is a Power IC?

Ans: Page 54 Unit 2.2.4 The Big parts and its functions

30.What is the difference between low-pass filter and high-pass filter?

Ans: Page 63 Unit 2.2.10 Filters

31. List steps to reset an iPhone.

Ans: Page 70 Unit 2.3.2 How to reset phones

32. List steps to reset a Windows phone.

Ans: Page 71 Unit 2.3.2 How to reset phones.

Exercises (Cont.)

33. What steps are involved to install apps on a Blackberry?

Ans: Page 73 Unit 2.3.3 How to install Apps?

34. List steps to update an Android phone.

Ans: Page 123 Unit 2.6.16 How to update a phone

35. Why do we need to reset phones?

Ans: Page 69 Unit 2.3.1 The need to reset a mobile phone

36. List steps to reset an Android phone.

Ans: Page 70 Unit 2.3.2 How to reset phones?

37. What steps are involved to install apps on an iPhone?

Ans: Page 73 Unit 2.3.3 How to install Apps?

38. List steps to set-up email on an iPhone.

Ans: Page 75 Unit 2.3.4 How to set up eMails?

Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

N·S·D·C
National
Skill Development
Corporation
Transforming the skill landscape

Telecom
Sector
Skill
Council

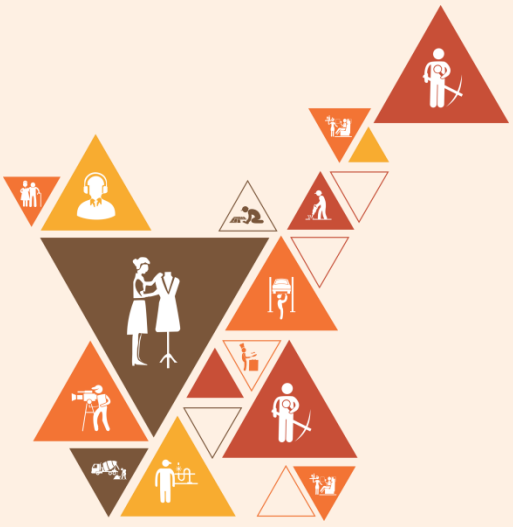
3. Basic repair and maintenance of laptops and mobile accessories

Unit 3.1 – Introduction to Tablets

Unit 3.2 – Replacing common parts

Unit 3.3 – Basic troubleshooting

Unit 3.4 – Safety guidelines



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3.1: Introduction to Tablets

Unit Objectives

At the end of this unit, students will be able to:

1. Outline and explain a tablet and compare it with a traditional computer

Ask

- Ask the students what you understand by tablets.
- Ask them to work in their respective teams and identify the various models and uses of tablets.

Say

- Having understood how to troubleshoot software related issues in mobile phones.
- We will now explain and outline the features of a tablet and its use.

Do

- Share with the help of the hand book the range of tablets, its use and the various operating systems.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the various steps in detail.
- Conduct a quick quiz in order to test the participants understanding and move on to the next section.

Summarise

- Refer to page 118-119 of the hand book.

3.2: Replacing Common Parts

Unit Objectives

At the end of this unit, students will be able to:

1. Understand and follow common safety precautions to be undertaken while repairing a handset

Notes for Facilitation

- You could ask the students what they know about replacing common parts of a tablet.
- Also ask students about the various tools required to replace the common parts.
- Give students some time to think about the various steps and tools.
- Set the context and enquire about the steps to replace the common parts of the tablet and the tools required for the same.

3.2.1: Repairing Tablets

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt about the various tablets and it features, etc.
- In this session we will learn about repairing tablets.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss with the students that repairs for most tablet computers because of their small size and frequent use of adhesive is involved.
- Discuss with the students the tools required – set of screwdrivers, spudger, mobile opener, tweezers, etc.
- Refer to the relevant sections on page 120 of the participant's hand book.
- Conduct a quick quiz in order to test the participants understanding and move on to the next section.

Summarise

- Refer to page 120 of the hand book.

3.2.2: Steps – How to Replace a Battery?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing tablets.
- In this session we will learn about the steps to replace a battery.

Demonstrate

- Demonstrate to the students the steps to replace a battery.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace a Battery?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free side of the front panel up from the rear case releases it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Steps: How to Replace a Battery? (Cont.)

Step 8– Use your fingernail to carefully flip up the retaining flaps on the two digitizer ribbon cable ZIF sockets. Now pull the digitizer ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10–Using a plastic opening tool peel up the two pieces of copper tape covering the USB connector board near the battery and the motherboard.

Step 11–Remove the screws securing the USB connector board to the rear case.

Step 12–Pry the upper end of the USB connector board upwards to disconnect it from its socket.

Step 13–Pull the USB connector board away from the bottom edge of the rear case and lift, do not remove it completely.

Step 14–Pull the vibrator motor from its socket on the USB connector board, and completely remove the USB connector board.

Step 15– Remove (if present) the two pieces of tape boxed in red.

Step 16– Using a plastic opening tool flip up the retaining flap on the volume control/power button ribbon cable socket and pull out the cable.

Step 17– Using a plastic opening tool lift the camera connector up & out of its socket, bend camera cable away from the motherboard.

Step 18– Flip up the retaining flap on microphone cable socket and pull out the microphone cable.

Step 19– Using your plastic opening tool pry the upper antenna connector up from its socket.

Step 20– Pry up the retaining flap on the headphone jack ribbon cable socket and pull the headphone jack ribbon cable out.

Step 21– Pry (from beneath the wires) the speaker cable connector up from its socket on the motherboard.

Step 22– Using a plastic opening tool flip up the retaining flap on the digitiser board ribbon cable socket and pull it out.

Step 23– Pry up the lower antenna cable connector from its socket.

Step 24– De-route the antenna cable, carefully pulling it out from under its retaining clip near the top right corner of the battery.

Step 25– Remove screws securing battery, motherboard to the rear case.

Step 26– Using a plastic opening tool pry the battery up from the tape securing it to the rear case.

Step 27– Lift the motherboard assembly out of the rear case, carefully avoiding any cables.

Step 28– Remove the battery by pulling it away from the motherboard to disconnect its cable.

Step 29– Battery remains.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; Hand over an Android tablet to each team.
- Ask participants to practice steps to replace battery under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of phone.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing battery of a tablet	5 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 121-130 of the hand book.

3.2.3: Steps – How to Replace a Camera?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing battery of tablets.
- In this session we will learn about the steps to replace the camera of the tablet.

Demonstrate

- Demonstrate to the students the steps to replace camera.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace a Camera?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Steps: How to Replace a Camera? (Cont.)

Step 9– Remove the front panel assembly.

Step 10– Use a plastic opening tool to lift the camera connector up and out of its socket.

Step 11– Using a plastic opening tool move the camera upwards to dislodge it from its recess in the rear case. Lift the camera out.

Step 12– Using a plastic opening tool move the camera upwards to dislodge it from its recess in the rear case. Lift the camera out.

Step 13– Lift the camera out.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace camera under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of phone.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing camera of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 131-132 of the hand book.

3.2.4: Steps – How to Replace a Control Button Assembly?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing the camera of tablets.
- In this session we will learn about the steps to replace the control button assembly of the tablet.

Demonstrate

- Demonstrate to the students the steps to replace
  - camera
  - the control button assembly of the tablet.
- give them adequate time to practice.

Elaborate

- Tell them to follow all the steps carefully while replacing the camera.

Steps: How to Replace Control Button Assembly?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free side of the front panel up from the rear case releases it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10– Using a plastic opening tool flip up the retaining flap on the control button cable ZIF socket, and pull the control button ribbon cable straight out of its socket.

Step 11– Use a plastic opening tool to peel the ambient light sensor off the body of the control button assembly, and find hidden screws.

Step 12– Remove the screws securing the control button assembly to the rear case.

Step 13– Use a plastic opening tool to lift the control button assembly up from its housing, and remove it completely.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace control button assembly under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of phone.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing control button assembly of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 133-134 of the hand book.

3.2.5: Steps – How to Replace Digitiser Control Board?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing the control button assembly.
- In this session we will learn about the steps to replace the digitiser control board of the tablet.

Demonstrate

- Demonstrate to the students the steps to replace the digitizer control board of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace Digitiser Control Board (DCB)?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free side of the front panel up from the rear case releases it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10– Remove screws securing the digitiser control board to the rear case.

Step 11– Carefully lift (not remove) the digitiser control board as it is still connected to the motherboard by the digitiser control board ribbon cable.

Steps: How to Replace (DCB)? (Cont.)

Step 12– Using the edge of a plastic opening tool, carefully flip up the retaining flap on the digitiser control board ribbon cable ZIF socket, and pull out the digitiser control board ribbon cable.

Step 13– Now safely remove the digitiser control board.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace digitizer control board under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of phone.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing digitizer control board of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 135-136 of the hand book.

3.2.6: Steps – How to Replace Display Data Cable?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing the digitizer control board.
- In this session we will learn about the steps to replace the display data cable of the tablet.

Demonstrate

- Demonstrate to the students the steps to replace the display data cable of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace the Display Data Cable? (DDC)

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10– Using a plastic opening tool peel up the self-adhesive pull tab stuck to the display data cable.

Steps: How to Replace the DDC? (Cont.)

Step 11– Pull the tab up to unlock the display data cable connector from its socket on the LCD.

Step 12– Pull the display data cable out of its socket.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace display data cable under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of phone.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing display data cable of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 173 of the hand book.

3.2.7: Steps – How to Replace Front Cable?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing the display data cable.
- In this session we will learn about the steps to replace the front panel of the tablet.

Demonstrate

- Demonstrate to the students the steps to replace the front panel of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace the Front Panel?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Steps: How to Replace the Front Panel? (Cont.)

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10– Remove screws securing the LCD to the front panel.

Step 11– Lift up and remove the LCD assembly from the front panel.

Step 12– Front panel remains.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace front panel under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of phone.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing front panel of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 175 of the hand book.

3.2.8: Steps – How to Replace Head Phone Jack?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing the front panel.
- In this session we will learn about the steps to replace the head phone jack of the tablet.

Demonstrate

- Demonstrate to the students the steps to replace the head phone jack of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace the Head Phone Jack?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10– Using a plastic opening tool flip up the retaining flap on the headphone jack ribbon cable ZIF socket and pull the headphone jack ribbon cable out of its socket.

Steps: How to Replace the Head Phone Jack? (Cont.)

Step 11– Remove screws securing the headphone jack to the rear case.

Step 12– Using a plastic opening tool remove the headphone jack away from the adhesive securing it to the rear case.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace head phone jack under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of phone.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing head phone jack of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 177of the hand book.

3.2.9: Steps – How to Replace Home Button Board?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing the head phone jack.
- In this session we will learn about the steps to replace the home button board of the tablet.

Demonstrate

- Demonstrate to the students the steps to replace the home button board of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace the Home Button Board?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Steps: How to Replace the Home Button? (Cont.)

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Steps 10– Using a plastic opening tool carefully pry the home button board off the adhesive securing it to the front panel.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace home button board under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of phone.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing home button board of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 179 of the hand book.

3.2.10: Steps – How to Replace LCD?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing home button board.
- In this session we will learn about the steps to replace the LCD of the tablet.

Demonstrate

- Demonstrate to the students the steps to replace the LCD of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace the LCD?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Steps: How to Replace the LCD? (Cont.)

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10– Remove screws securing the LCD to the front panel.

Step 11– Lift up and remove the LCD assembly from the front panel.

Step 12– Using a plastic opening tool peel up the self-adhesive pull tab stuck to the display data cable.

Step 13– Pull the tab up to unlock the display data cable connector from its socket on the LCD. Pull the display data cable (parallel to the LCD) out of its socket.

Step 14– LCD remains.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace LCD under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing LCD of a tablet	3 hours	• Tablets – Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 180 of the hand book.

3.2.11: Steps – How to Replace Lower Antenna?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replacing LCD.
- In this session we will learn about the steps to replace the lower antenna of the tablet.

Demonstrate

- Demonstrate to the students the steps to replace the LCD of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace the Lower Antenna?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Steps: How to Replace the Lower Antenna? (Cont.)

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10–Using a plastic opening tool peel up the two pieces of copper tape covering the USB connector board near the battery and the motherboard.

Step 11–Remove screws securing the USB connector board to the rear case.

Step 12–Pry the upper end of the USB connector board upwards to disconnect it from its socket.

Step 13–Pull the USB connector board away from the bottom edge of the rear case and lift, do not remove it completely.

Step 14–Pull the vibrator motor from its socket on the USB connector board, and completely remove the USB connector board. (In case the vibrator motor is soldered on to the USB Board, the motor is to be removed along with the board.)

Step 15– Remove (if present) the two pieces of tape boxed in red.

Step 16– Using a plastic opening tool pry the lower antenna connector up from its socket.

Step 17– De-route the antenna cable, carefully pulling it out from under its retaining clip near the top right corner of the battery.

Step 18– Pull the lower antenna cable out of the plastic retaining clip.

Step 19– Using a plastic opening tool peel the lower antenna off the adhesive securing it to the rear case.

Step 20– Peel the foil tape attached to the lower antenna and remove the antenna completely.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace lower antenna under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Activity (Cont.)

Skill Practice	Time	Resources
Replacing lower antenna of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 182 of the participant hand book.

3.2.12: Steps – How to Replace a Microphone?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replace the lower antenna.
- In this session we will learn about the steps to replace a microphone.

Demonstrate

- Demonstrate to the students the steps to replace the microphone of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace Microphone?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Steps: How to Replace Microphone? (Cont.)

Step 9– Remove the front panel assembly.

Step 10– Using a plastic opening tool flip up the microphone ribbon cable retaining flap. Use a pair of tweezers to pull the microphone cable out of its socket on the motherboard.

Step 11– Using your tweezer remove the black rubber fastener between the microphone and rear case.

Step 12– Using a plastic opening tool pry the microphone away from the rear case right above the camera.

Step 13– Remove the microphone.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace microphone under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing microphone of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 185 of the hand book.

3.2.13: Steps – How to Replace Upper Antenna?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt replace the microphone.
- In this session we will learn about the steps to replace the upper antenna.

Demonstrate

- Demonstrate to the students the steps to replace the upper antenna of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace Upper Antenna?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10– Use the edge of a plastic opening tool to flip up the retaining flap on the headphone jack ribbon cable ZIF socket. Pull the headphone jack ribbon cable out of its socket and bend the cable away from the large piece of EMI foil stuck to the top speaker.

Steps: How to Replace Upper Antenna? (Cont.)

Step 11–Using a plastic opening tool pry the upper antenna connector up from its socket.

Step 12–Using a plastic opening tool peel the upper antenna off the adhesive securing it to the top speaker.

Step 13– Carefully peel the foil tape attached to the upper antenna off the top speaker and remove the upper antenna.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace upper antenna under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing upper antenna of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 149-150 of the hand book.

3.2.14: Steps – How to Replace USB Connector Board?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt how to replace the upper antenna.
- In this session we will learn about the steps to replace.

Demonstrate

- Demonstrate to the students the steps to replace the USB connector board of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace Upper Antenna?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free side of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Step 9– Remove the front panel assembly.

Step 10–Using a plastic opening tool peel up the two pieces of copper tape covering the USB connector board near the battery and the motherboard.

Step 11–Remove the four 3.2 mm screws securing the USB connector board to the rear case.

Steps: How to Replace Upper Antenna? (Cont.)

Step 12–Pry the upper end of the USB connector board upwards to disconnect it from its socket.

Step 13–Pull the USB connector board away from the bottom edge of the rear case and lift, do not remove it completely.

Step 14–Pull the vibrator motor from its socket on the USB connector board, and completely remove the USB connector board.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace USB connector board under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing USB connector board of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 189 of the hand book.

3.2.15: Steps – How to Replace Vibrator Motor?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt how to replace USB connector board.
- In this session we will learn about the steps to replace vibrator motor.

Demonstrate

- Demonstrate to the students the steps to replace the vibrator motor of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace Vibrator Motor?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free sides of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Steps: How to Replace Vibrator Motor? (Cont.)

Step 9– Remove the front panel assembly.

Step 10–Using a pair of tweezers carefully pull the vibrator motor Out of its recess.

Step 11–Pull the vibrator motor connector away from its socket.

Step 12– Safely remove the vibrator motor from the rear case.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace vibrator motor under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing vibrator motor of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 190 of the hand book.

3.2.16: Steps – How to Replace Motherboard?

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt how to replace vibrator motor.
- In this session we will learn about the steps to replace motherboard board.

Demonstrate

- Demonstrate to the students the steps to replace the motherboard board of the tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Replace Motherboard?

Step 1– Insert the metal spudger in the gap between the rubber outer ring on the front panel and the rear case near the USB connector. Pry the front panel up carefully.

Step 2– Repeat the above process along the long edge on the volume button side until there is a gap between the front panel and the rear case.

Step 3– Pry up the front panel along the top edge.

Step 4– Pry up the front panel along the edge closest to the home screen button.

Step 5– Before lifting the free side of the front panel up from the rear case release it from the plastic retaining clips.

Step 6– Lift the front panel assembly away from the rear case.

Step 7– Using the attached black tab pull the display data cable upwards from the socket on the motherboard.

Step 8– Use your fingernail to carefully flip up the retaining flaps on the two digitiser ribbon cable ZIF sockets. Now pull the digitiser ribbon cable straight out of its two sockets on the motherboard.

Steps: How to Replace Motherboard? (Cont.)

Step 9– Remove the front panel assembly.

Step 10–Using a plastic opening tool peel up the two pieces of copper tape covering the USB connector board near the battery and the motherboard.

Step 11–Remove the screws securing the USB connector board to the rear case.

Step 12–Pry the upper end of the USB connector board upwards to disconnect it from its socket.

Step 13–Pull the USB connector board away from the bottom edge of the rear case and lift, do not remove it completely.

Step 14–Pull the vibrator motor from its socket on the USB connector board, and completely remove the USB connector board.

Step 15– Remove (if present) the two pieces of tape boxed in red.

Step 16– Using a plastic opening tool flip up the retaining flap on the volume control/power button ribbon cable socket and pull out the cable.

Step 17– Using a plastic opening tool lift the camera connector up & out of its socket, bend camera cable away from the motherboard.

Step 18– Flip up the retaining flap on microphone cable socket and pull out the microphone cable.

Step 19– Using your plastic opening tool pry the upper antenna connector up from its socket.

Step 20– Pry up the retaining flap on the headphone jack ribbon cable socket and pull the headphone jack ribbon cable out.

Step 21– Pry (from beneath the wires) the speaker cable connector up from its socket on the motherboard.

Step 22– Using a plastic opening tool flip up the retaining flap on the digitiser board ribbon cable socket and pull it out.

Step 23– Pry up the lower antenna cable connector from its socket.

Step 24– De-route the antenna cable, carefully pulling it out from under its retaining clip near the top right corner of the battery.

Step 25– Remove screws securing battery, motherboard to the rear case.

Step 26– Using a plastic opening tool pry the battery up from the tape securing it to the rear case.

Step 27– Lift the motherboard assembly out of the rear case, carefully avoiding any cables.

Step 28– Remove the battery by pulling it away from the motherboard to disconnect its cable.

Step 29– Remove and replace the motherboard.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; hand over an Android tablet to each team.
- Ask participants to practice steps to replace motherboard under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Replacing motherboard of a tablet	3 hours	• Tablets - Android

Do

- Ask them to get into teams for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

Summarise

- Refer to page 191 of the hand book.

3.3: Basic Trouble Shooting

Unit Objectives

At the end of this unit, students will be able to:

1. Demonstrate steps to troubleshoot common software related issues in tablets
2. Demonstrate steps to update the software of popular tablets and create a back-up of data from tablet to a computer

Notes for Facilitation

- You could ask the students what they know about software related trouble shooting in mobiles.
- Give students some time to think about the ways to troubleshoot software problems in tablets.
- Give students some time to think about the same.
- Set the context and enquire about the various ways to troubleshoot software related problems in tablets.

3.3.1: Common Software Problems and Solutions

Ask

- Ask the students what are the common software problems in a tablet.
- Ask them to work in their respective teams and identify how to fix them.

Say

- Having understood how to replace different parts and components of a tablet.
- We will now understand how to fix common software related problem in a tablet.

Do

- Share with the help of the hand book how to solve common software related problem in a mobile phone.
- Share with the participant – screen issues, power & battery related issues, computer not recognizing tablet, etc.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the various steps in detail.
- Refer to the relevant sections on page 157 of the participant's hand book.
- Conduct a quick quiz in order to test the participants understanding and move on to the next section.

Summarise

- Refer to page 193 of the hand book.

3.3.2: Steps to Update a Tablet

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt about common software problems and solution.
- In this session we will learn about the steps to update a tablet.

Demonstrate

- Demonstrate to the students the steps to update a tablet.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Update a Tablet?

It is a good practice to back up your data such as contacts and photos before a tablet upgrade.

Android

Step 1– Navigate to the Setting menu of your tablet.

Step 2– Scroll down the Settings menu and click on 'About Device'. If you have a tabbed settings menu then this will appear in the 'general' section.

Step 3– Click the 'Software Update' or a similar option.

Step 4– Your tablet will now search for an available update. If you are taken to another menu, select the 'Software update check' button or something similar. If an update is available for your device then you will be asked whether you wish to install it. If you select yes then the system will download and install the new software and reboot the tablet.

Steps: How to Update a Tablet? (Cont.)

iPad

From the tab directly

Step 1– Plug your iPad in to power and connect to the Internet with Wi-Fi.

Step 2– Tap Settings > General > Software Update.

Step 3– Tap, download and Install.

Step 4– To update now, tap Install.

Step 5– If prompted, enter your pass code.

Through iTunes

Step 1– Install the latest version of iTunes on your computer.

Step 2– Connect the iPad to your computer.

Step 3– Open iTunes and select your iPad.

Step 4– Click Summary, then click 'Check for Update'.

Step 5– Click, download and Update.

Summarise

- Refer to page 194 of the hand book.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; share with them an Android and an iOS tablet each. Now ask them to practice steps to update the tablet under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of tablet.

Activity (Cont.)

- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Tablet update steps	3 hours	• Android tablet
		• iPad

Do

- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

3.3.3: Steps Tablet Data Transfer

Do

- Welcome the participants. Revise the learning of the previous session and clarify doubts if any.

Say

- In the previous session we learnt about steps to update a tablet.
- In this session we will learn about the steps to transfer tablet data.

Demonstrate

- Demonstrate to the students the steps to transfer tablet data.
- Share with the student these steps.
- Also give them adequate practice time.

Steps: How to Transfer Tablet Data?

Using USB Cable

Step 1– Connect the tablet to your computer using the USB cable that comes with the tablet.

Step 2– Find the icon of a removable drive (your tablet) on your computer under My Computer or Finder if a pop-up window does not open.

Step 3– Drag and drop files that you want to copy from your tablet to the computer (or vice-versa).

Step 4– When you are finished, close the window and disconnect the USB cable.

Using Bluetooth

Step 1– Make sure Bluetooth is turned on in both the tablet and computer. You can activate it in your tablet by looking under Settings or Controls. If you have a Mac, you can make sure your Bluetooth is on by clicking on the Bluetooth symbol on the right side of the upper toolbar. The symbol should be to the left of the Date and Time and should look like a white B with a blue background. On Windows it should be under the Control Panel.

Step 2– Make sure that the tablet is not too far away from the computer.

Step 3– Find and select the file (tablet) that you want to transfer.

Step 4– Select Copy or Send in the menu.

Step 5– Choose the Bluetooth option.

Step 6– Select the "Look for Devices" or a similar option in the Bluetooth menu that pops up.

Step 7– Select your device (computer).

Step 8– Request would be sent to the device to accept the file.

Step 9– Accept request and data will be sent from tablet to computer and vice-versa.

Steps: How to Transfer Tablet Data? (Cont.)

Using iTunes

Step 1– Connect iPad to computer using a USB cable. If iTunes doesn't open automatically, open it from the Start Menu or your Applications folder.

Step 2– Select your iPad from the list under Devices button (upper right corner of iTunes window).

Step 3– Choose the media (Apps, Music, Movies, etc.) that you want to sync. Click on each tab that you want to add to your device and check the "Sync" checkbox. You can choose to sync all media of that type, or just specific files.

Summarise

- Refer to pages 195 of the hand book.

Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Organize the participants into three teams - Team 1, 2 & 3; share with them an Android and an iOS tablet each. Now ask them to practice steps to transfer tablet data under the supervision of a professional instructor thoroughly.
- There after let the teams interchange phone types for updating as mentioned above till every team and therefore every participant is completely thorough with each and every step for each and every type of tablet.
- Make sure that all the steps are followed keeping in mind the precautions related to handling as well as health and safety of participants.

Skill Practice	Time	Resources
Tablet data transfer steps	3 hours	• Android tablet
		• iPad

Do

- Ask them to get into pairs for practice.
- Go around and make sure they are doing it properly.
- Wrap the unit up after summarizing the key points and answering questions.
- Ask the students to complete the exercise in their participant handbook.

3.4: Safety Guidelines

Unit Objectives

At the end of this unit, students will be able to:

- Understand and follow common safety precautions to be undertaken while repairing a handset

Notes for Facilitation

- You could ask the students what they know about safety guidelines while repairing mobiles.
- Give students some time to think about the various safety guidelines.
- Set the context and enquire about the various safety guidelines required to service mobile phones.

3.4.1: Safety Guidelines

Ask

- Ask the students what are the common safety guidelines while troubleshooting a tablet.
- Ask them to work in their respective teams and identify them.

Say

- Having understood how to transfer tablet data using various ways.
- We will now understand and demonstrate various safety related guidelines in a tablet.

Do

- Share with the help of the hand book the various safety related guidelines to be followed while repairing a tablet.

Notes for Facilitation

- Facilitate the discussion and avoid arguments.
- Discuss the various steps in detail.
- Refer to the relevant sections on page 161 of the participant's hand book.
- Conduct a quick quiz in order to test the participants understanding and move on to the next section.

Summarise

- Refer to page 197 of the hand book.

Answers to exercises for PHB

1. Which of the following is a common reason for slow touchscreens:

Ans : a. RAM

2. Sometimes deleting apps fix problem related to:

Ans. c.Camera

3. You can connect a tablet to computer using:

Ans d. All of the above.

4. You need to backup data in case of:

Ans: b. OS reinstall

5. To remove a battery, we have to first remove the:

Ans a. Motherboard

6. A tablet cannot do the following:

Ans: d. Play the DVD

7. Which of the following OS is used in tablets:

Ans d. All of the above

8. In what all ways can you update an iPad:

Ans c. both a & b

9. In case you have to reinstall the OS in a table, remember to:

Ans b. backup all data

10. Which of the following is anti static clothing :

Ans d. all of the above

Answers to exercises for PHB

11. Briefly explain a tablet.
Ans. Page 144-145 3.1.1 introduction to tablets

12. How can you fix up a slow responding touchscreen?
Ans. Page 193. Unit 3.3.1 common software problems and solutions

13. List steps to transfer data using iTunes.
Ans. Page 196. Unit 3.3.3 Tablet data transfer

14. List some ESD-safe clothing.
Ans. Page 197. Unit 3.4.1 safety tips and precautions

15. Name some popular tablet platforms.
Ans. Page 219 Unit4.2.12 Different types of mobile operating system (OS)

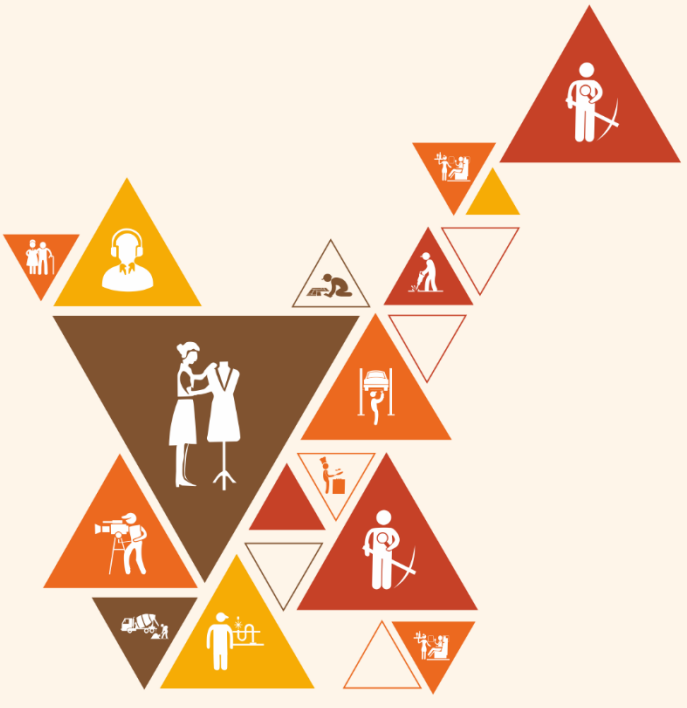
16. Which common tools are used in tablet repair?
Ans. Page 156 Unit 3.2.1 Repairng Tablets

17. How will you fix the battery drain issue in a tablet?
Ans. Page 152 Unit 3.1.3 Identifying faulty tablets

18. What will you do if the computer does not recognise a tablet?
Ans. Page 193 Unit 3.3.1 Common Software problems and solutions

4. Sustainability Practices in Telecom Operations

Unit 4.1 - Identification and Categorization of Recyclable, Reusable, and Disposable Components
Unit 4.2 - Adherence to Environmental Standards
Unit 4.3 - Sustainable Repair Practices
Unit 4.4 - Adherence to Organizational Protocols



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Key Learning Outcomes

After the completion of this module, the participant will be able to:

1. Explain the relevant environmental laws and regulations for the telecom sector.
2. Describe the different recyclable and hazardous components in telecom equipment.
3. Demonstrate how to identify telecom components that can be recycled, refurbished, or reused during repair and maintenance.
4. Discuss the relevant tools and techniques that support sustainable repair practices.
5. Elucidate the safe handling, storage, and disposal of hazardous materials.
6. Demonstrate how to follow guidelines for the safe handling, storage, and disposal of hazardous and non-hazardous materials.
7. Show how to sort and evaluate dismantled parts into recyclable, reusable, and hazardous waste categories for proper disposal.
8. Explain the process of e-waste recycling through certified vendors.
9. Describe the documentation required for sustainability and waste disposal.
10. Show how to maintain compliance with environmental regulations and record all e-waste disposal and recycling activities as per company policies.
11. Determine the proper waste segregation and sorting guidelines in the telecom industry.
12. Discuss the industry's best practices for reducing environmental impact.
13. Show how to label and segregate hazardous materials for specialized disposal, ensuring compliance with safety regulations.
14. Demonstrate the correct use of protective equipment when handling hazardous waste to prevent environmental contamination.
15. Show how to conduct regular audits of waste management processes to ensure alignment with sustainability standards.

UNIT 4.1: Identification and Categorization of Recyclable, Reusable, and Disposable Components

Unit Objectives

After the completion of this unit, participants will be able to:

1. Explain the difference between recyclable, reusable, and disposable components.
2. Identify common materials and components that can be recycled, reused, or need disposal.
3. Categorize waste materials appropriately during and after repair activities.
4. Demonstrate proper segregation techniques as per material type and disposal category.

Resources to be Used

Participant handbook, pen, notebook, whiteboard, flipchart, markers, laptop, overhead projector, laser pointer, equipment and tools.

Note

In this unit, we will discuss Identification and Categorization of Recyclable, Reusable, and Disposable Components.

Say

Good morning and welcome back to this training program on Identification and Categorization of Recyclable, Reusable, and Disposable Components

Ask

Ask the participants the following questions:

- What are recyclable, reusable, and disposable components?
- What are the common material and component that can be recycled, reused or need disposal?
- How to segregate the waste based on type and disposal category?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- **Identification of Telecom Components**
  - Reusable Components: Motherboards, displays, cameras/speakers/mics, chassis/housings, connectors/flex cables.
  - Refurbishable Components: Motherboards with minor faults, repairable connectors, software faults (flashing).
  - Recyclable Components: Scrapped motherboards, old batteries, broken plastic/metal parts, damaged displays.
  - Identification Methods: Visual inspection, functional test, multimeter/diagnostic tools.
- **Sorting Materials into Reusable, Recyclable & Hazardous**
  - Categories:
  - bins for reusable; e-waste bin for recyclables; fire-proof containers for batteries.
  - DeReusable/Refurbishable, Recyclable, Hazardous Protocols:Clear labels (Reusable, Recyclable, Hazardous – Batteries/LCDs).
  - Clean dicated sorting area.
  - Hazardous Examples: Batteries, circuit boards (heavy metals), older LCDs (mercury), chemical waste.
- **Labelling & Segregation of Hazardous Materials**
  - **Label Requirements:** Material type, hazard warning, date.
  - **Storage:**
    - Dedicated containers for each type.
    - Batteries in fire-resistant boxes with taped terminals.
    - Separate bins for boards and chemicals.
- **Disposal:** Only through certified e-waste recyclers; never in general trash.

Say

Let us participate in an activity to understand this unit better.

Activity

Waste Bin Match"Instructions (3–4 minutes):

1. Place three labeled bins/cards: Recyclable, Reusable, Disposable.
2. Call out items one by one (e.g., metal screws, working adapter, broken PCB, damaged cable, battery, packaging foam).
3. Learners point to or place the item in the correct bin.
4. Trainer quickly confirms the correct category and explains why.

Activity	Duration	Resources used
Role Play activity	60 minutes	Participant handbook, whiteboard, laptop, notebook, pen, pencil, marker, etc.

Notes for Facilitation

- Ask them to answer the questions given in the participant manual.
- Ensure that all the participants answer every question.
- Answer all the doubts raised by the trainees in the class
- Discuss the proper communication technique in group discussion

UNIT 4.2: Adherence to Environmental Standards

Unit Objectives

After the completion of this unit, participants will be able to:

1. Identify different waste types and follow appropriate handling and storage practices, including segregation of materials, and placement in secure, ventilated areas.
2. Differentiate between hazardous and non-hazardous waste, and ensure safe, certified disposal through authorized recycling partners.
3. Maintain accurate records of e-waste disposal and recycling.
4. Select and use safety gear correctly to prevent injury and contamination while handling batteries, circuit boards, and chemicals.
5. Prevent environmental contamination through containment measures.
6. Participate in regular waste management audits and improvements

Resources to be Used

Participant handbook, whiteboard, flipchart, markers, laptop, notebook, pen, PPE samples, dummy e-waste items (battery, PCB, cable, plastic housing).

Note

In this unit, we will discuss safe handling, segregation, storage, documentation and disposal of telecom e-waste.

Say

Good morning and welcome back to this training program on Safe Handling, Segregation, PPE Use, Disposal and Compliance in E-Waste Management.

Ask

Ask the participants the following questions:
- What types of waste do you commonly see in telecom repair or dismantling work?
- Which wastes are hazardous and which are non-hazardous?
- Why is segregation important for safe handling and disposal?
- What PPE do you use while handling batteries, chemicals, or damaged components?
- How do we maintain waste disposal records?

Write down the trainees' responses on the whiteboard/flipchart. Draw cues from their answers and begin teaching the unit.

Elaborate

In this session, we will discuss the following points:

- **Types of Waste** – Hazardous (batteries, PCBs, chemicals) and non-hazardous (plastic housings, cables, metal parts).
- **Segregation & Storage** – Separate hazardous and non-hazardous waste; use labeled bins; store batteries in fire-resistant containers; keep waste in ventilated, secured areas.
- **Safe Disposal** – Dispose of waste only through certified recyclers; maintain receipts and compliance records.
- **Use of PPE** – Gloves, masks, goggles, and antistatic straps while handling batteries, circuit boards, and chemicals.
- **Containment Measures** – Use trays for spills, keep bins covered, isolate damaged batteries.
- **Record-Keeping & Audits** – Maintain logs of waste movement, disposal documents, and support audit activities.

Say

Let us participate in an activity to understand this unit better.

Activity

Waste Sorting Drill (3–4 minutes):

Instructions

1. Place three labeled bins/cards: Hazardous Waste, Non-Hazardous Waste, Requires PPE.
2. Show items (damaged battery, PCB, cracked display, cable, plastic housing).
3. Learners point to or place items into the correct category.
4. Trainer confirms the correct handling method and safety precautions.

Activity	Duration	Resources used
Role Play activity	60 minutes	Participant handbook, whiteboard, laptop, notebook, pen, pencil, marker, etc.

Do

- Ensure that all trainees participate in the class.
- Encourage the non-participating trainees to open up and speak.

Notes for Facilitation

- Ask them to answer the questions given in the participant manual.
- Ensure that all the participants answer every question.
- Answer all the doubts raised by the trainees in the class
- Discuss the proper communication technique in group discussion

UNIT 4.3: Sustainable Repair Practices

Unit Objectives

After the completion of this unit, participants will be able to:

1. Appropriate repair techniques to reduce waste and energy consumption.
2. Select and use energy-efficient and eco-friendly spare parts.
3. Assess, test, and catalog reusable parts for future use, reducing procurement and material waste.
4. Minimize the use of single-use materials in repairs.
5. Follow a systematic diagnosis process using appropriate tools and documentation to prevent the wastage of functional components.

Resources to be Used

Participant handbook, whiteboard, flipchart, markers, laptop, pen, notebook, multimeter, testing jig, sample spare parts, packaging materials, toolkits.

Note

In this unit, we will discuss sustainable repair practices that reduce waste, conserve energy, and promote reuse in telecom equipment handling.

Say

Good morning and welcome back to this training program on Sustainable and Environment-Friendly Repair Practices in Telecom Equipment Handling.

Ask

Ask the participants the following questions:

- How can repair techniques help reduce e-waste?
- What spare parts are considered eco-friendly or energy-efficient?
- How do you identify parts that can be reused?
- What single-use materials do you frequently see during repair work?
- Why is systematic diagnosis important before replacing any component?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Sustainable Repair Techniques – Repair instead of replace whenever feasible; use proper tools to avoid damage; follow energy-efficient work practices.
- Eco-Friendly Spare Parts – Choose durable, energy-efficient, and recyclable parts to reduce long-term waste.
- Reusable Parts Management – Test, clean, and catalog components such as housings, ports, cables, and minor-fault PCBs for future reuse.
- Reducing Single-Use Materials – Avoid excessive use of tapes, sleeves, packing foam, and disposable consumables.
- Systematic Diagnosis – Use proper testing tools, follow checklists, and document findings to avoid unnecessary replacement of functional parts.

Say

Let us participate in an activity to understand this unit better.

Activity

Waste Bin Match"Instructions (3–4 minutes):

1. Display different items: slightly damaged housing, working charger, scratched display, loose connector, torn packaging, burnt IC.
2. Ask learners to classify each item as: Repairable, Reusable, or Needs Replacement.
3. Encourage them to justify their choice based on sustainability principles.
4. Trainer confirms correct decisions and highlights repair techniques or reuse possibilities.

Activity	Duration	Resources used
Repair/Replace – Decision Activity	60 minutes	Participant handbook, whiteboard, laptop, notebook, pen, pencil, marker, etc.

Notes for Facilitation

- Ask them to answer the questions given in the participant manual.
- Ensure that all the participants answer every question.
- Answer all the doubts raised by the trainees in the class
- Discuss the proper communication technique in group discussion

UNIT 4.4: Sustainable Repair Practices

Unit Objectives

After the completion of this unit, participants will be able to:

1. Follow organizational sustainability policies in repair operations.
2. Coordinate with certified recyclers for safe e-waste disposal.
3. Document waste transfers for compliance and traceability.
4. Participate in sustainability and environmental training programs.
5. Promote sustainability awareness among colleagues and customers.

Resources to be Used

Participant handbook, whiteboard, flipchart, markers, laptop, notebook, pen, sample forms, compliance logs, recycler certificates.

Note

In this unit, we will discuss organizational sustainability procedures, documentation practices, and internal coordination for responsible e-waste management.

Say

Good morning and welcome back to this training session on Organizational Sustainability Protocols and Compliance in E-Waste Handling.

Ask

Ask the participants the following questions:

- What sustainability policies does your organization follow during repair activities?
- How do you coordinate with authorized recyclers for e-waste collection?
- What records or documents are maintained during waste transfer?
- Have you attended any environmental or sustainability training programs?
- How can you promote sustainability practices among team members or customers?

Write down the trainees' answers on the whiteboard/flipchart. Draw appropriate cues from the answers and start teaching the lesson.

Elaborate

In this session, we will discuss the following points:

- Organizational Sustainability Policies – Follow internal guidelines on waste reduction, repair efficiency, reuse, and safe disposal.
- Coordination with Certified Recyclers – Handover waste only to approved recyclers; verify certification and maintain receipts.
- Documentation & Traceability – Record waste type, transfer date, recycler details, and maintain compliance logs.
- Training Participation – Attend periodic sustainability workshops and updates on environmental standards.
- Promoting Awareness – Encourage colleagues and customers to follow eco-friendly repair and disposal practices.

Say

Let us participate in an activity to understand this unit better.

Activity

Compliance Checkpoint

Instructions (3–4 minutes):

1. Provide sample documents (waste transfer forms, recycler receipts, sustainability guidelines).
2. Ask learners to identify:

- Which documents are needed for compliance
- Which reflect recycler authorization
- Which records ensure traceability

3. Learners briefly explain why each document is important.
4. Trainer validates answers and highlights key compliance steps.

Activity	Duration	Resources used
Repair/Replace – Decision Activity	60 minutes	Participant handbook, whiteboard, laptop, notebook, pen, pencil, marker, etc.

Notes for Facilitation

- Ask them to answer the questions given in the participant manual.
- Ensure that all the participants answer every question.
- Answer all the doubts raised by the trainees in the class
- Discuss the proper communication technique in group discussion

Exercise

Answers to exercises for PHB

Multiple Choice Questions

1. b. To turn a piece of waste into a reusable asset
2. c. Lithium-ion batteries
3. b. To track hazardous waste from its point of generation to its final disposal
4. c. It reduces lead contamination and is required by many regulations.
5. a. To check for compliance with regulations and identify areas for improvement

Fill in the Blanks

1. refurbishable component.
2. recyclable
3. functional test
4. waste manifest
5. hazardous and non-hazardous waste

Short Questions (Answers)

1. Reusable, Refurbishable, and Recyclable components.
2. Lithium, lead, or other heavy metals (any one is correct).
3. To remove harmful fumes and prevent inhalation of toxic soldering smoke.
4. By using efficient tools, avoiding unnecessary rework, and following proper diagnosis before replacing parts.
5. They reduce costs, minimize waste, support sustainability, and extend component life.
6. To ensure compliance, maintain traceability, and verify proper disposal through authorized recyclers.

Notes

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N·S·D·C
National
Skill Development
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Transforming the skill landscape

Telecom
Sector
Skill
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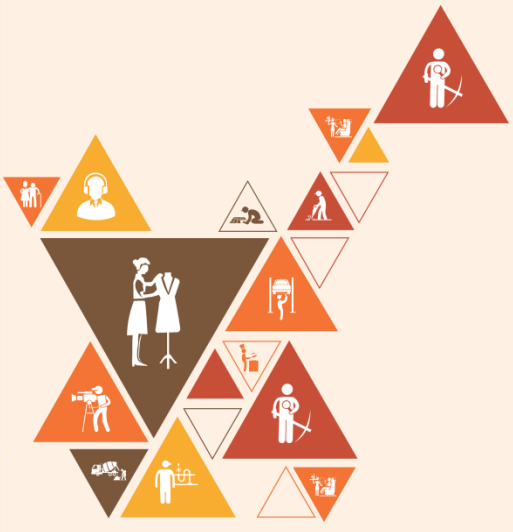
7. Annexures

Annexure I: Training Delivery Plan

Annexure II: Assessment Criteria



Sl. No.	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration (hours)
1	Role and Responsibilities of a Handheld Devices (Mobile & Accessories) Technician	Introduction to the program Introduction to the Telecom Sector and the Role of Handheld Devices(Handset & Tablet) Technician	• Explain the overview of the Program • Explain the role and responsibilities of Handheld Devices(Handset & Tablet) Technician • Rules for Efficient Learning in the class room • Discuss the outcome of this training program and the employment opportunities for the trainees. • Describe the size and scope of the Telecom industry and its various sub-sectors • Handset vendors in India	Bridge module	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Laptop with software like MS Office and internet, Whiteboard, Marker, Projector	6 T (4:00) P (2:00)
2		About Cell phones	• Evolution of cell phones • How does a cell phone works • common features of mobile phones • Popular use of mobile phones and polular mobile platforms				16 T(10:00) P(6:00)
3		Organisation Policies and standards	• Explain the organisation policies and delivery standards • Explain personal management standards • discuss public relations norms				8 T(6:00) P(2:00)
4	Repairing Handsets (TEL/N2213)	Prepare for receiving a handset	• inspect the repair area is neat and clean and ready for carrying out repairing • arrange the tools and equipments required for repairing • receive the phone from front end team and analyse the problem • diagnose the problem in the handset as per the organization standards • identify the root cause of the problem and inform supervisor if parts replacement is required. • inform the timelines and repair commitments as per the supervisor's observation and SLA guidelines • plan and prioritize activities to meet the delivery timeline	N2213/PC1-PC6,PC10-PC12	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Laptop with software like MS Office and internet, Whiteboard, Marker, Projector	10 T(04:00) P(06:00)
5		Basic Electronics of a Mobile Phone	• Understand and differentiate between the various electronic components that are used in mobile handsets likePCB, IC, Power Section, CPU, LCD display, MIC ,Speaker,Flash Light,Camera Section, head phone section, Transistor-Basics, Types, Symbol, Denoting Letter, PNP and NPN, EMMC chip off, Reballing and Soldering Concept, Smartphone IMEI Repair Tools, CRU based Smartphone FRP etc	N2213/KU9, KU10,KU18, KU19,20		Laptop with software like MS Office and internet, Whiteboard, Marker, ProjectorBasic electronic components IC, resistors, capacitors etc.IC's, transistors, capacitors , circuit boards, miniature cams, microphone and speakers etc.	70 T(32:00) P(38:00)
6		Fixing the firmware & Resetting the Phone	• understand various flashing tools, CPU based Smartphone Flashing,flashing handsets online/offline	N2213/KU1, KU5, KU18,KU21			8 T(04:00) P(04:00)
7		Hardware Repair Tools	• Explain soldering, de-soldering, lead free soldering tools,using multimeter	N2213/PC14, KU9,KU15			22 T(10:00 P(12:00)

8	Repairing Tabets (TEL/N2214)	Introduction to tablets and replacing common parts	• Explain features of tablets • Explain uses of tablets • Explain different parts of tablets • explain through demonstration how to replace different parts of tablets.	N2214/PC1-8, PC14,PC16, PC17, PC18	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Tablets of different brands Laptop with software like MS Office and internet, Whiteboard, Marker, Projector	50 T:20:00) P(30:00)
9		Basic Troublshooting & Safety guidelines	• rectify the common software problems • uninstall and reinstall the required apps with a valid login credentials • take back up of data before dismantling the laptop • check all ESD precautions are considered before repairing the latop	N2214/PC12, PC13,PC14, PC15-PC17, PC20,			30 T(10:00) P(20:00)
10	Process of carrying out the chip-level repair of mobile phone(TEL/N4631)	Perform chip level repairs	• Use of denoting letters, colour coding, symbol and functions of the solid type and Surface Mounted Device (SMD) • SMD diodes • Properties and Functions of Electromagnetic coil • Difference between and functions of Positive-Negative-Positive (PNP) and Negative- Positive-Negative (NPN) transistors • Process of conducting diagnostic or power on tests for different types of Original Equipment Manufacturer (OEM) components	ELE/N4631-PC1,PC2	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Tablets of different brands Laptop with software like MS Office and internet, Whiteboard, Marker, Projector	60 T(24:00) P(38:00)
11		Prepare necessary documentation	•Prepare the job sheet for all the devices that come to the service centre • Maintain the daily tracker, and adhere to the timelines as per the SLA, maintain the TAT	ELE/N4631-PC17,PC18, PC19	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Tablets of different brands Laptop with software like MS Office and internet, Whiteboard, Marker, Projector	20 T(06:00 P(12:00)
12	Organise resources and work effectively and safely	Perform work as per quality standards	•Employ appropriate ways to keep the workspace clean and tidy •Discuss how to perform individual roles and responsibilities as per the job role while taking accountability for the work •Show how to record/document tasks completed as per the requirements within specific timelines •Perform the steps to implement schedules to ensure the timely completion of tasks •Identify the cause of a problem related to your own work and validate it •Apply appropriate techniques to analyse problems accurately and communicate different possible solutions to the problem	TEL/N9101 PC1, PC2, PC3, PC4, PC5, PC6	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Whiteboard/blackboard marker /chalk, Duster, Computer or Laptop attached to LCD projector, Personal Protection Equipment: Safety glasses, Head protection, Rubber gloves, Safety footwear, Warning signs and tapes, Fire extinguisher and First aid kit	6 T(2:00) P(4:00)

13		Maintain a safe, healthy and secure working environment (Part - 1)	• Discuss how to comply with the organisation's current health, safety, security policies and procedures • Demonstrate the steps to check for water spills in and around the workspace and escalate these to the appropriate authority • Practice reporting any identified breaches in health, safety, and security policies and procedures to the designated person • Use safety materials such as goggles, gloves, earplugs, caps, ESD pins, covers, shoes, etc. • Apply required precautions to avoid damage of components due to negligence in ESD procedures or any other loss due to safety negligence • Identify hazards such as illness, accidents, fires or any other natural calamity safely, as per the organisation's emergency procedures, within the limits of the individual's authority • Explain the importance of regularly participating in fire drills or other safety-related workshops organised by the company • Discuss the significance of reporting any hazard outside the individual's authority to the relevant person in line with organisational procedures and warn others who may be affected	TEL/N9101 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, PC12, PC13, PC14			6 T(2:00) P(4:00)
14		Maintain a safe, healthy and secure working environment (Part - 2)	• Explain how to maintain appropriate posture while sitting/standing for long hours • Employ appropriate techniques to handle heavy and hazardous materials with care while maintaining an appropriate posture • Discuss the importance of sanitising workstations and equipment regularly • Discuss how to avoid contact with anyone suffering from communicable diseases and take necessary precautions • Show how to clean hands with soap and alcohol-based sanitiser regularly • List the safety precautions to be taken while travelling, e.g., maintain a 1m distance from others, sanitise hands regularly, wear masks, etc. • Role-play a situation to report hygiene and sanitation issues to the appropriate authority • Discuss how to follow recommended personal hygiene and sanitation practices, for example, washing/sanitising hands, covering the face with a bent elbow while coughing/sneezing, using PPE, etc.	TEL/N9101 PC15, PC16, PC17, PC18, PC19, PC20, PC21, PC22			6 T(2:00) P(4:00)

15		Conserve material / energy / electricity	• Apply appropriate ways to optimise the usage of material, including water, in various tasks/activities/processes • Use resources such as water, electricity and others responsibly • Demonstrate the steps to carry out routine cleaning of tools, machines and equipment • Apply appropriate ways to optimise the use of electricity/energy in various tasks/activities/processes • Perform periodic checks of the functioning of the equipment/machine and rectify wherever required • Explain the significance of reporting malfunctioning and lapses in the maintenance of equipment • Use electrical equipment and appliances properly	TEL/N9101 PC23, PC24, PC25, PC26, PC27, PC28, PC29			6 T(2:00) P(4:00)
16		Use effective waste management / recycling practices	• Identify recyclable, non-recyclable and hazardous waste • Apply appropriate ways to deposit recyclable and reusable material at the identified location • Explain the process to dispose of non-recyclable and hazardous waste as per recommended processes	TEL/N9101 PC30, PC31, PC32			6 T(2:00) P(4:00)
17	Communication and interpersonal skills	Interact effectively with superiors	• Explain how to receive work requirements from superiors and customers and interpret them correctly • Role-play a situation to inform the supervisor and/or concerned person about any unforeseen disruptions or delays • Practice participating in decision-making by providing facts and figures, giving/accepting constructive suggestions • Practice rectifying errors as per feedback and ensure the errors are not repeated	TEL/N9102 PC1, PC2, PC3, PC4	Classroom lecture / PowerPoint Presentation / Question & Answer / Group Discussion	Whiteboard and Markers, Chart paper and sketch pens, LCD Projector and Laptop for presentations, Sample of escalation matrix, organisation structure	6 T(2:00) P(4:00)
18		Interact effectively with colleagues and customers (Part - 1)	• Discuss how to comply with the organisation's policies and procedures for working with team members • Apply appropriate modes of communication, such as face-to-face, telephonic and written, to communicate professionally • Show how to respond to queries and seek/provide clarifications if required	TEL/N9102 PC5, PC6, PC7			6 T(2:00) P(4:00)
19		Interact effectively with colleagues and customers (Part - 2)	• Illustrate the process to co-ordinate with the team to integrate work as per requirements • Discuss how to resolve conflicts within the team/with customers to achieve a smooth workflow • Discuss how to recognise emotions accurately in self and others to build good relationships • State how to prioritise team and organisation goals above personal goals	TEL/N9102 PC8, PC9, PC10, PC11			6 T(2:00) P(4:00)

20		Gender sensitisation	• Explain how to maintain a conducive environment for all genders in the workplace • Discuss ways to encourage appropriate behaviour and conduct with people across gender • Explain how to ensure equal participation of people across genders in discussions	TEL/N9102 PC12, PC13, PC16			6 T(2:00) P(4:00)
21		PwD sensitisation	• Identify ways to assist team members with a disability in overcoming any challenges faced at work • Practice appropriate verbal and non-verbal communication while interacting with People with Disability (PwD)	TEL/N9102 PC14, PC15			6 T(2:00) P(4:00)
22	Employability Skills	DGT/VSQ/N0102 Employability Skills		DGT/VSQ/N0101			60 hrs
Grand Total: 480 hrs Total Theory Duration: 120 hrs Total Practical Duration: 210 hrs OJT Duration: 90 Employability Skills: 60							

Annexure II

Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for Handheld Devices (Mobile & Accessories) Technician	
Job Role	**Handheld Devices (Mobile & Accessories) Technician**
Qualification Pack	**TEL/Q2201, version 5.0**
Sector Skill Council	**Telecom Sector Skill Council**

S. N	Guidelines for Assessment
1	Each Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each Element/ PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3	Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/ option NOS/set of NOS.
4	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below).
5	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/ training center based on these criteria.
6	To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.
7	In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
TEL/N2213. Perform basic hardware and software repair of Android mobile phones and iPhones	30	50	-	20	100	30
TEL/N2214. Perform basic hardware and software repair of Android tablets and iPads	30	50	-	20	100	25
TEL/N2218. Perform basic hardware and software repair of Windows laptops, MacBook, and mobile accessories	30	50	-	20	100	25
TEL/N9108. Follow sustainability practices in telecom operations	30	50	-	20	100	10
DGT/VSQ/N0102. Employability Skills (60 Hours)	20	30	-	-	50	10
Total	**140**	**230**	**-**	**80**	**450**	**100**

Annexure I

QR Codes –Video Links

Chapter No	Unit No	Topic Name	QR Code
1. Role and Responsibilities of a Handheld Devices- (Handset & Tablet) Technician	1.2 - About the Cell phones	About Cell Phones	Click/Scan the QR code to know the basic understanding of the smartphone
2. Basic Hardware and Software Repair of Android Mobile Phones, Tablets, iPhones and iPads 4	2.3. Repair and Testing of Mobile Phones and Tablets	Resetting a phone	Click/Scan the QR Code for Resetting an android phone
	2.2. Preparation of Tools and Repair Station for Repair	Hardware Repair Tool	Click/Scan the QR Code to replace motherboard in a smartphone
	2.4. Basic Chip-Level Repairs	Replacing Common Parts	Click/Scan the QR Code for Replacing the battery of a tablet
4. Sustainability Practices in Telecom Operations	4.4 Compliance with Sustainability Protocols and Policies	Importance of safe working practices	Click/Scan this QR code to view the video First Aid at work place

Chapter No	Unit No	Topic Name	QR Code
4. Sustainability Practices in Telecom Operations 7 Sustainability Practices in Telecom Operations	4.3 Sustainable Repair and Maintenance Practices	Importance of safe working practices	 Click/Scan the QR code to view the video on hand washing techniques
	4.3 Sustainable Repair and Maintenance Practices	Importance of safe working practices	 Click/Scan this QR code to view the video on CPR Techniques
	4.1 Identification and Categorization of Recyclable, Reusable, and Disposable Components	Waste Management	 Click/Scan this QR code to view the video on Waste Management
		E-Waste Management	 Click/Scan this QR code to view the video on E-Waste Management
		E-Waste Management in India	 Click/Scan this QR code to view the video on E-Waste Management
		Eco Recycling: Inside India's E-Waste	 Click/Scan this QR code to view the video on E-Waste Management

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