RTB | RWANDA TVET BOARD

RQF LEVEL 5

TRADE: ELECTRONIC SERVICES

MODULE CODE: ELSED501

TEACHER'S GUIDE

MODULE NAME: MAINTAINING ELECTRONIC DISPLAY

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Kigali November 2022

ELSED501 MAINTAINING ELECTRONIC DISPLAY

Kigali, November, 2022

Contents

Kigali, November, 2022

Acronyms

PPE: personal protective equipment

DMM: digital Multimeter

LCD: Liquid crystal display

T : Transformer

Pts: points

Ltd: Limited

LED: Light emitting diode

OLED: Organic light emitting diode

V: Voltage

W: Watt

TV: Television

TVs: Televisions

HDMI: High definition multimedia interface

P: Pixel

RCA: Radio Corporation of America.

VGA: Video graphic array

DVD: Digital video disk

CRT: Ccathode-ray tube

HDTVs: High definition televisions

LC: Inductor capacitor

RC: Resistor capacitor

IC: Integrated circuit

AC: Alternating current

DC: Direct current

D: Diode

CPU: Central processing unit

OL: open loop

B: Base

C: Collector

E: Emitter

GPS: Global Positioning System

iOS: iPhone operating system)

GNSS: Global Navigation Satellite System

Oss: operating systems

PC: Personal computer

N: Number

C: Capacitor

R: Resistor

K: Kilo

F: Farad

SD: Storage device

USB: Universal Serial Bus

EHT: Extra High Tension

Introduction

Purpose statement

This module describes the skills, knowledge and attitudes required to maintain and install an electronic display. At the end of this module, participants will be able to describe the electronic display parts, repair as well as install an electronic display.
An electronic visual display is a display device for presentation of images, text, or video transmitted electronically, without producing a permanent record.
Electronic visual displays include television sets, computer monitors, projector and digital signage.

ELSED501 MAINTAINING ELECTRONIC DISPLAY

Learning Units:

1. Prepare the electronic display maintenance
2. Repair electronic display
3. Install the electronic display
4. Document the work done

Kigali, November, 2022

Learning Unit 1: Prepare the electronic display maintenance

STRUCTURE OF LEARNING UNIT

Picture/s reflecting the Learning unit 1

Learning outcomes:

1.1. Select the materials, tools and equipment

1.2. Setup the working environment

1.3. Identify the faults

Learning outcome 1.1. Select the materials, tools and equipment

Duration: 2 hours

1.1.A. Learning outcome 1.1 objectives :

By the end of the learning outcome, the trainees will be able to:

1.List properly materials, tools and equipments used in electronic display repair.
2. Explain clearly the role of each tool, material and equipment as used in electronic display repair.
3.Differentiate correctly the term material, tool and equipment as used in electronic maintenance.

1.1.B. Resources

Equipment	Tools	Materials
o Electronic display o Drilling machine and accessories o Screwdriver machine Soldering station o Digital Multimeter o Air blowing machine o Rivet gun o PPE	• Soldering irons • Screwdrivers • Pliers • Spanners • Chisel • Hammer • Tape measure • Step ladder • Spirit level • Brushes • Sponge • Soft cloth	➢ Adhesives ➢ Soldering tin ➢ Screws ➢ Universal anchors ➢ Cables and wires ➢ Electronic components

1.1.C. **Advance preparation:**

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

1.1.D. Content 1: Description of tools, material and equipment.

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- ✓ **Tool** is an item hold in hand that helps us to perform a specific task. Any physical item that is used to achieve a goal but is not consumed during this process can be defined as a tool.
  Example: screw driver.
- ✓ **Equipment** is a device that can be hold in hand or with two hands that need to perform a task. It represents all parts of machinery, functional devices or accessories which serve an individual, household or a community purpose.
  Example: screw driving machine.
- ✓ **Material** is a thing that can be used once or many times by facilitate us to perform a given task. It I s taken as a consumable.
  Example: screws. (Mixabest, 2012 Posted by Admin)

1.1.D.1. Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

- ✓ Define the term tool, material and equipment
- ✓ Give us an example on each term

1.1.D.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Among those tools, materials and equipment assembled on table, class them into three groups.
  - I. Tools
  - II. Materials
  - III. equipments

1.1.D.3.  Points to Remember (Take home message)

Tool is an item hold in hand that helps us to perform a specific task.

Equipment is a device that can be hold in hand or with two hands that need to perform a task.

Material is a thing that can be used once or many times by facilitate us to perform a given task.

1.1.E. Content 2: Classification of Tools, materials and their uses

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

1. Repairing tools

- **Soldering irons**: is a tool used to solders(joins)components with each other.
- **Screwdrivers** : screw driver *is* a tool manual or powered, for screwing (installing) and unscrewing (removing) screws.
- **Pliers**: plier is a small, hand-held device or a tool used in stripping electrical insulation from electrical wires, cutting and joining two or more wires together.
- **Spanners:** is a tool used to provide grip and mechanical advantage in applying torque to turn objects.

1. Cleaning tools

- **Sponge** it is a tool or cleaning aid made of soft, porous material (is a material that is able to easily absorb fluids or allow liquid to pass through), typically used for cleaning impervious surfaces(unable to be affected by).

- **Brushes:** it is a tool that use bristles, wire, or other filaments to dust and remove deposits from objects and surfaces. (Pubalan, 1997)

- **Soft cloth** it is a tool used to remove the dust on an equipment or a device.

tools used to remove material so as to create a hole.

1. Digging tools

- **Chisel:** Is a tool with a characteristically shaped cutting edge of blade on its end, for cutting a hard material such as wood, stone, or metal by hand.

- **Hammer:** it is a tool with a heavy head and a handle used for pounding (hitting of something)

4. Measuring tools

- **Tape measure:** Is a flexible ruler used to measure size or distance.

5. Miscellaneous tools

- **Step ladder:** Is a piece of equipment with *steps* for climbing up and down that can stand on its own or be folded (flexible) for carrying.
- **Spirit level** also called bubble level, or simply a level, is an is an instrument designed to indicate whether a surface is horizontal (level) or vertical (plumb).

Classifications of materials and their use

1. Adhesives: A substance used for sticking objects or materials together; glue

2. Repairing materials

- **Soldering tin**: are wires with a low melting point which can melt along with the soldering iron.
- **Screws**: Is a short, slender, sharp-pointed metal pin with a raised helical thread running round it and a slotted head, used to join things together.
- **Universal anchors** help you with the installation of timber or metal attachments.

- **Cables and wires**: **wire** is a single usually cylindrical, flexible strand or rod of metal hence it is a single conductor where **Cable** is a group of conductors inside a rubber or plastic covering, which is used to carry electricity or electronic signals.
- **Electronic components:** Are basic electronic elements that can be connected together to make a circuits. For examples resistors, transistors, capacitors, etc.

1.1.E.1. Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

- ✓ Give us at least two example of digging tools and other for miscellaneous tools that can be used in maintaining an electronic display.
- ✓ Give us at least two example of repairing materials that can be used in maintaining an electronic display.

1.1.E.2. Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Among those tools and materials assembled on table, identify them into three groups.
  1. Repairing materials
  2. Repairing materials
  3. Cleaning tools

1.1.E.3. Points to Remember (Take home message)

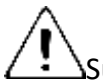
✓ **Classification of tools**

- Repairing tools
- Cleaning tools
- Digging tools
- Measuring tools
- Miscellaneous tools

✓ **Classifications of materials**

- Adhesives
- Repairing materials
  - Soldering tin
  - Screws
  - Universal anchors
  - Cables and wires
  - Electronic components

1.1.F. Content 3: Equipment and their uses


Summary for the trainer related to the content (key notes using bullets such as ticks etc)

- **Electronic display:** is a display device for presentation of images, text, or video transmitted electronically, without producing a permanent record.
  - **Drilling machine and accessories:** It is a device for producing holes of different size in a hard substance.
  - **Screwdriver machine:** The most powerful screwdrivers, these are primarily intended to drive in screws for projects that require a lot of muscle like building frames.
  - **Soldering station:** It is a device with a separate station to control temperature, a soldering iron and cleaning sponge and sometimes a hot air guns.
  - **Digital Multimeter:** a digital Multimeter (DMM) is an electronic device that helps us to measure the resistance, inductance, capacitance, both ac and dc voltage, current values displayed on its LCD screen, also it is used to test continuity between electrical devices.
  - **Air blowing machine:** Is a simple and effective electrical device used in homes, workshops and industries to blow away dust from every corner.
  - **Rivet gun**, is a type of tool used to drive rivets. A rivet is a permanent mechanical metal bolt for holding together two plates of metal. Called bolts ad nuts

- **PPE** (personal protective equipment) (NIOSH, 2022)

Types of personal protective equipment

A. Respiratory protection - for example, disposable (intended to be thrown away after use).

B. Eye protection – for example, spectacles (a pair of glasses.), visors.

Figure: face visor

C. **Hearing protection** – for example, ear muffs and plugs.

Figure 1: ear plugs.

Figure 2: ear muffs

D. **Hand protection** – for example, gloves

E. **Foot protection** – for example, shoes/boots.

F. **Head protection** – for example, helmets

G. **Skin protection** – for example, long sleeved clothes

1.1.F.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

1. Give us at least four types of PPE and an example for each
2. Give us at least two example of equipment that can be used in maintaining an electronic display.

1.1.F.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

Among those equipments assembled on table, identify the role of each in maintaining an electronic display.

1.1.F.3.  Points to Remember (Take home message)

Equipments

- Electronic display
- Drilling machine and accessories
- Screwdriver machine
- Soldering station
- Digital Multimeter
- Air blowing machine
- Rivet gun
- PPE

1.1.G.  Learning outcome 1.1: formative assessment

 **Please mix different assessment instruments/tools for triangulation and relevancy of assessment**

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions

Q1. An electronic visual display is a display device for presentation of images, text, or video transmitted electronically, and producing a permanent record. **F**

Q2. plier is a small, hand-held device or a tool used in stripping electrical insulation from electrical wires, cutting and joining two or more wires together. **T**

Q3. Brush is a material that is able to easily absorb fluids or allow liquid to pass through, typically used for cleaning impervious surfaces. **F**

Q4. Chisel and hammer are considered as miscellaneous tool in maintaining an electronic display. **F**

Q5. Disposable (intended to be thrown away after use) is an example of Respiratory protection. **T**

- ✓ Multiple choice

Q1. The table below comprises tools, materials and equipment used in maintenance and repair of an electronic display and their uses. Complete the column named Answers by matching the letter corresponding to the correct answer. **2 marks /Each.**

Answers	**External parts**	**Their uses**
1. **C**	1.Rivet gun	A) An instrument designed to indicate whether a surface is horizontal (level) or vertical (plumb).
2.**D**	2. spectacles	B) It is a device for producing holes of different size in a hard substance.
3.**A**	3. Spirit level	C) A type of tool used to drive rivets. A rivet is a permanent mechanical metal bolt for holding together two plates of metal. Called bolts ad nuts
4.**B**	4. Drilling machine and accessories	D) Eye protection
5.**G**	5. Universal anchors	E) it is a tool that use bristles, wire, or other filaments to dust and remove deposits from objects and surfaces.
		F) A substance used for sticking objects or materials together; glue
		G) help you with the installation of timber or metal attachments.

- ✓ Essay: Question with short responses and Open ended questions

- ✓ Case studies

1. Define Electronic display / **3pts**

2. Describe four types of personal protective equipment …… **/4 marks**

3. Write out four (4) examples of an electronic display……. / **2pts**

4. Enumerate the components below and their uses…….. **/6 marks**

Learning outcome 1.2. Setup the working environment

Duration: 1 hour

1.2.A. Learning outcome 1.2. objectives:

By the end of the learning outcome, the trainees will be able to:

1. Differentiate correctly cleaning techniques as used in electronic devices' maintenance.
2. List properly safety rules and guidelines used in electronic display repair.
3. Explain clearly the methods of arranging tools, equipment and material as used in electronic display.

1.2.B. Resources

Equipment	Tools	Materials
o Air blowing machine o PPE o Vacuum cleaner	• broom • Brushes • Sponge • Soft cloth	➢ Water ➢ soap ➢ Isopropyl alcohol

1.2.C. Advance preparation:

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

CONTENT

1.2.D. Content 1: Cleaning techniques and their applications.

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- ✓ **Brushing** using brush
- ✓ **Blowing**: using air blower
- ✓ **Towelling:** dry with a towel. a piece of thick absorbent cloth or paper used for drying oneself or wiping things dry.

1.2.D.1. Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

3. Define the term Cleaning in our dairly life?
4. Give us examples of cleaning techniques you can be applied in electronic display maintenance

1.2.D.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Among those Cleaning techniques we have studied, classify the following tools, materials and equipment into three groups.

IV. Brushing
V. Blowing
VI. Towelling

1.2.D.3.  Points to Remember (Take home message)

- ✓ **Brushing** using brush
- ✓ **Blowing**: using air blower
- ✓ **Towelling:** dry with a towel. a piece of thick absorbent cloth or paper used for drying oneself or wiping things dry.

1.2.E. Content 2 : Apply safety rules and guidelines

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.

1.**Individual safety precautions**

1. Eye protection must be worn at all times when in the workshop.
2. No student is allowed to work in the any shop alone.
3. Obtain first aid immediately for any injury.
4. No shorts dresses or shirts allowed when working in the workshop.
5. Remove all jewelry that could be caught in moving machinery.
6. Wearing of gloves when required, etc.

2.**Operating safety precautions**

Clean the workplace once there is a mess
Brush the wall with paint if it is necessary
Arrange materials, tools and equipment
Clean the equipment you are using if it is dirty.

3.**Electrical safety precautions**

1. Avoid water at all times when working with electricity.
2. Never use equipment with damaged insulation or broken plugs.
3. put up a sign on the service panel so that nobody turns the main switch ON by accident
4. Always use insulated tools while working.
5. Never try repairing energized equipment.
6. Always use appropriate insulated rubber gloves and goggles while working on any branch circuit or any other electrical circuit.

1.2.E.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

5. Give us at least four examples of individual safety precautions that can be used in maintaining an electronic display.
6. Give us at least three examples of electrical safety precautions that can be used in maintaining an electronic display.
7. Give us at least two examples of operating safety precautions that can be used in maintaining an electronic display.

1.2.E.1.  Practical learning Activity

(Example: Trainees in pair perform ……)

Among those safety precautions that can be used in maintaining an electronic display listed on the flipcharts, identify them into three groups.

Individual safety precautions
Electrical safety precautions
Operating safety precautions

1.2.E.3.  Points to Remember (Take home message)

There are three safety rules and guidelines that can be applied while maintaining an electronic display:

1. Individual safety precautions
2. Operating safety precautions
3. Electrical safety precautions

1.2.F.Content 3: Methods of arranging tools, equipment and material

Summary for the trainer related to the content (key notes using bullets such as ticks etc.

- Arrangement by types
- Arrangement by uses
- Arrangement by weight.
- Arrangement according to the manual instructions
- Arrangement by size.

1.2.F.1. Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

Give us at least four methods of arranging tools, equipment and material do you know

1.2.F.2. Practical learning Activity

(Example: Trainees in pair perform ……)

Arrange those tools, equipments and materials assembled on table, identify the role of each in maintaining an electronic display.

1.2.F.3. Points to Remember (Take home message)

ARRANGEMENT TECHNICS

1. Arrangement by types
2. Arrangement by uses
3. Arrangement by weight.
4. Arrangement according to the manual instructions
5. Arrangement by size.

1.2.G.  Learning outcome 1.2 : formative assessment

 **Please mix different assessment instruments/tools for triangulation and relevancy of assessment**

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions

Q1. Never try repairing energized equipment is one of the operating safety precaution. **F**

Q2. No shorts dresses or shirts allowed when working in the workshop is one of the individual safety precaution. **T**

Q3. In the arrange of materials, tools and equipment it is not necessary to use PPE.**F**

Q4. Avoid water at all times when working with electricity is one of the electrical safety precaution. **T**

Q5. While Towelling, you can use a broom in maintaining an electronic display workshop. **F**

- ✓ Multiple choice

Q1. The table below comprises of safety precautions and their corresponding examples. Complete the column named Answers by matching the letter corresponding to the correct answer. **2 marks /Each.**

Answers	**EXAMPLES**	Safety precautions
1. **A**	1. put up a sign on the service panel so that nobody turns the main switch ON by accident	A) electrical
2.**C**	2. Clean the workplace once there is a mess	B) Individual

3.**A**	3. Always use appropriate insulated rubber gloves and goggles while working on any branch circuit or any other electrical circuit.	C) operating
4.**C**	4. Arrange materials, tools and equipment	
5.**B**	5. No student is allowed to work in the any shop alone.	
6.**B**	6.Remove all jewelry that could be caught in moving machinery.	

Essay: Question with short responses and Open ended questions

1. List the arrangement techniques of tools, materials and equipment in the workplace while maintaining an electronic display …… / **5pts**

2. Describe Cleaning technics do you know ……. **/5 marks**

3.What is the role of the equipment shown in image below in maintaining electronic display

Practical assessment

- Assessment instruments/tools

  ✓ Task to be performed with performance checklist/quality product checklist

Trainer prepare the practical assessment about respect safety rules

Learning Outcome 1.3: Identify the faults (INC, 2018)

Duration: 2 hours

1.3.A. Learning outcome 1.3 objectives:

By the end of the learning outcome, the trainees will be able to:

1. List properly common faults that occur in electronic display as used in electronics.
2. Differentiate correctly common faults that occur in electronic display as used in electronics.

1.3.B. Resources

Equipment	Tools	Materials
o PPE o Electronic display o Screw driving machine o Digital multimeter o Soldering station	• Screwdriver • Brushes • Sponge • Soft cloth • Soldering iron • Tape measure • Step ladder • Spirit level	➢ water ➢ soap ➢ Isopropyl alcohol ➢ Screws ➢ Electronic components ➢ Soldering wires ➢ Adhesives ➢ Cables and wires

1.3.C. **Advance preparation:**

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

CONTENT

1.3.D. **Content 1: Identification of common faults**

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

1.No light on screen

- Ensure the device is properly plugged into a working outlet.
- Check the temperature lights to make sure the device hasn't overheated and shut down.
- If you are using a remote to turn on the device, check the batteries.
- Be sure all of the device latches (slots) are closed.

For **a projector**, Check the display settings on your computer and Check the resolution settings on your source device and select a 1080p or 720p resolution. For **a television**, reset all components by unplugging them for 5 minutes including the **T**V. Be sure all COAX CABLES and HDMI CABLES are tight and properly connected**.**

check if the source of light is damaged Otherwise replace the screen.

2.**No image on screen**

- Check to make sure you are on the current input
- If that does not resolve the problem, check the video cable known as the VGA or HDMI cable.

For a projector, make sure the cable is connected to the computer's VGA port and the projector's VGA port. For TVs, this would mean that either a COAX CABLE, HDMI CABLE, ETC may not be working properly, be sure all COAX CABLES and HDMI CABLES are tight and properly connected. Check also the banana cable (RCA connector), is a type of electrical connector commonly used to carry audio and video signals. The name RCA derives from the company Radio Corporation of America.

3. **Broken display parts**

Replace it with the new one

4.**Incorrect colors**

- Use the buttons on the front of the monitor to adjust its contrast and brightness levels.
- Change the color quality settings on the computer's built-in video card.
- Change the screen resolution.

5. Residual image

It is an image left on a screen after displaying the same image for a long time. It is a faded version of the image or "ghost image" which is known as image burning that covers part or all of the screen.
Image persistence or LCD shadow can be reversed by allowing the liquid crystals to return to their relaxed state. In other words, turning off the monitor for a sufficient long period of time (a few hours or may be a day) will relax the crystals and eliminate image retention.
Image **retention** is temporary: it goes in time
Image **burn- in** is permanent: it does not go away.
Another prevention method is to reduce screen contrast as much as you can. (BLOG, 2021)

6. **Flickering:** shining unsteadily; wavering.

There are a few ways to correct flickering:

a) Missed connection, it is simply caused by malfunctioning cord or a loose of connection
b) Off again, on again: resetting a TV could help to adjust the settings and fix whatever was malfunctioning. for best result turn the TV off and then unplug it for one to five minutes before plugging it back in and turning it ON.
c) WIFI router, try to move it away from the TV to see if that helps and prevents the interference with your television.
d) Update software, for newer TVs.
e) Confirm the source, because other devices that are connected to the TVs may cause that problem. Some of the devices are DVD player or blu ray player.
f) Overheating, try letting the TV rest by turning it off for a while. If it occurs again you could look into getting the cooling system fixed or you might want to consider a new TV.
g) Dying bulbs; LED TVs works by backlighting the image with a bunch of little LED lights. If one or more of those bulbs is dying, you might start seeing flickering spots in your TV. You can replace the backlight or buy the new TV otherwise you can check if the TV is under warranty, you might be able to have it replaced for free.
h) Burned in
i) Disconnected from the inside: you will need to open the device and tight every connection.

A video card that isn't properly seated on the motherboard can cause a lot of problems, including a screen flicker. Turn the computer off and open the case. If the card is seated on the motherboard properly but the issue persists, a faulty card is likely the issue. The video card also called graphic card is responsible for rendering an image to your monitor, and it does this by converting data into a signal your monitor can understand. This is naturally very important for gamers and video editors.

It is an integrated circuit that generates the video signal sent to a computer.

7. **Loose connection**

A reason why your TV loses its connection is because of signal interference. Such things might obtain in the way of your smart TV's ability to keep the connection. One of the easiest ways that you can do fix this problem is to place your router close to your Smart TV.

1.3.D.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

- ✓ What can you do on your device when there is no light on screen?
- ✓ How can you correct the problem of Residual image on your electronic display?

- ✓ List other faults that can occur on an electronic display

1.3.D.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Based on what we saw in class, Identify the faults on this electronic display device and propose the solutions on each fault?

1.3.D.3.  Points to Remember (Take home message)

Common faults that occur on electronic display

- ✓ No light on screen
- ✓ No image on screen
- ✓ Broken display parts
- ✓ Incorrect colours
- ✓ Residual image
- ✓ Flickering
- ✓ Loose connection

1.3.E.  Learning out come 1.3 : formative assessment

 **Please mix different assessment instruments/tools for triangulation and relevancy of assessment**

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions

Q1. A reason why your TV loses its connection is because of signal interference. **T**

Q2. Residual image is an image left on a screen after displaying the same image for a short time. **F**

Q3. A video card is an integrated circuit that generates the video signal sent to a computer. **T**

Q4. Coax cables is not the same as coaxial cable. **F**

Q5. Flickering can be caused by non-updated software. **T**

- ✓ Multiple choice

Match the following:

Answers	EXAMPLES	Safety precautions
1. **C**	1. Turning off the monitor for a sufficient long period of time (a few hours or may be a day) will relax the crystals and eliminate image retention	A) No light on screen
2.**D**	2. One of the easiest ways that you can do fix this problem is to place your router close to your Smart TV.	B) Flickering
3.**B**	3.A video card that isn't properly seated on the motherboard	C) Residual image
4.**E**	4.Use the buttons on the front of the monitor to adjust its contrast and brightness levels.	D)Loose connection
5.**F**	5.Check to make sure you are on the current input	E)Incorrect colors
6.**A**	6. For a projector, Check the display settings on your computer and Check the resolution settings on your source device and select a 1080p or 720p resolution.	F)No image on screen
		G) Broken display parts
		H) burned VGA cables

- ✓ Essay: Question with short responses and Open ended questions
- ✓ Case studies

1. a) List the common faults that occurs in electronic display …… / **6pts**

b) Differentiate two of them ……. **/4 marks**

Practical assessment

- Assessment instruments/tools

✓ Task to be performed with performance checklist/quality product checklist

Gisakura tea factory located in NYAMASHEKE district, has assigned different tasks to a technician to maintain a P3 Full Colour OLED Module electronic display board (Module Size: 224X106 mm). The display in question picture are not clear as a video equipment technician, you are requested to identify the fault. You must do activity within 20 min

Checklist	Score	
	Yes	No
Indicator:Materials are well identified		
✓ Soldering tin		
✓ Electronic components		
✓ Cables and wires		
✓ Universal anchors		
✓ Screws		
Indicator:Tools are well identified		
✓ Soldering irons		
✓ Screwdrivers		
✓ Pliers		
✓ Spanners		

✓ Brushes		
✓ Sponge		
✓ Soft cloth		
✓ Chisel		
✓ Hammer		
✓ Tape measure		
✓ Step ladder		
✓ Spirit level		
Indicator:Equipments are identified		
✓ Drilling machine and accessories		
✓ Soldering station		
✓ Digital Multimeter		
✓ Screwdriver machine		
✓ Air blowing machine		
✓ Rivet gun		
✓ PPE		
Observation		

Indicator: The electronic display is well checked		
✓ Checking method are applied		
✓ Parts are checked diagnose		
Indicator: the fault is well fixed		
✓ Fault fixing techniques are applied		
✓ The image is displayed on screen		
Observation		

Learning Unit 2: Repair electronic display

STRUCTURE OF LEARNING UNIT

Picture/s reflecting the Learning unit 2


Learning outcomes:

2. 1. Check the electronic display parts

2. 2. Suitable fixing of faulty parts according to their types

2.3. Correct testing of repaired electronic display according to testing techniques

Learning Outcome 2.1: Check the electronic display parts

Duration: 10 hours

Learning outcome 2.1.objectives :

By the end of the learning outcome, the trainees will be able to:

1. Define correctly the term electronic display as used in electronics.
2. List properly Electronic display technologies as used in electronic display devices
1. Disassemble and assemble properly electronic display devices as used in electronic technology
2. Explain clearly the role of each electronic display main parts as used in electronics
3. Describe correctly the Checking methods used in electronic display devices

2.1.A. Resources

Equipment	Tools	Materials
o Electronic display o Drilling machine and accessories	• Soldering irons • Screwdrivers • Pliers	➢ Adhesives ➢ Soldering tin ➢ Screws

o Screwdriver machine Soldering station o Digital Multimeter o Air blowing machine o Rivet gun o PPE o Projector	• Spanners • Chisel • Hammer • Tape measure • Step ladder • Spirit level • Brushes • Sponge • Soft cloth • tables	➢ Universal anchors ➢ Cables and wires ➢ Electronic components

2.1.B. Advance preparation:

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

CONTENT

2.1.C. Content 1: **Introduction to electronic display operation and its technologies**

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

Electronic visual displays present visual information according to the electrical input signal either by emitting light (then they are called active displays) or, alternatively, by modulating available of reflection or transmission (light modulators are called passive display). A backlight is a form of illumination used in liquid crystal displays (LCDs).

Backlighting is the process of illuminating the subject from the back. Backlights are used in small displays to increase readability in low light conditions such as in wristwatches, and are used in smart phones, computer displays and LCD televisions to produce light in a manner similar to a CRT display.

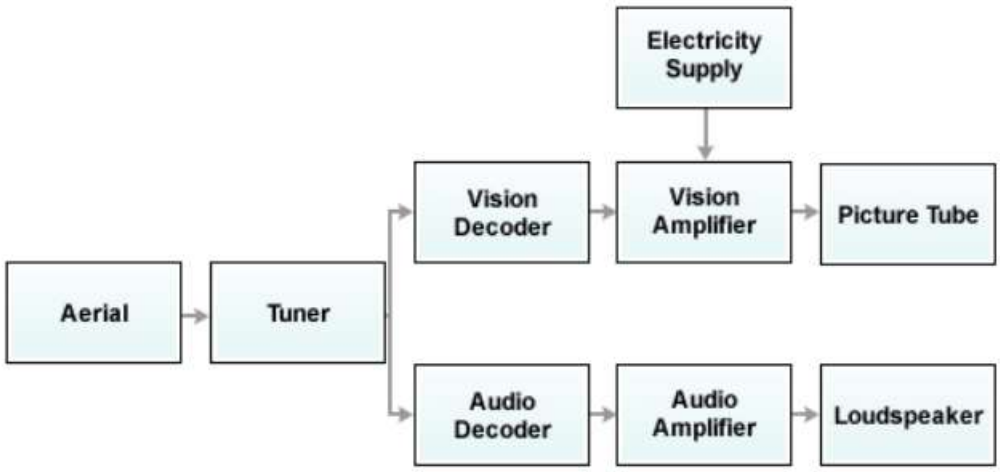
An OLED and LED displays are emissive display where plasma, LCD and CRT display need a backlight.

Electronic display technologies

1.CRT(A cathode-ray tube)

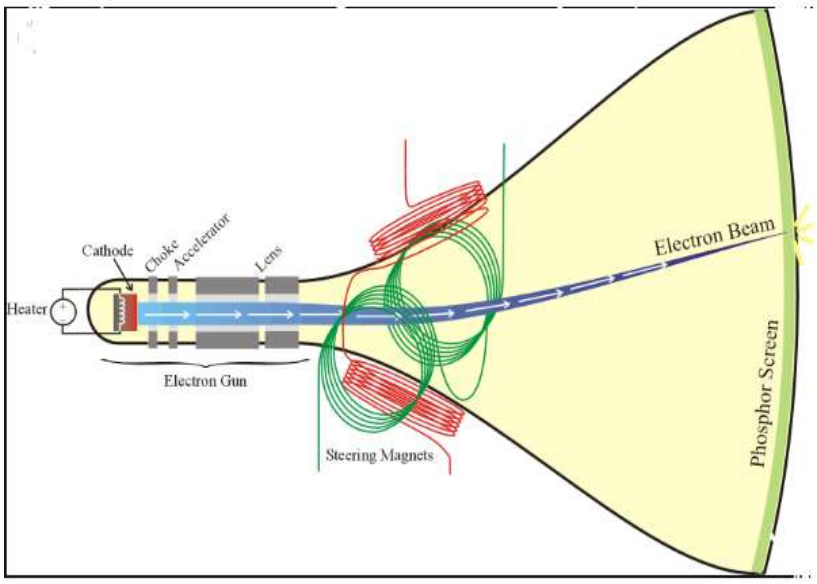
The first computer monitors and the TV receiver screen used cathode ray tubes (CRTs). One electron beam was used to produce the picture, the electron beam is made of white phosphorus which only allows it to produce black and white images. The display was monochrome and far less sharp and detailed than on a modern flat-panel monitor. CRT monitors have a superior response time.

TV RECEIVER BLOCK DIAGRAM



- The aerial picks up the signals transmitted by all the television transmitters in range and converts them into electrical signals.
- The tuner can be adjusted to select one particular signal by picking out its carrier frequency and rejecting all other frequencies.
- The vision decoder separates the video information from the carrier wave.
- The audio decoder separates the audio information from the carrier wave.
- The electricity supply provides the extra energy needed to power both the audio and vision amplifiers and the picture tube and to drive the loudspeaker.
- The vision amplifier increases the strength of the video signal.
- The audio amplifier increases the strength of the audio signal.
- The picture tube converts the video part of the electrical signal into a picture made up of light.
- The loudspeaker transforms the audio part of the electrical signal into sound waves.

1. External parts of a TV receiver
    - Cover
    - Volume control
    - Channel selector
    - Menu
    - IR sensor
    - Power inlet
    - Audio/video inlet and outlet systems (USB driver, HDMI driver, SD CARD)
2. Main internal parts of a TV receiver;
    - DC power supply (rectifier, filter and regulator, driver transistor or driver IC, Chopper transformer)
    - Amplifier
    - Tuner
    - synchronizing IC
    - vertical IC
    - EHT : Extra high tension
    - Screen



HOW A CRT TV WORKS?

1. An antenna (aerial) on your roof picks up radio waves from the transmitter. With satellite TV, the signals come from a satellite dish mounted on your wall or roof. With cable TV, the signal comes to you via an underground fiber optic cable.
2. The incoming signal feeds into the antenna socket on the back of the TV.
3. The incoming signal is carrying picture and sound for more than one station (program). An electronic circuit inside the TV selects only the station you want to watch and splits

the signal for this station into separate audio (sound) and video (picture) information, passing each to a separate circuit for further processing.

4. The electron gun circuit splits the video part of the signal into separate red, blue, and green signals to drive the three electron guns.
5. The circuit fires three electron guns (one red, one blue, and one green) down a cathode-ray tube, like a fat glass bottle from which the air has been removed.
6. The electron beams pass through a ring of electromagnets. Electrons can be steered by magnets because they have a negative electrical charge. The electromagnets steer the electron beams so they sweep back and forth across the screen, line by line.
7. The electron beams pass through a grid of holes called a mask, which directs them so they hit exact places on the TV screen. Where the beams hit the phosphors (colored chemicals) on the screen, they make red, blue, or green dots. Elsewhere, the screen remains dark. The pattern of red, blue, and green dots builds up a colored picture very quickly.
8. Meanwhile, audio (sound) information from the incoming signal passes to a separate audio circuit.
9. The audio circuit drives the loudspeaker (or loudspeakers, since there are at least two in a stereo TV) so they recreate the sound exactly in time with the moving picture.

2.**LCD**(A liquid crystal display)

An LCD pixel is made up of three sub-pixels in elementary colors. the LCD doesn't emit light, the light emitted by the backlighting passes through the liquid crystal and is then colored by a filter. Each sub-pixel has the same architecture, only the color of the filter changes depending on the pixel. The liquid crystal of each sub-pixel can be controlled electrically. More or less light is allowed to pass through the crystal to control how much red, green and blue is emitted for each pixel.

2.Benefits of LCDs over CRT displays	2.Drawbacks
• LCDs consume less power • LCDs take up much less space • Better picture quality • Also has less flickering and are considerably lighter. • They're also ideal for watching television in any light condition. They	• It is limited when compared to other types of HDTVs. The display has a low contrast ratio. • some of the crystals in the display can burn out, leading to "dead pixels" on the screen. These blank flecks are irreparable and can be

work equally well in dark or well-lit rooms. • LCD fabrication is simpler and less costly compared to the other HDTVs. • The higher price.	very distracting. Because of this, LCD TVs are not as long-lived as other types of HDTV technology.

3.**PLASMA**

A plasma display panel is a type of flat panel display that uses small cells containing plasma (ionized gas that responds to electric fields).

How a Plasma TV Works?

Plasma TVs were developed in response to the weaknesses of LCD displays. Like LCD displays, a plasma screen TV has two panes of glass that make up the flat screen. Rather than using liquid crystals, plasma TVs have chambers filled with xenon and neon. When electricity runs through these chambers, the gas converts into plasma; as the plasma moves through the chamber, it emits photons that display in various colors.

Benefits	Drawbacks
• Plasma displays are found mostly in high-quality (excellent picture quality), large-format video systems. • Big size • Video performance	• High power consumption • High cost • TVs are heavier • They are expensive to repair and sometimes cannot be repaired at all. • TVs also look much better in low light than in bright light. (Lower brightness). • Much thinner • Shorter life span and there is no option to repair a burnt out tube. • Often designed to be mounted on a wall.

4.LED (Light emitting diodes.)

The newest type of HDTV on the market uses LED technology. LED screens use light emitting diodes. This makes LEDs more energy efficient.

2.Benefits	3.Drawbacks

• LED TVs have better color contrast and brightness (greatly improves picture quality) • the display is bright enough to watch in any light. • They also draw less power than either LCD or plasma displays.	• high cost • LED TVs still sometimes suffer from the “dead pixel” issue.

5.OLED (Organic light-emitting diode)

2.Benefits	3.Drawbacks
• OLED monitors provide higher contrast • better color reproduction • OLED displays offer a better image quality compared to LCD or Plasma displays • They also draw less power than either LCD or plasma displays. • More efficient • OLED substrate are plastic rather than the glass used for LED	• they require more power when displaying documents with white or bright backgrounds • they are often more expensive • They are thinner.

OLED is a technology that uses LEDS in which the light is produced by organic molecules. It is a flat light emitting technology, made by placing a series of organic thin films between two conductors. When electrical current is applied, a bright light is emitted.

Which Television to Buy

The type of TV you choose will depend on:

What you’re watching
How often you watch TV
What conditions you’ll watch TV in and

How much you're willing to spend.

The superior picture quality may make a LED or plasma display superior for some viewers, but the lower cost of LCD technology might be a selling point for some.

If you'll be watching your television during the day or in a bright area, you'll want to avoid a plasma screen. If you want a rich, dark picture and cinematic experience in a darkened room, plasma might be the best choice.
No matter what you choose, your new television will have a better picture than your old CRT set.

Cleaning the screen

For both **LED** and **LCD** TVs, Clean with a soft, dry cloth to avoid scratching or damaging the screen. In all cases
turn off the TV
unplug the TV
If you have any doubts about which type of TV you have, you can always consult the owner's manual instructions.

For CRT TV, use a soft damp cloth rub around the plastic case of your TV to remove dust. take another soft cloth and spray some Window Cleaner onto it until it is damp. Spray is a mass of very small drops of liquid carried in the air. It's okay to use a window cleaner, such as:
Windex
Anything with alcohol
Anything with ammonia but has to stay away from the screens.

2.1.C.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

8. Talk about electronic display technologies
9. Explain the operation of an electronic display

2.1.C.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Among those electronic display assembled on table, write the name of each and discuss on the operation of each

2.1.C.3.  Points to Remember (Take home message)

Electronic display technologies

1. CRT
2. PLASMA
3. LCD
4. LED
5. OLED

2.1.D. Content 2: Disassembling process (steps)

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- Interpretation of the user manual
- Turn off the power
- Disconnect the power cable
- Remove cover
- Disconnect internal functional parts
- Remove internal functional parts


2.1.D.1 Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

10. Enumerate assembling and disassembling steps to follow while assembling and disassembling an electronic display


2.1.D.2. Practical learning Activity

(Example: Trainees in pair perform ……)

After disassembling an electronic display, make an assembling process. Remember to follow the steps.


2.1.D.3. Points to Remember (Take home message)

Disassembling process (steps)

Interpretation of the user manual

Turn off the power

Disconnect the power cable

Remove cover

Disconnect and remover internal functional parts

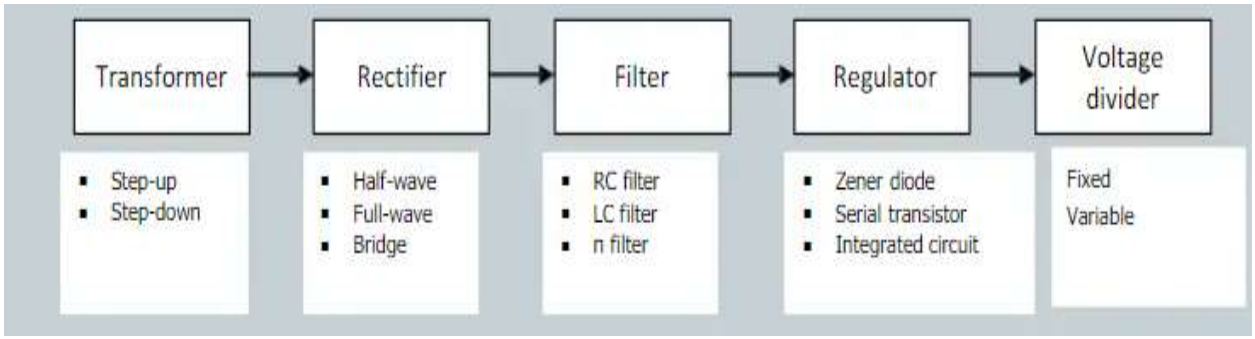
2.1.E. Content 3: Checking electronic display main parts and their functions

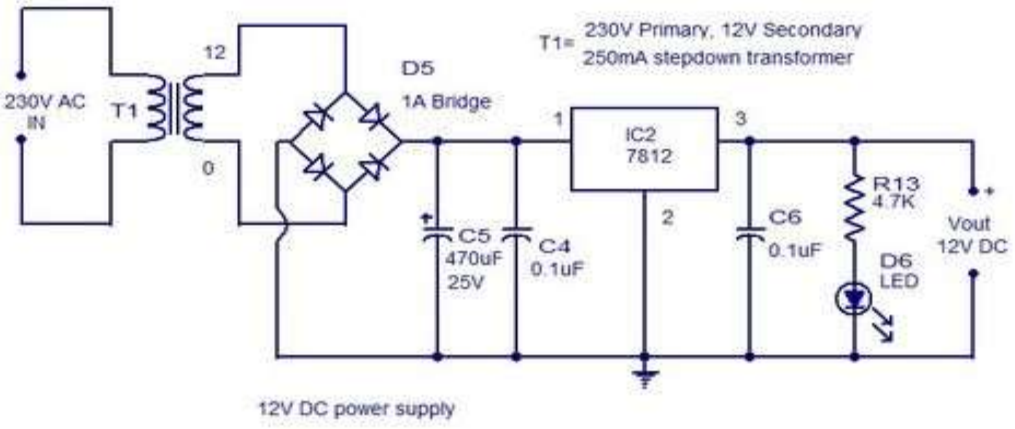
 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

1.Power supply

A power supply is an electrical device that supplies electric power to an electrical load. The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power the load. As a result, power supplies are sometimes referred to as electric power converters.

CIRCUIT DIAGRAM OF DC POWER SUPPLY





i. Transformer, a transformer is a static piece of equipment used either for raising (step up) or lowering the voltage of an AC (step down). It essentially consists of two windings, the primary and secondary. The winding connected to the AC Source is called primary winding (or primary) and the one connected to load is called secondary winding (or secondary).

ii. A diode is unidirectional device that allows the current flow in only one direction. The working of a diode is not controlled as it will conduct as long as it is forward biased. A full wave rectifier converts both positive and negative half cycles of the ac (alternating current) into dc (direct current). A bridge rectifier uses four diodes to convert both half cycle of the input ac into dc output. this type of rectifier is more preferred than others because it produces a pure DC.

iii. Filter: electronic filters are electrical circuits which perform signal processing functions, specifically to remove unwanted frequency components from the signal, to enhance wanted ones, or both. Filters can be active or passive, and the four main types of filters are low-pass, high-pass, band-pass, and notch/band-reject.

iv. Voltage regulator, any electrical or electronic device that maintains the voltage of a power source within acceptable limits.

2. Screen

A flat panel or area on an electronic device such as a television, computer, or smartphone, on which images and data are displayed.

3. Signal processing

Is considered as the brain of the computer. CPU performs all types of data processing operations. It stores data, intermediate results, and instructions (program). It controls the operation of all parts of the computer. For a TV set and smartphone, the motherboard is taken as the CPU.

4. Signal control

An electronic display can be operated using front panel or remote control. The main functions of the front panel are:

- Receive users input and sent it to the main processor.
- A receiver in the front panel listens to the input from the remote control device.

A remote control is an electronic device used to operate the device from a distance, usually wirelessly. Remote controls for these devices are usually small wireless handheld objects with an array of buttons for adjusting various settings such as television channel and volume, projector settings, etc.

Checking methods

1.**Visual checking**: this method, a technician uses his/her experience through cognitive knowledge to locate the fault in a certain device.

2.**Measuring:** here a technician uses the tools and equipments that are able to locate the faults of any device.

2.1.E.1 Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

11. Discuss about the main parts of an electronic display
12. Explain the circuit diagram of dc power supply

2.1.E.2. Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Among those equipments assembled on table, identify the power supply of each electronic display.

2.1.E.3. Points to Remember (Take home message)

Electronic display main parts

- Power supply
- Screen
- Signal control
- Signal processing

Checking methods

- Visual checking
- Measuring

2.1.F. Learning outcome 2.1 : formative assessment

Please mix different assessment instruments/tools for triangulation and relevancy of assessment

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions

Q1. Signal control is a part of an electronic display that can be operated using front panel or remote control. **T**

Q2. A remote control is an electronic device used to operate the device from a distance, **T**

Q3. Filter is unidirectional device that allows the current flow in only one direction. **F**

Q4. The four main types of filters are low-pass, high-pass, band-high, and notch/band-reject. **F**

Q5. Screen is a flat panel or area on an electronic device such as a television, computer, or smartphone, on which images and data are displayed. **T**

- ✓ Multiple choice

Q1. Checking methods on electronic display are: **2 marks**

a. Visual checking
b. Remove cover
c. Measuring
d. Maintaining

Q2. The role of voltage regulator is to:

a. Maintains the voltage of a power source within acceptable limits.
b. Remove unwanted frequency components from the signal
c. perform signal processing functions
d. convert both half cycle of the input ac into dc output. **/2 marks**

Q3. The role of transformer is to:

a. raise (step up) or lower the voltage of an AC (step down).
b. Remove unwanted frequency components from the AC signal
c. raise (step up) or lower the voltage of an AC
d. both A and C are correct.
e. used either for raising (step up) or lowering the voltage of a DC (step down).
f. None of the above

Q3. The A full wave bridge rectifier:

a. converts both positive and negative half cycles of the ac (alternating current) into dc (direct current).
b. converts only positive half cycles of the ac (alternating current) into dc (direct current).
c. uses two diodes
d. uses one diodes and a capacitor for filtering
e. uses four diodes
f. Both a and e are correct
g. All of the above/2 marks

✓

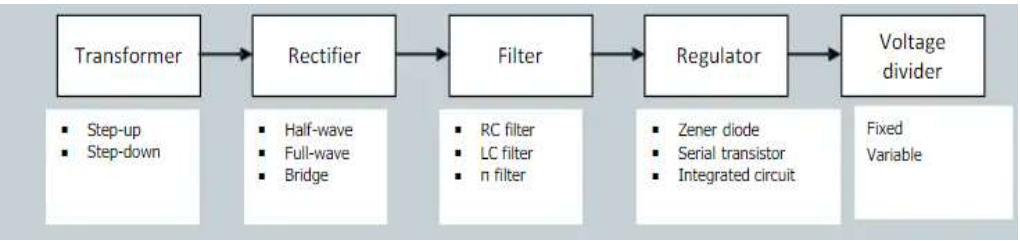
✓ Essay: Question with short responses and Open ended questions

1. Define power supply …… / **3pts**

2. Describe four types of filter in electronics**/4 marks**

3.Write out four (4) main parts of an electronic display and distinguish them…. / **6pts.**

4.Explain the working principle of the below block diagram ……. **/6 marks**



Learning Outcome 2.2: Fix the faulty parts

Duration: 5 hours
2.2.A. Learning outcome 2.2 objectives :

By the end of the learning outcome, the trainees will be able to:

1. Identify correctly electronic display (faulty) parts as used in electronics.
2. List properly Faults fixing techniques as used in electronic display devices
3. Assemble properly electronic display as used in electronic technology
4. Explain clearly the role of each electronic display main parts as used in electronics

2.2.B. **Resources**

Equipment	**Tools**	**Materials**
o Electronic display o Drilling machine and accessories o Screwdriver machine Soldering station o Digital Multimeter o Air blowing machine o Rivet gun o PPE o Projector	• Soldering irons • Screwdrivers • Pliers • Spanners • Chisel • Hammer • Tape measure • Step ladder • Spirit level • Brushes • Sponge • Soft cloth • tables	➢ Adhesives ➢ Soldering tin ➢ Screws ➢ Universal anchors ➢ Cables and wires ➢ Electronic components

2.2.C. **Advance preparation:**

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

CONTENT

2.2.D. **Content 1**: **Identification of electronic display (faulty) parts**

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

I. Power supply system

i.Blown transformer

There are some steps to follow in testing the transformer:

- Test if there is open circuit between the core and the primary winding, the core and the secondary winding, and the primary winding and the secondary winding. If this condition is achieved the transformer is working properly.
- Connect the transformer to the power source and then connect the primary winding of the transformer to the multimeter leads set on ac voltage. You will get the voltage above 220v then connect the secondary winding of the transformer to the multimeter leads, you will get the voltage of the transformer operation.
- Set the Multimeter to the resistance measurement, then test if the resistance of the primary winding is greater than that of secondary winding for a step down transformer. It will be the opposite for a step up transformer.

ii. Blown rectifier

- Connect the cathode terminal of the diode to the terminal marked positive on the multimeter, and the anode to the negative or common terminal. Set the meter to read ohms, and a "lowish" reading should be obtained. Reverse the connections. This time a high resistance reading should be obtained.
- All you want to know is whether the diode has a low resistance in the forward direction and a high resistance in the reverse direction. Diode troubles are indicated for any of the following: extremely low resistance in both directions (diode shorted); high resistance in both directions (diode open).

iii. Blown up filter

a good capacitor stores an electrical charge and may remain energized after power is removed. Before touching it or taking a measurement,

a) turn all power off

b) use your multimeter to confirm that power is off and

c) carefully discharge the capacitor by connecting a resistor across the leads be sure to wear appropriate personal protective equipment.

- For a correct measurement, the capacitor will need to be removed from the circuit. Connect the test leads to the capacitor terminals. If the capacitance value is within the measurement range, the multimeter will display the capacitor's value. It will display ol if

a) the capacitance value is higher than the measurement range

b) the capacitor is faulty.

- Use your digital multimeter (DMM) to ensure all power to the circuit is off. If the capacitor is used in an ac circuit, set the multimeter to measure ac voltage. If is used

in a dc circuit set the DMM to measure dc voltage. Then measure the voltage across the capacitor to ensure if it is around or equal to the desired operational voltage.

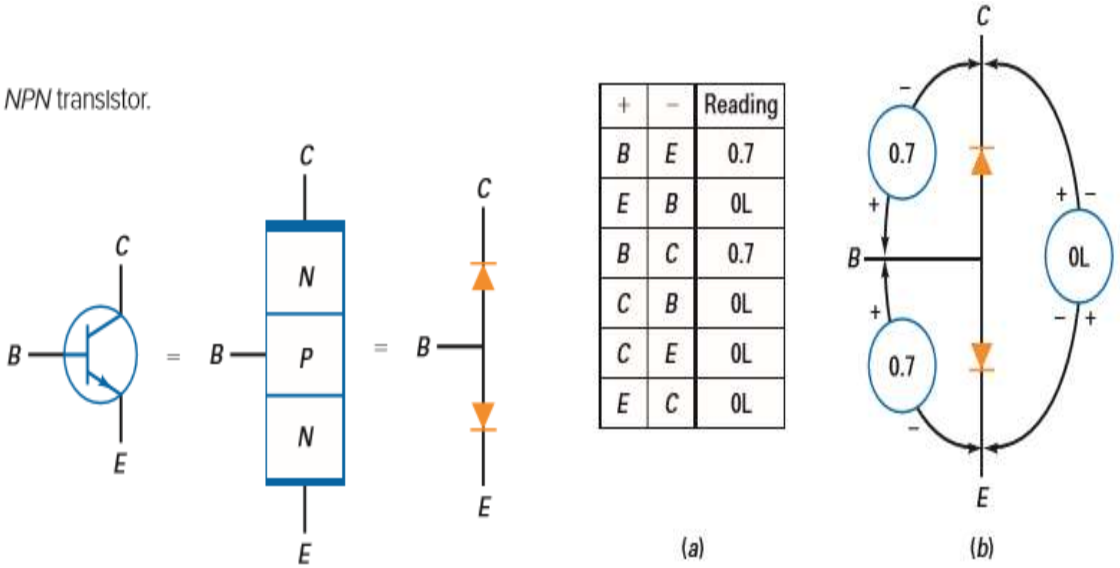
- Set the multimeter in the continuity mode, if the beep sound occurs of there is a continuity and hence the capacitor is shorted.

- Then visually inspect the capacitor. If leaks, cracks, or other signs of deterioration are evident, replace the capacitor.

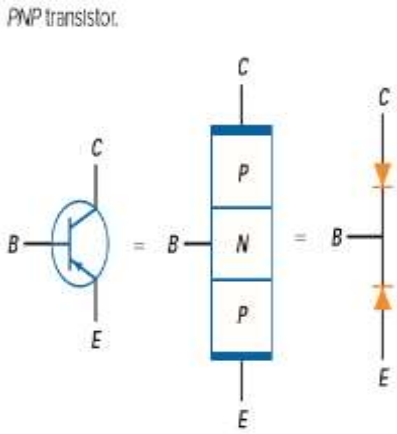
iv. Blown up resistors

Physically cracked (broken), burned and blacked, bad smell or broken lead. To ensure accurate measurement, one end of the resistor should be soldered from the circuit. If the measured resistance is infinite, the resistor has failed to open (open circuit). If the measured resistance is far from the nominal value, it indicates that the resistance value is not suitable for reuse.

II. Transistor for multimeter test.

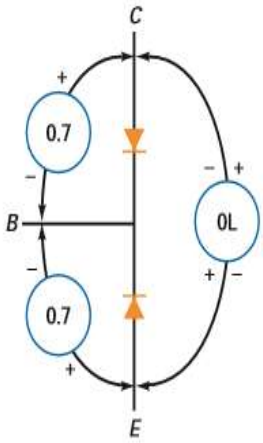


+	−	Reading
B	E	0.7
E	B	0L
B	C	0.7
C	B	0L
C	E	0L
E	C	0L



+	−	Readings
B	E	0L
E	B	0.7
B	C	0L
C	B	0.7
C	E	0L
E	C	0L

(a)



(b)

Blown chopper transformer

chopper transformer fails a lot due to design problem of the circuit. Chopper circuits are known as DC to DC converters. Similar to the transformers of the AC circuit, choppers are used to step up and step down the DC power. They change the fixed DC power to variable DC power. Using these, DC power supplied to the devices can be adjusted to the required amount.

II. Screen

III. Control system (control module)

IV. Data processing unit (motherboard)

 ic blown up **(**destroyed)

The ic is nothing but a small chip containing the very large and complicated circuit. An ic (integrated circuit) cannot be repaired and neither it had to be since they come in very cheap cost in comparison to the circuitry they contain.

Ways to test an ic and if the ic is fine and in proper working condition then it has to pass all the four conditions.

Shorting condition

The purpose of this method is to test if there is a short circuit inside the ic

Set your multimeter to the continuity mode.

Connect all of the pins altogether from one of the side in ic to the multimeter cable.

Take the terminal-cable from multimeter and connect it one by one to each of the pins of another side separately.

If the beep sound occurs of there is a continuity in more than 50% of the combinations, then there is a good chance of the ic to be shorted from inside.

Turn the multimeter knob at vdc. Then place the black probe at the ground or earth around the ic and use the red probe to check each of the legs of the ic, each leg will have a reading but anytime there is an audible continuous sound from the multimeter when you touch a particular leg of the ic it means there is a short circuit in that leg and this means that the ic is bad. This means the ic is shorted to the ground.

Leakage condition

In this method you have to test an ic that weather the package is damaged. Take the observation of the ic from each of the sides possible, if you see even a little crack, burned mark or its broken from either side then the ic is surely to be damaged or leaked.

Heating condition

In the method we test if an ic is getting overheated unnecessarily.

Give the voltage supply to the ic as per its operating condition or if it's on board then turn its supply on.

Touch the ic with your finger just by starting the voltage supply to it.

Notice if the ic is getting heat up as it naturally gets or if you are not able to touch it after few 10-12 seconds.

If the ic is getting heat up extremely faster, then the ic is surely to be damaged.

 cooling system faults

The most common cooling system problems fall into three common areas such as overcooling, high heat and noise.

- Clear the area around the electronic display
- Ensure there is nothing blocking the electronic display vents.
- To brush the cooling fan if the problem persists replace the component.

V. Connectivity

VI. Signal source

VII. Connecting cables
VIII. Connectors and ports
IX. Short or open electronic components

- **Open-circuit faults**: occurs when current is not flowing where it is supposed to pass. Here the resistance becomes almost infinite and the current refuse to pass in that path.
- **Short-circuit faults**: On the other hand, if you find current flowing somewhere it is not supposed to be flowing. Here the resistance becomes almost zero and the current pass in the path where it is easy to flow.

2.2.D.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

13. Talk about electronic display faulty parts and propose the solutions on each

2.2.D.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

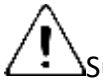
✓ Based on This electronic display, write the name of each fault and correct them

2.2.D.3.  Points to Remember (Take home message)

Electronic display (faulty) parts

1. Power supply system
2. Screen
3. Control system
4. Data processing unit
5. Connectivity
6. Signal source
7. Connecting cables
8. Connectors and ports
9. Short or open electronic components

2.2.E.Content 2: Faults fixing techniques

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- Disordering and Soldering different components
- Replacement of defective components.
- Cleaning
- Tightening loose cables (to make something more fixed in place)
- Removing the short circuit
- Removing the open circuit

2.2.E.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

14. Discuss about the Faults fixing techniques do you know

2.2.E.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

✓ After disassembling an electronic display, apply Faults fixing techniques do you know on this display

2.2.E.3. Points to Remember (Take home message)

Faults fixing techniques

- Disordering and Soldering different components
- Replacement of defective components.
- Cleaning
- Tightening loose cables (to make something more fixed in place)
- Removing the short circuit
- Removing the open circuit

2.2.F.**Content 3: Assembling process**

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- Interpretation of the user manual
- Connect and put internal functional parts
- Put the cover
- Connect the power cable
- Turn ON the power

2.2.F.1. Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

15. Discuss about the assembling process of an electronic display

2.2.F.2 Practical learning Activity

(Example: Trainees in pair perform ……)

✓ Among those equipments assembled on table, assemble each of the electronic display.

2.2.F.3 Points to Remember (Take home message)

Assembling process (steps)

- Interpretation of the user manual
- Connect and put internal functional parts
- Put the cover
- Connect the power cable
- Turn ON the power

2.2.G. Learning outcome 2.2 : formative assessment

Please mix different assessment instruments/tools for triangulation and relevancy of assessment

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions

Q1. Open-circuit faults occur when current is not flowing where it is supposed to pass. Here the resistance becomes almost infinite and the current refuse to pass in that path. **T**

Q2. Short-circuit fault, the resistance becomes almost zero and the current pass in the path where it is easy to flow. **T**

Q3. In testing a capacitor, set the multimeter in the continuity mode, if the beep sound occurs of there is a continuity and hence the capacitor is not shorted. **F**

Q4. In testing a capacitor, set the multimeter in the continuity mode, if the beep sound occurs of there is a continuity and hence the capacitor is shorted. **T**

Q5. Cleaning is not one of the faults fixing techniques. **F**

  - ✓ Multiple choice

Q1. One of the following is not belongs in the assembling steps

I. Interpretation of the user manual
II. Disconnect and put internal functional parts
III. Put the cover
IV. Connect the power cable
V. Turn ON the power **/2 marks**

Q2. The role of voltage regulator is to:

e. Maintains the voltage of a power source within acceptable limits.

f. Remove unwanted frequency components from the signal
g. perform signal processing functions
h. convert both half cycle of the input ac into dc output. **/2 marks**

Q3. Two of the following is not belongs in the faults fixing techniques

a. Disordering and Soldering different components
b. Replacement of defective components.
c. Tightening loose cables (to make something more fixed in place)
d. Turn ON the power
e. Removing the open circuit
f. Removing the open circuit
g. Continuity testing

Q4. The main electronic display parts are(is):

1. Power supply system
2. Signal source
3. Connectivity
4. Screen
5. Control system
6. Data processing unit
7. Cable
8. Both 1 and 4 are correct
9. All of the above/2 marks

Essay: Question with short responses and Open ended questions

1. Explain clearly the role of electronic display main parts…… / **6pts**
2. How can you test if an IC is blown up **/4marks**
3. Enumerate the assembling process of an electronic display / **6pts.**
4. Differentiate open circuit from short circuit **/4marks**
5. How can you correct the connectors and ports faults **/6 marks**

Practical assessment

- Assessment instruments/tools

  ✓ Task to be performed with performance checklist/quality product checklist
  Trainer prepare practical assessment about faults fixing

Learning Outcome 2.3: Test the electronic display

Duration: 5 hours

2.3.A Learning outcome 2.3 objectives :

By the end of the learning outcome, the trainees will be able to:

1. Measure correctly the electrical Voltage as used in electronic display.
2. Measure clearly the electrical current as used in electronic display.
3. Supply properly signal to the electronic display as used in electronics

2.3.B. Resources

Equipment	Tools	Materials
o Electronic display o Drilling machine and accessories o Screwdriver machine Soldering station o Digital Multimeter o Air blowing machine o Rivet gun o PPE o Projector	• Soldering irons • Screwdrivers • Pliers • Spanners • Chisel • Hammer • Tape measure • Step ladder • Spirit level • Brushes • Sponge • Soft cloth • tables	➢ Adhesives ➢ Soldering tin ➢ Screws ➢ Universal anchors ➢ Cables and wires ➢ Electronic components

2.3.C. Advance preparation:

. Preparation of the workshop

. Avail electrical power at workplace

2.3.D. Content 1: Verify electronic display functionality

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

1.Measurement of electrical quantities: Voltage, current

By using multimeter you can measure the voltage and current passing through different components.

2.Supplying signal to the electronic display

You connect the computer to the projector and check if the projector is receiving the input signal.

A Video Graphics Array VGA and The High-Definition Multimedia Interface HDMI connectors allows for video connections. Especially No soldering is required which allows for quick installation. They are shown below:

2.3.D.1. Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

16. Talk about electronic display functionality

2.3.D.2. Practical learning Activity

(Example: Trainees in pair perform ……)

✓ Based on This electronic display, Verify its functionality.

2.3.D.3.  Points to Remember (Take home message)

Verify electronic display functionality

- Measurement of electrical quantities
  - Voltage
  - current
- Supplying signal to the electronic display

2.3.E.  Learning outcome 2.3 : formative assessment

 **Please mix different assessment instruments/tools for triangulation and relevancy of assessment**

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions

Q1. By using multimeter you can measure the voltage and current passing through different components. **T**

Q2. By using multimeter you can measure the frequency of an electronic display signals. **F**

Q3. A Video Graphics Array VGA and The High-Definition Multimedia Interface HDMI are the same cables. **F**

Q4. A Video Graphics Array VGA and The High-Definition Multimedia Interface HDMI connectors allows for video connections**. T**

Q5. You connect the computer to the projector and check if the projector is receiving the input signal. **T**

✓ Multiple choice

Q1. By using multimeter you can measure different electrical quantities, including:

a. Voltage,
b. Power
c. Current
d. Distance
e. Both a and c are correct
f. All of the above

- ✓ Essay: Question with short responses and Open ended questions
- ✓ Case studies

1. Explain the role of each cable, after write their names/ **5pts**

2. How can you verify electronic display functionality**/5marks**

Practical assessment

- Assessment instruments/tools

✓ Task to be performed with performance checklist/quality product checklist

Eric tech group company Ltd located in Rulindo district precisely in Rulindo city need to hire four technician who can help its group to handle different tasks according to the clients they meet day to day. You as one of the technician you are requested to pass the practical examination where there is a P3 Full Colour AMOLED TV working on 5v, recommended resolution of 1080*776, max power consumption: 1200W/square meter and colour display is manual adjust used to display advertisements in that company. The display was working properly after some hours it is not turning ON once connected to the electrical outlet. As an Electronician technician, you are requested to correct that faults so that you can get a job in our Eric tech company. You must do activity within 3 hours.

Checklist	Score	
	Yes	No
Indicator:Materials are well identified		
✓ Soldering tin		
✓ Electronic components		
✓ Cables and wires		
✓ Universal anchors		
✓ Screws		
Indicator:Tools are well identified		
✓ Soldering irons		
✓ Screwdrivers		
✓ Pliers		
✓ Spanners		

✓ Brushes		
✓ Sponge		
✓ Soft cloth		
✓ Chisel		
✓ Hammer		
✓ Tape measure		
✓ Step ladder		
✓ Spirit level		
Indicator:Equipments are identified		
✓ Drilling machine and accessories		
✓ Soldering station		
✓ Digital Multimeter		
✓ Screwdriver machine		
✓ Air blowing machine		
✓ Rivet gun		
✓ PPE		
Observation		

Indicator: The electronic display is well checked		
✓ Checking method are applied		
✓ Parts are checked diagnose		
Indicator: the fault is well fixed		
✓ Fault fixing techniques are applied		
✓ The image is displayed on screen		
Observation		

Assesment Criterion 2: Quality of product

Checklist	Score	
	Yes	No
Indicator: the display is well mounted		
✓ User manual instructions are respected		
Observation		

Learning Unit 3: Install the electronic display

STRUCTURE OF LEARNING UNIT

Picture/s reflecting the Learning unit 3

Learning outcomes:

3. 1. Conduct the site survey Mount the electronic display

3. 2. Configure the electronic display

3.3. Mount the electronic display

Learning Outcome 3.1: Conduct the site survey

Duration: 10 hours

3.1.A. Learning outcome 3.1.objectives :

By the end of the learning outcome, the trainees will be able to:

1. Define correctly the term site survey as used in electronics.
2. List properly site surveying instruments as used in electronic display technologies
3. Explain clearly the role of site surveying instruments as used in electronic display technologies
4. Explain clearly the site surveying factors as used in electronic display

3.1.B. Resources

Equipment	Tools	Materials
o Electronic display o Drilling machine and accessories o GPS o Theodolite o Screwdriver machine Soldering station o Digital Multimeter o Air blowing machine o Rivet gun o PPE o Projector	• Soldering irons • Screwdrivers • Pliers • Spanners • Chisel • Hammer • Tape measure • Step ladder • Spirit level • Brushes • Sponge • Soft cloth • Tables • Surveyor hand tools	➢ Adhesives ➢ Soldering tin ➢ Screws ➢ Universal anchors ➢ Cables and wires ➢ Electronic components

3.1.C. Advance preparation:

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

3.1.D. Content 1: Introduction to a site survey

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

Site surveys are inspections of an area where work is proposed, to gather information for a design or an estimate to complete the initial tasks required for an outdoor activity.

Purpose of site survey:

- Gather the information about the design.
- Determination of a precise location
- Gather the information about the cost of work.
- Determination of the best orientation for the site
- Determination of the location of the obstacles.
- Consult to the nature of the project

Examples of projects requiring a preliminary site survey:

- Urban construction
- Specialized construction (such as the location for a telescope).

Telescope is an optical instrument designed to make distant objects appear nearer, containing an arrangement of lenses, or of curved mirrors and lenses, by which rays of light are collected and focused and the resulting image magnified.

- wireless network design.

3.1.D. 1. Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

17. Talk about electronic display site survey
18. Explain the Purpose of site surveying

3.1.D. 2.  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ We need to install a TV advertisement at GISHUSHU road near the convention centre main gate, make a site survey there and write the necessary information you gain.

3.1.D. 3.  Points to Remember (Take home message)

Definition of Site surveys

Site surveys are inspections of an area where work is proposed, to gather information for a design or an estimate to complete the initial tasks required for an outdoor activity.

Purpose of site survey:

- Gather the information about the design.
- Determination of a precise location
- Gather the information about the cost of work.
- Determination of the best orientation for the site
- Determination of the location of the obstacles.
- Consult to the nature of the project

3.1.E. Content 2: Introduction to site surveying instruments

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- GPS

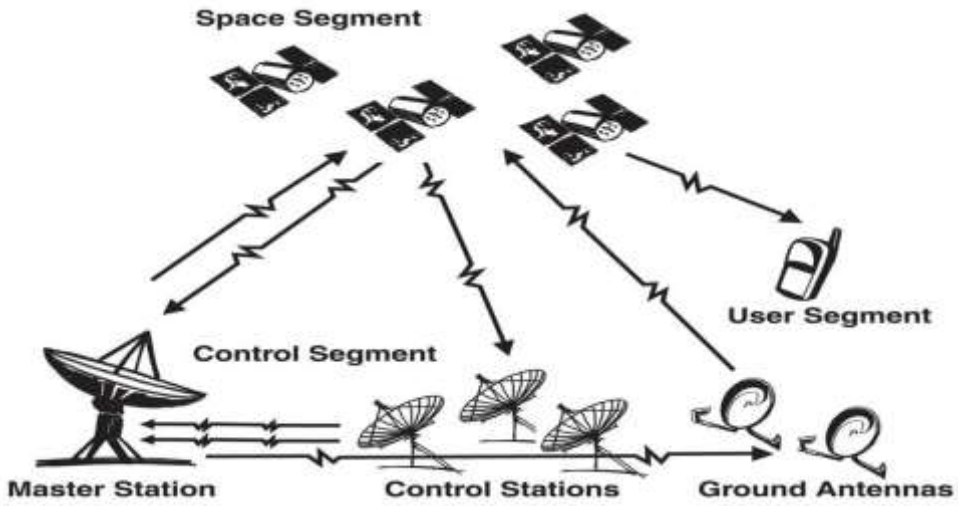
GPS Stands for "Global Positioning System." GPS is a satellite navigation system used to determine the ground position of an object. They are used in many commercial devices such as automobiles, smartphones, watches, etc.

In general, there are five key uses of GPS:

1. Location — determining a position.
2. Navigation — getting from one location to another.
3. Tracking — monitoring object or personal movement.
4. Mapping — creating maps of the world
5. Timing — making it possible to take precise time measurements.

The Global Positioning System (**GPS**) has been developed in order to allow accurate determination of geographical locations by military and civil users. It is based on the use of satellites in Earth orbit that transmit information which allow to measure the distance between the satellites and the user.

The three main components are:



The **GPS satellites**

The **GPS receivers**, and

The **complex computer software** needed to decode the signals and compute the geographical position of the user.

Most **GPS** receivers consist of three basic **components**:

(1) **an antenna**, which receives the signal and, in some cases, has anti-jamming capabilities which protect GPS receiver from interference.

(2) **a receiver-processor unit**, which converts the radio signal to a useable navigation solution; and

(3) **a control/display unit**, which displays the positioning information.

A **passive GPS tracking system** will monitor location and will store its data on journeys based on certain types of events. The data stored on this kind of GPS tracking system is usually stored in internal memory or on a memory card, which can then be downloaded to a computer at a later date for analysis.

An **active GPS tracking system** is also known as a real-time system as this method automatically sends the information on the GPS system to a central tracking portal or system in real-time as it happens. This is a useful way of monitoring the behavior of employees as they carry out their work.

Can I Use GPS Without an Internet Connection? Yes. On both iOS (iPhone operating system) and Android phones, any mapping app has the ability to track your location without needing an internet connection.

A GPS tracking system uses the Global Navigation Satellite System (GNSS) network. All three coordinates (longitude, latitude, altitude).

- **Theodolite**

A **theodolite** is a precision optical instrument for measuring angles between designated visible points in the horizontal and vertical planes and **distances**. It is a surveying instrument with a rotating telescope that is mounted on a base for measuring horizontal and vertical angles as well as an electronic readout screen that is used to display horizontal and vertical angles.

- **Surveyor hand tools**

Surveyor hand tools are the tools which can be hold in hands during the site survey.

Hammer

A hammer is a tool consisting of a weighted "head" fixed to a long handle that is swung (rotated) to deliver an impact to a small area of an object. This can be, for example, to drive nails into wood, to shape metal, or to crush rock.

Tape measure

A tape measure or measuring tape is a flexible ruler used to measure size or distance.

Spirit level

To **use a spirit level correctly**, it should be positioned in the center of the object you are levelling. If the object is level the bubble will sit between the two marks. If the bubble sits to the left side of the marks that means the left side is too high (or the right too low) and vice-versa for the opposite side.

Redtop manhole cover pick.

Lock

Chisel or Center punch point.

It is a cutting tool used to remove parts of stone, wood or metal by pushing or pounding the back when sharp edge is against the material.

Knife and scissor sharpener

It is a tool designed for cutting consisting of a blade usually sharpened on an edge, attached to a handle.

Drilling machine

Rivet gun

3.1.E. 1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

19. Discuss about site surveying instruments

3.1.E. 2.  Practical learning Activity

(Example: Trainees in pair perform ……)

✓ Using a theodolite, calculate the accurate angles of this area.

3.1.E. 3.  Points to Remember (Take home message)

Site surveying instruments

- GPS
- Theodolite
- Surveyor hand tools:
- Hammer
- Tape measure
- Spirit level
- Redtop manhole cover pick.
- Lock
- Chisel or Center punch point.
- Knife and scissor sharpener
- Drilling machine
- Rivet gun

3.1.F. Content 3: Electronic display site surveying factors

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- Audience
- Location
- Electronic display size
- Mounting position

3.1.F. 1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

20. Discuss about the electronic display site surveying factors

3.1.F. 2.  Practical learning Activity

(Example: Trainees in pair perform ……)

✓ Consider the electronic display site surveying factors, and show us where we can mount our television set.

3.1.F. 3.  Points to Remember (Take home message)

Electronic display site surveying factors:

- Audience
- Location
- Electronic display size
- Mounting position

3.1.G.  Learning out come 3.1 : formative assessment

 **Please mix different assessment instruments/tools for triangulation and relevancy of assessment**

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions

Q1. A tape measure or measuring tape is a flexible ruler used to measure size or distance. **T**

Q2. A theodolite is a non-precision optical instrument for measuring angles between designated visible points in the horizontal and vertical planes and distances. **F**

Q3. Most GPS receivers consist of three basic components including an antenna, a receiver-processor unit and a spirit level. **F**

Q4. A control/display unit, which displays the positioning information. **T**

Q5. Consult to the nature of the project is not one of the purpose of site visit. **F**

- ✓ Multiple choice

Q1. The electronic display site surveying factors are the following, except:

a. Audience
b. Location
c. Electronic display voltage
d. Mounting position **/3 marks**

Q2. The following are site surveying instruments, except:

a. GPS
b. Theodolite
c. Air blow gun
d. Hammer
e. Tape measure**/2 marks**

Q3. The following are the key uses of GPS, select the correct answer(s):

i. Location, determining a position.
ii. Navigation, getting from one location to another.
iii. Both I and V are correct
iv. Consult to the nature of the project
v. Timing
vi. All of the above **/2 marks**

Q4. The following are the purposes of site survey, circle the one which is wrong.

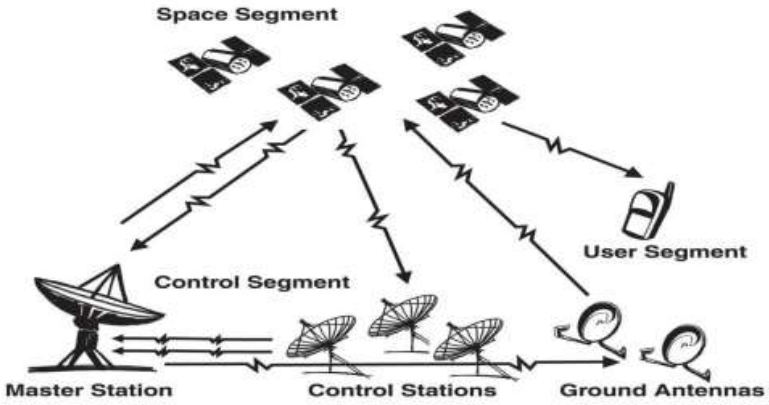
a) Gather the information about the design.
b) Make distant objects appear nearer
c) Determination of a precise location
d) determining a position.
e) Gather the information about the cost of work.
f) None of the above**/3 marks**

- ✓ Essay: Question with short responses and Open ended questions
- ✓ Case studies

1. List the electronic display site surveying factors? ……. / **4pts**

2. **a)** What is Site surveys? ……. / **3pts.**
   b) List at least four Purposes of site survey? ……/ **4pts**
   c) What is the role of theodolite in site surveying? …… / **3pts**
3. **a)** Define GPS? …… / **3pts**
   b) What are the role of GPS in our daily lives? ……/ **3pts**
   C) GPS receiver consist of three main parts, explain them? **4pts**

4. **A)** Explain the working principle of the following diagram? …….. / **7pts**



5. Differentiate passive GPS tracking system from an active GPS tracking system? ……/ **4pts**

Practical assessment

- Assessment instruments/tools

  ✓ Task to be performed with performance checklist/quality product checklist Trainer prepares the task about installation of any display device of his/her choice

Learning Outcome 3.2: Configure the electronic display

Duration: 5 hours

3.2.A. Learning outcome 3.2 objectives :

By the end of the learning outcome, the trainees will be able to:

1. Identify correctly electronic display drivers as used in electronics.
2. List Drivers installation process as used in electronic display devices
3. Set properly electronic display parameters as used in electronic technology.

3.2.B. Resources

Equipment	Tools	Materials

o Electronic display o Digital Multimeter o Air blowing machine o PPE o Projector	• Screwdrivers • Pliers • Spanners • Hammer • Tape measure • Step ladder • Spirit level • Brushes • Sponge • Soft cloth • tables	➢ Adhesives ➢ Screws ➢ Universal anchors ➢ Cables and wires ➢ Electronic components

3.2.C. Advance preparation:

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

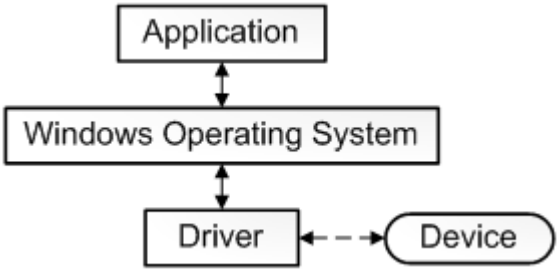
. making groups which will allow trainees to work in a good conditions

CONTENT

3.2.D. Content 1: Identification of electronic display drivers

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

A driver is a software component that lets the operating system and a device communicate with each other or a piece of software that connect operating system and hardware. For example, suppose an application needs to read some data from a device. The application calls a function implemented by the operating system, and the operating system calls a function implemented by the driver.



Software is often divided into three **categories**:

System software serves as a base for application software. System software includes device drivers and operating systems (OSs) helping the computer to operate more efficiently. An operating system is system software that manages computer hardware, software resources, and provides common services for computer programs.

- **Application software** is intended to perform certain tasks. Examples: gaming applications, educational software.
- **Programming software** is a set of tools to aid developers in writing programs. The various tools available are compilers, linkers, debuggers, interpreters and text editors.

Our display drivers have been adopted in a wide range of applications, from large-screen TVs, PC monitors, and laptop PCs to electronic calculators, instrument displays in automotive systems, and industrial equipment.

Examples of drivers

- LCD drivers
- LED drivers.

Display driver is usually a semiconductor integrated circuit which provides an interface function between a microprocessor, microcontroller, or general-purpose peripheral interface and a particular type of display device, e.g. LCD, LED, OLED.

3.2.D.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

21. Talk about electronic display drivers

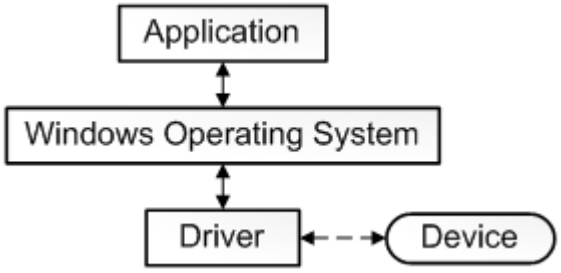
3.2.D.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Based on This electronic display, write the name of the electronic display drivers do you found.

3.2.D.3.  Points to Remember (Take home message)

A driver is a software component that lets the operating system and a device communicate with each other or a piece of software that connect operating system and hardware.



CONTENT

3.2.E. Content 2: Drivers installation process

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

Download the driver manually

To download the new drivers, go to PC manufacturers website or device manufacturers. Drivers updates are often available in support session of their website.

How to download the driver?

The downloaded driver will be an executable file (file name ends in ".exe") or a zip file (file name ends in ".zip"). To install the driver, you just need to double click on the file and follow screen instructions. If you cannot find an executable file, you need to install the driver step by step using the ".inf" file. The following steps are for your reference on how to install the driver.

1. Go to device manager

2. Find the device that you need to install the driver (here let take video card for example).

3. right click on the device and select update the driver software.

4. Select browse my computer for driver software

5. Select "Let me pick from a list of the device drivers on my computer".

6. Click "have a disk……button"

7. Click Browse button. Navigate to the folder where you saved you downloaded driver file and browse the .inf driver file.

8. Click Ok button then button to finish the installation.

Note: Please restart your PC when you finish the driver installation.

3.2.E.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

22. Discuss about drivers installation process

3.2.E.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

✓ Install an LCD driver in this electronic display

3.2.E.3.  Points to Remember (Take home message)

Drivers installation process

1. Go to device manager

2. Find the device that you need to install the driver (here let take video card for example).

3. right click on the device and select update the driver software.

4. Select browse my computer for driver software

5. Select “Let me pick from a list of the device drivers on my computer”.

6. Click “have a disk……button”

7. Click Browse button. Navigate to the folder where you saved you downloaded driver file and browse the .inf driver file.

8. Click Ok button then button to finish the installation.

Note: Please restart your PC when you finish the driver installation.

3.2.F. Content 3: Setting electronic display parameters

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

Electronic display parameters

I. **Color**: it is defined as the spectral composition of visible light.

II. **Sharpness** refers to the degree of clarity. It describes the clarity of detail in a photo and the focus of an image.

III. **resolution** refers to the number of pixels in an image. Resolution is sometimes identified by the width and height of the image as well as the total number of pixels in the image. For example, an image that is 2048 pixels wide and 1536 pixels high (2048 x 1536) contains (multiply) 3,145,728 pixels (or 3.1 Megapixels).

IV. Contrast is the difference in luminance or color that makes an object distinguishable from other objects within the same field of view.

Low Contrast Image

High Contrast Image

V. **Brightness** is an attribute of visual perception in which a source appears to be radiating or reflecting light. Hence it is the perceived luminance of an object.

3.2.F.1 Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

23. Discuss about the electronic display parameters

3.2.F.2 Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Vary the parameters of the given electronic display.

3.2.F.3. Points to Remember (Take home message)

Electronic display parameters

- ✓ Contrast
- ✓ Brightness
- ✓ Colours
- ✓ Sharpness
- ✓ Resolution

3.2.G.  Learning out come 3.2 : formative assessment

 **Please mix different assessment instruments/tools for triangulation and relevancy of assessment**

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions

Q1. A driver is a software component that lets the operating system and a device communicate with each other or a piece of software that connect operating system and software. **F**

Q2**.** System software serves as a base for application software. **T**

Q3. Sharpness refers to the number of pixels in an image. Resolution is sometimes identified by the width and height of the image as well as the total number of pixels in the image. **F**

Q4. To download the new drivers, go to PC manufacturers website or device manufacturers. Drivers updates are often available in support session of their website. **T**

Q5. Colour refers to the degree of clarity. It describes the clarity of detail in a photo and the focus of an image. **F**

- ✓ Multiple choice

Q1. One of the following is not belongs in the electronic display parameters

VI.

I. Contrast
II. Brightness
III. Level
IV. Sharpness **/2 marks**

Q2. Software is often divided into three categories, one of them includes device drivers and operating systems (OSs) helping the computer to operate more efficiently. select the correct answer

I. System software
II. Application software
III. Programming software **/3 marks**

Q3. some of the following steps does not belongs to the driver's installation process, select them

1. Go to device manager

2. Find the device that you need to install the driver

3. right click on the device and select update the driver software.

4. Select browse my computer for driver software

5. Select “Let me pick from a list of the device drivers on my computer”.

6. Click “have a Photo……button”

7. Right click button. Navigate to the folder where you saved you downloaded driver file and browse the .inf driver file.

8. Click Ok button then button to finish the installation.

Essay: Question with short responses and Open ended questions

- ✓ Case studies

1. Define the following term: …….. / **6pts**
   a) Brightness
   b) Resolution
   c) A driver
2. List the driver’s installation process **/6marks**
3. Enumerate the electronic display parameters do you know / **3pts.**

Practical assessment

- Assessment instruments/tools

  - ✓ Task to be performed with performance checklist/quality product checklist Trainer prepare task about configuring electronics display and drivers installation

Learning Outcome 3.3: Mount the electronic display

Duration: 5 hours

3.3.A. Learning outcome 3.3 objectives :

By the end of the learning outcome, the trainees will be able to:

4. Identify correctly the Stand set up techniques as used in electronic display.
5. Fix clearly the electronic display on the stand as used in electronics
6. Mention properly the powering electronic display process as used in electronics

3.3.B. Resources

Equipment	Tools	Materials
o Electronic display o Drilling machine and accessories o Screwdriver machine Soldering station o Digital Multimeter o Air blowing machine o Rivet gun o PPE o Projector	• Soldering irons • Screwdrivers • Pliers • Spanners • Chisel • Hammer • Tape measure • Step ladder • Spirit level • Brushes • Sponge • Soft cloth • tables	➢ Adhesives ➢ Soldering tin ➢ Screws ➢ Universal anchors ➢ Cables and wires ➢ Electronic components

3.3.C. Advance preparation:

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

. making groups which will allow trainees to work in a good conditions

CONTENT

3.3.D. Content 1: **Stand set up techniques**

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- **Orientation** means the determination of the relative position of something. It describes what direction you are facing.

It can be landscape or portrait

Portrait orientation**:** Here the height of the display is greater than the width.

Landscape orientation: It can be oriented Left or right.

- **Measuring**

You measure different parameters including distance, length, width, angle, etc.

3.3.D.1  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

24. Talk about electronic display Stand set up techniques

3.3.D.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

✓ Based on This electronic display, Verify its Stand set up techniques.

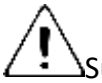
3.3.D.3.  Points to Remember (Take home message)

Stand set up techniques

- **Orientation** means the determination of the relative position of something.
- **Measuring**

You measure different parameters including distance, length, width, angle, etc.

3.3.E. Content 2: Fixing the electronic display on the stand process

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

Items you will need while mounting an electronic display

- Projector screen or TV screen
- Wall-mount brackets
- Stud sensor

- Screws
- Screw gun or screwdriver
- Tape measure
- Pencil

For a projector;

Step 1

Consult the projector's manual to determine how far from the screen your projector should sit.

Step 2

Use a tape measure to determine the appropriate height for the wall mounts. They should sit quite close to the ceiling to take advantage of the projector screen's large size.

Step 3

Drag the stud sensor over the wall upon which you will mount the screen. When it beeps, it has found part of the stud wall. Make a small mark on this area with a pencil.

Step 4

Measure the width of the screen with the tape measure and locate approximately where the second mounting bracket should sit.

Step 5

Drag the stud sensor across the wall in this area, and again mark the wall with your pencil where the stud sensor beeps.

Step 6

Use a screwdriver or screw gun to fasten the mounting brackets into the stud wall, using your pencil marks as guides.

Step 7

Connect the TV screen in the arms of brackets

Step 8

Connect the power cable and other cables on an electronic display

Step 9

Power an electronic display.

Plays the ultimate role of helping to find the stud on a wall with a movement of the magnets and the strong attraction.

3.3.E.1 Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

25. Discuss about the fixing of an electronic display on the stand

3.3.E.2. Practical learning Activity

(Example: Trainees in pair perform ……)

26. Fix this electronic display on the stand

3.3.E.3. Points to Remember (Take home message)

Items you will need while mounting an electronic display

- Projector screen or TV screen
- Wall-mount brackets

- Stud sensor
- Screws
- Screw gun or screwdriver
- Tape measure
- Pencil

3.3.F. Content 3: Powering the electronic display process

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- ➢ Construct the connections of cable conduit
- ➢ Pass the cable through the cable conduit
- ➢ Plug your power cable into the television and the other end into an outlet.

Cable conduit is a tube used to protect and route electrical wiring from damage in a building.

3.3.F.1  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

27. Discuss about the Powering of an electronic display process

3.3.F.2  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Power the given electronic display.

3.3.F.3.  Points to Remember (Take home message)

Powering the electronic display process

- ➢ Construct the connections of cable conduit
- ➢ Pass the cable through the cable conduit
- ➢ Plug your power cable into the television and the other end into an outlet.

Cable conduit is a tube used to protect and route electrical wiring from damage in a building

3.3.G. Learning out come 3.3 : formative assessment

Please mix different assessment instruments/tools for triangulation and relevancy of assessment

Written assessment

- Assessment instruments/tools
  - ✓ Essay: Question with short responses and Open ended questions

What are the process of powering an electronic display? **/5 marks**

Practical assessment

- Assessment instruments/tools
  - ✓ Task to be performed with performance checklist/quality product checklist

Academy nursery school located in Rusizi district, kamembe sector need a technician who is capable of making a site survey because that school need to mount a Full Colour plasma TV display which can help student to view some sketch that can empower their knowledge and encourage them to actively participate in the school activities. You as a technician you are selected as you are requested to make a site survey and mount an electronic display. Remember to make an adjustment on display settings including the level of brightness, contrast ratio, resolution and sharpness. You must do activity within 3 hours.

Assessment criterion 1: quality of process

Checklist	Score	
	Yes	No
Indicator: site survey is established		
✓ Mounting position is observed		
✓ Measuring angle was done		
✓ GPS is used		
✓ Theodolite is used		
✓ spirit level is used		
✓ drilling machine is used		

✓ Tape measure is used		

Assesment Criterion 2: Quality of product

Checklist	Score	
	Yes	No
Indicator: parameters are as expected		
✓ Colors		
✓ Brightness		
✓ Contrast		
✓ Sharpness		
Indicator: the display is well mounted		
✓ User manual instructions are respected		
Observation		

Assesment Criterion 3: Relevance

Checklist	Score	
	Yes	No
Indicator: the time is respected		
✓ Time is respected		
Indicator: Efficient use of materials		
✓ No materials are wasted		
Observation		

Assesment Criterion 4: Safety

Checklist	Score	
	Yes	No
Indicator :safety rules are applied		
✓ Individual safety precautions		
✓ Operating safety precautions		
✓ Electrical safety precautions		
✓ Tools are safeguarded		
✓ No equipment are damaged		
Observation		

Learning Unit 4: Document the work done

STRUCTURE OF LEARNING UNIT

Picture/s reflecting the Learning unit 4

Learning outcomes:

4. 1. Review the previous work document

4. 2. Record the work process

4.3. Write technical recommendation

Learning Outcome 4.1: Review the previous work document

Duration: 2 hours

4.1.A. Learning outcome 4.1.objectives :

By the end of the learning outcome, the trainees will be able to:

1. Describe correctly the elements of work document as used in electronics.
2. Explain Analyse clearly the previous work document as used in electronic display

4.1.B. **Resources**

Equipment	**Tools**	**Materials**
o Electronic display	• Surveyor hand tools • Notebook	➢ Universal anchors ➢ Cables and wires

	• Pen • Chairs • tables	➢ Electronic components

4.1.C. **Advance preparation:**

. Preparation of the working area

4.1.D. **Content 1**: **Description of work document elements**

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- Repairing date: this is the date at which the device has been repaired
- Addresses of technician: this is the address where the workshop of the technician is located, his or her phone number, his or her name, etc.
- Status (situation or information) of electronic display parts. This is to specify if the parts of an electronic display are working or not.
- Name of the repaired parts
- Work carried out: this involves the work done when repairing the electronic display
- Recommendation: this is to suggest the way the display can be used in order to work properly.

Your recommendation should be focused on the specific problem you've presented at the beginning of your paragraph. Do not try to provide recommendations on several different problems in the same paragraph. This will only confuse your reader. The recommendation should be written in clear, easy to understand language, and lay out a plan for what you think should be done to fix the problem. Use specific language in your recommendation so that there can be no debate about what you suggest.

4.1.D.1. Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

28. Talk about work document elements

4.1.D.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Make an example of a work document elements.

4.1.D.3.  Points to Remember (Take home message)

work document elements

- ✓ Repairing date
- ✓ Addresses of technician
- ✓ Status of Electronic display parts
- ✓ Name of the repaired parts
- ✓ Work carried out
- ✓ Recommendation

4.1.E.Content 2: Analysis of the previous work document

 Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- Previous faults
- Previous used Techniques
- Previous status of the Electronic display

What types of electronic display, what are their main parts, what was the situation of the device?

- Previous recommendation

4.1.E.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

- ✓ Make an analysis of the previous work document

4.1.E.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

✓ Analysis of this previous work document

4.1.E.3.  Points to Remember (Take home message)

Analysis of the previous work document

- Previous faults
- Previous used Techniques
- Previous status of the Electronic display
- Previous recommendation

4.1.F.  Learning out come 4.1 : formative assessment

 **Please mix different assessment instruments/tools for triangulation and relevancy of assessment**

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions
  - ✓ Multiple choice
  - ✓ Essay: Question with short responses and Open ended questions
  - ✓ Case studies
    1. Describe the work document elements? ……. / **4pts**
    2. Describe the elements of the previous work document ……/ **4pts**

Practical assessment

- Assessment instruments/tools
  - ✓ Task to be performed with performance checklist/quality product checklist

Learning Outcome 4.2: Record the work process

 **Duration: 2 hours**

4.2.A.  Learning outcome 4.2 objectives :

By the end of the learning outcome, the trainees will be able to:

1. Describe correctly the work carried out in electronic display maintenance

4.2.B. **Resources**

Equipment	Tools	Materials
o Electronic display o Digital Multimeter o Air blowing machine o PPE o Projector	o Screwdrivers o Pliers o Tape measure o Brushes o Sponge o Tables o Chairs o Pen o Notebook	➢ Screws ➢ Universal anchors ➢ Cables and wires ➢ Electronic component ➢ papers

4.2.C. **Advance preparation:**

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

. making groups which will allow trainees to work in a good conditions

CONTENT

4.2.D. **Content 1**: **Description of the work carried out**

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- Faulty parts
- Type of fault
- Tools, materials and equipment used
- Steps and Techniques used to fix the fault
- Status of the Electronic display after work

4.2.D.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

- ✓ Describe the work carried out

4.2.D.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Make your own work .

4.2.D.3.  Points to Remember (Take home message)

Description of the work carried out

- Faulty parts
- Type of fault
- Tools, materials and equipment used
- Steps and Techniques used to fix the fault
- Status of the Electronic display after work

4.2.E.  Learning out come 4.2 : formative assessment

 **Please mix different assessment instruments/tools for triangulation and relevancy of assessment**

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions
  - ✓ Multiple choice

Case studies

1. Describe the work carried out in electronic display maintenance

Practical assessment

- Assessment instruments/tools

- ✓ Task to be performed with performance checklist/quality product checklist

Learning Outcome 4.3: Write technical recommendation

Duration: 1 hours

4.3.A. Learning outcome 4.3 objectives :

By the end of the learning outcome, the trainees will be able to:

1. List clearly the elements of technical recommendation as used in electronic display maintenance.
2. Describe correctly the elements of technical recommendation as used in electronic display maintenance.
3. Make properly the technical recommendation as used in electronic display maintenance.

4.3.B. **Resources**

Equipment	**Tools**	**Materials**
o Electronic display o Digital Multimeter o Air blowing machine o PPE o Projector	• Screwdrivers • Pliers • Tape measure • Brushes • Sponge • Tables • Chairs • Pen • Notebook	➢ Screws ➢ Universal anchors ➢ Cables and wires ➢ Electronic component ➢ Papers

4.3.C. **Advance preparation:**

. Preparation of the workshop

. Arrangement of tools, materials and equipments the trainees will use

. making groups which will allow trainees to work in a good conditions

CONTENT

4.3.D. **Content 1**: **Description of element of technical recommendation**

Summary for the trainer related to the content (key notes using bullets such as ticks etc.)

- ❖ Propose preventive strategies
- ❖ Suggest solutions to faced challenges
- ❖ Propose the periodic check up

4.3.D.1.  Theoretical learning Activity

(example: ask trainees to brainstorm about……. within groups)

29. Describe the elements of technical recommendation

4.3.D.2.  Practical learning Activity

(Example: Trainees in pair perform ……)

- ✓ Make your own technical recommendation after repairing any device.

4.3.D.3.  Points to Remember (Take home message)

Elements of technical recommendation

- ❖ Propose preventive strategies
- ❖ Suggest solutions to faced challenges
- ❖ Propose the periodic check up

4.3.E.  Learning out come 4.3 : formative assessment

Please mix different assessment instruments/tools for triangulation and relevancy of assessment

Written assessment

- Assessment instruments/tools
  - ✓ True or false questions

- ✓ Multiple choice

- ✓ Essay: Question with short responses and Open ended questions
- ✓ Case studies

What are the elements of technical recommendation? **/5 marks**

Practical assessment

- Assessment instruments/tools

Task to be performed with performance checklist/quality product checklist
Trainer prepares a task about reporting the work done

SUMMATIVE ASSESSMENT

Goshen finance Rubavu branch located between Rubavu district Rubavu sector has assigned different tasks to a technician to maintain a P3 Full Colour LED Module electronic display board (Module Size: 224X106 mm; Working voltage: 5V; Max power consumption: 1800W/square meter; Ave power consumption: 700W/square meter; Brightness: 2200 cd/square meter; Colour display: manual adjust) used to display the news to the clients and sometimes other information about Goshen, the display has a problem of displaying an incorrect color. As a video equipment technician, you are requested to rectify the faults and mount the display within 2 hours. The documentation of the work done is highly required.

Assesment Criterion 1: Quality of Process

Checklist	Score	
	Yes	No
Indicator: Tools, equipment and materials are well selected		
Tools		
✓ Screwdrivers		
✓ Spanners		
✓ pliers		
✓ Brushes		
✓ Sponge		
✓ Soft cloth		
✓ Chisel		
✓ Hammer		
Materials		
✓ Adhesives		

✓ Soldering tin		
✓ Screws		
✓ Universal anchors		
✓ Cables and wires		
✓ Electronic components		
Equipment		
✓ Soldering irons		
✓ Electronic display		
✓ Drilling machine and accessories		
✓ Digital multimeter		
✓ Rivet gun		
✓ PPE		
Indicator: The electronic display is well checked		
✓ Checking method are applied		
✓ Parts are checked diagnose		
Indicator: the fault is well fixed		
✓ Fault fixing techniques are applied		
✓ The image is displayed on screen		
Observation		

Assesment Criterion 2: Quality of product

Checklist	Score	
	Yes	No
Indicator: parameters are as expected		
✓ Colors		
✓ Brightness		
✓ Contrast		
✓ Sharpness		
Indicator: the display is well mounted		
✓ User manual instructions are respected		
Observation		

Assesment Criterion 3: Relevance

Checklist	Score	
	Yes	No

Indicator: the time is respected		
✓ Time is respected		
Indicator: Efficient use of materials		
✓ No materials are wasted		
Indicator: the documentation of the work is well done		
✓ Repairing date		
✓ Addresses of technician		
✓ Status of Electronic display parts		
✓ Name of the repaired parts		
✓ Work carried out		
✓ Recommendation		
Observation		

Assesment Criterion 4: Safety

Checklist	Score	
	Yes	No
Indicator :safety rules are applied		
✓ Individual safety precautions		
✓ Operating safety precautions		
✓ Electrical safety precautions		
✓ Tools are safeguarded		
✓ No equipment are damaged		
Observation		

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