Hardware and Network Servicing

Level-II

Based on June 2021, Curriculum Version 1



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Acknowledgment

We would like to thank First of all God for giving me strength and health to start and finishing TTLM. And next we thanks Ministry of Labor and Skills that MoLS gives available environment like dormitory, hotel, water, coffee ceremony and other facilities for the all TVE trainers to work this Teaching, Training and Learning Materials (TTLM).

Acronym

UFS	UNIX FILE SYSTEM
HFS	HIERARCHICAL FILE SYSTEM
CPU	CENTRAL PROCESSING UNIT
AVR	**AUTOMATIC VOLTAGE REGULATOR**
PPE	WHAT IS PERSONAL PROTECTIVE EQUIPMENT
UPS	UNINTERRUPTIBLE POWER SUPPLY
AC	ALTERNATE CURRENT
DC	DIRECT CURRENT
CRT	CATHODE-RAY TUBE
ESD	ELECTROSTATIC DISCHARGE

Introduction to the Module

This module provide you to acquire knowledge of Network devices and hardware peripherals that allow user interface and networking systems, how to connect network devices and computer hardware peripherals in general.

This module covers the units:

- Clean equipment
- Replace and maintain consumables and supplies
- Maintain equipment

Learning Objective of the Module

- Know the how to clean equipment
- To obtain skills of replace and maintain consumables and supplies
- To maintain knowledge of toolkits of maintenance

Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

- Read the specific objectives of this Learning Guide.
- Read the information that this module contain.
- Complete the Self-check.
- Submit your accomplished Self-check.
- Do the Operations which in the module.
- Do the LAP test in page (if you are ready) and show your output to your teacher.

Your teacher will assess your result either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory you can proceed to the next topic.

Unit One: Clean equipment

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Accessing and verifying cleaning equipment and supplies
- Recording and documenting maintenance actions
- Cleaning equipment according to manufacturer specification

This unit will also support you to accomplish the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Access and verify cleaning supplies for usability on the selected equipment.
- Record and document maintenance actions undertaken according to organizational procedures.
- Clean equipment as per manufacturer specifications and in line with organizational manuals.

1. Clean equipment

1.1. Accessing and verifying cleaning equipment and supplies

Cleaning your computer, components, and peripherals help keep everything in good working condition, helps prevent germs from spreading, and helps allow proper air flow. The picture shows a good example of how dirty the inside of your computer case can get. Looking at this picture it's immediately obvious that all the dust and dirt is going to prevent proper air flow and may even prevent the fan from working.

General cleaning tips

The following Suggestions to follow when cleaning any computer components or peripherals and tips to help keep a computer clean.

1. Ever spray or squirt any liquid onto any computer component. If a spray is needed, spray the liquid onto a cloth.
2. You can use a vacuum to suck up dirt, dust, or hair around the computer. However, **do not** use a vacuum inside your computer as it generates static electricity that damages your computer. If you need to use a vacuum inside your computer, use a portable battery powered vacuum or try compressed air.
3. When cleaning a component or the computer, turn it off before cleaning.
4. Be cautious when using any cleaning solvents; some people have allergic reactions to chemicals in cleaning solvents, and some solvents can even damage the case. Try always to use water or a highly diluted solvent.
5. When cleaning, be careful to not accidentally adjust any knobs or controls. Also, when cleaning the back of the computer, if anything is connected make sure to disconnect the plugs.
6. When cleaning fans, especially smaller fans, hold the fan or place something in-between the fan blades to prevent it from spinning. Spraying compressed air into a fan or cleaning a fan with a vacuum may cause damage or generate a back voltage.
7. Never eat or drink around the computer.
8. Limit smoking around the computer.

Cleaning tools

Although computer cleaning products are available, you can also use household items to clean your computer and its peripherals. Computer cleaning products are substances and tools used to remove dirt, dust, stains, and clutter from PC, keyboards, and monitors screens.

Below is a listing of items you may need or want to use while cleaning your computer.

1. **Cloth -** A cotton cloth is the best tool used when rubbing down computer components. Paper towels can be used with most hardware, but we always recommend using a cloth whenever possible. However, only use a cloth when cleaning components such as the case, a drive, mouse, and keyboard. Don't use a cloth to clean any circuitry such as the RAM or motherboard.
2. **Water or rubbing alcohol -** When moistening a cloth, it is best to use water or rubbing alcohol. Other solvents may be bad for the plastics used with your computer.

3. **Portable Vacuum** - Sucking the dust, dirt, hair, cigarette particles, and other particles out of a computer can be one of the best methods of cleaning a computer. However, do not use a vacuum that plugs into the wall since it creates lots of static electricity that damages your computer.
4. **Cotton swabs** - Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas in your keyboard, mouse, and other locations.
5. **Foam swabs** - Whenever possible, it is better to use lint-free swabs such as foam swabs.
6. **Air compressor (air blower)**- Used to blow away dust and debris from different computer parts without touching the components.

Why cleaning needed to computer hardware?

Cleaning your computer's hardware **makes the entire system run more smoothly and keep it running longer**. Regular cleaning protects not only your investment, but the important data stored on it as well. Every few days or so, give the screen a good wipe and empty the crumbs out of the keyboard.

Dust needs to be removed because it acts as an insulator that prevents air from circulating over or through the components and this can cause overheating. If dust contains conductive particles it can also cause a short circuit, which can damage components or even cause a fire.

What is the importance of maintaining hardware tools?

If you take care of your tools, they will return the favor. Proper care and routine maintenance of your hand tools and power tools **makes any home improvement or repair project easier, safer and more successful**. Proper tool care also saves you money because the better they're cared for, the longer they'll last.

Cleanliness **gives rise to a good character by keeping body, mind, and soul clean and peaceful**. Maintaining cleanliness is the essential part of healthy living because it is the cleanliness only which helps to improve our personality by keeping clean externally and internally.

Removing Dust

Dust can be removed using a household vacuum cleaner with an appropriate attachment, although it is much easier to use a purpose-built computer vacuum cleaner or keyboard cleaner.

For virtually any PC fan (case fans, graphics card fans, heat sink fans, etc.), **a few blasts of compressed air can remove most loose dust**. Just make sure that if you're cleaning a case fan, you open up the case so that you can blow the dust out into the environment and not back into the computer.

Use compressed air and a lint free cloth to blow and wipe any dust build up you can see.

Pay particular attention to any crevices, plastic shrouds, and heat sinks. Thoroughly clean any dust filters too. To clean fan blades, hold them steady and wipe or blow each blade individually.

How to Clean a Dusty Computer

Every computer slowly fills up with dust and other loose debris as it filters air through its hardware. While the goal of the fans found in any computer is to cool off all the components that get hot, the dust

that clogs up a computer does the opposite. It's important to try and get rid of the dust in your computer with canned air and a microfiber cloth on a regular basis. However, a deeper clean with rubbing alcohol and cotton swabs might be necessary if it's been a while since your last dusting efforts.

Precautions

Precautions are guidelines to be followed to prevent damage to equipment or injury to people.

The following are *very important* precautions:

i. Before cleaning any electrical equipment make sure that it is **switched off and unplugged from the mains.**
ii. Allow certain equipment, such as monitors and laser printers, to cool down and lose their capacitance before cleaning them for at least 1 hours.
iii. When cleaning inside the PC, or handling parts from a PC such as hard disk or circuit boards, you should earth yourself using antistatic wrist strap.
iv. Always refer to the manufactures manual before attempting to clean any equipment, because improper cleaning or maintenance may be dangerous and also may invalidate your warranty.
v. Some equipment such as power supplies and monitors use voltages and therefore should only be maintained by specially trained people. It could be dangerous for any one else to open these up for maintenance.

1.2. Recording and documenting maintenance actions

Maintenance documentation is any record containing information that you might need to complete maintenance tasks and inspections. It tells you what you have, shows you how to maintain it, and has records of all your past work.

Maintenance record, as name suggests, is **a document that includes information regarding each repair and maintenance work that is done on asset or equipment**. In simple words, it keeps tracks of assets failures and repairs.

An equipment maintenance log is **a document that organizations use to record asset maintenance activities**. It enables them to monitor their system checkup processes and track maintenance tasks performed by technicians, the exact time the tasks were performed, and each specific task's purpose.

1.3. Cleaning equipment according to manufacturer specification

Before cleaning the computer follow these steps:

Step 1.Shut down your computer and unplug it from its power source.

- Shut the computer down from the power control menu on your operating system. Then, unplug the computer from its power cord if it's hooked up. Make sure you power off the computer all the way, and don't accidentally restart it or put it in "sleep" mode. If your computer is unresponsive, you can do a hard shut down with the power button on the outside of the computer.



Step 2. Dust the computer's casing with a damp cloth or paper towel.

If you are cleaning a desktop, the outside of the case is probably covered in dust. Unlike the sensitive inside, you can just use some slightly damp paper towels or cloths to wipe down the outside. Dust every side of the computer to make sure it's all clean.

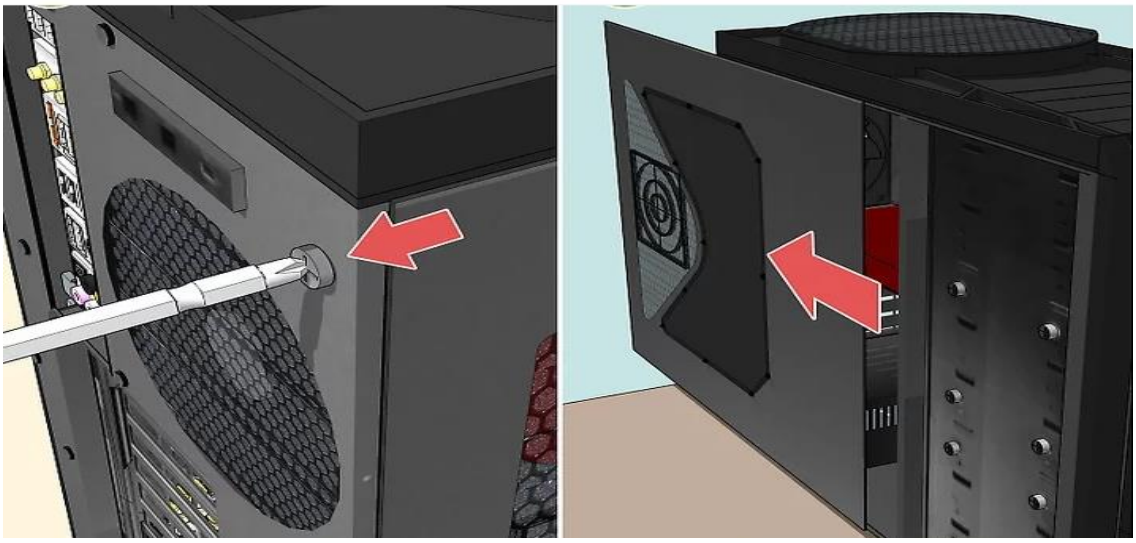
- Try not to accidentally brush dust into any of the ports.



Step 3. Unscrew the side panel to access the inside of a desktop computer.

Typically, one side of a desktop computer is designated to be opened, allowing easy access to the interior hardware. Take a screwdriver that fits the screws and turn them counter-clockwise to loosen them.

- Some computers have a different mechanism from screws. Consult your computer's user manual if you are unsure how to open it up.



Step 4 Use a damp cloth or paper towel to wipe down the access panel.

Once you've removed the side panel, or whichever component of the casing allows you to access the inside, you'll want to give it a quick clean. Just like the exterior parts, its okay to

take a slightly damp cloth or paper towel and wipe down the inside of this panel after taking it off.



Step 5 Take out the battery to clean out a laptop.

To clean out a dusty laptop, you'll have to remove the battery so that you can blow out the dust from inside the tightly-packed equipment inside. Unscrew the screws holding the battery under the casing, or slide the battery out on its own, if your battery casing has no screws.

- If your laptop is overheating, there's a good chance it's dusty on the inside.
- Some laptops, including most Mac Books made after 2012, make it difficult or impossible to open the backing without violating the warranty. You may have to take these in for a professional cleaning.



Cleaning equipment Computer hardware peripherals

Keyboards

The keyboard tends to not only accumulate a lot of dust and skin residue but also some hair and lint form clothing. Loose matter can generally be removed with the vacuum cleaner.



Mouse

The mouse tends to accumulate a mixture of dust and skin residue from the surface it rolls on. Therefore to properly clean the mouse:

1. Turn the mouse upside down and push down and away the roller-opening hatch with two fingers until you see the panels open.
2. Use a soft, dry, lint free cloth to wipe the ball clean. Never use cleaning fluid or solvent. Gently blow into the mouse housing to remove any dust.
3. To clean the steel rollers carefully use a cotton swab to remove the material buildup.
4. Replace the ball in it its housing, and then re-insert the retaining panel. When the panel is in place push it down and backwards until it locks firmly.



Scanners and photocopiers

The glass top flatbed scanners, like those of monitors and photocopiers, can get pretty dirty with finger marks. Usually you would use a lint-free cloth dabbed with whatever chemical the manufacture recommends to wipe it clean.



Monitors

Carefully clean dust away from the vents in the monitor's enclosure using a vacuum cleaner. Anything other than a vacuum cleaner (e.g. a rag or air blower) is likely to push the dust inside the enclosure where it can lie on electrical components, causing failure. You should clean the glass screen with one of the cleaners described previously. If you use a spray to clean a monitor you should be careful to spray the wipe.



Printers

You will get the greatest benefit from cleaning a printer if you can remove any dust from the paths of moving parts. To do this you may need to remove covers or paper trays. However, at all times refer to the printer manual. It will contain the instructions for removing parts and may even have some tips on cleaning. Do not use any liquid cleaner on a printer unless the manufacturer recommends it.



Laser Printers

To clean laser printers:

1. Switch off and unplug the printer, and wait at least 30 minutes for it to cool.
2. Wear disposable plastics gloves.
3. Clean the outer casing of the printer using a dampened paper towel or a lint-free cloth with a little detergent on it.
4. Check for, and remove any loose bits of paper.
5. Vacuum inside the printer using a static-safe vacuum cleaner.
6. Use a lint-free swab dipped in isopropyl alcohol to clean the corona wire.



Power Supplies

Maintenance for the power supply to PCs includes: Vacuuming dust from the vent holes Checking that the cables coming out of them are not worn or broken Checking that the power socket is clear of dust and dirt



Tape Drives

Because tape drives are usually used for backing up data, it is important that they are kept clean, so that data is not corrupted by oils and other contaminants during the backup process. You can purchase cleaning tapes, or you can usually use a lint-free bud.



Self check test 1.

Name _____ IDNo _____ Level _____

Start time _____ Finishing time _____

Instruction: Read the given questions bellow and answers you own.

Part I. Choice

1. Which one of the following one is true about cleaning computer hardware**?**

A. Cleaning computer's hardware makes the entire system run more smoothly and keep it running longer.
B. Cleaning equipment regularly is not good for its life.
C. Cleaning keyboard or mouse only good and better.
D. No answers

2. Before cleaning any electrical equipment make sure that it is _____.

A. Check virus scan
B. Check application software installation
C. Switched off and unplugged from the mains.
D. No answer

Part II. Match the following column A with column B

Column A	**Column B**
3. Consumables	A. . It includes instruments, tools, & Personal protective equipment
4. Maintaining equipment and consumables	B. printer may need cleaning or new cartridge
5. Printouts faded	C. Consumables

Part III. Give short answer

6. Why do we have to clean the equipment?
7. Writing down at least 4 cleaning tools of computer hardware?

Part III. Say True or False

8. Cleaning equipment is very god for hardware peripherals.

Operation sheet-1. PC Maintenance Schedule:

Here is a schedule for maintaining your computer, it is highly recommended that you follow these routines to have a healthy computer.

Recommended Maintenance Schedule

Daily	**Virus Scan** **Adware / Spyware Scan**
Weekly	**Data Backups** **AntiVirus Software Updates** **Adware/Spyware Software Updates** **Windows Updates** **Office Updates** **Disk Cleanup** **Deleting Temporary Internet Files, History, Cookies**
Monthly	**Disk Defragment**

Computer maintenance is an important part of keeping any business running smoothly. An ounce of prevention is worth a pound of cure. Below is a basic recommended schedule for preventing costly computer problems on workstations.

i. SCHEDULE FOR WORKSTATIONS:

FREQUENCY	MAINTENANCE ACTION
Weekly	**Update virus definitions** - There have been an average of about 19 new viruses per day on Windows systems since 1995. **Run and install Windows Updates** - This will fix security flaws in Windows, reduce crashing and can solve compatibility issues. You do not need to install all of the "Recommended Updates" but you should install ALL "Critical Updates"

	Mac Users: "Software Update" Control Panel - This is the Macintosh equivalent for Windows Update. Open this control panel and choose "Update Now". When the list of available software appears, choose to install all "Security Updates"
Bi-Weekly	**Run Scandisk (Standard Scan)** - Fixes some kinds of incorrect file information and provides early detection of potential hard drive crash.
Quarterly	**Run Disk Defragmenter** - This will increase the efficiency and decrease the wear on the hard drive. On Windows this is a Utility in Start/Programs/Accessories/System Tools/Disk Defragmenter. On Mac OS 9, Norton Utilities has a good tool. On Mac OS X, Micromat v.1.1 can be used but it is not necessary if you setup your drive as UFS (not HFS). **Run Scandisk (Thorough Scan)** - This thoroughly scans the hard drive for bad physical sectors and will provide early detection of potential hard drive crash.
Yearly	**Disk Cleanup** - This frees up space on your hard drive by displaying and, if you desire, removing unnecessary or unused programs, temporary files and Internet cache files. Located in Accessories/System Tools on Windows. **Check Fans and System Temperature (hard drive and CPU)** - This can usually be done in the system BIOS at startup and varies from PC to PC. Insurance of proper operation of this hardware can help prevent hardware freezes and costly hardware repair. **Upgrades** - There are usually upgrades for drivers and firmware released annually. Installation of these will usually make your system more compatible and reliable and can get rid of a huge assortment of problems. Check with the hardware manufacturer for upgrades for each device.

ii. SCHEDULE FOR SERVERS:

For servers, perform these activities **in addition to** the above activities.

FREQUENCY	MAINTENANCE ACTION
Bi-Weekly	**Check Backup Logs** - This is a common problem. Businesses think that their data is being backed up when it is not. Checking the log will ensure that the backup was made.

Monthly	**Clean Tape Drive (physically)** - This is done with a cleaning tape. It will remove dirt and prevent physical problems with the drive.

Maintenance Schedule Logs

A maintenance log is used to document components which need maintenance, frequency, times, method etc. A schedule plans for when the maintenance will take place where a log will describes what has been done. On the schedule there should be allowance to note when the last maintenance was carried out.

A maintenance schedule / log is a table which can be manual, Word, Excel. The advantage of electronic format is that it is easily updateable and clients can also look to see when the next maintenance is due.

Components	Installed	Method	Duration	Frequency	Last Cleaned	Due Next	Name
Monitor	**c 0ctober 1, 2022**	**Cleaning cloth and glass cleaner**	**2mins**	**daily**	**October 31, 2022**	**January 02, 2022**	**Genet**
Keyboard	**April 01, 2022**						
Mouse	**April 01, 2022**						
Printer	**April 01,2022**						
System Unit	**April 01, 2022**						

Lap test 1.

Name _____IDNo _____ Level _____

Start time _____ Finishing time_____

Instruction: You are required to perform the following individually with the presence of your teacher.

Prepare maintenance schedule or logs using spreadsheet with the following format:

Components	Installed	Method	Duration	Frequency	Last Cleaned	Due Next	Name
Monitor	‘April 01, 2013	Cleaning cloth and glass cleaner	2mins	daily	March 31, 2013	April 02, 2013	Genet
Keyboard	‘April 01, 2013						

1. Demonstrate to your teacher how to clean the following equipment and peripherals:
    a. Monitor
    b. Printer
    c. Mouse
    d. Keyboard
    e. Power Supply
    f. Tape Drive

- Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory, you can proceed to the next topic.

Unit Two: Replace and maintain consumables and supplies

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Access consumables from storage points
- Replace consumables
- Dispose of consumables

This unit will also support you to accomplish the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Verifying and Accessing consumables from storage points and record usage information in line with organizational procedures
- Obtain knowledge how to replace consumables when needed and log the action undertaken
- Disposing of consumables following environmental guidelines

2. Replace and maintain consumables and supplies

2.1. Access consumables from storage points

Consumables are goods that require recurrent replacement because they are used up or transformed in their use. The market for these goods tends to be consistent and can be a strong place for investment, even during periods of economic uncertainty, as the need for such products cannot be put off by consumers. Individuals and businesses both buy consumables, in varying amounts, and a number of companies specializing in a range of consumable products provide goods to the public. Consumables are regularly used up or changed and an office must maintain a steady supply of these products in order to function. Groceries and personal care products are consumables seen in the home. Conversely, things like appliances are not placed in this class, but are considered durable goods. They are designed to be used for an extended period of time.

Consumables (also known as consumable goods, nondurable goods, or soft goods) are goods that, according to the 1913 edition of Webster's Dictionary, are capable of being consumed; that may be destroyed, dissipated, wasted, or spent. John Locke specifies these as "consumable commodities". Consumables are products that consumers buy *regularly*, i.e., items which "get used up" or discarded. This is in contrast to the capital goods or durable goods in the office, such as computers, fax machines, and other business machines or office furniture. – Wikipedia

Example consumable materials

Office supplies are such products as paper, pens, scissors, file folders, post-it notes, computer disks, toner or ink cartridges, fasteners, cable ties, and tape

- Calculators.
- Envelopes.
- Whiteboard markers.
- Printer paper
- Cleaners

A supply list can help track and categorize supplies according to need and urgency.





Difference between a consumable item and a capital asset

A capital asset is more expensive than a consumable item, and isn't something you would buy every day in your business. It would also be useful to your business for 2 years or more. So if you buy a computer and, separately, some batteries to power it, the computer would be a capital asset, the batteries would be consumable items.

Vital Supplies

Exam table paper, prescription pads

Appointment books, holiday cards

Periodic Supplies

Incidental Supplies

Staples, rubber bands

Organizing Consumables and Supplies:

- Store supplies in a orderly, organized manner to prevent:
  - Loss
  - Theft
  - Damage
  - Deterioration





Keep its Inventory.

✓ It is a list of supply items and quantities on hand.

✓ Keeping the inventory accurate requires

a. Careful planning

b. Attention

2.2. Replace consumables

Consumables are goods used by individuals and businesses that must be replaced regularly because they wear out or are used up. They can also be defined as the components of an end product that is used up or permanently altered in the process of manufacturing such as semiconductor wafers and basic chemicals.

Removing and Installing Ink Cartridges

1. Turn on your product.
2. Lift up the scanner unit.

3. Press the stop button.
4. Squeeze the tab on the cartridge and lift the cartridge straight up to remove it. ...
5. Before opening the new cartridge package, shake it gently four or five times. ...
6. Remove the cartridge from the package.

This means a new cartridge was installed and the Replace Toner message cleared. Then, after printing some pages, Replace Toner re-appeared on the display.

Can I replace just one cartridge?

Printer cartridges can be replaced on an as needed basis!
If one cartridge is running low, you do not have to replace the other colors at the same time. However, you do need to have all of the printer cartridges installed in the printer for it to work.
How do I clear the message replace toner?

The message "Replace Toner" is intended to alert you that the toner cartridge has reached the end of its expected life. It is recommended that the toner cartridge be replaced. To clear the "Replace Toner".

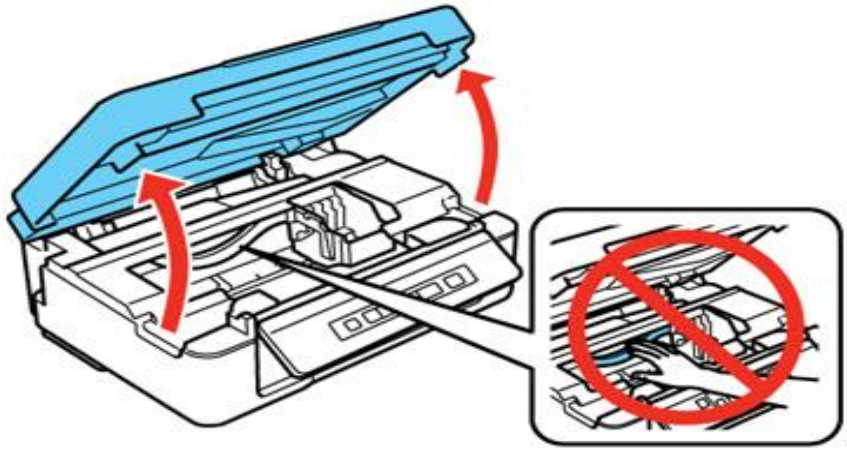
Some steps of Removing and Installing Ink Cartridges

Make sure you have your replacement cartridges handy before you begin. You must install new cartridges immediately after removing the old ones.

Note:
Leave your old cartridges in the printer until you are ready to replace them to prevent the print head nozzles from drying out. Do not open ink cartridge packages until you are ready to install the ink. Cartridges are vacuum packed to maintain reliability.

1. Turn on your product.

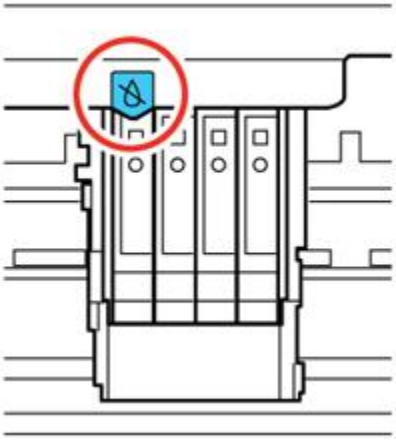
2. Lift up the scanner unit.



Caution:
Do not move the print head by hand; otherwise, you may damage your product. Do not touch the flat white cable inside the printer.

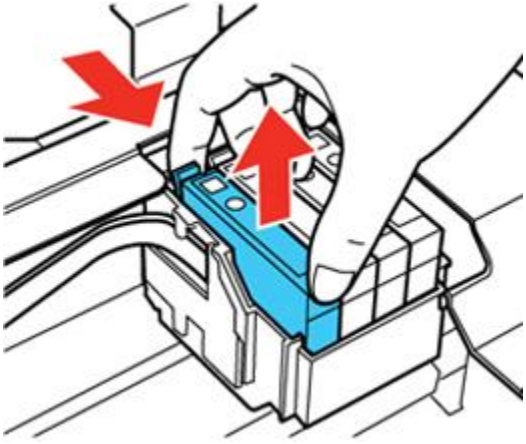
3. Press the stop button.

✓ If a cartridge is low or expended, the print head moves that cartridge to the indicator position. Press the stop button again to check for additional low or expended cartridges. When all cartridges have been identified, the print head moves to the replacement position.



✓ If no cartridges are low or expended, the print head does not move. If you want to replace a cartridge before it is low or expended, press the stop button for 6 seconds. The print head moves to the replacement position.

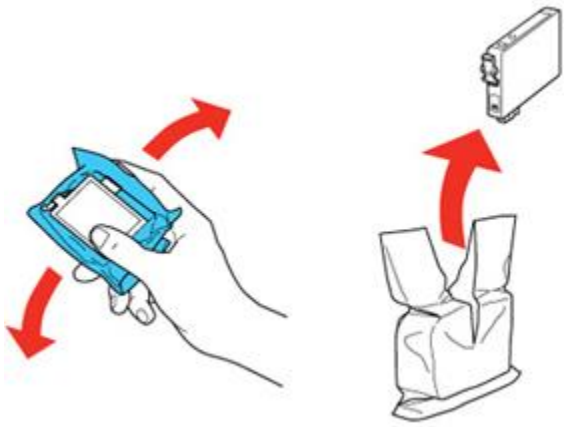
4. Squeeze the tab on the cartridge and lift the cartridge straight up to remove it.



Note: Dispose of used cartridges carefully. Do not take the used cartridge apart or try to refill it.

Warning: If ink gets on your skin, wash it thoroughly with soap and water. If ink gets into your eyes, flush them immediately with water. If ink gets into your mouth, spit it out and see a doctor right away. Keep ink cartridges out of the reach of children.

5. Before opening the new cartridge package, shake it gently four or five times.



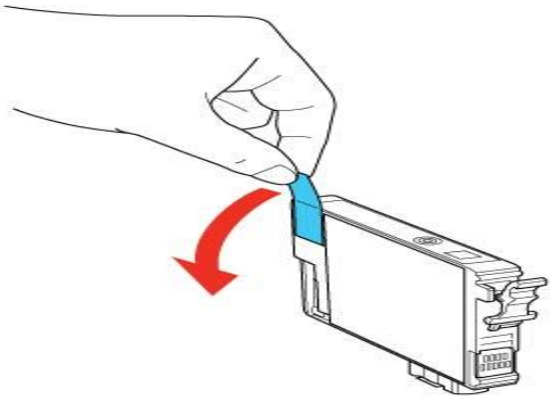
Caution:
Do not shake the cartridges after opening the packages, or ink may leak.

6. Remove the cartridge from the package.

Caution:
Do not touch the green chip or the small window on the cartridge. Install the new cartridge immediately after removing the old one; if you do not, the print head may dry out and be unable to print.

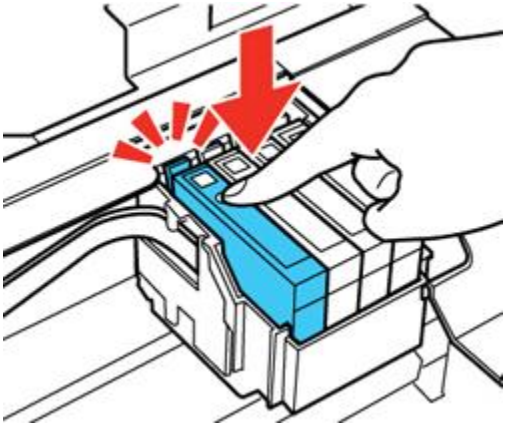


7. Remove the yellow tape from the side of the cartridge

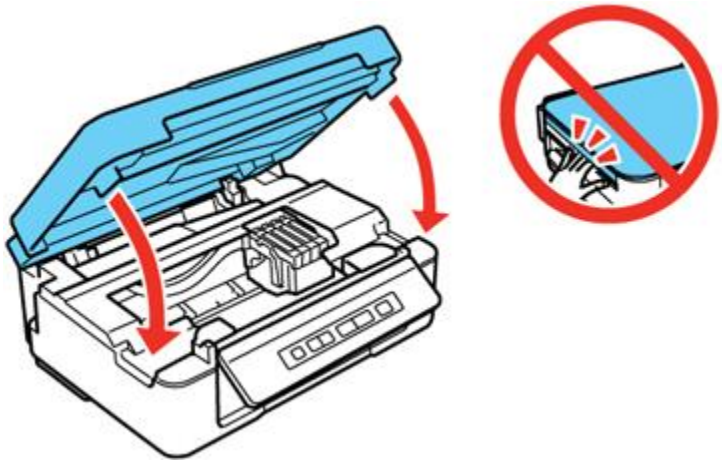


Caution: Do not remove any other labels or seals, or ink will leak.

8. Insert the new cartridge into the holder and push it down until it clicks into place.



9. Lower the scanner unit.



Press the stop button. The print head moves to its home position and the printer starts charging the ink. This takes about 1.5 minutes. When the power light stops flashing and remains on, ink charging is finished.

Caution:
Never turn off the product while the power light is flashing or you will waste ink.

Note: If the ink light is on after the print head moves to its home position or the power light is still flashing 3 minutes after replacing a cartridge, an ink cartridge may not be installed properly. Press the stop button, then press the ink cartridge down until it clicks into place.

2.3. Dispose of consumables

Dispose of used consumables (such as waste ink, pre-treatment solution, cleaning solution, and the ink charging unit) and optional parts according to your local laws and regulations, and always use an industrial waste disposal company.

Disposing: Here are 3 ways to dispose toner cartridges correctly:

1. Locate companies in your area that will actually take in your empty toner cartridges. Many aftermarket and remanufactured cartridge suppliers recycle old toner cartridges and resell them, and may compensate you if you send empty toner cartridges their way. The components in old cartridges are used in new cartridges that are thoroughly tested before being resold.
2. You can also directly get in touch with the toner cartridge manufacturer. Many major brands have their own recycling plans which include taking back old and used toner cartridges. It is best to contact your manufacturer or supplier to find out more.
3. Toner cartridges should always be disposed off in an appropriate container or bin and should not be treated like a regular trash item. If you live at home you can dispose of the cartridge in the ‘green’ bin. Offices most likely collect old toner and then depending on your setup they’ll get picked up or shipped to a facility that recycles them.



Caution:
Ink cleaning solution is classified as industrial waste. Dispose of the cleaning solution according to your local laws and regulations such as entrusting it to an industrial waste disposal company. When handing over the pre-treatment solution to the industrial waste disposal company, make sure you include the Safety Data Sheet found on Epson's support website.

Self check test 2

Name _____ IDNo _____ Level _____

Start time _____ Finishing _____

Instruction: You are required to perform the following individually with the presence of your teacher.

1. What is consumable means define?
2. Write the difference and similarities of consumables and capital assets?
3. Discuss and explain printer ink installing and removing steps?
4. Write at least 4 examples of consumable materials.
5. What is dispose consumable means?

Instruction: Write true or false for the given questions.

1. Printer cartridges and paper are not consumables.
2. Dispose of the cleaning solution according to your local laws and regulations very good to your environment.
3. A capital asset is more expensive than a consumable item.
4. If ink gets on your skin is not good to your skin.
5. Printer cartridges cannot be replaced on an as needed basis because it can be used permanently used.

Instruction: Choose the correct answer for the following questions.

1. Which one of the following is not consumable?
   A. Whiteboard markers.
   B. Printer paper
   C. Cleaners
   D. None
2. One of the following is capital asset and it is not grouped in to consumable
   A. Whiteboard markers.
   B. Printer paper
   C. Cleaners
   D. Computer
3. If you shake the cartridges after opening the packages

   A. Ink may leak B. Printer may leak C. paper may jam D. None

Operation sheet 2

Storing Office Supplies



- ☐ Place close to areas of use
- ☐ Storage cabinets
  - ■ Label storage cabinets and boxes to facilitate finding supplies
  - ■ Note the shelf life of items and place older items in the front to be used first
  - ■ Always check expiration dates

Note: **Do not store any items on the floor**



- ☐ Store paper products flat in their boxes or packages
- ☐ Information booklets may be stored upright to save space
- ☐ Envelopes and other paper goods with gummed surfaces must be kept dry to prevent them from sticking

- ☐ Implement the rules of good housekeeping and asepsis for clinical supplies
- ☐ Sterile items must be kept sterile and clean items clean
- ☐ Chemicals, drugs, and solutions
- ☐ Keep in a cool, dark place unless refrigeration is required

- ☐ Keep liquids in original containers

Replacing Consumable Items: Printer

Caution:

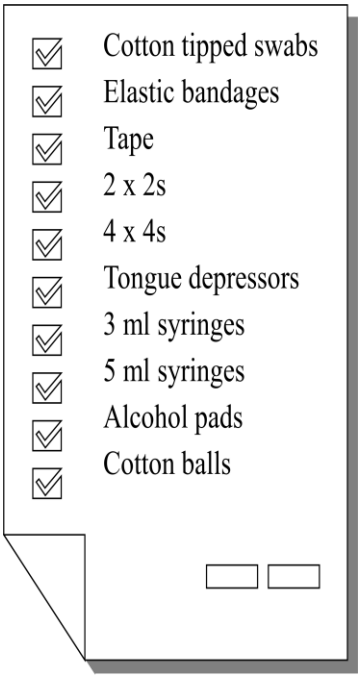
To avoid toner wastage and possible toner sensor errors, do not change the toner cartridge(s) until "TONER EMPTY" is displayed.

1. The toner used in this machine is a very fine dry powder.
2. Have a sheet of paper handy so that you have somewhere to place the used cartridge while you install the new one.
3. Dispose of the old cartridge responsibly, inside the pack that the new one came in. Follow any regulations, recommendations, etc., which may be in force concerning waste recycling.
4. If you do spill any toner powder, lightly brush it off. If this is not enough, use a cool, damp cloth to remove any residue. Do not use hot water, and never use solvents of any kind. They will make stains permanent.

Warning:

If you inhale any toner or get it in your eyes, drink a little water or bathe your eyes liberally in cold water. Seek medical attention immediately.

Procedures in Ordering Supplies:



- ✓ Order forms
  - Orders can be made
    - With traditional order forms
    - By telephone, fax, or online
  - Be sure to keep a copy of order form
  - Double-check order form for accuracy

- ✓ Purchase requisitions
  - Formal requests for purchases
  - Large purchases may require approval

- ✓ Purchase orders
  - Preprinted forms, often with consecutive numbers
  - Authorize a purchase for a medical practice

- ✓ Record the date orders are received

- ✓ Check the shipment packing slip against the order to ensure all merchandise are received
  - MSDS should be provided by manufacturer for any chemical item
  - File alphabetically in a notebook

Lap Test 2

Name _____ IDNo _____ Level _____

Start _____ finishing time _____

Instruction: You are required to perform the following individually with the presence of your teacher.

1. Demonstrate to your teacher how to store office supplies in the cabinet.
2. Demonstrate how to replace the printer toner cartridge.
3. Give the procedures in ordering office supplies.
4. What are the three (3) correct ways to dispose toner cartridge?
5. Waste Management: Identify the following items as reduce, reuse, recycle and dispose.
   a. Toner cartridge
   b. Pen
   c. Brush
   d. Paper
   e. Fuse
   f. Containers
   g. Bottle
   h. Network cable
   i. Bottle cap
   j. Candy wrapper
   k. Chemical
   l. Tape
   m. Disk
   n. Tissue
   o. Can

Unit Three: Maintain equipment

This unit is developed to provide you the necessary information regarding the following content coverage and topics:

- Definition equipment
- Equipment which require maintenance
- Maintenance Procedure
- Storing unused equipment device

This unit will also support you to accomplish the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Equipments are identified which requires maintenance
- Equipment *is* maintained as required by organizational guidelines and manufacturer specifications.
- Maintenance procedures are documented as required by organizational guidelines.
- Care is exercised to prevent interruption of business activities during maintenance procedures

  Unused equipment devices are stored in line with manufacturer specifications

3. Maintain equipment

3.1. Definition of equipment

Equipment is any tangible property (other than land or buildings) that is used in the operations of a business.



Computer Equipment

3.2. Equipment which require maintenance

Different types of Equipment

- ✓ Printer
- ✓ Monitor
- ✓ Switches/hubs
- ✓ Modem and Router
- ✓ Optical Drives
- ✓ Motherboard
- ✓ Processor
- ✓ AVR
- ✓ Keyboard

- ✓ Mouse

Electronic and Computerized equipment include: Computers, networking devices, dictating machines, bookkeeping and billing equipment, electronic typewriters and calculators, scanners, printers, fax machines, safety deposit boxes, personal-display assistances, transcription machines, cash-handling systems, voice recorders and paper shredders.

Furniture: Tables, chairs and desks are some of the most common types of office equipment

http://www.ask.com/question/what-are-the-main-different-types-of-office-equipment

What is Personal Protective Equipment (PPE)?

Personal protective equipment (**PPE**) refers to protective clothing, helmets, goggles, or other garments or equipment designed to protect the wearer's body from injury. The hazards addressed by protective equipment include physical, electrical, heat, chemicals, biohazards, and airborne particulate matter. Protective equipment may be worn for job-related occupational safety and health purposes, as well as for sports and other recreational activities. "Protective clothing" is applied to traditional categories of clothing, and "protective gear" applies to items such as pads, guards, shields, or masks, and others.

The purpose of personal protective equipment is to reduce employee exposure to hazards when engineering and administrative controls are not feasible or effective to reduce these risks to acceptable levels. PPE is needed when there are hazards present. PPE has the serious limitation that it does not eliminate the hazard at source and may result in employees being exposed to the hazard if the equipment fails.

EYE AND FACE PROTECTION

Goggles and face protection must be used when workers are at risk from flying particles. Workers must also be protected from radiation of computer Goggles and face protection must meet certain design criteria for safety.

FOOT PROTECTION

Safety shoes with impact protection are required in work areas where heavy objects or tools could be accidentally dropped on the feet. Safety shoes are required when working to have foot puncture protection.

HAND PROTECTION

Gloves are required to protect workers from cuts, scrapes, punctures, burns, or temperature extremes. It is crucial that the type of glove being used is the right one for the job since incorrect gloves may provide no protection.

Note: Pay special attention to working conditions or processes that can produce the following **Hazards:**

- Falling objects
- objects that could puncture the skin

- Objects that could roll over workers' feet
- Toxic chemicals
- Heat
- Harmful dust
- Radiation

3.3. Equipment Maintenance Procedure

Preventive Maintenance Products and Procedures

Preventive maintenance is something that customers often forget or do not believe is necessary. However, nothing could be further from the truth. For example, suppose you have a customer who frequently reschedules their preventive maintenance time. Because you are unable to perform the maintenance, neither of you would be aware that the fan in the power supply had stopped working. As a result, instead of just having to replace the power supply, the processor and some of the memory failed due to the excessive heat. In addition, the unscheduled downtime resulted in a loss of productivity and a larger bill from you.

As you can see from the preceding example, by performing regular maintenance on computer equipment, you can extend the life of the components themselves as well as locating potential problems. In the long run, this will save the customer time and money. In the next subsections, we discuss the various products available on the market along with the proper procedures for using them.

3.4. Storing unused equipment device

A UPS is essentially a battery that is designed to take over when there is a power loss, in addition to ensuring that only the proper type and form of current is passed on to the computer. When you need to store a UPS, you must ensure that is has not been discharged. A discharged UPS that is stored for a long period of time may lose some of its capacity to store power or may become unable to accept a charge at all. To ensure that your UPS is stored in the proper manner, review the manufacturer’s documentation for any other recommended procedures.

With other computer components, you need to protect them from damage resulting from electrostatic discharge (ESD). ESD occurs when two charged objects come into contact with each other and energy is transferred between them. This transference of energy happens to equalize the charge between these two objects. A good example of ESD is when you grab a door knob, or other metal object, and get shocked. Computer components are very sensitive to ESD and can even be rendered useless. Whenever you store computer components, you must place them in an anti-static bag to ensure their safety from ESD. Anti-static bags are

designed so that static build-up is contained on the outside of the bag rather than on the inside, thus protecting the delicate components.

Manufacturer Suggested Guidelines

Before beginning any preventative maintenance procedures, it is critical that you consult the manufacturer's documentation. Vendors include the information on the proper cleaning materials to use when cleaning or maintaining their components. Failure to follow these guidelines could result in either component degradation, complete failure, or avoided warranty. Never assume that you already know what you can use with what device; instead, take the time to review the documentation. Remember that customer service is not only solving a problem, but also ensuring that you do not generate them.

Self check test 3

Name _____ IDNo _____ Level _____

Start time _____ Level _____

Instruction: Choose the best answer for the following questions.

1. _____ is essentially a battery that is designed to take over when there is a power loss
   A. Hard disk C. CMOS
   B. UPS D. None
2. _____equipment designed to protect the wearer's body from injury.
   A. Eye protection C. Personal protective equipment
   B. Hand protection D. None
3. Before beginning any preventative maintenance procedures, what is critical thing?
   A. Consulting manufacturer's documentation
   B. Starting maintenance
   C. Maintenance scheduling
   D. All are

Instruction: Match the following columns

Column A	Column B
1. Eye protection	A) Safety shoes
2. Hazard	B) Goggles
3. Foot protection	C) Gloves
4. Hand protection	D) Toxic chemicals

Instruction: Say True or False

1. Computer components are very sensitive to ESD and can even be rendered useless.
2. Performing regular maintenance on computer equipment, you can extend the life of the components.

Instruction: write short answer.

1. Write down at least 4 any tangible equipment.
   a. _____
   b. _____
   c. _____
   d. _____

Operation sheet 3

Troubleshooting Computer Hardware

By taking logical steps and walking through the process of troubleshooting you should be able to solve almost any computer problem, software or hardware related. It involves identifying the problem(s), finding the cause of that problem, determining the solution, executing that solution, and testing and checking that solution to see if it solves your problem.

Generally there are only so many steps you can take before you solve the problem and everything is back in order. Make sure that before you start testing and swapping out parts that the problem wasn't caused by you changing a software setting in Windows or some ambiguous option in the motherboard's BIOS that causes your problem.

Determining Wear and Tear

Computer peripherals are not only electrical components, they are also mechanical components. These components wear out over time and eventually fail. As a service technician, you should inspect peripherals for signs of deterioration and replace any components that are about to expire. By doing so, you will save the customer time and money from untimely downtime when the component finally fails. Signs of wear can include thin spots on belts, bends or tear in cables, and moving parts that are only sporadically functioning.

UPS (Uninterruptible Power Supply)

Today's UPS units are populating homes and businesses at an increasing rate as the cost has decreased substantially from the early days of computer history. The UPS is designed to protect your computer from sudden lapses in power, power spikes or surges, and "dirty" current. This is accomplished by several components in the UPS, such as suppressors, noise filters, and surge protectors. Each of these items are discussed in the following paragraphs.

Suppressors

At times, your power outlet will experience momentary surges of current, called *spikes*. Spikes can harm computers and their components much in the same way as ESD damage. However, the damage that results is usually on a much greater level, with catastrophic damage becoming more frequent. A suppressor is designed to either absorb or block the excess power and thus save computer components from injury.

Noise Filters

When someone refers to "dirty current," they are talking about the noise present on the power line itself. This noise is caused by *electro-magnetic interference (EMI)* and can stray, or leak, from the current into nearby components. When EMI leaks from power current, it is called a

magnetic field and can easily damage computer components. UPS's contain a special filter, called a *noise filter*, that reduces the amount of noise present in electrical current and eliminates magnetic fields caused by noise, thus providing some protection to the components that utilize the current or are nearby.

Lasers and High-Voltage Equipment

Whenever you work around lasers or high-voltage equipment, you must be extremely careful not to injure yourself. These forms of equipment can cause damage in the form of burns, eye-related problems including blindness, or even death. There are procedures that should be followed whenever working with either high-voltage equipment or lasers. These procedures are discussed in the following subsections

Lasers

Lasers employ a high-intensity light beam that can cause severe damage to your eyes, including blindness. *Never* look directly into a laser beam. Some lasers can cause severe burns when they come into contact with skin, or even death depending on the intensity of the beam and the location on you. However, the lasers employed in CD-ROM drives are Level 3 laser beams and are of a significantly lower intensity than those employed in construction or scientific applications. As a result, you will not get a severe burn from them but should nevertheless be cautious when working with them.

The laser that is employed in laser printers is also a Level 3 type of beam. However, laser printers do generate an excessive amount of heat, and components that reside inside these printers *can* cause severe burns. It is for this reason that you should be extremely cautious when working inside a laser printer.

High Voltage Equipment

You should exercise extreme caution when working around any high-voltage equipment, including any equipment near the computer itself. You can spot these items from one of two types of labels on the equipment itself. The first type of label is a Warning label that usually informs you of the potential of equipment damage as well as personal injury. The second type of label is a Caution that tells you of possible personal injuries that can occur. Most labels refer to a procedure or set of guidelines to be performed whenever you work on the equipment, although some refer you the equipment's documentation for more information. It is always important to follow the manufacturer's guidelines whenever working on or around high-voltage equipment. Failure to follow these instructions to the letter can result in severe burns or electrocution.

Power Supply

A power supply is the perfect example of high-voltage equipment. As discussed in Chapter 1, these devices convert the alternating current (AC) that comes from your regular power outlet into

the direct current (DC) that your computer uses. Therefore, you want to ensure that the computer is turned off and that the power cord has been disconnected from the power supply.

When the power supply performs the power conversion process, some of that energy is lost and converted into another form of energy: heat. The heat generated by a power supply can cause severe burns. Therefore, it is important for you to ensure that the power supply has had sufficient time to cool down before coming into contact with it.

The first thing to do to diagnose your power supply is check the power supply connectors, make sure everything is plugged into the motherboard and the power cable is plugged into the power supply, you wouldn't believe how many people forget to plug in their computer. Many power supplies also have a power switch on them so check to make sure that no one accidentally or purposefully switched it off maybe for a prank. Check the fan to see if it is spinning at the correct speed and if it's dusty vacuum it out. Determine if the power supply cables are giving out the right amount of voltage, if you computer will let you boot you should be able to check them in the BIOS menu to see if the correct voltages are being given. Normal power supplies give +3.3 volts DC, +5 volts DC, -5 volts DC, +12 volts DC, and -12 volts DC.

CRT

Monitors are high-voltage components that should only be repaired by experienced personnel. When working on monitors, it is important to remember that extreme caution should be taken at all times, as any built-up charge can be lethal. However, the first thing to remember is *never wear an ESD wrist strap when handling monitors*. After you have removed your wrist strap, ensure that the monitor is powered off and disconnected from the power outlet. This is an important step because you have to discharge the monitor.

To discharge a monitor, you need to have a jumper wire and a screwdriver with a non-conductive handle. First, connect one end of the jumper wire to a ground such as the screw on an electrical outlet. Next, wrap the free end of the wire around the metal shaft of the screwdriver. When you do this, make sure that the wire is as far away from the shaft of the screwdriver as possible. This helps to prevent any accidental contact between you and the wire.

Hard Drive Maintenance

Before your hard drive kicks the bucket there is usually a few warning signs:

- Abnormally slow file transfers
- Problems with booting, especially when Windows is being loaded
- Corrupted files
- Disappearing files or folders
- Loud hard drive noise is a good sign that there is a mechanical problem going on inside

Because hard drives are sealed units that can only be opened in a "clean room," there is nothing you can do to clean the read/write heads. However, hard drives have a tendency to become fragmented over a period of time or with excessive use and should be defragmented as a part of normal preventative maintenance. To perform a defragmentation, you can use a special software

program that was designed specifically for this purpose, such as Norton Utilities or Microsoft Disk Defragmenter.

Another problem with hard drives is that the disk surface can become corrupted over time. If the drive attempts to read or write to these corrupted sections, the computer could crash or exhibit strange symptoms that are difficult to pin down. Some software utilities, such as the Microsoft Scandisk utility, are designed to locate and mark corrupted sections on the disk. The mark tells the hard drive to ignore this section of the hard drive. This process should be performed on a regular basis in conjunction with a disk defragmentation.

Lap test 3

Name _____IDNo _____Level _____

Start time _____ Finishing time _____

Instruction: You are required to perform the following individually with the presence of your teacher.

1. Troubleshoot and identify the problem of the computer that your teacher has given to you.

2. Explain to your teacher how to maintain the following:

   a. Hard Drive
   b. Monitor
   c. UPS
   d. Power Supply
   e. Printer

3. Give three (3) examples of high-voltage equipment

- Your teacher will evaluate your output either satisfactory or unsatisfactory. If unsatisfactory, your teacher shall advice you on additional work. But if satisfactory, you can proceed to the next topic.

Reference

- https://sites.google.com/site/year11itvet/replacement-of-consumables
- http://www.slideshare.net/pmhs/i-t-v-e-t-2006-maintain-equipment-lecture
- http://en.wikipedia.org/wiki/Consumables
- http://whatis.techtarget.com/definition/Reduce-reuse-recycle-R3
- http://www.islandinkjet.com/blog/index.php/top-3-ways-to-dispose-toner-cartridges-correctly
- http://en.wikipedia.org/wiki/Personal_protective_equipment
- www4.rgu.ac.uk/files/33 Equipment and Consumables Management finalversion1.pdf

Participants of this Module (training material) preparation

No	Name	Qualification (Level)	Field of Study	Organization/ Institution	Mobile number	E-mail
1	Zerihun Abate	A(MSC)	IT	Sabata PTC	0911858358	Zedoabata2017@gail.com
2	Michael Kassahun	Bsc	IT	Misrak PTC	0989308914	Miko3mt@gmail.com
3	sewAyew W/Yohannies	Msc	IT	Sod PTC	0911716133	Sewnet1221@gmail.com
4	Yonas Beyan	Msc	IT	Ethio-Italy PYC	0915007456	Yonas.beyane@gmail.com
5	Abebe Mulatu	Bsc	IT	Daye PTC	0904834788	abebemulatumgh@gmail.com
6	Solomon Yilma	Msc	IT	Asossa PTC	0911954729	sollangano@gmail.com
7	Yohannes Bekele	Bsc	Computer science	Hawasa PTC	0939797218	Ybekele71@gmail.com
8	Tewdros Girma	Msc	IT	Sheno PTC	0911835002 0912068479	temutd@gmail.com
9	Subagadis Gigar	Bsc	Computer science&ICT	MoLS	0920193859	subiartpromo@gmail.com


የሥራና ክህሎት ሚኒስቴር
Ministry of Labor and Skills