**COMPUTER HARWARE & M AINTENANCE LAB MANUAL**

**Experiment No. 1**

*Aim of the experiment -*

 To study personal computer layout system.

*Equipment required -*

 Personal computer

*Theory -*

**Computer :**

A computer in simple terms can be defined as an electronic device that is designed to accept data, perform the required mathematical or logical operational at high speed and output the result.

Basic computer organization -

A computer is an electronic device that basically perform

* Accepting data or (information) / instructions (input)
* Storing data
* Processing data
* Displaying result (output)
* Controlling and co-ordinating all operation inside a computer.

**Input device**

This is the process of entering data & instruction into the computer system. This data or instruction can be entered into the computer system by using different input devices such as keyboard, mouse, scanner, joystick, MICR, OMR, BCR, camera etc.

**Keyboard –**

 It is the standard or main input device for computer. It contains various keys in a board such as alphabet key(a-z), number key(0-9),function key(f1 –f12) Escape key, control key, tab key, shift key, caps lock key, enter key, num lock pad, page up & down etc.

Type of keyboard

* Standard keyboard (108keys)
* Multimedia keyboard (115 keys)

Connection of keyboard–

Keyboard can be connected with different ports like serial port, PS/2 port,USB port etc.

Advantage -

 The keyboard is easy to use and cheap.

Disadvantage –

 The keyboard cannot be used to draw figure.

**Mouse –**

The mouse is an input device that use for graphical user interface (GUI).

Basically mouse is having 2 types-

1. Scroll mouse

2. Wireless/ Cordless mouse

3. Optical mouse

 Now days the optical mouse is very much popular. It is used to create graphics such as lines, curves and freehand shapes on the screen.

 Mouse can be connected with different ports like serial port, PS/2 port, USB port. It is having left button, right button and scroll button.

**Scanner -**

 It is an input device which scan/ convert the physical images, photograph, written document into a system / computer flies.

**Camera -**

 Video input signal device are used to captures video from the outside world into the computer. The term video means moving pictures along with sound. We are having sound card to convert analog audio signal to digital data and vice versa. Like such a manner video card isto convert analogue signal to digital data and vice versa.

Example of video signal device -

1. Digital camera

2. Web camera

**Output device –**

It is the device that gives information from a computer can be called an output device. Basically output device are electromechanical device that accepts signal digital data(in this form of 0 1 and 1 1) from the computer and convert them into human understandable language.

Output device

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 Soft copy Hard copy

 Monitor Printer

 Projector Plotter

 Speaker

Soft copy

 Soft copy device produce an electronic version of an output.

Monitor (visual display unit/ VDU)

The monitor is a soft copy device generated by the computer through the video card.

Different types of VDU

1. CRT (Cathode Ray tube)

2. LCD (Liquid Crystal display)

3. TFT (Thin Film Transistor)

4. LED (Light Emitting Diodes)

Hardcopy Device-

Hardcopy device produce a physical form of output.

For e.g.:-The content of a file printed on a paper is a form of hardcopy output.

Printer-

A printer is a device that accept the text and graphcs information obtained from a computers and print it on to a paper. printers are available in various size, speeds, resolution and memory card.

Printer

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 Impact printer non-impact printer

 Dotmatrix Inkjet

 Daily wheel Laser

 Line

**Conclusion**

From the above experiment we have studied the computer’s input and output devices .

**Experiment-2**

*Aim of the experiment*

 To study the computer memory and processer.

*Equipment required*

 Personal computer

Theory.

Memory is an external storage area in a computer which is used to store the data and program either temporary or permanently.

Memory is divided in two groups.

* Primary memory
* Secondary memory

RAM - Random access memory

FPM - Font Page memory

DRAM - Dynamic random access memory

SRAM - Synchronous ram

EDORAM - Extend Data Output ram

SDRAM - Synchronous Data ram

RDRAM - Rhombus Dynamic ram

DDRRAM - Dual data rate ram

ROM - Read only memory

PROM - Programmable rom

EPRPM - Erasable programmable rom

EEPROM - Electrically Erasable programmable rom

EAPROM - Electrically alterable programmable rom

FD - Floppy disk

FDD - Floppy disk drive

HD - Hard disk

**Primary memory**

Primary memory is the main memory i.e internal memory. It is directly accessed by the CPU. The CPU continuously read the instructions stored in primary memory and execute them.

*RAM-* Ram is a volatile memory, which is used to store data temporarily.

*ROM-* Rom is a non-volatile memory, where the system configuration data are stored by the manufacturer.

**Secondary memory -**

It is also called “auxiliary memory or permanent memory”.

*Magnetic tape-*

Magnetic tape is a medium for magnetic recording, made of a thin, magnetizable coating on a long, narrow strip of plastic film.

*Floppy disk-*

It has the storage capacity 144mb and size is 3.5inch.

*Hard disk-*

Storage capacity 1 GB, 10GB, 1tb, 2tb.

*Control unit -*

It is main unit where instruction should be obeyed and performed time by time.

*Alu -*

In this unit all arithmetically tasked are performed.

**Conclusion**

From the above experiment we have studied the computer’s memory and processor.

**Experiment-3**

*Aim of the experiment-*

 To study the overview of front panel and back panel.

*Equipment required-*

 Personal computer

*Theory-*

Front panel

  

* CD drive - This is the drive where any external CD/dvd can be inserted.
* Floppy disk drive - This the drive where any external floppy can be inserted.
* Power button - It is the button where the power can supply in to the system.
* Reset button – It is to restart the system .
* USB ports – It is used to attach any kbd, mouse, printer, pendrive etc.
* Headphone / Mic port – it is use to attach headphone or speaker.
* Led - It is the indicator which shows the power supply current is going on into the system.

Back panel

* SMPS/Power supply – (switch mode power supply) It is having the 3 pin power connector , to supply AC current in to the system. This unit provides all the electrical power needed by all the components of the computer.
* Power supply cooling Fan – This fan cool the smps.
* PS/2 connector – This is 6 pin female port used to connect kbd and mouse.
* Serial com port – This is 9 pin male port used to connect kbd.
* VGA port – This is 15 pin female port used to connect VGA cable.
* Parallel port – This is 25 pin female port used to connect printer.
* USB port - This port can connect up to 127 peripherals (such as mouse, keyboard, printer, pendrive etc.) at once.
* RJ-45 LAN port – The Ethernet port accepts an Ethernet cable which allows you to communicate on a network that runs transmission control protocol/internet protocol (TCP/IP).
* Audio Jack - Mike in port (pink), Audio/Speaker output (green), Line in port (Blue)
* Expansion slots - An **expansion slot** is a socket on the motherboard that is **used** to insert an **expansion** card (or circuit board), which provides additional features to a computer such as video, sound, advanced graphics, Ethernet or memory.
* RJ 11 – Telephone modem card with RJ-11 female connectors to phone line and telephone. (broad band connection)

Conclusion:

 From the above experiment we have studied the front and back panel.

**EXPRIMENT- 4**

*Aim of the experiment*

 To study motherboard layout of a system

*Equipment required*

 Personal computer

*Theory*

Mother Board

**A Computer Motherboard** is commonly known as Main board or MB or System board or logic board is designed on PCB (Printed Circuit Board).That holds or connects all components and parts together on a single sheet. The Computer Motherboard holds all the circuitry to connect the various components of a computer system. Therefore it is also called as backbone of [Personal computer system](https://www.chtips.com/computer-fundamentals/what-is-a-computer). **The Main board or Motherboard** is the main, cruical and important part of the computer system. It holds many important components such as [Computer memory](https://www.chtips.com/computer-fundamentals/what-is-a-computer-memory) slots, cpu, sata IDE slots, expansions slots(PCI,AGP etc),capacitor’s, resistor’s ,BIOS chip etc The Computer main board is made up of thin sheet of non conductive material from plastic.

The motherboard may be characterized by the

1. Form factor
2. Chipset
3. Processor socket

Form factor : It refers to the motherboard’s geometry, dimensions, arrangement and electrical requirements. Advanced Technology Extended (ATX) is the most common design of motherboard for desktop computers.

Chipset : It is a circuit, which is used to controls the of resources such as the bus interface with the processor, cache memory and RAM, expansion cards, etc. It used to coordinate data transfers between the various components of the computer.

The processor socket : It is a connector into which the processor is mounted. The Basic Input Output System (BIOS) and Complementary Metal – Oxide semiconductor (CMOS) are present on the motherboard.

Components of Motherboard

1. PCI Slot – Thos board has 2 PCI solts. These can be used for components such as Ethernet cards, sound cards, and modems.
2. PCI-E 16x Slot – There are 2 of them on this motherboard diagram, both are blue. These are used for your graphics card. With two of them onboard, you can run 2 graphics cards in SLI. You would only need this if you are a gamer, or working with high end video / graphics editing. These are the 16x speed versions, which are currently the fastest.
3. PCI-E 1x Slot – Single slot – In the PCI e 1x generation, each lane (1 x) carries 250 MB/s compared to 133 MB/s for the PCI slots. These can be used for expansion cards such as Sound cards, or Ethernet cards.
4. Northbridge – This is the Northbridge for this motherboard. This allows communication between the CPU and the system memory and PCI-E slots.
5. ATX 12V 2x and 4 Pin power connection – This is one of two power connections that supply power to the motherboard. This connection will come from your Power Supply.
6. CPU – Fan Connection – This is where your CPU fan will connect. Using this connection over one from your power supply will allow the motherboard to control the speed of your fan, based on the CPU temperature.
7. Socket – This is where your CPU will plug in. The orange bracket that is surrounding it is used for high end heat sinks. It helps to support the weight of the heat sink.
8. Memory slots – These are the slots for your RAM. Most boards will have 4 slots, but some will only have 2. The color coding you see on the motherboard diagram is used to match up RAM for Dual-Channel. Using them this way will give your memory a speed boost.
9. ATX Power connector – This is the second of two power connections. This is the main power connection for the motherboard, and comes from the power supply.
10. IDE connection – The IDE(Integrated Drive Electronics) is the connection for your hard drive or CD / DVD drive. Most drives today come with SATA connections, so you may not use this.
11. Southbridge – This is the controller for components such as the PCI slots, onboard audio, and USB connection.
12. SATA connections – These are 4 of the 6 SATA connections on the motherboard. These will be used for hard drives, and CD / DVD drives.
13. Front Panel connections – This is where you will hook in the connections from your case. These are mostly the different lights on your case, such as power on , hard drive activity etc.
14. FDD connection – The FDD is the floppy Disk controller. If you have a floppy disk drive in your computer, this is where you will hook it up.
15. External USB connections – This is where you will plug in external USB connections for your case or USB bracket.
16. CMOS battery – This is the motherboard’s battery. This is used to allow the CMOS to keep it settings.

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| --- | --- |
| component of motherboard Keyboard port | **Keyboard & Mouse :** This Port is used to connect keyboard and mouse , now a day we use USB connector for keyboard and mouse |
|  component of motherboard serial port |  **Serial or COM :** It used to connect some types of modem, scanner, or digital camera |
|  component of motherboard parallel Port | **Parallel or Printer** : You plug your printer into the parallel, or printer, port. But now printers may use a USB port |
|  component of motherboard USB port | **USB :** Designed to replace older Serial and Parallel ports, the USB (Universal Serial Bus) can connect computers with a number of devices, such as printers, keyboards, mice, scanners, digital cameras, PDAs, and more |
|  component of motherboard monitor Port |  **Video or Monitor** : It used to connect your monitor into the video port |
|  component of motherboard Line Out |  **Line Out** : It used to connect speakers or headphone into the Line Out jack |
|  component of motherboard line IN | **Line In** : The Line In jack allows you to listen to your computer using a stereo system |
|  component of motherboard microphone port |  **Microphone** : It used to connect a microphone into this jack to record sounds on your computer |
|  component of motherboard JoyStick |  **Joystick or Game** : If you have a joystick, musical (MIDI) keyboard, or other gaming device, this is where you plug it in |
|  component of motherboard Phone or Modem port |  **Phone or Modem** : The phone or modem jack is where you plug your computer into a phone line |
|  component of motherboard LAN port |  **Network or Ethernet** : You can connect your computer to a network by plugging in an Ethernet cable in this port |
|  component of motherboard Printer Port |  **SCSI** : It used to connect a hard drive, CD-ROM drive, or other device to a computer |

**Conclusion:**

From the above experiment we have studied the motherboard layout system

**Experiment-5**

Aim of the Experiment

 To study the connection of pen drive, USB and Ipod

Equipment Required

 Personal Computer

Theory

Connect and enable a pen drive and iPod

1. Insert pen drive and iPod into the hard disk USB port

2. It automatically display message (new device found)

3. If the devices is having data then it automatically open with a small window.

Format the pen drive or iPod-

1. Select the pen drive with their specified drive name (E : / F: etc)

2. Press right mouse button above of the drive name.

3. Then click in format

4. Select the quick format option for quickly formatting the device.

5. Click in start button.

6. It will take sometime after that it display a message “format completed”.

Copy files and folders from pen drive/I ports to hard disk

1. Open my computer.

2. Select the pen drive.

3. Double click for open the pen drive.

4. Select files or folders by left click.

5. Click right mouse button above the selected files or folders.

6. Click on copy.

7. Select the hard disk (C: / D:)

8. Right click at blank place.

9. Click in the paste.

Copy files and folders from hard disk to pen drive

1. Open my computer.

2. Select the C: / D: drive.

3. Double click it for opening the C: / D: drive.

4. Select files or folders by left click.

5. Click right mouse button above the selected files or folders.

6. Select the pen drive for copy.

7. Right click on the blank space.

8. Click in paste.

Conclusion:

From the above experiment we have studied and about use of pendrive / ipod, and transfer the data from hard disk to pendrive & vice versa.

**Experiment - 6**

Aim of the experiment:

 To study CMOS setup utility in PC.

Experiment requirement:

 Personal Computer

Theory:

CMOS : **CMOS** (Complementary metal-oxide-semiconductor) is the term usually used to describe the small amount of memory on a computer motherboard that stores the BIOS settings.

The BIOS setup has also been called the "CMOS setup" or "CMOS RAM," because settings were initially held in a battery-backed CMOS memory circuit. Subsequently, BIOS settings were stored in non-volatile flash memory.

**Accessed at Startup**

The BIOS setup is accessed at startup. Soon after a PC is turned on, a short screen message typically passes by very quickly indicating which key to press (usually Esc, F1, F12 or Del).

CMOS setup utility:

1. Standard BIOS feature
2. Advance BIOS feature
3. Advance chip set features
4. Boot configuration feature
5. Power management feature
6. PnB/PCI Configuration
7. PCL health status
8. BIOS security feature
* load fail-safe default
* Load optimized default
* Save exit setup
* Exit without saving

Conclusion:

From the above experiment we have studied the CMOS setup utility in PC.

**Experiment -7**

Aim of the experiment:

 To study installation of FDD drive.

Equipment required:

 Personal Computer.

Theory:

Check the FDD configuration where, it may be 5.25 inch/ 3.5 inch.

Put the FDD in front panel CPU area.

Attach the IDE cable/ connector for connecting FDD with motherboard, SMPS connector to FDD also.

After this it is deleted for working.

Put any floppy disk, in the FDD and check its content in my computer.

Conclusion:

 From the above experiment we have studied that installation of FDD drive.

**Experiment no-8**

 Aim of the experiment:

 To study the installation of DVD Multirecorder drive.

 Equipment requirement:

 Personal Computer.

Theory:

DVD multirecorder drive installation-

Put the DVD drive in front panel CPU area.

Attach the IDE cable/ connector for connecting DVD with motherboard, SMPS connector to DVD also.

After this it is deleted for working.

Put any DVD in the DVD drive and check its content in my computer.

How to read/write using CD/DVD:

* Open the DVD drive in my computer
* Double click above the icons to display to content.
* To open the file, double click just above of the file or folder
* For writing, copy any file and paste in CD/DVD or by writing software like NERO 8.

Conclusion:

 From the above experiment, we studied installation of DVD multirecorder drive

**Experiment no-9**

Aim of the experiment:

 To study the installation of HDD.

Equipment requirement:

 Personal computer.

Theory

HDD installation:

1. Mount the harddisk in the chasis
2. Connect the data cable to the drive and sata interface.
3. Connect a power cable to the drive
4. Restart the system & run BIOS setup
5. Install the OS in Hard drive.

Conclusion:

From the above experiment we have studied the installation of HDD.

**Experiment no-10**

Aim of the experiment:

 To study the installation of printer and trouble shooting.

Equipment required:

 Personal computer, printer.

Theory:

Printer, installation and troubleshooting :

1. The printer are of different types and it’s must have a driver CD.
2. This driver identity the printer in the system.
3. Printer is having 2 cables, power cable and interface USB printable cable.
4. Insert the printable cable in the USB port.
5. After attaching the cable, put the driver CD into drive, start installing of the OS WIN-7, VISTA etc.
6. First install the driver then login the printer.
7. Check whether CPU is detecting the printer or not.
8. Open the control panel, click in the view devices & printers .
9. Here it display the printer details like HP, Laser 1000 etc.

How to Add a new printer in to the system:

Control panel -> view devices and printers -> click in add printer -> select add local printer -> then install it.

Conclusion:

 From the above experiment, we have studied installation of printer and trouble shooting.

**Experiment no-11**

 Aim of the experiment:

 To study the installation of scanner.

Equipment required:

 Personal computer.

Theory:

Installation of scanner:

The scanner is having 2 cables - power cable and interface USB cable.

 Attach the interface scanner cable to the CPU in USB port, put the driver CD of scanner and start running the setup file, it automatically asks for attaching the scanner cable then it start working.

How to check whether the scanner is working or not :

1. Open the scanner cover
2. Put any photograph or printed paper
3. Click in the scanner icon on desktop ,
4. Click in “next” for preview the data / image.
5. Click in the “next” for saving the file in desktop.

Conclusion:

 From the above experiment, we have studied the installation of scanner.

**Experiment - 12**

Aim of the experiment:

 To study installation of MODEM.

Equipment required:

 Personal computer.

Theory:

 MODEM installation:

Install the MODEM card (daughter card) in PCI slot of the motherboard. Install the driver which is given by the manufacture with the MODEM.

 To check the working condition of MODEM active the internet with internet connection.

Conclusion:

From the above experiment, we have studied installation of MODEM.

**Experiment no-13**

Aim of the experiment:

 To study the installation of configuration of windows 7.

Equipment required:

 Personal computer.

Theory:

1. Move to the CMOS setup to change boot priority in BIOS.
2. Before going inside to BIOS, put the window OS CD/DVD in DVD drive .
3. In BIOS booting system is selected as CD/DVD and it display one dialogue box.

 Install

 Language English

 Time and currency format English US English IND

 Keyboard US

 Next

1. Click on next.
2. Install now

 This is for your first time install topic

 OS Architecture. Date modify

 Windows 7 x86 (32bites)

 x64 (64bites)

1. select 32 bites, click in next.
2. 🗹 Click on 7 to access the license terms
3. Click in next.
4. Now it display upgrade or custom advance
5. Now select custom advance
6. It display drives with size.

 Name Total size Presize

Partition 1 50GB 28.1GB

 2 150GB 11.3GB

 3 2331GB 233.0GB

 Refresh load drive drive option next

1. Here, select the partition for “C” drive, to detect it , select drive option -> OK -> delete -> ok.
2. Or select drive option -> ok -> format -> ok.
3. After delete, it is having Unallocated space .
4. click in new size for different partition , so, apply “ok”.
5. It automatically display 100MB reserved
6. Like such as a manner, it display 100% complete
7. It take some time to restart your system.
8. It restart from harddisk, set date & time & other features.
9. After this system is again restart, then after whatever driver is necessary install it like printer, lan, wan, modem , scanner etc.

Conclusion:

From the above experiment, we have studied the installation and configuration of windows OS.

**Experiment -14**

Aim of the experiment:

 To study the assembly of personal computer.

Equipmentrequired:

 Personal computer.

Theory:

Take the motherboard.

Fit the processor .

Fit the heat sinks

Fit the cooling fan.

Fit the memory in memory slot.

Fit the motherboard into the cabinet.

Fit the SMPS into the cabinet

Fit the harddisk into the cabinet

Fit the DVD drive into the cabinet.

Attach all devices with their respective connector.

Conclusion:

From the above experiment, we have studied assembly of personal computer.

**Experiment -15**

Aim of the experiment:

 To study the familiarize of scan disk, recent antivirus software and recent diagnostic software.

Equipment required:

 Personal computer.

Theory:

Familiarize of scan disk:

To check the integrity of the disk, the bad sector is to be repaired by the command.

Step:

Start ­-> run -­> accessories ­-> scan disk

Antivirus software

When the system is affected by the virus, that can be cleared by antivirus software.

Select any drive (C/D/E) from any computer ->Press RMB ->select antivirus software name.

It starts searching for virus and clear it.

PC doctor is the software through which it can diagonised system like HDD, FDD, monitor, RAM,processor etc.

Conclusion:

From the above experiment, we have studied the familiarize of scan disk recent antivirus software and recent PC diagnose system.