ASSEMBLING OF PENTINUM III PERSONAL COMPUTER

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Assembling of Pentium III Personal Computer

By

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CERTIFICATION

This is to certify that this project work was carried out by **SOBANJO ADETOLA. 'BIMBOLA.** Department of Computer Engineering, Abraham Adesanya Polytechnic, Ijebu-Igbo. Ogun - State.

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DEDICATION

This Project is dedicated to the most high God, for His love and care over my life. I want to dedicate this project to my Parents Rot. Tayo & Mrs. Sola Sobanjo, and my siblings.

Most especially, my Dean School of Engineering, Engr. Lawrence Oborkale, my Supervisor, Mr. Olugbenga Banjo who has contributed immensely towards the positive achievement of this project. I thank you all.

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Glory be to the name of God, the Almighty who saw me through during the period of this research study.

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I also wish to express my appreciation to my School mates in Abraham Adesanya Polytechnic, Ijebu-Igbo. 2006/2009

I would like to express my profound gratitude to my Dean Engr. Obokarle. May Almighty God continue to shower His abundant blessing upon him and his family in Jesus name. Amen

Lastly, to my family friends Engr & Mrs. Oluyemi, to my household of faith Pastor and Pastor Mrs. R.O Oyeniyi.

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CHAPTER ONE

1.1 INTRODUCTION

Computers have moved into every nook and cranny of our daily lives, whether or not you personally know anything about it. You use computers when you make a back withdrawal, when you groceries at the supermarket and even when you drive you car. But should you have a computer at your personal disposal? The answer to day is "probably".

Although only a little more than half of Americans have personal computers in their homes, a much higher percentage use computers on the job.

Almost any career in the future will involve a computer in some ways. In their homes, people use computer technology for writing papers and memos, for keeping track of bank accounts, for communicating with friends and associates.

Before, personal computer to many people is that big box that has winkling light, different front panel button and a whispering noisemaker, which is not.

A computer is an electronic device (calculating machine) that solves problems by applying prescribed instructions in data presented to it.

It performs its data processing by operating accurately at high speed with little or no human intervention by loading it with different packages or programmes. It is also called an automatic device and has the ability to perform calculations, sorting files and edit information.

Due to speed and accuracy of processing, computer machine are fast becoming more popular and there is increase in their demand in the world over.

The computer also perform any kind of work involving arithmetic and logic operations on data, it gets that date through an input device, process it according to the instruction given and gives the information as output.

It can also be an electronic machine that is capable of performing calculations and other manipulations. That's a machine that processes data according to a set of instructions that are stored internally either temporarily or permanently.

Hence, a computer is also capable of storing, retrieving and processing data as a result or programmed set of instructions supplied to it.

The truth of the matter, however, is that the internal components of a PC are surprisingly user-friendly, much more so than a watch or a T.V set. Because most of the PC's components are assembled in discrete modules, you can easily learn to perform basic repairs and upgrades, even if you are not handy with tools or familiar with electronics.

It is also a powerful and versatile tools ever created by man and it made a serious job in every nook and cranny of our everyday lives, their presence can be felt at almost every working place such as Schools, Colleges, Homes, Offices, Industries, Hospitals, Banks, Railways Research Organisations and so on.

It performs data-processing operations accurately at high speed with little or no human interventions by loading it with different packages or programmes. It

is also called automatic device and has the ability to perform calculations, sort files and edit information.

1.2 AIMS OF THE PROJECT

The aims of the project is to:

to a develop manual skill in the assembling of the Personal Computers by using different theories, proofs and concepts in it's assembling.

to acquire knowledge and priviledge in assembling rather than purchasing.

to allow the user to learn more on how to assemble a computer system.

to expose readers to various parts of components rating, that can be used in assembling a Personal Computer.

to provide the readers with correct up-to-day information and knowledge gain in assembling a computer system.

1.3 SCOPE OF THE STUDY

The Construction has the following data: voltage – 230 volts, CPU Speed of 933MHz, 256MB RAM, 40 GB HDD (Hard Disk), CD ROM and ATX Motherboard.

1.4 LIMITATION OF THE PROJECT

This project has a limitation of poor financial support owning to lack of resource of some of the group members. Hence the aviate resource will be utilized to assemble only the System Units.

FINANCIAL SUPPORT: It was a little bit difficult to source for fund for the purchase of materials and components needed to execute this project.

AREAS OF APPLICATION

- **HOME**

- Used for playing games.
- Used for typing letters.
- As calculator.
- For entertainment
- Document production.

- **OFFICES**

- Document production
- Record keeping
- Communication e.g. E-mail, Internet
- Calculation of Salary and Payroll.

- **BANKING SYSTEM**

- For keeping Customer Account
- For dispensing money to customers such as Automated Teller Machine (ATM)

- **EDUCATIONAL SYSTEM**

- For Calculation.
- For Recording Grade
- For students' record.
- For Personal Record.
- The school administrator can use it for keeping school records.

- **HOSPITAL**

- Keeping records about patients
- Keeping records of bed.
- Keeping records of doctors and nurses
- Billing of patients.
- Diagnosis of ailments and diseases.

DEPARTMENTAL STORES/COMPANIES

- For storing information.
- Forecasting products sales
- Typing of letters
- For calculating their salaries
- To print letter and send document
- Preparing workers salary

CHAPTER TWO

LITERATURE REVIEW

2.0 BACKGROUND OF THE STUDY

The computers have been with us for a very long time about 3,000 to 5,000 years ago, Chinese introduced the **"ABACUS"**. It was a manual calculating device and is still being used as a calculator in China.

Basically, an Abacus is a frame of wires, Beads or pebbles are strung on the wires. The device permits the users to represent number by the position of beads on the rack; simple addition and subtraction can be carried out rapidly and effectively by positioning the bead appropriately.

In 1642, a mechanical digital calculator was produced by **BLAISE PASCAL**, a French mathematician. This machine was known as the **"AUDITING MACHINE"** because it could only add and subtract.

The principle of this machine was similar to a clock mechanism and the odometer.

A German Mathematician **BARON GOTTFRIED WILNELM VON LEIBNIZ** improved the adding machine by performing multiplication through repeated addition of a number. This number was called **LEIBNIZ'S "RECKONING MACHINE"**. This machine was commercially accepted and more than one thousand machines were sold in the market.

A Professor of Mathematics at the Cambridge University gave the idea of **"DIFFERENCE ENGINE"** in year 1822, which produced reliable tables.

In 1842, Charles Babbage came out with his new idea of **"ANALYTICAL ENGINE"** that was intended to be completely automatic. It is for his efforts that he is today known as a father of modern digital computers.

2.1 THEORETICAL ANAYLSIS

Fundamental Principle of Personal Computers:

Of all computers, the personal computers are the one which is extensively used for various kinds of application purposes.

Personal Computers do not have a step up or step down transformer to reduce the current flowing into the device. It uses an Uninterrupted Power Supply (UPS) to store power and a voltage stabilizer to regulate the current coming into the device.

2.2 GENERATION OF COMPUTER

After the first mechanical computer, the design of computer evolved over a period of time. The generations of computers are: -

(i) First Generation Computer

(ii) Second Generation Computer

(iii) Third Generation Computer

(iv) Fifth Generation Computer

(v) Future Generation Computer.

FIRST GENERATION OF COMPUTER

In the Second World War, 1939 to 1945, some of the first electronic computers were built. In Germany, a computer helped to design the German flying bombard missiles.

The British used a computer called **COLOSSUS** to crack the secret code used by Germany to send messages.

The colossus computer was very large indeed. It contained 1500 valves. It was used for the first time in 1943. After the war more large computers were built, some of the first ones were used for carrying out complicated calculations. One of the first was called ENIAC and was built in the United State. It contained 1800 values. ENIAC is an acronym for Electronic Numerical Integrator and Calculator. The computer that used Universal Automatic Computer (UNIVAC).

The technology was based on vacuum tubes. The computer that used vacuum tubes circuits were called the First Generation Computer; the vacuum tube circuit contained a filament that was heated to emit electrons.

Most of the first electronic computers were built and used in universities for solving scientific problems.

The first generation computers were characterized again by often-enormous size, talking up entire rooms.

They were expensive, difficult to operate, consumed a great deal of electricity and generated a lot of heat. This was often the cause of malfunctioning. They relied on machine language to perform operations and application program.

Features of the first – Generation of Computer includes:

1. Huge size and they were developed in between 1940 – 1950
2. Slow and often unreliable
3. Instructions were coded in machine language
4. Expensive to buy and power
5. Limited internal storage
6. Used to enter data into the machines

SECOND GENERATION OF COMPUTER

First generation computer relied on valves, these were quite and often had to be replaced. This was a big drawback of First generation of computers. It was overcome with the invention of the **TRANSISTOR.**

Second Generation computers were not just more reliable than the earlier computers, they could also carry out more difficult calculations. They used more sophisticated English like Computer language for coding e.g. COBOL, FORTAN etc.

External storage like magnetic tape or magnetic disks supplemented the internal storage for which magnetic cores were used instead of magnetic drums.

Bells labs of USA invented transistors that were used in place of vacuum tubes – transistors are electronic circuit that are small in size and not require any heating for emitting electronics.

The Computers that used transistors were called the **SECOND GENERATION COMPUTERS.**

Features of the Second – Generation of Computer includes:

- They were developed in 1955 and 1965
- Smaller in size in comparism with the previous generation and generated less heat.
- Internal storage capacity was increased and processor speed measured in micro second.
- Magnetic core memories as primary storage.
- More reliable and less prone to errors

THIRD GENERATION OF COMPUTERS

These used Large-Scale Integrated (LSI) Circuits for processing. The LSI circuits were invented in mid – 1960. LSI circuits integrate several circuit components into a single chip.

The third generation computer used less power, cost less, they were smaller in size and are much reliable. The internal memory increased and COMPATIBILTY was introduced. This period also marked the emergence of software industry and the development of mini computers.

Features of the Third Generation of Computer Includes:

- Smaller in size and it was developed in between 1968 – 1970
- The use of high level language such as COBOL, FORTRAN
- Disk used as backing stored medium
- Complex and Sophisticated technology used for CPU design
- Processor speeds measured in nano seconds

FOURTH GENERATION OF COMPUTER

The fourth generation of computers used Large Integrated Circuit (LSI) and more recently. Very Integrated Circuit (VLSI) and Ultra Large Scale Integrated Circuit (ULSI)

Although a silicon chip is very small, it is very powerful, computers using chips may be small in size but they can solve very complicated problems, computers are no longer big to occupy large rooms.

Due to the size and compatibility called microcomputers chips, that used in micro computers are called microprocessors.

Ceramic Metal – Oxide Semi – Conductor (CMOS) was used for the internal memory. Also the fourth generation of computers were invented in the year 1969. The computers that used VLSI are called the fourth generation of computers and arrived in the mid – 1970's.

The introduction of standard architecture helped in greater mobility of systems, the introduction of micro – technology and significant software development.

Features of the fourth generation of computer includes:

- ❖ Development of micro – processor based on technology.
- ❖ Semi – conductor memory used.
- ❖ Personal and home computers availability.
- ❖ Sophisticated system software.
- ❖ Complex and sophisticated technology used for CPU design.

FIFTH GENERATION OF COMPUTERS

Recent research has focused on developing "thinking computers i.e. artificial intelligence. These computers are called fifth generation computers and are developed in the laboratories of USA and JAPAN. These will have (VVLSI) (Very Very Large Scale Integration) technology with sophisticated operation system interface capability, these computers will have KIPS (Knowledge Information Processing System.)

The race towards the ends of one millennium to the beginning of another has caused the development rate of the computers to be rapid. Reducing the size of the computers and enhancing its power are areas of concentration. Movement was made such a way that, greater memory capacity was possible. New words such as "SIMMS, " SDRAM" were introduced to re - Christian. "CHIPS"

Large sized software in terms of memory utilization and complexity is common features.

Additional storage devices and drives as CD – ROM (Compact Disk Read Only Memory) are common features this generation of computers.

Communication between hardware, no matter the distance in between them, was conquered as in the INTERNET. The speed of operation could range from 233 to 550MHz, the RAM from 32MB to 128MB, and the from 6.4 to 20GB as in Pentium III

FUTURE GENERATION OF COMPUTERS INCLUDES:

Since the urge now is to endow computers with the ability to take decisions in various circumstances. It is expected that this will now be the area of interest to achieve this, software will have develop more, so that its artificial intelligence and robotics can grow.

DURABILITY:

It is a machine that lasts longer than people think of its carefully handled.

CONSISTENCY:

It is a consistency machine that works with peoples ideas. It does not give one result now and later change the same if the data is not enough.

VERSATILITY

It is a versatile machine. It can be used for different things in different places.

2.4 PARTS OF A PERSONAL COMPUTER

A Personal Computer consists of four main parts, which are:

- ✓ Software.
- ✓ Hardware.
- ✓ People ware.
- ✓ Procedures.

SOFTWARE

Software is used in contrast to hardware, to describe all instructions (programs which are used in a particular computer installation purposely to activate the hardware component.

It is the software that drives the hardware, it is designed to exploit and provide the potential capabilities of the hardware to the intending computer user. It distinguishes a computer from an ordinary machine. Hence, for a set of electronic components to be called a computer, there must be present software to make these components to become functional because the combination of hardware and software makes a computer system to be complete.

The act of designing a program so as to be able to achieve a desire task is known as PROGRAMMING, while the person who knows how to design a program is known as a PROGRAMMER.

PEOPLE WARE

These are the people working with the computer. They range from professional users such as the system analysts, programmers, to operational users such as data entry operators.

A user could also be anyone who makes use of the computer. Without people the computer cannot function.

PROCEDURES

The operations of any computing or data processing centre requires and extensive and clearly defined set of procedures for performing the essential functions of the computer centre. These functions generally include obtaining,

preparing and entering of data into the computer. They also include processing special and regularly scheduled jobs, initiating new programs and changing or deleting old ones; securing and ensuring that data is always correct and updated e.t.c. All such procedures would include provision for what actions are to be taken, and by who in the event of a hardware or software malfunction.

HARDWARE

Hardware is the actual circuitry and physical equipment of the computer system. Hardware components are the parts of the computer that are tangible (those that can be touched and handled). The hardware consist of two types:

- The Peripheral device
- Central Processing Unit (CPU) or system unit.

A peripheral device is any components in a computer system that is not actually the computer itself. Peripheral devices are components that are external to the CPU. The components includes the input unit, output unit and the backing storage i.e., Keyboard, Monitors, Mouse, Printer, Scanner, Microphones, Speaker, Cameras, Headphones, Tape drivers, Hard Disk Drive (HDD), Floppy Disk Drive (FDD), Compact Disc Read-Only Memory (CD-ROM) Drive. e.t.c

2.5 BASIC PART OF COMPUTER HARDWARE

The basic parts of Computer hardware consist of the following:

- Input Devices
- Arithmetic and Logic Unit
- Control Unit
- Memory
- Output devices
- External storage devices.

2.5.1 INPUT DEVICES

The input device allows data to flow and instruction to be fed into the computer. It serves as interface between the user(s) and the computer system, the input devices are Keyboard, Mouse, Scanner, Modem, Joystick and Track bill.

MOUSE: This is a simple device that moves a pointer around the computer screen and enables simple commands to be sent to the computer screen. It normally works in conjunction with a keyboard and it is dependent on the software being used. The mouse can be USB mouse or PS2 mouse.

2.5.2 ARITHMETIC AND LOGIC UNIT (ALU)

This unit carries out arithmetic operations such as addition, subtraction, multiplication, division and logic operations such as computer language. The ALU has a number of registers where the data can be stored during processing. These registers are also known as ACCUMULATORS and they are used for data handling operations.

2.5.3 CONTROL UNIT

This is the part that controls the coordinators the other parts of the computer system as directed by the programs instructions one at a time from the main memory. The control unit monitors the entire parts that make up a computer system. It interprets instruction, issues commands to all parts of computer.

Hence, it is the function of the control unit to select instructions from the program in the main store decode the instructions and then cause them to be carried out.

2.5.4 MEMORY

A major attribute of the computer is its ability to store almost unlimited amount of data or information in a relative small space. Is a fast storage device. It operates at speeds approaching that of light.

The memory determines the capability of data or information computer can hold. Data and information reside on the computer either permanently or temporarily as long as the unit is still in good working condition.

The memory unit, as part of the hardware component, is divided into primary and secondary storage.

2.5.5 OUTPUT DEVICE

This is where the result of processing is sent together as printed result or inform of data for future processing example:

- Monitor
- Printer

MONITOR: Your monitor displays information visually, whether in the form of text, charts, or graphic images, allowing you to see the result of the work going-on inside your PC.

PRINTER: This is the most common output device, which produce a permanent record input. There are various types of printers available and are dependent on the quality of production. Examples are dot matrix printers, laser printers, and inkjet printers.

2.5.6 EXTERNAL STORAGE DEVICES

The external memory (also called secondary of backing store) is used to permanently store data and information. They come as devices can be attached to the input and the output units.

2.6 COMPONENTS OF A PERSONAL COMPUTER

The components that constitute a personal computer (i.e. component assembled together to form a personal computer) are listed below.

- Computer case and power supply
- The motherboard
- The CPU and heat sink
- RAM
- Floppy drives
- Hard drives
- CD-ROM drives

CHAPTER THREE

3.0 COMPUTER CASE AND POWER SUPPLY

Computer houses the components on the computer, whether you are buying a tower or desktop computer, it should conform to the ATX standard and have at least 250watt-power supply. Make sure that the case you purchase comes with a tray that allow easy access to the internal component and provides enough room for expansion. Look for space drive bags, easily removable motherboard mounting plates and drive racks.

Verify the strength of the case, because of some of the cheaper ones can be flimsy. Power supplies provide electrical power for every component inside the system unit. The computer power supply performs the critical roles of converting commercial electrical power conceived of from 120-volt AC, 60Hz or 220-Volt, 50Hz (Outside the United State) outlets into other level requires by the components.

Power supply is distributed to every component inside the System Unit.

3.1 MOTHERBOARD

All the electronics components in a PC are monitored on a piece of fiberglass called motherboard. Fiberglass cannot conduct electricity, so such component is insulated from all the others. Thin lines of metal on the surfaces of

the glass connect pins from one component to another, forming the computer electrical circuits.

Also, the AT motherboard is very large and old most manufacture now type product before introduced a new type called the ATX, which is more compact.

Besides the processor, the next important component on the board is the CIPSET. Which determines the capability of the motherboard, such as memory support and power management.

The motherboard is without a drought the primary component of the entire system.

3.2 THE CPU AND THE HEAT SINK

The microprocessor, or the central processing unit, is an important single item that process the jobs. It does all the PC's thinking and runs the programs (series of instructions) that you request. The main functional parts of the central processing unit (CPU) are the control unit, the main memory and Arithmetic and Logic Unit (ALU) when to start a personal computer by placing a disk in the drive and turning on the power, the CPU causes a program to be transferred from the disk into the memory. It also accesses the uses the main memory RAM (Random Access Memory) within a computer. Processors execute machine instructions at a speed determined by their internal clock.

The CPU's speed or clock is measured in megahertz (MHz) and Gigahertz (GHz). The higher the speed of the processor, the faster the computer works. It is

important to note that Pentium II and some of Pentium III processor are available in either slot or socket technology, However, Pentium IV processor come with socket 7 or 8 technologies.

3.3 RAM

Memory used by the computer, when the operating system loads from disk when you first switch on the computer, It is copied into RAM. The original computer may have the RAM of 15,32,63,128, 256 and 512 and recently IGB. Each bytes is identified by its own "address" and its contents can be picked up and changed individually. In present-day technology this sort of memory is volatile i.e. the data that holds currently are lost when the machine is switched off.

There are two main types of RAM:

(a) DIMM

(b) SIMM

3.4 FLOPPY DRIVES

Is a storage device that stores data and information either temporarily or permanently depending on the usage by the user.

Each floppy drive consists of a slot to accept a floppy disk.

A motor that spins the disks and a recording/reading device that moves across the disk in order to read and write data Computer use disk to store information. It can be used floppy disk to store data and move data easily from one PC to another.

3.5 HARD DRIVE

The hard disk is a storage device or machine that permanent serves as a storage unit, holding large amounts of data and programs, unlike data held in RAM, the information on your hard disk is not affected when you turn off the PC. remains there unless you instruct the PC to.

On like memory chips the amount of data that can be stored on a disk is measured in kilobytes (thousand of bytes) or megabytes. The hard drive on PC may be either have a capacity from 20 megabytes up to 200 megabytes or more.

5 CD-ROM DRIVE

CD-ROM drive can held several hundred million characters of data enough store hundreds of thousands of pages of typed text, thousands of images, or a ture of these media. To use these discs, you need a CD-ROM drive.

The information is recorded during the disc's manufactures at this time, cannot record your own data onto a CD-ROM drive. However, you can play a

ariety of CD-ROM discs in a CD-ROM drive in the same way that you uses ppy disk drive for reading from different floppy disks.

7 PARTS THAT CONSTITUTE A COMPLETE PERSONAL OMPUTER

These are both the input and output device that makes a complete mputer system, which are:

A System Unit.

A Monitor.

A Keyboard.

A Mouse.

A Speaker.

7.1 A SYSTEM UNIT

The system unit is a master conductor that comprises all the mechanical s for operations orchestrating your PC's operations, on the monitor when you s a keys connecting cords and cables plug into the back of the system unit, ng your Keyboard, Monitor, Mouse, Printer and other peripherals, so there is ally no need to venture inside.

The brain behind everything that happens in your PC is contained within ystem unit. Inside the unit is the impressive electronics that run programs

ndle typed instructions and determine the results. Most of the more important
ns are identified and described below (the extract positioning of component in
r own PC may be different).

SOFTWARE

This is a program which coordinates all computer hardware together to form a complete operation. It connects the cable and the internal hardware ether before operation can be materialized.

.1 TYPES OF SOFTWARE

Software has been categorized into two major parts, which are:

System Software

Application Software

2 SYSTEM SOFTWARE

System software is the part that controls various internal computer ties.

Any software that controls such activities will fall into one of three ories of system software.

3.8.2.1 CATEGORIES OF SYSTEM SOFTWARE

a) **PROGRAMMING LANGUAGE:** Programming language are various methods of writing computer instructions. The instructions adhere to a particular set of protocols for each language, through the years, more than 200 languages have been developed, some of the most popular languages includes Pascal, c-programming, C^{++}, Visual Basic, COBOL, and FORTRAN. The First generation of programming language was called Machine Language. The second generation is called Assembly Language, the third generation was called Very High-Level Language (VHL).

b) **OPERATION SYSTEM:** The Operating System is a group of system programs that helps in the operation of a computer. It tells the computer how to internet command process the inputs and outputs and manage data. The operating system (OS) is automatically loaded when the personal computer (PC) is started and activated other programs. By for the most common operating system (OS) for personal computer is the Disk Operating System are: IBM's, OS/2, APPLES system 7, Microsoft Window as and Window MT, AT and TS UNIX, Window AS, Window ME, Window 2000 e.t.c

UTILITIES: Utility software expands the performance of the operating software by adding functions that are not part of the original system (OS). Utilities perform jobs as troubleshooting the hardware, inspecting diskettes for damages, file conversion, defragmenter, data compression and file

spooling. They are retrieve data from damaged disks and they can also be used to customize the operation system environment. Examples of utilities are: Symantec's Norton, Utilities, and Norton Disk Doctor.

8.2.2 APPLICATION SOFTWARE

Application software is used to perform specialized functions or specific tasks on the computer. It also loads and non-application on the computer.

Categories of Application Software

i) **SPREADSHEET:** The first spreadsheet was introduced and it was VisiCalc. It gives user the ability to prepare detailed budgets and financial analysis. It enables personal computer users to do something that a mainframe cannot.

ii) **DATABASE MANAGEMENT:** One of the applications that initially seemed to be limited to mainframes and micro-computer use the management of large database.

iii) **WORD PROCESSING:** A major problem for word processing software reports full of number not word, the first was a small program call Electric pencil.

iv) **ENTERTAINMENT:** It helps to use computers system as an entertainment tools. Video games can be played and developed using the computer.

e) **EDUCATION SOFTWARE:** It helps to use computer as teaching and learning language tool. Examples are teaching of Mathematics, Recognition of alphabet e.t.c.

9.1 ASSEMBLING A PERSONAL COMPUTER SYSTEM

9.2 OVERVIEW OF GENERAL SAFETY ISSUES

Use an Anti-static mat and ground wrist strap or grounding wrist strap only.

Use Anti-static bags to store and move computer components. Do not put more than one component in each bag, as slacking them can cause some of the components to become loose or broken.

Do not remove or install components while the computer is ON.

Protect yourself often to prevent static charges from building up either touch a piece of bare metal on the chassis or power supply to discharge the built-in voltage.

Hold cards by the edges; avoid touching chips or the edge connectors on the expansion cards.

Keep computer disks away from magnetic fields, heat and cold.

Keep the work area clean and orderly, when finished with a tool or components; put it back into its proper place.

3.10.1 SAFETY PROCEDURE

Before beginning any Assembly process, review safety procedures.

Assembling a computer is not an inherently dangerous job, but being aware of safety procedures is a good starting point.

In addition to the safety procedures, there are safety concerns with leaving the computer plugged in while working inside it.

Electronic Discharge (ESD) is a more commonly referred to as static electricity.

ESD is probably the greatest problem when a user is unwrapping newly purchased computer parts and components while preparing to assemble the computer component.

3.10.2 COMPUTER CASES AND SYSTEM UNITS

Whether buying a tower or desktop, it is recommended that the unit conforms to the ATX standard and has at least a 250-watt power supply (300 watt is ideal).

Purchase a case that comes with a tray that allows easy access to the internal components.

There are three basic system unit styles: desktops, towers and portables. Each design offers characteristics that adapt the system for different environments.

3.10.3 DESKTOPS

There are two important considerations in choosing a desktop case style or a computer:

Available desktop space

Form factor (describes the general layout of the computer case).

3.10.4 TOWERS

Tower cases are usually designed to sit vertically on the floor beneath a esk.

Tower cases come in three sizes:

Mid towers.

Mini towers.

Full-size towers.

3.10.5 POWER SUPPLIES

The power supply unit provides electrical power for every component side the system unit.

There are two basic types of power supplies:

AT Power Supplies

ATX Power Supplies

The Power supply produces for (five in the ATX) different levels of well-regulated DC voltage for use by the system components. These are +5V, -5V, +12V, and –12V.

In ATX power supplies, the +3.3V level is also produced and is used by the second-generation Intel Pentium processors. The IC devices on the motherboards and adapter cards use the +5V level.

Be able to identify the uses for each voltage level and corresponding colour-coded-wire. This will allow testing of the wires using a multimeters to determine if there are problems with the power supply.

The computer power supply produces a voltage only when it has a load.

Some component must be running on the machine before a voltage can be nd in the power cable connectors.

1 PREPARING THE MOTHERBOARDS FOR INSTALLATION

2.1 MOTHERBOARD LOCATION MAP

A Motherboard location map shows where the hardware and major components are located on the motherboard.

Typically, everything listed in the specifications sections of the motherboards manual is depicted and labeled on the location map.

The main memory is sub-divided into slots, and the slots are identified and nbered in sequence DIMM bank 1, DIMM bank 2 and DIMM bank

233 (note 2)	5-6	1-2 and 4-5	66
200	5-6	1-2 and 5-6	66
166	5-6	2-3 and 5-6	66
150	4-5	2-3 and 5-6	60
133	5-6	2-3 and 4-5	66
120	4-5	2-3 and 4-5	60
100	5-6	1-2 and 4-5	66
90	4-5	1-2 and 4-5	60

Example of a processor frequency VS host bus frequency configuration

hart.

Configuring the motherboard typically means taking the following steps:

) Installing the CPU, installing the heat sink and fan, installing RAM, connecting the power supply cables to the motherboard power connectors, connecting miscellaneous connectors to the correct switches and status light, and setting the system BIOS.

) Location maps allow the correct configuration of the motherboard for the case controls and monitor lights on the front case panel.

) For the disk controllers, always remember that a coloured stripe on the data cable is pin 1.

) The BIOS interface can be keyboard driven, or it can be graphical and mouse driven.

(5) When drives are placed, memory upgraded, or adapter boards added, the BIOS setup will need to be updated to reflect the configuration changes and saved the CMOS chip.

(6) The motherboard must be configured for the frequency of the installed processor.

3.2.3 MOTHERBOARD JUMPERS.

- A jumper is a pair of prongs that are electrical contact points set into the computer motherboard or an adapter card.
- When setting a jumper, place a plug on the prongs that completes or closes the contact.
- Closing or Opening the circuits established logic levels to select functions for the operation of the board.
- Typically, motherboard jumpers are configured by using a jumper to bridge a pair of pins that are to be connected together (to complete a circuit) on the board.
- Removing or inserting jumpers on a set of pins will enable or clear a given option inspected in the motherboard manual.
- There are several additional jumper settings that many have to be set along with the general motherboard configurations.

✓ BIOS recovery

✓ Clear CMOS

✓ Password clear

✓ BIOS setup access

✓ Processor voltage

3.2.3.1 INSTALLING THE MOTHERBOARD

Attaching the LED's, keylock and speaker

- LED's, the status lights are useful in indicating whether components inside the computer are on or working.
- LED's, that could be installed are for power, turbo, and the hard drive.
- The keylock switch is used to prevent non-authorized individuals from booting the computer and changing the BIOS settings.

3.2.4 CONNECTING POWER SUPPLY CABLES TO THE MOTHEBOARD

- After successfully installing the motherboard in the computer case, proceed with attaching the appropriate power supply connector(s) to it.
- This process is easy with an ATX (boards and power supply) because there is only a connector that is also keyed to fit only one way.

3.2 INSTALLING THE CPU

(1) Turn over the chip and inspect the pins to make sure non are damaged (bent or broken). All pins should stick straight out.

(2) Align pin 1 on the chip with pin1 on the socket for a correct installation.

(3) Open the ZIF socket, shift the levell slightly away from the socket, from its default closed level position is raise it to the open, vertical position.

(4) Align pin 1 according to the orientation that was determined in step 2. Insert the processor chip into the socket so that all the pins slide into the matching holes.

(5) Verify to make sure that there is no gap between the bottom of the CPU chip and the socket. If there is none, then the processor chip is properly inserted.

(6) Secure the installed chip: push the lever gently back down to the closed level position.

(7) Most motherboards are flexible enough to handle a variety of CPU's, but most CPU's are very particular about the amount of voltage they can handle.

(8) After installating the CPU, it is important to make sure that the right voltage is present for the proper performance of the processor.

(9) If the proper voltage is not set, total damage to the system could occur, or the whole system will never operate correctly.

3.3 INSTALLING THE HEAT SINK AND FAN

- Most microprocessor can produce a lot of heat, which if not efficiently dissipated can cause the system to operate intermittently or fail completely.
- One way to dissipate heat from processors is to use the heat sink, cooling fan and place a thermal compound onto the processor or head before placing the heat sink on top thereafter, cooling fan.
- Processors that come with the fan and heat sink already attached to them are more convenient.
- These are called boxed processors.
- Boxed processors cost a bit more but are safer to install since it lessens the chance of breaking the pins.
- They also have better warranty coverage that those without the fan and heat sink attached.
- Boxed processors are referred to as original equipment manufacturer (OEM) processors.

3.5 INSTALLING RAM

- There are two types of memory modules used on most PC's: 168-in dual in-line memory module (DIMM) cards and 72-in single In-Line Memory Module (SIMM) cards.
- Cover the four-step installation of RAM.

- The designation of a hard drive or CD-ROM drive as either master or slave is generally determined by the jumper configuration, not by the order in which the drive is daisy-chained to the other drive.
- It is much easier to configure these drives before installing them in the computer case.
- Before setting the jumpers, determine the types and number of drives to install.
- In a basic system that only has one hard drive, set the jumper to "master". Some drives have another setting called "single".
- The CD-ROM is similarly easy to configure. However, jumpers may be located in different places on each drive and may even is labeled differently.
- Set the CD-ROM to "master". If it is the only drive connected to the second IDE channel.
- The hard drive can be inserted in any free bay in a computer case.

However, there are some things that should be considered:

- They can generate a lot of heat. Therefore, keep these drives as far away from other hardware as possible.
- If it is necessary to install a drive cooler, make sure there is enough room.
- Install a hard drive away from the power supply.
- Try to keep the hard drive near the front of the case. It will benefit from the cooling effect of the air current drawn into the case through the front by the system cooling fans.

- New motherboards do not use SIMMS. It may be found, for example, that the DIMM sockets on the motherboard map are grouped into three or four banks of one slot each.
- DIMM 1 and DIMM 2 are bank 0 and bank 1.
- In some cases, motherboards have more than two slots for RAM. These slots would be DIMM 3 and DIMM 4.

3.5.1 INSTALLING THE FLOPPY DRIVE, HARD DRIVE AND CD-ROM

- The step-by-step process is used for installing either a 3.5" drive or 5.25" drives.
- Make sure the floppy cables and power cables are long enough to reach the drive starting.
- Verify the drive is mounted right side up or it will not work.

3.5.2 ATTACHING THE HARD DRIVE & CD-ROM TO THE CASE

- Attaching the hard drive and CD-ROM are basically similar processes.
- Make sure that the interface cable will reach the drive in its intended location.
- With IDE/ATA drives, the length of the cable is limited to 18" and less, in some cases.

- Installing the CD-ROM is not very different than installing the hard drive.
- Remove the drive bay cover first, then set the CD-ROM jumper to master since it will be connected to the secondary IDE channel.
- Slide the drive into the bay from the front, making sure that it is flush with the front panel, and screw it in place.
- In some computer cases, particularly the mini-towers, it can be quite challenging to work behind the CD-ROM because of its length and also because it is obstructed by the power supply.

3.5.3 CONNECTING POWER CABLES TO THE FLOPPY DRIVE, HARD DRIVE AND CD-ROM.

- ✓ Small cable drive connectors from the power supply provide power to the floppy drive, hard drive and the CD-ROM. The cable connectors have a female 4-in plug that connects to a male 4-pin connector at the rear of each drive.
- ✓ Two different power voltages are required for proper functioning of the drives. The circuit board and the logic chips are designed to use +5V power. The drive motors use the +12V power.
- ✓ Attaching the power cables to the floppy drive, hard drive, and the CD-ROM is simple since all the connectors are keyed and can only be inserted one way.

3.5.4STEP-BY-STEP INSTALLATION OF THE VIDEO CARD

- The video card as shown is the only expansion card that needs to be installed before booting the PC for the first time.
- It is critical in displaying vital information need to configure the BIOS during the initial boot process.
- All the other cards can be installed once the computer is up and running.
- Cover the four steps to install the video card.

3.5.5 FINAL STEPS

FITTING THE CASE TOGETHER

- Once all the components and parts have been installed in the case, it is time to complete the PC assembly process.
- Check to make sure that all the pin 1, indicators on the cables matches up with all of the pin 1 indicators on the sockets and that connection are snug.
- Make sure that all the screws are properly connected and properly tightened.
- When securing the case, make sure no cables or wires are sticking out or are cut between the pars of the case.

3.6 INSTALLING THE OPERATING SYSTEM

For an operating system to run, it must be loaded into the Random Access Memory (RAM).

When a computer is first turned on, it launches to bootstrap loader. The primary functions of bootstrap are to test the computer hardware and to locate and load the operating system into RAM.

During the BIOS firmware routines, three major sets of operation happen.

i. Power-On-Self-Tests or POST

ii. Initialization.

iii. BIOS moves the starting address and mode information into the DMA controller then

iv. Master Boot Record (MBR)

3.6.1 STEP FOR THE INSTALLATION

Step 1 - Select, which drive bay, is to be used for the floppy drive. Remove the faceplate of the bay and save the faceplate for future use.

Step 2 - Without connecting anything, insert the drive into the chosen bay, making sure it fits properly.

Step 3 - Select the proper size screws (preferably those that came with the drive). If using brackets to hold the drive in place, secure them now, or simply use the screws to attach the drive to bay.

Step 4 - attach the power and ribbon cable to the drive. If other drives are to be installed, this step can be skipped. This provides more manelivering room in the case, especially if there are no removable drive bays. The drive cable and power cord can then be connected after all the drives have been installed.

CHAPTER FOUR

RESULT AND ANALYSIS

4.1 OPERATIONAL ANALYSIS

You may find a protective piece of cardboard or plastic inside your floppy disk drive (the wide slot at the front of the System Unit) pull out the card and keep it with other packing materials.

Power ON the system unit and the monitor from the power button (usually at the front of the "marked" power) or and I/O switch ("O" for OFF and "I" for ON"). Switch may be located at the front, back or side of the unit. Always switch the monitor ON first, then your system unit, and then the computer is ready to boot.

If nothing happens when you powered the PC, check power cord plug to see if it is well powered into the socket and into the PC, but se nothing on the screen, make sure the monitor switch is ON, check also the monitor cables are plugged firmly into the correct sockets at the back of the system unit.

If you have a surge protector, be sure it is turned ON also.

4.2 PRINCIPLE OF OPERATION

BIOS stands for Basic Input Output System, it contains the program code required to control all the basic operating components of the computer system. It

contains the software required to test hardware at boot up, load the operating system, and support the transfer of data between hardware components.

CMOS is a battery-powered storage chip

The function run basic device test programs and then seeks to configure these devices. The system BIOS and the information required to configure, it is stored on a complementary metal-oxide-semi-conductor (CMOS) chip.

CMOS is a battery-powered storage chip locates on the system board.

The CMOS chip has rewritable memory since the configuration date can be changed and updated as the components or devices in the computer are changed.

The system BIOS and the information required to configures, it is stored on a **Complementary Metal-Oxide Semiconductor (CMOS)** chip.

The BIOS function runs basic devices that test programs and then seeks to configure these devices.

4.3 MAINTENANCE

Maintenance is the preventive measure(s) put in place in order to ensure a continuous, safety and proper working condition of the personal computer. There are different methods of maintaining a personal computer VIZ opportunity maintenance, operational for failure, fixed time or fixed period maintenance e.t.c.

Here are the lists of the preventive maintenance measures

Use an uninterrupted power supply (UPS) with your personal computer.

- Make sure you look for good antivirus software to face all viruses coming into your personal computer.
- Make ever there is failure of electricity or illegal shutdown, allow your operating system to scandisk the hard disk for you, and don't cancel the scandisk operation.
- Try to put administrative password to ensure your computer from illegal unauthorization.
- Provide a cooling system for your personal computer to reduce the heat generated by the microchips of the motherboard.

4.4 TESTING

There are four of human that check and employed in determining whether a personal computer is faulty or not, these include:

4.4.1 HEARING: Sound coming out of the personal computer enables one to know that this is the particular problem arising to this personal computer or state of condition of the computer system.

4.4.2 VISUAL TEST: This is done by using our sense of sight in the following manner, to watch the monitor during the boot process of the personal computer (i.e. visual display of the monitor) if there is any malfunctioning

computer, the computer gives out a beep signal indicates that the computer hardware and software are in order or otherwise. It gives a continuous beep which indicates problems either the component are not in order. Then it needs to be checked before boot continues.

000-00F, 081-09F	-	Direct Memory Access Controller
010-01F, 0A0-0A1	-	Programmable Interrupt Controller
040-043	-	System Timer
060-060	-	Keyboard
061-061	-	PC Speaker
070-071	-	CMOS / Real time clock

4.4.3 SMELLING: This enables the users to quickly know that one of computer components has burnt or the wires used are burnt.

4.4.4 TOUCHING: This can be done by placing one palm on the system unit of the personal computer, this will enable one to know if there is electrical discharge from the computer system which can be quickly rectified.

4.5 PRACTICAL TROUBLESHOOTING TABLE

SYMPTOM	POSSIBLE SOLUTION
- Dead Computer	- Check if power cable is connected and supply power.
- (Nothing happens when you press power button) - "OS" not found"	- Ensure UPS is ON and supplying. - Check boot sequence in setup. - The hard disk may be bad, check the hard disk on another system.
- No sound output	- Ensure that speakers are ON, and connected. - Re-install sound drivers.
- Computer fails to "see" other computer on the network	- Ensure that the right network cable is used, and that is well connected. - Try using another one.
- System comes on but does not display on the monitor.	- Ensure the monitor is ON and connected. - Ensure the VGA card is OK and well seated.

	- The RAM may be faulty. Replace it or reset or reseat it.

5.2 CONCLUSION

This project enables us to know how the computer system is been assemble and also it tells the way to maintain the computer system in order to prevent it from developing fault.

Also, this project provides the basic materials and installation of a Pentium III personal computer.

5.3 RECOMMENDATION

Having completed the project, the following analysis should be put into consideration viz:

- Always shutdown properly to prevent hard disk from crashing.
- The hardware part should be cleaned to avoid short circuit and over heating.
- Ensure regular check on your hard disk and back up.
- General routine maintenance should be done on the system on every monthly basis.
- Reseat any socket chip regularly. Ensure they are well seated.
- Clean all connectors and card contacts.

This project research can be recommended computing, edit, control, solving a complex tasks and also be useful in making some future research in developing the economy.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY

In summary, the computer system is an electronic device (calculating machine) that solves problems by applying prescribed instructions on data presented to it.

It performs its data-processing operations accurately at high speed with little or no human intervention by loading it with different packages or programmes. It is also called an automatic device and has the ability to perform calculation, sort files and edit information.

From the basic design and construction, the problem associated with the computer system is short circuiting which is generally caused by the temperature, that is where the computer system is been placed. But normally, it is advisable that the computer system should be placed in a well-ventilated area because computer chips produce heat on operation and needs a lot of ventilation. Also, the computer room needs to be laid with carpet or rug in order to avoid short-circuiting because of moisture build up from the floor.

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