ASSEMBLING OF A
COMPUTER SYSTEM

BAMIRO ADEBOWALE SAMSON
MATRIC NO. 06 262

**DEPARTMENT OF COMPUTER ENGINEERING
ABRAHAM ADESANYA POLYTECHNIC
IJEBU - IGBO OGUN STATE, NIGERIA**

JUNE, 2009

ASSEMBLING OF A COMPUTER SYSTEM

(BEING AN ORIGINAL ESSAY SUBMITTED BY)

BAMIRO ADEBOWALE SAMSON
MATRIC NUMBER 06/262
TO THE
COMPUTER ENGINEERING DEPARTMNENT,
SCHOOL OF ENGINEERING TECHNOLOGY,

ABRAHAM ADESANYA POLYTECHNIC
IJEBU-IGBO, OGUN STATE, NIGERIA.

IN PARTIAL FULFILMENT OF THE
REQUIREMENT FOR THE AWARD OF ORDINARY
NATIONAL DIPLOMA (OND) IN COMPUTER
ENGINEERING.

JUNE, 2009.

CERTIFICATION

I certify that this Project was carried out by BAMIRO ADEBOWALE SAMSON in the Department of Computer Engineering , School Of Engineering and Technology, Abraham Adesanya Polytechnic, Ijebu-Igbo under my supervision

....   03|07|2009.

Bamiro Adebowale S.   Date
      (student)

....
Engr. Lawrence Oborkhale   Date
(Dean School of Engineering & Technology.)
      Supervisor.

....
Mr. Adekunle Adesina   Date
(HOD Computer Engineering Dept.)

ii

DEDICATION

This Project is dedicated to the **Almighty God**. The most beneficent, most merciful and Gracious. The omnipotent, the Guardian, the Alpha and Omega, in whom I found great to complete my Ordinary National Diploma (OND). successfully. This Project is also dedicated to my Parents **Mr. and Mrs. Bamiro and all the members of Bamiros' Family.**

ACKNOWLEDGEMENT

My sincere and utmost gratitude goes to the Almighty God for all the love, mercy and strength all through this daunting and challenging task throughout my stay on Campus and subsequent completion of this project. My profound gratitude goes to my able, patient, dynamic and supportive supervisor **Engr. Lawrence Oborkhale (Dean School of Engineering Technology)** for his thorough assistance, guidance and undivided attention with continuous encouragement towards the success of this project as well as making necessary corrections.

Special thanks to my humble Parents **Mr. Adewale and Mrs. Olusola, Abisola and Oriyomi Bamiro** who helped me made the dream come true may the lord spare your lives to reap the fruit of your labour. With pride and deep appreciation, I put on record the financial and moral support received from **uncle Toye, uncle Lanre and sister Tutu**. My appreciation also goes to my twin sister **Adewunmi Bamiro** and to my **brother Remi Oluboyo**. My appreciation also goes to my younger ones; **Adedayo, Oluwadamilare and Oluwaseun Bamiro**, Rasak May the good Lord continue to be with you all.

Many thanks to all to my humble lecturers Mr. Adekunle (HOD. Computer Engineering) Mr. G.O Odulaja, Mr. Abiodun Odumosu (HOD Electrical/Electronics Department) Mr. Banjo, Mr. O Odunsi, Mr. Mudiaga, Mr. Uche, Miss Ndu Uche, Mr. Oloyede (HOD SBSS), Mr. Badmus

This acknowledgement will be incomplete without mentioning the following good friends of mine who have one way or the other contributed to my advancement on campus particularly **Adeleye Timilehin T., Hazzan**

iv

<div align="right">

Bamiro Adebowale S.

</div>

TABLE OF CONTENT

CONTENT
                                         PAGES

CHAPTER ONE
INTRODUCTION

CHAPTER TWO
HISTORY AND PARTS OF COMPUTERS

CHAPTER FOUR

OPERATIONAL ANALYSIS, TESTING AND MAINTENANCE

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

BIBLIOGRAPHY

CHAPTER ONE

1.1 INTRODUCTION

A Computer is the most powerful and versatile tool ever created by man. Its presence can be felt world wide in different areas of life. It has been in existence for over five hundred years.

A Computer is an electronic machine which make use of electric supply. The absence of electric supply renders its service useless because electricity is needed to put life into the computer. It is a device which requires the service of Man (as the operator) for its functioning. It can also be operated following the instruction stored in its memory. It is a device which receives raw fact and process it to give a meaningful result.

A computer is an electronic device which accept data as INPUT through the input device, store data in its memory and process the input data to produce a meaningful information called the OUTPUT through the output device or stored for further processing.

1.2 AIM AND OBJECTIVE OF THE PROJECT

The major aim and objective of this project is to access the assembling of a computer system. This project is aimed at exposing me to how assembling of a computer system can be done which involves getting and identifying the basic required hardware and software components needed and how it should be put together to ensure it proper functioning.

1.3 THE SCOPE OF THE PROJECT

This project involves the assembling of a Pentium III system with the following specifications;

An Intel ATX Pentium III motherboard with a processor of 800MHZ which will raise the processing speed to an appreciable level. A RAM of 256MB which makes data to be accessed fast enough coupled with a hard disk drive of 40GB which will make available high storage space for loading operating system and storing data . The system coupled with a floppy drive which will enhance storage of data on a diskette which can be transported from one place to another and a DVD-ROM drive and a Window XP operating system and applications on it.

1.4 THE LIMITATION OF THE PROJECT

The limitation of this project will include the condition of terms in obtaining the adequate textbook needed for the project, the cost of getting the necessary and required components needed for the project, transportation and the time needed to complete the research work. These are the problems that will be encountered.

1.5 COMPUTER APPLICATIONS AND ITS USES.

Computers are widely used in the following areas:

OFFICES: They are widely used in offices for preparing documents, keeping account records, calculating, communications etc.

BANKS: Computers are used in banks for processing cheques, keeping account records, calculating customers' interest and bank charges, annual financial report preparation, payroll, security etc.

EDUCATION: It is used for making research , keeping student records, teaching students computer skills and so on.

HOMES: Computers are used in homes for playing games, entertainment, security etc.

Computers are also used in hospitals, airports, TV and Radio stations and so on to mention few.

CHAPTER TWO
HISTORY AND PARTS OF COMPUTER

2.1 INTRODUCTION

Computers have been evolving over the years which can be traced to the time when man thought of something that could help him in counting. The history of computer is closely related to the problems of counting and calculating. The calculation functions of man were those that stimulated the development of electronic computers.

2.2 HISTORY OF COMPUTER

The history of computer is the history of search for quick and reliable method of performing calculations and other mathematical operations. Man first calculating device was his fingers and toes, stones and sticks. Fingers and toes were actually used for counting numbers and performing calculations. Stones and sticks are used for counting month days and market days. Charcoal are also used.

With time, both fingers, toes, stones, and sticks became inadequate. Hence more sophisticated method were devised.

2.2.1 INVENTION OF CALCULATING DEVICES

The first calculating device was invented by the man named ABACUS which originated about five thousand years ago. The design was simply in a wooden rack holding a parallel wires on which beads are strung. Calculation is done manually by sliding the beads along the parallel wires.

FIG.2.1 ABACUS MACHINE.
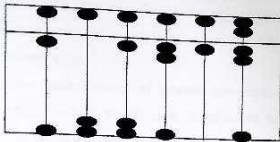
2.2.2 INVENTION OF CALCULATING MACHINES

In 1614, a Scotsman who was also a mathematician developed a machine which he named after himself. He called it NAPIER'S BONES. It was a set of logarithm table carved on ivory rods. These ivory sticks were a set of wooden rods on which there was a multiplication tables. There are nine of such tables. It can be used for both multiplications and divisions.

Later in the century, a machine was invented by a man named BLAISE PASCAL at the age of nineteen 1642 to be precise. His invention was in respond to his father's tasking business account work that involve a lot of calculations. Pascal's machine was made only to carry out addition or subtraction of numbers. The machine utilizes mechanical gear system. Addition of numbers is done by moving the wheel forward while subtraction is done by moving the wheel backward.

In 1694, the German mathematician called LEIBNITZ design a more advance mechanical calculator. The calculator is called STEPPED RECHONES. It can only perform multiplication, division, and extract square root.

After Leibniz machine proved unreliable, in 1830s, CHARLES BABBAGE an English inventor developed the first automatic digital computer called **analytical engine**. The new device was able to combine arithmetic process of addition, subtraction, multiplication, and division with decision based on its own computation.

Most of the basic element of modern computers was found in Babbage engine which include punch card, input/output medium, arithmetic unit, memory for storage of numbers and sequential control.

In the year 1946, an American mathematician called **John Von Neumann** with the help of two of his friends through his paper work built a machine called **Von Neumann Machine**. The machine had memory storage, control, arithmetic and both input and output unit. The machine was a general purpose computing machine that could store programs in 1949 called **Electronic Delay Storage Automatic Calculator** (EDSAC) by a professor called **Maurice Wilkes At Cambridge University In England**. John Von Neumann's paper also led to the development of **Electronic Discrete Variable Automatic Computer (EDVAC)**.

2.3 GENERATIONS OF COMPUTER.

There exist five generations of computer. Computers seen today either belongs to any of these generations;

2.3.1 THE FIRST GENERATIONS OF COMPUTER (1946-1951)

This generation of computer was design by the man named J.P Echart and W. Mauchly. their machine is named **Electronic Numerical Integrator And Calculator (ENIAC) built in 1946**. It was first all purpose electronic digital computer. Unlike the earlier machine, it uses vacuums tube

<VALVES> instead of relays as it active logic element. It is made up of 17,468 vacuum tube, 70,000 resistors , 5 million soldered joint,. 18,000 square fit size, thirty tones weight. It consume 160kw of energy. It dissipate a lot of heat which make it require a full air conditioning environment. The computer of this generations are costly and bulky in size. They use machine language which is in binary (i.e. 1 and 0). Example is ENIAC IBM 700 SERIES.

2.3.2 THE SECOND GENERATIONS OF THE COMPUTERS (1955-1964)

This generation computer was between 19565 and 1964. The invention of semiconductors known as TRANSISTOR in electronic engineering led to the development of the second generation of the computers. After series of development of transistors for about ten years (10 years), it became viable alternate to the vacuum tube.

The small size of the transistor, it greater reliability and its comparatively low power consumption made it far superior to the latter i.e. the first generations computer. They make use of symbolic language for coding such as FORTRAN. The transistors helps in building a series of processor operation at microsecond speed range. They have efficient storage capacity, faster input and output. They generates lesser amount of heat. They perform more calculations. Examples are IBM 140, UNIVAC 107 etc.

2.3.3 THE THIRD GENERAITONS OF COMPUTERS (1960-1970)

During the year 1960s and 1970s, an important technological innovation result in a dramatic advancement of computer hardware. The breakthrough is fabrication of integrated circuit (IC'S). A solid state device

consisting of hundreds of **Transistor, Diodes And Resistors** on tiny silicon chip. The impact of the IC'S permitted the construction of mainframe (large scale) computers of higher operating skills, capacity and reliability at low cost. This generations of computers helped the engineers to design a mini-computers. The development of large scale integration makes it possible to pack thousand of transistor, resistors and diodes on a single silicon chip. It led to the innovation of the micro processor which is an IC on a single silicon chip that contains all the arithmetic, logic and control circuitry which makes up a digital computer central processing unit (CPU). Examples are the ICL 1900 series and the IBM360 series.

2.3.4 THE FOURTH GENERATIONS OF THE COMPUTERS (1970-1980).

The set of computers produced in the late 1970s and 1980s are referred to as fourth generation computers. The only distinguishing characteristics is attributed to the availability of the **Very Large Scale Integrated Circuit (VLSIC)** as compared to the **Large Scale Integrated Circuit** of the third generation. This technology has vastly increased the circuit density of micro processor, memory and support chips. This generations of computers witness the introduction of wide variety of software tools in the market such as Data base management system, word processing packages such as MS-word, game packages and more. All the computers seen nowadays belong to this generations.

consisting of hundreds of **Transistor, Diodes And Resistors** on tiny silicon chip. The impact of the IC'S permitted the construction of mainframe (large scale) computers of higher operating skills, capacity and reliability at low cost. This generations of computers helped the engineers to design a mini-computers. The development of large scale integration makes it possible to pack thousand of transistor, resistors and diodes on a single silicon chip. It led to the innovation of the micro processor which is an IC on a single silicon chip that contains all the arithmetic, logic and control circuitry which makes up a digital computer central processing unit (CPU). Examples are the ICL 1900 series and the IBM360 series.

2.3.4 THE FOURTH GENERATIONS OF THE COMPUTERS (1970-1980).

The set of computers produced in the late 1970s and 1980s are referred to as fourth generation computers. The only distinguishing characteristics is attributed to the availability of the **Very Large Scale Integrated Circuit (VLSIC)** as compared to the **Large Scale Integrated Circuit** of the third generation. This technology has vastly increased the circuit density of micro processor, memory and support chips. This generations of computers witness the introduction of wide variety of software tools in the market such as Data base management system, word processing packages such as MS-word, game packages and more. All the computers seen nowadays belong to this generations.

2.3.5 THE FIFTH GENERATIONS OF COMPUTER (1990 TILL DATE)

There are many prediction that by the early 21st century, computers will be have been developed that will be able to converse with people in human manner and that will be able to mimic human senses, manual skills and intelligence. The term fifth generations is often used to describe such computer systems.

2.4   TYPES OF COMPUTERS
2.4.1 ANALOGUE COMPUTERS

This types of computers are used for measuring. They are used for continuous measurement such as temperature, speed, power etc. They operates on the principle of similarity of proportion relation to a process modeled when values are kept constant over a specified range. They translate various physical condition such as temperature, speed, power etc into mechanical and electrical analogue value. Example of Analogue computers are thermometer, speedometer, wattmeter etc.

2.4.2 DIGITAL COMPUTERS

This type of computers are used for calculating and counting. They are capable of processing all kinds of data in a discrete form i.e number express directly as 2 digits 0 and 1 of the binary code. The two binary digits 0 and 1 can be made to represent numbers, letters, symbols, electrical values and so on. They can be used to represent electrical state. Take for instance ON or OFF

0 stands for OFF while

1 stands for ON

Examples of Digital computers are **Mainframes, Super Computers, Mini Computers And Micro Computers.**

2.4.3 HYBRID COMPUTERS

This type of computers combines both features of the analogue and digital computers. They are used for counting, calculating and measuring. They are built with special processing ability in that they are capable of converting analogue measurement to digital form and vice versa. Such devices include hybrid wristwatch, hybrid speedometer etc.

2.5 CHARACTERISTICS OF COMPUTER

Computers are being used in all human endeavors due to the following characteristics it possessed

➢ SPEED: A computer has a high processing speed and save processing time compare to man

➢ ACCURACY: It has a the ability to produce accurate and reliable result.

➢ EFFICIENCY: The computer has the ability to produce the desired result without wasting tome

➢ VERSATILITY: It is used for different purposes at different places.

➢ CAPACITY: The computer has the ability to process and store large volume of data at a time.

➢ PROGRAMMABILITY: It execute set of instructions as instructed by the programmer.

2.6 CLASSIFICATIONS OF COMPUTERS

Computers can be classified based on;

- Their memory capacity
- Processing Capabilities
- Price range and speed of operation

Using the above factors, computers can be classified as;

2.6.1 THE SUPER COMPUTERS

They are the largest, fastest and most expensive class of computers. They are used by large organization for performing special task such as complex calculation, weather forecasting etc. They are also used by NASA (National Aeronautics and Space Administration) to track and control space explorations. They have greater processing speed, they have high storage capacity but very expensive. Example of this class of computers include Cray X-MP2.

2.6.2 THE MAINFRAME COMPUTERS

This class of computers also operate at a very high speed but not as high as compare to the super computers. They have greater processing speed and data storage. They require a large space, they generates much heat which makes them require an air conditioning environment. They are used in research organization, large industries, large business and government organizations, banks and airline reservations where large database is needed . However, these computers consumes more electricity. Examples are IBM 3000 series and UNIVAC1180

2.6.3 THE MINI COMPUTERS

This class of computers are also called MINIS. They are faster and more powerful than the micro computers. Their word length is 32bits. They

are large in size and their storage capacity is small to medium. They can perform special task and used for specific purpose e.g. production department uses mini computer to monitor certain manufacturing processes and assembling line operation. They are less expensive than the super and mainframe computers. They are also used for payroll preparation, accounting and scientific computation. Examples are VAX11, PDP11/42, WIPRO LANDMARK860 etc.

2.6.4 THE MICRO COMPUTERS

They are called MICROS or PERSONAL COMPUTERS (PC). They are the least powerful class of computers but the most common and well used. They are the least expensive class of computers. They are easy to use and learn. They are small in size and least powerful. Their word length lies in the range of 8-32 bits. They have high memory capacity. They can be linked to other bigger computers such as mainframe. They are used for general purpose calculations, industrial control, home appliances, desktop publishing, graphic design, project management etc. They are of four different sizes which include

The Desktop: they are small enough to fix on the desk but too big to carry about.

Note Books Or Laptops: They are portable and fixed into brief cases and easy to carry around.

HAND HELD COMPUTERS: These are the smallest. They are design to fit into the palm of the hand. They are also known as PALM TOPS. They usually combine pen input, writing recognition, personal organization tools and a communication capability in a very small package. Personal Digital

are large in size and their storage capacity is small to medium. They can perform special task and used for specific purpose e.g. production department uses mini computer to monitor certain manufacturing processes and assembling line operation. They are less expensive than the super and mainframe computers. They are also used for payroll preparation, accounting and scientific computation. Examples are VAX11, PDP11/42, WIPRO LANDMARK860 etc.

2.6.4 THE MICRO COMPUTERS

They are called MICROS or PERSONAL COMPUTERS (PC). They are the least powerful class of computers but the most common and well used. They are the least expensive class of computers. They are easy to use and learn . They are small in size and least powerful. Their word length lies in the range of 8-32 bits. They have high memory capacity. They can be linked to other bigger computers such as mainframe. They are used for general purpose calculations, industrial control, home appliances, desktop publishing, graphic design, project management etc. They are of four different sizes which include

The Desktop: they are small enough to fix on the desk but too big to carry about.

Note Books Or Laptops: They are portable and fixed into brief cases and easy to carry around.

HAND HELD COMPUTERS: These are the smallest. They are design to fit into the palm of the hand. They are also known as PALM TOPS. They usually combine pen input, writing recognition, personal organization tools and a communication capability in a very small package. Personal Digital

Assistant (PDAs') are the most widely used palm held computers e.g. Blackberry.

Examples of micro computers are IBM PC, PS12, APPLE11 and Macintosh.

2.7 PARTS OF COMPUTERS

The computer system is made up of several components which could either be Hardware or Software. Different parts of the computer can be removed and replace without affecting its functioning.

2.7.1 THE COMPUTER HARDWARES

The computer hardwares are referred to as the physical parts of the computer system which can be seen, felt and touched. Some of the common hardware components are:

The Casing: It is the most important piece of hardware in the computer system. It is the big box called the system unit which houses components such as the motherboard, hard disk drive, and many other internal components. It usually comes with the power pack. The two types of casing available are:

The Desktop: This type is seated horizontally on the desk while the monitor is placed on it.

The Tower: It is the most common type of casing found everywhere. It is placed vertically on the while the monitor is placed beside it.

Hardware components found in the system unit are:

The Motherboard: It is also called Main board or System board. It is the communication medium for the entire computer system. It is rectangular piece of plastic on which micro chips and other components are mounted.

13

Assistant (PDAs') are the most widely used palm held computers e.g. Blackberry.

Examples of micro computers are IBM PC, PS12, APPLE11 and Macintosh.

2.7 PARTS OF COMPUTERS

The computer system is made up of several components which could either be Hardware or Software. Different parts of the computer can be removed and replace without affecting its functioning.

2.7.1 THE COMPUTER HARDWARES

The computer hardwares are referred to as the physical parts of the computer system which can be seen, felt and touched. Some of the common hardware components are:

The Casing: It is the most important piece of hardware in the computer system. It is the big box called the system unit which houses components such as the motherboard, hard disk drive, and many other internal components. It usually comes with the power pack. The two types of casing available are:

The Desktop: This type is seated horizontally on the desk while the monitor is placed on it.

The Tower: It is the most common type of casing found everywhere. It is placed vertically on the while the monitor is placed beside it.

Hardware components found in the system unit are:

The Motherboard: It is also called Main board or System board. It is the communication medium for the entire computer system. It is rectangular piece of plastic on which micro chips and other components are mounted.

The motherboard contains several board also called Cards that performs specific functions.

It can either be:

Open Board: which don't have its processor sound card and video card on the motherboard or **Close Board**: which have its processor, sound card and video card together on the main board.

The main board also contains sockets which provide a connection point for chips. Chips are tiny circuit board made of silicon. The main board contains Bus lines which are connecting lines which provide pathways for communication between components on the main board. Some hardware components found on the main board include the Video Card, Sound card, the RAM, The NIC Card, CMOS battery and so on. The two types of main board available are:

The AT mother board: which is very large and older.

The ATX mother board: it is now being produced by most manufacturers and more compact. The most popular manufacturers of the mother board include Intel, IBM, COMPAQ.

The Processor Or The Central Processing Unit (CPU): It is a computer ship that receives the data input from an input device e.g. keyboard, process the data in someway by performing calculation or reorganizing it, store the result in its memory until it sends them to the output device e.g. monitor or store them on a backing storage devices. It is the brain of the computer. It performs most of the calculations within the computer and is responsible for the smooth running of operating system for example ms-windows as well as application programs such as word processors. It access and uses the main memory RAM within a computer. It execute machine instructions at a speed determined by their internal clock which is measure in Mega Hertz (MHz)

but new computers come on Giga Hertz (GHz). The higher the number of the frequency, the faster the machine work.

DEVELOPMENT OF PROCESSOR

The original IBM PC released in 1981 ran at less than 5MHz while modern PCs' can run at speed well in excess of 2GHz. However, prior to 1997, there exist the following micro processors manufactured by Intel Incorporation:

Intel 80286: referred to 286 processor supported 16 bit architecture was released in 1982 and was available in clock speed 8MHz, 10MHz, and 12MHz.

Intel 80386dx: Featured the 32 bit architecture and built in multitasking, manufactured in 1985 and available in clock speed of 16MHz, 20MHz, 25MHz and 33MHz.

Intel 80486dx: Micro processor released in April 1989 featured built in memory cashes and 32 bit architecture, more than three times the computing power of the 386DX and was available in 25MHz, 33MHz and 50Mhz.

Intel Pentium Micro Processor: Was introduced in March 1993 designed to replace the 486 processor. It can operate at speed 60MHz and 200MHz.

Intel Pentium Pro: Was introduced in 1995 with 64 b it architecture. The internal clock processor speed ranged between 150-200Mhz.

Intel Pentium Mmx: Was the third generation of Intel processor code named P55C was introduced January 1997 which incorporated the new technology MMX (Multi media Extension). The Pentium MMX processor were available in 166, 200, 233,and 266 MHz mobile version.

From 1997 till date, there have been tremendous efforts in boosting the clock speed of processor. The period has witnessed the following capacity range of Intel Pentium processors:

Pentium II released in between 1997 and 1998 has 233–450MHz

Pentium III released in the year 1999 has 500Mhz to1.2GHz

Pentium IV released in the 2000 has 1.4GHZ to 3.0GHz. however, a processor could either be SLOT or SOCKET type.

The Hard Disk Drive: It is a secondary storage device. It permanently stores all data and programs. It has a high storage high capacity. It consist of numerous metallic platters which stores data magnetically. It has to be formatted before it can store data or programs.

Floppy Disk Drive: it is also a secondary device. They work much like the hard disk drive but they consist of thin sheets of a magnetic tape like material instead of hard metallic platters. They permit the transportation of data and information via a device called the **Diskette.**

CD Rom/CD-RW Drives: The CD-ROM drive is a device that drives the CD-ROM disk. It is the location where CD ROM disk are fixed before the user can use them on the system. The CD ROM disk are also secondary storage device. They perform the same function the floppy disk perform. Their storage capacity ranges between 650MB to 750MB.

The CD RW drive let you write data to a CD ROM disk but more expensive than the CD ROM

DVD Rom/ DVD RW This is a device that drives the DVD ROM disc. The only difference between the DVD ROM drive and the CD ROM drive is that DVD- ROM drive can play or access both DVD disk and CD ROM disk while CD ROM drive cannot access the DVD ROM disk. The DVD WR are

used to duplicate or write a DVD ROM disk and a CD ROM disk. But a bit expensive than the DVD ROM.

2.7.1.1   THE INPUT PERIPHERALS

These are peripherals hardware which enables data and instruction to be transferred into the computer. They help to convey information from human readable form to electronic digital form which the machine can interpret and execute within its CPU. They include:

The Keyboards: These are device which allow the user to communicate with the computer. It is used in sending signals to the system. The various types of keyboard are:

- ✓ Traditional keyboard: They ate fill size rigid and rectangular in shape.
- ✓ Flexible keyboard: This type of keyboard can fold up or roll up for easy packaging.
- ✓ Ergonomic Keyboard: They are similar to traditional keyboard but are not rectangular in shape. It provides palm rest to alleviate wrist strain.
- ✓ Wireless Keyboard: They transmit data to the system through wireless communication. They uses radio signals to convey data to the system. They eliminate wires.
- ✓ PDA Keyboards: These are miniature keyboard for PDAs'.

The Mouse: It is a hardware which controls a pointer called cursor which is displayed on a monitor screen. Some are oval in shape and some are curvy in shape to better fit into the palm. The mouse can either be USB mouse or PS2 mouse. Some types of mouse include:

- ➢ Mechanical Mouse: It is the most common type of mouse. It has a ball in its bottom and is attached with a cord to the system.

> Optical Mouse: It has no moving parts. It emits and senses light to detect movement. It can be used on any surface and does not require periodic cleaning.

> Cordless or Wireless Mouse: This is a battery powered device which uses radio wave or infrared to communicate with the computer.

Light Pen: It is light sensitive pen like device. It is placed against the monitor which closes a photoelectric circuit and identify the spot for entering or modifying data.

Scanner: This converts images and text into a form the computer can process.

Joystick: It is the most popular for computer games. It is used to control game action by varying the pressure, speed and direction of the joysticks.

2.7.1.2   THE OUTPUT PERIPHERALS

These are hardware that displays processed information in a computer. They include:

The Monitor: It is also known as Visual Display Unit (VDU). It displays information that has been processed by the CPU and also displays data entered into the system on its screen. The two types available are:

> The Cathode Ray Tube (CRT) Monitor: It is the most common types of the monitor. It is cheap and has excellent resolution. It is bulky in size which makes it require a considerable space. It consumes more power and dissipate more heat.

> The Flat Screen Monitor or LCD Monitor: The technology used involves liquid crystals. They are thinner and require less power to operate. They are used with desktops, tablet PCs', notebook and hand held computers.

The Printer: It presents information on a paper. It is often called hard copy which can be moved from one place to another. The two types of printer available are:

- ✓ The Ink Jet Printer: It sprays ink onto the paper. It produces color images and it is less expensive.
- ✓ The Laser Printer: It has similar technology to photocopier. A light beam transfer the images to paper using toner. It is more expensive than the ink jet printer but have higher quality.

Projector: It is used for projecting photographs or films on a screen. It is also used in projecting the display of a monitor screen. It is also used in Cinema houses to show films.

Speaker: This produces audio and video sound output from the system. It might be internal or external.

2.7.1.3 STORAGE PERIPHERALS

Random Access Memory (Ram): This memory can be read from and written to. It is used to hold operating system, programs and data that require by the processor. It is volatile in nature i.e. it contents can easily be affected by power outage. To avoid this problem, all information in the RAM must be backed up in some other memory location. The various sizes of RAM available are 64MB, 128MB, 256MB, 512MB and 1GB.

Diskettes: They are used to store data and information but has a lesser storage capacity.

Flash Drive: It is a storage medium which has large storage capacity of storing and holding data and information. It ranges in sizes and more expensive than diskettes.

Other peripherals of the computer include:

Cables: It allows components such as hard disk drive, CD-ROM drive to be connected to the motherboard.

Cords: This allows external devices to be connected to the system. Example is the monitor's cord.

Uninterrupted Power Supply (UPS): It supply current to the system. It is still ON when there is power failure which allows the system to be properly shutdown to the hard disk from crashing and save jobs.

2.7.2 THE COMPUTER SOFTWARE

Software is a generic term used for all sort of programs that run the hardware system. It is the suit of programs that propels the hardware to function. They drive the hardware. The software is design to exploit and provide the potential capabilities of the hardware to he intending users.

2.7.2.1 CLASSIFICATION OF SOFTWARES

Software are classified into two major group:

- System software
- Application software

2.7.2.1.1 SYSTEM SOFTWARE

System software is a collection of programs that handles hundred of technical details with little or no user intervention. It refers to the suite of programs that facilitate the optima use of the hardware system and provide suitable environment for the writing, editing, debugging, testing and running of the user programs. Usually, every computer system comes with a collection of this suites of programs which are provided by the

manufacturers. They constitute and essential part of any computer system. Examples of this class of programs are :

Operating System: An operating system is a suit of programs acting as an interphase between the user of the computer and the hardware. It provides the user with feature that makes it easier for it to code, text, execute, debug and maintain its programs while efficiently managing the hardware resources and controls all other programs. Few function of the operating system are:

- ❖ Coordinating and handling computer resources
- ❖ Input and output handing
- ❖ Memory management
- ❖ Filling system
- ❖ Program interaction and control
- ❖ Protecting and error handling

Utility Software: These are also known as service programs. They perform specific task related to managing computer resources. Examples are antivirus, file compression programs, disk defragmenter, disk clean up etc.

Device Drivers: These are specialized programs designed to allow a particular device communicate with the computer. Examples are sound card driver, printer driver etc.

Language Translator: This converts programs instructions written by programmer into a language the computer understands. Examples are:

Assembler: It is a computer program that accept source program in assembling language and produces and equivalent machine language called object program or object code. Each machine has its own assembling language i.e. machine language of one machine cannot run on another machine.

Compiler: It is a computer program that accept a source program in high level language (user oriented language), read and translate the entire user program into an equivalent program in machine language called object code or object program.

Interpreter: This is a program that accept the program in source code (user language), read, translate and execute it line by line.

2.7.2.1.2 APPLICATION SOFTWARES

An application software is otherwise known as application program. An application software is a program designed to perform a specific function directly for the user. It uses the services of the computer operating system and other supporting application. Examples are:

Accounting Packages: This application covers sales ledger, invoicing inventory, control payroll. Fixed asset, purchase ledger, order processing and nominal ledger to mention few. Examples are SAGE which has a number of packages, SAGE payroll 2, SAGE account and SAGE financial controller compact which contains compact day book account compact nucleus and compact payroll.

Word Processing Packages: These packages are used mainly for document preparation. Examples are Microsoft word, Word perfect, WordStar, LOTUS professional writer, Display writer etc.

Spreadsheet Packages: A spreadsheet is a sheet of paper rule into a grid of rows and columns on which you can do financial and numerical calculations. A spreadsheet calculator does exactly the same thing on the screen of the computer. Example are LOTUS1-2-3, Supercale, VP Planner, Ms Excel, Quarto Professional etc.

22

Integrated Packages: These are programs or packages that performs a variety of different processing operation that is compatible with whatever operation is being carried out. They perform a number of operations like word processing, database management and spreadsheet processes. Examples are office writer, logistic symphony frame work, smart ware 2, Ms word etc.

Graphic Packages: These are packages that enables you bring out images, diagram and pictures. Examples are: Graph writer, instant artiste, Photoshop, Corel draw etc.

Database Packages: These are software for designing up and subsequently managing a database. A database is an organized collection of data that allows for modification taking care of user view. Examples include: Database 2, Database 3, Database 4, FoxBASE, R base, Paradox 3 etc.

2.7.3 SYSTEM FIRMWARE

System firmware is a computer program that is embedded in a hardware device for example a micro controller. It is responsible for configuring several key parameters on each PCI adapter as well as configuring options in the input and output chip on the various input/output and PCI buses in the system. In some cases, the firmware sets parameters unique to specific adapter. For example the PCI latency timer and cashe line size. The parameters are keys to obtaining good performance from the adapter. If these parameters are not properly set because of the firmware low level. It will be impossible to achieve optimal performance by software tuning alone. Ensure that you update the firmware on older system before adding adapter to the system.

CHAPTER THREE
ASSEMBLING OF A COMPUTER SYSTEM

3.0 INTRODUCTION

Assembling of a computer system is the process of putting together i.e. screwing together all the various components of the computer bought. Once all the require components required are available, assembling is done effective with ease. Assembling of a computer system usually takes up to 20 – 30minnutes (installation not included). Assembling of a computer system is although easy but must be done carefully to avoid unnecessary damaged to the system components.

The major goal of assembling the computer components is to make a complete system which will function properly. After buying all the components needed, they must be put together. This process is called assembling.

3.1 COMPONENTS REQUIRED FOR COMPUTER ASSEMBLING

There are some major computer components which must be made available before computer assembling can be achieved or done. These components include:

➢ Cabinet (case)
➢ Motherboard
➢ Hard disk drive
➢ Processor
➢ Random access memory (RAM)
➢ Floppy drive

- CD ROM drive
- VGA Card: if not on the motherboard
- Sound card : if not on the motherboard
- Monitor
- Keyboard
- Mouse
- Cables : keep all the cables that comes with each components
- Cords
- Modem
- UPS OR STABILIZER
- Operating system (window XP professional)

3.2 TOOLS REQUIRED FOR ASSEMBLING

+ Philips head screw driver
+ Flat head screw driver
+ Forceps for pulling out jumpers and screw
+ Magnetized screw driver
+ Multi meter or tester for testing
+ Wrist strap

3.3 REQUIRED ENVIRONMENT

❖ Make sure that a flat surface of a good area is available when the system
   is been assembled
❖ Make sure the room has enough space to move around
❖ Ensure the room is dust free as dust can harm the system components
❖ Ensure the room has a good ventilation system

◆ Check the grounding in the plug to make sure that earthing is done properly

3.4 PRECAUTIONS

Some precaution must be taken before the actual assembling of the computer is done to avoid any to avoid any mistake which may damage the components

While the motherboard has to be fitted at a fixed place inside the cabinet (case), the location of the add on cards (as and when used) and the drives (hard disk drive, floppy disk drive, CD ROM drive within the drivers bay of the cabinet can be changed within certain limits. But better to place them away from each other (the length of the cable provided for interconnection to the motherboard must be taken into account as there must be some slack after these are installed and connected to the motherboard. This will improve the cooling and reduce the chance of electromagnetic interference between them.

The motherboard contains some sensitive components which can be easily damaged by static electricity. Therefore, the motherboard should remain in its original anti-static envelope until required for installation. The person taken it out should wear an anti-static wrist wrap that is properly grounded. In the absence of a wrist strap, you must make one on your own using a pealed of multi stranded copper cable and ground it properly. Similar handling precaution are also required for cards.

Be sure to handle all the components with great care. If a small thing like screw is dropped on the motherboard, it can damage the delicate circuitry rendering the motherboard useless.

3.5 PROCEDURES AND STEPS TAKEN FOR COMPUTER ASSEMBLING

3.5.1 INSTALLING THE MOTHERBOARD

You need to determine if the case or cabinet has the appropriate risers or spacers installed. Risers or spacers keeps the motherboard from touching the metal surface of the

case after it is installed avoiding a short circuit and a wrecked computer. Any new case will include a form of risers which may be metal or plastic. They may or may not be preinstalled into the case. Keep the cabinet panel on the table and fix the motherboard on it. A gentle pressure is enough to mount the motherboard on the riser. There is a mechanism to lock the motherboard in place. Identify its working and mount the motherboard accordingly. Tighten the screw on the motherboard to the panel

3.5.2 INSTALLING THE PROCESSOR / CPU.

Now, gently lower the CPU into the zero insertion force (ZIF) socket. No pressure is required. If the CPU is placed properly, it will slide into the socket. Make sure the number 1 pin is placed correctly. If you cannot get the CPU to sit evenly, Do not force it. After placing the CPU, lock the socket using the locking lever. Apply the IC paste that comes with the processor to the bottom of the heat sink. The heat sink will conduct all the heat produced by the processor during operation which is a cooling method. After applying the paste, fix the heat sink on the processor. Make sure that the locks of the heat sink are well positioned and locked.

3.5.3 INSTALLING THE RAM

Place the RAM module in the slot and ensure it is well positioned and press downward. Be careful not jerk the RAM while pressing it down.

Ensure that the lock gets hold of the RAM, and stay in the locked position. The way in which the RAM will be installed will depend on the type of the RAM we want to install. We have the SDRAM, DDRAM, RDRAM etc.

3.5.4 INSERTING THE EXPANSION CARDS

Expansion cards should be inserted to the motherboard if available so that device like sound card , video card and other cards could added if not on the motherboard. Presently, we have three types of slots on the motherboard PCI,ISA and AGP. Video cards are made compatible with the three of them. Adding the card is done by inserting it on the motherboard and make sure the other side of the card can be seen at the back of the casing and screw it to the casing.

3.5.6 INSTALLING THE HARD DISK DRIVE

Ensure that the hard disk is set to be the master drive on its IDE cable. Each IDE cable can support up to two IDE devices such as hard drive, CD drive, ZIP drive etc. But in order to make them function, one IDE device must be designated as master and other as slave because we can have two master or two slave devices on a single cable. This may later be configured in the BIOS set up. Position the top of your hard disk drive into the 3½" drive tray and slide it into fit it into space provided and screw into the case on both side to the tray of the casing.

3.5.6 INSTALLING THE CD/DVD/DVD/RW ROM DRIVE

Ensure that at least one full sized 5.25"bay is meant to install the drive. Insert the drive and slide it into the bay, make sure it is well seated and the front plane of the drive aligned with front panel of the case. Use

screw the drive on both side to the casing, attach the IDE cable to the drive. Note that generally this should be a regular 40 pin IDE cable not the 80 pin IDE cable that is used for the hard disk drive and this device must be made as slave IDE devise

3.5.7 INSTALLING THE FLOPPY DRIVE

Make the 3.5"bay of the case is free and opened. If your case come with rails for the floppy drive, attach them to the sides of the drive and slide the drive into the into the until it is well seated and the front is aligned with the front of the casing. Rails are small metal pieces which clip or screw the device and allow it to be inserted or removed from the case with minimal effort. OR

Slide the drive into the bay through the front side of the case until the faceplate of the floppy drive is aligned with the front bezel of the case and screw it on both side to the bay of the casing.

3.5.8 ATTACHING THE CABLES

Some cables are needed in computer assembling so as to ensure communication between the components. These cables includes:

IDE hard disk drive, CD ROM drive 40 pins

Floppy IDE floppy drive 34 pins

Power cables from the system power supply to the motherboard 6x2 in AT and 20 in ATX front panel display speaker, hard disk drive indicator LED, power and restart LED different for each backside connection PS/2, USB,LPT, COM1, COM2 etc. different for each card connectors CD ROM, audio cables on board display to backside cable etc.

There are other cable such as processor fan power supply, power supply for devices like hard disk drive, floppy disk drive, CD ROM etc. which are not connected to the motherboard. All must be connected properly to pin configuration on motherboard. Ensure the cables are well and carefully connected to the motherboard and the components so as not to brake the pin.

3.5.9 INSTALLING THE POWER SUPPLY

We have two types of power pack, they are;

The ATX power supply

The AT power supply

When you have identified the type of power pack that is compatible with your casing, place the power pack into the bay provided for it in the casing, make sure it is well seated and screw it to the casing. Ensure it well tighten to the case and make sure all connection point of the of power cord well seated. Connect the power cable of the power supply to the space provided on the motherboard and also connect power cables to the necessary drives such as the hard disk drive. Connect the wires coming out from behind the front of the casing to the motherboard. They control the power ON, OFF, RESTART of the computer system. After connecting each wire to each destination in the cabinet, double check the connections and make sure all wire are firmly connected and also ensure no wire is running close to the top of the CPU heat sink fan. Then cover the casing and screw it up. Place it in an upright position for tower and casing and place it horizontally on the desk for desktops. Connect other peripherals to the back of the cabinet. Plug the data cable of the monitor to the to the display card and connect and connect the power plug to the power outlet. Connect the keyboard and mouse cord to the port at the back of the case which could either be a PS/2

or USB keyboard or mouse depending on the one available. But note that USB devices must be connected to USB port and PS/2 devices to PS/2 ports. Connect other peripherals available and also connect the power cord the power pack and the power source which might be a UPS.

3.6 POWERING THE COMPUTER SYSTEM

Before pressing the power ON button, ensure that all cords are properly connected and also make sure the source is supplying the require voltage to power the computer system. Press the power ON button on the system unit. If everything is properly connected and working fine, you will hear a beep and also the green LED will be ON. After some few seconds, the system will come up. Depending on the motherboard, you will get a splash screen or just a memory check. The system will now alt with an error because we are yet to install the operating system. Check the necessary LED to see if they are working fine. Also test the power OFF, RESET button and the LED if there is problem.

3.7 CONFIGURING THE BIOS

After turning ON the computer system, from the first screen you will see a message that says press DEL key to enter at the bottom of the screen. The key to press may be different so it good to pay attention. So press the DEL key and the BIOS set up screen will appear. Review the BIOS settings, there are some little things you pay attention to;

o Setting the time and date
o IDE devices which is the master and which is set to the slave
o Boot sequence or boot order; set the boot sequence to boot from CD ROM

Press the key F10 to save settings and exit set up

3.8 INSTALLING THE OPERATING SYSTEM

Formatting of the hard disk is done before installing the Operating system.
The following are the steps taken during the installation of Windows XP
Operating system

- ✓ Boot up the system
- ✓ Press delete to enter BIOS set-up
- ✓ Make CD ROM as first boot, hard drive as second and floppy drive as third boot
- ✓ Insert the Window XP Professional CD into the CD/DVD ROM
- ✓ Restart the system and press any key to continue
- ✓ Press enter key to set up WIN XP
- ✓ Press F8 to agree
- ✓ Press R to repair or Press F to format the OS
- ✓ Press D to delete Partition and press enter to continue
- ✓ Press C to create Partition, specify the number of partition and press enter to continue.
- ✓ Formatting and copying of files will be done
- ✓ After formatting and copying files, the system will restart and start the installation of Window XP operating system

After the installation of the operating system, installation of Application
software such as Offices like Ms Word, Ms perfect, Ms Excel, Ms Power,
Corel draw, Instant Artiste, Page maker and so on can be done.

CHAPTER FOUR
OPERATIONAL ANALYSIS, TESTING AND MAINTENANCEE

4.1 OPEARATIONAL ANALYSIS

Before pressing the power ON button, ensure that all cords are properly connected and also make sure the source is supplying the require voltage to power the computer system. Press the power ON button on the system unit. If everything is properly connected and working fine, you will hear a beep and also the green LED will be ON. After some few seconds, the system will come up and you will see a message that says press F1 to continue or press Del key to enter set up. Press F1 and the system will load to the desktop thereby performing checks on the BIOS and memory before loading to the desktop.

4.2 TESTING

The following test should be carried out before powering ON the Computer system;

Electrical Testing: The electric supply source should be tested and ensure that is supplying the needed voltage that will power the computer system as high or fluctuating voltage can burn the power supply of the system and renders it useless. Also ensure that the cord connecting the system unit and monitor to the power source is working fine

Environmental Testing: The room where the computer system is been kept should be ensure that is well ventilated i.e. allowing air in and out or should

be provided with an air condition environment or the use of fan to enhance the cooling method.

4.3 MAINTENANCE

These are measures taken to prevent the computer system from been faulty or damaged. Proper maintenance of the computer system be ensured so as to;

> To increase the efficiency of the computer system
> To increase its lifespan
> To ensure its proper working
> To reduce the cost of repairing when damaged or faulty

The two types of maintenance common to the computer system are;

Corrective Maintenance: They are taken to repair or correct a particular fault or problem in the computer system. They are costly and not advisable. Example is the replacement of a crashed hard disk drive.

Preventive Maintenance: They are measures taken to prevent the system and its components from being faulty. It is a cheap method of maintaining the computer system. Example is the regular cleaning of the computer components

The following are some of the basic preventive maintenance tips which should taken

> Dust can cause short circuit and overheating. So dust the board, fan and the power supply regularly
> Clean all connectors and card contacts regularly
> Clean keyboard and mouse regularly
> Ensure regular check on your hard disk and back up
> Always shut down properly to prevent hard disk from crashing

be provided with an air condition environment or the use of fan to enhance the cooling method.

4.3 MAINTENANCE

These are measures taken to prevent the computer system from been faulty or damaged. Proper maintenance of the computer system be ensured so as to;

> To increase the efficiency of the computer system
> To increase its lifespan
> To ensure its proper working
> To reduce the cost of repairing when damaged or faulty

The two types of maintenance common to the computer system are;

Corrective Maintenance: They are taken to repair or correct a particular fault or problem in the computer system. They are costly and not advisable. Example is the replacement of a crashed hard disk drive.

Preventive Maintenance: They are measures taken to prevent the system and its components from being faulty. It is a cheap method of maintaining the computer system. Example is the regular cleaning of the computer components

The following are some of the basic preventive maintenance tips which should taken

> Dust can cause short circuit and overheating. So dust the board, fan and the power supply regularly
> Clean all connectors and card contacts regularly
> Clean keyboard and mouse regularly
> Ensure regular check on your hard disk and back up
> Always shut down properly to prevent hard disk from crashing

➤ The use of password to prevent unauthorized access to the computer system

➤ Ensure a good ventilated environment.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

This chapter reveals the summary, conclusion and recommendation of the project.

5.2 SUMMARY

In summary of the project, the computer system is an electronic device which accepts data as input or information from the input unit through the input device such as keyboard and process it to give a meaningful output called information which is displayed through the output unit such as monitor or stored for further processing.

Computer assembling is the bringing together of all various computer components to have complete working computer system. From the basic design and construction, the problem associated with computer system is short circuitry which is generally caused by the temperature generated where the computer is kept. Therefore, it is advisable that the computer system should be placed in a well ventilated area because computer chip produce heat on operation and needed cooling. Also, the computer room floor must be laid with carpet or rug in order to avoid short circuitry because of moisture build up from the floor.

5.3 CONCLUSION

This project enables us to know and identify the various computer components. It also enables us to know how the computer system is

designed and assembled. It also provide the basic steps and installation process of operating system and the configuration of the computer system. This project also expose us to the fault associated with the computer system, the causes, how they are rectified and the basic maintenance tips.

5.4 RECOMMENDATION

The following are recommended for achieving a more efficient and performing computer system:

- An ATX Pentium IV motherboard which is better compared to Pentium III motherboard
- Processor of higher speed: The higher the speed of the processor, the faster the processor
- RAM of higher size: For easier and faster accessing, a higher size RAM is recommended
- New version Operating system: Window vista is a more sophisticated, current and new version of operating system which is better compared to windows XP or windows XP professional.
- Hard disk drive of higher size which provides more storage space for data and information on the computer.

BIBLIOGRAPHY

1. C.S. FRENCH "Computer Science" , Tata McGraw hill publishing company limited, Sixth Edition, 1996.

2. C.S. FRENCH "Computer Science", Tata McGraw hill publishing company limited, Fourth Edition, 1992.

3. C.S. FRENCH "Computer Science", Tata McGraw hill publishing company limited, First Edition, 1980.

4. Cheryl Schmidt "The Complete Computer Repair Text book" 2004 Edition

5. Craig Zacher & John Rouke, "The Complete Reference PC hardware" London Mcmillan press, Eleventh Edition, 2001.

6. David Gustafson PhD, "Software Engineering" Tata McGraw hill publishing company limited, 3rd Edition, 2002.

7. J.B. DIXIT, "Fundamental Of Computer Programming and Information", Maxwell publishing company 2nd Edition, 2006.

8. J.B.DIXIT "Computer Concept and C programming", Maxwell publishing company, New Edition, 2002.

9. John Ronake "PC Hardware" Tata McGraw hill publishing company limited New edition 2006

10. Nicholas Carter, "Computer Architecture" NTE Electronics INC. third edition, 2005.

11. Sajan Matteu, "Software Engineering" , S chands and Company Ltd 2nd Edition, 2000.