ELECTRONICS AND COMPUTER

BY

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APPROVAL PAGE

This project has been read and approved and accepted as meeting the requirement of Mathematics and Computer, Federal University of Technology, Minna, for the award of Post-graduate Diploma in Computer Science.

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DEDICATION

This Project is dedicated to God Almighty and to my lovely husband: MR. C. O. EGUAIKHIDE and my daughter: VICTORIA OSHUARE EGUAIKHIDE.

ACKNOWLEDGEMENT

My special thanks goes to God for the privilege given me to undergo and complete this program. My profound gratitude goes to Mallam Audu Isah: my project supervisor and the program coordinator who despite his tight schedule, spared time for me to see that this project come to a reasonable conclusion. Also to my entire lecturers, I say, thank you.

I acknowledge my parents: Mr. & Mrs. S. A. Ebozoje and my brother for their love and care.

I wish to acknowledge all my course-mates. I say, God bless you all.

Finally, I appreciate and acknowledge all my well wishers for their cooperation, love and understanding. I cannot but to remember Mr. Ajayi L. O. who helped in typing out this project. May all your good labour of love be rewarded.

ABSTRACT

This Project work, Electronics and Computer was designed to show that without electronics, there is no computer. This implies the importance of electronics in computer.

CHAPTER ONE

GENERAL INTRODUCTION

1.1 INTRODUCTION

A computer is an electronic machine which accepts and processes data by following a set of instructions to produce an accurate and efficient result.

Electronics is the technology of using transistors, silicon chips or valves especially in the manufacture of device such as radios, televisions and computers.

Electronics is simply the next work of the various chips to produce sound, image and so on, computer is a product of electronics which has some other system attached to it. For instance, the keyboard or printer.

1.2 ORIGIN OF ELECTRONICS

Electronics are practical applications of the general principles of electricity. The same electricity produced by a battery for a flashlight can be modified to do any number of jobs, from running a motor or producing heat and light to more advanced uses such as working a computer.

The word electronics derived from electron, which is a tiny invisible quantity of electricity present in all materials. In terms of its many uses, electronics can be defined to include all applications of electricity flowing in a vacuum, as in vacuum tubes in gas or vapor and in certain solid materials such as transistor.

Electronics also include all effects of electricity where the action of individual electrons determines the application.

1.2.1 CONCEPT OF ELECTRONICS

Electronics is the major sources of development; it has its uses in almost all industries for quality control and automation. Just a few examples are given here to indicate its many possibilities – Electronic Calculators, Electronic Data Processing (EDP), Medical Electronics, Electronic Watches, Industrial Electronics, Supersonic or Utrasonics (uses sounds waves).

1.2.2 ACTIVE COMPONENTS OF ELECTRONICS

These are components which control the current flowing in a circuit. It can increase or decrease the current in the circuit. The active components are mainly semi-conductor devices.

A semi-conductor is a material which has a resistances in between that of a conductor and an insulator. The structure of a semi-conductor allows their conductivity to be increase by adding impurity elements, a process called DOPING. The purpose is to increase the number of free charges that can be moved by an external applied voltage.

1.2.3 PASSIVE COMPONENTS OF ELECTRONICS

These are components which do not have control over the current flowing in a circuit. That is, they do not alter the current, the major passive components are Resistors, Capacitors and Inductors.

Resistors are components which show electrical resistance. There are mainly two types of resistors; those that have fixed values and those that are variable. The variable type may be mechanically adjusted by a knob or screwdriver or have resistances which are dependent on light, heat or pressure.

A capacitor consists of two conductors separated by a di-electric insulator. Its ability to store charge is the capacitance C.

Applying voltage to store charge is changing the capacitor.

The most common form of an inductor is a coil of wire, the more turns of wires you have, the higher the inductance of the coil.

1.2.4 ANALOG AND DIGITAL ELECTRONICS

Electronic circuits can be divided into two broad groups, analog and digital. In analog circuits, the voltage and current waveforms are similar to the signal variations. A digital signal, however, is a group of pulses with the same level but either ON or OFF. This is also called a binary signal because it has just two bits of information.

1.3.0 SCOPE OF THE STUDY

Due to the constrain of time and resources, this project work will be limited to the Electronics being the major component of the hardware of a computer.

1.3.1 OBJECTIVE OF THE STUDY

The object of this project is to develop a relationship between computer and electronics.

1.4 ORIGIN AND CLASSIFICATION OF COMPUTERS

Computing with machines started in the middle East by the invention of a counting instrument by the Babylonians called the ABACUS. Man instruments and machines were made after this for the purpose of counting, measuring and calculating. However, the first group of electronic computers were developed in 1946 in United States of America (USA). They are called THE MAIN FRAME COMPUTERS. They used different operating system and storage media.

These are giant computers that are installed in large rooms. They are used by large companies which store large information.

The second group of computers were developed in 1960. They are called THE MINI COMPUTERS. They also use different operating system and storage media.

The third group of computers are called THE MICRO COMPUTERS. They were made in 1970. Modern personal computers, the one that can see almost everywhere are Micro Computer.

These types of computers are small and can stand on a table. Some micro computers can be carried along from one place to another like a traveling bag. They are called LAPTOPS while very smaller ones are called NOTEBOOKS. Micro computers can be used in companies, factories, ordinary shops, offices and by individual at home.

The common instruments we use at home, schools and offices are computers. The computer can be grouped into three which are:

1. Digital Computer
2. Analog Computer
3. Hybrid Computer

A common use of digital circuit is in numerical counting. These application include the important fields of computers, electronic calculators, digital clocks and test equipment. A digital frequency meter is also an example. A comparison between analog and digital equipment can be seen from the analog VTVM and digital VTVM.

Furthermore, digital signals have an advantage over analog signals in reducing the effects of noise. For this reason, digital circuit are used in communications electronics in addition to numerical counting and digital control.

DIGITAL COMPUTERS

Computer we use only for counting things are called Digital Computers. This is one which performs arithmetic operation and access logical decisions according to instructions coded to it in advance.

In the digital computers, numbers and letters are represented as digits. Personal computers and main frames are digital computers.

ANALOG COMPUTERS

This kind of computer performs its operation by measuring and comparing or relating physical phenomena or changes and variables in the form of mathematical equation in some notable quantities. An analog computer processes data that vary continuously such as variation in temperature, speed, the chemical compositions of petroleum product or the amount of current flowing through an electric conductor.

Analog computers are used for a wide variety of industrial and scientific applications that require the processing of data that are measured continuously. It does not contain memory since it measures or compares data/value.

HYBRID COMPUTERS

This is simply a combination of those two types of computers stated above. This combines the capabilities of analog and digital computer systems in one. Hybrid computers are powerful computing devices and as such, they are mostly used to solve rather sophisticated problems such as

those from the studies of process control and optimization and physical process described by a set of physical simultaneous ordinary or positive differentiation.

FUNCTIONAL UNITS OF COMPUTER

A computer system consists of a number of components each performing a specific function. The three basic components include input device (used to send information to the computer), a central processing unit and output device that communicate results to human. The physical components of the computer system are called HARDWARE.

INPUT DEVICE

Input devices are used to enter data into the computer. This unit facilitates flow of information into the computer memory from source cards. It translates information in form acceptable to the computer. The form in which the information is translated into so as to be acceptable to the computer is binary numbers.

Some common input devices are the keyboard, disk drives, tape drives and light pens. Some of these devices such as the keyboard and the light pens can only be used for input, whereas disk and tape drives can be used for both input and output.

OUTPUT DEVICE

This is the unit which yields up information output. Devices such as disk and tape drives are used to transfer data, results and programs from the

primary storage unit to secondary (at auxiliary) storage media such as floppy disks, hard disks and magnetic tape.

Some common output devices are visual display unit (VDU) printer. Other input devices are video screen or monitor. Other names for a monitor are CRT (Cathodes Ray Tube) and VDT (Video Display Terminal).

The monitor is very important for my computer system for two reasons. First, it shows the user the data or instruction that are input from the keyboard or other input device. Second, the monitor is an almost instaneous outlet for results.

THE CENTRAL PROCESSING UNIT

The most complex and powerful of a computer system is the C.P.U. just as the brain is the centre of human activity, exactly is the same way the C.P.U. is cental to the operation of computers. The C.P.U. can store data temporarily. It can also perform operations on these data. The C.P.U. can be thought of as the "brain" of the computer. The C.P.U. comprises three major units: the control unit, the arithmetic/logical unit and the primary storage unit.

Just as the cerebellum is the part of the brain that controls vital organs of the body, the C.U. directs processor activities for the various devices that are attached to it. As the cerebellum is to the brain, so is the C.U. to the C.P.U.

The control unit is in charge of the activities of the C.P.U. It does not process or store data itself but instructs various parts of the computer in performing these tasks. Instructions given to the computer by the user are interpreted by the control unit which then signals to circuits within the C.P.U. to execute these instructions. The appropriate input devices are directed to send the user-supplied data to the computer.

The control unit also keeps track of which parts of a program have been executed and which ones remain to be executed finally. It collects data from the input and sends it to the designated output device such as a terminal screen or a printer.

WHAT MAKES COMPUTERS TO WORK

When we want to listen to the radio or watch a television program at home, we need electric power. Like the radio or the television set, computer needs electric power before it can work.

Some computers are very small. They can use battery just like some smaller radios we carry about. Because electricity can damage the computer, we need to protect the computer from receiving too much or too little electric power anytime we use it. The following can provide us with electric power:

1. Generator
2. Water
3. Batteries

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 HISTORICAL PERCEPTIVE OF ELECTRONICS

Electronics and radio communications are practical application of the general principles of electricity. The same electricity produced by a battery for a flashlight can be modified to do any number of job from running a motor or producing heat and light to mere advanced uses such as working a computer or providing wireless broadcasting for radio and television.

The word electronics derived from the electron which is a tiny, invisible quantity of electricity present in all materials. In terms of its many uses, electronics can be defined to include all applications of electricity flowing in a vacuum, as in vacuum tubes, in gas or vapor and in certain solid materials such as transistors, mere generally electronics include all effects of electricity where the action of individual electrons determines the application. The main electronic devices are transistors and vacuum tube.

Radio and electronics are closely related. Sometimes, they are even joined in their use. For example, an electronic heating unit generate radio wave that goes through the wire to produce heat. The principles of radio and electronics are essentially the same. Both are based on the fundamental laws of electricity.

2.2 ELECTRONIC AS AN INFORMATION MACHINERIES

Electronic technology and information are mutually reinforcing phenomena and one of the key aspects of living in the information society, is the growing level of interactions we have with this complex and increases electronic environment. The general consequences of the information society are three fold:

i. Large volumes of information.

ii. New forms and aggregation of information.

iii. New tools for working with information.

Information Technology is the technology involved in acquiring processing and distributing information by electronic means (including Radio, T.V, Telephone and Computers) as well as the introduction of new technology or putting new electronic equipment into a business or industry.

Development in information technology has given birth to some intermediary systems, which as a whole constitute to the field of information technology. Included among these are as follow:

a. ***Internet***:

Network that uses coaxial cables and/or satellites to reach clients outside a country. The basic services provided by the internet include E-mail, usenet newspapers, chanting, telnet, gophers and word wide web.

the numbers. The next major step taken by the first civilization was to represent numbers by means of stones in heap of ten. This in turn lead to the development of Abacus or counting frame of beads used by ancient Greeks or Romans and even today by many shops in China. Arithmetic calculations are performed by manipulating the beads and the expert Abacus operator can calculate faster than a clerk using a desk calculator.

NAPIER'S BONES (1617)

The invention of logarithms by John Napier's is a landmark in the history of computer. Logarithms enable us to multiply and divide large numbers quickly, accurately and easily. As a by-product of logarithms, Napier devised a tool for multiplication and division that was nick name Napier Bones. The bones were actually rods manipulated to multiply or divide two numbers.

PASCAL ADDING MACHINE (1642)

Blaise Pascal produced the first mechanical calculating machines in 1642. In his machine, Pascal replaced bead of the Abacus by cylinders with the numbers 0 –9 and engraved it around the circumference of the beads. It was operated by wheels on the front of calculator with the carry over digit transmitted to the next column by direct gearing of successful shaft.

The machine could only used to add or subtract numbers, it cannot perform multiplication and division. It was difficult to repair and many people were in the doubt of its ability to save time.

LEIBNIZ'S CALCULATOR (1671)

In 1671, Golffried Von Leibniz developed a machine which was an improvement of Pascal calculator. It utilized the same technique for addition and subtraction of the Pascal device. In addition, it can now perform multiplication and division of numbers.

JACQUARD WEAVING LOOM

In 1801 Joseph Marie Jacquard developed a method of controlling the operations of a weaving loom with the use of holes punched into card. This device was called Jacquard weaving loom. The holes punch into appropriate position on the card and could be mechanically programmed to weave specific pattern and to use specific colour. Jacquard device was the phototype of the punched card machine which we are using today.

CHARLES BABBAGE

Babbage in 1822 built his first different engine. It is a small machine involving several linked adding mechanism which will automatically generate successful value of simple algebraic function using the method of finite differences. This machine can compute very accurate mathematical table once a single set of initial value has been input into the machine. From 1822 to 1848, Babbage worked on a designing of general-purpose digital calculating machine called an Analytical engine. This machine is a program-controlled mechanical digital computer, incorporating a complete arithmetic unit, a store and a punched card for input and output.

HOLLERITH TABULATING MACHINE

Toward the end of 19th century, Dr. Herman Hollerith modified the idea of Babbage different and analytical engines to produce a machine to speed up the task of taking national census in U.S.A. This machine was designed to incorporate manual operator which consist of punched card with holes punched on a card of 80 columns and 12 rows that can be read using electronic means. This machine was capable of tabulating and sorting numbers and they used it for data processing for the population census in 1890 in U.S.A. In 1910, a new machine was developed for census in U.S.A. which was a new tabulating system involving mechanical sensing card. This was the original of punched card and was used in 1911 to develop an accounting machine and this was the fire-runners of machines used for accounting purpose nowadays.

MARK I

In 1936 Professor Havard Aiken in collaboration with IBM construct the automatic sequence controller calculator. They were successful in 1941 by demonstrating the activities of Havard Mark I and the machine that was capable of performing arithmetic operations effectively was developed.

This machine was an electronic device which make use of counter wheel to store numbers in decimal form. This machine could complete in one hour as many calculators as the Mark I could do in a week. The major

short-coming of ENIAC was its inability to store programs along with the data to be processed.

EDVAC (ELECTRONIC DISCRETE VARIABLE AUTOMATIC COMPUTER

In 1946, Manchly and Eckert thought of another device that could incorporate Dr. Van Nemmann's idea of stored program list of instructions which control the operation of the computer, coded in the same way as the input data, initially stored in the computer along with the data and this program is executed automatically.

EDSAC (ELECTRONIC DELAY STORED AUTOMATIC CALCULATOR

This was the first computer to use the stored program. It was developed by M. V. Wilkers of Cambridge University. The stored program concept allows modification to be done during the execution of program as intermediate result, data and in fact, the program could be stored for future use instead of the usual repetition each time a program is run (executed). Recently, we have other electronic commercial and scientific computers that were designed by the pioneers of EDSAC.

2.4 COMPUTER AS A PRIMARY TOOL OF INFORMATION

The primary tool of the information society is the computer. Although micro-processors are used to improve the performance of other

technologies, computers are increasingly used to control and integrate other kinds of information machineries.

Information is of great importance in our dynamic word. But the level of transformation (qualitative changes) we derive from it depends on its availability in terms of time, space and quality, which are very much dependent on the level of technology incorporated.

A computer is essentially an electronic device which processes data supplied through any available input device into information which can be stored in its memory or communicated to the user via any available output device. The computer used in Data Processing composed one or more electronic machines using digital sign for recording and moving data and instructions. Thus, an interface has to exist between the computer itself and the users.

With this, computer can be referred to as the primary tool in information technology.

In the half-wave rectifier circuit shown above, rectification occurs as follows. As the supply alternating voltage swings positive in the first half-cycle, it exceeds the threshold voltage of the rectifier and current flows through the diode. The magnitude of the current is limited by the load resistance in series with the diode resistance and with any source resistance present. The peak value of load voltage resulting is

$$V_{2p} = I_{2p}R_L$$

$$= \frac{(V_{sp} - V_d)R_L}{R_s + R_f + R_L}$$

The power supply is a transformer, it transforms household current (230 volts alternating into appropriate voltages [5 and 12 volts direct]) for the components as computer on electronic devices.

3.2.1 ELECTRONICS, THE COMPONENTS OF COMPUTER

It can be seen that without electronics, there is no computer because electronics are the major components of computers especially the hardware of the computer are all made up of electronic.

Looking at the following aspects in the hardware:

1. Mainboard
2. Harddisk
3. Keyboard
4. Monitor

5. Printer

and so on, we see that they are all electronics in short.

Furthermore, without power supply, computer cannot work and this is also another aspect of electronics.

With this, one can conclude that computers are made up of electronics circuit.

3.2.2 MAINBOARD

The mainboard is also known as the system board or the mother board. IBM PC/XT and AT mainboards are made up of electronic items listed below:

a. Microprocessor (CPU Chip)

This is an 8088 or 8086 chip for PC/XT clones, an 80286 for AT/26 clones and an 80386 for AT/386 machines.

b. BIOS ROM (System Rom)

A Rom is a Read only memory chip. The computer power-on-self-test (POST) and the boot instructions are stored in the BIOS (Basic input/output system) Rom. The Rom also provides the most basic level of hardware control while the computer is running.

c. *RAM (Random Access Memory)*

Also called system memory, it provides a temporary storage area for DOS programs and data.

d. *Clock and Clock Crystal*

Both PC/XT clones and 286/386 clones have an internal clock, calibrated with a quartz crystal to regulate computer processes. In addition, 286 and 386 computers employ a real-time clock. With battery back up that reminds the data and time if the computer is off or on. PC/XT clones have no real-time clock on the mainboard but they may be equipped with one on an expansion card.

e. *Clock/CMOS Battery*

The 6volt battery powers both the CMOS chip and the real-time clock/calendar chip whenever the computer is off. Both 286 and 386 computers have this battery (or a wire carrying a current from the battery pack) right on the mainboards. PX/XT clones do not have a clock on the mainboard. If an expansion card with a clock has been installed, the battery is located on that expansion card.

f. *Numeric Compressor Socket*

This socket can accommodate an optional mathematics chip for heavy number crunching work. All mainboard have the

socket but very few computers have compressor chips installed.

g. Jumpers

Each mainboard manufacturer uses jumpers slightly differently. You must have the mainboard manual to know which function a particular jumper controls.

3.2.3 HOW THE MAINBOARD WORKS

To understand how the mainboard components interact, we consider what happens, step by step when we put on a computer. The initial steps are hardwire into the circuiting. The power supply comes up to speed, then sends a "power go" signal to the clock reset chip and the mainboard. The reset chip in turn sends a hard reset to the micro-processor (the CPU). The C.P.U resets and initializes. The final, hard-wired step in the micro-processor reset procedure involves jumping to a very high address to look for further instruction.

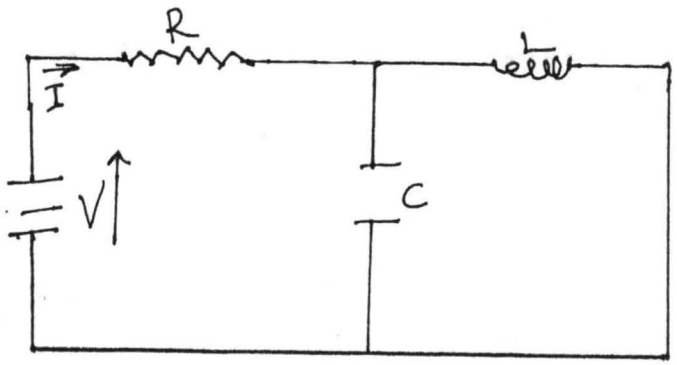
POWER SUPPLY OF A COMPUTER

The power supply is a transformer. It transforms household current (230 volts alternating) into appropriate voltages (5and 12 volts direct) for the other computer components.

KEYBOARD

When you press or release a keyboard key, the keyboard sends a signal to the computer via a keyboard port on the mainboard. If you look at the back of the chassis, you can see the keyboard cable connector. When you disconnect the keyboard cable, you can see the mainboard and the keyboard part through a hole in the chassis.

3.3 SIMPLE ELECTRONIC CIRCUIT



Electronic Circuit

I - current

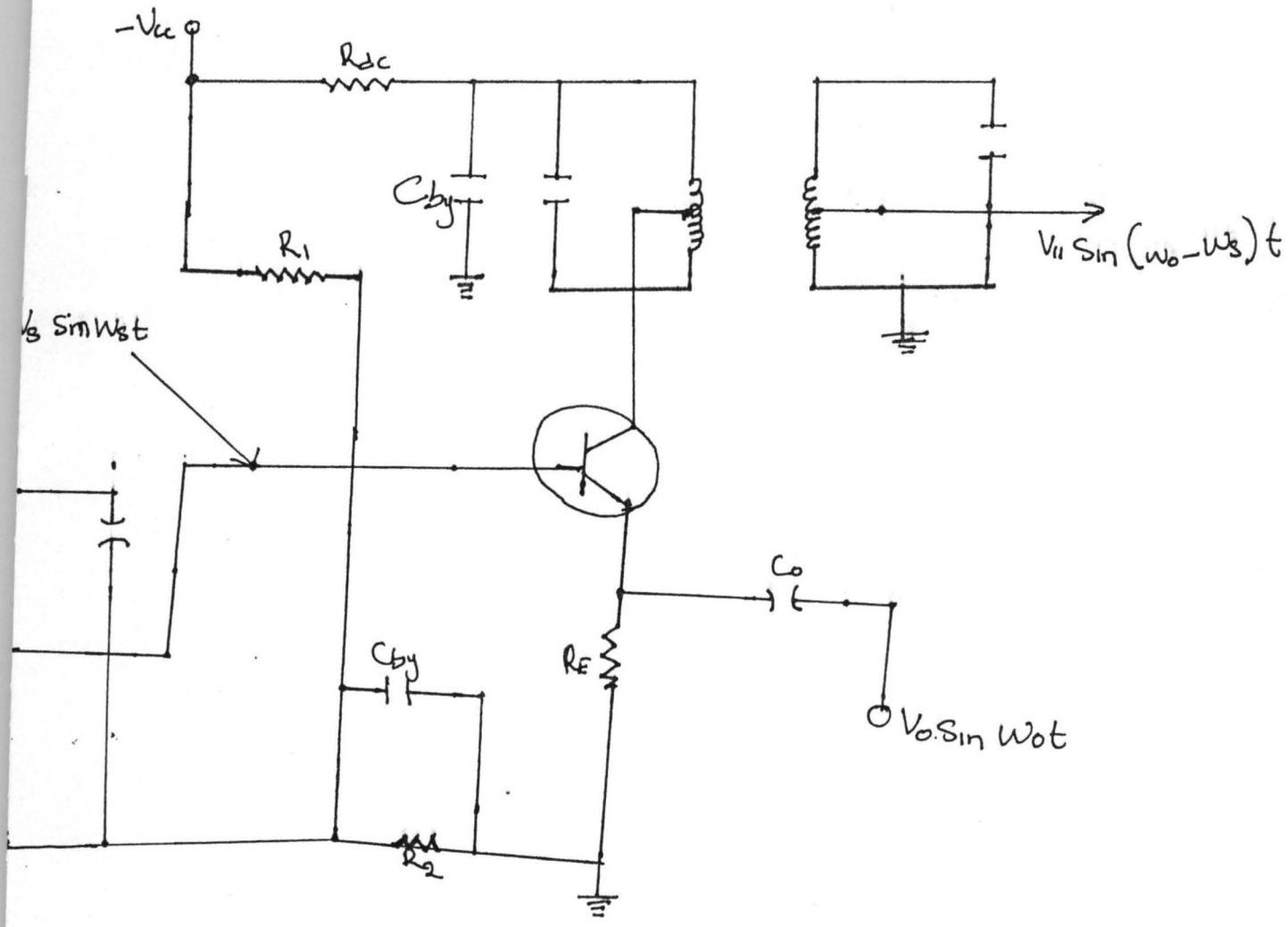
R - resistor

C - capacitor

L - inductor

V - voltage

3.4 COMMUNICATION CIRCUIT



Bipolar transistor additive mixer

CHAPTER FOUR

SYSTEM DESIGN

4.0 INTRODUCTION

System design and implementation is the process of converting the requirement specifications into the system requirement, coding, testing and documenting programs in the system. It involves the development of quality assurance procedures including data security, back up and system control.

4.1 MATHEMATICAL IMPLICATIONS

Electronic is a field of study that makes extensive use of numbers. Numbers range from the very small to the very large with both extremes commonly encountered simultaneously.

A scientific calculator which is a product of electronic is a useful tool today for all those involved in putting figures together.

In the banking industries, electronics adding machines help in the counting of very large figures thereby improving the efficiency of the personal saddled with the responsibility of collecting figures.

Mathematical problems which would have put so many students away from engineering and related field have been made easy with the discovery of scientific calculators.

4.2 VOLTAGE, CURRENT AND POWER REGULATOR

Many of today's high technology applications of electronic circuits require very stable and highly regulated sources of electric power. Fluctuation in the power supply voltages can seriously affect the accuracy and reliability of many different kinds of electronic equipment. Industrial electronic system including industrial robots must respond accurately to signals that tell them how much power they are to apply to motors and heating elements. There are **ics** available for regulating a wide range of voltages, currents and power levels.

Electronic regulators work much like a thermostat system in your home. The thermostat keeps the temperature in your home as close as possible to some prescribed level in spite of events that tend to oppose a stable temperature.

One of the simpler and mere common electronic regulator **ics** is one that is used for regulating the output of a DC power supply. These fixed voltage regulator **ics** maintains a specified output voltage level in spite of changes in the AC input voltage level and loading on the DC output. The voltage regulator **ics** are specified according to their output regulating voltage level. Output current-carrying capacity and the range of input voltage levels they can handle.

4.3 HARDWARE

Hardware is also a general name given to the computer and its parts that we can see and touch. They include all the main parts of the computer, all peripherals, cables, mouse, pads, printer ribbons, etc.

Computer hardware is put into the following groups. They are:

1. Input devices
2. Processing devices
3. Output devices

INPUT DEVICES

Computer input: All types of data we send into a computer for processing are described as computer input. The computer accepts instructions and data before it can work. Without the input devices, it will be difficult to do so.

Input devices are therefore parts of the computer we use to send data or instructions into the computer. Some of the input devices are: the keyboard, mouse, scanner, joystick.

PROCESSING DEVICES

We have known that data is information which is not yet processed; we need to process data before it can become information. All parts of the computer we can use to process data are called processing devices. We therefore, call the processed data an information. Examples of processing devices are the CPU, Modem.

OUT DEVICES

Computer output: Information displayed on the screen or printed out on the paper from the computer is called computer output. The output is sent to the output devices. We can also store the output for future use on a diskette.

Output stored on hard disks or diskettes for future use is called intermediate output. Some common output devices are: the monitor, printer, plotter.

Hardware

input devices		processing device	output device		
keyboard	scanner	cpu	modem	monitor	printer

4.4 BOOTING THE COMPUTER

To boot a computer means to switch it on. We can boot a computer using the following methods:

1. ***Cold Booting***:

   This is the method by which we switch on the computer from a power button on the CPU or the monitor.

2. ***Warm Booting***:

This method restarts a computer from the keyboard by pressing three different keys together. They are Control, Alternate, Delete. (Ctrl + Alt + Del) or

By pressing the reset button if it exists on the CPU. Note that before all these can be done, the electric power is already switched on from the main socket.

4.5 THE CENTRAL PROCESSING UNIT (C.P.U)

The most complex and powerful of a computer system is the CPU – just as the brain is the centre of human activity exactly the same way, the CPU is central to the operation of computers.

The CPU can store data temporarily, it can also perform operations on these data. The CPU can be thought of as the "brain" of the computer. The CPU comprises of three major units: the control unit, arithmetic's/logical unit and the primary storage unit.

Just as the cerebellum is the part of the brain that controls vital organs of the body, the CU directs processor activities for the various devices that are attached to it. As the cerebellum is to the brain, so is the CU to the CPU.

The control unit is in charge of the activities of the CPU. It does not process or store data itself but instructs various parts of the computer in

performing these tasks. Instructions given to the computer by the user are interpreted by the control unit which then signals out signals to circuits within the CPU to execute these instructions. The appropriate input devices are directed to send the user – supplied data to the computer.

The control unit also keeps tract of which parts of a program have been executed and which ones remain to be executed finally. It collects the output and send it to the designated input device such as a terminal screen or a printer.

THE ARITHMETIC/LOGICAL UNIT (ALU)

Just as the cerebellum is the centre of thought and decision of brain, the arithmetic and logic unit (ALU) is the reasoning centre of the CPU. As the cerebellum is to the brain so is the ALU to the CPU.

This controls all operations of Arithmetic and logic. As directed by the CU, the ALU performs all computations (addition, subtraction, multiplication and division) and all logic operations (comparisons). The ALU of most computers performs all arithmetic functions using binary numbers.

Primary Storage Unit: This is the component of the CPU that temporarily stores program, data and results. It is also referred to as the main memory, primary memory or internal storage and it holds program, instruction, data and the intermediate and final results of processing. It consists of many storage location, each of which can hold a small amount

of information. Each of these storage location has a unique address associated with it. This address allows the computer to locate items that have been stored in its memory. Large computers have millions of those storage locations.

4.6 USES OF THE COMPUTER

Computers are used in all aspect of human life.

Education: This is seen as a process of learning whether in school or out of school; it is indeed, a life-long process since it goes on as long as one lives. Everybody is thus faced with one learning situation or the other throughout one's lifetime.

Historically, one of the strength of computer networks has been the ability to bring people together while a traditional classroom relies on a single teacher to provide students with a glimpse into knowledge producers and student.

Governance: Since it is generally agreed that it is the duty of government to bring the greatest good to the majority of the populace, computer today can be applied to areas that had hitherto been outside the mainstream of information technology. Its uses is very heavy in provision of social services.

It takes government awareness about the state of her population to be able to make accurate decision. Computer has enabled the government to access the state of her population from time to time.

Commerce and Industry: Current information is needed to be taken. The business world is such a competitive type which requires the generation of information to effect changes. Almost every moment research results are being published to allow changes to take place. Management requires information on the market price, latest raw materials for the development of their products and possible product consumers. Even then, the way manufacturing is carried out today has been greatly influenced by many emerging technologies not least of them being those particular technologies that make up the internet as we know today.

4.7 ELECTRONICS BENEFIT

Electronics is a very broad field that offers exciting and diverse opportunities to those who are willing to accept its technical challenges. It offers one of the broadest range of physical and mental requirements to be found in any occupational category. Jobs range from sitting at a comfortable work-station in an air conditioned environment to installing antennas atop two hundred foot tall towers on mountain peaks in the middle of January, which adds a whole new meaning to "air" and "conditioned."

CHAPTER FIVE

SUMMARY

5.0 EVALUATION OF ELECTRONICS IN GENERAL

The choice of what area of electronics to enter as a profession is very personal. Some positions require more people, skills than technical skills, which may appeal to many. But others may be more at home with the creativity afforded by working closely with the design process. In the areas of industrial, communications and engineering, wages from electronics technicians are on-par with the highest paying construction trades, but they come with the strenuous physical labour and feast or famine cycle so common to the construction trade.

5.1 LIMITATION

1. Computer technology changes so rapidly that it is difficult to become as familiar with the equipment as a technician should be.
2. Being familiar with a wide range of operating systems and and customer software can be very difficult, if not impossible.
3. The price of purchasing a system is very high.

IMPROVEMENT

Telecommunication and computer technology have conspired to put the following at our reach:

1. We shall soon have unlimited access to cheap education as a result of the opportunities which WEB based educational and entertainment facilities provide.
2. Information technology should be able to close the gap between the rich and the poor.
3. Education if fundamental and is a right of all citizens of the world.

5.2 COMPUTERS IN COMMUNICATION

Information are sent to somewhere else, far away from one's town. Communication is made possible by using of the following methods:

a. Telephone service.
b. Radio announcement.
c. Television.
d. Fax or teleprinter.
e. Letter writing.

All the above are means of transferring data and information electronically from one point to another. This is referred to as Telecommunication or data communication.

With good equipment, computer can be connected by telephone radio for telecommunication. A MODEM is an equipment that connects a telephone

or a radio to a computer. The modem makes it possible for data to be transferred between radio or telephone and the computer.

TYPES OF MODEMS

Modem means Modulator-Demodulator. There are two types of modems. They are:

a. Acoustic modem.

b. Direct-connect modem.

When using a modem with a computer to connect a telephone system, telephone receivers are no more necessary for telecommunications.

5.3 COMPUTER NETWORK

We can connect several computers together using cables for data communication. This system of connecting more than one computer together is called computer network. Just as the operating system for a single unit is DOS, network has its own networking operating system. This is called UNIX.

Unix operating system can be used in mainframe, mini-computers and micro-computers network. In network operation, one powerful computer serves as a controlier to each of the computers in the system. This powerful computer or controller is called the file server.

There are four types of network arrangement. They are:

a. Point - to - point.

b. Multi – drop line.

c. Stem.

d. Ring.

Point-to-point network connects two computers with single line. When the computers connected are more than two, the arrangement is called multi-drop line. The stem arrangement shows each computer printer and modem in the network linked to the file server. The ring network arrangement shows all computers linked up but they have no file server. There are two kinds of network:

a. Local Area Network or LAN.

b. Wide Area Network or WAN.

LOCAL AREA NETWORK (LAN)

The local area network or LAN: This is where computers are linked together and located within a small distance from each other. The LAN distance is about (one square kilometer). LAN can be used within the same locality or city.

In principle, a LAN provides users, each with their own system, a way of sharing resources which may be expensive (like Hard Disks) or common value (like centralized se of departmental records). Things to consider in a local area network for proper running are:

1. Resources sharing.

2. Proper organization of systems environment.

3. Integration, making the processes look like a single operation.

With good setup, LAN is supposed to provide both local and external services.

1. ***Local Services***:
   a. Electronic mail.
   b. Voice mail.
   c. Desktop publishing.
   d. File services for share data and programs.
   e. File transfer.
   f. Share laser printers.
   g. Network management.
   h. Security system.
2. ***External Services***:
   a. Electronic mail.
   b. Type-setting bureaux.
   c. Fax.
   d. Telex.
   e. Mainframe computers.
   f. Other Lans.
   g. External telephone calls.

SERVERS

Servers provide control for shared resources. Examples:

a. file server would control disk stores

b. printer server would control printers

c. communication servers would control gateways and modems.

A file server could be a desktop computer dedicated to the task, or a work station also performing the same task.

TYPES OF LANS

There are two types of LANS. They are:

1. Ether Net.

2. Token Ring.

ETHER NET

This is a baseband Bus system using data transmission at data ratios around ten metre per seconds.

TOKEN RING

This is a baseband at high speed or broadband. It normally uses co-axial. It is good for complex networks with multiple users allowing long data transfers.

THE WIDE AREA NETWORK (WAN)

This is where computers are linked together and are located within a far distance to each other. WAN can be used to link up two or more cities within the country.

TIME-SHARING OR MULTI USER

Time-sharing is similar to networking. However, the system makes use of only one CPU with many terminals. All the terminals run their programs from the RAM.

The processor runs one program at a time. But it switches so quickly among the programs in RAM that it appears to anyone of the users that he or she has complete control of the system.

5.4 CHALLENGE TO YOUNG SCIENTIST

The project is a very broad field that offers exciting and diverse opportunities to those who are willing to accept its technical challenges. It offers one of the broadest ranges of physical and mental requirements to be found in any occupational category.

For all citizens to have access to the tremendous opportunities described earlier, it is clear that they must be computer literate, have the means to acquire the wherewithal and have easy access to the basic infrastructure of energy and telephony. This is the challenge for the young scientist.

5.5 CONCLUSION

In this project work, it is so clear that computers are made up of electronic components. And is only computer technicians that can make repair in any computer because the various circuit boards are treated as plug-in components. The computer users often do not understand the machines they are working with or the proper use of the software the computers are running. A computer technician must understand both the software and hardware better than the customer.

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