DESIGN AND CONSTRUCTION OF A COMPUTERIZED SCHOOL LIBRARY CARD

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Dedication

I dedicate this project first and foremost to almighty god who facilitate my entry into this university and who has been with me throughout my time here, which has culminated into this final piece of work before your eyes.

And also to my parents, my late father Mr. Onyenuru Conleth may your soul rest in perfect peace daddy and my mother Mrs. Onyenuru Regina for their support all through my stay in the university.

Declaration

I Onyenuru Sunday Innocent declare that this work was done by me and has never been presented elsewhere for the award of a degree. I also hereby relinquish the copyright to the Federal University of Technology. Minna.

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Acknowledgment

With great honor and deep sense of appreciation, I give thanks to the almighty god for his protection, guidance and divine supervision during this project work.

I would like to say a very big thanks to my parents Mr. and Mrs. Conleth Onyenuru (my father and mother) for bringing me up morally, academically and in the way of the lord, I love you dad and mum, you're the most wonderful parents in the world. My sincere thanks goes to my elder brothers and sisters, Mr. hope Onyenuru, Mr. Ndubuisi Onyenuru (brothers), Mrs. faith Idiaro, Mrs. charity Ike (sisters) for their lovely support they gave to me during my stay in this school and this piece of work a huge success.

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Abstract

This project is a design of a computerized library card which is used in the library to check the numbers of books borrowed from the library. It is based on a digital computer card, and a comparator (card reader), which send the information to the computer in a digital form. The comparator is connected to the computer through the parallel port, which is the printer cable.

The parallel port is programmed using visual basic program for its case flexibility. The setup program is installed in the computer before the device is used. The output point of the device is when the device load is connected. The device works when the card is slotted into the comparator (card reader) connected to the computer, the computer will now gives out all other information of the student inside it, the picture of the bearer, registration number, department, and other personal data will equally be displayed.

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CHAPTER ONE

1.0 INTRODUCTION

Education is one major yardstick of national development since it builds the nations builders. It form the foundation on which a nation is build on hence should be given the highest priority in the nation's growth plan.

In our pursuit for education, we gradually built up a large frame of reference by continual reading. Education is a continuous process, which involves continuous reading. The culture of reading is compulsory requirement for the education of an individual and hence, the nation at large.

Since there is the need for reading, there is the need to also arrange our books in a way that will enable easy access to them. The library is a place where books are kept so that readers can have easy access to them. Therefore, it is important for the library to be organized in a way that facilitates easy record keeping of books. Our aim of this project is to develop a computerized library card system, which will aid the primary objectives of a library, which is a good record keeping.

This project work will also provide additional features such as:

1) High level of security
2) Eliminate impersonation
3) Eliminate illegal access to the library
4) High reliability

This project can be implemented easily on an already existing library and it is our goal to see Minna management implement this system in the nearest future.

1.1 AIMS AND OBJECTIVES

The aim of this project is to develop a computerized library card system which is used for a proper record keeping of student information, update of books borrowed by the student, list of library membership card, and to encounter fake identity, over crowding of the library, improper record keeping of borrows record, material classification, security by passing, impersonation (use of another user library card to borrow books). It is our aim to have a system of management that can be incorporated into the modern digital word and thereby phasing the old fashioned method of library management and administration and at the same time providing a system that will be simple, reliable, cost effective and efficient and easy to implement.

1.2 METHODOLOGY

The computerized library card system can be described as follows:
When a student arrives at the library, he/she present his computerized library membership card to the gatekeepers at the entrance of the library. The gate keeper slides the computerized library membership card down the card reader system. The carder reader reads the card and the bit patterns are transmitted to a computer system through the serial port of the computer system.

A program in the system does a series of checks and comparism and finally the students information with the matching bits is retrieve and displayed on the monitor of the computer system. The present student's book status is displayed together with his/her passport, which identifies him/her. If the expected date of return is still valid, the student is granted access to the library. These process normally take less than a minute.

If a student wishes to borrow a book, he/share simply locates the book on the bookshelves and then presents the book together with the computerized library membership card to the library personnel at the counter. The library personnel update the

student's book status profile. The card reader system at the counter and that at the entrance/exit of the library are network together. The student is expected to present the computerized library membership card to the gate keeper who performs the same operation to ascertain that the book has being properly registered.

To reduce congestion at the entrance/exist and also at the counter of the library, multiple card reader systems can be provided and networked together. At the card systems can controlled by a master card reader system. However, this project was designed with one card reader system, which can perform the basic operations. A student who did not borrow any book just simply take his/her leave when no books belonging to library is found on him since the necessary check was perform at the time of entrance. This can further reduce congestion at the entrance/exist to the library.

1.3 SCOPE OF THE PROJECT

This project work is concerned only with the internal running of the library and does not involves the use of the card as an access credential, which opens the entrance door when slide down the card reader system as obtained in high security areas. The system is also intended to be for management use only, thereby keeping the user away from the system.

The project work at present does not include facilities for online user but this is an area of improvement in future works.

Finally, the project does not automatically identify the user; it relies on the operator to decide if the passport matches the user. Thus the reliability of the system is 99% and not 100%.

1.4 LIMITATIONS AND MERITS OF THE PROJECT

The limitation of this project is that the device can not be use for the provision for automatic counts of daily users. This can however be done manually to implement changes and to provide for exposure. Also due to the increasing population of students in institution of higher learning in the country, the staff of university libraries will find it difficult in trying to keep up with their work also meeting up with the needs of the readers.

Its merits is that when implemented will ensure that the integrity of library management process is maintained as well as providing a high reliable, a high level of security, a reduced rate of anti-library activities such as impersonation.

The computerized library card system addresses all problems in a cost effective way by using an easy to implement yet difficult to forge computerized library membership card which identifies the student when slid down the card reader system.

The system also comprises of a database, which stores all the necessary information about the student.

CHAPTER TWO

LITERATURE REVIEW

2.1 Historical Background

In the days prior to the advent of the computerized access control system, authorized personnel in establishments and high security facilities had to present identity passport photographs to gatekeepers before they were granted access into the establishment or to the secured facilities. When narrowed down to a library management system, all registered members of a library will usually have a membership card. This card is then used as entry permit into the library and records about a reader's library activities updated manually from time to time.

With increasing number of readers the present practice becomes crude, time wasting, inefficient as well as resource wasting as many personnel need to employ to cater for the needs of the teeming readers.

It then becomes obvious that a new system of administration needs to be introduced which will be efficient and secure in granting the reader access to the library.

The next evolutionary step then becomes to understand the principles and technical know how of interfacing a computer to a number of hardware peripherals devices and to achieve the necessary 'computer-to-peripheral' relationship through computer programming.

The issue of access control has gained significant popularity due to its being cost effective and efficient of enforcing security. Prioritization and database management. It can be implemented based on a variety of techniques and swipe card readers.

2.2 General Principles of Operation

The computerized library card used for this project work is similar to the bar coded card, it's principle of operation is based on the optical technology. It comprises of black and white shade printed on it. There are two shade patterns coded on it, one is for data input while the other is for clock input to the computer. The card reader system is basically a photographic sensor system; it detects the variation in light intensity due to

variation in the bit patterns coded on the card. Although, this card can be forged when the pattern coded on it is known, it is relatively cheap and easy to implement.

2.3 Card Access

The role of the computerized library card is not only to act as an entry permit but also, to be used in tracking down the student's records at each visit to the library. In this way, when the card is slid down the card reader, the bits pattern coded on the card will be transmitted to the computer through its serial port. This will trigger the database to load the student's record and the library personnel can then update the information about this student as the case may be.

2.4 Credentials

A credential is something you have, something you know, some biological characteristics, or some combinations of these. The typical credentials today is something you have such as an access card, key fob or other keys. There are many card technologies including; punch card, bar-code, and smart (chip) card.

A credential based on what you know can be a Personal Identification Number (PIN), a combination, or a password. The use of biological characteristics as credentials is generally called biometrics. Typical biometric technologies include; finger prints, face recognition, retinal scan, voice and geometry.

All card technologies are generally used to convey an identification number that is comprised of three components:

1. The card number that distinguishes the card holder from all other card holders.
2. The facility code, also called the site code. This is a number that was created when memory was expensive, to allow the range of unique numbers to be smaller while eliminating duplication of numbers.
3. The issued number which is incremented each time the card is replaced due to a lost or missing card.

2.4.1 Punch Card

The punch card (or "Hollerith" card, or "IBM card") is an obsolescent recoding medium for use by automated date processing machines, including early mainframe-based computers which used them as the primary medium for input of both computer programs and data. Made of thin cardboard, the punch card represents information by the presence or absence of holes in predefined positions. In the first generation of computing, from the 1900s into 1950s, punch cards were the primary medium for data entry, storage, and processing institutional computing. Eventually, during the late-1970s to middle-1980s, the punch card was gradually replaced by the combination of better, more capable computers, magnetic disk storage, and computer terminals on less expensive minicomputers.

Today, punch cards are all but obsolete outside of a few legacy systems and specialized applications such as ballot processing.

2.4.2 Bar Coded Card

A bar code is a series of alternating dark and light stripes that are read by an optical scanner. The organization and the width of the lines are determined by the bar code protocol selected. There are many different protocols but code 39 is the most popular in the security industry. Sometimes the digits represented by dark and light bars are also printed to allow people read the number without an optical fiber.

The advantage of using bar code technology is that it is cheap and easy to generate the credential and it can easily be applied to cards or other items. The disadvantage of this technology is easy and cheap to generate a credential making technology susceptible to fraud and the optical reader can have reliability problems with dirty or smudged credentials. One attempt to reduce fraud is to print the bar code using carbon-based ink and then cover the bar code with an optical reader tuned to the infrared spectrum, but cannot easily be copied by a copy machine. This does not address the ease with which bar code numbers can be generated from a computer using almost any printer.

2.4.3 Smart (Chip) Card

A smart card, chip card, or integrated circuit(s) card (ICC), is defined as any pocket-sized card with embedded integrated circuit. Although, there is a diverse range of applications, smart cards are defined according to;

i. How the card data is read and written.

➢ The type of chip implanted within the card and its capabilities.

There are three broad categories of smart cards as shown below.

2.4.4 Contact Cards

This is the most common type of smart card. Electrical contacts located on the outside of the card connect to a card reader when the card is inserted. Increased levels of processing power, flexibility and memory add cost. The card contacts for a typical model are shown below.

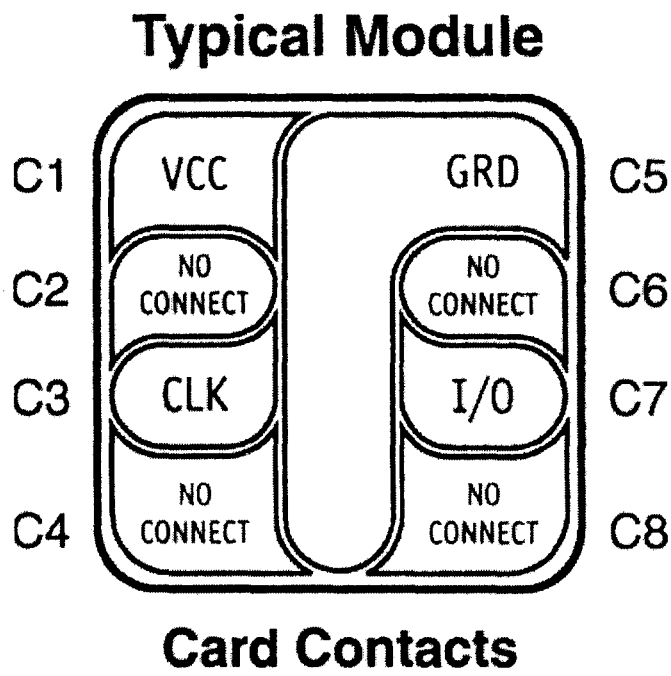

Fig 2.1 card contacts for a typical module

Contact cards can be categorized into:

1. Memory cards and
2. CPU/MPU cards

2.4.5 Memory cards

Memory cards have no sophisticated processing power and cannot manage files dynamically. All memory cards communicate to readers through synchronous protocols. In all memory cards you read and write to fixed address on the card. There are three primary types of memory cards:

1) Straight,
2) Protected, and
3) Stored value.

2.4.5.1 Straight Memory Cards

These cards just store data and have no data processing capabilities. These cards are the lowest cost per bit for user memory. They should be regarded as floppy disk of varying sizes without the lock mechanism. These cards cannot identify themselves to the reader, so your host system has to know what type of card is being inserted into a reader. These cards are easily duplicated and cannot be tracked by on-card identifiers.

2.4.5.4 CPU/MPU Microprocessor Multifunction Cards

These cards have on-card dynamic data processing capabilities. Multifunction smart cards allocate card memory into independent sections or files assigned to a specific function or application. Within the card is a microprocessor or microcontroller chips that manages this memory allocation and file access. This type of chip is similar to those found inside all personal computers and when implanted in a smart card, manages data in organized file structures, through a Card Operating System (COS).

Unlike other operating systems, this software controls access to the on-card user memory. This capability permits different and multiple functions and/or different application to reside on the card, allowing enterprises to issue and maintain a diversity of 'products' through the card. Multifunction cards benefit issuers by enabling them to market their products and services through state-of-the-art transaction and encryption technology. Specifically, the technology enables secure identification of users and permits information updates without replacement of the installed base of cards, thus simplifying program changes and reducing cost. For the card user, multifunction means

greater convenience and security, and ultimately, consolidation of multiple cards down to a select few that serve many purposes.

2.4.6 Combination Cards

These are hybrids that employ both contact and Contac less technology in one card. Combination cards can also contains two different types of chips in contrast to a Dual-Interface card where a single chip manages both functions.

2.4.7 Smart Card Operating System

The two primary types of smart card operating systems are:

1) Fixed File Structure and
2) Dynamic Application System.

As with card types, selected of a card Operating System depends on the application the card is developed for. The other defining difference is in the number is too difficult to remember. The advantage to using a pin as an access credential is that it cannot be lost or left somewhere.

The disadvantage is the difficult some people have in remembering numbers that are therefore used by unauthorized people. The PIN is less secure than a bar code or magnetic stripe.

2.5 Models of Library and Information System

The library is an organized place where books are stored retrieve. In order to ensure that users are able to reach these books with ease, there is the need for proper classification /documentation. The method of classification that has been developed for material resources in library is given below:

A - General Works, Encyclopedia
B - BJ - Philosophy, Psychology
BL -BX - Religion
C -F - History
DT -African History

G - Geography, Maps, Anthropology, Recreation

H - Social Science

HA - Statistics

HB - HD - Economics

HE - Transportation

HF - Commerce

HG - HI - Finance

HM - HV - Sociology

J - Political Science

K - Law

L - Education

M - Music

N - Fine arts

NA - Architecture

P - Language and Literature

PE - English

PL - African, East Asia, and Oceanic Language

PR - Literature-in-English

Q - Science

QA - Mathematics

QB - Astronomy

QC - Physics

QD - Chemistry

QE - Geology

QH - Life Science

QK - Botany

QL - Zoology

QM - Human Anatomy

QP - Physiology

QR - Microbiology, Medicine, Agriculture

SB - Plant Culture

SD - Forestry

SF - Animal Culture

SH - Fish Culture

SK - Hunting

T - Technology

TA - General and Civil Engineering

TC - Hydraulic Engineering

TE - Highway Engineering

TF - Rail / Road Engineering

TG - Bridge Engineering

TH - Building Construction

TJ - Mechanical Engineering / Metallurgical

TK - Electrical Engineering

TL - Motor Vehicle, Aeronautics

TN - Mining Engineering, Metallurgy

TP - Chemical Technology

TS - Manufactures, Production Management

TT - Arts and Crafts

U - Military Science

V - Naval Science

Z - Bibliography and Library Science

2.6 Card Reader Circuitry

The major components of the card reader circuit include:

i. The LM 358 OP – AMP configured as the comparator

ii. Light Dependent Resistor (LDR)

2.6.1 LM358 (Dual Low Power Operational Amplifier)

The LM358 series consists of two independent high-gains, internally frequency compensated operational amplifies which were designed specifically to operate from a single power supply over a wide range of voltages. The PIN Configuration of the OP-AMP is shown below.

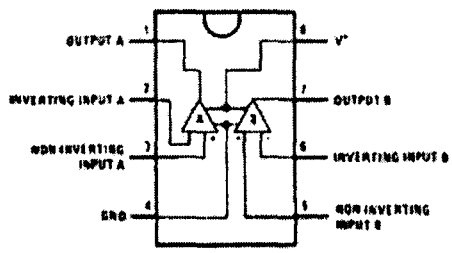

Fig 2.2: Pin configuration of LM358 OP-Amp

2.6.2 Features of LM358 OP-Amp

The features include:

i. Internally frequency compensated for unity gain

ii. Wide power supply range 3V – 32V

iii. Input common –mode voltage range include ground

iv. Large DC voltage gain

v. Very low supply current drain (500MA) essentially independent of supply voltage.

vi. Two way supply voltage ± 1.5v to ± 16v.

vii. Large output voltage swing.

2.6.2.1 Applications of LM358 OP-Amp

The applications include:

i. General purpose amplifier

ii. Transducer amplifier

2.6.3 Light Dependent Resistor (LDR)

A light dependent resistor is an electronic component whose resistance decreases with increasing incident light intensity. It can also be called a photo resistor or photoconductor. LDRs are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically.

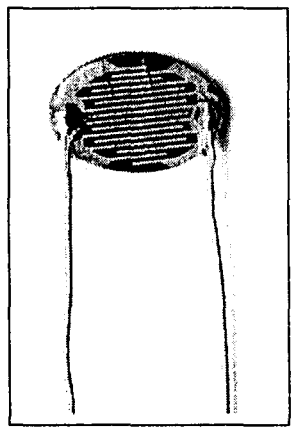

Fig 2.3: diagram of a light dependent resistor

2.6.3.1 Applications

Light dependent resistor (LDR) finds many uses as a low cost photosensitive element and was used for many years used in photographic light meters as well as in other application such as flame, smoke and burglar detector, card reader and lightning controls for sheet lamps.

2.7 Computer Interfacing

Computer interfacing can be define as a hardware and/or software data transmission regulator that contains data exchange between a PC and other devices, including such data storage devices as the hard disk drive, floppy drive, CD drive, DVD drive etc. the interfacing is provided by the electronics data transfer controller and the

drive electronic. There are standards adopted for the interfacing other devices to the computer. The different interfacing standards in use today include:

1.-1 Parallel interfacing

2.-1 Serial interfacing

The parallel interfacing was used for this project and hence it would be analyzed thoroughly in this report.

2.7.1 The Computer Parallel Port

The parallel port was originally created for communicating with the printer and thus is called a 'printer port'. It is the most commonly used port for interfacing home projects. This port will allow the input of up to 9-bits or the output of 12-bits at any one given time, thus requiring minimal external circuit to implement many simpler tasks. The port is composed of 4 control links, 5 status lines and 8 data lines. It is found commonly at the back of PC a D-type 25 pin female connector. [5]

2.8 Hardware Properties

The pin out of the DB-25 connector is shown in Figure 2.4 below.

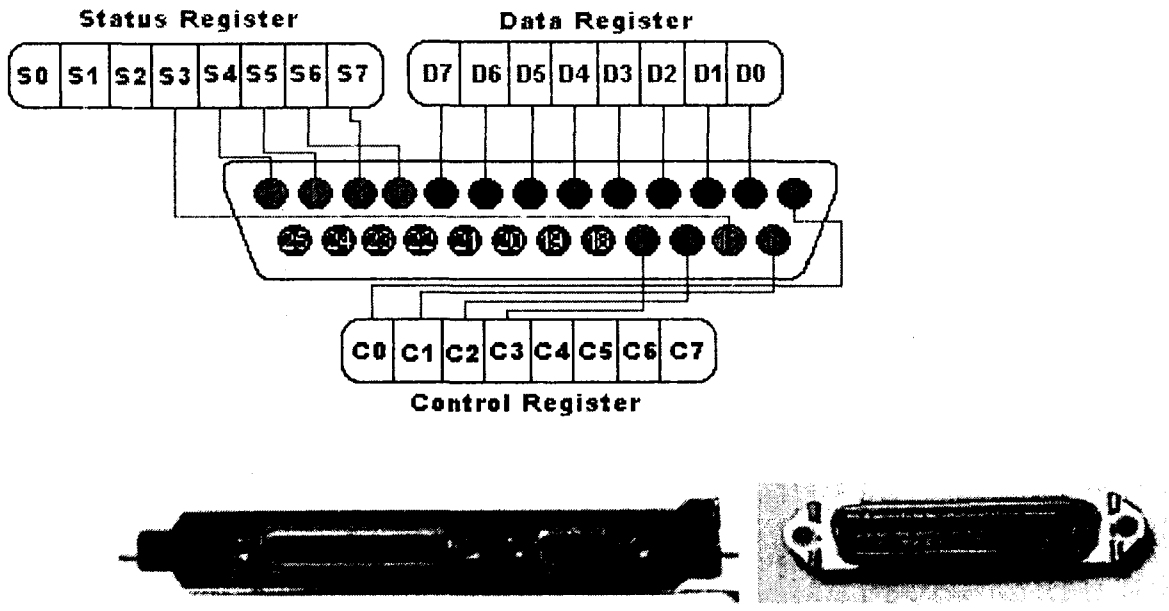

Figure 2.4 Pin-out Components of the Parallel Port

Figure 2.4 the photo on the left shows the back panel of an expansion card, with a parallel port's 25-pin female D-sub connector on the left side of the panel. (The other connector is for a video monitor.) The photo on the right shows the 36-pin female Centronics connector used on most printers.

The lines in the DB-25 connector of the parallel port are divided into 17 signal lines and 8 earth lines.

2.9 Flow Control

Flow control is used to control the speed of data between the terminal equipment and the Data Communication Equipment so as to avoid the loss of data as buffer overflow. There are two basic varieties which are:

1. Software Flow Control
2. Hardware Flow Control

2.9.1 Software Flow Control

Software flow control, sometimes expressed as Xon/Xoff uses two characters Xon and Xoff. Xon is normally indicated by ASCI I 17 characters where as the ASCI I 19 characters is used for Xoff. The modern will only have a small buffer so when the computer fills it up, the modern sends a Xoff character to tell DTE e.g. computer to stop sending data. Once the modem has room for more data, it then sends a Xon character and the computer sends more data. This type of flow controls has the advantage that it does not require any more wires as the characters are set via the TD /RD lines. However, the extra characters can slow down communications since each character requires 10 bits.

2.9.2 Hardware Flow Control

Hardware flow control is known as RTS/CTS flow controls. It uses two wires in the series cable rather than extra characters transmitted in the data lines. Thus, hardware flow control will not slow down transmission times like Xon /Xoff does.

When the compute wishes to send data, it takes active the Request to send line. If the modem has room for this data, then the modern will reply by taking active the Clear to send line and the computer starts sending data.

CHAPTER THREE

DESIGN AND IMPLEMENTATION

The design and construction of a computerized library card can be divided into five modules:

1. Power supply unit
2. Ultra violet LEDs
3. Light sensors (LDRs)
4. Comparator
5. Computer system

3.1 Design Analysis

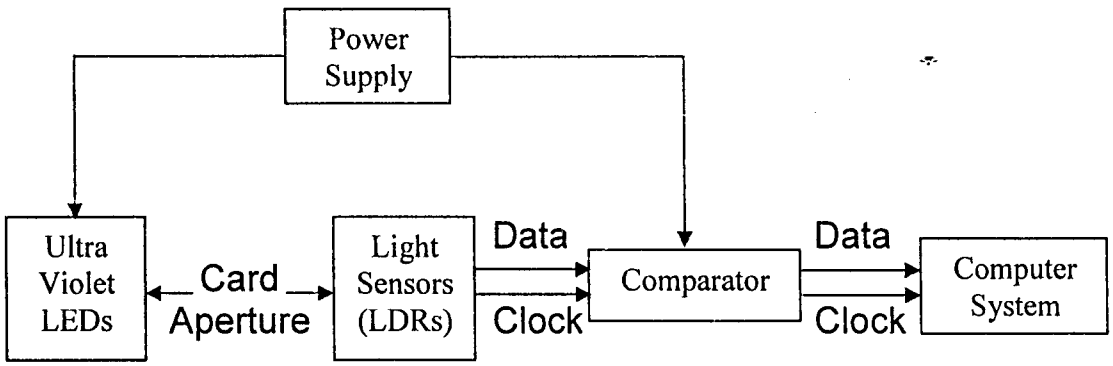

Fig 3.1: Block diagram of computerized school library card

3.1.2 Power Supply Unit

The 9V battery supplies 9Vdc when the switch is close.[1] The 1000μf/5V capacity filters off the ripples in the converted dc volt. The supply unit delivers a constant voltage to the ultraviolet (UV) LEDs and the comparator unit. The voltage is a constant 5V unit dc supply which was regulated by the LM7805 comparator. The 1k resistor limits the current into the indicator LED, to avoid it burning with excess current.

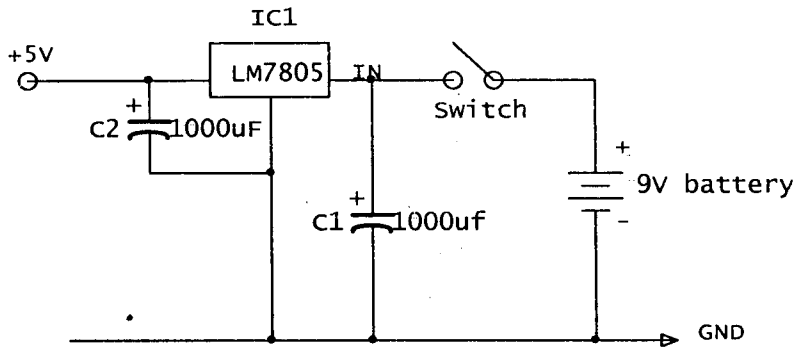

Fig 3.2: power supply unit

3.1.3 Ultraviolet LE Ds

LED's are specially diodes that emit light when connected in a circuit.[2] [3] They are frequently used as "pilot" light on electronic appliances to indicate whether the circuit is closed or not. The white UV LEDs emits continuous ultraviolet light when there is power in the circuit. When a card is slide down the card aperture, the light intensity received by the light sensors begins to vary depending on the shade pattern of black and white coded on the card.

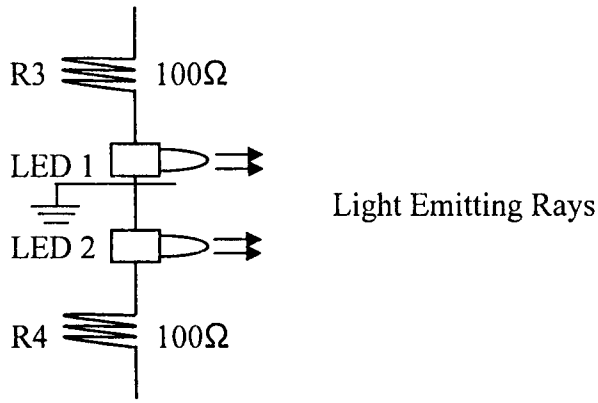

Fig3.3: Ultraviolet (LEDS)

3.1.4 Light Sensors (LDRs)

Electronic auto sensors are devices that altered their electronic characteristic in the presence of visible or invisible light. [3] This light senor is useful especially in light/dark sensor circuit. Normally the resistance of an LDR is very higher but when they are illuminated with light the resistance drops dramatically. It is used to vary the card reader.

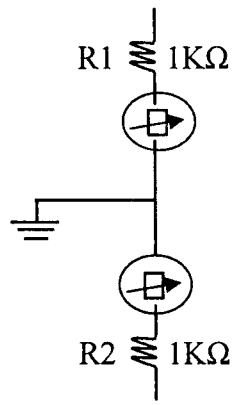

Fig 3.4: Light sensors (LDRS)

3.1.5 Comparator Unit

The comparator unit is a dual low power operational amplifier. It is used to compare the received light intensity with reference level pins numbered from 1 to 8 respectively. When there is a light barrier (black shade), the output of the comparator is the binary value "1" on the other hand, a white shade gives an output of "0".[4] The output of the comparator unit delivers two data signal to the computer.

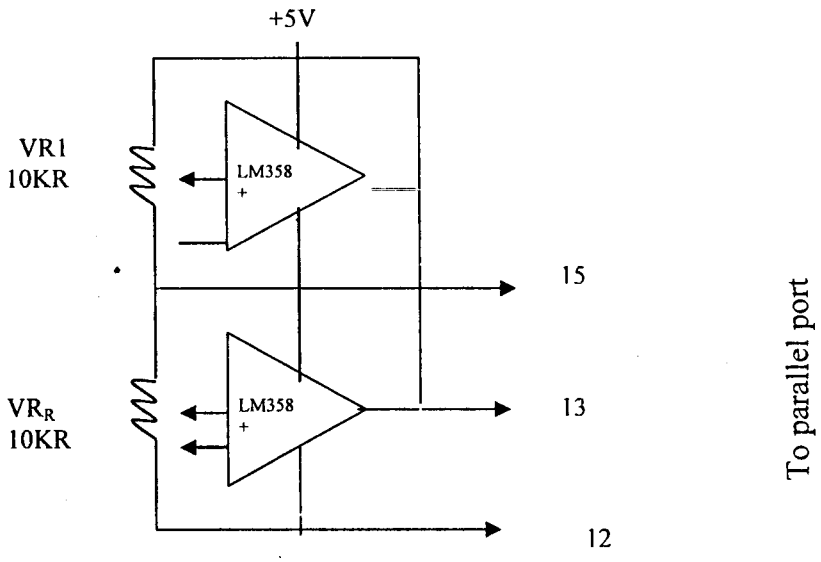

Fig 3.5 Comparator unit

3.1.6 Computer System

A computer system is a group of components, physical and non-physical, that are interconnected, each one carrying out specific function towards the common objective of processing data.[5] [6] So the computer system unit is used for processing the student's information stored in its Data base.

3.2 Design Objectives Goals

The following design objectives and goals had to be established prior to the design of the circuitry.

a) Cost effectiveness
b) High durability & reliability
c) Low power consumption
d) Portability & precision

3.2.1 Cost Effectiveness

The cost of designing the had ware circuitry and interfacing it to the computer were put into consideration before embarking on the project for instance, the circuit was

interfaced to the computer via the computer serial port & not the parallel port since the letter allows more options for expansion at a lower cost. In the same vain, the choice of components was conducted in a cost effective way without necessarily compromising the quality of the design.

3.2.2 High Durability

High performance components were selected & the overall design technique was aimed at achieving a high durability & reliability. For instance low power soldering iron was used for soldering electronic component & strong electrical contacts were ensured for high durability & reliability.

3.2.3 Low Power Consumption

The overall power consumption of the project design is very low. The constant 5volts D.C required to power the comparator &ultraviolet LEDs was achieved by supplying a 9vdc supply to the IC LM7805. This 9volts d.c is then is regulated to 5 volts d.c by the IC LM7805 & further filtering was carried out to remove ripples that will be present after the regulation. An a.c supply was preferred to d.c supply because it is cheap when used for industrial purpose.

3.2.4 Portability & Precision

The project design was implemented in such a manner that will ensure high portability for easy transportation & mounting of the end product. The packaging was implemented using plastic casings and not wooden or metal casing since a plastic casing is light when compared to either a wooden or a metal casing which are both heaving. The entire design assembly presupposes lightweight and compact components with minimal volume.

Also, the cards and its reader were constructed with high precision.

3.3 Hardware Design

A diagrammatic description of the hardware plan is illustrated below;

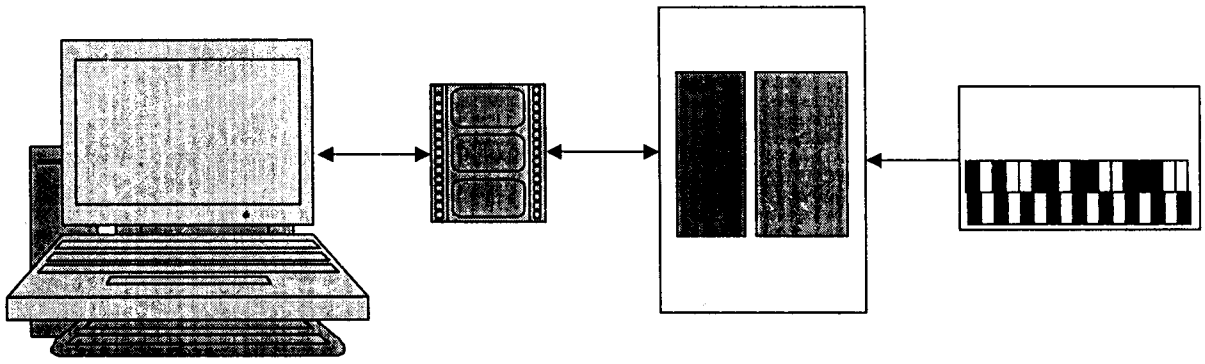

Fig 3.6 The entire system data flow

The basic functional block in the overall project architecture includes the followings:

a. Human –to- machine interface, which is the context of this project work, was implemented as a card reader system functioning with a computerized user card.
b. The interface subsystem, which serves as a bidirectional highway of information from the computer to the card reader system.
c. The software program, which runs on a computer that reads inputs from cards and writes to the serial port, registers, thereby managing the library database system in an automated procedure.

3.3.1.1 The Computerized card

The computerized card is unique & peculiar to each user. The front view of the computerized library card contains the following information about the user;

Name

Registration number

Department

Its primary function is to identify the use without using the card reader system. The rear view of the computerized library card contains the coded bits input, which the computer requires to access the student's information stored in its database. The bits are

coded using a black and white shade patterns. A black shade represents the binary value "1" while a white shade represents the binary value "0".[8] The bits inputs to the computer serial port comprise of the data input & the clock input. The clock input is the same for all cards and it comprises of successive values of 1's and 0's. The clock input is required to synchronize the data input bits and the computer. It comprises of 17 binary digits. The shade pattern of the clock inputs and its corresponding binary value is shown below;

1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1

Fig 3.7 Clock input pattern

The bits pattern for data input is represented in the same fashion as the clock input. However, the bit pattern is unique to each user. It comprises of 17 binary digits.

The 1st and last bits are called the start and stop bits respectively and are represented by the binary value "1" and "0" respectively. The start and stop bits are the same for all the user. Thus, there are 15 binary digits available to code user's information. Hence, a maximum of $2^{15} = 32,768$ students can have access to the library. This value is a great improvement over other previous research work in this area.

This achievement is made possible by using the serial port instead of the parallel port of the computer. The user of the serial port allows flexibility in expansion of the system to accommodate more users. To expand on the maximum number of users who can have access to the library, the number of bits will be increased and the necessary software program implemented without tempering with the hardware design. Below is a diagram showing the data bits input for a particular student & the corresponding binary value.

1 0 1 0 0 1 1 0 1 1 0 0 1 1 1 0 0

Fig 3.7.1 Data input for a particular student

Generally, the width of each shade is 4mm while its length is 9mm. when slide a card down the card reader, the first data input bit (the start bit) is first received by the serial port before the first clock input bits. In this way, synchronization is achieved in the data input bits by the start of another alternate clock input bit. The following diagram illustrates how the data and clock input pattern are coded with reference to a particular card.

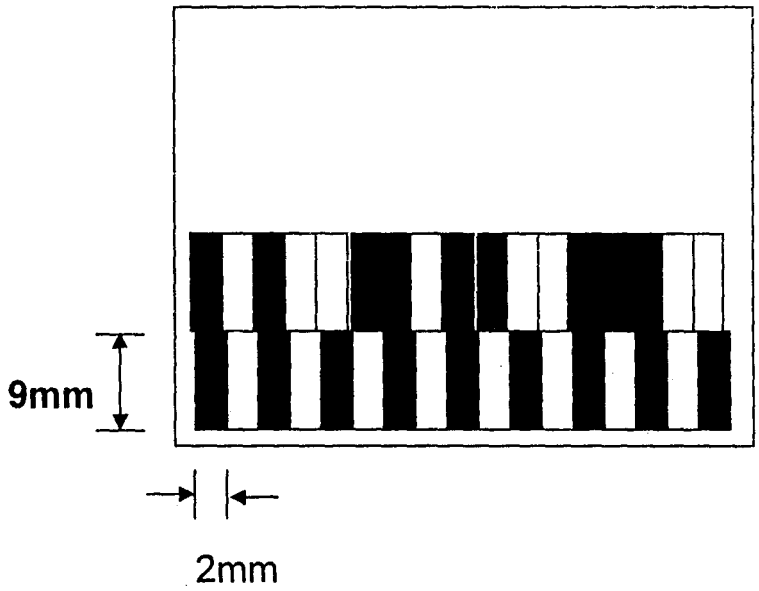

Fig 3.8 Coded Shade Pattern for a Particular Student

3.3.1.2 The Card Reader

The card reader interpret shade pattern encoded in the computerized card as the card is slides down the card aperture.

Components used and their values

1) A 9V Battery
2) A Switch
3) Two Capacitors C1 = C2 = 1000μF
4) Voltage regulator (LM7805)
5) Dual low power operation Amplifier (LM358)
6) Three variable resistors $VR_1 = VR_2 = VR3 = 10KVR$
7) Three resistors $R_1 = R_2 = R3 = 1K\Omega$
8) Three Ultraviolet LEDs (white LEDs)
9) Three Resistors $R_4 = R5 = R6 = 100\Omega$
10) Three Light Dependent Resistors LDR_1 and LDR_2
11) One Parallel Port Cable

3.3.1.3 Circuit Description and Analysis

The circuit is designed to perform the function of a photographic sensor. the backup battery supplies a dc voltage by the closing of the switch to the circuit. A capacitor C_1 filters the ripples that are present after the regulation. An IC, which is called a voltage regulator with product number LM7805, regulates the d.c 9 volts that have being filtered to a constant 5 V output. The input of the voltage regulator (LM7805) is from the battery while its output supplies the ultraviolet LEDs and the comparator (LM358) a constant 5 Volts. The centre Pin of the voltage regulator (LM7805) is connected to the ground. A capacitor C_2 is used to remove surges or ripples that will be present after voltage regulation.

The comparator system in this circuit is built with an IC labeled as IC_{2a}, IC_{2b} and IC_{2C}. Both comparators are present in one IC with product number LM358. This IC is

called a dual comparator integrated circuit. The first section of the comparator has pin 2 as its inverting input and pin 3 as its non-inverting input. Pin 1 is the output of this section. Pin 4 is connected to the ground while Pin 8 is connected to the constant 5 volts positive supply from the voltage regulator.

The other section has Pin 5 and Pin 6 as its non-inverting and inverting inputs respectively. The output of this section is Pin 7. IC_{2a} is responsible for receiving input from LDR_1 while IC_{2b} is responsible for receiving input from LDR_2. LED_1 and LED_2 are ultraviolet light emitting diodes, which emit white light on LDR_1, LDR_2 and LDR_3 respectively. Resistors R_3 and R_4 are used as voltage drops for LED_1 and LED_2 respectively. LDR_1 and LDR_2 is used as light sensor for data input while LDR_3 is used as light sensor for clock input. The clock input is required by the computer program stored in its database for synchronization so as to determine the bits pattern stored in the card. Variable resistors (VR_1, VR_2 and VR_3) are responsible for setting the variation in light intensity that is received by LDR_1, LDR_2 and LDR_3 respectively.

Therefore, VR_2 and VR_3 would be used as voltage reference that is preset for IC_{2a} and IC_{2b} respectively for comparing the voltage that is delivered at LDR_1 and LDR_2 respectively. This reference voltage is 2.5 volts d.c. If the output of the LDR is greater than 2.5V d.c (that is when there is a light barrier), the output of the comparator will be "1". On the other hand when there is no light barrier, is it "0". Resistor R_1 and R_2 are used as voltage dividers with LDR_1, LDR_2 and LDR_3 respectively.

When a card that possesses data printed on it slides in between LED_1 and LDR_1 as well as LED_2 and LDR_2, the light intensity received by LDR_1 and LDR_2 begins to vary depending on the shade pattern in the card. As the card slides down the card aperture, the comparator begins to give output depending on the shade pattern of black and white. This output is transmitted to the computer's parallel port.

3.3.2 The Parallel Port Interface

The parallel port serves as the interface subsystem, which acts as a bi-directional highway of information from the computer to the card reader system.

The parallel port receives the data input from pin 9, and the output from pin 12, 13, and 15 respectively. While pin 1 is used to detect when there is power in the circuit.

3.4 The Software Program

The program detects all the signals that are received by the parallel port. This is used for processing the student's information, which is stored in its database. The software program for this project work was written using visual basic.

Software Design

3.5 FUT Minna Computerized Library Card Program

3.6 Program Features & Overview:

The computerized library card program was customarily designed for FUT Minna library, but can easily be re-structured to fit into any new or existing library database system.

The program on start-up initiates a monitoring timer that signals the software on the insertion of any card into the card reader system. The program queries validity of the card first before matching the Unique ID stored in the card with an existing record in its database system.

It reports an error message when:

An invalid card is inserted

1. No match for that card is found
2. The card slides at a fast rate
3. The card is slid in the reverse direction.

After the validation and record matching exercise, the student's record stored in the database is checked and a decision based on the student's status is passed on to the hardware almost immediately.

The entire process has been summarized in a flowchart shown below:

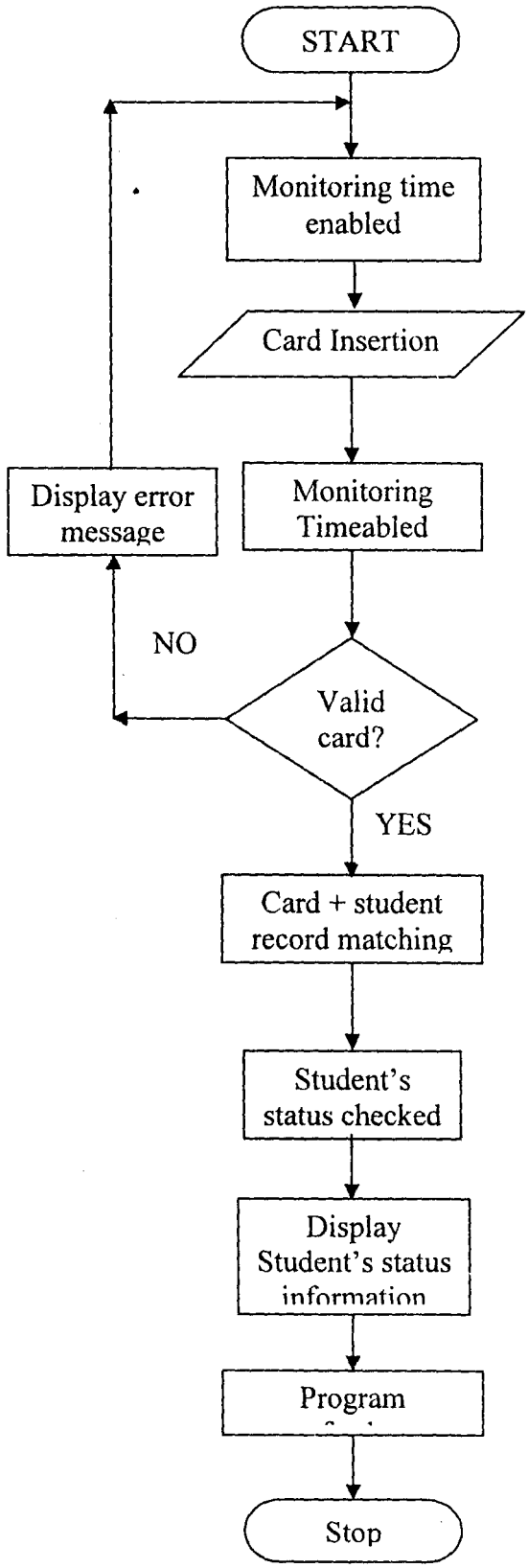

Fig 3.9 Process flowchart

3.8 Operation of the System

The power supply unit delivers a constant voltage to both the ultraviolet (UV) LEDs and the comparator unit. The voltage is a constant 5volts dc supply. The white UV LEDs emits continuous ultraviolet light when there power in the circuit. When a card is slid down the card aperture, the light intensity received by the light sensors begins to vary depending on the shade pattern of black and white coded on the card.

The comparator unit is a dual low power operational amplifier. It is used to compare the received light intensity with a reference level. When there is a light barrier (black shade), the output of the comparator is the binary value "1". On the other hand, a white shade gives an output of "0". The output of the comparator unit delivers three data signal to the computer system unit. Two of the data signal is used as a data output while the other is used as a clock timer.

The computer system unit is used for processing the student's information stored in its database. This information will be sent to the computer which will display the student name, metric number, and its department. And this operation will be done with various student who are coming to used the library, and it will go a long way in helping the library attendant to know the number books borrowed by the student which will help a long way in securing the various books in the library.

CHAPTER FOUR

TEST, RESUIT AND DISCUSSION

4.1 Implementation, Testing and Result

Many digital electronics systems have four main phases of existence and these include **concept, specification, designing and implementation**. The underling concept of this project has been described in the preceding chapters so has the design, and specification. However, this chapter shall examine in detail how the design system is implemented to obtain the functional system. Two major factors greatly affect the performance of the interface control system. Firstly, the proper functionality of each discrete component and secondly it's the modular operation. The implementation took the following sequence.

4.2 Implementation of Power Supply

The working power supply with the capability of delivering two +5V and +9V of power were implemented through the following steps.

1. Identify the configuration of the battery to determine the ac inputs and dc outputs pins.
2. Ensure that the voltage IC regulators are in proper working condition regulators.
3. Having verified these features the bridge rectifier was mounted on the Vero board on separate conductor lines. Thc rest of the components were then soldered on the board following the schematic diagram of the circuit. The soldering was done to ensure proper contact of the ICs and avoid.
4. Bridging different conduction lines.

4.3 Discrete Component Testing

The project made use of various discrete electronic components. Each of these components were powered with +5V. The LEDs were mounted at each testing point to

test the required output at each point to ensure proper functionality. These were carried out for most of the components on the dial-up module.

4.4 Bread Boarding

The electronic components utilized in the construction comprised of dual-in-line packaged ICs.

The components were mounted on a single breadboard. The mounting procedures followed the real implementation diagram of the circuit and not the logic diagrams. For every component added, the source (5V) and ground was first connected before making any further connection. Also, LEDs were connected at strategic points to test/indicate the output.

4.5 Testing and Monitoring State

Logic system are tested, debugged and serviced by putting them into operation and subsequently comparing the result obtained against the supposed result. The testing of the breadboard circuit was done on a-one-step-at-a-time basis. This was done by sending a clock signal from the PC to the connected modules and observing the output of the LEDs and then comparing them with the supposed result. This was done for the entire circuit.

4.5.1 Hardware Testing

Testing the hardware for its conformability to the design specifications entails testing the various hardware component parts or modules. This is of great concern since environmental conditions, wear and tear or extremely high current and voltage can easily affect hardware. The basic test equipments used in the design of this project are; digital millimeter and a microcomputer for the hardware interface test.

4.5.2 Pre-Implementation Testing

Pre-implementation stage involves carrying out the appropriate verification test on the components to ensure that they match their functional specification prior to implementation on a project board and subsequently on a Vero board. At this stage the

cable for the serial port interface was tested for continuity between its two ends for each of the lines used in the project to ensure reliable transfer of information bits.

4.5.3 Post-Implementation Testing

Post –implementation involves testing each module or unit of the hardware after implementation to ensure that they perform their functions/operations as intended in the design. This also includes subsequent tests on the complete system for precision. The following tests were conducted at this stage of the project:

The outputs of the comparator which goes into the serial port were tested. The disparity between the PC ground and the hardware ground was tested and corrected. The last test carried out on the hardware was interfacing with the computer to confirm interaction between the hardware and the software especially in function and in timing operation.

4.6 Software Testing

Software design and implementation, which usually take quite a while especially when good quality software is desired, pass through a lot of testing. These tests are usually tasking especially for a library database system where high precision should not be compromised.

Actually, software testing can be done practically at any level or all the stages of its development, though the dominant test type is the post – implementation test.

4.7 Complete System Testing

After both the software and the hardware have been elaborately and vigorously tested, the whole components were then brought together, assembled and tested to ensure that the complete project work is functioning well.

4.8 Packaging

This project work was assembled and packaged in modules. Packaging is very important in any business oriented project since it enhances the maintainability of the given product or system.

This involves the packaging of the database software using the packaging and deployment wizard. The hardware i.e. the card reader system was also packaged to achieve the above objective.

Among the factors considered in the packaging of this project are: the cost, ease of maintenance, durability, aesthetics, contact precision and portability.

The above considerations were achieved with a good thermoplastic casing. The final appearance of the project work is shown in the figure below.

4.9 Maintainability and Troubleshooting

The user should perform routine maintenance operations include cleaning up dust particles in the control (or dial-up) circuit. Digital systems operate mostly at room temperatures, for high temperatures; air conditioner or fan should be made available especially for the dial-up circuit.

The software driver application was designed to attend to problems and complexities encountered during its use. Many troubleshooting tips have been included to give the user an idea of how to handle any malfunction arising from its use. In the case of any malfunction, the following modules should be referred to:

1. Device is being addressed from the user interface but no switching ON/OFF is observed:
    1.1 Check the input line of the serial port interface.
    1.2 Check the data input line of the printer cable.
    1.3 Check the printer cable.
2. The PC is not communicating with the control circuit:

Check the printer cable, Check multiplexed control lines of the printer cable.

CHAPTER FIVE

CONCLUSION, RECOMMENDATION AND PROBLEMS

5.1 Conclusion

A functional library is essential for all stages in education. This can only be achieved when the procedure for managing the library database is simple and reliable. The computerized library card system, if properly deployed, will automate the whole process of library database management and thus providing a better quality of service to the users. The project work will also reduce illegal access to the library and lost of library resources when properly deployed.

By successfully completing this project work, we have also been about to reduce the period of time required for the management to renew membership card and also the student's profile can easily be access by the library management when the need arises.

By implementing the above listed recommendations, the whole process of library database management will be quite interesting and library will be as it ought to be. This will in the long run, make student, develop the habit of constantly using the library and by constant academic research, Nigeria will in no short tie, be among the leading nations of the world.

5.2 Recommendation

Having implemented the design on a prototype, the following recommendations are hereby proposed for real academic and research deployment of this work both in public and private libraries.

1. The database can be implemented with better platform like the PHP and Oracle.
2. The prototype does not have the facilities for on-line users. This can however be achieved by changing the database platform to say PHP, MYSOL or ORACLE.
3. The digital card can be improved on by making use of a contact less card instead of a contact card.

4. For very large academic and research libraries were higher data transmission rate and reliability are demanded, the hardware can be interfaced via the USB port of the computer.
5. The project can be restructured to automatically count the daily users. This is necessary for growth plan.
6. For very large libraries, this project work can be implemented by networking different card readers together to achieve a higher quality of service.
7. The software program can be written to provide a database of all the books in the library and their status. This can help users to search and locate the position of books in the shelves when the program is queried.

5.3 Problems Experienced

No project work can be actualized without encountering some problems at the different stages of implementation. This project work can therefore be no exception. Various problems were encountered at the different stages of this project work.

Since this project work has two main integral parts (*i.e. Hardware and Software sections).* The problems can be categorized under two headings namely:

1. Hardware Problems
2. Software Problems

5.3.1 Hardware Problems

The problems encounter during the hardware design, implementation, and packaging and testing includes:

1. The sensitivity of the Light Dependent Resistor (LDR) was not good enough. This requires that different types of LDR should be used until a favorable one was found.
2. The gap between each bit has to be well separated before an accurate data can be read.
3. There was difficulty in soldering and making good electrical contacts on the card.
4. Due to unavailable technology we could not make use of the standard smart card technology and hence opted for the optical based type.

5. Power failure also constituted huge problems as it often made it impossible for us to work as scheduled thereby prolonging the period of completion.
6. There was also problem encountered during the testing of this work as some cards failed to work after a short period of time.

5.3.2 Software Problems

The software problems include:

1. To develop an accurate method of error correction was difficult because the speed of sliding the card may vary.
2. There was a problem of compatibility with different computer systems especially the ones that do not have port one as its first serial port.
3. Unavailability and high cost of reference materials.
4. Erratic power supply also affected the estimated period for the coding of the program.
5. There was the problem of response time of the System being far greater than that of the hardware *(The comparator to be specific).* Delays had to be integrated in the program codes to cater for the disparity in response times.

5.3.1 Construction Problems

This project is quite a big one. To fully accomplish all the required features of the system we needed to make use of a huge number of discrete electronic components. This gave us a tasking experience in the construction phase where we needed to solder a wide range of electronic components. Mechanisms that will prevent us from having burn out IC were employed from one component to the other.

In the development of the software package, it was also required that we do some calculations that enable the system works synchronously.

Programming the ports, configuring the component pins and other components to work as a single unit really took a lot of mental work and perseverance.

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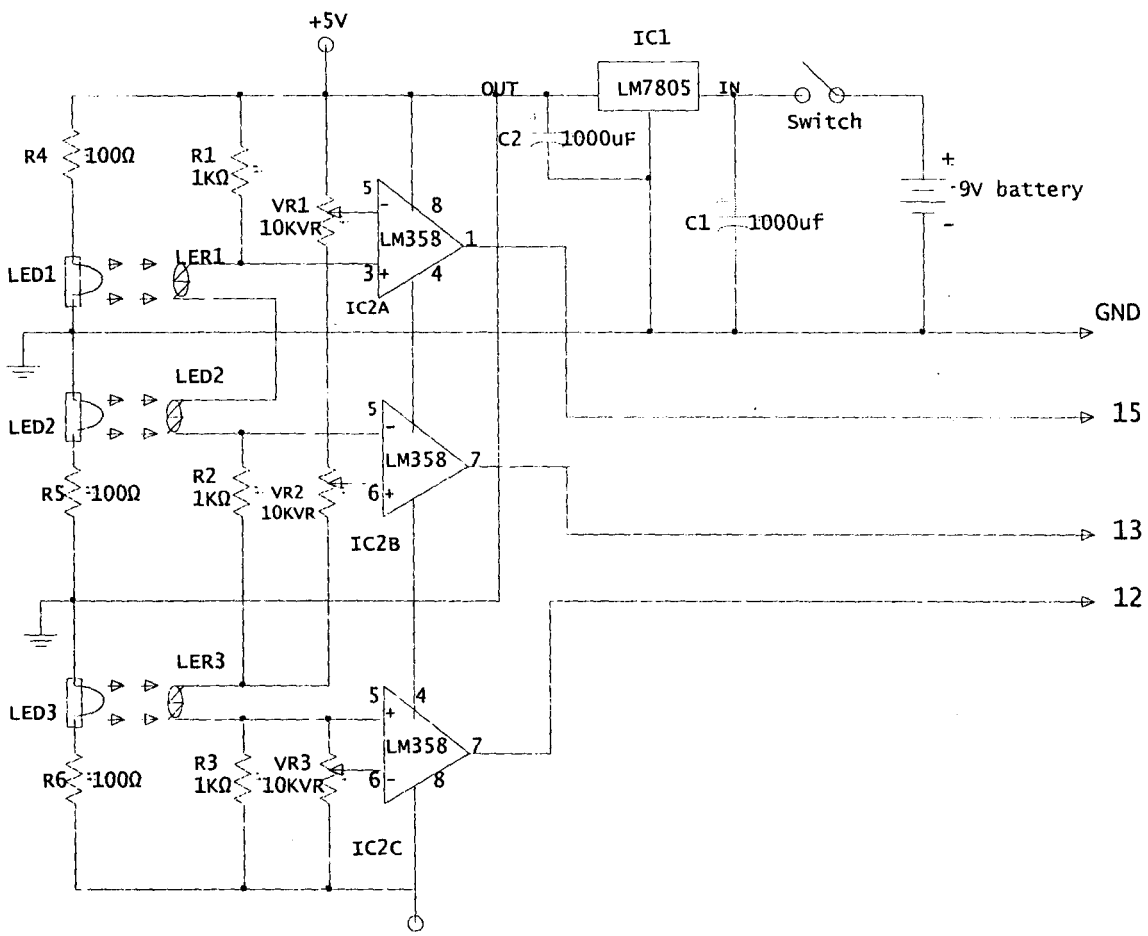
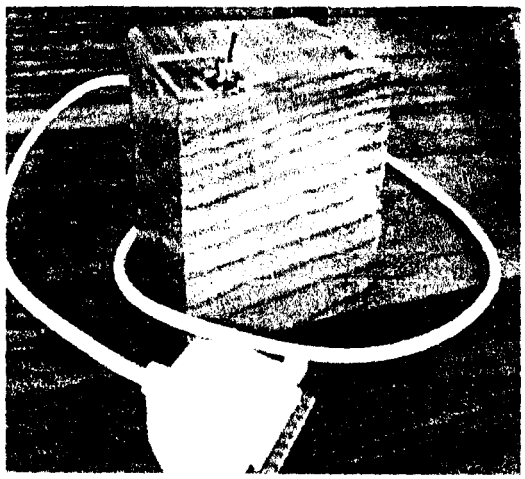
Appendix 1

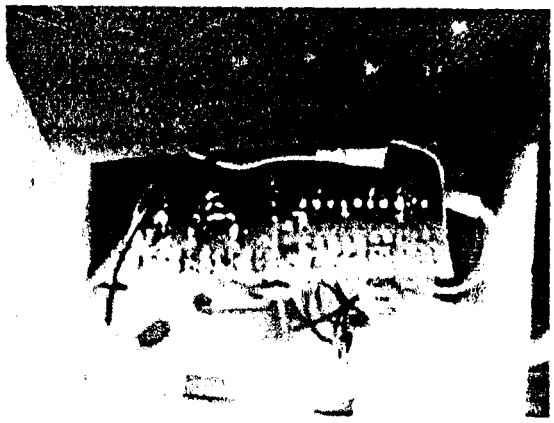
Complete Circuit Diagram



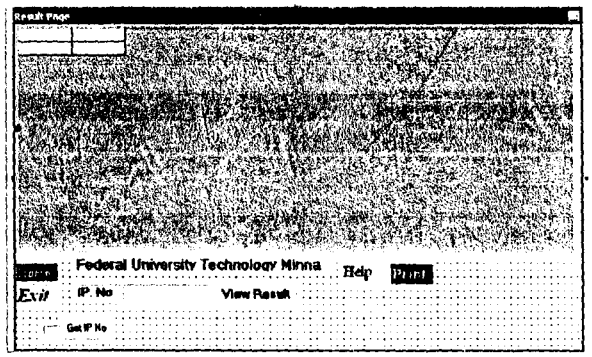
Appendix 2



Pictorial View of the Device



Inside View of the Device



Form 4 (View Books Results)

form1

Appendix 4

PSEUDOCODE OF THE PROGRAM

FORM1

```
Public cnt


Private Sub cmdAdd_Click()
On Error GoTo AddErr
  Adodc1.Recordset.AddNew

  Exit Sub
AddErr:
  MsgBox Err.Description
End Sub

Private Sub cmdDelete_Click(Index As Integer)
On Error GoTo DeleteErr
  With Adodc1.Recordset
    .Delete
    .MoveNext
    If .EOF Then .MoveLast
  End With
  Exit Sub
DeleteErr:
  MsgBox Err.Description
End Sub

Private Sub cmdRefresh_Click()
'This is only needed for multi user apps
  On Error GoTo RefreshErr
  Adodc1.Refresh
  Exit Sub
RefreshErr:
  MsgBox Err.Description
End Sub

Private Sub cmdUpdate_Click()
 On Error GoTo UpdateErr

  Adodc1.Recordset.UpdateBatch adAffectAll
  Exit Sub
UpdateErr:
  MsgBox Err.Description
```

```
End Sub


Private Sub Comchange_Click()
chk1.Visible = True
chk2.Visible = True
Lab1.Visible = True
Lab2.Visible = True
chk1.Text = ""
chk2.Text = ""

End Sub



Private Sub exitt_Click()
Dim exiti As Integer
exiti = MsgBox("Do you want to Exit?", vbYesNoCancel +
vbExclamation, "Exit (PhyEBSU) ")
If exiti = 6 Then
End
Else
Exit Sub
End If
End Sub

Private Sub helpp_Click()
Call Shell("explorer.exe manual.htm", vbNormalFocus)

End Sub

Private Sub Image2_Click()
tr.Visible = False
End Sub

Private Sub p1_Click()
Form4.Show vbModal

End Sub

Private Sub p2_Click()
Form4.Show vbModal

End Sub

Private Sub p3_Click()
Form3.Show vbModal

End Sub

Private Sub p4_Click()
Form2.Show vbModal
```

```
End Sub



Private Sub sh_Click()
tr.Visible = True
tr.Text = tpaswod.Text & "oforogbonnaigwe"
End Sub

Private Sub Timer1_Timer()
x = Inp(&H379)
iptx.Text = x
End Sub
```

FORM 2

```
Public conn As ADODB.Connection
Public rs As ADODB.Recordset
Public fld As ADODB.Field

Public RegNum As String
Public DB As String
Public year As String



'The dimensions of the DIN A4 paper size in Twips:
Const A4Height = 16840, A4Width = 11907

'To get the scroll width:
Private Declare Function GetSystemMetrics Lib "user32" (ByVal nIndex
As Long) As Long
Private Const SM_CYHSCROLL = 3
Private Const SM_CXVSCROLL = 2

'Declared Private WithEvents to get NewPage event:
Private WithEvents cTP As clsTablePrint


Private Sub cmdRefresh_Click()

    'Read the FlexGrid:
    'Set the wanted width of the table to -1 to get the exact widths
of the FlexGrid,
    ' to ScaleWidth - [the left and right margins] to get a fitting
table !
    ImportFlexGrid cTP, fxgSrc, IIf((chkColWidth.Value = vbChecked),
picTarget.ScaleWidth - 2 * 567, -1)

    'Set margins (not needed, but looks better !):
    cTP.MarginBottom = 567 '567 equals to 1 cm
    cTP.MarginLeft = 567
    cTP.MarginTop = 567

    'Clear the box:
    picTarget.Cls

    'Class begins drawing at CurrentY !
    picTarget.CurrentY = cTP.MarginTop

    'Finally draw the Grid !
    cTP.DrawTable picTarget
```

```
    'Done with drawing !
End Sub

Private Sub exitt_Click()
Dim exiti As Integer
exiti = MsgBox("Do you want to Exit?", vbYesNoCancel +
vbExclamation, "Exit (PhyEBSU) ")
If exiti = 6 Then
End
Else
Exit Sub
End If

End Sub

Private Sub Form_Load()
    Set conn = New ADODB.Connection
    Set rs = New ADODB.Recordset
     On Error Resume Next
    conn.Open "password=kk;dbq=rsutpepa.mdb;driver={driver do
microsoft access (*.mdb)}"

    exitt.ForeColor = vbRed

End Sub

Private Sub helpp_Click()
Call Shell("explorer.exe manual.htm", vbNormalFocus)

End Sub

Private Sub homee_Click()
    Unload Me
End Sub
Private Sub hscScroll_Change()
    picTarget.Left = -hscScroll.Value * 120
End Sub

Private Sub hscScroll_Scroll()
    hscScroll_Change
End Sub



Private Sub iptxt_Click()
x = Inp(&H379)
T2.Text = x
If x = 120 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
ElseIf x = 127 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
```

```
Exit Sub
ElseIf x = 8 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
ElseIf x = 15 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
Else
Text1.Text = T2
End If
End Sub

Private Sub vscScroll_Change()
    picTarget.Top = -CSng(vscScroll.Value) * 120
End Sub


Private Sub vscScroll_Scroll()
    vscScroll_Change
End Sub
Private Sub InitializePictureBox()
    Dim sngVSCWidth As Single, sngHSCHeight As Single
    'Set the size to the DIN A4 width:
    picTarget.Width = A4Width
    picTarget.Height = A4Height
    'Resize the scrollbars:
    sngVSCWidth = GetSystemMetrics(SM_CXVSCROLL) *
Screen.TwipsPerPixelX
    sngHSCHeight = GetSystemMetrics(SM_CYHSCROLL) *
Screen.TwipsPerPixelY
    hscScroll.Move 0, picScroll.ScaleHeight - sngHSCHeight,
picScroll.ScaleWidth - sngVSCWidth, sngHSCHeight
    vscScroll.Move picScroll.ScaleWidth - sngVSCWidth, 0,
sngVSCWidth, picScroll.ScaleHeight

    SetScrollBars
End Sub


Private Sub printt_Click()

InitializePictureBox
    Set cTP = New clsTablePrint
     cmdRefresh_Click


If MsgBox("The application will now print the grid on the default
printer (Show a print dialog here later !).", vbInformation +
vbOKCancel, "Print") = vbCancel Then Exit Sub

    'Simply initialize the printer:
    Printer.Print
```

```
    'Read the FlexGrid:
    'Set the wanted width of the table to -1 to get the exact widths
of the FlexGrid,
    ' to ScaleWidth - [the left and right margins] to get a fitting
table !
    ImportFlexGrid cTP, fxgSrc, IIf((chkColWidth.Value = vbChecked),
Printer.ScaleWidth - 2 * 567, -1)

    'Set margins (not needed, but looks better !):
    cTP.MarginBottom = 567 '567 equals to 1 cm
    cTP.MarginLeft = 567
    cTP.MarginTop = 567

    'Class begins drawing at CurrentY !
    Printer.CurrentY = cTP.MarginTop

    'Finally draw the Grid !
    cTP.DrawTable Printer
    'Done with drawing !

    'Say VB it should finally send it:
    Printer.EndDoc

    homee.Visible = False
    exitt.Visible = False
    printt.Visible = False
    helpp.Visible = False
    wholresut.Visible = False
    Form2.PrintForm
    homee.Visible = True
    exitt.Visible = True
    printt.Visible = True
    helpp.Visible = True
    wholresut.Visible = True

End Sub



Private Sub SetScrollBars()
    hscScroll.Max = (picTarget.Width - picScroll.ScaleWidth +
vscScroll.Width) / 120 + 1
    vscScroll.Max = (picTarget.Height - picScroll.ScaleHeight +
hscScroll.Height) / 120 + 1
End Sub


Private Sub wholresut_Click()
If Text1.Text = "" Then
MsgBox ("No Valid IP No.")
ElseIf Text1.Text = 120 Then
```

```
MsgBox ("No Valid IP No.")
ElseIf Text1.Text = 127 Then
MsgBox ("No Valid IP No.")
ElseIf Text1.Text = 8 Then
MsgBox ("No Valid IP No.")
ElseIf Text1.Text = 15 Then
MsgBox ("No Valid IP No.")
Else

    rs.Open "SELECT * FROM resutshit where ipno = '" & Text1.Text &
"'", conn, 2, 3    .

        fxgSrc.Cols = 0
        fxgSrc.Row = 0
        fxgSrc.Rows = 1

        For Each fld In rs.Fields
            y = y + 1
            fxgSrc.Cols = y
            fxgSrc.Col = y - 1
            fxgSrc.Text = fld.Name

        Next

    Do Until rs.EOF
    fxgSrc.Rows = fxgSrc.Rows + 1
    fxgSrc.Row = fxgSrc.Rows - 1

        y = 0
        On Error Resume Next
        For Each fld In rs.Fields
            y = y + 1
            fxgSrc.Col = y - 1
            fxgSrc.Text = fld.Value
        Next

    Text2.Text = Val(Text2.Text) + rs("credit Load")
    Text3.Text = Val(Text3.Text) + rs("Grade Point")

    rs.MoveNext
    Loop
    rs.Close

    On Error Resume Next
    Text4.Text = ""
    Text4.Text = Val(Text3.Text) / Val(Text2.Text)
    End If
End Sub
```

FORM3

```
Private Sub cmdAdd_Click()
On Error GoTo AddErr
  Adodc1.Recordset.AddNew

lgp.Text = ""

  Exit Sub
AddErr:
  MsgBox Err.Description
End Sub


Private Sub cmdClose_Click()
Unload Me
End Sub

Private Sub cmdDelete_Click()
  On Error GoTo DeleteErr
  With Adodc1.Recordset
    .Delete
    .MoveNext
    If .EOF Then .MoveLast
  End With
  Exit Sub
DeleteErr:
  MsgBox Err.Description
End Sub

Private Sub cmdRefresh_Click()
'This is only needed for multi user apps
  On Error GoTo RefreshErr
  Adodc1.Refresh
  Exit Sub
RefreshErr:
  MsgBox Err.Description
End Sub

Private Sub cmdUpdate_Click()
If regt.Text = "" Or yeart.Text = "" Or C.Text = "" Then

MsgBox ("Put IP. No, Reg. No and Book No.")
Exit Sub
Else

  On Error GoTo UpdateErr

  Adodc1.Recordset.UpdateBatch adAffectAll
```

```
  On Error Resume Next
  cmdAdd_Click
  End If

  Exit Sub
UpdateErr:
  MsgBox Err.Description

End Sub

Private Sub exitt_Click()
Dim exiti As Integer
exiti = MsgBox("Do you want to Exit?", vbYesNoCancel +
vbExclamation, "Exit (PhyEBSU) ")
If exiti = 6 Then
End
Else
Exit Sub
End If

End Sub

Private Sub fest_Click()
    On Error Resume Next
Adodc1.Recordset.MoveFirst
End Sub

Private Sub Form_Load()

exitt.ForeColor = vbRed

On Error GoTo AddErr
  Adodc1.Recordset.AddNew

  Exit Sub
AddErr:
  MsgBox Err.Description
End Sub



Private Sub getip_Click()
x = Inp(&H379)
T.Text = x

If x = 120 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
ElseIf x = 127 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
```

```
ElseIf x = 8 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
ElseIf x = 15 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
Else
regt.Text = T.Text
End If

End Sub

Private Sub helpp_Click()
Call Shell("explorer.exe manual.htm", vbNormalFocus)

End Sub


Private Sub homee_Click()

Unload Me
End Sub



Private Sub lastt_Click()
On Error Resume Next
Adodc1.Recordset.MoveLast
End Sub

Private Sub nestt_Click()
On Error Resume Next
Adodc1.Recordset.MoveNext
End Sub



Private Sub prev_Click()
On Error Resume Next
Adodc1.Recordset.MovePrevious
End Sub
```

FORM 4

```
Private Sub bye_Click()
Unload Me
End
End Sub

Private Sub cmdAdd_Click()
On Error GoTo AddErr
  Adodc1.Recordset.AddNew

  Exit Sub
AddErr:
  MsgBox Err.Description
End Sub

Private Sub cmdDelete_Click()
On Error GoTo DeleteErr
  With Adodc1.Recordset
    .Delete
    .MoveNext
    If .EOF Then .MoveLast
  End With
  Exit Sub
DeleteErr:
  MsgBox Err.Description
End Sub

Private Sub cmdRefresh_Click()
'This is only needed for multi user apps
  On Error GoTo RefreshErr
  Adodc1.Refresh
  Exit Sub
RefreshErr:
  MsgBox Err.Description
End Sub

Private Sub cmdUpdate_Click()
If reg.Text = "" Then

MsgBox ("Put IP. No")
Exit Sub
Else

'to save picture
On Error Resume Next
FileCopy Dialog.FileName, App.Path & "\pics\" & reg.Text
```

```
'to save data in the database
  On Error GoTo UpdateErr

  Adodc1.Recordset.UpdateBatch adAffectAll

  On Error Resume Next
  Img.Visible = False
  cmdAdd_Click
  End If

  Exit Sub
UpdateErr:
  MsgBox Err.Description
End Sub

Private Sub exitt_Click()
Dim exiti As Integer
exiti = MsgBox("Do you want to Exit?", vbYesNoCancel +
vbExclamation, "Exit (PhyEBSU) ")
If exiti = 6 Then
End
Else
Exit Sub
End If
End Sub

Private Sub fest_Click()
    On Error Resume Next
Adodc1.Recordset.MoveFirst
End Sub

Private Sub Form_Load()
prtdate.Visible = False
tim.Visible = False
dtim.Visible = False
timm.Visible = False

exitt.Visible = False
p1.Visible = True
fst.Visible = False
prv.Visible = False
nxt.Visible = False
lst.Visible = False
fest.Visible = False
prev.Visible = False
nestt.Visible = False
lastt.Visible = False
bye.Visible = False

picbutton.Visible = False
cmdUpdate.Visible = False
cmdAdd.Visible = False
```

```
cmdRefresh.Visible = False
cmdDelete.Visible = False
Tsach.Visible = False
sarch.Visible = False
homee.Visible = False
p2.Visible = True
putreg.Visible = False
fst.Visible = False
prv.Visible = False
nxt.Visible = False
lst.Visible = False
fest.Visible = False
prev.Visible = False
nestt.Visible = False
lastt.Visible = False
putreg.Visible = False
homee.Visible = False
putreg.Visible = False

bye.Visible = False
picbutton.Visible = False
cmdUpdate.Visible = False
cmdAdd.Visible = False
cmdRefresh.Visible = False
cmdDelete.Visible = False
Tsach.Visible = Falrse
sarch.Visible = False
End Sub

Private Sub helpp_Click()
Call Shell("explorer.exe manual.htm", vbNormalFocus)

End Sub

Private Sub homee_Click()
Unload Me
End Sub

Private Sub lastt_Click()
On Error Resume Next
Adodc1.Recordset.MoveLast

End Sub

Private Sub nestt_Click()
On Error Resume Next
Adodc1.Recordset.MoveNext
End Sub

Private Sub p1_Click()
cmdAdd_Click
fst.Visible = True
```

```
prv.Visible = True
nxt.Visible = True
lst.Visible = True
fest.Visible = True
prev.Visible = True
nestt.Visible = True
lastt.Visible = True
bye.Visible = True

picbutton.Visible = True
cmdUpdate.Visible = True
cmdAdd.Visible = True
cmdRefresh.Visible = True
cmdDelete.Visible = True
Tsach.Visible = False
sarch.Visible = False
homee.Visible = False
p2.Visible = False
putreg.Visible = False
p1.Visible = False
End Sub

Private Sub p2_Click()
cmdRefresh_Click
Tsach.TabIndex = 0
p2.Visible = False
p1.Visible = False
fst.Visible = True
prv.Visible = True
nxt.Visible = True
lst.Visible = True
fest.Visible = True
prev.Visible = True
nestt.Visible = True
lastt.Visible = True
putreg.Visible = True
homee.Visible = True
putreg.Visible = True

fst.Visible = False
prv.Visible = False
nxt.Visible = False
lst.Visible = False
fest.Visible = False
prev.Visible = False
nestt.Visible = False
lastt.Visible = False

bye.Visible = False
picbutton.Visible = False
cmdUpdate.Visible = False
cmdAdd.Visible = False
```

```
cmdRefresh.Visible = False
cmdDelete.Visible = False
Tsach.Visible = True
sarch.Visible = True
End Sub

Private Sub picbutton_Click()
Img.Visible = True
    Dialog.ShowOpen
Img.Picture = LoadPicture(Dialog.FileName)

End Sub

Private Sub prev_Click()
On Error Resume Next
Adodc1.Recordset.MovePrevious
End Sub

Private Sub printt_Click()
Dim printi As Integer
printi = MsgBox("Do you want to print this Form?", vbYesNoCancel +
vbExclamation, "Exit (PhyEBSU) ")
If printi = 6 Then

dtim.Text = Date$
timm.Text = Time$
prtdate.Visible = True
tim.Visible = True
dtim.Visible = True
timm.Visible = True

printt.Visible = False
picbutton.Visible = False
cmdUpdate.Visible = False
fst.Visible = False
prv.Visible = False
nxt.Visible = False
lst.Visible = False
fest.Visible = False
prev.Visible = False
nestt.Visible = False
lastt.Visible = False
cmdRefresh.Visible = False
cmdDelete.Visible = False
cmdAdd.Visible = False
sarch.Visible = False
p1.Visible = False
p2.Visible = False
homee.Visible = False
bye.Visible = False
exitt.Visible = False
showpic.Visible = False
```

```
putreg.Visible = False
Tsach.Visible = False
Else
Exit Sub

End If

dispiayy.Caption = "Department of Industrial Physics"

Form4.PrintForm


p1.Visible = True
p2.Visible = True
prtdate.Visible = False
tim.Visible = False
dtim.Visible = False
timm.Visible = False

End Sub

Private Sub sarch_Click()
On Error Resume Next
showpic_Click

    Adodc1.Recordset.MoveFirst
    Do Until Adodc1.Recordset.EOF = True
        If Tsach.Text = reg.Text Then Exit Sub
        Adodc1.Recordset.MoveNext

    Loop
    sage = MsgBox("Data Not Found. Do you want to Register this
Card", vbYesNoCancel + vbExclamation, "Change values")
If sage = 6 Then
p1_Click
Else
Exit Sub
End If

End Sub

Private Sub sho_Click()
x = Inp(&H379)
xt.Text = x

Tsach.Text = xt.Text

If x = 120 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
ElseIf x = 127 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
```

```
Exit Sub
ElseIf x = 8 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
ElseIf x = 15 Then
sage = MsgBox("No Card, or a bad Card.", vbYes)
Exit Sub
Else
sarch_Click
End If

End Sub

Private Sub showpic_Click()
 If Tsach.Text = "" Then Exit Sub
Image1.Picture = LoadPicture(App.Path & "\pics\" & Tsach.Text)

End Sub

Private Sub Timer1_Timer()
dispiayy.Caption = Right$((dispiayy.Caption), Len(dispiayy.Caption)
- 1) & Left$((dispiayy.Caption), 1)


End Sub
```