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Barcode Based Attendance System

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Abstract: Objective of this paper proposed attendance system uses barcode technology to take attendance. Attendance in colleges is generally paper based which may sometimes cause errors.
Taking attendance manually consumes more time. So the proposed attendance system uses BARCODE technology to take attendance. In this system, each student is issued a BARCODE tag. Controlling unit is in the institute. Whenever the card is placed near the reader, it will take the attendance.
Keywords: Bar Code, RS 232, PIC microcontroller, LED display.

I. INTRODUCTION

Until today, most lecturers in universities are found still using the conventional method of taking students attendance either by calling out the student names or by passing around an attendance sheet for student to sing confirming their presence. In addition to the time-consuming issue, such method is also at higher risk of having students cheating about their attendance, especially in a large classroom.

Therefore, a method of taking attendance by employing an application running on the Barcode based platform. Barcode based attendance system consists of barcode reader, barcode tag, LCD display, and microcontroller unit. Barcode can be interfaced to microcontroller through USART.

Data is transferred from barcode cards to reader and from there to microcontroller. Radiofrequency technology is used in many applications. Barcode tags are of two types -1) passive tags and 2) active tags. Passive tags contains13 digit number tag inbuilt in it, where as active tag is read/write tag i.e., one can read from the tag and write to the tag. This project uses passive tag. In real time tags to the students, with their roll numbers as their tags.

Barcode reader contains a copper winding in it. This winding act as an antenna. When the tag is placed near the reader, due to the induced mutual inductance energy, data is transferred to reader. Reader then transfers the data to the microcontroller. Microcontroller checks for the data continuously, if any data is, received microcontroller compares the data in database. If the tag is authenticated, microcontroller takes the attendance.

II. BARCODE BASED ATTENDANCE SYSTEM

Regulated DC 5V is used for Harvard architecture based microcontroller, warning indication (i.e. LED indication), audible alarm unit and Safety monitoring unit i.e.

LCD Display unit which is shown in a Fig 1. Unregulated DC voltage is used for relay circuit which is used for controlling and triggering the various output devices which is to be in the car that which has been adopted with driver circuit. Since, all electronic circuits work only with low D.C. voltage we need a power supply unit to provide the appropriate voltage supply. This unit consists of transformer, rectifier, filter and regulator.

A.C. voltage typically 230V rms is connected to a transformer which steps that AC voltage down to the level to the desired AC voltage. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a DC voltage.

This resulting DC voltage usually has some ripple or AC voltage variations. Regulator circuit can use this DC input to provide DC voltage that not only has much less ripple voltage but also remains the same DC value even the DC voltage varies somewhat, or the load connected to the output DC voltage changes.

The power supply unit is a source of constant DC supply voltage. The required DC supply is obtained from the available AC supply after rectification, filtration and regulation.

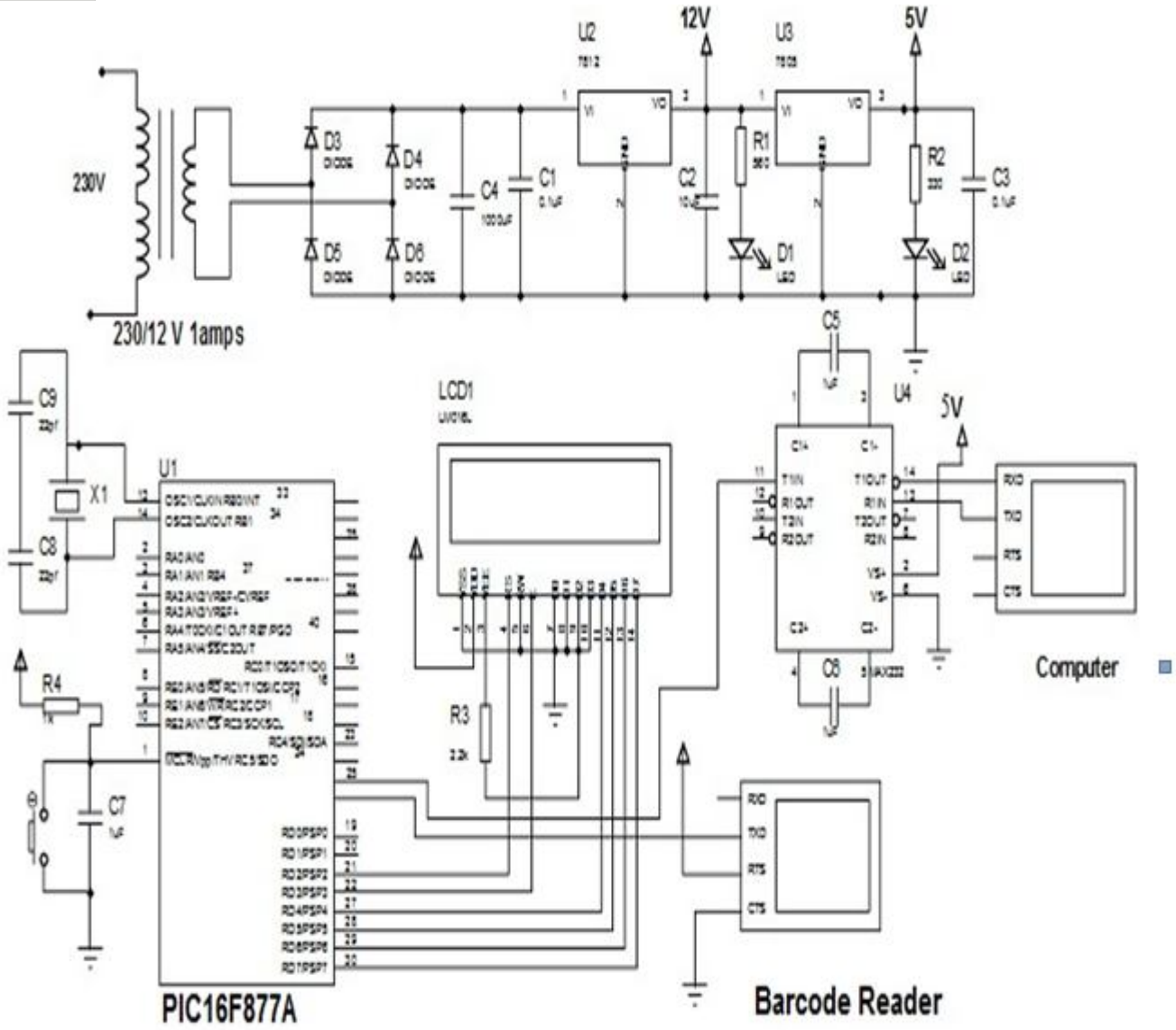


Fig .1 Circuit diagram for barcode based attendance system

III. PIC CONTROLLER

PIC is a family of modified Harvard architecture microcontrollers made by Microchip Technology, derived from the PIC1650 originally developed by General Instrument's Microelectronics Division. The name PIC initially referred to "Peripheral Interface Controller PIC's are popular with both industrial developers and hobbyists alike due to their low cost, wide availability, large user base, extensive collection of application notes, availability of low cost or free development tools, and serial programming (and re-programming with flash memory) capability. They are also commonly used in educational programming as they often come with the easy to use 'pic logicator' software. The microcontroller that has been used for this project is from PIC series. PIC microcontroller is the first RISC based microcontroller fabricated in CMOS (complimentary metal oxide semiconductor) that uses separate bus for instruction and data allowing simultaneous access of program and data memory. The main advantage of CMOS and RISC combination is low power consumption resulting in a very small chip size with a small pin count. The main advantage of CMOS is that it has immunity to noise than other fabrication techniques. Various microcontrollers offer different kinds of memories, which was shown in a Fig 3. EEPROM, EPROM, FLASH etc. are some of the memories of which FLASH is the most recently developed. Technology that is used in pic16F877 is flash technology, so that data is retained even when the power is switched off. Easy Programming and erasing are other features of PIC 16F877.

A. PIC Pin diagram

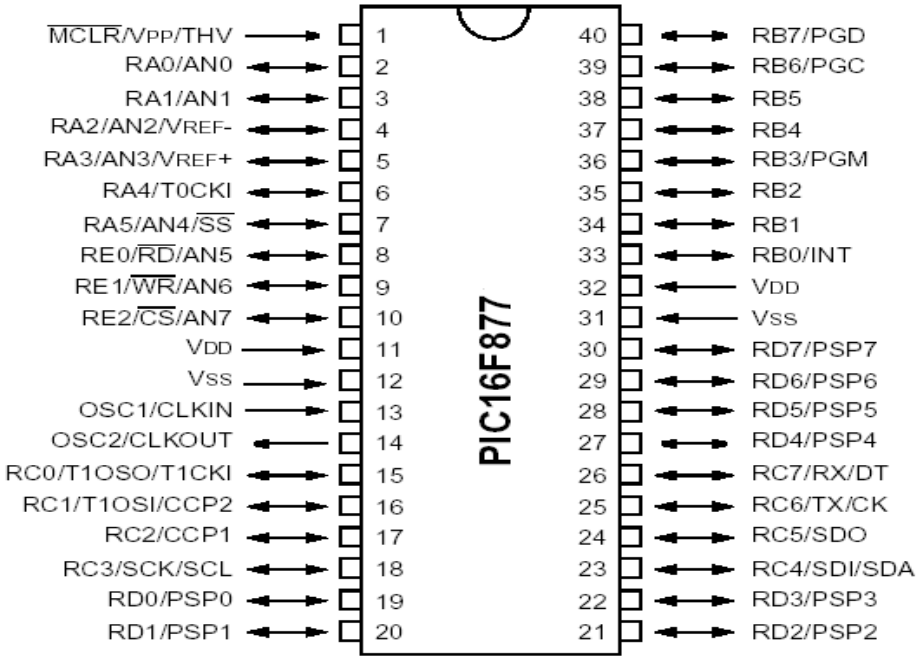
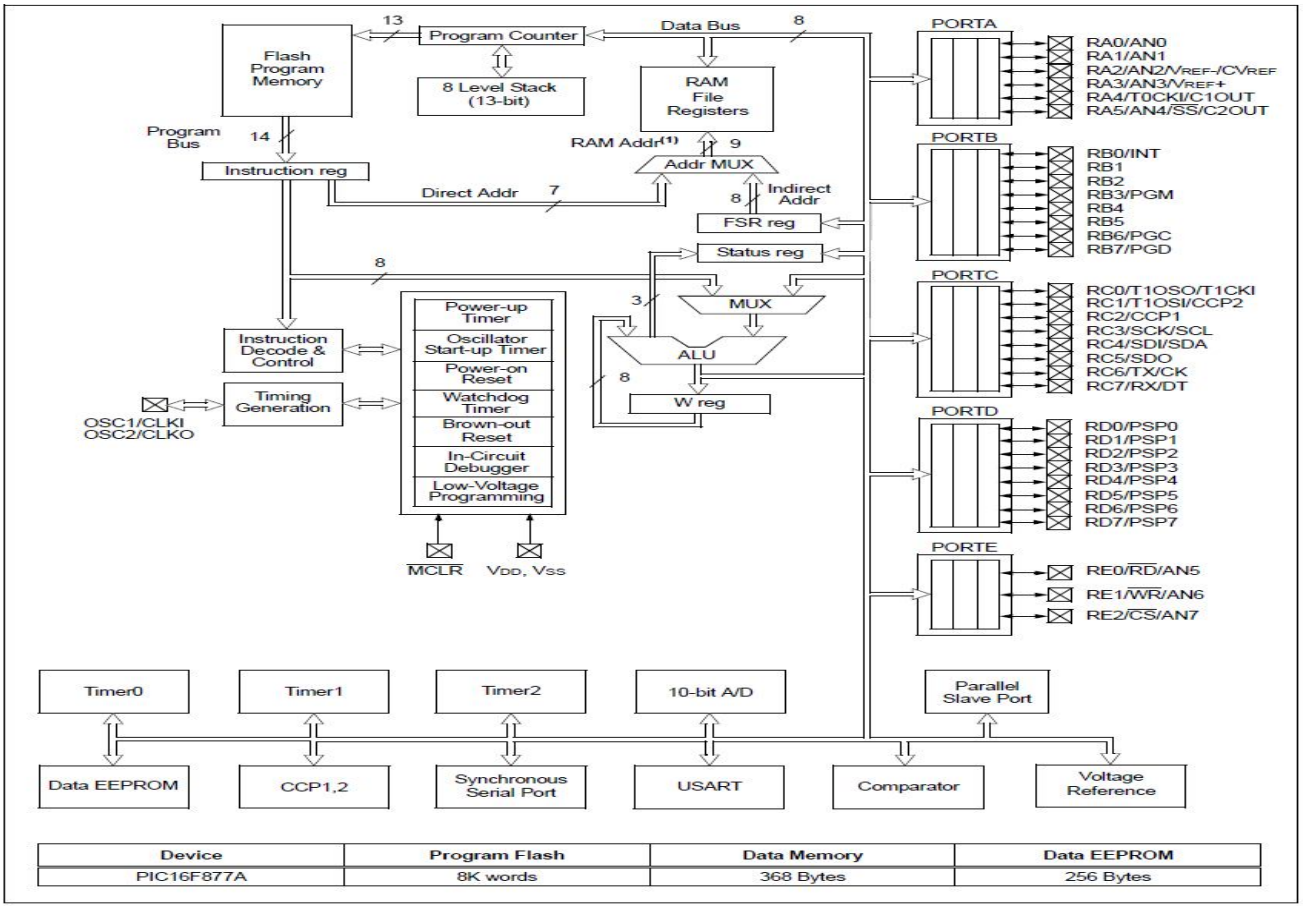


Fig.2 Pin Diagram for Pic 16F877

B. PIC Block Diagram



Device	Program Flash	Data Memory	Data EEPROM
PIC16F877A	8K words	368 Bytes	256 Bytes

Fig .3 Architectural Diagram Pic 16F877

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IV. INTEGRATED CIRCUIT RS232

The MAX232 is an integrated circuit first created in 1987 by Maxim Integrated Products that converts signals from a TIA-232(RS-232) serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals. The drivers provide TIA-232 voltage level outputs (approx. ± 7.5 volts) from a single five-volt supply via on-chip charge pumps and external capacitors. This makes it useful for implementing TIA-232 in devices that otherwise do not need any other voltages. The receivers reduce TIA-232 inputs, which may be as high as ± 25 volts, to standard five-volt TTL levels. These receivers have a typical threshold of 1.3 volts and a typical hysteresis of 0.5 volts. It is helpful to understand what occurs to the voltage levels. When a MAX232 IC receives a TTL level to convert, it changes a TTL logic 0 to between +3 and +15 V, and changes TTL logic 1 to between -3 to -15 V, and vice versa for converting from TIA-232 to TTL. This can be confusing when you realize that the TIA-232 data transmission voltages at a certain logic state are opposite from the TIA-232 control line voltages at the same logic state. To clarify the matter, see the RS232 voltage levels in table 1. For more information,

A. RS232 Voltage levels

TIA- 232line type and logic level	TIA-232 voltage	TTL voltage to/from MAX232
Data transmission (Rx/Tx) logic 0	+3 V to +15 V	0 V
Data transmission (Rx/Tx) logic 1	-3 V to -15 V	5 V
Control signals (RTS/CTS/DTR/DSR) logic 0	-3 V to -15 V	5 V
Control signals (RTS/CTS/DTR/DSR) logic 1	+3 V to +15 V	0 V

Table 1: RS232 Voltage levels

B. Applications

The MAX232 (A) has two receivers that convert from RS-232 to TTL voltage levels, and two drivers that convert from TTL logic to RS-232 voltage levels. As a result, only two out of all RS-232 signals can be converted in each direction. Typically, the first driver/receiver pair of the MAX232 is used for TX and RX signals, and the second one for CTS and RTS signals. There are not enough drivers/receivers in the MAX232 to also connect the DTR, DSR, and DCD signals. Usually, these signals can be omitted when, for example, communicating with a PC's serial interface.

If the DTE really requires these signals, either a second MAX232 is needed, or some other IC from the MAX232 family can be used. Also, it is possible to connect DTR (DE-9 pin #4) directly to DSR (DE-9 pin #6) without going through any circuitry, which provides an automatic (brain-dead) DSR acknowledgment of the incoming DTR signal.

V. BARCODE TAG

In this paper proposed a barcode is an optical machine-readable representation of data relating to the object to which it is attached. Originally, barcodes systematically represented data by varying the widths and spacings of parallel lines, and may be referred to as linear or one-dimensional (1D).

Later they evolved into rectangles, dots, hexagons and other geometric patterns in two dimensions (2D). Although 2D systems use a variety of symbols, they are generally referred to as barcodes as well. Special optical scanners called barcode readers originally scanned Barcodes. Later, scanners and interpretive software became available on devices including desktop printers and smartphones.

The Association of American Railroads sponsored an early use of one type of barcode in an industrial context in the late 1960s. Developed by General Telephone and Electronics (GTE) and called KarTrak ACI (Automatic Car Identification), this scheme involved placing colored stripes in various combinations on steel plates, which were affixed to the sides of railroad rolling stock. Two plates were used per car, one on each side, with the arrangement of the colored stripes representing things such as ownership, type of equipment, and identification number.

A. The plates were "read" by a trackside scanner located, for instance, at the entrance to a classification yard while the car was moving past.

B. The project was abandoned after about ten years because the system proved unreliable after long- term use in the field.

Barcodes became commercially successful when they were used to automate supermarket checkout systems, a task for which they have become almost universal. Their use has spread too many other tasks that are generically referred to as automatic identification and data capture (AIDC). The very first scanning of the now ubiquitous Universal Product Code (UPC) barcode was on a pack of Wrigley Company chewing gum in June 1974.Other systems have made inroads in the AIDC market, but the simplicity, universality and low cost of barcodes has limited the role of these other systems until the 2000s (decade), over 40 years after the introduction of the commercial barcode, with the introduction of technologies such as radio frequency identification, or RFID. Barcodes are applied to products as a means of quick identification. They are used in retail stores as part of the purchase process, in warehouses to track inventory, and on invoices to assist in accounting, among many other uses. Barcodes make doing business much more efficient for companies.

VI. RESULT AND DISCUSSION

A barcode to eliminate the possibility of manmade fault. The occurrence of errors for manually entered data is significantly higher than that of barcodes. Barcode scan is fast and reliable, and take infinitely less time than entering data by hand. Using barcode system reduces employee training time. Barcodes provide a method to track and store information about goods, from individual items to large stocks of thousands or even millions of items. They serve an important role and provide advantages compared with manually entering information.

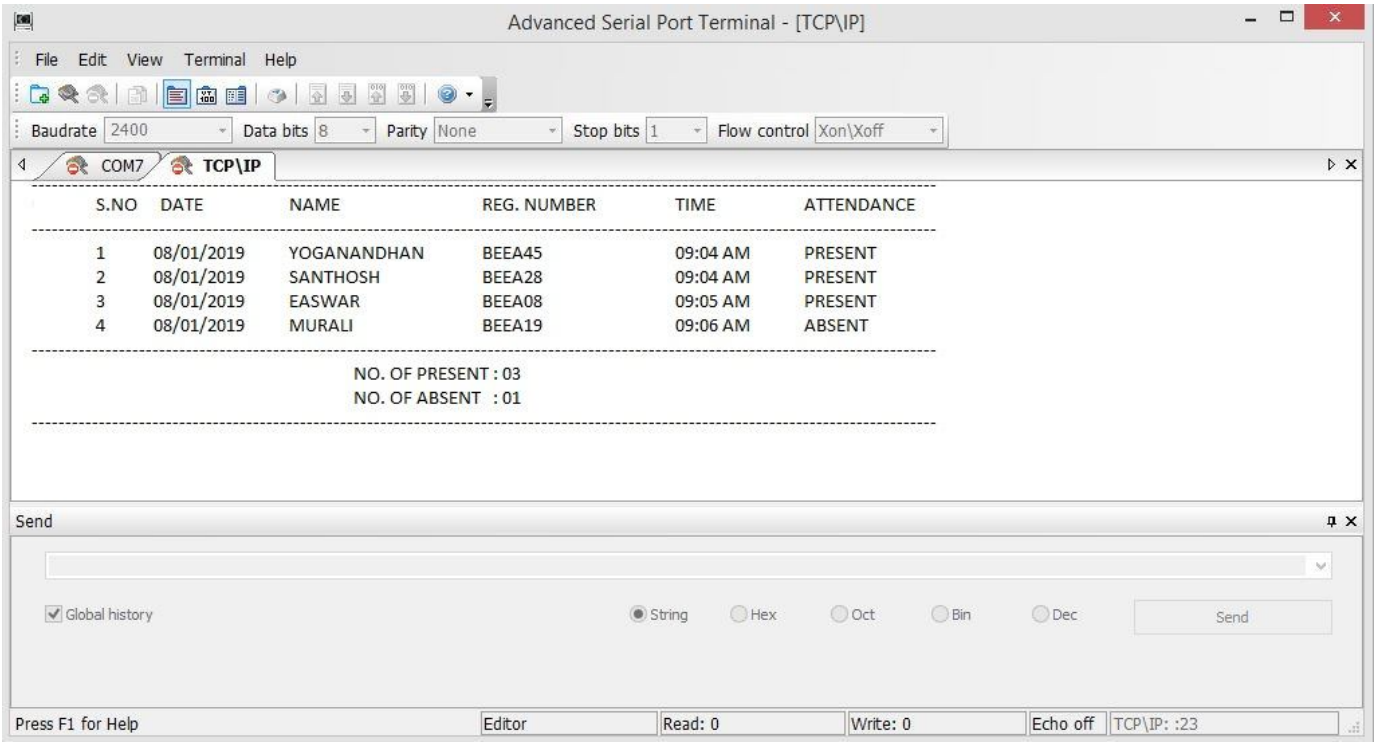

Fig 4. Result of barcode based attendance systems

The performance of barcode to be printed on the ID card. The major advantage of this work to reduce the man made errors while taking attendance. For e.g. Time delay, date name, etc. Pre-set time is included in additional to this work. Once the Pre-set time is elapsed then the attendance will be marked “ABSENT” and the main problems are minimized. The output is taken from the computer and it shows date, name of the student/employee, register number, time, and attendance, which was shown in a fig.4. Moreover, the data will be saved for future purpose.

VII. CONCLUSION

The main objective of this paper was to develop Barcode Based Attendance Systems based on certain specifications. This was successfully implemented. We consider this paper as journey where we acquired knowledge and also gained some insights into the subject, which we have shared in this report. Many additional features like user defined volume specification etc. were added in the different stages in our work and the desired results were obtained.

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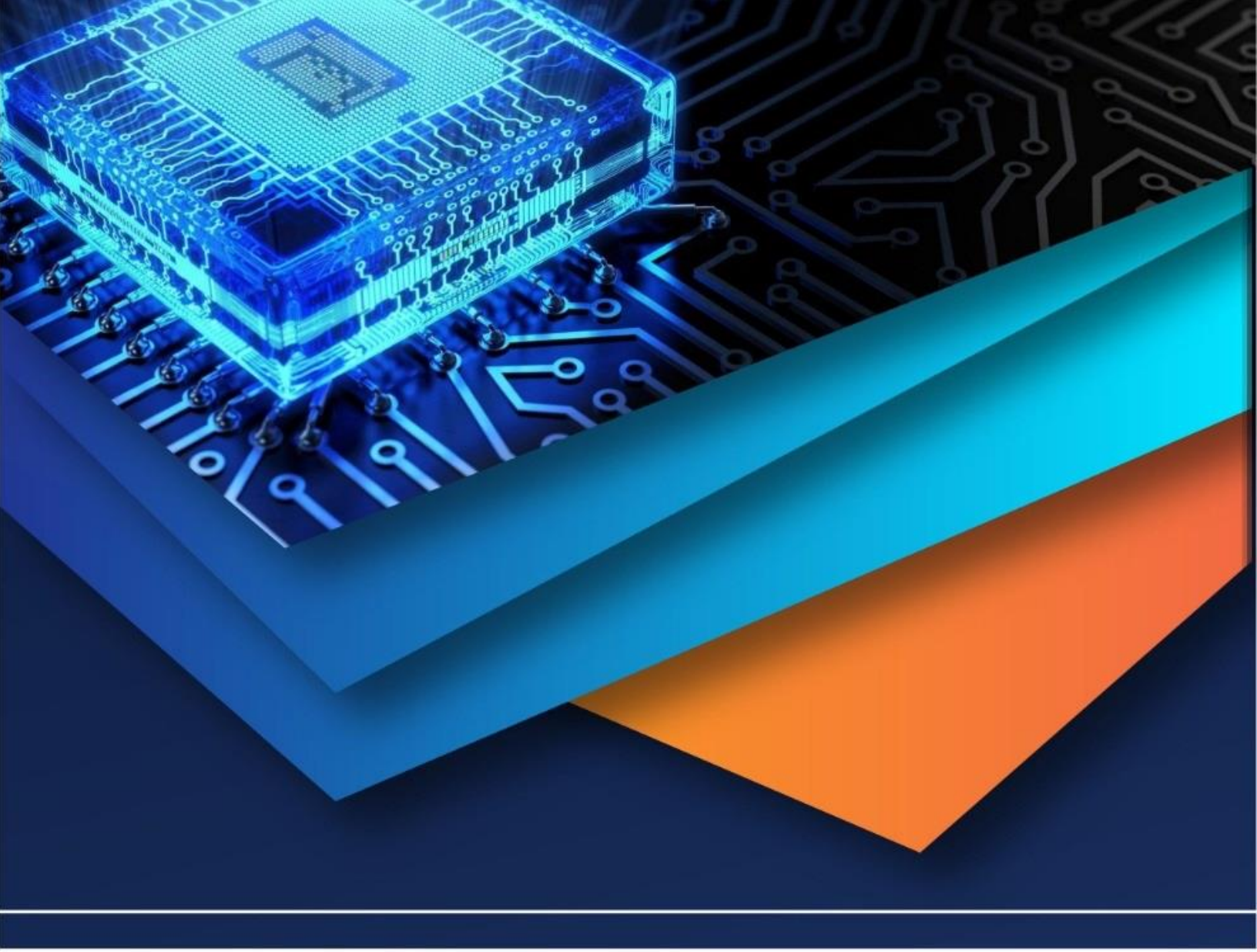

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