iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 6 **Issue:** I **Month of publication:** January 2018

DOI: http://doi.org/10.22214/ijraset.2018.1268

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor:6.887
Volume 6 Issue I, January 2018- Available at www.ijraset.com

Infrared Based Home Appliance Remote Control

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Abstract: In this paper, we are discussinga kind of embedded system. TheAT89s52 micro-controller is used in this system. The logic behind this project is to interface the IR receiver with the controller. The control codes are sent in serial format modulated to that 36 KHz, carrier frequency (usually by turning the carrier on and off)."IR" stands for infrared. Infrared light is invisible since its frequency is below that of visible range. Otherwise, it is like any other light source, operating under the same laws of physics.
Keywords: Infrared, LED, Frequency, Transceiver, Remote, Sensor, Radio.

I. OVERVIEW

It is an embedded controller circuit to switch on or off electrical appliances as required. This system will use normal TV remote control to send the control signal. The TV remote control sends different control signals as per the key pressed. This control can be used for decoding and select some of the out pin of the micro controller.
The TV remote control sends control signals in the form of IR rays to the receiving unit. The receiving unit receives the IR signals. The IR signal will be converted into digital signal with the help of an IR receiver. The received signals are decoded by the micro controller and changes its output with respect to the code received. The remote transmitter used in this project is a TV remote control used for Phillips TVs. It sends the control signals, which are in RC5 protocol modulated on a 40 kHz carrier signal.
In this device we also control the high temperature by the use of humidity sensor. When the temperature increase then it control the temperature of the room and fan speed is automatic slow and fast when temperature vary in the room.
The controller 8051 are attached with Surface Mounted Devices on which they work.

II. MICROCONTROLLER

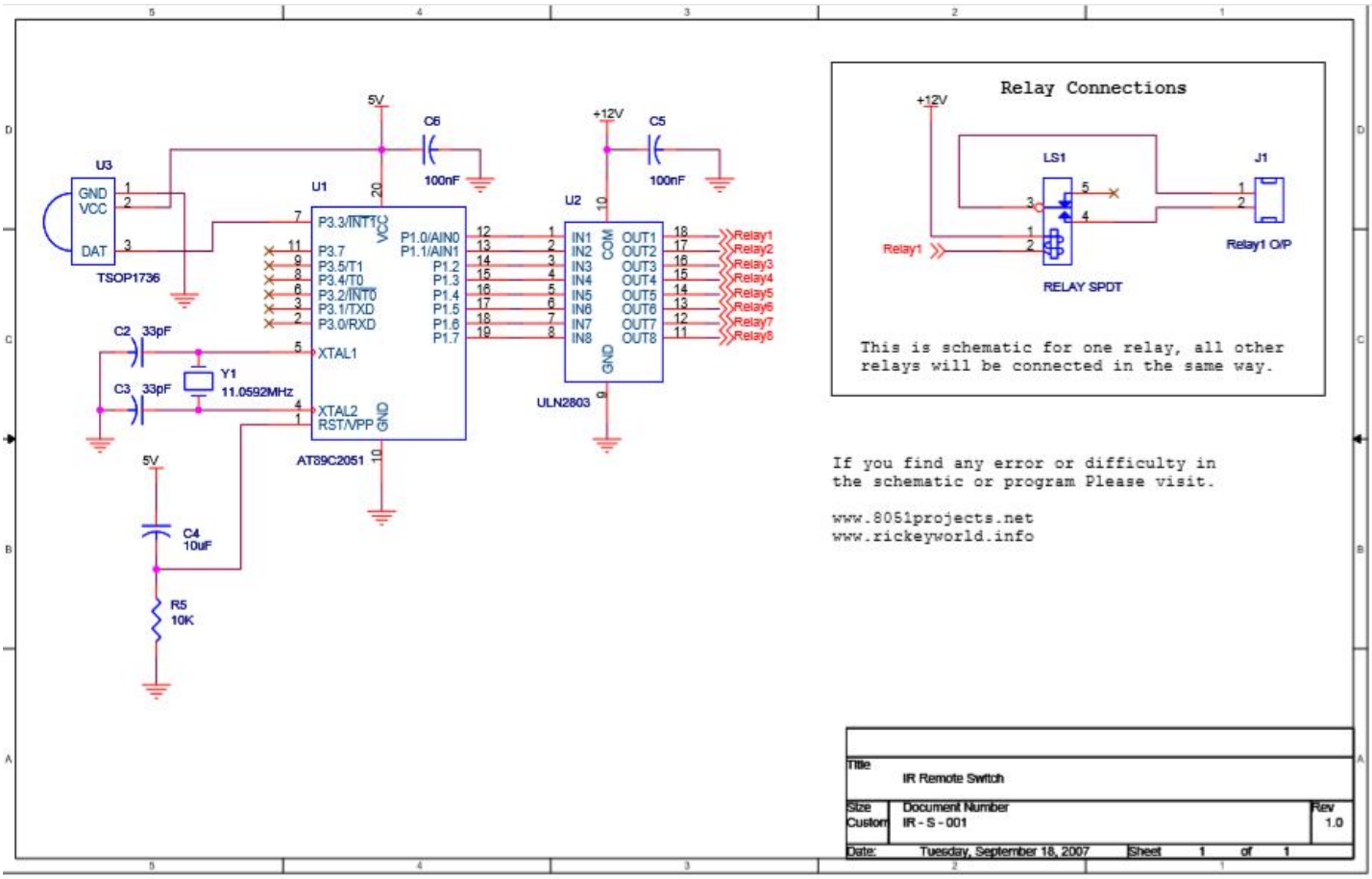
The 89C2051 micro controller is used in this project. It is in the family of Intel 8051. It is a CISC type processor and having 256 instructions. It has a 16-bit timer and UART. The controller receives the signals, which are in RC5 protocol. It decodes the control signals and changes the port status.

A. Why 89C2051?

Microcontrollers these days are silent workers in many apparatus, ranging from the washing machine to the video recorder. Nearly all of these controllers are mask programmed and therefore are of very little use for applications that require the programs to be changed during the course of execution.
The 89C2051, an 8 bit single chip microcontroller, 64K program memory address space, 64K data memory address space, 128 bytes of on chip RAM ,2K Bytes of Reprogrammable Flash Memory, two 16 bit timers/counters and an extensive interrupt structure.

B. Connection With Microcontroller 89c2051

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C. MICRO CONTROLLER Programming for Remote Control Home Appliances

Coding….

```
VAR1   equ r7            ;Temporary Variable
TEMP   equ 10H           ;Temp variable
COUNT  equ 11H           ;Count
ADDR   equ 12H           ;Device address
CMD    equ 13H                 ;Command
FLIP   bit 00H           ;Flip bit
TOG    bit 01H  ;Temp bit for flip
IR     equ P3.3;IR Receiver connected to this pin
SW1    equ P1.0;Switch 1 connected here
SW2    equ P1.1;Switch 2 connected here
SW3    equ P1.2;Switch 3 connected here
SW4    equ P1.3;Switch 4 connected here
SW5    equ P1.4;Switch 5 connected here
SW6    equ P1.5;Switch 6 connected here
SW7    equ P1.6;Switch 7 connected here
SW8    equ P1.7;Switch 8 connected here
SWport equ P1            ;Port at which switches are connected
       org 00H                 ;Start of prog
       mov SWport,#00H ;switch all relays off!
       mov sp,#50H             ;Stack pointer initialization
       clr TOG                 ;Clear temp bit
```

```
main:
        jnb IR,$                ;Wait for first bit
        mov VAR1,#255       ;3.024mS delay
        djnz VAR1,$
        mov VAR1,#25
        djnz VAR1,$
        mov VAR1,#25
        djnz VAR1,$
        mov VAR1,#25
        djnz VAR1,$
        mov VAR1,#255
        djnz VAR1,$
        mov VAR1,#100
        djnz VAR1,$
        movc,IR             ;Read Flip bit
        movFLIP,c
        clr A
        ;Count for address
fadd:
        mov VAR1,#255       ;1.728mS delay for each bit
        djnz VAR1,$
        mov VAR1,#255
        djnz VAR1,$
        mov VAR1,#255
        djnz VAR1,$
        mov VAR1,#4
        djnz VAR1,$
        movc,IR
        rlc a
        djnzCOUNT,fadd
        mov ADDR,A              ;Save the address
        clr a
Count for Command
fcmd:
        mov VAR1,#255       ;1.728mS Delay for each bit
        djnz VAR1,$
        mov VAR1,#255
        djnz VAR1,$
        mov VAR1,#255
        djnz VAR1,$
        mov VAR1,#4
        djnz VAR1,$
        movc,IR
        rlc a
        djnzCOUNT,fcmd
        mov TEMP,CMD            ;Save the old command
        movCMD,a                ;Save the new command
        mova,ADDR               ;Cheack for valid address

        cjne a,#00,nvalid
```

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```
        mova,TEMP
        cjnea,CMD,valid ;Check for valid command
nvalid
ljmp main
valid                           ;Key press check
clr a
        movc,FLIP
        rlc a
        movTEMP,a
        clr a
        movc,TOG
        cjne a,TEMP,valid1
        sjmpnvalid
valid1
movc,FLIP
        movTOG,c
        mova,CMD
        clr c
        cjne a,#1,skip1         ;Check for SW1
        jb SW1,isset1
        setb SW1
        ljmp main
isset1
        clr SW1
        ljmp main
skip1
        cjne a,#2,skip2         ;Check for SW2
        jb SW2,isset2
        setb SW2
        ljmp main
isset2
        clr SW2
        ljmp main
skip2
        cjne a,#3,skip3         ;Check for SW3
        jb SW3,isset3
        setb SW3
        ljmp main
isset3
        clr SW3
        ljmp main
skip3
cjne a,#4,skip4         ;Check for SW4
        jb SW4,isset4
        setb SW4
        ljmp main

isset4
        clr SW4
        ljmp main
```

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```
,skip5          ;Check for SW5
        jb SW5,isset5
        setb SW5
        ljmp main
isset5
        clr SW5
        ljmp main
skip5
        cjne a,#6,skip6         ;Check for SW6
        jb SW6,isset6
        setb SW6
        ljmp main
isset6:
        clr SW6
        ljmp main
skip6:
        cjne a,#7,skip7         ;Check for SW7
        jb SW7,isset7
        setb SW7
        ljmp main
isset7
        clr SW7
        ljmp main
skip7
        cjne a,#8,skip8         ;Check for SW8
        jb SW8,isset8
        setb SW8
        ljmp main
isset8
        clr SW8
        ljmp main
skip8:
        cjne a,#0CH,exit  ;Check for all switches
        mov SWport,#00H
        ljmp main
exit:
        ljmp main
        END                     ;End of program
```

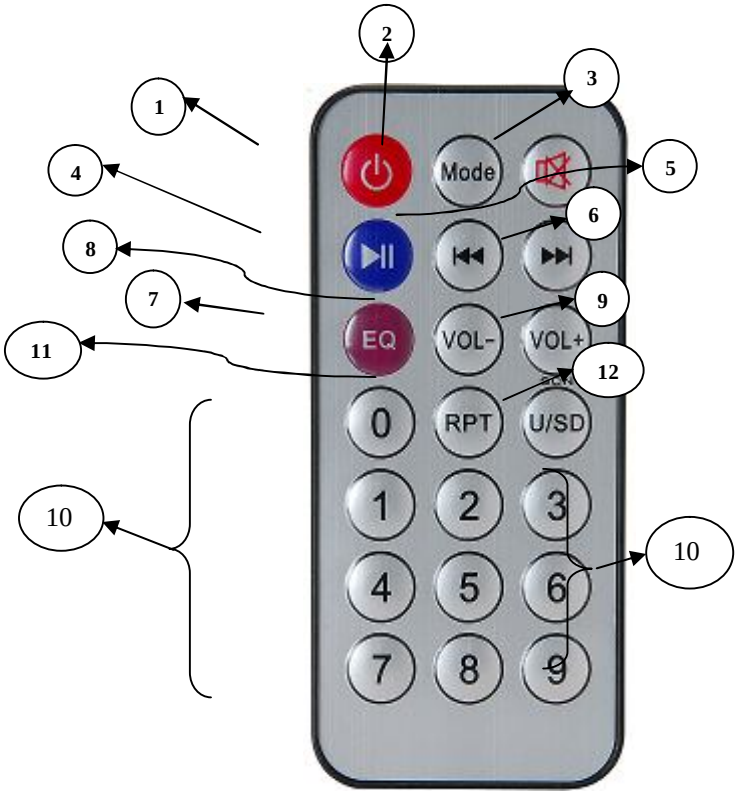
D. Remote Configuration

III. IR BASED HOME AUTOMATION

A. IR Remote Layout

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B. Remote Key Explanation

1) Key 1 (Power On/Off):N/A
2) Key 3 (Mute):N/A
3) Key 4 (Play/Pause):N/A
4) Key 5 (REW):To Decrease the speed of FAN_1.
5) Key 6 (FWD)To Increase the speed of FAN_1.
6) Key 8 (VOL+):To Increase the speed of FAN_2.
7) Key 9 (VOL-):To Decrease the speed of FAN_2.
8) Key 7 (EQ): NA
9) Key 11 (RPT): NA.
10) Key 12 (U/SD): NA.
11) Key 2 MODE: NA.
12) Key 10 (0-9 Key):
13) Numeric Key 1: To ON/OFF Relay1.
a) Numeric Key 2: To ON/OFF Relay 2.
b) Numeric Key 3: To ON/OFF Relay 3.
c) Numeric Key 4: To ON/OFF Relay 4.
d) Numeric Key 5-0 :N/A.

NOTE:Fan Speed up to 5 levels.

IV. REMOTE RECEIVING UNIT

The remote receiving unit receives the IR signals coming from the TV remote control unit. These signals are converted into electrical signals by the help of IR receiver. The TV remote control sends the control signals with RC5 protocol. The micro controller receives the signals and it decodes the control signals.

As per the control signals it changes the states of its port

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A. Introduction

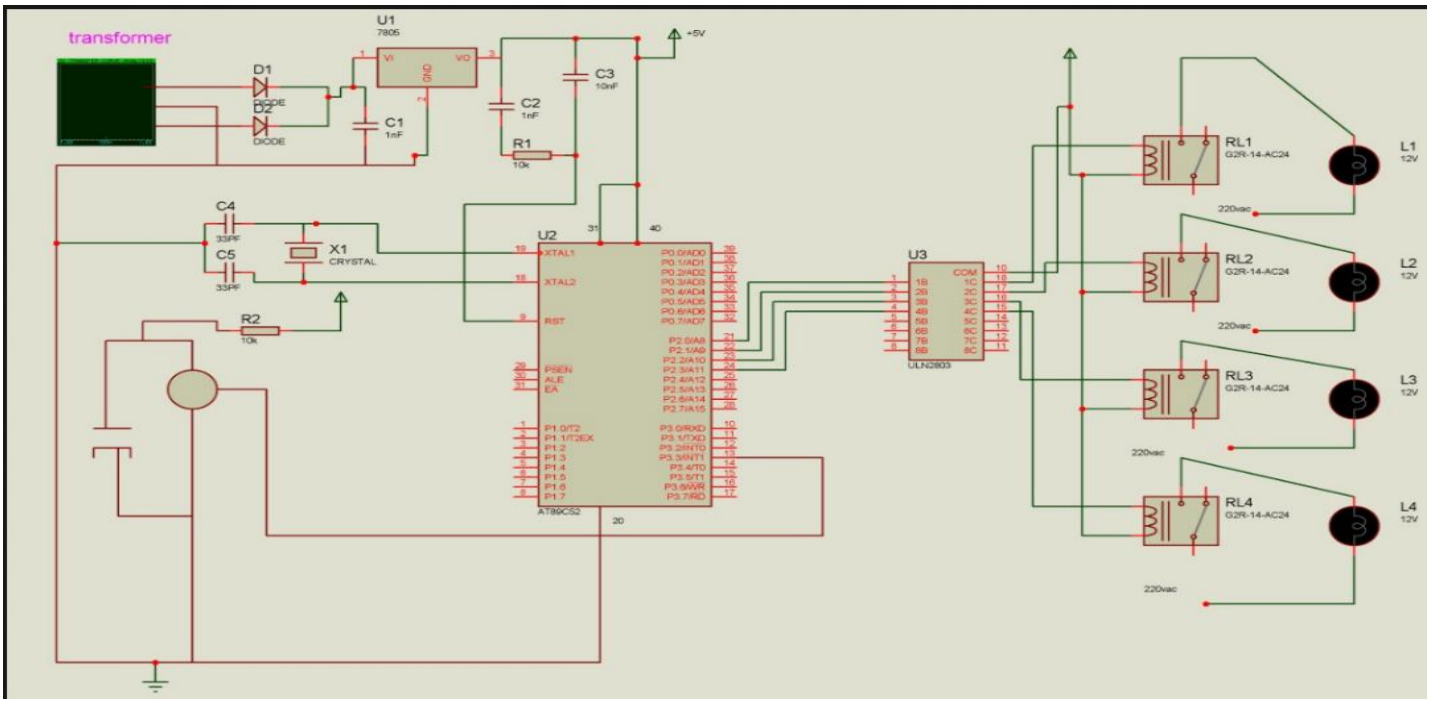
Infrared is actually a normal light with a particular colour. We can't see this color because its wavelength of 950nm is below from the visible spectrum. There are some IR system which uses other frequencies and other modulation. The cheapest way to remotely control a device within a visible range is via infrared light. Almost all audio and video equipment can be controlled by this way now-a-days. The IR remote is generally used in home theatres and is based on the principle of using infrared light as the medium of communication. Our infrared based home appliance remote control basically consists of a set of buttons and a circuit board. We perform a specific task by a specific buttons. Although we humans can't see the Infra-Red light emitted from a remote control doesn't mean we can't make it visible.

A video camera or digital photo camera can "see" the Infra-Red light as you can see in this picture. If you own a web cam you're in luck, point your remote to it, press any button and you'll see the Liquid Flow Through flicker. Unfortunately for us there are many more sources of Infra-Red light. The sun is the brightest source of all but there are many others, like: light bulbs, candles, central heating system, and even our body radiate infrared light.

B. Development

As we know that the first remote controllers were developed in the early 1990s.And in the starting remote were connected with wires to devices. But we can see that today remotes used infrared control and thus we are capable of controlling many task at a time as the working abilities of these remotes. In the starting only remote controllers were developed but after this infrared controls were developed in the 1970s.The 1970s remote use IR light and different light frequencies for different task but a now- a-days remote can control several appliances , equipment's AC ,TVs, Radios, video games etc.

C. Block Diagram of Project



D. Center Tapped Step Down Transformer

The center-tapped step-down transformer is used to step down the supply voltage of 230v ac from mains to lowervalues, as the various ICâ„¢s used in this project require reduced voltages.

The outputs from the secondary coil which is center tapped are the ac values of 0v, 15v and-15v.The conversion of these ac values to dc values is done using the full wave rectifier unit.

E. Rectifier Unit

The rectifier circuit is used to convert the ac voltage into its corresponding dc voltage.

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The most important and simple device used in rectifier circuit is the diode.
The simple function of the diode is to conduct when forward biased and not to conduct in reverse bias.

V. CONCLUSION & RESULT

This Project entitled "INFRARED REMOTE SWITCH USING MICROCONTROLLER" is used to switch on/off the Home Appliances by using a standard Remote control. The system is used to switch on/off up to six electrical devices simultaneously. All the above processes are controlled by the 8 bit Microcontroller AT89C2051. The Microcontroller receives the Infrared Signal from the receiver and it decodes and switch on/off the appropriate Device. The Range of the system is upto 10 meters. The system works on Phillips RC5 format. The device can switch on/off electrical devices of maximum load current of 5Amperes. High power loads can also be connected by changing the Relay. The Microcontroller is used to receive the Infrared signal from the Transmitter, the received signal is processed by the Microcontroller and according to the signal the corresponding device is switched ON/OFF.

VI. ACKNOWLEDGEMENT

We take this opportunity to express our deep sense of gratitude & whole hearted thanks to our Institution "Technovision, Lucknow, Uttar Pradesh" for inspiring and encouraging us to explore ourselves. The Institute is a beehive of intellectual and innovative activities. Under the effective guidance of our Director Sir, we have completed the final draft INFRARED BASED HOMEAPPLIENCE REMOTE CONTROL Our Institute has always focused on providing us a framework for better future for mankind. Also in shaping us to become effective, skilled professionals in coming future. We are very thankful to the Institute's Management & our Director Sir for his kindness, constant encouragement, and influential leadership & for the valuable time which he devoted to us. Also, thanks to our family & friends who directly & indirectly helped, supported & motivated us along the due course of completion of this review paper.

REFERENCES

[1] Celadon Remote Control Systems Profile Page"
[2] Lightoller, Charles Herbert (1935). Titanic and Other Ships. I. Nicholson and Watsons.
[3] Freeman, Williams; Weissman, Craig (1995). "Television control by hand gestures". Mitsubishi Electric Research Laboratories
[4] Derene, Glen (2007). "Wii 2.0: Loop remote works lets you click by gesture". Popular Mechanics. Retrieved November 11, 2011
[5] Kanellos, Michael (November 8, 2006). "Space-age remote control coming in 2007 in use". Cnet.co
[6] Wilson, Marks (June 15, 2009). "The Loop Controls Your TV Like the Wii for $100". Gizmodo
[7] Radio Aims At Remote Control". Popular Science. November 1930 are researched
[8] James Wray and Ulf Stabe (2011-12-05). "Microsoft brings TV voice control to Kinect". Thetechherald.com. Retrieved
[9] John Wharton: An Introduction to the Intel MCS-51 Single-Chip Microcomputer Family, Application Note AP-69, May 1980, Intel Corporation in India
[10] Han-Way Huang. "Embedded System Design with C8051". published. 238
[11] Mazidi; McKinlay; Mazidi (2012). The 8051 Microcontroller: A Systems Approach. 648 pp. ISBN 978-0-13-508044-3
[12] Calcutt; Cowan; Parchizadeh (2000). 8051 Microcontrollers: Hardware, Software and Applications. 329 pp. ISBN
[13] Microcontroller Handbook; Intel; 1984; publication number 210918-002
[14] 8051 Microcontroller Preliminary Architectural Specification and Functional Description; Intel; 44 pages; 19
[15] Payne, William (December 19, 1990) [1990]. Embedded Controller FORTH for the 8051 Family (hardcover). Boston: Academic Press. 528 pp. ISBN 978-0-12-547570-9.

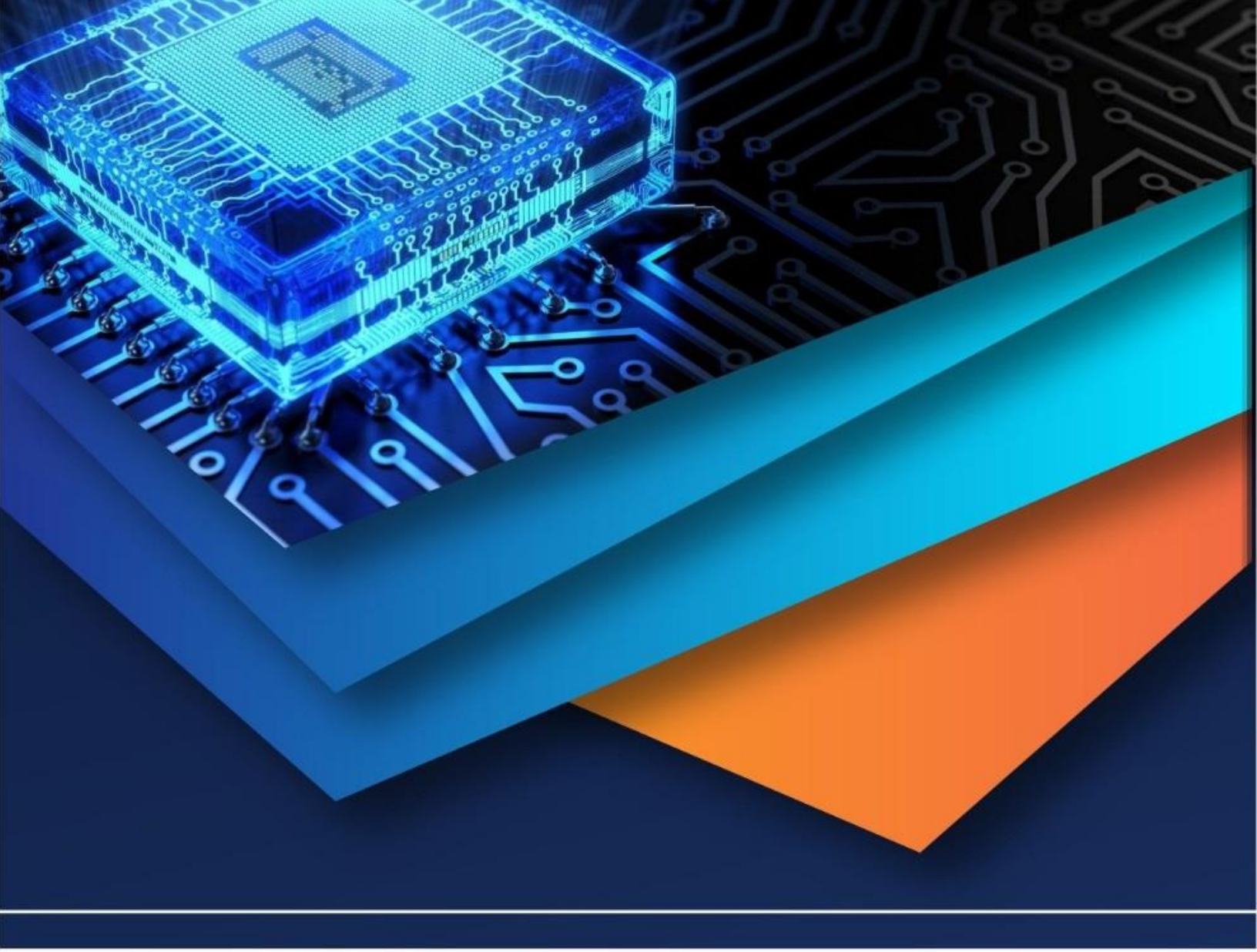
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