NEW HORIZON
COLLEGE OF ENGINEERING

AUTONOMOUS COLLEGE Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade

ELECTRONIC DICE

A MINI PROJECT

REPORT

Submitted by:

Md Sagar Khan (1NH18E727)

Mohammed Usman Khan (1NH18EE728)

Lokare Ashwini Balasaheb (1NH18EE725)

Kulshrestha Utkarsh Alok (1NH18EE724)

In partial fulfillment of the degree of

BACHELOR OF ENGINEERING

IN

ELECTRICAL AND ELECTRONICS ENGINEERING

NEW HORIZON
COLLEGE OF ENGINEERING
Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC
Accredited by NAAC with 'A' Grade, Accredited by NBA

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

BONAFIDE CERTIFICATE

Certified that the Mini Project work entitled **"Electronic Dice"** carried out by **Md Sagar Khan (1NH18EE727), Mohammed Usman Khan (1NH18EE728), Lokare Ashwini Balasaheb (1NH18EE725), Kulshrestha Utkarsh Alok (1NH18EE724)** are bonafide Students of New Horizon College of Engineering and have submitted the report in completion of project at Department of Electrical and Electronics Engineering, New Horizon College of Engineering during the Academic Year 2019-20.

It is certified that every correction/suggestion indicated for Internal Assessment have been incorporated in the report deposited within the departmental library. The project report has been approved because it satisfies the academic requirements in respect of Project work prescribed for aforementioned Degree.

Project Guide	**HoD-EEE**
Dr. B Guna Priya	**Dr. RamKumar S**

Abstract

This mini project includes a 555-Timer,IC 4017,IC 7511 based analoge & digital dice game using an electronic digital dice with the help of LEDs & 7 segment diplay. The game designed is simple electronic circuit with a push button that can be used like a normal dice in games. The dice works by switching Light Emitting Diodes (LEDs) on and off just like the pattern of dots found on a traditional dice & also the number is displayed in 7-segment display, which make this game both analoge & digital.

The main brain of this project is IC 4017 with the help of IC 555 toggles the LEDs at a decent speed. IC 4511 is used to display and provide the specific LED a Number. The main work is that when we press the switch, it starts series toggling and when we release the switch it stops at a random digit next to the sequence giving you a random number as that for dice.

ACKNOWLEDGEMENT

This is to acknowledge our gratitude towards our guide **Dr. B.Guna Priya,** Associate Professor Dept. of Electrical & Electronics Engineering for her guidance and suggestions in preparing this Mini-Project report. Her suggestion and way of summarizing the things made us to go for independent studying and trying our best to get the maximum in our topic this made our circle of knowledge very vast.We are highly thankful by getting guidance from you on this seminar.

We especially thanks to **Dr. RamKumar S,** HoD Electrical & Electronics Department for giving the idea of taking initiation on this project.We also place on record, our sense of gratitude to one and all who, directly or indirectly, have lent their helping hand in the Mini-Project report.

Date-04/11/2019

- ✓ Md. Sagar Khan
  1NH18EE727
- ✓ Mohammad Usman Khan
  1NH18EE728
- ✓ Kulshreshtha Utkarsh Alok
  1NH18EE724
- ✓ Lokare Ashwini Balasaheb
  1NH18EE725

[BE (EEE) _III SEM]

Table of Contents

List of Figures

Chapter 1

Introduction

A digital dice is an electronic dice, can generate any numbers from 1 to 6 using 7 segment displays.

The distinction between traditional dice and digital dice is that we are able to solely get dice vary from one to six in traditional dice.

Here we are showing a working circuit to design a digital dice game using an electronic digital dice with the help of a seven segment display controlled by 555-timer, IC 4017 and IC 4511.

The game designed is simple electronic circuit with a push button that can be used like a normal dice in games.

The dice works by switching Light Emitting Diodes (LEDs) on and off just like the pattern of dots found on a traditional dice & also the number is displayed in 7-segment display, which make this game both analogue and digital.

The dice becomes biased if the form isn't cut well. Also, the dice will become biased because of deformations.

If it's a wood die, it can deform due to dampness in the atmosphere or due to mechanical stress.

To solve of these issues that we have with a traditional dice, we have made a dice circuit which solves all the problems of a current traditional dice.

Electronic dice is nearly unbiased. Nobody can cheat as the circuit operates and pulsates at such a high speed that the circuit is almost imperceptible to the human eye.

Chapter 1

Introduction

There is additionally very little maintenance and there's hardly any impact on aging of the circuit.

The frequency may vary a bit with change in power supply voltage and varying the resistor, aging of the active and passive components but still the randomness will be preserved without any trouble.

The main unit of this project is IC 4017 with the help of IC 555 toggles the LEDs at a decent speed. IC 4511 is used to display and provide the 7-segment diplay a specific Number.

The main work is that when we press the switch, it starts series toggling and when we release the switch it stops at a random digit next to the sequence giving you a random number as that for dice (Detailed in Procedure).

Chapter 2

Literature Survey

[1] Jeena Joy proposed his paper that even certain aspects of the system can be modified as experience is gained with it. As the users play with the system, they develop variety of new ideas for the development of the project.

Number of players may be redoubled by creating little changes within the programmingand incorporating few further hardware units.

[2] Disha Kapoor did other study that examined seven segment displays in depth, and provided a number of recommendations, numbered for easy reference.

Aim of the Project

The aim of this mini project is to study the working of IC 4017 (a decade counter), IC 4511 (BCD to 7-segment display code converter) and to implement the same for making an **'Analogue & Digital Electronic Dice'**.

Chapter 3

System Description

3.1 IC 4017–CMOS Counter

IC 4017 is a 5-stage Johnson Counter having 10 decoded outputs. It is used to build all kinds of the timer, LED sequencers and controllers circuits.

Pin sixteen is positive power provides and pin eight could be a ground. The power provides varry of three volts to sixteen volt.

Most of the power provides voltage at pin one should not be greater than eighteen volts. Pin thirteen has Clock enabled pins to controls the clock.

When it's “0” logic, the clock is enabled and the counter advances one count for each clock pulse.

When “1” logic, the clock input is stopped, and the 4017 counter does nothing even when a clock pulse is reached.

Pin 14 is the clock triggers one count. Pin 15 is the reset pin.

Normally, it is “0”. When created high, the counter is reset to low. Pins 1-7 and 9-11 are the output pins.

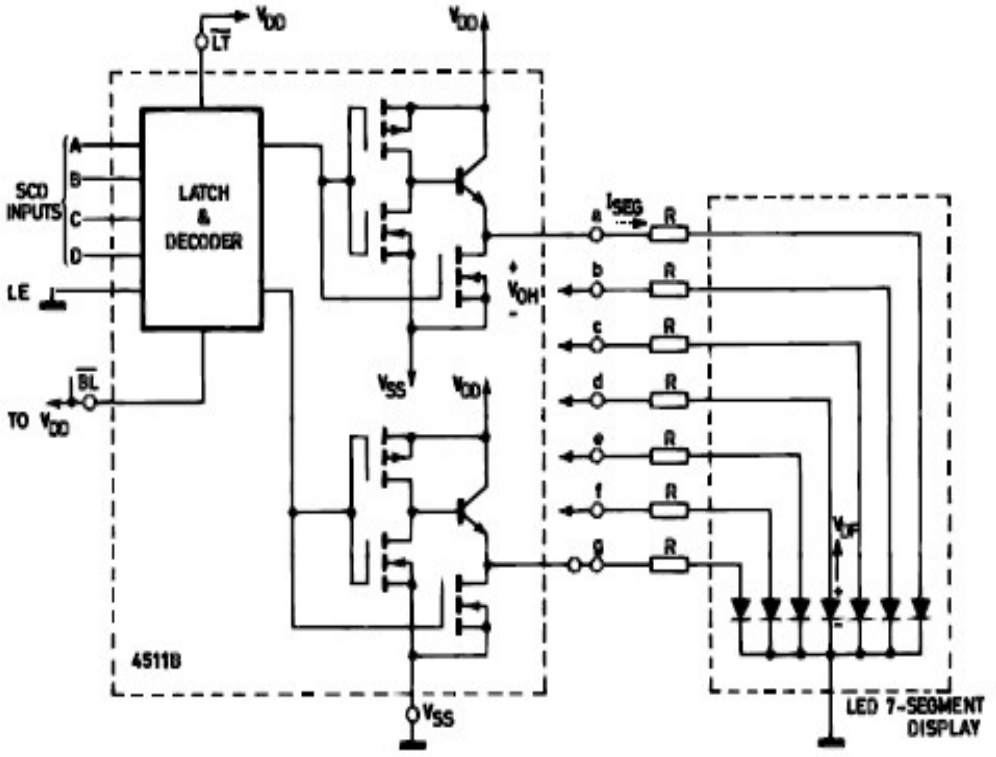
Chapter 3

System Description

3.1 IC 4017–CMOS Counter

The active count pin goes high and all others remain low. Pin 12 is Carry output, for the clock input of a further counter or associate degree external circuit that the count is complete.

The 14th PIN of IC 4017 is the input by which clock pulses are given to the IC 4017 to give the output as count sequence. This PIN is connected with switch S2 followed by IC 555 Timer.



Chapter 3

System Description

3.1 IC 4017–CMOS Counter

The 16th PIN of IC 4017 is directly connected to the supply. The 13th and 8th PIN of IC 4017 are shorted together and directly connected to the ground. 15th and 5th PINs are shorted together.

The PIN 1 , 2 , 3 , 4 , 7 and 10 PINs are used as output PINs for IC 4017. The 6th , 9th , 10th , 11th and 12th are kept free (disconnected).

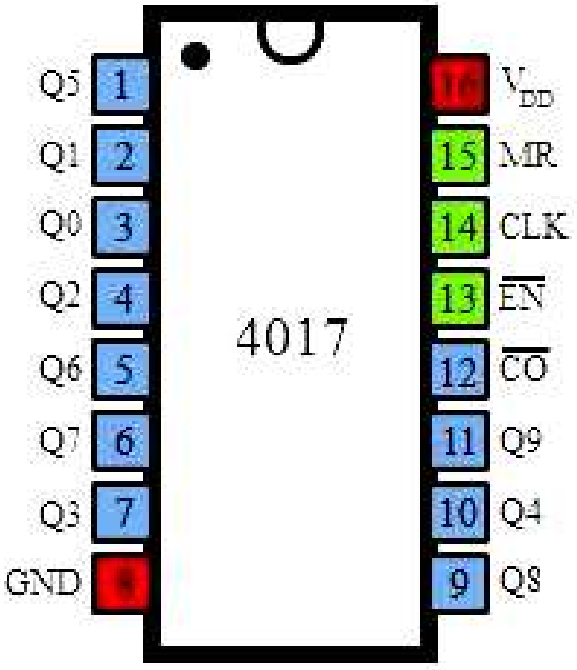


Fig 1: IC 4017_Decade Counter

Chapter 3

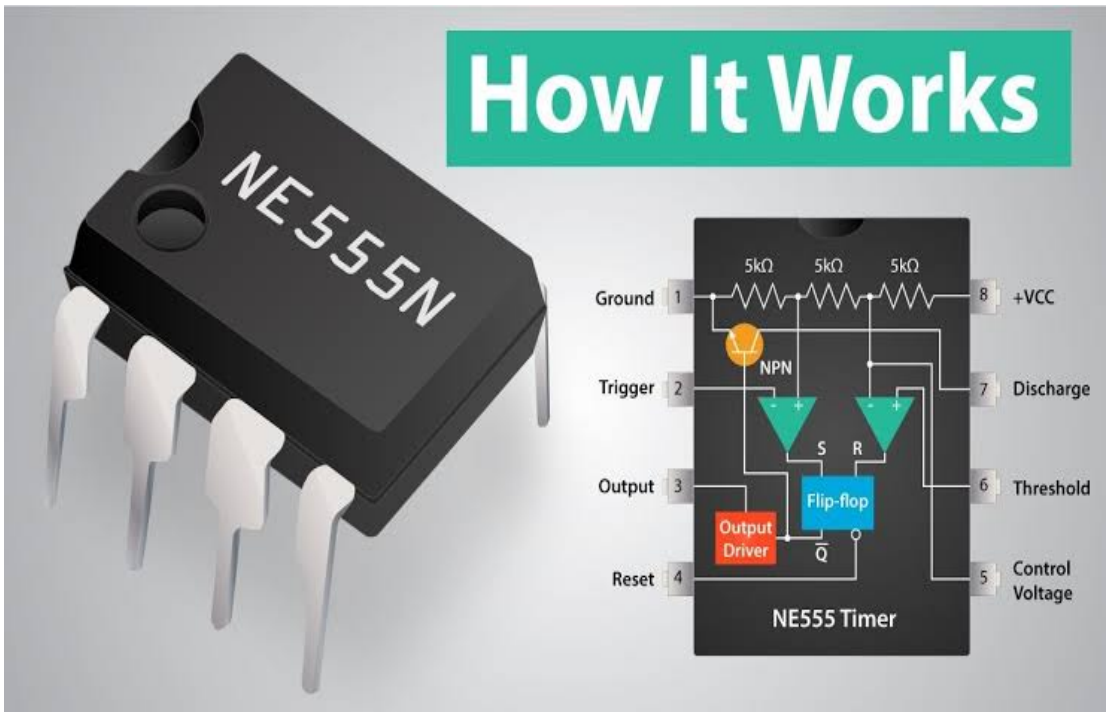
System Description

3.2 IC 555–Timer

The 555 timer datasheet specifies that 555 IC could be an extremely stable device for generating correct time delays. Additional terminals area unit provided for triggering or resetting if it is required.

In the time delay mode of operation, the time is exactly controlled by one external electrical device and capacitance.

For astable operation as associate degree generator, the free running frequency and duty cycle area unit accurately controlled with two external resistors and one capacitor.



Chapter 3

System Description

3.2 IC 555–Timer

The 4th and 8th PIN of the IC 555 Timer are directly connected with positive of the DC supply followed by the switch S1.

The 1st PIN of the IC 555 Timer is connected to the ground.The 6th and 2nd PIN of IC 555 Timer are shorted.

Two 10K resistors and one 0.1 uf capacitor are used to get the time interval of 0.02 seconds by IC 555 Timer.

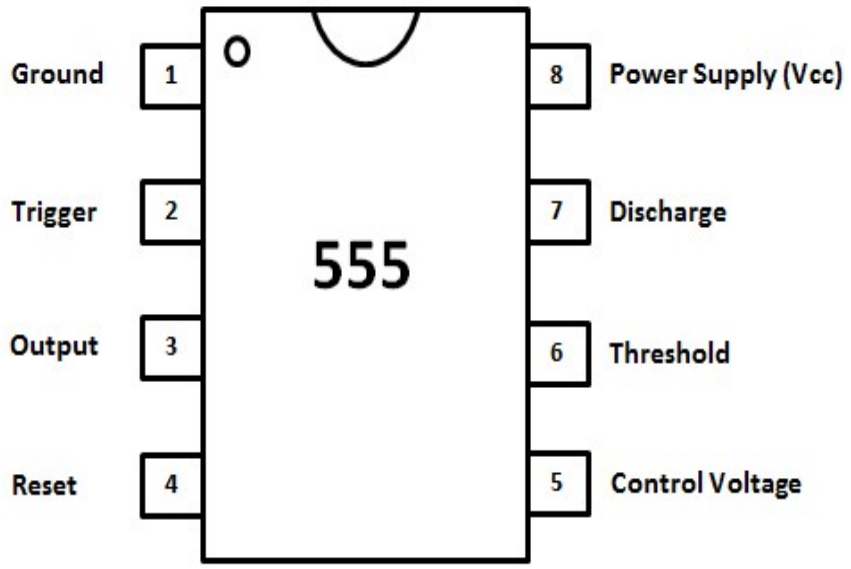


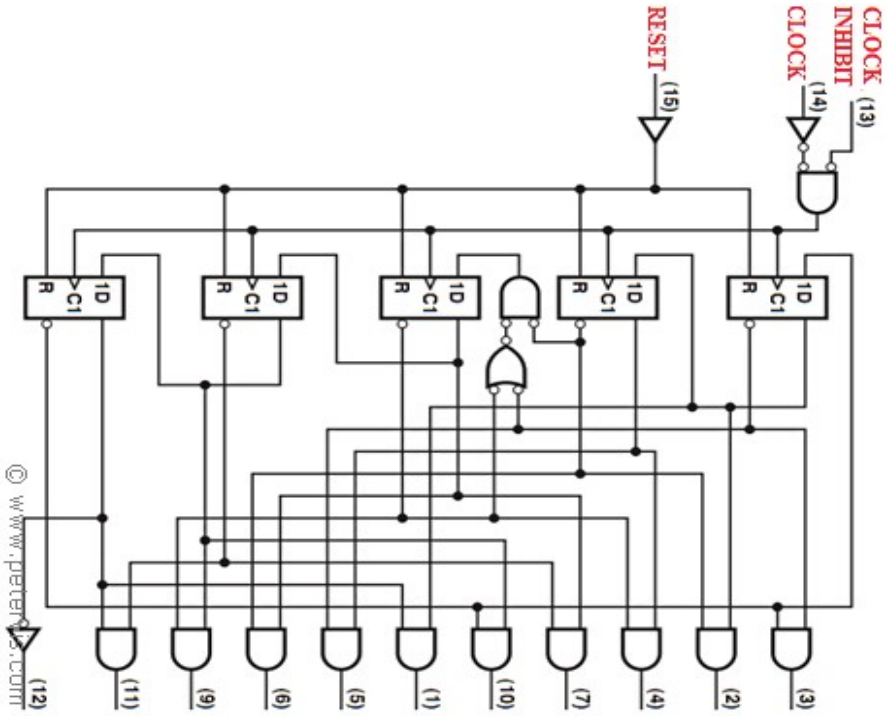
Fig 2: IC 555_Timer

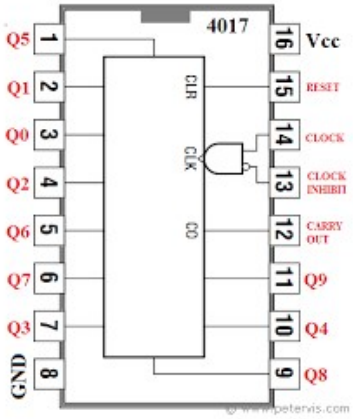
Chapter 3

System Description

3.3 IC 4511 –CMOS BCD to 7 Segment Latch Decoder Driver

The 4511 IC is a BCD to 7-Segment latch/decoder/driver with four address inputs (DA to DD), a LOW latch alter input (EL), a LOW ripple blanking input (BI), a LOW lamp check input (LT), and 7 active HIGH NPN bipolar semiconductor phase outputs.





Chapter 3

System Description

3.3 IC 4511 –CMOS BCD to 7 Segment Latch Decoder Driver

The 7th PIN of IC 4511 is connected with diodes D1, D2, D3 followed by 4th , 10th and 3rd PINs of IC 4017 respectively with the help of jumper wires (male to male wires).

The 1st PIN of IC 4511 is connected with the diodes D4, D5, D8 followed by 2nd , 4th and 1st PIN of IC 4017 respectively with the help of jumper wires (male to male wires).

The 2nd PIN of IC 4511 is connected with the diodes D6, D7, D9 followed by 7th , 10th and 1st PIN of IC 4017 respectively with the help of jumper wires (male to male wires).

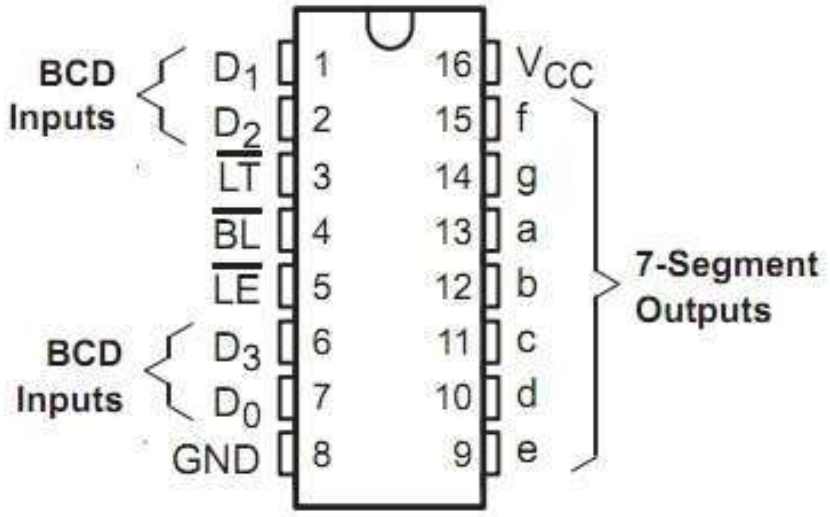


Fig 3: IC 4511 –CMOS BCD to 7 Segment Latch Decoder

Chapter 3

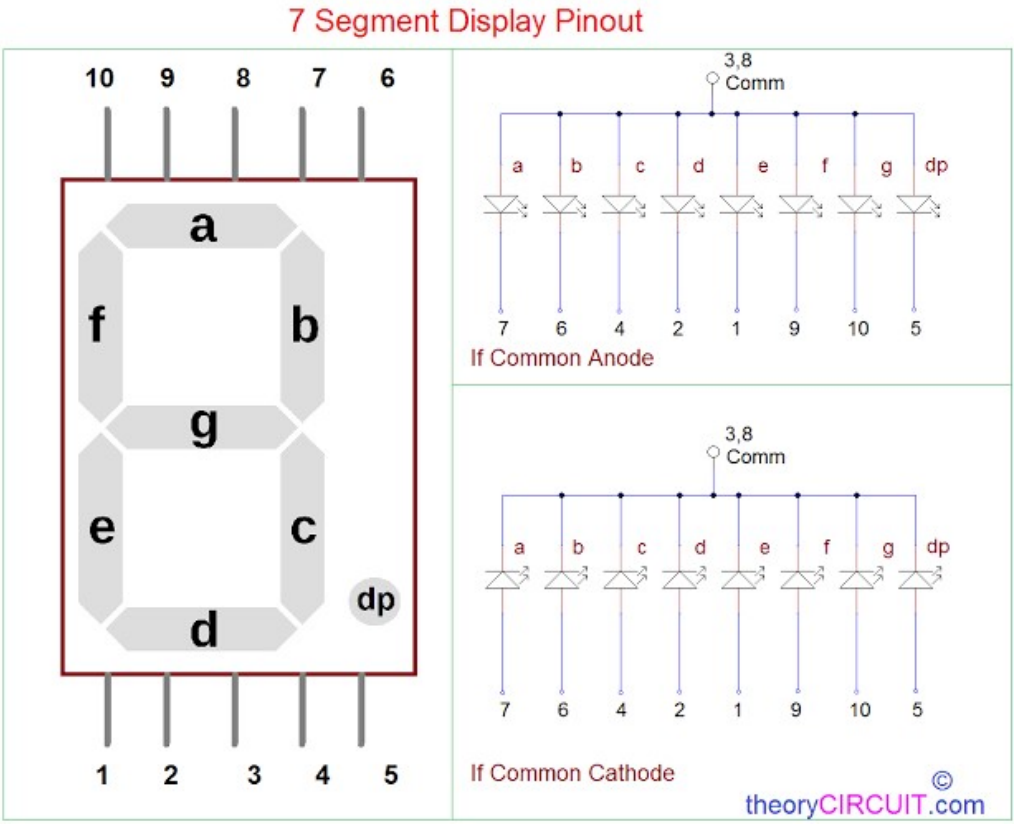
System Description

3.4 7-Segment Display

A seven-segment show (SSD) is widely used as electronic display device for displaying decimal numbers from zero to nine.

They are most ordinarily employed in electronic devices like digital clocks, timers and calculators to show numeric information.

As its name indicates, it's fabricated from seven totally different illuminating segments that square measure organized in such a way that it will type the numbers from 0-9 by displaying different combinations of segments. It is also able to form some alphabets such as ‘‘A’’, ‘‘B’’, ‘‘C’’, ‘‘H’’, ‘‘F’’, ‘‘E’’, etc.

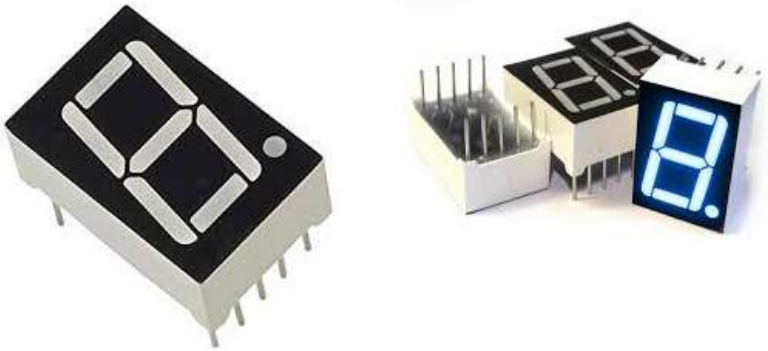


Chapter 3

System Description

3.4 7-Segment Display

The input PINs of 7-Segment display are A, B, C, D, E, F, G. These are connected with the output PINs of IC 4511.



There are two common PINs in 7-Segment display which are shorted together and connected the ground followed by a 330ohms resistor R9. The DP PIN is kept free (disconnected).

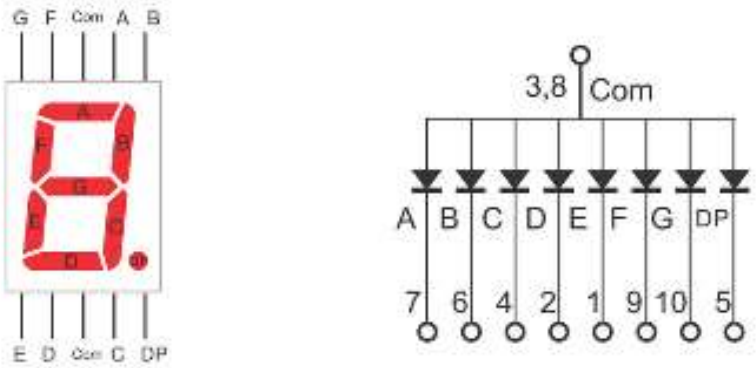


Fig 4: 7-Segment Display

Chapter 3

System Description

3.5 1N4148 Diode

The 1N4148 could be a customary semiconducting material switch signal diode. It is one among the foremost fashionable and durable switch diodes owing to its dependable specifications and low cost. The 1N4148 is helpful in switch applications concerning time up to 4 nano-second.

The output PINs of IC 4017, PINs 3^{rd} , 2^{nd} , 4^{th} ,7^{th} , 10^{th} , 1^{st} which are used as Q_0, Q_1, Q_2, Q_3, Q_4, Q_5 respectively, feeded as inpiuts to IC 4511 with help of 1N4148 diodes (D1 to D9).

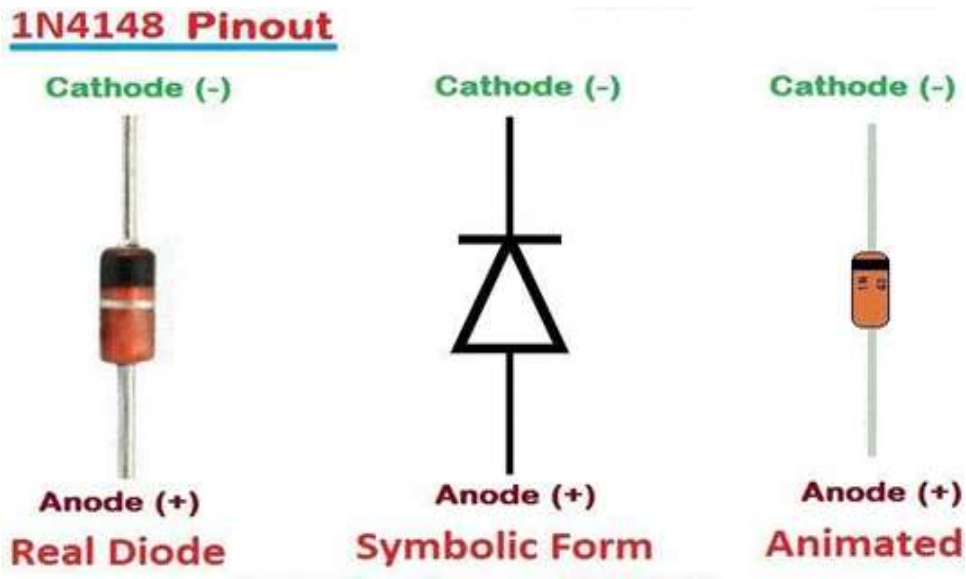


Fig 5: 1N4148 Diode Pin Diagram

Chapter 3

System Description

3.6 Other materials required

The remaining components on the breadboard are as follows:

I. 6*LEDs,
II. 6*220ohm Resistors,
III. 2*10Kohm Resistors,
IV. 1*300ohm Resistor,
V. 1*0.1uf Capacitor,
VI. 1* 9V battery and battery clip,
VII. 1* Power switch and
VIII. 1* Push switch.

Fig-6: Other Components Required

Chapter 3

System Description

3.6 Other materials required

3.6.1 LED :

The LEDs (Light Emitting Diodes) work only on reverse bias mode as per their characterstics. These are pn-junction diode having both positive and negative end.

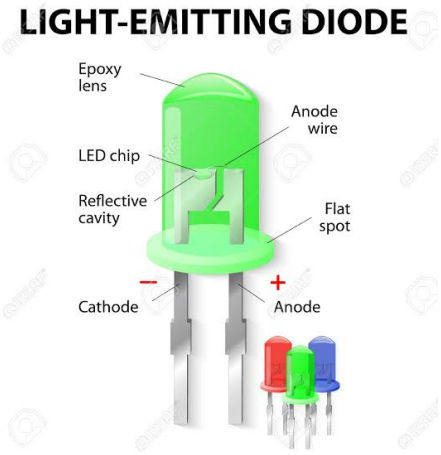
There are several types LEDs available in the market. But for our mini-project the suitable is LEDs which can operate on maximum 5V.

Here the LEDs are used as display-1 (DIS-1) in order to display the outputs as 'Analogue' . Hence this 'Electronic Dice' is called both 'Digital' and 'Analogue' too.

Here 6 LEDs are used in order to represent all the 6 numbers as seen in traditional dice. 1st 5 LEDs are blue in colour and the 6th LED is red in colour.

The uppermost glass part of the LED is called 'Epoxy Lens'. Inside this epoxy lens it consists of LED chip with reflective cavity and anode wire.

The lower and circular part at the end of the LED's glass part is called 'Flat Spot'. Out of the glass part anode and cathode metal wires are there as extentions.



Chapter 3

System Description

3.6 Other materials required

3.6.2 Resistor:

A circuit or device which opposes the flow of current in a circuit is known as resistor. Resistor is linear and bilateral device. It dissipiates power in the form of heat.

Resistor follows Ohm's law, so it is a linear device. Current in resistor can flow through both the sides or directions of a resistor, hence for it is a bilateral device.

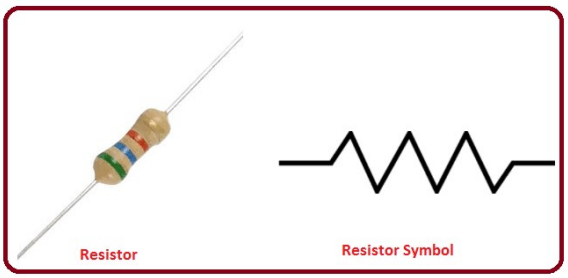
Resistor can be defined by Ohm's law as amount of voltage in one unit current or the ratio of voltage to current. The unit for resistor is 'Ohm'. It is having two terminals.

In the market there are several resitors available with variety of resistance value. Here we have used two 10KOhms resistor, six 220Ohms resistor and one 330Ohms resistor.

Two 10KOhms resistors are used along with one 0.1uf capacitor in order to get time interval of 0.02seconds by the IC 555 Timer.

Six 220Ohms resistors are connected in series with six LEDS in order to oppose high current flowing through it to prevent the damage of LEDs.

One 330Ohms resistor is connected with the two shorted common PIN of the 7-Segment display and then it is connected to the ground of the system.



Chapter 3

System Description

3.6 Other materials required

3.6.3 Capacitor:

A device which is used to store the charge or electric energy is called capacitor. It can store the electrical energy in the form of electrostatics field.

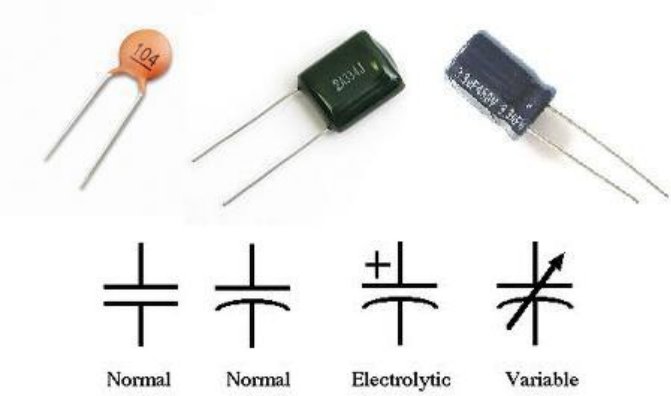
Capacitor is linear and bilateral device. Capacitor follows Ohm's law, so it is a linear device. Current in capacitor can flow through both the sides or directions of a capacitor, hence for it is a bilateral device.

Capacitor has two terminals and current can flow through any of these terminals. The measure of the capacitor is capacitance and the unit is 'Farad'.

In the market there are several resitors available with variety of types (ceramic and electrolyte etc.) and of different capacitance values.

Here we have used only one capacitor to make the 'Electronic Dice'. The type of the capacitor is ceramic and it has capacitance value of 0.1 microfarad (uf).

The 0.1uf capacitor is connected with 10K resistors in order to create the time interval of 0.02seconds by IC 555 Timer and then it is connected to the ground.



Chapter 3

System Description

3.6 Other materials required

3.6.4 Battery:

Battery is a device which is having many electrochemical cells in it in series or in any fashion in order to store desired quantity of electrical energy.

The electrical energy which is stored in battery can afterwards be used for supplying power to any other device or circuit depending upon the neccessity or requirements or the demand.

The batteries can be AC type or DC type with different values. Here in our project we are using a DC battery of 9Volts. It can supply the power of 12Watts.

Here the battery is used as a power supply device and with the help of a battery clip it is provided or connected to the system.

The positive of the 9V DC supply (12Watt-9Volt Battery) is given to the system with the help of a switch (S1) with the help of wires. The negative of the supply is directly connected to the ground of the system with the help of a wire.

Chapter 3

System Description

3.6 Other materials required

3.6.5 Power switch :

The power switch operates normal ‘On/Off’ operation by means of changing the position of the switch, in the circuit it is marked as ‘S1’.

The power switch is used here in order to turn On or Off the DC supply to the system.

Chapter 3

System Description

3.6 Other materials required

3.6.6 Push switch :

The push switch operates the ‘ON’ operation when it is pushed or pressed and ‘OFF’ when it is released or free in normal condition.

The push switch is used here in order to give the clock pulses to IC 4017 as clock inputs from the output of IC 555 Timer.

Chapter 3

System Description

3.6 Other materials required

3.6.7 Wires :

The wires are basically are the metal rods which allows the current flow through it. Wires are of various types depending upon the applications such as:

1. Single Strand Wires
2. Multi Strand Wires
3. Jumper Wires

Here we have used some single strand and some jumper wires. Jumper wires are basically connectors. It can be male-male, male-female, female-female connectors.

Chapter 3

System Description

3.6 Other materials required

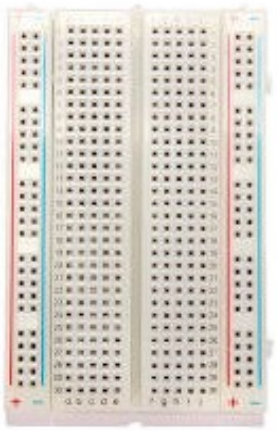
3.6.8 Breadboard :

Breadboard is an electrical equipment which serves as a base for many circuit designs instead of using PCBs and other complex equipments.

Breadboard is used for testing many circuit designs before they can be implemented for PCBs.

The breadbord consists of several holes in it with electric conductor metal plate below.

The components required for a particular circuit design is attached through the holes of the breadboard.



Chapter 4

Circuit Description

The positive of the supply, which is a 9V DC supply (12Watt-9Volt Battery), is given to the system with the help of a switch which operates normal 'On/Off' operation (by means of changing the position of the switch, in the circuit it is marked as 'S1') with the help of wires.

The negative of the supply is directly connected to the ground of the system with the help of a wire. The 4th and 8th PIN of the IC 555 Timer are directly connected with positive of the DC supply followed by the switch S1.

The 1st PIN of the IC 555 Timer is connected to the ground. The 6th and 2nd PIN of IC 555 Timer are shorted.

Two 10K resistors and one 0.1 uf capacitor are used to get the time interval of 0.02 seconds by IC 555 Timer. One side of the resistor R1 is connected to the ground while other side connected with PIN 7 of IC 555 Timer and with one side of resistor R2.

The 2nd side of the resistor R2 is connected with the shorted PINs (6th and 2nd) of IC 555 Timer and with one side of the capacitor (0.1uf). The 2nd side of the capacitor (0.1uf) can be shorted with 1st PIN of IC 555 Timer or can be directly connected the ground. Here it is connected directly to the ground.

The 3rd PIN of the IC 555 Timer is used as output and it provides the required series clock pulses with the time interval of 0.02 seconds, feeded as the input for IC 4017 in order to operate the desired operation.

This 3rd PIN of IC 555 Timer is provided to the IC 4017 with the help of a push switch which operates the 'ON' operation when it is pushed or pressed and 'OFF' when it is released or free in normal condition.

One side of the switch is connected to the IC 555 Timer while other side with IC 4017, in circuit diagram it is mentioned as 'S2'.

Chapter 4

Circuit Description

The 14^{th} PIN of IC 4017 is the input by which clock pulses are given to the IC 4017 to give the output as count sequence. This PIN is connected with switch S2 followed by IC 555 Timer.

The 16^{th} PIN of IC 4017 is directly connected to the supply. The 13^{th} and 8^{th} PIN of IC 4017 are shorted together and directly connected to the ground. 15^{th} and 5^{th} PINs are shorted together.

The 1^{st} , 2^{nd} , 3^{rd} , 4^{th} , 7^{th} and 10^{th} PINs are used as output PINs for IC 4017. The 6^{th} , 9^{th} , 10^{th} , 11^{th} and 12^{th} are kept free (disconnected).

The 3^{rd} PIN of IC 4017 is used as Q_0 used connected to 1^{st} LED followed by a 220ohms resistor R3 with the help of jumper wires (male to male wires).

The 2^{nd} PIN of IC 4017 is used as Q_1 used connected to 2^{nd} LED followed by a 220ohms resistor R4 with the help of jumper wires (male to male wires).

The 4^{th} PIN of IC 4017 is used as Q_2 used connected to 3^{rd} LED followed by a 220ohms resistor R5 with the help of jumper wires (male to male wires).

The 7^{th} PIN IC 4017 is used as Q_3 used connected to 4^{th} LED followed by a 220ohms resistor R6 with the help of jumper wires (male to male wires).

The 10^{th} PIN IC 4017 is used as Q_4 used connected to 5^{th} LED followed by a 220ohms resistor R7 with the help of jumper wires (male to male wires).

The 1^{st} PIN IC 4017 is used as Q_5 used connected to 6^{th} LED followed by a 220ohms resistor R8 with the help of jumper wires (male to male wires).

Again the output PINs of IC 4017, PINs 3^{rd} , 2^{nd} , 4^{th} ,7^{th} , 10^{th} , 1^{st} which are used as Q_0, Q_1, Q_2, Q_3, Q_4, Q_5 respectively, feeded as inpiuts to IC 4511 with help of 1N4148 diodes (D1, D2, D3, D4, D5, D6, D7, D8, D9).

Chapter 4

Circuit Description

The 3rd, 4th and 16th PINs of IC 4511 are directly connected to the supply. The 6th PIN is directly connected to the ground. The 5th and 8th PINs are shorted together and directly connected to the ground.

The input PINs of IC 4511 are 1st , 2nd and 7th PINs. The PINs 9, 10, 11, 12, 13, 14 and 15 are the output PINs of IC 4511.

The 7th PIN of IC 4511 is connected with diodes D1, D2, D3 followed by 4th , 10th and 3rd PINs of IC 4017 respectively with the help of jumper wires (male to male wires).

The 1st PIN of IC 4511 is connected with the diodes D4, D5, D8 followed by 2nd , 4th and 1st PIN of IC 4017 respectively with the help of jumper wires (male to male wires).

The 2nd PIN of IC 4511 is connected with the diodes D6, D7, D9 followed by 7th , 10th and 1st PIN of IC 4017 respectively with the help of jumper wires (male to male wires).

Again the output PINs of IC 4511 (9th , 10th , 11th , 12th , 13th , 14th and 15th PINs) are feeded as inputs to 7-Segment display.

The input PINs of 7-Segment display are A, B, C, D, E, F, G. These are connected with the output PINs of IC 4511.

There are two common PINs in 7-Segment display which are shorted together and connected the ground followed by a 330ohms resistor R9. The DP PIN is kept free (disconnected).

The input PINs ‘A’, ‘B’, ‘C’, ‘D’, ‘E’, ‘F’, ‘G’ of 7-Segment display are connected with output PINs 13th , 12th ,11th , 10th , 9th , 15th and 14th of IC 4511 respectively with the help of jumper wires (male to male wires).

Chapter 4

Circuit Description

The clock pulses area unit given to a counter humour decoder circuit IC 4017 with the seventh output given to reset.

It has 9 attainable outputs out of that, the seventh is given to reset as a result of we tend to solely would like a count up to six as a dice has six faces solely.

The first six outputs area unit is given severally to the crystal rectifiers so the several LED can glow for the corresponding count.

If the count is 0, LED-1 will glow. If the count if 1, LED-2 will glow and so on until the sixth count that is 5.

When the count is 5, the sixth crystal rectifier can glow and afterward for subsequent clock pulse the counter can advance and also the count increments to seven.

In this count, the circuit resets itself because the seventh count is given to the reset pin that is PIN-15.

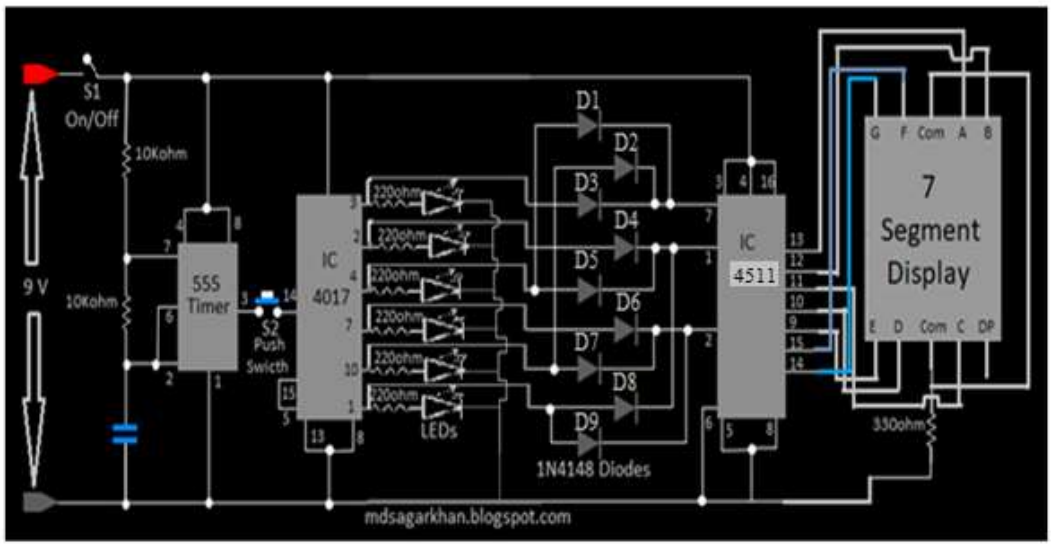


Fig 7: Conceptual Block Diagram of Electronic Dice

Chapter 5

Procedure

The leds are controlled by a 4017(IC 2) decade counter IC. Of this IC six outputs are used to drive the LEDs and a seventh & sixth output are used to reset the counter.

This way it only counts up to five. To light up the correct LEDs, LEDs are connected with corresponding output with 220ohm resistors.

The same is connected to 7-segment display with the help of diodes.

This system restricts the current flow in one way so reamining outputs of the IC aren't affected when 7-segment display is connected to multiple outputs.

To make the IC count, a clock supply is required. For this an IC 555(IC 1) timer is used.

This IC generates a clock pulse of around five kc. To roll the dice you have got to press the button on the PCB.

This button enables the IC 4017 counter IC which then starts counting.

When you unharness the button, the IC is disabled, but it keeps showing the current output state in LEDs (DIS-1). Because the clock is therefore quick, the output is totally random.

The outputs of the decade counter are fed to BCD-7Segment Display decoder IC 4511 (IC3), which, in turn, is connected to common-anode, 7-segment display LTS542 (DIS-2).

Here the outputs of deacade counters are used as Q_0 as 1(glows 1st Led & displays ‘1’in 7-segment display).

Likewise Q_5 as 6(glows 6th Led & displays ‘6’in 7-segment display),wherein Q_6 to Q_9 are remained disconnected(not used).

Chapter 5

Procedure

When you unharness the button, the IC is disabled, but it keeps showing the current output state in LEDs (DIS-1). Because the clock is therefore quick, the output is totally random.

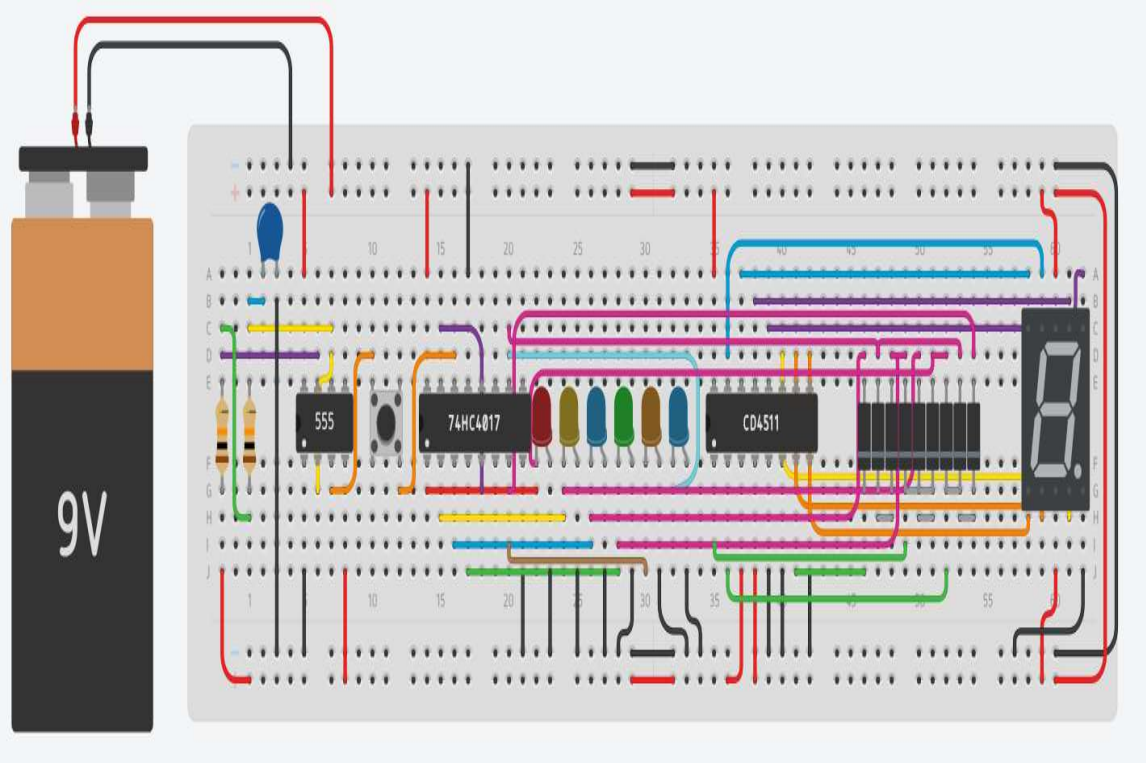


Fig 8.a: Animated Circuit Diagram in Software

Here D of the IC 4511,BCD to 7-segment converter is grounded. So MSB bit D=0 always. LSB bit= A

When Q_0 is high then diode D_3 will only conduct while other diodes don't conduct, hence only A=1 & B=C=0. Hence the sequence is C B A (0 0 1) [Decimal Equivalent=1]

Chapter 5

Procedure

When Q_1 is high then diode D_4 will only conduct while other diodes don't conduct, hence only B=1 & A=C=0. Hence the sequence is C B A (0 1 0) [Decimal Equivalent=2]

When Q_2 is high then D_1 & D_5 conducts while other diodes don't conduct, hence A=B=1 & C=0. Hence the sequence is C B A (0 1 1) [Decimal Equivalent=3]

When Q_3 is high then D_6 will only conduct, hence C=1 & A=B=0. Hence the sequence is C B A (1 0 0) [Decimal Equivalent=4]

When Q_4 is high then D_2 & D_7 conducts, hence C=A=1 & B=0. Hence the sequence is C B A (1 0 1) [Decimal Equivalent=5]

When Q_5 is high then D_8 & D_9 conducts, hence C=B=1 & A=0. Hence the sequence is C B A (1 1 0) [Decimal Equivalent=6]

- Working Model

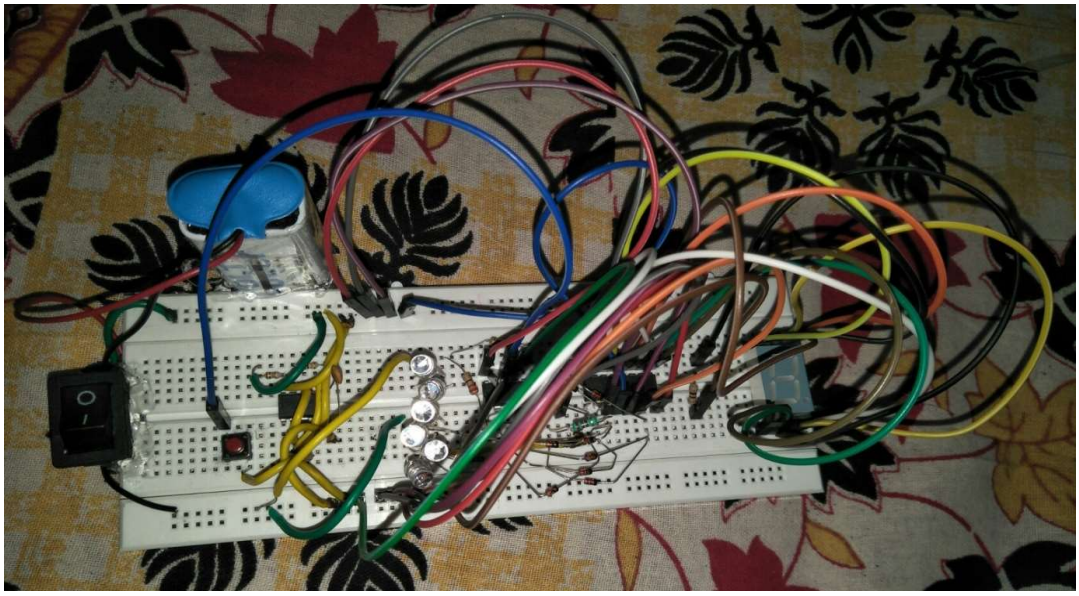


Fig 8.b: Build working model of Electronic Dice

Chapter 6

Experimental Results

The experimental results are shown in various images below which depict the various patterns of the LEDs & 7-segment display. The project's different stages of operation are as follows:

At initial stage when the supply is given to the circuit, but the clock pulse is not given, the previous data is displayed.

As the clock pulses are given with the help of a push button the stages are as follows:

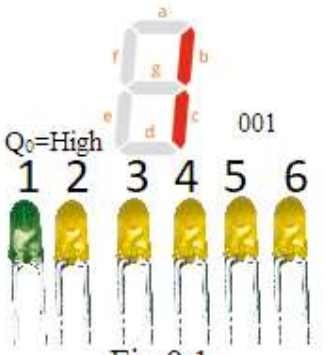


Fig-9.1

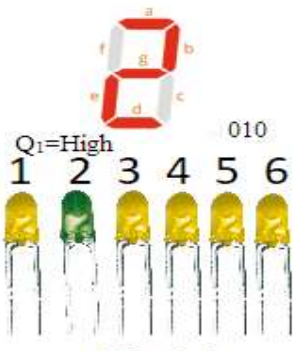


Fig-9.2

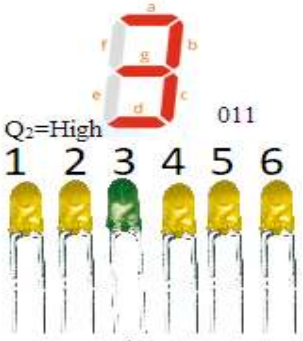


Fig-9.3

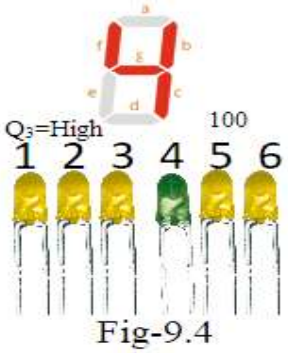


Fig-9.4

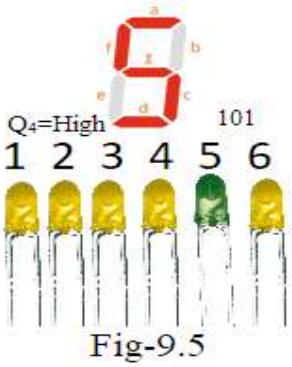


Fig-9.5

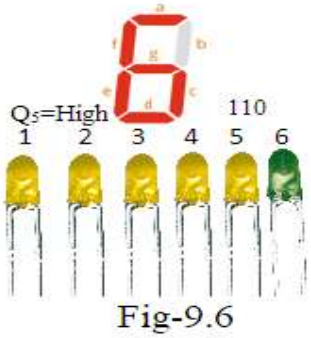


Fig-9.6

3

Chapter 7

Application & Conclusion

7.1 Application

• Designing and implementing a digital instruction-assisted system

• It can be used as a normal dice in any board games

• It can give any random value from 1 to 6.

7.2 Conclusion

The working of IC 4017 & IC 4511 along with IC 555-timer have been observed with implementation of the 'Electronic Dice'.The desired digital dice game has been designed and the complete system is working as per the initial specifications and requirements of our project.

Even sure aspects of the system are changed as operational expertise is gained with it. As the users play with the system, they develop variety of new ideas for the development of the project.

Chapter 8

References

[1] Jeena Joy, Athira Poovathody, Athul R S, Athul Subran, Basil Paul, “Implementation of Digital Dice Game”, Professor, Dept. of EEE, Mar Athanasius College of Engineering, Kothamangalam1 UG Student, Dept. of EEE, Mar Athanasius College of Engineering, Kothamangalam, India2,3,4,5, Vol. 3, Issue 2, February 2014.

[2] Disha Kapoor*, Rohit Pandey, Rishav Vaid, M.V. Patil, Professors, ECE Dept, B.V.U College Of Engineering, Pune, India, May 2016.

[3] https://www.elektormagazine.com

[4] https://electronicsforu.com

[5] http://ethcircuits.com