

Sinhgad Technical Education Society
Sinhgad Academy of Engineering
 Department of FE (2019-20 SEM-II)

Sr. No.	Name of Staff	Division	Roll No.	Name of Student	Project Title
1	Mrs. V. R. Rokade	B	FEB023	Yash Lad	DRIP IRRIGATION
			FEB044	N.V. Phad	
			FEB045	S.P. Pharkute	
			FEB034	A.H.Pabhale	
			FEB012	K.U.Kamthe	
			FEB039	Sanket Patil	Proximity Sensor For Blind People
			FEB005	Akash Manik	
			FEB047	Shukla Nitin	
			FEB048	Jadhav P K	
			FEB024	Malusare Shivam	
2	Dr.S.P.Saptale	A	FEA022	Pranav chavan	Arduino line follower robot
			FEA034	Bhavesb Dhobe	
			FEA004	Anuj Dwivedi	
			FEA017	Sandali Bhise	
			FEA046	Sunandini Gupta	
			FEA039	Yash Doke	Automated vehicle machine
			FEA047	Devesh Sawarkar	
			FEA041	Ishwar Gangawane	
			FEA035	Abhishek Dhurawade	
			FEA036	GauravDimbale	
			FEA005	Badgujar Diksha	Oil collecting boat in Sea
			FEA006	Badgujar Nikhil	
			FEA037	Divekar Vishal	
			FEA014	Suyash Bhamare	
FEA042	Garje Nikita				
3	Mr. S. I. Barde	F	FEF022	suryavanshi saurabh sanjay	Smart City by using Arduino
			FEF010	gomashe govardhan gangadhar	
			FEF019	deshmukh aditya dineshraoji	
			FEF027	patilvaishnavi sanjay	
			FEF040	kuwar apurva sunil	
			FEF039	pakhare prathamesh digambar	Arduino obstacle avoiding car
			FEF003	satam aaditya santosh	
			FEF025	mokashe pooja balasaheb	
			FEF048	gaikwad mansi gangaram	
			FEF044	gowardipe dhananjay chetan	
			FEF034	kawale yash datta	Interfacing of motor's with arduino
			FEF046	landge pratik sanjay	
			FEF020	sirsat nikhil vasanta	
			FEF016	mulla samir nabisab	
FEF005	bharati rohit motilal				

Sr. No.	Name of Staff	Division	Roll No.	Name of Student	Project Title
4	Mrs.P.C.Jadhav	F	FEF023	Alwis Shaji	Notice Board for FE
			FEF029	Amit Raj	
			FEF007	Praful Lokhande	
			FEF013	Shivani Shedage	
			FEF033	Sakshi Talekar	
			FEF011	Sbhubham Dhotre	
			FEF018	Prerana Kharat	Light Fidelity Technology
			FEF030	Mansi Shinde	
			FEF002	Adnan Shaikh	
			FEF028	Pankaj More	
			FEF024	Chetan Muluk	
			FEF009	Mansi Upari	
			FEF047	Ashlesha Hingane	Wireless Power Transfer
			FEF045	Kantiki Nanekar	
			FEF043	Dnyanesh Auti	
			FEF006	Sahil Auti	
FEF004	Sonu Kumar				
5	Dr. N.P.Dharmadhikari	F	FEF012	Taralgatti Parth Namdeo	
			FEF014	Soudagar Shahnawaz Jilani	
			FEF017	Pembatla Rohit Srinivas	
			FEF031	Rathore Nihal Singh	
			FEF032	Ekunkar Aditya Rajendra	
			FEF037	Shaikh Mubin Shahid	
			FEF041	SOHAM SAWANT	"SMART REMOTE USING GESTURE CONTROL
			FEF021	MITESH KHANDAIT	
			FEF008	SHUBHAM HIRAKKI	
			FEF036	PRATIK BELOTE	
			FEF022	SURYARAJ RAJENIMBALKAR	

Sr. No.	Name of Staff	Division	Roll No.	Name of Student	Project Title
6	Ms.P.H.Pawar	E	FE012	Nawale Samrudhi Sunil	AUTOMATION OF IRRIGATION
			FE028	Shankar Adhwaith	
			FE036	Singh Utkarsh Harendra	
			FE040	Ugale Gargi Nitin	
			FE042	Verma Manish	
			FE001	Lande Swaraj Sunil	DISSOCIATIVE IDENTITY DISORDER
			FE002	Londhe Shruti Nagesh	
			FE013	Nikam Atharva Pradip	
			FE035	Siddiqui Zabhi Bahar	
			FE038	Telrandhe Suraj Kishor	
			FE047	Zodge Rutuja Machhindra	Superconductor levitating-Maglev train
			FE018	Patil Sakshi Ashok	
			FE022	Pore Vijaya Ananta	
			FE024	Raut Shivanand Uttam	
FE025	Raut Varad Madhukar				
FE048	Bajare Atharva Pavankumar				
7	Mr.Trushant A Karanjkar	E	FEE039	PRATIK THORAT	UNIVERSE (SPACE)
			FEE015	pandhare kunal sambhaji	
			FEE034	shinde saurabh shivaji	
			FEE016	panmand shubhangi dayanand	
			FEE003,	mali gaurav rahul	
			FEE045,	waghmode mohini dattatray	
			FE026	Samdade Mukteshwar	Automatic Floor Cleaner
			FE032	Shinde Aniket	
			FE044	waghmare Dnyaneshwar	
			FE29	Shelake Uday	Signal Jammers
			FEE008	Shruti moon	
			FEE017	Rohit Patil	
			FEE027	shraddha Savadi	
			FEE031	Abhishek shinde	
FEE030	Chinmay Shimpi				
FEE050	Akanksha Nagare				

Sr. No.	Name of Staff	Division	Roll No.	Name of Student	Project Title
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			FEB011	Aziz Kamri	
			FEB020	Swarnim Koteswar	
			FEB046	Osheen Raina	
			FEB043	Pawar Shreya	Obstacles avoiding robot car
			FEB021	Kothavale Amruta	
			FEB004	Jagalpure Akash	
			FEB049	Ahirekar Tejas	
			FEB015	Khan Belal	
			FEB003	Pragya Jain	Free Energy Generator using magnet
			FEB040	Umesh Patil	
			FEB035	Dipali Partali	
			FEB027	Altaf Alam	
			FEB041	Vibhave Patil	
FEB032	Deepak Nakkanwar				
9	Mrs.Sarika S. Sawant	D	FED016	Nayankumar Dhome	Arduino & Ultrasonic Sensor Based Distance Measurement
			FED025	Tejas Girge	
			FED035	Abhishek Kadam	
			FED039	Abhishek Kale	
			FED040	Rohit Kale	
			FED020	Ajay Chate	
			FED046	Aashlesha Kondgire	
			FED017	Snehal Divekar	Wireless Power Transfer
			FED024	Ayush Gimekar	
			FED029	Samrat Ingle	
			FED041	Yashaswini kale	
			FED007	Ganesh Mahadev Bikkad	
			FED004	Yash Hanumant Bhapkar	SMART IRRIGATION
			FED009	Sonali Ashok Chaubhare	
			FED033	Sneha Dattatray Solepatil	
FED001	Subham Gajanan Aghav				

Sr. No.	Name of Staff	Division	Roll No.	Name of Student	Project Title
10	Mrs.Shilpa Gadakh	B	FEB002	Shrutam Jadhav	Sound Following Robot
			FEB001	Sanjay Jadhav	
			FEB031	Samir Mulla	
			FFE006	Ishant Kadam	
			FEB038	Patil Rohini Dilip	
			FEB042	Pawar Sakshi Sanjay	
			FEB033	Nishant Nargide	Library Management
			FEB019	Kamal Kishor	
			FEB022	Anupam Kumar	
			FEB013	Rutuja Kamthe	
			FEB030	Lisani Mondal	Voice Controlled Car by using Arduino
			FEB025	Shivam Sanjay Malusare	
			FEB007	Prathamesh Rajan Kadam	
			FEB014	Prachi Pandurang Kawtikwar	
FEB037	Payal Pradip Patil				
FEB026	Shubham Madhukar Mathefod				
11	Mr.BACHKAR.Y.R	D	FED010	Devashish Chaukhande	Internet Of Things
			FED011	Tanmay Dabhade	
			FED018	Aishwarya Diwane	
			FED027	Gaurav Halanavar	
			FED042	Kajal Katke	
			FED032	Dipak Jagtap	Laser Light Security system
			FED045	Rushikesh Khillare	
			FED038	Aniket Kakade	
			FED030	Atharve Inkar	
			FED006	Onkar Bhushan	Gesture Controlled Robot
			FED026	Hake Pooja	
			FED049	Phanse Rutuja	
			FED034	Jayatkar Ketan	
			FED028	Hiradeve Harsh	
FED044	Khatekar Shradhey				

Sr. No.	Name of Staff	Division	Roll No.	Name of Student	Project Title
12	Mr. Prashant S Rade	A	FEA002	Adam Ussamuddin Mir Salahuddin	Scientific Calculator
			FEA026	Chougule Om	
			FEA028	Dahotre Atharva	
			FEA038	Dodmani Rudrant	
			FEA040	Gandhi Priyansh	
			FEA007	Sampanna Bagade	Water through electricity generator
			FEA009	Zaid Beldar	
			FEA011	Berad Shrikant	
			FEA016	Bhawate Abhishek	
			FEA043	Gele Dattatray	
			FEA013	Prasad Bhalkikar	Cafe Billing system
			FEA019	Khadid Zehra charoliya	
			FEA021	Chavan Akash	
			FEA023	Chavan Vaishnavi	
FEA028	Dahibhate Vishal				
13	Mrs. Ojaswini Deshmukh	B	FEB009	Asit Kamble	Agriculture Based on Aurdino
			FEB010	Kuldeep Kamble	
			FEB028	Sharique Zaki	
			FEB029	Momin Huzaifa	
			FEB036	Purushottam Patel	

HOD
FE Department

Sinhgad Technical Education Society's
SINHGAD ACADEMY OF ENGINEERING

KONDHWA, PUNE-48

First Year Engineering Department



Sinhgad Institutes

PROJECT BASED LEARNING (PBL)
WORK BOOK

ACADEMIC YEAR: 2019/2020 Semester: II

Division: F

Batch:

Project Title: PORTABLE INVERTER USING IC555

Area of Project: BASIC ELECTRICAL ENGINEERING/PHYSIC

First Year Engineering Department
SINHGAD ACADEMY OF ENGINEERING
KONDHWA PUNE-48
(For Private Circulation Only)



Sinhgad Institutes

SINHGAD ACADEMY OF ENGINEERING

KONDHWA, PUNE - 411 048.

Department of First Year Engineering

Certificate

This is to certify that, following students,

- | | |
|------------------------------------|-------------------------|
| 1. <u>Taralgatti Parth Namdeo</u> | Roll no.: <u>FEF012</u> |
| 2. <u>Soudagar Shanawaz Jilani</u> | Roll no.: <u>FEF014</u> |
| 3. <u>Pambatla Rohit Srinivas</u> | Roll no.: <u>FEF017</u> |
| 4. <u>Rathore Nihal Singh</u> | Roll no.: <u>FEF031</u> |
| 5. <u>Ekunkar Aditya Rajendra</u> | Roll no.: <u>FEF032</u> |
| 6. <u>Shaikh Mubin Shahid</u> | Roll no.: <u>FEF037</u> |

has completed all the Term Work & Practical Work in the subject **Project Based Learning (PBL)** satisfactorily in the department of First Year Engineering as prescribed by SavitribaiPhule Pune University, in the academic year 2019 -2020..

Faculty-in-charge

Dr.N.P. Dharmadhikari

Head of Department

Dr. N.P. Dharmadhikari
M.Sc. M.Phil Ph.D(Env.Sci) Ph.D (Physics)
Associate Professor

Date: ___/___/___
Sinhgad Academy Of Engineering
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Principal

Skawar
HOD.

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Division: F

Batch:

Group:

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Initial Survey for Finalization of Title (Literature Survey):

Within the last decades there has been major advantage advancement in power electronics. One of such the power electronic device which converts DC power to AC power at required output voltage and frequency level is known as inverter.

Inverters are used for many applications as in situations where low voltage resources such as batteries solar panels are fuel cells must be converted so that devices can run off of AC power. One example of such a situation would be converting electrical power from a car battery to run a laptop, TV or cell phone this report focuses on design and simulation of portable inverter using IC 555.

Applications of inverters are in numerous in day to day life. During the power cut we generally see its use in both rural and urban areas. By observing condition of day to day needs we work on a simple DC to AC inverter using IC 555 timer IC as our project.

Required H/W & S/W:

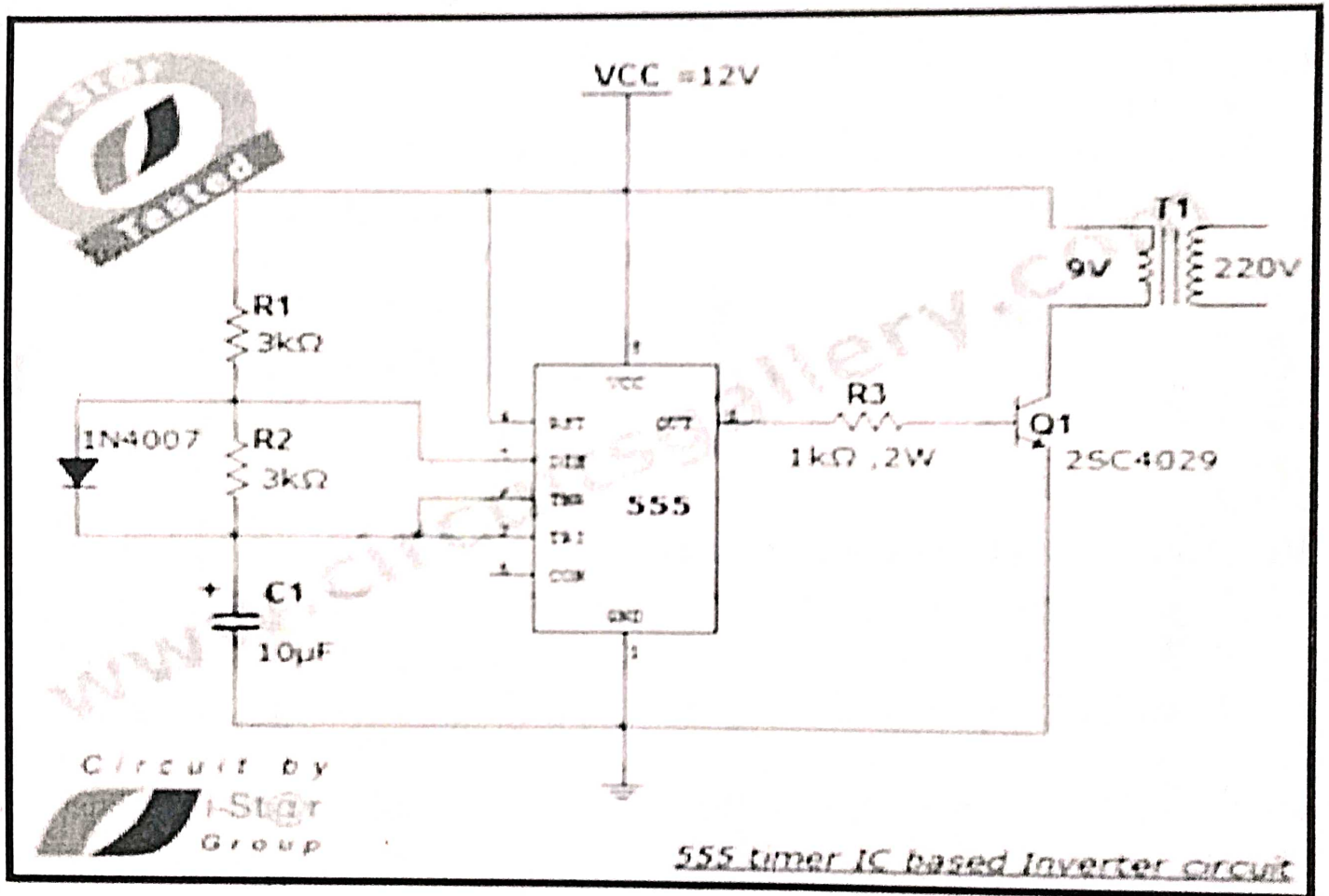
Hardware required:-

- 555 TIMER IC (NE555N).
- TRANSISTOR (2SC4029).
- STEP UP TRANSFORMER (9-0-9).
- RECHARGABLE BATTERY (12 V).
- RESISTORS.
- RECTIFIER DIODE (1N4007).
- CAPACITORS.
- SINGLE STAND WIRE.

References: (Website/Books/Papers):

- www.makeitmech.com
- www.scribd.com
- www.eleccircuit.com
- www.electrooobs.com
- www.circuitgallery.com
- www.youtube.com

Figure/Circuit Diagram/Block Diagram/Flow Chart:



Area & Scope:

There are lots of applications of the DC to AC inverter. We cannot use DC to power up appliances in power failure so as a DC to AC inverted supply is used. Some of the low power inverter applications are:

- This is a simple inverter circuit based on 555 timer IC. Here timer IC wired as anastable multivibrator mode.
- The diode IN4007 is used to get 50% duty cycle for the pulses from 555.
- The output pulse from 555 astable multivibrator is fed to the base of power transistor 2sc4029. The 2sc4029 transistor is used as switch.
- Transformer step up to 12 V to 220 V , thus we got 50Hz, 220 V AC supply at the output of transformer secondary.
- Use a 12 V battery along with a battery charger circuit to power this DC to AC inverter.

Final Title of Project:

PORTABLE INVERTER USING IC555

Signature of PBL Coordinator / PBL Coordinator

Dr. N.P. Dharmadhikari
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Abstract:





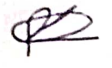


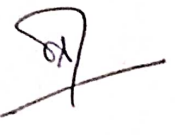
All modern engineering system includes certain aspects of control system at some point in their broadcast scenes, control engineering and the associated theory are concerned with the means of making system to behave in a desired way.


Applications of inverters are in numerous in day to day life. During the power cut we generally see its use in both rural and urban areas. By observing condition of day to day needs we work on a simple DC to AC inverter using IC 555 timer IC as our project.

It is a low cost simple 12 volt to 220 volt inverter circuit the astable multivibrator mode operation of 555 timer IC utilized here for AC oscillation inverters are very useful electronics products for compensating emergency power failure more advancement can also be made in circuit design to make it work more efficiently and in large scale.

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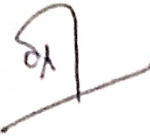


Weekly Planning Sheet

Week No.	Activity Planned	Activities Completed	Signature of Students	Signature of Faculty/Mentor
1	Formation of group	Group formed and Discussed about everyone's field of interest to proceed For a topic.		
2	Start working on the topic and looking for requirements like Hardware.	Discussed the problem statement and how to manage it.		
3	To give a final title to project and search for previous research done on it.	Finalized title and gathered information from websites ,books, teachers, papers.		
4	To research on the idea of the inverter.	Completed research and made list of parts/hardware required.		


 Signature of PBL Coordinator
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Weekly Planning Sheet

Week No.	Activity Planned	Activities Completed	Signature of Students	Signature of Faculty/Mentor
5	Testing the parts brought.	Successfully tested and rectified the parts.		
6	Assembling the hardware	Successfully assembled the hardware.		
7	Testing the inverter on live circuits.	Successfully tested inverter on low watt appliances.		
8	Workbook completion and submission.	Workbook completed and submitted to mentor.		

DEPARTMENT OF ELECTRICAL ENGINEERING
 SINHGAD ACADEMY OF ENGINEERING
 KONDHWA, PUNE 48



Signature of **Dr. N.P. Dharmadhikari**
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 Associate Professor
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 Kondhwa, Pune 48.

SINHGAD INSTITUTE's
SINHGAD ACADEMY OF ENGINEERING
Department of Engineering Science

A

Project Report

On

PORTABLE INVERTER USING IC 555

Submitted by

Roll no.	PRN no	Name	Contact no.
FEF012	72029340F	Taralgatti Parth Namdeo	7666510441
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FEF017	72029261B	Pembatla Rohit Srinivas	7030318858
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FEF037	72029231L	Shaikh Mubin Shahid	8104640712

Under the Guidance of: Prof. N.P Dharmadhikari

A.Y.: 2019-20

Sem; 2

SUB : PBL

Sr no.	Content	Page no.
1.	Abstract	3
2.	Introduction	4
3.	Components	5
4.	Brief Description of parts	6
5.	Circuit Diagram	10
6.	Working Principal of the circuit	11
7.	Results	12
8.	Applications	13
9.	Advantages and Disadvantages	14
10.	Conclusion	15
11.	Future Aspects	16
12.	References	17

ABSTRACT

Within the last decades there has been major advantage advancement in power electronics. One of such the power electronic device which converts DC power to AC power at required output voltage and frequency level is known as inverter.

Inverters are used for many applications as in situations where low voltage resources such as batteries solar panels are fuel cells must be converted so that devices can run off of AC power. One example of such a situation would be converting electrical power from a car battery to run a laptop, TV or cell phone this report focuses on design and simulation of portable inverter using IC 555.

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All modern engineering system includes certain aspects of control system at some point in their broadcast scenes, control engineering and the associated theory are concerned with the means of making system to behave in a desired way.

Applications of inverters are in numerous in day to day life. During the power cut we generally see its use in both ruler and urban areas. By observing condition of day to day needs we work on a simple DC to AC inverter using IC 555 timer IC as our project.

It is a low cost simple 12 volt to 220 volt inverter circuit the astable multivibrator mode operation of 555 timer IC utilized here for AC oscillation inverters are

very useful electronics products for compensating emergency power failure more advancement can also be made in circuit design to make it work more efficiently and in large scale.

COMPONENTS

In the designing of this circuit we have require different types of linear and nonlinear electronics components. Some of the few components of our inverter are listed and described in the below section.

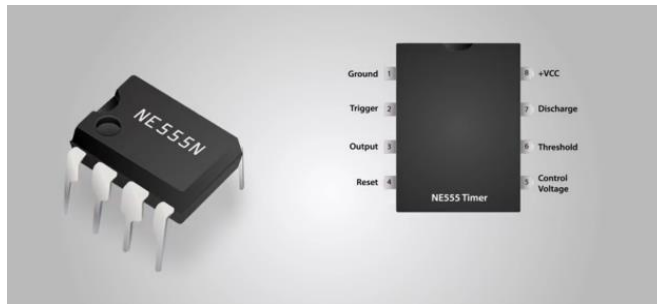
Part Lists-

- ✦ 555 TIMER IC (NE555N).
 - ✦ TRANSISTOR (2SC4029).
 - ✦ STEP UP TRANSFORMER (9-0-9).
 - ✦ RECHARGABLE BATTERY (12 V).
 - ✦ RESISTORS.
 - ✦ RECTIFIER DIODE (1N4007).
 - ✦ CAPACITORS.
 - ✦ SINGLE STAND WIRE.
-

BRIEF DESCRIPTION OF PARTS

○ 555 TIMER IC (NE555N)

555 timer IC is an integrated circuit used in a variety of timer pulse generator and oscillator applications. The 555 can be used to provide time delays as an oscillator and as flip block element derivatives provide two or four times circuits in one package. Additional terminals are provided for triggering, for resetting if



desired. In the time delay mode of operation the time is precisely controlled by one external resistor and capacitor.

○ 12 V RECHARGEABLE BATTERY

- A rechargeable battery, a storage battery or an accumulator is a type of electrical battery, it comprises one or more electrochemical cells and is a type of energy accumulator used for electrochemical energy storage. It is technically known as a secondary cell because its electrochemical reactions are electrically reversible.
- Rechargeable batteries come in many different shapes and sizes, ranging from button cells to megawatt systems connected to stabilize an electrical distribution network. Several different combinations of chemicals are commonly used, including: lead-acid,

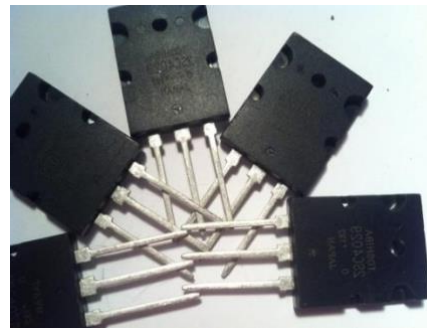


nickel cadmium (NiCad), nickel metal hydride (NiMH), lithium ion (Li-ion) and lithium ion polymer (Li-ion polymer).

○ TRANSISTOR (2SC4029)

A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power. It is composed of semiconductor materials usually with at least three terminals for connection to an external circuit

- ✦ 2SC4029 is a High Power NPN silicon Power transistor.
- ✦ It is designed for use in general purpose Amplifier and switching application.
- ✦ Also complementary to 2SC4029.



○ 12 V SMPS (BATTERY CHARGER)

A Switched mode power supply is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently.



Like other power supplies, an SMPS transfers power from a source, like mains power, to a load, such as personal computer, while converting voltage and current.

○ STEP UP TRANSFORMER (9-0-9)

- A transformer in which the output voltage is greater than its input voltage is called a



IN4007 DIODE



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- 9-0-9 is a centre tapped transformer.
- The secondary winding of the transformer has a tapping i.e.; 0 in 9-0-9.
- 0 V is the centre of the secondary wire with 9 V and 9 V at the ends.
- If we use 9 and 0 then we get output as 9 V. If we use 9 and 9 then we get output as 18 V.

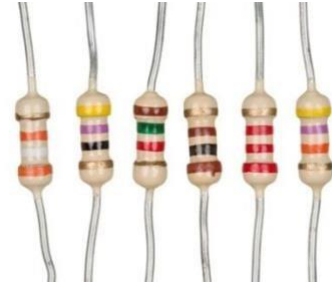
○ RECTIFIER DIODE (1N4007)

- 1N4007 is a PN junction diode. 1N4007 belongs to the series of 1NXXXX devices. 1N indicates single junction whereas N indicates the semiconductor diode. 4007 is the specific number to indicate the particular diode.
- These type of diodes allow only the flow of electrical current in one direction only. So, it is used for conversion of AC power to DC.
- 1N4007 is electrically compatible with other rectifier diodes and can be used instead of any of the diode belonging to 1N400X series.

- Some of the purposes of 1N4007 are freewheeling diodes application, general purpose rectification of power supplies, inverters, converters, etc

RESISTORS

- Registers are electronic components which have specific never changing electrical resistance. The resistance limits flow of electrons through a circuit. They are passive components meaning they only consume power. Resistors are usually added to circuits where the compliment active components like opens microcontrollers and other integrated circuits.
- The current through a resistor is directly proportional to the voltage across the resistor terminals. This relationship is represented by ohm's law.



$$I = V/R$$

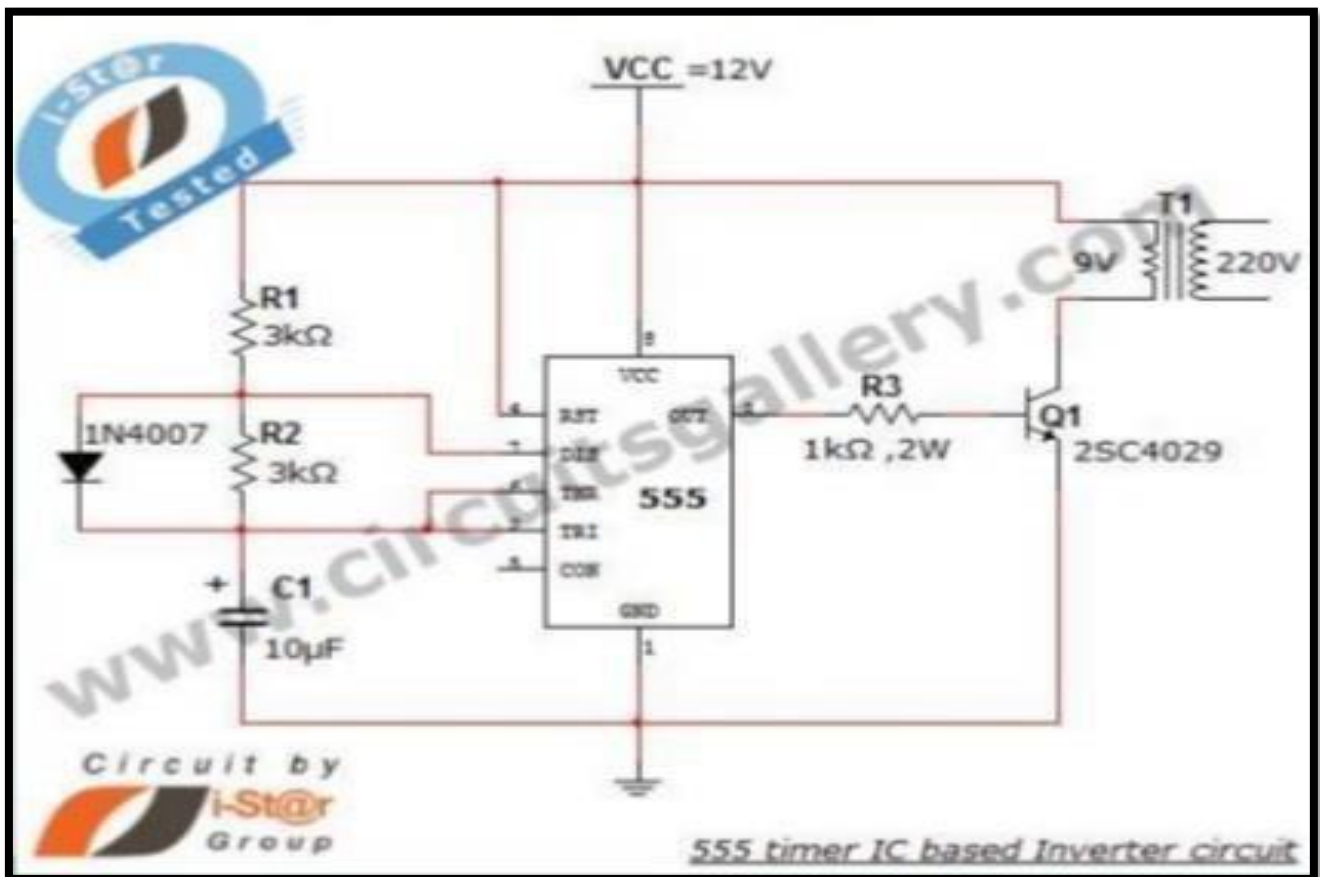
- Where I is the current in amperes, V is potential difference in volts measured across the conductor, and R is the resistance of the conductor in ohms.

○ CAPACITORS

A capacitor (condenser) is a passive two terminal electrical component used to store energy electro statically in an electric field. The forms of practical capacitors vary widely, but all contain at least two plates separated by dielectric. A dielectric can be glass, air, paper, mica, etc. the dielectric acts to increase the capacitor's charge capacity. Capacitors are widely used as parts of electrical circuits in many common electrical devices.



CIRCUIT DIAGRAM



WORKING PRINCIPAL OF THE CIRCUIT

- This is a simple inverter circuit based on 555 timer IC. Here timer IC wired as an astable multivibrator mode.
- The diode IN4007 is used to get 50% duty cycle for the pulses from 555.
- The output pulse from 555 astable multivibrator is fed to the base of power transistor 2sc4029. The 2sc4029 transistor is used as switch.
- Transformer step up to 12 V to 220 V, thus we got 50Hz, 220 V AC supply at the output of transformer secondary.
- Use a 12 V battery along with a battery charger circuit to power this DC to AC inverter.

RESULT

- Transformer step up the 9 V to 220 V, thus we got 50 Hz, 220 V AC supply at the output of transformer secondary.
- The output will be 220 V AC 150 W at transformer secondary.
- AC bulb or any other low watt appliances can be connected across transformer secondary for results.

APPLICATIONS

There are lots of applications of the DC to AC inverter. We cannot use DC to power up appliances in power failure so as a DC to AC inverted supply is used. Some of the low power inverter applications are:

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ADVANTAGES

- This circuit can be used in cars and other vehicles to charge small batteries.
 - This circuit can be used to drive low power AC motors.
 - It can be used in solar power system.
-

DISADVANTAGES

- Since 555 Timer is used, the output may slightly vary around the required duty cycle of 50% i.e.; exact 50% duty cycle signal is hard to achieve.
 - Use of transistors reduces the efficiency of the circuit.
 - Use of switching transistors has the possibility of causing cross over distortion in the output signal. However this limitation has been reduced to some extent by the use of biasing diodes.
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CONCLUSION

After working on our simple DC to AC inverter using 555 timer circuit we have observed that the converter is converting the 12 V DC to AC through proper circuit and then by using 9 V to 220 V centre trapped transformer we are increasing the voltage and thus we can glow a led or bulb for certain time limit.

AC can't be stored for future use whereas DC can be stored in battery and it can be converted back to AC by using power inverters when required.

Thus, finally we have successfully completed our project and by observing its results we can say that it's a very important power cut solution for this era and also potential material for coming years.....

FUTURE ASPECTS

- The inverter has no doubt a very handy and promising the future prospects.
- We can still make it large by using more complex circuits and large batteries.
- For more advancement on this domain research and development work needs to be done.

so let hope a world with an uninterrupted supply of power by using INVERTER circuits.....

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