Simple 100 watt inverter

Vikas Vitthal Rokade, Sandip Subhash Bangale, Vinod Sambhaji Gaikwad & Aslam Usman Mujawar

Department of Electrical Engineering, SVERI's College of Engineering (Poly.), Pandharpur

Third Year Diploma Students

ABSTRACT:

From the late 19th century through the middle of the 20th century, DC to AC power conversion were accomplished using rotary converters or motor – generator sets. In the early 20th century, vaccum tubes and gas filled tubes begin to be used as switches in inverters circuits. The most widely used type of tube was the thyratron

The origins of electro mechanical inverters explain the source of the term inverter. An inverter is an electrical device that converts direct current (DC) to alternating current (AC), the converted AC can be at any required voltage and frequency with the use of appropriate transformers, switching and control circuits .An inverter is essentially the opposite of a rectifier.An uninterruptible power supply (UPS) uses batteries and an inverter to supply ac power when main power is not available. When main power is restored, a rectifier is used to supply DC power to recharge theb batteries.

HISTORY:

From the late nineteenth century through the middle of the twentieth century, DC-to-AC power conversion was accomplished using rotary converters or motor-generator sets (M-G sets). In the early twentieth century, vacuum tubes and gas filled tubes began to be used as switches in inverter circuits. The most widely used type of tube was the thyratron.

The origins of electromechanical inverters explain the source of the term inverter. Early AC-to-DC converters used an induction or synchronous AC motor direct-connected to a generator (dynamo) so that the generator's commutator reversed its connections at exactly the right moments to produce DC. A later development is the synchronous converter, in which the motor and generator windings are combined into one armature, with slip rings at one

Keyword:

- A 12 V car battery can be used as the 12V source.
- Use the POT R1 to set the output frequency to50Hz.
- For the transformer get a 9-0-9 V, 10A step down transformer. But here the 9-0-9 V winding will be the primary and 220V winding will be the secondary.
- If you could not get a 10A rated transformer, don't worry a 5A one will be just enough. But the allowed out put power will be reduced to 100W.
- Use a 10 A fuse in series with the battery as shown in circuit.
- Mount the IC on an IC holder.
- Remember, this circuit is nothing when compared to advance PWM inverters.This is a low cost circuit meant for low scale applications.

- IC CD4047 (14 pins)
- Zener Diode,Resistor,capacitors etc.

INTRODUCTION:

An inverter is an electrical device that converts direct current (DC) to alternating current (AC), the converted AC can be at any required voltage and frequency with the use of appropriate transformers, switching, and control circuits. An inverter is essentially the opposite of a rectifier. Static inverters have no moving parts and are used in a wide range of applications, from small switching power supplies in computers, to large electric utility high-voltage direct current applications that transport bulk power. Inverters are commonly used to supply AC power from DC sources such as solar panels or batteries. The electrical inverter is a high-power electronic oscillator. It is so named because early mechanical AC to DC converters was made to work in reverse, and thus was "inverted", to convert DC to AC.

Direct current (DC) is the unidirectional flow of electric charge. Direct current is produce

Literature Review:

Inverter:

Mobility and versatility have become a must for the fast-paced society today. People can no longer afford to be tied down to a fixed power source location when using their equipments. Overcoming the obstacle of fixed power has led to the invention of DC/AC power inverters. While the position of power inverter in the market is relatively well established, there are several features that can be improved upon. A comparison analysis of the different power inverter has been compiled. Aside from the differences in power wattage, cost per wattage, efficiency and harmonic contend, power inverters can be categorized into threegroups.

Types of inverter:

Controlled rectifier inverters Since early transistors were not available with sufficient voltage and current ratings for most inverter applications, it was the 1957 introduction of the thyristor or silicon-controlled rectifier (SCR) that initiated the transition to solid state inverter circuits. Rectifiers, 18-pulse rectifiers and so on

Powersupply:

Circuit connection: - In this we are using Transformer (0-12) v, 1Amp, IC 7805 & 7812, diodes IN 4007, LED & resistors. The micro controller requires +5 Volts for its operation where as the D.C. Motor used here require 12v. In this design the power supply for D.C. motor is constructed separately, to avoid harmonic interferences and transient impacts.

Rectifier and inverter pulse numbers

Rectifier circuits are often classified by the number of current pulses that flow to the DC side of the rectifier per cycle of AC input voltage. A single-phase half-wave rectifier is a one-pulse circuit and a single-phase full-wave rectifier is a two-pulse circuit. A three-phase half-wave rectifier is a three-pulse circuit and a three-phase full-wave rectifier is a six-pulse circuit. With three-phase rectifiers, two or more rectifiers are sometimes connected in series or parallel to obtain higher voltage or current ratings. The rectifier inputs are supplied from special transformers that

provide phase shifted outputs. This has the effect of phase multiplication. Six phases are obtained from two transformers, twelve phases from three transformers and so on. The associated rectifier circuits are 12-pulse rectifiers, 18-pulse rectifiers and so on.

ZENERDIODE:

A Zener Diode is an electronic component which can be used to make a very simple voltage regulator circuit. This circuit enables a fixed stable voltage to be taken from an unstable voltage source such as the battery bank of a renewable energy system which will fluctuate depending on the state of charge of the bank. As the input voltage increases the current through the Zener diode increases but the voltage drop remains constant - a feature of zener diodes. Therefore since the current in the circuit has increased the voltage drop across the resistor increases by an amount equal to the difference between the input voltage and the zener voltage of the diode

Methodology:

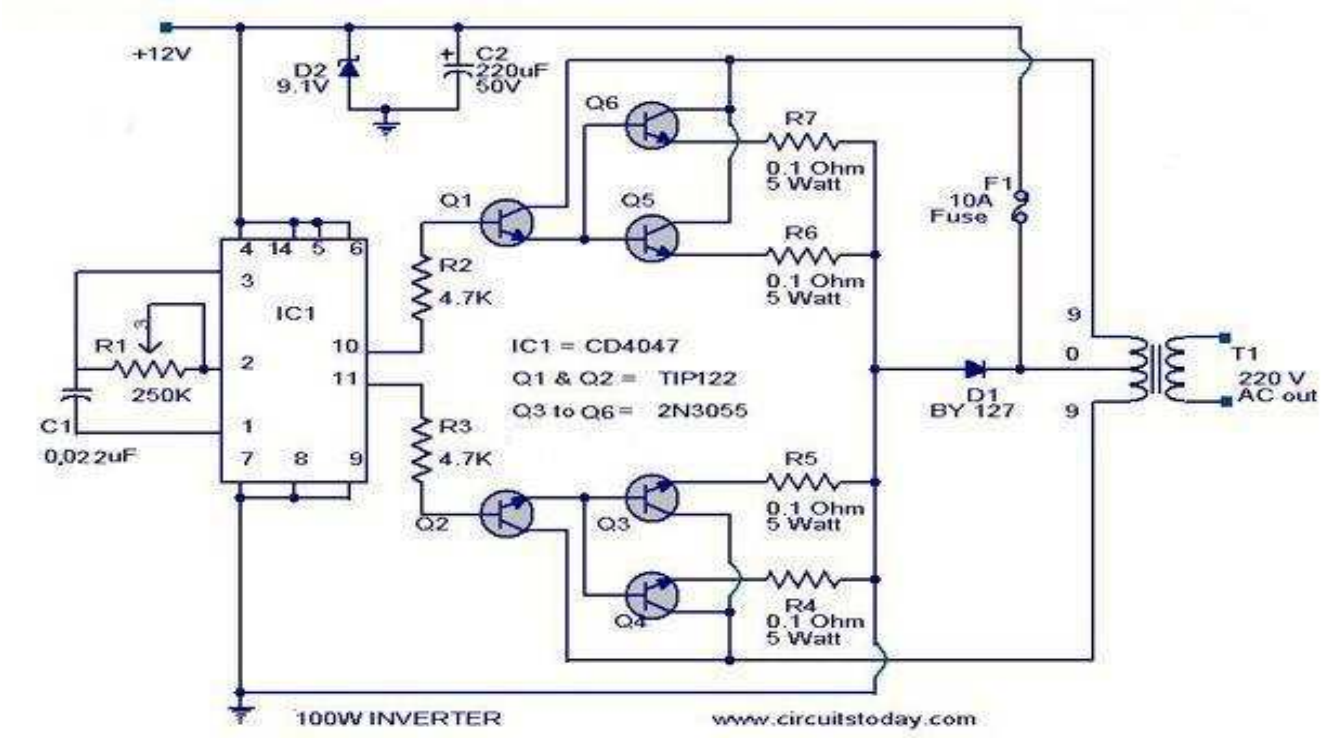
In one simple inverter circuit, DC power is connected to a transformer through the centre tap of the primary winding. A switch is rapidly switched back and forth to allow current to flow back to the DC source following two alternate paths through one end of the primary winding and then the other. The alternation of the direction of current in the primary winding of the transformer produces alternating current (AC) in the secondary circuit. The electromechanical version of the switching device includes two stationary contacts and a spring supported moving contact. The spring holds the movable contact against one of the stationary contacts and an electromagnet pulls the movable contact to the opposite stationarycontact.

The current in the electromagnet is interrupted by the action of the switch so that the switch continually switches rapidly back and forth. This type of electromechanical inverter switch, called a vibrator or buzzer, was once used in vacuum tube automobile radios. A similar mechanism has been used in door bells, buzzers and guns.by such sources as batteries, thermocouples, solar cells, and commutator-type electric machines of the dynamo type. Direct current may flow in a conductor such as a wire, but can also be through semiconductors, insulators, or even through a vacuum as in electron or ion beams. The electric charge flows in a constant direction, distinguishing it from alternating current (AC). A term formerly used for direct current was galvanic current.

Project Development:

The device of this research is to study, design, build and modified the user friendly,low cost and efficient, 12VDC to 240VAC power inverter. The inverter that will be built in this project is the simple 12VDC to 240 volt, 50 Hz inverter that can be used for normal **AC** equipment such as lighting and motor but maybe not be suitable for sensitive electronic equipment such as computer. The research can be simply broke up in to six sections

Circuit Diagram:



Observation:

1. It easy to make and Less Time Consuming
2. Low cost.
3. Compact in size
4. Capable for only low load

CONCLUSION:

An inverter is used to produce an un-interrupted 220V AC (depending on the line voltage of the particular country) supply to the device connected as the load at the output socket. The inverter gives constant AC voltage at its output socket when the AC mains power supply is not available. The 100 Watt inverter applicable for home application and light load.