



INVENTIVE CELL PHONE CHARGER

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Abstract- The major challenges in meeting the efficient use of mobile or cell phones are its batteries. While traveling or while one is in remote places one may face the problem of low batteries due to other add on difficulties like the unavailability of electrical supply source. The manufacturing companies try to provide batteries that can support a back up for 4-5 hours. After frequent use of cell phones we have low battery supply. Researchers have documented their findings in numerous per-reviewed journal articles to use alternate supply source. In this paper we attempt to overcome such problem by suggesting the use of inventive cell phone charger.

The inventive charger uses an external battery for charging the mobile batteries. The key idea behind the use of external battery is that to charge the mobile batteries current of 200mA given at a slow rate is sufficient to maintain a back up of approximately 3 hrs[2].

Thus in inventive mobile charger a 12V battery made up of eight pen cells is used. It provides 1.8A current to charge the battery connected across the output terminals. The circuit is implemented using step down transformer, a rectifier and an external battery source. The circuit is designed so as to automatically cut off the charging process when its output terminal voltage increases above the predetermined voltage level. This paper gives the working as well as the experimental output used in the inventive mobile charger.

Keywords- Rectifier, Step Down Transformer, External battery source.

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Introduction

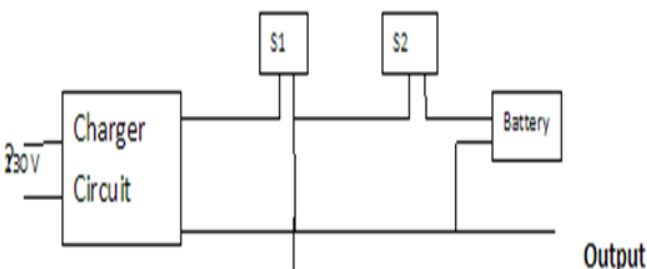


Fig.1- Basic block diagram of Inventive Cell Phone Charger
 While travelling or while in remote places the problem one comes across is low battery and the unavailability of electrical supply for charging. Many alternative methods have been tried and developed[1]. In this paper we suggest an alternative charging method-

ology even when the electrical power supply is unavailable. We suggest the use of external battery (9 V) as the charging source which can charge the mobile battery and can provide a back up of 2- 3 hours

Circuit Diagram

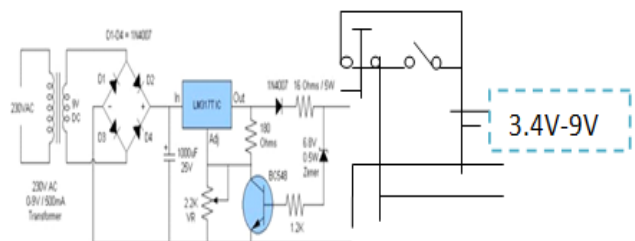


Fig. 2- Main Circuit Diagram

Basic Components Of Circuit Diagram

The circuit is composed of the following components

- Step Down Transformer
- Bridge Rectifier and
- External Battery(9V)

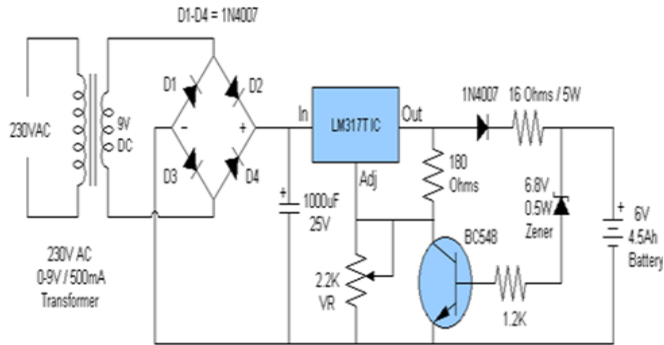


Fig. 3- Circuit Diagram of Bridge Rectifier used charger

And the third main part of this project is a battery of 9 volt in which we store energy for emergency charging where power supply will not provided.

We give output of the above circuit as an input to the battery.

Working

After the circuit has been designed, then experimental results are carried out for the proper functioning of the system.

At the beginning a 230v AC power is supplied to the step down transformer which is of rating 230v AC, 0-9v 500mA.

The transformer gives a 9v at the output of the step down transformer.

This 9v is supplied to the bridge rectifier circuit which converts it into DC.

The full wave bridge rectifier is designed to convert an AC sine wave to a full wave pulsating DC signal.

The bridge is normally connected to the secondary of a transformer as shown in fig.4a

The discussion of the operation of this circuit will be performed using conventional current flow.

Current will flow from a point with a higher potential to a point of lower potential.

During the positive half cycle, the circuit is equivalent to the following-

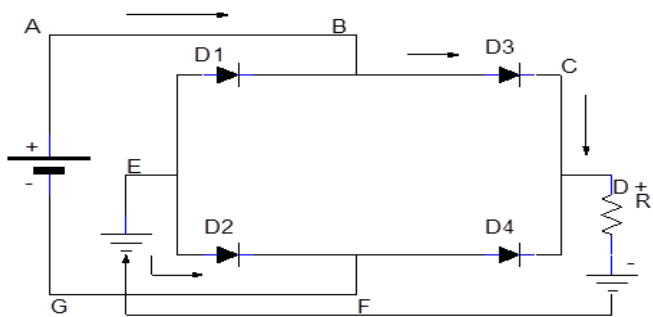


Fig. 4a- Positive Half Cycle of Full Wave Rectifier

Since the top of the battery is positive so it has highest potential and current flows from A to B. Now point B will be at higher poten-

tial than point C, diode D2 will be forward biased and will conduct current.

Now Point E will be at lower potential than point B, diode D1 will be reverse biased and will not conduct current.

Now point C will be at higher potential than point D, so current will flow through R. The load voltage will flow through the ground connection from point D to point E.

Point E will be at a higher potential than point D. In this condition diode D3 will be forward biased and will conduct current.

After this point B will be at higher potential than point E, diode D1 will be reverse biased and will conduct no current. Current will flow back to the negative terminal of the battery.

Point F is at lower potential than point C, now diode D4 is reverse biased and will not conduct current.

Here the positive half cycle is complete.

During negative half cycle just reverse the polarity of the battery in the circuit.

Since the bottom of the battery is positive then it has the highest potential, current flows from point A to point B.

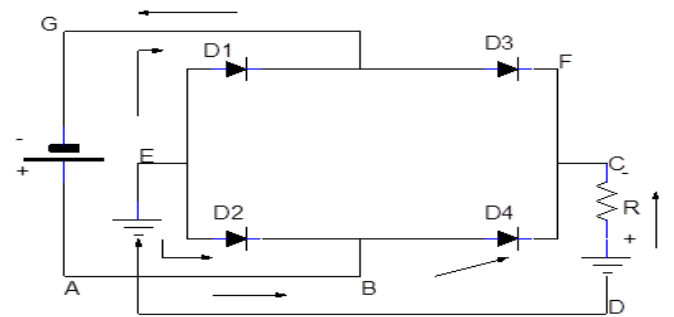


Fig. 4b- Negative Half Cycle of Full Wave Rectifier

Point B will be at higher potential than point C then diode D4 will be forward biased and will conduct current.

Now point E will be at lower potential than point B then diode D3 will be reverse biased and will not conduct any current.

Further point C will be at higher potential than point D then current flow through R. The load voltage will have the polarity as shown in the fig.4b

Now current will flow through ground connection from point D to point E.

Point E will be at higher potential than point F, diode D1 will be forward biased and will conduct current.

Point B will be at higher potential than point E, diode D3 will be reverse biased and will not conduct current.

Current will flow back to the negative terminal of the battery.

Point F is at a lower potential than point C then diode D2 is reverse biased and will not conduct current.

Now the output waveform will appear as follow-

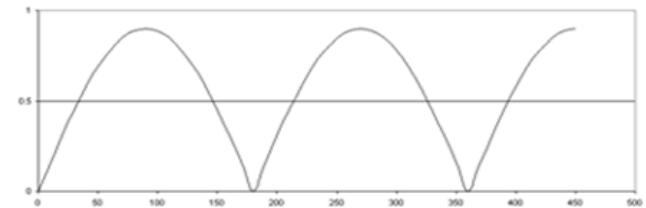


Fig. 5- Waveform of Full Wave rectifier

Now finally we get 9 volt DC supply as output.

Now we have to implement a battery here and a two way switch.

Now there are three cases-

- In the first case when we have power supply available, we directly charge the cell phone through the charger circuit.
- In the second case when we turn the two way switch to the right direction the battery start charging.
- In the third case when we turn the two way switch toward left and main supply (i e 230v AC) is off the battery start charging the cell phone[4].

Component Ratings

Transformer: 230 volt AC 0-9 volt/500mA

D1-D2 : 1N4007

IC : LM317T

Capacitor : 1000 μ F 25 volts.

Conclusion And Future Scope

The main purpose of charging cell phone batteries in absence of any external electricity supply usually while travelling was successfully implemented with the help of inventive cell phone charger. This provided a back up of approximately of 2 to 3 hours. This charger has a simple circuit layout and is easy to implement and in use.

This charger can be further enhanced by considering various aspects related to safety while charging. We suggest enhancing the circuit operations by implementing relay or capacitor along with output of the transformer so that we get regulated voltage supply during charging through AC power supply.

The cost of implementation of Inventive Cell Phone Charger is very less .It worth only Rs.150.

References

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