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Coin-Based Mobile Battery Charger Using Solar Panel

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Abstract: **The coin-based mobile battery charger developed in this paper is providing a unique service to the rural public where grid power is not available for partial/full daytime and a source of revenue for site providers. The coin-based mobile battery charger can be quickly and easily installed outside any business premises. The mobile phone market is a vast industry, and has spread into rural areas as a essential means of communication. While the urban population use more sophisticated mobiles with good power batteries lasting for several days, the rural population buy the pre owned mobile phones that require charging frequently. Many times battery becomes flat in the middle of conversation particularly at inconvenient times when access to a standard charger isn't possible. The coin-based mobile battery chargers are designed to solve this problem. The user has to plug the mobile phone into one of the adapters and insert a coin; the phone will then be given a micro-pulse for charging. It does not bring a mobile from 'dead' to fully charged state. The charging capacity of the mobile is designed with the help of pre defined values. It is, of course, possible to continue charging the mobile by inserting more coins. This compact and lightweight product is designed to cater for the growing number of rural mobile users worldwide. A suitable microcontroller is programmed for all the controlling applications. The source for charging is obtained from solar energy and back up storage battery in case of non availability of solar energy.**

Keywords: **Adapters, Battery Charger, Mobile Phone, Microcontroller, solar panel.**

1. INTRODUCTION

The growth of mobile phone market is phenomenal in recent years and the need for charging the mobile battery is required anytime and anywhere. In many developing countries the grid power is not available for few hours to several hours on daily basis especially in semi urban and rural areas where the mobile phones are the essential communication device. While the urban population use more sophisticated mobiles with good power batteries lasting for few days, the rural population buy the pre owned mobile phones that require charging frequently even two or three times a day. A coin based universal mobile battery charger is designed and developed in this paper. This device is like a vending machine for mobile battery charging and the user has to plug the phone into one of the adapters and insert a coin for charging at a constant current for a definite duration. In this paper, the design and development of a coin based universal mobile battery charger based on main power is discussed and this is primarily for rural areas where the mobiles are basic needs for communication and the main power is not available all the time.

2. BASIC ASSUMPTION

- The coin based mobile phone charger is very useful to public for using coin to charge for the mobile phone in any places.
- This system is useful in hilly areas.
- Rural and remote areas where the current supply is not at all available all the time .This is also applicable in these areas.

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- More useful to save energy from sun and intelligent tracking solar energy.
- Less expensive

3. OPERATION

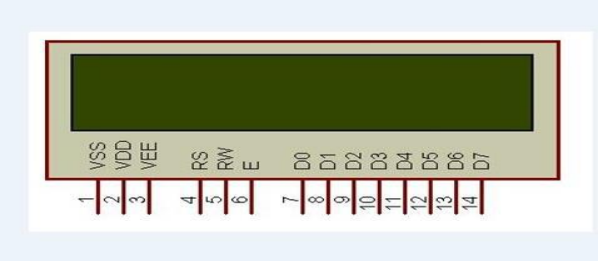
The Coin Based Mobile Battery Charger system uses PIC16F73 as the micro controller. PIC needs 5V supply to work. A 230V is given to a transformer and this output is give to a rectifier. To ensure safety we use a voltage regulating IC LM7805. This is a three pin IC. To the first pin, we provide the input voltage and to the second we provide the ground. The regulated voltage is obtained from the third pin. This IC can regulate up to 30V and provide steady 5V to PIC. Oscillator circuit is provided to the controller for the clock. The LCD of the system is connected directly to the ports of the PIC. It is connected to the PORT B of the system. When a metal sensor detect a coin then its output become low and it is connected to the 11th pin of the micro controller. Then there is a magnification occurred in the microcontroller. The 14th pin of the controller is connected to the relay. The Relay switch is always connected to ground and it will have a low pulse in its output. When there is a magnification in the controller, the Relay switches to the next pin connected to the power supply. Now the phone will be charged by taking the power from the solar power supply section which is connected to the relay. The Relay continues to be connected to the power source until the pulse or magnification weakens. There is an NPN transistor is used to control the relay current. A series base resistor is used to set the base current of transistor. Here using BC 548 NPN transistor.

3. MICROCONTROLLER

The micro controller is an I/O oriented single chip microcomputer. The micro controller normally consists of CPU, internal RAM, internal EEPROM, main memory, I/O port, DMA controller, interrupt handlers, timers, watchdog timers, ADC and DAC. The instruction set of micro controller is versatile and suited for control applications. Here we use microcontroller 16F73.

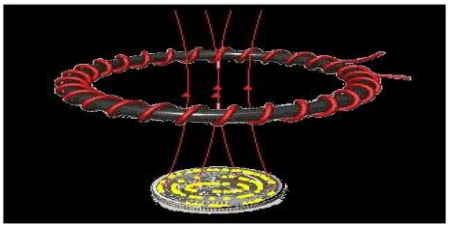
4. LCD

In this project we use LCD display (LM016L) to display the various outputs from the microcontroller like required messages, charging status etc. Most LCDs with one controller has 14 pins and LCDs with 2 controller has 16 pins.



5. METAL SENSOR

The input of the metal sensor is a coin. The input coin is firstly inserted to the coin slot provided in the system. When the coin is inserted to the metal detector it detects the presence of a coin and makes a beep tone to indicate that the coin is inserted properly. Metal detector output is a high signal indicates that there is no presence of coin and when the output is low that seems the presence of a coin. The output of the metal sensor is fed to the microcontroller where further processing of the signal is taking place.



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6. SOLAR PANEL

A solar panel turns the sun light into electricity! We see electricity at work every day. For instance, when you turn on a lamp, electrons move through the cord and light up the bulb. That flow of electrons is called electricity.

7. CHARGER DRIVER

The charger driver section contains charger and the relay circuit. A relay is an electrically operated switch. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical. At the one end of the charger driver we connect the mobile phone where it gets charged for particular duration of time. Charging time can be decided by manufacturer.

8. POWER SUPPLY UNIT

Power supply is an integral parts a vital role in every electronic system and hence their design constitutes a major part in every application. In order to overcome mal-operation which results due to fluctuations in the load and discontinuity in the supply proper choice of power supply is indeed a great need in this hour. This section consist of solar panel, related to it there is voltage regulator. Solar panel has two pins one is positive and other is negative .Its output is given to the regulator through a diode and a capacitor. This diode is used to protect the circuit, so it is called protection diode. Capacitor works as a filter. It is used to avoid ripple factor. The regulator that we used in this section is LM317.It has one input pin one output pin and a ground pin. There is a potentiometer connected across the regulator. This port is used to control the regulator voltage by using this regulator we will get the voltage from 5v to 17v.

9. RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so relays have two switch positions and they are double throw (changeover) switches. Relays allow one circuit to switch a second circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is magnetic and mechanical.

The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Most ICs (chips) cannot provide this current and a transistor is usually used to amplify the small IC current to the larger value required for the relay coil. The maximum output current for the popular 555 timer IC is 200mA so these devices can supply relay coils directly without amplification.

10. RESULT

In this paper we use a method of charging mobile batteries of different manufacturer using solar power has been designed for rural and remote areas where the current supply is not at all available all the time. This paper is very useful in today's life. Because now days the necessity of communication is very important, so every person having cell phone but every time we cannot carry charger with us. When we are going for long travel we may forget to carry cell phone charger. This paper is used to help the people by coin based charger.

REFERENCES

[1] Mill Man J and Hawkies C.C. "INTEGRATED ELECTRONICS" McGraw Hill, 1972.

[2] M D Singh and K B Khanchanani, "POWER ELECTRONICS" Tata McGraw Hill, 2003.

[3] http://www.atmel.com/.

[4] http://www.micochip.com/.

[5] http://www.beyondlogic.org.

[6] www.slideshare.net.