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Coin Paid Mobile Charging System Using solar panel as well as AC supply

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Abstract— The coin-based mobile battery charging system is developed in this project, we will 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 but todays smartphone has less battery backup time. The rural population buy the pre owned mobile phones that require charging frequently. Many times battery becomes at 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 preened 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 PIC microcontroller is programmed for all the controlling applications. The source for charging is obtained from direct power grid and solar energy in case of non availability of grid power.

Keywords- Solar panel, IR sensor, PIC microcontroller, universal charger, Battery.

I. 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. In the event of unpredictable grid power and availability of abundant solar power. 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 at kiosks 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 10 min duration. The solar power application to battery charging has been studied in the past.

Solar chargers convert light energy into DC current for a range of voltage that can be used for charging the battery. They are generally potable but can also bermly mounted. In this design of coin based mobile charger a fixed size solar panel of size 290x185x22mm , 5W is used to charge the battery up to maximum 1.0 amp in bright sun light. In this project, the design and development of a coin based universal mobile battery charger based on main power and solar 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. The mobile phone market is a vast industry, and has spread into

rural areas as an 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 at 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 predened 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 PIC microcontroller is programmed for all the controlling applications. The source for charging is obtained from direct power grid and solar energy in case of non availability of grid power.

II. PROPOSED MODEL AND WORKING

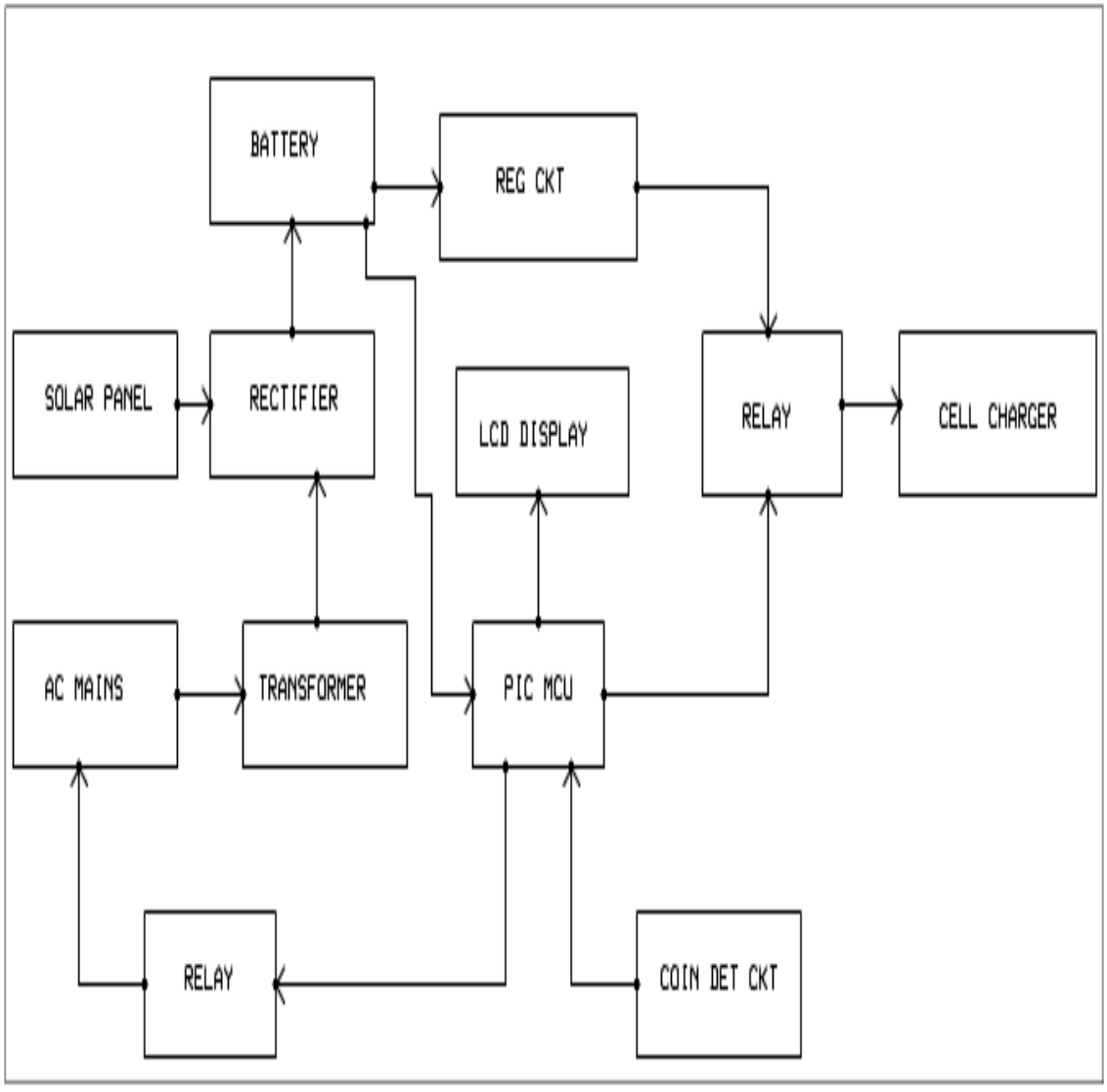

Figure 1. Block diagram of coin paid mobile charging system.

2.1. Input Stage

The mobile battery charger starts charging a mobile connected to it when a coin is inserted at the input stage. The type of coin and the size will be displayed at the LCD display for the user so as to ensure correct coin insertion. Any other coin if inserted in the slot it will be returned to refund box. A

sensor attached to the coin insertion slot accepts the coin into the battery charging unit and start charging the mobile battery for a specic period controlled by the software of the pic microcontroller. The sensor is an IR sensor. The resistance of the sensor decreases when IR (infrared) light falls on it. A good sensor will have near zero resistance in presence of light and a very large resistance in absence of light. When the coin obstruct the IR light falling on a sensor, it sends a pulse to the control unit authorizing the start of charging the mobile battery con- nected to the device. Two IR sensors are used for positive authentication of the charging process.

2.2. Power Supply

The salient feature of the universal mobile battery charger is that it draws power from the solar energy during the day time for charging the internal battery of the controller. Only if additional power is required, then the grid power is used. AC Power supply for supplying 230v, 50Hz so that both grid power and the solar power are use with a switch to changeover from one to the other.

2.3. PIC Microcontroller

This section acts according to the input signal from the sensor circuit. Coin accepted or rejected is based on the diameter of the coin. This invokes PIC microcontroller along with LCD interface displays the selection of mobile option if particular mobile is selected for charging the corresponding routine is activated and charge the mobile for a particular duration of time .When the routine completes, it indicates charge complete message through LCD display. Simi- larly the same procedure is followed for charging more than four different mobiles simultaneously.

2.4. Output and Display

The LCD displays all the information to the customer as and when required. When the mobile battery is connected, it displays Insert Coin. While charging it displays Charging and at the end of charging cycle it displays Charge completed. For charging continuously the coin has to be inserted when the display shows insert coin.

Table 1: Charging Requirements of Mobile Batteries

SI.NO	Mobile Type	Maximum Charging Voltage (V)	Maximum Charging Current(mAh)
1	Samsung	5.7	3400
2	Sony Ecrisson	4.8	900
3	Nokia	4.8	1500
4	LG	5.5	2100
5	Panasonic	3.7	1200
6	HTC	5.5	1800
7	Black berry	3.7	1300

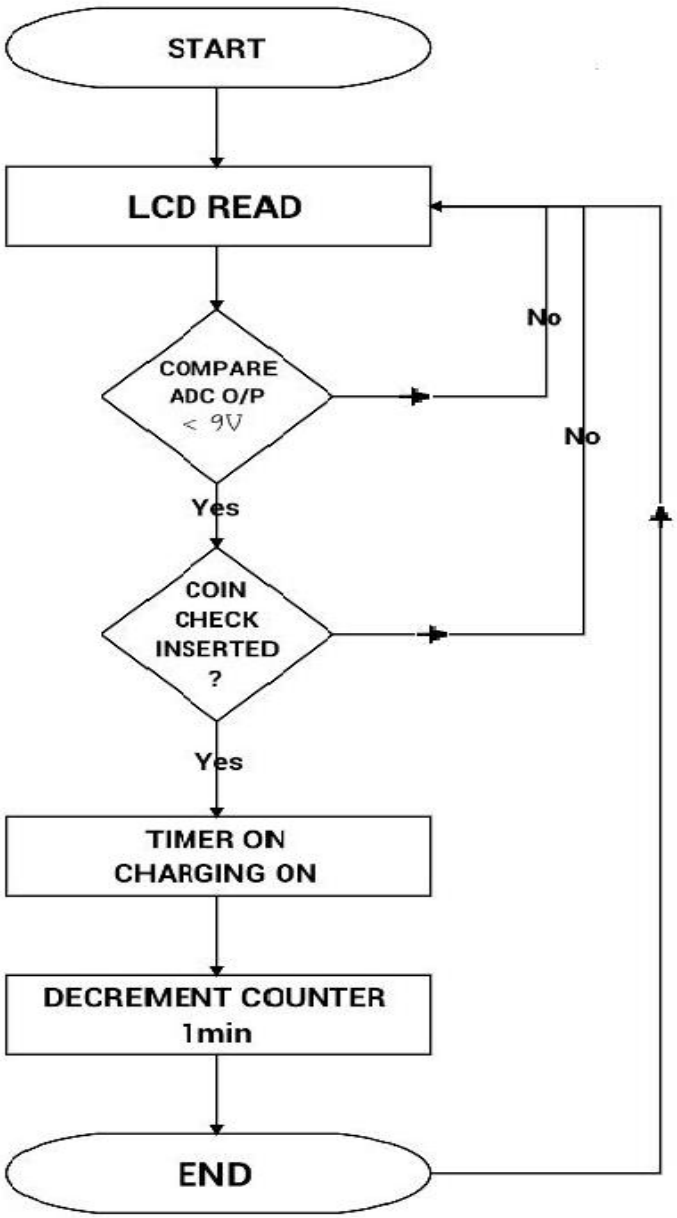

Figure2. Flow chart of coin paid mobile charging system.

III. FUTURE SCOPE

1. Recently there was a news from appo mobile company they have found technology to charge mobile four times faster than conventional charging method.
2. They provide high current to the mobile battery which is up to 4 amperes.
3. If we used such high current to charge conventional battery of mobile, so it will get start heating and has chances of damage of mobile and battery. So they have provide protection from such heating problem.
4. So if all the mobile companies started using this technology then the customer of our coin paid mobile charging system does not have to wait for long time to charge his mobile.
5. Hence instead of 10 minutes of charging time the battery got charged in 2 to 4 minutes.

IV. CONCLUSION

In this project, a novel method of charging mobile batteries using solar power as well as AC power supply with Relay switching has been designed and developed for rural and remote areas where the grid power is not available all the time. The mobile communication has become a necessity even in rural areas and this device is useful for charging mobile batteries as these mobile battery chargers can be installed at various public places for the convenience of mobile users for charging purpose

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