

Multi User Solar Operated Coin & Card Base Mobile Charging Unit

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Abstract—The growth of mobile phone market is phenomenal in recent years and the need for charging the mobile battery is required anytime and anywhere. This project is very much useful to people who are all using mobile phone without charging condition in public places. The mobile phones becoming the major source of business/personal communication, the mobile phone business is currently worth billions of dollars, and supports millions of phones. Especially in semi urban and rural areas where the mobile phones are the essential communication device. The need to provide a public charging service is essential. Many times on Public Places such as Railway Station & Bus Stop, Unfortunately battery gets discharge during conversation. In rural area where electricity has not been available to charge the mobile. Some Person does not carry coins with them for charging mobile on Public Places. Advanced Multi User Solar Operated Coin & Card Base Mobile Charging Unit is designed to overcome the problem of charging during emergency on Public Places. Different types of mobile, Power Bank, I-pod & Tablet can be charge.No need to carry charger. The source of charging is Solar Energy. It is providing a unique service to the rural public where grid power is not available. The user has to plug the mobile phone into one of the adapters and insert a coin or swap the RFID card, then the phone will get a micro-pulse for charging. 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. In this Charging Unit locking and tracking system is used. In gloomy weather solar panel does not capture required amount of energy, with the help of locking and tracking system solar panel able to capture that much amount of energy. And main advantage of this project is, More than one user can get charged their devices simultaneously by using this system.

Keywords: - Solar Panel, Controller, Coin Sensor, RFID Reader, locking and tacking, Raspberry pi.

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. This project is very useful to people who are all using mobile phone without charging condition in public places. With mobile phones becoming the major source of business/personal communication, the mobile phone business is currently worth billions of dollars, and supports millions of phones. Especially in semi urban and rural areas where the mobile phones are the essential communication device. The need to provide a public charging service is essential. Many times battery becomes flat in the middle of conversation particularly at inconvenient times when access to a standard charger is not possible. The coin-based mobile battery charger is 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 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.

II. PLAN AND DESIGN

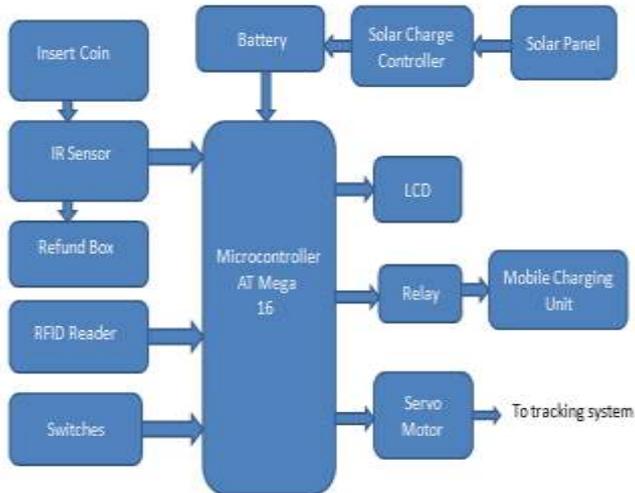
Stages of development

The evolution of the system was split into five main stages according to the development strategy. Each stage content some basic information about system.

Stage 1: Block Diagram

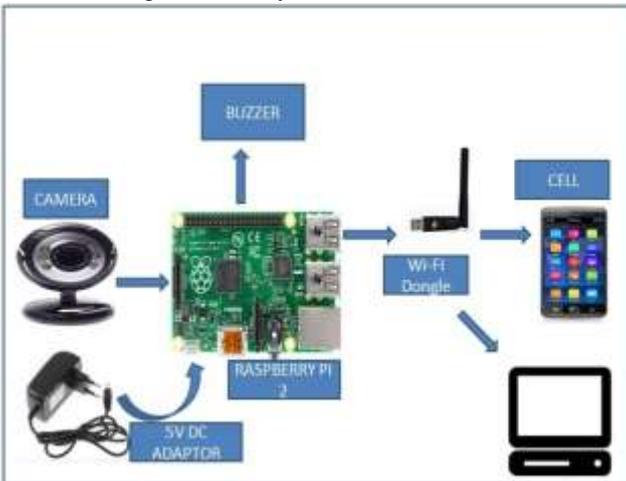
As per from above block diagram, after inserting coin from insertion coin block IR coin sensor will sense whether coin is original or not if it is not then it will refund into refund box and if is then it will gives action to the microcontroller. Similarly for RFID Reader (Radio Frequency Identification Reader). Solar panel collects which ever energy comes from sun and it will send to the solar charge controller which converts energy into charge then charge will go and store into battery. Battery operates microcontroller. As soon as coin will insert microcontroller gives action to the LCD, Relay, Servo motor. When relay

will ON that time mobile charging unit (bunch of USB cables) will also ON. Servo motor is for locking and tracking purpose. Here Switches are used for selecting charging slot where to be charged.



Stage 2: Security System

For safety point of view of above system security system provided. In that Rasp-berry Pi is used. In case if anyone is teasing with that, that time camera will capture image of that particular person then it will send to the controller, who is operating and observing this system from another side. When controller gives command from himself only buzzer will ON and that teaser will alert or stop whatever action they were doing. We can perform above observing action by using Wi-Fi or Dongle itself only.

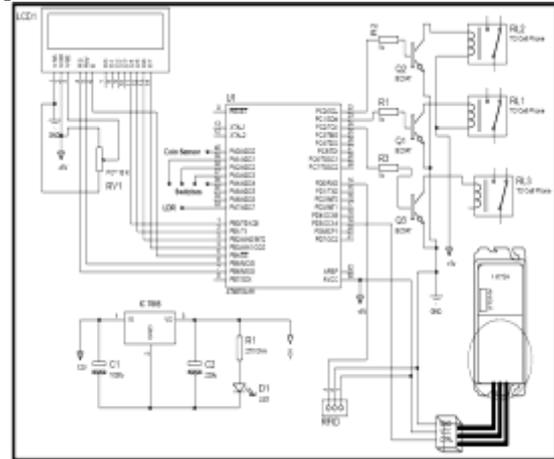


Stage 3: Circuit Diagram

In this circuit we use AT mega16 microcontroller. Microcontroller can be termed as a single on chip computer which include number of peripheral like RAM, EEPROM, timer etc. required to perform some predefine task. It has four ports, port A, B, C and D. For operating microcontroller and other sensor required 5v. Solar panel generates 12v and it will store charge in to 12v battery. Using 7805 voltage regulator IC convert 12v input voltage in to 5v. Then 5v is connected to vcc pin of microcontroller and gnd pin connected to ground pin of microcontroller. 16*2 LCD (liquid crystal display) which is connected to port B of

microcontroller. Coin sensor is connected to port A pin no.40. There are three switches which are connected to PA1, PA2 and PA3 pin.

In this circuit there are three relay used for connecting three mobiles, this connection is used for more than one user can be charge their mobile at a time. Also in future we can increase the number of relay for more than three users or multiple user will be charge their mobile and their device. These relay are connect to microcontroller at PC0, PC1 and PC2 pin.



In this circuit used Driver circuit for that BC547 transistor. RFID reader module also connected with microcontroller. The TXD pin of RFID which is connected to RXD pin microcontroller. Vcc pin connected to 5v and ground connected to GND pin of microcontroller. Servo motor has three wires, onewire connected to 5v, second one connected to ground and third wire is connected to PD5 pin of microcontroller.

Stage 4: PCB layout:

In this stage, basic circuit has been designed by using simulation tools to check the overall working of the circuit. Several parts were gathered using the simulator tool and hence the working of circuit was tested on the simulator. Granting to the circuit designed, PCB Layout was made such that the hardware components can be set up accordingly.

Stage 5: Hardware

Above system is based on two part hardware as well as software. In this circuit hardware consist of solar panel, IR coin sensor and motor. The purpose of solar panel is for collecting rays which come from sun in large quantity. IR coin sensor used for the identifying coin with their specification. It can accept more than one coin simultaneously. Main part which helps in operation it's known as Hardware.

Stage 5: Assembling:

At this stage of system evolution, all the elements are gathered together according to the circuit designed and PCB layout as presented in the old phases. After assembling of all the components, testing was performed to check the working

of every component with each other. Hence the hardware testing was done in parallel.

Stage 7: Software:

After detail study of hardware components and their assembling, as described in previous stages, next is to travel towards the software part of the system. Software part includes two sub-steps as stated be: -Atmel studio was designed for hardware developers to help them create microcontroller applications, and also debug them. It comes as an integrated development platform that uses Microsoft Visual Studio shell. This program efficiently handles application written in C and also in assembly language is highly portable, this means that program ones written can be run on another machine with little or no modification

III. CONCLUSION

After indulgent the related articles, literatures and analysis of a few similar projects, the current design strategy has been selected. In this work a novel method of charging mobile phones with coin detection as well as smart card has been designed for travelers who need to charge their mobile phones and gadgets immediately. Hence we are functioning on the project Advanced multi user solar operated coin and card base mobile charging unit.

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