

## “Solar Operated Coin Based Universal Mobile Battery Charger”

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**ABSTRACT:** The growth of mobile phone market is increase day by day and the need for charging the mobile battery is required anytime and anywhere. This paper describes mobile battery charger using solar panel system based on coin and RFID module. Many times on Public Places such as Railway Station & Bus Stop, Unfortunately battery gets discharge during conversation.

To overcome this problem the universal mobile battery charger is design. This system is very useful specially in semi urban and rural area where grid power is not available for partial/full time on daily basis. The coin-based mobile battery chargers are designed to solve this problem. This design is based on AVR ATMEGA16, a 40 pin microcontroller with LCD displays showing the actual time left. During the time period, a relay output is latched.

This can be used at Hotels, colleges, bus station, Conference centers, Exhibition halls, service offices, Shopping malls, Airports, Train terminals. So that the mobile phone users can reactivate a low battery or dead battery by simply plug in & charging for one rupee.

**KEYTERMS:** Microcontroller(ATMEGA16), LCD Disply, RFID Module, Motor Driver, Coin Detector Sensor, Mobile Phone, Solar panel.

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### I. INTRODUCTION:

Mobile phones have a great value in today's market, as well as mobile phone is a great communication media for personal and industrial purpose. 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 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 or some user does not carry coins with them to overcome this problem RFID module is implemented. A suitable microcontroller is programmed for all the controlling applications. The source for charging is obtained from solar energy and direct power grid and in case of non availability of solar energy.

Also there is provision of solar tracking and locking due this solar panel get sufficient sun rays to work properly. The solar panel will rotate according to reading read by LDR and mechanical movement will provided by servo motor. This work mainly designed to control the solar panel automatically, maintains face of the solar panel towards the sun.

### II. LITERATURE REVIEW:

[1] Gunjan Chhabra, Sunil Kumar and Pankaj Badoni -1st International Conference on Next Generation Computing Technologies (NGCT-2015) Dehradun, India, 4-5 September 2015.

In this communication era, mobile - telephone industry has grown profoundly. The urban population uses the latest mobile-phone technology while the rural population buys second hand ones, mostly with degraded battery, that require frequent charging. This battery-problem becomes a giant when user doesnt have a standard charger or an electricity connection. In this paper, researchers intent is to propose a public coin based mobile battery charging system. By using image processing techniques, value of the coin has been detected for a limited time; it will charge the device accordingly. A suitable microcontroller is programmed for all the controlling applications. The source for charging is obtained either from a direct power grid or by solar energy.

[2] S.B.Sridevi, A.Sai Suneel, K.Nalini- International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) Volume 2, Issue 9, September 2013

This paper describes coin based mobile charger using solar tracking system. Mobile phone's become a major source of business/personal communication; the mobile phone business is currently worth billions of dollars, and supports millions of phones. The need to provide a public charging service is essential. Many critics argued that a public mobile phone charging service is not a lucrative business because most users can charge their phones at home, in their office or in their cars. Coin operated mobile phone charger is new business milestone because many are attending business conventions and forgetting their charger

at home or in hotel rooms. Students and many people use the public transportation that don't know that their level of their battery is low are prospective customers for coin operated mobile phone charger service. Recommended locations include: Hotels, Conference centres, Exhibition halls, Serviced offices, Exchange halls, Motels, Leisure centres, Health clubs, Training centres, Golf clubs, Retail outlets, Shopping malls, Internet cafes, universities, Colleges, Hall of residence, Airports, Train terminals, etc., so that the mobile phone users can reactivate a low or dead battery by simply plugging in and charging for one rupee. This is designed based on ATMEL 89c51 a 40-pin micro controller that does the countdown timings for a period of 3 minutes with LCD displays showing the actual time left. During the timing period a relay output is latched and finishing timing in progress.

[3] Raju R. Khawse, Sachin S. Shikare , Pradip Suryawanshi, Prof. A. A. Trikolikar- International Journal of Advanced Research in Computer Engineering & Technology (IJARCET) Volume 4 Issue 3, March 2015

Mobile phones play's an important role in present communication world as well as day to day life. This paper describes mobile charger using solar panel system based on coin and RFID module. The mobile phone business is currently worth billions of Dollars supports of most no. of features in your mobile phone with several OS. There are increasing large numbers of Android user which requires more battery supply. So to operate these mobile phones public charging needed & it should be useful to public. This design is based on AVR ATMEGA16, a 40 pin microcontroller with LCD displays showing the actual time left. During the time period, a relay output is latched. This can be used at Hotels, Conference centers, Exhibition halls, service offices, Shopping malls, Airports, Train terminals. So that the mobile phone users can reactivate a low battery or dead battery by simply plug in & charging for one rupee.

**BASIC ASSUMPTION:**

The design of solar operated coin based mobile battery charger is based on following assumption:

- The charging current is up to 1AH @ 6vDC.vv
- A solar panel of size 635x550x38 mm, 37WP capable of supplying upto 2.0 amp is used.
- Provision to charge maximum is provided.
- Insertion of a fixed coin size for charging (for ex. 1₹).

**BLOCK DIAGRAM**

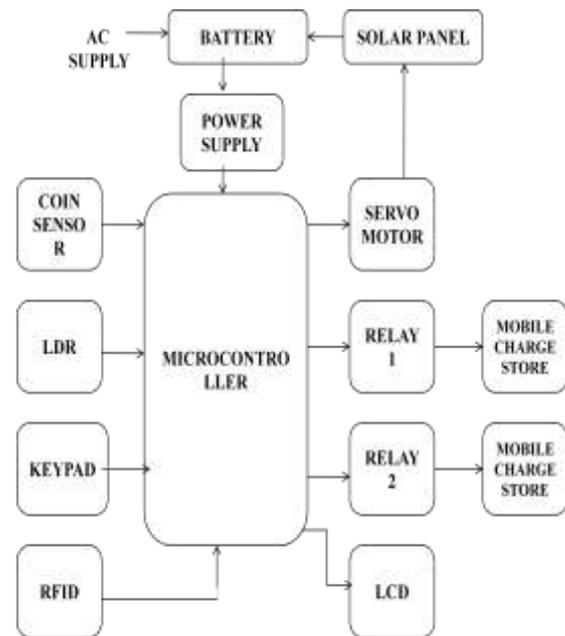
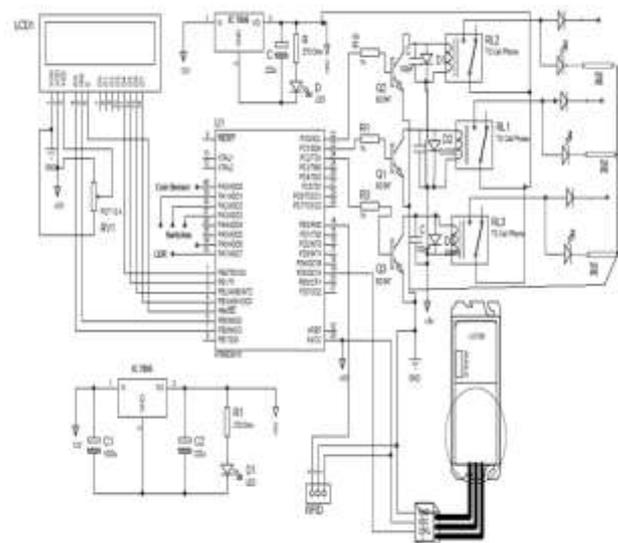


Fig:- Block diagram

**CIRCUIT DIAGRAM**



**OPERATION**

**1 INPUT STAGE**

The mobile battery charger starts charging a mobile connected to it, when a coin is inserted at the coin insertion slot 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 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 specific period controlled by the software of the microcontroller.

RFID can be used if we don't have coin or requires long time period of charging. RFID is a radio frequency identification used electro-magnetic energy as a medium for communication. The basic components, reader and transponder are connected to microcontroller. Transponder is a radio transmitter and receiver. When the transponder receives a signal from reader unit, it responds by transmitting its unique identification code.

## 2 CONTROLLER

This section acts according to the input signal received from mechanical detection. Coin accepted or rejected is based on the diameter of the coin. This invokes 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. Similarly the same procedure is followed for charging more than two different mobiles simultaneously

## 3 OUTPUT STAGE

The supply from relay given to the mobile charger pin. The charger will be ON only when the coin is inserted or RFID card swap. 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 "Charge Completed". The output has 10 terminals for connecting different types of mobile batteries and 7 of them are internally connected for charging mobile batteries of different make as shown in Table 1[4].

**Table 1: Charging Requirements of Mobile Batteries**

S.NO.	Mobile Type	Maximum Charging Voltage (V)	Maximum Charging Current (mAh)
1	Samsung	5.7	3400
2	Sony Ericsson	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

## 4 SOLAR TRACKING SYSTEM

To provide power supply regularly, we use Solar Panel, DC Power Supply, Battery. Solar Panel provide DC power supply which is given to charge the rechargeable battery of 12V and DC power supply which is from Grid supply provides DC 12V to charge the battery.

The mechanical movement of the solar controlled through the stepper motor [5]. 2 LDR's will be placed on arch. So according to the sun movement LDR intensity will be varied where the sun light intensity is more LDR intensity will be less and depending upon LDR intensities stepper motor will be rotated to the side where the LDR intensity is found to be less so that solar panel is also rotates.

Power optimization is done by using LDR. If the surrounding light is less then LDR reads maximum. According to the value of LDR the ADC shows the reading. The ADC will send this value to microcontroller.

## 5 POWER SUPPLY

The input to the circuit is applied from the regulated power supply [6]. The AC input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating DC voltage. So in order to get a pure DC voltage, the output voltage from the rectifier is fed to a filter to remove any AC components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant DC voltage.

### ADVANTAGES

- Simple and hand efficient.
- Affordable for users.
- Reduced man power.
- Low power consumption.
- More than one user can charge their devices.
- Low Maintenance.
- One time investment system

### APPLICATIONS

- It is useful in public Places.
- It can be used to charge any type of mobile phones.
- It can be used in rural areas where grid is not available.
- It can be used to charge the Power Bank

### III. CONCLUSION

After understanding the related articles, literatures and analysis of a few similar projects, the current design strategy was selected. In this project a novel method of charging mobile phones with coin detection as well as smart card has been designed and with the provision of solar tracking and locking system, travelers who need to charge their mobile phones and gadgets any times and anywhere.

Thus we have worked on the project Advanced multi user solar operated coin and card base mobile charging unit.

#### IV. FUTURE SCOPE

- Charging slot can be increased for more number of user.
- Laptop and Camera can be charged using this system.

#### REFERENCES

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- [6] Quoting US patent #4937722, High efficiency direct coupled switched mode power supply: The power supply can also include crowbar circuit protecting it against damage by clamping the output to ground if it exceeds a particular voltage.