

# Coin Based Mobile Charger

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**Abstract:** The coin based mobile charging system charges the mobile phones when the coin is inserted. This system is used by shop owners, rural people and can be implemented in the public places like railway stations, bus stand to provide mobile charging facility. So the coin acceptor recognizes valid coins and then signals the arduino for further action. If a valid coin is found, it signals the arduino and then arduino starts the mobile charging mechanism providing a 5V supply through a power supply section to the mobile phone. The arduino starts a reverse countdown timer to display the charging time for that mobile phone. Further the user adds another coin, the arduino adds to the currently remaining time and once again decrements the countdown. This system can be used for smart mobile charging at public places. This coin based mobile charging system will supply the enough amount of charge to the mobile phone and is available on demand in public places.

**Index Terms**—Coin Acceptor; Arduino; LCD Display; Relay.

## I. INTRODUCTION

The usage of mobile phones is increasing in many folds. Hence, charging the mobile phones has become a greater task these days. Battery power is the main concern when buying new mobile phones. The main purpose of mobile charger is to reduce the wastage of electrical power which often arises due to negligence of the user. Once the coin is inserted, the coin acceptor detects whether the coin is valid or not. For each unit of price, the power is available only for a limited period. The arduino can calculate the time based on the number of coins inserted.

## II. LITERATURE REVIEW

In recent times, there have been lots of advancements in technologies being developed for charging the mobile phones. In most cases solar energy is used for charging the mobile phones. Solar energy converts light energy into DC current that can be used for charging the mobile phones. A fixed solar panel of size 635x550x38mm,

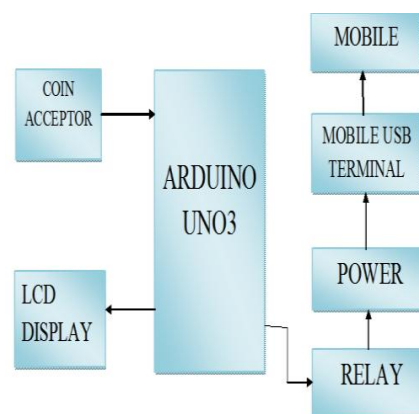
37WP is used to charge the mobile phones up to maximum 2.0 amp[1].

The Infra-Red Sensor is another way to charge mobile phones. The Infra-Red transmitter transmits IR signals in the transmitter side and receives the IR signal in the IR receiver side. Based on the signal between the IR transmitter and receiver, insert a coin to change the polarity of pulse in SCU input. The SCU converts low pulse to high pulse and fed as input into driver circuit and driver circuit provides sufficient input voltage of relay. This will be used for charging the mobile phones. The microcontroller performs the countdown time period for a 3 minutes, with LCD display shows the actual time left. During the time period a relay was out latch and finishing time in progress [2]. In [3], it experimentally investigated the working of Coin based mobile charger with solar tracking system by peak power positioning [3]. In this experiment the operational amplifiers can operate the ON/OFF and directional functions of the structured five motors. These motors rotate in two axes. The tracker's sun sensor is mounted. From the output of this device it will check the outputs are all equal, then the collector structure is nearly perpendicular to the sun and tracking error is reduced. According to [4], the renewable energy is the main source of one of the renewable energy sources is solar energy. This energy generated more energy because the solar panel is to maintain a perpendicular to the sun's rays [4]. By using an IoT, the mobile phone can be charged. In this scenario, it monitors the solar energy as well as battery power when the coin is inserted in the coin box. Once the coin is detected, it sends signal to the Raspberry pi and it trigger the relay and the LCD display show the countdown time. The Raspberry pi can collaborate with the outside world. The relay generates the voltage and fed as input to mobile phones.

There are various technologies evolved for charging the mobile phones in our world [5].

### III. SYSTEM ARCHITECTURE

The system architecture is described in the figure 3.1. A sequence of modules are used in the architecture namely Arduino UNO board, LCD 16x2 display, transistor, resistors, power source for arduino, battery and USB Port. The Arduino can "talk", (transmit or receive data data) via a serial channel, so any other device with serial capabilities can communicate with an Arduino.



**Figure 3.1: System Architecture**

### IV. MODULES

This section describes the modules for the proposed system.

- Input stage-To accepts the valid coin.
- Controller-To control the voltage using relay.
- Power-To supply the power based on the requirements.
- Output and display-To display the output information.

### 1. Input Stage:

The user inserts a coin to the coin insertion slot. The sensor is attached to the coin insertion slot and the coin is validated based on the diameter of the coin inserted. Initially the LCD display a message as "Please insert coin". If the inserted coin is valid, the message is displayed in the LCD and signal is sent to the arduino. If the coin is not valid, it is returned back. When the coin is accepted, the arduino and relay is activated and the battery starts getting charged by the software of relay.

### 2. Controller:

The system performs according to the input signal from the circuit. Based on the diameter of the coin, the coin is either accepted or rejected. If the coin is accepted, it sends signal to arduino along with LCD interface. Once the arduino receives the signal from the coin insertion slot, it sends signal to the relay. The relay generates the voltage of 5v, which in turn charges the mobile phone through the mobile USB terminal.

### 3. Output and Display:

The LCD connected displays the messages as and when required. Initially, when the mobile charger is connected the LCD displays as, "Please insert coin". When the mobile phone is charging, it displays "Charging" and the duration of charging based on the coin inserted.

### 4. Power:

This coin based mobile charger draws power from the arduino through relay. The voltage is regulated based on the type of the mobile phone connected

for charging. The following list describes the various mobile phones and their charging requirement

**Table 1:Charging Requirements of mobile batteries.**

SL.No	Mobile type	Max. Charging Voltage(V)	Max. Charging Current(mAh)
1	Samsung	5.7	3400
2	Sony Ericson	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

Courtesy: images.google.com

## V. COMPONENTS

- Arduino UNO
- Relay

### 1. Arduino UNO:

Today, Arduino is one of the major hardware components in our world. It is an Open Source platform. It is flexible and easy to use in hardware and software field. It consists of both a microcontroller and a piece of software that runs on your computer that is used to write a data and upload a code in to the physical board. It is based on the ATmega 328. In arduino consists of 14 digital input/output pins in which 6 pins can be used as PWM outputs, a 16 MHz ceramic resonator, an ICSP header, a USB connection, 6 analog inputs, a power jack and a reset button. The power supply for arduino is given through USB connection. It selects their power source automatically. The range of voltage is 7 to 12 volts to be recommended. It has 32KB of flash memory for storing code and 2KB of SRAM and 1KB of EEPROM. The power pins are as follows:

- **VIN:** The voltage can supply through this pin or the voltage can be supplied via the power jack.
- **5V:** The regulated power supply is used to power the microcontroller and other components on the board. The power supply can come either from VIN or be supplied by USB or another regulated 5V supply.
- **3V3:** A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- **GND:** Ground pins.

ARDUINO UNO R3

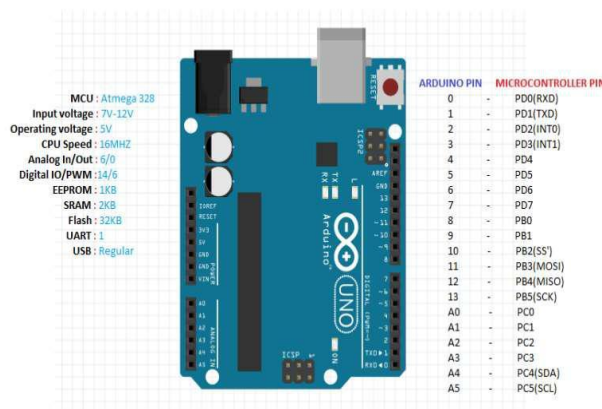


Figure 5.1: Arduino UNO

## 2. Relay:

A relay is a switch. This is an electromagnet switch in which it operates as a mechanically and also other operating principles are also used, such as Solid-state relays.

It can be used to control a circuit by a separate low-power signal, or must be controlled by one signal. The relays were used in many

fields. One of the fields used as an amplifier: they repeated the signal coming in from one circuit and re-transmitted it on another circuit.

It can be used extensively in telephone exchanges and early computers to perform logical operations. When an electric current is passed through the coil in which the coil is placed inside the relay and it generates a magnetic field.

The relays are manufactured to operate quickly. It reduces the noise in low voltage application and it reduces arcing in high voltage application.



Figure 5.2: Relay

## VI. IMPLEMENTATION METHODOLOGY

The three pins of the coin sensor are connected with the arduino board. One pin is connected with the pin 2 in arduino and the other two pins are connected with the positive and negative terminal of the battery.

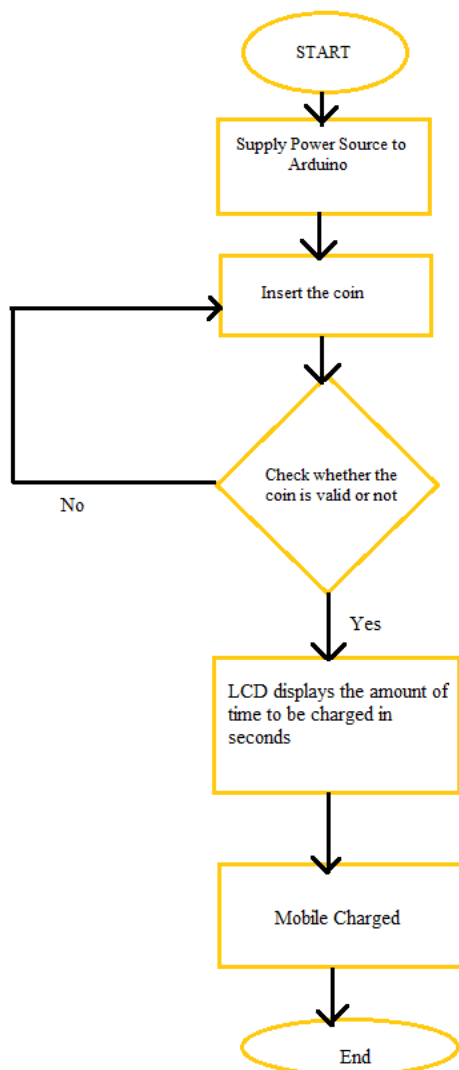
Once the coin is inserted into coin sensor, it validates the coin and sends signal to the arduino.

The arduino will send the signal to LCD 16x2 display. The LCD displays the amount of time to be charged. Then the

battery will be charged the mobile phone based on the number of valid coins.

If the coin is invalid then the LCD displays a message as “INSERT THE COIN”.

The following flowchart describes how the system works.



**Figure 6.1: Flowchart of the system**

### Algorithm:

Algorithm: Charge\_Mobile(coin)

Input: Coin.

Output: Charging the mobile phone.

Process:

Display a message as “Please insert coin”  
// LCD will display a message.

If (valid coin) // coin sensor // validates whether the coin is valid or not

{

Coinval=the value of the coin.

Based on the coin value the timer will be decremented in seconds.

LCD display the message as “Charging”

LCD display the time period for charging the mobile phone.

}

Else

{

The coin returned back to the coin slot.

}

## VII. RESULT

In this system, we have implemented the simple and hand efficient mobile charger which helps the user, charge their phones during urgent needs. This system is very helpful to the users who are all using mobile phone without charging conditions in public places. This system simple to use and is less expensive.

## VIII. CONCLUSION AND FUTURE WORK

In our work, we have generated the results of a create-and-design research aimed at providing a Coin Based Mobile Charger using Arduino, Coin Sensor and relay. This plays a vital role in charging the mobile phones. The sensor has been fabricated for particular type of coin. Once it was fabricated for accepting many types of coins, then it will be very useful and can be implemented in many areas.

## IX. REFERENCES

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