RFID Based Battery Charger Using Solar Panel

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Abstract: *In this paper the idea of this RFID based battery charger using solar panel helps us in the emergency posture by the way of charging our battery.In this generation and the future generation the battery is playing and will be play the another role of our life. The daily usage of this battery operated device like vehicle, laptop, mobile, it should be alive at every seconds without dead. In the way to give the life to this character our RFID card based battery charger using solar panel is used in the public places where the charging station is not available yet. We mostly face the low battery situation in the long time conversation, playing games, songs, at the interesting and serious condition the battery going to low means it brings our mood to irritation and tension. In case of battery operated vehicle if battery discharged then no way to charge it on highway or any other public place. To deal with these disappointment RFID card based battery charger is used by suddenly plugging the charger to the battery.These working of RFID based battery charger is simplified and used in where there is no conventional power obtained by the help of solar panel.*

Keywords: RFID Tags, EM18 Module Reader, crystal, Electrical vehicle, Microprocessor, Solar panels etc.

I. INTRODUCTION

Battery play's an important role in present communication world as well as day to day life. The describes battery charger using solar panel system based on RFID card and RFID module.to operate these battery phone public charging needed it should be useful to public. This design is based on AVR ATMEGA16, A40 pin microcontroller with LCD displays showing the actual time left. During the time period, relay output is latched. This can be used at Hotels, Conference centres, Exhibition halls, service offices, Shopping malls, Airports, Train terminals. So that the battery user can reactivate a low battery or dead battery by simply plug in & charging.

Today's world is energy driven and batteries have become an integral part as an energy source considering the technological advances in consumer electronics to electric vehicles, renewables, and smart grid Batteries are energy limited and require recharging. Recharging batteries with solar panel by means of photovoltaic cells can offer a convenient option for consumer electronics. Meanwhile, batteries can be used to address the intermittency concern of photovoltaic. This perspective discusses the advances in battery charging using solar energy. Grid-connected design of solar charged batteries involves the use of photovoltaic cells and solar modules as two separate units connected by electric wires.

Advanced design involves the integration of In-situ energy stored in solar modules, thus offering compactness and fewer packaging requirements with the potential to become affordable. This advancement can be cost effective for consumer electronics where space, size, and packaging requirements hold greater value. Three major indicator namely energy density, efficiency, and stability have been addressed by presenting relevant potential opportunities.

The integrated design is still in the early R&D phase. There is a need for innovatives design that explores high-capacitys, efficients, and stable materials. Meanwhile, to demonstrate its practical viability, Solar radiation particularly is usually converted into two forms of energy: thermal and electrical energy.

The solar electricity specifically has applications such as rural electrification, water pumping and satellite communications in a big way. Solar energy is usually used for most purposes in large scale-grid system and also stands alone system or small remote photovoltaic plant which is quite significant. This paper shows that Charging Electric Vehicles from Solar Energy is possible in a major way.

Due to the rapid increase in the world population and economic expansion geographically, leading to diminishing of fossil fuels and continuously growing environmental concerns such as greenhouse gas emissions in a particularly big way. Now

by using new technology in this project, much more electronic devices are being used to replace manpower thus leading to further increase in energy demand in a major way. Energy obtained from the sun radiations when in contact with the earth's atmosphere and or surface as radiances kind of is called solar energy.

1.1 Problem Statement

The major factor that drove us to this project is that it is one the method of charging that utilizes the renewable sources of energy where we can overcome the exhaustible usage of power and charge. It reduces the environmental pollution and is much user friendly. During disasters and power outages, it can be used with ease and with a long and forever durability of device and power. Even in the remote areas having scarcity of electricity, such models can be used. It can be a bit rusty during the rainy and foggy days and needs delicate care.

1.2 Objective

- Solar energy as energy source.
- Rechargeable battery as storage device.
- Multi-voltage outputs.
- Charging of various low-voltage devices.
- RFID based pay & charge system for public.
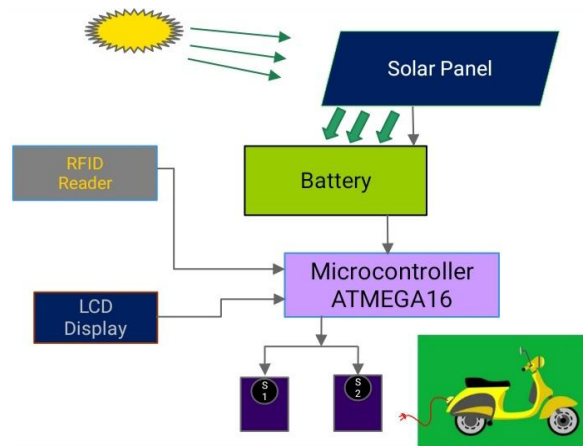- RFID card system use as cashless system.

II. METHODOLOGY

Figure 1: Block Diagram
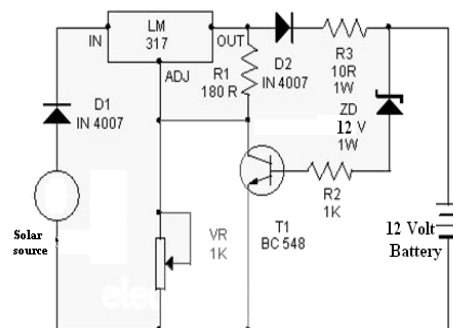
III. WORKING

Figure 2: Battery Charging Circuit

The supply from relay given to the battery charger pin. The charger will be ON only when the RFID card is inserted or RFID.card swap. It gives 4.8V&1500mA.power to the battery battery.The microcontroller used is ATMEGA16 which is type of reprogrammable microcontroller programmed consist of relay, which acts as switch to turn ON and turn OFF. The relay output is directly given to the battery charger pin. The different battery charger requires different size pins.solar power application to battery charging has been studied properly. Solar chargers convert light energy into DC current for a range of voltage that can be used for Charging the battery.They are generally portable but can also be mounted as per required place.In this design of RFID based battery charger is a fixed solar panel is used to charge the battery upto maximum bright sun light.

IV. RFID EM 18 Reader Module programming

```
$regfile = "m16def.dat"
$crystal = 16000000
$baud = 9600
$hwstack = 64
$swstack = 64
$framesize = 64
'$sim
Config Portd.5 = Output
Config Portd.6 = Output
Config Portd.7 = Output
'relay
Dim A As Byte
Dim Rfid As String * 160
Dim Num As String * 80
Dim Msg As String * 13
Dim Inmsg As String * 160
Dim Gps As Byte
Dim X As Byte
Dim Y As Byte
Dim Bat_pow As Word
Dim Bat_fact As Single
Dim Bat_volt As Single
Bat_fact = 12 / 508
'------------------ LCD Configuration and connection-------------------------
Incr A
Config Lcdpin = Pin , Db7 = Portc.0 , Db6 = Portc.1 , Db5 = Portc.2 , Db4 = Portc.3 , E = Portc.4 , Rs = Portc.5
Config Lcd = 16 * 2
Config Adc = Single , Prescaler = Auto ', Reference = Avcc
Start Adc
Declare Sub Getline
Declare Sub Starting
Declare Sub Batt
Declare Sub 1
Declare Sub 2
Declare Sub 3
'------------ Variables and constants for Battery Charger -------------------------------- ------
Relay Alias Portd.6
Led1 Alias PortD.7' GREEN led
Led2 Alias PortD.5 'RED  LED
```

```
Led1 = 0
Led2 = 0
Relay = 0
Sub Starting
Cls                           'Clear display
Cursor Off
Locate 1 , 1                  'set cursor position
Lcd "  Solar Based   "
Lowerline                     'second line
cd " Multi-Charger   "
Wait 2
' Cls                         'Clear display
'Cursor Off
'Locate 1 , 1                 'set cursor position
  'Lcd "    college     "
 ' Lowerline                  'second line
 ' Lcd "    "
  'Wait 2
  Cls                         'Clear display
  Cursor Off
  Locate 1 , 1                'set cursor position
  Lcd "Waiting For....."
  Lowerline                   'second line
  Lcd "RFID TAG......."
  Reset Relay
  Reset Led1
  Set Led2
  Wait 1
  'Batt
Do
Getline
  Waitms 500
 'Input , Msg
  If Inmsg = "3000503D9DC0" Then
  Reset Relay
  Waitms 500
  1
  Elseif Inmsg = "3000510B7913" Then
  Waitms 500
  2
  Elseif Inmsg = "30005073B5A6" Then
  Waitms 500
  4
  Else
  Waitms 500
  3
  End If
  Loop
  End Sub
```

Sub 2
A = 20
Do
Wait 1
Decr A
Set Relay
Set Led1
Reset Led2
Cls   'Clear display
Cursor Off
Locate 1 , 1   'set cursor position
Lcd "Charging ON....."
Lowerline

V. COMPONENTS AND RATINGS

| Sr.No	COMPONENTS	PECIFICATIONS & RATINGS
1	Solar panel	20 watt
2	Microcontroller ATMGE16	5 volt , A40 pins
3	Battery	12 volt, 8.3Ah
4	EM 18 Reader Module	5volt , 2 Ampere
5	DC Relay	12 volt
6	LCD Display	16×2 , 5 volt
7	RFID tags	1 nos.
8	Electrolytic Capacitor	470 & 1000 micro farad
9	Variable Voltage Regulator	12 volt DC
10	Fixed Voltage Regulator	12 volt DC
11	Others	

VI. PROJECT HARDWARE
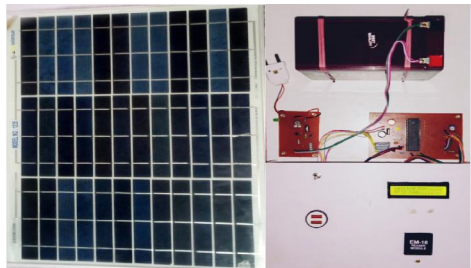
Figure: Project Hardware

VII. APPLICATIONS AND ADVANTAGES

- Industrial applications for battery.
- Power management system, Solar system based charging station. The RFID based battery charger is very useful For public using RFID card to charge for the battery in any places.
- This device can also be used to charge Portable batteries etc.
- Simple and hand efficient.
- Less expensive.
- Reduced man power.
- Low power consumption.

VIII. CONCLUSION

To present this paper is to bring aware of the RFID based battery charger to the public places. The necessity of battery phone communication is vast increased in this technology life. So usage time of battery is also increased without decreasing the battery charge the RFID based battery charge is used at the time of unavailability of charger with us. Thus this paper is useful to the rural people were the insufficiency of grid power by solar panel and RFID is also used.

IX. FUTURE SCOPE

In future, the rate of charging station will increase. This confirms that an increase of Electric vehicles charging stations is very necessary within public parking, near shops, sports-complex, leisure facility and along highways to ensure full coverage and increased appeal for the user. When the electric vehicle get parked in the parking, this parking would be accompanied with solar panel with the help of people's participation which will charge electric vehicle in stand-by mode. An increase of charging stations is not only necessary on the road but also private parking. With research of electric charging has no hazard of bursting into flames as compare to a daily car. Whether private or public all parking will important to increase the quantity of EV charging stations.

REFERENCES

[1]. S.B.Shridevi, A.Sai.Suneel, K.Nalini "RFID card based battery charger using Solar tracking system", IJAREC, pp. 741-745, Sept. 2013.

[2]. K. M. Trautz, P. P.Jenkins, R. J.Walters, D. Scheiman, R.Hoheisel, R.Tatavarti, R.Chan, H. Miyamoto,J.G.Adams,V.C.Elarde, and J.Grimsley "Battery Solar Power",IEEE, pp.535-541,Jan. 2013.

[3]. F.Boico,Brad,L.K.Shujaee, "SolarBatteryCharger for NiMH Batteries"IEEE Trans. Power Electronics, vol. 22, no. 5,pp.1600-1609, Sept.2007.

[4]. J.Eakburanawat,I.Boonyaroonate, "Development of thermoelectric battery-charger with microcontroller-based maximum power point tracking technique",Applied Energy 83,pp.- 687–704 , ELSEVIER, 2006

[5]. C.Silva,D.M.Sousa and A.Roque,"Charging electric vehicles from photovoltaic generation with intermediate energy storage",2017 6th International Conference on Clean Electrical Power (ICCEP), 2017.

[6]. L.Dickerman and J.Harrison,"A New Car a New Grid",IEEE Power Energy Mag.,vol.8,no.2, pp. 55-61, 2010.

[7]. K.H. Law and M. S. A. Dahidah, "Dc-dc boost converter based mshe-pwm cascaded multilevel inverter control for statcom systems",Int. Power Electron. Conf.pp.1283-1290,2014.

[8]. K.H. Law,M.S.A. Dahidah and N. Mariun, "Cascaded multilevel inverter based statcom with power factor correction feature", IEEE Conf. Sustain. Utilization and Develop. in Eng.And Technol., pp. 1-7, 2011.