

## SMART SOLAR SYSTEM WITH DIGITIZER

PROF. ABHIJIT N. WADEKAR

Department of Electrical Engineering, Solapur University / SKNSCOE Pandharpur, India,  
shashikant.gidde@sknscoe.ac.in

MR. DNYANESHWAR SHINDE

Department of Electrical Engineering, Solapur University / SKNSCOE Pandharpur, India,  
dnyaneshwardshinde1057@gmail.com

MISS. PRIYANKA PAWAR

Department of Electrical Engineering, Solapur University / SKNSCOE Pandharpur,  
India,priyankalpawar3338@gmail.com

MISS. AAFRIN SAYYAD

Department of Electrical Engineering, Solapur University / SKNSCOE Pandharpur,  
India,dimpalsayyad786@gmail.com

MR. SUDARSHAN VYAVAHARE

Department of Electrical Engineering, Solapur University / SKNSCOE Pandharpur,  
India,sudarshanvyvahare18@gmail.com

### ABSTRACT

In the past these were working on pure AC supply. The components used in these types of appliances were also AC. The limitation of AC supply was that it required more current than we used our project for example. LED scrolling display used 230V/35Amp (AC) before, whereas our project uses 5V/10Amp (DC). Now we are using solar power for working of these appliances. We are combining all three appliances on one source. It provides combined features where we can display the notice, streets can get light and there is facility to charge phone in emergency. In future we can add a network router to this combination. This will give free internet connection to rural areas with effective 500m working diameter. The display can be modified in such a way that it receives order from voice messages.

**KEYWORDS:** Solar cell, Battery, LED (P10) Display, Mobile charging, Street Light.

### INTRODUCTION

Now a day's energy conservation & use of renewable sources is needed for us because energy demand has increased. So this project introduces the main consideration in automation, cost effectiveness & consumption of power for present field technology. One of the most important and expensive liabilities of the villages is to provide street light. This system is designed for outdoor application in un-electrified remote rural areas. This system is an ideal application for campus and village street lighting. This system is used to compensate the growing energy demand by using renewable energy sources as solar. To light the street of rural area with transmission lines as well as solar power where there are so many power cuts occur. Because of use of solar panel there is low maintenance need & as well as low power consumption, reliability of our product. In this system utilize the optimum solar energy & conservation of mains. It reduces the emission of harmful gases.

### COMPONENTS SELECTION

#### SOLAR PANEL

On this earth almost every source of energy is because of the SUN directly or indirectly. On this earth India is richest in terms of solar radiation where almost India receives 250 to 300 days per year solar radiations. This is enough to provide 6000 Trillion Kwh per year. Now to extract this much power from the sun solar cells play an important role. But since the output of solar cells is adversely affected by the atmospheric condition, there should be a technique which is used to get maximum amount of power from these solar

cells. There are broadly two types of solar cells amorphous silicon cell and crystalline silicon cell. In this paper amorphous silicon cell is used. To extract maximum power from the solar cell irrespective of the atmospheric condition dc to dc converter can be used which convert variable dc output into fixed dc output. There are various types of converters out of witch specific type should be applicable to appropriate one. A solar panel consists of number of photovoltaic cells assembled together. Number of solar panels when used together can generate and supply large amount of electricity to industrial and household requirements. Solar panels work on the principle that when sun rays fall on the panel, it generates electricity due to photovoltaic effect.

### **BATTERY**

Batteries are used so that the unused or extra amount of energy generated can be stored and given out whenever required because the electricity produced is not always equal to the demand. Hence batteries are always preferred while working with photovoltaic system. Hence batteries are important as it provides the electricity when there is no sun rays falling on the panel (i.e. during night time or Foggy days). Various types of rechargeable batteries are as follows Li-Based, Ni-Based, Lead Acid, Leclanche.

### **CHARGE CONTROLLER**

A charge controller is a device which controls the intake and outgoing of the electric current through the battery. It reduces the risk of overcharging which may lead to damage to the battery, its life and risk to humans working with these batteries. Not only should this prevent from overcharging but it should also prevent the battery from fully draining out as it harms the battery life. Hence a battery controller senses the requirement of charging for a battery and charges it using the solar panels. It then charges it until it is full and then automatically stops so that battery doesn't overcharge. On other hand when it senses no solar rays, it assumes the time to be night and starts the load on until it discharges to the undamaged level. It stops the load below this as it will drain out all the charging, damaging whole battery and its life.

### **LED SCROLLING DISPLAY (P10 BOARD)**

In past we use normally simple static LED display screen for convey the important message , but now a days when we want to convey large data and also we can change the message for every few instances. So as compared to static display, scrolling Displays are more preferred. With the help of control card which will Pre-Programmed controller, using this scroll the message in scrolling way. By using PC controller system we can control LED Display. For example, LED Scrolling Display for outdoor messages, Electronic projects and marketable LED notification.

### **BLUETOOTH & ARDUINO**

For transparent wireless serial connection setup (Smartphone), Bluetooth SPP (Serial Port Protocol) is used which uses HC-05 Bluetooth module. Serial communication is done as it is an easy way to interface with the Arduino. It is provided with a switching mode of master and slave so that it is enable to use neither receiving nor transmitting data.

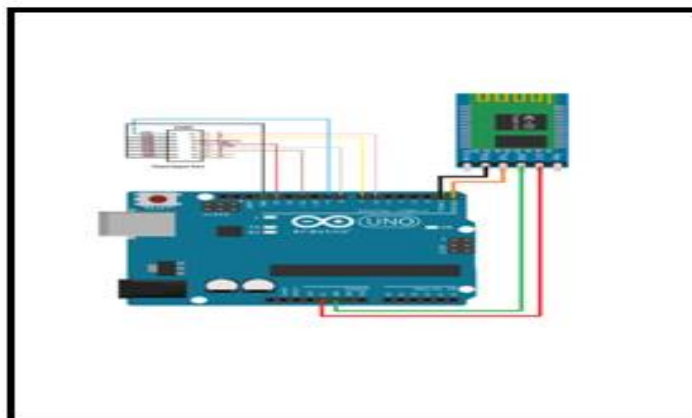


Figure no.1: Connection diagram of Bluetooth & Arduino

## STREET LIGHT:

When a street light uses PV cells to operate, these are known as solar street lighting. These are used to light up an open area or a street. A PV Street light is made by the combination of a LED lights and current PV technology. These have become a normal thing in our day to day lives. The old type of Street lamps such as HID lamps(High Intensity Discharge) and HPS (High Pressure Sodium) are replaced by LED Street light (AC and DC). The components used in a solar powered LED Street light are: PV module, LF (Lighting Fixture), rechargeable battery, MPPT (Solar charge controller), light pole.

## WORKING

The working of this project is that when in day time, the solar panel charges the battery and also provides the supply to LED display and mobile charger. Hence there is no load on the battery during day time. During night time the MPPT shifts the load from solar panel to the battery and all three components work on the supply provided by the battery. The street light is off during day time as we are using a LDR kit which senses the requirement of the light comparing it with the natural light available and turns the Street light on as the natural light dims down. For mobile charging we have used a USB control hub which is an interface between control card and USB hub. The LED display can work on the signal provided by Bluetooth connected device and/or USB devices.

## BLOCK DIAGRAM

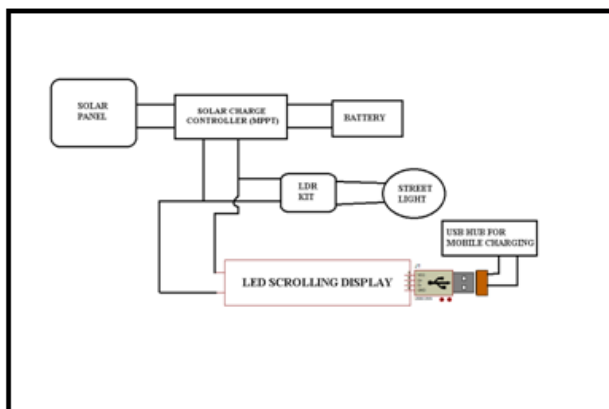


Figure no.2: Block diagram of “smart solar system with digitizer”

## RESULTS



Photograph1: Results

## CONCLUSION

You all know about solar based street light, on the basis of this project we have implemented other applications one is digitization and another is mobile charging circuitry as per human requirements, means

we designed solar based digital display. It shows the daily activities which are happening in that village. And another thing is we have implemented mobile charging circuitry because those people who want to need emergency mobile charging they can charge their mobile.

## REFERENCES

- I. Anuradha Mujamdar, Vaishali Niranjane, Deepika Sagane "Scrolling LED Display using Wireless transmission" International Journal of Scientific Engineering and Technology, Volume:2, Issue-1, ISSN:2321-9939.
- II. Bhawna Saini, Rachna Devi, Shilpi Dhankhar, Mohammad-ziaul-Haque, Jagandeep Kaur "Smart LED Display Boards" International Journal of Electronic and Electrical Engineering. ISSN 0974-2174 Volume 7, Number 10 (2014), pp. 1057-1067
- III. Ch Kavitha, Swathi, Satyaprakash, "Solar Powered LED Street Lighting with Auto Intensity Control" Vinitha <http://www.ijser.org> International Journal of Scientific & Engineering Research, Volume 7, Issue 7, July-2016 34 ISSN 2229-5518 IJSER © 2016
- IV. Mokhtar Ali<sup>1</sup>, Mohamed Orabi<sup>1</sup>, Emad Abdelkarim<sup>1</sup>, Jaber A. Abu Qahouq<sup>2</sup> and Abdelali El Aroudi<sup>3</sup> <sup>1</sup> APEARC, South Valley University, Aswan 81542, Egypt <sup>2</sup> Electrical and Computer Eng. Dept., The University of Alabama, Tuscaloosa, Alabama 35487, USA <sup>3</sup> Universitat Rovira i Virgili, Tarragona, Spain, Conference Paper · December 2011 DOI: 10.1109/ISGT- idEast. 2011. 6220812 "Design and Development of Energy-Free Solar Street LED Light System"
- V. Prachi U. Ketkar, Kunal P. Tayade, Akash P. kulakarni, Rajkishor M. Tugnayat "GSM Mobile Phone based LED Scrolling Message Display System" International Journal of Scientific Engineering and Technology, Volume:2. Issue-3, PP: 149-155, ISSN: 2277-1581, 1st April, 2013.