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Solar Powered Wireless Message Display Board

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ABSTRACT

In this paper, an overview of the SOLAR POWERED WIRELESS MESSAGE DISPLAY BOARD is presented. Global System for Mobile communication (GSM) LED Message Display Board for displaying messages or notices at places that require real time noticing, by sending messages in the form of Short Message Service(SMS) through mobile. This project showcases a model of a Portable Solar Powered Message Board in which the messages are scrolling, where it empowers the user to change the message using SMS instantaneously. It has dual power supply such as Solar Power and Direct current (D.C.) power which creates the ability to do work in any situation. This display unit finds its application in the transportation sector. The LED display board can be used for safety awareness and navigation in remote locations and highways. It can be used to display safety awareness message if any disturbance in the road ahead found. Moreover, it saves electricity and manpower as well as it is advantageous in those areas which has no supply of electricity.

Keywords: GSM, Solar and LED.

1. INTRODUCTION

An information display is a way of providing information and/or is used as an object for promotion which can be seen in a form of cardboard or tarpaulin at stores and electronic display devices. But the advent of new technologies made the information in the form of an electronic display in the world of advertisements and promotions. The ability to display short messages using LED proves to be a great advantage as LED consumes less power and the entire display unit is very efficient and cost effective way to display messages to people. LED is a solid state light source with attractive properties for its display applications.

The high frequency of 900MHz and international roaming of the GSM makes the mobile phone users to recognize this technology worldwide. Because of the digitalized signal and speech clarity, GSM is considered the third gen (3G) mobile communication system. In this project, an SMS is being sent by the user using GSM through mobile phone which gets displayed on the LED Display Board. The display unit has a dual power supply system. It runs on solar energy during daytime and in the absence of solar energy, it uses the energy stored in the battery during the day. The other modifications in our project is that, if any disturbance found in the system, instantly the user gets notified. For example, if there is a voltage drop or the weather is cloudy for a prolonged time, the user gets notified about the issue and he can take required actions.

2. EXISTING SYSTEM

The advent of new technologies made the information in the form of an electronic display in the world of advertisements and promotions. The existing system which were implemented had an electronic way of displaying messages and used an external power source. The other systems were developed where solar power was used as a source of power but it had no alternatives during absence of solar power. Our proposed system provides a dual power supply in order to compensate during absence of solar power. Moreover we are using a GSM technology in order to communicate between the user and the LED display board.

Drawbacks

- ❖ Not portable.
- ❖ Single mode power supply (external or solar power).
- ❖ Cannot be used in remote locations having no electricity.

3. PROPOSED SYSTEM

Our system provides a revolutionary way of displaying messages using GSM technology as the mode of communication between user and the display board. First, a message is send by the user with a particular authentication key in order to display on board. Now, the SIM card present in the GSM module receives the message and the interfacing between GSM module and Arduino leads to display the message. An interfacing also takes place between Arduino and LED drivers in order to control the LEDs.

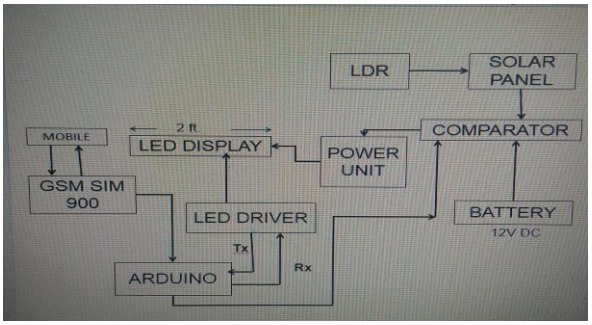

Fig. Block Diagram of proposed system

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The power supply is a dual mode power supply having a comparator in order to switch between the modes when required. Primarily, it uses solar energy during day as its power source but switches to battery mode during absence of solar energy. This system has the capabity to use solar energy as a direct power source as well as charge the battery simultaneously for alternative purpose.

4. DESCRIPTION

4.1 GSM (GLOBAL SYSTEM FOR MOBILE COMMUNICATION)

GSM (Global System for Mobile Communications, originally Groupe Spécial Mobile) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones, first deployed in Finland in July 1991. As of 2014 it has become the de facto global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories.

4.2 ARDUINO UNO

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

4.3 INTERFACING

Interfacing GSM Module with Arduino

- ❖ We use SIM900 GSM Module.
- ❖ Checking the power requirements of GSM Module.
- ❖ Checking the TTL Output pins in the Module.
- ❖ Booting the GSM Module.
- ❖ Connecting GSM to Arduino using a program.

The program has two objectives as described below:-

- Send SMS using Arduino and GSM Module – to a specified mobile number inside the program.
- Receive SMS using Arduino and GSM Module – to the SIM card loaded in the GSM Module.

Interfacing LED and Arduino display

- ❖ Preparing the MATRIX.
- ❖ Connecting the shift registers and transistors.
- ❖ Single shift register to drive the row.
- ❖ Daisy chained shift registers with common clock pin to drive columns.

Pin of Arduino		Shift register pins
5	-	12
6	-	11
7	-	14

The above are for the column drivers

9	-	12
10	-	11
8	-	14

The above are for the row drivers.

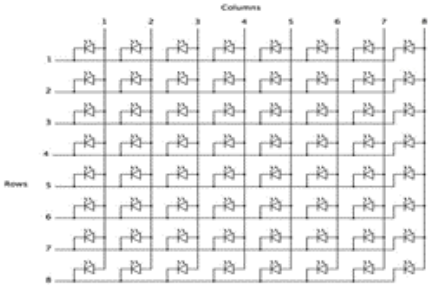

Fig. A LED Matrix

5. ADVANTAGES

The proposed system proves to be advantageous because:

- ❖ It is a power efficient device.
- ❖ It keeps the user updated about the system.
- ❖ The device is portable hence it can be used in remote locations.
- ❖ The device is cost effective and energy efficient.
- ❖ The display system is powered by solar energy.

6. APPLICATIONS

The proposed system finds its applications in:

- ❖ Educational Institutions and Organizations.
- ❖ Crime Prevention.
- ❖ Managing Traffic.
- ❖ Advertisement.
- ❖ Railway Station.

7. RESULT

The proposed system is a power efficient system of displaying messages wirelessly using a solar energy as the power source. This system is a portable device and is made cost effective so that it can be used in society and productive to the market.

8. CONCLUSION

The display boards are one of the major communications medium for mass media. Local language can be added as a variation in this project. This can be achieved by using different software's and graphics. This usage saves time, energy and accidents also. Information can be given to a large number of people from our fingertips. The project helps in reducing the cost and the components used are very simple and easily understandable and available in the market. We believe that our project can become commercial and can be used in places such as colleges, banks railway station village areas etc. Thus this project being widely used GSM and arduino technology has scope for future development and research and can be modified according to its applications used by the people.

9. FUTURE SCOPE

To implement this system in remote locations where hardly electricity is found. Moreover, using this system in highways in order to display messages without involving any disruption saving electricity and energy.

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