

Solar Powered Scrolling led Display Board for Public Utility Places

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ABSTRACT

This work introduces a development of scrolling LED notice board with self-generating power from built in solar panel for its working. The main advantage of the project is to get a major reduction in paper consumption and manpower. The messages can also be passed immediately without any delay. Scrolling LED display is used as it is low power and low cost. The led Display System is aimed at the colleges and universities for displaying day-to-day information continuously or at regular intervals during the working hours.

Keywords : Microcontroller, USB, Photovoltaic Arrays

I. INTRODUCTION

The work done includes the development of LED Scrolling Display based on renewable source using microcontroller. Display boards are very commonly used in any institute, public places like bus stops, railway stations, parks, shopping malls to display information regarding platforms, various advertisements about the products, or important notices. People are now adapted to the idea of the world at its fingertips. We made a Display Board based on Solar Panel as it is more reliable than any conventional energy source. The system is so designed to work efficiently irrespective of the climatic conditions.

LED-based moving-message displays are becoming popular for transmitting information to large groups of people quickly. These can be used indoors or outdoors. We can find such displays in areas like railway platforms, banks, public offices, hotels,

training institutes, nightclubs and shops. Compared to LEDs, liquid-crystal displays (LCDs) are easy to interface with a microcontroller for displaying information as these have many built-in functions. But these can't be observed from a distance and large size LCDs are very costly. LED-based displays can be of two types: dot-matrix and segmental. If you implement a moving-message display with multiplexed dot-matrix LEDs, it will be very costly for displaying 16 characters or more at a time. Moreover, programming will require a lot of data memory or program memory space.

An external RAM may be needed to complement a microcontroller like AT89S52. However, if you use alphanumeric (16-segment LED) displays for the above purpose, programming burdens reduced and also it becomes highly cost-effective. You can make your own display panel consisting of 16 alphanumeric characters at a much lower cost. The circuit presented here uses 16 common-anode, single-

digit, alphanumeric displays to show 16 characters at a time.

Moreover, programming has been done to make the characters move in a beautiful manner. A message appears on the panel from the right side, stays for a few seconds when the first character reaches the leftmost place and then goes out from the left side. It displays 16 different messages to depict different occasions, which can be selected by the user through a DIP controlling electronic devices from a 89s52 is fun. Here is a scrolling message display that mare's use of the micro controller output port. The Message typed from the keyboard of the PC is displayed on the light-emitting diodes arranged as 5x7 ld-matrix display in moving message format.

The PC; computer key board parallel port (LPT PORT) is used to output the display code and the clock signal for the scrolling message display. The parallel ports in terminated into a 25-pin D-type female connector at the back of the PC IBM PCs usually come with one or two LPT ports. Each parallel port is actually made up 1 of three ports namely. Data part, status port and control port. Here only data port is used scrolling PROGRAM REACHES THE END of the message it starts from the beginning again To change the text being displayed, exit the program by pressing Esc and edit the message txt file using Notepad. After making changes to the message txt file save it and execute the scroll.exe file. The program makes use of the out port b0 function which works perfectly only on Windows 95/98 However the program may not work with the latest window versions such as windows 2000/x When you try to save changes in the message txt file the window shows an error saying Can't save message txt.

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.

Light-emitting diode (LED) may be a two-lead semiconductor source of illumination. it's a p-n junction diode, that emits light-weight once activated. When an appropriate voltage is applied to the leads, leptons are ready to recombine with electron holes at intervals the device, cathartic energy within the style of photons. This impact is named electroluminescence, and also the color of the sunshine (corresponding to the energy of the photon) is decided by the energy band gap of the semiconductor. LEDs are simply little light-weight bulbs that match simply into AN electric circuit. however in contrast to standard incandescent bulbs, they do not have a filament that may blow, and that they aren't getting particularly hot. they're lit exclusively by the movement of electrons in an exceedingly semiconductor material, and that they last even as long as a regular junction transistor. The time period of AN semiconductor diode surpasses the short lifetime of AN incandescent bulb by thousands of hours. little LEDs are already exchange the tubes that remove darkness from liquid crystal display HDTVs to form dramatically dilatants televisions.

II. METHODS AND MATERIAL

1. BLOCK DIAGRAM:

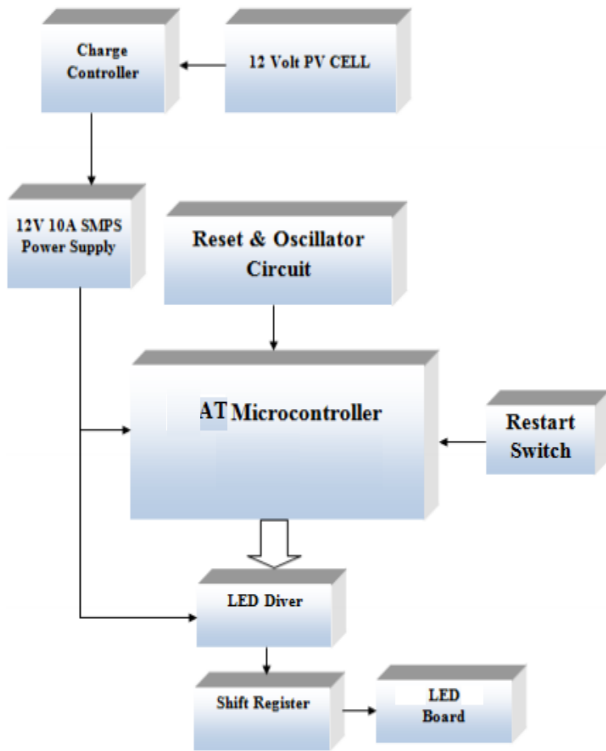


Fig. 1 Block Diagram

2.1 Block Diagram Explanation:

Message display Pins 2 through 9 forms the 8-bit data output port this is purely a write-only port which means it can only output data. The base address of the first parallel port (LPT1) is 378H OR 888 (decimal) Parallel-input parallel-output (PIPO) REGISTERS ARE USED to shift the signal from right to left. The clock pulse and code signal are generated by the computer program and output from the parallel port (base address 0x378) theoretically, we can add infinite number of PIPO registers but the maximum number of registers is actually limited to the current triggering value of the shows the circuit of the microcontroller-based moving-message display. It comprises microcontroller AT89s52, three-to-eight decoder 74LS138, common anode alphanumeric displays, regulator 7805 and a few discrete components. The heart of the moving-message display is Atmel AT89s52 microcontroller (IC1)

It is a low-power, high-performance, 8-bit microcontroller with 4 kB of flash programmable and erasable read-only memory (PEROM) used as on-chip program memory, 128 bytes of RAM used as internal data memory, 32 individually programmable input/output (I/O) lines divided into four 8-bit ports, two 16-bit programmable timers/counters, a five-vector two-level interrupt architecture, on-chip oscillator and clock circuit. To add a large number of PIPO registers, amplify the clock pulse prior to connecting it to the PIPO ICs. Circuit description the circuit for the scrolling message display IC74174 has been used as PIPO REGISTER WHICH comprises high-speed, hex type flip-flops it is used as a 6-bit edge-triggered storage register THE DATA ON the inputs of the flip-flop is transferred for storage during high-to low transition clock.

Data lines do through D5 1 of the parallel part are connected to the input pins of the first flop (IC2) the output of IC2 is fed to the next flip-flop IC input as well as LED. Data line D6 is fed to IC8, while data line D7 is connected to the clock inputs of IC2 through IC8 Clock pins of all the flip-flop ICs are connected together. Master reset pin 1 of all the flip-flops is connected to Vcc. Pins 18 through 25 of the parallel port are grounded. As data present on lines DO through D6 shifts from the first stage to the next stage, And so on the message appears as scrolling on the dot-matrix LED display. The present circuit supports a display made of 42 LEDs comprising seven rows and six columns. Up to 30 such units can be added with no change in the circuit.

To add these units you need to amplify the clock pulse output, Note that each character is displayed in a matrix of 5 columns and 7 rows (explained later) hence the sixth column LEDs form part of the next character (column1) the power supply circuit. The AC mains is stepped down by transformer x1 to deliver a secondary output of 7.5V AC at 1A The transformer output is rectified by a full-wave bridge rectifier comprising diodes D1 through D4 filtered by

capacitor C1 then regulated by IC 7805C (ic1) to provide regulated 5V DC to the circuit commercially 7X5 dot-matrix displays with discrete LEDs may not be easily available in the market; therefore a perforated board with holes for the LED leads may be used. The layout of such a board The holes are used for passing the LED leads.

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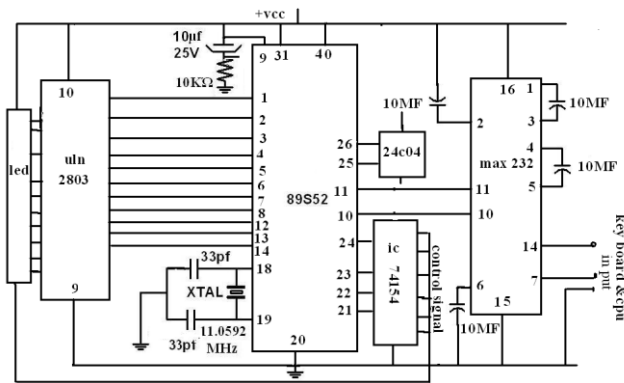


Fig 2. Circuit Diagram

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Available in various sizes and are also made to custom requirements Specifications for regular model: Display Matrix: 9 characters in 7x5, 2.5" high character LED configuration. Power Supply: 220v AC Dimensions: Display Unit: 25 inches X 7 inches X 1.5 inches appx. Control Unit: 6 inches X 7 inches X 2 inches app.(fixed on back side of display unit) Compatible with any Computer Keyboard. Some of the routines in the experiments for the 5x7 Display Project look very simple but a lot of thought has gone into producing them. The art to producing a good routine is to make it look simple as this will make it easy to follow and easy to trouble-shoot, if something goes wrong. The delay routine is a typical example. It can be laid out using simple-to-follow instructions or complex instructions. Let's not worry about the complex approach; our aim is to show how easy it is to program the PIC chip

2.2 SOLAR PANEL: 20W SOLAR PANEL 12V DC:

A solar cell, or photovoltaic cell, is an electrical device that converts the energy of light directly into electricity by the photovoltaic effect, which is a physical and chemical phenomenon. It is a form of photoelectric cell, defined as a device whose electrical characteristics, such as current, voltage, or resistance, vary when exposed to light. Individual

solar cell devices can be combined to form modules, otherwise known as solar panels.



Fig. 3 Solar Panel

20W Solar Panel Specifications:

Electrical:

Power Max (Pm) 20 +/- 5%

Short Circuit Current (Isc) 1.4 A

Max Power Current (Imp) 1.15 A

Maximum Voltage (Vmp) 17.7 V

Open Circuit Voltage (Voc) 21.4 V

Maximum System Voltage 600 VDC

Mechanical:

Type Multi Crystalline

No of Cells in Series 36

Frame Type Aluminum

Weight 2.60 Kg

2.3 BATTERY: LEAD ACID BATTERY:

The battery which uses sponge lead and lead peroxide for the conversion of the chemical energy into

electrical power, such type of battery is called a lead acid battery. The lead acid battery is most commonly used in the power stations and substations because it has higher cell voltage and lower cost.

Voltage 12 V

Capacity 15Ah

Color Black

Material Plastic

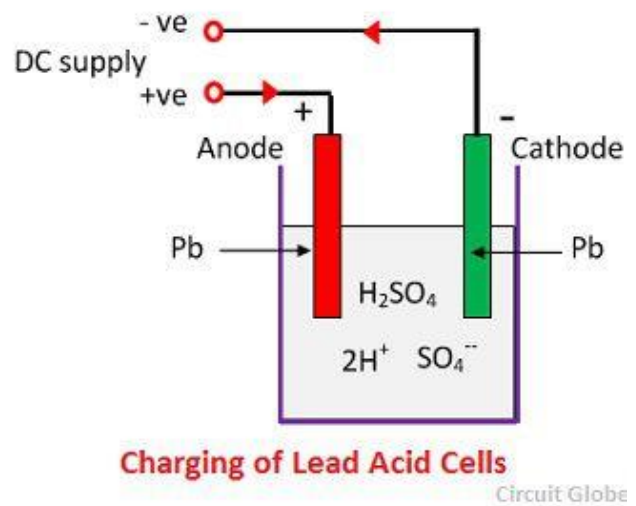


Fig. 4. Lead acid cells

When the sulfuric acid dissolves, its molecules break up into positive hydrogen ions ($2H^+$) and sulphate negative ions (SO_4^-) and move freely. If the two electrodes are immersed in solutions and connected to DC supply then the hydrogen ions being positively charged and moved towards the electrodes and connected to the negative terminal of the supply. The SO_4^- ions being negatively charged moved towards the electrodes connected to the positive terminal of the supply main (i.e., anode).

Each hydrogen ion takes one electron from the cathode, and each sulphates ions takes the two

negative ions from the anodes and react with water and form sulfuric and hydrogen acid. The oxygen, which produced from the above equation react with lead oxide and form lead peroxide (PbO_2 .) Thus, during charging the lead cathode remain as lead, but lead anode gets converted into lead peroxide, chocolate in color.

If the DC source of supply is disconnected and if the voltmeter connects between the electrodes, it will show the potential difference between them. If wire connects the electrodes, then current will flow from the positive plate to the negative plate through external circuit i.e. the cell is capable of supplying electrical energy.

III. APPLICATIONS

- Colleges: for displaying important messages . e.g. : placement news, cultural activities news ,etc.
- Hotels : to display the availability of the rooms and the room rents , the type of rooms. Restaurants: to display the menu and offers etc.
- Railway stations : to display the scheduling time of the train and the platform, the services offered by the railways.

IV. CONCLUSION & FUTURE ENHANCEMENT

This system can also be implemented in railway stations and airports to display information regarding the train and flight timings. This system reduces the wastage of papers. The information is sent through a PC, which is interfaced to a 8051 family microcontroller through MAX232 interface IC. An external memory connected to the microcontroller stores the information. An LED is connected to the microcontroller to display the message in a continuous scrolling manner. The solar panel included provides us power independent. By this man power and paper wastage can be reduced in huge.

Many more messages would be possible if complete Port-3 is used for message selection. Pins RxD, TxD, INT0 and INT1 have been kept free, so that these can be used interfacing with the serial port of the PC. Also, interrupt pins can be used to display some message and sound an alarm in the case of an emergency. For example, a fire sensor can be connected to 'INT0' and a vibration detector to 'INT1.' These pins can also be used to send signals to synchronize a similar system that displays another related message at the same time, so a 16-character, two line displays is made possible.

V. REFERENCES

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