Load Shedding Time Management System for Developing Areas using Microcontroller

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Abstract— Electricity is one of the most significant prerequisites of present-day human progress. Without which different Indispensable applications will tie to bring to a halt. As we realize that request of electricity is expanding now days. So electric utilities incline toward load shedding when the interest surpasses the flexibly. In this way in a conveyance framework it should be exactly estimated for explicit timeframe. Programmable burden shedding time the board framework is a solid and viable burden shedding strategy that assumes control over the manual undertaking of switch ON/OFF the electrical flexibly regarding time. It utilizes real time clock (RTC) interfaced to the 8051-family microcontroller. The paper "compelling burden shedding procedure for utility division" will give genuine and capable burden shedding methods with the end goal that circulation substation can be checked and load shedding from one specific spot.

Keywords: Load shedding, 8051 family, periodic switch, real time clock

I. INTRODUCTION

The venture is a programmed load activity framework that controls load activity, numerous quantities of times as indicated by customized guidance. The undertaking disposes of the manual ON/OFF exchanging of burden. A Real time clock (RTC) is utilized to follow the time and naturally switch ON/OFF the heap (load). This undertaking is required for load shedding time the executives which is utilized when the power request surpasses the supply and there comes a requirement for physically turning ON/OFF the electrical gadgets in time. Thus, this framework dispenses with the manual activity via automatically turning the heap ON/OFF. A matrix keypad is interfaced with the microcontroller from where the predefined time is contribution to the microcontroller When this information time equivalents to the ongoing, in view of the orders the microcontroller starts that specific transfer to turn ON/OFF the heap. The time is shown on a seven-fragment show.

II. BLOCK DIAGRAM
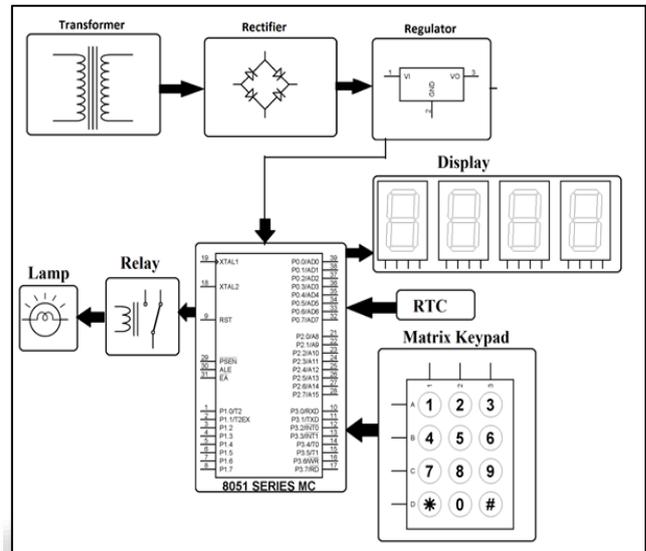
III. COMPONENTS USED

A. Regulator

A controller (regulator) is a framework used to keep up a consistent voltage. The obstruction of the controller differs as per the heap bringing about a consistent yield voltage. The managing gadget is made to act like a variable resistor, ceaselessly modifying a voltage divider system to keep up a steady yield voltage, and persistently dispersing the contrast between the info and controlled voltages as waste warmth. Conversely, an exchanging controller utilizes a functioning gadget that turns on and off to keep up a normal estimation of yield. Since the directed voltage of a straight controller should consistently be lower than input voltage, effectiveness is constrained, and the info voltage must be sufficiently high to consistently permit the dynamic gadget to drop some voltage.

B. RTC

The module dependent on DS1307, The DS1307 serial real-time clock (RTC) is a low-power, full binary coded decimal (BCD) clock/schedule in addition to 56 bytes of NV SRAM. Address and information are moved sequentially through an I²C, bidirectional transport. The clock/schedule gives seconds, minutes, hours, day, date, month, and year data. The month's end date is naturally balanced for a considerable length of time with less than 31 days, including adjustments for jump year. The check works in either the 24-hour or 12-hour design with AM/PM pointer. The DS1307 has a worked in power-sense circuit that identifies power disappointments and naturally changes to the

reinforcement flexibly. Timekeeping activity proceeds while the part works from the reinforcement gracefully.

C. LCD

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

D. KEYPAD

Matrix keyboards are basic as an info gadget in microcontroller-based tasks. A traditional method of interfacing a network console to a microcontroller is to utilize numerous I/O pins of the MCU. The MCU at that point utilizes a filtering calculation to recognize which keys are squeezed. A downside of this strategy is that it requires countless the MCU's I/O pins to associate the console. For instance, to associate a 4×3 console requires seven advanced I/O pins. It filters line and segment to recognize what is the info

E. RELAY

Relay is used to obtain the output. From the output of the relay, the control goes to the main power supply. The whole system acts as an automatic switch.

F. ARDUINO

The Arduino UNO is an open-source microcontroller board dependent on the Microchip ATmega328P microcontroller and created by Arduino The board is furnished with sets of advanced and simple info/yield (I/O) sticks that might be interfaced to different development sheets (shields) and different circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) through a kind B USB link. It very well may be fueled by a USB link or by an outer 9-volt battery, however it acknowledges voltages somewhere in the range of 7 and 20 volts. It is likewise like the Arduino Nano and Leonardo. The equipment reference configuration is conveyed under a Creative Commons Attribution share Alike 2.5 permit and is accessible on the Arduino site. Design and creation records for certain renditions of the equipment are additionally accessible. "Uno" signifies one in Italian and was picked to check the arrival of Arduino Software (IDE) 1.0. The Uno board and form 1.0 of Arduino Software (IDE) were the reference variants of Arduino, presently advanced to more current discharges. The Uno

board is the first in a progression of USB Arduino sheets, and the reference model for the Arduino stage. The ATmega328 on the Arduino Uno comes prearranged with a boot loader that permits transferring new code to it without the utilization of an outside equipment software engineer. It imparts utilizing the first STK500 convention. The Uno additionally contrasts from every former board in that it doesn't utilize the FTDI USB-to-sequential driver chip. Rather, it utilizes the Atmega16U2 (Atmega8U2 up to variant R2) modified as a USB-to-sequential converter.

G. TRANSFORMER

A transformer is a static electric that transfers energy by inactive coupling between its winding circuits. A varying current in the primary winding creates a varying magnetic flux in the transformer's core and thus a varying magnetic flux through the secondary winding. This varying magnetic flux induces a varying electromotive force (emf).

H. LED

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. This effect is called electroluminescence.

IV. CIRCUIT OPERATIONS

1) The programmable burden shedding time the executives for utility division circuit comprises of a 8592 microcontroller ic,16*2 LCD module,7805 voltage controller ic,4*3 keypad, DS12887 RTC IC, relay, Crystal oscillator.

2) The 7805 voltage controller changes over the info voltage to 5V and is given to the VCC (pin: 40) of the 8952 microcontrollers. This voltage is important to empower the microcontroller. A DS12887 RTC interfaces with port0 of the microcontroller i.e.. from pins 32 to 39. The RTC shows the ongoing at each moment. When the RTC is modified, it will work consistently despite the fact that the force goes off in the middle. The keypad is interfaced with port2 of the microcontroller for example from pins21 to28.The keypad is utilized to set the continuous, the ideal opportunity for load shedding time and the time span. The 16*2 LCD is interfaced to port1of the microcontroller for example from pins 1 to 8. The precious stone oscillator assists with giving the working recurrence 11.059MHz to the microcontroller.

3) The microcontroller modified so that we can set the real time and burden shedding time. Utilizing the program, we can screen both constant and burden shedding time. Program consistently check the fairness and at whatever point it get coordinated yield transfer turn off. At that point it started to check fairness with target time and continuous, at whatever point it get coordinated hand-off turns on

V. BASIC SYSTEM WORKING

The AC power supply from mains initially gets changed over into and unregulated DC and afterward into a

consistent directed DC with the assistance of this circuit. The circuit is comprised of transformer, connect rectifier made up from diodes, direct voltage controller 7805 and capacitors. On the off chance that you watch, the working of the circuit can be partitioned into two sections. In the initial segment, the AC Mains is changed over into unregulated DC and in the subsequent part, this unregulated DC is changed over into controlled 5V DC. Thus, let us begin examining the working in view of this. At first, a 230V to 12V Step down transformer is taken and its essential is associated with mains gracefully. The auxiliary of the transformer is associated with Bridge rectifier (either a devoted IC or a mix of 4 1N4007 Diodes can be utilized). A 1A intertwine is put between the transformer and the scaffold rectifier. This will confine the current attracted by the circuit to 1A. The amended DC from the extension rectifier is smoothened out with the assistance of 1000μF Capacitor. Along these lines, the yield over the 1000μF Capacitor is unregulated 12V DC. This is given as a contribution to the 7805 Voltage Regulator IC. 7805 IC at that point changes over this to a managed 5V DC and the yield can be acquired at its yield terminals.

A. Advantages

1) Automatic Load shedding is possible.
2) Differs from current system, here we can program the Load shedding process.
3) RTC provides the real time.
4) LCD provides the real time and Load shedding timings with great deal of accuracy.
5) KEYPAD to set the time.
6) Easy to set up and manage.
7) Economical and reliable for usage.
8) Manpower dependency is less since the system is automated.
9) Power can be saved.
10) Low cost.
11) Easy to use.
12) Accuracy in time
13) Effective distribution of power.
14) We can set the time in advance.

VI. THE ALGORITHM

1) STEP 01: Start.
2) STEP 02: Initialize RTC.
3) STEP 03: Initialize LCD.
4) STEP 04: Turn on relay.
5) STEP 05: Display time on LCD.
6) STEP 06: If pin P3.2=0 then go to step 7 else go to step8.
7) STEP 07: Read character 'n' from keypad.
8) STEP 08: If n=1 then go to step 10.
9) STEP 09: Update the current time and go to step13.
10) STEP 10: If n=2 then go to step11 else go to step12.
11) STEP 11: set the power off alarm time and power off interval, go to step13.
12) STEP 12: Display "try again" and go to step 13.
13) STEP 13: If current time matches the alarm time then go to step14 else go to step5.
14) STEP 14: Turn off the relay.

15) STEP 15: Set the new value of alarm time as the power on time.
16) STEP 16: display the current time and power on time on LCD.
17) STEP 17: If current time matches the alarm time go to step 16.
18) STEP 18: Turn on relay and go to step5.
19) STEP 19: END

VII. CONCLUSION AND FUTURE SCOPE

According to our observations real time clocks (RTC) work more accurate than other time-keeping alternatives, it allows the main system to perform important tasks, and they do not consume much power. Functionality of Electronic devices can even increase by using real-time clocks (RTC). Certain electronic devices can rely on real time clocks when comparing the times of previous functions. If the functions have taken place within a selected period of time, device functions can be reduced drastically. Hence real time clocks interfaced with AT89S52 microcontrollers could be used extensively in load shedding time management system by utility departments

This venture can be progressed in which the appropriation point checked by one focal area. The transfers are utilized to cut off gracefully of concerned geological locale through electrical switch. In this framework client can send orders to concerned DP to peruse the remote electrical parameters. This framework can over and again send the continuous electrical parameter information like dynamic force, receptive force, voltage, flow, recurrence and so forth., occasionally as SMS to the client. It very well may be intended to send SMS alarms when transfer trips. In this force framework microcontroller are being utilized to adequately speak with the sensors. The microcontroller has interior memory to hold the get together code. This inward memory is utilized to dump some arrangement of gathering directions into the controller. The activity of the smaller scale controller is totally reliant on these get together guidelines. The proposed framework will beat manual endeavors for controlling the heap shedding time break in a deliberate manner by sending SMS. Focal unit can cut off force gracefully of explicit zone by simply sending a SMS to the concerned Distribution Point. These transfer gets actuated at whatever point the electrical parameters exaggerate the predefined values. The proposed framework is intended to Load Monitoring.

REFERENCES

[1] Datasheet of AT89S52 microcontroller from Atmel [online] available. www.atmel.com/images/doc0265.pdf
[2] Demand for electricity changes through the days www.eia.gov
[3] Electricity Demand http://www.mpoweruk.com/electricity_demand.htm