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PROGRAMMABLE LOAD CONTROL MANAGEMENT FOR UTILITY DEPARTMENT

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Abstract - *An automatic load operation system that controls load operation, multiple numbers of times according to programmed instruction. The project eliminates the manual ON/OFF switching of load. A real time clock (RTC) is used to track the time and automatically switch ON/OFF the load. It is required for load control management which is used when the electricity demand exceeds the supply and there comes a need for manually switching ON/OFF the electrical devices in time. Hence this system eliminates the manual operation by automatically switching the load ON/OFF. A matrix keypad is interfaced with the microcontroller from where the specified time is input to the microcontroller.*

When this input time equals to the real time, based on the commands the microcontroller initiates that particular relay to switch ON/OFF the load. The time is displayed on a seven segment display.

***Key Words*: RTC, Relay, Seven segment display, Load control**

1. INTRODUCTION

As we know , when a power system is stable at normal frequency the total mechanical power input from the prime movers to the generators is equal to the sum of all running load and all real power losses in the power system. The frequency conditions of the overall power system will directly depend on the amount of active power that the generator could deliver to the system. Also, the prime mover's stored energy plays an important role on the system behaviour. This stored energy varies drastically from thermal, to hydro units. For gradual increases in electric load, or sudden but mild overloads, unit governors will sense speed change and therefore increase power input to the generator. Extra load is handled by the unused capacity of all accessible generators functioning and synchronized to the system. If all generators are operating at their maximum capacities and the spinning reserve is zero, then the governors may be powerless to relieve overloads. So it is necessary to control the load of a particular geographical region. Load control is an intentionally engineered electrical power outage where electricity supply is stopped for non-overlapping periods of time over a particular zone. For manually maintaining Load controlling times, some man power may be employed or by using computer it can be controlled efficiently. Detaching of power is done to minimize the consumer load provided through several substations, which are connected to the main power station. And the main station instructs the sub-stations to cut some of the feeders for a certain period of time & thus the shedding procedure continues.

2. BLOCK DIAGRAM

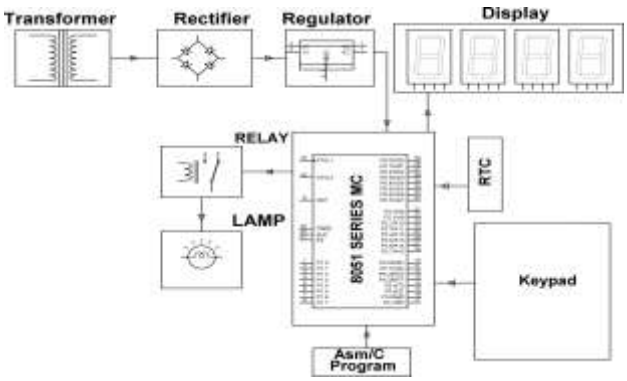

Fig1: Block diagram

3. HARDWARE REQUIREMENTS

1. Transformer (230 – 12 v ac)
2. Voltage regulator (lm 7805)
3. Rectifier
4. Filter
5. Microcontroller (at89s52/at89c51)
6. Pushbutton
7. Matrix keypad
8. Seven segment
9. BC547
10. LED
11. 1N4007
12. Resistors
13. Capacitors
14. DS1307 RTC

4. SOFTWARE TOOL

Keil development tools for the 8051 Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software developer. The industry-standard Keil C Compilers, Macro Assemblers, Debuggers,

Real-time Kernels, Single-board Computers, and Emulators support all 8051 derivatives and help you get your projects completed on schedule. The Keil 8051 Development Tools are designed to solve the complex problems facing embedded software developers. When starting a new project, simply select the microcontroller you use from the Device Database and the µVision IDE sets all compiler, assembler, linker, and memory options for you. Numerous example programs are included to help you get started with the most popular embedded 8051 devices. Visual Basic (VB) is a programming environment from Microsoft in which a programmer uses a graphical user interface (GUI) to choose or modify selected sections of code written in the BASIC programming language. Visual Basic is engineered for building safe and object-oriented applications. Visual Basic enables developers to target Windows, Web, and mobile devices. As with all languages targeting the Microsoft .NET Framework, programs written in Visual Basic benefit from security and language interoperability.

5. WORKING

It uses one real time clock IC DS1307 i.e., Interface to the MC pin 27 & 28. A matrix keypad is used for setting the time, relay ON time & OFF time. The relay is driven by pin 25 of MC through driving transistor BC547. Seven segment LEDs are parallel connected to Port 0 through driving transistors four numbers BC547 to the respective, anode of seven segment LED display as per the operation and the operation procedure of the project is explained below:

1. Enter the Current real time using keypad.
2. Press '#' to store the real time.
3. Press '*' display shows all dashes.
4. Enter the 1st ON time of load.
5. Press '*' to save the 1st ON time.
6. Press '*' display shows all dashes.
7. Enter the 1st OFF time of load.
8. Press '*' to save the 1st OFF time.
9. Continue this procedure for 3 ON times & 3 OFF times
10. Press '*' to get the real time.

6. ADVANTAGES

1. Power can be Saved.
2. Low cost.
3. Easy to use.
4. Accuracy in time
5. Effective distribution of power
6. We can set the time in advance

7. DISADVANTAGES

- It won't work based on load condition.
- In emergency, it can't be operated in the absence of a person.

8. CONCLUSION

The aim of our kit is to present the load control phenomena highlights their use in industry, agriculture, power sector etc. It has been seen that this hardware kit solution can perfectly address the current challenges in these fields such as high control performance, reliability and efficiency. In future we can use these kits to control various loads by switching operation to save energy. Programmable parameters allow the complete control over the whole system.

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