

REMOTE CONTROLLING STREET LIGHT SYSTEM AND INFORMATIONS DISPLAY ON LCD VIA SMS WITH THE USE OF MICROCONTROLLER BASED AUTOMATION

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ABSTRACT

Remote controlling is a concept which uses to control devices in remote area. That minimizes the time wasting and power consumption instead of manually controlling. In this research study a remote controlling system is implemented with GSM modem for controlling via SMS. This system can be controlled with the case of 'SIM' card and any mobile phone. Main objective was focused on controlling street lights via SMS. Considering main process of this system, wherever a SMS is sent to the GSM modem, the received SMS is taken by the controller panel which consists of a advanced version of PIC microcontroller. After analyzing the SMS the system will take the required actions according to the command given by the SMS. According to user requirements the switches can be controlled by the controller circuit which set the time to automatically ON and OFF lights in everyday usage. Also the constructed prototype system was included with digital clock on LCD that can be remotely controlled by the user. The novel system has data backup plane when main power is cut off. Even power is going fail system will keep the data safely while properly controlling the switches when controller circuit get main power again. With further this system is implemented as a solution to remote controlling and self-adjacent system with reliability.

Keywords: *Remote controlling via SMS, GSM modem.*

1.0 INTRODUCTION

Effective and efficient techniques and devices are needed to make the acumen based controlling routing done works automated. Therefore remote controlling topic has been one of the most important and valuable concept in present day world. Different techniques are used to control the devices placed in remote areas of Sri Lanka.

Wi-Fi, Bluetooth, Infrared, Radio Frequency waves and web applications are used to online station monitor and controlling devices remotely. Expensive and prototype simulators devices are needed to established the system when use Wi-Fi, web application,

Radio Frequencies etc. Nevertheless the distance is limited when using Bluetooth, Infrared technologies for communication using these types of systems.

In this research study has focused on to implement another technique to control street lights system remotely. Therefore controlling switching system using SMS is studied in this research. Power circuit can be controlled remotely using SMS command by power circuit switchers which controlled by the controller circuit. Task can be specified in the system using SMS command. Comparing with other techniques SMS is a better to access devices remotely.

2.0 THE METHODOLOGY

2.1 Major components used in the System and contribution.

In this remote controlling system use GSM modem, microcontroller, Optoisolator Traic driver IC, aTraic, RTC IC and LCD as major components to build the system. PIC and GSM modem data transmission was done in serial communication using RS232 protocol. Pin connection of RX, TX between them should be connected as the connection between DCE & DTE. Pin number 7, 8 and pin number 1,4,6 should be connect in short⁶. Then enough current should be supplied to the controller circuit. Power circuit switchers were connected with PORTD of the PIC. MOC3041 and BT10 Traic IC are used in the power circuit switchers to control the power circuit like street light system, motors, and any other electrical and electronic devices. The system is implemented with unique features of digital clock display on LCD which also can be controlled by the SMS commands. PORTB was connected with LCD which displays the digital clock^{1,3,4}. Data is communicated in between RTC IC and PIC through I2C protocol. System has data backup plane in the case of main power cut off. Even if the power is going fail the constructed system will keep the data safely and properly controlling wireless the switches when controller circuit get main power again. Data backup plane was placed with RTC to store data safely and for longer backup plane even 50 years if the power failure. Alarm system also was implemented in the system. Alarm details about the lights store in PIC EEPROM. Therefore Switches can be automatically ON and OFF on user predefine time by the controller circuit with a PIC microcontroller.

2.2 Methodology and Operation of the system

The signaling SMS was received by the GSM modem which placed at the controller circuit. Command should be properly typed SMS transmission module in the sending SMS. Else received SMS will be neglected by the controller circuit. Further, the received SMS was analyzed by the controller circuit to identify the command. According to specified task of the command will be done by the controller circuit. Major tasks of the system are ON and OFF the switches, set alarm to automatically ON and OFF the lights at predefined time, remotely setting date or time on the LCD. One of them can be a specified task which included in a command as use requirement. The signal from controller circuit is received on the power circuit switcher control the power circuit. In other words lights will be controlled using power circuit switchers controlling circuit according to the task specified in a command. Then the LCD set new date or time that mention in the received SMS.

3.0. RESULTS AND DISCUSSION

There was a five specified tasks in the proposed System operation this section interpret results according to the specified commands.

Command to set bulb ON is %SOL%. Percentage marks and letters should be typed. 'O' is indicate to controller circuit to set the light ON .Bulb was ON when send this command to the GSM modem.

Command to set bulb OFF is %SFL%. Percentage marks and letters should be typed. 'F' is indicate to controller circuit to set the light OFF. Bulb was OFF when send this command to the GSM modem.

Command to set the bulb automatically ON and OFF is %SAD%093000A093200A. First six digits and letter 'A' describes the time to 'ON' lights on every day. Last six digits and letter 'A' describes the time to 'OFF' lights on every day. This six digits are allocated to indicates the ON and OFF time as follows.

- First two digits for hour
- Second two digits for minutes
- Last two digits for seconds
- Letter 'A' for AM
- Letter 'P' for PM

Percentage marks and letters should be typed. According to the command used here bulb is ON when time is 09.30 am. Also the bulb will be OFF when the time will arrive at 09.32 am.

Command to set the date on LCD is %SDD%140211. First two digits for the year, second two digits for month and the last two digits indicate the date. Date was set as 2014:02:11 on LCD inform the sending command to the GSM modem.

Command to set the time on LCD is %STD%093000A. First two digits for the hour, second two digits for minutes and the last two digits indicate seconds. Last letter 'A' indicate the 'AM' and if it is a 'P' that indicate the 'PM'. Time was set as 09:30:00 am on LCD sending command to the GSM modem.

4.0 CONCLUSION

The proposed system is the system to control remote area than currently used other systems. User is benefited with more features than other remote system and easier to use with their own mobile phone. This system can be implemented not only in remote area but also can be used to full fill user requirements such as Home lights control, at Company electrical devices control systems etc. System can be further developed considering user requirements within the two sections (as hardware and software).

ACKNOWLEDGEMENT

Authors would like to thanks to Mr. P. D. S. Pushpakumara who is one of the senior research engineer of the Communication Division and all the staff members of the Arthur C Clarke Institute for Modern Technologies.

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