



Central Unit for Multi-Patient Medication Register

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ABSTRACT

In hospitals, there is a central nursing station for the simultaneous monitoring of the large count of the patients in ICU. But the medication provided to the patients is still in a tradition manner or with the help of the infusion and syringe pumps by the supervision of the nursing staffs. The automated register and medication time remainder (alerts when the time exceeds its offset) may be the next automation expectations to the hospitals. As its beginning our paper talks about the basic protocol of automated registering and remembering the time of medication to the nurse for the patient precaution and followed by the future analysis of the patient medication details.

Keywords : Medication Register, Hospitals, Medical Services, Reduced number of Nursing Staffs, Remainder for Medication.

I. INTRODUCTION

As a beings of modern world, it's a day-to-day scenario of hearing about new diseases and disasters, which mainly opens full responsibility to hospitals on the case of admitting the victims. The victims may be large in count and it may be manageable for the hospitals of urban areas, but it is not possible to manage those patients by the reduced number of nursing employees in rural hospitals. Although it is the necessary job for the nurse to provide medicine for the patients at regular intervals, due to increased count of patients it seems little difficult to remember while providing medicines for all the patients. Hence we developed a hardware for monitoring of providing medication of those victims at regular interval of time with the use of reduced number of nursing staffs (almost a one or two staffs). At first, the beds of the

ward are connected to the console through a Microcontroller. This hardware has an RFID to ensure that the patient has been medicated by the nurse using a unique RFID card for every beds. If medicine is not provided to the patient at the registered time it gives an alarm to the nurse through LED glow and buzzer. The data sheet of the medication and the time has been stored in the console for the doctor's reference. This may reduce the manual encryption of the medicine list, nurse inconvenience and mainly delayed medication of the patients.

II. BLOCK DIAGRAM DESCRIPTION

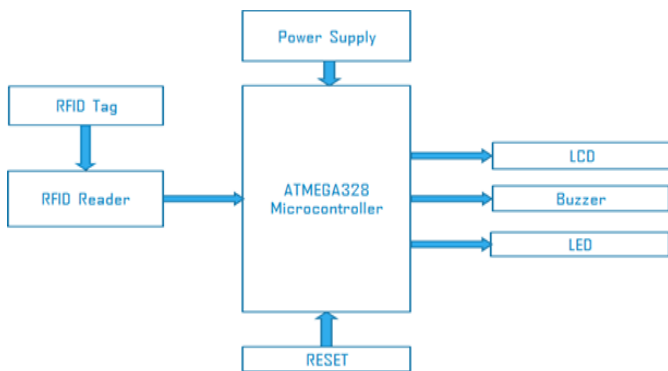


Fig. 1 Block Diagram

The power supply to the microcontroller is accommodated with a step-down transformer to provide a 5V supply to the microcontroller. A unique RFID card is imparted for every bed with a centralised RFID decoder. When the card is tagged on the RFID it gives a TTL signal to the Microprocessor which can be seen in the LCD display the corresponding bed number, which ID has been tagged and it can be stored for the future analysis. It also has a timer for the medication to every bed, if the medicine is not provided at the given time, it will alert the nurse with the help of LED glowing and the buzzer.

III. Circuit Diagram Explanation

The circuit diagram consists of the RFID reader. The RFID reader decodes the unique number in the RFID card and the output signal of the RFID reader is given to the analog input terminal of the Microcontroller, which reflects to the LCD display connected to the output terminals of the Microcontroller. A reset button is associated with the microcontroller, so that the whole system can be easily reset (as we are not using a real time clock here). If the RFID is not providing any signal for the microcontroller in the given time, the LED glows and the buzzer alarm to indicate that the patient is not medicated within the

given time. The Circuit board of the Microprocessor contains basic components namely, resistor, capacitors, regulator and crystal oscillator. We have used three resistors, ten capacitors (8 ceramics and 2 electrolytic), a voltage regulator and the crystal oscillator. The voltage regulator is to uphold the persistent voltage for the Microcontroller automatically.

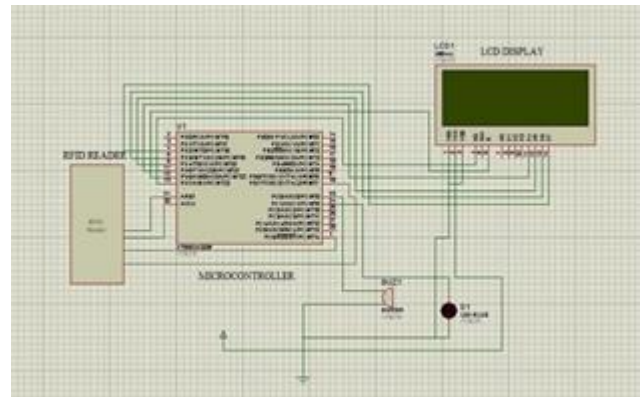


Fig.2 Circuit Diagram

IV. Materials Used

The microcontroller used is belonged to the family of AVR (RISC-based) named as ATMEga328P-U manufactured by Atmel. It can be functioned with the minimum voltage of 4.5V and maximum of 5.5V. A Step down transformer is used to provide the required voltage for the circuit to be operated. An electromagnetic field operated RFID reader is used to read the specific RFID of each bed. A 20x4 LCD display is for showing the medicated and not medicated bed for nurse information. It can display up to 80 characters with 20 rows and 4 columns.



Fig. 3 20x4 LCD

A buzzer and an LED is provided for the alert signal to the nurse when the patient with certain bed number is not medicated.

V. Results

As we predicted, we have shaped a model the we proposed above. This working model consists of a stepdown transformer, Microcontroller unit, RFID Reader, LCD Display, indicators circuit and a programmer interface.



Fig. 4 Project Kit

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MEDICINE CHECK
BED 1:MED TAKEN
BED 2:MED NOT TAKEN
BED 3:MED NOT TAKEN
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Fig. 5 LCD output when bed 1 only treated

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MEDICINE CHECK
BED 1:MED TAKEN
BED 2:MED TAKEN
BED 3:MED TAKEN
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Fig. 6 LCD output when all the beds are treated

On switching on the circuit, the LCD displays shows “Medicine check 1”. We used three model beds with a unique RFID. Once the bed number 1 is medicated,

the LCD shows “BED 1: MED TAKEN” and the other beds are still to be medicated, hence the alarm shouts for a particular time. If the three beds are medicated at the time, the buzzer shuts and the output in the LCD be as shown in the figure.

We have imparted a reset button, so that it can assist us to reset the microcontroller operation without switching off the device.

VI. Conclusion

As the fragment of our project we had prospered in preparing a basic protocol for the Central Unit for Multi-Patient Medication Register using the Atmel produced ATmega328P-U Microcontroller deprived of RTC (Real Time Clock). This can help the nursing staffs in the hospitals especially in the rural hospitals with less technologies.

VII.Future Scope

The Imminent of this project is applied with a help of the RTC (Real Time Clock) which can be useful in the real-time applications such as direct implementation over the hospitals for medication register with a use of a storage device such as cloud storage or some external storage devices to store the medication details of every patient for the imminent examination by the doctors. It can be an effective tool for the hospital staff for the register and retrieval of the patient medication database easier.

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