



Patient Monitoring System in Hospitalization Using PIC Microcontroller

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Abstract: Prevention is better than cure in the same way prevention during cure is also important. Due to the increasing population the burden of the health system is also increasing. The doctors have to face critical patients on a regular basis. The health system is the only system which is under tremendous pressure. A survey suggests that India has a single doctor for a population of 1700 people. Such conditions force the engineers to build a system that more or less help the doctors to fight with critical conditions. It is observed that the doctors spend a large portion of time in monitoring the patients and then thinking about the treatment. A system which can monitor the patient's health and directly provide data to the doctor, can reduce the time of action and the treatment can start quickly. Our system does the same thing. It enables the doctors to monitor patient's health parameters (temp, heartbeat, ECG, position) in real time. Here the parameters of patient are measured continuously (temp, heartbeat, ECG) and wirelessly transmitted using Zigbee. This results in reducing the monitoring time due to which the doctors can directly focus on treatment.

Keywords: Patient monitoring, ECG, temperature, PIC microcontroller.

1. INTRODUCTION

Care of critically ill patient, requires spontaneous & accurate decisions so that life-protecting & lifesaving therapy can be properly applied. Statistics reveal that every minute a human is losing his/her life across the globe. Moreover, in India, everyday many lives are affected by heart attacks and more importantly because the patients did not get timely and proper medical aid. Biomedical devices benefit from the rapid growth of gsm and wireless technology for measuring Physiological signals. The use of wireless communications in healthcare systems provides great Mobility and increase comfort level of patients.

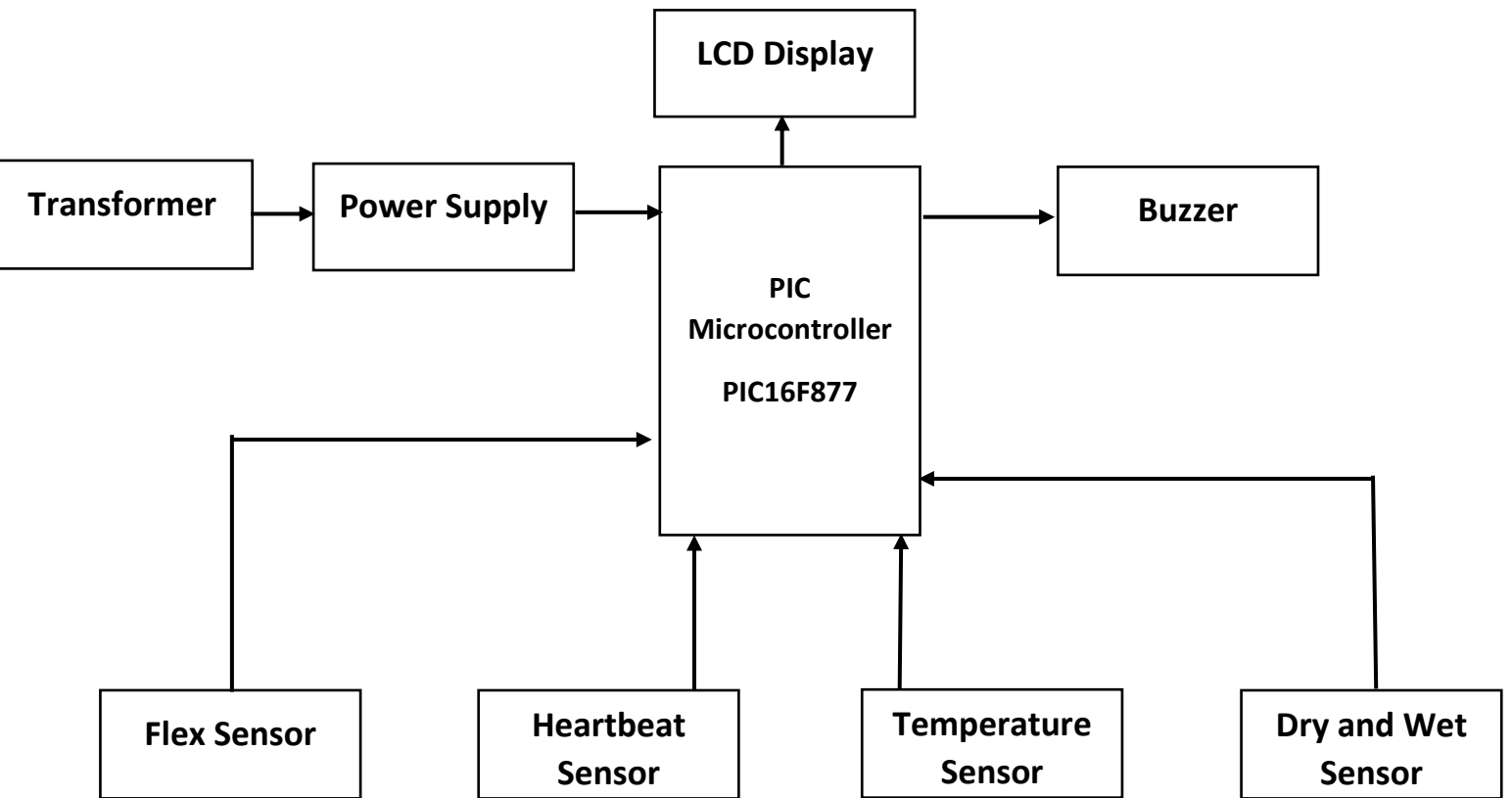
The wireless technology for biomedical applications should be suitably selected depending on the data rate and range required for the transmission. With advanced wireless technologies easy access can be made possible and quality healthcare can be provided to people, especially to those residing in the rural areas. Shorter hospital stay and better community care are expected to be the future trend of national health services. Recent advancements in sensor technology wireless communications and information Technology in general give opportunities to new models for providing health care and wellness or disease management tools, which enable extended independent living at home and improvement of quality of life for individuals.

2. MOTIVATION

Technology largely contributes in the field of defence, space, research etc., but the use of technology can be done in medical fields too. Using technology in medical field can cause a major difference in the lives of people. With the new emerging technologies like 5G, IoT, Machine learning etc., can be used to make the medical facilities more reliable. Saving life can be easy in future. So, to contribute in this process we came up with this idea of Patient Monitoring System in Hospitalization Using PIC Microcontroller



3. BLOCK DIAGRAM



3.1. Block Diagram Description

- In this project, the main controller used is PIC controller (PIC16F877).
- To power the circuit a 5V 1 Ampere power supply is designed.
- We have used total 4 sensors namely Flex sensor, Heartbeat sensor, Temperature sensor, Dry and Wet Sensor.
- The four parameters of the patient will be checked.
- These sensors will detect all the parameters and will then provide signals to the controller.
- After receiving the signals from the 4 sensors the controller will process them and then take actions accordingly.
- The controller will send a signal to the buzzer unit and then the buzzer will start beeping.
- The LCD display (16 X 2 LCD) will indicate the status of the system in real time.

3.2. Power Supply Circuit

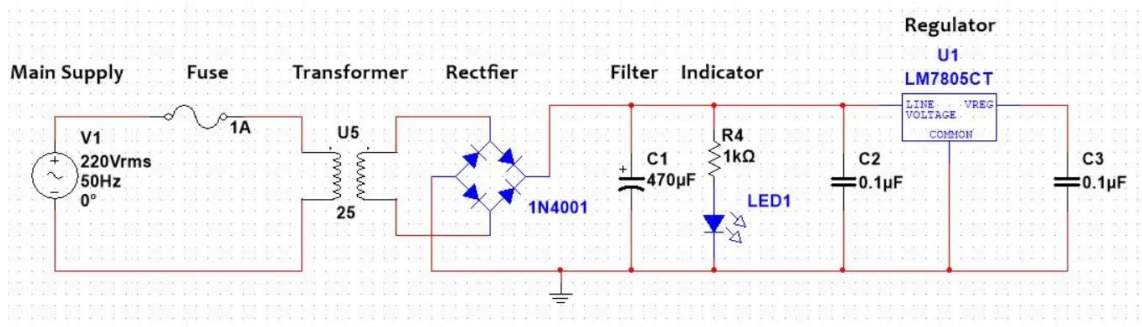


Fig 3.2. Power Supply Simulation on Proteus



3.3. Power Supply Circuit PCB Design

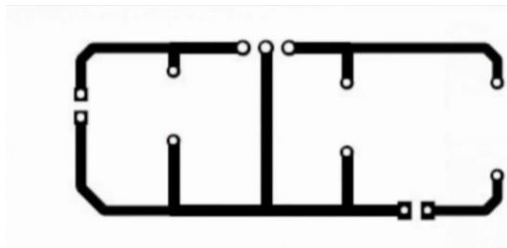


Fig 3.3. Power Supply Circuit on PCB

3.4. Detailed Working

- The transformer connected to the mains supply 230V @ 50Hz to the bridge rectifier circuit, and finally at the output of the power supply we get 5V 1 Amp regulated DC supply.
- This power supply satisfies the total power need of the project.
- The PIC controller act as the main controller of the project. It processes the signals coming from the different components and gives commands accordingly.
- The flex sensor will detect the disease or symptoms of a disease by detecting the composition, deficiency, or abundance of specific constituents in the subject of interest.
- If the flex sensor, senses some abnormality, the sensor sends a signal to the controller board.
- The temperature of the patient also plays an important role. So, the temperature sensor, senses the temperature of the patient.
- If the temperature of the patient goes above a threshold value, the sensor sends a signal to the controller.
- The heartbeat sensor senses the heart rate of the patient and sends continuous track of the data to the controller.
- The dry and wet sensor, senses the contents in the saline bottle, if the saline bottle gets empty then the sensor sends a signal to the controller.
- The controller receives the signals coming from all the sensors and then take actions rapidly. It sends a signal to the buzzer unit and then the buzzer starts beeping so that the doctor in charge attends the patient immediately.
- The status of sensors, buzzer is displayed on the LCD display in real time.

4. SIMULATION

4.1 Simulation of power supply

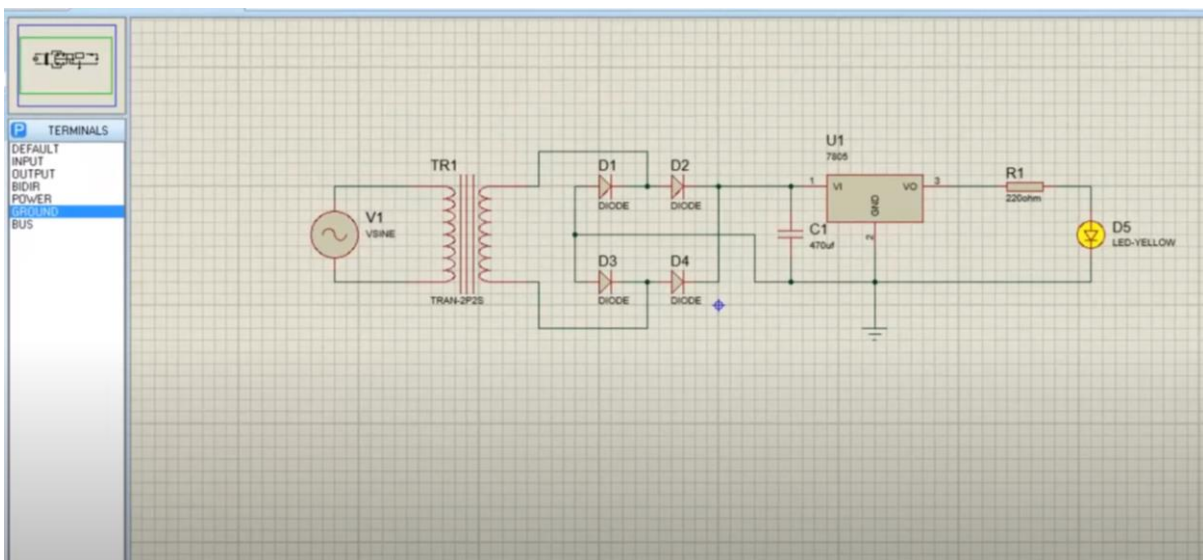


Fig 4.1. Simulation of Power Supply



5. ADVANTAGES

1. Simple construction.
2. Low power consumption.
3. Fast response.
4. Low-cost module.
5. Easy installation.

6. APPLICATIONS

1. In hospitals.
2. In clinics
3. In laboratories
4. In Ambulance

7. CONCLUSION

Patient Monitoring System is a technology strengthens the capabilities of doctors and medical authorities to track patient's vital parameters and determine their health condition. Patient monitors are the most important diagnostic devices in the critical care units of hospitals, providing continuous display and interpretation of the patient's vital parameters. Patient monitoring system measure physiological condition either continuously or at regular interval over time. The patient monitoring requirements include periodic detection of routine vital parameters and transmission of alerting signals when vital parameters indicate any kind of threats or danger.

8. ACKNOWLEDGMENT

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