

Patients Monitoring System Using CAN Bus

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ABSTRACT

The project makes use of CAN technology to sense and transfer the physiological signals and parameters of a patient's body. With the help of the project, efficient medical services can be provided to the patient in appropriate time. A microcontroller board is used for analysing the signals from patient's body. If any abnormal value is sensed, the monitoring system gives intimation by raising alarm on the receiver side which are generally in doctor's cabin or monitoring room. All the process parameters will be seen at the hyper terminal window on the computer on receiver's side. This project is designed to monitor pulse rate and body temperature of a patient's body and has been designed considering two patients. It can be achieved using CAN technology. At present this kind of high speed and continuous patient monitoring system has not been implemented currently, the continuous manual monitoring is done which consumes lot of time and also increases the skilled manpower. This project shall cover the flaws of speed and interfacing problems of the existing system. This increases the efficiency of hospital staffs and improves the comfort of patients and makes monitoring easier. Another most important point is that system makes sure the parameters of different patients do not get mixed up and are sent by the right name of the patient and recorded accordingly as well, only if needed. For providing high transmission speeds, this project has been designed as a system that uses CAN protocol which has a high data rate of 1 Megabyte per second at 1 Megahertz frequency.

Keywords: Power supply, Transformer, Timer, Sensors, LCD.

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I. INTRODUCTION

With the use of high performance and fault tolerant wired layout, parameters like Temperature and Pulse rate are taken using sensors from patient's body and transferred to doctors' computer using CAN technology. A Body Sensor Network (BSN) is established at a medical aid providing Centre, to eliminate medical errors and reduce workload of nurses and doctors. Interest among research groups in developing system for recording and monitoring the physiological parameters on real time basis (e.g. ECG, EEG, EOG, EMG, pulse Oximetry, blood flow, blood pressure etc.) from the human body is increased. But here, we are

~~taking Temperature and Pulse rate as parameters into consideration.~~ Most of the current efforts have mainly been focused on the devices that are monitoring sensor signals only from a single patient's body. Monitoring many physiological signals from a large number of patients at the same time is one of the current needs in order to deploy a complete such an application presents some challenges in both software and hardware designs. Some of them as follows: reliable communication by eliminating collisions of two patients' signals and interference from other external devices, low-cost, low power consumption and providing flexibility of relocating patients anytime. This work presents a heterogeneous sensor network system that has the capability to monitor physiological parameters from multiple patient bodies (here 2 patients), by means of Medical communication standard MICS (Medical Implant

Communication Service) .Instead of applying available standards, this project is designed with hardware operating at the MICS band for data collections from sensors. The system targets both implanted and on body (i.e. external) nodes. Previously, a MICS based BSN had the capability of simplex communication and only allowed one patient's condition to be monitored locally (i.e. a single body sensor network). But, in our project more than one patient can be monitored simultaneously.

II. OBJECTIVE

CAN Protocol was designed specifically for automotive applications but is now also used in other areas. Medicine, nursing, pharmacy, nutrition, therapies such as respiratory, physical, and occupational, and others. Although the work of the various disciplines sometimes overlaps, each has its own primary focus, emphasis, and methods of care delivery. Each discipline's work is complex in itself, and collaboration among disciplines adds another level of complexity. In all disciplines, the quality of clinical decisions depends in part on the quality of information available to the decision-maker. The process of care begins with collecting data and assessing the patient's current status in comparison to criteria or expectations of normality. Through cognitive processes specific to the discipline, diagnostic labels are applied, therapeutic goals are identified with timelines for evaluation, and therapeutic interventions are selected and implemented. At specified intervals, the patient is reassessed, the effectiveness of care is evaluated, and therapeutic goals and interventions are continued or adjusted as needed. If the reassessment shows that the patient no longer needs care, services are terminated.

III. PROPOSED SYSTEM

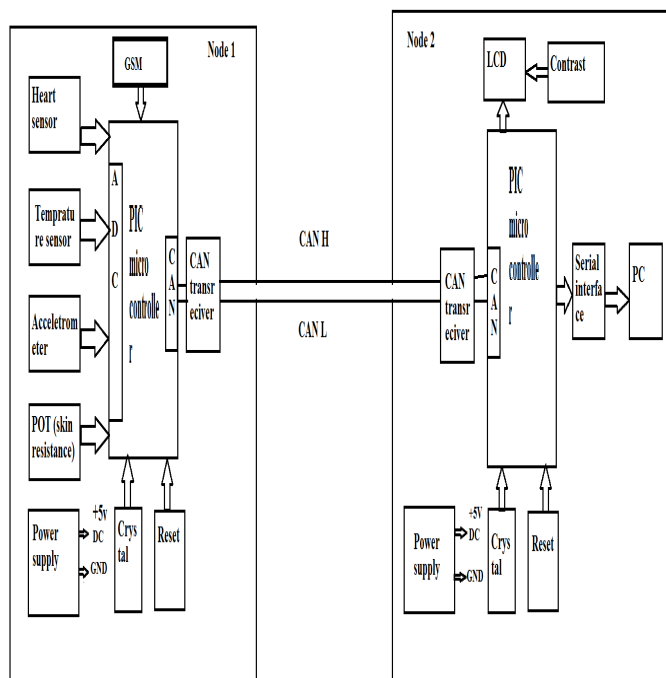


Fig 1. Block Diagram

The patient monitoring system to measure Pulse rate and Body temperature of the patient by using embedded technology CAN. So, by just connecting the temperature sensor (LM35) and Pulse Rate sensor (using IRD-Infrared

Device sensor) on multiple patients, simultaneous monitoring of many patients' conditions can be done. The sensors and LCD are connected to the controller. The controller has in built ADC which will convert analog signals from sensors to digital signal and calculate them to an accurate number to display on Liquid Crystal Display. In case, the temperature and/or pulse rate cross a safe limit (threshold value) as specified by the user, then on the receiver side a buzzer will ring to intimate the nearby authority about the abnormality. The sensors measure the parameters and transmit it through CAN Protocol, which is a function provided in our microcontroller.

Every electronic device (also known as the node) which needs to communicate using the CAN protocol is connected with each other via a common serial bus to transmit and receive messages. Every node has a Host controller which is responsible for the functioning of the respective node. In addition to the host controller every node has a CAN controller and CAN transceiver. CAN controller convert the messages of the nodes in accordance with the CAN protocols to be transmitted via CAN transceiver over the serial bus and vice versa.

IV. RESULT

The presence of doctor is essential for the patient care. But the doctor will have appointments for many patients at same time. In hospital, care taker (nurse) it gives less attention to patient. Hence it takes more time for a doctor or nurse to monitor the all patient because of the analog sensors and techniques. The above problem made us to proposal based on Data Acquisition System based on Microcontroller. The vital signs of the patient are monitored through the automated system. This consists of a heart beat sensor for pulse measurement, Blood pressure sensor for measuring the blood pressure, Temperature sensor for body temperature, accelerometer for sensing element. These systems continuously captures the data from all sensors and pass over the CAN trans receiver to PC as well as message alert system using GSM it directly connected to the specific person. This helps doctors or nurse to quickly monitor number of patients.

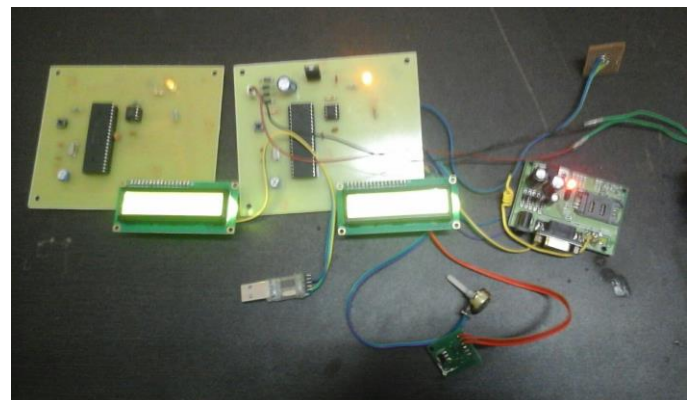


Fig 2. Final Circuit Embedded Kit



Fig 3. LCD Display Output



Fig 3. LCD Display final Calculation Output

V. ADVANTAGES

- Low connect cost.
- Low cost components.
- Growing number of CAN chip.
- Increasing knowledge base and integration service base.

VI. CONCLUSION

Our project can produce. Due to CAN bus interfaced with PC and software data base in the system, will help in providing quick notifications and patient readings and the same can be accessed globally. Patient's data can be monitored remotely. Patient's data can be stored in computer for future treatment and use. Patients data can be sent directly on doctors mobile which will make treatment faster using GSM. SMS alerts can be sent on patient's relative mobile to inform them about health of patient. It helps doctor to monitor patient easily. This system can be used for number of patients by adding multiple sensors. Highly accurate, reliable, low cost. Patient's data can be monitored. For remote Patients data monitoring To keep the track of health of patients.

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