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Remote Monitoring for VIPs Using GPRS

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Abstract—By Using GPRS patient condition can be monitor In communication channel of a tele-operation control task, there always exists a time-delay problem which causes poor performance and even instability of the system. The aim of this project is to provide an ECG medical monitoring for the user at any time and any place, if there is any abnormal change of ECG data. It also explains the advanced relief measures for the soldiers such as automatic injection system and Vibrotactile system which is used for oxygen pumping.The portable remote medical monitoring unit consists of Advanced RISC Machines (ARM) with the embedded operating system, wearable, GPS and a GPRS (Gsm) module capable of transmitting information to processing centers.

Key words—GPRS System, ECG monitoring System , Automatic injection system.

I. INTRODUCTION

Present works tend to use emerging wireless transmission solutions like Bluetooth and ZigBee technology to improve mobility and minimize power consumption of the wearable part.

The proposed work of this project is to develop a system that can be supplemented with real-time wireless monitoring systems which are designed and implemented through GPRS network and are able to record and transmit bio-signals of patients. The aim of this project is to provide an ECG medical monitoring for the user at any time and any place, if there is any abnormal change of ECG data. It also explains the advanced relief measures for the soldiers such as automatic injection system and Vibrotactile system which is used for oxygen pumping this all contain one robot section in the robot we are going to control from the base station.

II. SYSTEM ARCHITECTURE

It is composed of three parts

A). Person unit

B). Robot section

C).Military base station.

A) Person unit

This unit consists of three types of sensors such as temperature sensor, pressure sensor and heart beat sensor. These sensors are used to measure the signals from the human body such as heat signal, human body pressure and ECG signal respectively.

After measurement, these analog signals are converted into digital signals and compared with the actual signals stored in the EPROM device. If any discrepancy occurs between the measured signals and the actual signals, then it is considered as an emergency.

The ARM 7 LPC2148 processor plays an important role in controlling all the devices. It has an inbuilt A\D convertor. when it detects the emergency(discrepancy in signal), it just skip over the control to relief measures such as automatic injection system and automatic oxygen pumping system.

GPRS transmitter is used to transmit the signals from the sensors which are controlled by the ARM7 microprocessor. So to provide a permanent and immediate relief to the soldier, GPS system is used to locate the position of the soldier. It is very helpful for the relief team to rescue the soldier as soon as the emergency signal is received.

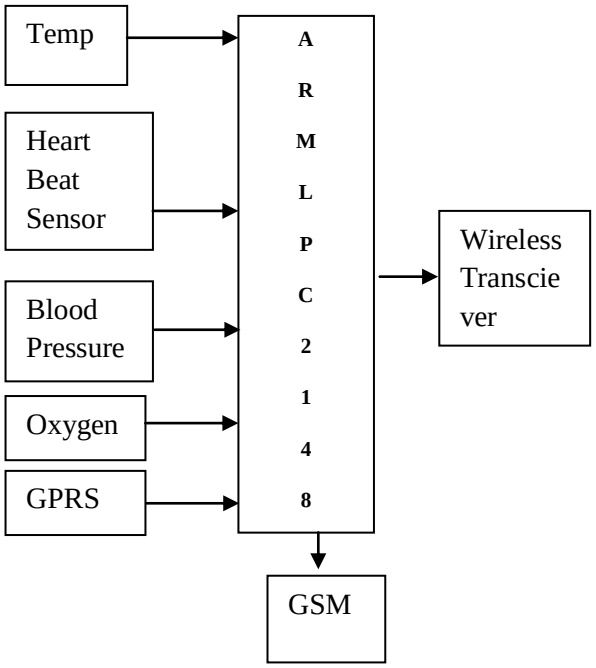

Figure 1: Medical Monitoring System

In Relation to the Medical monitoring System GPRS will take care about the locations in different areas, In related to where is patient located, the Central monitoring and controlling action is done through ARM based micro controller as shown in above figure

LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4°C at room temperature and ±3⁄4°C over a full −55 to +150°C temperature range.
As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35C is rated for a −40° to +110°C range (−10° with improved accuracy).

B) Robot Section

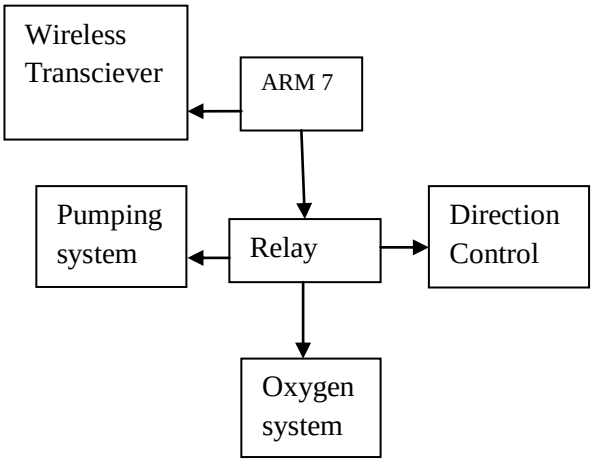

Figure 2: Block diagram of Robot section

The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Hence a CB amplifier is used to achieve the current rating of the relay.

Monitoring centre block will have the server to monitor the Sensor node values received via GPRS. Each server will be assigned an IP address. GPS receiver is used here to locate the position of the soldiers. GPS receiver is used here to locate the position of the soldiers. The continuous ambulatory monitoring is done in the base station to provide the immediate relief measures. The monitoring centre is composed of the monitoring station and the information processing system which realizes information management, real-time analysis, wireless transmission, a warning mechanism for emergency.

In the robot section the relay connection is going to control the robots direction, injection section, oxygen pumping system

Relay circuit

The coil of a relay passes a relatively large current, typically 30mA for a 12V relay, but it can be as much as 100mA for relays designed to operate from lower voltages. Hence a CB amplifier is used to achieve the current rating of the relay.

Transistors and ICs must be protected from the brief high voltage produced when a relay coil is switched off. The diagram shows how a signal diode (e.g. 1N4148) is connected 'backwards' across the relay coil to provide this protection.

C) Base station

TRANSMITTER

The TWS-434 extremely small, and are excellent for applications requiring short-range RF remote controls. The transmitter module is only 1/3 the size of a standard postage stamp, and can easily be placed inside a small plastic enclosure.

TWS-434: The transmitter output is up to 8mW at 433.92MHz with a range of approximately 400 foot (open area) outdoors. Indoors, the range is approximately 200 foot, and will go through most walls.

The TWS-434 transmitter accepts both linear and digital inputs can operate from 1.5 to 12 Volts-DC, and makes building a miniature hand-held RF transmitter very easy. The TWS-434 is approximately 1/3 the size of a standard postage stamp.

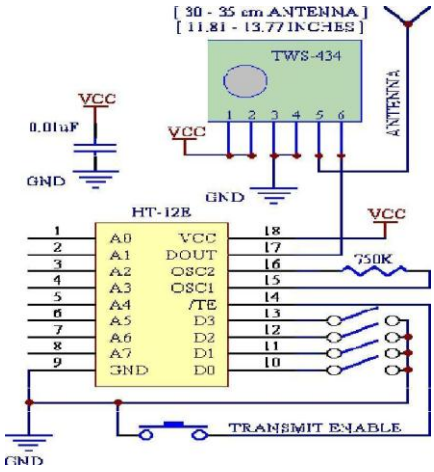

Figure 3: Application circuit

RECEIVER

RWS-434: The receiver also operates at 433.92MHz, and has a sensitivity of 3uV. The WS-434 receiver operates from 4.5 to 5.5 volts-DC, and has both linear and digital outputs.

GENERATING DATA

The TWS-434 modules do not incorporate internal encoding. If you want to send simple control or status signals such as button presses or switch closures, consider using an encoder and decoder IC set that takes care of all encoding, error checking, and decoding functions.

RECEIVER DATA OUTPUT

A 0 volt to Vcc data output is available on pins. This output is normally used to drive a digital decoder IC or a microprocessor which is performing the data decoding. The receiver's output will only transition when valid data is present. In instances, when no carrier is present the output will remain low.

DECODING DATA

The RWS-434 modules do not incorporate internal decoding. If you want to receive Simple control or status signals such as button presses or switch closes, you can use the encoder and decoder IC set. Decoders with momentary and latched outputs are available.

TRANSMITTING AND RECEIVING

Full duplex or simultaneous two-way operation is not possible with these modules. If transmit and receive module are in close proximity and data is sent to a remote receive module while attempting to simultaneously receive data from a remote transmit module, the receiver will be overloaded by its close proximity transmitter.

GPRS AND TRANSMISSION MODULE

Prioritizing easy operation, a GPRS module SIM300 provided by Simcom is chosen to be the transmitter/receiver so that the user could send his/her ECG signals at anytime wherever GSM coverage is present.

With a tiny configuration of 40mm x 33mm x 2.85 mm, SIM300 can fit almost all the space requirement in your industrial application, such as The two serial ports can help you easily develop your applications. It is designed with power saving technique, the current consumption to as low as 2.5mA in SLEEP mode.

In order to develop the ECG related software just like developing application software in Personal Computer (PC), the system uses an Operating System (OS) named uClinux. First of all, the firmware system will do initialization of UART, A/D conversions, LCD controller, and then create ECG data acquisition task, data transmission task, timer task, ISR task and so on.

A. Heart Rate Sensor

The heartbeat sensor, also known as the heart rate sensor or heartbeat detector, is a device used in different fields for different reasons. For medical use, it measures the heart rate of an individual. In terms of security it can detect people hidden in vehicles

Heart rate sensor offers the following Applications

a. Heart Rate Sensor

Medical heart sensors are capable of monitoring vascular tissue through the tip of the finger or the ear lobe. It is often used for health purposes, especially when monitoring the body after physical training.

b. Heavy Security

The heartbeat detector was created by the U.S. Department of Energy's Oak Ridge National Laboratory as a way to detect the presence of hidden personnel in vehicles around laboratories .

c. Military Equipment

According to a PowerPoint presentation about Micropower Impulse Radio given by the Lawrence Livermore National Laboratory and be found on the Defense Advanced Research Projects Agency's website, there are patents and research

III. CONCLUSION

The current technology being used in our paper is remote monitoring the soldiers with GPRS based protection system. It measures the heart beat rate, pressure range, temperature range, respiration system and compared with the actual value stored in the EPROM. If any discrepancy occurs, then ARM7 processor will shift the control over to the relief system such as automatic injection system and Vibrotactile system to simulate the oxygen pumping and also transmit the Bio-Signals to the base station through GPRS.

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