ISSN No: 2348-4845
International Journal & Magazine of Engineering, Technology, Management and Research
A Peer Reviewed Open Access International Journal

Analysis of Patient Health System Using Wireless Communications

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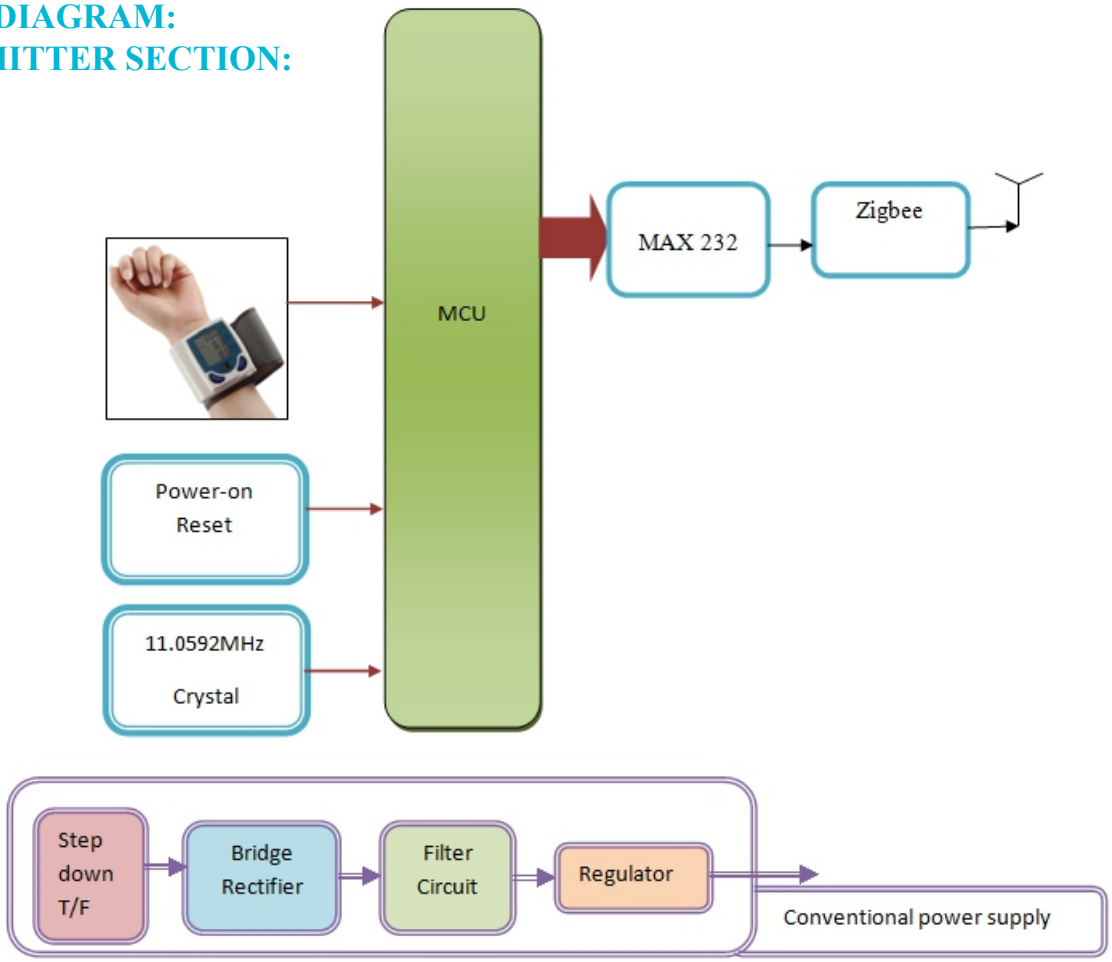
Abstract:

The paper presents design and development of a Non-invasive wireless blood pressure data acquisition instrument for remote monitoring based Micro-controller and Bluetooth transmission kit. The real-time blood pressure biomedical signal is measured using an optical measurement circuit based Plethysmography technique (PPG) continuously for a long period of time. The detected measured signal amplified using an operational amplifier circuit and interfaced with the Microcontroller. Blood pressure readings with help of developed algorithm has been calculated and transmitted via Bluetooth kit to the stationary computer.

Numerical reading values of systolic and diastolic blood pressure remotely recorded and displayed with help of LCD as well stationary computer. Furthermore, the obtained results were compared with existing devices data like a Sphygmomanometer to verify the accuracy of the developed Instrument.This project describes the design of a simple, low-cost controller based patient health monitoring system. By reading pulse values continuously from pulse count sensor placed wrist of patient these values are displayed on LCD.. This project uses regulated 5V, 750mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.

BLOCK DIAGRAM:
TRANSMITTER SECTION:



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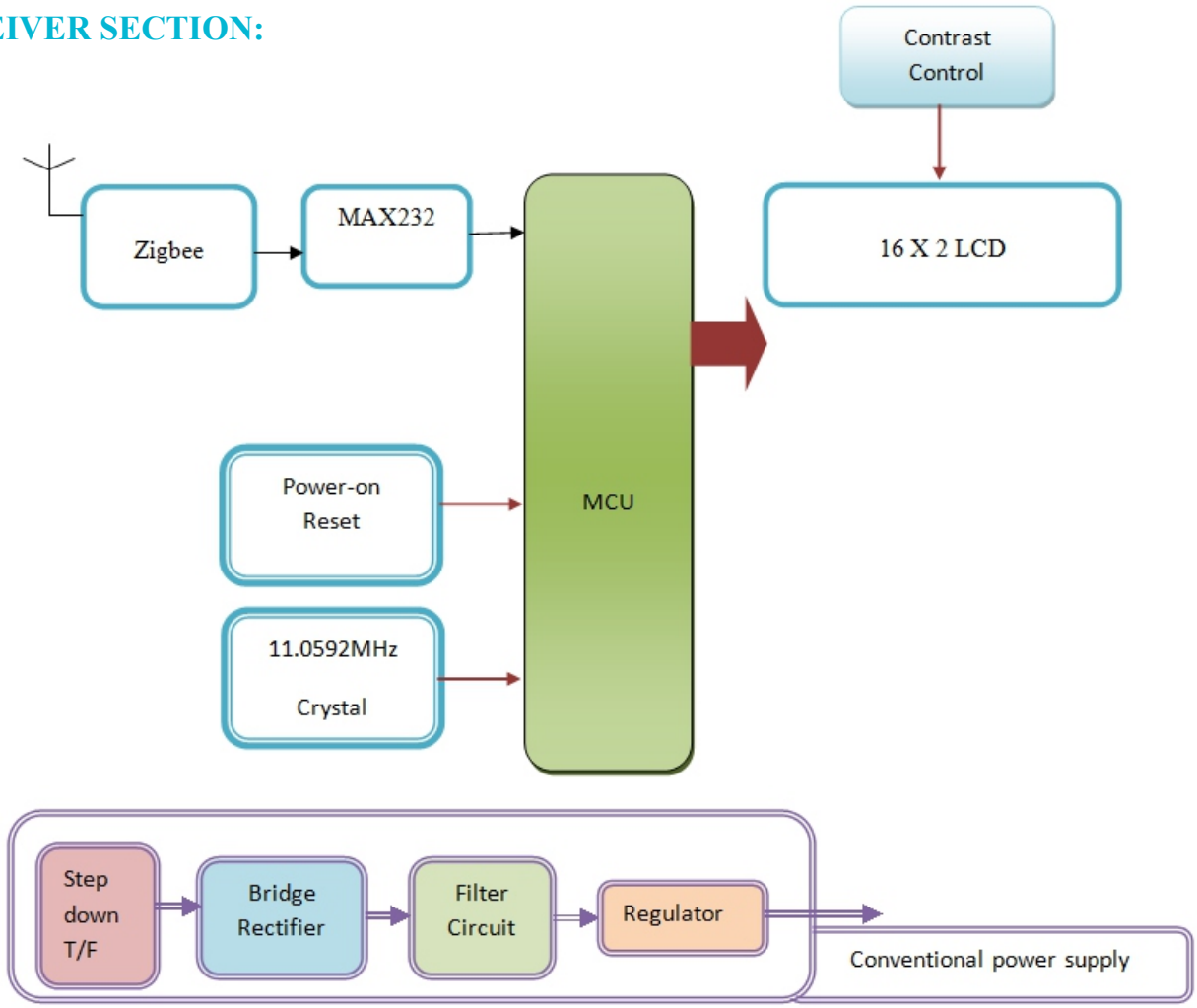
RECEIVER SECTION:



Explanation of devices used

Blood pressure :

Blood pressure (BP) is the pressure exerted by circulating blood upon the walls of blood vessels and is one of the principal DOC.dochen used without further specification, "blood pressure" usually refers to the arterial pressure of the systemic circulation, usually measured at a person's upper arm. A person's blood pressure is usually expressed in terms of the systolic pressure over diastolic pressure and is measured in millimeters of mercury (mm Hg). Normal resting blood pressure for an adult is approximately 120/80 mm Hg.

AT89S52 Microcontroller:

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory.

The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be re-programmed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications.

ZIGBEE:

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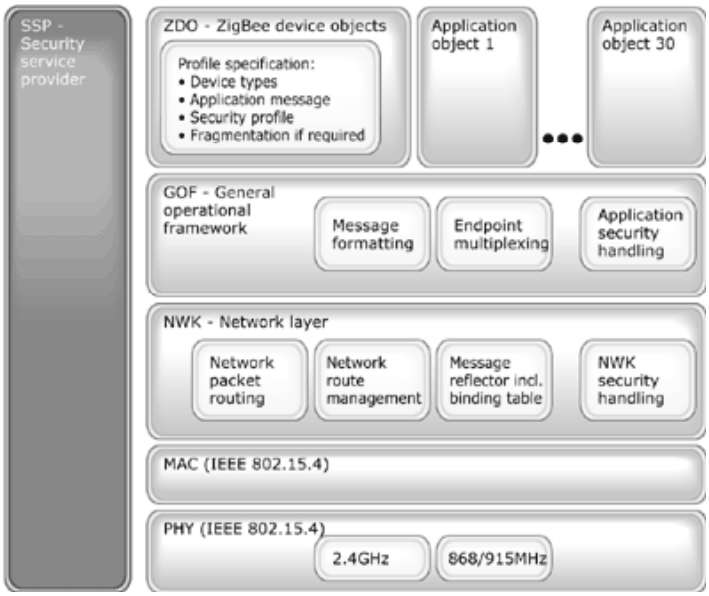
ZigBee module. The €1 coin, shown for size reference, is about 23 mm (0.9 inch) in diameter. ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4-2003 standard for wireless personal area networks (WPANs), such as wireless headphones connecting with cell phones via short-range radio. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPANs, such as Bluetooth. ZigBee is targeted at radio-frequency (RF) applications that require a low data rate, long battery life, and secure networking. The ZigBee Alliance is a group of companies that maintain and publish the ZigBee standard.



ARCHITECTURE

KEIL SOFTWARE:

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.

PROLOAD:

Proload is a software which accepts only hex files. Once the machine code is converted into hex code, that hex code has to be dumped into the microcontroller placed in the programmer kit and this is done by the Proload. Programmer kit contains a microcontroller on it other than the one which is to be programmed. This microcontroller has a program in it written in such a way that it accepts the hex file from the keil compiler and dumps this hex file into the microcontroller which is to be programmed

Advantages:

•Ease of operation
•Low maintenance cost
•Fit and forget system
•No wastage of time
•Durability
•Accuracy

Applications:

•Hospitals
•Remote heart rate monitoring applications
•Local monitoring applications
•Designed for Home and Clinical Applications

IV. CONCLUSION:

In this paper, we developed Noninvasive Wireless Remote Monitoring Blood Pressure Measurement Instrument based Microcontroller and using photoplethysmography technique.The blood pressure was measured continuously for a long period of time with help of developed algorithm the small embedded system and displayed the systolic and diastolic blood pressure on a mini LCD.

The results were further compared with existing devices data likesphygmomanometer to verify the accuracy of the developed system. Moreover, the developed system can transmit the measured blood pressure values to any Bluetooth enabled device though Bluetooth wireless technology. This system provides users an easy-to-use interface and simple BP management environment. The Bluetooth interface provides a convenient and low-power consumption method for data transmission.

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