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A PATH FOR HORIZING YOUR INNOVATIVE WORK

WEB BASED INDUSTRIAL BOILER REMOTE MONITORING SYSTEM

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Abstract: In order to realize the remote monitoring of boiler temperature, we propose the use of Linux OS and ARM(S3C2440) processor to build the hardware and software platform for the system. To complete the measurement of temperature for the controlled objects, the system employs a set of sensors to collect temperature signals and uses the A/D converter integrated by a microprocessor to carry out A/D conversion. The system adopts a temperature control algorithm based on Linux system to achieve an ideal temperature control, combines the Wi-Fi and TCP/IP protocol embedded in Linux OS to realize the network connection, and employs the Wi-Fi function of Android mobile phone to monitor the temperature of the boiler at the remote terminal. Through the test and analysis of key modules, the system is proven to be stable and reliable, and can realize the remote monitoring of boiler temperature.

Keywords: ARM 9, Temperature sensor, Zigbee, Camera



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INTRODUCTION

Here, we propose the design and implementation of low cost web based remote monitoring system with built-in security features. Due to the usage of an embedded intelligent monitoring module which is the ARM9 Instrument, portability, low power consumption and low cost have been achieved in the system. The intelligent embedded module is made up of a 3.5 Lcd screen 1GB Memory processor. The maximum power consumption of the board is 2 watts. The arm 9 board is a low-power open source hardware single-board computer which measures , making it very much suitable for a portable system. Later programming is done on this Board to make it act as an embedded web server. Many papers have already been published based on the topics of remote monitoring and security either separately or jointly. But most of them lack Implementation, as some lack low level implementation details, In some of them, implementations are done on workstation like embedded server with huge database backup.

SYSTEM HARDWARE AND IMPLIMENTAION WORK

Mini2440

The mini2440 is a practical low-cost ARM9 Single Board Computer (SBC) with a very high performance/cost ratio. With the Samsung S3C2440 microprocessor and the use of professional layout and quality peripheral chips, it is very robust. The Mini2440 uses a four-layer board design with gold immersion processing, and has high quality equal-length bus routing in timing critical areas. The production environment and quality control are the same as those of modern high-speed motherboards



Camera

Camera plays a vital role in automation purpose. The camera is used for monitoring of a room from a remote place. The camera used is a USB camera (life cam vx-800). Whenever the user clicks on to video button on loaded webpage, the corresponding room video will be streamed on to webpage .For this purpose we use a MJPG streamer.

Zigbee Module

ZigBee Modules typically come with several antenna options, including U.FL, PCB Embedded, Wire, and RPSMA. The ZigBees can operate either in a transparent data mode or in a packet-based application programming interface (API) mode. In the transparent mode, data coming into the Data IN (DIN) pin is directly transmitted over-the-air to the intended receiving radios without any modification. Incoming packets can either be directly addressed to one target (point-to-point) or broadcast to multiple targets.

Network Interface

The interfacing of sensor with the ARM 9 is done using the 3-wire communication through 3 wire communication protocol[1]. The application calls a method to read a value, which starts the conversion and then returns. As soon as sensor gets a query for data it starts conversion and sends it to XBee transceiver through processing unit

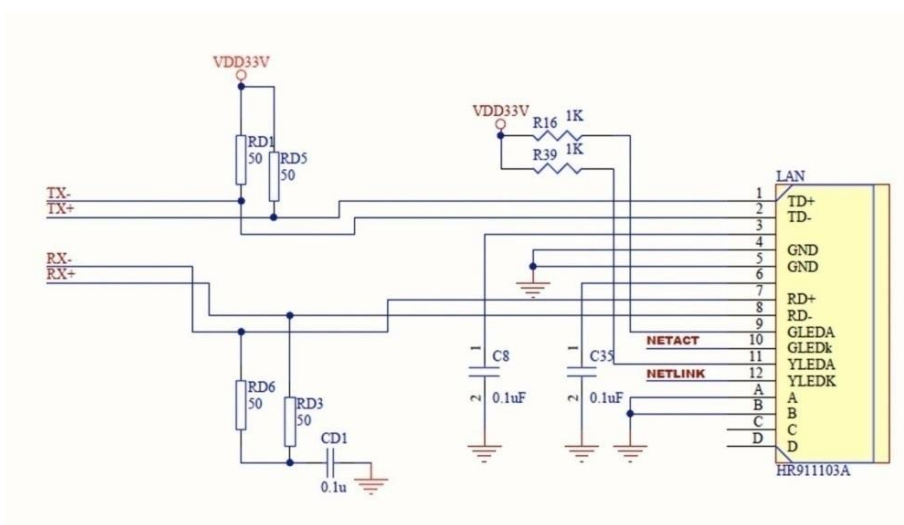


Fig 1 Network Interface

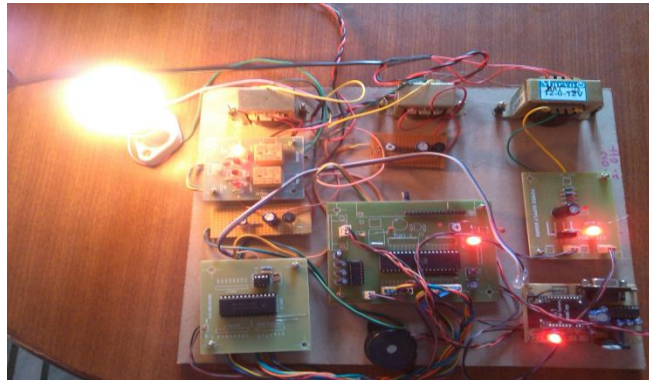


Fig 2 Remote Load

ETHERNET

Ethernet LANs

The most widely used local-area network (LAN) access method - defined by the Institute of Electrical and Electronics Engineers (IEEE) - is the 802.3 [4] standard. Ethernet has become so popular, that most Apple computers and many PCs are fabricated directly with 10/100 Ethernet ports for home use. These ports enable you not only to create a small home network, but also to connect to the Internet via a Digital Subscriber Line (DSL) or cable modem, which requires an Ethernet connection. A 10/100 port was created for a network interface, which supports both 10BASE-T at 10 megabits per second (Mbps) and 100BASE-T at 100 Mbps.

Ethernet is a shared-media LAN, which means that all stations on the segment use a part of the total bandwidth. Depending on the type of Ethernet implemented, this total bandwidth is a 10 Mbps (Ethernet), 100 Mbps (Fast Ethernet), or 1000 Mbps (Gigabit Ethernet). In a shared Ethernet environment all hosts are connected to the same bus and compete with each other for the bandwidth. In such an environment packets meant for one machine are received by all the other machines. Thus, any machine in such an environment placed in promiscuous mode will be able to capture packets meant for other machines and can therefore listen to all the traffic on the network using the carrier sense multiple access with collision detect (CSMA/CD) mechanism like in Point-to-Multipoint communication.

A switched Ethernet environment - in which the hosts are connected to a switch instead of a hub - is called a Switched Ethernet. The switch maintains a table keeping track of each computer's MAC address and delivers packets destined for a particular machine by sending it to the port on which that machine is connected.

Media Access Control (MAC) Addressing

MAC address is a unique serial number assigned and burned into each network adapter that differentiates network cards, just as your house number is unique on your street and identifies your home among others. To be a part of any network, you must have an address so that you will be able to be reached. Two types of addresses are found in a network: the logical (OSI model Layer 3, network) and the physical (OSI model Layer 2, data link). For this part of the thesis the physical address (also known as the Media Access Control [MAC] address) is relevant.

A MAC address is the physical address of the device. It is 48 bits (6 bytes) long and is made up by two parts: the organizational unique identifier (OUI) and the vendor-assigned address, as illustrated in

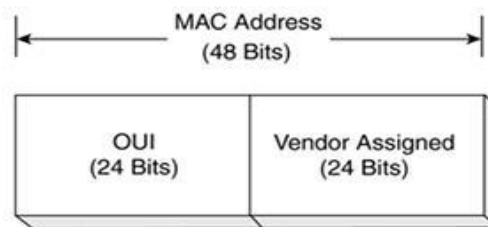
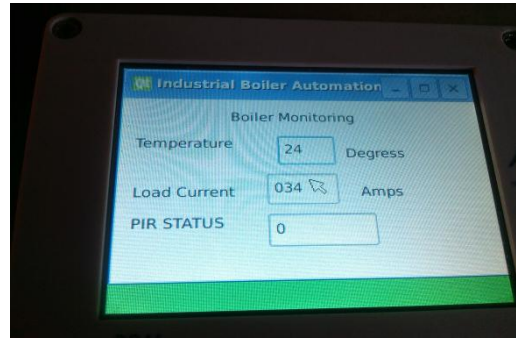


Fig 3 Structure of the MAC Address

The MAC address on a computer might look like this: 00-08-a1-08-c8-13. This MAC address is used for the Fast Ethernet adapter on a given computer. The OUI is 00-08-a1, and the vendor-assigned number is 08-c8-13.

RESULTS





CONCLUSION

In this paper, a fully automated intelligent remote monitoring and controlling system has been designed and implemented. Sensors are used as a reliable solution in providing remote monitoring and controlling for vulnerable monitoring systems. The features of Bluetooth/zigbee are explored to design the system for long distance communication. As the ARM processor has been specifically designed to be small to reduce the power consumption and extend the battery operation for portable devices applications, the proposed system itself is a low cost, portable and also flexible with the increasing variety of devices to be controlled.

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