

Gprs webpage based industrial automation and monitoring

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Abstract:

Wireless Packet Data Networks, such as GPRS, hold great promise for applications that rely on machine to machine (M2M) communication. The rapidly advancing mobile communication technology and the decrease in costs make it possible to incorporate mobile technology into home automation systems. Based on an SMS/GPRS (Short Message Service/General Packet Radio Service) mobile cell module and a microcontroller, a home automation server can be established, Powerful microcontrollers are used as parts of most home and office appliances of today. Integrating web servers to these intelligent devices will aid in controlling them over the Internet and also in creating effective user interfaces in the form of web pages. This paper presents the development of AT modem driver, text based command processing software, output for an Atmel microcontroller to facilitate in sending and receiving data via the cell module. The proposed design is implemented using SMS (commonly known as text messages) and GPRS (Internet based protocol) as the main communication protocol.

Keywords: LPC2148 development board, GPRS Modem, Cell Phone which can support JAVA Application, Intelligent appliances

I. Introduction:

Remote control via the Internet is not a new feature and used in home automation systems. However, providing a mechanism for interaction between devices in this environment is quite challenging. The internet has been mostly used to connect personal computers so far, but shortly all kinds of appliances with embedded computers will exchange information over the Internet. A massive number of microcontrollers are available in today's devices which can be linked to the Internet. If these intelligent appliances could be connected to the Internet at low cost, the way we control and manage their functions would change entirely. An embedded web server should use the HTTP protocol to transmit Web pages from the embedded system to the attached to the appliance. The embedded system requires a network interface, such as Ethernet, a TCP/IP protocol stack, embedded web server software and static and dynamic web pages that form the user interface for that specific device.

II. The Hardware System

Micro controller:

This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller

forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI:

ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Liquid-crystal display (LCD):

Liquid crystal display is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

THERMISTOR:

Thermistors are a temperature sensing device. It is used to sense the temperature. In this project by depends on the value of temperature the exhaust fan will run.

I. Design of Proposed Hardware System

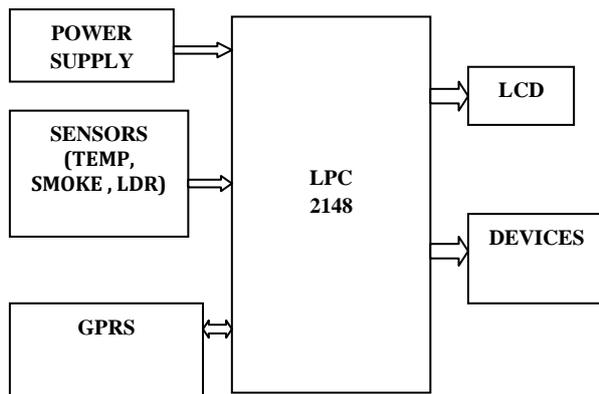


Fig.1.Block diagram

We can overcome the disadvantage of the existing method by Remote control via the Internet and it's a new feature and used in home automation systems. However, providing a mechanism for interaction between devices in this environment is quite challenging. The internet has been mostly used to connect personal computers so far, but shortly all kinds of appliances with embedded computers will exchange information over the Internet. A massive no of microcontrollers are available in today's devices which can be linked to the Internet. If these intelligent appliances could be connected to the Internet at low cost, the way we control and manage their functions would change entirely. The embedded system requires a network interface such as Ethernet, a TCP/IP protocol stack, embedded web server software and static and dynamic web pages that form the user interface for that specific device. The system uses a compact circuitry built around LPC2148 (ARM7) microcontroller programs are developed in Embedded C. Flash magic is used for loading programs into Microcontroller.

LDR:

LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000 ohms, but when they are illuminated with light resistance drops dramatically. However, when light shines onto the LDR its resistance falls and current flows into the base of the first transistor and then the second transistor. The LED lights on. The preset resistor can be turned up or down to increase or decrease resistance, in this way it can make the circuit more or less sensitive.

HUMIDITY:

Humidity is the amount of water vapor in the air. In daily language the term "humidity" is normally taken to mean relative humidity. Relative humidity is defined as the ratio of the partial pressure of water vapor in a parcel of air to the saturated vapor pressure of water vapor at a prescribed temperature. Humidity may also be expressed as absolute humidity and specific humidity. Relative humidity is an important metric used in forecasting weather. Humidity indicates the likelihood of precipitation, dew, or fog. High humidity makes people feel hotter outside in the summer because it reduces the effectiveness of sweating to cool the body by preventing the evaporation of perspiration from the skin. Absolute humidity is the quantity of water in a particular volume of air. The most common units are grams per cubic meter, although any mass unit and any volume unit could be used. Relative humidity is defined as the ratio of the partial pressure of water vapor in a gaseous mixture of air and water vapor to the saturated vapor pressure of water at a given temperature. Relative humidity is expressed as a percentage. Specific humidity is the ratio of water vapor to air (including water vapor and dry air) in a particular volume. Measuring and regulating humidity.

SMOKE SENSOR:

Smoke sensor is used to detect any leakage of smoke and any hazardous gases such that an alarm can be initiated to avoid any damages in the industries. These sensors are also used in many applications like corporate and in any office work areas these are linked to fire alarms .And buzzers through the micro-controller. There are two main types of smoke detectors: Ionization detectors and photoelectric detectors. A smoke alarm uses one or both methods, sometimes plus a heat detector, to warn of a fire. Ionization detectors have an ionization chamber and a source of ionizing radiation. The source of ionizing radiation is a minute quantity of americium-241 (perhaps 1/5000th of a gram), which is a source of alpha particles (helium nuclei). The ionization chamber consists of two plates separated by about a centimeter. The battery applies a voltage to the plates, charging one plate positive and the other plate negative. Alpha particles constantly released by the americium knock electrons off of the atoms in the air, ionizing the oxygen and nitrogen atoms in the chamber. The positively-charged oxygen and nitrogen atoms are attracted to the negative plate and the electrons are attracted to the positive plate, generating a small, continuous electric current. When smoke enters the ionization chamber, the smoke particles attach to the ions and neutralize

them, so they do not reach the plate. The drop in current between the plates triggers the alarm. In one type of photoelectric device, smoke can block a light beam. In this case, the reduction in light reaching a photocell sets off the alarm. In the most common type of photoelectric unit, however, light is scattered by smoke particles onto a photocell, initiating an alarm. In this type of detector there is a T-shaped chamber with a light-emitting diode (LED) that shoots a beam of light across the horizontal bar of the T. A photocell, positioned at the bottom of the vertical base of the T, generates a current when it is exposed to light. Under smoke-free conditions, the light beam crosses the top of the T in an uninterrupted straight line, not striking the photocell positioned at a right angle below the beam. When smoke is present, the light is scattered by smoke particles, and some of the light is directed down the vertical part of the T to strike the photocell. When sufficient light hits the cell, the current triggers the alarm.

WEB SERVER:

Recent technological developments enable us to embed web servers into everyday appliances with low costs. What do we hope to gain by putting our devices online? Basically, the web enables users to fetch web pages and display them on their own browsers in a platform-independent manner. Moreover, information coming from an appliance's sensors can be used to generate dynamic HTML documents by common gateway interface (CGI) scripts. Therefore, any device connected this way can be monitored and controlled through CGI scripts and the results can be sent to the user's browser as a web page. Not only users, but also manufacturers can use web access to update their products' software simply by uploading the new software to devices remotely or appliances can be programmed to regularly check the manufacturer's web site for software updates and download them automatically when they are available. Furthermore, when an appliance requires maintenance, it can automatically inform the technical staff without interrupting the user.

Web-based interfaces are cross-platform and easier to develop. The costs related to product documentation, training and support are lower. These can be instrumental in solving user interface related problems. Most complex appliances have many unused functions, because users find them too difficult to use. There are several reasons for poor interfaces. An important one of these is that since manufacturers economize on buttons and displays, complex features can be used only by button combinations with no or very hard to

understand indications on the button labels. Moreover, the feedback given to the user after a performed action is usually not satisfactory (Nichols and Myers, 2003). On the other hand, as manifested by the exponential growth of the number of web users globally, ordinary people can use web based interfaces effortlessly without any knowledge of the underlying hardware and software.

Board Hardware Resources Features

GPRS:

GPRS (General Packet Radio Service) is a packet based communication service for mobile devices that allows data to be sent and received across a mobile telephone network. GPRS is a step towards 3G and is often referred to as 2.5G. Here are some key benefits of GPRS .GPRS usage is typically charged based on volume of data transferred, contrasting with circuit switched data, which is usually billed per minute of connection time. Usage above the bundle cap is either charged per megabyte or disallowed.

GPRS is a best-effort service, implying variable throughput and latency that depend on the number of other users sharing the service concurrently, as opposed to circuit switching, where a certain quality of service (QoS) is guaranteed during the connection. In 2G systems, GPRS provides data rates of 56–114 kbit/second.^[3] 2G cellular technology combined with GPRS is sometimes described as 2.5G, that is, a technology between the second (2G) and third (3G) generations of mobile telephony.^[4] It provides moderate-speed data transfer, by using unused time division multiple access (TDMA) channels in, for example, the GSM system. GPRS is integrated into GSM Release 97 and newer releases. As mentioned earlier GPRS is not a completely separate network to GSM. Many of the devices such as the base transceiver stations and base transceiver station controllers are still used. Often devices need to be upgraded by its software, hardware or both. When deploying GPRS many of the software changes can be made remotely. There are however two new functional elements which play a major role in how GPRS works. The Serving GPRS Support Node (SGSN) and the Gateway GPRS support node (GGSN).



DEVICES:

There are two devices ,device1 and device 2,controlled by the web pages, these web pages are communicated to the controller using TCP/IP protocol , parallely we create web switches in web page , using these web switches we will controle the devices when the sensor are reached the threshold values.

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