

Intelligent Street Lighting System Sensors with Wireless Sensor Networks

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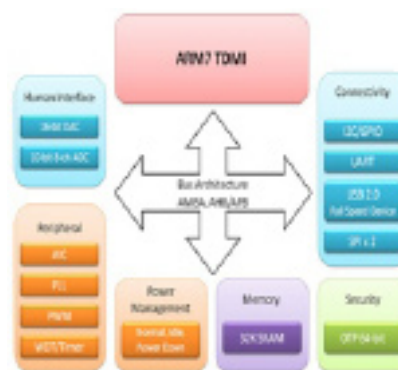
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ABSTRACT:

Lighting systems, especially in the public sector, are still designed according to the old standards of reliability and they often do not take advantage of the latest technological developments. In the present world we can find the street lights on road sides as well as highways also. Some times due to various reasons the lights might be damaged. This information is not reached to the electricity department people whether the light is damaged or not by sitting in the remote place. This problem can be overcome easily by using embedded technology. In this scenario the total application is implemented with the help of wireless communication technology by using Zigbee modules. In this application total two sections are implemented one is transmitter section i.e street lights section. Here in our application if we are using three street lights as a prototype, we need to interface the street lights section to the Zigbee transmitter module, if any one of the street light had been damaged the information immediately is transferred to the receiver section i.e.

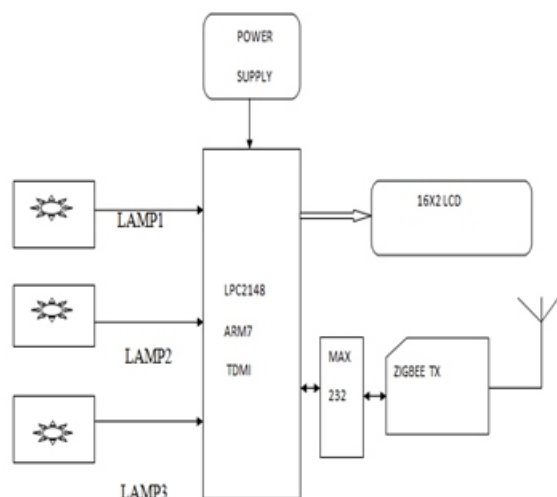
Electricity department. In the receiver section it will be displayed on LCD. Here we have a zigbee receiver to take the information. We are using LPC2148 as our controller which is the heart of the entire system in the receiver section and AT89S52 in the transmitter section. The LPC2148 are based on a 16/32 bit ARM7TDMI-S™ CPU with real-time emulation and embedded trace support, together with 128/512 kilobytes of embedded high speed flash memory. A 128-bit wide memory interface and unique accelerator architecture enable 32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bit Thumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64 pin package, low power consumption, various 32-bit timers, 4- channel 10-bit ADC, USB PORT, PWM channels and 46 GPIO lines

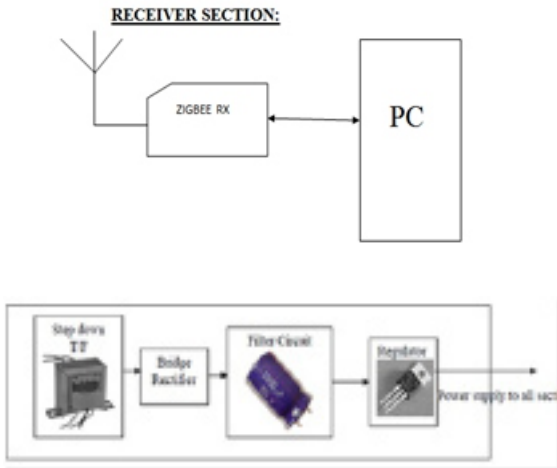
with up to 9 external interrupt pins these microcontrollers are particularly suitable for industrial control, medical systems, access control and point-of-sale. With a wide range of serial communications interfaces, they are also very well suited for communication gateways, protocol converters and embedded soft modems as well as many other general-purpose applications.



BLOCKDIAGRAM:

TRANSMITTER SECTION:





This project uses regulated 3.3V, 500mA 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.

Zigbee Technology Zigbee



ZigBeemodule. 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.

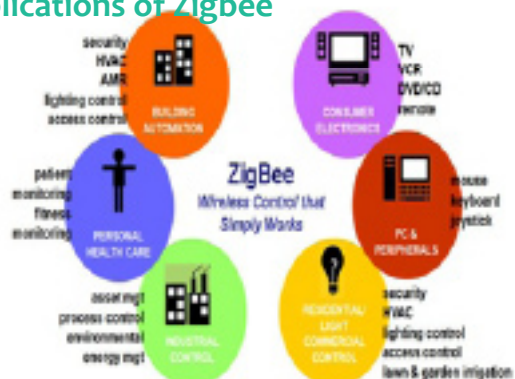
ARCHITECTURE:



ZigBee is a home-area network designed specifically to replace the proliferation of individual remote controls. ZigBee was created to satisfy the market's need for a cost-effective, standards-based wireless network that supports low data rates, low power consumption, security, and reliability. It may be helpful to think of IEEE 802.15.4 as the physical radio and ZigBee as the logical network and application software. Following the standard Open Systems Interconnection (OSI) reference model, ZigBee's protocol stack is structured in layers. The first two layers, physical (PHY) and media access (MAC), are defined by the IEEE 802.15.4 standard. The layers above them are defined by the ZigBee Alliance. The IEEE working group passed the first draft of PHY and MAC in 2003.



Applications of Zigbee



LIQUID CRYSTAL DISPLAY:

LCD stands for Liquid Crystal Display. LCD is finding wide spread use replacing LEDs (seven segment LEDs or other multi segment LEDs) because of the following reasons:

- 1.The declining prices of LCDs.
- 2.The ability to display numbers, characters and graphics. This is in contrast to LEDs, which are limited to numbers and a few characters.
- 3.Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In contrast, the LED must be refreshed by the CPU to keep displaying the data.
- 4.Ease of programming for characters and graphics.

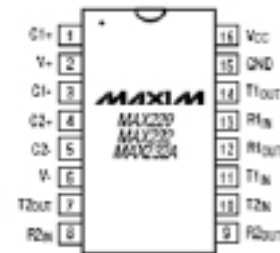
These components are “specialized” for being used with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing different messages on a miniature LCD.



MAX 232

Max232 IC is a specialized circuit which makes standard voltages as required by RS232 standards. This IC provides best noise rejection and very reliable against discharges and short circuits. MAX232 IC chips are commonly referred to as line drivers.

To ensure data transfer between PC and microcontroller, the baud rate and voltage levels of Microcontroller and PC should be the same. The voltage levels of microcontroller are logic 1 and logic 0 i.e., logic 1 is +5V and logic 0 is 0V. But for PC, RS232 voltage levels are considered and they are: logic 1 is taken as -3V to -25V and logic 0 as +3V to +25V. So, in order to equal these voltage levels, MAX232 IC is used. Thus this IC converts RS232 voltage levels to microcontroller voltage levels and vice versa

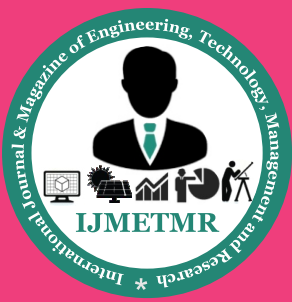


Working procedure:

- The street lights section is interfaced to the controller and the current status of the light will sent to the electricity department using Zigbee communication.
- At the transmitter section we are using AT89S52 as our controller and at the receiver section we are using LPC2148.
- Zigbee transmitter sends the status.
- At the receiver section the zigbee receiver takes the information and displays on the LCD.
- If anyone got damaged then immediately the information of the light will be shown in that LCD, so that the department people can take immediate action without making the public to complain against this issue.

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