Adaptable and Reliable Industrial Security System using PIC Controller

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Abstract

The system needs to measure, acquire and store the parameters of electric power or solar battery equipment, including alternating and direct voltage and current, temperature and luminous flux. They then are stored in system memory, and can be accessed through network. The system can measure the parameters of the time, store them in system memory, and send them to clients through network periodically according to internet network protocols. It can be sent the range of these parameters as SMS. The hardware design of embedded system and the ADC value of the temperature sensor and Luminous sensor, DC and AC voltage and current values are read by the PIC 16f877a and gas sensor is used to detect the Harmful gases when the gases are detect GSM sent the messages to controller room at the same time we can get all the values of sensor to monitor the industrials.
Keywords: PIC, MAX 232, Sensor, LCD, GSM

I. INTRODUCTION

Recently Embedded system has got rapidly developed, the applications based on Embedded System are used in everywhere because of the high ratio of performance and price and short development period. This paper introduces parameter measurement system based on Micro controller PIC 16F877-A. It realizes measurement and control of system parameters including direct and alternating voltage and current, temperature and luminous flux, which are stored in system memory, and can be accessed through IP network. PIC 16F877-A is designed to provide hand-held devices and general applications with cost-effective, low power, and high-performance micro controller solution in small die size. To reduce total system cost, the PIC 16F877-A includes separate 16KB instruction and 16KB data cache, MMU to handle virtual memory management, NAND flash boot loader, SDRAM controller, UART, ADC, I2C and I2S bus interface and many I/O ports.

It adopts a new bus architecture called Advanced Microcontroller Bus Architecture (AMBA), thus greatly improves the transmission speed of data and instruction. With the plentiful interface and embedded hardware controller, most application systems can be realized by using its simplest system. This paper also uses the simplest system to fulfill parameter measurement.

II. PROBLEM DEFINITION

A. Existing System

RF based automation system is a type of remote control communication, without using microcontroller. We can operate it by staying at one place. We can control by using remote. In wired security system all sensors will be linked up to the control panel by a series of wires. The main disadvantage of security wired system is it cost high and it also increases work load.

B. Proposed System

It is a reliable system. The proposed system uses GSM module which enables us to know the security status of industry when we are away from the industry. In this system, we are using PIC16f877A. It have inbuilt ADC, so there is no peripheral connection for ADC is required. PIC controllers have 8kb ROM and 512-bit RAM memory.

There are five input/output ports, such as PORT A, PORT B, PORT C, PORT D, PORT E. It measure parameters including temperature, luminous flex, direct current and voltage, alternating current and voltage, gases. This system can measure the parameters of time store them in a system memory. It can be set the range of these parameters and can give SMS to the corresponding owner.

III. LCD DISPLAY

Liquid Crystal displays have materials that combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal. LCD consists of two glass panels, with the Liquid crystal material sand witched in between them. The inner surface of the glass plates are coated with the transparent electrodes which define the character, symbols or patterns to be displayed. Polymeric layers are present in between the electrodes and the Liquid crystals, which makes the Liquid crystal molecules to maintain a defined orientation angle. One ach polarize are pasted outside the two glass panels. This polarize would rotate the light rays passing through them to a definite angle, in a particular direction.

When the LCD is in the off state, light rays are rotated by the two polarize and liquid crystal, such that the light rays come out of the LCD without any orientation, and hence the LCD appears transparent. When sufficient voltage is applied to the electrodes, the Liquid crystal would be aligned in a specific direction. The light rays passing through the LCD would be rotated by the polarize, which would result in activating the desired characters. The LCD is lightweight with only a few millimeters thickness. Since the LCD consume less power, they are compatible with low power electronic circuits, and can be powered for long durations.

IV. GSM

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. A GSM modem can be an external device or a PC Card / PCMCIA Card. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. As mentioned in earlier sections of this SMS tutorial, computers use AT commands to control modems. Both GSM modems and dial-up modems support a common set of standard AT commands.

You can use a GSM modem just like a dial-up modem. In addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards with the extended AT commands, you can do things like:

- Reading, writing and deleting SMS messages.
- Sending SMS messages.
- Monitoring the signal strength.
- Monitoring the charging status and charge level of the battery.

Reading, writing and searching phone book entries, the number of SMS messages that can be processed by a GSM modem per minute is very low only about six to ten SMS messages per minute. Currently almost of the public having an own vehicle, theft is happening on parking and sometimes driving insecurity places. The safe of vehicles is extremely essential for public vehicles. Vehicle locking system installed in the vehicle, to locking engine motor. Global System Mobile Communication (GSM), when the theft identified, the responsible person send SMS to the microcontroller, then microcontroller issue the control signals to stop the engine motor.

Authorized person need to send the password to controller to restart the vehicle. This is more secured, reliable and low cost. GSM is a cellular network, which means that cell phones connect to it by searching for cells in the immediate vicinity. There are five different cell sizes in a GSM network macro, micro, pic, femto, and umbrella cells. The coverage area of each cell varies according to the implementation environment.

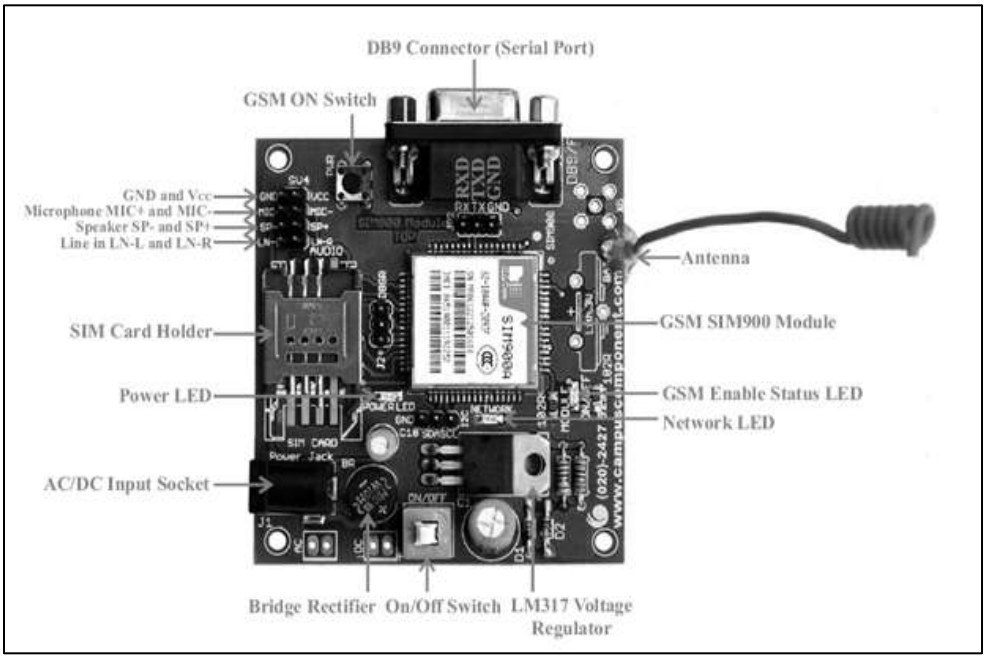

Fig. 2: GSM Hardware description

A. Max232 ic

The MAX232 is an integrated circuit that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits, so that devices works on TTL logic can share the data with devices connected through Serial port (DB9 Connector).So, when there is no alcohol gas the flow of electrons will be normal, when there is alcohol gas the flow of electrons will be increased .A-A & B-B are the input and output which can interchanged as inputs or outputs.

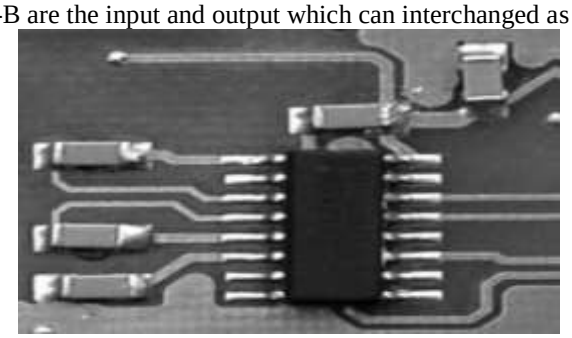

Fig. 3: MAX232 IC

B. SIM (Subscriber Identity Module) Card Slot

This onboard SIM card slot provide User functionality of insert a SIM (GSM only) card of any service provider. Process of inserting and locking SIM card into SIM card slot is given in this manual. While inserting in and removing out SIM card from SIM card slot, User needs to take precaution that power supply should be OFF so that after making Power supply ON it will be easy to reinitialize with SIM for this module.

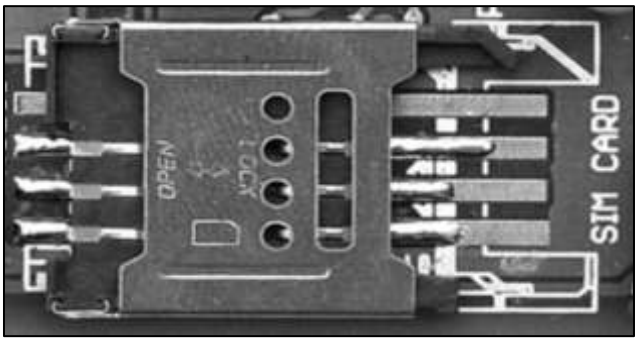

Fig. 4: Subscriber Identity Module Card Slot

V. SENSORS

A. GAS Sensor

A gas sensor is a device that detects the presence of gases in an area, often as part of a safety system. This type of equipment is used to detect a gas leak or other emissions and can interface with a control system. It can be automatically shut down and used to provide information to a certain conditions. A wide range of gas sensor products for the detection of various gases, from explosive gases such as propane, toxic gases such as carbon monoxide, to air quality sensor (VOCs) that are responsible for sick-house syndrome.

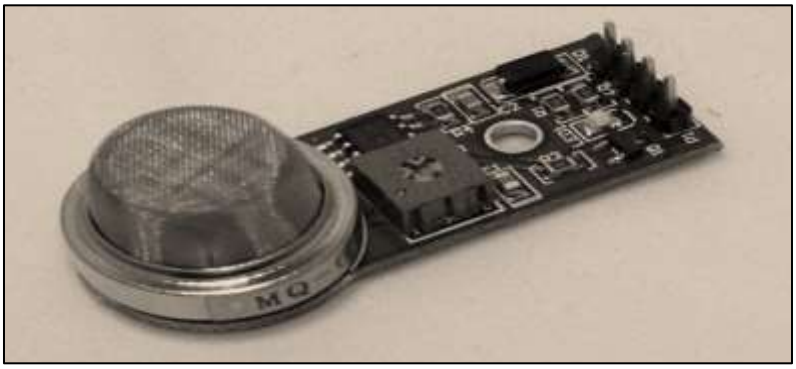

Fig. 5: Gas sensor

B. Temperature Sensor

National semiconductor's LM35 IC has been used for sensing the temperature. It is an integrated circuit sensor that can be used to measure temperature with an electrical output proportional to the temperature (in 0C). The temperature can measure more accurately with it than using a thermistor.

Temperature is an important parameter in many control systems

- Several distinctly different transduction mechanisms are employed
- These include non-electrical as well as electrical methods
- A thermometer is the most common non electrical sensor

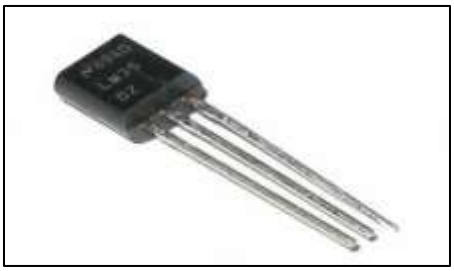

Fig. 6: Hardware view of temperature sensor

C. AC and DC Voltage Sensor

A voltage sensor is going to be able to determine and even monitor and measure the dc voltage supply. It is then able to take those measurements and turn them into a signal that one will then be able to read. Connect directly to any XR440 or XR5-SE data logger or connect to a recorder or data acquisition systems 0-5vdc input. No external power required.

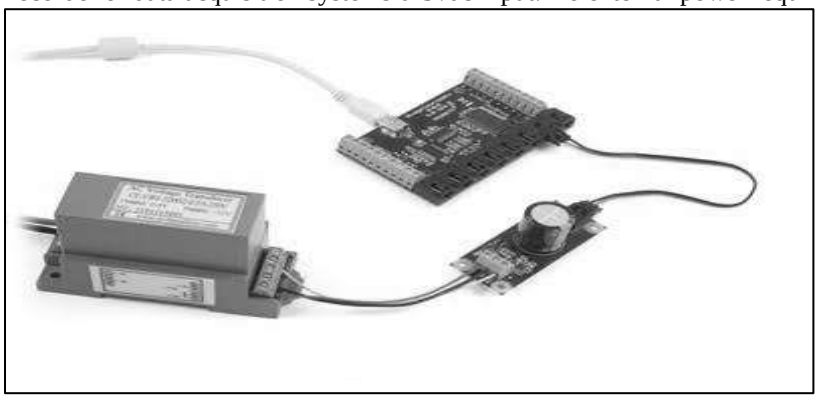

Fig. 7: Hardware view of voltage sensor

VI. CONCLUSION

This paper describes parameter measurement through network based on microcontroller. It can be done by local serial port or IP network using most useful network protocols. This system can be used in electric power or solar battery equipment. The direct and alternating voltage and current, temperature and luminous flux can be acquired, stored and accessed through IP network. They can be also controlled according to the set threshold. The system is realized using microcontroller embedded system, having high ratio of performance and price, powerful functions, and has got good applications.

After completing the project we found that it will function correctly. As the sensitivity and power consumption is low and it is having visual mode. We can transmit and receive the information through the network so we can access it anywhere from the world. This project is very much useful for the industries, medical field and also for the government sectors for security system.

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