A Cyber-Physical System for Environmental Monitoring based on GPS

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Abstract— Different from the traditional embedded gadget or the real-time system, Cyber-Physical System (CPS) integrates computation with physical entities, making it smooth for humans to engage with the world that we stay. With the improvement of CPS, extra gadgets may be incorporated into the internet, specifically in the discipline of Environment Monitoring. Thus, the control and far off manage of gadgets motive issues for CPSs. Towards this end, we broaden a CPS via featuring a scalable, bendy structure in Environment tracking. The environment monitoring machine (EMS) includes 3 layers: bodily sensing layer, data delivery layer, records management layer. Generally, sensors and sensor hub which collects sensor information and transfer them to the upper layer make up of physical sensing layer. And the principle characteristic for records transport layer is to forward sensor records to the specified vacation spot. The ultimate layer is within the cloud, composed of a statistics processor and a understanding base. Data from bodily sensing layer can be analyzed because of the robust computation capacity of cloud computing.

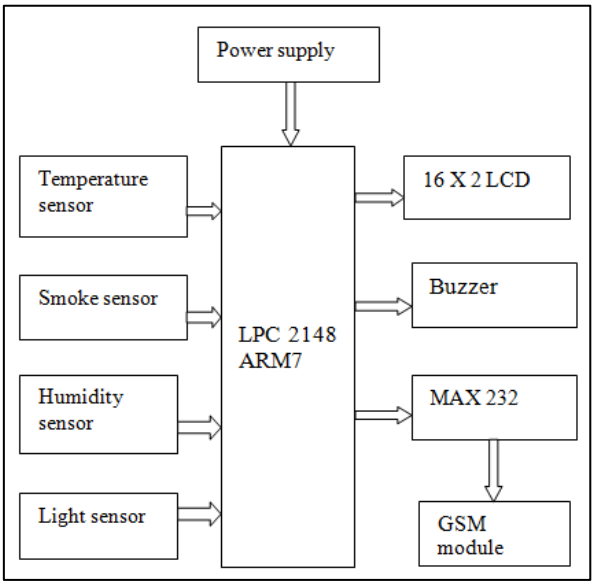
Key words: Cyber-Physical System, Environment Monitoring Machine (EMS)

I. EXISTING SYSTEM

This paper presents the development of a cyber-physical system that monitors the environmental conditions or the ambient conditions in indoor spaces at remote locations. The communication between the system's components is per-formed using the existent wireless infrastructure based on the IEEE 802.11 b/g standards. The resulted solution provides the possibility of logging measurements from locations all over the world and of visualizing and analyzing the gathered data from any device connected to the Internet.

II. PROPOSED SYSTEM

The system is developed based on gps system.A GSM modem is a tool which may be either a cellular telephone or a modem device which can be used to make a laptop or every other processor speak over a network. A GSM modem requires a SIM card to be operated and operates over a community range subscribed with the aid of the network operator. It may be related to a computer through serial, USB or Bluetooth connection.

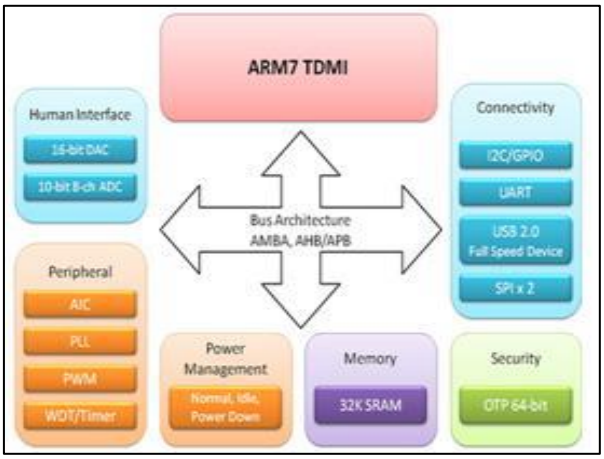


A GSM modem duly interfaced to the MC through the level shifter IC Max232. The SIM card hooked up GSM modem upon receiving digit command through SMS from any cellular smartphone ship that statistics to the MC thru serial verbal exchange. While this system is accomplished, the GSM modem gets command 'STOP' to broaden an output on the MC, the contact factor of which are used to disable the ignition switch

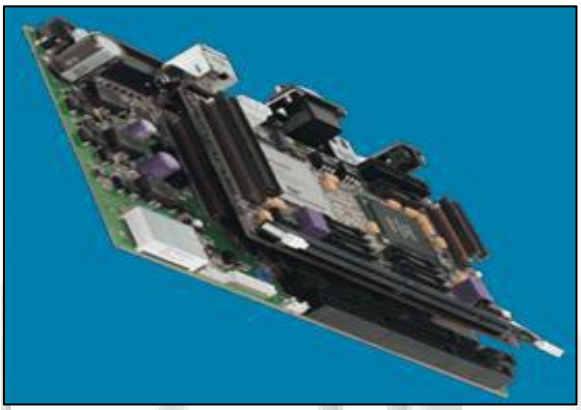
The command so sent with the aid of the consumer is based on an intimation acquired via him thru the GSM modem 'ALERT' a programmed message simplest if the input is pushed low. The entire operation is displayed over sixteen×2 LCD display.

A. Modules used in this Project

The LPC2148 are based on a 16/32 bit ARM7TDMIS™ 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 enable32-bit code execution at maximum clock rate. For critical code size applications, the alternative 16-bitThumb Mode reduces code by more than 30% with minimal performance penalty. With their compact 64pin package, low power consumption, various 32-bittimers, 4- channel 10-bit ADC, USB PORT,PWM channels and 46GPIO 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.



III. ARM PROCESSOR

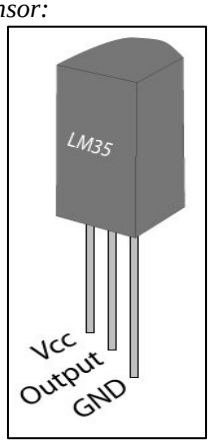


A. *ARM7TDMI Processor Core*

- Current low-end ARM core for applications like digital mobile phones
- TDMI
- T: Thumb, 16-bit compressed instruction set
- D: on-chip Debug support, enabling the processor to halt in response to a debug request
- M: enhanced Multiplier, yield a full 64-bit result, high performance
- I: Embedded ICE hardware
- Von Neumann architecture

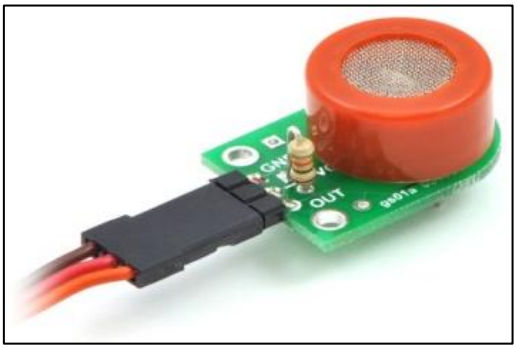
B. *Sensors*

1) Temperature Sensor:



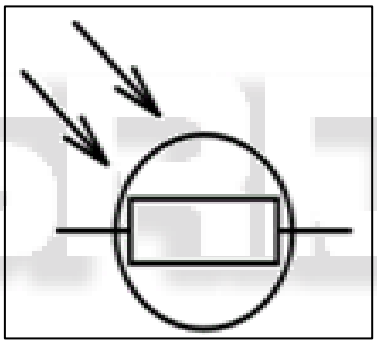
LM35 is a precision IC temperature sensor with its output proportional to the temperature (in oC). The sensor circuitry is sealed and consequently it isn't always subjected to oxidation and other strategies. With LM35, temperature may be measured greater correctly than with a thermistor.It additionally possess low self heating and does not cause greater than zero.1 o C temperature upward push in nonetheless air

2) Smoke Sensor:



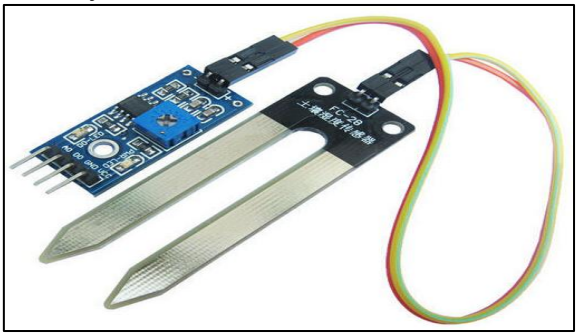
A smoke detector is a device that senses smoke, typically as an indicator of fire. Commercial security devices issue a signal to a fire alarm control panel as part of a fire alarm system, while household smoke detectors, also known as smoke alarms, generally issue a local audible or visual alarm from the detector itself.

3) Light Sensor:



Light Dependent Resistor: A Light Dependent Resistor (LDR) or an image resistor is a device whose resistivity is a function of the incident electromagnetic radiation. Hence, they may be light sensitive gadgets. They are also referred to as as picture conductors, image conductive cells or clearly photocells. They are made from semiconductor materials having high resistance. There are many exceptional symbols used to suggest a LDR, one of the maximum typically used image is proven within the determine underneath. The arrow suggests light falling on it.

4) Humidity Sensor:

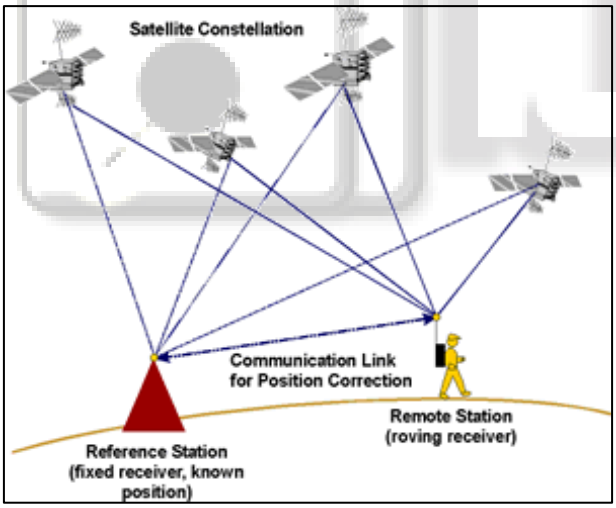


Humidity or Soil moisture sensors measure the volumetric water content in soil. Since the direct gravimetric dimension of unfastened soil moisture calls for casting off, drying, and

weighting of a pattern, soil moisture sensors measure the volumetric water content circuitously via the usage of a few other belongings of the soil, together with electrical resistance, dielectric steady, or interaction with neutrons, as a proxy for the moisture content.

C. Global Positioning System

The Global Positioning System (GPS) is a U.S. space-based global navigation satellite system. It provides reliable positioning, navigation, and timing services to worldwide users on a continuous basis in all weather, day and night, anywhere on or near the Earth which has an unobstructed view of four or more GPS satellite



From the beneath circuit, a GSM modem duly interfaced to the MC thru the level shifter IC Max232. The SIM card mounted GSM modem upon receiving digit command by SMS from any cellular phone send that statistics to the MC through serial communiqué. While this system is finished, the GSM modem gets command 'STOP' to broaden an output on the MC, the contact point of which might be used to disable the ignition switch. The command so sent through the person is based on an intimation obtained by using him thru the GSM modem 'ALERT' a programmed message only if the enter is pushed low. The whole operation is displayed over 16×2 LCD show.

D. Advantages

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

IV. Conclusion

The project "CYBER PHYSICAL SYSTEM FOR ENVIRONMENTAL MONITORING USING GSM" has been successfully designed and tested. It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented.

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