



XBEE BASED SMART SENSOR NETWORK FOR MONITORING AN AGRICULTURAL ENVIRONMENT

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ABSTRACT:

Intelligent info appliance is that the main direction of development within the appliance management field. Intelligent appliance network has bit and low speed of knowledge transmission, there are several appliances in family and it desires a lot of network capability. XBee is developed in recent years, a long-range wireless engineering, with low-power, low rate, long distance, low cost, safe and reliable. During this project, supported {wifi|wireless local area network/WLAN/wireless fidelity/WiFi|local area network| LAN} technology & the ARM silicon chip we have a tendency to are progressing to implement the intelligent household appliance.

Keywords: Sensors unit, buzzer, motor, xbee, Embedded Systems, Remote Monitoring

1. INTRODUCTION:

World Wide net, wireless communication tools and gadgets are being extensively used by the youth via social networks, good phone and GPS technologies. whereas on the move, young home house owners are utilizing GPS and GIS technologies for road and private navigation, texting one another victimization good mobile devices, victimization social media to speak and

follow every others' news instantly. The wide-spread quality, acceptance and usage of those technologies has conferred a chance to analysis and development engineers in addition as info technology service suppliers to develop and supply added services. One such added service will modify the digital native generation to access and act with their home appliances and to observe and management their home systems additionally to good energy conservation

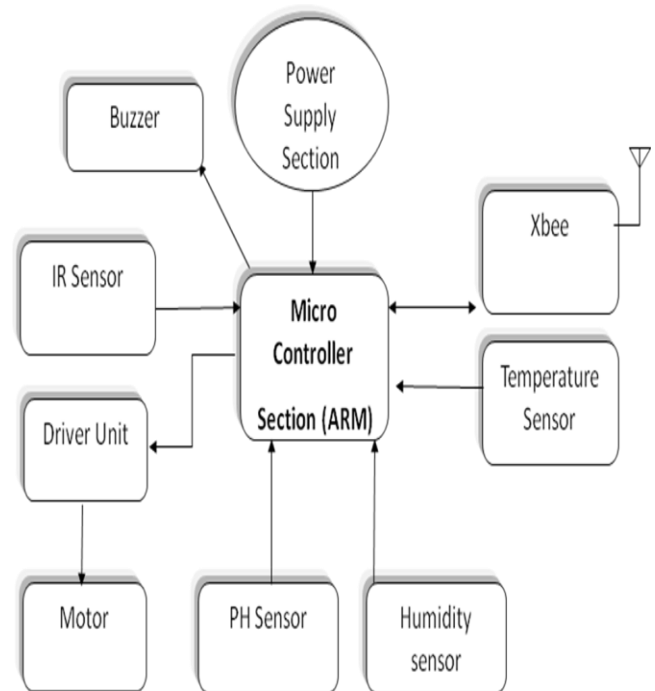
whereas on the move. many systems victimization Bluetooth, Infrared (IR), Zigbee and frequency Identification System (RFID) based mostly communication protocols have already been used to wirelessly monitor homes inside a brief vary. as an example, the Bluetooth technology was used to create AN intelligent home security system. Additionally, remote-controllable power outlet system for home power management, a networked observance system for home automation and intelligent household appliance system have additionally been projected. IR interactive remote controls of bequest home appliances through a just about wired device network were additionally represented. Zigbee-based technology has been utilized in native observance and dominant of home appliances inside homes. as an example, Zigbee-based remote info observance devices for good homes and residential automation systems were developed and rumored. Observance and protection building electrical safety system utilizing ZigBee was additionally conferred. RFID technology has additionally been used in home automations, homes safety and health observance systems for aged in nursing homes. The higher than wireless native vary observance systems are extended to a wider remote vary victimization GSM/GPRS networks and wireless TCP/IP based mostly communications.

In addition, a coffee price wireless entrance utilizing a GSM/GPRS based mostly system to observe hearth and door knobs were rumored and lots of others to say. The higher than mentioned systems are used for

native observance or remote observance victimization wireless elements like wireless access points and GSM/GPRS modems. In turn, such services enhance the standard of life aspects associated with safety and luxury of a house owner

Block Diagram:

Crop field Section:



Monitoring section:

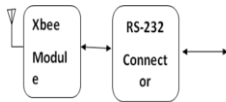


Fig-1. Module wise Block Diagram

B. Micro Controller (ARM7) FAMILY

- The ARM7 family includes the ARM7TDMI, ARM7TDMI-S, ARM720T, and ARM7EJ-S processors. The ARM7TDMI core is that the industry's most generally used 32-bit embedded architecture silicon chip answer. Optimized for price and power-sensitive applications, the ARM7TDMI answer provides the low power consumption, small size, and high performance required in transportable, embedded applications.
- The ARM7TDMI-S core is that the synthesizable version of the ARM7TDMI core, obtainable in each VERILOG and VHDL, prepared for compilation into processes supported by in-house or commercially obtainable synthesis libraries. Optimized for flexibility and that includes the same feature set to the exhausting macro cell, it improves time-to-market by reducing development time whereas providing increased style flexibility, and facultative >>98% fault coverage. The ARM720T exhausting macro cell contains the ARM7TDMI core, 8kb unified cache, and a Memory Management Unit (MMU) that permits the utilization of protected execution areas and computer memory. This macro cell is compatible with leading operational systems as well as Windows metal, Linux, palm OS, and SYMBIAN OS.
- The ARM7EJ-S processor may be a synthesizable core that gives all the advantages of the ARM7TDMI – low power consumption, small size, {and therefore the additionally } thumb instruction set – whereas also incorporating ARM's latest DSP extensions and Jazelle technology, facultative acceleration of java-based applications. Compatible with the ARM9™, ARM9E™, and ARM10™ families, and Strong-Arm® design computer code written for the ARM7TDMI processor is 100% binary-compatible with alternative members of the ARM7 family and forwards-compatible with the ARM9, ARM9E, and ARM10 families, in addition as product in Intel's robust ARM and scale architectures. This provides designers a selection of software-compatible processors with robust price-performance points. Support for the ARM design nowadays includes:
 - Operating systems like Windows metal, Linux, palm OS and SYMBIAN OS

- More than forty period of time operational systems, as well as qnx, wind river's vx works

C.LPC2148 MICROCONTROLLER

LPC2148 Microcontroller design. The ARM7TDMI-S may be a general purpose 32-bit silicon chip, that offers high performance and really low power consumption. The ARM design is predicated on Reduced Instruction Set pc (RISC) principles, and also the instruction set and connected rewrite mechanism are a lot of easier than those of small programmed advanced Instruction Set Computers (CISC). This simplicity ends up in a high instruction outturn and spectacular period of time interrupt response from a little and cost-efficient processor core.

Pipeline techniques are utilized so all elements of the process and memory systems will operate endlessly. Typically, whereas one instruction is being dead, its successor is being decoded, and a 3rd instruction is being fetched from memory. The ARM7TDMI-S processor additionally employs a singular field strategy referred to as Thumb that makes it ideally suited to high-volume applications with memory restrictions, or applications wherever code density is a difficulty.

The key plan behind Thumb is that of a super-reduced instruction set. Basically, the ARM7TDMI-S processor has 2 instruction sets:

- The normal 32-bit ARM set.

- A 16-bit Thumb set.

The Thumb set's 16-bit instruction length permits it to approach doubly the density of normal ARM code whereas retentive most of the ARM's performance advantage over a conventional 16-bit processor victimization 16-bit registers. this can be doable as a result of Thumb code operates on a similar 32-bit register set as ARM code. Thumb code is ready to supply up to sixty five maximize the code size of ARM, and a hundred and sixty maximize the performance of constant ARM processor connected to a 16-bit memory system

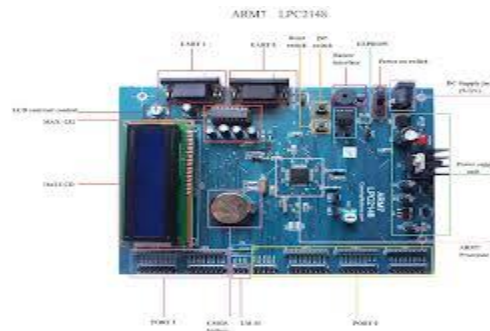


Fig: ARM Processor

IV. II.METHOD (SENSOR CONCEPT)

F) TEMPERATURE SENSOR

The LM35 series are preciseness integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Anders Celsius (Centigrade) temperature. The LM35 so has a plus over linear temperature sensors tag in ° Kelvin, because the user isn't needed to deduct an outsized constant voltage from its output to get convenient

Centigrade scaling. The LM35 doesn't need any external standardization or trimming to supply typical accuracies of $\pm 1/4^{\circ}\text{C}$ at temperature and $\pm 3/4^{\circ}\text{C}$ over a full -55 to $+150^{\circ}\text{C}$ temperature vary. Low price is assured by trimming and standardization at the wafer level. The LM35's low output electric resistance, linear output, and precise inherent standardization create interfacing to readout or management electronic equipment particularly simple. It are often used with single power provides, or with and minus provides. Because it attracts solely sixty μA from its offer, it's terribly low self-heating, but zero.1 $^{\circ}\text{C}$ in still air. The LM35 is rated to work over a -55° to $+150^{\circ}\text{C}$ temperature vary, whereas the LM35C is rated for a -40° to $+110^{\circ}\text{C}$ vary (-10° with improved accuracy). The LM35 series is on the market prepackaged in tight TO-46 semiconductor packages, whereas the LM35C, LM35CA, and LM35D also are obtainable within the plastic TO-92 semiconductor package.

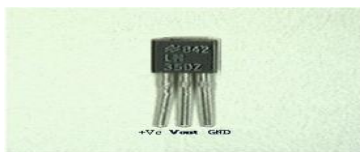
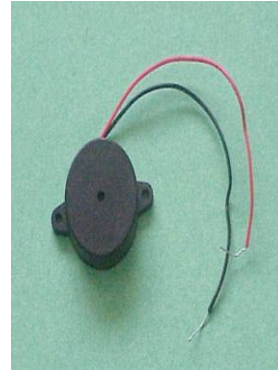


Fig: temp sensor LM35

Buzzer:

A buzzer or pager is AN audio device, which can be mechanical, mechanical device, or electronic. Typical uses of buzzers and beepers embody alarms, timers

and confirmation of user input like a click or keystroke.



FEATURES

- The lead metal } series are superior buzzers with a unimorph electricity ceramic element and an integral self-excitation generator circuit.
- They exhibit very low power consumption as compared to magnetism units.
- they're created while not shift contacts to make sure long life and no electrical noise.
- Compact, however produces high acoustic output with marginal voltage.

Mechanical

A joy buzzer is AN example of a strictly mechanical buzzer.

Humidity sensor:

Humidity is that the presence of water in air. The number of vapor in air will have an effect on human comfort in addition as several producing processes in industries. The presence of vapor additionally influences varied physical, chemical, and

biological processes. Wetness activity in industries is vital as a result of it's going to have an effect on the business price of the merchandise and also the health and safety of the personnel. Hence, wetness sensing is incredibly necessary, particularly within the management systems for industrial processes and human comfort.



IR sensor

Infrared (IR) radiation is no particulate radiation of a wavelength longer than that of actinic radiation, however shorter than that of microwaves. The name suggests that "below red" (from the Latin below, "below"), red being the color of actinic radiation with the longest wavelength. Infrared emission has wavelengths between concerning 750 nm and one millimeter, spanning 5 orders of magnitude. Humans at traditional blood heat will radiate at a wavelength of ten microns.

Transmitter: a blinking IR light-weight

Receiver: a light-weight dependent electrical device

Infrared electronic communication

- must have line- of-sight
- Direction dependent
- Short distances
- Reflection

- can suffer from daylight and tube light-weight (TL) noise

III.METHOD(WIRELESS COMMUNICATION)

Zigbee:



Zig-bee may be a specification for a collection of high level communication protocols victimization little, low-power digital radios supported the IEEE 802.15.4,2006 normal for wireless personal space networks (WPANs), Like wireless headphones connecting with cell phones via short-range radio. The technology outlined by the Zig-bee specification is meant to be easier and fewer high-priced than alternative WPANs, like Bluetooth. Zig-bee is targeted at radio-frequency (RF) applications that need a coffee rate, long battery life, and secure networking.

Zig-bee may be a low rate, two-way normal for home automation and information networks. the quality specification for up to 254 nodes as well as one master, managed from one device. Real usage samples of Zig-bee includes home automation tasks like turning lights on, setting the house security system, or beginning the tape machine. With Zig-bee of

these tasks are often done from anyplace within the home at the bit of a button. Zig-bee additionally permits for dial-in access via the web for automation management.

Zig-bee protocol is optimized for terribly long battery life measured in months to years from cheap, ready-to-wear non-rechargeable batteries, and might management lighting, air con and heating, smoke and hearth alarms, and alternative security devices. the quality supports a pair of.4 Gc (worldwide), 868 MHz (Europe) and 915 MHz (Americas) unauthorized radio bands with vary up to a hundred meters.

V. CONCLUSION

In this system we are doing advance monitoring & controlling of an agriculture area and giving security system. For detecting the objects we kept IR should detect buzzer will turn on. Temperature, humidity, ph level values will be monitored in VB.

In this demonstration when any value exceed motor will run. This is very useful for agriculture peoples.

By using this technique they can monitor and control the agriculture area from anywhere.

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