# TRAILING SYSTEM TO PERCEIVE ADVERSARY INTRUSION IN BORDERS USING WIRELESS SECURITY NETWORK

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## ABSTRACT

The project aims to develop next generation wireless sensor networks for defence industry and homeland security applications. Classifies into vehicles, individuals and groups. These motes have a variety of sensors i.e. vibration/seismic, magnetic, acoustic and thermal, a microcontroller for processing these sensor values and a radio transceiver for communication over a wireless network. The sensor readings are processed to classify detected target and the result is transferred to the central unit via wireless network using special protocol. A network of this type can be deployed within an area as large as 4,000m² in a few minutes by one or two men.

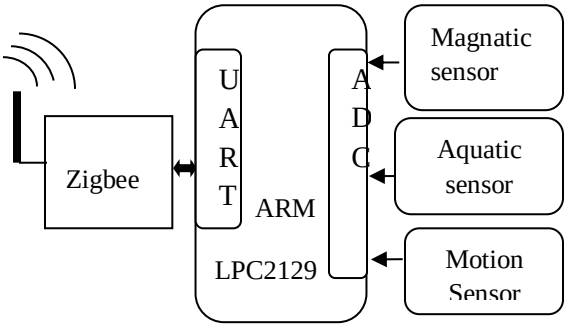
The central monitoring node acts as the parent node in a peer to peer wireless network model. ARM lpc2129 is used and a Zigbee protocol is used in all dust motes and they are typically battery powered..

## INTRODUCTION

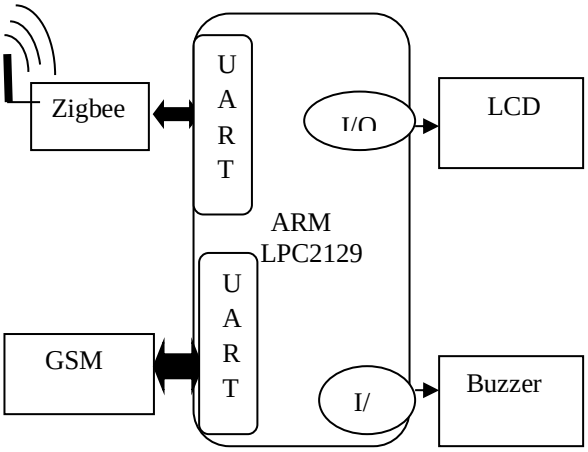
In today's geopolitical climate, ensuring the protection of secure facilities or key locations against resourceful and determined intruders is of paramount importance to the defence of a national border as well as industries of national importance. The greatest threat to national security is "Terrorism" and it cannot be defeated by conventional military force alone.
Existing system In critical border areas such as Kashmir and Bangladesh, regular forces or even satellites cannot monitor these intruding terrorists as the area monitored is quite large and quite complex.
Proposed system Here to assist the army and security forces operating in these areas, smart dust like micro-sensors with wireless interfaces could be utilized to study and monitor these environments from a certain distance for military purposes. And also GSM is used to send the received signal to the monitoring person as a SMS alert.

## BLOCK DIAGRAM

Sensor Mote




Receiver section



## HARDWARE REQUIRMENT

1: Power supply Unit

2: Microcontroller Unit

3: LCD

4:MAX232

5**:** Zigbee

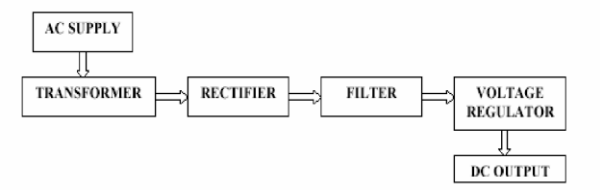
6: GSM

7:Buzzer

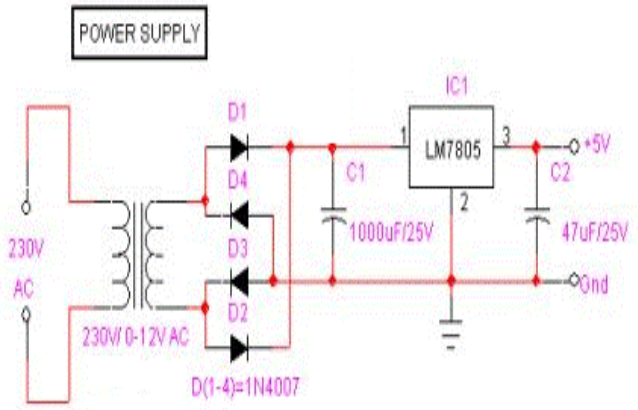
## 1: Power Supply Unit

A power supply provides a constant output regardless of voltage variations "Fixed" three-terminal linear regulators are commonly available to generate fixed voltages of plus 3 V, and plus or minus 5 V, 9 V, 12 V, or 15 V when the load is less than about 7 amperes. The power supply section is the important one. It should deliver constant output regulated power supply for successful working of the project. Here we are giving 220 v A.C supply but for our project we need 5v dc supply so here we have to step down this voltage, and a 0-12V/1 mA transformer is used for this purpose, and this will convert 220v A.C current into 12v A.C. The primary of this transformer is connected in to main supply through on/off switch& fuse for protecting from overload and short circuit protection.

Block diagram:




The secondary is connected full bridge rectifier to convert 12V AC to 12V DC voltage. And filtered by the capacitors, which is further regulated to +5v, by using IC 7805 which is a voltage regulator. Now this will removes the ripples and also remains at the same dc value even if the input dc voltage varies or load connected to the output dc voltage changes. So basically it is a fixed three terminal voltage regulator IC which has an unregulated D.C input voltage and regulated D.C output voltage. And it contains the circuitry for reference source, comparator amplifier, and control device and overload protection all in a single IC.




## 2: Microcontroller Unit

### 2.a. ARM MICROCONTROLLER LPC2129

Microcontroller is an integrated chip that is often part of an embedded system. The microcontroller includes a CPU, RAM, ROM, I/O ports, and timers like a standard computer, but because they are designed to execute only a single specific task to control a single system, they are much smaller and simplified Some of its features are, it has 4kb of reprogrammable flash memory, 128 byte of RAM, 32 programmable I/O lines, two 16 bit timer/counter, six interrupt sources and on chip oscillator and clock circuitry. Apart from that it also has 4 bidirectional ports and each of them can be use as a input output port. But port 3 has got some alternative function. And supports two software selectable power saving mode. The idle mode stops the cpu while allowing the RAM, timer/counter, serial port and interrupt system to continue functioning. And power down mode saves the RAM contents but freezes the oscillator disabling the all other chips functioning until the next hardware reset. Here it will receive the signals by using Zigbee transceiver and performs the required operation. So it is a powerful microcontroller,

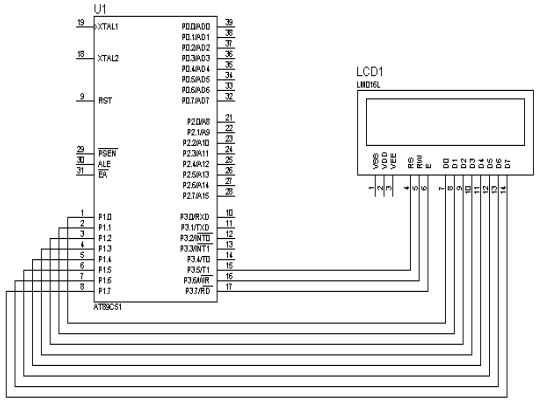
which provides a highly flexible and cost effective solution to many embedded control appliance.

## 2.b. LPC2129 Microcontroller

It is a 32 Bit reduced instruction set computer also known as RISC computer which is developed by ARM limited. LPC2129 is based on 16/32 bit ARM7TDMI-STM CPU with real time emulation and trace support. And has a 128/256 kb of high speed flash memory. A 128 bit wide internal memory interface and unique accelerator architecture enable the code to be executed at a highest clock rate. And due to its compact 64 pin package, lower power consumption, various 32 bit timers, 4 channel 10 bit ADC, two advanced CAN channel and 46 fast GPIO line with up nine external interrupt pin it is suitable for automation purposes. Apart from this some of its key features are that it has external 8, 16, 32 bit bus, and takes 1ms to execute per 512 byte line. Mainly it hac three different buses and they are ARM7 Local Bus , Which is used for interfacing on chip memory controllers, Second is Advanced High Performance Bus, Which is used to interface interrupt controllers, and the final is VLSI Peripheral Bus, Which is used for connection to on chip peripheral function. The connection of on chip to devise pin is controlled by a pin connection block. And this must be configured by software to fit specific application. And pipelining is used for continuously processing of data. And on chip flash memory can be programmed by any on of the three way and they are, By means of serial Interface Built In-JTAG, By means of In System Programming (ISP) and UART0, And by means of In Application Programming (IAP).

## 3: LCD

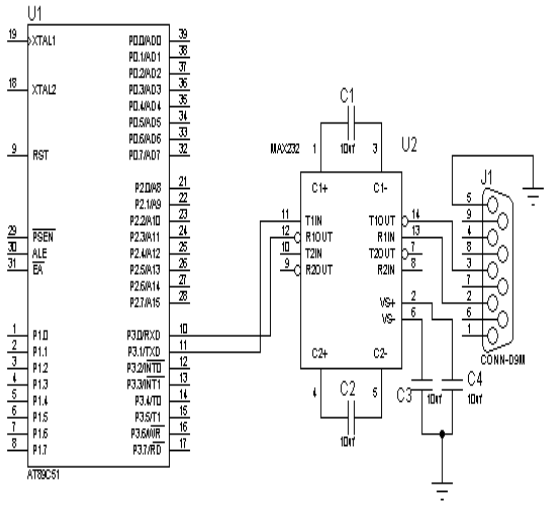
A liquid crystal display (LCD) is an electro-optical amplitude modulator realized as a thin, flat display device made up of any number of colour or monochrome pixels arrayed in front of a light source or reflector. It is often utilized in battery-powered electronic devices because it uses very small amounts of electric power. It uses two controller.Lcd with one controller uses 14 pins and with two controller uses 16 pins ,2 more pins for light the LCD. The LCD standard requires 3 control lines and 8 I/O lines for the data bus. 8 Data Pin D7:D0, And it is bidirectional data/command pin and from here alphanumeric values are send in the ASCII format, RS: Register Select and if it is set to zero then it means that command register is selected else if it is one then data register is selected, E: Enable Latch, And Used to latch the data present on the data pins. A high-to-low edge is needed to latch the data. The 8 data lines are connected to PORT 1 of 8051 microcontroller. The three control lines (RS, RW and EN) are connected to PORT 3.5, 3.6 and 3.7 respectively.




## 4: MAX232

The MAX232 acts as a buffer driver for the processor. It accepts the standard digital logic values of 0 and 5 volts and converts them to the RS232 standard of +10 and -10 volts. The MAX232 is a dual driver/receiver that includes a capacitive voltage generator to supply RS 232 voltage levels from a single 5v supply. Because we know that our microcontroller unit uses TTL voltage level but Zigbee will serially transmit the data from control section to devise section in the form of RS232 voltage level. So at the devise section it needs to be converted into TTL voltage level .E ach receiver converts RS-232 to 5v TTL/CMOS levels. Each driver converts TLL/CMOS input levels into RS-232 levels. The P3-0 (RX) and P3-1 (TX) pin of controller is connected to the max 232 driver and the TX and RX pin of max 232 is connected to the Zigbee. In this circuit

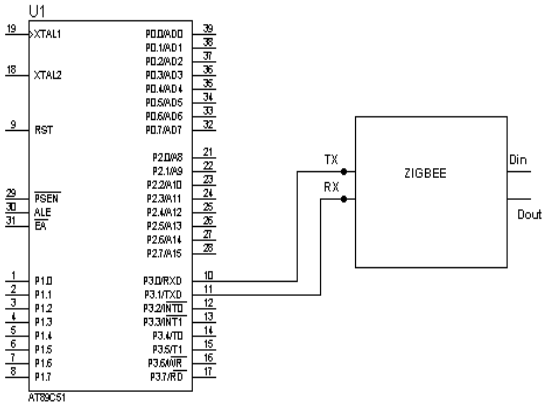
the microcontroller transmitter pin is connected in the MAX232 T2IN pin which converts input 5v TTL/CMOS level to RS232 level. Then T2OUT pin is connected to reviver pin of 9 pin D type serial connector which is in turn connected to Zigbee.




## 5: Zigbee

ZigBee and IEEE 802.15.4 are standards-based protocols that provide the network infrastructure required for wireless sensor network applications. 802.15.4 defines the physical and MAC layers, and ZigBee defines the network and application layers.

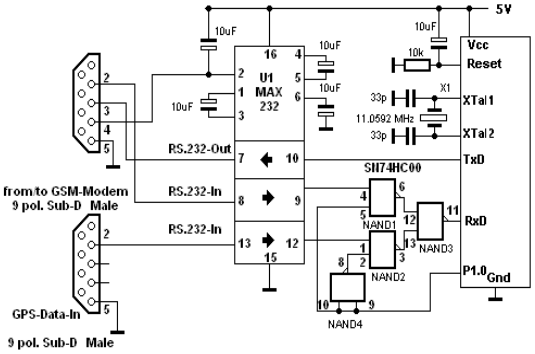
It is a specification for a suite of high level communication protocol using small, low power digital radios based on IEEE802.15.4 standard for WPAN..




The standard takes full advantage of the IEEE 802.15.4 physical radio specification and operates in unlicensed bands worldwide at the following frequencies: 2.400–2.484 GHz, 902-928 MHz and 868.0–868.6 MHz, With a different data rates of 250 kbps, 40 kbps, 20 kbps. And each band has a 16 number of fixed channels. And need 3.3 to 5v to power it upThe Zigbee when transmit the data to another Zigbee then it transmit from Dout pin and at the other side it receives from the Din pin of another Zigbee.

## 6: GSM

GSM (Global System for Mobile Communications, originally Group Special Mobile), is a standard set to describe technologies for second generation (2G) digital cellular networks. Developed as a replacement for first generation (1G) analog cellular networks, the GSM standard originally described a digital, circuit switched network optimized for full duplex voice telephony. The standard was expanded over time to include first circuit switched data transport, then packet data transport via GPRS (General Packet Radio Services). Packet data transmission speeds were later increased via EDGE (Enhanced Data rates for GSM Evolution) referred as EGPRS. The GSM standard is more improved after the development of third generation (3G) UMTS standard developed by the 3GPP. GSM networks will evolve further as they begin to incorporate fourth generation (4G) LTE Advanced standards.




GSM Circuit diagram

The GSM makes use of narrowband Time Division Multiple Access (TDMA) technique for transmitting signals. The GSM was developed using digital technology.

### 7: Buzzer

A buzzer or beeper is a signalling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a pre-set time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise).

## APPLICATION

To assist the army and security forces operating in these areas, smart dust like micro-sensors with wireless interfaces could be utilized to study and monitor these environments from a certain distance for military purposes. And also GSM is used to send the received signal to the monitoring person as a SMS alert.

## FUTURE ENHANCEMENT

With the help of camera we can find which type of person entered in that particular field whether he belongs to own country or some other country. We can implement this in industries malls, hotel and in colleges so that we can prevent malfunction in that particular area. Then in future we can use “xbee pro” in place of Zigbee for transmitting the information over very long distances. With the help of GPS we can find the exact position of the person’s through in which area they have entered.

## CONCLUSION

With the help of this we can accurately monitor the border system, reserved areas and protected areas. By the use of this project we can take care of the reserved forest and also in the human living areas. The difficulties of security in sensor networks mainly stem from the constraints imposed by the simplicity of sensor devices: limited power, limited communication bandwidth and processing capabilities.

## ACKNOWLEDGEMENT

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