



## ARM BASED HOME SECURITY SYSTEM USING INTERNET OF THINGS

Mr. M.Sathish Kumar<sup>1</sup>, A.Kishore Venkat<sup>2</sup>, P.Akalya Karthika<sup>3</sup>, A.Hariharan<sup>4</sup>, S.Senthilnathan<sup>5</sup>

Assistant Professor, Department of EEE, Periyar Maniammai University, Vallam, Tanjavur<sup>1</sup>

UG Scholar, Department of EEE, Periyar Maniammai University, Vallam, Tanjavur<sup>2,3,4,5</sup>

**Abstract:** An embedded system is a device which can be used to control, monitor, or auxiliary operate machinery and equipment as well as a combination of software and hardware and has a strict require to functionality, reliability, cost, size, and power consumption as well as can be applied to some specific occasions. Home security is essential for occupant's convenience and port over manual system. With the rapid increase in the number of users of internet over the past decade has made Internet a part and parcel of life, and IOT is the latest and emerging internet technology. Home Appliances Control of Smart Security System using IOT uses computers or mobile devices to control basic home functions and features through internet from anywhere around the world. This security system differs from other system by allowing the user to operate the system from anywhere around the world through internet connection. The motion sensing circuit, smoke or gas sensing circuit, vibration sensing circuit were designed to be connected with Arduino Mega microcontroller and Ethernet shield. This system can monitor the gas intruder detection. Real time result was displayed on web server page via the internet

**Keywords:** ARM, SENSOR, WIRELESS NETWORK6.

### I. INTRODUCTION

In this section, discussed different home automation system with their technology with features, benefit and limitations they have basic architecture of remote home automation basic block diagram of home automation the home automation system that uses wi-fi technology. System consists of three main components; web server, which presents system core that controls, and monitors users home and hardware interface module (arm, pcb(ready-made), wi-fi shield pcb, 3 input alarms pcb, and 3 output actuators pcb.), which provides appropriate interface to sensors and automation.

### II. OBJECTIVE

- To secure the home safety purpose
- To reduce home interface
- Save money
- To monitor our home wherever from.

### III. This paper has the following features:

Low cost of all the microcontroller used in the sensor

nodes and the gateway are cheap and all other devices are inexpensive. Friendly user interface, the system has a friendly user interface the LCD. Users can view the states of security sensor nodes, modify and change the Internet of things server. Home to alarm in emergency situations. Easily installing the hardware and software.

### BLOCK DAIGARM:

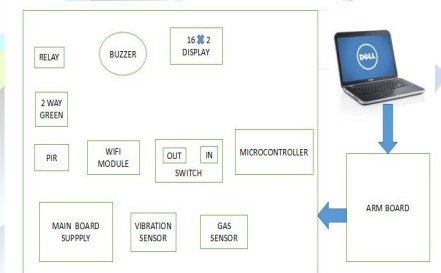


Fig 1:Block Diagram of the Project

### CLOUD-BASED HOME APPLIANCE:

Monitoring and controlling System. Design and implement a home gateway to collect metadata from home appliances and send to the cloud-based data server to store on HDFS (Hadoop Distributed File System), process them using Map Reduce and use to provide a monitoring function to Remote user. It has been implemented with ARM PROCESSOR through reading the subject of E-mail and the algorithm. ARM proves to be a powerful, economic and efficient platform for implementing the smart home



automation .ARM based home automation is better than other home automation methods is several ways. For example, in home automation through DTMF (dual tone multi-frequency), the call tariff is a huge disadvantage, which is not the case in their proposed method. Also, in Web server based home automation, the design of web server and the memory space required is ejected by this method, because it simply uses the already existing web server service provided by G-mail. LEDs were used to indicate the switching action. System is interactive, efficient and flexible. Shih-Pang Tseng.

### IOT NETWORK PROTOCOLS

Rather than trying to fit all of the IOT Protocols on top of existing architecture models like OSI Model, we have broken the protocols into the following layers to provide some level of organization:

- **Infrastructure** (ex: 6LowPAN, IPv4/IPv6, RPL)
- **Identification** (ex: EPC, uCode, IPv6, URIs)
- **Comms / Transport** (ex: Wi-Fi, Bluetooth, LPWAN)
- **Discovery** (ex: Physical Web, mDNS, DNS- SD)
- **Data Protocols** (ex: MQTT, COAP, AMQP, Web socket, Node)
- **Device Management** (ex: TR-069, OMA-DM)
- **Semantic** (ex: JSON-LD, Web Thing Model)
- **Multi-layer Frameworks** (ex: AllJoyn, IoTivity, Weave, Home kit)

### SYSTEM HARDWARE DESIGN:

The LPC81xM are an ARM Cortex-M0+ based, low- cost 32-bit MCU family operating at CPU frequencies of up to 30 MHz The LPC81xM support up to 16 kB of flash memory and 4 kB of SRAM. The peripheral complement of the LPC81xM includes a CRC engine, one I2C-bus interface, up to three USARTs, up to two SPI interfaces, one multi- rate timer, self-wake-up timer, and state configurable timer, one comparator, function-configurable I/O ports through a switch matrix, an input pattern match engine, and up to 18 general-purpose I/O pins. These fixed-pin functions are selectable between GPIO and the comparator inputs, SWD, RESET, and the XTAL pins. By default, the GPIO function is selected except on pins PIO0\_2, PIO0\_3, and PIO0\_5. JTAG functions are available in boundary scan mode only. The I2C, USART, SPI, and SCT pin functions, which can be

assigned through the switch matrix to any pin that is not power or ground in place of the pin's fixed functions. The following exceptions apply for full I2C-bus compatibility, assign the I2C functions to the open-drain pins PIO0\_11 and PIO0\_10. Do not assign more than one output to any pin. The ARM Cortex- M0+ core runs at an operating frequency of up to 30

MHz using a two-stage pipeline. Integrated in the core are the NVIC and Serial Wire Debug with four breakpoints and two watch points. The I2C-bus is bidirectional for inter-IC control using only two wires: a serial clock line (SCL) and a serial data line (SDA). Each device is recognized by a unique address and can operate as either a receiver-only device (e.g., an LCD driver) or a transmitter with the capability to both receive and send information (such as memory).

### HARDWARE COMPONENTS

- Microcontroller-LPC812M101JDH20
- SMPS
- Vibration sensor
- Gas sensor MQ135
- PIR
- Relay Circuit
- Buzzer
- ESP8266-Wifi Module
- 16\*2 LCD Display

### LPC812M101JDH20

The LPC81xM contain up to 16 kB of on-chip flash program memory. The flash memory supports a 64 Byte page size with page write and erase. 3.15 V - 3.3 V external power, or from USB via on-board LPC-LINK JTAG probe

The LPC81xM are an ARM Cortex-M0+ based, low-cost 32-bit MCU family operating at CPU frequencies of up to 30 MHz. The LPC81xM support up to 16 kB of flash memory and 4 kB of SRAM. The peripheral complement of the LPC81xM includes a CRC engine, one I2C-bus interface, up to three USARTs, up to two SPI interfaces, one multi- rate timer, self wake-up timer, and state configurable timer, one comparator, function-configurable I/O ports through a switch matrix, an input pattern match engine, and up to 18 general-purpose I/O pins.

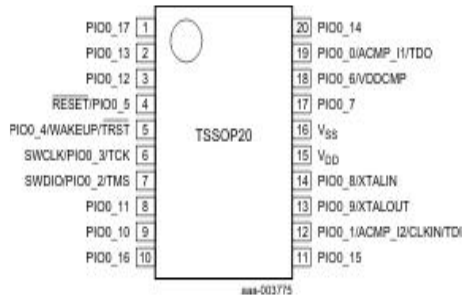


Fig 2: Pin Configuration of LPC812

- Device pins that are not connected to a specific peripheral function are controlled by the GPIO registers.

## SENSORS

- Vibration sensor** - The vibration sensor uses a piezoelectric element to measure vibration on a surface and connects to an Analog Input or VINT Hub port.
- Gas Sensor MQ135** - The MQ135 gas sensor has high sensitivity in ammonia, sulfide, benzene steam, smoke and in other harmful gas.
- PIR Sensor** - Overview PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range.

## RELAY CIRCUIT

A relay is an electromagnetic switch operated by a relatively small electric current that can turn on or off a much larger electric current.

## WIFI MODULE

The ESP8266 WiFi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network

- Sending it AT commands from a computer via an USB to serial adapter. This is mostly useful for testing and setup.
- Interfacing with an Arduino or any other microcontroller and using this board as a peripheral.
- Programming the module directly and use its GPIO pins to talk to your sensors, eliminating the need for a second controller.

## 16\*2 LCD DISPLAY

An LCD is an electronic display module which uses liquid crystal to produce a visible image. It translates data into a

display 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5x7 pixel matrix.

## SOFTWARE SPECIFICATION

- LPCxpresso IDE
- Programming tool-Flash magic
- Ubidots.com

## LPCXPRESSO IDE

The LPCxpresso IDE gives developers a low-cost way to create high-quality applications for LPC microcontrollers (MCUs). Based on the Eclipse platform, it has many enhancements to simplify application development. It uses a choice of libraries: a proprietary, optimized C library or the standard GNU Newlib library. The LPCxpresso IDE can be used to build an executable of any size with full code optimization.

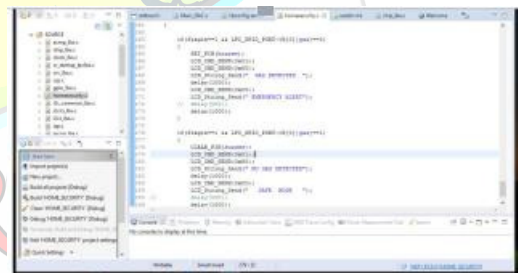


Fig 3: LPCxpresso program

## FLASH MAGIC

Flash Magic is a PC tool for programming flash-based microcontrollers from NXP using a serial or Ethernet protocol while in the target hardware.



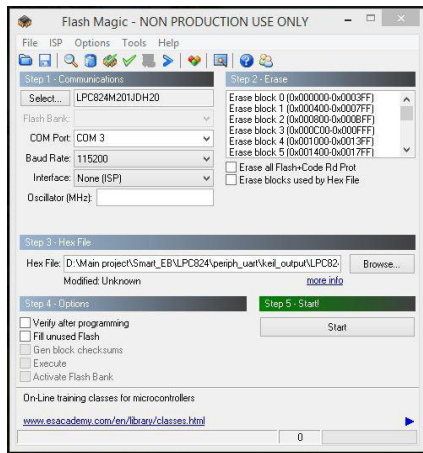


Fig 4:Flash Magic

## UBIDOTS.COM

With Ubidots comprehensive Internet of Things (IoT) and cloud development platform, integrators and business developers create applications to deliver business insights from sensor data improving efficiency, economizing resources, and cutting costs.

## CONCLUSION

Passive Infrared (PIR) sensor based motion detectors have become very popular for intrusion detection in homes and commercial places. These sensors could be put to use in places like keyholes, kitchens, hallways, stairways and safe cabinets. In this project, we are developed a **PIR sensor and GSM based home security system**. This project is developed using LPC812 IC. It can be used to detect any intrusion in houses and offices and send the alerts on cell phones. In this project we have used LPC812 IC for controlling the whole process of the project. A PIR sensor is used for sensing human presence. And when PIR sensor sense any movement in targeted area of room then it gives a HIGH logic to microcontroller and then Microcontroller take place and make a call via GSM module using AT commands. Controller calls to a predefined mobile number and at the same time it also sends a message to the same number via GSM Module.

## REFERENCES:

[1] Rana, G.M.S.M., Khan, A.A.M., Hoque, M.N. and Mitul, A.F. (2013) Design and Implementation of a GSM

Based Remote Home Security and Appliance Control System. Proceedings of the 2nd International Conference on Advances in Electrical Engineering, Dhaka, 19-21 December 2013, 291-295.

[2] Ahmad, A.W., Jan, N., Iqbal, S. and Lee, C. (2011) Implementation of ZigBee—GSM Based Home Security Monitoring and Remote Control System. IEEE 54th International Midwest Symposium on Circuits and Systems, Seoul, 7-10 August 2011, 1-4.

[3] El-Medany, W.M. and El-Sabry, M.R. (2008) GSM-Based Remote Sensing and Control System using FPGA. Proceedings of International Conference on Computer and Communication Engineering, Kuala Lumpur, 13-15 May 2008, 1093-1097.

[4] Yuksekkaya, B., Kayalar, A.A., Tosun, M.B., Ozcan, M.K. and Alkar, A.Z. (2006) A GSM, Internet and Speech Controlled Wireless Interactive Home Automation System. IEEE Transactions on Consumer Electronics, 52, 837-843.

[5] Golzar, M.G. and Tajozzakerin, H.R. (2010) A New Intelligent Remote Control System for Home Automation and Reduce Energy Consumption. 4th Asia International Conference on Mathematical/Analytical Modelling and Computer Simulation, Kota Kinabalu, 26-28.

(Print)

ISSN 2394-3777

(Online)

ISSN 2394-3785

Available online at

[www.ijartet.com](http://www.ijartet.com)



*International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)*  
*Vol. 5, Special Issue 8, March 2018*

