

IOT Based Home Automation Using Email

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ABSTRACT:

Security is primary concern everywhere and for everyone. Every person wants his home, industry etc to be secured. This project describes a security system that can control an industry and home. This is a simple and useful system and easy to install. Here our application uses Raspberry Pi as its controller and this can be placed where ever required so that one can operate the loads through internet. We can place this module at home or offices, factories or any other place where we need controlling for the purpose of security/safety.

Introduction:

Today the technological world's centralized principle is to automate each conceivable thing for simplicity in life, providing security, saving electricity and time. Home automation is one of the major things that automatically switch on and off the home appliances. Home automation can be characterized as a method for doing something without human inclusion. It may incorporate brought together to control the lighting, heating, ventilation, air-conditioning, machines, security doors locking and different systems, to provide improved convenience, comfort, energy efficiency and security. The idea of automate each appliances in home is done many years ago, it started with connecting two electric wires to the battery and close the circuit by connecting load as a light. Later it can be developed by different organizations, creates its own automation systems with different devices like sensors, controllers, actuators, buses, and interfaces. There are few methods for controlling home automation systems.

These can be separated into two main structures:

- i) Wireless systems and
- ii) Hard-wired systems.

Wireless systems: With wireless routines you can utilize distinctive media like Bluetooth, infrared or radio frequencies to control the automation system.

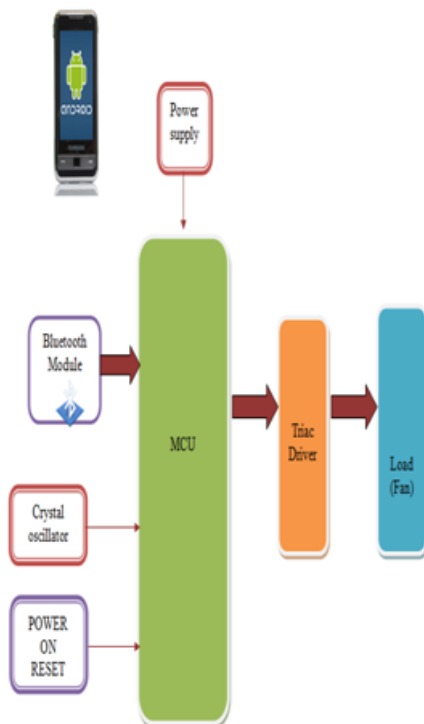
Hard-wired systems: With hard-wired routines you can utilize Ethernet links like fiber optic links, electrical wirings, telephone lines and even coaxial links are normally utilized as a part of home security system. In present days most of the automation systems utilizes the combination of hardwired and wireless systems for control the appliances. It should have both equipment and programming set up for proficient systems.

Existing system

One of wireless communication system is Bluetooth communication system. This is not only used in industry but also used in domestic purposes as controlling of home appliances using Bluetooth remote, some persons who are unable to walk to switch board for such type of persons needs this type of project and also elder people can control the speed of the fan using remote, without moving from their place. Remote operation is achieved by any smart-phone/Tablet etc., with Android OS, upon a GUI (Graphical User Interface) based touch screen operation. This project is based on the android application, android application send command through Bluetooth. In this project we have an electrical load i.e., fan. In extension to the project some Industries have different types of loads at different locations. We can control all loads at a time from one place (control room) without connecting any physical wire between loads and control room.

In this project we are using Bluetooth module for communication, Android phone as our remote controller and some discrete components.

BLOCK DIAGRAM:

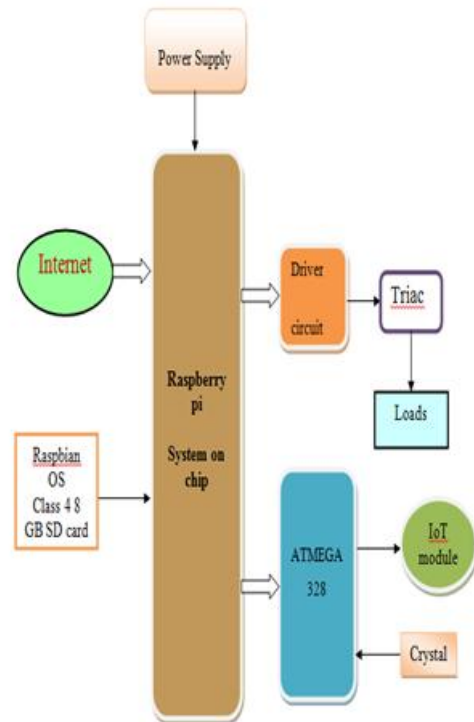


Draw back

Bluetooth can be implemented with only shorter distance.

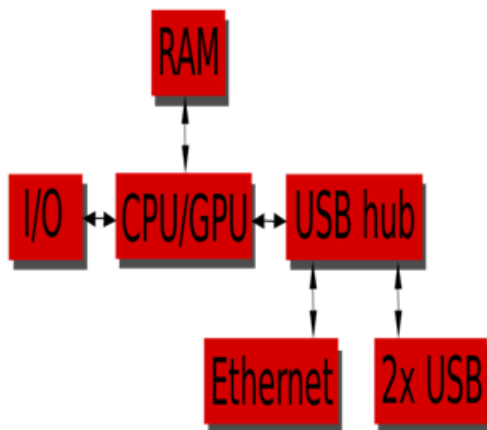
Proposed system

The **Raspberry Pi** is a credit-card-sized single-board computer developed in UK by the Raspberry Pi Foundation. The Raspberry Pi has a Broadcom BCM2836/2837 system on a chip. It does not include a built-in hard disk or solid-state drive, but Uses a SD card for booting and long-term storage. Here an IoT module is connected to update the information about the loads in the web server to make them available anywhere throughout the world using internet. This module is connected using ATMEGA328. This project uses regulated 5V, 1A power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac output of secondary 230/12V step down transformer.



I. RASPBERRY-PI:

The **Raspberry Pi** has a Broadcom **BCM2836** system on a chip (SoC), which includes a quad-core Cortex-A7 cluster. The Cortex-A7 MP Core processor is a high-performance, low-power processor that implements the ARMv7-A architecture. The Cortex-A7 MP Core processor has one to four processors in a single multiprocessor device with a L1 cache subsystem, an optional integrated GIC, and an optional L2 cache controller. The Raspberry Pi foundation has finally released an upgraded version of the Raspberry Pi. Raspberry Pi 2 model B features much of the same ports and form factor as Raspberry Pi Model B+, by replacing Broadcom BCM2835 ARM11 processor @ 700 MHz with a much faster Broadcom BCM2836 quad core ARMv7 processor @ 900 MHz, and with an upgrade to 1GB RAM.

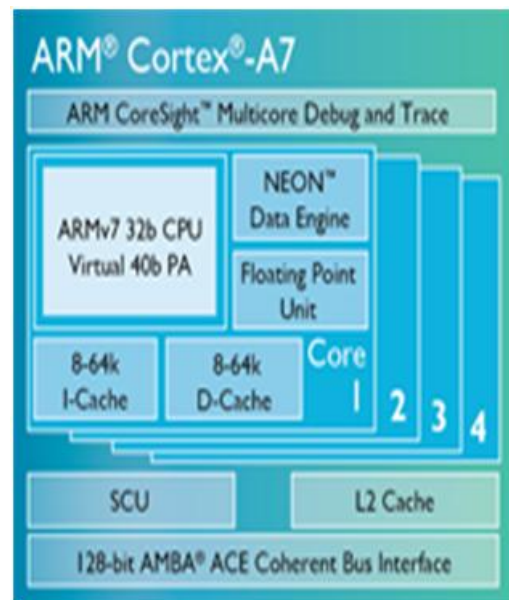


Expansion

- a. 2×20 pin header for GPIOs
 - b. Camera header.
 - c. Display header.
- Power – 5V via micro USB port.
 - Dimensions – 85 x 56 mm.



Image of the board showing SD card
Cortex-A7 Processor



Basic Hardware of Raspberry-PI

Raspberry Pi 2 Model B specifications:

- SoC – Broadcom BCM2836 quad core Cortex A7 processor @ 900MHz with VideoCore IV GPU.
- System Memory – 1GB LPDDR2
Storage – micro SD card slot (push release type).
- Video & Audio Output – HDMI and AV via 3.5mm jack.
- Connectivity – 10/100M Ethernet
USB – 4x USB 2.0 ports, 1x micro USB for power.

OS used in Raspberry pi is Linux



Pin diagram:

3.3v	5V
I2CO SDA	DNC
I2CO SCL	GND
GPIO 4	UART/TXD
DNC	UART/RXD
GPIO17	GPIO18
GPIO21	DNC
GPIO22	GPIO23
USB	GPIO24
DNC	DNC
SPIO MOSI	Ethernet out
SPIO MISO	GPIO25
SPIO SCLK	SP10 CE0 N
DNC	SP10 CE1 N

INTERNET OF THINGS

Internet is helping people to communicate each other using different applications.



Internet of things helps the things to communicate each other using IoT module

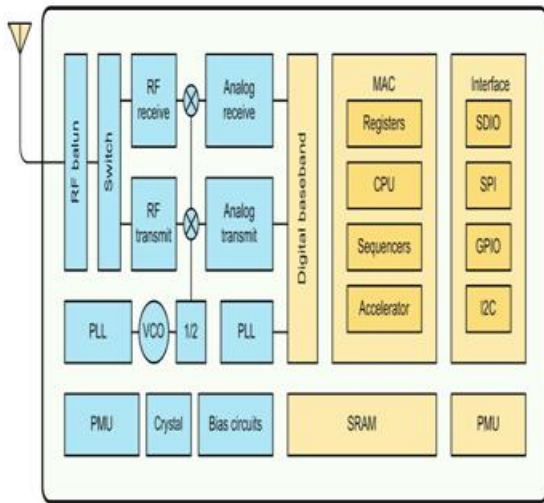
ESP8266EX

- ▶ The Internet of Things (IOT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data.



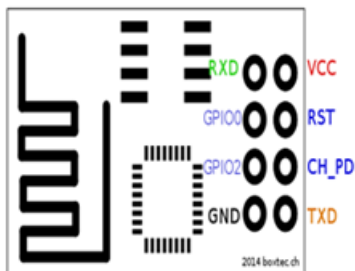
Different Modules

- ▶ ESP8266(ESPRESSIF).
- ▶ ESP8089.
- ▶ ESP6203.



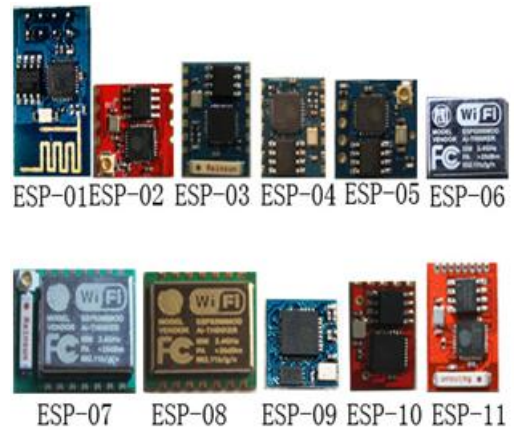
Wi-Fi module

ESP8266EX offers a complete and self-contained Wi-Fi networking solution. It can be used to host the application or to offload Wi-Fi networking functions from another application processor. When ESP8266EX hosts the application, it boots up directly from an external flash. It has integrated cache to improve the performance of the system in such applications. Alternately, serving as a Wi-Fi adapter, wireless internet access can be added to any micro controller-based design with simple connectivity (SPI/SDIO or I2C/UART interface). ESP8266EX is among the most integrated Wi-Fi chip in the industry it integrates the antenna switches, RF balun, power amplifier, low noise receive amplifier, filters, power management modules, it requires minimal external circuitry, and the entire solution, including front-end module, is designed to occupy minimal PCB area.



ESP8266EX also integrates an enhanced version of Tensilica's L106 Diamond series 32-bit processor, with on-chip SRAM, besides the WiFi functionalities.

ESP8266EX is often integrated with external sensors and other application specific devices through its GPIOs, sample codes for such applications are provided in the software development kit (SDK).



Advantages:

- Highly-flexible.
- Fit & Forget System.
- No need of human effort

Conclusion

Here we are implementing a home automation via E-mail using Raspberry pi.

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