# Design of Home Burglar-Alarm System Based on GSM Message Module

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**Abstract.** With economic and social development and the constant improvement of informatization, people's requirement for life quality has also been improved correspondingly with ever increasing demand for fire protection, burglar alarm and distant power/blackout of household appliances, so various intelligent distant monitoring and alarm systems come into being. This paper introduces the home burglar alarm system based on the GSM message module and elaborates on the entire design scheme of the system's hardware and software, component type, unit circuit design and the entire circuit connection. The infrared induction module and microwave sensor module monitor the invading signals, and when the two modules monitor invading signals at the same time, the system will give an alarm through message to realize the distant alarming function. The test proves that this system is reliable with low cost, so it can be widely applied to modern residence.

## Introduction

At present, the common communication ways of anti-theft alarm system on the market include fixed telephone dial-up, Ethernet and cluster system, etc. However, they have their own shortcomings: (1) it is easy for thefts to cut off the telephone line of fixed telephones or maliciously engage it so that it will fail at the critical moment; (2) Ethernet is also faced with the hidden risk of cutting off lines and it is not easy to be popularized; (3) the cluster system consumes a lot of energy with high maintenance costs, and it is needed to buy fixed frequency point.

Aiming at the advantages and disadvantages of the above communication modes, this paper designs a home wireless anti-theft alarm system based on GSM message module. This system can solve these risks and make home anti-theft more timely and convenient. It no longer depends on the cable telephone to call the police, but relies on the most reliable and mature GSM mobile network to directly reflect situation of the alarm place on your mobile screen with the most intuitive form of Chinese short message or telephones. It adopts the active infrared sensor for monitor and transforms the traditional tangible burglar mesh window into invisible to provide convenience for fire escape. And it is equipped with the sensor and gas leakage sensor to prevent fire and gas leakage.

## Selection of Single-Chip Machine

The AT89S52, as ordinary 51 MCU has been and widely used in a variety of products, the interface simple, easy to use and powerful functions, so the system by AT89S52 microcontroller as the main control chip. AT89S52 with the following criteria: 8KB flash, 256 bytes of ram, 32 I / O lines, watchdog timer, two data pointers three 16 bit-timer / counter, a six vector two-level interrupt structure, a full duplex serial port, on-chip crystal oscillator, and a clock circuit. In addition, AT89S52 can be reduced to 0Hz static logic operation, support 2 kinds of software selectable power saving mode.

## Introduction to GSM Network

GSM is the abbreviation of System for Mobile Communications Global, a digital mobile communications standard developed by the European Telecommunications Standards Organization GSM, ETSI is the abbreviation of the global mobile communication system. Its air interface uses time division multiple access technology. Since the 90's into business, have been more than 100 countries around the world. GSM standard equipment to occupy the current global cellular mobile

communication equipment market more than 80%. The GSM module is the terminal equipment following the GSM mobile phone and a very important GSM mobile communication system. It is applicable not only to frequent transmission of small amount of data, to achieve remote monitoring of wireless data, bi-directional transmission and control advantages, but also has wide coverage, low price, do not need to dial, permanent online, such as short message with its unique advantages. SMS short message service in the GSM system is provided in a GSM terminal, through the service center (with information storage and forwarding) application service text messaging.

The GSM communication module uses a Siemens TC35i module, which supports Chinese short message, in EGSM900 and GSM1800 dual band, can transmit voice and data signals, the interface connector and an antenna connector connected SIM card reader card and antenna, via standard AT commands bidirectional transmission of instructions and data.

Before work, the GSM telecommunication module needs to confirm whether the following work is at place:

(1) Whether P2 short-cap exists (if not, it is necessary to manually trigger the key networking);

(2) Confirm that the supply indicator D4 is light and indicator D6 is flashing when the supply button is pressed, which indicates that GSM module begins to work;

(3) Wait for the D6 indicator 75ms is light and /3s blackout, which means the SIM card successfully registers the network;

(4) RXD, TXD and GND are connected to the single-chip machine's connector respectively.

## System Structure

Message monitor and alarm system based on GSM (Global System for Mobile Communication is composed of two major parts: hardware and software and description of each component's work module and function is as follows:

The hardware sector is composed of three parts: pyroelectric infrared sensor, single-chip controller and GSM telecommunication module. Sensor is responsible for monitoring invasion and transmitting the data to single-chip controller, which will process data and coordinate the work of each functional module, mainly including processing data of the sensor and GSM telecommunication input as well issuing control.

The system uses infrared detection and microwave detection and double detection module, and based on the GSM module automatically send text messages via mobile phone remote. This detection method to combine two kinds of detection technology, when the relationship between "phase" to trigger an alarm means that only two detectors simultaneously in a short time to detect intrusion target, only an alarm signal. The system can also support the addition of other sensors as a security alarm system to detect extension portion. System structure shown in Fig. 1.
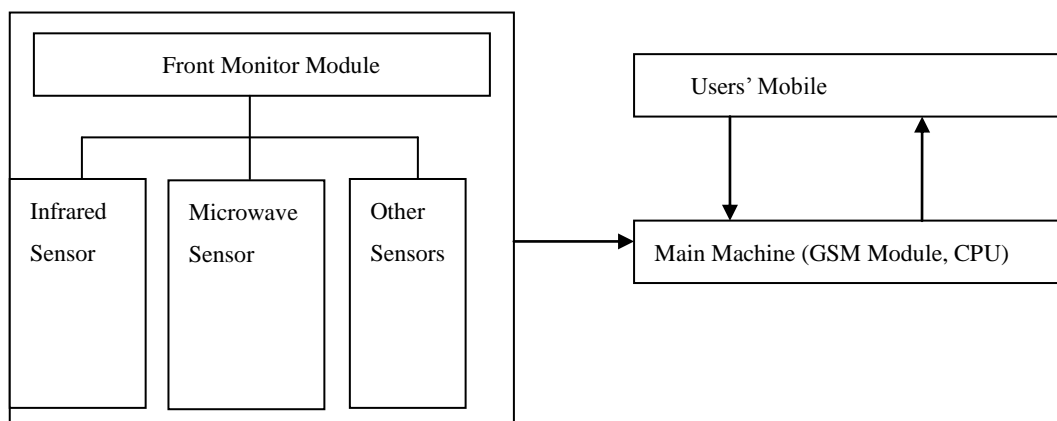


Figure 1.    System Structure Chart

## Main Controlling Module

When the system boots, the system control module first GSM communication module self-test, then the dynamic and constantly testing the short message reception sensor when the sensor detects an abnormal condition, it will send abnormal signals to the microcontroller, the microcontroller ring it should signal and controls GSM communication module to the specified mobile phone to send alarm information. When the GSM communication module receives a specific phone text messages sent to a particular, specific information is feedback to the microcontroller, the microcontroller will make the appropriate control commands according to the instruction information expressed, such as arming, querying system status, disarm, system reset set and determination and so on again. Its simple work flow chart is shown in Fig. 2
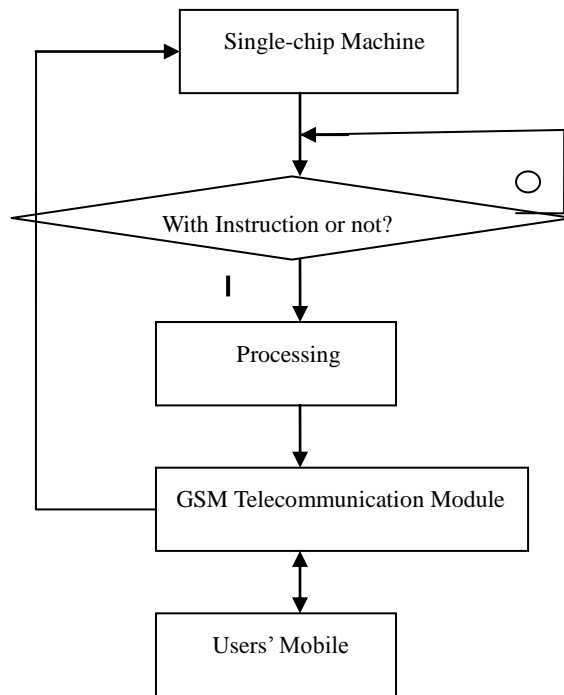


Figure 2.    Work Flow of Main Controlling Module

## Conclusion

During the design process, as it is not a long time for me to learn serial communication with the lack of theoretical knowledge, I have encountered a lot of troubles in actually making hardware and writing software, so I searched some relevant literatures to get to know relevant knowledge, which has not only increased my knowledge, but also supplemented me with the latest professional knowledge. Besides, I have improved my application ability and can solve some basic problems on my own.

The home burglar-alarm system based on the GSM message module in this paper can rapidly give an alarm in abnormal cases and send the compiled specific message to the originally set telephone to realize distant control over home security. After test, it has the optimal monitoring effect at 5m horizontally and 2.5 vertically. This system has mature technique, low cost, simple operation and good expansion performance, so it is easy to maintain and utilize it with certain practical value.

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