

A Smart Home System Design Based on GSM

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ABSTRACT

This paper introduces a mobile phone short message control method in smart home based on GSM (Global System for Mobile communications). AT commands and the system structure is illustrated in detail. The hardware system including STC89C51 and TC35i is presented. The software framework is also analyzed clearly in this paper. In addition, some other potential application areas and its direction of development in future are given at last.

Keywords: GSM; Smart Home; STC89C51; Wireless Communication

1. Introduction

As the prevailing trend of IOT (Internet of Things) [1] covering the global, smart home find its way in the trend. All control and communication method dashed into this area: GSM, WIFI, CAN, Bluetooth, ZigBee. They all try to solve those problems in this smart world [2]. Among these solutions, GSM has a prominent position as mobile phone has been a comprehensive communicating fashion in modern society.

GSM is a kind of digital mobile communication network. It is developing rapidly in recent years. And the short message service is an important business network based on GSM. Its simple and efficient performance as well as relatively low fee absorbs the customers. [3] Moreover, the technical possibility for many types of remote monitoring make it bound to be the most convenient and welcomed way in smart home control as people can monitor their home anytime anywhere. In this paper, I'll present you a wonderful smart home solution based on GSM and explain the implementation of software and hardware.

2. System Framework

The GSM control system contains the communication part, the control center and the object to be controlled. Figure 1 is the system block diagram.

In this system, GSM module plays the communication role. STC89C516RD+ bears the task of a control center. The relay module connected to home appliances is the object to be controlled. There are several channels of relays on the module. Each connects to a different home appliance.

The GSM module with a smart card is responsible for receiving text messages from the GSM network and

transmitting the short message from the local MCU (STC89C516RD+) to the GSM network. It also receives message command from user's mobile and sends the corresponding command to the control center STC89C516RD+. The controller analysis the command and conducts the relay to open or close the anticipated channel, such to open or close the related appliance. After this, the control center indicates the GSM module to send feedback message to the user terminal.

3. AT Commands

MCU communicate with GSM module through AT (Attention Commands) [4]. AT command set is the interface standard between TE (terminal equipment) and TA (terminal adaptor), as well as between DTE (data terminal equipment) and DCE (data circuit terminal equipment). In the early 1990s, AT command set is only used in the operation of modem. With a series of evolution, AT commands are added GSM07.05 standards. Up to now, Most of the GSM modules support this standard.

3.1. The Syntax of Basic AT Commands

Each AT command must begin with "AT" or "at", and end with <CR>. Four kinds of syntax are showed in Table 1.



Figure 1. The block diagram of the mobile control system.

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