Wireless SMTP Protocol Research and Realization Based on GPRS

Peng WANG, Bin LEI

Xi'an Technological University, School of Electronic and Information Engineering, Xi'an, China

Email: Wang_peng_1@126.com

Abstract: This paper introduces a data wireless transmission system based on SMTP(Simple Mail Transfer Protocol).The system transmits data by using integrated circuit LPC2114 of ARM7 and GSM/GPRS module Q24PLUS of WAVECOM. First, it established GPRS (General Packet Radio Service) link through LPC2114 control GPRS module, then data will be transmitted to designated E-mail boxes by the SMTP carrier after the GPRS data channel building. This paper introduces hardware structure, software system and some key technology appliances, etc.

Keywords: SMTP Protocol; LPC2114; Q24PLUS; GPRS; E-Mail

1 Introduction

With the development of Internet, the strengthen exchange of information between people, people put forward higher requirements with network applications based IP network. E-mail services which as the most widely used and most widely used services has been widely applied on Internet. E-mail system also has its transport protocol, including SMTP (Simple Mail Transfer Protocol), POP (Post Office Protocol), IMAP (Internet Message Access Protocol), this protocol apply to send and receive e-mail.

This paper introduces a new way of embedded remote communication based on china GSM network; it sends data in the form of e-mail to the specified e-mail box using ARM to achieve GPRS (General Packet Radio Service) of GPRS module. Then it achieved remote SMTP protocol through wireless mode [1].

2 Crucial Technologies

2.1 SMTP Protocol

SMTP (Simple Mail Transfer Protocol): The transport protocol which e-mail transmitted from the client to the server or from one server to another server. SMTP protocol is a member of TCP/IP protocol suite, mainly provides how to send an e-mail address from the sender to the recipient address, and provides the transmission of the rules made. The communication model of SMTP protocol is not complicated, the main work primarily concentrates the sending SMTP protocol and receiving SMTP protocol, firstly all send e-mail requests for users by the sending SMTP to establish a duplex communication connection link to the receiving SMTP. The receiving SMTP is relation to sending for the purposes of sending SMTP, it can be the ultimate recipient, also maybe the middle of the carrier. The sending SMTP is responsible for send SMTP command to the receiving SMTP, and the receiving SMTP is responsible for receive and Feedback Response.

Shaanxi Provincial Department of Education Special Research Projects Funded Project (06JK282)

2.2 GPRS Business

GPRS is a data bearer and data transmission mode of package switching based on the development of GSM. GPRS network is constituted of two new network nodes In the GSM network architecture. The two nodes is SGSN (Serving GPRS Supporting Node), GGSN (Gateway GPRS Supporting Node), it provide the support for GPRS function. SGSN realizes mobility and security management to the GPRS modules, and responsible for the sending and receiving mobile data packages between the GPRS module and GGSN. GPRS principle structure diagram is shown as figure 1[2].

3 System Design

It introduces each components of the system in detail, including structure model of the hardware, software, structural design, SMTP protocol structure and operational mechanism, and analysis the concrete realization of the process of SMTP protocol of the ARM system.

3.1 System Components

The system is composed of three parts: WRTU (Wireless Remote Terminal Unit), GPRS wireless network, host servers. The diagram of system components is shown as figure 2[3].

3.2 Hardware Components

The Block Diagram of the WRTU hardware is shown as figure 3.

978-1-935068-10-5

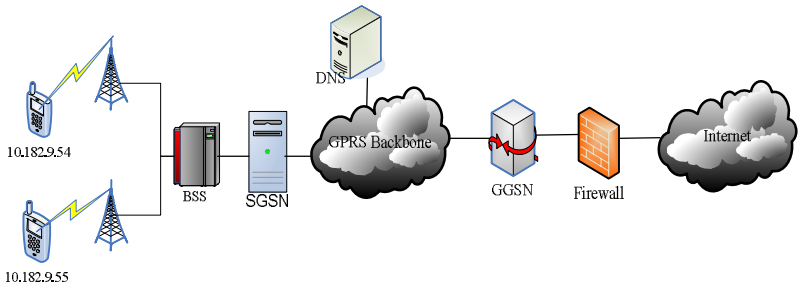

Figure 1. GPRS Principle Structure Diagram

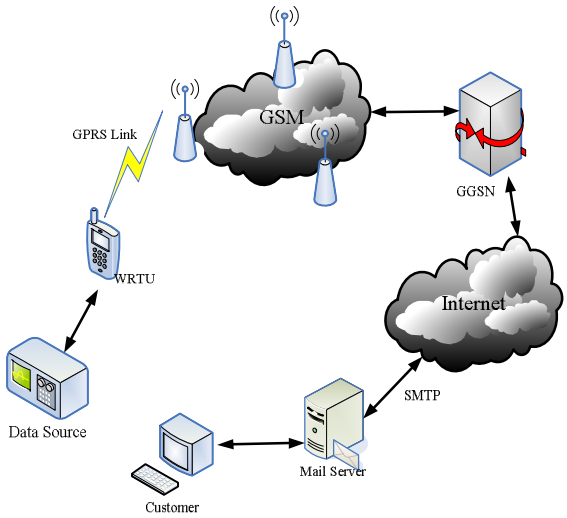

Figure 2. Diagram of System Components

3.2.1 ARM Microprocessor

Lpc2114 is a microprocessor with 32 bits ARM7TDMI-S core. It has 16K bytes static RAM, 128K bytes high speed flash memory, RTC and two UARTS and other peripherals, then the system design Becomes more and more simple. Lpc2114 needs two types power, the CPU operating voltage range is 1.65~1.95 V, I/O operating voltage range is 3.0~3.6 V. The ARM interface circuit is shown as figure 4[4].

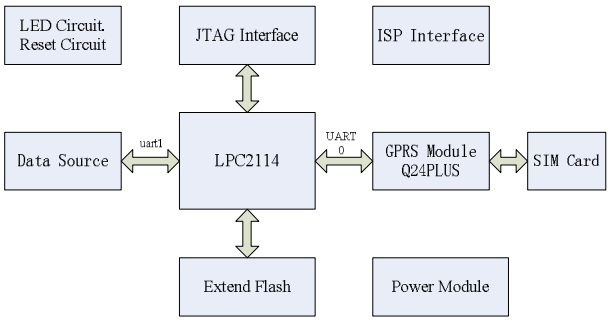

Figure 3. Block Diagram of the Hardware

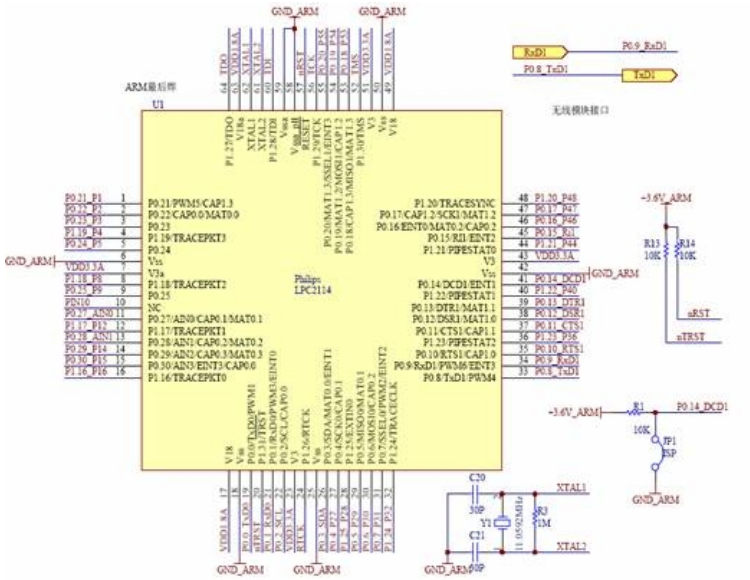

Figure 4. ARM Interface Circuit

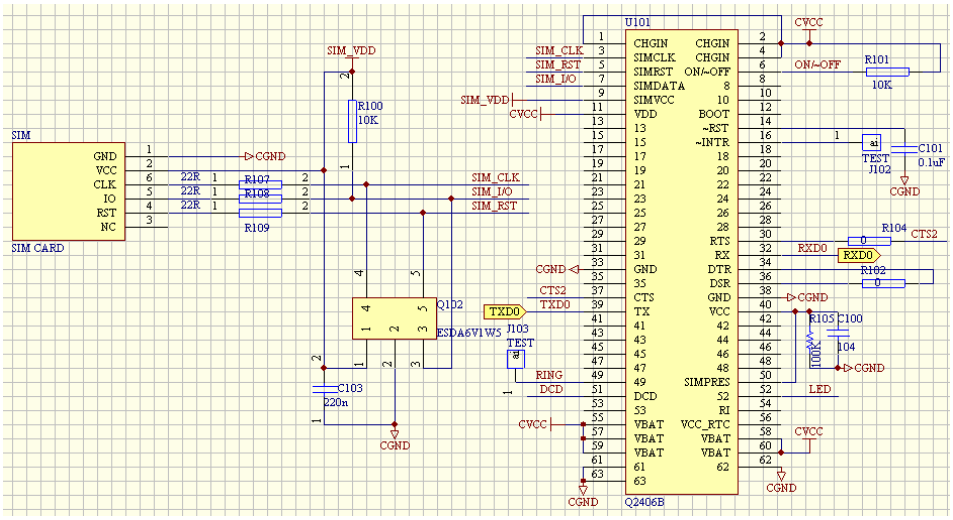

Figure 5. GPRS Module Interface Circuit

3.2.2 GPRS Module

In this system, GPRS module uses Q24PLUS of Wavecom Company. Q24PLUS which has abundant AT command is a combining data terminal device of traditional modem and GPRS wireless mobile communication system. This module set RF circuits and base band in it, provides a standard AT command interface, and provides a fast reliable, secure transmission to transmit data, voice, short messaging and fax to facilitate application development and design. The Q24PLUS module interface circuit is shown as figure5 [5] [6].

3.3 Software Design

After completing the GPRS module initialization, LPC2114 implements GPRS and SMTP protocol by control Q24PLUS module using AT command. AT command is a modem operation command set of Hayes Company, and is an industry standard of modem communication interface. SMTP established based on GPRS network, therefore firstly establish the GPRS network link. The establishment of the following steps is [7]:

1. AT+CGATT=1: This execution command is used to attach the MT to, or detach the MT from the GPRS service.
2. AT+CGDCONT=1 ， “IP” ， “CMNET”: This command specifies PDP context parameter values for a PDP context identified by the local context identification parameter.
3. AT+CGACT: This execution command is used to activate or deactivate the specified PDP context.
4. AT#ConnectionStart: This execution command is used to established GPRS link.

The flowchart of establishing GPRS link is shown as figure 6.

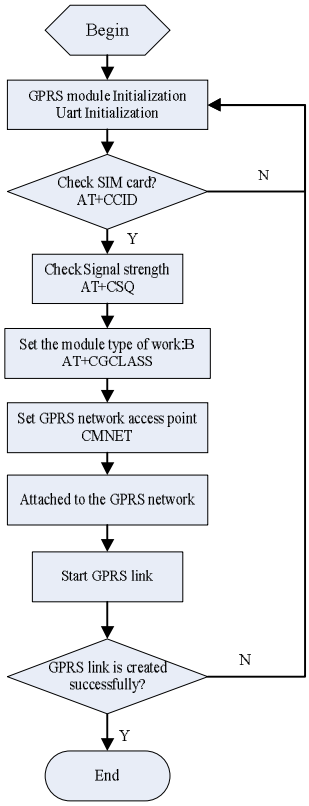

Figure 6. Flowchart of Establish GPRS Links

When the GPRS network link establishment of the future and send an e-mail, it needs configure SMTP, the configuration command is as below:

1. AT# DOMAIN ="tom.com": Set domain name
2. AT# SMTPSERV ="smtp.tom.com": Set

978-1-935068-10-5 © 2010 SciRes.

SMTP servers

3. AT#SENDERADDR=yjwp@tom.com : Set sender address
4. AT# SMTPUN ="yjwp": Set SMTP User-name
5. AT# SMTPPW ="123456": Set SMTP Code
6. AT# SENDERNAME ="yjwp": Set the sender user name
7. AT# DNSSERV1="61.232.202.158": Set the DNS1

The send process of SMTP is shown as figure 7[8].

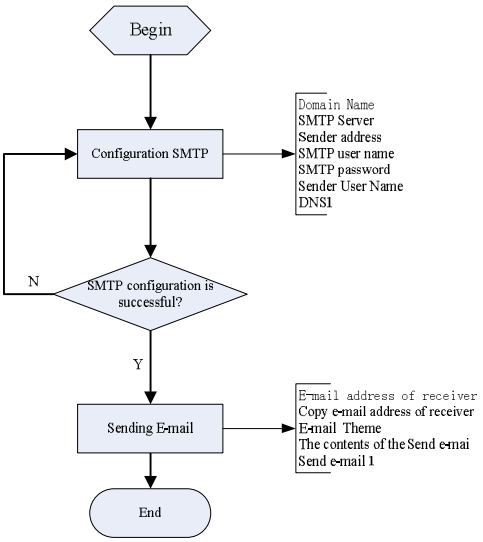

Figure 7. Flowchart of Achieve SMTP

4 Conclusions

This paper introduces a new way of information transmission system. This system transmits data using GPRS service based on GSM network, adopts SMTP e-mail transmits protocol. The system's technology innovation is using advanced ARM microprocessor core processors, GPRS (General Packet Radio Service) and SMTP (Simple Mail Transfer Protocol). In embedded systems perspective, it can be asynchronous transmission data by using simple SMTP protocol, the data is transmitted in the form of E-mail, mainly work is takes over by the SMTP infrastructure in order to reduces the overhead running costs in embedded systems for synchronous data transmission. And also can extends a single transmission of text data, transmits various data including audio, video or still images and other rich multimedia data.

To sum up, selecting GPRS and SMTP as the carrier of transmission data, is not only reduces the cost of data transmission, but also get a larger data transfer contents and transfer file types. This system has broad application prospects.

References

[1] Wang Qinggang,Yang Dianfu, The Applications Of GPRS In Embedded System.. CONTROL & AUTOMATION . 2005.21:46.

[2] Hu Ke,Cai FangKai, Implementation of GPRS-based Intelligent Data Transmission Terminal[J]. TELECOMMUNICATION ENGINEERING, 2003.43(5).

[3] Ma ShaoPing, Luo Zhigang, Sun Lei, Hap Xiang He Wanshuang . Design and Implement Of GPRS Remote Terminal Based On ARM. CONTROL & AUTOMATION . 2006.5-2.

[4] PHILIPS LPC2200 32bits ARM microprocessor, LPC2210.pdf http：//www.zlgmcu.com/philips/philips-arm.asp， 2005:68-78.

[5] Q2406 and Q2426 Product SpecificaTion. http: // www. bjcjt. com/ images/Q2406.pdf， 2005:78.

[6] Hou Ting, Yang Hongye, Li Junfen, Sun Zuolei. The Design and Implementation of GPRS wireless Data Transmission Terminal. CONTROL & AUTOMATION . 2006.8-2.

[7] AT_Commands_Inteface_Guide_for_IP_Connectivity_002-prelim. http：//www.bjcjt.com/images/Q2406B_AT_IP.pdf， 2005.

[8] LIAO BIN, YE WEIQIONG, YANG LIANLE. The Design of long-distance Control based on ARM chip by SMTP Protocol. CONTROL & AUTOMATION . 2007.23:19-21.