Design of Electronic Communication Power Monitoring System Based on GPRS Technology

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Abstract. If the electronic communication power supply fails, the entire electronic communication system will be paralyzed, resulting in the abnormal operation of the system and increased maintenance costs in the later period. However, due to the slow transmission rate of the electronic communication power supply monitoring system, a GPRS based electronic communication power supply monitoring system is designed. Hardware part: the communication resources of the base station are used for networking, and the AC input is sent to the rectifier module after power distribution; Software part: identify the type of monitoring object, change the electrical signal or non electrical signal into a standard electrical signal, select UDP as the transmission protocol, use GPRS technology to formulate the communication protocol, and optimize the software function of the electronic communication power monitoring system. Experimental results: the average transmission rate of the electronic communication power supply monitoring system designed this time and the other two electronic communication power supply monitoring systems are 63.712 kpbs, 54.586 kpbs and 54.057 kpbs respectively, which shows that the system performance is more superior after the GPRS technology is integrated into the electronic communication power supply monitoring system.

Keywords: GPRS · Electronic communication · Communication power monitoring · Monitoring object · Protocol conversion · Communication resources

1 Introduction

The electronic communication power supply is usually called the heart of the communication system. The electronic communication power supply is extremely important to ensure the smooth flow of the entire communication system. If it does not work properly, it will cause the communication system to fail and even lead to the paralysis of the entire system. With the rapid development of communication business and science and technology, the automation performance of communication equipment has been greatly improved, which provides feasibility for centralized monitoring and management of communication systems. Electronic communication power supply is an important part

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of communication system. To adapt to the overall development of communication technology, it is necessary to actively adopt centralized monitoring system [1]. In order to ensure the smooth flow of the entire communication system, the electronic communication power monitoring system came into being. The electronic communication power monitoring system is to set up the necessary monitoring points for the distributed electronic communication power equipment and equipment room air conditioners, lighting and other equipment, conduct real-time monitoring, automatically monitor and deal with the faults of various equipment in the system, and achieve 24-h non-stop that cannot be achieved by manual methods. Intermittent automatic inspection [2].

The direction of power supply equipment maintenance reform is centralized monitoring, and gradually realize that there are few and unattended power supply equipment in communication stations. The so-called centralized monitoring of electronic communication power supply is to use a computer control system to reasonably set up necessary monitoring points for the power supply equipment of communication stations distributed in different regions, carry out telemetry, remote signaling, remote control, monitor the operating parameters of the equipment in real time, and find and deal with faults in time. The core and most important function of the monitoring system is fault alarm and real-time monitoring. The key of the monitoring system is mainly to see whether it can monitor and warn the electronic communication power equipment in an uninterrupted, stable, reliable and real-time manner for many years.

The design of electronic communication power monitoring system has important practical significance to ensure the smooth flow of the entire communication system. Reference [3] proposes Design and Research of Communication Power Monitoring System Based on Internet of Things Technology. The system uses ARM chip as the core controller, uses Hall sensors to collect working status information of communication power equipment, and generates DC signals through A/D conversion., Use GPRS DTU module to transmit signals, read signal information in monitoring center, and issue control commands. Complete the optimization of the electronic communication power monitoring system. Reference [4] proposes Design of Communication Power Monitoring System in Power Communication, uses UML modeling technology to analyze system functional requirements, uses C++ to develop power monitoring data acquisition module, uses C# to develop power monitoring system interface, and designs power monitoring system database at the same time. In order to complete the optimization of the electronic communication power monitoring system. However, the above methods all have the problem of low transmission rate of the communication power monitoring system. In this regard, this paper proposes Design of Electronic Communication Power Monitoring System Based on GPRS Technology. On the basis of the hardware and software of the electronic communication power monitoring system, UDP is selected as the Transmission protocol, use GPRS technology to formulate communication protocol, optimize the software function of electronic communication power monitoring system. The experimental results show that the average transmission rate of the electronic communication power monitoring system designed in this paper is 63.712 kpbs. It has a certain technical level and practicality.

2 Hardware Design of Electronic Communication Power Monitoring System

The monitoring system is monitored by computer software through hardware, so the reliability of system hardware is very important. First of all, in the circuit design, it is necessary to ensure that the correct telemetry signal is obtained, and the linearity in the transformation and transmission is guaranteed. Considering the reliability of the AC power supply, the system can be powered by two mains, the two mains work as the main and standby mode, automatically switch over, and have an electrical interlock function. After the AC input is distributed, it is sent to the rectifier module., the DC output of the rectifier module is connected to the DC power distribution unit through the bus bar, and finally the battery pack is charged and power is supplied to each load through the DC power distribution unit. For remote signaling signals, it is necessary to ensure that the logic is correct, and multiple monitoring of important signals can be performed, and the correctness of remote signaling signals can be judged through software. The selected components should have high reliability. The selected control board (1/0 board, AJD board) should choose high-quality and reliable products. The selected computer should be a high-end (referring to reliability) microcomputer. For some electrical signals, limit the amplitude to prevent abnormal signals from damaging circuits and devices. When designing the printed board, increase the wire area for the power line and the ground line to reduce the line resistance. The hardware structure of the electronic communication power monitoring system is shown in Fig. 1:

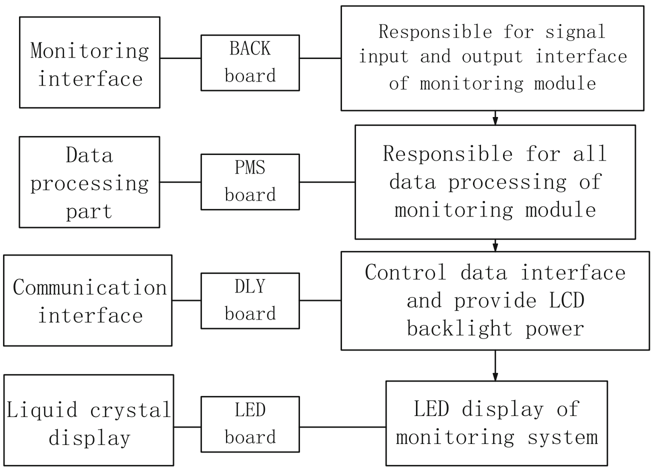

Fig. 1. Hardware function of electronic communication power supply monitoring system

As can be seen from Fig. 1, the hardware can be functionally divided into four parts: monitoring interface part, data processing part, communication interface part, and liquid crystal display part. The whole system structure is divided into four boards: BACK board, PMS board, DLY board and LED board. The connectors used should choose connectors with good contact and a locking device. There are many input and output signal lines in the monitoring system (up to hundreds), how to connect with the system to ensure reliable connection and easy maintenance must be carefully considered. The BACK board is responsible for the signal input and output interfaces of the monitoring module. All analog signals are converted into digital signals on this board and then sent to the PMS board for data processing. The PMS board is responsible for all data processing of the monitoring module and is the core of the monitoring module. The DLY board is responsible for the LCD interface of the system, including the control data interface and the LCD backlight power supply. The LED board is responsible for monitoring the LED display of the system. It can be connected to the system through terminal blocks and connectors. The entire base station centralized monitoring system is divided into three parts, namely pre-data acquisition, long-distance transmission and central local area network. MISU multifunctional integrated monitoring equipment is an embedded microprocessor system. In the input and output circuit design, in addition to considering the I/O resources, factors such as the control form of the switch level, the software processing of the switch level, and the software anti-interference of the switch level signal should also be considered. In order to improve the speed at which the computer samples the switching level signal, the byte processing method is selected in the hardware design of the input interface. It can realize real-time monitoring and alarm processing of various base station power equipment and environmental monitoring signals, and make corresponding control according to application requirements. At the same time, MISU has the networking capability for downlink base stations, which can effectively utilize the communication resources of base stations for networking. The input of switch level should be buffered and isolated and then input to the I/O port of the computer after filtering, and the output will be output by the I/O port after being locked. In the design of the interface circuit, attention should be paid to the anti-interference problem of the digital input, and attention should be paid to the rational allocation of resources. ZXM10 MISU multi-function integrated monitoring equipment is an embedded microprocessor system. It can realize real-time monitoring and alarm processing of various base station power equipment and environmental monitoring signals, and make corresponding relay contact output control according to application requirements. The input of the switch is often accompanied by noise interference. If the computer judges that the state of the switch is uncertain, it will affect the control result. Therefore, the combination of hardware and software should be used to remove the uncertain state (defibrillation) to ensure the reliability of the entire system. In dealing with these disturbances, hardware methods include filtering, isolation, etc. MISU continuously collects monitoring signals of various base station power equipment and environment, and processes the monitoring signals into real-time monitoring and alarm information that can be transmitted by the transmission channel. Under normal circumstances, MISU does not actively report real-time data and alarm information, and only reports these real-time data and alarm information when the transceiver asks the module.

3 Software Design of Electronic Communication Power Monitoring System

3.1 Identify the Type of Monitoring Object

The monitoring objects of the electronic communication power monitoring system include all the power supplies, air-conditioning equipment and environmental quantities of the communication station [5, 6]. The main equipment of the electronic communication power supply system includes high-voltage power distribution equipment, low-voltage power distribution equipment, mains oil generator conversion panel, rectifier power distribution equipment (rectifier equipment, power room AC and DC power distribution equipment and battery pack), converter equipment (UPS, inverter and DC-DC converter) and power station equipment, etc.

The monitoring point is the specific monitoring and control semaphore set by the monitoring object. In terms of data types, these semaphores include analog, digital, state, switch, and so on. From the flow of the signal, there are two types of input and output. The monitoring content, also called monitoring item, refers to the specific monitoring and control semaphore set for the above monitoring object. From the point of view of data type, these semaphores include analog quantity, digital quantity, state quantity, switch quantity, etc. From the perspective of signal flow, they also include input quantity and output quantity. Monitoring objects can be divided into smart devices and non-intelligent devices according to the characteristics of the monitored device itself. Among them, the intelligent device itself can collect and process data, and has an intelligent communication interface, which can be connected to the monitoring system directly or through protocol conversion, and each intelligent device is used as a monitoring module. Telemetry refers to the process of obtaining these data remotely by collecting continuously changing analog quantities of equipment or the environment. The objects of telemetry are all analog quantities, including various electric quantities such as voltage, current, and power, and various non-electric quantities such as temperature, pressure, and liquid level. Therefore, these monitoring items can be divided into four categories, mainly including: telemetry, remote signaling, remote control and remote adjustment [7, 8]. After a series of transformation processing of sensors, transmitters and monitoring modules, it is converted into a digital quantity that is very close to the real value, and is handed over to the computer for further processing. Remote signaling refers to the process of remotely obtaining corresponding state quantities by monitoring the operating state of field devices or environments. Non-intelligent devices cannot collect and process data by themselves, and there is no intelligent communication interface. They need to be connected to the monitoring system through data acquisition and control equipment (data collectors). Each data acquisition and control device is used as a monitoring module. The monitored signals can be divided into power signals and non-power signals. The content of remote signaling generally includes two types of equipment operating status and status alarm information. The values of these states are usually several discrete values, each of which has a fixed meaning and is used to represent an operating state of the device or its part. Some state quantities have only two values, which indicate the presence or absence of certain states, alarm or no alarm. In the monitoring system, the processing of the monitored signal generally needs to go through the process of sensing, transmission and conversion before it can be converted into a digital signal in the computer.

Non-smart devices and environmental quantities cannot be directly connected to the acquisition channel of the data collector for measurement. These power signals or non-power signals need to be converted into standard power signals through sensors/transmitters before they can be connected to the data collector. Remote control refers to the process in which the monitoring system issues specific instructions to the remote equipment to make the equipment perform corresponding actions. The value of the remote control quantity is usually a switch quantity, which is used to express information such as "on", "off" or "running", "stop", etc., and a multi-valued state quantity can also be used to enable the equipment to perform operations between several different states. Toggle action. Monitoring items can be divided into telemetry, remote signaling, and remote control: telemetry refers to data collection of continuously changing analog signals. Remote signaling refers to data acquisition of discrete state switching signals. Remote control refers to discrete control commands issued by a monitoring system. The setting of monitoring points is not the better. When a small number of monitoring points can fully reflect or basically reflect the operating status of the equipment, setting too many monitoring points is not only unnecessary, but will increase the cost and complexity of the system and reduce reliability.

3.2 Optimize the Software Function of Electronic Communication Power Monitoring System

Communication protocol is a set of rules agreed in advance between two computer systems for communication and must be observed jointly. Starting from the problems to be solved by the communication protocol, there should generally be three basic requirements. The communication protocol must be able to achieve accurate communication between intelligent devices and monitoring systems (computers). For the server, it also applies for a fixed socket and starts to wait for the request of the client. Any client can send a connection request and an information request to it. After the connection is successful, both the client and the server can send and receive data to the socket. When the communication ends, close the socket and cancel the connection [9]. Just like the language used by people in conversation, communication protocol is also a set of very strict "language". All the "words and sentences" used must be defined in advance, and ambiguity is absolutely not allowed. The communication protocol must be able to provide reliable communication. Socket skillfully solves the problem of establishing communication connection between processes by using C/S mode. In the monitoring system, UDP is selected as the transmission protocol. Datagram protocol UDP is a connectionless communication protocol based on IP protocol. UDP does not need to establish a communication channel before transmitting data, but directly sends the data to the receiving end. There are three types of communication protocols related to the monitoring system, as shown in Fig. 2:

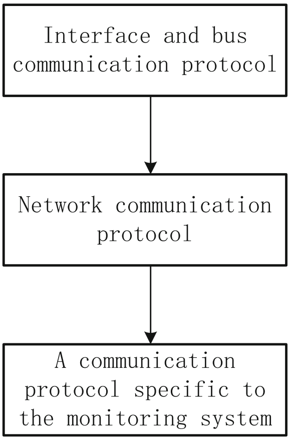

Fig. 2. Communication protocol types

As can be seen from Fig. 2, communication protocol types include: interface and bus communication protocol, network communication protocol, and monitoring system specific (special) communication protocol. The communication protocol should be able to provide efficient communication. This paper uses the designed communication protocol for data transmission.

According to the actual needs, the basic functions of the monitoring system can be divided into monitoring functions, human-computer interaction functions, management functions and auxiliary functions, among which the management functions include data management functions, alarm management functions, configuration management functions, security management functions, Self-management function and file management function, etc. The monitoring module is the lowest monitoring layer in the monitoring system [10]. It is directly connected to the equipment and is used to monitor, collect and process the working status and operating parameters of the monitored equipment to form standardized status, data and alarm information for upward transmission. At the same time, it receives and executes various monitoring and control commands issued by the station center to control the equipment and adjust parameters. For the parameters in the system, the current packet data charging is calculated according to the data above the second layer of the network protocol (that is, IP packet data), and the transmission efficiency calculation is calculated according to the following formula:

$$T = \frac{\phi}{G + \eta} \tag{1}$$

In formula (1), ϕ represents the data length, G represents the user data length, and η represents the TCP header length.

Among them, the monitoring function is the most basic function of the monitoring system, which also includes the monitoring function and the control function. The monitoring system can continuously monitor the real-time operation status of the equipment and the environmental conditions that affect the operation of the equipment, and obtain the original data and various states of the equipment operation for system analysis and processing. Since it is directly dealing with the monitored equipment, to meet the reliability of the monitoring system, the monitoring module must have the highest monitoring priority. The core part of the monitoring module is generally served by a single-chip microcomputer. It sets a certain number of interfaces and channels such as analog input, switch input, digital output, switch output and counting input through a certain interface chip and peripheral circuit. The sensors, transmitters and contacts on the controlled equipment are connected to directly monitor and control the controlled equipment in real time. This process is called telemetry and remote signaling. Human-computer interaction function refers to the function of mutual dialogue between the monitoring system and people and between monitoring systems, including the functions realized by the human-computer interaction interface and the function of interconnection and communication between systems. The station center is a centralized operation and maintenance management point for the environmental power equipment of the communication station, which is used to monitor and manage the monitoring modules of each equipment in the station. Its function mainly focuses on monitoring, which sends monitoring and control commands to the monitoring module, including the setting and adjustment of parameters.

On the basis of formula (1), the calculation formula of network load is obtained as:

$$D = \gamma \times \frac{1}{\sum_{\phi=1} |\eta - 1|^2} \tag{2}$$

In formula (2), γ represents the communication time of the TCP protocol stack, and η represents the number of bytes in a single frame of data. In the monitoring center, the front-end computer is responsible for receiving, analyzing and processing all monitoring point data, including performance data, alarm data and system data, etc. The expression formula of point-to-point data transmission is:

$$\mu = \frac{\left\| t - y^2 \right\|}{2} \times \gamma + \eta \tag{3}$$

In formula (3), t represents the initial time when static IP is written into the GPRS module, and y represents the communication rate.

The system interconnection function refers to the horizontal networking function between the upper and lower monitoring systems with jurisdictional relationship through a certain protocol interface, and the vertical networking function between the monitoring system and other systems (such as the network management system), which enables the system to Network flexibly. Summarize the data collected by each monitoring module for further processing and storage, and display or print if necessary: transmit real-time data, historical data, equipment parameters, status information, alarm information and statistics to the superior at regular intervals or according to the requirements of the regional monitoring center information, and accept the equipment remote control command issued by the superior. Alarm is also a kind of data. From the particularity of its content and meaning, alarm is the most important monitoring data of the monitoring system, and the alarm management function is also the most important function of the monitoring system. For the same reason, dozens of alarm messages may be generated on the monitoring interface at once (for example, when a power failure occurs, corresponding alarms will be issued by AC power distribution, DC power distribution, rectifier, etc.). The regional monitoring center is a centralized operation and maintenance point used to monitor and manage all the bureau stations in a city-level area, and is the basic operation and maintenance unit of the environmental power equipment in the monitoring system. It has the most powerful functions and the most perfect performance in the whole monitoring system. At this time, the system needs to determine the most critical and fundamental alarms according to the pre-set logical relationship, so as to filter out the other related alarms, so as to achieve the real alarm location. Configuration management refers to editing and modifying the configuration parameters, interface and other characteristics of the monitoring system to ensure the normal operation of the system, optimize the performance of the system, and enhance the practicability of the system. Communication and port parameters, such as communication rate, serial data bits, number of ports and modules, addresses, etc. Taker compensation parameters, such as acquisition point slope compensation, phase compensation, function compensation, etc. Some of these parameters often need some necessary adjustments according to the actual situation, and the monitoring system must be able to provide users with convenient and practical parameter configuration functions. The regional monitoring center is usually a local area network composed of computer equipment such as data servers, communication machines, disk arrays, operation desks, and printers. When communicating with the central station, the communication protocol is consistent with the communication protocol of the central station. In some cases, the communication protocol is inconsistent. At this time, the protocol conversion needs to be carried out by software. System parameters are important configuration information to ensure the normal operation of the monitoring system and to reflect the equipment conditions truthfully. These parameters include data processing parameters, such as data sampling period, data storage period, data storage threshold and so on. Alarm setting parameters, such as alarm upper and lower limit, alarm mask event segment, whether to activate sound alarm, etc.The specific monitoring functions are shown in the following figure:

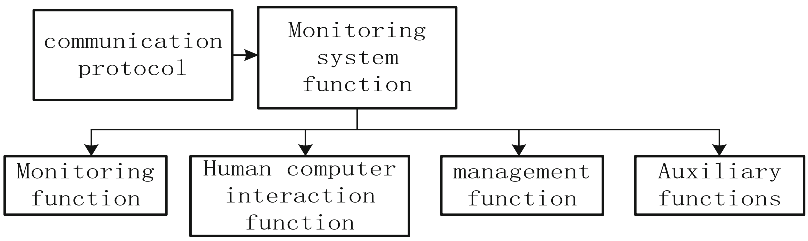

Fig. 3. Schematic diagram of monitoring function

4 Experimental Analysis

4.1 Set up the Experimental Environment

The built test environment: the monitoring center consists of a front-end communication machine, a database server, and a user operation terminal. Because it is difficult to simulate the actual power supply operation data under laboratory conditions, only the parameter data of the computer room environment is simulated and tested in the data acquisition terminal part. To develop application programs on Windows, there are many tools to choose from, such as: VB, Delphi, VC, C++ Builder, etc. The VB man-machine interface is very good, but it is weak in the underlying manipulation ability and the communication speed is slow, while the VC man-machine interface is better, the communication function is strong, and the underlying manipulation ability is strong. The communication module is connected with the central communication machine through the RS232 interface/E1 interface of the digital business channel. The intelligent protocol conversion module performs protocol conversion for intelligent devices (such as switching power supplies, professional air conditioners) through 3 RS485/RS422/RS232 intelligent interfaces and 1 RS232 intelligent interface. In the actual test, two collectors, two smoke sensors, and two access control sensors are used to simulate the operating environment of 82 bureaus and 83 bureaus in the actual monitoring system. Front communication machine: built-in TCP/IP communication module, used to transmit data.

4.2 Experimental Results

In order to test the application effect of the electronic communication power monitoring system designed this time, the experimental test is carried out. The literature [3] and literature [4] are selected for experimental comparison. The transmission rates of the three systems are tested under the conditions of different concurrent users. The experimental results are shown in Table 1–5:

It can be seen from Table 1 that the average transmission rates of the electronic communication power monitoring system designed this time and the other two electronic communication power monitoring systems are: 94.235 kpbs, 84.144 kpbs, 84.161 kpbs.

It can be seen from Table 2 that the average transmission rates of the electronic communication power monitoring system designed this time and the other two electronic communication power monitoring systems are: 76.499 kpbs, 65.936 kpbs, 65.820 kpbs.

It can be seen from Table 3 that the average transmission rates of the electronic communication power monitoring system designed this time and the other two electronic communication power monitoring systems are: 65.212 kpbs, 56.864 kpbs, 56.204 kpbs.

It can be seen from Table 4 that the average transmission rates of the electronic communication power monitoring system designed this time and the other two electronic communication power monitoring systems are: 46.710 kpbs, 37.330 kpbs, 36.574 kpbs respectively.

It can be seen from Table 5 that the average transmission rates of the electronic communication power monitoring system designed this time and the other two electronic communication power monitoring systems are: 35.906 kpbs, 28.657 kpbs, and 27.527 kpbs, respectively. According to the experimental results in Table 1–5, as the number

Table 1. Transmission rate of the system with 50 concurrent users (kpbs)

Number of experiments/time	Literature [3]	Literature [4]	The electronic communication power monitoring system designed this time
1	83.611	82.501	96.748
2	82.004	83.646	95.316
3	83.649	84.745	94.522
4	82.055	82.997	93.748
5	83.747	83.649	92.501
6	84.559	82.554	91.749
7	83.615	83.679	93.545
8	84.517	84.755	93.846
9	83.994	83.902	94.805
10	84.165	84.397	93.648
11	85.912	85.636	94.715
12	86.794	84.122	95.313
13	85.216	85.704	94.705
14	84.773	84.910	93.847
15	83.552	85.223	94.512

Table 2. The transmission rate of the system with 100 concurrent users (kpbs)

Number of experiments/time	Literature [3]	Literature [4]	The electronic communication power monitoring system designed this time
1	65.849	63.845	76.455
2	71.006	65.009	77.311
3	69.546	65.887	76.911
4	66.548	66.9993	75.813
5	65.812	65.213	76.488
6	64.377	64.774	75.412
7	65.696	65.995	76.316
8	65.997	69.822	75.820
9	64.331	67.313	76.117
10	65.819	66.549	75.151
11	66.748	63.215	76.909
12	65.812	66.845	77.463
13	63.774	65.887	78.111
14	62.912	64.233	79.006
15	64.819	65.718	74.203

of concurrent users increases, the data transmission rate of the system decreases, and the data transmission rate of the electronic communication power monitoring system designed this time can meet the needs of system operation.

Table 3. Transmission rate of the system with 150 concurrent users (kpbs)

Number of experiments/time	Literature [3]	Literature [4]	The electronic communication power monitoring system designed this time
1	56.151	56.849	63.021
2	55.846	57.661	64.918
3	59.845	55.774	65.224
4	56.747	56.933	64.833
5	55.822	55.714	65.121
6	54.913	56.880	64.793
7	55.864	55.974	65.812
8	56.893	56.332	66.464
9	55.122	55.818	65.933
10	56.047	54.779	65.714
11	57.448	55.316	63.821
12	58.666	55.822	64.512
13	57.317	56.917	65.315
14	58.916	55.378	66.904
15	57.364	56.919	65.788

Table 4. Transmission rate of the system with 200 concurrent users (kpbs)

Number of experiments/time	Literature [3]	Literature [4]	The electronic communication power monitoring system designed this time
1	36.646	36.385	44.559
2	38.579	37.413	45.877
3	39.845	36.588	46.312
4	36.727	35.811	49.002
5	35.812	36.923	47.616
6	36.914	35.747	48.377
7	37.315	36.499	46.919
8	38.567	35.844	45.213
9	39.454	36.745	46.337
10	36.825	37.614	45.844
11	37.533	36.825	46.918
12	38.166	37.447	47.553
13	37.646	36.914	48.512
14	35.202	35.331	45.211
15	34.714	36.528	46.399

In order to verify the effectiveness of the method in this paper, taking the monitoring accuracy of the electronic communication power monitoring system as the experimental index, the method in this paper, the method in the literature [3], and the method in the literature [4] are used for experimental tests. The test results are shown in Table 6:

Table 5. The transmission rate of the system with 250 concurrent users (kpbs)

Number of experiments/time	Literature [3]	Literature [4]	The electroniccommunication power monitoring system designed this time
1	29.845	28.514	33.616
2	31.546	29.606	34.528
3	28.477	26.774	36.977
4	30.221	25.648	35.844
5	29.466	26.845	36.107
6	28.745	27.451	35.899
7	27.334	26.845	36.071
8	28.549	27.443	37.646
9	29.613	26.887	35.447
10	27.451	27.942	36.919
11	26.448	28.545	35.332
12	27.355	27.994	36.747
13	28.946	26.501	35.218
14	27.313	27.365	36.901
15	28.544	28.541	35.332

Table 6. Comparative experimental results of system monitoring accuracy

Number of experiments/time	Literature [3]	Literature [4]	The electroniccommunication power monitoring system designed this time
10	98%	85%	89%
20	97%	86%	89%
30	98%	85%	88%
40	99%	84%	87%
50	98%	86%	88%
60	97%	87%	89%
70	96%	86%	87%
80	98%	87%	87%
90	97%	86%	86%
100	99%	84%	88%

From the results shown in Table 6, it can be seen that the accuracy rate of the method in this paper is up to 98%, the accuracy rate of the method in the literature [3] is up to 87%, and the accuracy rate of the method in the literature [4] is up to 89%. It can be seen that the accuracy rate of the method in this paper is significantly higher than that of the method in the literature [3] and the method in the literature [4]. It shows that the method in this paper has good monitoring performance of the electronic communication power monitoring system. The technical level and application value of the method proposed in this paper are proved to be high.

5 Concluding Remarks

This paper studies and expounds the relevant theory and technology of data transmission using GPRS, and then analyzes the development status and characteristics of the electronic communication power supply monitoring system. On the basis of the data transmission design scheme, a communication protocol is formulated. In addition, the electronic communication power monitoring system function has been optimized. At the same time, a good client program has been developed and constructed, which makes the monitoring system interface good, easy to use, easy to maintain, and simple to expand, laying a good foundation for further development and improvement in the future.

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