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THE DESIGN OF FOREST FIRE ALARM SYSTEM POWERED BY SOLAR ENERGY

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Abstract
A set of forest fire prevention system using remote SMS alarm, which is based on GSM network solar energy intelligent power supply, is designed in this research. This system takes STC89S52 microcontroller as the control core, and it is mainly composed of GSM module, photosensitive resistance sensor module, temperature sensor module, solar power supply module. Furthermore, it has the function of SMS alarm and warning in case of open fire. A photosensitive resistance sensor is applied to distinguish light conditions. Solar panels are used for power supply when there is sufficient light, and batteries are used for power supply when there is insufficient or no light, so as to achieve the purpose of continuous power supply. In addition, A DS18b20 temperature sensor is used to detect the surrounding temperature. When the temperature exceeds the setting value, STC89S52 MCU will send instructions to the GSM module, and then, the GSM module will send an alarm notice to the terminal in the form of SMS. In this way, when the forest is on fire, the possibility of timely treatment will be greatly increased. Using this system to monitor the occurrence of forest fires in real time can reduce the energy invested by human, so as to achieve unsupervised in forest fire prevention and protection. At the same time, the modular alarm system is easier to maintain and overhaul, as long as the irregular inspection and maintenance of the alarm system in the forest. The solar energy intelligent power supply system is used in this design, which conforms to the goals, such as sensitivity and convenience, energy saving, green environmental protection. The finished product has been tested, and the results show that it has good performance, so that it will be of great market value.
Keywords: STC89S52 MCU; Data wireless transmission; GSM module; Solar power supply system.

1. RESEARCH INTRODUCTION

Developing the science and technology of forest fire prevention is the key to prevent and control forest fires and minimize the losses in fires. China's forest fire prevention work should be in accordance with the general requirements of the outline of forestry construction and development, and also should be based on China's national conditions and the actual situation of the forestry industry, to continue to earnestly implement the policy of "prevention first and active elimination". In the future, we must constantly increase the proportion of science and technology in the forest fire prevention work, and continue to make efforts to carry out scientific research on fire weather and fire situation. It's necessary to strengthen the efforts of forest fire communication, aircraft fire fighting and chemical firefighting, so is to enhance the construction of professional firefighting teams of the forest police force, and gradually make our country's forest fire prevention work to be scientific and modern. On the basis of constantly improving the comprehensive ability of fire prevention and fighting, we hope to gradually achieve effective control of forest fires.

2. DESIGN SCHEME

The system can be divided into several basic modules, and the overall scheme diagram of the system is shown in **Fig 1**:

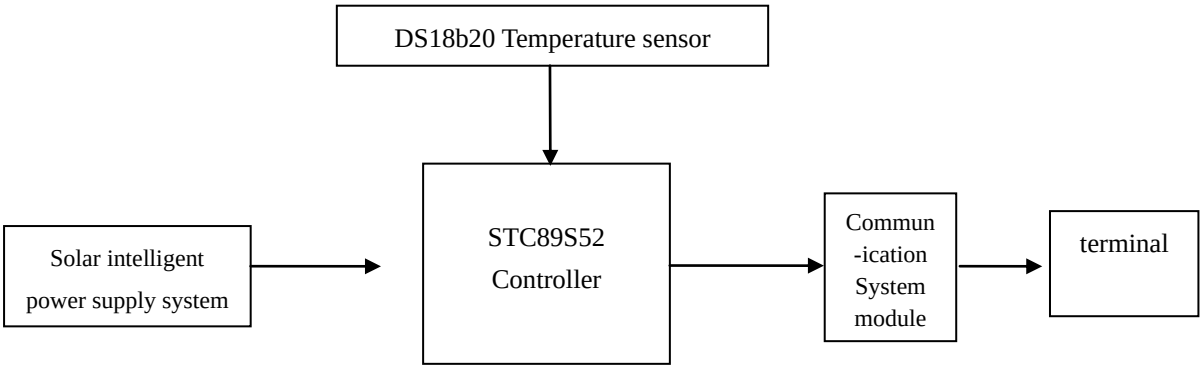

Fig 1. The overall scheme diagram of the system

Because the device needs to be placed in the forest, the staff will not be able to analyze the data generated by the whole system in real time, and the device provides the staff with the required data by SMS through the GSM network, so as to achieve the purpose of receiving management data remotely. This design adopts the T35IGSM module of Siemens, which adopts two modes of work and sleep. When a fire occurs, it will be awakened by STC89S52
single-chip microcomputer and send alarm information to the terminal. This mode can greatly reduce the pressure of the power supply system, reduce power consumption and save energy, which is beneficial to use in the unattended field conditions.
Physical picture of the system is shown in **Fig 2**:

Fig 2. System physical diagram

The prototype proposed in this paper has the following advantages:
(1) wear resistance, small size, easy to use, various forms of packaging, suitable for a variety of small space;
(2) Low power consumption, long life, easy recovery, no pollution;
(3) low cost, strong practicability, easy to promote, real-time alarm function.

3. CONCLUSION

This work is a set of intelligent forest fire microcomputer as the control core to build. Light signals are converted into electrical signals through the photosensitive resistance, and electrical signals are transmitted to the single-chip microcomputer. Then the single-chip microcomputer analyse and temperature controller DS18b20 and GSM communication module process the signals. Based on these complete and reliable hardware design, the use of a unique software algorithm achieves the accurate control of the forest fire prevention intelligent alarm system.

4. ACKNOWLEDGEMENT

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