Design of Track and Field Stopwatch Timing System Based on Serial Communication Software

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Abstract. At a time when all kinds of education are progressing in the direction of modernization and informatization, physical education has gradually begun to use informatization to make physical training more scientific. With the ability to transmit a lot of wireless data, a lot of communication software will also have dramatic changes. The track and field stopwatch lower computer part of the serial communication software and the desktop software upper computer part can be built into a complete set of timing systems. Come as a good helper for timing. Such systems can play an important role in physical education. The track and field stopwatch timing system based on serial communication software uses the technology of wireless transmission module to realize the connection with the communication software and realize the communication of data. The situation is sorted out, and then the communication data is realized through the software interface, and it can also be displayed to the public through the big screen, store the data of the game, analyze it, and provide the corresponding game data and performance statistics. The track and field stopwatch timing system can provide scientific reference for competitors and students in track and field competitions and track and field training, so as to improve the speed of track and field sports.

Keywords: serial communication · Interface design · UTC1212 · Visual C++

1 Introduction

According to the development of modern society, a lot of people are more and more like and pay attention to sports, especially the increasing number of competitive events, accurate and detailed record of standard competition results can be recognized by people. Also because today's people in addition to work or home, there is no exercise, which will affect people's physical and mental health, so more and more people will pay attention to sports. In sports activities, the larger the game timing devices are expensive relative to the budget, and that kind of equipment are basically adopts advanced technology and complicated process of installation, can't meet the demand of temporary game, cannot achieve the function of fast and convenient, but also cannot achieve the function of automation, It will also require a lot of manpower and material resources to carry out the work, which will also lead to the poor state of the competition and the result of the race

V. Balakrishnan et al. (Eds.): ICMEIM 2022, AHSSEH 6, pp. 635–640, 2022.
https://doi.org/10.2991/978-94-6463-044-2_81

timing error. Therefore, under such circumstances, it is necessary to design and explore how to design a track and field stopwatch timing system based on serial communication with strong function, high reliability, accurate timing and strong intelligence to carry out the competition [1].

2 System Design Scheme

The whole complete system is composed of single chip microcomputer data acquisition, wireless data transmission module, computer software, three functions are playing their own functions, to achieve the communication between the single chip microcomputer and computer technology, but also played a link role. These three functions have the use of serial communication mode, can unify the realization of the auxiliary role of the system [2]. This is shown in Fig. 1.

2.1 Microcontroller End

The equipment at the lower end of the machine is a relatively prominent STC12C5A60S2 microcontroller, which is equipped with high speed and low energy consumption, as well as a machine that is not interfered by external things [3]. It is more than the traditional machine has a high speed, and compared with the previous speed increased by 8~12 times. According to the operation of the machine steps, the first is to improve the chip inside and outside of the microcontroller, and then include some auxiliary devices with strong configuration and initialization of UTC1212 module, which can be used to transmit data, if not uploaded, it will appear in the microcontroller side for storage [4]. The operation flow of the monolithic end of the system is shown in Fig. 2.

2.2 UTC1212 Wireless Data Transmission Module

UTC1212 module is able to have a high level of integration and remote transmission module, a strong transfer function and time consuming rate is low and so on merits, in the middle of the module can provide a number of channels to choose, can achieve the serial port baud rate and modify the function of various parameters under normal

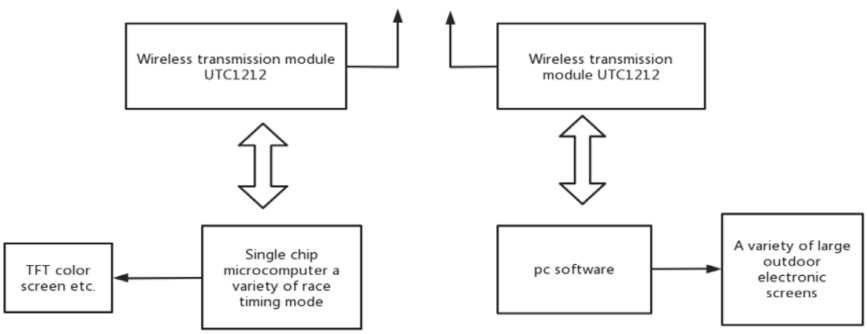

Fig. 1. Structure diagram of the system (self-painted)

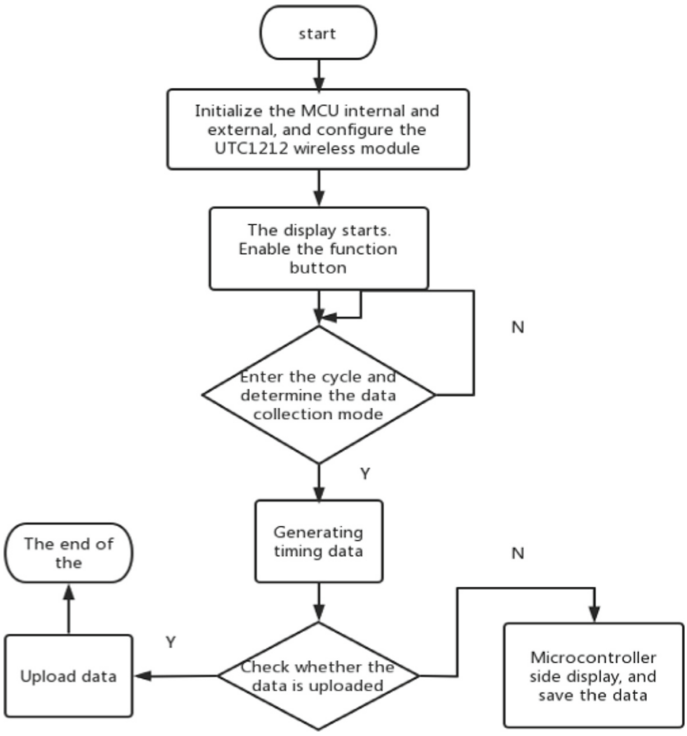

Fig. 2. The flow chart of the monolithic end of the system (self-painted)

Table 1. Connection diagram between UTC1212 module and STC12C5A60S2

STC12C5A60S2 serial port	GND	GND	UTC1212 Wireless module
	VCC	VCC	
	GPIO	SET-A	
	TXD	RXD	
	RXD	TXD	
	EINI	AUX	
	GPIO	SET-A	

working process, is a wireless module and MCU can be connected to circuit diagram, Connected between the TXD module and RXD module, the wireless module can work out of control [5]. This is shown in Table 1.

2.3 Computer Side

The desktop software designed based on MSComm serial communication can realize the corresponding control of the lower computer, and also can specify some instructions,

including the timing mode of the single chip microcomputer work and competition, etc. [6]. Receiving the data taught by the lower computer and the corresponding format are recorded and saved by details. These data can receive data such as the race and the number of laps in the race. Therefore, there will also be the interface of the game results to save [7].

3 Formulation of Serial Communication Protocol

Serial communication has the advantages of function conducive to system perfection, can have the advantages of simple development, easy to get started, strong confidentiality and so on [8]. At the same time in the upper and lower computer data exchange, can realize the programming of serial communication, it is not only can have a role in providing simple communication functions, but also has a very advanced communication tools for the creation of perfect functions. Through the API function of Windows, you can realize the custom function for users. Its disadvantage is that it will be more complex to write programs, and also need to have a certain understanding of the function of serial communication. At the same time, serial communication in VC++ 6.0 also has the key technology of implementation, such as the operation under MSComm, and the preparation of message processing, by the implementation of serial data to format processing, can also be displayed in the data editing box, matching and processing the received data.

There are several steps to add a background color to the Tab control:

A. Change the property value to true in the control's Style.

B. Then create a new class called CMyTabCtrl.

C. Create a DrawItem function of a class, and modify TAB characters and backgrounds in the DrawItem function. To change the font size, add the following code to the OnInitDialog () function of the main dialog box.

D. Add a function to the main speaker box to improve the font.

Add the following generation to the OnInitDialog () function of the main dialog Code, the font size can be changed.

```
my
CreatePointFont (300, _ T (" Arial "),
NULL);
my

_
SetFont (&my _ font, true);
my

_
SetFont (&my _ font, true);
```

4 Conclusion

In the design of track and field stopwatch timing system based on serial communication, a timer is used for remote operation and acquisition. After the unified experiment, the whole system can be stable and accurate, and the data collection will show that the operation is normal, which makes up for the shortcomings of the timing system, such as the connection and high manpower and material resources input and low automation. Therefore, the design in this system is relatively simple, its operation can also be strong, further can help the process of sports events better record, help sports competitive activities to further development. At the same time, in the design of the system has a high practical value, but in the system software interface, still need to be further improved, further optimization, can achieve the best interaction, can promote the role of serial communication.

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