

The application of data buffer in an electronic experiment system

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Abstract: The study included for the innovative design of the image electronics course teaching experiment device, object oriented higher vocational college, school teachers and students. The results of the project to take a most intuitive and the most feasible way to replace the existing teaching equipment. It can be used at any time, and can meet the requirements of the students autonomous experiment after class. At the same time, the working mode of data buffering and the method of using the experimental program in the functional area are described, the experimental parameters of the circuit experimental system meet the design requirements after circuit tested.

1. Introduction

At present, most of the experimental equipment used in the teaching of image electronics courses are mainly two categories, One kind is the national each big teaching instrument company complete set of experiment table test equipment. Its large size, high cost, there are various types of instruments on the experimental stage, the experimental circuit is generally fixed, through the connection with a dedicated wire. Disadvantage is that the circuit can not be seen on the back of the device, easy to make students and beginners to understand the misunderstanding. The second category is to buy their own small desktop experimental device, the cost is low, but only a list of various types of experimental project process, there is no system of teaching methods to support. The significance and research value of this project lies in the knowledge points which are used in the electronic technology courses can be integrated with experimental project, for design an open experimental device with the improved teaching methods to achieve the best teaching effect.

2. Functional

FX-A full development board is composed of two major parts, which are software experimentation area and hardware experimentation area, cooperate With a variety of functional Modules and components to quickly develop a variety of applications. Experimental development board as shown in Figure 1 below.

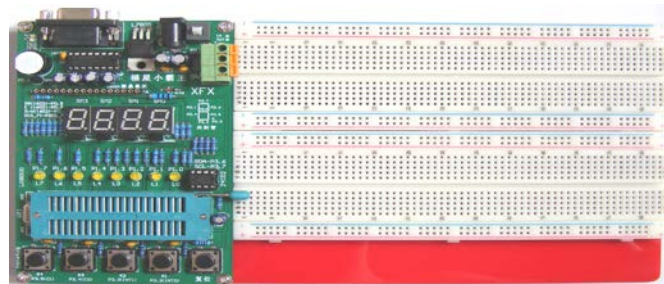


Fig. 1 FX-A full development board

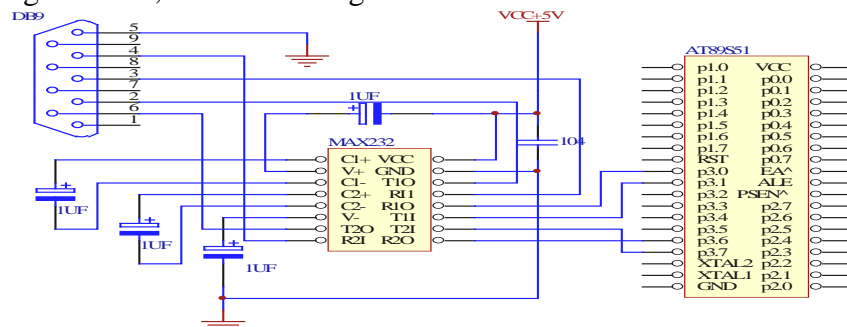
Development board adopt AT89S51 and AT89S52 as chip for experiment development. Two digital tube, eight light-emitting diodes (leds), four push button switch, a simple sound circuit, RS232 serial communication interface, serial memory, LCD display interface, etc were installed on the plate,

as shown in figure 2. This experiment board not only can detect water lights, buzzer, LED dynamic scanning, the interrupt, counters, such as basic programming practice, but also can learn the I2C serial communication interface with PC, LCD display, etc. At present more popular technology [1].

At the same time, more convenient for beginners to understand the controlled object, in the experimental plate screen printing are marked on the surface of each control point of pin symbol, user-friendly rapid development on the experiment board control program.

3. Performance

Development board software experimentation area is based on the students to learn microcontroller technology experimental requirements to develop a multi-function circuit board, able to complete as many as more than ten kinds of experiments and portfolio projects. And have ISP online programming function, as shown in figure 2.



3.5 Serial interface

Serial communication function is often used in the application of single chip microcomputer, is the only channel experiment board and PC communication, need to debug the program through serial interface to download to experiment board, the running state of the board program and partial results are to be uploaded to the PC through serial interface. As shown in figure 2.

PC serial interface RS - 232, RS - 232 includes electric of a bitwise serial transmission and regulations of mechanical aspects. RS - 232 requirement about electric property, drives the output voltage is relative to the signal ground between 5 v to 15 v for logic 1 level, said mark state; Relative to the output voltage signal ground between + 5 v ~ + 15 v for logic 0 level, said the empty state. At the receiving end, logic level 1 to 3 v to 15 v, logic 0 to + 3 v ~ + 15 v, which allows the sender to the receiver has 2 v voltage drop. The RS - 232 level and TTL logic circuit (single-chip microcomputer) level is different, therefore, between PC and single chip microcomputer 89 s51 must pass a certain circuit switching logic level[5].

In direct communication with PC and single chip microcomputer, a selection of PC side 9-pin serial interface, so the RS - 232 only just need to a few lines to work normally. TXD/RXD are a pair of cable ,TXD for sending data output, RXD for receiving data input, when PC and single chip microcomputer in full-duplex mode directly communication, the two wires should be cross connection on both sides. There are more than these three lines (TXD, RXD and signal ground), single-chip microcomputer and PC can be respectively for asynchronous communication circuit chip programming, set to do not need any contact or handshake signal, direct way for data exchange.

The second function of the main chip of the P3 port pins P3.0, P3.1 is serial port RXD and TXD, its internal serial interface circuit with asynchronous communication function. Use MAX232 chip, MCU TTL level conversion required by RS232 level and RS232 level translation for TTL level, there have a charge pump inside the chip , as long as the single 5V power supply can be generated by high voltage, the use is very convenient, chip peripheral circuit is simple, four 1 micro method of capacitors can be.

3.6 Key input

Main chip P3.2 - P3.5 took four push button switch, the experimental plate in order to consider the anti-jamming, the input pin and appropriate pull-up resistor ,as shown in figure 3.

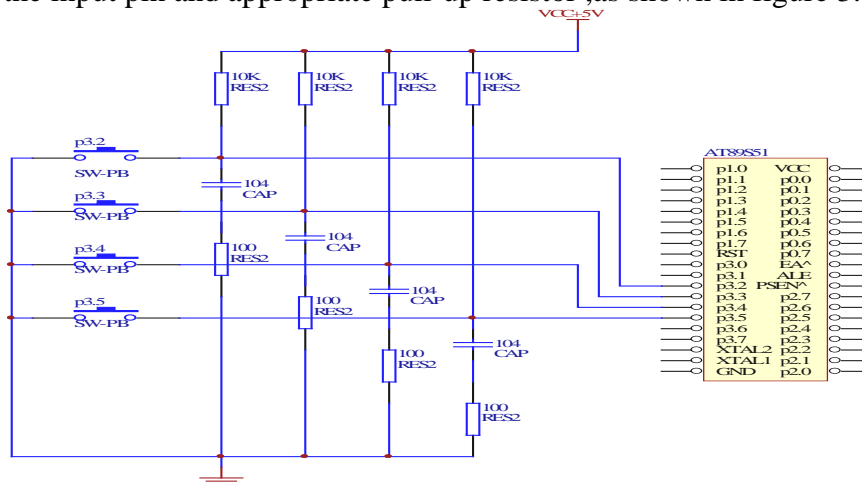


Fig. 3 The key input module

3.7 Conventional operating area

Read device:the user can read information from the chip without encryption or encryption, convenient to view the program in the chip, the error location.

3.8 Data buffer

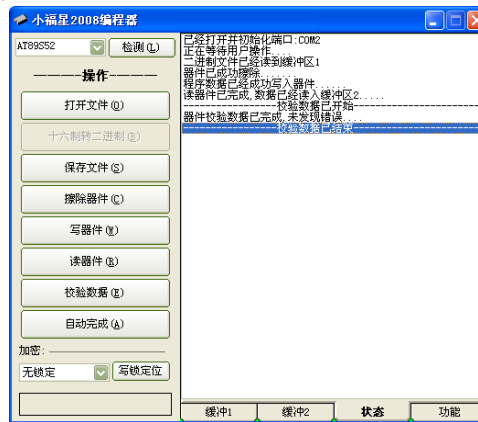
It is convenient for users to view the intermediate data, check the places where the program reports

errors, and locate the errors of the program.



3.9 The operation status area displays the actions and results that the user is operating.

At the same time, it is convenient for the user to see where the error occurs, so that the user can check the problem specifically.

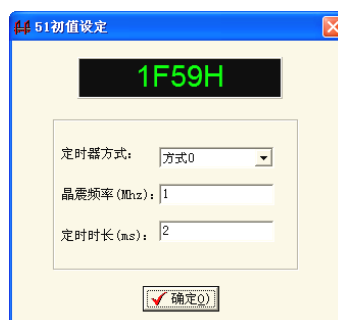


3.10 In order to make the function area easy for users to use

A matching experimental program is specially added. Users only need to select the corresponding experiment, and then the corresponding program can be transferred into the software and then burned into the chip. In addition, in order to facilitate users to use commonly used software, special added some software. Experimental procedures: including 12 experimental procedures and seven items of procedures, convenient for users to use.



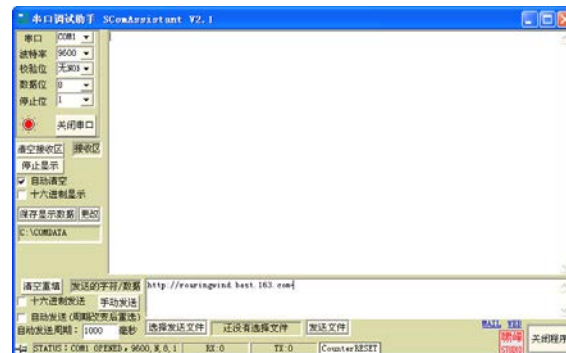
Timer calculator



Baud rate calculator



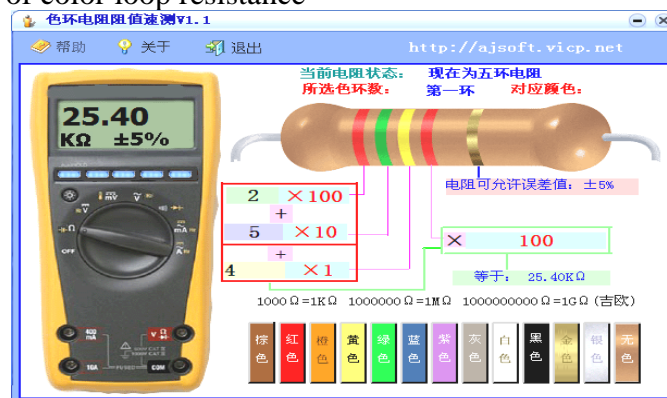
COMPort Debugger



Digital tube encoder



Quick measurement of color loop resistance



Step motor calculation table

