Lab Report

School of Manufacturing Science and Engineering

Course Name		**Microcontroller: Principles and Interfacing Technology**					
Name of the Experiment		**Learn to use the hardware and software of the development platform**					
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Date		**2016.9.28**		Location	**C204, Basic Teaching Building**		
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1. Experimental procedure

1.1 Installation of the software platform on lap-top

In order to utilize the development platform and use our lap-top to design all kinds of electronic circuits based on assembly language and test them on the platform, we first need to make the so-called 'connection' between our lap-top and the development platform. Fortunately, this kind of software has already been developed and is named Keil μvision and PZISP burning software. Among them, Keil is used to compile and simulate the programming of designer, so we may test our program first on this software platform. After that, the PZISP burning software would assist us in downloading the program and code into the hardware development platform. Through utilizing the microcontroller, all kinds of ports and devices on the platform can function properly. With the installation instruction given by our professor Yu, we successfully installed these two softwares on our lap-tops from the CD, finishing this first and probably most important step.

1.2 Installation of the USB to SERIAL driver of STC90C516RD

In the second step, we installed the USB to SERIAL driver of STC90C516RD on our lap-top. As is known, the mechanic language which could be recognized and executed on the 8051 microcontroller is different from our Windows Operation System on lap-top. After distracting the installation program from the CD, we set up that program and finished it installation. Then we can download our program from lap-top to the 8051 microcontroller from our USB port.

1.3 Connection of the experimental kit with lap-top

During the third step, we opened our development platform box and use the experimental kit in it to connect the hardware with our lap-top USB ports. Since we have already installed the USE to SERIAL driver, our computer can recognize this kind of connection successfully.

1.4 Software setting of Keil µvision 4 and PZISP

In order to use Keil and PZISP altogether, we need to set several changes in these softwares, such as letting Keil create HEX file after compiling the ASM project. Only in this way can we use the PZISP to download that HEX file into our development platform to test the code function. Also we need to set the PZISP download chip type into STC905XX series, changing the baud rate to a more suitable amount and select downloading with low rate mode.

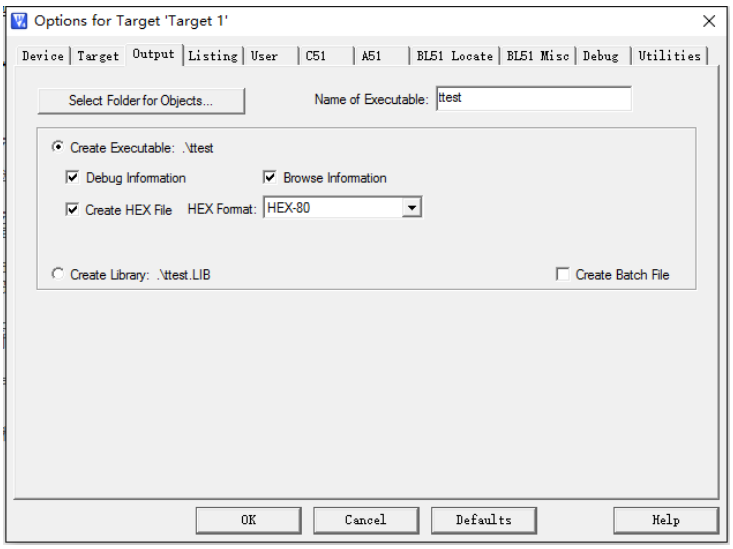

Fig. 1 Keil µvision 4 Setting of Creating HEX File

1.5 Use the hardware and software platform by a simple LED flash lab

(1) Create a project, add an assembly program in the project, debug the program, compile the program using Keil µvision

We created the project in the Keil, then we may add the ASM file in that project. After searching and adding the ASM file from our CD, we can see the program on our screen. With certain of its correction, we started the Debug Session function in Keil and simulated the function of this program in Keil. Then we just let Keil to compile the project and saved the HEX file into the certain path.

(2) Download the generated binary code to the experimental toolkit using PZISP

After creating HEX file, we connected our development platform with our computer, and used PZISP to recognize the serial number port. Then we used lines to connect our microcontroller to the LED device. After finishing it, we directed the PZISP to the path of HEX file created before and click the download button. Waited for a few seconds, we saw the LED flash function on the LED of our hardware platform.

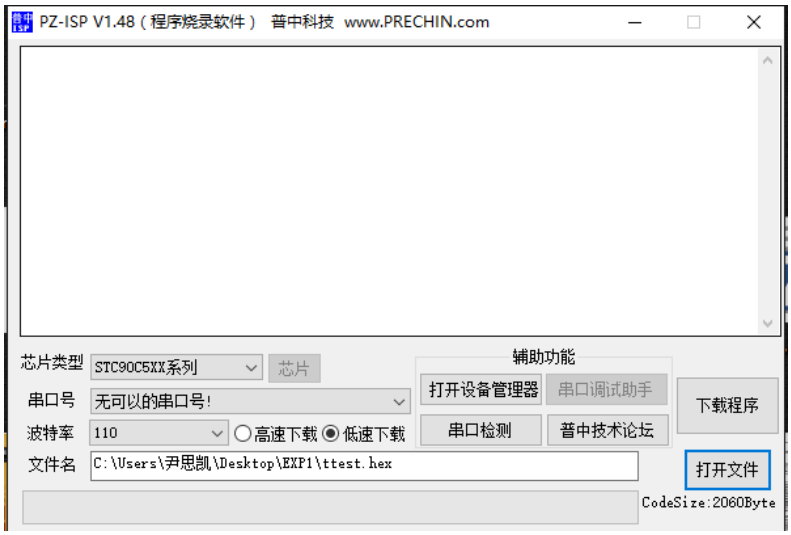

Fig. 2 The Download Process into the Experimental Toolkit Using PZISP

2. Experimental results

The image of LED flash was demonstrated through our development platform, shining one after another in the sequence, which was really beautiful.

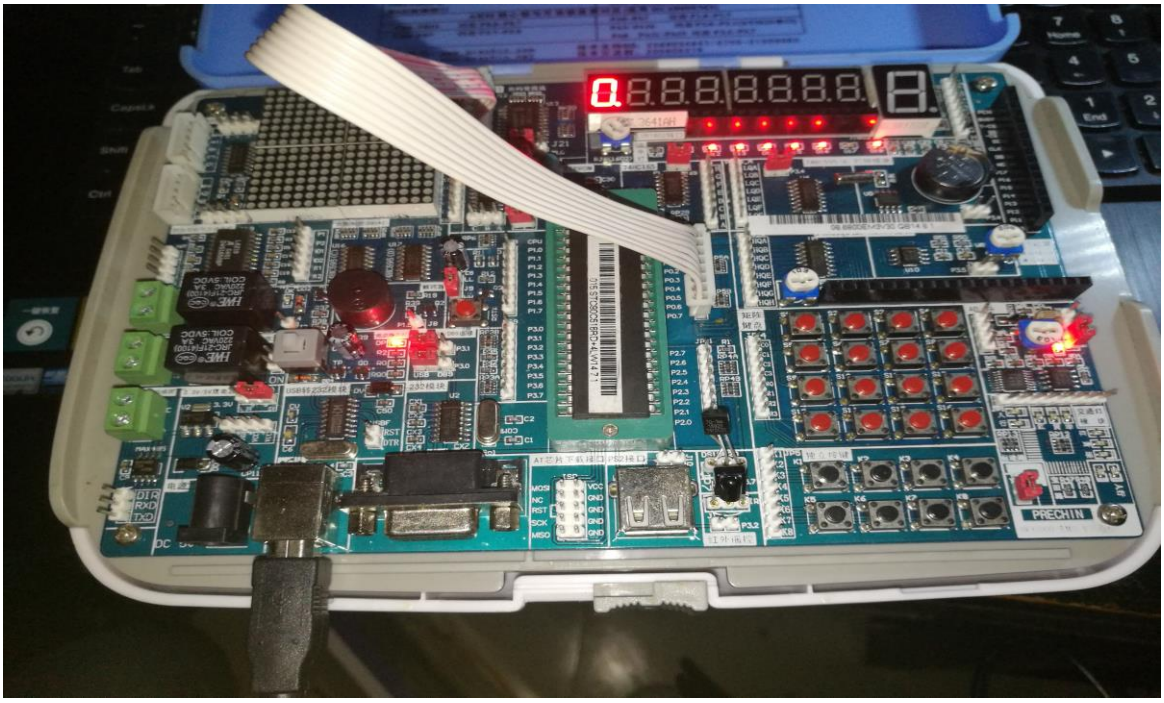

Fig. 3 The Demonstration of LED Flash Lights

3. Source code with comments(Assembly language and Chinese comments)

```
    org 0000h                ;程序从 0000 开始运行
    jmp init                 ;跳到主程序
init:
    mov     ie,#10000001b    ;中断使能
```

```
      mov       ip,#00000001b     ;中断优先
      mov       tcon,#0000000b    ;中断为电平触发
main:                             ;主程序循环点亮
      mov       P0,#00h           ;全亮
      lcall delay                 ;延时一段时间
      mov       a,#0feh           ;每次只亮一个灯。
loop:
      mov       P0,a              ;输出到 p1
      lcall delay                 ; 延时
      rl        a                 ;循环左移。
      ajmploop                    ; 跳转 main 继续循环

delay:
      mov       r5,#20            ;延时子程序 1 闪烁灯调用
d1:
      mov       r6,#20
d2:
      mov       r7,#250
      djnz      r7,$
      djnz      r6,d2
      djnz      r5,d1
      ret
end
```

4. Conclusions, suggestions and comments on the experiments

Through this interesting lab about LED flash, I got much more familiar with the 8051 microcontroller. Although we can see these lights everyday in our lives, today I understood it deeply of its control. The microcontroller is really significant in converting the program into the control signals to electronic devices and let them function as the designer wanted. The experiment greatly improved my hands-on ability and computer skills. More importantly, it greatly aroused my interest towards electronic circuits designing. I am sure I will study the course harder in order to learn the assembly language and structure of 8051 microcontroller to design the personal work of electronic circuits. I wish to accomplish more interesting and inspiring projects like this.As for the suggestions and comments on the experiments, I think we can prolong the time of experiment and test more ASM files on the CD. Also, there are many other devices including the STM32 microcontroller in the box, I hope we can learn them and grasp the ability of electronic circuit designing.

That is all the knowledge and ideas that I obtained through today's experiment, actually I can not wait for the next one. I will do more active individual learning and interdisciplinary studies based on my major afterwards with the platform and I hope I can get more interesting results. Also, I want to express my gratitude to our tutor for your patient guidance on this experiment. Thank you very much!