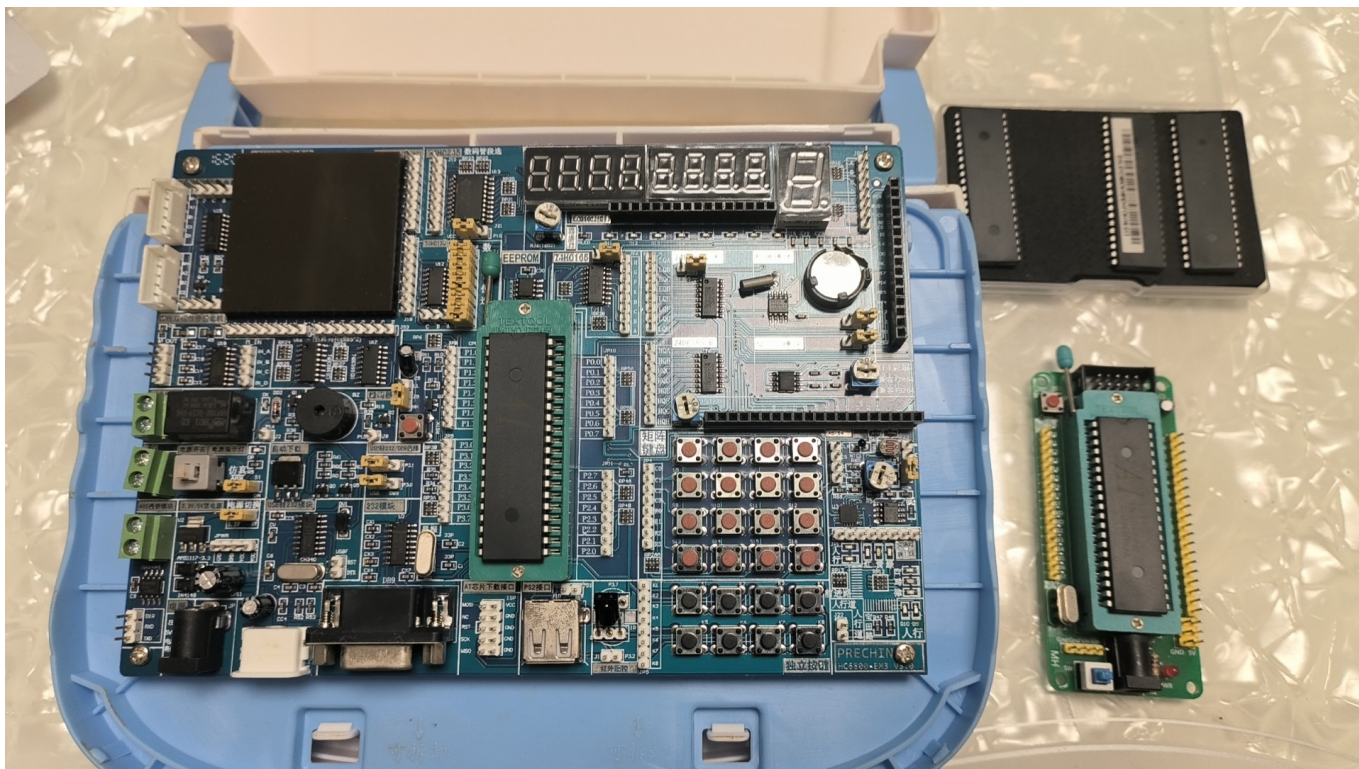


1 概述

使用普中51学习板重新学一遍Ai8051U记录

翻出吃灰N年的51开发板，换上STC&立创活动送的芯片，单车变摩托，借此机会重学一边记录下，温故而知新。



2 开发环境准备

2.1 工具和手册下载

[Alapp-ISP](#)

[库函数和中断修复工具](#)

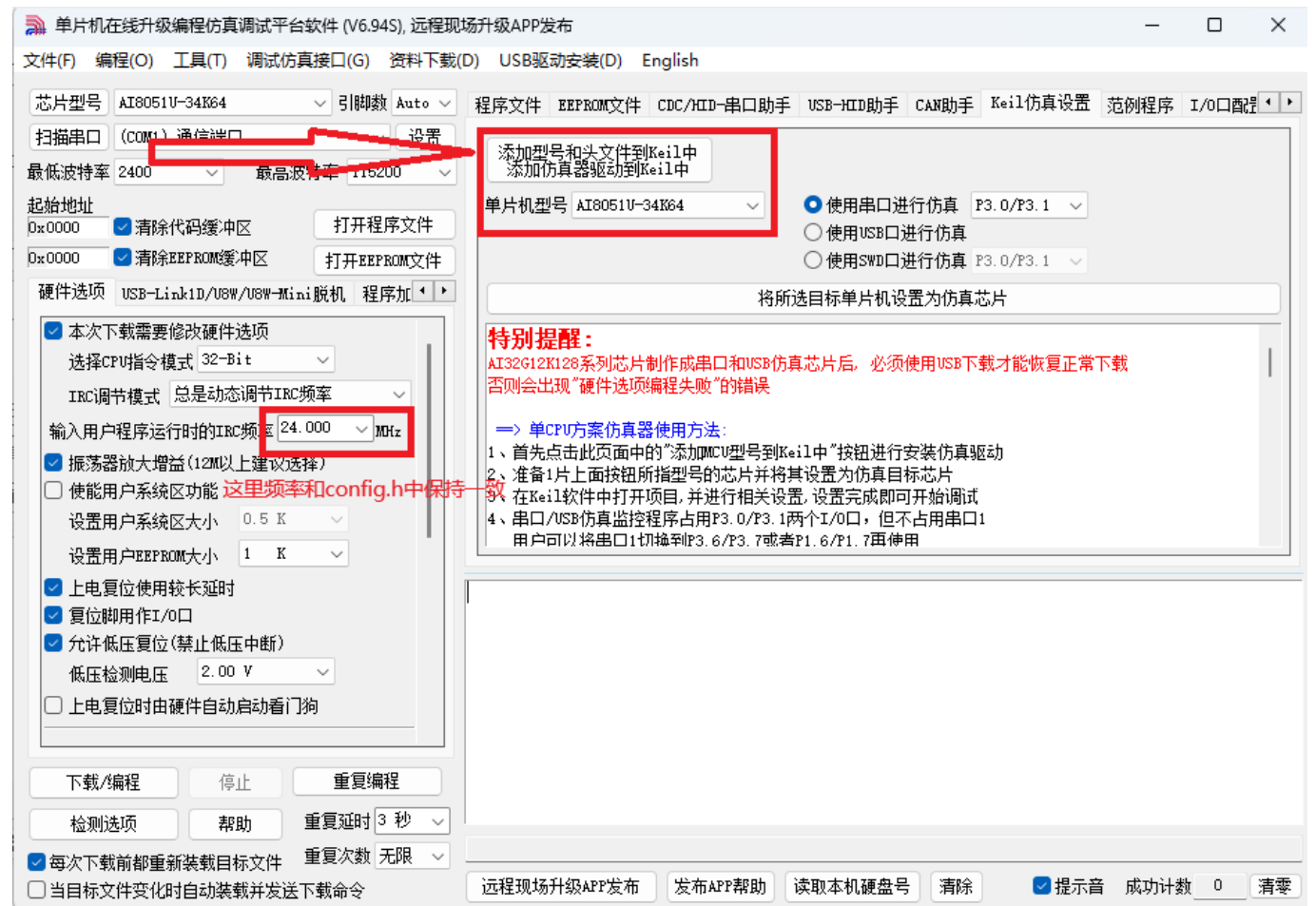
[Ai8051U手册](#)

[C251包下载](#)

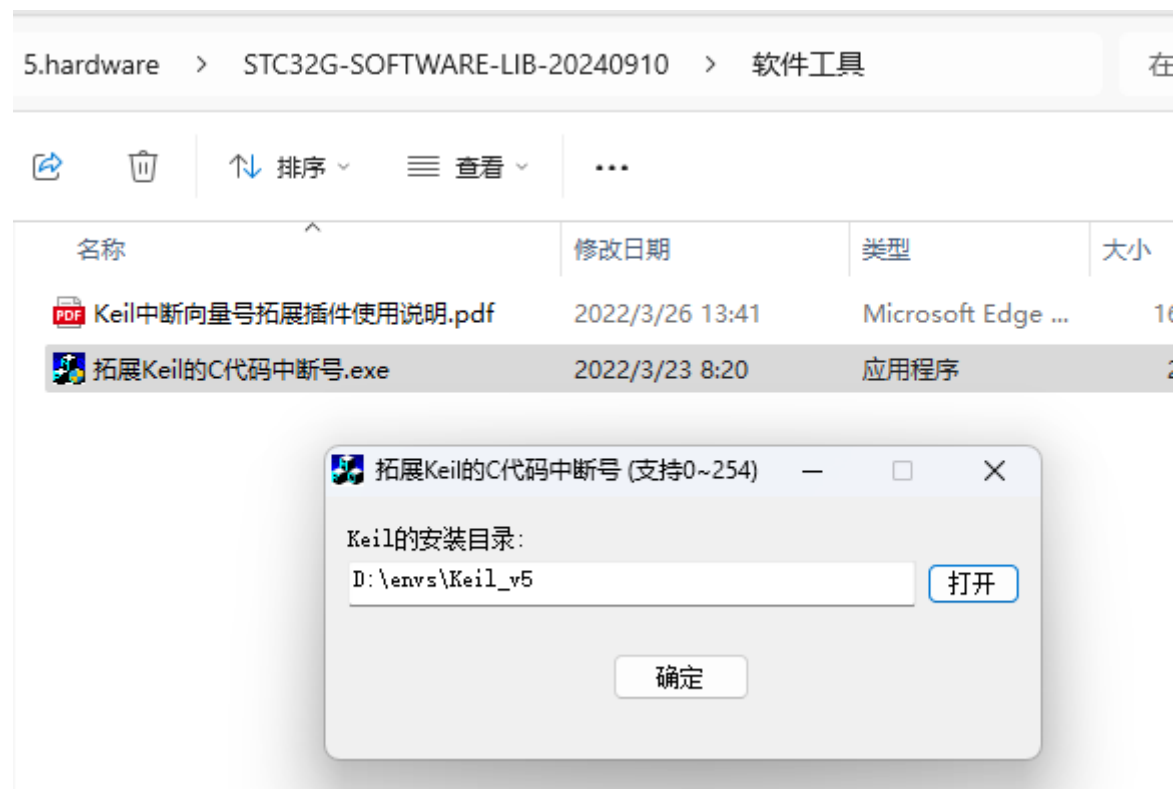
2.1 keil配置

参考官方手册(doc/Ai8051U.pdf)第六章

2.2 添加芯片头文件



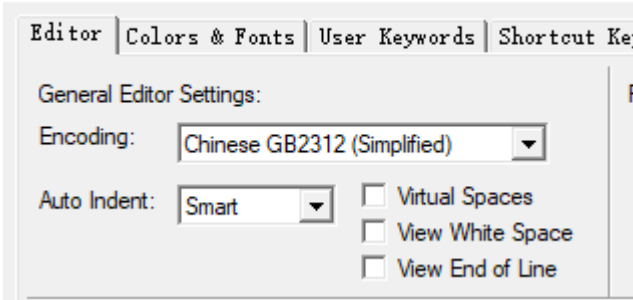
2.2 拓展Keil的C代码中断号



2.3 中文配置*

复制中文注释到keil中会乱码，配置gb2312编码格式解决。修改菜单栏 (Edit) - Configuration - Editor -

Configuration



Encoding 为 GB2312

2.4 Vscode配置

Vscode配合build脚本也可快速开发。

编码配置：在项目的根目录下创建一个 .vscode 文件夹，并在其中创建一个 settings.json 文件，添加以下配置：

```
{
  "[Markdown]": {
    "files.encoding": "utf8"
  },
  "[c]": {
    "files.encoding": "gb2312"
  },
  "[cpp]": {
    "files.encoding": "gb2312"
  }
}
```

3 测试工程使用方法

工程文件：STC-Ai8051U-Project\RVMDK\STC-Ai8051U.uvproj 所有实验实现代码在STC-Ai8051U-Project\App目录下。切换实验，主要涉及修改以下文件, 放开需要的注释，其余屏蔽即可

```
STC-Ai8051U-Project\App\src\APP.h
STC-Ai8051U-Project\User\Task.c
```

如图：

19

20 static TASK_COMPONENTS Task_Comps[]=

21 {

22 //状态 计数 周期 执行函数 初始化函数

23 {0, 250, 250, Test1_LightingUpFirstLED_run, Test1_LightingUpFirstLED_in

24 {0, 450, 450, Test2_BlinkingLED_run, Test2_BlinkingLED_init},

25 {0, 200, 200, Test3_LEDRunningLight_run, Test3_LEDRunningLight_init},

26 //{0, 250, 250, Test4_Buzzer_run, Test4_Buzzer_init},

27 //{0, 250, 250, Test5_Relay_run, Test5_Relay_init},

APP.c

Task.c

system_init.c

APP.h

16

17

18

19

20 #include "config.h"

21 #include "test1_LightingUpFirstLED.h"

22 #include "test2_BlinkingLED.h"

23 #include "test3_LEDRunningLight.h"

24 #include "test4_Buzzer.h"

25 #include "test5_Relay.h"

26 #include "test6_StaticSevenSegmentDisplay.h"

27 #include "test7_DynamicSevenSegmentDisplay.h"

28 #include "test8_IndependentKey.h"

29 #include "test9_MatrixKeypad.h"

30 #include "test10_MicrocontrollerIOExpansion_74HC165.h"

31 #include "test11_MicrocontrollerIOExpansion_74HC595.h"

32 #include "test12_LEDDotMatrix_LightingSinglePoint.h"

33 #include "test13_LEDDotMatrix_DisplayingChineseCharacters.h"

34 #include "test14_DCMotor.h"

35 #include "test15_StepperMotor.h"

36 #include "test16_ExternalInterrupt0.h"

4 实验目录

中文	英文
实验1:点亮第一个LED	test1_LightingUpFirstLED
实验2:LED闪烁	test2_BlinkingLED
实验3:LED流水灯	test3_LEDRunningLight
实验4:蜂鸣器	test4_Buzzer
实验5:继电器	test5_Relay
实验5:静态数码管显示	test6_StaticSevenSegmentDisplay
实验6:动态数码管显示	test7_DynamicSevenSegmentDisplay
实验7:独立按键	test8_IndependentKey
实验8:矩阵按键	test9_MatrixKeypad
实验9:单片机IO扩展-74HC165	test10_MicrocontrollerIOExpansion_74HC165
实验10:单片机IO扩展-74HC595	test11_MicrocontrollerIOExpansion_74HC595
实验11:LED点阵(点亮一个点)	test12_LEDDotMatrix_LightingSinglePoint
实验12:LED点阵(显示汉字)	test13_LEDDotMatrix_DisplayingChineseCharacters
实验13:直流电机	test14_DCMotor
实验14:步进电机	test15_StepperMotor
实验15:外部中断0	test16_ExternalInterrupt0

中文	英文
实验16:外部中断1	test17_ExternalInterrupt1
实验17:定时器0中断	test18_Timer0Interrupt
实验18:定时器1中断	test19_Timer1Interrupt
实验19:交通灯	test20_TrafficLight
实验20:NE555脉冲发生器	test21_NE555PulseGenerator
实验21:串口通信	test22_SerialCommunication
实验22:RS485通信	test23_RS485Communication
实验23:EEPROM-IIC	test24_EEPROM_I2C
实验24:DS18B20温度传感器	test25_DS18B20TemperatureSensor
实验25:DS1302时钟	test26_DS1302Clock
实验26:红外通信	test27_InfraredCommunication
实验27.1:AD模数转换-光敏电阻	test28_Photorresistor_ADC
实验27.2:AD模数转换-外部输入	test29_ExternalInput_ADC
实验27.3:AD模数转换-热敏电阻	test30_Thermistor_ADC
实验27.4:AD模数转换-电位器	test31_Potentiometer_ADC
实验28:DA数模转换	test32_DigitalToAnalogConversion_DAC
实验29:LCD1602液晶	test33_LCD1602Display
实验30.1:LCD12864液晶-刷屏	test34_LCD12864FloodTheScreen
实验30.2:LCD12864液晶-显示图片	test35_LCD12864DisplayShowImg
实验30.3:LCD12864液晶-显示文字	test36_LCD12864DisplayShowText
实验31:TFT彩屏	test37_TFTColorScreen
实验32:DS1302时钟LCD1602显示(可以按键设置时钟)	test38_DS1302ClockWithLCD1602Display
实验33:LCD1602滚动显示	test39_LCD1602ScrollDisplay
实验34:LCD1602显示红外值	test40_LCD1602DisplayInfraredValue
实验35:LCD1602显示矩阵按键键值	test41_LCD1602DisplayMatrixKeypadKeyValue
实验36:LCD显示温度+串口接收温度	test42_LCDDisplayTemperature_SerialPortReceiveTemperature
实验37:LED流水+定时器	test43_LEDRunningLight_Timer
实验38:按键控制蜂鸣器	test44_ButtonControlBuzzer
实验39:按键控制数码管	test45_ButtonControlSevenSegmentDisplay

中文	英文
实验40:定时器秒表 (查询方式)	test46_TimerStopwatch_PollingMethod
实验41:蜂鸣器音乐之八月桂花	test47_BuzzerMusic_AugustOsmanthus
实验42:矩阵按键数码管移位显示	test48_MatrixKeypadSevenSegmentDisplayShift
实验43:门铃设计	test49_DoorbellDesign
实验44:秒表	test50_Stopwatch
实验45:音乐播放器	test51_MusicPlayer

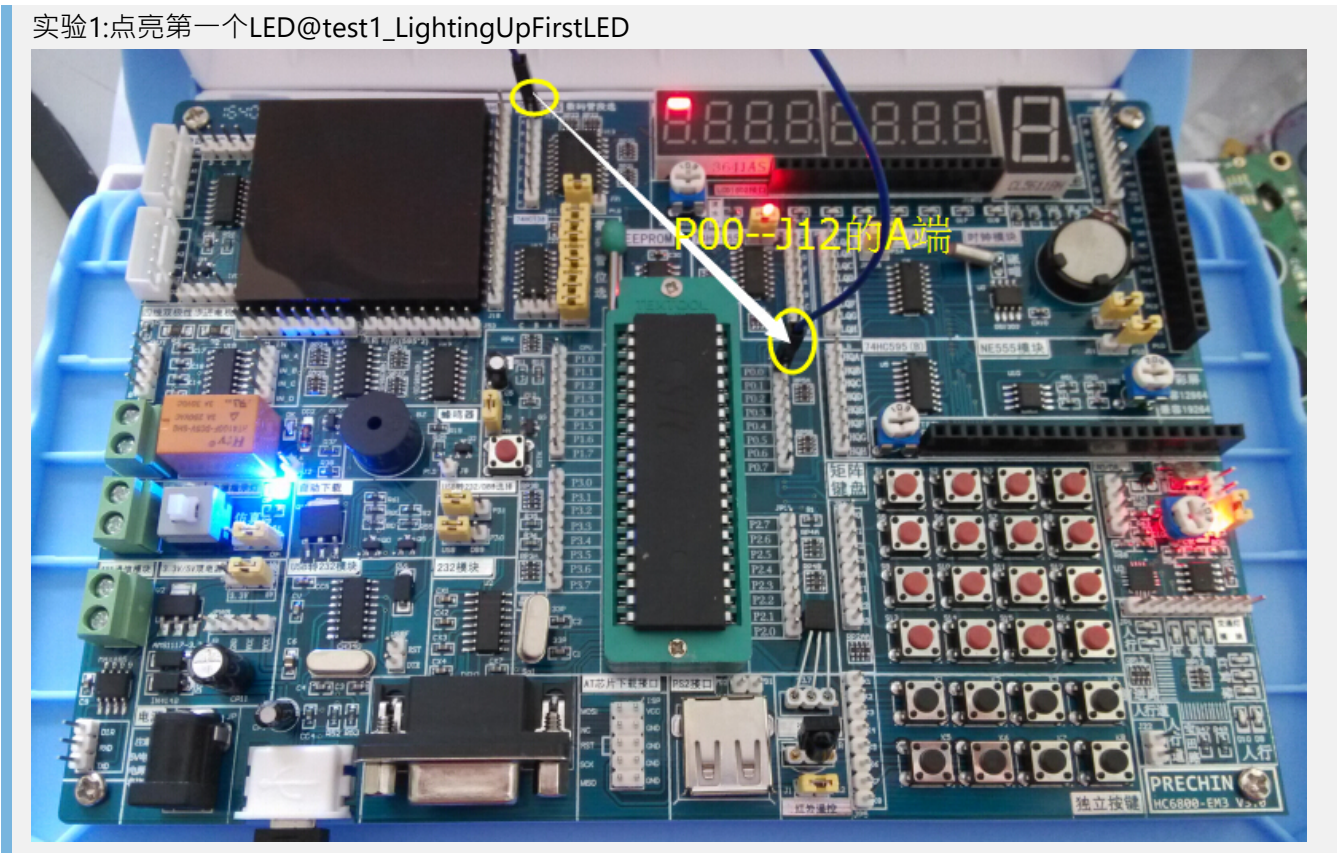
6 其它

学习板是HC6800-EM3 V3.0，这款貌似停产了，差异对比看doc/EM3_V3.0原理图.pdf

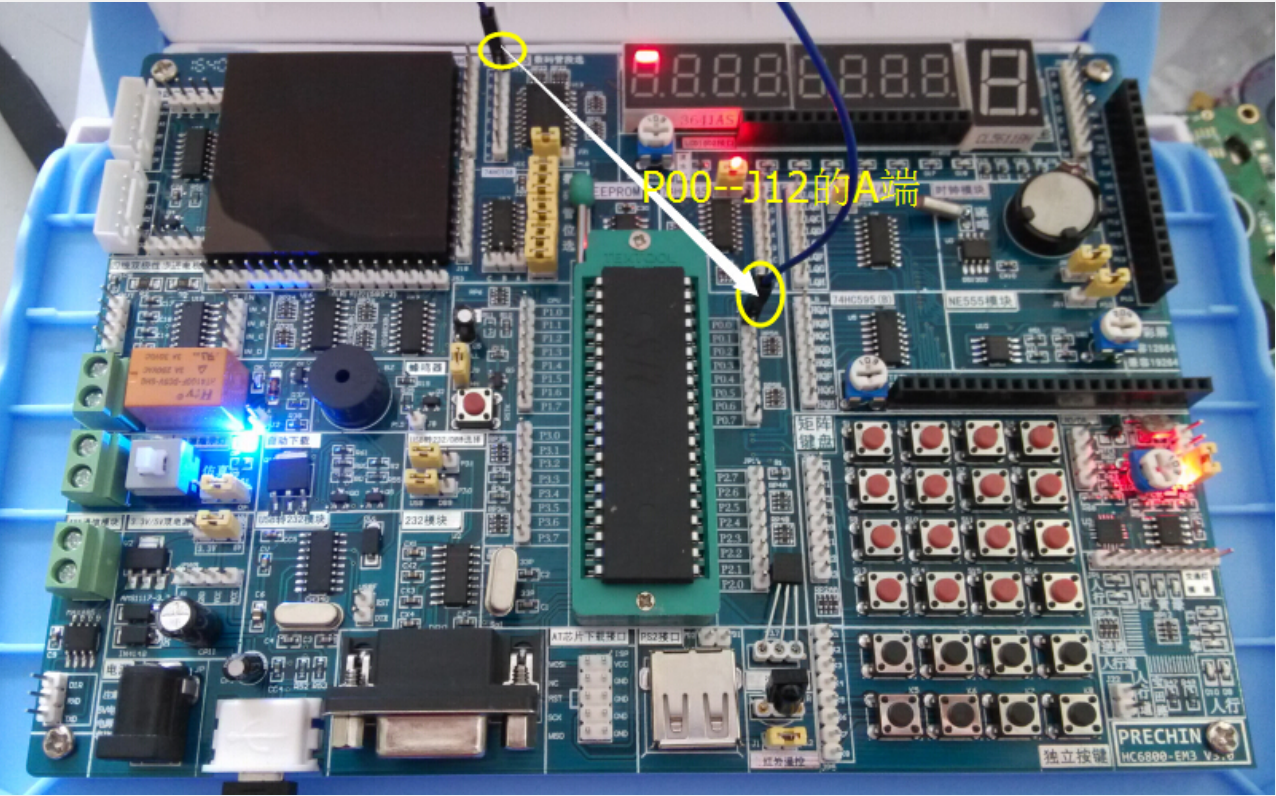
实验过程一些截图和视频参见论坛：[使用普中51学习板重新学一遍Ai8051U记录贴](#)

7 附录

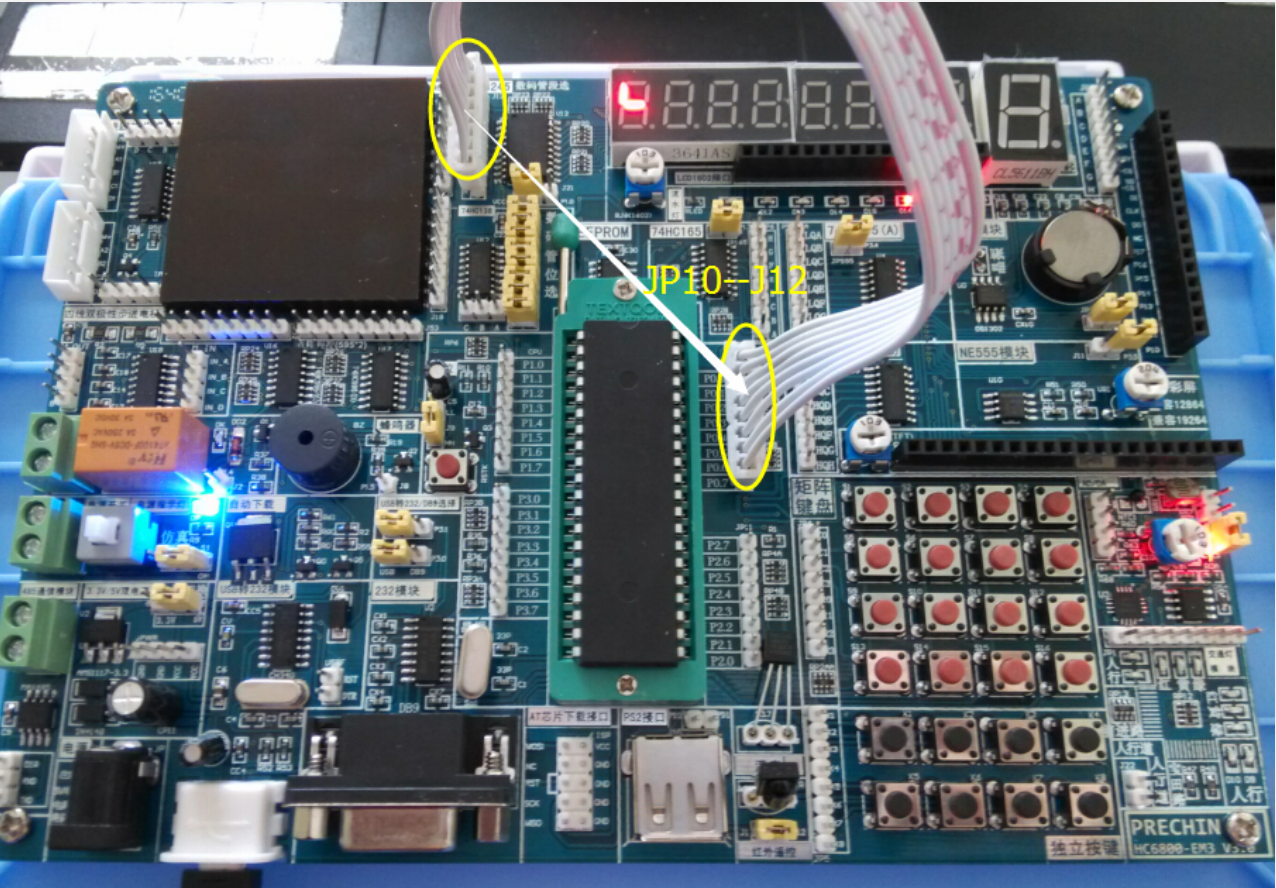
7.1 实验接线图



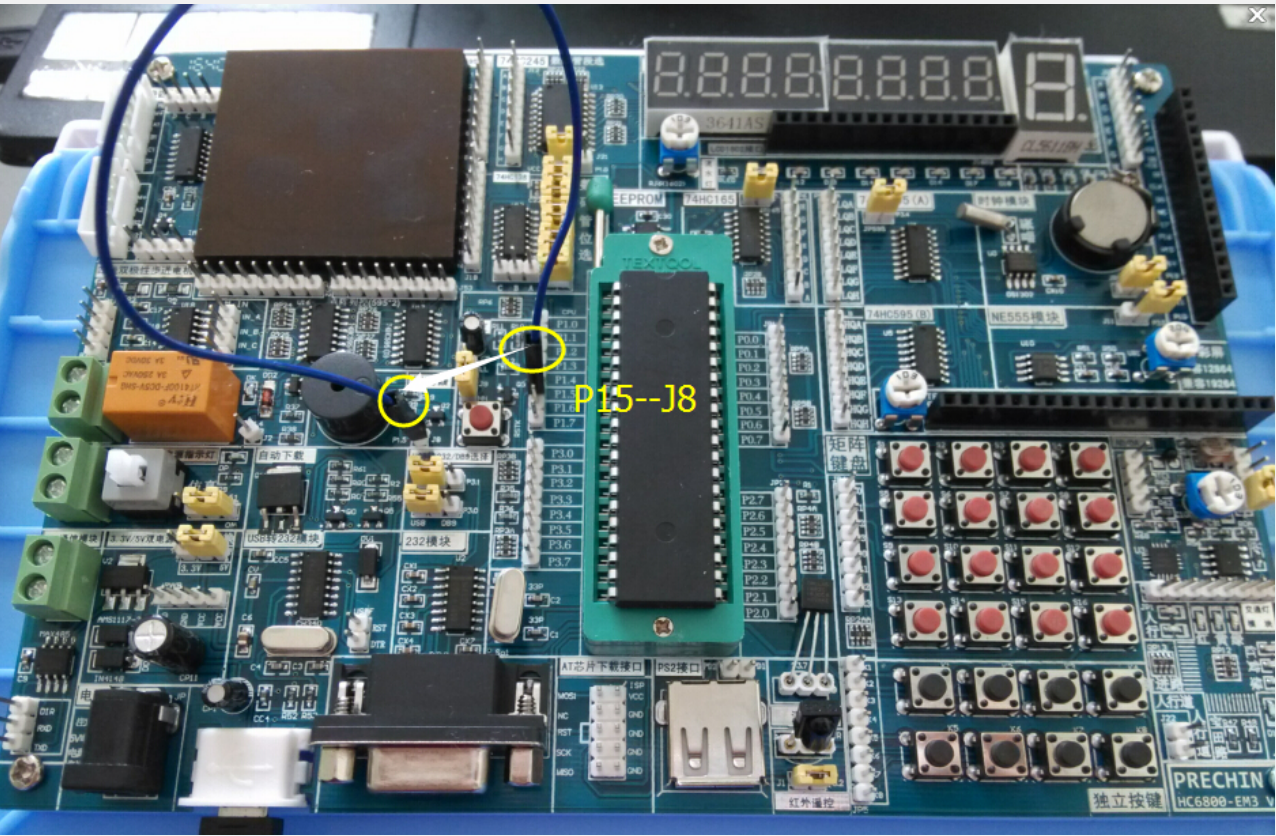
实验2:LED闪烁@test2_BlinkingLED



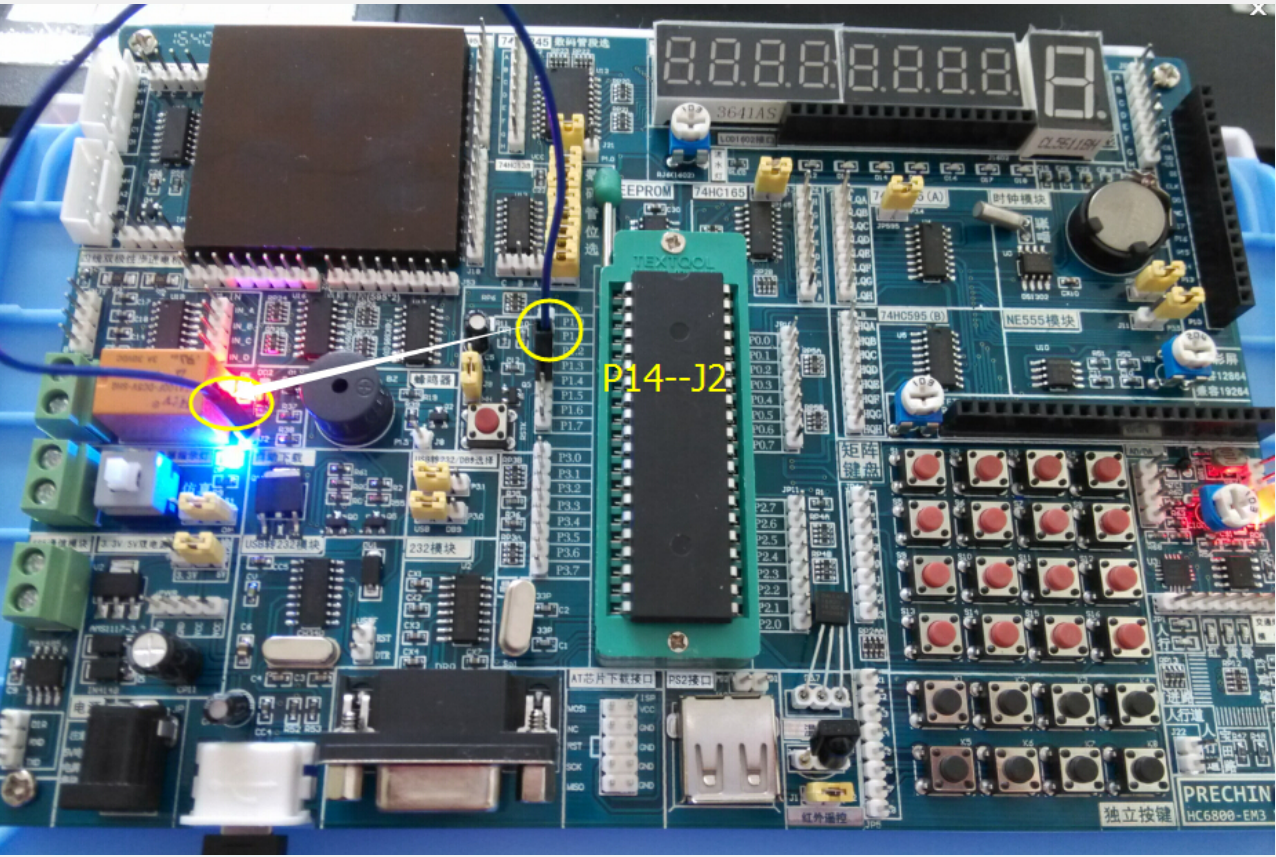
实验3:LED流水灯@test3_LEDRunningLight



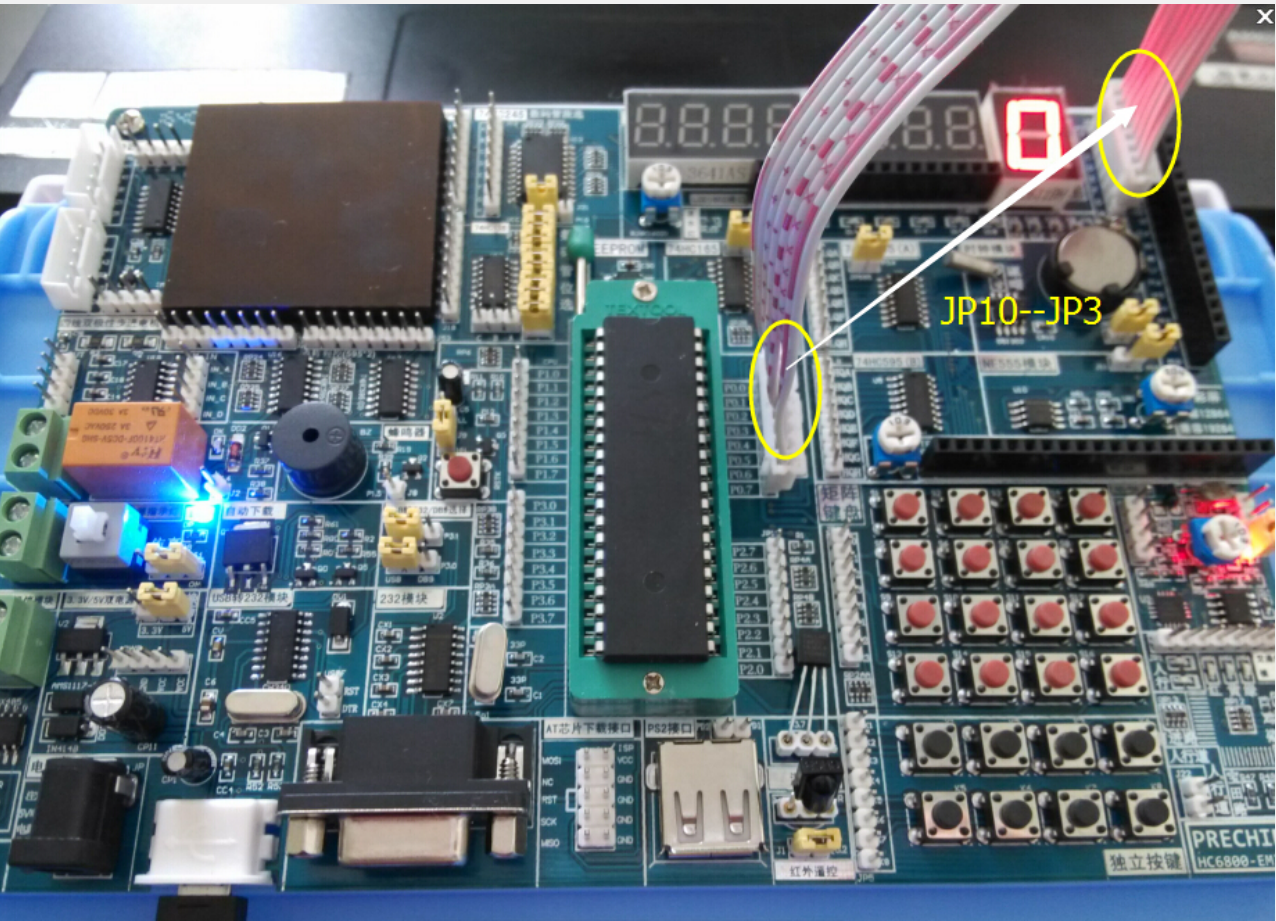
实验4:蜂鸣器@test4_Buzzer



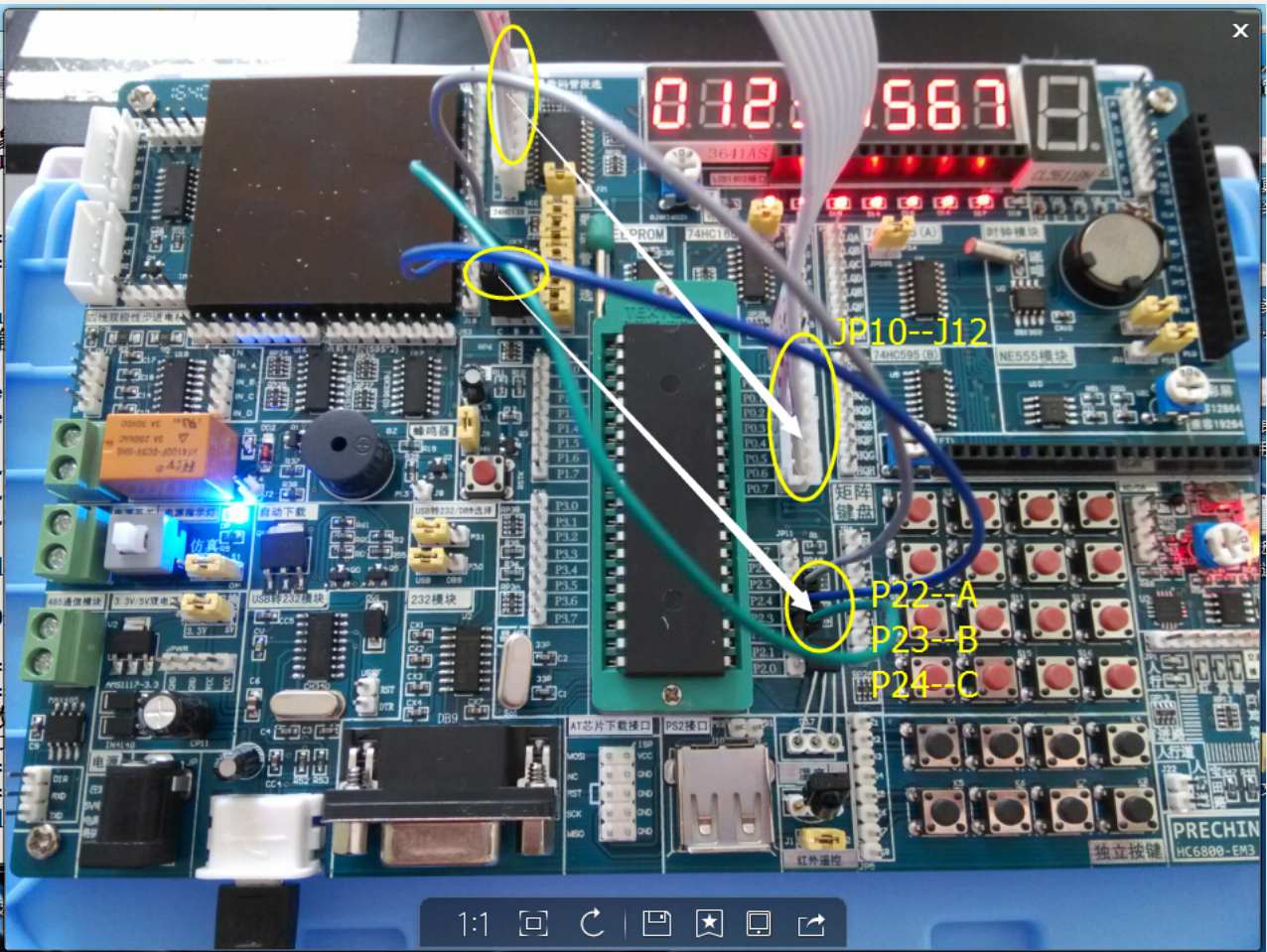
实验5:继电器@test5_Relay



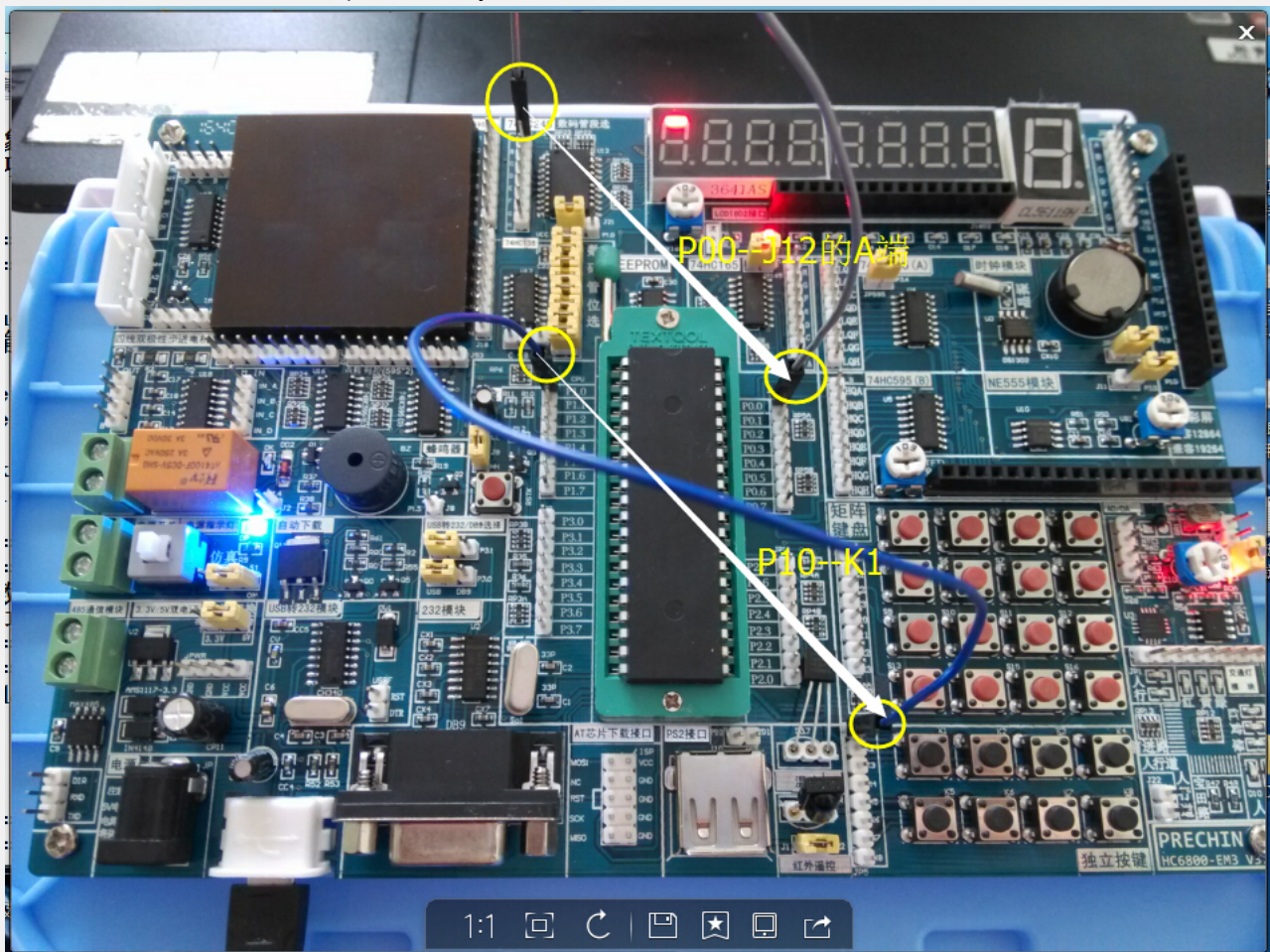
实验5:静态数码管显示@test6_StaticSevenSegmentDisplay



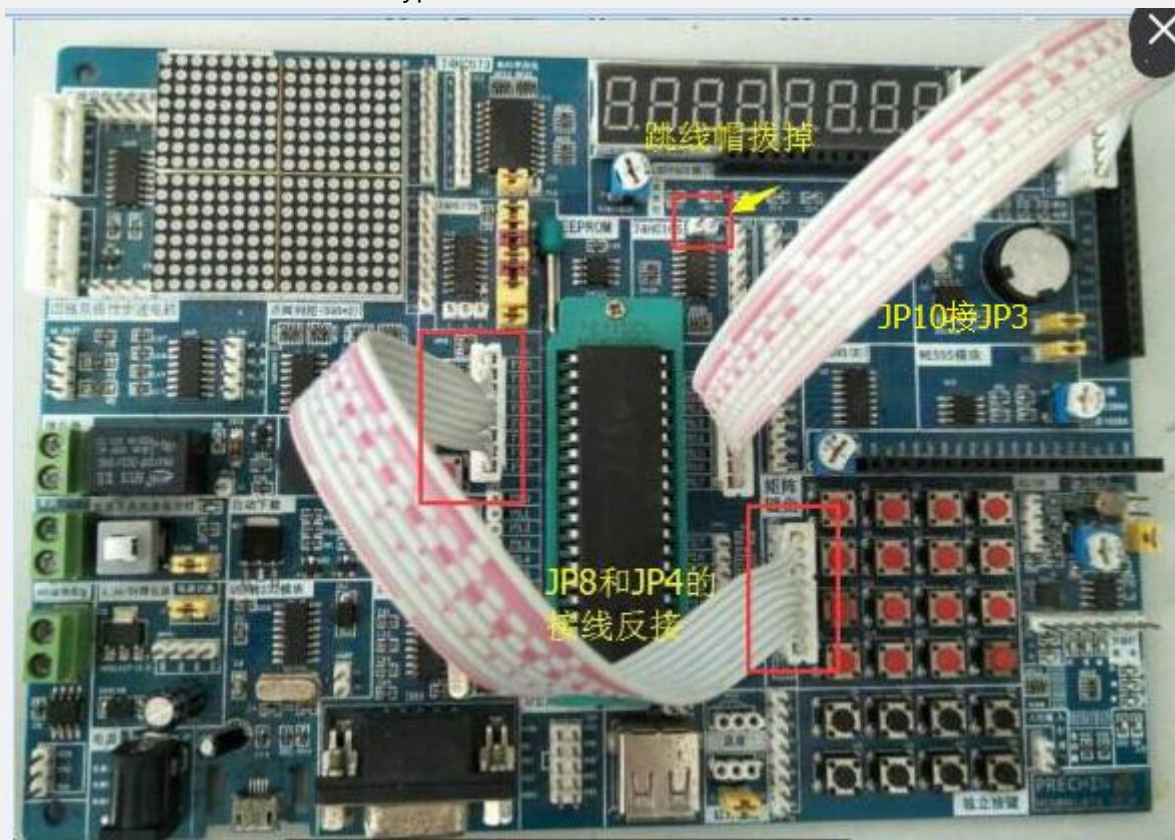
实验6:动态数码管显示@test7_DynamicSevenSegmentDisplay



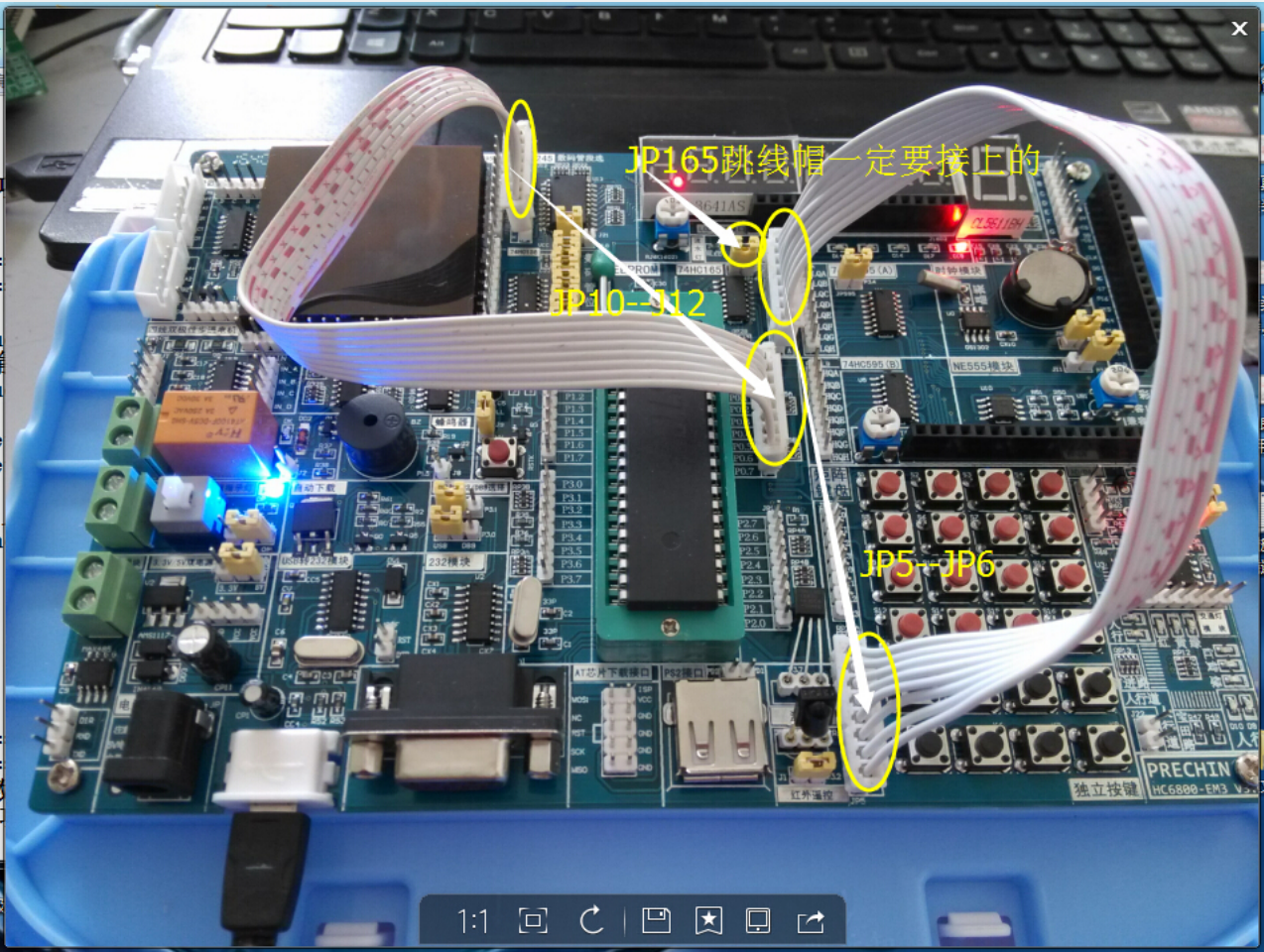
实验7:独立按键@test8_IndependentKey



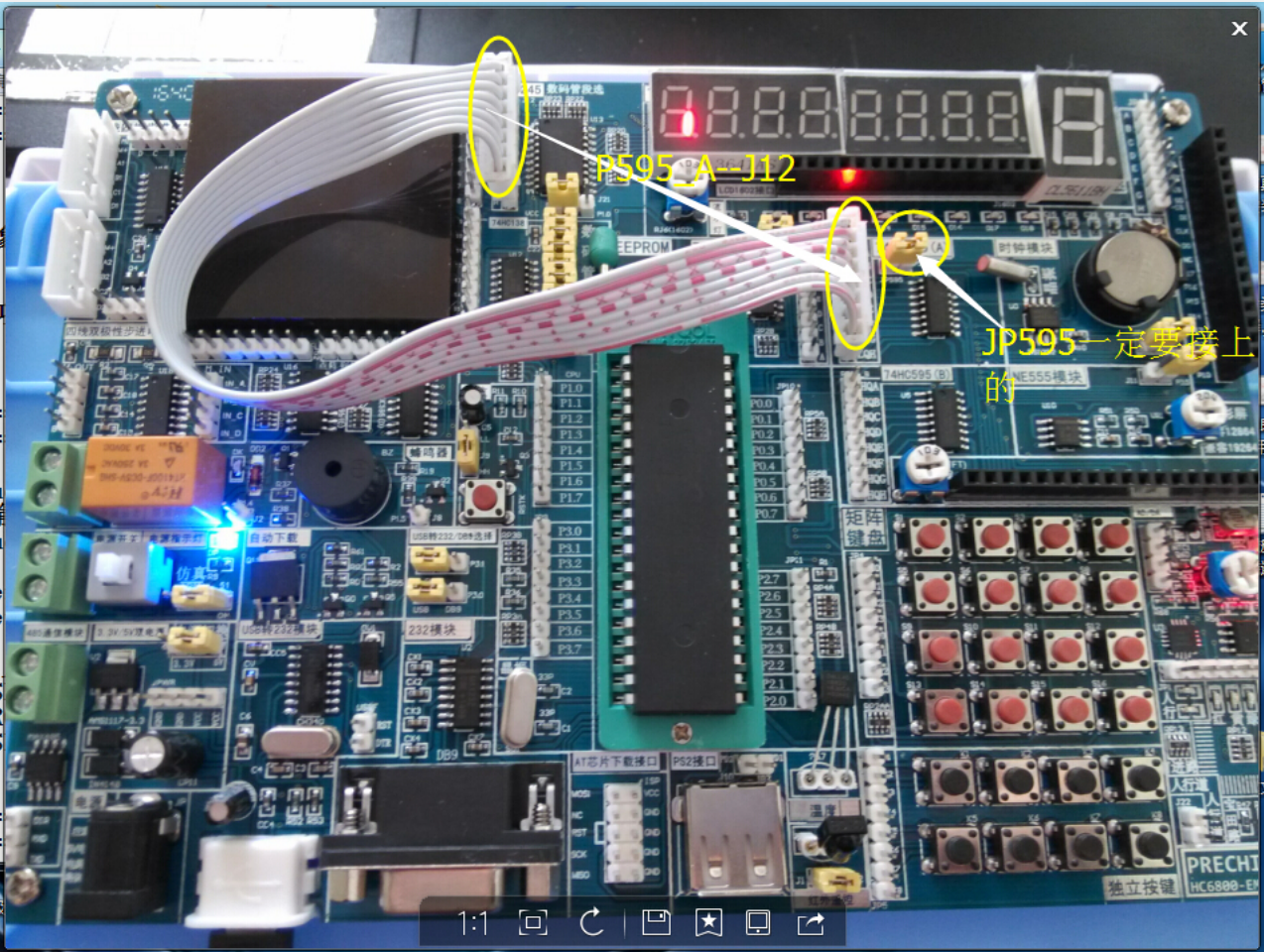
实验8:矩阵按键@test9_MatrixKeypad



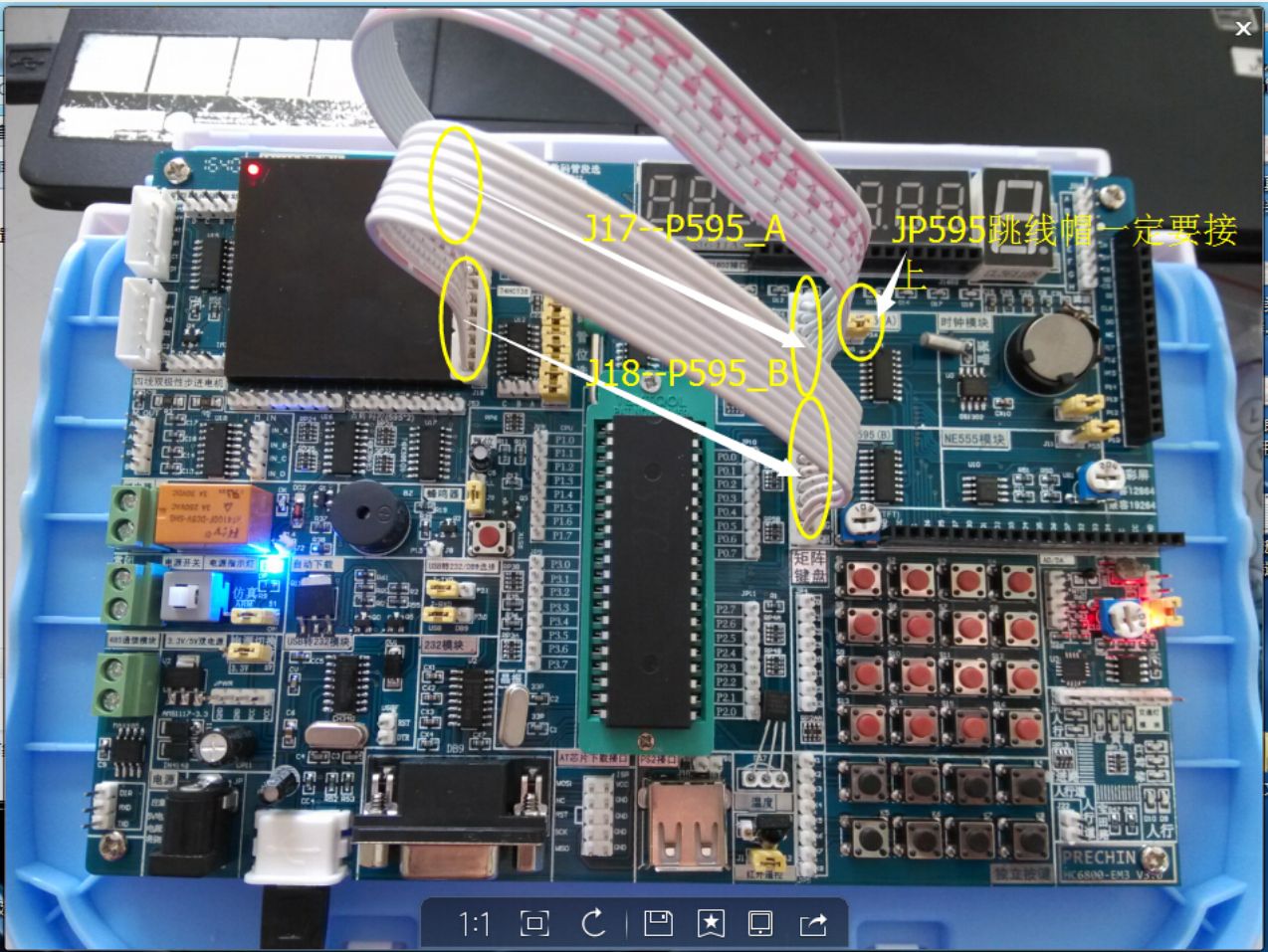
实验9:单片机IO扩展-74HC165@test10_MicrocontrollerIOExpansion_74HC165



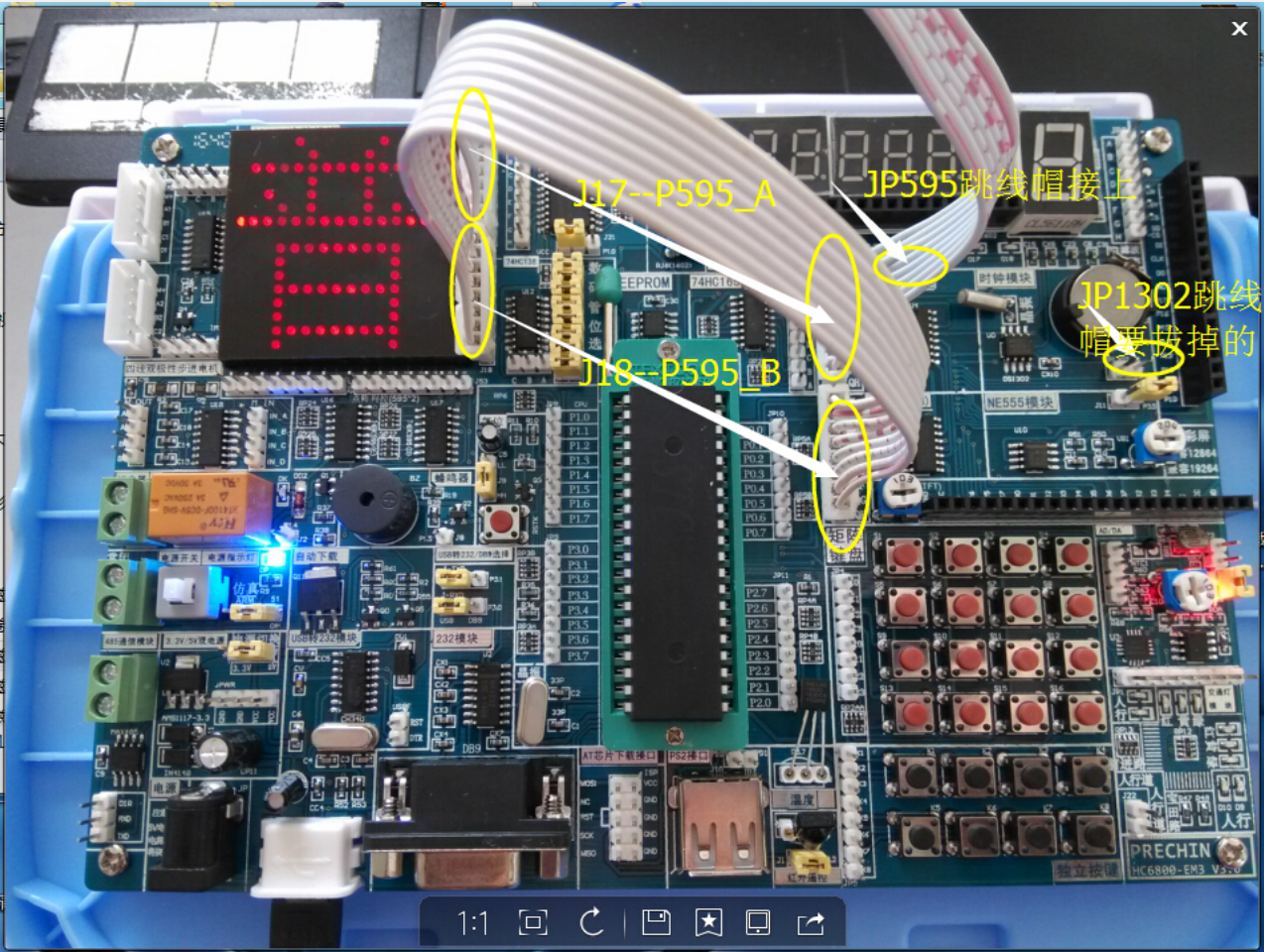
实验10:单片机IO扩展-74HC595@test11_MicrocontrollerIOExpansion_74HC595



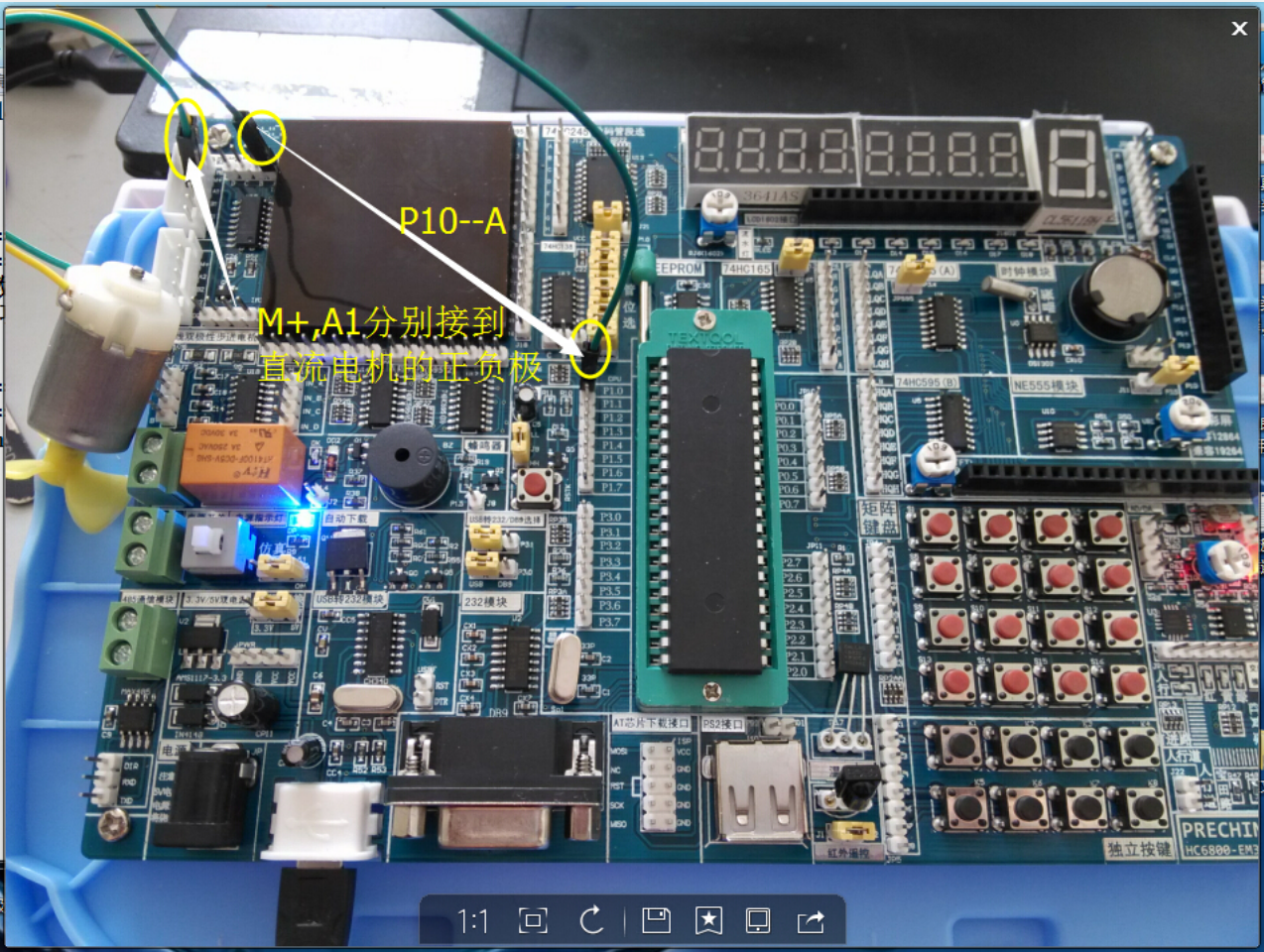
实验11:LED点阵(点亮一个点)@test12_LEDDotMatrix_LightingSinglePoint



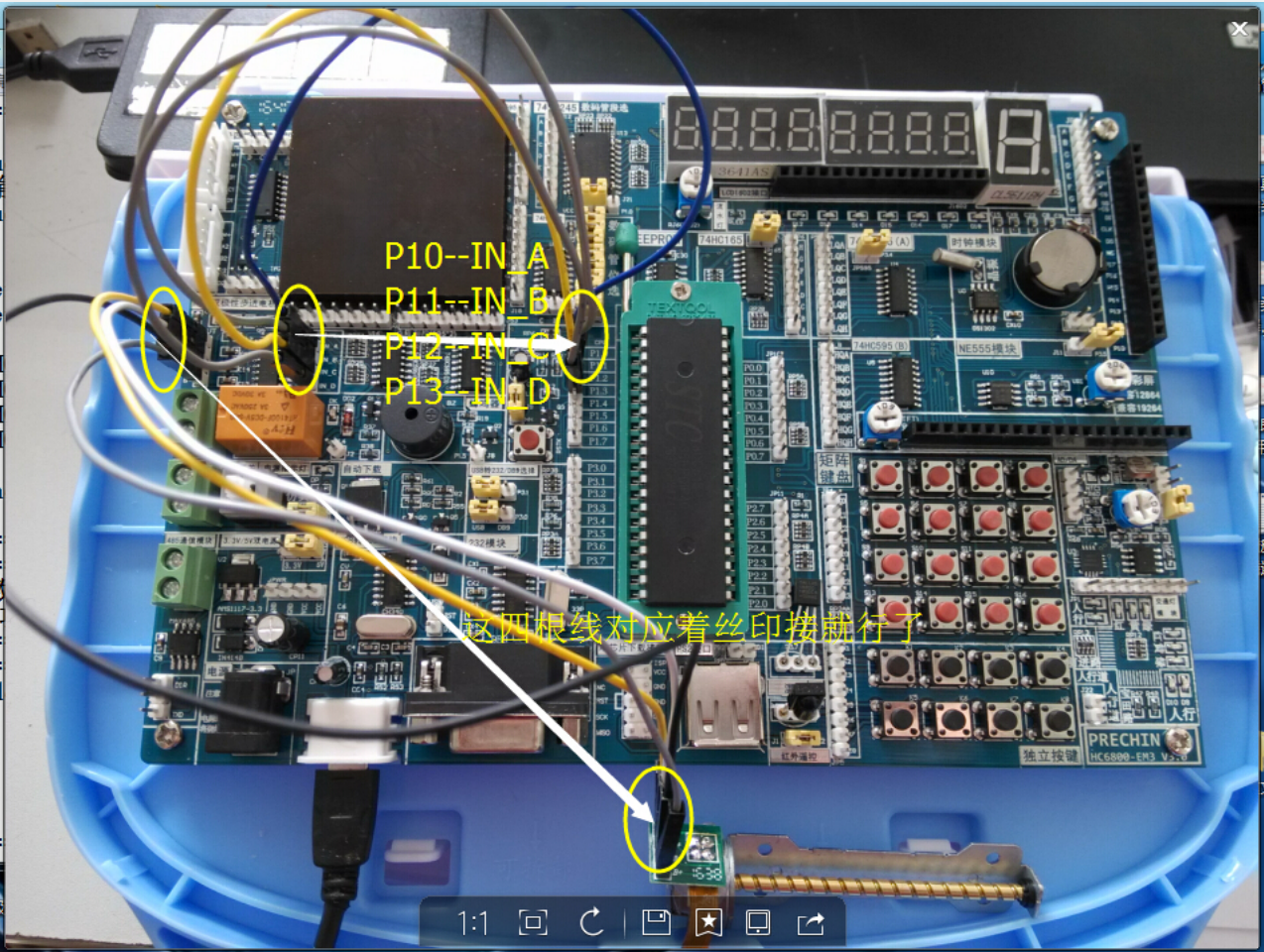
实验12:LED点阵(显示汉字)@test13_LEDDotMatrix_DisplayingChineseCharacters



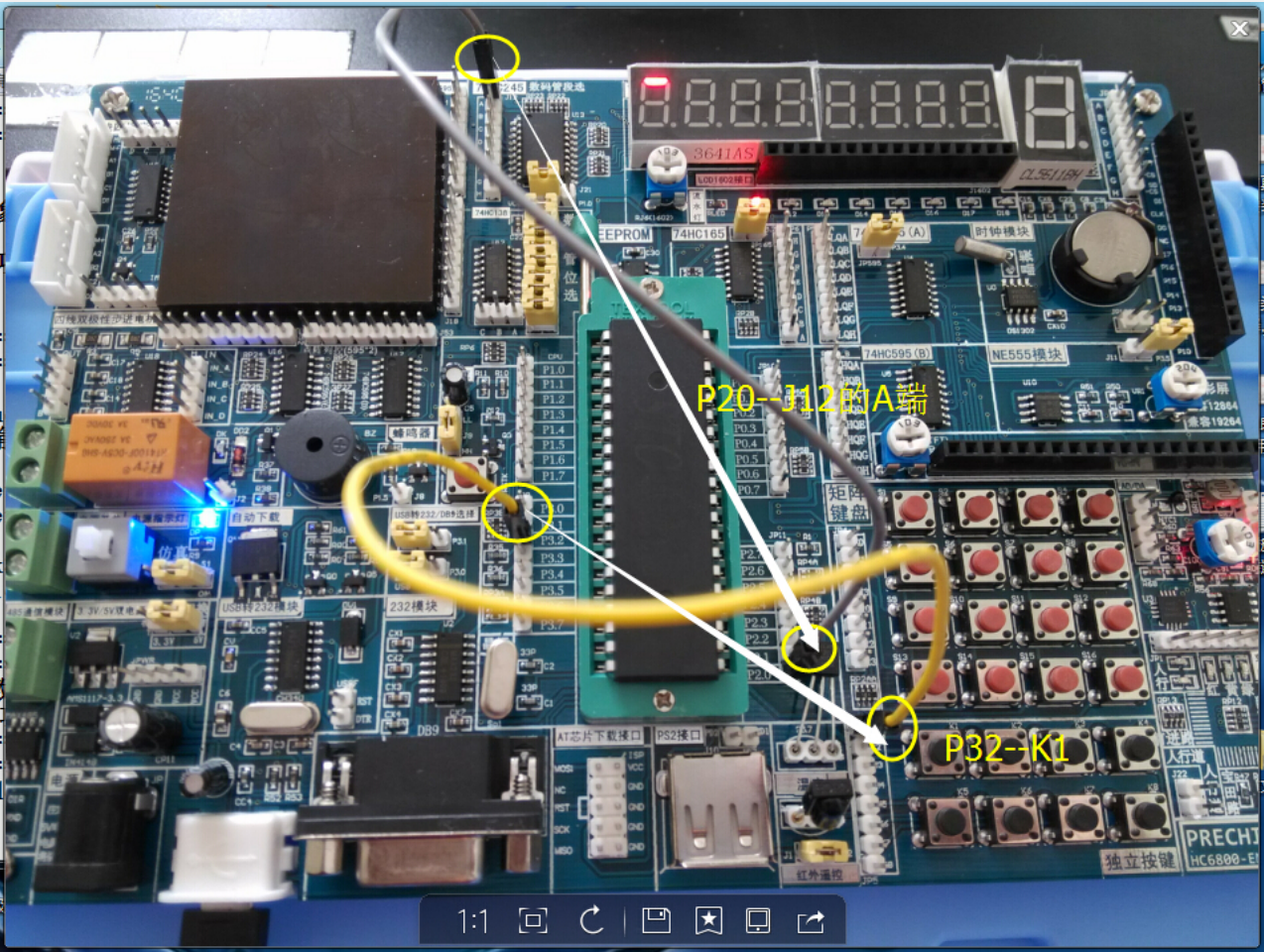
实验13:直流电机@test14_DCMotor



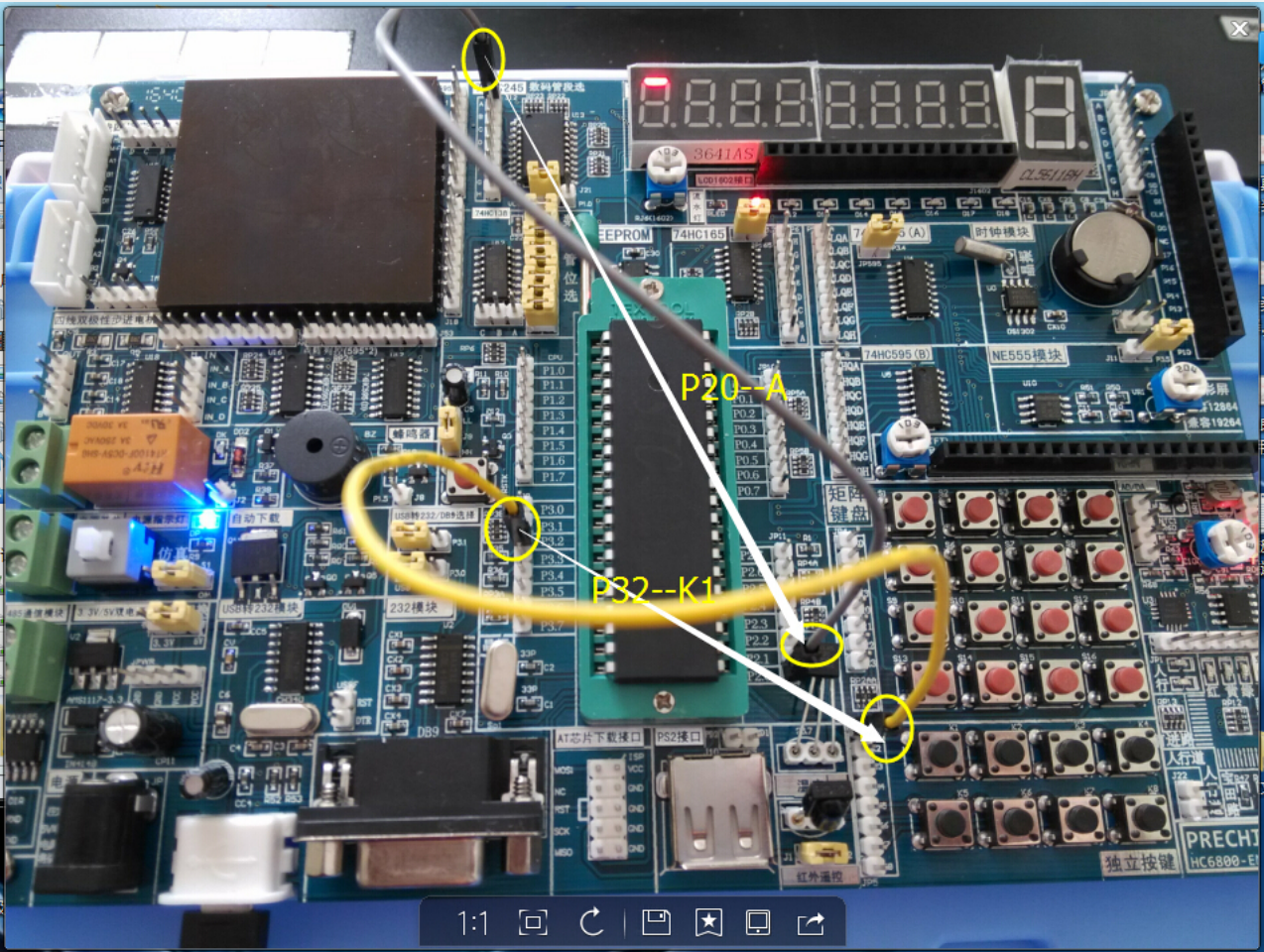
实验14:步进电机@test15_StepperMotor



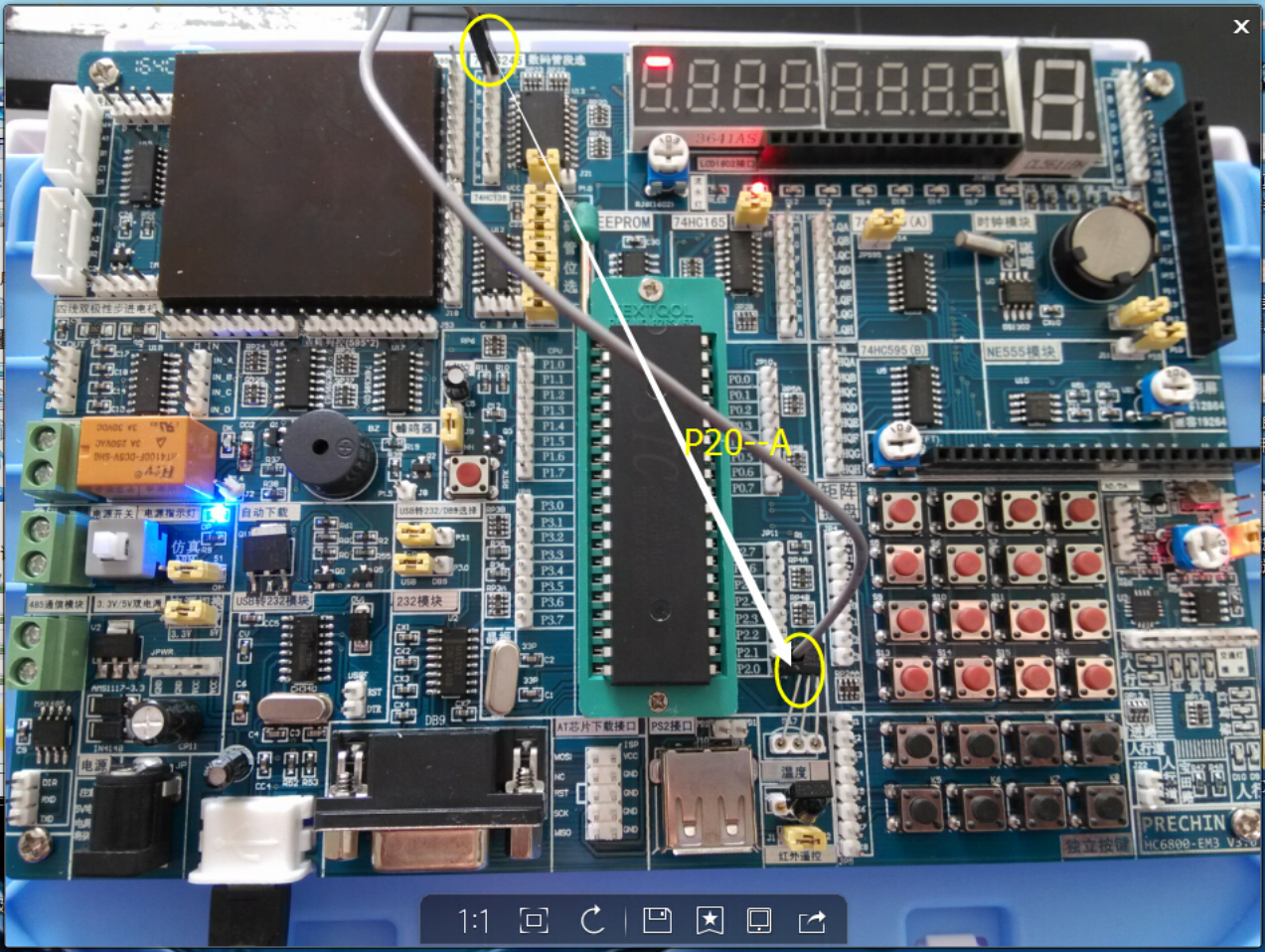
实验15:外部中断0@test16_ExternalInterrupt0



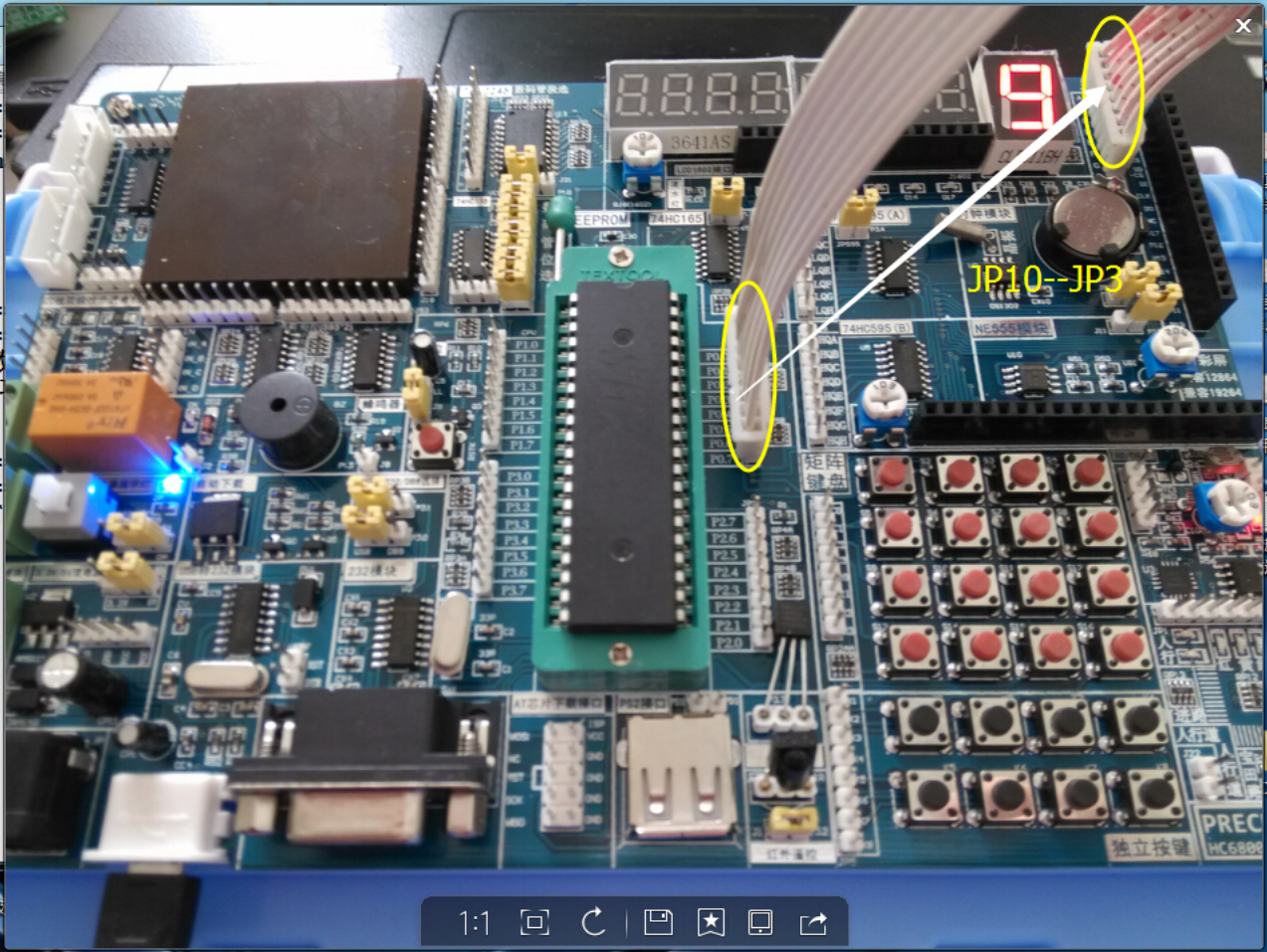
实验16:外部中断1@test17_ExternalInterrupt1



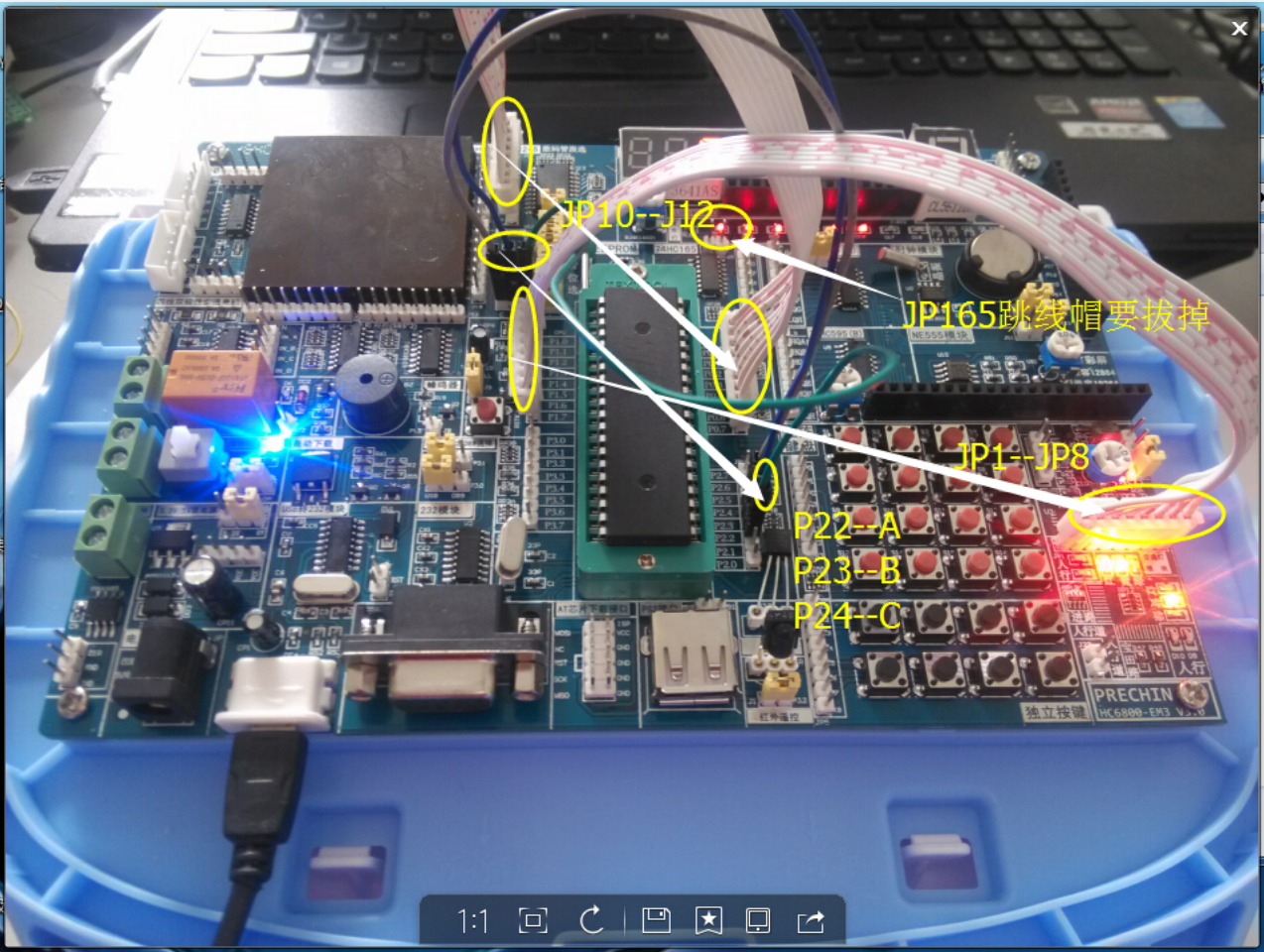
实验17:定时器0中断@test18_Timer0Interrupt



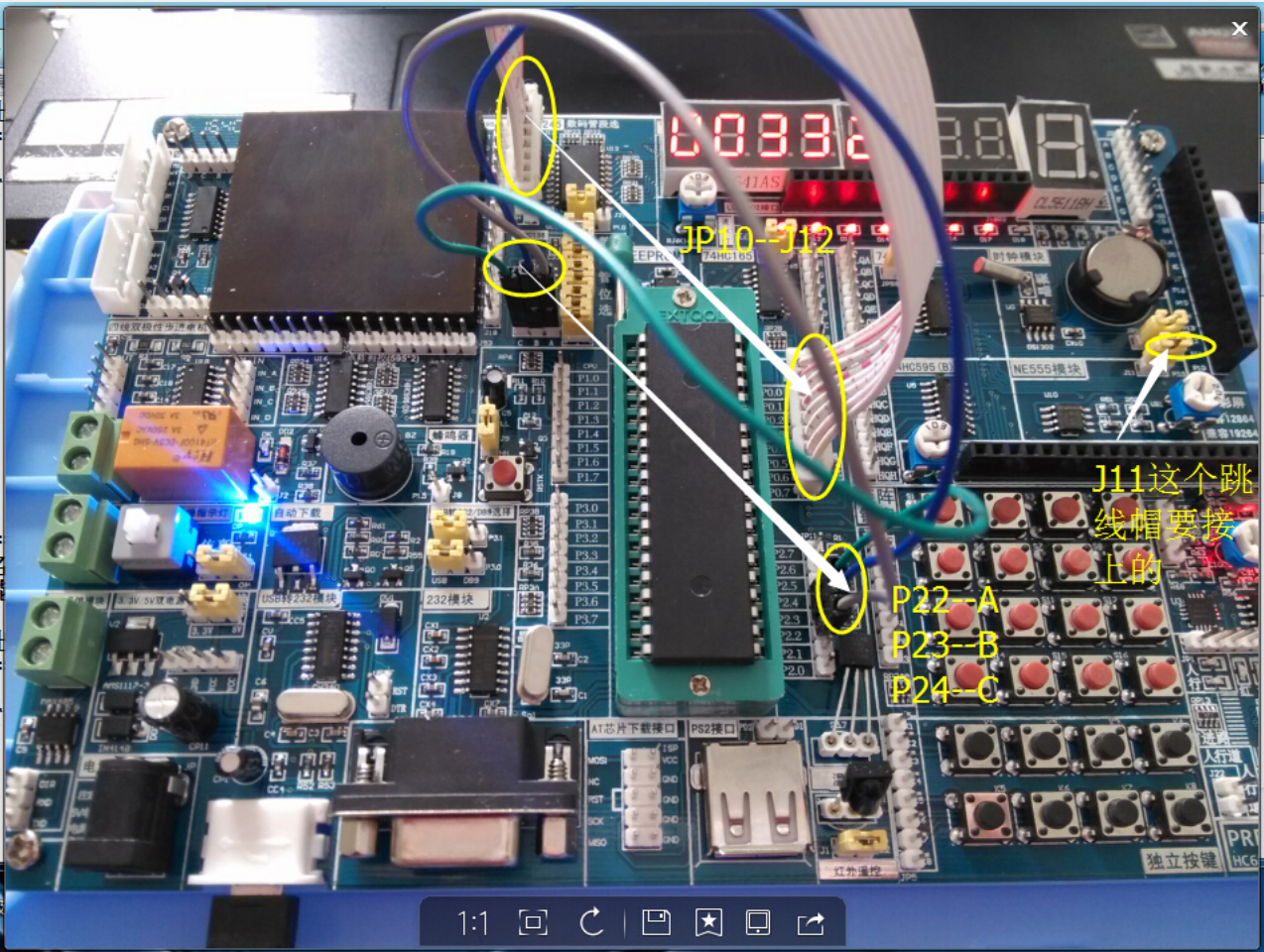
实验18:定时器1中断@test19_Timer1Interrupt



实验19:交通灯 @test20_TrafficLight



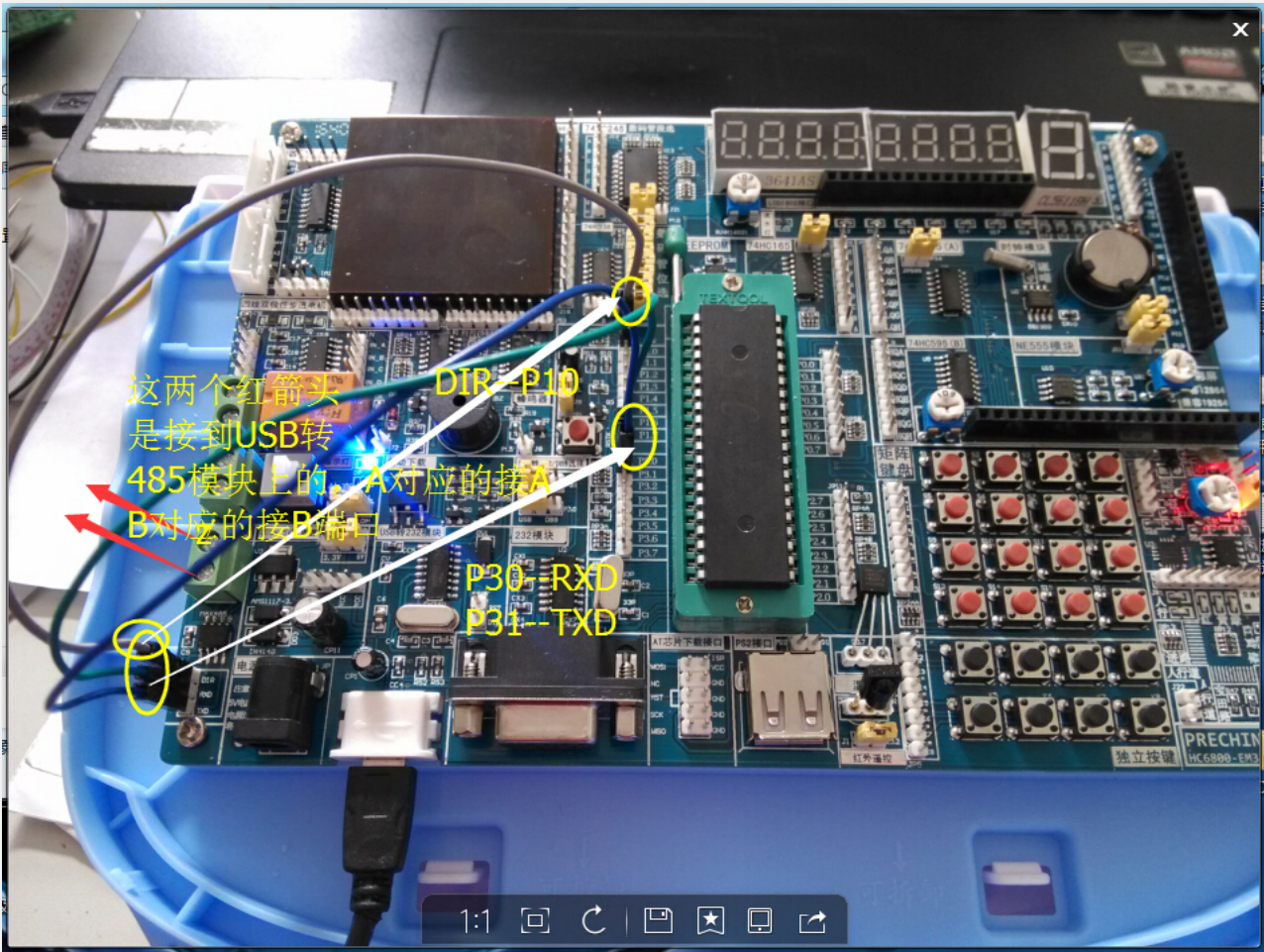
实验20:NE555脉冲发生器@test21_NE555PulseGenerator



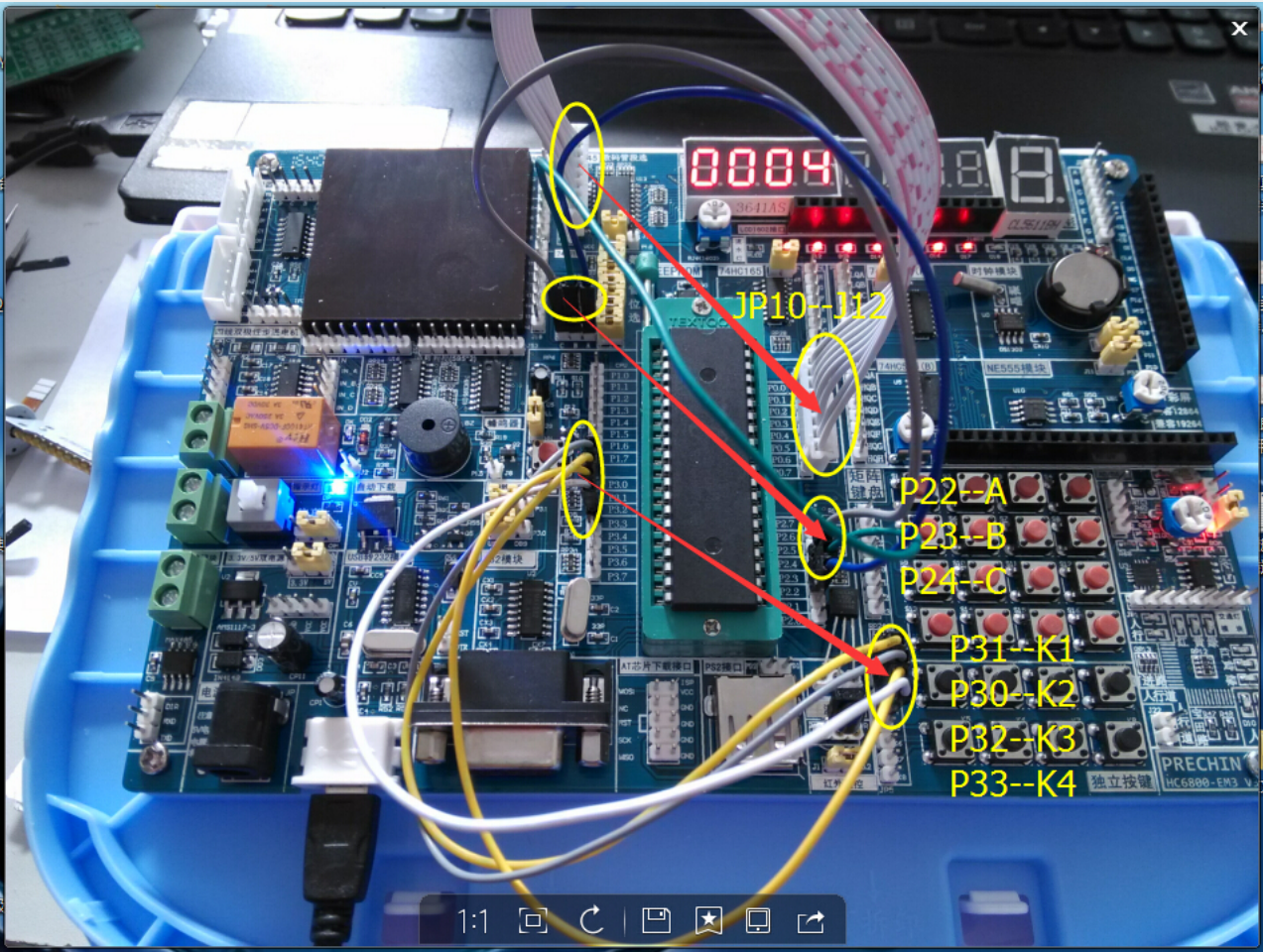
实验21:串口通信@test22_SerialCommunication

不需要接线·usb插上打开串口即可·波特率默认115200

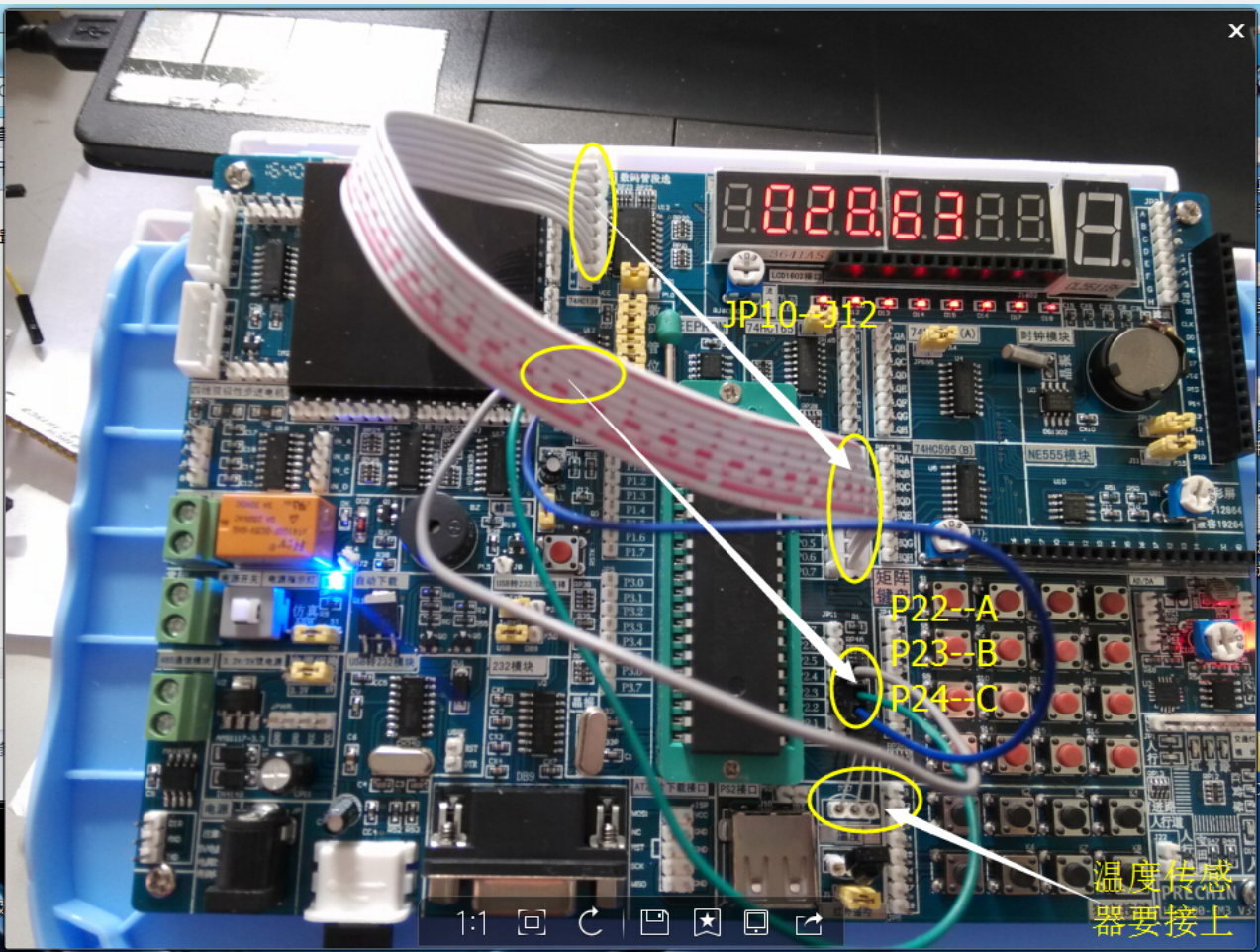
实验22:RS485通信@test23_RS485Communication



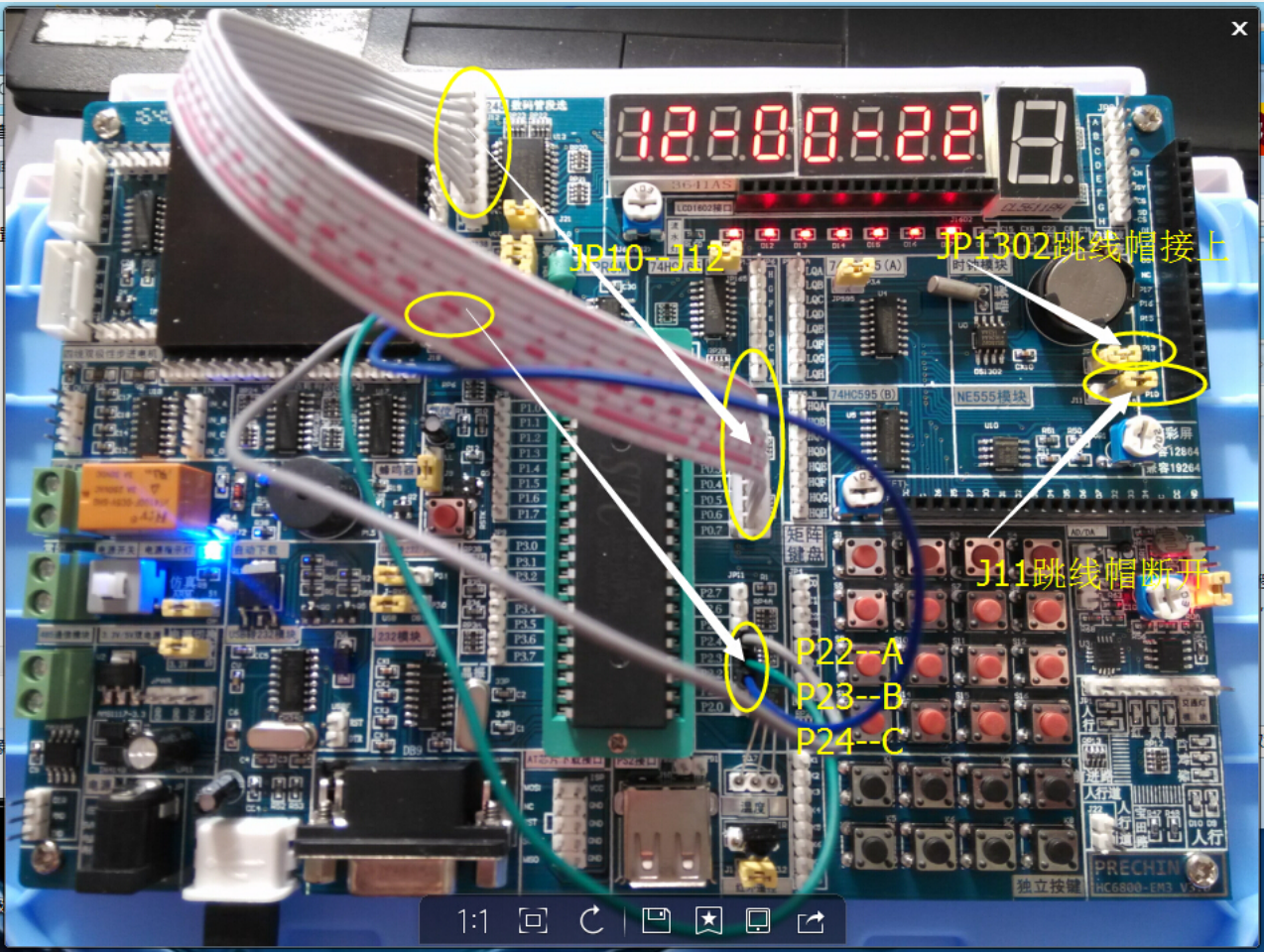
实验23:EEPROM-IIC@test24_EEPROM_I2C



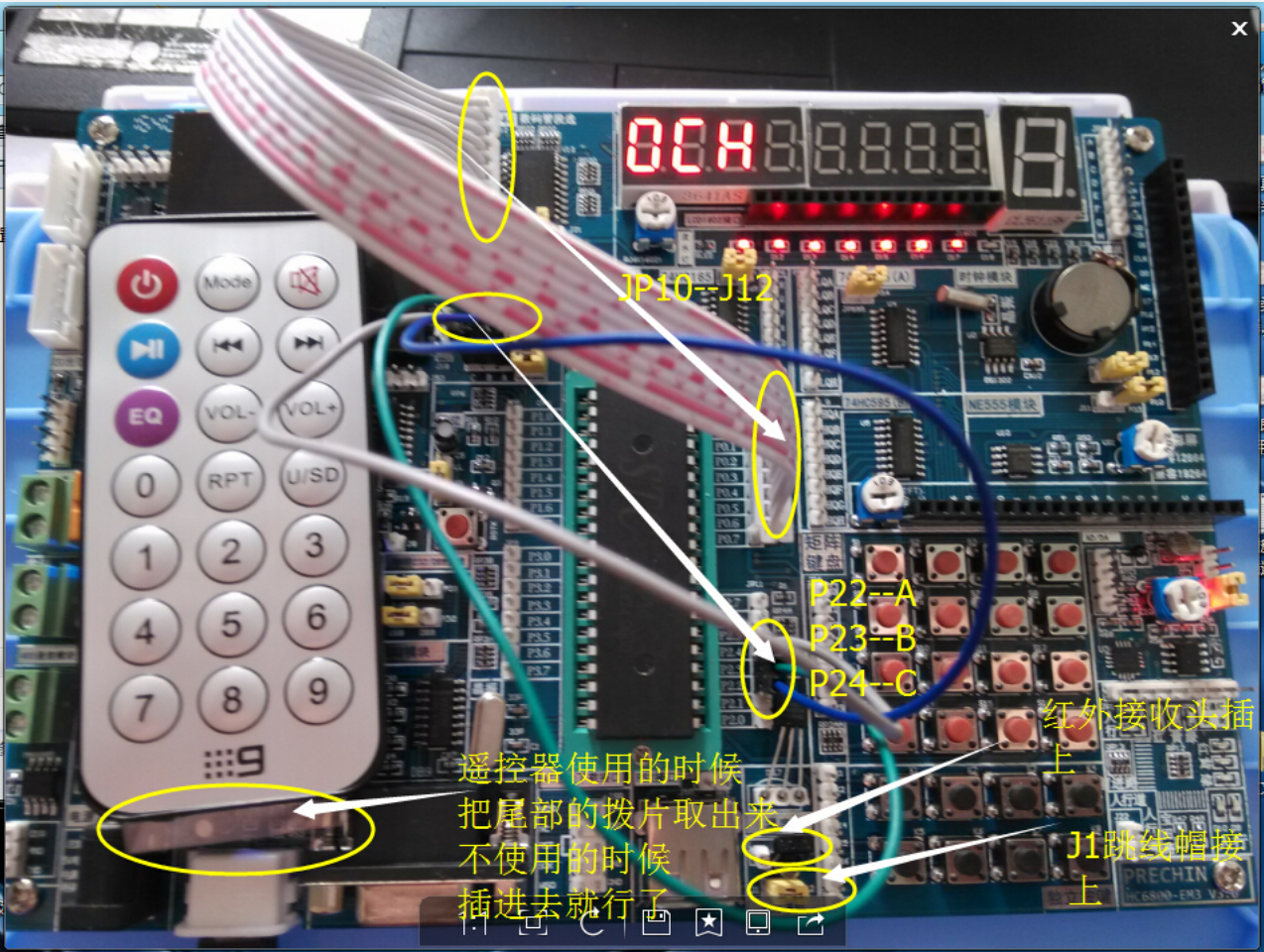
实验24:DS18B20温度传感器@test25_DS18B20TemperatureSensor



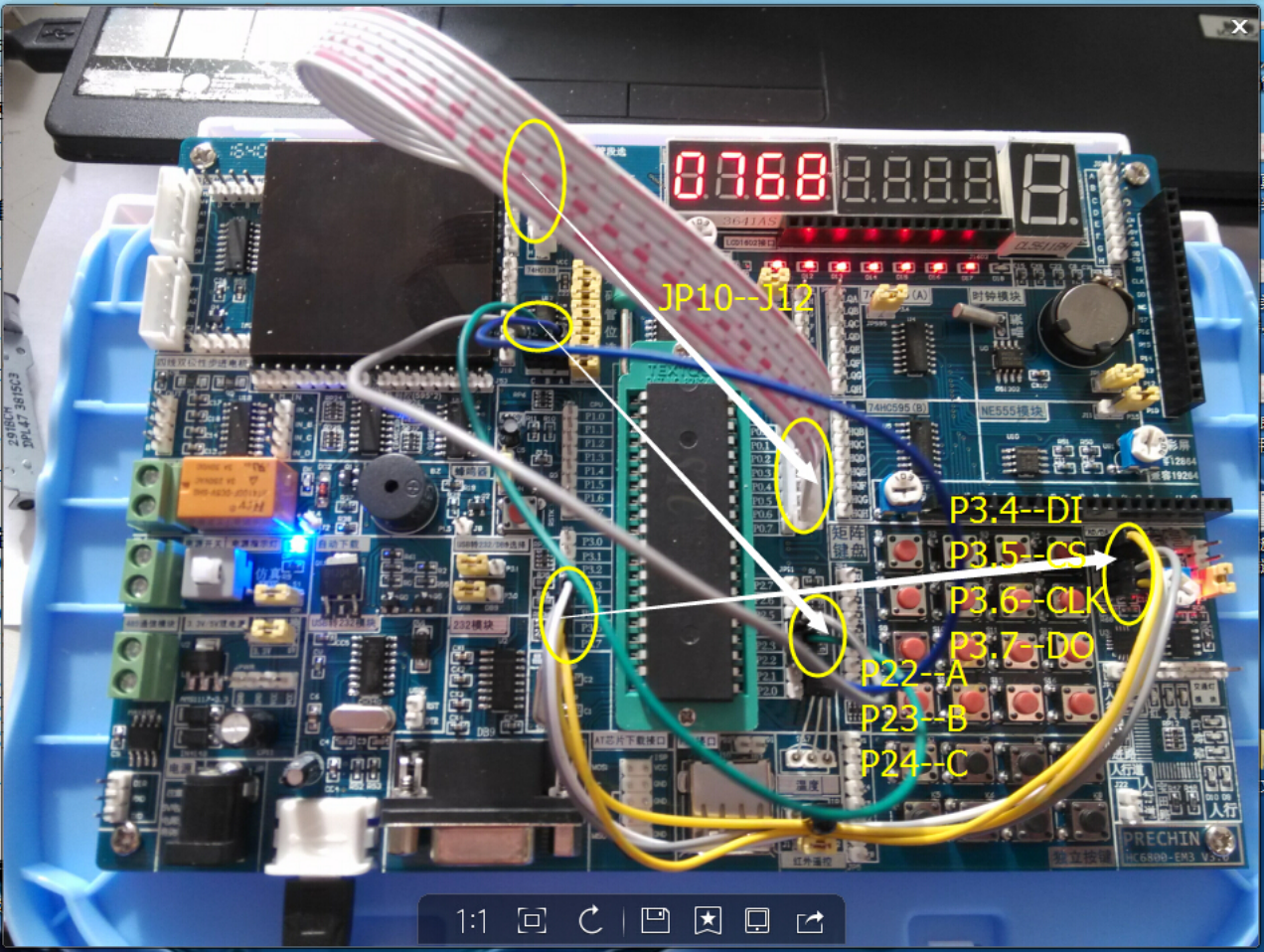
实验25:DS1302时钟@test26_DS1302Clock



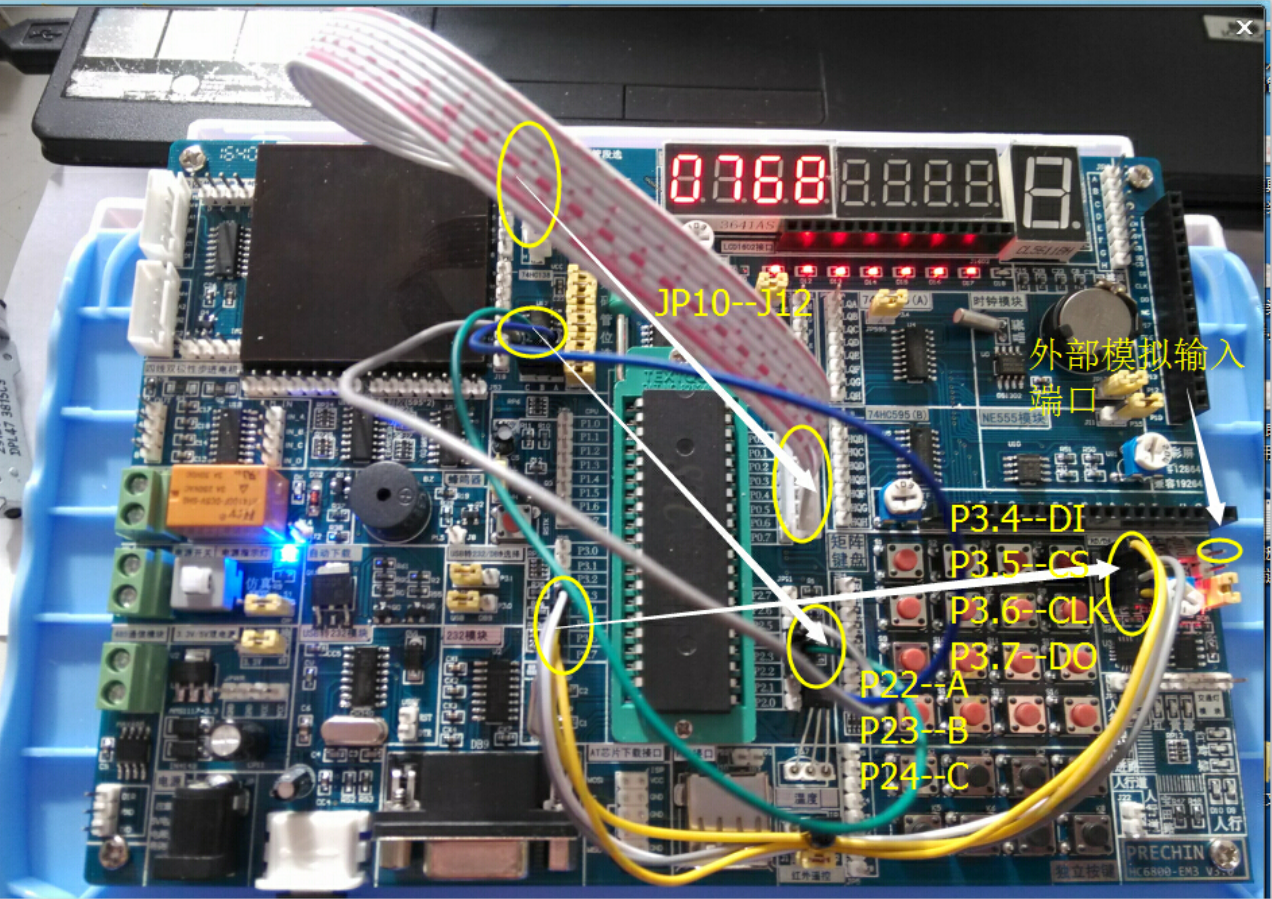
实验26:红外通信@test27_InfraredCommunication



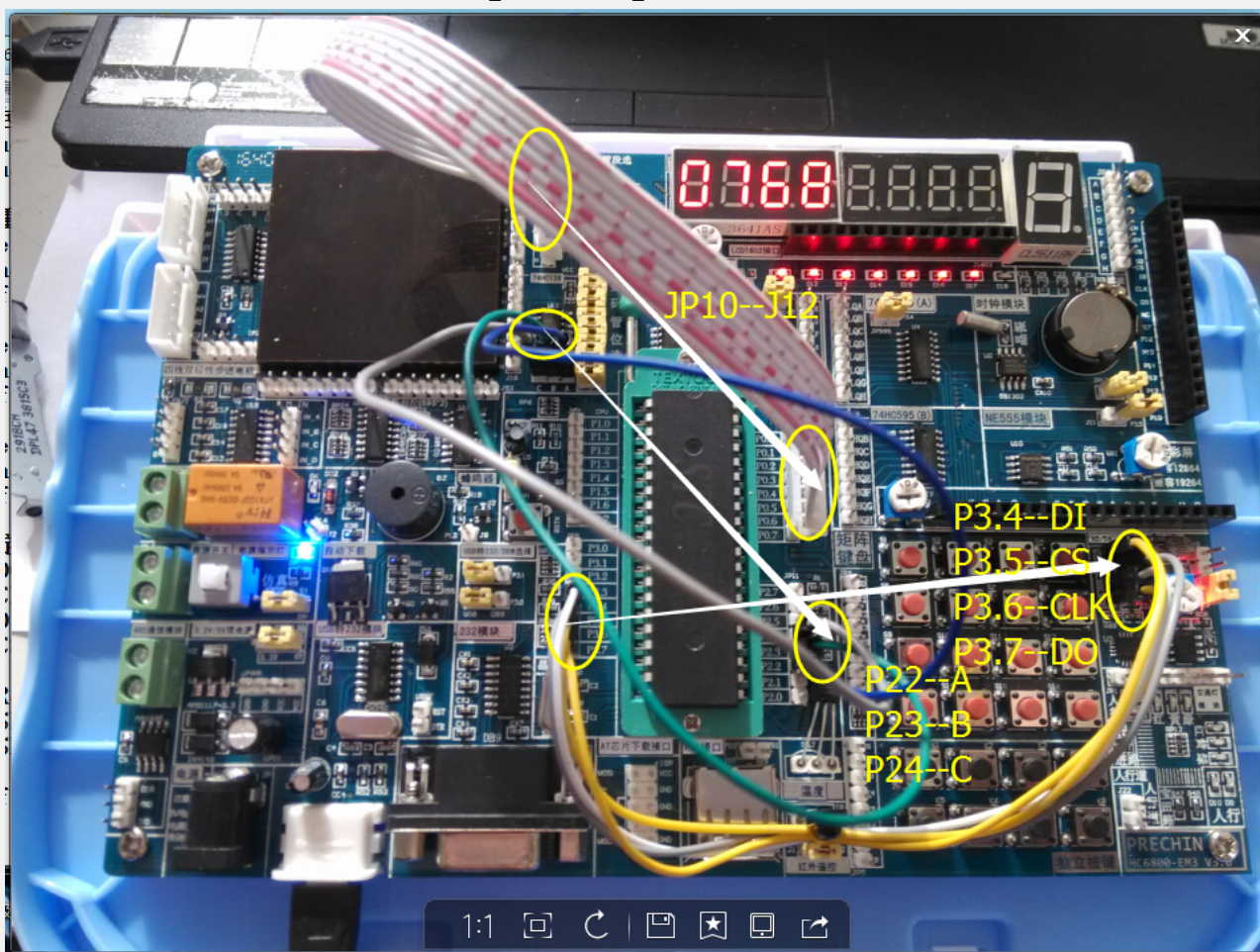
实验27.1:AD模数转换-光敏电阻@test28_Photorresistor_ADC



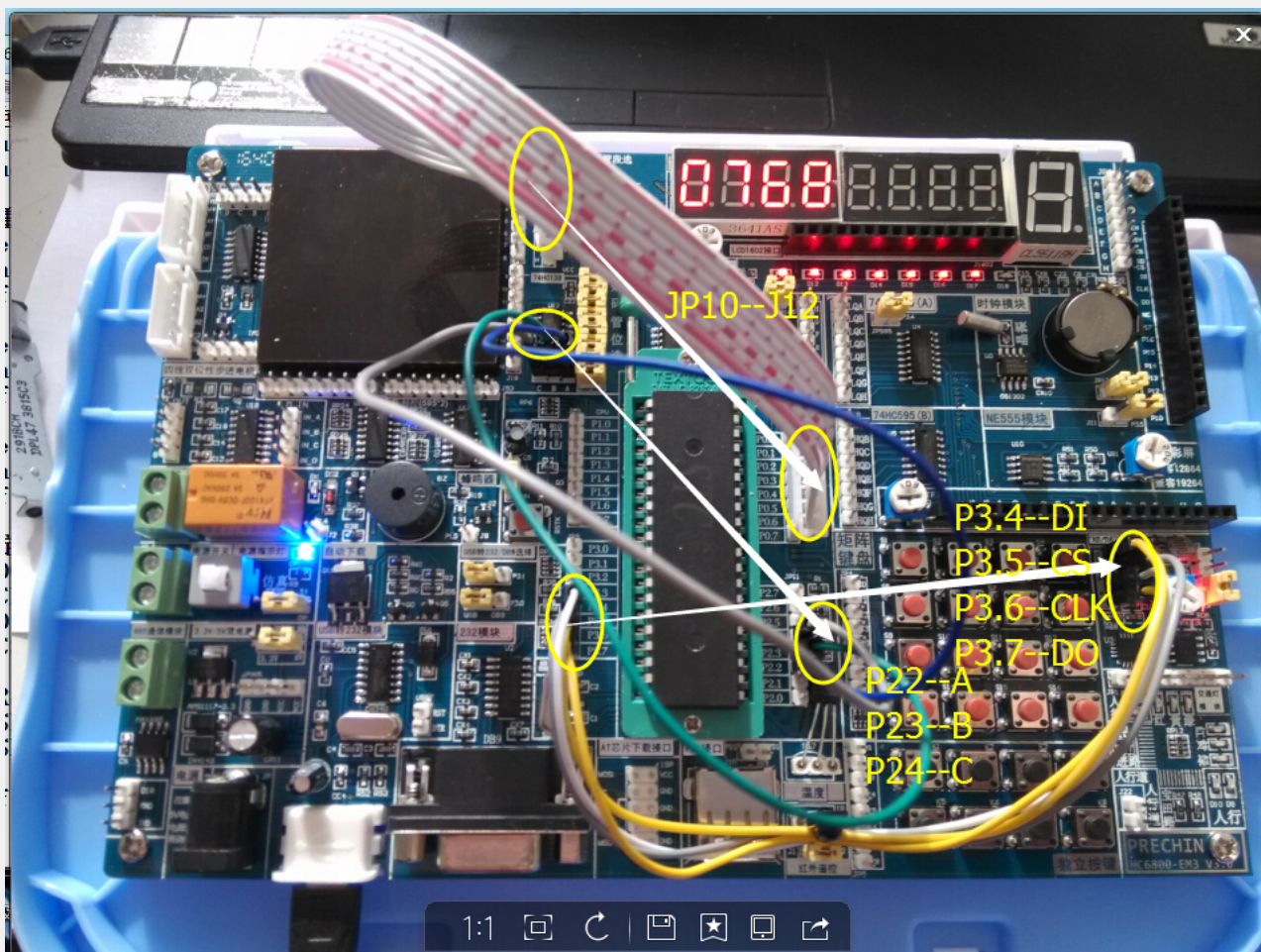
实验27.2:AD模数转换-外部输入@test29_ExternalInput_ADC



实验27.3:AD模数转换-热敏电阻@test30_Thermistor_ADC



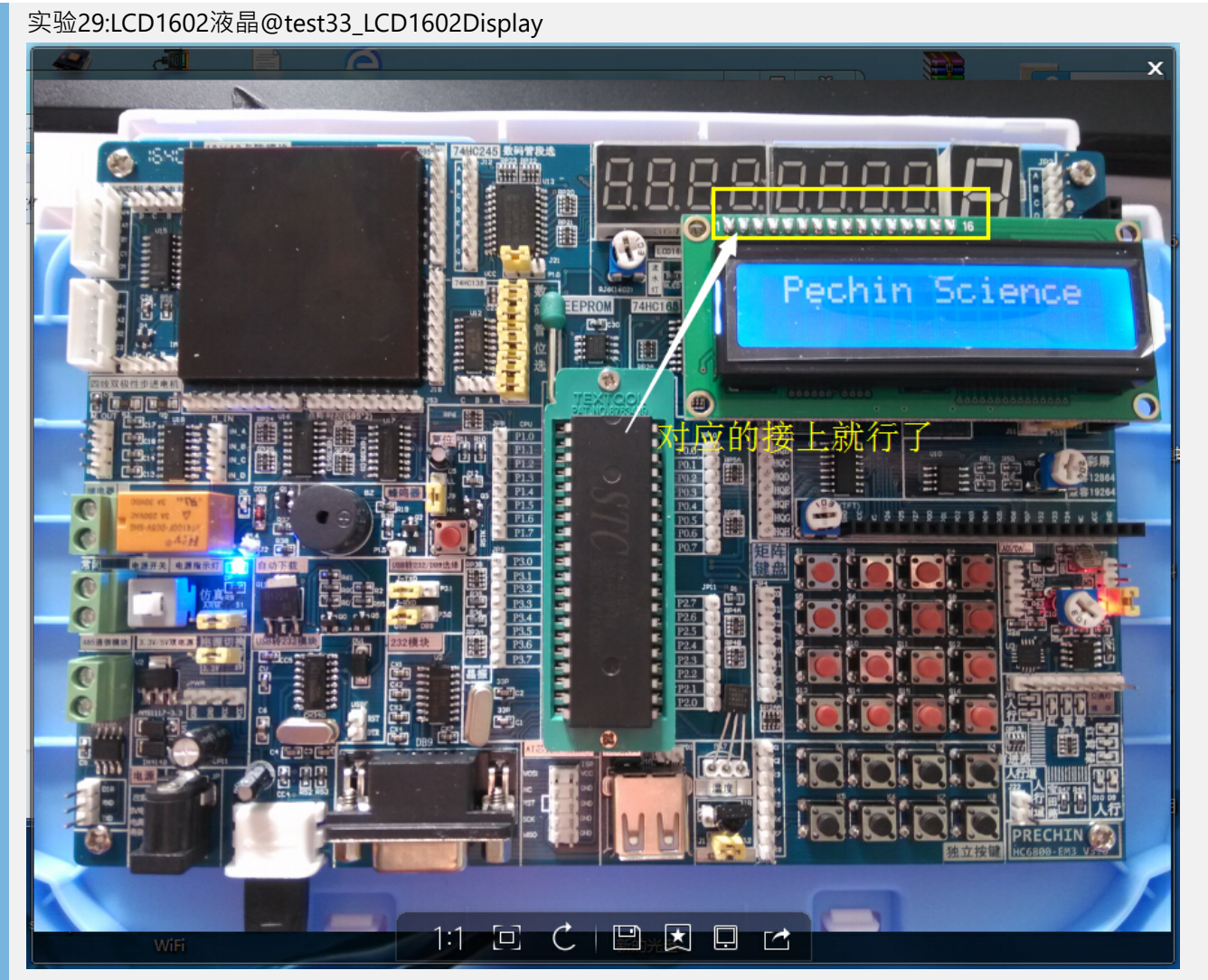
实验27.4:AD模数转换-电位器@test31_Potentiometer_ADC



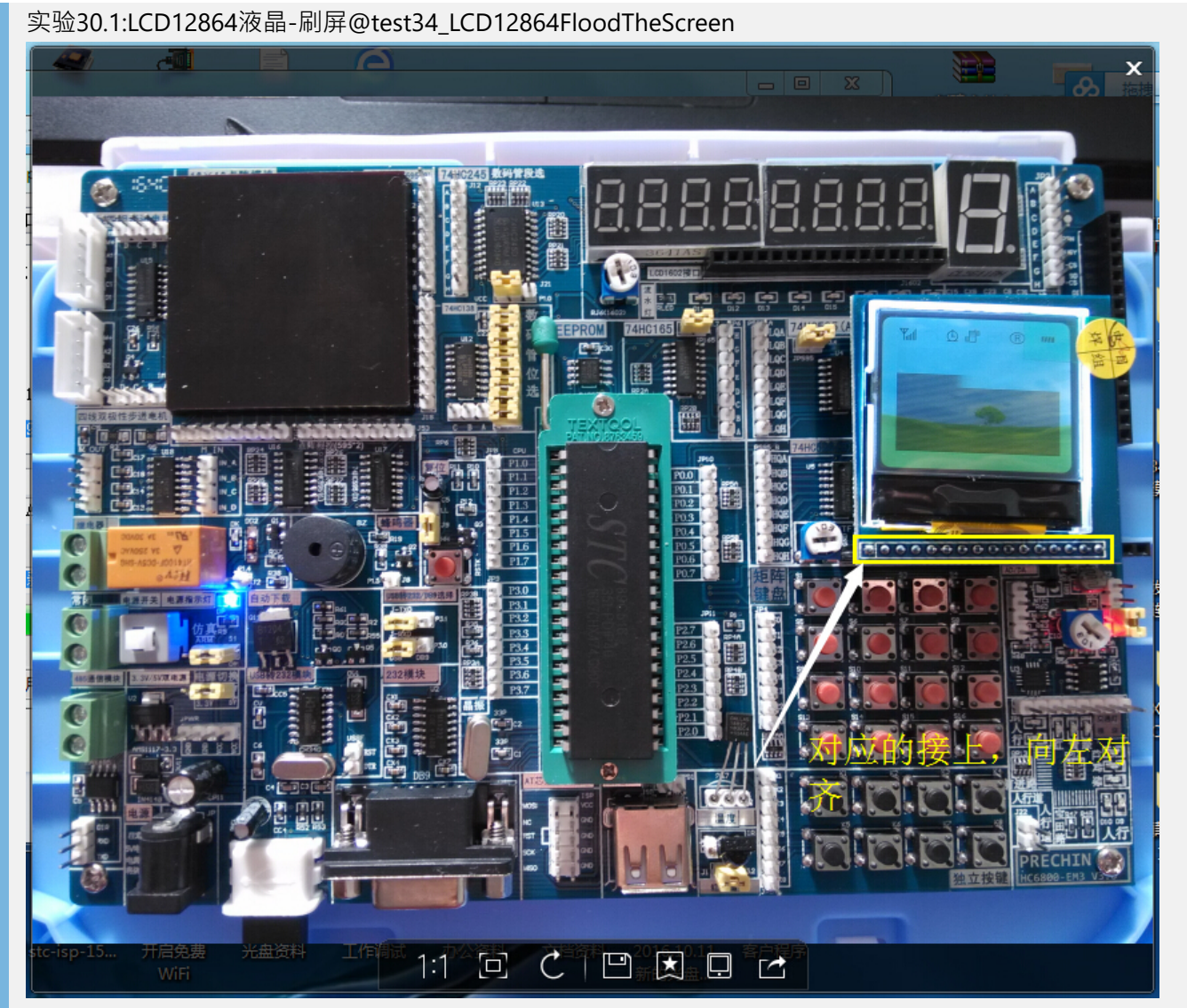
实验28:DA数模转换@test32_DigitalToAnalogConversion_DAC



实验29:LCD1602液晶@test33_LCD1602Display



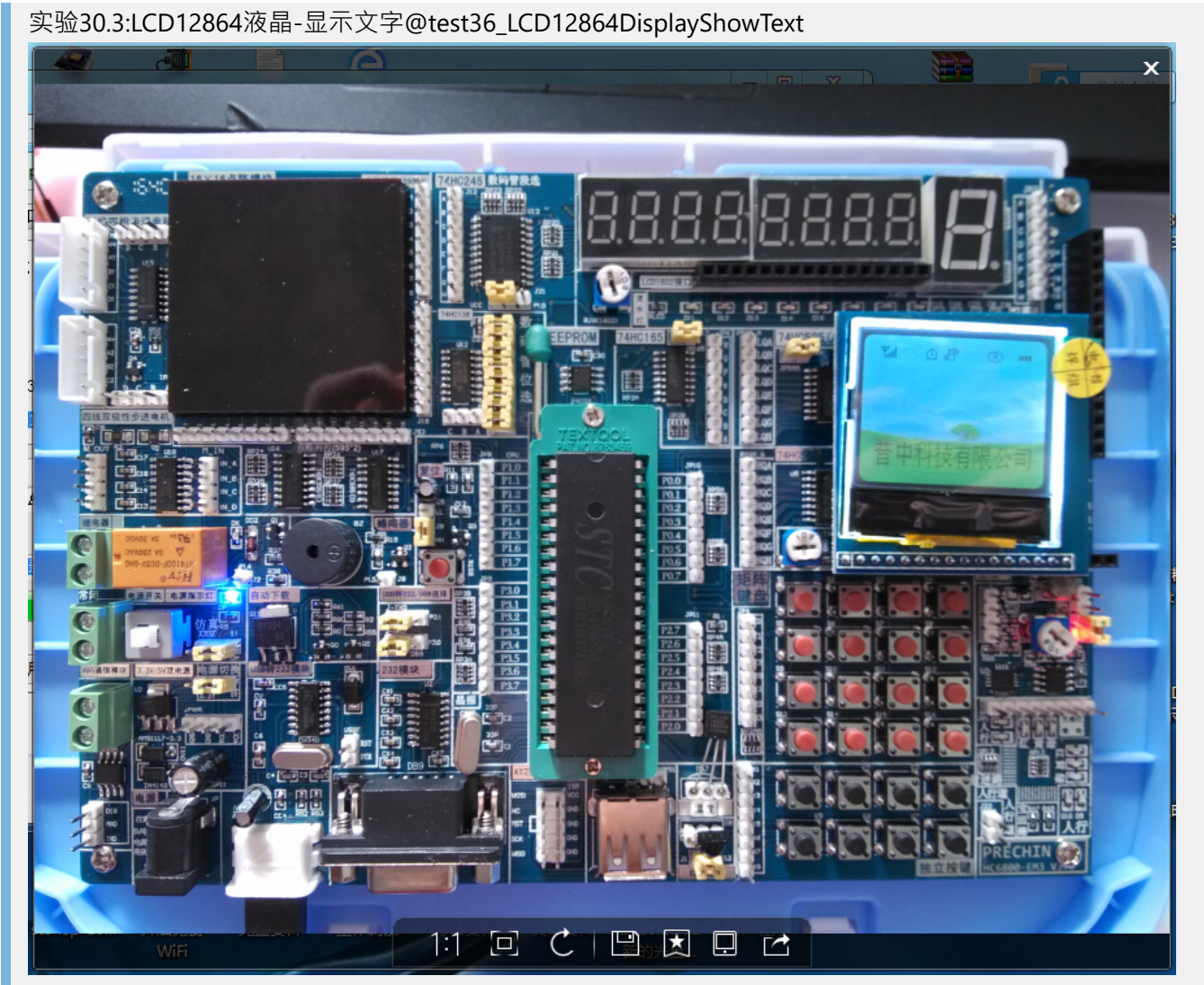
实验30.1:LCD12864液晶-刷屏@test34_LCD12864FloodTheScreen



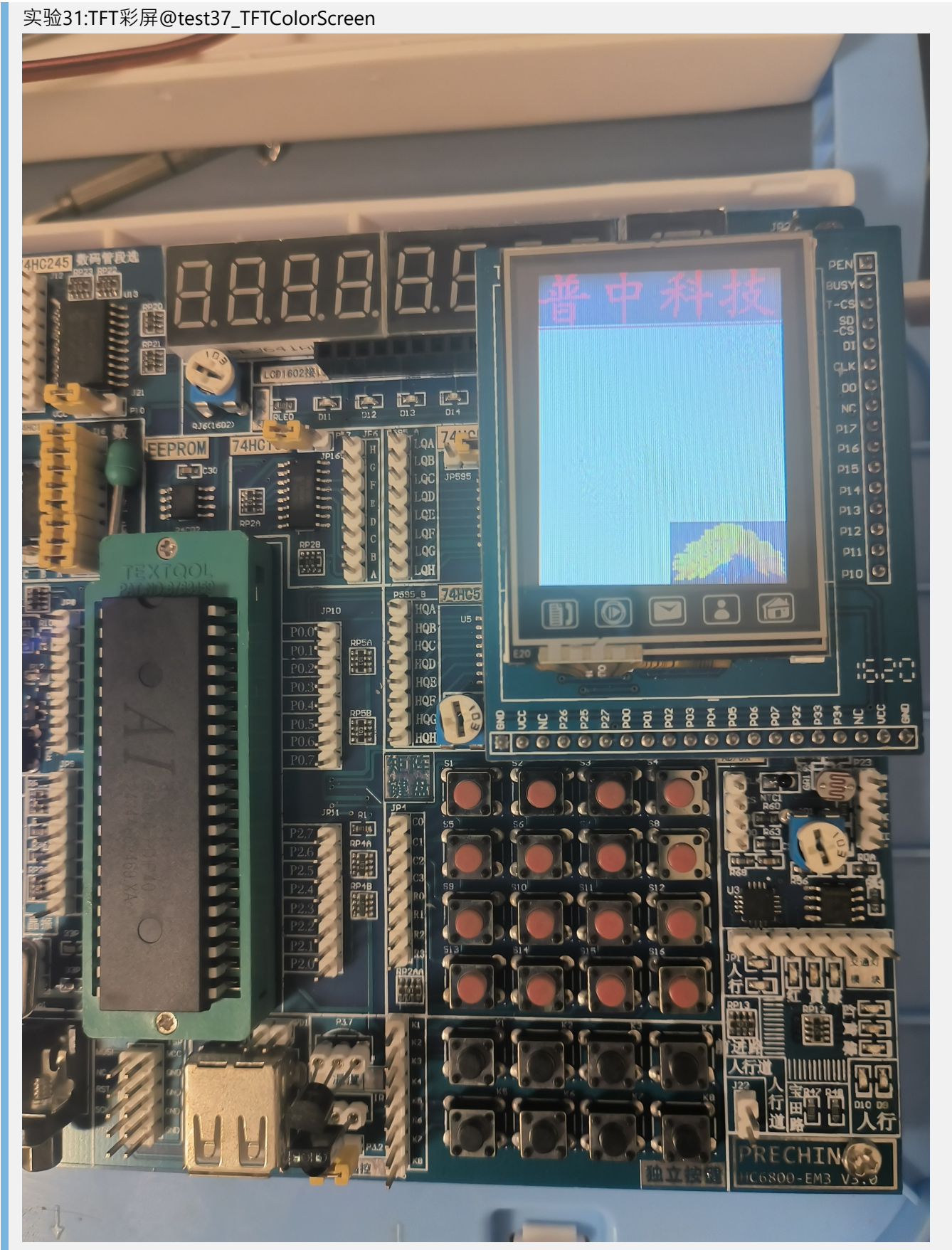
实验30.2:LCD12864液晶-显示图片@test35_LCD12864DisplayShowImg



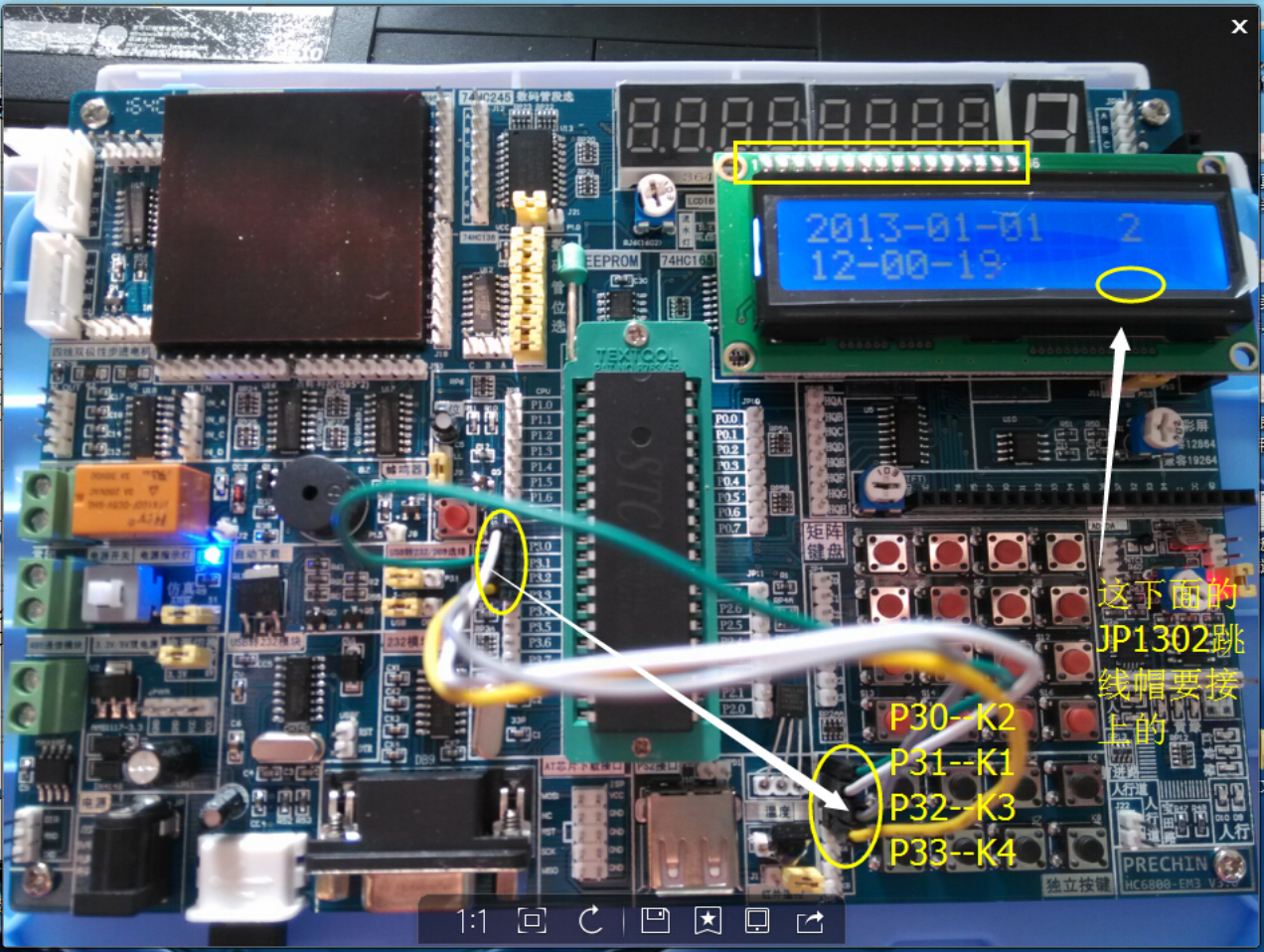
实验30.3:LCD12864液晶-显示文字@test36_LCD12864DisplayShowText



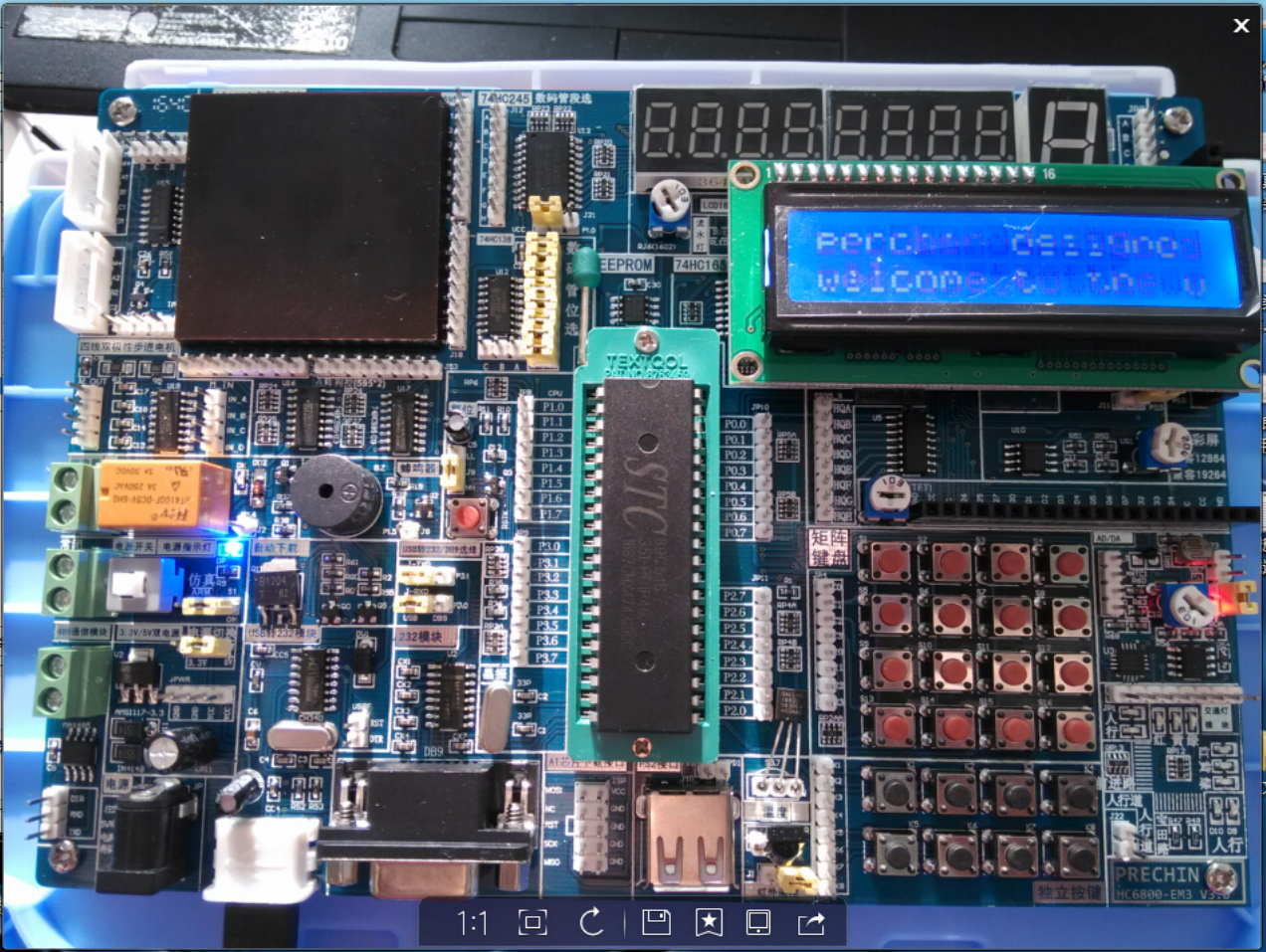
实验31:TFT彩屏@test37_TFTColorScreen



实验32:DS1302时钟LCD1602显示(可以按键设置时钟)@test38_DS1302ClockWithLCD1602Display



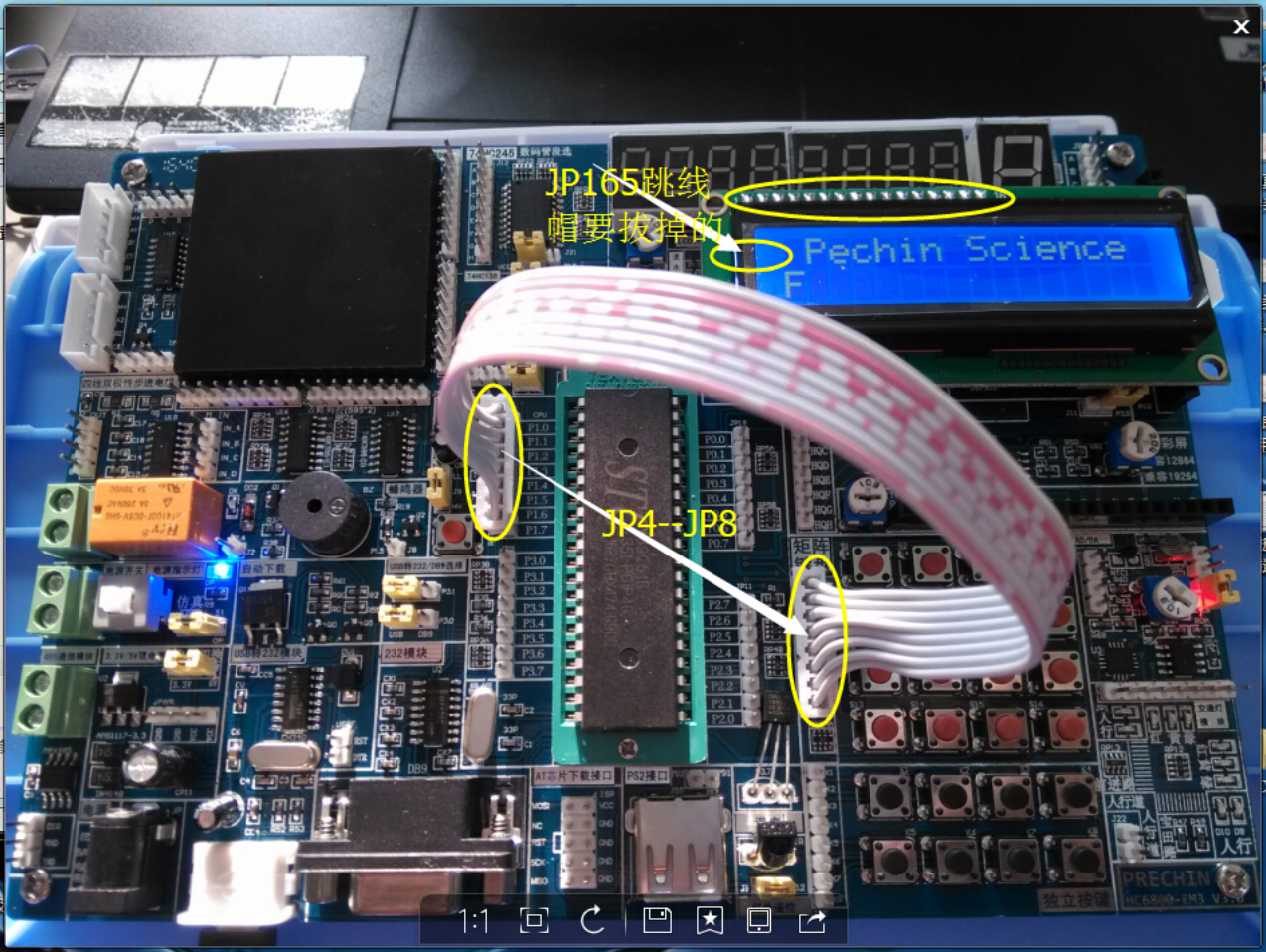
实验33:LCD1602滚动显示@test39_LCD1602ScrollDisplay



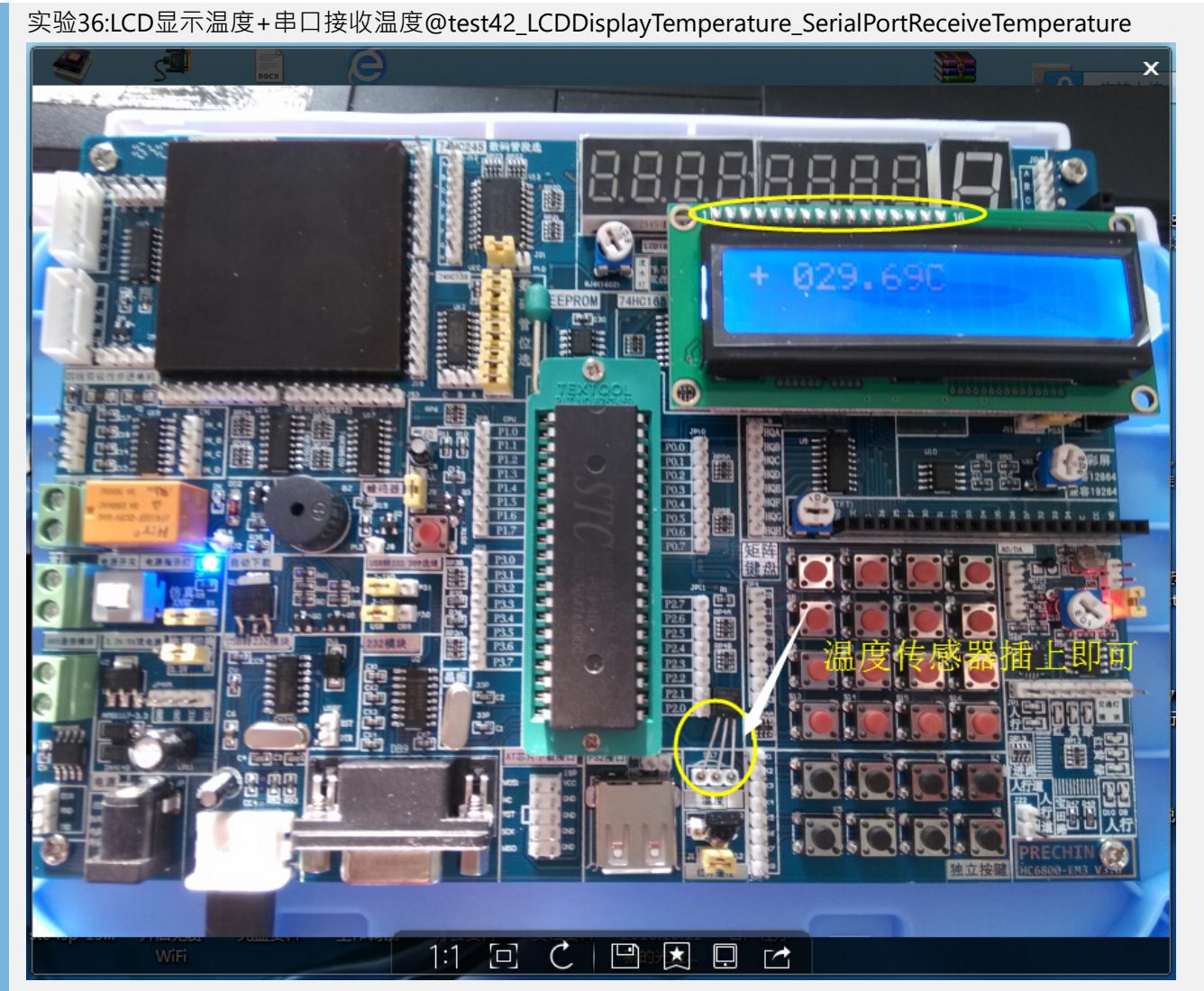
实验34:LCD1602显示红外值@test40_LCD1602DisplayInfraredValue



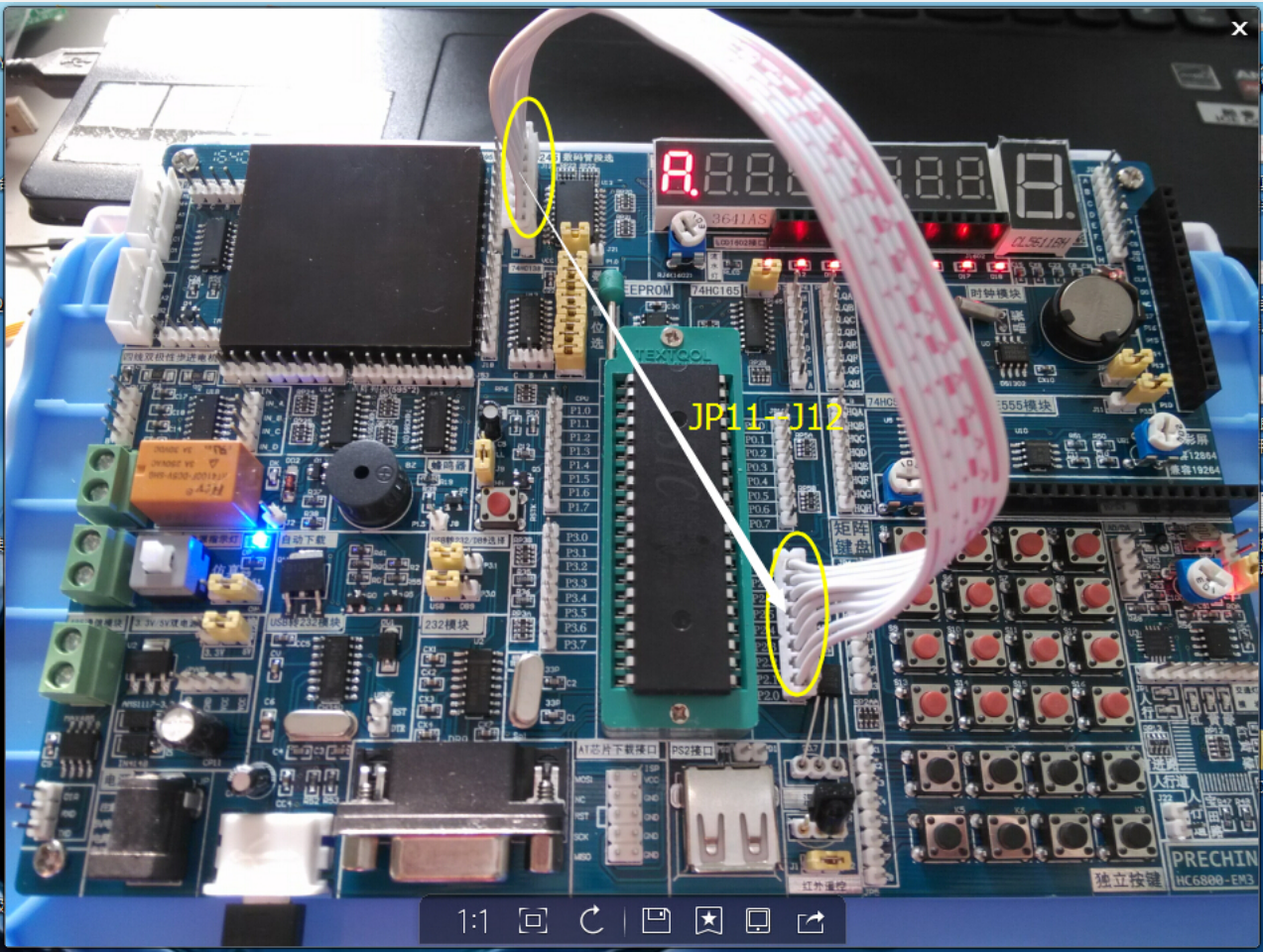
实验35:LCD1602显示矩阵按键键值@test41_LCD1602DisplayMatrixKeypadKeyValue



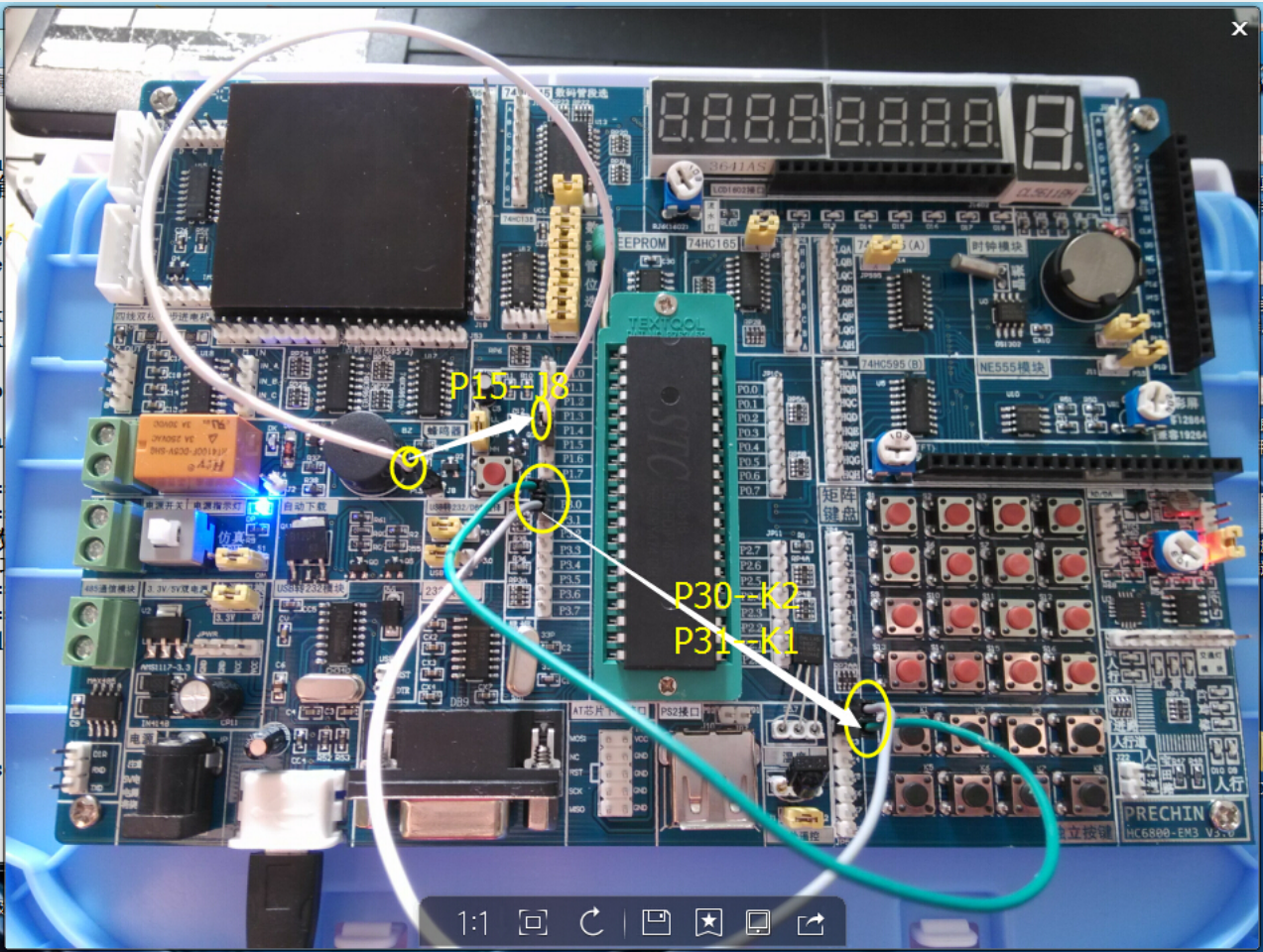
实验36:LCD显示温度+串口接收温度@test42_LCDDisplayTemperature_SerialPortReceiveTemperature



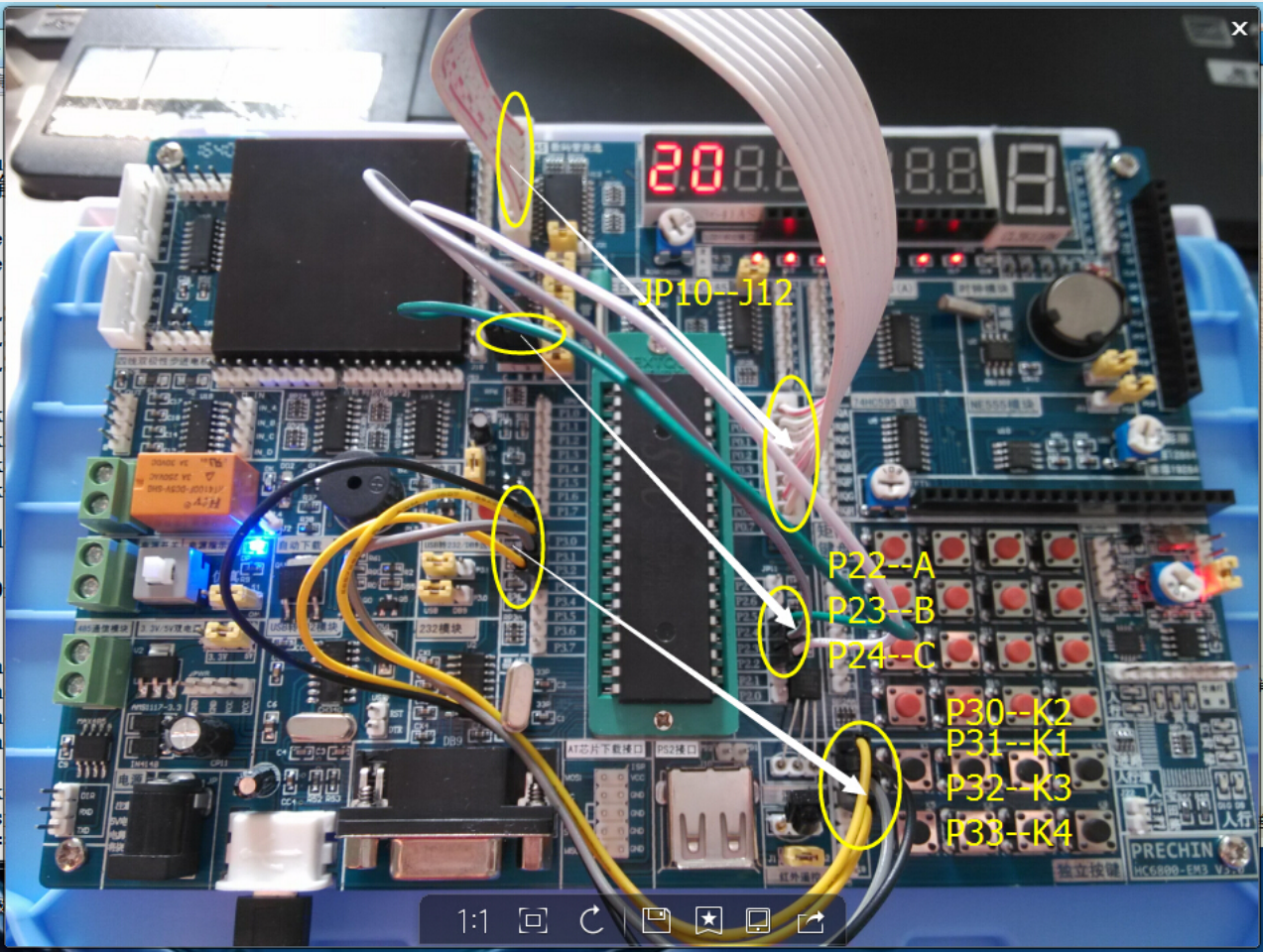
实验37:LED流水+定时器@test43_LEDRunningLight_Timer



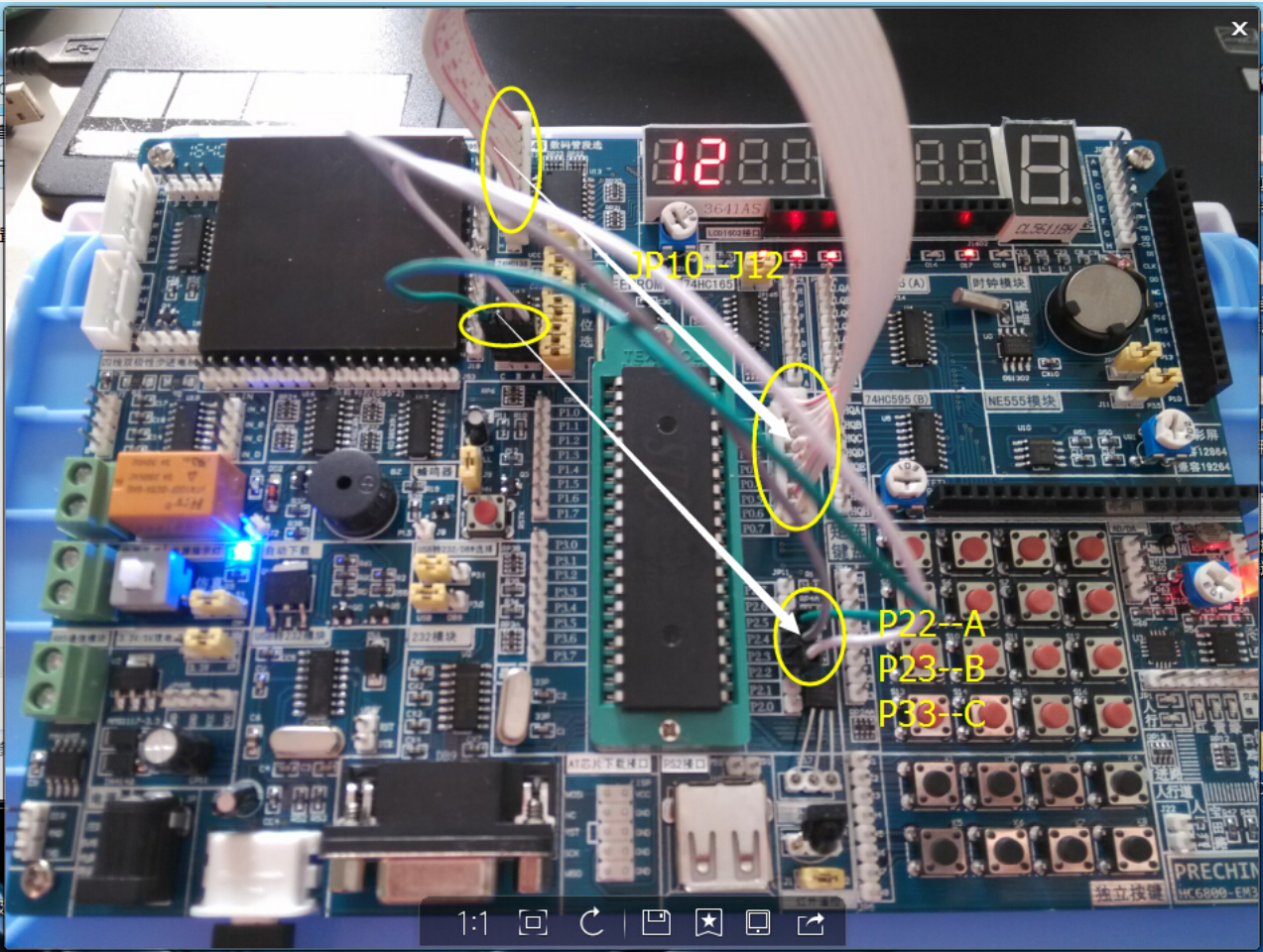
实验38:按键控制蜂鸣器@test44_ButtonControlBuzzer



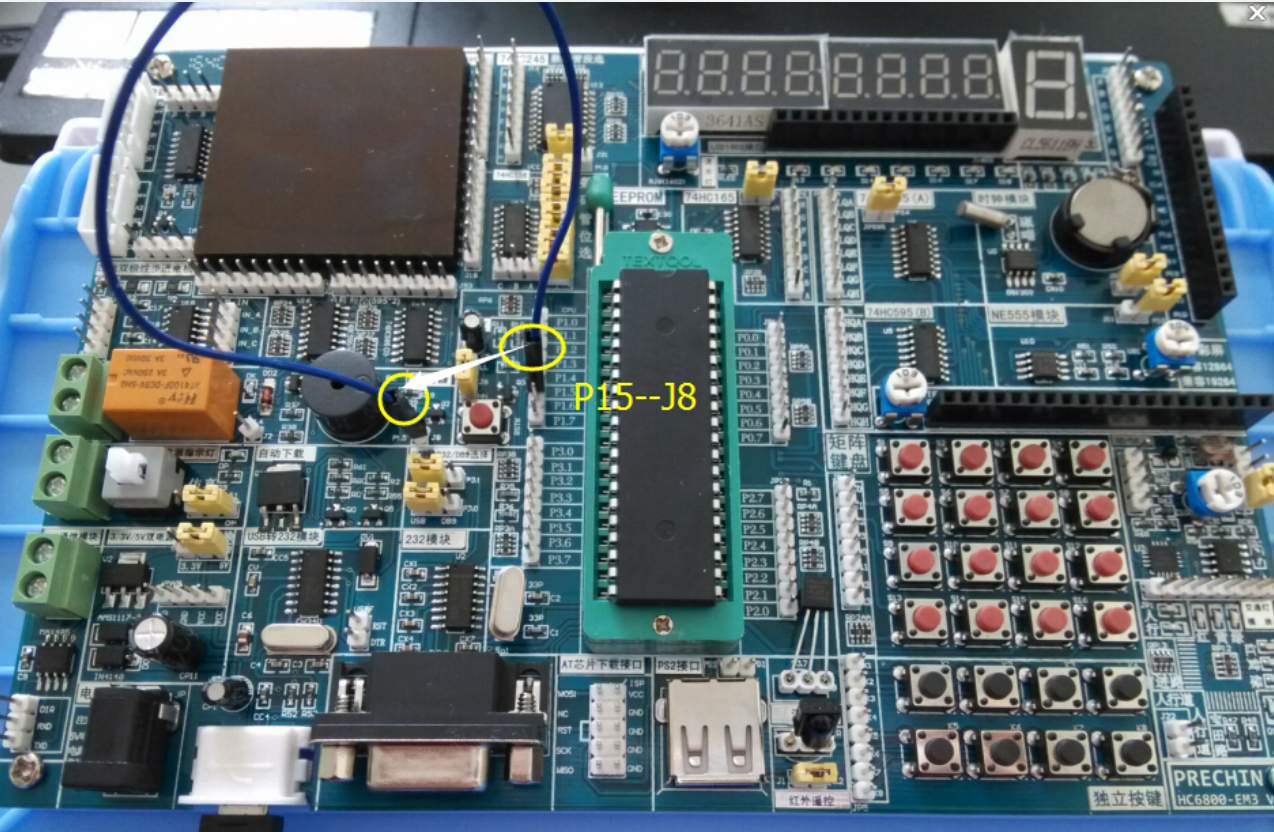
实验39:按键控制数码管@test45_ButtonControlSevenSegmentDisplay



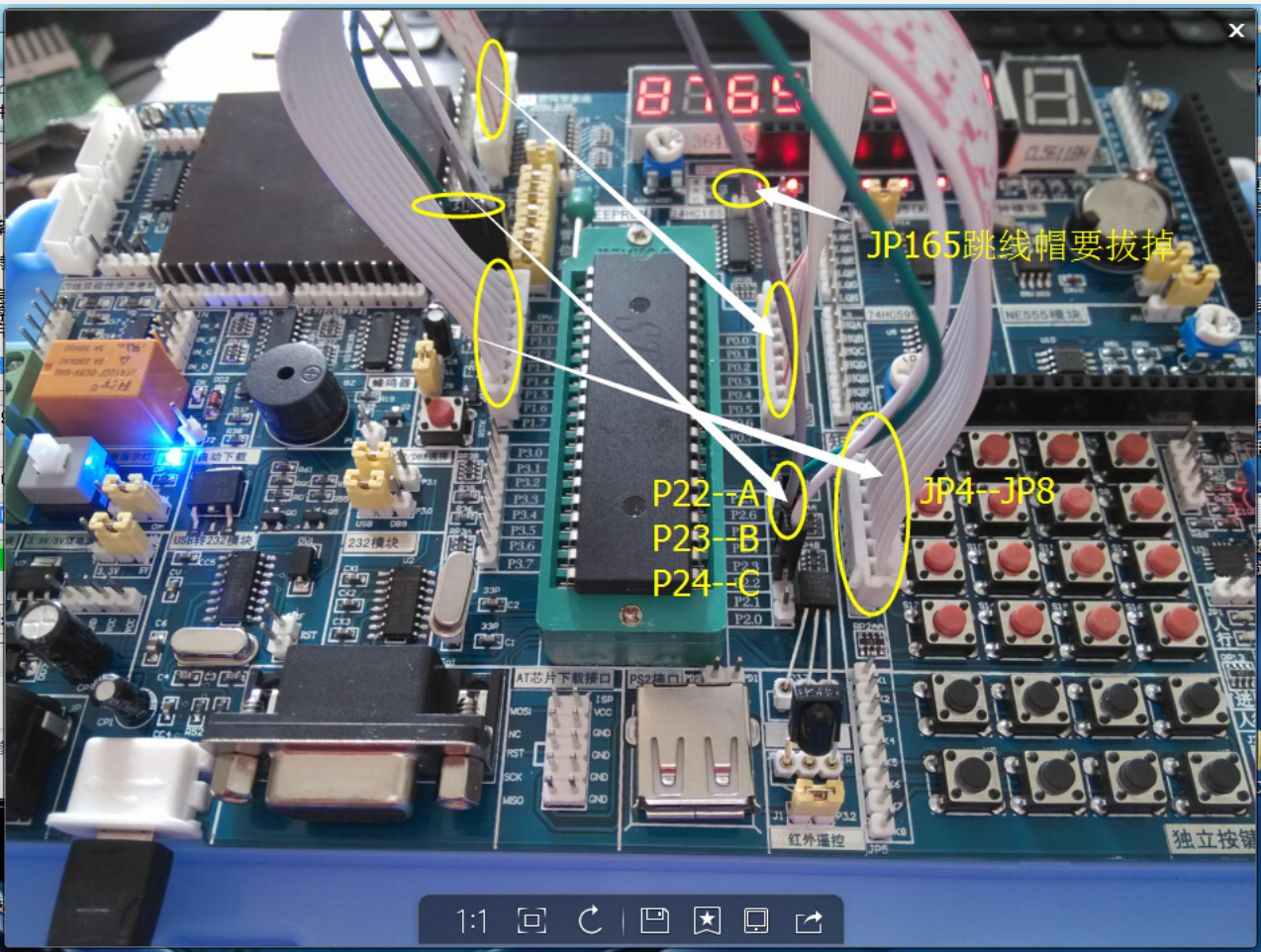
实验40:定时器秒表 (查询方式) @test46_TimerStopwatch_PollingMethod



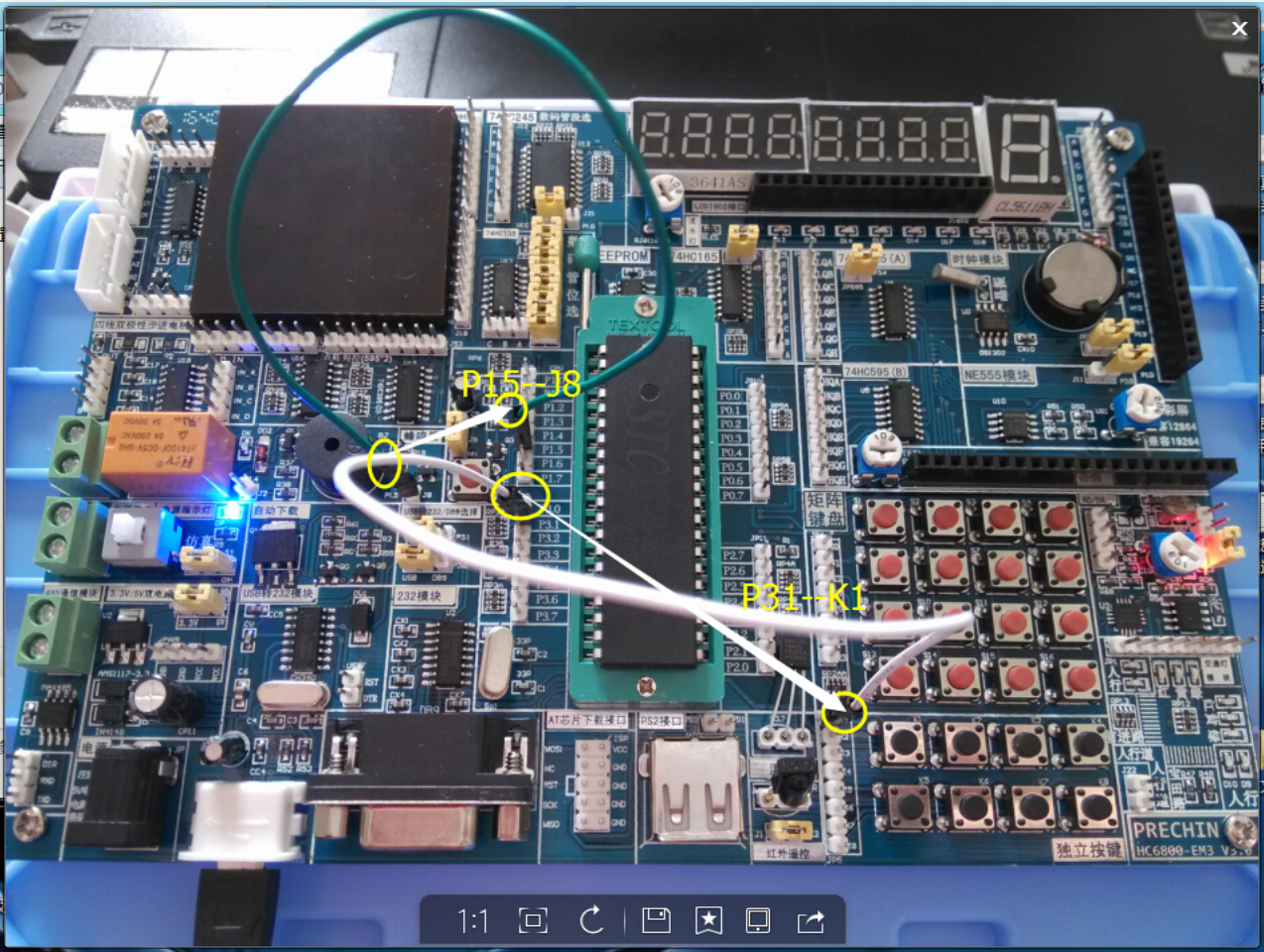
实验41:蜂鸣器音乐之八月桂花@test47_BuzzerMusic_AugustOsmanthus



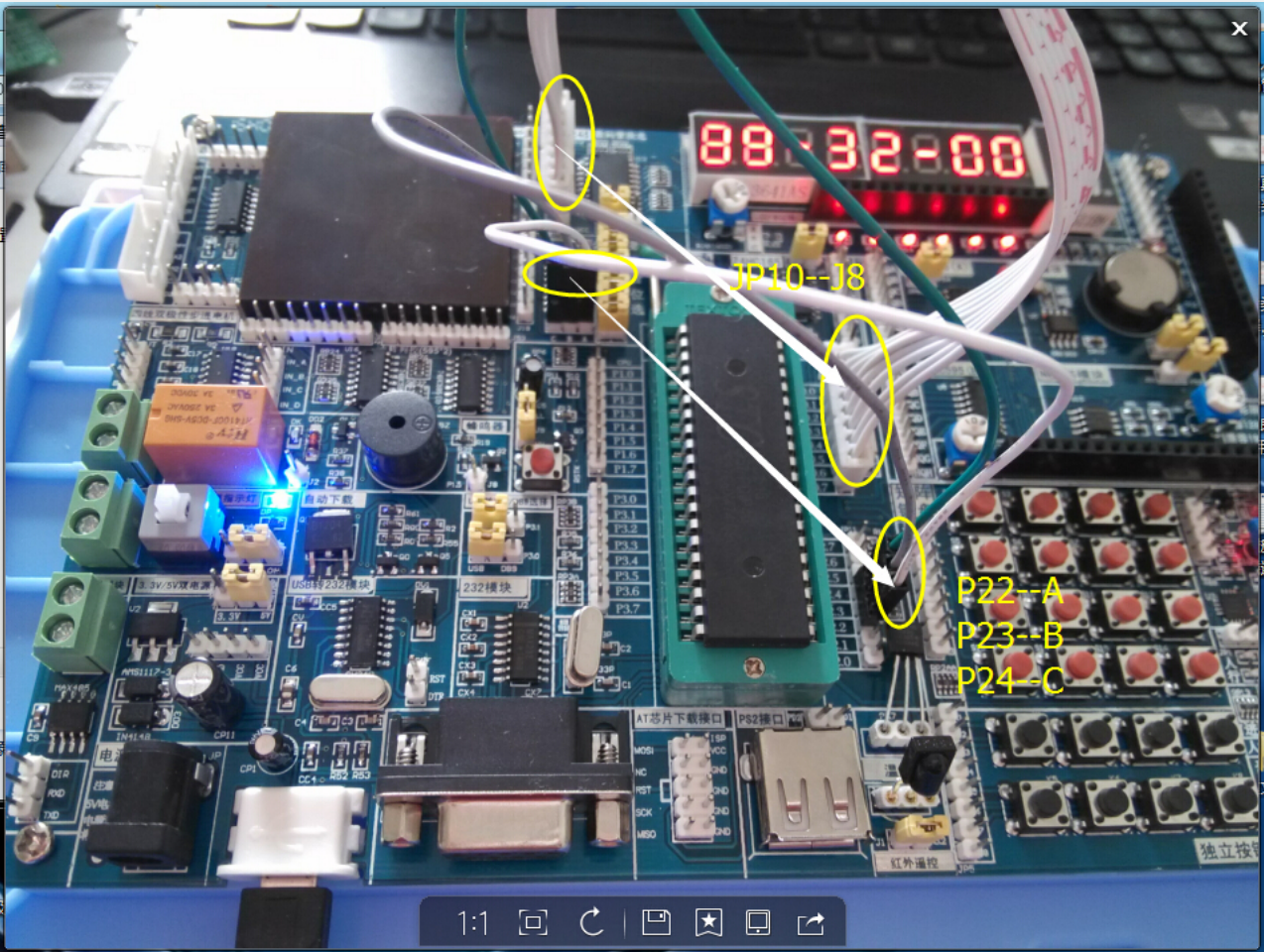
实验42:矩阵按键数码管移位显示@test48_MatrixKeypadSevenSegmentDisplayShift



实验43:门铃设计@test49_DoorbellDesign



实验44:秒表@test50_Stopwatch



实验45:音乐播放器@test51_MusicPlayer

