[Micropython]TPYBoard控制LCD5110汉字显示温度时间

1. ****实验目的****

**1. 学习在PC机系统中扩展简单I/O 接口的方法。**

**2. 什么是SPI接口。**

**3. 学习TPYBoard I2C接口的用法。**

**4. 学习LCD5110接线方法。**

**5. DS3231的接线方法。**

**6. 16\*16汉字显示温度与当前时间。**

****2.所需元器件****

**DS3231模块一个**

**TPYBoard板子一块**

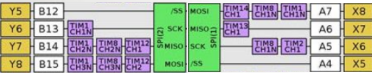
**LCD5110显示屏一个**

**数据线一条**

**杜邦线若干**

1. ****TPYBoard的SPI接口****

**LCD5110需要SPI接口与TPYBoard进行连接传输数据，SPI接口是在CPU和外围低速器件之间进行同步串行数据传输，TPYBoard有两个SPI接口，我们用的为SPI1接口。**



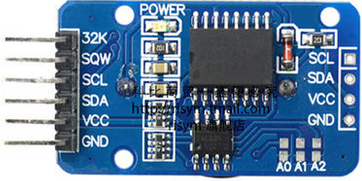
1. ****TPYBoard的I2C接口****

**DS3231是I2C接口通信的，它通过I2C接口与TPYboard进行数据通讯，DS3231通过这个接口与TPYBoard进行双向通讯，进行数据传输，TPYBoard有两个I2C接口，我们在这用的是I2C接口1。**



****5.DS3231的接线方法****

**DS会我们在这只用到DS3231的SCL,SDA,VCC,GND四个针脚即可设定读出当前时间，我们用的是TPYBoard的I2C接口1，即DS3231的针脚SCL接TPYboard的针脚X9，针脚SDA接TPYBoard的针脚X10，VCC接TPYBoard的3.3V，GND接TPYBoard的GND。**

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****6.控制5110显示屏显示16x16汉字****

**Lcd5110针脚对应关系（注意：LCD5110屏幕不一样针脚也不一样）**

**TPYBoard的针脚与5110的针脚对应关系如下：**

**TPYBoard       LCD5110    memo**

**————————————————————————————**

**# any   Pin        => RST       Reset pin (0=reset, 1=normal)**

**# any   Pin        => CE        Chip Enable (0=listen for input,   1=ignore input)**

**# any   Pin        => DC        Data/Command (0=commands, 1=data)**

**#   MOSI          => DIN       data flow (Master out, Slave in)**

**#   SCK           => CLK       SPI clock**

**# 3V3   or any Pin  => VCC       3.3V logic voltage (0=off, 1=on)**

**# any   Pin        => LIGHT     Light (0=on, 1=off)**

**#   GND           => GND**

**还是看不明白的话，直接上针脚编号吧**

**TPYBoard       LCD5110    memo**

**————————————————————————————**

**X1        => RST       Reset pin (0=reset, 1=normal)**

**X2        => CE        Chip Enable (0=listen for input, 1=ignore input)**

**X3         => DC        Data/Command (0=commands, 1=data)**

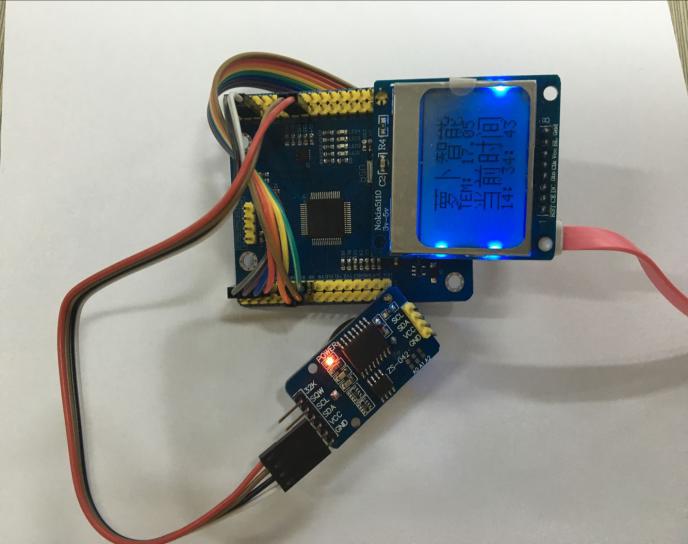
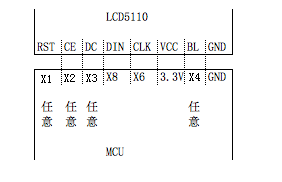
**X8         => DIN       data flow (Master out, Slave in)**

**X6         => CLK       SPI clock**

**VCC**

**X4        =>LIGHT     Light (0=on, 1=off)**

**GND => GND**

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**接线ok后，并且导入font.py文件、upcd8544.py、chinsese.py文件以及DS3231.py，编写main.py设定时间，运行main.py即可将当前温度与时间显示在5110显示屏上,如上图所示。**

****7.源代码****

**# main.py -- put your code here!**

**import pyb**

**import upcd8544**

**from machine import SPI,Pin**

**from DS3231 import DS3231**

**ds=DS3231(1) #定义DS3231**

**# 用于设定时间和日期**

**def setDateTime(year,month,day,time,minutes,seconds):**

**ds.DATE([year,month,day])**

**ds.TIME([time,minutes,seconds])**

**# 在LCD5110 显示时间或日期，separator 中间的分割符**

**# x，y 在LCD5110 显示的位置**

**def showTimeOrDate(why,x,y,separator=':'):**

**# [HH,MM,SS] >> HH:MM:SS**

**why = why.replace('[','')**

**why = why.replace(']','')**

**why = why.replace(',',separator)**

**print(why)**

**lcd\_5110.lcd\_write\_string(why,x,y)**

**def main():**

**lcd\_5110.lcd\_write\_chinese('萝',14,0)**

**lcd\_5110.lcd\_write\_chinese('卜',30,0)**

**lcd\_5110.lcd\_write\_chinese('智',46,0)**

**lcd\_5110.lcd\_write\_chinese('能',62,0)**

**lcd\_5110.lcd\_write\_string('TEM:',14,2)**

**lcd\_5110.lcd\_write\_string(str(ds.TEMP()),44,2)**

**lcd\_5110.lcd\_write\_chinese("当",14,3)**

**lcd\_5110.lcd\_write\_chinese("前",30,3)**

**lcd\_5110.lcd\_write\_chinese("时",46,3)**

**lcd\_5110.lcd\_write\_chinese("间",62,3)**

**showTimeOrDate(str(ds.TIME()),14,5)**

**print(str(ds.TIME()))**

**pyb.delay(1000)**

**if \_\_name\_\_ == '\_\_main\_\_':**

**#setDateTime(2016,12,27,13,17,00)#设置时间**

**ds.DATE()**

**SPI = pyb.SPI(1) #DIN=>X8-MOSI/CLK=>X6-SCK**

**#DIN =>SPI(1).MOSI 'X8' data flow (Master out, Slave in)**

**#CLK =>SPI(1).SCK 'X6' SPI clock**

**RST = pyb.Pin('X1')**

**CE = pyb.Pin('X2')**

**DC = pyb.Pin('X3')**

**LIGHT = pyb.Pin('X4')**

**lcd\_5110 = upcd8544.PCD8544(SPI, RST, CE, DC, LIGHT)**

**while(1):**

**main()**