**电子设计自动化（EDA）实验报告**

实验题号 :实验十三

项目名称 : SOPC嵌入式系统外设接口控制

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实验日期 : 2021-11-27

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实验报告

1. LED
2. 跑马灯

**#include** "system.h"

**#include** "altera\_avalon\_pio\_regs.h"

**#include** "alt\_types.h"

**int** main (**void**) \_\_attribute\_\_ ((weak, alias ("alt\_main")));

**void** delay (**void**)

{

alt\_u32 i=0, j=0;

**while** (i<200000)

i++;

**while** (j<200000)

j++;

**return**;

}

**int** alt\_main (**void**)

{

alt\_u16 led = 0x2;

alt\_u8 dir = 0;

/\*

\* Infinitely shift a variable with one bit set back and forth, and write

\* it to the LED PIO. Software loop provides delay element.

\*/

**while** (1)

{

**if** (led & 0x81)

{

dir = (dir ^ 0x1);

}

**if** (dir)

{

led = led >> 1;

}

**else**

{

led = led << 1;

}

IOWR\_ALTERA\_AVALON\_PIO\_DATA(LED\_PIO\_BASE,led);

delay();

}

**return** 0;

}

1. 按键控制

**#include** "system.h"

**#include** "altera\_avalon\_pio\_regs.h"

**#include** "alt\_types.h"

**int** main (**void**) \_\_attribute\_\_ ((weak, alias ("alt\_main")));

**int** alt\_main (**void**)

{

alt\_u8 button ;

/\*

\* Infinitely shift a variable with one bit set back and forth, and write

\* it to the LED PIO. Software loop provides delay element.

\*/

**while** (1)

{

button=IORD\_ALTERA\_AVALON\_PIO\_DATA(BUTTON\_PIO\_BASE) ;

IOWR\_ALTERA\_AVALON\_PIO\_DATA(LED\_PIO\_BASE,button) ;

}

**return** 0;

}

1. LCD

代码：

**#include** <stdio.h>

**#include** "system.h"

**#include** "altera\_avalon\_pio\_regs.h"

**#include** "alt\_types.h"

**#include** <unistd.h>

**#include** <string.h>

**unsigned** **char** seg[]={'1','2','3','4','5','6','7','8','9','0','a','b','c','d','e','f', 'g','h','i','j','k','l','m','n','o','p','q','r','s','t','u','v'};

**void** Write\_data(alt\_u8 data)

{

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_RS\_BASE,1);

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_NWR\_BASE,0);

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_DATA\_BASE,data); //地址计数器自动加1，显示屏不移动

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_NRD\_BASE,1);

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_NRD\_BASE,0);

usleep(1000);

}

**void** Write\_cmd(alt\_u8 cmd)

{

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_RS\_BASE,0);

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_NWR\_BASE,0);

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_DATA\_BASE,cmd); //地址计数器自动加1，显示屏不移动

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_NRD\_BASE,1);

IOWR\_ALTERA\_AVALON\_PIO\_DATA(TFT\_LCD\_NRD\_BASE,0);

usleep(1000);

}

**void** initial(**void**)

{

Write\_cmd(0x3c);

Write\_cmd(0x06);

Write\_cmd(0x0e);

Write\_cmd(0x01);

}

**int** main()

{

**unsigned** **char** data\_index;

**unsigned** **char** add\_first,add\_second;

initial(); //初始化LCD

data\_index=0;add\_first=0x80;add\_second=0xC0;

**while**(data\_index<=15) //第一行显示

{

Write\_cmd(add\_first+data\_index);

Write\_data(seg[data\_index]);

data\_index++;

}

**while**(data\_index<=31) //第二行显示

{

Write\_cmd(add\_second+data\_index-16);

Write\_data(seg[data\_index]);

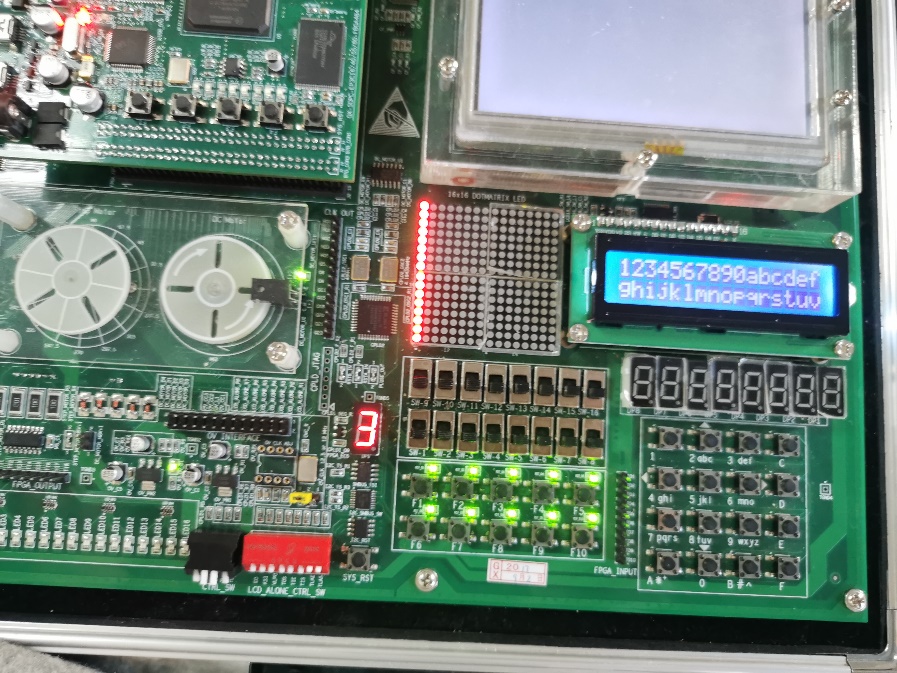
data\_index++;

}

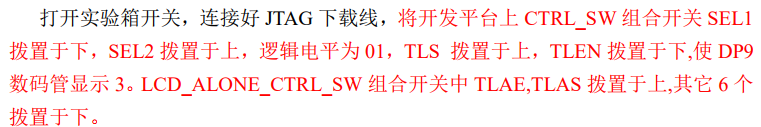
**return** 0;

}

实验结果：



【注意】



1. 点阵

代码：

**#include** "system.h"

**#include** "altera\_avalon\_pio\_regs.h"

**#include** "alt\_types.h"

alt\_u16 row\_num[2][16]= {{0x7FFF,0x4088,0x4208,0x5D8C,

0x6079,0x0082,0x10C4,0x1398,

0x0C90,0xF080,0x5080,0x17FF,

0x1080,0x1090,0x1088,0x1086},//chen

{0x0010,0x0062,0x47A2,0x5524,

0x5564,0xF36F,0x5555,0x5555,

0x57FD,0x04E5,0x0D55,0xFB6D,

0x8A6F,0x8A64,0xF524,0x1926} // xin

};

**int** main()

{

alt\_u8 col\_num,read\_data;

**while**(1)

{

read\_data=IORD\_ALTERA\_AVALON\_PIO\_DATA(BUTTON\_PIO\_BASE) ;

**for**(col\_num=0;col\_num<16;col\_num++)

{

IOWR\_ALTERA\_AVALON\_PIO\_DATA(ROW\_BASE,0);

IOWR\_ALTERA\_AVALON\_PIO\_DATA(COL\_BASE,col\_num) ;

**if**(read\_data==0xfe){

IOWR\_ALTERA\_AVALON\_PIO\_DATA(ROW\_BASE,row\_num[0][col\_num]);

}**else**{

IOWR\_ALTERA\_AVALON\_PIO\_DATA(ROW\_BASE,row\_num[1][col\_num]);

}

usleep(1);

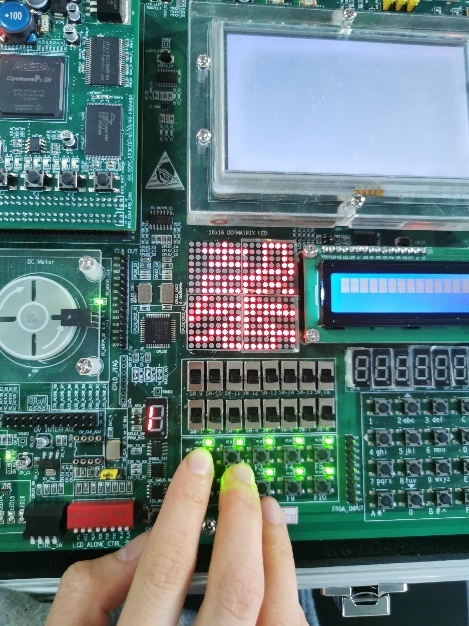
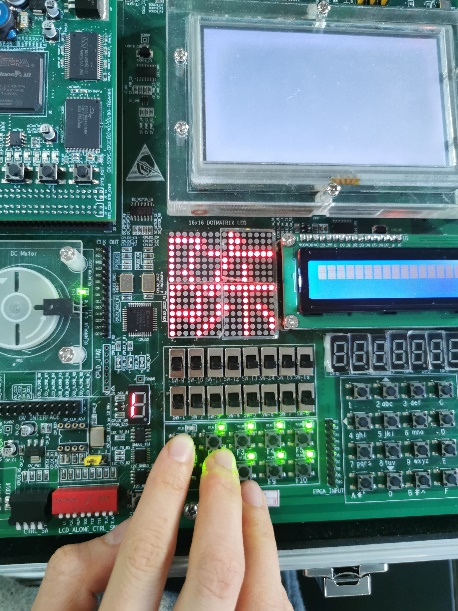
}

}

**return** 0;

}

实验结果：



顶层模块：

