

FT60F01X

Application note

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FT60F01x SLEEP 相关寄存器的设置

1 Sleep 睡眠模式功能及注意事项

产品在待机状态时候，要想达到最低功耗，可以选择睡眠模式，既可以随时唤醒，也可以减少损耗。

为了达到最低睡眠功耗(<3 ua)，注意如下：

- 1、当 IO 口悬空时候，软件可以将所悬空的 IO 口 设为输出并置低，若没有悬空，则以外围电路状态为主，避免 IO 口 耗电；
- 2、I/O 作为输入的，外部电路应将其拉高或拉低，避免翻转耗电；
- 3、/MCLR 应该在高电平；
- 4、选择 LVREN 禁止使能。

2 应用范例

```
//*****
/* 文件名: TEST_60F01x_SLEEP.c
* 功能:   FT60F01x-SLEEP 功能演示
* IC:     FT60F011A SOP8
* 晶振:   16M/4T
* 说明:   此程序为 FT60F01x-SLEEP 睡眠演示程序，上电之后 PA0、PA1 同时置高约 4s，
*         然后置低，进入睡眠。测试 FT60F01x 的睡眠功耗：
*
*         FT60F011A  SOP8
*         -----
* VDD-----|1(VDD) (GND)8|-----GND
* NC-----|2(PA2)  (PA4)7|-----NC
* led1-----|3(PA1)  (PA5)6|-----NC
* NC-----|4(PA3)  (PA0)5|-----led2
*         -----
*/
//*****
#include "SYSCFG.h"
//*****
#define OSC_16M  0X70
#define OSC_8M   0X60
#define OSC_4M   0X50
#define OSC_2M   0X40
#define OSC_1M   0X30
#define OSC_500K 0X20
#define OSC_250K 0X10
#define OSC_32K  0X00

#define WDT_256K 0X80
#define WDT_32K  0X00
```

```

/*****
/*****宏定义*****/
#define uchar      unsigned char
#define uint       unsigned int
#define ulong      unsigned long
#define led1       RA1
#define led2       RA0

/*-----
* 函数名: POWER_INITIAL
* 功能:   上电系统初始化
* 输入:   无
* 输出:   无
-----*/

void POWER_INITIAL(void)
{
    OSCCON = WDT_32K|OSC_16M|0X01; //INROSC
    //OSCCON = 0B01110001;          //WDT 32KHZ IRCF=111=16MHZ/4=4MHZ,0.25US/T
                                   //Bit0=1,系统时钟为内部振荡器(60F01x 保留位)
                                   //Bit0=0,时钟源由 FOSC<2:0>决定即编译选项时选择

    INTCON = 0;                    //暂禁止所有中断

    PORTA = 0B00000000;
    TRISA = 0B00000000;            //PA 输入输出 0-输出 1-输入
    WPUA = 0B00100000;            //PA 端口上拉控制 1-开上拉 0-关上拉
    //WPUA2 = 1;                  //开 PA2 上拉

    OPTION = 0B00001000;          //Bit3=1 WDT MODE,PS=000=1:1 WDT RATE
                                   //Bit7(PAPU)=0 ENABLED PULL UP PA

    MSCKCON = 0B00000000;         //Bit6->0,禁止 PA4, PC5 稳压输出(60F01x 保留位)
                                   //Bit5->0,TIMER2 时钟为 Fosc(60F01x 保留位)
                                   //Bit4->0,禁止 LVR(60F01x O 版之前)
                                   //Bit4->0, LVREN 使能时,开启 LVR(60F01x O 版及
                                   //O 版后)
                                   //Bit4->1, LVREN 使能时,工作时开启 LVR, 睡眠时自
                                   //动关闭 LVR(60F01x O 版及 O 版之后)

}

/*-----
* 函数名称: DelayUs
* 功能:     短延时函数 --16M-2T--大概快 1%左右.
* 输入参数: Time 延时时间长度 延时时长 Time Us
* 返回参数: 无
-----*/

void DelayUs(unsigned char Time)
{

```

```
    unsigned char a;
    for(a=0;a<Time;a++)
    {
        CLRWDT();
    }
}
/*-----
* 函数名称: DelayMs
* 功能:      短延时函数
* 输入参数: Time 延时时间长度 延时时长 Time ms
* 返回参数: 无
-----*/
void DelayMs(unsigned char Time)
{
    unsigned char a,b;
    for(a=0;a<Time;a++)
    {
        for(b=0;b<5;b++)
        {
            DelayUs(197);          //快 1%
        }
    }
}
/*-----
* 函数名称: DelayS
* 功能:      短延时函数
* 输入参数: Time 延时时间长度 延时时长 Time S
* 返回参数: 无
-----*/
void DelayS(unsigned char Time)
{
    unsigned char a,b;
    for(a=0;a<Time;a++)
    {
        for(b=0;b<10;b++)
        {
            DelayMs(100);
        }
    }
}
/*-----
* 函数名:  main
* 功能:    主函数
* 输入:    无
```

* 输出: 无

-----*/

```
void main()
```

```
{
```

```
    POWER_INITIAL();    //系统初始化
```

```
    led1 = 1;
```

```
    led2 = 1;
```

```
    DelayS(3);
```

```
    led1 = 0;
```

```
    led2 = 0;
```

```
    while(1)
```

```
    {
```

```
        CLRWDT();        //清看门狗
```

```
        NOP();
```

```
        SLEEP();
```

```
        NOP();
```

```
    }
```

```
}
```

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