基于N76E003实现Wiegand协议封包

NuMicro® 8 位系列微控制器范例代码介绍

文件信息

代码简述	本范例代码基于N76E003的定时器(Timer)与通用输入输出接口(GPIO)实现收发Wiegand 协议封包
BSP 版本	N76E003_BSP_Keil_C51_V1.0.6
开发平台	NT-N76E003 V2.1

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1 功能介绍

1.1 简介

Wiegand通讯协议由摩托罗拉公司制定，广泛应用于门禁系统的读卡器和电子卡片，为现今的工业标准，最常见的格式为标准的26-bit封包。本范例代码基于N76E003的定时器(Timer)与通用输入输出接口(GPIO)实现收发26-bit的Wiegand协议封包。

1.2 Wiegand 协议

Wiegand界面是一种通讯协议，由3根线组成 Data0, Data1, Data return。Data0与Data1在没有数据输出时保持+5V高电平。若输出为0，则D0拉低一段时间；若输出为1，则D1拉低一段时间。

1.3 Wiegand 协议结构

标准Wiegand协议是由26位二进制数组成，定义如下：

Bit	含义
Bit 1	作为 BIT[2:13] (A Data) 隐含码(HID, Hidden ID code)的奇偶校验位
Bit [2:9]	低8位 (A Data)，作为隐含码使用，Bit 2 是MSB
Bit [10:25]	高16位 (B Data)，作为公开码(PID, Public ID code)使用 Bit 10 是MSB
Bit [26]	作为BIT [14:25] (B Data) 公开码的奇校验位

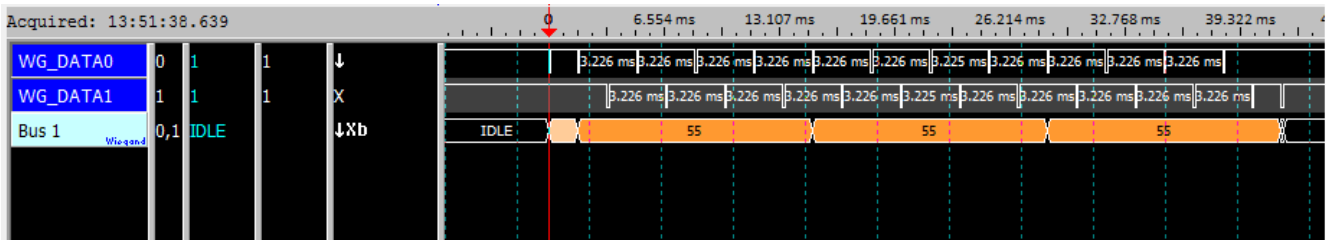
组合为26位数据如下

1	2	3	4	5		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
P	A	A	A	A		A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	P
		Even parity Field								Odd Parity Field																
		Facility Code								Card Number																

Public ID code (PID): 不同卡片具有不同的公开码，以区别用户。
Hidden ID code (HID): 隐含码存放在卡片中，也存放于读卡器中，假如卡片与读卡器中的HID码不同的话，卡片将无法在读卡器上使用。.

1.4 执行结果

送出 0x55, 0x55, 0x55 后量测到的 Weigand Bus 结果



2 代码介绍

主程序：

```
/*---------------------------------------------------------------------------*/
/* Global variables                                                          */
/*---------------------------------------------------------------------------*/
unsigned char out[3] = {0x55, 0x55, 0x55};

/*---------------------------------------------------------------------------*/
/* Functions                                                                 */
/*---------------------------------------------------------------------------*/
void main(void)
{
    //Keep wiegand bus on high state.
    P05 = 1;
    P06 = 1;
    //initial all gpio on quasi mode
    Set_All_GPIO_Quasi_Mode;
    delay_1500us();
    //send wiegand package
    send_wiegand26(out);
    while(1);
}
```

发送 26 位数据的程序

```
void send_wiegand26(unsigned char *str)
{
    unsigned char data i;
    unsigned  char check_temp;
    unsigned char data check;
    bit  even;
    bit  odd;
    unsigned char data wiegand[3];

    wiegand[0] = *str;
    wiegand[1] = *(str + 1);
    wiegand[2] = *(str + 2);
    check = 0;
    check_temp = wiegand[0];
    //even data check for data 2-9
    for(i = 0; i < 8; i++)
    {
        if((check_temp & 0x80) == 0X80)
        {
            check++;
        }
        check_temp = check_temp << 1;
    }
    if(check % 2 == 0)
        even = 0;
    else
        even = 1;
    check = 0;
    //odd data check for data 10-25
    check_temp = wiegand[1];
    for(i = 0; i < 8; i++)
    {
        if(check_temp & 0x80 == 0X80)
```

```
        {
            check++;
        }
        check_temp = check_temp << 1;
    }
    check_temp = wiegand[2];
    for(i = 0; i < 8; i++)
    {
        if(check_temp & 0x80 == 0X80)
        {
            check++;
        }
        check_temp = check_temp << 1;
    }
    if(check % 2 == 0)
        odd = 1;
    else
        odd = 0;
    //send header ep
    if(even)
    {
        WG_send_bit_1();
    }
    else
    {
        WG_send_bit_0();
    }
    //send data
    for(i = 0; i < 24; i++)
    {

        if((wiegand[0]) & 0x80)
        {
            WG_send_bit_1();
        }
        else
        {
            WG_send_bit_0();
        }
        (*(long*)&wiegand[0]) <<= 1;
    }
    //send op
    if(odd)
    {
        WG_send_bit_1();
    }
    else
    {
        WG_send_bit_0();
    }
}           …
          GPIO_CLR_INT_FLAG(PE, BIT0);
       }
```

3 软件与硬件环境

- **软件环境**
  - BSP 版本
    - N76E003_BSP_Keil_C51_V1.0.6
  - IDE 版本
    - Keil uVersion 4.6 及 PK51 Development Kit V9.52
- **硬件环境**
  - 硬件需求
    - NT-N76E003 V2.1 两组
  - 接线图

VCC	↔	VCC
P05	↔	P05
P06	↔	P06
GND	↔	GND
NT-N76E003 V2.1 (主设备)		NT-N76E003 V2.1 (从设备)

4 目录信息

- N76E003_Wiegand_V1.0
  - Common: N76E003 common function library.
  - Include: N76E003 code header.
  - Sample_Code
    - ExampleCode： Source file of example code
      - Wiegand_Master: Example code source file of wiegand master.
      - Wiegand_Slave: Example code source file of wiegand slave.
  - Startup
    - N76E003: startup code.

5 如何执行范例程序

1. 本项目支持Keil uVersion 4.6及以上版本
2. 根据目录信息进入Sample_Code\ExampleCode文件夹，双击Wiegand_Master与Wiegand_Slave文件夹中的Wiegand_Master.uvproj与Wiegand_Slave.uvproj
3. 进入编译模式接口
   a. 编译
   b. 下载代码至内存
   c. 进入 / 离开除错模式
4. 进入除错模式接口
   a. 可别进入除错模式进行调试
   b. 执行代码

6 修订纪录

日期	版本	描述
Sep. 24, 2019	1.00	1. 初始发布.

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