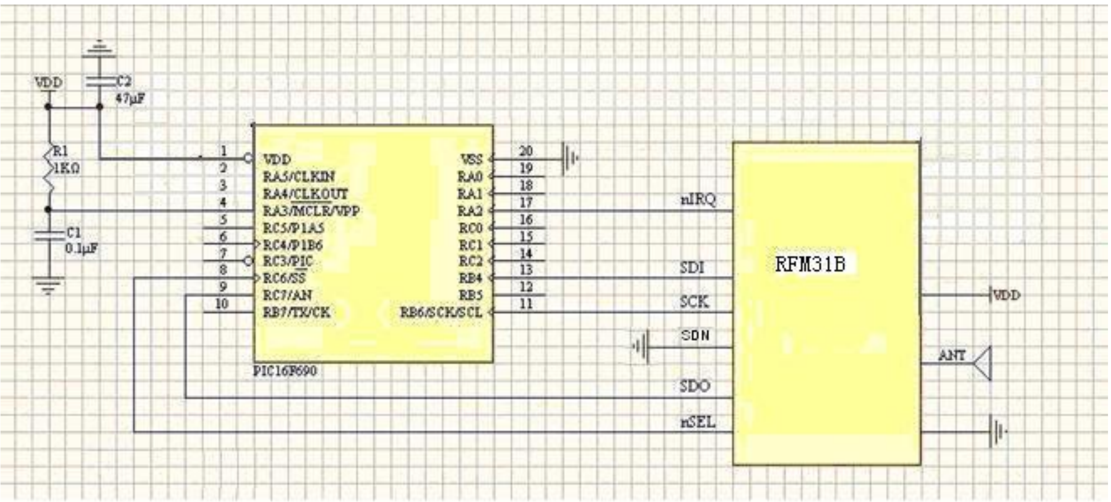
Title: RFM31B receive demo program



Note: The SDN pin connect to GND or control by IO port of MCU. When the module is in working, the SDN pin must set to low.When the SDN pin is high,the Module current consumption is 0.01uA.

```
Title: RFM31B receive demo program
Current version: v1.0
Function: Package send Demo
Processor PIC16F690 DIP-20
Clock: internal 8M.
Operate frequency: 434MHz
Data rate: 4.8kbps
modulation: FSK
deviation: 45K
bandwidth: 94.8K
frame mode: PH + FIFO
payload 0x30, 0x31...0x3f, 0x78(chksum)
Company: HopeRF microelectroni
Contact: +86-0755-82973806
Date: 2000-05-31
*/

#include<pic.h>
#include<math.h>




#define    LED_GREEN        RC4
```

```
#define    LED_RED              RB5


unsigned char    temp0;

unsigned char RF_RXBUF[35];

unsigned char send_command(void);

void to_rx_mode(void);
void rx_reset(void);
void to_ready_mode(void);



void send_8bit_command(unsigned char i);
void send_read_address(unsigned char i);
void spi_write(unsigned char j, unsigned char i);

void RF31B_init_parameter(void);
void delay_50ms(void);
void delay_200ms(void);
void delay_5ms(void);
void delay_1ms(void);
void port_init(void);
void power_on_delay(void);

unsigned char spi_read(unsigned char i);

void Write0( void );
void Write1( void );

void Write8bitcommand(unsigned char command);

void main()
{
        unsigned char    i, chksum;

        OSCCON = 0X70;  // pic osc initial
        WDTCON = 0X00;    // pic watch dog initial

        power_on_delay();      // pic power on delay for system stable
        port_init();           // pic I/O port initial
```

```
    INTCON = 0x00;   // interrupt disable

    RF31B_init_parameter();      // RF IC register initial

    to_rx_mode();     // start Rx

    while(1)
    {
        if(!RA2)
        {


            send_read_address(0x7f);
            for(i = 0; i<17; i++)
            {
                RF_RXBUF[i] = send_command();
            }

            chksum = 0;
                for(i=0;i<16;i++)
                    chksum += RF_RXBUF[i];

                if(( chksum == RF_RXBUF[16] )&&( RF_RXBUF[0] == 0x30 ))
                {
                    to_ready_mode();
                }
                else
                {
                rx_reset();
                }
        }
    }
}

void Write0( void )       // send data 0
{
    RB6=0;
    NOP();

    RB4=0;
    NOP();

    RB6=1;
    NOP();

}

void Write1( void )   // send data 1
{
    RB6=0;
    NOP();

    RB4=1;
    NOP();

    RB6=1;
    NOP();
}

void Write8bitcommand(unsigned char command)    // send 8bit command
{
    unsigned char n=8;
    RC6 = 1;        // RC6 = 1;
    RB6=0;              // RB6 = 0;
    RC6=0;              // RC6 = 0;
    while(n--)          // cycle to 8 times
    {
            if(command&0x80)// send one bit command
            Write1();
            else
            Write0();
            command = command << 1;
    }

}



void delay_200ms(void)
{
    unsigned char j;
    for(j = 0; j<40; j++)   // delay 200ms = 40*5ms
    {
        delay_5ms();
    }
}
void delay_50ms(void)
{
        unsigned char    j;
        for(j = 0; j<10; j++)
        {
                delay_5ms();      // delay 50ms = 10*5ms
        }
}

void delay_5ms(void)
{
        int i;
        for(i = 0; i<650; i++)
        {
                ;                              // delay 5ms
        }
}

void delay_1ms(void)
{
        unsigned char i;
        for(i = 0; i<130; i++)
        {
                ;                            // delay 1ms
        }
}

void port_init(void)
{
        ANSEL = 0;
        ANSELH = 0;
        WPUA = 0;
        IOCA = 0;
        TRISA = 0x0f;
        TRISB = 0x80;
        WPUB = 0x00;
        TRISC = 0b10101111;
        RA4 = RA5 = 0;
        LED_GREEN = LED_RED = 0;
}
void power_on_delay(void)
{
        unsigned int i;
        for(i = 0; i<1000; i++)
        {
                delay_1ms();
        }
}


unsigned char spi_read(unsigned char i)
{
        unsigned char result;
        send_read_address(i);
        result = send_command();
        RC6 = 1;
        return(result);
}

void RF31B_init_parameter(void)
{



        spi_write(0x06, 0x00);   // interrupt all disable

        spi_write(0x07, 01);       // to ready mode

        spi_write(0x09, 0x7f);   // cap = 12.5pf

        spi_write(0x0a, 0x05);    //clk output is 2MHz
        spi_write(0x0b, 0xf4);    // GPIO0 is for Rx data output
        spi_write(0x0c, 0xef); // GPIO1 Tx/Rx data clk output
        spi_write(0x0d, 0x00);    // GPIO2 for MCLK output
        spi_write(0x0e, 0x00);    //GPIO port use default value

        spi_write(0x0f, 0x70);    // NO ADC used

        spi_write(0x10, 0x00);   //no adc used

        spi_write(0x12, 0x00);   // no temperature sensor used
        spi_write(0x13, 0x00);   // no temperature sensor used

        spi_write(0x70, 0x20);    // no mancheset code, no data whiting, data rate < 30Kbps

        spi_write(0x1c, 0x1d);   // IF filter bandwidth
        spi_write(0x1d, 0x40);   // AFC LOOP
        spi_write(0x1e, 0x08); //AFC timing

        spi_write(0x20, 0xa1);   //clock recovery
        spi_write(0x21, 0x20);   //clock recovery
        spi_write(0x22, 0x4e;    //clock recovery
        spi_write(0x23, 0xa5);   //clock recovery
        spi_write(0x24, 0x00);   //clock recovery timing
        spi_write(0x25, 0x0a);   //clock recovery timing

        spi_write(0x2a, 0x1e);
        spi_write(0x2c, 0x29);
        spi_write(0x2d, 0x04);
        spi_write(0x2e, 0x29);

//      spi_write(0x6e, 0x27);   // Tx data rate 1
//      spi_write(0x6f, 0x52);   // Tx data rate 0

        spi_write(0x30, 0x41);     // data access control



        spi_write(0x32, 0xff);   // header control

        spi_write(0x33, 0x42);   // // header 3, 2, 1,0 used for head length, fixed packet length, synchronize word length 3, 2,



        spi_write(0x34, 64);     // 64 nibble = 32byte preamble
        spi_write(0x35, 0x20);   //0x35 need to detect 20bit preamble
        spi_write(0x36, 0x2d);   // synchronize word
        spi_write(0x37, 0xd4);
        spi_write(0x38, 0x00);
        spi_write(0x39, 0x00);
//      spi_write(0x3a, 's');            // set tx header
//      spi_write(0x3b, 'o');
//      spi_write(0x3c, 'n');
//      spi_write(0x3d, 'g');
//      spi_write(0x3e, 17);   // total tx 17 byte
        spi_write(0x3f, 's');      // set rx header
        spi_write(0x40, 'o');
        spi_write(0x41, 'n');
        spi_write(0x42, 'g');
        spi_write(0x43, 0xff); // all the bit to be checked
        spi_write(0x44, 0xff); // all the bit to be checked
        spi_write(0x45, 0xff); // all the bit to be checked
        spi_write(0x46, 0xff); // all the bit to be checked
```

```
//      spi_write(0x56, 0x01);

//      spi_write(0x6d, 0x07); // tx power to Max

        spi_write(0x79, 0x0);    // no frequency hopping
        spi_write(0x7a, 0x0);    // no frequency hopping

        spi_write(0x71, 0x22); // Gfsk, fd[8] =0, no invert for Tx/Rx data, fifo mode, txclk -->gpio

//      spi_write(0x72, 0x48); // frequency deviation setting to 45k = 72*625

        spi_write(0x73, 0x0);    // no frequency offset
        spi_write(0x74, 0x0);      // no frequency offset

        spi_write(0x75, 0x53); // frequency set to 434MHz
        spi_write(0x76, 0x64); // frequency set to 434MHz
        spi_write(0x77, 0x00);// frequency set to 434MHz
}



void spi_write(unsigned char j, unsigned char i)
{
        j |= 0x80;
        Write8bitcommand(j);                    // spi write funciton
        send_8bit_command(i);
        RC6 = 1;
}

void send_read_address(unsigned char i)
{
        i &= 0x7f;                              // spi read funciton
        Write8bitcommand(i);
}

void send_8bit_command(unsigned char i)
{
        unsigned char n = 8;
        RB6=0;
        while(n--)
        {
                if(i&0x80)
                Write1();
                else
```

```
            Write0();
            i = i << 1;
    }
    RB6=0;
}

unsigned char send_command(void)
{
    unsigned char Result, i;

    RB6=0;
    Result=0;
    for(i=0;i<8;i++)
    {
        Result=Result<<1;
        RB6=1;
        NOP();
        if(RC7)
        {
            Result|=1;
        }

        RB6=0;
        NOP();
     }
    return(Result);
}

void to_rx_mode(void)
{
    to_ready_mode();
    RA5 = 1;
    RA4 = 0;
    delay_50ms();
    rx_reset();
}

void rx_reset(void)
{
    spi_write(0x07, 01);

    i = spi_read(0x03);        //read the Interrupt Status1 register
    i = spi_read(0x04);
```

```
        spi_write(0x7e, 17);

        spi_write(0x08, 0x03);      // fifo reset
        spi_write(0x08, 0x00);

        spi_write(0x07,05 );

        spi_write(0x05, 02);


}

void to_ready_mode(void)
{



        spi_write(0x07, 01);

}
```