Lecture (11)
PIC16F84A Serial interface interfacing light and temperature sensors

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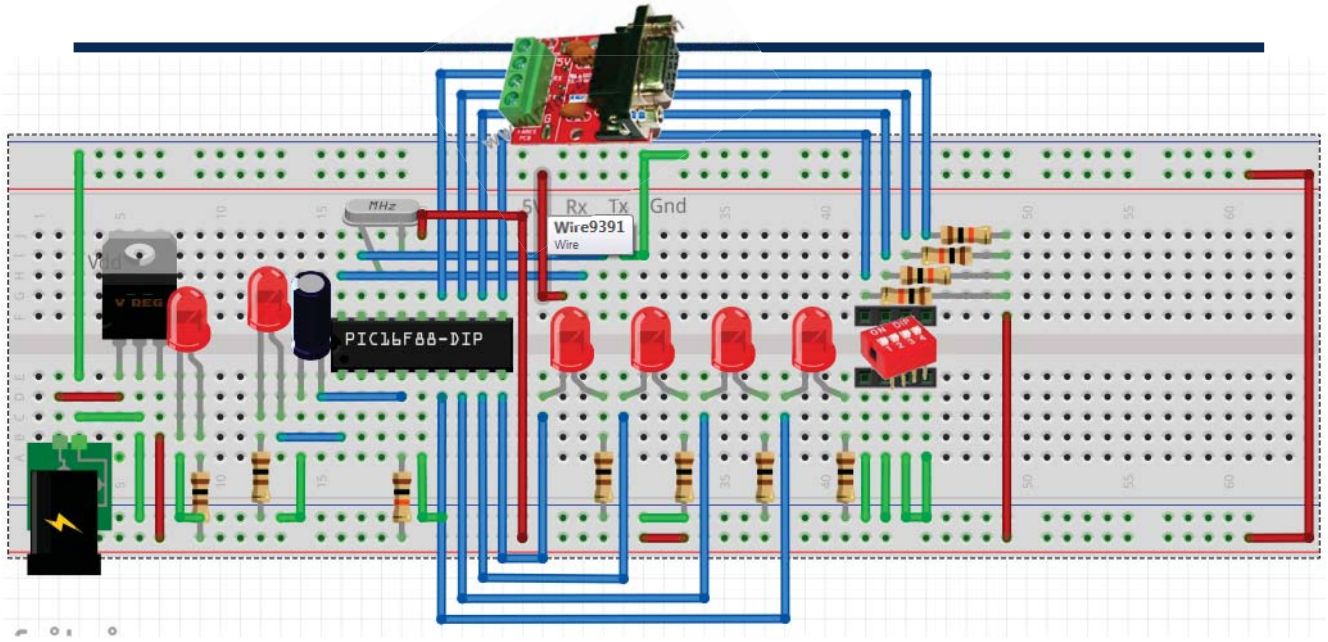
- PIC16F84A serial interface

PC controlled and monitor module



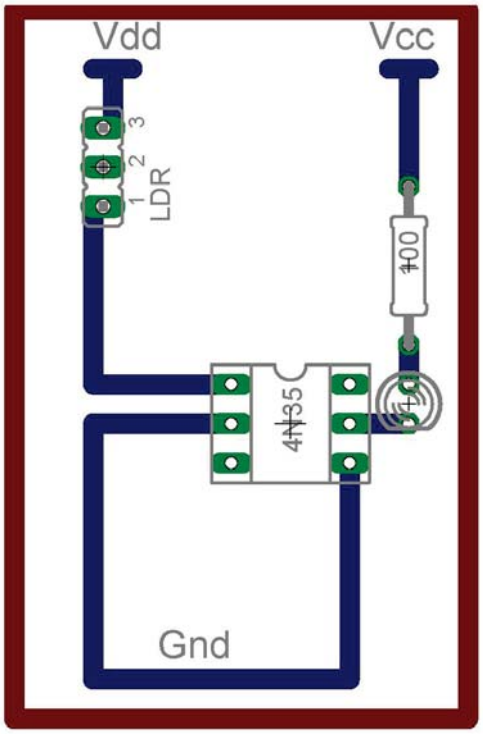
Software_UART.h

```
#define _XTAL_FREQ 4000000
#define Baudrate   300
#define OneBitDelay (1000000/Baudrate)
#define DataBitCount 8
#define UART_RX RA1
#define UART_TX RA0
#define UART_RX_DIR TRISA1
#define UART_TX_DIR TRISA0

//Function Declarations
void InitSoftUART(void);
unsigned char UART_Receive(void);
void UART_Transmit(const char);
void UART_Transmit_Str(char str[]);
```

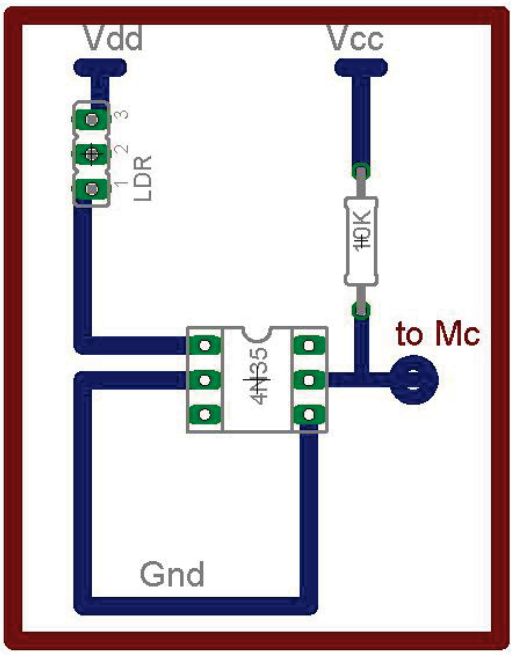
Newfile.c

```
#include <xc.h>
//#include <htc.h>
#include <pic16f84a.h>
#include "Software_UART.h"
#include "config.h"

int main(void) {
        unsigned char ch = 0;          //
Variable to store Rx character
    int act1=0,act2=0,act3=0,act4=0;
        InitSoftUART();
          // Intialize Soft UART
    TRISB=0xf0;
    PORTB=0x00;
    RB0=act1;
    RB1=act2;
    RB2=act3;
    RB3=act4;
    UART_Transmit_Str("\n\rwelcome to
serial control and monitor project");
        while(1)
        {
                ch = UART_Receive();
// Receive a character from UART
            switch(ch)
            {
                case '1':
                    act1=~act1;
                    RB0=act1;
UART_Transmit_Str("\n\rActuator 1 : ");
                    if(act1==0)
UART_Transmit_Str("DeActivated");
                    else
UART_Transmit_Str("Activated");
                    break;
                case '2':
                    act2=~act2;
                    RB1=act2;
UART_Transmit_Str("\n\rActuator 2 : ");
                    if(act2==0)
UART_Transmit_Str("DeActivated");
                    else
UART_Transmit_Str("Activated");
                    break;
                case '3':
                    act3=~act3;
                    RB2=act3;
 UART_Transmit_Str("\n\rActuator 3 : ");
                    if(act3==0)
UART_Transmit_Str("DeActivated");
                    else
UART_Transmit_Str("Activated");
                    break;
                case '4':
                    act4=~act4;
                    RB3=act4;
UART_Transmit_Str("\n\rActuator 4 : ");
                    if(act4==0)
UART_Transmit_Str("DeActivated");
                    else
UART_Transmit_Str("Activated");
                    break;
                case '?':
UART_Transmit_Str("\n\rAlarm 1 : ");
                    if(RB4==0)
UART_Transmit_Str("Active");
                    else
UART_Transmit_Str("Clear");

UART_Transmit_Str("\n\rAlarm 2 : ");
                    if(RB5==0)
UART_Transmit_Str("Active");
                    else
UART_Transmit_Str("Clear");

UART_Transmit_Str("\n\rAlarm 3 : ");
                    if(RB6==0)
UART_Transmit_Str("Active");
                    else
UART_Transmit_Str("Clear");

UART_Transmit_Str("\n\rAlarm 4 : ");
                    if(RB7==0)
UART_Transmit_Str("Active");
                    else
UART_Transmit_Str("Clear");
                    break;
                default:
                   UART_Transmit_Str("\n\rYou
typed : ");
                    UART_Transmit(ch);
                    break;
             }
            }
   return (0);}
```

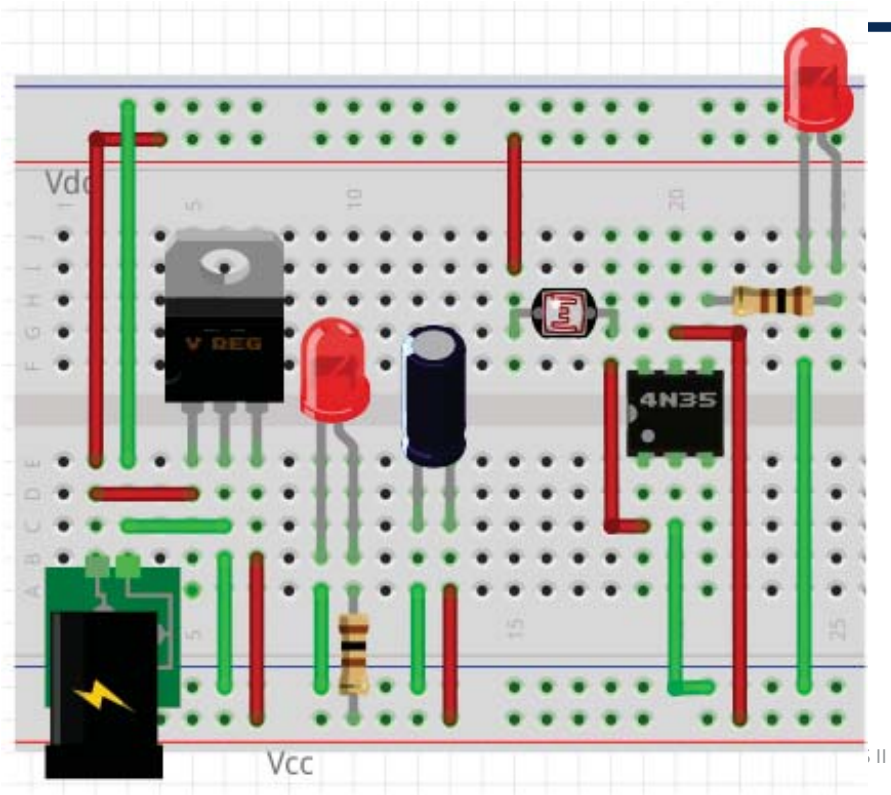
Interfacing generic sensors using opto-coupler isolators I, Light sensor (LDR)



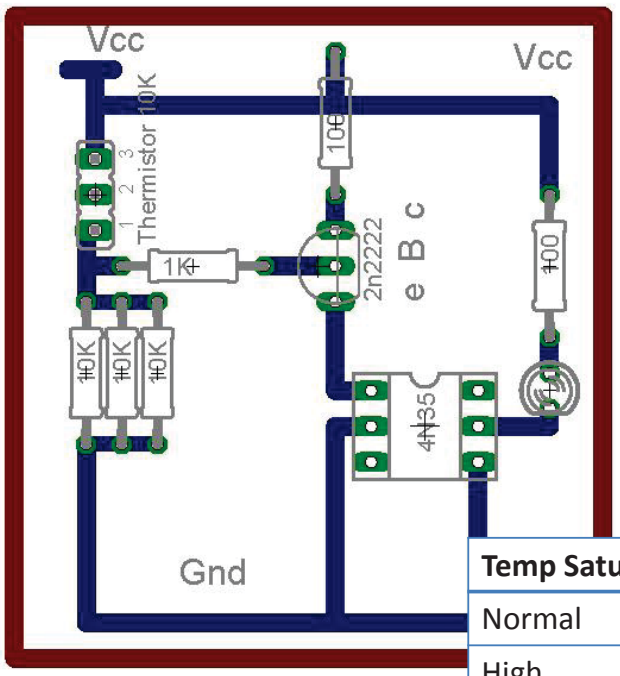
Light status	Resistance	Coupler	Led
dark	1 mega ohm	off	Off
light	36 k ohm	On	on



Light status	Resistance	Coupler	To MC
dark	1 mega ohm	off	1
light	36 k ohm	On	0



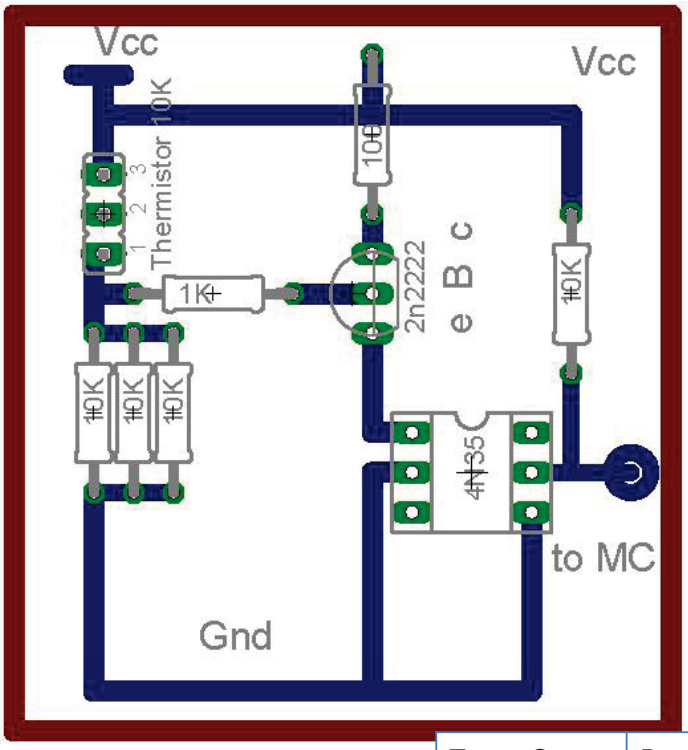
Interfacing generic sensors using opto-coupler isolators II, Temp sensor (Thermistor)



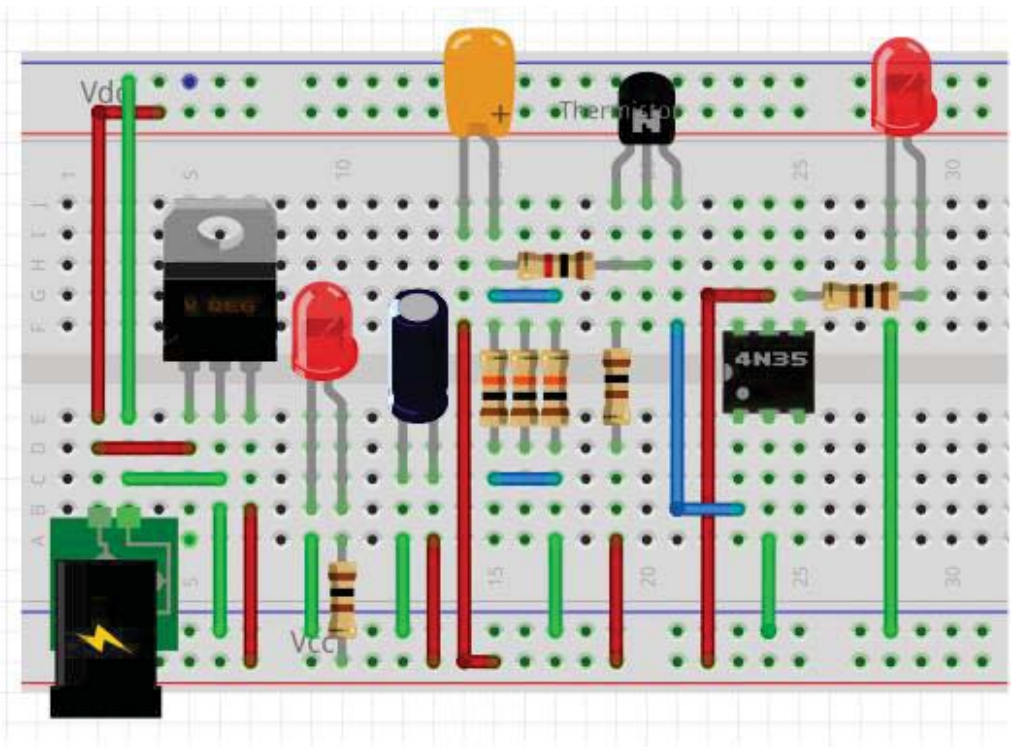
Temp status	Thermistor Resistance
Room temp ()	10 K ohm
High temp ()	5 K ohm

For the best temp sensitivity
Rvar = 3.6K or 3 parallel 10K R

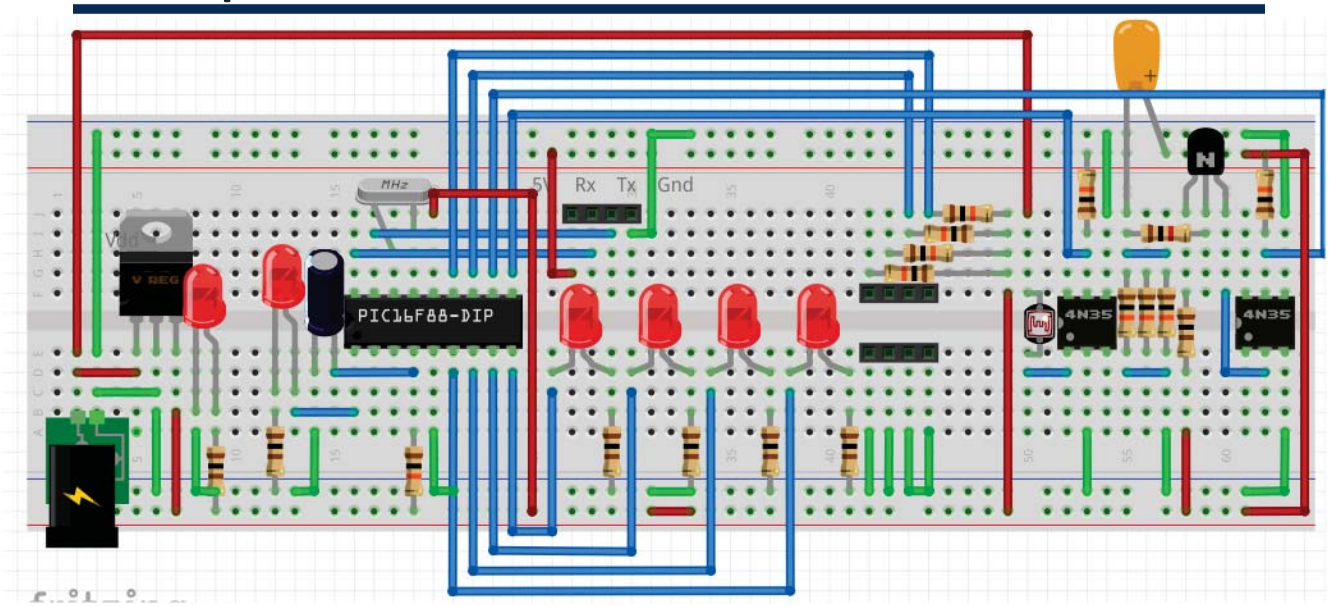
Temp Satus	Resistance	Transistor	Coupler	Led
Normal	High	**off**	off	Off
High	Low	On	On	On



Temp Satus	Resistance	Transistor	Coupler	MC
Normal	High	**off**	off	1
High	Low	On	On	0



Interfacing MC to light and Temperature sensors



Thanks,..

See you next week (ISA),…