Chapter 3 – Hardware Interfacing

Communication: USART

```
//on-off control via UART.
#include <avr/io.h>
#include <avr/interrupt.h>
#include <util/delay.h>

#define BLINK_TIME 100
#define LED_ON  PORTB|=(1<<PORTB5);
#define LED_OFF  PORTB&=~(1<<PORTB5);
Int16_t volatile cmd=-1;
ISR(USART_RX_vect){
   unsigned char status;
   cmd=UDR0;
   status=UCSR0A; //read USART status.
   //if error occur.
   if(status&((1<<FE0)|(1<<DOR0)|(1<<UPE0))){
      cmd=-1;
   }else{     //no error
      //cmd is UDR0
   }
}
```

```
void blink(unsigned char n){
   LED_OFF
   _delay_ms(BLINK_TIME);
   while(n--){
      LED_ON
      _delay_ms(BLINK_TIME);
      LED_OFF
      _delay_ms(BLINK_TIME);
   }
}

void init_usart(unsigned long baud){
   unsigned int ubrr;
//Set baud rate, baud=Fosc/(8*(UBRR+1)) (2X mode)
   ubrr=(unsigned int)(F_CPU/8/baud)-1;
   UBRR0 = ubrr;
//Double the USART Transmission Speed
   UCSR0A = (1<<U2X0);
// Enable TX,RX and RX interrupt.
   UCSR0B = (1<<TXEN0)|(1<<RXEN0)|(1<<RXCIE0);
//Set frame to 8data, 2stop bit
   UCSR0C = (1<<USBS0)|(1<<UCSZ01)|(1<<UCSZ00);
}
```