



T. Y. B. Tech (Electrical and Computer Engineering)

Trimester: V

Name: Shreerang Mhatre

Roll No: 52

Subject: Microcontroller and Applications

Class: TY

Batch: A3

Experiment No: 08

Name of the Experiment: Implement UART with C8051F340

Performed on: 5/12/2023

Submitted on: 7/12/2023

Mark s	Teacher's Signature with date

Aim: Write a C program for serial communication using C8051F340 to transfer data from C8051F340 to PC

Apparatus: EPBF340 Board, Connectors

Theory: Serial Communication is of two types Synchronous and Asynchronous. The asynchronous mode is used to connect the C8051F340 to PC serial port for the purpose of full duplex serial data transfer. C8051F340 has inbuilt UART (Universal Asynchronous Receiver Transmitter). Baud rate is a significant factor for serial communication of microcontroller with other devices. For communication with PC the baud rate of 9600 is selected.

baud rate generation:

Timer-1 is used to generate baud rate for mode-1 serial communication by using overflow flag of the timer to determine the baud frequency. Timer-1 is used in timer mode-2 as an auto-reload 8-bit timer. The data rate is generated by timer-1 using the following formula.

$$TH1 = 256 - (\text{SYSCLK} / \text{Desired baud rate} / 2)$$

Interfacing Diagram:

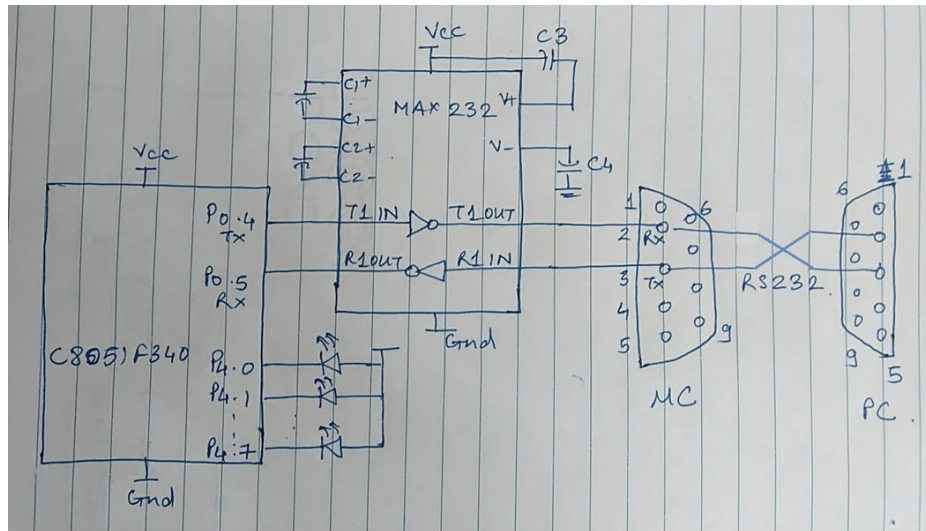


Figure 4.1 Interfacing Diagram for UART

Program:

Expected Result:

The string should be displayed on HyperTerminal.

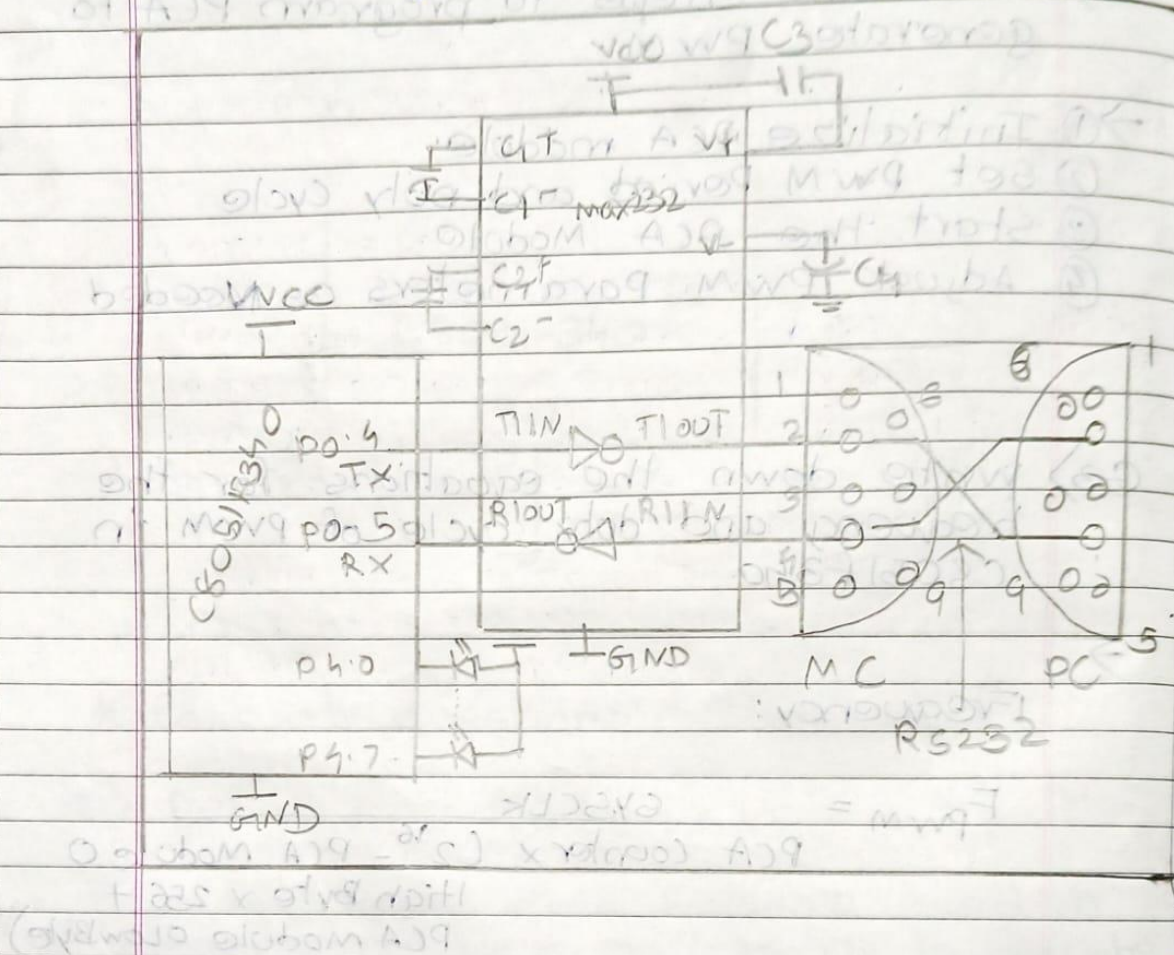
Conclusion:

Study Question:

1. Explain the need of MAX232 in serial communication.
2. Write the Port Properties for setting Hyper Terminal connection.
3. Explain UART registers.

Exp 8 UART

* Interfacing diagram.



Tranmission program for Uart with C8051F340

```
// Exp - 8 Implement UART with C8051F340
/*
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```

```
Tranmission program:
*/
```

```
#include "c8051f340.h"
#define sysclk 12000000
#define BR_UART0 9600

void main()
{
    char ch[]=("SHREERANG");
    int i;
    OSCICN = 0X80;
    XBR0=0X01;
    XBR1=0X40;
    P0MDOUT=0X10;
    SCON0=0X00;
    CKCON=0X01;
    TH1=256-(sysclk/BR_UART0/2/4);
    TH1=TL1;
    TMOD=0x20;
    TR1=1;
    while(1)
    {
        for(i=0;ch[i]!='\0';i++)
        {
            SBUF0=ch[i];
            while(TI0==0);
        }
    }
}
```

Receiving program for Uart with C8051F340

```
// Exp - 8 Implement UART with C8051F340
/*
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Class: TY
```

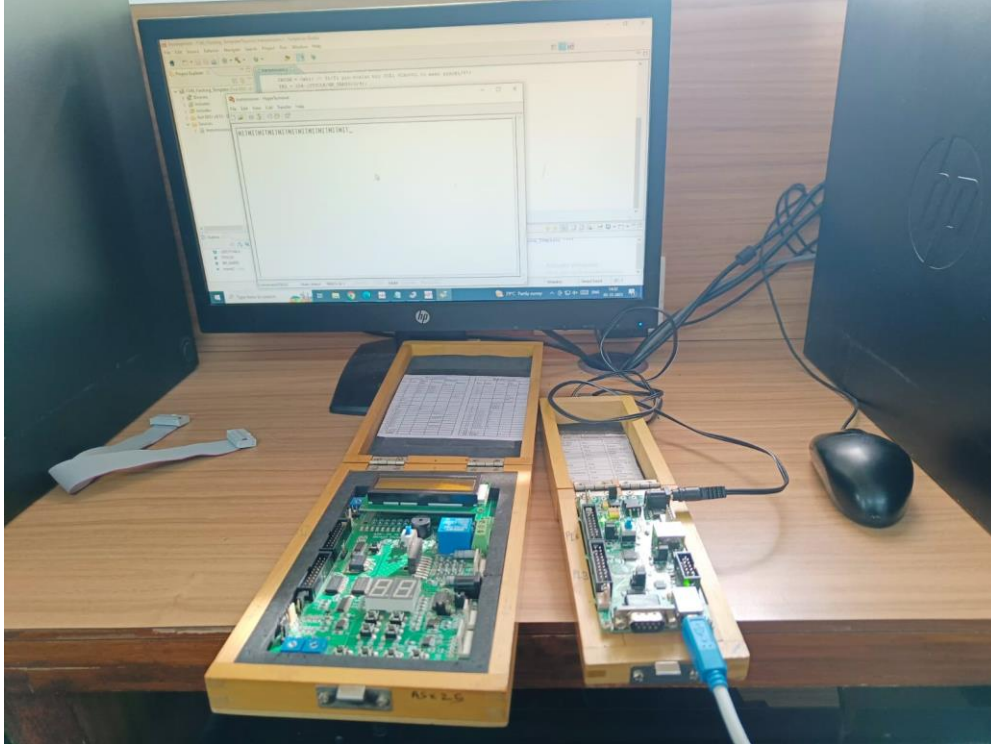
Receiving Program:

```
*/

#include "c8051f340.h"
#define sysclk 12000000
#define BR_UART0 9600
sbit BUZZER=P3^3;

void main()
{
    OSCICN = 0X83;
    XBR0=0X01;
    XBR1=0X40;
    P3MDOUT=0X08;
    BUZZER=1;
    P0MDIN=0X20;
    P4MDOUT=0xFF;
    SCON0=0X10;
    CKCON=0X01;
    TH1=256-(sysclk/BR_UART0/2/4);
    TH1=TL1;
    TMOD=0x20;
    TR1=1;
    while(RI0==0)
    {
        P4=~SBUF0;
        RI0=0;
    }
}
```

Transmission Output:



Receiving Output:



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Q. Study Question

Q1) Explain the need of MAX232 in serial communication.

→ The MAX232 is a crucial component in serial communication systems, serving as a bridge between devices operating at different voltage levels and signal polarities. In older RS-232 communication, signals are represented by voltage levels ranging from $-15V$ to $+15V$ with inverted logic, while modern microcontrollers typically operate at lower voltage levels and use non-inverted logic. The MAX232 addresses this discrepancy by performing voltage level conversion and signal inversion, ensuring seamless communication between devices.

Q2) Write the Port Properties for setting Hyper Terminal connection.

→ Port Properties for setting Hyper Terminal connection are -

- ① Baud Rate
- ② Data Bits
- ③ Parity
- ④ Stop Bits
- ⑤ Flow Control.

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Q3) Explain UART registers.

→ UART (Universal Asynchronous Receiver/Transmitter) registers are hardware registers in a microcontroller or communication module responsible for controlling and managing serial communication. These registers include configuration settings such as baud rate, data bits, parity, and stop bits. Additionally, there are status registers that provide information about the current state of the UART, including flags for transmit and receive buffers, errors, and interrupts.