

# **EXPERIMENT 4**

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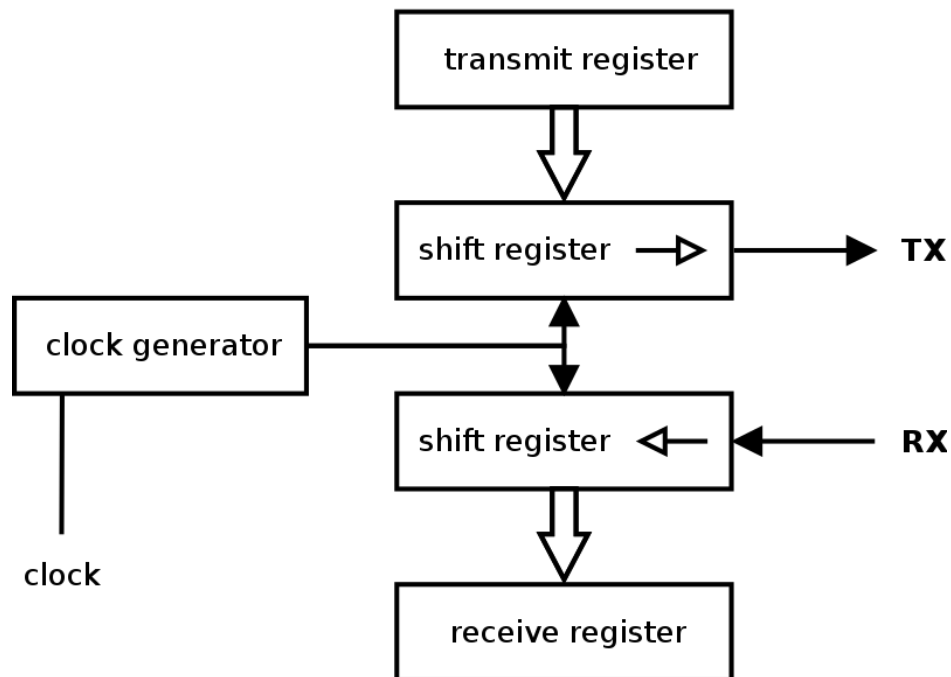
**BATCH: EA-3**

**SUBJECT: ESRTOS**

**Aim:** Using UART Protocol in Embedded Systems.

**Theory:** A universal asynchronous receiver-transmitter is a computer hardware device for asynchronous serial communication in which the data format and transmission speeds are configurable. It sends data bits one by one, from the least significant to the most significant, framed by start and stop bits so that precise timing is handled by the communication channel. It was one of the earliest computer communication devices, used to attach teletypewriters for an operator console. It was also an early hardware system for the Internet. The electric signaling levels are handled by a driver circuit external to the UART. Two common signal levels are RS-232, a 12-volt system, and RS-485, a 5-volt system. Specialised UARTs are used for automobiles, smart cards and SIMs. Early teletypewriters used current loops. A UART is usually an individual (or part of an) integrated circuit (IC) used for serial communications over a computer or peripheral device serial port. One or more UART peripherals are commonly integrated in microcontroller chips.

## Block Diagram of UART:



## Code of the Program:

```
#include<lpc21xx.h>
void Uart_Init(void)
{

    U0LCR= 0x9B;
    U0DLL= 0x62;
    U0DLM= 0x00;
    U0LCR= 0x1B;

}
void Uart_Data(unsigned char data){

    U0THR = data;
    while((U0LSR & 0X20)!= 0X20);

}

void Uart_String(unsigned char *dat){
    while(*dat!="\0") {
        Uart_Data(*dat);
        dat++;
    }
}
```

```

}
void Port_Init(void) {

PINSEL0 = 0x00000005;
}

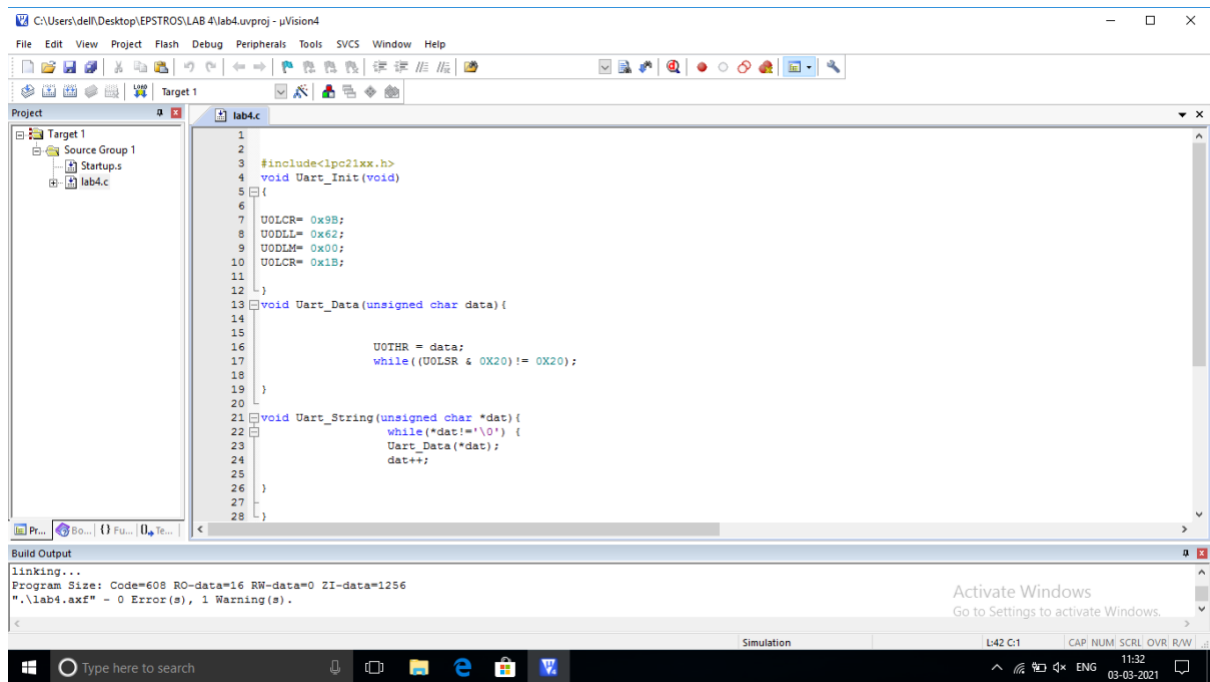
int main(){

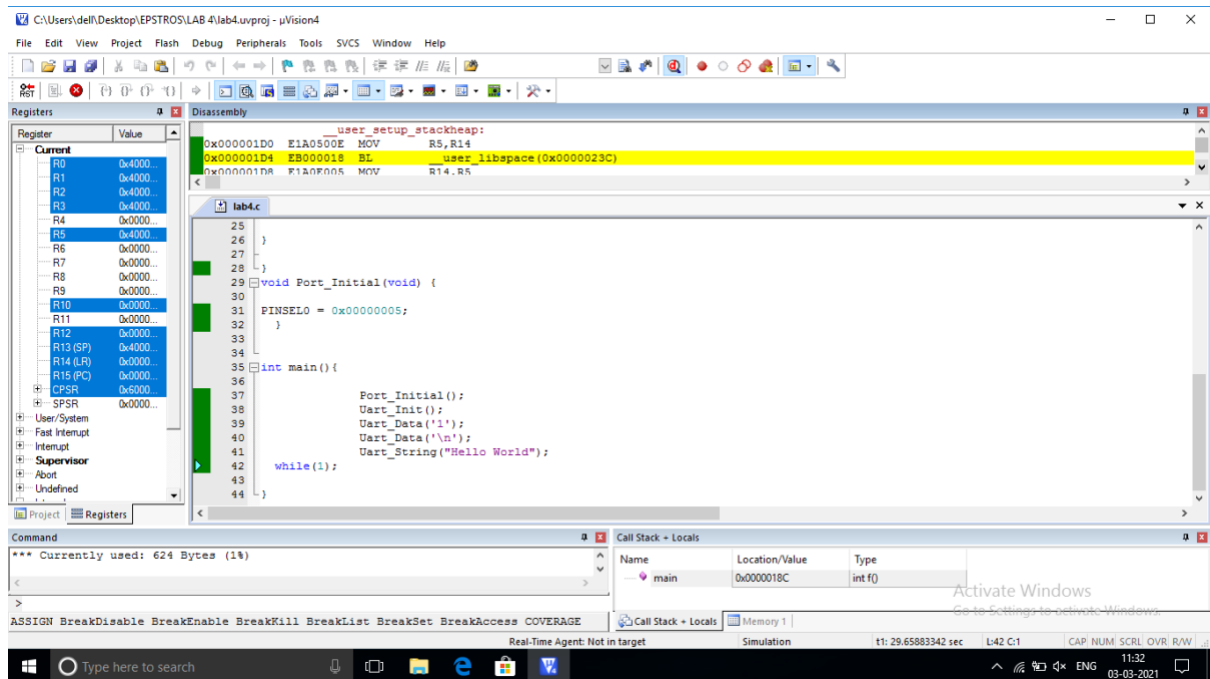
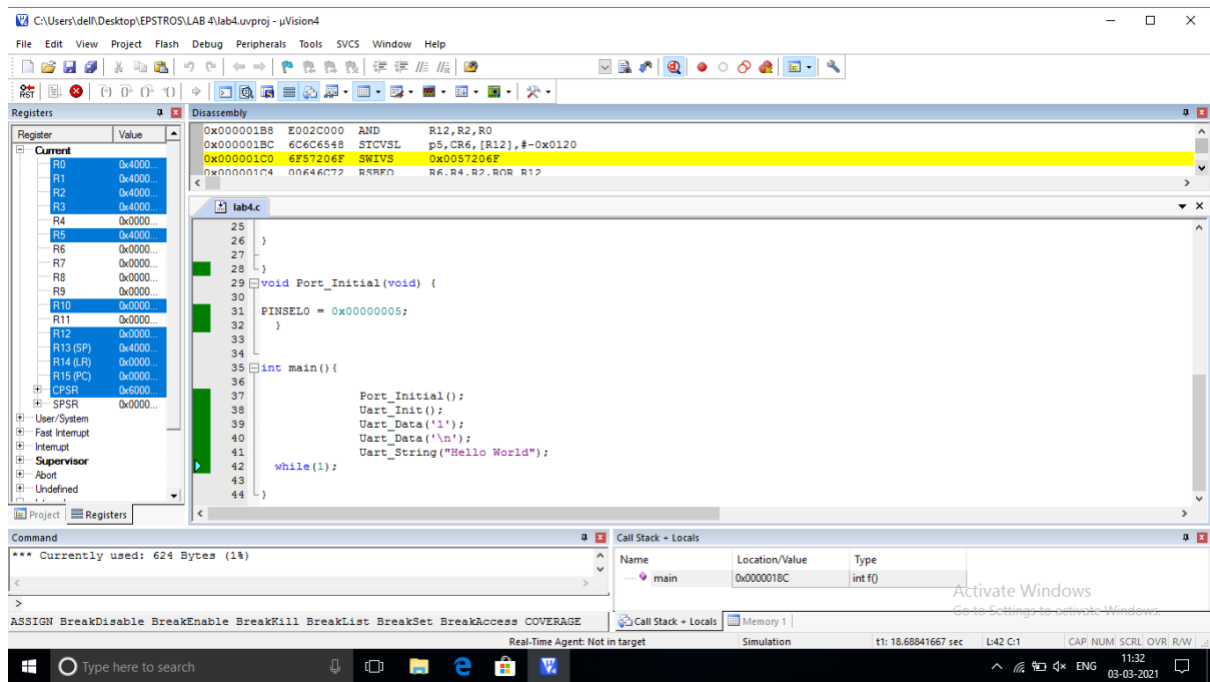
Port_Init();
Uart_Init();
Uart_Data('1');
Uart_Data('\n');
    Uart_String("Hello World");
while(1);

}

```

## Screenshots of the Program:





**Conclusion: From this experiment we have understood the working and implementation of UART Protocol in LPC2129.**