

IUST  
Iran University of  
Science and Technology

Department of  
Computer Engineering

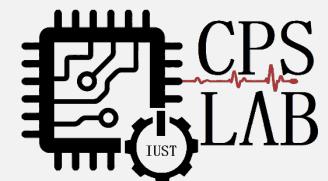
# Computer Architecture Laboratory

## UART Serial Communication

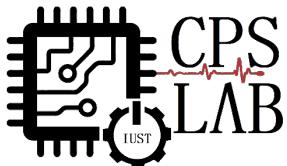
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5<sup>th</sup> session



Cyber-Physical Systems Laboratory

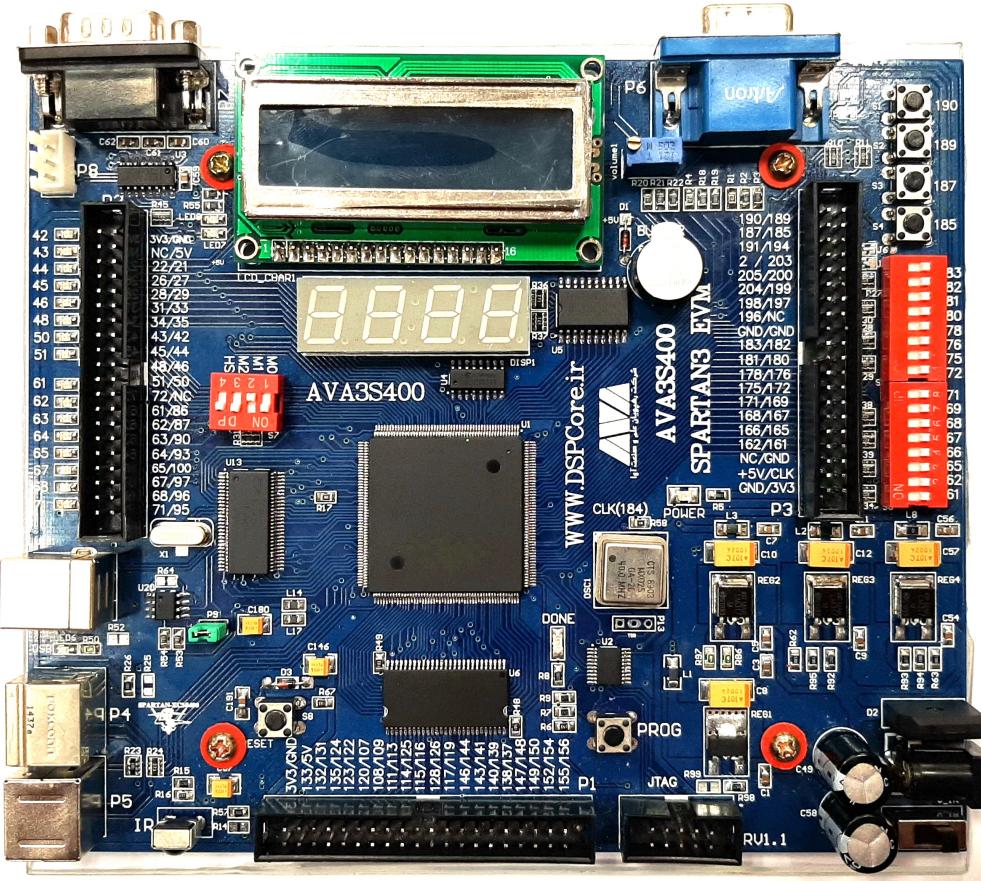


# Overview

- RS-232 Physical Layer
- Circuit Schematic
- How the Protocol Works
- Experiment

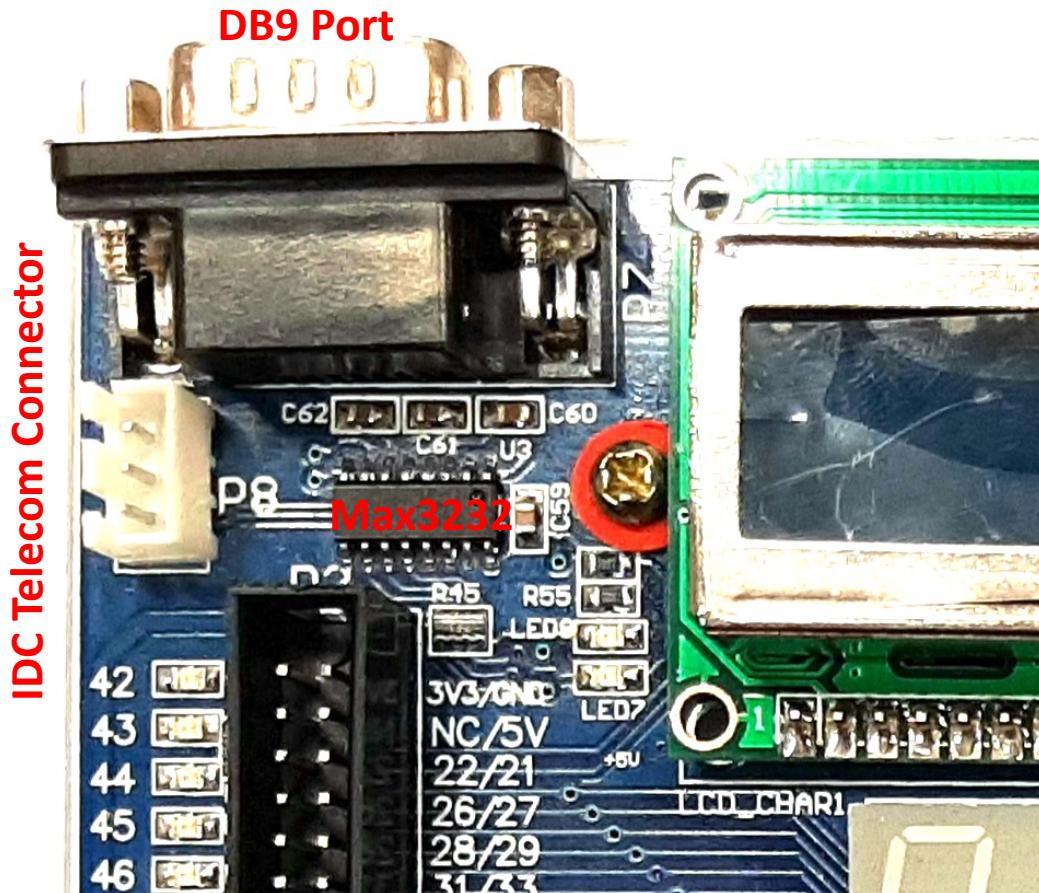
# RS-232

## Physical Layer



# RS-232

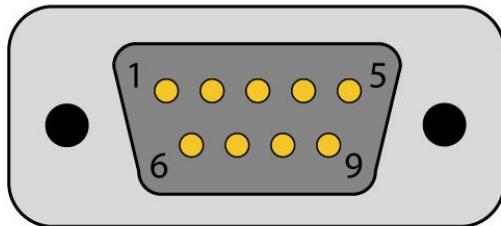
## Physical Layer



# RS-232

## Physical Layer

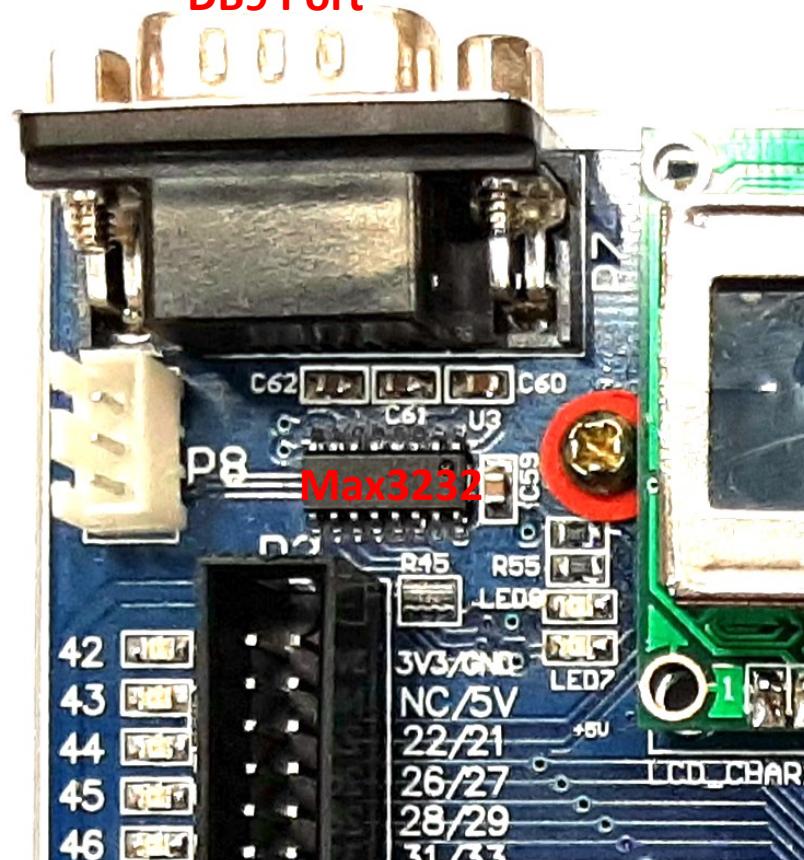
**DB9M Connector**



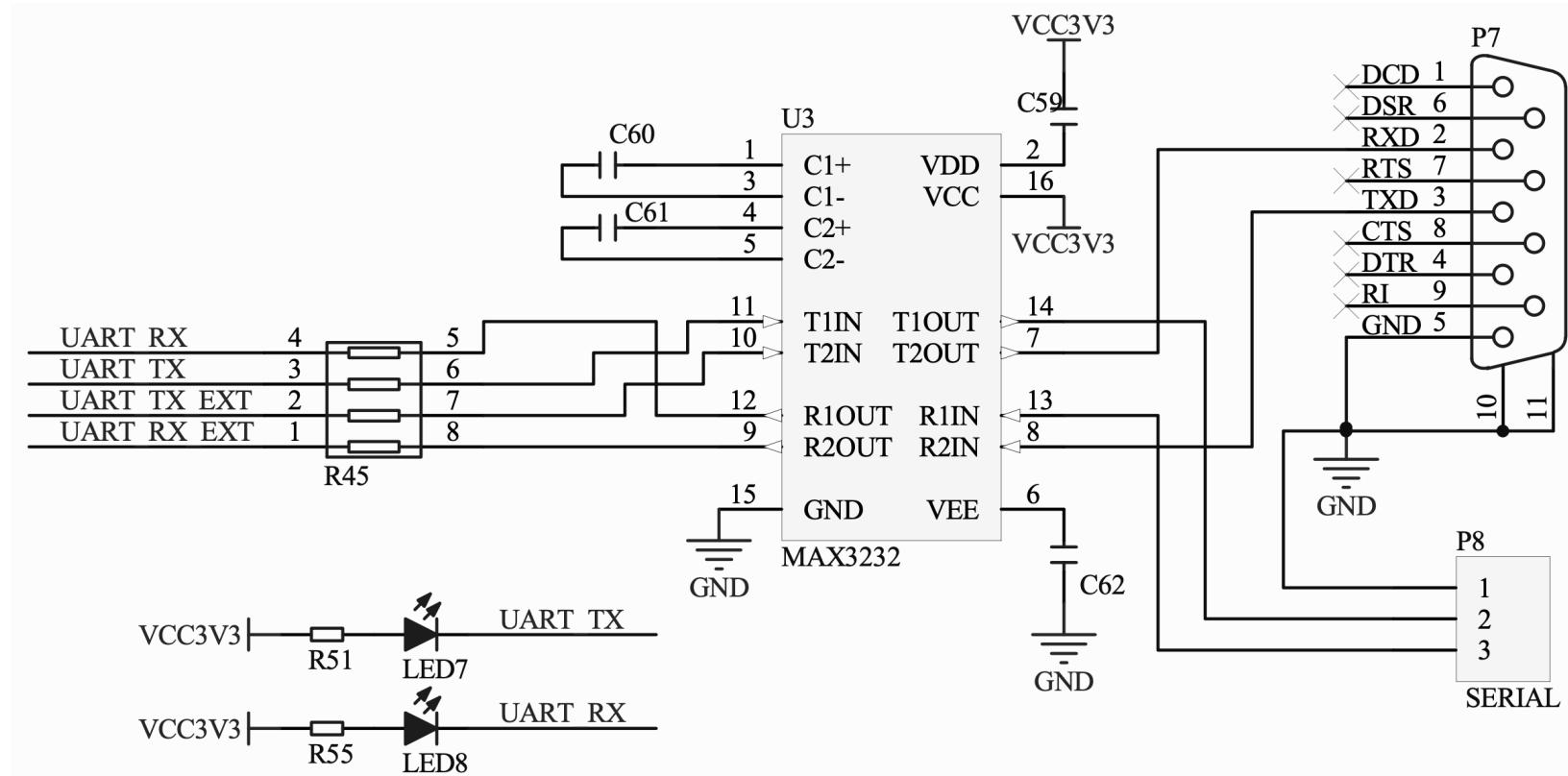
**RS232 Pin Out**

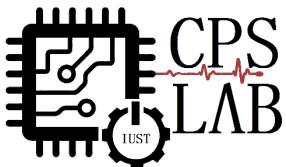
Pin #	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

**DB9 Port**

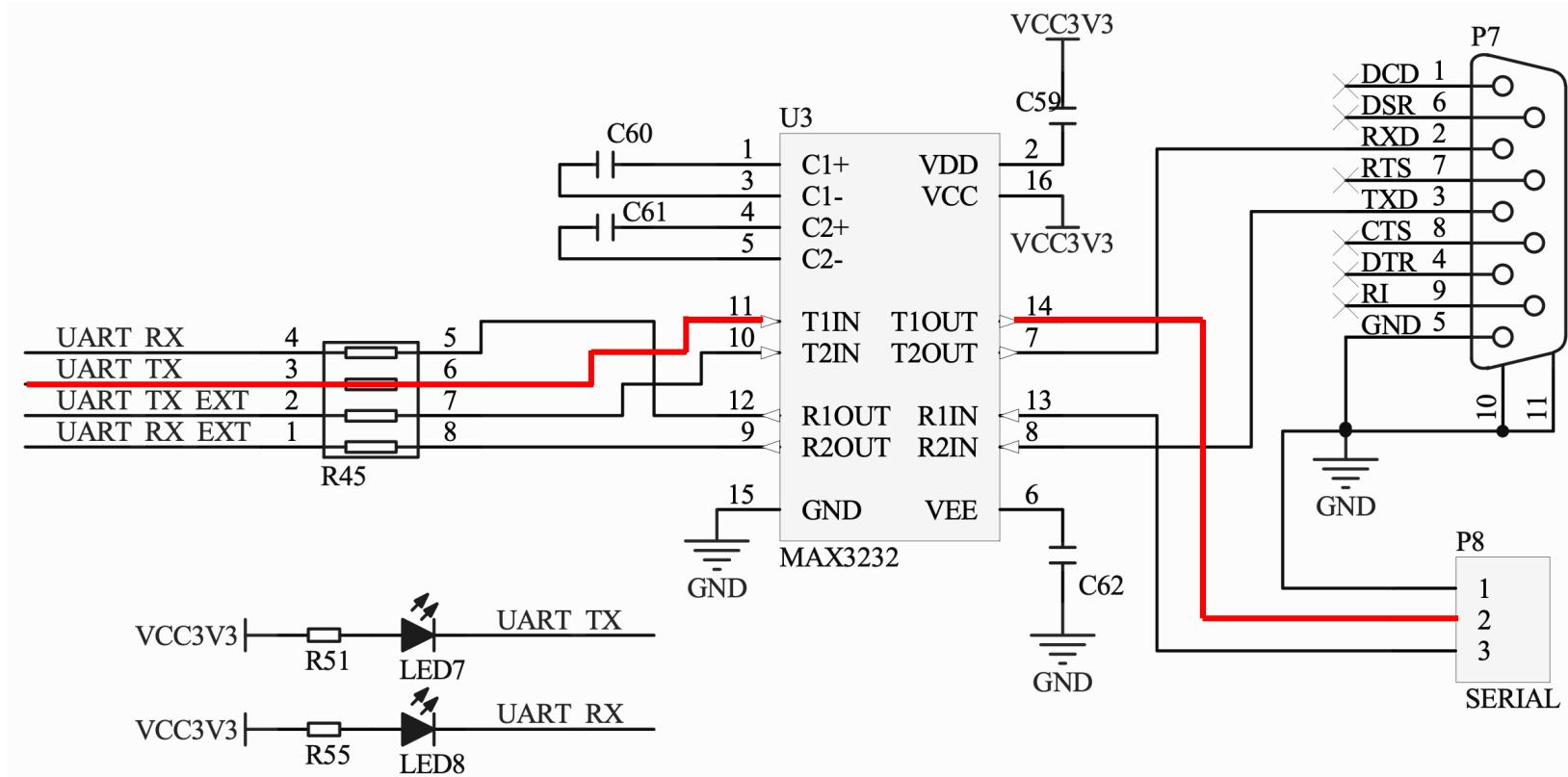


# Schematic

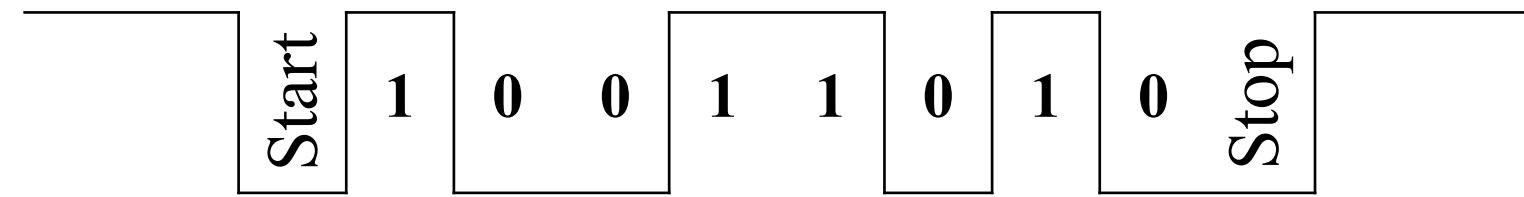




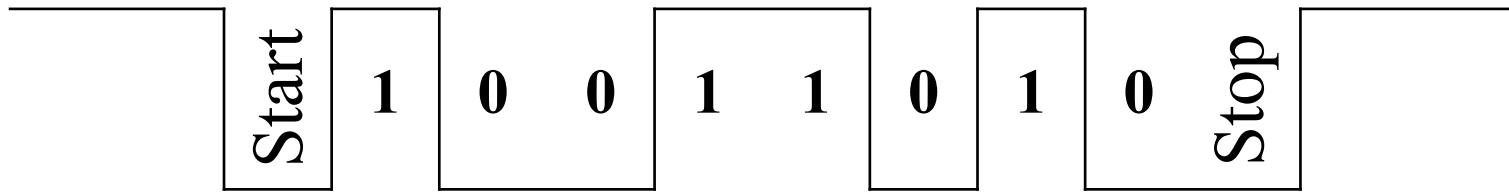
# Schematic



# How the Protocol Works



# How the Protocol Works



Bauds	Bit duration	Speed
9600 bauds	104.167 µs	1200 bytes/s
19200 bauds	52.083 µs	2400 bytes/s
28800 bauds	34.722 µs	3600 bytes/s
38400 bauds	26.042 µs	4800 bytes/s
57600 bauds	17.361 µs	7200 bytes/s
76800 bauds	13.021 µs	9600 bytes/s
<b>115200 bauds</b>	<b>8.681 µs</b>	<b>14400 bytes/s</b>

# Experiment

```
entity RS-232 is
Port ( GCLK : in STD_LOGIC;
        TX : out STD_LOGIC;
        DIP : in STD_LOGIC_VECTOR (7 downto 0)
);
end RS-232;

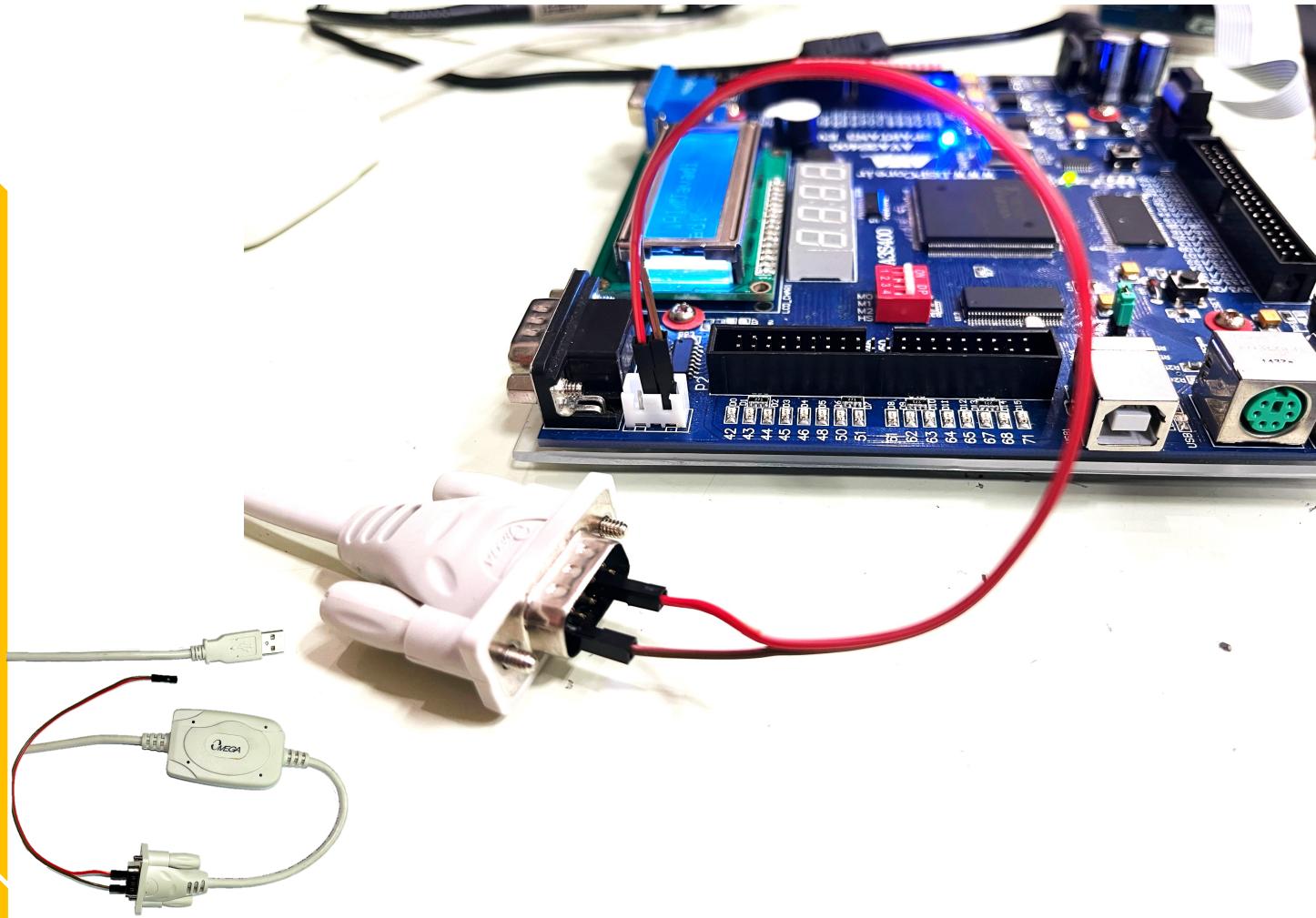
architecture Behavioral of RS-232 is

process(GCLK)--For Generate UART Clock
//to do
end process;

process(CLKUART)--To Send Bits in The Correct Order
//to do
end process;

end Behavioral;
```

# Experiment





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# THANK YOU

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