

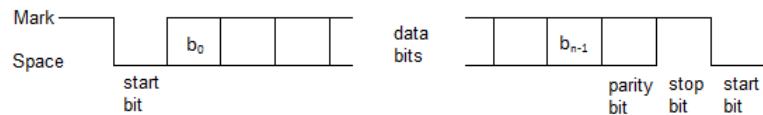
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Experiment No. VI: Serial Communication.

Objective: To know data transfer technique using asynchronous serial mode of communication.

Preamble: For long distance or low speed data transfer serial communication is an appropriate choice. Serial communication may be synchronous or asynchronous. The simplest is the asynchronous serial communication where no common clock is used by the transmitter and receiver unlike its synchronous form.

Technique: The communication line when idle is known to be in the MARK (high) state (The low state is known as SPACE). A data unit consists of 5, 6, 7 or 8 bits (usually 8 bits or a byte is a standard now). Each data unit is preceded by a start bit (low) and followed by 1, $1\frac{1}{2}$ or 2 stop bits (high). A parity bit may also be added after the data bits for error checking. Start and stop bits are added with the data bits by the transmitter to maintain a pseudo synchronism with the receiver. The receiver checks the line and waits for transmission to start. A transmitter pulls the line from MARK state to SPACE indicating an impending data transmission and provides a start bit and followed by the data bits. The receiver after detecting the start bit gets the data bits serially and completes receiving the data bits and do some housekeeping when it detects the stop bit. The subtle points like the communication speed, no. of data bits, use of parity bit and the no. of stop bits are agreed upon by the transmitter and receiver as a prerequisite to the asynchronous serial transfer.



- Note: 1) always a single bit is used to initiate start
- 2) 1, 1.5 or 2 bits are used to indicate stop
- 3) parity bit is optional
- 4) Data bit length varies from 5 to 8 bits.
- 5) Pseudo synchronism is achieved through start bit transmitted before every frame.

Standard: The EIA RS-232C standard is a common choice (being replaced by high speed USB standard) for low cost serial transfer. The communication speed is measured in bauds and are typically 300, 600, 1200, 2400, 4800, 9600 or 19200 bauds. In RS-232C standard TRUE or ONE is represented by -5 to -15 volts while a FALSE or ZERO is represented by +5 to +15 volts. For this reason standard drivers are used in transmitting and receiving sides to invert and change the standard TTL logic level to corresponding RS-232C level.

Task: Write Console in (CI) and Console Out (CO) routine using the 1 bit serial I/O port (SID and SOD lines of the 8085A processor).

Report: 1) Baud rate; 2) Error detection and correction; 3) USART; 4) RS 232C standard; 5) USB standard and 6) Current Loop.