03.2　Universal asynchronous receivers−transmitters

Universal asynchronous receivers-transmitters (UARTs) are hardware devices that allow microcontroller CPUs to asynchronously, serially communicate with other devices of the microcontroller or peripheral devices.

Often, the data input to a TX UART arrives in parallel but must transmitted in serial. This is achieved via a shift register operating in parallel-in, serial-out (PISO) mode. Consider the byte 1101 0001 into a four-bit shift register. Table 03.1 shows the register contents at each step of transmission.

Table 03.1: a four-bit shift register operating in PISO mode transmitting the byte 1101 0001 in serial.

registers				output
0	0	0	1	
1	0	0	0	1
0	1	0	0	0
1	0	1	0	0
1	1	0	1	1
0	1	1	0	0
0	0	1	1	→ 0
0	0	0	1	→ 1
0	0	0	0	→ 1

In the corresponding RX UART, the opposite process called serial-in, parallel-out (SIPO) is also performed with a shift register in SIPO mode.

A UART can transmit and receive data with different rates, parity bits, stop bits, etc., and therefore must be properly configured. If a peripheral device requires a certain serial communication configuration, the UART transmitter controlled by a microcontroller's CPU must match this configuration.

The myRIO microcontroller has a configurable UART interface that will be used in Lab Exercise 03 to transmit data to the LCD display.

LCD UART
119200 baud

119200 $\frac{bits}{s}$