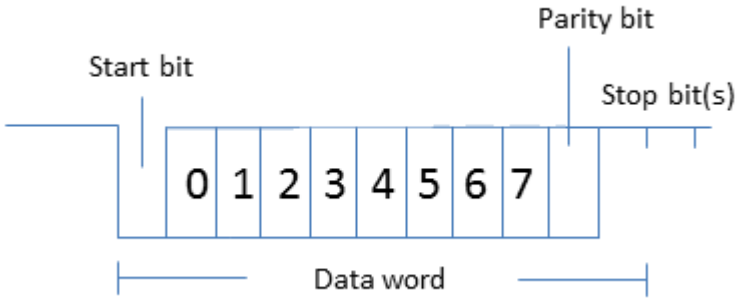
Communication between F4 Discovery and Nucleo

UART

- What is UART?
- What is the difference between UART and USART?
- How to configure it?

What is UART?

- UART stands for Universal Asynchronous Receiver/Transmitter
- The universal asynchronous receiver/transmitter (UART) takes bytes of data and transmits the individual bits in a sequential fashion. At the destination, a second UART re-assembles the bits into complete bytes. Each UART contains a shift register, which is the fundamental method of conversion between serial and parallel forms.
- Serial transmission of digital information (bits) through a single wire or other medium is less costly than parallel transmission through multiple wires.



What is the difference between UART and USART

- Please do NOT use USART because Nucleo does not support it.
- USART requires a shared external clock signal for synchronization purpose while UART does not need it.
- A USART can be set up to run in synchronous mode. In this mode the sending peripheral will generate a clock that the receiving peripheral can recover from the data stream without knowing the baud rate ahead of time. Alternatively, the link will use a completely separate line to carry the clock signal. The use of the external clock allows the data rate of the USART to be much higher than that of a standard UART, reaching up to rates of 4 Mbps.
- http://www.edn.com/electronics-blogs/embedded-basics/4440395/USART-vs-UART--Know-the-difference
- https://www.kanda.com/blog/microcontrollers/usart-uart-microcontroller/

Configuration

- Transmitting and receiving UARTs must be set for the same bit speed, character length, parity, and stop bits for proper operation.

```
huart2.Instance = USART2;
huart2.Init.BaudRate = 115200;
huart2.Init.WordLength = UART_WORDLENGTH_8B;
huart2.Init.StopBits = UART_STOPBITS_1;
huart2.Init.Parity = UART_PARITY_NONE;
huart2.Init.Mode = UART_MODE_TX_RX;
huart2.Init.HwFlowCtl = UART_HWCONTROL_NONE;
huart2.Init.OverSampling = UART_OVERSAMPLING_16;
HAL_UART_Init(&huart2);
```

- One PIN for sending and one PIN for receiving for each board.
- The size of the buffers.