Setting the UART or USART

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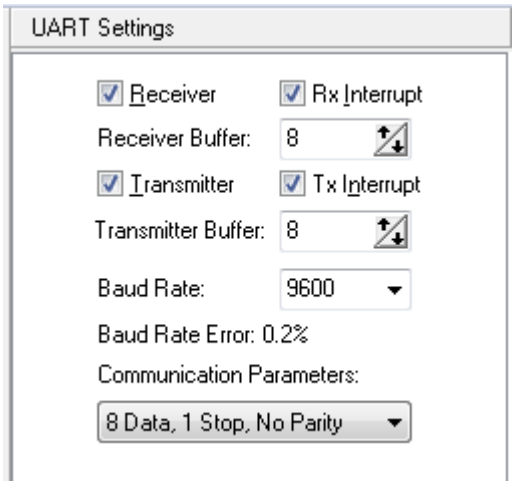
The UART or USART configuration can be specified by clicking on the **USART** node(s) of the CodeWizardAVR selection tree.



Checking the **Receiver** check box activates the UART receiver.
The receiver can function in the following modes:

- polled, the **Rx Interrupt** check box isn't checked
- interrupt driven circular buffer, the **Rx Interrupt** check box is checked.

In the interrupt driven mode you can specify the size of the circular buffer using the **Receiver Buffer** spinedit box.

Checking the **Transmitter** check box activates the UART transmitter.
The transmitter can function in the following modes:

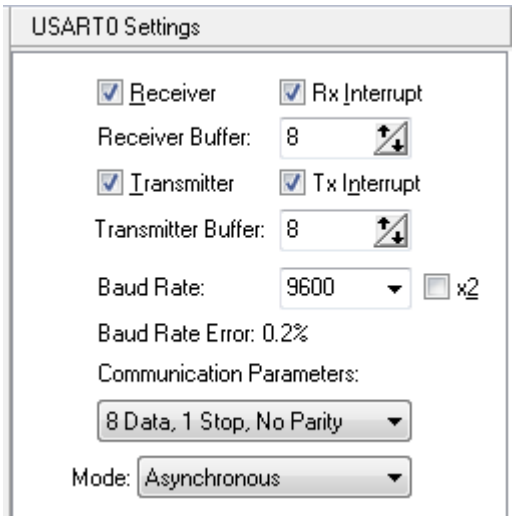
- polled, the **Tx Interrupt** check box isn't checked
- interrupt driven circular buffer, the **Tx Interrupt** check box is checked.

In the interrupt driven mode you can specify the size of the circular buffer using the **Transmitter Buffer** spinedit box.

The communication Baud rate can be specified using the **UART Baud Rate** list box.
CodeWizardAVR will automatically set the UBRR according to the Baud rate and AVR chip clock frequency.
The Baud rate error for these parameters will be calculated and displayed.

The **Communications Parameters** list box allows you to specify the number of data bits, stop bits and parity used for serial communication.

For devices featuring an **USART** there will be an additional **Mode** list box.



It allows you to specify the following communication modes:

- Asynchronous
- Synchronous Master, with the UCSRC register's UCPOL bit set to 0
- Synchronous Master, with the UCSRC register's UCPOL bit set to 1
- Synchronous Slave, with the UCSRC register's UCPOL bit set to 0
- Synchronous Slave, with the UCSRC register's UCPOL bit set to 1.

The serial communication is realized using the Standard Input/Output Functions **getchar**, **gets**, **scanf**, **putchar**, **puts** and **printf**.
For interrupt driven serial communication, CodeWizardAVR automatically redefines the basic **getchar** and **putchar** functions.

The receiver buffer is implemented using the global array **rx_buffer**.
The global variable **rx_wr_index** is the **rx_buffer** array index used for writing received characters in the buffer.
The global variable **rx_rd_index** is the **rx_buffer** array index used for reading received characters from the buffer by the **getchar** function.
The global variable **rx_counter** contains the number of characters received in **rx_buffer** and not yet read by the **getchar** function.
If the receiver buffers overflows the **rx_buffer_overflow** global bit variable will be set.

The transmitter buffer is implemented using the global array **tx_buffer**.
The global variable **tx_wr_index** is the **tx_buffer** array index used for writing in the buffer the characters to be transmitted.
The global variable **tx_rd_index** is the **tx_buffer** array index used for reading from the buffer the characters to be transmitted by the **putchar** function.
The global variable **tx_counter** contains the number of characters from **tx_buffer** not yet transmitted by the interrupt system.

For devices with 2 UARTs, respectively 2 USARTs, there will be two tabs present: **UART0** and **UART1**, respectively **USART0** and **USART1**.
The functions of configuration check and list boxes will be the same as described above.

The UART0 (USART0) will use the normal **putchar** and **getchar** functions.
In case of interrupt driven buffered communication, UART0 (USART0) will use the following variables:
rx_buffer0, **rx_wr_index0**, **rx_rd_index0**, **rx_counter0**, **rx_buffer_overflow0**,
tx_buffer0, **tx_wr_index0**, **tx_rd_index0**, **tx_counter0**.

The UART1 (USART1) will use the **putchar1** and **getchar1** functions.
In case of interrupt driven buffered communication, UART1 (USART1) will use the following variables:
rx_buffer1, **rx_wr_index1**, **rx_rd_index1**, **rx_counter1**, **rx_buffer_overflow1**,
tx_buffer1, **tx_wr_index1**, **tx_rd_index1**, **tx_counter1**.

All serial I/O using functions declared in **stdio.h**, will be done using UART0 (USART0).