UART Drivers

For

AVR Microcontrollers

Nti Team

Software Requirement Specification Document

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Version: 1st **Date: 26/10/2023**

1. Scope of Document

This document specifies requirements on the module UART Driver.

1.1 Constraints

First scope for specification of requirements on basic software modules is systems which are not safety relevant. For this reason safety requirements are assigned to medium priority.

2. Requirements Structure

Each module specific chapter contains a short functional description of the Basic Software Module. Requirements of the same kind within each chapter are grouped under the following Functions:

Functional Requirements: -

Functional responsible for Initialize the UART device

Functional responsible for send byte to another UART device.

Functional responsible for receive byte from another UART device

Send the required string through UART to the other UART device.

Receive the required string until the '#' symbol through UART from the other UART device.

Non-Functional Requirements:-

Timing Requirements.

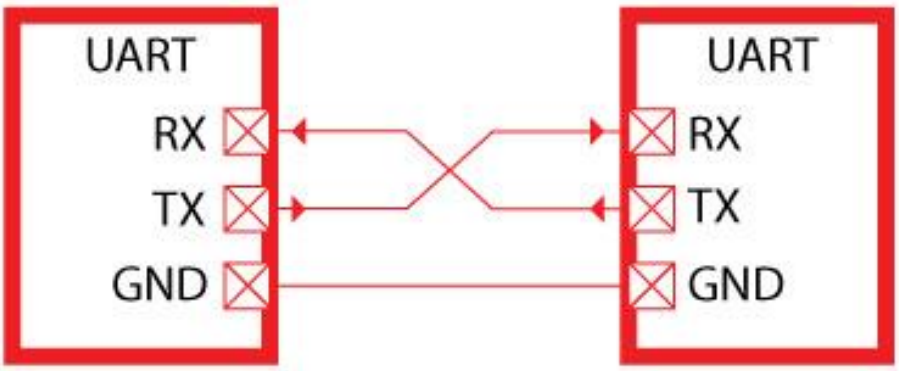
Resource Usage.

Usability.

3. Functional Overview

3.1 UART Driver, common functionality:

An embedded project/product without a Universal Asynchronous Receiver Transmitter (UART) interface is unimaginable. Even if the MCU is not talking to another serial device, you'll need it at-least during the development work to speak to your computer. UART also come in handy for firmware upgrade and enabling/disabling product features during it's lifetime. This probably one of the first interfaces you would want to include in your project.



4. Requirement Specification

4.1 Functional Requirements

[SRS_REQ_1] The UART Driver shall support a function to initialise the Communication protocol.
[SRS_REQ_2] The driver shall be compatible with all AVR microcontrollers.
[SRS_REQ_3] The UART Driver shall support a Functional responsible for send byte to another UART device.
[SRS_REQ_4] The UART Handler/Driver shall handle the chip
[SRS_REQ_5] The UART Driver shall support Functional responsible for receive byte from another UART device.

[SRS_REQ_6] The UART Driver Support function that Send the required string through UART to the other UART device.

[SRS_REQ_7] The UART Driver Support function that Receive the required string until the '#' symbol through UART from the other UART device.

[SRS_REQ_8] The UART Driver shall have a scalable functionality to fit the needs of the ECU.

4.2 Non-functional requirements

[SRS_REQ_9] The driver shall be easy to use and understand.

[SRS_REQ_10] The driver shall be well-documented.

[SRS_REQ_11] The driver shall be efficient and use minimal resources.

[SRS_REQ_12] The driver shall be reliable and robust.

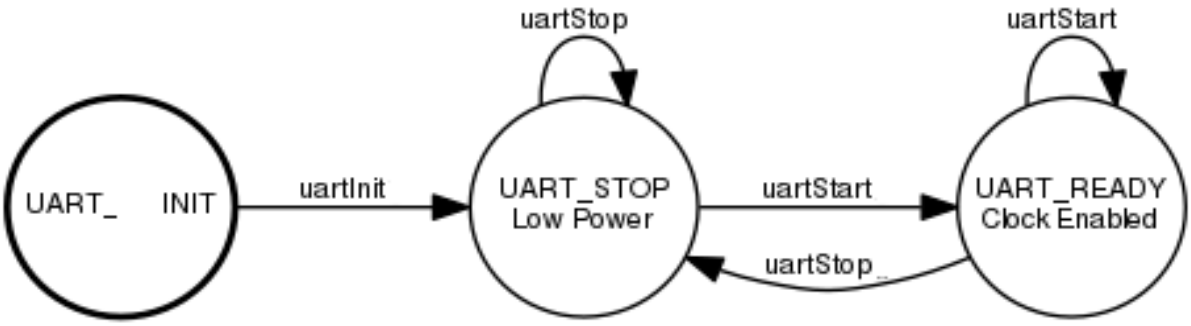
[SRS_REQ_13] In addition to the above requirements, the UART driver should also meet the following non-technical requirements

[SRS_REQ_14] The driver should be open source and freely available to use.

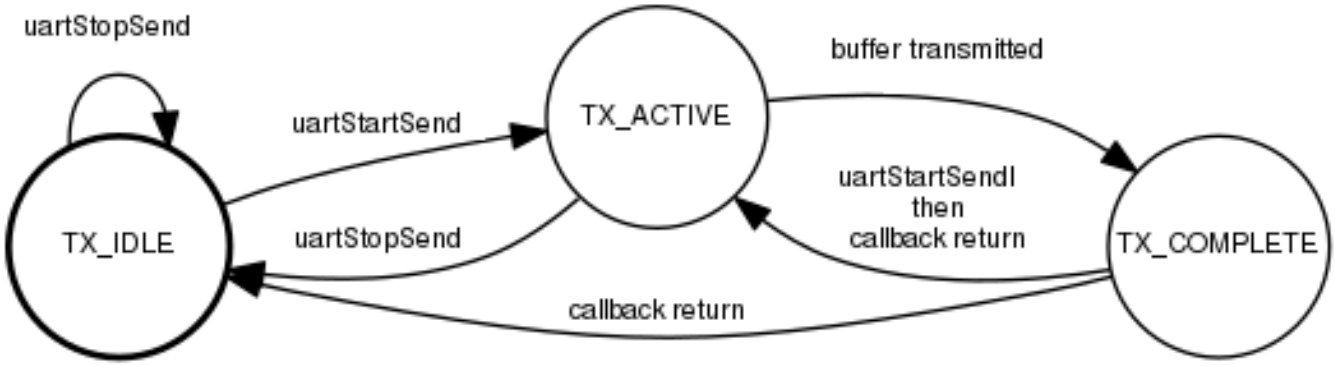
[SRS_REQ_15] The driver should be actively maintained and supported by the community.

5. State machine

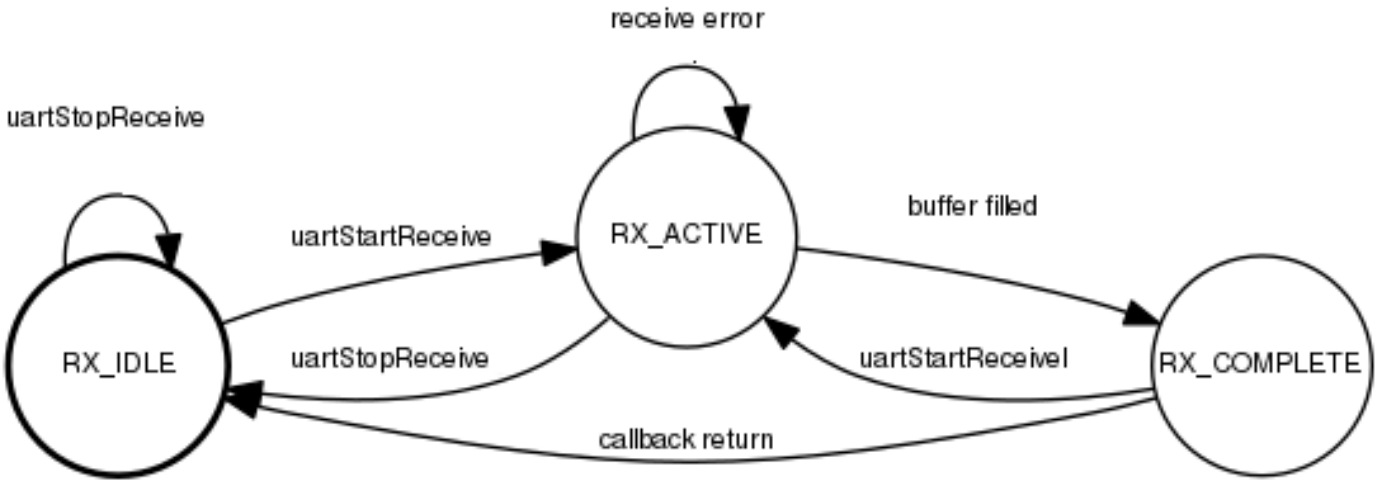
5.1 Driver State Machine.



5.2 Transmitter sub State Machine



5.3 Receiver sub State Machine



6. Acceptance Criteria

The UART driver shall be accepted when it meets the following criteria:

- The driver shall compile and run without errors on all AVR microcontrollers.
- The driver shall pass all unit tests.
- The driver shall pass all integration tests.
- The driver shall pass all system tests.

7. References

1. Developers of NTI team.
2. AVR Microcontroller Datasheets.