**Dio Software Design**

***SteerTurnIllum***



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# Glossary

This section contains a glossary of all the important terms and acronyms used inside the document.

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| **Term / Acronym** | **Description** |
| AUTOSAR | AUTomotive Open System ARchitecture |
| VFB | Virtual Functional Bus |
| SWC | Software Component |
| RTE | Runtime Environment |
| BSW | Basic Software |
| OS | Operating System |
| S/R | Sender / Receiver |
| C/S | Client / Server |
| ECU | Electronic Control Unit |
| uC | Microcontroller |
| ADC | Analog Digital Converter |
| DIO | Digital Input / Output |
| PWM | Pulse Width Modulation |

Table 1 - Glossary.

# Introduction

## Purpose of the Document

The purpose of the document is to define the software design of the ***Dio*** driver for the ***SteerTurnIllum*** embedded academy project.

## Overview

While the AUTOSAR ***Dio*** module is complex and is usually configured via generators, in this project it is manually implemented and its features are limited to:

* Reading and writing channels.
* Reading and writing ports.

# Design Requirements

1. The Dio driver shall be implemented according to AUTOSAR 4.3.1 specifications.
2. The Dio driver shall implement the following interfaces and all their required data types for reading and writing DIO channels and ports:

* *Dio\_ReadChannel();*
* *Dio\_WriteChannel();*
* *Dio\_FlipChannel();*
* *Dio\_ReadPort();*
* *Dio\_WritePort();*

1. The Dio driver shall consist of the following files:

* *Dio.c*: Implements all the required interfaces in a generic way.
* *Dio*.*h*: Exports all the required interfaces, data types and the link-time configuration.
* *Dio\_Lcfg.*c: Defines the list of registers and masks to be used for reading and writing DIO channels and ports.
* *Dio\_Cfg.h:* Defines and exports the following:
  + *DIO\_API\_CHANNELS* macro: defining if the DIO channels APIs are activated or not (STD\_ON or STD\_OFF).
  + *DIO\_API\_PORTS* macro: defining if the DIO ports APIs are activated or not (STD\_ON or STD\_OFF).
  + *DIO\_NUMBER\_OF\_PORTS* macro: number of configured DIO ports.
  + *DIO\_<Port\_ID>* macros: zero based IDs of all the DIO ports.
  + *DIO\_NUMBER\_OF\_CHANNELS* macro: number of configured DIO channels.
  + *DIO\_<Port\_ID>\_<Port\_Pin\_ID>* macros: zero based IDs of all the DIO channels.

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## Version Index

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Table 2 - Version Index.