User's Manual

AUTOSAR MCAL R4.0.3
User's Manual

DIO Driver Component Ver.1.0.5

Generation Tool User's Manual

Target Device:
RH850/P1x

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Abbreviations and Acronyms

Abbreviation / Acronym	Description
API	Application Programming Interface
AUTOSAR	AUTomotive Open System ARchitecture
BSWMDT	Basic Software Module Description Template
ECU	Electronic Control Unit
Id	Identifier
MCAL	Microcontroller Abstraction Layer
Dio/DIO	Digital Input Output
XML	eXtensible Mark-up Language
RUCG	Renesas Unified Code Generator

Definitions

Terminology	Description
BSWMDT File	This file is the template for the Basic Software Module Description.
Configuration XML File	This file contains the setting of command line options.
ECU Configuration Description File	Input file to DIO Driver Generation Tool. It is generated by ECU Configuration Editor.
Sl.No	Serial Number.
Translation XML File	This file contains the translation and device specific header file path.

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Chapter 1 Introduction

The DIO Driver component provides the service for initializing the whole DIO structure of the microcontroller.

The DIO Driver module comprises of two sections as Embedded Software and the Generation Tool to achieve scalability and configurability.

The document describes the features of the Renesas Unified Code Generator (RUCG) tool. Renesas Unified Code Generator (RUCG) tool is a command line tool that extracts information from ECU Configuration Description File, BSWMDT and Dio_X1x.dll as input File and generates DIO Driver C Source and C Header files.
Dio_Cfg.h and Dio_PBcfg.c.

This document contains information on the options, input and output files of the DIO Driver Generation Tool. In addition, this manual covers a step-by-step procedure for the usage of tool.

ECU Configuration Description File contains information about DIO configuration.

1.1 Document Overview

This user manual is organized as given in the table below:

Section	Contents
Section 1 (Introduction)	Provides an introduction to the document and explains how information is organized in this manual.
Section 2 (Reference)	Provides a list of documents referred while developing this document.
Section 3 (DIO Driver Generation Tool Overview)	Provides the DIO Driver Generation Tool Overview.
Section 4 (Input Files)	Provides information about ECU Configuration Description File.
Section 5 (Output Files)	Explains the output files that are generated by the DIO Driver Generation Tool.
Section 6 (Precautions)	Contains precautions to be taken during configuration of ECU Configuration Description File.
Section 7 (User Configuration Validation)	Describes about user configuration validation done by the DIO Driver Generation Tool.
Section 8 (Messages)	Describes all the Error/Warning/Information messages of R4.0.3 which helps the user to understand the probable reason for the same.
Section 9 (Notes)	Provides notes to help the user to understand this document better.

Chapter 2 Reference

2.1 Reference Documents

The following table lists the documents referred to develop this document:

Sl.No.	Title	Version
1.	**Autosar R4.0** AUTOSAR_SWS_DIODriver.pdf	2.5.0
2.	**P1x Parameter Definition File** R403_DIO_P1M_04_05_12_13_20_21.arxml	1.0.5
3.	**P1x Parameter Definition File** R403_DIO_P1M_10_11_14_15_18_19_22_23.arxml	1.0.6

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Chapter 3 DIO Driver Generation Tool Overview

DIO Driver Generation Tool overview is shown below.

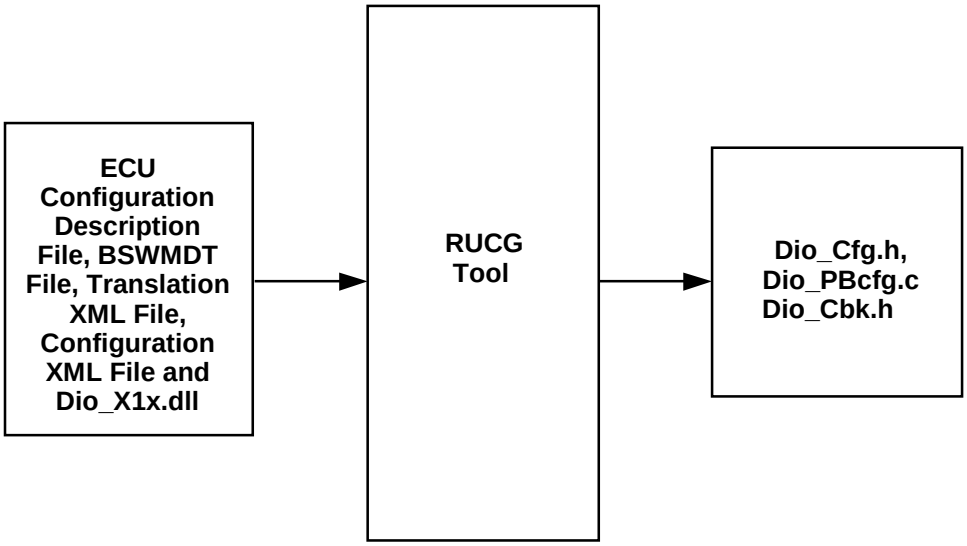

Figure 3-1 Overview of DIO Driver Generation Tool

Renesas Unified Code Generator (RUCG) tool is a command line tool that extracts, analyzes the configuration details provided in the input file and validates correctness of the data and provides scalability and configurability for DIO Driver module. It accepts ECU Configuration Description File(s), Translation XML File, BSWMDT File, Configuration XML and Dio_X1x.dll as input File as input and displays appropriate context sensitive error messages for wrong input and exits. Tool creates the Log file (Msn.log) that contains the list of Error/Warning/Information messages in the output directory.

For the error free input file, the tool generates the following output files: Dio_Cfg.h and Dio_PBcfg.c.

Dio_Cfg.h will be compiled and linked with DIO Driver Component. Dio_PBcfg.c will be compiled and linked separately from the other C Source files and placed in flash.

ECU Configuration Description File can be created or edited using ECU Configuration Editor.

Remark

- In case of errors the generation tool returns a 1, in case of no errors the generation tool returns a 0.
- DIO Driver Generation Tool uses “Common Published Information” from DIO module specific BSWMDT File. DIO module specific BSWMDT File should not be updated manually since it is “Static Configuration” file.

Chapter 4 Input Files

RUCG Tool accepts ECU Configuration Description File(s), BSWMDT File, Translation XML File, Configuration XML File and Dio_X1x.dll as input. RUCG Tool needs information about DIO Driver module. Hence ECU Configuration Description File should contain configuration of DIO Driver module. Generation Tool ignores any other AUTOSAR component configured in the ECU Configuration Description File. ECU Configuration Description File can be generated using configuration editor.

ECU Configuration Description File must comply with AUTOSAR standard ECU Configuration Description File format.

Remark The detailed explanation about the parameters and containers are found in Parameter Definition File mentioned in the Reference Documents section.

Chapter 5 Output Files

RUCG Tool generates configuration details in C Header and C Source files.

(DIO Driver Generation Tool will generate Dio_Cfg.h and Dio_PBcfg.c files.).

The content of each output file is given in the table below:

Table 5-1 Output Files Description

Output File	Details
Dio_Cfg.h	This file contains the macro definitions for development error detects, version info API and channel group. This file contains DIO Channel Configuration Handles, DIO Port Configuration Handles and DIO Channel Group Configuration Handles.
Dio_PBcfg.c	This file contains Data Structures for DIO Port Group Configuration, DIO Port Channel Configuration and DIO Port Channel Group Configuration. This file also contains information on Number of ports and Channels configured.
Dio_Cbk.h	This file contains callback function prototype declarations to be used by application.

Remark Output files generated by RUCG Tool should not be modified or edited manually.

Chapter 6 Precautions

- ECU Configuration Description File and BSWMDT File must comply with AUTOSAR standard for R4.0.3 ECU Configuration Description File and BSWMDT File respectively.
- The input file must contain DIO Driver module.
- Default Configuration XML File (Dio_X1x.cfgxml) must be present in same location of Dio_X1x.dll.
- If Translation XML File is not provided on the command line, Dio_X1x.trxml which is present in same location of Dio_X1x.dll is considered as ‘default’ Translation XML File.
- If Configuration XML File is not provided on the command line, Dio_X1x.cfgxml which is present in same location of Dio_X1x.dll is considered as ‘default’ Configuration XML File.
- Translation XML File should contain the file extension ‘.trxml’.
- Configuration XML File should contain the file extension ‘.cfgxml’.
- All the function names and the string values configured should follow C syntax for variables. It can only contain alphanumeric characters and “_”. It should start with an alphabet.
- If the output files generated by RUCG Tool are modified externally, then they may not produce the expected results or may lead to error/warning/Information messages.
- Short Name for a container should be unique within a name space.
- An error free ECU Configuration Description File generated from configuration editor has to be provided as input to the RUCG Tool. Otherwise Tool may not produce the expected results or may lead to errors/warnings/information messages.
- User has to make sure that the respective device specific configuration file is used otherwise Tool may not produce the expected results or may lead to errors/warnings/information messages.
- The description file should always be generated using AUTOSAR specified configuration editor and it should not be edited manually.

Remark Please refer the DIO Component User Manual for deviations from AUTOSAR Specifications, if any.

Chapter 7 User Configuration Validation

This section provides help to analyze the error, warning and information messages displayed during the execution of DIO Driver Generation Tool. It ensures conformance of input file with syntax and semantics. It also performs validation on the input file for correctness of the data.

For more details on list of Error/Warning/Information messages that are displayed as a result of input file(s) validation, refer Chapter “8 *Messages*”.

The Generation Tool displays error or warning or information when the user has configured incorrect inputs. The format of Error/Warning/Information message is as shown below.

- ERR/WRN/INF<mid><xxx>: <Error/Warning/Information Message>.

  where,

<mid>: 120 - DIO Driver Module id (120) for user configuration checks.

000 - for command line checks.

<xxx>: 001-999 - Message id.

- File Name: Name of the file in which the error has occurred
- Path: Absolute path of the container in which the parameter is present

‘File Name’ and ‘Path’ need not be present for all Error/Warning/Information messages.

Chapter 8 Messages

The messages help to identify the syntax or semantic errors in the ECU Configuration Description File. Hence it ensures validity and correctness of the information available in the ECU Configuration Description File.

The following section gives the list of error, warning and information messages displayed by the Generation Tool.

8.1 Error Messages

ERR120001: Number of fields is not same for the entity 'Structure Name'.

This error occurs, if the number of fields is not same in the structure that is to be generated in the output file.

ERR120002: Field 'Field Name' is empty in the entity 'Structure Name'.

This error occurs, if the structure fields that are to be generated in the output file are empty.

ERR120003: 'DIO Driver' Component is not present in the input file(s).

This error occurs, if DIO Driver Component is not present in the input ECU Configuration Description File(s).

ERR120004: The parameter 'parameter name' in the container 'container name' should be configured.

This error occurs, if any of the mandatory configuration parameter(s) mentioned below is (are) not configured in ECU Configuration Description File.

The list of mandatory parameters with respect to container is listed below:

Table 8-1 Parameters and Container related to error ERR102004

Parameter Name	Container Name
DioDevErrorDetect	DioGeneral
DioMaskedWritePortApi	
DioVersionInfoApi	
DioVersionCheckExternalModules	
DioDeviceName	
DioFlipChannelApi	
DioCriticalSectionProtection	
DioWriteVerify	
DioUseWriteVerifyErrorInterface	

Parameter Name	Container Name
DioPortName	DioPort
DioChannelBitPosition	DioChannel
DioPortMask	DioChannelGroup
DioPortOffset	

ERR120005: The value <value for DioPortName> configured for the parameter 'DioPortName' present in the container 'DioPort' should be unique.

This error occurs, if the value for parameter DioPortName present in the container DioPort is not unique.

ERR120006: The value for parameter 'DioChannelBitPosition' present in the container 'DioChannel' of the DIO port group <value for DioPortName parameter> is not in the range of <Start> and <End>.

This error occurs, if the value for parameter DioChannelBitPosition present in the container DioChannel for respective DIO port group is not valid as configured channel bit position must belongs to the respective DIO port group. In above error message, <Start> and <End> will be replaced by 'start channel bit position' and 'end channel bit position' respectively for selected DIO port group.

Example: Suppose in PORTGROUP_2_BITS_0_TO_2, only 0 to 2 channels are available. If user configures channels, which does not belongs to PORTGROUP_2_BITS_0_TO_2 then it is invalid configuration. Here start is 0 and end is 2.

ERR120007: The value <value for DioChannelBitPosition> configured for the parameter 'DioChannelBitPosition' present in the container 'DioChannel' of the DIO port group <value for DioPortName parameter> should be unique.

This error occurs, if the value for parameter DioChannelBitPosition present in the container DioChannel is not unique for respective DIO port group configured for the parameter DioPortName.

ERR120008: The value for parameter 'DioPortMask' <value for the DioPortMask> present in the container 'DioChannelGroup' of the DIO port group <value for DioPortName parameter> is not valid.

This error occurs, if value for parameter DioPortMask present in the container DioChannelGroup for respective DIO port group is not valid as the grouped channels must belong to the respective DIO port group.

Example: Suppose in PORTGROUP_2_BITS_0_TO_2, only 0 to 2 channels are available. In this case, user should not consider channel 3 and channel 4 in channel grouping, since channel 3 and channel 4 does not belong to PORTGROUP_2_BITS_0_TO_2.

ERR120009: The value for parameter 'DioPortMask' <value for the DioPortMask> present in the container 'DioChannelGroup' of the DIO port group <value for DioPortName parameter> is not valid. While masking, channels should be grouped in continuous order.

This error occurs, if value for parameter DioPortMask present in the container DioChannelGroup is not valid. The grouped channels should be continuous order.

Example: Channel 1 and Channel 5 cannot be grouped in one DIO Channel Group since they are not continuous channels.

ERR120010: The value for parameter 'DioPortOffset' <value for the DioPortOffset> present in the container 'DioChannelGroup' of the DIO port group <value for DioPortName parameter> is not valid. The value of the parameter 'DioPortOffset' should be equal to the start position of the DIO channel group.

This error occurs, if the value for parameter DioPortOffset present in the container DioChannelGroup is not valid. The value of the parameter DioPortOffset should be equal to the start position of the DIO channel group.

Example: Suppose DIO channel grouping started from Channel 2 then value for parameter DioPortOffset should be 2.

ERR120011: The short name <short name for DioPort> configured for the container 'DioPort' should be unique.

This error occurs, if short name of the container DioPort is not unique in ECU Configuration Description File.

ERR120012: The short name <short name for DioChannel> configured for the container 'DioChannel' should be unique.

This error occurs, if short name of the container DioChannel is not unique in each DioPort container.

ERR120013: The short name <short name for DioChannelGroup> configured for the container 'DioChannelGroup' should be unique.

This error occurs, if short name of the container DioChannelGroup is not unique in each DioPort container.

ERR120014: The number of 'DioPort' container is not same across multiple configuration sets.

This error occurs, if the number of DioPort container is not same across multiple configuration sets.

ERR120015: The number of 'DioChannel' container is not same across multiple configuration sets.

This error occurs, if the number of DioChannel container is not same across multiple configuration sets.

ERR120016: The number of 'DioChannelGroup' container is not same across multiple configuration sets.

This error occurs, if the number of DioChannelGroup container is not same across multiple configuration sets.

ERR120017: The container short name of 'DioPort' container is not same across multiple configuration sets.

This error occurs, if the container short name of DioPort container is not same across multiple configuration sets.

ERR120018: The container short name of 'DioChannel' container is not same across multiple configuration sets.

This error occurs, if the container short name of DioChannel container is not same across multiple configuration sets.

ERR120019: The container short name of 'DioChannelGroup' container is not same across multiple configuration sets.

This error occurs, if the container short name of DioChannelGroup container is not same across multiple configuration sets.

ERR120020: As write-verify check is enabled through the parameter DioWriteVerify in DioGeneral container and DioUseWriteVerifyErrorInterface is configured as true.

DioWriteVerifyError Interface should have valid error notification.
This error will occur if there is no valid error notification configured for the parameter Dio UseWriteVerifyError Interface when write-verify check is enabled.

ERR120021:As write-verify check is enabled through the parameter DioWriteVerify in DioGeneral container, DIO_E_REG_WRITE_VERIFY in DioDemEventParameterRefs container should be configured.

This error will occur if the parameter DIO_E_REG_WRITE_VERIFY in DioDemEventParameterRefs container is not configured when write-verify check is enabled.

ERR120022: The reference path <path> provided for the parameter 'DIO_E_REG_WRITE_VERIFY' within the container 'DioDemEventParameterRefs' is incorrect.

This error will occur, if the path provided for the parameter DIO_E_REG_WRITE_VERIFY in the container DioDemEventParameterRefs is incorrect.

ERR120023: As write-verify check is disabled via the parameter DioWriteVerify, DioUseWriteVerifyErrorInterface parameter should not be configured as true in DioGeneral Container.

This error will occur when the parameter DioUseWriteVerifyErrorInterface is configured as true, when the write-verify check is disabled.

8.2 Warning Messages

None.

8.3 Information Messages

None

Chapter 9 Notes

“Generation tool” and “Tool” terminologies are used interchangeably to refer DIO driver generation Tool.

Revision History

Sl.No.	Description	Version	Date
1.	Initial Version	1.0.0	30-Sep-2013
2.	• Parameter 'DioCriticalSectionProtection' is updated in Error message 'ERR120004'. • Reference Documents section is updated for addition of Parameter definition file reference in chapter 2. • Precautions chapter is updated.	1.0.1	01-Sep-2014
3.	• Section 2.1 Reference documents section is updated with the parameter definition file names.	1.0.2	27-Apr-2015
4	• R-Number is added. • Chapter 2.1, Reference Documents version details are updated.	1.0.3	28-Mar-2016
5	• Chapter 8.1 Error Messages updated. • Chapter 2.1 Reference Documents version details are updated. • Chapter 3 , Figure 3-1 is updated. • Chapter 5 , Table 5-1 is updated. • R-Number updated.	1.0.4	04-Aug-2016
6	• Table headers added for Table 8.1	1.0.5	09-Sep-2016

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