User's Manual

AUTOSAR MCAL R4.0.3
User's Manual

PORT Driver Component Ver.1.0.9

Generation Tool User's Manual

Target Device:
RH850/P1x

Renesas Electronics
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Abbreviations and Acronyms

Abbreviation / Acronym	Description
AUTOSAR	AUTomotive Open System ARchitecture
BSWMDT	Basic Software Module Description Template
DEM	Diagnostic Event Manager
DIO	Digital Input Output
ECU	Electronic Control Unit
ICU	Input Capture Unit
Id/ID	Identifier
INTP	Interrupt
MCAL	Micro Controller Abstraction Layer
MCU	Micro Controller Unit
NMI	Non Maskable Interrupt
RUCG	Renesas Unified Code Generator
Rev.	Revision
XML	eXtensible Mark-up Language

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 PORT Driver Generation Tool. It is generated by ECU Configuration Editor.
PORT	Represents a whole configurable port on a microcontroller device.
Sl.No	Serial Number.
Rev	Revision
Translation XML File	This file contains the translation and device specific header file path.

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Chapter 1 Introduction

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

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

The document describes the features of the PORT Driver Generation Tool. PORT Driver Generation Tool is a command line tool that extracts information from ECU Configuration Description File and generates PORT Driver C Source and C Header files (Port_Cfg.h, Port_Cbk.h and Port_PBcfg.c)

This document contains information on the options, input and output files of the PORT 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 PORT General Configuration, Port Pin Configurations.

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 (PORT Driver Generation Tool Overview)	Provides the component overview of PORT Driver.
Section 4 (Input Files)	Provides information about ECU Configuration Description File.
Section 5 (Output Files)	Explains the output files that are generated by the PORT 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 PORT 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_SWS_PortDriver.pdf	3.2.0
2.	**P1x Parameter Definition File** R403_PORT_P1M_04_05.arxml	1.0.5
3.	**P1x Parameter Definition File** R403_PORT_P1M_12_13.arxml	1.0.6
4.	**P1x Parameter Definition File** R403_PORT_P1M_20_21.arxml	1.0.5
5.	**P1x Parameter Definition File** R403_PORT_P1M_18_19_22_23.arxml	1.0.5
6.	**P1x Parameter Definition File** R403_PORT_P1M_10_11_14_15.arxml	1.0.8

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Chapter 3 PORT Driver Generation Tool Overview

PORT Driver Generation Tool overview is shown below.

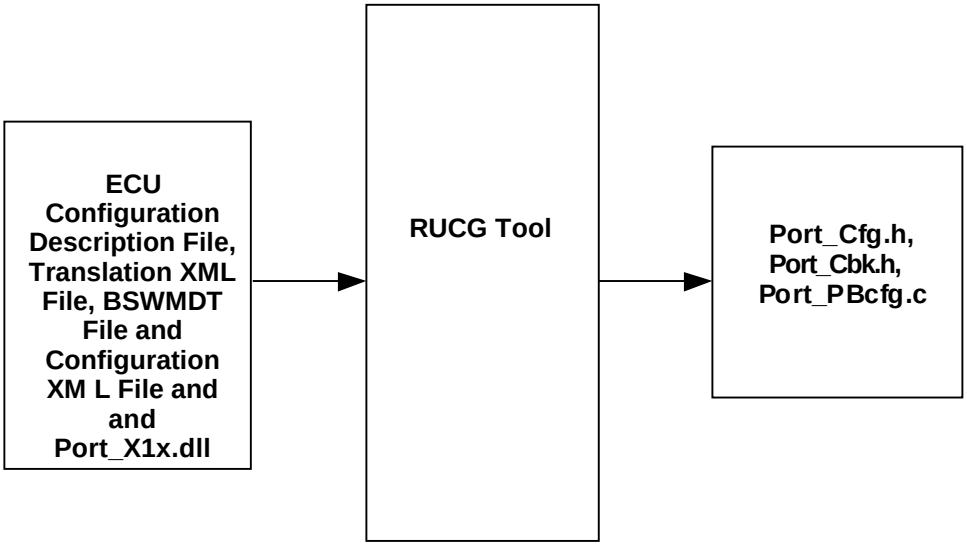

Figure 3-1 Overview of PORT Driver Generation Tool

RUCG Tool is a command line tool that provides scalability and configurability for PORT Driver component. It accepts ECU Configuration Description File(s) , BSWMDT File, Translation XML File, Configuration XML File and Port_X1x.dll as input and generates the C Header and C Source files (Port_Cfg.h,Port_Cbk.h and Port_PBcfg.c) for error free input files.

Port_Cfg.h and Port_Cbk.h will be compiled and linked with PORT Driver Component. Port_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.

PORT Driver Generation Tool extracts, analyzes the configuration details provided in the input file and validates correctness of the data. Tool displays appropriate context sensitive error messages for wrong input and exits. Tool creates the Log file (Port.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: C header Port_Cfg.h, Port_Cbk.h and C source Port_PBcfg.c file names.

Remark

- In case of errors the generation tool returns a 1, in case of no errors the generation tool returns a 0.
- PORT Driver Generation Tool uses “Common Published Information”

from PORT module specific BSWMDT File.This should not be updated manually since it is “Static Configuration” file.

Chapter 4 Input Files

PORT Driver Generation Tool accepts ECU Configuration Description File(s), Configuration XML file, BSWMDT File and Translation XML File as input. PORT Driver Generation Tool needs information about PORT Driver component. Hence ECU Configuration Description File should contain configuration of PORT Driver component. 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

PORT Driver Generation Tool generates configuration details in C Header and C Source files (Port_Cfg.h, Port_Cbk.h and Port_PBcfg.c).

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

Table 5-1 Output Files Description

Output File	Details
Port_Cfg.h	This file contains the macro definitions for general configuration, total number of Port Pins configured and configuration set handles. This file also includes the Port Pin handles for each configuration set.
Port_Cbk.h	This file contains prototype declarations for PORT call back notification functions.
Port_PBcfg.c	This file contains structure for Port Pin Initialization, Port Pin Direction Switch and Port Pin Direction Refresh during runtime.

Remark Output files generated by PORT Driver Generation 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 PORT Driver and DEM component related configuration.
  .
- Default Translation XML File (Port_X1x.trxml) should be present in same location of Port_X1x.dll when the variant specific trxml file is not given as input in command line.
- Default Configuration XML File (Port_X1x.cfgxml) must be present in same location of Port_X1x.dll.
- If Translation XML File is not provided on the command line, Port_X1x.trxml which is present in same location of Port_X1x.dll is considered as ‘default’ Translation XML File.
- If Configuration XML File is not provided on the command line, Port_X1x.cfgxml which is present in same location of Port_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 PORT Driver Generation 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 PORT Driver Generation Tool. Otherwise Tool may not produce the expected results or may lead to “errors/warnings/information messages”.
- If no configuration of certain port filter is done within this Port Module, the device specific default settings will take effect on this filter.
- If user selects the alternate signal in the port group container, then the respective port filter container should be configured. For example: If signal NMI is selected in the port group container respective filter group container has to be configured.
- The digital noise filter clock container ‘PortDigitalFilterClkCtrl’ should be configured along with containers ‘PortDigitalFilterGroup’, if ‘PortDigitalFilterClkCtrl’ container exists.
- In case of multiple configuration sets, if any filter is configured in one configuration set, then the same filter should be configured across all configured multiple configuration sets.
- In post-build time, sub containers of PortFilterGroupConfig containers should not be added or deleted.
- Edge/Level settings for External Interrupt (INTP) signals can be overwritten by ICU component to change the default activation type and

the type of activation at run-time.

- 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 PORT 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 PORT 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 messages 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>: 124 - PORT Driver Module Id (124) 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

ERR124001: 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.

ERR124002: 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.

ERR124003: 'PORT Driver / DEM' Component is not present in the input file(s).

This error occurs, if PORT Driver or DEM component is not present in the input ECU Configuration Description File(s).

ERR124004: 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 ERR124004

Parameter Name	Container Name
-	PortConfigSet
PortDevErrorDetect	PortGeneral
PortSetPinDirectionApi	
PortSetPinModeApi	
PortVersionInfoApi	
PortDeviceName	
PortCriticalSectionProtection	
PortVersionCheckExternalModules	
PortLoopTimeout	

Parameter Name	Container Name
PortMaxMode	
PortSetToDioAltModeApi	
PortSetPinDefaultDirectionApi	
PortWriteVerify	
PortUseWriteVerifyErrorInterface	
PortSetPinDefaultModeApi	
PortPinDirection	‘Port Group’ container Where in ‘Port Group container': PortGroup<Group number/Alphabetic name> for PortPin<Pin number>. E.g. PortGroup0 PortPin0, PortGroup1 PortPin1, PortGroupJtag0 PortPin0 etc.
PortPinDirectionChangeable	
PortPinLevelValue	
PortPinInitialMode	
PortInputBufferControl	
PortBiDirectionControl	
PortPullUpOption	
PortPullDownOption	
PortInputSelection	
PortIpControl	
PortInputSelection	
PortOutputDriveStrength	
PortPinModeChangeable	
PortOpenDrainControl_Expansion	
PortOutputLevelInversion	
PortPinDioAltModeChangeable	
-	PortFilterGroupConfig
PortSameLevelSamples	Digital Filter Container PortDigitalFilterGroup<Filter Group number> Ex: PortDigitalFilterGroup0, PortDigitalFilterGroup1... etc
PortSamplingClockFrequency	
PortDigitalFilterEnableInput(X) where X= 0-7	
PortDigitalFilterEdgeControl(Y) where Y =0-5	
PortDigitalFilterModeSelection	
PORT_E_WRITE_TIMEOUT_FAILURE	PortDemEventParameterRefs
PortClockSource<Filter clock source selection number>	SamplingClockSourceSelection

ERR124005: The number of configuration sets configured for 'PORT' and 'MCU' modules should be same.

This error occurs, if the number of configuration sets configured for PORT and MCU modules are not same.

ERR124007: Short name of ‘Port Group container’ container should be same across all configuration sets.

This error occurs, if short name of ‘Port Group container’ container is not same across all configuration sets.

ERR124008: Short name of ' Port Pin container’ should be same across all configuration sets.

This error occurs, if short name of ‘Port Pin container’ is not same across all configuration sets.

ERR124009: The value for parameter 'PortPinModeChangeable' from ‘Port Group Container’ container should not be configured as <true> as the value for parameter ‘PortSetPinModeApi’ in the container ‘PortGeneral’ is configured as <false>.

This error occurs, if the parameter PortSetPinModeApi in the container PortGeneral is configured as false and parameter PortPinModeChangeable is configured as true for at least one of the ‘Port Group container’ container.

ERR124010: The value for parameter 'PortInputBufferControl' of the 'PortPin[X]' container should not be configured as <true> as either configured value for parameter 'PortPinDirection' of the same container is configured as <PORT_PIN_OUT> or parameter 'PortPinInitialMode' is configured as '<value of PortPinInitialMode>' and parameters 'PortPinDirectionChangeable', 'PortPinDioAltModeChangeable' 'PortPinModeChangeable' are configured <FALSE>.

This error will occur,if PortInputBufferControl configured as true when PortPinInitialMode is OUT mode or PortPinDirection is PORT_PIN_OUT and none of the corresponding runtime changeable features [PortPinDirectionChangeable, PortPinDioAltModeChangeable, PortPinModeChangeable] is made true.

ERR124011: The value for parameter ‘PortPinDirectionChangeable’ for any ‘Port Group Container’ container should not be configured as <true> as the value for parameter ‘PortSetPinDirectionApi’ in the container ‘PortGeneral’ is configured as <false>.

This error occurs, if the parameter PortSetPinDirectionApi in the container PortGeneral is configured as false and parameter PortPinDirectionChangeable is configured as true for at least one of the ‘Port Group container’ container.

ERR124012: The reference path <path> provided for the parameter 'PORT_E_WRITE_TIMEOUT_FAILURE' within the container 'PortDemEventParameterRefs' is incorrect.

This error occurs, if the path provided for parameter PORT_E_WRITE_TIMEOUT_FAILURE in the container PortDemEventParameterRefs is incorrect.

ERR124013: Value of the parameter 'PortPinInitialMode' of 'Port Group container' 'Port Pin container' container should not be configured as <value of PortPinInitialMode>, since the parameter 'PortPinDioAltModeChangeable' of same container is configured as <true>.

This error occurs, if the parameter PortPinInitialMode of the ‘Port Group container’ is configured as DIO and parameter PortPinDioAltModeChangeable of the same ‘Port Group container’ container is true.

ERR124014: The value for parameter ‘PortPinDioAltModeChangeable’ for any ‘Port Group Container’ container should not be configured as <true> as the value for parameter ‘PortSetToDioAltModeApi’ in the container ‘PortGeneral’ is configured as <false>.

This error occurs, if the parameter PortSetToDioAltModeApi in the container PortGeneral is configured as false and parameter PortPinDioAltModeChangeable is configured as true for at least one of the

'Port Group container' container.

ERR124015: The value for parameter 'PortSetPinDefaultDirectionApi' from 'PortGeneral' container should not be configured as <true> as the value for parameter 'PortSetPinDirectionApi' in the container 'PortGeneral' is configured as <false>.

This error will occur, if the parameter PortSetPinDirectionApi in the container PortGeneral is configured as false and parameter PortSetPinDefaultDirectionApi in the PortGeneral container PortGeneral is configured as true.

ERR124016: The value for parameter 'PortSetPinDefaultModeApi' from 'PortGeneral' container should not be configured as <true> as the value for parameter 'PortSetPinModeApi' in the container 'PortGeneral' is configured as <false>.

This error will occur, if the parameter PortSetPinModeApi in the container PortGeneral is configured as false and parameter PortSetPinDefaultModeApi in the PortGeneral container PortGeneral is configured as true.

ERR124018: The configured value of the parameter 'PortPinInitialMode' of the container 'PortPin1' is incorrect, since the parameter 'PortIpControl' is configured as <true> and 'PortPinInitialMode' is configured as <>.

This error will occur, if the parameter PortIpControl in the container PortGroup is configured as true and parameter PortPinInitialMode of the same PortGroup container is configured as any mode except the one for which the parameter PortIpControl is required to be TRUE.

ERR124019: The value of the parameter'PORT_E_REG_WRITE_VERIFY' should be configured in the container 'PortDemEventParameterRefs' when the parameter 'PortWriteVerify' is configured as <TRUE> in the 'PortGeneral' container

This error occurs, if DEM parameter PORT_E_REG_WRITE_VERIFY path is not configured in PortDemEventParameterRefs container when parameter 'PortWriteVerify' is configured as true in PortGeneral container.

ERR124020: As write-verify check is enabled through the parameter PortWriteVerify in PortGeneral container and PortUseWriteVerifyErrorInterface is configured as true, PortWriteVerifyErrorInterface should have valid error notification.

This error will occur, if the parameters PortWriteVerify and PortUseWriteVerifyErrorInterface in PortGeneral container is configured as true and valid notification name is not configured for the parameter PortWriteVerifyErrorInterface.

ERR124021: The reference path <Value of path > configured for the parameter 'PORT_E_REG_WRITE_VERIFY' in the container 'PortDemEventParameterRefs', short name of the DEM container is incorrect.

This error occurs, if the path provided for the DEM parameter 'PORT_E_REG_WRITE_VERIFY' inside 'PortDemEventParameterRefs' container is wrong when the parameter 'PortWriteVerify' in the 'PortGeneral ' container is configured as True.

ERR124022: As write-verify check is disabled in the parameter 'PortWriteVerify' and 'PortUseWriteVerifyErrorInterface' parameter should not be configured as true in PortGeneral Container.

This error will occur, if the parameter 'PortUseWriteVerifyErrorInterface' is configured as true when the parameter 'PortWriteVerify' is disabled in the PortGeneral Container.

ERR124023: In PortConfigSet container If any PortDigitalFilterGroup is configured,then the container SamplingClockSourceSelection inside PortFilterGroupConfig should be configured.

This error will occur, if any of the PortDigitalFilterGroup is configured and the container SamplingClockSourceSelection inside the PortFilterGroupConfig is not configured.

ERR124024: In PortConfigSet container If any PortDigitalFilterGroup is configured,then the parameter PortDigitalFilterClockSelection inside the PortFilterGroupConfig container should be configured.

This error will occur,if any of the PortDigitalFilterGroup is configured and the parameter PortDigitalFilterClockSelection inside the PortFilterGroupConfig container is not configured.

ERR124025: The reference path <PortDigitalFilterClockSelectionPath> provided for the parameter within the container 'PortFilterGroupConfig' is incorrect.

This error will occur, if the reference path provided for the parameter PortDigitalFilterClockSelection within the container 'PortFilterGroupConfig' is incorrect.

ERR124026: If any PortDigitalFilterGroup is configured,then the parameter PortDigitalFilterClockSelection should be present and configured inside the PortFilterGroupConfig container.

This error will occur, if any of the PortDigitalFilterGroup container is configured and the parameter PortDigitalFilterClockSelection inside the PortFilterGroupConfig container is not present.

ERR124027: The parameters 'PortPullUpOption' and 'PortPullDownOption' should not be configured as <true> at the same time.

This error will occur, if the parameters 'PortPullUpOption' and 'PortPullDownOption' configured as <true> at the same time in PortPin container of any PortGroup.

8.2 Warning Messages

WRN124001: The parameter 'PortPinDirection' of container 'Port Group container' should not be configured as <PORT_PIN_OUT>, since the parameter 'PortPinInitialMode' of the same 'Port Group container' container is configured as an Input type mode. The value for parameter 'PortPinDirection' is considered as <PORT_PIN_IN>.

This warning occurs, if value configured for the parameter PortPinDirection is Output and value configured for the parameter PortPinInitialMode is of Input type mode. The value of the parameter PortPinDirection will be considered as Input.

WRN124002: The parameter 'PortPinDirection' of container 'Port Group container' should not be configured as <PORT_PIN_IN>, since the parameter 'PortPinInitialMode' of the same 'Port Group container' container 'is configured as an Output type mode. The value for parameter 'PortPinDirection' is considered as <PORT_PIN_OUT>.

This warning occurs, if value configured for the parameter PortPinDirection is Input and value configured for the parameter PortPinInitialMode is of Output type mode. The value of the parameter PortPinDirection will be considered as Output.

WRN124006: The values configured in SamplingClockSourceSelection container are ignored since no PortDigitalFilterGroup container is configured.

This warning will occur if the values configured for SamplingClockSourceSelection container are ignored when no PortDigitalFilterGroup container is configured.

8.3 Information Messages

None.

Chapter 9 Notes

“Generation Tool” and “Tool” terminologies are used interchangeably to refer PORT Driver Generation Tool.

Revision History

Sl.No.	Description	Version	Date
1.	Initial Version	1.0.0	08-Oct-2013
2.	Following change is made: • Error message ERR124004 is updated for addition of PortDemEventParameterRefs container.	1.0.1	21-Nov-2013
3.	Following changes are made: • Error messages ERR124003, ERR124005, ERR124006, ERR124008 and ERR124014 are added in section 8.1. • Error message ERR124004 is updated in section 8.1. • Warning messages WRN124003, WRN124005 are updated in section 8.2.	1.0.2	28-Jan-2014
4.	Following changes are made: • Error messages ERR124004 is updated in section 8.1 for the removal of PortPinStatusBackup parameter. • The error message ERR124006 and the warning message WRN124004 are deleted from chapter 8.	1.0.3	12-Mar-2014
5.	Following changes are made: • Error messages ERR124015 and ERR124016 are added newly in section 8.1. • Error message ERR124004 is updated for addition of SamplingClockSourceSelection container and PortSetPinDefaultDirectionApi and PortSetPinDefaultModeApi parameters in PortGeneral container. • The warning message WRN124006 is added newly in section 8.3 . • Reference Documents section is updated for addition of Parameter definition file reference in chapter 2. • Precautions chapter is updated.	1.0.4	27-Aug-2014
6.	Following changes are made: • Parameter definition file names and versions are updated in section 2.1. • Error message ERR124018 is added in section 8.1.	1.0.5	29-Apr-2015
7.	Following changes are made: • Parameter definition file name versions are updated in section 2.1. • Description for error message ERR124010 is updated in section 8.1. • Port_X1x.exe is replaced with Port_X1x.dll in Chapter 6 • ERR124004 is updated to remove parameter PortDemErrorDetect from container PortGeneral • Added R number at end of the document • Chapter 3 is updated for Figure 3-1 • Copyright information is updated	1.0.6	29-Mar-2016

Sl.No.	Description	Version	Date
8.	Following changes are made: • Parameter definition file name versions are updated in section 2.1 • Port_Cbk.h information added in the chapter 1,3 and 5. • Error message ERR124019 to ERR124027 are added in section 8.1. • R number is updated at end of the document	1.0.7	11-Jul-2016
9.	Following changes are made: • Warning messages WRN124003 and WRN124005 are removed from section 8.2. • Table number is added for table present in Chapter 8.1 Error Messages. • Parameter definition file name versions are updated in section 2.1 • Parameters PortDriveStrengthControl and PortUnlimitedCurrentControl are removed and PortOutputDriveStrength is added to the Table 8-1	1.0.8	24-Oct-2016
10.	Following changes are made: • Abbreviation list is updated. • R number is updated at end of the document • Notice is updated • Version of Parameter definition files updated in the section 2.1.Reference Documents	1.0.9	14-Feb-2017

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PORT Driver Component Ver.1.0.9
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AUTOSAR MCAL R4.0.3

User's Manual

Renesas Electronics Corporation

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