User's Manual

AUTOSAR MCAL R4.0.3
User's Manual

FLS Driver Component Ver.1.0.8

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
DEM/Dem	Diagnostic Event Manager
ECU	Electronic Control Unit
FACI	Flash Application Command Interface
FLS	FLash Driver
FCU	Flash Control Unit
id	Identifier
MCAL	Microcontroller Abstraction Layer
MCU	MicroController Unit
PDF	Parameter Definition File
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 FLS 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.

Table of Contents

List of Figures

List of Tables

Chapter 1 Introduction

The FLS Software component provides the service for initializing the whole FLS structure of the microcontroller.

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

The document describes the features of the FLS Software Generation Tool. FLS Software Generation Tool is a command line tool that extracts information from ECU Configuration Description File and generates FLS Software C Header files and Source Files (Fls_Cbk.h, Fls_Cfg.h and Fls_PBcfg.c).

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

ECU Configuration Description File contains information about FLS 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 (FLS Driver Generation Tool Overview)	Provides the component overview of FLS 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 FLS 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 FLS 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:

Table 2-1 Reference Documents Description

Sl.No.	Title	Version
1.	Specification of Flash Driver for R4.0.3 AUTOSAR_SWS_FlashDriver.pdf	3.2.0
2.	**P1x Parameter Definition File** R403_FLS_P1M_04_05_10_to_15.arxml	1.1.6
3.	**P1x Parameter Definition File** R403_FLS_P1M_18_to_23.arxml	1.0.6

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Chapter 3 FLS Driver Generation Tool Overview

FLS Driver Generation Tool overview is shown below.

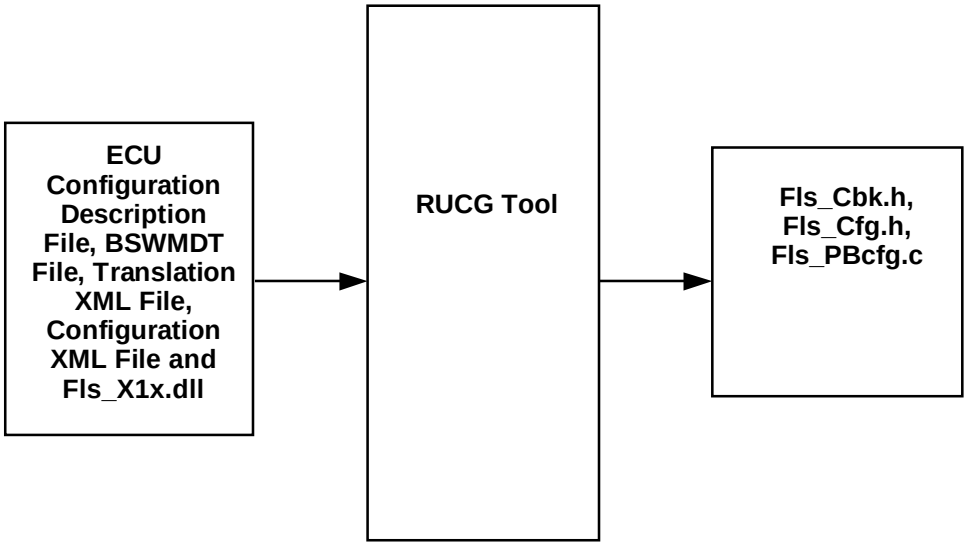

Figure 3-1 Overview of FLS Driver Generation Tool

Renesas Unified Code Generator (RUCG) tool shall be used for FLS driver configuration generation.
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 FLS Driver module. It accepts ECU Configuration Description File(s), BSWMDT File, Translation XML File, Configuration XML File and Fls_X1x.dll as input and displays appropriate context sensitive error messages for wrong input and exits. Tool creates the Log file Fls.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:

FLS Driver generation tool will generate Fls_Cfg.h, Fls_Cbk.h and Fls_PBcfg.c files.

Fls_Cfg.h and Fls_Cbk.h will be compiled and linked with FLS Driver Component. Fls_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.
- FLS Driver Generation Tool uses “Common Published Information” from FLS module specific BSWMDT File. FLS 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 Fls_X1x.dll as input. FLS Driver Generation Tool needs information about FLS Driver module. Hence ECU Configuration Description File should contain configuration of FLS 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 (Fls_Cbk.h, Fls_Cfg.h and Fls_PBcfg.c).

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

Table 5-1 Output Files Description

Output File	Details
Fls_Cbk.h	This file contains call-back functions prototype declarations.
Fls_Cfg.h	This file contains pre-compile time parameters.
Fls_PBcfg.c	This file contains post-build time parameters.

Remark Output files generated by FLS 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 FLS Driver module.
- Default Translation XML File (Fls_X1x.trxml) should be present in same location of Fls_X1x.dll when the variant specific trxml file is not given as input in command line.
- Default Configuration XML File (Fls_X1x.cfgxml) must be present in same location of Fls_X1x.dll.
- If Translation XML File is not provided on the command line, Fls_X1x.trxml which is present in same location of Fls_X1x.dll is considered as ‘default’ Translation XML File.
- If Configuration XML File is not provided on the command line, Fls_X1x.cfgxml which is present in same location of Fls_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 FLS 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 FLS Driver Generation 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 leads

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 FLS 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 FLS 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>: 092- FLS Driver Module id (092) 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

ERR092001: 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.

ERR092002: 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.

ERR092003: 'FLS Driver / MCU Driver' Component is not present in the input file(s).

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

ERR092004: 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 ERR092004

Parameter Name	Container Name
FlsDevErrorDetect	FlsGeneral
FlsCancelApi	
FlsCompareApi	
FlsSetModeApi	
FlsUseInterrupts	
FlsVersionInfoApi	
FlsVersionCheckExternalModules	
FlsCriticalSectionProtection	
FlsFaciEccCheck	
FlsInterruptConsistencyCheck	
FlsWriteVerify	
FlsUseWVErrorInterface	
FlsLoopCount	
FlsVirtualBoundaryAddress	
FlsDeviceName	
FlsTimeoutMonitoring	
FlsEraseTime	
FlsWriteTime	

Parameter Name	Container Name
FlsErasedValue	FlsPublishedInformation
FlsBlankCheckTime	
FlsCallCycle	
FlsDefaultMode	
FlsMaxReadFastMode	
FlsMaxReadNormalMode	
FlsSectorIndex	FlsSector
FlsNumberOfSectors	
FlsPageSize	
FlsSectorSize	
FlsSectorStartaddress	
FlsDFBaseAddress	FlsDataFlash
FlsDFBlockSize	
FlsDFTotalBlocks	
FlsDataFlashSize	
FlsFdlCpuFrequency	
FlsBlankCheckApi	
FlsReadImmediateApi	
FlsSuspendApi	
FlsResumeApi	
FLS_E_READ_FAILED	FlsDemEventParameterRefs
FLS_E_WRITE_FAILED	
FLS_E_READ_FAILED_DED	
FLS_E_ERASE_FAILED	
FLS_E_COMPARE_FAILED	
FLS_E_HW_FAILURE	

Remark

- The container FlsDataFlash and its parameters are mandatory.

ERR092007: The value configured for the parameter 'parameter name' should follow C syntax < [a-zA-Z] [a-zA-Z0-9_]>.

This error occurs, if the value of configuration parameters mentioned in below table does not adhere to C syntax as if the value contains characters other than (a-z, A-Z, 0-9 or "_"). The parameter value should always start with an alphabet.

Table 8-2 Parameters and Container related to error ERR092007

Parameter Name	Container Name
FlsJobEndNotification	FlsConfigSet
FlsJobErrorNotification	
FlsEccSedNotification	FlsDataFlash
FlsEccDedNotification	

ERR092012: The reference path <reference value> provided for the parameter 'parameter name' within the container 'FlsDemEventParameterRefs' is incorrect.

This error occurs, if the reference path <reference value> provided for the

following parameters within the container 'FlsDemEventParameterRefs' is incorrect.

Table 8-3 Parameters and Container related to error ERR092012

Parameter Name	Container Name
FLS_E_COMPARE_FAILED	FlsDemEventParameterRefs
FLS_E_ERASE_FAILED	
FLS_E_READ_FAILED	
FLS_E_WRITE_FAILED	
FLS_E_READ_FAILED_DED	
FLS_E_REG_WRITE_VERIFY	
FLS_E_HW_FAILURE	
FLS_E_ECC_FAILED	
FLS_E_INT_INCONSISTENT	

ERR092015: The value configured for the parameter 'parameter name' in the container 'FlsSector' should be <actual value>, since the sector used is data flash sector.

This error occurs, if the value configured for the following parameters in the container FlsSector is not as per below table.

Table 8-4 Parameters and Container related to error ERR092015

FlsNumberOfSector	FlsSectorSize
512	64

Remark

- For R7F701318, R7F701319, R7F701320, R7F701321, R7F701322 and R7F701323 devices the value for FlsNumberOfSector is 1024.

ERR092017: The value configured for the parameter 'parameter name' in the container 'container name' should be same for the FlsSectorIndex <Value of FlsSectorIndex> across the multiple configuration set of 'FlsConfigSet'.

This error occurs, if the value configured for the following parameters in the respective container is not same for the FlsSectorIndex across the multiple configuration set of FlsConfigSet.

Table 8-5 Parameters and Container related to error ERR092017

Parameter Name	Container Name
FlsSectorSize	FlsSector
FlsNumberOfSectors	
FlsSectorStartaddress	

ERR092018: The values configured for the parameters 'FlsEccSedNotification' and 'FlsEccDedNotification' in the container 'FlsDataFlash' and the values configured for the parameters 'FlsJobEndNotification' and 'FlsJobErrorNotification' in any of the 'FlsConfigSet' container should be unique.

This error occurs, if the values configured for the parameters ‘FlsEccSedNotification’ and ‘FlsEccDedNotification’ in the container ‘FlsDataFlash’ and the values configured for the parameters ‘FlsJobEndNotification’ and ‘FlsJobErrorNotification’ in any of the ‘FlsConfigSet’ container is not unique. For example, the following table shows the conditions when the error message occurs.

Table 8-6 Parameters and Container related to error ERR092018

Container : FlsDataFlash		Container : FlsConfigSet	
FlsEccSedNotification	**FlsEccDedNotification**	**FlsJobEndNotification**	**FlsJobErrorNotification**
EccSedNotification	EccSedNotification	EccSedNotification	EccSedNotification
EccSedNotification	EccSedNotification	-	-
-	-	EccSedNotification	EccSedNotification
-	EccSedNotification	-	EccSedNotification
EccSedNotification	-	-	EccSedNotification

ERR092019: The value configured for the parameter ‘parameter name’ in the container ‘FlsDemEventParameterRefs’ should be same across the multiple configuration set of ‘FlsConfigSet’.

This error occurs, if the value configured for the following parameters in the container FlsDemEventParameterRefs is not same across the multiple configuration set of FlsConfigSet.

Table 8-7 Parameters and Container related to error ERR092019

Parameter Name	Container Name
FLS_E_COMPARE_FAILED	FlsDemEventParameterRefs
FLS_E_ERASE_FAILED	
FLS_E_READ_FAILED	
FLS_E_WRITE_FAILED	
FLS_E_READ_FAILED_DED	
FLS_E_REG_WRITE_VERIFY	
FLS_E_HW_FAILURE	
FLS_E_INT_INCONSISTENT	
FLS_E_ECC_FAILED	

ERR092020: The value configured for the parameter ‘FlsSectorIndex’ in the container ‘FlsSector’ should be same across the multiple configuration set of 'FlsConfigSet'.

This error occurs, if the value configured for the parameter FlsSectorIndex in the container FlsSector is not same across the multiple configuration set of FlsConfigSet.

ERR092023: The reference path of MCU <configured value of FlsFdlCpuFrequency> provided for the parameter ‘FlsFdlCpuFrequency’ in the container 'FlsDataFlash' is incorrect.

This error occurs, if the reference path of MCU provided for the parameter FlsFdlCpuFrequency in the container FlsDataFlash is incorrect.

ERR092028: The value configured for the parameter 'FlsSectorStartaddress' should be within the range of <range of value> for

the <configured value of FlsSectorOption>.

This error occurs, if the value configured for the parameter FlsSectorStartaddress is not within the below range.

Table 8-8 Parameters and Container related to error ERR092028

Range of value for FlsSectorStartaddress
0 to (value configured for FlsVirtualBoundaryAddress - 1)

ERR092029: The value configured for the parameter 'FlsTotalSize' should be (FlsNumberOfSectors * FlsSectorSize) since the sector used is data flash sector.

This error occurs, if the parameter FlsTotalSize in the container FlsGeneral is not configured with value equal to (FlsNumberOfSectors * FlsSectorSize).

ERR092032: The value configured for the parameter FlsMaxReadFastMode should be greater than or equal to FlsMaxReadNormalMode in the container FlsConfigSet <config_index>.

This error occurs, if the parameter FlsMaxReadFastMode is not configured with value greater than the value configured for the parameter FlsMaxReadNormalMode in the container FlsConfigSet.

ERR092033: The value configured for the parameter FlsCallCycle should be greater than '0' if the parameter FlsTimeoutMonitoring is set as TRUE.

This error occurs, if the parameter FlsTimeoutMonitoring is set to TRUE and the value configured for the FlsCallCycle is 0.

ERR092034: If the parameter FlsFaciEccCheck is configured as true, then FLS_E_ECC_FAILED in the container FlsDemEventParameterRefs must be configured.

This error will occur if no reference path is provided for the DEM parameter FLS_E_ECC_FAILED in the container FlsDemEventParameterRefs when the parameter FlsFaciEccCheck is configured as true.

ERR092035: If the parameter FlsInterruptConsistencyCheck is configured as true, then FLS_E_INT_INCONSISTENT in the container FlsDemEventParameterRefs must be configured.

This error will occur if no reference path is provided for the DEM parameter FLS_E_INT_INCONSISTENT in the container FlsDemEventParameterRefs when the parameter FlsInterruptConsistencyCheck is configured as true.

ERR092036: If the parameter FlsWriteVerify is configured as FLS_INIT_ONLY or FLS_INIT_AND_RUNTIME, then the parameter 'FLS_E_REG_WRITE_VERIFY' in the container FlsDemEventParameterRefs should be configured.

This error will occur if no reference path is provided for the DEM parameter FLS_E_REG_WRITE_VERIFY in the container FlsDemEventParameterRefs when the parameter FlsUseWVErrorInterface is configured as true.

ERR092037: FlsWriteVerifyErrorInterface parameter should have a value when the parameter FlsUseWVErrorInterface is configured as true.

This error will occur, if the parameter FlsWriteVerifyErrorInterface is not configured when the parameters FlsWriteVerify is configured as FLS_INIT_ONLY or FLS_INIT_AND_RUNTIME and FlsUseWVErrorInterface is configured as true.

ERR092038: If the parameters FlsUseInterrupts and FlsTimeoutMonitoring are configured as true, then the parameter FlsTimeOutCountValue in the container FlsConfigSet should have a value.

This error will occur if the FlsTimeOutCountValue is not configured when the parameters FlsUseInterrupts and FlsTimeoutMonitoring in the container FlsGeneral is configured as true.

ERR092039: The value configured for the parameter FlsCallCycle in the container FlsConfigSet should be same across the multiple configuration set.

This error occurs, if the value configured for the parameter FlsCallCycle is not same across the multiple configuration set of FlsConfigSet.

ERR092040: The value configured for the parameter FlsTimeOutCountValue in the container FlsConfigSet should be same across the multiple configuration set.

This error occurs, if the value configured for the parameter FlsTimeOutCountValue is not same across the multiple configuration set of FlsConfigSet.

ERR092041: User shall not configure multiple sectors. Since data flash is a monolithic on-chip NV memory with homogeneous block size, it is not required to have multiple sectors with the same sector sizes.

This error occurs, if more than one "FlsSector" is configured in the container FlsConfigSet.

8.2 Warning Messages

None

8.3 Information Messages

INF092001: The parameter 'parameter name' in the container ‘FlsConfigSet' is not configured.

This information occurs, if the parameters FlsJobEndNotification or FlsJobErrorNotification or FlsEccSedNotification or FlsEccDedNotification in the container FlsConfigSet are not configured or configured with NULL or NULL_PTR.

Chapter 9 Notes

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

Revision History

Sl.No.	Description	Version	Date
1.	Initial Version	1.0.0	29-Oct-2013
2.	Following changes are made: • Error messages ERR092010, ERR092018, ERR092029, ERR092030 and ERR092031 are added. • Error message ERR092007is updated.	1.0.1	28-Jan-2014
3.	Following changes are made: • FlsUseInterrupts parameter is added in FlsGeneral container in error message ERR092004 in section 8.1. Error Messages • FlsSuspendTime parameter is added in FlsPublishedInformation container in error message ERR092004 in section 8.1.1. Error Messages. • FlsBlankCheckApi, FlsReadImmediateApi, FlsSuspendApi and FlsResumeApi parameters are added in FlsDataFlash container in error message ERR092004 in section 8.1.1. Error Messages. • Error messages ERR092008, ERR092009 and ERR092010 are deleted and error message ERR092018 is updated in section 8.1 Error Messages.	1.0.2	2-Sep-2014
4	The following changes are made: • PDF name and version are updated in Section 2.1 • Added parameters FlsCancelTime and FlsCFCancelTime in the list of mandatory parameters in Section 8.1. • The description of error ERR092029 is updated in Section 8.1. • Updated version number and copyright year.	1.0.3	24-Apr-2015
5	The following changes are made: • Updated Abbreviations and Acronyms section to include FACI and FCU. • Removed fcl_cfg.h, fdl_descriptor.h, fcl_descriptor.h details and references from Chapter 1, Chapter 3 and 5. • FLS_E_REG_WRITE_VERIFY is added to the existing Dem parameter list. • FlsAccess, FlsSectorOption and CODE FLASH related parameters and container details are removed from ERR092004 in Section 8.1. • Error messages and Information messages for the parameters FlsAccess and FlsSectorOption are removed from section 8.1 and 8.3 respectively. • Error message ERR092032 is added and ERR092014, ERR092021, ERR092022, ERR092024, ERR092025, ERR092026, ERR092030 and ERR092031 are removed • Information messages INF092002, INF092003, INF092004 and INF092005 related to FlsAccess and FlsSectorOption parameters are removed. • Error Messages ERR092032 and ERR092034 are added. • Updated Chapters 3, 4, 5 and 6 for RUCG tool and DLL file. • Added FLS_E_ECC_FAILED in the parameter name of ERR092019. • Added the parameter 'FlsFaciEccCheck' in the parameter name of ERR092004. • Error message ERR092035, ERR092036, ERR092037, ERR092038, ERR092039, ERR092040 are added • Modified ERR092004, ERR092012 and ERR092019 • Publication date and copyright updated	1.0.4	15-Feb-2016

Sl.No.	Description	Version	Date
6.	The following changes are made: • Added R number at end of the document. • Renamed FlsDFTotalSize in ERR092004 to FlsDataFlashSize. • Updated section 2.1 Reference Documents to correct the version of parameter definition files.	1.0.5	24-Mar-2016
7.	The following changes are made: • Updated section 2.1 Reference Documents to correct the file name and version of parameter definition files. • Updated R Number • Removed not used mandatory parameters from section 8.1	1.0.6	16-Jul-2016
8.	The following changes are made: • Error message ERR092041 is added in section 8.1 • Table headers are added • Info message INF092001 is updated.	1.0.7	19-Sep-2016
9.	The following changes are made: • Abbreviation and Acronyms list is updated. • Updated Section 2.1 for Document versions. • Table headers are updated in section 8.1 to specify correct ERR Ids. • Updated R Number. • Updated notice, address and copyright information's. • Error message ERR092033 is added in section 8.1.	1.0.8	13-Feb-2017

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