User Manual

for S32K1 EEP Driver

Document Number: UM2EEPASR4.4 Rev0000R1.0.1 Rev. 1.0

Chapter 1

Revision History

Revision	Date	Author	Description
1.0	24.02.2022	NXP RTD Team	Prepared for release RTD S32K1 Version 1.0.1

Chapter 2

Introduction

This User Manual describes NXP Semiconductor AUTOSAR EEP for S32K1. AUTOSAR EEP driver configuration parameters and deviations from the specification are described in Driver chapter of this document. AUTOSAR EEP driver requirements and APIs are described in the AUTOSAR EEP driver software specification document.

2.1 Supported Derivatives

The software described in this document is intended to be used with the following microcontroller devices of NXP Semiconductors:

- s32k116_qfn32
- s32k116_lqfp48
- s32k118_lqfp48
- s32k118_lqfp64
- s32k142_lqfp48
- s32k142_lqfp64
- s32k142_lqfp100
- s32k142w_lqfp48
- s32k142w_lqfp64
- s32k144_lqfp48

- s32k144_lqfp64
- s32k144_lqfp100
- s32k144_mapbga100
- s32k144w_lqfp48
- s32k144w_lqfp64
- s32k146_lqfp64
- s32k146_lqfp100
- s32k146_mapbga100
- s32k146_lqfp144
- s32k148_lqfp100
- s32k148_mapbga100
- s32k148_lqfp144
- s32k148_lqfp176

All of the above microcontroller devices are collectively named as S32K1.

2.2 Overview

AUTOSAR (AUTomotive Open System ARchitecture) is an industry partnership working to establish standards for software interfaces and software modules for automobile electronic control systems.

AUTOSAR:

- paves the way for innovative electronic systems that further improve performance, safety and environmental friendliness.
- is a strong global partnership that creates one common standard: "Cooperate on standards, compete on implementation".
- is a key enabling technology to manage the growing electrics/electronics complexity. It aims to be prepared for the upcoming technologies and to improve cost-efficiency without making any compromise with respect to quality.
- facilitates the exchange and update of software and hardware over the service life of the vehicle.

2.3 About This Manual

This Technical Reference employs the following typographical conventions:

- **Boldface** style: Used for important terms, notes and warnings.
- *Italic* style: Used for code snippets in the text. Note that C language modifiers such "const" or "volatile" are sometimes omitted to improve readability of the presented code.

Notes and warnings are shown as below:

Note

This is a note.

Warning

This is a warning

2.4 Acronyms and Definitions

Term	Definition
API	Application Programming Interface
AUTOSAR	Automotive Open System Architecture
DET	Default Error Tracer
DEM	Diagnostic Event Manager
ECC	Error Correcting Code
VLE	Variable Length Encoding
N/A	Not Available
MCU	Microcontroller Unit
ECU	Electronic Control Unit
EEPROM	Electrically Erasable Programmable Read-Only Memory
EA	EEPROM Abstraction
EEP	EEPROM driver
XML	Extensible Markup Language

2.5 Reference List

#	Title	Version
1	Specification of Fls Driver	AUTOSAR Release 4.4.0
2	Reference Manual	S32K1xx Series Reference Manual, Rev. 14, 09/2021
3	Datasheet	S32K1xx Data Sheet, Rev. 14, 08/2021
4	Errata	S32K116_0N96V Rev. 22/OCT/2021
		S32K118_0N97V Rev. 22/OCT/2021
		S32K142_0N33V Rev. 22/OCT/2021
		S32K144_0N57U Rev. 22/OCT/2021
		S32K144W_0P64A Rev. 22/OCT/2021
		S32K146_0N73V Rev. 22/OCT/2021
		S32K148_0N20V Rev. 22/OCT/2021

Chapter 3

Driver

3.1 Requirements

Requirements for this driver are detailed in the AUTOSAR 4.4.0 Eep Driver Software Specification document (See Table Reference List)

3.2 Driver Design Summary

- The EEP driver provides services for reading, writing and erasing FTFC memory. The EEP module shall work with FlexRam block of FTFC, it starts at address 0x14000000.
- The sizes of flash memory (FTFC) types on the chip are:

Chips	FlexRam Size
S32K116	2 KB
S32K118	2 KB
S32K142	4 KB
S32K144	4 KB
S32K144W	4 KB
S32K146	4 KB
S32K148	4 KB

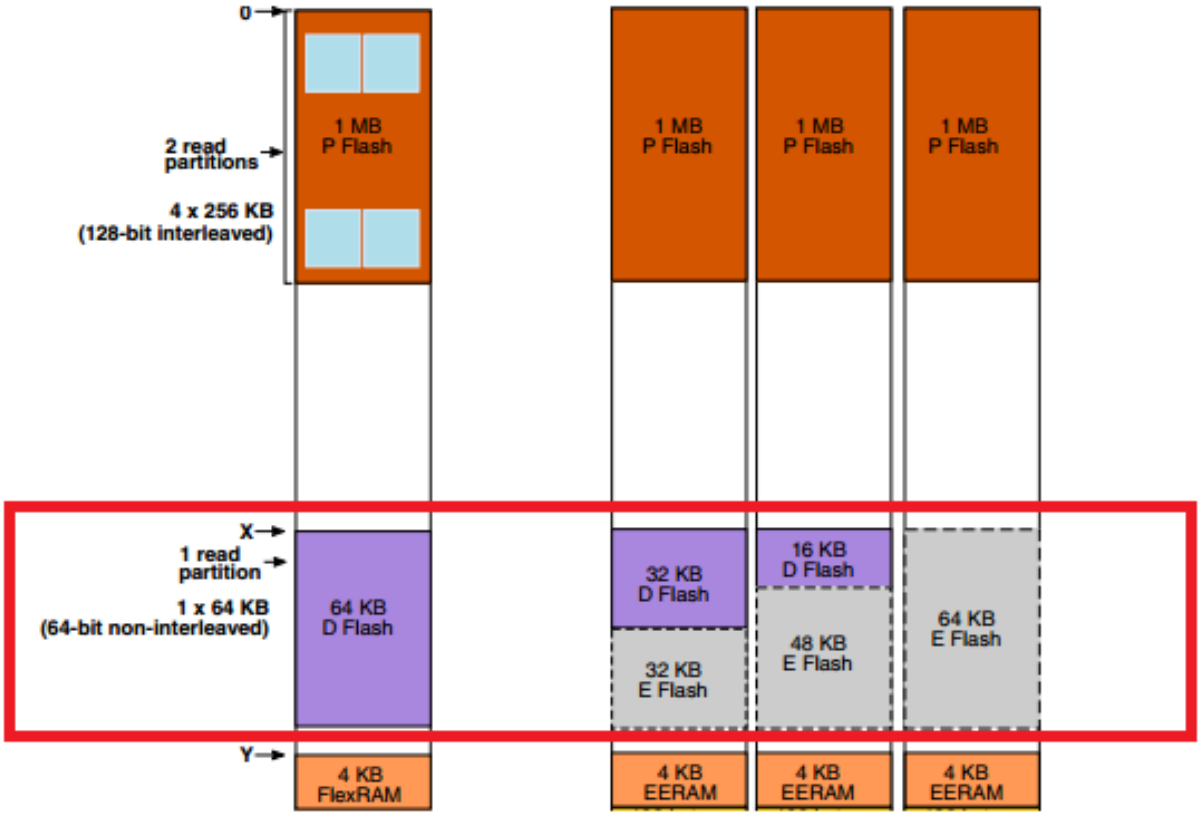
S32K1 EEP Driver

Note

- Before working with EEP driver, we have to configure FlexNVM partition to split the FlexNVM block between data flash memory and emulated EEPROM backup memory supporting emulated EEPROM functions
- To configure FlexNVM partition, we program the DEPART value of FlexNVM partition code.
- Example for S32K144 deravative with 64KB FlexNVM read partition and 4KB FlexRAM:

DEPART	Data flash size (KB)	EEPROM backup size (KB)
0000	64	0
0011	32	32
0100	0	64
1000	0	64
1010	16	48
1011	32	32
1100	64	0
1111	Default value	

Flash memory map:



3.3 Hardware Resources

The EEP driver uses the FTFC hardware resources.

3.4 Deviations from Requirements

The driver deviates from the AUTOSAR Eep Driver software specification in some places. There are also some additional requirements (on top of requirements detailed in AUTOSAR EEP Driver software specification) which need to be satisfied for correct operation.

Term	Definition
N/S	Out of scope
N/I	Not implemented
N/F	Not fully implemented

Below table identifies the AUTOSAR requirements that are out of scope for the driver.

Requirement	Status	Description	Notes
CPR_RTD_00011.eep	N/S	ISR shall check whether its respective driver is initialized. If the driver is not initialized, the ISR shall only clear interrupt status flag and return immediately.	Not applicable for EEP driver on S32K1XX
CPR_RTD_00028.eep	N/S	ISR shall check whether its respective interrupt status flag and interrupt enable flag are set; i.e. whether the interrupt is not spurious. If at least one flag is not set, then the interrupt is spurious and the ISR shall only clear the interrupt status flag and return immediately.	Not applicable for EEP driver on S32K1XX
CPR_RTD_00516.eep	N/S	Interrupt flags shall be cleared when the interrupt is acknowledged.	Not applicable for EEP driver on S32K1XX

3.5 Driver Limitations

FTFC should not be run simultanously in EEP and FLS.

3.6 Driver usage and configuration tips

- Eep_QuickWrite now performs the first write synchronously, to leverage the driver.
- Eep_AcLoad and Eep_AcUnload are no longer used during runtime to put the AC Code in RAM, this is done at precompile time.

3.7 Runtime errors

The driver generates the following DEM errors at runtime.

Function	Error Code	Condition triggering the error
Eep_MainFunction()	EEP_E_ERASE_FAILED	Erase operation failed.
Eep_MainFunction()	EEP_E_ERASE_FAILED	Erase operation failed (in case of detected timeout event).
Eep_MainFunction()	EEP_E_WRITE_FAILED	Write operation failed.
Eep_MainFunction()	EEP_E_WRITE_FAILED	Write operation failed (in case of detected timeout event).
Eep_MainFunction()	EEP_E_READ_FAILED	Read operation failed
Eep_MainFunction()	EEP_E_COMPARE_FAILED	Compare operation failed.

The driver generates the following DET errors at runtime.

Function	Error Code	Condition triggering the error
EEP_E_INIT_FAILED	0x10	API service called with init failed
EEP_E_PARAM_ADDRESS	0x11	TargetAddress is not in range and aligned to first byte of eeprom sector
EEP_E_PARAM_DATA	0x12	NULL_PTR == SourceAddressPtr
EEP_E_PARAM_LENGTH	0x13	TargetAddress is not in range and aligned to last byte of eeprom sector
EEP_E_UNINIT	0x20	API service called without module initialization
EEP_E_BUSY	0x21	API service called while driver still busy
EEP_E_TIMEOUT	0x22	The hardware operation did not finish before timeout expired.
EEP_E_PARAM_POINTER	0x23	NULL_PTR passed

3.8 Symbolic Names Disclaimer

All containers having symbolicNameValue set to TRUE in the AUTOSAR schema will generate defines like:

#define <Mip>Conf_<Container_ShortName>_<Container_ID>

For this reason it is forbidden to duplicate the names of such containers across the RTD configurations or to use names that may trigger other compile issues (e.g. match existing `#ifdefs` arguments).

Chapter 4

Tresos Configuration Plug-in

This chapter describes the Tresos configuration plug-in for the driver. All the parameters are described below.

- Module Eep
  - Container EepInitConfiguration
    - Parameter EepSize
    - Parameter EepBaseAddress
    - Parameter EepJobCallCycle
    - Parameter EepDefaultMode
    - Parameter EepJobEndNotification
    - Parameter EepJobErrorNotification
    - Parameter EepFastReadBlockSize
    - Parameter EepNormalReadBlockSize
    - Parameter EepFastWriteBlockSize
    - Parameter EepNormalWriteBlockSize
    - Container EepDemEventParameterRefs
      - Reference EEP_E_COMPARE_FAILED
      - Reference EEP_E_ERASE_FAILED
      - Reference EEP_E_READ_FAILED
      - Reference EEP_E_WRITE_FAILED
      - Reference EEP_E_BO_MAINTENANCE
      - Reference EEP_E_BO_QUICK_WRITES
      - Reference EEP_E_BO_NORMAL_WRITES
      - Reference EEP_E_MGSTAT_BLOCK
    - Container EepExternalDriver
      - Reference EepSpiReference
  - Container EepFtfcCfg
    - Parameter EepFtfcIpDevErrorDetect
    - Parameter EepFtfcAcLoadToRam
    - Parameter EepFtfcEnableQuickWriteApi
    - Parameter EepFtfcEnableCompareApi
    - Parameter EepFtfcCheckAlignmentEnabled
    - Parameter EepFtfcSize

    - Parameter EepTimeoutMethod
    - Parameter EepFtfcAbortTimeout
    - Parameter EepFtfcAsyncWriteTimeout
    - Parameter EepFtfcSyncWriteTimeout
    - Parameter EepFtfcAcCallBack
    - Parameter EepStartEepromAccessNotif
    - Parameter EepFinishedEepromAccessNotif
  - Container AutosarExt
    - Parameter EepCancelApi
    - Parameter EepGetJobResultApi
    - Parameter EepGetStatusApi
    - Parameter EepSetModeApi
    - Parameter EepBlockSizeWriteAsynchBehaviorEn
    - Parameter EepBlockSizeEraseAsynchBehaviorEn
    - Parameter EepDisableDemReportErrorStatus
    - Parameter EepEnableUserModeSupport
  - Container EepGeneral
    - Parameter EepDevErrorDetect
    - Parameter EepDriverIndex
    - Parameter EepUseInterrupts
    - Parameter EepVersionInfoApi
    - Parameter EepWriteCycleReduction
    - Reference EepEcucPartitionRef
  - Container EepPublishedInformation
    - Parameter EepEraseUnitSize
    - Parameter EepEraseTime
    - Parameter EepEraseValue
    - Parameter EepMinimumAddressType
    - Parameter EepMinimumLengthType
    - Parameter EepReadUnitSize
    - Parameter EepTotalSize
    - Parameter EepAllowedWriteCycles
    - Parameter EepSpecifiedEraseCycles
    - Parameter EepWriteTime
    - Parameter EepWriteUnitSize
  - Container CommonPublishedInformation
    - Parameter ArReleaseMajorVersion
    - Parameter ArReleaseMinorVersion
    - Parameter ArReleaseRevisionVersion
    - Parameter ModuleId
    - Parameter SwMajorVersion
    - Parameter SwMinorVersion
    - Parameter SwPatchVersion
    - Parameter VendorApiInfix
    - Parameter VendorId

4.1 Module Eep

Configuration of the Eep (internal or external eeprom driver) module.

Included containers:

- EepInitConfiguration
- EepFtfcCfg
- AutosarExt
- EepGeneral
- EepPublishedInformation
- CommonPublishedInformation

Property	Value
type	ECUC-MODULE-DEF
lowerMultiplicity	1
upperMultiplicity	Infinite
postBuildVariantSupport	true
supportedConfigVariants	VARIANT-POST-BUILD, VARIANT-PRE-COMPILE

4.2 Container EepInitConfiguration

Container for runtime configuration parameters of the eeprom driver.

Implementation Type: Eep_ConfigType.

Included subcontainers:

- EepDemEventParameterRefs
- EepExternalDriver

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.3 Parameter EepSize

This parameter is the used size of EEPROM device in bytes.

Not applied due to depending on the SD/eMMC size

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	1024
max	4294967295
min	0

4.4 Parameter EepBaseAddress

The eeprom memory start address (see also EEP118).

EEP169: This parameter defines the lower boundary for read / write / erase and compare jobs.Note:Not needed / supported by the driver.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	4294967295
min	0

4.5 Parameter EepJobCallCycle

Cycle time of calls of the eeprom driver main function.

Property	Value
type	ECUC-FLOAT-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0.01
max	1.0
min	0.0

4.6 Parameter EepDefaultMode

This parameter is the default EEP device mode after initialization.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	MEMIF_MODE_SLOW
literals	['MEMIF_MODE_FAST', 'MEMIF_MODE_SLOW']

4.7 Parameter EepJobEndNotification

Mapped to the job end notification routine provided by some upper layer module, typically the Fee module.

Note: Disable the end notification to have it set as NULL_PTR

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Ea_JobEndNotification

4.8 Parameter EepJobErrorNotification

Mapped to the job error notification routine provided by some upper layer module, typically the Fee module.

Note: Disable the error notification to have it set as NULL_PTR

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Ea_JobErrorNotification

4.9 Parameter EepFastReadBlockSize

The maximum number of bytes to read or compare in one cycle of the eeprom driver's job processing function in fast mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	4096
max	4294967295
min	0

4.10 Parameter EepNormalReadBlockSize

The maximum number of bytes to read or compare in one cycle of the eeprom driver's job processing function in normal mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	4096
max	4294967295
min	0

4.11 Parameter EepFastWriteBlockSize

The maximum number of bytes to write in one cycle of the eeprom driver's job processing function in fast mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF

Property	Value
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	4096
max	4294967295
min	0

4.12 Parameter EepNormalWriteBlockSize

The maximum number of bytes to write in one cycle of the eeprom driver's job processing function in normal mode.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	4096
max	4294967295
min	0

4.13 Container EepDemEventParameterRefs

Container for the references to DemEventParameter elements which shall be invoked using the Dem_ReportErrorStatus API in case the corresponding error occurs.

The EventId is taken from the referenced DemEventParameter's DemEventId value. The standardized errors are provided in the container and can be extended by vendor specific error references.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: POST-BUILD

4.14 Reference EEP_E_COMPARE_FAILED

Reference to the DemEventParameter which shall be issued when the error "Eeprom compare failed (HW)" has occurred.

Property	Value
type	ECUC-REFERENCE-DEF
origin	AUTOSAR_ECUC
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/Dem/DemConfigSet/DemEventParameter

4.15 Reference EEP_E_ERASE_FAILED

Reference to the DemEventParameter which shall be issued when the error "Eeprom erase failed (HW)" has occurred.

Property	Value
type	ECUC-REFERENCE-DEF
origin	AUTOSAR_ECUC
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE

Property	Value
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/Dem/DemConfigSet/DemEventParameter

4.16 Reference EEP_E_READ_FAILED

Reference to the DemEventParameter which shall be issued when the error "Eeprom read failed (HW)" has occurred.

Property	Value
type	ECUC-REFERENCE-DEF
origin	AUTOSAR_ECUC
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/Dem/DemConfigSet/DemEventParameter

4.17 Reference EEP_E_WRITE_FAILED

Reference to the DemEventParameter which shall be issued when the error "Eeprom write failed (HW)" has occurred.

Property	Value
type	ECUC-REFERENCE-DEF
origin	AUTOSAR_ECUC
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/Dem/DemConfigSet/DemEventParameter

4.18 Reference EEP_E_BO_MAINTENANCE

Reference to the DemEventParameter which shall be issued when the error "Brown out detected before completing EEPROM quick write maintenance (HW)" has occurred.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/Dem/DemConfigSet/DemEventParameter

4.19 Reference EEP_E_BO_QUICK_WRITES

Reference to the DemEventParameter which shall be issued when the error "Brown out detected before completing EEPROM quick writes (HW)" has occurred.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/Dem/DemConfigSet/DemEventParameter

4.20 Reference EEP_E_BO_NORMAL_WRITES

Reference to the DemEventParameter which shall be issued when the error "Brown out detected before completing EEPROM normal writes (HW)" has occurred.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/Dem/DemConfigSet/DemEventParameter

4.21 Reference EEP_E_MGSTAT_BLOCK

Reference to the DemEventParameter which shall be issued when the error "Brown out detected before completing EEPROM normal writes (HW)" has occurred.

Property	Value
type	ECUC-REFERENCE-DEF
origin	NXP
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/Dem/DemConfigSet/DemEventParameter

4.22 Container EepExternalDriver

This container is present for external Eeprom drivers only. Internal Eeprom drivers do not use the parameter listed in this container, hence its multiplicity is 0 for internal drivers.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: POST-BUILD

4.23 Reference EepSpiReference

Reference to SPI sequence (required for external Eeprom drivers).

Property	Value
type	ECUC-REFERENCE-DEF
origin	AUTOSAR_ECUC
lowerMultiplicity	1
upperMultiplicity	Infinite
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/Spi/SpiDriver/SpiSequence

4.24 Container EepFtfcCfg

Configuration for ftfc ip layer

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	Infinite
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-PRE-COMPILE: PRE-COMPILE
	VARIANT-POST-BUILD: POST-BUILD

4.25 Parameter EepFtfcIpDevErrorDetect

Pre-processor switch to enable and disable development error detection for IP layer.

true: Development error detection enabled for Ip layer.

false: Development error detection disabled for Ip layer.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.26 Parameter EepFtfcAcLoadToRam

The eeprom driver shall load the eeprom access code to RAM.

true: Eeprom access code will be loaded to RAM.

false: Eeprom access code will be stored in ROM.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.27 Parameter EepFtfcEnableQuickWriteApi

Compile switch to enable and disable the Eep_EnableQuickWrites function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.28 Parameter EepFtfcEnableCompareApi

Compile switch to enable and disable the Eep_Ftfc_Compare function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.29 Parameter EepFtfcCheckAlignmentEnabled

Compile switch to enable and disable checking the RAM addresses need to be 2bytes or 4bytes aligned when performing 2bytes or 4bytes reads/writes.

true: Enable checking.

false: Disable checking.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.30 Parameter EepFtfcSize

Eep Ftfc Size (in byte).

It depend on size of Eep backup region.

Ex: If size of Eep backup region is 32kb, this value must be between 1 and 2048(32/16=2kb).

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	2048
max	4294967295
min	1

4.31 Parameter EepTimeoutMethod

Vendor specific: Counter type used in timeout detection for Ftfc operations.

Based on selected counter type the timeout value will be interpreted as follows:

OSIF_COUNTER_SYSTEM - Microseconds.

OSIF_COUNTER_CUSTOM - Defined by user implementation of timing services

OSIF_COUNTER_DUMMY - Counts the number of iterations of the waiting loop. The actual timeout depends on many factors: operation type, compiler optimizations, interrupts or other tasks in the system, etc.

Property	Value
type	ECUC-ENUMERATION-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	OSIF_COUNTER_DUMMY
literals	['OSIF_COUNTER_SYSTEM', 'OSIF_COUNTER_CUSTOM', 'OSIF_COUNTER_DUMMY']

4.32 Parameter EepFtfcAbortTimeout

Eep Ftfc Abort Timeout Value

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	268435456

Property	Value
max	4294967295
min	1

4.33 Parameter EepFtfcAsyncWriteTimeout

Eep Ftfc Async Write Timeout Value

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	268435456
max	4294967295
min	1

4.34 Parameter EepFtfcSyncWriteTimeout

Eep Ftfc Sync Write Timeout Value

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	268435456
max	4294967295
min	1

4.35 Parameter EepFtfcAcCallBack

Vendor specific: Mapped to the Access Code Callback provided by some upper layer module.

Note: Disable the Access Code Callback to have it set as NULL_PTR.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	NULL_PTR

4.36 Parameter EepStartEepromAccessNotif

Start eeprom access. If configured, this notification will be called before any EFLASH memory access in synchronuous mode.

The purpose of this notification together with EepFinishedEepromAccess,

is to be used by the integrator in case operations are needed before and after EFLASH access, for eg to avoid concurrent access issue.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Eep_StartEepromAccessNotif

4.37 Parameter EepFinishedEepromAccessNotif

Finished eeprom access. If configured, this notification will be called before any EFLASH memory access in synchronuous mode.

The purpose of this notification together with EepStartEepromAccess,

is to be used by the integrator in case operations are needed before and after EFLASH access, for eg to avoid concurrent access issue.

Property	Value
type	ECUC-FUNCTION-NAME-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: POST-BUILD
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	Eep_FinishedEepromAccessNotif

4.38 Container AutosarExt

Vendor specific: This container contains the global Non-Autosar configuration parameters of the Eep driver.

This container is a MultipleConfigurationContainer, i.e. this container and

its sub-containers exist once per configuration set.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.39 Parameter EepCancelApi

Compile switch to enable and disable the Eep_Cancel function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.40 Parameter EepGetJobResultApi

Compile switch to enable and disable the Eep_GetJobResult function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.41 Parameter EepGetStatusApi

Compile switch to enable and disable the Eep_GetStatus function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.42 Parameter EepSetModeApi

Compile switch to enable and disable the Eep_SetMode function.

true: API supported / function provided.

false: API not supported / function not provided

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.43 Parameter EepBlockSizeWriteAsynchBehaviorEn

Vendor specific: Enable asynchronous execution of the write job in the Eep_MainFunction function which doesn't wait (block) for completion of the block size write operation(s).

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.44 Parameter EepBlockSizeEraseAsynchBehaviorEn

Vendor specific: Enable asynchronous execution of the erase job in the Eep_MainFunction function which doesn't wait (block) for completion of the block size erase operation(s).

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.45 Parameter EepDisableDemReportErrorStatus

Vendor specific: Switches the Diagnostic Error Reporting and Notification OFF.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.46 Parameter EepEnableUserModeSupport

When this parameter is enabled, the EEP module will adapt to run from User Mode, with the following measures:

configuring REG_PROT for Eep IPs so that the registers under protection can be accessed from user mode by setting UAA bit in REG_PROT_GCR to 1

for more information and availability on this platform, please see chapter User Mode Support in IM

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.47 Container EepGeneral

Container for general parameters of the eeprom driver. These parameters are always pre-compile.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.48 Parameter EepDevErrorDetect

Pre-processor switch to enable and disable development error detection (see EEP077).

true: Development error detection enabled.

false: Development error detection disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.49 Parameter EepDriverIndex

Index of the driver, used by FEE.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	true
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

Property	Value
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	0
max	254
min	0

4.50 Parameter EepUseInterrupts

Job processing triggered by hardware interrupt. true: Job processing triggered by interrupt (hardware controlled) false: Job processing not triggered by interrupt (software controlled)

Note:Not supported by hardware.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.51 Parameter EepVersionInfoApi

Pre-processor switch to enable / disable the API to read out the modules version information.

true: Version info API enabled.

false: Version info API disabled.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1

Property	Value
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	true

4.52 Parameter EepWriteCycleReduction

Switches to activate or deactivate write cycle reduction (EEPROM value is read and compared before being overwritten).

true: writecycle reduction enabled. false: Write cycle reduction disabled.

The parameter is currently not used as the support for the write cycle reduction is implemented in hardware.

Property	Value
type	ECUC-BOOLEAN-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
defaultValue	false

4.53 Reference EepEcucPartitionRef

Maps the Eep driver to zero or one ECUC partition to make the driver API available in this partition.

Property	Value
type	ECUC-REFERENCE-DEF
origin	AUTOSAR_ECUC
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	true
multiplicityConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE

Property	Value
postBuildVariantValue	true
valueConfigClasses	VARIANT-POST-BUILD: PRE-COMPILE
	VARIANT-PRE-COMPILE: PRE-COMPILE
requiresSymbolicNameValue	False
destination	/AUTOSAR/EcucDefs/EcuC/EcucPartitionCollection/EcucPartition

4.54 Container EepPublishedInformation

Additional published parameters not covered by CommonPublishedInformation container.

Note that these parameters do not have any configuration class setting, since they are published information.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.55 Parameter EepEraseUnitSize

Size of smallest erasable EEPROM data unit in bytes.FLEXRAM does not allow erase.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	1

Property	Value
max	4294967295
min	0

4.56 Parameter EepEraseTime

Maximum time to erase one complete eeprom data unit.

Note:This value can be found on DS as the maximum erase time occurs after the specified number of program/erase cycles.

FLEXRAM does not allow erase, only DFLASH, PFLASH allow erase.

Property	Value
type	ECUC-FLOAT-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	5.0E-4
max	5.0E-4
min	0.0

4.57 Parameter EepEraseValue

The contents of an erased eeprom memory cell.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false

Property	Value
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	255
max	255
min	0

4.58 Parameter EepMinimumAddressType

Minimum expected size of Eep_AddressType.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	4
max	4294967295
min	0

4.59 Parameter EepMinimumLengthType

Minimum expected size of Eep_LengthType.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION

Property	Value
defaultValue	1
max	4294967295
min	0

4.60 Parameter EepReadUnitSize

Size of smallest readable EEPROM data unit in bytes.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	1
max	4294967295
min	0

4.61 Parameter EepTotalSize

This parameter is the used size of EEPROM device in bytes (K14x is 4096 bytes, K11x is 2048 bytes).

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0
max	4294967295
min	0

4.62 Parameter EepAllowedWriteCycles

Specified maximum number of write cycles under worst case conditions of specific EEPROM hardware.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	100000
max	4294967295
min	0

4.63 Parameter EepSpecifiedEraseCycles

Number of erase cycles specified for the EEP device (usually given in the device data sheet). FLEXRAM does not allow erase.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	100000
max	4294967295
min	0

4.64 Parameter EepWriteTime

Maximum time to program one complete eeprom page.

Property	Value
type	ECUC-FLOAT-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	5.0E-4
max	5.0E-4
min	0.0

4.65 Parameter EepWriteUnitSize

Size of smallest writeble EEPROM data unit in bytes.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	AUTOSAR_ECUC
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	1
max	4294967295
min	0

4.66 Container CommonPublishedInformation

Common container, aggregated by all modules. It contains published information about vendor and versions.

Included subcontainers:

- None

Property	Value
type	ECUC-PARAM-CONF-CONTAINER-DEF
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

4.67 Parameter ArReleaseMajorVersion

Vendor specific: Major version number of AUTOSAR specification on which the appropriate implementation is based on.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	4
max	4
min	4

4.68 Parameter ArReleaseMinorVersion

Vendor specific: Minor version number of AUTOSAR specification on which the appropriate implementation is based on.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A

Property	Value
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	4
max	4
min	4

4.69 Parameter ArReleaseRevisionVersion

Vendor specific: Patch version number of AUTOSAR specification on which the appropriate implementation is based on.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	0
max	0
min	0

4.70 Parameter ModuleId

Vendor specific: Module ID of this module.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false

Property	Value
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	90
max	90
min	90

4.71 Parameter SwMajorVersion

Major version number of the vendor specific implementation of the module. The numbering is vendor specific.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	1
max	1
min	1

4.72 Parameter SwMinorVersion

Minor version number of the vendor specific implementation of the module. The numbering is vendor specific.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION

Property	Value
defaultValue	0
max	0
min	0

4.73 Parameter SwPatchVersion

Patch level version number of the vendor specific implementation of the module. The numbering is vendor specific.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	1
max	1
min	1

4.74 Parameter VendorApiInfix

In driver modules which can be instantiated several times on a single ECU, BSW00347 requires that the name of APIs is extended by the VendorId and a vendor specific name.

This parameter is used to specify the vendor specific name. In total, the implementation specific name is generated as follows:

<ModuleName>_>VendorId>_<VendorApiInfix>.

E.g. assuming that the VendorId of the implementor is 123 and the implementer chose a VendorApiInfix of "v11r456" a api name Can_Write defined in the SWS will translate to Can_123_v11r456Write.

This parameter is mandatory for all modules with upper multiplicity > 1. It shall not be used for modules with upper multiplicity =1.

Property	Value
type	ECUC-STRING-PARAM-DEF
origin	NXP

Property	Value
symbolicNameValue	false
lowerMultiplicity	0
upperMultiplicity	1
postBuildVariantMultiplicity	false
multiplicityConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	

4.75 Parameter VendorId

Vendor ID of the dedicated implementation of this module according to the AUTOSAR vendor list.

Property	Value
type	ECUC-INTEGER-PARAM-DEF
origin	NXP
symbolicNameValue	false
lowerMultiplicity	1
upperMultiplicity	1
postBuildVariantMultiplicity	N/A
multiplicityConfigClasses	N/A
postBuildVariantValue	false
valueConfigClasses	VARIANT-POST-BUILD: PUBLISHED-INFORMATION
	VARIANT-PRE-COMPILE: PUBLISHED-INFORMATION
defaultValue	43
max	43
min	43

Chapter 5

Module Index

5.1 Software Specification

Here is a list of all modules:

Chapter 6

Module Documentation

6.1 Eeprom Driver

6.1.1 Detailed Description

Macros

- #define EEP_E_INIT_FAILED

  Development error codes (passed to DET).
- #define EEP_E_PARAM_ADDRESS

  service ID of error: TargetAddress is not in range and aligned to first byte of eeprom sector. (passed to DET)
- #define EEP_E_PARAM_DATA

  service ID of error: NULL_PTR == SourceAddressPtr. (passed to DET)
- #define EEP_E_PARAM_LENGTH

  service ID of error: TargetAddress is not in range and aligned to last byte of eeprom sector. (passed to DET)
- #define EEP_E_UNINIT

  service ID of error: API service called without module initialization. (passed to DET)
- #define EEP_E_BUSY

  service ID of error: API service called while driver still busy. (passed to DET)
- #define EEP_E_TIMEOUT

  service ID of error: The hardware operation did not finish before timeout expired. (passed to DET)
- #define EEP_E_PARAM_POINTER

  service ID of error: NULL_PTR passed. (passed to DET)
- #define EEP_INIT_ID

  All service IDs (passed to DET).
- #define EEP_START_SEC_CODE

  Start of Eep section CODE.
- #define EEP_STOP_SEC_CODE

  Stop of Eep section CODE.

Types Reference

- typedef uint32 Eep_AddressType
  Eep Address Type.
- typedef uint32 Eep_LengthType
  Eep Length Type.
- typedef void(∗ Eep_JobEndNotificationPtrType) (void)
  Eep Job End Notification Pointer Type.
- typedef void(∗ Eep_JobErrorNotificationPtrType) (void)
  Eep Job Error Notification Pointer Type.
- typedef uint16 Eep_CrcType
  Eep CRC Type.

Enum Reference

- enum Eep_JobType
  Type of job currently executed by Eep_MainFunction.
- enum Eep_ReturnType
  Result of low-level eeprom operation.
- enum Eep_CrcDataSizeType
  Size of data to be processeed by CRC.

Function Reference

- void Eep_Init (const Eep_ConfigType ∗ConfigPtr)
  The function initializes Eep module.
- Std_ReturnType Eep_Write (Eep_AddressType EepromAddress, const uint8 ∗DataBufferPtr, Eep_LengthType Length)
  Write one or more complete eeprom pages to the eeprom device.
- Std_ReturnType Eep_Erase (Eep_AddressType EepromAddress, Eep_LengthType Length)
  Erase memory by writing erase value.
- Std_ReturnType Eep_Read (Eep_AddressType EepromAddress, uint8 ∗DataBufferPtr, Eep_LengthType Length)
  Reads from eeprom memory.

6.1.2 Macro Definition Documentation

6.1.2.1 EEP_E_INIT_FAILED

```
#define EEP_E_INIT_FAILED
```

Development error codes (passed to DET).

service ID of function: Eep_Init. (passed to DET)

Definition at line 121 of file Eep.h.

6.1.2.2 EEP_E_PARAM_ADDRESS

```
#define EEP_E_PARAM_ADDRESS
```

service ID of error: TargetAddress is not in range and aligned to first byte of eeprom sector. (passed to DET)

Definition at line 125 of file Eep.h.

6.1.2.3 EEP_E_PARAM_DATA

```
#define EEP_E_PARAM_DATA
```

service ID of error: NULL_PTR == SourceAddressPtr. (passed to DET)

Definition at line 129 of file Eep.h.

6.1.2.4 EEP_E_PARAM_LENGTH

```
#define EEP_E_PARAM_LENGTH
```

service ID of error: TargetAddress is not in range and aligned to last byte of eeprom sector. (passed to DET)

Definition at line 133 of file Eep.h.

6.1.2.5 EEP_E_UNINIT

```
#define EEP_E_UNINIT
```

service ID of error: API service called without module initialization. (passed to DET)

Definition at line 137 of file Eep.h.

6.1.2.6 EEP_E_BUSY

```
#define EEP_E_BUSY
```

service ID of error: API service called while driver still busy. (passed to DET)

Definition at line 141 of file Eep.h.

6.1.2.7 EEP_E_TIMEOUT

```
#define EEP_E_TIMEOUT
```

service ID of error: The hardware operation did not finish before timeout expired. (passed to DET)

Definition at line 145 of file Eep.h.

6.1.2.8 EEP_E_PARAM_POINTER

```
#define EEP_E_PARAM_POINTER
```

service ID of error: NULL_PTR passed. (passed to DET)

Definition at line 149 of file Eep.h.

6.1.2.9 EEP_INIT_ID

```
#define EEP_INIT_ID
```

All service IDs (passed to DET).

Definition at line 155 of file Eep.h.

6.1.2.10 EEP_START_SEC_CODE

```
#define EEP_START_SEC_CODE
```

Start of Eep section CODE.

Definition at line 174 of file Eep.h.

6.1.2.11 EEP_STOP_SEC_CODE

```
#define EEP_STOP_SEC_CODE
```

Stop of Eep section CODE.

Definition at line 402 of file Eep.h.

6.1.3 Types Reference

6.1.3.1 Eep_AddressType

```
typedef uint32 Eep_AddressType
```

Eep Address Type.

Address offset from the configured eeprom base address to access a certain eeprom memory area.

Definition at line 95 of file Eep_Types.h.

6.1.3.2 Eep_LengthType

```
typedef uint32 Eep_LengthType
```

Eep Length Type.

Number of bytes to read,write,erase,compare

Definition at line 102 of file Eep_Types.h.

6.1.3.3 Eep_JobEndNotificationPtrType

```
typedef void(* Eep_JobEndNotificationPtrType) (void)
```

Eep Job End Notification Pointer Type.

Pointer type of Eep_JobEndNotification function

Definition at line 109 of file Eep_Types.h.

6.1.3.4 Eep_JobErrorNotificationPtrType

```
typedef void(* Eep_JobErrorNotificationPtrType) (void)
```

Eep Job Error Notification Pointer Type.

Pointer type of Eep_JobErrorNotification function

Definition at line 116 of file Eep_Types.h.

6.1.3.5 Eep_CrcType

```
typedef uint16 Eep_CrcType
```

Eep CRC Type.

CRC computed over config set.

Definition at line 123 of file Eep_Types.h.

6.1.4 Enum Reference

6.1.4.1 Eep_JobType

```
enum Eep_JobType
```

Type of job currently executed by Eep_MainFunction.

Enumerator

EEP_JOB_ERASE	erase one or more complete eeprom sectors
EEP_JOB_WRITE	write one or more complete eeprom pages
EEP_JOB_READ	read one or more bytes from eeprom memory
EEP_JOB_COMPARE	compare data buffer with content of eeprom memory

Definition at line 82 of file Eep_InternalTypes.h.

6.1.4.2 Eep_ReturnType

```
enum Eep_ReturnType
```

Result of low-level eeprom operation.

Enumerator

EEP_E_OK	operation succeeded
EEP_E_FAILED	operation failed due to hardware error
EEP_E_BLOCK_INCONSISTENT	data buffer doesn't match with content of eeprom memory
EEP_E_PENDING	operation is pending

Definition at line 114 of file Eep_InternalTypes.h.

6.1.4.3 Eep_CrcDataSizeType

```
enum Eep_CrcDataSizeType
```

Size of data to be processeed by CRC.

Definition at line 127 of file Eep_InternalTypes.h.

6.1.5 Function Reference

6.1.5.1 Eep_Init()

```
void Eep_Init (
            const Eep_ConfigType * ConfigPtr )
```

The function initializes Eep module.

The function sets the internal module variables according to given configuration set.

Parameters

in	*ConfigPtr*	Pointer to eeprom driver configuration set.

Precondition

ConfigPtr must not be NULL_PTR and the module status must not be MEMIF_BUSY.

6.1.5.2 Eep_Write()

```
Std_ReturnType Eep_Write (
            Eep_AddressType EepromAddress,
            const uint8 * DataBufferPtr,
            Eep_LengthType Length )
```

Write one or more complete eeprom pages to the eeprom device.

Starts a write job asynchronously. The actual job is performed by Eep_MainFunction.

Parameters

in	*EepromAddress*	Target address in eeprom memory.
in	*DataBufferPtr*	Pointer to source data buffer.
in	*Length*	Number of bytes to write.

Returns

Std_ReturnType

Return values

E_OK	Write command has been accepted.
E_NOT_OK	Write command has not been accepted.

Precondition

The module has to be initialized and not busy.

6.1.5.3 Eep_Erase()

```
Std_ReturnType Eep_Erase (
            Eep_AddressType EepromAddress,
            Eep_LengthType Length )
```

Erase memory by writing erase value.

Starts an erase job asynchronously. The actual job is performed by the Eep_MainFunction.

Parameters

in	*EepromAddress*	Target address in eeprom memory.
in	*Length*	Number of bytes to erase by writing the erased value.

Returns

Std_ReturnType

Return values

E_OK	Erase command has been accepted.
E_NOT_OK	Erase command has not been accepted.

Precondition

The module has to be initialized and not busy.

Postcondition

6.1.5.4 Eep_Read()

```
Std_ReturnType Eep_Read (
            Eep_AddressType EepromAddress,
            uint8 * DataBufferPtr,
            Eep_LengthType Length )
```

Reads from eeprom memory.

Starts a read job asynchronously. The actual job is performed by `Eep_MainFunction`.

Parameters

in	*EepromAddress*	Source address in eeprom memory.
in	*Length*	Number of bytes to read.
out	*DataBufferPtr*	Pointer to target data buffer.

Returns

MemIf_JobResultType

Return values

MEMIF_JOB_OK	Successfully completed job.
MEMIF_JOB_FAILED	Not successfully completed job.
MEMIF_JOB_PENDING	Still pending job (not yet completed).
MEMIF_JOB_CANCELED	Job has been canceled.
MEMIF_BLOCK_INCONSISTENT	Inconsistent block requested, it may contains corrupted data.
MEMIF_BLOCK_INVALID	Invalid block requested.

Precondition

The module has to be initialized and not busy.

Postcondition

6.2 FTFC_EEP_IP

6.2.1 Detailed Description

Data Structures

- struct Ftfc_Eep_Ip_ConfigType

Types Reference

- typedef void(* Ftfc_Eep_Ip_Ac_Callback_Type) (void)
- typedef void(* Ftfc_Eep_Ip_StartEepromAccessNotif_Type) (void)
- typedef void(* Ftfc_Eep_Ip_FinishedEepromAccessNotif_Type) (void)
- typedef uint32 Ftfc_Eep_Ip_AddressType
- typedef uint32 Ftfc_Eep_Ip_LengthType

Enum Reference

- enum Ftfc_Eep_Ip_StatusType
- enum Ftfc_Eep_Ip_BrownOutCodeType
- enum Ftfc_Eep_Ip_PageSizeType

Function Reference

- Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_Init (Ftfc_Eep_Ip_ConfigType const *pConfig)

  Initialize the module.
- Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_Read (Ftfc_Eep_Ip_AddressType SrcAddress, uint8 *pu8DestAddress, Ftfc_Eep_Ip_LengthType Length)

  Read `Length` bytes from EEPROM `SrcAddress` to `pu8DestAddress`.
- Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_Write (Ftfc_Eep_Ip_AddressType DestAddress, uint8 const *pu8SrcAddress, Ftfc_Eep_Ip_PageSizeType PageSize, boolean Async)

  Write `PageSize` bytes from `pu8SrcAddress` buffer to EEPROM at `offset` DestAddress.
- Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_Erase (Ftfc_Eep_Ip_AddressType Address, Ftfc_Eep_Ip_PageSizeType PageSize, boolean Async)

  Erase API.
- Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_GetJobResult (void)

  Interrogate the result of the last async job, considering the timeout and FSTAT errors.
- Ftfc_Eep_Ip_BrownOutCodeType Ftfc_Eep_Ip_GetBrownOutCode (void)

  Getter for Ftfc_Eep_Ip_eBrownOutCode.

6.2.2 Data Structure Documentation

6.2.2.1 struct Ftfc_Eep_Ip_ConfigType

Configuration structure for the FTFC IP driver.

Definition at line 123 of file Ftfc_Eep_Ip_Types.h.

6.2.3 Types Reference

6.2.3.1 Ftfc_Eep_Ip_Ac_Callback_Type

```
typedef void(* Ftfc_Eep_Ip_Ac_Callback_Type) (void)
```

Mapped to the Access Code Callback provided by some upper layer module.

Definition at line 110 of file Ftfc_Eep_Ip_Types.h.

6.2.3.2 Ftfc_Eep_Ip_StartEepromAccessNotif_Type

```
typedef void(* Ftfc_Eep_Ip_StartEepromAccessNotif_Type) (void)
```

pointer to start eeprom access notification

Definition at line 113 of file Ftfc_Eep_Ip_Types.h.

6.2.3.3 Ftfc_Eep_Ip_FinishedEepromAccessNotif_Type

```
typedef void(* Ftfc_Eep_Ip_FinishedEepromAccessNotif_Type) (void)
```

pointer to finished eeprom access notification

Definition at line 116 of file Ftfc_Eep_Ip_Types.h.

6.2.3.4 Ftfc_Eep_Ip_AddressType

```
typedef uint32 Ftfc_Eep_Ip_AddressType
```

The module's address type.

Definition at line 131 of file Ftfc_Eep_Ip_Types.h.

6.2.3.5 Ftfc_Eep_Ip_LengthType

```
typedef uint32 Ftfc_Eep_Ip_LengthType
```

Type mainly used for storing offsets from a given address.

Definition at line 134 of file Ftfc_Eep_Ip_Types.h.

6.2.4 Enum Reference

6.2.4.1 Ftfc_Eep_Ip_StatusType

```
enum Ftfc_Eep_Ip_StatusType
```

Return values for a FTFC operation.

Enumerator

FTFC_EEP_IP_STATUS_OK	success
FTFC_EEP_IP_STATUS_FAILED	failure
FTFC_EEP_IP_STATUS_BLOCK_INCONSISTENT	the Compare API found a difference in the memory contents
FTFC_EEP_IP_STATUS_PENDING	the async job is pending
FTFC_EEP_IP_STATUS_TIMEOUT	a timeout has occured
FTFC_EEP_IP_STATUS_FAILED_MGSTAT	MGSTAT errors need to be reported separately

Definition at line 78 of file Ftfc_Eep_Ip_Types.h.

6.2.4.2 Ftfc_Eep_Ip_BrownOutCodeType

```
enum Ftfc_Eep_Ip_BrownOutCodeType
```

Brown-out detection code found after a reset

Enumerator

FTFC_EEP_IP_NO_BO_DETECTED	No EEPROM issues detected
FTFC_EEP_IP_BO_DURING_MAINTENANCE	Quick write maintenance has to be completed.
FTFC_EEP_IP_BO_DURING_QUICK_WRITES	Quick writes were discarded due to a reset.
FTFC_EEP_IP_BO_DURING_NORMAL_WRITES	A normal write was interrupted by reset.

Definition at line 89 of file Ftfc_Eep_Ip_Types.h.

6.2.4.3 Ftfc_Eep_Ip_PageSizeType

```
enum Ftfc_Eep_Ip_PageSizeType
```

Accepted values for an operation's page size

Enumerator

FTFC_EEP_IP_PAGE_BYTE	8-bit unaligned operation
FTFC_EEP_IP_PAGE_WORD	16-bit aligned operation
FTFC_EEP_IP_PAGE_LONGWORD	32-bit aligned operation

Definition at line 98 of file Ftfc_Eep_Ip_Types.h.

6.2.5 Function Reference

6.2.5.1 Ftfc_Eep_Ip_Init()

```
Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_Init (
            Ftfc_Eep_Ip_ConfigType const * pConfig )
```

Initialize the module.

Set FlexRAM to work as EEERAM. Query EEPROM quick write status and complete the maintenance, if needed.

Out of reset with the FSTAT[CCIF] bit clear, the partition settings (EEESIZE, DEPART) are read from the data flash IFR and the emulated EEPROM file system is initialized accordingly. The emulated EEPROM file system locates all valid EEPROM data records in EEPROM backup and copies the newest data to FlexRAM.

CCIF is cleared throughout the reset sequence. Completion of the reset sequence is marked by setting CCIF which enables flash user commands.

Parameters

in	*pConfig*	pointer stored in Ftfc_Eep_Ip_pxConfiguration

Returns

the initialization result

Return values

FTFC_EEP_IP_STATUS_OK	initialization successful

Return values

FTFC_EEP_IP_STATUS_TIMEOUT	a flash cmd timeout has occurred
FTFC_EEP_IP_STATUS_FAILED	a flash command failed to execute
FTFC_EEP_IP_STATUS_FAILED_MGSTAT	one or more MGSTAT 1/2/3 bits were set

6.2.5.2 Ftfc_Eep_Ip_Read()

```
Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_Read (
            Ftfc_Eep_Ip_AddressType SrcAddress,
            uint8 * pu8DestAddress,
            Ftfc_Eep_Ip_LengthType Length )
```

Read `Length` bytes from EEPROM `SrcAddress` to `pu8DestAddress`.

Parameters

`in`	*SrcAddress*	EEPROM address to read from
`out`	*pu8DestAddress*	buffer to store the read data
`in`	*Length*	how many bytes to read

Returns

the read operation status

Return values

FTFC_EEP_IP_STATUS_OK	the requested bytes were copied into the destination buffer
FTFC_EEP_IP_STATUS_FAILED	FTFC not ready
FTFC_EEP_IP_STATUS_FAILED	a read was attempted on an invalid page size

6.2.5.3 Ftfc_Eep_Ip_Write()

```
Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_Write (
            Ftfc_Eep_Ip_AddressType DestAddress,
            uint8 const * pu8SrcAddress,
            Ftfc_Eep_Ip_PageSizeType PageSize,
            boolean Async )
```

Write `PageSize` bytes from `pu8SrcAddress` buffer to EEPROM at `offset` DestAddress.

Parameters

out	*DestAddress*	EEPROM offset
in	*pu8SrcAddress*	buffer containing the data to be written
in	*PageSize*	must be a valid PageSize: 1, 2 or 4 bytes for FTFC and only 4 bytes for FTFM
in	*Async*	choose between a synchronous and an asynchronous job

Returns

the write operation result

Return values

FTFC_EEP_IP_STATUS_FAILED	FTFC not ready
FTFC_EEP_IP_STATUS_FAILED	an invalid page alignment was given
FTFC_EEP_IP_STATUS_FAILED	sync: some of the FSTAT error bits were set
FTFC_EEP_IP_STATUS_TIMEOUT	sync: timeout occurred while waiting for CCIF
FTFC_EEP_IP_STATUS_OK	sync: page successfully written to EFLASH
FTFC_EEP_IP_STATUS_PENDING	async: the page was written to FlexRAM, but the status of the EFLASH record shall be interrogated with GetJobResult

6.2.5.4 Ftfc_Eep_Ip_Erase()

```
Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_Erase (
            Ftfc_Eep_Ip_AddressType Address,
            Ftfc_Eep_Ip_PageSizeType PageSize,
            boolean Async )
```

Erase API.

Invokes a write with ERASED_CELL_VALUE.

Returns

the erase operation result

Return values

FTFC_EEP_IP_STATUS_FAILED	FTFC not ready
FTFC_EEP_IP_STATUS_FAILED	an invalid page size/alignment was given
FTFC_EEP_IP_STATUS_FAILED	sync: some of the FSTAT error bits were set
FTFC_EEP_IP_STATUS_TIMEOUT	sync: timeout occurred while waiting for CCIF
FTFC_EEP_IP_STATUS_OK	sync: page successfully written to EFLASH
FTFC_EEP_IP_STATUS_PENDING	async: the page was written to FlexRAM, but the status of the EFLASH record shall be interrogated with GetJobResult

6.2.5.5 Ftfc_Eep_Ip_GetJobResult()

```
Ftfc_Eep_Ip_StatusType Ftfc_Eep_Ip_GetJobResult (
            void  )
```

Interrogate the result of the last async job, considering the timeout and FSTAT errors.

Returns

the result of the last async job

Return values

FTFC_EEP_IP_STATUS_OK	the job finished successfully
FTFC_EEP_IP_STATUS_FAILED	FSTAT error bits were set
FTFC_EEP_IP_STATUS_PENDING	the job is still waiting for CCIF
FTFC_EEP_IP_STATUS_TIMEOUT	a timeout has occurred while waiting for CCIF

6.2.5.6 Ftfc_Eep_Ip_GetBrownOutCode()

```
Ftfc_Eep_Ip_BrownOutCodeType Ftfc_Eep_Ip_GetBrownOutCode (
            void  )
```

Getter for Ftfc_Eep_Ip_eBrownOutCode.

Returns

the brownout code read after reset

Return values

0x04	normal write was interrupted
0x02	quick write was interrupted before writing all bytes to flash
0x01	quick write was interrupted before maintenance completed

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