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1 Introduction and functional overview

This specification describes the functionality, API and configuration of the AUTOSAR Basic Software Module "Memory Abstraction Interface" (MemIf). This module allows the [1] NVRAM manager to access several memory abstraction modules (FEE or EA modules) (see Figure 1.1).

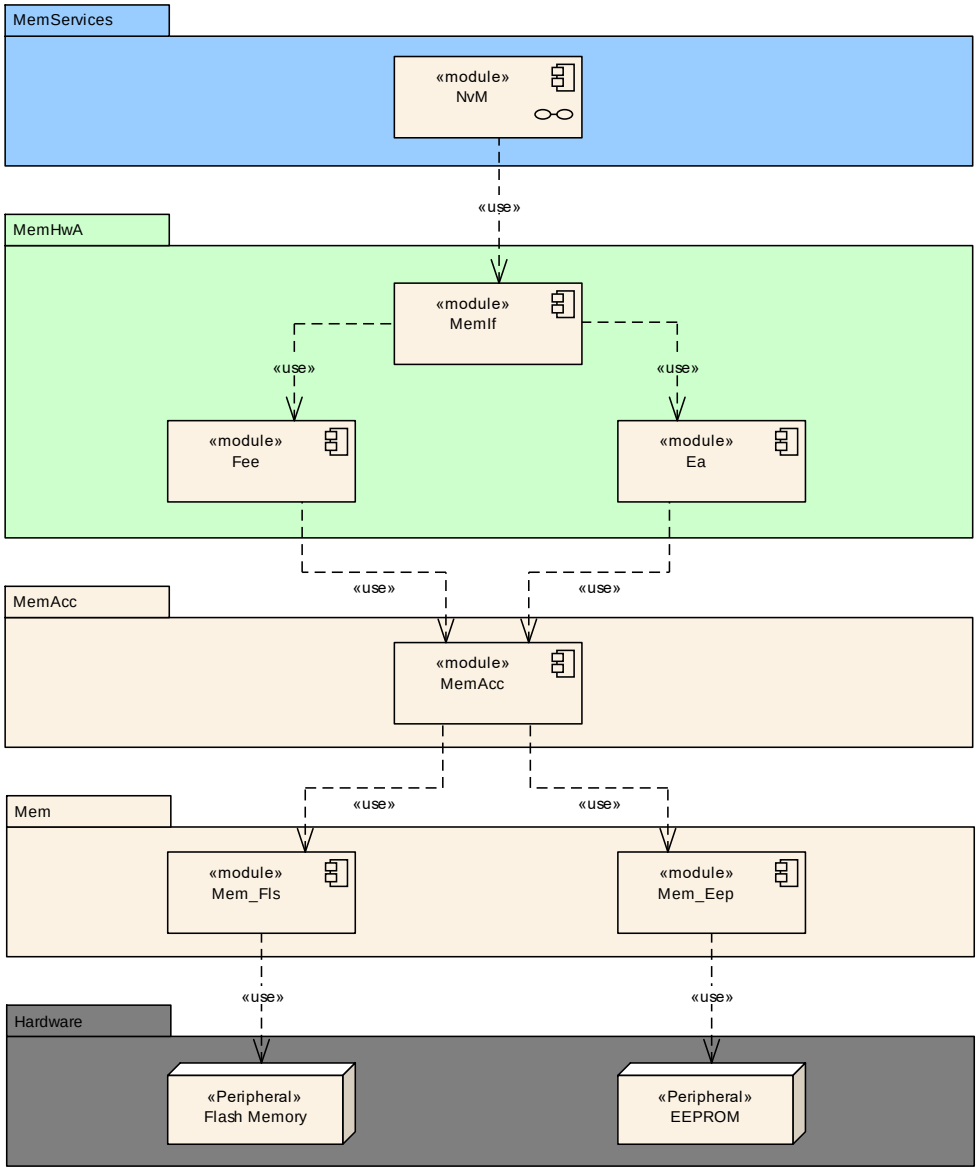


Figure 1.1: Module overview of memory hardware abstraction layer

The Memory Abstraction Interface (MemIf) shall abstract from the number of underlying [2] FEE or [3] EA modules and provide upper layers with a virtual segmentation on a uniform linear address space.

2 Acronyms and Abbreviations

The glossary below includes acronyms and abbreviations relevant to the MemIf module that are not included in the [4, AUTOSAR glossary].

Abbreviation / Acronym:	Description:
EA	EEPROM Abstraction
EEPROM	Electrically Erasable and Programmable ROM (Read Only Memory)
FEE	Flash EEPROM Emulation
LSB	Least significant bit / byte (depending on context). Here it's bit.
Mem	AUTOSAR Basic Software Module Memory Driver
MemAcc	AUTOSAR Basic Software Module Memory Access
MemIf	Memory Abstraction Interface
MSB	Most significant bit / byte (depending on context). Here it's bit.
NvM	NVRAM Manager
NVRAM	Non-volatile RAM (Random Access Memory)
Address area	Contiguous memory area in the logical address space. Typically, multiple physical memory sectors are combined to one logical address area.
Fast Mode	E.g. during startup / shutdown the underlying driver may be switched into fast mode in order to allow for fast reading / writing in those phases. Note: Whether this is possible depends on the implementation of the driver and the capabilities of the underlying device. Whether it is done depends on the configuration of the NVRAM manager and thus on the needs of a specific project.
Slow Mode	During normal operation the underlying driver may be used in slow mode in order to reduce the resource usage in terms of runtime or blocking time of the underlying device / communication media. Note: Whether this is possible depends on the implementation of the driver and the capabilities of the underlying device. Whether it is done depends on the configuration of the NVRAM manager and thus on the needs of a specific project.
Vendor specific library	A vendor specific library is an ICC-2 implementation of the FEE/FLS and EA/EEP modules respectively. It provides the same upper layer interface (API) and functionality as the corresponding ICC-3 implementation.

Table 2.1: Acronyms and abbreviations used in the scope of this Document

3 Related documentation

3.1 Input documents & related standards and norms

[1] Specification of NVRAM Manager
AUTOSAR_CP_SWS_NVRAMManager

[2] Specification of Flash EEPROM Emulation
AUTOSAR_CP_SWS_FlashEEPROMEmulation

[3] Specification of EEPROM Abstraction
AUTOSAR_CP_SWS_EEPROMAbstraction

[4] Glossary
AUTOSAR_FO_TR_Glossary

[5] General Specification of Basic Software Modules
AUTOSAR_CP_SWS_BSWGeneral

[6] General Requirements on SPAL
AUTOSAR_CP_RS_SPALGeneral

[7] General Requirements on Basic Software Modules
AUTOSAR_CP_RS_BSWGeneral

[8] Requirements on Memory Hardware Abstraction Layer
AUTOSAR_CP_RS_MemoryHWAbstractionLayer

3.2 Related specification

AUTOSAR provides a General Specification on Basic Software modules [5, SWS BSW General], which is also valid for Memory Abstraction Interface.

Thus, the specification SWS BSW General shall be considered as additional and required specification for Memory Abstraction Interface.

4 Constraints and assumptions

4.1 Limitations

No limitations.

4.2 Applicability to car domains

No restrictions.

5 Dependencies to other modules

No content.

6 Requirements Tracing

The following tables reference the requirements specified in [6, SRS SPALGeneral], [7, SRS BSWGeneral], [8, SRS MemoryHWAbstraction] and links to the fulfillment of these. Please note that if column ”Satisfied by” is empty for a specific requirement this means that this requirement is not fulfilled by this document.

Requirement	Description	Satisfied by
[SRS_BSW_00323]	All AUTOSAR Basic Software Modules shall check passed API parameters for validity	[SWS_MemIf_00022]
[SRS_BSW_00327]	Error values naming convention	[SWS_MemIf_00006]
[SRS_BSW_00337]	Classification of development errors	[SWS_MemIf_00006]
[SRS_BSW_00369]	All AUTOSAR Basic Software Modules shall not return specific development error codes via the API	[SWS_MemIf_00024]
[SRS_BSW_00384]	The Basic Software Module specifications shall specify at least in the description which other modules they require	[SWS_MemIf_00047]
[SRS_BSW_00385]	List possible error notifications	[SWS_MemIf_00048]
[SRS_BSW_00386]	The BSW shall specify the configuration and conditions for detecting an error	[SWS_MemIf_00006] [SWS_MemIf_00023]
[SRS_BSW_00392]	Parameters shall have a type	[SWS_MemIf_00037] [SWS_MemIf_00064] [SWS_MemIf_00065]
[SRS_MemHwAb_-14010]	The FEE and EA modules shall provide a write service that operates only on complete configured logical blocks	[SWS_MemIf_00040]
[SRS_MemHwAb_-14019]	The Memory Abstraction Interface shall provide uniform access to the API services of the underlying memory abstraction modules	[SWS_MemIf_00017]
[SRS_MemHwAb_-14020]	The Memory Abstraction Interface shall allow the selection of an underlying memory abstraction module by using a device index	[SWS_MemIf_00011] [SWS_MemIf_00018] [SWS_MemIf_00035]
[SRS_MemHwAb_-14021]	The Memory Abstraction Interface shall allow the pre-compile time configuration of the number of underlying memory abstraction modules	[SWS_MemIf_00018] [SWS_MemIf_00019] [SWS_MemIf_00020] [SWS_MemIf_00022]
[SRS_MemHwAb_-14022]	The Memory Abstraction Interface shall preserve the functionality of the underlying memory abstraction module	[SWS_MemIf_00010] [SWS_MemIf_00017] [SWS_MemIf_00039] [SWS_MemIf_00040] [SWS_MemIf_00041] [SWS_MemIf_00042] [SWS_MemIf_00043] [SWS_MemIf_00044] [SWS_MemIf_00046]
[SRS_MemHwAb_-14023]	The Memory Abstraction Interface shall only check those parameters that are used within the interface itself	[SWS_MemIf_00022]
[SRS_MemHwAb_-14028]	The FEE and EA modules shall provide a service to invalidate a logical block	[SWS_MemIf_00044]

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Requirement	Description	Satisfied by
[SRS_MemHwAb_-14029]	The FEE and EA modules shall provide a read service that allows reading all or part of a logical block	[SWS_MemIf_00039]
[SRS_MemHwAb_-14031]	The FEE and EA modules shall provide a service that allows canceling an ongoing asynchronous operation	[SWS_MemIf_00041]
[SRS_MemHwAb_-14032]	The FEE and EA modules shall provide an erase service that operates only on complete logical blocks containing immediate data	[SWS_MemIf_00046]
[SRS_SPAL_12078]	The drivers shall be coded in a way that is most efficient in terms of memory and runtime resources	[SWS_MemIf_00019] [SWS_MemIf_00020]
[SRS_SPAL_12448]	All driver modules shall have a specific behavior after a development error detection	[SWS_MemIf_00023]

Table 6.1: Requirements Tracing

7 Functional specification

7.1 Error Classification

Chapter [5, General Specification of Basic Software Modules] 7.2 *"Error Handling"* describes the error handling of the Basic Software in detail. Above all, it constitutes a classification scheme consisting of five error types which may occur in BSW modules.

Based on this foundation, the following section specifies particular errors arranged in the respective subsections below.

7.1.1 Development Errors

[SWS_MemIf_00006] Definition of development errors in module MemIf

Upstream requirements: SRS_BSW_00337, SRS_BSW_00386, SRS_BSW_00327

⌈

Type of error	*Related error code*	*Error value*
API service called with wrong device index parameter	MEMIF_E_PARAM_DEVICE	0x01
API service called with NULL pointer argument	MEMIF_E_PARAM_POINTER	0x02

⌋

7.1.2 Runtime Errors

There are no runtime errors.

7.1.3 Production Errors

There are no production errors.

8 API specification

8.1 Imported types

8.1.1 Standard types

In this chapter, all types included from the following modules are listed:

[SWS_MemIf_00037] Definition of imported datatypes of module MemIf

Upstream requirements: SRS_BSW_00392

⌈

Module	*Header File*	*Imported Type*
Std	Std_Types.h	Std_ReturnType

⌋

8.2 Type definitions

[SWS_MemIf_00010]

Upstream requirements: SRS_MemHwAb_14022

⌈The types specified in this chapter shall not be changed or extended for a specific memory abstraction module or hardware platform.⌋

[SWS_MemIf_00011]

Upstream requirements: SRS_MemHwAb_14020

⌈The data type for the memory device index shall be uint8. The lowest value to be used for this device index shall be 0. The allowed range of indices thus shall be 0..MEMIF_NUMBER_OF_DEVICES-1.⌋

8.2.1 MemIf_StatusType

[SWS_MemIf_00064] Definition of datatype MemIf_StatusType

Upstream requirements: SRS_BSW_00392

⌈

Name	MemIf_StatusType		
Kind	Enumeration		
Range	MEMIF_UNINIT	–	The underlying abstraction module or device driver has not been initialized (yet).
	MEMIF_IDLE	–	The underlying abstraction module or device driver is currently idle.

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	MEMIF_BUSY	–	The underlying abstraction module or device driver is currently busy.
	MEMIF_BUSY_INTERNAL	–	The underlying abstraction module is busy with internal management operations. The underlying device driver can be busy or idle.
Description	Denotes the current status of the underlying abstraction module and device drive.		
Available via	MemIf.h		

⌋

8.2.2 MemIf_JobResultType

[SWS_MemIf_00065] Definition of datatype MemIf_JobResultType

Upstream requirements: SRS_BSW_00392

⌈

Name	MemIf_JobResultType		
Kind	Enumeration		
Range	MEMIF_JOB_OK	–	The job has been finished successfully.
	MEMIF_JOB_FAILED	–	The job has not been finished successfully.
	MEMIF_JOB_PENDING	–	The job has not yet been finished.
	MEMIF_JOB_CANCELED	–	The job has been canceled.
	MEMIF_BLOCK_INCONSISTENT	–	1. The requested block is inconsistent, it may contain corrupted data. 2. Block is NOT found.
	MEMIF_BLOCK_INVALID	–	The requested block has been marked as invalid, the requested operation can not be performed.
Description	Denotes the result of the last job.		
Available via	MemIf.h		

⌋

8.3 Function definitions

This chapter contains all APIs provided by the module.

[SWS_MemIf_00017]

Upstream requirements: SRS_MemHwAb_14019, SRS_MemHwAb_14022

⌈The API specified in this chapter shall be mapped to the API of the underlying memory abstraction modules. For functional behavior refer to the specification of those modules respectively to that of the underlying memory drivers.⌋

[SWS_MemIf_00018]

Upstream requirements: SRS_MemHwAb_14020, SRS_MemHwAb_14021

⌈The parameter `DeviceIndex` shall be used for selection of memory abstraction modules (and thus memory devices). If only one memory abstraction module is configured, the parameter `DeviceIndex` shall be ignored.⌋

[SWS_MemIf_00019]

Upstream requirements: SRS_SPAL_12078, SRS_MemHwAb_14021

⌈If only one memory abstraction module is configured, the Memory Abstraction Interface shall be implemented as a set of macros mapping the Memory Abstraction Interface API to the API of the corresponding memory abstraction module.⌋

Example:

```
#define MemIf_Write(DeviceIndex, BlockNumber, DataPtr) \
            Fee_Write(BlockNumber, DataPtr)
```

[SWS_MemIf_00020]

Upstream requirements: SRS_SPAL_12078, SRS_MemHwAb_14021

⌈If more than one memory abstraction module is configured, the Memory Abstraction Interface shall use efficient mechanisms to map the API calls to the appropriate memory abstraction module.⌋

Note: One solution is to use tables of pointers to functions where the parameter `DeviceIndex` is used as array index.

Example:

```
#define MemIf_Write(DeviceIndex, BlockNumber, DataPtr) \
          MemIf_WriteFctPtr[DeviceIndex](BlockNumber,DataPtr)
```

Note: The service IDs given in this interface specification are related to the service IDs of the underlying memory abstraction module(s). For that reason, they may not start with 0.

[SWS_MemIf_00022]

Upstream requirements: SRS_BSW_00323, SRS_MemHwAb_14021, SRS_MemHwAb_14023

⌈If more than one memory abstraction module is configured and development error detection is enabled for this module, the functions of the Memory Abstraction Interface API shall check the parameter `DeviceIndex` for being an existing device or the broadcast identifier within the module's services.⌋

[SWS_MemIf_00023]

Upstream requirements: SRS_BSW_00386, SRS_SPAL_12448

⌈The functions of the Memory Abstraction Interface API shall report detected errors attributed to an illegal parameter `DeviceIndex` to the Default Error Tracer (DET) with the error code `MEMIF_E_PARAM_DEVICE` and the called service shall not be executed.⌋

[SWS_MemIf_00024]

Upstream requirements: SRS_BSW_00369

⌈If a called function of the Memory Abstraction Interface API has detected an error attributed to an illegal parameter `DeviceIndex` and has a return value, it shall be set as follows:

MemIf_GetStatus: `MEMIF_UNINIT`

MemIf_GetJobResult: `MEMIF_JOB_FAILED`

All other functions: `E_NOT_OK`⌋

8.3.1 MemIf_Read

[SWS_MemIf_00039] Definition of API function MemIf_Read

Upstream requirements: SRS_MemHwAb_14029, SRS_MemHwAb_14022

⌈

Service Name	MemIf_Read	
Syntax	`Std_ReturnType MemIf_Read ( uint16 DeviceIndex, uint16 BlockNumber, uint16 BlockOffset, uint8* DataBufferPtr, uint16 Length )`	
Service ID [hex]	0x02	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	DeviceIndex	–
	BlockNumber	–
	BlockOffset	–
	Length	–
Parameters (inout)	None	
Parameters (out)	DataBufferPtr	–
Return value	Std_ReturnType	In case development error detection is enabled for the Memory Abstraction Interface and a development error is detected according to [SWS_MemIf_00022] the function shall return `E_NOT_OK` else it shall return the value of the called function of the underlying module.

▽

△

Description	Invokes the "Read" function of the underlying memory abstraction module selected by the parameter DeviceIndex.
Available via	MemIf.h

⌋

8.3.2 MemIf_Write

[SWS_MemIf_00040] Definition of API function MemIf_Write

Upstream requirements: SRS_MemHwAb_14010, SRS_MemHwAb_14022

⌈

Service Name	MemIf_Write	
Syntax	`Std_ReturnType MemIf_Write ( uint16 DeviceIndex, uint16 BlockNumber, const uint8* DataBufferPtr )`	
Service ID [hex]	0x03	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	DeviceIndex	–
	BlockNumber	–
	DataBufferPtr	–
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_ReturnType	In case development error detection is enabled for the Memory Abstraction Interface and a development error is detected according to [SWS_MemIf_00022] the function shall return `E_NOT_OK` else it shall return the value of the called function of the underlying module.
Description	Invokes the "Write" function of the underlying memory abstraction module selected by the parameter DeviceIndex.	
Available via	MemIf.h	

⌋

8.3.3 MemIf_Cancel

[SWS_MemIf_00041] Definition of API function MemIf_Cancel

Upstream requirements: SRS_MemHwAb_14031, SRS_MemHwAb_14022

⌈

Service Name	MemIf_Cancel	
Syntax	`void MemIf_Cancel ( uint16 DeviceIndex )`	
Service ID [hex]	0x04	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	DeviceIndex	–
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	Invokes the "Cancel" function of the underlying memory abstraction module selected by the parameter DeviceIndex.	
Available via	MemIf.h	

⌋

8.3.4 MemIf_GetStatus

[SWS_MemIf_00042] Definition of API function MemIf_GetStatus

Upstream requirements: SRS_MemHwAb_14022

⌈

Service Name	MemIf_GetStatus	
Syntax	`MemIf_StatusType MemIf_GetStatus ( uint16 DeviceIndex )`	
Service ID [hex]	0x05	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	DeviceIndex	–
Parameters (inout)	None	
Parameters (out)	None	
Return value	MemIf_StatusType	–
Description	Invokes the "GetStatus" function of the underlying memory abstraction module selected by the parameter DeviceIndex.	
Available via	MemIf.h	

⌋

[SWS_MemIf_00035]

Upstream requirements: SRS_MemHwAb_14020

⌈If the function MemIf_GetStatus is called with the device index denoting a broadcast to all configured devices (MEMIF_BROADCAST_ID), the Memory Abstraction Interface module shall call the "GetStatus" functions of all underlying devices in turn. It shall return the value

- MEMIF_IDLE - if all underlying devices have returned this state
- MEMIF_UNINIT - if at least one device returned this state, all other returned states shall be ignored
- MEMIF_BUSY - if at least one configured device returned this state and no other device returned MEMIF_UNINIT
- MEMIF_BUSY_INTERNAL - if at least one configured device returned this state and no other device returned MEMIF_BUSY or MEMIF_UNINIT

⌋

Note: *The special "broadcast" device ID in the call to MemIf_GetStatus is used to query whether all devices are idle in order to shut down the ECU.*

8.3.5 MemIf_GetJobResult

[SWS_MemIf_00043] Definition of API function MemIf_GetJobResult

Upstream requirements: SRS_MemHwAb_14022

⌈

Service Name	MemIf_GetJobResult	
Syntax	`MemIf_JobResultType MemIf_GetJobResult ( uint16 DeviceIndex )`	
Service ID [hex]	0x06	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	DeviceIndex	–
Parameters (inout)	None	
Parameters (out)	None	
Return value	MemIf_JobResultType	In case development error detection is enabled for the Memory Abstraction Interface and a development error is detected according to [SWS_MemIf_00022] the function shall return MEMIF_JOB_FAILED else it shall return the value of the called function of the underlying module.
Description	Invokes the "GetJobResult" function of the underlying memory abstraction module selected by the parameter DeviceIndex.	
Available via	MemIf.h	

⌋

8.3.6 MemIf_InvalidateBlock

[SWS_MemIf_00044] Definition of API function MemIf_InvalidateBlock

Upstream requirements: SRS_MemHwAb_14028, SRS_MemHwAb_14022

⌈

Service Name	MemIf_InvalidateBlock	
Syntax	`Std_ReturnType MemIf_InvalidateBlock ( uint16 DeviceIndex, uint16 BlockNumber )`	
Service ID [hex]	0x07	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	DeviceIndex	–
	BlockNumber	–
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_ReturnType	In case development error detection is enabled for the Memory Abstraction Interface and a development error is detected according to [SWS_MemIf_00022] the function shall return `E_NOT_OK` else it shall return the value of the called function of the underlying module.
Description	Invokes the "InvalidateBlock" function of the underlying memory abstraction module selected by the parameter DeviceIndex.	
Available via	MemIf.h	

⌋

8.3.7 MemIf_EraseImmediateBlock

[SWS_MemIf_00046] Definition of API function MemIf_EraseImmediateBlock

Upstream requirements: SRS_MemHwAb_14032, SRS_MemHwAb_14022

⌈

Service Name	MemIf_EraseImmediateBlock	
Syntax	`Std_ReturnType MemIf_EraseImmediateBlock ( uint16 DeviceIndex, uint16 BlockNumber )`	
Service ID [hex]	0x09	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	DeviceIndex	–
	BlockNumber	–
Parameters (inout)	None	
Parameters (out)	None	

▽

△

Return value	Std_ReturnType	In case development error detection is enabled for the Memory Abstraction Interface and a development error is detected according to [SWS_MemIf_00022] the function shall return `E_NOT_OK` else it shall return the value of the called function of the underlying module.
Description	Invokes the "EraseImmediateBlock" function of the underlying memory abstraction module selected by the parameter DeviceIndex.	
Available via	MemIf.h	

⌋

8.4 Scheduled functions

None, there are no asynchronous functions in this module.

8.5 Expected interfaces

8.5.1 Mandatory Interfaces

This chapter defines all interfaces which are required to fulfill the core functionality of the module.

[SWS_MemIf_00047] Definition of mandatory interfaces required by module Mem If

Upstream requirements: SRS_BSW_00384

⌈

API Function	*Header File*	*Description*
Ea_EraseImmediateBlock	Ea.h	Erases the block BlockNumber.
Ea_GetStatus	Ea.h	Service to return the Status.
Ea_InvalidateBlock	Ea.h	Invalidates the block BlockNumber.
Fee_EraseImmediateBlock	Fee.h	Service to erase a logical block.
Fee_GetStatus	Fee.h	Service to return the status.
Fee_InvalidateBlock	Fee.h	Service to invalidate a logical block.

⌋

8.5.2 Optional Interfaces

This chapter defines all interfaces which are required to fulfill an optional functionality of the module.

[SWS_MemIf_00048] Definition of optional interfaces requested by module MemIf

Upstream requirements: SRS_BSW_00385

⌈

API Function	*Header File*	*Description*
Det_ReportError	Det.h	Service to report development errors.

⌋

8.5.3 Configurable interfaces

In this chapter all interfaces are listed where the target function could be configured. The target function is usually a call-back function. The names of these kind of interfaces is not fixed because they are configurable.

There are no configurable interfaces for this module.

9 Sequence diagrams

Refer to the specifications of the memory abstraction modules.

10 Configuration specification

10.1 Containers and configuration parameters

The following chapters summarize all configuration parameters. The detailed meaning of the parameters are described in Chapter 7 and Chapter 8.

10.1.1 MemIf

[ECUC_MemIf_00025] Definition of EcucModuleDef MemIf ⌈

Module Name	MemIf
Description	Configuration of the MemIf (Memory Abstraction Interface) module.
Post-Build Selectable Support	false
Post-Build Loadable Support	false

Included Containers		
Container Name	**Multiplicity**	**Description**
MemIfGeneral	1	Configuration of the memory abstraction interface (Memif) module.

⌋

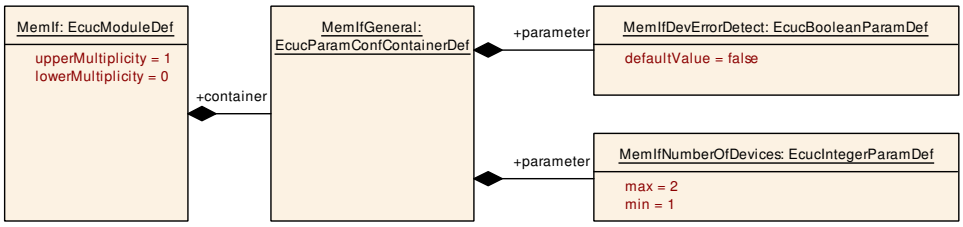


Figure 10.1: Configuration of the MemIf

10.1.2 MemIfGeneral

[ECUC_MemIf_00034] Definition of EcucParamConfContainerDef MemIfGeneral ⌈

Container Name	MemIfGeneral
Parent Container	MemIf
Upstream mapping defined	–
Description	Configuration of the memory abstraction interface (Memif) module.
Multiplicity	1
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
MemIfDevErrorDetect	1	[ECUC_MemIf_00035]
MemIfNumberOfDevices	1	[ECUC_MemIf_00033]

No Included Containers

⌋

[ECUC_MemIf_00035] Definition of EcucBooleanParamDef MemIfDevErrorDetect ⌈

Parameter Name	MemIfDevErrorDetect
Parent Container	MemIfGeneral
Upstream mapping defined	–
Description	Switches the development error detection and notification on or off. • true: detection and notification is enabled. • false: detection and notification is disabled.
Multiplicity	1
Type	EcucBooleanParamDef
Default value	false
Pre-Compile only	true

⌋

[ECUC_MemIf_00033] Definition of EcucIntegerParamDef MemIfNumberOfDevices ⌈

Parameter Name	MemIfNumberOfDevices	
Parent Container	MemIfGeneral	
Upstream mapping defined	–	
Description	Concrete number of underlying memory abstraction modules. Calculation Formula: Count number of configured EA and FEE modules.	
Multiplicity	1	
Type	EcucIntegerParamDef	
Range	1 .. 2	
Default value	–	
Pre-Compile only	true	

⌋

A Change history of AUTOSAR traceable items

A.1 Traceable item history of this document according to AUTOSAR Release R26-11

A.1.1 Added Specification Items in R26-11

none

A.1.2 Changed Specification Items in R26-11

Number	Heading
[ECUC_MemIf_00034]	Definition of EcucParamConfContainerDef MemIfGeneral
[SWS_MemIf_00037]	Definition of imported datatypes of module MemIf

Table A.1: Changed Specification Items in R26-11

A.1.3 Deleted Specification Items in R26-11

Number	Heading
[ECUC_MemIf_00032]	Definition of EcucBooleanParamDef MemIfVersionInfoApi
[SWS_MemIf_00045]	Definition of API function MemIf_GetVersionInfo

Table A.2: Deleted Specification Items in R26-11

A.2 Traceable item history of this document according to AUTOSAR Release R25-11

A.2.1 Added Specification Items in R25-11

none

A.2.2 Changed Specification Items in R25-11

none

A.2.3 Deleted Specification Items in R25-11

none

B Not applicable requirements

[SWS_MemIf_NA_00999]

Upstream requirements: SRS_BSW_00404, SRS_BSW_00101, SRS_BSW_00159, SRS_BSW_00168, SRS_BSW_00170, SRS_BSW_00336, SRS_BSW_00339, SRS_BSW_00375, SRS_BSW_00380, SRS_BSW_00398, SRS_BSW_00399, SRS_BSW_00400, SRS_BSW_00405, SRS_BSW_00406, SRS_BSW_00416, SRS_BSW_00417, SRS_BSW_00422, SRS_BSW_00423, SRS_BSW_00424, SRS_BSW_00425, SRS_BSW_00426, SRS_BSW_00427, SRS_BSW_00428, SRS_BSW_00429, SRS_BSW_00432, SRS_BSW_00433, SRS_SPAL_00157, SRS_SPAL_12056, SRS_SPAL_12057, SRS_SPAL_12063, SRS_SPAL_12064, SRS_SPAL_12067, SRS_SPAL_12068, SRS_SPAL_12069, SRS_SPAL_12075, SRS_SPAL_12077, SRS_SPAL_12092, SRS_SPAL_12125, SRS_SPAL_12129, SRS_SPAL_12163, SRS_SPAL_12263, SRS_SPAL_12265, SRS_SPAL_12267, SRS_SPAL_12461, SRS_SPAL_12462, SRS_SPAL_12463

⌈These requirements are not applicable to this specification.⌋