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Date	Version	Changed by	Change Description
15.09.2010	2.3.0	AUTOSAR Administration	• Replaced generic <Module> by "PLATFORM" in chapter 10 • Legal disclaimer revised
13.11.2007	2.2.0	AUTOSAR Administration	• Chapter 8.2: "AUTOSAR supports for compiler and target implementation only 2 complement arithmetic" • Chapter 12.10: changed the basic type for *_least types (optimized types) from 'int' to 'long' for SHx processors • Removal the explicit cast to boolean in the precompile definition (#define) for macros TRUE and FALSE ("#define TRUE ((boolean) 1)" has become "#define TRUE 1") • Document meta information extended • Small layout adaptations made
31.01.2007	2.1.0	AUTOSAR Administration	• Boolean type has been defined as an eight bit long unsigned integer • Legal disclaimer revised • Release Notes added • “Advice for users” revised • “Revision Information” added
12.07.2006	2.0.0	AUTOSAR Administration	Second release
30.06.2005	1.0.0	AUTOSAR Administration	Initial Release

Table of Contents

1 Introduction and functional overview

This document specifies the AUTOSAR platform types header file. It contains all platform dependent types and symbols. Those types must be abstracted in order to become platform and compiler independent.

It is required that all platform types files are unique within the AUTOSAR community to guarantee unique types per platform and to avoid type changes when moving a software module from platform A to B.

2 Acronyms and abbreviations

Acronyms and abbreviations that have a local scope are not contained in the AUTOSAR glossary. These must appear in a local glossary.

Acronym:	***Description:***
Rollover mechanism	The following example sequence is called ‘rollover’: • An unsigned char has the value of 255 • It is incremented by 1 • The result is 0
SDU	Service Data Unit (payload)

Abbreviation:	***Description:***
int	Integer

3 Related documentation

3.1 Input documents

[1] General Requirements on Basic Software Modules,
AUTOSAR_SRS_General.pdf

[2] AUTOSAR Basic Software Module Description Template,
AUTOSAR_BSW_Module_Description.pdf

[3] Cosmic C Cross Compiler User's Guide for Motorola MC68HC12, V4.5

[4] ARM ADS compiler manual

[5] Greenhills MULTI for V850 V4.0.5:
Building Applications for Embedded V800, V4.0, 30.1.2004

[6] TASKING for ST10 V8.5:
C166/ST10 v8.5 C Cross-Compiler User's Manual, V5.16
C166/ST10 v8.5 C Cross-Assembler, Linker/Locator, Utilities User's Manual, V5.16

[7] Wind River (Diab Data) for PowerPC Version 5.2.1:
Wind River Compiler for Power PC - Getting Started, Edition 2, 8.5.2004
Wind River Compiler for Power PC - User's Guide, Edition 2, 11.5.2004

[8] TASKING for TriCore TC1796 V2.1R1:
TriCore v2.0 C Cross-Compiler, Assembler, Linker User's Guide, V1.2

[9] Metrowerks CodeWarrior 4.0 for Freescale HC9S12X/XGATE (V5.0.25):
Motorola HC12 Assembler, 2.6.2004
Motorola HC12 Compiler, 2.6.2004
Smart Linker, 2.4.2004

3.2 Related standards and norms

[10] ISO/IEC 9899:1990 Programming Language – C

[11] MISRA-C 2004: Guidelines for the use of the C language in critical systems, October 2004

4 Constraints and assumptions

4.1 Limitations

No limitations.

4.2 Applicability to car domains

No restrictions.

4.3 Applicability to safety related environments

The AUTOSAR `boolean` type may be used if the correct usage (see PLATFORM027) is proven by a formal code review or a static analysis by a validated static analysis tool.

The optimized AUTOSAR integer data types (`*_least`) may be used if the correct usage (see PLATFORM005) is proven by a formal code review or a static analysis by a validated static analysis tool.

5 Dependencies to other modules

None.

5.1 File structure

5.1.1 Code file structure

None

5.1.2 Header file structure

Two header file structures are applicable. One is depending on communication related basic software modules and the second is depending on non-communication related basic software modules.

5.1.2.1 Communication related basic software modules

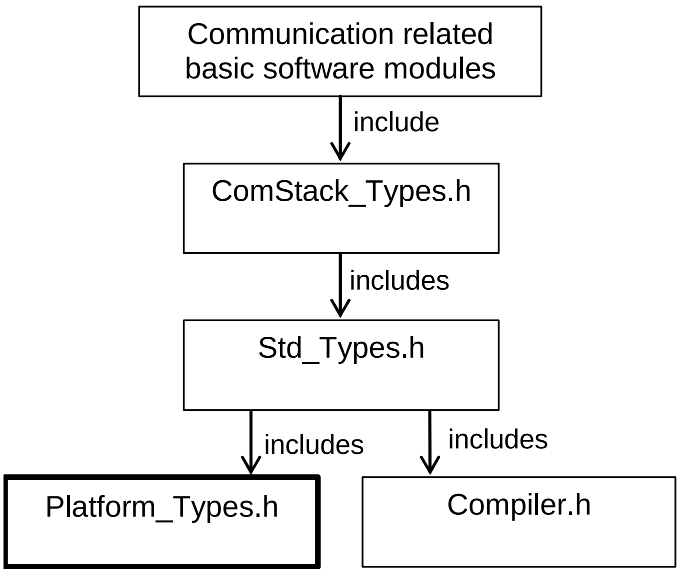


Figure 1: Include File Structure for communication related basic software modules

- `<user>_Types.h` shall include `ComStack_Types.h` and `<user>` is a communication related basic software module (e.g. Com, PduR, Can…)
- `ComStack_Types.h` shall include `Std_Types.h`
- `Std_Types.h` shall include `Platform_Types.h`
- `Std_Types.h` shall include `Compiler.h`

5.1.3 Non-communication related basic software modules

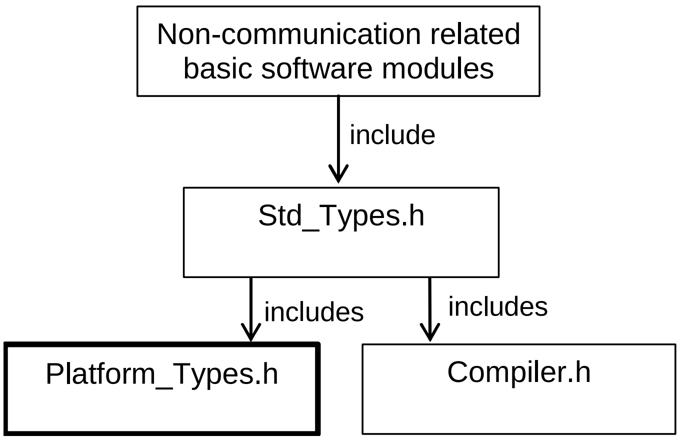


Figure 2: Include File Structure for non-communication related basic software modules

- `<user>_Types.h` shall include `ComStack_Types.h` and user is a non-communication related basic software module(e.g. Mcu, WdgM ...)
- `Std_Types.h` shall include `Platform_Types.h`
- `Std_Types.h` shall include `Compiler.h`

6 Requirements traceability

Document: General Requirements on Basic Software Modules,

Requirement	***Satisfied by***
[BSW00344] Reference to link-time configuration	Not applicable (i.e. PlatformTypes SWS specifies a header file)
[BSW00404] Reference to post build time configuration	Not applicable (i.e. PlatformTypes SWS specifies a header file)
[BSW00405] Reference to multiple configuration sets	Not applicable (i.e. PlatformTypes SWS specifies a header file)
[BSW00345] Pre-compile-time configuration	Not applicable (i.e. PlatformTypes SWS is not a module specific configuration file)
[BSW159] Tool-based configuration	Not applicable (i.e. PlatformTypes SWS is not a BSW module)
[BSW167] Static configuration checking	Not applicable (i.e. PlatformTypes SWS is not a BSW module)
[BSW171] Configurability of optional functionality	Not applicable (i.e. PlatformTypes SWS specifies a header file)
[BSW170] Data for reconfiguration of AUTOSAR SW-Components	Not applicable (i.e. no reconfiguration available for platform types)
[BSW00380] Separate C-Files for configuration parameters	Not applicable (i.e no configuration parameters available for platform types)
[BSW00419] Separate C-Files for pre-compile time configuration parameters	Not applicable (i.e no configuration parameters available for platform types)
[BSW00381] Separate configuration header file for pre-compile time parameters	Not applicable (i.e no configuration parameters available for platform types)
[BSW00412] Separate H-File for configuration parameters	Not applicable (i.e no configuration parameters available for platform types)
[BSW00383] List dependencies of configuration files	Not applicable (i.e no configuration parameters available for platform types)
[BSW00384] List dependencies to other modules	Not applicable (i.e no configuration parameters available for platform types)
[BSW00387] Specify the configuration class of callback function	Not applicable (i.e no callback function available for platform types)
[BSW00388] Introduce containers	Not applicable (i.e no configuration parameters available for platform types)
[BSW00389] Containers shall have names	Not applicable (i.e no configuration parameters available for platform types)
[BSW00390] Parameter content shall be unique within the module	Not applicable (i.e no configuration parameters available for platform types)
[BSW00391] Parameter shall have unique names	Not applicable (i.e no configuration parameters available for platform types)
[BSW00392] Parameters shall have a type	Not applicable (i.e no configuration parameters available for

	platform types)
[BSW00393] Parameters shall have a range	Not applicable (i.e no configuration parameters available for platform types)
[BSW00394] Specify the scope of the parameters	Not applicable (i.e no configuration parameters available for platform types)
[BSW00395] List the required parameters (per parameter)	Not applicable (i.e no configuration parameters available for platform types)
[BSW00396] Configuration classes	Not applicable (i.e no configuration parameters available for platform types)
[BSW00397] Pre-compile-time parameters	Not applicable (i.e no configuration parameters available for platform types)
[BSW00398] Link-time parameters	Not applicable (i.e no configuration parameters available for platform types)
[BSW00399] Loadable Post-build time parameters	Not applicable (i.e no configuration parameters available for platform types)
[BSW00400] Selectable Post-build time parameters	Not applicable (i.e no configuration parameters available for platform types)
[BSW00402] Published information	[PLATFORM012]
[BSW00375] Notification of wake-up reason	Not applicable (i.e. no functionality defined with platform types)
[BSW101] Initialization interface	Not applicable (i.e. no functionality defined with platform types)
[BSW00416] Sequence of Initialization	Not applicable (i.e. no functionality defined with platform types)
[BSW00406] Check module initialization	Not applicable (i.e. no functionality defined with platform types)
[BSW168] Diagnostic Interface of SW components	Not applicable (i.e. no testing of platform types defined)
[BSW00407] Function to read out published parameters	Not applicable (i.e. no functionality defined with platform types)
[BSW00423] Usage of SW-C template to describe BSW modules with AUTOSAR Interfaces	Not applicable (i.e platform types is not a module)
[BSW00429] Restricted BSW OS functionality access	Not applicable (i.e. no functionality defined with platform types. It's a header file)
[BSW00432] Modules should have separate main processing functions for read/receive and write/transmit data path	Not applicable (i.e. no functionality defined with platform types. It's a header file)
[BSW00336] Shutdown interface	Not applicable (i.e. no functionality defined in platform types. It's a header file)
[BSW00337] Classification of errors	Not applicable (i.e. no error classification defined with platform types)
[BSW00338] Detection and Reporting of development errors	Not applicable (i.e. no error classification defined with platform types)
[BSW00369] Do not return development error codes via API	Not applicable (i.e. no functionality defined in platform types. It's a header file)

[BSW00339] Reporting of production relevant error status	Not applicable (i.e. no functionality defined in platform types. It's a header file)
[BSW00422] Debouncing of production relevant error status	Not applicable (i.e. no functionality defined in platform types. It's a header file)
[BSW00420] Production relevant error event rate detection	Not applicable (i.e. no functionality defined in platform types. It's a header file)
[BSW00417] Reporting of Error Events by Non-Basic Software	Not applicable (i.e. no functionality defined in platform types. It's a header file)
[BSW00323] API parameter checking	Not applicable (i.e. no functionality defined in platform types. It's a header file)
[BSW004] Version check	[PLATFORM012]
[BSW00409] Header files for production code error IDs	Not applicable (i.e. no error defined with platform types)
[BSW00385] List possible error notifications	Not applicable (i.e. no error defined with platform types)
[BSW00386] Configuration for detecting an error	Not applicable (i.e. no error defined with platform types)
[BSW161] Microcontroller abstraction	Not applicable (i.e. no interface provided)
[BSW162] ECU layout abstraction	Not applicable (i.e. no interface provided)
[BSW005] No hard coded horizontal interfaces within MCAL	Not applicable (i.e. no interface provided)
[BSW00415] User dependent include files	Not applicable (i.e. no interface provided)
[BSW164] Implementation of interrupt service routines	Not applicable (i.e. only types are defined here)
[BSW00325] Runtime of interrupt service routines	Not applicable (i.e. only types are defined here)
[BSW00326] Transition from ISRs to OS tasks	Not applicable (i.e. only types are defined here)
[BSW00342] Usage of source code and object code	Not applicable (i.e. only types are defined here)
[BSW00343] Specification and configuration of time	Not applicable (i.e. no time configuration provided)
[BSW160] Human-readable configuration data	Not applicable (i.e. only types are defined here)
[BSW007] HIS MISRA C	Not applicable (i.e. only types are defined here)
[BSW00300] Module naming convention	Not applicable (i.e. only types are defined here)
[BSW00413] Accessing instances of BSW modules	Not applicable (i.e. only types are defined here)
[BSW00347] Naming separation of different instances of BSW drivers	Not applicable (i.e. instantiation of platform types required)
[BSW00305] Self-defined data types naming convention	Not applicable (i.e. platform types apply to all BSW modules)
[BSW00307] Global variables naming convention	Not applicable (i.e. only types are defined here)
[BSW00310] API naming convention	Not applicable (i.e. only types are defined here)
[BSW00373] Main processing function naming convention	Not applicable (i.e. only types are defined here)
[BSW00327] Error values naming convention	Not applicable (i.e. only types are defined here)

[BSW00335] Status values naming convention	Not applicable (i.e. only types are defined here)
[BSW00350] Development error detection keyword	Not applicable (i.e. only types are defined here)
[BSW00408] Configuration parameter naming convention	Not applicable (i.e. only types are defined here)
[BSW00410] Compiler switches shall have defined values	Not applicable (i.e. compiler switches not provided)
[BSW00411] Get version info keyword	Not applicable (i.e. only types are defined here)
[BSW00346] Basic set of module files	Not applicable (i.e. only types are defined here)
[BSW158] Separation of configuration from implementation	Not applicable (i.e. no configuration provided with platform types)
[BSW00314] Separation of interrupt frames and service routines	Not applicable (i.e. only types are defined here)
[BSW00370] Separation of callback interface from API	Not applicable (i.e. only types are defined here)
[BSW00348] Standard type header	Not applicable (i.e. platform types are defined here)
[BSW00353] Platform specific type header	PLATFORM001, PLATFORM003 Chapter 8.2 Type definitions
[BSW00361] Compiler specific language extension header	Not applicable (i.e. only types are defined here)
[BSW00301] Limit imported information	Not applicable (i.e. only types are defined here)
[BSW00302] Limit exported information	Not applicable (i.e. only types are defined here)
[BSW00328] Avoid duplication of code	Not applicable (i.e. only types are defined here)
[BSW00312] Shared code shall be reentrant	Not applicable (i.e. only types are defined here)
[BSW006] Platform independency	All SWS items present in this document
[BSW00357] Standard API return type	Not applicable (i.e. only types are defined here)
[BSW00377] Module specific API return types	Not applicable (i.e. only types are defined here)
[BSW00304] AUTOSAR integer data types	PLATFORM001, PLATFORM003, PLATFORM005, PLATFORM013, PLATFORM014, PLATFORM015, PLATFORM016, PLATFORM017, PLATFORM018, PLATFORM020, PLATFORM021, PLATFORM022, PLATFORM023, PLATFORM024, PLATFORM025
[BSW00355] Do not redefine AUTOSAR integer data types	Not applicable (i.e. only types are defined here)
[BSW00378] AUTOSAR boolean type	PLATFORM026, PLATFORM027, PLATFORM034
[BSW00306] Avoid direct use of compiler and platform specific keywords	Not applicable (i.e. this SWS does not specify a module)
[BSW00308] Definition of global data	Not applicable (i.e. only types are defined here)
[BSW00309] Global data with read-only constraint	Not applicable (i.e. only types are defined here)
[BSW00371] Do not pass function pointers via API	Not applicable (i.e. only types are defined here)
[BSW00358] Return type of `init()` functions	Not applicable (i.e. only types are defined here)
[BSW00414] Parameter of init function	Not applicable (i.e. only types are defined here)
[BSW00376] Return type and parameters of main processing functions	Not applicable (i.e. only types are defined here)

[BSW00359] Return type of callback functions	Not applicable (i.e. only types are defined here)
[BSW00360] Parameters of callback functions	Not applicable (i.e. only types are defined here)
[BSW00329] Avoidance of generic interfaces	Not applicable (i.e. only types are defined here)
[BSW00330] Usage of macros / inline functions instead of functions	Not applicable (i.e. only types are defined here)
[BSW00331] Separation of error and status values	Not applicable (i.e. only types are defined here)
[BSW009] Module User Documentation	Not applicable (i.e. only types are defined here)
[BSW00401] Documentation of multiple instances of configuration parameters	Not applicable (i.e. only types are defined here)
[BSW172] Compatibility and documentation of scheduling strategy	Not applicable (i.e. only types are defined here)
[BSW010] Memory resource documentation	Not applicable (i.e. only types are defined here)
[BSW00333] Documentation of callback function context	Not applicable (i.e. only types are defined here)
[BSW00374] Module vendor identification	Not applicable (i.e. only types are defined here)
[BSW00379] Module identification	Not applicable (i.e. only types are defined here)
[BSW003] Version identification	PLATFORM012
[BSW00318] Format of module version numbers	PLATFORM012
[BSW00321] Enumeration of module version numbers	Not applicable (i.e. this SWS does not specify a module)
[BSW00341] Microcontroller compatibility documentation	Not applicable (i.e. this SWS is not a module documentation)
[BSW00334] Provision of XML file	Not applicable (i.e. only types are defined here)

6.1 Linkage items for requirements management

This chapter contents several items which are only used in the requirement management tool. The items are necessary to build up the linkage between requirements, specification, etc. (e.g. for impact and coverage analyses).

Not applicable

For release versions, this chapter has to be removed.

7 Functional specification

7.1 General issues

PLATFORM001: For each platform an own platform types header file has to be provided.

PLATFORM031: If a specific compiler (not listed in this specification) requires a different mapping of ANSI C types to the AUTOSAR standard integer types, an own platform types header file for this compiler has to be provided.

PLATFORM003: The file name of the platform types header file shall be for all platforms ‘`Platform_Types.h`’.

PLATFORM002: It is not allowed to add any extension to this file. Any extension invalidates the AUTOSAR conformity.

7.2 CPU Type

PLATFORM044: For each platform the register width of the CPU used shall be indicated by defining `CPU_TYPE`.

PLATFORM045: According to the register width of the CPU used, `CPU_TYPE` shall be assigned to one of the symbols `CPU_TYPE_8`, `CPU_TYPE_16` or `CPU_TYPE_32`.

7.3 Endianess

The pattern for bit, byte and word ordering in native types, such as integers, is called endianess.

PLATFORM043: For each platform the appropriate bit order on register level shall be indicated in the platform types header file using the symbol `CPU_BIT_ORDER`.

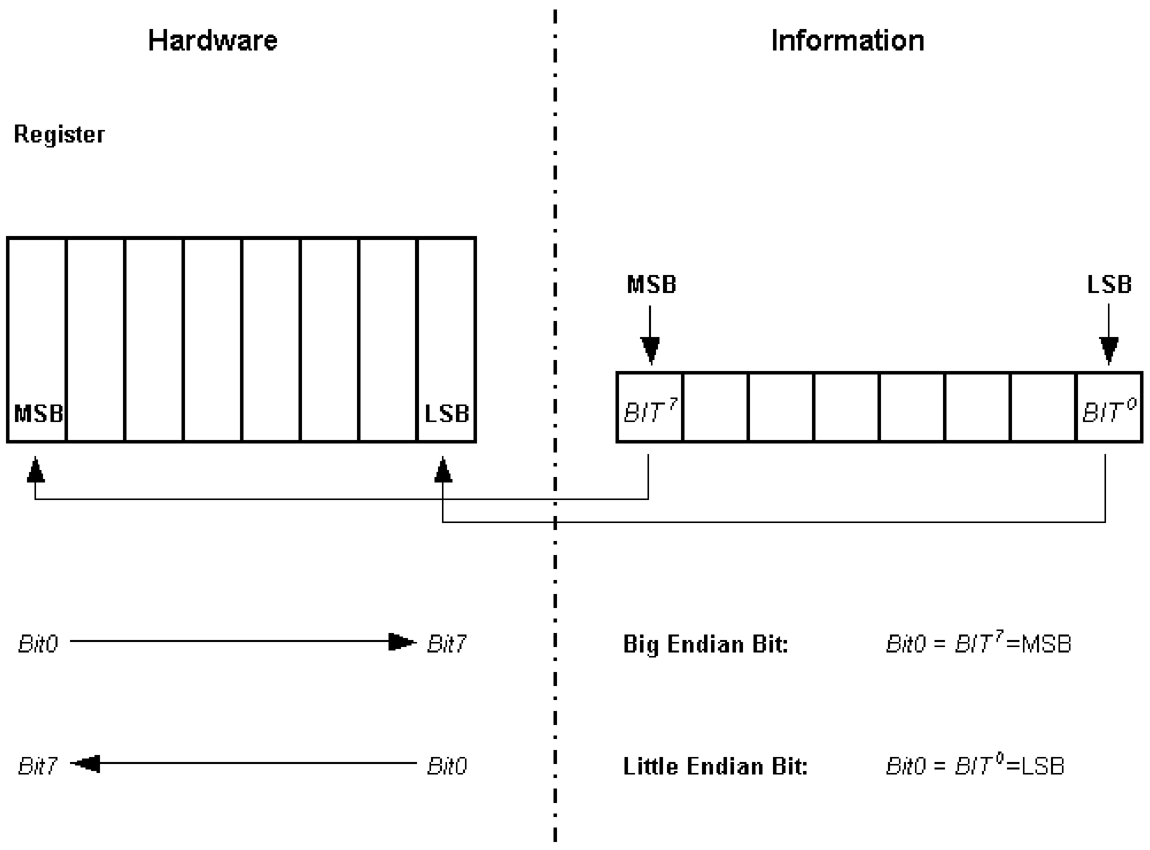
PLATFORM046: For each platform the appropriate byte order on memory level shall be indicated in the platform types header file using the symbol `CPU_BYTE_ORDER`.

7.3.1 Bit Ordering (Register)

PLATFORM048: In case of big endian bit ordering `CPU_BIT_ORDER` shall be assigned to `MSB_FIRST` in the platform types header file.

PLATFORM049: In case of little endian bit ordering `CPU_BIT_ORDER` shall be assigned to `LSB_FIRST` in the platform types header file.

Illustrations:



Important Note:
The *naming* convention Bit0, Bit1, etc. and the bit's *significance* within a byte, word, etc. are different topics and shall not be mixed. The counting scheme of bits in Motorola µC-architecture's (Big Endian Bit Order) starts with Bit0 indicating the Most Significant Bit, whereas all other µC using Little Endian Bit Order assign Bit0 to be the Least Significant Bit!

The MSB in an accumulator is always stored as the left-most bit regardless of the CPU type. Hence, big and little endianess bit orders imply different bit-naming conventions.

7.3.2 Byte Ordering (Memory)

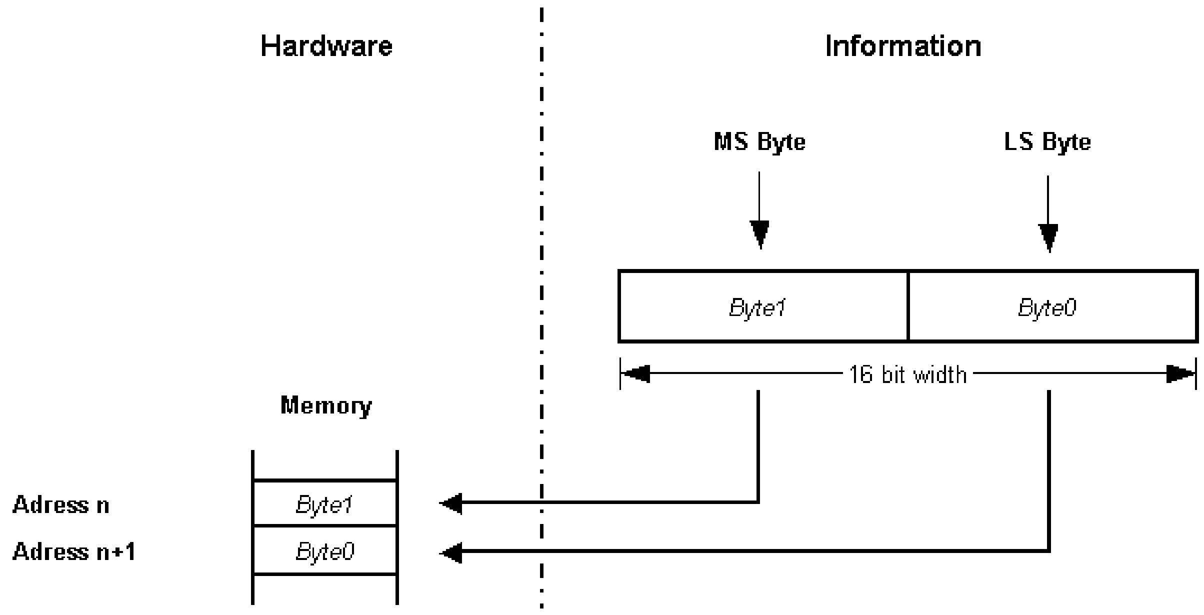
PLATFORM050: In case of big endian byte ordering `CPU_BYTE_ORDER` shall be assigned to `HIGH_BYTE_FIRST` in the platform types header file.

PLATFORM051: In case of little endian byte ordering `CPU_BYTE_ORDER` shall be assigned to `LOW_BYTE_FIRST` in the platform types header file.

Naming convention for illustration:

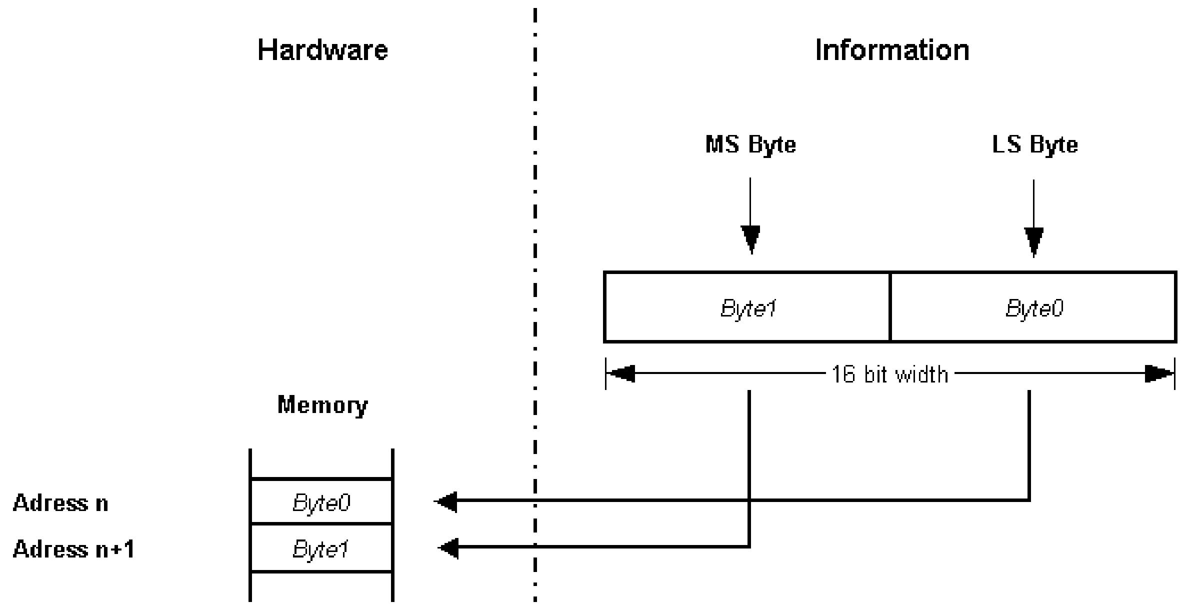
The Most Significant Byte within a 16 bit wide data is named	Byte1.
The Least Significant Byte within a 16 bit wide data is named	Byte0.

Big Endian(HIGH_BYTE_FIRST)



Address	Data	Order
n	Byte1	Most Significant Byte (HIGH_BYTE_FIRST)
n+1	Byte0	Least Significant Byte

Little Endian(LOW_BYTE_FIRST)



Address	Data	Order
n	Byte0	Least Significant Byte (LOW_BYTE_FIRST)
n+1	Byte1	Most Significant Byte

Important Note:
The naming convention Byte0 and Byte1 is not unique and may be different in the manufacturer’s reference documentation for a particular µC.

7.4 Optimized integer data types

PLATFORM005: The optimized AUTOSAR integer data types (`*_least`) shall have at least the size given by the type name, but the types shall be implemented in a way that the best performance on the specific platform is achieved. 'Best performance' is defined in this context as 'least processor cycles for variable access as possible'. Example: on a TC1796, `uint8_least` is mapped to `unsigned int` (32 bit) because access to this type requires less processor cycles than e.g. `unsigned char` (8 bit).

PLATFORM032: The optimized AUTOSAR integer data types (`*_least`) shall only be used with a local scope inside a module. They are not allowed to be used within the API of a module.

PLATFORM033: Operations on the optimized AUTOSAR integer data types (`*_least`) shall not expect a specific size of this type. The size specified by the name is guaranteed, but can be larger. It is not allowed to use rollover mechanisms during counting and shifting.

Examples of usage:

- Loop counters (e.g. maximum loop count = 124 → use `uint8_least`)
- Switch case arguments (e.g. maximum number of states = 17 → use `uint8_least`)

7.5 boolean data type

PLATFORM027: The standard AUTOSAR type `boolean` shall be implemented on basis of an eight bits long unsigned integer.

PLATFORM034: The standard AUTOSAR type `boolean` shall only be used in conjunction with the standard symbols `TRUE` and `FALSE`. For value assignments of variables of type boolean no arithmetic or logical operators (+, ++, -, --, *, /, \, <<, >>, !, ~) must be used. The only allowed form of assignment is

```
boolean var;
…
var = TRUE;
var = FALSE;
```

The only allowed forms of comparison are

```
boolean var;
…
if (var == TRUE)
if (var == FALSE)
if (var != TRUE)
if (var != FALSE)
```

8 API specification

8.1 Imported types

Not applicable.

8.2 Type definitions

Type definitions.PLATFORM061: Concerning the signed integer types, AUTOSAR supports for compiler and target implementation only 2 complement arithmetic. This directly impacts the chosen ranges for these types.

8.2.1 boolean

Type:	Unsigned integer	
Range:	0	FALSE
	1	TRUE
Description:	PLATFORM026: This standard AUTOSAR type shall only be used together with the definitions TRUE and FALSE. See PLATFORM027 for implementation and usage. PLATFORM060: The boolean type shall always be mapped to a platform specific type where pointers can be applied to to enable a passing of parameters via API. There are specific BIT types of some HW platforms which are very efficient but where no pointers can point to.	

8.2.2 uint8

Type:	Unsigned integer	
Range:	0..255 0x00..0xFF	8 bit
Description:	PLATFORM013: This standard AUTOSAR type shall be of 8 bit unsigned.	

8.2.3 uint16

Type:	Unsigned integer	
Range:	0..65535 0x0000..0xFFFF	16 bit
Description:	PLATFORM014: This standard AUTOSAR type shall be of 16 bit unsigned.	

8.2.4 uint32

Type:	Unsigned integer	
Range:	0..4294967295 0x00000000..0xFFFFFFFF	32 bit
Description:	PLATFORM015: This standard AUTOSAR type shall be 32 bit unsigned.	

8.2.5 sint8

Type:	Signed integer	
Range:	-128..+127 0x80..0x7F	7 bit + 1 bit sign
Description:	PLATFORM016: This standard AUTOSAR type shall be 8 bit signed.	

8.2.6 sint16

Type:	Signed integer	
Range:	-32768 ..+32767 0x8000..0x7FFF	15 bit + 1 bit sign
Description:	PLATFORM017: This standard AUTOSAR type shall be 16 bit signed.	

8.2.7 sint32

Type:	Signed integer	
Range:	-2147483648.. +2147483647 0x80000000..0x7FFFFFFF	31 bit + 1 bit sign
Description:	PLATFORM018:	

8.2.8 uint8_least

Type:	Unsigned integer	
Range:	At least 0..255	At least 8 bit
Description:	PLATFORM020: This optimized AUTOSAR type shall be at least of 8 bit unsigned. See PLATFORM005 for implementation and usage.	

8.2.9 uint16_least

Type:	Unsigned integer	
Range:	At least 0..65535	At least 16 bit
Description:	PLATFORM021: This standard AUTOSAR type shall be at least 16 bit unsigned. See PLATFORM005 for implementation and usage.	

8.2.10 uint32_least

Type:	Unsigned integer	
Range:	At least 0..4294967295	At least 32 bit
Description:	PLATFORM022. See PLATFORM005 for implementation and usage.	

8.2.11 sint8_least

Type:	Signed integer	
Range:	At least -128..+127	At least 7 bit + 1 bit sign
Description:	PLATFORM023. See PLATFORM005 for implementation and usage.	

8.2.12 sint16_least

Type:	Signed integer	
Range:	At least -32768 ..+32767	At least 15 bit + 1 bit sign
Description:	PLATFORM024. See PLATFORM005 for implementation and usage.	

8.2.13 sint32_least

Type:	Signed integer	
Range:	At least -2147483648 .. +2147483647	At least 31 bit + 1 bit sign
Description:	PLATFORM025 See PLATFORM005 for implementation and usage.	

8.2.14 float32

Type:	Float	
Range:	-	32 bit
Description:	PLATFORM041	

8.2.15 float64

Type:	Double	
Range:	-	64 bit
Description:	PLATFORM042:	

8.3 Symbol definitions

8.3.1 CPU_TYPE

Symbol	`CPU_TYPE`	
Range	`CPU_TYPE_8`	Indicating a 8 bit processor
	`CPU_TYPE_16`	Indicating a 16 bit processor
	`CPU_TYPE_32`	Indicating a 32 bit processor
Description:	This symbol shall be defined as #define having one of the values CPU_TYPE_8, CPU_TYPE_16 or CPU_TYPE_32 according to the platform.	

8.3.2 CPU_BIT_ORDER

Symbol	`CPU_BIT_ORDER`	
Range	`MSB_FIRST`	The most significant bit is the first bit of the bit field
	`LSB_FIRST`	The least significant bit is the first bit of the bit field
Description:	PLATFORM038: `MSB_FIRST LSB_FIRST`	

8.3.3 CPU_BYTE_ORDER

Symbol	`CPU_BYTE_ORDER`	
Range	`HIGH_BYTE_FIRST`	Within a `uint16`, the high byte is located before the low byte.
	`LOW_BYTE_FIRST`	Within `uint16`, the low byte is located before the high byte.
Description:	PLATFORM039: This symbol shall be defined as #define having one of the values `HIGH_BYTE_FIRST` or `LOW_BYTE_FIRST` according to the platform.	

8.3.4 TRUE, FALSE

Symbol/Value:	TRUE	1
Symbol/Value:	FALSE	0

Description:	PLATFORM054: In case of in-built compiler support of the symbols, redefinitions shall be avoided using a conditional check.
	PLATFORM056: The symbols TRUE and FALSE shall be defined as follows:
	
	`#ifndef TRUE`
	` #define TRUE     1`
	`#endif`
	
	`#ifndef FALSE`
	` #define FALSE    0`
	`#endif`
	PLATFORM055: These symbols shall only be used in conjunction with the `boolean` type defined in Platform_Types.h.	

8.4 Function definitions

Not applicable.

8.5 Call-back notifications

Not applicable.

8.6 Scheduled functions

Not applicable.

8.7 Expected Interfaces

Not applicable.

9 Sequence diagrams

Not applicable.

10 Configuration specification

10.1 Published parameters

Published information contains data defined by the implementer of the SW module that does not change when the module is adapted (i.e. configured) to the actual HW/SW environment. It thus contains version and manufacturer information.

The standard common published information like

vendorId (PLATFORM_VENDOR_ID),
moduleId (PLATFORM_MODULE_ID),
arMajorVersion (PLATFORM_AR_MAJOR_VERSION),
arMinorVersion (PLATFORM_AR_MINOR_VERSION),
arPatchVersion (PLATFORM_AR_PATCH_VERSION),
swMajorVersion (PLATFORM_SW_MAJOR_VERSION),
swMinorVersion (PLATFORM_SW_MINOR_VERSION),
swPatchVersion (PLATFORM_SW_PATCH_VERSION),
vendorApiInfix (PLATFORM_VENDOR_API_INFIX)

is provided in the BSW Module Description Template (see [2] Figure 4.1 and Figure 7.1).

Additional published parameters are listed below if applicable for this module.

11 Changes to Release 1

11.1 Deleted SWS Items

PLATFORM052
PLATFORM053
PLATFORM040
PLATFORM047

11.2 Replaced SWS Items

Not applicable

11.3 Changed SWS Items

PLATFORM012

11.4 Added SWS Items

Not applicable

12 Annex

12.1 Type definitions – general

PLATFORM057: The platform type files for all platforms shall contain the following symbols:

```
#define CPU_TYPE_8        8
#define CPU_TYPE_16       16
#define CPU_TYPE_32       32

#define MSB_FIRST         0
#define LSB_FIRST         1

#define HIGH_BYTE_FIRST   0
#define LOW_BYTE_FIRST    1
```

12.2 Type definitions – S12X

PLATFORM006: The platform types for Freescale S12X shall have the following mapping to the ANSI C types:

Symbols:
```
#define CPU_TYPE            CPU_TYPE_16
#define CPU_BIT_ORDER       LSB_FIRST
#define CPU_BYTE_ORDER      HIGH_BYTE_FIRST
```

Types:
```
typedef unsigned char       boolean;

typedef signed char         sint8;
typedef unsigned char       uint8;
typedef signed short        sint16;
typedef unsigned short      uint16;
typedef signed long         sint32;
typedef unsigned long       uint32;

typedef signed char         sint8_least;
typedef unsigned char       uint8_least;
typedef signed short        sint16_least;
typedef unsigned short      uint16_least;
typedef signed long         sint32_least;
typedef unsigned long       uint32_least;

typedef float               float32;
typedef double              float64;
```

12.3 Type definitions – ST10

PLATFORM007: The platform types for ST Microelectronics ST10 shall have the following mapping to the ANSI C types:

Symbols:
```
#define CPU_TYPE            CPU_TYPE_16
#define CPU_BIT_ORDER       LSB_FIRST
#define CPU_BYTE_ORDER      LOW_BYTE_FIRST
```

Types:
```
typedef unsigned char       boolean;

typedef signed char         sint8;
typedef unsigned char       uint8;
typedef signed short        sint16;
typedef unsigned short      uint16;
typedef signed long         sint32;
typedef unsigned long       uint32;

typedef unsigned short      uint8_least;
typedef unsigned short      uint16_least;
typedef unsigned long       uint32_least;
typedef signed short        sint8_least;
typedef signed short        sint16_least;
typedef signed long         sint32_least;

typedef float               float32;
typedef double              float64;
```

12.4 Type definitions – ST30

PLATFORM008: The platform types for STMicroelectronics ST30 shall have the following mapping to the ANSI C types:

Symbols:
```
#define CPU_TYPE            CPU_TYPE_32
#define CPU_BIT_ORDER       LSB_FIRST
#define CPU_BYTE_ORDER      LOW_BYTE_FIRST
```

Types:
```
typedef unsigned char       boolean;

typedef signed char         sint8;
typedef unsigned char       uint8;
typedef signed short        sint16;
typedef unsigned short      uint16;
typedef signed long         sint32;
typedef unsigned long       uint32;
typedef unsigned long       uint8_least;
typedef unsigned long       uint16_least;
typedef unsigned long       uint32_least;
typedef signed long         sint8_least;
typedef signed long         sint16_least;
typedef signed long         sint32_least;

typedef float               float32;
typedef double              float64;
```

12.5 Type definitions – V850

PLATFORM009: The platform types for NEC V850 shall have the following mapping to the ANSI C types:

Symbols:

```
#define CPU_TYPE            CPU_TYPE_32
#define CPU_BIT_ORDER       LSB_FIRST
#define CPU_BYTE_ORDER      LOW_BYTE_FIRST
```

Types:

```
typedef unsigned char       boolean;

typedef signed char         sint8;
typedef unsigned char       uint8;
typedef signed short        sint16;
typedef unsigned short      uint16;
typedef signed long         sint32;
typedef unsigned long       uint32;

typedef unsigned long       uint8_least;
typedef unsigned long       uint16_least;
typedef unsigned long       uint32_least;
typedef signed long         sint8_least;
typedef signed long         sint16_least;
typedef signed long         sint32_least;

typedef float               float32;
typedef double              float64;
```

12.6 Type definitions – MPC5554

PLATFORM010: The platform types for Freescale MPC5554 shall have the following mapping to the ANSI C types:

Symbols:

```
#define CPU_TYPE            CPU_TYPE_32
#define CPU_BIT_ORDER       MSB_FIRST
```

```
#define CPU_BYTE_ORDER      HIGH_BYTE_FIRST
```

Types:

```
typedef unsigned char       boolean;

typedef signed char         sint8;
typedef unsigned char       uint8;
typedef signed short        sint16;
typedef unsigned short      uint16;
typedef signed long         sint32;
typedef unsigned long       uint32;

typedef unsigned long       uint8_least;
typedef unsigned long       uint16_least;
typedef unsigned long       uint32_least;
typedef signed long         sint8_least;
typedef signed long         sint16_least;
typedef signed long         sint32_least;

typedef float               float32;
typedef double              float64;
```

12.7 Type definitions – TC1796/TC1766

PLATFORM011: The platform types for Infineon TC1796/TC1766 shall have the following mapping to the ANSI C types:

Symbols:

```
#define CPU_TYPE            CPU_TYPE_32
#define CPU_BIT_ORDER       LSB_FIRST
#define CPU_BYTE_ORDER      LOW_BYTE_FIRST
```

Types:

```
typedef unsigned char       boolean;

typedef signed char         sint8;
typedef unsigned char       uint8;
typedef signed short        sint16;
typedef unsigned short      uint16;
typedef signed long         sint32;
typedef unsigned long       uint32;

typedef unsigned long       uint8_least;
typedef unsigned long       uint16_least;
typedef unsigned long       uint32_least;
typedef signed long         sint8_least;
typedef signed long         sint16_least;
typedef signed long         sint32_least;

typedef float               float32;
typedef double              float64;
```

12.8 Type definitions – MB91F

PLATFORM019: The platform types for Fujitsu MB91F shall have the following mapping to the ANSI C types:

Symbols:

```
#define CPU_TYPE            CPU_TYPE_32
#define CPU_BIT_ORDER       LSB_FIRST
#define CPU_BYTE_ORDER      HIGH_BYTE_FIRST
```

Types:

```
typedef unsigned char       boolean;

typedef signed char         sint8;
typedef unsigned char       uint8;
typedef signed short        sint16;
typedef unsigned short      uint16;
typedef signed long         sint32;
typedef unsigned long       uint32;

typedef unsigned long       uint8_least;
typedef unsigned long       uint16_least;
typedef unsigned long       uint32_least;
typedef signed long         sint8_least;
typedef signed long         sint16_least;
typedef signed long         sint32_least;

typedef float               float32;
typedef double              float64;
```

12.9 Type definitions – M16C/M32C

PLATFORM058: The platform types for Renesas M16C and M32C shall have the following mapping to the ANSI C types:

Symbols:

```
#define CPU_TYPE            CPU_TYPE_16
#define CPU_BIT_ORDER       LSB_FIRST
#define CPU_BYTE_ORDER      LOW_BYTE_FIRST
```

Types:

```
typedef unsigned char       boolean;

typedef signed char         sint8;
typedef unsigned char       uint8;
typedef signed short        sint16;
typedef unsigned short      uint16;
typedef signed long         sint32;
typedef unsigned long       uint32;

typedef unsigned short      uint8_least;
typedef unsigned short      uint16_least;
typedef unsigned long       uint32_least;
typedef signed short        sint8_least;
typedef signed short        sint16_least;
typedef signed long         sint32_least;

typedef float               float32;
typedef double              float64;
```

12.10Type definitions – SHx

PLATFORM059: The platform types for Renesas SHx shall have the following mapping to the ANSI C types:

Symbols:

```
#define CPU_TYPE            CPU_TYPE_32
#define CPU_BIT_ORDER       LSB_FIRST
#define CPU_BYTE_ORDER      HIGH_BYTE_FIRST
```

Types:

```
typedef unsigned char       boolean;

typedef signed char         sint8;
typedef unsigned char       uint8;
typedef signed short        sint16;
typedef unsigned short      uint16;
typedef signed int          sint32;
typedef unsigned int        uint32;

typedef unsigned long       uint8_least;
typedef unsigned long       uint16_least;
typedef unsigned long       uint32_least;
typedef signed long         sint8_least;
typedef signed long         sint16_least;
typedef signed long         sint32_least;

typedef float               float32;
typedef double              float64;
```