

|                                   |                                    |
|-----------------------------------|------------------------------------|
| <b>Document Title</b>             | <b>Specification of Module XCP</b> |
| <b>Document Owner</b>             | AUTOSAR                            |
| <b>Document Responsibility</b>    | AUTOSAR                            |
| <b>Document Identification No</b> | 412                                |
| <b>Document Classification</b>    | Standard                           |
|                                   |                                    |
| <b>Document Status</b>            | Final                              |
| <b>Part of AUTOSAR Standard</b>   | Classic Platform                   |
| <b>Part of Standard Release</b>   | 4.3.0                              |

| <b>Document Change History</b> |                |                                  |   |
|--------------------------------|----------------|----------------------------------|---|
| <b>Date</b>                    | <b>Release</b> | <b>Changed by</b>                | <b>Change Description</b>   |
| 2016-11-30                     | 4.3.0          | AUTOSAR<br>Release<br>Management | <ul style="list-style-type: none"> <li>Editorial corrections.</li> <li>Harmonize descriptions of identical API functions.</li> <li>Removal of unused artifacts and obsolete elements.</li> </ul>  |
| 2015-07-31                     | 4.2.2          | AUTOSAR<br>Release<br>Management | <ul style="list-style-type: none"> <li>Debugging support marked as obsolete</li> <li>Editorial corrections.</li> <li>Modifications in some parameters multiplicity of XcpDaqList container.</li> </ul>  |
| 2014-10-31                     | 4.2.1          | AUTOSAR<br>Release<br>Management | <ul style="list-style-type: none"> <li>Editorial corrections.</li> <li>Minor corrections.</li> <li>Changed the multiplicity of XcpEventChannelTriggeredDaqList Ref.</li> <li>Remove limitation "Flash Programming for ECU development purposes".</li> </ul>   |
| 2014-03-31                     | 4.1.3          | AUTOSAR<br>Release<br>Management | <ul style="list-style-type: none"> <li>Editorial correction for faulty references links.</li> <li>Minor editorial correction for SWS_Xcp_00841, SWS_Xcp_00844.</li> <li>Changed Xcp_RxIndication argument from PduInfoType* to const PduInfoType*.</li> </ul> |
| 2013-10-31                     | 4.1.2          | AUTOSAR<br>Release<br>Management | <ul style="list-style-type: none"> <li>Minor corrections</li> <li>Editorial changes</li> <li>Removed chapter(s) on change documentation</li> </ul>  |

| Document Change History |         |                        |   |
|-------------------------|---------|------------------------|---|
| Date                    | Release | Changed by             | Change Description  |
| 2013-03-15              | 4.1.1   | AUTOSAR Administration | <ul style="list-style-type: none"><li>• Reclassify XCP_E_INIT_FAILED from class production error to development</li></ul>   |
| 2013-03-15              | 4.1.1   | AUTOSAR Administration | <ul style="list-style-type: none"><li>• Added parameters for Event Channel and Timestamp configuration</li><li>• Added possibility to calculate memory consumption for ODT (DAQ &amp; STIM)</li><li>• Restructuring configuration parameters for static &amp; dynamic ODT</li><li>• Added support for deactivation of transmission capabilities</li></ul> |
| 2011-12-22              | 4.0.3   | AUTOSAR Administration | <ul style="list-style-type: none"><li>• Add chapter 7.8 (Version check), RTE limitation, OS Counter Ref</li><li>• Remove InstanceID and known limitation (OS)</li></ul>   |
| 2010-09-30              | 3.1.5   | AUTOSAR Administration | <ul style="list-style-type: none"><li>• Initial Release</li></ul>   |

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## 1 Introduction and functional overview

This specification specifies the functionality, API and the configuration of the AUTOSAR Basic Software module XCP

XCP is a protocol description (ASAM standard) between a master (tool) and a slave (device), which provides the following basic features:

- Synchronous data acquisition (measurement)
- Synchronous data stimulation (for rapid prototyping)
- Online memory calibration (read / write access)
- Calibration data page initialization and switching
- Flash Programming for ECU development purposes
- Every feature is optional and the access can be restricted
- Various communications busses are supported

XCP was designed according to the following principles:

- Minimal Slave resource consumption (RAM, ROM, runtime)
- Efficient communication
- Simple Slave implementation

## 2 Acronyms and abbreviations

| Acronym: | Description:  |
|----------|---|
| AUTOSAR  | <b>AUT</b> omotive <b>O</b> pen <b>S</b> ystem <b>AR</b> chitecture                                 |
| A2L      | File Extension for an ASAM 2MC Language File  |
| ASAM     | <b>A</b> ssociation for <b>S</b> tandardization of <b>A</b> utomation and <b>M</b> easuring Systems |
| BSW      | <b>B</b> asic <b>S</b> oftware  |
| CAN      | <b>C</b> ontroller <b>A</b> rea <b>N</b> etwork   |
| CanIf    | <b>CAN</b> Interface  |
| CTO      | <b>C</b> ommand <b>T</b> ransfer <b>O</b> bject   |
| DAQ      | <b>D</b> ata <b>AcQ</b> uisition, Data AcQuisition Packet   |
| DTO      | <b>D</b> ata <b>T</b> ransfer <b>O</b> bject  |
| ECU      | <b>E</b> lectronic <b>C</b> ontrol <b>U</b> nit   |
| Frlf     | <b>F</b> lex <b>R</b> ay Interface  |
| HIS      | <b>H</b> ersteller <b>I</b> nitiative <b>S</b> oftware  |
| LPDU     | Data Link Layer PDU   |
| MCD      | <b>M</b> easurement <b>C</b> alibration and <b>D</b> iagnostics                                     |
| MISRA    | <b>M</b> otor <b>I</b> ndustry <b>S</b> oftware <b>R</b> eliability <b>A</b> ssociation             |
| ODT      | <b>O</b> bject <b>D</b> escriptor <b>T</b> able   |
| PDU      | <b>P</b> rotocol <b>D</b> ata <b>U</b> nit  |
| RAM      | <b>R</b> andom <b>A</b> ccess <b>M</b> emory  |
| ROM      | <b>R</b> ead <b>O</b> nly <b>M</b> emory  |
| SchM     | <b>S</b> chedule <b>M</b> anager  |
| SVN      | <b>S</b> ub <b>v</b> ersion   |
| SRS      | <b>S</b> oftware <b>R</b> equirements <b>S</b> pecification   |
| STIM     | Data <b>S</b> timulation packet   |
| SW       | <b>S</b> oftware  |
| SWS      | <b>S</b> oftware <b>S</b> pecification  |
| TCP/IP   | <b>T</b> ransfer <b>C</b> ontrol <b>P</b> rotocol / Internet <b>P</b> rotocol                       |
| TS       | <b>T</b> ime <b>S</b> tamp  |
| UDP/IP   | <b>U</b> ser <b>D</b> atagram <b>P</b> rotocol / Internet <b>P</b> rotocol                          |
| URL      | <b>U</b> niform <b>R</b> esource <b>L</b> ocator  |
| XCP      | Universal Calibration Protocol  |
| XML      | <b>E</b> xtensible <b>M</b> arkup <b>L</b> anguage  |
| ISR      | <b>I</b> nterrupt <b>S</b> ervice <b>R</b> outine   |
| DET      | <b>D</b> efault <b>E</b> rror <b>T</b> racer (AUTOSAR BSW module)                                   |

## 3 Related documentation

### 3.1 Input documents

- [0] Basic Software Module Description Template  
AUTOSAR\_TPS\_BSWModuleDescriptionTemplate.pdf
- [1] List of Basic Software Modules  
AUTOSAR\_TR\_BSWModuleList.pdf
- [2] AUTOSAR Layered Software Architecture  
AUTOSAR\_EXP\_LayeredSoftwareArchitecture.pdf
- [3] General Requirements on Basic Software Modules  
AUTOSAR\_SRS\_BSWGeneral.pdf
- [4] Specification of RTE (BSW Scheduler)  
AUTOSAR\_SWS\_RTE.pdf
- [5] Specification of ECU Configuration  
AUTOSAR\_TPS\_ECUConfiguration
- [6] Specification of Memory Mapping  
AUTOSAR\_SWS\_MemoryMapping.pdf
- [7] Specification of FlexRay Interface  
AUTOSAR\_SWS\_FlexRayInterface.pdf
- [8] Specification of CAN Interface  
AUTOSAR\_SWS\_CANInterface
- [9] Specification of Socket Adaptor  
AUTOSAR\_SWS\_SocketAdaptor
- [10] Requirements on XCP Module  
AUTOSAR\_SRS\_XCP.pdf
- [11] AUTOSAR OS Specification  
AUTOSAR\_SWS\_OS
- [12] General Specification of Basic Software Modules  
AUTOSAR\_SWS\_BSWGeneral.pdf

#### 3.1.1 Related standards and norms

- [13] ASAM XCP – The Universal Measurement and Calibration Protocol:  
ASAM\_XCP\_Part1-Overview - Version 1.1



- [14] ASAM XCP – Transport Layer Specification XCP on CAN:  
ASAM\_XCP\_Part3 Transport-Layer-Specification\_XCPonCAN - Version 1.1
- [15] ASAM XCP – Transport Layer Specification XCP on Ethernet:  
ASAM\_XCP\_Part3-Transport-Layer-Specification\_XCPonEthernet  
(TCP\_IP&UDP\_IP) – Version 1.1
- [16] ASAM XCP – Transport Layer Specification XCP on FlexRay:  
ASAM\_XCP\_Part3-Transport-Layer-Specification\_XCPonFlexRay-Version 1.1

## 3.2 Related specification

AUTOSAR provides a General Specification on Basic Software modules [12] (SWS BSW General), which is also valid for XCP.

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

## 4 Constraints and assumptions

### 4.1 Limitations

The following XCP features are currently out of scope:

- The SET\_DAQ\_ID command according to the XCP CAN Transport Layer Specification is not part of the AUTOSAE XCP module”
- Currently, the AUTOSAR RTE does not offer APIs for direct communication with XCP
- For further details concerning the supported feature set, please refer to [13]
- NAX is only configurable through the ASAM configuration file A2L.

Please note:

For the communications bus LIN, no ASAM XCP is specified.

### 4.2 Applicability to car domains

n/a

## **5 Dependencies to other modules**

This section describes the relations to other modules and files within the AUTOSAR basic software architecture. It contains brief descriptions of configuration information and services, which are required by the XCP module from other modules.

### **5.1 AUTOSAR RTE (BSW Scheduler)**

The BSW Scheduler calls the main functions of the Xcp, which are necessary for the cyclic processes of the Xcp.

### **5.2 AUTOSAR FlexRay Interface**

The FlexRay Interface is used to transmit and receive XCP PDUs via FlexRay.

### **5.3 AUTOSAR CAN Interface**

The CAN Interface is used to transmit and receive XCP PDUs via CAN.

### **5.4 AUTOSAR SocketAdaptor**

The SocketAdaptor is used to transmit and receive XCP PDUs via Ethernet.

### **5.5 AUTOSAR RTE**

The RTE is used for copying calibration parameters from ROM/FLASH to RAM and to use the double pointer method

### **5.6 AUTOSAR OS**

In order to be able to use the time stamped feature of XCP, an AUTOSAR OS Counter is used.

### **5.7 AUTOSAR Diagnostic Event Manager**

In order to be able to report production errors, the XCP has to have access to the Diagnostic Event Manager.

## 5.8 AUTOSAR Default Error Tracer

In order to be able to report default errors, the XCP has to have access to the error hook of the Default Error Tracer.

## 5.9 File structure

### 5.9.1 Code file structure

#### [SWS\_Xcp\_00501]

[ The code file structure shall not be defined within this specification completely. At this point it shall be pointed out that the code-file structure shall include the following files named:

- Xcp.c – general source code file of the module XCP
- Xcp\_Cfg.c – for pre-compile time configurable parameters
- Xcp\_Lcfg.c – for link time configurable parameters and
- Xcp\_PBcfg.c – for post build time configurable parameters. ]  
(SRS\_BSW\_00419, SRS\_BSW\_00383, SRS\_BSW\_00346,  
SRS\_BSW\_00158)

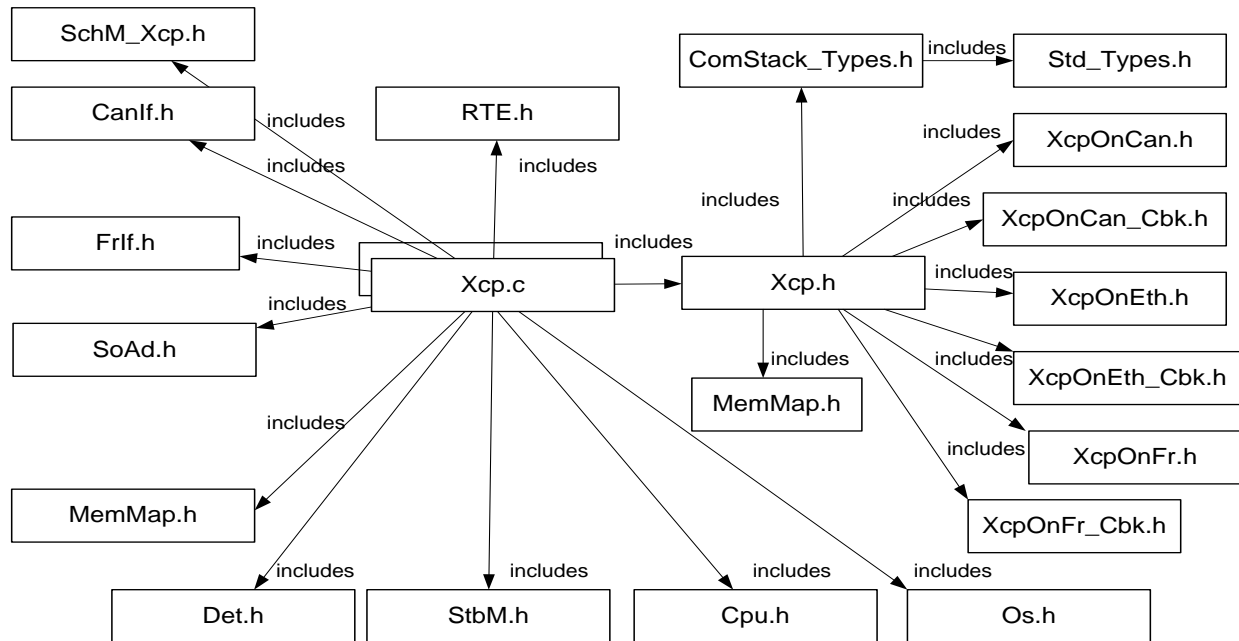
These files shall contain all link time and post-build time configurable parameters.

#### [SWS\_Xcp\_00500]

[ The module XCP shall access the location of the API of all used modules for pre-compile time configuration by either using of external declaration in includes of the used modules' public header files <x>.h or by the code file Xcp\_Cfg.c. ] ()

### 5.9.2 Header file structure

#### [SWS\_Xcp\_00502] [



**Figure 1: XCP Header File Structure**

] (SRS\_BSW\_00381, SRS\_BSW\_00412, SRS\_BSW\_00409, SRS\_BSW\_00301)

**[SWS\_Xcp\_00505]**

[ The implementation of the XCP module shall provide the header file `Xcp.h`, which is the main module interface file. It shall contain all types and function prototypes required by the XCP module's environment.] (SRS\_BSW\_00302)

**[SWS\_Xcp\_00506]**

[ The implementation of the XCP on CAN module shall provide the header file `XcpOnCan_Cfg.h` that shall contain the pre-compile-time configuration parameters.]  
] ()

**[SWS\_Xcp\_00507]** [

The implementation of the XCP on FlexRay module shall provide the header file `XcpOnFr_Cfg.h` that shall contain the pre-compile-time configuration parameters.]  
()

**[SWS\_Xcp\_00508]** [

The implementation of the XCP on Ethernet module shall provide the header file `XcpOnEth_Cfg.h` that shall contain the pre-compile-time configuration parameters.]  
] ()

## 6 Requirements traceability

| Requirement   | Description  | Satisfied by                                      |
|---------------|--|---|
| SRS_BSW_00003 | All software modules shall provide version and identification information  | SWS_Xcp_00807                                     |
| SRS_BSW_00005 | Modules of the $\mu$ C Abstraction Layer (MCAL) may not have hard coded horizontal interfaces  | SWS_Xcp_00999                                     |
| SRS_BSW_00006 | The source code of software modules above the $\mu$ C Abstraction Layer (MCAL) shall not be processor and compiler dependent.                  | SWS_Xcp_00999                                     |
| SRS_BSW_00009 | All Basic SW Modules shall be documented according to a common standard.   | SWS_Xcp_00999                                     |
| SRS_BSW_00010 | The memory consumption of all Basic SW Modules shall be documented for a defined configuration for all supported platforms.                    | SWS_Xcp_00999                                     |
| SRS_BSW_00101 | The Basic Software Module shall be able to initialize variables and hardware in a separate initialization function                             | SWS_Xcp_00803                                     |
| SRS_BSW_00158 | All modules of the AUTOSAR Basic Software shall strictly separate configuration from implementation  | SWS_Xcp_00501                                     |
| SRS_BSW_00159 | All modules of the AUTOSAR Basic Software shall support a tool based configuration   | SWS_Xcp_00102                                     |
| SRS_BSW_00161 | The AUTOSAR Basic Software shall provide a microcontroller abstraction layer which provides a standardized interface to higher software layers | SWS_Xcp_00999                                     |
| SRS_BSW_00162 | The AUTOSAR Basic Software shall provide a hardware abstraction layer  | SWS_Xcp_00999                                     |
| SRS_BSW_00164 | The Implementation of interrupt service routines shall be done by the Operating System, complex drivers or modules                             | SWS_Xcp_00999                                     |
| SRS_BSW_00167 | All AUTOSAR Basic Software Modules shall provide configuration rules and constraints to enable plausibility checks                             | SWS_Xcp_00103,<br>SWS_Xcp_00104,<br>SWS_Xcp_00105 |
| SRS_BSW_00168 | SW components shall be tested by a function defined in a common API in the Basis-SW  | SWS_Xcp_00999                                     |
| SRS_BSW_00170 | The AUTOSAR SW Components shall provide information about their dependency from faults, signal qualities, driver demands                       | SWS_Xcp_00999                                     |
| SRS_BSW_00171 | Optional functionality of a Basic-SW component that is not required in the ECU shall be configurable at pre-compile-time                       | SWS_Xcp_00999                                     |
| SRS_BSW_00172 | The scheduling strategy that is built inside the Basic Software Modules shall be compatible with the strategy used in the system               | SWS_Xcp_00999                                     |
| SRS_BSW_00301 | All AUTOSAR Basic Software Modules shall only import the necessary information   | SWS_Xcp_00502                                     |
| SRS_BSW_00302 | All AUTOSAR Basic Software Modules shall   | SWS_Xcp_00505                                     |

|               |   |               |
|---------------|---|---------------|
|               | only export information needed by other modules   |               |
| SRS_BSW_00306 | AUTOSAR Basic Software Modules shall be compiler and platform independent   | SWS_Xcp_00999 |
| SRS_BSW_00309 | All AUTOSAR Basic Software Modules shall indicate all global data with read-only purposes by explicitly assigning the const keyword | SWS_Xcp_00999 |
| SRS_BSW_00312 | Shared code shall be reentrant  | SWS_Xcp_00999 |
| SRS_BSW_00314 | All internal driver modules shall separate the interrupt frame definition from the service routine                                  | SWS_Xcp_00999 |
| SRS_BSW_00318 | Each AUTOSAR Basic Software Module file shall provide version numbers in the header file  | SWS_Xcp_00807 |
| SRS_BSW_00321 | The version numbers of AUTOSAR Basic Software Modules shall be enumerated according specific rules                                  | SWS_Xcp_00999 |
| SRS_BSW_00325 | The runtime of interrupt service routines and functions that are running in interrupt context shall be kept short                   | SWS_Xcp_00999 |
| SRS_BSW_00327 | Error values naming convention  | SWS_Xcp_00763 |
| SRS_BSW_00328 | All AUTOSAR Basic Software Modules shall avoid the duplication of code  | SWS_Xcp_00999 |
| SRS_BSW_00330 | It shall be allowed to use macros instead of functions where source code is used and runtime is critical                            | SWS_Xcp_00999 |
| SRS_BSW_00331 | All Basic Software Modules shall strictly separate error and status information   | SWS_Xcp_00999 |
| SRS_BSW_00333 | For each callback function it shall be specified if it is called from interrupt context or not                                      | SWS_Xcp_00999 |
| SRS_BSW_00335 | Status values naming convention   | SWS_Xcp_00999 |
| SRS_BSW_00336 | Basic SW module shall be able to shutdown   | SWS_Xcp_00999 |
| SRS_BSW_00341 | Module documentation shall contains all needed informations   | SWS_Xcp_00999 |
| SRS_BSW_00344 | BSW Modules shall support link-time configuration   | SWS_Xcp_00741 |
| SRS_BSW_00345 | BSW Modules shall support pre-compile configuration   | SWS_Xcp_00742 |
| SRS_BSW_00346 | All AUTOSAR Basic Software Modules shall provide at least a basic set of module files   | SWS_Xcp_00501 |
| SRS_BSW_00347 | A Naming separation of different instances of BSW drivers shall be in place   | SWS_Xcp_00999 |
| SRS_BSW_00358 | The return type of init() functions implemented by AUTOSAR Basic Software Modules shall be void                                     | SWS_Xcp_00803 |
| SRS_BSW_00360 | AUTOSAR Basic Software Modules callback functions are allowed to have parameters  | SWS_Xcp_00999 |
| SRS_BSW_00371 | The passing of function pointers as API parameter is forbidden for all AUTOSAR Basic Software Modules                               | SWS_Xcp_00999 |

|               |  |               |
|---------------|--|---------------|
| SRS_BSW_00373 | The main processing function of each AUTOSAR Basic Software Module shall be named according the defined convention                             | SWS_Xcp_00823 |
| SRS_BSW_00374 | All Basic Software Modules shall provide a readable module vendor identification   | SWS_Xcp_00807 |
| SRS_BSW_00375 | Basic Software Modules shall report wake-up reasons  | SWS_Xcp_00999 |
| SRS_BSW_00377 | A Basic Software Module can return a module specific types   | SWS_Xcp_00999 |
| SRS_BSW_00379 | All software modules shall provide a module identifier in the header file and in the module XML description file.                              | SWS_Xcp_00807 |
| SRS_BSW_00381 | The pre-compile time parameters shall be placed into a separate configuration header file  | SWS_Xcp_00502 |
| SRS_BSW_00383 | The Basic Software Module specifications shall specify which other configuration files from other modules they use at least in the description | SWS_Xcp_00501 |
| SRS_BSW_00401 | Documentation of multiple instances of configuration parameters shall be available   | SWS_Xcp_00999 |
| SRS_BSW_00402 | Each module shall provide version information  | SWS_Xcp_00807 |
| SRS_BSW_00404 | BSW Modules shall support post-build configuration   | SWS_Xcp_00742 |
| SRS_BSW_00405 | BSW Modules shall support multiple configuration sets  | SWS_Xcp_00803 |
| SRS_BSW_00407 | Each BSW module shall provide a function to read out the version information of a dedicated module implementation                              | SWS_Xcp_00807 |
| SRS_BSW_00409 | All production code error ID symbols are defined by the Dem module and shall be retrieved by the other BSW modules from Dem configuration      | SWS_Xcp_00502 |
| SRS_BSW_00410 | Compiler switches shall have defined values  | SWS_Xcp_00999 |
| SRS_BSW_00411 | All AUTOSAR Basic Software Modules shall apply a naming rule for enabling/disabling the existence of the API                                   | SWS_Xcp_00807 |
| SRS_BSW_00412 | References to c-configuration parameters shall be placed into a separate h-file  | SWS_Xcp_00502 |
| SRS_BSW_00413 | An index-based accessing of the instances of BSW modules shall be done   | SWS_Xcp_00999 |
| SRS_BSW_00414 | Init functions shall have a pointer to a configuration structure as single parameter   | SWS_Xcp_00803 |
| SRS_BSW_00415 | Interfaces which are provided exclusively for one module shall be separated into a dedicated header file                                       | SWS_Xcp_00999 |
| SRS_BSW_00416 | The sequence of modules to be initialized shall be configurable  | SWS_Xcp_00999 |
| SRS_BSW_00417 | Software which is not part of the SW-C shall report error events only after the DEM is fully operational.                                      | SWS_Xcp_00999 |
| SRS_BSW_00419 | If a pre-compile time configuration parameter is   | SWS_Xcp_00501 |

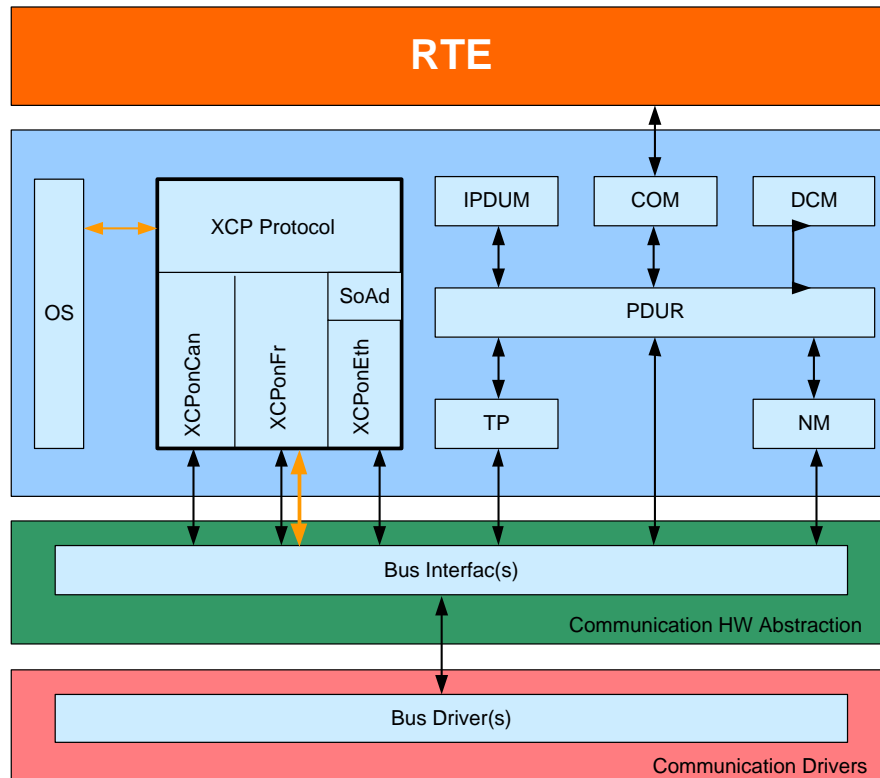


|               |  |   |
|---------------|--|---|
|               | implemented as "const" it should be placed into a separate c-file  |   |
| SRS_BSW_00423 | BSW modules with AUTOSAR interfaces shall be describable with the means of the SW-C Template                           | SWS_Xcp_00999   |
| SRS_BSW_00424 | BSW module main processing functions shall not be allowed to enter a wait state  | SWS_Xcp_00823   |
| SRS_BSW_00425 | The BSW module description template shall provide means to model the defined trigger conditions of schedulable objects | SWS_Xcp_00999   |
| SRS_BSW_00426 | BSW Modules shall ensure data consistency of data which is shared between BSW modules                                  | SWS_Xcp_00999   |
| SRS_BSW_00427 | ISR functions shall be defined and documented in the BSW module description template                                   | SWS_Xcp_00999   |
| SRS_BSW_00428 | A BSW module shall state if its main processing function(s) has to be executed in a specific order or sequence         | SWS_Xcp_00999   |
| SRS_BSW_00432 | Modules should have separate main processing functions for read/receive and write/transmit data path                   | SWS_Xcp_00999   |
| SRS_BSW_00433 | Main processing functions are only allowed to be called from task bodies provided by the BSW Scheduler                 | SWS_Xcp_00823   |
| SRS_Xcp_29001 | The AUTOSAR XCP module shall be located above the bus interfaces / Socket Adaptor                                      | SWS_Xcp_00701   |
| SRS_Xcp_29002 | The AUTOSAR XCP shall make use of the data transmit- and receive APIs of the Bus Interfaces                            | SWS_Xcp_00712,<br>SWS_Xcp_00714,<br>SWS_Xcp_00720,<br>SWS_Xcp_00734 |
| SRS_Xcp_29003 | The AUTOSAR XCP messages shall be identified by unique PDU-IDs   | SWS_Xcp_00702   |
| SRS_Xcp_29004 | The XCP Specification Version 1.1 shall be used  | SWS_Xcp_00703   |
| SRS_Xcp_29005 | XCP on CAN shall be supported  | SWS_Xcp_00713   |
| SRS_Xcp_29006 | XCP on FlexRay shall be supported  | SWS_Xcp_00719   |
| SRS_Xcp_29007 | XCP on Ethernet shall be supported   | SWS_Xcp_00733   |
| SRS_Xcp_29008 | The code generator of the XCP Module shall generate the A2L IF_DATA section  | SWS_Xcp_00853,<br>SWS_Xcp_00999                                     |
| SRS_Xcp_29009 | The slave shall transfer the contents of the elements defined in each ODT of the DAQ-list to the master                | SWS_Xcp_00705   |
| SRS_Xcp_29010 | Synchronous Data Stimulation shall be the inverse mode of Synchronous Data Acquisition                                 | SWS_Xcp_00707   |
| SRS_Xcp_29012 | The XCP master shall already send the next request before having received the response on the previous request         | SWS_Xcp_00710   |
| SRS_Xcp_29013 | It shall be possible to configure the DAQ Lists dynamically  | SWS_Xcp_00706   |
| SRS_Xcp_29014 | It shall be possible to transmit a timestamp within the XCP packet   | SWS_Xcp_00709   |

|               |   |                                 |
|---------------|---|---------------------------------|
| SRS_Xcp_29015 | It shall be possible to bypass data by making use of Synchronous Data Acquisition and Synchronous Data Stimulation simultaneously | SWS_Xcp_00761                   |
| SRS_Xcp_29016 | The feature "Seed&Key" shall be used for protection handling purpose  | SWS_Xcp_00766                   |
| SRS_Xcp_29017 | The AUTOSAR XCP module shall implement an interface for initialization.   | SWS_Xcp_00803                   |
| SRS_Xcp_29018 | Page switching shall be supported   | SWS_Xcp_00852                   |
| SRS_Xcp_29019 | DAQ configuration storing with power-up data transfer (RESUME mode) shall be supported  | SWS_Xcp_00854                   |
| SRS_Xcp_29020 | Flash Programming for ECU development purposes  | SWS_Xcp_00855,<br>SWS_Xcp_00856 |

## 7 Functional specification

The specification of the module XCP shall define all parameters and interfaces, which are required to use the ASAM XCP protocol specification within an AUTOSAR environment.



**Figure 2: Description**

Black arrows: Data Path (Signals/Pdus)  
Orange arrows: Control Path (FlexRay Interface)

[SWS\_Xcp\_00701]

The AUTOSAR XCP Module be located above the bus specific Interfaces in case of FlexRay and Can. In case of Ethernet, the AUTOSAR XCP module shall be located above the Socket Adaptor.] (SRS\_Xcp\_29001)

[SWS\_Xcp\_00702]

For transmitting and receiving of XCP messages, unique PDU-IDs shall be used. ] (SRS\_Xcp\_29003)

[SWS\_Xcp\_00703]

The AUTOSAR XCP Module shall support the ASAM XCP Specification Version 1.1. ] (SRS\_Xcp\_29004)

[SWS\_Xcp\_00705]

The AUTOSAR XCP Module shall support the basic feature “Synchronous data acquisition (measurement) “. Please refer to [\[13\]](#) (SRS\_Xcp\_29009)

[SWS\_Xcp\_00706]

The AUTOSAR XCP Module shall support the feature “Dynamic DAQ Configuration”.  
according to [\[13\]](#) (SRS\_Xcp\_29013)

[SWS\_Xcp\_00707]

[ The AUTOSAR XCP Module shall support the basic feature “Synchronous data stimulation” according to [\[13\]](#) ] (SRS\_Xcp\_29010)

[SWS\_Xcp\_00708]

The AUTOSAR XCP Module shall support the basic feature “Online memory calibration (read / write access) “, according to [\[13\]](#) ] ()

[SWS\_Xcp\_00709]

The AUTOSAR XCP Module shall support the feature “Timestamped Data Transfer“, according to [\[13\]](#) ] (SRS\_Xcp\_29014)

[SWS\_Xcp\_00768]

The ECU local time shall be derived from the AUTOSAR OS.] ()

[SWS\_Xcp\_00711]

The AUTOSAR XCP Module shall support the feature “Block communication mode“, according to [\[13\]](#) ] ()

[SWS\_Xcp\_00761]

The AUTOSAR XCP Module shall support the feature “Bypassing“, according to [\[13\]](#) ] (SRS\_Xcp\_29015)

[SWS\_Xcp\_00766]

The AUTOSAR XCP Module shall support the feature “Seed & Key” according to [\[13\]](#) ] (SRS\_Xcp\_29016)

[SWS\_Xcp\_00712]

For sending and receiving of calibration data, the sending and receiving APIs specified within the AUTOSAR BSW Bus Interfaces (FlexRay Interface, CAN Interface, TCP/IP Socket Adaptor) shall be used. Please refer to chapter 7.1, 7.2 and 7.3.] (SRS\_Xcp\_29002)

[SWS\_Xcp\_00852]The AUTOSAR XCP Module shall support the feature “Page switching“, according to [\[13\]](#)](SRS\_Xcp\_29018)

[SWS\_Xcp\_00853]The code generator of the XCP Module shall generate the A2L IF\_DATA section, based on the configuration of XCP](SRS\_Xcp\_29008)

[SWS\_Xcp\_00854]The AUTOSAR XCP Module shall support the feature “Power-Up data transfer (RESUME MODE)“, according to [\[13\]](#)](SRS\_Xcp\_29019)

[SWS\_Xcp\_00855] [ The AUTOSAR XCP Module shall support the flash programming (PGM) according to [\[13\]](#) ] ( SRS\_Xcp\_29020)

[SWS\_Xcp\_00856] [ Indication the end of a programming sequence is supported using the optional command "PROGRAM\_RESET", where the slave will go to disconnected state but without forcing a device reset ] (SRS\_Xcp\_29020)

[SWS\_Xcp\_00859] The XCP module shall wait for the Xcp\_<Lo>TxConfirmation (positive or negative) after each call to <Lo>\_Transmit to avoid overwriting previously transmitted data ] ()

## 7.1 XCP on CAN

[SWS\_Xcp\_00713]  
The AUTOSAR XCP Module shall support the CAN communications bus according to [\[14\]](#) (SRS\_Xcp\_29005)

[SWS\_Xcp\_00714]  
[ XCP data sent and received via CAN, the PDUs have to be transmitted and received using the transmitting and receive APIs provided by the AUTOSAR CAN Interface, according to [\[8\]](#) (SRS\_Xcp\_29002)

[SWS\_Xcp\_00715]  
For sending and receiving XCP data via CAN, at least two different CAN identifiers have to be configured to be used by XCP.] ()

[SWS\_Xcp\_00716]  
Performance information shall be exchanged between the XCP master and XCP slave using the parameters according to [\[14\]](#) ()

[SWS\_Xcp\_00718]  
The XCP Module shall support the GET\_SLAVE\_ID command according to [\[14\]](#) ()

## 7.2 XCP on FlexRay

[SWS\_Xcp\_00719]  
The AUTOSAR XCP Module shall support the FlexRay communications bus according to [\[16\]](#) (SRS\_Xcp\_29006)

[SWS\_Xcp\_00720]  
XCP data sent and received via FlexRay, the PDUs have to be transmitted and received using the transmit and receive APIs provided by the AUTOSAR FlexRay Interface according to [\[7\]](#).] (SRS\_Xcp\_29002)

[SWS\_Xcp\_00721]  
All XCP on FlexRay LPDUs always are event driven. Please refer to Chapter 1.1.2 “FlexRay Frame Type” of [\[16\]](#) ()

[SWS\_Xcp\_00722]

The hardware buffers (of the FlexRay Communication Controller) XCP uses for data transmission and reception are assigned exclusively to the XCP module.] ()

**Note:**

This restriction prevents disturbances of ongoing FlexRay communication.

[SWS\_Xcp\_00723][

The usage of FlexRay Communication Controller's hardware buffers shall be configured by the corresponding parameters according to [\[16\]](#)] ()

[SWS\_Xcp\_00724][

The FlexRay PDU length used by the AUTOSAR XCP module shall be set using the corresponding parameters according to [\[16\]](#)] ()

[SWS\_Xcp\_00725][

LPDU\_IDs which shall be routed to the AUTOSAR XCP module (using the AUTOSAR Bus Interface) have to be defined by the system designer. ] ()

[SWS\_Xcp\_00726][

The ASAM MCD 2MC description file (i.e. A2L file) describes to which extent the XCP-dedicated buffers of a specific slave can be configured for XCP communication. ] ()

[SWS\_Xcp\_00728][

The XCP master gets the information about the XCP dedicated FlexRay Communication Controller buffers from the ASAM MCD 2MC description file. ] ()

[SWS\_Xcp\_00729][

Limitations due to the usage of multiple XCP slaves on the FlexRay communications bus shall be taken into consideration by the system designer. Please refer to [\[16\]](#).] ()

[SWS\_Xcp\_00730][

Depending upon the requirements on sequencing correctness, alignment and net data throughput, different header types are possible. Please refer to Chapter 1.4.1 "Header" of [\[16\]](#)] ()

[SWS\_Xcp\_00731]

[ For XCP on FlexRay, the Tail consists of a Control Field containing optional FILL bytes according to [\[16\]](#).] ()

[SWS\_Xcp\_00732][

The AUTOSAR XCP module shall be able to pack multiple XCP messages into one FlexRay Frame according to [\[16\]](#).] ()

### 7.3 XCP on Ethernet

[SWS\_Xcp\_00733]

The AUTOSAR XCP Module shall support the Ethernet communications bus according to [\[15\]](#) (SRS\_Xcp\_29007)

[SWS\_Xcp\_00734]

XCP data sent and received via Ethernet, the PDUs have to be transmitted and received using the transmitting and receive APIs provided by the AUTOSAR Socket Adaptor according to [\[9\]](#).] (SRS\_Xcp\_29002)

[SWS\_Xcp\_00735]

The AUTOSAR XCP slave connected by Ethernet and TCP/IP or UDP/IP is addressed by its IP Address and Port number.] ()

[SWS\_Xcp\_00736]

The AUTOSAR XCP slave only accepts one connection at the time. ] ()

[SWS\_Xcp\_00737]

If the socket is closed while in XCP connected state, the slave device will perform an XCP disconnect, which means that all data acquisition will be stopped.] ()

[SWS\_Xcp\_00738]

The addressing scheme is defined according to [\[15\]](#) ()

[SWS\_Xcp\_00739]

The header and tail of an XCP on Ethernet message have to be set according to [\[15\]](#) ] ()

[SWS\_Xcp\_00740]

The upper performance limit depends on the protocol stack of the host system. The corresponding parameters defined according to [\[15\]](#) have to be set.] ()

[SWS\_Xcp\_00710]

The AUTOSAR XCP Module shall support the feature “Interleaved communication mode“, according to according to [\[13\]](#) (SRS\_Xcp\_29012)

### 7.4 General Requirements

[SWS\_Xcp\_00741]

Link-time and post-build-time configuration data shall be implemented as read-only data structures. Link-time configuration data shall be immediately referenced by the implementation, the start-address of post-build-time configuration data shall be passed during module initialization] (SRS\_BSW\_00344)



[SWS\_Xcp\_00742]

[ The XCP module shall support pre-compile time, link-time and post-build-time configuration.] (SRS\_BSW\_00404, SRS\_BSW\_00345)

## 7.5 Error classification

[SWS\_Xcp\_00763]

[ The error values and EventIds are named in capital letters according to the scheme

XCP\_E\_<NAME>, where NAME describes the error/EventId and may consist of several words separated by underscores.] (SRS\_BSW\_00327)

### 7.5.1 Development Errors

[SWS\_Xcp\_00857]

[ Development Error Types] ()

| <i>Type or error</i>                        | <i>Relevance</i> | <i>Related error code</i> | <i>Value [hex]</i> |
|---|------------------|---------------------------|--------------------|
| Invalid pointer                             | Development      | XCP_E_INV_POINTER         | 0x01               |
| Module not initialized                      | Development      | XCP_E_NOT_INITIALIZED     | 0x02               |
| Initialization of XCP failed                | Development      | XCP_E_INIT_FAILED         | 0x04               |
| Null pointer has been passed as an argument | Development      | XCP_E_PARAM_POINTER       | 0x12               |
| API call with wrong PDU ID                  | Development      | XCP_E_INVALID_PDUID       | 0x03               |

### 7.5.2 Runtime Errors

< There are no runtime errors.>

### 7.5.3 Transient Faults

< There are no transient faults.>

### 7.5.4 Production Errors

< There are no production errors.>

## **7.6 Error detection**

For details refer to the chapter 7.3 “Error Detection” in *SWS\_BSWGeneral*.

## **7.7 Error notification**

For details refer to the chapter 7.4 “Error notification” in *SWS\_BSWGeneral*.

## **7.8 Version checking**

For details refer to the chapter 5.1.8 “Version Check” in *SWS\_BSWGeneral*.

## 8 API specification

### 8.1 Imported types

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

[SWS\_Xcp\_00801] [

| Module         | Imported Type       |
|----------------|---------------------|
| ComStack_Types | NetworkHandleType   |
|                | PduldType           |
|                | PdulInfoType        |
| Fr             | Fr_ChannelType      |
| Os             | CounterType         |
|                | StatusType          |
|                | TickRefType         |
| Std_Types      | Std_ReturnType      |
|                | Std_VersionInfoType |

] ()

### 8.2 Type definitions

#### 8.2.1 Xcp\_ConfigType

[SWS\_Xcp\_00845] [

|                     |  |   |  |
|---------------------|--|---|--|
| <b>Name:</b>        | Xcp_ConfigType   |   |  |
| <b>Type:</b>        | Structure  |   |  |
| <b>Range:</b>       | implementation specific  | The content of the initialization data structure is implementation specific |  |
| <b>Description:</b> | This is the type of the data structure containing the initialization data for XCP. |   |  |

] ()

#### 8.2.2 Xcp\_Transmission Mode Type

[SWS\_Xcp\_00846] [

|                     |   |      |                       |
|---------------------|---|------|-----------------------|
| <b>Name:</b>        | Xcp_TransmissionModeType                                    |      |                       |
| <b>Type:</b>        | Enumeration   |      |                       |
| <b>Range:</b>       | XCP_TX_OFF  | 0x00 | Transmission Disabled |
|                     | XCP_TX_ON   | 0x01 | Transmission Enabled  |
| <b>Description:</b> | Handles the enabling and disabling of the transmission mode |      |                       |

] ()

## 8.3 Function definitions

This is a list of functions provided for upper layer modules.

### 8.3.1 Xcp\_Init

[SWS\_Xcp\_00803] [

|                            |   |   |
|----------------------------|---|---|
| <b>Service name:</b>       | Xcp_Init  |   |
| <b>Syntax:</b>             | <pre>void Xcp_Init(     const Xcp_ConfigType* Xcp_ConfigPtr )</pre>         |   |
| <b>Service ID[hex]:</b>    | 0x00  |   |
| <b>Sync/Async:</b>         | Synchronous   |   |
| <b>Reentrancy:</b>         | Non Reentrant   |   |
| <b>Parameters (in):</b>    | Xcp_ConfigPtr   | Pointer to a selected configuration structure |
| <b>Parameters (inout):</b> | None  |   |
| <b>Parameters (out):</b>   | None  |   |
| <b>Return value:</b>       | void  | --  |
| <b>Description:</b>        | This service initializes interfaces and variables of the AUTOSAR XCP layer. |   |

] (SRS\_BSW\_00405, SRS\_BSW\_00101, SRS\_BSW\_00358, SRS\_BSW\_00414, SRS\_Xcp\_29017)

[SWS\_Xcp\_00802] [ The function `Xcp_Init` shall internally store the configuration address to enable subsequent API calls to access the configuration] ()

### 8.3.2 Xcp\_GetVersionInfo

[SWS\_Xcp\_00807] [

|                            |  |   |
|----------------------------|--|---|
| <b>Service name:</b>       | Xcp_GetVersionInfo   |   |
| <b>Syntax:</b>             | <pre>void Xcp_GetVersionInfo(     Std_VersionInfoType* versioninfo )</pre> |   |
| <b>Service ID[hex]:</b>    | 0x01   |   |
| <b>Sync/Async:</b>         | Synchronous  |   |
| <b>Reentrancy:</b>         | Reentrant  |   |
| <b>Parameters (in):</b>    | None   |   |
| <b>Parameters (inout):</b> | None   |   |
| <b>Parameters (out):</b>   | versioninfo  | Pointer to where to store the version information of this module. |
| <b>Return value:</b>       | void   | --  |
| <b>Description:</b>        | Returns the version information of this module.                            |   |

] (SRS\_BSW\_00402, SRS\_BSW\_00407, SRS\_BSW\_00411, SRS\_BSW\_00374, SRS\_BSW\_00379, SRS\_BSW\_00003, SRS\_BSW\_00318)

[SWS\_Xcp\_00825] [

If development error detection for the Xcp module is enabled, then the function Xcp\_GetVersionInfo shall check whether the parameter VersioninfoPtr is a NULL pointer (NULL\_PTR). If VersioninfoPtr is a NULL pointer, then the function Xcp\_GetVersionInfo shall raise the development error XCP\_E\_PARAM\_POINTER and return.] ()

## 8.4 Call-back notifications

[SWS\_Xcp\_00836] [

This is a list of functions provided for other modules. The function prototypes of the callback functions shall be provided in the file Xcp\_Cbk.h] ()

### 8.4.1 Xcp\_<Lo>RxIndication

[SWS\_Xcp\_00813] [

|                            |  |   |
|----------------------------|--|---|
| <b>Service name:</b>       | Xcp_<Lo>RxIndication   |   |
| <b>Syntax:</b>             | <pre>void Xcp_&lt;Lo&gt;RxIndication(     PduIdType RxPduId,     const PduInfoType* PduInfoPtr )</pre> |   |
| <b>Service ID[hex]:</b>    | 0x42   |   |
| <b>Sync/Async:</b>         | Synchronous  |   |
| <b>Reentrancy:</b>         | Reentrant for different PduIds. Non reentrant for the same PduId.                                      |   |
| <b>Parameters (in):</b>    | RxPduId  | ID of the received PDU.   |
|                            | PduInfoPtr   | Contains the length (SduLength) of the received PDU, a pointer to a buffer (SduDataPtr) containing the PDU, and the MetaData related to this PDU. |
| <b>Parameters (inout):</b> | None   |   |
| <b>Parameters (out):</b>   | None   |   |
| <b>Return value:</b>       | None   |   |
| <b>Description:</b>        | Indication of a received PDU from a lower layer communication interface module.                        |   |

] ()

The callback function Xcp\_<Lo>RxIndication is called by the Bus Interfaces, Ethernet Socket Adaptor or CDD and is implemented by the Xcp module.

[SWS\_Xcp\_00847] [

The callback function Xcp\_<Lo>RxIndication shall inform the DET, if development error detection is enabled (XCP\_DEV\_ERROR\_DETECT is set to TRUE) and if function call has failed because of the following reasons:

- Xcp was not initialized (XCP\_E\_NOT\_INITIALIZED)
- PduInfoPtr equals NULL\_PTR (XCP\_E\_PARAM\_POINTER)
- Invalid PDUID (XCP\_E\_INVALID\_PDUID)] ()

The function Xcp\_<Lo>RxIndication shall be called by the Xcp module's environment in an interrupt context.

### 8.4.2 Xcp\_<Lo>TxConfirmation

[SWS\_Xcp\_00814] [

|                            |  |   |
|----------------------------|--|---|
| <b>Service name:</b>       | Xcp_<Lo>TxConfirmation   |   |
| <b>Syntax:</b>             | <pre>void Xcp_&lt;Lo&gt;TxConfirmation(     PduIdType TxPduId,     Std_ReturnType result )</pre>                     |   |
| <b>Service ID[hex]:</b>    | 0x40   |   |
| <b>Sync/Async:</b>         | Synchronous  |   |
| <b>Reentrancy:</b>         | Reentrant for different PduIds. Non reentrant for the same PduId.  |   |
| <b>Parameters (in):</b>    | TxPduId  | ID of the PDU that has been transmitted.                                    |
|                            | result   | E_OK: The PDU was transmitted.<br>E_NOT_OK: Transmission of the PDU failed. |
| <b>Parameters (inout):</b> | None   |   |
| <b>Parameters (out):</b>   | None   |   |
| <b>Return value:</b>       | None   |   |
| <b>Description:</b>        | The lower layer communication interface module confirms the transmission of a PDU, or the failure to transmit a PDU. |   |

] ()

#### Note:

The callback function `Xcp_<Lo>TxConfirmation` is called by the Bus Interfaces, Ethernet Socket Adaptor or CDD and is implemented by the Xcp module.

#### [SWS\_Xcp\_00840] [

If development error detection for the XCP module is enabled: if the function `Xcp_<Lo>TxConfirmation` is called before the XCP was initialized successfully, the function `Xcp_<Lo>TxConfirmation` shall raise the development error `XCP_E_NOT_INITIALIZED` and return.] ()

#### [SWS\_Xcp\_00841] [

Caveats of `Xcp_<Lo>TxConfirmation`:

- The call context is either on interrupt level (interrupt mode) or on task level
- The Xcp module is initialized correctly.

] ()

### 8.4.3 Xcp\_<Lo>TriggerTransmit

#### [SWS\_Xcp\_00835] [

|                            |   |  |
|----------------------------|---|--|
| <b>Service name:</b>       | Xcp_<Lo>TriggerTransmit   |  |
| <b>Syntax:</b>             | <pre>Std_ReturnType Xcp_&lt;Lo&gt;TriggerTransmit(     PduIdType TxPduId,     PduInfoType* PduInfoPtr )</pre> |  |
| <b>Service ID[hex]:</b>    | 0x41  |  |
| <b>Sync/Async:</b>         | Synchronous   |  |
| <b>Reentrancy:</b>         | Reentrant for different PduIds. Non reentrant for the same PduId.   |  |
| <b>Parameters (in):</b>    | TxPduId   | ID of the SDU that is requested to be transmitted.   |
| <b>Parameters (inout):</b> | PduInfoPtr  | Contains a pointer to a buffer ( <code>SduDataPtr</code> ) to where the SDU data shall be copied, and the available buffer size in <code>SduLength</code> . On return, the service will indicate the length of the copied SDU data in <code>SduLength</code> . |

|                          |  |   |
|--------------------------|--|---|
| <b>Parameters (out):</b> | None   |   |
| <b>Return value:</b>     | Std_ReturnType   | E_OK: SDU has been copied and SduLength indicates the number of copied bytes.<br>E_NOT_OK: No SDU data has been copied. PduInfoPtr must not be used since it may contain a NULL pointer or point to invalid data. |
| <b>Description:</b>      | Within this API, the upper layer module (called module) shall check whether the available data fits into the buffer size reported by PduInfoPtr->SduLength. If it fits, it shall copy its data into the buffer provided by PduInfoPtr->SduDataPtr and update the length of the actual copied data in PduInfoPtr->SduLength. If not, it returns E_NOT_OK without changing PduInfoPtr. |   |

] ()

#### Note:

The callback function `Xcp_<Lo>TriggerTransmit` is called by the Bus Interfaces, Ethernet Socket Adaptor or CDD and is implemented by the Xcp module.

#### [SWS\_Xcp\_00842] [

If development error detection for the XCP module is enabled: if the function `Xcp_<Lo>TriggerTransmit` is called before the XCP was initialized successfully, the function `Xcp_<Lo>TriggerTransmit` shall raise the development error `XCP_E_NOT_INITIALIZED` and return `E_NOT_OK`.] ()

#### [SWS\_Xcp\_00843] [

Caveats of `Xcp_<Lo>TriggerTransmit`:

- The call context is either on interrupt level (interrupt mode) or on task level
- The Xcp module is initialized correctly.] ()

### 8.4.4 Xcp\_SetTransmissionMode

#### [SWS\_Xcp\_00844] [

|                            |   |  |
|----------------------------|---|--|
| <b>Service name:</b>       | Xcp_SetTransmissionMode   |  |
| <b>Syntax:</b>             | <pre>void Xcp_SetTransmissionMode(     NetworkHandleType Channel,     Xcp_TransmissionModeType Mode )</pre> |  |
| <b>Service ID[hex]:</b>    | 0x05  |  |
| <b>Sync/Async:</b>         | Synchronous   |  |
| <b>Reentrancy:</b>         | Non Reentrant   |  |
| <b>Parameters (in):</b>    | Channel   | The Network channel for the used bus communication |
|                            | Mode  | Enabled or disabled Transmission mode Parameters   |
| <b>Parameters (inout):</b> | None  |  |
| <b>Parameters (out):</b>   | None  |  |
| <b>Return value:</b>       | None  |  |
| <b>Description:</b>        | This API is used to turn on and off of the TX capabilities of used communication bus channel in XCP module. |  |

] ()

#### [SWS\_Xcp\_00848] [

The XCP module shall provide this service only if `XCP_SUPPRESS_TX_SUPPORT` (see [ECUC Xcp 00169](#)) equals `TRUE`.] ()



[SWS\_Xcp\_00849] [

If `Xcp_SetTransmissionMode(Channel, Mode)` is called and parameter `Mode` equals `XCP_TX_OFF`, all TxPDUs which are assigned to `Channel` shall not be transmitted. ] ()

Note: It could be derived from <Bus>If configuration and the global PDU parameter, to which specific communication channel the PDU is assigned to.

[SWS\_Xcp\_00850] [

If `Xcp_SetTransmissionMode(Channel, Mode)` is called and parameter `Mode` equals `XCP_TX_ON`, all TxPDUs which are assigned to `Channel` shall be able to be transmitted. ] ()

## 8.5 Scheduled functions

The functions are called directly by Basic Software Scheduler. The following functions shall have no return value and no parameter. All functions shall be non reentrant.

### 8.5.1 Xcp\_MainFunction

[SWS\_Xcp\_00823] [

|                         |                                      |
|-------------------------|--------------------------------------|
| <b>Service name:</b>    | Xcp_MainFunction                     |
| <b>Syntax:</b>          | void Xcp_MainFunction(<br>void<br>)  |
| <b>Service ID[hex]:</b> | 0x04                                 |
| <b>Description:</b>     | Scheduled function of the XCP module |

] (SRS\_BSW\_00424, SRS\_BSW\_00433, SRS\_BSW\_00373)

[SWS\_Xcp\_00824] [

The XCP Main Function shall be called cyclically.] ()

## 8.6 Expected Interfaces

In this chapter, all interfaces required from other modules are listed.

### 8.6.1 Mandatory Interfaces

[SWS\_Xcp\_91001] [

| API function | Description |
|--------------|-------------|
|--------------|-------------|

] ()

## 8.6.2 Optional Interfaces

[SWS\_Xcp\_00832] [

| <i>API function</i> | <i>Description</i>   |
|---------------------|--|
| CanIf_Transmit      | Requests transmission of a PDU.  |
| Det_ReportError     | Service to report development errors.  |
| FrIf_DisableLPdu    | Wraps the FlexRay Driver Function Fr_DisableLPdu. It disables the hardware resource of an LPdu for transmission/reception.   |
| FrIf_ReconfigLPdu   | Calls the FlexRay Driver's API Fr_ReconfigLPdu.<br>The enum value "FR_CHANNEL_AB" shall not be used.   |
| FrIf_Transmit       | Requests transmission of a PDU.  |
| GetCounterValue     | This service reads the current count value of a counter (returning either the hardware timer ticks if counter is driven by hardware or the software ticks when user drives counter). |
| GetElapsedValue     | This service gets the number of ticks between the current tick value and a previously read tick value.   |
| SoAd_IfTransmit     | Requests transmission of a PDU.  |

] ()

## 8.6.3 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.

The XCP module offers configurable interfaces to be used by Complex Driver(s).

## 9 Sequence diagrams

### 9.1 XCP on FlexRay

#### 9.1.1 Xcp on FlexRay Transmit

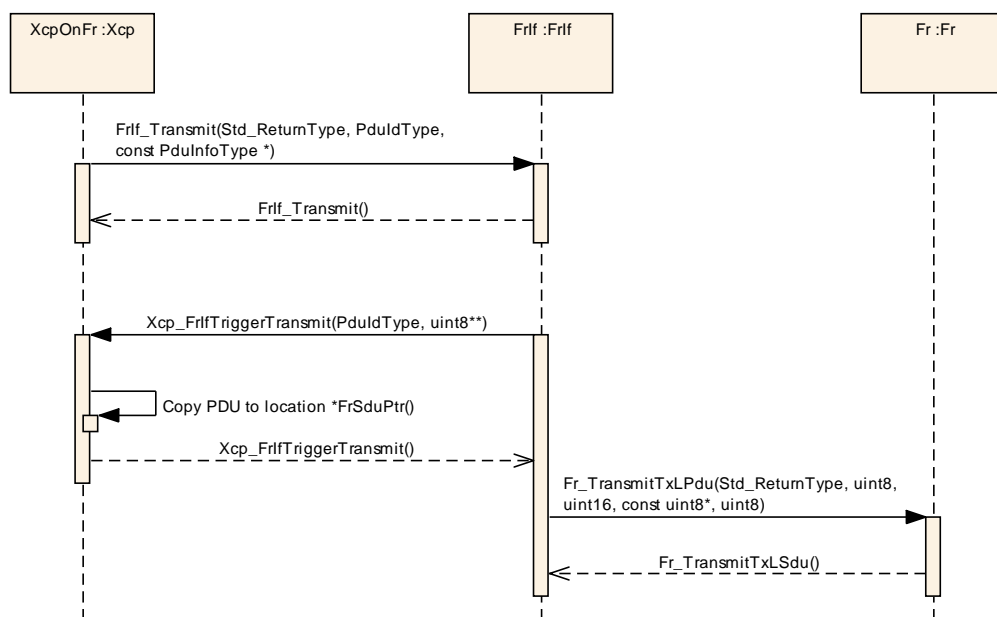


Figure 3: Xcp On FlexRay Transmit

#### 9.1.2 Xcp on FlexRay Receive Indication

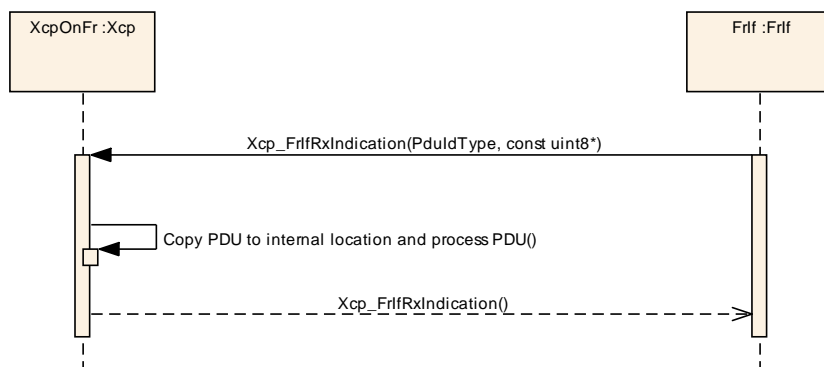


Figure 4: Xcp on FlexRay Receive Indication

## 9.2 XCP on CAN

### 9.2.1 Xcp on CAN Transmit

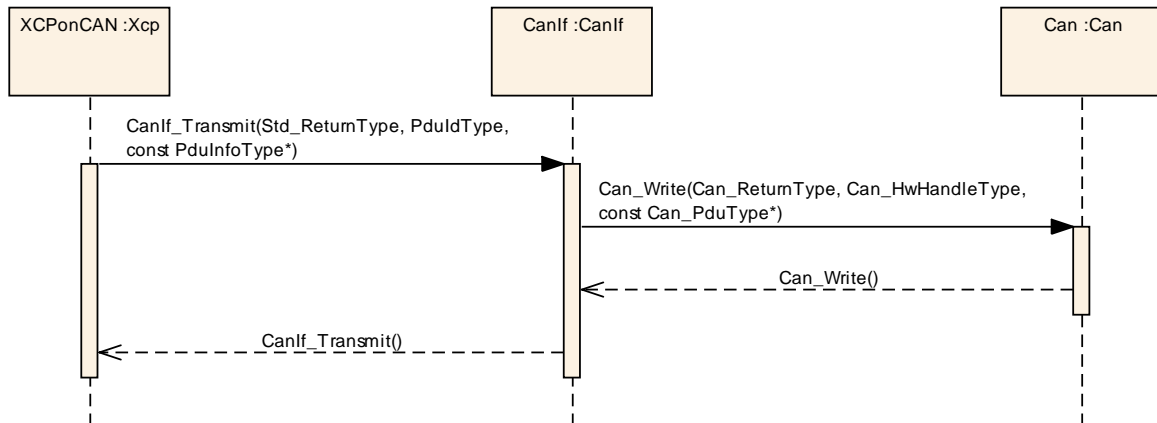


Figure 5: Xcp on Can Transmit

### 9.2.2 Xcp on CAN Transmit Confirmation

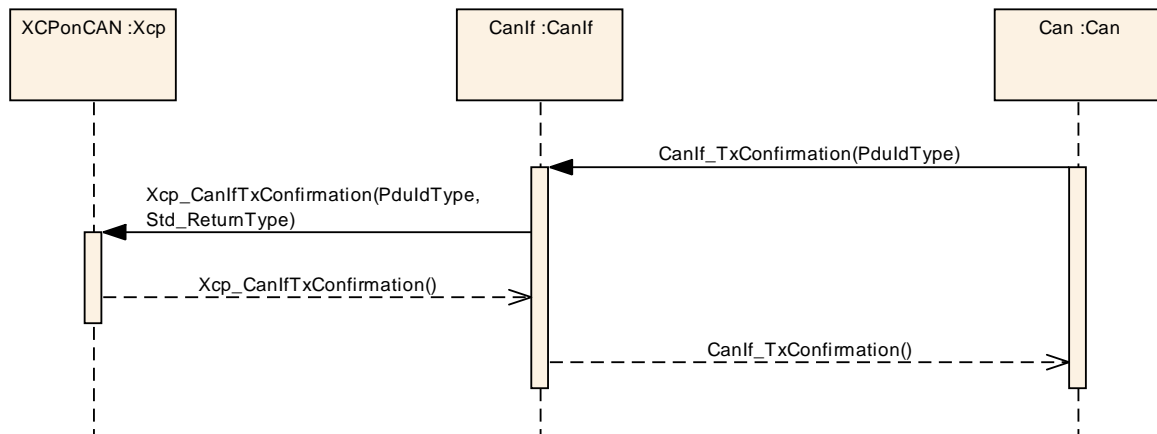


Figure 6: Xcp on CAN Transmit Confirmation

### 9.2.3 Xcp on CAN Receive Indication

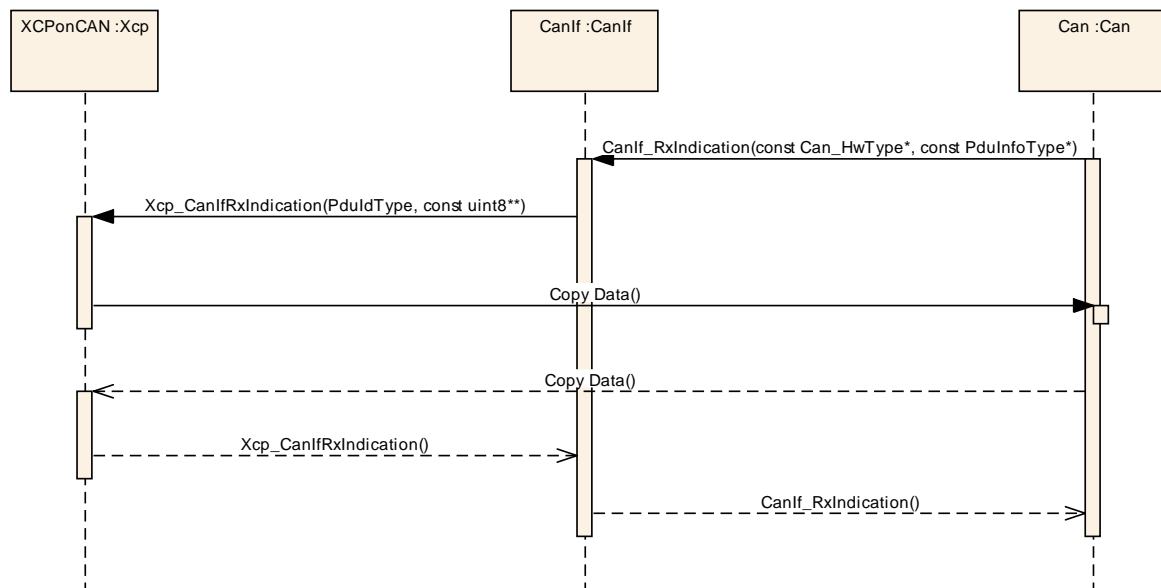


Figure 7: Xcp on CAN Receive Indication

## 9.3 XCP on Ethernet

### 9.3.1 Xcp on Ethernet Receive Indication

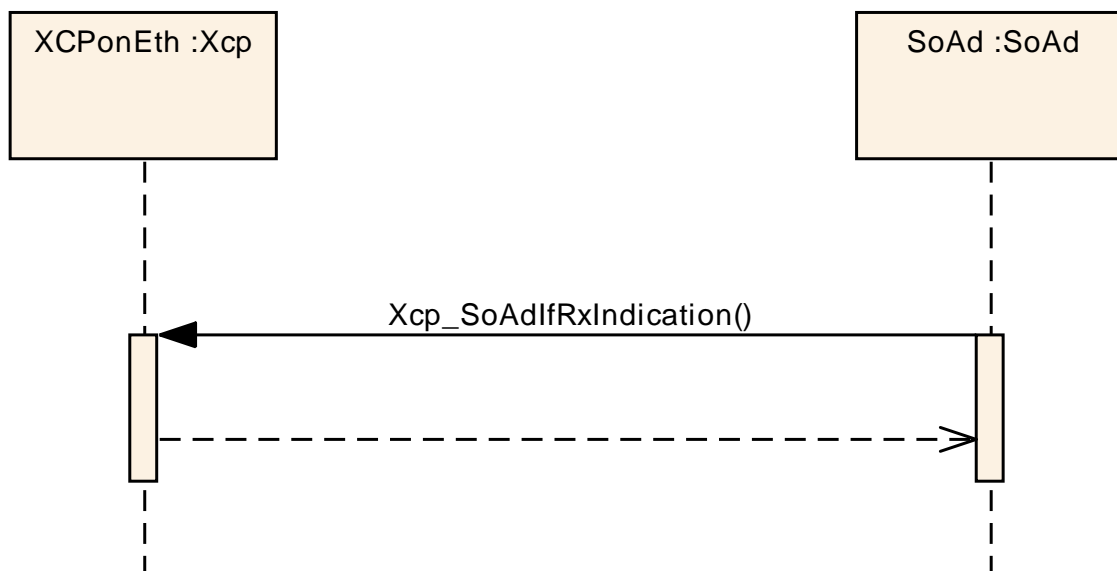


Figure 8: Xcp on Ethernet Receive Indication

## 10 Configuration specification

In general, this chapter defines configuration parameters and their clustering into containers. In order to support the specification Chapter 10.1 describes fundamentals. It also specifies a template (table) you shall use for the parameter specification. We intend to leave Chapter 10.1 in the specification to guarantee comprehension.

Chapter 10.2 specifies the structure (containers) and the parameters of the module XCP.

Chapter 10.3 specifies published information of the module XCP.

### 10.1 How to read this chapter

For details refer to the chapter 10.1 “Introduction to configuration specification” in *SWS\_BSWGeneral*.

### 10.2 Containers and configuration parameters

The following chapters summarize all configuration parameters. The detailed meanings of the parameters describe Chapters 7 and Chapter 8.

#### [SWS\_Xcp\_00102] [

The listed configuration items can be derived from a network description database, which is based on the EcuConfigurationTemplate. The configuration tool shall extract all information to configure the XCP.] (SRS\_BSW\_00159)

#### [SWS\_XCP\_00103] [

The configuration tool must check the consistency of the configuration at configuration time.] (SRS\_BSW\_00167)

#### [SWS\_Xcp\_00104] [

Configuration rules and constraints for plausibility checks shall be performed during configuration time, wherever possible.] (SRS\_BSW\_00167)

#### [SWS\_Xcp\_00105] [

These dependencies between FlexRay Interface and FlexRay Driver configuration must be provided at configuration time by the configuration tools. ] (SRS\_BSW\_00167)

### 10.2.1 Xcp

|                                   |   |
|-----------------------------------|---|
| <b>SWS Item</b>                   | <b>ECUC_Xcp_00182 :</b>                 |
| <b>Module Name</b>                | <i>Xcp</i>                              |
| <b>Module Description</b>         | Configuration of the XCP module         |
| <b>Post-Build Variant Support</b> | true                                    |
| <b>Supported Config Variants</b>  | VARIANT-POST-BUILD, VARIANT-PRE-COMPILE |

| <b>Included Containers</b> |                     |  |
|----------------------------|---------------------|--|
| <b>Container Name</b>      | <b>Multiplicity</b> | <b>Scope / Dependency</b>  |
| XcpConfig                  | 1                   | This container contains the configuration parameters and sub containers of the AUTOSAR Xcp module. |
| XcpGeneral                 | 1                   | This container contains the general configuration parameters of the XCP.                           |

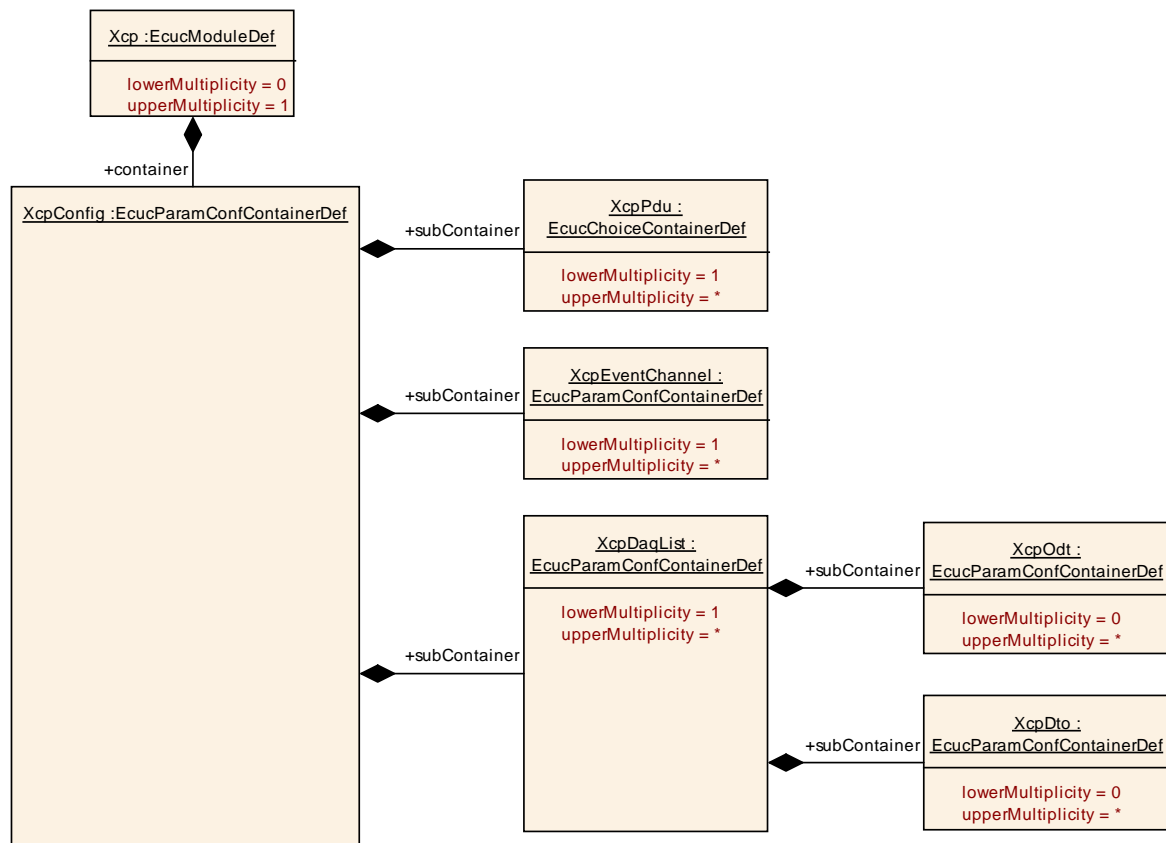


Figure 9: Diagram

### 10.2.2 XcpGeneral

|                                 |  |
|---------------------------------|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00001 :</b>  |
| <b>Container Name</b>           | <i>XcpGeneral</i>  |
| <b>Description</b>              | This container contains the general configuration parameters of the XCP. |
| <b>Configuration Parameters</b> |  |

|                 |                         |
|-----------------|-------------------------|
| <b>SWS Item</b> | <b>ECUC_Xcp_00164 :</b> |
|-----------------|-------------------------|

|                                  |  |   |              |
|----------------------------------|--|---|--------------|
| <b>Name</b>                      | XcpDaqConfigType   |   |              |
| <b>Description</b>               | Sets the DAQ_CONFIG_TYPE bit within the DAQ_PROPERTIES parameter to "static" or to "dynamic". If DAQ_STATIC is selected, the DAQ_CONFIG_TYPE bit is set to "0". If DAQ_DYNAMIC is selected, the DAQ_CONFIG_TYPE bit is set to "1". |   |              |
| <b>Multiplicity</b>              | 1  |   |              |
| <b>Type</b>                      | EcucEnumerationParamDef  |   |              |
| <b>Range</b>                     | DAQ_DYNAMIC  | If DAQ_DYNAMIC is selected, the DAQ_CONFIG_TYPE bit is set to '1' |              |
|                                  | DAQ_STATIC   | If DAQ_STATIC is selected, the DAQ_CONFIG_TYPE bit is set to '0'  |              |
| <b>Post-Build Variant Value</b>  | false  |   |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X   | All Variants |
|                                  | <b>Link time</b>   | --  |              |
|                                  | <b>Post-build time</b>   | --  |              |
| <b>Scope / Dependency</b>        | scope: ECU<br>dependency: If DAQ_CONFIG_TYPE = dynamic, MAX_DAQ equals MIN_DAQ+DAQ_COUNT.  |   |              |

|                                  |  |    |                     |
|----------------------------------|--|----|---------------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00012 :</b>  |    |                     |
| <b>Name</b>                      | XcpDaqCount  |    |                     |
| <b>Description</b>               | Indicates the number of DAQ lists for dynamic configuration.   |    |                     |
| <b>Multiplicity</b>              | 1  |    |                     |
| <b>Type</b>                      | EcucIntegerParamDef  |    |                     |
| <b>Range</b>                     | 0 .. 65535   |    |                     |
| <b>Default value</b>             | --   |    |                     |
| <b>Post-Build Variant Value</b>  | false  |    |                     |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | VARIANT-PRE-COMPILE |
|                                  | <b>Link time</b>   | -- |                     |
|                                  | <b>Post-build time</b>   | -- |                     |
| <b>Scope / Dependency</b>        | scope: ECU<br>dependency: This parameter is available only if XcpDaqConfigType is set to "1" i.e DAQ_DYNAMIC |    |                     |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00003 :</b>   |    |              |
| <b>Name</b>                      | XcpDevErrorDetect   |    |              |
| <b>Description</b>               | Switches the development error detection and notification on or off. <ul style="list-style-type: none"> <li>true: detection and notification is enabled.</li> <li>false: detection and notification is disabled.</li> </ul> |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucBooleanParamDef   |    |              |
| <b>Default value</b>             | false   |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: local  |    |              |

|                                 |   |  |  |
|---------------------------------|---|--|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00181 :</b>                         |  |  |
| <b>Name</b>                     | XcpFlashProgrammingEnabled                      |  |  |
| <b>Description</b>              | Enabling of XCP Flash programming functionality |  |  |
| <b>Multiplicity</b>             | 1   |  |  |
| <b>Type</b>                     | EcucBooleanParamDef                             |  |  |
| <b>Default value</b>            | --  |  |  |
| <b>Post-Build Variant Value</b> | false   |  |  |



|                                  |                         |    |              |
|----------------------------------|-------------------------|----|--------------|
| <b>Value Configuration Class</b> | <b>Pre-compile time</b> | X  | All Variants |
|                                  | <b>Link time</b>        | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: local            |    |              |

|                                  |   |  |              |
|----------------------------------|---|--|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00170 :</b>   |  |              |
| <b>Name</b>                      | XcpIdentificationFieldType  |  |              |
| <b>Description</b>               | Type of Identification Field the slave will use when transferring DAQ Packets to the master. The master has to use the same Type of Identification Field when transferring STIM Packets to the slave. |  |              |
| <b>Multiplicity</b>              | 1   |  |              |
| <b>Type</b>                      | EcucEnumerationParamDef   |  |              |
| <b>Range</b>                     | ABSOLUTE  | Absolute ODT number  |              |
|                                  | RELATIVE_BYTE   | Relative ODT number, absolute DAQ list number (BYTE)           |              |
|                                  | RELATIVE_WORD   | Relative ODT number, absolute DAQ list number (WORD)           |              |
|                                  | RELATIVE_WORD_ALIGNED   | Relative ODT number, absolute DAQ list number (WORD, aligned). |              |
| <b>Post-Build Variant Value</b>  | false   |  |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | --   |              |
|                                  | <b>Post-build time</b>  | --   |              |
| <b>Scope / Dependency</b>        | scope: local  |  |              |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00014 :</b>  |    |              |
| <b>Name</b>                      | XcpMainFunctionPeriod  |    |              |
| <b>Description</b>               | The XCP does not require this information but the BSW scheduler, which invokes the main function, needs it in order to plan its tasks. |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucFloatParamDef  |    |              |
| <b>Range</b>                     | ]0 .. INF[   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: local   |    |              |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00004 :</b>                                    |    |              |
| <b>Name</b>                      | XcpMaxCto  |    |              |
| <b>Description</b>               | MAX_CTO shows the maximum length of a CTO packet in bytes. |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucIntegerParamDef  |    |              |
| <b>Range</b>                     | 8 .. 255   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>                                    | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>                                     | -- |              |
| <b>Scope / Dependency</b>        | scope: local   |    |              |

|                 |                         |  |  |
|-----------------|-------------------------|--|--|
| <b>SWS Item</b> | <b>ECUC_Xcp_00005 :</b> |  |  |
| <b>Name</b>     | XcpMaxDto               |  |  |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>Description</b>               | MAX_DTO shows the maximum length of a DTO packet in bytes. |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucIntegerParamDef  |    |              |
| <b>Range</b>                     | 8 .. 65535   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>                                    | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>                                     | -- |              |
| <b>Scope / Dependency</b>        | scope: local   |    |              |

|                                  |                         |    |              |
|----------------------------------|-------------------------|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00011 :</b> |    |              |
| <b>Name</b>                      | XcpMaxEventChannel      |    |              |
| <b>Description</b>               | --                      |    |              |
| <b>Multiplicity</b>              | 1                       |    |              |
| <b>Type</b>                      | EcucIntegerParamDef     |    |              |
| <b>Range</b>                     | 0 .. 65535              |    |              |
| <b>Default value</b>             | --                      |    |              |
| <b>Post-Build Variant Value</b>  | false                   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b> | X  | All Variants |
|                                  | <b>Link time</b>        | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU              |    |              |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00013 :</b>   |    |              |
| <b>Name</b>                      | XcpMinDaq   |    |              |
| <b>Description</b>               | Indicates the number of predefined, read only DAQ lists on the XCP slave. |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucIntegerParamDef   |    |              |
| <b>Range</b>                     | 0 .. 255  |    |              |
| <b>Default value</b>             | --  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU  |    |              |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00054 :</b>  |    |              |
| <b>Name</b>                      | XcpOdtCount  |    |              |
| <b>Description</b>               | This parameter indicates the amount of ODTs of a DAQ list using dynamic DAQ list configuration.              |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucIntegerParamDef  |    |              |
| <b>Range</b>                     | 0 .. 252   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU<br>dependency: This parameter is available only if XcpDaqConfigType is set to "1" i.e DAQ_DYNAMIC |    |              |

|                    |  |  |  |
|--------------------|--|--|--|
| <b>SWS Item</b>    | <b>ECUC_Xcp_00059 :</b>  |  |  |
| <b>Name</b>        | XcpOdtEntriesCount   |  |  |
| <b>Description</b> | Indicates the amount of entries into an ODT using dynamic DAQ list |  |  |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
|                                  | configuration.   |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucIntegerParamDef  |    |              |
| <b>Range</b>                     | 0 .. 255   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU<br>dependency: This parameter is available only if XcpDaqConfigType is set to "1" i.e DAQ_DYNAMIC |    |              |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00177 :</b>  |    |              |
| <b>Name</b>                      | XcpOdtEntrySizeDaq   |    |              |
| <b>Description</b>               | Indicates the size of an element described by an ODT entry to the DaqListType for a DAQ. |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucIntegerParamDef  |    |              |
| <b>Range</b>                     | 0 .. 255   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU   |    |              |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00178 :</b>   |    |              |
| <b>Name</b>                      | XcpOdtEntrySizeStim   |    |              |
| <b>Description</b>               | Indicates the size of an element described by an ODT entry to the DaqListType for a stim. |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucIntegerParamDef   |    |              |
| <b>Range</b>                     | 0 .. 255  |    |              |
| <b>Default value</b>             | --  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU  |    |              |

|                                  |                                    |    |              |
|----------------------------------|------------------------------------|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00006 :</b>            |    |              |
| <b>Name</b>                      | XcpOnCanEnabled                    |    |              |
| <b>Description</b>               | Enabling of XCPonCAN functionality |    |              |
| <b>Multiplicity</b>              | 1                                  |    |              |
| <b>Type</b>                      | EcucBooleanParamDef                |    |              |
| <b>Default value</b>             | --                                 |    |              |
| <b>Post-Build Variant Value</b>  | false                              |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>            | X  | All Variants |
|                                  | <b>Link time</b>                   | -- |              |
|                                  | <b>Post-build time</b>             | -- |              |
| <b>Scope / Dependency</b>        | scope: local                       |    |              |

|                    |                                    |  |  |
|--------------------|------------------------------------|--|--|
| <b>SWS Item</b>    | <b>ECUC_Xcp_00009 :</b>            |  |  |
| <b>Name</b>        | XcpOnCddEnabled                    |  |  |
| <b>Description</b> | Enabling of XCPonCdd functionality |  |  |

|                                  |                         |    |              |
|----------------------------------|-------------------------|----|--------------|
| <b>Multiplicity</b>              | 1                       |    |              |
| <b>Type</b>                      | EcucBooleanParamDef     |    |              |
| <b>Default value</b>             | --                      |    |              |
| <b>Post-Build Variant Value</b>  | false                   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b> | X  | All Variants |
|                                  | <b>Link time</b>        | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: local            |    |              |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00008 :</b>                 |    |              |
| <b>Name</b>                      | XcpOnEthernetEnabled                    |    |              |
| <b>Description</b>               | Enabling of XCPonEthernet functionality |    |              |
| <b>Multiplicity</b>              | 1                                       |    |              |
| <b>Type</b>                      | EcucBooleanParamDef                     |    |              |
| <b>Default value</b>             | --                                      |    |              |
| <b>Post-Build Variant Value</b>  | false                                   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>                 | X  | All Variants |
|                                  | <b>Link time</b>                        | -- |              |
|                                  | <b>Post-build time</b>                  | -- |              |
| <b>Scope / Dependency</b>        | scope: local                            |    |              |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00007 :</b>                |    |              |
| <b>Name</b>                      | XcpOnFlexRayEnabled                    |    |              |
| <b>Description</b>               | Enabling of XCPonFlexRay functionality |    |              |
| <b>Multiplicity</b>              | 1                                      |    |              |
| <b>Type</b>                      | EcucBooleanParamDef                    |    |              |
| <b>Default value</b>             | --                                     |    |              |
| <b>Post-Build Variant Value</b>  | false                                  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>                | X  | All Variants |
|                                  | <b>Link time</b>                       | -- |              |
|                                  | <b>Post-build time</b>                 | -- |              |
| <b>Scope / Dependency</b>        | scope: local                           |    |              |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00169 :</b>  |    |              |
| <b>Name</b>                      | XcpPrescalerSupported  |    |              |
| <b>Description</b>               | This parameter enables and disables the support for Prescaler support.<br>True is Enabled, False is disabled |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucBooleanParamDef  |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: local   |    |              |

|                                 |  |  |  |
|---------------------------------|--|--|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00176 :</b>  |  |  |
| <b>Name</b>                     | XcpSuppressTxSupport   |  |  |
| <b>Description</b>              | Switches the support of suppressing transmission of PDUs per communication channel on or off.<br>TRUE: Suppressing of TxPDUs supported<br>FALSE: Suppressing of TxPDUs not supported |  |  |
| <b>Multiplicity</b>             | 1  |  |  |
| <b>Type</b>                     | EcucBooleanParamDef  |  |  |
| <b>Default value</b>            | --   |  |  |
| <b>Post-Build Variant Value</b> | false  |  |  |

|                                  |                         |    |              |
|----------------------------------|-------------------------|----|--------------|
| <b>Value Configuration Class</b> | <b>Pre-compile time</b> | X  | All Variants |
|                                  | <b>Link time</b>        | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: local            |    |              |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00167 :</b>   |    |              |
| <b>Name</b>                      | XcpTimestampTicks   |    |              |
| <b>Description</b>               | This parameter defines the timestamp that will increment based<br>TIMESTAMP_TICKS per unit and wrap around if an overflow occurs. |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucIntegerParamDef   |    |              |
| <b>Range</b>                     | 0 .. 65535  |    |              |
| <b>Default value</b>             | --  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: local  |    |              |

|                                  |  |  |              |
|----------------------------------|--|--|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00166 :</b>  |  |              |
| <b>Name</b>                      | XcpTimestampType   |  |              |
| <b>Description</b>               | This parameter indicates the number of bytes used for the timestamp field. In case No_TIME_STAMP is selected the timestamp field is not available. |  |              |
| <b>Multiplicity</b>              | 1  |  |              |
| <b>Type</b>                      | EcucEnumerationParamDef  |  |              |
| <b>Range</b>                     | FOUR_BYTE  | timestamp field has the size of four byte. |              |
|                                  | NO_TIME_STAMP  | timestamp field is not available.          |              |
|                                  | ONE_BYTE   | timestamp field has the size of one byte.  |              |
|                                  | TWO_BYTE   | timestamp field has the size of two byte.  |              |
| <b>Post-Build Variant Value</b>  | false  |  |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | --   |              |
|                                  | <b>Post-build time</b>   | --   |              |
| <b>Scope / Dependency</b>        | scope: local   |  |              |

|                     |   |                          |  |
|---------------------|---|--------------------------|--|
| <b>SWS Item</b>     | <b>ECUC_Xcp_00168 :</b>   |                          |  |
| <b>Name</b>         | XcpTimestampUnit  |                          |  |
| <b>Description</b>  | This parameter indicates the resolution of the data acquisition clock of the slave<br>when transferring data to master. |                          |  |
| <b>Multiplicity</b> | 1   |                          |  |
| <b>Type</b>         | EcucEnumerationParamDef   |                          |  |
| <b>Range</b>        | TIMESTAMP_UNIT_100MS  | Unit is 100 millisecond. |  |
|                     | TIMESTAMP_UNIT_100NS  | Unit is 100 nanosecond.  |  |
|                     | TIMESTAMP_UNIT_100PS  | Unit is 100 picosecond.  |  |
|                     | TIMESTAMP_UNIT_100US  | Unit is 100 microsecond. |  |
|                     | TIMESTAMP_UNIT_10MS   | Unit is 10 millisecond.  |  |
|                     | TIMESTAMP_UNIT_10NS   | Unit is 10 nanosecond.   |  |
|                     | TIMESTAMP_UNIT_10PS   | Unit is 10 picosecond.   |  |
|                     | TIMESTAMP_UNIT_10US   | Unit is 10 microsecond.  |  |
|                     | TIMESTAMP_UNIT_1MS  | Unit is 1 millisecond.   |  |
|                     | TIMESTAMP_UNIT_1NS  | Unit is 1 nonasecond.    |  |

|                           |                    |                        |              |
|---------------------------|--------------------|------------------------|--------------|
|                           | TIMESTAMP_UNIT_1PS | Unit is 1 picosecond.  |              |
|                           | TIMESTAMP_UNIT_1S  | Unit is 1 second.      |              |
|                           | TIMESTAMP_UNIT_1US | Unit is 1 microsecond. |              |
| Post-Build Variant Value  | false              |                        |              |
| Value Configuration Class | Pre-compile time   | X                      | All Variants |
|                           | Link time          | --                     |              |
|                           | Post-build time    | --                     |              |
| Scope / Dependency        | scope: local       |                        |              |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00002 :</b>  |    |              |
| <b>Name</b>                      | XcpVersionInfoApi  |    |              |
| <b>Description</b>               | Enables/disables the existence of the XCP_GetVersionInfo() API service.<br>TRUE: XCP_GetVersionInfo() API service exists<br>FALSE: XCP_GetVersionInfo() API service does not exist |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucBooleanParamDef  |    |              |
| <b>Default value</b>             | false  |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: local   |    |              |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00162 :</b>   |    |              |
| <b>Name</b>                      | XcpCounterRef   |    |              |
| <b>Description</b>               | This parameter contains a reference to the counter, which is used by XCP. |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | Reference to [ OsCounter ]  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: local  |    |              |

|   |   |    |                     |
|---|---|----|---------------------|
| <b>SWS Item</b>                         | <b>ECUC_Xcp_00180 :</b>   |    |                     |
| <b>Name</b>                             | XcpNvRamBlockIdRef  |    |                     |
| <b>Description</b>                      | This reference contains the link to a non-volatile memory block to be used in the feature "RESUME MODE" so this information has to be stored non volatile to be available directly after start-up of the ECU. |    |                     |
| <b>Multiplicity</b>                     | 0..1  |    |                     |
| <b>Type</b>                             | Symbolic name reference to [ NvMBlockDescriptor ]   |    |                     |
| <b>Post-Build Variant Multiplicity</b>  | true  |    |                     |
| <b>Post-Build Variant Value</b>         | true  |    |                     |
| <b>Multiplicity Configuration Class</b> | <b>Pre-compile time</b>   | X  | VARIANT-PRE-COMPILE |
|   | <b>Link time</b>  | -- |                     |
|   | <b>Post-build time</b>  | X  | VARIANT-POST-BUILD  |
| <b>Value Configuration Class</b>        | <b>Pre-compile time</b>   | X  | VARIANT-PRE-COMPILE |
|   | <b>Link time</b>  | -- |                     |
|   | <b>Post-build time</b>  | X  | VARIANT-POST-BUILD  |
| <b>Scope / Dependency</b>               | scope: local  |    |                     |

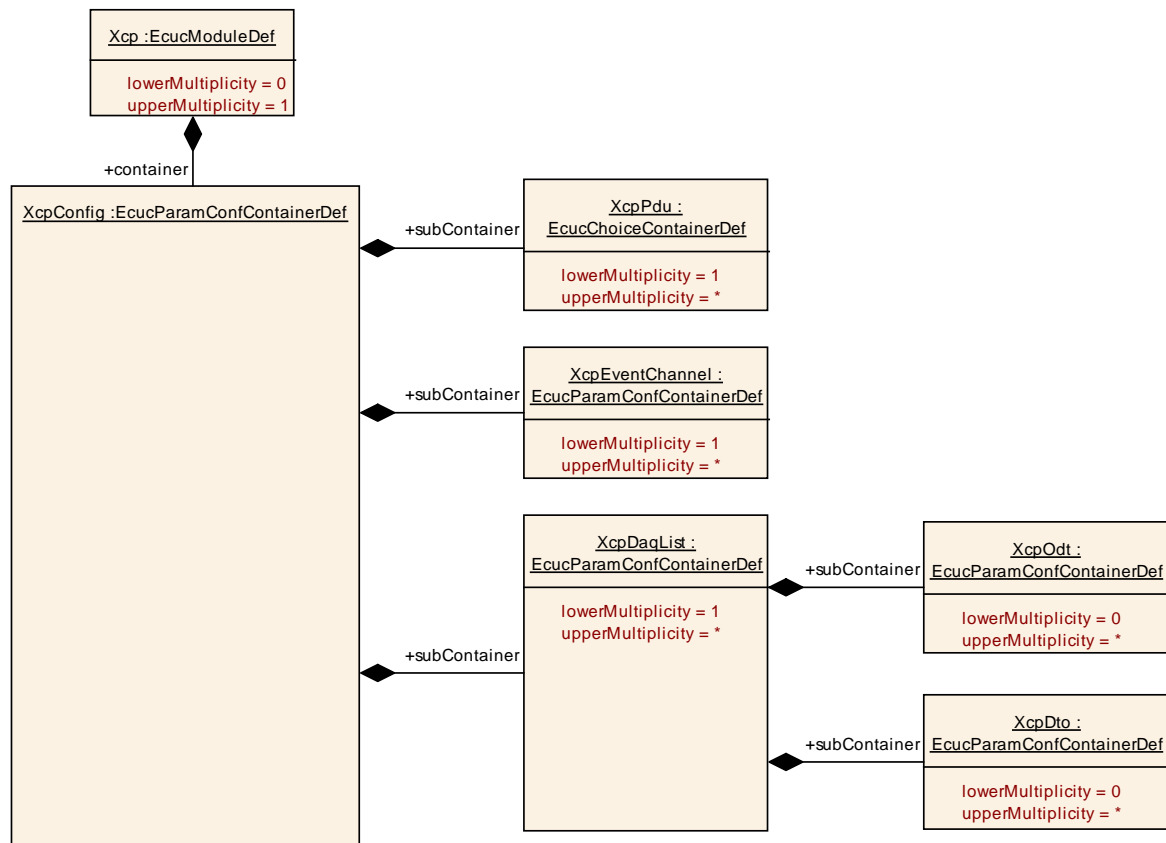
**No Included Containers**



### 10.2.3 XcpConfig

|                                 |  |
|---------------------------------|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00020 :</b>  |
| <b>Container Name</b>           | XcpConfig  |
| <b>Description</b>              | This container contains the configuration parameters and sub containers of the AUTOSAR Xcp module. |
| <b>Configuration Parameters</b> |  |

| <b>Included Containers</b> |                     |  |
|----------------------------|---------------------|--|
| <b>Container Name</b>      | <b>Multiplicity</b> | <b>Scope / Dependency</b>  |
| XcpDaqList                 | 1..*                | This container contains the configuration of the DAQs.                               |
| XcpEventChannel            | 1..*                | This container contains the configuration of event channels on the XCP slave.        |
| XcpPdu                     | 1..*                | Contains PDU information. A PDU may be either a transmission PDU or a reception PDU. |



### 10.2.4 XcpDaqList

|                                 |  |
|---------------------------------|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00050 :</b>                                |
| <b>Container Name</b>           | XcpDaqList   |
| <b>Description</b>              | This container contains the configuration of the DAQs. |
| <b>Configuration Parameters</b> |  |



|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00051 :</b>  |    |              |
| <b>Name</b>                      | XcpDaqListNumber   |    |              |
| <b>Description</b>               | Index number of the DAQ list                                     |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucIntegerParamDef (Symbolic Name generated for this parameter) |    |              |
| <b>Range</b>                     | 0 .. 65534   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU   |    |              |

|                                  |  |    |                                   |
|----------------------------------|--|----|-----------------------------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00052 :</b>  |    |                                   |
| <b>Name</b>                      | XcpDaqListType   |    |                                   |
| <b>Description</b>               | This indicates whether this DAQ list represents a DAQ or a STIM. |    |                                   |
| <b>Multiplicity</b>              | 1  |    |                                   |
| <b>Type</b>                      | EcucEnumerationParamDef  |    |                                   |
| <b>Range</b>                     | DAQ  |    | This DAQ list is a DAQ.           |
|                                  | DAQ_STIM   |    | This DAQ list can be DAQ or STIM. |
|                                  | STIM   |    | This DAQ list is a STIM.          |
| <b>Post-Build Variant Value</b>  | false  |    |                                   |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants                      |
|                                  | <b>Link time</b>   | -- |                                   |
|                                  | <b>Post-build time</b>   | -- |                                   |
| <b>Scope / Dependency</b>        | scope: ECU   |    |                                   |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00053 :</b>   |    |              |
| <b>Name</b>                      | XcpMaxOdt   |    |              |
| <b>Description</b>               | MAX_ODT indicates the maximum amount of ODTs in this DAQ list (STATIC configuration)          |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucIntegerParamDef   |    |              |
| <b>Range</b>                     | 0 .. 252  |    |              |
| <b>Default value</b>             | --  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU<br>dependency: only available if XcpDaqConfigType is "DAQ_STATIC" (bit set to '0') |    |              |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00058 :</b>   |    |              |
| <b>Name</b>                      | XcpMaxOdtEntries  |    |              |
| <b>Description</b>               | This parameter indicates the maximum amount of entries in an ODT of this DAQ list (STATIC configuration). |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucIntegerParamDef   |    |              |
| <b>Range</b>                     | 0 .. 255  |    |              |
| <b>Default value</b>             | --  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |

|                           |   |    |  |
|---------------------------|---|----|--|
|                           | <b>Post-build time</b>  | -- |  |
| <b>Scope / Dependency</b> | scope: ECU<br>dependency: only available if XcpDaqConfigType is "DAQ_STATIC" (bit set to '0') |    |  |

| <b>Included Containers</b> |                     |  |
|----------------------------|---------------------|--|
| <b>Container Name</b>      | <b>Multiplicity</b> | <b>Scope / Dependency</b>  |
| XcpDto                     | 0..*                | This container collects data transfer object specific parameters for the DAQ list. |
| XcpOdt                     | 0..*                | This container contains ODT-specific parameter for the DAQ list.                   |

### 10.2.5 XcpDto

|                                 |  |
|---------------------------------|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00065 :</b>  |
| <b>Container Name</b>           | XcpDto   |
| <b>Description</b>              | This container collects data transfer object specific parameters for the DAQ list. |
| <b>Configuration Parameters</b> |  |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00066 :</b>  |    |              |
| <b>Name</b>                      | XcpDtoPid  |    |              |
| <b>Description</b>               | Packet identifier (PID) of the DTO that identifies the ODT the content of the DTO. |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucIntegerParamDef (Symbolic Name generated for this parameter)                   |    |              |
| <b>Range</b>                     | 0 .. 251   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU   |    |              |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00067 :</b>   |    |              |
| <b>Name</b>                      | XcpDto2PduMapping   |    |              |
| <b>Description</b>               | This reference specifies the mapping of the DTO to the PDUs from the lower-layer interfaces (CanIf, FrIf, SoAd and Cdd).<br>A reference to a XcpRxPdu is only feasible if the the DaqListType is DAQ_STIM.<br>A reference to a XcpTxPdu is only feasible if the DaqListType is DAQ. |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | Choice reference to [ XcpRxPdu , XcpTxPdu ]   |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU  |    |              |

|                               |
|-------------------------------|
| <b>No Included Containers</b> |
|-------------------------------|

## 10.2.6 XcpOdt

|                                 |  |
|---------------------------------|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00055 :</b>  |
| <b>Container Name</b>           | XcpOdt   |
| <b>Description</b>              | This container contains ODT-specific parameter for the DAQ list. |
| <b>Configuration Parameters</b> |  |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00060 :</b>   |    |              |
| <b>Name</b>                      | XcpOdtEntryMaxSize  |    |              |
| <b>Description</b>               | This parameter indicates the upper limit for the size of the element described by an ODT entry. Depending on the DaqListType this ODT belongs to it describes the limit for a DAQ (MAX_ODT_ENTRY_SIZE_DAQ) or a STIM (MAX_ODT_ENTRY_SIZE_STIM). |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucIntegerParamDef   |    |              |
| <b>Range</b>                     | 0 .. 254  |    |              |
| <b>Default value</b>             | --  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU  |    |              |

|   |  |    |              |
|---|--|----|--------------|
| <b>SWS Item</b>                         | <b>ECUC_Xcp_00057 :</b>  |    |              |
| <b>Name</b>                             | XcpOdtNumber   |    |              |
| <b>Description</b>                      | Index number of this ODT within the DAQ list.                    |    |              |
| <b>Multiplicity</b>                     | 0..1   |    |              |
| <b>Type</b>                             | EcucIntegerParamDef (Symbolic Name generated for this parameter) |    |              |
| <b>Range</b>                            | 0 .. 251   |    |              |
| <b>Default value</b>                    | --   |    |              |
| <b>Post-Build Variant Multiplicity</b>  | false  |    |              |
| <b>Post-Build Variant Value</b>         | false  |    |              |
| <b>Multiplicity Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|   | <b>Link time</b>   | -- |              |
|   | <b>Post-build time</b>   | -- |              |
| <b>Value Configuration Class</b>        | <b>Pre-compile time</b>  | X  | All Variants |
|   | <b>Link time</b>   | -- |              |
|   | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>               | scope: ECU   |    |              |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00056 :</b>   |    |              |
| <b>Name</b>                      | XcpOdt2DtoMapping   |    |              |
| <b>Description</b>               | This reference maps the ODT to the according DTO in which it will be transmitted. |    |              |
| <b>Multiplicity</b>              | 0..1  |    |              |
| <b>Type</b>                      | Reference to [ XcpDto ]   |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU  |    |              |

|                            |                     |                           |
|----------------------------|---------------------|---------------------------|
| <b>Included Containers</b> |                     |                           |
| <b>Container Name</b>      | <b>Multiplicity</b> | <b>Scope / Dependency</b> |

|             |      |  |
|-------------|------|--|
| XcpOdtEntry | 1..* | This container collects all configuration parameters that comprise an ODT entry. |
|-------------|------|--|

### 10.2.7 XcpOdtEntry

|                                 |  |
|---------------------------------|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00061 :</b>  |
| <b>Container Name</b>           | XcpOdtEntry  |
| <b>Description</b>              | This container collects all configuration parameters that comprise an ODT entry. |
| <b>Configuration Parameters</b> |  |

|   |  |    |              |
|---|--|----|--------------|
| <b>SWS Item</b>                         | <b>ECUC_Xcp_00063 :</b>                              |    |              |
| <b>Name</b>                             | XcpOdtEntryAddress                                   |    |              |
| <b>Description</b>                      | Memory address that the ODT entry is referencing to. |    |              |
| <b>Multiplicity</b>                     | 0..1   |    |              |
| <b>Type</b>                             | EcucLinkerSymbolDef                                  |    |              |
| <b>Default value</b>                    | --   |    |              |
| <b>maxLength</b>                        | --   |    |              |
| <b>minLength</b>                        | --   |    |              |
| <b>regularExpression</b>                | --   |    |              |
| <b>Post-Build Variant Multiplicity</b>  | false  |    |              |
| <b>Post-Build Variant Value</b>         | false  |    |              |
| <b>Multiplicity Configuration Class</b> | <b>Pre-compile time</b>                              | X  | All Variants |
|   | <b>Link time</b>                                     | -- |              |
|   | <b>Post-build time</b>                               | -- |              |
| <b>Value Configuration Class</b>        | <b>Pre-compile time</b>                              | X  | All Variants |
|   | <b>Link time</b>                                     | -- |              |
|   | <b>Post-build time</b>                               | -- |              |
| <b>Scope / Dependency</b>               | scope: ECU   |    |              |

|   |  |    |              |
|---|--|----|--------------|
| <b>SWS Item</b>                         | <b>ECUC_Xcp_00179 :</b>  |    |              |
| <b>Name</b>                             | XcpOdtEntryBitOffset   |    |              |
| <b>Description</b>                      | Represent the bit offset in case of the element represents status bit. |    |              |
| <b>Multiplicity</b>                     | 0..1   |    |              |
| <b>Type</b>                             | EcucIntegerParamDef  |    |              |
| <b>Range</b>                            | 0 .. 31  |    |              |
| <b>Default value</b>                    | --   |    |              |
| <b>Post-Build Variant Multiplicity</b>  | false  |    |              |
| <b>Post-Build Variant Value</b>         | false  |    |              |
| <b>Multiplicity Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|   | <b>Link time</b>   | -- |              |
|   | <b>Post-build time</b>   | -- |              |
| <b>Value Configuration Class</b>        | <b>Pre-compile time</b>  | X  | All Variants |
|   | <b>Link time</b>   | -- |              |
|   | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>               | scope: ECU   |    |              |

|                    |   |  |  |
|--------------------|---|--|--|
| <b>SWS Item</b>    | <b>ECUC_Xcp_00064 :</b>   |  |  |
| <b>Name</b>        | XcpOdtEntryLength   |  |  |
| <b>Description</b> | Length of the referenced memory area that is referenced by the ODT entry. |  |  |

|   |                         |    |              |
|---|-------------------------|----|--------------|
| <b>Multiplicity</b>                     | 0..1                    |    |              |
| <b>Type</b>                             | EcucIntegerParamDef     |    |              |
| <b>Range</b>                            | 0 .. 255                |    |              |
| <b>Default value</b>                    | --                      |    |              |
| <b>Post-Build Variant Multiplicity</b>  | false                   |    |              |
| <b>Post-Build Variant Value</b>         | false                   |    |              |
| <b>Multiplicity Configuration Class</b> | <b>Pre-compile time</b> | X  | All Variants |
|   | <b>Link time</b>        | -- |              |
|   | <b>Post-build time</b>  | -- |              |
| <b>Value Configuration Class</b>        | <b>Pre-compile time</b> | X  | All Variants |
|   | <b>Link time</b>        | -- |              |
|   | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>               | scope: ECU              |    |              |

|   |                               |    |              |
|---|-------------------------------|----|--------------|
| <b>SWS Item</b>                         | <b>ECUC_Xcp_00062 :</b>       |    |              |
| <b>Name</b>                             | XcpOdtEntryNumber             |    |              |
| <b>Description</b>                      | Index number of the ODT entry |    |              |
| <b>Multiplicity</b>                     | 0..1                          |    |              |
| <b>Type</b>                             | EcucIntegerParamDef           |    |              |
| <b>Range</b>                            | 0 .. 254                      |    |              |
| <b>Default value</b>                    | --                            |    |              |
| <b>Post-Build Variant Multiplicity</b>  | false                         |    |              |
| <b>Post-Build Variant Value</b>         | false                         |    |              |
| <b>Multiplicity Configuration Class</b> | <b>Pre-compile time</b>       | X  | All Variants |
|   | <b>Link time</b>              | -- |              |
|   | <b>Post-build time</b>        | -- |              |
| <b>Value Configuration Class</b>        | <b>Pre-compile time</b>       | X  | All Variants |
|   | <b>Link time</b>              | -- |              |
|   | <b>Post-build time</b>        | -- |              |
| <b>Scope / Dependency</b>               | scope: ECU                    |    |              |

**No Included Containers**

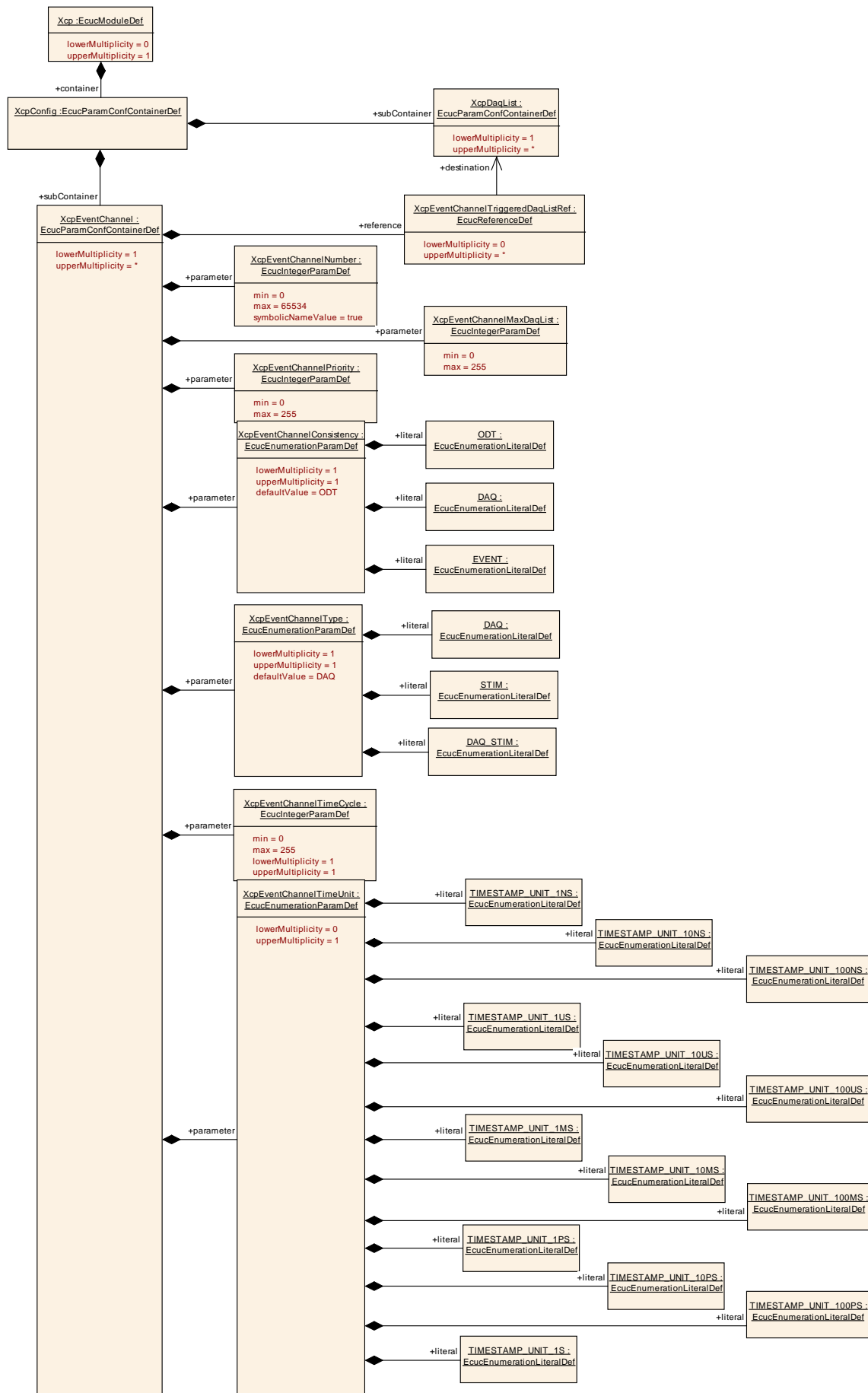


Figure 12: Diagram XcpOdtEntry

### 10.2.8 XcpEventChannel

|                                 |   |
|---------------------------------|---|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00150 :</b>   |
| <b>Container Name</b>           | XcpEventChannel   |
| <b>Description</b>              | This container contains the configuration of event channels on the XCP slave. |
| <b>Configuration Parameters</b> |   |

|                                  |   |   |              |
|----------------------------------|---|---|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00171 :</b>                   |   |              |
| <b>Name</b>                      | XcpEventChannelConsistency                |   |              |
| <b>Description</b>               | Type of consistency used by event channel |   |              |
| <b>Multiplicity</b>              | 1   |   |              |
| <b>Type</b>                      | EcucEnumerationParamDef                   |   |              |
| <b>Range</b>                     | DAQ                                       | Consistency on DAQ list level             |              |
|                                  | EVENT                                     | Consistency on Event Channel Level        |              |
|                                  | ODT                                       | Consistency on ODT level (default value). |              |
| <b>Default value</b>             | ODT                                       |   |              |
| <b>Post-Build Variant Value</b>  | false                                     |   |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>                   | X   | All Variants |
|                                  | <b>Link time</b>                          | --  |              |
|                                  | <b>Post-build time</b>                    | --  |              |
| <b>Scope / Dependency</b>        | scope: local                              |   |              |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00153 :</b>   |    |              |
| <b>Name</b>                      | XcpEventChannelMaxDaqList   |    |              |
| <b>Description</b>               | Maximum amount of DAQ lists that are handled by this event channel. |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucIntegerParamDef   |    |              |
| <b>Range</b>                     | 0 .. 255  |    |              |
| <b>Default value</b>             | --  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU  |    |              |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | ECUC_Xcp_00152 :   |    |              |
| <b>Name</b>                      | XcpEventChannelNumber  |    |              |
| <b>Description</b>               | Index number of the event channel.                               |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucIntegerParamDef (Symbolic Name generated for this parameter) |    |              |
| <b>Range</b>                     | 0 .. 65534   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU   |    |              |

|                 |                         |
|-----------------|-------------------------|
| <b>SWS Item</b> | <b>ECUC_Xcp_00154 :</b> |
|-----------------|-------------------------|

|                                  |                               |    |              |
|----------------------------------|-------------------------------|----|--------------|
| <b>Name</b>                      | XcpEventChannelPriority       |    |              |
| <b>Description</b>               | Priority of the event channel |    |              |
| <b>Multiplicity</b>              | 1                             |    |              |
| <b>Type</b>                      | EcucIntegerParamDef           |    |              |
| <b>Range</b>                     | 0 .. 255                      |    |              |
| <b>Default value</b>             | --                            |    |              |
| <b>Post-Build Variant Value</b>  | false                         |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>       | X  | All Variants |
|                                  | <b>Link time</b>              | -- |              |
|                                  | <b>Post-build time</b>        | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU                    |    |              |

|                                  |  |    |              |
|----------------------------------|--|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00173 :</b>  |    |              |
| <b>Name</b>                      | XcpEventChannelTimeCycle   |    |              |
| <b>Description</b>               | The event channel time cycle indicates which sampling period is used to process this event channel. A value of 0 means 'Not cyclic'. |    |              |
| <b>Multiplicity</b>              | 1  |    |              |
| <b>Type</b>                      | EcucIntegerParamDef  |    |              |
| <b>Range</b>                     | 0 .. 255   |    |              |
| <b>Default value</b>             | --   |    |              |
| <b>Post-Build Variant Value</b>  | false  |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|                                  | <b>Link time</b>   | -- |              |
|                                  | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>        | scope: local   |    |              |

|   |   |                          |              |
|---|---|--------------------------|--------------|
| <b>SWS Item</b>                         | <b>ECUC_Xcp_00174 :</b>   |                          |              |
| <b>Name</b>                             | XcpEventChannelTimeUnit   |                          |              |
| <b>Description</b>                      | This configuration parameter indicates the unit of the event channel time cycle.        |                          |              |
| <b>Multiplicity</b>                     | 0..1  |                          |              |
| <b>Type</b>                             | EcucEnumerationParamDef   |                          |              |
| <b>Range</b>                            | TIMESTAMP_UNIT_100MS  | Unit is 100 millisecond. |              |
|   | TIMESTAMP_UNIT_100NS  | Unit is 100 nanosecond.  |              |
|   | TIMESTAMP_UNIT_100PS  | Unit is 100 picosecond.  |              |
|   | TIMESTAMP_UNIT_100US  | Unit is 100 microsecond. |              |
|   | TIMESTAMP_UNIT_10MS   | Unit is 10 millisecond.  |              |
|   | TIMESTAMP_UNIT_10NS   | Unit is 10 nanosecond.   |              |
|   | TIMESTAMP_UNIT_10PS   | Unit is 10 picosecond.   |              |
|   | TIMESTAMP_UNIT_10US   | Unit is 10 microsecond.  |              |
|   | TIMESTAMP_UNIT_1MS  | Unit is 1 millisecond.   |              |
|   | TIMESTAMP_UNIT_1NS  | Unit is 1 nonasecond.    |              |
|   | TIMESTAMP_UNIT_1PS  | Unit is 1 picosecond.    |              |
|   | TIMESTAMP_UNIT_1S   | Unit is 1 second.        |              |
|   | TIMESTAMP_UNIT_1US  | Unit is 1 microsecond.   |              |
| <b>Post-Build Variant Multiplicity</b>  | false   |                          |              |
| <b>Post-Build Variant Value</b>         | false   |                          |              |
| <b>Multiplicity Configuration Class</b> | <b>Pre-compile time</b>   | X                        | All Variants |
|   | <b>Link time</b>  | --                       |              |
|   | <b>Post-build time</b>  | --                       |              |
| <b>Value Configuration Class</b>        | <b>Pre-compile time</b>   | X                        | All Variants |
|   | <b>Link time</b>  | --                       |              |
|   | <b>Post-build time</b>  | --                       |              |
| <b>Scope / Dependency</b>               | scope: local<br>dependency: Dependent on the Parameter EventChannelTimeCycle. When this |                          |              |



|  |   |
|--|---|
|  | parameter is set to 0, the entire event channel time unit parameter shall be ignored. |
|--|---|

|                           |  |   |              |
|---------------------------|--|---|--------------|
| SWS Item                  | ECUC_Xcp_00172 :   |   |              |
| Name                      | XcpEventChannelType  |   |              |
| Description               | This configuration parameter indicates what kind of DAQ list can be allocated to this event channel. |   |              |
| Multiplicity              | 1  |   |              |
| Type                      | EcucEnumerationParamDef  |   |              |
| Range                     | DAQ  | only DAQ supported (default value).           |              |
|                           | DAQ_STIM   | Both DAQ and STIM supported (Simultaneously). |              |
|                           | STIM   | only STIM supported                           |              |
| Default value             | DAQ  |   |              |
| Post-Build Variant Value  | false  |   |              |
| Value Configuration Class | Pre-compile time   | X   | All Variants |
|                           | Link time  | --  |              |
|                           | Post-build time  | --  |              |
| Scope / Dependency        | scope: local   |   |              |

|   |  |    |              |
|---|--|----|--------------|
| <b>SWS Item</b>                         | <b>ECUC_Xcp_00151 :</b>  |    |              |
| <b>Name</b>                             | XcpEventChannelTriggeredDaqListRef                                 |    |              |
| <b>Description</b>                      | References all DAQ lists that are triggered by this event channel. |    |              |
| <b>Multiplicity</b>                     | 0..*   |    |              |
| <b>Type</b>                             | Reference to [ XcpDaqList ]  |    |              |
| <b>Post-Build Variant Multiplicity</b>  | false  |    |              |
| <b>Post-Build Variant Value</b>         | false  |    |              |
| <b>Multiplicity Configuration Class</b> | <b>Pre-compile time</b>  | X  | All Variants |
|   | <b>Link time</b>   | -- |              |
|   | <b>Post-build time</b>   | -- |              |
| <b>Value Configuration Class</b>        | <b>Pre-compile time</b>  | X  | All Variants |
|   | <b>Link time</b>   | -- |              |
|   | <b>Post-build time</b>   | -- |              |
| <b>Scope / Dependency</b>               | scope: ECU   |    |              |

**No Included Containers**

### 10.2.9 XcpPdu

|                              |  |  |  |
|------------------------------|--|--|--|
| <b>SWS Item</b>              | <b>ECUC_Xcp_00100 :</b>  |  |  |
| <b>Choice container Name</b> | XcpPdu   |  |  |
| <b>Description</b>           | Contains PDU information. A PDU may be either a transmission PDU or a reception PDU. |  |  |

| <b>Container Choices</b> |                     |   |
|--------------------------|---------------------|---|
| <b>Container Name</b>    | <b>Multiplicity</b> | <b>Scope / Dependency</b>                   |
| XcpRxPdu                 | 0..1                | This container specifies received PDUs.     |
| XcpTxPdu                 | 0..1                | This container specifies transmission PDUs. |

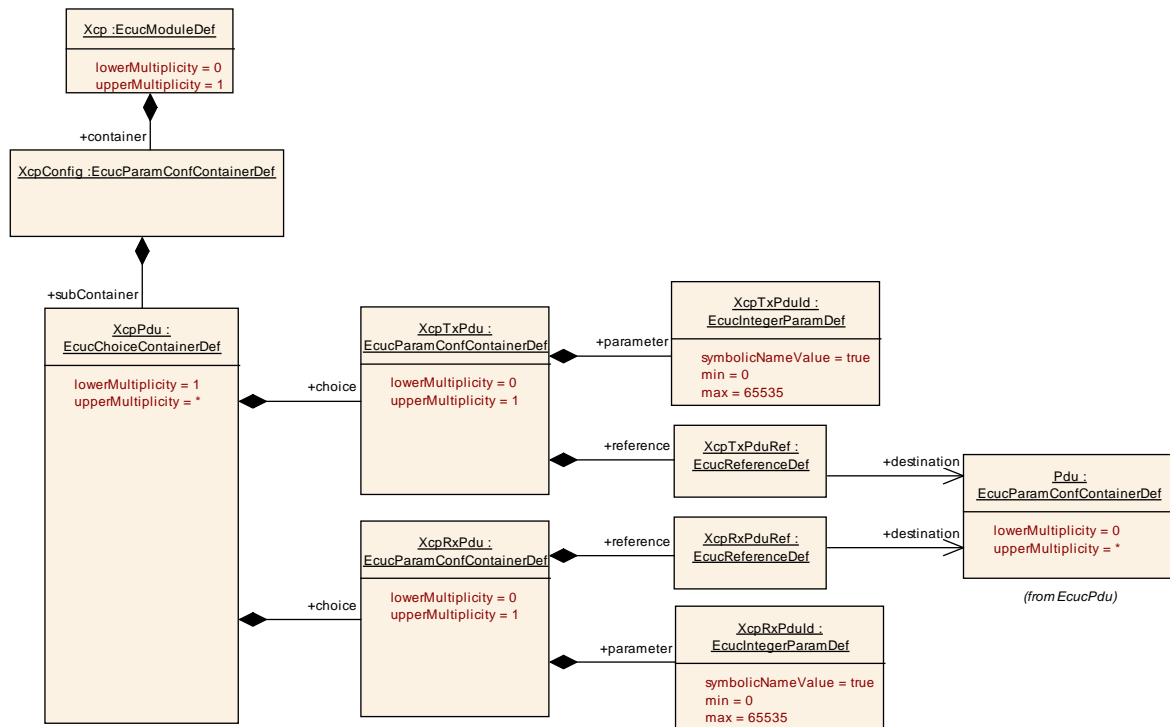


Figure 13: Diagram XcpPdu

## 10.2.10 XcpRxPdu

|                                 |   |  |  |
|---------------------------------|---|--|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00105 :</b>                 |  |  |
| <b>Container Name</b>           | XcpRxPdu                                |  |  |
| <b>Description</b>              | This container specifies received PDUs. |  |  |
| <b>Configuration Parameters</b> |   |  |  |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00106 :</b>   |    |              |
| <b>Name</b>                      | XcpRxPduId  |    |              |
| <b>Description</b>               | ID of the PDU that will be received via a Xcp_<module>RxIndication. |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucIntegerParamDef (Symbolic Name generated for this parameter)    |    |              |
| <b>Range</b>                     | 0 .. 65535  |    |              |
| <b>Default value</b>             | --  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU  |    |              |

|                                  |                         |    |                     |
|----------------------------------|-------------------------|----|---------------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00107 :</b> |    |                     |
| <b>Name</b>                      | XcpRxPduRef             |    |                     |
| <b>Description</b>               | --                      |    |                     |
| <b>Multiplicity</b>              | 1                       |    |                     |
| <b>Type</b>                      | Reference to [ Pdu ]    |    |                     |
| <b>Post-Build Variant Value</b>  | true                    |    |                     |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b> | X  | VARIANT-PRE-COMPILE |
|                                  | <b>Link time</b>        | -- |                     |

|                           |                        |    |                    |
|---------------------------|------------------------|----|--------------------|
|                           | <b>Link time</b>       | -- |                    |
|                           | <b>Post-build time</b> | X  | VARIANT-POST-BUILD |
| <b>Scope / Dependency</b> | scope: ECU             |    |                    |

**No Included Containers**

### 10.2.11 XcpTxPdu

|                                 |   |  |  |
|---------------------------------|---|--|--|
| <b>SWS Item</b>                 | <b>ECUC_Xcp_00101 :</b>                     |  |  |
| <b>Container Name</b>           | XcpTxPdu                                    |  |  |
| <b>Description</b>              | This container specifies transmission PDUs. |  |  |
| <b>Configuration Parameters</b> |   |  |  |

|                                  |   |    |              |
|----------------------------------|---|----|--------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00103 :</b>   |    |              |
| <b>Name</b>                      | XcpTxPduld  |    |              |
| <b>Description</b>               | The PDU identifier, which has to be used by the lower layer BSW module for TxConfirmations or TriggerTransmits. |    |              |
| <b>Multiplicity</b>              | 1   |    |              |
| <b>Type</b>                      | EcucIntegerParamDef (Symbolic Name generated for this parameter)  |    |              |
| <b>Range</b>                     | 0 .. 65535  |    |              |
| <b>Default value</b>             | --  |    |              |
| <b>Post-Build Variant Value</b>  | false   |    |              |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>   | X  | All Variants |
|                                  | <b>Link time</b>  | -- |              |
|                                  | <b>Post-build time</b>  | -- |              |
| <b>Scope / Dependency</b>        | scope: ECU  |    |              |

|                                  |   |    |                     |
|----------------------------------|---|----|---------------------|
| <b>SWS Item</b>                  | <b>ECUC_Xcp_00104 :</b>                   |    |                     |
| <b>Name</b>                      | XcpTxPduRef                               |    |                     |
| <b>Description</b>               | Reference to the external PDU definition. |    |                     |
| <b>Multiplicity</b>              | 1   |    |                     |
| <b>Type</b>                      | Reference to [ Pdu ]                      |    |                     |
| <b>Post-Build Variant Value</b>  | true                                      |    |                     |
| <b>Value Configuration Class</b> | <b>Pre-compile time</b>                   | X  | VARIANT-PRE-COMPILE |
|                                  | <b>Link time</b>                          | -- |                     |
|                                  | <b>Post-build time</b>                    | X  | VARIANT-POST-BUILD  |
| <b>Scope / Dependency</b>        | scope: ECU                                |    |                     |

**No Included Containers**

## 10.3 Published Information

For details refer to the chapter 10.3 “Published Information” in *SWS\_BSWGeneral*.

## 11 Not applicable requirements

**[SWS\_Xcp\_00999]** [ These requirements are not applicable to this specification. ]  
(SRS\_BSW\_00171, SRS\_BSW\_00170, SRS\_BSW\_00375, SRS\_BSW\_00416,  
SRS\_BSW\_00168, SRS\_BSW\_00423, SRS\_BSW\_00425, SRS\_BSW\_00426,  
SRS\_BSW\_00427, SRS\_BSW\_00428, SRS\_BSW\_00432, SRS\_BSW\_00336,  
SRS\_BSW\_00417, SRS\_BSW\_00161, SRS\_BSW\_00162, SRS\_BSW\_00005,  
SRS\_BSW\_00415, SRS\_BSW\_00164, SRS\_BSW\_00325, SRS\_BSW\_00413,  
SRS\_BSW\_00347, SRS\_BSW\_00335, SRS\_BSW\_00410, SRS\_BSW\_00314,  
SRS\_BSW\_00328, SRS\_BSW\_00312, SRS\_BSW\_00006, SRS\_BSW\_00377,  
SRS\_BSW\_00306, SRS\_BSW\_00309, SRS\_BSW\_00371, SRS\_BSW\_00360,  
SRS\_BSW\_00330, SRS\_BSW\_00331, SRS\_BSW\_00009, SRS\_BSW\_00401,  
SRS\_BSW\_00172, SRS\_BSW\_00010, SRS\_BSW\_00333, SRS\_BSW\_00321,  
SRS\_BSW\_00341, SRS\_Xcp\_29008)