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4.1.2	AUTOSAR Release Management	<ul style="list-style-type: none"> • Minor corrections • Editorial changes • Removed chapter(s) on change documentation
4.1.1	AUTOSAR Administration	<ul style="list-style-type: none"> • Reclassify XCP_E_INIT_FAILED from class production error to development
4.1.1	AUTOSAR Administration	<ul style="list-style-type: none"> • Added parameters for Event Channel and Timestamp configuration • Added possibility to calculate memory consumption for ODT (DAQ & STIM) • Restructuring configuration parameters for static & dynamic ODT • Added support for deactivation of transmission capabilities
4.0.3	AUTOSAR Administration	<ul style="list-style-type: none"> • Add chapter 7.8 (Version check), RTE limitation, OS Counter Ref • Remove InstanceID and known limitation (OS)
3.1.5	AUTOSAR Administration	<ul style="list-style-type: none"> • Initial Release

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Table of Contents

1	Introduction and functional overview	5
2	Acronyms and abbreviations	6
3	Related documentation.....	7
3.1	Input documents.....	7
3.1.1	Related standards and norms.....	7
3.2	Related specification	8
4	Constraints and assumptions	9
4.1	Limitations	9
4.2	Applicability to car domains.....	9
5	Dependencies to other modules.....	10
5.1	AUTOSAR RTE (BSW Scheduler)	10
5.2	AUTOSAR FlexRay Interface	10
5.3	AUTOSAR CAN Interface.....	10
5.4	AUTOSAR SocketAdaptor.....	10
5.5	AUTOSAR RTE	10
5.6	AUTOSAR OS.....	10
5.7	AUTOSAR Diagnostic Event Manager	10
5.8	AUTOSAR Development Error Tracer.....	11
5.9	File structure.....	11
5.9.1	Code file structure.....	11
5.9.2	Header file structure.....	11
6	Requirements traceability	14
7	Functional specification	20
7.1	XCP on CAN	23
7.2	XCP on FlexRay	23
7.3	XCP on Ethernet.....	25
7.4	Requirements on Debugging.....	26
7.4.1	General Requirements.....	26
7.5	Error classification	26
7.6	Error detection	27
7.7	Error notification	27
7.8	Version checking.....	27
8	API specification.....	28
8.1	Imported types.....	28
8.2	Type definitions	28
8.2.1	Xcp_ConfigType	28
8.2.2	Xcp_Transmission Mode Type.....	28
8.3	Function definitions.....	29
8.3.1	Xcp_Init.....	29
Xcp_GetVersionInfo	30	
8.4	Call-back notifications.....	31

8.4.1	Xcp_<Lo>RxIndication	31
8.4.2	Xcp_<Lo>TxConfirmation	32
8.4.3	Xcp_<Lo>TriggerTransmit	32
8.4.4	Xcp_SetTransmissionMode	33
8.5	Scheduled functions	34
8.5.1	Xcp_MainFunction	34
8.6	Expected Interfaces.....	35
8.6.1	Mandatory Interfaces	35
8.6.2	Optional Interfaces.....	35
8.6.3	Configurable interfaces	36
9	Sequence diagrams	37
9.1	XCP on FlexRay.....	37
9.1.1	Xcp on FlexRay Transmit.....	37
9.1.2	Xcp on FlexRay Receive Indication	37
9.2	XCP on CAN	38
9.2.1	Xcp on CAN Transmit	38
9.2.2	Xcp on CAN Transmit Confirmation	39
9.2.3	Xcp on CAN Receive Indication	39
9.3	XCP on Ethernet.....	40
9.3.1	Xcp on Ethernet Receive Indication	40
10	Configuration specification.....	41
10.1	How to read this chapter	41
10.2	Containers and configuration parameters	41
10.2.1	Variants	42
10.2.2	Xcp	42
10.2.3	XcpGeneral.....	43
10.2.4	XcpConfig.....	51
10.2.5	XcpDaqList	52
10.2.6	XcpDto.....	54
10.2.7	XcpOdt.....	54
10.2.8	XcpOdtEntry	56
10.2.9	XcpEventChannel.....	59
10.2.10	XcpPdu.....	61
10.2.11	XcpRxPdu.....	62
10.2.12	XcpTxPdu	63
10.3	Published Information.....	64
11	Not applicable requirements	65

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

In order to be able to report development errors, the XCP has to have access to the error hook of the Development 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] [

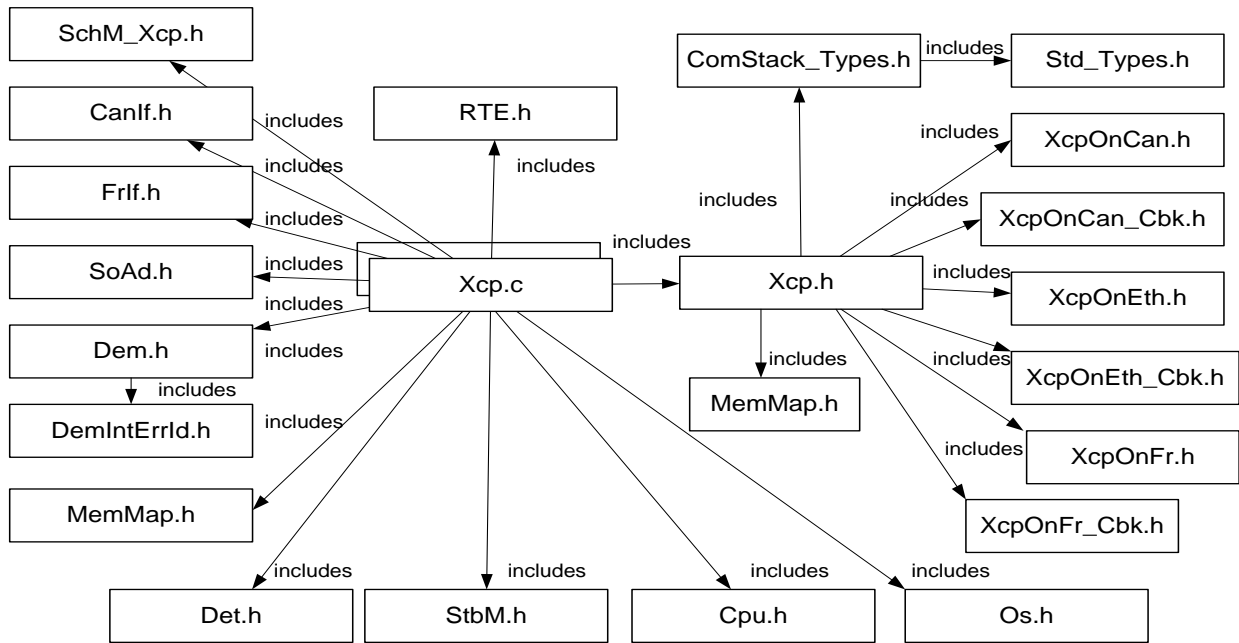


Figure 1: XCP Header File Structure

] (SRS_BSW_00381, SRS_BSW_00412, SRS_BSW_00409, SRS_BSW_00301)

The XCP module shall include the *Dem.h* file. By this inclusion, the APIs to report errors as well as the required Event Id symbols are included. This specification defines the name of the Event Id symbols, which are provided by XML to the DEM configuration tool. The DEM configuration tool assigns ECU dependent values to the Event Id symbols and publishes the symbols in *Dem_IntErrId.h*.

[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
-	-	SWS_Xcp_00500
-	-	SWS_Xcp_00506
-	-	SWS_Xcp_00507
-	-	SWS_Xcp_00508
-	-	SWS_Xcp_00708
-	-	SWS_Xcp_00715
-	-	SWS_Xcp_00716
-	-	SWS_Xcp_00718
-	-	SWS_Xcp_00721
-	-	SWS_Xcp_00722
-	-	SWS_Xcp_00723
-	-	SWS_Xcp_00724
-	-	SWS_Xcp_00725
-	-	SWS_Xcp_00726
-	-	SWS_Xcp_00728
-	-	SWS_Xcp_00729
-	-	SWS_Xcp_00730
-	-	SWS_Xcp_00731
-	-	SWS_Xcp_00732
-	-	SWS_Xcp_00735
-	-	SWS_Xcp_00736
-	-	SWS_Xcp_00737
-	-	SWS_Xcp_00738
-	-	SWS_Xcp_00739
-	-	SWS_Xcp_00740
-	-	SWS_Xcp_00764
-	-	SWS_Xcp_00768
-	-	SWS_Xcp_00801
-	-	SWS_Xcp_00802
-	-	SWS_Xcp_00813
-	-	SWS_Xcp_00814
-	-	SWS_Xcp_00824
-	-	SWS_Xcp_00825
-	-	SWS_Xcp_00831
-	-	SWS_Xcp_00832
-	-	SWS_Xcp_00833

-	-	SWS_Xcp_00835
-	-	SWS_Xcp_00836
-	-	SWS_Xcp_00840
-	-	SWS_Xcp_00841
-	-	SWS_Xcp_00842
-	-	SWS_Xcp_00843
-	-	SWS_Xcp_00844
-	-	SWS_Xcp_00845
-	-	SWS_Xcp_00846
-	-	SWS_Xcp_00847
-	-	SWS_Xcp_00848
-	-	SWS_Xcp_00849
-	-	SWS_Xcp_00850
BSW00431	-	SWS_Xcp_00999
BSW00434	-	SWS_Xcp_00999
BSW420023	-	SWS_Xcp_00855, SWS_Xcp_00856
BSW42911	-	SWS_Xcp_00711
SRS_BSW_00003	All software modules shall provide version and identification information	SWS_Xcp_00807
SRS_BSW_00005	Modules of the $\hat{\mu}$ 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 $\hat{\mu}$ 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	SWS_Xcp_00999

	drivers or modules	
SRS_BSW_00167	All AUTOSAR Basic Software Modules shall provide configuration rules and constraints to enable plausibility checks	SWS_Xcp_00103, SWS_Xcp_00104, 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 only export information needed by other modules	SWS_Xcp_00505
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_00326	-	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_00329	-	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 seperation 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_00370	-	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_00387	-	SWS_Xcp_00999
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	SWS_Xcp_00807

	module implementation	
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 implemented as "const" it should be placed into a separate c-file	SWS_Xcp_00501
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	SWS_Xcp_00712,

	transmit- and receive APIs of the Bus Interfaces	SWS_Xcp_00714, SWS_Xcp_00720, 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, 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

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.

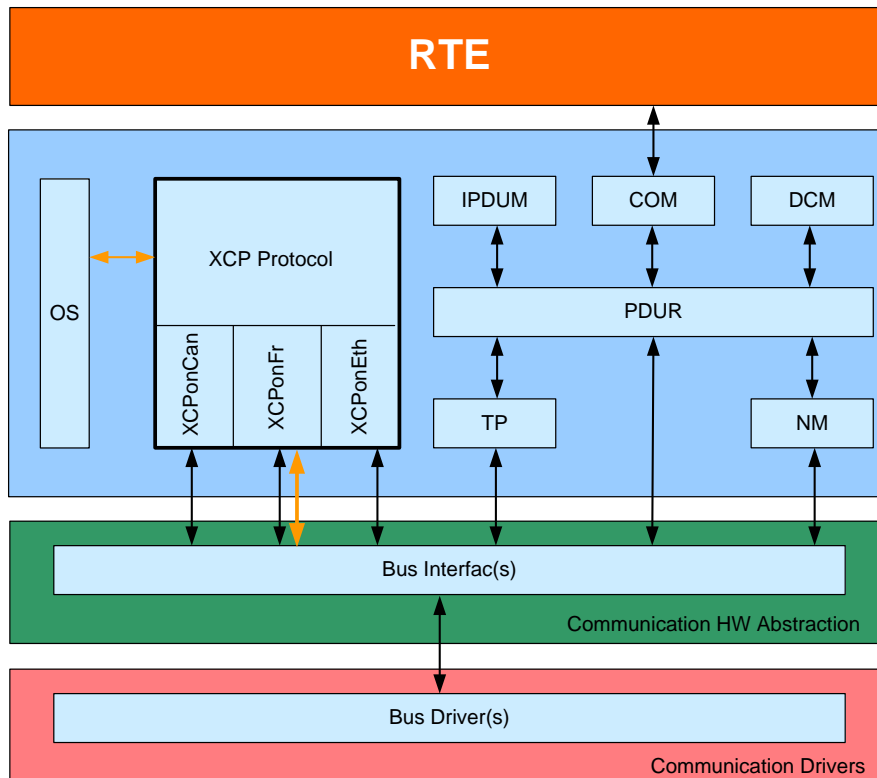


Figure 2: Description

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 [\[13\]](#)] (BSW42911)

[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 [\[13\]](#)] (BSW420023)

[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] (BSW420023)

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 Requirements on Debugging

[SWS_Xcp_00764] {OBSOLETE}[

The internal XCP states shall be available for debugging.] ()

In general, it is not necessary/intended for AUTOSAR debugging, that SWS documents define specific variables.

7.4.1 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)

<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
API call with wrong PDU ID	Development	XCP_E_INVALID_PDUID	0x03
Initialization of XCP failed	Development	XCP_E_INIT_FAILED	0x04

Null pointer has been passed as an argument	Development	XCP_E_PARAM_POINTER	0x12
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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][

<i>Module</i>	<i>Imported Type</i>
ComStack_Types	NetworkHandleType
	PdulType
	PdulInfoType
Dem	Dem_EventIdType
	Dem_EventStatusType
Os	CounterType
	StatusType
	TickRefType
Std_Types	Std_ReturnType
	Std_VersionInfoType

] ()

8.2 Type definitions

8.2.1 Xcp_ConfigType

[SWS_Xcp_00845][

Name:	Xcp_ConfigType	
Type:	Structure	
Range:	implementation specific	The content of the initialization data structure is implementation specific
Description:	This is the type of the data structure containing the initialization data for XCP.	

] ()

8.2.2 Xcp_Transmission Mode Type

[SWS_Xcp_00846][

Name:	Xcp_TransmissionModeType	
Type:	Enumeration	
Range:	XCP_TX_OFF	Transmission Disabled
	XCP_TX_ON	Transmission Enabled
Description:	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] [

Service name:	Xcp_Init	
Syntax:	<pre>void Xcp_Init(const Xcp_ConfigType* Xcp_ConfigPtr)</pre>	
Service ID[hex]:	0x00	
Sync/Async:	Synchronous	
Reentrancy:	Non Reentrant	
Parameters (in):	Xcp_ConfigPtr	Pointer to a selected configuration structure
Parameters (inout):	None	
Parameters (out):	None	
Return value:	void	--
Description:	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] ()

Xcp_GetVersionInfo

[SWS_Xcp_00807] [

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

Service name:	Xcp_<module>RxIndication	
Syntax:	<pre>void Xcp_<module>RxIndication(PduIdType XcpRxPduId, const PduInfoType* XcpRxPduPtr)</pre>	
Service ID[hex]:	0x03	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant for different XcpRxPduld, non reentrant for the same XcpRxPduld	
Parameters (in):	XcpRxPduld	PDU-ID that has been received
	XcpRxPduPtr	Pointer to SDU (Buffer of received payload)
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This function is called by the lower layers (i.e. FlexRay Interface, TTCAN Interface and Socket Adaptor or CDD) when an AUTOSAR XCP PDU has been received	

] ()

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_NO_INIT)
- XcpRxPduPtr 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] [

Service name:	Xcp_<module>TxConfirmation	
Syntax:	void Xcp_<module>TxConfirmation(PduIdType XcpTxPduId)	
Service ID[hex]:	0x02	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant for different XcpTxPduls, non reentrant for the same XcpTxPdul	
Parameters (in):	XcpTxPdul	PDU-ID that has been transmitted
Parameters (inout):	None	
Parameters (out):	None	
Return value:	void	--
Description:	This function is called by the lower layers (i.e. FlexRay Interface, TTCAN Interface and Socket Adaptor or CDD) when an AUTOSAR XCP PDU has been transmitted	

] ()

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] [

Service name:	Xcp_<Lo>TriggerTransmit	
Syntax:	Std_ReturnType Xcp_<Lo>TriggerTransmit(PduIdType TxPduId, PduInfoType* PduInfoPtr)	
Service ID[hex]:	0x41	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant for different Pduls. Non reentrant for the same Pdul.	
Parameters (in):	TxPdul	ID of the SDU that is requested to be transmitted.
Parameters (inout):	PduInfoPtr	Contains a pointer to a buffer (SduDataPtr) to where the SDU data shall be copied, and the available buffer size in SduLengh.

		On return, the service will indicate the length of the copied SDU data in SduLength.
Parameters (out):	None	
Return value:	Std_ReturnType	E_OK: SDU has been copied and SduLength indicates the number of copied bytes. 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.
Description:	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][

Service name:	Xcp_SetTransmissionMode	
Syntax:	void Xcp_SetTransmissionMode(NetworkHandleType Channel, Xcp_TransmissionModeType Mode)	
Service ID[hex]:	0x05	
Sync/Async:	Synchronous	
Reentrancy:	Non Reentrant	
Parameters (in):	Channel	The Network channel for the used bus communication
	Mode	Enabled or disabled Transmission mode Parameters
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	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]

Service name:	Xcp_MainFunction
Syntax:	void Xcp_MainFunction(void)
Service ID[hex]:	0x04
Description:	Scheduled function of the XCP module

Service name:	Xcp_MainFunction
Syntax:	void Xcp_MainFunction(void)
Service ID[hex]:	0x04
Description:	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

API function	Description
<UL_RxIndication>	This API service of an upper layer BSW module (e.g. PduR, FrTp, FrNm, Xcp) is called by the FlexRay Interface to indicate to this upper layer BSW module that the PDU with index FrLf_RxPduId has been received via the FlexRay Communication System.
<UL_TxConfirmation>	This API service of an upper layer BSW module (e.g. PduR, FrTp, FrNm, Xcp) is called by the FlexRay Interface to confirm to this upper layer BSW module that the PDU with index FrLf_TxPduId has been transmitted via the FlexRay Communication System.
<User_RxIndication>	This service indicates a successful reception of a received Message to the corresponding UL module. This service provides the syntax with a PDU Info pointer.
<User_TxConfirmation>	This service confirms a previous successfully processed CAN transmit request.
CanLf_Transmit	This service initiates a request for transmission of the CAN L-PDU specified by the CanTxSduId and CAN related data in the L-SDU structure.
Dem_ReportErrorStatus	Queues the reported events from the BSW modules (API is only used by BSW modules). The interface has an asynchronous behavior, because the processing of the event is done within the Dem main function. OBD Events Suppression shall be ignored for this computation.
FrLf_Transmit	Requests the sending of a PDU.
SoAd_IfTransmit	Requests transmission of an I-PDU.

8.6.2 Optional Interfaces

[SWS_Xcp_00832] [

API function	Description
Det_ReportError	Service to report development errors.
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.

] ()

[SWS_Xcp_00833] [

API function	Description
FrLf_ReconfigLPdu	API can be used for buffer reconfiguration of the FlexRay CC
FrLf_DisableLPdu	API can be used to disable the transmission or reception of LPdus

] ()

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).

[SWS_Xcp_00831] [

<i>API function</i>	<i>Description</i>
<Cdd_Transmit>	Requests the sending of a PDU via Complex Driver
<Xcp_CddTxConfirmation>	API confirming the successful transmission of the PDU
<Xcp_CddRxIndication>	This API service called by the AUTOSAR Cdd indicates a successful reception of an L-PDU.
()	

9 Sequence diagrams

9.1 XCP on FlexRay

9.1.1 Xcp on FlexRay Transmit

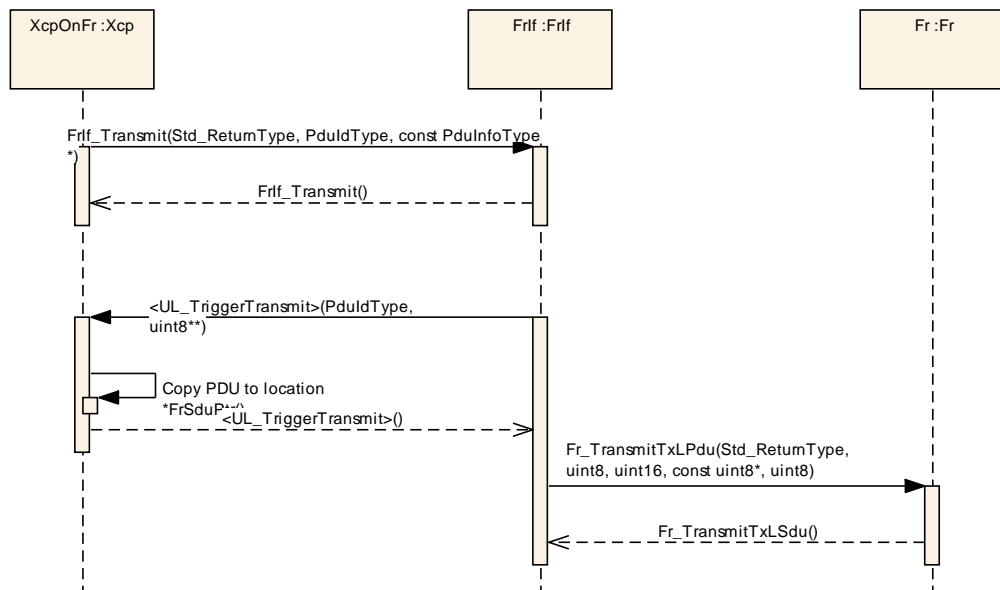


Figure 3: Xcp On FlexRay Transmit

9.1.2 Xcp on FlexRay Receive Indication

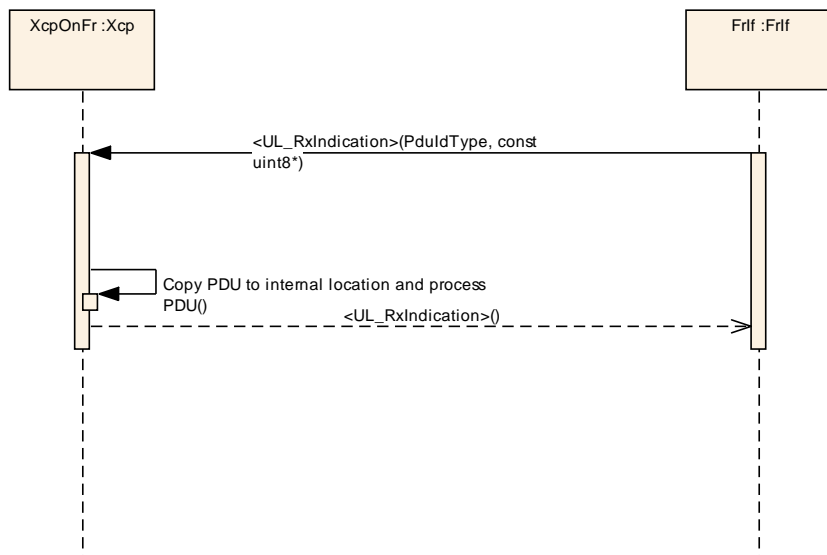


Figure 4: Xcp on FlexRay Receive Indication

9.2 XCP on CAN

9.2.1 Xcp on CAN Transmit

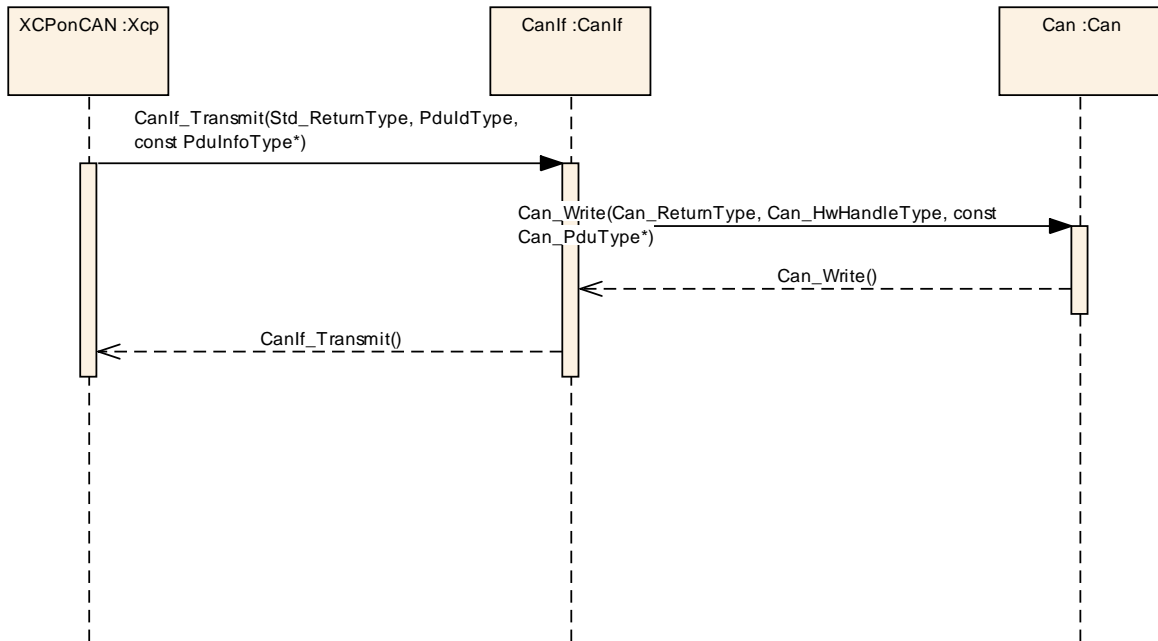


Figure 5: Xcp on Can Transmit

9.2.2 Xcp on CAN Transmit Confirmation

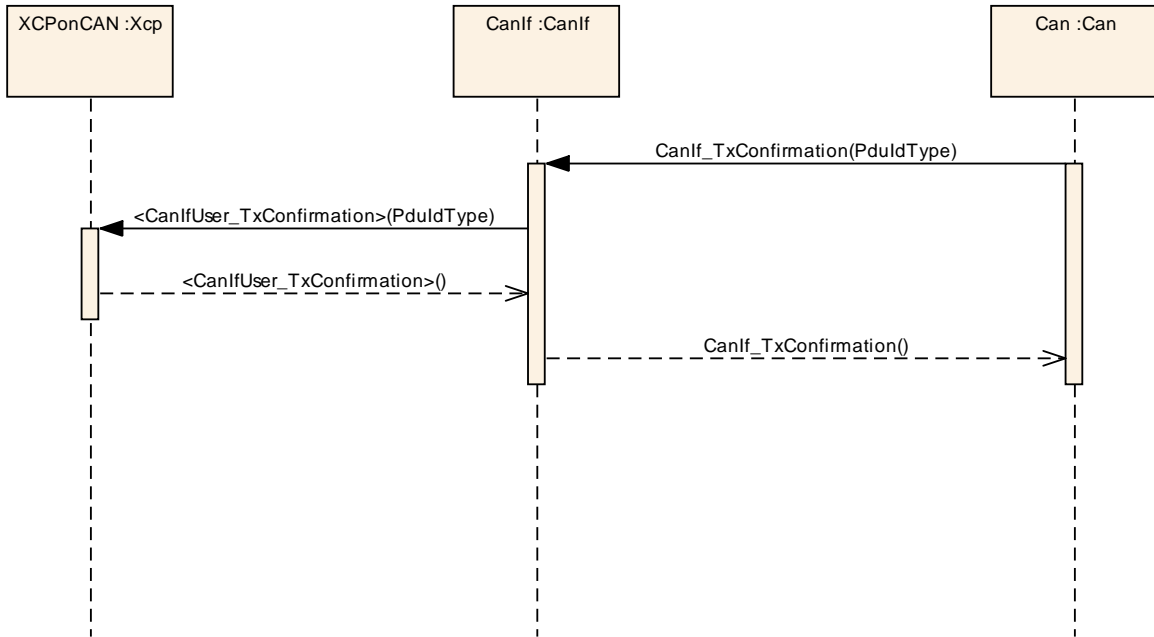


Figure 6: Xcp on CAN Transmit Confirmation

9.2.3 Xcp on CAN Receive Indication

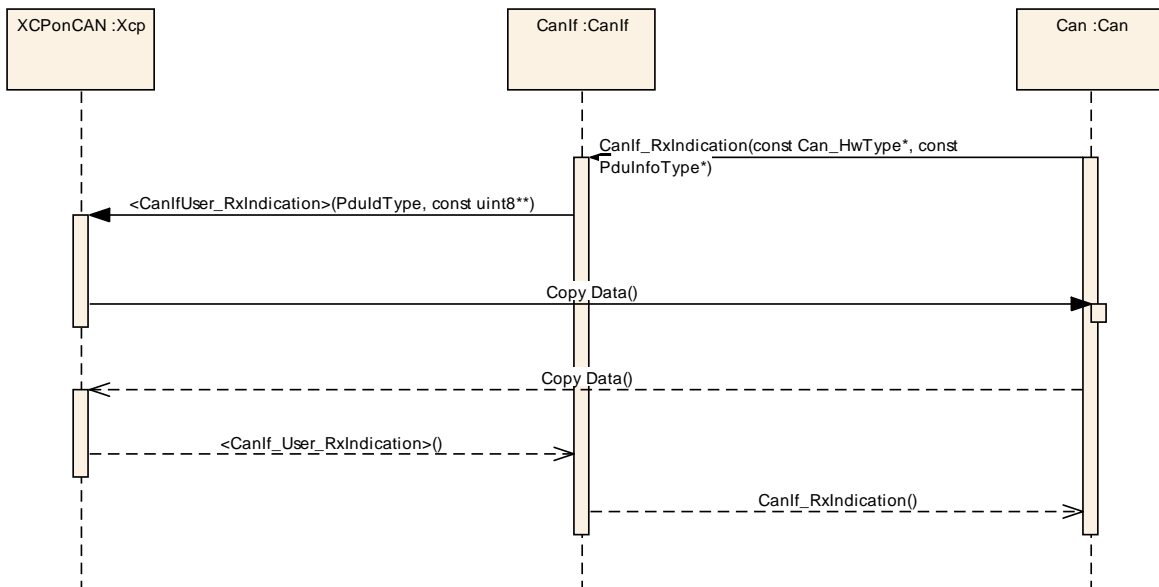


Figure 7: Xcp on CAN Receive Indication

9.3 XCP on Ethernet

9.3.1 Xcp on Ethernet Receive Indication

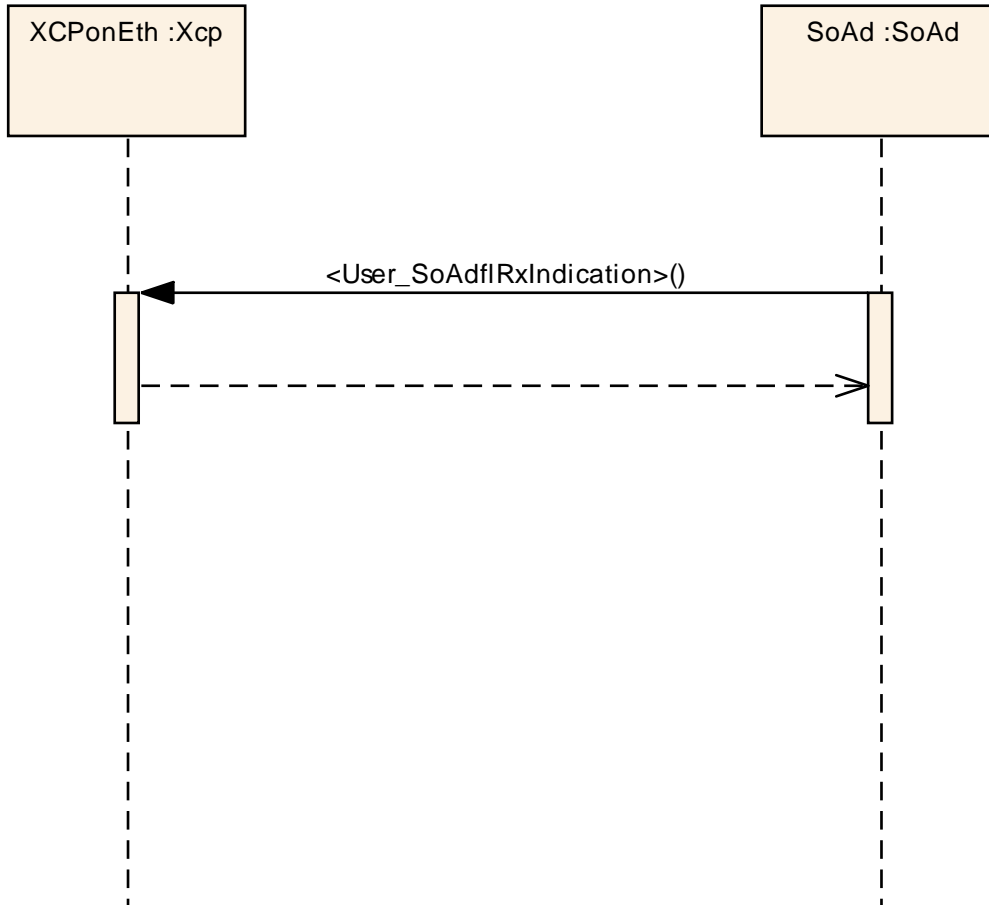


Figure 8: Xcp on Ethernet Receive Indication

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 Variants

VARIANT-POST-BUILD: All configuration parameters in container 'XcpGeneral' shall be configurable at pre-compile time. All other configuration parameters shall be configurable at post-build-time.

Use case: Object code delivery, selectable configuration

VARIANT-PRE-COMPILE: All configuration parameters shall be configurable at pre-compile time.

Use case: Execution time optimizations

VARIANT-LINK-TIME: It shall include all configuration options of the variant VARIANT-PRE-COMPILE. Additionally all parameters that are marked as link-time configurable with "VARIANT-LINK-TIME" shall be configurable at link time for example by linking a special configured parameter object file.

10.2.2 Xcp

Module Name	Xcp
Module Description	Configuration of the XCP module
Post-Build Variant Support	true

Included Containers		
Container Name	Multiplicity	Scope / Dependency
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.

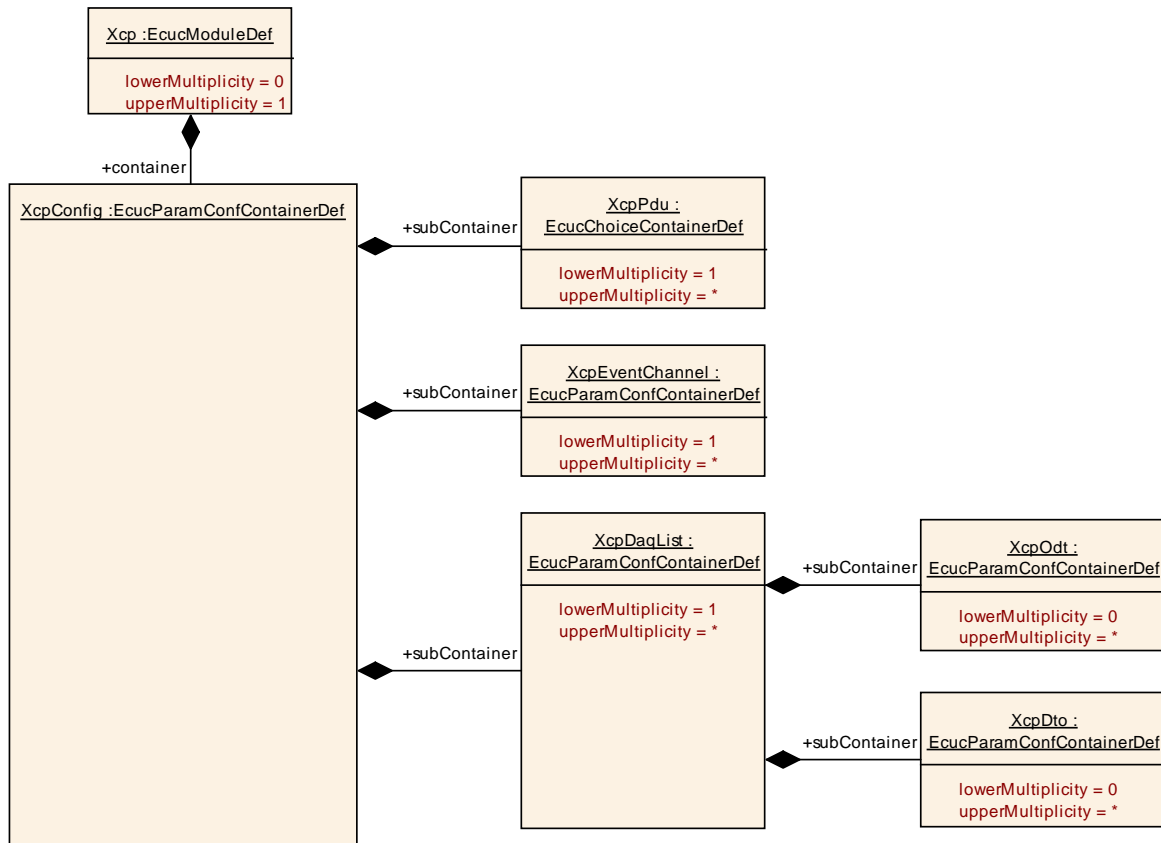


Figure 9: Diagram

10.2.3 XcpGeneral

SWS Item	ECUC_Xcp_00001 :
Container Name	XcpGeneral
Description	This container contains the general configuration parameters of the XCP.
Configuration Parameters	

SWS Item	ECUC_Xcp_00164 :		
Name	XcpDaqConfigType		
Description	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".		
Multiplicity	1		
Type	EcucEnumerationParamDef		
Range	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'	
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU dependency: If DAQ_CONFIG_TYPE = dynamic, MAX_DAQ equals		

	MIN_DAQ+DAQ_COUNT.
--	--------------------

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

SWS Item	ECUC_Xcp_00003 :		
Name	XcpDevErrorDetect		
Description	Switches the Default Error Tracer (Det) detection and notification ON or OFF. <ul style="list-style-type: none"> true: enabled (ON). false: disabled (OFF). 		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	ECUC_Xcp_00181 :		
Name	XcpFlashProgrammingEnabled		
Description	Enabling of XCP Flash programming functionality		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	ECUC_Xcp_00170 :		
Name	XcpIdentificationFieldType		
Description	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.		
Multiplicity	1		
Type	EcucEnumerationParamDef		
Range	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).	
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

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

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

SWS Item	ECUC_Xcp_00005 :		
Name	XcpMaxDto		
Description	MAX_DTO shows the maximum length of a DTO packet in bytes.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	8 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	ECUC_Xcp_00011 :		
Name	XcpMaxEventChannel		
Description	--		
Multiplicity	1		

Type	EcucIntegerParamDef		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

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

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

SWS Item	ECUC_Xcp_00059 :		
Name	XcpOdtEntriesCount		
Description	Indicates the amount of entries into an ODT using dynamic DAQ list configuration.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU dependency: This parameter is available only if XcpDaqConfigType is set to "1" i.e DAQ_DYNAMIC		

SWS Item	ECUC_Xcp_00177 :		
Name	XcpOdtEntrySizeDaq		

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

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

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

SWS Item	ECUC_Xcp_00009 :		
Name	XcpOnCddEnabled		
Description	Enabling of XCPonCdd functionality		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	ECUC_Xcp_00008 :		
Name	XcpOnEthernetEnabled		
Description	Enabling of XCPonEthernet functionality		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		

Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

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

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

SWS Item	ECUC_Xcp_00176 :		
Name	XcpSuppressTxSupport		
Description	Switches the support of suppressing transmission of PDUs per communication channel on or off. TRUE: Suppressing of TxPDUs supported FALSE: Suppressing of TxPDUs not supported		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

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

	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	ECUC_Xcp_00166 :		
Name	XcpTimestampType		
Description	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.		
Multiplicity	1		
Type	EcucEnumerationParamDef		
Range	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.	
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	ECUC_Xcp_00168 :		
Name	XcpTimestampUnit		
Description	This parameter indicates the resolution of the data acquisition clock of the slave when transferring data to master.		
Multiplicity	1		
Type	EcucEnumerationParamDef		
Range	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		

SWS Item	ECUC_Xcp_00002 :		
Name	XcpVersionInfoApi		
Description	Enables/disables the existence of the XCP_GetVersionInfo() API service. TRUE: XCP_GetVersionInfo() API service exists FALSE:		

	XCP_GetVersionInfo() API service does not exist		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

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

SWS Item	ECUC_Xcp_00180 :		
Name	XcpNvRamBlockIdRef		
Description	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.		
Multiplicity	0..1		
Type	Symbolic name reference to [NvMBlockDescriptor]		
Post-Build Variant Multiplicity	true		
Post-Build Variant Value	true		
Multiplicity Configuration Class	Pre-compile time	X	VARIANT-PRE-COMPILE
	Link time	--	
	Post-build time	X	VARIANT-POST-BUILD
Value Configuration Class	Pre-compile time	X	VARIANT-PRE-COMPILE
	Link time	--	
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2.4 XcpConfig

SWS Item	ECUC_Xcp_00020 :
Container Name	XcpConfig [Multi Config Container]
Description	--
Configuration Parameters	

Included Containers		
Container Name	Multiplicity	Scope / Dependency
XcpDaqList	0..*	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.

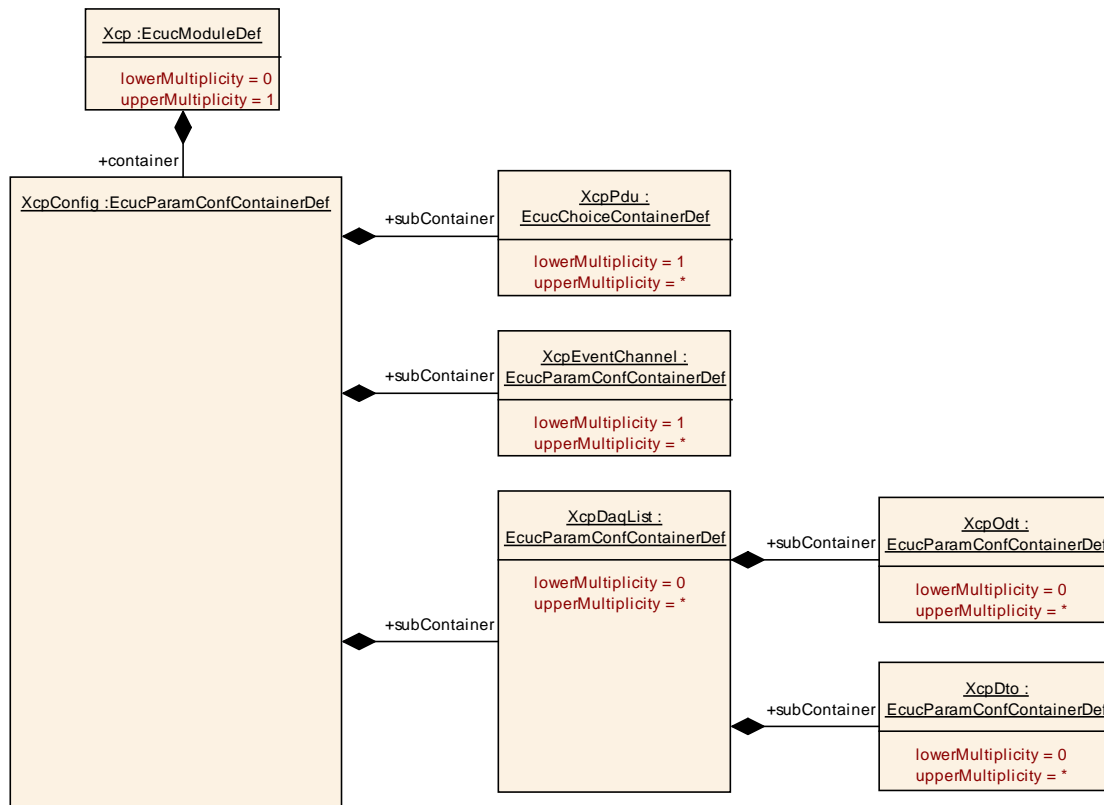


Figure 10: Diagram XcpConfig (1)

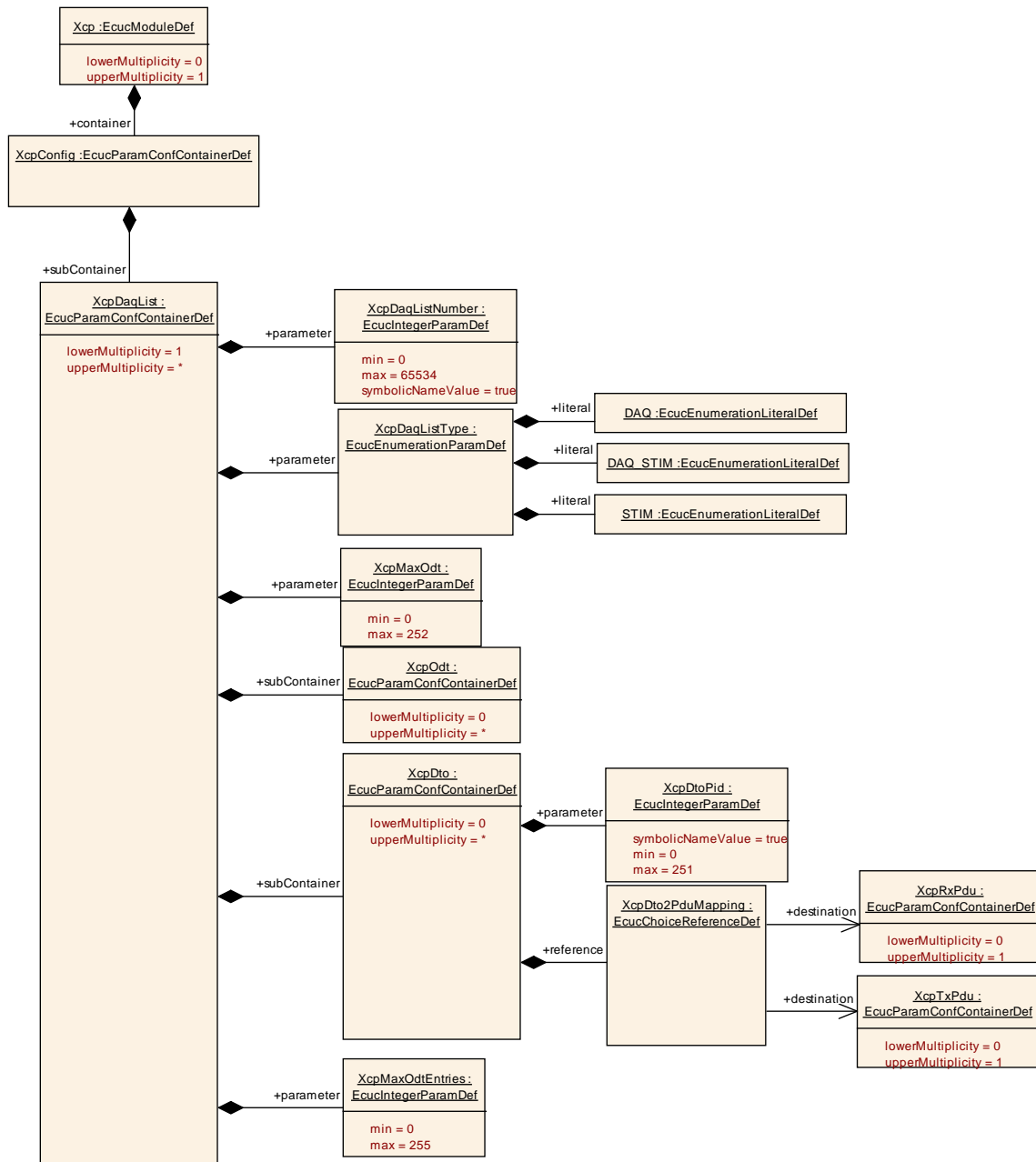


Figure 11: Diagram XcpConfig (2)

10.2.5 XcpDaqList

SWS Item	ECUC_Xcp_00050 :
Container Name	XcpDaqList
Description	This container contains the configuration of the DAQs.
Configuration Parameters	

SWS Item	ECUC_Xcp_00051 :
Name	XcpDaqListNumber
Description	Index number of the DAQ list
Multiplicity	1

Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65534		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

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

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

SWS Item	ECUC_Xcp_00058 :		
Name	XcpMaxOdtEntries		
Description	This parameter indicates the maximum amount of entries in an ODT of this DAQ list (STATIC configuration).		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU dependency: only available if XcpDaqConfigType is "DAQ_STATIC" (bit set to '0')		

Included Containers		
Container Name	Multiplicity	Scope / Dependency
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.

10.2.6 XcpDto

SWS Item	ECUC_Xcp_00065 :		
Container Name	XcpDto		
Description	This container collects data transfer object specific parameters for the DAQ list.		
Configuration Parameters			

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

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

No Included Containers

10.2.7 XcpOdt

SWS Item	ECUC_Xcp_00055 :		
Container Name	XcpOdt		

Description	This container contains ODT-specific parameter for the DAQ list.
Configuration Parameters	

SWS Item	ECUC_Xcp_00060 :		
Name	XcpOdtEntryMaxSize		
Description	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).		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 254		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

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

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

Included Containers		
Container Name	Multiplicity	Scope / Dependency
XcpOdtEntry	1..*	This container collects all configuration parameters that comprise an ODT entry.

10.2.8 XcpOdtEntry

SWS Item	ECUC_Xcp_00061 :
Container Name	XcpOdtEntry
Description	This container collects all configuration parameters that comprise an ODT entry.
Configuration Parameters	

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

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

SWS Item	ECUC_Xcp_00064 :		
Name	XcpOdtEntryLength		
Description	Length of the referenced memory area that is referenced by the ODT entry.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Multiplicity	false		

Post-Build Variant Value	false		
Multiplicity Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

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

No Included Containers

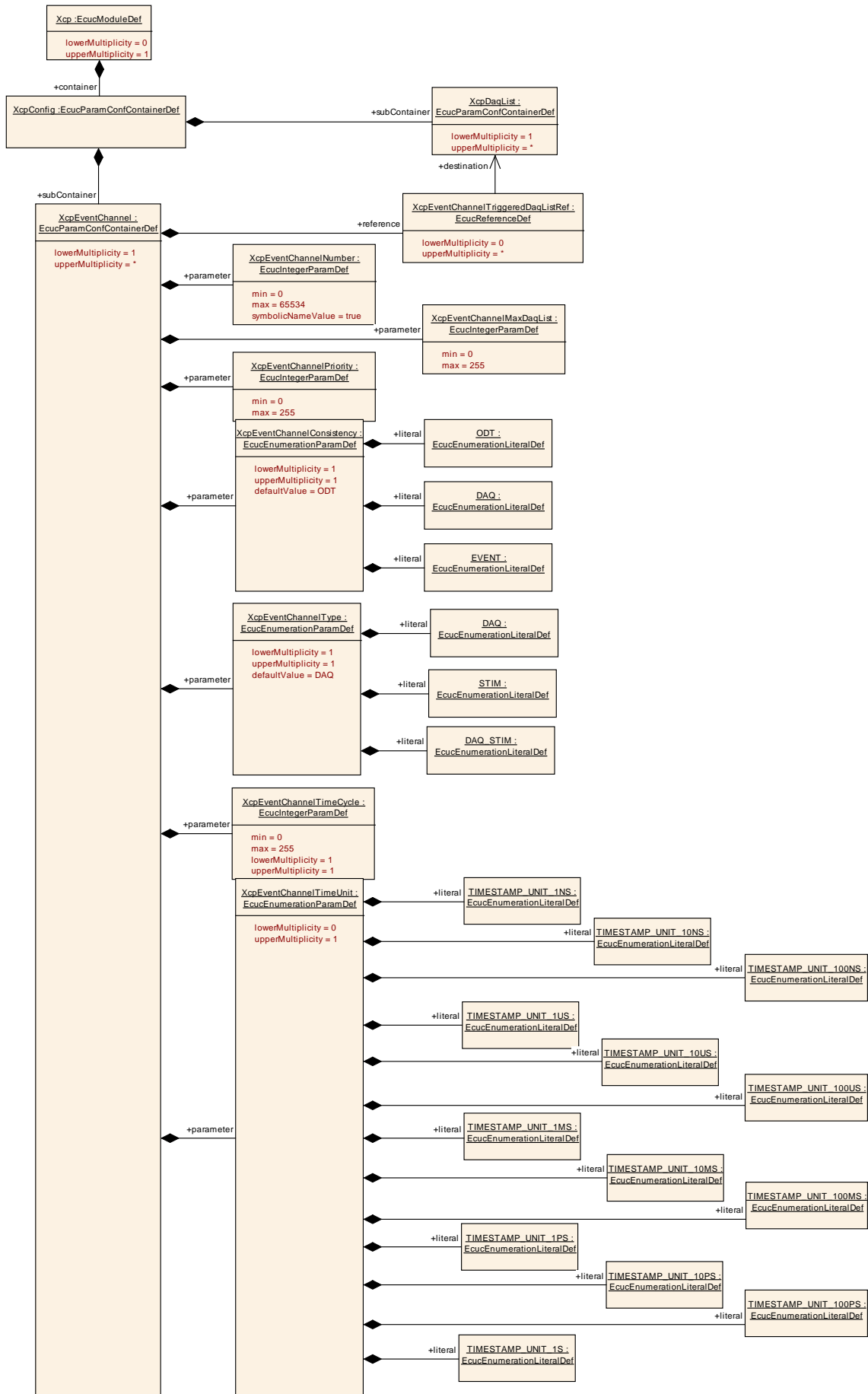


Figure 12: Diagram XcpOdtEntry

10.2.9 XcpEventChannel

SWS Item	ECUC_Xcp_00150 :		
Container Name	XcpEventChannel		
Description	This container contains the configuration of event channels on the XCP slave.		
Configuration Parameters			

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

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

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

SWS Item	ECUC_Xcp_00154 :		
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Name	XcpEventChannelPriority		
Description	Priority of the event channel		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

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

SWS Item	ECUC_Xcp_00174 :		
Name	XcpEventChannelTimeUnit		
Description	This configuration parameter indicates the unit of the event channel time cycle.		
Multiplicity	0..1		
Type	EcucEnumerationParamDef		
Range	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 Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local 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		

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

No Included Containers

10.2.10 XcpPdu

SWS Item	ECUC_Xcp_00100 :		
Choice container Name	XcpPdu		
Description	Contains PDU information. A PDU may be either a transmission PDU or a reception PDU.		

Container Choices		
Container Name	Multiplicity	Scope / Dependency
XcpRxPdu	0..1	This container specifies received PDUs.
XcpTxPdu	0..1	This container specifies transmission PDUs.

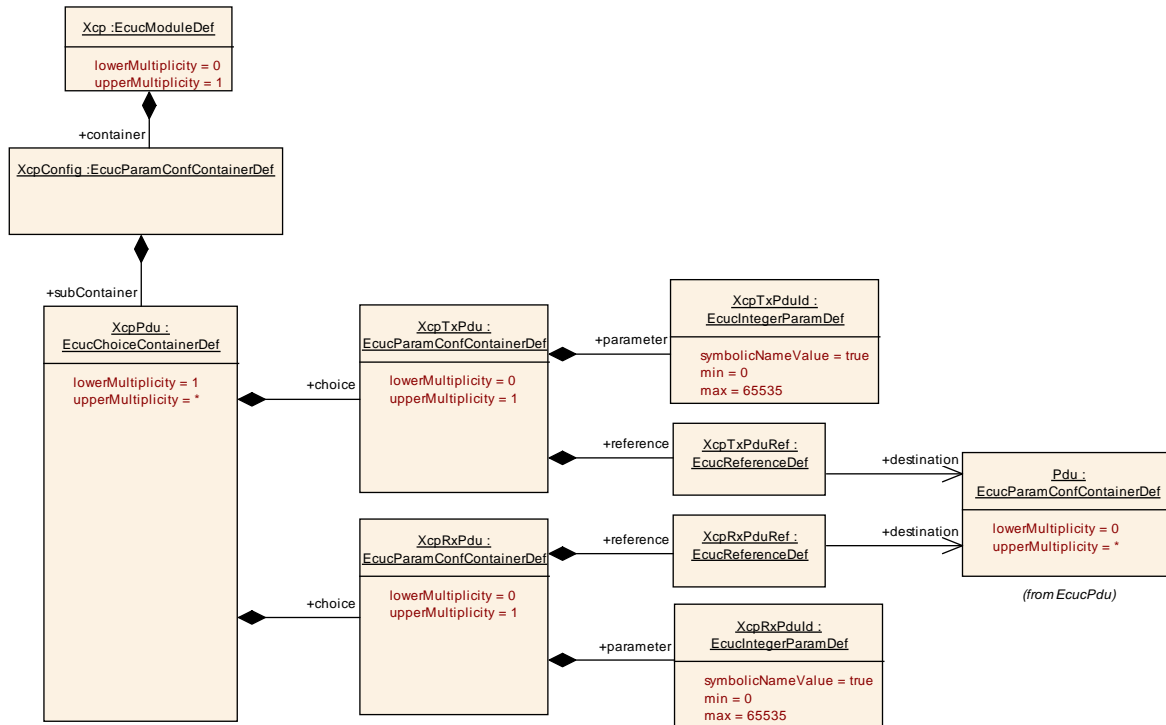


Figure 13: Diagram XcpPdu

10.2.11 XcpRxPdu

SWS Item	ECUC_Xcp_00105 :
Container Name	XcpRxPdu
Description	This container specifies received PDUs.
Configuration Parameters	

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

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

	Link time	--	
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: ECU		

No Included Containers

10.2.12 XcpTxPdu

SWS Item	ECUC_Xcp_00101 :		
Container Name	XcpTxPdu		
Description	This container specifies transmission PDUs.		
Configuration Parameters			

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

SWS Item	ECUC_Xcp_00104 :		
Name	XcpTxPduRef		
Description	Reference to the external PDU definition.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	Pre-compile time	X	VARIANT-PRE-COMPILE
	Link time	--	
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	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_00387, SRS_BSW_00375,
SRS_BSW_00416, SRS_BSW_00168, SRS_BSW_00423, SRS_BSW_00425,
SRS_BSW_00426, SRS_BSW_00427, SRS_BSW_00428, BSW00431,
SRS_BSW_00432, BSW00434, 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_00326, SRS_BSW_00413,
SRS_BSW_00347, SRS_BSW_00335, SRS_BSW_00410, SRS_BSW_00370,
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_00329, 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)