Document Title	Specification of a Diagnostic Communication Manager for SAE J1939
Document Owner	AUTOSAR
Document Responsibility	AUTOSAR
Document Identification No	610
Document Classification	Standard

Document Status	Final
Part of AUTOSAR Release	4.2.2

Document Change History

Release	Changed by	Change Description
4.2.2	AUTOSAR Release Management	• Clarifications • DM01 handling on multiple networks • DM19 updated negative response code
4.2.1	AUTOSAR Release Management	• Optimizations • Editorial changes
4.1.3	AUTOSAR Release Management	• Refinement of J1939Dcm_DemTriggerOnDTCStatus • Smaller corrections • Editorial changes
4.1.2	AUTOSAR Release Management	• Introduction of formal descriptions of service interfaces • Configuration of further DMx messages • Revised DEM interface • Editorial changes
4.1.1	AUTOSAR Administration	• Initial Release

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1 Introduction and functional overview

This specification specifies the functionality, API and the configuration of the AUTOSAR Basic Software module J1939 Diagnostic Communication Manager.

1.1 Diagnostics according to SAE J1939

SAE J1939-73 defines the message structures and behavior of so-called ‘Diagnostic messages’ (DMs) which are used for diagnostic communication in J1939 networks.

Beside the communication when the vehicle is being repaired, it is also used during vehicle operation to report immediate diagnostic information into the vehicle like periodically broadcasting active DTCs to the instrument cluster to communicate to the driver status of the vehicle using different lamp status.

2 Acronyms and abbreviations

Abbreviation / Acronym:	*Description:*
ACKM	Acknowledgement Message, J1939 PGN $0E800_{16}$
DEM	Diagnostic Event Manager
DET	Default Error Tracer
DM	Diagnostic messages
PGN	Parameter Group Number
SAE	Society of Automotive Engineers (in charge of J1939 specification)
SPN	Suspect Parameter Number

3 Related documentation

3.1 Input documents

[1] List of Basic Software Modules
AUTOSAR_TR_BSWModuleList.pdf

[2] Layered Software Architecture
AUTOSAR_EXP_LayeredSoftwareArchitecture.pdf

[3] General Requirements on Basic Software Modules
AUTOSAR_SRS_BSWGeneral.pdf

[4] General Specification for Basic Software Modules
AUTOSAR_SWS_BSWGeneral.pdf

[5] Requirements on Diagnostic
AUTOSAR_SRS_Diagnostic.pdf

[6] Specification of Communication Stack Types
AUTOSAR_SWS_CommunicationStackTypes.pdf

[7] System Template
AUTOSAR_TPS_SystemTemplate.pdf

[8] Specification of Diagnostic Event Manager
AUTOSAR_SWS_DiagnosticEventManager.pdf

[9] Specification of PDU Router
AUTOSAR_SWS_PDURouter.pdf

[10] Specification of Default Error Tracer
AUTOSAR_SWS_DefaultErrorTracer.pdf

[11] Specification of a Request Manager for SAE J1939
AUTOSAR_SWS_SAEJ1939RequestManager.pdf

[12] Specification of Network Management for SAE J1939
AUTOSAR_SWS_SAEJ1939NetworkManagement.pdf

[13] Specification of BSW Scheduler
AUTOSAR_SWS_BSWScheduler.pdf

[14] Specification of ECU Configuration
AUTOSAR_TPS_ECUConfiguration.pdf

[15] Specification of Memory Mapping
AUTOSAR_SWS_MemoryMapping.pdf

[16] General Specification of Basic Software Modules AUTOSAR_SWS_BSWGeneral.pdf

3.2 Related standards and norms

[17] J1939-73 FEB2010, Application Layer – Diagnostics

3.3 Related specification

AUTOSAR provides a General Specification on Basic Software modules [16] (SWS BSW General), which is also valid for SAE J1939 Transport Layer.

Thus, the specification SWS BSW General shall be considered as additional and required specification for SAE J1939 Diagnostic Communication Manager.

4 Constraints and assumptions

4.1 Limitations

The J1939 Diagnostic Communication Manager implements only a subset of 'Diagnostic messages' as defined in Table 1: Supported DMx messages.

The DM13 does not support "Suspend Signal" "Suspend Duration".

NACK is not provided for received DMx messages that are not supported or not configured. This restriction mainly affects handling of DM07 and DM13.

4.2 Applicability to car domains

J1939 is developed by the SAE as a standard for heavy duty on-highway, farming, and construction vehicles. It is not applicable to passenger cars or light trucks. The J1939 Diagnostic Communication Manager will only be used in heavy duty on-highway vehicles, because other domains are currently excluded by AUTOSAR.

5 Dependencies to other modules

The J1939 Diagnostic Communication Manager (J1939Dcm) has interfaces towards the PDU Router (PduR, upper and lower), the J1939 Request Management module (J1939Rm), the Diagnostic Event Manager module (DEM) and the Default Error Tracer (DET).

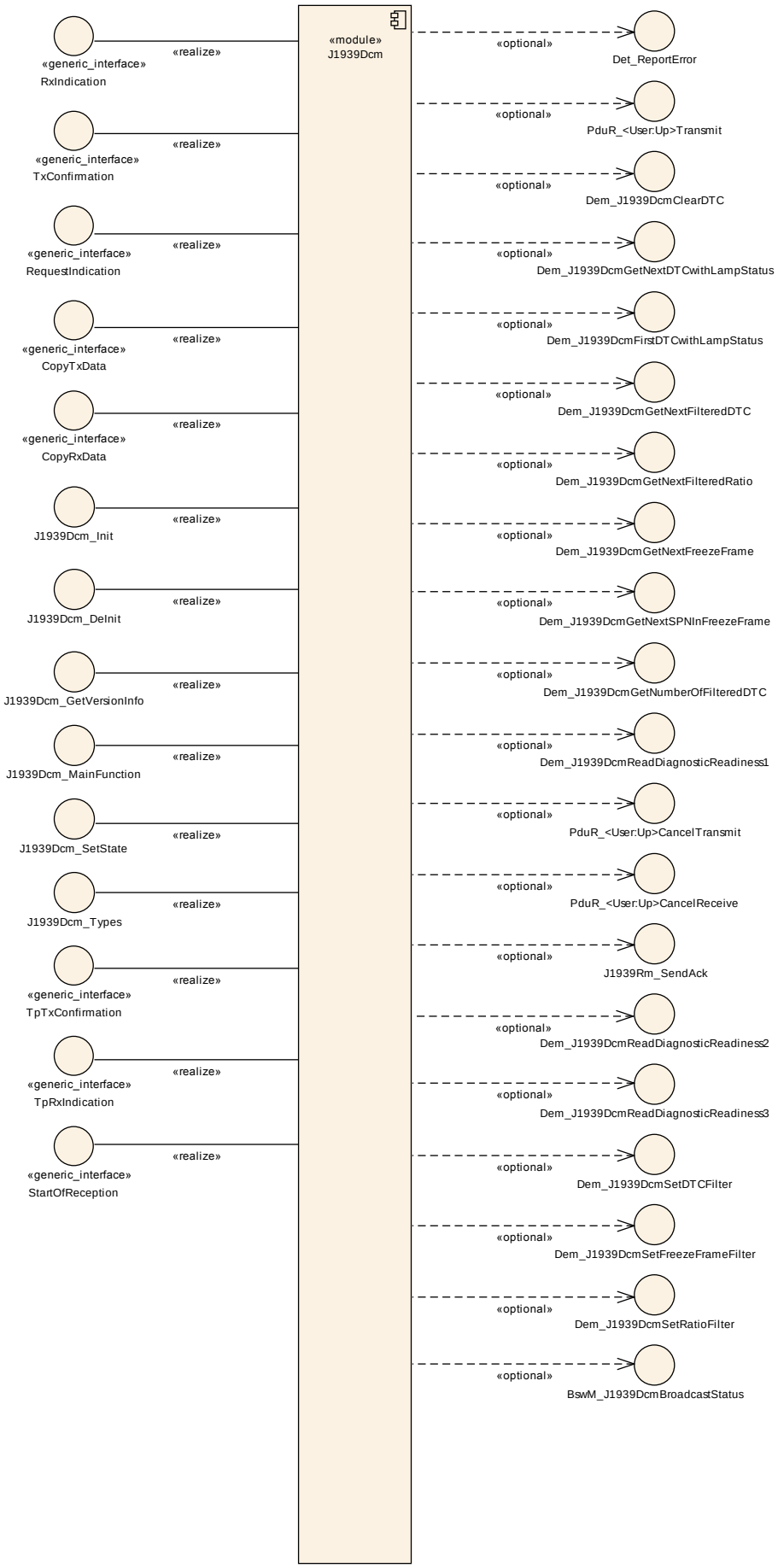
«module»
J1939Dcm
«generic_interface»
RxIndication
«realize»
«generic_interface»
TxConfirmation
«realize»
«generic_interface»
RequestIndication
«realize»
«generic_interface»
CopyTxData
«realize»
«generic_interface»
CopyRxData
«realize»
J1939Dcm_Init
«realize»
J1939Dcm_DeInit
«realize»
J1939Dcm_GetVersionInfo
«realize»
J1939Dcm_MainFunction
«realize»
J1939Dcm_SetState
«realize»
J1939Dcm_Types
«realize»
«generic_interface»
TpTxConfirmation
«realize»
«generic_interface»
TpRxIndication
«realize»
«generic_interface»
StartOfReception
«realize»
«optional»
Det_ReportError
«optional»
PduR_<User:Up>Transmit
«optional»
Dem_J1939DcmClearDTC
«optional»
Dem_J1939DcmGetNextDTCwithLampStatus
«optional»
Dem_J1939DcmFirstDTCwithLampStatus
«optional»
Dem_J1939DcmGetNextFilteredDTC
«optional»
Dem_J1939DcmGetNextFilteredRatio
«optional»
Dem_J1939DcmGetNextFreezeFrame
«optional»
Dem_J1939DcmGetNextSPNInFreezeFrame
«optional»
Dem_J1939DcmGetNumberOfFilteredDTC
«optional»
Dem_J1939DcmReadDiagnosticReadiness1
«optional»
PduR_<User:Up>CancelTransmit
«optional»
PduR_<User:Up>CancelReceive
«optional»
J1939Rm_SendAck
«optional»
Dem_J1939DcmReadDiagnosticReadiness2
«optional»
Dem_J1939DcmReadDiagnosticReadiness3
«optional»
Dem_J1939DcmSetDTCFilter
«optional»
Dem_J1939DcmSetFreezeFrameFilter
«optional»
Dem_J1939DcmSetRatioFilter
«optional»
BswM_J1939DcmBroadcastStatus

Figure 1: Module dependencies of the J1939Dcm module

The J1939 Diagnostic Communication Manager just includes header files of the PDU Router, the J1939 Request Manager, the DEM, the Default Error Tracer. The other interfaces are provided via generated header files.

5.1 File structure

5.1.1 Code file structure

For details, refer to the section 5.1.6 "Code file structure" of the SWS BSW General [4].

5.1.2 Header file structure

Besides the files defined in section 5.1.7 “Header file structure” of the SWS BSW General [4], the J1939 Diagnostic Communication Manager needs to include the files defined below.

[SWS_J1939Dcm_00086][
The implementation header files shall include *ComStack_Types.h*.]()

[SWS_J1939Dcm_00109][The implementation source files shall include *J1939Rm.h*, which contains the callbacks functions of the J1939Rm module that are used by the J1939Dcm module.]()

The following picture shows the include hierarchy of the J1939 Diagnostic Communication Manager.

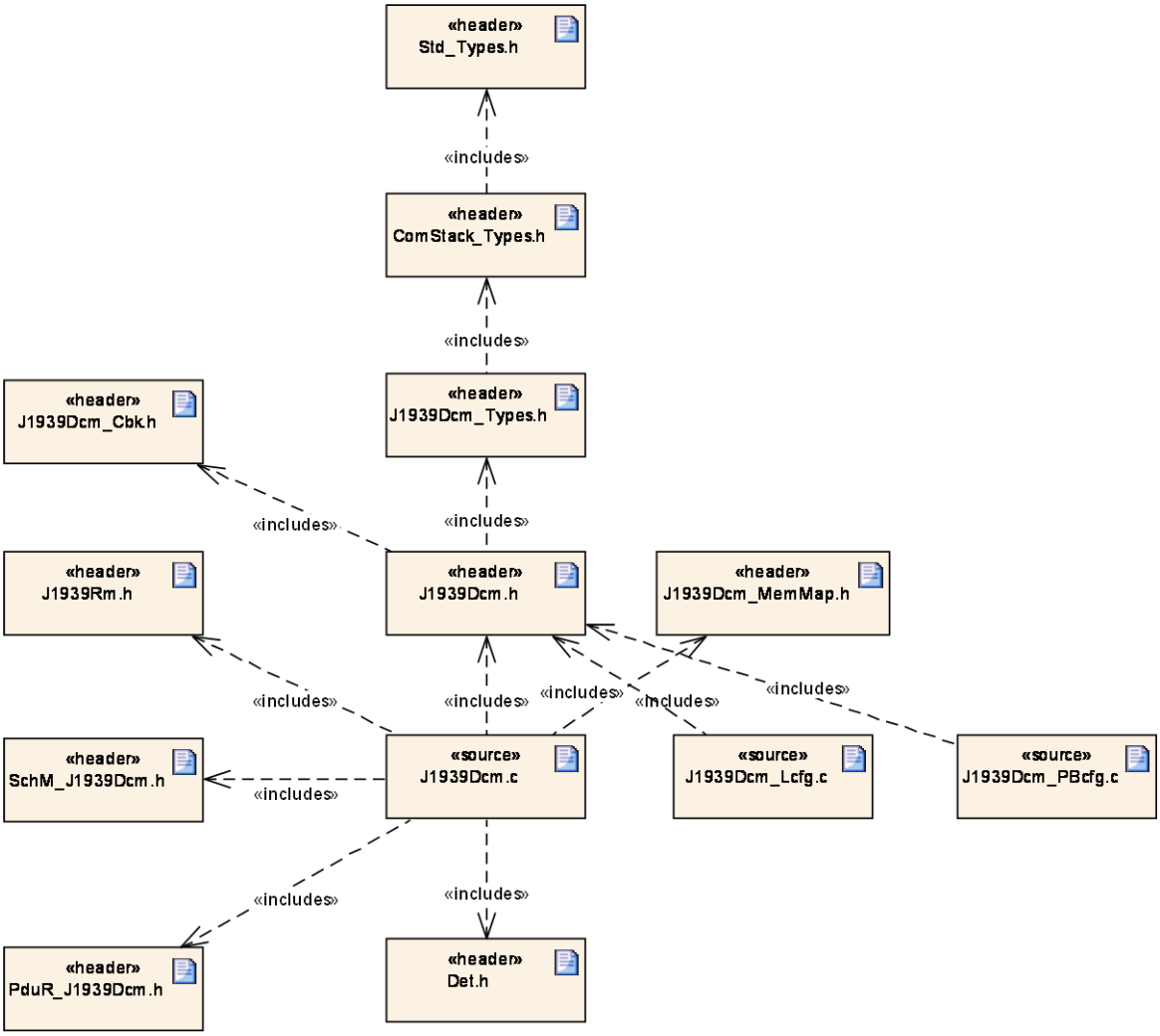

Figure 2: File structure of J1939Dcm

6 Requirements traceability

Requirement	Description	Satisfied by
-	-	SWS_J1939Dcm_00002
-	-	SWS_J1939Dcm_00003
-	-	SWS_J1939Dcm_00004
-	-	SWS_J1939Dcm_00005
-	-	SWS_J1939Dcm_00006
-	-	SWS_J1939Dcm_00007
-	-	SWS_J1939Dcm_00008
-	-	SWS_J1939Dcm_00009
-	-	SWS_J1939Dcm_00010
-	-	SWS_J1939Dcm_00011
-	-	SWS_J1939Dcm_00012
-	-	SWS_J1939Dcm_00014
-	-	SWS_J1939Dcm_00015
-	-	SWS_J1939Dcm_00016
-	-	SWS_J1939Dcm_00017
-	-	SWS_J1939Dcm_00018
-	-	SWS_J1939Dcm_00020
-	-	SWS_J1939Dcm_00021
-	-	SWS_J1939Dcm_00022
-	-	SWS_J1939Dcm_00023
-	-	SWS_J1939Dcm_00024
-	-	SWS_J1939Dcm_00025
-	-	SWS_J1939Dcm_00027
-	-	SWS_J1939Dcm_00028
-	-	SWS_J1939Dcm_00029
-	-	SWS_J1939Dcm_00030
-	-	SWS_J1939Dcm_00031
-	-	SWS_J1939Dcm_00032
-	-	SWS_J1939Dcm_00033
-	-	SWS_J1939Dcm_00034
-	-	SWS_J1939Dcm_00035
-	-	SWS_J1939Dcm_00036
-	-	SWS_J1939Dcm_00037
-	-	SWS_J1939Dcm_00038
-	-	SWS_J1939Dcm_00039
-	-	SWS_J1939Dcm_00040

-	-	SWS_J1939Dcm_00041
-	-	SWS_J1939Dcm_00042
-	-	SWS_J1939Dcm_00043
-	-	SWS_J1939Dcm_00045
-	-	SWS_J1939Dcm_00046
-	-	SWS_J1939Dcm_00047
-	-	SWS_J1939Dcm_00048
-	-	SWS_J1939Dcm_00049
-	-	SWS_J1939Dcm_00050
-	-	SWS_J1939Dcm_00051
-	-	SWS_J1939Dcm_00052
-	-	SWS_J1939Dcm_00053
-	-	SWS_J1939Dcm_00054
-	-	SWS_J1939Dcm_00055
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-	-	SWS_J1939Dcm_00059
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-	-	SWS_J1939Dcm_00061
-	-	SWS_J1939Dcm_00062
-	-	SWS_J1939Dcm_00063
-	-	SWS_J1939Dcm_00064
-	-	SWS_J1939Dcm_00065
-	-	SWS_J1939Dcm_00067
-	-	SWS_J1939Dcm_00068
-	-	SWS_J1939Dcm_00069
-	-	SWS_J1939Dcm_00070
-	-	SWS_J1939Dcm_00071
-	-	SWS_J1939Dcm_00073
-	-	SWS_J1939Dcm_00074
-	-	SWS_J1939Dcm_00075
-	-	SWS_J1939Dcm_00076
-	-	SWS_J1939Dcm_00077
-	-	SWS_J1939Dcm_00078
-	-	SWS_J1939Dcm_00079
-	-	SWS_J1939Dcm_00080
-	-	SWS_J1939Dcm_00081
-	-	SWS_J1939Dcm_00082

-	-	SWS_J1939Dcm_00083
-	-	SWS_J1939Dcm_00084
-	-	SWS_J1939Dcm_00085
-	-	SWS_J1939Dcm_00086
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-	-	SWS_J1939Dcm_00092
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-	-	SWS_J1939Dcm_00098
-	-	SWS_J1939Dcm_00099
-	-	SWS_J1939Dcm_00100
-	-	SWS_J1939Dcm_00101
-	-	SWS_J1939Dcm_00102
-	-	SWS_J1939Dcm_00103
-	-	SWS_J1939Dcm_00104
-	-	SWS_J1939Dcm_00105
-	-	SWS_J1939Dcm_00106
-	-	SWS_J1939Dcm_00107
-	-	SWS_J1939Dcm_00108
-	-	SWS_J1939Dcm_00109
-	-	SWS_J1939Dcm_00111
-	-	SWS_J1939Dcm_00113
-	-	SWS_J1939Dcm_00114
-	-	SWS_J1939Dcm_00115
-	-	SWS_J1939Dcm_00116
-	-	SWS_J1939Dcm_00117
-	-	SWS_J1939Dcm_00118
-	-	SWS_J1939Dcm_00119
-	-	SWS_J1939Dcm_00120
-	-	SWS_J1939Dcm_00121
-	-	SWS_J1939Dcm_00122
-	-	SWS_J1939Dcm_00123
-	-	SWS_J1939Dcm_00124
-	-	SWS_J1939Dcm_00125
-	-	SWS_J1939Dcm_00126

-	-	SWS_J1939Dcm_00127
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-	-	SWS_J1939Dcm_00133
-	-	SWS_J1939Dcm_00134
-	-	SWS_J1939Dcm_00135
-	-	SWS_J1939Dcm_00136
-	-	SWS_J1939Dcm_00137
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-	-	SWS_J1939Dcm_00140
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-	-	SWS_J1939Dcm_00155
-	-	SWS_J1939Dcm_00156
-	-	SWS_J1939Dcm_00158
-	-	SWS_J1939Dcm_00160
-	-	SWS_J1939Dcm_00161
-	-	SWS_J1939Dcm_00162
-	-	SWS_J1939Dcm_00163
-	-	SWS_J1939Dcm_00164
-	-	SWS_J1939Dcm_00165
-	-	SWS_J1939Dcm_00167

7 Functional specification

This chapter defines the behavior of the J1939 Diagnostic Communication Manager. The API of the module is defined in chapter 8, while the configuration is defined in chapter 10.

7.1 Overview

The J1939 Diagnostic Communication Manager is responsible to process the diagnostic request messages and the sending of the appropriate response ACKM PGs.

7.1.1 Supported diagnostic messages

The following table defines the supported DMx messages.

Name	PGN (Hexadecimal)	Size	Received	Transmitted	Description
DM01	FECA	Var.	-	Cyclic 1s	Active Diagnostic Trouble Codes
DM02	FECB	Var.	-	On Request	Previously Active Diagnostic Trouble Codes
DM03	FECC	-	-	On Request	Diagnostic Data Clear/Reset for Previously Active DTCs
DM04	FECD	Var.	-	On Request	Freeze Frame Parameters
DM05	FECE	8	-	On Request	Diagnostic Readiness 1
DM06	FECF	Var.	-	On Request	Emission Related Pending DTCs
DM11	FED3	-	-	On Request	Diagnostic Data Clear/Reset for Active DTCs
DM12	FED4	Var.	-	On Request	Emissions Related Active DTCs
DM13	DF00	8	X	-	Stop Start Broadcast
DM19	D300	Var.	-	On Request	Calibration Information
DM20	C200	Var.	-	On Request	Monitor Performance Ratio SAE J1939-73 Revised SEP2006
DM21	C100	8	-	On Request	Diagnostic Readiness 2
DM23	FDB5	Var.	-	On Request	Previously Active Emission Related Faults
DM24	FDB6	8	-	On Request	SPN Support
DM25	FDB7	Var.	-	On Request	Expanded Freeze Frame

DM26	FDB8	Var.	-	On Request	Diagnostic Readiness 3
DM28	FD80	Var.	-	On Request	Permanent DTCs
DM29	9E00	8	-	On Request	Regulated DTC Counts (Pending, Permanent, MIL-On, PMIL-On)
DM31	A300	Var.	-	On Request	DTC to Lamp Association
DM35	9F00	Var.	-	On Request	Immediate Fault Status

Table 1: Supported DMx messages

7.2 Module Handling

This section contains description of auxiliary functionality of the J1939 Diagnostic Communication Manager.

7.2.1 Initialization

The J1939 Diagnostic Communication Manager is initialized via J1939Dcm_Init, and de-initialized via J1939Dcm_DeInit. Except for J1939Dcm_GetVersionInfo and J1939Dcm_Init, the API functions of the J1939 Diagnostic Communication Manager may only be called when the module has been properly initialized.

[SWS_J1939Dcm_00002][A call to J1939Dcm_Init initializes all internal variables and sets the J1939 Diagnostic Communication Manager to the initialized state.] ()

[SWS_J1939Dcm_00003][A call to J1939Dcm_DeInit sets the J1939 Diagnostic Communication Manager back to the uninitialized state.] ()

[SWS_J1939Dcm_00004][When DET reporting is enabled (see J1939DcmDevErrorDetect), the J1939 Diagnostic Communication Manager shall call Det_ReportError with the error code 1939DCM_E_UNINIT when any API other than J1939Dcm_GetVersionInfo or J1939Dcm_Init is called in uninitialized state.] ()

[SWS_J1939Dcm_00005][When J1939Dcm_Init is called in initialized state, the J1939 Diagnostic Communication Manager shall not re-initialize its internal variables. It shall instead call Det_ReportError with the error code J1939DCM_E_REINIT if DET reporting is enabled (see J1939DcmDevErrorDetect).] ()

7.3 Message processing

7.3.1 Reception of Requests

The J1939 Diagnostic Communication Manager receives most requests for the DMx PGs (DM01 to DM52) via J1939Dcm_RequestIndication from the J1939 Request

Manager. Exceptions are the command messages (marked in “received” column in Table 1: Supported DMx messages).

[SWS_J1939Dcm_00091][The configured DMx messages in J1939Dcm shall match the *J1939RmUserPGN* configured for *J1939RmUserType* J1939RM_USER_J1939DCM in J1939Rm.] ()

[SWS_J1939Dcm_00006][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_RequestIndication shall check if the requestedPgn parameter address a configured DMx message (J1939DcmDiagnsoticMessageSupport and the corresponding PGN could be found in table 1 column “PGN (Hexadecimal)”). In case of an error, the function J1939Dcm_RequestIndication shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_PGN.] ()

[SWS_J1939Dcm_00007][When J1939Dcm_RequestIndication is called and the requested diagnostic message is supported (configured via DMx specific configuration switch in container *J1939DcmDiagnsoticMessageSupport*); the J1939 Diagnostic Communication Manager shall, except for DM01 message (see 7.6.1 for DM01 handling), lock the common buffer (of [SWS_J1939Dcm_00115]) and start to process it with next execution of J1939Dcm_MainFunction.] ()

Note: a NACK by J1939Dcm_RequestIndication will not be called because the J1939Rm will send the NACK for not supported DMx messages due to [SWS_J1939Dcm_00091].

[SWS_J1939Dcm_00115][The J1939Dcm shall provide a buffer in size of *J1939DcmCommonBufferSize* for the common DMx message processing including a semaphore to lock the buffer to prevent a multiple usage of this buffer.
] ()

[SWS_J1939Dcm_00008][When J1939Dcm_RequestIndication is called and any other diagnostic message (apart from DM01) is currently processed, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameters ‘ackCode’ set to J1939RM_ACK_CANNOT_RESPOND to send a negative acknowledgement (considering [SWS_J1939Dcm_00113]).] ()

J1939 diagnostic do not require positive or negative acknowledgement after request to the global address
[SWS_J1939Dcm_00113][When J1939Dcm_RequestIndication is called with destination address (destAddress) is set to the global address (0xff), the J1939Dcm shall not call J1939Rm_SendAck to send an acknowledgement.] ()

7.3.2 Termination of message

[SWS_J1939Dcm_00009][For messages sent via TP (Size in Table 1 is variable), the transmission is terminated when J1939Dcm_TpTxConfirmation is called after transmission of a requested message which has been accepted and processed

according to [SWS_J1939Dcm_00007], the J1939 Diagnostic Communication Manager shall then release the buffer of [SWS_J1939Dcm_00115].⌋ ()

[SWS_J1939Dcm_00164]⌈ For messages sent via IF (Size in Table 1 is 8), the transmission is terminated when J1939Dcm_TxConfirmation is called after transmission of a requested message which has been accepted and processed according to [SWS_J1939Dcm_00007]. The J1939 Diagnostic Communication Manager shall then release the buffer of [SWS_J1939Dcm_00115].⌋ ()

7.4 Communication State Handling

In general, diagnostics is only active and available when the ECU is online (see [12] for details). The J1939 Diagnostic Communication Manager provides an API that is used by the BSW Mode Manager (BswM) to notify the J1939 communication state.

[SWS_J1939Dcm_00125]⌈During initialization via J1939Dcm_Init, the J1939 Diagnostic Communication Manager assumes the offline state.⌋()

[SWS_J1939Dcm_00126]⌈A call to J1939Dcm_SetState sets the J1939 Diagnostic Communication Manager to online or offline state.⌋()

[SWS_J1939Dcm_00127]⌈In the offline state, the J1939 Diagnostic Communication Manager shall not progress any periodic messages.⌋()

Note: The J1939Rm does not forward mode any request message to J1939Dcm when it assumes J1939RM_STATE_OFFLINE.

7.5 J1939Dcm – DEM interaction

Many diagnostic messages report DTC information from Diagnostic Event Manger. Most of these messages are structured identically, wherefore the same API sequences are used.

[SWS_J1939Dcm_00133]⌈ The J1939Dcm shall ensure that access to the DEM is strictly serialized, i.e. that only one DEM sequence is executed in parallel.⌋ ()

Note: This is implicitly achieved by locking the global buffer (see [SWS_J1939Dcm_00007]) for all diagnostic messages apart from DM01 and DM03. Thus, the implementation must take care that DM01 and DM03 execution does not start while the global buffer is locked, and vice versa.

7.5.1 DTC status

Diagnostic message		DTCStatusFilter Parameter	DTCKind
DM01	Active Diagnostic Trouble Codes	DEM_J1939DTC_ACTIVE	DEM_DTC_KIND_ALL_DTCS
DM02	Previously Active Diagnostic Trouble Codes	DEM_J1939DTC_ PREVIOUSLY_ACTIVE	DEM_DTC_KIND_ALL_DTCS

DM06	Emission Related Pending DTCs	DEM_J1939DTC_PENDING	DEM_DTC_KIND_EMISSION_ REL_DTCS
DM12	Emissions Related Active DTCs	DEM_J1939DTC_ACTIVE	DEM_DTC_KIND_EMISSION_ REL_DTCS
DM23	Previously Active Emission Related Faults	DEM_J1939DTC_ PREVIOUSLY_ACTIVE	DEM_DTC_KIND_EMISSION_ REL_DTCS
DM28	Permanent DTCs	DEM_J1939DTC_ PERMANENT	DEM_DTC_KIND_EMISSION_ REL_DTCS
DM35	Immediate Fault Status	DEM_J1939DTC_CURRENTLY_ ACTIVE	DEM_DTC_KIND_ALL_DTCS

Table 2: Filter criteria for diagnostic messages

[SWS_J1939Dcm_00010][On start of DTC status sequence, the J1939 Diagnostic Communication Manager shall call the Dem_J1939DcmSetDTCFilter with the parameters 'DTCStatusFilter' and 'DTCKind' defined by the DMx message that triggered the sequence, as well as the requested 'node'.] ()

[SWS_J1939Dcm_00011][In case the Dem_ReturnSetFilterType is set to DEM_FILTER_ACCEPTED, the values in parameter 'LampStatus' shall be encoded into the response message layout according to SAE J1939-73.
The high byte is the Byte 1 in the response message. The low byte is the Byte 2 of the response message.
] ()

Note: The bit-structure of parameter 'LampStatus' is already structured according SAE J1939-73 by DEM module, wherefore no rearrangement is required by J1939Dcm.

[SWS_J1939Dcm_00012][In case the Dem_ReturnSetFilterType is unequal to DEM_FILTER_ACCEPTED, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameters 'ackCode' set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).] ()

The J1939 Diagnostic Communication Manager shall continue the sequence by subsequent calling the Dem_J1939DcmGetNextFilteredDTC, till the return value Dem_ReturnGetNextFilteredElementType is set to 'DEM_FILTERED_NO_MATCHING_ELEMENT'.
The calls may be distributed over several calls of J1939Dcm_MainFunction.

[SWS_J1939Dcm_00014][If the return value Dem_ReturnGetNextFilteredElementType is set to DEM_FILTERED_OK, the parameter 'J1939DTC' and 'OccurenceCounter' shall be copied to the response message defined by the DMx message that triggered the sequence.] ()

[SWS_J1939Dcm_00015][The J1939 Diagnostic Communication Manager shall continue the sequence by subsequent calling the Dem_J1939DcmGetNextFilteredDTC, except the maximum sequence counter threshold per MainFunction is reached (see *J1939DcmMaxDTCsPerMainFunction*) or the return value Dem_ReturnGetNextFilteredElementType is set to

'DEM_FILTERED_PENDING'. In this case, the execution is postponed to the next J1939Dcm_MainFunction call. ⌋ ()

[SWS_J1939Dcm_00016]⌈ If the return value Dem_ReturnGetNextFilteredElementType is set to 'DEM_FILTERED_NO_MATCHING_ELEMENT' the J1939 Diagnostic Communication Manager shall call PduR_J1939DcmTransmit with the PduId of the requested message and set the destination address (via MetaData) according to the source address of the request, or to 0xFF when the destination of the request was 0xFF, or to 0xFF (broadcast) for spontaneous DM1 messages.⌋ ()

Note: In case the same DTC needs to be reported from different nodes, each node would require its own EventId.

7.5.2 FreezeFrame

[SWS_J1939Dcm_00017]⌈ On start of FreezeFrame sequence, the J1939 Diagnostic Communication Manager shall call the Dem_J1939DcmSetFreezeFrameFilter with the parameters 'FreezeFrameKind' defined by the DMx message that triggered the sequence, as well as the requested 'node'.⌋ ()

[SWS_J1939Dcm_00018]⌈ In case the Dem_ReturnSetFilterType is unequal to DEM_FILTER_ACCEPTED, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameters 'ackCode' set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋ ()

7.5.2.1 'FreezeFrameKind' is set to 'DEM_J1939DCM_FREEZEFRAME' or 'DEM_J1939DCM_EXPANDED_FREEZEFRAME'

This FreezeFrameKind is used by DM04 and DM25

In case the Dem_ReturnSetFilterType is set to DEM_FILTER_ACCEPTED and the 'FreezeFrameKind' is set to 'DEM_J1939DCM_FREEZEFRAME' or 'DEM_J1939DCM_EXPANDED_FREEZEFRAME', the J1939 Diagnostic Communication Manager shall continue the sequence by subsequent calling the Dem_J1939DcmGetNextFreezeFrame, till the return value Dem_ReturnGetNextFilteredElementType is set to 'DEM_FILTERED_NO_MATCHING_ELEMENT'.
The calls may spread over several calls of J1939Dcm_MainFunction.

[SWS_J1939Dcm_00020]⌈ If the return value Dem_ReturnGetNextFilteredElementType is set to DEM_FILTERED_OK and the 'FreezeFrameKind' is set to 'DEM_J1939DCM_FREEZEFRAME' or 'DEM_J1939DCM_EXPANDED_FREEZEFRAME', the parameter 'BufSize', 'DestBuffer, 'J1939DTC' and 'OccurenceCounter' shall be encoded into the response message layout according to SAE J1939-73.⌋ ()

[SWS_J1939Dcm_00021][The J1939 Diagnostic Communication Manager shall continue the sequence by subsequent calling the Dem_J1939DcmGetNextFreezeFrame, except the maximum sequence counter threshold per MainFunction is reached (see *J1939DcmMaxFreezeFramesPerMainFunction*) or the return value Dem_ReturnGetNextFilteredElementType is set to 'DEM_FILTERED_PENDING'.] ()

[SWS_J1939Dcm_00022][If the return value Dem_ReturnGetNextFilteredElementType is set to 'DEM_FILTERED_NO_MATCHING_ELEMENT' and the 'FreezeFrameKind' is set to 'DEM_J1939DCM_FREEZEFRAME' or 'DEM_J1939DCM_EXPANDED_FREEZEFRAME' the J1939 Diagnostic Communication Manager shall trigger PduR_J1939DcmTransmit with the PduId of the requested message and set the destination address (via MetaData) according to the source address of the request, or to 0xFF when the destination of the request was 0xFF.] ()

7.5.2.2 'FreezeFrameKind' is set to 'DEM_J1939DCM_SPNS_IN_EXPANDED_FREEZEFRAME'

This FreezeFrameKind is used by DM24

In case the Dem_ReturnSetFilterType is set to DEM_FILTERED_OK and the 'FreezeFrameKind' is set to 'DEM_J1939DCM_SPNS_IN_EXPANDED_FREEZEFRAME', the J1939 Diagnostic Communication Manager shall continue the sequence by subsequent calling the Dem_J1939DcmGetNextSPNInFreezeFrame, till the return value Dem_ReturnGetNextFilteredElementType is set to 'DEM_FILTERED_NO_MATCHING_ELEMENT'.
The calls may spread over several calls of J1939Dcm_MainFunction.

[SWS_J1939Dcm_00094][If the return value Dem_ReturnGetNextFilteredElementType is set to DEM_FILTERED_OK and the 'FreezeFrameKind' is set to 'DEM_J1939DCM_SPNS_IN_EXPANDED_FREEZEFRAME', the parameter 'SPNSupported' and 'SPNDataLength' shall be encoded into the response message layout according to SAE J1939-73 and the bit 1 'Supported in Expanded Freeze Frame' in 'SPN support type' shall be set to 1.] ()

[SWS_J1939Dcm_00095][In addition to [SWS_J1939Dcm_00094] the bit 2 'Supported in Data Stream' in 'SPN support type' shall be set to 1 in case the SPN is also contained in the list of configuration parameters J1939DcmSPNsInDataStream.] ()

[SWS_J1939Dcm_00096][If the return value Dem_ReturnGetNextFilteredElementType is set to 'DEM_FILTERED_NO_MATCHING_ELEMENT' and the 'FreezeFrameKind' is set to 'DEM_J1939DCM_SPNS_IN_EXPANDED_FREEZEFRAME' the J1939 Diagnostic Communication Manager shall add to the response message all SPNs which are only

supported in J1939DcmSPNsInDataStream and not in the ExpandedFreezFrame (returned by [SWS_J1939Dcm_00094]).
The bit 2 ‘Supported in Data Stream’ in ‘SPN support type’ shall be set to 1 and the ‘SPN Data Length’ shall be set to 0x00.
Afterwards PduR_J1939DcmTransmit shall be triggered with the PduId of the requested message and set the destination address (via MetaData) according to the source address of the request, or to 0xFF when the destination of the request was 0xFF.⌋ ()

[SWS_J1939Dcm_00165] ⌈ If the configuration parameter J1939DcmDevErrorDetect
[**ECUC_J1939Dcm_00003 :**] is enabled and the return value Dem_ReturnGetNextFilteredElementType is set to DEM_FILTERED_BUFFER_TOO_SMALL the J1939Dcm shall report this error to the Default Error Tracer with the error code J1939DCM_E_BUFFER_TOO_SMALL. ⌋ ()

7.5.3 Ratio

[SWS_J1939Dcm_00023]⌈ On start of Ratio sequence, the J1939 Diagnostic Communication Manager shall call the Dem_J1939DcmSetRatioFilter with the requested ‘node’.⌋ ()

[SWS_J1939Dcm_00024]⌈ In case the Dem_ReturnSetFilterType is set to DEM_FILTER_ACCEPTED, the values in parameter ‘Ignition_Cycle_Counter ‘ and ‘OBD_Monitoring_Conditions_Encountered ‘ shall be encoded into the response message layout according to SAE J1939-73.⌋ ()

[SWS_J1939Dcm_00025]⌈ In case the Dem_ReturnSetFilterType is unequal to DEM_FILTER_ACCEPTED, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameters ‘ackCode’ set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋ ()

The J1939 Diagnostic Communication Manager shall continue the sequence by subsequent calling the Dem_J1939DcmGetNextFilteredRatio, till the return value Dem_ReturnGetNextFilteredElementType is set to ‘DEM_FILTERED_NO_MATCHING_ELEMENT’.
The calls may spread over several calls of J1939Dcm_MainFunction.

[SWS_J1939Dcm_00027]⌈ If the return value Dem_ReturnGetNextFilteredElementType is set to DEM_FILTERED_OK, the parameter ‘SPN‘, ‘Numerator’ and ‘Denumerator‘ shall be copied to the response message defined by the DMx message that triggered the sequence. ⌋ ()

[SWS_J1939Dcm_00028]⌈ The J1939 Diagnostic Communication Manager shall continue the sequence by subsequent calling the Dem_J1939DcmGetNextFilteredRatio, except the maximum sequence counter threshold per MainFunction is reached (see *J1939DcmMaxRatiosPerMainFunction*)

or the return value Dem_ReturnGetNextFilteredElementType is set to 'DEM_FILTERED_PENDING'.⌋ ()

[SWS_J1939Dcm_00029]⌈ If the return value Dem_ReturnGetNextFilteredElementType is set to 'DEM_FILTERED_NO_MATCHING_ELEMENT' the J1939 Diagnostic Communication Manager shall call PduR_J1939DcmTransmit with the PduId of the requested message and set the destination address (via MetaData) according to the source address of the request, or to 0xFF when the destination of the request was 0xFF.⌋ ()

7.6 Diagnostic messages

7.6.1 Diagnostic message 1 (DM01)

The DM01 is used to broadcast periodically and on change the active DTCs and the summarized lamp status of this ECU.

[SWS_J1939Dcm_00030]⌈ On reception of request for DM01 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column "PGN (Hexadecimal)") the J1939 Diagnostic Communication Manager shall lock the dedicated DM01 buffer and use the common sequence of chapter 7.5.1 'DTC status' with the parameters 'DTCStatusFilter' and 'DTCKind' according to Table 2.⌋ ()

7.6.1.1 Periodic collection and transmission of DM01 message

[SWS_J1939Dcm_00031]⌈ The J1939 Diagnostic Communication Manager shall lock the dedicated DM01 buffer, collect all active DTCs and the summarized lamp status in this buffer, and transmit the DM01 message with a period of 1s as defined by [SWS_J1939Dcm_00033], [SWS_J1939Dcm_00032], [SWS_J1939Dcm_00114] and [SWS_J1939Dcm_00034].⌋ ()

[SWS_J1939Dcm_00114]⌈ The J1939Dcm shall provide a buffer in size of *J1939DcmDM01BufferSize* for the parallel DM01 processing to support [SWS_J1939Dcm_00031].⌋ ()

[SWS_J1939Dcm_00032]⌈ When DEM calls J1939Dcm_DemTriggerOnDTCStatus, the DM01 message shall be transmitted (additionally to the regular periodic transmission) for the reported 'node' for all configured channels, except J1939Dcm_DemTriggerOnDTCStatus for the same DTC is triggered more than once per second. The separate DM01 buffer shall be used. ⌋ ()

Note: The exception prevents a too high busload.

[SWS_J1939Dcm_00033]⌈ The DM01 shall use for all configured DM1 messages (J1939DcmDmxSupport == J1939DCM_DM01_SUPPORT) on all nodes

(J1939DcmNode) and on all channels (J1939DcmDiagnosticMessageSupportChannelRef) the common sequence of chapter 7.5.1 ‘DTC status’ with the parameters ‘DTCStatusFilter’ and ‘DTCKind’ according to Table 2.⌋ ()
Note: The periodic DM1 messages is broadcasted on all configured networks for all configured nodes. Example: Node_A will transmit periodically DTC_A and DTC_B on channel_1 and channel_2, but node_B will only transmit DTC_C on channel_2.
The requested DM1 message is only transmitted on the requested channel for the requested node.

[SWS_J1939Dcm_00034]⌈ The return values ‘J1939DTC’ and ‘OccurenceCounter’ shall be encoded into the DM01 layout according to SAE J1939-73.⌋ ()

To enable the ECU to use BAM for anything else than cyclic DM01 transmission, the maximum number of DTCs shall be restricted. 20 DTCs require about 2/3 of the available bandwidth of BAM.
[SWS_J1939Dcm_00116]⌈ After transmission of 20 DTCs the transmission shall be stopped.⌋ ()

Note: The transmit request to PduR is covered by the common sequence

7.6.2 Diagnostic message 2 (DM02)

The DM02 message reports previously active DTCs.

[SWS_J1939Dcm_00035]⌈ On reception of request for DM02 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall use the common sequence of chapter 7.5.1 ‘DTC status’ with the parameters ‘DTCStatusFilter’ and ‘DTCKind’ according to table Table 2⌋ ()

[SWS_J1939Dcm_00036]⌈ The return values ‘J1939DTC’ and ‘OccurenceCounter’ shall be encoded into the DM02 layout according to SAE J1939-73.⌋ ()

7.6.3 Diagnostic message 3 (DM03)

The DM03 message clears previously active DTCs

[SWS_J1939Dcm_00037]⌈ On reception of request for DM03 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall trigger Dem_J1939DcmClearDTC with parameter DTCTypeFilter set to DEM_J1939DTC_CLEAR_PREVIOUSLY_ACTIVE.⌋ ()

[SWS_J1939Dcm_00038]⌈ If the return value Dem_ReturnClearDTCType of Dem_J1939DcmClearDTC is set to DEM_CLEAR_PENDING, the J1939 Diagnostic Communication Manager shall retrigger Dem_J1939DcmClearDTC (with parameter

DTCTypeFilter set to DEM_J1939DTC_CLEAR_PREVIOUSLY_ACTIVE) in the next call of J1939Dcm_MainFunction.⌋ ()

[SWS_J1939Dcm_00039]⌈ If the return value Dem_ReturnClearDTCType of function Dem_J1939DcmClearDTC is set to DEM_CLEAR_OK, the J1939 Diagnostic Communication Manager shall send a positive acknowledgement (PACK) by J1939Rm_SendAck with parameters 'ackCode' set to J1939RM_ACK_POSITIVE.⌋ ()

[SWS_J1939Dcm_00040]⌈ If return value Dem_ReturnClearDTCType is other than DEM_CLEAR_OK or DEM_CLEAR_PENDING, the J1939 Diagnostic Communication Manager shall send a negative acknowledgement (NACK) by J1939Rm_SendAck with parameters 'ackCode' set to J1939RM_ACK_NEGATIVE.⌋ ()

Note: In case the destination address of the request was broadcast (0xFF), no acknowledgement shall be send according to SAE J1939-73 (refer [SWS_J1939Dcm_00113]).

7.6.4 Diagnostic message 4 (DM04)

The DM04 message reports the stored FreezeFrame(s).

[SWS_J1939Dcm_00041]⌈ On reception of request for DM04 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column "PGN (Hexadecimal)") the J1939 Diagnostic Communication Manager shall use the common sequence of chapter "7.5.2 FreezeFrame" with the parameters 'FreezeFrameKind' set to 'DEM_J1939DCM_FREEZEFRAME'.⌋ ()

7.6.5 Diagnostic message 5 (DM05)

The DM05 message reports the diagnostic readiness.

[SWS_J1939Dcm_00042]⌈ On reception of request for DM05 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column "PGN (Hexadecimal)") the J1939 Diagnostic Communication Manager shall call Dem_J1939DcmReadDiagnosticReadiness1 with the requested 'node' latest on next J1939Dcm_MainFunction.⌋ ()

[SWS_J1939Dcm_00043]⌈ If the return value of Dem_J1939DcmReadDiagnosticReadiness1 is E_OK, the return parameter 'DataValue' shall be encoded into the DM05 layout according to SAE J1939-73.
Afterwards PduR_J1939DcmTransmit with the PduId of the requested message shall be called with the destination address (via MetaData) set according to the source address of the request, or to 0xFF when the destination of the request was 0xFF.⌋ ()

[SWS_J1939Dcm_00045]⌈ If the return value of Dem_J1939DcmReadDiagnosticReadiness1 is unequal E_OK, the J1939 Diagnostic

Communication Manager shall call J1939Rm_SendAck with parameters ‘ackCode’ set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋ ()

7.6.6 Diagnostic message 6 (DM06)

The DM06 message reports OBD-relevant pending DTCs.

[SWS_J1939Dcm_00046]⌈ On reception of request for DM06 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall use the common sequence of chapter 7.5.1 ‘DTC status’ with the parameters ‘DTCStatusFilter’ and ‘DTCKind’ according to Table 2.⌋ ()

[SWS_J1939Dcm_00047]⌈ The return values ‘J1939DTC’ and ‘OccurenceCounter’ shall be encoded into the DM06 layout according to SAE J1939-73.⌋ ()

7.6.7 Diagnostic message 11 (DM11)

The DM11 message should at least clear all applicable diagnostic data pertaining to active DTCs (further affected diagnostic data refer SAE J1939-73).

[SWS_J1939Dcm_00048]⌈ On reception of request for DM11 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall trigger Dem_J1939DcmClearDTC with parameter DTCTypeFilter set to ‘DEM_J1939DTC_CLEAR_ALL ‘.
⌋ ()

[SWS_J1939Dcm_00049]⌈ If return value Dem_ReturnClearDTCType of function Dem_J1939DcmClearDTC is set to DEM_CLEAR_PENDING, the J1939 Diagnostic Communication Manager shall retrigger Dem_J1939DcmClearDTC (with parameter DTCTypeFilter set to ‘DEM_J1939DTC_CLEAR_ALL ‘) in the next call of J1939Dcm_MainFunction.⌋ ()

[SWS_J1939Dcm_00050]⌈ If the return value Dem_ReturnClearDTCType of function Dem_J1939DcmClearDTC is set to DEM_CLEAR_OK, the J1939 Diagnostic Communication Manager shall send a positive acknowledgement (PACK) by J1939Rm_SendAck with parameters ‘ackCode’ set to J1939RM_ACK_POSITIVE.⌋ ()

[SWS_J1939Dcm_00051]⌈ If return value Dem_ReturnClearDTCType of function Dem_J1939DcmClearDTC is other than DEM_CLEAR_OK or DEM_CLEAR_PENDING, the J1939 Diagnostic Communication Manager shall send a negative acknowledgement (NACK) by J1939Rm_SendAck with parameters ‘ackCode’ set to J1939RM_ACK_NEGATIVE.⌋ ()

Note: In case the destination address of the request was broadcast (0xFF), no acknowledgement shall be sent according to SAE J1939-73 (refer [SWS_J1939Dcm_00113]).

7.6.8 Diagnostic message 12 (DM12)

The DM12 message reports OBD-relevant active DTCs.

[SWS_J1939Dcm_00052][On reception of request for DM12 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall use the common sequence of chapter 7.5.1 ‘DTC status’ with the parameters ‘DTCStatusFilter’ and ‘DTCKind’ according to Table 2.] ()

[SWS_J1939Dcm_00053][The return values ‘J1939DTC’ and ‘OccurenceCounter’ shall be encoded into the DM12 layout according to SAE J1939-73.] ()

7.6.9 Diagnostic message 13 (DM13)

The DM13 message stops and starts the broadcast of messages to certain networks.

The following networks are available: (see also J1939DcmBusType)

1. J1587
2. J1922
3. J1939 Network #1, Primary vehicle network
4. J1939 Network #2
5. ISO 9141
6. J1850
7. Other, Manufacture Specified Port
8. SAE J1939 Network #3

[SWS_J1939Dcm_00129][The J1939Dcm shall maintain the *broadcast status information* of the DM13 command message. The initial value of the *broadcast status information* is the normal broadcasting mode for all networks.] ()

[SWS_J1939Dcm_00054][On reception of DM13 command message via call of J1939Dcm_RxIndication with parameter RxPduId set to the configured PduId J1939DcmDM13RxPduId and the hold signal set to ‘not available’, the J1939 Diagnostic Communication Manager shall start timeout supervision and call BswM_J1939DcmBroadcastStatus with the updated *broadcast status information*; see also [SWS_J1939Dcm_00055], [SWS_J1939Dcm_00056], [SWS_J1939Dcm_00057], and [SWS_J1939Dcm_00058].] ()

[SWS_J1939Dcm_00055][For network “Current Data Link”, the received DM13 IPDU determines the network bit reported to BswM.] ()

[SWS_J1939Dcm_00092][For other bus types in the DM13 command message, if there is a channel with an adequate J1939DcmBusType, that channel determines the network bit reported to BswM. Otherwise the request is ignored.] ()

[SWS_J1939Dcm_00056][A 'Stop Broadcast' shall result in a '0' in the bit associated with the network in the *broadcast status information* provided to BswM.] ()

[SWS_J1939Dcm_00057][A 'Start Broadcast' shall result in a '1' in the bit associated with the network in the *broadcast status information* provided to BswM.] ()

[SWS_J1939Dcm_00058][A 'Don't Care/take no action (leave as is)' in the bit associated with the network in the *broadcast status information* shall not update the J1939Dcm internal broadcast status information.] ()

[SWS_J1939Dcm_00134] [On reception of DM13 command message via call of J1939Dcm_RxIndication with parameter RxPduId set to the configured PduId J1939DcmDM13RxPduId and the hold signal set to 'all devices' or to 'devices whose broadcast state has been modified', the J1939 Diagnostic Communication Manager shall restart timeout supervision.] ()

Note: Timeout supervision is only started when the node has been addressed as described by [SWS_J1939Dcm_00054]. When the node was not addressed by a DM13 message without hold signal, it will therefore not be affected by the hold signal 'devices whose broadcast state has been modified'.

[SWS_J1939Dcm_00135] [When timeout occurs after 6 seconds without another DM13 message, all buses shall be set back to broadcast mode by calling BswM_J1939DcmBroadcastStatus with a *broadcast status information* where all buses are set to '1'.] ()

Note: It's up to the application to use the broadcast state reported to BswM in order to avoid setting diagnostic trouble codes because some signals where not received in time.

7.6.10 Diagnostic message 19 (DM19)

The DM19 message reports the Calibration Verification Number.

[SWS_J1939Dcm_00059][On reception of request for DM19 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column "PGN (Hexadecimal)") the J1939 Diagnostic Communication Manager shall trigger the operation GetCalibrationVerificationNumber of port prototype J1939Dcm_CalibrationInformation to collect the CVN (see also chapter 8.2).] ()

[SWS_J1939Dcm_00060][If the Std_ReturnType is set to any other value other than E_OK or E_NEXT, the J1939 Diagnostic Communication Manager shall send the acknowledgement by J1939Rm_SendAck with parameters 'ackCode' set to J1939RM_ACK_NEGATIVE (considering [SWS_J1939Dcm_00113]).] ()

Note: Some regulations require that the last computed value be stored and reported while a current cycle calculation is underway. For this case, the application needs to store the last calculated CVN(s).

[SWS_J1939Dcm_00061]⌈ If the Std_ReturnType is set to E_NEXT, the J1939 Diagnostic Communication Manager shall encode the return parameter 'CalibrationVerificationNumber' and 'CalibrationID' into the DM19 layout according to SAE J1939-73. Afterwards the operation GetCalibrationVerificationNumber of port prototype J1939Dcm_CalibrationInformation shall be re-triggered to collect the next part of the CVN.⌋ ()

[SWS_J1939Dcm_00062]⌈ If the Std_ReturnType is set to E_OK, the J1939 Diagnostic Communication Manager shall encode the return parameter 'CalibrationVerificationNumber' and 'CalibrationID' into the DM19 layout according to SAE J1939-73.
Afterwards PduR_J1939DcmTransmit with the PduId of the requested message shall be triggered and set the destination address (via MetaData) according to the source address of the request, or to 0xFF when the destination of the request was 0xFF.⌋ ()

7.6.11 Diagnostic message 20 (DM20)

The DM20 message reports the In-Use-Monitor Performance Ratio (IUMPR).

[SWS_J1939Dcm_00063]⌈ On reception of request for DM20 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column "PGN (Hexadecimal)") the J1939 Diagnostic Communication Manager shall use the common sequence of chapter "7.5.3 Ratio".⌋ ()

7.6.12 Diagnostic message 21 (DM21)

The DM21 message reports the diagnostic readiness.

[SWS_J1939Dcm_00064]⌈ On reception of request for DM21 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column "PGN (Hexadecimal)") the J1939 Diagnostic Communication Manager shall call Dem_J1939DcmReadDiagnosticReadiness2 with the requested 'node' latest on next J1939Dcm_MainFunction cycle.⌋ ()

[SWS_J1939Dcm_00065]⌈ If the return value of Dem_J1939DcmReadDiagnosticReadiness2 is E_OK, the return parameter 'DataValue' shall be encoded into the DM21 layout according to SAE J1939-73.
Afterwards PduR_J1939DcmTransmit with the PduId of DM21 shall be triggered and the destination address shall be set (via MetaData) to the source address of the request, or to 0xFF when the destination of the request was 0xFF.⌋ ()

[SWS_J1939Dcm_00067]⌈ If the return value of Dem_J1939DcmReadDiagnosticReadiness2 is unequal E_OK, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameters 'ackCode'

set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋ ()

7.6.13 Diagnostic message 23 (DM23)

The DM23 message reports OBD-relevant previously-active DTCs.

[SWS_J1939Dcm_00068]⌈ On reception of request for DM23 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall use the common sequence of chapter 7.5.1 ‘DTC status’ with the parameters ‘DTCStatusFilter’ and ‘DTCKind’ according to Table 2.⌋ ()

[SWS_J1939Dcm_00069]⌈ The return values ‘J1939DTC’ and ‘OccurenceCounter’ shall be encoded into the DM23 layout according to SAE J1939-73.⌋ ()

7.6.14 Diagnostic message 24 (DM24)

The DM24 message reports supported SPNs of DM25 and DataStream.

[SWS_J1939Dcm_00118]⌈ On reception of request for DM24 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall use the common sequence of chapter “7.5.2 FreezeFrame” with the parameters ‘FreezeFrameKind’ set to ’DEM_J1939DCM_SPNS_IN_EXPANDED_FREEZEFRAME’.⌋ ()

7.6.15 Diagnostic message 25 (DM25)

The DM25 reports the data of the expanded Freeze Frame

[SWS_J1939Dcm_00117]⌈ On reception of request for DM25 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall use the common sequence of chapter “7.5.2 FreezeFrame” with the parameters ‘FreezeFrameKind’ set to ’DEM_J1939DCM_EXPANDED_FREEZEFRAME’.⌋ ()

7.6.16 Diagnostic message 26 (DM26)

The DM26 message reports the diagnostic readiness.

[SWS_J1939Dcm_00070]⌈ On reception of request for DM26 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall call Dem_J1939DcmReadDiagnosticReadiness3 with the requested ‘node’ latest on next J1939Dcm_MainFunction cycle.⌋ ()

[SWS_J1939Dcm_00071][If the return value of Dem_J1939DcmReadDiagnosticReadiness3 is E_OK, the return parameter 'DataValue' shall be encoded into the DM26 layout according to SAE J1939-73. Afterwards PduR_J1939DcmTransmit with the PduId of DM26 shall be triggered and the destination address (via MetaData) set according to the source address of the request, or to 0xFF when the destination of the request was 0xFF.] ()

[SWS_J1939Dcm_00073][If the return value of Dem_J1939DcmReadDiagnosticReadiness3 is unequal E_OK, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameters 'ackCode' set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).] ()

7.6.17 Diagnostic message 28 (DM28)

The DM28 message reports OBD-relevant permanent DTCs.

[SWS_J1939Dcm_00074][On reception of request for DM28 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column "PGN (Hexadecimal)") the J1939 Diagnostic Communication Manager shall use the common sequence of chapter 7.5.1 'DTC status' with the parameters 'DTCStatusFilter' and 'DTCKind' according to Table 2.] ()

[SWS_J1939Dcm_00075][The return values 'J1939DTC' and 'OccurenceCounter' shall be encoded into the DM28 layout according to SAE J1939-73.] ()

7.6.18 Diagnostic message 29 (DM29)

The DM29 message reports the count of DTCs in each category.

[SWS_J1939Dcm_00076][On reception of request for DM29 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column "PGN (Hexadecimal)") the J1939 Diagnostic Communication Manager shall call for each byte in the response message the Dem_J1939DcmSetDTCFilter with the parameters 'DTCStatusFilter' and 'DTCKind' as defined by Table 3.] ()

Byte-position	**Count of:**	**Dem_J1939DcmSetDTCFilter parameters**	
		DTCStatusFilter	**DTCKind**
Byte 1	Pending DTCs	DEM_J1939DTC_PENDING	DEM_DTC_KIND_EMISSION_REL_DTCS
Byte 2	All Pending DTCs	DEM_J1939DTC_PENDING	DEM_DTC_KIND_ALL_DTCS
Byte 3	MIL-On DTCs	DEM_J1939DTC_ACTIVE	DEM_DTC_KIND_EMISSION_REL_DTCS
Byte 4	Previously MIL-On DTCs	DEM_J1939DTC_PREVIOUSLY_ACTIVE	DEM_DTC_KIND_EMISSION_REL_DTCS
Byte 5	Permanent DTCs	DEM_J1939DTC_PERMANENT	DEM_DTC_KIND_EMISSION_REL_DTCS
Byte 6	0xFF		

Byte 7	0xFF		
Byte 8	0xFF		

Table 3: Response message structure of DM29

[SWS_J1939Dcm_00077][After each call of Dem_J1939DcmSetDTCFilter, the J1939 Diagnostic Communication Manager shall call Dem_J1939DcmGetNumberOfFilteredDTC to get the current count of matching DTCs.] ()

[SWS_J1939Dcm_00078][If the return value Dem_ReturnGetNumberOfFilteredDTCType is set to DEM_NUMBER_OK, the J1939 Diagnostic Communication Manager shall copy the value of return parameter NumberOfFilteredDTC to the corresponding byte in the response message of DM29.] ()

[SWS_J1939Dcm_00079][If the return value Dem_ReturnGetNumberOfFilteredDTCType is set to DEM_NUMBER_PENDING, the J1939 Diagnostic Communication Manager shall retrigger Dem_J1939DcmGetNumberOfFilteredDTC in the next call of J1939Dcm_MainFunction.
The unused bytes 6 to 8 shall be set to 0xFF.] ()

7.6.19 Diagnostic message 31 (DM31)

The DM31 message reports DTC to Lamp Association.

[SWS_J1939Dcm_00080][On reception of request for DM31 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall call the function Dem_J1939DcmFirstDTCwithLampStatus to start the data streaming.] ()

[SWS_J1939Dcm_00120][The J1939 Diagnostic Communication Manager shall continue the sequence by subsequent calling the Dem_J1939DcmGetNextDTCwithLampStatus, except the maximum sequence counter threshold per MainFunction is reached (see *J1939DcmMaxDTCsPerMainFunction*) or the return value Dem_ReturnGetNextFilteredElementType is set to ‘DEM_FILTERED_PENDING’. In this case, the execution is postponed to the next J1939Dcm_MainFunction call.] ()

[SWS_J1939Dcm_00081][The return values ‘J1939DTC’, ‘OccurenceCounter’ and ‘LampStatus’ of each function call Dem_J1939DcmGetNextDTCwithLampStatus shall be subsequently encoded into the DM31 layout according to SAE J1939-73.] ()

[SWS_J1939Dcm_00121][If the return value Dem_ReturnGetNextFilteredElementType is set to ‘DEM_FILTERED_NO_MATCHING_ELEMENT’ the J1939 Diagnostic Communication Manager shall call PduR_J1939DcmTransmit with the PduId of the requested message and set the destination address (via MetaData) according to the

source address of the request, or to 0xFF when the destination of the request was 0xFF.⌋ ()

7.6.20 Diagnostic message 35 (DM35)

The DM35 message reports the immediate fault status.

[SWS_J1939Dcm_00082]⌈ On reception of request for DM35 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according Table 1 column “PGN (Hexadecimal)”) the J1939 Diagnostic Communication Manager shall start to collect all immediate DTCs and the summarized lamp status using the separate DM35 buffer and transmit the DM35 message with a period of 1s until module shutdown. ⌋ ()

Note: AUTOSAR has chosen the option to transmit this message only once per second.

[SWS_J1939Dcm_00083]⌈ The DM35 shall use the common sequence of chapter 7.5.1 ‘DTC status’ with the parameters ‘DTCStatusFilter’ and ‘DTCKind’ according to table Table 2.⌋ ()

[SWS_J1939Dcm_00084]⌈ The return values ‘J1939DTC’ and ‘OccurenceCounter’ shall be encoded into the DM35 layout according to SAE J1939-73.⌋ ()

7.7 Error Classification

7.7.1 Development Errors

[SWS_J1939Dcm_00089] ⌈
On errors and exceptions, the J1939Dcm module shall not modify its current module state but shall simply report the error event. ⌋ ( )

[SWS_J1939Dcm_00090]⌈ J1939Dcm shall use following errors:

Type or error	***Relevance***	***Related error code***	***Value [hex]***
API service called with wrong PDU or SDU.	Development	J1939DCM_E_INVALID_PDU_SDU_ID	0x01
API function called with a NULL Pointer (refer to [SWS_BSW_00212])	Development	J1939DCM_E_PARAM_POINTER	0x11
Dem initialisation	Development	J1939DCM_E_INIT_FAILED	0x14

failed (refer to [SWS_BSW_00050])			
API service used in un-initialized state	Development	J1939DCM_E_UNINIT	0x20
Dem_Init used in initialized state	Development	J1939DCM_E_REINIT	0x21
API service called with or in a wrong state	Development	J1939DCM_E_INVALID_STATE	0x06
API service called with wrong node parameter	Development	J1939DCM_E_INVALID_NODE	0x08
API service called with wrong channel parameter	Development	J1939DCM_E_INVALID_CHANNEL	0x0B
API service called with wrong PGN parameter	Development	J1939DCM_E_INVALID_PGN	0x0D
Buffer too small	Development	J1939DCM_E_BUFFER_TOO_SMALL	0x0E

⌋()

7.7.2 Runtime Errors

There are no runtime errors.

7.7.3 Transient Faults

There are no transient faults.

7.7.4 Production Errors

There are no production errors.

7.7.5 Extended Production Errors

There are no extended production errors.

8 API specification

8.1 API

8.1.1 Imported types

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

[SWS_J1939Dcm_00085][

Module	*Imported Type*
ComStack_Types	BufReq_ReturnType
	NetworkHandleType
	PduIdType
	PduInfoType
	PduLengthType
	RetryInfoType
Dem	Dem_DTCKindType
	Dem_J1939DcmDTCStatusFilterType
	Dem_J1939DcmDiagnosticReadiness1Type
	Dem_J1939DcmDiagnosticReadiness2Type
	Dem_J1939DcmDiagnosticReadiness3Type
	Dem_J1939DcmLampStatusType
	Dem_J1939DcmSetClearFilterType
	Dem_J1939DcmSetFreezeFrameFilterType
	Dem_ReturnClearDTCType
	Dem_ReturnGetNextFilteredElementType
	Dem_ReturnGetNumberOfFilteredDTCType
	Dem_ReturnSetFilterType
J1939Rm	J1939Rm_AckCode
Std_Types	Std_ReturnType
	Std_VersionInfoType

] ()

8.1.2 Type definitions

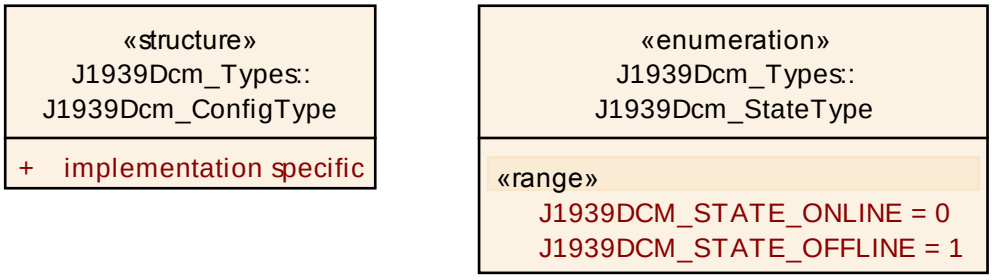


Figure 3: Overview of type definitions

8.1.2.1 J1939Dcm_ConfigType

[SWS_J1939Dcm_00111][

Name:	`J1939Dcm_ConfigType`		
Type:	`Structure`		
Element:	`void`	`implementation specific`	--
Description:	This is the base type for the configuration of the J1939 Diagnostic Communication Manager. A pointer to an instance of this structure will be used in the initialization of the J1939 Diagnostic Communication Manager. The content of this structure is defined in chapter 10 Configuration specification.		

] ()

8.1.2.2 J1939Dcm_StateType

[SWS_J1939Dcm_00123][

Name:	`J1939Dcm_StateType`	
Type:	`Enumeration`	
Range:	`J1939DCM_STATE_ONLINE`	Normal communication (0)
	`J1939DCM_STATE_OFFLINE`	No diagnostic communication (1)
Description:	This type represents the communication state of the J1939 Diagnostic Communication Manager.	

] ()

8.1.3 Function definitions

8.1.3.1 J1939Dcm_Init

[SWS_J1939Dcm_00098][

Service name:	J1939Dcm_Init	

Syntax:	`void J1939Dcm_Init(`
	`  const J1939Dcm_ConfigType* configPtr`
	`)`	

Service ID[hex]:	0x01	
Sync/Async:	Synchronous	
Reentrancy:	Non Reentrant	
Parameters (in):	configPtr	Pointer to selected configuration structure
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This function initializes the J1939 Diagnostic Communication Manager.	

] ()

See section 7.2.1 for details.

8.1.3.2 J1939Dcm_DeInit

[SWS_J1939Dcm_00099][

Service name:	J1939Dcm_DeInit

Syntax:	`void J1939Dcm_DeInit(`
	`  void`
	`)`

Service ID[hex]:	0x02

Sync/Async:	Synchronous
Reentrancy:	Non Reentrant
Parameters (in):	None
Parameters (inout):	None
Parameters (out):	None
Return value:	None
Description:	This function resets the J1939 Diagnostic Communication Manager to the uninitialized state.

] ()

See section 7.2.1 for details

8.1.3.3 J1939Dcm_GetVersionInfo

[SWS_J1939Dcm_00100][

Service name:	J1939Dcm_GetVersionInfo
Syntax:	`void J1939Dcm_GetVersionInfo( Std_VersionInfoType * versioninfo )`
Service ID[hex]:	0x03
Sync/Async:	Synchronous
Reentrancy:	Non Reentrant
Parameters (in):	None
Parameters (inout):	None
Parameters (out):	versioninfo Pointer to where to store the version information of this module.
Return value:	None
Description:	Returns the version information of this module.

] ()

8.1.3.4 J1939Dcm_SetState

[SWS_J1939Dcm_00124][

Service name:	J1939Dcm_SetState	
Syntax:	`Std_ReturnType J1939Dcm_SetState( NetworkHandleType channel, uint8 node, J1939Dcm_StateType newState )`	
Service ID[hex]:	0x0b	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	channel	Channel for which the state shall be changed.
	node	Node for which the state shall be changed.
	newState	New state the J1939Dcm shall enter, see definition of J1939Dcm_StateType for available states.
Parameters (inout):	None	
Parameters (out):	None	
Return value:	Std_ReturnType	E_OK: New communication state was set E_NOT_OK: Communication state was not changed due to wrong value in NewState or wrong initialization state of the module.
Description:	Changes the communication state of J1939Dcm to offline or online.	

] ()

[SWS_J1939Dcm_00130][The J1939 Diagnostic Manager shall reject the state change by returning E_NOT_OK when the 'newState' is not in the valid range. If DET is enabled via J1939DcmDevErrorDetect, the DET error J1939DCM_E_INVALID_STATE shall be reported.]()

[SWS_J1939Dcm_00147] [If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_SetState shall check if the node parameter is configured (J1939DcmNmNodeRef [**ECUC_J1939Dcm_00013 :**]). In case of an error, the function J1939Dcm_SetState shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_NODE.] ()

[SWS_J1939Dcm_00148][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_SetState shall check if the channel parameter is configured (J1939DcmNodeChannelRef) for the requested node parameter. In case of an error, the function J1939Dcm_SetState shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_CHANNEL] ()

8.1.4 Call-back notifications

This is a list of functions provided for other modules. The function prototypes of the callback functions shall be provided in the file J1939Dcm_Cbk.h

8.1.4.1 J1939Dcm_RequestIndication

[SWS_J1939Dcm_00101][

Service name:	J1939Dcm_RequestIndication	
Syntax:	`void J1939Dcm_RequestIndication( uint8 node, NetworkHandleType channel, uint32 requestedPgn, uint8 sourceAddress, uint8 destAddress, uint8 priority )`	
Service ID[hex]:	0x43	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	node	Node by which the request was received.
	channel	Channel on which the request was received.
	requestedPgn	PGN of the requested PG.
	sourceAddress	Address of the node that sent the Request PG.
	destAddress	Address of this node or 0xFF for broadcast.
	priority	Priority of the Request PG.
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	Indicates reception of a Request PG.	

] ()

[SWS_J1939Dcm_00138][When the interface J1939Dcm_RequestIndication is called while the J1939Dcm is in offline state (refer API J1939Dcm_SetState), the J1939 Diagnostic Communication Manager shall ignore the request message. Further a call to DET with parameter J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled.] ()

[SWS_J1939Dcm_00149][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_RequestIndication shall check if the node parameter is configured (J1939DcmNmNodeRef [ECUC_J1939Dcm_00013]). In case of an error, the function J1939Dcm_RequestIndication shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_NODE.]()

[SWS_J1939Dcm_00150][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_RequestIndication shall check if the channel parameter is configured (J1939DcmNodeChannelRef) for the requested node parameter. In case of an error, the function J1939Dcm_RequestIndication shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_CHANNEL.]()

The parameter *requestedPgn* is verified in SWS_J1939Dcm_00006.
The parameter *destAddress* is only used to determine the broadcast address and requires therefore no special verification
The parameter *sourceAddress* is used to set the destAddress for the transmission, but is already verified in J1939Rm.
The parameter *priority* needs not to be verified, because it is not considered at all.

8.1.4.2 J1939Dcm_RxIndication

[SWS_J1939Dcm_00128][

Service name:	J1939Dcm_RxIndication	
Syntax:	`void J1939Dcm_RxIndication( PduIdType RxPduId, const PduInfoType* PduInfoPtr )`	
Service ID[hex]:	0x42	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in):	RxPduId	ID of the received I-PDU.
	PduInfoPtr	Contains the length (SduLength) of the received I-PDU and a pointer to a buffer (SduDataPtr) containing the I-PDU.
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	Indication of a received I-PDU from a lower layer communication interface module.	

] ()

[SWS_J1939Dcm_00139][When the interface J1939Dcm_RxIndication is called while the J1939Dcm is in offline state (refer API J1939Dcm_SetState), the J1939 Diagnostic Communication Manager shall ignore the command message. Further a call to DET with parameter J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled.] ()

[SWS_J1939Dcm_00151][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_RxIndication shall check if the RxPduId parameter is not configured (J1939DcmRxPduId) on any DMx message (J1939DcmDiagnosticMessageSupport). In case of an error, the function J1939Dcm_RxIndication shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_PDU_SDU_ID.] ()

8.1.4.3 J1939Dcm_TxConfirmation

[SWS_J1939Dcm_00145][

Service name:	J1939Dcm_TxConfirmation	

Syntax:	`void J1939Dcm_TxConfirmation(`
	`  PduIdType TxPduId`
	`)`	

Service ID[hex]:	0x40	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in):	TxPduId	ID of the I-PDU that has been transmitted.
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	The lower layer communication interface module confirms the transmission of an I-PDU.	

] ()

[SWS_J1939Dcm_00146][When the interface J1939Dcm_TxConfirmation is called while the J1939Dcm is in offline state (refer API J1939Dcm_SetState), the J1939 Diagnostic Communication Manager shall release the buffer (of [SWS_J1939Dcm_00115]). Further a call to DET with parameter J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled.] ()

[SWS_J1939Dcm_00162][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_TxConfirmation shall check if the id parameter is not configured (J1939DcmTxPduId) on any DMx message (J1939DcmDiagnosticMessageSupport). In case of an error, the function J1939Dcm_TxConfirmation shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_PDU_SDU_ID.] ()

[SWS_J1939Dcm_00163][The function J1939Dcm_TxConfirmation shall check if it is called out of context i.e. if the J1939Dcm is currently transmitting a response message over TP protocol. In case of an error, the function J1939Dcm_TxConfirmation shall return return without any effect. Further a call to DET with parameter J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled.] ()

8.1.4.4 J1939Dcm_StartOfReception

[SWS_J1939Dcm_00102][

Service name:	J1939Dcm_StartOfReception	

Syntax:	`BufReq_ReturnType J1939Dcm_StartOfReception(`
	`  PduIdType id,`
	`  const PduInfoType* info,`
	`  PduLengthType TpSduLength,`
	`  PduLengthType* bufferSizePtr`
	`)`	

Service ID[hex]:	0x46	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	id	Identification of the I-PDU.
	info	Pointer to a PduInfoType structure containing the payload data (without protocol information) and payload length of the first frame or single frame of a transport protocol I-PDU reception. Depending on the global parameter MetaDataLength, additional bytes containing MetaData (e.g. the CAN ID) are appended after the payload data, increasing the length accordingly. If neither first/single frame data nor MetaData are available, this parameter is set to NULL_PTR.
	TpSduLength	Total length of the N-SDU to be received.
Parameters (inout):	None	
Parameters (out):	bufferSizePtr	Available receive buffer in the receiving module. This parameter will be used to compute the Block Size (BS) in the transport protocol module.
Return value:	BufReq_ReturnType	BUFREQ_OK: Connection has been accepted. bufferSizePtr indicates the available receive buffer; reception is continued. If no buffer of the requested size is available, a receive buffer size of 0 shall be indicated by bufferSizePtr. BUFREQ_E_NOT_OK: Connection has been rejected; reception is aborted. bufferSizePtr remains unchanged. BUFREQ_E_OVFL: No buffer of the required length can be provided; reception is aborted. bufferSizePtr remains unchanged.
Description:	This function is called at the start of receiving an N-SDU. The N-SDU might be fragmented into multiple N-PDUs (FF with one or more following CFs) or might consist of a single N-PDU (SF).	

] ()

[SWS_J1939Dcm_00140][When the interface J1939Dcm_StartOfReception is called while the J1939Dcm is in offline state (refer API J1939Dcm_SetState), the J1939 Diagnostic Communication Manager shall reject this command message by returning BUFREQ_E_NOT_OK. Further a call to DET with parameter

J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled.] ()

[SWS_J1939Dcm_00152][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_StartOfReception shall check if the id parameter is not configured (J1939DcmRxPduId) on any DMx message (J1939DcmDiagnosticMessageSupport). In case of an error, the function J1939Dcm_StartOfReception shall return with BUFREQ_E_NOT_OK and without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_PDU_SDU_ID.]()

[SWS_J1939Dcm_00153][The function J1939Dcm_StartOfReception shall check if the TpSduLength parameter is smaller or equal as the configured buffer size (J1939DcmCommonBufferSize). In case of an error, the function J1939Dcm_StartOfReception shall return with BUFREQ_E_OVFL.]()

[SWS_J1939Dcm_00155][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_StartOfReception shall check if the J1939Dcm is the right state to receive a command message over TP protocol. In case of an error, the function J1939Dcm_StartOfReception shall return with BUFREQ_E_NOT_OK and without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_STATE.]()

8.1.4.5 J1939Dcm_CopyRxData

[SWS_J1939Dcm_00103][

Service name:	J1939Dcm_CopyRxData	

Syntax:	`BufReq_ReturnType J1939Dcm_CopyRxData(`
	`  PduIdType id,`
	`  const PduInfoType* info,`
	`  PduLengthType* bufferSizePtr`
	`)`	

Service ID[hex]:	0x44	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	id	Identification of the received I-PDU.
	info	Provides the source buffer (SduDataPtr) and the number of bytes to be copied (SduLength). An SduLength of 0 can be used to query the current amount of available buffer in the upper layer module. In this case, the SduDataPtr may be a NULL_PTR.
Parameters (inout):	None	
Parameters (out):	bufferSizePtr	Available receive buffer after data has been copied.
Return value:	BufReq_ReturnType	BUFREQ_OK: Data copied successfully BUFREQ_E_NOT_OK: Data was not copied because an error occurred.
Description:	This function is called to provide the received data of an I-PDU segment (N-PDU) to the upper layer. Each call to this function provides the next part of the I-PDU data. The size of the remaining data is written to the position indicated by bufferSizePtr.	

] ()

[SWS_J1939Dcm_00141][The function J1939Dcm_CopyRxData shall check if it is called out of context i.e. if the J1939Dcm is currently receiving a command message over TP protocol. In case of an error, the function J1939Dcm_CopyRxData shall return BUFREQ_E_NOT_OK. Further a call to DET with parameter J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled.] ()

[SWS_J1939Dcm_00154][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_CopyRxData shall check if the id parameter is not configured (J1939DcmRxPduId) on any DMx message (J1939DcmDiagnosticMessageSupport). In case of an error, the function J1939Dcm_CopyRxData shall return with BUFREQ_E_NOT_OK and without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_PDU_SDU_ID.] ()

8.1.4.6 J1939Dcm_TpRxIndication

[SWS_J1939Dcm_00104][

Service name:	J1939Dcm_TpRxIndication	
Syntax:	`void J1939Dcm_TpRxIndication( PduIdType id, Std_ReturnType result )`	
Service ID[hex]:	0x45	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	id	Identification of the received I-PDU.
	result	Result of the reception.
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	Called after an I-PDU has been received via the TP API, the result indicates whether the transmission was successful or not.	

] ()

[SWS_J1939Dcm_00142][The function J1939Dcm_ TpRxIndication shall check if it is called out of context i.e. if the J1939Dcm is currently receiving a response message over TP protocol. In case of an error, the function J1939Dcm_ TpRxIndication shall return without any effect. Further a call to DET with parameter J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled.] ()

[SWS_J1939Dcm_00156][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_TpRxIndication shall check if the id parameter is not configured (J1939DcmRxPduId) on any DMx message (J1939DcmDiagnosticMessageSupport). In case of an error, the function J1939Dcm_TpRxIndication shall return and without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_PDU_SDU_ID.] ()

8.1.4.7 J1939Dcm_CopyTxData

[SWS_J1939Dcm_00105][

Service name:	J1939Dcm_CopyTxData	

Syntax:	`BufReq_ReturnType J1939Dcm_CopyTxData(`
	`  PduIdType id,`
	`  const PduInfoType* info,`
	`  RetryInfoType* retry,`
	`  PduLengthType* availableDataPtr`
	`)`	

Service ID[hex]:	0x43	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	id	Identification of the transmitted I-PDU.
	info	Provides the destination buffer (SduDataPtr) and the number of bytes to be copied (SduLength). If not enough transmit data is available, no data is copied by the upper layer module and BUFREQ_E_BUSY is returned. The lower layer module may retry the call. An SduLength of 0 can be used to indicate state changes in the retry parameter or to query the current amount of available data in the upper layer module. In this case, the SduDataPtr may be a NULL_PTR.
	retry	This parameter is used to acknowledge transmitted data or to retransmit data after transmission problems. If the retry parameter is a NULL_PTR, it indicates that the transmit data can be removed from the buffer immediately after it has been copied. Otherwise, the retry parameter must point to a valid RetryInfoType element. If TpDataState indicates TP_CONFPENDING, the previously copied data must remain in the TP buffer to be available for error recovery. TP_DATACONF indicates that all data that has been copied before this call is confirmed and can be removed from the TP buffer. Data copied by this API call is excluded and will be confirmed later. TP_DATARETRY indicates that this API call shall copy previously copied data in order to recover from an error. In this case TxTpDataCnt specifies the offset in bytes from the current data copy position.
Parameters (inout):	None	
Parameters (out):	availableDataPtr	Indicates the remaining number of bytes that are available in the upper layer module's Tx buffer. availableDataPtr can be used by TP modules that support dynamic payload lengths (e.g. FrIsoTp) to determine the size of the following CFs.
Return value:	BufReq_ReturnType	BUFREQ_OK: Data has been copied to the transmit buffer completely as requested. BUFREQ_E_BUSY: Request could not be fulfilled, because the required amount of Tx data is not available. The lower layer module may retry this call later on. No data has been copied. BUFREQ_E_NOT_OK: Data has not been copied. Request failed.
Description:	This function is called to acquire the transmit data of an I-PDU segment (N-PDU). Each call to this function provides the next part of the I-PDU data unless retry->TpDataState is TP_DATARETRY. In this case the function restarts to copy the	

	data beginning at the offset from the current position indicated by retry->TxTpDataCnt. The size of the remaining data is written to the position indicated by availableDataPtr.

] ()

[SWS_J1939Dcm_00143][The function J1939Dcm_CopyTxData shall check if it is called out of context i.e. if the J1939Dcm is currently transmiting a response message over TP protocol. In case of an error, the function J1939Dcm_CopyTxData shall return BUFREQ_E_NOT_OK. Further a call to DET with parameter J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled.] ()

[SWS_J1939Dcm_00158][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_CopyTxData shall check if the id parameter is not configured (J1939DcmTxPduId) on any DMx message (J1939DcmDiagnosticMessageSupport). In case of an error, the function J1939Dcm_CopyTxData shall return with BUFREQ_E_NOT_OK and without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_PDU_SDU_ID.]()

8.1.4.8 J1939Dcm_TpTxConfirmation

[SWS_J1939Dcm_00106][

Service name:	J1939Dcm_TpTxConfirmation	
Syntax:	`void J1939Dcm_TpTxConfirmation( PduIdType id, Std_ReturnType result )`	
Service ID[hex]:	0x48	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	id	Identification of the transmitted I-PDU.
	result	Result of the transmission of the I-PDU.
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This function is called after the I-PDU has been transmitted on its network, the result indicates whether the transmission was successful or not.	

] ()

[SWS_J1939Dcm_00160][If the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled, the function J1939Dcm_TpTxConfirmation shall check if the id parameter is not configured (J1939DcmRxPduId) on any DMx message (J1939DcmDiagnosticMessageSupport). In case of an error, the function J1939Dcm_TpTxConfirmation shall return and without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_PDU_SDU_ID.]()

[SWS_J1939Dcm_00161][The function J1939Dcm_TpTxConfirmation shall check if it is called out of context i.e. if the J1939Dcm is currently transmitting a response message over TP protocol. In case of an error, the function

J1939Dcm_TpTxConfirmation shall return and without any effect. Further a call to DET with parameter J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect [**ECUC_J1939Dcm_00003 :**] is enabled.] ()

8.1.5 Call-back notifications from DEM

8.1.5.1 J1939Dcm_DemTriggerOnDTCStatus

[SWS_J1939Dcm_00122][

Service name:	J1939Dcm_DemTriggerOnDTCStatus	
Syntax:	`void J1939Dcm_DemTriggerOnDTCStatus( uint32 DTC, uint8 node )`	
Service ID[hex]:	0x0a	
Sync/Async:	Synchronous	
Reentrancy:	Non Reentrant	
Parameters (in):	DTC	Diagnostic Trouble Code in UDS format.
	node	Node at which the DTC status change has happened.
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	Trigger for DM01 message that a DTC status change has happened.	

] ()

8.1.6 Scheduled functions

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

8.1.6.1 J1939Dcm_MainFunction

[SWS_J1939Dcm_00107][

Service name:	J1939Dcm_MainFunction
Syntax:	`void J1939Dcm_MainFunction( void )`
Service ID[hex]:	0x04
Description:	Main function of the J1939 Diagnostic Communication Manager. Used for scheduling purposes and timeout supervision.

] ()

[SWS_J1939Dcm_00108][The frequency of invocations of J1939Dcm_MainFunction is determined by the configuration parameter J1939DcmMainFunctionPeriod.] ()

8.1.7 Expected Interfaces

In this section, all interfaces required by other modules are listed.

8.1.7.1 Mandatory Interfaces

The J1939Dcm does not have any mandatory interfaces.

8.1.7.2 Optional Interfaces

This section defines all interfaces that are required to fulfill an optional functionality of the module.

[SWS_J1939Dcm_00132][

API function	*Description*
BswM_J1939DcmBroadcastStatus	This API tells the BswM the desired communication status of the available networks. The status will typically be activated via COM I-PDU group switches.
Dem_J1939DcmClearDTC	Clears active DTCs as well as previously active DTCs.
Dem_J1939DcmFirstDTCwithLampStatus	The function sets the filter to the first applicable DTC for the DM31 response for a specific node.
Dem_J1939DcmGetNextDTCwithLampStatus	Gets the next filtered J1939 DTC for DM31 including current LampStatus.
Dem_J1939DcmGetNextFilteredDTC	Gets the next filtered J1939 DTC.
Dem_J1939DcmGetNextFilteredRatio	Gets the next filtered Ratio.
Dem_J1939DcmGetNextFreezeFrame	Gets next freeze frame data. The function stores the data in the provided DestBuffer.
Dem_J1939DcmGetNextSPNInFreezeFrame	Gets next SPN.
Dem_J1939DcmGetNumberOfFilteredDTC	Gets the number of currently filtered DTCs set by the function Dem_J1939DcmSetDTCFilter.
Dem_J1939DcmReadDiagnosticReadiness1	Service to report the value of Diagnostic Readiness 1 (DM05) computed by the Dem.
Dem_J1939DcmReadDiagnosticReadiness2	Service to report the value of Diagnostic Readiness 2 (DM21) computed by the Dem.
Dem_J1939DcmReadDiagnosticReadiness3	Service to report the value of Diagnostic Readiness 3 (DM26) computed by the Dem.
Dem_J1939DcmSetDTCFilter	The function sets the DTC filter for a specific node and returns the composite lamp status of the filtered DTCs.
Dem_J1939DcmSetFreezeFrameFilter	The function sets the FreezeFrame filter for a specific node.
Dem_J1939DcmSetRatioFilter	The function sets the Ratio filter for a specific node and returns the corresponding Ignition Cycle Counter and General Denominator.
Det_ReportError	Service to report development errors.
J1939Rm_SendAck	Requests transmission of an Acknowledgement PG.
PduR_J1939DcmCancelReceive	Requests cancellation of an ongoing reception of an I-PDU in a lower layer transport protocol module.
PduR_J1939DcmCancelTransmit	Requests cancellation of an ongoing transmission of an I-PDU in a lower layer communication interface or transport protocol module.
PduR_J1939DcmTransmit	Requests transmission of an I-PDU.

] ()

[SWS_J1939Dcm_00167][The parameter "broadcast" of J1939Rm_SendAck shall always be set to FALSE.] ()

Background: The ACKM message is never sent as response to a broadcast request. This is precluded by SAE J1939-21 for negative acknowledgements, and by SAE J1939-73 for positive acknowledgements of DM3, DM11, and DM55.

8.2 Service Interfaces

8.2.1 Client-Server-Interfaces

8.2.1.1 J1939Dcm_CalibrationInformation

[SWS_J1939Dcm_00097][The *J1939Dcm Service Component* shall provide the port interface *J1939Dcm_CalibrationInformation*, if DM19 is configured (refer **ECUC_J1939Dcm_00042 :** J1939DcmDmxSupport == J1939DcmDm19Support).

Name	J1939Dcm_CalibrationInformation	
Comment	--	
IsService	true	
Variation	{ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmNode/ J1939DcmDiagnosticMessageSupport.J1939DcmDmxSupport)} == J1939DcmDm19Support	
Possible Errors	0	E_OK
	1	E_NOT_READY
	2	E_NEXT

Operations

GetCalibrationVerificationNumber		
Comments	--	
Variation	--	
Parameters	CalibrationVerificationNumber	
	Comment	--
	Type	uint32
	Variation	--
	Direction	OUT
	CalibrationID	
	Comment	--
	Type	CalibrationIDArrayType
	Variation	--
	Direction	OUT
Possible	E_OK	E_OK is used if the CVN calculation is finished and completed.

Errors	E_NOT_READY	E_NOT_READY is used if the CVN calculation is not finished yet. The tool needs to send the request again.
	E_NEXT	E_NEXT is used if the CVN calculation is finished, but not all CVNs returned yet.

] ()

8.2.2 Implementation Data Types

8.2.2.1 CalibrationIDArrayType

[SWS_J1939Dcm_00136][The *J1939Dcm Service Component* shall provide the implementation data type CalibrationIDArrayType, if DM19 is configured (refer **ECUC_J1939Dcm_00042 :** J1939DcmDmxSupport == J1939DcmDm19Support).

Name	CalibrationIDArrayType		
Kind	Array	Element type	uint8
Size	16 Elements		
Description	--		
Variation	--		

] ()

8.2.3 Ports

8.2.3.1 J1939Dcm_CalibrationInformation

[SWS_J1939Dcm_00137][The *J1939Dcm Service Component* shall provide the port prototype *J1939Dcm_CalibrationInformation*, if DM19 is configured (refer **ECUC_J1939Dcm_00042 :** J1939DcmDmxSupport == J1939DcmDm19Support).

Name	J1939Dcm_CalibrationInformation		
Kind	RequiredPort	Interface	J1939Dcm_CalibrationInformation
Description	Port to retrieve the Calibration Verification Numbers (CVNs) from the application.		
Variation	{ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmNode/ J1939DcmDiagnosticMessageSupport.J1939DcmDmxSupport)} == J1939DcmDm19Support		

] ()

9 Sequence diagrams

This version of the J1939 SWS does not include sequence diagrams.

10 Configuration specification

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

Section 10.2 specifies the structure (containers) and the parameters of the J1939 Diagnostic Communication Manager.

Section 10.3 specifies published information of the J1939 Diagnostic Communication Manager.

10.1 How to read this chapter

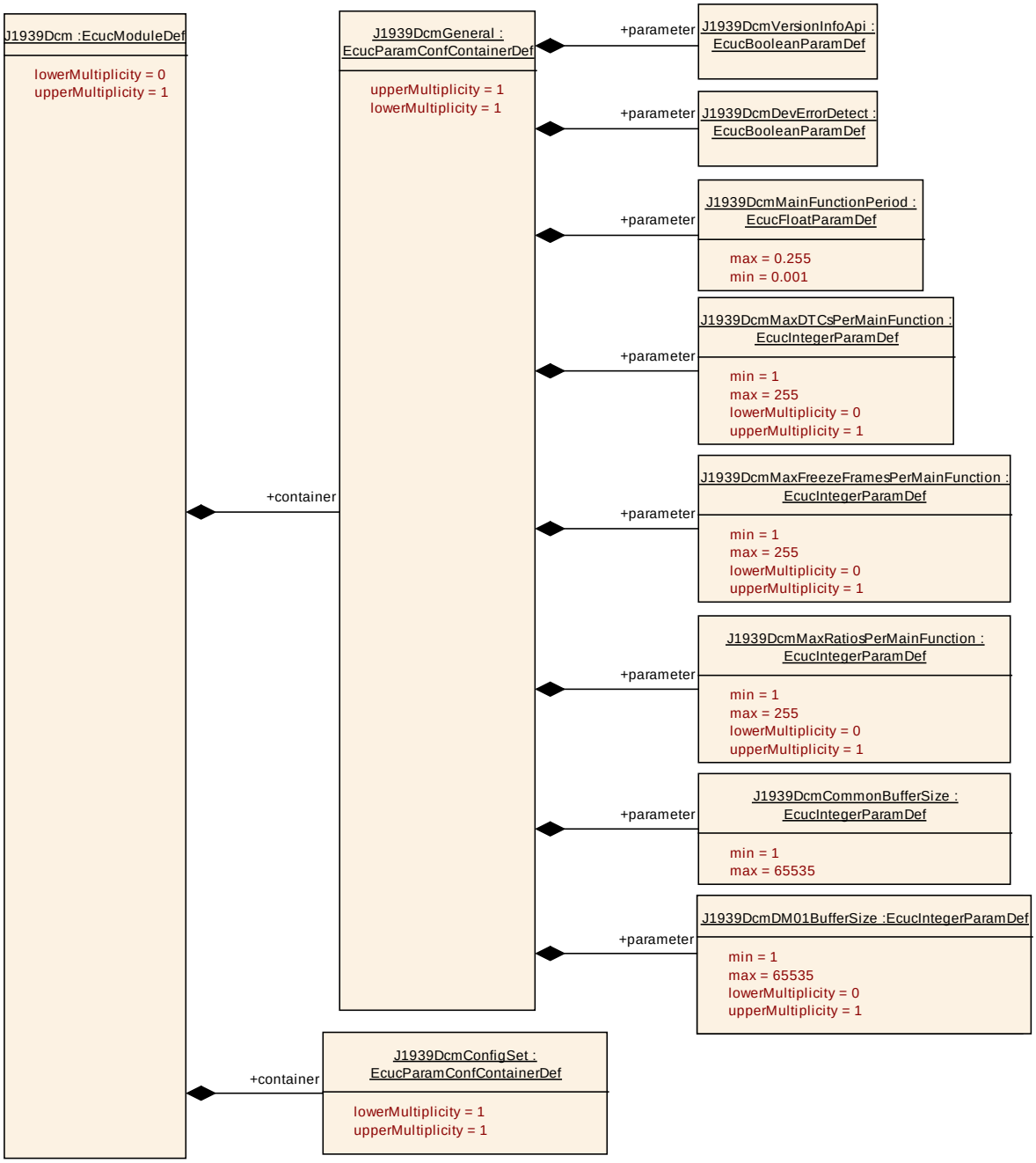
For details refer to the chapter 10.1 “Introduction to configuration specification” in *SWS_BSWGeneral*

10.2 Containers and configuration parameters

The following sections summarize all configuration parameters of the J1939 Diagnostic Communication Manager. The detailed meaning of the parameters is described in chapters 7 and 8.

10.2.1 Variants

[SWS_J1939Dcm_00119][The J1939 Diagnostic Communication Manager shall support the configuration variants VARIANT-PRE-COMPILE, VARIANT-LINK-TIME, and VARIANT-POST-BUILD.
] ()

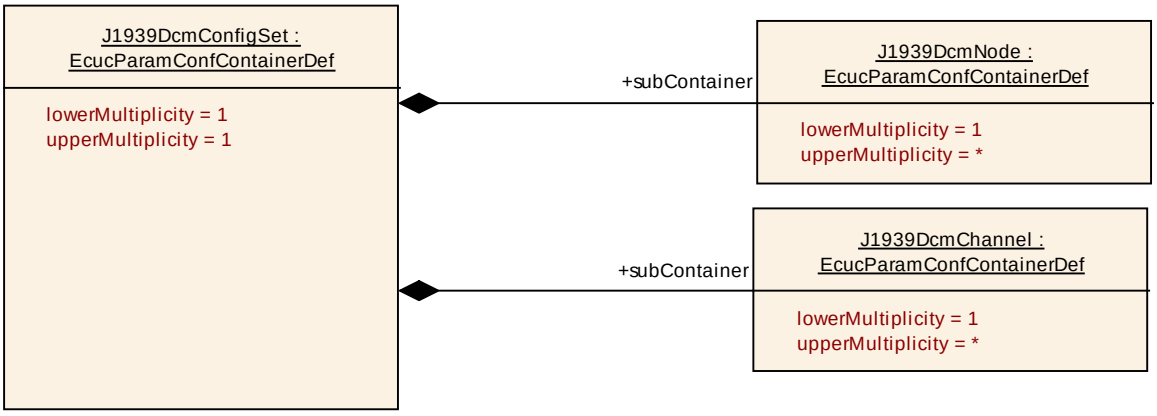


10.2.2 J1939Dcm

SWS Item	**ECUC_J1939Dcm_00005 :**
Module Name	*J1939Dcm*
Module Description	The SAE J1939 Dcm module
Post-Build Variant Support	true

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939DcmConfigSet	1	This container contains the configuration parameters and sub containers of the AUTOSAR J1939Dcm module.

J1939DcmGeneral	1	Contains the general configuration parameters of the module.



10.2.3 J1939DcmConfigSet

SWS Item	**ECUC_J1939Dcm_00009 :**
Container Name	J1939DcmConfigSet
Description	This container contains the configuration parameters and sub containers of the AUTOSAR J1939Dcm module.
Configuration Parameters	

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939DcmChannel	1..*	Contains the J1939DcmChannel parameters.
J1939DcmNode	1..*	Contains the parameters for the support of a logical J1939 node.

10.2.4 J1939DcmGeneral

SWS Item	**ECUC_J1939Dcm_00001 :**
Container Name	J1939DcmGeneral
Description	Contains the general configuration parameters of the module.
Configuration Parameters	

SWS Item	**ECUC_J1939Dcm_00040 :**	
Name	J1939DcmCommonBufferSize	
Description	Size of common buffer (in Bytes). The buffer size should be as large as the longest command or response message.	
Multiplicity	1	
Type	EcucIntegerParamDef	
Range	1 .. 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_J1939Dcm_00041 :**		
Name	J1939DcmDM01BufferSize		
Description	Size of DM01 buffer (in Bytes). The buffer size should be as large as the longest DM01 response message.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	1 .. 65535		
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: local		

SWS Item	**ECUC_J1939Dcm_00003 :**		
Name	J1939DcmDevErrorDetect		
Description	Switches the Default Error Tracer (Det) detection and notification ON or OFF. • 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_J1939Dcm_00004 :**		
Name	J1939DcmMainFunctionPeriod		
Description	Call cycle in seconds of J1939Dcm_MainFunction.		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	0.001 .. 0.255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: ECU		

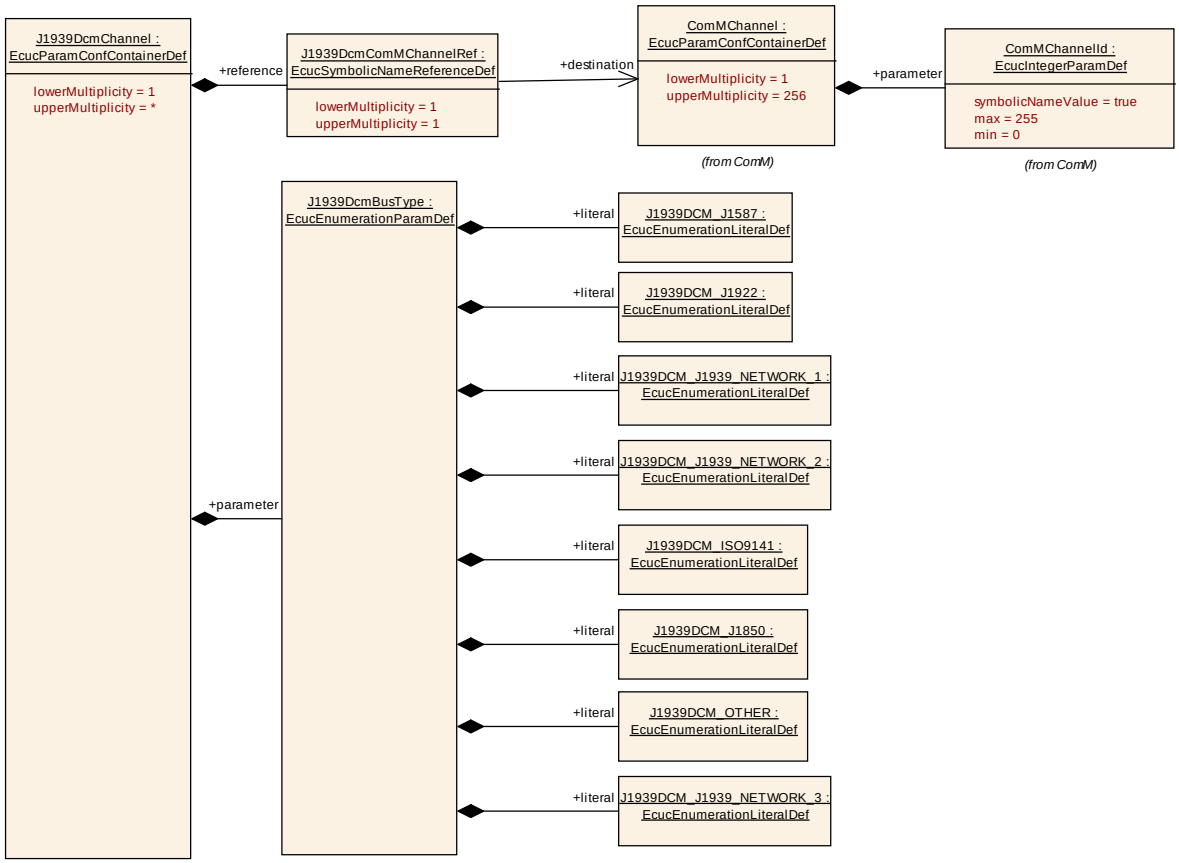
SWS Item	ECUC_J1939Dcm_00006 :		
Name	J1939DcmMaxDTCsPerMainFunction		
Description	Maximum threshold of DTCs filtered in a single MainFunction cycle.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	1 .. 255		
Default value	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
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: local		

SWS Item	ECUC_J1939Dcm_00007 :		
Name	J1939DcmMaxFreezeFramesPerMainFunction		
Description	Maximum threshold of FreezeFrames filtered in a single MainFunction cycle.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	1 .. 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: local		

SWS Item	ECUC_J1939Dcm_00008 :		
Name	J1939DcmMaxRatiosPerMainFunction		
Description	Maximum threshold of Ratios filtered in a single MainFunction cycle.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	1 .. 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: local		

SWS Item	**ECUC_J1939Dcm_00002 :**		
Name	J1939DcmVersionInfoApi		
Description	Pre-processor switch for enabling version info API support.		
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		

No Included Containers



10.2.5 J1939DcmChannel

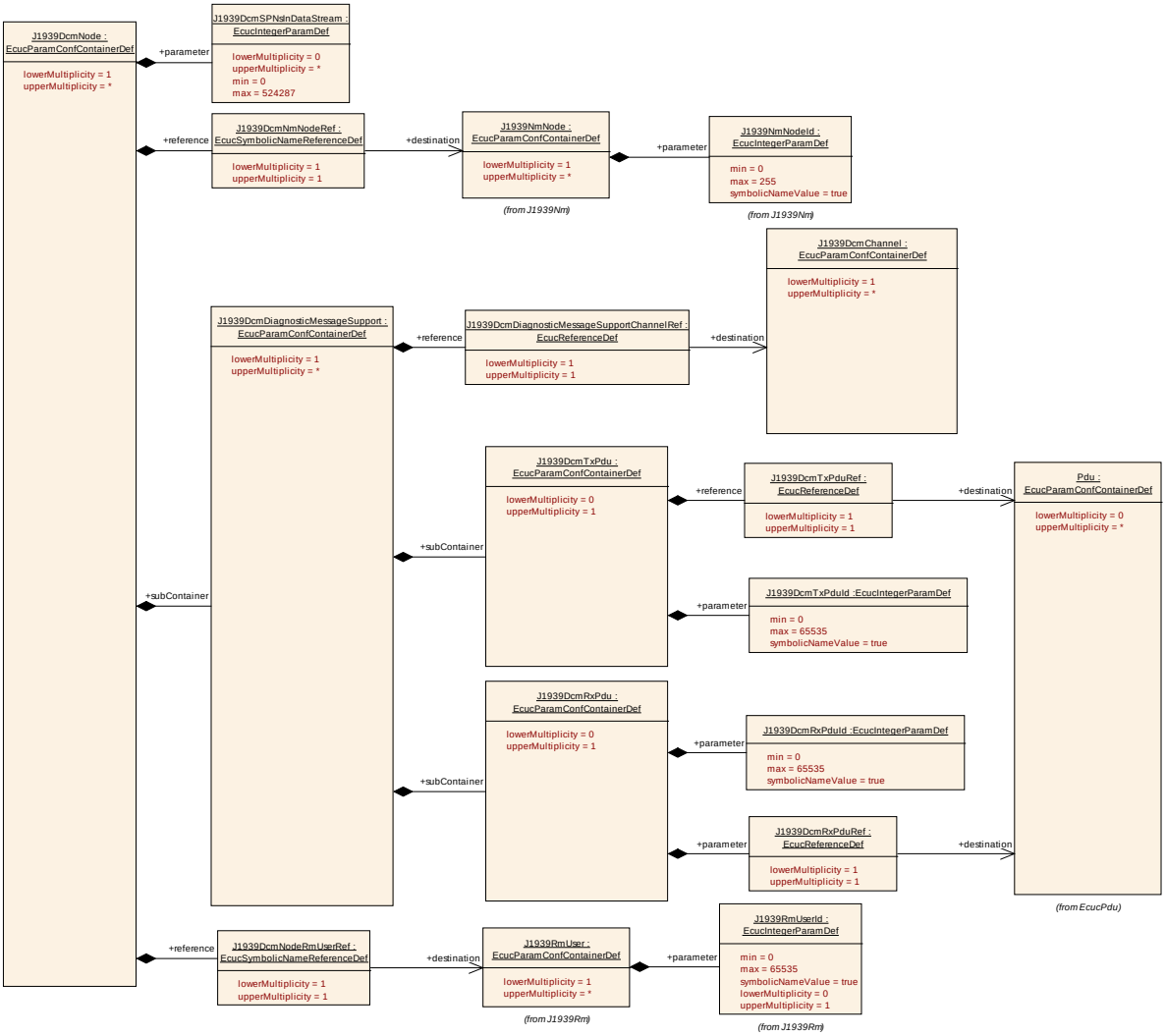
SWS Item	**ECUC_J1939Dcm_00011 :**
Container Name	J1939DcmChannel
Description	Contains the J1939DcmChannel parameters.
Configuration Parameters	

SWS Item	**ECUC_J1939Dcm_00039 :**
Name	J1939DcmBusType

Description	Identifies the communication port		
Multiplicity	1		
Type	EcucEnumerationParamDef		
Range	J1939DCM_ISO9141	Identifies the ISO 9141 communications port.	
	J1939DCM_J1587	Identifies the J1587 communication port.	
	J1939DCM_J1850	Identifies the J1850 communication port.	
	J1939DCM_J1922	Identifies the J1922 communication port.	
	J1939DCM_J1939_NETWORK_1	Identifies the J1939 Network #1, Primary Vehicle Network communication port.	
	J1939DCM_J1939_NETWORK_2	Identifies the J1939 Network #2 communication port.	
	J1939DCM_J1939_NETWORK_3	Identifies the J1939 Network #3 communication port.	
	J1939DCM_OTHER	Identifies the “Other, Manufacture Specified Port” communication port.	
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_J1939Dcm_00038 :**		
Name	J1939DcmComMChannelRef		
Description	Reference to the ComMChannel.		
Multiplicity	1		
Type	Symbolic name reference to [ComMChannel]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: ECU		

No Included Containers



10.2.6 J1939DcmNode

SWS Item	**ECUC_J1939Dcm_00010 :**
Container Name	J1939DcmNode
Description	Contains the parameters for the support of a logical J1939 node.
Configuration Parameters	

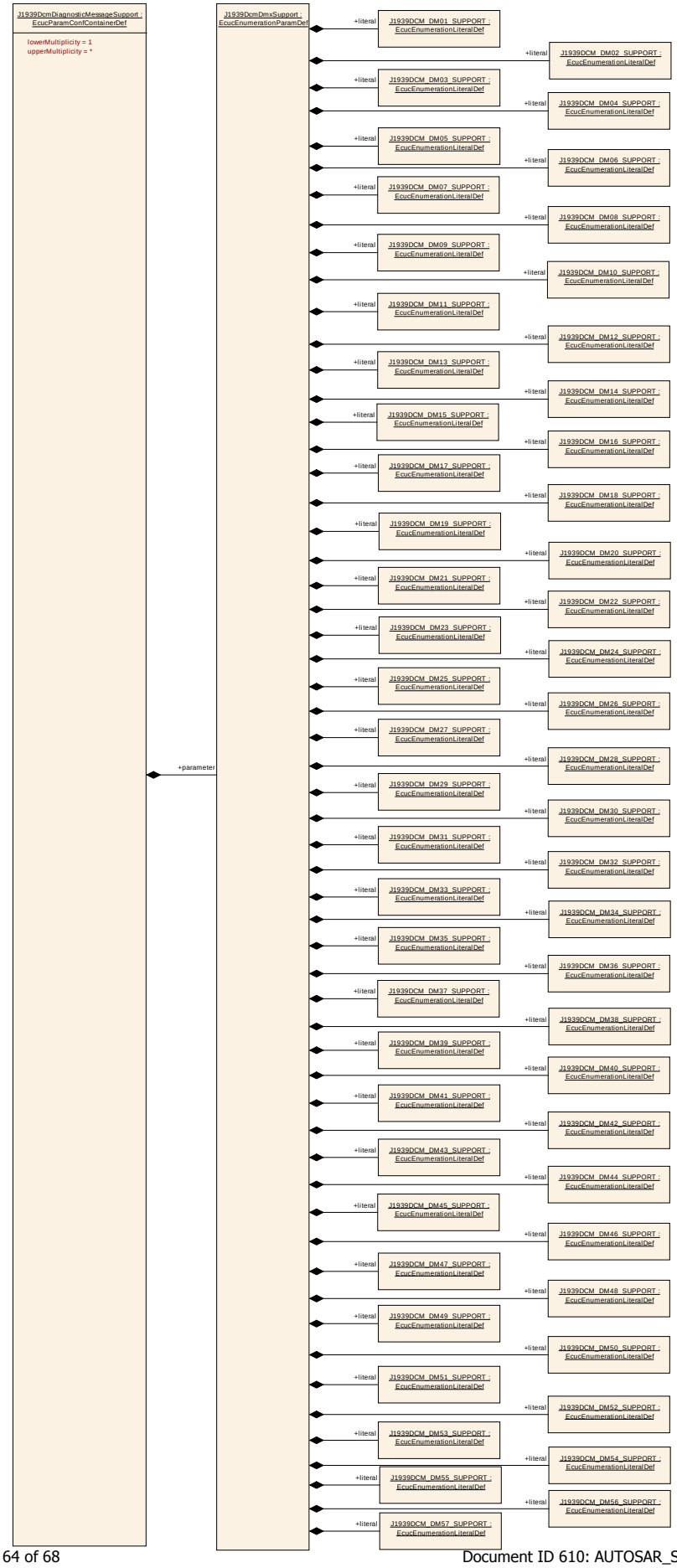
SWS Item	**ECUC_J1939Dcm_00047 :**		
Name	J1939DcmSPNsInDataStream		
Description	Defines the SPNs available in data stream for use in DM24.		
Multiplicity	0..*		
Type	EcucIntegerParamDef		
Range	0 .. 524287		
Default value	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
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: local		

SWS Item	**ECUC_J1939Dcm_00013 :**		
Name	J1939DcmNmNodeRef		
Description	Reference to the corresponding J1939Nm node.		
Multiplicity	1		
Type	Symbolic name reference to [J1939NmNode]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Dcm_00049 :**		
Name	J1939DcmNodeRmUserRef		
Description	Reference to the J1939RmUser used by J1939Dcm.		
Multiplicity	1		
Type	Symbolic name reference to [J1939RmUser]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939DcmDiagnosticMessageSupport	1..*	Contains parameters to configure the diagnostic message support


J1939DcmDiagnosticMessageSupport : EcucParamConfContainerDef
lowerMultiplicity = 1
upperMultiplicity = *
+parameter
J1939DcmDmxSupport : EcucEnumerationParamDef
+literal
J1939DCM_DM01_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM02_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM03_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM04_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM05_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM06_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM07_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM08_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM09_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM10_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM11_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM12_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM13_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM14_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM15_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM16_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM17_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM18_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM19_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM20_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM21_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM22_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM23_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM24_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM25_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM26_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM27_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM28_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM29_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM30_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM31_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM32_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM33_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM34_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM35_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM36_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM37_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM38_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM39_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM40_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM41_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM42_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM43_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM44_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM45_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM46_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM47_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM48_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM49_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM50_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM51_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM52_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM53_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM54_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM55_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM56_SUPPORT : EcucEnumerationLiteralDef
J1939DCM_DM57_SUPPORT : EcucEnumerationLiteralDef

10.2.7 J1939DcmDiagnosticMessageSupport

SWS Item	**ECUC_J1939Dcm_00014 :**
Container Name	J1939DcmDiagnosticMessageSupport
Description	Contains parameters to configure the diagnostic message support
Configuration Parameters	

SWS Item	**ECUC_J1939Dcm_00042 :**	
Name	J1939DcmDmxSupport	
Description	This parameter is used to identify the actual DMx message.	
Multiplicity	1	
Type	EcucEnumerationParamDef	
Range	J1939DCM_DM01_SUPPORT	DM01: Active Diagnostic Trouble Codes
	J1939DCM_DM02_SUPPORT	DM02: Previously Active Diagnostic Trouble Codes
	J1939DCM_DM03_SUPPORT	DM03: Diagnostic Data Clear/Reset for Previously Active DTCs
	J1939DCM_DM04_SUPPORT	DM04: Freeze Frame Parameters
	J1939DCM_DM05_SUPPORT	DM05: Diagnostic Readiness 1
	J1939DCM_DM06_SUPPORT	DM06: Emission Related Pending DTCs
	J1939DCM_DM07_SUPPORT	DM07: Command Non-continuously Monitored Test
	J1939DCM_DM08_SUPPORT	DM08: Test Results for Non-continuously Monitored Systems
	J1939DCM_DM09_SUPPORT	DM09: Oxygen Sensor Test Results
	J1939DCM_DM10_SUPPORT	DM10: Non-continuously Monitored System Test Identifiers Support
	J1939DCM_DM11_SUPPORT	DM11: Diagnostic Data Clear/Reset for Active DTCs
	J1939DCM_DM12_SUPPORT	DM12: Emissions Related Active DTCs
	J1939DCM_DM13_SUPPORT	DM13: Stop Start Broadcast
	J1939DCM_DM14_SUPPORT	DM14: Memory Access Request
	J1939DCM_DM15_SUPPORT	DM15: Memory Access Response
	J1939DCM_DM16_SUPPORT	DM16: Binary Data Transfer
	J1939DCM_DM17_SUPPORT	DM17: Boot Load Data
	J1939DCM_DM18_SUPPORT	DM18: Data Security
	J1939DCM_DM19_SUPPORT	DM19: Calibration Information
	J1939DCM_DM20_SUPPORT	DM20: Monitor Performance Ratio
	J1939DCM_DM21_SUPPORT	DM21: Diagnostic Readiness 2
	J1939DCM_DM22_SUPPORT	DM22: Individual Clear/Reset of Active and Previously Active DTC
	J1939DCM_DM23_SUPPORT	DM23: Emission Related Previously Active DTCs
	J1939DCM_DM24_SUPPORT	DM24: SPN Support
	J1939DCM_DM25_SUPPORT	DM25: Expanded Freeze Frame
	J1939DCM_DM26_SUPPORT	DM26: Diagnostic Readiness 3
	J1939DCM_DM27_SUPPORT	DM27: All Pending DTCs
	J1939DCM_DM28_SUPPORT	DM28: Permanent DTCs
	J1939DCM_DM29_SUPPORT	DM29: Regulated DTC Counts
	J1939DCM_DM30_SUPPORT	DM30: Scaled Test Results

	J1939DCM_DM31_SUPPORT	DM31: DTC to Lamp Association	
	J1939DCM_DM32_SUPPORT	DM32: Regulated Exhaust Emission Level Exceedance	
	J1939DCM_DM33_SUPPORT	DM33: Emission Increasing Auxiliary Emission Control Device Active Time	
	J1939DCM_DM34_SUPPORT	DM34: NTE Status	
	J1939DCM_DM35_SUPPORT	iDM35: Immediate Fault Status	
	J1939DCM_DM36_SUPPORT	DM36: Harmonized Roadworthiness - Vehicle (HRWV)	
	J1939DCM_DM37_SUPPORT	DM37: Harmonized Roadworthiness – System (HRWS)	
	J1939DCM_DM38_SUPPORT	DM38: Harmonized Global Regulation Description (HGRD)	
	J1939DCM_DM39_SUPPORT	DM39: Harmonized Cumulative Continuous Malfunction Indicator – System (HCMI)	
	J1939DCM_DM40_SUPPORT	DM40: Harmonized B1 Failure Counts (HB1C)	
	J1939DCM_DM41_SUPPORT	DM41: DTCs - A, Pending	
	J1939DCM_DM42_SUPPORT	DM42: DTCs - A, Confirmed and Active	
	J1939DCM_DM43_SUPPORT	DM43: DTCs - A, Previously Active	
	J1939DCM_DM44_SUPPORT	DM44: DTCs - B1, Pending	
	J1939DCM_DM45_SUPPORT	DM45: DTCs - B1, Confirmed and Active	
	J1939DCM_DM46_SUPPORT	DM46: DTCs - B1, Previously Active	
	J1939DCM_DM47_SUPPORT	DM47: DTCs - B2, Pending	
	J1939DCM_DM48_SUPPORT	DM48: DTCs - B2, Confirmed and Active	
	J1939DCM_DM49_SUPPORT	DM49: DTCs - B2, Previously Active	
	J1939DCM_DM50_SUPPORT	DM50: DTCs - C, Pending	
	J1939DCM_DM51_SUPPORT	DM51: DTCs - C, Confirmed and Active	
	J1939DCM_DM52_SUPPORT	DM52: DTCs - C, Previously Active	
	J1939DCM_DM53_SUPPORT	DM53: Active Service Only DTCs	
	J1939DCM_DM54_SUPPORT	DM54: Previously Active Service Only DTCs	
	J1939DCM_DM55_SUPPORT	DM55: Clear All Service Only DTCs	
	J1939DCM_DM56_SUPPORT	DM56: Engine Emissions Certification Information	
	J1939DCM_DM57_SUPPORT	DM57: OBD Information	
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_J1939Dcm_00048 :**
Name	J1939DcmDiagnosticMessageSupportChannelRef
Description	Reference to J1939DcmChannel for which this diagnostic message is supported.
Multiplicity	1
Type	Reference to [J1939DcmChannel]
Post-Build Variant Value	false

Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939DcmRxPdu	0..1	Contains parameters to configure the J1939DcmRxPdu.
J1939DcmTxPdu	0..1	Contains parameters to configure the J1939DcmTxPdu.

10.2.8 J1939DcmRxPdu

SWS Item	**ECUC_J1939Dcm_00046 :**
Container Name	J1939DcmRxPdu
Description	Contains parameters to configure the J1939DcmRxPdu.
Configuration Parameters	

SWS Item	**ECUC_J1939Dcm_00016 :**		
Name	J1939DcmRxPduId		
Description	The I-PDU identifier used for communication with PduR.		
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_J1939Dcm_00017 :**		
Name	J1939DcmRxPduRef		
Description	Reference to the global Pdu element in the Ecuc module.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2.9 J1939DcmTxPdu

SWS Item	**ECUC_J1939Dcm_00045 :**
Container Name	J1939DcmTxPdu
Description	Contains parameters to configure the J1939DcmTxPdu.
Configuration Parameters	

SWS Item	**ECUC_J1939Dcm_00044 :**		
Name	J1939DcmTxPduId		
Description	The I-PDU identifier used to identify the Tx message.		
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_J1939Dcm_00043 :**		
Name	J1939DcmTxPduRef		
Description	Reference to the global Pdu element in the Ecuc module.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.3 Published Information

For details refer to the chapter 10.3 “Published Information” in *SWS_BSWGeneral.*