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2016-11-30	4.3.0	AUTOSAR Release Management	• Clarifications, Corrections and Optimization • DM1 max number of DTC to be set to configurable • Support of DM53, DM54, and DM55 • Extend J1939DcmBusType with new enumerators
2015-07-31	4.2.2	AUTOSAR Release Management	• Clarifications • DM01 handling on multiple networks • DM19 updated negative response code
2014-10-31	4.2.1	AUTOSAR Release Management	• Optimizations • Editorial changes
2014-03-31	4.1.3	AUTOSAR Release Management	• Refinement of J1939Dcm_DemTriggerOnDTCStatus • Smaller corrections • Editorial changes

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2013-10-31	4.1.2	AUTOSAR Release Management	• Introduction of formal descriptions of service interfaces • Configuration of further DMx messages • Revised DEM interface • Editorial changes
2013-03-15	4.1.1	AUTOSAR Administration	• Initial Release

Disclaimer

Contents

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 SAE 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 Glossary, Acronyms, and Abbreviations

The glossary below includes terms and acronyms and abbreviations relevant to the J1939Dcm module that are not included in the [1, AUTOSAR Glossary].

Acronym / Abbreviation	Description
ACK	J1939 Acknowledgement PG (ACKM) with control byte set to 0, positive acknowledgement
ACKM	J1939 Acknowledgement PG (PGN = 0x0E800)
BAM	Broadcast Announce Message, broadcast variant of SAE J1939 transport layer
BSW	Basic Software (module)
BswM	Basic Software Mode Manager, see [2, SWS Basic Software Mode Manager]
CanIf	CAN Interface, see [3, SWS CAN Interface]
CDD	Complex Driver, any software that interfaces directly with AUTOSAR BSW, but is not defined by AUTOSAR, see [4, CDD Design And Integration Guideline] and [5, TPS ECU Configuration]
CMDT	Connection Mode Data Transfer, a.k.a. RTS/CTS, peer-to-peer variant of SAE J1939 transport layer
ComM	Communication Manager, [6, SWS Communication Manager]
DA	Destination Address, part of the 29 bit identifier of SAE J1939 messages
DEM	Diagnostic Event Manager, stores DTCs containing diagnostic events and test results, and associated information, see [7, SWS Diagnostic Event Manager]
DET	Default Error Tracer, supports development and runtime error reporting, see [8, SWS Default Error Tracer]
DM	SAE J1939 Diagnostic Message defined in SAE J1939-73, many of these consisting of the Lamp Status and a variable number of DTCs
DP	Data Page, the most significant bit (MSB) of the 18 bit PGN
DTC	Diagnostic Trouble Code, transmitted inside a diagnostic message and containing the source of the problem (SPN), the kind of the problem (FMI), and an occurrence counter (OC)
EcuM	ECU State Manager, see [9, SWS ECU State Manager]
EDP	Extended Data Page, the second bit (after MSB) of the 18 bit PGN
FMI	Failure Mode Indicator, identifying the problem with an SPN in a DTC
J1939Dcm	SAE J1939 Diagnostic Communication Manager (this module)
J1939Nm	SAE J1939 Network Management, see [10, SWS SAE J1939 Network Management]
J1939Rm	SAE J1939 Request Manager, see [11, SWS SAE J1939 Request Manager]
J1939Tp	SAE J1939 Transport Layer, see [12, SWS SAE J1939 Transport Layer]
LampStatus	The Lamp Status contains information about the severity of active errors, transmitted as part of diagnostic messages
MetaData	Meta data transferred alongside a PDU, consisting of a set of meta data items
MetaDataItem	A single item of meta data of defined type and size
NACK	J1939 Acknowledgement PG (ACKM) with control byte set to 1, negative acknowledgement
OC	Occurrence Counter, counting how often a problem with an SPN occurred since the last reset of a DTC
Parameter	Parameter, SAE J1939 term for a signal, including defined scale, limits, offset, and physical unit
PDU	Protocol Data Unit, a message transferred between the layers of the AUTOSAR stack, also known as I-PDU
PDU1	J1939 PDU Type 1, this kind of PG can be sent to a specific destination address
PDU2	J1939 PDU Type 2, this kind of PG can only be sent as broadcast

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Acronym / Abbreviation	Description
PDUF	PDU Format, the middle byte of the 18 bit PGN which identifies the PG and determines the layout (PDU1/PDU2) of the PGN
PduR	PDU Router, see [13, SWS PDU Router]
PDUS	PDU Specific, the lower byte of the 18 bit PGN which further identifies PDU2 PG which do cannot have a destination address
PG	Parameter Group, SAE J1939 term for a specific message layout
PGN	Parameter Group Number, unique identifier (18 bits: EDP, DP, PDUF, PDUS) of an SAE J1939 Parameter Group that is contained in the payload of many J1939 protocol messages and in the 29bit CAN identifier of SAE J1939 messages.
PRI	Priority, part of the 29 bit identifier of SAE J1939 messages
RQST	J1939 Request PG (PGN = 0x0EA00)
RTE	AUTOSAR Runtime Environment, see [14, SWS RTE]
SA	Source Address, part of the 29 bit identifier of SAE J1939 messages
SAE	Society of Automotive Engineers (in charge of J1939 specification)
SAE J1939	Serial control and communications standard for heavy duty vehicle networks created by the SAE, see [15, SAE J1939]
SAE J1939-21	Data link layer for CAN 2.0 created by the SAE, see [16, SAE J1939-21]
SAE J1939-73	Diagnostics application layer created by the SAE, see [17, SAE J1939-73]
SchM	Basic Software Schedule Manager, part of the RTE
Service SW-C	Service Software Component, the SW-C that represents the BSW module
SNA	Signal Not Available, all bits set to 1 in SAE J1939 PGs/Parameters
SPN	Suspect Parameter Number, unique identifier of an SAE J1939 Parameter
SW-C	AUTOSAR Software Component (of the Application)

3 Related Documentation

3.1 Input Documents & Related Standards and Norms

[1] Glossary
AUTOSAR_FO_TR_Glossary

[2] Specification of Basic Software Mode Manager
AUTOSAR_CP_SWS_BSWModeManager

[3] Specification of CAN Interface
AUTOSAR_CP_SWS_CANInterface

[4] Complex Driver design and integration guideline
AUTOSAR_CP_EXP_CDDDesignAndIntegrationGuideline

[5] Specification of ECU Configuration
AUTOSAR_CP_TPS_ECUConfiguration

[6] Specification of Communication Manager
AUTOSAR_CP_SWS_COMManager

[7] Specification of Diagnostic Event Manager
AUTOSAR_CP_SWS_DiagnosticEventManager

[8] Specification of Default Error Tracer
AUTOSAR_CP_SWS_DefaultErrorTracer

[9] Specification of ECU State Manager
AUTOSAR_CP_SWS_ECUStateManager

[10] Specification of Network Management for SAE J1939
AUTOSAR_CP_SWS_SAEJ1939NetworkManagement

[11] Specification of a Request Manager for SAE J1939
AUTOSAR_CP_SWS_SAEJ1939RequestManager

[12] Specification of a Transport Layer for SAE J1939
AUTOSAR_CP_SWS_SAEJ1939TransportLayer

[13] Specification of PDU Router
AUTOSAR_CP_SWS_PDURouter

[14] Specification of RTE Software
AUTOSAR_CP_SWS_RTE

[15] SAE J1939 – Serial Control and Communications Heavy Duty Vehicle Network

[16] SAE J1939-21 Data Link Layer

[17] SAE J1939-73 Application Layer – Diagnostics

[18] General Specification of Basic Software Modules

AUTOSAR_CP_SWS_BSWGeneral

[19] Layered Software Architecture
AUTOSAR_CP_EXP_LayeredSoftwareArchitecture

[20] Requirements on Diagnostics
AUTOSAR_FO_RS_Diagnostics

[21] General Requirements on Basic Software Modules
AUTOSAR_CP_SRS_BSWGeneral

[22] Specification of Communication Stack Types
AUTOSAR_CP_SWS_CommunicationStackTypes

[23] Specification of Standard Types
AUTOSAR_CP_SWS_StandardTypes

[24] List of Basic Software Modules
AUTOSAR_CP_TR_BSWModuleList

[25] System Template
AUTOSAR_CP_TPS_SystemTemplate

3.2 Related Specifications

AUTOSAR provides a General Specification on Basic Software modules [18, SWS BSW General], which is also valid for SAE J1939 Diagnostic Communication Manager.

Thus, the specification [18, 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 the subset of 'Diagnostic Messages' defined in Table 7.1.

The DM13 does not support "Suspend Signal" and "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 Automotive 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 mainly be used in heavy duty on-highway vehicles.

5 Dependencies to Other Modules

The [19, EXP Layered Software Architecture] shows an overview of the neighboring modules of the J1939 Diagnostic Communication Manager.

The J1939 Diagnostic Communication Manager module (J1939Dcm) has direct interfaces and/or configuration dependencies towards the Diagnostic Event Manager (DEM), the PDU Router (PduR), the J1939 Request Manager (J1939Rm), the Basic Software Mode Manager (BswM), the ECU State Manager (EcuM), and the Default Error Tracer (DET), and also to application software components (SW-Cs) via the AUTOSAR Runtime Environment (RTE and to Complex Drivers (CDD). Besides these, there are also indirect dependencies towards the Communication Manager (ComM), the J1939 Transport Layer (J1939Tp), and the CAN Interface (CanIf). See also Figure 5.1.

The J1939 Diagnostic Communication Manager module includes header files of the Diagnostic Event Manager, the PDU Router, the Basic Software Mode Manager, the J1939 Request Manager, and the Default Error Tracer.

5.1 File Structure

5.1.1 Code File Structure

For details, refer to the subsection 5.1.6 “Code file structure” of the [18, SWS BSW General].

5.1.2 Header File Structure

For details, refer to the subsection 5.1.7 “Header file structure” of the [18, SWS BSW General].

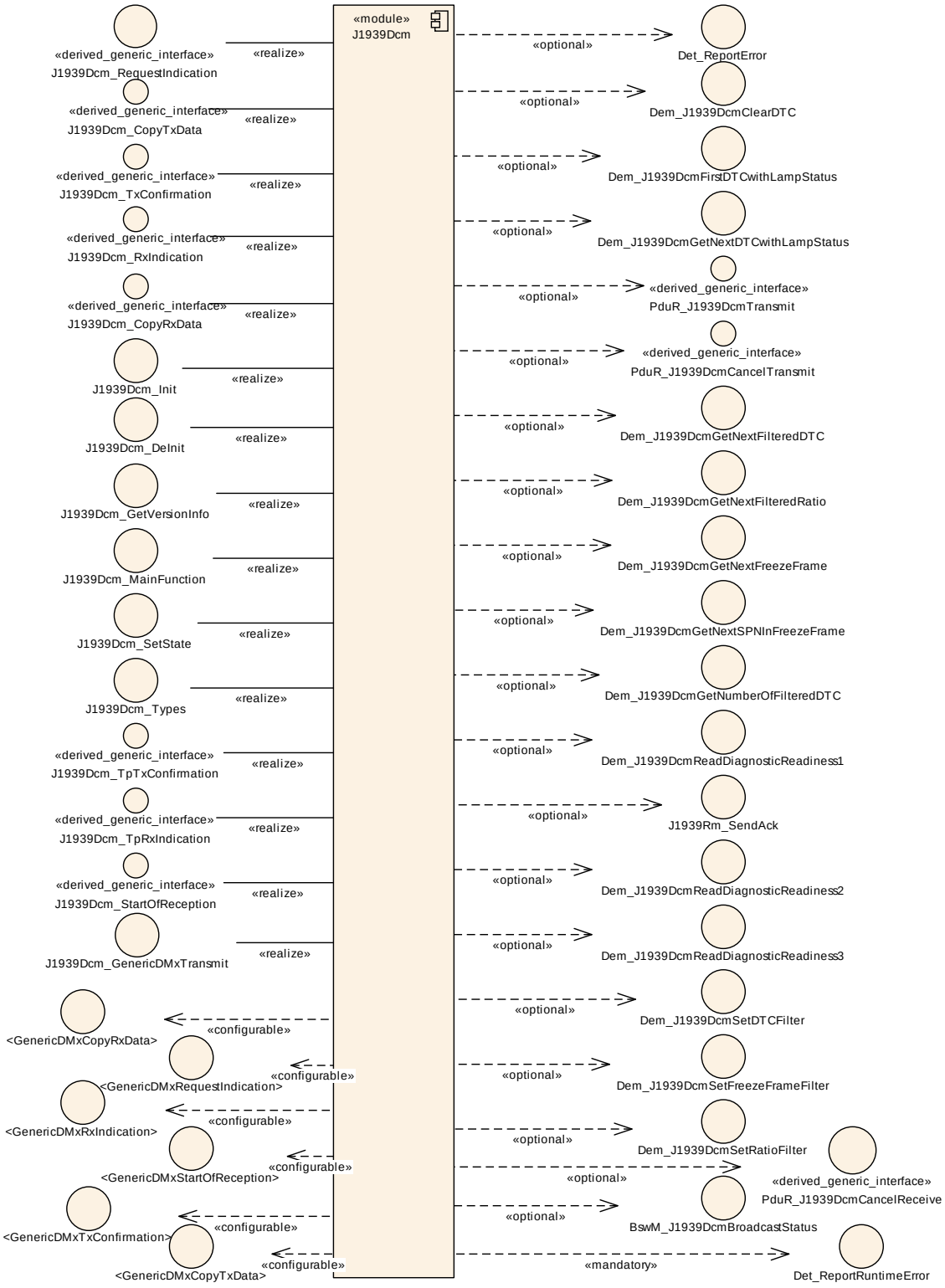

Figure 5.1: Module Dependencies of the J1939Dcm Module

6 Requirements Tracing

The following tables reference the requirements specified in [20, RS Diagnostics] (Requirements on Diagnostics) and [21, SRS BSW General] and links to the fulfillment of these.

Requirement	Description	Satisfied by
[RS_Diag_04112]	The DEM module shall support DTCs according to SAE J1939	[SWS_J1939Dcm_00048] [SWS_J1939Dcm_00049] [SWS_J1939Dcm_00177] [SWS_J1939Dcm_00178] [SWS_J1939Dcm_00179] [SWS_J1939Dcm_00180] [SWS_J1939Dcm_00181] [SWS_J1939Dcm_00182] [SWS_J1939Dcm_00183] [SWS_J1939Dcm_00184] [SWS_J1939Dcm_00197]
[RS_Diag_04113]	Support a set of SAE J1939 DM-messages	[SWS_J1939Dcm_00209] [SWS_J1939Dcm_00238]
[RS_Diag_04241]	Support for unsupported SAE J1939 DM-messages	[SWS_J1939Dcm_00204] [SWS_J1939Dcm_00205] [SWS_J1939Dcm_00206] [SWS_J1939Dcm_00207] [SWS_J1939Dcm_00208] [SWS_J1939Dcm_91001] [SWS_J1939Dcm_91002] [SWS_J1939Dcm_91003] [SWS_J1939Dcm_91004] [SWS_J1939Dcm_91005] [SWS_J1939Dcm_91006] [SWS_J1939Dcm_91007]

Table 6.1: RequirementsTracing

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

[SWS_J1939Dcm_00209] ⌈The J1939 Diagnostic Communication Manager shall support the diagnostic messages (DMx) shown in [SWS_J1939Dcm_00238].⌋ *(RS_Diag_04113)*

[SWS_J1939Dcm_00238] ⌈

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

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Name	PGN (Hexadecimal)	Size	Received	Transmitted	Description
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
DM53	FCD1	Var.	-	On Request	Active Service Only DTCs
DM54	FCD2	Var.	-	On Request	Previously Active Service Only DTCs
DM55	FCD3	Var.	-	On Request	Diagnostic Data Clear/Reset for all Service Only DTCs

Table 7.1: Supported DMx Messages

⌋(*RS_Diag_04113*)

[SWS_J1939Dcm_00204] ⌈If J1939DcmGenericDMxSupport is enabled, Requests for DMx messages that are not listed in [SWS_J1939Dcm_00238] shall be forwarded via the callout configured as J1939DcmGenericDMxRequestFunction. They can be answered using J1939Dcm_GenericDMxTransmit, which will trigger the callbacks configured via J1939DcmGenericDMxCopyTxDataFunction and J1939DcmGenericDMxTxConfirmationFunction.⌋(*RS_Diag_04241*)

[SWS_J1939Dcm_00205] ⌈If J1939DcmGenericDMxSupport is enabled, received DMx messages that are not listed in [SWS_J1939Dcm_00238] shall be forwarded to the application using the callbacks configured via J1939DcmGenericDMxStartOfReceptionFunction, J1939DcmGenericDMxCopyRxDataFunction, and J1939DcmGenericDMxRxIndicationFunction.⌋(*RS_Diag_04241*)

[SWS_J1939Dcm_00193] ⌈DMx message with variable size are exchanged with the J1939Tp, using the TP API (PduR_J1939DcmTransmit, J1939Dcm_CopyTxData, J1939Dcm_TpTxConfirmation for transmission and J1939Dcm_StartOfReception, J1939Dcm_CopyRxData, J1939Dcm_TpRxIndication for reception). DMx message with a fixed size of 8 bytes are exchanged with the CanIf, using the IF API (PduR_J1939DcmTransmit, J1939Dcm_TxConfirmation for transmission and J1939Dcm_RxIndication for reception).⌋()

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_GetVer-

sionInfo 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_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).⌋*()*

7.2.2 Error Handling

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

7.3 Message Processing

7.3.1 Reception of Requests

The J1939 Diagnostic Communication Manager receives most requests for the DMx PGs via J1939Dcm_RequestIndication from the J1939 Request Manager. Exceptions are the command messages (marked in "received" column in Table 7.1).

[SWS_J1939Dcm_00091] ⌈The configured DMx messages in J1939Dcm shall match the J1939RmUserPGN configured for a J1939RmDcmUser in J1939Rm.⌋*()*

[SWS_J1939Dcm_00006] ⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_RequestIndication shall check if the requestedPgn parameter addresses a configured DMx message (J1939DcmDiagnosticMessageSupport and the corresponding PGN could be found in [SWS_J1939Dcm_00238] in table 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 J1939DcmDiagnosticMessageSupport); the J1939

Diagnostic Communication Manager shall, except for DM01 and DM35 messages, lock the common buffer (of [SWS_J1939Dcm_00115]) and start to process it with next execution of J1939Dcm_MainFunction.⌋()

See subsection 7.7.1 for DM01 and subsection 7.7.20 for DM35 handling.

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_00173] ⌈If the newly received Diagnostic Message is not allowed in the current mode condition (according to the configuration parameter J1939DcmDiagnosticMessageModeRuleRef), the J1939Dcm shall ignore the current request.⌋()

[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 and DM35) is currently processed, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameter ackCode set to J1939RM_ACK_CANNOT_RESPOND to send a negative acknowledgement (considering [SWS_J1939Dcm_00113]).⌋()

SAE J1939 diagnostics 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 Failed Message Transmission

[SWS_J1939Dcm_00197] ⌈When PduR_J1939DcmTransmit returns anything but E_OK, or when J1939Dcm_TpTxConfirmation or J1939Dcm_TxConfirmation reports E_NOT_OK, the J1939Dcm shall retry the failed transmission from the next main function up to J1939DcmMaxTransmitRetries times.⌋(*RS_Diag_04112*)

7.3.3 Termination of Message

[SWS_J1939Dcm_00009] ⌈For messages sent via TP (“Size” in the table in [SWS_J1939Dcm_00238] 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 the table in [SWS_J1939Dcm_00238] 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].⌋()

7.3.4 Handling of Meta Data

[SWS_J1939Dcm_00194] ⌈Meta data items of type CAN_ID_32 contain the source address in the fourth (least significant) byte.⌋()

[SWS_J1939Dcm_00195] ⌈Meta data items of type CAN_ID_32 contain the destination address in the third byte.⌋()

[SWS_J1939Dcm_00196] ⌈Meta data items of type CAN_ID_32 contain the priority in the bits 2-4 of the first (most significant) byte, where bit 0 is the least significant bit of a byte.⌋()

7.4 Communication State Handling

In general, diagnostics is only active and available when the ECU is set to to online by J1939Nm. 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 any request message to J1939Dcm when it assumes J1939RM_STATE_OFFLINE.

7.5 Mode Dependent Request Execution

The execution of a request can be limited depending on mode condition. This enables the J1939Dcm to formalize environmental checks.

[SWS_J1939Dcm_00168] ⌈The J1939DcmModeRule shall evaluate all referenced J1939DcmModeConditions and/or nested J1939DcmModeRules either by a logical AND in case J1939DcmLogicalOperator is set to J1939DCM_AND or by a logical OR in case the J1939DcmLogicalOperator is set to J1939DCM_OR. In case only a single J1939DcmModeCondition or J1939DcmModeRule is referenced, the J1939DcmLogicalOperator shall not be present and therefore not be used.⌋*()*

[SWS_J1939Dcm_CONSTR_06201] ⌈J1939DcmModeCondition shall have either a J1939DcmBswModeRef or a J1939DcmSwcModeRef or a J1939DcmSwcSRDataElementRef as external reference.⌋*()*

[SWS_J1939Dcm_00169] ⌈The J1939DcmSwcModeRef and J1939DcmBswModeRef of J1939DcmModeConditions shall evaluate if the referenced Mode-Declaration is set in case of J1939DcmConditionType is set to J1939DCM_EQUALS or is not set in case of J1939DcmConditionType is set to J1939DCM_EQUALS_NOT.⌋*()*

[SWS_J1939Dcm_00170] ⌈The J1939DcmSwcSRDataElementRef of J1939DcmModeCondition shall be evaluated if the referenced data element (by J1939DcmDspExternalSRDataElementClass)

- is equal to the value represented by the J1939DcmSwcSRDataElementValue in case of J1939DcmConditionType is set to J1939DCM_EQUALS,
- is unequal to the value represented by the J1939DcmSwcSRDataElementValue in case of J1939DcmConditionType is set to J1939DCM_EQUALS_NOT,
- is greater than the value represented by the J1939DcmSwcSRDataElementValue in case of J1939DcmConditionType is set to J1939DCM_GREATER_THAN,
- is greater than or equal to the value represented by the J1939DcmSwcSRDataElementValue in case of J1939DcmConditionType is set to J1939DCM_GREATER_OR_EQUAL,
- is less than the value represented by the J1939DcmSwcSRDataElementValue in case of J1939DcmConditionType is set to J1939DCM_LESS_THAN,
- is less than or equal to the value represented by the J1939DcmSwcSRDataElementValue in case of J1939DcmConditionType is set to J1939DCM_LESS_OR_EQUAL.

⌋*()*

[SWS_J1939Dcm_CONSTR_06202] ⌈The values J1939DCM_GREATER_THAN, J1939DCM_GREATER_OR_EQUAL, J1939DCM_LESS_OR_EQUAL, and J1939DCM_LESS_THAN shall not be used with a Mode reference (J1939DcmBswModeRef or J1939DcmSwcModeRef).⌋*()*

Note: The current mode of the referenced ModeDeclarationGroupPrototypes could be read by either the API SchM_Mode (in case of J1939DcmBswModeRef) or by the API Rte_Mode (in case of J1939DcmSwcModeRef).

[SWS_J1939Dcm_00171] ⌈In case multiple J1939DcmModeConditions are referenced within a J1939DcmModeRule, they shall be evaluated in order of the index attributes of the EcucReferenceValues for J1939DcmArgumentRef.⌋*()*

[SWS_J1939Dcm_00172] ⌈The J1939Dcm shall create for commonly used ModeDeclarationGroupPrototype of each J1939DcmSwcModeRef of J1939DcmModeConditions a required mode switch port referencing this ModeDeclarationGroupPrototype. The name pattern of this port prototype shall be "J1939DcmModeUser_<ModeDeclarationGroupPrototype>" in case the ModeDeclarationGroupPrototype short name is unique. Otherwise, the name pattern is implementation specific, except the required prefix "J1939DcmModeUser_".⌋*()*

Note: ModeDeclarationGroupPrototypes are not necessarily unique, wherefore the exception is required to avoid name clashes in the J1939Dcm Service SWC.

7.6 J1939Dcm - DEM Interaction

Many diagnostic messages report DTC information from Diagnostic Event Manager. 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, DM03, DM11, and DM35. Thus, the implementation must take care that DM01, DM03, DM11, and DM35 execution does not start while the global buffer is locked, and vice versa.

7.6.1 DTC Status

[SWS_J1939Dcm_00236] ⌈

Diagnostic message		Dem_J1939DcmSetDTCFilter Parameters		
		DTCStatusFilter	DTCKind	DTCOrigin
DM01	Active Diagnostic Trouble Codes	DEM_J1939DTC_ACTIVE	DEM_DTC_KIND_ALL_DTCS	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM02	Previously Active Diagnostic Trouble Codes	DEM_J1939DTC_PREVIOUSLY_ACTIVE	DEM_DTC_KIND_ALL_DTCS	DEM_DTC_ORIGIN_PRIMARY_MEMORY

▽

△

Diagnostic message		Dem_J1939DcmSetDTCFilter Parameters		
		DTCStatusFilter	DTCKind	DTCOrigin
DM06	Emission Related Pending DTCs	DEM_J1939DTC_-PENDING	DEM_DTC_KIND_-EMISSION_REL_DTCS	DEM_DTC_ORIGIN_-PRIMARY_MEMORY
DM12	Emissions Related Active DTCs	DEM_J1939DTC_-ACTIVE	DEM_DTC_KIND_-EMISSION_REL_DTCS	DEM_DTC_ORIGIN_-PRIMARY_MEMORY
DM23	Previously Active Emission Related Faults	DEM_J1939DTC_-PREVIOUSLY_ACTIVE	DEM_DTC_KIND_-EMISSION_REL_DTCS	DEM_DTC_ORIGIN_-PRIMARY_MEMORY
DM28	Permanent DTCs	DEM_J1939DTC_-PERMANENT	DEM_DTC_KIND_-EMISSION_REL_DTCS	DEM_DTC_ORIGIN_-PRIMARY_MEMORY
DM35	Immediate Fault Status	DEM_J1939DTC_-CURRENTLY_ACTIVE	DEM_DTC_KIND_ALL_-DTCS	DEM_DTC_ORIGIN_-PRIMARY_MEMORY
DM53	Active Service Only DTCs	DEM_J1939DTC_-ACTIVE	DEM_DTC_KIND_ALL_-DTCS	Origin definition from J1939DcmServiceOnly DTCsMemory DestinationRef
DM54	Previously Active Service Only DTCs	DEM_J1939DTC_-PREVIOUSLY_ACTIVE	DEM_DTC_KIND_ALL_-DTCS	Origin definition from J1939DcmServiceOnly DTCsMemory DestinationRef

Table 7.2: 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 assigned ClientId of the requested node.⌋()

[SWS_J1939Dcm_00011] ⌈In case the Dem_J1939DcmSetRatioFilter, Dem_-J1939DcmSetDTCFilter, or Dem_J1939DcmSetFreezeFrameFilter returns E_OK, 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_J1939DcmSetRatioFilter, Dem_-J1939DcmSetDTCFilter, or Dem_J1939DcmSetFreezeFrameFilter returns E_NOT_OK, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameter 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 returned value is DEM_NO_SUCH_ELEMENT.

The calls may be distributed over several calls of J1939Dcm_MainFunction.

[SWS_J1939Dcm_00014] ⌈If the returned value is E_OK, the parameters 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 returned value is DEM_PENDING. In this case, the execution is postponed to the next J1939Dcm_MainFunction call.⌋*()*

[SWS_J1939Dcm_00016] ⌈If the returned value is DEM_NO_SUCH_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 DM01 messages.⌋*()*

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

7.6.2 FreezeFrame

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

[SWS_J1939Dcm_00018] ⌈In case the Dem_J1939DcmSetRatioFilter, Dem_J1939DcmSetDTCFilter, or Dem_J1939DcmSetFreezeFrameFilter returns E_NOT_OK, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameter ackCode set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋*()*

7.6.2.1 FreezeFrameKind equals DEM_J1939DCM_FREEZEFRAME or DEM_J1939DCM_EXPANDED_FREEZEFRAME

This FreezeFrameKind is used by DM04 and DM25.

[SWS_J1939Dcm_00201] ⌈In case the Dem_J1939DcmSetRatioFilter, Dem_J1939DcmSetDTCFilter, or Dem_J1939DcmSetFreezeFrameFilter returns E_OK 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 returned value is DEM_NO_SUCH_ELEMENT.

The calls may spread over several calls of J1939Dcm_MainFunction.⌋()

[SWS_J1939Dcm_00020] ⌈If the returned value is E_OK and the FreezeFrameKind is set to DEM_J1939DCM_FREEZEFRAME or DEM_J1939DCM_EXPANDED_FREEZEFRAME, the parameters 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 returned value is DEM_PENDING.⌋()

[SWS_J1939Dcm_00022] ⌈If the returned value is DEM_NO_SUCH_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.⌋()

7.6.2.2 FreezeFrameKind equals DEM_J1939DCM_SPNS_IN_EXPANDED_FREEZEFRAME

This FreezeFrameKind is used by DM24.

[SWS_J1939Dcm_00202] ⌈In case the Dem_J1939DcmSetRatioFilter, Dem_J1939DcmSetDTCFilter, or Dem_J1939DcmSetFreezeFrameFilter returns E_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 returned value is DEM_NO_SUCH_ELEMENT.

The calls may spread over several calls of J1939Dcm_MainFunction.⌋()

[SWS_J1939Dcm_00094] ⌈If the returned value is E_OK and the FreezeFrameKind is set to DEM_J1939DCM_SPNS_IN_EXPANDED_FREEZEFRAME, the parameter “SPN-Supported” 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 0.⌋()

[SWS_J1939Dcm_00095] ⌈In addition to [SWS_J1939Dcm_00094] the bit 2 “Supported in Data Stream” in “SPN support type” shall be set to 0 in case the SPN is also contained in the list of configuration parameters J1939DcmSPNsInDataStream.⌋()

[SWS_J1939Dcm_00096] ⌈If the returned value is DEM_NO_SUCH_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 ExpandedFreezeFrame (returned by [SWS_J1939Dcm_00094]).

The bit 2 “Supported in Data Stream” in “SPN support type” shall be set to 0 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 returned value is DEM_BUFFER_TOO_SMALL, the J1939Dcm shall report this error to the Default Error Tracer with the error code J1939DCM_E_BUFFER_TOO_SMALL, and shall call J1939Rm_SendAck with parameter ackCode set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋*()*

7.6.3 Ratio

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

[SWS_J1939Dcm_00024] ⌈In case the Dem_J1939DcmSetRatioFilter, Dem_J1939DcmSetDTCFilter, or Dem_J1939DcmSetFreezeFrameFilter returns E_OK, the values in parameter IgnitionCycleCounter and OBDMonitoringConditionsEncountered shall be encoded into the response message layout according to SAE J1939-73.⌋*()*

[SWS_J1939Dcm_00025] ⌈In case the Dem_J1939DcmSetRatioFilter, Dem_J1939DcmSetDTCFilter, or Dem_J1939DcmSetFreezeFrameFilter returns E_NOT_OK, the J1939 Diagnostic Communication Manager shall call J1939Rm_SendAck with parameter ackCode set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋*()*

[SWS_J1939Dcm_00203] ⌈The J1939 Diagnostic Communication Manager shall continue the sequence by subsequent calling the Dem_J1939DcmGetNextFilteredRatio, till the returned value is DEM_NO_SUCH_ELEMENT.

The calls may spread over several calls of J1939Dcm_MainFunction.⌋*()*

[SWS_J1939Dcm_00027] ⌈If the returned value is E_OK, the parameters 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 returned value is DEM_PENDING.⌋*()*

[SWS_J1939Dcm_00029] ⌈If the returned value is DEM_NO_SUCH_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.⌋*()*

7.6.4 Service Only DTCs

J1939 has the concept of "Service only DTCs". These DTCs are considered to be stored in any of the user defined fault memories of the DEM (Dem_DTCOriginType with DEM_DTC_ORIGIN_USERDEFINED_MEMORY_<Name>). All other DTCs are considered to be stored in the primary fault memory (Dem_DTCOriginType with DEM_DTC_ORIGIN_PRIMARY_MEMORY).

[SWS_J1939Dcm_00177] ⌈While processing DM53, DM54, or DM55, the J1939Dcm shall call the DEM APIs Dem_J1939DcmClearDTC and Dem_J1939DcmSetDTCFilter with the Dem_DTCOriginType corresponding to the DemUserDefinedMemory referenced by J1939DcmServiceOnlyDTCsMemoryDestinationRef.⌋*(RS_Diag_04112)*

J1939Dcm/DEM interaction in the J1939Dcm:

[SWS_J1939Dcm_CONSTR_06203] ⌈The J1939DcmServiceOnlyDTCsMemoryDestinationRef shall reference an event memory assigned to the DemEventMemorySet of the current J1939DcmDemClientRef.⌋*()*

7.7 Diagnostic Messages

7.7.1 Active Diagnostic Trouble Codes (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]), the J1939 Diagnostic Communication Manager shall lock the dedicated DM01 buffer (see [SWS_J1939Dcm_00114]) and use the common "DTC status" sequence with the parameters DTCStatusFilter and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*()*

The common “DTC status” sequence is described in subsection 7.6.1.

7.7.1.1 Periodic Collection and Transmission of the DM01 Message

[SWS_J1939Dcm_00031] ⌈The J1939 Diagnostic Communication Manager shall lock the dedicated DM01 buffer (see [SWS_J1939Dcm_00114]), collect all active DTCs and the lamp status in this buffer according to SAE J1939--73, and transmit the DM01 message with a period of $1s$ as defined by [SWS_J1939Dcm_00032], [SWS_J1939Dcm_00033], [SWS_J1939Dcm_00034], and [SWS_J1939Dcm_00114].⌋*()*

[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 corresponding J1939DcmNmNodeRef of the reported ClientId for all configured channels, except J1939Dcm_DemTriggerOnDTCStatus for the same DTC is triggered more than once per second. The separate DM01 buffer (see [SWS_J1939Dcm_00114]) shall be used.⌋*()*

Note: The exception prevents a too high busload.

[SWS_J1939Dcm_00033] ⌈The DM01 shall use for all configured DM01 messages (J1939DcmDmxSupport == J1939DCM_DM01_SUPPORT) on all nodes (J1939DcmNode) and on all channels (J1939DcmDiagnosticMessageSupportChannelRef) the common “DTC status” sequence with the parameters DTCStatusFilter and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*()*

The common “DTC status” sequence is described in subsection 7.6.1.

Note: The periodic DM01 messages is broadcast 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 DM01 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 configured DTCs in parameter J1939DcmDM01MaxDTCs the transmission shall be stopped.⌋*()*

Note: The transmit request to PduR is covered by the common “DTC status” sequence described in subsection 7.6.1.

7.7.2 Previously Active Diagnostic Trouble Codes (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 to table column “PGN (Hexadecimal)” in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common “DTC status” sequence with the parameters DTCStatusFilter and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*()*

The common “DTC status” sequence is described in subsection 7.6.1.

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

7.7.3 Diagnostic Data Clear/Reset for Previously Active DTCs (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 to table column “PGN (Hexadecimal)” in [SWS_J1939Dcm_00238]) 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 of the function Dem_J1939DcmClearDTC is DEM_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 of the function Dem_J1939DcmClearDTC is E_OK, the J1939 Diagnostic Communication Manager shall send a positive acknowledgement (ACK) by J1939Rm_SendAck with parameter ackCode set to J1939RM_ACK_POSITIVE.⌋*()*

[SWS_J1939Dcm_00040] ⌈If return value Std_ReturnType is other than E_OK or DEM_PENDING, the J1939 Diagnostic Communication Manager shall send a negative acknowledgement (NACK) by J1939Rm_SendAck with parameter 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]).

7.7.4 Freeze Frame Parameters (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "FreezeFrame" sequence with the parameter FreezeFrameKind set to DEM_J1939DCM_FREEZEFRAME.⌋*()*

The common "FreezeFrame" sequence is described in subsection 7.6.2.

7.7.5 Diagnostic Readiness 1 (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall call Dem_J1939DcmReadDiagnosticReadiness1 with the assigned ClientId of 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 parameter ackCode set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋*()*

7.7.6 Emission Related Pending DTCs (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "DTC status" sequence with the parameters DTCStatusFilter and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*()*

The common "DTC status" sequence is described in subsection 7.6.1.

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

7.7.7 Diagnostic Data Clear/Reset for Active DTCs (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall trigger Dem_J1939DcmClearDTC with parameter DTCTypeFilter set to DEM_J1939DTC_CLEAR_ACTIVE.⌋*(RS_Diag_04112)*

[SWS_J1939Dcm_00049] ⌈If return value of the function Dem_J1939DcmClearDTC is DEM_PENDING, the J1939 Diagnostic Communication Manager shall re-trigger Dem_J1939DcmClearDTC (with parameter DTCTypeFilter set to DEM_J1939DTC_CLEAR_ACTIVE) in the next call of J1939Dcm_MainFunction.⌋*(RS_Diag_04112)*

[SWS_J1939Dcm_00050] ⌈If the return value of the function Dem_J1939DcmClearDTC is E_OK, the J1939 Diagnostic Communication Manager shall send a positive acknowledgement (ACK) by J1939Rm_SendAck with parameter ackCode set to J1939RM_ACK_POSITIVE.⌋*()*

[SWS_J1939Dcm_00051] ⌈If return value of the function Dem_J1939DcmClearDTC is other than E_OK, the J1939 Diagnostic Communication Manager shall send a negative acknowledgement (NACK) by J1939Rm_SendAck with parameter 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]).

7.7.8 Emissions Related Active DTCs (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "DTC status" sequence with the parameters DTCStatusFilter and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*()*

The common "DTC status" sequence is described in subsection 7.6.1.

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

7.7.9 Stop Start Broadcast (DM13)

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

The following networks are available:

- J1587
- J1922
- J1939 Network #1, Primary vehicle network
- J1939 Network #2
- ISO 9141
- J1850
- Other, Manufacture Specified Port
- SAE J1939 Network #3
- Proprietary Network #1
- Proprietary Network #2
- J1939 Network #4

See also J1939DcmBusType.

[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 J1939DcmRxPduId 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 corresponding ComMChannelId of received DM13 command message determines the network bit reported to BswM.⌋()

[SWS_J1939Dcm_00092] ⌈For other bus types in the DM13 command message, if there is an adequate J1939DcmBusType the corresponding referenced ComMChannelId of J1939DcmComMChannelRef shall represent the network bit in the NetworkMask 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 J1939DcmRxPduId 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.

7.7.10 Calibration Information (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall trigger the operation GetCalibrationVerificationNumber of port prototype J1939Dcm_CalibrationInformation to collect the CVN.⌋()

[SWS_J1939Dcm_00060] ⌈If the returned value is E_NOT_READY, the J1939 Diagnostic Communication Manager shall send the acknowledgement by J1939Rm_SendAck with parameter ackCode set to J1939RM_ACK_CANNOT_RESPOND (considering [SWS_J1939Dcm_00113]).⌋*()*

[SWS_J1939Dcm_00210] ⌈If the returned value is E_NOT_OK, the J1939 Diagnostic Communication Manager shall ignore the return parameters and report "CalibrationVerificationNumber" with zeros (0x00) and "CalibrationID" with high values (i.e. 0xFF) 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.⌋*()*

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 returned value is 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 returned value is 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.⌋*()*

7.7.11 Monitor Performance Ratio (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "Ratio" sequence.⌋*()*

The common "Ratio" sequence is described in subsection 7.6.3.

7.7.12 Diagnostic Readiness 2 (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall call Dem_J1939DcmReadDiagnosticReadiness2 with the assigned ClientId of 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 parameter ackCode set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋*()*

7.7.13 Previously Active Emission Related Faults (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "DTC status" sequence with the parameters DTCStatusFilter and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*()*

The common "DTC status" sequence is described in subsection 7.6.1.

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

7.7.14 SPN Support (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 to table column

"PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "FreezeFrame" sequence with the parameter FreezeFrameKind set to DEM_J1939DCM_SPNS_IN_EXPANDED_FREEZEFRAME.⌋()

The common "FreezeFrame" sequence is described in subsection 7.6.2.

7.7.15 Expanded Freeze Frame (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "FreezeFrame" sequence with the parameter FreezeFrameKind set to DEM_J1939DCM_EXPANDED_FREEZEFRAME.⌋()

The common "FreezeFrame" sequence is described in subsection 7.6.2.

7.7.16 Diagnostic Readiness 3 (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall call Dem_J1939DcmReadDiagnosticReadiness3 with the assigned ClientId of 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 parameter ackCode set to J1939RM_ACK_NEGATIVE to send a negative acknowledgement (NACK) (considering [SWS_J1939Dcm_00113]).⌋()

7.7.17 Permanent DTCs (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "DTC status" sequence with the parameters DTCStatusFilter and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*()*

The common "DTC status" sequence is described in subsection 7.6.1.

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

7.7.18 Regulated DTC Counts (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) 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 in [SWS_J1939Dcm_00237].⌋*()*

[SWS_J1939Dcm_00237] ⌈

Byte Position	Counting	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 7.3: 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 returned value is E_OK, the J1939 Diagnostic Communication Manager shall copy the value returned in parameter NumberOfFilteredDTC to the corresponding byte in the response message of DM29.⌋*()*

[SWS_J1939Dcm_00079] ⌈If the returned value is DEM_PENDING, the J1939 Diagnostic Communication Manager shall re-trigger Dem_J1939DcmGetNumberOfFilteredDTC in the next call of J1939Dcm_MainFunction.

The unused bytes 6 to 8 shall be set to 0xFF.⌋*()*

7.7.19 DTC to Lamp Association (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) 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 returned value is DEM_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 returned value is DEM_NO_SUCH_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.⌋*()*

7.7.20 Immediate Fault Status (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 to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall start to collect all immediate DTCs and the summarized lamp status using the separate DM35 buffer (see [SWS_J1939Dcm_00200]) 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_00200] ⌈The J1939Dcm shall provide a buffer in size of J1939DcmDM35BufferSize for the parallel DM35 processing to support [SWS_J1939Dcm_00082].⌋*()*

[SWS_J1939Dcm_00083] ⌈The DM35 shall use the common "DTC status" sequence with the parameters DTCStatusFilter and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*()*

The common "DTC status" sequence is described in subsection 7.6.1.

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

7.7.21 Active Service Only DTCs (DM53)

The DM53 message reports active service only DTCs.

[SWS_J1939Dcm_00178] ⌈On reception of request for DM53 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "DTC status" sequence with the parameters DTCStatusFilter, DTCOrigin, and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*(RS_Diag_04112)*

The common "DTC status" sequence is described in subsection 7.6.1.

[SWS_J1939Dcm_00179] ⌈The return values J1939DTC and OccurenceCounter shall be encoded into the DM53 layout according to SAE J1939-73.⌋*(RS_Diag_04112)*

7.7.22 Previously Active Service Only DTCs (DM54)

The DM54 message reports previously active service only DTCs.

[SWS_J1939Dcm_00180] ⌈On reception of request for DM54 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according to table column

"PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall use the common "DTC status" sequence with the parameters DTCStatusFilter, DTCOrigin, and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋*(RS_Diag_04112)*

The common "DTC status" sequence is described in subsection 7.6.1.

[SWS_J1939Dcm_00181] ⌈The return values J1939DTC and OccurenceCounter shall be encoded into the DM54 layout according to SAE J1939-73.⌋*(RS_Diag_04112)*

7.7.23 Diagnostic Data Clear/Reset for all Service Only DTCs (DM55)

The DM55 message clears all service only DTCs.

[SWS_J1939Dcm_00182] ⌈On reception of request for DM55 (call of J1939Dcm_RequestIndication with parameter requestedPgn set according to table column "PGN (Hexadecimal)" in [SWS_J1939Dcm_00238]) the J1939 Diagnostic Communication Manager shall trigger Dem_J1939DcmClearDTC with parameter DTCTypeFilter set to DEM_J1939DTC_CLEAR_ACTIVE_AND_PREVIOUSLY_ACTIVE and DTCOrigin set to definition from J1939DcmServiceOnlyDTCsMemoryDestinationRef.⌋*(RS_Diag_04112)*

[SWS_J1939Dcm_00183] ⌈If the return value of the function Dem_J1939DcmClearDTC is DEM_PENDING, the J1939 Diagnostic Communication Manager shall retrigger Dem_J1939DcmClearDTC (with parameter DTCTypeFilter set to DEM_J1939DTC_CLEAR_ACTIVE_AND_PREVIOUSLY_ACTIVE) in the next call of J1939Dcm_MainFunction.⌋*(RS_Diag_04112)*

[SWS_J1939Dcm_00184] ⌈If the return value of the function Dem_J1939DcmClearDTC is E_OK or DEM_PENDING, the J1939 Diagnostic Communication Manager shall send a positive acknowledgement (ACK) by J1939Rm_SendAck with parameter ackCode set to J1939RM_ACK_POSITIVE.⌋*(RS_Diag_04112)*

[SWS_J1939Dcm_00185] ⌈If return value is other than E_OK or DEM_PENDING, the J1939 Diagnostic Communication Manager shall send a negative acknowledgement (NACK) by J1939Rm_SendAck with parameter 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]).

7.8 Error Classification

The section 7.2 “Error Handling” of the [18, SWS BSW General] describes the error handling of the Basic Software in detail. Above all, it constitutes a classification scheme consisting of five error types which may occur in BSW modules.

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

7.8.1 Development Errors

[SWS_J1939Dcm_00090] Definiton of development errors in module J1939Dcm ⌈

Type of error	*Related error code*	*Error value*
API service called with wrong PDU or SDU.	J1939DCM_E_INVALID_PDU_SDU_ID	0x01
API service called with or in a wrong state	J1939DCM_E_INVALID_STATE	0x06
API service called with wrong node parameter	J1939DCM_E_INVALID_NODE	0x08
API service called with wrong channel parameter	J1939DCM_E_INVALID_CHANNEL	0x0B
API service called with wrong PGN parameter	J1939DCM_E_INVALID_PGN	0x0D
API function called with a NULL Pointer	J1939DCM_E_PARAM_POINTER	0x11
J1939Dcm initialisation failed	J1939DCM_E_INIT_FAILED	0x14
API service used in un-initialized state	J1939DCM_E_UNINIT	0x20
J1939Dcm_Init used in initialized state	J1939DCM_E_REINIT	0x21

⌋()

7.8.2 Runtime Errors

[SWS_J1939Dcm_00198] Definiton of runtime errors in module J1939Dcm ⌈

Type of error	*Related error code*	*Error value*
Buffer too small	J1939DCM_E_BUFFER_TOO_SMALL	0x0E

⌋()

7.8.3 Transient Faults

There are no transient faults.

7.8.4 Production Errors

There are no production errors.

7.8.5 Extended Production Errors

There are no extended production errors.

8 API Specification

8.1 Imported Types

This section lists all types used by the J1939 Diagnostic Communication Manager together with the defining module.

[SWS_J1939Dcm_00085] Definition of imported datatypes of module J1939Dcm
⌈

Module	*Header File*	*Imported Type*
ComStack_Types	ComStack_Types.h	BufReq_ReturnType
	ComStack_Types.h	NetworkHandleType
	ComStack_Types.h	PduIdType
	ComStack_Types.h	PduInfoType
	ComStack_Types.h	PduLengthType
	ComStack_Types.h	RetryInfoType
	ComStack_Types.h	TpDataStateType
Dem	Dem.h	Dem_J1939DcmDTCStatusFilterType
	Dem.h	Dem_J1939DcmDiagnosticReadiness1Type
	Dem.h	Dem_J1939DcmDiagnosticReadiness2Type
	Dem.h	Dem_J1939DcmDiagnosticReadiness3Type
	Dem.h	Dem_J1939DcmLampStatusType
	Dem.h	Dem_J1939DcmSetClearFilterType
	Dem.h	Dem_J1939DcmSetFreezeFrameFilterType
	Dem_J1939Dcm.h	Dem_DTCKindType
	Rte_Dem_Type.h	Dem_DTCOriginType
J1939Rm	Rte_J1939Rm_Type.h	J1939Rm_AckCode
	Rte_J1939Rm_Type.h	J1939Rm_ExtIdInfoType
	Rte_J1939Rm_Type.h	J1939Rm_ExtIdType
Std	Std_Types.h	Std_ReturnType
	Std_Types.h	Std_VersionInfoType

⌋()

The types that are declared in `ComStack_Types.h` are defined in [22, SWS Communication Stack Types], while the types declared in `Std_Types.h` are defined in [23, SWS Standard Types].

8.2 Type Definitions

Figure 8.1: Overview of Type Definitions

8.2.1 J1939Dcm_ConfigType

[SWS_J1939Dcm_00111] Definition of datatype J1939Dcm_ConfigType ⌈

Name	J1939Dcm_ConfigType	
Kind	Structure	
Elements	implementation specific	
	Type	–
	Comment	–
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.	
Available via	J1939Dcm.h	

⌋()

8.2.2 J1939Dcm_StateType

[SWS_J1939Dcm_00123] Definition of datatype J1939Dcm_StateType ⌈

Name	J1939Dcm_StateType		
Kind	Enumeration		
Range	J1939DCM_STATE_ ONLINE	0x00	Normal communication
	J1939DCM_STATE_ OFFLINE	0x01	No diagnostic communication
Description	This type represents the communication state of the J1939 Diagnostic Communication Manager.		
Available via	J1939Dcm.h		

⌋()

8.3 Function Definitions

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

8.3.1 J1939Dcm_Init

[SWS_J1939Dcm_00098] Definition of API function J1939Dcm_Init ⌈

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.	
Available via	J1939Dcm.h	

⌋()

See subsection 7.2.1 for details.

8.3.2 J1939Dcm_DeInit

[SWS_J1939Dcm_00099] Definition of API function J1939Dcm_DeInit ⌈

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.
Available via	J1939Dcm.h

⌋()

See subsection 7.2.1 for details.

8.3.3 J1939Dcm_GetVersionInfo

[SWS_J1939Dcm_00100] Definition of API function J1939Dcm_GetVersionInfo ⌈

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.	
Available via	J1939Dcm.h	

⌋()

See subsection 8.3.4 “Get Version Information” of [18, SWS BSW General] for details. The module ID of the J1939 Diagnostic Communication Manager is defined in [24, TR BSW Module List].

8.3.4 J1939Dcm_SetState

[SWS_J1939Dcm_00124] Definition of API function J1939Dcm_SetState ⌈

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.	
Available via	J1939Dcm.h	

⌋()

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

[SWS_J1939Dcm_00147] ⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_SetState shall check if the node parameter is configured (J1939DcmNmNodeRef). 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 is enabled, the function J1939Dcm_SetState shall check if the channel parameter is configured (J1939DcmDiagnosticMessageSupportChannelRef) 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.⌋*()*

8.3.5 J1939Dcm_GenericDMxTransmit

[SWS_J1939Dcm_91007] Definition of API function J1939Dcm_GenericDMx Transmit ⌈

Service Name	J1939Dcm_GenericDMxTransmit	
Syntax	`Std_ReturnType J1939Dcm_GenericDMxTransmit ( uint8 dmId, uint8 node, NetworkHandleType channel, uint8 destAddress, uint8 priority )`	
Service ID [hex]	0x49	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	dmId	Number of the J1939 diagnostic message.
	node	Node by which the message shall be sent.
	channel	Channel on which the message shall be transmitted
	destAddress	Address of the node that shall receive the diagnostic message or 0xFF for broadcast.
	priority	Priority of the diagnostic message.
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_ReturnType	E_OK: Transmit request has been accepted. E_NOT_OK: Transmit request has not been accepted.
Description	Requests transmission of a diagnostic message	
Available via	J1939Dcm.h	

⌋*(RS_Diag_04241)*

[SWS_J1939Dcm_00206] ⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_GenericDMxTransmit shall check if the dmId parameter addresses a configured (via J1939DcmDiagnosticMessageSupport) but unsupported DMx message. In case

of an error, the function J1939Dcm_GenericDMxTransmit shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_PGN.⌋(*RS_Diag_04241*)

The currently supported diagnostic messages are listed in Table 7.1.

[SWS_J1939Dcm_00207] ⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_GenericDMx-Transmit shall check if the node parameter is configured (J1939DcmNmNodeRef). In case of an error, the function J1939Dcm_GenericDMxTransmit shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_NODE.⌋(*RS_Diag_04241*)

[SWS_J1939Dcm_00208] ⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_Generic-DMxTransmit shall check if the channel parameter is configured (J1939DcmDiagnosticMessageSupportChannelRef) for the requested node parameter. In case of an error, the function J1939Dcm_GenericDMxTransmit shall return without any effect and shall report the error to the Default Error Tracer with the error code J1939DCM_E_INVALID_CHANNEL.⌋(*RS_Diag_04241*)

8.4 Callback Notifications

This is a list of functions provided for other modules.

8.4.1 J1939Dcm_RequestIndication

[SWS_J1939Dcm_00101] Definition of callback function J1939Dcm_RequestIndication ⌈

Service Name	J1939Dcm_RequestIndication	

Syntax	`void J1939Dcm_RequestIndication (`
	`  uint8 node,`
	`  NetworkHandleType channel,`
	`  uint32 requestedPgn,`
	`  const J1939Rm_ExtIdInfoType* extIdInfo,`
	`  uint8 sourceAddress,`
	`  uint8 destAddress,`
	`  uint8 priority`
	`)`	

Service ID [hex]	0x47	
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.

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	extIdInfo	Extended identifier bytes.
	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 or Request2 PG.	
Available via	J1939Dcm.h	

⌋()

[SWS_J1939Dcm_00138] ⌈When the interface J1939Dcm_RequestIndication is called while the J1939Dcm is in offline state (refer to 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 is enabled.⌋()

[SWS_J1939Dcm_00149] ⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_RequestIndication shall check if the node parameter is configured (J1939DcmNmNodeRef). 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] ⌈The function J1939Dcm_RequestIndication shall check if the channel parameter is configured (J1939DcmDiagnosticMessageSupportChannelRef) for the requested node parameter. If the channel is not configured, the function J1939Dcm_RequestIndication shall return without any effect.⌋()

The parameter requestedPgn is verified in [SWS_J1939Dcm_00006].

The parameter destAddress is only used to check for the broadcast address (0xFF) and requires therefore no special verification.

The parameter sourceAddress is used to set the destination address for the transmission, but is already verified in J1939Rm.

The parameter priority needs not to be verified, because it is not considered at all.

8.4.2 J1939Dcm_RxIndication

[SWS_J1939Dcm_00128] Definition of callback function J1939Dcm_RxIndication ⌈

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 PDU.
	PduInfoPtr	Contains the length (SduLength) of the received PDU, a pointer to a buffer (SduDataPtr) containing the PDU, and the MetaData related to this PDU.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	Indication of a received PDU from a lower layer communication interface module.	
Available via	J1939Dcm.h	

⌋()

[SWS_J1939Dcm_00139] ⌈When the interface J1939Dcm_RxIndication is called while the J1939Dcm is in offline state (refer to 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 is enabled.⌋()

[SWS_J1939Dcm_00151] ⌈If the configuration parameter J1939DcmDevErrorDetect 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.⌋()

8.4.3 J1939Dcm_TxConfirmation

[SWS_J1939Dcm_00145] Definition of callback function J1939Dcm_TxConfirmation ⌈

Service Name	J1939Dcm_TxConfirmation	
Syntax	`void J1939Dcm_TxConfirmation ( PduIdType TxPduId, Std_ReturnType result )`	
Service ID [hex]	0x40	
Sync/Async	Synchronous	
Reentrancy	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in)	TxPduId	ID of the PDU that has been transmitted.
	result	E_OK: The PDU was transmitted. E_NOT_OK: Transmission of the PDU failed.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	The lower layer communication interface module confirms the transmission of a PDU, or the failure to transmit a PDU.	
Available via	J1939Dcm.h	

⌋()

[SWS_J1939Dcm_00146] ⌈When the interface J1939Dcm_TxConfirmation is called while the J1939Dcm is in offline state (refer to 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 is enabled.⌋()

[SWS_J1939Dcm_00162] ⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_TxConfirmation shall check if the TxPduId 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 without any effect. Further a call to DET with parameter J1939DCM_E_INVALID_STATE shall be triggered if the configuration parameter J1939DcmDevErrorDetect is enabled.⌋()

8.4.4 J1939Dcm_StartOfReception

[SWS_J1939Dcm_00102] Definition of callback function J1939Dcm_StartOfReception ⌈

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, and the MetaData related to this PDU. 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). The service shall provide the currently available maximum buffer size when invoked with TpSdu Length equal to 0.	
Available via	J1939Dcm.h	

⌋()

[SWS_J1939Dcm_00140] ⌈When the interface J1939Dcm_StartOfReception is called while the J1939Dcm is in offline state (refer to 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 is enabled.⌋()

[SWS_J1939Dcm_00152] ⌈If the configuration parameter J1939DcmDevErrorDetect 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 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.⌋*()*

[SWS_J1939Dcm_00186] ⌈When the API J1939Dcm_StartOfReception is invoked with TpSduLength equal to 0, the value BUFREQ_E_NOT_OK shall be returned and no further action shall be taken.⌋*()*

8.4.5 J1939Dcm_CopyRxData

[SWS_J1939Dcm_00103] Definition of callback function J1939Dcm_CopyRxData ⌈

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 buffer is written to the position indicated by bufferSizePtr.	
Available via	J1939Dcm.h	

⌋*()*

[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 is enabled.⌋()

[SWS_J1939Dcm_00154] ⌈If the configuration parameter J1939DcmDevErrorDetect 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.⌋()

8.4.6 J1939Dcm_TpRxIndication

[SWS_J1939Dcm_00104] Definition of callback function J1939Dcm_TpRxIndication ⌈

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	E_OK: The PDU was received. E_NOT_OK: Reception of the PDU failed.
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.	
Available via	J1939Dcm.h	

⌋()

[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 is enabled.⌋()

[SWS_J1939Dcm_00156] ⌈If the configuration parameter J1939DcmDevErrorDetect 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.⌋()

8.4.7 J1939Dcm_CopyTxData

[SWS_J1939Dcm_00105] Definition of callback function J1939Dcm_CopyTxData ⌈

Service Name	J1939Dcm_CopyTxData	
Syntax	`BufReq_ReturnType J1939Dcm_CopyTxData ( PduIdType id, const PduInfoType* info, const 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 Sdu DataPtr 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.

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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.
Available via	J1939Dcm.h

⌋()

[SWS_J1939Dcm_00143] ⌈The function J1939Dcm_CopyTxData 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_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 is enabled.⌋()

[SWS_J1939Dcm_00158] ⌈If the configuration parameter J1939DcmDevErrorDetect 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.⌋()

8.4.8 J1939Dcm_TpTxConfirmation

[SWS_J1939Dcm_00106] Definition of callback function J1939Dcm_TpTxConfirmation ⌈

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	E_OK: The PDU was transmitted. E_NOT_OK: Transmission of the PDU failed.
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.	
Available via	J1939Dcm.h	

⌋()

[SWS_J1939Dcm_00160] ⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_TpTxConfirmation shall check if the id parameter is not configured (J1939DcmTxPduId) 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 is enabled.⌋()

8.4.9 Callback Notifications from DEM

8.4.9.1 J1939Dcm_DemTriggerOnDTCStatus

[SWS_J1939Dcm_00122] Definition of callback function J1939Dcm_DemTriggerOnDTCStatus ⌈

Service Name	J1939Dcm_DemTriggerOnDTCStatus	
Syntax	`void J1939Dcm_DemTriggerOnDTCStatus ( uint32 DTC, uint8 ClientId )`	
Service ID [hex]	0x0a	
Sync/Async	Synchronous	
Reentrancy	Re-entrant for different ClientIDs, Non re-entrant for same ClientId.	
Parameters (in)	DTC	Diagnostic Trouble Code in UDS format.
	ClientId	DemClientId value that references the fault memory assigned to the DTC.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	Trigger for DM01 message that a UDS status change has happened.	
Available via	J1939Dcm_Dem.h	

⌋()

8.5 Scheduled Functions

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

8.5.1 J1939Dcm_MainFunction

[SWS_J1939Dcm_00107] Definition of scheduled function J1939Dcm_MainFunction ⌈

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.
Available via	SchM_J1939Dcm.h

⌋()

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

8.6 Expected Interfaces

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

8.6.1 Mandatory Interfaces

This chapter defines all external interfaces which are required to fulfill a mandatory functionality of the module.

[SWS_J1939Dcm_00199] Definition of mandatory interfaces in module J1939Dcm ⌈

API Function	***Header File***	***Description***
Det_ReportRuntimeError	Det.h	Service to report runtime errors. If a callout has been configured then this callout shall be called.

⌋()

8.6.2 Optional Interfaces

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

[SWS_J1939Dcm_00132] Definition of optional interfaces in module J1939Dcm ⌈

API Function	*Header File*	*Description*
BswM_J1939DcmBroadcastStatus	BswM_J1939Dcm.h	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	Dem_J1939Dcm.h	Clears the status of all event(s) related to the specified DTC(s), as well as all associated event memory entries for these event(s).
Dem_J1939DcmFirstDTCwithLamp Status	Dem_J1939Dcm.h	The function sets the filter to the first applicable DTC for the DM31 response for a specific node.
Dem_J1939DcmGetNextDTCwith LampStatus	Dem_J1939Dcm.h	Gets the next filtered J1939 DTC for DM31 including current LampStatus.
Dem_J1939DcmGetNextFilteredDTC	Dem_J1939Dcm.h	Gets the next filtered J1939 DTC.
Dem_J1939DcmGetNextFilteredRatio	Dem_J1939Dcm.h	Gets the next filtered Ratio.
Dem_J1939DcmGetNextFreezeFrame	Dem_J1939Dcm.h	Gets next freeze frame data. The function stores the data in the provided DestBuffer.
Dem_J1939DcmGetNextSPNInFreeze Frame	Dem_J1939Dcm.h	Gets next SPN.
Dem_J1939DcmGetNumberOfFiltered DTC	Dem_J1939Dcm.h	Gets the number of currently filtered DTCs set by the function Dem_J1939DcmSetDTCFilter.
Dem_J1939DcmReadDiagnostic Readiness1	Dem_J1939Dcm.h	Service to report the value of Diagnostic Readiness 1 (DM05) computed by the Dem.
Dem_J1939DcmReadDiagnostic Readiness2	Dem_J1939Dcm.h	Service to report the value of Diagnostic Readiness 2 (DM21) computed by the Dem.
Dem_J1939DcmReadDiagnostic Readiness3	Dem_J1939Dcm.h	Service to report the value of Diagnostic Readiness 3 (DM26) computed by the Dem.
Dem_J1939DcmSetDTCFilter	Dem_J1939Dcm.h	The function sets the DTC filter for a specific node and returns the composite lamp status of the filtered DTCs.
Dem_J1939DcmSetFreezeFrameFilter	Dem_J1939Dcm.h	The function sets the FreezeFrame filter for a specific node.
Dem_J1939DcmSetRatioFilter	Dem_J1939Dcm.h	The function sets the Ratio filter for a specific node and returns the corresponding Ignition Cycle Counter and General Denominator.
Det_ReportError	Det.h	Service to report development errors.
J1939Rm_SendAck	J1939Rm.h	Requests transmission of an Acknowledgement PG.
PduR_J1939DcmCancelReceive	PduR_J1939Dcm.h	Requests cancellation of an ongoing reception of a PDU in a lower layer transport protocol module.
PduR_J1939DcmCancelTransmit	PduR_J1939Dcm.h	Requests cancellation of an ongoing transmission of a PDU in a lower layer communication module.
PduR_J1939DcmTransmit	PduR_J1939Dcm.h	Requests transmission of a PDU.

⌋*()*

[SWS_J1939Dcm_00167] ⌈The parameter `broadcast` of `J1939Rm_SendAck` shall always be set to FALSE.⌋*()*

[SWS_J1939Dcm_00187] ⌈The parameter `extIdInfo` of `J1939Rm_SendAck` shall always be set to `NULL_PTR`.⌋*()*

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 `DM03`, `DM11`, and `DM55`.

8.6.3 Configurable interfaces

This section lists all interfaces where the target function can be configured. The target function is usually a call-back function. The name of this kind of interfaces is not fixed because they are configurable.

8.6.3.1 <GenericDMxRequestIndication>

[SWS_J1939Dcm_91001] Definition of configurable interface <GenericDMxRequestIndication> ⌈

Service Name	<GenericDMxRequestIndication>	
Syntax	`void <GenericDMxRequestIndication> ( uint8 dmId, NetworkHandleType channel, uint8 sourceAddress, uint8 destAddress, uint8 priority )`	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	dmId	Number of the requested J1939 diagnostic message.
	channel	Channel on which the request was received.
	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 or Request2 PG for an unsupported diagnostic message.	
Available via	J1939Dcm.h	

⌋(*RS_Diag_04241*)

8.6.3.2 <GenericDMxCopyTxData>

[SWS_J1939Dcm_91005] Definition of configurable interface <GenericDMxCopyTxData> ⌈

Service Name	<GenericDMxCopyTxData>
Syntax	`BufReq_ReturnType <GenericDMxCopyTxData> ( uint8 dmId, NetworkHandleType channel, const PduInfoType info, const RetryInfoType* retry, PduLengthType* availableDataPtr )`

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Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	dmId	Number of the J1939 diagnostic message
	channel	Channel on which the message is transmitted
	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 Sdu DataPtr 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 a diagnostic message segment. Each call to this function provides the next part of the diagnostic message data unless retry->TpData State 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.	
Available via	J1939Dcm.h	

⌋(*RS_Diag_04241*)

8.6.3.3 <GenericDMxTxConfirmation>

[SWS_J1939Dcm_91003] Definition of configurable interface <GenericDMxTx Confirmation> ⌈

Service Name	<GenericDMxTxConfirmation>	
Syntax	`void <GenericDMxTxConfirmation> ( uint8 dmId, NetworkHandleType channel, Std_ReturnType result )`	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	dmId	Number of the J1939 diagnostic message.
	channel	Channel on which the message is transmitted.
	result	E_OK: The PDU was transmitted. E_NOT_OK: Transmission of the PDU failed.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	Called after a diagnostic message has been transmitted, the result indicates whether the transmission was successful or not.	
Available via	J1939Dcm.h	

⌋*(RS_Diag_04241)*

8.6.3.4 <GenericDMxStartOfReception>

[SWS_J1939Dcm_91004] Definition of configurable interface <GenericDMxStart OfReception> ⌈

Service Name	<GenericDMxStartOfReception>	
Syntax	`BufReq_ReturnType <GenericDMxStartOfReception> ( uint8 mId, NetworkHandleType channel, PduLengthType length, PduLengthType bufferSizePtr, uint8 sourceAddress, uint8 priority )`	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	mId	Number of the J1939 diagnostic message.
	channel	Channel on which the message is received.
	length	Total length of the diagnostic message to be received.
	sourceAddress	Address of the node that sent the diagnostic message.
	priority	Priority of the diagnostic message.
Parameters (inout)	None	
Parameters (out)	bufferSizePtr	Available receive buffer.

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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 diagnostic message.	
Available via	J1939Dcm.h	

⌋(*RS_Diag_04241*)

8.6.3.5 <GenericDMxCopyRxData>

[SWS_J1939Dcm_91002] Definition of configurable interface <GenericDMxCopyRxData> ⌈

Service Name	<GenericDMxCopyRxData>	

Syntax	`BufReq_ReturnType <GenericDMxCopyRxData> (`
	`  uint8 dmId,`
	`  NetworkHandleType channel,`
	`  const PduInfoType* info,`
	`  PduLengthType* bufferSizePtr`
	`)`	

Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	dmId	Number of the J1939 diagnostic message.
	channel	Channel on which the message is received.
	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 a diagnostic message segment to the upper layer. Each call to this function provides the next part of the diagnostic message data. The size of the remaining buffer is written to the position indicated by bufferSizePtr.	
Available via	J1939Dcm.h	

⌋(*RS_Diag_04241*)

8.6.3.6 <GenericDMxRxIndication>

[SWS_J1939Dcm_91006] Definition of configurable interface <GenericDMxRxIndication> ⌈

Service Name	<GenericDMxRxIndication>	
Syntax	`void <GenericDMxRxIndication> ( uint8* dmId, NetworkHandleType channel, Std_ReturnType result )`	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	dmId	Number of the J1939 diagnostic message.
	channel	Channel on which the message is received.
	result	Result of the reception.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	Called after a diagnostic message has been received, the result indicates whether the reception was successful or not.	
Available via	J1939Dcm.h	

⌋*(RS_Diag_04241)*

8.7 Service Interfaces

8.7.1 Implementation Data Types

8.7.1.1 CalibrationIDArrayType

The J1939Dcm Service Component shall provide the implementation data type CalibrationIDArrayType, if DM19 is configured (refer to J1939DcmDmxSupport == J1939DCM_DM19_SUPPORT).

[SWS_J1939Dcm_00136] Definition of ImplementationDataType CalibrationIDArrayType ⌈

Name	CalibrationIDArrayType		
Kind	Array	***Element type***	uint8
Size	16 Elements		
Description	–		
Variation	–		
Available via	Rte_J1939Dcm_Type.h		

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8.7.2 Client-Server-Interfaces

8.7.2.1 J1939Dcm_CalibrationInformation

The J1939Dcm Service Component shall provide the port interface J1939Dcm_CalibrationInformation, if DM19 is configured (refer to J1939DcmDmxSupport == J1939DCM_DM19_SUPPORT).

[SWS_J1939Dcm_00097] Definition of ClientServerInterface J1939Dcm_CalibrationInformation ⌈

Name	J1939Dcm_CalibrationInformation		
Comment	–		
IsService	true		
Variation	{ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmNode/J1939DcmDiagnosticMessageSupport.J1939DcmDmxSupport)} == J1939DcmDm19Support		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_READY	E_NOT_READY is used if the CVN calculation is not finished yet. The tool needs to send the request again.
	2	E_NEXT	E_NEXT is used if the CVN calculation is finished, but not all CVNs returned yet.

Operation	GetCalibrationVerificationNumber	
Comment	–	
Mapped to API	–	
Variation	–	
Parameters	CalibrationVerificationNumber	
	Type	uint32
	Direction	OUT
	Comment	–
	Variation	–
	CalibrationID	
	Type	CalibrationIDArrayType
	Direction	OUT
	Comment	–
	Variation	–
Possible Errors	E_OK E_NOT_READY E_NEXT	

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8.7.3 Sender-Receiver-Interfaces

8.7.3.1 DataCondition

[SWS_J1939Dcm_91010] Definition of SenderReceiverInterface DataCondition_{ModeCondition} ⌈

Name	DataCondition_{ModeCondition}	
Comment	–	
IsService	false	
Variation	({ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmModeCondition/J1939DcmSwcSRDataElementRef)} != NULL) ModeCondition = {ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmModeCondition.SHORT-NAME)}	
Data Elements	data	
	Type	{ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmModeCondition/J1939DcmSwcSRDataElementRef->J1939DcmDataElementInstance/J1939DcmDataElementInstanceRef)}
	Variation	({ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmModeCondition/J1939DcmSwcSRDataElementRef->J1939DcmDataElementInstance/J1939DcmDataElementInstanceRef)} != NULL)
	data	
	Type	{ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmModeCondition/J1939DcmSwcSRDataElementRef->J1939DcmSubElementInDataElementInstance/J1939DcmSubElementInDataElementInstanceRef)}
	Variation	({ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmModeCondition/J1939DcmSwcSRDataElementRef->J1939DcmSubElementInDataElementInstance/J1939DcmSubElementInDataElementInstanceRef)} != NULL)
	data	
	Type	{ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmModeCondition/J1939DcmSwcSRDataElementRef->J1939DcmSubElementInImplDataElementInstance/J1939DcmSubElementInImplDataElementInstanceRef)}
	Variation	({ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmModeCondition/J1939DcmSwcSRDataElementRef->J1939DcmSubElementInImplDataElementInstance/J1939DcmSubElementInImplDataElementInstanceRef)} != NULL)

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8.7.4 Ports

8.7.4.1 J1939Dcm_CalibrationInformation

The J1939Dcm Service Component shall provide the port prototype J1939Dcm_CalibrationInformation, if DM19 is configured (refer to J1939DcmDmxSupport == J1939DCM_DM19_SUPPORT).

[SWS_J1939Dcm_00137] Definition of Port J1939Dcm_CalibrationInformation required by module J1939Dcm ⌈

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/J1939DcmDiagnosticMessage Support.J1939DcmDmxSupport)} == J1939DcmDm19Support		

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8.7.4.2 DataCondition

[SWS_J1939Dcm_91008] Definition of Port DataCondition_{ModeCondition} required by module J1939Dcm ⌈

Name	DataCondition_{ModeCondition}		
Kind	RequiredPort	***Interface***	DataCondition_{ModeCondition}
Description	–		
Variation	({ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmMode Condition/J1939DcmSwcSRDataElementRef)} != NULL) ModeCondition = {ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/ J1939DcmModeCondition.SHORT-NAME)}		

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8.7.4.3 ModeCondition

The J1939Dcm Service Component shall provide the port prototype ModeCondition for each J1939DcmSwcModeRef.

[SWS_J1939Dcm_91009] Definition of Port ModeCondition_{ModeCondition} required by module J1939Dcm ⌈

Name	ModeCondition_{ModeCondition}
Kind	RequiredPort
Interface-Ref	{ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmMode Condition/J1939DcmSwcModeRef)}.parent
Description	–
Variation	({ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/J1939DcmMode Condition/J1939DcmSwcModeRef)} != NULL) ModeCondition = {ecuc(J1939Dcm/J1939DcmConfigSet/J1939DcmProcessingConditions/ J1939DcmModeCondition.SHORT-NAME)}

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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. For general information about the definition of containers and parameters, refer to the section 10.1 “Introduction to configuration specification” in [18, SWS BSW General]. For details about published information of the J1939 Diagnostic Communication Manager module, refer to the section 10.3 “Published Information” in [21, SWS BSW General].

The section 10.1 specifies the structure (containers) and the parameters of the module J1939Dcm.

10.1 Containers and Configuration Parameters

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

Some of these containers and parameters are derived from classes and attributes of the [25, TPS System Template], which also contains the rules for these derivations.

The following pictures show an overview of the configuration parameters available for J1939Dcm.

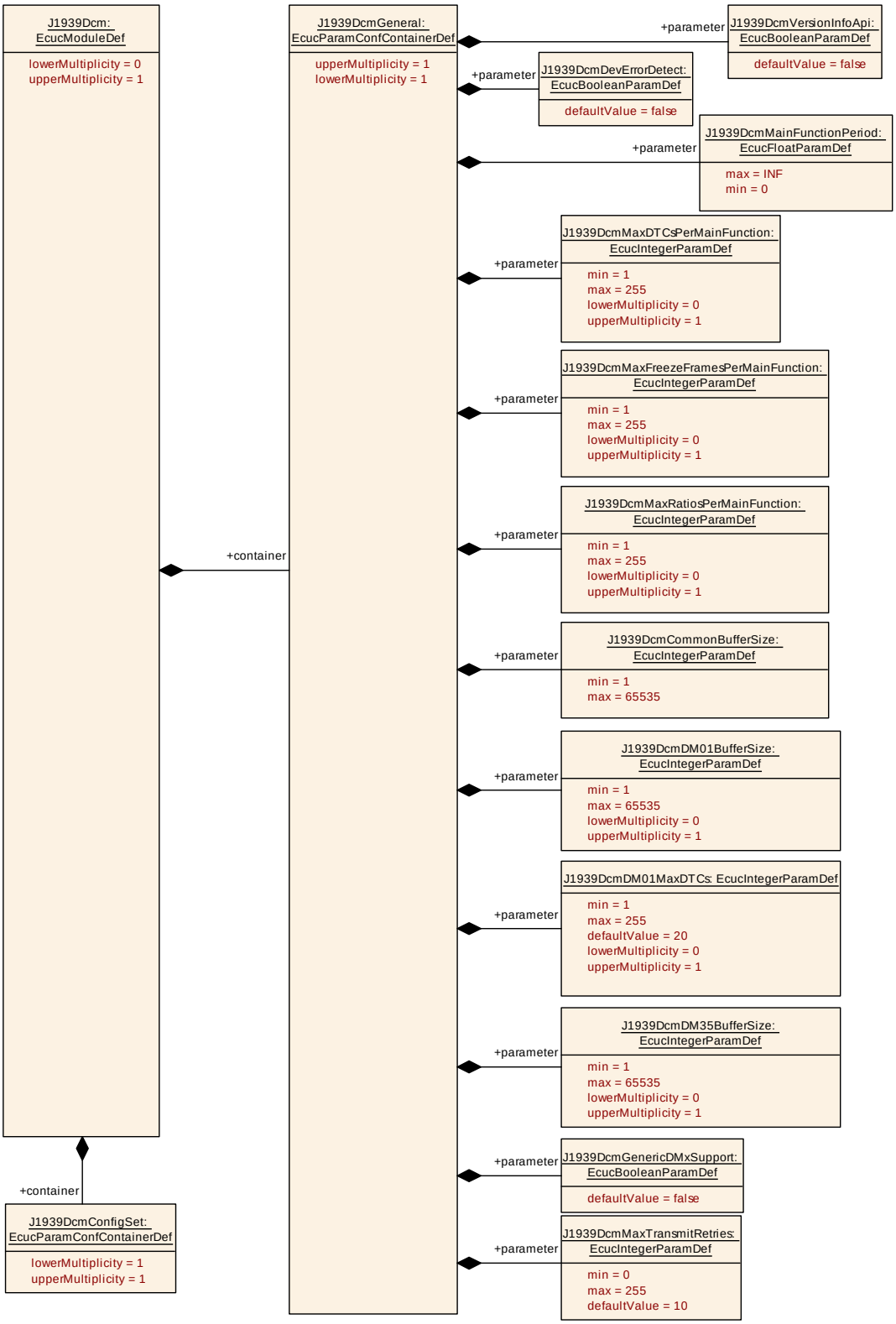

Figure 10.1: Module Configuration

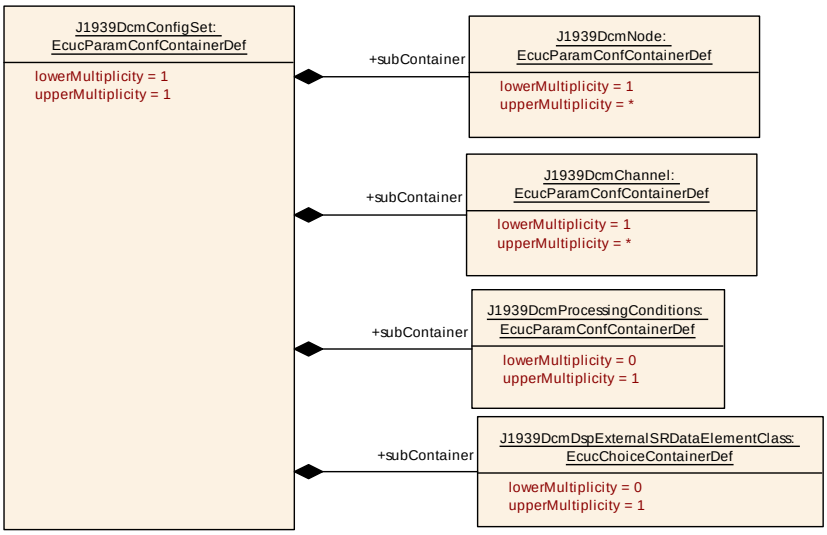

Figure 10.2: Configuration Set

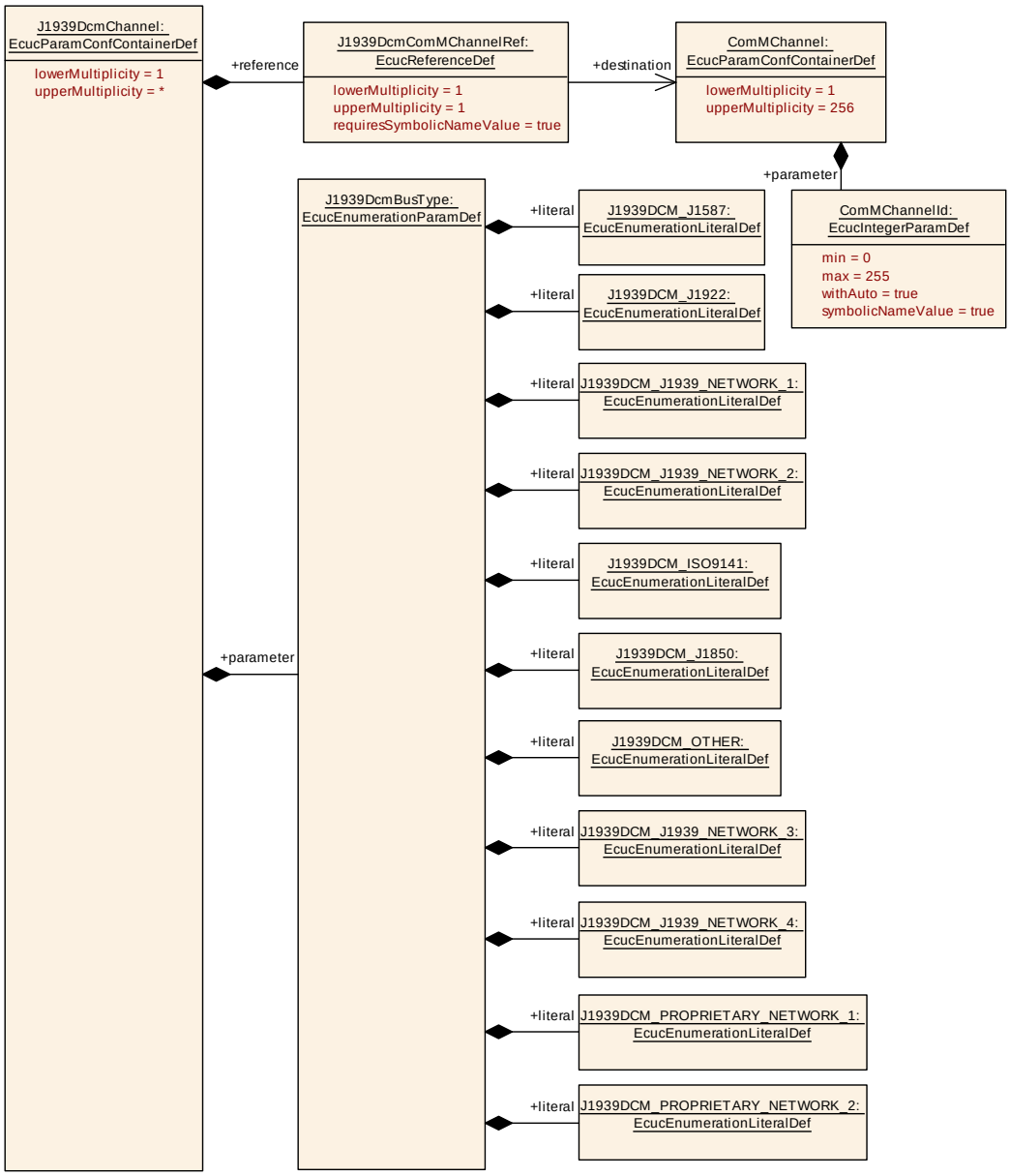

Figure 10.3: Configuration of Channels

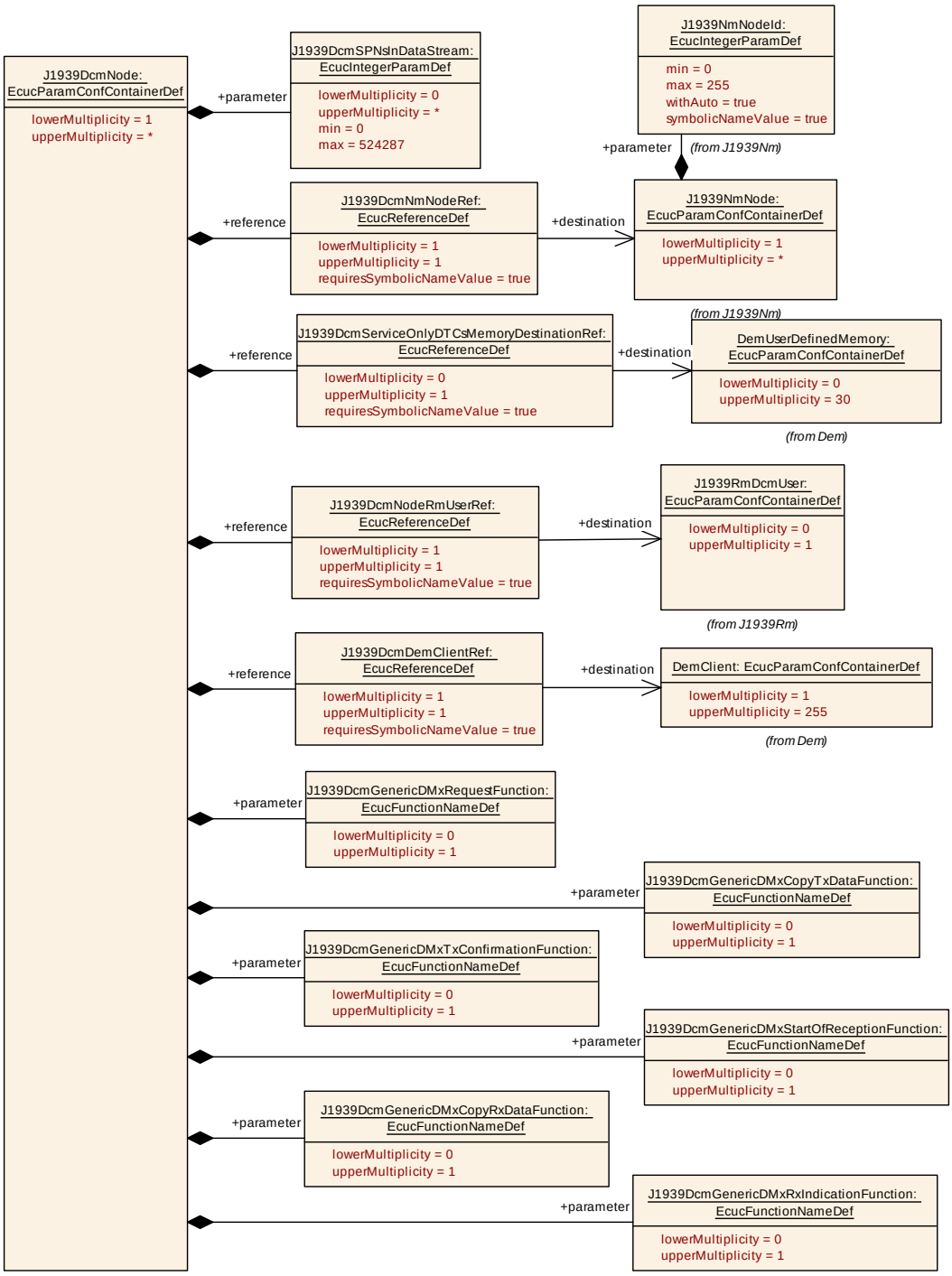

Figure 10.4: Configuration of Nodes - Part 1

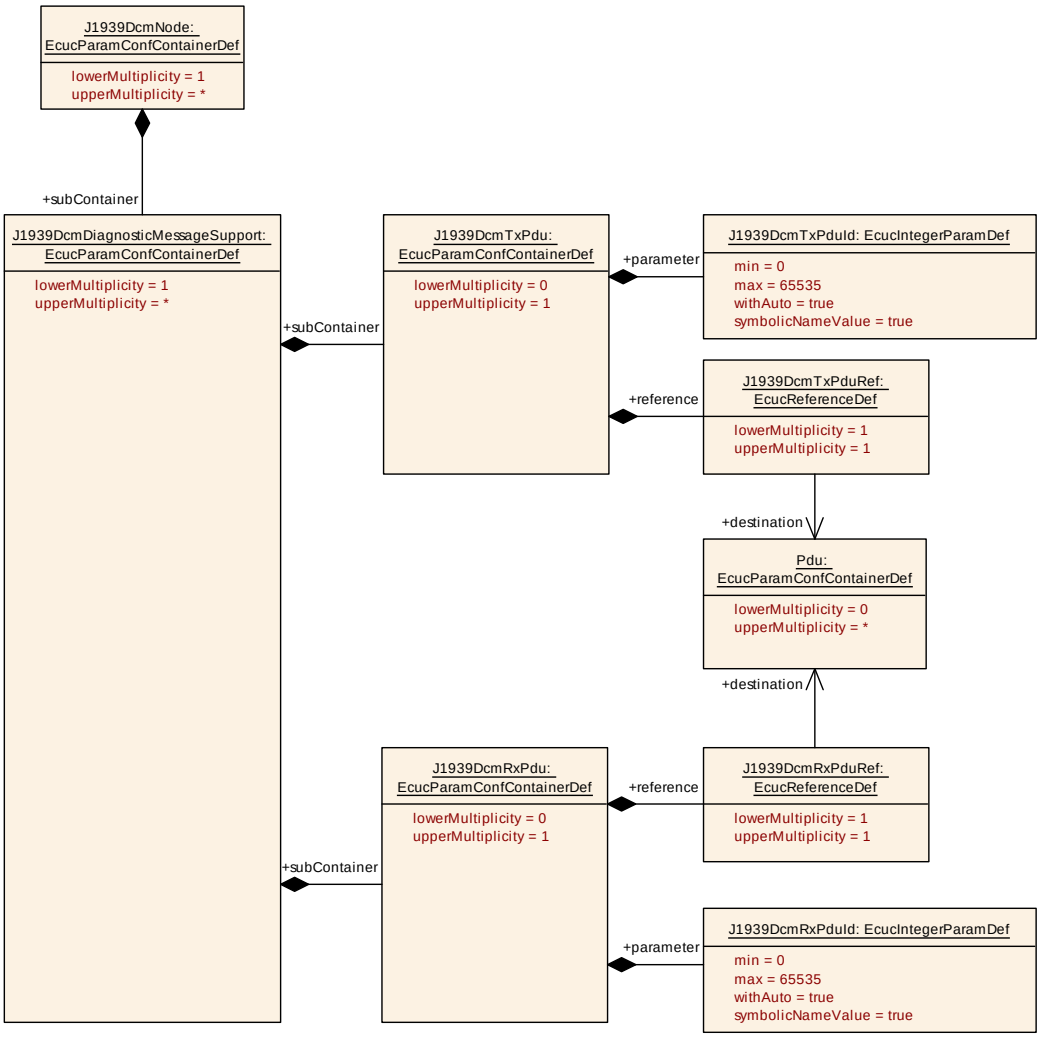

Figure 10.5: Configuration of Nodes - Part 2

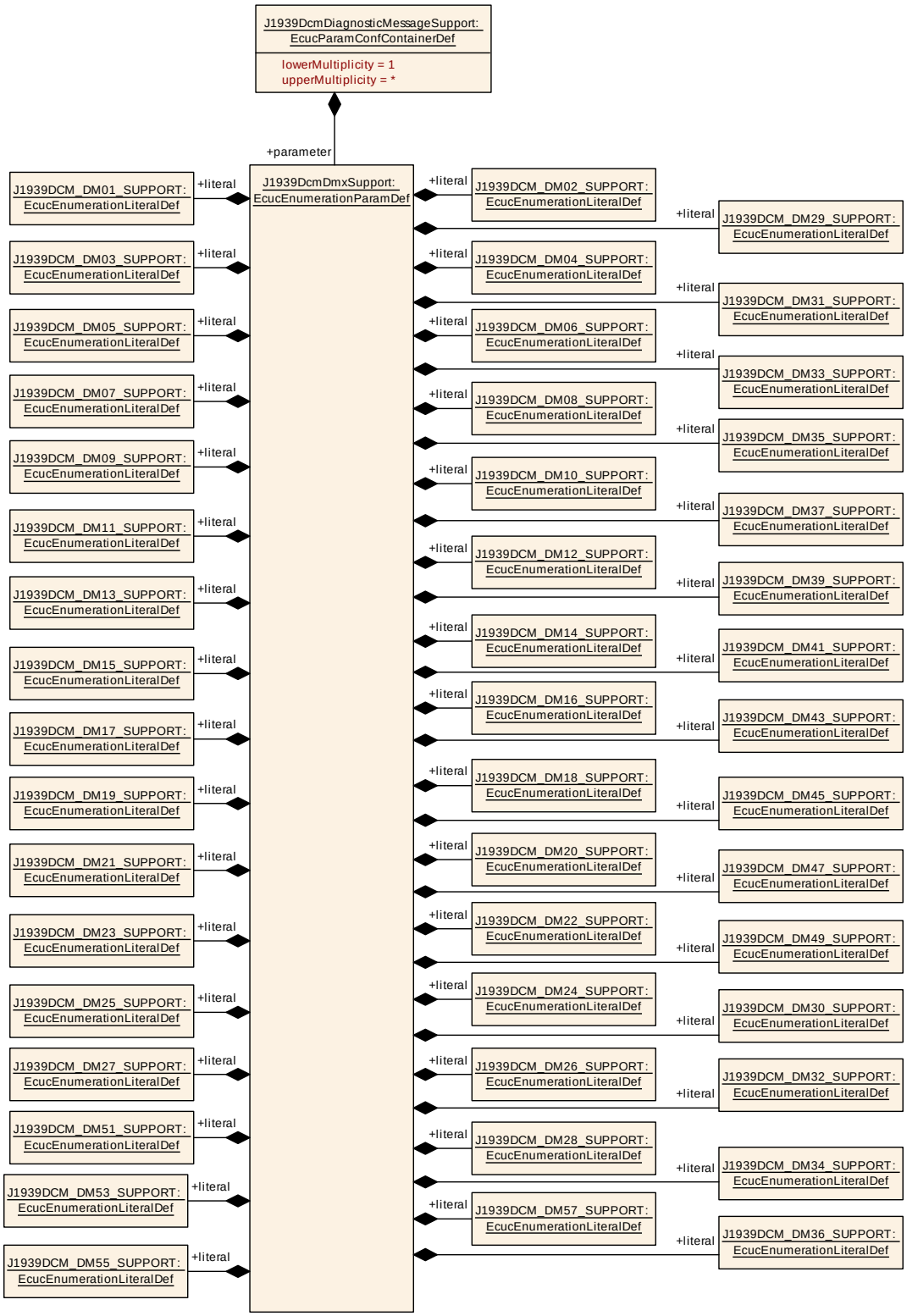

Figure 10.6: Configuration of Diagnostic Messages - Part 1

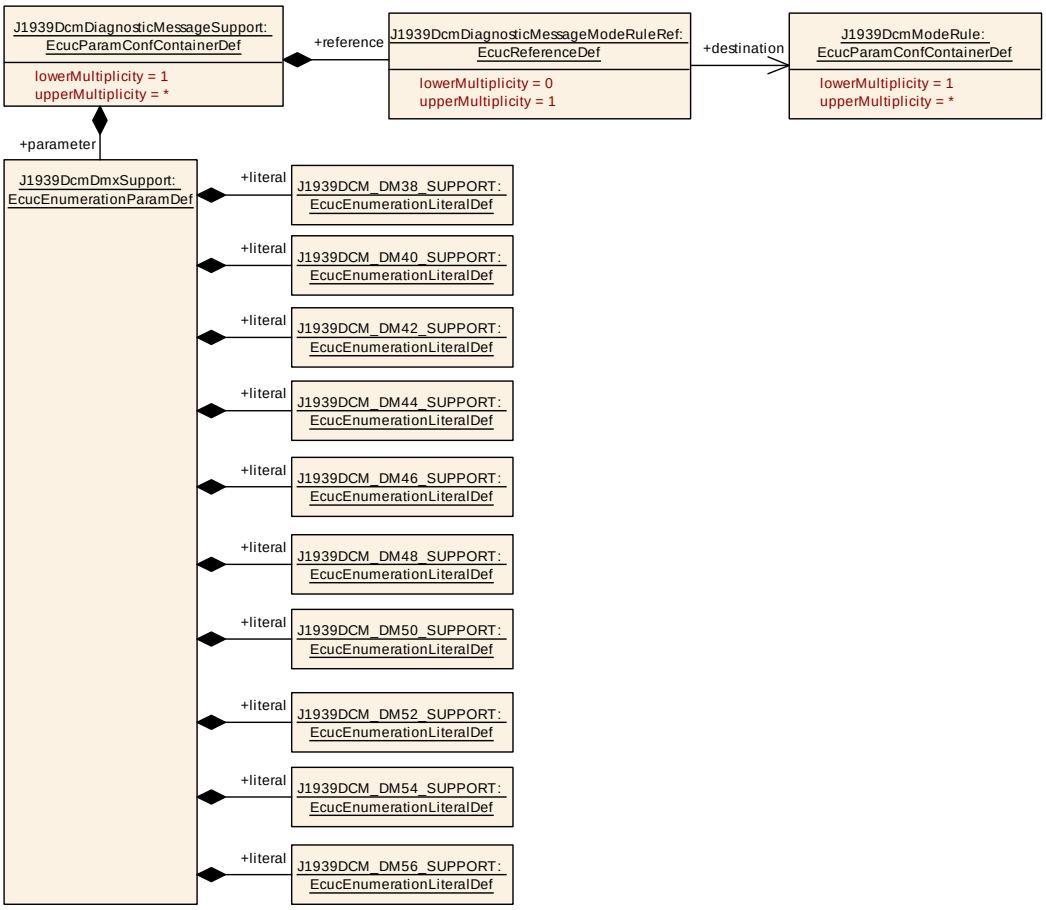

Figure 10.7: Configuration of Diagnostic Messages - Part 2

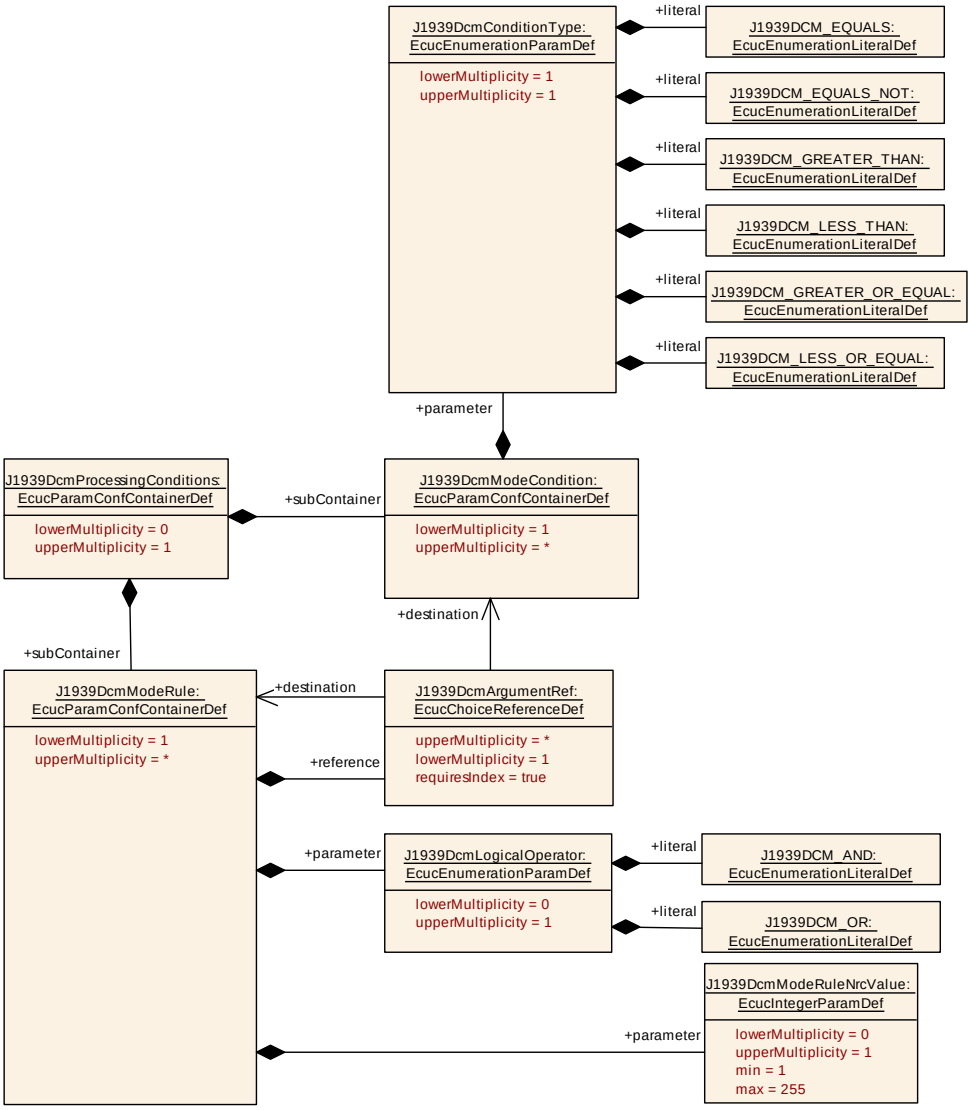

Figure 10.8: Configuration of Processing Conditions - Part 1

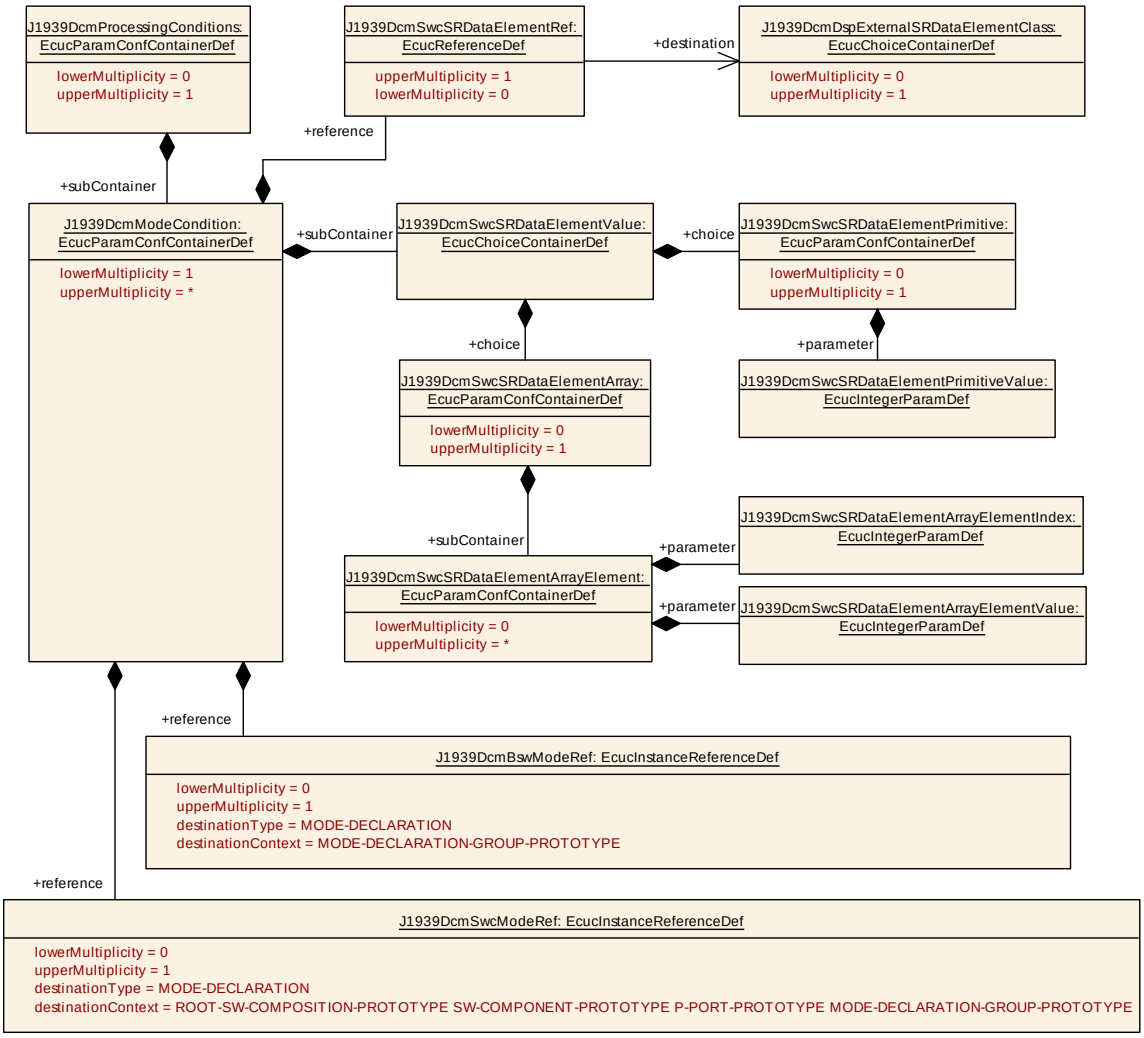

Figure 10.9: Configuration of Processing Conditions - Part 2

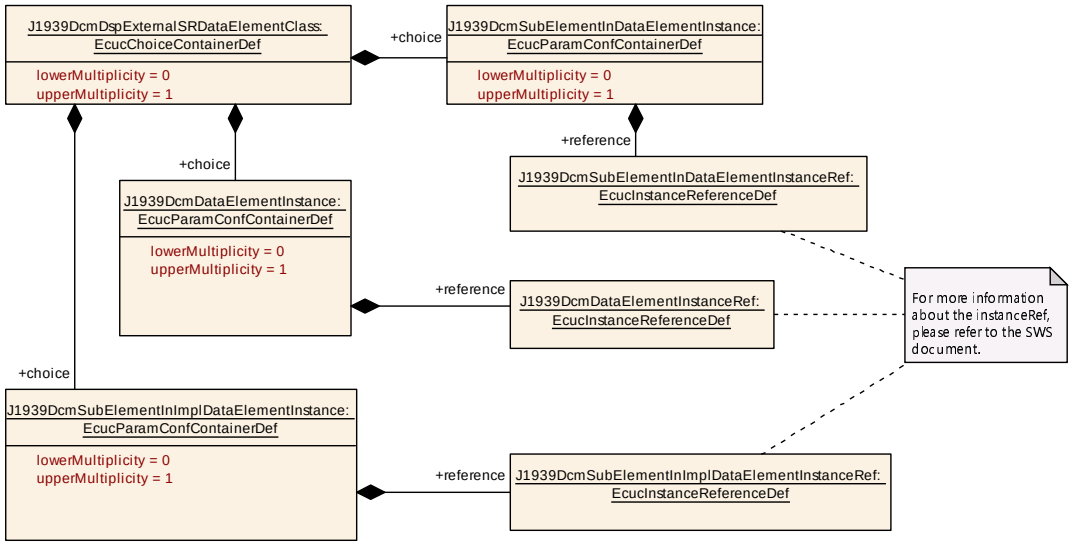

Figure 10.10: Configuration of External Data Element Class

10.1.1 J1939Dcm

SWS Item	[ECUC_J1939Dcm_00005]
Module Name	J1939Dcm
Description	The SAE J1939 Dcm module
Post-Build Variant Support	true
Supported Config Variants	VARIANT-LINK-TIME, VARIANT-POST-BUILD, VARIANT-PRE-COMPILE

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.

10.1.2 J1939DcmGeneral

SWS Item	[ECUC_J1939Dcm_00001]
Container Name	J1939DcmGeneral
Parent Container	J1939Dcm
Description	Contains the general configuration parameters of the module.
Configuration Parameters	

SWS Item	[ECUC_J1939Dcm_00040]		
Parameter Name	J1939DcmCommonBufferSize		
Parent Container	J1939DcmGeneral		
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_00003]
Parameter Name	J1939DcmDevErrorDetect
Parent Container	J1939DcmGeneral
Description	Switches the development error detection and notification on or off. • true: detection and notification is enabled. • false: detection and notification is disabled.
Multiplicity	1
Type	EcucBooleanParamDef

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Default value	false		
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]**		
Parameter Name	J1939DcmDM01BufferSize		
Parent Container	J1939DcmGeneral		
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 dependency: Shall be present if J1939DcmDmxSupport is set to J1939DCM_DM01_SUPPORT for at least one J1939DcmDiagnosticMessageSupport.		

SWS Item	**[ECUC_J1939Dcm_00050]**		
Parameter Name	J1939DcmDM01MaxDTCs		
Parent Container	J1939DcmGeneral		
Description	Configuration value of limitation of maximum DTCs to be reported in the DM01 message.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	1 .. 255		
Default value	20		
Post-Build Variant Value	false		
Value Configuration Class	**Pre-compile time**	X	All Variants
	Link time	–	
	Post-build time	–	
Scope / Dependency	scope: local dependency: Shall be present if J1939DcmDmxSupport is set to J1939DCM_DM01_SUPPORT for at least one J1939DcmDiagnosticMessageSupport.		

SWS Item	**[ECUC_J1939Dcm_00073]**
Parameter Name	J1939DcmDM35BufferSize
Parent Container	J1939DcmGeneral

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Description	Size of DM35 buffer (in Bytes). The buffer size should be as large as the longest DM35 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_00081]**		
Parameter Name	J1939DcmGenericDMxSupport		
Parent Container	J1939DcmGeneral		
Description	Switches the support for all DMx messages that are not directly implemented in J1939Dcm. True: Unsupported DMx messages are handled by a CDD. False: Unsupported DMx messages are ignored/rejected.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	false		
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]**		
Parameter Name	J1939DcmMainFunctionPeriod		
Parent Container	J1939DcmGeneral		
Description	Call cycle in seconds of J1939Dcm_MainFunction.		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	]0 .. INF[		
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]		
Parameter Name	J1939DcmMaxDTCsPerMainFunction		
Parent Container	J1939DcmGeneral		
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]		
Parameter Name	J1939DcmMaxFreezeFramesPerMainFunction		
Parent Container	J1939DcmGeneral		
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]		
Parameter Name	J1939DcmMaxRatiosPerMainFunction		
Parent Container	J1939DcmGeneral		
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

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	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_00088]**		
Parameter Name	J1939DcmMaxTransmitRetries		
Parent Container	J1939DcmGeneral		
Description	Maximum number of retries to send a diagnostic message in case PduR_J1939Dcm Transmit returns E_NOT_OK.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	10		
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_00002]**		
Parameter Name	J1939DcmVersionInfoApi		
Parent Container	J1939DcmGeneral		
Description	Pre-processor switch for enabling version info API support.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	false		
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

10.1.3 J1939DcmConfigSet

SWS Item	**[ECUC_J1939Dcm_00009]**
Container Name	J1939DcmConfigSet
Parent Container	J1939Dcm
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.
J1939DcmDspExternalSRData ElementClass	0..1	This container defines the source of data in a provided port which shall be read respectively the target of data in a required port which shall be written. This container shall contain either one J1939DcmSubElementIn DataElementInstance OR J1939DcmDataElementInstance OR J1939DcmSubElementInImplDataElementInstance reference.
J1939DcmNode	1..*	Contains the parameters for the support of a logical J1939 node.
J1939DcmProcessingConditions	0..1	This container contains the configuration for mode arbitration functionality of the J1939Dcm

10.1.4 J1939DcmChannel

SWS Item	**[ECUC_J1939Dcm_00011]**
Container Name	J1939DcmChannel
Parent Container	J1939DcmConfigSet
Description	Contains the J1939DcmChannel parameters.
Configuration Parameters	

SWS Item	**[ECUC_J1939Dcm_00039]**		
Parameter Name	J1939DcmBusType		
Parent Container	J1939DcmChannel		
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_J1939_NETWORK_4	Identifies the J1939 Network #4 communication port.	
	J1939DCM_OTHER	Identifies the "Other, Manufacture Specified Port" communication port.	
	J1939DCM_PROPRIETARY_ NETWORK_1	Identifies the Proprietary Network #1 communication port.	
	J1939DCM_PROPRIETARY_ NETWORK_2	Identifies the Proprietary Network #2 communication port.	
Post-Build Variant Value	false		
Value Configuration Class	**Pre-compile time**	X	All Variants
	Link time	–	

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	Post-build time	–	
Scope / Dependency	scope: local		

SWS Item	**[ECUC_J1939Dcm_00038]**		
Parameter Name	J1939DcmComMChannelRef		
Parent Container	J1939DcmChannel		
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

10.1.5 J1939DcmNode

SWS Item	**[ECUC_J1939Dcm_00010]**
Container Name	J1939DcmNode
Parent Container	J1939DcmConfigSet
Description	Contains the parameters for the support of a logical J1939 node.
Configuration Parameters	

SWS Item	**[ECUC_J1939Dcm_00086]**		
Parameter Name	J1939DcmGenericDMxCopyRxDataFunction		
Parent Container	J1939DcmNode		
Description	Provides part of the data of an unsupported DMx message. Required if J1939Dcm GenericDMxSupport is enabled.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	–		
Regular Expression	–		
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_00083]		
Parameter Name	J1939DcmGenericDMxCopyTxDataFunction		
Parent Container	J1939DcmNode		
Description	Requests to provide part of the data of an unsupported DMx message, following a call to J1939Dcm_GenericDMxTransmit. Required if J1939DcmGenericDMxSupport is enabled.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	–		
Regular Expression	–		
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_00082]		
Parameter Name	J1939DcmGenericDMxRequestFunction		
Parent Container	J1939DcmNode		
Description	Indicates the reception of a request for an unsupported DMx message. Required if J1939DcmGenericDMxSupport is enabled.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	–		
Regular Expression	–		
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_00087]
Parameter Name	J1939DcmGenericDMxRxIndicationFunction
Parent Container	J1939DcmNode
Description	Confirms complete reception of an unsupported DMx message. Required if J1939Dcm GenericDMxSupport is enabled.
Multiplicity	0..1
Type	EcucFunctionNameDef
Default value	–
Regular Expression	–

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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_00085]**		
Parameter Name	J1939DcmGenericDMxStartOfReceptionFunction		
Parent Container	J1939DcmNode		
Description	Indicates reception of an unsupported DMx message. Required if J1939DcmGeneric DMxSupport is enabled.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	–		
Regular Expression	–		
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_00084]**		
Parameter Name	J1939DcmGenericDMxTxConfirmationFunction		
Parent Container	J1939DcmNode		
Description	Confirms transmission of an unsupported DMx message. Required if J1939Dcm GenericDMxSupport is enabled.		
Multiplicity	0..1		
Type	EcucFunctionNameDef		
Default value	–		
Regular Expression	–		
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_00047]		
Parameter Name	J1939DcmSPNsInDataStream		
Parent Container	J1939DcmNode		
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_00072]		
Parameter Name	J1939DcmDemClientRef		
Parent Container	J1939DcmNode		
Description	Reference to the corresponding Dem Client.		
Multiplicity	1		
Type	Symbolic name reference to DemClient		
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_00013]		
Parameter Name	J1939DcmNmNodeRef		
Parent Container	J1939DcmNode		
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]
Parameter Name	J1939DcmNodeRmUserRef
Parent Container	J1939DcmNode
Description	Reference to the J1939RmUser used by J1939Dcm.

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Multiplicity	1		
Type	Symbolic name reference to J1939RmDcmUser		
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		

SWS Item	**[ECUC_J1939Dcm_00051]**		
Parameter Name	J1939DcmServiceOnlyDTCsMemoryDestinationRef		
Parent Container	J1939DcmNode		
Description	Reference to the user defined memory used for the Service Only DTCs handled by DM53, DM54, and DM55.		
Multiplicity	0..1		
Type	Symbolic name reference to DemUserDefinedMemory		
Post-Build Variant Value	false		
Value Configuration Class	**Pre-compile time**	X	All Variants
	Link time	–	
	Post-build time	–	
Scope / Dependency	scope: local dependency: The referenced event memory shall be assigned to the DemEvent MemorySet of the DemClient referenced by J1939DcmDemClientRef.		

Included Containers		
Container Name	**Multiplicity**	**Scope / Dependency**
J1939DcmDiagnosticMessage Support	1..*	Contains parameters to configure the diagnostic message support

10.1.6 J1939DcmDiagnosticMessageSupport

SWS Item	**[ECUC_J1939Dcm_00014]**
Container Name	J1939DcmDiagnosticMessageSupport
Parent Container	J1939DcmNode
Description	Contains parameters to configure the diagnostic message support
Configuration Parameters	

SWS Item	**[ECUC_J1939Dcm_00042]**	
Parameter Name	J1939DcmDmxSupport	
Parent Container	J1939DcmDiagnosticMessageSupport	
Description	This parameter is used to identify the actual DMx message.	
Multiplicity	1	
Type	EcucEnumerationParamDef	
Range	J1939DCM_DM01_SUPPORT	DM01: Active Diagnostic Trouble Codes

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	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)

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	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_00070]**		
Parameter Name	J1939DcmDiagnosticMessageModeRuleRef		
Parent Container	J1939DcmDiagnosticMessageSupport		
Description	Reference to a J1939DcmModeRule which controls the execution of a Diagnostic Message.		
Multiplicity	0..1		
Type	Reference to J1939DcmModeRule		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	**Pre-compile time**	X	VARIANT-PRE-COMPILE, VARIANT-POST-BUILD
	Link time	X	VARIANT-LINK-TIME
	Post-build time	–	
Value Configuration Class	**Pre-compile time**	X	VARIANT-PRE-COMPILE, VARIANT-POST-BUILD
	Link time	X	VARIANT-LINK-TIME
	Post-build time	–	
Scope / Dependency	scope: ECU		

SWS Item	[ECUC_J1939Dcm_00048]		
Parameter Name	J1939DcmDiagnosticMessageSupportChannelRef		
Parent Container	J1939DcmDiagnosticMessageSupport		
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. This PDU consumes meta data items of type CAN_ID_32 for PDUs received from CanIf, and of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16, and PRIORITY_8 for PDUs received from J1939Tp.
J1939DcmTxPdu	0..1	Contains parameters to configure the J1939DcmTxPdu. This PDU produces meta data items of type CAN_ID_32 for PDUs transmitted via CanIf, and of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16, and PRIORITY_8 for PDUs transmitted via J1939Tp.

10.1.7 J1939DcmRxPdu

SWS Item	[ECUC_J1939Dcm_00046]
Container Name	J1939DcmRxPdu
Parent Container	J1939DcmDiagnosticMessageSupport
Description	Contains parameters to configure the J1939DcmRxPdu. This PDU consumes meta data items of type CAN_ID_32 for PDUs received from Can If, and of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16, and PRIORITY_8 for PDUs received from J1939Tp.
Configuration Parameters	

SWS Item	[ECUC_J1939Dcm_00016]		
Parameter Name	J1939DcmRxPduId		
Parent Container	J1939DcmRxPdu		
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

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	Link time	–	
	Post-build time	–	
Scope / Dependency	scope: ECU withAuto = true		

SWS Item	**[ECUC_J1939Dcm_00017]**		
Parameter Name	J1939DcmRxPduRef		
Parent Container	J1939DcmRxPdu		
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

10.1.8 J1939DcmTxPdu

SWS Item	**[ECUC_J1939Dcm_00045]**
Container Name	J1939DcmTxPdu
Parent Container	J1939DcmDiagnosticMessageSupport
Description	Contains parameters to configure the J1939DcmTxPdu. This PDU produces meta data items of type CAN_ID_32 for PDUs transmitted via Can If, and of type SOURCE_ADDRESS_16, TARGET_ADDRESS_16, and PRIORITY_8 for PDUs transmitted via J1939Tp.
Configuration Parameters	

SWS Item	**[ECUC_J1939Dcm_00044]**		
Parameter Name	J1939DcmTxPduId		
Parent Container	J1939DcmTxPdu		
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 withAuto = true		

SWS Item	[ECUC_J1939Dcm_00043]		
Parameter Name	J1939DcmTxPduRef		
Parent Container	J1939DcmTxPdu		
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

10.1.9 J1939DcmProcessingConditions

SWS Item	[ECUC_J1939Dcm_00052]
Container Name	J1939DcmProcessingConditions
Parent Container	J1939DcmConfigSet
Description	This container contains the configuration for mode arbitration functionality of the J1939Dcm
Configuration Parameters	

Included Containers		
Container Name	Multiplicity	Scope / Dependency
J1939DcmModeCondition	1..*	This container contains the configuration of a mode condition or an environmental conditions which can be used as argument in J1939DcmModeRules. One J1939DcmModeCondition shall contain either one J1939DcmSwcModeRef or one J1939DcmBswModeRef or one J1939DcmSwcSRDataElementRef. Please note that the J1939Dcm acts as well as mode manager. Therefore the references J1939DcmSwcModeRef or one J1939DcmBswModeRef might point to provided Mode DeclarationGroupPrototypes of the J1939Dcm itself as well as to provided ModeDeclarationGroupPrototypes of other Bsw Modules or software components. In case of a configured J1939DcmSwcModeRef or J1939Dcm BswModeRef only the J1939DcmConditionType J1939DCM_ EQUALS or J1939DCM_EQUALS_NOT are applicable. In case of J1939DcmSwcSRDataElementRef all literals of J1939DcmConditionType are possible.
J1939DcmModeRule	1..*	This container contains the configuration of a mode rule which represents a logical expression with J1939DcmModeConditions or other J1939DcmModeRules as arguments. All arguments are processed with the operator defined by Dcm LogicalOperator, for instance: Argument_A AND Argument_B AND Argument_C

10.1.10 J1939DcmModeRule

SWS Item	**[ECUC_J1939Dcm_00053]**
Container Name	J1939DcmModeRule
Parent Container	J1939DcmProcessingConditions
Description	This container contains the configuration of a mode rule which represents a logical expression with J1939DcmModeConditions or other J1939DcmModeRules as arguments. All arguments are processed with the operator defined by DcmLogicalOperator, for instance: Argument_A AND Argument_B AND Argument_C
Configuration Parameters	

SWS Item	**[ECUC_J1939Dcm_00054]**		
Parameter Name	J1939DcmLogicalOperator		
Parent Container	J1939DcmModeRule		
Description	This parameter specifies the logical operator to be used in the logical expression. If the expression only consists of a single condition this parameter shall not be used.		
Multiplicity	0..1		
Type	EcucEnumerationParamDef		
Range	J1939DCM_AND	–	
	J1939DCM_OR	–	
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_00056]**		
Parameter Name	J1939DcmModeRuleNrcValue		
Parent Container	J1939DcmModeRule		
Description	Optional parameter which defines the NRC to be sent in case the mode rule condition is not valid.		
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	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	–	
Value Configuration Class	**Pre-compile time**	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	–	
Scope / Dependency	scope: ECU		

SWS Item	**[ECUC_J1939Dcm_00055]**		
Parameter Name	J1939DcmArgumentRef		
Parent Container	J1939DcmModeRule		
Description	This is a choice reference either to a mode condition or a an other mode rule serving as sub-expression. **Attributes:** requiresIndex=true		
Multiplicity	1..*		
Type	Choice reference to [J1939DcmModeCondition, J1939DcmModeRule]		
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		

No Included Containers

10.1.11 J1939DcmModeCondition

SWS Item	**[ECUC_J1939Dcm_00071]**
Container Name	J1939DcmModeCondition
Parent Container	J1939DcmProcessingConditions
Description	This container contains the configuration of a mode condition or an environmental conditions which can be used as argument in J1939DcmModeRules. One J1939DcmModeCondition shall contain either one J1939DcmSwcModeRef or one J1939DcmBswModeRef or one J1939DcmSwcSRDataElementRef. Please note that the J1939Dcm acts as well as mode manager. Therefore the references J1939DcmSwcModeRef or one J1939DcmBswModeRef might point to provided ModeDeclarationGroupPrototypes of the J1939Dcm itself as well as to provided ModeDeclarationGroupPrototypes of other Bsw Modules or software components. In case of a configured J1939DcmSwcModeRef or J1939DcmBswModeRef only the J1939DcmConditionType J1939DCM_EQUALS or J1939DCM_EQUALS_NOT are applicable. In case of J1939DcmSwcSRDataElementRef all literals of J1939DcmConditionType are possible.
Configuration Parameters	

SWS Item	**[ECUC_J1939Dcm_00057]**
Parameter Name	J1939DcmConditionType
Parent Container	J1939DcmModeCondition
Description	This parameter specifies what kind of comparison that is made for the evaluation of the mode condition.
Multiplicity	1

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Type	EcucEnumerationParamDef		
Range	J1939DCM_EQUALS	–	
	J1939DCM_EQUALS_NOT	–	
	J1939DCM_GREATER_OR_ EQUAL	–	
	J1939DCM_GREATER_THAN	–	
	J1939DCM_LESS_OR_EQUAL	–	
	J1939DCM_LESS_THAN	–	
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_00059]**		
Parameter Name	J1939DcmBswModeRef		
Parent Container	J1939DcmModeCondition		
Description	This parameter references a mode of a ModeDeclarationGroupPrototype provided by a Basic Software Module used for the condition. Please note that such ModeDeclarationGroupPrototype are owned by a Basic Software Module Description in the role providedModeGroup.		
Multiplicity	0..1		
Type	Instance reference to MODE-DECLARATION context: MODE-DECLARATION-GROUP-PROTOTYPE		
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_00058]**		
Parameter Name	J1939DcmSwcModeRef		
Parent Container	J1939DcmModeCondition		
Description	This parameter references a mode in a particular mode request port of a software component that is used for the condition.		
Multiplicity	0..1		
Type	Instance reference to MODE-DECLARATION context: ROOT-SW-COMPOSITION-PROTOTYPE SW-COMPONENT-PROTOTYPE P-PORT-PROTOTYPE MODE-DECLARATION-GROUP-PROTOTYPE		
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

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

SWS Item	**[ECUC_J1939Dcm_00060]**		
Parameter Name	J1939DcmSwcSRDataElementRef		
Parent Container	J1939DcmModeCondition		
Description	Reference to environmental conditions. It is possible to reference a S/R Receiver-Port to read physical values and compare (equal, greater, less,...) them with a configured value that is defined by J1939DcmSwcSRDataElementValue.		
Multiplicity	0..1		
Type	Reference to J1939DcmDspExternalSRDataElementClass		
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		

Included Containers		
Container Name	**Multiplicity**	**Scope / Dependency**
J1939DcmSwcSRDataElement Value	1	This container contains the configuration of a S/R compare value.

10.1.12 J1939DcmSwcSRDataElementValue

SWS Item	**[ECUC_J1939Dcm_00074]**
Choice Container Name	J1939DcmSwcSRDataElementValue
Parent Container	J1939DcmModeCondition
Description	This container contains the configuration of a S/R compare value.

Container Choices		
Container Name	**Multiplicity**	**Scope / Dependency**
J1939DcmSwcSRDataElement Array	0..1	This container contains the configuration of a array SR data element compare value.
J1939DcmSwcSRDataElement Primitive	0..1	This container contains the configuration of a primitive SR data element compare value.

10.1.13 J1939DcmSwcSRDataElementPrimitive

SWS Item	[ECUC_J1939Dcm_00075]
Container Name	J1939DcmSwcSRDataElementPrimitive
Parent Container	J1939DcmSwcSRDataElementValue
Description	This container contains the configuration of a primitive SR data element compare value.
Configuration Parameters	

SWS Item	[ECUC_J1939Dcm_00077]		
Parameter Name	J1939DcmSwcSRDataElementPrimitiveValue		
Parent Container	J1939DcmSwcSRDataElementPrimitive		
Description	Reference to a primitive SR data element compare value.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 18446744073709551615		
Default value	–		
Post-Build Variant Value	false		
Value Configuration Class	**Pre-compile time**	X	All Variants
	Link time	–	
	Post-build time	–	
Scope / Dependency			

No Included Containers

10.1.14 J1939DcmSwcSRDataElementArray

SWS Item	[ECUC_J1939Dcm_00076]
Container Name	J1939DcmSwcSRDataElementArray
Parent Container	J1939DcmSwcSRDataElementValue
Description	This container contains the configuration of a array SR data element compare value.
Configuration Parameters	

Included Containers		
Container Name	Multiplicity	Scope / Dependency
J1939DcmSwcSRDataElement ArrayElement	0..*	This container contains the configuration of a array element SR data element compare value.

10.1.15 J1939DcmSwcSRDataElementArrayElement

SWS Item	[ECUC_J1939Dcm_00080]
Container Name	J1939DcmSwcSRDataElementArrayElement
Parent Container	J1939DcmSwcSRDataElementArray

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Description	This container contains the configuration of a array element SR data element compare value.
Configuration Parameters	

SWS Item	**[ECUC_J1939Dcm_00078]**		
Parameter Name	J1939DcmSwcSRDataElementArrayElementIndex		
Parent Container	J1939DcmSwcSRDataElementArrayElement		
Description	Index to an array SR data element.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 18446744073709551615		
Default value	–		
Post-Build Variant Value	false		
Value Configuration Class	**Pre-compile time**	X	All Variants
	Link time	–	
	Post-build time	–	
Scope / Dependency			

SWS Item	**[ECUC_J1939Dcm_00079]**		
Parameter Name	J1939DcmSwcSRDataElementArrayElementValue		
Parent Container	J1939DcmSwcSRDataElementArrayElement		
Description	Value of an array SR data element compare value.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 18446744073709551615		
Default value	–		
Post-Build Variant Value	false		
Value Configuration Class	**Pre-compile time**	X	All Variants
	Link time	–	
	Post-build time	–	
Scope / Dependency			

No Included Containers

10.1.16 J1939DcmDspExternalSRDataElementClass

SWS Item	**[ECUC_J1939Dcm_00062]**
Choice Container Name	J1939DcmDspExternalSRDataElementClass
Parent Container	J1939DcmConfigSet
Description	This container defines the source of data in a provided port which shall be read respectively the target of data in a required port which shall be written. This container shall contain either one J1939DcmSubElementInDataElementInstance OR J1939DcmDataElementInstance OR J1939DcmSubElementInImplDataElement Instance reference.

Container Choices		
Container Name	**Multiplicity**	**Scope / Dependency**
J1939DcmDataElementInstance	0..1	Instance Reference to the primitive data in a port where the data element is typed with an ApplicationPrimitveDataType or an ImplementationDataType.
J1939DcmSubElementInData ElementInstance	0..1	Instance Reference to the primitve sub-element (at any level) of composite data in a port where the data element is typed with an ApplicationCompositeDataType.
J1939DcmSubElementInImplData ElementInstance	0..1	Instance Reference to the primitve sub-element (at any level) of composite data in a port where the data element is typed with an ImplementationDataType.

10.1.17 J1939DcmDataElementInstance

SWS Item	[ECUC_J1939Dcm_00064]
Container Name	J1939DcmDataElementInstance
Parent Container	J1939DcmDspExternalSRDataElementClass
Description	Instance Reference to the primitive data in a port where the data element is typed with an ApplicationPrimitveDataType or an ImplementationDataType.
Configuration Parameters	

SWS Item	[ECUC_J1939Dcm_00067]		
Parameter Name	J1939DcmDataElementInstanceRef		
Parent Container	J1939DcmDataElementInstance		
Description	Instance Reference to the primitive data which shall be read or written. Supported are VariableDataPrototypes in SenderReceiverInterfaces and NvDataInterfaces and ParameterDataPrototypes in ParameterInterfaces (read only). This reference is applicable if the AutosarDataPrototype is typed with a ApplicationPrimitiveDataType of category VALUE or BOOLEAN or if the AutosarDataPrototype is typed with a ImplementationDataType of category VALUE or TYPE_REFERENCE that in turn boils down to VALUE		
Multiplicity	1		
Type	Instance reference to AUTOSAR-DATA-PROTOTYPE context: ROOT-SW-COMPOSITION-PROTOTYPE SW-COMPONENT-PROTOTYPE PORT-PROTOTYPE		
Post-Build Variant Value	false		
Value Configuration Class	**Pre-compile time**	X	All Variants
	Link time	–	
	Post-build time	–	
Scope / Dependency			

No Included Containers

10.1.18 J1939DcmSubElementInDataElementInstance

SWS Item	[ECUC_J1939Dcm_00063]
Container Name	J1939DcmSubElementInDataElementInstance
Parent Container	J1939DcmDspExternalSRDataElementClass
Description	Instance Reference to the primitve sub-element (at any level) of composite data in a port where the data element is typed with an ApplicationCompositeDataType.
Configuration Parameters	

SWS Item	[ECUC_J1939Dcm_00066]		
Parameter Name	J1939DcmSubElementInDataElementInstanceRef		
Parent Container	J1939DcmSubElementInDataElementInstance		
Description	Instance Reference to the primitve sub-element (at any level) of composite data in a port which shall be read. Supported are VariableDataPrototypes in SenderReceiver Interfaces and NvDataInterfaces and ParameterDataPrototypes in ParameterInterfaces (read only). This reference is applicable if the AutosarDataPrototype is typed with a ApplicationCompositeDataType.		
Multiplicity	1		
Type	Instance reference to APPLICATION-COMPOSITE-ELEMENT-DATA-PROTOTYPE context: ROOT-SW-COMPOSITION-PROTOTYPE SW-COMPONENT-PROTOTYPE PORT-PROTOTYPE AUTOSAR-DATA-PROTOTYPE APPLICATION-COMPOSITE-ELEMENT-DATA-PROTOTYPE*		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	–	
	Post-build time	–	
Scope / Dependency			

No Included Containers

10.1.19 J1939DcmSubElementInImplDataElementInstance

SWS Item	[ECUC_J1939Dcm_00065]
Container Name	J1939DcmSubElementInImplDataElementInstance
Parent Container	J1939DcmDspExternalSRDataElementClass
Description	Instance Reference to the primitve sub-element (at any level) of composite data in a port where the data element is typed with an ImplementationDataType.
Configuration Parameters	

SWS Item	[ECUC_J1939Dcm_00068]
Parameter Name	J1939DcmSubElementInImplDataElementInstanceRef
Parent Container	J1939DcmSubElementInImplDataElementInstance

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Description	Instance Reference to the primitve sub-element (at any level) of composite data in a port which shall be read. Supported are VariableDataPrototypes in SenderReceiver Interfaces and NvDataInterfaces and ParameterDataPrototypes in ParameterInterfaces (read only). This reference is applicable if the AutosarDataPrototype is typed with a ImplementationDataType of category STRUCTURE or ARRAY. Please note that in case of ARRAY the index attribute in the target reference has to be set to select a single array element.		
Multiplicity	1		
Type	Instance reference to IMPLEMENTATION-DATA-TYPE-ELEMENT context: ROOT-SW-COMPOSITION-PROTOTYPE SW-COMPONENT-PROTOTYPE PORT-PROTOTYPE AUTOSAR-DATA-PROTOTYPE IMPLEMENTATION-DATA-TYPE-ELEMENT*		
Post-Build Variant Value	false		
Value Configuration Class	**Pre-compile time**	X	All Variants
	Link time	–	
	Post-build time	–	
Scope / Dependency			

No Included Containers

A Not Applicable Requirements

[SWS_J1939Dcm_NA] ⌈These requirements are not applicable to this specification.⌋ *()*