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2023-11-23	R23-11	AUTOSAR Release Management	• Fixed non-diagnostic channels and return values of `Dem_J1939DcmGetNumberOfFilteredDTC` • Added missing service ports and interfaces for DM13 • Added information about automatic handle IDs to configuration • Converted to LaTeX and changed document name to include "CP"
2022-11-24	R22-11	AUTOSAR Release Management	• Clarification of Lamp Status in DM01 • Fixed ACK code for DM19 • Limited retransmission of messages
2021-11-25	R21-11	AUTOSAR Release Management	• Fixed description of return values
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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
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

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Table of Contents

1 Introduction and Functional Overview 9
1.1 Diagnostics according to SAE J1939 . . . 9
2 Acronyms, Abbreviations, and Terms 10
2.1 Definition of Acronyms and Abbreviations . . . 10
2.2 Definition of Terms . . . 12
3 Related Documentation 15
3.1 Input Documents & Related Standards and Norms . . . 15
3.2 Related Specification . . . 16
4 Constraints and Assumptions 17
4.1 Limitations . . . 17
4.2 Applicability to Automotive Domains . . . 17
5 Dependencies to Other Modules 18
5.1 File Structure . . . 18
5.1.1 Code File Structure . . . 18
5.1.2 Header File Structure . . . 18
6 Requirements Tracing 20
7 Functional Specification 21
7.1 Overview . . . 21
7.1.1 Supported Diagnostic Messages . . . 21
7.2 Module Handling . . . 23
7.2.1 Initialization . . . 23
7.2.2 Error Handling . . . 24
7.3 Message Processing . . . 24
7.3.1 Reception of Requests . . . 24
7.3.2 Failed Message Transmission . . . 25
7.3.3 Termination of Message . . . 25
7.3.4 Handling of Meta Data . . . 26
7.4 Communication State Handling . . . 26
7.5 Mode Dependent Request Execution . . . 26
7.6 J1939Dcm - DEM Interaction . . . 28
7.6.1 DTC Status . . . 28
7.6.2 FreezeFrame . . . 31
7.6.2.1 FreezeFrameKind equals FREEZEFRAME or EXPANDED_FREEZEFRAME . . . 31
7.6.2.2 FreezeFrameKind equals SPNS_IN_EXPANDED_FREEZEFRAME . . . 32
7.6.3 Ratio . . . 33
7.6.4 Service Only DTCs . . . 34

7.7 Diagnostic Messages . . . 34
7.7.1 Active Diagnostic Trouble Codes (DM01) . . . 34
7.7.1.1 Periodic Collection and Transmission of the DM01 Message . . . 34
7.7.2 Previously Active Diagnostic Trouble Codes (DM02) . . . 36
7.7.3 Diagnostic Data Clear/Reset for Previously Active DTCs (DM03) . . . 36
7.7.4 Freeze Frame Parameters (DM04) . . . 37
7.7.5 Diagnostic Readiness 1 (DM05) . . . 37
7.7.6 Emission Related Pending DTCs (DM06) . . . 37
7.7.7 Diagnostic Data Clear/Reset for Active DTCs (DM11) . . . 38
7.7.8 Emissions Related Active DTCs (DM12) . . . 39
7.7.9 Stop Start Broadcast (DM13) . . . 39
7.7.10 Calibration Information (DM19) . . . 41
7.7.11 Monitor Performance Ratio (DM20) . . . 42
7.7.12 Diagnostic Readiness 2 (DM21) . . . 42
7.7.13 Individual Clear/Reset of Active and Previously Active DTC (DM22) 42
7.7.14 Previously Active Emission Related Faults (DM23) . . . 43
7.7.15 SPN Support (DM24) . . . 43
7.7.16 Expanded Freeze Frame (DM25) . . . 44
7.7.17 Diagnostic Readiness 3 (DM26) . . . 44
7.7.18 Permanent DTCs (DM28) . . . 45
7.7.19 Regulated DTC Counts (DM29) . . . 45
7.7.20 DTC to Lamp Association (DM31) . . . 46
7.7.21 Immediate Fault Status (DM35) . . . 46
7.7.22 Harmonized Failure Classification DTC Reporting (DM41 – DM52) . 47
7.7.23 Active Service Only DTCs (DM53) . . . 47
7.7.24 Previously Active Service Only DTCs (DM54) . . . 48
7.7.25 Diagnostic Data Clear/Reset for all Service Only DTCs (DM55) . . . 48
7.8 Error Classification . . . 49
7.8.1 Development Errors . . . 50
7.8.2 Runtime Errors . . . 50
7.8.3 Production Errors . . . 50
8 API Specification 51
8.1 Imported Types . . . 51
8.2 Type Definitions . . . 51
8.2.1 J1939Dcm_ConfigType . . . 52
8.2.2 J1939Dcm_StateType . . . 52
8.3 Function Definitions . . . 52
8.3.1 Generally Available Functions . . . 52
8.3.1.1 J1939Dcm_Init . . . 53
8.3.1.2 J1939Dcm_DeInit . . . 53
8.3.1.3 J1939Dcm_SetState . . . 54
8.3.1.4 J1939Dcm_GenericDMxTransmit . . . 55
8.3.1.5 J1939Dcm_RequestIndication . . . 56

8.3.1.6 J1939Dcm_RxIndication . . . 57
8.3.1.7 J1939Dcm_TxConfirmation . . . 58
8.3.1.8 J1939Dcm_StartOfReception . . . 59
8.3.1.9 J1939Dcm_CopyRxData . . . 61
8.3.1.10 J1939Dcm_TpRxIndication . . . 62
8.3.1.11 J1939Dcm_CopyTxData . . . 63
8.3.1.12 J1939Dcm_TpTxConfirmation . . . 64
8.3.2 Functions Provided for DEM . . . 65
8.3.2.1 J1939Dcm_DemTriggerOnDTCStatus . . . 65
8.4 Scheduled Functions . . . 66
8.4.1 J1939Dcm_MainFunction . . . 66
8.5 Expected Interfaces . . . 66
8.5.1 Mandatory Interfaces . . . 66
8.5.2 Optional Interfaces . . . 67
8.5.3 Configurable interfaces . . . 68
8.5.3.1 <GenericDMxRequestIndication> . . . 69
8.5.3.2 <GenericDMxCopyTxData> . . . 69
8.5.3.3 <GenericDMxTxConfirmation> . . . 71
8.5.3.4 <GenericDMxStartOfReception> . . . 71
8.5.3.5 <GenericDMxCopyRxData> . . . 72
8.5.3.6 <GenericDMxRxIndication> . . . 73
8.5.3.7 <GenericTriggerOnDTCStatus> . . . 73
8.6 Service Interfaces . . . 74
8.6.1 Client-Server Interfaces . . . 74
8.6.1.1 J1939Dcm_CalibrationInformation . . . 74
8.6.2 Sender-Receiver Interfaces . . . 75
8.6.2.1 DataCondition . . . 75
8.6.3 Implementation Data Types . . . 75
8.6.3.1 CalibrationIDArrayType . . . 75
8.6.4 Ports . . . 76
8.6.4.1 J1939Dcm_CalibrationInformation . . . 76
8.6.4.2 DataCondition . . . 76
8.6.4.3 ModeCondition . . . 76

9 Sequence Diagrams 78

10 Configuration Specification 79
10.1 Containers and Configuration Parameters . . . 79
10.1.1 J1939Dcm . . . 89
10.1.2 J1939DcmGeneral . . . 89
10.1.3 J1939DcmConfigSet . . . 94
10.1.4 J1939DcmChannel . . . 95
10.1.5 J1939DcmNode . . . 96
10.1.6 J1939DcmDiagnosticMessageSupport . . . 100

10.1.7 J1939DcmRxPdu . . . 104
10.1.8 J1939DcmTxPdu . . . 105
10.1.9 J1939DcmProcessingConditions . . . 106
10.1.10 J1939DcmModeRule . . . 107
10.1.11 J1939DcmModeCondition . . . 109
10.1.12 J1939DcmSwcSRDataElementValue . . . 111
10.1.13 J1939DcmSwcSRDataElementPrimitive . . . 111
10.1.14 J1939DcmSwcSRDataElementArray . . . 112
10.1.15 J1939DcmSwcSRDataElementArrayElement . . . 113
10.1.16 J1939DcmDspExternalSRDataElementClass . . . 114
10.1.17 J1939DcmDataElementInstance . . . 114
10.1.18 J1939DcmSubElementInDataElementInstance . . . 115

A Not Applicable Requirements 117

B Change History of AUTOSAR Traceable Items 118
B.1 Traceable Item History of this Document According to AUTOSAR Release R26-11 . . . 118
B.1.1 Added Specification Items in R26-11 . . . 118
B.1.2 Changed Specification Items in R26-11 . . . 118
B.1.3 Deleted Specification Items in R26-11 . . . 118
B.1.4 Added Constraints in R26-11 . . . 118
B.1.5 Changed Constraints in R26-11 . . . 118
B.1.6 Deleted Constraints in R26-11 . . . 118
B.2 Traceable Item History of this Document According to AUTOSAR Release R25-11 . . . 119
B.2.1 Added Specification Items in R25-11 . . . 119
B.2.2 Changed Specification Items in R25-11 . . . 119
B.2.3 Deleted Specification Items in R25-11 . . . 119
B.2.4 Added Constraints in R25-11 . . . 119
B.2.5 Changed Constraints in R25-11 . . . 119
B.2.6 Deleted Constraints in R25-11 . . . 119
B.3 Traceable Item History of this Document According to AUTOSAR Release R24-11 . . . 119
B.3.1 Added Specification Items in R24-11 . . . 119
B.3.2 Changed Specification Items in R24-11 . . . 120
B.3.3 Deleted Specification Items in R24-11 . . . 120
B.3.4 Added Constraints in R24-11 . . . 120
B.3.5 Changed Constraints in R24-11 . . . 120
B.3.6 Deleted Constraints in R24-11 . . . 120

1 Introduction and Functional Overview

This specification describes the functionality, the 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 Acronyms, Abbreviations, and Terms

2.1 Definition of Acronyms and Abbreviations

The table below contains all acronyms, abbreviations or initialisms that are component-specific and not available in the AUTOSAR glossary [1].

Acronym/ Abbreviation	Description
AC	SAE J1939 AddressClaimed PG (PGN = 0x0EE00), which contains the NAME and is used for the SAE J1939 address claiming, CannotClaimAddress when SA = 0xFE
ACK	SAE J1939 Acknowledgement PG (ACKM) with control byte set to 0, positive acknowledgement
ACKM	SAE J1939 Acknowledgement PG (PGN = 0x0E800)
BAM	Broadcast Announce Message, broadcast variant of SAE J1939 transport protocol
BswM	Basic Software Mode Manager, controlling modes of the whole BSW, see [2, SWS Basic Software Mode Manager]
CA	Controller Application, role of an ECU tied to one address, referred to as node in the remainder of this specification
CanIf	CAN Interface, abstracting from CAN drivers and transceivers, see [3, SWS CAN Interface]
CDD	Complex Driver, any software that interfaces directly with AUTOSAR BSW modules, 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 protocol
ComM	Communication Manager, controlling the bus communication, see [6, SWS Communication Manager]
DA	Destination Address, the address of the receiving CA of a PG. Part of the 29 bit CAN identifier of SAE J1939 PGs.
DMx	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, mainly responsible for startup and shutdown of the ECU, see [7, 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

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Acronym/ Abbreviation	Description
J1939Dcm	SAE J1939 Diagnostic Communication Manager, this BSW module, implementing the SAE J1939 Diagnostics
J1939Nm	SAE J1939 Network Management module, implementing the SAE J1939 Address Claiming, see [8, SWS SAE J1939 Network Management]
J1939Rm	SAE J1939 Request Manager, implementing the SAE J1939 Request Handling, see [9, SWS SAE J1939 Request Manager]
J1939Tp	SAE J1939 Transport Layer, implementing the SAE J1939 Transport Protocol, see [10, SWS SAE J1939 Transport Layer]
NACK	SAE J1939 Acknowledgement PG (ACKM) with control byte set to 1, negative acknowledgement
NAME	The 64 bit NAME of a CA used in the AddressClaimed PG
OC	Occurrence Counter, counting how often a problem with an SPN occurred since the last reset of a DTC
PDU1	SAE J1939 PDU Type 1, this kind of PG can be sent to a specific destination address
PDU2	SAE J1939 PDU Type 2, this kind of PG can only be sent as broadcast
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, establishes communication between BSW modules, see [11, SWS PDU Router]
PDUS	PDU Specific, the lower byte of the 18 bit PGN which further identifies PDU2 PGs which cannot have a destination address
PG	Parameter Group
PGN	Parameter Group Number
PRI	Priority, part of the 29 bit identifier of SAE J1939 messages
RQST	SAE J1939 Request PG (PGN = 0x0EA00)
SA	Source Address, the address of the transmitting CA of a PG. Part of the 29 bit CAN identifier of SAE J1939 PGs.
SchM	Basic Software Schedule Manager, part of the RTE
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
TP.CM	Connection Management message (PGN = 0x0EC00) used by SAE J1939 transport protocol, corresponds to an N-PDU of J1939Tp
TP.CM_CTS	Connection Mode Clear To Send, variant of TP.CM that is used for handshake during CMDT transmission

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Acronym/ Abbreviation	Description
TP.CM_RTS	`Connection Mode` Request To Send, variant of TP.CM that initiates a CMDT transmission

Table 2.1: Acronyms and Abbreviations

The table below contains all document-independant acronyms or abbreviations that are defined in the AUTOSAR glossary [1].

Acronym/ Abbreviation	Description
BSW	`Basic Software`
DEM	`Diagnostic Event` Manager
DET	Default Error Tracer, supports development and runtime error reporting, see [12, Specification of Default Error Tracer]
PDU	`Protocol Data Unit`
RTE	Run-Time Environment, provides the infrastructure services that enable communication to occur between AUTOSAR SWCs as well as acting as the means by which AUTOSAR SWCs access basic software modules including the OS and communication service. This includes the RTE's responsibility for the realization of the scheduling of the SWCs. See [13, Specification of RTE Software]
SAE	Society of Automotive Engineers, see: `SAE J1939`
SWC/SW-C	`Software Component`

Table 2.2: Acronyms and Abbreviations used from AUTOSAR Glossary

Missing Citations

The following entries in Table 2.2 lack citations:

DEM Diagnostic Event Manager, stores DTCs containing diagnostic events (production errors) and test results, and associated information, see [14, SWS Diagnostic Event Manager]

2.2 Definition of Terms

The table below contains all definitions of terms that are used in this document.

Glossary Term	Explanation
Basic Software module (BSW)	A module of the AUTOSAR stack below the RTE
Lamp Status	The Lamp Status contains information about the severity of active errors, transmitted as part of diagnostic messages
Meta Data	Meta data transferred alongside a PDU, consisting of a set of meta data items
Meta Data Item	A single item of meta data of defined type and size
Node	Synonym for the SAE J1939 CA
Parameter	A parameter is a signal of the SAE J1939 application layer. The Parameter definition includes defined scale, limits, offset, and physical unit. Parameters are uniquely identified by the SPN.
Parameter Group	A Parameter Group is a message of the SAE J1939 application layer. Each Parameter Group contains several Parameters (signals), and is uniquely identified by the 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 SAE J1939 protocol messages and in the 29bit CAN identifier of SAE J1939 PGs.
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]
SAE J1939-81	Network management layer created by the SAE, see [18, SAE J1939-81]
SAE J1939 Address Claiming	The SAE J1939 address claiming procedure is the core feature of the network management of SAE J1939 defined in the standard document SAE J1939-81. Address claiming assigns a temporary 8-bit identifier to each CAs connected to an SAE J1939 network, based on the NAME of the CAs. Within each network, the 8-bit identifier is required to be unique. The 8-bit identifier is used as SA and DA of Parameter Groups (messages) transferred via the SAE J1939 network. The address claiming procedure is based on the exchange of AddressClaimed messages.
SAE J1939 Diagnostic Trouble Code	Diagnostic Trouble Code (DTC) defined by SAE J1939, transmitted inside a diagnostic message and containing the source of the problem (SPN), the kind of the problem (FMI), and an occurrence counter (OC).

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Glossary Term	Explanation
SAE J1939 Diagnostics	The SAE J1939 diagnostic layer is defined in the standard document SAE J1939-73. The SAE J1939 diagnostics is functionally similar to the UDS diagnostics, and has recently been extended to support OBD for emission related values.
SAE J1939 Request Handling	The SAE J1939 request handling allows a CA to request the transmission of a PG with transmission mode “On Request”. The request handling is defined in the network layer standard document SAE J1939-21.
SAE J1939 Transport Protocol	The SAE J1939 transport protocol is used for the segmented transmission of PGs with more than 8 bytes of data. The transport protocol is defined in the network layer standard document SAE J1939-21.
Software Component	AUTOSAR Software Component (SWC) of the Application
Service Software Component	The Software Component that represents the BSW module

Table 2.3: Definition of terms in the scope of this Document

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 ECU State Manager
AUTOSAR_CP_SWS_ECUStateManager

[8] Specification of Network Management for SAE J1939
AUTOSAR_CP_SWS_SAEJ1939NetworkManagement

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

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

[11] Specification of PDU Router
AUTOSAR_CP_SWS_PDURouter

[12] Specification of Default Error Tracer
AUTOSAR_CP_SWS_DefaultErrorTracer

[13] Specification of RTE Software
AUTOSAR_CP_SWS_RTE

[14] Specification of Diagnostic Event Manager
AUTOSAR_CP_SWS_DiagnosticEventManager

[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] SAE J1939-81 Network Management

[19] General Specification of Basic Software Modules
AUTOSAR_CP_SWS_BSWGeneral

[20] Layered Software Architecture
AUTOSAR_CP_EXP_LayeredSoftwareArchitecture

[21] Requirements on Diagnostics
AUTOSAR_FO_RS_Diagnostics

[22] General Requirements on Basic Software Modules
AUTOSAR_CP_RS_BSWGeneral

[23] Specification of Communication Stack Types
AUTOSAR_CP_SWS_CommunicationStackTypes

[24] Specification of Standard Types
AUTOSAR_CP_SWS_StandardTypes

[25] System Template
AUTOSAR_CP_TPS_SystemTemplate

[26] Diagnostic Extract Template
AUTOSAR_CP_TPS_DiagnosticExtractTemplate

3.2 Related Specification

AUTOSAR provides a General Specification on Basic Software modules [19, SWS BSW General], which is also valid for the SAE J1939 Diagnostic Communication Manager.

Thus, the specification [19, SWS BSW General] shall be considered as additional and required specification for the 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 [SWS_J1939Dcm_00238].

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, DM13, and DM22.

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

The J1939 Diagnostic Communication Manager (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 (SWC) 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 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 [19, SWS BSW General] Chapter 5.1.6 *"Code file structure"*.

5.1.2 Header File Structure

For details, refer to [19, SWS BSW General] Chapter 5.1.7 *"Header file structure"*.

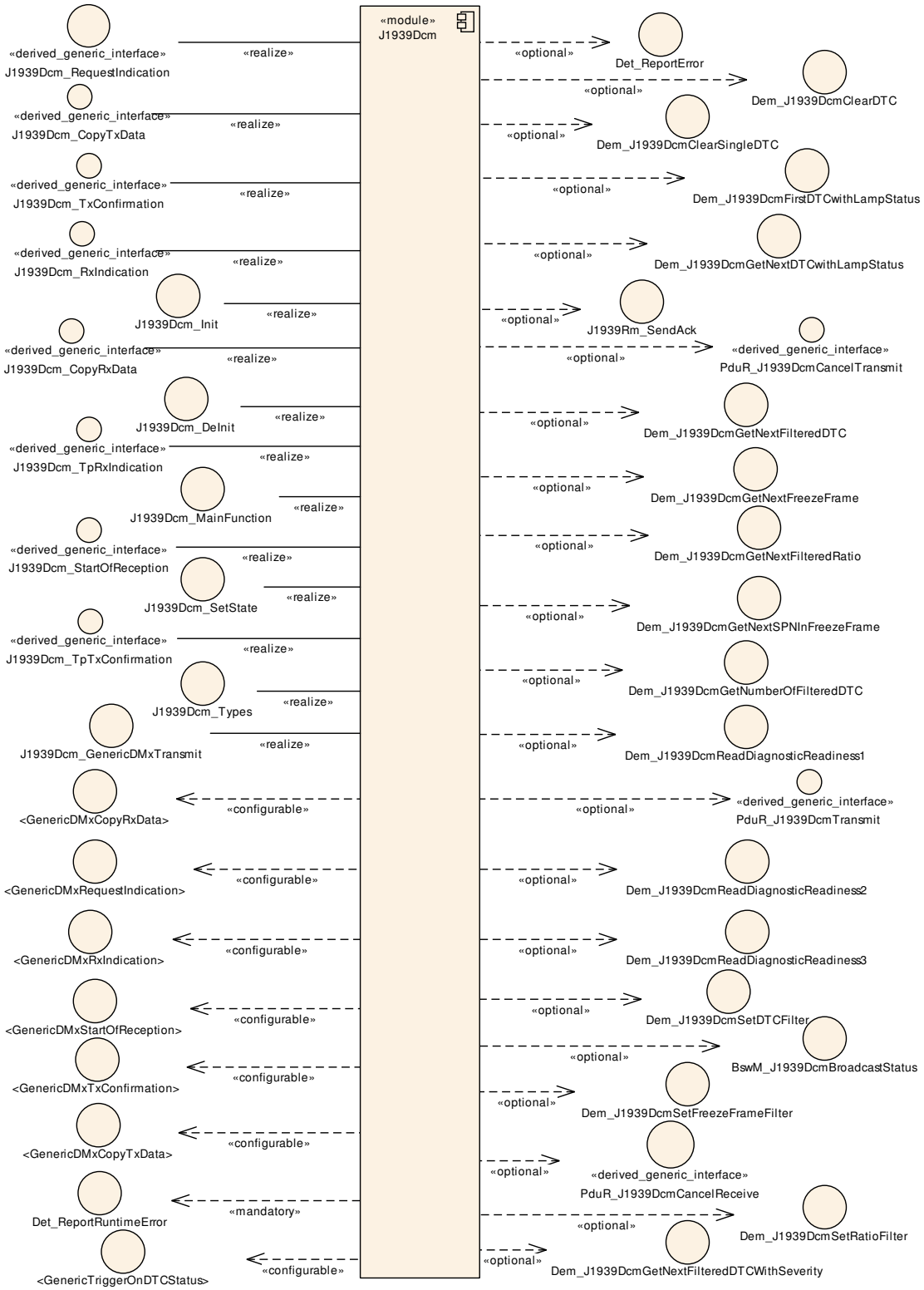


Figure 5.1: Module Dependencies of the J1939Dcm Module

6 Requirements Tracing

The following tables reference the requirements specified in [21, RS Diagnostics] (Requirements on Diagnostics) and [22, RS 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] [SWS_J1939Dcm_00239]
[RS_Diag_04113]	Support a set of SAE J1939 DM-messages	[SWS_J1939Dcm_00209] [SWS_J1939Dcm_00238] [SWS_J1939Dcm_00239]
[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_00240] [SWS_J1939Dcm_91001] [SWS_J1939Dcm_91002] [SWS_J1939Dcm_91003] [SWS_J1939Dcm_91004] [SWS_J1939Dcm_91005] [SWS_J1939Dcm_91006] [SWS_J1939Dcm_91007]
[SRS_BSW_00386]	The BSW shall specify the configuration and conditions for detecting an error	[SWS_J1939Dcm_00005] [SWS_J1939Dcm_00006] [SWS_J1939Dcm_00089] [SWS_J1939Dcm_00130] [SWS_J1939Dcm_00138] [SWS_J1939Dcm_00139] [SWS_J1939Dcm_00140] [SWS_J1939Dcm_00141] [SWS_J1939Dcm_00142] [SWS_J1939Dcm_00143] [SWS_J1939Dcm_00146] [SWS_J1939Dcm_00147] [SWS_J1939Dcm_00148] [SWS_J1939Dcm_00149] [SWS_J1939Dcm_00151] [SWS_J1939Dcm_00152] [SWS_J1939Dcm_00154] [SWS_J1939Dcm_00155] [SWS_J1939Dcm_00156] [SWS_J1939Dcm_00158] [SWS_J1939Dcm_00160] [SWS_J1939Dcm_00161] [SWS_J1939Dcm_00162] [SWS_J1939Dcm_00163] [SWS_J1939Dcm_00165] [SWS_J1939Dcm_00206] [SWS_J1939Dcm_00207] [SWS_J1939Dcm_00208]

Table 6.1: Requirements Tracing

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] DMx Supported by J1939Dcm

Upstream requirements: RS_Diag_04113

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

[SWS_J1939Dcm_00238] Supported DMx Messages

Upstream requirements: RS_Diag_04113

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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
DM22	C300	8	X	After Reception of DM22	Individual Clear/Reset of Active and Previously Active DTC

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Name	PGN (Hexadecimal)	Size	Received	Transmitted	Description
DM23	FDB5	Var.	-	On Request	Previously Active Emission Related Faults
DM24	FDB6	Var.	-	On Request	SPN Support
DM25	FDB7	Var.	-	On Request	Expanded Freeze Frame
DM26	FDB8	Var.	-	On Request	Diagnostic Readiness 3
DM28	FD80	Var.	-	On Request	Permanent DTCs
DM29	9E00	8	-	On Request	Regulated DTC Counts (Pending, Permanent, MIL-On, PMIL-On)
DM31	A300	Var.	-	On Request	DTC to Lamp Association
DM35	9F00	Var.	-	On Request	Immediate Fault Status
DM41	FD5F	Var.	-	On Request	DTCs – A, Pending
DM42	FD5E	Var.	-	On Request	DTCs – A, Confirmed and Active
DM43	FD5D	Var.	-	On Request	DTCs – A, Previously Active
DM44	FD5C	Var.	-	On Request	DTCs – B1, Pending
DM45	FD5B	Var.	-	On Request	DTCs – B1, Confirmed and Active
DM46	FD5A	Var.	-	On Request	DTCs – B1, Previously Active
DM47	FD59	Var.	-	On Request	DTCs – B2, Pending
DM48	FD58	Var.	-	On Request	DTCs – B2, Confirmed and Active
DM49	FD57	Var.	-	On Request	DTCs – B2, Previously Active
DM50	FD56	Var.	-	On Request	DTCs – C, Pending
DM51	FD55	Var.	-	On Request	DTCs – C, Confirmed and Active
DM52	FD54	Var.	-	On Request	DTCs – C, Previously Active
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

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[SWS_J1939Dcm_00204] Generic Handling of Requested DMx Messages

Upstream requirements: RS_Diag_04241

⌈If `J1939DcmGenericDMxSupport` is enabled, `Requests` for DMx messages that are not listed in [SWS_J1939Dcm_00238] or for which `J1939DcmDiagnosticMessageGenericHandling` is enabled 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`. If `J1939DcmDiagnosticMessageGenericHandling` is enabled, the usual `Request` processing shall be skipped.⌋

[SWS_J1939Dcm_00205] Generic Handling of Received DMx Messages

Upstream requirements: RS_Diag_04241

⌈If `J1939DcmGenericDMxSupport` is enabled, received DMx messages that are not listed in [SWS_J1939Dcm_00238] or for which `J1939DcmDiagnosticMessageGenericHandling` is enabled shall be forwarded to the application using the callbacks configured via `J1939DcmGenericDMxStartOfReceptionFunction`,

J1939DcmGenericDMxCopyRxDataFunction, and J1939DcmGenericDMxRxIndicationFunction. If J1939DcmDiagnosticMessageGenericHandling is enabled, the usual DMx processing shall be skipped.⌋

[SWS_J1939Dcm_00240] Generic Handling of DTC Status Change for DM01

Upstream requirements: RS_Diag_04241

⌈If J1939DcmGenericDMxSupport is enabled and J1939DcmDiagnosticMessageGenericHandling is enabled for DM01, J1939Dcm shall forward calls to J1939Dcm_DemTriggerOnDTCStatus for the corresponding J1939DcmNode directly to the application using the callback configured via J1939DcmTriggerOnDTCStatusFunction, skipping the usual DM01 processing.⌋

[SWS_J1939Dcm_00193] TP API and IF API ⌈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_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]

Upstream requirements: SRS_BSW_00386

⌈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]

Upstream requirements: SRS_BSW_00386

⌈On errors and exceptions, the J1939Dcm 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 [SWS_J1939Dcm_00238]).

[SWS_J1939Dcm_00091] ⌈The configured DMx messages in J1939Dcm shall match the J1939RmUserRequestPGN configured for a J1939RmDcmUser in J1939Rm.⌋

[SWS_J1939Dcm_00006]

Upstream requirements: SRS_BSW_00386

⌈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 Chapter 7.7.1 for DM01 and Chapter 7.7.21 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]

Upstream requirements: RS_Diag_04112

⌈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.⌋

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.

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[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] Filter Criteria for Diagnostic Messages ⌈

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

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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
DM41	DTCs – A, Pending	DEM_J1939DTC_PENDING	DEM_DTC_KIND_WWHOBD_CLASS_A	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM42	DTCs – A, Confirmed and Active	DEM_J1939DTC_ACTIVE	DEM_DTC_KIND_WWHOBD_CLASS_A	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM43	DTCs – A, Previously Active	DEM_J1939DTC_PREVIOUSLY_ACTIVE	DEM_DTC_KIND_WWHOBD_CLASS_A	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM44	DTCs – B1, Pending	DEM_J1939DTC_PENDING	DEM_DTC_KIND_WWHOBD_CLASS_B1	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM45	DTCs – B1, Confirmed and Active	DEM_J1939DTC_ACTIVE	DEM_DTC_KIND_WWHOBD_CLASS_B1	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM46	DTCs – B1, Previously Active	DEM_J1939DTC_PREVIOUSLY_ACTIVE	DEM_DTC_KIND_WWHOBD_CLASS_B1	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM47	DTCs – B2, Pending	DEM_J1939DTC_PENDING	DEM_DTC_KIND_WWHOBD_CLASS_B2	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM48	DTCs – B2, Confirmed and Active	DEM_J1939DTC_ACTIVE	DEM_DTC_KIND_WWHOBD_CLASS_B2	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM49	DTCs – B2, Previously Active	DEM_J1939DTC_PREVIOUSLY_ACTIVE	DEM_DTC_KIND_WWHOBD_CLASS_B2	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM50	DTCs – C, Pending	DEM_J1939DTC_PENDING	DEM_DTC_KIND_WWHOBD_CLASS_C	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM51	DTCs – C, Confirmed and Active	DEM_J1939DTC_ACTIVE	DEM_DTC_KIND_WWHOBD_CLASS_C	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM52	DTCs – C, Previously Active	DEM_J1939DTC_PREVIOUSLY_ACTIVE	DEM_DTC_KIND_WWHOBD_CLASS_C	DEM_DTC_ORIGIN_PRIMARY_MEMORY
DM53	Active Service Only DTCs	DEM_J1939DTC_ACTIVE	DEM_DTC_KIND_ALL_DTCS	Origin definition from J1939DcmService-OnlyDTCsMemory-DestinationRef
DM54	Previously Active Service Only DTCs	DEM_J1939DTC_PREVIOUSLY_ACTIVE	DEM_DTC_KIND_ALL_DTCS	Origin definition from J1939DcmService-OnlyDTCsMemory-DestinationRef

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[SWS_J1939Dcm_00010] Set Filter for "Status Sequence" ⌈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] Retrieving the Lamp Status ⌈In case the Dem_J1939DcmSetDTCFilter 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, wherefore no rearrangement is required by J1939Dcm.

[SWS_J1939Dcm_00012] Negative Acknowledgement for Failed "Status Sequence" ⌈In case the Dem_J1939DcmSetDTCFilter 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 continues the sequence by subsequently calling Dem_J1939DcmGetNextFilteredDTC or, for DM01, Dem_J1939DcmGetNextFilteredDTCWithSeverity, until the returned value is DEM_NO_SUCH_ELEMENT.

The calls may be distributed over several calls of J1939Dcm_MainFunction.

[SWS_J1939Dcm_00015] Continued Retrieval of DTCs ⌈The J1939 Diagnostic Communication Manager shall continue the sequence by subsequently calling Dem_J1939DcmGetNextFilteredDTC or, for DM01, Dem_J1939DcmGetNextFilteredDTCWithSeverity, until either the maximum sequence counter threshold per MainFunction J1939DcmMaxDTCsPerMainFunction is reached or the returned value is DEM_PENDING. In the latter case, the execution is postponed to the next J1939Dcm_MainFunction call.⌋

[SWS_J1939Dcm_00014] Retrieving the DTC and OC ⌈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_00244] Sorting of Retrieved DTCs of DM01 ⌈If the return value is DEM_NO_SUCH_ELEMENT and the requested diagnostic message is DM01, the J1939 Diagnostic Communication Manager shall sort the collected DTCs according to their severity levels in the following order:

1. DEM_SEVERITY_CHECK_IMMEDIATELY
2. DEM_SEVERITY_CHECK_AT_NEXT_HALT
3. DEM_SEVERITY_MAINTENANCE_ONLY
4. DEM_SEVERITY_NO_SEVERITY

⌋

[SWS_J1939Dcm_00016] Transmit Result of "DTC status" Sequence ⌈For all diagnostic messages that use the "DTC status" sequence, 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 meta data) according to the source address of the request, or to 0xFF (broadcast) for spontaneous DM01 messages and when the destination address of the request was 0xFF.⌋

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_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 FREEZEFRAME or EXPANDED_FREEZEFRAME

This FreezeFrameKind is used by DM04 and DM25.

[SWS_J1939Dcm_00201] ⌈In case the 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 meta data) according to the source address of the request, or to 0xFF when the destination address of the request was 0xFF.⌋

7.6.2.2 FreezeFrameKind equals SPNS_IN_EXPANDED_FREEZEFRAME

This FreezeFrameKind is used by DM24.

[SWS_J1939Dcm_00202] ⌈In case the 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 SPNSupported and SPNDataLength shall be encoded into the response message layout according to SAE J1939-73 and the bit 1 “Supported in Expanded Freeze Frame” in “SPN support type” shall be set to 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 meta data) according to the source address of the request, or to 0xFF when the destination address of the request was 0xFF.⌋

[SWS_J1939Dcm_00165]

Upstream requirements: SRS_BSW_00386

⌈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 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 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 Denominator 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 meta data) according to the source address of the request, or to 0xFF when the destination address 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). All other DTCs are considered to be stored in the primary fault memory (Dem_DTCOriginType with DEM_DTC_ORIGIN_PRIMARY_MEMORY).

[SWS_J1939Dcm_00177]

Upstream requirements: RS_Diag_04112

⌈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.⌋

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 Chapter 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 $1\,s$ 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 Chapter 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 Chapter 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 Chapter 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 Chapter 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 meta data) set according to the source address of the request, or to 0xFF when the destination address 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 Chapter 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]

Upstream requirements: RS_Diag_04112

⌈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.⌋

[SWS_J1939Dcm_00049]

Upstream requirements: RS_Diag_04112

⌈If 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) in the next call of J1939Dcm_MainFunction.⌋

[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 Chapter 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 signal 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 J1939 Dcm 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 meta data) according to the source address of the request, or to 0xFF when the destination address 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 meta data) according to the source address of the request, or to 0xFF when the destination address 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 Chapter 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 meta data) to the source address of the request, or to 0xFF when the destination address 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 Individual Clear/Reset of Active and Previously Active DTC (DM22)

The DM22 message clears an individual active or previously active DTC.

[SWS_J1939Dcm_00241] Reception of DM22 ⌈On reception of DM22 command message via call of J1939Dcm_RxIndication with parameter RxPduId set to the configured J1939DcmRxPduId, the J1939 Diagnostic Communication Manager shall trigger Dem_J1939DcmClearSingleDTC with the parameter DTCTypeFilter set according to the received control byte, J1939DTC set to the received SPN and

FMI, DTCOrigin set to DEM_DTC_ORIGIN_PRIMARY_MEMORY, and ClientId to the node corresponding to the used destination address./⌋

Please note: In case the destination address of the received message is 0xFF, Dem_J1939DcmClearSingleDTC shall be called for each suitable J1939DcmNode in turn.

[SWS_J1939Dcm_00242] Repetition of DTC clearing ⌈If Dem_J1939DcmClearSingleDTC returns DEM_PENDING, the J1939 Diagnostic Communication Manager shall retrigger Dem_J1939DcmClearSingleDTC in the next call of J1939Dcm_MainFunction./⌋

[SWS_J1939Dcm_00243] Response of DM22 ⌈If Dem_J1939DcmClearSingleDTC returns any other value than DEM_PENDING, the J1939 Diagnostic Communication Manager shall call PduR_J1939DcmTransmit to transmit the response message with the control byte set according to the returned value and the received control byte, and the received SPN and FMI./⌋

Please note: In case the destination address of the received message was 0xFF, PduR_J1939DcmTransmit shall be called for each suitable J1939DcmDiagnosticMessageSupport in turn.

7.7.14 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 Chapter 7.6.1.

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

7.7.15 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 Chapter 7.6.2.

7.7.16 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 Chapter 7.6.2.

7.7.17 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 meta data) set according to the source address of the request, or to 0xFF when the destination address 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]).⌋

7.7.18 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 Chapter 7.6.1.

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

7.7.19 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] Response Message Structure of DM29 ⌈

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		

⌋

[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.⌋

7.7.20 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 meta data) according to the source address of the request, or to 0xFF when the destination address of the request was 0xFF.⌋

7.7.21 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 $1\,s$ 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 Chapter 7.6.1.

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

7.7.22 Harmonized Failure Classification DTC Reporting (DM41 – DM52)

[SWS_J1939Dcm_00239] Support of DM41 up to DM52

Upstream requirements: RS_Diag_04112, RS_Diag_04113

⌈On reception of request for DM41, DM42, DM43, DM44, DM45, DM46, DM47, DM48, DM49, DM50, DM51, and DM52, 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].⌋

7.7.23 Active Service Only DTCs (DM53)

The DM53 message reports active service only DTCs.

[SWS_J1939Dcm_00178]

Upstream requirements: RS_Diag_04112

⌈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].⌋

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

[SWS_J1939Dcm_00179]

Upstream requirements: RS_Diag_04112

⌈The return values J1939DTC and OccurenceCounter shall be encoded into the DM53 layout according to SAE J1939-73.⌋

7.7.24 Previously Active Service Only DTCs (DM54)

The DM54 message reports previously active service only DTCs.

[SWS_J1939Dcm_00180]

Upstream requirements: RS_Diag_04112

⌈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 DTCStatus-Filter, DTCOrigin, and DTCKind set according to the corresponding table columns in [SWS_J1939Dcm_00236].⌋

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

[SWS_J1939Dcm_00181]

Upstream requirements: RS_Diag_04112

⌈The return values J1939DTC and OccurenceCounter shall be encoded into the DM54 layout according to SAE J1939-73.⌋

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

The DM55 message clears all service only DTCs.

[SWS_J1939Dcm_00182]

Upstream requirements: RS_Diag_04112

⌈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.⌋

[SWS_J1939Dcm_00183]

Upstream requirements: RS_Diag_04112

⌈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`.⌋

[SWS_J1939Dcm_00184]

Upstream requirements: RS_Diag_04112

⌈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`.⌋

[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

Chapter [19, General Specification of Basic Software Modules] Chapter 7.2 *"Error Handling"* describes the error handling of the `Basic Software` in detail. Above all, it constitutes a classification scheme consisting of following 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] Definition 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 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] Definition of runtime errors in module J1939Dcm ⌈

Type of error	*Related error code*	*Error value*
API service called with or in a wrong state	J1939DCM_E_INVALID_STATE	0x06
Buffer too small	J1939DCM_E_BUFFER_TOO_SMALL	0x0E

⌋

7.8.3 Production Errors

There are no 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*
Comtype	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
	Dem_J1939Dcm.h	Dem_J1939DcmDTCSeverityType
	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

⌋

The types that are declared in ComStack_Types.h (Module Comtype) are defined in [23, SWS Communication Stack Types], while the types declared in Std_Types.h (Module Std) are defined in [24, 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 chapter contains all APIs provided by the module.

8.3.1 Generally Available Functions

This chapter contains all APIs which are provided by the module via `J1939Dcm.h`.

8.3.1.1 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 Chapter 7.2.1 for details.

8.3.1.2 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 Chapter 7.2.1 for details.

8.3.1.3 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 J1939 Dcm_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]

Upstream requirements: SRS_BSW_00386

⌈The J1939 Diagnostic Communication Manager shall reject the state change by returning E_NOT_OK when the newState is not in the valid range, and shall report the runtime error J1939DCM_E_INVALID_STATE.⌋

[SWS_J1939Dcm_00147]

Upstream requirements: SRS_BSW_00386

⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_SetState shall check if the node parameter is configured (J1939DcmNm-NodeRef). 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]

Upstream requirements: SRS_BSW_00386

⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_SetState shall check if the channel parameter is configured (J1939 DcmDiagnosticMessageSupportChannelRef) 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 J1939 DCM_E_INVALID_CHANNEL.⌋

8.3.1.4 J1939Dcm_GenericDMxTransmit

[SWS_J1939Dcm_91007] Definition of API function J1939Dcm_GenericDMx Transmit

Upstream requirements: RS_Diag_04241

⌈

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	

⌋

[SWS_J1939Dcm_00206]

Upstream requirements: RS_Diag_04241, SRS_BSW_00386

⌈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`.⌋

The currently supported `diagnostic messages` are listed in [SWS_J1939Dcm_00238].

[SWS_J1939Dcm_00207]

Upstream requirements: RS_Diag_04241, SRS_BSW_00386

⌈If the configuration parameter `J1939DcmDevErrorDetect` is enabled, the function `J1939Dcm_GenericDMxTransmit` 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.⌋

[SWS_J1939Dcm_00208]

Upstream requirements: RS_Diag_04241, SRS_BSW_00386

⌈If the configuration parameter J1939DcmDevErrorDetect is enabled, the function J1939Dcm_GenericDMxTransmit 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.⌋

8.3.1.5 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.
	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]

Upstream requirements: SRS_BSW_00386

⌈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, and shall report the runtime error J1939DCM_E_INVALID_STATE.⌋

[SWS_J1939Dcm_00149]

Upstream requirements: SRS_BSW_00386

⌈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.

8.3.1.6 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]

Upstream requirements: SRS_BSW_00386

⌈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, and shall report the runtime error `J1939DCM_E_INVALID_STATE`.⌋

[SWS_J1939Dcm_00151]

Upstream requirements: SRS_BSW_00386

⌈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`.⌋

8.3.1.7 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 successfully. `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]

Upstream requirements: SRS_BSW_00386

⌈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]), and shall report the runtime error `J1939DCM_E_INVALID_STATE`.⌋

[SWS_J1939Dcm_00162]

Upstream requirements: SRS_BSW_00386

⌈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]

Upstream requirements: SRS_BSW_00386

⌈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, and shall report the runtime error `J1939DCM_E_INVALID_STATE`.⌋

8.3.1.8 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

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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	

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[SWS_J1939Dcm_00140]

Upstream requirements: SRS_BSW_00386

⌈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, and shall report the runtime error J1939DCM_E_INVALID_STATE.⌋

[SWS_J1939Dcm_00152]

Upstream requirements: SRS_BSW_00386

⌈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]

Upstream requirements: SRS_BSW_00386

⌈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 without any effect, and shall report the runtime error 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.⌋

8.3.1.9 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]

Upstream requirements: SRS_BSW_00386

⌈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, and shall report the runtime error J1939DCM_E_INVALID_STATE.⌋

[SWS_J1939Dcm_00154]

Upstream requirements: SRS_BSW_00386

⌈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.⌋

8.3.1.10 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 successfully. 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 reception was successful or not.	
Available via	J1939Dcm.h	

⌋

[SWS_J1939Dcm_00142]

Upstream requirements: SRS_BSW_00386

⌈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, and shall report the runtime error J1939DCM_E_INVALID_STATE.⌋

[SWS_J1939Dcm_00156]

Upstream requirements: SRS_BSW_00386

⌈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`.⌋

8.3.1.11 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]

Upstream requirements: SRS_BSW_00386

⌈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`, and shall report the runtime error `J1939DCM_E_INVALID_STATE`.⌋

[SWS_J1939Dcm_00158]

Upstream requirements: SRS_BSW_00386

⌈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`.⌋

8.3.1.12 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 successfully. `E_NOT_OK`: Transmission of the PDU failed.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	

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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]

Upstream requirements: SRS_BSW_00386

⌈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]

Upstream requirements: SRS_BSW_00386

⌈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, and shall report the runtime error `J1939DCM_E_INVALID_STATE`.⌋

8.3.2 Functions Provided for DEM

This chapter contains all APIs which are provided to DEM via the private module header (`J1939Rm_Dem.h`).

8.3.2.1 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.

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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

⌋

8.4 Scheduled Functions

This function is directly called by the Basic Software Scheduler (SchM).

8.4.1 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.⌋

8.5 Expected Interfaces

This section lists all interfaces required from other modules.

8.5.1 Mandatory Interfaces

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

[SWS_J1939Dcm_00199] Definition of mandatory interfaces required by 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.

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8.5.2 Optional Interfaces

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

[SWS_J1939Dcm_00132] Definition of optional interfaces requested by 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_J1939DcmClearSingleDTC	Dem_J1939Dcm.h	Clears the status of all event(s) related to the specified DTC, 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_J1939DcmGetNextFiltered DTCWithSeverity	Dem_J1939Dcm.h	Gets the next filtered J1939 DTC and its severity.
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.

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API Function	*Header File*	*Description*
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`.

8.5.3 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 interface is not fixed because they are configurable.

8.5.3.1 <GenericDMxRequestIndication>

[SWS_J1939Dcm_91001] Definition of configurable interface <GenericDMxRequestIndication>

Upstream requirements: RS_Diag_04241

⌈

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	

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8.5.3.2 <GenericDMxCopyTxData>

[SWS_J1939Dcm_91005] Definition of configurable interface <GenericDMxCopyTxData>

Upstream requirements: RS_Diag_04241

⌈

Service Name	<GenericDMxCopyTxData>	

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

Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	dmId	Number of the J1939 diagnostic message

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	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	

⌋

8.5.3.3 <GenericDMxTxConfirmation>

[SWS_J1939Dcm_91003] Definition of configurable interface <GenericDMxTx Confirmation>

Upstream requirements: RS_Diag_04241

⌈

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	

⌋

8.5.3.4 <GenericDMxStartOfReception>

[SWS_J1939Dcm_91004] Definition of configurable interface <GenericDMxStart OfReception>

Upstream requirements: RS_Diag_04241

⌈

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.

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	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.
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	

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8.5.3.5 <GenericDMxCopyRxData>

[SWS_J1939Dcm_91002] Definition of configurable interface <GenericDMxCopyRxData>

Upstream requirements: RS_Diag_04241

⌈

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	

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8.5.3.6 <GenericDMxRxIndication>

[SWS_J1939Dcm_91006] Definition of configurable interface <GenericDMxRxIndication>

Upstream requirements: RS_Diag_04241

⌈

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	`E_OK`: The diagnostic message was received successfully. `E_NOT_OK`: Reception of the diagnostic message failed.
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	

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8.5.3.7 <GenericTriggerOnDTCStatus>

[SWS_J1939Dcm_91011] Definition of configurable interface <GenericTriggerOnDTCStatus> ⌈

Service Name	<GenericTriggerOnDTCStatus>	
Syntax	`void <GenericTriggerOnDTCStatus> ( uint32 DTC, uint8 ClientId )`	
Sync/Async	Synchronous	
Reentrancy	Reentrant 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.h	

⌋

8.6 Service Interfaces

8.6.1 Client-Server Interfaces

8.6.1.1 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_OK	Operation failed
	2	E_NEXT	E_NEXT is used if the CVN calculation is finished, but not all CVNs returned yet.
	3	E_NOT_READY	E_NOT_READY is used if the CVN calculation is not finished yet. The tool needs to send the request again.

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

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8.6.2 Sender-Receiver Interfaces

8.6.2.1 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)

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8.6.3 Implementation Data Types

8.6.3.1 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		

⌋

8.6.4 Ports

8.6.4.1 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		

⌋

8.6.4.2 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/J1939 DcmModeCondition.SHORT-NAME)}		

⌋

8.6.4.3 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/J1939 DcmModeCondition.SHORT-NAME)}

⌋

9 Sequence Diagrams

This version of the SWS J1939Dcm 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 [19, SWS BSW General] Chapter 10.1 *"Introduction to configuration specification"*. For details about published information of the J1939 Diagnostic Communication Manager, refer to [19, SWS BSW General] Chapter 10.3 *"Published Information"*.

The Chapter 10.1 specifies the structure (containers) and the parameters of the J1939 Dcm.

10.1 Containers and Configuration Parameters

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

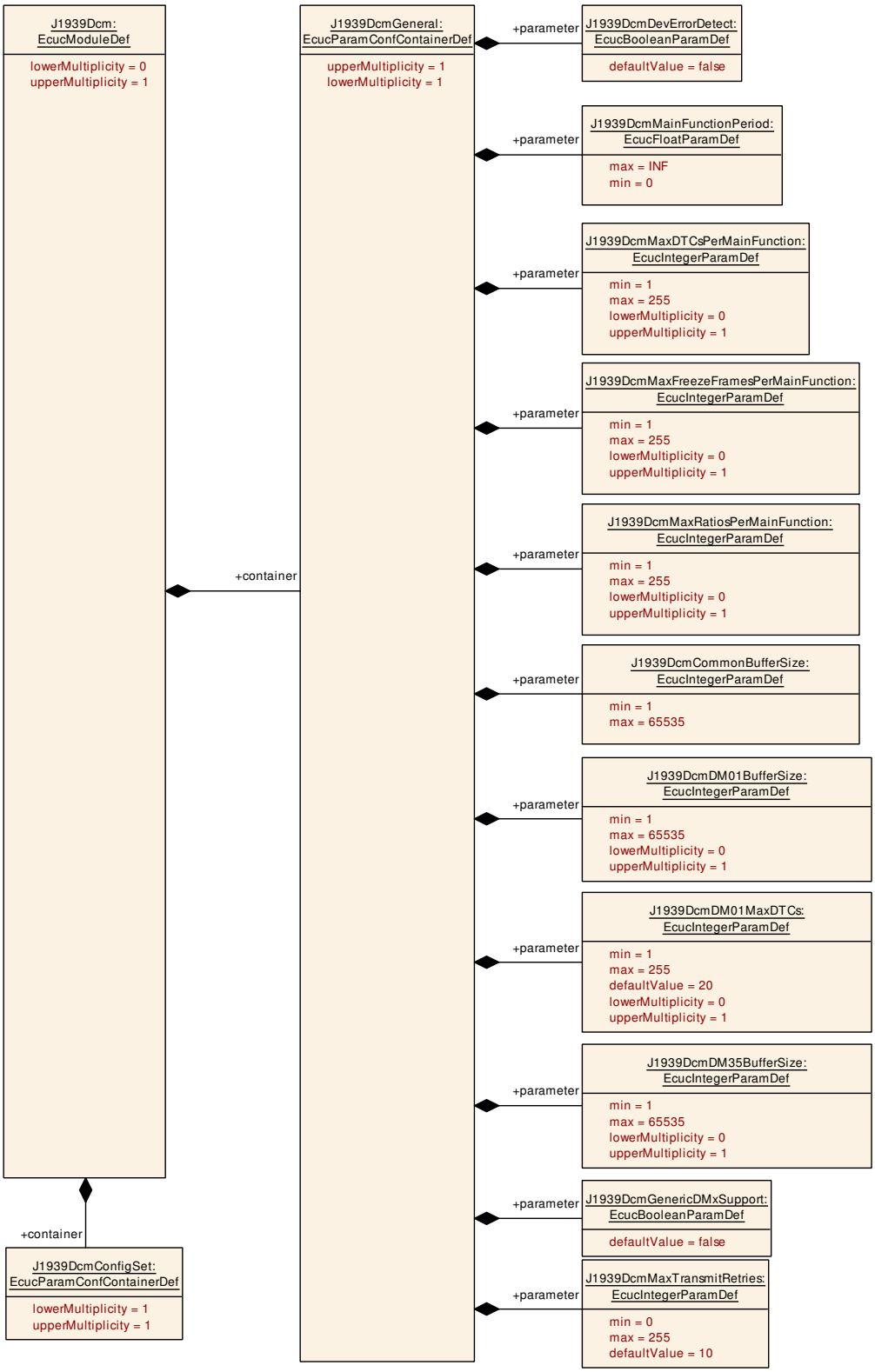


Figure 10.1: Module Configuration

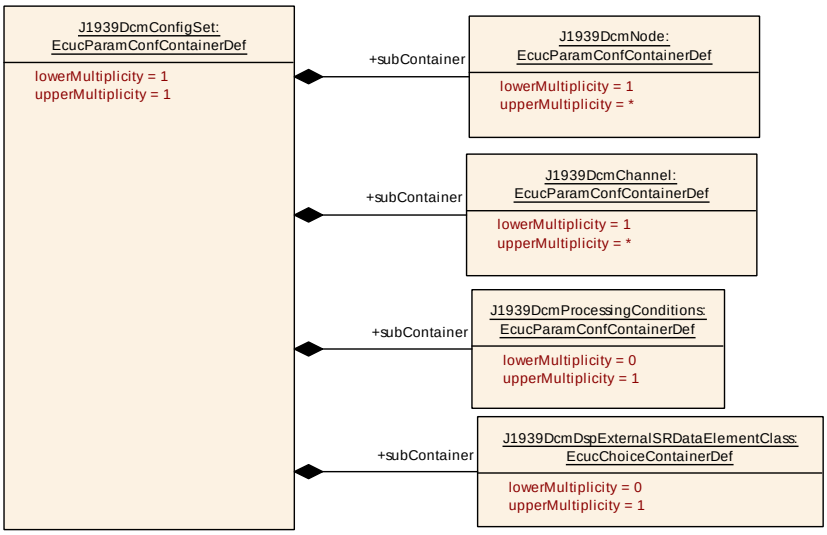


Figure 10.2: Configuration Set

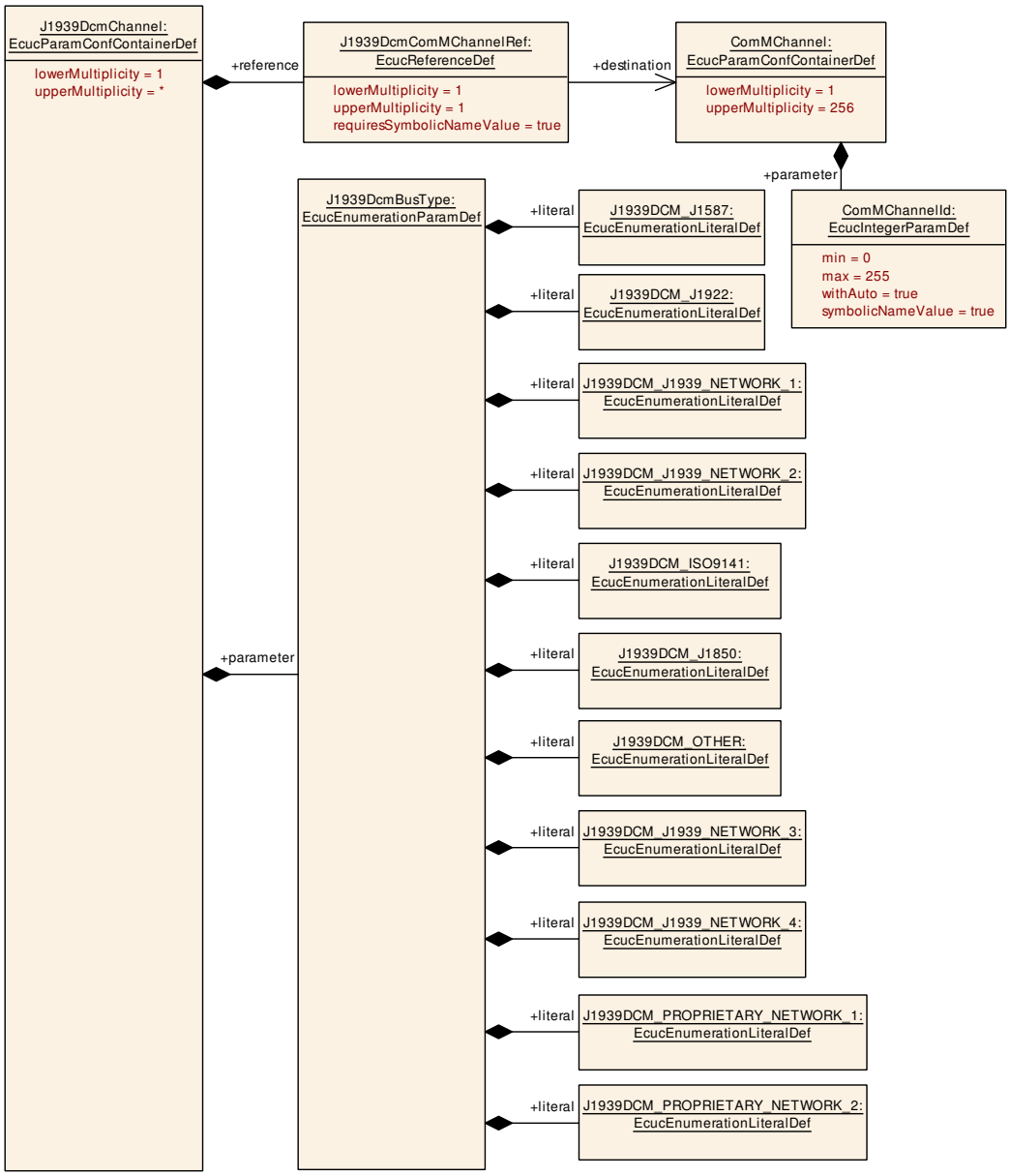


Figure 10.3: Configuration of Channels

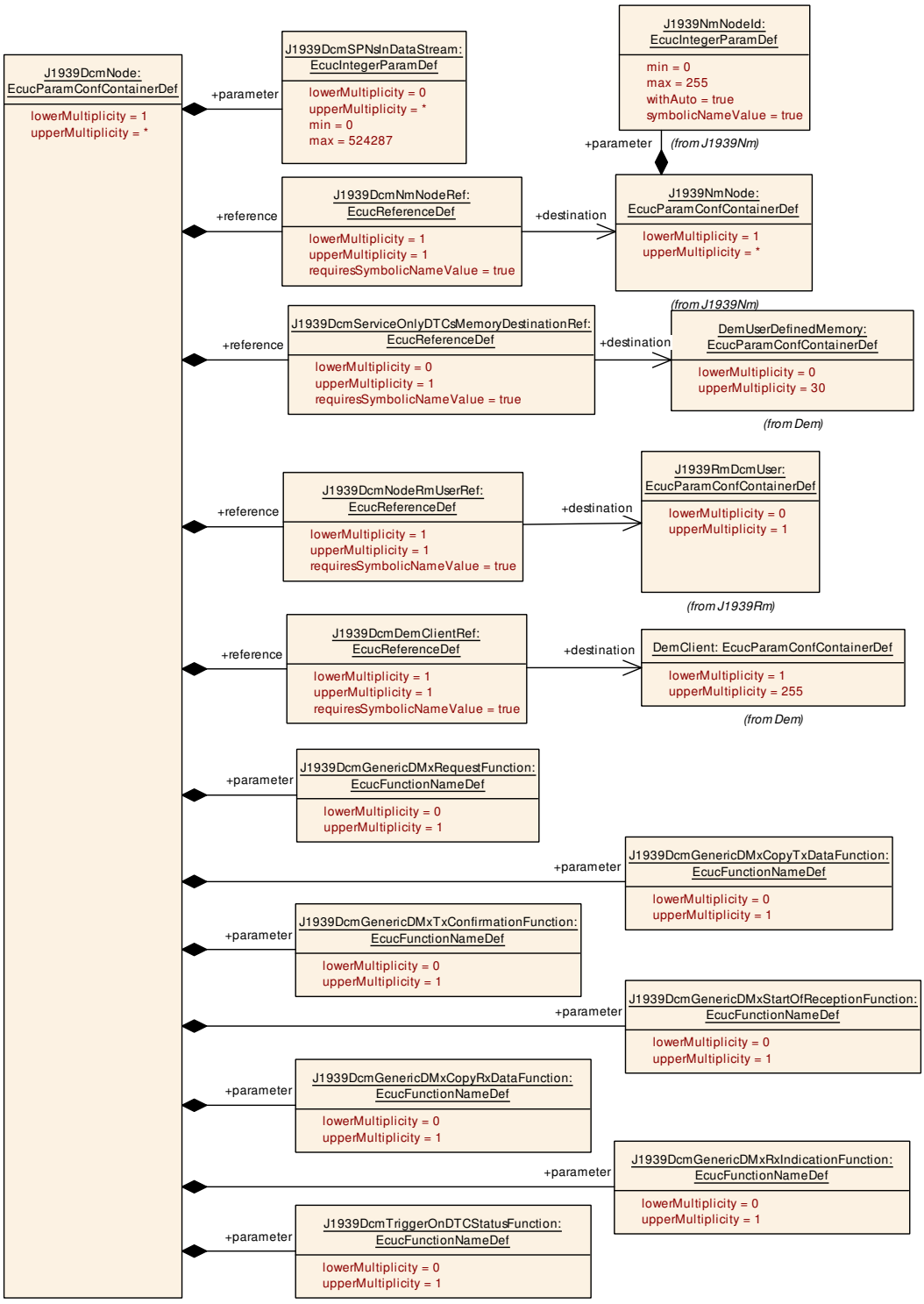


Figure 10.4: Configuration of Nodes - Part 1

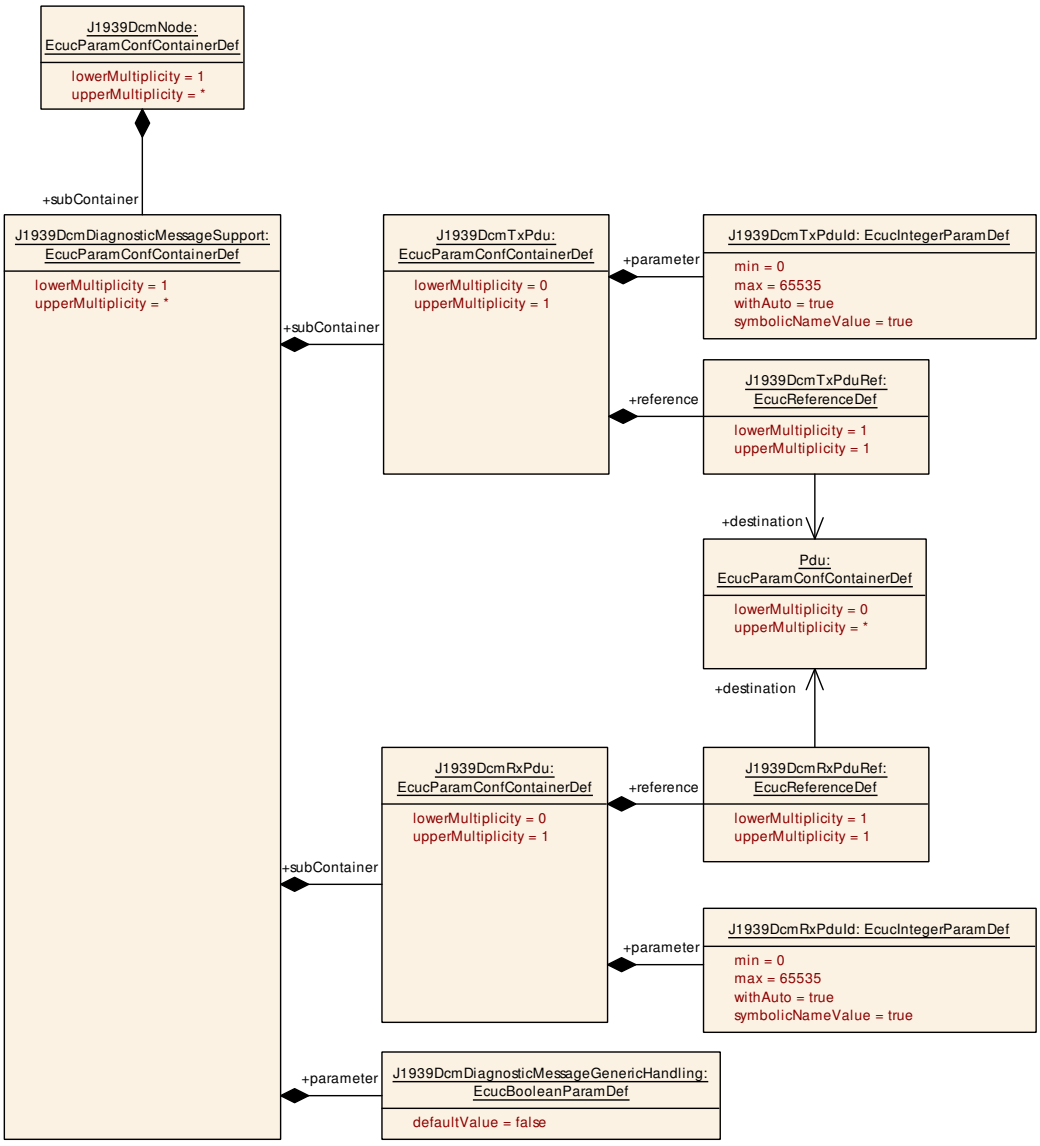


Figure 10.5: Configuration of Nodes - Part 2

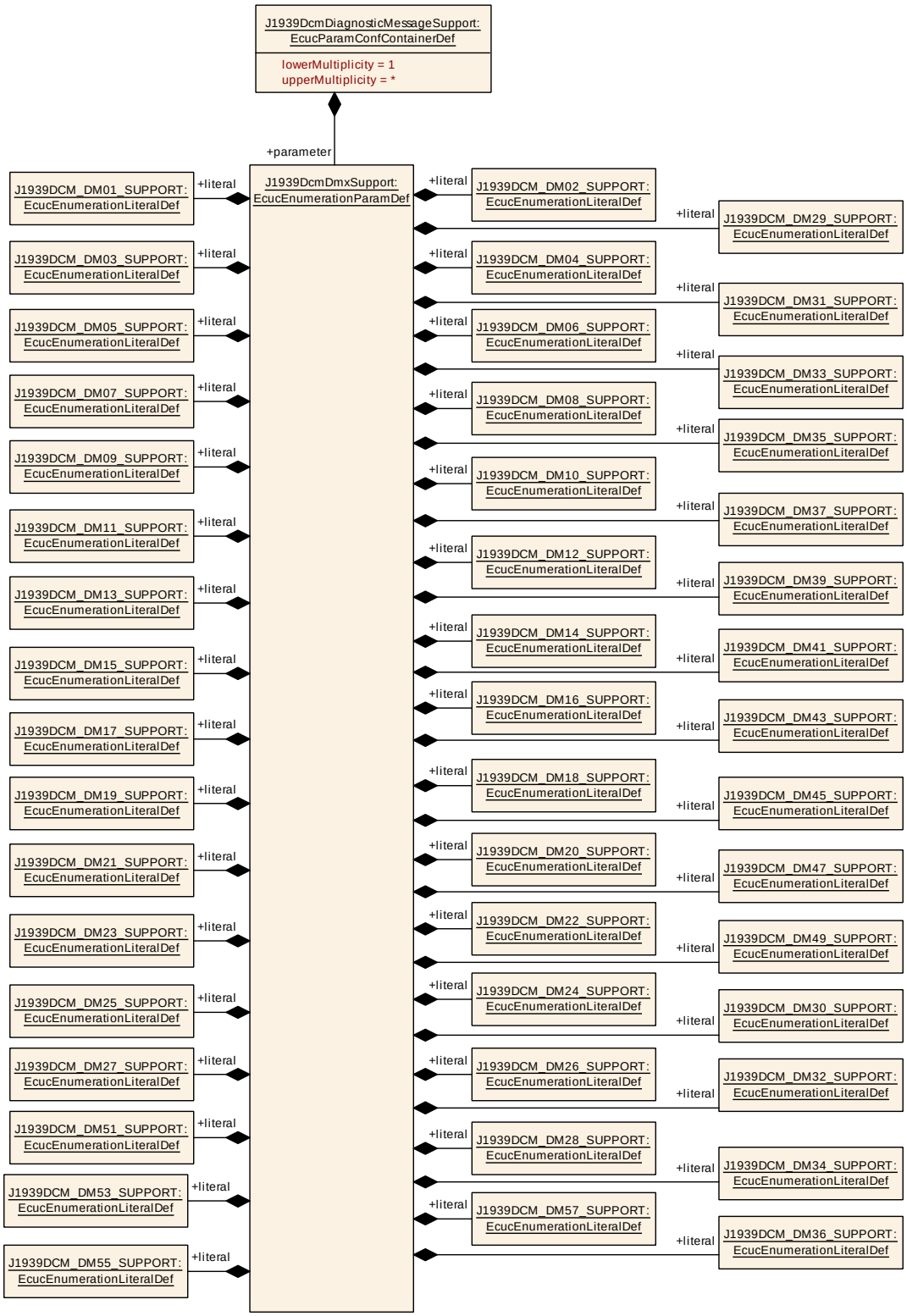


Figure 10.6: Configuration of Diagnostic Messages - Part 1

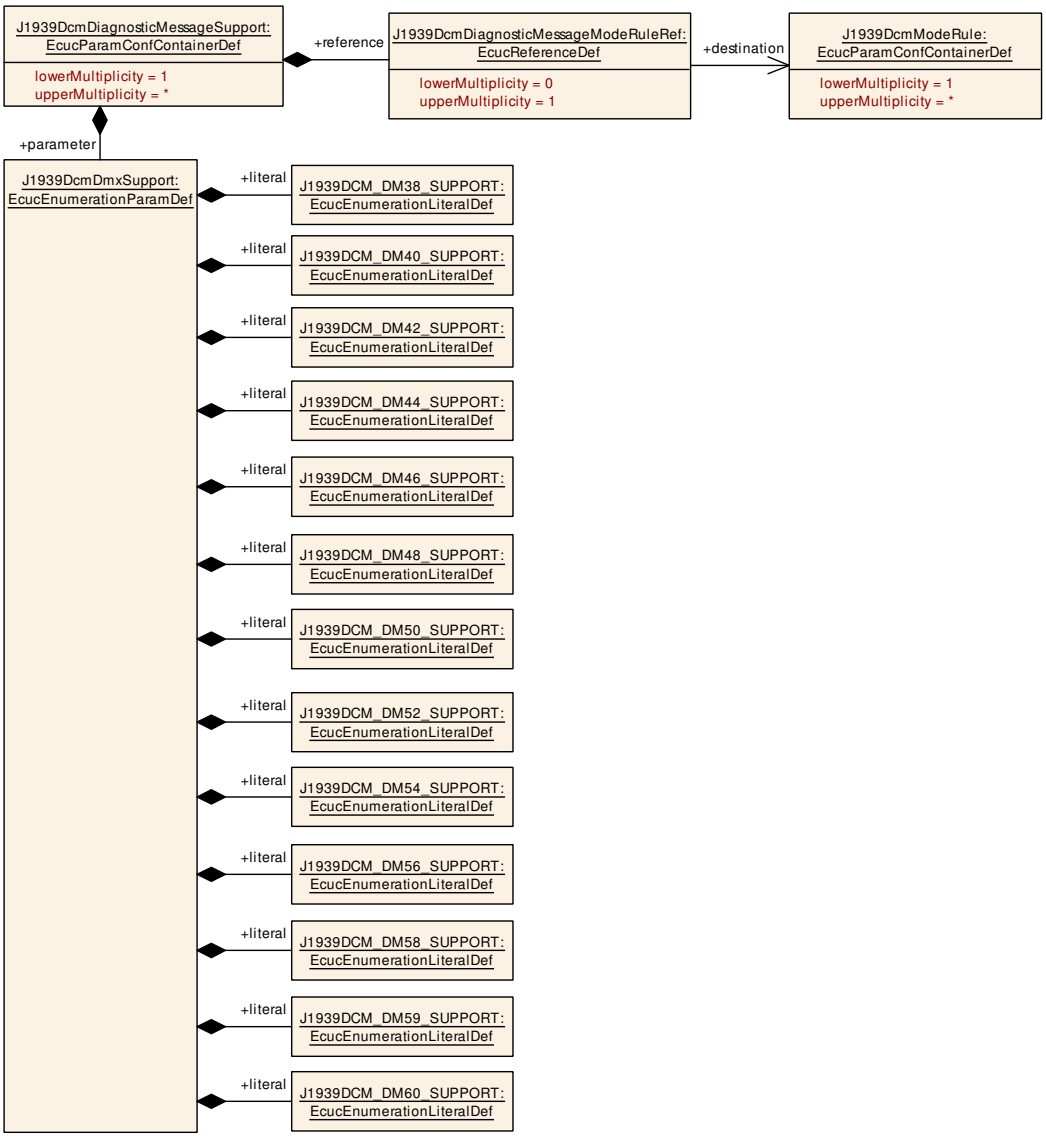


Figure 10.7: Configuration of Diagnostic Messages - Part 2

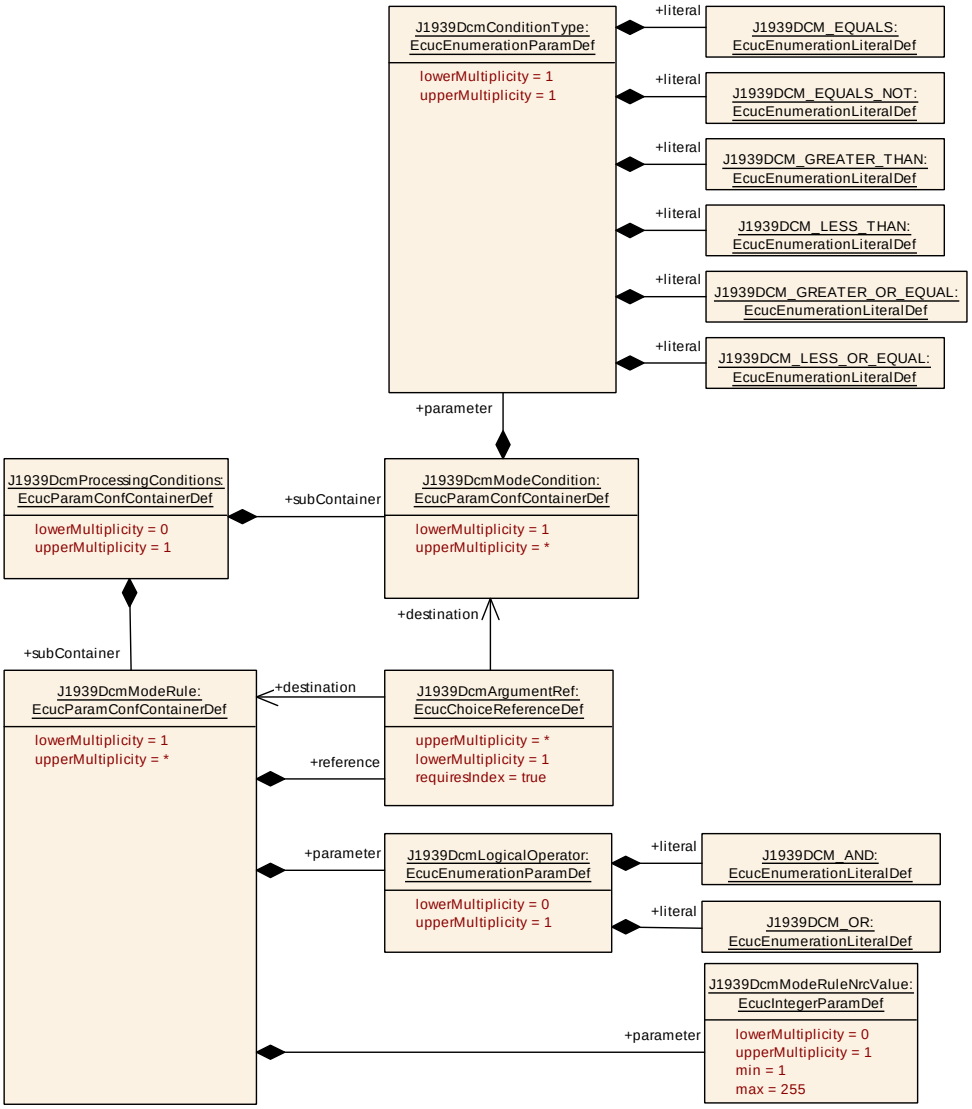


Figure 10.8: Configuration of Processing Conditions - Part 1

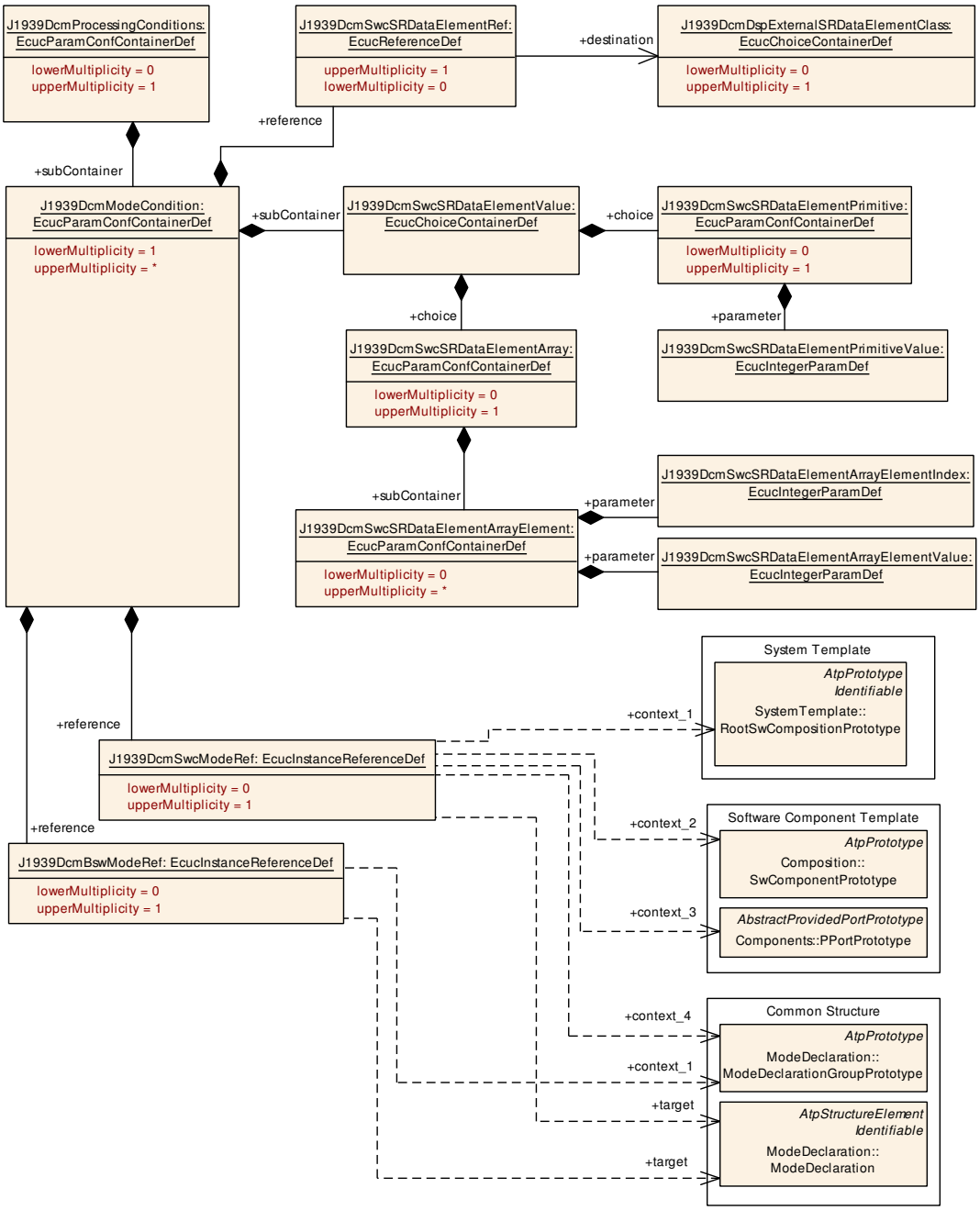


Figure 10.9: Configuration of Processing Conditions - Part 2

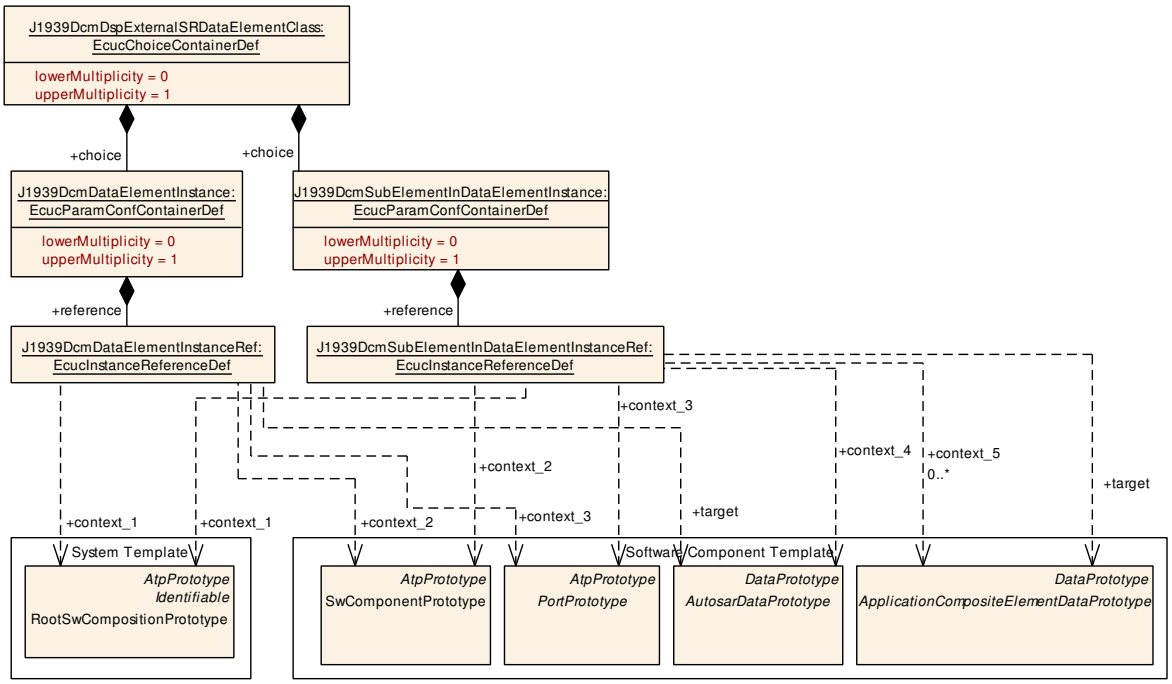


Figure 10.10: Configuration of External Data Element Class

10.1.1 J1939Dcm

[ECUC_J1939Dcm_00005] Definition of EcucModuleDef J1939Dcm ⌈

Module Name	J1939Dcm
Description	The SAE J1939 Dcm module
Post-Build Selectable Support	true
Post-Build Loadable Support	true

Included Containers		
Container Name	**Multiplicity**	**Description**
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

[ECUC_J1939Dcm_00001] Definition of EcucParamConfContainerDef J1939Dcm General ⌈

Container Name	J1939DcmGeneral
Parent Container	J1939Dcm
Upstream mapping defined	–
Description	Contains the general configuration parameters of the module.
Multiplicity	1
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmCommonBufferSize	1	[ECUC_J1939Dcm_00040]
J1939DcmDevErrorDetect	1	[ECUC_J1939Dcm_00003]
J1939DcmDM01BufferSize	0..1	[ECUC_J1939Dcm_00041]
J1939DcmDM01MaxDTCs	0..1	[ECUC_J1939Dcm_00050]
J1939DcmDM35BufferSize	0..1	[ECUC_J1939Dcm_00073]
J1939DcmGenericDMxSupport	1	[ECUC_J1939Dcm_00081]
J1939DcmMainFunctionPeriod	1	[ECUC_J1939Dcm_00004]
J1939DcmMaxDTCsPerMainFunction	0..1	[ECUC_J1939Dcm_00006]
J1939DcmMaxFreezeFramesPerMainFunction	0..1	[ECUC_J1939Dcm_00007]
J1939DcmMaxRatiosPerMainFunction	0..1	[ECUC_J1939Dcm_00008]
J1939DcmMaxTransmitRetries	1	[ECUC_J1939Dcm_00088]

No Included Containers

⌋

[ECUC_J1939Dcm_00040] Definition of EcucIntegerParamDef J1939DcmCommonBufferSize ⌈

Parameter Name	J1939DcmCommonBufferSize	
Parent Container	J1939DcmGeneral	
Upstream mapping defined	–	
Description	Size of common buffer (in Bytes). The buffer size should be as large as the longest command or response message. This buffer will not be used if only the diagnostic messages DM01 and DM35 are configured, because these messages have separate buffers configured via J1939Dcm DM01BufferSize and J1939DcmDM35BufferSize.	
Multiplicity	1	
Type	EcucIntegerParamDef	
Range	1 .. 65535	
Default value	–	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00003] Definition of EcucBooleanParamDef J1939DcmDevErrorDetect ⌈

Parameter Name	J1939DcmDevErrorDetect
Parent Container	J1939DcmGeneral
Upstream mapping defined	–
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
Default value	false
Pre-Compile only	true

⌋

[ECUC_J1939Dcm_00041] Definition of EcucIntegerParamDef J1939DcmDM01BufferSize ⌈

Parameter Name	J1939DcmDM01BufferSize	
Parent Container	J1939DcmGeneral	
Upstream mapping defined	–	
Description	Size of DM01 buffer (in Bytes). The buffer size should be as large as the longest DM01 response message. Dependency: Shall be present if J1939DcmDmxSupport is set to J1939DCM_DM01_SUPPORT for at least one J1939DcmDiagnosticMessageSupport.	
Multiplicity	0..1	
Type	EcucIntegerParamDef	
Range	1 .. 65535	
Default value	–	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00050] Definition of EcucIntegerParamDef J1939DcmDM01MaxDTCs ⌈

Parameter Name	J1939DcmDM01MaxDTCs	
Parent Container	J1939DcmGeneral	
Upstream mapping defined	–	
Description	Configuration value of limitation of maximum DTCs to be reported in the DM01 message. Dependency: Shall be present if J1939DcmDmxSupport is set to J1939DCM_DM01_SUPPORT for at least one J1939DcmDiagnosticMessageSupport.	
Multiplicity	0..1	
Type	EcucIntegerParamDef	
Range	1 .. 255	
Default value	20	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00073] Definition of EcucIntegerParamDef J1939DcmDM35 BufferSize ⌈

Parameter Name	J1939DcmDM35BufferSize	
Parent Container	J1939DcmGeneral	
Upstream mapping defined	–	
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	–	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00081] Definition of EcucBooleanParamDef J1939Dcm GenericDMxSupport ⌈

Parameter Name	J1939DcmGenericDMxSupport
Parent Container	J1939DcmGeneral
Upstream mapping defined	–
Description	Switches the support for all DMx messages that are not directly implemented in J1939 Dcm. True: Unsupported DMx messages are handled by a CDD. False: Unsupported DMx messages are ignored/rejected.
Multiplicity	1
Type	EcucBooleanParamDef
Default value	false
Pre-Compile only	true

⌋

[ECUC_J1939Dcm_00004] Definition of EcucFloatParamDef J1939DcmMain FunctionPeriod ⌈

Parameter Name	J1939DcmMainFunctionPeriod	
Parent Container	J1939DcmGeneral	
Upstream mapping defined	–	
Description	Call cycle in seconds of J1939Dcm_MainFunction.	
Multiplicity	1	
Type	EcucFloatParamDef	
Range	]0 .. INF[	
Default value	–	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00006] Definition of EcucIntegerParamDef J1939DcmMaxDTCsPerMainFunction ⌈

Parameter Name	J1939DcmMaxDTCsPerMainFunction	
Parent Container	J1939DcmGeneral	
Upstream mapping defined	–	
Description	Maximum threshold of DTCs filtered in a single MainFunction cycle.	
Multiplicity	0..1	
Type	EcucIntegerParamDef	
Range	1 .. 255	
Default value	–	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00007] Definition of EcucIntegerParamDef J1939DcmMaxFreezeFramesPerMainFunction ⌈

Parameter Name	J1939DcmMaxFreezeFramesPerMainFunction	
Parent Container	J1939DcmGeneral	
Upstream mapping defined	–	
Description	Maximum threshold of FreezeFrames filtered in a single MainFunction cycle.	
Multiplicity	0..1	
Type	EcucIntegerParamDef	
Range	1 .. 255	
Default value	–	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00008] Definition of EcucIntegerParamDef J1939DcmMaxRatiosPerMainFunction ⌈

Parameter Name	J1939DcmMaxRatiosPerMainFunction	
Parent Container	J1939DcmGeneral	
Upstream mapping defined	–	
Description	Maximum threshold of Ratios filtered in a single MainFunction cycle.	
Multiplicity	0..1	
Type	EcucIntegerParamDef	
Range	1 .. 255	
Default value	–	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00088] Definition of EcucIntegerParamDef J1939DcmMaxTransmitRetries ⌈

Parameter Name	J1939DcmMaxTransmitRetries	
Parent Container	J1939DcmGeneral	
Upstream mapping defined	–	
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	
Pre-Compile only	true	

⌋

10.1.3 J1939DcmConfigSet

[ECUC_J1939Dcm_00009] Definition of EcucParamConfContainerDef J1939DcmConfigSet ⌈

Container Name	J1939DcmConfigSet
Parent Container	J1939Dcm
Upstream mapping defined	–
Description	This container contains the configuration parameters and sub containers of the AUTOSAR J1939Dcm module.
Multiplicity	1
Pre-Compile only	true
Configuration Parameters	

No Included Parameters

Included Containers		
Container Name	**Multiplicity**	**Description**
J1939DcmChannel	1..*	Contains the J1939DcmChannel parameters.
J1939DcmDspExternalSRDataElementClass	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 J1939DcmSubElementInDataElementInstance OR J1939DcmDataElementInstance 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

[ECUC_J1939Dcm_00011] Definition of EcucParamConfContainerDef J1939Dcm Channel ⌈

Container Name	J1939DcmChannel
Parent Container	J1939DcmConfigSet
Upstream mapping defined	–
Description	Contains the J1939DcmChannel parameters.
Multiplicity	1..*
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmBusType	1	[ECUC_J1939Dcm_00039]
J1939DcmComMChannelRef	1	[ECUC_J1939Dcm_00038]

No Included Containers

⌋

[ECUC_J1939Dcm_00039] Definition of EcucEnumerationParamDef J1939Dcm BusType ⌈

Parameter Name	J1939DcmBusType	
Parent Container	J1939DcmChannel	
Upstream mapping defined	[25, CP_TPS_SystemTemplate]	
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.

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	J1939DCM_PROPRIETARY_NETWORK_2	Identifies the Proprietary Network #2 communication port.
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00038] Definition of EcucReferenceDef J1939DcmComMChannelRef ⌈

Parameter Name	J1939DcmComMChannelRef	
Parent Container	J1939DcmChannel	
Upstream mapping defined	–	
Description	Reference to the ComMChannel.	
Multiplicity	1	
Type	Symbolic name reference to ComMChannel	
Post-Build Value	Loadable	Selectable

⌋

10.1.5 J1939DcmNode

[ECUC_J1939Dcm_00010] Definition of EcucParamConfContainerDef J1939DcmNode ⌈

Container Name	J1939DcmNode
Parent Container	J1939DcmConfigSet
Upstream mapping defined	–
Description	Contains the parameters for the support of a logical J1939 node.
Multiplicity	1..*
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmGenericDMxCopyRxDataFunction	0..1	[ECUC_J1939Dcm_00086]
J1939DcmGenericDMxCopyTxDataFunction	0..1	[ECUC_J1939Dcm_00083]
J1939DcmGenericDMxRequestFunction	0..1	[ECUC_J1939Dcm_00082]
J1939DcmGenericDMxRxIndicationFunction	0..1	[ECUC_J1939Dcm_00087]
J1939DcmGenericDMxStartOfReceptionFunction	0..1	[ECUC_J1939Dcm_00085]
J1939DcmGenericDMxTxConfirmationFunction	0..1	[ECUC_J1939Dcm_00084]
J1939DcmSPNsInDataStream	0..*	[ECUC_J1939Dcm_00047]
J1939DcmTriggerOnDTCStatusFunction	0..1	[ECUC_J1939Dcm_00090]
J1939DcmDemClientRef	1	[ECUC_J1939Dcm_00072]
J1939DcmNmNodeRef	1	[ECUC_J1939Dcm_00013]
J1939DcmNodeRmUserRef	1	[ECUC_J1939Dcm_00049]
J1939DcmServiceOnlyDTCsMemoryDestinationRef	0..1	[ECUC_J1939Dcm_00051]

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

⌋

[ECUC_J1939Dcm_00086] Definition of EcucFunctionNameDef J1939Dcm GenericDMxCopyRxDataFunction ⌈

Parameter Name	J1939DcmGenericDMxCopyRxDataFunction
Parent Container	J1939DcmNode
Upstream mapping defined	–
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	–
Pre-Compile only	true

⌋

[ECUC_J1939Dcm_00083] Definition of EcucFunctionNameDef J1939Dcm GenericDMxCopyTxDataFunction ⌈

Parameter Name	J1939DcmGenericDMxCopyTxDataFunction
Parent Container	J1939DcmNode
Upstream mapping defined	–
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	–
Pre-Compile only	true

⌋

[ECUC_J1939Dcm_00082] Definition of EcucFunctionNameDef J1939Dcm GenericDMxRequestFunction ⌈

Parameter Name	J1939DcmGenericDMxRequestFunction
Parent Container	J1939DcmNode
Upstream mapping defined	–
Description	Indicates the reception of a request for an unsupported DMx message. Required if J1939DcmGenericDMxSupport is enabled.
Multiplicity	0..1
Type	EcucFunctionNameDef

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Default value	–
Regular Expression	–
Pre-Compile only	true

⌋

[ECUC_J1939Dcm_00087] Definition of EcucFunctionNameDef J1939Dcm GenericDMxRxIndicationFunction ⌈

Parameter Name	J1939DcmGenericDMxRxIndicationFunction
Parent Container	J1939DcmNode
Upstream mapping defined	–
Description	Confirms complete reception of an unsupported DMx message. Required if J1939Dcm GenericDMxSupport is enabled.
Multiplicity	0..1
Type	EcucFunctionNameDef
Default value	–
Regular Expression	–
Pre-Compile only	true

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[ECUC_J1939Dcm_00085] Definition of EcucFunctionNameDef J1939Dcm GenericDMxStartOfReceptionFunction ⌈

Parameter Name	J1939DcmGenericDMxStartOfReceptionFunction
Parent Container	J1939DcmNode
Upstream mapping defined	–
Description	Indicates reception of an unsupported DMx message. Required if J1939DcmGeneric DMxSupport is enabled.
Multiplicity	0..1
Type	EcucFunctionNameDef
Default value	–
Regular Expression	–
Pre-Compile only	true

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[ECUC_J1939Dcm_00084] Definition of EcucFunctionNameDef J1939Dcm GenericDMxTxConfirmationFunction ⌈

Parameter Name	J1939DcmGenericDMxTxConfirmationFunction
Parent Container	J1939DcmNode
Upstream mapping defined	–
Description	Confirms transmission of an unsupported DMx message. Required if J1939Dcm GenericDMxSupport is enabled.
Multiplicity	0..1
Type	EcucFunctionNameDef
Default value	–

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Regular Expression	–
Pre-Compile only	true

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[ECUC_J1939Dcm_00047] Definition of EcucIntegerParamDef J1939DcmSPNsIn DataStream ⌈

Parameter Name	J1939DcmSPNsInDataStream
Parent Container	J1939DcmNode
Upstream mapping defined	–
Description	Defines the SPNs available in data stream for use in DM24.
Multiplicity	0..*
Type	EcucIntegerParamDef
Range	0 .. 524287
Default value	–
Pre-Compile only	true

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[ECUC_J1939Dcm_00090] Definition of EcucFunctionNameDef J1939DcmTrigger OnDTCStatusFunction ⌈

Parameter Name	J1939DcmTriggerOnDTCStatusFunction
Parent Container	J1939DcmNode
Upstream mapping defined	–
Description	Indicates the occurrence of a new active DTC. Required if J1939DcmGenericDMx Support is enabled and a J1939DcmDiagnosticMessageSupport with J1939DcmDmx Support set to J1939DCM_DM01_SUPPORT is configured.
Multiplicity	0..1
Type	EcucFunctionNameDef
Default value	–
Regular Expression	–
Pre-Compile only	true

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[ECUC_J1939Dcm_00072] Definition of EcucReferenceDef J1939DcmDemClient Ref ⌈

Parameter Name	J1939DcmDemClientRef
Parent Container	J1939DcmNode
Upstream mapping defined	–
Description	Reference to the corresponding Dem Client.
Multiplicity	1
Type	Symbolic name reference to DemClient
Pre-Compile only	true

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[ECUC_J1939Dcm_00013] Definition of EcucReferenceDef J1939DcmNmNode Ref ⌈

Parameter Name	J1939DcmNmNodeRef
Parent Container	J1939DcmNode
Upstream mapping defined	–
Description	Reference to the corresponding J1939Nm node.
Multiplicity	1
Type	Symbolic name reference to J1939NmNode
Pre-Compile only	true

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[ECUC_J1939Dcm_00049] Definition of EcucReferenceDef J1939DcmNodeRm UserRef ⌈

Parameter Name	J1939DcmNodeRmUserRef	
Parent Container	J1939DcmNode	
Upstream mapping defined	–	
Description	Reference to the J1939RmUser used by J1939Dcm.	
Multiplicity	1	
Type	Symbolic name reference to J1939RmDcmUser	
Post-Build Value	Loadable	Selectable

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[ECUC_J1939Dcm_00051] Definition of EcucReferenceDef J1939DcmService OnlyDTCsMemoryDestinationRef ⌈

Parameter Name	J1939DcmServiceOnlyDTCsMemoryDestinationRef
Parent Container	J1939DcmNode
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]
Description	Reference to the user defined memory used for the Service Only DTCs handled by DM53, DM54, and DM55. Dependency: The referenced event memory shall be assigned to the DemEvent MemorySet of the DemClient referenced by J1939DcmDemClientRef.
Multiplicity	0..1
Type	Symbolic name reference to DemUserDefinedMemory
Pre-Compile only	true

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10.1.6 J1939DcmDiagnosticMessageSupport

[ECUC_J1939Dcm_00014] Definition of EcucParamConfContainerDef J1939Dcm DiagnosticMessageSupport ⌈

Container Name	J1939DcmDiagnosticMessageSupport
Parent Container	J1939DcmNode
Upstream mapping defined	[25, CP_TPS_SystemTemplate]
Description	Contains parameters to configure the diagnostic message support
Multiplicity	1..*
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	Multiplicity	ECUC ID
J1939DcmDiagnosticMessageGenericHandling	1	[ECUC_J1939Dcm_00089]
J1939DcmDmxSupport	1	[ECUC_J1939Dcm_00042]
J1939DcmDiagnosticMessageModeRuleRef	0..1	[ECUC_J1939Dcm_00070]
J1939DcmDiagnosticMessageSupportChannelRef	1	[ECUC_J1939Dcm_00048]

Included Containers		
Container Name	Multiplicity	Description
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.

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[ECUC_J1939Dcm_00089] Definition of EcucBooleanParamDef J1939DcmDiagnosticMessageGenericHandling ⌈

Parameter Name	J1939DcmDiagnosticMessageGenericHandling
Parent Container	J1939DcmDiagnosticMessageSupport
Upstream mapping defined	–
Description	If enabled, this message is handled using the generic interface even though it is supported by J1939Dcm.
Multiplicity	1
Type	EcucBooleanParamDef
Default value	false
Pre-Compile only	true

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[ECUC_J1939Dcm_00042] Definition of EcucEnumerationParamDef J1939Dcm DmxSupport ⌈

Parameter Name	J1939DcmDmxSupport	
Parent Container	J1939DcmDiagnosticMessageSupport	
Upstream mapping defined	[25, CP_TPS_SystemTemplate]	
Description	This parameter is used to identify the actual DMx message.	
Multiplicity	1	
Type	EcucEnumerationParamDef	
Range	J1939DCM_DM01_SUPPORT	DM01: Active Diagnostic Trouble Codes
	J1939DCM_DM02_SUPPORT	DM02: Previously Active Diagnostic Trouble Codes
	J1939DCM_DM03_SUPPORT	DM03: Diagnostic Data Clear/Reset for Previously Active DTCs
	J1939DCM_DM04_SUPPORT	DM04: Freeze Frame Parameters
	J1939DCM_DM05_SUPPORT	DM05: Diagnostic Readiness 1
	J1939DCM_DM06_SUPPORT	DM06: Emission Related Pending DTCs
	J1939DCM_DM07_SUPPORT	DM07: Command Non-continuously Monitored Test
	J1939DCM_DM08_SUPPORT	DM08: Test Results for Non-continuously Monitored Systems
	J1939DCM_DM09_SUPPORT	DM09: Oxygen Sensor Test Results
	J1939DCM_DM10_SUPPORT	DM10: Non-continuously Monitored System Test Identifiers Support
	J1939DCM_DM11_SUPPORT	DM11: Diagnostic Data Clear/Reset for Active DTCs
	J1939DCM_DM12_SUPPORT	DM12: Emissions Related Active DTCs
	J1939DCM_DM13_SUPPORT	DM13: Stop Start Broadcast
	J1939DCM_DM14_SUPPORT	DM14: Memory Access Request
	J1939DCM_DM15_SUPPORT	DM15: Memory Access Response
	J1939DCM_DM16_SUPPORT	DM16: Binary Data Transfer
	J1939DCM_DM17_SUPPORT	DM17: Boot Load Data
	J1939DCM_DM18_SUPPORT	DM18: Data Security
	J1939DCM_DM19_SUPPORT	DM19: Calibration Information
	J1939DCM_DM20_SUPPORT	DM20: Monitor Performance Ratio
	J1939DCM_DM21_SUPPORT	DM21: Diagnostic Readiness 2
	J1939DCM_DM22_SUPPORT	DM22: Individual Clear/Reset of Active and Previously Active DTC
	J1939DCM_DM23_SUPPORT	DM23: Emission Related Previously Active DTCs
	J1939DCM_DM24_SUPPORT	DM24: SPN Support
	J1939DCM_DM25_SUPPORT	DM25: Expanded Freeze Frame
	J1939DCM_DM26_SUPPORT	DM26: Diagnostic Readiness 3
	J1939DCM_DM27_SUPPORT	DM27: All Pending DTCs
	J1939DCM_DM28_SUPPORT	DM28: Permanent DTCs
	J1939DCM_DM29_SUPPORT	DM29: Regulated DTC Counts
	J1939DCM_DM30_SUPPORT	DM30: Scaled Test Results
	J1939DCM_DM31_SUPPORT	DM31: DTC to Lamp Association

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	J1939DCM_DM32_SUPPORT	DM32: Regulated Exhaust Emission Level Exceedance
	J1939DCM_DM33_SUPPORT	DM33: Emission Increasing Auxiliary Emission Control Device Active Time
	J1939DCM_DM34_SUPPORT	DM34: NTE Status
	J1939DCM_DM35_SUPPORT	iDM35: Immediate Fault Status
	J1939DCM_DM36_SUPPORT	DM36: Harmonized Roadworthiness - Vehicle (HRWV)
	J1939DCM_DM37_SUPPORT	DM37: Harmonized Roadworthiness - System (HRWS)
	J1939DCM_DM38_SUPPORT	DM38: Harmonized Global Regulation Description (HGRD)
	J1939DCM_DM39_SUPPORT	DM39: Harmonized Cumulative Continuous Malfunction Indicator - System (HCMI)
	J1939DCM_DM40_SUPPORT	DM40: Harmonized B1 Failure Counts (HB1C)
	J1939DCM_DM41_SUPPORT	DM41: DTCs - A, Pending
	J1939DCM_DM42_SUPPORT	DM42: DTCs - A, Confirmed and Active
	J1939DCM_DM43_SUPPORT	DM43: DTCs - A, Previously Active
	J1939DCM_DM44_SUPPORT	DM44: DTCs - B1, Pending
	J1939DCM_DM45_SUPPORT	DM45: DTCs - B1, Confirmed and Active
	J1939DCM_DM46_SUPPORT	DM46: DTCs - B1, Previously Active
	J1939DCM_DM47_SUPPORT	DM47: DTCs - B2, Pending
	J1939DCM_DM48_SUPPORT	DM48: DTCs - B2, Confirmed and Active
	J1939DCM_DM49_SUPPORT	DM49: DTCs - B2, Previously Active
	J1939DCM_DM50_SUPPORT	DM50: DTCs - C, Pending
	J1939DCM_DM51_SUPPORT	DM51: DTCs - C, Confirmed and Active
	J1939DCM_DM52_SUPPORT	DM52: DTCs - C, Previously Active
	J1939DCM_DM53_SUPPORT	DM53: Active Service Only DTCs
	J1939DCM_DM54_SUPPORT	DM54: Previously Active Service Only DTCs
	J1939DCM_DM55_SUPPORT	DM55: Clear All Service Only DTCs
	J1939DCM_DM56_SUPPORT	DM56: Engine Emissions Certification Information
	J1939DCM_DM57_SUPPORT	DM57: OBD Information
	J1939DCM_DM58_SUPPORT	DM58: Rationality Fault SP Data
	J1939DCM_DM59_SUPPORT	DM59: Diagnostic Readiness 4
	J1939DCM_DM60_SUPPORT	DM60: Extended DTC Information
Pre-Compile only	true	

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[ECUC_J1939Dcm_00070] Definition of EcucReferenceDef J1939DcmDiagnosticMessageModeRuleRef ⌈

Parameter Name	J1939DcmDiagnosticMessageModeRuleRef
Parent Container	J1939DcmDiagnosticMessageSupport
Upstream mapping defined	–

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Description	Reference to a J1939DcmModeRule which controls the execution of a Diagnostic Message.
Multiplicity	0..1
Type	Reference to J1939DcmModeRule
Pre-Compile only	true

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[ECUC_J1939Dcm_00048] Definition of EcucReferenceDef J1939DcmDiagnosticMessageSupportChannelRef ⌈

Parameter Name	J1939DcmDiagnosticMessageSupportChannelRef
Parent Container	J1939DcmDiagnosticMessageSupport
Upstream mapping defined	–
Description	Reference to J1939DcmChannel for which this diagnostic message is supported.
Multiplicity	1
Type	Reference to J1939DcmChannel
Pre-Compile only	true

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10.1.7 J1939DcmRxPdu

[ECUC_J1939Dcm_00046] Definition of EcucParamConfContainerDef J1939DcmRxPdu ⌈

Container Name	J1939DcmRxPdu
Parent Container	J1939DcmDiagnosticMessageSupport
Upstream mapping defined	[25, CP_TPS_SystemTemplate]
Description	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.
Multiplicity	0..1
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmRxPduId	1	[ECUC_J1939Dcm_00016]
J1939DcmRxPduRef	1	[ECUC_J1939Dcm_00017]

No Included Containers

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[ECUC_J1939Dcm_00016] Definition of EcucIntegerParamDef J1939DcmRxPduId ⌈

Parameter Name	J1939DcmRxPduId	
Parent Container	J1939DcmRxPdu	
Upstream mapping defined	–	
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	–	
With Auto	true	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00017] Definition of EcucReferenceDef J1939DcmRxPduRef ⌈

Parameter Name	J1939DcmRxPduRef	
Parent Container	J1939DcmRxPdu	
Upstream mapping defined	–	
Description	Reference to the global Pdu element in the Ecuc module.	
Multiplicity	1	
Type	Reference to Pdu	
Post-Build Value	Loadable	Selectable

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10.1.8 J1939DcmTxPdu

[ECUC_J1939Dcm_00045] Definition of EcucParamConfContainerDef J1939DcmTxPdu ⌈

Container Name	J1939DcmTxPdu
Parent Container	J1939DcmDiagnosticMessageSupport
Upstream mapping defined	[25, CP_TPS_SystemTemplate]
Description	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.
Multiplicity	0..1
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmTxPduId	1	[ECUC_J1939Dcm_00044]
J1939DcmTxPduRef	1	[ECUC_J1939Dcm_00043]

No Included Containers

⌋

[ECUC_J1939Dcm_00044] Definition of EcucIntegerParamDef J1939DcmTxPduId ⌈

Parameter Name	J1939DcmTxPduId	
Parent Container	J1939DcmTxPdu	
Upstream mapping defined	–	
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	–	
With Auto	true	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00043] Definition of EcucReferenceDef J1939DcmTxPduRef ⌈

Parameter Name	J1939DcmTxPduRef	
Parent Container	J1939DcmTxPdu	
Upstream mapping defined	–	
Description	Reference to the global Pdu element in the Ecuc module.	
Multiplicity	1	
Type	Reference to Pdu	
Post-Build Value	Loadable	Selectable

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10.1.9 J1939DcmProcessingConditions

[ECUC_J1939Dcm_00052] Definition of EcucParamConfContainerDef J1939DcmProcessingConditions ⌈

Container Name	J1939DcmProcessingConditions
Parent Container	J1939DcmConfigSet
Upstream mapping defined	–
Description	This container contains the configuration for mode arbitration functionality of the J1939 Dcm
Multiplicity	0..1
Pre-Compile only	true
Configuration Parameters	

No Included Parameters

Included Containers		
Container Name	**Multiplicity**	**Description**
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 J1939 DcmSwcModeRef or one J1939DcmBswModeRef or one J1939 DcmSwcSRDataElementRef. Please note that the J1939Dcm acts as well as mode manager. Therefore the references J1939DcmSwcModeRef or one J1939 DcmBswModeRef might point to provided ModeDeclaration GroupPrototypes 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 J1939 DcmConditionType 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

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10.1.10 J1939DcmModeRule

[ECUC_J1939Dcm_00053] Definition of EcucParamConfContainerDef J1939Dcm ModeRule ⌈

Container Name	J1939DcmModeRule
Parent Container	J1939DcmProcessingConditions
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]
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
Multiplicity	1..*
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmLogicalOperator	0..1	[ECUC_J1939Dcm_00054]
J1939DcmModeRuleNrcValue	0..1	[ECUC_J1939Dcm_00056]
J1939DcmArgumentRef	1..*	[ECUC_J1939Dcm_00055]

No Included Containers

⌋

[ECUC_J1939Dcm_00054] Definition of EcucEnumerationParamDef J1939DcmLogicalOperator ⌈

Parameter Name	J1939DcmLogicalOperator	
Parent Container	J1939DcmModeRule	
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]	
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	And (&&)
	J1939DCM_OR	Or (||)
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00056] Definition of EcucIntegerParamDef J1939DcmModeRuleNrcValue ⌈

Parameter Name	J1939DcmModeRuleNrcValue	
Parent Container	J1939DcmModeRule	
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]	
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	–	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00055] Definition of EcucChoiceReferenceDef J1939DcmArgumentRef ⌈

Parameter Name	J1939DcmArgumentRef
Parent Container	J1939DcmModeRule
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]
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]
Pre-Compile only	true

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10.1.11 J1939DcmModeCondition

[ECUC_J1939Dcm_00071] Definition of EcucParamConfContainerDef J1939Dcm ModeCondition ⌈

Container Name	J1939DcmModeCondition
Parent Container	J1939DcmProcessingConditions
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]
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.
Multiplicity	1..*
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmConditionType	1	[ECUC_J1939Dcm_00057]
J1939DcmBswModeRef	0..1	[ECUC_J1939Dcm_00059]
J1939DcmSwcModeRef	0..1	[ECUC_J1939Dcm_00058]
J1939DcmSwcSRDataElementRef	0..1	[ECUC_J1939Dcm_00060]

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

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[ECUC_J1939Dcm_00057] Definition of EcucEnumerationParamDef J1939Dcm ConditionType ⌈

Parameter Name	J1939DcmConditionType	
Parent Container	J1939DcmModeCondition	
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]	
Description	This parameter specifies what kind of comparison that is made for the evaluation of the mode condition.	
Multiplicity	1	
Type	EcucEnumerationParamDef	
Range	J1939DCM_EQUALS	Equal (==)

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	J1939DCM_EQUALS_NOT	Not equal (!=)
	J1939DCM_GREATER_OR_ EQUAL	Greater or equal (>=)
	J1939DCM_GREATER_THAN	Greater than (>)
	J1939DCM_LESS_OR_EQUAL	Less or equal (<=)
	J1939DCM_LESS_THAN	Less than (<)
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00059] Definition of EcucInstanceReferenceDef J1939Dcm BswModeRef ⌈

Parameter Name	J1939DcmBswModeRef
Parent Container	J1939DcmModeCondition
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]
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
Pre-Compile only	true

⌋

[ECUC_J1939Dcm_00058] Definition of EcucInstanceReferenceDef J1939Dcm SwcModeRef ⌈

Parameter Name	J1939DcmSwcModeRef
Parent Container	J1939DcmModeCondition
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]
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
Pre-Compile only	true

⌋

[ECUC_J1939Dcm_00060] Definition of EcucReferenceDef J1939DcmSwcSR-DataElementRef ⌈

Parameter Name	J1939DcmSwcSRDataElementRef
Parent Container	J1939DcmModeCondition
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]

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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
Pre-Compile only	true

⌋

10.1.12 J1939DcmSwcSRDataElementValue

[ECUC_J1939Dcm_00074] Definition of EcucChoiceContainerDef J1939DcmSwcSRDataElementValue ⌈

Choice Container Name	J1939DcmSwcSRDataElementValue
Parent Container	J1939DcmModeCondition
Upstream mapping defined	–
Description	This container contains the configuration of a S/R compare value.
Multiplicity	1
Pre-Compile only	true

No Included Parameters

Container Choices		
Container Name	**Multiplicity**	**Description**
J1939DcmSwcSRDataElementArray	0..1	This container contains the configuration of a array SR data element compare value.
J1939DcmSwcSRDataElementPrimitive	0..1	This container contains the configuration of a primitive SR data element compare value.

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10.1.13 J1939DcmSwcSRDataElementPrimitive

[ECUC_J1939Dcm_00075] Definition of EcucParamConfContainerDef J1939DcmSwcSRDataElementPrimitive ⌈

Container Name	J1939DcmSwcSRDataElementPrimitive
Parent Container	J1939DcmSwcSRDataElementValue
Upstream mapping defined	–
Description	This container contains the configuration of a primitive SR data element compare value.
Multiplicity	0..1
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmSwcSRDataElementPrimitiveValue	1	[ECUC_J1939Dcm_00077]

No Included Containers

⌋

[ECUC_J1939Dcm_00077] Definition of EcucIntegerParamDef J1939DcmSwcSRDataElementPrimitiveValue ⌈

Parameter Name	J1939DcmSwcSRDataElementPrimitiveValue	
Parent Container	J1939DcmSwcSRDataElementPrimitive	
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]	
Description	Reference to a primitive SR data element compare value.	
Multiplicity	1	
Type	EcucIntegerParamDef	
Range	0 .. 18446744073709551615	
Default value	–	
Pre-Compile only	true	

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10.1.14 J1939DcmSwcSRDataElementArray

[ECUC_J1939Dcm_00076] Definition of EcucParamConfContainerDef J1939DcmSwcSRDataElementArray ⌈

Container Name	J1939DcmSwcSRDataElementArray
Parent Container	J1939DcmSwcSRDataElementValue
Upstream mapping defined	–
Description	This container contains the configuration of a array SR data element compare value.
Multiplicity	0..1
Pre-Compile only	true
Configuration Parameters	

No Included Parameters

Included Containers		
Container Name	**Multiplicity**	**Description**
J1939DcmSwcSRDataElementArrayElement	0..*	This container contains the configuration of a array element SR data element compare value.

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10.1.15 J1939DcmSwcSRDataElementArrayElement

[ECUC_J1939Dcm_00080] Definition of EcucParamConfContainerDef J1939DcmSwcSRDataElementArrayElement ⌈

Container Name	J1939DcmSwcSRDataElementArrayElement
Parent Container	J1939DcmSwcSRDataElementArray
Upstream mapping defined	–
Description	This container contains the configuration of a array element SR data element compare value.
Multiplicity	0..*
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmSwcSRDataElementArrayElementIndex	1	[ECUC_J1939Dcm_00078]
J1939DcmSwcSRDataElementArrayElementValue	1	[ECUC_J1939Dcm_00079]

No Included Containers

⌋

[ECUC_J1939Dcm_00078] Definition of EcucIntegerParamDef J1939DcmSwcSRDataElementArrayElementIndex ⌈

Parameter Name	J1939DcmSwcSRDataElementArrayElementIndex	
Parent Container	J1939DcmSwcSRDataElementArrayElement	
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]	
Description	Index to an array SR data element.	
Multiplicity	1	
Type	EcucIntegerParamDef	
Range	0 .. 18446744073709551615	
Default value	–	
Pre-Compile only	true	

⌋

[ECUC_J1939Dcm_00079] Definition of EcucIntegerParamDef J1939DcmSwcSRDataElementArrayElementValue ⌈

Parameter Name	J1939DcmSwcSRDataElementArrayElementValue	
Parent Container	J1939DcmSwcSRDataElementArrayElement	
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]	
Description	Value of an array SR data element compare value.	
Multiplicity	1	
Type	EcucIntegerParamDef	
Range	0 .. 18446744073709551615	

▽

△

Default value	–
Pre-Compile only	true

⌋

10.1.16 J1939DcmDspExternalSRDataElementClass

[ECUC_J1939Dcm_00062] Definition of EcucChoiceContainerDef J1939DcmDspExternalSRDataElementClass ⌈

Choice Container Name	J1939DcmDspExternalSRDataElementClass
Parent Container	J1939DcmConfigSet
Upstream mapping defined	–
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 reference.
Multiplicity	0..1
Pre-Compile only	true

No Included Parameters

Container Choices		
Container Name	**Multiplicity**	**Description**
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.

⌋

10.1.17 J1939DcmDataElementInstance

[ECUC_J1939Dcm_00064] Definition of EcucParamConfContainerDef J1939DcmDataElementInstance ⌈

Container Name	J1939DcmDataElementInstance
Parent Container	J1939DcmDspExternalSRDataElementClass
Upstream mapping defined	–
Description	Instance Reference to the primitive data in a port where the data element is typed with an ApplicationPrimitveDataType or an ImplementationDataType.
Multiplicity	0..1
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmDataElementInstanceRef	1	[ECUC_J1939Dcm_00067]

No Included Containers

⌋

[ECUC_J1939Dcm_00067] Definition of EcucInstanceReferenceDef J1939Dcm DataElementInstanceRef ⌈

Parameter Name	J1939DcmDataElementInstanceRef
Parent Container	J1939DcmDataElementInstance
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]
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
Pre-Compile only	true

⌋

10.1.18 J1939DcmSubElementInDataElementInstance

[ECUC_J1939Dcm_00063] Definition of EcucParamConfContainerDef J1939Dcm SubElementInDataElementInstance ⌈

Container Name	J1939DcmSubElementInDataElementInstance
Parent Container	J1939DcmDspExternalSRDataElementClass
Upstream mapping defined	–
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.
Multiplicity	0..1
Pre-Compile only	true
Configuration Parameters	

Included Parameters		
Parameter Name	**Multiplicity**	**ECUC ID**
J1939DcmSubElementInDataElementInstanceRef	1	[ECUC_J1939Dcm_00066]

No Included Containers

⌋

[ECUC_J1939Dcm_00066] Definition of EcucInstanceReferenceDef J1939Dcm SubElementInDataElementInstanceRef ⌈

Parameter Name	J1939DcmSubElementInDataElementInstanceRef
Parent Container	J1939DcmSubElementInDataElementInstance
Upstream mapping defined	[26, CP_TPS_DiagnosticExtractTemplate]
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*
Pre-Compile only	true

⌋

A Not Applicable Requirements

[SWS_J1939Dcm_NA_00001] Requirements Not Applicable to this Specification

Upstream requirements: SRS_BSW_00168, SRS_BSW_00170, SRS_BSW_00375, SRS_BSW_00383, SRS_BSW_00384, SRS_BSW_00388, SRS_BSW_00389, SRS_BSW_00390, SRS_BSW_00392, SRS_BSW_00393, SRS_BSW_00395, SRS_BSW_00403, SRS_BSW_00416, SRS_BSW_00417, SRS_BSW_00419, SRS_BSW_00422, SRS_BSW_00425, SRS_BSW_00469, SRS_BSW_00471, SRS_BSW_00472, SRS_BSW_00478, SRS_BSW_00490, SRS_BSW_00491

⌈These requirements are not applicable to this specification.⌋

[SWS_J1939Dcm_NA_00002] Only One Main Function

Upstream requirements: SRS_BSW_00432

⌈The SAE J1939 Diagnostic Communication Manager usually does not have much to do in its main function, therefore a single main function is sufficient.⌋

B Change History of AUTOSAR Traceable Items

Please note that the lists in this chapter also include traceable items that have been removed from the specification in a later version. These items do not appear as hyperlinks in the document.

B.1 Traceable Item History of this Document According to AUTOSAR Release R26-11

B.1.1 Added Specification Items in R26-11

[ECUC_J1939Dcm_00089] [ECUC_J1939Dcm_00090] [SWS_J1939Dcm_00240] [SWS_J1939Dcm_00241] [SWS_J1939Dcm_00242] [SWS_J1939Dcm_00243] [SWS_J1939Dcm_00244] [SWS_J1939Dcm_91011]

B.1.2 Changed Specification Items in R26-11

[ECUC_J1939Dcm_00001] [ECUC_J1939Dcm_00010] [ECUC_J1939Dcm_00014] [ECUC_J1939Dcm_00040] [ECUC_J1939Dcm_00054] [ECUC_J1939Dcm_00057] [ECUC_J1939Dcm_00062] [SWS_J1939Dcm_00015] [SWS_J1939Dcm_00016] [SWS_J1939Dcm_00085] [SWS_J1939Dcm_00132] [SWS_J1939Dcm_00204] [SWS_J1939Dcm_00205] [SWS_J1939Dcm_00238] [SWS_J1939Dcm_91010]

B.1.3 Deleted Specification Items in R26-11

[ECUC_J1939Dcm_00002] [ECUC_J1939Dcm_00065] [ECUC_J1939Dcm_00068] [SWS_J1939Dcm_00100]

B.1.4 Added Constraints in R26-11

none

B.1.5 Changed Constraints in R26-11

none

B.1.6 Deleted Constraints in R26-11

none

B.2 Traceable Item History of this Document According to AUTOSAR Release R25-11

B.2.1 Added Specification Items in R25-11

[SWS_J1939Dcm_00239]

B.2.2 Changed Specification Items in R25-11

[ECUC_J1939Dcm_00042] [SWS_J1939Dcm_00011] [SWS_J1939Dcm_00012]
[SWS_J1939Dcm_00018] [SWS_J1939Dcm_00024] [SWS_J1939Dcm_00025]
[SWS_J1939Dcm_00090] [SWS_J1939Dcm_00130] [SWS_J1939Dcm_00138]
[SWS_J1939Dcm_00139] [SWS_J1939Dcm_00140] [SWS_J1939Dcm_00141]
[SWS_J1939Dcm_00142] [SWS_J1939Dcm_00143] [SWS_J1939Dcm_00146]
[SWS_J1939Dcm_00155] [SWS_J1939Dcm_00161] [SWS_J1939Dcm_00163]
[SWS_J1939Dcm_00198] [SWS_J1939Dcm_00201] [SWS_J1939Dcm_00202]
[SWS_J1939Dcm_00236] [SWS_J1939Dcm_00238] [SWS_J1939Dcm_91006]

B.2.3 Deleted Specification Items in R25-11

none

B.2.4 Added Constraints in R25-11

none

B.2.5 Changed Constraints in R25-11

none

B.2.6 Deleted Constraints in R25-11

none

B.3 Traceable Item History of this Document According to AUTOSAR Release R24-11

B.3.1 Added Specification Items in R24-11

none

B.3.2 Changed Specification Items in R24-11

[SWS_J1939Dcm_00027] [SWS_J1939Dcm_00091] [SWS_J1939Dcm_00097]

B.3.3 Deleted Specification Items in R24-11

none

B.3.4 Added Constraints in R24-11

none

B.3.5 Changed Constraints in R24-11

none

B.3.6 Deleted Constraints in R24-11

none