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Document Change History

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2013-03-15	4.1.1	AUTOSAR Administration	• Initial Release

Disclaimer

Table of Contents

1 Introduction and functional overview

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

1.1 Request Management according to SAE J1939

J1939 defines a special parameter group (PG) called Request (RQST, PGN = 0x0EA00), which may be used to request transmission of any other parameter group. The Request parameter group just contains the PGN of the requested parameter group.
Depending on the destination address used by the Request PG, the response must be sent directly to the requesting ECU, or to all ECU. For short parameter groups with PDU1 format, the destination address is set accordingly[1], for large parameter groups the suitable transport protocol mode (BAM or CMDT, see [9] and [18]) is used.
Depending on the requested parameter group and the destination address of the Request PG, ECUs answer either with the requested parameter group, with the special Acknowledgement parameter group (ACKM, PGN = 0x0E800), or not at all.
Finally, J1939 defines that the response to a Request will be expected within 1.25s after the Request was sent. The responding node is required to answer within 200ms.
Besides the Request PG, J1939 also defines a Request2 PG (RQST2, PGN=0xC900). The behavior of this PG is identical to that of the Request PG, with the following extensions:

- A transmission with the transfer function can be requested to provide the same PG from multiple ECUs.
- Extended identifier bytes can be specified to request a defined layout of a multiplexed message.

1.2 J1939 Request Manager BSW Module

The J1939 Request Manager (J1939Rm) handles received and transmitted Request, Request2, and Acknowledgement PGs. It natively supports handling of incoming requests for address claim and is configurable to support incoming requests for diagnostic and other J1939 PGNs. Unknown incoming requests are answered with a negative Acknowledgement PG if they address a specific destination address.
The J1939Rm also supports transmission of requests and timeout supervision for the resulting PG or acknowledgement.

1.3 J1939 Terminology

The terminology of J1939 differs noticeably from the usual AUTOSAR terminology. For consistency reasons, this introduction used the terms of the J1939 specification,

[1] Short parameter groups with PDU2 format have no destination address, they are broadcast PGs by nature.

while the remainder of this specification will use terms that are more common within AUTOSAR:

- ‘I-PDU’ replaces ‘parameter group’

2 Acronyms and abbreviations

Abbreviation / Acronym:	*Description:*
AC	J1939 AddressClaimed PG (PGN = 0x0EE00)
ACK	J1939 Acknowledgement PG (ACKM) with control byte set to 0
ACKM	J1939 Acknowledgement PG (PGN = 0x0E800)
BSW	Basic Software (module)
CA	Controller Application, role of an ECU tied to one address
DET	Default Error Tracer, supports development and runtime error reporting
DP	Data Page, the most significant bit (MSB) of the 18 bit PGN
EDP	Extended Data Page, the second bit (after MSB) of the 18 bit PGN
NACK	J1939 Acknowledgement PG (ACKM) with control byte set to 1
PDUF	PDU Format, the middle byte of the 18 bit PGN
PDUS	PDU Specific, the lower byte of the 18 bit PGN
PG	Parameter Group
PGN	Parameter Group Number (18 bits, contains EDP, DP, PDUF, PDUS)
RQST	J1939 Request PG (PGN = 0x0EA00)
RQST2	J1939 Request2 PG (PGN = 0x0C900)
RTE	AUTOSAR Runtime Environment
SW-C	AUTOSAR Software Component (of the Application)
XFER	J1939 Transfer PG (PGN = 0x0CA00)

3 Related documentation

3.1 Input documents

[1] List of Basic Software Modules
AUTOSAR_TR_BSWModuleList.pdf

[2] Layered Software Architecture
AUTOSAR_EXP_LayeredSoftwareArchitecture.pdf

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

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

[5] Requirements on BSW Modules for SAE J1939
AUTOSAR_SRS_J1939.pdf

[6] Specification of Communication Stack Types
AUTOSAR_SWS_CommunicationStackTypes.pdf

[7] System Template
AUTOSAR_TPS_SystemTemplate.pdf

[8] Specification of CAN Interface
AUTOSAR_SWS_CANInterface.pdf

[9] Specification of a Transport Layer for SAE J1939
AUTOSAR_SWS_SAEJ1939TransportLayer.pdf

[10] Specification of PDU Router
AUTOSAR_SWS_PDURouter.pdf

[11] Specification of Communication
AUTOSAR_SWS_COM.pdf

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

[13] Specification of a Diagnostic Communication Manager for SAE J1939
AUTOSAR_SWS_SAEJ1939DiagnosticCommunicationManager.pdf

[14] Specification of Default Error Tracer
AUTOSAR_SWS_DefaultErrorTracer.pdf

[15] Specification of BSW Scheduler
AUTOSAR_SWS_BSWScheduler.pdf

[16] Specification of ECU Configuration
AUTOSAR_TPS_ECUConfiguration.pdf

[17] Specification of Memory Mapping
AUTOSAR_SWS_MemoryMapping.pdf

3.2 Related standards and norms

[18] J1939-21 MAR2016, Data Link Layer

3.3 Related specification

AUTOSAR provides a General Specification on Basic Software modules [4] (SWS BSW General), which is also valid for the SAE J1939 Request Manager.

Thus, the specification SWS BSW General shall be considered as additional and required specification for SAE J1939 Transport Layer.

4 Constraints and assumptions

4.1 Limitations

The J1939 Request Manager only implements Request, Request2, and Acknowledgement PGs. It does not provide support for the Transfer PG.

4.2 Applicability to car domains

J1939 is developed by the SAE as a standard for heavy-duty on-highway, farming, and construction vehicles. It is not applicable to passenger cars or light trucks.

5 Dependencies to other modules

The J1939 Request Manager (J1939Rm) has interfaces towards COM, the PDU Router (PduR), the J1939 Network Management module (J1939Nm), the J1939 Diagnostic Communication Management module (J1939Dcm), the Default Error Tracer (DET), and application software components (SW-Cs) via the AUTOSAR Runtime Environment (RTE). It also supports Complex Drivers (CDD).

The J1939 Request Manager includes header files of COM, J1939Nm, J1939Dcm, PduR, DET, CDDs, and the RTE.

5.1 File structure

5.1.1 Code file structure

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

5.1.2 Header file structure

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

[SWS_J1939Rm_00114] ⌈J1939Rm shall include the header file Com.h if at least one J1939RmComUser is configured.⌋ ()

[SWS_J1939Rm_00111] ⌈J1939Rm shall include the header file J1939Nm.h if at least one J1939RmNmUser is configured.⌋ ()

[SWS_J1939Rm_00112] ⌈J1939Rm shall include the header file J1939Dcm.h if at least one J1939RmDcmUser is configured.⌋ ()

[SWS_J1939Rm_00113] ⌈J1939Rm shall include a header file named <apiServicePrefix>_Cbk.h for every configured J1939RmCddUser.⌋ ()

Please note: Complex driver (CDD) APIs use the module prefix configured by the apiServicePrefix of the CDD’s module description file.

6 Requirements traceability

Requirement	Description	Satisfied by
SRS_BSW_00407	Each BSW module shall provide a function to read out the version information of a dedicated module implementation	SWS_J1939Rm_00039
SRS_J1939_00012	The J1939 Request Manager shall provide an interface for module initialization	SWS_J1939Rm_00012, SWS_J1939Rm_00037, SWS_J1939Rm_00073
SRS_J1939_00013	The J1939 Request Manager shall provide an interface for module shutdown	SWS_J1939Rm_00013, SWS_J1939Rm_00038
SRS_J1939_00014	The J1939 Request Manager shall forward incoming requests to configured destinations	SWS_J1939Rm_00002, SWS_J1939Rm_00003, SWS_J1939Rm_00007, SWS_J1939Rm_00008, SWS_J1939Rm_00063, SWS_J1939Rm_00100, SWS_J1939Rm_00107, SWS_J1939Rm_00115, SWS_J1939Rm_00116
SRS_J1939_00015	The J1939 Request Manager shall forward incoming acknowledgements to configured destinations	SWS_J1939Rm_00026, SWS_J1939Rm_00027, SWS_J1939Rm_00028, SWS_J1939Rm_00064, SWS_J1939Rm_00066, SWS_J1939Rm_00101, SWS_J1939Rm_00106, SWS_J1939Rm_00126
SRS_J1939_00016	The J1939 Request Manager shall provide an interface for transmission of request messages	SWS_J1939Rm_00016, SWS_J1939Rm_00021, SWS_J1939Rm_00022, SWS_J1939Rm_00023, SWS_J1939Rm_00025, SWS_J1939Rm_00054, SWS_J1939Rm_00097, SWS_J1939Rm_00104, SWS_J1939Rm_00118
SRS_J1939_00017	The J1939 Request Manager shall provide an interface for transmission of acknowledgement messages	SWS_J1939Rm_00008, SWS_J1939Rm_00009, SWS_J1939Rm_00018, SWS_J1939Rm_00019, SWS_J1939Rm_00020, SWS_J1939Rm_00056, SWS_J1939Rm_00098, SWS_J1939Rm_00103
SRS_J1939_00026	The J1939 Request Manager shall support timeout supervision for outgoing requests	SWS_J1939Rm_00017, SWS_J1939Rm_00024, SWS_J1939Rm_00029, SWS_J1939Rm_00030, SWS_J1939Rm_00055, SWS_J1939Rm_00065, SWS_J1939Rm_00099, SWS_J1939Rm_00102, SWS_J1939Rm_00105, SWS_J1939Rm_00108
SRS_J1939_00050	The J1939 Request Manager shall route incoming requests and acknowledgements to connected channels	SWS_J1939Rm_00127, SWS_J1939Rm_00128, SWS_J1939Rm_00129

7 Functional specification

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

7.1 Overview

On one side, the J1939 Request Manager is responsible for routing incoming RQST and RQST2 PGs to the correct destination, and to provide an infrastructure for sending responding ACKM PGs.

On the other side, the J1939 Request Manager also provides an infrastructure to send RQST and RQST2 PGs, and to supervise timeout of the response(s), including but not limited to ACKM PGs.

The J1939 Request Manager uses meta data items of type CAN_ID_32 of the received and transmitted ACKM and RQST PGs to access the source address, the destination address, and the priority which are encoded in the CAN ID.

[SWS_J1939Rm_00119] [Meta data items of type CAN_ID_32 contain the source address in the fourth (least significant) byte.] ()

[SWS_J1939Rm_00120] [Meta data items of type CAN_ID_32 contain the destination address in the third byte.] ()

[SWS_J1939Rm_00121] [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.] ()

7.2 Module Handling

This section contains description of auxiliary functionality of the J1939 Request Manager.

7.2.1 Initialization

The J1939 Request Manager is initialized via J1939Rm_Init, and de-initialized via J1939Rm_DeInit. Except for J1939Rm_GetVersionInfo and J1939Rm_Init, the API functions of the J1939 Request Manager may only be called after the module has been properly initialized.

[SWS_J1939Rm_00012] [A call to J1939Rm_Init initializes all internal variables and sets the J1939 Request Manager to the initialized state.] (SRS_J1939_00012)

[SWS_J1939Rm_00013] [A call to J1939Rm_DeInit sets the J1939 Request Manager back to the uninitialized state.] (SRS_J1939_00013)

[SWS_J1939Rm_00011] ⌈When J1939Rm_Init is called in initialized state, the J1939 Request Manager shall not re-initialize its internal variables. It shall instead call Det_ReportError with the error code J1939RM_E_REINIT if DET reporting is enabled (see J1939RmDevErrorDetect).⌋ ()

7.2.2 Timing Related Functionality

To be able to measure times, the J1939 Request Manager is triggered cyclically via the J1939Rm_MainFunction.
[SWS_J1939Rm_00072] ⌈The J1939 Request Manager shall use the J1939Rm_MainFunction for timing related purposes.⌋ ()

7.3 Communication State Handling

In general, request handling is only active when the ECU is online (see [12] for details). The exceptions to this rule are received and transmitted requests for the AddressClaimed PG, which must be possible in all cases. The J1939 Request Manager provides an API that is used by the BSW Mode Manager (BswM) to notify the J1939 communication state.

[SWS_J1939Rm_00073] ⌈During initialization via J1939Rm_Init, the J1939 Request Manager assumes the offline state for all nodes on all channels.⌋ (SRS_J1939_00012)

[SWS_J1939Rm_00014] ⌈A call to J1939Rm_SetState sets the state of a node's channel to online or offline.⌋ ()

[SWS_J1939Rm_00015] ⌈In the offline state, the J1939 Request Manager only processes requests for the AddressClaimed PG, while timeout supervision and acknowledgement handling are completely disabled.⌋ ()

7.4 Reception of Requests

The J1939 Request Manager receives request PGs (RQST and RQST2) via J1939Rm_RxIndication from the CAN Interface. The J1939 Request Manager shall use the meta data item type CAN_ID_32 to be able to identify the sender, the destination address, and the priority of the request.

[SWS_J1939Rm_00122] ⌈The J1939 Request Manager shall use a meta data item of type CAN_ID_32 to determine the source address, destination address, and priority of received Request PGs.⌋ ()

[SWS_J1939Rm_00007] ⌈The J1939 Request Manager shall only accept requests addressed to the whole network (global DA), or to one of the configured addresses of the ECU (see J1939RmNmNodeRef).⌋ (SRS_J1939_00014)

Requests for the AddressClaimed PG (AC, PGN = 0x0EE00) always go to the J1939 Network Management module. Requests for the DMx PGs (DM01 to DM57) always

go to the J1939 Diagnostic Communication Manager, the destination of these and other PGNs is configured via J1939RmUserRequestPGN.

Besides forwarding to the J1939 Network Management module, the J1939 Diagnostic Communication Manager, and CDDs, the J1939 Request Manager can also forward requests to SW-Cs, and trigger COM to send requested PGs.

7.4.1 Request Forwarding

Forwarding to other BSW modules is done via the generic callout function <User>_RequestIndication (see section 8.7.3.1). Forwarding to SW-C uses a dedicated service port function with the same signature as the <User>_RequestIndication.

[SWS_J1939Rm_00002] [When J1939Rm_RxIndication is called by the PDU Router to indicate reception of a request, and the requested PGN is configured via J1939RmUserRequestPGN to trigger either the J1939 Diagnostic Communication Manager or a CDD, the J1939 Request Manager shall call the corresponding <User>_RequestIndication.] (SRS_J1939_00014)

[SWS_J1939Rm_00116] [When J1939Rm_RxIndication is called by the PDU Router to indicate reception of a request, and the requested PGN is AddressClaimed (AC, 0xEE00), the J1939 Request Manager shall call J1939Nm_RequestIndication.] (SRS_J1939_00014)

[SWS_J1939Rm_00003] [When J1939Rm_RxIndication is called by the PDU Router to indicate reception of a request, and the requested PGN is configured via J1939RmUserRequestPGN to be forwarded to the RTE, the J1939 Request Manager shall call the corresponding service port function.] (SRS_J1939_00014)

7.4.2 Request Handling via COM

If COM is configured as destination for the request of a certain PGN, the J1939 Request Manager will prepare the MetaData, and request COM to send the PDU with the MetaData provided via Com_TriggerIPDUSendWithMetaData. This sequence is shown in Figure 3.

[SWS_J1939Rm_00115] [When J1939Rm_RxIndication is called by the PDU Router to indicate reception of a request, and the requested PGN is configured via J1939RmComIPduPGN to be handled via COM, and when the extended identifier bytes of an RQST2 match the multiplexor values of a multiplexed message, the J1939 Request Manager shall prepare the MetaData from the given information and provide it to COM via Com_TriggerIPDUSendWithMetaData together with the PduId of the transmitted COM I-PDU referenced by J1939RmComIPduRef.] (SRS_J1939_00014)

7.4.3 Request of Unknown PGNs

The J1939 Request Manager shall respond to requests for unknown PGNs with a NACK, but only when the request was sent to a specific destination address.

[SWS_J1939Rm_00008] ⌈When J1939Rm_RxIndication is called by the PDU Router to indicate reception of a request, and the requested PGN or the requested extended identifier bytes are not configured, and the destination address is not the broadcast address, the J1939 Request Manager shall call PduR_J1939RmTransmit to send a negative acknowledgement (NACK).⌋ (SRS_J1939_00014, SRS_J1939_00017)

7.5 Transmission of Acknowledgements

For unknown PGNs, the J1939 Request Manager transmits a negative acknowledgement by itself (see section 7.4.3 above). Modules that receive requests from the J1939 Request Manager may use the API J1939Rm_SendAck to transmit the acknowledgement variants defined by the J1939 standard (see section 5.4.4 in [18] and description of the API J1939Rm_SendAck in section 8.4.7).

The Acknowledgement PG is supposed to have a fixed destination address (FF_{16}), configured via CanIfTxPduCanId in the CAN Interface. The J1939 Request Manager shall use the meta data item type CAN_ID_32 so that it can modify the priority and source address.

[SWS_J1939Rm_00009] ⌈When a BSW module, a CDD, or an SW-C (via service port and RTE) calls J1939Rm_SendAck, the J1939 Request Manager shall call PduR_J1939RmTransmit to send the required acknowledgement.⌋ (SRS_J1939_00017)

[SWS_J1939Rm_00123] ⌈The J1939 Request Manager shall use a meta data item of type CAN_ID_32 to provide the source address and priority of transmitted Acknowledgement PGs.⌋ ()

There is only one I-PDU available to send Acknowledgement PGs. Still, it must be ensured, that no Acknowledgement PG is lost, even when a new transmission is initiated while this I-PDU is already occupied by another transmission. To achieve this, the J1939 Request Manager needs to queue Acknowledgement PGs.

[SWS_J1939Rm_00018] ⌈Transmission requests for the Acknowledgement PG shall be queued when a previous transmission of this PG is still pending. The size of this queue is determined by J1939RmAckQueueSize.⌋ (SRS_J1939_00017)

[SWS_J1939Rm_00019] ⌈The J1939 Request Manager shall use the J1939Rm_TxConfirmation with result E_OK of the associated I-PDU to trigger transmission of pending Acknowledgement PGs.⌋ (SRS_J1939_00017)

[SWS_J1939Rm_00020] ⌈If the J1939Rm_TxConfirmation is called with result E_NOT_OK, the J1939 Request Manager shall flush the Acknowledgement PG queue.⌋ (SRS_J1939_00017)

The acknowledgement type (Control byte), the extended identifier bytes, and the Address parameter of the Acknowledgement PG are set according to the arguments of the J1939Rm_SendAck function, as described in section 8.4.7. The destination address is always the global address, as defined in [18].

[SWS_J1939Rm_00126] ⌈When an acknowledgement is sent, it shall also be handled internally as if it was received via J1939Rm_RxIndication.⌋ (SRS_J1939_00015)

7.6 Transmission of Requests

As stated in section 7.1, the J1939 Request Manager also supports transmission of requests, reception of responding acknowledgements, and timeout supervision for the responses.

To trigger the transmission of a request, the J1939 Request Manager provides the API J1939Rm_SendRequest.

The J1939 Request Manager shall use the meta data item type CAN_ID_32 to be able to set the priority and the source and destination address freely. The CAN Interface must be configured such that the PDUF and data page bits are fixed, while the remaining bits of the CAN ID are variable.

[SWS_J1939Rm_00016] ⌈When a BSW module, a CDD, or an SW-C (via service port and RTE) calls J1939Rm_SendRequest, the J1939 Request Manager shall call PduR_J1939RmTransmit to send the request.⌋ (SRS_J1939_00016)

[SWS_J1939Rm_00117] ⌈When no extended identifier bytes are provided with J1939Rm_SendRequest, J1939Rm shall send an RQST PG. When one or more extended identifier bytes are provided, an RQST2 PG shall be sent.⌋ ()

[SWS_J1939Rm_00124] ⌈The J1939 Request Manager shall use a meta data item of type CAN_ID_32 to provide the source address, destination address, and priority of transmitted Request PGs.⌋ ()

There is only one I-PDU available to send Request PGs, and one for Request2 PGs. Still, it must be ensured that no request PG is lost, even when a new transmission is initiated while this I-PDU is already occupied by another transmission. To achieve this, the J1939 Request Manager needs to queue request PGs.

[SWS_J1939Rm_00021] ⌈Transmission requests for the Request PG shall be queued when a previous transmission of this PG is still pending. The size of this queue is determined by J1939RmRequestQueueSize.⌋ (SRS_J1939_00016)

[SWS_J1939Rm_00118] ⌈Transmission requests for the Request2 PG shall be queued when a previous transmission of this PG is still pending. The size of this queue is determined by J1939RmRequest2QueueSize.⌋ (SRS_J1939_00016)

[SWS_J1939Rm_00022] ⌈The J1939 Request Manager shall use the J1939Rm_TxConfirmation with result E_OK of the associated I-PDU to trigger transmission of pending Request and Request2 PGs.⌋ (SRS_J1939_00016)

[SWS_J1939Rm_00023] ⌈If the J1939Rm_TxConfirmation is called with result E_NOT_OK, the J1939 Request Manager shall flush the corresponding request PG queue.⌋ (SRS_J1939_00016)

To be able to do timeout supervision, the J1939 Request Manager needs to remember the initiator, the destination address, extended identifier bytes, and the PGN of the request.

[SWS_J1939Rm_00024] ⌈When J1939Rm_SendRequest is called with the parameter checkTimeout set to TRUE and a destination address that is not the broadcast address (0xff), and timeout handling is enabled for the caller via J1939RmUserTimeoutSupervision: The J1939 Request Manager shall store (separately for each node) the calling module's user ID, the PGN, extended identifier bytes, the source address, and the destination address of the request.⌋ (SRS_J1939_00026)

Finally, requests to the global address must also be handled internally as described in section 7.4.

[SWS_J1939Rm_00025] ⌈When a request is sent with the global destination address, it shall also be handled internally as if it was received via J1939Rm_RxIndication.⌋ (SRS_J1939_00016)

7.7 Reception of Acknowledgements

The J1939 Request Manager receives Acknowledgement PGs (ACKM) via J1939Rm_RxIndication from the CAN Interface. The J1939 Request Manager shall use the meta data item type CAN_ID_32 to be able to identify the priority and the sender of the acknowledgement.

[SWS_J1939Rm_00125] ⌈The J1939 Request Manager shall use a meta data item of type CAN_ID_32 to determine the source address and priority of received Acknowledgement PGs.⌋ ()

[SWS_J1939Rm_00026] ⌈The J1939 Request Manager shall only accept acknowledgements where the AddressAcknowledged is set to one of the configured addresses of the ECU (see J1939RmNmNodeRef).⌋ (SRS_J1939_00015)

The scheduling of received Acknowledgement PGs is configured similarly to the Request PG, see section 7.4.1, but the destinations are restricted to CDD and Application, because the J1939Nm and the J1939Dcm currently do not need to request any information from other ECUs.

[SWS_J1939Rm_00066] ⌈When J1939Rm_RxIndication is called by the PDU Router to indicate reception of an acknowledgement which matches a pending request

(acknowledged PGN, source address, acknowledged address), the J1939 Request Manager shall call the <User>_AckIndication or the service port function corresponding to the stored user ID.] (SRS_J1939_00015)

[SWS_J1939Rm_00027] [When J1939Rm_RxIndication is called by the PDU Router to indicate reception of an acknowledgement which does not match a pending request, and the acknowledged PGN is configured via J1939RmUserAckPGN to trigger a CDD, the J1939 Request Manager shall call the corresponding <User>_AckIndication.] (SRS_J1939_00015)

[SWS_J1939Rm_00028] [When J1939Rm_RxIndication is called by the PDU Router to indicate reception of an acknowledgement which does not match a pending request, and the acknowledged PGN is configured via J1939RmUserAckPGN to be forwarded to the RTE, the J1939 Request Manager shall call the corresponding service port function.] (SRS_J1939_00015)

7.8 Timeout Supervision

The SAE J1939 specification [18] defines a maximum delay of 200ms for the answer to a request. This delay is not supervised by the J1939 Request Manager. On the other hand, the timeout of 1.25s for the reception of the answer to a request will be supervised by the J1939 Request Manager, if configured accordingly via J1939RmUserTimeoutSupervision. In that case, when the request is transmitted, the timer is started and the request data is stored as described in [SWS_J1939Rm_00024].

[SWS_J1939Rm_00017] [If timeout supervision is enabled for the caller of J1939Rm_SendRequest via J1939RmUserTimeoutSupervision, and the parameter checkTimeout is TRUE, and the destination address is not the broadcast address (0xff): The J1939 Request Manager shall start timeout supervision.] (SRS_J1939_00026)

[SWS_J1939Rm_00029] [When an acknowledgement matching the request is received, when a configured COM RxIPduCallout is triggered which matches the request, or when a CDD or an application SW-C calls J1939Rm_CancelRequestTimeout, the timeout supervision of the request is stopped.] (SRS_J1939_00026)

[SWS_J1939Rm_00030] [If the timeout supervision for a request reaches 1.25s, the J1939 Request Manager shall call the <User>_RequestTimeoutIndication corresponding to the userId parameter of the initial J1939Rm_SendRequest.] (SRS_J1939_00026)

7.9 Routing of Requests and Acknowledgements

Depending on the configuration of J1939NmSharedAddressSpace and J1939NmExternalNodeGatewayedChannelRef referring to J1939NmChannels that reference the same ComMChannels as the J1939RmChannels, the Request,

Request2, and Acknowledgement messages need to be routed from one J1939RmChannel to another.

[SWS_J1939Rm_00127] [If J1939RmGatewaySupport is enabled, and a J1939RmChannel is linked to another J1939RmChannel via a J1939NmSharedAddressSpace: All Request, Request2, and Acknowledgement messages that are received on the first J1939RmChannel shall be forwarded to the second J1939RmChannel.] (SRS_J1939_00050)

Note: The complete path between two J1939RmChannels linked via a J1939NmSharedAddressSpace is:
J1939RmChannel -> J1939RmComMNetworkHandleRef -> ComMChannel <- J1939NmComMNetworkHandleRef <- J1939NmChannel <- J1939NmSharedChannelRef <- J1939NmSharedAddressSpace -> J1939NmSharedChannelRef -> J1939NmChannel -> J1939NmComMNetworkHandleRef -> ComMChannel <- J1939RmComMNetworkHandleRef <- J1939RmChannel

[SWS_J1939Rm_00128] [If J1939RmGatewaySupport is enabled, and a J1939RmChannel is referenced by another J1939RmChannel via a J1939NmExternalNodeGatewayedChannelRef: All Request, Request2, and Acknowledgement messages that are received on the first J1939Rm shall be forwarded to the second J1939RmChannel.] (SRS_J1939_00050)

Note: The complete path between two J1939RmChannels linked via a J1939NmExternalNodeGatewayedChannelRef is:
J1939RmChannel -> J1939RmComMNetworkHandleRef -> ComMChannel <- J1939NmComMNetworkHandleRef <- J1939NmChannel <- J1939NmExternalNodeGatewayedChannelRef <- J1939NmExternalNode -> J1939NmExternalNodeChannelRef -> J1939NmChannel -> J1939NmComMNetworkHandleRef -> ComMChannel <- J1939RmComMNetworkHandleRef <- J1939RmChannel

[SWS_J1939Rm_00129] [Request and Request2 messages shall only be forwarded if the destination address of the message is the global address (0xFF) or a destination address that does not correspond to any J1939NmNodePreferredAddress referenced by a J1939RmNode that references the J1939RmChannel on which the message was received.] (SRS_J1939_00050)

7.10 Error classification

Section 7.2 "Error Handling" of the document "General Specification of Basic Software Modules" [4] describes the error handling of the Basic Software in detail. Above all, it constitutes a classification scheme consisting of five error types which may occur in BSW modules.

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

7.10.1 Development Errors

[SWS_J1939Rm_00031]⌈

Type of error	*Related error code*	*Error value*
An API was called while the module was uninitialized	J1939RM_E_UNINIT	0x01
The Init API was called twice	J1939RM_E_REINIT	0x02
J1939Rm_Init was called with an invalid configuration pointer	J1939RM_E_INIT_FAILED	0x03
An API service was called with a NULL pointer	J1939RM_E_PARAM_POINTER	0x10
An API service was called with a wrong ID	J1939RM_E_INVALID_PDU_ SDU_ID	0x11
An API service was called with wrong network handle	J1939RM_E_INVALID_ NETWORK_ID	0x12
The API J1939Rm_SetState was called with a wrong state	J1939RM_E_INVALID_STATE	0x13
An API was called with an illegal user ID	J1939RM_E_INVALID_USER	0x14
An API was called with an unknown or illegal PGN	J1939RM_E_INVALID_PGN	0x15
An API was called with an illegal priority	J1939RM_E_INVALID_PRIO	0x16
An API was called with an illegal node address	J1939RM_E_INVALID_ ADDRESS	0x17
An API was called with an illegal Boolean option	J1939RM_E_INVALID_OPTION	0x18
An API was called with an illegal AckCode	J1939RM_E_INVALID_ACK_ CODE	0x19
An API was called with an illegal node ID	J1939RM_E_INVALID_NODE_ID	0x1a
An API was called with invalid extended identifier bytes	J1939RM_E_INVALID_EXTID_ INFO	0x1b

⌋()

7.10.2 Runtime Errors

Runtime errors have not yet been classified.

7.10.3 Transient Faults

There are no transient faults.

7.10.4 Production Errors

There are no production errors.

7.10.5 Extended Production Errors

There are no extended production errors.

8 API specification

8.1 API Parameter Checking

The J1939 Request Manager performs parameter checks for all called APIs. It reports the development error J1939RM_E_PARAM_POINTER when a call provides a NULL pointer, J1939RM_E_INVALID_PDU_SDU_ID when a check of a PDU/SDU ID fails, J1939RM_E_INVALID_NETWORK_ID when a check of a network handle fails, and J1939RM_E_INVALID_NODE_ID when a check of a node handle fails.

J1939RM_E_PARAM_POINTER shall be reported as specified in [4] by SWS_BSW_00212.

[SWS_J1939Rm_00033] ⌈If DET reporting is enabled via J1939RmDevErrorDetect, the J1939 Request Manager shall check PduIdType parameters (SDU/PDU IDs) of its API functions against the configured IDs, and shall report the development error J1939RM_E_INVALID_PDU_SDU_ID when an unknown ID is provided by the call.⌋ ()

[SWS_J1939Rm_00041] ⌈If DET reporting is enabled via J1939RmDevErrorDetect, the J1939 Request Manager shall check NetworkHandleType parameters (network handles) of its API functions against the referenced network handles of ComM, and shall report the development error J1939RM_E_INVALID_NETWORK_ID when an unknown handle is provided by the call.⌋ ()

[SWS_J1939Rm_00096] ⌈If DET reporting is enabled via J1939RmDevErrorDetect, the J1939 Request Manager shall check node handle parameters of its API functions against the node handles of J1939Nm referenced via J1939RmNmNodeRef, and shall report the development error J1939RM_E_INVALID_NODE_ID when an unknown handle is provided by the call.⌋ ()

8.2 Imported types

In this section, all types used by the J1939 Request Manager are listed together with the defining module:

[SWS_J1939Rm_00035]⌈

Module	*Header File*	*Imported Type*
ComStack_Types	ComStack_Types.h	NetworkHandleType
	ComStack_Types.h	PduIdType
	ComStack_Types.h	PduInfoType
	ComStack_Types.h	PduLengthType
Std	Std_Types.h	Std_ReturnType
	Std_Types.h	Std_VersionInfoType

](

8.3 Type definitions

8.3.1 J1939Rm_ConfigType

[SWS_J1939Rm_00036][

Name	J1939Rm_ConfigType	
Kind	Structure	
Elements	implementation specific	
	Type	--
	Comment	--
Description	This is the base type for the configuration of the J1939 Request Manager. A pointer to an instance of this structure will be used in the initialization of the J1939 Request Manager. The content of this structure is defined in chapter 10 Configuration specification.	
Available via	J1939Rm.h	

](

8.3.2 J1939Rm_StateType

[SWS_J1939Rm_00049][

Name	J1939Rm_StateType		
Kind	Enumeration		
Range	J1939RM_STATE_OFFLINE	0x00	Only Request for AC
	J1939RM_STATE_ONLINE	0x01	Normal communication
Description	This type represents the communication state of the J1939 Request Manager.		
Available via	J1939Rm.h		

](

8.4 Function definitions

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

8.4.1 J1939Rm_Init

[SWS_J1939Rm_00037][

Service Name	J1939Rm_Init	

Syntax	`void J1939Rm_Init (`
	`  const J1939Rm_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 Request Manager.	
Available via	J1939Rm.h	

](SRS_J1939_00012)

See section 7.2.1 for details.

See section 8.1 for parameter checks.

J1939RM_E_INIT_FAILED shall be reported as specified in [4] by SWS_BSW_00050.

8.4.2 J1939Rm_DeInit

[SWS_J1939Rm_00038][

Service Name	J1939Rm_DeInit

Syntax	`void J1939Rm_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 Request Manager to the uninitialized state.
Available via	J1939Rm.h

](SRS_J1939_00013)

See section 7.2.1 for details.

8.4.3 J1939Rm_GetVersionInfo

[SWS_J1939Rm_00039][

Service Name	J1939Rm_GetVersionInfo	
Syntax	`void J1939Rm_GetVersionInfo ( Std_VersionInfoType* versionInfo )`	
Service ID [hex]	0x03	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (in)	None	
Parameters (inout)	None	
Parameters (out)	versionInfo	Pointer to where to store the version information of this module.
Return value	None	
Description	Returns the version information of this module.	
Available via	J1939Rm.h	

](SRS_BSW_00407)

See section 8.3.4 “Get Version Information” of [4] for details.

See section 8.1 for parameter checks.

8.4.4 J1939Rm_SetState

[SWS_J1939Rm_00048][

Service Name	J1939Rm_SetState
Syntax	`Std_ReturnType J1939Rm_SetState ( NetworkHandleType channel, uint8 node, J1939Rm_StateType newState )`

Service ID [hex]	0x05	
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 J1939Rm shall enter, see definition of J1939Rm_ 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 J1939Rm to offline (only Request for AC supported) or online.	
Available via	J1939Rm.h	

]()

[SWS_J1939Rm_00040] [The J1939 Request Manager shall reject the state change by returning E_NOT_OK when the 'newState' is not in the valid range. If DET is enabled via J1939RmDevErrorDetect, the development error J1939RM_E_INVALID_STATE (see section 7.10) shall be reported.] ()

See section 7.2.1 for error handling and section 8.1 for parameter checks.

8.4.5 J1939Rm_SendRequest

[SWS_J1939Rm_00054][

Service Name	J1939Rm_SendRequest
Syntax	`Std_ReturnType J1939Rm_SendRequest ( uint8 userId, NetworkHandleType channel, uint32 requestedPgn, const J1939Rm_ExtIdInfoType* extIdInfo, uint8 destAddress, uint8 priority, boolean checkTimeout )`
Service ID [hex]	0x07
Sync/Async	Synchronous

Reentrancy	Reentrant	
Parameters (in)	userId	Identification of the calling module.
	channel	Channel on which the request shall be sent.
	requestedPgn	PGN of the requested PG.
	extIdInfo	Extended identifier bytes. J1939RM_EXTID_NONE is assumed if a NULL pointer is provided.
	destAddress	Address of the destination node or 0xFF for broadcast.
	priority	Priority of the Request PG.
	checkTimeout	TRUE: Timeout supervision will be performed FALSE: No timeout supervision will be started
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_Return-Type	E_OK: Transmission request is accepted E_NOT_OK: Transmission request is not accepted
Description	Requests transmission of a Request or Request2 PG.	
Available via	J1939Rm.h	

](SRS_J1939_00016)

[SWS_J1939Rm_00074] [The J1939Rm_SendRequest API function shall only be available if J1939RmUserSendRequest is set for at least one user.] ()

See section 7.6 for details.

[SWS_J1939Rm_00067] [The J1939 Request Manager shall reject transmission of a request by returning E_NOT_OK when the ‘requestedPGN’, the ‘extIdType’ element within the ‘extIdInfo’, the ‘destAddress’, or the ‘priority’ are not in the valid range, or when the ‘userId’ is not one of the configured user IDs (see J1939RmUserId), or when ‘checkTimeout’ is true but timeout handling is disabled for the calling module (see J1939RmUserTimeoutSupervision). If DET is enabled via J1939RmDevErrorDetect, the corresponding development error (see section 7.10) shall be reported: J1939RM_E_INVALID_USER for ‘userId’, J1939RM_E_INVALID_EXTID_INFO for 'extIdInfo', J1939RM_E_INVALID_PGN for ‘requestedPGN’, J1939RM_E_INVALID_PRIO for ‘priority’, J1939RM_E_INVALID_ADDRESS for ‘destAddress’, and J1939RM_E_INVALID_OPTION for ‘checkTimeout’.] ()

[SWS_J1939Rm_00068] [The J1939 Request Manager shall reject transmission of a request by returning E_NOT_OK when another request is pending and the request queue is full.] ()

See section 7.2.1 for further error handling and section 8.1 for further parameter checks.

8.4.6 J1939Rm_CancelRequestTimeout

[SWS_J1939Rm_00055][

Service Name	J1939Rm_CancelRequestTimeout	
Syntax	`Std_ReturnType J1939Rm_CancelRequestTimeout ( uint8 userId, NetworkHandleType channel, uint32 requestedPgn, const J1939Rm_ExtIdInfoType* extIdInfo, uint8 destAddress )`	
Service ID [hex]	0x08	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	userId	Identification of the calling module.
	channel	Channel on which the request was sent.
	requestedPgn	PGN of the requested PG.
	extIdInfo	Extended identifier bytes. J1939RM_EXTID_NONE is assumed if a NULL pointer is provided.
	destAddress	Address of the destination node or 0xFF for broadcast.
Parameters (inout)	None	
Parameters (out)	None	
Return value	Std_Return-Type	E_OK: Cancellation of request timeout was successful E_NOT_OK: Cancellation of request timeout was not successful
Description	Cancels timeout monitoring of a request. If the request is not active, or timeout monitoring was not requested, this call has no effect.	
Available via	J1939Rm.h	

](SRS_J1939_00026)

[SWS_J1939Rm_00075] [The J1939Rm_CancelRequestTimeout API function shall only be available if J1939RmUserTimeoutSupervision is set for at least one user.] ()

See section 7.8 for details.

[SWS_J1939Rm_00069] [The J1939 Request Manager shall ignore the timeout cancellation request when the ‘requestedPGN’, the ‘extIdType’ element within the ‘extIdInfo’, or the ‘destAddress’ are not in the valid range, or when the ‘userId’ is not one of the configured user IDs (see J1939RmUserId), or if no suitable entry can be found in the list of pending requests. If DET is enabled via J1939RmDevErrorDetect, the corresponding development error (see section 7.10) shall be reported: J1939RM_E_INVALID_USER for ‘userId’, J1939RM_E_INVALID_PGN for ‘requestedPGN’, J1939RM_E_INVALID_EXTID_INFO for 'extIdInfo', and J1939RM_E_INVALID_ADDRESS for ‘destAddress’.] ()

See section 7.2.1 for further error handling and section 8.1 for further parameter checks.

8.4.7 J1939Rm_SendAck

[SWS_J1939Rm_00056][

Service Name	J1939Rm_SendAck	

Syntax	`Std_ReturnType J1939Rm_SendAck (`
	`  uint8 userId,`
	`  NetworkHandleType channel,`
	`  uint32 ackPgn,`
	`  const J1939Rm_ExtIdInfoType* extIdInfo,`
	`  J1939Rm_AckCode ackCode,`
	`  uint8 ackAddress,`
	`  uint8 priority,`
	`  boolean broadcast`
	`)`	

Service ID [hex]	0x09	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	userId	Identification of the calling module.
	channel	Channel on which the acknowledgement shall be sent.
	ackPgn	Acknowledged PGN.
	extIdInfo	Extended identifier bytes. J1939RM_EXTID_NONE is assumed if a NULL pointer is provided.
	ackCode	Type of acknowledgement, see definition of J1939Rm_AckCode for available codes.
	ackAddress	Address of the node that sent the request.
	priority	Priority of the Acknowledgement PG.
	broadcast	Indicates whether the ACKM is a response to a broadcast request.
Parameters (inout)	None	

Parameters (out)	None	
Return value	Std_Return-Type	E_OK: Transmission request is accepted E_NOT_OK: Transmission request is not accepted
Description	Requests transmission of an Acknowledgement PG.	
Available via	J1939Rm.h	

](SRS_J1939_00017)

[SWS_J1939Rm_00076] [The J1939Rm_SendAck API function shall only be available if J1939RmUserSendAck is set for at least one user.] ()

See section 7.5 for details.

[SWS_J1939Rm_00070] [The J1939 Request Manager shall reject transmission of an acknowledgement by returning E_NOT_OK when the ‘ackPgn’, the ‘extIdType’ element within the ‘extIdInfo’, the ‘ackAddress’, or the ‘priority’ are not in the valid range, or when the ‘userId’ is not one of the configured user IDs (see J1939RmUserId). If DET is enabled via J1939RmDevErrorDetect, the corresponding development error (see section 7.10) shall be reported: J1939RM_E_INVALID_USER for 'userId', J1939RM_E_INVALID_EXTID_INFO for 'extIdInfo', J1939RM_E_INVALID_PGN for ‘ackPgn’, J1939RM_E_INVALID_ACK_CODE for ‘ackCode’, J1939RM_E_INVALID_ADDRESS for ‘ackAddress’, and J1939RM_E_INVALID_PRIO for ‘priority’.] ()

[SWS_J1939Rm_00071] [The J1939 Request Manager shall reject transmission of an acknowledgement by returning E_NOT_OK when another acknowledgement is pending and the acknowledgement queue is full.] ()

See section 7.2.1 for further error handling and section 8.1 for further parameter checks.

8.5 Call-back notifications

This is a list of functions provided for other modules.

8.5.1 J1939Rm_RxIndication

[SWS_J1939Rm_00058][

Service Name	J1939Rm_RxIndication

Syntax	`void J1939Rm_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	J1939Rm.h	

]()

[SWS_J1939Rm_00080] ⌈The J1939Rm_RxIndication call back function shall only be available if J1939RmUserAckIndication or J1939RmUserRequestIndication is set for at least one user.⌋ ()

See sections 7.4 and 7.7 for details.

See section 7.2.1 for error handling and section 8.1 for parameter checks.

8.5.2 J1939Rm_TxConfirmation

[SWS_J1939Rm_00059]⌈

Service Name	J1939Rm_TxConfirmation	
Syntax	`void J1939Rm_TxConfirmation ( PduIdType TxPduId, Std_ReturnType result )`	
Service ID [hex]	0x40	
Sync/Async	Synchronous	
Reentrancy	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in)	TxPduId	ID of the PDU that has been transmitted.
	result	E_OK: The PDU was transmitted. E_NOT_OK: Transmission of the PDU failed.

Parameters (inout)	None
Parameters (out)	None
Return value	None
Description	The lower layer communication interface module confirms the transmission of a PDU, or the failure to transmit a PDU.
Available via	J1939Rm.h

]()

[SWS_J1939Rm_00081] ⌈The J1939Rm_TxConfirmation call back function shall only be available if J1939RmUserSendAck or J1939RmUserSendRequest is set for at least one user.⌋ ()

See sections 7.5 and 7.6 for details.

See section 7.2.1 for error handling and section 8.1 for parameter checks.

8.5.3 J1939Rm_CheckReceivedComIPdu

[SWS_J1939Rm_00062]⌈

Service Name	J1939Rm_CheckReceivedComIPdu	

Syntax	`boolean J1939Rm_CheckReceivedComIPdu (`
	`  PduIdType PduId,`
	`  const PduInfoType* PduInfoPtr`
	`)`	

Service ID [hex]	0x28	
Sync/Async	Synchronous	
Reentrancy	Reentrant for different PduIds. Non reentrant for the same PduId.	
Parameters (in)	PduId	ID of the received ComIPdu.
	PduInfoPtr	Length (SduLength) of the received ComIPdu and a pointer to the data of the ComIPdu (SduDataPtr).
Parameters (inout)	None	
Parameters (out)	None	
Return value	boolean	Shall be always true to ensure the ComIPdu is received.
Description	Reports a received ComIPdu. If this ComIPdu was requested via J1939Rm_Send Request or the SendRequest service operation, a request timeout for this request is stopped.	

Available via	J1939Rm_Com.h

](

[SWS_J1939Rm_00079] [The J1939Rm_CheckReceivedComIPdu call back function shall only be available if J1939RmUserTimeoutSupervision is set for at least one user.] ()

See section 7.8 for details.

See section 7.2.1 for error handling and section 8.1 for parameter checks.

8.6 Scheduled functions

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

8.6.1 J1939Rm_MainFunction

[SWS_J1939Rm_00042][

Service Name	J1939Rm_MainFunction

Syntax	`void J1939Rm_MainFunction (`
	`  void`
	`)`

Service ID [hex]	0x04
Description	Main function of the J1939 Request Manager. Used for scheduling purposes and timeout supervision.
Available via	SchM_J1939Rm.h

](

[SWS_J1939Rm_00043] [The frequency of invocations of J1939Rm_MainFunction is determined by the configuration parameter J1939RmMainFunctionPeriod.] ()

8.7 Expected Interfaces

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

8.7.1 Mandatory Interfaces

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

[SWS_J1939Rm_00044][

API Function	*Header File*	*Description*
PduR_J1939RmTransmit	PduR_J1939Rm.h	Requests transmission of a PDU.

]()

8.7.2 Optional Interfaces

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

[SWS_J1939Rm_00045]⌈

API Function	*Header File*	*Description*
Com_TriggerI-PDUSend-WithMetaData	Com.h	By a call to Com_TriggerIPDUSendWithMetaData the AUTOSAR COM module updates its internal metadata for the I-PDU with the given ID by copying the metadata from the given position and with respect to length of the globally configured MetaDataType of this I-PDU. Then the I-PDU is triggered for transmission.
Det_Report-Error	Det.h	Service to report development errors.
J1939Dcm_-Request-Indication	J1939Dcm.h	Indicates reception of a Request or Request2 PG.
J1939Nm_-Request-Indication	J1939Nm.h	Indicates reception of a Request or Request2 PG.

]()
[SWS_J1939Rm_00082] ⌈The Com_TriggerIPDUSendWithMetaData function is only required if at least one J1939RmComUser is configured.⌋ ()

[SWS_J1939Rm_00083] ⌈The J1939Dcm_RequestIndication function is only required if at least one J1939RmDcmUser is configured.⌋ ()

[SWS_J1939Rm_00084] ⌈The J1939Nm_RequestIndication function is only required if at least one J1939RmNmUser is configured.⌋ ()

8.7.3 Configurable interfaces

In this section, all interfaces are listed where the target function could be configured. The target function is usually a call-back function. The name of this kind of interfaces is not fixed because they are configurable.

8.7.3.1 <User>_RequestIndication

[SWS_J1939Rm_00063]⌈

Service Name	< User >_RequestIndication	

Syntax	`void < User >_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	configurable	

](SRS_J1939_00014)

[SWS_J1939Rm_00085] [The configured <User>_RequestIndication function shall be available for each user that has J1939RmUserRequestIndication enabled.] ()

See section 7.4 for details.

8.7.3.2 <User>_AckIndication

[SWS_J1939Rm_00064][

Service Name	< User >_AckIndication

Syntax	`void < User >_AckIndication (`
	`  uint8 node,`
	`  NetworkHandleType channel,`

	`uint32 ackPgn,`
	`const J1939Rm_ExtIdInfoType* extIdInfo,`
	`J1939Rm_AckCode ackCode,`
	`uint8 ackAddress,`
	`uint8 sourceAddress,`
	`uint8 priority`
	`)`	

Service ID [hex]	0x4d	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	node	Node by which the acknowledgement was received.
	channel	Channel on which the acknowledgement was received.
	ackPgn	Acknowledged PGN.
	extIdInfo	Extended identifier bytes.
	ackCode	Type of acknowledgement, see definition of J1939Rm_AckCode for available codes.
	ackAddress	Address of this node.
	source Address	Address of the node that sent the Acknowledgement PG.
	priority	Priority of the Acknowledgement PG.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	Indicates reception of an Acknowledgement PG.	
Available via	configurable	

](SRS_J1939_00015)

[SWS_J1939Rm_00086] [The configured <User>_AckIndication function shall be available for each user that has J1939RmUserAckIndication enabled.] ()

See section 7.7 for details.

8.7.3.3 <User>_RequestTimeoutIndication

[SWS_J1939Rm_00065][

Service Name	< User >_RequestTimeoutIndication
Syntax	`void < User >_RequestTimeoutIndication (`

	uint8 node, NetworkHandleType channel, uint32 requestedPgn, const J1939Rm_ExtIdInfoType* extIdInfo, uint8 destAddress)	
Service ID [hex]	0x4e	
Sync/Async	Synchronous	
Reentrancy	Reentrant	
Parameters (in)	node	Node by which the request was sent.
	channel	Channel on which the request was sent.
	requestedPgn	PGN of the requested PG.
	extIdInfo	Extended identifier bytes.
	destAddress	Address of the destination node or 0xFF for broadcast.
Parameters (inout)	None	
Parameters (out)	None	
Return value	None	
Description	Indicates timeout of a request triggered with the same parameters.	
Available via	configurable	

](SRS_J1939_00026)

[SWS_J1939Rm_00087] [The configured <User>_RequestTimeoutIndication function shall be available for each user that has J1939RmUserTimeoutSupervision enabled.] ()

See section 7.8 for details.

8.8 Service Port Descriptions

This section defines the client server interfaces and the derived service ports used by J1939Rm to communicate with application software components (SWCs).

8.8.1 Provided Service Ports

These service ports provide API functions of the J1939Rm to the application SWCs.

Please note: All three ports use a port defined argument value to provide the userId argument of the corresponding BSW interfaces.

8.8.1.1 J1939Rm_SendAck

[SWS_J1939Rm_00098]⌈

Name	J1939Rm_SendAck_{user}		
Kind	Provided Port	***Interface***	AppSendAck
Description	--		
Port Defined Argument Value(s)	***Type***	uint8	
	Value	{ecuc(J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser/J1939RmRteUser/J1939RmUserId.value)}	
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportAckTransmission)} == true user = {ecuc(J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser.SHORT-NAME)}		

⌋(SRS_J1939_00017)

8.8.1.2 J1939Rm_SendRequest

[SWS_J1939Rm_00097]⌈

Name	J1939Rm_SendRequest_{user}		
Kind	Provided Port	***Interface***	AppSendRequest
Description	--		
Port Defined Argument Value(s)	***Type***	uint8	
	Value	{ecuc(J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser/J1939RmRteUser/J1939RmUserId.value)}	
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportRequestTransmission)} == true user = {ecuc(J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser.SHORT-NAME)}		

⌋(SRS_J1939_00016)

8.8.1.3 J1939Rm_CancelRequestTimeout

[SWS_J1939Rm_00099]⌈

Name	J1939Rm_CancelRequestTimeout_{user}		
Kind	Provided Port	***Interface***	AppCancelRequestTimeout
Description	--		
Port Defined	***Type***	uint8	

Argument Value(s)	***Value***	{ecuc(J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser/J1939RmRteUser/J1939RmUserId.value)}
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportTimeoutSupervision)} == true user = {ecuc(J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser.SHORT-NAME)}	

](SRS_J1939_00026)

8.8.2 Required Service Ports

These service ports provide call back functions of the J1939Rm to the application SWCs.

8.8.2.1 J1939Rm_AckIndication

[SWS_J1939Rm_00101][

Name	J1939Rm_AckIndication_{user}		
Kind	RequiredPort	***Interface***	AppAckIndication
Description	--		
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportAckIndication)} == true user = {ecuc(J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser.SHORT-NAME)}		

](SRS_J1939_00015)

8.8.2.2 J1939Rm_RequestIndication

[SWS_J1939Rm_00100][

Name	J1939Rm_RequestIndication_{user}		
Kind	RequiredPort	***Interface***	AppRequestIndication
Description	--		
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportRequestIndication)} == true user = {ecuc(J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser.SHORT-NAME)}		

](SRS_J1939_00014)

8.8.2.3 J1939Rm_RequestTimeoutIndication

[SWS_J1939Rm_00102][

Name	J1939Rm_RequestTimeoutIndication_{user}		
Kind	RequiredPort	***Interface***	AppRequestTimeoutIndication

Description	--
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportTimeoutSupervision)} == true user = {ecuc(J1939Rm/J1939RmConfigSet/J1939RmNode/J1939RmUser.SHORT-NAME)}

](SRS_J1939_00026)

8.8.3 Client-Server Interfaces

This section lists the client-server interfaces used by the ports provided and required by the J1939 Request Manager.

Please note: The availability of these interfaces depends on the configuration of the J1939 Request Manager. The relevant parameters of the J1939 Request Manager configuration are listed as “Variation” of the operations.

8.8.3.1 AppSendAck

[SWS_J1939Rm_00103][

Name	AppSendAck		
Comment	--		
IsService	true		
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportAckTransmission)} == true		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	SendAck	
Comment	Requests transmission of an Acknowledgement PG.	
Variation	--	
Parameters	channel	
	Type	NetworkHandleType
	Direction	IN
	Comment	Channel on which the acknowledgement shall be sent.
	Variation	--
	ackPgn	
	Type	uint32
	Direction	IN
	Comment	Acknowledged PGN.

	Variation	--
	extIdInfo	
	Type	J1939Rm_ExtIdInfoType
	Direction	IN
	Comment	--
	Variation	--
	ackCode	
	Type	J1939Rm_AckCode
	Direction	IN
	Comment	Type of acknowledgement, see definition of J1939Rm_AckCode for available codes.
	Variation	--
	ackAddress	
	Type	uint8
	Direction	IN
	Comment	Address of the node that sent the request.
	Variation	--
	priority	
	Type	uint8
	Direction	IN
	Comment	Priority of the Acknowledgement PG.
	Variation	--
	broadcast	
	Type	boolean
	Direction	IN
	Comment	Indicates whether the ACKM is a response to a broadcast request.
	Variation	--
Possible Errors	E_OK E_NOT_OK	

](SRS_J1939_00017)

8.8.3.2 AppSendRequest

[SWS_J1939Rm_00104][

Name	AppSendRequest		
Comment	--		
IsService	true		
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportRequestTransmission)} == true		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	SendRequest	
Comment	Requests transmission of a Request or Request2 PG.	
Variation	--	
Parameters	channel	
	Type	NetworkHandleType
	Direction	IN
	Comment	Channel on which the request shall be sent.
	Variation	--
	requestedPgn	
	Type	uint32
	Direction	IN
	Comment	PGN of the requested PG.
	Variation	--
	extIdInfo	
	Type	J1939Rm_ExtIdInfoType
	Direction	IN
	Comment	--
	Variation	--
	destAddress	
	Type	uint8
	Direction	IN
	Comment	Address of the destination node or 0xFF for broadcast.
	Variation	--

	priority	
	Type	uint8
	Direction	IN
	Comment	Priority of the Request PG.
	Variation	--
	checkTimeout	
	Type	boolean
	Direction	IN
	Comment	TRUE: Timeout supervision will be performed FALSE: No timeout supervision will be started
	Variation	--
Possible Errors	E_OK E_NOT_OK	

](SRS_J1939_00016)

8.8.3.3 AppCancelRequestTimeout

[SWS_J1939Rm_00105][

Name	AppCancelRequestTimeout		
Comment	--		
IsService	true		
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportTimeoutSupervision)} == true		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	CancelRequestTimeout	
Comment	Cancels timeout monitoring of a request. If the request is not active, or timeout monitoring was not requested, this call has no effect.	
Variation	--	
Parameters	channel	
	Type	NetworkHandleType
	Direction	IN
	Comment	Channel on which the request was sent.
	Variation	--
	requestedPgn	

	Type	uint32
	Direction	IN
	Comment	PGN of the requested PG.
	Variation	--
	extIdInfo	
	Type	J1939Rm_ExtIdInfoType
	Direction	IN
	Comment	--
	Variation	--
	destAddress	
	Type	uint8
	Direction	IN
	Comment	Address of the destination node or 0xFF for broadcast.
	Variation	--
Possible Errors	E_OK E_NOT_OK	

](SRS_J1939_00026)

8.8.3.4 AppAckIndication

[SWS_J1939Rm_00106][

Name	AppAckIndication		
Comment	--		
IsService	true		
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportAckIndication)} == true		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	AckIndication	
Comment	Indicates reception of an Acknowledgement PG.	
Variation	--	
Parameters	node	
	Type	uint8

	Direction	IN
	Comment	Node by which the acknowledgement was received.
	Variation	--
	channel	
	Type	NetworkHandleType
	Direction	IN
	Comment	Channel on which the acknowledgement was received.
	Variation	--
	ackPgn	
	Type	uint32
	Direction	IN
	Comment	Acknowledged PGN.
	Variation	--
	extIdInfo	
	Type	J1939Rm_ExtIdInfoType
	Direction	IN
	Comment	Extended identifier bytes.
	Variation	--
	ackCode	
	Type	J1939Rm_AckCode
	Direction	IN
	Comment	Type of acknowledgement, see definition of J1939Rm_AckCode for available codes.
	Variation	--
	ackAddress	
	Type	uint8
	Direction	IN
	Comment	Address of this node.
	Variation	--
	sourceAddress	
	Type	uint8

	Direction	IN
	Comment	Address of the node that sent the Acknowledgement PG.
	Variation	--
	priority	
	Type	uint8
	Direction	IN
	Comment	Priority of the Acknowledgement PG.
	Variation	--
Possible Errors	E_OK E_NOT_OK	

](SRS_J1939_00015)

8.8.3.5 AppRequestIndication

[SWS_J1939Rm_00107][

Name	AppRequestIndication		
Comment	--		
IsService	true		
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportRequestIndication)} == true		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	RequestIndication	
Comment	Indicates reception of a Request or Request2 PG.	
Variation	--	
Parameters	node	
	Type	uint8
	Direction	IN
	Comment	Node by which the request was received.
	Variation	--
	channel	
	Type	NetworkHandleType
	Direction	IN

	Comment	Channel on which the request was received.
	Variation	--
	requestedPgn	
	Type	uint32
	Direction	IN
	Comment	PGN of the requested PG.
	Variation	--
	extIdInfo	
	Type	J1939Rm_ExtIdInfoType
	Direction	IN
	Comment	Extended identifier bytes.
	Variation	--
	sourceAddress	
	Type	uint8
	Direction	IN
	Comment	Address of the node that sent the Request PG.
	Variation	--
	destAddress	
	Type	uint8
	Direction	IN
	Comment	Address of this node or 0xFF for broadcast.
	Variation	--
	priority	
	Type	uint8
	Direction	IN
	Comment	Priority of the Request PG.
	Variation	--
Possible Errors	E_OK E_NOT_OK	

](SRS_J1939_00014)

8.8.3.6 AppRequestTimeoutIndication

[SWS_J1939Rm_00108][

Name	AppRequestTimeoutIndication		
Comment	--		
IsService	true		
Variation	{ecuc(J1939Rm/J1939RmGeneral.J1939RmSupportTimeoutSupervision)} == true		
Possible Errors	0	E_OK	Operation successful
	1	E_NOT_OK	Operation failed

Operation	RequestTimeoutIndication	
Comment	Indicates timeout of a request triggered with the same parameters.	
Variation	--	
Parameters	node	
	Type	uint8
	Direction	IN
	Comment	Node by which the request was sent.
	Variation	--
	channel	
	Type	NetworkHandleType
	Direction	IN
	Comment	Channel on which the request was sent.
	Variation	--
	requestedPgn	
	Type	uint32
	Direction	IN
	Comment	PGN of the requested PG.
	Variation	--
	extIdInfo	
	Type	J1939Rm_ExtIdInfoType
	Direction	IN
	Comment	Extended identifier bytes.

	Variation	--
	destAddress	
	Type	uint8
	Direction	IN
	Comment	Address of the destination node or 0xFF for broadcast.
	Variation	--
Possible Errors	E_OK E_NOT_OK	

](SRS_J1939_00026)

8.8.4 Implementation Data Types

In this section, the implementation data types used by the client-server interfaces of the J1939 Request Manager are listed.

Please note: It is essential that the implementation of the J1939 Request Manager does not define these data types twice, by including them both from the RTE generated header and the own types header.

8.8.4.1 J1939Rm_AckCode

[SWS_J1939Rm_00057][

Name	J1939Rm_AckCode		
Kind	Enumeration		
Range	J1939RM_ACK_POSITIVE	0x00	Positive Acknowledgement
	J1939RM_ACK_NEGATIVE	0x01	Negative Acknowledgement
	J1939RM_ACK_ACCESS_DENIED	0x02	Access Denied
	J1939RM_ACK_CANNOT_RESPOND	0x03	Cannot Respond
Description	This type represents the available kinds of acknowledgements.		
Variation	--		
Available via	Rte_J1939Rm_Type.h		

]()

[SWS_J1939Rm_91000][

Name	J1939Rm_ExtIdType		
Kind	Enumeration		
Range	J1939RM_EXTID_NONE	0x00	No extended identifier bytes (0)

	J1939RM_EXTID_ONE	0x01	One extended identifier byte (1)
	J1939RM_EXTID_TWO	0x02	Two extended identifier bytes (2)
	J1939RM_EXTID_THREE	0x03	Three extended identifier bytes (3)
	J1939RM_EXTID_GF	0x04	Group function value, only for ACKM (4)
Description	This type represents the available kinds of extended identifier usage.		
Variation	--		
Available via	Rte_J1939Rm_Type.h		

]()

[SWS_J1939Rm_91001][

Name	J1939Rm_ExtIdInfoType	
Kind	Structure	
Elements	extIdType	
	Type	J1939Rm_ExtIdType
	Comment	Denotes the number of extended identifier bytes.
	extId1	
	Type	uint8
	Comment	First extended identifier byte or group function for ACKM.
	extId2	
	Type	uint8
	Comment	Second extended identifier byte.
	extId3	
	Type	uint8
	Comment	Third extended identifier byte.
Description	This type represents a set of extended identifiers.	
Variation	--	
Available via	Rte_J1939Rm_Type.h	

]()

9 Sequence diagrams

The following sequence diagrams shall give an impression of the way the J1939 Request Manager shall behave and interoperate with other BSW modules. They are not complete and not binding for the implementation.

9.1 Reception of Request PG

The following diagram shows the interaction with PduR and a J1939Rm User when a Request PG is received.

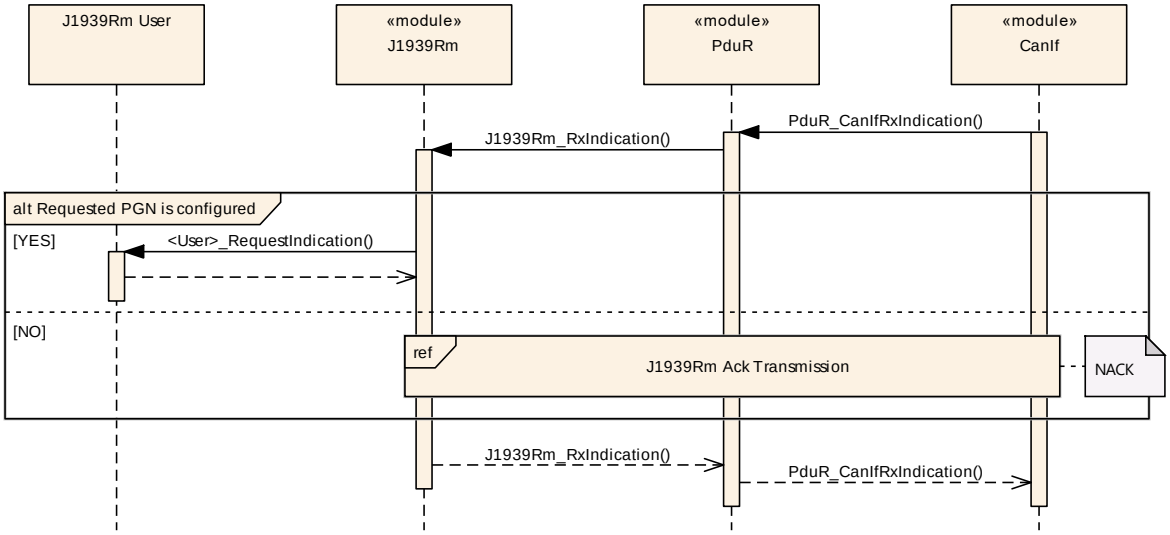

Figure 1: Reception of Request PG

9.2 Transmission of Acknowledgement PG

The following diagram shows the interaction with a J1939Rm User and PduR when an Acknowledgement PG is transmitted.

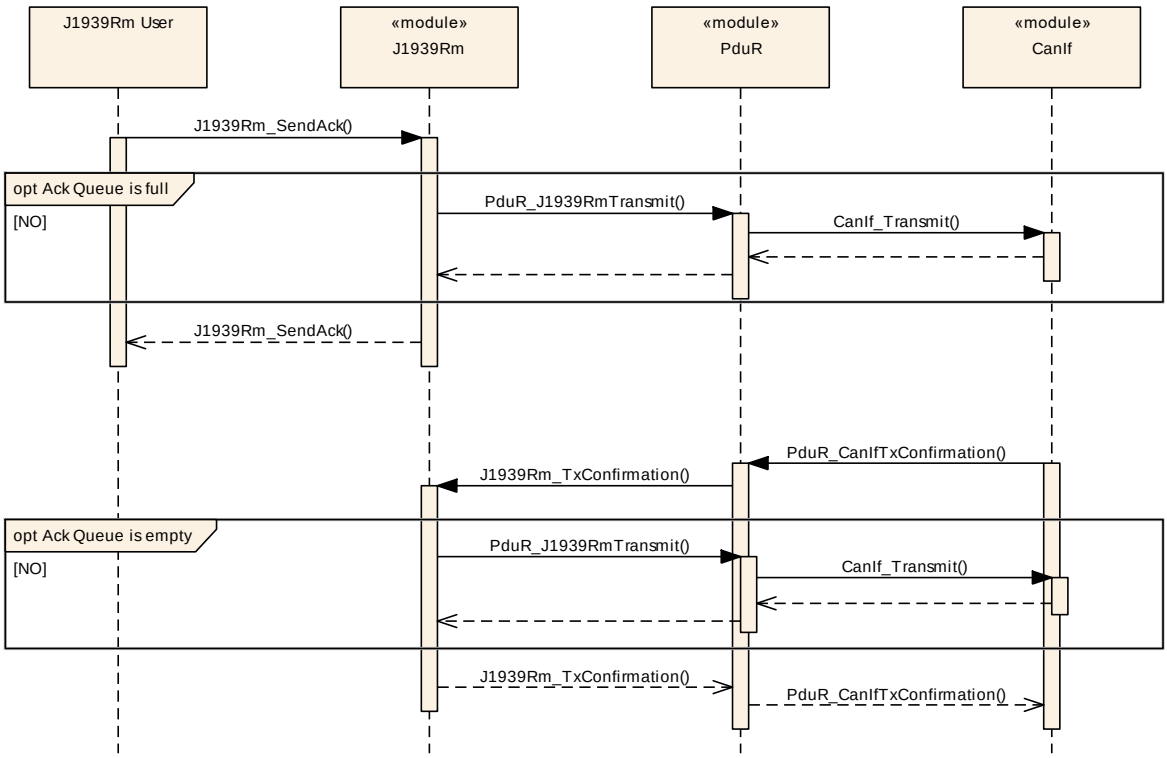

Figure 2: Transmission of Acknowledgement PG

9.3 Handling of Request for a COM Pdu

The following diagram shows the interaction with PduR and COM when the J1939 Request Manager receives a Request for a PG of PDU1 format that is transmitted as COM Pdu.

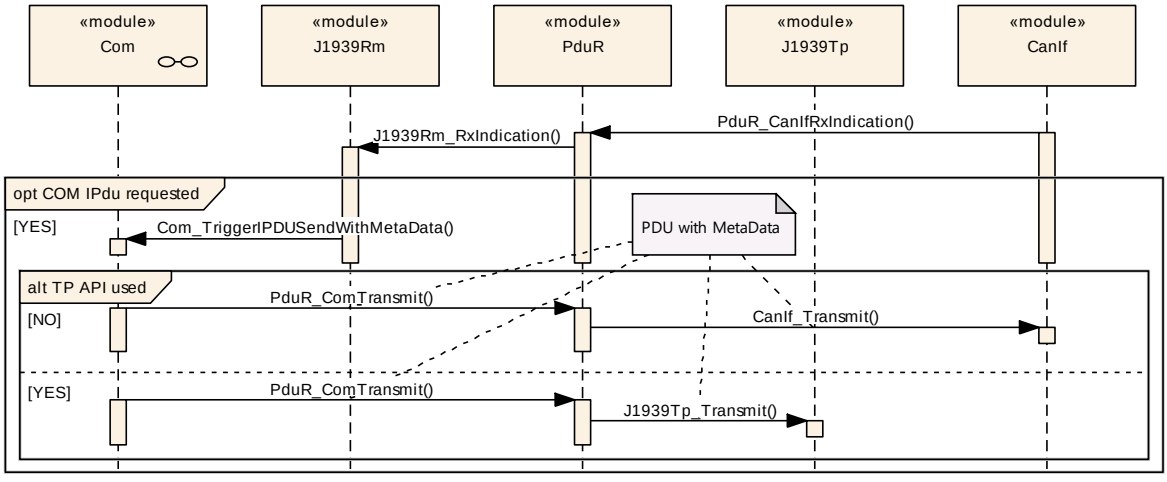

Figure 3: Handling of Request for a COM Pdu with PDU1 format

9.4 Handling of Request for a Diagnostic Pdu

The following diagram shows the interaction with PduR and J1939Dcm when a Request for a diagnostic PG is received.

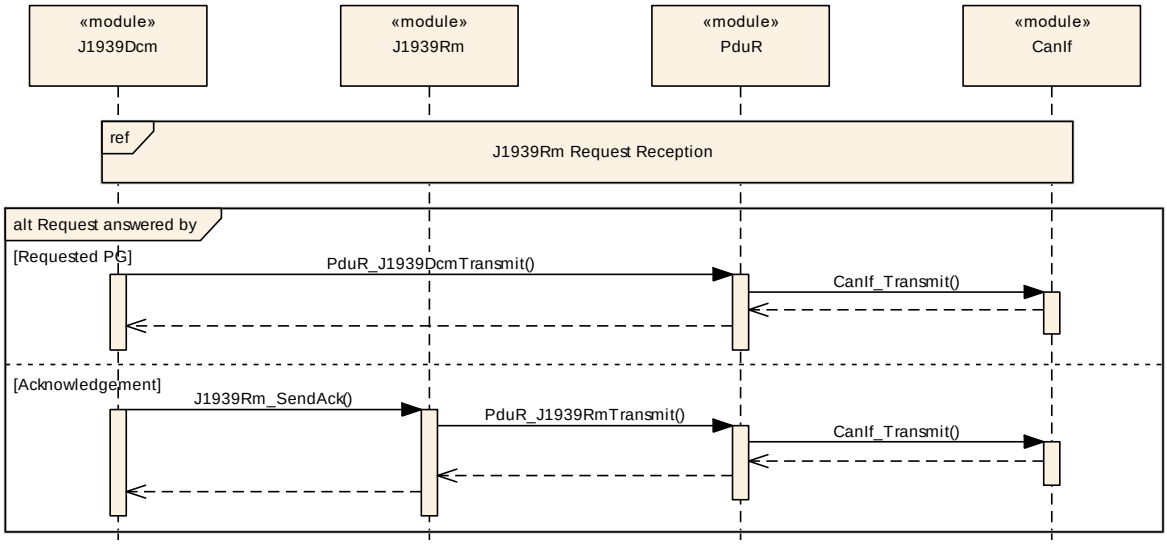

Figure 4: Handling of Request for a Diagnostic Pdu

9.5 Transmission of Request PG

The following diagram shows the interaction with a J1939Rm User and PduR when a Request PG is transmitted.

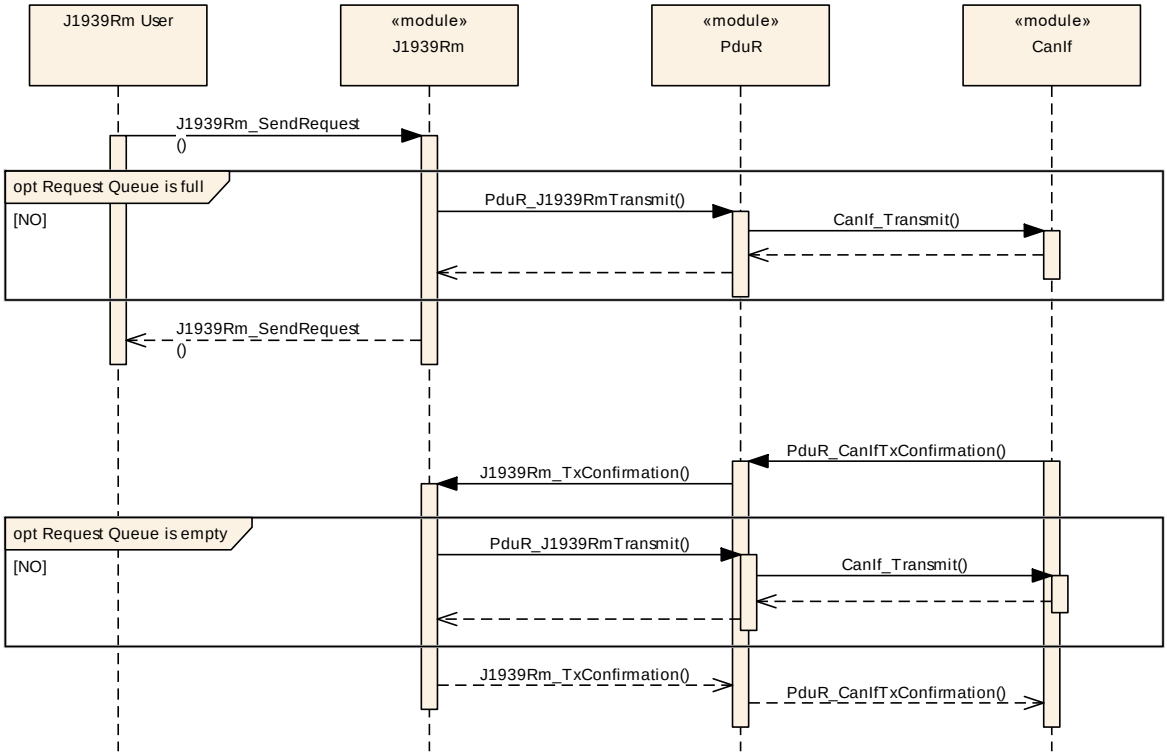

Figure 5: Transmission of Request PG

9.6 Reception of Acknowledgement PG

The following diagram shows the interaction with PduR and a J1939Rm User when an Acknowledgement PG is received.

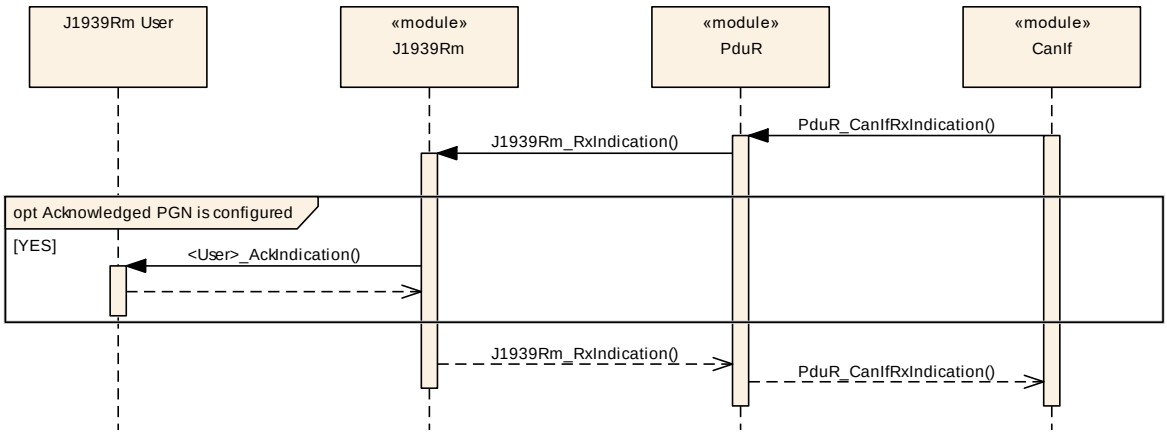

Figure 6: Reception of Acknowledgement PG

9.7 Monitoring of Request Timeout

The following diagram shows the interaction with a J1939Rm User and PduR when the J1939Rm monitors timeout of a transmitted Request PG.

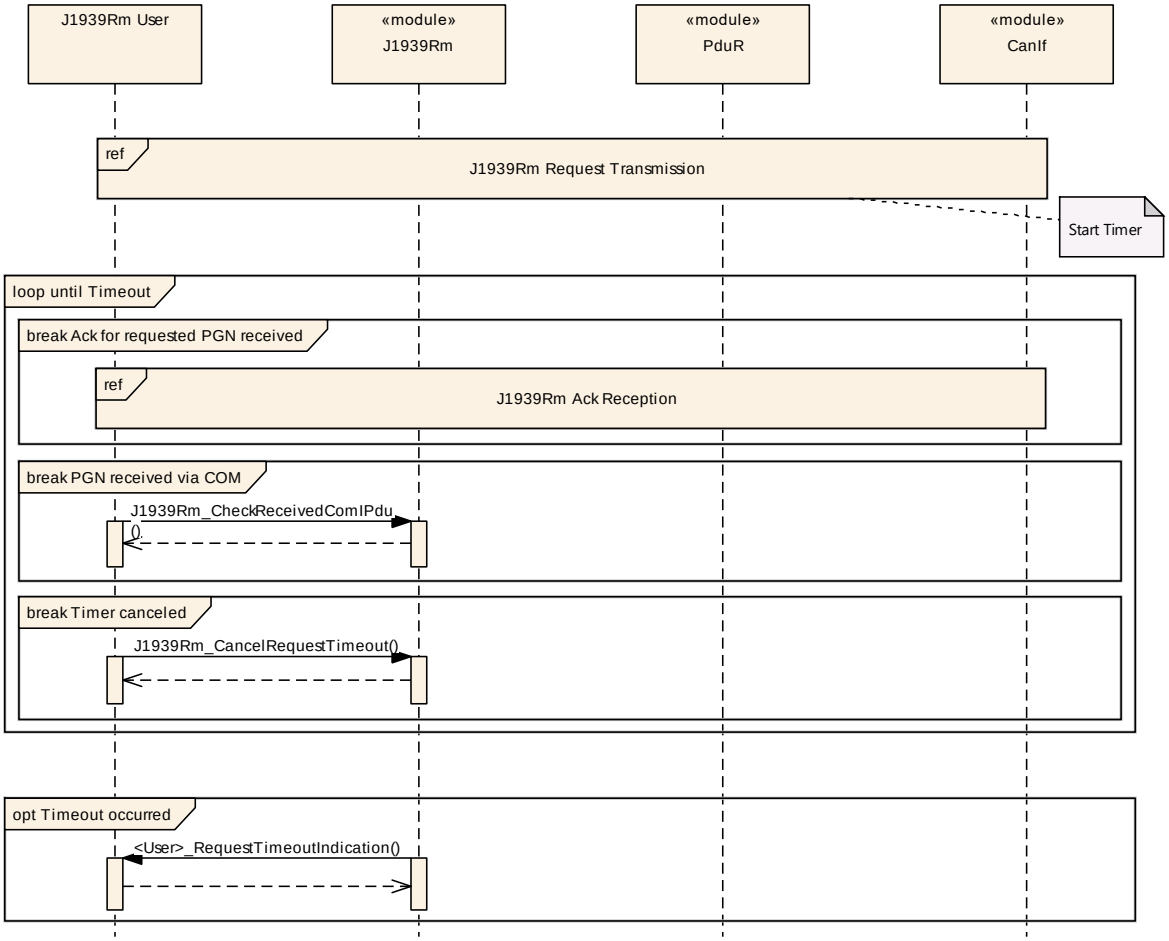

Figure 7: Monitoring of Request Timeout

10 Configuration specification

In general, this chapter defines configuration parameters and their clustering into containers. For general information about the definition of containers and parameters, refer to the chapter 10.1 “Introduction to configuration specification” in the SWS BSW General [4].

Section 10.1 specifies the structure (containers) and the parameters of the J1939 Request Manager.

Section 10.2 specifies published information of the J1939 Request Manager.

10.1 Containers and configuration parameters

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

The following pictures show an overview of the configuration parameters available for J1939Rm:

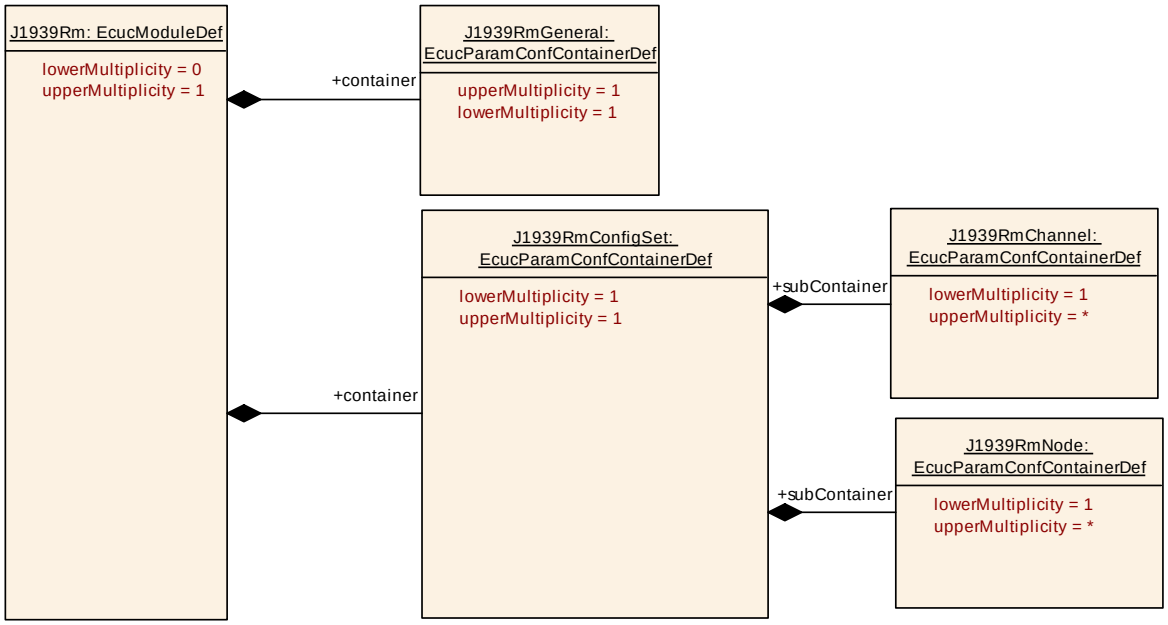

Figure 8: Configuration container J1939Rm with subcontainer J1939RmConfigSet

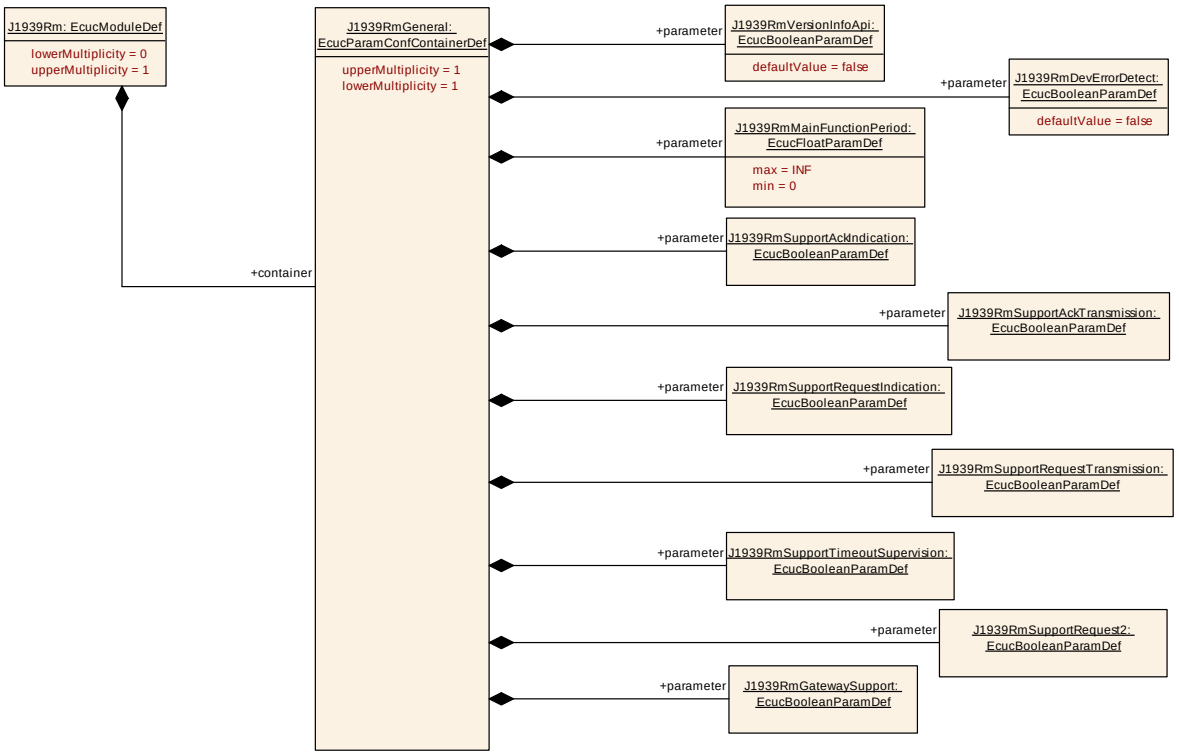

Figure 9: Configuration container J1939RmGeneral

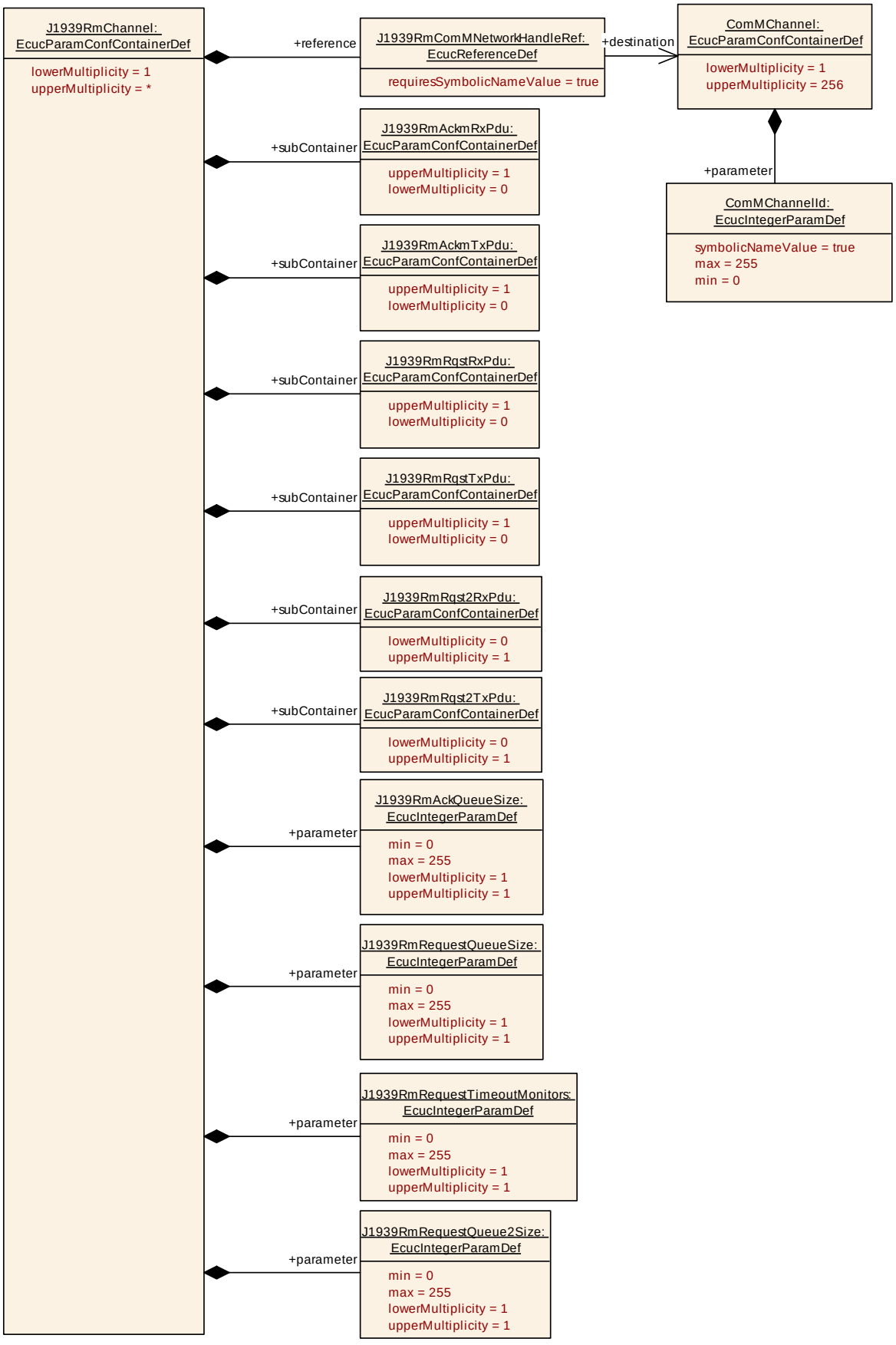

Figure 10: Configuration container J1939RmChannel

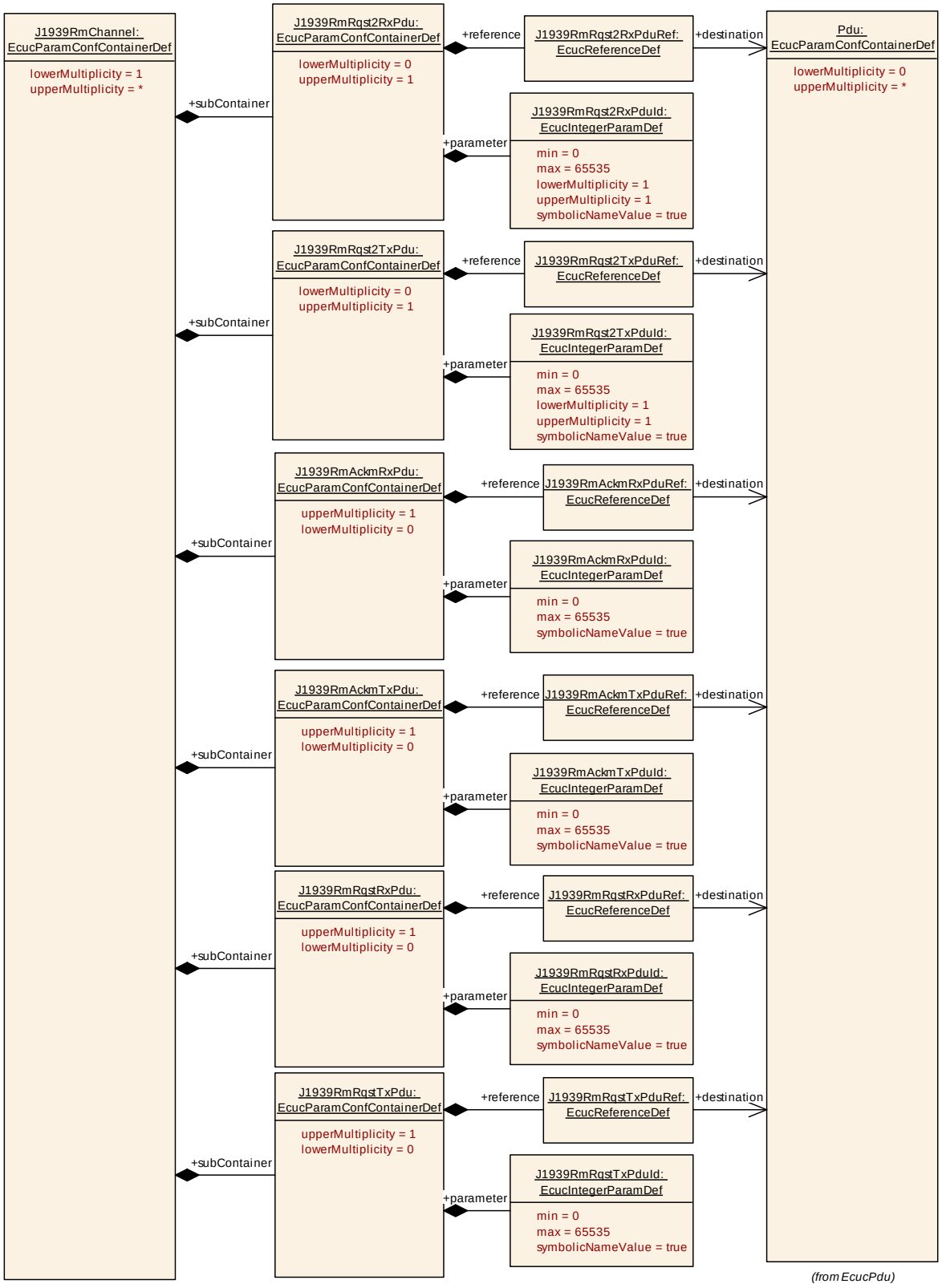

Figure 11: Configuration container J1939RmChannel with PDUs

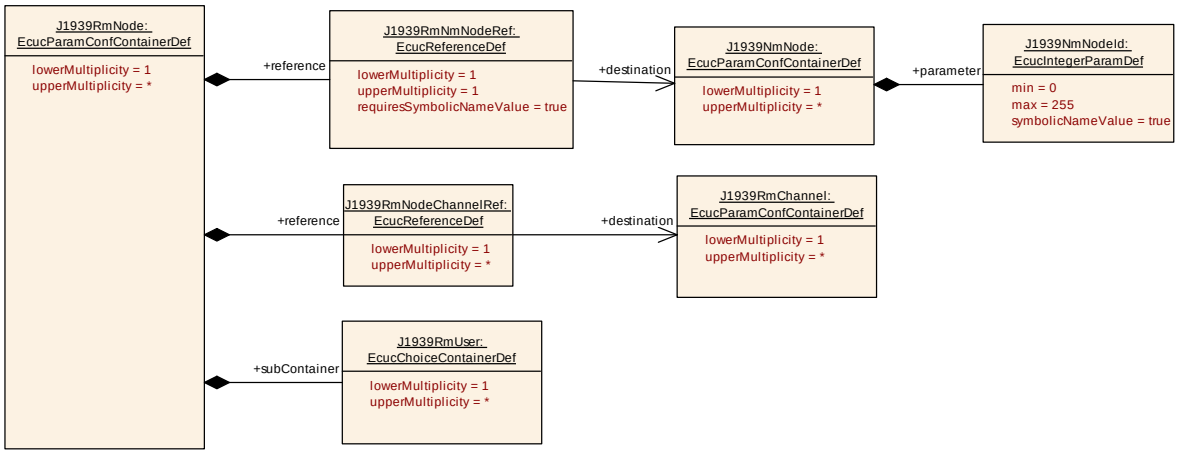

Figure 12: Configuration container J1939RmNode

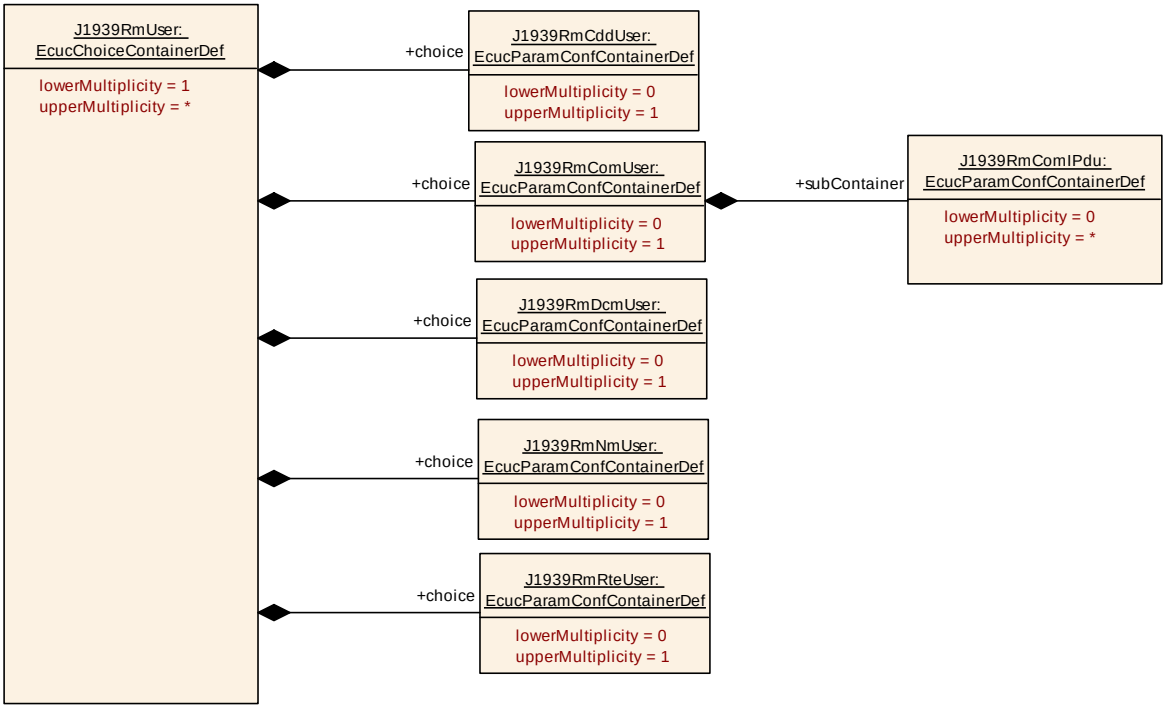

Figure 13: Configuration container J1939RmUser

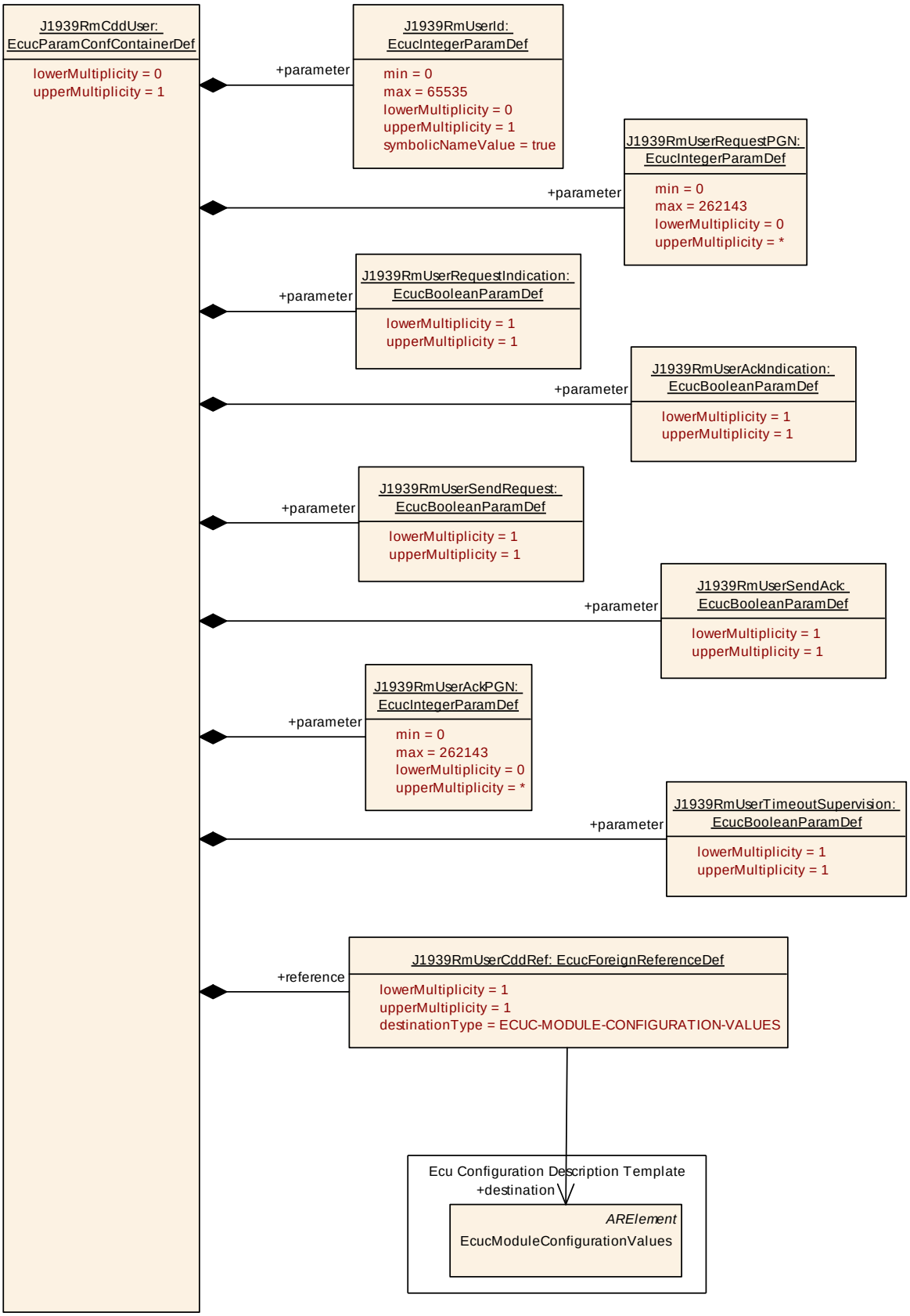

Figure 14: Configuration container J1939RmCddUser

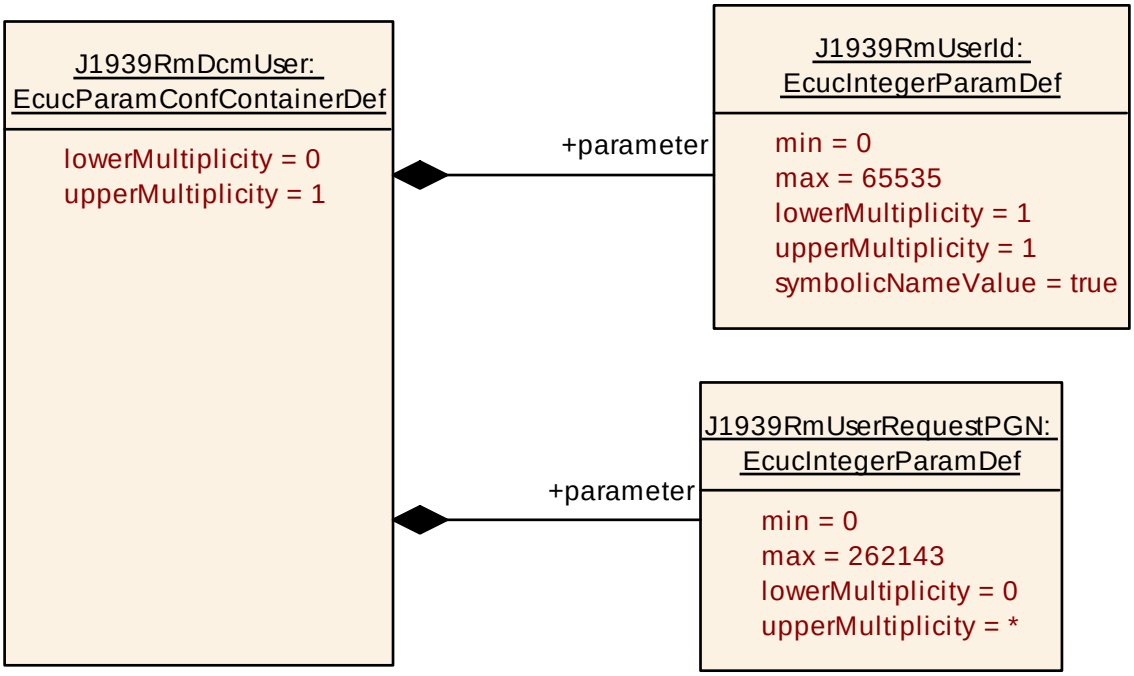

Figure 15: Configuration container J1939RmDcmUser

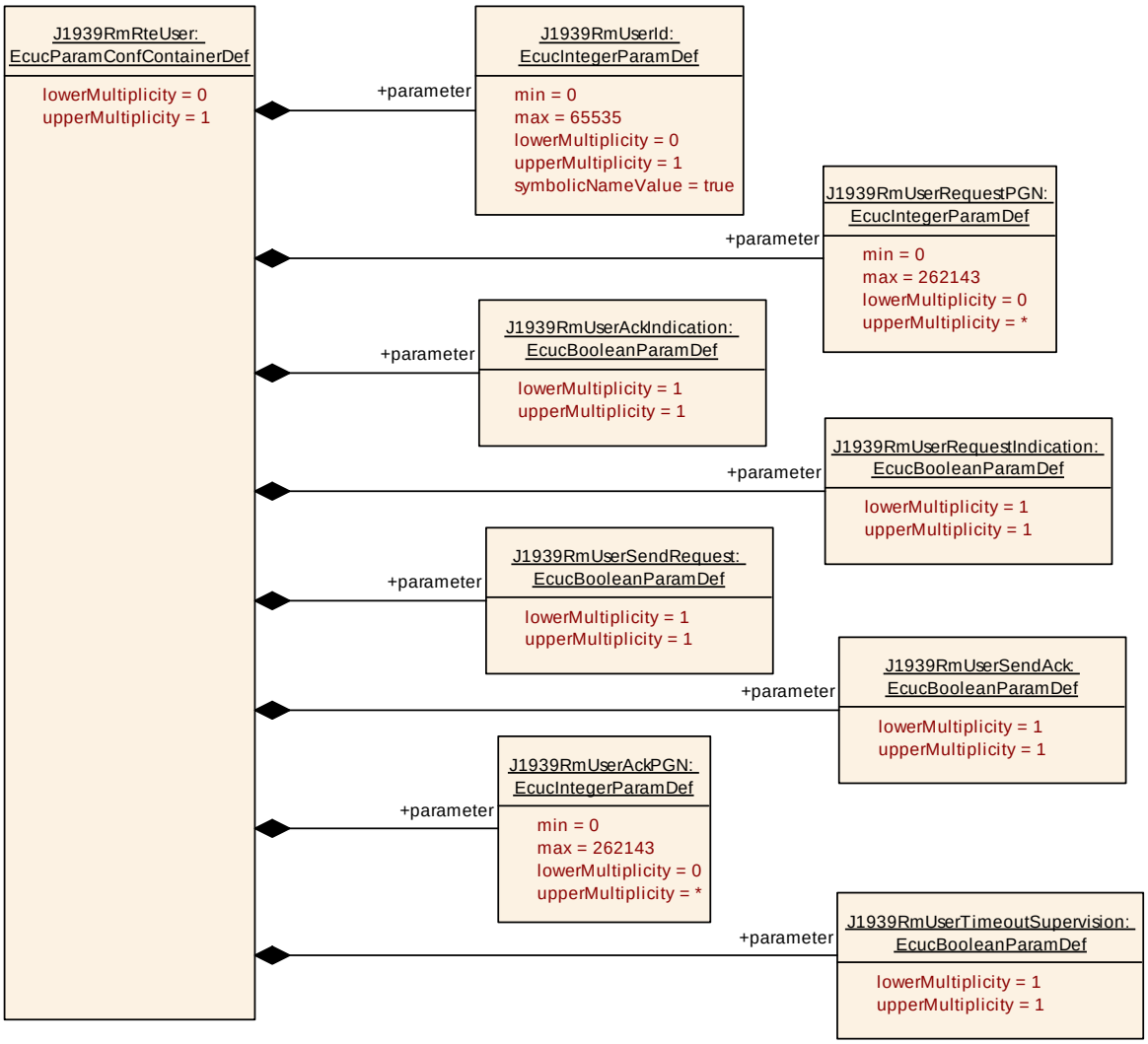

Figure 16: Configuration container J1939RmRteUser

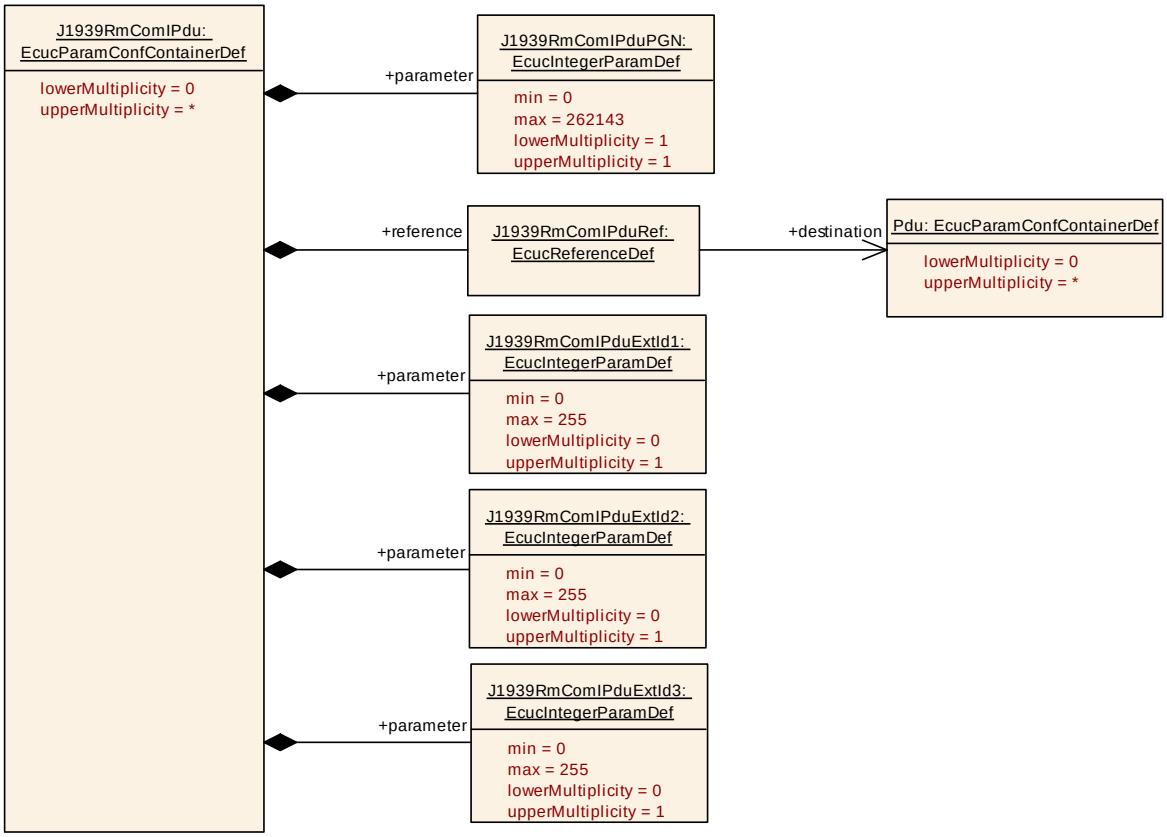

Figure 17: Configuration container J1939RmComIPdu

10.1.1 J1939Rm

SWS Item	**ECUC_J1939Rm_00043 :**
Module Name	*J1939Rm*
Module Description	Configuration of the J1939 Request Manager.
Post-Build Variant Support	true
Supported Config Variants	VARIANT-LINK-TIME, VARIANT-POST-BUILD, VARIANT-PRE-COMPILE

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939RmConfigSet	1	This container contains the configuration parameters and sub containers of the AUTOSAR J1939Rm module.
J1939RmGeneral	1	Contains the general configuration parameters of the module.

10.1.2 J1939RmGeneral

SWS Item	**ECUC_J1939Rm_00001 :**
Container Name	J1939RmGeneral
Parent Container	J1939Rm
Description	Contains the general configuration parameters of the module.
Configuration Parameters	

SWS Item	ECUC_J1939Rm_00003 :		
Name	J1939RmDevErrorDetect		
Parent Container	J1939RmGeneral		
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		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	ECUC_J1939Rm_00084 :		
Name	J1939RmGatewaySupport		
Parent Container	J1939RmGeneral		
Description	Enables/disables support for routing Request and Acknowledgement messages.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	ECUC_J1939Rm_00004 :		
Name	J1939RmMainFunctionPeriod		
Parent Container	J1939RmGeneral		
Description	Execution cycle of J1939Rm_MainFunction in seconds.		
Multiplicity	1		
Type	EcucFloatParamDef		
Range	]0 .. INF[		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	Pre-compile time	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	ECUC_J1939Rm_00054 :
Name	J1939RmSupportAckIndication
Parent Container	J1939RmGeneral
Description	Pre-processor switch for enabling support of acknowledgement indications.
Multiplicity	1
Type	EcucBooleanParamDef
Default value	--
Post-Build Variant Value	false

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

SWS Item	**ECUC_J1939Rm_00055 :**		
Name	J1939RmSupportAckTransmission		
Parent Container	J1939RmGeneral		
Description	Pre-processor switch for enabling support of acknowledgement transmission.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00073 :**		
Name	J1939RmSupportRequest2		
Parent Container	J1939RmGeneral		
Description	Pre-processor switch for enabling support of the Request2 PG. Please note: Transfer is not supported.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00056 :**		
Name	J1939RmSupportRequestIndication		
Parent Container	J1939RmGeneral		
Description	Pre-processor switch for enabling support of request indications.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00057 :**		
Name	J1939RmSupportRequestTransmission		
Parent Container	J1939RmGeneral		
Description	Pre-processor switch for enabling support of request transmission.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	

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

SWS Item	**ECUC_J1939Rm_00058 :**		
Name	J1939RmSupportTimeoutSupervision		
Parent Container	J1939RmGeneral		
Description	Pre-processor switch for enabling support of request timeout supervision.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00002 :**		
Name	J1939RmVersionInfoApi		
Parent Container	J1939RmGeneral		
Description	Pre-processor switch for enabling version info API support.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	false		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.1.3 J1939RmConfigSet

SWS Item	**ECUC_J1939Rm_00017 :**
Container Name	J1939RmConfigSet
Parent Container	J1939Rm
Description	This container contains the configuration parameters and sub containers of the AUTOSAR J1939Rm module.
Configuration Parameters	

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939RmChannel	1..*	Contains the parameters for a CAN channel supported by the J1939 Request Manager.
J1939RmNode	1..*	Contains the parameters for the support of a logical J1939 node (identified by an ECU address).

10.1.4 J1939RmChannel

SWS Item	**ECUC_J1939Rm_00009 :**

Container Name	J1939RmChannel		
Parent Container	J1939RmConfigSet		
Description	Contains the parameters for a CAN channel supported by the J1939 Request Manager.		
Post-Build Variant Multiplicity	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Configuration Parameters			

SWS Item	**ECUC_J1939Rm_00007 :**		
Name	J1939RmAckQueueSize		
Parent Container	J1939RmChannel		
Description	Number of transmitted Acknowledgement messages that can be stored.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00074 :**		
Name	J1939RmRequestQueue2Size		
Parent Container	J1939RmChannel		
Description	Number of transmitted Request2 messages that can be stored.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00006 :**		
Name	J1939RmRequestQueueSize		
Parent Container	J1939RmChannel		
Description	Number of transmitted Request messages that can be stored.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00008 :**		
Name	J1939RmRequestTimeoutMonitors		
Parent Container	J1939RmChannel		
Description	Number of transmitted requests that can be monitored for timeout.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00051 :**		
Name	J1939RmComMNetworkHandleRef		
Parent Container	J1939RmChannel		
Description	Reference to the channel defined by the ComMChannel providing access to the unique channel index ComMChannelId.		
Multiplicity	1		
Type	Symbolic name reference to [ComMChannel]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939RmAckmRxPdu	0..1	Contains the configuration of the I-PDU used to receive the Acknowledgement PG. This PDU consumes a meta data item of type CAN_ID_32.
J1939RmAckmTxPdu	0..1	Contains the configuration of the I-PDU used to transmit the Acknowledgement PG. This PDU produces a meta data item of type CAN_ID_32.
J1939RmRqst2RxPdu	0..1	Contains the configuration of the I-PDU used to receive the Request2 PG. This PDU consumes a meta data item of type CAN_ID_32.
J1939RmRqst2TxPdu	0..1	Contains the configuration of the I-PDU used to transmit the Request2 PG. This PDU produces a meta data item of type CAN_ID_32.
J1939RmRqstRxPdu	0..1	Contains the configuration of the I-PDU used to receive the Request PG. This PDU consumes a meta data item of type CAN_ID_32.
J1939RmRqstTxPdu	0..1	Contains the configuration of the I-PDU used to transmit the Request PG. This PDU produces a meta data item of type CAN_ID_32.

10.1.5 J1939RmAckmRxPdu

SWS Item	**ECUC_J1939Rm_00011 :**
Container Name	J1939RmAckmRxPdu

Parent Container	J1939RmChannel
Description	Contains the configuration of the I-PDU used to receive the Acknowledgement PG. This PDU consumes a meta data item of type CAN_ID_32.
Configuration Parameters	

SWS Item	**ECUC_J1939Rm_00015 :**		
Name	J1939RmAckmRxPduId		
Parent Container	J1939RmAckmRxPdu		
Description	The I-PDU identifier used for RxIndication from PduR.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_J1939Rm_00016 :**		
Name	J1939RmAckmRxPduRef		
Parent Container	J1939RmAckmRxPdu		
Description	Reference to the Pdu object representing the I-PDU.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.1.6 J1939RmAckmTxPdu

SWS Item	**ECUC_J1939Rm_00012 :**
Container Name	J1939RmAckmTxPdu
Parent Container	J1939RmChannel
Description	Contains the configuration of the I-PDU used to transmit the Acknowledgement PG. This PDU produces a meta data item of type CAN_ID_32.
Configuration Parameters	

SWS Item	**ECUC_J1939Rm_00018 :**	
Name	J1939RmAckmTxPduId	
Parent Container	J1939RmAckmTxPdu	
Description	The I-PDU identifier used for TxConfirmation from PduR.	
Multiplicity	1	
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)	
Range	0 .. 65535	
Default value	--	

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

SWS Item	**ECUC_J1939Rm_00019 :**		
Name	J1939RmAckmTxPduRef		
Parent Container	J1939RmAckmTxPdu		
Description	Reference to the Pdu object representing the I-PDU.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.1.7 J1939RmRqstRxPdu

SWS Item	**ECUC_J1939Rm_00013 :**
Container Name	J1939RmRqstRxPdu
Parent Container	J1939RmChannel
Description	Contains the configuration of the I-PDU used to receive the Request PG. This PDU consumes a meta data item of type CAN_ID_32.
Configuration Parameters	

SWS Item	**ECUC_J1939Rm_00020 :**		
Name	J1939RmRqstRxPduId		
Parent Container	J1939RmRqstRxPdu		
Description	The I-PDU identifier used for RxIndication from PduR.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_J1939Rm_00021 :**		
Name	J1939RmRqstRxPduRef		
Parent Container	J1939RmRqstRxPdu		
Description	Reference to the Pdu object representing the I-PDU.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE

	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.1.8 J1939RmRqstTxPdu

SWS Item	**ECUC_J1939Rm_00014 :**
Container Name	J1939RmRqstTxPdu
Parent Container	J1939RmChannel
Description	Contains the configuration of the I-PDU used to transmit the Request PG. This PDU produces a meta data item of type CAN_ID_32.
Configuration Parameters	

SWS Item	**ECUC_J1939Rm_00022 :**		
Name	J1939RmRqstTxPduId		
Parent Container	J1939RmRqstTxPdu		
Description	The I-PDU identifier used for TxConfirmation from PduR.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_J1939Rm_00023 :**		
Name	J1939RmRqstTxPduRef		
Parent Container	J1939RmRqstTxPdu		
Description	Reference to the Pdu object representing the I-PDU.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.1.9 J1939RmRqst2RxPdu

SWS Item	**ECUC_J1939Rm_00075 :**
Container Name	J1939RmRqst2RxPdu
Parent Container	J1939RmChannel

Description	Contains the configuration of the I-PDU used to receive the Request2 PG. This PDU consumes a meta data item of type CAN_ID_32.
Configuration Parameters	

SWS Item	**ECUC_J1939Rm_00078 :**		
Name	J1939RmRqst2RxPduId		
Parent Container	J1939RmRqst2RxPdu		
Description	The I-PDU identifier used for RxIndication from PduR.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_J1939Rm_00077 :**		
Name	J1939RmRqst2RxPduRef		
Parent Container	J1939RmRqst2RxPdu		
Description	Reference to the Pdu object representing the I-PDU.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.1.10 J1939RmRqst2TxPdu

SWS Item	**ECUC_J1939Rm_00076 :**
Container Name	J1939RmRqst2TxPdu
Parent Container	J1939RmChannel
Description	Contains the configuration of the I-PDU used to transmit the Request2 PG. This PDU produces a meta data item of type CAN_ID_32.
Configuration Parameters	

SWS Item	**ECUC_J1939Rm_00080 :**		
Name	J1939RmRqst2TxPduId		
Parent Container	J1939RmRqst2TxPdu		
Description	The I-PDU identifier used for TxConfirmation from PduR.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	

	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_J1939Rm_00079 :**		
Name	J1939RmRqst2TxPduRef		
Parent Container	J1939RmRqst2TxPdu		
Description	Reference to the Pdu object representing the I-PDU.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.1.11 J1939RmNode

SWS Item	**ECUC_J1939Rm_00049 :**		
Container Name	J1939RmNode		
Parent Container	J1939RmConfigSet		
Description	Contains the parameters for the support of a logical J1939 node (identified by an ECU address).		
Post-Build Variant Multiplicity	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Configuration Parameters			

SWS Item	**ECUC_J1939Rm_00005 :**		
Name	J1939RmNmNodeRef		
Parent Container	J1939RmNode		
Description	Reference to the corresponding J1939Nm node.		
Multiplicity	1		
Type	Symbolic name reference to [J1939NmNode]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME, VARIANT-POST-BUILD
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00052 :**
Name	J1939RmNodeChannelRef
Parent Container	J1939RmNode
Description	Reference to the channels this node has access to.
Multiplicity	1..*
Type	Reference to [J1939RmChannel]
Post-Build Variant Multiplicity	false

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

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939RmUser	1..*	Contains the configuration of a module that uses the request and acknowledgement interfaces of J1939Rm.

10.1.12 J1939RmUser

SWS Item	**ECUC_J1939Rm_00010 :**		
Choice container Name	J1939RmUser		
Parent Container	J1939RmNode		
Description	Contains the configuration of a module that uses the request and acknowledgement interfaces of J1939Rm.		
Post-Build Variant Multiplicity	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD

Container Choices		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939RmCddUser	0..1	J1939Rm User representing a complex driver (CDD). CDDs may use all services provided by J1939Rm.
J1939RmComUser	0..1	J1939Rm User representing AUTOSAR COM. Supports requests for COM I-PDUs.
J1939RmDcmUser	0..1	J1939Rm User representing the J1939Dcm. Requires request indication and transmission of acknowledgement.
J1939RmNmUser	0..1	J1939Rm User representing the J1939Nm. Requires request indication.
J1939RmRteUser	0..1	J1939Rm User representing an application software component (SW-C). SW-Cs may use all services provided by the J1939Rm via service ports.

10.1.13 J1939RmNmUser

SWS Item	**ECUC_J1939Rm_00071 :**
Container Name	J1939RmNmUser
Parent Container	J1939RmUser
Description	J1939Rm User representing the J1939Nm. Requires request indication.
Post-Build Variant	true

Multiplicity			
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Configuration Parameters			

No Included Containers

10.1.14 J1939RmDcmUser

SWS Item	**ECUC_J1939Rm_00068 :**		
Container Name	J1939RmDcmUser		
Parent Container	J1939RmUser		
Description	J1939Rm User representing the J1939Dcm. Requires request indication and transmission of acknowledgement.		
Post-Build Variant Multiplicity	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Configuration Parameters			

SWS Item	**ECUC_J1939Rm_00072 :**		
Name	J1939RmUserId		
Parent Container	J1939RmDcmUser		
Description	Identifier used by J1939Dcm when calling J1939Rm_SendAck.		
Multiplicity	1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_J1939Rm_00070 :**		
Name	J1939RmUserRequestPGN		
Parent Container	J1939RmDcmUser		
Description	PGN of DMx PG supported by J1939Dcm.		
Multiplicity	0..*		
Type	EcucIntegerParamDef		
Range	0 .. 262143		
Default value	--		
Post-Build Variant Multiplicity	true		
Post-Build Variant Value	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD

Scope / Dependency	scope: local

No Included Containers

10.1.15 J1939RmCddUser

SWS Item	**ECUC_J1939Rm_00066 :**		
Container Name	J1939RmCddUser		
Parent Container	J1939RmUser		
Description	J1939Rm User representing a complex driver (CDD). CDDs may use all services provided by J1939Rm.		
Post-Build Variant Multiplicity	false		
Multiplicity Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Configuration Parameters			

SWS Item	**ECUC_J1939Rm_00028 :**		
Name	J1939RmUserAckIndication		
Parent Container	J1939RmCddUser		
Description	Enable AckIndication for this module. In case of CDD, the name is <apiServicePrefix>_AckIndication. In case of RTE, the operation AckIndication of the required port J1939Rm_AckIndication_{user} is called.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00061 :**		
Name	J1939RmUserAckPGN		
Parent Container	J1939RmCddUser		
Description	PGN supported to be acknowledged to this module. The PGNs supported by different modules should usually be disjunctive.		
Multiplicity	0..*		
Type	EcucIntegerParamDef		
Range	0 .. 262143		
Default value	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00025 :**		
Name	J1939RmUserId		
Parent Container	J1939RmCddUser		
Description	Identifier used by a module using J1939Rm. This parameter is only required when the module uses transmission of requests or acknowledgements.		
Multiplicity	0..1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_J1939Rm_00027 :**		
Name	J1939RmUserRequestIndication		
Parent Container	J1939RmCddUser		
Description	Enable RequestIndication for this module. In case of J1939Nm or J1939Dcm, the name is fixed. In case of CDD, the name is <apiServicePrefix>_RequestIndication. In case of RTE, J1939Rm will call the operation RequestIndication of the required port J1939Rm_RequestIndication_{user}.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00026 :**		
Name	J1939RmUserRequestPGN		
Parent Container	J1939RmCddUser		
Description	PGN supported to be requested from this module. The PGNs supported by different modules should usually be disjunctive.		
Multiplicity	0..*		
Type	EcucIntegerParamDef		
Range	0 .. 262143		
Default value	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	

Scope / Dependency	scope: local

SWS Item	**ECUC_J1939Rm_00030 :**		
Name	J1939RmUserSendAck		
Parent Container	J1939RmCddUser		
Description	Enable the SendAck API for this module. In case of RTE, the operation SendAck of the provided port J1939Rm_SendAck_{user} is called.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00029 :**		
Name	J1939RmUserSendRequest		
Parent Container	J1939RmCddUser		
Description	Enable the SendRequest API for this module. In case of RTE, the operation SendRequest of the provided port J1939Rm_SendRequest_{user} is called.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00031 :**		
Name	J1939RmUserTimeoutSupervision		
Parent Container	J1939RmCddUser		
Description	Enable RequestTimeoutIndication and CancelRequestTimeout for this module. RequestTimeoutIndication: In case of CDD, the name is <apiServicePrefix>_RequestTimeoutIndication. In case of RTE, the operation RequestTimeoutIndication of the required port J1939Rm_RequestTimeoutIndication_{user} is called. CancelRequestTimeout: In case of RTE, the operation CancelRequestTimeout of the provided port J1939Rm_CancelRequestTimeout_{user} is called.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00042 :**
Name	J1939RmUserCddRef
Parent Container	J1939RmCddUser

Description	Reference to the CDD module description.		
Multiplicity	1		
Type	Foreign reference to [ECUC-MODULE-CONFIGURATION-VALUES]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

No Included Containers

10.1.16 J1939RmRteUser

SWS Item	**ECUC_J1939Rm_00069 :**		
Container Name	J1939RmRteUser		
Parent Container	J1939RmUser		
Description	J1939Rm User representing an application software component (SW-C). SW-Cs may use all services provided by the J1939Rm via service ports.		
Post-Build Variant Multiplicity	false		
Multiplicity Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Configuration Parameters			

SWS Item	**ECUC_J1939Rm_00028 :**		
Name	J1939RmUserAckIndication		
Parent Container	J1939RmRteUser		
Description	Enable AckIndication for this module. In case of CDD, the name is <apiServicePrefix>_AckIndication. In case of RTE, the operation AckIndication of the required port J1939Rm_AckIndication_{user} is called.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00061 :**		
Name	J1939RmUserAckPGN		
Parent Container	J1939RmRteUser		
Description	PGN supported to be acknowledged to this module. The PGNs supported by different modules should usually be disjunctive.		
Multiplicity	0..*		
Type	EcucIntegerParamDef		
Range	0 .. 262143		
Default value	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration	***Pre-compile time***	X	All Variants

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

SWS Item	**ECUC_J1939Rm_00025 :**		
Name	J1939RmUserId		
Parent Container	J1939RmRteUser		
Description	Identifier used by a module using J1939Rm. This parameter is only required when the module uses transmission of requests or acknowledgements.		
Multiplicity	0..1		
Type	EcucIntegerParamDef (Symbolic Name generated for this parameter)		
Range	0 .. 65535		
Default value	--		
Post-Build Variant Multiplicity	false		
Post-Build Variant Value	false		
Multiplicity Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: ECU		

SWS Item	**ECUC_J1939Rm_00027 :**		
Name	J1939RmUserRequestIndication		
Parent Container	J1939RmRteUser		
Description	Enable RequestIndication for this module. In case of J1939Nm or J1939Dcm, the name is fixed. In case of CDD, the name is <apiServicePrefix>_RequestIndication. In case of RTE, J1939Rm will call the operation RequestIndication of the required port J1939Rm_RequestIndication_{user}.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00026 :**		
Name	J1939RmUserRequestPGN		
Parent Container	J1939RmRteUser		
Description	PGN supported to be requested from this module. The PGNs supported by different modules should usually be disjunctive.		
Multiplicity	0..*		
Type	EcucIntegerParamDef		
Range	0 .. 262143		
Default value	--		
Post-Build Variant Multiplicity	false		

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

SWS Item	**ECUC_J1939Rm_00030 :**		
Name	J1939RmUserSendAck		
Parent Container	J1939RmRteUser		
Description	Enable the SendAck API for this module. In case of RTE, the operation SendAck of the provided port J1939Rm_SendAck_{user} is called.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00029 :**		
Name	J1939RmUserSendRequest		
Parent Container	J1939RmRteUser		
Description	Enable the SendRequest API for this module. In case of RTE, the operation SendRequest of the provided port J1939Rm_SendRequest_{user} is called.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants
	Link time	--	
	Post-build time	--	
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00031 :**		
Name	J1939RmUserTimeoutSupervision		
Parent Container	J1939RmRteUser		
Description	Enable RequestTimeoutIndication and CancelRequestTimeout for this module. RequestTimeoutIndication: In case of CDD, the name is <apiServicePrefix>_RequestTimeoutIndication. In case of RTE, the operation RequestTimeoutIndication of the required port J1939Rm_RequestTimeoutIndication_{user} is called. CancelRequestTimeout: In case of RTE, the operation CancelRequestTimeout of the provided port J1939Rm_CancelRequestTimeout_{user} is called.		
Multiplicity	1		
Type	EcucBooleanParamDef		
Default value	--		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	All Variants

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

No Included Containers

10.1.17 J1939RmComUser

SWS Item	**ECUC_J1939Rm_00067 :**		
Container Name	J1939RmComUser		
Parent Container	J1939RmUser		
Description	J1939Rm User representing AUTOSAR COM. Supports requests for COM I-PDUs.		
Post-Build Variant Multiplicity	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Configuration Parameters			

Included Containers		
Container Name	***Multiplicity***	***Scope / Dependency***
J1939RmComIPdu	0..*	Contains the configuration of an I-PDU that is to be transmitted on request by COM.

10.1.18 J1939RmComIPdu

SWS Item	**ECUC_J1939Rm_00032 :**		
Container Name	J1939RmComIPdu		
Parent Container	J1939RmComUser		
Description	Contains the configuration of an I-PDU that is to be transmitted on request by COM.		
Post-Build Variant Multiplicity	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Configuration Parameters			

SWS Item	**ECUC_J1939Rm_00081 :**	
Name	J1939RmComIPduExtId1	
Parent Container	J1939RmComIPdu	
Description	First extended identifier byte of the COM I-PDU.	
Multiplicity	0..1	
Type	EcucIntegerParamDef	
Range	0 .. 255	
Default value	--	
Post-Build Variant Multiplicity	true	
Post-Build Variant Value	true	

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

SWS Item	**ECUC_J1939Rm_00082 :**		
Name	J1939RmComIPduExtId2		
Parent Container	J1939RmComIPdu		
Description	Second extended identifier byte of the COM I-PDU.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Multiplicity	true		
Post-Build Variant Value	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00083 :**		
Name	J1939RmComIPduExtId3		
Parent Container	J1939RmComIPdu		
Description	Third extended identifier byte of the COM I-PDU.		
Multiplicity	0..1		
Type	EcucIntegerParamDef		
Range	0 .. 255		
Default value	--		
Post-Build Variant Multiplicity	true		
Post-Build Variant Value	true		
Multiplicity Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00033 :**		
Name	J1939RmComIPduPGN		
Parent Container	J1939RmComIPdu		
Description	PGN of the COM I-PDU.		
Multiplicity	1		
Type	EcucIntegerParamDef		
Range	0 .. 262143		
Default value	--		
Post-Build Variant Value	true		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE

	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

SWS Item	**ECUC_J1939Rm_00065 :**		
Name	J1939RmComIPduRef		
Parent Container	J1939RmComIPdu		
Description	Reference to the Pdu object representing the I-PDU.		
Multiplicity	1		
Type	Reference to [Pdu]		
Post-Build Variant Value	false		
Value Configuration Class	***Pre-compile time***	X	VARIANT-PRE-COMPILE
	Link time	X	VARIANT-LINK-TIME
	Post-build time	X	VARIANT-POST-BUILD
Scope / Dependency	scope: local		

No Included Containers

10.2 Published Information

For details, refer to the chapter 10.3 “Published Information” in the SWS BSW General [4].