AUTOSAR CanSM User Manual

Document Change Histroy				
Date (YYYY-MM-DD)	Ver.	Editor	Chap	Content
2020-03-23	1.0.0.0	LinhTT36	All	- Initial version
2021-08-25	1.0.0.1	SM Kwon	4.3 5	- Add Change Log - Update Default value of the configurations
2022-01-07	1.0.1.0	HieuTM8	4.2 4.3.1 7.2.1	- Change module version - Add change log - Delete ERR140001, ERR140002
2022-04-29	1.0.2.0	HieuTM8	4.2 4.3	- Change module version - Add change log
2022-06-28	1.0.2.1	HJ Seong	4.3	- Add change log
2022-08-02	1.0.3.0	HieuTM8	4.2 4.3	- Change module version - Add change log
2022-10-17	1.0.4.0	HieuTM8	4.2 4.3	- Change module version - Add change log
2022-10-31	1.0.5.0	HieuTM8	4.2 4.3	- Change module version - Add change log
2022-12-05	1.0.5.1	HieuTM8	4.3	- Add change log
2022-12-13	1.0.6.0	HieuTM8	4.2 4.3	- Change module version - Add change log
2022-02-08	1.0.7.0	HieuTM8	4.2 4.3	- Change module version - Add change log
2023-03-03	1.0.8.0	HieuTM8	4.2 4.3 7.2.1	- Change module version - Add change log - Add ERR140020
2023-06-07	1.0.9.0	HieuTM8	4.2 4.3 5.1	- Change module version - Add change log - Update CanSMMainFunctionTimePeriod
2024-02-23	1.0.9.0_HF1	MU Kim	4.3 4.5 5.1 7.1.1 9.2	- Add change log - Add Deviation about indication for Silent Com / Full Com in CanSM_TxTimeoutException. - Add Configuration about CanSMUserTimeoutFunction and CanSMUserTimeoutHeader - Add ERR140021 - Add Appendix about User Timeout Callout Function

Table of Contents

1 Overview

The document is written based AUTOSAR standard SRS/SWS, and if more detailed functional description is needed when using the module, refer to the reference below

The interpretation of the category related to setting is as follows

- Changeable (C): Items that can be set by users
- Fixed (F): Items that can not changed by users
- NotSupported (N): Not used

2 Reference

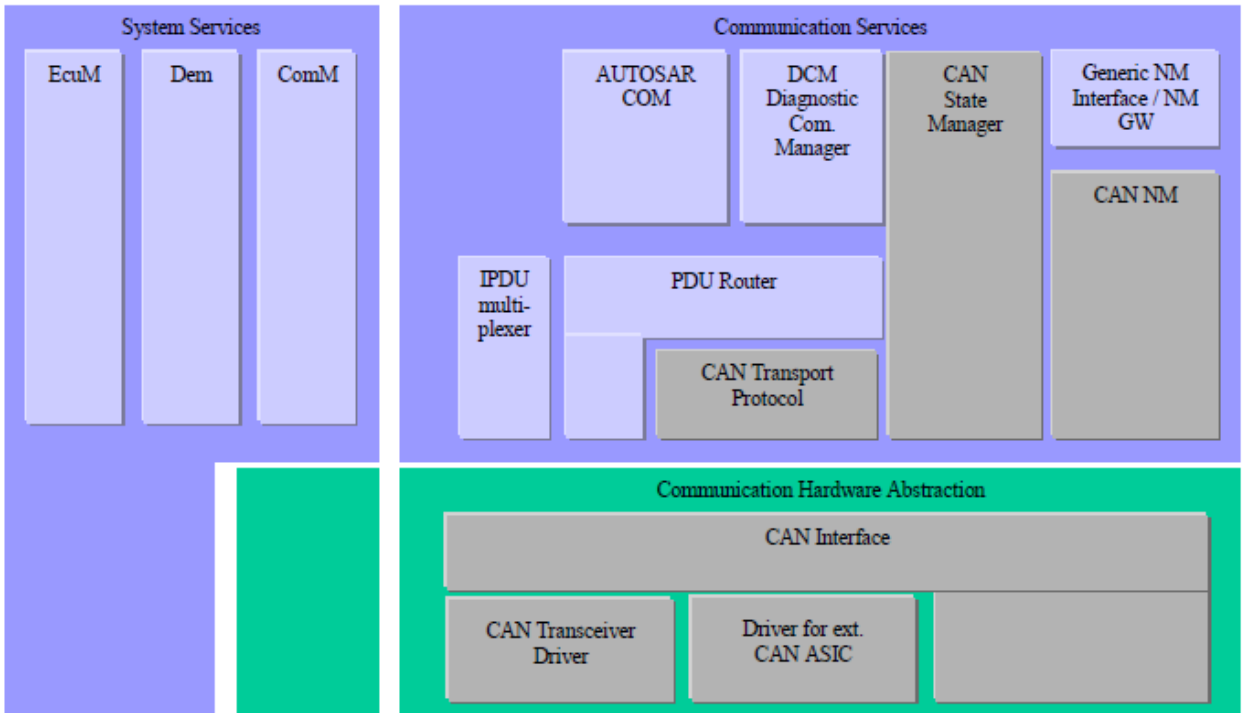
Sl. No.	Title	Version
1	AUTOSAR_SWS_CANStateManager.pdf	4.4.0

3 AUTOSAR System

3.1 Overview of Software Layers

The CanSM module is a module that controls communication status in ECU and performs Bus-Off recovery

- CAN communication status control
- Bus-Off Recovery



4 Product Release Notes

4.1 Overview

The purpose of this chapter is to provide information related to Huyndai AutoEver's CanSM module and describe limitations and specifics of CanSM software product release version.

4.2 Scope of the Release

All contents of this document are limited to the following Huyndai AutoEver's CanSM modules

Module name	AUTOSAR version	Module version
CanSM	4.4.0	1.0.9

※ Module version means the Sw version of each module's BswModule Description (Bswmd) file.

4.3 Change Log

4.3.1 Version 1.0.9.0_HF1

- Bug
  - Repeated Msg drop and Controller Reset after Nm Msg Timeout occurred

Cause	After Nm Msg Timeout occurs, the buffer for Nm Msg attempted to transmit within the previous task is cleared by performing a Controller Reset in the next task and the timeout reoccurs
Operation effect	None
Setting effect	None
ASW Action	None

- Bug
  - If the Controller Reset fails repeatedly, communication status transition to No Com.

Cause	Logic exists for transition to NoCom in CanSM_TimeoutProcessing, which is called when mode transition fails.
Operation effect	None
Setting effect	None
ASW Action	None

4.3.2 Version 1.0.9.0

- Improvement
  - Support Can Driver AR 4.3 for Orin X

Cause	CanSM should support Can Driver R4.3.1 for Orin MCU
Operation effect	None
Setting effect	None
ASW Action	None

- Improvement
  - Fix compile warning – remove dead assignment

Cause	All compile warning should be fixed
Operation effect	None
Setting effect	None

ASW Action	None

- Improvement
  - Update 'Bsw Timing Event' in CanSM Bswmd to match with 'CanSMMainFunctionTimePeriod'

Cause	The 'Bsw Timing Event' in CanSM Bswmd should be changed to match with 'CanSMMainFunctionTimePeriod' in CanSM's configuration
Operation effect	None
Setting effect	None
ASW Action	None

- Improvement
  - Include "Dem.h" only when Dem configuration file is provided as an input file

Cause	The include section in CanSM_Cfg.h/ CanSM_PBcfg.h should be changed. Replacing include "Dem.h" with "Std_Types.h"
Operation effect	None
Setting effect	None
ASW Action	None

4.3.3 Version 1.0.8.0

- Improvement
  - Update the generator for checking missing CanTrcv in the input file when PN is set ON

Cause	CanTrcv should be added in the input file of the generator when the PNC is set ON
Operation effect	None
Setting effect	None
ASW Action	None

- Bug
  - The sequence to change the PN channel to sleep mode is incorrect

Cause	Function CanSM_ClearTrcvWufFlagIndication should be improved to cover requirement SWS_CanSM_00440
Operation effect	None
Setting effect	None

ASW Action	None

4.3.4 Version 1.0.7.0

- Improvement
  - Improve the code that CanSM_TxTimeoutException function is always generated

Cause	CanSM_TxTimeoutException should always exist
Operation effect	None
Setting effect	None
ASW Action	None

4.3.5 Version 1.0.6.0

- Task
  - Code improvements based on MISRA check results

Cause	MISRA rules should be improved
Operation effect	None
Setting effect	None
ASW Action	None

4.3.6 Version 1.0.5.1

- Bug
  - Update PDF to support PostBuild

Cause	PDF of CanSM should support configuring PostBuild-Selectable
Operation effect	None
Setting effect	None
ASW Action	None

4.3.7 Version 1.0.5.0

- Improvement
  - PDF CanSM does not support PostBuild

Cause	PDF of CanSM should support configuring PostBuild
Operation effect	None
Setting effect	None
ASW Action	None

- Update T-Code to match PostBuild requirements

Cause	PostBuild feature of CanSM should be improved
Operation effect	None
Setting effect	None
ASW Action	None

4.3.8 Version 1.0.4.0

- Task
  - ASPICE Improvements

Cause	Improve work products by referring to ASPICE inspection results
Operation effect	None
Setting effect	None
ASW Action	None

4.3.9 Version 1.0.3.0

- Improvement
  - Fix UNECE violations

Cause	Security coding rule should be improved based on the R44 RTU
Operation effect	None
Setting effect	None
ASW Action	None

- Bug
  - Fix the problem that No to Full Comm transition is delayed by 1 cycle

Cause	When transitioning from No to Full Comm, related status variable is changed, but calling related functions is omitted
Operation effect	NM Alive message is not transmitted
Setting effect	None
ASW Action	None

4.3.10 Version 1.0.2.1

- Task
  - Editorial Changes of Work Products

Cause	- Clarify the copyright of code - Delete Module.bat file in the module - Divide 'delivery' folder into 'delivery/src' and 'delivery/inc'
Operation effect	None
Setting effect	None
ASW Action	None

4.3.11 Version 1.0.2.0

- Defect
  - An error in which incorrect patch version information is returned from the CanSM_GetVersionInfo function (Issued in R40)

Cause	Add software patch version in the return value of CanSM_GetVersionInfo function
Operation effect	None
Setting effect	None
ASW Action	None

- Defect
  - During Bus-Off Recovery, recovery does not occur depending on the timing of message transmission (Issued in R40)

Cause	During Bus-Off Recovery, recovery does not occur depending on the timing of message transmission
Operation effect	None
Setting effect	None
ASW Action	None

- Change Request
  - Fix UNECE security coding rule violations

Cause	CanSM should follow UNECE security coding rule
Operation effect	None
Setting effect	None
ASW Action	None

4.3.12 Version 1.0.1.0

- Change Request
  - Migrate CanSM from R44 repository to R40 repository

Cause	Migrate latest codes of CanSM R44 in the R44 Repository (SUD Traceability in E-Code, Update for a Polyspace)
Operation effect	None
Setting effect	None
ASW Action	None

- Change Request
  - Fix new ASPICE findings

Cause	Fix findings to follow the ASPICE Process
Operation effect	None
Setting effect	None
ASW Action	None

4.3.13 Version 1.0.0.1

- Change Request
  - Update PDF for the default value for each configuration

Cause	Modify the default value for configurable parameters which should be the same as those in R40 UM.
Operation effect	None
Setting effect	None
ASW Action	None

- Change Request
  - Update UM for the default value for each configuration

Cause	Update the default value for configurable parameters which should be the same as those in R40 UM.
Operation effect	None
Setting effect	None
ASW Action	None

4.3.14 Version 1.0.0.0

- New version
  - New CanSM module development

Cause	New development
Operation effect	None
Setting effect	None

ASW Action	None

4.4 Limitations

- None

4.5 Deviations

- During Bus-Off Recovery, if the user requests to change the mode to No Communication, the communication channel changes the mode to No Communication. (Other mode change requests are rejected but the errors are not reported to DET)
- An error shall be reported to DET if the pointer provided by <User_GetBusOffDelay> is NULL.
- Indication for Silent Com occurs before Controller Reset in CanSM_TxTimeoutException and Full Com indication occurs when Controller Reset is complete.

5 Configuration Guide

The CanSM setting of the AUTOSAR platform distributed by Hyundai AutoEver is a setting that reflects Hyundai AutoEver's policy, so you must consult with Hyundai AutoEver when changing.

5.1 CanSMGeneral setting

Parameter Name	Value	Category
CanSMDevErrorDetect	True	C
CanSMGetBusOffDelayFunction	-	C
CanSMGetBusOffDelayHeader	-	C
CanSMIcomSupport	False	C
CanSMMainFunctionTimePeriod	0.01	C
CanSMPncSupport	False	C
CanSMSetBaudrateApi	False	C
CanSMTxOfflineActiveSupport	False	C
CanSMVersionInfoApi	False	C
CanSMUserTimeoutFunction	-	C
CanSMUserTimeoutHeader	-	C

1) CanSMDevErrorDetect
- Select whether to use error notification function

2) CanSMGetBusOffDelayFunction
- This parameter configure the name of the <User_GetBusOffDelay> callout function

3) CanSMGetBusOffDelayHeader
- This parameter configure the header file containing <User_GetBusOffDelay> callout function

4) CanSMIcomSupport
- Whether the pretended networking features are supported for the module

5) CanSMMainFunctionTimePeriod
- Set the execution cycle (unit: second) of the cyle function

6) CanSMPncSupport
- Whether the partial networking features are supported for the module

7) CanSMSetBaudrateApi
- Whether the Can_SetBaudrate API is supported

8) CanSMTxOfflineActiveSupport
- Whether ECU Passive feature is supported for the module

9) CanSMVersionInfoApi
- Whether the version information API is available

10) CanSMUserTimeoutFunction
- This parameter configure the name of the < CANSM_USER_TIMEOUT_FUNCTION> callout function

11) CanSMUserTimeoutHeader

- This parameter configure the header file containing < CANSM_USER_TIMEOUT_FUNCTION> callout function

5.2 CanSMConfiguration settings

Parameter Name	Value	Category
CanSMModeRequestRepetitionMax	3	C
CanSMModeRequestRepetitionTime	0.03	C

This container shall be multiplied in case multiple variant is applied. The number of this container shall equal the number of variants. All parameters within the container can be different from variants except for the parameters *CanSMBorTxConfirmationPolling* and *CanSMEnableBusOffDelay,* the two parameters must be the same in all variants.

1) CanSMModeRequestRepetitionMax

- If E_NOT_OK is received when Mode Request is requested (in case of returning E_NOT_OK, it may be different for each MCU)
- If E_OK is received when Mode Request is requested, but there is no ModeIndication
- E_OK is received when requesting a Mode request, but ModeIndication is incorrect. RepetitionMax Count decreases.

2) CanSMModeRequestRepetitionTime

- The period to request the Mode request again If there is no or incorrect Mode indication after requesting the Mode request (unit: second)

5.3 CanSMConfiguration-CanSMManagerNetwork settings

Parameter Name	Value	Category
CanSMBorCounterL1ToL2	3	C
CanSMBorTimeL1	0.96	C
CanSMBorTimeL2	0.96	C
CanSMBorTimeTxEnsured	0.02	C
CanSMBorTxConfirmationPolling	False	C
CanSMEnableBusOffDelay	False	C
CanSMComMNetworkHandleRef	Automated	F
CanSMTransceiverId	-	C

1) CanSMBorCounterL1ToL2

- Number of occurances of Bus Off to change from Short Bus Off recovery to Long Bus off

recovery mode (Unit: Count)

2) CanSMBorTimeL1

- Time required for short Bus Off recovery (Unit: second)

3) CanSMBorTimeL2

- Time required for short Bus Off recovery (Unit: second)

4) CanSMBorTimeTxEnsured

- Time to judge the completion of Bus Off Recovery after restarting communication (unit: second)
- Bus-Off recovery TxEnsured Time should be greater than the time that the first PDU is transmitted after the PDU is switched to Full communication

5) CanSMBorTxConfirmationPolling

- Whether or not CAN transmission is completed normally is checked by polling method

6) CanSMEnableBusOffDelay

- Whether Bus Off recovery of the current network is supported with <User_GetBusOffDelay>

7) CanSMComMNetworkHandleRef

- ComM channel id connected to CanSM Network

8) CanSMTransceiverId

- Transceiver Id connected to CanSM Network

5.4 CanSMConfiguration-CanSMManagerNetwork-CanSMController settings

Parameter Name	Value	Category
CanSMControllerId	Automated	F

1) CanSMControllerId

- Can controller Id connected to CanSM Network

5.5 CanSMConfiguration-CanSMManagerNetwork-CanSMDemEventParameterRefs settings

Parameter Name	Value	Category
CANSM_E_BUS_OFF	-	C
CANSM_E_MODE_REQUEST_TIMEOUT	-	C

1) CANSM_E_BUS_OFF

- Dem Event connected to CanSM Network.
- When BUS OFF occurs in the corresponding channel, the event is notified to Dem module.
- When a BUS OFF event occurs, it cannot be switched to a communication mode other than NO communication

2) CANSM_E_MODE_REQUEST_TIMEOUT

- Dem Event connected to CanSM Network.
- When the CanSM failed to execute transition among different modes. CanSMModeRequestRepetitionMax times, the event is notified to Dem module.
- When the CanSM received any indications about controller and transceiver mode change sent by CanIf, It shall notify Dem module.

6 Application Programming Interface (API)

6.1 Type Definitions

None

6.2 Macro Constants

None

6.3 Functions

6.3.1 Startup services

6.3.1.1 Initialization

Function Name	CanSM_Init	
Syntax	void CanSM_Init(const CanSM_ConfigType* ConfigPtr)	
Service ID	0x00	
Sync/Async	Synchronous	
Reentrancy	Non Reentrant	
Parameters (In)	ConfigPtr	Pointer to init structure for the post build parameters of the CanSM
Parameters (Inout)	None	
Parameters (Out)	None	
Return Value	None	
Description	This service initializes the CanSM module	
Available via:	CanSM.h	

6.3.1.2 De-Initialization

Service name:	CanSM_DeInit
Syntax:	void CanSM_DeInit(void)
Service ID[hex]:	0x14
Sync/Async:	Synchronous
Reentrancy:	Non Reentrant
Parameters (in):	None
Parameters (inout):	None
Parameters (out):	None
Return value:	None
Description:	This service de-initializes the CanSM module.
Available via:	CanSM.h

6.3.2 Control services

6.3.2.1 CanSM_GetCurrentComMode

Service name:	CanSM_GetCurrentComMode	
Syntax:	Std_ReturnType CanSM_GetCurrentComMode(NetworkHandleType network, ComM_ModeType* ComM_ModePtr)	
Service ID[hex]:	0x03	
Sync/Async:	Reentrant	
Reentrancy:	Reentrant (only for different network handles)	
Parameters (in):	network	Network handle, whose current communication mode shall be put out
Parameters (inout):	None	
Parameters (out):	ComM_ModePtr	Pointer, where to put out the current communication mode
Return value:	Std_ReturnType	E_OK: Service accepted E_NOT_OK: Service denied
Description:	This service shall put out the current communication mode of a CAN network.	
Available via:	CanSM.h	

6.3.2.2 CanSM_RequestComMode

Service name:	CanSM_RequestComMode	
Syntax:	Std_ReturnType CanSM_RequestComMode(NetworkHandleType network, ComM_ModeType ComM_Mode)	
Service ID[hex]:	0x02	
Sync/Async:	Asynchronous	
Reentrancy:	Reentrant (only for different network handles)	
Parameters (in):	network	Handle of destined communication network for request
Parameters (inout):	None	
Parameters (out):	None	
Return value:	Std_ReturnType	E_OK: Service accepted E_NOT_OK: Service denied
Description:	This service shall change the communication mode of a CAN network to the requested one.	
Available via:	CanSM.h	

6.3.2.3. CanSM_StartWakeupSource

Service name:	CanSM_StartWakeupSource	
Syntax:	Std_ReturnType CanSM_StartWakeupSource(NetworkHandleType network)	
Service ID[hex]:	0x11	
Sync/Async:	Synchronous	
Reentrancy:	Non Reentrant	
Parameters (in):	network	network
Parameters (inout):	None	
Parameters (out):	None	
Return value:	Std_ReturnType	E_OK: Service accepted E_NOT_OK: Service denied
Description:	This function shall be called by EcuM when a wakeup source shall be started.	
Available via:	CanSM.h	

6.3.2.4. CanSM_StopWakeupSource

Service name:	CanSM_StopWakeupSource	
Syntax:	Std_ReturnType CanSM_StopWakeupSource(NetworkHandleType network)	
Service ID[hex]:	0x12	
Sync/Async:	Synchronous	
Reentrancy:	Non Reentrant	
Parameters (in):	network	network
Parameters (inout):	None	
Parameters (out):	None	
Return value:	Std_ReturnType	E_OK: Service accepted E_NOT_OK: Service denied
Description:	This function shall be called by EcuM when a wakeup source shall be stopped.	
Available via:	CanSM.h	

6.3.3 Call-back notifications

6.3.3.1 CanSM_ControllerBusOff

Service name:	CanSM_ControllerBusOff	
Syntax:	void CanSM_ControllerBusOff(uint8 ControllerId)	
Service ID[hex]:	0x04	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant (only for different CanControllers)	
Parameters (in):	ControllerId	CAN controller, which detected a bus-off event
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This callback function notifies the CanSM about a bus-off event on a certain CAN controller, which needs to be considered with the specified bus-off recovery handling for the impacted CAN network.	
Available via:	CanSM_CanIf.h	

6.3.3.2 CanSM_ControllerModeIndication

Service name:	CanSM_ControllerModeIndication	
Syntax:	void CanSM_ControllerModeIndication(uint8 ControllerId, Can_ControllerStateType ControllerMode)	
Service ID[hex]:	0x07	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant (only for different CanControllers)	
Parameters (in):	ControllerId	CAN controller, whose mode has changed
	ControllerMode	Notified CAN controller mode
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This callback shall notify the CanSM module about a CAN controller mode change.	
Available via:	CanSM_CanIf.h	

6.3.3.3 CanSM_TransceiverModeIndication

Service name:	CanSM_TransceiverModeIndication	
Syntax:	void CanSM_TransceiverModeIndication(uint8 TransceiverId, CanTrcv_TrcvModeType TransceiverMode)	
Service ID[hex]:	0x09	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant for different CAN Transceivers	
Parameters (in):	ControllerId	CAN controller, whose mode has changed
	ControllerMode	Notified CAN controller mode
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This callback shall notify the CanSM module about a CAN transceiver mode change.	
Available via:	CanSM_CanIf.h	

6.3.3.4 CanSM_TxTimeoutException

Service name:	CanSM_TransceiverModeIndication	
Syntax:	void CanSM_TxTimeoutException(NetworkHandleType Channel)	
Service ID[hex]:	0x0b	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	Channel	Affected CAN network
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This function shall notify the CanSM module, that the CanNm has detected for the affected partial CAN network a tx timeout exception, which shall be recovered within the respective network state machine of the CanSM module.	
Available via:	CanSM_CanIf.h	

6.3.3.5 CanSM_ClearTrcvWufFlagIndication

Service name:	CanSM_ClearTrcvWufFlagIndication	
Syntax:	void CanSM_ClearTrcvWufFlagIndication(uint8 Transceiver)	
Service ID[hex]:	0x08	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant for different CAN Transceivers	
Parameters (in):	Transceiver	Requested Transceiver
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This callback function shall indicate the CanIf_ClearTrcvWufFlag API process end for the notified CAN Transceiver.	
Available via:	CanSM_CanIf.h	

6.3.3.5 CanSM_CheckTransceiverWakeFlagIndication

Service name:	CanSM_CheckTransceiverWakeFlagIndication	
Syntax:	void CanSM_CheckTransceiverWakeFlagIndication(uint8 Transceiver)	
Service ID[hex]:	0xa	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant for different CAN Transceivers	
Parameters (in):	Transceiver	Requested Transceiver
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This callback function indicates the CanIf_CheckTrcvWakeFlag API process end for the notified CAN Transceiver.	
Available via:	CanSM_CanIf.h	

6.3.3.6 CanSM_ConfirmPnAvailability

Service name:	CanSM_ConfirmPnAvailability	
Syntax:	void CanSM_ConfirmPnAvailability(uint8 TransceiverId)	
Service ID[hex]:	0x06	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	TransceiverId	CAN transceiver, which was checked for PN availability
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This callback function indicates that the transceiver is running in PN communication mode.	
Available via:	CanSM_CanIf.h	

6.3.3.7 CanSM_CurrentIcomConfiguration

Service name:	CanSM_CheckTransceiverWakeFlagIndication	
Syntax:	void CanSM_CurrentIcomConfiguration(uint8 ControllerId, IcomConfigIdType ConfigurationId, IcomSwitch_ErrorType Error)	
Service ID[hex]:	0x10	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant only for different network handles	
Parameters (in):	ControllerId	CAN Controller Id, whose configuration has changed.
	ConfigurationId	Changed Configuration Id
	Error	ICOM_SWITCH_E_OK: No Error ICOM_SWITCH_E_FAILED: Switch to requested Configuration failed. Severe Error.
Parameters (inout):	None	
Parameters (out):	None	
Return value:	None	
Description:	This service shall inform about the change of the Icom Configuration of a CAN network.	
Available via:	CanSM.h	

6.3.4 Optional services

6.3.4.1 CanSM_GetVersionInfo

Service name:	CanSM_GetVersionInfo	
Syntax:	void CanSM_GetVersionInfo(Std_VersionInfoType* VersionInfo)	
Service ID[hex]:	0x01	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant	
Parameters (in):	None	
Parameters (inout):	None	
Parameters (out):	VersionInfo	Pointer to where to store the version information of this module.
Return value:	None	
Description:	This service puts out the version information of this module (module ID, vendor ID, vendor specific version numbers related to BSW00407)	
Available via:	CanSM.h	

6.3.4.2 CanSM_SetBaudrate

Service name:	CanSM_SetBaudrate	
Syntax:	Std_ReturnType CanSM_SetBaudrate(NetworkHandleType Network, uint16 BaudRateConfigID)	
Service ID[hex]:	0x0d	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant for different Networks. Non reentrant for the same Network.	
Parameters (in):	Network	Handle of the addressed CAN network for the baud rate change
	BaudRateConfigID	references a baud rate configuration by ID(see CanControllerBaudRateConfigID)
Parameters (inout):	None	
Parameters (out):	None	
Return value:	Std_ReturnType	E_OK: Service request accepted, setting of (new) baud rate started E_NOT_OK: Service request not accepted
Description:	This service shall start an asynchronous process to change the baud rate for the configured CAN controllers of a certain CAN network. Depending on necessary baud rate modifications the controllers might have to reset.	

Available via:	CanSM.h

6.3.4.2 CanSM_SetIcomConfiguration

Service name:	CanSM_SetIcomConfiguration	
Syntax:	Std_ReturnType CanSM_SetIcomConfiguration(NetworkHandleType Network, IcomConfigIdType ConfigurationId)	
Service ID[hex]:	0x0f	
Sync/Async:	Synchronous	
Reentrancy:	Reentrant only for different network handles	
Parameters (in):	Network	Handle of destined communication network for request
	ConfigurationId	Requested Configuration
Parameters (inout):	None	
Parameters (out):	None	
Return value:	Std_ReturnType	E_OK: Request accepted E_NOT_OK: Request denied
Description:	This service shall change the Icom Configuration of a CAN network to the requested one.	
Available via:	CanSM.h	

6.3.4.3 CanSM_SetEcuPassive

Service name:	CanSM_SetEcuPassive	
Syntax:	Std_ReturnType CanSM_SetEcuPassive(boolean CanSM_Passive)	
Service ID[hex]:	0x13	
Sync/Async:	Synchronous	
Reentrancy:	Non Reentrant	
Parameters (in):	CanSM_Passive	TRUE: set all CanSM channels to passive, i.e. receive only FALSE: set all CanSM channels back to non-passive
Parameters (inout):	None	
Parameters (out):	None	
Return value:	Std_ReturnType	E_OK: Request accepted E_NOT_OK: Request not accepted
Description:	This function can be used to set all CanSM channels of the ECU to a receive only mode. This mode will be kept either until it is set back, or the ECU is reset.	
Available via:	CanSM.h	

6.3.5 Scheduled services

6.3.5.1 CanSM_MainFunction

Service name:	CanSM_MainFunction
Syntax:	void CanSM_MainFunction(void)
Service ID[hex]:	0x05
Description:	Scheduled function of the CanSM
Available via:	SchM_CanSM.h

7 Generator

7.1 Generator Message

Options	Description
-G,--Generation	Symbolic parameters to be used for fore generation (skip validation).
-H,--Help	Display this help message.
-I,--Input <I>	ECU description file path of the module for which generation tool need to run.
-L,--Log	Symbolic parameters to be used for generation error log.
-M,--Module <M>	Specify module name and version to be generated code for.
-O,--Output <O>	Project-relative path to location where the generated code is to be placed.
-T,--Top_path <T>	Symbolic parameters to be used for set path of module.
-V,--Validate	Symbolic parameters to be used for invoking validation checks.

This section helps to analyze the errors or warnings displayed during the execution of the tool. It ensures conformance of input file(s) with syntax and semantics.

The Generation Tool displays errors or warnings or information when the user has configured incorrect inputs. The format of Error/Warning/Information message is as shown below:

- ERR/WRN/INF<mid><xxx>: < Error/Warning/Information Message>

  Where,
  <mid>: 140 – CanSM Module Id (140) for user configuration checks.
  000 - for command line checks.
  <xxx>: 001 - 999 - Message ID.
- File Name : Name of the file in which the error has occurred
- Path : Absolute path of the container in which the parameter is present

'File Name' and 'Path' are optional.

Below section provides the list of error, warning and information messages.

7.1.1 Error Messages

ERR140003: 'Component name' Component is not present in the input file(s).

This error occurs, if any of the component ComM or CanSM or CanIf is(are) not present in any of the input ECU Configuration Description File(s).

ERR140004: The reference path is empty for the parameter 'parameter name' in the container 'container name', having short name 'short name'.

This error occurs, if reference path is not configured for the below mentioned parameters.

Container Name	Parameter Name
CanSMManagerNetwork	CanSMComMNetworkHandleRef
CanSMController	CanSMControllerId

ERR140005: The parameter 'Parameter Name' in the container 'Container Name' should be configured.

This error occurs, if value of any of the mandatory parameters mentioned in the below table are not configured.

Container Name	Parameter Name
CanSMManagerNetwork	CanSMBorTimeL2
	CanSMBorCounterL1ToL2
	CanSMBorTimeTxEnsured
	CanSMBorTimeL1
	CanSMBorCounterL1ToL2
CanSMGeneral	CanSMVersionInfoApi
	CanSMDevErrorDetect
	CanSMMainFunctionTimePeriod

Container Name	Parameter Name
	CanSMIcomSupport
CanSMConfiguration	CanSMModeRequestRepetitionMax
	CanSMModeRequestRepetitionTime

ERR140013: The reference path <reference path> provided for the parameter 'parameter name' in the container 'container name', having short name <container short name> is incorrect.

This error occurs, if reference path of any of the mandatory parameters mentioned in the below table is incorrect.

Container Name	Parameter Name
CanSMManagerNetwork	CanSMComMNetworkHandleRef
CanSMController	CanSMControllerId

Note: CanSMComMNetworkHandleRef are reference parameters of container CanSMManagerNetwork. The Container CanSMManagerNetwork is the Sub-container of CanSMConfiguration.

ERR140050: The container ''Container Name' should be configured in the input file.

This error occurs, if any of the mandatory containers are not configured.

Container Name
CanSMManagerNetwork
CanSMController
CanSMConfiguration

ERR140051: The configured value for the parameter 'Parameter Name' should be unique in the container 'Container Name'.

This error occurs, if any of the mandatory parameters are not having unique values.

Container Name	Parameter Name
CanSMManagerNetwork	CanSMComMNetworkHandleRef
CanSMController	CanSMControllerId
CanSMDemEventParameterRefs	CANSM_E_BUS_OFF
CanSMDemEventParameterRefs	CANSM_E_MODE_REQUEST_TIMEOUT

ERR140052: The configured value for the parameter 'Parameter Name' should not be configured as zero in the container 'Container Name'.

This error occurs, if the value of the below mentioned parameters is configured as zero.

Container Name	Parameter Name
CanSMGeneral	CanSMMainFunctionTimePeriod

ERR140007: The header and service name of <User_GetBusOffDelay> must be configured in case the Bus Off delay has already been enabled in a network.
This error occurs, If the value of parameter for <User_GetBusOffDelay> is “true” but one of the following parameters are not configured.

Container Name	Parameter Name
CanSMGeneral	CanSMGetBusOffDelayHeader
CanSMGeneral	CanSMGetBusOffDelayFunction

ERR140008: The TrcvId of CanIfTrcvCfg which is provided for CanSM by CanIf is empty.
The error will occurs If CanIf does not provide CanSM with TrcvId CanSM/CanSMConfiguration/CanSMManagerNetwork/CanSMTransceiverId/CanIfTrcvCfg/TrcvId must be filled with a value.

ERR140009: The CtrlId of CanIfCtrlCfg which is provided for CanSM by CanIf is empty.
The error will occurs If CanIf does not provide CanSM with TrcvId CanSM/CanSMConfiguration/CanSMManagerNetwork/CanSMTransceiverId/CanIfTrcvCfg/TrcvId must be filled with a value.

ERR140010: The parameter "Id" in ComMchannel container which is provided for CanSMManagerNetwork is empty.
The error will occurs if the following parameter is empty
1.CanSMConfiguration/CanSMManagerNetwork/CanSMComMNetworkHandleRef/ComMChannel/Id.

ERR140011: The number of CanSMConfiguration containers is different from the number of Variant provided by EcuC.
The error occurs if the number of CanSMConfiguration containers is not equal the number of Variant. The number of variant is provided by EcuC, path: EcuC/EcucPostBuildVariants.

ERR140012: All CanSMConfiguration has to be selected with "Apply Variant" option.
The error occurs if the option "Apply Variant" of the CanSMConfiguration is not selected.
1. In order to determine the "Apply variant" value is selected, the short name "POST-BUILD-VARIANT-CRITERION" shall be found in the Container "CanSMConfiguration" (Do not consider any sub containers).

ERR140013: A variant contains only one CanSMConfiguration.
A variant only contain one CanSMConfiguration The short name <VALUE SHORT-LABEL="<variant>"><value></VALUE> is found within the CanSMConfiguration in CanSM EcuD file, "<varient>" must be unique and "<value>" must be unique.

ERR140014: CanSMBorTxConfirmationPollings which belong to CanSMManagerNetworks which have the same index in all variant should be configured the same.
The error occur if CanSMBorTxConfirmationPolling belong to a CanSMManagerNetwork is configured differently from CanSMBorTxConfirmationPolling of CanSMManagerNetwork which has the same index of the previous one.

ERR140015: CanSMEnableBusOffDelays which belong to CanSMManagerNetworks which have the same index in all variant should be configured the same.
The error occur if CanSMEnableBusOffDelay belong to a CanSMManagerNetwork is configured differently from CanSMEnableBusOffDelay of CanSMManagerNetwork which has the same index of the previous one.

ERR140016: A ComMchannel is mapped by more than one CanSMManagerNetwork.
The Id below must have a unique value: <Apply for each Variant, not for all Variant>
CanSM/CanSMConfiguration/CanSMManagerNetwork/ComMNetworkHandleRef/ComMChanne

I/Id.

ERR140017: TransceiverId of different CanSMManagerNetwork cannot map to the same TrcvId.
The Id below must have a unique value: <Apply for each Variant, not for all Variant>: CanSM/CanSMConfiguration/CanSMManagerNetwork/TransceiverId/CanIfTrcvCfg/TrcvId

ERR140018: There is only one container CanSMGeneral because it does not support post-build multiplicity.
The error occurs when there is more than one container CanSMGeneral in the arxml file of CanSM.

ERR140019: The "Post Build Variant Used" status is not compatible to status of "Implementation Config Variant".
The error occurs when Post Build Variant Used is set to FALSE, but Implementation Config Variant is set to POST-BUILD and otherwise.

ERR140020: Missing CanTrcv file in the input files when CanSMPncSupport is set ON.
The error occurs when the parameter CanSMPncSupport is set ON, the channel in CanSM needs to mapping to the PN channel in CanTrcv, the CanSM's generator should check the existing of CanTrcv in the input files.

ERR140021: Both 2 parameters 'CanSMUserTimeoutFunction' and 'CanSMUserTimeoutHeader' of CanSMGeneral must be set or not set.
This error occurs, if only one of 'CanSMUserTimeoutFunction' or 'CanSMUserTimeoutHeader' is set.

7.2.2. Warning Messages

NA

7.2.3. Information Messages

INF140015: AUTOSAR Release version 'AR-RELEASE-VERSION' configured for the parameter 'AR-RELEASE-VERSION' in provided MDT file is not correct. AUTOSAR Release version should be one of the following: 4.4.0.

This information occurs, if AR-RELEASE-VERSION in BSW-IMPLEMENTATION is not configured as 4.4.0

8 SWP Error Code List

8.1 SWP Error Code List

8.1.1 CANSM_E_BUS_OFF

ErrorId Symbol	CANSM_E_BUS_OFF_X
Description	MCAL CAN Driver notifies the status by recognizing Bus-Off
Cause of the problem	MCAL
Platform Default Action	NO RESET
Functional impact	Due to the progress of Bus-Off recovery, normal CAN communication is impossible until Recovery is completed.
Other module association	NA
MCU	common
Type of question	H/W problem
Application applicable measures	- The CanSM module proceeds with Bus-Off recovery. - While Bus-Off Recovery is in progress, it waits until the recovery is completed, and if it repeats infinitely, measures related to Applicatoin are necessary. - If the H / W problem is not resolved, the same phenomenon may occur even after reset. - Appropriate measures such as Reset or Wait are required in the application.

9 Appendix

9.1 Dem Error

Bsw module errors shall be reported to the Dem_ReportErrorStatus() when the errors occur.

9.1.1 CANSM_E_MODE_REQUESTED_TIMEOUT

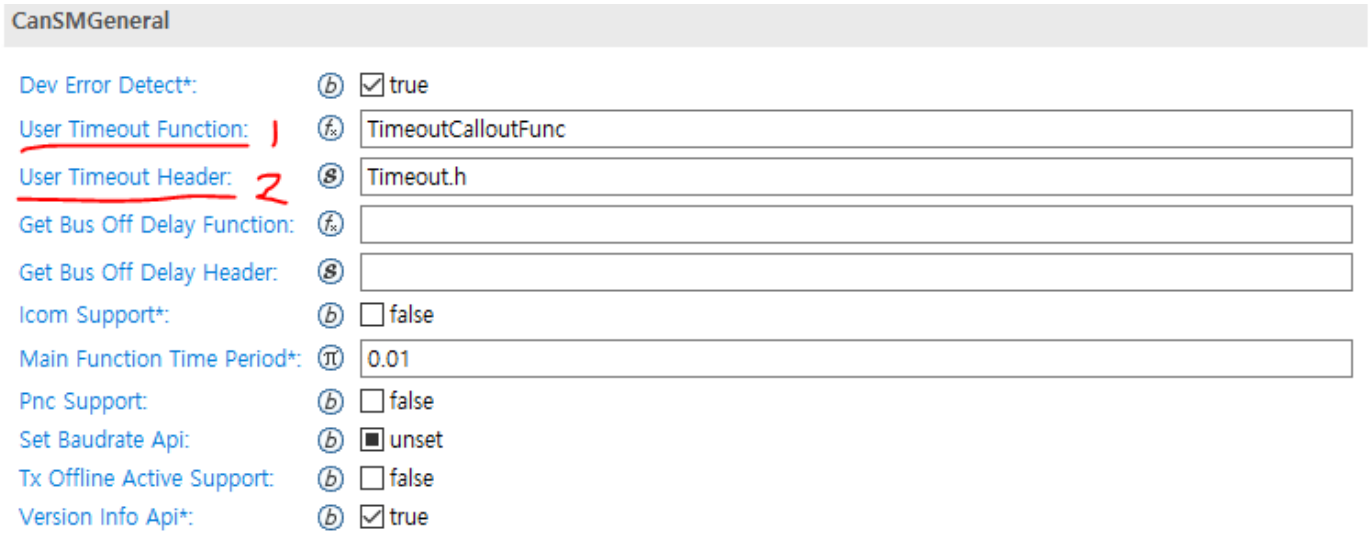
ErrorId Symbol	CANSM_E_MODE_REQUESTED_TIMEOUT
Description	The CAN State Manager was not able to change the mode of a CAN network after CanSMModeRequestRepetitionMax retries. It monitors the following CanIf services and the corresponding indications: 1)CanIf_SetControllerMode()-> CanSM_ControllerModeIndication() 2) CanIf_SetTrcvMode() -> CanSM_TransceiverModeIndication() 3) CanIf_CheckTrcvWakeFlag() ->CanSM_CheckTransceiverWakeFlagIndication() 4)CanIf_ClrTrcvWufFlag()-> CanSM_ClearTrcvWufFlagIndication()
Platform Default Action	S/W
Platform Default Action	NO RESET
Functional impact	- When the CAN State Manager executed any of the CanIf services listed above without receiving the corresponding indication for CanSMModeRequestRepetitionMax times, it shall report the extended production error CANSM_E_MODE_REQUEST_TIMEOUT with event status DEM_EVENT_STATUS_PREFAILED to DEM and the current substate machine shall be switched to CANSM_BSM_S_PRE_NOCOM.
Other module association	NA
MCU	common
Type of question	S/W
Application applicable measures	• CanSM shall report the extended production error CANSM_E_MODE_REQUEST_TIMEOUT with DEM_EVENT_STATUS_PREPASSED to DEM When it received any of the services listed above • The CanSM shall report the extended production error

	CANSM_E_MODE_REQUEST_TIMEOUT with event status DEM_EVENT_STATUS_PREFAILED to DEM after CanSMModeRequestRepetitionMax times failed to execute any services listed above • The current communication mode shall be switched back to CANSM_BSM_S_PRE_NOCOM after CanSMModeRequestRepetitionMax times failed to execute any services listed above

9.2 User Timeout Callout Function

When changing mode, If timeout occurs over the set number of repetitions, the user timeout callout function can be used by CanSMUserTimeoutFunction.

In CanSM / CanSMGeneral,
Set parameters about User Timeout Function. Like below (It is an example.)
1. CanSMUserTimeoutFunction : Timeout Callout Function Name.
2. CanSMUserTimeoutHeader : Name of the header file to be included by the CanSM module for timeout callout function.



Then, Call CanSM_TimeoutProcessing due to timeout for mode transition.
And When CanSM_TimeoutProcessing is called by the set value(CanSMModeRequestRepetitionMax, CanSMModeRequestRepetitionTime), the callout function is called.(CanSMUserTimeoutFunction)