**Module Design Document**

**For**

**DemIf**

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**Prepared For:**

**Software Engineering**

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# Introduction

## Purpose

Purpose of this document is to present design of the DemIf component software implementation.

## Scope

Document focuses on DemIf component only.

The following definitions are used throughout this document:

* **Shall**: indicates a mandatory requirement without exception in compliance.
* **Should**: indicates a mandatory requirement; exceptions allowed only with documented justification.
* **May**: indicates an optional action.

# DemIf & High-Level Description

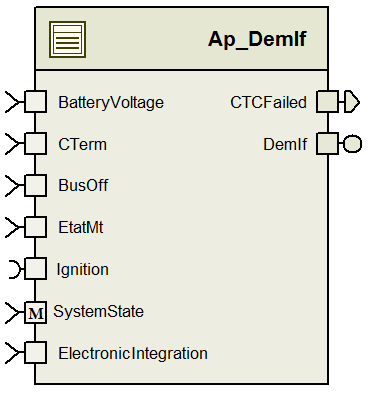
DemIf component is an interface between AUTOSAR DEM component interface and Nexteer DiagMgr component. Intention of this component is to give flexibility in the interaction between those two components.

DemIf optimizes monitoring of the status of DTC (CTC) events and lets to control which DTC shall be reported and which not.

DemIf is responsible also for deinitialization of DEM component and changing Operational Cycles in DEM on SWC request.

# Design details of software module

## Graphical representation of DemIf



## Data Flow Diagram

### Module level DFD for DTC monitoring functionality



### Module level DFD for DTC inhibition functionality



## Component diagram

## Variable Data Dictionary

### User defined ‘typedef’ definition/declaration

N/A

### Variable definition for enumerated types

N/A

## Constant Data Dictionary

### Program Constants

#### Local Constants

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Value** | **Description** |
| CTCInhibitionMask\_Cnt\_M\_u08 | uint8[] | See the code | Holds configuration of all DTC for inhibition scenarios. If flag for particular scenario is set, DTC shall be inhibited if scenario is active |
| D\_CTC\_INHIB\_ESC | uint8 | 0x01u | Flag for ESC inhibition scenario |
| D\_CTC\_INHIB\_BSI | uint8 | 0x02u | Flag for BSI inhibition scenario |
| D\_CTC\_INHIB\_CAV | uint8 | 0x04u | Flag for CAV inhibition scenario |
| D\_CTC\_INHIB\_AAS | uint8 | 0x08u | Flag for AAS inhibition scenario |
| D\_CTC\_INHIB\_CMM | uint8 | 0x10u | Flag for CMM inhibition scenario |
| D\_CTC\_INHIB\_COM | uint8 | 0x40u | Flag for COM inhibition scenario |
| D\_CTC\_INHIB\_ELEC\_INT | uint8 | 0x80u | Flag for ELEC\_INT inhibition scenario |
|  |  |  |  |
|  |  |  |  |

#### Global Constants

N/A

### Module Specific Lookup Tables

See CTCInhibitionMask\_Cnt\_M\_u08 chapter 3.5.1.1

## Software Module Implementation

### Sub-Module Functions

#### Initialization sub-module DemIf\_Init()



#### Periodic sub-module DemIf\_Per()



#### Non Periodic sub-module DemIf\_SetEventStatus ()



#### Non Periodic sub-module DemIf\_DTCStatusChanged()



#### Non Periodic sub-module DemIf\_SetOperationCycleState()

Function passes operational cycle directly to DEM.

#### Non Periodic sub-module DemIf\_RestartDem()

Function initializes DEM component.

#### Non Periodic sub-module DemIf\_DemShutdown()

Function shuts down DEM component.

### Interrupt Service Routines

N/A

### \_SCOMM () Functions DemIf\_VehSpdControl()

Function stores Vehicle Speed Control status reported by Serial Com / Diagnostics

### Module Internal (Local) Functions

#### Module Internal (Local) Function DemIf\_CheckVoltageRange()

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | DemIf\_CheckVoltageRange | Type | Min | Max |
| **Arguments Passed** | voltage\_Volt\_T\_f32 | float32 | 0 | 31 |
|  | min\_Volt\_T\_f32 | float32 | 0 | 31 |
|  | max\_Volt\_T\_f32 | float32 | 0 | 31 |
|  | time\_cnt\_T\_u32 | uint32 | 0 | 2^32 |
|  | timer\_cnt\_T\_u32 | uint32\* | 0 | 2^32 |



#### Module Internal (Local) Function DemIf\_EvaluateLogicalCondition()

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | DemIf\_EvaluateLogicalCondition | Type | Min | Max |
| **Arguments Passed** | Time\_ms\_T\_u32 | uint32 | 0 | 2^32 |



### Transition Functions

N/A

# Known Limitations with Design

Any change in configuration of the DEM Event list may impact content of the CTCInhibitionMask\_Cnt\_M\_u08. DEM sorts Events by DTC number. If event number changes, there is risk of sorting events in different order what changes event IDs.

# UNIT TEST CONSIDERATION

N/A

Abbreviations and Acronyms

| **Abbreviation or Acronym** | **Description** |
| --- | --- |
| CTC | Customer Trouble Code, equivalent to DTC |
|  |  |

Glossary

**Note**: Terms and definitions from the source “Nexteer Automotive” take precedence over all other definitions of the same term. Terms and definitions from the source “Nexteer Automotive” are formulated from multiple sources, including the following:

* ISO 9000
* ISO/IEC 12207
* ISO/IEC 15504
* Automotive SPICE® Process Reference Model (PRM)
* Automotive SPICE® Process Assessment Model (PAM)
* ISO/IEC 15288
* ISO 26262
* IEEE Standards
* SWEBOK
* PMBOK
* Existing Nexteer Automotive documentation

| **Term** | **Definition** | **Source** |
| --- | --- | --- |
| MDD | Module Design Document |  |
| DFD | Data Flow Diagram |  |

References

| **Ref. #** | **Title** | **Version** |
| --- | --- | --- |
| 1 | AUTOSAR Specification of Memory Mapping (Link:[AUTOSAR\_SWS\_MemoryMapping.pdf](http://www.autosar.org/download/R4.0/AUTOSAR_SWS_MemoryMapping.pdf)) | v1.3.0 R4.0 Rev 2 |
| 2 | MDD Guideline | EA3 01.04.00 |
| 3 | [Software Naming Conventions.doc](http://misagweb01.nexteer.com/eRoomReq/Files/erooms8/NextGeneration/0_fc55f/Software%20Naming%20Conventions%2003x(In%20Work).doc) | 1.0 |
| 4 | [Software Design and Coding Standards.doc](http://eroom1.nexteer.com/eRoomReq/Files/erooms8/NextGeneration/0_1a67a9/Software%20Design%20and%20Coding%20Standards.doc) | 2.0 |