**Module Design Document**

**For**

**FordMsg3D7BusHiSpd**

**19-Apr-2018**

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# Introduction

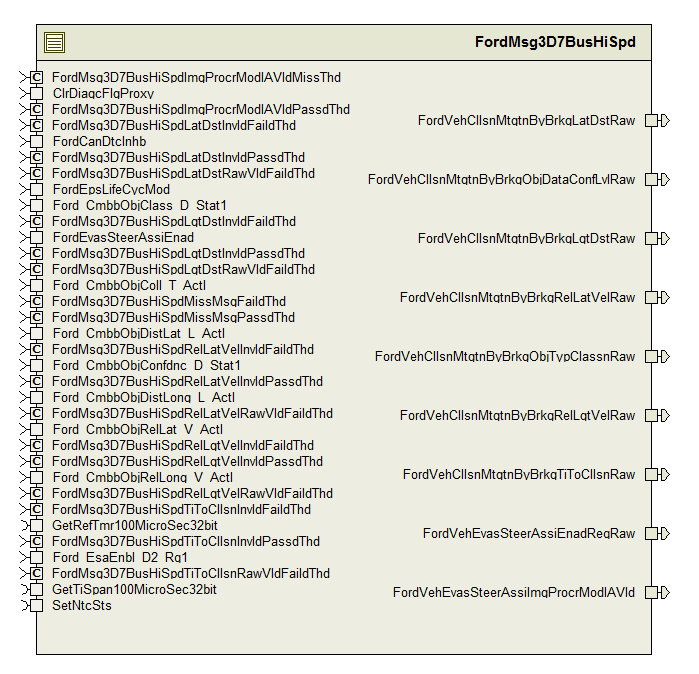
## MDD for FordMsg3D7BusHiSpd

# FordMsg3D7BusHiSpd & High-Level Description

Please refer FDD.

# Design details of software module

## Graphical representation of FordMsg3D7BusHiSpd



## Data Flow Diagram

### Component level DFD

Please refer FDD.

### Function level DFD

Please refer FDD.

# Constant Data Dictionary

## Program (fixed) Constants

### Embedded Constants

#### Local Constants

|  |  |  |  |
| --- | --- | --- | --- |
| Constant Name | Resolution | Units | Value |
| Please refer Data Dictionary .m file | NA | NA | NA |

# Software Component Implementation

## Sub-Module Functions

### 5.1.1 Init: FordMsg3D7BusHiSpdInit1

#### Design Rationale

None

#### Module Outputs

None

### 5.1.2 Per: FordMsg3D7BusHiSpdPer1

#### 5.1.2.1 Design Rationale

None

#### 5.1.2.2 Store Module Inputs to Local copies

None

#### 5.1.2.3 Processing of function

None

#### 5.1.2.4 Store Local copy of outputs into Module Outputs

None

## Server Runnables

### 5.2.1 ComIPduCallout\_Steer\_Assist\_Data\_FD1

#### 5.2.1.1 Design Rationale

None

#### 5.2.1.2 (Processing of function)

None

### 5.2.2 ComTimeoutNotification\_EsaEnbl\_D2\_Rq

#### 5.2.2.1 Design Rationale

None

#### 5.2.2.2 (Processing of function)

None

## Interrupt Functions

None

## Module Internal (Local) Functions

### NtcEnab

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | NtcEnab | Type | Min | Max |
| Arguments Passed | FordEvasSteerAssiEnad\_Cnt\_T\_logl | boolean | 0U | 1U |
| FordCanDtcInhb\_Cnt\_T\_logl | boolean | 0U | 1U |
| ClrDiagcFlgProxy\_Cnt\_T\_u08 | uint8 | 0U | 1U |
| Return Value |  | boolean |  |  |

#### Design Rationale

Refer FDD

#### Processing

Refer FDD

### MsgMiss

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | MsgMiss | Type | Min | Max |
| Arguments Passed | DiagEna\_Cnt\_T\_logl | boolean | 0U | 1U |
| BusHiSpdMissThd\_Cnt\_T\_u16 | Uint16 | 0U | 6000U |
| ClrDiagcFlgProxyEna\_Cnt\_T\_logl | boolean | 0U | 1U |
| Return Value |  | Boolean  Uint8  Uint16 |  |  |

#### Design Rationale

Refer FDD

#### Processing

Refer FDD

### OutpProcd

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | MsgPrsnt | Type | Min | Max |
| Arguments Passed | Ford\_EsaEnbl\_D2\_Rq\_Cnt\_T\_enum | enum | 0U | 3U |
| Ford\_CmbbObjClass\_D\_Stat\_Cnt\_T\_enum | enum | 0U | 15U |
| Ford\_CmbbObjConfdnc\_D\_Stat\_Cnt\_T\_enum | enum | 0U | 3U |
| Ford\_CmbbObjDistLong\_L\_Actl\_Cnt\_T\_u16 | Uint16 | 0U | 1023U |
| Ford\_CmbbObjDistLat\_L\_Actl\_Cnt\_T\_u16 | Uint16 | 0U | 511U |
| Ford\_CmbbObjRelLong\_V\_Actl\_Cnt\_T\_u16 | Uint16 | 0U | 1023U |
| Ford\_CmbbObjRelLat\_V\_Actl\_Cnt\_T\_u16 | Uint16 | 0U | 511U |
| Ford\_CmbbObjColl\_T\_Actl\_Cnt\_T\_u08 | Uint8 | 0U | 127U |
| Return Value |  | Boolean  Uint8  Uint16 |  |  |

#### Design Rationale

Refer FDD

#### Processing

Refer FDD

### VldElpdTi

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | VldElpdTi | Type | Min | Max |
| Arguments Passed | No input arguments |  |  |  |
| Return Value |  | Boolean |  |  |

#### Design Rationale

Refer FDD

#### Processing

Refer FDD

### FirstTran

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | FirstTran | Type | Min | Max |
| Arguments Passed | VldChkFlg\_Cnt\_T\_logl | boolean | 0U | 1U |
| Return Value |  | boolean |  |  |

#### Design Rationale

Refer FDD

#### Processing

Refer FDD

### ChkElpdTi

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | ChkElpdTi | Type | Min | Max |
| Arguments Passed | VldChkFlg\_Cnt\_T\_logl | boolean | 0U | 1U |
| ImgProcrModlAVldPassdElpdTi\_Cnt\_T\_logl | boolean | 0U | 1U |
| FordVehCllsnMtgtnByBrkgLgtDstRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| LgtDstRawVldFaildElpdTi\_Cnt\_T\_logl | boolean | 0U | 1U |
| FordVehCllsnMtgtnByBrkgLatDstRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| LatDstRawVldFaildElpdTi\_Cnt\_T\_logl | boolean | 0U | 1U |
| FordVehCllsnMtgtnByBrkgRelLgtVelRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| RelLgtVelRawVldFaildElpdTi\_Cnt\_T\_logl | boolean | 0U | 1U |
| FordVehCllsnMtgtnByBrkgRelLatVelRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| RelLatVelRawVldFaildElpdTi\_Cnt\_T\_logl | boolean | 0U | 1U |
| FordVehCllsnMtgtnByBrkgTiToCllsnRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| TiToCllsnRawVldFaildElpdTi\_Cnt\_T\_logl | boolean | 0U | 1U |
| Return Value |  | boolean |  |  |

#### Design Rationale

Refer FDD

#### Processing

Refer FDD

### Enad

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | Enabled | Type | Min | Max |
| Arguments Passed | FordVehCllsnMtgtnByBrkgLgtDstRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| BusHiSpdLgtDstInvldThd\_Cnt\_T\_u16 | Uint16 | 0U | 6000U |
| BusHiSpdLatDstInvldThd\_Cnt\_T\_u16 | Uint16 | 0U | 6000U |
| FordVehCllsnMtgtnByBrkgLatDstRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| Return Value | None |  |  |  |

#### Design Rationale

Refer FDD

#### Processing

Refer FDD

### Enad2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | ElpdTi | Type | Min | Max |
| Arguments Passed | FordVehCllsnMtgtnByBrkgRelLgtVelRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| FordVehCllsnMtgtnByBrkgRelLatVelRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| FordVehCllsnMtgtnByBrkgTiToCllsnRawInp\_Cnt\_T\_logl | boolean | 0U | 1U |
| BusHiSpdRelLgtVelInvldThd\_Cnt\_T\_u16 | Uint16 | 0U | 6000U |
| BusHiSpdRelLatVelInvldThd\_Cnt\_T\_u16 | Uint16 | 0U | 6000U |
| BusHiSpdTiToCllsnInvldThd\_Cnt\_T\_u16 | boolean | 0U | 1U |
| Return Value | None |  |  |  |

#### Design Rationale

Refer FDD

#### Processing

Refer FDD

## GLOBAL Function/Macro Definitions

None

# Known Limitations with Design

1. The datatypes of the following outputs and PIMs have been changed to uint8 as per clarification by the Architect.

FordVehCllsnMtgtnByBrkgObjDataConfLvlRaw\_Cnt\_T\_u08

FordVehCllsnMtgtnByBrkgObjTypClassnRaw\_Cnt\_T\_u08

FordVehEvasSteerAssiEnadReqRaw\_Cnt\_T\_u08

Rte\_Pim\_FordVehCllsnMtgtnByBrkgObjDataConfLvlRawPrev

Rte\_Pim\_FordVehCllsnMtgtnByBrkgObjTypClassnRawPrev

Rte\_Pim\_FordVehEvasSteerAssiEnadReqRawPrev

2) FORDVEHCLLSNMTGTNBYBRKGTITOCLLSNRAWTHD\_CNT\_U16 is of type uint8 but wrongly named as U16. This was changed in the code to FORDVEHCLLSNMTGTNBYBRKGTITOCLLSNRAWTHD\_CNT\_U08.

# UNIT TEST CONSIDERATION

1. The datatypes of the following outputs and PIMs have been changed to uint8 from enum as per clarification by the Architect.

FordVehCllsnMtgtnByBrkgObjDataConfLvlRaw\_Cnt\_T\_u08

FordVehCllsnMtgtnByBrkgObjTypClassnRaw\_Cnt\_T\_u08

FordVehEvasSteerAssiEnadReqRaw\_Cnt\_T\_u08

Rte\_Pim\_FordVehCllsnMtgtnByBrkgObjDataConfLvlRawPrev

Rte\_Pim\_FordVehCllsnMtgtnByBrkgObjTypClassnRawPrev

Rte\_Pim\_FordVehEvasSteerAssiEnadReqRawPrev

1. FORDVEHCLLSNMTGTNBYBRKGTITOCLLSNRAWTHD\_CNT\_U16 is of type uint8 but wrongly named as U16. This was changed in the code to FORDVEHCLLSNMTGTNBYBRKGTITOCLLSNRAWTHD\_CNT\_U08.

Abbreviations and Acronyms

| **Abbreviation or Acronym** | **Description** |
| --- | --- |
|  |  |
|  |  |

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) | v1.3.0 R4.0 Rev 2 |
| 2 | MDD Guideline | EA4 01.00 |
| 3 | Software Naming Conventions.doc | EA4 01.02 |
| 4 | Software Design and Coding Standards.doc | EA4 2.01 |
| 5 | FDD: MM075A\_FordMsg3D7BusHiSpd\_Design | See Synergy subproject version |