**Module Design Document**

**For**

**GmRoadWhlInQlfr**

**March 2, 2016**

**Prepared For:**

**Software Engineering**

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| **Description** | **Author** | **Version** | **Date** |
| Initial Version | N. Saxton | 1.0 | 02-Mar-2016 |

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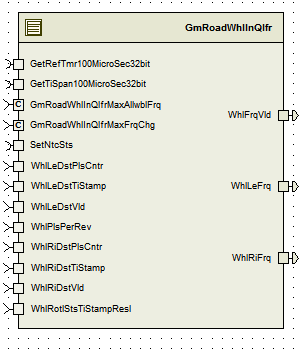
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# GmRoadWhlInQlfr High-Level Description

*Refer FDD*

# Design details of software module

## Graphical representation of GmRoadWhlInQlfr



## Data Flow Diagram

Refer FDD

### Component level DFD

Refer FDD

### Function level DFD

Refer FDD

# Constant Data Dictionary

## Program (fixed) Constants

### Embedded Constants

#### Local Constants

Refer DataDict.m for constants

# Software Component Implementation

## Sub-Module Functions

Refer FDD

## Init: GmRoadWhlInQlfrInit1

## Design Rationale

*Refer FDD*

## Module Outputs

*Refer FDD*

## Per: GmRoadWhlInQlfrPer1

## Design Rationale

Refer FDD

## Store Module Inputs to Local copies

Refer FDD

## (Processing of function)………

Refer FDD

## Store Local copy of outputs into Module Outputs

Refer FDD

## Server Runables

None

## Interrupt Functions

None

## Module Internal (Local) Functions

## Local Function #1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | CalcLeWhlFrqAndFrqVld | Type | Min | Max |
| **Arguments Passed** | WhlRotlStsTiStampResl\_SecPerCnt\_T\_f32 | Float32 | 2e-09 | 4.084e-06 |
|  | WhlLeDstPlsCntr\_Cnt\_T\_u16 | Uint16 | 0 | 1023 |
|  | WhlLeDstTiStamp\_Cnt\_T\_u16 | Uint16 | 0 | 65535 |
|  | WhlPlsPerRev\_CntPerRoadWhlRev\_T\_u08 | Uint08 | 1 | 127 |
|  | \*LeWhlFrqVld\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | \*WhlLeFrq\_Hz\_T\_f32 | Float32 | 0.01 | 60 |
|  | \*LeFrqOutOfRng\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | \*LeFrqChgOutOfRng\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | \*LeWhlDiagFlg\_Cnt\_T\_logl | Boolean | FALSE | TRUE |

\* LeWhlFrqVld\_Cnt\_T\_logl, \* WhlLeFrq\_Hz\_T\_f32, \*LeFrqOutOfRng\_Cnt\_T\_logl, \*LeFrqChgOutOfRng\_Cnt\_T\_logl and \*LeWhlDiagFlg\_Cnt\_T\_logl are outputs of this function

## Design Rationale

Implementation of "Chk Curr and Prev LeWhlDstTiStamp" block

## Processing

Refer FDD

## Local Function #2

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | CalcRiWhlFrqAndFrqVld | Type | Min | Max |
| **Arguments Passed** | WhlRotlStsTiStampResl\_SecPerCnt\_T\_f32 | Float32 | 2e-09 | 4.084e-06 |
|  | WhlRiDstPlsCntr\_Cnt\_T\_u16 | Uint16 | 0 | 1023 |
|  | WhlRiDstTiStamp\_Cnt\_T\_u16 | Uint16 | 0 | 65535 |
|  | WhlPlsPerRev\_CntPerRoadWhlRev\_T\_u08 | Uint08 | 1 | 127 |
|  | \*RiWhlFrqVld\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | \*WhlRiFrq\_Hz\_T\_f32 | Float32 | 0.01 | 60 |
|  | \*RiFrqOutOfRng\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | \*RiFrqChgOutOfRng\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | \*RiWhlDiagFlg\_Cnt\_T\_logl | Boolean | FALSE | TRUE |

\* RiWhlFrqVld\_Cnt\_T\_logl, \* WhlRiFrq\_Hz\_T\_f32, \*RiFrqOutOfRng\_Cnt\_T\_logl, \*RiFrqChgOutOfRng\_Cnt\_T\_logl and \*RiWhlDiagFlg\_Cnt\_T\_logl are outputs of this function

## Design Rationale

Implementation of "Chk Curr and Prev RiWhlDstTiStamp" block

## Processing

Refer FDD

## Local Function #3

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | NTCDiag | Type | Min | Max |
| **Arguments Passed** | LeWhlDiagFlag\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | RiWhlDiagFlag\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | LeFrqOutOfRng\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | RiFrqOutOfRng\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | LeFrqChgOutOfRng\_Cnt\_T\_logl | Boolean | FALSE | TRUE |
|  | RiFrqChgOutOfRng\_Cnt\_T\_logl | Boolean | FALSE | TRUE |

## Design Rationale

Implementation of "NTC Diag" block and immediately preceding logic

## Processing

Refer FDD

## GLOBAL Function/Macro Definitions

None

# Known Limitations with Design

* None

# UNIT TEST CONSIDERATION

* None

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](http://www.autosar.org/download/R4.0/AUTOSAR_SWS_MemoryMapping.pdf)) | v1.3.0 R4.0 Rev 2 |
| 2 | MDD Guideline | EA4 01.00.00 |
| 3 | EA4 [Software Naming Conventions.doc](http://misagweb01.nexteer.com/eRoomReq/Files/erooms8/NextGeneration/0_fc55f/Software%20Naming%20Conventions%2003x(In%20Work).doc) | 01.00.00 |
| 4 | [Software Design and Coding Standards.doc](http://eroom1.nexteer.com/eRoomReq/Files/erooms8/NextGeneration/0_1a67a9/Software%20Design%20and%20Coding%20Standards.doc) | 2.1 |
| 5 | CF018A\_GmRoadWhlInQlfr\_Design | See Synergy subproject version |