**Module Design Document**

**For**

**TEstimn**

**06-Apr-2018**

**Prepared By:**

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|  |  |  |  |
| --- | --- | --- | --- |
| **Description** | **Author** | **Version** | **Date** |
| Initial Version | Sankardu Varadapureddi | 1 | 17-Sep-2015 |
| Updated to Design v2.2.0 | Matthew Leser | 2 | 26-Apr-2017 |
| Updated Graph and added new local function | Matthew Leser | 3 | 06-Dec-2017 |
| Added local constants and unit test considerations. | SPP | 4 | 06-Apr-2018 |

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# Introduction

## Purpose

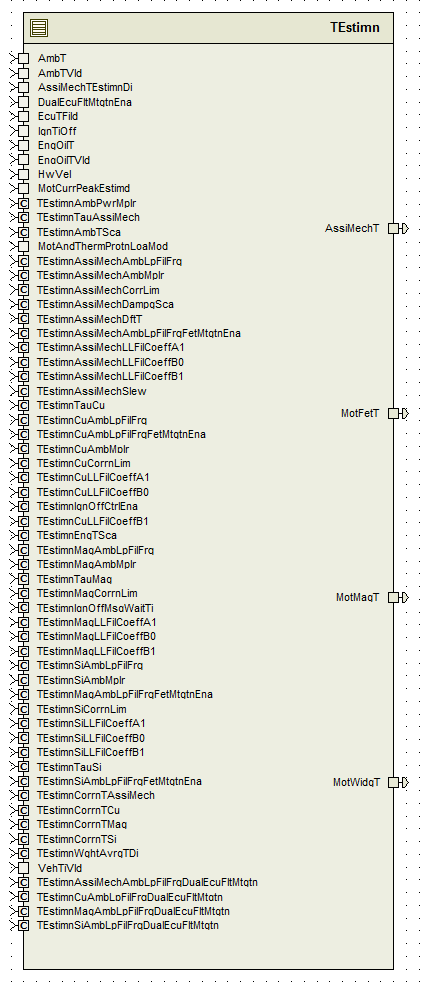
## Scope

# TEstimn High-Level Description

Refer to FDD

# Design details of software module

## Graphical representation of TEstimn



## Data Flow Diagram

Refer FDD

### Component level DFD

### Function level DFD

# Constant Data Dictionary

## Program (fixed) Constants

### Embedded Constants

Refer .m file

#### Local Constants

#define TESTIMNASSIMECHTHILIM\_DEGCGRD\_F32 150.0F

#define TESTIMNASSIMECHTLOLIM\_DEGCGRD\_F32 (-50.0F)

#define TESTIMNFETTHILIM\_DEGCGRD\_F32 200.0F

#define TESTIMNFETTLOLIM\_DEGCGRD\_F32 (-50.0F)

#define TESTIMNMAGTHILIM\_DEGCGRD\_F32 150.0F

#define TESTIMNMAGTLOLIM\_DEGCGRD\_F32 (-50.0F)

#define TESTIMNWIDGTHILIM\_DEGCGRD\_F32 300.0F

#define TESTIMNWIDGTLOLIM\_DEGCGRD\_F32 (-50.0F)

#define DUALECUSTSIDX\_CNT\_U08 ((uint8)0U)

#define SNGECUSTSIDX\_CNT\_U08 ((uint8)1U)

#define EXPCOEFF\_ULS\_F32 (-1.0F)

#define SILLFILVALMIN\_ULS\_F32 (-2431500.0F)

#define SILLFILVALMAX\_ULS\_F32 (1001200.0F)

#define SILPFILVALMIN\_ULS\_F32 (0.0F)

#define SILPFILVALMAX\_ULS\_F32 (62500.0F)

#define ASSIMECHLLFILVALMIN\_ULS\_F32 (-4577000.0F)

#define ASSIMECHLLFILVALMAX\_ULS\_F32 (1716400.0F)

#define ASSIMECHLPFILVALMIN\_ULS\_F32 (0.0F)

#define ASSIMECHLPFILVALMAX\_ULS\_F32 (1764.0F)

#define CULLFILVALMIN\_ULS\_F32 (-2431500.0F)

#define CULLFILVALMAX\_ULS\_F32 (1001200.0F)

#define CULPFILVALMIN\_ULS\_F32 (0.0F)

#define CULPFILVALMAX\_ULS\_F32 (62500.0F)

#define MAGLLFILVALMIN\_ULS\_F32 (-2431500.0F)

#define MAGLLFILVALMAX\_ULS\_F32 (1001200.0F)

#define MAGLPFILVALMIN\_ULS\_F32 (0.0F)

#define MAGLPFILVALMAX\_ULS\_F32 (62500.0F)

#define FILVALMIN\_ULS\_F32 (0.0F)

#define TESTIMNFETMTGTNIDX\_CNT\_U08 ((uint8)2U)

#define TESTIMNIGNTIOFFTHD\_CNT\_F32 (10000.0F)

# #define FETLOABITMASK\_CNT\_U08 ((uint8)4U)Software Component Implementation

## Sub-Module Functions

## Init: TEstimnInit1

## Design Rationale

*Refer FDD for the functionality.*

## Module Outputs

*Refer FDD*

## Per: TEstimnPer1

## Design Rationale

In ‘AssistMechanismLeadLagFilterRe-Initialization’ block, blocks ‘AssistMechanismInitEnable’ and ‘AssistMechanismInitDisable’ have similar logic except for some calculations related to inputs. So the differences are implemented in ‘if-else’ statement and common logic is implemented after ‘if-else’ statements in the SW.

## Store Module Inputs to Local copies

*Refer FDD*

## (Processing of function)………

*Refer FDD*

## Store Local copy of outputs into Module Outputs

*Refer FDD*

## Server Runnables

*None*

## Interrupt Functions

*None*

## Module Internal (Local) Functions

## Local Function #1

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | FltMtgtnCalSeln | Type | Min | Max |
| **Arguments Passed** | FetLoaMtgtnEna\_Cnt\_T\_logl | boolean | FALSE | TRUE |
|  | DualEcuFltMtgtnEna\_Cnt\_T\_logl | boolean | FALSE | TRUE |
| **Return Value** | NA | NA | NA | NA |

## Design Rationale

Implementation of ‘Fault Mitigation Calibration Selection’ block in FDD (To reduce cyclomatic complexity & path count in Per1).

## GLOBAL Function/Macro Definitions

None

# Known Limitations with Design

*None*

# UNIT TEST CONSIDERATION



Calculate TEstimnSiLLFilCoeffB0 as per following equation:

TEstimnSiLLFilCoeffB0= -1\*[(TEstimnSiLLFilCoeffA1-1)+TEstimnSiLLFilCoeffB1]

Calculate TEstimnCuLLFilCoeffB0 as per following equation:

TEstimnCuLLFilCoeffB0= -1\*[(TEstimnCuLLFilCoeffA1-1)+TEstimnCuLLFilCoeffB1]

Calculate TEstimnMagLLFilCoeffB0 as per following equation:

TEstimnMagLLFilCoeffB0= -1\*[(TEstimnMagLLFilCoeffA1-1)+TEstimnMagLLFilCoeffB1]

Calculate TEstimnAssiMechLLFilCoeffB0 as per following equation:

TEstimnAssiMechLLFilCoeffB0= -1\*[(TEstimnAssiMechLLFilCoeffA1-1)+TEstimnAssiMechLLFilCoeffB1]

Anomaly 20644 Issue 1B and 1C were not addressed due to time considerations. Anomaly 19666 issue 4 is a test issue that should be addressed by test team but does not affect design or code.

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 01.00.01 |
| 3 | [Software Naming Conventions.doc](http://misagweb01.nexteer.com/eRoomReq/Files/erooms8/NextGeneration/0_fc55f/Software%20Naming%20Conventions%2003x(In%20Work).doc) | EA4 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 | FDD : SF006A\_ TEstimn\_Design | See Synergy sub project version |