**Module Design Document**

**For**

**PsaAgArbn**

**February 20, 2018**

**Prepared For:**

**Software Engineering**

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**Saginaw, MI, USAChange History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Description** | **Author** | **Version** | **Date** |
| Initial Version of CF039A PsaAgArbn | JK | 1.0 | 03/15/17 |
| Updated to FDD v1.2.0 | JK | 2.0 | 04/05/2017 |
| Updated to FDD v1.3.0 | ML | 3.0 | 04/26/2017 |
| Updated to FDD v2.0.0 | KByrski | 4.0 | 02/20/2018 |

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# Introduction

## Purpose

The purpose of this document is to create Module Design Document for CF039A PsaAgArbn.

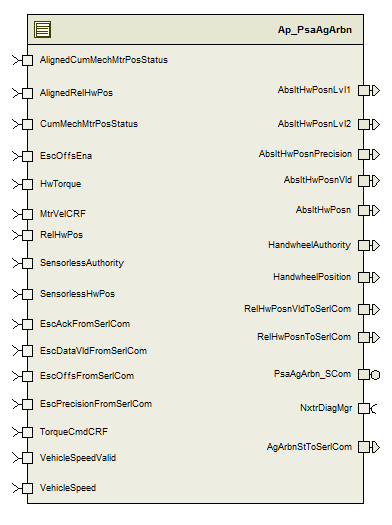
# PsaAgArbn & High-Level Description

This function produces a readjusted steering column angle available at wakeup .The EPS produces and emits the relative column angle. The ESC estimates the offset, associated with an offset accuracy and emits them. If the offset determined by the ESC is better than the one already used by the EPS, the EPS will replace its effective offset by the new offset coming from ESC.

# Design details of software module

*Refer FDD (Ref [5])*

## Graphical representation of PsaAgArbn



## Component diagram

*Refer FDD (Ref [5])*

## Variable Data Dictionary

Refer Variable Dictionary sheet of component’s Data Dictionary.

### User defined ‘typedef’ definition/declaration

None

### Variable definition for enumerated types

|  |  |  |
| --- | --- | --- |
| **Enumerated data type name** | **Enumerators** | **Value** |
| PsaAgAn\_EscOffsSt\_Enum | PSAAGAN\_INIT | 0U |
|  | PSAAGAN\_POWERCUT | 1U |
|  | PSAAGAN\_PROCESSING | 2U |
|  | PSAAGAN\_DEFECT | 3U |
| PsaAgAn\_PsaAgArbnSnsrMod\_Enum | PSAAGAN\_MODININ | 0U |
|  | PSAAGAN\_MODREL | 1U |
|  | PSAAGAN\_MODABSLT | 2U |
|  | PSAAGAN\_MODFAIL | 3U |

## Constant Data Dictionary

### Program Constants

#### Local Constants

|  |  |  |  |
| --- | --- | --- | --- |
| **Constant Name** | **Resolution** | **Units** | **Value** |
| Refer .m file for constants |  |  |  |

#### Global Constants

None

### Module Specific Lookup Tables

None

## Software Module Implementation

### Sub-Module Functions

#### Initialization: PsaAgArbn\_Init1

Refer FDD Design (Simulink model)

#### Periodic: PsaAgArbn\_Per1

Refer FDD Design (Simulink model)

#### Non Periodic sub-module {\_NONPer()}

None

### Interrupt Service Routines

None

### \_SCOMM () Functions

#### PsaAgArbn\_SCom\_PsaAaCmd

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | PsaAgArbn\_SCom\_PsaAaCmd | Type | Min | Max |
| **Arguments Passed** | DiagCmd\_Cnt\_enum | PsaAgArbnDiagCmdReq\_Enum | 0 | 2 |
| **Return Value** | N/A |  |  |  |

### Module Internal (Local) Functions

#### ESCOffsMngr

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | ESCOffsMngr | Type | Min | Max |
| **Arguments Passed** | EscDataVldFromSerlCom\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | EscOffsFromSerlCom\_HwDeg\_T\_f32 | float32 | -1630.0F | 1630.0F |
|  | EscPrecisionFromSerlCom\_HwDeg\_T\_f32 | float32 | 0.0F | 29.0F |
| **Return Value** | N/A |  |  |  |

#### OffsConsistencyFltMngt

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | OffsConsistencyFltMngt | Type | Min | Max |
| **Arguments Passed** | EscDataVldFromSerlCom\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | EscMinOffset\_HwDeg\_T\_f32 | float32 | -1630 | 1679 |
|  | EscMaxOffset\_HwDeg\_T\_f32 | float32 | - 1679 | 1630 |
| **Return Value** | N/A |  |  |  |

#### SnsrMon

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | SnsrMon | Type | Min | Max |
| **Arguments Passed** | CumMechMtrPosStatus\_Cnt\_T\_u08 | uint8 | 0U | 255U |
|  | EscOffsEna\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | AlignedCumMechMtrPosStatus\_Cnt\_T\_u08 | uint8 | 0U | 255U |
|  | AlignedRelHwPos\_HwDeg\_T\_f32 | float32 | -10125.0F | 10125.0F |
|  | RelHwPos\_HwDeg\_T\_f32 | float32 | -3200.0F | 3200.0F |
| **Return Value** | N/A |  |  |  |

#### SnsrSupv

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | SnsrSupv | Type | Min | Max |
| **Arguments Passed** | - | - | - | - |
| **Return Value** | N/A |  |  |  |

#### RecommendedState

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | RecommendedState | Type | Min | Max |
| **Arguments Passed** | - | - | - | - |
| **Return Value** | RecomSt\_Cnt\_T\_enum | PsaAgArbnSt\_Enum | 2U | 4U |

#### GenRawAbsltHwPosnSignals

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | GenRawAbsltHwPosnSignals | Type | Min | Max |
| **Arguments Passed** | \*AbsltHwPosnVld\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | \*AbsltHwPosnLvl1\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
|  | \*PsaAgAn\_AbsltHwPosnLvl2\_Cnt\_M\_lgc | boolean | FALSE | TRUE |
|  | \*AbsltHwPosn\_HwDeg\_T\_f32 | float32 | -1600.0F | 1600.0F |
|  | \*AbsltHwPosnPrecision\_HwDeg\_T\_f32 | float32 | -1679.0F | 1679.0F |
| **Return Value** | N/A |  |  |  |

#### VehCondChk

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | VehCondChk | Type | Min | Max |
| **Arguments Passed** | FiltMtrVelCRF\_MtrRadpS\_T\_f32 | float32 | -1350.0F | 1350.0F |
|  | FiltPinionTrq\_HwNm\_T\_f32 | float32 | -890.0F | 890.0F |
|  | FiltHwTrq\_HwNm\_T\_f32 | float32 | -10.0F | 10.0F |
|  | VehicleSpeed\_Kph\_T\_f32 | float32 | 0.0F | 511.0F |
|  | VehicleSpeedValid\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
| **Return Value** | VehCond\_Cnt\_T\_lgc | boolean | FALSE | TRUE |

#### SwitchOffs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Function Name** | SwitchOffs | Type | Min | Max |
| **Arguments Passed** | VehCond\_Cnt\_T\_lgc | boolean | FALSE | TRUE |
| **Return Value** | N/A |  |  |  |

### Transition Functions

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 | 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) | 2.0 |
| 4 | [Software Design and Coding Standards.doc](http://eroom1.nexteer.com/eRoomReq/Files/erooms8/NextGeneration/0_1a67a9/Software%20Design%20and%20Coding%20Standards.doc) | 2.1 |
| 5 | FDD CF039A PsaAgArbn | 2.0.0 |