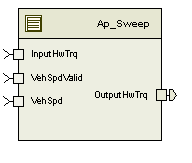
# Module – Sweep

# High-Level Description

# Figures

## Component Diagram



# Variable Data Dictionary

|  |  |  |
| --- | --- | --- |
| Module Inputs | Module Outputs | |
| InputHwTrq\_HwNm\_f32 | | OutputHwTrq\_HwNm\_f32 |
| VehSpdValid\_Cnt\_lgc | |  |
| VehSpd\_Kph\_f32 | |  |

## Module Internal Variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable Name | Datatype | Resolution | Legal Range  (min) | Legal Range  (max) | Software Segment  {Data Type} |
| HwTrqQuantization\_Uls\_M\_f32 | Float32 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_32 |
| CosSweepTorque\_HwNm\_M\_f32 | Float32 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_32 |
| SweepVehSpdMax\_Kph\_M\_f32 | Float32 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_32 |
| DwellStartTime\_mS\_M\_u32p0 | Uint32 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_32 |
| LastStateSinArg\_Uls\_M\_f32 | Float32 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_32 |
| TransStartTime\_mS\_M\_u32p0 | Uint32 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_32 |
| MtrTrqQuantization\_Uls\_M\_f32 | Float32 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_32 |
| SweepTorque\_HwNm\_M\_f32 | Float32 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_32 |
| SweepAmplitude\_HwNm\_M\_u5p11 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| SweepOffset\_HwNm\_M\_s4p11 | Sint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| SweepState\_Cnt\_M\_u16 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| FreqIndex\_Cnt\_M\_u16 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| k\_N\_SweepConfig\_Cnt\_u16 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| k\_N\_SweepGain\_MtrNmpHwNm\_u1p15 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| L5\_N\_SweepOffset\_HwNm\_M\_s4p11 | Sint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| L5\_N\_SweepAmplitude\_HwNm\_M\_u5p11 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| L5\_N\_CosSweepTorque\_HwNm\_M\_s10p5 | Sint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| L5\_N\_RespTorque\_HwNm\_G\_s10p5 | Sint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| L5\_N\_SweepState\_Cnt\_M\_u16 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| L5\_N\_SweepTorque\_HwNm\_G\_s10p5 | Sint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| L5\_N\_InstFrequency\_Hz\_G\_u7p9 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| SweepConfig\_Cnt\_M\_u16 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| SweepGain\_MtrNmpHwNm\_M\_u1p15 | Uint16 |  |  |  | SWEEP\_START\_SEC\_VAR\_CLEARED\_16 |
| L5\_N\_GenHwTrq\_Cnt\_M\_lgc | boolean | N/A | FALSE | TRUE | SWEEP\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| k\_N\_EnVehSpdCheck\_Cnt\_lgc | boolean | N/A | FALSE | TRUE | SWEEP\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| k\_N\_SweepModeEn\_Cnt\_lgc | boolean | N/A | FALSE | TRUE | SWEEP\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| EnVehSpdCheck\_Cnt\_M\_lgc | boolean | N/A | FALSE | TRUE | SWEEP\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| GenHwTrq\_Cnt\_M\_lgc | boolean | N/A | FALSE | TRUE | SWEEP\_START\_SEC\_VAR\_CLEARED\_BOOLEAN |
| SweepModeEn\_Cnt\_M\_lgc | boolean | N/A | FALSE | TRUE |  |

### User defined typedef definition/declaration

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Typedef Name | Element Name | User Defined Type | Legal Range  (min) | Legal Range  (max) |
|  |  |  |  |  |

# Constant Data Dictionary

## Calibration Constants

|  |
| --- |
| Constant Name |
|  |

## Program(fixed) Constants

### Embedded Constants

#### Local

|  |  |  |  |
| --- | --- | --- | --- |
| Constant Name | Resolution | Units | Value |
| D\_SWEEPHWTRQ\_CNT\_U16 | 1 | Uint16 | 2 |
| D\_SWEEPMTRTRQ\_CNT\_U16 | 1 | Uint16 | 1 |
| D\_SWEEPSTART\_CNT\_U16 | 1 | Uint16 | 0 |
| D\_SWEEPTRANSITION\_CNT\_U16 | 1 | Uint16 | 1 |
| D\_SWEEPDWELL\_CNT\_U16 | 1 | Uint16 | 2 |
| D\_SWEEPSTOP\_CNT\_U16 | 1 | Uint16 | 3 |
| D\_SWEEPRAMP\_CNT\_U16 | 1 | Uint16 | 4 |
| D\_SWEEPDONE\_CNT\_U16 | 1 | Uint16 | 5 |

#### Global

|  |
| --- |
| Constant Name |
| D\_FALSE\_CNT\_LGC |
| D\_ZERO\_ULS\_F32 |

### Module specific Lookup Tables Constants

|  |  |  |  |
| --- | --- | --- | --- |
| Constant Name | Resolution | Value | Software Segment |
| T\_SweepFreq\_Hz\_f32[100] | N/A | {0.0F, 1.0F, 1.2F, 1.4F, 1.6F, 1.8F, 2.0F, 2.25F, 2.5F, 2.75F, 3.0F, 3.25F, 3.5F, 3.75F, 4.0F, 4.25F, 4.5F, 4.75F, 5.0F, 5.25F, 5.5F, 5.75F, 6.0F, 6.25F, 6.5F, 6.75F, 7.0F, 7.25F, 7.5F, 7.75F, 8.0F, 8.25F, 8.5F, 8.75F, 9.0F, 9.25F, 9.5F, 9.75F, 10.0F, 10.25F, 10.5F, 10.75F, 11.0F, 11.25F, 11.5F, 11.75F, 12.0F, 12.25F, 12.5F, 12.75F, 13.0F, 13.25F, 13.5F, 13.75F, 14.0F, 14.25F, 14.5F, 14.75F, 15.0F, 15.5F, 16.0F, 16.5F, 17.0F, 17.5F, 18.0F, 18.5F, 19.0F, 19.5F, 20.0F, 21.0F, 22.0F, 23.0F, 24.0F, 25.0F, 26.0F, 27.0F, 28.0F, 29.0F, 30.0F, 32.0F, 34.0F, 36.0F, 38.0F, 40.0F, 42.0F, 44.0F, 46.0F, 48.0F, 50.0F, 55.0F, 60.0F, 65.0F, 70.0F, 75.0F, 80.0F, 85.0F, 90.0F, 95.0F, 100.0F, 105.0F} | AUTOMATIC |
| T\_TransTime\_mS\_u16p0[100] | N/A | {2000U, 500U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 250U, 1000U} | AUTOMATIC |
| T\_DwellTime\_mS\_u16p0[100] | N/A | {0U, 32000U, 18333U, 10714U, 9375U, 8333U, 7500U, 6667U, 6000U, 5455U, 4667U, 4308U, 3714U, 3467U, 3000U, 2824U, 2667U, 2526U, 2400U, 2286U, 2182U, 2087U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U, 2000U} | AUTOMATIC |

# Functions/Macros used by the Sub-Modules

## Library Functions / Macros

The library and functions / Macros that are called by the various sub modules are identified below,

## Data Hiding Functions

1. <None>

## Global Functions/Macros Defined by this Module

none

## Local Functions/Macros Used by this MDD only

none

# Software Module Implementation

## Runtime Environment (RTE) Initial Values

|  |  |
| --- | --- |
| Data | Value |
| InputHwTrq\_HwNm\_f32 | 0 |
| VehSpdValid\_Cnt\_lgc | FALSE |
| VehSpd\_Kph\_f32 | 0 |

## Initialization Functions

#### Design Rationale

None

#### Description



## Periodic Functions

#### Design Rationale

None

#### Description

#### Store Module Inputs to Local copies Fault Recovery Functions

See below

#### Description







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

See above

## Shutdown Functions

None

## Interrupt Functions

None

## Fault Recovery Functions

None

## Shutdown Functions

None

## Interrupt Functions

None

## Serial Communication Functions

None

# Execution Requirements

## Execution Sequence of the Module

## Execution Rates for sub-modules called by the Scheduler

This table serves as reference for the Scheduler design

|  |  |  |
| --- | --- | --- |
| Function Name | Calling Frequency | System State(s) in which the function is called |
| Sweep\_Per1 | 2ms | RTE\_AP\_SWEEP\_APPL\_CODE |

## Execution Requirements for Serial Communication Functions

|  |  |
| --- | --- |
| Function Name | Sub-Module called by (Serial Comm Function Name) |
|  |  |

# Memory Map Definition Requirements

## Sub Modules (Functions)

This table identifies the software segments for functions identified in this module.

|  |  |
| --- | --- |
| Name of Sub Module | Software Segment |
|  |  |

## Global and Local Functions

This table identifies the software segments for local functions identified in this module.

|  |  |
| --- | --- |
| Name of Sub Module | Software Segment |
| Sweep\_Per1 | RTE\_AP\_SWEEP\_APPL\_CODE |

# Known Issues / Limitations With Design

1. (Item #1)

# Revision Control Log

|  |  |  |  |
| --- | --- | --- | --- |
| **Rev #** | **Change Description** | **Date** | **Author Initials** |
| 1 | Initial MDD version | 25-Mar-13 | VK |