# 1 HUD_Speed Limit Function – CGEA1.3+

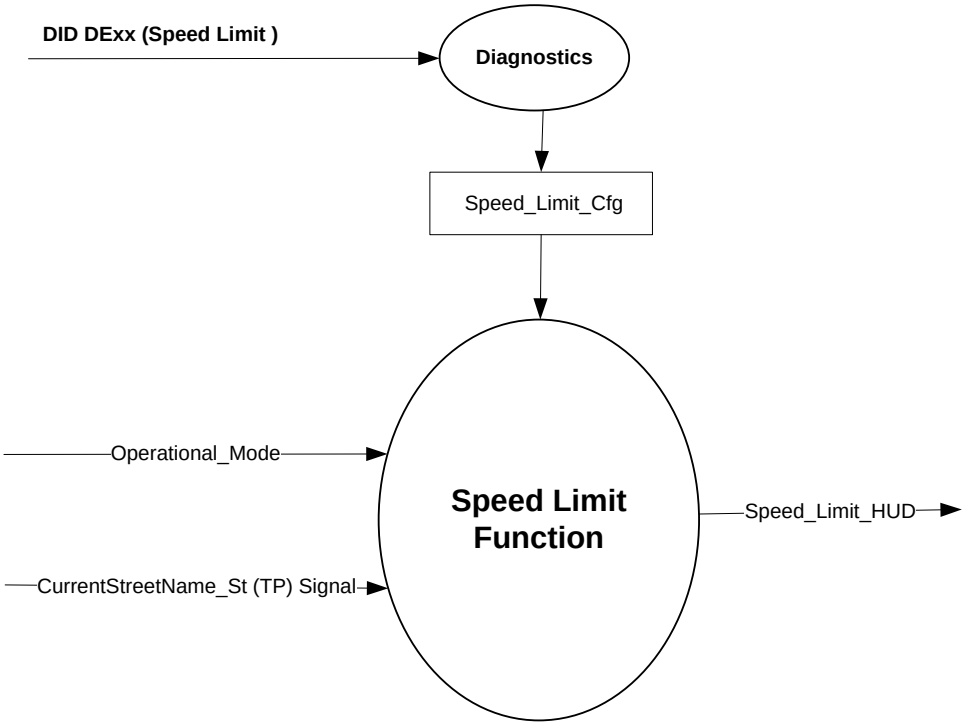
## 1.1 Functional Description

The Speed Limit feature is a mechanism for displaying the speed limit of the current vehicle path to the user. Speed Limit feature relies on the Transport Protocol (TP) data transmitted by the NAV feature from APIM module.

## 1.2 Interfaces

### 1.2.1 Interface Context Diagram (I/O Block Diagram)

**Speed Limit Function Context Diagram**




### 1.2.2 Inputs

*1.2.2.1 IR-REQ-300355/A-INTERNAL*

- Operational_Mode

***1.2.2.2 MUX Messages***

**1.2.2.2.1 SIG-REQ-300353/A-CurrentStreetName_St (TP) Signal**

| Signal Name | Size (bits) | Detail | Units | Res. | Offset | State Encoded | Min | Max |
|---|---|---|---|---|---|---|---|---|
| CurrentStreetName_St | 6 | | | | | | | |
| | | Byte 5 is used for Speed Limit display | none | 1 | x | | 0 (0x0) | 255 (0xFF) |

1.2.3 IR-REQ-300360/A-Outputs

- Speed_Limit_HUD

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## 1.3 Function/Performance

1.3.1 REQ-300362/A-Operational Modes

| Mode | Differentiating Vehicle Conditions |
|---|---|
| Sleep Mode | TSR Display Messages Disabled |
| Limited Mode | TSR Display Messages Disabled |
| Normal Mode | TSR Display Messages Enabled / Disabled |
| Crank Mode | TSR Display Messages Enabled / Disabled |

### 1.3.2 Voltage Levels

Refer to the Cluster Features table located in the Operational Modes and Voltage Range Strategies Section in this SPSS.

### 1.3.3 Human-Machine Interface

#### *1.3.3.1 Visual*

1.3.3.1.1 HMI-REQ-300354/A-Indicator Graphics / Display Format

Please refer to the program specific menu structure for exact graphics.
Example graphic for the Speed Limit is shown below:


#### 1.3.3.1.2 Indicator Color Coordinates

Reference section COLOR & ILLUMINATION REQUIREMENTS (GRAPHICS)

#### *1.3.3.2 Audio*

None

#### *1.3.3.3 Switch Control Logic*

None

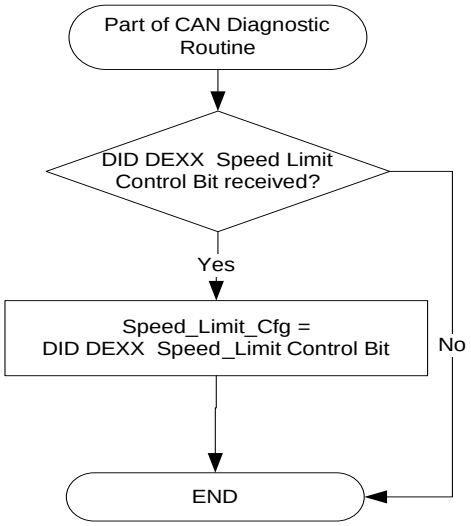
1.3.4 PFM-REQ-300361/A-System Accuracy

Within a 100msec of receiving a message that results in a change of state the cluster will update the display to the proper status.

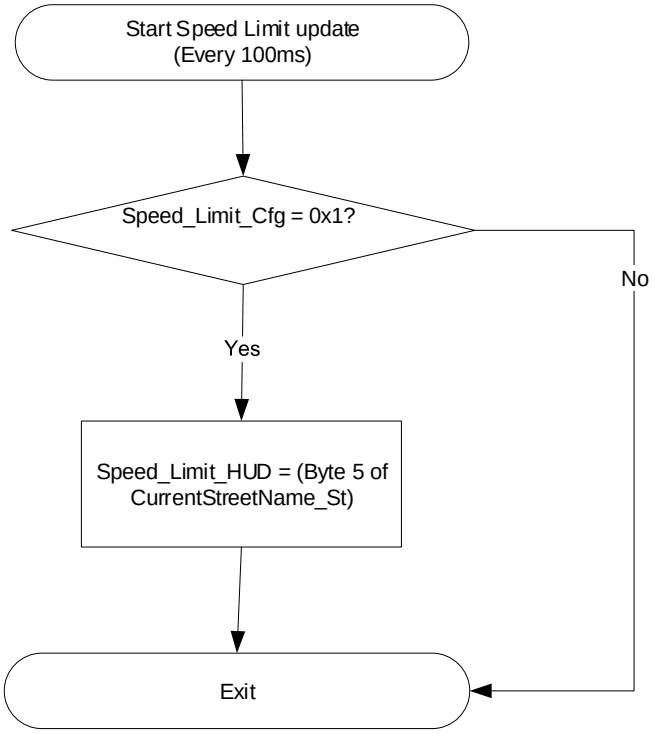
### 1.3.5 Operation: Performance and Functional

#### *1.3.5.1 F-REQ-300356/B-Subsystem Algorithm Flowchart / State Diagram*

**Speed Limit Configuration Flowchart**



**Speed limit input request Flowcharts**




### *1.3.5.2 Operation Description (supports algorithm flowchart /state diagram)*

- HUD should follow the Transport Protocol (see section 1.6) for handling the TP messages.

### *1.3.5.3 Function Safety Classification (EMC)*

Class B

### *1.3.5.4 NVM-REQ-300357/B-Memory Storage*

| Parameter Name | Description | Value at Battery Connect | Value at Wake-up |
|---|---|---|---|
| CurrentStreetName_St | TP signal carries the Speed Limit | Do not Init | Do not Init |
| Speed_Limit_HUD | Speed limit to be displayed.<br>0x00 Invalid<br>0x01 1<br>…<br>0xFF 255 | 0x0 | Do not Init |
| Operational_Mode | 4 state indicator for cluster operational mode | Limited | Limited, Normal or Crank |

#### *1.3.5.5 Reconfigurable Telltale*

None

#### *1.3.5.6 Prove Out*

Not applicable

#### *1.3.5.7 Message Center Msg*

None

## 1.4 Error Handling

### 1.4.1 Missing Message Strategy

The signals will be declared missing as per the Diagnostics section of this SPSS.
If a signal is declared as missing, the Speed Limit display shall be blank.

DTCs states and history will be determined as per the Diagnostics section of this SPSS.

If Speed_Limit_Cfg = Disabled (0x0), the HUD shall never log a missing message DTC for this feature

### 1.4.2 Invalid Message Strategy

If the signal is invalid (0x00), the Speed Limit display shall be blank.

## 1.5 Diagnostics

### 1.5.1 Self Test

None

### 1.5.2 Engineering Test Mode

Reference section “Dealer / Engineering Test Mode (ETM)”

### 1.5.3 Part II Performance

#### *1.5.3.1 DTC-REQ-300358/B-Supported Diagnostic Trouble Codes (DTCs)*

| DTC | Description |
|---|---|
| ~~C25387~~ | ~~Lost Communication with APIM~~ |

### *1.5.3.2 DCR-REQ-300359/A-DID DExx*

| Block Num | Block Description | Size (bits) | Type | Byte(s) | Bits | State: Description | "0" | "1" | Default | Comments/ Information |
|---|---|---|---|---|---|---|---|---|---|---|
| PACKETED BLOCKS | | | | | | | | | | |
| | | | | | | | | | | |
| $xx | Option Content (B&A) | * | 1 | * | 1 | Speed Limit | Disabled | Enabled | 0x00 | This option is enabled on FoE variants only. |
| *Byte and bit location to be identified in Part II Specification for this HUD | | | | | | | | | | |

## 1.6 Reference Specification

APIM - Transport Protocol HUD SPSS v1.0 (Draft) Jul 28 2014.

## 1.7 Revision History

**SPSS Module Revision History**

| Revision Level | Name | Change Description | Date |
|---|---|---|---|
| 1.0 | M. Ye | Initial draft. | 8/15/2014 |
| 1.1 | M. Ye | Updated section 1.3.5.1 to use the speed limit from NAV directly without additional logic of unit conversion. In this case, the speed limit shown is not unit aware, it matches the speed limit implementation in the IPC. | 8/27/2014 |
| 1.2 | A. Salameh | Initial VSEM RM Release | 3/8/2018 |
| 1.3 | Ilopezla | This update was done in 4/20/2016 by A. Mathai but was not reflected in VSEM STSS.<br>Speed_Limit_ HUD not to initialize on wakeup to support startup animation. | 2/3/2019 |
| 1.4 | F. Sethi | Updated requirement “DTC-REQ-300358/A-Supported Diagnostic Trouble Codes (DTCs)” while deleting/strikethrough DTC C25387.<br>Note: Ford decided not to log DTCs against TP signals from DI Core perspective.<br><br>This STSS is applicable for CGEA1.3 and greater architectures. | 6/17/2021 |