

**Research & Vehicle Technology**

**“Infotainment Systems Product Development”**

**Feature – Selectable Drive Mode**

**Infotainment Subsystem Part Specific Specification (SPSS)**

Version 1.4

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**Version Date: August 17, 2020**

**FORD CONFIDENTIALF**

**Revision History**

|  |  |  |  |
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|  | MD-REQ-333094/B-SdmPostXSt | | tmertiri: typo fixing |
|  | SDM-REQ-334800/B-Soft Key Availability While SDM Faulty | | tmertiri: updated wording to confirm to updated behaviour |
|  | SDM-REQ-334801/B-SDM Selection Page | | tmertiri: updated wording to confirm to correct intended feature behaviour |
|  |  |  |  |
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|  | 597838/B-General Requirements | | tmertiri: structure change. New req added |
|  | SDM-REQ-361035/A-No Faulty Display | | tmertiri: new req to comply with FBMP changes |
|  | SDM-REQ-361027/A-Display Status Update | | tmertiri: new req to comply with FBMP changes |
|  | SDM-REQ-334800/B-Soft Key Availability While SDM Faulty+ | | tmertiri: updated wording to confirm to updated behaviour |
|  | SDM-REQ-334800/C-Soft Key Availability While SDM Faulty | | tmertiri: added content for req 334801 to make this req more inline with HMI specs |
|  | SDM-REQ-334801/B-SDM Selection Page+ | | tmertiri: updated wording to confirm to correct intended feature behaviour |
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|  |  |  |  |
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|  | SDM-IIR-REQ-333081/B-SDMClient\_Rx | | tmertiri: added LMyKey signal |
|  | MD-REQ-333093/C-SdmPosX | | tmertiri: change definition. Read about value 0x1F |
|  | MD-REQ-333094/D-SdmPostXSt | | tmertiri: update definition to better describe new operation with mykey signal |
|  | MD-REQ-333095/B-LSdmMsg | | tmertiri:update signal parameters |
|  | MD-REQ-388951/A-LMyKey | | tmertiri: new signal |
|  | 597838/C-General Requirements | | tmertiri: add new requirements |
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|  | SDM-REQ-361027/B-Display Status Update | | tmertiri: change timing of the disaply status update |
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|  | SDM-REQ-388955/A-SDM Display Restrictions | | tmertiri: new req |
|  | SDM-REQ-388968/A-Lin Button | | tmertiri: new req |
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|  |  |  |  |
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|  | 597837/C-Logical Signal Mapping | | tmertiri: new signals for shortcut keys |
|  | SDM-IIR-REQ-333081/C-SDMClient\_Rx | | tmertiri: added new signals for shortcut keys |
|  | MD-REQ-333093/D-SdmPosX | | tmertiri: add new engnineering name |
|  | MD-REQ-333094/E-SdmPostXSt | | tmertiri: update definition. Remove MyKey content. |
|  | MD-REQ-333095/C-LSdmMsg | | tmertiri: add additional Variant A for 0x5. Variant A is defined by configuration value. |
|  | MD-REQ-394187/A-LDis | | tmertiri: New method |
|  | SDM-REQ-388955/B-SDM Display Restrictions | | tmertiri: adding Variant A configuration |
|  | 597839/B-Functional Definition | | tmertiri: add Shortcut key function |
|  | SDM-FUN-REQ-394194/A-SDM Shortcut | | tmertiri: New section |
|  | 780546/A-Shorcut Key Overview | | tmertiri: New section |
|  | 780422/A-Requirements | | tmertiri: New section |
|  | SDM-REQ-394233/A-HMI Display | | tmertiri: New section |
|  | SDM-REQ-394232/A-SDM Mode Change | | tmertiri: New section |
|  | 780423/A-Use Cases | | tmertiri: New section |
|  | SDM-UC-REQ-394190/A-Shortcut Key Menu SDM Display Activation | | tmertiri: New section |
|  | SDM-UC-REQ-394191/A-Shortcut Key Menu SDM Display Deactivation | | tmertiri: New section |
|  | SDM-UC-REQ-394192/A-SDM Sport Mode Activation | | tmertiri: New section |
|  | SDM-UC-REQ-394193/A-SDM Sport Mode Deactivation | | tmertiri: New section |
|  | 780424/A-White Box Views | | tmertiri: New section |
|  | 782217/A-Actvity Diagrams | | tmertiri: New section |
|  | SDM-REQ-394197/A-Shortcut Key Drive Mode Change | | tmertiri: New section |
|  | SDM-REQ-394195/A-Shortcut Key Operation | | tmertiri: New section |
|  | 780426/A-Sequence Diagrams | | tmertiri: New section |
|  | SDM-REQ-394196/A-Shortcut Key Operations | | tmertiri: New section |

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# Overview

Selectable Drive Mode allows the user to change the driving mode as Normal or Sport as they wish. Other modes could be available, depending on vehicle type and options.

# Architectural Design

## SDM-CLD-REQ-333082/A-SDM Client

Selectable Drive Mode Client provides the user with opportunity to request DM changes and various information from the server.

## SDM-CLD-REQ-333083/A-SDM Server

Selectable Drive Mode Server take user’s input for any particular drive mode request and does the necessary work to enable that particular drive state. Also, it can control the order of the drive modes being displayed in HMI screen.

## SDM-CLD-REQ-394185/A-SDM Client 2

In some programs the feature gives the users the ability to interface with the feature through hard buttons functioning as shortcut keys. Client 2 is the module that sends user requests to Client to follow up with the requests. Further details are provided in Shortcuts Function.

## Logical Signal Mapping

The CAN signals mentioned throughout this document shall refer to the CAN signal’s logical name. The logical names shall be mapped to their actual CAN signal names. Please use the table below to perform the mapping. The InfoCAN database file is the master file for the actual CAN signal names. Note: There may be cases where the actual CAN signal name is used in this documentation.

|  |  |  |
| --- | --- | --- |
| Client | Can Signal Logical Name | Can Signal Real Physical name |
| Rx | LActDMSt | ActvDrvMde\_D2\_Stat |
| Rx | LSDM | SelDrvMde\_D2\_Rq |
| Rx | LSDMSt | SelDrvMde\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos01\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos02\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos03\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos04\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos05\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos06\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos07\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos08\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos09\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos10\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos11\_D\_Stat |
| Rx | SdmPosX | SelDrvMdePos12\_D\_Stat |
| Rx | SdmPostXSt | SelDrvMdePos01\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos02\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos03\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos04\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos05\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos06\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos07\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos08\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos09\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos10\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos11\_B\_Avail |
| Rx | SdmPostXSt | SelDrvMdePos12\_B\_Avail |
| Rx | LSdmMsg | SelDrvMdeMsgTxt2\_D\_Rq |
| Rx | LMyKey | IgnKeyType\_D\_Actl |
| Rx | LDis | SelDrvMdeSwtch\_D\_Stat4 |
| Tx | LSdmRqDis | SelDrvMde\_D\_RqDrv |
| Tx | LSDmStDis | SelDrvMdePage\_B\_Stat |
| Tx | SdmMsgReset | SelDrvMdeTxtRst\_B\_Rq2 |
| Tx | SdmCnfMsg | SelDrvMdeCnfm\_D\_Stat2 |
|  |  |  |
| Tx | LDisFalFbmp |  |

LIN Signal:

|  |  |  |
| --- | --- | --- |
| Logical Input ID | Input Switch Name | Lin Encoding |
| ID\_99 | Drive Modes | 0x77 ICPBtnID\_DrvModes |

## SDM-IIR-REQ-333081/C-SDMClient\_Rx

### MD-REQ-333090/A-LActDMSt

LActDMSt

This signal is sent by the server to the client to indicate the current state of the Selectable Driver Mode.

|  |  |
| --- | --- |
| **State** | **Encoding** |
| 0x0 | SelDrvMde01 |
| 0x1 | SelDrvMde02 |
| 0x2 | SelDrvMde03 |
| 0x3 | SelDrvMde04 |
| 0x4 | SelDrvMde05 |
| 0x5 | SelDrvMde06 |
| 0x6 | SelDrvMde07 |
| 0x7 | SelDrvMde08 |
| 0x8 | SelDrvMde09 |
| 0x9 | SelDrvMde10 |
| 0xA | SelDrvMde11 |
| 0xB | SelDrvMde12 |
| 0xC | SelDrvMde13 |
| 0xD | SelDrvMde14 |
| 0xE | SelDrvMde15 |
| 0xF | SelDrvMde16 |
| 0x10 | SelDrvMde17 |
| 0x11 | SelDrvMde18 |
| 0x12 | SelDrvMde19 |
| 0x13 | SelDrvMde20 |
| 0x14 | SelDrvMde21 |
| 0x15 | SelDrvMde22 |
| 0x16 | SelDrvMde23 |
| 0x17 | SelDrvMde24 |
| 0x18 | SelDrvMde25 |
| 0x19 | SelDrvMde26 |
| 0x1A | SelDrvMde27 |
| 0x1B | SelDrvMde28 |
| 0x1C | SelDrvMde29 |
| 0x1D | SelDrvMde30 |
| 0x1E | SelDrvMde31 |
| 0x1F | Faulty |

A state of Faulty (0x1F) could be sent by the server at startup.

### MD-REQ-333091/A-LSDM

LSDM: This signal indicates the users selection for the new SDM option.

This feature provides user’s input in externally of the client. This is what this signal represents. The user’s choice ( entered externally of client input system) for SDM state change. Refer to HMI specs on what Client may need to do upon RX this signal

|  |  |
| --- | --- |
| **Signal Parameter State** | **Encoding** |
| 0x0 | SelDrvMde01 |
| 0x1 | SelDrvMde02 |
| 0x2 | SelDrvMde03 |
| 0x3 | SelDrvMde04 |
| 0x4 | SelDrvMde05 |
| 0x5 | SelDrvMde06 |
| 0x6 | SelDrvMde07 |
| 0x7 | SelDrvMde08 |
| 0x8 | SelDrvMde09 |
| 0x9 | SelDrvMde10 |
| 0xA | SelDrvMde11 |
| 0xB | SelDrvMde12 |
| 0xC | SelDrvMde13 |
| 0xD | SelDrvMde14 |
| 0xE | SelDrvMde15 |
| 0xF | SelDrvMde16 |
| 0x10 | SelDrvMde17 |
| 0x11 | SelDrvMde18 |
| 0x12 | SelDrvMde19 |
| 0x13 | SelDrvMde20 |
| 0x14 | SelDrvMde21 |
| 0x15 | SelDrvMde22 |
| 0x16 | SelDrvMde23 |
| 0x17 | SelDrvMde24 |
| 0x18 | SelDrvMde25 |
| 0x19 | SelDrvMde26 |
| 0x1A | SelDrvMde27 |
| 0x1B | SelDrvMde28 |
| 0x1C | SelDrvMde29 |
| 0x1D | SelDrvMde30 |
| 0x1E | SelDrvMde31 |
| 0x1F | Not Used |

### MD-REQ-333092/A-LSDMSt

LSDMSt: This signal is sent by the server to the client to indicate the current state of the selected mode request.

|  |  |
| --- | --- |
| Signal Parameters | Parameter Description |
| 0x0 | No Drive Mode Change Request |
| 0x1 | Drive Mode Change Selection |
| 0x2 | Drive Mode Change Request |
| 0x3 | Not used |

### MD-REQ-333093/D-SdmPosX

SdmPosX : This logical name signal represents a set of physical name signals. The real can signals are “locked” to particular position in HMI screen. Each of this signals’ parameters, provides the whole list of available drive modes. So by having this position signals, the server has control on the order of how to show in HMI the order of selectable drive modes.

If this signal has a value of 0x1F, the Client should not display anything.

*This signal represents the 12 physical signals. For purpose of clarity in diagrams, those physical signals have only one logical name.*

|  |  |  |
| --- | --- | --- |
| **State** | **Encoding** | **Engineering Names** |
| 0x0 | SelDrvMde01 | Normal Mode |
| 0x1 | SelDrvMde02 | Sport Mode |
| 0x2 | SelDrvMde03 | Comfort Mode |
| 0x3 | SelDrvMde04 | Economy Mode |
| 0x4 | SelDrvMde05 | Economy Comfort Mode |
| 0x5 | SelDrvMde06 | Low Mu Mode |
| 0x6 | SelDrvMde07 | Tow Haul Mode |
| 0x7 | SelDrvMde08 | Mud/Rut Mode |
| 0x8 | SelDrvMde09 | Sand Mode |
| 0x9 | SelDrvMde10 | Rock Crawl Mode |
| 0xA | SelDrvMde11 | Normal 2H Mode |
| 0xB | SelDrvMde12 | Normal 4A Mode |
| 0xC | SelDrvMde13 | Normal 4L Mode |
| 0xD | SelDrvMde14 | Rough Road Mode |
| 0xE | SelDrvMde15 | Track Mode |
| 0xF | SelDrvMde16 | EV Now Mode |
| 0x10 | SelDrvMde17 | EV Later/Charge Mode |
| 0x11 | SelDrvMde18 | Baja Mode |
| 0x12 | SelDrvMde19 | Drag Mode |
| 0x13 | SelDrvMde20 | Custom Mode |
| 0x14 | SelDrvMde21 | Snow/Sand Assist |
| 0x15 | SelDrvMde22 | Off Road |
| 0x16 | SelDrvMde23 | Not Used |
| 0x17 | SelDrvMde24 | Not Used |
| 0x18 | SelDrvMde25 | Not Used |
| 0x19 | SelDrvMde26 | Not Used |
| 0x1A | SelDrvMde27 | Not Used |
| 0x1B | SelDrvMde28 | Not Used |
| 0x1C | SelDrvMde29 | Not Used |
| 0x1D | SelDrvMde30 | Not Used |
| 0x1E | SelDrvMde31 | Not Used |
| 0x1F | Faulty | Faulty (Default Drive Mode) |

### MD-REQ-333094/E-SdmPostXSt

SdmPostXSt: This signal represents a set of physical signals. This signal control the display state of SdmPosX signals. The client is able to control in HMI various states of drive mode display, such as not display the drive mode at all, gray out (disabled) or enabled. For visual affects refer to HMI documentation.

*This signal represents the 12 physical signals. For purpose of clarity in diagrams, those physical signals have only one logical name.*

|  |  |
| --- | --- |
| Signal parameter | Parameter Description |
| 0x0 | Not Available |
| 0x1 | Available |

### MD-REQ-333095/C-LSdmMsg

LSdmMsg : This signal provides drive mode status information that should be presented to the driver.

Original :

|  |  |  |
| --- | --- | --- |
| **State** | **Encoding** | **Description** |
| 0x0 | No Message | No Message |
| 0x1 | Message 1 | Selection pop-up window (W3540) |
| 0x2 | Message 2 | SDM not available (W3541) |
| 0x3 | Message 3 | SDM reduced (W3542) |
| 0x4 | Message 4 | SDM preconditions not met (W3543) |
| 0x5 | Message 5 | EV Mode Not Available (W3544) |
| 0x6 | Message 6 | Change To Normal for best towing (W3633) |
| 0x7 | Message 7 | Return to X mode (W4146 / W4147) |
| 0x8 | Message 8 | Not used |
| 0x9 | Message 9 | Not used |
| 0xA | Message 10 | Not used |
| 0xB | Message 11 | Not used |
| 0xC | Message 12 | Not used |
| 0xD | Message 13 | Not used |
| 0xE | Message 14 | Not used |
| 0xF | Message 15 | Not used |

Variant A:

|  |  |  |
| --- | --- | --- |
| 0x5 | Message 5 | Selected Drive Mode Not Available to Maintain System Performance (W4378) |

About Variant A:

This is another way to do something such as display a text or specific client behavior. **Variant A** is linked to specific car models, so a Configuration value determines if **Variant A** or **Original** is to be operated.

### MD-REQ-388951/A-LMyKey

LMyKey: This signal indicates the key in ignition cycle.

|  |  |
| --- | --- |
| Encoding Meaning | Signal Encoding |
| Key\_Read\_In\_Progress | 0x0 |
| Key\_In\_Ign\_Standard\_Key | 0x1 |
| Key\_In\_Ign\_My\_Key | 0x2 |
| Key\_Not\_Prgrm\_Read\_Failure | 0x3 |
| Unknown | 0xE |
| Invalid | 0xF |

### MD-REQ-394187/A-LDis

LDis: This signal is sent form SDM client 2 to the client to indicate particular user requests. Refer to shortcut function for further details. The signal states are like below.

|  |  |  |
| --- | --- | --- |
| State | Encoding | Description |
| 0x0 | Not pressed | None button pressed |
| 0x1 | Switch State 1 | SDM Button pressed |
| 0x2 | Switch State 2 | Sport Button pressed |
| 0x3 | Faulty | Error detected |

## SDM-IIR-REQ-333080/A-SDMClient\_TX

### MD-REQ-333097/A-SdmMsgReset

SdmMsgReset: This signal is sent by the client to the server to to tell the server that the message has been cleared due to another higher priority message or the user cleared it manually.

|  |  |
| --- | --- |
| Signal Parameter | Signal Description |
| 0x0 | No |
| 0x1 | Yes |

### MD-REQ-333098/A-SdmCnfMsg

SdmCnfMsg: This signal provides the confirmation status of the message on the client side for the message sent by the server.

|  |  |  |
| --- | --- | --- |
| **State** | **Encoding** | **Engineering Names** |
| 0x0 | Null | No SDM pop-ups shown or user does not confirmed the SDM warning |
| 0x1 | NotAccepted | SDM warning has been exited/cancelled. |
| 0x2 | Accepted | SDM warning has been confirmed and accepted. |
| 0x3 | NotUsed\_1 | Not used |

### MD-REQ-334802/A-LSdmRqDis

LSdmRqDis: This signal provides the requested selectable drive mode as selected by the user through the Client HMI interface.

|  |  |
| --- | --- |
| **State** | **Encoding** |
| 0x0 | SelDrvMde01 |
| 0x1 | SelDrvMde02 |
| 0x2 | SelDrvMde03 |
| 0x3 | SelDrvMde04 |
| 0x4 | SelDrvMde05 |
| 0x5 | SelDrvMde06 |
| 0x6 | SelDrvMde07 |
| 0x7 | SelDrvMde08 |
| 0x8 | SelDrvMde09 |
| 0x9 | SelDrvMde10 |
| 0xA | SelDrvMde11 |
| 0xB | SelDrvMde12 |
| 0xC | SelDrvMde13 |
| 0xD | SelDrvMde14 |
| 0xE | SelDrvMde15 |
| 0xF | SelDrvMde16 |
| 0x10 | SelDrvMde17 |
| 0x11 | SelDrvMde18 |
| 0x12 | SelDrvMde19 |
| 0x13 | SelDrvMde20 |
| 0x14 | SelDrvMde21 |
| 0x15 | SelDrvMde22 |
| 0x16 | SelDrvMde23 |
| 0x17 | SelDrvMde24 |
| 0x18 | SelDrvMde25 |
| 0x19 | SelDrvMde26 |
| 0x1A | SelDrvMde27 |
| 0x1B | SelDrvMde28 |
| 0x1C | SelDrvMde29 |
| 0x1D | SelDrvMde30 |
| 0x1E | SelDrvMde31 |
| 0x1F | Faulty |

### MD-REQ-334803/A-LSdmStDis

LSdmStDis: This signal is sent from the client to the server to indicate the current screen state of the Client HMI.

|  |  |  |
| --- | --- | --- |
| **State** | **Encoding** | **Description** |
| 0x0 | Inactive | SDM Selection page not shown |
| 0x1 | Active | SDM Selection page shown |

Whenever Client HMI is in SDM feature, the signal value is Active.

### MD-REQ-334807/B-LDisFalFbmp

LDisFalFbmp : This signal is sent by the client to the server to indicate display status or any potential fault with the feature on the client side, such as HMI interface not working or other possible fault states.

This signal uses Feature Based Messaging Protocol. Feature ID 0x0030.

Set values are:

|  |  |
| --- | --- |
| **Value** | **Description** |
| 0x0 | Not Used |
| 0x1 | No Display Fault |
| 0x2 | Display Faulted |
| 0x3 | SDM Failure |

Refer to FBMP SPSS for Feature Based Messaging Protocol operational details. Req 361027 takes precedence over any FBMP SPSS content.

# General Requirements

## SDM-REQ-333124/A-Missing Signals

In case a signal goes missing for longer than 5 signal periods, the client shall log a “Lost Communication” DTC.

The client shall also send LDisFalFbmp (FeatureID 0x0030, Configuration = Set, Config = 0x3, PerIndex= Vehicle).

## SDM-REQ-333125/A-Invalid Signals

The client shall consider invalid any signal that comes with values not used or with values that are not applicable due to configurations.

The client shall also send LDisFalFbmp (FeatureID 0x0030, Configuration = Set, Config = 0x3, PerIndex= Vehicle).

## SDM-REQ-334908/B-Client Faulty

In case client has detected any internal fault with HMI input, it shall send the signal like below (if it is able to do that)

The client shall also send LDisFalFbmp (FeatureID 0x0030, Configuration = Set, Config = 0x2 [Display Faulted] , PerIndex= Vehicle).

Any DTC from the list below should generate the above message:

DTC 0x908E01 - Display General Electrical Failure

DTC 0x908E4A - Display Incorrect Component Installed

DTC 0x908E02 - Display General Signal Failure

DTC 0xC16200 - Lost Communication With Navigation Display Module No Sub Type Information

DTC 0x908E87 - Display Missing Message

DTC 0xF00041 - Control Module General Checksum Failure

DTC 0xF00317 - Battery Voltage Circuit Voltage Above Threshold

DTC 0xF00316 - Battery Voltage Circuit Voltage Below Threshold

DTC 0x908E02 - Display General Signal Failure

Client shall use LDisFalFbmp (FeatureID 0x0030, Configuration = Set, Config = 0x2 [Display Faulted] , PerIndex= Vehicle) only for SDM relevant faults.

## SDM-REQ-361035/A-No Faulty Display

In cases where there are no missing signals, or invalid signals or any errors as mentioned in SDM-Req-334908 the client shall send the data below:

The client shall also send LDisFalFbmp (FeatureID 0x0030, Configuration = Set, Config = 0x1 [No Display Fault], PerIndex= Vehicle).

## SDM-REQ-361027/B-Display Status Update

The message LDisFalFbmp should be sent with the applicable feature configuration value every (one) 1 sec (period of 1000ms) for 100ms.

## SDM-REQ-334799/A-SDM Soft Key Availability

The Drive Mode Switch soft key shall be greyed out as long as the Ignition Status is different from Run or Start.

## SDM-REQ-334800/C-Soft Key Availability While SDM Faulty

The SDM soft key switch shall be available (not depending on the state of the feature faulty or not) however, the selectable drive modes should be grayed out when Server is faulty. If user selects any of the drive modes, even when they are grayed out, the client shall send the proper mode request change to the server.

## SDM-REQ-334801/C-SDM Selection Page

When the Drive Mode Switch soft key is selected, the Client HMI shall display the SDM selection screen.

As long as SDM selection page is shown, Client shall set the signal LSdmStDis equal to Active.

The Client shall close the SDM selection page and set the LSdmStDis CAN signal equal to Inactive when another page is selected by the user.

## SDM-REQ-335109/B-Text Display

There are multiple actions that the client should do, when LSdmMsg with a value of non 0x0 is delivered to the client.

The text popup is to be displayed for as long as LSdmMsg has a value different from 0x0. When LSdmMsg is again set to 0x0, the popup should be removed.

These two Client Tx signals, are linked to LSdmMsg parameters;

SdmMsgReset

SdmCnfMsg

When LSdmMsg has the values 0x2, 0x3,0x4, 0x5 or 0x6 , the values of the two Client TX signals should be like below:

SdmMsgReset send a 0x0 (No) whenever the warning is displayed.

SdmCnfMsg is sent with a value of 0x0 (Null) .

When user clicks on the popup,

SdmMsgReset sends 0x1 (Yes)

SdmCnfMsg is sent with a value of 0x0 (Null)

When LSdmMsg has the value 0x7 , the values of the two Client TX signals should be like below:

SdmMsgReset send a 0x0 (No) whenever the warning is displayed.

SdmCngMsg is sent with a value of 0x1 or 0x2 , depending on user’s response.

## SDM-REQ-335110/A-Change Mode Rq Server Replies

When a user requests a SDM change, they expect the mode to change. There may be cases where the mode may not change.

In cases where a user SDM change was done, but the state of SDM is the same, then the Client shall keep track of this server inaction in an error variable.

In cases where a user SDM change was done, but the state of SDM changes, however it is not the SDM that the user requested, then the Client shall consider this operation as successful behavior of server and no error is to be recorded.

## SDM-REQ-336981/A-Remembering Modes And Positions

The client should remember available drive modes and their respective positions in HMI screen through an ignition cycle.

Background info: The drive modes are transmitted at large period of times (100 sec) from the server. The first time the signal is sent, it could be missed by the client. To not keep the feature screen blank until the next signal data, the client should remember the states before ignition cycle and repopulate the feature HMI screen with previous ignition cycle content.

## SDM-REQ-336983/A-Requesting Drive Mode Change

The signal that request drive mode is LSdmRqDis. The value of this signal should be all the time 0x1F, unless the user requests a mode change, in which case, it should be the proper hex value. Once the proper change request has been sent to the bus once, the value should go back to 0x1F.

## SDM-REQ-337301/B-Error Counter

When client sends a request for mode change and the new drive mode state doesn’t come within timer MaxResponeTimer, the error counter SDMFeedbackError will be incremented.

SDMFeedbackError will increment every time the condition above is satisfied. This value is reset to 0 at ignition cycle or if a SDM mode change comes within allowed time.

SDMFeedbackError does not change value when LActDMSt is 0x31 (Faulty)

When MaxSDMFeedbackError is reached, the client shall send LDisFalFbmp (FeatureID 0x0030, Configuration = Set, Config = 0x3, PerIndex= Vehicle).

MaxResponeTimer is a configurable parameter. Check with Diagnostics spec for this value. It represents the max allowed time for server to provide new SDM change signal.

MaxSDMFeedbackError is a configurable error counter parameter. Check with Diagnostics spec for this value. This parameter represent total number of errors allowed before client transmits SDM failure signal to the server.

## SDM-REQ-388955/B-SDM Display Restrictions

**Original :**

When SdmPostXSt is Unavailable, the modes indicated by SdmPosX should not be displayed to the user.

**Variant A :**

When LMyKey = 0x2 and any drive modes for which SdmPostXSt is Unavailable, the modes indicated by SdmPosX should not be displayed to the user.

When LMyKey != 0x2 and any drive modes for which SdmPostXSt is Unavailable, the modes indicated by SdmPosX should be disabled.

\*Remember when SdmPosX = 0x1F, that drive mode is not to be displayed at all to the user.

## SDM-REQ-388968/A-Lin Button

Some vehicle programs could use a hard button that links directly to Client through LIN interface instead of through CAN signal communication. Upon receiving a specific LIN signal, the Client shall display a particular screen as defined in HMI requirements.

For those programs that use LIN button connection, the Logical Input ID ID\_99 should be used. For further details about hard buttons through LIN connections refer to Appendix reference documentation.

# Functional Definition

## SDM-FUN-REQ-333084/A-SDM

### Use Cases

#### SDM-UC-REQ-334792/A-Open Selection Screen

|  |  |
| --- | --- |
| **Actors** | Driver |
| **Pre-conditions** | The ignition is on.  Client disaply is in a non SDM screen |
| **Scenario Description** | The driver touches SDM feature access in Client screen. |
| **Post-conditions** | * Client displays the SDM selection screen   + the CAN signal Drive Mode Position communicates the drive modes and the sequence that the modes shall be displayed   + the CAN signal Drive Mode Position Availability communicates the drive modes that shall be grayed out / hidden * Client communicates SDM Main Arbitration via the CAN signal SDM Selection Page Active the status of the selection screen |
| **List of Exception Use Cases** | * SDM Feature is faulted out, communicated via Active Drive Mode = Faulty.   + SDM soft button shall be greyed out |
| **Interfaces** | Client HMI screen. |

#### SDM-UC-REQ-334793/A-Selecting Drive Mode

|  |  |
| --- | --- |
| **Actors** | Driver |
| **Pre-conditions** | The ignition is on.  Client displays the SDM selection screen with the available drive modes |
| **Scenario Description** | The driver touches and releases the soft button of a drive mode   * 1. Client highlighted the touched drive mode as the selected drive mode   2. Client via the CAN signal “SDM Driver Selected Drive Mode” the selected drive mode to SDM Main Arbitration   Center stack waits confirmation from SDM Main Arbitration |
| **Post-conditions** | Server confirms the selection  Client highlights the drive mode according to the CAN signals “Drive Mode Request” and “Drive Mode Request Status” |
| **List of Exception Use Cases** | 1. Server does not send a feedback 2. Client removes the highlight from selected drive mode |
| **Interfaces** | Client Hmi interface |

#### SDM-UC-REQ-334794/A-Close Selection Screen

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Ignition is On. Client displays the SDM selection screen with the available drive modes. |
| **Scenario Description** | User selects another feature in Client HMI screen.  Client send feature screen state to the server through LSdmStDis signal. |
| **Post-conditions** | LSdmStDis signal status is 0x0 (Inactive) |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

#### SDM-UC-REQ-334795/A-Client Warning Display

|  |  |
| --- | --- |
| **Actors** | SDM Main Arbitration |
| **Pre-conditions** | The ignition is on. |
| **Scenario Description** | SDM Server detects a condition that shall be communicated to the driver  SDM Server requests SDM Client to display a SDM Warning |
| **Post-conditions** | SDM Client HMI displays the requested SDM Warning |
| **List of Exception Use Cases** |  |
| **Interfaces** | SDM Client HMI |

#### SDM-UC-REQ-334796/A-Server Warning Arbritration

|  |  |
| --- | --- |
| **Actors** | SDM Server |
| **Pre-conditions** | The ignition is on. |
| **Scenario Description** | SDM Client HMI is displaying a SDM Warning  User acknowledges the warning pressing OK / Cancel |
| **Post-conditions** | SDM Client HMI displays close the SDM Warning  SDM Client communicates SDM Main Arbitration the warning is closed via “SDM Display Message Text Reset” |
| **List of Exception Use Cases** |  |
| **Interfaces** | SDM Client HMI |

### White Box Views

#### Activity Diagrams

##### SDM-ACT-REQ-334813/B-SDM Activity Diagram



#### Sequence Diagrams

##### SDM-SD-REQ-334815/B-SDM Operation SD



## SDM-FUN-REQ-394194/A-SDM Shortcut

### Shorcut Key Overview

Some vehicles may have dedicated buttons to act as shortcut keys for SDM feature. One button would activate/deactivate the SDM HMI screen in the client and another button toggles between Sport Mode and Normal mode.

### Requirements

#### SDM-REQ-394233/A-HMI Display

When Signal LDis is received with parameter Switch State 1 Pressed, the Client should toggle between activating and deactivating the SDM screen.

#### SDM-REQ-394232/A-SDM Mode Change

When LDis signal is received with parameter Switch State 2, the client shall request SDM change to Sport Mode.

In cases where SDM mode is already Sport Mode, any Switch State 2 detection , the client shall request Normal Mode request to the server.

Switch State 2 does not affect the Client HMI SDM feature display.

### Use Cases

#### SDM-UC-REQ-394190/A-Shortcut Key Menu SDM Display Activation

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The ignition status is Run/Start  The infotainment system is powered on.  Vehicle is equipped with an SDM shortcut key feature.  SDM selection screen is Off. |
| **Scenario Description** | Customer presses shortcut key SDM button once. |
| **Post-conditions** | HMI shall display SDM selection screen.  Client communicates SDM Main Arbitration the status of the selection screen to the server. |
| **List of Exception Use Cases** |  |
| **Interfaces** | Shortcut Key Button, Client HMI |

#### SDM-UC-REQ-394191/A-Shortcut Key Menu SDM Display Deactivation

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The ignition status is Run/Start  The infotainment system is powered on.  Vehicle is equipped with an SDM shortcut key feature.  SDM selection screen is On. |
| **Scenario Description** | Customer presses shortcut key SDM button once. |
| **Post-conditions** | Client HMI shall remove SDM selection screen.  Client communicates SDM Main Arbitration the status of the selection screen to the server. |
| **List of Exception Use Cases** |  |
| **Interfaces** | Shortcut Key button, Client HMI |

#### SDM-UC-REQ-394192/A-SDM Sport Mode Activation

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The ignition status is Run/Start  The infotainment system is powered on.  Vehicle is equipped with an SDM Sport Mode shortcut key feature.  SDM Active Drive Mode is different from Sport Mode |
| **Scenario Description** | Customer presses shortcut key SDM Sport Mode button once. |
| **Post-conditions** | Client communicates the selection to server via the CAN signal “SDM Driver Selected Drive Mode” the “Sport Mode”  HMI shall highlight the “Sport Mode” button as selected. |
| **List of Exception Use Cases** | SDM Active Drive Mode is equal to Faulty Drive Mode  No HMI actions (SDM Main Arbitration handle recover / warning). |
| **Interfaces** |  |

#### SDM-UC-REQ-394193/A-SDM Sport Mode Deactivation

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The ignition status is Run/Start  The infotainment system is powered on.  Vehicle is equipped with an SDM Sport Mode shortcut key feature.  SDM Active Drive Mode is equal to “Sport Mode” |
| **Scenario Description** | Customer presses shortcut key SDM Sport Mode button once. |
| **Post-conditions** | Client communicates the selection to Server via the CAN signal “SDM Driver Selected Drive Mode” the “Normal Mode”  HMI shall highlight the “Normal Mode” button as selected |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

### White Box Views

#### Actvity Diagrams

##### SDM-REQ-394197/A-Shortcut Key Drive Mode Change



##### SDM-REQ-394195/A-Shortcut Key Operation



#### Sequence Diagrams

##### SDM-REQ-394196/A-Shortcut Key Operations



# Appendix: Reference Documents

|  |  |
| --- | --- |
| 1 | APIM Feature Based Messaging Protocol |
| 2 | Global Input Translation Matrix |
| 3 | Button Strategy SPSS |
| 4 |  |