Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – TailGate Softswitch Interface Client

Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.3

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FORD CONFIDENTIAL

Revision History

Date	Ver	Notes	
Oct. 5, 2018	**1.0**	**Initial Release**	
Dec. 18, 2018	**1.1**		
	MD-REQ-325540/B-TailGateEnable_Rq	MBORREL4: Updated encodings to remove Inactive	
	MD-REQ-325541/B-TailGateEnable_St	MBORREL4: Updated encodings 2 & 3 (correction)	
	STR-578783/B-General Requirements	MBORREL4: Removed REQ-326331	
	TGSS-REQ-326333/B-Power TailGate Setting - Interface Client Request	MBORREL4: Corrected signal values	
	TGSS-REQ-326419/B-Power TailGate Setting - Startup/Shutdown	MBORREL4: Updated req	
	TGSS-REQ-326335/B-Power TailGate Setting - User Input	MBORREL4: Added HMI ID# for reference	
	TGSS-REQ-330173/B-Power TailGate Setting - User Input Enable/Disable	MBORREL4: Removed Speed Restriction precondition (not needed)	
	STR-578786/B-Use Cases	MBORREL4: Removed REQ-326257	
	TGSS-UC-REQ-326255/B-User enables Power TailGate setting	MBORREL4: Removed vehicle speed precondition and exception usecase	
	TGSS-UC-REQ-326256/B-User disables Power TailGate setting	MBORREL4: Removed vehicle speed precondition and exception usecase	
	TGSS-SD-REQ-330665/B-User Enables/Disables Power TailGate Setting	MBORREL4: Updated diagram as "Inactive" encoding was removed	
	STR-578788/B-Appendix: Reference Documents	MBORREL4: Added reference to HMI Settings ID doc. Removed DR SPSS reference.	
February 4, 2019	**1.2**		
	TGSS-CLD-REQ-325387/B-TailGate Softswitch Interface Client	MBORREL4: Updated for IP switch functionality	
	TGSS-CLD-REQ-325388/B-TailGate Softswitch Server	MBORREL4: Updated for IP switch functionality	
	TGSS-IIR-REQ-325390/B-TGSSInterfaceClient_Rx	MBORREL4: Added REQ-201601 and REQ-343137	
	MD-REQ-343137/A-PowerLiftgateInteriorSwitch_St	MBORREL4: New signal	
	TGSS-REQ-326328/B-Powermode Conditions	MBORREL4: Updated conditons to support IP switch	
	STR-578784/B-Functional Definition	MBORREL4: Added REQ-343153	
	TGSS-REQ-330173/C-Power TailGate Setting - User Input Enable/Disable	MBORREL4: Updated conditions	
	TGSS-FUN-REQ-343153/A-Interior Power TailGate Switch HMI Trigger	MBORREL4: New function	
	STR-620615/A-Requirements	MBORREL4: New STR/section header	
	TGSS-REQ-343154/A-Interior Power TailGate Switch Status	MBORREL4: New req.	
	STR-620616/A-Use Cases	MBORREL4: New STR/section header	
	TGSS-UC-REQ-343155/A-User Presses Interior Power TailGate Switch	MBORREL4: New usecase	

June 25, 2019	1.3	
	TGSS-REQ-326333/C-Power TailGate Setting - Interface Client Request	MBORREL4: Updated req. for default 'Enabled' behavior

Table of Contents

1 Architectural Design

1.1 TGSS-CLD-REQ-325387/B-TailGate Softswitch Interface Client

The TailGate Softswitch Interface Client (TGSSInterfaceClient) is responsible for the tasks listed below:

- Providing a user interface to allow the altering of TailGate feature settings
- Transmitting user input to TGSSServer
- Receiving feature status from TGSSServer
- Displaying active feature state on user interface
- Providing a user interface based on Interior Power TailGate Switch

Please review the implementation guide/block diagram to locate the TGSSInterfaceClient class.

1.2 TGSS-CLD-REQ-325388/B-TailGate Softswitch Server

The TailGate Softswitch Server (TGSSServer) is responsible for the tasks listed below:

- Receiving user request from TGSSInterfaceClient
- Managing TailGate feature status
- Transmitting feature status to TGSSInterfaceClient
- Transmitting Interior Power TailGate Switch status to TGSSInterfaceClient

Please review the implementation guide/block diagram to locate the TGSSServer class.

1.3 Physical Mapping of Classes

The table below shows an example of how the logical classes that make up the TailGate Softswitch feature can be mapped into physical modules. This mapping is an example only and does not necessarily carryover to other carlines or vehicle architectures.

Logical Class	Physical Module (ECU)
TGSSInterfaceClient	SYNC
TGSSServer	RGTM

1.4 TGSSInterfaceClient Interface

1.4.1 TGSS-IIR-REQ-325389/A-TGSSInterfaceClient_Tx

1.4.1.1 MD-REQ-325540/B-TailGateEnable_Rq

Message Type: Request

The signal is used by the TGSSInterfaceClient to enable/disable the Power TailGate feature.

Name	Literals	Value	Description
Type	-	-	Request to enable/disable the Power TailGate feature
	Disable	0x0	
	Enable	0x1	

1.4.2 TGSS-IIR-REQ-325390/B-TGSSInterfaceClient_Rx

1.4.2.1 MD-REQ-325541/B-TailGateEnable_St

Message Type: Status

The signal is used to inform the TGSSInterfaceClient of the current Power TailGate feature status.

Name	Literals	Value	Description
Status	-	-	Indicates the current Power TailGate feature status
	Disabled	0x0	
	Enabled	0x1	
	Not Used	0x2	
	Not Supported	0x3	

1.4.2.2 MD-REQ-199809/A-IgnitionStatus_St

Message Type: Status

Signal used to indicate ignition state.

Name	Literals	Value	Description
Type	-	-	Indicates ignition state
	Unknown	0x0	
	Off	0x1	
	Accessory	0x2	
	Run	0x4	
	Start	0x8	
	Invalid	0xF	

1.4.2.3 MD-REQ-201601/A-Delay_Accy

Message Type: Status

This signal is used indicate whether Delayed Accessory is active or not.

Name	Literals	Value	Description
Type	-	-	Status of delayed accessory
	Off	0x00	
	On	0x01	

1.4.2.4 MD-REQ-343137/A-PowerLiftgateInteriorSwitch_St

Message Type: Status

Signal used to indicate the staus of the Interior Power Tailgate Switch.

Name	Literals	Value	Description
Type	-	-	Status of Interior Power Tailgate Switch
	Null	0x0	
	Pressed	0x1	

2 General Requirements

2.1 TGSS-REQ-326328/B-Powermode Conditions

The TGSSInterfaceClient shall only allow the functionality defined by this feature/SPSS when:

- IgnitionStatus_St = Run, Start, or Acc and the touch screen display is On, OR
- IgnitionStatus_St = Off and Delay_Accy = On and the touch screen display is On

2.2 TGSS-REQ-326330/A-Feature Configuration

The TGSSInterfaceClient shall have a configurable parameter to determine whether the vehicle supports Power TailGate.

- If the parameter indicates the vehicle supports Power TailGate, then all the functionality and signals defined in this SPSS shall be supported.
- If the parameter indicates the vehicle does not support Power TailGate, then none of the functionality defined in this SPSS shall be supported.

2.3 TGSS-REQ-331161/A-Missing Message DTC

The TGSSInterfaceClient shall set a “lost communication” DTC for any expected TGSS periodic messages that are not received for more than 5 seconds.

3 Functional Definition

3.1 TGSS-FUN-REQ-325391/A-Enable/Disable Power TailGate Feature

3.1.1 Requirements

3.1.1.1 TGSS-REQ-326333/C-Power TailGate Setting - Interface Client Request

The TGSSInterfaceClient shall set and send TailGateEnable_Rq to the TGSSServer with the following values:

- TailGateEnable_Rq = "(0x0) Disabled" when Off (Disabled, Manual, etc.) is selected by the user
- TailGateEnable_Rq = "(0x1) Enabled" when On (Enabled, Power, etc.) is selected by the user

To ensure the feature is enabled and available to the customer upon vehicle delivery, the TGSSInterfaceClient shall set and send TailGateEnable_Rq = "(0x1) Enabled" to the TGSSServer by default (upon first battery connect).

3.1.1.2 TGSS-REQ-326334/A-Power TailGate Setting - Server Response

The TGSSInterfaceClient shall monitor TailGateEnable_St from the TGSSServer for the active Power TailGate status.

- When TailGateEnable_St = "(0x0) Disabled" is received, the TGSSInterfaceClient shall reflect that Off (Disabled, Manual, etc.) is selected to the user
- When TailGateEnable_St = "(0x1) Enabled" is received, the TGSSInterfaceClient shall reflect that On (Enabled, Power, etc.) is selected to the user

3.1.1.3 TGSS-REQ-326419/B-Power TailGate Setting - Startup/Shutdown

Upon system shutdown, the TGSSInterfaceClient shall store the last received value of TailGateEnable_St from the TGSSServer and shall display the stored value at system startup until TailGateEnable_St is received from the TGSSServer.

Upon system shutdown, the TGSSInterfaceClient shall store the last transmitted value of TailGateEnable_Rq and shall continue to transmit the stored value again at system startup.

3.1.1.4 TGSS-REQ-326335/B-Power TailGate Setting - User Input

The TGSSInterfaceClient shall provide a user interface (button/graphic) to enable/disable the Power TailGate feature.

SYNC Gen4 Screen / ID HMI Number	HMI Setting ID
22a	1011

3.1.1.5 TGSS-REQ-330173/C-Power TailGate Setting - User Input Enable/Disable

The TGSSInterfaceClient shall enable/disable (show/hide, grey-out, etc.) the Power TailGate feature setting user interface (button/graphic) based on the following:

- If IgnitionStatus_St = (0x4) Run, (0x8) Start, or (0x2) Accessory, the above shall be enabled
- If IgnitionStatus_St != (0x4) Run, (0x8) Start, or (0x2) Accessory, the above shall be disabled (greyed-out, hidden, etc.)
- IgnitionStatus_St = (0x0) Off and Delay_Accy = (0x1) On, the above shall be enabled
- IgnitionStatus_St = (0x0) Off and Delay_Accy = (0x0) Off, the above shall be disabled (greyed-out, hidden, etc.)
- If the DTC defined by REQ-331161 is active, the above shall be disabled (greyed-out, hidden, etc.)

3.1.2 Use Cases

3.1.2.1 TGSS-UC-REQ-326255/B-User enables Power TailGate setting

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions are met TGSSInterfaceClient is ON Power TailGate feature is set to "Off" (Disabled, Manual, etc.)

Scenario Description	The user accesses the Power TailGate menu on the TGSSInterfaceClient and selects On (Enabled, Power, etc.)
Post-conditions	• The TGSSServer updates the Power TailGate feature to “On” (Enabled, Power, etc.) • The TGSSInterfaceClient updates its HMI to reflect “On” (Enabled, Power, etc.) is active
List of Exception Use Cases	
Interfaces	TGSSInterfaceClient

3.1.2.2 TGSS-UC-REQ-326256/B-User disables Power TailGate setting

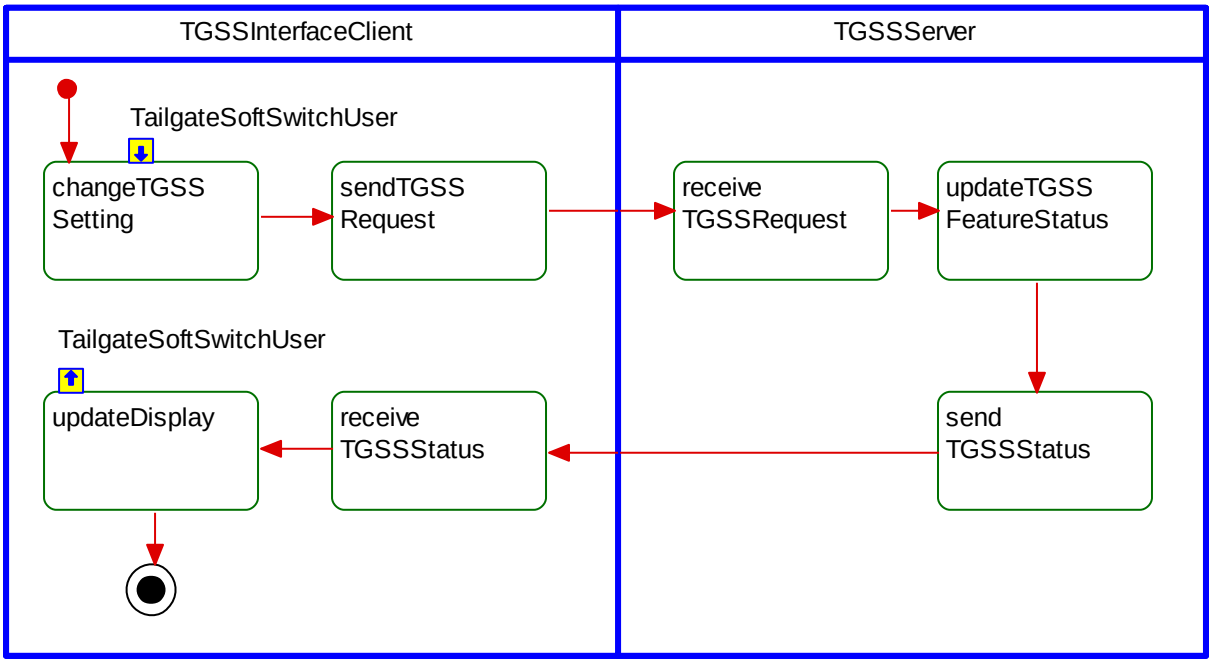
Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions are met TGSSInterfaceClient is ON Power TailGate feature is set to “On” (Enabled, Power, etc.)
Scenario Description	The user accesses the Power TailGate menu on the TGSSInterfaceClient and selects “Off” (Disabled, Manual, etc.)
Post-conditions	• The TGSSServer updates the Power TailGate feature to “Off” (Disabled, Manual, etc.) • The TGSSInterfaceClient updates its HMI to reflect “Off” (Disabled, Manual, etc.) is active
List of Exception Use Cases	
Interfaces	TGSSInterfaceClient

3.1.3 White Box View

3.1.3.1 Activity Diagrams

3.1.3.1.1 TGSS-ACT-REQ-330689/A-User Enables/Disables Power TailGate Setting

Activity Diagram



3.1.3.2 Sequence Diagrams

3.1.3.2.1 TGSS-SD-REQ-330665/B-User Enables/Disables Power TailGate Setting

Constraints

Pre-Condition

Powermode Conditions are met
TGSSInterfaceClient is ON

Scenarios

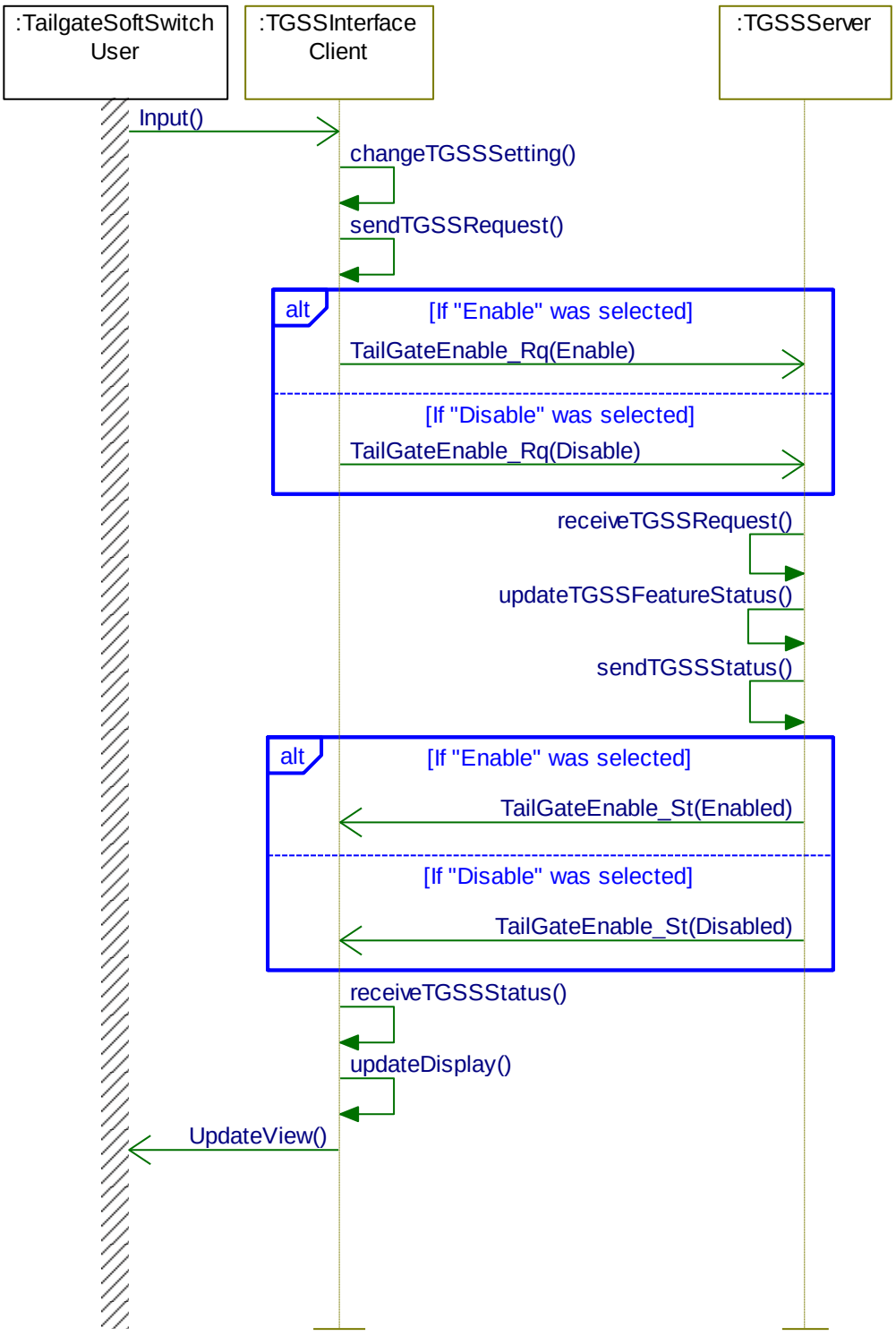
Normal Usage

The user accesses the Power TailGate menu on the TGSSInterfaceClient and selects On or Off (Enabled/Disabled, Power/Manual, etc.).

Post-Condition

The TGSSServer updates the Power TailGate feature accordingly
The TGSSInterfaceClient updates its HMI to reflect active state

Sequence Diagram



3.2 TGSS-FUN-REQ-343153/A-Interior Power TailGate Switch HMI Trigger

3.2.1 Requirements

3.2.1.1 TGSS-REQ-343154/A-Interior Power TailGate Switch Status

When TailGateEnable_St = "(0x0) Disabled", the TGSSInterfaceClient shall monitor PowerLiftgateInteriorSwitch_St from the TGSSServer for the Power TailGate Interior Switch status:

- When PowerLiftgateInteriorSwitch_St = "(0x0) Null" is received, no action shall be taken by the TGSSInterfaceClient
- When PowerLiftgateInteriorSwitch_St = "(0x1) Pressed" is received, the TGSSInterfaceClient shall provide an interface to allow the user to enable the feature (when allowed, per REQ-330173).
    - If the Power Tailgate user interface (per REQ-326335) is already the active screen, no action shall be taken by the TGSSInterfaceClient

Note: Please refer to "H22a-Screen Interruption Table" for allowable screen transitions.

3.2.2 Use Cases

3.2.2.1 TGSS-UC-REQ-343155/A-User Presses Interior Power TailGate Switch

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions are met TGSSInterfaceClient is ON Power TailGate feature is set to "Off" (Disabled, Manual, etc.)
Scenario Description	The user presses the Interior Power TailGate Switch
Post-conditions	The TGSSInterfaceClient shows an interface that allows the user to turn On (Enable, Auto, etc.) the Power TailGate feature
List of Exception Use Cases	
Interfaces	TGSSInterfaceClient

4 Appendix: Reference Documents

Reference #	Document Title
1	Logical to Physical Signal Mapping (available on FISI Sharepoint)
2	HMI Settings ID's - not generated by Cluster
3	
4	
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