Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – Frunk Softswitch Interface Client

Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.2

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Version Date: July 15, 2020

FORD CONFIDENTIAL

Revision History

Date	Ver	Notes	
October 29, 2018	**1.0**	**Initial Release**	
June 21, 2019	**v1.1**		
	FKSS-IIR-REQ-323819/B-FSSInterfaceClient_Rx	MBORREL4: Added REQ-297763	
	STR-572687/B-Requirements	MBORREL4: Added REQ-354981	
	FKSS-REQ-354981/A-Frunk Ajar Status	MBORREL4: New req.	
	FKSS-UC-REQ-323945/B-User selects Frunk Release on FSSInterfaceClient (not restricted)	MBORREL4: Updated for ajar status	
	FKSS-SD-REQ-333004/B-User Selects Frunk Release On FSSInterfaceClient	MBORREL4: Updated diagram (correction)	
July 15, 2020	**v1.2**		
	FKSS-CLD-REQ-323813/B-Frunk Softswitch Interface Client	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-CLD-REQ-323814/B-Frunk Softswitch Server1	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-CLD-REQ-323815/B-Frunk Softswitch Server2	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	DOC-572111/B-Physical Mapping of Classes	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	STR-572170/B-FKSSInterfaceClient Interface	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-IIR-REQ-323818/B-FKSSInterfaceClient_Tx	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-IIR-REQ-323819/C-FKSSInterfaceClient_Rx	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	MD-REQ-328281/B-FrunkRestricted_St	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-328542/B-Powermode Conditions	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-328543/B-Feature Configuration	MBORREL4: Updated for new DID values to account for the alternate Frunk v2 design.	
	FKSS-REQ-328651/B-Frunk Release - Interface Client Request	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-332106/B-Initial Value	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-332234/B-Valid Events	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-332108/B-Voltage Range	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-332109/B-Bus Wakeup	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-332110/B-Bus Sleep Voting	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-332111/B-Value Retention	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-328654/B-Frunk Release - User Input	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-328655/B-Frunk Release - User Input Enable/Disable	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-REQ-354981/B-Frunk Ajar Status	MBORREL4: Clarification Only - corrected logical class name "FKSS."	
	FKSS-UC-REQ-323945/C-User selects Frunk Release	MBORREL4: Clarification Only - corrected logical class name "FKSS."	

	on FKSSInterfaceClient (not restricted)	
	FKSS-UC-REQ-323946/B-User selects Frunk Release on FKSSInterfaceClient (restricted)	MBORREL4: Clarification Only - corrected logical class name "FKSS."
	FKSS-ACT-REQ-333003/B-User Selects Frunk Release On FKSSInterfaceClient	MBORREL4: Clarification Only - corrected logical class name "FKSS."
	FKSS-SD-REQ-333004/C-User Selects Frunk Release On FKSSInterfaceClient	MBORREL4: Clarification Only - corrected logical class name "FKSS."

Table of Contents

1 Architectural Design

1.1 FKSS-CLD-REQ-323813/B-Frunk Softswitch Interface Client

The Frunk Softswitch Interface Client (FKSSInterfaceClient) is responsible for the tasks listed below:

- Providing a user interface for the Frunk Softswitch feature
- Transmitting user input to FKSSServer1
- Receiving feature restricted status from FKSSServer2
- Displaying active feature state on user interface

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

1.2 FKSS-CLD-REQ-323814/B-Frunk Softswitch Server1

The Frunk Softswitch Server1 (FKSSServer1) is responsible for the tasks listed below:

- Receiving user request from FKSSInterfaceClient
- Transmitting request to FKSSServer2

Please review the implementation guide/block diagram to locate the FKSSServer1 class.

1.3 FKSS-CLD-REQ-323815/B-Frunk Softswitch Server2

The Frunk Softswitch Server2 (FKSSServer2) is responsible for the tasks listed below:

- Managing feature restricted status
- Transmitting feature restricted status to FKSSInterfaceClient
- Receiving release request from FKSSServer1
- Releasing the Frunk

Please review the implementation guide/block diagram to locate the FKSSServer2 class.

1.4 Physical Mapping of Classes

The table below shows an example of how the logical classes that make up the Frunk 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)
FKSSInterfaceClient	SYNC
FKSSServer1	BCM
FKSSServer2	FTRM

1.5 FKSSInterfaceClient Interface

1.5.1 FKSS-IIR-REQ-323818/B-FKSSInterfaceClient_Tx

1.5.1.1 MD-REQ-328279/A-FrunkReleaseCounter_Rq

Message Type: Request

This signal is used to request a release of the Frunk. This signal increments by 1 everytime it is sent to request a release.

Name	Literals	Value	Description
Type	-	-	Unit: SED Resolution: 1 Offset: 0
	Initial Value	0x0	Reserved for transmitter reset

	Code Value	0x1 To 0x6	
	Not Used	0x7	

1.5.2 FKSS-IIR-REQ-323819/C-FKSSInterfaceClient_Rx

1.5.2.1 MD-REQ-328281/B-FrunkRestricted_St

Message Type: Status

The signal is used to inform the FKSSInterfaceClient of the current FKSSServer2 restriction status.

Name	Literals	Value	Description
Status	-	-	Indicates the current FKSSServer2 restriction status
	Inactive	0x0	
	Restricted	0x1	
	Not Restricted	0x2	

1.5.2.2 MD-REQ-027149/A-IgnitionStatus_St (TcSE ROIN-225464-1)

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	

1.5.2.3 MD-REQ-014025/A-VehicleSpeed_St (TcSE ROIN-223023-1)

Message Type: Status

Status used to indicate vehicle speed.

Name	Literals	Value	Description
Type	-	-	Indicates vehicle speed. Unit: kph Resolution:0.01 Offset:0
	kph	0x0 to 0xFFFF	

1.5.2.4 MD-REQ-333022/A-LockInhibit_St

Message Type: Status

This signal is used to indicate the lock inhibit status.

Name	Literals	Value	Description

Type	-	-	Current Lock Inhibit status
	No Inhibit	0x0	
	Inhibit	0x1	

1.5.2.5 MD-REQ-297763/A-HoodStatus

Message Type: Status

This method is indicating the vehicle hood status.

Name	Literals	Value	Description
HoodStatus	-	-	
	Closed	0x0	
	Ajar	0x1	

2 General Requirements

2.1 FKSS-REQ-328542/B-Powermode Conditions

The FKSSInterfaceClient shall only allow the functionality of this feature when the IgnitionStatus_St = Run and the touch screen display is On.

2.2 FKSS-REQ-328543/B-Feature Configuration

The FKSSInterfaceClient shall have configurable parameters to determine whether the vehicle supports the Frunk Softswitch feature and which specific variant.

- All of the functionality and signals defined in this SPSS shall be supported if the parameters indicate that:
  - The Frunk Softswitch feature is Enabled, AND
  - The Frunk Restricted Determination is External

- None of the functionality defined in this SPSS shall be supported if the parameters indicate that:
  - The Frunk Softswitch feature is Enabled, AND
  - The Frunk Restricted Determination is Internal
    - (see Frunk Softswitch v2 SPSS in this case)

    OR
  - The Frunk Softswitch feature is Disabled

3 Functional Definition

3.1 FKSS-FUN-REQ-323942/A-Frunk Release Softswitch

3.1.1 Requirements

3.1.1.1 FKSS-REQ-328651/B-Frunk Release - Interface Client Request

When the Frunk Release is selected by the user via HMI, the FKSSInterfaceClient shall increment the event counter FrunkReleaseCounter_Rq by a value of 1.

When FrunkReleaseCounter_Rq reaches a count value of 6, the next increment shall reset the counter to a value of 1. The count value of 0 is reserved, and shall not be used in the increment operation of this counter.

3.1.1.2 Event Counter Requirements

3.1.1.2.1 FKSS-REQ-332106/B-Initial Value

When the FKSSInterfaceClient resets, it shall initialize and publish FrunkReleaseCounter_Rq = 0.

Immediately following a reset, the FKSSInterfaceClient shall monitor for events that will cause FrunkReleaseCounter_Rq to increment.

The FKSSInterfaceClient shall continue to publish 0 until an event causes FrunkReleaseCounter_Rq to increment.

3.1.1.2.2 FKSS-REQ-332234/B-Valid Events

For a count event to be deemed valid, the FKSSInterfaceClient must first detect a “non-button press” before an actual “press.” Only then shall the FKSSInterfaceClient increment FrunkReleaseCounter_Rq.

When powering back On from a reset, the FKSSInterfaceClient shall not increment FrunkReleaseCounter_Rq if the first value it reads for the corresponding button is a “pressed” value. This is to avoid any possible “stuck button” error conditions.

Ex. If the interface is a manual switch that is pressed/not pressed, the module shall ensure that the switch is first not pressed, and then when it sees a pressed event, it shall increment the counter.

3.1.1.2.3 FKSS-REQ-332108/B-Voltage Range

The FKSSInterfaceClient shall not increment FrunkReleaseCounter_Rq when voltage is out of range, even if an incrementing event occurs (refer to Ford Next Generation Infotainment Engineering Spec_VerX_SYNC4 for voltage requirements).

3.1.1.2.4 FKSS-REQ-332109/B-Bus Wakeup

The FKSSInterfaceClient shall wake CAN whenever FrunkReleaseCounter_Rq has changed.

3.1.1.2.5 FKSS-REQ-332110/B-Bus Sleep Voting

The FKSSInterfaceClient is allowed to vote for CAN Sleep 5 seconds after the last FrunkReleaseCounter_Rq change, independent of the FNOS wakeup strategy.

3.1.1.2.6 FKSS-REQ-332111/B-Value Retention

The FKSSInterfaceClient shall retain the last transmitted value of FrunkReleaseCounter_Rq through sleep/wake cycle.

3.1.1.3 FKSS-REQ-328654/B-Frunk Release - User Input

The FKSSInterfaceClient shall provide a user interface (button/graphic) to allow selection of the Frunk Softswitch release button.

3.1.1.4 FKSS-REQ-328655/B-Frunk Release - User Input Enable/Disable

The FKSSInterfaceClient shall enable/disable (show/hide, grey-out, etc.) the Frunk Softswitch user interface (button/graphic) based on the following:

- If LockInhibit = “Inhibit” the above shall be disabled (greyed-out, hidden, etc.)

- If LockInhibit = “No_Inhibit” the below conditions shall be used:
  - If FrunkRestricted_St = “Restricted” the above shall be disabled (greyed-out, hidden, etc.)
  - If FrunkRestricted_St = “Not Restricted” the above shall be enabled
  - If FrunkRestricted_St = “Inactive” or is not available (missing from bus), the the above shall be disabled (greyed-out, hidden, etc.)

3.1.1.5 FKSS-REQ-354981/B-Frunk Ajar Status

The FKSSInterfaceClient shall display a graphic indicating the ajar (open/close) status of the Frunk. The graphic shall be shown as such:

- When HoodStatus = “(0x0) Closed” the Frunk shall be shown as Closed
- When HoodStatus = “(0x1) Ajar” the Frunk shall be shown as Opened
  - If HoodStatus is not available on the bus or cannot be read, the Frunk shall be shown as Closed

3.1.2 Use Cases

3.1.2.1 FKSS-UC-REQ-323945/C-User selects Frunk Release on FKSSInterfaceClient (not restricted)

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions are met FKSSInterfaceClient is ON FKSSServer2 reports a “not restricted” status
Scenario Description	The user selects the Frunk Release softswitch on the FKSSInterfaceClient
Post-conditions	The FKSSServer2 releases the Frunk FKSSInterfaceClient displays the Frunk as Opened
List of Exception Use Cases	FKSS-UC-REQ-323946
Interfaces	FKSSInterfaceClient CAN, G-HMI

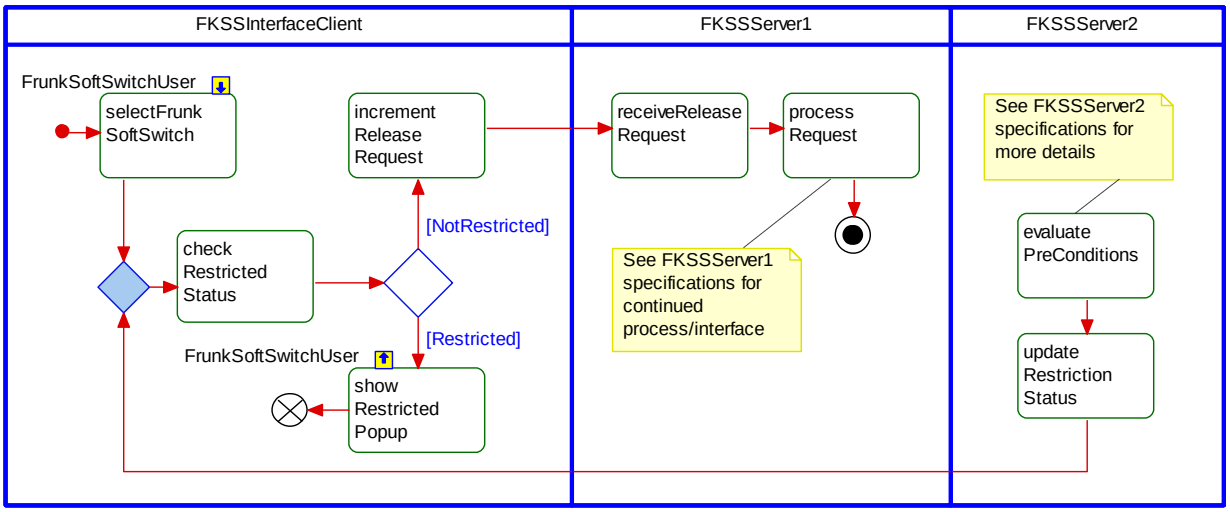
3.1.2.2 FKSS-UC-REQ-323946/B-User selects Frunk Release on FKSSInterfaceClient (restricted)

Actors	Vehicle Occupant
Pre-conditions	Powermode Conditions are met FKSSInterfaceClient is ON FKSSServer2 reports a “restricted” status
Scenario Description	The user selects the Frunk Release softswitch on the FKSSInterfaceClient
Post-conditions	The FKSSInterfaceClient indicates that the operation cannot be performed at this time
List of Exception Use Cases	
Interfaces	FKSSInterfaceClient CAN, G-HMI

3.1.3 White Box View

3.1.3.1 Activity Diagrams

3.1.3.1.1 FKSS-ACT-REQ-333003/B-User Selects Frunk Release On FKSSInterfaceClient Activity Diagram



3.1.3.2 Sequence Diagrams

3.1.3.2.1 FKSS-SD-REQ-333004/C-User Selects Frunk Release On FKSSInterfaceClient

Constraints

Pre-Condition

Powermode Conditions are met
FKSSInterfaceClient is ON
FKSSServer2 reports a “not restricted” status

Scenarios

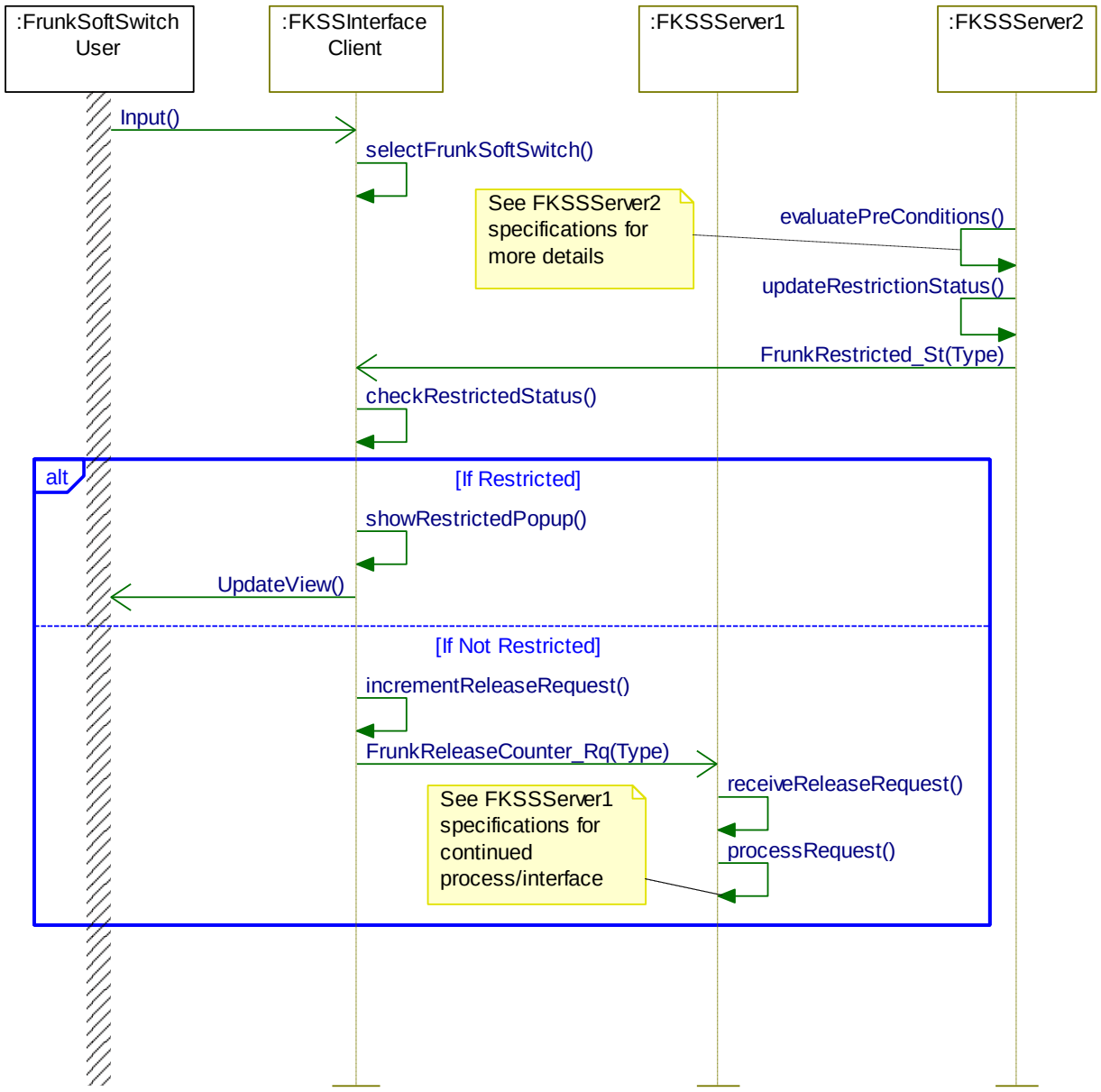
Normal Usage

The user selects the Frunk Release softswitch on the FKSSInterfaceClient

Post-Condition

The FKSSServer2 releases the Frunk

Sequence Diagram



4 Appendix: Reference Documents

Reference #	Document Title
1	Infotainment Diagnostics Specification APIM Gen 4
2	Ford Next Generation Infotainment Engineering Spec_VerX_SYNC4
3	
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