

**Research & Vehicle Technology**

**“Infotainment Systems Product Development”**

**Feature – Frunk Softswitch**

**Interface Client**

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

Version 1.1

**UNCONTROLLED COPY IF PRINTED**

**Version Date: June 21, 2019**

**FORD CONFIDENTIALF**

**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) |

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# Architectural Design

## FKSS-CLD-REQ-323813/A-Frunk Softswitch Interface Client

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

* Providing a user interface for the Frunk Softswitch feature
* Transmitting user input to FSSServer1
* Receiving feature restricted status from FSSServer2
* Displaying active feature state on user interface

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

## FKSS-CLD-REQ-323814/A-Frunk Softswitch Server1

The Frunk Softswitch Server1 (FSSServer1) is responsible for the tasks listed below:

* Receiving user request from FSSInterfaceClient
* Transmitting request to FSSServer2

Please review the implementation guide/block diagram to locate the FSSServer1 class.

## FKSS-CLD-REQ-323815/A-Frunk Softswitch Server2

The Frunk Softswitch Server2 (FSSServer2) is responsible for the tasks listed below:

* Managing feature restricted status
* Transmitting feature restricted status to FSSInterfaceClient
* Receiving release request from FSSServer1
* Releasing the Frunk

Please review the implementation guide/block diagram to locate the FSSServer2 class.

## 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)** |
| FSSInterfaceClient | SYNC |
| FSSServer1 | BCM |
| FSSServer2 | FTRM |

## FSSInterfaceClient Interface

### FKSS-IIR-REQ-323818/A-FSSInterfaceClient\_Tx

#### 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 |  |

### FKSS-IIR-REQ-323819/B-FSSInterfaceClient\_Rx

#### MD-REQ-328281/A-FrunkRestricted\_St

Message Type: Status

The signal is used to inform the FSSInterfaceClient of the current FSSServer restriction status.

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

#### 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 |  |

#### 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 |  |

#### 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 |  |

#### 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 |  |

# General Requirements

## FKSS-REQ-328542/A-Powermode Conditions

The FSSInterfaceClient shall only allow the functionality of this feature when the IgnitionStatus\_St = Run and the touch screen display is On.

## FKSS-REQ-328543/A-Feature Configuration

The FSSInterfaceClient shall have a configurable parameter to determine whether the vehicle supports Frunk Softswitch.

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

# Functional Definition

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

### Requirements

#### FKSS-REQ-328651/A-Frunk Release - Interface Client Request

When the Frunk Release is selected by the user via HMI, the FSSInterfaceClient 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.

#### Event Counter Requirements

##### FKSS-REQ-332106/A-Initial Value

When the FSSInterfaceClient resets, it shall initialize and publish FrunkReleaseCounter\_Rq = 0.

Immediately following a reset, the FSSInterfaceClient shall monitor for events that will cause FrunkReleaseCounter\_Rq to increment.

The FSSInterfaceClient shall continue to publish 0 until an event causes FrunkReleaseCounter\_Rq to increment.

##### FKSS-REQ-332234/A-Valid Events

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

When powering back On from a reset, the FSSInterfaceClient 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.

##### FKSS-REQ-332108/A-Voltage Range

The FSSInterfaceClient 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).

##### FKSS-REQ-332109/A-Bus Wakeup

The FSSInterfaceClient shall wake CAN whenever FrunkReleaseCounter\_Rq has changed.

##### FKSS-REQ-332110/A-Bus Sleep Voting

The FSSInterfaceClient is allowed to vote for CAN Sleep 5 seconds after the last FrunkReleaseCounter\_Rq change, independent of the FNOS wakeup strategy.

##### FKSS-REQ-332111/A-Value Retention

The FSSInterfaceClient shall retain the last transmitted value of FrunkReleaseCounter\_Rq through sleep/wake cycle.

#### FKSS-REQ-328654/A-Frunk Release - User Input

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

#### FKSS-REQ-328655/A-Frunk Release - User Input Enable/Disable

The FSSInterfaceClient 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.)

#### FKSS-REQ-354981/A-Frunk Ajar Status

The FSSInterfaceClient 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

### Use Cases

#### FKSS-UC-REQ-323945/B-User selects Frunk Release on FSSInterfaceClient (not restricted)

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | Powermode Conditions are met  FSSInterfaceClient is ON  FSSServer2 reports a “not restricted” status |
| **Scenario Description** | The user selects the Frunk Release softswitch on the FSSInterfaceClient |
| **Post-conditions** | The FSSServer2 releases the Frunk  FSSInterfaceClient displays the Frunk as Opened |
| **List of Exception Use Cases** | FKSS-UC-REQ-323946 |
| **Interfaces** | FSSInterfaceClient  CAN, G-HMI |

#### FKSS-UC-REQ-323946/A-User selects Frunk Release on FSSInterfaceClient (restricted)

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | Powermode Conditions are met  FSSInterfaceClient is ON  FSSServer2 reports a “restricted” status |
| **Scenario Description** | The user selects the Frunk Release softswitch on the FSSInterfaceClient |
| **Post-conditions** | The FSSInterfaceClient indicates that the operation cannot be performed at this time |
| **List of Exception Use Cases** |  |
| **Interfaces** | FSSInterfaceClient  CAN, G-HMI |

### White Box View

#### Activity Diagrams

##### FKSS-ACT-REQ-333003/A-User Selects Frunk Release On FSSInterfaceClient

Activity Diagram



#### Sequence Diagrams

##### FKSS-SD-REQ-333004/B-User Selects Frunk Release On FSSInterfaceClient

Constraints

Pre-Condition

Powermode Conditions are met

FSSInterfaceClient is ON

FSSServer2 reports a “not restricted” status

Scenarios

Normal Usage

The user selects the Frunk Release softswitch on the FSSInterfaceClient

Post-Condition

The FSSServer2 releases the Frunk

Sequence Diagram



# Appendix: Reference Documents

|  |  |
| --- | --- |
| Reference # | Document Title |
| 1 | Infotainment Diagnostics Specification APIM Gen 4 |
| 2 | Ford Next Generation Infotainment Engineering Spec\_VerX\_SYNC4 |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
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