



**Research & Vehicle Technology**  
**“Infotainment Systems Product Development”**

**Feature – Rear Audio Control**

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

Version 1.4

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Version Date: July 1, 2017

**FORD CONFIDENTIAL**



## Revision History

Date	Version	Notes	
May 30, 2013	1.0	Initial Release	
June 4, 2014	1.1	Updated Release	
	RAC-IIR-REQ-023552/B-RAC Client CAN Status (TcSE ROIN-201162-1)	rpaquet2 - Updated interface to add SetVolume signal only used with rotary volume knob.	
	RAC-SR-REQ-023555/B-Button Performance for the Button Input Server (TcSE ROIN-201173-3)	<jmyslin2> Update for rotary knob (SetVolume)	
	STR-071151/B-Use Cases (TcSE ROIN-293546)	rpaquet2 - added new use case for Rotary Volume Knob.	
	RAC-UC-REQ-087340/A-Volume Rotary Knob Activated CW/CCW	rpaquet2- New use case for rotary volume knob,	
	RAC-SR-REQ-023531/B-Volume button press handling (TcSE ROIN-201172-1)	rpaquet2 - Updated to account for SetVolume signal.	
April 28, 2016	1.2	Updated Release	
	STR-071224/B-Architectural Design (TcSE ROIN-293553-1)	rpaquet2 - Added requirement 214274	
	RAC-CLD-REQ-214274/A-Rear Audio Control Lockout Client	rpaquet2 - new	
	STR-071218/B-Interface Requirements (TcSE ROIN-222806-1)	rpaquet2 - Added 214283 and 214289	
	RAC-IIR-REQ-214283/A-RearAudioControlLockoutClient_Tx	rpaquet2 - New for RAC lockout	
	MD-REQ-214277/A-RACLockout_Rq+	rpaquet2 - new signal	
	MD-REQ-214277/B-RACLockout_Rq	rpaquet2 - Updated encoding.	
	RAC-IIR-REQ-214289/A-RearAudioControlLockoutClient_Rx	rpaquet2 - New for RAC lockout	
	MD-REQ-214281/A-RACLockout_St+	rpaquet2 - new signal	
	MD-REQ-214281/B-RACLockout_St	rpaquet2 - Updated encoding.	
	STR-071225/C-Functional Definition (TcSE ROIN-293554-1)	rpaquet2 - Removed 210482 Rer infotainment Lock-Out and replaced it with 213329 Rear Audio Control Lock-Out.	
	RAC-FUN-REQ-213329/A-Rear Audio Control Lock-Out	rpaquet2 - New Function for Rear Lock Out	
	RAC-SR-REQ-213334/A-Lock-Out of Rear Audio Controls	rpaquet2 - new	
	RAC-ACT-REQ-214210/A-Lock and Unlock of Rear Audio Controls	rpaquet2 - New Activity diagram	
	RAC-SD-REQ-214211/A-Rear Audio Control Lock/Unlock Request+	rpaquet2 - New Sequence Diagram	
	RAC-SD-REQ-214211/B-Rear Audio Control Lock/Unlock Request	rpaquet2 - Updated encoding.	
December 22, 2016	1.3	Updated Release	
	STR-071218/C-Interface Requirements (TcSE ROIN-222806-1)	rpaquet2 - Added RearAudioControlClient TxRx with LBP Request response reference to the LBP SPSS.	
	RAC-SR-REQ-023555/D-Button Performance for the Button Input Server (TcSE ROIN-201173-3)	rpaquet 2- Updated to indicate that the seek button shall act like the seek button on the EFP(shall seek to next channel).	
	STR-071225/D-Functional Definition (TcSE ROIN-293554-1)	rpaquet2 - Added new functions Play-Pause, Shuffle -Repeat, Direct Source Selection	
	RAC-SR-REQ-213334/B-Lock-Out of Rear Audio Controls	rpaquet2 - Changed Rear Audio Control Server to Rear Audio Control Lockout Server for clarification.	
	RAC-FUN-REQ-239380/A-Play-Pause	rpaquet2 - Initial release	
	RAC-UC-REQ-239381/A-Play Button Pressed	rpaquet2 -Initial Release	
	RAC-UC-REQ-239382/A-Pause Button Pressed	rpaquet2 -Initial Release	
	RAC-FUN-REQ-242991/A-Shuffle-Repeat	rpaquet2 - Initial release	
	RAC-FUN-REQ-245309/A-Direct Source Selection	rpaquet2 - Initial release	
	RAC-SR-REQ-245706/A-List Server Radio	sberg15: updated to support also AM/FM/DAB/SDARS within the root list; Added	



2 - RACM HMI

FM/SDARS/DAB station list for future upgradeability.

July 1, 2017

1.4

Updated Release

STR-071218/D-Interface Requirements  
(TcSE ROIN-222806-1)

rpaquet2 - Corrected the RearAudioControlClient to Server\_Tx/Rx no content change

ENMEM-REQ-099693/E-Display Data  
Refresh After Driver Profile Change

MBORREL4: Updated to clarify that all Clients that display any EnMem settings shall perform refresh.

ENMEM-REQ-099674/C-Requesting Audio  
Preset Info After Profile Change

MBORREL4: Updated to include to all Clients that display audio presets

ENMEM-TMR-REQ-099763/C-  
T\_PersPresetWait

MBORREL4: Updated to include to all Clients that display audio presets

STR-071225/E-Functional Definition (TcSE  
ROIN-293554-1)

rpaquet2 - Added Power On/off and Mute function to go along with the Global Input translation matrix. should already be implemented.

STR-417273/B-Use Cases

rpaquet2 - Removed the Play and Pause use cases and replaced with one Play/Pause Use Case

RAC-FUN-REQ-257547/A-Power On/Off

rpaquet2 - RACM Already doing this function added for clarification and RSEM implementation.

RAC-UC-REQ-257548/A-On/Off Button  
Pressed

rpaquet2 - Added to Use Case to match what RACM is doing and for RSEM to implement.

RAC-FUN-REQ-257549/A-Mute

rpaquet2 - RACM Already doing this function added for clarification and RSEM implementation.

RAC-UC-REQ-257550/A-Mute Pressed

rpaquet2 - Added to Use Case to match what RACM is doing and for RSEM to implement.



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# 1 Architectural Design

## 1.1 RAC-CLD-REQ-023557/B-RAC Server (TcSE ROIN-293560)

The RAC Server (Button Input Server) is responsible for receiving the button press and acting on the press as defined in the use cases and requirements for the active source. The RAC Server also is responsible for responding to a request for its source list or a request for a source in the list follow List Browse Protocol SPSS for LBP request response.

## 1.2 RAC-CLD-REQ-214274/A-Rear Audio Control Lockout Client

The Rear Audio Control Lockout Client is responsible for reading the lockout button input and requesting the Rear Audio Control Lockout Server to change their lock state.

## 1.3 Interface Requirements

### 1.3.1 RAC-IIR-REQ-023552/C-RAC Client CAN Status (TcSE ROIN-201162-1)

Method	Notes	Parameters
«CAN» RSEM_Button_Press()	Event-Periodic method from the Rear Seat Entertainment Module (RSEM) Button Input Client to the receiving modules.  <a href="#">SetVolume signal used for rotary volume knob configuration only.</a>	Button A Name ID (signal) Button A Activation State (signal) see Info-CAN dB  Button B Name ID (signal) Button B Activation State (signal) see Info-CAN dB  Button C Name ID (signal) Button C Activation State (signal) see Info-CAN dB  Button D Name ID (signal) Button D Activation State (signal) see Info-CAN dB  <a href="#">SetVolume (signal)</a> <a href="#">See Info-CAN dB</a>

### 1.3.2 RAC-IIR-REQ-245766/A-RearAudioControlServer\_Tx

#### 1.3.2.1 MD-REQ-245767/A-LBP Response

See List Browse Protocol SPSS for response definition.

### 1.3.3 RAC-IIR-REQ-245765/A-RearAudioControlServer\_Rx

#### 1.3.3.1 MD-REQ-245768/A-LBP Request

See List Browse Protocol SPSS for request definition.

**1.3.4 RAC-IIR-REQ-214283/A-RearAudioControlLockoutClient\_Tx****1.3.4.1 MD-REQ-214277/B-RACLockout\_Rq**

Message type: Request

This signal is used to request the Rear Audio Control Module to lock or unlock the audio controls in the rear.

Name	Literals	Value	Description
Type	-	-	Requests locking or unlocking of the rear audio controls.
	Null (Inactive)	0x0	
	Lock	0x1	
	Unlock	0x2	
	Not Used	0x3	

**1.3.5 RAC-IIR-REQ-214289/A-RearAudioControlLockoutClient\_Rx****1.3.5.1 MD-REQ-214281/B-RACLockout\_St**

Message Type: Status

This signal is used to indicate the lockout state of the Rear Audio Control Module.

Name	Literals	Value	Description
Type	-	-	Status of the Rear Audio Control Modules lockout state.
	Null (Invalid)	0x0	
	Locked	0x1	
	Unlocked	0x2	
	NotUsed_1	0x3	



## 2 General Requirements

### 2.1 RAC-FUR-REQ-023554/A-RSEM Functional Requirements (TcSE ROIN-201174-1)

Reference the RSEM Component spec for functional requirements.

### 2.2 RAC-SR-REQ-023555/D-Button Performance for the Button Input Server (TcSE ROIN-201173-3)

The Button Input Server shall act on the button press received from the RSEM Button Input Client in the same manner as if it were receiving the button press from the Steering Wheel Control. [Seek button shall be acted on in the same manner as an EFP button press.](#)

The Button Input Server shall determine based on the operational state of the System whether to act on the button press received from the RSEM Button Input Client.

The exception is SetVolume for the rotary RSEM knob.

### 2.3 Enhanced Memory Mix Mode Preset Support

#### 2.3.1 ENMEM-REQ-099693/E-Display Data Refresh After Driver Profile Change

After a driver profile change has occurred, the EnhancedMemoryInterfaceClient, and any Client displaying settings status (ex. Cluster, RACM, etc.), shall always refresh all applicable settings data (including the active screen) according to existing module setting HMI standards and requirements. This is to reflect the most recent settings values once a Driver Profile has been recalled.

Ex. The Cluster active screen has information displayed that was originally requested with feature based message protocol. While on the screen the ActivePersonality\_St signal changes from Pers1 to Pers3. When changing to Pers3, the Cluster shall re-request the active screen information even though the screen didn't change. The Cluster has no knowledge if the feature is personalizable or not, so the Cluster shall always re-request the screen information when the Active Personality changes.

Ex. The Cluster infotainment active screen is displaying radio preset stations. While on the screen the ActivePersonality\_St signal changes from Pers1 to Pers3. When changing to Pers3, the Cluster shall re-request the active screen information even though the screen didn't change. The Cluster has no knowledge if the feature is personalizable or not, so the Cluster shall always re-request the screen information when the Active Personality changes.

#### 2.3.2 ENMEM-REQ-099674/C-Requesting Audio Preset Info After Profile Change

When the EnhancedMemoryInterfaceClient, and any Client displaying audio presets, receives a Driver Profile recall event via ActivePersonality\_St, it shall wait at least T\_PersPresetWait and then shall request the audio preset information from the AudioServer and shall update the audio preset HMI information to the new Driver Profile.

#### 2.3.3 ENMEM-TMR-REQ-099763/C-T\_PersPresetWait

Name	Description	Units	Range	Resolution	Default
T_PersPresetWait	Minimum time the EnhancedMemoryInterfaceClient, and any Client displaying audio presets, shall wait before requesting preset data from the AudioServer.	msec	100-300	5	200





### 3 Functional Definition

#### 3.1 RAC-FUN-REQ-023525/A-Seek (TcSE ROIN-293542)

##### 3.1.1 Use Cases

##### 3.1.1.1 RAC-UC-REQ-023526/A-Seek Up/Down Button Pressed (TcSE ROIN-292225)

<b>Actors</b>	User
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	The User has selected Seek Up/Down.
<b>Post-conditions</b>	Rear Audio Control sends Seek Up/Down Button press to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

##### 3.1.1.2 RAC-UC-REQ-023527/A-Seek Up/Down Button Pressed and Held (TcSE ROIN-292229)

<b>Actors</b>	User
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	The User has pressed and held Seek Up/Down.
<b>Post-conditions</b>	Rear Audio Control continues to send Seek Up/Down Button press to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

#### 3.2 RAC-FUN-REQ-023528/A-Volume (TcSE ROIN-293544)

##### 3.2.1 Use Cases

##### 3.2.1.1 RAC-UC-REQ-023529/B-Volume Up/Down Button Pressed (TcSE ROIN-292226)

###### Linked Elements

RAC-SR-REQ-023531/B-Volume button press handling (TcSE ROIN-201172-1)

<b>Actors</b>	User
<b>Pre-conditions</b>	Infotainment System is ON Media Source is Active (ex AM/FM/CD.... )
<b>Scenario Description</b>	The User has selected Volume Up/Down.
<b>Post-conditions</b>	Rear Audio Control sends Volume Up/Down to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

##### 3.2.1.2 RAC-UC-REQ-023530/B-Volume Up/Down Button Pressed and Held (TcSE ROIN-292230)

###### Linked Elements

RAC-SR-REQ-023531/B-Volume button press handling (TcSE ROIN-201172-1)



<b>Actors</b>	User
<b>Pre-conditions</b>	Infotainment System is ON Media Source is Active
<b>Scenario Description</b>	The User has pressed and held Volume Up/Down button.
<b>Post-conditions</b>	Rear Audio Control continues to send Volume Up/Down increment/decrement Button press to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

### 3.2.1.3 RAC-UC-REQ-087340/B-Volume Rotary Knob Activated CW/CCW

<b>Actors</b>	User
<b>Pre-conditions</b>	Infotainment System is ON Media source is active (AM/FM/CD...)
<b>Scenario Description</b>	The user turns the rotary volume knob CW/CCW.
<b>Post-conditions</b>	Rear Audio Control sends SetVolume increment/decrement volume to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle system Interface

## 3.2.2 Requirements

### 3.2.2.1 RAC-SR-REQ-023531/B-Volume button press handling (TcSE ROIN-201172-1)

The Button Input Server shall respond to the Volume button press [or SetVolume signal](#) received by the Button Input Client by sending the appropriate Volume command to the Volume Server.

## 3.3 RAC-FUN-REQ-023532/A-Media (TcSE ROIN-293547)

### 3.3.1 Use Cases

#### 3.3.1.1 RAC-UC-REQ-023533/A-Media Button Pressed (TcSE ROIN-292227)

<b>Actors</b>	User
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	The User has pressed the Media button.
<b>Post-conditions</b>	Rear Audio Control sends Media Button press to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface



### 3.4 RAC-FUN-REQ-023534/A-Clock (TcSE ROIN-293549)

#### 3.4.1 Use Cases

##### 3.4.1.1 RAC-UC-REQ-023535/A-Clock Pressed (TcSE ROIN-292228)

###### Linked Elements

RAC-SR-REQ-023536/A-RSEM Clock Duration (TcSE ROIN-203219-1)

RAC-SR-REQ-245707/A-Requesting the Source Lists from the Servers

<b>Actors</b>	User
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	The User has pressed the Clock button.
<b>Post-conditions</b>	Rear Audio Control shows the Clock to the User. Clock will be shown for X seconds see RSEM spec for timing requirement.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

#### 3.4.2 Requirements

##### 3.4.2.1 RAC-SR-REQ-023536/A-RSEM Clock Duration (TcSE ROIN-203219-1)

See RSEM Component Spec for clock duration.

### 3.5 RAC-FUN-REQ-213329/A-Rear Audio Control Lock-Out

#### 3.5.1 Use Case

##### 3.5.1.1 RAC-UC-REQ-213330/B-Entering Rear Audio Lock-Out

<b>Actors</b>	Vehicle Occupant
<b>Pre-conditions</b>	Rear infotainment controls and HMI are not locked out Infotainment System is On (HMIMode = On)
<b>Scenario Description</b>	The front user locks out rear infotainment control via the ECP Lock out Button.
<b>Post-conditions</b>	The rear infotainment buttons and audio controls are disabled. See HMI specs for Rear Audio Lockout indications.
<b>Notes</b>	
<b>Interfaces</b>	G-HMI, Vehicle Interface

##### 3.5.1.2 RAC-UC-REQ-213331/A-Exiting Rear Audio Lock-Out

<b>Actors</b>	Vehicle Occupant
<b>Pre-conditions</b>	Rear infotainment controls and HMI locked out Infotainment System is On (HMIMode = On)
<b>Scenario Description</b>	The front user disables rear infotainment lockout via the ECP Lock out Button
<b>Post-conditions</b>	The rear infotainment buttons and audio controls are functional The rear infotainment HMI can be shown Front Centerstack HMI indicates that rear infotainment is unlocked.
<b>Notes</b>	
<b>Interfaces</b>	G-HMI, Vehicle Interface

**3.5.1.3 RAC-UC-REQ-213332/A-Pressing Rear infotainment button during Rear Audio Lock-Out**

<b>Actors</b>	Vehicle Occupant
<b>Pre-conditions</b>	Rear infotainment controls and HMI are locked out
<b>Scenario Description</b>	The user presses a rear infotainment button or tries to activate a rear infotainment control (ex seek, volume, power, display, source)
<b>Post-conditions</b>	The rear infotainment buttons are not functional and no infotainment feature/function is acted upon.  Rear Infotainment HMI indicates Rear Audio locked out
<b>Notes</b>	
<b>Interfaces</b>	G-HMI, Vehicle Interface

**3.5.1.4 RAC-UC-REQ-213333/A-Maintaining Lockout State Through Ignition Cycles**

<b>Actors</b>	Vehicle Occupant
<b>Pre-conditions</b>	Rear infotainment controls and HMI are locked out Infotainment System is On (HMIMode = On)
<b>Scenario Description</b>	1. User exits vehicle and Infotainment System powers down (HMIMode = Off) 2. User re-enters the vehicle and Infotainment System powers up (HMIMode = On)
<b>Post-conditions</b>	The rear infotainment buttons are not functional
<b>Notes</b>	
<b>Interfaces</b>	G-HMI, Vehicle Interface

**3.5.2 Requirements****3.5.2.1 RAC-SR-REQ-213334/B-Lock-Out of Rear Audio Controls**

The Rear Audio Control Lockout Server shall default the Lockout state to Unlocked. Upon battery connect the Rear Audio Control Lockout Server shall report Unlocked in the RACLockout\_St.

The Rear Audio Control Lockout Server shall maintain the Lockout state through ignition cycles, powermode cycles (example: HMIAudioMode → On → Off → On), and bus sleep/wakeup cycles.

RACLockout\_St shall represent the state of the Rear Audio Control Lockout Server and shall update based on the User input received via the RACLockout\_Rq.

The Rear Audio Control Lockout Client upon receiving the lockout button press via CAN or LIN shall send the appropriate RACLockout\_Rq to the Rear Audio Control Lockout Server. Rear Audio Control Lockout Client shall monitor the RACLockout\_St to determine the appropriate RACLockout\_Rq to send (example: RACLockout\_St = Unlocked then request is RACLockout\_Rq = Lock).

The Rear Audio Control Lockout Client shall update its HMI based on the RACLockout\_St signal.

**3.5.2.2 RAC-SR-REQ-210509/D-Rear Lock-out of the infotainment buttons**

During a REFP/RACM infotainment rear lockout event the REFP infotainment buttons shall be locked out. If the user presses an infotainment button during a rear infotainment lockout event the REFP shall NOT send out a button on the network set to the "Pressed" state but shall only be set to the "Not\_Pressed" state. During a rear lockout event:

- The ButtonA/B/C/DActivationState signal shall be set to the Not\_Pressed encoding.



- The setVolume signal shall be set to the Not\_Pressed encoding

If a rear lockout event happens while an infotainment button is being pressed then the REFP shall set the button in the signal ButtonA/B/C/DNameID to a Not Pressed state. The REFP shall not just change ButtonA/B/C/DNameID to Inactive without first sending the Not Pressed encoding for the button in ButtonA/B/C/DNameID if it is already set to the Pressed state.

Note: If the Not Pressed encoding is not sent for a specific button set to the Pressed encoding when a rear lock-out event happens then the receiving module having not received the Not Pressed could stay in a press and hold state.

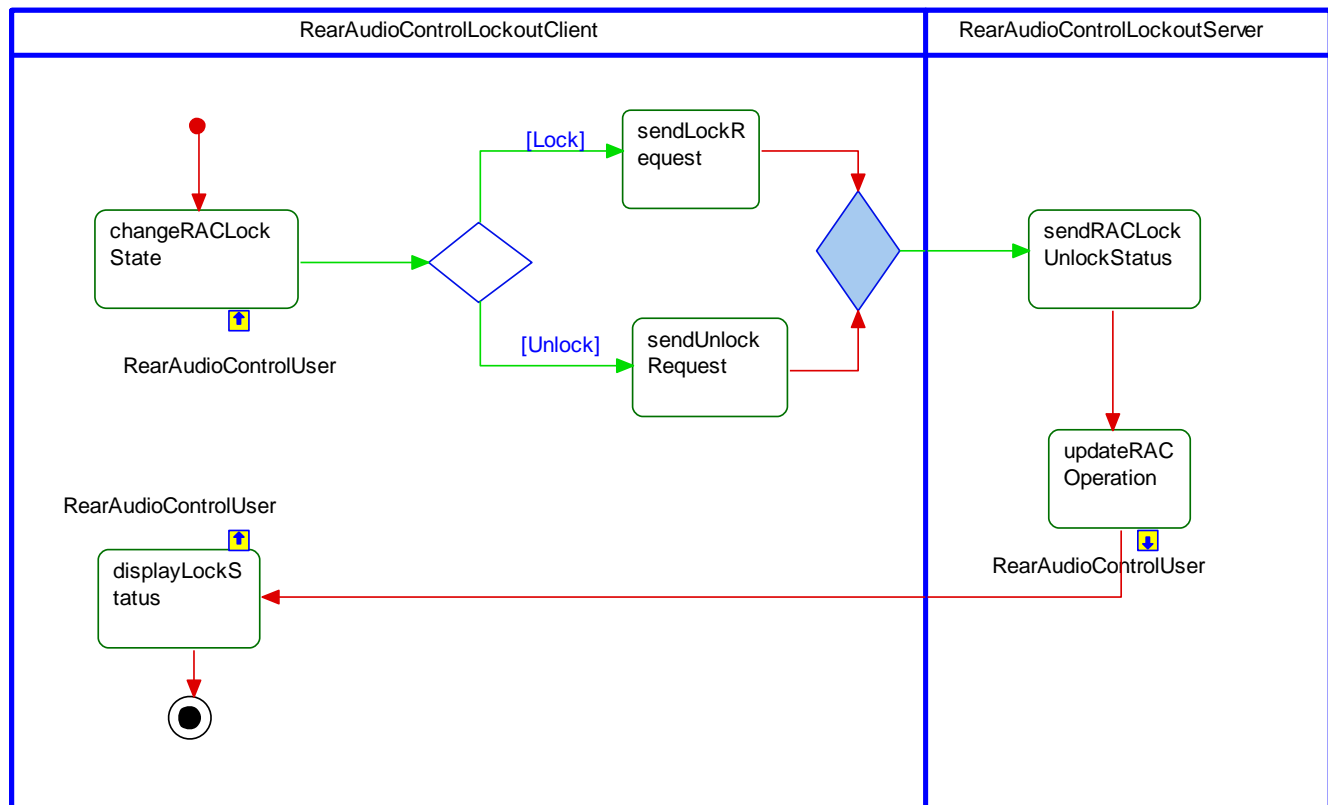
- Example how the REFP should function when a button is pressed and a rear lockout event happens:
  - The rear user is pressing Button X with the ButtonANameID = ButtonX and ButtonAAActivationState = Pressed
  - A rear infotainment lockout event occurs before the user releases ButtonX
  - The REFP sends "ButtonANameID = ButtonX" AND "ButtonAAActivationState = Not Pressed" even if Button X is still be pressed.

Note: this requirement is only for the infotainment buttons and does not include climate button functionality.

### 3.5.3 White Box View

#### 3.5.3.1 Activity Diagrams

##### 3.5.3.1.1 RAC-ACT-REQ-214210/A-Lock and Unlock of Rear Audio Controls





### 3.5.3.2 Sequence Diagrams

#### 3.5.3.2.1 RAC-SD-REQ-214211/B-Rear Audio Control Lock/Unlock Request





### 3.6 RAC-FUN-REQ-239380/A-Play-Pause

#### 3.6.1 Use Cases

##### 3.6.1.1 RAC-UC-REQ-263258/A-Play/Pause Button Pressed

<b>Actors</b>	User
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	The User has pressed the Play/Pause button.
<b>Post-conditions</b>	Rear Audio Control sends Play/Pause Button press to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

### 3.7 RAC-FUN-REQ-242991/A-Shuffle-Repeat

#### 3.7.1 Use Cases

##### 3.7.1.1 RAC-UC-REQ-242978/A-Shuffle Button Pressed

<b>Actors</b>	User
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	The User has selected Shuffle.
<b>Post-conditions</b>	Rear Audio Control sends Shuffle Button press to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

##### 3.7.1.2 RAC-UC-REQ-242979/A-Repeat Button Pressed

<b>Actors</b>	User
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	The User has selected Repeat.
<b>Post-conditions</b>	Rear Audio Control sends Repeat Button press to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

### 3.8 RAC-FUN-REQ-245309/A-Direct Source Selection

#### 3.8.1 Use Cases

##### 3.8.1.1 RAC-UC-REQ-242983/A-Direct Source Selection



<b>Actors</b>	User
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	The User selects a source from the source list.
<b>Post-conditions</b>	RAC Client sends request for source and the receiving module RAC Server/Server2 transitions to the source requested.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

### 3.8.1.2 RAC-UC-REQ-242985/A-Request Source List from Servers

<b>Actors</b>	System
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	RAC Client(LBP Client) request source list from RAC Server/Server2 (List Browse Protocol Servers).
<b>Post-conditions</b>	Source list from the List Browse Protocol servers are displayed to the user.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

## 3.8.2 Requirements

### 3.8.2.1 RAC-SR-REQ-245707/A-Requesting the Source Lists from the Servers

The RAC Client shall request the source list from all RAC Servers that contain sources. The RAC Servers will provide the list requested by the RAC Client. Once all list have been received the RAC Client shall update its display with the list content.

Currently there are two lists for the RAC Client to request:

245706 – List Server Radio 1 – RACM HMI provides the Radio sources

019756 – List Server Generic Media 1 – Media List Structure provides the APIM sources

### 3.8.2.2 RAC-SR-REQ-245706/A-List Server Radio 2 - RACM HMI

RadioSource Root List						
ListServerID =	Radio 2 (0x0A)					
ActiveListID =	Radio Source Root (0x0000)					
ParentList ID =	Radio Source Root (0x0000)					
NbrItemsInSelection=	Varies					
ItemIndex	Data Type	ActivationEvent	Object Type	ItemDescriptor	getItem(ItemIndex) Behavior	setItem() Behavior
0x0000	Generic Text (0x02)	Not Supported (0x0)	List Label	Radio	Invalid	Invalid
0x0001	Radio Source (0xA4)	Supported (0x1)	Entry Object (0x1)	{Source Icon}; AM	Invalid	Activate AM Radio
0x0002	Radio Source (0xA4)	Supported (0x1)	Entry Object (0x1)	{Source Icon}; FM	Invalid	Activate FM Radio
0x0003	Radio Source (0xA4)	Supported (0x1)	Entry Object (0x1)	{Source Icon}; DAB or {Source Icon}; SAT	Invalid	Activate DAB or SAT Radio
0x0004	Radio Source (0xA4)	Supported (0x1)	Entry Object (0x1)	{Source Icon}; CD	Invalid	Activate CD Audio

DAB and SDARS can only be available separately based on configuration (EU/NA)

### 3.8.2.3 LBP-REQ-019756/A-List Server Generic Media 1 - Media List Structure (TcSE ROIN-301572-1)





## Media Root List

ListServerID =	Generic Media1 (0x02)					
ActiveListID =	Media Root (0x0000)					
ParentList ID =	Media Root (0x0000)					
NbrItemsInSelection =	20					
ItemIndex	Data Type	ActivationEvent	Object Type	ItemDescriptor	getItem(ItemIndex) Behavior	setItem() Behavior
0x0000	Generic Text (0x02)	Not Supported (0x0)	List Label	{Media Root List}	Invalid	Invalid
0x0001	Media Type (0x20)	Supported (0x1)	List Object (0x2)	{Source Icon} {Source # Source Name}	Goto Active List ID 0x0001 or 2	Set Source to Entry 1
0x0002	Media Type (0x20)	Supported (0x1)	List Object (0x2)	{Source Icon} {Source # Source Name}	Goto Active List ID 0x0001 or 2	Set Source to Entry 2
0x0003	Media Type (0x20)	Supported (0x1)	List Object (0x2)	{Source Icon} {Source # Source Name}	Goto Active List ID 0x0001 or 2	Set Source to Entry 3
0x0004	Media Type (0x20)	Supported (0x1)	List Object (0x2)	{Source Icon} {Source # Source Name}	Goto Active List ID 0x0001 or 2	Set Source to Entry 4
...						
0x0014	Media Type (0x20)	Supported (0x1)	Entry Object (0x1)	{Source Icon} {Source # Source Name}	Invalid	Set Source to Entry 20

## Example 1:

0x0001	Media Type (0x20)	Supported (0x1)	List Object (0x2)	{USB Icon} 1:USB	Goto Active List ID 0x0001 or 2	Set Source to Entry 1
0x0002	Media Type (0x20)	Supported (0x1)	List Object (0x2)	{USB Icon} 2:USB	Goto Active List ID 0x0001 or 2	Set Source to Entry 2

## Example 2:

0x0001	Media Type (0x20)	Supported (0x1)	Entry Object (0x1)	{0x07} 1: Pandora	Invalid	Set Source to Entry 1
0x0002	Media Type (0x20)	Supported (0x1)	Entry Object (0x1)	{0x07} 2: iHeart Radio	Invalid	Set Source to Entry 2

## Example: Now Playing (Applink Source selected)

Source Info: {device name}
Metadata1: {mainField 1}
Metadata2: {mainField 2}
Metadata Icon 1 and 2: 0x17 (No Icon)

Note: Fields described in examples are referenced in S28 63.4 2.41 TP-LOG-GTPC-160692-2-SID-79-MediaInformation\_St

## Indexing Device Features

ListServerID =	Generic Media1 (0x02)					
ActiveListID =	Indexable Features (0x0001)					
ParentList ID =	Media Root (0x0000)					
NbrItemsInSelection =	4					
ItemIndex	Data Type	ActivationEvent	Object Type	ItemDescriptor	getItem(ItemIndex) Behavior	setItem() Behavior
0x0000	Generic Text (0x02)	Not Supported (0x0)	List Label	{Device Name}	Invalid	Invalid
0x0001	Generic Text (0x02)	Supported (0x1)	Entry Object (0x1)	Now Playing	Invalid	Play Entry 1
0x0002	Generic Text (0x02)	Supported (0x1)	Entry Object (0x1)	Play All	Invalid	Play Entry 2
0x0003	Generic Text (0x02)	Supported (0x1)	Entry Object (0x1)	Shuffle All	Invalid	Play Entry 3
0x0004	Generic Text (0x02)	Supported (0x1)	Entry Object (0x1)	Similar Music	Invalid	Play Entry 4

## Example:

0x0000	Generic Text (0x02)	Not Supported (0x0)	List Label	Ken's iPod	Invalid	Invalid
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## Non Indexing Device Features

ListServerID =	Generic Media1 (0x02)					
ActiveListID =	Non Indexable Features (0x0002)					
ParentList ID =	Media Root (0x0000)					
NbrItemsInSelection =	1					
ItemIndex	Data Type	ActivationEvent	Object Type	ItemDescriptor	getItem(ItemIndex) Behavior	setItem() Behavior
0x0000	Generic Text (0x02)	Not Supported (0x0)	List Label	{Device Name}	Invalid	Invalid
0x0001	Generic Text (0x02)	Supported (0x1)	Entry Object (0x1)	Play All	Invalid	Play Entry 1

## Example:

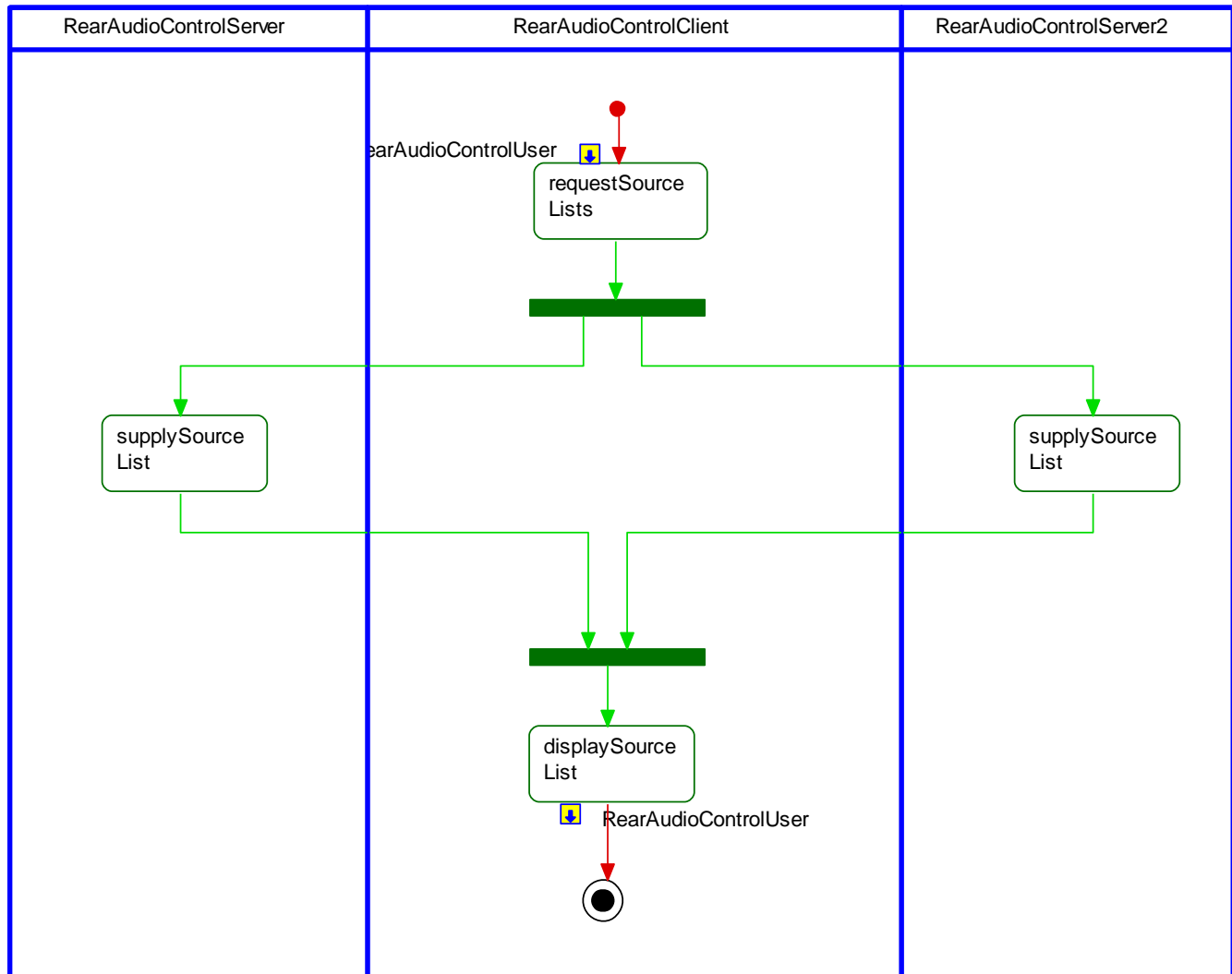
0x0000	Generic Text (0x02)	Not Supported (0x0)	List Label	Ken's iPhone	Invalid	Invalid
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### 3.8.3 White Box View

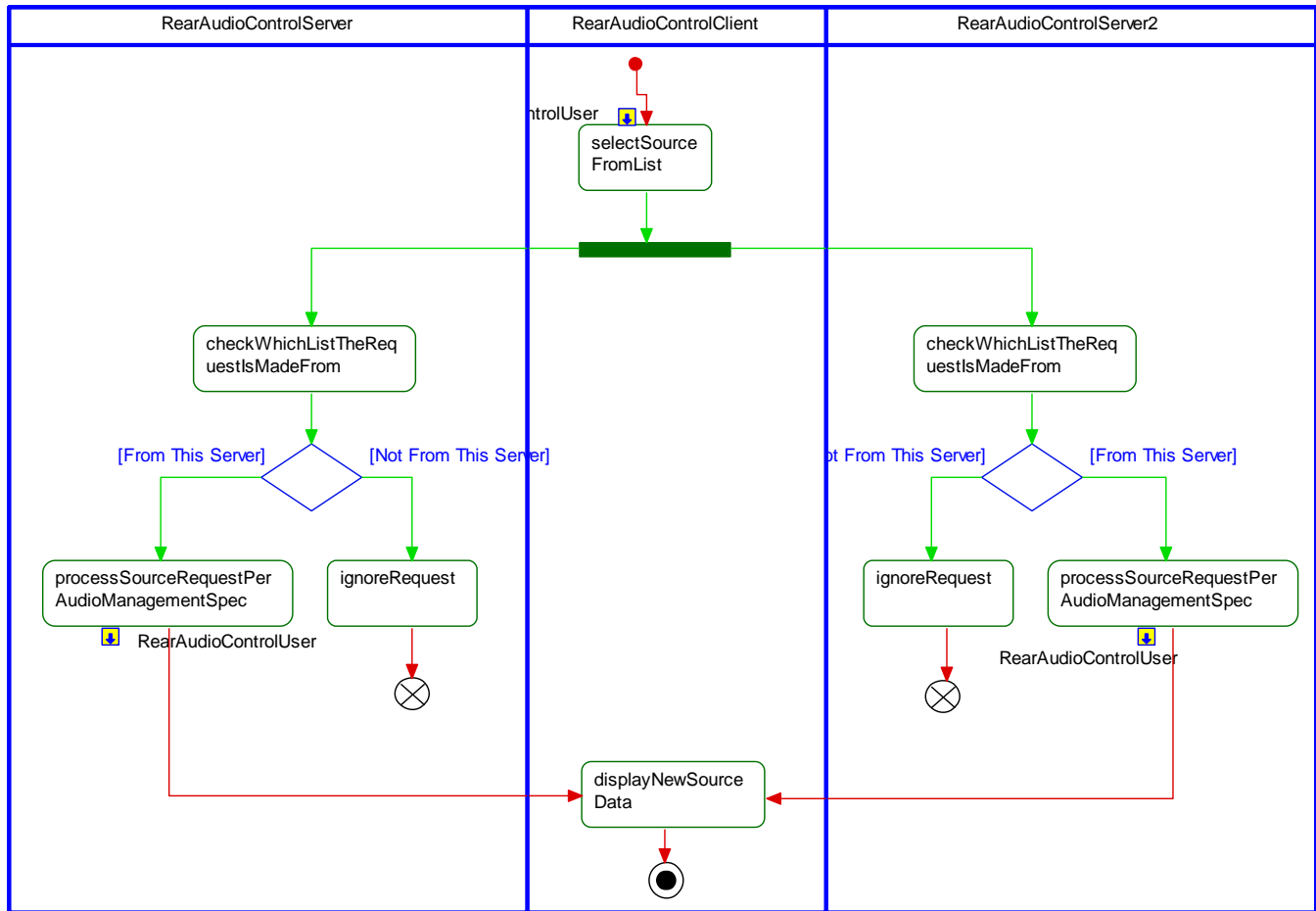
#### 3.8.3.1 Activity Diagrams

##### 3.8.3.1.1 RAC-ACT-REQ-245703/A-Rear Audio Control Request Source Lists





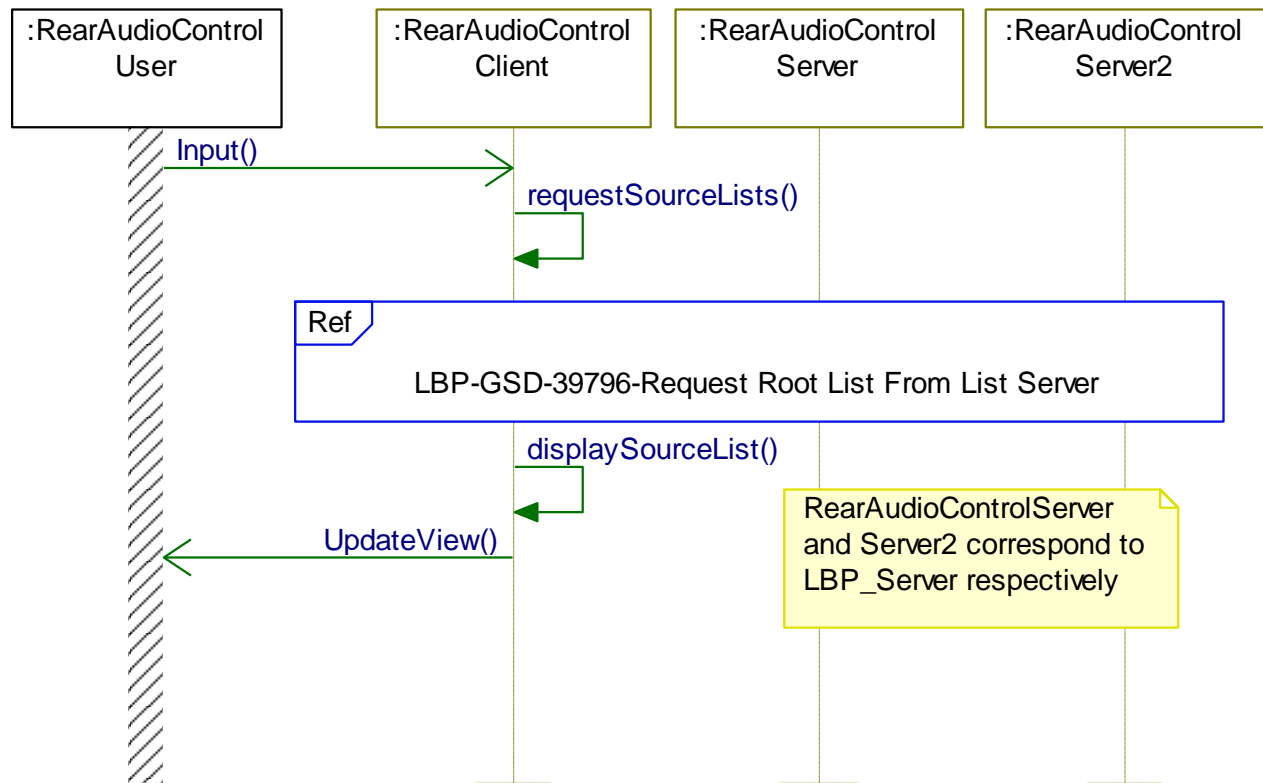
## 3.8.3.1.2 RAC-ACT-REQ-245385/A-Rear Audio Control Direct Source Selection





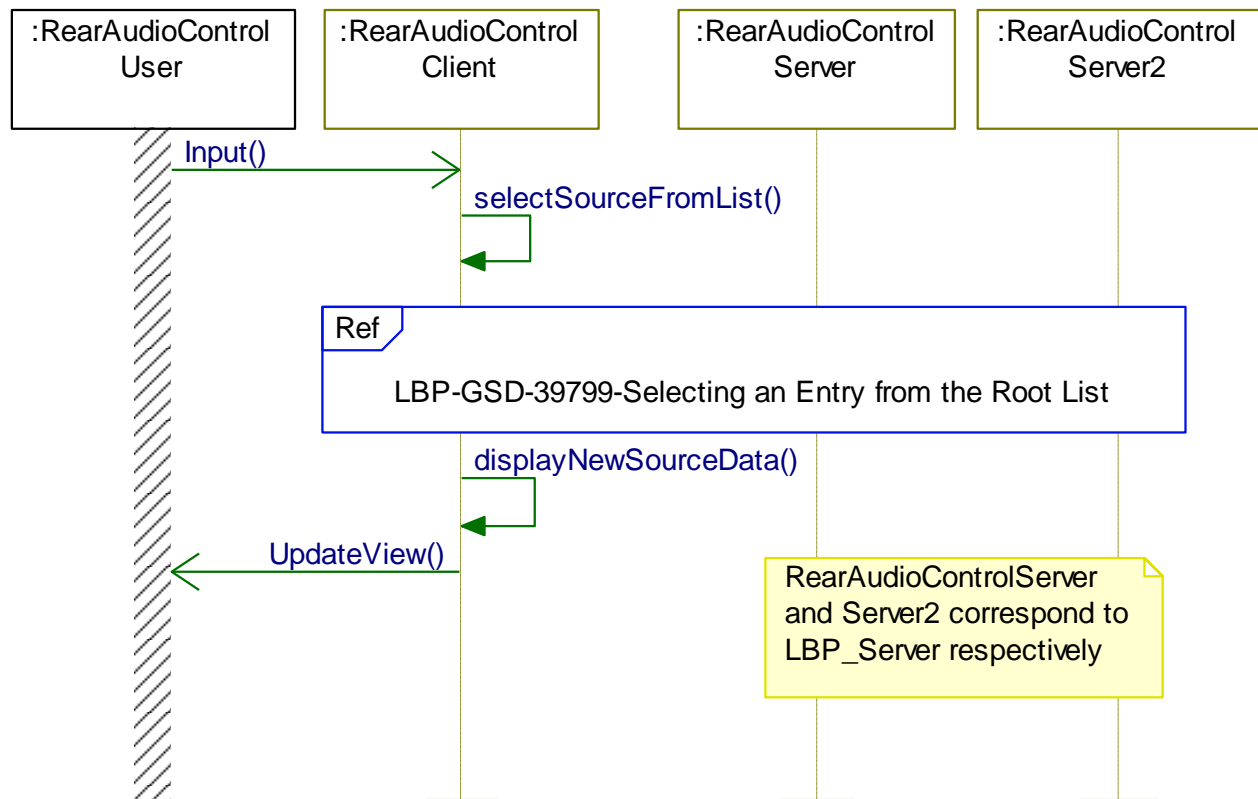
### 3.8.3.2 Sequence Diagrams

#### 3.8.3.2.1 RAC-SD-REQ-245384/A-Rear Audio Control Request Source Lists





### 3.8.3.2.2 RAC-SD-REQ-245383/A-Rear Audio Control Direct Source Selection



## 3.9 RAC-FUN-REQ-257547/A-Power On/Off

### 3.9.1 Use Cases

#### 3.9.1.1 RAC-UC-REQ-257548/A-On/Off Button Pressed

<b>Actors</b>	User
<b>Pre-conditions</b>	Bus Awake or Sleep
<b>Scenario Description</b>	The User has pressed the On/Off (Power) button.
<b>Post-conditions</b>	Rear Audio Control sends On/Off (Power) Button press to the Button Input Server see Rear EFP Power Button Press requirement in the Power Management section.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface

## 3.10 RAC-FUN-REQ-257549/A-Mute

### 3.10.1 Use Cases

#### 3.10.1.1 RAC-UC-REQ-257550/A-Mute Pressed

<b>Actors</b>	User
<b>Pre-conditions</b>	CAN Bus is active.
<b>Scenario Description</b>	The User has pressed the Mute button.



<b>Post-conditions</b>	Rear Audio Control sends Mute Button press to the Button Input Server.
<b>List of Exception Use Cases</b>	N/A
<b>Interfaces</b>	G-HMI, Vehicle System Interface



## 4 Appendix: Reference Documents

Reference #	Document Title
1	
2	
3	
4	
5	