Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – Rear Seat Controls Lockout

APIM Phoenix Domain Controller Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.1

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FORD CONFIDENTIAL

Revision History

Date	Version	Notes	
September 21, 2021	**1.0**	**Initial Release**	
January 28, 2022	**1.1**		
	STR-878445/B-Functional Definition		rpaquet2 - added Rear Audio Lockout and Rear Climate Lockout
	RSCL-UC-REQ-414466/B-User Requests to Activate Global Rear Seat Control Lockout		rpaquet2 - added the Rear Climate Lockout and Rear Audio Lockout
	RSCL-UC-REQ-414467/B-User Requests to Deactivate Global Rear Seat Control Lockout		rpaquet2 - added the Rear Climate Lockout and Rear Audio Lockout
	STR-889612/B-Requirements		rpaquet2 - added the Rear Climate Lockout Request Logic Req
	RSCL-REQ-414656/B-###R_FNC_RSCL_00046###Global RSCL Activation		rpaquet2 - added Rear Audio and rear Climate Lockout.
	RSCL-REQ-414657/B-###R_FNC_RSCL_00047### Global RSCL Deactivation		rpaquet2 - Added Rear Audio and Rear Climate lockout
	RSCL-REQ-465757/A-Rear Climate Control Lockout Request Logic		rpaquet2 - New
	RSCL-FUN-REQ-414471/A-Rear Audio Lockout		rpaquet2 - New
	STR-889614/A-Requirements		rpaquet2 - New
	RSCL-REQ-414474/A-Rear Audio Lockout Function		rpaquet2 - New
	RSCL-FUN-REQ-414481/A-Rear Climate Control Lockout		rpaquet2 - New
	STR-889647/A-Requirements		rpaquet2 - New
	RSCL-REQ-414482/A-Rear Climate Control Lockout Function		rpaquet2 - New

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1 Architectural Design

1.1 Overview

The new Rear Seat Controls Lockout feature shall enable removal of the physical lockout buttons from the driver door switch pack and allow the customer to engage / disengage the controls listed below using Center Stack HMI. The Center Stack HMI would allow the rear seat controls to be either locked / unlocked individually or all at once (globally). The list of rear seat controls contained in this feature is as follows:

- Rear door inner handles
- Rear window switches
- Rear audio controls through rear control panel and/or URC
- Rear climate controls through rear control panel and/or URC

NOTE: Global Rear Seat Controls Lockout will always engage / disengage all RSCL features together.

1.2 RSCL-CLD-REQ-411535/A-RSCL Client

The Rear Seat Control Lockout Client is responsible for providing the user and interface to request a change to the lockout state of the defined functions in this SPSS. The RSCL Client shall also provide the status of the lockout state of the defined functions in this SPSS.

1.3 RSCL-CLD-REQ-411536/A-RSCL Server 1

The Rear Seat Control Lockout Server 1 is responsible for processing the requests from the RSCL Client. The RSCL Server 1 will provide the request to door lock modules based on inputs received from other functions in conjuction with the request from the RSCL Client. The RSCL Server 1 will report back to the RSCL Client the state of the Power Child Lockout.

1.4 RSCL-CLD-REQ-414628/A-RSCL Server 2

The Rear Seat Control Lockout Server 2 will lock or unlock the rear windows and provide the current state of the driver and passenger rear window locks.

1.5 RSCL-CLD-REQ-439801/A-RSCL Server 3

The Rear Seat Control Lockout Server 3 will lock or unlock the RACM/RSEM when requested to do so by the Rear Seat Control Client.

1.6 Physical Mapping of Classes

The table below shows how the logical classes that make up the Rear Seat Controls Lockout feature may be mapped into physical modules.

Logical Class	Physical Module (ECU)
RSCL Client	APIM
RSCL Server 1	BCM
RSCL Server 2	DDM/DCU
RSCL Server 3	RACM

1.7 Logical Signal Mapping

Each logical name used in this document is mapped to its corresponding CAN signal. Please refer to the following mapping:

Logical name	CAN signal name
WindowControlLockout_Rq	WndwChildLckPw_B_RqMnu
DoorPowerChildLockout_Rq	DrChildLckPw_No_RqMnu
PowerChildLockoutCrc_Rq	Mnu_No_Crc
PowerChildLockoutCnt_Rq	Mnu_No_Cnt
RearMenuControlLock_Rq	RearMnuCtlLck_B_Rq
DoorPowerChildLockout_St	ChildLck_D_Dsply
PowerChildLockoutCrc_St	CanMsg3A4_No_Crc
PowerChildLockoutCnt_St	CanMsg3A4_No_Cnt
DrWindowChildLock_St	WndwChildLckPw_B_Stat
RearMenuControlLock_St	RearMnuCtlLck_B_Stat

1.8 IIR-REQ-411539/A-RSCL Client _Tx

1.8.1 MD-REQ-411540/A-WindowControlLockout_Rq

Message Type: Request

The signal is used to request the rear windows be locked or unlocked from the rear user.

Name	Literals	Value	Description
Type	-	-	
	Unlock	0x0	
	Lock	0x1	

1.8.2 MD-REQ-414639/A-DoorPowerChildLockout_Rq

Message Type: Request

The signal is used to request activation or deactivation of Door Power Child Lockout.

Name	Literals	Value	Description
Type	-	-	
	Transmitter Reset	0x0	
	Lock	0x1	
	Unlock	0x2	
	Lock	0x3	
	Unlock	0x4	
	Lock	0x5	
	Unlock	0x6	
	Not Used	0x7	

1.8.3 MD-REQ-433624/A-PowerChildLockoutCrc_Rq

Message Type: Request

Cyclic Redundancy Check (CRC) based on Polynomial 0x1D of CRC-8-SAE J1850 is specified for Profile 1. Autosar Profile 1A.

Name	Literals	Value	Description
Type	-	-	
	0	0x0	
	…	…	
	254	0xFF	

1.8.4 MD-REQ-433625/A-PowerChildLockoutCnt_Rq

Message Type: Request

Implements a Counter mechanism that is incremented every Send request and explicitly sent. Autosar Profile 1A

Name	Literals	Value	Description
Type	-	-	
	0	0x0	
	…	…	
	15	0xF	

1.8.5 MD-REQ-439802/A-RearMenuControlLock_Rq

Message Type: Request

Signal used to Lock or Unlock RACM functionality.

Name	Literals	Value	Description
Type	-	-	
	Unlock	0x0	
	Lock	0x1	

1.9 IIR-REQ-411537/A-RSCL Client _Rx

1.9.1 MD-REQ-411538/A-DrWindowChildLock_St

Message Type: Status

The signal indicates the Window Control Lockout state.

Name	Literals	Value	Description
Type	-	-	
	Unlocked	0x0	
	Locked	0x1	

1.9.2 MD-REQ-414640/A-DoorPowerChildLockout_St

Message Type: Status

Indicates the status of requested child lock operation for display/indication.

Name	Literals	Value	Description
Type	-	-	
	Child_Lock	0x0	
	Child_UnLock	0x1	
	Error	0x2	
	Not Supported	0x3	

1.9.3 MD-REQ-433627/A-PowerChildLockoutCrc_St

Message Type: Status

Cyclic Redundancy Check (CRC) for E2E

Name	Literals	Value	Description
Type	-	-	
	0	0x0	
	…	…	
	254	0xFF	

1.9.4 MD-REQ-433628/A-PowerChildLockoutCnt_St

Message Type: Status

Counter signal for E2E protection.

Name	Literals	Value	Description
Type	-	-	
	0	0x0	
	…	…	
	15	0xF	

1.9.5 MD-REQ-439803/A-RearMenuControlLock_St

Message Type: Request

Signal used to indicate the lockout state of the RACM.

Name	Literals	Value	Description
Type	-	-	
	Unlocked	0x0	
	Locked	0x1	

2 General Requirements

2.1 RSCL-REQ-414643/A-###R_FNC_RSCL_00004### HMI individual settings screen

RSCL Client shall provide menu options to activate / deactivate:
- PCL (if supported) individually
- WCL (if supported) individually
- RAL (if supported) individually
- RCL (if supported) individually
- RACM (if supported) individually

All above functions (as supported) globally

2.2 RSCL-REQ-414647/A-###R_FNC_RSCL_00003### HMI global settings screen

RSCL Client shall allow to access the RSCL feature menu in at most 2 steps (i.e., 2 actions) – starting from any HMI state.

2.3 RSCL-REQ-414648/A-###R_FNC_RSCL_00007### RSCL Status Indicators

RSCL Client shall provide visual status indicators to the user to indicate activation state of
- PCL (if supported)
- WCL (if supported)
- RAL (if supported)
- RCL (if supported)
- RACM (if supported)
- RSCL globally

based on RSCL HMI stat

2.4 RSCL-REQ-414649/A-###R_FNC_RSCL_00001### RSCL disable

If RSCL Client reads configuration parameter RSCL_enable=off it shall go to state RSCL disable. All outgoing request signals shall be set to deactivated.
Signal RSCL HMI stat shall be set to disabled.

2.5 RSCL-REQ-414650/A-###R_FNC_RSCL_00002### RSCL enable

If RSCL Client reads configuration parameter RSCL_enable=on it shall go to state RSCL enable. All outgoing request signals shall be set to deactivated.
Signal RSCL HMI stat and RSCL Voice stat shall be set to show feature status.

2.6 RSCL-REQ-414651/A-###R_FNC_RSCL_00050### Vehicle configuration

If RSCL_enable = on RSCL Client shall read RSCL_content to request the proper HMI interface.

2.7 RSCL-REQ-414652/A-###R_FNC_RSCL_00039### Reset

After reset RSCL Client shall start with last memorized state of output signals. If no memorized state is available RSCL Client shall start with all signals set to deactivate.

2.8 RSCL-REQ-414653/A-###R_FNC_RSCL_00049### Engine restart

At each ignition on, RSCL Client shall start with the last memorized state of output signals. RSCL Client will memorize the last state of the feature settings.

2.9 RSCL-REQ-414654/A-###R_FNC_RSCL_00045### Delayed accessory timer

RSCL Client shall allow the user to change settings until Delayed Accessory timer times out or driver opens the driver door.

Settings for locking of rear climate control will not be available as soon as ignition is off.

2.10 RSCL-REQ-414655/A-###R_FNC_RSCL_00028### RSCL Feature Status feedback

RSCL Client shall read all incoming status signals and update HMI accordingly.

3 Functional Definition

3.1 RSCL-FUN-REQ-411541/A-Power Child Lockout

3.1.1 Use Cases

3.1.1.1 RSCL-UC-REQ-411543/A-User Requests to Activate Power Child Locks

Actors	User
Pre-conditions	The vehicle is in accessory mode or above (BEV: ready to drive mode) RSCL Client is booted (up to 30s after first wake-up trigger) Centerstack HMI is active. Rear Seat Controls Lockout feature is set in the last state before RSCL Client was shut off.
Scenario Description	The user has selected to activate Power Child Locks
Post-conditions	Power Child Locks are activated and the rear passengers cannot open the rear doors with the rear inner door handles.
List of Exception Use Cases	
Interfaces	CAN, HMI

3.1.1.2 RSCL-UC-REQ-414046/A-User Requests to Deactivate Power Child Locks

Actors	User
Pre-conditions	The vehicle is in accessory mode or above (BEV: ready to drive mode) RSCL Client is booted (up to 30s after first wake-up trigger) Centerstack HMI is active. Rear Seat Controls Lockout feature is set in the last state before RSCL Client was shut off.
Scenario Description	The user has selected to deactivate Power Child Locks
Post-conditions	Power Child Locks are deactivated and the rear passengers are allowed to open the rear doors with the rear inner door handles.
List of Exception Use Cases	
Interfaces	CAN, HMI

3.1.2 Requirements

3.1.2.1 RSCL-REQ-414644/A-###R_FNC_RSCL_00006### PCL activation/deactivation feedback

If PCL is supported RSCL Client shall support a visual PCL confirmation within tbd msec when user locks / unlocks PCL with RSCL HMI stat.

3.1.2.2 RSCL-REQ-414645/A-###R_FNC_RSCL_00008### User Notification for manual PCL

If “Manual PCL” is supported only, RSCL content = PCLoff, RSCL Client shall provide visual information to the user that PCL needs to be enabled/disabled manually.

3.1.2.3 RSCL-REQ-414646/A-###R_FNC_RSCL_00017### HMI Error Indication

If an error is detected (refer to signal:RSCL PCL stat), RSCL Client shall indicate an error to the user with a service notification.

3.1.2.4 RSCL-REQ-414659/A-###R_FNC_RSCL_00041### PowerChildLockout_Rq Lock / Unlock

If DoorPowerChildLockout_St is deactivated and RSCL Client receives input for PowerChildLockout as activate or a Global request to lock all, then RSCL Client shall set DoorPowerChildLockout_Rq = Lock.
If DoorPowerChildLockout_St is activated and RSCL Client receives input for PowerChildLockout as deactivate or a Global request to unlock all, then RSCL Client shall set DoorPowerChildLockout_Rq = Unlock.

3.1.2.5 RSCL-REQ-414661/A-###R_FNC_RSCL_00048### PCL Error

If RSCL Client reads DoorPowerChildLockout_St = error it shall indicate an error in the HMI.

3.1.2.6 RSCL-REQ-434029/A-PCL Signal Usage

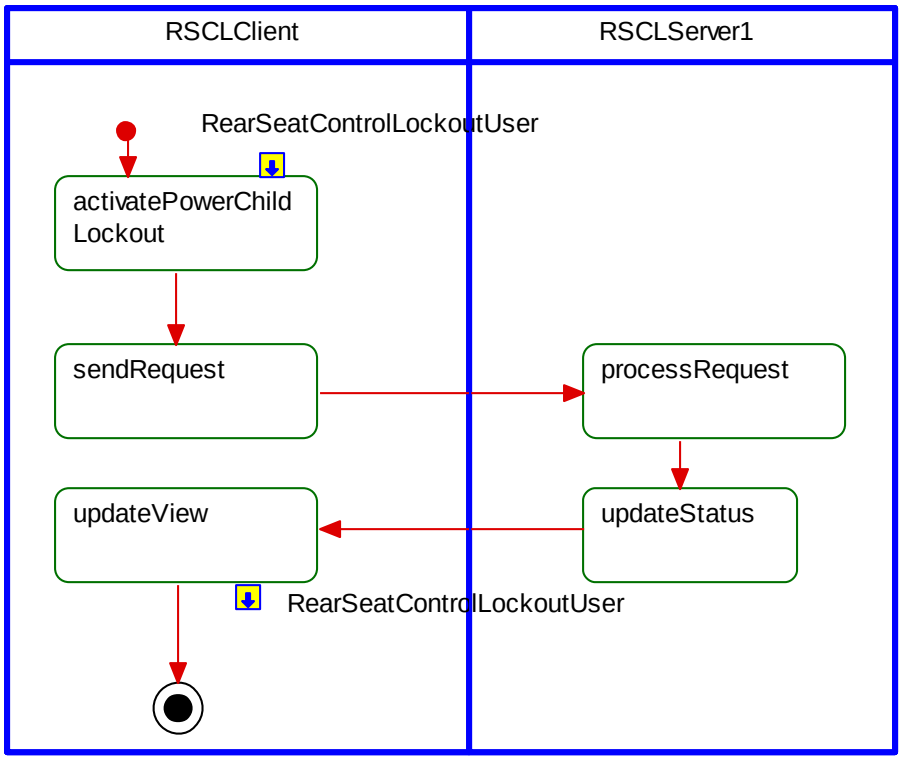
Transmittter (RSCL Client) will retain the previous value unless a new event occurs, including through sleep/wake cycles Transmitter (RSCL Client) to default to zero on ECU reset.

Receiver will monitor for lost message when ignition = RUN. When message is determined to be lost, the receiver will wait for the first new message to be received and resync to the latest received value without performing an action.
Receiver will monitor for value of zero. If zero is received the receiver will resync to the zero value without performing an action.

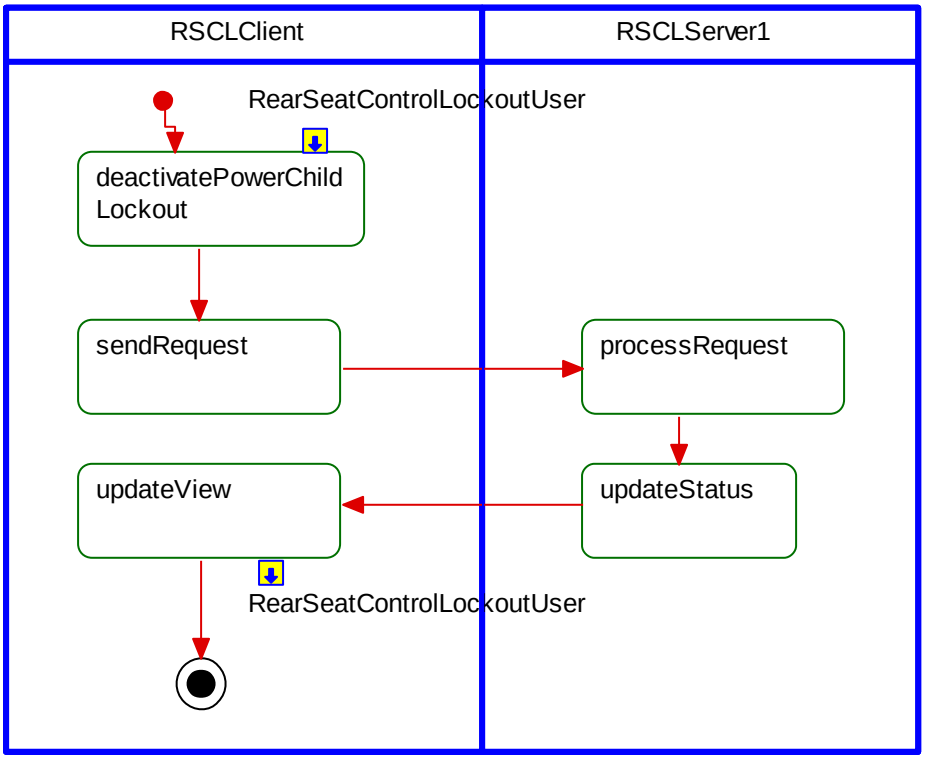
3.1.3 White Box View

3.1.3.1 Activity Diagrams

3.1.3.1.1 RSCL-ACT-REQ-414537/A-Power Child Lockout Activated

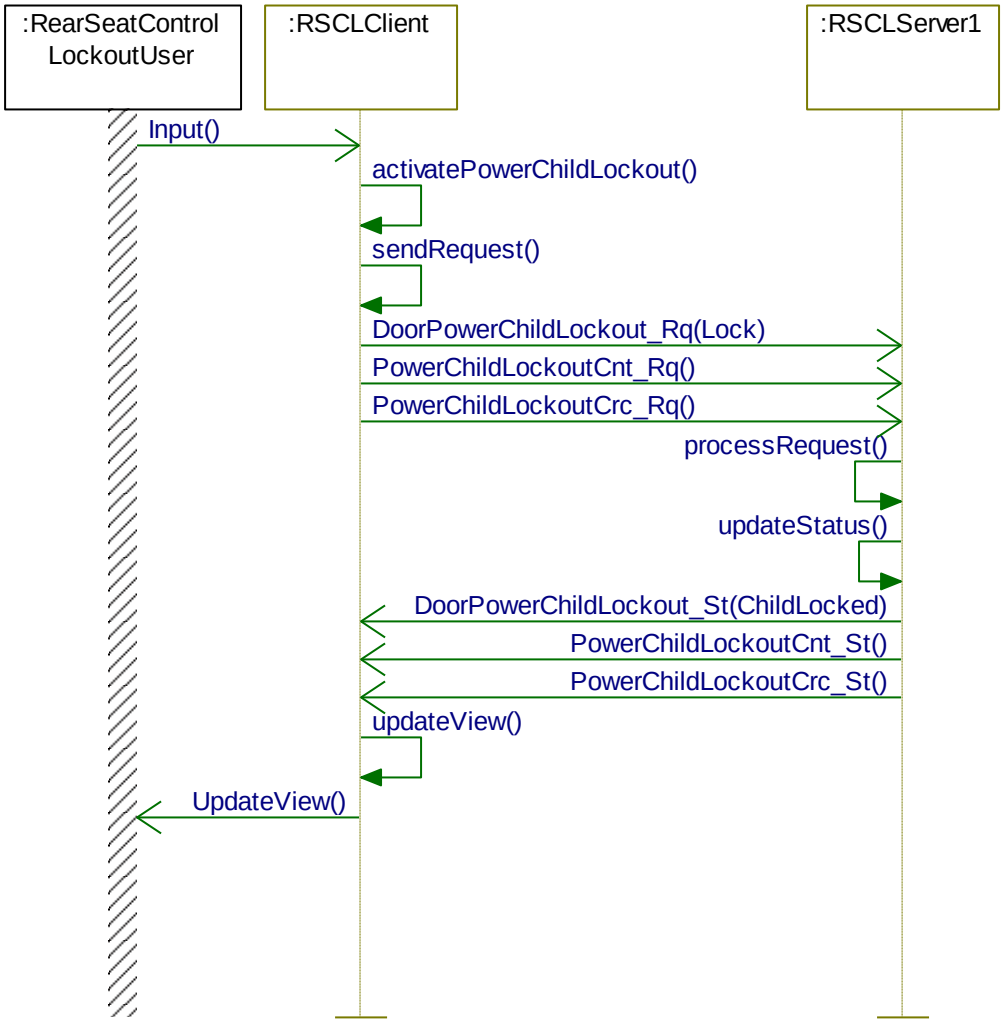


3.1.3.1.2 RSCL-ACT-REQ-414540/A-Power Child Lockout Deactivated

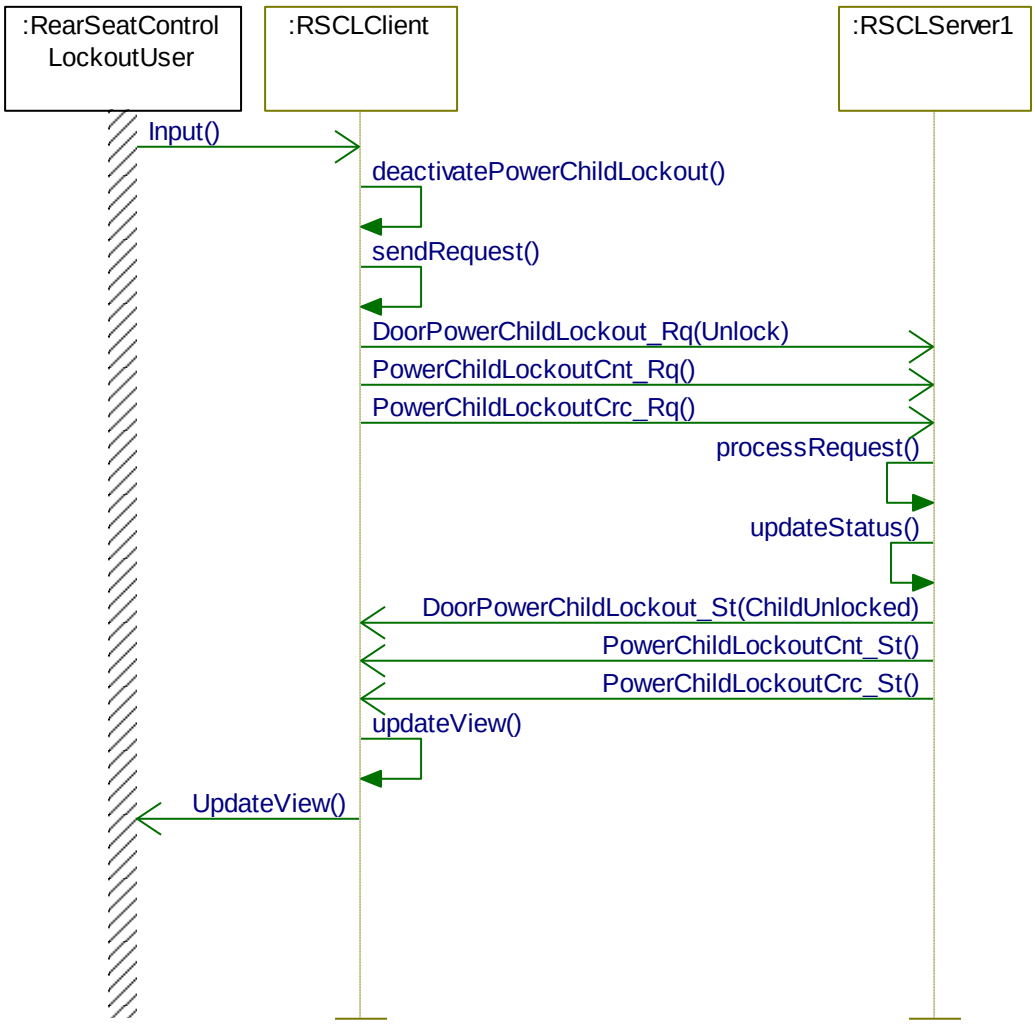


3.1.3.2 Sequence Diagrams

3.1.3.2.1 RSCL-SD-REQ-414538/A-Activate Power Child Lockout



3.1.3.2.2 RSCL-SD-REQ-414541/A-Deactivate Power Child Lockout



3.2 RSCL-FUN-REQ-411544/A-Window Control Lockout

3.2.1 Use Cases

3.2.1.1 RSCL-UC-REQ-411545/A-User Activates Rear Window Control Lock

Actors	User
Pre-conditions	The vehicle is in accessory mode or above (BEV: ready to drive mode) RSCL Client is booted (up to 30s after first wake-up trigger) HMI is active. Rear Seat Controls Lockout feature is set in the last state before RSCL Client was shut off.
Scenario Description	The user has selected to Activate the rear Window Controls Lockout
Post-conditions	The rear windows are lockout and the rear passengers cannot change the rear window position with the rear window switches or any linked mobile device

List of Exception Use Cases	
Interfaces	CAN, HMI

3.2.1.2 RSCL-UC-REQ-414464/A-User Deactivates Rear Window Control Lock

Actors	User
Pre-conditions	The vehicle is in accessory mode or above (BEV: ready to drive mode) RSCL Client is booted (up to 30s after first wake-up trigger) HMI is active. Rear Seat Controls Lockout feature is set in the last state before RSCL Client was shut off.
Scenario Description	The user has selected to deactivate rear Window Controls Lockout
Post-conditions	The rear windows are unlocked and the rear passengers is allowed to change the rear window position with the rear window switches or any linked mobile device
List of Exception Use Cases	
Interfaces	CAN, HMI

3.2.2 Requirements

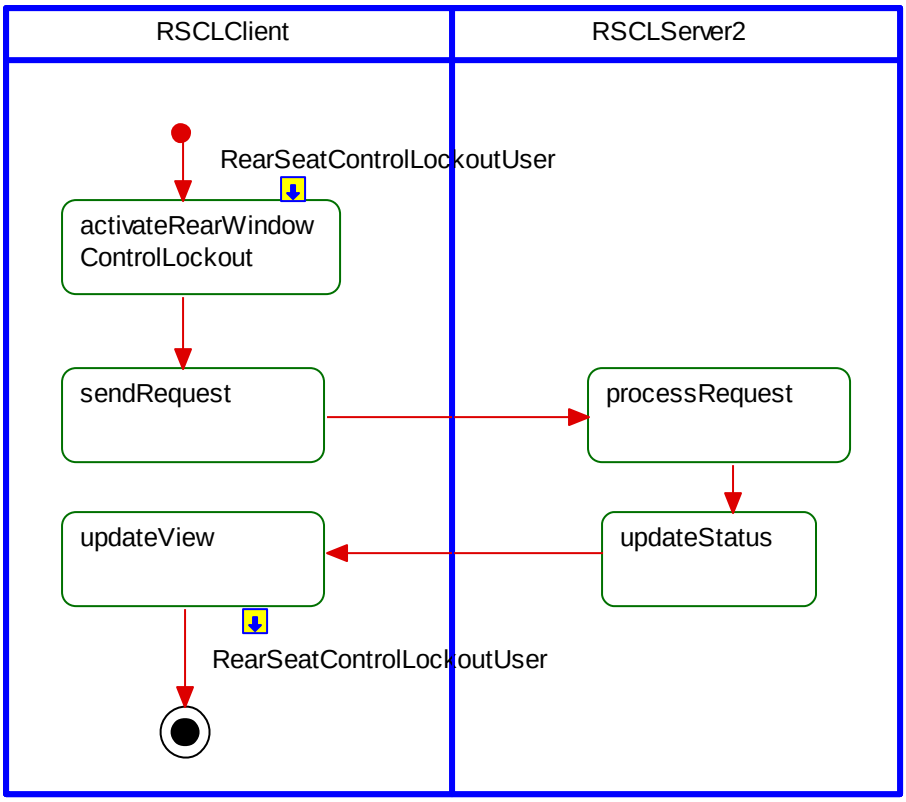
3.2.2.1 RSCL-REQ-414658/A-###R_FNC_RSCL_00040### WindowControlLockout_Rq Activation / Deactivation

If WindowControlLockout_St is unlocked (deactivated) and RSCL Client receives input for WindowControlLockout as lock or a Global request to lock all, then RSCL Client shall set WindowControlLockout_Rq = lock.
If WindowControlLockout_St is locked (activated) and RSCL Client receives input for WindowControlLockout as unlock or a Global request to unlock all, then RSCL Client shall set WindowControlLockout_Rq = unlock.

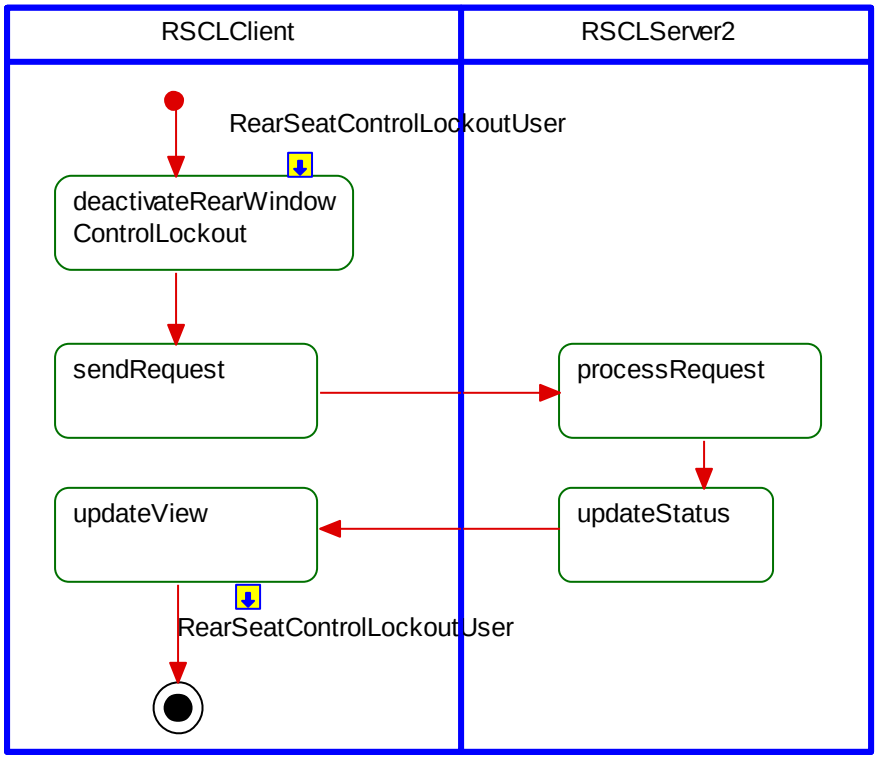
3.2.3 White Box View

3.2.3.1 Activity Diagrams

3.2.3.1.1 RSCL-ACT-REQ-414543/A-Window Control Lockout Activated

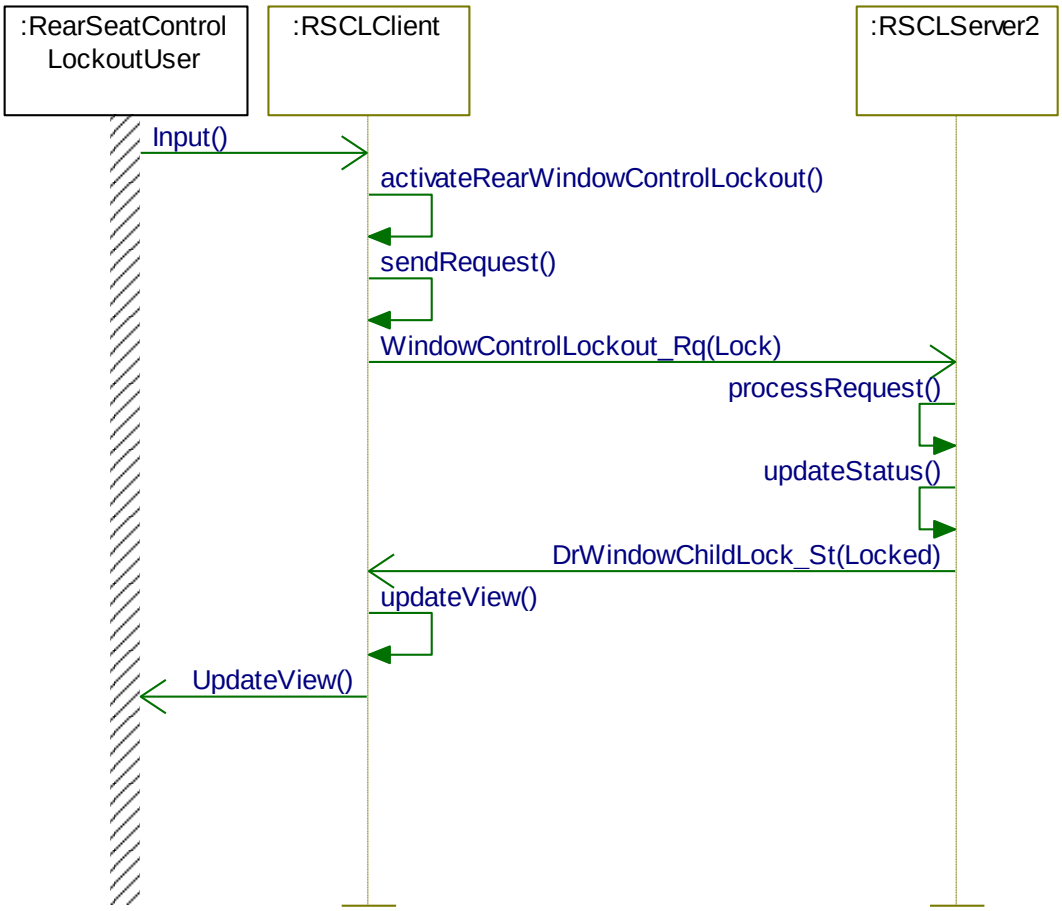


3.2.3.1.2 RSCL-ACT-REQ-414544/A-Window Control Lockout Deactivated

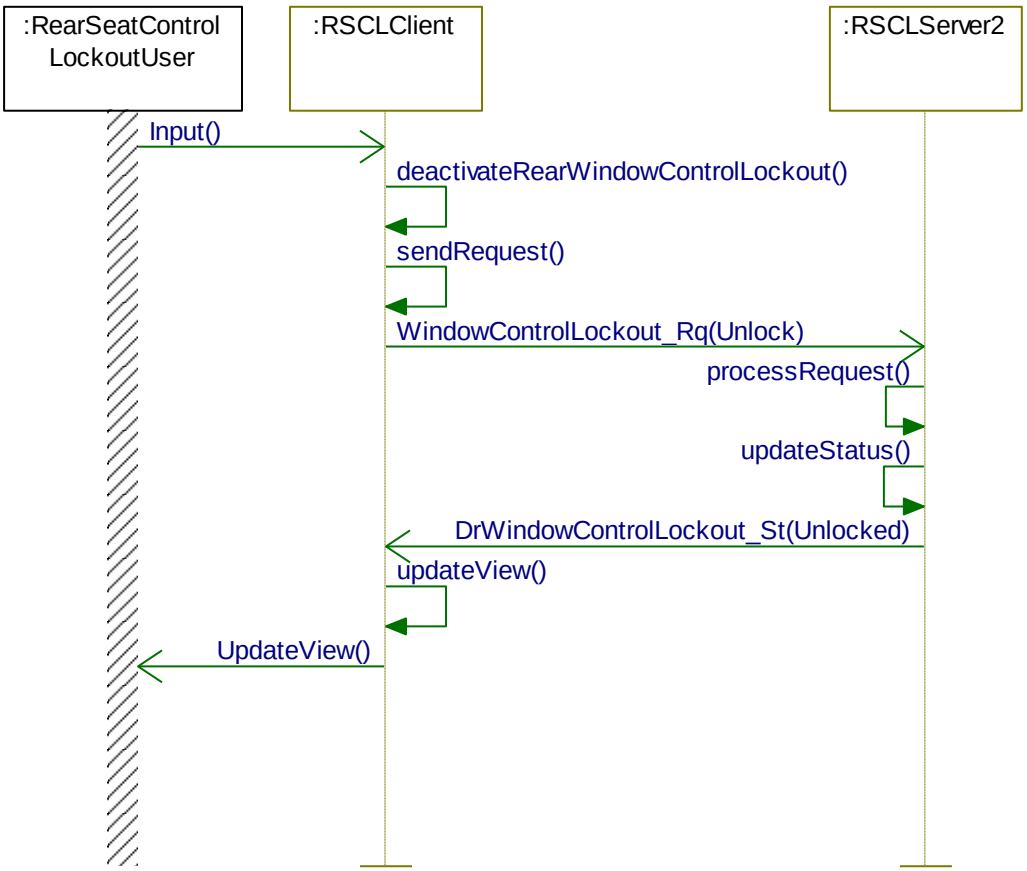


3.2.3.2 Sequence Diagrams

3.2.3.2.1 RSCL-SD-REQ-414545/A-Activate Window Control Lockout



3.2.3.2.2 RSCL-SD-REQ-414546/A-Deactivate Window Control Lockout



3.3 RSCL-FUN-REQ-414465/A-Global Activation or Deactivation of Rear Seat Control Lockout

3.3.1 Use Cases

3.3.1.1 RSCL-UC-REQ-414466/B-User Requests to Activate Global Rear Seat Control Lockout

Actors	User
Pre-conditions	The vehicle is in accessory mode or above (BEV: ready to drive mode) RSCL Client is booted (up to 30s after first wake-up trigger) Centerstack HMI is active. Rear Seat Controls Lockout feature is set in the last state before RSCL Client was shut off. HMI indicates to driver PCL status by permanently visible sign when activated
Scenario Description	The user has selected to activate the Global Rear Seat Controls Lockout
Post-conditions	Power Child Locks are activated and the rear passengers cannot open the rear doors with the rear inner door handles. The rear windows are lockout and the rear passengers cannot change the rear window position with the rear window switches or any linked mobile device RACM Lockout is activated so rear passenger cannot change vehicle controls from the rear. Rear Audio Lockout is activated Rear Climate Lockout is activated

	Note: functions that are not implemented will not be part of the post condition
List of Exception Use Cases	
Interfaces	CAN, HMI

3.3.1.2 RSCL-UC-REQ-414467/B-User Requests to Deactivate Global Rear Seat Control Lockout

Actors	User
Pre-conditions	The vehicle is in accessory mode or above (BEV: ready to drive mode) RSCL Client is booted (up to 30s after first wake-up trigger) Centerstack HMI is active. Rear Seat Controls Lockout feature is set in the last state before RSCL Client was shut off. HMI indicates to driver PCL status by permanently visible sign when activated
Scenario Description	The user has selected to deactivate the Global Rear Seat Controls Lockout
Post-conditions	Power Child Locks are deactivated and the rear passengers is allowed to open the rear doors with the rear inner door handles. The rear windows are unlocked and the rear passenger is allowed to change the rear window position with the rear window switches or any linked mobile device RACM Lockout is deactivated so rear passenger is able to change vehicle controls from the rear. Rear Audio Lockout is deactivated Rear Climate Lockout is deactivated Note: functions that are not implemented will not be part of the post condition
List of Exception Use Cases	
Interfaces	CAN, HMI

3.3.2 Requirements

3.3.2.1 RSCL-REQ-414656/B-###R_FNC_RSCL_00046###Global RSCL Activation

If RSCL Client is requested to do a Global lock all, it shall send

DoorPowerChildLockout_Rq = Lock, PowerChildLockoutCrc_Rq and PowerChildLockoutCnt_Rq signals
AND
Request signal defined in Rear Audio Lockout in the RAC SPSS
AND
Rear Climate Control Lockout as defined in the Climate Control spec
AND
RearMenuControlLock_Rq = Lock
AND
WindowControlLockout_Rq = Lock

See individual functions for detailed signal interactions.

Note: Please check the implementation guide to see which functions have been marked to be implement. If marked no then the signals associated to the function would not be sent.

3.3.2.2 RSCL-REQ-414657/B-###R_FNC_RSCL_00047### Global RSCL Deactivation

If RSCL Client is requested to do a Global Unlock all, it shall send

DoorPowerChildLockout_Rq = Unlock, PowerChildLockoutCrc_Rq and PowerChildLockoutCnt_Rq signals
AND
Request signal defined in Rear Audio Lockout in the RAC SPSS
AND
Rear Climate Control Lockout as defined in the Climate Control spec
AND
RearMenuControlLock_Rq = Unlock
AND
WindowControlLockout_Rq = Unlock

See individual functions for detailed signal interactions.

Note: Please check the implementation guide to see which functions have been marked to be implement. If marked no then the signals associated to the function would not be sent.

3.3.2.3 RSCL-REQ-465757/A-Rear Climate Control Lockout Request Logic

When All Lock is selected the RSCL Server shall monitor the Rear Climate (status) and decide if the (Rear Lock button press signal should be transmitted per) the Rear Climate (SPSS).

If Rear Climate (status) indicates that Rear Climate is already locked out then no action shall be taken by the RSCL Server.

If Rear Climate (status) indicates that Rear Climate is not locked out then the RSCL Server shall follow the Rear Climate SPSS and (transmit the Rear Lock button press signal to) request the lock out.

When All Unlock is selected the RSCL Server shall monitor the Rear Climate (status) and decide if the (Rear Lock button press signal should be transmitted per) the Rear Climate (SPSS).

If Rear Climate (status) indicates that Rear Climate is already locked out then the RSCL Server shall follow the Rear Climate SPSS and (transmit the Rear Lock button press signal to) to unlock Rear Climate.

If Rear Climate (status) indicates that Rear Climate is not locked out then no action shall be taken by the RSCL Server.

3.4 RSCL-FUN-REQ-414471/A-Rear Audio Lockout

3.4.1 Requirements

3.4.1.1 RSCL-REQ-414474/A-Rear Audio Lockout Function

The Rear Audio Lockout will follow the function RAC-FUN-213329-Rear Audio Control Lock-Out found in the Rear Audio Control APIM SPSS. All interactions and interfaces will be found in the Rear Audio Control APIM SPSS.

3.5 RSCL-FUN-REQ-414481/A-Rear Climate Control Lockout

3.5.1 Requirements

3.5.1.1 RSCL-REQ-414482/A-Rear Climate Control Lockout Function

The Rear Climate Lockout will follow the Climate Control Interface specification implemented by the APIM. All interactions and interfaces will be found in the Climate Control Interface Spec.

3.5.1.2 RSCL-REQ-465757/A-Rear Climate Control Lockout Request Logic

When All Lock is selected the RSCL Server shall monitor the Rear Climate (status) and decide if the (Rear Lock button press signal should be transmitted per) the Rear Climate (SPSS).

If Rear Climate (status) indicates that Rear Climate is already locked out then no action shall be taken by the RSCL Server.

If Rear Climate (status) indicates that Rear Climate is not locked out then the RSCL Server shall follow the Rear Climate SPSS and (transmit the Rear Lock button press signal to) request the lock out.

When All Unlock is selected the RSCL Server shall monitor the Rear Climate (status) and decide if the (Rear Lock button press signal should be transmitted per) the Rear Climate (SPSS).

If Rear Climate (status) indicates that Rear Climate is already locked out then the RSCL Server shall follow the Rear Climate SPSS and (transmit the Rear Lock button press signal to) to unlock Rear Climate.

If Rear Climate (status) indicates that Rear Climate is not locked out then no action shall be taken by the RSCL Server.

3.6 RSCL-FUN-REQ-425237/A-RACM Lockout

3.6.1 Use Cases

3.6.1.1 RSCL-UC-REQ-439807/A-Entering RACM Lock-Out

Actors	Vehicle Occupant
Pre-conditions	Rear infotainment controls and HMI are not locked out Infotainment System is On (HMIMode = On)
Scenario Description	The front user locks out RACM.
Post-conditions	The RACM is locked out. See HMI specs for Rear Lockout indications.
Notes	
Interfaces	G-HMI, Vehicle Interface

3.6.1.2 RSCL-UC-REQ-439808/A-Exiting RACM Lock-Out

Actors	Vehicle Occupant
Pre-conditions	Rear infotainment controls and HMI are locked out Infotainment System is On (HMIMode = On)
Scenario Description	The front user unlocks RACM.
Post-conditions	The RACM is no longer locked out.

Notes	
Interfaces	G-HMI, Vehicle Interface

3.6.2 Requirements

3.6.2.1 RSCL-REQ-425238/A-RACM Lockout Inhibited Features

The RSCL Server 3 shall inhibit the use of features in their module when ever RearMenuControlLock_St is set to Lock.

List of features to Inhibit are the following:

- Climate
- Audio
- Seat Heat/Vent
- Pie Plate interaction for Seat features – MCS (Massage, Lumbar) + Calf raise, Chauffeur switch
- Lincoln Embrace (Welcome Farewell)
- Ambient Lighting
- PDLC Skylight
- My Seat Space
- Settings (to control screen brightness (dimming), calm screen, theme (day/night) along with Auto feature.

3.6.2.2 RSCL-SR-REQ-439998/A-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:
  1. The rear user is pressing Button X with the ButtonANameID = ButtonX and ButtonAActivationState = Pressed
  2. A rear infotainment lockout event occurs before the user releases ButtonX
  3. The REFP sends "ButtonANameID = ButtonX" AND "ButtonAActivationState = 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.

3.6.2.3 RSCL-SR-REQ-439999/A-Lock-Out of RACM

The RSCL Server 3 shall default the Lockout state to Unlocked. Upon battery connect the RSCL Server 3 shall report Unlocked in the RearMenuControlLock_St.

The RSCL Server 3 shall maintain the Lockout state through ignition cycles, powermode cycles (example: HMIAudioMode →On →Off→On), and bus sleep/wakeup cycles.

RearMenuControlLock_St shall represent the state of the RSCL Server 3 and shall update based on the User input received via the RearMenuControlLock_Rq.

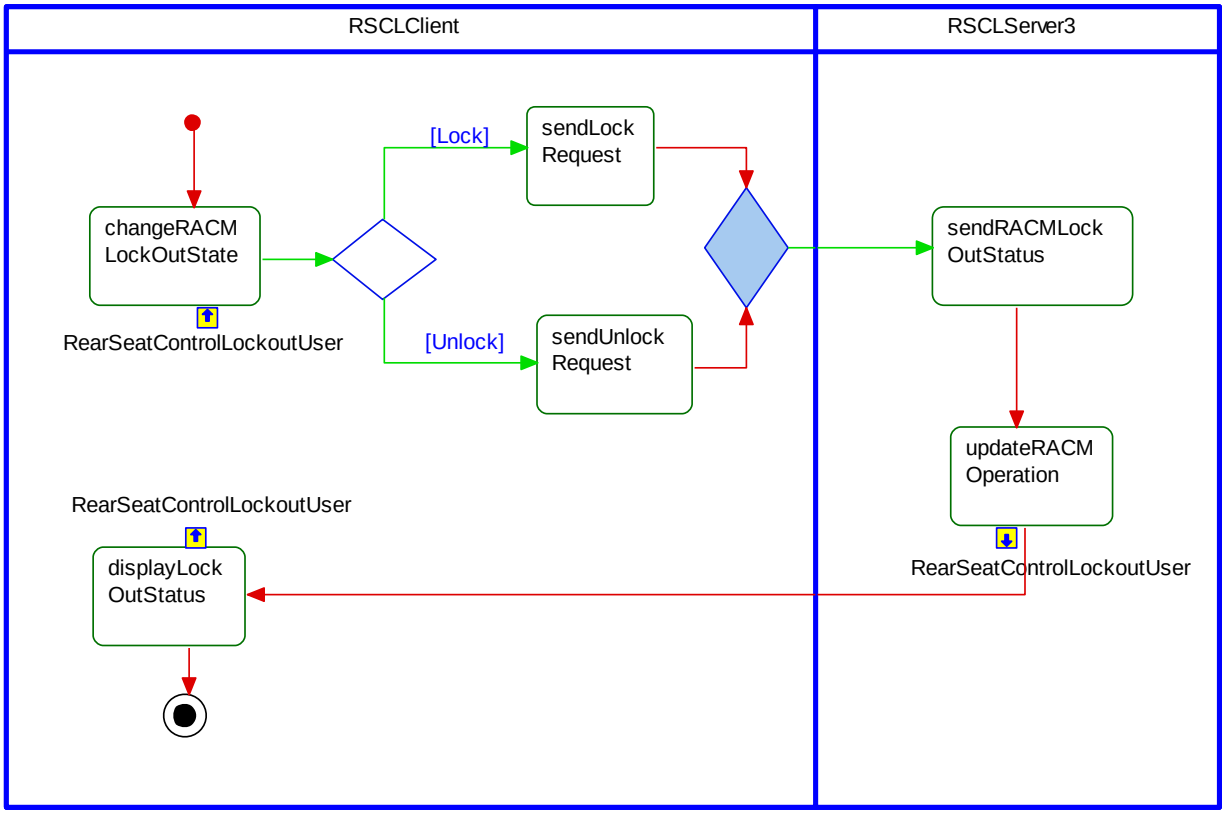
The RSCL Client upon receiving the lockout button press via CAN or LIN or internal soft button shall send the appropriate RearMenuControlLock_Rq to the RSCL Server 3. RSCL Client shall monitor the RearMenuControlLock_St to determine the appropriate RearMenuControlLock_Rq to send (example: RearMenuControlLock_St = Unlocked then request is RearMenuControlLock_Rq = Lock).

The Rear Audio Control Lockout Client shall update its HMI based on the RearMenuControlLock_St signal.

3.6.3 White Box View

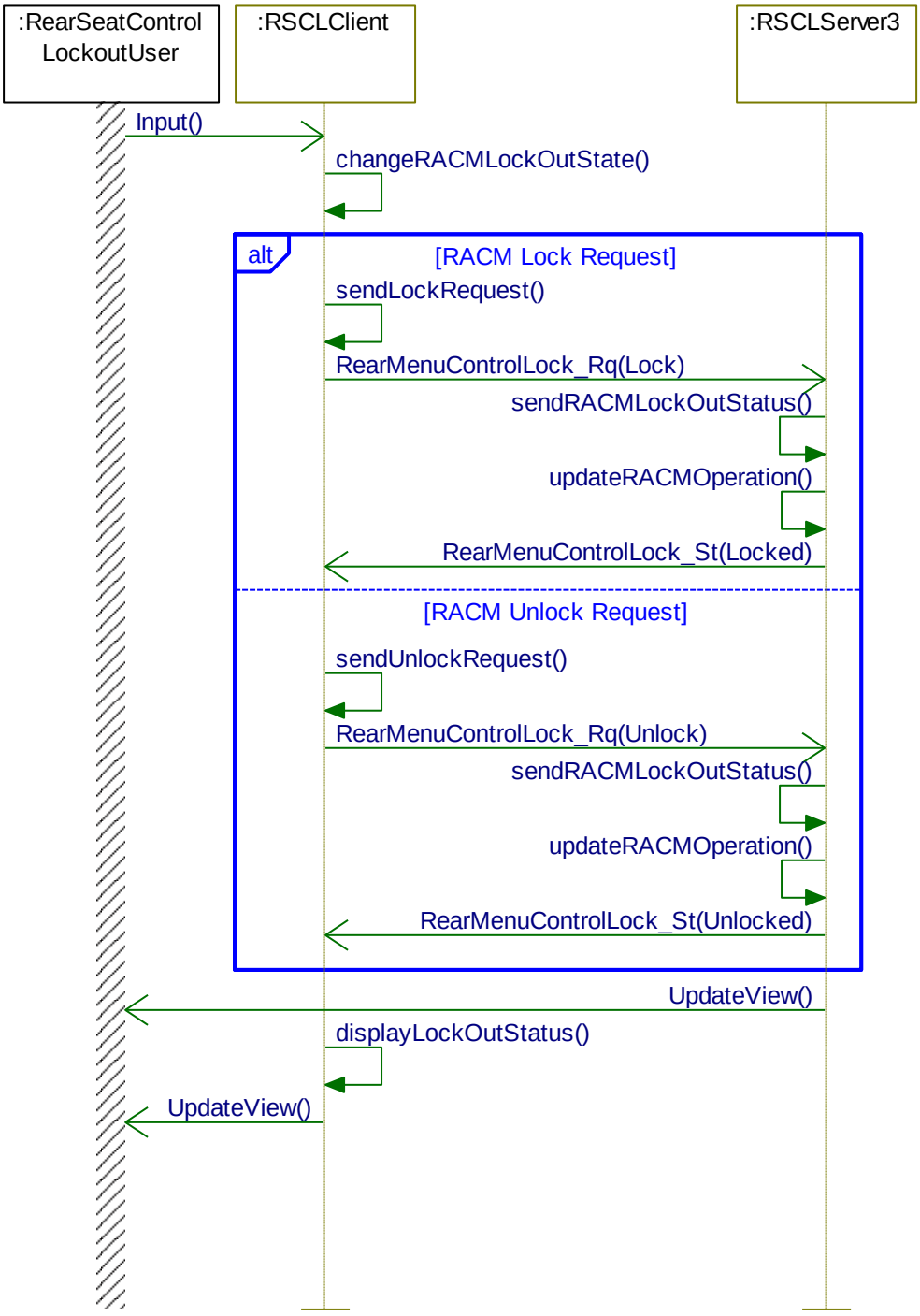
3.6.3.1 Activity Diagrams

3.6.3.1.1 RSCL-ACT-REQ-439797/A-RACM Lockout



3.6.3.2 Sequence Diagrams

3.6.3.2.1 RSCL-SD-REQ-439799/A-RACM Lockout Request



3.7 RSCL-FUN-REQ-434024/A-TSR Functional Safety

3.7.1 Requirements

3.7.1.1 RSCL-REQ-434025/A-TSR 1 for PCL

Purpose	FTTI	Text	Satisfied By	ASIL	Safe State	Requirement Status
Power Child Lock activation request via soft key on APIM shall only be allowed on dedicated inputs to prevent unintended deactivation request.	2 seconds	The APIM shall receive HMI signal PCL_HMI_Rq (internal signal) from driver through Power Child Lock soft key.	IPC/APIM (AD or newer)	A	Maintain Child Lock Status, warn and inform driver about current PCL status	Approved

3.7.1.2 RSCL-REQ-434026/A-TSR 2 for PCL

Purpose	FTTI	Text	Satisfied By	ASIL	Safe State	Requirement Status
Transferring the request to BCM ensures that the activation request by the customer is evaluated.	2 seconds	The APIM shall send E2E protected RSCL_PCL_Rq to BCM to indicate if Child Lock activation or deactivation was requested. Note: Whether the button press is an activation or deactivation request shall be evaluated by the BCM.	IPC/APIM (AD or newer)	A	Maintain Child Lock Status, warn and inform driver about current PCL status	Approved

3.7.1.3 RSCL-REQ-434027/A-TSR 3 for PCL

Purpose	FTTI	Text	Satisfied By	ASIL	Safe State	Requirement Status
Protecting the signal against corruption ensures that no invalid deactivation request is given.	2 seconds	Power Child Lock requests coming from DDM, PSD ECU or APIM shall be E2E protected against corruption using AutoSar Profile 1A.	DDM SDLC/GWM/ECG IPC/APIM (AD or newer)	A	Maintain Child Lock Status, warn and inform driver about current PCL status	Approved

3.7.1.4 RSCL-REQ-434028/A-TSR 4 for PCL

Purpose	FTTI	Text	Satisfied By	ASIL	Safe State	Requirement Status
Informing the customer about faults in the system to increase controllability for the user.	4 seconds	BCM shall provide E2E protected FS_CAN_BCM_PCL_Stat_Ind signal to IPC/APIM. IPC/APIM shall display warning message to driver when FS_CAN_BCM_PCL_Stat_Ind signal has the value flash.	BCM IPC/APIM (AD or newer) SDLC/GWM/ECG	A	Maintain Child Lock Status, warn and inform driver about current PCL status	Ready for Review

4 Appendix: Reference Documents

Reference #	Document Title
1	Rear Audio Control APIM SPSS v1.4 or higher
2	Climate Control Interface Specification latest version
3	
4	
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