



Research & Vehicle Technology
“Infotainment Systems Product Development”

Feature – Reverse Brake Assist

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

Version 1.2

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FORD CONFIDENTIAL



Revision History

Date	Version	Notes	
October 6, 2016	1.0	Initial Release	
February 20, 2017	1.1		
	RBA-FUR-REQ-237323/B-RBA Logical Signal Mapping	TM: Updating signalscapitalization and renaming RbaSys_D_Statto RbaMnu_D_Rq	
	MD-REQ-237337/B-RBAAltSt	TM: Updating Signal literals	
	MD-REQ-237338/B-RBASt	Update literals	
	MD-REQ-238207/B-RBASysRq	TM: rename signal	
	MD-REQ-237339/B-RBARq	TM: Signal literalsupdated	
	MD-REQ-237339/B-RBARq	TM: Signal literalsupdated	
	MD-REQ-237337/B-RBAAltSt	TM: Updating Signal literals	
	MD-REQ-237338/B-RBASt	Update literals	
	MD-REQ-238207/B-RBASysRq	TM: rename signal	
	RBA-406892/B-General Requirements	TM: Deleting mykey references.	
RBA-REQ-238208/B-Feature Availability	Update signal name		
May 17, 2021	1.2		
	RBA-406892/C-General Requirements	tmertiri: add fleet requirement	
	RBA-REQ-416172/A-Fleet Vehicle	tmertiri: add fleet requirement	
	RBA-406895/B-Use Cases	tmertiri: add fleet usecases	
	RBA-UC-REQ-416173/A-RBA ON/OFF state at Key-On when optioned for Fleet Vehicle	tmertiri: new fleet usecase	



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1 Architectural Design

1.1 Overview

Reverse Brake Assist (RBA) is a driver assistance feature that provides audible and visual notifications of potential collisions in a zone behind the vehicle, and then responds with automatic braking if a collision is imminent and the driver has not yet intervened. The feature operates while an equipped vehicle is travelling in the reverse direction at low speeds. The feature integrates detections from rear sensing systems including the camera system, ultrasonic park aid sensors, and cross traffic radars to determine the threat of objects in the vehicle path of travel.

1.2 RBA-CLD-REQ-237138/A-Reverse Brake Assistant Client

Responsibility: Reverse Brake Assistant (RBA) Client among its other duties that it may have is also responsible for displaying the RBA feature state, enables the users to change the state of the RBA feature (such as On and Off).

1.3 RBA-CLD-REQ-237139/A-Reverse Brake Assistant Server

Responsibility: Reverse Brake Assist Server is responsible for the main feature functionality. Basically it will reply to user requests to turn the feature On or Off or will notify the Client if the feature is unavailable due to any restrictions or errors.

1.4 RBA-FUR-REQ-237323/B-RBA Logical Signal Mapping

The CAN signals mentioned throughout this document shall refer to the CAN signal's logical name. The logical names shall be mapped to their actual CAN signal names. Please use the table below to perform the mapping. The InfoCAN database file is the master file for the actual CAN signal names. Note: There may be cases where the actual CAN signal name is used in this documentation.

Logical Name	CAN Signal Name
RBAAlrtSt	RbaAlrt_D_Dsply
RBASSt	Rba_D_Stat
RBASysRq	RbaMnu_D_Rq
RBARq	Rba_D_Rq

Table: Logical name/CAN signal mapping

1.5 RBA-IIR-REQ-237325/A-RBAServer_Tx

1.5.1 MD-REQ-237337/B-RBAAlrtSt

RBAAlrtSt is used by the Server to tell the Client to display warning notifications to the user.

Name	Literals	Value	Description
RBAAlrtSt			
	OFF	0x0	Do not display warning graphics.
	GRAPHIC	0x1	Client displays warning graphics.
	TEXT	0x2	Cluster displays warning text.
	BOTH	0x3	Client displays warning graphics and cluster displays warning text.



1.5.2 MD-REQ-237338/B-RBASt

RBASt is used by the Server to send to the Client RBA State condition

Name	Literals	Value	Description
RBASt			
	OFF	0x0	RBA feature is off (Client displays OFF)
	ON	0x1	RBA feature is on (Client displays ON)
	DISABLED	0x2	RBA feature is disabled (Client does not display RBA menu)
	Unused	0x3	This value is not being used currently

1.5.3 MD-REQ-238207/B-RBASysRq

RBASysRq is sent by the Server to the Client. The client uses it to determine on whether the feature is Active (0x2), or Not Active (0x1), etc.

Name	Literals	Value	Description
RBASysRq			
	NONE	0x0	Indicates that no ON/OFF menu should be available to the user. This would only be the case when the RBA feature has been disabled by Method II configuration.
	INACTIVE	0x1	Indicates that the ON/OFF menu should be visible but not active to the user. Menu should be greyed out.
	ACTIVE	0x2	Indicates that the ON/OFF menu should be visible and active to the user.
	Unused	0x3	Not used currently.

1.6 RBA-IIR-REQ-237326/A-RBAServer_Rx

1.6.1 MD-REQ-237339/B-RBARq

RBARq is used by the Client to send to requests to the Server to turn the feature On , Off etc.

Name	Literals	Value	Description
RBARq			
	NULL	0x0	No new request to change feature state.
	OFF	0x1	Request to turn Off RBA



	ON	0x2	Request to turn On RBA
	Unused	0x3	Not used currently.

1.7 RBA-IIR-REQ-237327/A-RBAClient_Tx

1.7.1 MD-REQ-237339/B-RBARq

RBARq is used by the Client to send requests to the Server to turn the feature On , Off etc.

Name	Literals	Value	Description
RBARq			
	NULL	0x0	No new request to change feature state.
	OFF	0x1	Request to turn Off RBA
	ON	0x2	Request to turn On RBA
	Unused	0x3	Not used currently.

1.8 RBA-IIR-REQ-237328/A-RBAClient_Rx

1.8.1 MD-REQ-237337/B-RBAAlrtSt

RBAAlrtSt is used by the Server to tell the Client to display warning notifications to the user.

Name	Literals	Value	Description
RBAAlrtSt			
	OFF	0x0	Do not display warning graphics.
	GRAPHIC	0x1	Client displays warning graphics.
	TEXT	0x2	Cluster displays warning text.
	BOTH	0x3	Client displays warning graphics and cluster displays warning text.

1.8.2 MD-REQ-237338/B-RBAST

RBAST is used by the Server to send to the Client RBA State condition

Name	Literals	Value	Description
RBAST			



	OFF	0x0	RBA feature is off (Client displays OFF)
	ON	0x1	RBA feature is on (Client displays ON)
	DISABLED	0x2	RBA feature is disabled (Client does not display RBA menu)
	Unused	0x3	This value is not being used currently

1.8.3 MD-REQ-238207/B-RBASysRq

RBASysRq is sent by the Server to the Client. The client uses it to determine on whether the feature is Active (0x2), or Not Active (0x1), etc.

Name	Literals	Value	Description
RBASysRq			
	NONE	0x0	Indicates that no ON/OFF menu should be available to the user. This would only be the case when the RBA feature has been disabled by Method II configuration.
	INACTIVE	0x1	Indicates that the ON/OFF menu should be visible but not active to the user. Menu should be greyed out.
	ACTIVE	0x2	Indicates that the ON/OFF menu should be visible and active to the user.
	Unused	0x3	Not used currently.



2 General Requirements

2.1 RBA-REQ-237140/A-State Recall

RBA Server shall recall the last state of RBA feature after an ignition cycle. The server shall inform the client of this state.

2.2 RBA-REQ-237355/A-RBA activation

Upon receiving a message indicating that the system has applied automatic braking, the Client shall display an alert indicating that a brake event has occurred for as long as the signals are being sent by the sensor.

2.3 RBA-REQ-238208/B-Feature Availability

RBASysRq tells the client of the feature availability. The feature shall be available only for value 0x2. For any other value the feature should be grayed out and user should not be able to select anything on client.

If RBASSt comes with a value of 0x2 (Disabled) the Client should not Display anything about the feature.

For the user to be able to interface with the feature, RBASysRq should 0x2 (Active) and RBASSt must not be 0x2 (RBA menu Off) or 0x3 (unused).

2.4 RBA-REQ-416172/A-Fleet Vehicle

Whenever client has been configured as a fleet vehicle, client will request RBA to be On upon ignition cycle.



3 Functional Definition

3.1 Use Cases

3.1.1 RBA-UC-REQ-237343/A-RBA Customer Disable

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start Vehicle is equipped with Reverse Brake Assist feature.
Scenario Description	Customer finds RBA on/off selection in Sync. Client displays that RBA is ON. Customer selects on/off toggle.
Post-conditions	Client displays that RBA is OFF.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

3.1.2 RBA-UC-REQ-237344/A-RBA Customer Enable

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start Vehicle is equipped with Reverse Brake Assist feature.
Scenario Description	Customer finds RBA on/off selection in Sync. Client displays that RBA is OFF. Customer selects on/off toggle.
Post-conditions	Client displays that RBA is ON.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

3.1.3 RBA-UC-REQ-237345/A-RBA Key Cycle- RBA ON

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start Vehicle is equipped with Reverse Brake Assist feature. RBA is ON in the customer settings in Sync.
Scenario Description	Customer shuts vehicle OFF. Customer turns vehicle ON at later time. Customer finds RBA setting in Sync.
Post-conditions	Client displays that RBA is ON.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

**3.1.4 RBA-UC-REQ-237346/A-RBA Key Cycle- RBA Off**

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start Vehicle is equipped with Reverse Brake Assist feature. RBA is OFF in the Client settings.
Scenario Description	Customer shuts vehicle OFF. Customer turns vehicle ON at later time. Customer finds RBA setting in Sync.
Post-conditions	Client is displaying that RBA is OFF.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

3.1.5 RBA-UC-REQ-237347/A-RBA Unavailable

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start Vehicle is equipped with Reverse Brake Assist feature.
Scenario Description	Customer finds RBA on/off selection in Sync. Client is displaying that RBA is ON. Customer turns off Park Aid (or something else happens that causes RBA to be unavailable- sensor blockage, fault, CTA off, trailer connected).
Post-conditions	Client displays that RBA is unavailable (follow HMI strategy).
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

3.1.6 RBA-UC-REQ-237348/A-RBA Brake Alert Activation - Rear Park Aid Detection

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start Vehicle is equipped with Reverse Brake Assist feature.
Scenario Description	The driver places vehicle in reverse and Reverse Brake Assist (RBA) is active. The driver reverses vehicle towards an obstacle in path and receives notifications of the obstacles presence via PDC display and chimes. The driver continues to approach obstacle until collision is imminent and the RBA feature applies automatic braking.
Post-conditions	The vehicle display shows the RBA brake alert animation.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

3.1.7 RBA-UC-REQ-237349/A-RBA Brake Alert Activation - Cross Traffic Alert Detection



Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start Vehicle is equipped with Reverse Brake Assist feature.
Scenario Description	The driver places vehicle in reverse and Reverse Brake Assist (RBA) is active. The driver reverses vehicle towards cross traffic and receives notifications of the obstacles presence via Cross Traffic Alert (CTA) graphics and chimes. The driver continues to approach cross traffic until collision is imminent and the RBA feature applies automatic braking.
Post-conditions	The vehicle display stops showing CTA Alert and shows the RBA brake alert animation.
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

3.1.8 RBA-UC-REQ-237350/A-RBA Brake Alert No Activation

Actors	Vehicle Occupant
Pre-conditions	The infotainment system is powered on. The ignition status is Run/Start Vehicle is equipped with Reverse Brake Assist feature.
Scenario Description	The driver places vehicle in reverse and Reverse Brake Assist (RBA) is active. The driver reverses vehicle and no obstacles are detected.
Post-conditions	The vehicle display does not show any RBA animation
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface

3.1.9 RBA-UC-REQ-416173/A-RBA ON/OFF state at Key-On when optioned for Fleet Vehicle

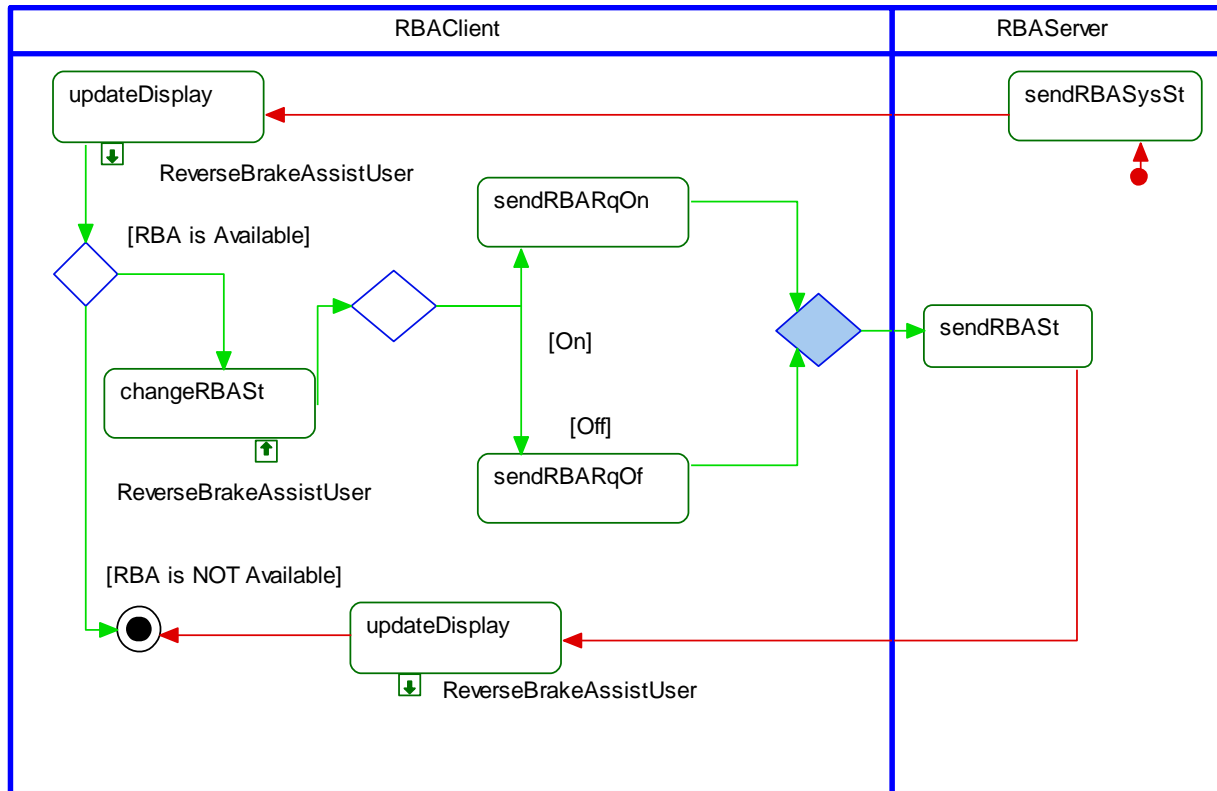
Actors	Vehicle Occupant
Pre-conditions	Client has been configured for RBA. Client has been configured for Fleet. Server has been configured for RBA. RBA setting was set to Off previous ignition cycle.
Scenario Description	Ignition On.
Post-conditions	Client will request RBA feature On. Server will turn RBA On.
List of Exception Use Cases	E1 – Vehicle is not RUN/START E2 – Loss of communication with IPMB module
Interfaces	



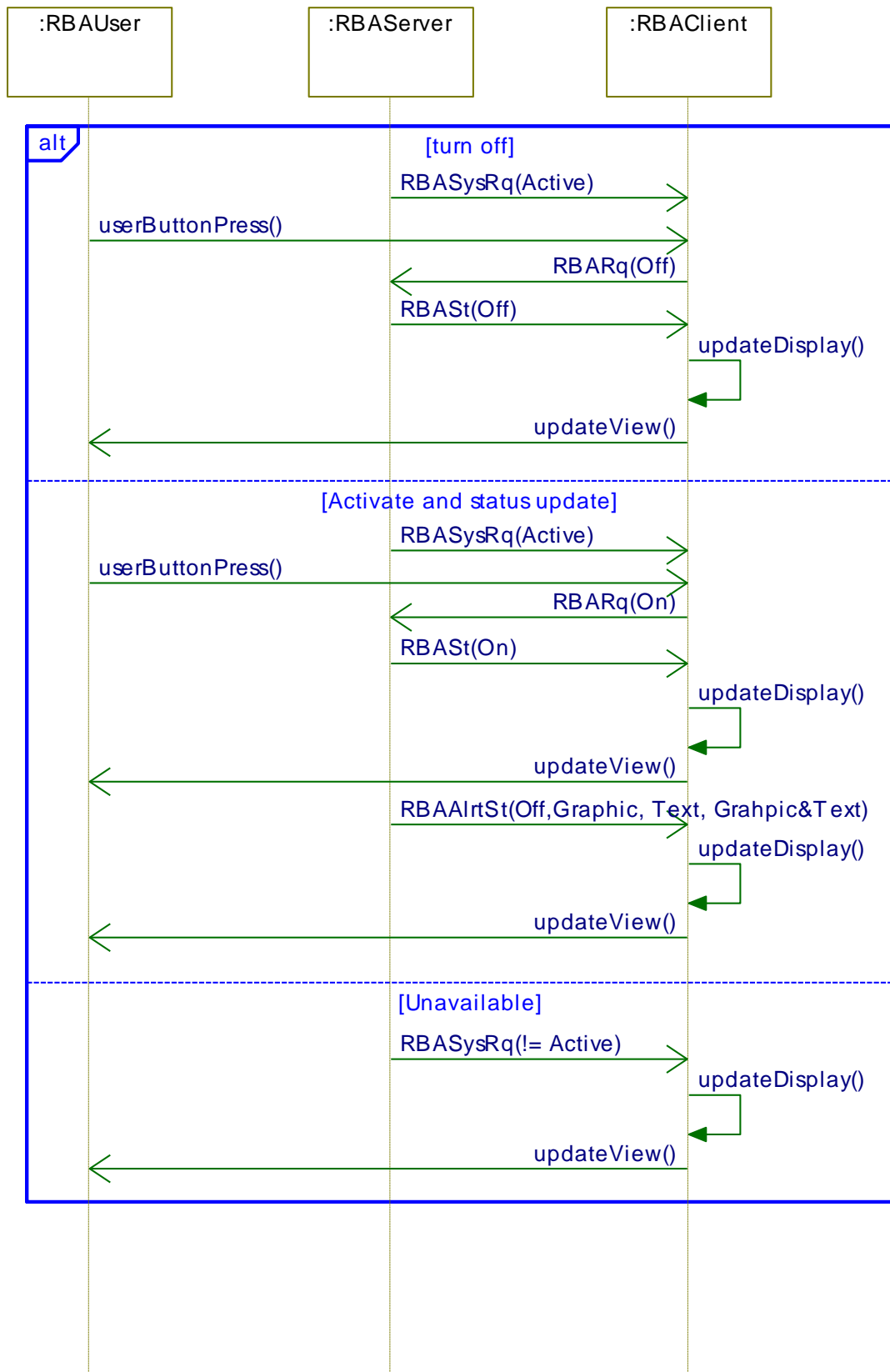
3.2 White Box Views

3.2.1 Activity Diagram

3.2.1.1 RBA-REQ-237353/A-Activity Diagram Activate/Deactivate



**3.2.1.2 REQ-237725/A-State Update Activity Diagram****3.2.2 Sequence Diagram****3.2.2.1 RBA-REQ-237354/B-Sequence Diagram**





4 Appendix: Reference Documents

Reference #	Document Title
1	
2	
3	
4	
5	