



Research & Vehicle Technology
“Infotainment Systems Product Development”

Feature – Feature Based Message Protocol
APIM Infotainment Subsystem Part Specific
Specification (SPSS)

Version 1.3
UNCONTROLLED COPY IF PRINTED

Version Date: May 8, 2017

FORD CONFIDENTIAL



Revision History

Date	Version	Notes	
May 31, 2013	1.0	Initial Release	
September 26, 2016	1.1	Updated Release	
	MD-REQ-014070/A-Feature_St (TcSE ROIN-282399-2)	sorris1: Updated the Personalization Index parameter encoding to match the CAN database.	
	MD-REQ-014070/A-Feature_St (TcSE ROIN-282399-2)	sorris1: Updated the Personalization Index parameter encoding to match the CAN database.	
	FBMP-REQ-023037/B-PersIndex Definition (TcSE ROIN-287215-1)+	<jmyslin2> updated to include the case when enhanced memory is active	
	FBMP-REQ-023039/B-Feature_St message properties (TcSE ROIN-287217-1)+	<jmyslin2> added clarifications to the requirement to make sure worked correctly with modules that didn't support Round Robin style FBMP Feature.St messages	
	FBMP-FUN-REQ-023019/B-Query Operation (TcSE ROIN-291021-1)	<jmyslin2> Query function added clarifications to support Driver Information Feature Based Message Protocol menu settings moving from the Cluster to Centerstack Infotainment module(s)	
	FBMP-UC-REQ-023021/B-System Start-up Query Operation for features only active in Run (TcSE ROIN-291013-1)	<JM> Updated to add a note about the Cluster menu settings moving to centerstack having this use case apply	
	FBMP-REQ-023024/B-Query Operation during Start-Up (TcSE ROIN-287298-1)	<jmyslin2> Updated to include clarifications for querying for Driver Information Settings in the Centerstack	
	FBMP-SD-REQ-023026/B-Query Operation at Start-Up (TcSE ROIN-287300-1)	<jmyslin2> Updated sequence diagram to show that the new requests at start-up have to be done within 50 msec of receiving the response from the feature server	
February 6, 2017	1.2	Updated Release	
	FBMP-FUN-REQ-023019/C-Query Operation (TcSE ROIN-291021-1)	<jmyslin2> New requirement to support Feature Based Message Protocol settings in the centerstack and Enhanced Memory when a new personality profile is selected.	
	FBMP-SR-REQ-238230/A-Enhanced Memory - Active Personality Profile change using Feature Based Message Protocol+	<jmyslin2> New requirement that supports Settings in the Centerstack using Feature Based Message Protocol when an Enhanced Memory personality profile changes.	
May 8, 2017	1.3	Updated Release	
	FBMP-REQ-023039/E-Feature_St message properties (TcSE ROIN-287217-1)	<jmyslin2>No content change just reference the HMI	
	FBMP-REQ-023017/B-Set request but no response from Feature Server (TcSE ROIN-287260-1)	<jmyslin2> Per Ford SYNC HMI team feedback for setting in the centerstack added on option that on the retry could display the last state.	
	FBMP-UC-REQ-023020/C-System Start-up Query Operation when the Infotainment System turns On (TcSE ROIN-291012-1)	<jmyslin2> Updated Query operation to 600 msec after HMI_HMIMode_St = ON	
	FBMP-UC-REQ-023021/C-System Start-up Query Operation when Ignition Status goes to Run (TcSE ROIN-291013-1)	<jmyslin2> Changed query from 500 to 600 msec	
	FBMP-UC-REQ-023022/C-Initiating a Query Request for a particular feature (TcSE ROIN-291014-1)	<jmyslin2> No update for revision	
	FBMP-REQ-023024/C-Query Operation during Start-Up (TcSE ROIN-287298-1)+	<jmyslin2> Updated for a crank event	
	FBMP-REQ-023024/D-Query Operation during Start-Up (TcSE ROIN-287298-1)	<jmyslin2> changes the Query time after ignition goes to Run from 500 msec to 600 msec	
	FBMP-SR-REQ-238230/F-Enhanced Memory - Active Personality Profile change using Feature Based Message Protocol	<jmyslin2> spec clarification (no content change)	
	FBMP-SD-REQ-023026/C-Query Operation at Start-Up (TcSE ROIN-287300-1)	<jmyslin2> updated so query after 600 msec	
	FBMP-SD-REQ-023027/B-Query Operation at Start-Up with no response with Retries (TcSE ROIN-287326-1)	<jmyslin2> Updated so query after 600 msec	



Table of Contents

REVISION HISTORY	2
1 ARCHITECTURAL DESIGN.....	4
1.1 FBMP-CLD-REQ-023041/A-Feature Client (TcSE ROIN-287204-1).....	4
1.2 FBMP-CLD-REQ-023042/A-Feature Server (TcSE ROIN-287205-1)	4
1.3 Interface Requirements	4
1.3.1 FBMP-IIR-REQ-023043/A-FeatureClient_Tx (TcSE ROIN-289913)	4
1.3.2 FBMP-IIR-REQ-023044/A-FeatureClient_Rx (TcSE ROIN-289914)	5
1.3.3 FBMP-IIR-REQ-023045/A-FeatureServer_Tx (TcSE ROIN-289953)	5
1.3.4 FBMP-IIR-REQ-023046/A-FeatureServer_Rx (TcSE ROIN-289954).....	6
2 GENERAL REQUIREMENTS	7
2.1 FBMP-REQ-023034/A-FeatureID Definition (TcSE ROIN-287211-1).....	7
2.2 FBMP-REQ-023035/D-Operation Definition (TcSE ROIN-287213-1).....	7
2.3 FBMP-REQ-023036/A-Configuration Number (TcSE ROIN-287214-1)	8
2.4 FBMP-REQ-023037/C-PersIndex Definition (TcSE ROIN-287215-1)	8
2.5 FBMP-REQ-023038/C-Feature_Rq message properties (TcSE ROIN-287216-1).....	8
2.6 FBMP-REQ-023039/E-Feature_St message properties (TcSE ROIN-287217-1)	9
3 FUNCTIONAL DEFINITION	12
3.1 FBMP-FUN-REQ-023014/A-Set Operation (TcSE ROIN-291017-1).....	12
3.1.1 Use Cases	12
3.1.2 Requirements	12
3.1.3 Sequence Diagrams	13
3.2 FBMP-FUN-REQ-023019/C-Query Operation (TcSE ROIN-291021-1)	14
3.2.1 Use Cases	14
3.2.2 Requirements	15
3.2.3 Sequence Diagrams	16
4 APPENDIX: REFERENCE DOCUMENTS.....	19



1 Architectural Design

1.1 FBMP-CLD-REQ-023041/A-Feature Client (TcSE ROIN-287204-1)

The Feature Client uses the Feature_Rq message to request that the Feature Server perform a FBMP operation.

Example: The Feature Client may have a menu of options that can be selected by the user. If the user selects a specific menu option, then the Feature Client may request the specific menu option the user selected by sending a "Set" request to the Feature Server.

1.2 FBMP-CLD-REQ-023042/A-Feature Server (TcSE ROIN-287205-1)

The Feature Server is the module that controls the requested FBMP feature. The Feature Server receives requests from the Feature Client and is responsible for performing the requested FBMP operation and updating the Feature_St message. The Feature Server stores the setting and remembers the value if applicable between power mode cycles.

1.3 Interface Requirements

1.3.1 FBMP-IIR-REQ-023043/A-FeatureClient_Tx (TcSE ROIN-289913)

1.3.1.1 MD-REQ-014068/A-Feature_Rq (TcSE ROIN-282333-2)

Message Type: Request

Represents the request to command a feature change (select new feature, change feature setting, query features, etc.).

Included Parameters:

Operation

FeatureID

Configuration

PersIndex

Name	Literals	Value	Description
Operation	-	-	Type of operation being requested
	Null	0x0	
	Query	0x1	
	Set	0x2	
	Upload	0x3	
	Restore	0x4	
	Copy	0x5	
	NotUsed	0x6 – 0x7	
FeatureID	-	-	Feature number being requested
		0x0000 – 0xFFFF	
Configuration	-	-	Configuration value being requested
		0x0000 – 0xFFFF	
PersIndex	-	-	Indicates which personality profile is being accessed
	PERS_1	0x0	
	PERS_2	0x1	
	PERS_3	0x2	
	PERS_4	0x3	
	VEHICLE	0x4	
	Not Used	0x5	
	Not Used	0x6	
	Not Used	0x7	

**1.3.2 FBMP-IIR-REQ-023044/A-FeatureClient_Rx (TcSE ROIN-289914)****1.3.2.1 MD-REQ-014070/A-Feature_St (TcSE ROIN-282399-2)**

Message Type: Status

Represents the current status of a feature (feature selected, feature setting, etc.).

Included Parameters:

FeatureID

Configuration

PersIndex

Name	Literals	Value	Description
FeatureID	-	-	Active feature number
		0x0000 – 0xFFFF	
Configuration	-	-	Active configuration value
		0x0000 – 0xFFFF	
PersIndex	-	-	Indicates which personality profile is active
	PERS_1	0x0	
	PERS_2	0x1	
	PERS_3	0x2	
	PERS_4	0X3	
	VEHICLE	0X4	
	Not Used	0x5	
	Not Used	0x6	
	Not Used	0x7	

1.3.3 FBMP-IIR-REQ-023045/A-FeatureServer_Tx (TcSE ROIN-289953)**1.3.3.1 MD-REQ-014070/A-Feature_St (TcSE ROIN-282399-2)**

Message Type: Status

Represents the current status of a feature (feature selected, feature setting, etc.).

Included Parameters:

FeatureID

Configuration

PersIndex

Name	Literals	Value	Description
FeatureID	-	-	Active feature number
		0x0000 – 0xFFFF	
Configuration	-	-	Active configuration value
		0x0000 – 0xFFFF	
PersIndex	-	-	Indicates which personality profile is active
	PERS_1	0x0	
	PERS_2	0x1	
	PERS_3	0x2	
	PERS_4	0X3	
	VEHICLE	0X4	
	Not Used	0x5	
	Not Used	0x6	
	Not Used	0x7	

**1.3.4 FBMP-IIR-REQ-023046/A-FeatureServer_Rx (TcSE ROIN-289954)****1.3.4.1 MD-REQ-014068/A-Feature_Rq (TcSE ROIN-282333-2)**

Message Type: Request

Represents the request to command a feature change (select new feature, change feature setting, query features, etc.).

Included Parameters:

Operation

FeatureID

Configuration

PersIndex

Name	Literals	Value	Description
Operation	-	-	Type of operation being requested
	Null	0x0	
	Query	0x1	
	Set	0x2	
	Upload	0x3	
	Restore	0x4	
	Copy	0x5	
	NotUsed	0x6 – 0x7	
FeatureID	-	-	Feature number being requested
		0x0000 – 0xFFFF	
Configuration	-	-	Configuration value being requested
		0x0000 – 0xFFFF	
PersIndex	-	-	Indicates which personality profile is being accessed
	PERS_1	0x0	
	PERS_2	0x1	
	PERS_3	0x2	
	PERS_4	0x3	
	VEHICLE	0x4	
	Not Used	0x5	
	Not Used	0x6	
	Not Used	0x7	



2 General Requirements

2.1 FBMP-REQ-023034/A-FeatureID Definition (TcSE ROIN-287211-1)

Each feature using the FBMP structure has a unique Feature ID assigned to it. For example in the table below individual features under the Feature Name column have a unique Feature ID assigned to it. Using this strategy one message can contain many features in a single network message. Since the Feature ID has a 16 bit resolution (0x0000 - 0xFFFF), there could potentially be up to 65,535 (0xFFFF) features using a single network message.

The feature ID number is used between Feature Client and Feature Server for the purpose of identifying specific features to perform different operations such as “Query” and “Set” for the selected feature.

Example of feature ID's:

Feature Name	Feature ID	Config Number	Config Value
Nav Prefs - Auto Fill State/Province	0x0302	0x0	Off
		0x1	On
Nav Prefs - Parking POI Notification	0x0306	0x0	Off
		0x1	On
Route Prefs - Preferred Route	0x0309	0x0	Shortest Distance
		0x1	Fastest Time
		0x2	Ecological
Route Prefs - Avoid Freeways	0x030A	0x0	Off
		0x1	On
Route Prefs - Avoid Tollroads	0x030B	0x0	Off
		0x1	On
Route Prefs - Avoid Ferries / Car trains	0x030C	0x0	Off
		0x1	On

2.2 FBMP-REQ-023035/D-Operation Definition (TcSE ROIN-287213-1)

The Operation signal instructs what operation the Feature Client is requesting be performed by the Feature Server.

Name	Literals	Value	Description
Operation	-	-	Type of operation being requested
	Null	0x0	
	Query	0x1	
	Set	0x2	
	Upload	0x3	
	Restore	0x4	
	Copy	0x5	
	NotUsed	0x6 – 0x7	

For Set and Query see “[FBMP-FUN-023014-Set Operation](#)” and “[FBMP-FUN-023019-Query Operation](#)” for definitions for those operations.

- Note: The FBMP Feature Client shall be capable of performing multiple QUERY or SET actions at once. An input from the driver, for example, shall never be “lost” if the FBMP Feature Client is performing a QUERY.

For Upload, Restore and Copy see the Enhanced Memory SPSS. These operations are only applicable if enhanced memory is supported.



2.3 FBMP-REQ-023036/A-Configuration Number (TcSE ROIN-287214-1)

The Configuration Number indicates the encoding value of the feature ID.

Feature Name	Feature ID	Config Number	Config Value
Nav Prefs - Auto Fill State/Province	0x0302	0x0	Off
		0x1	On

2.4 FBMP-REQ-023037/C-PersIndex Definition (TcSE ROIN-287215-1)

The PersIndex Definition indicates which (personality) profile is active.

If Enhanced Memory is not supported on a vehicle the PerIndex shall equal vehicle.

- For the “Set” and “Query” operation the PersIndex shall be set to “Vehicle” when enhanced memory is not supported
- The Feature.St message shall have PersIndex equal to “Vehicle” when enhanced memory is not supported.

If Enhanced Memory is supported on a vehicle then the PersIndex shall equal the active personality.

- For the “Set” and “Query” operation the PersIndex shall be set to the active personality when enhanced memory is supported.
- The Feature.St message shall have PersIndex equal to the active personality profile when enhanced memory is supported.

If Enhanced Memory is supported on a vehicle but the Feature Server module receiving Feature.Rq does not support enhanced memory then the Feature Server shall treat the PersIndex as a don't care for the “Set” and “Query” and shall still perform the operation.

If Enhanced Memory is supported on a vehicle but the Feature Server module receiving Feature.Rq does not support enhanced memory then the Feature Server shall set the PersIndex equal to “Vehicle” in the Feature.St message regardless of the active personality profile.

Note: the above rules shall be followed unless noted otherwise in a feature specification/SPSS.

Name	Literals	Value	Description
PersIndex	-	-	Indicates which personality profile is being accessed
	PERS_1	0x0	
	PERS_2	0x1	
	PERS_3	0x2	
	PERS_4	0x3	
	VEHICLE	0x4	When no Enhanced Memory Vehicle is always set
	Not Used	0x5	
	Not Used	0x6	
	Not Used	0x7	

2.5 FBMP-REQ-023038/C-Feature Rq message properties (TcSE ROIN-287216-1)

Feature_Rq

Message Type: Request

Represents the request to command a feature change (select new feature, change feature setting, query features, etc.).



Included Parameters:

Operation
FeatureID
Configuration
PersIndex

Name	Literals	Value	Description
Operation	-	-	Type of operation being requested
	Null	0x0	
	Query	0x1	
	Set	0x2	
	Upload	0x3	
	Restore	0x4	
	Copy	0x5	
	NotUsed	0x6 – 0x7	
FeatureID	-	-	Feature number being requested
		0x0000 – 0xFFFF	
Configuration	-	-	Configuration value being requested
		0x0000 – 0xFFFF	
PersIndex	-	-	Indicates which personality profile is being accessed
	PERS_1	0x0	
	PERS_2	0x1	
	PERS_3	0x2	
	PERS_4	0x3	
	VEHICLE	0x4	When no Enhanced Memory Vehicle is always set
	Not Used	0x5	
	Not Used	0x6	
	Not Used	0x7	

For event-periodic Feature_Rq messages when no request is being made the periodic messages shall set Operation to 0x0 Null and the other signals (FeatureID, Configuration and PersIndex) are considered don't care.

- Example: The user selects a menu item for Feature X:
 1. The Feature Client sends:
 - Feature_Rq(Operation = Set; FeatureID = Feature_X; Configuration = Configuration = Y (ex ON), Personality = Vehicle).
 2. Then after sending Feature Set request above the Feature Client sends Operation = Null below:
 - Feature_Rq(Operation = Null; FeatureID = 0x0/don't care; Configuration = 0x0/don't care; PersIndex = Vehicle/Active Personality/don't care)
 3. The Feature Server responds to the Set request (see Set portion of SPSS for details)

2.6 FBMP-REQ-023039/E-Feature St message properties (TcSE ROIN-287217-1)

Feature_St

Message Type: Status

Represents the current status of a feature (feature selected, feature setting, etc.).

Included Parameters:

FeatureID
Configuration
PersIndex

Name	Literals	Value	Description
------	----------	-------	-------------



FeatureID	-	-	Active feature number
		0x0000 – 0xFFFF	
Configuration	-	-	Active configuration value
		0x0000 – 0xFFFF	
PersIndex	-	-	Indicates which personality profile is active
	PERS_1	0x0	
	PERS_2	0x1	
	PERS_3	0x2	
	PERS_4	0x3	
	VEHICLE	0x4	
	Not Used	0x5	
	Not Used	0x6	
	Not Used	0x7	

What is described in this requirement below shall be followed by any module that is a feature server and sending an event-periodic Feature_St message. Any module that is a Feature Server using FBMP and receiving this specification shall follow the requirements below unless noted otherwise in another feature specification.

- Note: Since some non-infotainment Feature Server modules may not support what is described below in this requirement (ex. if they don't receive the FBMP SPSS) for the Feature_St message the strategy below the Feature Clients should not design in error handling based on. See other parts of the FBMP SPSS for error handling such as when to retry for queries or individual feature specifications that use FBMP.
 - For example a non infotainment module might not publish the Feature_St round robin style but may instead just publish the last response the Feature Server responded with in the Feature_St message. Infotainment modules should not go into an error state if not receiving Feature_St in round robin style.

1. The Feature Server shall respond to a Feature_Rq message with the Feature_St message within 75 msec of receiving the Feature_Rq message.

2. If a Feature Server changes a configuration setting for a particular feature ID without a Feature_Rq from the Feature Client then the Feature Server shall put the updated data on the network. The Feature Client shall store the updated setting (example changed from OFF to setting ON) and update the HMI (if applicable) from the Feature_St received from the Feature Server for the current power mode.

Example: The Feature Server has Feature_X information listed below

Feature Name	Feature ID	Config Number	Config Value
Feature_X	0x1234	0x0	Off
		0x1	On

If Feature_X changes from OFF to ON even though the Feature Client didn't send a Feature_Rq to change its setting the Feature Server shall update its Feature_St message and put on the network the updated configuration value for Feature_X. The Feature Client now has the updated configuration value and stores the new value and updates the HMI (if applicable).

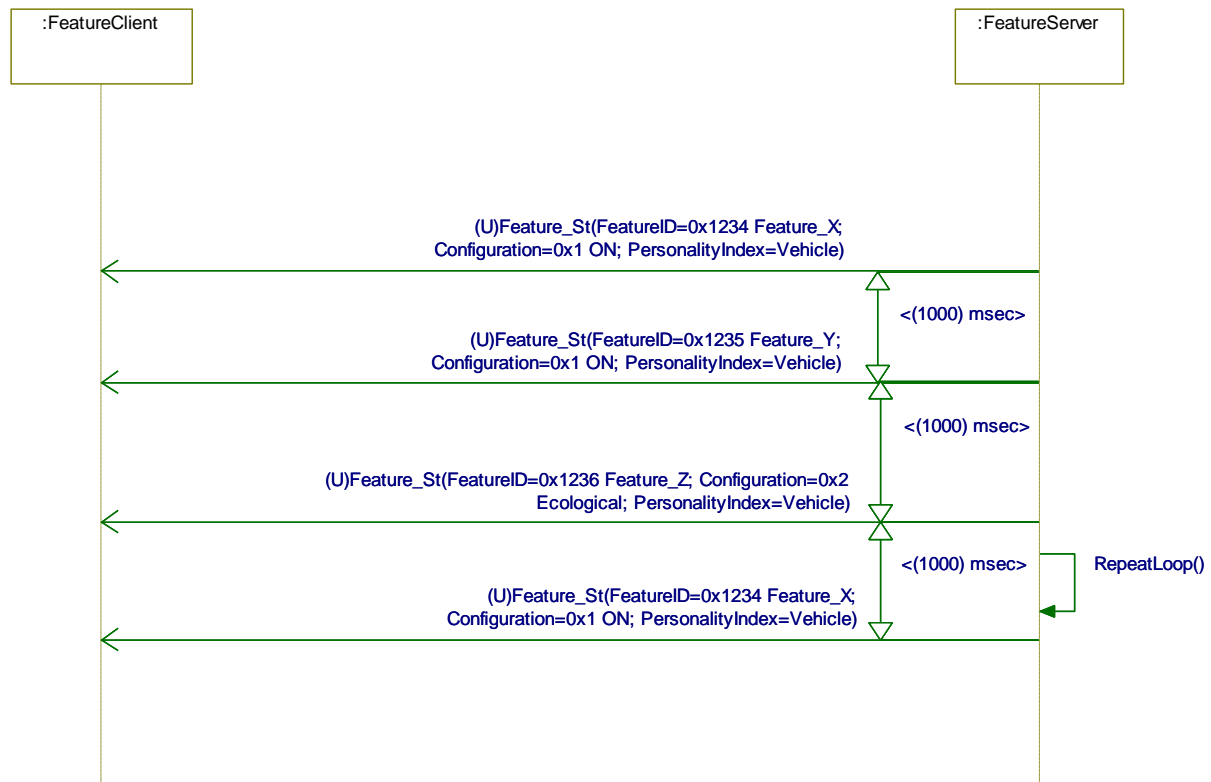
3. For Feature Server infotainment components sending out the event-periodic Feature_St message the following shall apply when sending out a periodic message:

- The Feature Server shall always respond on event to a Feature_Rq from a Feature Client
- When not responding to a Feature_Rq the Feature Server shall publish Feature_St information in a loop running through the different settings in a round robin fashion for each periodic message.

Example: A Feature Server supports the 3 features below in the FBMP format. If the Feature_St periodic rate is 1000 msec then the Feature Server sends the periodic message in a loop through all the supported features as shown on the sequence diagram below:



Feature Name	Feature ID	Config Number	Config Value
Feature_X	0x1234	0x0	Off
		0x1	On
Feature_Y	0x1235	0x0	Off
		0x1	On
Feature_Z	0x1236	0x0	Shortest Distance
		0x1	Fastest Time
		0x2	Ecological

Sequence Diagram – Periodic Feature_St



3 Functional Definition

3.1 FBMP-FUN-REQ-023014/A-Set Operation (TcSE ROIN-291017-1)

3.1.1 Use Cases

3.1.1.1 FBMP-UC-REQ-023015/B-Initiating a Set Operation Request (TcSE ROIN-291011-1)

Actors	Vehicle Occupant			
Pre-conditions	Feature_X is OFF (ie Feature Server has the Feature ID = 0x1234 Feature_X with its Configuration set to 0x0 OFF			
	Feature Name	Feature ID	Config Number	Config Value
	Feature_X	0x1234	0x0	OFF
			0x1	Setting_1
			0x2	Setting_2
			0x3	Setting_3
Scenario Description	The User selects Setting_2 from a menu (ie The Feature Client sends a Set request to the Feature Server for FeatureID = 0x1234 and Configuration set to 0x2 Setting_2)			
Post-conditions	The Feature Server changes from OFF to Setting_2 (ie Feature Server accepts the feature client request and changes the configuration number from 0x0 OFF to 0x2 Setting_2)			
Notes				
Interfaces	G-HMI; SWC; CBI			

3.1.2 Requirements

3.1.2.1 FBMP-REQ-023016/B-Set Definition (TcSE ROIN-287249-1)

The Feature Client is responsible for using the Set command when it is requesting a new feature setting from the Feature Server. When performing a Set command the Feature Client shall send a Feature_Rq with Operation = Set, the Feature ID set to the encoding of the feature being requested, the configuration set to the new encoding value being requested and the applicable personality profile selected (select vehicle if enhanced memory not supported).

The Feature Server shall respond to the Set FBMP request from the Feature Client if it supports the request by setting the applicable values in the Feature Status message. Ex. Feature.St (FeatureID = 0xXXXX, Configuration = Y (ex 0x1 ON), PersIndex = Person_X). The Feature Server shall remember the updated setting between power mode changes.

3.1.2.2 FBMP-REQ-023017/B-Set request but no response from Feature Server (TcSE ROIN-287260-1)

Once the Feature Client sends a Set request to the Feature Server if after sending a Set request the Feature Client does not receive a response from the Feature Server, then the Feature Client will need to determine if it should retry the request.

Infotainment components that support retries for a particular feature have a general strategy to retry 500 msec after the first request was sent. This would apply to the "Set" command if a retry is needed.

- [Note: for the Settings in the Centerstack feature this "Set" retry after 500 msec would apply](#)



If the Feature Client doesn't receive a Feature.St response for the Set request(s) then the Feature Client shall perform error handling. Unless noted otherwise in feature spec or HMI specification the general strategy for the error handling of a menu item when the Feature Client does not receive a response from the Feature Server (either after first attempt or after a retry/retries – if retries supported), is to display the menu with no item selected [or display the last state \(see the HMI specification for official direction for a particular feature\)](#). The error handling may vary between components and features.

3.1.3 Sequence Diagrams

3.1.3.1 FBMP-SD-REQ-023018/A-Set Operation (TcSE ROIN-287268-1)

Pre-condition

Feature X is OFF

Scenario

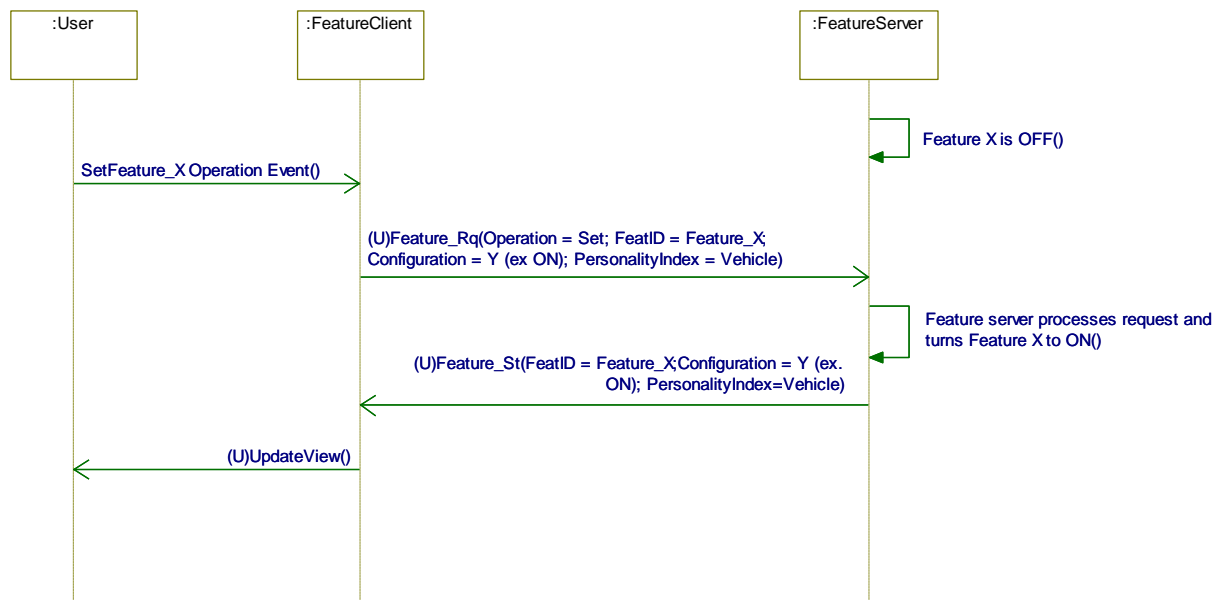
The User presses the menu item to turn Feature X to ON

Post-condition

Feature X is ON

HMI is updated to show Feature X is ON (if HMI supported for Feature X)

Sequence Diagram





3.2 FBMP-FUN-REQ-023019/C-Query Operation (TcSE ROIN-291021-1)

3.2.1 Use Cases

3.2.1.1 FBMP-UC-REQ-023020/C-System Start-up Query Operation when the Infotainment System turns On (TcSE ROIN-291012-1)

Actors	Vehicle Occupant
Pre-conditions	Infotainment system is OFF (ie HMIAudioMode = OFF) Turn the Infotainment system ON (ie HMIAudioMode goes from OFF to ON)
Scenario Description	The Feature Client performs a Query Operation 500 600 msec after the infotainment system turns on for all applicable infotainment features. The highest priority features are requested first.
Post-conditions	The Feature Client receives the Feature Query information from the Feature Server(s) and stores the data for various purposes including but not limited to the menu display
Notes	
Interfaces	G-HMI; SWC; CBI

3.2.1.2 FBMP-UC-REQ-023021/C-System Start-up Query Operation when Ignition Status goes to Run (TcSE ROIN-291013-1)

Actors	Vehicle Occupant
Pre-conditions	The Ignition_Status is less then Run (ex OFF, Accessory) The Ignition_Status is changed to Run
Scenario Description	The Feature Client performs a Query Operation 500 600 msec after Ignition_Status changes to Run for all the applicable features that are only active in Run. The highest priority features are requested first.
Post-conditions	The Feature Client receives the Feature Query information from the Feature Server(s) and stores the data for various purposes including but not limited to the menu display
Notes	Unless noted otherwise this is applicable to Query requests for the Vehicle Settings menus/HMI vehicle settings (ex driver information settings in Centerstack HMI).
Interfaces	G-HMI; SWC; CBI

3.2.1.3 FBMP-UC-REQ-023022/C-Initiating a Query Request for a particular feature (TcSE ROIN-291014-1)

Actors	Vehicle Occupant
Pre-conditions	A feature is activated while the module is already powered up in Run and needs feature information.



Scenario Description	The Feature Client performs a Query Operation for the affected feature
Post-conditions	The Feature Client receives the query information from the Feature Server and stores the data and performs any action needed with the data (ex. Updating the HMI menu)
Notes	
Interfaces	G-HMI; SWC; CBI

3.2.2 Requirements

3.2.2.1 FBMP-REQ-023023/A-Query Definition (TcSE ROIN-287297-1)

The Feature Client is responsible for using the Query command when it is requesting a new feature setting from the Feature Server. When performing a Query command the Feature Client shall send a Feature_Rq with Operation = Query, the Feature ID set to the encoding of the feature being requested with the applicable personality profile selected (select vehicle if enhanced memory not supported).

The Feature Server shall respond within 75 msec to the Query FBMP request from the Feature Client setting the applicable values in the Feature Status message. Ex. Feature.St (FeatureID = 0XXXXX, Configuration = Y (ex 0x1 ON), PersIndex = Person_X).

3.2.2.2 FBMP-REQ-023024/D-Query Operation during Start-Up (TcSE ROIN-287298-1)

The Feature Client shall perform the Query during the startup routine (unless noted otherwise in a specific feature spec).

- Infotainment Start-up: the query is first requested ~~500~~ 600 msec (tolerance range 600 – 650) after HMI Audio Mode changes from OFF to ON. Only use this strategy if specifically called out in a feature spec.
- Ignition_Status changes to Run Start-up: the query is performed ~~500~~ 600 msec (tolerance range 600 – 650) after Ignition_Status changes from OFF/ACC to RUN. Only use this strategy if specifically called out in a feature spec.
- The Feature Client shall not perform the query operation during Crank/Start (ie Ignition_Status = Crank). If a query event is in progress and a crank event happens then after the crank event finishes (Ignition_Status goes from Crank/Start → Run) the Query shall resume where it left off.

The Feature Client shall request the highest priority features first for the query operation. High priority should be given to features that either need to be displayed immediately (ex. welcome stage), features that are most likely be inquired by users or features determined to be critical to the Feature Client.

Upon the reception of a valid Feature ID along with its corresponding feature setting and personality profile, the Feature Client shall store the data, stop the query process for that feature and move to query a different feature.

If during the Feature Query process at start-up the user selects a feature that hasn't been queried yet then that user selected feature shall be the next feature queried (unless noted otherwise) and the feature query start-up process shall resume where it left off.

- Example: for this example say it typically takes 12 seconds to query everything at start-up and "Feature X" is typically queried at the end of the start-up process. Then if for example in the first second of the query start-up process the user went to a menu/HMI screen for "Feature X" that hadn't been queried yet then since that is the active screen "Feature X" would be the next item queried in the start-up process so it could populate the menu setting. Once "Feature X" was queried the start-up feature query process would continue on to the next item in the start-up process.

When querying features in the start-up routine after the Feature Client receives the Feature.St response from the Feature Server then within 50 msec of receiving the Feature.St the feature client shall query the next item in the start-up routine.

When querying features in the start-up routine the Feature Client can query multiple modules at the same time.

- For example if the Feature Client is Querying Module_X for Feature X at the same time the Feature Client could also query Module_Y for Feature Y.



3.2.2.3 FBMP-REQ-023025/B-Query request but no response from Feature Server (Query Retries) (TcSE ROIN-287299-1)

If after sending a Query request, the Feature Client does not receive a response from the Feature Server, then the Feature Client shall retry the query request for the feature. The Query requests for a feature are retried up to 5 times before stopping. The query retries happen at 100 msec intervals and shall not take more than 500 msec from the time of the first query request. After 500 msec of retrying with no response the Feature Client shall move on to the next feature query.

If the Feature Client doesn't receive a response for the Query requests then the Feature Client shall perform error handling. The general strategy for error handling of a menu item when the Feature Client does not receive a response from the Feature Server, is to display the menu with no item selected (see HMI specification for what to do for particular features – the HMI spec take precedent over the SPSS in case of conflict between specs)). There are exceptions such that a default item in the menu might be required to be selected depending on the feature. It is also possible that the menu might have to use the last received value that the Feature Server sent in a previous power mode state. The default state error handling may vary between components and features.

3.2.2.4 FBMP-SR-REQ-238230/F-Enhanced Memory - Active Personality Profile change using Feature Based Message Protocol

If Enhanced Memory is supported, then after the ActivePersonality_St changes to a new personality profile as defined in the Enhanced Memory SPSS, the FBMP Feature Client (ex Centerstack Settings HMI Client module) shall Query all the FBMP Feature Servers (ex Query all FBMP settings in centerstack) that use FBMP with the PersIndex set to the new personality profile. The query is performed 200 msec after the ActivePersonality_St signal changes to the new profile (the 200 msec gives the Feature Settings Servers time to update to the new active personality before queried). If the active screen is displaying any FBMP settings, those settings shall be queried first.

- See Enhanced Memory requirement “[ENMEM-REQ-099693-Display Data Refresh After Driver Profile Change](#)” in the Enhanced Memory SPSS.

The FBMP Feature Settings Client (ex Centerstack Settings HMI Client module) shall save all FBMP settings the Feature Servers responds back with, regardless of what the PersIndex is set to for Enhanced Memory.

- Note: some Feature Servers using FBMP don't support enhanced memory (or the FBMP SPSS). Since those features may not respond with a relevant PersIndex, the PersIndex shall be ignored by the FBMP Feature Setting Client.
- Note2: infotainment Feature Server modules supporting the infotainment FBMP SPSS, and not supporting Enhanced Memory, shall respond with PersIndex set to Vehicle per “[FBMP-REQ-023037-PersIndex Definition](#)”.

For FBMP Feature Server modules that do support Enhanced Memory, when a FBMP Feature Server module is being Queried, it shall respond back with the settings/data for whatever PersIndex the FBMP Feature Client is Querying regardless what is the Active Personality (ActivePersonality_St) for Enhanced Memory.

3.2.3 Sequence Diagrams

3.2.3.1 FBMP-SD-REQ-023026/C-Query Operation at Start-Up (TcSE ROIN-287300-1)

Pre-condition

The system is OFF for a particular feature (ie HMIAudioMode = OFF and/or Ignition_Status < Run)

System start-up is initiated (ie infotainment system ON (ie HMIAudioMode goes from OFF to ON) and/or Ignition_Status = Run)

Scenario

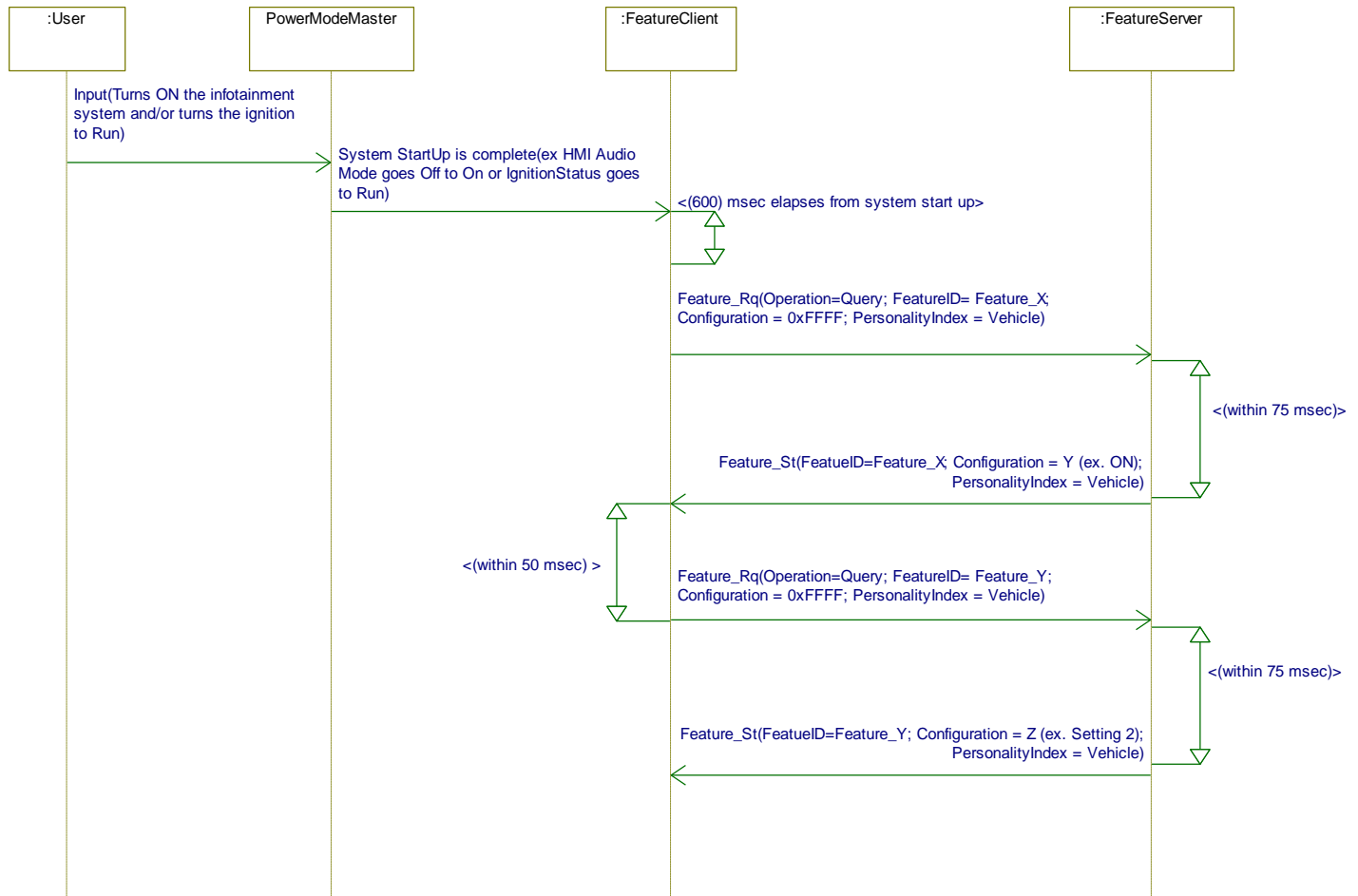
The Feature Client performs the Query start-up routine ~~500~~ 600 msec after the system start-up (ie ~~500~~ 600 msec after HMIAudioMode = ON and/or ~~500~~ 600 msec after Ignition_Status = Run)

Post-condition

The Feature Client receives the Feature Query information from the Feature Server and stores the data for various purposes including but not limited to the menu display and then queries the next feature



Sequence Diagram

**3.2.3.2 FBMP-SD-REQ-023027/B-Query Operation at Start-Up with no response with Retries (TcSE ROIN-287326-1)****Pre-condition**

The system is OFF for a particular feature (ie HMIAudioMode = OFF and/or Ignition_Status < Run)

System start-up is initiated (ie Infotainment system ON (HMIAudioMode goes from OFF to ON) and/or Ignition_Status changes from OFF/Accessory to Run)

Scenario

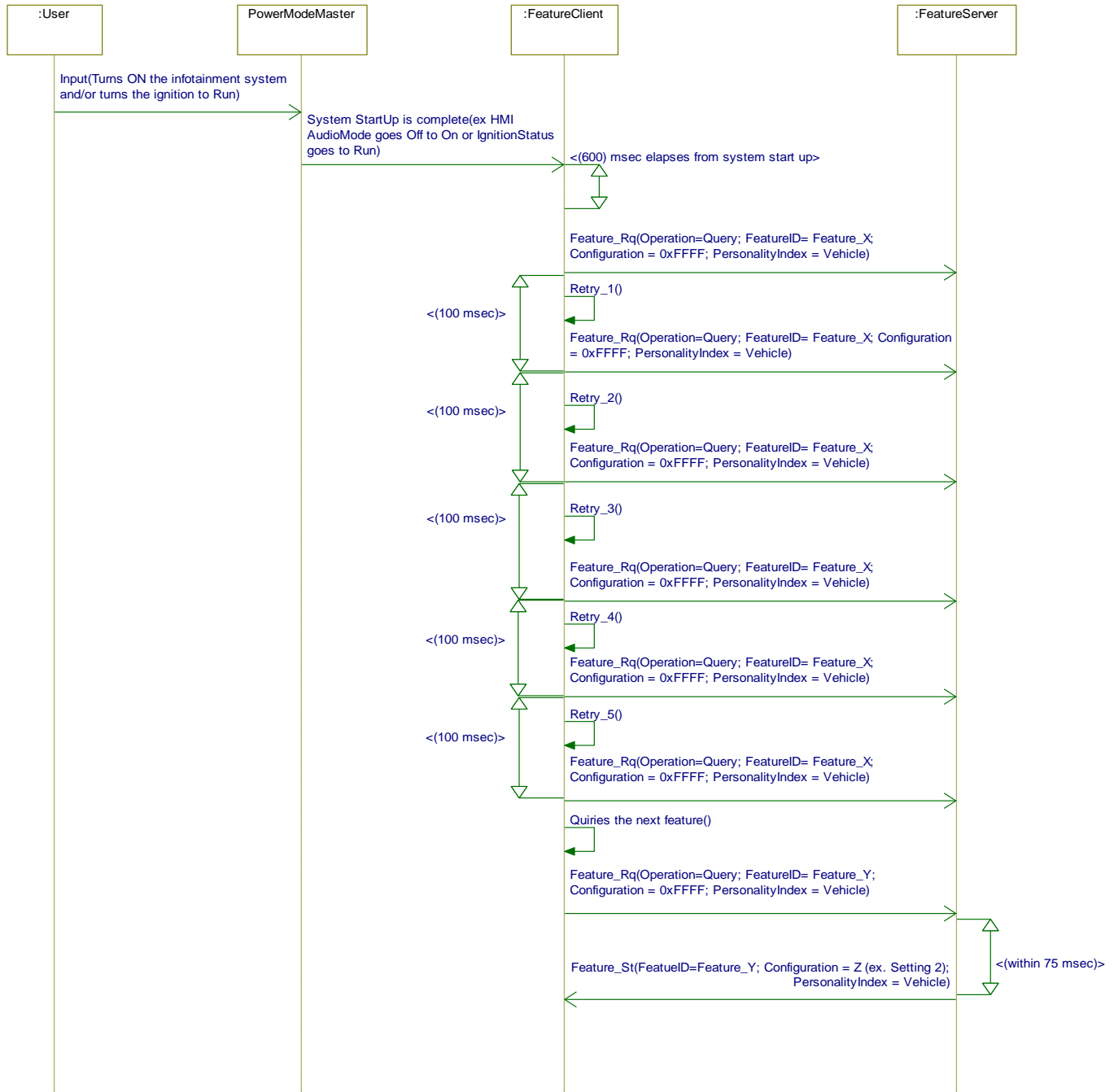
The Feature Client performs the Query start-up routine 500 600 msec after the system start-up (ie 500 600 msec after HMIAudioMode = ON and/or 500 600 msec after Ignition_Status changes from OFF/Accessory to Run)

Post-condition

The Feature Client does not receive the response from the Feature Server, up to 5 retries are performed before move to Query the next feature



Sequence Diagram





4 Appendix: Reference Documents

Reference #	Document Title
1	Settings in the Centerstack SPSS
2	Adjustable Chime SPSS (for adjustable chime setting)
3	Enhanced Memory SPSS
4	Other specs may use parts of this spec (ex Multicamera, TBA, TGA, VPA...)
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	