Research & Vehicle Technology
"Infotainment Systems Product Development"

Feature – Favorites Hard Button Server

Infotainment Subsystem Part Specific Specification (SPSS)

Version 1.0
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FORD CONFIDENTIAL

<u>Revision History</u>

Date	Ver	Notes
October 29, 2021	**1.0**	**Initial Release**

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1   Overview

The Favorites Hard Button feature allows a user to select a feature setting on the HMI to set as their 'favorite' in respect to the Favorites Hard Button (not to be confused with the HMI's favorite button). When the Favorites Hard Button is pressed, the associated feature setting is toggled accordingly. This provides the user with a quick means to toggle a feature setting of their choosing (within the provided/allowed list of feature settings).

1.1   Terms and Definitions

Abbreviation	Description
CAN	Controller Area Network
CCS	Customer Connectivity Setting
DID	Data Identifier
FCI	Ford Cloud Interface
FHB	Favorites Hard Button
FNV2.0	Fully Networked Vehicle 2nd Generation
FTCP	Ford Telematics Communication Protocol
IPPT	IP pass-through
SDN	Service Delivery Network
SOA	Service Oriented Architecture
SPSS	Subsystem Part Specific Specification
WIR	Wireless Interface Router

Term	Description
Favorites Hard Button	They physical button on the IP that the user presses to activate their favorited feature setting.
Feature Setting	A setting that is available for the user to set as a favorite

2 Architectural Design

2.1 FHB-CLD-REQ-431200/A-Favorites Hard Button Server

The Favorites Hard Button Server (FHBServer) is responsible for the tasks listed below:

- Provide a user interface to allow the selection of a feature setting to be set as a favorite
- Receive input from Favorites Hard Button
- Toggle favorited feature setting upon Favorites Hard Button press
- Transmit favorited feature request interfaces
- Receive favorited feature status interfaces

Please review the implementation guide/ block diagram to locate the Favorites Hard Button Server class.

2.2 Physical Mapping of Classes

The table below shows an example of how the logical classes that make up the Favorites Hard Button feature can be mapped into physical modules. This mapping is an example only and does not necessarily carryover to other carlines or vehicle architectures.

Logical Class	Physical Module (ECU)
FHBServer	SYNC

2.3 FHBServer Interface

2.3.1 FHB-IIR-REQ-431201/A-FHBServer_Tx

The Favorites Hard Button uses a LIN interface to communicate the button press to the FHBServer. Please refer to the Button Strategy APIM SPSS for more details (REQ-096644 has been included for context).

Note: This feature uses existing features and their interfaces (relative to the 'favorited' feature). Refer to the referenced SPSS's in the requirements for full interface details.

2.3.1.1 BUTTONv2-IIR-REQ-096644/D-LIN BCP Button Press - Button Interface Requirements

| BCP_Button_Press (ICPBtnStateRotary, ICPBtnState…) | Method from the Button Input Client to the receiving modules. | ButtonANameID (ICPBtnID_A)
0x0 - 0xFF
see Input Translation Matrix

ButtonAActivationState (ICPBtnCoding_A)
0x0 Inactive / Not_Pressed
0x1 Active / Pressed
0x2 ShortEvent / Pressed
0x3 ShortElapsed / Pressed
0x4 LongEvent / Pressed
0x5 Stuck
0xF Idle / Not_Pressed

ButtonBNameID (ICPBtnID_B)
0x0 – 0xFF
see Input Translation Matrix

ButtonBActivationState (ICPBtnCoding_B)
0x0 Inactive / Not_Pressed
0x1 Active / Pressed
0x2 ShortEvent / Pressed
0x3 ShortElapsed / Pressed
0x4 LongEvent / Pressed
0x5 Stuck
0xF Idle / Not_Pressed

ButtonCNameID (ICPBtnID_C)
0x0 – 0xFF
see Input Translation Matrix

ButtonCActivationState (ICPBtnCoding_C)
0x0 Inactive / Not_Pressed
0x1 Active / Pressed
0x2 ShortEvent / Pressed
0x3 ShortElapsed / Pressed
0x4 LongEvent / Pressed
0x5 Stuck
0xF Idle / Not_Pressed

ButtonDNameID (ICPBtnID_D)
0x0 – 0xFF
see Input Translation Matrix

ButtonDActivationState (ICPBtnCoding_D)
0x0 Inactive / Not_Pressed
0x1 Active / Pressed
0x2 ShortEvent / Pressed
0x3 ShortElapsed / Pressed
0x4 LongEvent / Pressed
0x5 Stuck
0xF Idle / Not_Pressed |

Hint: maybe new interfaces like e.g. new generation interface, contains less button slots (including related ID and coding slots) e.g. 2. In this case only first number of slots e.g. A and B shall be considered).

2.3.2 FHB-IIR-REQ-431202/A-FHBServer_Rx

Note: This feature uses existing features and their interfaces (relative to the 'favorited' feature). Refer to the referenced SPSS's in the requirements for full interface details.

2.3.2.1 *MD-REQ-027149/A-IgnitionStatus_St (TcSE ROIN-225464-1)*

Message Type: Status

Signal used to indicate ignition state.

Name	Literals	Value	Description

Type	-	-	Indicates ignition state
	Unknown	0x0	
	Off	0x1	
	Accessory	0x2	
	Run	0x4	
	Start	0x8	
	Invalid	0xF	

3   General Requirements

3.1   FHB-REQ-431204/A-Feature Configuration

The FHBServer shall have a configurable parameter/DID (DE09 Byte 12 Bit 7 – Favorites Hard Button) to allow the feature to be enabled/disabled.

- When the parameter indicates that Favorites Hard Button is Present, all the functionality and signals defined in this SPSS shall be supported.
- When the parameter indicates that Favorites Hard Button is Not Present, none of the functionality defined in this SPSS shall be supported.
    - o   The default value for this parameter shall be Not Present.

3.2   FHB-REQ-431205/A-Powermode Conditions

The FHBServer shall only perform the Favorites Hard Button functionality when the following preconditions are met:
- IgnitionStatus_St = "(0x4) Run"

3.3   FHB-REQ-431206/A-Favorites Hard Button – Press & Hold Functionality

The FHBServer shall not support Press & Hold functionality on selection of the Favorites Hard Button. Only the below Activation States shall be supported by the FHBServer upon reception of BCP_Button_Press (ButtonXNameID = "(0x93) ICPBtnID_Favorites"):

ButtonXActivationState	FHBServer Action Taken
(0x0) Inactive / Not_Pressed	Supported: No action taken
(0x1) Active / Pressed	Supported: Treat as single button press
(0x2) ShortEvent / Pressed	Not Supported: No action taken
(0x3) ShortElapsed / Pressed	Not Supported: No action taken
(0x4) LongEvent / Pressed	Not Supported: No action taken
(0x5) Stuck	Supported: Input not valid if in this state (ignore button press when 'stuck')
(0xF) Idle / Not_Pressed	Supported: No action taken

Note: The 'X' in Button**X**ActivationState and Button**X**NameID is a placeholder for the actual button that was pressed (A,B,C,D etc.) This may be any valid button. See the Button Strategy APIM SPSS for more details.

3.4   FHB-REQ-431209/A-Favorites Hard Button Setting Redundancy

The feature settings offered within the Favorites Hard Button Edit Menu (except the Calm Screen) shall be redundant, meaning that they shall still be accessible and available via their native HMI menus.

3.5   FHB-REQ-463777/A-MyKey Restrictions & Favorites Hard Button

When a MyKey is detected/active, the Favorites Hard Button Edit Menu shall be made unavailable. Upon attempted entry into this screen, the user shall be notified that this feature is unavailable due to MyKey Restrictions.

If the Favorites Hard Button is pressed when the favorited setting is one that is also MyKey Restricted, the setting shall not be actuated (the relative signal request shall not be sent), and the user shall be notified that this feature is unavailable due to MyKey Restrictions.
- To determine whether a feature setting is MyKey Restricted, see the respective SPSS for that feature setting

4 Functional Definition

4.1 FHB-FUN-REQ-431203/A-Setting a Favorite

4.1.1 Use Cases

4.1.1.1 FHB-UC-REQ-431230/A-User selects a feature to associate to the Favorites Hard Button

Actors	FHBServer
Pre-conditions	Powermode conditions are met No feature set as a favorite
Scenario Description	User enters the Favorites Hard Button Edit Menu and selects a feature setting
Post-conditions	The FHBServer saves and associates the feature setting to the Favorites Hard Button
List of Exception Use Cases	
Interfaces	CAN, HMI

4.1.1.2 FHB-UC-REQ-431231/A-Favorites Hard Button setting after Master Reset

Actors	FHBServer
Pre-conditions	Powermode conditions are met A feature is set as a favorite
Scenario Description	User performs a Master Reset
Post-conditions	The FHBServer resets/clears the Favorites Hard Button selection
List of Exception Use Cases	
Interfaces	CAN, HMI

4.1.2 Requirements

4.1.2.1 FHB-REQ-431210/A-Favorites Hard Button Edit Menu
When the Favorites Hard Button Feature Configuration is set to "Present", the FHBServer shall show/enable the Favorites Hard Button Edit Menu. Otherwise, the Favorites Hard Button Edit Menu shall not be shown.

4.1.2.2 FHB-REQ-431211/A-Favorites Hard Button Edit Menu Feature Settings
The FHBServer shall provide the below options/feature settings in the Favorites Hard Button Edit Menu, based on their own existing feature configurations:
- **Launch Control** (DE09 Byte 11 Bit 3, Launch Control = 'Enabled')
- **Auto Hold** (DE00 Byte 12 Bit 6, Auto Hold = 'Enabled')
- **Rev Match** (DE08 Byte 14 Bit 0, Engine Rev Match = 'Enabled')
- **Calm Screen** (DE01 Byte 1 Bit 2, Calm Screen = 'Enabled')
- **Active Exhaust** (DE08 Byte 14 Bit 1, Tunable Exhausts = 'Enabled')
  - Exhaust Favorite (Quiet, Normal, Sport, Track)

Refer to the Infotainment Diagnostics Specification for the most up to date configuration information.

4.1.2.3   FHB-REQ-431212/A-Selecting a Favorite via the FHBServer

When the user selects one of the feature settings from the Edit Menu (Active Exhaust is an exception, see REQ-431213), that feature setting shall become the active Favorite. The selection of a favorite via the FHBServer shall not result in the actuation/toggling of the relative feature setting, that shall only be done via the Favorites Hard Button.

4.1.2.4   FHB-REQ-431213/A-Selecting a Favorite via the FHBServer - Exhaust Favorite

When the user selects Active Exhaust, the FHBServer shall display a list of exhaust modes (Quiet, Normal, Sport, Track) that the user can select to set as their Exhaust Favorite. The user must select one of the exhaust modes in order for Active Exhaust to become the active Favorite. This selection of an exhaust mode via the FHBServer shall not result in the actuation/toggling of the Active Exhaust, that shall only be done via the Favorites Hard Button.

Note: See the "Settings In Infotainment Centerstack SPSS" for full interface and available exhaust modes.

4.1.2.5   FHB-REQ-431207/A-Persisting the Favorites Hard Button Setting

The FHBServer shall persist the users selected Favorites Hard Button between key cycles. Prior to any Favorite being selected by the user, the FHBServer shall default the feature to an unselected state (No Favorite shall be set by default).

4.1.2.6   FHB-REQ-431208/A-Master Reset & Favorites Hard Button Setting

The FHBServer shall reset/clear the Favorites Hard Button selection upon a Master Reset.

4.1.3   White Box View

4.1.3.1   Activity Diagrams

4.1.3.2   Sequence Diagrams

4.2 FHB-FUN-REQ-431232/A-Toggle Favorite

4.2.1 Use Cases

4.2.1.1 *FHB-UC-REQ-431228/A-User presses Favorites Hard Button (no favorite set)*

Actors	FHBServer
Pre-conditions	Powermode conditions are met No feature set as a favorite
Scenario Description	User presses the Favorites Hard Button
Post-conditions	The FHBServer displays the Edit Menu, allowing the user to select which feature they would like to make a favorite
List of Exception Use Cases	
Interfaces	CAN, HMI

4.2.1.2 *FHB-UC-REQ-431229/A-User presses Favorites Hard Button (favorite set)*

Actors	FHBServer
Pre-conditions	Powermode conditions are met A feature is set as a favorite
Scenario Description	User presses the Favorites Hard Button
Post-conditions	The FHBServer toggles the favorited feature
List of Exception Use Cases	
Interfaces	CAN, HMI

4.2.2 Requirements

4.2.2.1 *FHB-REQ-431214/A-Favorites Hard Button – No Favorite Selected*

Upon receiving BCP_Button_Press (ButtonXNameID = "(0x93) ICPBtnID_Favorites", ButtonXActivationState = "(0x1) Active / Pressed") when no Favorite is selected (where no feature setting has been set as a favorite yet), the FHBServer shall display the Favorites Hard Button Edit Menu with no favorited feature selection.

4.2.2.2 *FHB-REQ-431215/A-Favorites Hard Button – Favorite Selected*

Upon receiving BCP_Button_Press (ButtonXNameID = "(0x93) ICPBtnID_Favorites", ButtonXActivationState = "(0x1) Active / Pressed") when a Favorite selection has already been made, the FHBServer shall actuate/toggle the favorited feature setting (see individual requirements below).

4.2.2.3 *Launch Control*

4.2.2.3.1 FHB-REQ-431216/A-Launch Control Favorited – Hard Button Pressed

When Launch Control is the active favorite when the Favorites Hard Button is pressed, the FHBServer shall:
- Request Launch Control turn ON, if it is OFF
- Request Launch Control turn OFF, if it is ON

Note: See the "Launch Control SPSS" for full interface and available Launch Control values.

4.2.2.3.2   FHB-REQ-431218/A-Determining the current Launch Control state

Per MD-REQ-410995-LnchRq, the FHBServer continuously sends the users requested state for Launch Control via LnchRq. The FHBServer shall determine the current Launch Control state by looking at the active state of this request signal at the time of the Hard Button Press per REQ-431216.

4.2.2.3.3   FHB-REQ-431217/A-Requesting Launch Control On/Off

The FHBServer shall utilize the existing Launch Control interfaces per TRAP-IIR-REQ-410998-Track Apps Client Tx, MD-REQ-410995-LnchRq and TRAP-REQ-411005-Launch Control User Request

When the FHBServer is required to request the Launch Control turn ON, the FHBServer shall send:
- LnchRq = "0x1 – On"

When the FHBServer is required to request the Launch Control turn OFF, the FHBServer shall send:
- LnchRq = "0x0 – Off"

Note: See the "Track Apps SPSS" for full interface and feature details.

4.2.2.4   Auto Hold

4.2.2.4.1   FHB-REQ-431219/A-Auto Hold Favorited – Hard Button Pressed

When Auto Hold is the active favorite when the Favorites Hard Button is pressed, the FHBServer shall send an Auto Hold button press event to toggle the feature state.

Note: See the "Auto Hold APIM SPSS" for full interface and feature details.

4.2.2.4.2   FHB-REQ-431220/A-Requesting Auto Hold On/Off

The FHBServer shall utilize the existing Auto Hold interfaces per AH-REQ-236106-AutoHoldClient_Rx and AH-REQ-235722-AutoHoldClient_Tx.

Regardless of the current Auto Hold feature state, when the FHBServer is required to request an Auto Hold toggle, the FHBServer shall send AHSwitch = "0x1 Pressed" for 200ms, followed by "0x0 – Not Pressed."

Note: See the "Auto Hold APIM SPSS" for full interface and feature details.

4.2.2.5   Rev Match

4.2.2.5.1   FHB-REQ-431221/A-Rev Match Favorited – Hard Button Pressed

When Rev Match is the active favorite when the Favorites Hard Button is pressed, the FHBServer shall:
- Request Rev Match turn ON, if it is OFF
- Request Rev Match turn OFF, if it is ON

Note: See the "Settings In Infotainment Centerstack SPSS" for full interface and available Rev Match values.

4.2.2.5.2   FHB-REQ-431222/A-Determining the current Rev Match state

The FHBServer shall utilize the existing Rev Match interfaces per VS-SR-REQ-280685-Rev Match (Engine Revolution Match) and VS-IIR-REQ-243929-FBMP Interface requirements.

The FHBServer shall determine the current Rev Match state by monitoring the last received value via Feature_St (from the most recently performed Query):
- Feature_St:
    - Feature ID = "0x0D08"
    - Configuration = [the Rev Match value]
        - Where 0x0 = Off, 0x1 = On
    - PersIndex = [the active PersIndex]

The FHBServer shall use this value to determine which request to send per REQ-431223.

Note: See the "Settings In Infotainment Centerstack SPSS" for full interface and available Rev Match values.

4.2.2.5.3   FHB-REQ-431223/A-Requesting Rev Match On/Off

The FHBServer shall utilize the existing Rev Match interfaces per <u>VS-SR-REQ-280685-Rev Match (Engine Revolution Match)</u> and <u>VS-IIR-REQ-243929-FBMP Interface requirements.</u>

When the FHBServer is required to request the Rev Match turn ON, the FHBServer shall send:
- Feature_Rq:
    - Operation = "0x1 – Set"
    - Feature ID = "0x0D08"
    - Configuration = "On – 0x1"
    - PersIndex = [the active PersIndex]

When the FHBServer is required to request the Rev Match turn OFF, the FHBServer shall send:
- Feature_Rq:
    - Operation = "0x1 – Set"
    - Feature ID = "0x0D08"
    - Configuration = "Off – 0x0"
    - PersIndex = [the active PersIndex]

Note: See the "Settings In Infotainment Centerstack SPSS" for full interface and available Rev Match values.

4.2.2.6   Calm Screen

4.2.2.6.1   FHB-REQ-431224/A-Calm Screen Favorited – Hard Button Pressed

When Calm Screen is the active favorite when the Favorites Hard Button is pressed, the FHBServer shall:
- Turn OFF the Calm Screen, if it is currently ON
- Turn ON the Calm Screen, if it is currently OFF
    - If turning back ON, the last displayed screen shall be shown to the user

4.2.2.7   Active Exhaust

4.2.2.7.1   FHB-REQ-431225/A-Active Exhaust Favorited – Hard Button Pressed

When Active Exhaust is the active favorite when the Favorites Hard Button is pressed, the FHBServer shall:
- Request the Exhaust Favorite, if it is not already active
- Request the last active exhaust mode, if the Exhaust Favorite is active

In order to do so, the FHBServer shall save/remember the exhaust mode that was active prior to the favorite button being selected. This value shall only be stored for the life of the ignition cycle.

If the currently active Exhaust Mode is the same as the Exhaust Favorite when the Favorites Hard Button is pressed, the FHBServer shall notify the user that the mode is active, but shall not send the request as per REQ-431227.

Note: Upon key on, the exhaust mode always defaults to 'Normal'

4.2.2.7.2   FHB-REQ-431226/A-Determining the current Active Exhaust mode

The FHBServer shall utilize the existing Active Exhaust interfaces per <u>VS-FUN-REQ-280671-Exhaust Mode</u> and <u>VS-IIR-REQ-243929-FBMP Interface requirements</u>.
The FHBServer shall determine the current Active Exhaust by monitoring the last received value via Feature_St (from the most recently performed Query):
- Feature_St:
    - Feature ID = "0x0D09"
    - Configuration = [the Active Exhaust value]
        - Where 0x0 = Quiet, 0x1 = Normal, 0x2 = Sport, 0x3 = Track
    - PersIndex = [the active PersIndex]

The FHBServer shall use this value to determine which request to send (per REQ-431227) and which value to store (per REQ-431225).

Note: See the "Settings In Infotainment Centerstack SPSS" for full interface and available exhaust modes.

4.2.2.7.3   FHB-REQ-431227/A-Requesting an Active Exhaust mode

The FHBServer shall utilize the existing Active Exhaust interfaces per VS-FUN-REQ-280671-Exhaust Mode and VS-IIR-REQ-243929-FBMP Interface requirements.

When the FHBServer is required to request the Exhaust Favorite, the FHBServer shall send:
- Feature_Rq:
    - Operation = "0x1 – Set"
    - Feature ID = "0x0D09"
    - Configuration = [the Exhaust Favorite previously set by the user]
        - Where 0x0 = Quiet, 0x1 = Normal, 0x2 = Sport, 0x3 = Track
    - PersIndex = [the active PersIndex]

When the FHBServer is required to request the last active exhaust mode, the FHBServer shall send:
- Feature_Rq:
    - Operation = "0x1 – Set"
    - Feature ID = "0x0D09"
    - Configuration = [the last active exhaust value]
        - Where 0x0 = Quiet, 0x1 = Normal, 0x2 = Sport, 0x3 = Track
    - PersIndex = [the active PersIndex]

Note: See the "Settings In Infotainment Centerstack SPSS" for full interface and available exhaust modes.

4.2.3   White Box View

4.2.3.1   Activity Diagrams

4.2.3.2   Sequence Diagrams

5   Appendix: Reference Documents

Reference #	Document Title
1	Button Strategy APIM SPSS
2	Settings In Infotainment Centerstack SPSS
3	Auto Hold APIM SPSS
4	Launch Control SPSS
5	
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