

**Research & Vehicle Technology**

**“Product Development”**

**Enhanced Memory (F000172)**

**Soft Button Feature Level Specification**

Version 1.3

**UNCONTROLLED COPY IF PRINTED**

**Version Date: May 6, 2022**

**FORD CONFIDENTIALF**

**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Version** | **Notes** | |
| **October 29, 2019** | **1.0** | **Initial Release** |  |
|  |  |  |  |
| **Februarys 26, 2020** | **1.1** | **Updated release** | **Add vehicle configure conditions** |
|  | ENMEM-REQ-xxx1/B-Classic Memory scope condition | | The Steering column and HUD need further modification. |
|  | ENMEM-REQ-xxx2/B-Memory Button conditions | | Memory button 1/2/3 is applier for this document, the Memory button 1/2/3Set need further modification also |
|  | ENMEM-REQ-198931/A-Retry and Error Handling Strategies for Seat Button Association Mode | | Added |
|  | 5.17.1 Compatibility description | | Remove the configuration parameter value list 0x3, make no sense |
|  |  | |  |
|  |  |  |  |
|  | **V1.2** | **Updated release** | **Add IVI configuration to identify soft button/hard button/disable** |
|  | ENMEM-FUN-REQ-xxx/x- Hard button and soft button configuration parameter | | Add DCU configuration to identify soft button/hard button.  Add IVI configuration to identify soft button/hard button/disable.  Add Requirement |
|  |  |  |  |
| **March 10, 2022** | **V1.3** | **Updated release** | **Delete Account and Face ID** |
|  | ENMEM-REQ-199760/B-Optional Keyfob/Phone/FaceID/Account Association to a Driver Profile | | Delete Account/FaceID Association to a Driver Profile |
|  | ENMEM-REQ-201962/B-Disassociate a Keyfob/Phone/FaceID/Account from a Driver Profile | | Delete Disassociate Account/FaceID from a Driver Profile |
|  | ENMEM-CLD-REQ-199792/A-Enhanced Memory Server | | Add ALCM in Enhanced Memory server |
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# Introduction

## Purpose of Specification

The following feature from the [Global Feature & Function List](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=ZmZNi0JHx3NrTDAAAAAAAAAAAAA) is described in this specification.

| **Feature ID** | **Feature Name** | **Core Owner** | **Reference** |
| --- | --- | --- | --- |
| F000172 | Enhanced Memory | Walter Stephens (wstephe1@ford.com) | [VDOC041625-Enhanced Memory Feature Specification](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=boRV6owSx3NrTDAAAAAAAAAAAAA) |

This document specifies

* Functionalities of the Enhanced Memory feature from the customer perspective
* Generic electrical/electronic system functional and architectural requirements

This feature specification can be used to define subsystems and component design as well as Netcom signals for each program and for different architectures. This specification alone shall not directly pass to suppliers without additional specifications and other documents.

## Target Audience of Specification

The target audience of this document includes:

* + Core Engineers responsible for writing the specifications of Enhanced Memory sub-systems and related components
  + Electrical Systems Engineers, System Integration Test Engineers and D&R Engineers conducting breadboard, system and vehicle integration testing and sign off

Component Suppliers are not the target audiences of this document due to the fact this document contains little or no details on physical and program specific information.

## Scope of Specification

The scope of this document is:

* + General Feature Requirements
  + Logic Architecture Design
  + Functional Requirements including Functional Decomposition Diagram, HMI Flow Chat, Use Cases, Activity Diagrams and Sequence Diagrams
  + High level HMI Requirements
  + Physical mapping of Classes
  + Logic Methods to Physical (CAN) signals translation table

Note: No physical level or program specific requirements will be included in this document. Important physical level and program specific specifications and information can be found in the Reference section.

## Document Structure

The structure of this document is explained below:

Change log

Table of Content

**Section 1** – Introduction: Giving an explanation how to use this document including responsibilities and the scope of the document. It explains the terminology and clarifies the definitions, concepts, and abbreviations used in the document

**Section 2** – Feature Description: Stating briefly the background and the purpose of the feature with use of a Feature Context Diagram

**Section 3** – Feature Requirements: Listing high level Feature functional, HMI and non-functional requirements with no implementation or physical layer information

**Section 4** – Feature Architecture:

* Defining architecture via Classes and Logic Methods
* Listing functionalities of each Class
* Defining interfaces among 4 Classes via Logic Methods
* Listing description of Logic Methods
* Providing physical mapping of Class and Logic Methods to Physical (CAN) signals translation table

**Section 5** – Functional Definition:

* Function Decomposition**:** Giving an overview of which functions are necessary to implement this feature, relation between User functions and Logic Functions, relation among Logic Functions, and Functional Decomposition Diagram
* Function Definitions: Giving functional description, Functional Decomposition Diagram, HMI Flow Chat, Use Cases, Requirements, Activity Diagram and Sequence Diagram

**Section 6** – Appendix: Presenting additional data mainly in a tabular form, e.g., a data dictionary, an automatically generated list of requirements or a traceability matrix

Note: No physical level or program specific requirements will be included in this document. Documents of important physical level and program specific specifications and information can be found in the Reference section.

## Terminology

### Definitions

|  |  |
| --- | --- |
| Enhanced Memory | The personalization feature defined in this SPSS which allows a user to create, manage, and recall up to 3 Driver Profiles all containing different positional and non-positional settings configurations. |
| Classic Memory | The original personalization feature which allows a user to store and recall positional settings for 3 drivers. |
| MyKey | Feature allowing a user to restrict a set of vehicle settings for specific vehicle keys |
| Keyfob | A vehicle key with lock, unlock, and alarm functionalities |
| Door Unlock Event | Event from Keyfob/phone Unlock button that triggers a recall request |
| Remote Start Event | Event from Keyfob/phone Remote Start button that triggers a recall request |
| Driving Restriction | HMI restrictions imposed to reduce the distraction risk connected to electronic devices built into a vehicle |
| Driver Profile | A collection of personalized vehicle settings that can be recalled by a user in an Enhanced Memory vehicle |
| Keyfob Association | The process by which a Keyfob is linked to a Driver Profile |
| Keyfob Disassociation | The process by which a Keyfob is unlinked from a Driver Profile |
| Driver Memory Seat Button Association | The process by which a Driver Memory Seat Button is linked to a Driver Profile |
| Positional Settings | Settings personalized by Classic Memory such as driver seat, exterior mirrors, adjustable pedals, the tilt/telescope steering column and Heads-up Display features. The complete list is vehicle dependent. |
| Non-Positional Settings | Settings personalized by Enhanced Memory such as radio presets, language, time, distance units, temperature, navigation, etc. |
| Phone as a Key | Feature that makes phone as a key to remote start vehicle, lock, unlock doors, start Engine, recall Enhanced Memory Driver Profiles and many other keyfob functions (Blue Tooth) |
| Phone Association | The process by which a Phone is linked to a Driver Profile |
| Phone Disassociation | The process by which a Phone is unlinked from a Driver Profile |

### Acronyms and Abbreviations

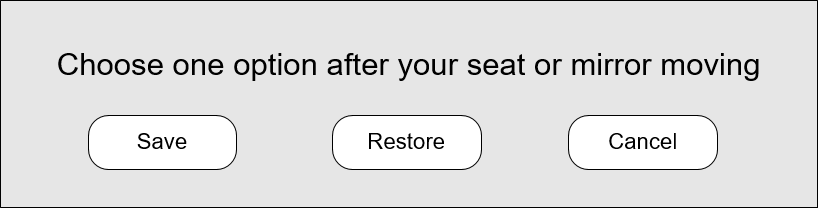
|  |  |
| --- | --- |
| ABS | Automatic Braking System |
| ACC | Accessory |
| Admin Key | Administrator’s Key |
| AHU | Audio Head Unit |
| AHUD | Advanced Heads Up Display |
| DuerOS | Duer Operation System |
| BCM | Body Control Module |
| BTMBF | Bass-Treble-Middle-Balance-Fade (Audio Adjustment Settings) |
| CAN | Controller Area Network |
| CAN dB init | Controller Area Network Database Initial Value |
| CES | Command Execution Status |
| CGEA 1.3 | Common Global Electrical Architecture 1.3 |
| D&R | Design and Release Engineer |
| DDM | Driver Door Module |
| DSM | Door Seat Module |
| DSP AMP | Digital Signal Processing Amplifier |
| DTC | Diagnostic Trouble Code |
| ECU | Electronic Control Unit |
| EM | Enhanced Memory |
| FCIM | Front Control Interface Module |
| FS | Feature Specification Document |
| GSDB | Global Signal Database |
| HCM | Headlamp Control Module |
| HMI | Human Machine Interface |
| IA | Intelligent Access Key |
| IKT | Integrated Key Transmitter |
| IPC | Instrument Panel Cluster |
| IPMA | Image Processing Module A |
| MY18 | Model Year 2018 |
| OCC Mode | Occupancy Mode |
| PEPS | Passive Entry Passive Start |
| RKE | Remote Keyless Entry |
| SCV | Speed Compensated Volume |
| VDM | Vehicle Dynamic Module |
| PaaK | Phone as a Key Feature |
| ECG | Enhanced Central Gateway |
| ALCM | Ambient Light Control Module |

# Feature Description

## Feature Overview

The Enhanced Memory feature introduces the Driver Profiles concept which extends memory capability of the vehicle from Classic Memory, mainly positional settings, to include many other settings such as radio presets, navigation preferences, and so on.

After personal profile created, positional and non-positional settings are stored in profile automatically. Non-positional settings will be auto-saved all the time. And positional change can be saved and restored according to IVI pop-up.



Enhanced Memory can be summarized as:

* Driver recognition system in which different drivers can have his/her own personalized settings in a vehicle.
* Users must “opt-in” to create Driver Profiles. Without opt-in, vehicle will operate as it does normally with no separate Driver Profiles for different drivers.
* A Driver Profile must be associated to a person index and can be optionally associated to keyfob, phone~~, FaceID or account.~~
* Upon entry into a vehicle, through Smart Handle or unlock button pressing from a Keyfo or a phone, a driver will be identified, and his/her Driver Profile will be recalled.
* Once in a vehicle, the active Driver Profile can be changed by going through Center Stack screen menus, or pressing a keyfob or a phone unlock button~~, or account login, or FaceID~~.
* If a feature configuration is changed, it will automatically be saved to the active Driver Profile with the exception of Classic Memory positional settings that require the user to choose “save” soft button to save the changed positional settings.

## Assumptions & Dependencies

Enhanced Memory is assumed to enhance and extend the Classic Memory feature, which is limited to strictly positional settings, to include and personalize non-positional settings. Technically speaking, vehicles without Classic Memory feature can still personalize non-positional settings with Enhanced Memory feature. In that case, the recall interface will not include the Driver Memory Seat button. However, Marketing and Brand strategy may not favor offering Enhanced Memory to vehicles without Classic Memory.

This specification, chapters 4 & 5 in particular, assumes a distributed system. Modules included in this system (Enhanced Memory) are responsible for auto-saving, recalling, maintaining, and storing the non-positional settings their Feature Owner have agreed to personalize, as defined in the Enhanced Memory Feature List (see references). A central module/interface will not be provided to manage/view all personalized settings.

## Enhanced Memory Context Diagram

The Context Diagram below shows the systems and entities that interact with the Enhanced Memory feature (for example Classic Memory and My Key).



Figure 1 – Enhanced Memory Context Diagram

# Feature Requirements

## Vehicle configure condition for this feature

### ENMEM-REQ-xxx1/B-Classic Memory scope condition

The vehicle shall be equipped with the classic memory which only include the mirrors and seat position. If the vehicle’s classic memory is also including Steering column position, the feature spec shall do the specific modification for that.

### ENMEM-REQ-xxx2/B-Memory Button conditions

The vehicle’s memory button configuration shall consist of the Button1/Button2/Button3 (MemorySetSw\_Cfg=Not Present, such as CD542), if the vehicle’s memory button consists of Button1/Button2/Button Set, the feature spec shall do the specific modification for that.

Also, this document only suitable for the program that replace the hard button with soft button on IVI.

## Functional Requirements

### ENMEM-REQ-201660/B-Enhanced Memory Functions

In order to allow the user to recall his or her personal settings, the Enhanced Memory feature shall contain the following functions (Without the Function Safety (ISO26262) Requirement):

* Opt-In and Opt-Out Enhanced Memory feature
* Enable and Disable Enhanced Memory feature
* Create/add Driver Profiles:
  + Obtain Driver Profile name
  + Assign a person index to profile
  + Copy current settings
* Recall Driver Profiles
* HMI menu recall
* Unlock from keyfob if profile was associated with keyfob
* Unlock from Phone if profile was associated with phone
* ~~Account login if profile was associated with account~~
* ~~Face identify if profile was associated with FaceID~~
* Edit Driver Profiles:
  + Change Driver Profile Name
  + Associate keyfob
  + Disassociate keyfob
  + Associate phone if the vehicle is equipped with PaaK Feature
  + Disassociate phone if the vehicle is equipped with PaaK Feature
  + Delete Driver Profiles

### ENMEM-REQ-201674/A-Availability of Enhanced Memory Recall Functions

Enhanced Memory shall allow the user to recall a Driver Profile without the restrictions of vehicle ignition status, transmission status, and driving restriction.

### ENMEM-REQ-199761/B-Methods to Recall a Driver Profile

Enhanced Memory shall provide the following methods to the user for recalling a Driver Profile:

* Pressing the unlock or remote start button on an RKE(remote keyless entry) transmitter (for both IKT(integrated key transmitter) and IA(Intelligent access) Key)
* Opening driver door with Smart Door Handle without pressing unlock button on an IA Key (Push to start engine type of keyfob)
* Selecting a Driver Profile through the HMI menu
* Pressing the unlock or remote start button on a phone
* ~~Account login~~
* ~~FaceID~~

### ENMEM-REQ-199762/B-Operations Shall Not Recall a Driver Profile

Enhanced Memory shall not allow the following operations to recall a Driver Profile, when Enhanced Memory is enabled:

* Entering a keypad code
* Starting engine with an associated or unassociated keyfob or phone
* Storing positional settings via the Classic Memory Method to a button that has not been associated to a Driver Profile. In this case, the saved Classic Memory positional settings shall be recalled and the Vehicle Profile shall be recalled for applicable soft settings.
* Associating a keyfob or a phone to a Driver Profile
* Pressing a Passenger Memory Seat Button

### ENMEM-REQ-199763/B-Active Driver Profile in Different Recall Events

When the Enhanced Memory feature is turned on and the vehicle is not in Driver Memory Seat button association mode, if the user recalls a Driver Profile through a keyfob, a phone, ~~a FaceID or account~~ that is already associated to a Driver Profile, that particular Driver Profile shall be recalled as the active Driver Profile.

In the event where a keyfob or a phone has not been associated to any Driver Profile, the last known Driver Profile shall be recalled as the active Driver Profile.

### ENMEM-REQ-199764/B-Default Active Driver Profile

When the Enhanced Memory feature is turned On, Enhanced Memory shall recall the last known Driver Profile as the active Drive Profile in the following use cases:

* There is no profile recall event occurring
* In the event where a profile recall event occurs but the recalled Drive Profile cannot be determined
* In the event where an unassociated keyfob or an unassociated phone is used to trigger the unlock door event

When the last known Driver Profile cannot be determined in all of the above scenarios, Enhanced Memory shall recall the Vehicle level Profile (Guest Profile) as the active Driver Profile.

### ENMEM-REQ-199757/A-Recall Vehicle Profile

Enhanced Memory shall recall the Vehicle Profile (Guest Profile) for the following use cases:

* When Enhanced Memory is not enabled because the user does not Opt-In to Enhanced Memory or the user turns Off Enhanced Memory
* The user recalls Guest Profile via the HMI menu while Enhanced Memory is enabled
* The active Profile is deleted while Enhanced Memory is enabled
* ~~An unassociated Driver Memory Seat button is pressed while Enhanced Memory is enabled.~~

### ~~ENMEM-SR-REQ-220733/A-Recall Strategy when Valet Mode is from on to off~~

~~When Valet Mode is turned off from on, Enhanced Memory shall recall the active Driver Profile prior to Valet Mode being turned on.~~

~~Examples:~~

~~If the active Drive Profile was Driver Profile 2 while the Valet Mode was turned on, then Enhanced Memory shall recall Driver Profile 2 once the Valet mode is turned off from on.~~

~~If the active Drive Profile was Guest Profile while the Valet Mode was turned on, then Enhanced Memory shall recall Guest Profile once the Valet mode is turned off from on. This example could happen for Enhanced Memory featured was on or off when Valet mode is turned off.~~

### ENMEM-REQ-199755/A-Numbers of Driver Profiles

Enhanced Memory shall provide the user a defined number, N\_NumberOfProfiles, of Driver Profiles, plus a Guest Profile. The defined number of Driver Profiles for any program/carline shall be the same as the maximum number of classic memory..

### ENMEM-REQ-199756/A-N\_NumberOfProfiles

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| N\_NumberOfProfiles | N\_NumberOfProfiles is the number of Driver Profiles available from Enhanced Memory. The Number is program dependent and shall be the same as the maximum number of classic memory |  | 2-5 | 1 | Program dependent |

### ENMEM-REQ-199754/A-Opt-In Enhanced Memory Feature to Create Driver Profile

Opt-in shall be required from the user to enable Enhanced Memory and create the first Driver Profile. Without the opt-in step the user cannot create any Driver Profiles and the vehicle will operate as it does normally without separate Driver Profiles for different drivers.

### ENMEM-REQ-199788/B-Opt-Out Enhanced Memory Feature

Enhanced Memory shall allow the user to opt-out of the Enhanced Memory feature and remove the capability of separate Driver Profiles for different drivers. All existing Driver Profiles, along with the association to keyfobs and phones, shall be permanently deleted.

### ~~ENMEM-REQ-201676/A-Disable Enhanced Memory~~

~~Enhanced Memory shall provide a means to allow the user to switch between Enhanced Memory mode and Classic Memory mode after the user has opted in to Enhanced Memory. A Disable Enhanced Memory function can allow the user to temporarily switch from Enhanced Memory mode to Classic Memory mode in which non-positional settings are not personalized for different users. Unlike opting out of Enhanced Memory, which permanently deletes all Driver Profiles, disabling Enhanced Memory only temporarily removes access to the Enhanced Memory Driver Profiles and all Enhanced Memory functions, allowing the vehicle to revert back to Classic Memory mode.~~

~~The Disable Enhanced Memory function shall temporarily remove access to the Enhanced Memory feature until it is enabled once again. All existing Driver Profiles (prior to disabling) shall be restored to the user when Enhanced Memory is enabled.~~

### ~~ENMEM-REQ-201675/A-Enable Enhanced Memory~~

~~Enhanced Memory shall provide a means to allow the user to switch between Enhanced Memory mode and Classic Memory mode after the user has opted in to Enhanced Memory.~~

~~Enable Enhanced Memory function shall allow the user to access all existing Driver Profiles and all functions provide by Enhanced Memory feature.~~

### ENMEM-REQ-201961/B-Create Driver Profile

An Enhanced Memory Driver Profile is a collection of personalized vehicle settings that can be recalled by a user. The process of creating a Driver Profile allows the driver to create a Driver Profile Name and associate the Driver Profile to a person index automatically. The creation process also allows the user to copy the current vehicle settings to the Driver Profile.

* Create/Add Driver Profile function shall solicit a unique Driver Profile name from the user
* Create/Add Driver Profile function shall assign a person index to driver profile according to the create order.
* Create/Add Driver Profile function shall copy current applicable settings to the Driver Profile
* Create/Add Driver Profile function shall automatically recall the newly created Driver Profile as the active Driver Profile upon completion

### ENMEM-REQ-199758/A-Associate Driver Profiles to a person index automatically

In profile create process, enhanced memory will assign a person index to driver profile according to the create order. Driver profile1/2/3 corresponding person index1/2/3.

If the profile changed, the person\_index shall change accordingly. Also, if one profile deleted, the left profile shall keep their association with person\_index.

### ENMEM-REQ-199760/B-Optional Keyfob/Phone/~~FaceID/Account~~ Association to a Driver Profile

Enhanced Memory shall allow a keyfob and a phone to be associated to an available Driver Profile. Each keyfob and each phone shall only be associated to one Driver Profile and one Driver Profile shall only be associated to one keyfob and/or one phone.

~~The detailed logic between driver profile, FaceID and account is not determined yet.~~

### ENMEM-REQ-201962/B-Disassociate a Keyfob/Phone/~~FaceID/Account~~ from a Driver Profile

Disassociate Keyfob function shall allow the associated keyfob to be disassociated from a Driver Profile.

Disassociate phone function shall allow the associated phone to be disassociated from a Driver Profile.

~~Disassociate FaceID function shall allow the associated FaceID to be disassociated from a Driver Profile.~~

~~Disassociate Account function shall allow the associated account to be disassociated from a Driver Profile.~~

### ENMEM-REQ-199787/B-Delete a Driver Profile

Delete Driver Profile function shall allow the user to delete a Driver Profile one at a time. Once a Driver Profile is deleted, the settings for all personalized features, the associations shall be permanently erased.

Consequently, deleting a Driver Profile will automatically disassociate that Driver Profile from the associated keyfob/phone/~~FaceID/account.~~

Once the associated keyfob or phone is disassociated, the keyfob or phone shall not be able to recall any Driver Profile including both positional and non-positional settings. This means a disassociated keyfob or phone cannot to be used to recall Classic Memory settings.

### ENMEM-REQ-199765/B-MyKey Takes Precedence Over Driver Profile Settings

If a MyKey is the active key or phone in the vehicle, all MyKey restrictions shall remain active regardless of which Driver Profile is active. In the event of any conflict between a MyKey restriction and an Enhanced Memory personalized setting, the MyKey restriction shall over write the personalized setting.

### ~~ENMEM-REQ-220734/A-Valet Mode Disables Enhanced Memory Feature~~

~~When Valet Mode is turned on, Enhanced Memory shall be disabled in order to prevent Driver Profiles from being changed.~~

### ENMEM-REQ-199767/A-Enhanced Memory Ignition Restriction

Enhanced Memory shall impose ignition restrictions to the following specific Enhanced Memory operations:

* Create/add Driver Profiles
* Edit Driver Profiles

These operations shall be allowed only when ignition is in Run.

### ENMEM-REQ-232557/A-Phone & Phone-As-A-Key

The association of a phone to a Driver Profile shall be supported by use of the Phone-As-A-Key (PaaK) feature. The phone must be setup, authorized, and connected as a PaaK before it can be associated to a Driver Profile.

Refer to the PaaK feature specification for detailed information.

## HMI Requirements

### ENMEM-HMI-REQ-199778/A-Enhanced Memory User Interface

Enhanced Memory shall provide a user interface to support Enhanced Memory functions.

### ENMEM-HMI-REQ-202211/A-HMI for Personalized Feature Settings

Enhanced Memory shall have a guide and HIM indication for profile creation, profile save and profile restore:

### ENMEM-HMI-REQ-199779/A-Indication of the Active Profile

Enhanced Memory shall provide the user an indication of the active Driver Profile, the Driver Profile that is currently recalled with its personalized settings executed. The indication of the active Driver Profile shall be displayed, but not limited to, the following circumstances:

* In a Welcome Message when vehicle is first started
* In a Driver Profile Menu when Enhanced Memory is turned on
* Whenever a Driver Profile change occurs

### ENMEM-HMI-REQ-201980/B-Indication of Existing Driver Profile Status

Enhanced Memory shall provide the user the statuses of all existing Driver Profiles. Within each existing Driver Profile, the following items shall be displayed:

* Driver Profile Name
* A keyfob icon if a keyfob is associated to a Driver Profile
* A phone icon if a phone is associated to a Driver Profile
* ~~A FaceID icon if a FaceID is associated to a Driver Profile~~
* ~~A Account icon if a account is associated to a Driver Profile~~
* Active Profile indication if the Driver Profile is the Active profile

### ENMEM-HMI-REQ-199780/B-Indication of Operation Status

Enhanced Memory shall provide the user the status, including success, failure, and time-out, of the following operations:

* Keyfob/Phone/~~FaceID or Account~~ Association
* Driver Profile Creation
* Copy Operation

### ENMEM-HMI-REQ-199781/B-Indication of Association Status

In the Enhanced Memory Association process, Enhanced Memory shall provide the user the status of an already associated keyfob, phone, ~~FaceID and account~~ if that phone or keyfob is selected by the user to be associated to a newly created Driver Profile.

### ~~ENMEM-REQ-199875/A-No Overwrite for Driver Memory Seat Button Association~~

~~Enhanced Memory shall not allow the user to associate an already associated Driver Memory Seat button to a different Driver Profile~~

### ENMEM-REQ-201981/B-Overwrite for Keyfob and phone Association

Enhanced Memory shall permit the user to associate an already associated keyfob or phone to a different Driver Profile. ~~（FaceID and Account is TBD, need strategy confirmation and any new added signals?）~~

### ENMEM-REQ-199786/B-Overwrite or Restart Keyfob and phone Association

In the Keyfob or phone Association process, if the user selects a keyfob or a phone that is already associated to another Driver Profile, the Enhanced Memory HMI shall provide the user a chance to overwrite the existing association or restart the Keyfob or phone Association process to select a different keyfob or phone.

### ENMEM-HMI-REQ-199782/B-Multiple Opportunities for Association

Enhanced Memory shall allow the user a defined number of retries, N\_NumberOfRetries, each with a defined length of time, T\_FobAssocOneTime, to associate a keyfob or a phone to a Driver Profile. The total Keyfob or phone Association process shall be limited to a defined amount of time, T\_FobAssocTotal, to prevent system lock-up.

Enhanced Memory shall allow the user a defined number of retries, N\_NumberOfRetries, each with a defined length of time, T\_SeatAssocOneTime, to associate a Driver Memory Seat button to a Driver Profile.

The total Driver Memory Seat Button Association process shall be limited to a defined amount of time, T\_SeatAssocOneTime2, to prevent system lock-up.

### ENMEM-REQ-199785/B-N\_NumberOfRetries

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| N\_NumberOfRetries | N\_NumberOfRetries is the number of retries:   * offered to the user to associate a Driver Memory Seat button * offered to the user to associate a fob to a Driver Profile * offered to the user to associate a phone to a Driver Profile * Performed by the EnhancedMemoryInterfaceClient when no response is detected from the Enter Driver Memory Seat Button Association request. |  | 2-5 | 1 | 3 |

### ENMEM-TMR-REQ-199783/B-T\_FobAssocOneTime

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_FobAssocOneTime | Maximum time the EnhancedMemoryInterfaceClient shall allow user to assign a keyfob/phone to a Driver Profile within one attempt. | sec | 10-60 | 5 | 15 |

### ENMEM-TMR-REQ-199784/B-T\_FobAssocTotal

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_FobAssocTotal | Maximum time the EnhancedMemoryInterfaceClient shall allow user to assign a keyfob/phone to a Driver Profile for all attempts. | sec | 180-600 | 60 | 300 |

### ~~ENMEM-TMR-REQ-199759/A-T\_SeatAssocOneTime~~

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **~~Name~~** | **~~Description~~** | **~~Units~~** | **~~Range~~** | **~~Resolution~~** | **~~Default~~** |
| ~~T\_SeatAssocOneTime~~ | ~~Maximum time the EnhancedMemoryInterfaceClient shall allow for the button pairing process.~~ | ~~sec~~ | ~~30-120~~ | ~~5~~ | ~~60~~ |

### ~~ENMEM-TMR-REQ-199881/A-T\_SeatAssocOneTime2~~

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **~~Name~~** | **~~Description~~** | **~~Units~~** | **~~Range~~** | **~~Resolution~~** | **~~Default~~** |
| ~~T\_SeatAssocOneTime2~~ | ~~Maximum time the EnhancedMemoryPositionClient shall wait before exiting Driver Memory Seat Button Association Mode.~~ | ~~sec~~ | ~~40-130~~ | ~~5~~ | ~~70~~ |

### ENMEM-HMI-REQ-199766/A-Enhanced Memory Specific Driving Restriction

Enhanced Memory shall impose driving restriction, defined by DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction – General Applications, to the following specific Enhanced Memory operations:

* Create/add Driver Profiless
* Edit Driver Profiles

### ENMEM-HMI-REQ-199772/A-Driver Distraction

Any existing driver distraction requirements and/or guidelines shall apply for settings personalized under Enhanced Memory and shall supersede any Enhanced Memory requirements. For example, positional settings shall follow Classic Memory requirements to restrict recalls while a vehicle is in motion (among other conditions).

### ENMEM-HMI-REQ-199768/A-Availability of Enhanced Memory Menu and Functions

The Enhanced Memory recall user interface shall be available to the user without the restrictions of vehicle ignition status, transmission status, and driving restriction:

* Opt-Out Enhanced Memory feature
* Enable Enhanced Memory feature
* Disable Enhanced Memory feature
* Recall a Driver Profile.

### ENMEM-HMI-REQ-199769/A-Enhanced Memory Driving Restriction Feedback

Enhanced Memory shall provide the user feedback in the event where the user attempts to use Enhanced Memory menus and functionalities that are disabled due to a driving restriction.

### ENMEM-HMI-REQ-199771/A-Content of Enhanced Memory Driving Restriction Feedback

Enhanced Memory driving restriction feedback shall provide the information listed below:

* The reason why the menu and functionalities are disabled
* The instruction to enable the menus and functionalities

### ~~ENMEM-HMI-REQ-199777/A-Enhanced Memory HMI Driver Profile Identification~~

~~The Enhanced Memory HMI shall identify a Driver Profile by a unique Driver Profile Name and a Driver Memory Seat button. Driver Profiles shall not be created without both a unique Driver Profile Name and the association to a Driver Memory Seat button.~~

~~The need of the association between a Driver Profile and a Driver Memory Seat button is to include positional settings in the Enhanced Memory Driver Profile and also to allow the user to use the Driver Memory Seat button as a recall interface to recall Enhanced Memory Driver Profiles.~~

### ENMEM-HMI-REQ-199751/A-HMI Performance Requirement

Enhanced Memory shall comply with Ford Trustmark RQT-001301-003538-12 LOGIC OF OPERATION: FEEDBACK.

### ENMEM-HMI-REQ-233264/B-Phone Association HMI Option

The EnhancedMemoryInterfaceClient shall monitor PaakConnection\_St and make active/inactive the offered “phone” and “both” pairing selections (see REQ-233260) and the ability to pair a phone via an edit menu as such:

* When PaakConnection\_St = Connected, the above shall be made active
* When PaakConnection\_St = NoneConnected, the above shall be made inactive (greyed-out, hidden, etc.)

## Non-Functional Requirements

### ENMEM-REQ-199750/A-Enhanced Memory Feature Classification

The feature classification of Enhanced Memory is B per ES1W7T-F407K00-AA. This means that Enhanced Memory is not a safety feature.

### ENMEM-REQ-199752/A-Enhanced Memory Interaction via Feature Based Message Protocol

Feature Based Message Protocol shall be used to implement Enhanced Memory personalized features whenever CAN signal structure permits. Please see reference for Feature Based Message Protocol specifications for different menu displays devices.

### ENMEM-SR-REQ-199753/B-Enhanced Memory Feature Inclusion Guidelines

As a general guideline, the following conditions were considered to determine if a feature shall be included as part of Enhanced Memory:

* If a setting is reset to a default value at every key cycle, then that setting is not included. One example of this type features is Traction Control setting
* If a setting can be remotely activated before reliable driver identification could occur, that setting is not included. One example of this type features is Remote Start Front Window Defrost setting
* MyKey is not included. All MyKey settings remain the same for different MyKey keyfobs, MyKey Phones and different Driver Profiles within a vehicle. For example, the MyKey Max Speed setting for MyKey keyfob1, MyKey keyfob2 MyKey phone1 must be the same value and cannot be personalized for different drivers within a vehicle.

Exact features included in Enhanced Memory could vary among different programs and different vehicle packages. Information about program specific Enhanced Memory Feature List can be found in the Reference section.

### ENMEM-REQ-199773/B-Retain Enhanced Memory Settings After Software Reflash

Enhanced Memory shall retain Driver Profile information and patronizable settings after software reflash occurs. This is to prevent the customer from having to recreate and reprogram their Driver Profiles, keyfobs, phones and feature settings after a software reflash service is performed at a dealership or via Wifi Automatic Software Update.

### ENMEM-SR-REQ-206880/A-Updates to Non-Volatile Memory

Personalized settings supported by Enhanced Memory shall be stored in NVM (Non-Volatile Memory) in order to survive power loss. These settings shall be saved and updated immediately in the NVM as user changes occur. NVM changes shall not be accumulated for later writing.

# Feature Architecture Design

At the logical level, the Enhanced Memory feature is distributed across four different classes, two servers, and two clients. These classes are:

* Enhanced Memory Interface Client
* Enhanced Memory Position Client
* Enhanced Memory Profile Server
* Enhanced Memory Server

The logic block diagram below summarizes the interface among the four classes. After the block diagram, functions of each class and their detailed class interface descriptions are given. The logic to physical signal translation table is listed for reference.

(The relationships can be easy understand by the “Vehicle network/system interface”

EM interface and position client send the information to EM profile server, EM profile server

Accept and broadcast the information, last, the EM server execute and maintain settings)

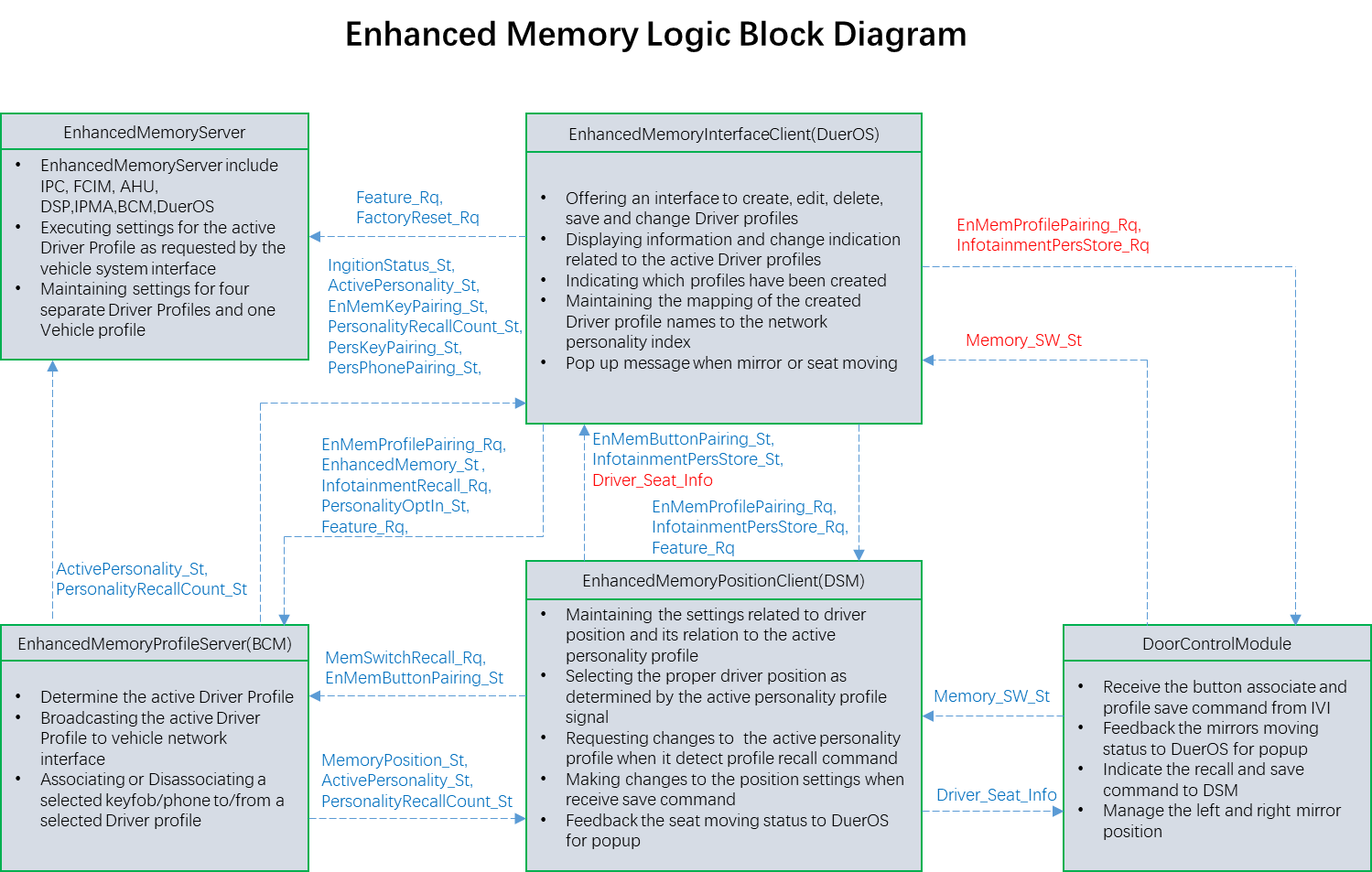


Figure 2 – Enhanced Memory Logic Block Diagram

## Enhanced Memory Class Functional Description

### ENMEM-CLD-REQ-199789/A-Enhanced Memory Interface Client

The EnhancedMemoryInterfaceClient is responsible for the tasks listed below.

* Offering the user an interface to turn on and off the Enhanced Memory feature
* Offering the user an interface to create, edit, delete and change Driver Profiles
* Displaying information related to the active Driver Profile
* Providing indications of changes to the active Driver Profile
* Indicating which Driver Profiles have been created (pers1-4 possible) to the vehicle system interface
* Maintaining the mapping of the created Driver Profile names to the network personality index

Please review the implementation guide/block diagram to locate the EnhancedMemoryInterfaceClient class

### ENMEM-CLD-REQ-199790/A-Enhanced Memory Position Client

The EnhancedMemoryPositionClient is responsible for the tasks listed below.

* Maintaining the settings related to driver position and its relation to the active personality profile
* Selecting the proper driver position (seat position, exterior mirror position, steering column position) as determined by the active personality profile signal on the vehicle network interface
* Requesting changes the active personality profile when it detects a Driver Memory Seat button is pressed
* Making changes to the position settings when a setting store operation is detected via a Driver Memory Seat button

Please review the implementation guide/block diagram to locate the EnhancedMemoryPositionClient object.

### ENMEM-CLD-REQ-199791/B-Enhanced Memory Profile Server

The EnhancedMemoryProfileServer is responsible for the tasks listed below.

* Determining the active Driver Profile
* **Broadcasting** the active Driver Profile to vehicle network interface
* Associating or Disassociating a selected keyfob and a phone to/from a selected Driver Profile

Review the implementation guide/block diagram to locate the EnhancedMemoryProfileServer class.

### ENMEM-CLD-REQ-199792/A-Enhanced Memory Server

The EnhancedMemoryServer is responsible for the tasks listed below.

* Executing settings for the active Driver Profile as requested by the vehicle system interface
* Maintaining settings for four separate Driver Profiles and one Vehicle Profile

Please review the implementation guide/ block diagram to locate the EnhancedMemoryServer class

## Physical Mapping of Classes

The table below shows an example of how the four logical classes that make up the Enhanced Memory feature can be mapped into physical modules. This mapping example is specific to MY24 CX821/771 FNV2 architecture and does not necessarily carryover to other carlines or vehicle architectures.

Please note that one physical module can belong to more than one class.

|  |  |
| --- | --- |
| Logical Class | Physical Module (ECU) |
| Enhanced Memory Interface Client | DuerOS |
| Enhanced Memory Position Client | DSM |
| Enhanced Memory Profile Server | BCM |
| Enhanced Memory Server | AHU, DuerOS, BCM, DSP, IPC, IPMA, ALCM |

## Enhanced Memory Class Interface Description

The table below summarizes the interface among the four classes. Transmitting methods and receiving methods of each class are given after the table.

### ENMEM-REQ-203519/C-Enhanced Memory Feature Interface Requirement

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Logic Method Name | Logic Parameter Name | Literals | Value | Tx | Rx |
| EnMemProfilePairing\_Rq | PersIndex | Null | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory ProfileServer |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
| NotUsed | 0x5 |
| NotUsed | 0x6 |
| NotUsed | 0x7 |
| ButtonPairing | Null | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory PositionClient |
| EnterButtonPairing | 0x1 |
| ExitButtonPairing | 0x2 |
| NotUsed | 0x3 |
| KeyPairing | Null | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory ProfileServer |
| EnterKeyPairing | 0x1 |
| ExitKeyPairing | 0x2 |
| DisassociateKey | 0x3 |
| OverwriteKey | 0x4 |
| EnterPhonePairing | 0x5 |
| DisassociatePhon InfotainmentRecall\_Rqe | 0x6 |
|  |  |  |  |  |  |
| InfotainmentPersStore\_Rq | PersIndex | Null | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory PositionClient |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
| Vehicle | 0x5 |
| InfotainmentRecall\_Rq | PersIndex | Null | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory ProfileServer |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
| Vehicle | 0x5 |
| PersonalityOptIn\_St | Pers1Status | NotOptedIn | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory ProfileServer |
| OptedIn | 0x1 |
| Pers2Status | NotOptedIn | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory ProfileServer |
| OptedIn | 0x1 |
| Pers3Status | NotOptedIn | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory ProfileServer |
| OptedIn | 0x1 |
| Pers4Status | NotOptedIn | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory ProfileServer |
| OptedIn | 0x1 |
|  |  |  |  |  |  |
| EnhancedMemory\_St | Status | Null | 0x0 | EnhancedMemory InterfaceClient | EnhancedMemory ProfileServer |
| ProfilesOn | 0x1 |
| ProfilesOff | 0x2 |
| NotSupported | 0x3 |
|  |  |  |  |  |  |
| EnMemButtonPairing\_St | ButtonPairing | Null | 0x0 | EnhancedMemory PositionClient, | EnhancedMemory InterfaceClient EnhancedMemory  ProfileServer |
| Button1Pressed | 0x1 |
| Button2Pressed | 0x2 |
| Button3Pressed | 0x3 |
| Button4Pressed | 0x4 |
| ButtonPairingEntered | 0x5 |
| ButtonPairingExited | 0x6 |
| ButtonPairingFailed | 0x7 |
|  |  |  |  |  |  |
| InfotainmentPersStore\_St | Status | Complete | 0x0 | EnhancedMemory PositionClient | EnhancedMemory InterfaceClient |
| InProgress | 0x1 |
| Null | 0x2 |
| MemSwitchRecall\_Rq | PersIndex | Null | 0x0 | EnhancedMemory PositionClient | EnhancedMemory ProfileServer |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
|  |  |  |  |  |  |
| EnMemKeyPairing\_St | PersIndex | Null | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
| NotUsed | 0x5 |
| NotUsed | 0x6 |
| NotUsed | 0x7 |
| KeyPairing | Null | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| KeyPairingEntered | 0x1 |
| KeyPairingExited | 0x2 |
| KeyDisassociated | 0x3 |
| KeyAlreadyInUse | 0x4 |
| KeyAssociateSuccess | 0x5 |
| KeyAssociateFailed | 0x6 |
| WrongDeviceSelected | 0x7 |
| PersKeyPairing\_St | Pers1KeyStatus | Null | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| Key Associated | 0x1 |
| Key Not Associated | 0x2 |
| Reserved | 0x3 |
| Pers2KeyStatus | Null | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| Key Associated | 0x1 |
| Key Not Associated | 0x2 |
| Reserved | 0x3 |
| Pers3KeyStatus | Null | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| Key Associated | 0x1 |
| Key Not Associated | 0x2 |
| Reserved | 0x3 |
| Pers4KeyStatus | Null | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| Key Associated | 0x1 |
| Key Not Associated | 0x2 |
| Reserved | 0x3 |
| PersPhonePairing\_St | Pers1PhoneStatus | No Phones Associated | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| One Phone Associated | 0x1 |
| Two Phones Associated | 0x2 |
| Three Phones Associated | 0x3 |
| Four Phones Associated | 0x4 |
| Five Phones Associated | 0x5 |
| Six Phones Associated | 0x6 |
| Seven Phones Associated | 0x7 |
| Pers2PhoneStatus | No Phones Associated | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| One Phone Associated | 0x1 |
| Two Phones Associated | 0x2 |
| Three Phones Associated | 0x3 |
| Four Phones Associated | 0x4 |
| Five Phones Associated | 0x5 |
| Six Phones Associated | 0x6 |
| Seven Phones Associated | 0x7 |
| Pers3PhoneStatus | No Phones Associated | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| One Phone Associated | 0x1 |
| Two Phones Associated | 0x2 |
| Three Phones Associated | 0x3 |
| Four Phones Associated | 0x4 |
| Five Phones Associated | 0x5 |
| Six Phones Associated | 0x6 |
| Seven Phones Associated | 0x7 |
| Pers4PhoneStatus | No Phones Associated | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| One Phone Associated | 0x1 |
| Two Phones Associated | 0x2 |
| Three Phones Associated | 0x3 |
| Four Phones Associated | 0x4 |
| Five Phones Associated | 0x5 |
| Six Phones Associated | 0x6 |
| Seven Phones Associated | 0x7 |
| PaakConnection\_St | Status | Null | 0x0 | PaaKServer | EnhancedMemory InterfaceClient |
| NoneConnected | 0x1 |
| Connected | 0x2 |
|  |  |  |  |  |  |
| ActivePersonality\_St | PersIndex | Pers1 | 0x0 | EnhancedMemory ProfileServer | ALL\* |
| Pers2 | 0x1 |
| Pers3 | 0x2 |
| Pers4 | 0x3 |
| Vehicle | 0x4 |
| NotDetermined | 0x5 |
| NotUsed | 0x6 |
| NotUsed | 0x7 |
| PersonalityRecallCount\_St | CountValue | 0 | 0x00 | EnhancedMemory ProfileServer | ALL\* |
| 1 | 0x01 |
| … |  |
| 255 | 0xFF |
| MemoryPosition\_St | PersIndex | Pers1 | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory PositionClient |
| Pers2 | 0x1 |
| Pers3 | 0x2 |
| Pers4 | 0x3 |
| Vehicle | 0x4 |
| Not Used | 0x5 |
| Not Used | 0x6 |
| Not Used | 0x7 |
|  |  |  |  |  |  |
| Feature\_Rq | Operation | Null | 0x0 | EnhancedMemory InterfaceClient | ALL\* |
| Query | 0x1 |
| Set | 0x2 |
| Upload | 0x3 |
| Restore | 0x4 |
| Copy | 0x5 |
| NotUsed | 0x6 |
| NotUsed | 0x7 |
| FeatureID | - | 0x0000 – 0xFFFF | EnhancedMemory InterfaceClient | ALL\* |
|
|
| Configuration | - | 0x0000 – 0xFFFF | EnhancedMemory InterfaceClient | ALL\* |
|
|
| PersIndex | PERS\_1 | 0x0 | EnhancedMemory InterfaceClient | ALL\* |
| PERS\_2 | 0x1 |
| PERS\_3 | 0x2 |
| PERS\_4 | 0X3 |
| VEHICLE | 0X4 |
| Not Used | 0x5 |
| Not Used | 0x6 |
| Not Used | 0x7 |
|  |  |  |  |  |  |
| VehicleSpeed\_St | Type | kph | 0x0000 - 0xFFFF | PCM | EnhancedMemory InterfaceClient |
| GearLvrPos\_D\_Actl | Type | Park | 0x0 | TCM | EnhancedMemory InterfaceClient |
| Reverse | 0x1 |
| Neutral | 0x2 |
| Drive | 0x3 |
| Sport\_DriveSport | 0x4 |
| Low | 0x5 |
| First | 0x6 |
| Second | 0x7 |
| Third | 0x8 |
| Fourth | 0x9 |
| Fifth | 0xA |
| Sixth | 0xB |
| Undefined\_Treat\_as\_Fault | 0xC |
| Undefined\_Treat\_as\_Fault1 | 0xD |
| Unknown\_Position | 0xE |
| Fault | 0xF |
| IgnitionStatus\_St | Type | Unknown | 0x0 | EnhancedMemory ProfileServer | EnhancedMemory InterfaceClient |
| Off | 0x1 |
| Accessory | 0x2 |
| Run | 0x4 |
| Start | 0x8 |
| Invalid | 0xF |
| FactoryReset\_Rq | Type | Invalid | 0x0 | EnhancedMemory InterfaceClient | INFO\*\* |
| Reset | 0x1 |

\* ALL refers to EnhancedMemoryServer

\*\* INFO refers to Infotainment Enhanced Memory Servers that support Master Reset

### Logic Method to Physical Signal Translation Table

Logic parameter names are translated into GSDB signal names in this table. The Global Signal Database (GSDB) is the master for all signals. GSDB signal names listed here are reference only.  Readers are advised to refer Global Signal Database for up to date information. Tx and Rx in this table only reflect MY 2020 U611 program and does not necessarily carryover to other carlines or other model years for U611.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Logic Method Name | Logic Parameter Name |  | GSDB Signal Name | GSDB Encoding Name | Value | Tx | Rx |
| EnMemProfilePairing\_Rq | PersIndex | EmPrflNo\_D\_Rq | Null | 0x0 | DuerOS | BCM/DCU |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
| NotUsed | 0x5 |
| NotUsed | 0x6 |
| NotUsed | 0x7 |
| ButtonPairing | EmPrflButtnAssoc\_D\_Rq | Null | 0x0 | DuerOS | DSM |
| EnterButtonAssociation | 0x1 |
| ExitButtonAssociation | 0x2 |
| NotUsed | 0x3 |
| KeyPairing | EmPrflKeyAssoc\_D\_Rq | Null | 0x0 | DuerOS | BCM |
| EnterKeyAssociation | 0x1 |
| ExitKeyAssociation | 0x2 |
| DisassociateKey | 0x3 |
| OverwriteKey | 0x4 |
| EnterPhoneAssociation | 0x5 |
| DisassociatePhone | 0x6 |
|  |  |  |  |  |  |  |
| InfotainmentPersStore\_Rq | PersIndex | PersStore\_D\_Rq | Null | 0x0 | DuerOS | DSM/DCU |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
| Vehicle | 0x5 |
| InfotainmentRecall\_Rq | PersIndex | CntrStk\_D\_RqRecall | Null | 0x0 | DuerOS | BCM |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
| Vehicle | 0x5 |
| PersonalityOptIn\_St | Pers1Status | Pers1OptIn\_B\_Stats | NotOptedIn | 0x0 | DuerOS | BCM |
| OptedIn | 0x1 |
| Pers2Status | Pers2OptIn\_B\_Stats | NotOptedIn | 0x0 | DuerOS | BCM |
| OptedIn | 0x1 |
| Pers3Status | Pers3OptIn\_B\_Stats | NotOptedIn | 0x0 | DuerOS | BCM |
| OptedIn | 0x1 |
| Pers4Status | Pers4OptIn\_B\_Stats | NotOptedIn | 0x0 | DuerOS | BCM |
| OptedIn | 0x1 |
|  |  |  |  |  |  |  |
| EnhancedMemory\_St | Status | Em\_D\_Stat | Null | 0x0 | DuerOS | BCM |
| ProfilesOn | 0x1 |
| ProfilesOff | 0x2 |
| NotSupported | 0x3 |
|  |  |  |  |  |  |  |
| EnMemButtonPairing\_St | ButtonPairing | EmButtn\_D\_Stat | Null | 0x0 | DSM | BCM DuerOS |
| Button1Pressed | 0x1 |
| Button2Pressed | 0x2 |
| Button3Pressed | 0x3 |
| Button4Pressed | 0x4 |
| ButtonAssociationEntered | 0x5 |
| ButtonAssociationExited | 0x6 |
| ButtonAssociationFailed | 0x7 |
|  |  |  |  |  |  |  |
| InfotainmentPersStore\_St | Status | PersStore\_D\_Actl | Complete | 0x0 | DSM | DuerOS |
| InProgress | 0x1 |
| Null | 0x2 |
| MemSwitchRecall\_Rq | PersIndex | MemSwtch\_D\_RqRecall | Null | 0x0 | DSM | BCM |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
|  |  |  |  |  |  |  |
| EnMemKeyPairing\_St | PersIndex | EmPrflNo\_D\_Stat | Null | 0x0 | BCM | DuerOS |
| Pers1 | 0x1 |
| Pers2 | 0x2 |
| Pers3 | 0x3 |
| Pers4 | 0x4 |
| NotUsed | 0x5 |
| NotUsed | 0x6 |
| NotUsed | 0x7 |
| KeyPairing | EmPrflKeyAssoc\_D\_Stat | Null | 0x0 | BCM | DuerOS |
| KeyAssociationEntered | 0x1 |
| KeyAssociationExited | 0x2 |
| KeyDisassociated | 0x3 |
| KeyAlreadyInUse | 0x4 |
| KeyAssociateSuccess | 0x5 |
| KeyAssociateFailed | 0x6 |
| WrongDevice | 0x7 |
| PersKeyPairing\_St | Pers1KeyStatus | Pers1Key\_D\_Stat | Null | 0x0 | BCM | DuerOS |
| KeyAssociated | 0x1 |
| KeyUnAssociated | 0x2 |
| NotUsed\_1 | 0x3 |
| Pers2KeyStatus | Pers2Key\_D\_Stat | Null | 0x0 | BCM | DuerOS |
| KeyAssociated | 0x1 |
| KeyUnAssociated | 0x2 |
| NotUsed\_1 | 0x3 |
| Pers3KeyStatus | Pers3Key\_D\_Stat | Null | 0x0 | BCM | DuerOS |
| KeyAssociated | 0x1 |
| KeyUnAssociated | 0x2 |
| NotUsed\_1 | 0x3 |
| Pers4KeyStatus | Pers4Key\_D\_Stat | Null | 0x0 | BCM | DuerOS |
| KeyAssociated | 0x1 |
| KeyUnAssociated | 0x2 |
| NotUsed\_1 | 0x3 |
| PersPhonePairing\_St | Pers1PhoneStatus | Pers1Phone\_D\_Stat | NoPhoneAssociated | 0x0 | BCM | DuerOS |
| OnePhoneAssociated | 0x1 |
| TwoPhoneAssociated | 0x2 |
| ThreePhoneAssociated | 0x3 |
| FourPhoneAssociated | 0x4 |
| FivePhoneAssociated | 0x5 |
| SixPhoneAssociated | 0x6 |
| SevenPhoneAssociated | 0x7 |
| Pers2PhoneStatus | Pers2Phone\_D\_Stat | NoPhoneAssociated | 0x0 | BCM | DuerOS |
| OnePhoneAssociated | 0x1 |
| TwoPhoneAssociated | 0x2 |
| ThreePhoneAssociated | 0x3 |
| FourPhoneAssociated | 0x4 |
| FivePhoneAssociated | 0x5 |
| SixPhoneAssociated | 0x6 |
| SevenPhoneAssociated | 0x7 |
| Pers3PhoneStatus | Pers3Phone\_D\_Stat | NoPhoneAssociated | 0x0 | BCM | DuerOS |
| OnePhoneAssociated | 0x1 |
| TwoPhoneAssociated | 0x2 |
| ThreePhoneAssociated | 0x3 |
| FourPhoneAssociated | 0x4 |
| FivePhoneAssociated | 0x5 |
| SixPhoneAssociated | 0x6 |
| SevenPhoneAssociated | 0x7 |
| Pers4PhoneStatus | Pers4Phone\_D\_Stat | NoPhoneAssociated | 0x0 | BCM | DuerOS |
| OnePhoneAssociated | 0x1 |
| TwoPhoneAssociated | 0x2 |
| ThreePhoneAssociated | 0x3 |
| FourPhoneAssociated | 0x4 |
| FivePhoneAssociated | 0x5 |
| SixPhoneAssociated | 0x6 |
| SevenPhoneAssociated | 0x7 |
|  |  |  |  |  |  |  |
| ActivePersonality\_St | PersIndex | PersNo\_D\_Actl | Pers1 | 0x0 | BCM | ALL\* |
| Pers2 | 0x1 |
| Pers3 | 0x2 |
| Pers4 | 0x3 |
| Vehicle | 0x4 |
| NotDetermined | 0x5 |
| Unused\_2 | 0x6 |
| Unused\_3 | 0x7 |
| PersonalityRecallCount\_St | CountValue | RecallEvent\_No\_Cnt | 0 | 0x00 | BCM | ALL\* |
| 1 | 0x01 |
| … |  |
| 255 | 0xFF |
| MemoryPosition\_St | PersIndex | PersNoPos\_D\_Actl | Pers1 | 0x0 | BCM | DSM |
| Pers2 | 0x1 |
| Pers3 | 0x2 |
| Pers4 | 0x3 |
| Vehicle | 0x4 |
| Not Used | 0x5 |
| Not Used | 0x6 |
| Not Used | 0x7 |
|  |  |  |  |  |  |  |
| Feature\_Rq | Operation | CtrStkDsplyOp\_D\_Rq | Null | 0x0 | DuerOS | ALL\* |
| Query | 0x1 |
| Set | 0x2 |
| Upload | 0x3 |
| Restore | 0x4 |
| Copy | 0x5 |
| NotUsed | 0x6 |
| NotUsed | 0x7 |
| FeatureID | CtrStkFeatNoActl | - | 0x0000 – 0xFFFF | DuerOS | ALL\* |
|
|
| Configuration | CtrStkFeatConfigActl | - | 0x0000 – 0xFFFF | DuerOS | ALL\* |
|
|
| PersIndex | CtrStkPersIndex\_D\_Actl | PERS\_1 | 0x0 | DuerOS | ALL\* |
| PERS\_2 | 0x1 |
| PERS\_3 | 0x2 |
| PERS\_4 | 0X3 |
| VEHICLE | 0X4 |
| Not Used | 0x5 |
| Not Used | 0x6 |
| Not Used | 0x7 |
|  |  |  |  |  |  |  |
| VehicleSpeed\_St | Type | Veh\_V\_ActlEng | Kph | 0x0000 - 0xFFFF | PCM | DuerOS |
| GearLvrPos\_D\_Actl | Type | GearLvrPos\_D\_Actl | Park | 0x0 | TCM | DuerOS |
| Reverse | 0x1 |
| Neutral | 0x2 |
| Drive | 0x3 |
| Sport\_DriveSport | 0x4 |
| Low | 0x5 |
| First | 0x6 |
| Second | 0x7 |
| Third | 0x8 |
| Fourth | 0x9 |
| Fifth | 0xA |
| Sixth | 0xB |
| Undefined\_Treat\_as\_Fault | 0xC |
| Undefined\_Treat\_as\_Fault1 | 0xD |
| Unknown\_Position | 0xE |
| Fault | 0xF |
| IgnitionStatus\_St | Type | Ignition\_Status | Unknown | 0x0 | BCM | DuerOS |
| Off | 0x1 |
| Accessory | 0x2 |
| Run | 0x4 |
| Start | 0x8 |
| Invalid | 0xF |
| FactoryReset\_Rq | Type | SDARS\_FactoryReset\_Rq | Invalid | 0x0 | DuerOS | INFO\*\* |
| Reset | 0x1 |
| Memory\_SW\_St | Button1\_Pressed\_St |  | Memory\_1\_SW\_Stat | Null | 0x0 | DCU | DSM |
| Pressed | 0x1 | DCU | DSM |
| Button2\_Pressed\_St | Memory\_2\_SW\_Stat | Null | 0x0 | DCU | DSM |
| Pressed | 0x1 | DCU | DSM |
| Button3\_Pressed\_St | Memory\_3\_SW\_Stat | Null | 0x0 | DCU | DSM |
| Pressed | 0x1 | DCU | DSM |
| Mirror\_Override\_St | Mirror\_Manual\_Override | Null | 0x0 | DCU | DSM |
| Override | 0x1 | DCU | DSM/ DuerOS |
| Driver\_Seat\_Info | Memory\_Cmd | Memory\_Cmd | Null | 0x0 | DSM | DCU |
| Store\_1 | 0x1 | DSM | DCU |
| Store\_2 | 0x2 | DSM | DCU |
| Store\_3 | 0x3 | DSM | DCU |
| Store\_4 | 0x4 | DSM | DCU |
| Recall\_1 | 0x5 | DSM | DCU |
| Recall\_2 | 0x6 | DSM | DCU |
| Recall\_3 | 0x7 | DSM | DCU |
| Recall\_4 | 0x8 | DSM | DCU |
| Driver\_Seat\_St | Cancel\_Auto\_Movement | Null | 0x0 | DSM | DCU/ DuerOS |
| Cancel | 0x1 | DSM | DCU/ DuerOS |

\* ALL refers to Enhanced Memory Server (AHU, DuerOS, BCM, DSP, IPC, ADAS )

\*\* INFO refers to Infotainment Enhanced Memory Servers that support Master Reset

#### ECG Requirement

1. ECG shall transmit the signals that are not on the same network in ‘4.3.2 Logic Method to Physical Signal Translation Table’.

*Note: The relationship between ECU and Network are decided by the vehicle architecture.*

2.Soft Button New signals shall to be transmitted compared with Hard button Enhanced Memory:

|  |  |  |  |
| --- | --- | --- | --- |
| No | Signal Name | Message | Comment |
| 1 | Cancel\_Auto\_Movement | 0x304, Driver\_Seat\_Information\_2 | From DSM to DuerOS |
| 2 | Mirror\_Manual\_Override | 0x33A, Memory\_Sw\_StatM | From DCU to DuerOS |
| 3 | PersStore\_D\_Rq | 0x3E2, Personality\_APIM\_Data | From DuerOS to DCU |
| 4 | EmPrflNo\_D\_Rq | 0x227, APIM\_Request\_Signals\_1 | From DuerOS to DCU |
| 5 | EmPrflKeyAssoc\_D\_Rq | 0x227, APIM\_Request\_Signals\_1 | From DuerOS to DCU |
| 6 | EmButtn\_D\_Stat | 0x3E1, Personality\_DSM\_Data | From DSM to DCU |

**Note: EmButtn\_D\_Stat was in MS1, but DCU do not receive it before, the signa need add Rx Node also.**

## Enhanced Memory Logic Method Requirements

### ENMEM-REQ-205033/B-Status Memory Storage Requirement for Profile Server

The EnhancedMemoryProfileServer shall maintain the following signals in non-volatile memory:

* Enhanced Memory Profile Status (PersonalityOptIn\_St)
* Enhanced Memory Feature status (EnhancedMemory\_St)
* Enhanced Memory Active Profile status (ActivePersonality\_St)
* Enhanced Memory Keyfob Association/Disassociation status (PersKeyPairing\_St)

If the above requirement cannot be met, the EnhancedMemoryProfileServer shall use other mechanism or design to ensure that the values of above signals can be recalled after the following events:

* After a B+ reset (Exception: ActivePersonality\_St shall be set to Vehicle after a B+ reset)
* After a module reset
* Between ignition cycles
* Between network bus sleep and wake-up events

### ENMEM-REQ-206269/A-Status Memory Storage Requirement for Interface Client

The EnhancedMemoryInterfaceClient shall maintain the following signals in non-volatile memory:

1. Enhanced Memory Profile Status (PersonalityOptIn\_St)
2. Enhanced Memory Feature status (EnhancedMemory\_St)

The EnhancedMemoryInterfaceClient shall ensure that the values required to be stored in non-volatile memory can be recalled after the following events:

* After a B+ reset
* After a module reset
* Between ignition cycles
* Between network bus sleep and wake-up events

### ENMEM-REQ-206271/A-Status Memory Storage Requirement for Enhanced Memory Servers

The EnhancedMemoryServers shall maintain the following signals in non-volatile memory:

* Enhanced Memory Active Profile status (ActivePersonality\_St)
* Enhanced Memory Driver Profile Recall Counter (PersonalityRecallCounter\_St)

The EnhancedMemoryServers shall ensure that the values required to be stored in non-volatile memory can be recalled for the following (but not limited to) events:

* Between network bus sleep and wake-up events
* Between ignition cycles
* When any network communication failure prevents these signals from being transmitted by the EnhancedMemoryProfileServer

### ENMEM-REQ-226669/A-Enhanced Memory Network WakeUp Signal Designation

The following signals shall be designated as Network WakeUp Signals as defined in the requirement of EY-0088(HIGH SPEED & MEDIUM SPEED CONTROLLER AREA NETWORK PROTOCOLS), when transmitter and receiver of the signal are not in the same Network:

* Enhanced Memory Profile Status (PersonalityOptIn\_St)
* Enhanced Memory Feature status (EnhancedMemory\_St)
* Enhanced Memory Menu Recall Request (InfotainmentRecall\_Rq)

This requirement is needed to ensure that Driver Profile can be recalled in the case when ignition is not in Run in which not all modules are awake at the same time.

### ENMEM-SR-REQ-199818/C-Request/Response Return to Null State

When updating on event, the following event-periodic signals listed below shall hold their signal encoding values for a period of time defined by T\_ReturnToNull and then shall transit back to Null as shown in the sequence diagrams:

* InfotainmentRecall\_Rq
* InfotainmentPersStore\_Rq
* EnMemProfilePairing\_Rq
* EnMemKeyPairing\_St
* MemSwitchRecall\_Rq
* InfotainmentPersStore\_St
* Feature\_Rq

The receiving modules of these signals shall act upon the event signal and shall not wait for the “Null” to act upon the signal request.

### ENMEM-TMR-REQ-199819/A-T\_ReturnToNull

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_ReturnToNull | Minimum time to hold on an event state before return to Null state | sec | 0.5-2 | 0.5 | 1 |

### ENMEM-REQ-199774/A-Crank Event - Enhanced Memory

In the context of Enhanced Memory, when a Crank event occurs (ex Ignition\_Status = Crank, the above definition call it start) it is to be considered a don’t care and assume the last state unless noted otherwise.

* For example, if Ignition\_Status = Run and a Crank event happens with Ignition\_Status = Crank and then Ignition\_Status goes back to Run, unless noted otherwise it shall be assumed that in the use cases and functional requirements that Ignition remained in Run.

## Enhanced Memory Method Descriptions

### MD-REQ-199794/B-EnMemProfilePairing\_Rq

Message Type: **Request**

The signal is used to request that the Enhanced Memory Position Client or Enhanced Memory Profile Server make a change to the state of driver memory seat button pairing mode, keyfob pairing mode, and phone pairing mode.

W

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| PersIndex | - | - | Indicates which Personality Profile the "Pairing" request is referring to.  Received by Enhanced Memory Profile Server only |
|  | Null | 0x0 |  |
|  | Pers1 | 0x1 |  |
|  | Pers2 | 0x2 |  |
|  | Pers3 | 0x3 |  |
|  | Pers4 | 0x4 |  |
|  | NotUsed | 0x5 |  |
|  | NotUsed | 0x6 |  |
|  | NotUsed | 0x7 |  |
| ButtonPairing | - | - | Indicates the Personality Profile button pairing mode request value. Received by Enhanced Memory Position Client only |
|  | Null | 0x0 |  |
|  | EnterButtonPairing | 0x1 |  |
|  | ExitButtonPairing | 0x2 |  |
|  | NotUsed | 0x3 |  |
| KeyPairing | - | - | Indicates the Personality Profile keyfob and phone pairing modes **request value**. Received by Enhanced Memory Profile Server only |
|  | Null | 0x0 |  |
|  | EnterKeyPairing | 0x1 |  |
|  | ExitKeyPairing | 0x2 |  |
|  | DisassociateKey | 0x3 |  |
|  | OverwriteKey | 0x4 |  |
|  | EnterPhonePairing | 0x5 |  |
|  | DisassociatePhone | 0x6 |  |

### MD-REQ-199796/A-InfotainmentPersStore\_Rq

Message Type: Request

The signal is used by the EnhancedMemoryInterfaceClient to request current Classic Memory settings be stored to the indicated personality profile by the EnhancedMemorySystem parts.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| PersIndex | - | - | Indicates the Personality Profile the requested store operation is referring to. |
|  | Null | 0x0 |  |
|  | Pers1 | 0x1 |  |
|  | Pers2 | 0x2 |  |
|  | Pers3 | 0x3 |  |
|  | Pers4 | 0x4 |  |
|  | Vehicle | 0x5 |  |

### MD-REQ-199797/A-InfotainmentRecall\_Rq

Message Type: Request

The signal is used by the Enhanced Memory Interface Client to change the active personality profile to the personality profile indicated in the request.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| PersIndex | - | - | Indicates the Personality Profile being requested. |
|  | Null | 0x0 |  |
|  | Pers1 | 0x1 |  |
|  | Pers2 | 0x2 |  |
|  | Pers3 | 0x3 |  |
|  | Pers4 | 0x4 |  |
|  | Vehicle | 0x5 |  |

### MD-REQ-199798/A-PersonalityOptIn\_St

Message Type: Status

The signal is used to inform the Enhanced Memory Profile Server which personality profiles have been created (Opted-In).

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Pers1Status | - | - | Indicates Personality Profile 1 Opt-In Status. |
|  | NotOptedIn | 0x0 |  |
|  | OptedIn | 0x1 |  |
| Pers2Status | - | - | Indicates Personality Profile 2 Opt-In Status. |
|  | NotOptedIn | 0x0 |  |
|  | OptedIn | 0x1 |  |
| Pers3Status | - | - | Indicates Personality Profile 3 Opt-In Status. |
|  | NotOptedIn | 0x0 |  |
|  | OptedIn | 0x1 |  |
| Pers4Status | - | - | Indicates Personality Profile 4 Opt-In Status. |
|  | NotOptedIn | 0x0 |  |
|  | OptedIn | 0x1 |  |

### MD-REQ-199795/A-EnhancedMemory\_St

Message Type: Status

The signal is used to inform the Enhanced Memory System whether the personality profiles feature is currently active or not.

Notes:

Enhanced Memory Active (enabled) means, Pers1/2/3/4 may be the active personality profile.

Enhanced Memory Not Active (disabled) means, only Guest can be the active personality profile.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Status | - | - | Indicates the status of the Enhanced Memory feature as selected by the driver. |
|  | Null | 0x0 |  |
|  | ProfilesOn | 0x1 |  |
|  | ProfilesOff | 0x2 |  |
|  | NotSupported | 0x3 |  |

### MD-REQ-199803/A-EnMemButtonPairing\_St

Message Type: Status

The signal is used to inform the Enhanced Memory Interface Client the status of driver memory seat button pairing mode.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| ButtonPairing | - | - | Indicates the Personality Profile driver memory seat button pairing mode status value. |
|  | Null | 0x0 |  |
|  | Button1Pressed | 0x1 |  |
|  | Button2Pressed | 0x2 |  |
|  | Button3Pressed | 0x3 |  |
|  | Button4Pressed | 0x4 |  |
|  | ButtonPairingEntered | 0x5 |  |
|  | ButtonPairingExited | 0x6 |  |
|  | ButtonPairingFailed | 0x7 |  |

### MD-REQ-199805/A-InfotainmentPersStore\_St

Message Type: Status

The signal is used to inform the Enhanced Memory Interface Client the status of a requested store event.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Status | - | - | Indicates the Personality Profile the store operation completed for. |
|  | Complete | 0x0 |  |
|  | InProgress | 0x1 |  |
|  | Null | 0x2 |  |

### MD-REQ-199812/A-MemSwitchRecall\_Rq

Message Type: Request

The signal is used by the Enhanced Memory Position Client to change the active personality profile to the personality profile indicated in the request.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| PersIndex | - | - | Indicates the Personality Profile being requested. |
|  | Null | 0x0 |  |
|  | Pers1 | 0x1 |  |
|  | Pers2 | 0x2 |  |
|  | Pers3 | 0x3 |  |
|  | Pers4 | 0x4 |  |

### MD-REQ-199804/B-EnMemKeyPairing\_St

Method Type: Status

The signal is used to inform the Enhanced Memory Interface Client the status of keyfob and phone pairing modes.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| PersIndex | - | - | Indicates which Personality Profile the "Pairing" status is referring to. |
|  | Null | 0x0 |  |
|  | Pers1 | 0x1 |  |
|  | Pers2 | 0x2 |  |
|  | Pers3 | 0x3 |  |
|  | Pers4 | 0x4 |  |
|  | NotUsed | 0x5 |  |
|  | NotUsed | 0x6 |  |
|  | NotUsed | 0x7 |  |
| KeyPairing | - | - | Indicates the Personality Profile keyfob and phone pairing modes status value. |
|  | Null | 0x0 |  |
|  | KeyPairingEntered | 0x1 |  |
|  | KeyPairingExited | 0x2 |  |
|  | KeyDisassociated | 0x3 |  |
|  | KeyAlreadyInUse | 0x4 |  |
|  | KeyAssociateSuccess | 0x5 |  |
|  | KeyAssociateFailed | 0x6 |  |
|  | WrongDeviceSelected | 0x7 |  |

### MD-REQ-199810/A-PersKeyPairing\_St

Message Type: Status

The signal is used to inform the EnhancedMemoryInterfaceClient if a personality profile has a keyfob associated to it or not.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Pers1KeyStatus | - | - | Indicates Personality Profile 1 Keyfob Association Status. |
|  | Null | 0x0 |  |
|  | Key Associated | 0x1 |  |
|  | Key Not Associated | 0x2 |  |
|  | Reserved | 0x3 |  |
| Pers2KeyStatus | - | - | Indicates Personality Profile 2 Keyfob Association Status. |
|  | Null | 0x0 |  |
|  | Key Associated | 0x1 |  |
|  | Key Not Associated | 0x2 |  |
|  | Reserved | 0x3 |  |
| Pers3KeyStatus | - | - | Indicates Personality Profile 3 Keyfob Association Status. |
|  | Null | 0x0 |  |
|  | Key Associated | 0x1 |  |
|  | Key Not Associated | 0x2 |  |
|  | Reserved | 0x3 |  |
| Pers4KeyStatus | - | - | Indicates Personality Profile 4 Keyfob Association Status. |
|  | Null | 0x0 |  |
|  | Key Associated | 0x1 |  |
|  | Key Not Associated | 0x2 |  |
|  | Reserved | 0x3 |  |

### MD-REQ-233879/A-PersPhonePairing\_St

Message Type: Status

The signal is used to inform the EnhancedMemoryInterfaceClient if a personality profile has a phone (or phones) associated to it or not.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Pers1PhoneStatus | - | - | Indicates Personality Profile 1 Phone Association Status. |
|  | No Phones Associated | 0x0 |  |
|  | One Phone Associated | 0x1 |  |
|  | Two Phones Associated | 0x2 |  |
|  | Three Phones Associated | 0x3 |  |
|  | Four Phones Associated | 0x4 |  |
|  | Five Phones Associated | 0x5 |  |
|  | Six Phones Associated | 0x6 |  |
|  | Seven Phones Associated | 0x7 |  |
| Pers2PhoneStatus | - | - | Indicates Personality Profile 2 Phone Association Status. |
|  | No Phones Associated | 0x0 |  |
|  | One Phone Associated | 0x1 |  |
|  | Two Phones Associated | 0x2 |  |
|  | Three Phones Associated | 0x3 |  |
|  | Four Phones Associated | 0x4 |  |
|  | Five Phones Associated | 0x5 |  |
|  | Six Phones Associated | 0x6 |  |
|  | Seven Phones Associated | 0x7 |  |
| Pers3PhoneStatus | - | - | Indicates Personality Profile 3 Phone Association Status. |
|  | No Phones Associated | 0x0 |  |
|  | One Phone Associated | 0x1 |  |
|  | Two Phones Associated | 0x2 |  |
|  | Three Phones Associated | 0x3 |  |
|  | Four Phones Associated | 0x4 |  |
|  | Five Phones Associated | 0x5 |  |
|  | Six Phones Associated | 0x6 |  |
|  | Seven Phones Associated | 0x7 |  |
| Pers4PhoneStatus | - | - | Indicates Personality Profile 4 Phone Association Status. |
|  | No Phones Associated | 0x0 |  |
|  | One Phone Associated | 0x1 |  |
|  | Two Phones Associated | 0x2 |  |
|  | Three Phones Associated | 0x3 |  |
|  | Four Phones Associated | 0x4 |  |
|  | Five Phones Associated | 0x5 |  |
|  | Six Phones Associated | 0x6 |  |
|  | Seven Phones Associated | 0x7 |  |

### MD-REQ-238321/A-PaakConnection\_St

Message Type: Status

This signal is used to inform whether a Phone-As-A-Key is currently connected to the vehicle.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Status | - | - | Indicates the connection status of a PaaK. |
|  | Null | 0x0 |  |
|  | NoneConnected | 0x1 |  |
|  | Connected | 0x2 |  |

### MD-REQ-199802/A-ActivePersonality\_St

Message Type: Status

The signal is used to inform the Enhanced Memory System which personality profile is currently active.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| PersIndex | - | - | Indicates which Personality Profile is currently active. |
|  | Pers1 | 0x0 |  |
|  | Pers2 | 0x1 |  |
|  | Pers3 | 0x2 |  |
|  | Pers4 | 0x3 |  |
|  | Vehicle | 0x4 |  |
|  | NotDetermined | 0x5 |  |
|  | NotUsed | 0x6 |  |
|  | Inactive/Null | 0x7 |  |

### MD-REQ-199806/A-PersonalityRecallCount\_St

Message Type: Status

The signal is used to inform the Enhanced Memory System a change in personality profile has occurred (counter is incremented each time a profile change occurs).

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| CountValue | - | - | Increment indicates a change to active personality profile. |
|  | 0 | 0x0 |  |
|  | 1 | 0x1 |  |
|  | … |  |  |
|  | 255 | 0xFF |  |

### MD-REQ-199814/A-MemoryPosition\_St

Message Type: Status

The signal is used to inform the Classic Memory Sub-system which memory position is currently active.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| PersIndex | - | - | Indicates which memory position is currently active. |
|  | Pers1 | 0x0 |  |
|  | Pers2 | 0x1 |  |
|  | Pers3 | 0x2 |  |
|  | Pers4 | 0x3 |  |
|  | Vehicle | 0x4 |  |
|  | NotUsed | 0x5 |  |
|  | NotUsed | 0x6 |  |
|  | NotUsed | 0x7 |  |

### MD-REQ-199799/A-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 |  |
|  | Not Used | 0x5 |  |
|  | Not Used | 0x6 |  |
|  | Not Used | 0x7 |  |

### MD-REQ-199807/A-VehicleSpeed\_St

Message Type: Status

Status used to indicate vehicle speed.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Type | - | - | Indicates vehicle speed.  Unit: kph  Resolution:0.01  Offset:0 |
|  | kph | 0x0 to 0xFFFF |  |

### MD-REQ-199808/A-GearLvrPos\_D\_Actl

Message Type: Status

Vehicle status signal for the Gear Lever Position on an automatic transmission vehicle.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Type | - | - | - |
|  | Park | 0x0 |  |
|  | Reverse | 0x1 |  |
|  | Neutral | 0x2 |  |
|  | Drive | 0x3 |  |
|  | Sport\_DriveSport | 0x4 |  |
|  | Low | 0x5 |  |
|  | First | 0x6 |  |
|  | Second | 0x7 |  |
|  | Third | 0x8 |  |
|  | Fourth | 0x9 |  |
|  | Fifth | 0xA |  |
|  | Sixth | 0xB |  |
|  | Undefined\_Treat\_as\_Fault | 0xC |  |
|  | Undefined\_Treat\_as\_Fault1 | 0xD |  |
|  | Unknown\_Position | 0xE |  |
|  | Fault | 0xF |  |

### MD-REQ-199809/A-IgnitionStatus\_St

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 |  |

### MD-REQ-199800/A-FactoryReset\_Rq

Message Type: Request

Note: Reset all user adjustable parameters to the factory default setting.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Literals** | **Value** | **Description** |
| Type | - | - | Reset all user adjustable parameters to the factory default setting. |
|  | Int Reset |  |  |
|  | Invalid | 0x0 |  |
|  | Reset | 0x1 |  |
|  |  |  |  |

# Functional Definition

## Enhanced Memory Functional Decomposition

At the functional level, Enhanced Memory can be decomposed into **Logic Functions** to support **customer functions**. Some Logic Functions call other Logic Functions as shown in the diagram below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Enhanced Memory Functional Decomposition Diagram** | | | | | |
| HMI Menu Customer Function | Logic Function | | | | |
| Level1 | | Level2 | | Level3 |
| Enable Enhanced Memory | Enable-Disable Enhanced Memory | Enable Enhanced Memory |  | | |
| Disable Enhanced Memory | Disable Enhanced Memory | **Recall Driver Profile** |  | |
| Opt-In | Opt In | | Enable Enhanced Memory |  | |
| Create/Add Driver Profile | Create/Edit Name | |
| Associate Memory Seat Button automatically | |
| Copy | |
| **Recall Driver Profile** | |
| Add Driver Profile | Create/Add Driver Profile | | Create/Edit Name |  | |
| Associate Memory Seat Button automatically |
| Copy |
| Recall Driver Profile |
| Recall Driver Profile | Recall Driver Profile | |  | | |
| Delete Driver Profile | Delete Driver Profile | | Disassociate Keyfob |  | |
| Disassociate Phone |
| Recall Driver Profile |
| Disable Enhanced Memory |
| Associate Keyfob | Associate Keyfob | |  |  | |
| Disassociate Keyfob | Disassociate Keyfob | |  |  | |
| Associate Phone | Associate Phone | |  |  | |
| Disassociate Phone | Disassociate Phone | |  |  | |
| Edit Name | Create/Edit Name | |  |  | |
| Master Reset | Opt Out | | Delete Driver Profile | Disassociate Keyfob | |
| Disassociate Phone | |
| Recall Driver Profile | |
| Disable Enhanced Memory | |

To distinguish between a Customer Function and Logic Function, the Customer Functions will be named as “function” and Logic Functions will be named as “Function”. For example, Delete Driver Profile Function is a Logic Function that supports the customer Delete Driver Profile function.

Figure 3 – Enhanced Memory Functional Decomposition Diagram

## ENMEM-FUN-REQ-199826/A-Enable/Disable Enhanced Memory

### Enable and Disable Function Description

The Enable Enhanced Memory function allows a user to access all existing Driver Profiles and functions provided by the Enhanced Memory feature.

The system will also enable and disable Enhanced Memory automatically in the following use cases:

1. System will disable Enhanced Memory:
   * When Master Reset is executed（执行）
2. System will enable Enhanced Memory:
   * When the user opts into Enhanced Memory and successfully creates their first Driver Profile
3. System will recall **Vehicle** Profile:
   * When Enhanced Memory is turned off automatically
   * When the active Driver Profile is deleted

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Enable-Disable Enhanced Memory Functional Decomposition Diagram | | | | |
| HMI Menu Customer Function | Logic Function | | | |
| Level1 | | Level2 | Level3 |
| Enable Enhanced Memory | Enable-Disable Enhanced Memory | Enable Enhanced Memory |  | |
| Disable Enhanced Memory | Disable Enhanced Memory |  | |
| Opt-In | Opt-In | | Enable Enhanced Memory |  |
| Delete Driver Profile | Delete Driver Profile | | Disable Enhanced Memory |  |
| Master Reset | Opt-Out | | Delete Driver Profile | Disable Enhanced Memory |

Figure 4 – Enable-Disable Enhanced Memory Functional Decomposition Diagram

### Use Cases

#### ENMEM-UC-REQ-232983/A-Disable the Enhanced Memory after Master Reset

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The ignition status is in Run.  The vehicle speed is less than the Driving Restriction threshold\*  Enhanced Memory is set to On |
| **Scenario Description** | The user enables Master Reset from the HMI |
| **Post-conditions** | Enhanced Memory remains Off  No recall is performed |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction. |

### Requirements

#### ENMEM-HMI-REQ-199829/A-Configurable Parameter to Enable Driver Profiles HMI

The EnhancedMemoryInterfaceClient shall have a **configurable parameter** to determine whether the vehicle supports the Enhanced Memory feature. If the parameter indicates that the vehicle is to support “Enhanced Memory”, then the Driver Profiles HMI shall be enabled and accessible within the existing HMI menu hierarchy（层级）.

#### ENMEM-REQ-199830/A-Enhanced Memory Feature Activation Status

The EnhancedMemoryInterfaceClient shall report the activation status of the Driver Profile feature via the EnhancedMemory\_St(Em\_D\_Stat) method.

#### ENMEM-REQ-202359/B-Available Functions When Enhanced Memory Feature Is On

When Enhanced Memory feature is enabled, the follow functions shall be available to the user:

* Create/Add Driver Profiles:
* Obtain Driver Profile Name
* Associate a Driver Memory Seat button automatically
* Copy current settings
* Recall Driver Profiles
* Edit Driver Profiles:
* Change Driver Profile Name
* Associate keyfob
* Disassociate keyfob
* Associate phone
* Disassociate phone
* Delete Driver Profiles

#### ENMEM-REQ-202360/A-Available Functions When Enhanced Memory Feature Is Off

When Enhanced Memory feature is disabled, All other Enhanced Memory functions shall not be available.

The Classic Memory feature shall be available when Enhanced Memory feature is disabled.

#### ENMEM-REQ-199831/A-Recall Vehicle Profile When Enhanced Memory Feature Is Off

When the Enhanced Memory feature is Off, indicated via EnhancedMemory\_St(ProfilesOff), the EnhancedMemoryInterfaceClient shall recall the Vehicle Profile via InfotainmentRecall\_Rq.( CntrStk\_D\_RqRecall)

#### ENMEM-REQ-199833/A-Driver Profiles Not Deleted When Enhanced Memory Feature OFF

When the Enhanced Memory feature is off, the EnhancedMemoryInterfaceClient shall NOT delete the existing Driver Profiles so that those Driver Profiles can be accessible to the user when Enhanced Memory is set back to on.

#### ~~ENMEM-SR-REQ-214810/A-Enable/Disable Enhanced Memory in Valet Mode~~

~~If EnhancedMemory\_St = ProfilesOn when Valet Mode is enabled, the EnhancedMemoryInterfaceClient shall disable the Enhanced Memory feature by setting EnhancedMemory\_St = ProfilesOff.~~

~~When Valet Mode is then disabled, the EnhancedMemoryInterfaceClient shall re-enable the Enhanced Memory feature by setting EnhancedMemory\_St = ProfilesOn.~~

~~If EnhancedMemory\_St = ProfilesOff when Valet Mode is enabled, the feature status shall remain set as EnhancedMemory\_St = ProfilesOff when Valet Mode is disabled.~~

~~All existing Valet Mode requirements/restrictions shall also apply for Enhanced Memory and supersede any Enhanced Memory requirements.~~

#### ENMEM-HMI-REQ-199834/A-Enhanced Memory HMI Indications When Enhanced Memory Feature OFF

After Enhanced Memory is set to Off:

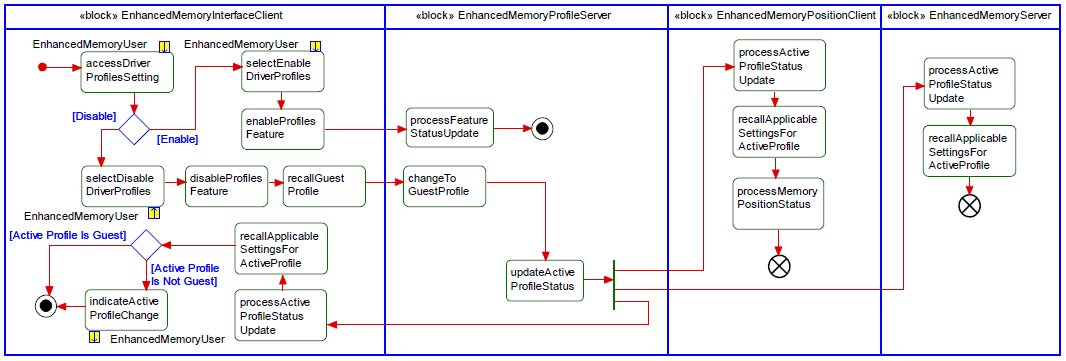
* The EnhancedMemoryInterfaceClient shall provide HMI indication that the Enhanced Memory feature is OFF.
* The EnhancedMemoryInterfaceClient shall not display any Driver Profile information
* The EnhancedMemoryInterfaceClient shall disable all Driver Profile menus

### White Box View

#### Activity Diagrams

##### ENMEM-ACT-REQ-199835/A-Enable-Disable Enhanced Memory Feature

Activity Diagram



#### Sequence Diagrams

##### ENMEM-SD-REQ-199836/A-Enable Enhanced Memory

Constraints

Pre-Condition

Driver profiles feature is disabled (set to Off)

Scenarios

Normal Usage

The driver chooses to enable the Enhanced Memory feature (set to On).

Post-Condition

The Enhanced Memory feature is enabled (set to On).

Sequence Diagram

~~p~~

##### ENMEM-SD-REQ-199837/A-Disable Enhanced Memory

Constraints

Pre-Condition

Enhanced Memory feature is enabled (set to On)

Scenarios

Normal Usage

The driver chooses to disable the Enhanced Memory feature (set to Off).

Post-Condition

The Enhanced Memory feature is disabled (set to off).

The active Driver Profile is set to “Guest”.

Positional settings are unaffected

Sequence Diagram



## ENMEM-FUN-REQ-204913/B-Opt-In

### Opt-In Function Description

The Opt-In function is a customer function that explains to a user the capabilities of Driver Profiles and the steps needed to create a Driver Profile before soliciting the user’s decision to create their first Driver Profile.

If the user chooses to proceed with the Opt-In process, the system will enable Enhanced Memory and direct the user through the Driver Profile creation process. If the user chooses to cancel the Opt-In process, the system will direct the user back to the previous menu.

The Opt-In Function is an Enhanced Memory Logic Function that supports all the functionalities mentioned above. Upon receiving the user request to proceed with the Opt-In process, the Opt-In Function calls the Enable-Disable Enhanced Memory Function and Create/Add Driver Profile Function in order to create a Driver Profile. This is illustrated in the diagram below:

|  |  |  |  |
| --- | --- | --- | --- |
| Opt-In Functional Decomposition Diagram | | | |
| HMI Menu Customer Function | Logic Function | | |
| Level1 | Level2 | Level3 |
| Opt-In | Opt-In | Enable Enhanced Memory |  |
| Create/Add Driver Profile | Create/Edit Name |
| Associate Driver Memory Seat Button Automatically |
| Copy |
| Recall Driver Profile |

Figure 5 – Opt-In Functional Decomposition Diagram

The HMI flow chart below illustrates the HMI process of Opt-In Enhanced Memory. The process explains the capabilities of Driver Profiles and the steps needed to create a Driver Profile before soliciting the user’s decision to create their first Driver Profile.

Please note that this flow chart only serves as a design aid and does not necessarily represent the final implementation.



Figure 6 – Enhanced Memory Opt-In HMI Flow Chart

### Use Cases

#### ENMEM-UC-REQ-201605/A-Opt in Enhanced Memory Feature

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Enhanced Memory feature is disabled (set to Off)  No Existing Driver Profiles |
| **Scenario Description** | The user accesses the Enhanced Memory HMI menu and chooses to Opt-In to Enhanced Memory in order to create a Driver Profile |
| **Post-conditions** | * The Enhanced Memory feature is enabled (set to On) * New Driver Profiles can be created |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** |  |

### Requirements

#### ENMEM-REQ-205009/A-Opt-In Condition

The Opt-In Function shall be called when the following conditions are all met:

* The user presses "Driver Profiles" on the HMI Settings Menu
* EnhancedMemory\_St = ProfilesOff
* No Driver Profile is created as indicated by PersonalityOptIn\_St

#### ENMEM-HMI-REQ-205010/A-Opt-In HMI Display

The Opt-In HMI display shall provide the user information on what features a Driver Profile can provide to the user and what steps are required to create a Driver Profile. The Opt-In HMI display shall also provide the user with a method to proceed in creating their first Driver Profile or to cancel the Opt-In process altogether.

Below is an example of what the Opt-In HMI display could look like. Please not this should only be treated as an example aid and not the actual final implementation



#### ENMEM-REQ-205011/A-Opt-In Transition State and Action

* Upon receiving a user’s “Opt-In” selection, the EnhancedMemoryInterfaceClient shall call Enable-Disable Enhanced Memory Function to set EnhancedMemory\_St = ProfilesOn, then call the Create/Add Function
* Upon receiving a user’s “Not Opt In” selection, the EnhancedMemoryInterfaceClient shall return to the previous HMI Menu.

## ENMEM-FUN-REQ-199838/B-Create/Add Driver Profile

### Create/Add Driver Profile Function Description

An Enhanced Memory Driver Profile is a collection of personalized vehicle settings that can be recalled by a user. The Driver Profile creation process allows a user to name the Driver Profile and to associate the Driver Profile to a Driver Memory Seat button. The creation process also copies the current active vehicle settings to the created Driver Profile.

To create the first Driver Profile, the user is required to first opt-in to the Enhanced Memory feature. Once a Driver Profile is created, the user may add more Driver Profiles without having to opt-in again. During the creation process, the user also has an option to associate a keyfob and/or a phone to the newly created Driver Profile.

The Create/Add Driver Profile Function is an Enhanced Memory Logic Function that will support all the functionalities mentioned above.

The Create/Add Driver Profile Function can be triggered by the user or called by the Opt-In Function. This Function first will call the Create/Edit Name Function to obtain a unique Driver Profile Name from the user, then call the Associate Driver Memory Seat button Function to associate the new Driver Profile to an un-associated Driver Memory Seat button. The Create/Add Driver Profile Function calls the Copy Function to copy all current active settings to the new Driver Profile. The Create/Add Driver Function HMI will also solicit the user option for associating a keyfob and a phone and call the Associate Keyfob Function and/or Associate Phone Function when the user successfully chooses to associate a keyfob and/or a phone. The Create/Add Driver Profile Function then calls the Recall Driver Profile Function to recall the newly created Driver Profile for the user automatically.

|  |  |  |  |
| --- | --- | --- | --- |
| Create/Add Driver Profile Functional Decomposition Diagram | | | |
| HMI Menu Customer Function | Logic Function | | |
| Level1 | Level2 | Level3 |
| Opt-In | Opt-In | Create/Add Driver Profile | Create/Edit Name |
| Associate Driver Memory Seat Button Automatically |
| Copy |
| Recall Driver Profile |
| Add Driver Profile | Create/Add Driver Profile | Create/Edit Name |  |
|  | Associate Driver Memory Seat Button Automatically |
|  | Copy |
|  | Recall Driver Profile |

Figure 7 – Create/Add Driver Profile Functional Decomposition Diagram

The HMI flow chart below illustrates the HMI process of Create/Add Driver Profile that includes obtaining Driver Profile Name, Associating Driver Memory Seat button, waiting for Copy and the optional Keyfob Association and Phone Association steps.

Please note that this flow chart only serves as a design aid and does not necessarily represent the final implementation.

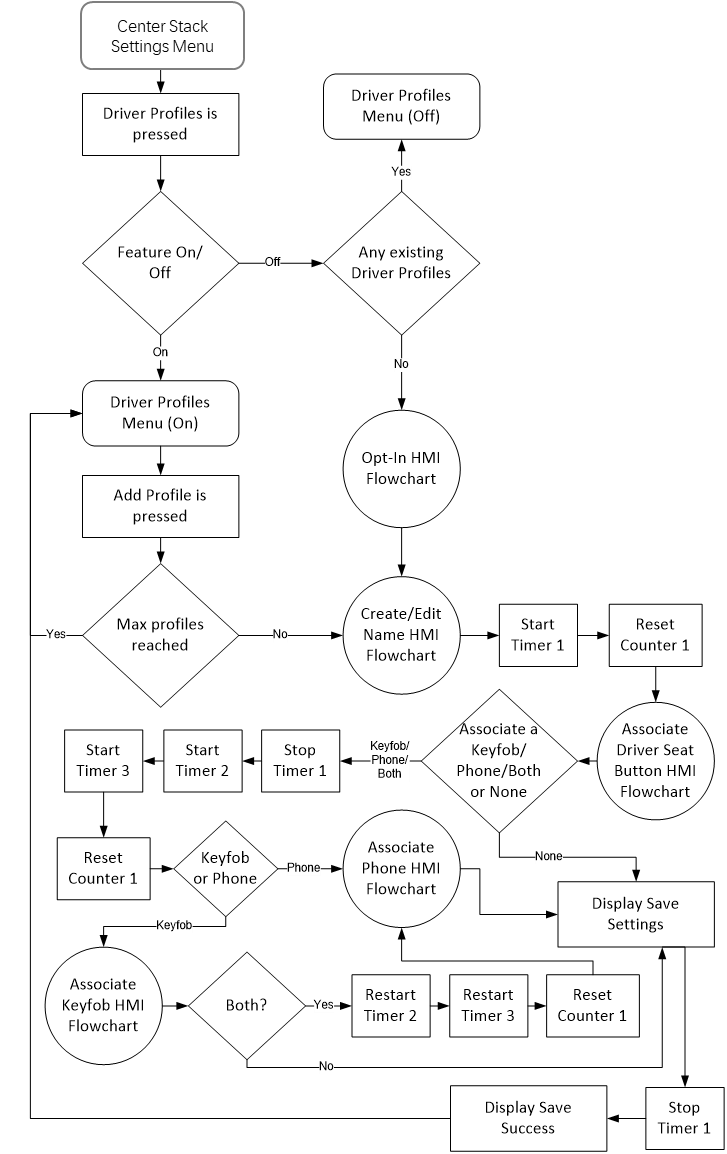


Figure 8 – Enhanced Memory Create/Add Profile HMI Flow Chart

### Use Cases

#### ENMEM-UC-REQ-199839/A-Create a Driver Profile

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run.  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The Enhanced Memory feature is enabled (set to On)  The maximum number of Driver Profiles has not yet been reached |
| **Scenario Description** | The User accesses the Enhanced Memory menu, chooses to create a new Driver Profile |
| **Post-conditions** | A new profile is created with:   * all applicable non-positional settings copied from the previous Driver Profile to the new Driver Profile * all applicable positional settings copied from the currently active settings (from previous Driver Profile, or from recently changed but not saved settings) to the new Driver Profile |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | Available Driver Memory Seat buttons for association are defined in ENMEM-HMI-REQ-198876  \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction. |

#### ENMEM-UC-REQ-199850/A-User Aborts or System Cancel Event Occurs During Driver Profile Creation Process

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The user is in the process of creating a Driver Profile |
| **Scenario Description** | * The user cancels out of the creation process   or   * A system event occurs that terminates the pairing process   + Vehicle gear shifts out of Park   + Vehicle in motion   + System Timeout   + Ignition no longer in Run   + System shutdown |
| **Post-conditions** | * The profile creation process has been aborted and a Driver Profile was not successfully created * HMI provides abort notification and instruction to restart the Driver Profile creation process |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

### Requirements

#### ENMEM-REQ-199852/A-Configurable Parameter for Personal Entry Code Association

The EnhancedMemoryProfileServer shall have a configurable parameter to determine whether the vehicle supports the Enhanced Memory feature:

* If the parameter indicates that the vehicle is to support “Enhanced Memory”, then a user-created personal entry code shall not be associated to auser created profile or Driver Memory Seat location
* If the parameter indicates that the vehicle is to support “Classic Memory”, then association of user-created personal entry codes shall be handled as defined by the Classic Memory systemstrategy.

#### ENMEM-REQ-199854/A-Driver Profile Opt-In Status

The EnhancedMemoryInterfaceClient shall notify the EnhancedMemoryProfileServer of all Driver Profiles that have been created via the PersonalityOptIn\_St method.

#### ENMEM-HMI-REQ-199777/A-Enhanced Memory HMI Driver Profile Identification

The Enhanced Memory HMI shall identify a Driver Profile by a unique Driver Profile Name. Driver Profiles shall not be created without both a unique Driver Profile Name and the association to a Driver Memory Seat Button Automatically.

#### ENMEM-REQ-198931/A-Retry and Error Handling Strategies for Seat Button Association Mode

After sending the request for entering Memory Seat Button Association Mode (EnMemProfilePairing\_Rq(ButtonPairing = EnterButtonPairing)), if there is no response (EnMemButtonPairing\_St(ButtonPairing = ButtonPairingEntered, ButtonPairingFailed)) within 500 msec or communication data is invalid or corrupted, then the EnhancedMemoryInterfaceClient shall resend the request up to 3 times.

o When multiple requests do not yield correct response, the EnhancedMemoryInterfaceClient shall abort Driver Profile creation process entirely by doing the following actions:

* Set EnMemProfilePairing\_Rq(ButtonPairing = ExitButtonPairing)
* Erase Driver Profile name from internal memory
* Turn Enhanced Memory Feature Off if the there is no other existing Driver Profiles

o The EnhancedMemoryInterfaceClient shall provide the user HMI notification about the abort process status

After sending the request for exiting Memory Seat Button Association Mode (EnMemProfilePairing\_Rq(ButtonPairing = ExitButtonPairing)), if there is no response (EnMemButtonPairing\_St(ButtonPairing = ButtonPairingExited, ButtonPairingFailed)) within 500 msec or communication data is invalid or corrupted, then the EnhancedMemoryInterfaceClient shall resend the request up to 3 times.

o When multiple requests do not yield correct response, the EnhancedMemoryInterfaceClient shall do the following actions:

* Revert the Pers#Status for PersonalityOptIn\_St back to NotOptedIn for the Memory Seat Button selected
* Do not perform a Driver Profile recall
* Do not store mapping of Profile Number to selected Memory Seat Button
* Turn Enhanced Memory Feature Off if the there is no other existing Driver Profiles

o The EnhancedMemoryInterfaceClient shall provide the user HMI notification about the abort process status

#### ENMEM-HMI-REQ-199856/B-Enhanced Memory HMI Indications for Driver Profile

The Enhanced Memory HMI indication of an existing Driver Profile shall include:

* Save button for positional settings saving
* the User’s keyed in Profile Name
* icon for an associated keyfob if one has been associated
* icon for an associated phone if one has been associated

#### ENMEM-REQ-199857/A-Driver Profile to Personality Mapping

The EnhancedMemoryInterfaceClient shall determine which Driver Profile value reported in the ActivePersonality\_St method is mapped to each Driver Profile Name. This mapping is done during Profile Creation and shall be stored and maintained by the EnhancedMemoryInterfaceClient until that Driver Profile is deleted.

See sequence diagram “ENMEM-SD-REQ-199919/-Create Driver Profile” for a detailed example.

#### ENMEM-REQ-199858/A-EnhancedMemoryInterfaceClient to Retain Settings After Software Reflash

The EnhancedMemoryInterfaceClient shall retain Driver Profile information and internally managed settings values after a software reflash occurs. This is to prevent the customer from recreating Driver Profiles and associating keyfobs after a software reflash service is done at a dealership or via Wifi Automatic Software Update.

The information that shall be retained included Opt-In and Opt-Out (created and deleted) status of all Driver Profiles, Driver Profile’s keyed-in name and the association of a Driver profile name to a Driver Memory Seat button number.

#### ENMEM-REQ-206864/A-EnhancedMemoryServers to Retain Settings After Software Reflash

The EnhancedMemoryServers shall retain all personalizable settings for each Driver Profile after a software reflash occurs.

This is to prevent the customer from having to reprogram their settings after a software reflash service performed at a dealership or via Wifi Automatic Software Update. For example, the information to be retained may include Language Settings, Navigation Preferences, etc.

#### ENMEM-HMI-REQ-199859/A-Maximum Number of Driver Profiles

The EnhancedMemoryInterfaceClient shall have a configurable parameter to indicate the max number of possible Driver Profiles that the vehicle can support.

#### ENMEM-HMI-REQ-199860/A-Max Number of Profiles Reached

When the maximum number of created Driver Profiles has been reached, the EnhancedMemoryInterfaceClient shall disable the functional of creating a new Driver Profile.

#### ~~ENMEM-REQ-199862/A-Alignment between Opt-In Driver Profile and Driver Memory Seat Button~~

~~The value of Personal Index in PersonalityOptIn\_St shall align with the number of the pressed Driver Memory Seat button, not the order of Driver Profile creation. In other words, the number of Personal Index in PersonalityOptIn\_St shall not be aligned with the order of Driver Profile creation.~~

~~Example: the first created Driver Profile is associated to Driver Memory Seat button #2~~

~~Precondition: Before any Driver Profile is created, the status of PersonalityOptIn\_St is~~

|  |  |  |  |
| --- | --- | --- | --- |
| ~~Logic Method Name~~ | ~~Logic Parameter Name~~ | ~~GSDB Encoding Name~~ | ~~GSDB Encoding Value~~ |
| ~~PersonalityOptIn\_St~~ | ~~Pers1Status~~ | ~~NotOptedIn~~ | ~~0x0~~ |
| ~~Pers2Status~~ | ~~NotOptedIn~~ | ~~0x0~~ |
| ~~Pers3Status~~ | ~~NotOptedIn~~ | ~~0x0~~ |
| ~~Pers4Status~~ | ~~NotOptedIn~~ | ~~0x0~~ |

~~Scenario: The user creates the first Driver Profile and presses Driver Memory Seat button #2 during the profile creation process~~

~~Post Condition: After the first Driver Profile is created, the status of PersonalityOptIn\_St shall be~~

|  |  |  |  |
| --- | --- | --- | --- |
| ~~Logic Method Name~~ | ~~Logic Parameter Name~~ | ~~GSDB Encoding Name and Value~~ | ~~GSDB Signal Value~~ |
| ~~PersonalityOptIn\_St~~ | ~~Pers1Status~~ | ~~NotOptedIn~~ | ~~0x0~~ |
| ~~Pers2Status~~ | ~~OptedIn~~ | ~~0x1~~ |
| ~~Pers3Status~~ | ~~NotOptedIn~~ | ~~0x0~~ |
| ~~Pers4Status~~ | ~~NotOptedIn~~ | ~~0x0~~ |

#### ~~ENMEM-HMI-REQ-199863/A-Enhanced Memory HMI Display Order of Existing Driver Profiles~~

~~The Enhanced Memory HMI display shall organize the Driver Profiles by their associated Driver Memory Seat Button number in ascending order, not in the order of profile creation. The number in the Driver Profile display shall be denoted by the associated Driver Memory Seat button number, not the order of creation.~~

~~Examples:~~

~~The first created Driver Profile is associated to Driver Memory Seat button #2. The number 2 indicates that this profile is associated to Driver Memory Seat button # 2.~~

~~~~

~~The second created Driver Profile is associated to Driver Memory Seat button #1. The list is arranged by Driver Memory Seat number and thus the new Driver Profile moved to the top.~~

~~~~

~~The third created Driver Profile is associated to Driver Memory Seat button #3, and placed at bottom.~~

~~~~

#### ENMEM-REQ-199864/A-Disable Driver Profile Creation and Editing when key is not in Run or Vehicle Speed is greater than Driver Restriction threshold

The EnhancedMemoryInterfaceClient shall disable Driver Profile creation and editing if the Ignition Status is any value other than Run or if the Vehicle Speed is greater than the Driving Restriction threshold, as defined in DRIVE-RESv2-FUR-REQ-025157/A-HMI Driving Restriction.

#### ENMEM-REQ-199865/A-Profile Creation Interruption

If the profile creation process is interrupted (ex. Ignition cycle, vehicle shifted out of park or vehicle speed becomes greater than the Driving Restriction threshold as defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction, Infotainment system reset, etc.) prior to completion, then the process shall be aborted. The EnhancedMemoryInterfaceClient shall set the EnMemProfilePairing\_Rq method to “ExitButtonPairing” and any profile information that was entered for the attempted profile creation shall be discarded.

#### ENMEM-HMI-REQ-199866/A-Enhanced Memory HMI Notification of Profile Creation Abort

When Driver Profile creation is aborted, per ENMEM-REQ-199878, the Enhanced Memory HMI shall notify the user that the process is aborted and shall provide the user the option to retry or cancel

#### ENMEM-HMI-REQ-199893/B-Edit Driver Profile

The Enhanced Memory Edit HMI menu shall contain Edit Name, Keyfob Association, Keyfob Disassociation, Phone Association, Phone Disassociation, Delete Drive Profile Menus and Positional Setting Save option.

#### ENMEM-REQ-199853/A-Missing DTC

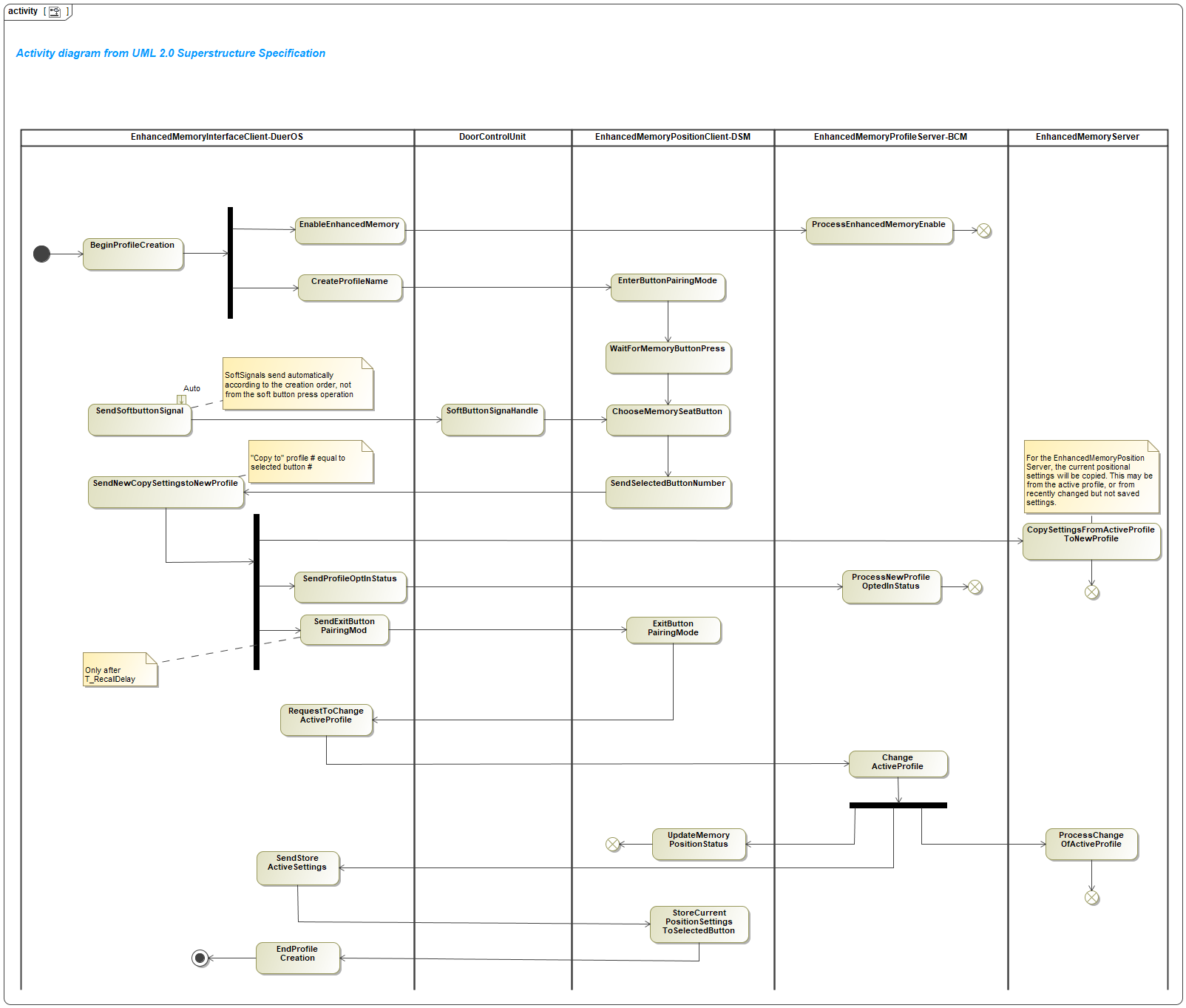
* The EnhancedMemoryInterfaceClient shall set a “lost communication” DTC for any expected Enhanced Memory periodic messages that are not received for more than 5 seconds.
* The EnhancedMemoryPositionClient shall set a “lost communication” DTC for any expected Enhanced Memory periodic messages that are not received for more than 5 seconds.
* The EnhancedMemoryProfileServer shall set a “lost communication” DTC for any expected Enhanced Memory periodic messages that are not received for more than 5 seconds.

### White Box View

#### Activity Diagrams

##### ENMEM-ACT-REQ-199915/A-Create Driver Profile

Activity Diagram



#### Sequence Diagrams

##### ENMEM-SD-REQ-199919/B-Create Driver Profile (A Happy Path)

Constraints

Pre-Condition

Ignition\_Status = Run

Vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\*

Maximum number of Driver Profiles has not yet been reached

\*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction

Scenarios

Normal Usage

The driver chooses to create a new Driver Profile and save pre-settings (positional and non-positional) in current Driver Profile.

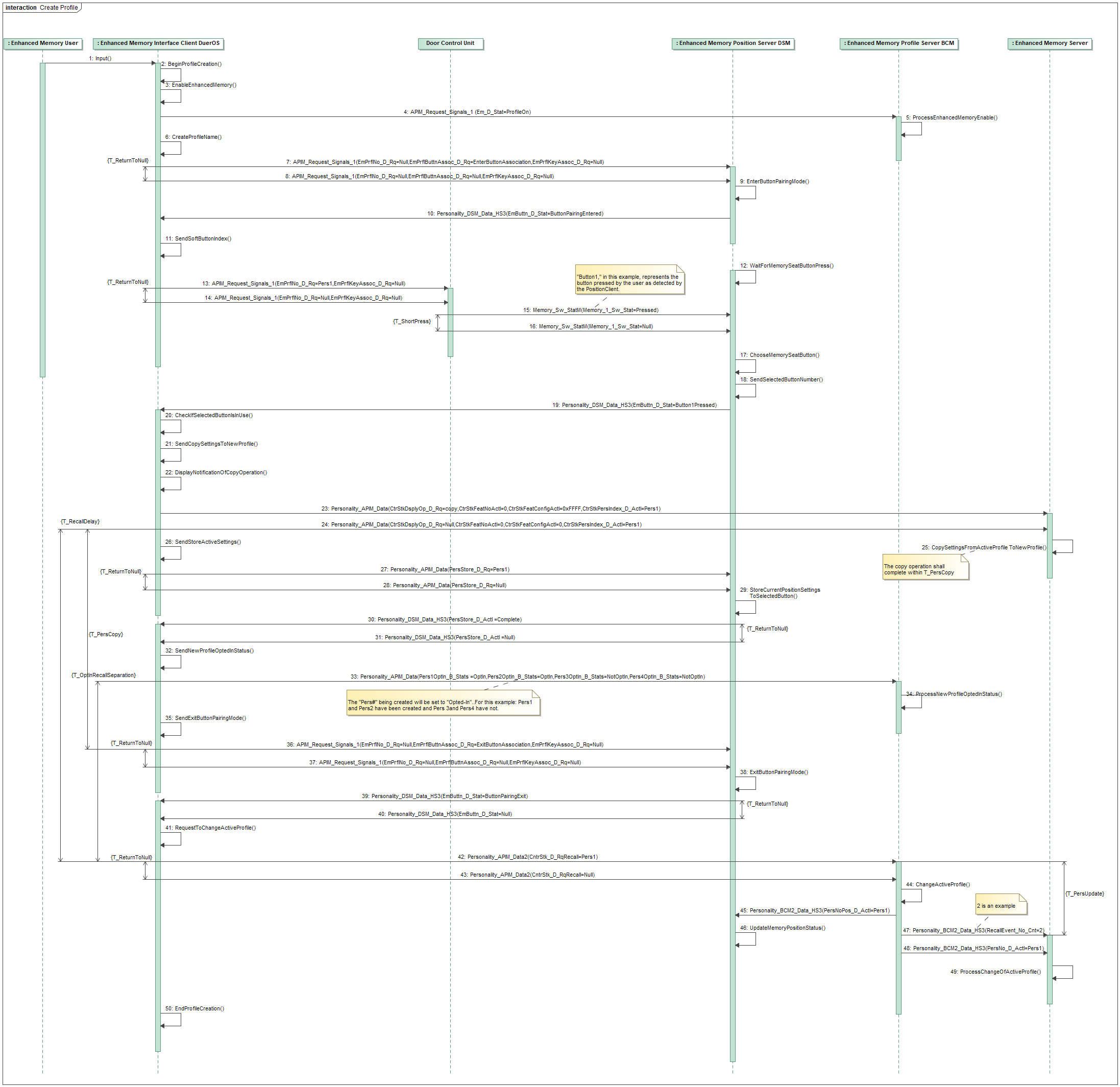
Post-Condition

Enhanced Memory feature is enabled

A new Driver Profile is created

The pre-settings (positional and non-positional) are associated with current profile.

Sequence Diagram



*Note: The Profile creating order, if any profile deleted, EnhancedMemoryInterfaceClient need keep the PersIndex.*

*For example: Driver creates 3 profile A, B and C. A.PersIndex=1, B.PersIndex=2, C.PersIndex=3. If we delete Profile B, and new created profile D, the result is as below:*

*A.PersIndex=1, C.PersIndex=3, D.PersIndex=2.*

##### ENMEM-TMR-REQ-xxx/x-T\_ShortPress

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_ShortPress | T\_ShortPress indicate the button short press time duration for button association | msec | 50-1500 | 5 | 100 |

## ENMEM-FUN-REQ-204951/A-Associate Keyfob

### Associate Keyfob Function Description

The Associate KeyFob function allows the user to associate a keyfob to a Driver Profile in order to recall the associated Driver Profile when unlocking the vehicle from the associated keyfob.

Keyfob association is not required to create a Driver Profile. Any keyfob that is shared among multiple users is not recommended to be associated to a Driver Profile. The user has the option to associate a keyfob during the Driver Profile creation process or after the Driver Profile has been created.

The Associate KeyFob Function is an Enhanced Memory Logic Function that will support all the functionalities mentioned above.

The HMI flow chart below illustrates the HMI process of Associate Keyfob where the user is provided multiple opportunities to select a keyfob along with an option to overwrite a keyfob or select a different keyfob if an already associated keyfob is selected.

Please note that this flow chart only serves as a design aid and does not necessarily represent the final implementation.



Figure 9 – Enhanced Memory Associate Keyfob HMI Flow Chart

### Use Cases

#### ENMEM-UC-REQ-199843/C-Associate Keyfob to a Driver Profile

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The ignition status is in Run.  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The user is in the process of creating or editing a Driver Profile |
| **Scenario Description** | The user accesses the Enhanced Memory HMI, chooses to create or edit a new Driver Profile, and has chosen to associate a keyfob to that profile. |
| **Post-conditions** | The chosen keyfob is now associated to the chosen Driver Profile. |
| **List of Exception Use Cases** | ENMEM-UC-REQ-095925/B-Attempt to Associate Already Associated Keyfob |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-199844/A-Attempt to Associate Already Associated Keyfob

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The user is in the process of associating a keyfob to a Driver Profile |
| **Scenario Description** | The user attempts to associate a keyfob that is already associated to another Driver Profile. |
| **Post-conditions** | * The user is informed by HMI indication that the chosen keyfob is already associated to another Driver Profile * The user is given the option to overwrite the chosen keyfob |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-199845/A-Associate a Keyfob with Incorrect Method

|  |  |
| --- | --- |
| **Actor** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  Vehicle is in Park or Neutral or Vehicle Speed is less than the Driving Restriction threshold\* for manual transmission  At least one set of positional settings is set (one Driver Memory Seat button is defined) |
| **Scenario Description** | The User tries to associate a keyfob to a preset positional setting (a Driver Memory Seat button) without using the Driver Profiles menu |
| **Post-conditions** | No chime is given (the indication of successful fob association).  The keyfob is not associated to any preset positional settings  The keyfob is not associated to any existing Driver Profile |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | For vehicles with Enhanced Memory, keyfob association can only be done through Enhanced Memory Keyfob Association menu. If the user does not create a Driver Profile, the user cannot associate the keyfob to any Driver File. When Driver Profiles are created, the user can only then associate a keyfob via the HMI menu.  \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-199851/A-User Aborts or System Cancel Event Occurs During Keyfob Association Process

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The user is in the process of associating a keyfob to a Driver Profile |
| **Scenario Description** | * The user cancels out of the pairing process   or   * A system event occurs that terminates the pairing process   + Vehicle gear shifts out of Park   + Vehicle in motion   + Recall Event occurs   + System Timeout   + Ignition no longer in Run   + System shutdown |
| **Post-conditions** | * The Keyfob Association process has been aborted and a keyfob was not successfully paired to the desired Driver Profile * HMI provides abort notification and instruction to restart the Keyfob Association process |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

### Requirements

#### ENMEM-REQ-199894/A-Configurable Parameter for Keyfob Association

The EnhancedMemoryProfileServer shall have a configurable parameter to determine whether the vehicle supports the Enhanced Memory feature:

* If the parameter indicates that the vehicle is to support “Classic Memory”, then the EnMemProfilePairing\_Rq(KeyPairing) method shall be ignored since keyfob association will instead be coordinated via the legacy MemSwtch\_D\_RqAssoc method, which is defined in the existing Classic Memory subsystem specifications.
* If the parameter indicates that the vehicle is to support “Enhanced Memory”, then the legacy MemSwtch\_D\_RqAssoc method shall be ignored since keyfob association will instead be coordinated via the EnMemProfilePairing\_Rq(KeyPairing) method.

#### ENMEM-REQ-199895/A-Configurable Parameter to Disable Classic Keyfob Association

The EnhancedMemoryPositionClient shall have a configurable parameter to determine whether the vehicle supports the Enhanced Memory feature. If the parameter indicates that the vehicle is to support “Enhanced Memory”, then the legacy MemSwtch\_D\_RqAssoc method shall be sent with null values to the EnhancedMemoryProfileServer and any associated chimes/tones for keyfob association shall be suppressed.

#### ENMEM-REQ-199906/B-Keyfob Association Error

If neither Keyfob Association nor Phone Association process is active (not in process of associating a keyfob or a phone to a Driver Profile) and the EnhancedMemoryInterfaceClient receives EnMemKeyPairing\_St(KeyPairing != Null), then the EnhancedMemoryInterfaceClient shall send EnMemProfilePairing\_Rq(KeyPairing = ExitKeyPairing).

In the event that the EnhancedMemoryInterfaceClient detects the vehicle is in motion, transitions out of Run, or shifts into Reverse in the middle of the Keyfob Association process, it shall abort the process by sending EnMemProfilePairing\_Rq(KeyPairing = ExitKeyPairing) to the EnhancedMemoryProfileServer.

#### ENMEM-TMR-REQ-199905/B-T\_FobAssocTotal2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_FobAssocTotal2 | Maximum time the EnhancedMemoryProfileServer shall wait before exiting Key/phone Association Mode. | msec | 300000-420000 | 60000 | 360000 |

#### ENMEM-REQ-199904/A-Keyfob Association Timer Expired

When T\_FobAssocTotal2 expires, the EnhancedMemoryProfileServer shall exit Keyfob Association Mode and update the status of EnMemKeyPairing\_St(KeyPairing) to KeyAssociateFailed for 1 second, followed by Null.

#### ENMEM-HMI-REQ-199903/A-Enhanced Memory HMI Notification of Keyfob Association Abort

When the Keyfob Association process is aborted, per ENMEM-REQ-199906-Keyfob Association Error, the Enhanced Memory HMI shall notify the user that the process has aborted and shall provide the user the option to retry or cancel

#### ENMEM-REQ-199902/B-Keyfob Association Failed

Any fault of the EnhancedMemoryProfileServer that prevents keyfob association shall result in the EnhancedMemoryProfileServer communicating to the EnhancedMemoryInterfaceClient that the keyfob wasn’t able to be associated by updating the status of EnMemKeyPairing\_St(KeyPairing) to KeyAssociateFailed.

#### ENMEM-HMI-REQ-199901/A-Enhanced Memory HMI Audible Notification of Successful Keyfob Association

When a keyfob is successfully associated to a Driver Profile, the EnhancedMemoryProfileServer shall submit a Chime request for keyfob association successful audible notification.

#### ENMEM-REQ-199900/A-Successful Keyfob Association Status

The EnhancedMemoryProfileServer shall set PersKeyPairing\_St for the applicable personality to KeyAssociated when a keyfob is successfully associated to a Driver Profile.

#### ENMEM-REQ-199897/A-Detection of Associated Keyfob

In the Keyfob Association Process, EnhancedMemoryProfileServer shall check if the requested keyfob is already associated to an existing Driver Profile.

In the case when the keyfob is already associated to an existing Driver Profile, EnhancedMemoryProfileServer shall update the status of EnMemKeyPairing\_St(KeyPairing) to KeyAlreadyInUse

#### ENMEM-HMI-REQ-199898/A-Enhanced Memory HMI Option for Associated Keyfob

In the Keyfob Association Process:

* EnhancedMemoryInterfaceClient shall monitor EnMemKeyPairing\_St to determine when a user attempts to associate an already associated keyfob to a new Driver Profile.
* When receiving KeyAlreadyInUse via EnMemKeyPairing\_St(KeyPairing):
* EnhancedMemoryInterfaceClient shall provide notification to the user that the keyfob was already associated to an existing Driver Profile
* EnhancedMemoryInterfaceClient shall provide the user an option to overwrite that associated keyfob or restart to associate a different keyfob
* When the user opts to overwrite the associated keyfob, EnhancedMemoryInterfaceClient shall set EnMemKeyPairing\_S\_Rq(KeyPairing) to OverwriteKey

#### ENMEM-REQ-199899/A-Overwrite Associated Keyfob

When receiving OverwriteKey via EnMemKeyPairing\_S\_Rq(KeyPairing),

* EnhancedMemoryProfileServer shall erase the existing keyfob association then associate the keyfob to a different Driver Profile denoted by EnMemKeyPairing\_S\_Rq(PersIndex)
* EnhancedMemoryProfileServer shall update PersKeyPairing\_St accordingly
* The Driver Profile with keyfob association erased shall be updated from KeyAssociated to KeyUnAssociated
* The Driver Profile with newly associated keyfob shall be updated from KeyUnAssociated to KeyAssociated

#### ENMEM-REQ-199896/A-Keyfob Association Mode

To associate a Driver Profile to a keyfob, the EnhancedMemoryInterfaceClient will communicate to the EnhancedMemoryProfileServer that a special Keyfob Association Mode has been entered via the EnMemProfilePairing\_Rq (KeyPairing) method.

* Once the request is sent with the value EnterKeyPairing, the EnhancedMemoryProfileServer shall begin looking for a **“Lock” button press from a keyfob to determine which keyfob** to associate the requested Driver Profile to, and then transmit EnMemKeyPairing\_St(KeyPairing = KeyAssociateSuccess) after associating the detected fob to the requested Driver Profile.
* The EnhancedMemoryProfileServer shall associate the detected keyfob to the requested Driver Profile, defined in EnMemProfilePairing\_Rq(PersIndex) and shall not associate to the active profile.
* The EnhancedMemoryProfileServer shall exit Keyfob Association Mode when indicated by EnMemProfilePairing\_Rq(KeyPairing = ExitKeyPairing), EnMemKeyPairing\_St(KeyPairing = KeyAssociateSuccess), or when Ignition\_Status\_St transitions out of *Run*, whichever comes first.

#### ENMEM-SR-REQ-212766/A-PersIndex used for Keyfob Association

When requesting to enter Keyfob Association Mode, the EnhancedMemoryInterfaceClient shall set the PersIndex of the EnMemProfilePairing\_Rq to the value of:

* The Profile creating order, if any profile deleted, EnhancedMemoryInterfaceClient need keep the PersIndex.

For example: Driver creates 3 profile A,B and C. A.PersIndex=1, B.PersIndex=2, C.PersIndex=3. If we delete Profile B, and new created profile D, the result is as below:

A.PersIndex=1, C.PersIndex=3, D.PersIndex=2.

#### ENMEM-REQ-234053/A-Detection of Wrong Device in Keyfob Association Mode

When a phone is selected by the user in Keyfob Association process, EnhancedMemoryProfileServer shall update the status of EnMemKeyPairing\_St(KeyPairing) to WrongDeviceSelected for 1 second, and then return to KeyPairingEntered to resume normal Keyfob Association mode operation.

#### ENMEM-HMI-REQ-234054/A-Enhanced Memory HMI Notification and Option for Wrong Device

In the Keyfob or Phone Association Process, the EnhancedMemoryInterfaceClient shall monitor EnMemKeyPairing\_St to provide the wrong device HMI notification to the user.

When a value of WrongDeviceSelected is detected via EnMemKeyPairing\_St(KeyPairing):

* The EnhancedMemoryInterfaceClient shall provide a notification to the user that a wrong type of device is selected
* This notification shall be triggered, not sustained, by the above signal value (See H31a\_SYNC3\_EMDriverProfile for notification duration).

### White Box View

#### Activity Diagrams

##### ENMEM-ACT-REQ-199916/A-Associate Keyfob To Driver Profile

Activity Diagram



#### Sequence Diagrams

##### ENMEM-SD-REQ-199921/A-Associate Keyfob

Constraints

Pre-Condition

IgnitionStatus\_St = Run

Vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\*

\*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction

Scenarios

Normal Usage

The driver chooses to associate a keyfob to a selected Diver Profile.

Post-Condition

The selected keyfob is associated to the selected Driver Profile.

Sequence Diagram



## ENMEM-FUN-REQ-204969/A-Disassociate Keyfob

### Disassociate Keyfob Description

The Disassociate Keyfob function allows the user to disassociate a keyfob from a Driver Profile in order to remove the recall functionality that is provided with the associated keyfob.

The user has the option to disassociate a keyfob only after a Driver Profile has been created. If a user chooses to overwrite a keyfob during the Keyfob Association Process, the associated keyfob will be automatically disassociated at that time. An automatic disassociation will also occur for any associated keyfob when a Driver Profile is deleted either manually or from a Master Reset.

The Disassociate Keyfob Function is an Enhanced Memory Logic Function that will support all the functionalities mentioned above.

|  |  |  |  |
| --- | --- | --- | --- |
| Disassociate Keyfob Functional Decomposition Diagram | | | |
| HMI Menu Customer Function | Logic Function | | |
| Level1 | Level2 | Level3 |
| Delete Driver Profile | Delete Driver Profile | Disassociate Keyfob |  |
| Recall Driver Profile |
| Disable Enhanced Memory |
| Disassociate Keyfob | Disassociate Keyfob |  | |
| Master Reset | Opt-Out | Delete Driver Profile | Disassociate Keyfob |
| Recall Driver Profile |
| Disable Enhanced Memory |

Figure 10 – Disassociate Keyfob Functional Decomposition Diagram

### Use Cases

#### ENMEM-UC-REQ-199846/B-Disassociate Keyfob from a Driver Profile

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR Vehicle Speed is less than the Driving Restriction threshold\*  User is in the process of editing a Driver Profile |
| **Scenario Description** | The User accesses the Enhanced Memory HMI, chooses to edit a new Driver Profile, and has chosen to remove the keyfob association from that profile. |
| **Post-conditions** | The previous keyfob association is now removed from the chosen Driver Profile. |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | Disassociating a keyfob does not delete the profile, it only removes the link between the selected profile and the keyfob.  \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-199847/A-Disassociate Keyfobs from Driver Profiles after Keyfobs Are Erased from a Vehicle

|  |  |
| --- | --- |
| **Actors** | Ford Dealership Technician and Vehicle Occupant |
| **Pre-conditions** | At least one keyfob is associated to a Driver Profile |
| **Scenario Description** | Keyfobs are erased by diagnostic tool and then keyfobs (new or original ones) are reprogrammed to the vehicle  The user starts up the vehicle and selects Enhanced Memory menu |
| **Post-conditions** | All Driver Profiles remain unchanged  All reprogrammed keyfobs are not associated to any Driver Profile.  HMI does not display keyfob association indicator for any Driver Profile |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | Keyfob association will be erased when the keyfobs are erased by the diagnostic tool |

### Requirements

#### ENMEM-REQ-199913/B-Disassociate Keyfob and Phone when a Driver Profile is deleted

When a user requests to delete a Driver Profile which has a keyfob and or a phone associated to it, the EnhancedMemoryInterfaceClient shall automatically send a keyfob and or a phone disassociation request, via EnMemProfilePairing\_Rq(KeyPairing=DisassociateKey) and EnMemProfilePairing\_Rq(KeyPairing=DisassociatePhone), without requiring separate disassociation requests from the user.

#### ENMEM-REQ-199914/A-Keyfob Disassociation Status

The EnhancedMemoryProfileServer shall set PersKeyPairing\_St for the applicable personality to KeyNotAssociated:

* When a keyfob is successfully disassociated for a Driver profile
* When all keyfobs are erased from a vehicle by a Diagnostic tool

#### ENMEM-REQ-199912/A-Disassociate the Keyfob per User Request

When a user requests to disassociate a keyfob from a Driver Profile, the EnhancedMemoryInterfaceClient shall set EnMemProfilePairing\_Rq(KeyPairing) to DisassociateKey for the requested Driver Profile

### White Box View

#### Activity Diagrams

### Please refer to ENMEM-ACT-REQ-199916-Associate Keyfob To Driver Profile

#### Sequence Diagrams

##### ENMEM-SD-REQ-199922/A-Disassociate Keyfob

Constraints

Pre-Condition

IgnitionStatus\_St = Run

Vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\*

\*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction

Scenarios

Normal Usage

The driver chooses to disassociate a keyfob from a selected Driver Profile.

Post-Condition

The selected keyfob is disassociated from the selected Driver Profile.

Sequence Diagram



## ENMEM-FUN-REQ-232251/A-Associate Phone

### Associate Phone Function Description

The Associate Phone function allows the user to associate a phone to a Driver Profile in order to recall the associated Driver Profile when remote start or unlocking the vehicle with the associated phone.

Unlike Driver Memory Seat button association, phone association is not required to create a Driver Profile. The user has the option to associate a phone during the Driver Profile creation process or after the Driver Profile has been created.

The Associate Phone Function is an Enhanced Memory Logic Function that will support all the functionalities mentioned above.

The HMI flow chart below illustrates the HMI process of Associate Phone where the user is provided multiple opportunities to select a phone along with an option to overwrite a phone or select a different phone if an already associated phone is selected.

Please note that this flow chart only serves as a design aid and does not necessarily represent the final implementation.



Figure 11 – Enhanced Memory Associate Phone HMI Flow Chart

### Use Cases

#### ENMEM-UC-REQ-232252/A-Associate Phone to a Driver Profile

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The ignition status is in Run.  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The user is in the process of creating or editing a Driver Profile |
| **Scenario Description** | The user accesses the Enhanced Memory HMI, chooses to create or edit a Driver Profile, and has chosen to associate a phone to that profile. |
| **Post-conditions** | The chosen phone is now associated to the chosen Driver Profile |
| **List of Exception Use Cases** | ENMEM-UC-REQ-232254-- Associate a Non-Registered Phone |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-232253/A-Attempt to Associate Already Associated Phone

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The user is in the process of associating a phone to a Driver Profile |
| **Scenario Description** | The user attempts to associate a phone that is already associated to another Driver Profile. |
| **Post-conditions** | * The user is informed by HMI indication that the chosen phone is already associated to another Driver Profile * The user is given the option to overwrite the chosen phone |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-232254/A-Attempt to Associate a Non-Registered Phone

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The ignition status is in Run.  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  Phone is not registered, authorized, paired or connected as a PaaK  The user is in the process of creating or editing a Driver Profile |
| **Scenario Description** | The user accesses the Enhanced Memory HMI, chooses to create or edit a Driver Profile, and has chosen to associate a phone |
| **Post-conditions** | The non-registered phone cannot be detected by the vehicle, thus it cannot be associated to any Driver Profile in that vehicle.  HMI will time out |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-232255/A-User Aborts or System Cancel Event Occurs During Phone Association Process

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The user is in the process of associating a phone to a Driver Profile |
| **Scenario Description** | * The user cancels out of the pairing process   or   * A system event occurs that terminates the pairing process   + Vehicle gear shifts out of Park   + Vehicle in motion   + Recall Event occurs   + System Timeout   + Ignition no longer in Run   + System shutdown |
| **Post-conditions** | * The Phone Association process has been aborted and a phone was not successfully paired to the desired Driver Profile * HMI provides abort notification and instruction to restart the Phone Association process |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

### Requirements

#### ENMEM-REQ-232258/A-Phone Association Error

If neither Keyfob Association nor Phone Association process is active (not in process of associating a keyfob or a phone to a Driver Profile) and the EnhancedMemoryInterfaceClient receives EnMemKeyPairing\_St(KeyPairing != Null), then the EnhancedMemoryInterfaceClient shall send EnMemProfilePairing\_Rq(KeyPairing = ExitKeyPairing).

In the event that the EnhancedMemoryInterfaceClient detects the vehicle is in motion, transitions out of Run, or shifts into Reverse in the middle of the Phone Association process, it shall abort the process by sending EnMemProfilePairing\_Rq(KeyPairing = ExitKeyPairing) to the EnhancedMemoryProfileServer.

#### ENMEM-REQ-232260/A-Phone Association Timer Expired

When T\_FobAssocTotal2 expires, the EnhancedMemoryProfileServer shall exit Phone Association Mode and update the status of EnMemKeyPairing\_St(KeyPairing) to KeyAssociateFailed for 1 second, followed by Null.

#### ENMEM-HMI-REQ-232261/A-Enhanced Memory HMI Notification of Phone Association Abort

When the Phone Association process is aborted, per ENMEM-REQ-232258-Phone Association Error, the Enhanced Memory HMI shall notify the user that the process has aborted and shall provide the user the option to retry or cancel

#### ENMEM-REQ-232262/B-Phone Association Failed

Any fault of the EnhancedMemoryProfileServer that prevents phone association shall result in the EnhancedMemoryProfileServer communicating to the EnhancedMemoryInterfaceClient that the phone wasn’t able to be associated by updating the status of EnMemKeyPairing\_St(KeyPairing) to KeyAssociateFailed.

#### ENMEM-HMI-REQ-232263/A-Enhanced Memory HMI Audible Notification of Successful Phone Association

When a phone is successfully associated to a Driver Profile, the EnhancedMemoryProfileServer shall submit a Chime request for phone association successful audible notification.

#### ENMEM-REQ-232264/A-Successful Phone Association Status

The EnhancedMemoryProfileServer shall update PersPhonePairing\_St to OnePhoneAssociated for the applicable personality to reflect the phone association status after a phone is successfully associated to a Driver Profile.

#### ENMEM-REQ-232267/A-Detection of Associated Phone

In the Phone Association Process, EnhancedMemoryProfileServer shall check if the requested phone is already associated to an existing Driver Profile.

In the case when the phone is already associated to an existing Driver Profile, EnhancedMemoryProfileServer shall update the status of EnMemKeyPairing\_St(KeyPairing) to KeyAlreadyInUse

#### ENMEM-HMI-REQ-232266/A-Enhanced Memory HMI Option for Associated Phone

In the Phone Association Process:

* EnhancedMemoryInterfaceClient shall monitor EnMemKeyPairing\_St to determine when a user attempts to associate an already associated Phone to a new Driver Profile.
* When receiving KeyAlreadyInUse via EnMemKeyPairing\_St(KeyPairing):
* EnhancedMemoryInterfaceClient shall provide notification to the user that the phone was already associated to an existing Driver Profile
* EnhancedMemoryInterfaceClient shall provide the user an option to overwrite that associated phone or restart to associate a different phone
* When the user opts to overwrite the associated phone, EnhancedMemoryInterfaceClient shall set EnMemProfilePairing\_Rq (KeyPairing) to OverwriteKey

#### ENMEM-REQ-232265/A-Overwrite Associated Phone

When receiving OverwriteKey via EnMemProfilePairing\_Rq (KeyPairing) during phone association process,

* EnhancedMemoryProfileServer shall erase the existing phone association then associate the phone to a different Driver Profile denoted by EnMemProfilePairing\_Rq (PersIndex)
* EnhancedMemoryProfileServer shall update PersPhonePairing\_St accordingly
* The Driver Profile with phone association erased shall be updated to NoPhoneAssociated or X-1PhoneAssociated where X is the original number of associated phones before overwriting
* The Driver Profile with newly associated Phone shall be updated to Y+1PhoneAssociated where Y is the original number of associated phones before overwriting

#### ENMEM-REQ-232268/A-Phone Association Mode

To associate a Driver Profile to a phone, the EnhancedMemoryInterfaceClient will communicate to the EnhancedMemoryProfileServer that a Phone Association Mode has been entered via the EnMemProfilePairing\_Rq (KeyPairing) method.

* Once the request is sent via the EnMemProfilePairing\_Rq (KeyPairing) with the value EnterPhonePairing, the EnhancedMemoryProfileServer shall begin looking for **a “Lock” button press from a phone to determine which phone** to associate the requested Driver Profile to, and then transmit EnMemKeyPairing\_St(KeyPairing = KeyAssociateSuccess) after associating the detected phone to the requested Driver Profile.
* The EnhancedMemoryProfileServer shall associate the detected phone to the requested Driver Profile, defined in EnMemProfilePairing\_Rq(PersIndex) and shall not associate to the active profile
* The EnhancedMemoryProfileServer shall exit Phone Association Mode when indicated by EnMemProfilePairing\_Rq(KeyPairing = ExitKeyPairing), EnMemKeyPairing\_St(KeyPairing = KeyAssociateSuccess), or when Ignition\_Status\_St transitions out of *Run*, whichever comes first.

#### ENMEM-SR-REQ-232269/A-PersIndex Used for Phone Association

When requesting to enter Phone Association Mode, the EnhancedMemoryInterfaceClient shall set the PersIndex of the EnMemProfilePairing\_Rq to the value of:

* The Profile creating order, if any profile deleted, EnhancedMemoryInterfaceClient need keep the PersIndex.

For example: Driver creates 3 profile A,B and C. A.PersIndex=1, B.PersIndex=2, C.PersIndex=3. If we delete Profile B, and new created profile D, the result is as below:

A.PersIndex=1, C.PersIndex=3, D.PersIndex=2.

#### ENMEM-REQ-234052/A-Detection of Wrong Device in Phone Association Mode

When a keyfob is selected by the user in Phone Association process, EnhancedMemoryProfileServer shall update the status of EnMemKeyPairing\_St(KeyPairing) to WrongDeviceSelected, for 1 second, and then return to KeyPairingEntered to resume normal Phone Association mode operation.

#### ENMEM-HMI-REQ-234054/A-Enhanced Memory HMI Notification and Option for Wrong Device

In the Keyfob or Phone Association Process, the EnhancedMemoryInterfaceClient shall monitor EnMemKeyPairing\_St to provide the wrong device HMI notification to the user.

When a value of WrongDeviceSelected is detected via EnMemKeyPairing\_St(KeyPairing):

* The EnhancedMemoryInterfaceClient shall provide a notification to the user that a wrong type of device is selected
* This notification shall be triggered, not sustained, by the above signal value (See H31a\_SYNC3\_EMDriverProfile for notification duration).

### White Box View

#### Activity Diagrams

##### ENMEM-ACT-REQ-232270/A-Associate Phone To Driver Profile

Activity Diagram



#### Sequence Diagrams

##### ENMEM-SD-REQ-232271/A-Associate Phone

Constraints

Pre-Condition

IgnitionStatus\_St = Run

Vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\*

\*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction

Scenarios

Normal Usage

The driver chooses to associate a phone to a selected Diver Profile.

Post-Condition

The selected phone is associated to the selected Driver Profile.

Sequence Diagram



## ENMEM-FUN-REQ-232272/A-Disassociate Phone

### Disassociate Phone Description

The Disassociate Phone function allows the user to disassociate a phone from a Driver Profile in order to remove the recall functionality that is provided with the associated phone.

The user has the option to disassociate a phone only after a Driver Profile has been created. If a user chooses to overwrite a phone during the Phone Association Process, the associated phone will be automatically disassociated at that time. An automatic disassociation will also occur for any associated phone if the phone is erased or revoked from the vehicle or when a Driver Profile is deleted either manually or from a Master Reset.

The Disassociate Phone Function is an Enhanced Memory Logic Function that will support all the functionalities mentioned above.

|  |  |  |  |
| --- | --- | --- | --- |
| Disassociate Phone Functional Decomposition Diagram | | | |
| HMI Menu Customer Function | Logic Function | | |
| Level1 | Level2 | Level3 |
| Delete Driver Profile | Delete Driver Profile | Disassociate Phone |  |
| Disassociate Keyfob |
| Recall Driver Profile |
| Disable Enhanced Memory |
| Disassociate Phone | Disassociate Phone |  | |
| Master Reset | Opt-Out | Delete Driver Profile | Disassociate Phone |
| Disassociate Keyfob |
| Recall Driver Profile |
| Disable Enhanced Memory |

Figure 12 – Disassociate Phone Functional Decomposition Diagram

### Use Cases

#### ENMEM-UC-REQ-232273/A-Disassociate Phone from a Driver Profile

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR Vehicle Speed is less than the Driving Restriction threshold\*  User is in the process of editing a Driver Profile |
| **Scenario Description** | The User accesses the Enhanced Memory HMI, chooses to edit a Driver Profile, and has chosen to remove the phone association from that profile. |
| **Post-conditions** | The previous phone association is now removed from the chosen Driver Profile.  HMI does not display phone indicator for the chosen Driver Profile |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | Disassociating a phone does not delete the profile nor erase the registration of the phone from the vehicle. It only removes the link between the selected profile and the phone.  \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-232274/A-Disassociate Phone from Driver Profiles after Phone Is Erased or Revoked from a Vehicle

|  |  |
| --- | --- |
| **Actors** | Ford Dealership Technician and Vehicle Occupant |
| **Pre-conditions** | A phone is associated to Driver Profile X |
| **Scenario Description** | The associated phone is erased or revoked from the vehicle  The user starts up the vehicle and selects Enhanced Memory menu |
| **Post-conditions** | Driver Profile X remain unchanged but no longer has a phone associated to it  HMI does not display phone association indicator for any Driver Profile |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | Phone association to a Driver Profile will be automatically (without the user disassociating it) erased when the registration of that phone to the vehicle is erased or revoked |

### Requirements

#### ENMEM-REQ-232275/A-Disassociate Keyfob and Phone when a Driver Profile is deleted

When a user requests to delete a Driver Profile which has a keyfob and/or a phone associated to it, the EnhancedMemoryInterfaceClient shall automatically send a keyfob and or a phone disassociation request, via  and EnMemProfilePairing\_Rq(KeyPairing=DisassociateKey)or EnMemProfilePairing\_Rq(KeyPairing=DisassociatePhone), without requiring separate disassociation requests from the user. Automatically.

#### ENMEM-REQ-232276/A-Phone Disassociation Status

The EnhancedMemoryProfileServer shall update PersPhonePairing\_St for the applicable personality to reflect phone disassociated status after any of the following actions:

* When a phone is successfully disassociated from a Driver profile
* When a phone is revoked from a vehicle
* When all phones are erased from a vehicle

#### ENMEM-REQ-232277/A-Disassociate the Phone per User Request

When a user requests to disassociate a phone from a Driver Profile, the EnhancedMemoryInterfaceClient shall set EnMemProfilePairing\_Rq(KeyPairing) to DisassociatePhone for the requested Driver Profile

#### ENMEM-REQ-239418/A-Phone Revoked Status

When a PaaK is erased or revoked from the vehicle, the PaaKServer shall send signal XXXX to the EnhancedMemoryProfileServer stating revoked/erased operation occurred at a particular phone via Phone Index or Phone ID.

This status notification from PaaKServer to EnhancedMemoryProfileServer is needed so that EnhancedMemoryProfileServer can update Driver Profile Phone Disassociation status accordingly and provide the updated dissociation status to EnhancedMemoryInterfaceClient for vehicle menu display.

### White Box View

#### Activity Diagrams

### Please refer to ENMEM-ACT-REQ-232270-Associate Phone to Driver Profile

#### Sequence Diagrams

##### ENMEM-SD-REQ-232278/A-Disassociate Phone

Constraints

Pre-Condition

IgnitionStatus\_St = Run

Vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\*

\*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction

Scenarios

Normal Usage

The driver chooses to disassociate a phone from a selected Driver Profile.

Post-Condition

The selected phone is disassociated from the selected Driver Profile.

Sequence Diagram



## ENMEM-FUN-REQ-204974/A-Delete Driver Profile

### Delete Driver Profile Function Description

The Delete Driver Profile function allows the user to delete a Driver Profile, one at a time. Once a Driver Profile is deleted the settings for all personalized features, the association to the Driver Memory Seat button, and the association to the keyfob and the phone are all permanently erased. When the **active Driver Profile or Last Driver Profile** is deleted, the system will automatically recall the Vehicle Profile. Master Reset also triggers the Delete Driver Profile function to delete all Driver Profiles sequentially (simultaneously to the user).

Upon receiving the user request to delete a Driver Profile or perform a Master Reset, the Delete Driver Profile Function is triggered which calls the Disassociate Keyfob Function, the Disassociate Phone Function, the Recall User Profile Function and the Disable Eenhanced Memory Function if necessary.

|  |  |  |  |
| --- | --- | --- | --- |
| Delete Driver Profile Functional Decomposition Diagram | | | |
| HMI Menu Customer Function | Logic Function | | |
| Level1 | Level2 | Level3 |
| Delete Driver Profile | Delete Driver Profile | Disassociate Keyfob |  |
|  | Disassociate Phone |  |
|  | Recall Driver Profile |  |
|  | Disable Enhanced Memory |  |
| Master Reset | Opt Out | Delete Driver Profile | Disassociate Keyfob |
|  | Disassociate Phone |
|  | Recall Driver Profile |
|  | Disable Enhanced Memory |

Figure 13 – Delete Driver Profile Functional Decomposition Diagram

### Use Cases

#### ENMEM-UC-REQ-199848/C-Delete a Driver Profile

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for manual transmission vehicles  At least one Driver Profile has been created |
| **Scenario Description** | The user accesses the Enhanced Memory HMI and chooses to delete a Driver Profile (need not to be the active Driver Profile) |
| **Post-conditions** | * The Driver Profile selected by the user now is deleted * If the active Driver Profile is deleted, Guest Profile is recalled automatically.   + Positional settings remain unchanged * If the last existing Driver Profile is deleted, Guest Profile is recalled automatically and Enhanced Memory is set to Off.   + Positional settings remain unchanged * Positional settings that were associated to the deleted Driver Profile remain associated to the Driver Memory Seat button. Pressing the disassociated Driver Memory Seat button will recall the stored positional settings * A keyfob and/or phone that was previously associated to the deleted Driver Profile is automatically disassociated   + Pressing the disassociated keyfob and/or phone will no longer trigger a recall.   + Positional settings will also not respond to keyfob or phone pressing * HMI disables Edit menu and deletes the Driver Profile Name along with and keyfob and phone association status for the deleted Driver Profile |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Note** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

### Requirements

#### ENMEM-REQ-199913/B-Disassociate Keyfob and Phone when a Driver Profile is deleted

When a user requests to delete a Driver Profile which has a keyfob and or a phone associated to it, the EnhancedMemoryInterfaceClient shall automatically send a keyfob and or a phone disassociation request, via EnMemProfilePairing\_Rq(KeyPairing=DisassociateKey) and EnMemProfilePairing\_Rq(KeyPairing=DisassociatePhone), without requiring separate disassociation requests from the user.

#### ENMEM-REQ-199909/A-Recall Vehicle Profile When Active or Last Driver Profile Is Deleted

The EnhancedMemoryInterfaceClient shall send an infotainment recall to recall Vehicle Profile via InfotainmentRecall\_Rq for the following cases

* When PersonalityOptIn\_St is updated to indicate that the currently active Driver Profile is deleted
* When PersonalityOptIn\_St is updated to indicate that the last Driver Profile is deleted

#### ENMEM-REQ-199908/A-Driver Profile Deleted Status

When a Driver Profile is deleted, the EnhancedMemoryInterfaceClient shall update the requested Driver Profile status to NotOptedIn via PersonalityOptIn\_St

#### ENMEM-HMI-REQ-199910/A-Enhanced Memory HMI Indications for Delete a Driver Profile

When a Driver Profile is deleted, The EnhancedMemoryInterfaceClient shall remove the deleted Driver Profile indication and Edit menu entirely.

Example of before Driver Profile #1 is deleted



Example of after Driver Profile #1 is deleted:



### White Box View

#### Activity Diagrams

##### ENMEM-ACT-REQ-199917/B-Delete Driver Profile

Activity Diagram



#### Sequence Diagrams

##### ENMEM-SD-REQ-199923/B-Delete Driver Profile

Constraints

Pre-Condition

Ignition Status = Run

Infotainment System is active

Vehicle transmission is in Park OR Vehicle Speed is less than the Driving Restriction threshold\*

\*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction

Scenarios

Normal Usage

The driver chooses to delete a Driver Profile.

Post-Condition

The selected Driver Profile is deleted.

Any keyfob associated to the deleted Driver Profile are disassociated.

Any phones associated to the deleted Driver Profile are disassociated.

Sequence Diagram



## ENMEM-FUN-REQ-204933/A-Create/Edit Name

### Create/Edit Function Description

Create/Edit Name is an Enhanced Memory user function that allows the user to name a Driver Profile during the Driver Profile creation process or edit existing Driver Profiles Names.

Each Driver Profile Name has to be at least 4-chacacters long and has to be unique. The Enhanced Memory feature will check the uniqueness of the name for the user, inform the user of any duplicates, should one be entered, and allow the user to enter a different name.

The Create/Edit Name Function is an Enhanced Memory Logic Function that will support all the functionalities mentioned above. This Function can be called out when the user selects to Edit Drive Profile Name or by the Create/Add Driver Profile Function as shown in the Functional Decomposition diagram below.

|  |  |  |  |
| --- | --- | --- | --- |
| Create/Edit Name Functional Decomposition Diagram | | | |
| HMI Menu Customer Function | Logic Function | | |
| Level1 | Level2 | Level3 |
| Opt-In | Opt-In | Enable Enhanced Memory |  |
| Create/Add Driver Profile | Create/Edit Name |
| Associate Driver Memory Seat Button automatically |
| Copy |
| Recall Driver Profile |
| Add Driver Profile | Create/Add Driver Profile | Create/Edit Name |  |
| Associate Driver Memory Seat Button automatically |
| Copy |
| Recall Driver Profile |
| Edit Name | Create/Edit Name |  | |

Figure 14 – Create/Edit Name Functional Decomposition Diagram

The HMI flow chart below illustrates the Create/Edit Name functionalities that Enhanced Memory will perform, such as checking the uniqueness of the Driver Profile Name, informing the user of any duplicates, should one be entered, and allowing the user to enter a different name.

Please note that this flow chart only serves as a design aid and does not necessarily represent the final implementation.



Figure 15 – Enhanced Memory Create/Edit Name HMI Flow Chart

### Use Cases

#### ENMEM-UC-REQ-199840/A-Create or Edit Driver Profile Name

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The user is in the process of creating or editing a Driver Profile |
| **Scenario Description** | The user chooses to create or edit a new Driver Profile Name, and has entered the new name for that Driver Profile |
| **Post-conditions** | The entered name has now been assigned to the new Driver Profile  Or  The Driver Profile name has now been updated to the new name |
| **List of Exception Use Cases** | NMEM-UC-REQ-198925/A-Attempt to give a Driver Profile an Existing Name |
| **Interfaces** | Personalization Interface |
| **Notes** | The user must choose a name that is not identical to an existing Driver Profile name.  \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-199841/A-Attempt to Give a Driver Profile an Existing Name

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The ignition status is in Run.  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  The user is in the process of creating or editing a Driver Profile |
| **Scenario Description** | The user enters an existing Driver Profile name |
| **Post-conditions** | * The user is informed by HMI indication that the Driver Profile entered name already exists * The user is given opportunity to retry |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

### Requirements

#### ENMEM-REQ-199868/A-Do Not Enter Driver Memory Seat Button Association Mode When Editing Name

While editing a Drive Profile Name, even if a unique Driver Profile name is successfully entered, the EnhancedMemoryInterfaceClient shall not command the EnhancedMemoryPositionClient to enter Driver Memory Seat button Association Mode.

The requirement is needed to prevent the system from entering Driver Memory Seat Button Association Mode once a Driver Profile name is successful edited. Contrary to this case, when creating a Driver Profile, once a Profile name is successful entered, the system shall enter Driver Memory Seat Button Association Mode automatically. Please refer to ENMEM-REQ-199867/-Request Enter Driver Memory Seat Button Association Mode.

#### ENMEM-HMI-REQ-199861/A-Driver Profile Name Restrictions

* Enhanced Memory Driver Profile Names shall be unique.
* In the event when an existing name is entered by the user:
  + The Enhanced Memory HMI shall provide notification to the user that the name already exists
  + The Enhanced Memory HMI shall not allow the existing name be overwritten
  + The Enhanced Memory HMI shall provide the user retry opportunity until an unique name is entered before proceeding to next step
* The length of each Driver Profile name shall be at least 1 character in length , but no more than 32 characters.
* The Driver Profile Name must begin with an alphabetic character.
* The button used to enter the Driver Profile Name and continue to the next screen shall be made inactive (inoperable) until the Driver Profile Name meets the above conditions.
* The keyboard used to enter the Driver Profile Name shall stop accepting character input when the maximum character limit has been reached.

## ENMEM-FUN-REQ-199925/A-Recall Driver Profile

### Recall Function Description and Interfaces

Recall is a function that loads a requested Driver Profile as the Active Driver Profile. This provides a user with his/her own personal settings to use and edit while in the vehicle.

The Recall Function can be initiated by different user requests and by one Enhanced Memory system request. A user recall request is sent, by keyfob detection (via unlock/remote start event), by phone detection (via unlock/remote start event), and by manual HMI selection.



Recall Function Data Flow Diagram

Upon receiving Recall Event Counter and Driver Profile Index, all EnhancedMemoryServers update the Active Driver Profile with the recalled Driver Profile and provide the Active Driver Profile settings for display, whereas the EnhancedMemoryPositionClient recalls positional settings.

The interfaces for all functions that support the Recall operation and the deployment mapping from functions to Classes can be summarized as below:



Recall Function Interfaces and Deployment Diagram

The Recall Function can be triggered by the user request and other Logic Functions as shown in the Diagram below

|  |  |  |  |
| --- | --- | --- | --- |
| Recall Functional Decomposition Diagram | | | |
| HMI Menu Customer Function | Logic Function | | |
| Level1 | Level2 | Level3 |
| Disable Enhanced Memory | Disable Enhanced Memory | Recall Driver Profile |  |
| Opt-In | Opt-In | Enable Enhanced Memory |  |
| Create/Add Driver Profile | Create/Edit Name |
| Associate Memory Seat Button automatically |
| Copy |
| Recall Driver Profile |
| Add Driver Profile | Create/Add Driver Profile | Create/Edit Name |  |
| Associate Memory Seat Button automatically |
| Copy |
| Recall Driver Profile |
| Recall Driver Profile | Recall Driver Profile |  | |
| Delete Driver Profile | Delete Driver Profile | Disassociate Keyfob |  |
| Disassociate Phone |
| Recall Driver Profile |
| Disable Enhanced Memory |
| Master Reset | Opt-Out | Delete Driver Profile | Disassociate Keyfob |
| Disassociate Phone |
| Recall Driver Profile |
| Disable Enhanced Memory |

Figure 16 – Recall Functional Decomposition Diagram

### Use Cases

#### ~~ENMEM-UC-REQ-199926/A-Driver Memory Seat Button Press Recall with Enhanced Memory OFF~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | ~~The Enhanced Memory feature is disabled (set to Off)~~ |
| **~~Scenario Description~~** | ~~The user presses any Driver Memory Seat button on the driver door panel~~ |
| **~~Post-conditions~~** | ~~The positional settings are recalled for that particular button and the user stays signed into the Guest Profile, though no Enhanced Memory user profile HMI indication is given while the Enhanced Memory feature is OFF~~ |
| **~~List of Exception Use Cases~~** |  |
| **~~Interfaces~~** | ~~Personalization Interface~~ |

#### ~~ENMEM-UC-REQ-199927/A-Driver Memory Seat Button Press Recall~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | ~~The Enhanced Memory feature is enabled (set to ON)~~ |
| **~~Scenario Description~~** | ~~The User presses a Driver Memory Seat button that is associated to an alternate Driver Profile (other than the active profile.)~~ |
| **~~Post-conditions~~** | ~~All applicable user settings including positional settings that tied with Classic Memory are recalled for that particular button and an HMI indication is given that the user has now signed into the associated Driver Profile for that button.~~ |
| **~~List of Exception Use Cases~~** | ~~E1 – ENMEM-UC-REQ-199928/ - Driver Memory Seat Button Press Recall While Vehicle In Motion~~ |
| **~~Interfaces~~** | ~~Personalization Interface~~ |
| **~~Note:~~** | ~~The Guest profile would be considered an “alternate Driver Profile” for any buttons that aren’t associated to a created Driver Profile.~~ |

#### ~~ENMEM-UC-REQ-199928/A-Driver Memory Seat Button Press Recall While Vehicle In Motion~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | ~~The Enhanced Memory feature is enabled (set to On)~~ |
| **~~Scenario Description~~** | ~~The User presses a Driver Memory Seat button on the driver door panel that is associated to an alternate Driver Profile (other than the active profile) while the vehicle is in motion (not in Park or vehicle speed is greater than the Driving Restriction threshold\* for a manual transmission)~~ |
| **~~Post-conditions~~** | ~~All applicable user settings, excluding positional settings that are tied to Classic Memory, are recalled for that particular button and an HMI indication is given that the user has now signed into the associated Driver Profile for that button~~ |
| **~~List of Exception Use Cases~~** |  |
| **~~Interfaces~~** | ~~Personalization Interface~~ |
| **~~Notes~~** | ~~\*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction~~ |

#### ~~ENMEM-UC-REQ-199929/A-Driver Memory Seat Button Recall of the Active Driver Profile~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | ~~The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission~~  ~~The Enhanced Memory feature is enabled (set to On)~~ |
| **~~Scenario Description~~** | ~~The User presses a Driver Memory Seat button on the driver door panel that is associated to the active Driver Profile.~~ |
| **~~Post-conditions~~** | ~~The last saved positional settings are recalled for the active Driver Profile. （Soft settings is saved automated）~~ |
| **~~List of Exception Use Cases~~** |  |
| **~~Interfaces~~** | ~~Personalization Interface~~ |
| **~~Notes~~** | ~~If the current positional settings are the same as the last saved positional settings, then no position change will occur.~~  ~~\*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction~~ |

#### ~~ENMEM-UC-REQ-199958/A-Driver Memory Seat Button Store Recall with Enhanced Memory OFF~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | ~~The Enhanced Memory feature is disabled (set to Off)~~ |
| **~~Scenario Description~~** | ~~The user initiates a “store position” operation via any Driver Memory Seat button press and hold~~ |
| **~~Post-conditions~~** | ~~The current positional settings are stored for that particular pressed Driver Memory Seat button and the user stays signed into the Guest Profile, though no HMI indication is given while the Enhanced Memory feature is OFF~~ |
| **~~List of Exception Use Cases~~** |  |
| **~~Interfaces~~** | ~~Personalization Interface~~ |

#### ~~ENMEM-UC-REQ-199959/A-Driver Memory Seat Button Store Recall of an Alternate Associated Profile~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | ~~The Enhanced Memory feature is enabled (set to On)~~ |
| **~~Scenario Description~~** | ~~The User initiates a “store position” operation via a Driver Memory Seat button that is associated to an alternate Driver Profile (other than the active Driver Profile.)~~ |
| **~~Post-conditions~~** | ~~The current positional settings are stored to the alternate Driver Profile, an HMI indication is given that the user has now signed into the alternate Driver Profile, and all applicable user settings are recalled for that new Driver Profile.~~ |
| **~~List of Exception Use Cases~~** |  |
| **~~Interfaces~~** | ~~Personalization Interface~~ |
| **~~Note:~~** | ~~The Guest profile would be considered an “alternate Driver Profile” for any Driver Memory Seat buttons that aren’t associated to a created Driver Profile.(ENMEM-UC-REQ-199961-Driver Memory Seat Button Store Recall of Unassociated Button)~~ |

#### ~~ENMEM-UC-REQ-199960/A-Driver Memory Seat Button Store Recall of the Active Driver Profile~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | ~~The Enhanced Memory feature is enabled (set to On)~~ |
| **~~Scenario Description~~** | ~~The user initiates a “store position” operation via a Driver Memory Seat button~~  ~~that is associated to the active Driver Profile.~~ |
| **~~Post-conditions~~** | ~~The current positional settings are stored to the active Driver Profile.~~ |
| **~~List of Exception Use Cases~~** |  |
| **~~Interfaces~~** | ~~Personalization Interface~~ |

#### ~~ENMEM-UC-REQ-199961/A-Driver Memory Seat Button Store Recall of Unassociated Button~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | ~~The Enhanced Memory feature is enabled (set to On)~~ |
| **~~Scenario Description~~** | ~~The user initiates a “store position” operation via a Driver Memory Seat button that has not been associated to any Driver Profile~~ |
| **~~Post-conditions~~** | ~~The current positional settings are stored to the unassociated Driver Memory Seat button.~~  ~~The Guest Profile will be recalled~~ |
| **~~List of Exception Use Cases~~** |  |
| **~~Interfaces~~** | ~~Personalization Interface~~ |
| **~~Note:~~** | ~~The Guest profile would be considered an “alternate Driver Profile” for any Driver Memory Seat buttons that aren’t associated to a created Driver Profile.~~ |

#### ENMEM-UC-REQ-199930/A-HMI Menu Recall

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Enhanced Memory feature is enabled |
| **Scenario Description** | The User accesses the Enhanced Memory HMI menu and chooses to recall  (sign in to) a Driver Profile. |
| **Post-conditions** | All applicable user settings are recalled for the chosen Driver Profile and an  HMI indication is given that the user has now signed into that Driver Profile. |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Note** | Positional settings will only be recalled if vehicle is in “Park” OR vehicle  speed is less than the Driving Restriction threshold as defined by DRIVE-  RESv2-FUR-REQ-025157-HMI Driving Restriction |

#### ENMEM-UC-REQ-199931/A-Keyfob Detection Recall

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Enhanced Memory feature is enabled  The User has chosen to associate their keyfob to their Driver Profile. |
| **Scenario Description** | The User’s keyfob is detected and the associated Driver Profile is signed in automatically. |
| **Post-conditions** | All applicable user settings are recalled for the chosen Driver Profile and an HMI indication is given that the user has now signed into that Driver Profile. |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | - Keyfob detection may be the result of an unlock or remote start button press from an associated keyfob (IKT or IA Key) or the result of a PEPS unlock event from an associated passive key. (i.e. Driver door handle unlock with a passive IA key present.) |

#### ENMEM-UC-REQ-199932/A-Keyfob Recall While Vehicle In Motion

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Enhanced Memory feature is enabled (set to On) |
| **Scenario Description** | The User presses a keyfob unlock button that is associated to an alternate Driver Profile (other than the active profile) while the vehicle is in motion (not in Park or vehicle speed is greater than 8 KPH). |
| **Post-conditions** | No new Drive Profile is recalled |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |

#### ENMEM-UC-REQ-199933/A-Keyfob Recall with Enhanced Memory OFF

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The User’s keyfob is associated to a Driver Profile  The Enhanced Memory feature is disabled (set to Off).  Vehicle is in PARK or less than 8 kph |
| **Scenario Description** | The User’s keyfob is detected. |
| **Post-conditions** | All Classic Memory positional settings are recalled for the associated memory position number and no Driver Profile recall occurs (i.e. Guest profile remains active.) |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | - **Keyfob detection** may be the result of a unlock button press from an associated keyfob (IKT or IA Key) or the result of a PEPS unlock event from an associated passive key. (i.e. Driver door handle unlock with a passive IA key present.)  - No HMI indication is given that the user has signed into the Guest Profile while the Driver Profiles feature is set to OFF. |

#### ENMEM-UC-REQ-232343/A-Phone Detection Recall

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Enhanced Memory feature is enabled (set to On)  The User has already associated their phone to a Driver Profile. |
| **Scenario Description** | The User’s phone is detected in a remote start event or in an unlock event. |
| **Post-conditions** | * The associated Driver Profile is recalled in automatically. * All applicable user settings are recalled for the chosen Driver Profile and an HMI indication is given that the user has now recalled that Driver Profile. |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** |  |

#### ENMEM-UC-REQ-232344/A-Phone Recall While Vehicle In Motion

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Enhanced Memory feature is enabled (set to On) |
| **Scenario Description** | The User presses a phone unlock button that is associated to an alternate Driver Profile (other than the active profile) while the vehicle is in motion (not in Park or vehicle speed is greater than 8 KPH). |
| **Post-conditions** | No new Drive Profile is recalled |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |

#### ENMEM-UC-REQ-232345/A-Phone Recall with Enhanced Memory OFF (don’t impact Classic Memory)

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The User’s phone is associated to a Driver Profile  The Enhanced Memory feature is disabled (set to Off).  Vehicle is in PARK or less than 8 kph |
| **Scenario Description** | The User’s phone is detected in a remote start event or an unlock event. |
| **Post-conditions** | All Classic Memory positional settings are recalled for the associated memory position number and no Driver Profile recall occurs (i.e. Guest profile remains active.) |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | No HMI indication is given that the user has signed into the Guest Profile while the Driver Profiles feature is set to OFF. |

#### ENMEM-UC-REQ-226667/B-No Recalls during a Crash Event

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | * The Enhanced Memory feature is enabled (set to On) * Emergency Assistance feature is activated by a crash event * Emergency Assistance feature is trying to make an Emergency Assistance call using connected phone device or connected CarPlay device |
| **Scenario Description** | The user attempts to recall a Driver Profile via Driver Memory Seat Button press, Keyfob or phone unlock press |
| **Post-conditions** | The vehicle will continue executing Emergency Assistance feature and ignore the Driver Profile recall request |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** |  |

#### ~~ENMEM-UC-REQ-199934/B-Recall Last Known Driver Profile With Keypad Code and no Keyfob nor Phone~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | * ~~The Enhanced Memory feature is enabled (set to On)~~ * ~~The Vehicle ignition is OFF~~ * ~~The user approaches the vehicle with NO keyfob nor phone~~ |
| **~~Scenario Description~~** | ~~The User uses the Vehicle Keypad to unlock the door then opens the door and finally starts the engine~~ |
| **~~Post-conditions~~** | ~~The last known Driver Profile is recalled~~ |
| **~~Interfaces~~** | ~~Personalization Interface~~ |
| **~~Note~~** | * ~~Because there is no keyfob and no Phone with the user, opening the door by via door handle will not change profiles for vehicles with or without Smart Door Handle~~ * ~~Starting the engine is not a method of recall profile~~ * ~~Keypad code entry not a method of recall profile~~ |

#### ~~ENMEM-UC-REQ-199935/B-Recall Driver Profile With Keypad Code and IA Key or Phone~~

|  |  |
| --- | --- |
| **~~Actors~~** | ~~Vehicle Occupant~~ |
| **~~Pre-conditions~~** | * ~~The Enhanced Memory feature is enabled (set to On)~~ * ~~The Vehicle ignition is OFF~~ * ~~The Vehicle is equipped with Smart Door Handle~~ * ~~The user approaches the vehicle with an IA Key or phone~~ |
| **~~Scenario Description~~** | ~~The user uses the Vehicle Keypad to unlock the door then opens the door and finally starts the engine~~ |
| **~~Post-conditions~~** | * ~~The last known Driver Profile is recalled if the IA Key or phone is not associated to any Driver Profile~~ * ~~The Driver Profile associated to the IA Key or phone with the user will be recalled, if the IA Key or phone is associated to a Driver Profile (it could be the last know Driver Profile or any other Driver Profile).~~ |
| **~~Interfaces~~** | ~~Personalization Interface~~ |
| **~~Note~~** | ~~Because the vehicle is equipped with Smart Door Handle and the IA Key or phone is with the user, opening the door via door handle will trigger passive unlock search. Depending on the keyfob or phone association status, passive unlock search may or may not recall a Driver Profile different than the last known Driver Profile.~~ |

#### ENMEM-UC-REQ-199936/B-MyKey Keyfob Overrides Driver Profile Setting

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | * The Enhanced Memory feature is enabled (set to On) * Driver Profile X has speed compensated volume set to HIGH * Driver Profile Y has speed compensated volume set to Low * Keyfob A is associated with Driver Profile X and is programmed as a MyKey * Volume Limiter is set to ON for MyKey |
| **Scenario Description** | Vehicle is started up with Keyfob A |
| **Post-conditions** | * Speed Compensated Volume is overridden from HIGH to disabled due to MyKey restriction if the active Driver Profile is X * Speed Compensated Volume is overridden from LOW to disabled due to MyKey restriction if the active Driver Profile is Y |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI  Vehicle System Interface |
| **Note** | No matter which profile is recalled to be the active Driver Profile, as long as a MyKey is in the ignition (recognized by vehicle to start engine), MyKey restrictions shall apply |

#### ENMEM-UC-REQ-232346/A-MyKey Phone Overrides Driver Profile Setting

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | * The Enhanced Memory feature is enabled (set to On) * Driver Profile X has speed compensated volume set to HIGH * Driver Profile Y has speed compensated volume set to Low * Phone A is associated with Driver Profile X and is programmed as a MyKey * Volume Limiter is set to ON for MyKey |
| **Scenario Description** | Vehicle is started up with Phone A |
| **Post-conditions** | * Speed Compensated Volume is overridden from HIGH to disabled due to MyKey restriction if the active Driver Profile is X * Speed Compensated Volume is overridden from LOW to disabled due to MyKey restriction if the active Driver Profile is Y |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI  Vehicle System Interface |
| **Note** | No matter which profile is recalled to be the active Driver Profile, as long as a MyKey phone is recognized by vehicle to start engine, MyKey restrictions shall apply |

#### ENMEM-UC-REQ-199937/B-Admin Keyfob Does Not Restrict Driver Profile Associated to MyKey

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | * The Enhanced Memory feature is enabled (set to On) * Driver Profile X has speed compensated volume set to HIGH * Keyfob A is associated with Driver Profile X and is programmed as a MyKey * Volume Limiter is set to ON for MyKey |
| **Scenario Description** | * Vehicle is started up with Keyfob B, an Admin Key (a non-MyKey Keyfob) * The driver recalls Driver Profile X after engine started |
| **Post-conditions** | Speed Compensated Volume from Driver Profile X is not overridden and remains HIGH |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI  Vehicle System Interface |
| **Note** | No matter which profile is recalled to be the active Driver Profile (even if associated to a MyKey Keyfob or a MyKey Phone), as long as an Admin Key (non-MyKey keyfob) is in the ignition (recognized by vehicle to start engine), MyKey restrictions shall NOT apply |

#### ENMEM-UC-REQ-232347/A-Admin Phone Does Not Restrict Driver Profile Associated to MyKey

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | * The Enhanced Memory feature is enabled (set to On) * Driver Profile X has speed compensated volume set to HIGH * Phone A is associated with Driver Profile X and is programmed as a MyKey phone * Volume Limiter is set to ON for MyKey |
| **Scenario Description** | * Vehicle is started up with Phone B, an Admin Phone (a non-MyKey Phone) * The driver recalls Driver Profile X after engine started |
| **Post-conditions** | Speed Compensated Volume from Driver Profile X is not overridden and remains HIGH |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI  Vehicle System Interface |
| **Note** | No matter which profile is recalled to be the active Driver Profile (even if associated to a MyKey keyfob or MyKey Phone), as long as an Admin Phone (non-MyKey Phone) is recognized by vehicle to start engine, MyKey restrictions shall NOTapply |

### Requirements

#### ENMEM-REQ-199944/A-Driver Profile Recall Event Counter

A Driver Profile recall event is denoted by the increment of PersonalityRecallCount\_St. The purpose of the counter is to indicate when a recall event has occurred and the active Driver Profile needs to be updated. The newly recalled Driver Profile may or may not be different than the previous active Driver Profile in terms of name of the Driver Profile and actual settings of Driver Profile. The recall event includes door unlock events, remote start event, user menu request and Enhanced Memory system recall. Definitions and requirements for Driver Memory Seat button press recall, door unlock recall and Remote start shall follow the design and requirements of Classic Memory.

* The EnhancedMemoryProfileServer shall increment the recall counter PersonalityRecallCount\_St each time a recall event occurs. Definitions and requirements for Driver Memory Seat button press recall and door unlock recall shall follow the design and requirements of Classic Memory.
* In the error case where the ActivePersonality\_St method changes values without a corresponding increment to the PersonalityRecallCount\_St method, EnhancedMemoryServers shall still update the active Driver Profile based on the change of ActivePersonality\_St.

#### Keyfob Detection Recall

To recall a Driver Profile triggered by unlock or remote start event, the EnhancedMemoryProfileServer shall recall a Driver Profile based on the Enhanced Memory feature On/Off status, vehicle crash event status, the Keyfob Association status and Driver Memory Seat button Association status as defined in the table below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Fob Recall REQ | Input | | | | | Output | | |
| Trigger Action | Seat Button Association Mode (EnMemButtonPairing\_St) | Vehicle in Crashed Mode | Enhanced Memory  Feature (EnhancedMemory\_St) | Keyfob X Association Status (PersKeyPairing\_St) | Recalled Profile | | Driver Profile Recall Event Counter Increment (PersonalityRecallCount\_St) |
| Positional Settings (MemoryPosition\_St) | Non-positional Settings (ActivePersonality\_St) |
| ENMEM-REQ-199583/B | Unlock/Remote Start Event via Keyfob X | Not in Association Mode | No | On | Associated to X | Driver Profile X | Driver Profile X | Yes |
| ENMEM-REQ-199584/B | Not in Association Mode | No | Off | Associated to X | Driver Profile X | Vehicle Profile | Yes |
| ENMEM-REQ-199585/B | Don't Care | No | Don't Care | Not Associated to X | No changed (Last known Profile) | No changed (Last known Profile) | No |
| ENMEM-REQ-199586/B | In Association Mode | Don't Care | Don't Care | Don't Care | No changed (Last known Profile) | No changed (Last known Profile) | No |
| ENMEM-REQ-227351/A | Don't Care | Yes | Don't Care | Don't Care | No changed (Last known Profile) | No changed (Last known Profile) | No |

#### Phone Detection Recall

To recall a Driver Profile triggered by unlock or remote start event via a phone, the EnhancedMemoryProfileServer shall recall a Driver Profile based on the Enhanced Memory feature On/Off status, vehicle crash event status, the phone Association status and Driver Memory Seat button Association status as defined in the table below:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Phone Recall REQ | Input | | | | | Output | | |
| Trigger Action | Seat Button Association Mode (EnMemButtonPairing\_St) | Vehicle in Crashed Mode | Enhanced Memory  Feature (EnhancedMemory\_St) | Phone X Association Status (PersPhonePairing\_St) | Recalled Profile | | Driver Profile Recall Event Counter Increment (PersonalityRecallCount\_St) |
| Positional Settings (MemoryPosition\_St) | Non-positional Settings (ActivePersonality\_St) |
| ENMEM-REQ-232352/A | Unlock/Remote Start Event via Phone X | Not in Association Mode | No | On | Associated to X | Driver Profile X | Driver Profile X | Yes |
| ENMEM-REQ-232354/A | Not in Association Mode | No | Off | Associated to X | Driver Profile X | Vehicle Profile | Yes |
| ENMEM-REQ-232355/A | Don't Care | No | Don't Care | Not Associated to X | No changed (Last known Profile) | No changed (Last known Profile) | No |
| ENMEM-REQ-232356/A | In Association Mode | Don't Care | Don't Care | Don't Care | No changed (Last known Profile) | No changed (Last known Profile) | No |
| ENMEM-REQ-232357/A | Don't Care | Yes | Don't Care | Don't Care | No changed (Last known Profile) | No changed (Last known Profile) | No |

#### ~~Driver Memory Seat Button Press Recall~~

~~To recall a Driver Profile triggered by Driver Memory Seat button press, the EnhancedMemoryProfileServer shall recall a Driver Profile based on the Enhanced Memory feature On/Off status, the Driver Memory Seat button Association status, vehicle crash event status and the Driver Profile existing status as defined in the table below. Please note that when a Driver Memory Seat button is never associated to positional settings, pressing that button will not recall any personalized settings. In the case of Driver Profile X\*, a Driver Profile with personalized settings will be recalled whereas in the case of Driver Profile X\*\*, the user will not see any positional settings change after recall as that Driver Memory Seat button is not associated to any positional settings.~~

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ~~Seat Button Recall REQ~~ | ~~Input~~ | | | | | ~~Output~~ | | | ~~Note~~ | |
| ~~Trigger Action~~ | ~~Seat Button Association Mode (EnMemButtonPairing\_St)~~ | ~~Vehicle in Crashed Mode~~ | ~~Enhanced Memory  Feature (EnhancedMemory\_St)~~ | ~~Driver Profile Created (Opted-in) Status~~ | ~~Recalled Profile~~ | | ~~Driver Profile Recall Event Counter Increment (PersonalityRecallCount\_St)~~ | ~~Seat Button X Associated to Poistional Settings~~ | ~~Use Case~~ |
| ~~Positional Settings (MemoryPosition\_St)~~ | ~~Non-positional Settings (ActivePersonality\_St)~~ |
| ~~ENMEM-REQ-199591/B~~ | ~~Memory Seat Button X is Pressed~~ | ~~Not in Association Mode~~ | ~~No~~ | ~~On~~ | ~~Opted-in~~ | ~~Driver Profile X~~ | ~~Driver Profile X~~ | ~~Yes~~ | ~~Yes~~ | ~~A happy path case~~ |
| ~~ENMEM-REQ-199592/B~~ | ~~Not in Association Mode~~ | ~~No~~ | ~~On~~ | ~~Opted-out~~ | ~~Driver Profile X\*~~ | ~~Vehicle Profile~~ | ~~Yes~~ | ~~Yes~~ | ~~Profile X was created then deleted. Classic Memory still woks~~ |
| ~~Driver Profile X\*\*~~ | ~~No~~ | ~~Seat button X is never associated to any positional settings nor any Driver Profile~~ |
| ~~ENMEM-REQ-199593/B~~ | ~~Not in Association Mode~~ | ~~No~~ | ~~Off~~ | ~~Opted-in~~ | ~~Driver Profile X~~ | ~~Vehicle Profile~~ | ~~Yes~~ | ~~Yes~~ |  |
| ~~ENMEM-REQ-199594/B~~ | ~~Not in Association Mode~~ | ~~No~~ | ~~Off~~ | ~~Opted-out~~ | ~~Driver Profile X\*~~ | ~~Vehicle Profile~~ | ~~Yes~~ | ~~Yes~~ | ~~Profile X was created then deleted~~ |
| ~~Driver Profile X\*\*~~ | ~~No~~ | ~~Seat button X is never associated to any positional settings nor any Driver Profile~~ |
| ~~ENMEM-REQ-199595/B~~ | ~~In Association Mode~~ | ~~Don't Care~~ | ~~Don't Care~~ | ~~Don't Care~~ | ~~No changed (Last known Profile)~~ | ~~No changed (Last known Profile)~~ | ~~No~~ | ~~Don't Care~~ |  |
| ~~ENMEM-REQ-227352/A~~ | ~~Don't Care~~ | ~~Yes~~ | ~~Don't Care~~ | ~~Don't Care~~ | ~~No changed (Last known Profile)~~ | ~~No changed (Last known Profile)~~ | ~~No~~ | ~~Don't Care~~ |  |

#### ~~ENMEM-REQ-199962/A-Driver Memory Seat Button Store Recall~~

~~After detecting a Driver Memory Seat button press and hold store event,~~

~~EnhancedMemoryPositionClient shall wait T\_PersStore before sending the recall request via MemSwitchRecall\_Rq to the EnhancedMemoryProfileServer~~

#### ~~ENMEM-TMR-REQ-199963/A-T\_PersStore~~

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **~~Name~~** | **~~Description~~** | **~~Units~~** | **~~Range~~** | **~~Resolution~~** | **~~Default~~** |
| ~~T\_PersStore~~ | ~~Minimum time the EnhancedMemoryPositionClient should wait before sending a recall request to the EnhancedMemoryProfileServer.~~ | ~~msec~~ | ~~150-350~~ | ~~5~~ | ~~250~~ |

#### ENMEM-REQ-199945/B-Menu Recall

When receiving a Driver Profile recall request via the InfotainmentRecall\_Rq method, the EnhancedMemoryProfileServer shall recall a Driver Profile based on the Enhanced Memory feature On/Off status, the Driver Memory Seat button Association status, vehicle crash event status and Driver Profile existing status as defined in the table below.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Input | | | | | Output | | |
| Trigger Action | Seat Button Association Mode (EnMemButtonPairing\_St) | Enhanced Memory  Feature (EnhancedMemory\_St) | Vehicle in Crashed Mode | Driver Profile Created (Opted-in) Status | Recalled Profile | | Driver Profile Recall Event Counter Increment (PersonalityRecallCount\_St) |
| Positional Settings (MemoryPosition\_St) | Non-positional Settings (ActivePersonality\_St) |
| InfotainmentRecall\_Rq=X | Not in Association Mode | On | No | Opted-in | Driver Profile X | Driver Profile X | Yes |
| Don't Care | On | Yes | Opted-in | No changed (Last known Profile) | No changed (Last known Profile) | No |

With the Enhanced Memory menu restriction, Menu Recall can only be accessed to existing Driver Profiles when the Enhanced Memory feature is On and not in Driver Memory Seat Button Association Mode. In the error cases where any one of three restrictions is violated, the EnhancedMemoryProfileServer shall responds to the error cases by complying with ENMEM-REQ-199593, ENMEM-REQ-199594, or ENMEM-REQ-199595.

#### ENMEM-REQ-202233/A-Recall Performance Requirement

After receiving a recall request, EnhancedMemoryProfileServer shall update the PersonalityRecallCounter\_St and ActivePersonality\_St within a defined period of time, T\_PersUpdate.

#### ENMEM-TMR-REQ-199943/A-T\_PersUpdate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_PersUpdate | Maximum time the EnhancedMemoryProfileServer shall take to update the PersonalityRecallCounter\_St and ActivePersonality\_St on the vehicle system interface, after receiving a recall request. | msec | 50-150 | 5 | 100 |

#### ENMEM-REQ-199946/B-Recall Priority

The EnhancedMemoryProfileServer shall prioritize the recall requests in the following descending order:

* Menu Recall
* Unlock Event by phone and keyfob
* Remote Start Event by phone and keyfob

Actually, the case that recall requests happen in the same time do not exist in the real situation.

#### Network StartUp Recall Strategies

##### ENMEM-REQ-199938/B-Last Known Driver Profile Applied at Network Startup with No Recall

Upon network wakeup, if no recall event is detected, the last known Driver Profile shall be set as the active Drive Profile via ActivePersonality\_St and the PersonalityRecallCount\_St shall NOT be incremented.

##### ENMEM-REQ-202304/B-Network Startup Recall Timing Performance Requirement

The EnhancedMemoryProfileServer shall update the ActivePersonality\_St within a defined time, T\_PrflSrvrUpdateStartUp, of network bus wake-up.

##### ENMEM-TMR-REQ-203821/A-T\_PrflSrvrUpdateStartUp

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_PrflSrvrUpdateStartUp | Maximum time from network bus wake-up that the EnhancedMemoryProfileServer shall take to update ActivePersonality\_St, and the EnhancedMemoryInterfaceClient shall take to update EnhancedMemory\_St and PersonalityOptIn\_St.  Note: Use the default value | msec | 400-600 | 50 | 500 |

##### ENMEM-SR-REQ-199823/B-Network Startup Recall Assumptions when Status Unknown

If the ActivePersonality\_St signal is published on the network bus before the value of the signal is known then the ActivePersonality\_St signal shall be set to NotDetermined by the EnhancedMemoryProfileServer at network bus start-up.

In addition, to determine which Driver Profile to be recalled, the status of EnhancedMemory\_St and PersonalityOptIn\_St are needed. The following assumptions shall apply to startup period for Driver Profile Recall:

Within the first defined period, T\_PrflSrvrUpdateStartUp, of network bus wakeup,

* If the EnhancedMemoryProfileServer receives EnhancedMemory\_St =Null then the EnhancedMemoryProfileServer shall assume the last known state. For example, if Enhanced Memory was last ON before network shutdown then assume EnhancedMemory\_St is still ON
* If the EnhancedMemoryProfileServer has not received PersonalityOptIn\_St, then the EnhancedMemoryProfileServer shall assume the last known state. For example, if all Driver Profiles were opted-in before network shutdown then assume they are still opted-in
* If the value of ActivePersonality\_St is not known because of an NVM type error (i.e. application powered up and still doesn’t know), then the EnhancedMemoryProfileServer shall update the ActivePersonality\_St signal with the default value of Vehicle. This could possibly occur for example if the EEPROM was corrupted

##### ENMEM-SR-REQ-206293/B-Network Startup Recall Assumptions when Status NotDetermined

The EnhancedMemoryServers shall treat ActivePersonality\_St = NotDetermined as a “don’t care” and shall recall the last known Driver Profile.

##### ENMEM-SR-REQ-199824/B-Network Startup Status Transmitting Requirement

* If the EnhancedMemory\_St signal is published on the network bus before the last known state can be published then the EnhancedMemory\_St signal shall be set to Null at network bus start-up
* The PersonalityOptIn\_St signals shall not be published on the bus until the last known state is published and shall not publish its CAN initial value at CAN bus startup.

Note: This requirement is to prevent the Driver Profile from flicking. PersonalityOptIn\_St has no “Null” value to be published, therefore the publishing has to be held up until last know status is available.

##### ENMEM-REQ-203736/B-Resend Data at Network Startup

The EnhancedMemoryProfileServer and EnhancedMemoryInterfaceClient can be on different network buses such that one bus is asleep while the other is awake (ex. Infotainment System ON while Ignition\_Status = OFF). In order for request signals / updated status signals not to be missed (first change in the signal encoding value wakes up the other bus) the following shall be supported:

* When using the request signal “InfotainmentRecall\_Rq = a new Personality” the EnhancedMemoryInterfaceClient shall send the request and re-send the same request after a defined period of time, T\_StartupResendData, without setting to Null between those two requests (the EnhancedMemoryProfileServer will act on the second request if its bus was asleep when the first request was sent).
* When the status signal EnhancedMemory\_St has an encoding value change (ex. ProfilesOn changes to ProfilesOff) the EnhancedMemoryInterfaceClient shall send the updated signal and re-send the same signal a defined period, T\_PrflSrvrUpdateStartUp, later (the EnhancedMemoryProfileServer will act on the second signal if its bus was asleep when the first updated signal was sent).

Note: PersonalityOptIn\_St can only be changed when Ignition Status = Run. In Run all the network buses are awake and therefore do not need to re-send the signal.

##### ENMEM-TMR-REQ-206538/A-T\_StartupResendData

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_StartupResendData | Nominal time the EnhancedMemoryInterfaceClient shall wait before resending InfotainmentRecall\_Rq or EnhancedMemory\_St.  Note: Use the default value | msec | 400-600 | 50 | 500 |

##### ENMEM-REQ-203735/B-Network Startup Transmitting Timing Performance Requirement

The EnhancedMemoryInterfaceClient shall update the EnhancedMemory\_St and PersonalityOptIn\_St signals with the last known state within the first defined period, T\_PrflSrvrUpdateStartUp of network bus wake-up.

##### ENMEM-REQ-202305/B-Network Startup Receiving Timing Performance Requirement

The EnhancedMemoryProfileServer shall be able to receive Enhanced Memory request signals such as InfotainmentRecall\_Rq or EnhancedMemory\_St within a defined period, T\_PrflSrvrRqStartUp, of network bus wake-up. If the application software is not completely powered up after a defined period of time, T\_PrflSrvrRqStartUp, those signals shall be stored and processed later by the EnhancedMemoryProfileServer.

This requirement is need in order to support ENMEM-REQ-202304/- Startup Recall Timing Performance Requirement. In addition, this requirement is also needed to prevent request signals from being lost when EnhancedMemoryInterfaceClient is awake whereas the EnhancedMemoryProfileServer is not awake. The use case for this scenario could be when EnhancedMemoryInterfaceClient is awake in delayed accessory mode or power extended mode (ignition is off) but EnhancedMemoryProfileServer is not awake.

##### ENMEM-TMR-REQ-203854/A-T\_PrflSrvrRqStartUp

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_PrflSrvrRqStartUp | Nominal time from network bus wake-up that the EnhancedMemoryProfileServer shall be able to receive Enhanced Memory request signals (i.e. InfotainmentRecall\_Rq, InfotainmentPersStore\_Rq).  Note: Use the default value | msec | 100-300 | 50 | 200 |

#### ENMEM-REQ-199939/A-Recall Settings for Active Driver Profile

A Driver Profile recall event is signaled when the PersonalityRecallCount\_St method is incremented.

When detecting an increment of PersonalityRecallCount\_St, EnhancedMemoryServers shall recall all settings for the active Driver Profile bases on ActivePersonality\_St within T\_PersRecall.

#### ENMEM-TMR-REQ-199940/A-T\_PersRecall

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_PersRecall | Maximum time the EnhancedMemoryServer shall take to recall all settings for a Driver Profile once the ActivePersonality\_St signal update is received to change a profile. | msec | 50-150 | 5 | 75 |

#### ENMEM-REQ-202225/A-Error Handling Strategy for Recall Driver Profile

* When recall settings for Active Profile, EnhancedMemoryServers shall treat any reserved or non-valid value of *ActivePersonality\_St* as **Vehicle**
* In the error case where the ActivePersonality\_St method changes values without a corresponding increment to the PersonalityRecallCount\_St method, EnhancedMemoryServers shall still update the active Driver Profile based on the change of ActivePersonality\_St

#### ENMEM-REQ-202227/A-Provide Active Settings for Display after Recall

The EnhancedMemoryServers shall wait for T\_PersRecallStatusUpdate, but no longer than 500 msec, before sending any status signals affected/updated sending any status signals affected/updated as a result Recall event

#### ENMEM-TMR-REQ-199941/A-T\_PersRecallStatusUpdate

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_PersRecallStatusUpdate | Minimum time the EnhancedMemoryServer shall wait after receiving the ActivePersonality\_St signal update before sending any status messages affected by the change in Driver Profile. | msec | 100-200 | 5 | 150 |

#### ENMEM-REQ-199947/A-Display Active Profile Settings after Recall

After each Driver Profile is recalled, the setting Display Devices shall update their display of Active Profile settings. This can be initiated by display device through Feature Based Message Protocol Query operation or be initiated by EnhancedMemoryServers that provide Active Driver Profile settings to the Display Devices. Existing HMI standards and requirements agreed by the EnhancedMemoryServer and its setting Display Devices shall be followed.

#### ENMEM-REQ-199948/B-Positional Settings Recall

The EnhancedMemoryPositionClient shall recall any positional settings when receiving an update of the MemoryPosition\_St method.

* An update of the MemoryPosition\_St to the value of Vehicle shall not trigger the recall of any positional settings
* A recall, triggered by pressing of an unassociated Driver Memory Seat button, shall not trigger the recall of any positional settings. An unassociated Seat button in this requirement is defined as a driver Memory Seat button is never associated to any positional settings via Press and Hold operation nor any Enhanced Memory Driver Profile.

#### ENMEM-REQ-199873/A-No Recall in Driver Memory Seat Button Association Mode

During Driver Memory Seat Button Association Mode, all profile recall requests from the user (regardless of recall method) shall be ignored by the EnhancedMemoryProfileServer. This is to prevent any confusion regarding what settings will be copied to a Driver Profile during Profile Creation.

#### ENMEM-REQ-199949/A-No Recall for Positional Settings When Vehicle in Motion

EnhancedMemoryServers shall not recall settings that are tied with Classic Memory when the vehicle is in motion per the requirements mandated by Classic Memory.

#### ENMEM-SR-REQ-214302/A-No Recalls during a Crash Event

The EnhancedMemoryProfileServer shall neither update ActivePersonality\_St nor PersonalityRecallCounter\_St when a Crash Event is in progress.

#### ENMEM-HMI-REQ-199950/C-Enhanced Memory HMI Notification for Updating Active Driver Profile

When Enhanced Memory feature is on, indicated by EnhancedMemory\_St = ProfilesOn, the EnhancedMemoryInterfaceClient shall provide its HMI active Driver Profile notification

* Each time the “Start Screen” is shown as defined by H22g\_SYNC3\_Welcome\_Power\_Modes
* Within T\_PersRecall when a changed/new value of ActivePersonality\_St is detected

The HMI active Driver Profile notification shall not be shown when EnhancedMemory\_St changes from ProfilesOn to ProfilesOf

#### ENMEM-HMI-REQ-199942/A-Driver Profile Recall Notification Queue

When a Driver Profile change occurs at a time when the EnhancedMemoryInterfaceClient cannot display a notification to the User, it shall queue up this display update until a time when a notification can then be displayed. This shall only apply for the last recall request.

### White Box View

#### Activity Diagrams

##### ENMEM-ACT-REQ-199953/B-Recall Driver Profile Via Keyfob/Phone

Activity Diagram



##### ~~ENMEM-ACT-REQ-199951/A-Recall Driver Profile Via Driver Memory Seat Button~~

~~Activity Diagram~~



##### ~~ENMEM-ACT-REQ-199964/A-Driver Memory Seat Button Store Recall~~

~~Activity Diagram~~



##### ENMEM-ACT-REQ-199952/A-Recall Driver Profile Via HMI Menu

Activity Diagram



#### Sequence Diagrams

##### ENMEM-SD-REQ-199956/B-Recall Driver Profile Via Keyfob/Phone

Constraints

Pre-Condition

A keyfob or phone is associated to a Driver Profile

The Enhanced Memory feature is enabled (set to On)

Scenarios

Normal Usage

The associated keyfob or phone is detected by the EnhancedMemoryProfileServer and the active Driver Profile is set to the Driver Profile associated to the keyfob or phone.

Post-Condition

All applicable user settings are recalled for the associated Driver Profile.

The associated Driver Profile is active.

Sequence Diagram



##### ~~ENMEM-SD-REQ-199954/A-Recall Driver Profile Via Driver Memory Seat Button~~

~~Constraints~~

~~Pre-Condition~~

~~The Enhanced Memory feature is enabled (set to On)~~

~~Scenarios~~

~~Normal Usage~~

~~A Driver Memory Seat button press is detected by the EnhancedMemoryPositionClient. A request is sent on the vehicle system interface to change the active Driver Profile to the Driver Profile associated to the pressed Driver Memory Seat button. The active Driver Profile is set to the associated Driver Profile.~~

~~Post-Condition~~

~~All applicable user settings are recalled for the associated Driver Profile.~~

~~The associated Driver Profile is active.~~

~~Sequence Diagram~~



##### ~~ENMEM-SD-REQ-199965/A-Driver Memory Seat Button Store Recall~~

~~Constraints~~

~~Pre-Condition~~

~~Scenarios~~

~~Normal Usage~~

~~A Driver Memory Seat button store operation is detected by the EnhancedMemoryPositionClient. All applicable current settings are stored to the driver Profile associated to the pressed Driver Memory Seat button. The driver Profile associated to the pressed Driver Memory Seat button becomes active if not currently active.~~

~~Post-Condition~~

~~All applicable user settings are stored to the associated Driver Profile.~~

~~The associated Driver Profile is active.~~

~~Sequence Diagram~~



##### ENMEM-SD-REQ-199955/A-Recall Driver Profile Via HMI Menu

Constraints

Pre-Condition

The infotainment system is active

The Enhanced Memory feature is enabled (set to On)

Scenarios

Normal Usage

An HMI selection for signing into a Driver Profile is detected by the EnhanceMemoryInterfaceClient. A request is sent on the vehicle system interface to change the active Driver Profile to the driver Profile associated to the HMI selection. The active Driver Profile is set to the associated Driver Profile.

Post-Condition

All applicable user settings are recalled for the associated Driver Profile. The associated Driver Profile is active.

Sequence Diagram



## ENMEM-FUN-REQ-204918/A-Opt-Out

### Opt-Out Function Description

Opt-Out is an Enhanced Memory function that allows a user to opt-out of the Enhanced Memory feature, removing separate Driver Profiles for different drivers in the vehicle. All existing Driver Profiles along with associated keyfobs and phones are permanently deleted. The difference between the Opt-Out function and the Disable function is that Opt-Out permanently disables Enhanced Memory whereas the Disable function only temporarily removes access to Enhanced Memory. Opt-Out will also erase all Driver settings from the vehicle’s NVM, this cannot be done when using the Delete Drive Profile function to delete all Driver Profiles.

Vehicles with the Master Reset Function may utilize the Master Reset feature (ex. reuse the same HMI menu) and add Enhanced Memory Opt-Out requirements to the existing Master Reset feature.

The Opt-Out Function is triggered by a user request and will call the Delete Driver Profile Function to delete all existing Driver Profiles. In addition, the Opt-Out Function also erases Driver Profile information from NVM that is not required to be executed by Delete Driver Profile Function. This is to align with Master Reset feature to erase applicable personal information from NVM.

|  |  |  |  |
| --- | --- | --- | --- |
| Opt Out Functional Decomposition Diagram | | | |
| HMI Menu Customer Function | Logic Function | | |
| Level1 | Level2 | Level3 |
| **Master Reset** | Opt Out | Delete Driver Profile | Disassociate Keyfob |
| Disassociate Phone |
| Recall Driver Profile |
| Disable Enhanced Memory |

Figure 17 – Opt-Out Functional Decomposition Diagram

### Use Cases

#### ENMEM-UC-REQ-199849/B-Opt-Out Enhanced Memory via Master Reset

|  |  |
| --- | --- |
| **Actor** | Vehicle Occupant |
| **Pre-conditions** | Infotainment system is on  Enhanced Memory feature is enabled (set to On)  Vehicle speed is less than the Driving Restriction threshold\*  At least one Driver Profile is created |
| **Scenario Description** | The user initiates Master Reset |
| **Post-conditions** | * All Driver Profiles are deleted and Enhanced Memory feature is disabled (set to Off) * HMI provides indication of Enhanced Memory feature is OFF. * All keyfobs and phones are disassociated from Driver Profiles |
| **List of Exception Use Cases** |  |
| **Interfaces** | Personalization Interface |
| **Notes** | Requirements of deleting a Driver Profile apply here as all Driver Profiles are deleted  \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

### Requirements

#### ENMEM-REQ-199911/A-Driver Profiles Deleted During Master Reset

The storage and maintenance of the Driver Profiles of Enhanced Memory shall comply with the design and requirements of Master Reset (refer to the latest version of VS-FUN-REQ-025341-Master Reset to Factory Defaults).

When a Master Reset operation is executed:

* The EnhancedMemoryInterfaceClient shall execute a Delete Driver Profile operation for all exiting Driver Profiles sequentially. Consequently, all requirements of Delete a Driver Profile shall apply to Master Reset.
* The EnhancedMemoryInterfaceClient shall set EnhancedMemory\_St to ProfilesOff per ENMEM-REQ-199830-Enhanced Memory Feature Activation Status
* Only after the Vehicle Profile is recalled, per ENMEM-REQ-199909-Recall Vehicle Profile When Active or Last Driver Profile Is Deleted, the EnhancedMemoryInterfaceClient and EnhancedMemoryServers (for infotainment modules that support Master Reset) shall reset applicable features in all Driver Profiles back to factory default settings per VS-FUN-REQ-025341-Master Reset to Factory Defaults

### White Box View

#### Activity Diagrams

##### ENMEM-ACT-REQ-199918/B-Opt-Out via Master Reset

Activity Diagram



#### Sequence Diagrams

##### ENMEM-SD-REQ-199924/B-Opt-Out via Master Reset

Constraints

Pre-Condition

Infotainment system is On

Vehicle speed is less than the Driving Restriction threshold\*

The Enhanced Memory feature is enabled (set to On)

\*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction

Scenarios

Normal Usage

The driver performs a Master Reset

Post-Condition

The Enhanced Memory feature is disabled (set to off).

All Driver Profiles are deleted.

All associated keyfobs and phones are disassociated.

The active Driver Profile is set to “Guest”.

Positional settings remain unchanged.

Applicable personalized infotainment settings are reset to factory default values for all Driver Profiles.

Sequence Diagram



## ENMEM-FUN-REQ-204960/A-Copy

### Driver Profile Creation via Copy Operation

A new Driver Profile is created by copying the current active settings to the target Driver Profile that’s being created.

This Driver Profile creation task is accomplished through a Copy operation that is designed to allow multiple features to be saved to a different profile at once with one signal command. Unlike other Feature Based Message Protocol operations such as Query and Set, the Copy command is not designed to be issued one at a time for a feature and thus does not provide the setting configuration for any feature. Each EnhancedMemoryServer needs to know all of its personalized features and retain its current active settings, which may or may not be the same as the settings stored in the Active Driver Profile at any given time. This discrepancy could occur before changes of current active settings are stored to Active Profile and could also occur if the user changes positional settings without storing the changes through Driver Memory Seat button press and hold action.

### Requirements

#### ENMEM-REQ-199882/A-Copy Request

After a Driver Memory Seat button is successfully associated to a Driver Profile, EnhancedMemoryInterfaceClient shall send the Copy operation request via Feature\_Rq(Operation=copy, FeatureID=0,Configuration=0xFFFF, PersIndex)to all EnhancedMemoryServers.

To prevent FeatureID and Configuration from being used in Copy command, FeatureID shall be set to zero to indicate an invalid feature ID whereas Configuration shall be set to 0xFFFF to indicate a non-existing setting.

#### ENMEM-REQ-199883/A-Driver Profile Index for Copy Command

In Copy request, the Drive Profile index, Feature\_Rq(PersIndex), shall be defined by an unassociated Driver Memory Seat button pressed by the user.

Example:

If Driver Memory Seat button X is pressed, indicated by EnMemButtonPairing\_St(ButtonPairing=ButtonXPressed), the EnhancedMemoryInterfaceClient will then determine the Driver Memory Seat button’s association status internally. If the status is not associated, the EnhancedMemoryInterfaceClient will then set Feature\_Rq(PersIndex) to PERS\_X.

#### ENMEM-REQ-199884/A-Execute Copy Operation

When receiving a Copy command via Feature\_Rq(Operation = Copy), the EnhancedMemoryServer shall copy all applicable personalized features’ current active settings (not the active Driver Profile settings as that could be different than current active settings) to the new Driver Profile indicated by Feature\_Rq(PersIndex = PERS\_X).

Personalized features that are to be copied to the new Driver Profile shall be internally managed by the EnhancedMemoryServer itself and shall be determined by a separate program-specific document for each EnhancedMemoryServer.

The Copy command shall **only be used** as an indicator for the EnhancedMemoryServer to perform an internal copy of all applicable personalized features. It shall not be used as a series of Copy commands for each individual FeatureID and Configuration supported by an EnhancedMemoryServer. For this reason, the Feature\_Rq(FeatureID) and Feature\_Rq(Configuration) values shall be ignored by the EnhancedMemoryServer for all Copy commands sent by the EnhancedMemoryInterfaceClient.

#### ENMEM-REQ-199885/A-Performance Requirement for Copy Operation

All EnhancedMemoryServers shall perform the Copy operation within T\_PersCopy.

#### ENMEM-TMR-REQ-199886/A-T\_PersCopy

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_PersCopy | Maximum time the EnhancedMemoryServer shall take to complete all Enhanced Memory related Copy operations for a given Driver Profile upon request. | msec | 1500-4500 | 500 | 3000 |

#### ENMEM-REQ-199890/A-Time Separation between Update Opt-In Status and Recall

After updating the newly created Driver Profile Opt-In status, the EnhancedMemoryInterfaceClient shall wait a minimum of T\_OptInRecallSeparation then issue a recall request to make the newly created Driver Profile as the Active Profile.

#### ENMEM-TMR-REQ-199891/A-T\_OptInRecallSeparation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_OptInRecallSeparation | Minimum separation time the EnhancedMemoryInterfaceClient shall have between sending the PersonalityOptIn\_St and sending the InfotainmentRecall\_Rq. | msec |  | 5 | 100 |

#### ENMEM-REQ-199887/A-Request Exit Driver Memory Seat Button Association Mode After Copy

After sending Copy request, EnhancedMemoryInterfaceClient shall wait a minimum of T\_PersCopy before sending a request to exit Driver Memory Seat Button Association Mode.

#### ENMEM-REQ-199888/A-Recall New Driver Profile After Copy

* After sending the Copy request and then sending an exit Driver Memory Seat Button Association request, the EnhancedMemoryInterfaceClient shall ensure EnMemButtonPairing\_St(ButtonPairing= ButtonPairingExited) is received and shall wait a minimum of T\_RecallDelay from the time the Copy request was first sent, before sending a request to update to the new Driver Profile via the InfotainmentRecall\_Rq method
* The value of T\_RecallDelay shall be a configurable value

#### ENMEM-TMR-REQ-199889/A-T\_RecallDelay

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_RecallDelay | Minimum time the EnhancedMemoryInterfaceClient shall wait after sending a copy operation, before sending a recall request to the vehicle system interface.  Example:  The EnhancedMemoryInterfaceClient sends a copy operation at time-stamp 10:00:00.  The EnhancedMemoryInterfaceClient must wait until 10:00:05 before sending a recall request to update the active driver profile. | msec | 3000-7000 | 500 | 5000 |

#### ENMEM-REQ-199892/A-Storing Positional Settings after Copy

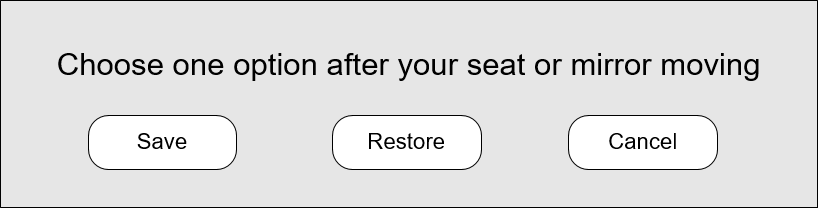
When creating a Driver Profile, the current positional settings shall be copied to the new Driver Profile that’s being created. In order to guarantee this task is accomplished, an infotainment store operation is also issued after Copy operation but before recall request.

* When sending a recall request for the new Driver Profile after Copy operation, the EnhancedMemoryInterfaceClient shall also send a store positional settings request via InfotainmentPersStore\_Rq to EnhancedMemoryPositionClient after Copy operation but before recall request
* The EnhancedMemoryPositionClient shall store all current Classic Memory settings to the indicated Driver Memory Seat button (which may include performing a Classic Memory subsystem store operation) upon reception of the InfotainmentPersStore\_Rq method and respond with InfotainmentPersStore\_St(Status = Complete) when complete.
  + While the store operation is being performed, the EnhancedMemoryPositionClient shall respond with InfotainmentPersStore\_St(Status = InProgress).

## ENMEM-FUN-REQ-xxx/x-Dialog

### Dialog Function Description

With a active driver profile, if the driver adjusts the left/right mirror or seat position, DuerOS shall display three options: ‘Save’, ’Restore’ and ‘Cancel’.



### Use Cases

#### ENMEM-UC-REQ-xxx/x-Dialog display after seat position adjustment

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  Profile A active. |
| **Scenario Description** | The driver adjusts the seat position |
| **Post-conditions** | DuerOS display dialog ‘Save’, ‘Restore’ and ‘Cancel’ |
| **List of Exception Use Cases** | If there no active driver profile present, DuerOS shall not display dialog. |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

### Requirements

#### ENMEM-REQ-xxx/x-Dialog Precondition

* One profile active is the precondition of Dialog function.
* In D or R/N Gear, the IVI shall not pop up the Enhanced Memory Dialog for the safety reason
* In Relax Mode, the IVI shall not pop up the Enhanced Memory Dialog for the UX reason

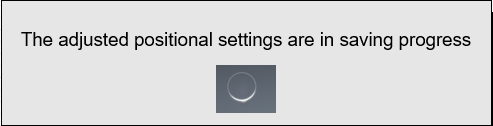
*Note: Except the vehicle profile.*

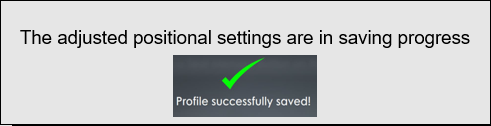
#### ENMEM-REQ-xxx/x-Save Function

If driver chooses the ‘save’ option, DuerOS shall send the save command to DCU, DCU will transfer the command to DSM. So that, the adjusted position will be saved in the current profile.

Also, the DuerOS need show a save progress bar after save button click and stop it when receive the ‘PersStore\_D\_Actl=Complete’ or 3s timeout.

Note: Because there must be a positional operation before the appearance of save, even if the complete is not received within 3s, the save popup will disappear without any problem, and the next time the save will be prompted again





#### ENMEM-REQ-xxx/x-Restore Function

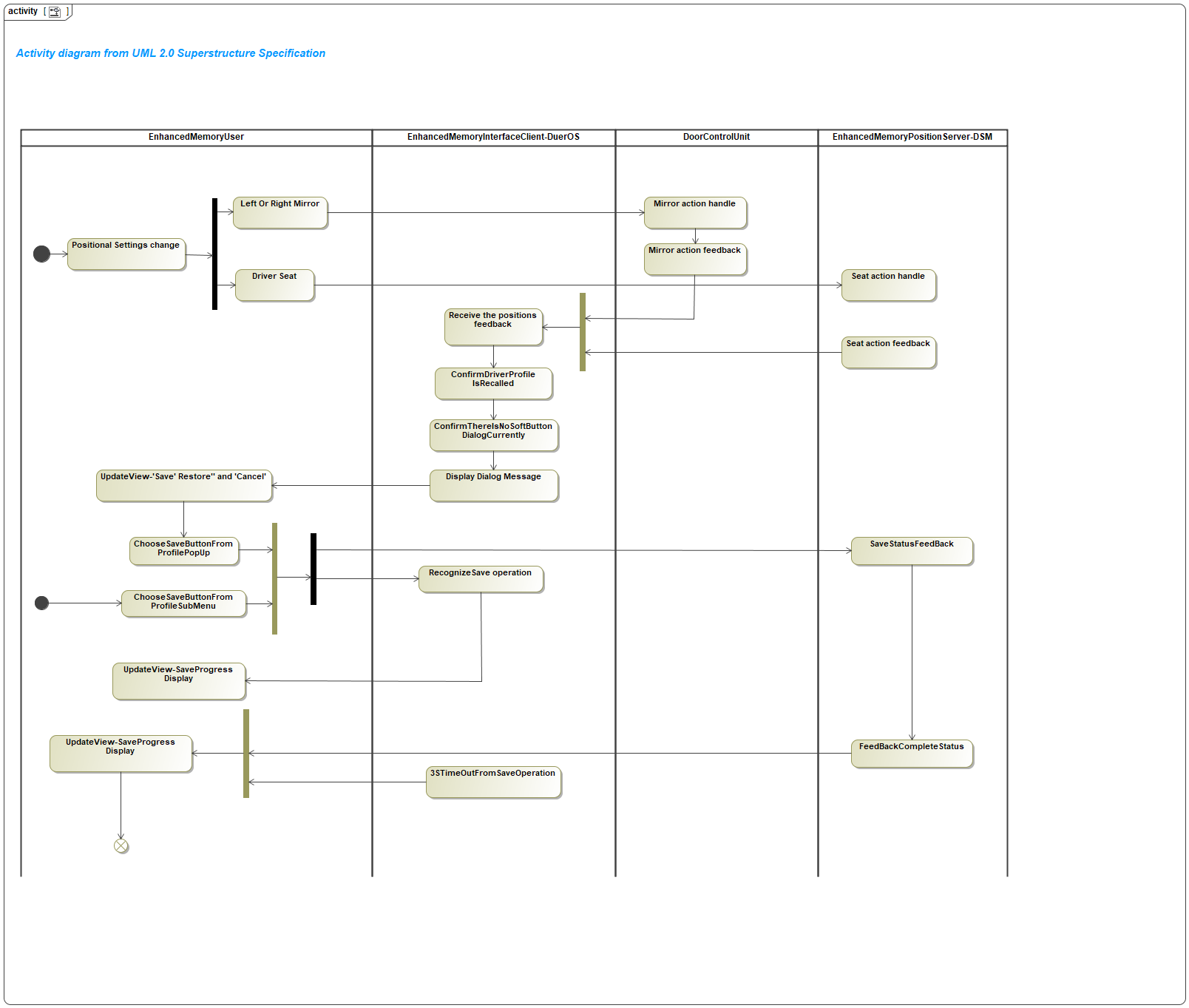
If driver chooses the ‘Restore’ option, DuerOS shall send the restore command to BCM, BCM will broadcast the current profile recall command to DSM and Enhanced Memory Servers. So that, the adjusted position will be restored in current profile.

#### ENMEM-REQ-xxx/x-Cancel Function

If driver chooses the ‘Cancel’ option, DuerOS shall cancel the dialog, and back to the original screen.

### White Box View

#### Activity Diagrams



#### Sequence Diagrams

##### ENMEM-SD-REQ-xxx/x-DuerOS dialog after positional settings changed

Constraints

Pre-Condition

One driver profile is in activate state.

Scenarios

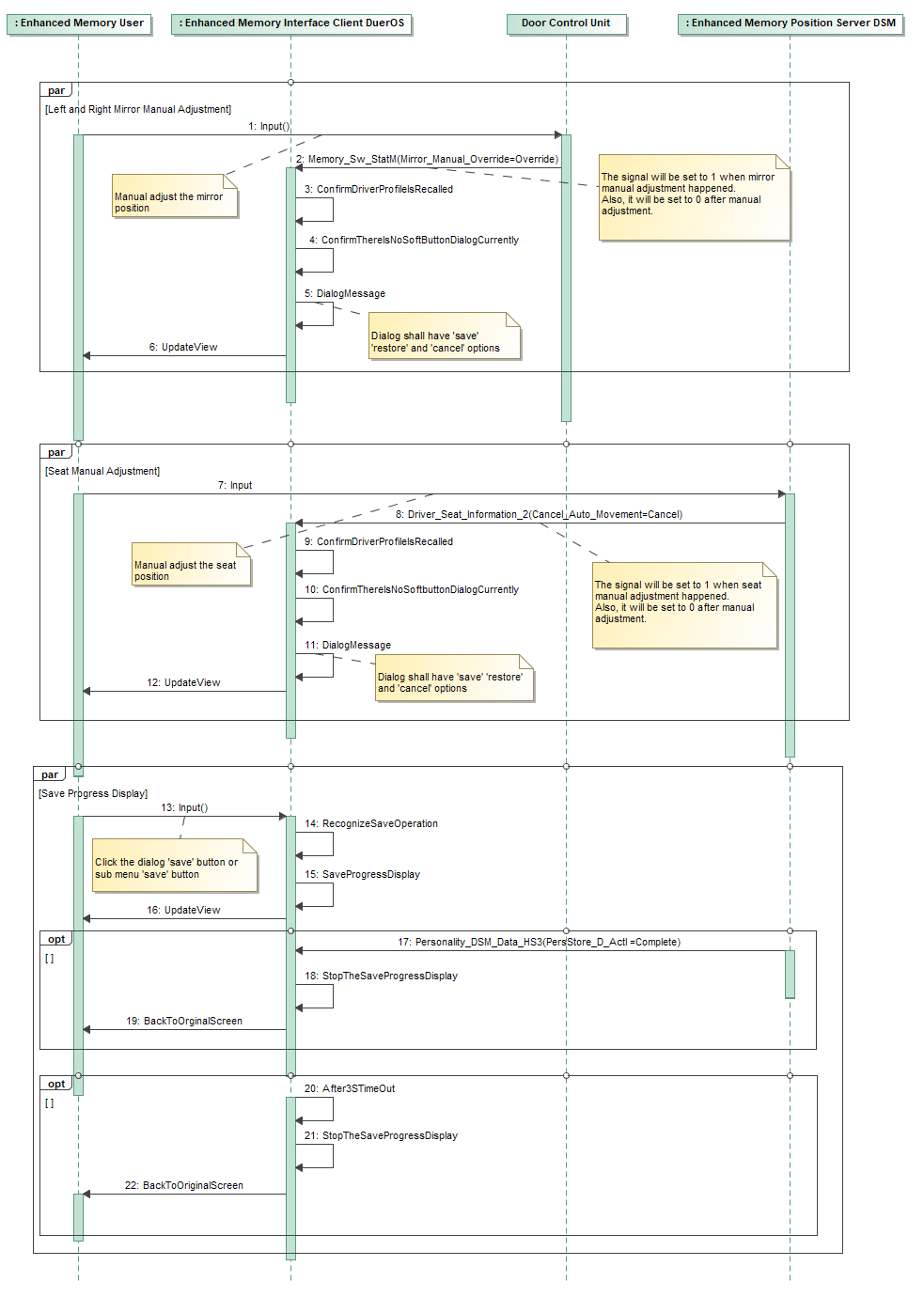
Normal Usage

The user adjusts the left/right mirrors or seat position.

Post-Condition

DuerOS display three options: ‘Save’, ’Restore’ and ‘Cancel’.

Sequence Diagram



## ENMEM-FUN-REQ-xxx/x-Save

### Save function description

Save the newest positional settings to the active profile.

### Use Cases

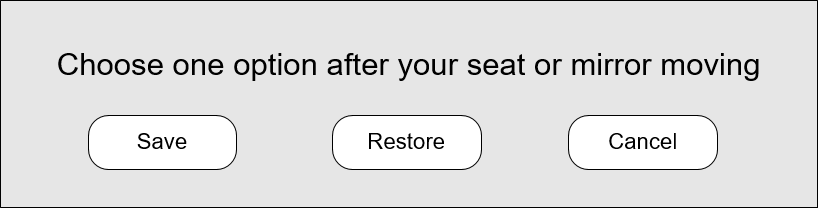
#### ENMEM-UC-REQ-xxx/x-Save the newest positional settings to the current profile

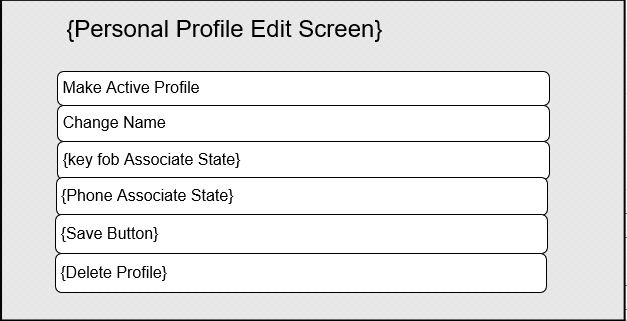
|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  Profile A is active. |
| **Scenario Description** | 1. The driver adjusts the seat and mirrors position 2. The driver chooses the ‘save’ button after dialog displayed |
| **Post-conditions** | The adjusted seat and mirrors position are stored in profile A |
| **List of Exception Use Cases** | If there no active driver profile present, DuerOS shall not display dialog. |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

### Requirement

#### ENMEM-REQ-xxx/x-Save entrance

Driver can access the save soft button from sub-menu or dialog.



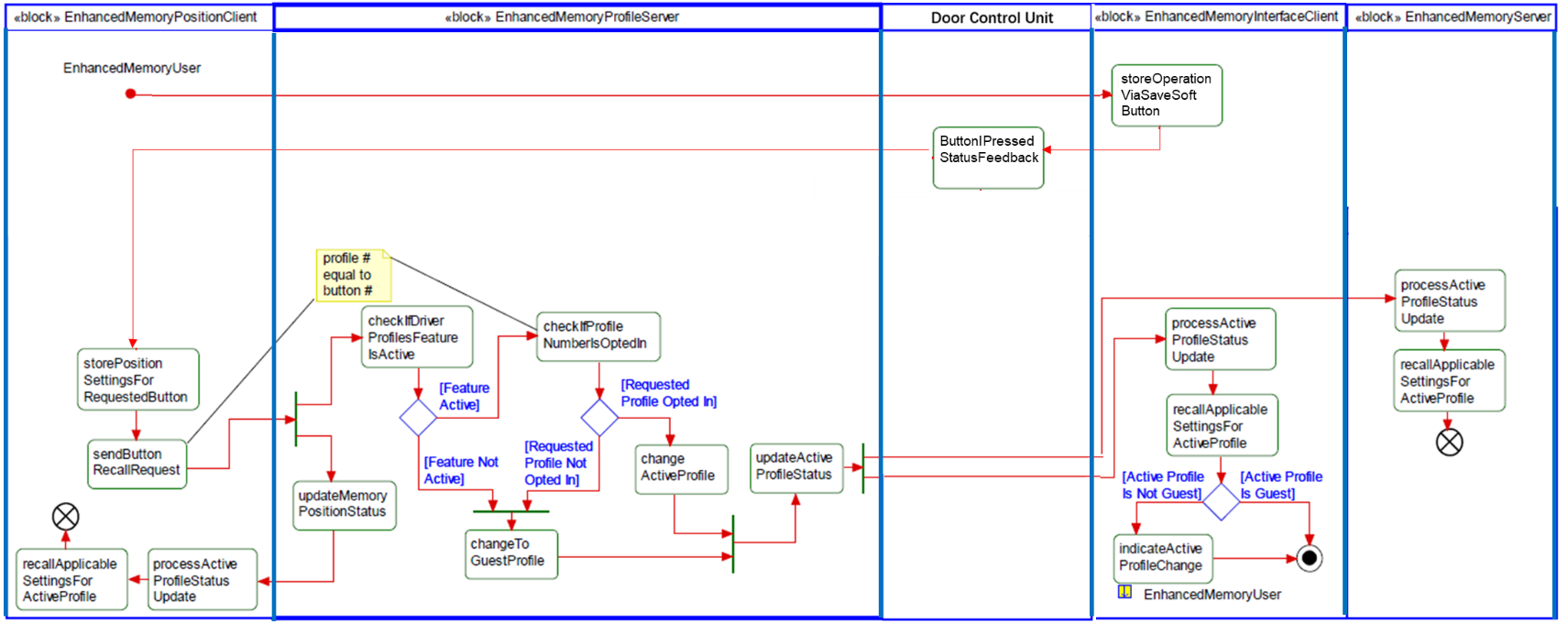


#### ENMEM-REQ-xxx/x-DuerOS show save progress bar

DuerOS shall show save progress bar after save operation and stop it when receive PersStore\_D\_Actl=complete or 3s timeout. Refer the 5.14.2.2 ENMEM-REQ-xxx/x-Save Function

### White Box View

#### Activity Diagrams



#### Sequence Diagram

##### Click save soft button after positional settings changed

**Constraints**

**Pre-Condition**

One profile is in activate state. And the user adjusts the left/right or seat position.

**Scenarios**

**Normal Usage**

Driver click the save soft button from DuerOS dialog.

**Post-Condition**

The newest positional settings are saved in the current profile.



##### ENMEM-TMR-REQ-xxx/x-T\_LongPress

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_LongPress | T\_LongPress indicate the button long press time duration for saving operation | msec | 1500-3000 | 5 | 2000 |

##### ENMEM-TMR-REQ-xxx/x-CheckTheButtonPressedStatusIsNull

DCU shall confirm the signal ‘EmButtn\_D\_Stat’ equal to Null in the save sequence diagram.

## ENMEM-FUN-REQ-xxx/x-Restore

### Restore function description

If driver choose the Restore option from the dialog, the DuerOS need send the current profile recall command to BCM. And all the changed positional settings will be restored to the settings previously stored in current profile.

### Use Cases

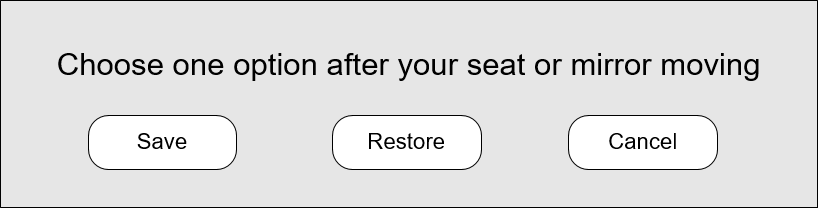
#### ENMEM-UC-REQ-xxx/x-Restore the mirrors and seat position

|  |  |
| --- | --- |
| **Actors** | Vehicle Occupant |
| **Pre-conditions** | The Ignition Status is in Run  The vehicle transmission is in Park OR vehicle speed is less than the Driving Restriction threshold\* for a manual transmission  Profile A is active. |
| **Scenario Description** | 1.The driver adjusts the seat or mirror position  2.The driver chooses the ‘Restore’ button after dialog displayed |
| **Post-conditions** | The mirrors and seat position are restored to the settings stored in profile A previously |
| **List of Exception Use Cases** | If there no active driver profile present, DuerOS shall not display dialog. |
| **Interfaces** | Personalization Interface |
| **Notes** | \*Driving Restriction threshold is defined in DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction |

### Requirement

#### ENMEM-REQ-xxx/x-Restore entrance

Driver can access the Restore option from the dialog:



#### ENMEM-REQ-xxx/x-Restore times

Pressing the ‘Restore’ button will send the recall command each time.

*Note: Restore function is same as ‘Sign into Driver Profile via HMI menu’ function, there are no times limit for recall event of the same profile.*

### White Box View

#### Activity Diagrams



#### Sequence Diagram

##### Click restore soft button after positional settings changed

**Constraints**

**Pre-Condition**

One profile is in activate state. And the user adjusts the left/right or seat position.

*Note: for this example, the current profile index is Pers\_3*

**Scenarios**

**Normal Usage**

Driver click the restore soft button from DuerOS dialog.

**Post-Condition**

The positional settings will be restored to the settings previously stored in the driver profile.



## ENMEM-FUN-REQ-xxx/x- Hard button and soft button configuration parameter

### Compatibility description

The DCU shall have a configuration parameter ‘EM\_Switch\_Type\_Cfg’ for hard memory switch and soft memory switch selection.

Name: EM\_Swtich\_Type\_Cfg

Description: Configure the Enhanced Memory switch type

Type: Numeric

Category: ECU Internal

Initial Value: 0

Storage Class: Non-Volatile

Structure of Data: Scalar

Units: NA

Resolution: 1

Min Value: 0

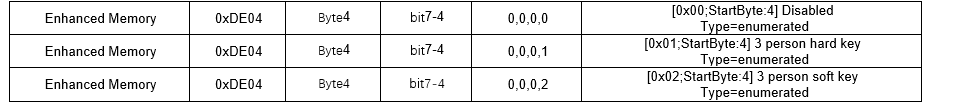
Max Value: 1

Value List:

0 Hard Switch

1 Soft Switch

The IVI shall also have the configuration for enhanced memory disable, enhanced memory with hard button, enhanced memory with soft button.



### Requirement

#### ENMEM-REQ-xxx/x-Enhanced Memory shall work with hard button

Enhanced Memory feature shall keep available if the vehicle equipped with hard button.

#### ENMEM-REQ-xxx/x-Enhanced Memory shall work with soft button

Enhanced Memory feature shall keep available if the vehicle equipped with soft button.

# Appendix: Reference Documents

|  |  |
| --- | --- |
| Reference # | Document Title |
| 1 | Enhanced Memory Module Implementation Guide |
| 2 | H84a\_SYNC3\_EMDriverProfile HMI specification |
| 3 | FBMP SPSS (Feature Based Message Protocol SPSS spec). This DuerOS specification. Modules with menus at DuerOS should refer to this document |
| 4 | Personalization (Enhanced Memory) Display Setup Overview – CGEA1.X. This is Cluster(IPC) specification Modules with menus at Cluster should refer to this document |
| 5 | RQT-001301-003538 LOGIC OF OPERATION:  FEEDBACK |
| 6 | Official Enhanced Memory Feature Number List  <https://www.vsemweb.ford.com:443/tc/launchapp?-attach=true&-s=226TCSession&-o=yBVV1Efix3NrTDAAAAAAAAAAAAA> |
| 7 | U544 Enhanced Memory Feature List |
| 8 | ES1W7T-F407K00-AA |
| 9 | VS-FUN-REQ-025341-Master Reset to Factory Defaults. This requirement contains Master Reset existing requirements |
| 10 | Place holder for PaaK Feature spec |
| 11 | Place holder for BCM PaaK spec |