Research & Vehicle Technology
"Product Development"

Feature – Driver profiles

SYNC+ Subsystem Part Specific Specification (SPSS)

Version 1.0

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Version Date: TBD

FORD CONFIDENTIAL

Revision History

Date	Version	Notes	
03/25/2019	1.0	Jwang308	Initial draft for SYNC+

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1 Overview

The Driver profiles is a subset of personalization. The current memory capability, commonly referred to as “Classic Memory,” only covers things related to driver position such as seat position, exterior mirror position and steering column position. With the addition of a driver profile, the memory capabilities are expanded to include many other settings that may include but are not limited to radio presets, drive assist settings as well as account based apps.

It allows a driver to create a unique profile that, when active, will automatically save included settings and keep those settings associated to this profile. The unique profile will be associated to one of the “Classic Memory” driver seat buttons and the driver can use this button to sign into his/her profile. The driver may also elect to associate a keyfob/PaaK or account to his/her profile such that when the unlock button of the chosen keyfob or phone is pressed, the driver is automatically signed into his/her associated profile. Additionally the driver has the option to sign-into his/her profile through the infotainment screen HMI.

The file is a variant of enhanced memory SPSS, which is applied to SYNC+ (DuerOS) based system. Hence the term of “enhanced memory” will still be used hereafter.

2 Architectural Design

2.1 ENMEM-CLD-REQ-099554/D-Enhanced Memory Interface Client - APIM

The EnhancedMemoryInterfaceClient is responsible for the tasks listed below.

- Offering the user an interface to turn on and off 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 EnhanceMemoryInterfaceClient class

2.2 ENMEM-CLD-REQ-099555/C-Enhanced Memory Position Client - DSM

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 memory seat button is pressed
- Making changes to the position settings when a setting store operation is detected via a memory seat button

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

2.3 ENMEM-CLD-REQ-099556/E-Enhanced Memory Profile Server - BCM

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 or phone to/from a selected Driver Profile

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

2.4 ENMEM-CLD-REQ-099557/D-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

2.5 ENMEMv2-CLD-REQ-321228/A-Enhanced Memory Server - APIM 4.1

2.5.1 ENMEM-FUR-REQ-134134/K-Enhanced Memory Features Supported - APIM

Remembered Feature	Remembered Settings	Affected Module	Feature Name
Screen Display Settings & Vehicle Settings	Center Stack Display: Auto Dim, Screen Mode, Brightness, etc Vehicle Setting		
	Clock Settings	APIM (Internal)	Time Zone
	Display Settings	APIM (Internal)	Screen mode (ie day/night mode)

	Display Settings	APIM (Internal)	Auto Dim
	Display Settings	APIM (Internal)	Screen Brightness
	Touchscreen Settings	APIM (Internal)	Sounds - Touchscreen button beep
	Touchscreen Settings	APIM (Internal)	Sounds - EFP Button Beep
	Language Settings	System interface / APIM (internal)	Language***
	Vehicle Settings	System interface	Distance Units
	Vehicle Settings	System interface	Clock (12/24 mode)
	Vehicle Settings	System interface	Temperature Units
	Vehicle Settings	System interface / APIM (internal)	Ambient Lighting**
	Camera Setting	APIM (Internal)	Enhanced Park Aids
	Camera Setting	APIM (Internal)	Rear Camera Delay ON / OFF
Audio / Volume Settings	Audio / Volume Settings		
	Volume Settings	System interface	Speed Compensated Volume
	Volume Settings	System interface	Phone Volume
	Volume Settings	System interface	Prompt Volume
	Volume Settings	System interface	Voice Recognition Volume
	Volume Settings	System interface	TA Volume
	Audio Settings	System interface	Equalizer Setting - Bass
	Audio Settings	System interface	Equalizer Setting - Treble
	Audio Settings	System interface	Equalizer Setting - Balance
	Audio Settings	System interface	Equalizer Setting - Fade
	Audio Settings	System interface	Equalizer Setting - Mid
	Audio Settings	System interface	Audio Occupancy Modes
Phone	Phone		
	Favorite Phone	APIM (internal)	Favorite Phone (includes phone settings: ring tone, Phonebook sorting…)
Voice Recognition Settings	Center Stack Display: Interaction Mode, Confirmation Prompts		
	Voice Recognition Settings	APIM (Internal)	Voice Recognition – Advance Mode

	Voice Recognition Settings	APIM (Internal)	Voice Recognition – Phone Confirmation
	Voice Recognition Settings	APIM (Internal)	Voice Recognition – Voice Command List
~~Navigation Preferences and Settings~~	~~Center Stack Display: Navigation: Map Preferences, Route Preferences, Navigation Preferences, Traffic Preferences, Avoid Areas.~~		-
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Nav Prefs - Guidance Prompts~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Nav Prefs - Parking POI Notification~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Route Prefs - Preferred Route~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Route Prefs - Avoid Freeways~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Route Prefs - Avoid Tollroads~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Route Prefs - Avoid Ferries / Car trains~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Route Preferences - Use HOV Lanes~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Route Prefs - Avoid Tunnels~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Map Prefs - Map Content - Breadcrumbs~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Map Prefs - Map Content - Point of Interest (POI) Icons~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~POI map overlay~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Previous destinations~~
-	~~Navigation Settings~~	~~APIM (Internal)~~	~~Traffic Prefs - traffic (map)~~
	~~Navigation Settings~~	~~APIM (Internal)~~	~~Dynamic Route Guidance (On/Off)~~

- Note when says “System interface” it can be something as simple as monitoring the status signals which APIM module should be doing already (ex Audio Settings, Vehicle Settings, Volume periodic status messages). See enhanced memory SPSS functional requirements for how this is done
  - If don’t have an * asterisk(s) next to a feature name marked as System Interface there should be no new requirements that need to be added to the SPSS features/functions.
- ** For Ambient Lighting to support enhanced memory see “Ambient Lighting – Variant 2”
- *** For Language see SPSS updates for Language and enhanced memory

2.5.2 ENMEM-FUR-REQ-134132/C-Enhanced Memory Features Supported - AHU

Remembered Feature	Remembered Settings	Affected Module	Feature Name
Radio Settings - Station presets	Station Presets (AM/FM, SDARS, DAB)	AHU	
	Radio Presets		Radio Presets (note: this includes all banks for all presets. Ex. AM1, AM2, DAB2…)

Audio Settings - Volume & Sound Settings	Volume Settings (SCV/Prompt/Phone), Sound Settings (Bass/MidRange/Treble/Balance/Fade)	AHU	
	Volume Settings		Speed Compensated Volume Setting
	Volume Settings		Phone Volume
	Volume Settings		Mixable Prompt Volume (ex SYNC prompts)
	Volume Settings		Voice Recognition Volume
	Volume Settings		TA Volume
	Sound Settings		Equalizer Setting - Bass
	Sound Settings		Equalizer Setting - Treble
	Sound Settings		Equalizer Setting - Balance
	Sound Settings		Equalizer Setting - Fade
	Sound Settings		Equalizer Setting - Mid
	Sound Settings		EQ Mode (ex Pop, Rock…)
	Sound Settings		Audio Occupancy Modes

Note: Media volume is not an enhanced memory remembered setting

2.6 EnhancedMemoryInterfaceClient Interface - APIM

2.6.1 ENMEM-IIR-REQ-099360/G-EnhancedMemoryInterfaceClient_Tx

The EnhancedMemoryInterfaceClient_Tx represents all the Enhanced Memory feature related signals transmitted by the EnhancedMemoryInterfaceClient object. The below table represents the mapping of the logical signal names (as described in this specification) to the global GSDB signal names.

Logical Signal Name	Parameter Name	GSDB Signal Name
EnMemProfilePairing_Rq	PersIndex	EmPrflNo_D_Rq
	ButtonPairing	EmPrflButtnAssoc_D_Rq
	KeyPairing	EmPrflKeyAssoc_D_Rq
EnhancedMemory_St	Status	Em_D_Stat
InfotainmentPersStore_Rq	PersIndex	PersStore_D_Rq
InfotainmentRecall_Rq	PersIndex	CntrStk_D_RqRecall
PersonalityOptIn_St	Pers1Status	Pers1OptIn_B_Stats
	Pers2Status	Pers2OptIn_B_Stats
	Pers3Status	Pers3OptIn_B_Stats
	Pers4Status	Pers4OptIn_B_Stats
Feature_Rq	Operation	CtrStkDsplyOp_D_Rq
	FeatureID	CtrStkFeatNoActl
	Configuration	CtrStkFeatConfigActl
	PersIndex	CtrStkPersIndex_D_Actl
FactoryReset_Rq	Type	SDARS_FactoryReset_Rq

Note: GSDB signal names are reference only. The Global Signal Database (GSDB) is the master for all signals. If there is a conflict bring to the module D&R's attention.

2.6.1.1 MD-REQ-099304/D-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 memory seat button pairing mode, keyfob pairing mode, or phone pairing mode.

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 key fob and phone pairing mode request value. Received by Enhanced Memory Profile Server only
	Null	0x0	
	EnterKeyPairing	0x1	
	ExitKeyPairing	0x2	
	DisassociateKey	0x3	
	OverwriteKey	0x4	
	EnterPhonePairing	0x5	
	DisassociatePhone	0x6	

2.6.1.2 MD-REQ-099311/B-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	

2.6.1.3 MD-REQ-099305/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	

2.6.1.4 MD-REQ-099308/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	

2.6.1.5 MD-REQ-099309/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	

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

Message Type: Request

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

Included Parameters:
Operation
FeatureID
Configuration
PersIndex

Name	Literals	Value	Description
Operation	-	-	Type of operation being requested
	Null	0x0	
	Query	0x1	
	Set	0x2	
	Upload	0x3	
	Restore	0x4	
	Copy	0x5	
	NotUsed	0x6 – 0x7	
FeatureID	-	-	Feature number being requested
		0x0000 – 0xFFFF	
Configuration	-	-	Configuration value being requested
		0x0000 – 0xFFFF	
PersIndex	-	-	Indicates which personality profile is being accessed
	PERS_1	0x0	
	PERS_2	0x1	

	PERS_3	0x2	
	PERS_4	0X3	
	VEHICLE	0X4	
	Not Used	0x5	
	Not Used	0x6	
	Not Used	0x7	

2.6.1.7 MD-REQ-015018/A-FactoryReset_Rq (TcSE ROIN-284876-1)

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	

2.6.2 ENMEM-IIR-REQ-099363/G-EnhancedMemoryInterfaceClient_Rx

The EnhancedMemoryInterfaceClient_Rx represents all the Enhanced Memory feature related signals received by the EnhancedMemoryInterfaceClient object. The below table represents the mapping of the logical signal names (as described in this specification) to the global GSDB signal names.

Logical Signal Name	Parameter Name	GSDB Signal Name
ActivePersonality_St	PersIndex	PersNo_D_Actl
EnMemButtonPairing_St	ButtonPairing	EmButtn_D_Stat
EnMemKeyPairing_St	PersIndex	EmPrflNo_D_Stat
	KeyPairing	EmPrflKeyAssoc_D_Stat
InfotainmentPersStore_St	Status	PersStore_D_Actl
PersonalityRecallCount_St	CountValue	RecallEvent_No_Cnt
PersKeyPairing_St	Pers1KeyStatus	Pers1Key_D_Stat
	Pers2KeyStatus	Pers2Key_D_Stat
	Pers3KeyStatus	Pers3Key_D_Stat
	Pers4KeyStatus	Pers4Key_D_Stat
PersPhonePairing_St	Pers1PhoneStatus	Pers1Phone_D_Stat
	Pers2PhoneStatus	Pers2Phone_D_Stat
	Pers3PhoneStatus	Pers3Phone_D_Stat
	Pers4PhoneStatus	Pers4Phone_D_Stat
PaakConnection_St	Status	PaakCnnct_D_Stat

Note: GSDB signal names are reference only. The Global Signal Database (GSDB) is the master for all signals. If there is a conflict bring to the module D&R's attention.

2.6.2.1 MD-REQ-099354/E-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	
	NotUsed	0x7	

2.6.2.2 MD-REQ-099312/A-EnMemButtonPairing_St

Message Type: Status

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

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

2.6.2.3 MD-REQ-099352/C-EnMemKeyPairing_St

Method Type: Status

The signal is used to inform the Enhanced Memory Interface Client the status of key fob 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 key fob and phone pairing mode status value.
	Null	0x0	
	KeyPairingEntered	0x1	
	KeyPairingExited	0x2	
	KeyDisassociated	0x3	
	KeyAlreadyInUse	0x4	
	KeyAssociateSuccess	0x5	
	KeyAssociateFailed	0x6	
	WrongDeviceSelected	0x7	

2.6.2.4 MD-REQ-099349/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	

2.6.2.5 MD-REQ-099356/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	

2.6.2.6 MD-REQ-197231/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	

2.6.2.7 MD-REQ-233493/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	

2.6.2.8 MD-REQ-238321/B-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	

2.7 EnhancedMemoryServer Interface

2.7.1 ENMEM-IIR-REQ-099371/B-EnhancedMemoryServer_Rx

The EnhancedMemoryServer_Rx represents all the Enhanced Memory feature related signals received by the EnhancedMemoryServer object. The below table represents the mapping of the logical signal names (as described in this specification) to the global GSDB signal names.

Logical Signal Name	Parameter Name	GSDB Signal Name
ActivePersonality_St	PersIndex	PersNo_D_Actl
PersonalityRecallCount_St	CountValue	RecallEvent_No_Cnt
Feature_Rq	Operation	CtrStkDsplyOp_D_Rq
	FeatureID	CtrStkFeatNoActl
	Configuration	CtrStkFeatConfigActl
	PersIndex	CtrStkPersIndex_D_Actl
FactoryReset_Rq	Type	SDARS_FactoryReset_Rq

Note: GSDB signal names are reference only. The Global Signal Database (GSDB) is the master for all signals. If there is a conflict bring to the module D&R's attention.

2.7.1.1 MD-REQ-099354/E-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	
	NotUsed	0x7	

2.7.1.2 MD-REQ-099356/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	

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

Message Type: Request

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

Included Parameters:
Operation
FeatureID
Configuration
PersIndex

Name	Literals	Value	Description
Operation	-	-	Type of operation being requested
	Null	0x0	
	Query	0x1	
	Set	0x2	
	Upload	0x3	
	Restore	0x4	
	Copy	0x5	
	NotUsed	0x6 – 0x7	
FeatureID	-	-	Feature number being requested
		0x0000 – 0xFFFF	
Configuration	-	-	Configuration value being requested
		0x0000 – 0xFFFF	
PersIndex	-	-	Indicates which personality profile is being accessed
	PERS_1	0x0	
	PERS_2	0x1	
	PERS_3	0x2	
	PERS_4	0X3	
	VEHICLE	0X4	
	Not Used	0x5	
	Not Used	0x6	
	Not Used	0x7	

2.7.1.4 MD-REQ-015018/A-FactoryReset_Rq (TcSE ROIN-284876-1)

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	

3 General Requirements

3.1 ENMEM-REQ-116801/D-Retain Enhanced Memory 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 and/or phone's after a software reflash service is done at dealership.

The information to be retained shall include opted in and opted out (created and deleted) status of all Driver Profiles, Driver Profile's keyed-in name and the association of Driver Profile name to Memory Seat button number.

3.2 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, Climate Control Settings, Navigation Preferences, etc.

3.3 ENMEM-SR-REQ-207325/A-Updates to Non-Volatile Memory

Personalized settings supported by EnhancedMemoryServers shall be stored in those modules' 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.

3.4 ENMEM-REQ-134099/B-MyKey Takes Precedence Over Driver Profile Settings

If a MyKey is the active key 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 override the personalized setting.

3.5 ENMEM-REQ-136642/B-Driver Distraction

For the purpose of this document if there are any existing driver distraction requirements and / or guidelines those requirements do apply for enhanced memory and supersede any requirements in this specification.

For any conflicts bring to the attention to the Ford D&R.

3.6 ENMEM-REQ-198389/B-Enhanced Memory Ignition Restriction

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

- Create/add Driver Profiles
- Edit Driver Profiles

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

3.7 ENMEM-REQ-136644/A-Crank Event - Enhanced Memory

For the purposes of this document when a crank event occurs (ex Ignition_Status = Crank) 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 then unless noted otherwise it shall be assumed that in the use cases and functional requirements that Ignition remained in Run.

3.8 ENMEM-REQ-136692/C-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.

3.9 ENMEM-SR-REQ-136936/C-Request/Response return to Null state

When updating on event, the following event-periodic signals listed below shall hold there 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.

3.10 ENMEM-TMR-REQ-198777/A-T_ReturnToNull

Name	Description	Units	Range	Resolution	Default
T_ReturnToNull	The nominal hold time before returning to a Null state. Use the default value +/- 10%.	sec	0.5-2	0.5	1

3.11 ENMEM-SR-REQ-136937/E-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
- MyKey is not included. All MyKey settings remain the same for different keyfobs, phones, and Driver Profiles within a vehicle. For example, the MyKey Max Speed setting for MyKey keyfob1 and MyKey keyfob2 can only be the same.

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 Reference section.

3.12 ENMEM-REQ-137866/A-Recall and Sign-In term consolidation

For purposes of this specification the terms "Recall" and "Sign-In" are used interchangeably and have the same meaning.

3.13 ENMEM-REQ-137867/B-Keyfob/Phone Association Term Consolidation

For purposes of this specification the terms "Link," "Pair," and "Associate" are used interchangeably with respect to describing a keyfob’s or phone’s connection to the Enhanced Memory feature, and thus have the same meaning.

3.14 ENMEM-REQ-166096/E-Operations Shall Not Recall a Driver Profile

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

- Entering a keypad code
- Starting engine with an associated or an 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 phone to a Driver Profile

3.15 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.

4 Functional Definition

4.1 ENMEM-FUN-REQ-136591/B-System Start-Up and Shut Down

4.1.1 Requirements

4.1.1.1 ENMEM-SR-REQ-136592/M-Network Bus Start-up / Shut-down (EnhancedMemoryProfileServer)

The EnhancedMemoryProfileServer shall update the ActivePersonality_St signal with the active personality (Vehicle, Pers1 – Pers4) used within 500 msec of network bus wake-up.

- 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 at network bus start-up.
- Exception: If within the first 500 msec of bus wake-up if the value of ActivePersonality_St is not known because of an error (ie application powered up and still doesn't know), then the Enhanced Memory Profile Server shall update the ActivePersonality_St signal with the default value of Vehicle. This could possibly occur for example if the EEPROM was corrupted.

At network bus wake-up/start-up if the EnhancedMemoryProfileServer receives EnhancedMemory_St =Null then the EnhancedMemoryProfileServer shall assume the last known state (ex if Enhanced Memory was last ON before network shutdown then assume still ON).

At network bus wake-up/start-up if the EnhancedMemoryProfileServer has not received PersonalityOptIn_St within 500 msec of network bus wake-up then the EnhancedMemoryProfileServer shall assume the last known state (ex if all profiles were opted-in before network shutdown than assume they are still opted-in).

The EnhancedMemoryProfileServer shall remember the last active personality profile between different power mode cycles such as remembering (but not limited to):

- between network bus sleep and wake-up events, and
- between ignition cycles

Responding to request signals at network bus start-up:
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 when Ignition_Status = OFF). In order for request signals not to be lost (first change in the request signal encoding value wakes up the other bus) the following shall be supported:

- The EnhancedMemoryProfileServer shall be able to receive enhanced memory request signals such as "InfotainmentRecall = New PersonX" or "EnhancedMemory = ON/OFF" within 200 msec of network bus wake-up. If the application software is not completely powered up after 200 msec those signals shall be stored and processed later by the EnhancedMemoryProfileServer.

4.1.1.2 ENMEM-SR-REQ-136594/I-Network Bus Start-up / Shut-down (EnhancedMemoryInterfaceClient)

The EnhancedMemoryInterfaceClient shall update the "EnhancedMemory_St" and "PersonalityOptIn_St : Pers1/2/3/4Status" signals with the last known state within 500 msec of network bus wake-up.

- 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 : Pers1/2/3/4Status" signals shall not be published on the bus until the last known state is published and shall not publish its CAN init value at CAN bus start-up.
    - Note: The "PersonalityOptIn_St : Pers1/2/3/4Status" signals shall not be set to the CAN dB Init value at CAN bus start-up since there is no "Null" value and only put on the bus the last value of the OptIn is published (has to be done within 500 msec of network bus wake-up)

The EnhancedMemoryInterfaceClient shall remember the "EnhancedMemory_St" and "PersonalityOptIn_St : Pers1/2/3/4Status" signal settings between different power mode cycles such as remembering:

- between network bus sleep and wake-up events, and
- between ignition cycles, and
- after a B+ reset

Note: ActivePersonality_St = NotDetermined is treated as a don't care and shall assume the last known state.

Request signals / Status signal update:
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 500 msec later 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 500 msec 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.

4.1.1.3 ENMEM-SR-REQ-136593/M-Network Bus Start-up / Shut-down (EnhancedMemoryServer)

At network bus wake-up/start-up the EnhancedMemoryServer shall act on the ActivePersonality_St and PersonalityRecallCounter_St signals.

- The EnhancedMemoryServer shall remember the last active personality and PersonalityRecallCounter_St for the following (but not limited to):
  - between network bus sleep and wake-up events, and
  - between ignition cycles
  - when any network communication failure prevents these signals from being transmitted by the EnhancedMemoryProfileServer

  Note: If the last active personality cannot be determined, the EnhancedMemoryServer shall default to the Vehicle level Profile (Guest Profile).

  Note: ActivePersonality_St = NotDetermined is treated as a don't care and shall assume the last known state.

Infotainment Only:
At infotainment system start-up the Infotainment System Master (ex SYNC) shall recall the last savable active audio source prior to the last shutdown. The active audio source is not personalizable for different personality profiles.

- For example if Profile 3 was last active at shutdown with CD as the last active source and if personality Profile 1 (last source SDARS) is active at start-up then the System Master shall still activate CD for personality Profile 1.

If a tuner source was the last savable source at shutdown then at system start-up the last known tuner frequency and band shall be activated regardless of personality Profile used at start-up.

4.2 ENMEM-FUN-REQ-095956/A-Enable/Disable Driver Profiles

4.2.1 Use Cases

4.2.1.1 ENMEM-UC-REQ-095714/B-Enable Driver Profiles Feature

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to Off (i.e. enhanced memory feature is turned Off).
Scenario Description	The User accesses the Driver Profiles HMI menu and chooses to enable the Driver Profiles feature (set to On)
Post-conditions	• The Driver Profiles feature is set to *ON* • New Driver Profiles can be added • Existing Driver Profiles now can be recalled and edited
List of Exception Use Cases	
Interfaces	Personalization Interface
Notes	

4.2.1.2 ENMEM-UC-REQ-095715/C-Disable Driver Profiles Feature

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to On. At least one Driver Profile has been created.
Scenario Description	The User accesses the Driver Profiles HMI and chooses to disable the Driver Profiles feature (set to Off).

Post-conditions	• The Driver Profiles feature is now set to *OFF*
	• The active Driver Profile is set to *Vehicle (i.e. Guest)*
	  • All applicable non-positional settings will be recalled for the Guest profile
	  • Positional settings remains unchanged
	• New profiles can no longer be added
	• Created Driver Profiles are not deleted and are temperately not accessible to the user

List of Exception Use Cases	
Interfaces	Personalization Interface
Notes	When the feature is turned on again, all created profile will be accessible again

~~*4.2.1.3 ENMEM-UC-REQ-214249/A-Valet Mode enabled with Enhanced Memory On*~~

~~**Actors**~~	~~Vehicle Occupant~~
~~**Pre-conditions**~~	~~The ignition status is in Run.~~ ~~The vehicle speed is less than 8 KPH~~ ~~Enhanced Memory is set to On~~ ~~Valet Mode is Off~~
~~**Scenario Description**~~	~~The user enables Valet Mode from the HMI~~
~~**Post-conditions**~~	~~Active Personality Profile is remembered~~ ~~Enhanced Memory is set to Off~~

	• By default, the Guest Profile is recalled Valet Mode is enabled
Interfaces	Personalization Interface

4.2.1.4 ENMEM-UC-REQ-214250/A-Valet Mode disabled with Enhanced Memory On

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle speed is less than 8 KPH Valet Mode is ON Enhanced Memory is set to Off (was On prior to enabling Valet Mode)
Scenario Description	The user disables Valet Mode from the HMI
Post-conditions	Valet Mode is disabled Enhanced Memory is set to On The remembered Active Personality Profile is recalled
List of Exception Use Cases	ENMEM-UC-REQ-214246-Valet Mode disabled with Enhanced Memory Off
Interfaces	Personalization Interface

4.2.1.5 ENMEM-UC-REQ-214246/A-Valet Mode disabled with Enhanced Memory Off

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle speed is less than 8 KPH Enhanced Memory is set to Off (prior to enabling Valet Mode) Valet Mode is On
Scenario Description	The user disables Valet Mode from the HMI
Post-conditions	Valet Mode is disabled Enhanced Memory remains Off No recall is performed
Interfaces	Personalization Interface

4.2.2 Requirements

4.2.2.1 ENMEM-SR-REQ-140360/B-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.

4.2.2.2 ENMEM-REQ-099679/B-Enhanced Memory Feature Activation Status

The EnhancedMemoryInterfaceClient shall report the activation status of the Driver Profile feature via the EnhancedMemory_St method:

- If a user opts in Enhanced memory to create the first Driver Profile, the EnhancedMemoryInterfaceClient shall then update the status of the EnhancedMemory_St method to indicate that the Driver Profiles feature is currently ON
- If a user selects to turn the Enhanced Memory feature on via HMI interface, the EnhancedMemoryInterfaceClient shall report the status of the EnhancedMemory_St method as ON to indicate that the Driver Profiles feature is currently ON.
- If the Enhanced Memory Feature is OFF or a user selects to turn the Enhanced Memory feature OFF via HMI interface, the EnhancedMemoryInterfaceClient shall report the status of the EnhancedMemory_St method as OFF to indicate that the Driver Profiles feature is currently OFF.
- If no profiles exist (either because all have been deleted by the user one by one or via Master Reset), the EnhancedMemoryInterfaceClient shall report the status of the EnhancedMemory_St method as OFF to indicate that the Driver Profiles feature is currently OFF.

4.2.2.3 ENMEM-REQ-134104/B-Recall Vehicle Profile When Enhanced Memory Feature Is Turned Off

When Enhanced Memory feature is turned Off, as indicated via EnhancedMemory_St(ProfilesOff), the EnhancedMemoryInterfaceClient shall recall Vehicle Profile via InfotainmentRecall_Rq

4.2.2.4 ENMEM-REQ-197515/A-Driver Profiles Not Deleted When Enhanced Memory Feature OFF

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

~~*4.2.2.5 ENMEM-SR-REQ-214801/A-Enable/Disable Enhanced Memory in Valet Mode*~~

~~If EnhancedMemory_St = ProfilesOn when Valet Mode is enabled, the EnhancedMemoryInterfaceClient shall temporarily 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.~~

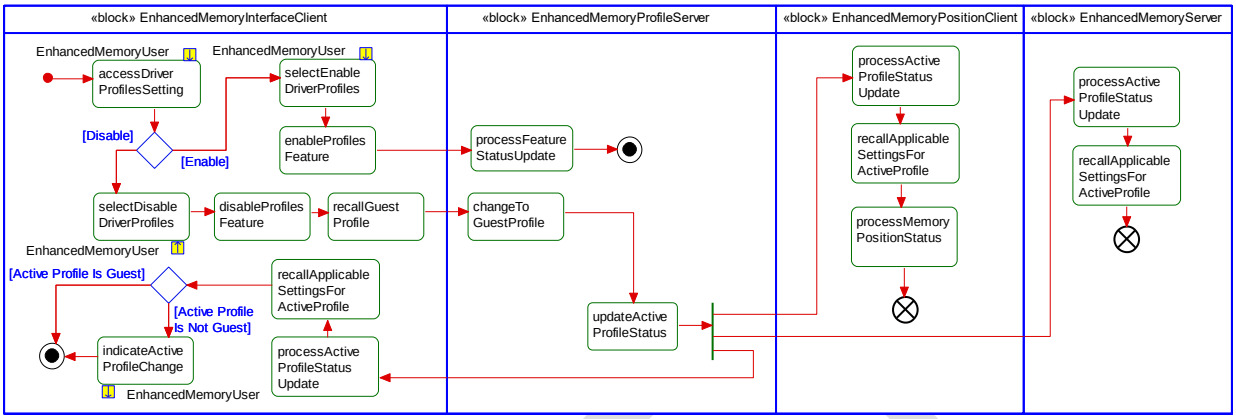
~~All existing Valet Mode requirements/restrictions apply for Enhanced Memory and supersede any requirements in this specification.~~

For any conflicts bring to the attention of the Ford D&R.

4.2.3 White Box View

4.2.3.1 Activity Diagrams

4.2.3.1.1 ENMEM-ACT-REQ-099381/B-Enable/Disable Driver Profiles Feature Activity Diagram



4.2.3.2 Sequence Diagrams

4.2.3.2.1 ENMEM-SD-REQ-099429/A-Enable Driver Profiles

Constraints

Pre-Condition

Driver profiles feature is disabled

Scenarios

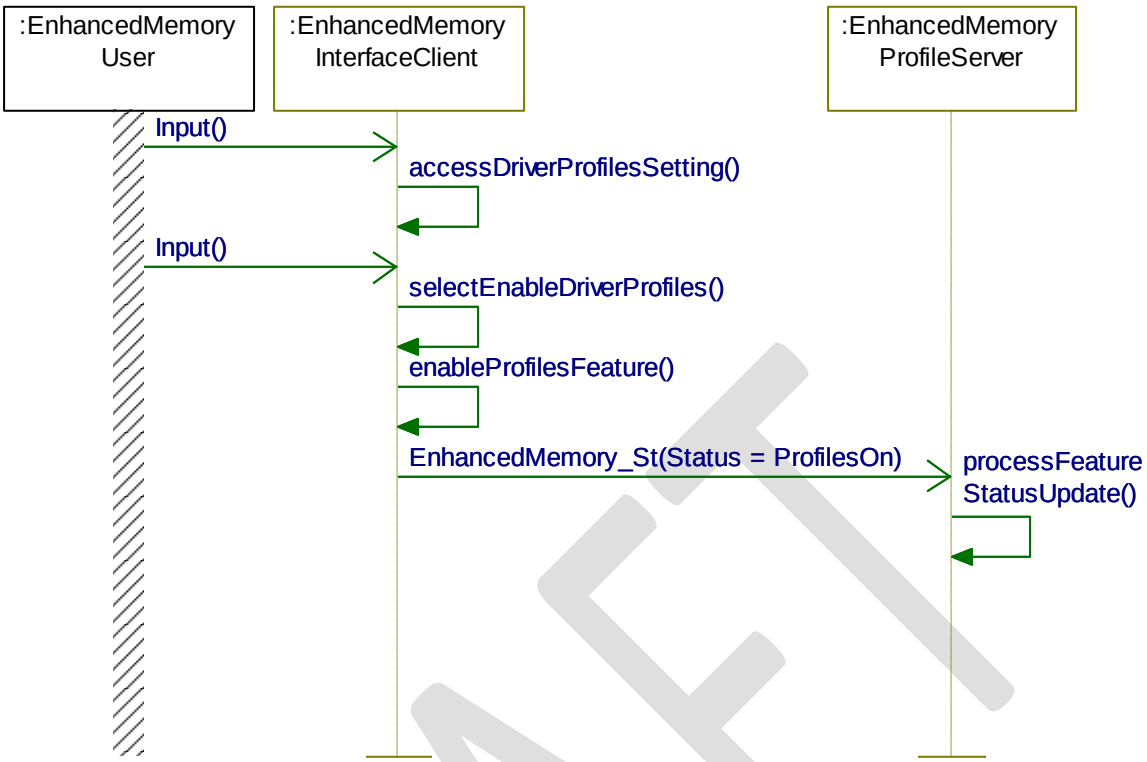
Normal Usage

The driver chooses to enable the driver profiles feature (set to on).

Post-Condition

The driver profiles feature is enabled (set to on).

Sequence Diagram



4.2.3.2.2 ENMEM-SD-REQ-099428/B-Disable Driver Profiles

Constraints

Pre-Condition

Driver profiles feature is enabled

Scenarios

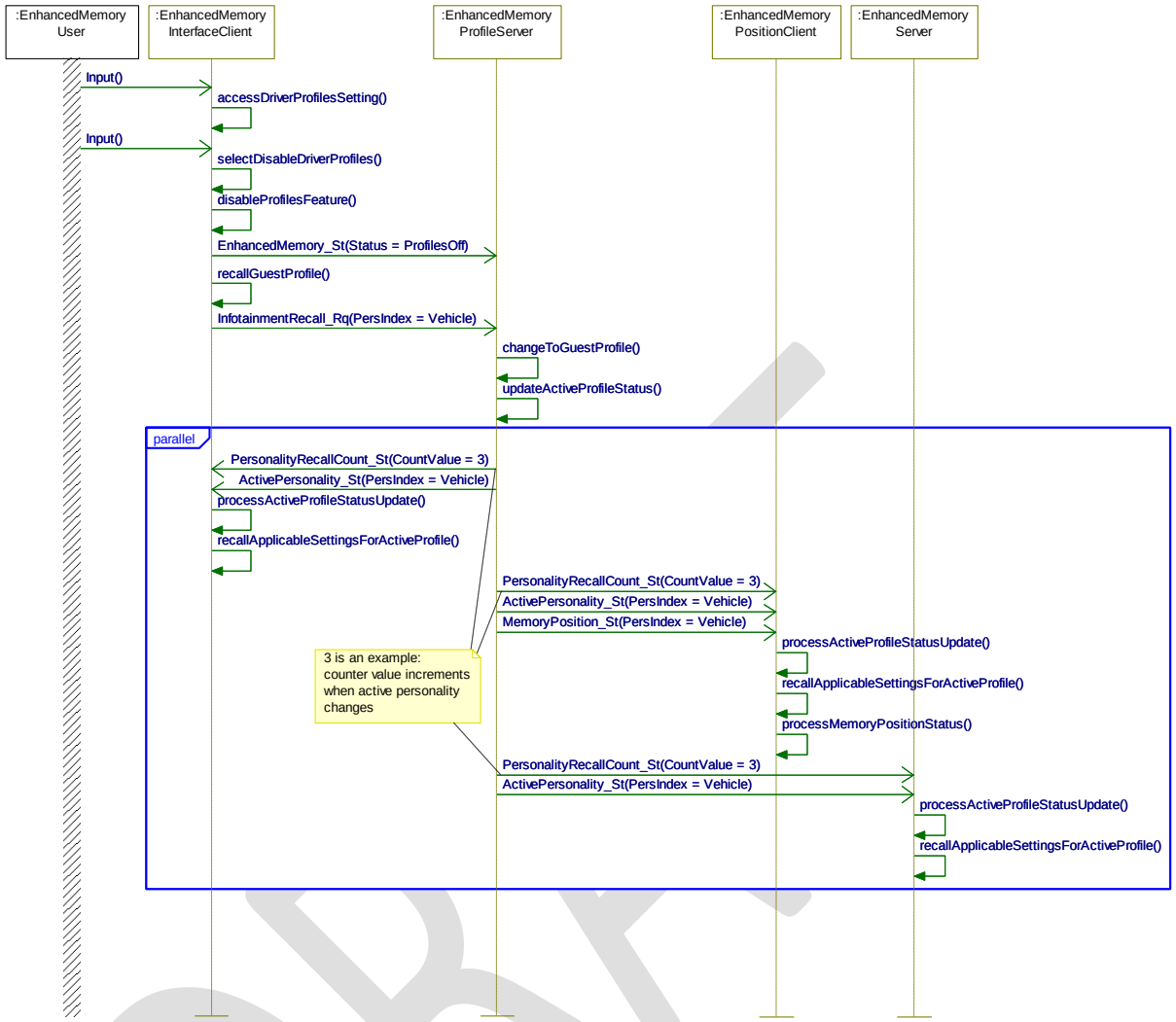
Normal Usage

The driver chooses to disable the driver profiles feature (set to off).

Post-Condition

The driver profiles feature is disabled (set to off).
The active personality profile is set to “Guest”.
Positional settings are unaffected

Sequence Diagram



4.3 ENMEM-FUN-REQ-095957/B-Sign-In/Recall Settings

4.3.1 Recall Function Description

Recall is a function that loads a requested Driver Profile, via a recall request, 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 three different user requests and by an Enhanced Memory system request. A user recall request may be sent by a Memory Seat Button press, by Keyfob or Phone detection (via unlock event or remote start event), and by touch screen manual selection. The Enhanced Memory System recall request may occur when the Active or last Driver Profile is deleted, when a Driver Profile is first created, and when the Enhanced Memory feature is turned from On to Off.

4.3.2 Use Cases

4.3.2.1 ENMEM-UC-REQ-095719/C-Memory Seat Button Recall with Driver Profiles OFF

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to OFF
Scenario Description	The User presses any 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
List of Exception Use Cases	
Interfaces	Personalization Interface

4.3.2.2 ENMEM-UC-REQ-095930/C-Sign Into a Driver Profile via Memory Seat Button

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to ON
Scenario Description	The User presses a memory seat button on the driver door panel 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-136944/A-Sign Into a Driver Profile via Memory Seat Button 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.

4.3.2.3 ENMEM-UC-REQ-136944/C-Sign Into a Driver Profile via Memory Seat Button While Vehicle In Motion

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to ON
Scenario Description	The User presses a 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 8 KPH for a manual transmission)

Post-conditions	All applicable user settings, excluding positional settings that are 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	
Interfaces	Personalization Interface

4.3.2.4 ENMEM-UC-REQ-095934/C-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 8 KPH for a manual transmission The Driver Profiles feature is set to ON
Scenario Description	The User presses a 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.
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.

4.3.2.5 ENMEM-UC-REQ-095939/C-Sign Into a Driver Profile via HMI Menu

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to ON
Scenario Description	The User accesses the Driver Profiles HMI menu and chooses to 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 8 KPH.

4.3.2.6 ENMEM-UC-REQ-095940/D-Sign Into a Driver Profile via Keyfob/Phone

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to ON. The User has chosen to associate their keyfob or phone to their Driver Profile. Phone is registered, authenticated, and connected as a PaaK (refer to the Phone-As-A-Key SPSS)
Scenario Description	The User’s keyfob or phone 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 or phone detection may be the result of an unlock or remote start button press from an associated phone or 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.)

4.3.2.7 ENMEM-UC-REQ-162635/C-Sign Into a Driver Profile via Keyfob/Phone Button Press While Vehicle In Motion

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to ON The User's keyfob or phone is associated to a Driver Profile Phone is registered, authenticated, and connected as a PaaK (refer to the Phone-As-A-Key SPSS)
Scenario Description	The User presses a keyfob or 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 Driver Profile is recalled
List of Exception Use Cases	
Interfaces	Personalization Interface

4.3.2.8 ENMEM-UC-REQ-161547/D-Classic Memory Only Recall via Previously Associated Keyfob/Phone

Actors	Vehicle Occupant
Pre-conditions	The User's keyfob or phone is associated to a Driver Profile Phone is registered, authenticated, and connected as a PaaK (refer to the Phone-As-A-Key SPSS) The Driver Profiles feature is set to OFF. Vehicle is in PARK or less than 8 kph
Scenario Description	The User's keyfob or phone is detected and the associated Classic Memory Position is recalled.
Post-conditions	All Classic Memory position 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 or phone detection may be the result of a unlock button press from an associated phone or 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.

4.3.2.9 ENMEM-UC-REQ-137996/D-Recall Last Known Driver Profile With Keypad Code When A Keyfob/Phone Is Not With The User

Actors	Vehicle Occupant
Pre-conditions	• The Driver Profile feature is set to ON

	• The Vehicle ignition is OFF • The user approaches the vehicle with NO associated keyfob or phone
Scenario Description	The User unlocks the door via the Vehicle Keypad then opens the door and starts the engine
Post-conditions	The last known Driver Profile is recalled
Interfaces	Personalization Interface
Note	• Because there is no keyfob or phone with the user, opening the door via door handle will not change profile for vehicle with or without Smart Door Handle • Starting the engine is not a method of recall profile

4.3.2.10 ENMEM-UC-REQ-162841/C-Recall Driver Profile When An IA Key Is With The User

Actors	Vehicle Occupant
Pre-conditions	• The Driver Profile feature is 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
Scenario Description	The User opens the door
Post-conditions	The last known Driver Profile is recalled if the IA Key is not associated to any Driver Profile. The Driver Profile associated to the user's IA Key will be recalled. It could be the last known Driver Profile or any other Driver Profiles.
Interfaces	Personalization Interface
Note	Because the vehicle is equipped with Smart Door Handle and the IA Key is with the user, opening the door via door handle will trigger passive key unlock search. Depending on the fob association status, passive key unlock search may or may not recall a Driver Profile different than the last known Driver Profile.

4.3.2.11 ENMEM-UC-REQ-137858/D-MyKey Overrides Driver Profile Setting

Actors	Vehicle Occupant
Pre-conditions	• The Driver Profiles feature is set to ON • Personality profile X has speed compensated volume set to HIGH • Personality profile Y has speed compensated volume set to Low • Fob A is associated with profile X and is programmed as a MyKey • Volume Limiter is set to ON for MyKey
Scenario Description	1. Vehicle is started up with MyKey Fob A and activates Profile X 2. User manually changes to Profile Y via the HMI
Post-conditions	Speed Compensated Volume is overridden and disabled due to the MyKey restriction on both Profile X and Profile Y
List of Exception Use Cases	
Interfaces	G-HMI Vehicle System Interface
Note	- No matter which profile is recalled to be the active profile as long as a MyKey is in the ignition (recognized by vehicle to start engine), MyKey restrictions shall apply. - Phones associated via PaaK may also be made a MyKey. The same functionality shall apply.

4.3.2.12 ENMEM-UC-REQ-162575/C-Admin Key does not restrict Driver Profile associated to MyKey

Actors	Vehicle Occupant
Pre-conditions	• The Driver Profiles feature is set to ON • Personality profile X has speed compensated volume set to HIGH • Fob A is associated with profile X and is programmed as a MyKey • Volume Limiter is set to ON for MyKey
Scenario Description	• Vehicle is started up with Fob B, an Admin Key (a non-MyKey Fob) • The driver recalls 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 profile (even if associated to a MyKey Keyfob) as long as an Admin Key (non-MyKey Fob) is in ignition (recognized by vehicle to start engine), MyKey restrictions shall not apply - Phones associated via PaaK may also be made a MyKey. The same functionality shall apply.

~~*4.3.2.13 ENMEM-UC-REQ-214249/A-Valet Mode enabled with Enhanced Memory On*~~

~~**Actors**~~	~~Vehicle Occupant~~
~~**Pre-conditions**~~	~~The ignition status is in Run.~~ ~~The vehicle speed is less than 8 KPH~~ ~~Enhanced Memory is set to On~~ ~~Valet Mode is Off~~
~~**Scenario Description**~~	~~The user enables Valet Mode from the HMI~~
~~**Post-conditions**~~	~~Active Personality Profile is remembered~~ ~~Enhanced Memory is set to Off~~ ~~• By default, the Guest Profile is recalled~~ ~~Valet Mode is enabled~~
~~**Interfaces**~~	~~Personalization Interface~~

~~*4.3.2.14 ENMEM-UC-REQ-214250/A-Valet Mode disabled with Enhanced Memory On*~~

~~**Actors**~~	~~Vehicle Occupant~~
~~**Pre-conditions**~~	~~The ignition status is in Run.~~ ~~The vehicle speed is less than 8 KPH~~ ~~Valet Mode is ON~~ ~~Enhanced Memory is set to Off (was On prior to enabling Valet Mode)~~
~~**Scenario Description**~~	~~The user disables Valet Mode from the HMI~~
~~**Post-conditions**~~	~~Valet Mode is disabled~~ ~~Enhanced Memory is set to On~~ ~~The remembered Active Personality Profile is recalled~~

~~List of Exception Use Cases~~	~~ENMEM-UC-REQ-214246-Valet Mode disabled with Enhanced Memory Off~~
~~Interfaces~~	~~Personalization Interface~~

4.3.3 Requirements

4.3.3.1 ENMEM-REQ-129547/C-Last Known Driver Profile Applied

If upon network wakeup, no sign-in method is detected, the EnhancedMemoryProfileServer shall recall the last known Driver Profile by updating the ActivePersonality_St method to the last known value. The PersonalityRecallCount_St shall NOT be incremented.

If the last known Driver Profile cannot be determined, the EnhancedMemoryProfileServer shall recall the Vehicle level Profile (Guest Profile) as the active Driver Profile.

4.3.3.2 ENMEM-REQ-099694/B-Driver Profile Recall Event

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 and may not be different than the previous active Driver Profile in terms of name of the Driver Profile and actual settings of Driver Profile.

- EnhancedMemoryProfileServer shall increment the recall counter PersonalityRecallCount_St each time a recall event occurs. The recall event includes memory seat button momently pressing, door unlock events and infotainment recall via InfotainmentRecall_Rq. Definitions and requirements for seat button press recall and door unlock recall shall follow the design and requirements of Classic memory.

- When detecting an increment of PersonalityRecallCount_St, EnhancedMemoryServers shall update the active Driver Profile according to ActivePersonality_St which may and may not be changed.

- In error case when 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.

4.3.3.3 ENMEM-REQ-099673/C-Driver Profile Settings Recall

When an EnhancedMemoryServer receives a Driver Profile recall event, it shall recall all settings for the Driver Profile indicated in the ActivePersonality_St method within T_PersRecall. Any reserved or non-valid value of *ActivePersonality_St* shall be treated as Vehicle.

- The EnhancedMemoryInterfaceClient shall update its driver profile sign-in notification HMI:
  - each time the “Start Screen” is shown as defined by H22g_SYNC3_Welcome_Power_Modes.
  - within T_PersRecall of receiving the ActivePersonality_St update
  - Note: No driver profile sign-in notification will be given when the Driver Profiles feature is disabled
- Any status signals that are updated as a result of the driver profile change shall not be sent until T_PersRecallStatusUpdate has elapsed since the EnhancedMemoryServer received the ActivePersonality_St but shall not take more than 500 msec from receiving the updated ActivePersonality_St signal to send all its status signals with the updated values.

4.3.3.4 ENMEM-TMR-REQ-099762/B-T_PersRecall

Name	Description	Units	Range	Resolution	Default
T_PersRecall	Maximum time the EnhancedMemoryServer should 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

	Note: Use the default value				

4.3.3.5 ENMEM-TMR-REQ-134105/B-T_PersRecallStatusUpdate

Name	Description	Units	Range	Resolution	Default
T_PersRecallStatusUpdate	Minimum time the EnhancedMemoryServer should wait after receiving the ActivePersonality_St signal update before sending any status messages affected by the change in driver profile. Note: Use the default value	msec	100-200	5	150

4.3.3.6 ENMEM-HMI-REQ-099692/B-Driver Profile Sign-In 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.

4.3.3.7 ENMEM-TMR-REQ-134102/B-T_PersUpdate

Name	Description	Units	Range	Resolution	Default
T_PersUpdate	Maximum time the EnhancedMemoryProfileServer should take to update the PersonalityRecallCounter_St and ActivePersonality_St on the vehicle system interface, after receiving a recall request. Note: Use the default value	msec	50-150	5	100

4.3.3.8 ENMEM-REQ-099671/E-Keyfob/Phone Detection for Driver Profile Sign-In

The EnhancedMemoryProfileServer shall determine when an unlock event has originated from a keyfob (per the existing Classic Memory Keyfob detection strategy) or phone (per PaaK) and check if the EnhancedMemory_St method is reporting that the Driver Profiles feature is ON or OFF

- If the feature is ON and if the originating keyfob or phone is associated to a Driver Profile, then the EnhancedMemoryProfileServer shall update the ActivePersonality_St and MemoryPosition_St methods with the corresponding Driver Profile number associated to that keyfob or phone.
- If the feature is OFF and if the originating keyfob or phone has been associated to a Driver Profile prior to the feature being set to OFF, then the EnhancedMemoryProfileServer shall update the ActivePersonality_St method to “Vehicle” and MemoryPosition_St method to the corresponding Driver Profile number associated to the keyfob or phone.
- Regardless if the feature is ON or OFF, if the originating keyfob or phone is not associated to a Driver Profile, then the EnhancedMemoryProfileServer shall maintain the last known ActivePersonality_St and MemoryPosition_St methods. The PersonalityRecallCount_St shall not increment.

For the latest EnhancedMemoryProfileServer requirements see the latest Enhanced Memory Feature Spec. This requirement may be outdated.

4.3.3.9 ENMEM-REQ-099682/C-Determination of Profile After Recall

When the EnhancedMemoryProfileServer receives a Driver Profile recall request via the MemSwitchRecall_Rq or InfotainmentRecall_Rq method, it shall check both the EnhancedMemory_St to determine if the feature is on or off, and PersonalityOptIn_St method to determine if that particular Driver Profile exists:

- If the EnhancedMemory_St method indicates that the feature is on and the PersonalityOptIn_St method reports that the requested Driver Profile is “Opted-In,” then the EnhancedMemoryProfileServer shall report a Driver Profile recall

event by incrementing the PersonalityRecallCount_St method and updating the ActivePersonality_St and MemoryPosition_St methods to the requested Driver Profile.

- If the EnhancedMemory_St method indicates that the feature is on and the PersonalityOptIn_St method reports that the requested Driver Profile is “Not Opted-In” then the EnhancedMemoryProfileServer shall report a Driver Profile recall event by incrementing the PersonalityRecallCount_St method and updating the ActivePersonality_St method to the Guest profile (ActivePersonality_St = Vehicle) and MemoryPosition_St to the requested Driver Profile.
- If the EnhancedMemory_St method indicates that the feature is off, then the EnhancedMemoryProfileServer shall report a Driver Profile recall event by incrementing the PersonalityRecallCount_St method and updating the ActivePersonality_St method to the Guest profile (ActivePersonality_St = Vehicle) regardless of the PersonalityOptIn_St method value. The MemoryPosition_St shall update to the requested Driver Profile

For the latest EnhancedMemoryProfileServer requirements see the latest Enhanced Memory Feature Spec. This requirement may be outdated.

4.3.3.10 ENMEM-REQ-154252/A-Positional Settings Status Update

When receiving the InfotainmentRecall_Rq, the EnhancedMemoryProfileServer shall update the value of MemoryPosition_St to the PersIndex value indicated by the recall request. This means that if the InfotainmentRecall_Rq is received with a PersIndex set to the value of Vehicle, then the MemoryPosition_St shall be updated to Vehicle as well.

4.3.3.11 ENMEM-REQ-199604/A-Recall Priority

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

- Infotainment Recall
- Unlock Event
- Remote Start Event
- Memory Seat button Press

For the latest EnhancedMemoryProfileServer requirements see the latest Enhanced Memory Feature Spec. This requirement may be outdated.

4.3.3.12 ENMEM-REQ-099693/E-Display Data Refresh After Driver Profile Change

After a driver profile change has occurred, the EnhancedMemoryInterfaceClient, and any Client displaying settings status (ex. Cluster, RACM, etc.), shall always refresh all applicable settings data (including the active screen) according to existing module setting HMI standards and requirements. This is to reflect the most recent settings values once a Driver Profile has been recalled.

Ex. The Cluster active screen has information displayed that was originally requested with feature based message protocol. While on the screen the ActivePersonality_St signal changes from Pers1 to Pers3. When changing to Pers3, the Cluster shall re-request the active screen information even though the screen didn’t change. The Cluster has no knowledge if the feature is personalizable or not, so the Cluster shall always re-request the screen information when the Active Personality changes.

Ex. The Cluster infotainment active screen is displaying radio preset stations. While on the screen the ActivePersonality_St signal changes from Pers1 to Pers3. When changing to Pers3, the Cluster shall re-request the active screen information even though the screen didn’t change. The Cluster has no knowledge if the feature is personalizable or not, so the Cluster shall always re-request the screen information when the Active Personality changes.

4.3.3.13 ENMEM-REQ-099700/C-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 the pressing of an unassociated Memory Seat button, shall not trigger the recall of any positional settings

For the latest EnhancedMemoryPositionClient requirements see the latest Driver Seat Module Spec. This requirement may be outdated.

4.3.3.14 ENMEM-REQ-198388/A-No Recall for Positional Settings When Vehicle in Motion

The EnhancedMemoryPositionClient shall not recall positional settings that are tied with Classic Memory when vehicle is not in park or vehicle speed is greater than 5kph for manual transmission.

For the latest EnhancedMemoryPositionClient requirements see the latest Driver Seat Module Spec. This requirement may be outdated.

4.3.3.15 ENMEM-SR-REQ-136618/F-Recall Event - Infotainment Audio

When the user is NOT in a Feature Volume Session:

For a recall event that results in a change to the Audio Settings (ex Occupancy mode, BTMBF…) if the recall event could cause distortion of audio then:

1. The Audio Setting Server (ex AHU, DSP AMP) shall mute the audio first,
2. Then update the Audio Settings (ex BTMBF, Occ Mode, SCV…), and
3. Then unmute when complete so there is no distortion of the audio.

When the user IS in a Feature Volume Session:

The above muting strategy shall not be implemented. The Audio Setting Server shall instead:

1. Maintain the initial profile's Phone / VR / TA volume setting while the Feature Volume session is active
2. Apply the recalled profile's Phone / VR / TA volume after the active Feature Volume session ends
    a. If the user makes a volume change during the active Feature Volume session, the Audio Setting Server shall apply and save the changed volume to the recalled profile.

The maximum amount of time to update all audio settings during a recall event, from the time the audio is muted until the unmute, shall not exceed 200 msec. The audio shall gracefully resume operation after the unmute.

The Media Volume shall not be stored individually for different Driver Profiles.

When changing between profiles the current active audio source shall not change.

- Ex. The active audio source is AM and channel X for person 1. The user changes to person 3 and the active audio source remains AM on the same channel X for person 3.

4.3.3.16 ENMEM-REQ-099674/C-Requesting Audio Preset Info After Profile Change

When the EnhancedMemoryInterfaceClient, and any Client displaying audio presets, receives a Driver Profile recall event via ActivePersonality_St, it shall wait at least T_PersPresetWait and then shall request the audio preset information from the AudioServer and shall update the audio preset HMI information to the new Driver Profile.

4.3.3.17 ENMEM-TMR-REQ-099763/C-T_PersPresetWait

Name	Description	Units	Range	Resolution	Default
T_PersPresetWait	Minimum time the EnhancedMemoryInterfaceClient, and any Client displaying audio presets, shall wait before requesting preset data from the AudioServer.	msec	100-300	5	200

~~*4.3.3.18 ENMEM-SR-REQ-214221/A-Recall behavior when Valet Mode Enabled/Disabled*~~

~~If EnhancedMemory_St = ProfilesOn when Valet Mode is enabled, the EnhancedMemoryInterfaceClient shall remember the last active personality profile prior to enabling Valet Mode.~~

~~When Valet Mode is then disabled, the EnhancedMemoryInterfaceClient shall recall the remembered personality profile after Enhanced Memory is re-enabled as defined in REQ-214801.~~

~~If EnhancedMemory_St = ProfilesOff when Valet Mode is enabled, the active personality profile shall not be remembered and a recall shall not be performed when Valet Mode is disabled.~~

~~The EnhancedMemoryInterfaceClient shall remember the last active personality profile (prior to enabling Valet Mode) between different power mode cycles such as remembering (but not limited to):~~

- ~~Between network bus sleep and wake-up events, and~~
- ~~Between ignition cycles~~

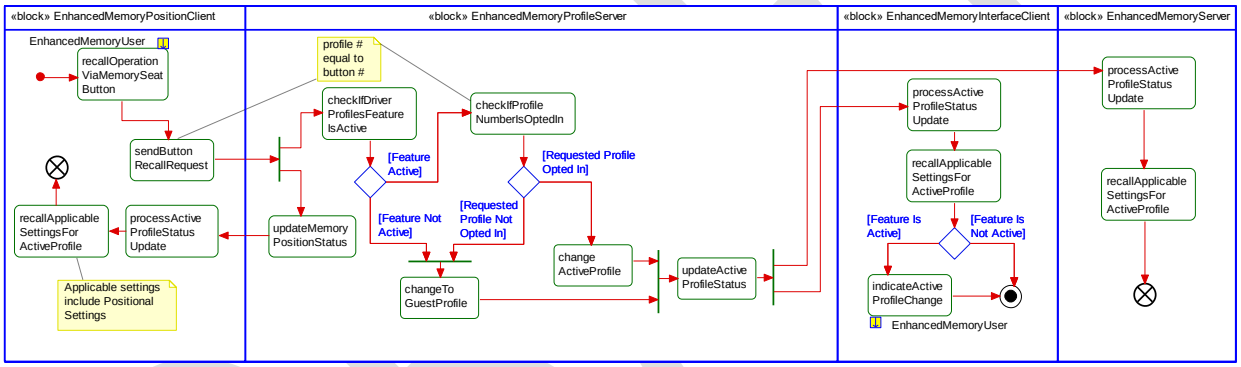
~~All existing Valet Mode requirements/restrictions apply for Enhanced Memory and supersede any requirements in this specification.~~

For any conflicts bring to the attention of the Ford D&R.

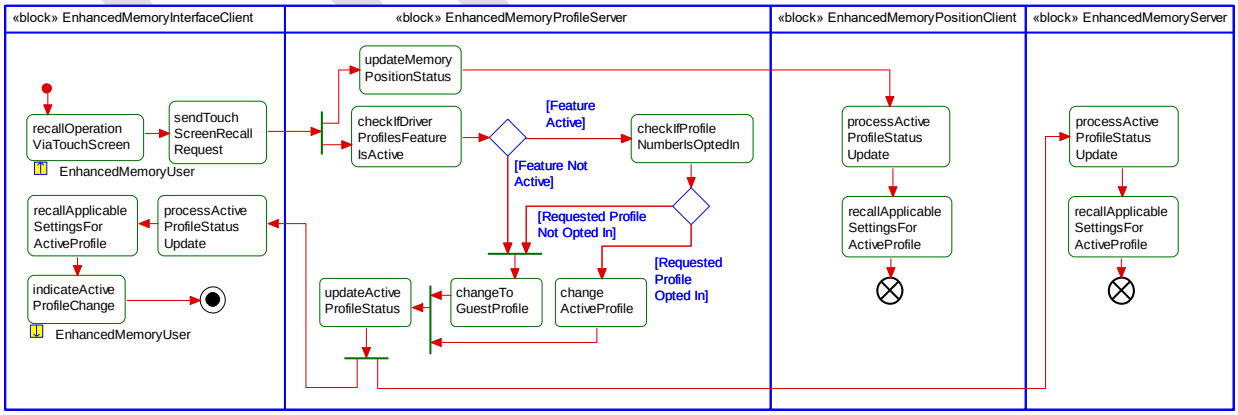
4.3.4 White Box View

4.3.4.1 Activity Diagrams

4.3.4.1.1 ENMEM-ACT-REQ-099387/B-Sign Into Driver Profile Via Memory Seat Button Activity Diagram

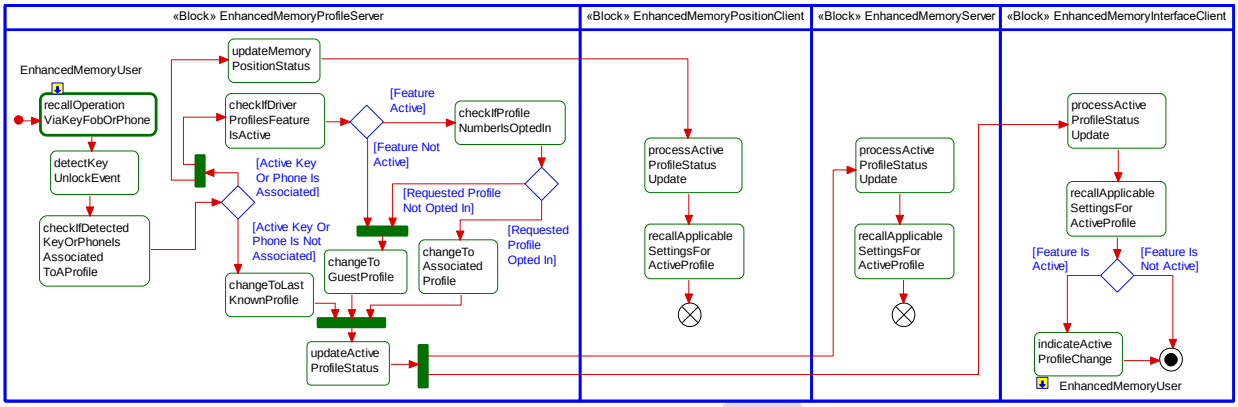


4.3.4.1.2 ENMEM-ACT-REQ-099388/C-Sign Into Driver Profile Via HMI Menu Activity Diagram



4.3.4.1.3 ENMEM-ACT-REQ-099384/D-Sign Into Driver Profile Via Keyfob/Phone

Activity Diagram



4.3.4.2 Sequence Diagrams

4.3.4.2.1 ENMEM-SD-REQ-099433/C-Sign Into Driver Profile Via Memory Seat Button

Constraints

Pre-Condition

The driver profiles feature is enabled

Scenarios

Normal Usage

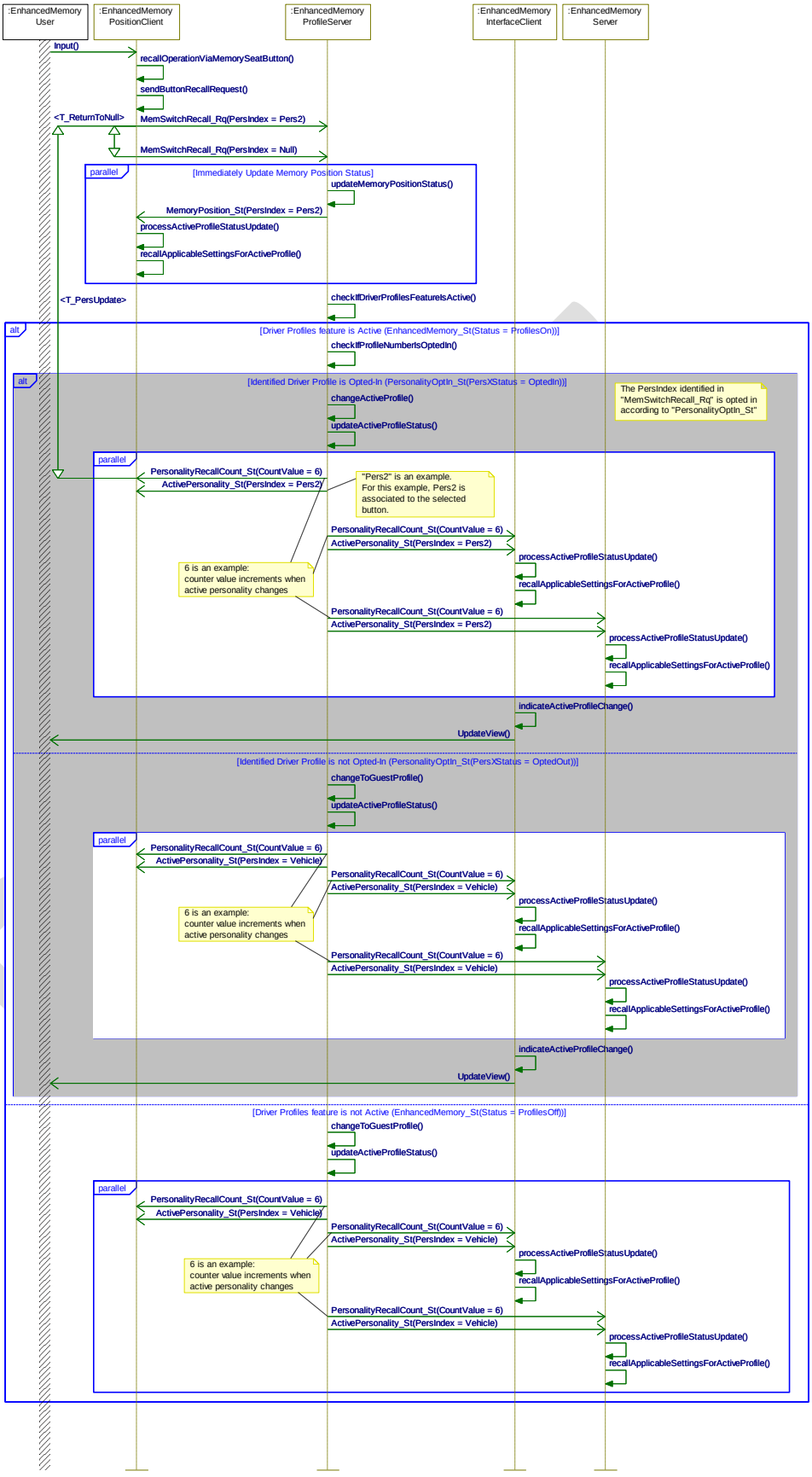
A memory seat button press is detected by the EnhancedMemoryPositionClient. A request is sent on the vehicle system interface to change the active personality to the profile associated to the pressed memory seat button. The active personality is set to the associated profile.

Post-Condition

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

Note: See sequence diagram below for alternate cases when drivers profile is off, or the requested profile is not OptedIn.

Sequence Diagram



4.3.4.2.2 ENMEM-SD-REQ-099434/C-Sign Into Driver Profile Via HMI Menu

Constraints

Pre-Condition

The infotainment system is active
The driver profiles feature is enabled

Scenarios

Normal Usage

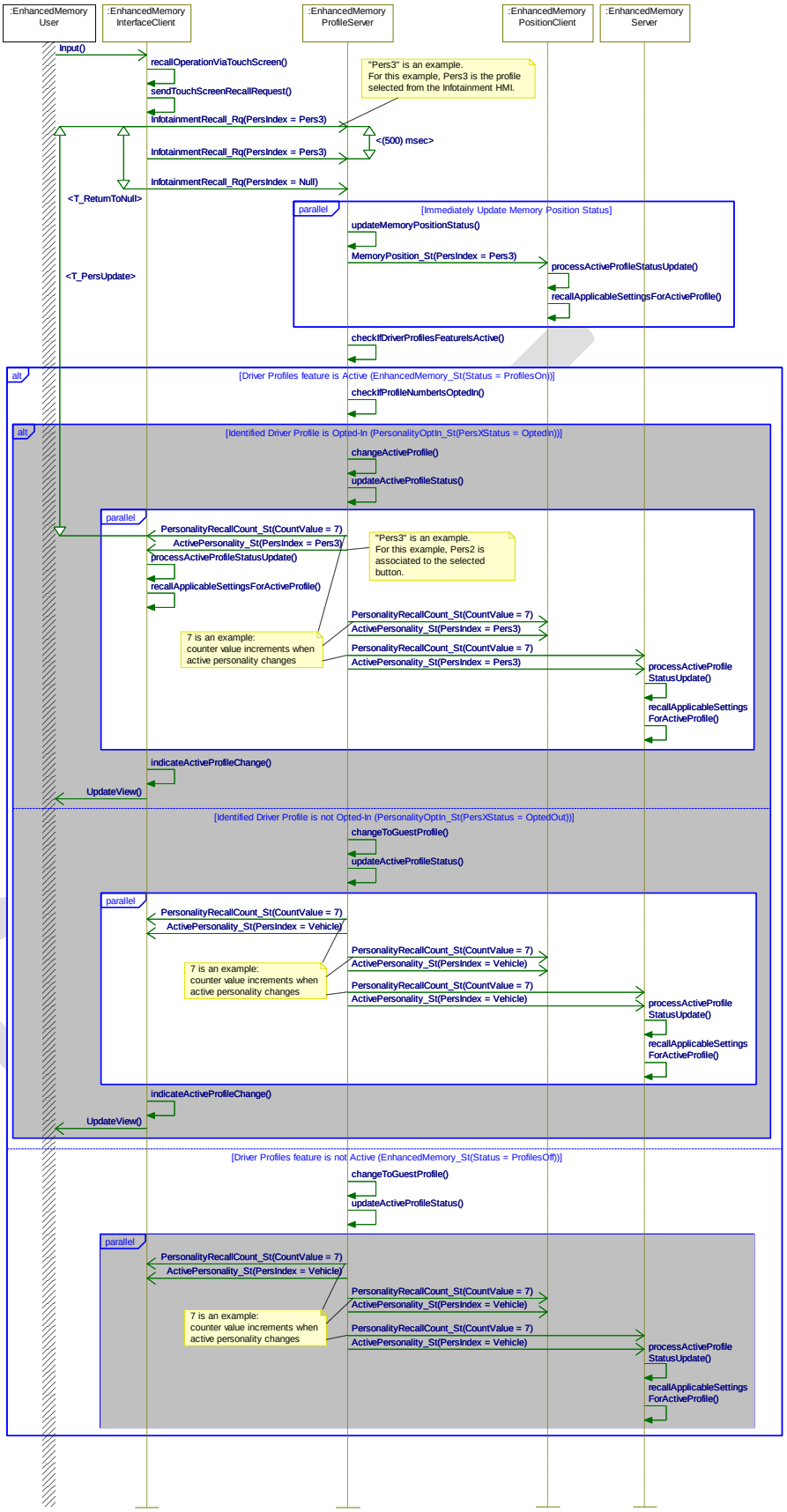
An HMI selection for signing into a profile is detected by the EnhanceMemoryInterfaceClient. A request is sent on the vehicle system interface to change the active personality to the profile associated to the HMI selection. The active personality is set to the associated profile.

Post-Condition

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

Note: See sequence diagram below for alternate cases when drivers profile is off, or the requested profile is not OptedIn.

Sequence Diagram



4.3.4.2.3 ENMEM-SD-REQ-099432/D-Sign Into Driver Profile Via Keyfob/Phone

Constraints

Pre-Condition

A keyfob or phone is associated to a personality profile
The driver profiles feature is enabled

Scenarios

Normal Usage

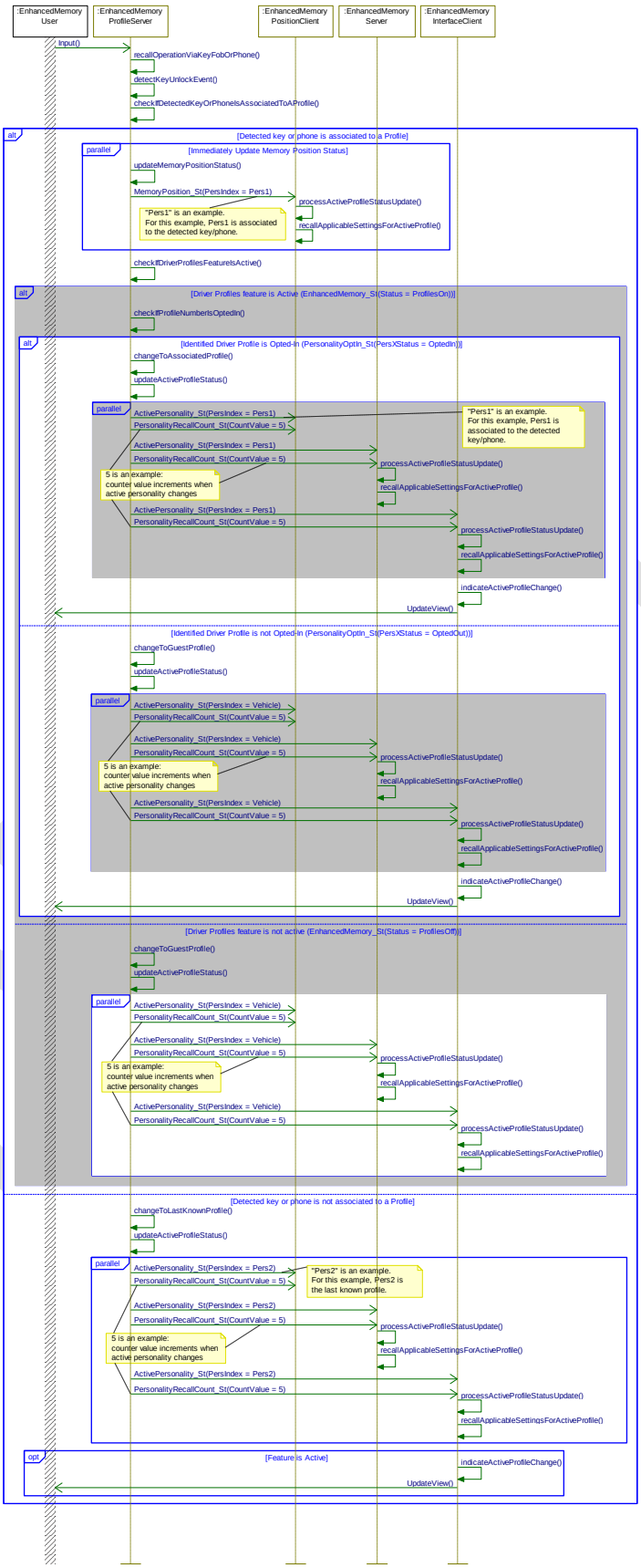
The associated keyfob or phone is detected by the EnhancedMemoryProfileServer and the active personality is set to the Opted-In profile associated to the keyfob or phone.

Post-Condition

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

Note: See sequence diagram below for alternate cases when keyfob/phone is not associated to profile, drivers profile is off, or the requested profile is not OptedIn.

Sequence Diagram



4.4 ENMEM-FUN-REQ-095958/A-Store Occupant Position Settings

4.4.1 Use Cases

4.4.1.1 ENMEM-UC-REQ-095720/B-Memory Seat Button Storing with Driver Profiles OFF

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to OFF
Scenario Description	The user initiates a “store position” operation via any Memory Seat button
Post-conditions	The current positional settings are stored for that particular pressed button and the user stays signed into the Guest Profile while the Driver Profiles feature is OFF
List of Exception Use Cases	
Interfaces	Personalization Interface

4.4.1.2 ENMEM-UC-REQ-095931/B-Memory Seat Button Storing of an Alternate Associated Profile

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to ON
Scenario Description	The User initiates a “store position” operation via a Memory Seat button that is associated to an alternate Driver Profile (other than the active 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 profile.
List of Exception Use Cases	
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.

4.4.1.3 ENMEM-UC-REQ-095938/B-Memory Seat Button Storing of the Active Driver Profile

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to ON
Scenario Description	The user initiates a “store position” operation via a 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

4.4.1.4 ENMEM-UC-REQ-166195/B-Memory Seat Button Storing of an Unassociated Button

Actors	Vehicle Occupant
Pre-conditions	The Driver Profiles feature is set to ON
Scenario Description	The user initiates a “store position” operation via a Memory Seat button on the driver door panel that has not been associated to any Driver Profile
Post-conditions	The current positional settings are stored to the unassociated 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 buttons that aren’t associated to a created Driver Profile.

4.4.2 Requirements

4.4.2.1 ENMEM-REQ-099687/B-Classic Memory Subsystem Store Delay

After detecting a memory seat button press and hold store event,

- EnhancedMemoryPositionClient shall store the current Classic Memory positional settings to a Driver Profile designated by a memory seat button that was pressed and held
- EnhancedMemoryPositionClient then shall wait T_PersStore before send the recall request via MemSwitchRecall_Rq to the EnhancedMemoryProfileServer

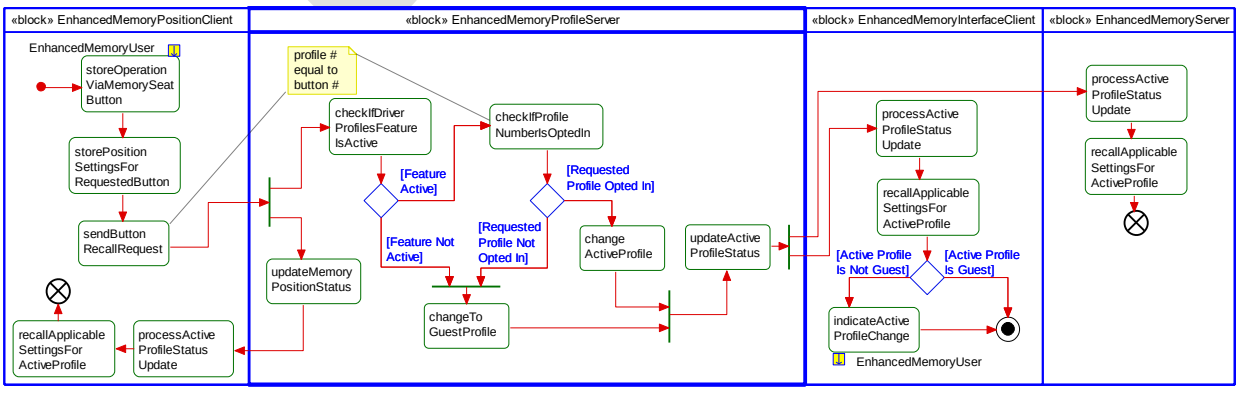
4.4.2.2 ENMEM-TMR-REQ-099764/B-T_PersStore

Name	Description	Units	Range	Resolution	Default
T_PersStore	Minimum time the EnhancedMemoryPositionClient should wait before sending a recall request to the EnhancedMemoryProfileServer. Note: Use the default value	msec	150-350	5	250

4.4.3 White Box View

4.4.3.1 Activity Diagrams

4.4.3.1.1 ENMEM-ACT-REQ-099389/B-Store Position Settings To Driver Profile Activity Diagram



4.4.3.2 Sequence Diagrams

4.4.3.2.1 ENMEM-SD-REQ-099435/C-Store Position Settings To Driver Profile

Constraints

Pre-Condition

The driver profiles feature is enabled

Scenarios

Normal Usage

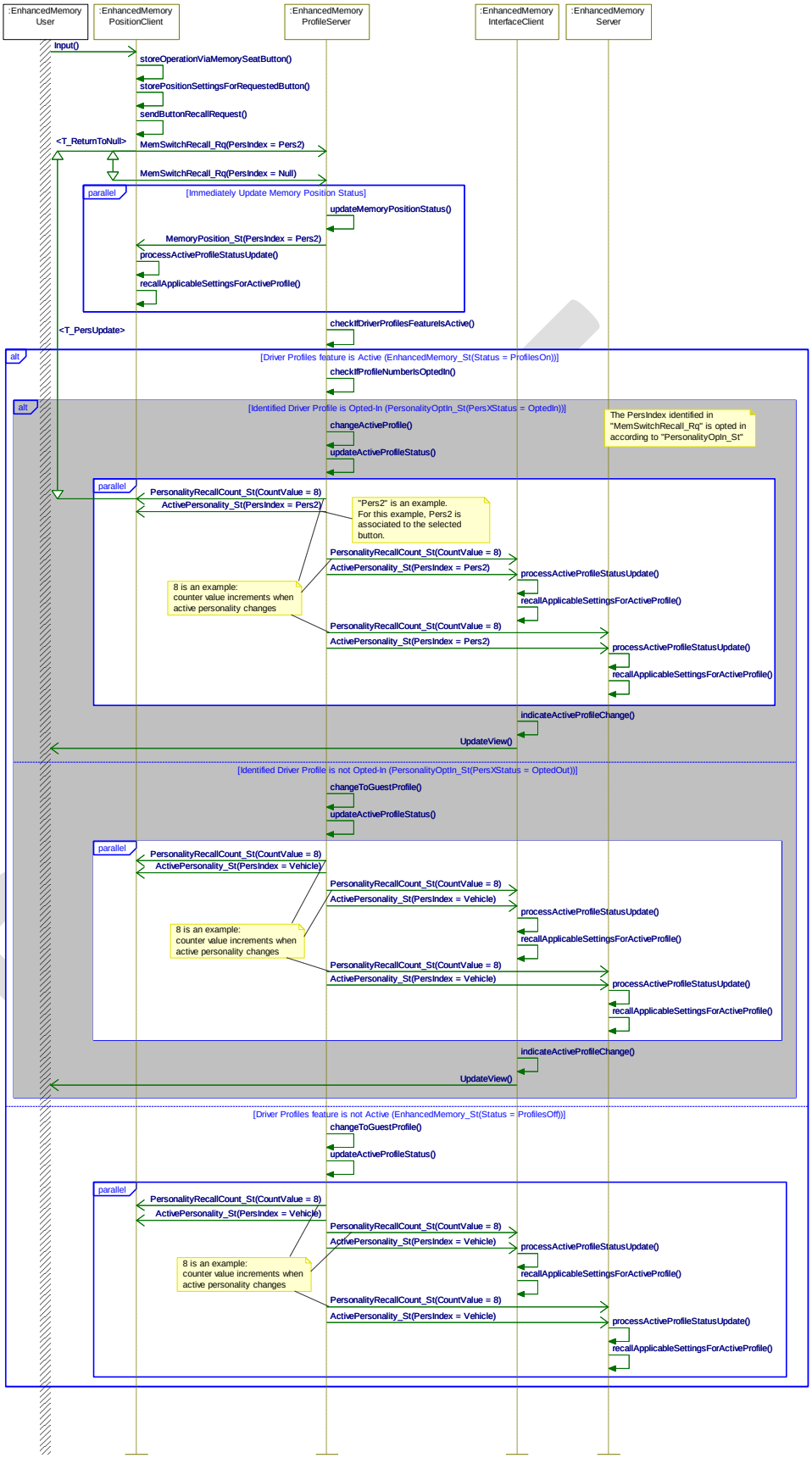
A memory seat button store operation is detected by the EnhancedMemoryPositionClient.

Post-Condition

All applicable user settings are stored to the associated profile.
The associated profile is active.

Note: See sequence diagram below for alternate cases when drivers profile is off, or the requested profile is not OptedIn.

Sequence Diagram



4.5 ENMEM-FUN-REQ-095959/A-Create/Edit Driver Profile

4.5.1 Use Cases

4.5.1.1 ENMEM-UC-REQ-095721/C-Create a Driver Profile

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle is in Park. The Driver Profiles feature is set to ON The vehicle speed is less than 8 KPH The maximum number of profiles has not yet been reached
Scenario Description	The User accesses the Driver Profiles, chooses to create a new Driver Profile, and then chooses to associate a memory seat button to that profile
Post-conditions	A new profile is created with: • all applicable non-positional settings copied from the previous profile to the new profile • all applicable positional settings copied from the currently active settings (from previous profile, or from recently changed but not saved settings) to the new profile The chosen memory seat button is associated to the new profile
Interfaces	Personalization Interface
Notes	

4.5.1.2 ENMEM-UC-REQ-134147/C-Create or Edit Driver Profile Name

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle is in Park. The vehicle speed is less than 8 KPH 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	User must choose a name that is not identical to an existing Driver Profile name.

4.5.1.3 ENMEM-UC-REQ-198925/A-Attempt to Give a Driver Profile an Existing Name

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle speed is less than 8 KPH 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 Driver Profile name already exists • The user is given opportunity to retry
Interfaces	Personalization Interface

Notes	

4.5.1.4 ENMEM-UC-REQ-197170/A-Attempt to Associate Already Associated Memory Seat Button

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle speed is less than 8 KPH Enhanced Memory HMI prompts the user to press a Memory Seat button at door panel during creating Driver Profile process
Scenario Description	The user presses a Memory Seat button that had been associated to other Driver Profile
Post-conditions	• The user is informed by HMI indication that the chosen Memory Seat button is already associated to other Drover Profile • The user is given multiple opportunities to retry
Interfaces	Personalization Interface
Notes	See requirement "ENMEM-REQ-197965-No overwrite for Memory Seat Buttons already associated to Existing Driver Profiles"

4.5.1.5 ENMEM-UC-REQ-095908/D-Associate Keyfob/Phone to a Driver Profile

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle speed is less than 8 KPH The user is in the process of creating or editing a Driver Profile Phone is registered, authenticated, and connected as a PaaK (refer to the Phone-As-A-Key SPSS)
Scenario Description	The user accesses the Driver Profiles HMI, chooses to create or edit a new Driver Profile, and has chosen to associate a keyfob or phone to that profile.
Post-conditions	The chosen keyfob or phone is now associated to the active Driver Profile.
List of Exception Use Cases	ENMEM-UC-REQ-095925-Attempt to Associate Already Associated Keyfob/Phone
Interfaces	Personalization Interface
Notes	

4.5.1.6 ENMEM-UC-REQ-095925/C-Attempt to Associate Already Associated Keyfob/Phone

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle speed is less than 8 KPH The user is in the process of associating a keyfob to a Driver Profile Phone is registered, authenticated, and connected as a PaaK (refer to the Phone-As-A-Key SPSS)
Scenario Description	The user attempts to associate a keyfob/phone that is already associated to another Driver Profile.
Post-conditions	• The user is informed by HMI indication that the chosen keyfob/phone is already associated to other Driver Profile • The user is given the option to overwrite the chosen keyfob/phone
Interfaces	Personalization Interface
Notes	

4.5.1.7 ENMEM-UC-REQ-195889/C-Associate a Keyfob with Incorrect Method

Actor	Vehicle Occupant
Pre-conditions	Ignition is Run The vehicle speed is less than 8 KPH At least one set of positional settings is set (one Memory Seat button is defined)
Scenario Description	The User tries to associate a keyfob to the saved positional setting Memory Seat button without using the Driver Profiles menu (ex. using Press & Hold or Set method)
Post-conditions	No chime, indicating a successful keyfob association, is given. The keyfob is not associated to any preset positional settings The keyfob is not associated to any existing Driver Profile
Interfaces	Personalization Interface
Notes	- For vehicles with Enhanced Memory, keyfob association must be done through the Enhanced Memory keyfob association menu. If the user does not create a Driver Profile, the user cannot associate the keyfob to any Memory Seat button. When Driver Profiles are created, the user can only associate a keyfob via menu. - Phone association to a Driver Profile (via PaaK) must also be done through the Driver Profiles menu. No other phone association method shall be supported.

4.5.1.8 ENMEM-UC-REQ-095927/C-Disassociate Keyfob/Phone from a Driver Profile

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle speed is less than 8 KPH User is in the process of editing a Driver Profile
Scenario Description	The User accesses the Driver Profiles HMI, chooses to edit a new Driver Profile, and has chosen to remove a keyfob or phone association from that profile.
Post-conditions	The previous keyfob or phone association is now removed from the active Driver Profile.
Interfaces	Personalization Interface
Note	Disassociating a keyfob or phone does not delete the profile, it only removes the link between the selected profile and the keyfob or phone.

4.5.1.9 ENMEM-UC-REQ-194188/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 key fob is associated to a Drive 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 Driver Profile menu
Post-conditions	All Driver Profiles remain the same after Keyfobs were reprogrammed All Keyfob reprogrammed to the vehicle will not be associated to any Driver Profile. HMI does not display Keyfob association indicator for any Driver Profile
Interfaces	Personalization Interface
Notes	Fob association will be erased at the same time Keyfobs are erased via diagnostic tool. For EnhancedMemoryInteraceClient HMI Keyfob indication associated with this see requirement "*ENMEM-HMI-REQ-202226-Keyfob HMI Indication".*

4.5.1.10 ENMEM-UC-REQ-232959/A-Disassociate Phone from Driver Profiles after Phone is Erased/Revoked

Actors	Vehicle Occupant
Pre-conditions	At least one phone is associated to a Driver Profile
Scenario Description	Phones are Erased or Revoked by the user from outside the vehicle The user starts up the vehicle and selects the Driver Profile menu
Post-conditions	All Driver Profiles remain the same after phones have been removed HMI does not display Phone association indicator for any Driver Profile
Interfaces	Personalization Interface
Notes	- Phone association will be erased at the same time Phones are erased or revoked from outside the vehicle (see Phone-As-A-Key SPSS for such methods). - For EnhancedMemoryInteraceClient HMI Phone indication, see "*ENMEM-HMI-REQ-202226-Keyfob/Phone HMI Indication".*

4.5.1.11 ENMEM-UC-REQ-095929/D-Delete a Driver Profile

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run The vehicle speed is less than 8 KPH At least one Driver Profile has been created
Scenario Description	The user accesses the Driver Profiles 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 profile is deleted, Guest Profile is recalled automatically. Positional settings remain unchanged
	• Positional settings that were associated to the deleted Driver Profile remain associated to the Memory Seat button. Pressing the disassociated Memory Seat button will recall the stored positional settings
	• The 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 name, keyfob, and/or phone association status for the deleted Driver Profile

Interfaces	Personalization Interface
Notes	Deleting a Driver Profile does not delete/erase/revoke the PaaK, it only deletes the association between the phone and the once existing Driver Profile (refer to Phone-As-A-Key SPSS on removal methods).

4.5.1.12 ENMEM-UC-REQ-195890/B-Delete All Driver Profiles via Master Reset

Actor	Vehicle Occupant
Pre-conditions	Infotainment system is ON At least one Driver Profile is created
Scenario Description	The user presses the Master Reset button
Post-conditions	• All Driver Profiles are deleted and Enhanced Memory feature is turned off

	• Upon return to the Driver Profiles HMI Menu Enhanced Memory feature is OFF. All Driver Profile menus, except Enhanced Memory feature ON/OFF, are disabled • All keyfobs and phones are disassociated from Driver Profiles and Memory Seat buttons • Positional settings remain associated to the Memory Seat buttons
Interfaces	Personalization Interface
Notes	When performing Master Reset, the Enhanced Memory requirements for Deleting a Driver Profile also apply. See Vehicle Settings SPSS and applicable Master Reset documents for performing a Master Reset. See Master Reset requirements to see if there are any driver distraction requirements

4.5.1.13 ENMEM-UC-REQ-096801/B-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 speed is less than 8 KPH The user is in the process of creating a Driver Profile
Scenario Description	• The user cancels out of the pairing process or • A system event occurs that terminates the pairing process as shown in some examples below: o Vehicle gear shifts out of Park, Vehicle in motion (i.e. follow Driver Distraction requirements) o System Timeout o Ignition no longer in Run o 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
Interfaces	Personalization Interface
Notes	

4.5.1.14 ENMEM-UC-REQ-096802/D-User Aborts or System Cancel Event Occurs During Keyfob/Phone Association Process

Actors	Vehicle Occupant
Pre-conditions	The ignition status is in Run. The vehicle speed is less than 8 KPH The user is in the process of associating a keyfob or phone to a Driver Profile Phone is registered, authenticated, and connected as a PaaK (refer to the Phone-As-A-Key SPSS)
Scenario Description	• The user cancels out of the pairing process or • A system event occurs that terminates the pairing process as shown in some examples below: o Vehicle gear shifts out of Park, Vehicle in motion (i.e. follow Driver Distraction requirements) o System Timeout

	○ Ignition no longer in Run ○ System shutdown
Post-conditions	• The keyfob or phone pairing process has been aborted and a keyfob or phone was not successfully paired to the desired Driver Profile • HMI provides Abort notification and instruction to restart the keyfob or phone association process
Interfaces	Personalization Interface
Notes	

4.5.2 Requirements

4.5.2.1 ENMEM-REQ-138622/B-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 a user created profile or 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 system strategy.

For the latest EnhancedMemoryProfileServer requirements see the latest Enhanced Memory Feature Spec. This requirement may be outdated.

4.5.2.2 ENMEM-SR-REQ-232984/A-Configurable Parameter to Enable PaaK HMI

The EnhancedMemoryInterfaceClient shall have a configurable parameter to determine whether the vehicle supports the PaaK feature. If the parameter indicates that the vehicle is to support “PaaK”, then the following functionality shall be enabled:

- Phone HMI Indication
- Phone Association via the Edit Menu
- Phone Disassociation via the Edit Menu
- The option during Driver Profile creation to enter Phone Association, either on its own or after Keyfob Association
- And all applicable PaaK screens as depicted in “H84a_SYNC3_EMDriverProfile”

4.5.2.3 ENMEM-REQ-138631/B-Missing Message 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.

4.5.2.4 ENMEM-REQ-099681/C-Driver Profile Opt-In Status

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

4.5.2.5 ENMEM-REQ-099684/B-Driver Profile to Personality Mapping

The EnhancedMemoryInterfaceClient shall determine which Driver Profile value, reported in the ActivePersonality_St method, is mapped to which 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-099425-Create Driver Profile” for a detailed example.

4.5.2.6 ENMEM-REQ-116801/D-Retain Enhanced Memory 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 and/or phone's after a software reflash service is done at dealership.

The information to be retained shall include opted in and opted out (created and deleted) status of all Driver Profiles, Driver Profile's keyed-in name and the association of Driver Profile name to Memory Seat button number.

4.5.2.7 ENMEM-SR-REQ-095961/B-Maximum Number of Driver Profiles

The EnhancedMemoryInterfaceClient shall have configurable parameters to indicate the max number of possible Driver Profiles that the vehicle can support. This parameter shall be set equal to the number of Memory Seat buttons, excluding SET button, on the driver door panel.

4.5.2.8 ENMEM-REQ-198384/A-Alignment between Opt-in Driver Profile and Memory Seat Button

The number in Personal Index of PersonalityOptIn_St shall align with the number of the pressed 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 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 Memory Seat button #2 during 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 Name
PersonalityOptIn_St	Pers1Status	NotOptedIn	0x0
	Pers2Status	**OptedIn**	**0x1**
	Pers3Status	NotOptedIn	0x0
	Pers4Status	NotOptedIn	0x0

4.5.2.9 ENMEM-REQ-099699/E-Disable Driver Profile Creation and Editing When Key is Not in Run or Vehicle Speed is greater than 8KPH

The EnhancedMemoryInterfaceClient shall disable Driver Profile creation and editing if:

1. the Ignition Status is any value other than Run, or
2. the Gear Lever Position Status is any value other than Park (for Automatic Transmissions only, see relevant config. bit), or
3. the Vehicle Speed is greater than 8KPH

- For driver restrictions related to vehicle in motion follow whatever is specified in the Driver Restrictions SPSS (DRIVE-RESv2-FUR-REQ-025157-HMI Driving Restriction – General Applications (TcSE ROIN-279695-1)).
    - If the vehicle in motion driver restrictions called out in the Enhanced Memory Spec (ex. 8KPH) differs from what is in Req-025157-HMI Driver Restriction, than Req-025157-HMI Driver Restriction shall take precedence.

4.5.2.10 ENMEM-REQ-116802/F-Profile Creation Interruption

If the profile creation process is interrupted prior to completion (For Example: Ignition cycle, vehicle transitions out of park, vehicle speed becomes greater than 8 KPH, user initiated HMI domain change*, Infotainment system reset, etc.), then the process shall be aborted. The EnhancedMemoryInterfaceClient shall:

- Set EnMemProfilePairing_Rq(ButtonPairing = ExitButtonPairing) if in Button Association Mode
- Set EnMemProfilePairing_Rq(KeyPairing = ExitKeyPairing) if in Keyfob or Phone Association Mode
- Revert the Pers#Status for PersonalityOptIn_St back to “NotOptedIn” for the Memory Seat Button selected if it was already set
- Not send Feature_Rq(Operation = Copy) if it was not yet sent
- Not perform a Driver Profile recall
- Erase mapping of Profile Number to selected Memory Seat Button
- Erase Driver Profile name from internal memory
- Turn Enhanced Memory Feature Off if there is no other existing Driver Profiles
- Update the user as per ENMEM-HMI-REQ-212764

*A user initiated HMI domain change is one where the customer intentionally changes domain via the HMI. A non-user initiated domain change is one where a system behavior/function causes a domain change (ex. an incoming phone call). In the case of the non-user initiated domain change, the profile creation shall continue to proceed and the abort behavior detailed above shall not occur.

4.5.2.11 ENMEM-HMI-REQ-202226/A-Keyfob HMI Indication

The EnhancedMemoryInterfaceClient shall monitor PersKeyPairing_St to maintain and display a Keyfob Association Icon for exsiting Driver Profiles:

- When PersKeyPairing_St = KeyAssociated, the icon shall be displayed
- When PersKeyPairing_St = KeyUnAssociated or Null, the icon shall not be displayed

4.5.2.12 ENMEM-HMI-REQ-233009/A-Phone HMI Indication

The EnhancedMemoryInterfaceClient shall monitor PersPhonePairing_St to maintain and display a Phone Association Icon for existing Driver Profiles:

- When PersPhonePairing_St = NoPhonesAssociated, the icon shall not be displayed
- When PersPhonePairing_St = OnePhoneAssociated, the icon shall be displayed

4.5.2.13 Memory Seat Button Association

In order to include Positional settings in Enhanced Memory, a Driver Profile is required to associate to a Memory Seat button.

4.5.2.13.1 ENMEM-REQ-099685/E-Request Enter Memory Seat Button Association Mode

When associating a Driver Memory Seat Button during the Profile Creation process, the EnhancedMemoryInterfaceClient will command the EnhancedMemoryPositionClient to enter a button pairing state where certain functions are to be disabled in the EnhancedMemoryPositionClient. This button pairing state is communicated to the EnhancedMemoryPositionClient via the EnMemProfilePairing_Rq(ButtonPairing) method.

This button pairing state shall also be re-entered between Driver Memory Seat Button Association attempts (limited to ENMEM-REQ-179346-N_NumberOfRetries) if an unsuccessful attempt should occur (i.e. timer expires or an already associated Driver Memory Seat button is pressed, as detailed in ENMEM-REQ-116803-Request Exit Memory Seat Button Association Mode).

Once the button pairing state is entered (EnMemProfilePairing_Rq(ButtonPairing = EnterButtonPairing)), the EnhancedMemoryPositionClient shall prevent driver position recalls (seat, mirrors, etc.), and suppress the transmission of

MemSwitchRecall_Rq and Memory_Cmd (legacy signal) methods when a Driver Memory Seat button is pressed during this state.

The EnhancedMemoryPositionClient shall exit this button pairing state when indicated by EnMemProfilePairing_Rq(ButtonPairing = ExitButtonPairing) or when Ignition_Status transitions out of *Run*, whichever comes first.

4.5.2.13.2 ENMEM-REQ-198930/A-No Request for Memory Seat Button Association Mode When Editing

When editing the Drive Profile name, even if an unique Driver Profile name is successfully entered, EnhancedMemoryInterfaceClient shall not command the EnhancedMemoryPositionClient to enter button association mode.

4.5.2.13.3 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.
    - 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
    - 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.
    - 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
    - The EnhancedMemoryInterfaceClient shall provide the user HMI notification about the abort process status

4.5.2.13.4 ENMEM-REQ-198928/B-Button Press in Button Association Mode

In Memory Seat button association mode, button presses as well as press and hold actions are not meant to recall Driver Profiles or save positional settings. Instead, button press actions shall only serve as the indicator of a button being associated to a new Driver Profile.

- In Memory Seat button association mode, EnhancedMemoryPositionClient shall suppress the transmission of MemSwitchRecall_Rq when a Memory Seat button is pressed during this mode.

- When detecting a button press in Memory Seat button association mode, EnhancedMemoryPositionClient shall inform the EnhancedMemoryInterfaceClient which button is pressed via EnMemButtonPairing_St (ButtonPairing).

4.5.2.13.5 ENMEM-REQ-198934/A-Button Press Error Strategy

The EnhancedMemoryPositionClient shall report ButtonPairingFailed via EnMemButtonPairing_St(ButtonPairing) whenever the user presses SET button during Memory Seat button association process.

Other customer button press errors, defined by Classic Memory feature specification, shall also trigger EnhancedMemoryPositionClient to report ButtonPairingFailed during Memory Seat button association process.

4.5.2.13.6 ENMEM-REQ-199236/A-No Recall in Button Association Mode

During Memory Seat Button Association Mode, all profile recall requests (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.

4.5.2.13.7 ENMEM-REQ-199352/A-Successful Memory Button Association

A successful Memory Seat button association event shall be defined as when in button association mode the EnhancedMemoryInterfaceClient receives a valid button press status and internally determines that the pressed button is not associated to any existing Driver Profiles.

A valid memory button press shall be defined as EnMemButtonPairing_St(ButtonPairing) with encoding value in the range from 1 to 4 (i.e. Button1Pressed, Button2Pressed, Button3Pressed, Button4Pressed)

The EnhancedMemoryInterfaceClient HMI shall display a retry popup when:

1. EnMemButtonPairing_St(ButtonPairing) is not in valid range
2. EnMemButtonPairing_St(ButtonPairing) is in failure state
3. Pressed button is already associated to another Driver Profile

4.5.2.13.8 ENMEM-REQ-197965/A-No overwrite for Memory Seat Buttons already associated to Existing Driver Profiles

The EnhancedMemoryInterfaceClient shall not permit a user to overwrite a Memory Seat Button already associated to an existing Driver Profile, to a newly created Driver Profile.

4.5.2.13.9 ENMEM-REQ-116803/C-Request Exit Memory Seat Button Association Mode

EnhancedMemoryInterfaceClient shall command the EnhancedMemoryPositionClient to exit Button Association Mode via EnMemProfilePairing_Rq(ButtonPairing = ButtonPairingExited) for the following cases:

- The user cancels out of the association process (ex. presses touch screen exit/back button)
- The user is inactive after T_SeatAssocOneTime expires. This is indicated through no change state of EnMemButtonPairing_St(ButtonPairing = ButtonPairingEntered)
- The user presses the Driver Memory Seat's SET button. This is indicated via EnMemButtonPairing_St(ButtonPairing= ButtonPairingFailed)
- The user presses an already associated Driver Memory Seat button
- The Association Retry Counter, N_NumberOfRetries, as defined in ENMEM-REQ-179346, is exceeded
- If the profile creation process is not active (not in process of creating a new profile) and the EnhancedMemoryInterfaceClient receives EnMemButtonPairing_St(ButtonPairing != Null)
- A system event occurs that terminates the association process
    - Vehicle speed is greater than 8kph (see ENMEM-REQ-099699)
    - Vehicle ignition is no longer in Run
    - Infotainment System is powered down (ex. Load Shed event)
    - Communication data is invalid, corrupted or Communication with EnhancedMemoryPositionClient is lost

4.5.2.13.10 ENMEM-REQ-198935/A-Exit Memory Seat Button Association Mode

EnhancedMemoryPositionClient shall exit Button Association Mode and set EnMemButtonPairing_St(ButtonPairing = ButtonPairingExited) for the following cases:

- When receiveing EnMemProfilePairing_Rq(ButtonPairing = ExitButtonPairing)
- The Association timer, T_SeatAssocOneTime2, as defined in ENMEM-TMR-REQ-197339, has expired
- Communication with EnhancedMemoryInterfaceClient is lost

4.5.2.13.11 ENMEM-REQ-197340/A-Button Pairing Timer Expired

When T_SeatAssocOneTime2 expires, the EnhancedMemoryPositionClient shall exit Button Association Mode and update the status of EnMemButtonPairing_St(ButtonPairing) to ButtonPairingExited for a time of T_ReturnToNull, followed by Null.

4.5.2.13.12 ENMEM-TMR-REQ-197339/A-T_SeatAssocOneTime2

Name	Description	Units	Range	Resolution	Default
T_SeatAssocOneTime2	Maximum time the EnhancedMemoryPositionClient shall wait before exiting Button Association Mode. Note: Use the default value	sec	40-130	5	70

4.5.2.14 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 each feature.

4.5.2.14.1 ENMEM-REQ-198923/A-Copy Request

After a 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.

4.5.2.14.2 ENMEM-REQ-198922/A-Driver Profile Index for Copy Command

In the Copy request, via Feature_Rq(PersIndex), the PersIndex shall be the same number as the unassociated Memory Seat button pressed by the user.

Example:
If the Memory Seat button X is pressed, indicated by EnMemButtonPairing_St(ButtonPairing=ButtonXPressed), the EnhancedMemoryInterfaceClient will then determine that Memory Seat button's association status internally.

- If the status is not associated, the EnhancedMemoryInterfaceClient will then set Feature_Rq(PersIndex) to PERS_X
- If the status is associated, the EnhancedMemoryInterfaceClient will send EnMemProfilePairing_Rq(ButtonPairing=ExitButtonPairing) to the EnhancedMemoryPositionClient and the EnhancedMemoryInterfaceClient will display a retry prompt to the user.

4.5.2.14.3 ENMEM-REQ-198920/B-Execute Copy Operation

When receiving a Copy command via Feature_Rq(Operation = Copy), an 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.

4.5.2.14.4 ENMEM-REQ-198919/B-Performance Requirement for Copy Operation

All EnhancedMemoryServers shall perform the Copy operation within T_PersCopy.

4.5.2.14.5 ENMEM-REQ-099698/B-Wait Response From AudioServer While Copy Operation is Still in Progress

The AudioServer shall complete all Copy operations within T_PersCopy. In the case that an Enhanced Memory related Copy operation is still in progress at the time a request for preset data (GetTUPresetInfo_Rq) is received, then the AudioServer shall respond to the GetTUPresetInfo_Rq method with a CES response code of "Intermediate Result - Wait" until the Copy operation has been successfully completed. Upon completion of the Enhanced Memory related Copy operation, the AudioServer will provide the requested preset data.

4.5.2.14.6 ENMEM-TMR-REQ-105579/B-T_PersCopy

Name	Description	Units	Range	Resolution	Default
T_PersCopy	Maximum time the EnhancedMemoryServers shall take to complete all Enhanced Memory related Copy operations for a given Driver Profile upon request. Note: Use the default value	msec	1500-4500	500	3000

4.5.2.14.7 ENMEM-REQ-199347/A-Request Exit Memory Button Association Mode After Copy

After sending the FBMP Copy request, EnhancedMemoryInterfaceClient shall wait a minimum of T_PersCopy before sending a request (EnMemProfilePairing_Rq(ButtonPairing = ExitButtonPairing)) to exit Memory Seat button association mode.

4.5.2.14.8 ENMEM-REQ-198918/A-Recall New Driver Profile After Copy

- After sending the Copy request and then sending an exit 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 FBMP 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

4.5.2.14.9 ENMEM-TMR-REQ-099765/B-T_RecallDelay

Name	Description	Units	Range	Resolution	Default
T_RecallDelay	The time from when the EnhancedMemoryInterfaceClient sends the FBMP Copy command until it sends the recall request Note: Use the default value + or - 10%	msec	3000-7000	500	5000

4.5.2.14.10 ENMEM-TMR-REQ-134146/B-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. Note: Use the default value	msec		5	100

4.5.2.14.11 ENMEM-REQ-099683/D-Storing Positional Settings for the Copy Operation

When creating a Driver Profile, during the copy operation, the EnhancedMemoryPositionClient's 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 positional setting store operation shall be issued before the recall request.

- The EnhancedMemoryInterfaceClient shall send a store positional settings request via InfotainmentPersStore_Rq to the EnhancedMemoryPositionClient before sending the recall request for the new Driver Profile

- The EnhancedMemoryPositionClient shall store all current Classic Memory settings to the indicated 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).

Reference sequence diagram ENMEM-SD-REQ-099425-Create Driver Profile for details.

4.5.2.15 Keyfob/Phone Association

The pairing of a Keyfob or Phone is an optional operation in the Enhanced Memory feature set. This can be done during or after profile creation. This can only be completed through the Enhanced Memory feature and is not available when Enhanced Memory is not OptedIn.

4.5.2.15.1 ENMEM-REQ-099672/C-Configurable Parameter for Key/Phone Pairing

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.
    - Phone association shall only be supported when the parameter indicates that the vehicle is to support “Enhanced Memory” and shall be coordinated via the EnMemProfilePairing_Rq(KeyPairing) method

4.5.2.15.2 ENMEM-REQ-099697/B-Configurable Parameter to Disable Classic Keyfob Pairing

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 key pairing shall be suppressed.

4.5.2.15.3 ENMEM-REQ-099686/C-Keyfob Pairing Mode

To associate a Driver Profile to a keyfob, the EnhancedMemoryInterfaceClient shall communicate to the EnhancedMemoryProfileServer that the Key Pairing mode has been entered via the EnMemProfilePairing_Rq (PersIndex=PersX, KeyPairing=EnterKeyPairing) method.

- Once EnMemProfilePairing_Rq (PersIndex=PersX, KeyPairing=EnterKeyPairing) is sent, the EnhancedMemoryProfileServer shall respond with EnMemKeyPairing_St(KeyPairing = KeyPairingEntered) upon successful entering of the Keyfob Pairing Mode.

- The EnhancedMemoryProfileServer shall begin looking for a “Lock” button press from PersX keyfob to associate to the requested Driver Profile. If the Keyfob detected is not already associated to another Driver Profile, the EnhancedMemoryProfileServer shall transmit EnMemKeyPairing_St(KeyPairing = KeyAssociateSuccess) after associating the detected keyfob to the requested Driver Profile.

- The EnhancedMemoryProfileServer shall update the status of PersKeyPairing_St(PersXKeyStatus=Key Associated).

- The EnhancedMemoryProfileServer shall exit Key Pairing mode when indicated by:
    - EnMemProfilePairing_Rq(KeyPairing = ExitKeyPairing)
    - EnMemKeyPairing_St(KeyPairing = KeyAssociateSuccess)
    - Ignition_Status transitions out of *Run*,
    - Gear Lever Position transitions out of *Park*,
    - Vehicle speed exceeds 8kph, whichever comes first.

Reference sequence diagram ENMEM-SD-REQ-099422-Associate Key Fob for details

4.5.2.15.4 ENMEM-REQ-233118/B-Phone Pairing Mode

To associate a Driver Profile to a phone, the EnhancedMemoryInterfaceClient shall communicate to the EnhancedMemoryProfileServer that the Phone Pairing mode has been entered via the EnMemProfilePairing_Rq (PersIndex=PersX, KeyPairing=EnterPhonePairing) method.

- Once EnMemProfilePairing_Rq (PersIndex=PersX, KeyPairing=EnterPhonePairing) is sent, the EnhancedMemoryProfileServer shall respond with EnMemKeyPairing_St(KeyPairing = KeyPairingEntered) upon successful entering of the Phone Pairing Mode.

- The EnhancedMemoryProfileServer shall begin looking for a “Lock” button press from PersX Phone to associate to the requested Driver Profile. If the Phone detected is not already associated to another Driver Profile, the EnhancedMemoryProfileServer shall transmit EnMemKeyPairing_St(KeyPairing = KeyAssociateSuccess) after associating the detected Phone to the requested Driver Profile.

- The EnhancedMemoryProfileServer shall update the status of PersPhonePairing_St(PersXPhoneStatus=OnePhoneAssociated).

- The EnhancedMemoryProfileServer shall exit Phone Pairing mode when indicated by:
  - EnMemProfilePairing_Rq(KeyPairing = ExitKeyPairing)
  - EnMemKeyPairing_St(KeyPairing = KeyAssociateSuccess)
  - Ignition_Status transitions out of *Run*,
  - Gear Lever Position transitions out of *Park*,
  - Vehicle speed exceeds 8kph, whichever comes first.

Reference sequence diagram ENMEM-SD-REQ-233258-Associate Phone for details

4.5.2.15.5 ENMEM-REQ-234278/A-Detection of a Keyfob/Phone in Opposite Pairing Mode

When a keyfob is detected during the Phone Association process, or when a phone is detected during the Keyfob Association process, the EnhancedMemoryProfileServer shall update the status of EnMemKeyPairing_St(KeyPairing) to WrongDeviceSelected for 1 second, and then return to KeyPairingEntered to resume the ongoing association mode operation.

4.5.2.15.6 ENMEM-HMI-REQ-234279/A-Wrong Device Detected HMI

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 temporary notification to the user that the wrong device was selected
- This notification shall be triggered, not sustained, by the above signal value (See H31a_SYNC3_EMDriverProfile for notification duration).

4.5.2.15.7 ENMEM-REQ-198044/B-Detection of Associated Keyfob/Phone

When a keyfob or phone is detected in their respective Keyfob or Phone Association processes, the EnhancedMemoryProfileServer shall check if the detected keyfob or phone is already associated to an existing Driver Profile.

In the case where the detected keyfob or phone is already associated to an existing Driver Profile, the EnhancedMemoryProfileServer shall update the status of EnMemKeyPairing_St(KeyPairing) to KeyAlreadyInUse.

4.5.2.15.8 ENMEM-SR-REQ-198055/C-Enhanced Memory HMI Option for Associated Keyfob/Phone

In the Keyfob or Phone Association process,

- The EnhancedMemoryInterfaceClient shall monitor EnMemKeyPairing_St to determine when a user attempts to associate an already associated keyfob or phone to a new Driver Profile.

- When receiving KeyAlreadyInUse via EnMemKeyPairing_St(KeyPairing):
  - EnhancedMemoryInterfaceClient shall provide notification to the user that the keyfob or phone is already associated to an existing Driver Profile
  - EnhancedMemoryInterfaceClient shall provide the user an option to over-write the associated keyfob or phone, or to cancel the keyfob or phone association process
  - When the user opts to over-write the associated keyfob or phone, the EnhancedMemoryInterfaceClient shall set EnMemProfilePairing_Rq(KeyPairing) to OverwriteKey.

4.5.2.15.9 ENMEM-REQ-198100/B-Overwrite Associated Keyfob

When receiving OverwriteKey via EnMemProfilePairing_Rq(KeyPairing):

- EnhancedMemoryProfileServer shall erase the existing keyfob association and associate the new keyfob to the Driver Profile denoted by EnMemProfilePairing_Rq (PersIndex)

- EnhancedMemoryProfileServer shall update PersKeyPairing_St accordingly:
  - The Driver Profile whose keyfob association was erased shall be updated from KeyAssociated to KeyUnAssociated
  - The Driver Profile with the newly associated keyfob shall be updated from KeyUnAssociated to KeyAssociated

4.5.2.15.10ENMEM-REQ-233161/A-Overwrite Associated Phone

When receiving OverwritePhone via EnMemProfilePairing_Rq(KeyPairing):

- EnhancedMemoryProfileServer shall erase the existing phone association and associate the new phone to the Driver Profile denoted by EnMemProfilePairing_Rq (PersIndex)

- EnhancedMemoryProfileServer shall update PersPhonePairing_St accordingly:
  - The Driver Profile whose phone association was erased shall be updated from OnePhoneAssociated to NoPhonesAssociated
  - The Driver Profile with the newly associated phone shall be updated from NoPhonesAssociated to OnePhoneAssociated

4.5.2.15.11ENMEM-REQ-099690/D-Keyfob/Phone Pairing Failed

Any fault of the EnhancedMemoryProfileServer that prevents Keyfob or Phone Pairing shall result in the EnhancedMemoryProfileServer communicating to the EnhancedMemoryInterfaceClient that the keyfob or phone was not able to be associated by updating the status of EnMemKeyPairing_St(KeyPairing) to KeyAssociateFailed.

When the EnhancedMemoryInterfaceClient receives EnMemKeyPairing_St(KeyPairing = KeyAssociateFailed), the EnhancedMemoryInterfaceClient HMI shall notify the user that the Keyfob or Phone Pairing process has failed and shall exit the Keyfob or Phone Pairing process.

4.5.2.15.12ENMEM-REQ-194169/B-Keyfob/Phone Pairing Timer Expired

When T_FobAssocTotal2 expires, the EnhancedMemoryProfileServer shall exit Keyfob or Phone Pairing Mode and update the status of EnMemKeyPairing_St(KeyPairing) to KeyAssociateFailed for 1 second, followed by Null.

4.5.2.15.13ENMEM-TMR-REQ-194101/C-T_FobAssocTotal2

Name	Description	Units	Range	Resolution	Default
T_FobAssocTotal2	After entering Keyfob or Phone Pairing Mode, the maximum time the EnhancedMemoryProfileServer shall wait before exiting Keyfob or Phone Pairing Mode.	msec	300000 - 420000	60000	360000

4.5.2.15.14ENMEM-REQ-116804/F-Keyfob/Phone Pairing Error

If the Keyfob or Phone Pairing process is not active (not in process of pairing a keyfob or phone to a profile) and the EnhancedMemoryInterfaceClient receives EnMemKeyPairing_St(KeyPairing != Null), then the EnhancedMemoryInterfaceClient shall send EnMemProfilePairing_Rq(KeyPairing = ExitKeyPairing).

The EnhancedMemoryInterfaceClient shall abort the process by sending EnMemProfilePairing_Rq(KeyPairing = ExitKeyPairing) to the EnhancedMemoryProfileServer in the event the EnhancedMemoryInterfaceClient detects that:

- the vehicle is in motion (>8kph), or
- the vehicle transitions out of Run or Park, or
- the user exits Keyfob or Phone Pairing Mode via the HMI in the middle of the Keyfob Phone Pairing process
    - including a user initiated HMI domain change* (see REQ-11680)

*In the case of a non-user initiated domain change, the Keyfob or Phone Pairing process shall continue to proceed and the abort shall not occur (see REQ-116802).

If the EnhancedMemoryInterfaceClient receives EnMemKeyPairing_St(KeyPairing = Null) after already entering Keyfob or Phone Pairing Mode, then the EnhancedMemoryInterfaceClient shall treat the Null as KeyAssociateExited.

4.5.2.15.15ENMEM-SR-REQ-212303/B-PersIndex used for Keyfob/Phone Association

When requesting to enter Keyfob or Phone Association Mode, the EnhancedMemoryInterfaceClient shall set the PersIndex of the EnMemProfilePairing_Rq to the value of:

- The Driver Memory Seat Button selected during the Create Driver Profile process, which is indicated by EnMemButtonPairing_St(ButtonPairing), OR
- The PersIndex of the selected Driver Profile Edit button when attempting associate a keyfob or phone

If a recall should occur any time after the Driver Memory Seat Button Association and the start of the Keyfob or Phone Association process, the recalled PersIndex shall not be used for the Keyfob or Phone Association.

4.5.2.16 Delete Driver Profiles

The Delete Profile operation is used to erase a user's Profile Name, Keyfob Icon, Phone Icon, Memory Seat Button Association, Keyfob Association, and Phone Association. This is a permanent operation and cannot be undone.

4.5.2.16.1 ENMEM-REQ-134465/D-Delete Driver Profile

When a created Driver Profile is deleted the EnhancedMemoryInterfaceClient shall:

1. If a keyfob is associated to the profile being deleted, the EnhancedMemoryInterfaceClient shall send a keyfob disassociation request, via EnMemProfilePairing_Rq(KeyPairing=DisassociateKey), without requiring a separate disassociation request from the user
2. If a phone is associated to the profile being deleted, the EnhancedMemoryInterfaceClient shall send a phone disassociation request, via EnMemProfilePairing_Rq(KeyPairing=DisassociatePhone), without requiring a separate disassociation request from the user
3. If the profile being deleted is the active profile, the EnhancedMemoryInterfaceClient shall send an infotainment recall request to recall Vehicle via InfotainmentRecall_Rq
4. The EnhancedMemoryInterfaceClient shall update the PersonalityOptIn_St to indicate that the deleted Driver Profile is "Opted-Out"
5. If the profile being deleted is the last available profile, the EnhancedMemoryInterfaceClient shall set the Enhanced Memory feature status to Off via EnhancedMemory_St(Status=ProfilesOff).

Reference sequence diagram ENMEM-SD-REQ-099427- Delete Driver Profile for details

4.5.2.16.2 ENMEM-HMI-REQ-197502/B-Enhanced Memory HMI Indications for Delete a Driver Profile

When a Driver Profile is deleted:

- The EnhancedMemoryInterfaceClient shall remove and disable the Edit Driver Profile functionality
- The EnhancedMemoryInterfaceClient shall remove the name for the deleted Driver Profile
- The EnhancedMemoryInterfaceClient shall update the keyfob association icon status based on PersKeyPairing_St for the deleted Driver Profile
- The EnhancedMemoryInterfaceClient shall update the phone association icon status based on PersPhonePairing_St for the deleted Driver Profile

4.5.2.16.3 ENMEM-REQ-105569/D-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:

1. The EnhancedMemoryInterfaceClient shall delete all internal Driver Profile data (i.e. Profile Name, Button Association) for all Driver Profiles
2. If a keyfob is associated to a Driver Profile(s) the following actions shall be performed:
    - The EnhancedMemoryInterfaceClient shall request to disassociate the keyfob via EnMemProfilePairingRq(KeyPairing=DisassociateKey)
    - The EnhancedMemoryProfileServer shall respond with a successful keyfob disassociation via EnMemKeyPairing_St(KeyPairing=KeyDisassociated)
    - The EnhancedMemoryProfileServer shall update the status of PersKeyPairing_St to KeyNotAssociated for the Driver Profile deleted
    - If there are more than one profile with keys paired, the EnhancedMemoryInterfaceClient shall repeat steps 2 and 3 above until all the keyfobs are dissociated from all profiles
3. If a phone is associated to a Driver Profile(s) the following actions shall be performed:
    - The EnhancedMemoryInterfaceClient shall request to disassociate the phone via EnMemProfilePairingRq(KeyPairing=DisassociatePhone)
    - The EnhancedMemoryProfileServer shall respond with a successful phone disassociation via EnMemKeyPairing_St(KeyPairing=KeyDisassociated)
    - The EnhancedMemoryProfileServer shall update the status of PersPhonePairing_St to NoPhonesAssociated for the Driver Profile deleted
    - If there are more than one profile with phones paired, the EnhancedMemoryInterfaceClient shall repeat steps 2 and 3 above until all the phones are dissociated from all profiles
4. The EnhancedMemoryInterfaceClient shall send a recall request for Vehicle Profile via InfotainmentRecall_Rq(PersIndex = Vehicle)
5. The EnhancedMemoryInterfaceClient shall OptOut of all profiles and set all active personalities in PersonalityOptIn_St to NotOptedIn
6. The EnhancedMemoryInterfaceClient shall set the Enhanced Memory feature status to Off via EnhancedMemory_St(Status = ProfileOff)
7. The EnhancedMemoryProfileServer shall send a recall request for Vehicle to the EnhancedMemoryPositionClient via MemoryPosition_St. Note: this step does not apply to the EnhancedMemoryInterfaceClient and is don't care for the EnhancedMemoryInterfaceClient
8. The EnhancedMemoryInterfaceClient shall send a Factory Reset request to the EnhancedMemoryServers via FactoryReset_Rq(Type = Reset) to perform Master Reset on the EnhancedMemoryServers that support Master Reset (ex. AHU resets SDARS presets - see SDARS SPSS for details). If the EnhancedMemoryServer supports FactoryReset_Rq, all profiles shall reset (ex. SDARS presets reset for all profiles).
9. The EnhancedMemoryInterfaceClient performs a reboot for Master Reset following VS-FUN-REQ-025341-Master Reset to Factory Defaults).
    - Note: the EnhancedMemoryInterfaceClient/Infotainment System Master shall send the FactoryReset_Rq before shutting down the Infotainment System (i.e. sends FactoryReset_Rq(Type = Reset) while HMI_HMIMode_St = On).

Reference sequence diagram ENMEM-SD-REQ-197509-Master Reset for details

4.5.2.17 Keyfob/Phone Disassociation

The Keyfob and Phone Disassociation processes can be completed manually via the HMI. It will be automatically performed when the user delete's a profile or performs a Master Reset.

4.5.2.17.1 ENMEM-REQ-197506/B-Disassociate the Keyfob per User Request

When a user requests to disassociate a keyfob from a Driver Profile, the EnhancedMemoryInterfaceClient shall send EnMemProfilePairing_Rq(KeyPairing = DisassociateKey) to the EnhancedMemoryProfileServer for the requested Driver Profile. The EnhancedMemoryProfileServer shall then respond with EnMemKeyPairing_St (PersIndex = Pers#, KeyPairing = KeyDisassociated) upon successful disassociation of the keyfob.

4.5.2.17.2 ENMEM-REQ-233209/A-Disassociate the Phone per User Request

When a user requests to disassociate a phone from a Driver Profile, the EnhancedMemoryInterfaceClient shall send EnMemProfilePairing_Rq(KeyPairing = DisassociatePhone) to the EnhancedMemoryProfileServer for the requested Driver Profile. The EnhancedMemoryProfileServer shall then respond with EnMemKeyPairing_St (PersIndex = Pers#, KeyPairing = KeyDisassociated) upon successful disassociation of the phone.

4.5.2.17.3 ENMEM-REQ-197505/A-Keyfob Disassociation Status

The EnhancedMemoryProfileServer shall send PersKeyPairing_St(PersXKeyStatus = KeyNotAssociated) to the EnhancedMemoryInterfaceClient for the applicable personality when:

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

4.5.2.17.4 ENMEM-REQ-233210/A-Phone Disassociation Status

The EnhancedMemoryProfileServer shall send PersPhonePairing_St(PersXPhoneStatus = NoPhonesAssociated) to the EnhancedMemoryInterfaceClient for the applicable personality when:

- a phone is successfully disassociated from a Driver Profile
- a phone is erased or revoked from outside the vehicle (see Phone-As-A-Key SPSS for such methods).

4.5.2.17.5 ENMEM-HMI-REQ-202226/A-Keyfob HMI Indication

The EnhancedMemoryInterfaceClient shall monitor PersKeyPairing_St to maintain and display a Keyfob Association Icon for exsiting Driver Profiles:

- When PersKeyPairing_St = KeyAssociated, the icon shall be displayed
- When PersKeyPairing_St = KeyUnAssociated or Null, the icon shall not be displayed

4.5.2.17.6 ENMEM-HMI-REQ-233009/A-Phone HMI Indication

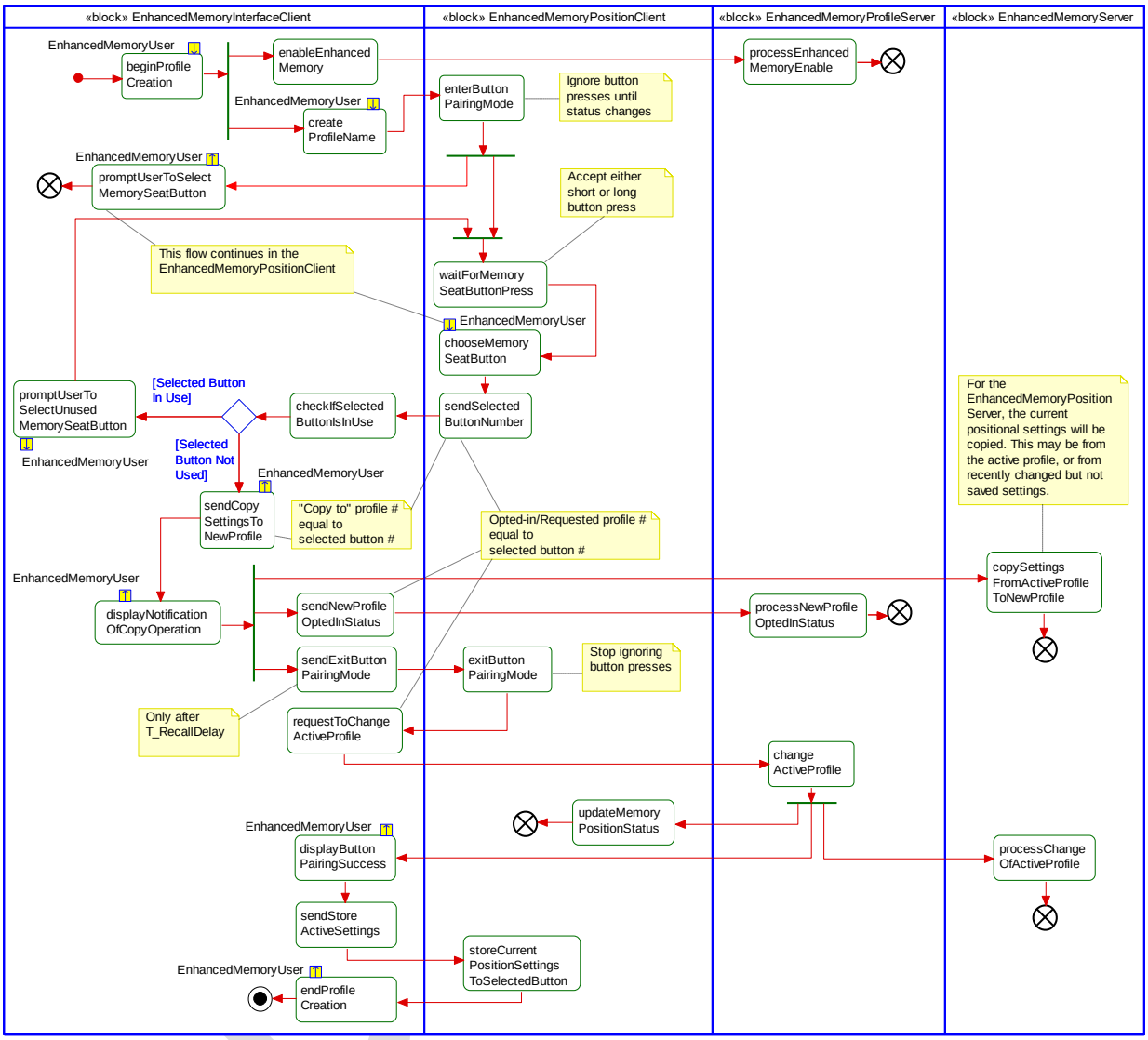
The EnhancedMemoryInterfaceClient shall monitor PersPhonePairing_St to maintain and display a Phone Association Icon for existing Driver Profiles:

- When PersPhonePairing_St = NoPhonesAssociated, the icon shall not be displayed
- When PersPhonePairing_St = OnePhoneAssociated, the icon shall be displayed

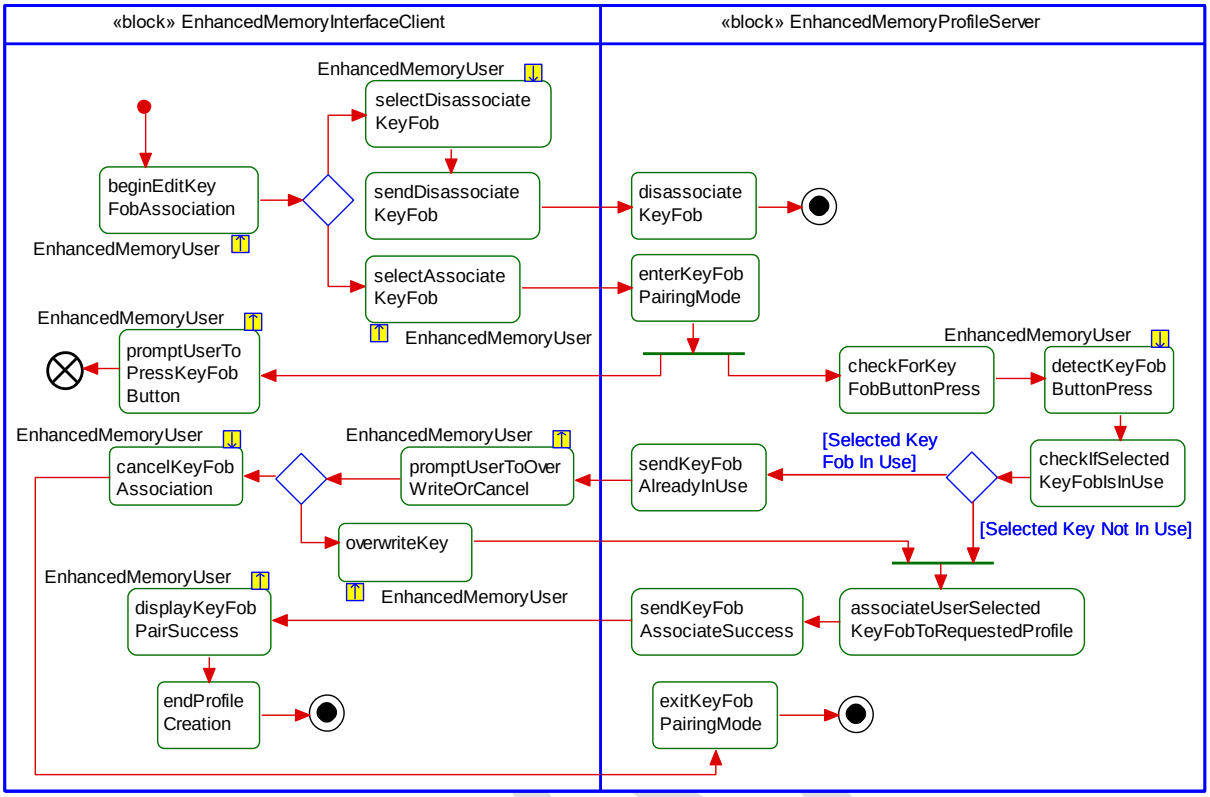
4.5.3 White Box View

4.5.3.1 Activity Diagrams

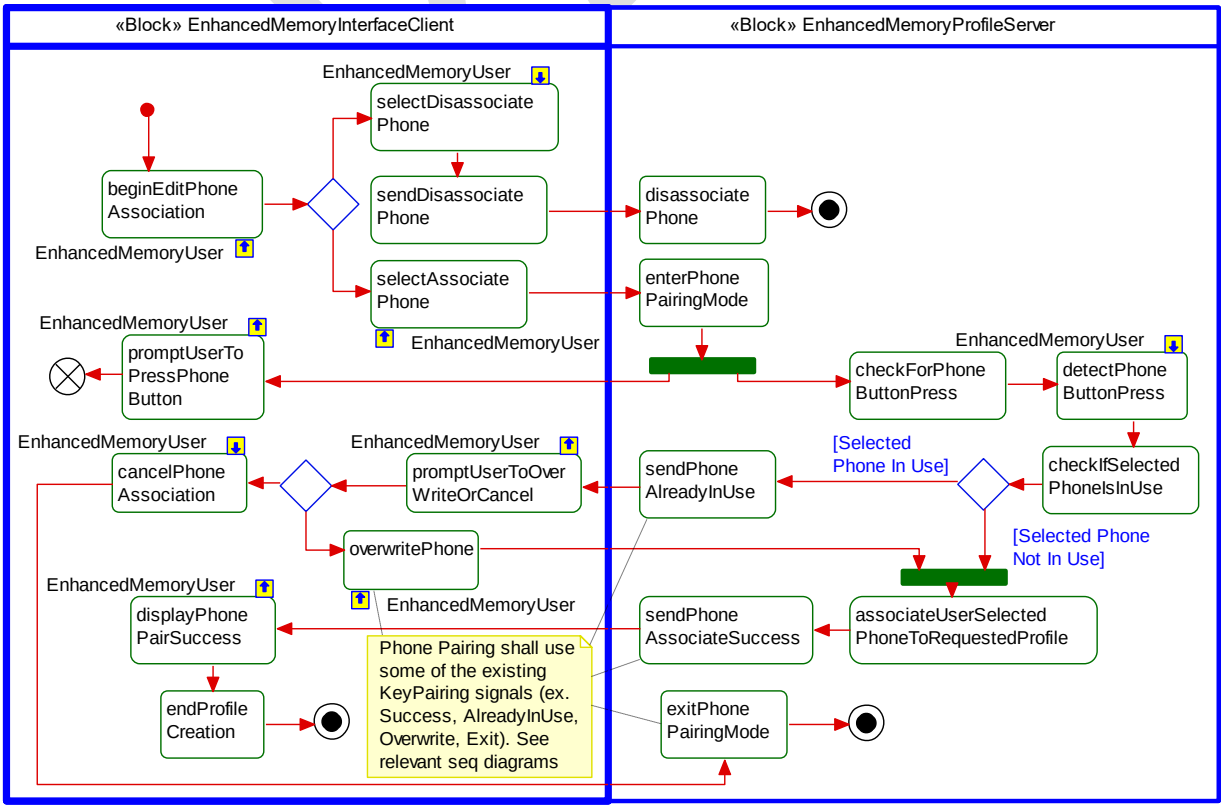
4.5.3.1.1 ENMEM-ACT-REQ-099377/C-Create Driver Profile Activity Diagram



4.5.3.1.2 ENMEM-ACT-REQ-099376/B-Associate Key Fob To Driver Profile Activity Diagram

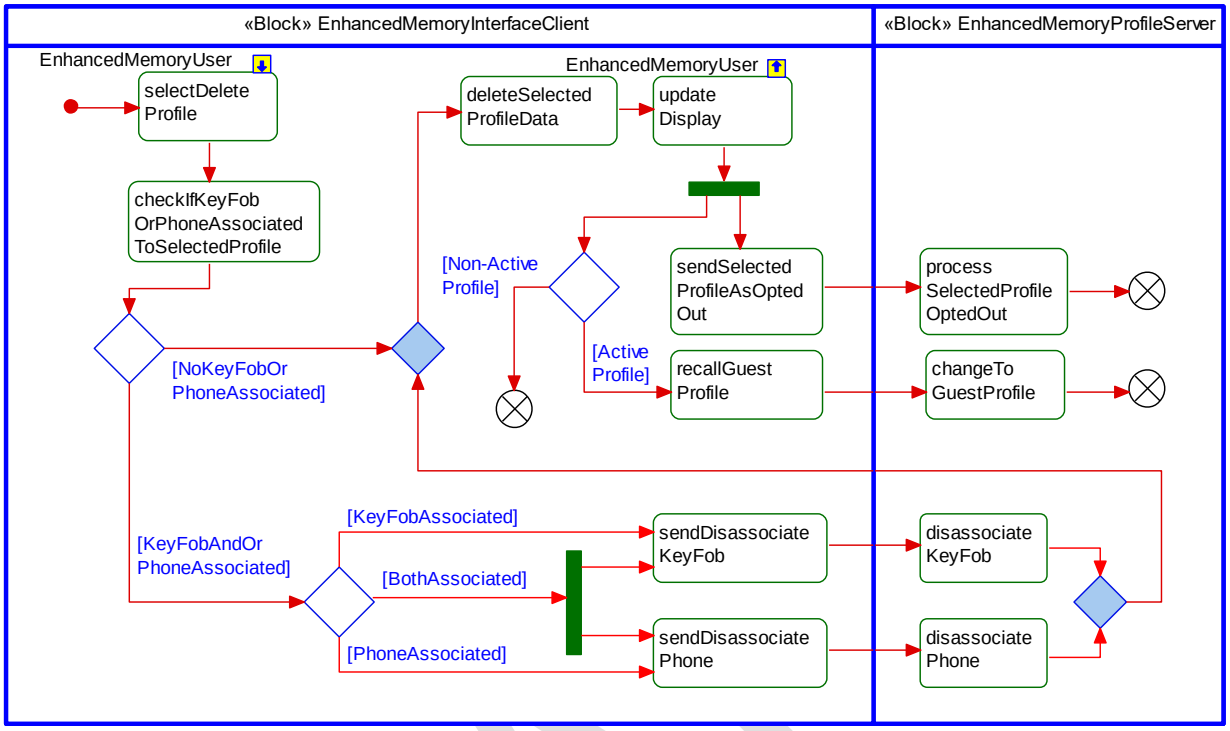


4.5.3.1.3 ENMEM-ACT-REQ-233257/A-Associate Phone To Driver Profile Activity Diagram



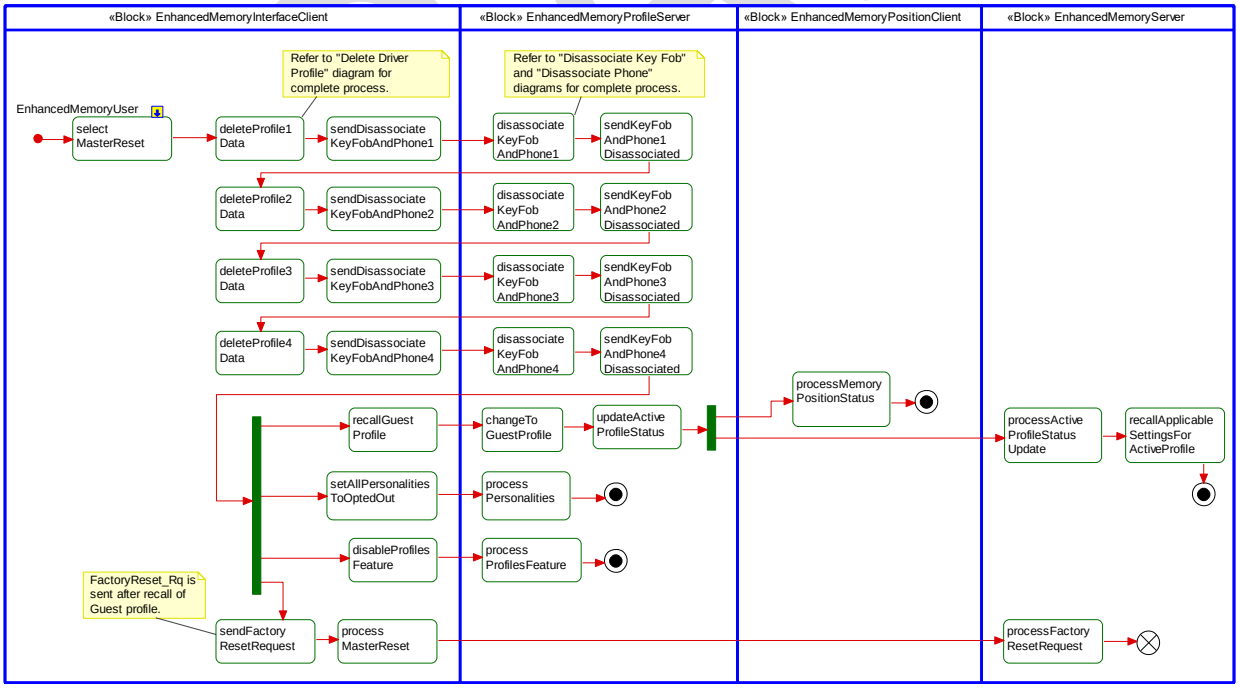
4.5.3.1.4 ENMEM-ACT-REQ-099379/D-Delete Driver Profile

Activity Diagram



4.5.3.1.5 ENMEM-ACT-REQ-197508/B-Master Reset

Activity Diagram



4.5.3.2 Sequence Diagrams

4.5.3.2.1 ENMEM-SD-REQ-099425/F-Create Driver Profile

Constraints

Pre-Condition

Ignition Status = Run
Vehicle is in Park
Vehicle speed is less than 8 KPH.
Maximum number of personality profiles has not yet been reached

Scenarios

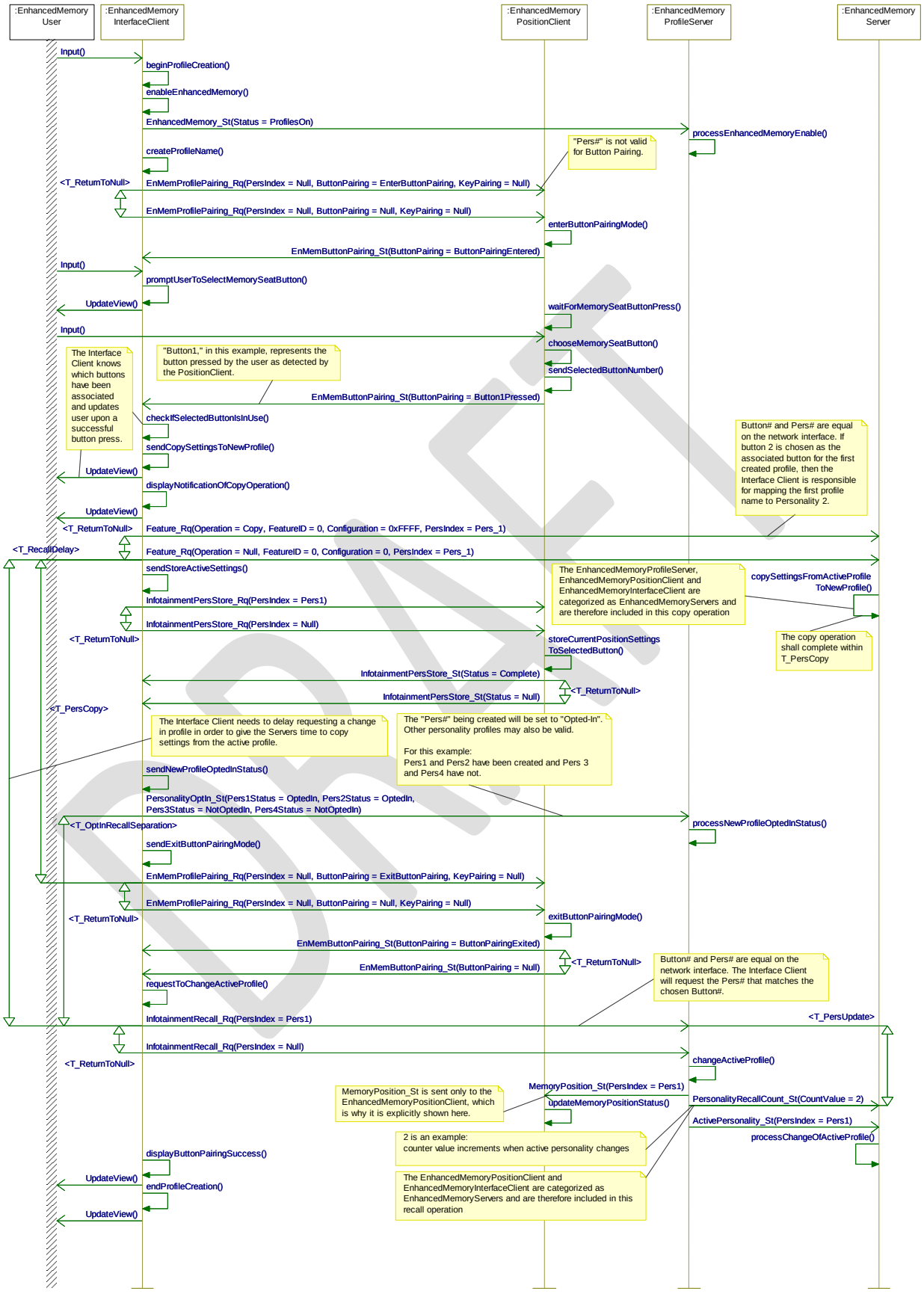
Normal Usage

The driver chooses to create a new personality profile and memory seat button to associate to that profile.

Post-Condition

Driver profiles feature is enabled
A new profile is created
The chosen memory seat button is associated to the new profile

Sequence Diagram



4.5.3.2.2 ENMEM-SD-REQ-197169/B-User Chooses a Seat Button That is Already Associated to Another Driver Profile

Constraints

Pre-Condition

Ignition Status = Run
Vehicle speed is less than 8 KPH
Vehicle HMI prompts the user to press a seat button at door panel during creating Driver profile process

Scenarios

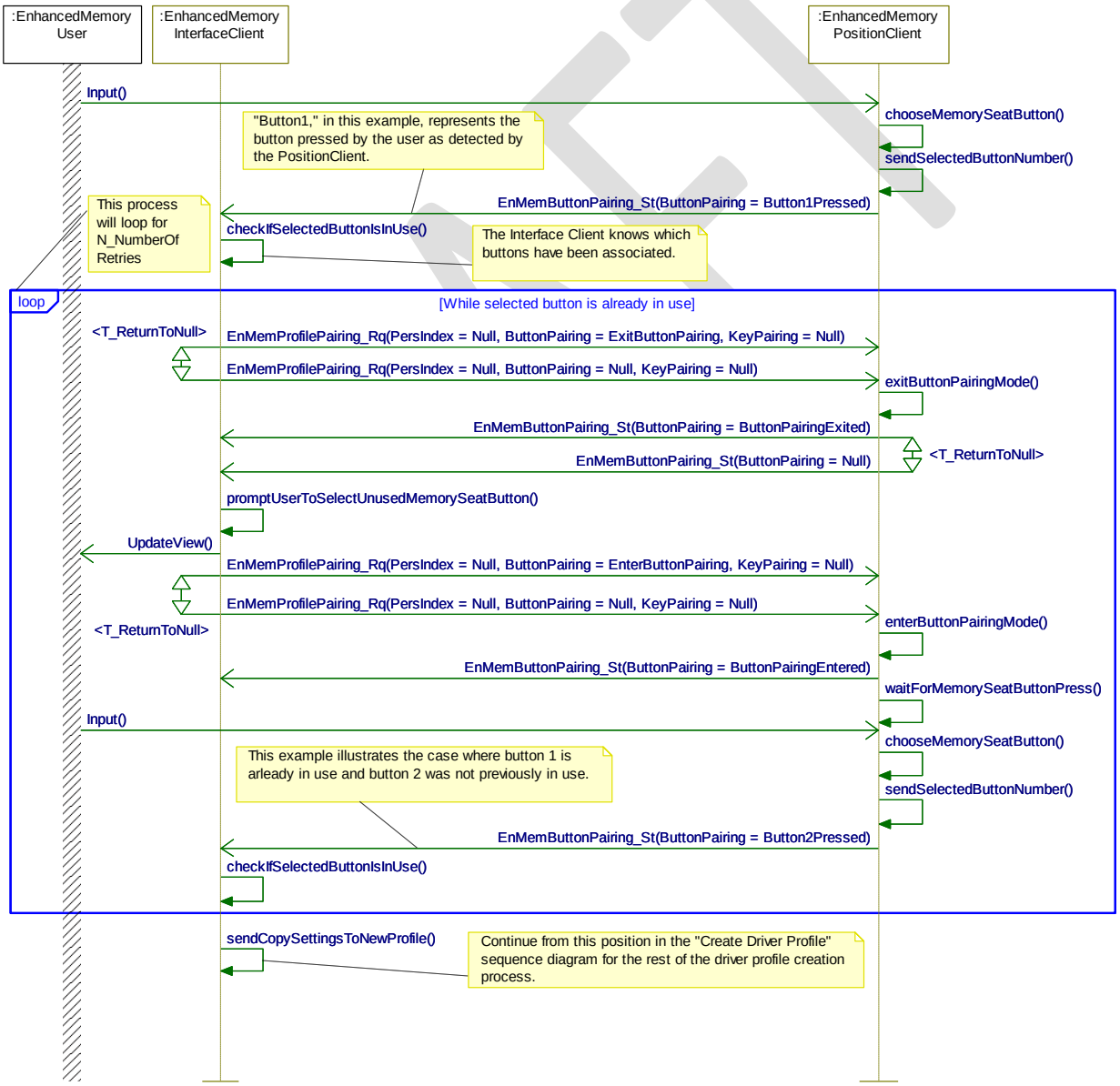
Normal Usage

The user presses a button that is already associated to another Driver profile

Post-Condition

Vehicle HMI provides indication that the button is already associated to another profile and provides the user opportunities to retry

Sequence Diagram



4.5.3.2.3 ENMEM-SD-REQ-099422/D-Associate Key Fob

Constraints

Pre-Condition

Ignition Status = Run
Vehicle is in Park
Vehicle speed is less than 8 KPH.

Scenarios

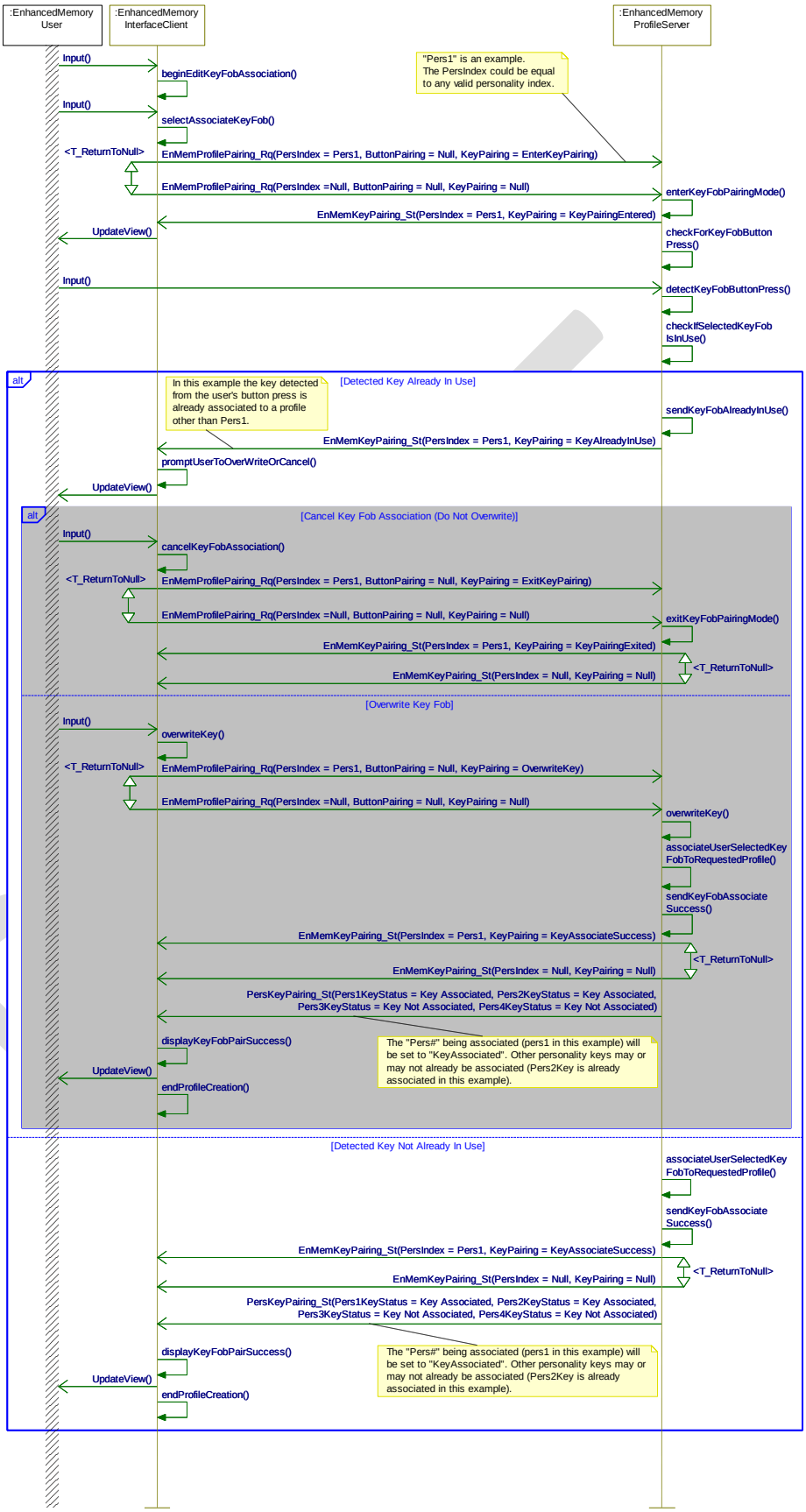
Normal Usage

The driver chooses to associate a key fob to a selected personality profile.

Post-Condition

The selected key fob is associated to the selected personality profile.

Sequence Diagram



4.5.3.2.4 ENMEM-SD-REQ-233258/B-Associate Phone

Constraints

Pre-Condition

Ignition Status = Run
Vehicle is in Park
Vehicle speed is less than 8 KPH.

Scenarios

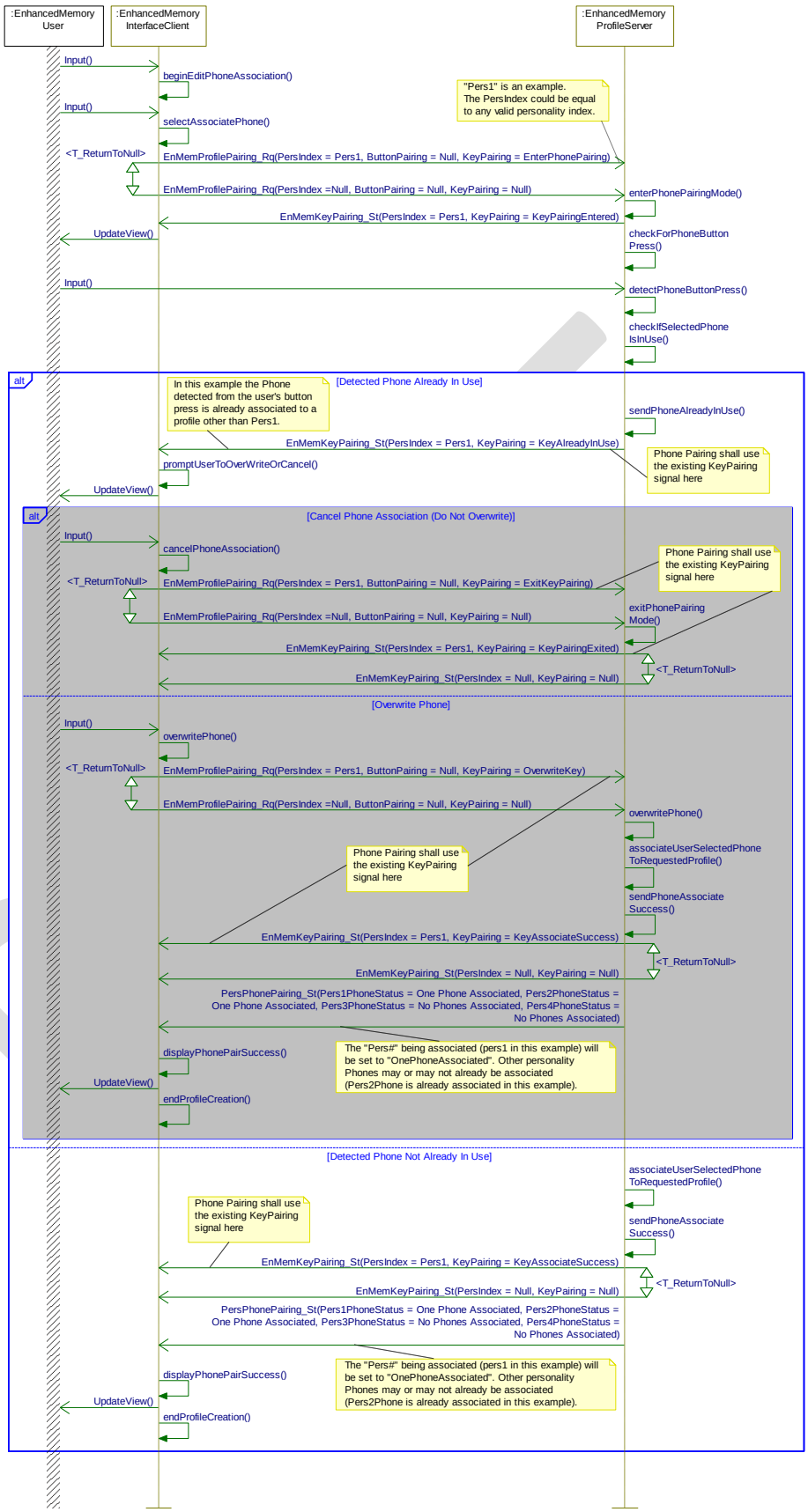
Normal Usage

The driver chooses to associate a phone to a selected personality profile.

Post-Condition

The selected phone is associated to the selected personality profile.

Sequence Diagram



4.5.3.2.5 ENMEM-SD-REQ-099423/B-Disassociate Key Fob

Constraints

Pre-Condition

Ignition Status = Run

Vehicle speed is less than 8 KPH.

Scenarios

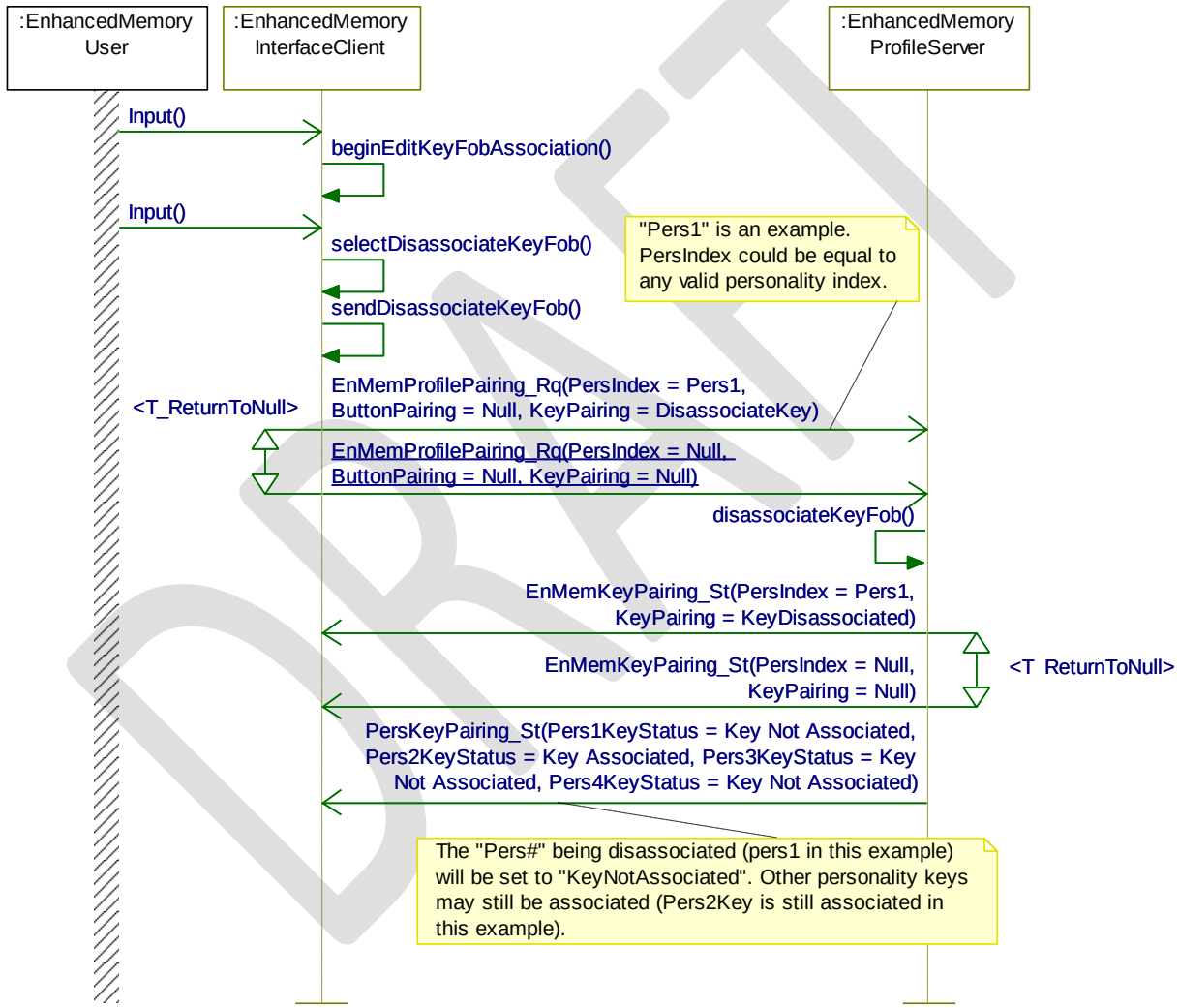
Normal Usage

The driver chooses to disassociate a key fob from a selected personality profile.

Post-Condition

The selected key fob is disassociated from the selected personality profile.

Sequence Diagram



4.5.3.2.6 ENMEM-SD-REQ-233259/A-Disassociate Phone

Constraints

Pre-Condition

Ignition Status = Run

Vehicle speed is less than 8 KPH.

Scenarios

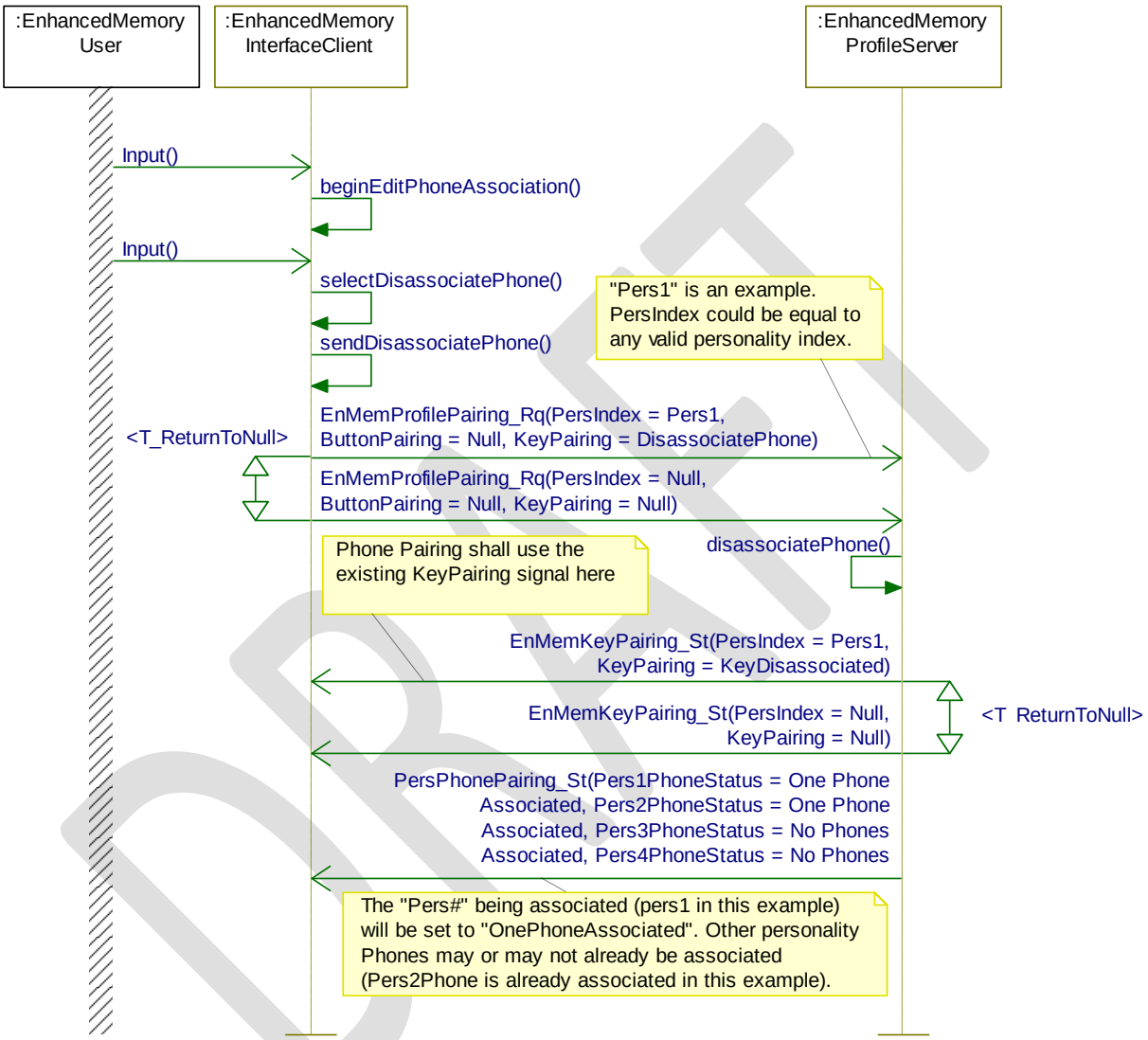
Normal Usage

The driver chooses to disassociate a phone from a selected personality profile.

Post-Condition

The selected phone is disassociated from the selected personality profile.

Sequence Diagram



4.5.3.2.7 ENMEM-SD-REQ-099427/D-Delete Driver Profile

Constraints

Pre-Condition

Ignition Status = Run
Vehicle speed is less than 8 KPH.
Infotainment system is active

Scenarios

Normal Usage

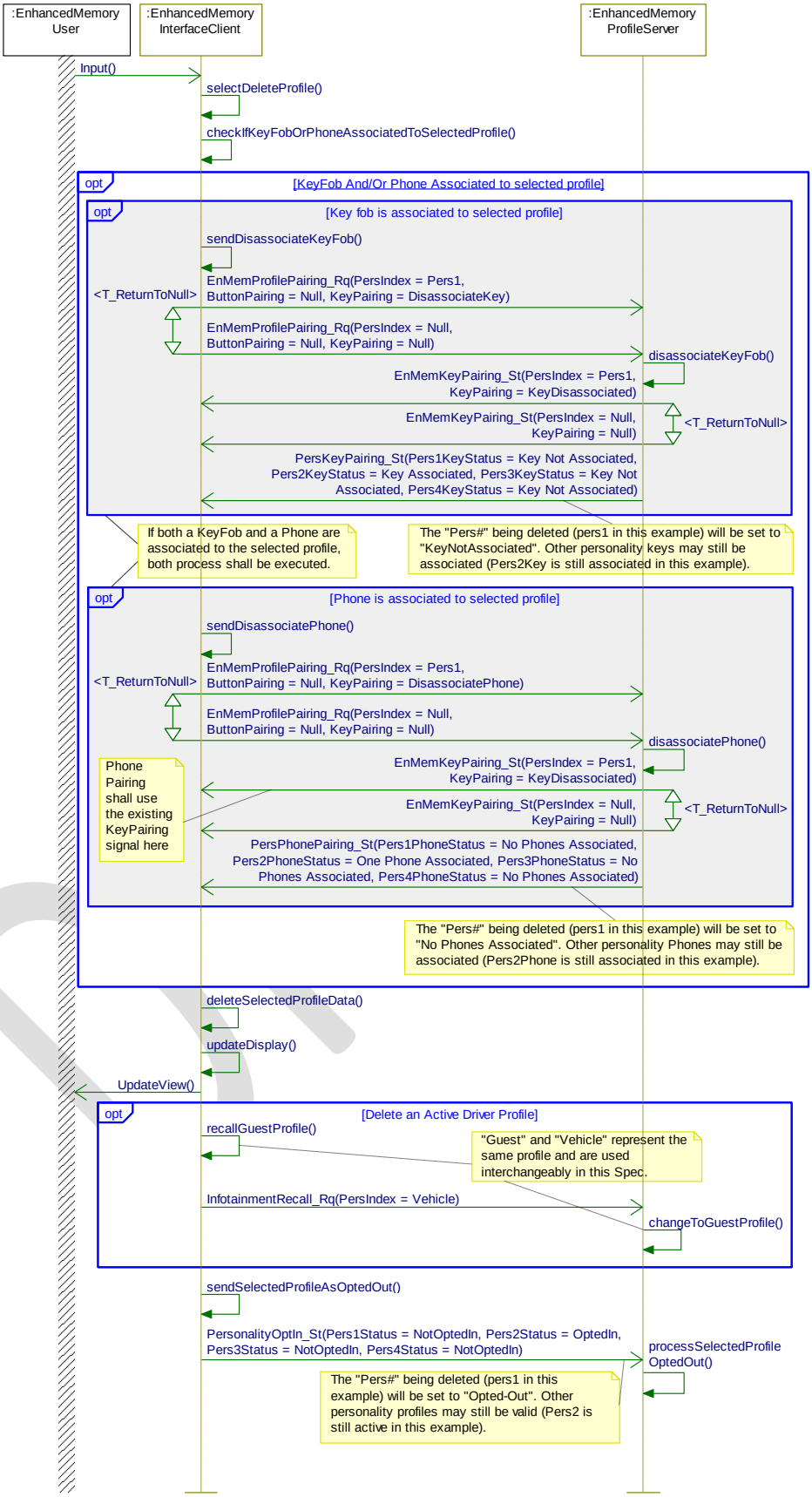
The driver chooses to delete a personality profile.

Post-Condition

The selected profile is deleted.

Any keyfobs associated to the deleted profile are disassociated.
Any phones associated to the deleted profile are disassociated.

Sequence Diagram



4.5.3.2.8 ENMEM-SD-REQ-197509/B-Master Reset

Constraints

Pre-Condition

Ignition Status = Run
Vehicle speed is less than 8KPH
Infotainment system is on
Driver profiles feature is enabled

Scenarios

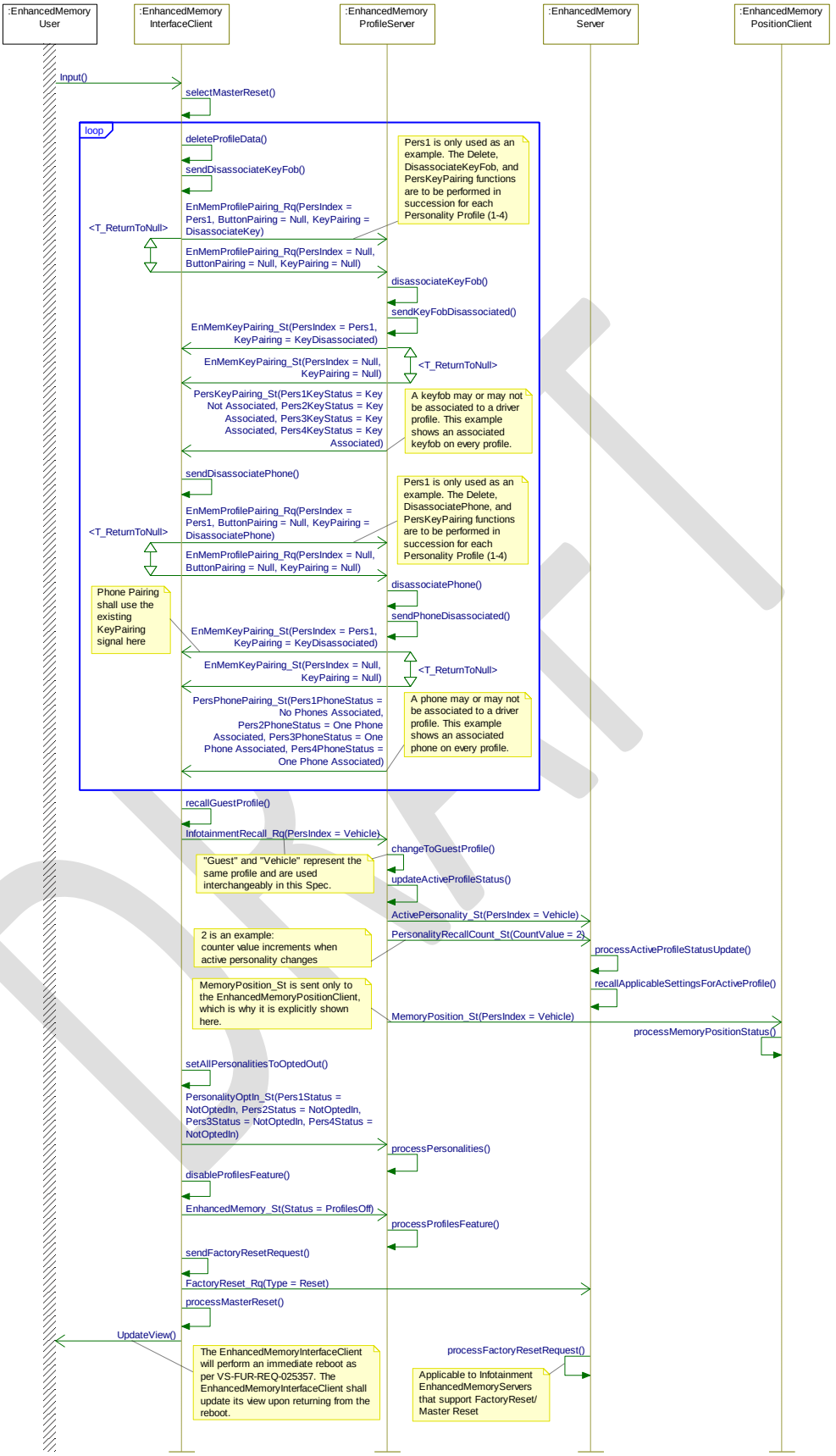
Normal Usage

The driver performs a Master Reset

Post-Condition

The Driver Profiles feature is disabled (set to off).
All Driver Profiles are deleted.
All associated keyfobs are disassociated.
All associated phones are disassociated.
The active Driver Profile is set to “Guest”.
Applicable personalized infotainment settings are reset to factory default values for all profiles.

Sequence Diagram



4.6 ENMEM-FUN-REQ-195573/C-EnhancedMemoryInterfaceClient HMI Requirements - APIM

4.6.1 Requirements

4.6.1.1 ENMEM-HMI-REQ-195574/B-HMI Timeout for Overall Keyfob/Phone Pairing Process

On the HMI screen flows when the user starts the keyfob or phone pairing process to a particular profile, the HMI shall timeout and exit the process after T_FobAssocTotal.

When the HMI screen flow is exited, the EnhancedMemoryIntefaceClient shall send EnMemProfilePairing_Rq(KeyPairing = ExitKeyPairing) to the EnhancedMemoryProfileServer.

4.6.1.2 ENMEM-TMR-REQ-194098/C-T_FobAssocTotal

Name	Description	Units	Range	Resolution	Default
T_FobAssocTotal	Maximum time the EnhancedMemoryInterfaceClient shall allow user to assign a Keyfob or Phone to a Driver Profile for all attempts. Note: use the default value	sec	180-600	60	300

4.6.1.3 ENMEM-HMI-REQ-195576/B-HMI Timeout for One Keyfob/Phone Pairing Attempt

On the HMI screen flows when the user starts the keyfob or phone pairing process to a particular profile, the HMI shall timeout and offer a retry after T_FobAssocOneTime.

When the HMI screen flow is entered for the keyfob pairing process, the EnhancedMemoryIntefaceClient shall send EnMemProfilePairing_Rq(KeyPairing = EnterKeyPairing) to the EnhancedMemoryProfileServer.

When the HMI screen flow is entered for the phone pairing process, the EnhancedMemoryIntefaceClient shall send EnMemProfilePairing_Rq(KeyPairing = EnterPhonePairing) to the EnhancedMemoryProfileServer.

When the timer expires and the HMI screen flow is exited the EnhancedMemoryIntefaceClient shall send EnMemProfilePairing_Rq(KeyPairing = ExitKeyPairing) to the EnhancedMemoryProfileServer.

4.6.1.4 ENMEM-TMR-REQ-194099/C-T_FobAssocOneTime

Name	Description	Units	Range	Resolution	Default
T_FobAssocOneTime	Maximum time the EnhancedMemoryInterfaceClient shall allow user to assign a Keyfob or Phone to a Driver Profile within one attempt. Note: use the default value	sec	10-60	5	15

4.6.1.5 ENMEM-HMI-REQ-195575/B-Number of Retries on HMI for Keyfob/Phone Pairing

On the HMI screen flows, when the user fails to associate a Memory Seat button, keyfob, or phone to a Driver Profile and the screen flow timeout occurs, the HMI shall offer the user a retry. The number of retries offered is defined by N_NumberOfRetries.

4.6.1.6 ENMEM-REQ-179346/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 Memory Seat button, keyfob, or		2-5	1	3

	phone to a Driver Profile before the association process is declared unsuccessful and terminated				

4.6.1.7 ENMEM-HMI-REQ-197344/A-HMI Timeout for One Button Pairing Attempt

On the HMI screen flows when the user starts the button pairing process upon profile creation, the HMI shall timeout and offer a retry after T_SeatAssocOneTime.

When the HMI screen flow is entered for the pairing process, the EnhancedMemoryIntefaceClient shall send EnMemProfilePairing_Rq (ButtonPairing = EnterButtonPairing) to the EnhancedMemoryPositionClient. When the timer expires and the HMI screen flow is exited the EnhancedMemoryIntefaceClient shall send EnMemProfilePairing_Rq (ButtonPairing = ExitButtonPairing) to the EnhancedMemoryPositionClient.

4.6.1.8 ENMEM-TMR-REQ-197338/B-T_SeatAssocOneTime

Name	Description	Units	Range	Resolution	Default
T_SeatAssocOneTime	Maximum time the EnhancedMemoryInterfaceClient shall allow for the button pairing process. Note: use the default value	sec	30-120	5	60

4.6.1.9 ENMEM-HMI-REQ-099692/B-Driver Profile Sign-In 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.

4.6.1.10 ENMEM-HMI-REQ-202226/A-Keyfob HMI Indication

The EnhancedMemoryInterfaceClient shall monitor PersKeyPairing_St to maintain and display a Keyfob Association Icon for exsiting Driver Profiles:

- When PersKeyPairing_St = KeyAssociated, the icon shall be displayed
- When PersKeyPairing_St = KeyUnAssociated or Null, the icon shall not be displayed

4.6.1.11 ENMEM-HMI-REQ-233009/A-Phone HMI Indication

The EnhancedMemoryInterfaceClient shall monitor PersPhonePairing_St to maintain and display a Phone Association Icon for existing Driver Profiles:

- When PersPhonePairing_St = NoPhonesAssociated, the icon shall not be displayed
- When PersPhonePairing_St = OnePhoneAssociated, the icon shall be displayed

4.6.1.12 ENMEM-HMI-REQ-202357/B-Logical Signal to HMI Mapping

In order to help establish a link between the Enhanced Memory SPSS and the Enhanced Memory HMI Specification, a third document “EnhancedMemory_SPSS_HMI_Mapping” was created. This document identifies where certain logic signals, timers, and other variables (that are defined in this SPSS) can be found in the HMI Specification.

4.6.1.13 ENMEM-HMI-REQ-197850/B-Enhanced Memory HMI Indications for Driver Profile

The Enhanced Memory HMI indication of an existing Driver Profile shall include the number of the associated Memory Seat button, the User’s keyed in Profile Name, and an associated keyfob icon and/or an associated phone icon shown only when one has been associated.

4.6.1.14 ENMEM-REQ-199352/A-Successful Memory Button Association

A successful Memory Seat button association event shall be defined as when in button association mode the EnhancedMemoryInterfaceClient receives a valid button press status and internally determines that the pressed button is not associated to any existing Driver Profiles.

A valid memory button press shall be defined as EnMemButtonPairing_St(ButtonPairing) with encoding value in the range from 1 to 4 (i.e. Button1Pressed, Button2Pressed, Button3Pressed, Button4Pressed)

The EnhancedMemoryInterfaceClient HMI shall display a retry popup when:
1. EnMemButtonPairing_St(ButtonPairing) is not in valid range
2. EnMemButtonPairing_St(ButtonPairing) is in failure state
3. Pressed button is already associated to another Driver Profile

4.6.1.15 ENMEM-SR-REQ-198055/C-Enhanced Memory HMI Option for Associated Keyfob/Phone

In the Keyfob or Phone Association process,

- The EnhancedMemoryInterfaceClient shall monitor EnMemKeyPairing_St to determine when a user attempts to associate an already associated keyfob or phone to a new Driver Profile.

- When receiving KeyAlreadyInUse via EnMemKeyPairing_St(KeyPairing):
  - EnhancedMemoryInterfaceClient shall provide notification to the user that the keyfob or phone is already associated to an existing Driver Profile
  - EnhancedMemoryInterfaceClient shall provide the user an option to over-write the associated keyfob or phone, or to cancel the keyfob or phone association process
  - When the user opts to over-write the associated keyfob or phone, the EnhancedMemoryInterfaceClient shall set EnMemProfilePairing_Rq(KeyPairing) to OverwriteKey.

4.6.1.16 ENMEM-HMI-REQ-197502/B-Enhanced Memory HMI Indications for Delete a Driver Profile

When a Driver Profile is deleted:
- The EnhancedMemoryInterfaceClient shall remove and disable the Edit Driver Profile functionality
- The EnhancedMemoryInterfaceClient shall remove the name for the deleted Driver Profile
- The EnhancedMemoryInterfaceClient shall update the keyfob association icon status based on PersKeyPairing_St for the deleted Driver Profile
- The EnhancedMemoryInterfaceClient shall update the phone association icon status based on PersPhonePairing_St for the deleted Driver Profile

4.6.1.17 ENMEM-HMI-REQ-205014/A-Opt-In HMI Display

The Opt-In HMI display shall be displayed when all of the following conditions are met:
- The user presses "Driver Profiles" on the HMI Menu
- EnhancedMemory_St(Status = ProfilesOff)
- No Driver Profile's have been created (indicated by PersonalityOptIn_St)

After displaying the Opt-In HMI, the following actions shall apply:
- Upon receiving a user's "Opt-In" selection, the EnhancedMemoryInterfaceClient shall set EnhancedMemory_St(Status = ProfilesOn) and begin the Create a Driver Profile process.
- Upon receiving a user's "Not Opt-In" selection, the EnhancedMemoryInterfaceClient shall return to the previous Menu leaving EnhancedMemory_St(Status = ProfilesOff)

4.6.1.18 ENMEM-HMI-REQ-207327/B-Driver Profile Name Restrictions

- The Driver Profile Names created and maintained by the EnhancedMemoryInterfaceClient shall be unique.
- In the event when an existing name is entered by the user, the EnhancedMemoryInterfaceClient shall:
  - provide notification to the user that the name already exists
  - not allow the existing name to be overwritten
  - provide the user retry opportunities until a unique name is entered before proceeding to next step

4.6.1.19 ENMEM-HMI-REQ-212764/A-Enhanced Memory HMI Notification of Profile Creation Abort

When Driver Profile creation is interrupted and aborted, per ENMEM-REQ-116802, the EnhancedMemoryInterfaceClient shall notify the user that the process has been aborted.

4.6.1.20 ENMEM-HMI-REQ-233260/A-Keyfob & Phone Association During Profile Creation

During Profile Creation, the EnhancedMemoryInterfaceClient shall offer the user the ability to pair a keyfob, a phone, both a keyfob and phone, or neither.

- A selection of “keyfob” shall begin the Keyfob Association Process
- A selection of “phone” shall begin the Phone Association Process
- A selection of “both” shall begin the Keyfob Association Process, followed by the Phone Association Process
- The EnhancedMemoryInterfaceClient shall remember a user selection of “both” in order to support the below functionality:
    - If the Keyfob Association Process successfully completes or is cancelled by the user, the Phone Association Process shall follow
    - If the Keyfob Association Process times-out (and after all retry attempts), the Phone Association Process shall follow
    - If the Keyfob Association Process is aborted by the system (see REQ-099690), the Phone Association Process shall not follow

4.6.1.21 ENMEM-HMI-REQ-234279/A-Wrong Device Detected HMI

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 temporary notification to the user that the wrong device was selected
- This notification shall be triggered, not sustained, by the above signal value (See H31a_SYNC3_EMDriverProfile for notification duration).

4.6.1.22 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.)

5 Appendix: Reference Documents

Reference #	Document Title
1	Enhanced Memory APIM Implementation Guide
2	Vehicle Settings APIM SPSS - feature/functions tied to Enhanced Memory (ex. Ambient Lighting Variant 2, Language update….)
3	APIM Enhanced Memory HMI specification
4	FBMP SPSS (Feature Based Message Protocol SPSS spec)
5	APIM Infotainment Diagnostic Specification with enhanced memory updates
6	EnhancedMemory_SPSS_HMI_Mapping