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# Introduction

## Document Purpose

The Function (Group) Specification (FS) specifies an individual function / a group of functions.

To get more information about the concept of feature, function and component level abstraction refer to the [Ford RE Wiki](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Engineering+for+SW+Enabled+Features).

## Document Audience

The FS is authored by the owners of the individual functions. All Stakeholders, i.e., all people who have a valid interest in the functions and their behavior should read and, if possible, review the FS. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the FS.

### Stakeholder List

For the latest list of the feature stakeholder and their roles & responsibilities refer to <Put VSEM Link here>.

|  |  |  |  |  |
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## Document Conventions

### Terminology

When referring to aspects of the system design, this document uses standardized language to avoid ambiguity and confusion. The following terms are of particular relevance to this document:

|  |  |
| --- | --- |
| **Term** | **Definition** |
| Configuration parameter | A property of a system that is stored in nonvolatile memory and not expected to be changed during system operation. Examples include assigned serial numbers that are unique to each module and static. |
| Runtime variable | A property of a system that can be read and modified during normal system operation. The variable might be stored in volatile or nonvolatile memory. Examples include stored/saved records, system states, and measured values. |
| Message | A message defines a data structure whose elements are all transmitted simultaneously. The message might be transmitted within a single system, or across a network between two separate systems.  The term “message” is used here to reduce confusion when discussing automotive system behaviors. As it is used in this document, a “message” is identical to the concept of a “signal” as defined in UML/SysML.  A message may or may not contain *signals* – see below. |
| Signal | A signal is a single data element within a message. A signal cannot be transmitted independently of a message, but a message can be transmitted without any signals.  As it is used in this document, a signal corresponds to the UML/SysML concept of a *property*. |

# Function Group Description

This Function Group consists of documentation about the logical system component -1109846592.jpg **Center Stack Display System.**.

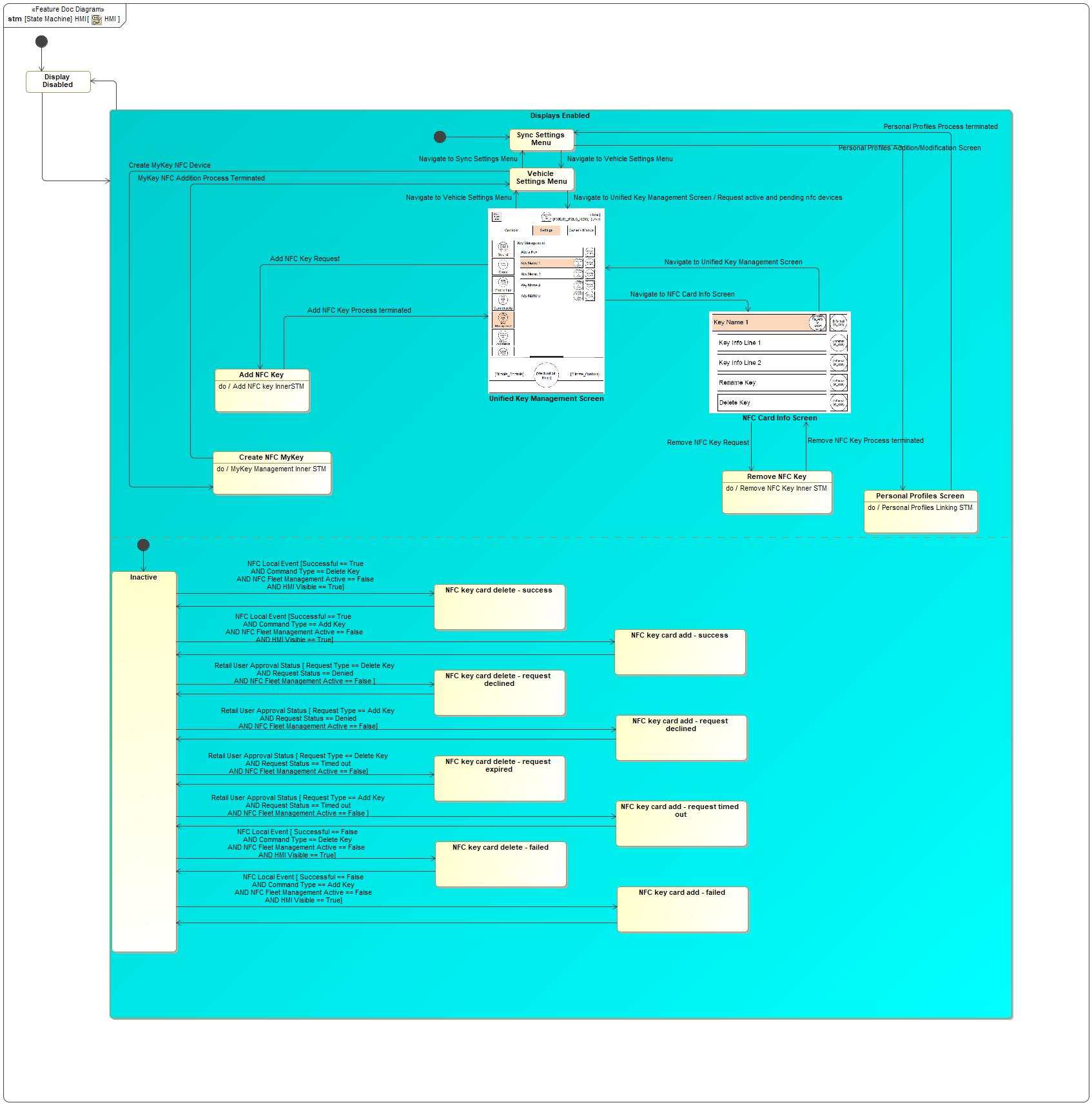
The Center Stack Display System represents the in-vehicle touchscreen interface available to the user.

In the NFC feature, management of key cards (pairing, unpairing) for retail customers is done exclusively through this in-vehicle HMI. Some management of NFC digital keys is also done here.

In addition to key management, users can use the Center Stack Display System to create NFC MyKeys and associate their NFC device with a Personal Profile.

## Center Stack Display System Logical System Behavior

HMI



The screens and flows of the in-vehicle display system that are relevant to the NFC Entry and Starting feature.

## Logical System Properties

#### Configuration Parameters

|  |  |  |
| --- | --- | --- |
| **Parameter name** | **Data type** | **Description** |
| MyKey Creation Body Control System Response Timeout | -838613092.jpg [period duration](#_dcf9ebca813fbf0130e68313c81f5b42) | The duration that the Display System will wait to receive a response from the Body Control System indicating that it is ready/allowing for MyKey creation  Default value = 30 seconds |
| NFC Card Add NFC Controller Response Timeout | -838613092.jpg [period duration](#_dcf9ebca813fbf0130e68313c81f5b42) | The maximum duration that the Center Stack Display System will wait for a response from the NFC Controller after it sends an HMI Command Request. If no response is received, the Center Stack Display System will display an error. |

#### Runtime Variables

|  |  |  |
| --- | --- | --- |
| **Variable name** | **Data type** | **Description** |
| HMI Available |  | Whether or not the in-vehicle center stack display is powered on and ready to display content to the user. |
| NFC fleet management active | -838613092.jpg [Boolean](#_cc312f59de173021fd2ee9302c245859) | Active = Vehicle is enrolled in "NFC Fleet Management" subscription  Inactive = Vehicle is not enrolled in "NFC Fleet Management" subscription |
| NFC enabled | -838613092.jpg [Boolean](#_cc312f59de173021fd2ee9302c245859) | Enabled = Display System NFC feature related behaviors, screens, and pop-ups are enabled  Disabled = Display System NFC feature related behaviors, screens, and pop-ups are disabled |

## Logical System Requirements

REQ-NFC-ES-4 NFC Card Info Screen

The NFC Card Info Screen shall display the following information for each paired NFC device:

* The type of device it is (NFC card or smartphone/smart device)
* The friendly name of the device
* If the device is an NFC card, the FESN of the card
* If the device is an NFC card, the location of the FESN on the NFC Card
* If the device is an NFC card and a factory card, an indication that it is a factory card

**Acceptance Criteria:**

Info pages for device within key management menu has an info button for each key present

REQ-NFC-ES-24 A MyKey cannot create a MyKey

If the Vehicle was started with a MyKey, functions for creating another MyKey shall be disabled.

**Acceptance Criteria:**

"Create MyKey" softbuttons not present while MyKey in use

REQ-NFC-ES-35 Modal return to previous screen

When a modal is dismissed or timed-out, the In-Vehicle HMI System shall return to the previous screen.

**Acceptance Criteria:**

Dismissing a NFC related pop-up will return HMI to previous screen/menu

REQ-NFC-ES-44 Do not wake HMI when vehicle is off

The NFC Command Complete Event shall not wake the HMI System if the vehicle is off.

**Acceptance Criteria:**

Centerstack display remains OFF while ignition is off and NFC Command Complete Event is true

REQ-NFC-ES-50 Master Reset - MyKey Cannot initiate

If the Vehicle was started with a MyKey, functions for Master Reset shall be disabled.

**Acceptance Criteria:**

Master Reset softbutton greyed out while MyKey in use

REQ-NFC-ES-85 NFC User Key not allowed to initiate Master Reset

The In-Vehilce HMI system shall disable the Master Reset function if the vehicle starting key is an NFC User Key

**Acceptance Criteria:**

Master Reset softbutton greyed out while NFC User key in use

REQ-NFC-ES-92 MyKey Users not allowed to add or remove NFC Cards

If the Vehicle was started using a MyKey, the Remove NFC Card Screen and the Add NFC Card Screen shall be inaccessible until the Vehicle is started with a Standard Key.

**Acceptance Criteria:**

NFC Key Management screen "Add" and "Delete" softbuttons for each indvidual key are greyed out while MyKey is in use

REQ-NFC-ES-129 NFC key management functions only available if modem is authorized

The Key Management screen "Add an NFC Key" or "Delete an NFC Key" soft-buttons/functions shall only be available while the modem is authorized and the vehicle is not enrolled into the "NFC Fleet Management" feature

**Acceptance Criteria:**

NFC Key Management Menu displays Add and Delete related soft buttons while modem authorized and not enrolled in fleet. If modem not authorized OR enrolled in fleet, buttons are disabled

REQ-NFC-ES-135 Master Reset Screen - User Cards not allowed to initiate Master Reset

The in-vehicle HMI System shall not allow the user to initiate master reset when the following conditions are true:

Key used to start vehicle == NFC

NFC key type == non Factory

**Acceptance Criteria:**

Master Reset softbutton greyed out while NFC User key in use

REQ-NFC-ES-307 Locking and starting function even without display system

The NFC system shall fulfill the unlocking, locking, and vehicle starting functions without depending on communications with, or the operation of, the in-vehicle display system.

**Acceptance Criteria:**

Enter and Start the vehicle with missing or disconnected Sync module

REQ-NFC-ES-337 NFC key management screen only available while in RUN and motive state

The NFC key management screen and its functions shall only be accessible when the ignition state is RUN and motive state..

**Acceptance Criteria:**

NFC Key Management menu is under "Vehicle Settings" menu and accessible only in RUN

# Operational modes and states

## Add NFC key InnerSTM

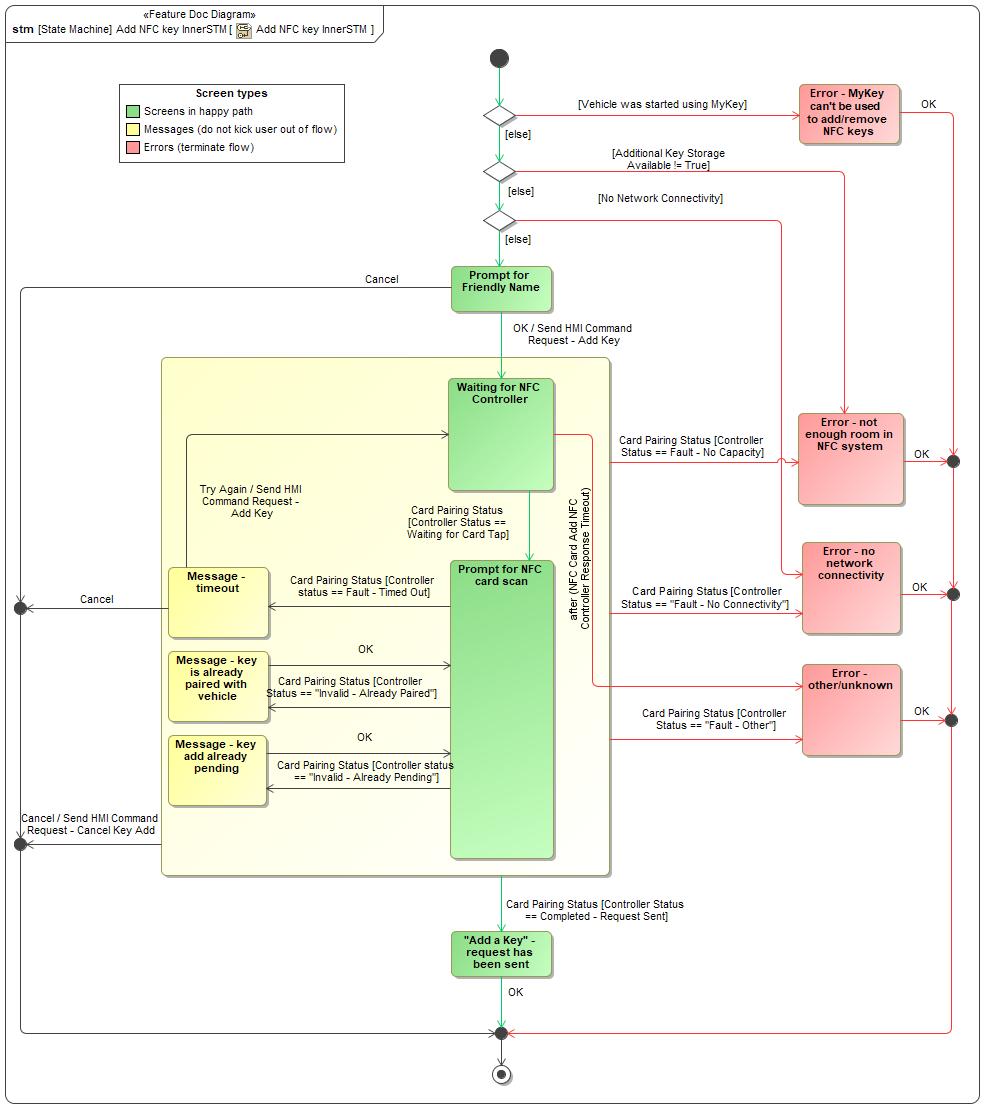


Figure 1: Add NFC key InnerSTM

### Add NFC key InnerSTM states

|  |  |
| --- | --- |
| **State** | **Requirements Reference** (optional) |
|  |  |
| "Add a Key" - request has been sent | 575039769.jpg [REQ-NFC-ES-205](#_b0dc73fcb8a33a12bd443ddc553b756b): Progress Screen: Waiting for Controller Ready  575039769.jpg [REQ-NFC-ES-218](#_7a633d7849968261a8acb7334c753686): Progress Screen: Add Request Sent |
| Error - MyKey can't be used to add/remove NFC keys | 575039769.jpg [REQ-NFC-ES-175](#_b2861a1bc3b70e07b60de7db6da03d61): Error Screen: Attempting to add or delete a key when MyKey restrictions are active |
| Error - no network connectivity | 575039769.jpg [REQ-NFC-ES-178](#_62c3cc488fd850b001dcc587679bbe59): Error Screen: Attempting to Add or Delete Keys When There Is No Network Connectivity |
| Error - not enough room in NFC system | 575039769.jpg [REQ-NFC-ES-176](#_6c86a715b21f5bb7b9bf89769c84007a): Error Screen: Selecting "Add a Key" Button When Key Storage is Full |
| Error - other/unknown | 575039769.jpg [REQ-NFC-ES-347](#_a267cb04799d1cc0879759c290c5e194): Error Screen: Other Error during NFC Card Add |
| Message - key add already pending | 575039769.jpg [REQ-NFC-ES-346](#_dcca17bf3856591b2a35e08f3e6d37e3): Error Screen: NFC Card Already Has Pending Request |
| Message - key is already paired with vehicle | 575039769.jpg [REQ-NFC-ES-174](#_206c7614dc890f4bc1a1337d522529c4): Error Screen: Scanning an Existing NFC Card |
| Message - timeout | 575039769.jpg [REQ-NFC-ES-349](#_33f4e7b01b2357b07a5dfac107643441): Error Screen: Timeout Waiting for NFC Card Scan  575039769.jpg [REQ-NFC-ES-350](#_a169f2a55c17ffee96a41dfbc81bb98a): Error Screen: Timeout Waiting for NFC Card Scan - Actions |
| Prompt for Friendly Name | 575039769.jpg [REQ-NFC-ES-204](#_8868779d74df8b44c0bb2acd094286cc): Prompt Screen: Naming a New NFC Card |
| Prompt for NFC card scan | 575039769.jpg [REQ-NFC-ES-205](#_b0dc73fcb8a33a12bd443ddc553b756b): Progress Screen: Waiting for Controller Ready  575039769.jpg [REQ-NFC-ES-206](#_cea26bf20badf299aafbd602688ce7a6): Prompt Screen: Prompt for NFC Card Scan  575039769.jpg [REQ-NFC-ES-218](#_7a633d7849968261a8acb7334c753686): Progress Screen: Add Request Sent  575039769.jpg [REQ-NFC-ES-346](#_dcca17bf3856591b2a35e08f3e6d37e3): Error Screen: NFC Card Already Has Pending Request  575039769.jpg [REQ-NFC-ES-348](#_bde29ec3f675495200c30d9be22a0795): Prompt Screen: Prompt for NFC Card Scan - actions |
| Waiting for NFC Controller | 575039769.jpg [REQ-NFC-ES-348](#_bde29ec3f675495200c30d9be22a0795): Prompt Screen: Prompt for NFC Card Scan - actions |

Table 1: Operation Modes and States on Add NFC key InnerSTM

### Add NFC key InnerSTM requirements

REQ-NFC-ES-174 Error Screen: Scanning an Existing NFC Card

If the Display System is displaying the "Prompt for NFC Card Scan" screen and it receives a Card Pairing Status message with the "Controller Status" value set to "Invalid - Already Paired", then the Display System shall show a message indicating that that the card scanned by the user is already paired with the vehicle, and cannot be re-added.

Dismissing this message shall cause the Display System to return to the "Prompt for NFC Card Scan" screen.

**Rationale**: This screen informs the user that the scanned NFC card is already paired to the vehicle.

**Acceptance Criteria:**

Scanning an already-paired NFC card while the display is prompting for a card scan causes a dismissable message to show, with text indicating that the card is already paired

REQ-NFC-ES-175 Error Screen: Attempting to add or delete a key when MyKey restrictions are active

When the key that started the vehicle is a MyKey, and either of the following occurs:

A user presses the disabled "Add NFC Card" button on the Unified Key Management Screen

A user presses the disabled "Remove NFC Card" button (or equivalent) on the Unified Key Management Screen or a key info screen

the Display System shall display a message indicating that NFC card pairings and unpairings are not allowed while MyKey restrictions are active.

The message should inform the user that they need to shut off the vehicle and start it with a key that is not a MyKey in order to manage NFC card pairings.

Dismissing the message shall return the Display System to the Unified Key Management Screen.

**Rationale**: This screen informs the user that NFC cards cannot be added to the vehicle when MyKey is active.

**Acceptance Criteria:**

In-vehicle HMI will grey out "Add a Key" and key delete buttons when MyKey is in use; pressing the disabled buttons causes a message to display

REQ-NFC-ES-176 Error Screen: Selecting "Add a Key" Button When Key Storage is Full

When either of the following occurs:

* The user presses the "Add NFC Card" button in the Unified Key Management Screen, but the "Additional Key Storage Available" value of the most recently received "NFC Devices List" message is False
* While the Display System is displaying the "Waiting for NFC Controller" or "Prompt for NFC card scan" screens, it receives a "Card Pairing Status" message with the "Controller status" value set to "Fault - No Capacity"

then the Display System shall display a message to the user indicating that the maximum number of NFC pairings has been reached, and they need to delete some existing pairings if they wish to create another.

Dismissing this message shall return the user to the Unified Key Management Screen.

**Rationale**: This screen informs the user that key storage is full when they attempt to add an NFC card.

**Acceptance Criteria:**

Pressing Add a Key button within in-vehicle HMI shall not start the key pairing process and display a pop-up indicating not enough room in NFC system (when no key storage is available on NFC system)

REQ-NFC-ES-178 Error Screen: Attempting to Add or Delete Keys When There Is No Network Connectivity

When any of the following occurs:

* The user presses the "Add NFC Card" button on the Unified Key Management Screen and the vehicle has no network connectivity
* The user presses the "Delete NFC Card" button (or equivalent) on the Unified Key Management Screen or a NFC key info screen
* While the HMI is displaying the "Waiting for NFC Controller" screen in the NFC key add or NFC key delete flows, or the "Prompt for NFC card scan" screen in the NFC key add flow, it receives a Card Pairing Status message with the "Controller Status" value == "Fault - No Connectivity"

then the Display System shall display a message to the user indicating that there is no network connectivity, and NFC cards cannot be added or deleted when there is no network connectivity.

Dismissing this message shall return a user to the Unified Key Management Screen.

**Rationale**: User guidance when key adds are not allowed

**Acceptance Criteria:**

Pressing "Add a Key" button or any NFC key delete button within in-vehicle HMI shall not start the key pairing process and display a pop-up indicating vehicle has no connectivity

REQ-NFC-ES-204 Prompt Screen: Naming a New NFC Card

When a user presses the "Add a Key" button on the Unified Key Management Screen, and all of the following are true:

* The vehicle has network connectivity
* The vehicle's ignition is in RUN
* The key that started the vehicle is not a MyKey
* The "NFC Fleet Management Active" configuration parameter of the Center Stack Display System is False

then the Display System shall show the "Add a Key - enter friendly name" screen.

**Rationale**: This screen prompts the user to name the new NFC card during the key add flow.

**Acceptance Criteria:**

Pressing "Add a Key" Button results in HMI showing keyboard appropriate to local language and accepts user input for NFC Device "Friendly Name"

REQ-NFC-ES-205 Progress Screen: Waiting for Controller Ready

When the HMI is displaying the "Add a Key - enter friendly name" screen and the user presses the "Next" button after entering a valid friendly name, the Display System shall:

* Send an "HMI Command Request" message with "Friendly Name" set to the user-entered friendly name, "Requested Command Type" set to "Add Key", and "FESN" null
* Display the "Waiting for NFC Controller" screen

**Rationale**: This screen informs the user of the progress of the key add request.

**Acceptance Criteria:**

Pressing "Next" button (or equivalent) results in HMI transmitting message to NFAM and switching to "Waiting for NFCController"screen

REQ-NFC-ES-206 Prompt Screen: Prompt for NFC Card Scan

When the Display System is displaying the "Waiting for NFC Controller" screen, and the Display System receives a "Card Pairing Status" message with the "Controller Status" value set to "Waiting for Card Tap", the Display System shall display the "Add a Key" screen - prompt for NFC card" screen.

**Rationale**: This screen prompts the user to scan a new NFC card during the key add flow.

**Acceptance Criteria:**

Display transitions from "Waiting"/"Loading" to "Scan NFC Card"when "Card Pairing Status" message is received with "Controller Status"== "Waiting for Card Tap"

REQ-NFC-ES-218 Progress Screen: Add Request Sent

When the Display System is displaying the "Prompt for NFC Card Scan" screen of the NFC card add flow, and it receives a "Card Pairing Status" message with the "Controller Status" value set to "Completed - Request Sent", it shall display a message to the user indicating that:

* The card add request has been sent successfully
* The card cannot be used until the vehicle owner approves the request on their mobile device

**Acceptance Criteria:** Display changes from card scan prompt to success message when Card Pairing Status message is received as described in requirement

REQ-NFC-ES-346 Error Screen: NFC Card Already Has Pending Request

When the Display System is displaying the "Prompt for NFC Card Scan" screen in the NFC card add flow, and it receives a "Card Pairing Status" message with the "Controller Status" value set to "Invalid - Already Pending", it shall display a message to the user indicating that they cannot add the card that was just tapped because it already has an outstanding add request.

Dismissing this message shall return the Display System to the "Prompt for NFC Card Scan" screen.

**Acceptance Criteria:** Attempting to create an add request for the same card twice in a row causes this message to appear

REQ-NFC-ES-347 Error Screen: Other Error during NFC Card Add

When any of the following occurs:

* While the Display System is displaying the "Waiting for NFC Controller" or "Prompt for NFC Card Scan" screens, it receives a "Card Pairing Status" message with the "Controller Status" value set to "Fault - Other"
* More time than the duration specified in the "NFC Card Add NFC Controller Response Timeout" parameter passes after the Display System sends the "HMI Command Request" message during the NFC card add flow

then the Display System shall display a message to the user indicating that an unknown error has occurred during the NFC card add process and they cannot continue.

Dismissing this message shall return the Display System to the Unified Key Management Screen.

**Acceptance Criteria:** Attempting to add NFC card while NFC Controller is disconnected causes error message to display after timeout duration

REQ-NFC-ES-348 Prompt Screen: Prompt for NFC Card Scan - actions

The "Prompt for NFC card scan" and "Waiting for NFC Controller" screens in the NFC card add flow shall have a button or action labeled "Cancel" (or equivalent).

Pressing this button shall:

* Transmit an "HMI Command Request" message with the Friendly Name value set to null, the FESN value set to null, and the Command Type value set to "Cancel Key Add"
* Return the user to the Unified Key Management Screen

**Acceptance Criteria:** Users are able to escape from NFC card add flow after typing in friendly name without needing to wait for the entire timeout duration. NFC Controller receives cancellation request when cancel button is pressed.

REQ-NFC-ES-349 Error Screen: Timeout Waiting for NFC Card Scan

If the Display System is displaying the "Prompt for NFC Card Scan" screen in the NFC card add flow, and it receives a "Card Pairing Status" message with the "Controller Status" value set to "Fault - Timed Out", then it shall display the "Message - timeout" screen.

**Acceptance Criteria:** Waiting for longer than NFC controller timeout at the NFC card scan screen results in this message being shown

REQ-NFC-ES-350 Error Screen: Timeout Waiting for NFC Card Scan - Actions

The "Message - timeout" screen/warning in the NFC card add flow shall have at least the following buttons/actions:

* "Cancel Add" or equivalent text. Pressing this button shall return the user to the Unified Key Management screen.
* "Try Again" or equivalent text. Pressing this button shall cause the Display System to:
  + Transmit an "HMI Command Request" message with the Friendly Name entered by the user earlier in the flow, no FESN, and the Command Type value set to "Add Card"
  + Transition to the "Waiting for NFC Controller" screen

**Acceptance Criteria:** After timeout occurs waiting for card scan, user is able to restart key add flow by pressing "Try Again" button

## HMI

The screens and flows of the in-vehicle display system that are relevant to the NFC Entry and Starting feature.

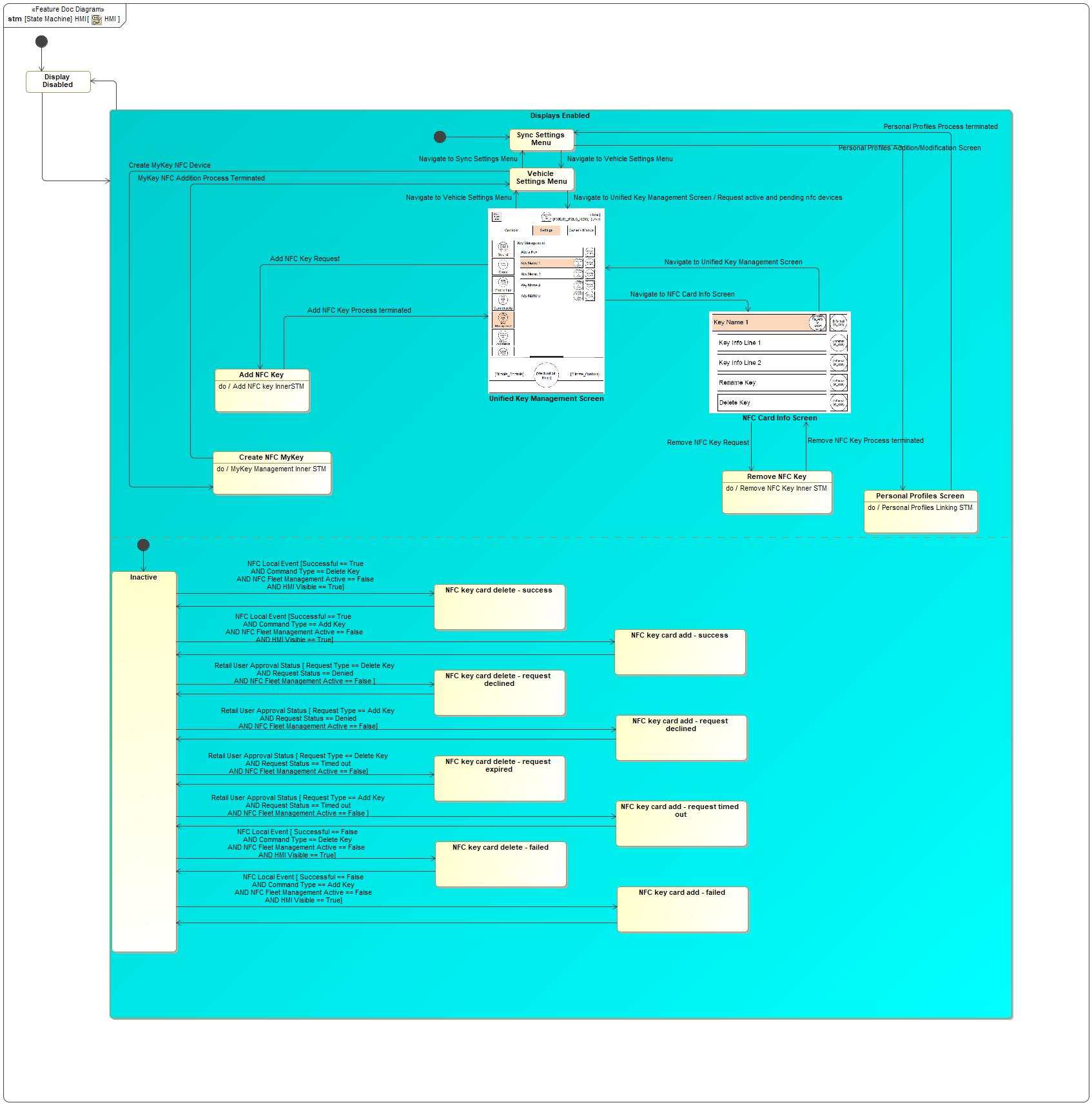


Figure 2: HMI

### HMI states

|  |  |
| --- | --- |
| **State** | **Requirements Reference** (optional) |
| Add NFC Key |  |
| Create NFC MyKey | 575039769.jpg [REQ-NFC-ES-172](#_143f712591abf2215f9ef5e7de63738f): Enable NFC MyKey Softbuttons |
| Display Disabled |  |
| Displays Enabled |  |
| Inactive |  |
| NFC Card Info Screen | 575039769.jpg [REQ-NFC-ES-4](#_c826ab5e3d7d784a2516e318637446dc): NFC Card Info Screen  575039769.jpg [REQ-NFC-ES-149](#_53fb3f3992dee34a7230b4573f1a8a7b): NFC key management functions - not available if vehicle is subscribed to fleet NFC management  575039769.jpg [REQ-NFC-ES-171](#_0c101f984350e25e1639d0e7a23f2552): Display System: Conditions to allow "Delete Key" for NFC Card Info Screen to be enabled  575039769.jpg [REQ-NFC-ES-240](#_19b33faf78e1730d2ece33ef16e77dba): Key Info Screen for NFC Device used to start the vehicle |
| NFC key card add - failed | 575039769.jpg [REQ-NFC-ES-79](#_d3411b62d7bd66188c691fb74040d8c2): Store NFC notifications for next vehicle start  575039769.jpg [REQ-NFC-ES-143](#_3626c48970ea6e7251b4558328b4eb70): NFC key management notifications - no notifications if vehicle is managed by fleet  575039769.jpg [REQ-NFC-ES-156](#_4528f5d78b7344204c1839a1f744b063): Key add failure pop-up verbiage  575039769.jpg [REQ-NFC-ES-210](#_061f9c6fca3a4c46afd2ada6a694716f): Show pop-up on key add failure |
| NFC key card add - request declined | 575039769.jpg [REQ-NFC-ES-79](#_d3411b62d7bd66188c691fb74040d8c2): Store NFC notifications for next vehicle start  575039769.jpg [REQ-NFC-ES-143](#_3626c48970ea6e7251b4558328b4eb70): NFC key management notifications - no notifications if vehicle is managed by fleet  575039769.jpg [REQ-NFC-ES-160](#_246f99bd85384c29578f40eea62dc736): Content of key add request denial pop-up  575039769.jpg [REQ-NFC-ES-214](#_2e38c053987b31e34f3e0a9f1d39d354): Show pop-up on key add request denial |
| NFC key card add - request timed out | 575039769.jpg [REQ-NFC-ES-79](#_d3411b62d7bd66188c691fb74040d8c2): Store NFC notifications for next vehicle start  575039769.jpg [REQ-NFC-ES-143](#_3626c48970ea6e7251b4558328b4eb70): NFC key management notifications - no notifications if vehicle is managed by fleet  575039769.jpg [REQ-NFC-ES-162](#_b846407505f1392a67a15076dbb7d42a): Content of key add request expiration pop-up  575039769.jpg [REQ-NFC-ES-216](#_a36e5d1ac6c3d1eb2cfcf00f96e8717a): Show pop-up on key add request expiration |
| NFC key card add - success | 575039769.jpg [REQ-NFC-ES-79](#_d3411b62d7bd66188c691fb74040d8c2): Store NFC notifications for next vehicle start  575039769.jpg [REQ-NFC-ES-143](#_3626c48970ea6e7251b4558328b4eb70): NFC key management notifications - no notifications if vehicle is managed by fleet  575039769.jpg [REQ-NFC-ES-157](#_d4bbbb2134e06b133926e96e38d37dfd): Content of key add success pop-up  575039769.jpg [REQ-NFC-ES-211](#_542c2aa3715deda3f0ea3b03081a3285): Show pop-up on key add success |
| NFC key card delete - failed | 575039769.jpg [REQ-NFC-ES-79](#_d3411b62d7bd66188c691fb74040d8c2): Store NFC notifications for next vehicle start  575039769.jpg [REQ-NFC-ES-143](#_3626c48970ea6e7251b4558328b4eb70): NFC key management notifications - no notifications if vehicle is managed by fleet  575039769.jpg [REQ-NFC-ES-158](#_333919901b925286283e50ca956cf9c5): Content of key delete failure pop-up  575039769.jpg [REQ-NFC-ES-168](#_e4adc88a52b070e96d193dd37ca898b7): Display System: Error screen after user confirms NFC Key Card Delete request  575039769.jpg [REQ-NFC-ES-212](#_d8d5430c6e4365fd4f42d46f4f7cda87): Show pop-up on key delete failure |
| NFC key card delete - request declined | 575039769.jpg [REQ-NFC-ES-79](#_d3411b62d7bd66188c691fb74040d8c2): Store NFC notifications for next vehicle start  575039769.jpg [REQ-NFC-ES-143](#_3626c48970ea6e7251b4558328b4eb70): NFC key management notifications - no notifications if vehicle is managed by fleet  575039769.jpg [REQ-NFC-ES-161](#_728fc562e89ab29a8cb957afb1d1550d): Content of key delete request denial pop-up  575039769.jpg [REQ-NFC-ES-215](#_12fe0614b285c7820929e2f6809698ec): Show pop-up on key delete request denial |
| NFC key card delete - request expired | 575039769.jpg [REQ-NFC-ES-79](#_d3411b62d7bd66188c691fb74040d8c2): Store NFC notifications for next vehicle start  575039769.jpg [REQ-NFC-ES-143](#_3626c48970ea6e7251b4558328b4eb70): NFC key management notifications - no notifications if vehicle is managed by fleet  575039769.jpg [REQ-NFC-ES-163](#_a9f7dec21c970adf3a6a639f328e53d9): Content of key delete request expiration pop-up  575039769.jpg [REQ-NFC-ES-217](#_59586789367754aa832b1f1136221a9c): Show pop-up on key delete request expiration |
| NFC key card delete - success | 575039769.jpg [REQ-NFC-ES-79](#_d3411b62d7bd66188c691fb74040d8c2): Store NFC notifications for next vehicle start  575039769.jpg [REQ-NFC-ES-143](#_3626c48970ea6e7251b4558328b4eb70): NFC key management notifications - no notifications if vehicle is managed by fleet  575039769.jpg [REQ-NFC-ES-159](#_a1611894e75c84b5a3a412d72dc71b12): Content of key delete success pop-up  575039769.jpg [REQ-NFC-ES-213](#_ecd3bb1f3051cc3bec5e8b040223714b): Show pop-up on key delete success |
| Personal Profiles Screen | 575039769.jpg [REQ-NFC-ES-26](#_c700767d93e7aa153bf7c09d9f2fa43e): NFC Card and Personal Profiles  575039769.jpg [REQ-NFC-ES-27](#_3fdade2d70ff28a2560619d48a1af995): Activating personal profile with NFC Device  575039769.jpg [REQ-NFC-ES-28](#_c7801142a3ba3eb7f7b12b34aa9bda9e): NFC Device associated to at most one Personal Profile  575039769.jpg [REQ-NFC-ES-29](#_af59a19d02ac7bd31a236cd075e12b8b): Multiple NFC Devices associated to one personal profile  575039769.jpg [REQ-NFC-ES-151](#_46379c3b6e37775a17094bd63ff2f7cf): abort Personal Profile NFC Pairing button  575039769.jpg [REQ-NFC-ES-179](#_c2ca9a1e8cea5a54a520b621a5031973): Feature availability for Personal Profile linking  575039769.jpg [REQ-NFC-ES-197](#_82887469d89b0e1b3e9523cfb6149ff6): NFC Personal Profile Pairing process consistency  575039769.jpg [REQ-NFC-ES-198](#_3246df5d7dae016f9b0b177f956368c8): Personal Profile NFC Pairing instructions |
| Remove NFC Key | 575039769.jpg [REQ-NFC-ES-169](#_4f197e865416cb787356c933792c1753): Prompt screen: confirm NFC card pairing deletion - actions when confirmed |
| Sync Settings Menu |  |
| Unified Key Management Screen | 575039769.jpg [REQ-NFC-ES-149](#_53fb3f3992dee34a7230b4573f1a8a7b): NFC key management functions - not available if vehicle is subscribed to fleet NFC management  575039769.jpg [REQ-NFC-ES-155](#_fddfac2e7b2b1e60035191c1a2910044): Conditions to Enable "Add a Key" Button on Unified Key Management Screen  575039769.jpg [REQ-NFC-ES-164](#_45fb6f1dcc3b6a674352a1b4e4940aac): Display "pending" indicator for cards that are pending deletion  575039769.jpg [REQ-NFC-ES-171](#_0c101f984350e25e1639d0e7a23f2552): Display System: Conditions to allow "Delete Key" for NFC Card Info Screen to be enabled  575039769.jpg [REQ-NFC-ES-204](#_8868779d74df8b44c0bb2acd094286cc): Prompt Screen: Naming a New NFC Card  575039769.jpg [REQ-NFC-ES-236](#_3b4d5eb1498e3438b4407d87a6c0856f): Unified Key Management Screen for Fleet vehicles  575039769.jpg [REQ-NFC-ES-237](#_0e0e0e9eab0b111c2bf7f4c63af312d0): Unified Key Management Screen while MyKey in-use  575039769.jpg [REQ-NFC-ES-302](#_cda6d322bc841e64105d6d654af08aca): Request active and pending NFC Device list  575039769.jpg [REQ-NFC-ES-337](#_98212b4b6af7624683084f2677f94a49): NFC key management screen only available while in RUN and motive state |
| Vehicle Settings Menu |  |

Table 2: Operation Modes and States on HMI

### HMI requirements

REQ-NFC-ES-4 NFC Card Info Screen

The NFC Card Info Screen shall display the following information for each paired NFC device:

* The type of device it is (NFC card or smartphone/smart device)
* The friendly name of the device
* If the device is an NFC card, the FESN of the card
* If the device is an NFC card, the location of the FESN on the NFC Card
* If the device is an NFC card and a factory card, an indication that it is a factory card

**Acceptance Criteria:**

Info pages for device within key management menu has an info button for each key present

REQ-NFC-ES-26 NFC Card and Personal Profiles

An NFC Device shall be associated to “default” profile settings after it is added to the Vehicle.

**Acceptance Criteria:**

Unique Profile not created immediately after NFC Device Add

REQ-NFC-ES-27 Activating personal profile with NFC Device

The vehicle shall apply the personal profile settings associated with an NFC Device when the user does any of the following:

- Unlocks the vehicle with an Exterior Reader scan

- Interior Reader scan while the vehicle is not running

**Acceptance Criteria:**

Profile related settings recalled when device used to unlock vehicle or start vehicle

REQ-NFC-ES-28 NFC Device associated to at most one Personal Profile

An NFC Device shall be associated with at most one Personal Profile.

**Acceptance Criteria:**

Attempting to Pair NFC Device to multiple profiles will result in dismiss-able pop-up when attempting to pair to second profile

REQ-NFC-ES-29 Multiple NFC Devices associated to one personal profile

It shall be possible to pair one or more NFC Devices to a Personal Profile, even if the Personal Profile has one or more keys of a different type already associated with it.

**Acceptance Criteria:**

HMI shall allow pairing a second NFC device to the same profile

REQ-NFC-ES-79 Store NFC notifications for next vehicle start

When an NFC Command Complete Event or Retail User Approval Status signal is received that would cause a pop-up while the Sync system isn't fully operational/awake, the In-Vehicle HMI System shall display the modal immediately at the moment it is fully operational/awake .

**Acceptance Criteria:**

HMI displays dismissable pop-up on wake-up if an NFC Add or Delete event had completed while vehicle was off.

Pop-up shall indicate the type of operation (Add or Delete) and the specific device's friendly name

REQ-NFC-ES-143 NFC key management notifications - no notifications if vehicle is managed by fleet

When the Display System's "NFC Fleet Management Active" configuration parameter is "True", then the Display System shall disable all pop-up notifications related to successfully adding or deleting devices from the vehicle

**Acceptance Criteria:**

HMI does not display a pop-up if Add or Delete operation was completed while NFC Fleet Management is active

REQ-NFC-ES-149 NFC key management functions - not available if vehicle is subscribed to fleet NFC management

When the Display System's "NFC Fleet Management Active" configuration parameter is "True", then the Display System shall disable the "Add NFC Device" and "Delete NFC Device" related soft buttons

**Acceptance Criteria:**

HMI shall disable "Add" and "Delete" soft buttons while NFC Fleet Management is active

REQ-NFC-ES-151 abort Personal Profile NFC Pairing button

The "Personal Profile "Link a Device" screen shall include a cancel/exit/skip button that allows the USER to abort the NFC Personal Profile Pairing process.

**Rationale**: allow a user to exit the NFC process without setting up a Personal Profile for an NFC device

**Acceptance Criteria:**

Personal profile pairing related screens shall support a cancel button, which can be pressed mid process to exit the profile pairing flow

REQ-NFC-ES-155 Conditions to Enable "Add a Key" Button on Unified Key Management Screen

When the "NFC Enabled on System" configuration parameter of the Display System is "True" and "NFC Fleet Management Active" configuration parameter is "False", the "Unified Key Management" screen shall include the "Add a Key" button.

**Rationale**: This button allows the user to initiate adding an NFC card to the vehicle.

**Acceptance Criteria:**

NFC Key Management screen will only enable the "Add NFC" soft button for Retail vehicles

REQ-NFC-ES-156 Key add failure pop-up verbiage

The Display System shall have an NFC Feature related center-stack pop-up to indicate a system error at the time of adding an NFC Device, which includes:

- Reason text: "NFC Key Card Add Failed"

- The FESN or Friendly name of the selected NFC Key Card

**Rationale**: This notification is shown in the error case where the vehicle owner has approved a pairing, but a system error onboard the vehicle prevented the pairing from being completed. The FESN should be included because multiple card requests can be pending simultaneously - the FESN uniquely identifies the card that is the subject of the notification.

**Acceptance Criteria:**

Key add fail pop-up will be dismissable and indicate for which device it was for.

REQ-NFC-ES-157 Content of key add success pop-up

The Display System shall have an NFC Feature related center-stack pop-up to indicate successful adding an NFC Device, which includes:

- Reason text: "NFC Key Card Add Successful"

- The FESN or Friendly name of the selected NFC Key Card

**Rationale**: This notification lets the user know that the card is ready for use in the vehicle. The FESN should be included because multiple card requests can be pending simultaneously - the FESN uniquely identifies the card that has been added.

**Acceptance Criteria:**

Key add successful pop-up will be dismissable and indicate for which device it was for.

REQ-NFC-ES-158 Content of key delete failure pop-up

The Display System shall have an NFC Feature related center-stack pop-up to indicate a system error at the time of deleting an NFC Device, which includes:

- Reason text: "NFC Key Card Delete Failed"

- The FESN or Friendly name of the selected NFC Key Card

**Rationale**: This notification is shown in the error case where the vehicle owner has approved an unpairing, but a system error onboard the vehicle prevented the unpairing from being completed. The FESN should be included because multiple card requests can be pending simultaneously - the FESN uniquely identifies the card that has been added

**Acceptance Criteria:**

A system failure resulting in an NFC Key not being able to be deleted from the vehicle will result in an in-vehilce pop-up indicating that an error occurred

REQ-NFC-ES-159 Content of key delete success pop-up

The Display System shall have an NFC Feature related center-stack pop-up to indicate successful deletion of an NFC Device, which includes:

- Reason text: "NFC Key Card Delete Successful"

- The FESN or Friendly name of the selected NFC Key Card

**Acceptance Criteria:**

Key delete successful pop-up will be dismissable and indicate for which device it was for.

REQ-NFC-ES-160 Content of key add request denial pop-up

The Display System shall have an NFC Feature related center-stack pop-up to indicate the admin has denied the NFC Key Add request which includes:

- Reason text: "NFC Key Card Add Request Denied"

- The FESN or Friendly name of the selected NFC Key Card

**Rationale**: This notification is shown in the case where the vehicle owner has explicitly denied a request to add a key. The card is not usable to enter and start the vehicle.

The FESN should be included because multiple card requests can be pending simultaneously - the FESN uniquely identifies the card that is the subject of the notification.

**Acceptance Criteria:**

Key add denial pop-up will be dismissable and indicate for which device it was for.

REQ-NFC-ES-161 Content of key delete request denial pop-up

The Display System shall have an NFC Feature related center-stack pop-up to indicate the admin has denied the NFC Key Delete request which includes:

- Reason text: "NFC Key Card Delete Request Denied"

- The FESN or Friendly name of the selected NFC Key Card

**Rationale**: This notification is shown in the case where the vehicle owner has explicitly denied a request to unpair a key. The card is still usable to enter and start the vehicle.

The FESN should be included because multiple card requests can be pending simultaneously - the FESN uniquely identifies the card that is the subject of the notification.

**Acceptance Criteria:**

Key delete denial pop-up will be dismissable and indicate for which device it was for.

REQ-NFC-ES-162 Content of key add request expiration pop-up

The Display System shall have an NFC Feature related center-stack pop-up to indicate the admin did not respond to the NFC Key Add request within a specific time frame, which includes:

- Reason text: "NFC Key Card Add Request Timed Out"

- The FESN or Friendly name of the selected NFC Key Card

**Rationale**: This notification is shown in the error case where the vehicle owner has not approved a request to unpair a key and the request has expired. The card is still usable to enter and start the vehicle.

The FESN should be included because multiple card requests can be pending simultaneously - the FESN uniquely identifies the card that is the subject of the notification.

**Acceptance Criteria:**

Key add expiration pop-up will be dismissable and indicate for which device it was for.

REQ-NFC-ES-163 Content of key delete request expiration pop-up

The Display System shall have an NFC Feature related center-stack pop-up to indicate the admin did not respond to the NFC Key Delete request within a specific time frame, which includes:

- Reason text: "NFC Key Card Delete Request Timed Out"

- The FESN or Friendly name of the selected NFC Key Card

**Rationale**: This notification is shown in the error case where the vehicle owner has not approved a request to unpair a key and the request has expired. The card is still usable to enter and start the vehicle.

The FESN should be included because multiple card requests can be pending simultaneously - the FESN uniquely identifies the card that is the subject of the notification.

**Acceptance Criteria:**

Key delete expiration pop-up will be dismissable and indicate for which device it was for.

REQ-NFC-ES-164 Display "pending" indicator for cards that are pending deletion

Card pairings which have an outstanding deletion request shall appear in the Unified Key Management Screen with an icon or other status indicator to show that they are pending deletion.

**Acceptance Criteria:** Card pairing which has an outstanding deletion request appears with icon or annotation

REQ-NFC-ES-168 Display System: Error screen after user confirms NFC Key Card Delete request

If either of the following occurs:

* The user presses the "delete key" button for a paired NFC device while the vehicle does not have network connectivity
* While the Display System is displaying the "Wait for NFC Controller" screen in the NFC card delete flow, it receives a Card Pairing Status message with the "Controller Status" value set to "Fault - No Connectivity"

then the Display System shall display a message indicating that there is no network connectivity, and NFC keys can only be deleted from the vehicle when there is network connectivity.Dismissing this message shall return to the Unified Key Management Screen or the key information screen where the user pressed the delete button.

**Rationale**: Informs user that request to delete key has failed due to lack of network connectivity or because of a system timeout

**Acceptance Criteria:**

In-vehicle HMI shall not initiate NFC Device Delete request if there is no vehicle connectivity at the time of request

REQ-NFC-ES-169 Prompt screen: confirm NFC card pairing deletion - actions when confirmed

If the Display System is displaying the Remove NFC Card - Confirm Delete screen in the NFC card delete flow, and the user presses the Confirm button (or equivalent), the Display System shall:

* Transmit an HMI Command Request message with:
  + the FESN value set to the FESN of the card pairing the user has selected for deletion
  + the Friendly Name value empty/null
  + the Command Type value set to "Delete Pairing"
* Transition to the "Wait for NFC Controller" screen

**Rationale**: Informs user that request to delete key has been processed

**Acceptance Criteria:**

REQ-NFC-ES-171 Display System: Conditions to allow "Delete Key" for NFC Card Info Screen to be enabled

Buttons and controls to delete NFC card pairings shall only be enabled when all of the following are true:

* Vehicle is in RUN ignition state
* Vehicle modem is authorized
* Vehicle has network connectivity
* The key that was used to start the vehicle is not a MyKey
* "NFC fleet management active" configuration parameter of the Display System is False
* "NFC Key Type" of the key selected for deletion is not "Factory Key"
* The key selected for deletion was not used to start the vehicle (in the current drive cycle)

**Rationale**: Allows user to select "Delete Key" in the NFC Card Info Screen to delete user's NFC Card keys when specific conditions are met

**Acceptance Criteria:**

"Delete" Key shall be displayed under NFC Key info menu, while vehicle is in run, for each key that is not a factory keys, and not a fleet user key

REQ-NFC-ES-172 Enable NFC MyKey Softbuttons

The Display system shall update its "Create MyKey" page to "grey out" the "Create NFC MyKey" related soft buttons while the following conditions are true:

- Current MyKey Level == MyKey

**Rationale**: NFC related MyKey softbuttons should only be available for Retail Vehicles with the NFC Feature

**Acceptance Criteria:**

"Create MyKey" button is greyed out after vehicle started with MyKey

REQ-NFC-ES-179 Feature availability for Personal Profile linking

When "NFC Enabled on System" configuration parameter of the Display System == True, the Display System shall include the option to link an NFC device within the Personal Profile Pairing process.

**Rationale**: ensure NFC features are available on the vehicle before allowing a NFC device to be setup as a Personal Profile

**Acceptance Criteria:**

Vehicles equipped with the NFC Feature shall support pairing NFC Devices to their profiles

REQ-NFC-ES-197 NFC Personal Profile Pairing process consistency

The Display System shall ensure the NFC Personal Profile Pairing process is consistent with current Personal Profile Device Pairing

**Rationale**: NFC is a tie-in to already existing Personal Profile process. The Display system shall incorporate NFC as an alternative device maintain consistency.

**Acceptance Criteria:**

REQ-NFC-ES-198 Personal Profile NFC Pairing instructions

The "Personal Profile "Link a Device" screen shall include instructions to pair an NFC device. The instructions shall include at minimum:

- Tap NFC device in interior reader

note: exact wording shall be reviewed by and concurred with HMI.

**Rationale**: provide instructions on how to pair an NFC device to the users personal profiles

**Acceptance Criteria:**

In-vehicle HMI shall prompt the user to scan the interior reader as part of pairing a profile to the NFC Device

REQ-NFC-ES-204 Prompt Screen: Naming a New NFC Card

When a user presses the "Add a Key" button on the Unified Key Management Screen, and all of the following are true:

* The vehicle has network connectivity
* The vehicle's ignition is in RUN
* The key that started the vehicle is not a MyKey
* The "NFC Fleet Management Active" configuration parameter of the Center Stack Display System is False

then the Display System shall show the "Add a Key - enter friendly name" screen.

**Rationale**: This screen prompts the user to name the new NFC card during the key add flow.

**Acceptance Criteria:**

Pressing "Add a Key" Button results in HMI showing keyboard appropriate to local language and accepts user input for NFC Device "Friendly Name"

REQ-NFC-ES-210 Show pop-up on key add failure

When the Display System receives an NFC Local Event message and all of the following are true:

* The "Successful" signal of the NFC Local Event message is False
* The "Command Type" signal of the NFC Local Event message is "Add Key"
* The "NFC Fleet Management Active" configuration parameter of the Display System is False

then the Display System shall show a pop-up indicating that the user's requested NFC card pairing failed to complete.

**Rationale**: This notification is shown in the error case where the vehicle owner has approved a pairing, but a system error onboard the vehicle prevented the pairing from being completed. The card may not be usable to enter and start the vehicle.

**Acceptance Criteria:**

A system failure resulting in an NFC Key not being able to be added to the vehicle will result in an in-vehilce pop-up indicating that an error occurred

REQ-NFC-ES-211 Show pop-up on key add success

When the Display System receives an NFC Local Event message and all of the following are true:

* - The "Successful" signal of the NFC Local Event message is True
* - The "Command Type" signal of the NFC Local Event message is "Add Key"
* - The "NFC Fleet Management Active" configuration parameter of the Display System is False

then the Display System shall show a pop-up indicating that the user's requested NFC card pairing was successful.

**Acceptance Criteria:**

A request being approved and successfully completed resulting in an NFC Key being added to the vehicle will result in an in-vehilce pop-up indicating that the request was successfully completed

REQ-NFC-ES-212 Show pop-up on key delete failure

When the Display System receives an NFC Local Event message and all of the following are true:

* The "Successful" signal of the NFC Local Event message is False
* The "Command Type" signal of the NFC Local Event message is "Delete Key"
* The "NFC Fleet Management Active" configuration parameter of the Display System is False

then the Display System shall show a pop-up indicating that the user's requested NFC card unpairing failed to complete.

**Rationale**: This notification is shown in the error case where the vehicle owner has approved an unpairing, but a system error onboard the vehicle prevented the unpairing from being completed. The card may still be usable to enter and start the vehicle.

**Acceptance Criteria:**

A system failure resulting in an NFC Key not being able to be deleted from the vehicle will result in an in-vehilce pop-up indicating that an error occurred

REQ-NFC-ES-213 Show pop-up on key delete success

When the Display System receives an NFC Local Event message and all of the following are true:

* The "Successful" signal of the NFC Local Event message is True
* The "Command Type" signal of the NFC Local Event message is "Delete Key"
* The "NFC Fleet Management Active" configuration parameter of the Display System is False

then the Display System shall show a pop-up indicating that the user's requested NFC card unpairing was successful.

**Acceptance Criteria:**

A request being approved and successfully completed resulting in an NFC Key being deleted from the vehicle will result in an in-vehilce pop-up indicating that the request was successfully completed

REQ-NFC-ES-214 Show pop-up on key add request denial

When the Display System receives an Retail User Approval Status message and all of the following are true:

* - The "Request Status" signal of the Retail User Approval Status message is "Denied"
* - The "Request Type" signal of the Retail User Approval Status message is "Add Key"
* - The "NFC Fleet Management Active" configuration parameter of the Display System is False

then the Display System shall show a pop-up indicating that the user's requested NFC card pairing was not approved because the retail owner did not reply to the request.

**Rationale**: This notification is shown in the case where the vehicle owner has explicitly denied a request to pair a key. The card is not usable to enter and start the vehicle.

**Acceptance Criteria:**

An admin rejection resulting in an NFC Key not being able to be added to the vehicle will result in an in-vehilce pop-up indicating that the request was rejected

REQ-NFC-ES-215 Show pop-up on key delete request denial

When the Display System receives an Retail User Approval Status message and all of the following are true:

* The "Request Status" signal of the Retail User Approval Status message is "Denied"
* The "Request Type" signal of the Retail User Approval Status message is "Delete Key"
* The "NFC Fleet Management Active" configuration parameter of the Display System is False

then the Display System shall show a pop-up indicating that the user's requested NFC card unpairing was not approved because the retail owner explicitly denied the request.

**Rationale**: This notification is shown in the case where the vehicle owner has explicitly denied a request to unpair a key. The card is not usable to enter and start the vehicle.

**Acceptance Criteria:**

An admin rejection resulting in an NFC Key not being able to be deleted from the vehicle will result in an in-vehilce pop-up indicating that the request was rejected

REQ-NFC-ES-216 Show pop-up on key add request expiration

When the Display System receives an Retail User Approval Status message and all of the following are true:

* The "Request Status" signal of the Retail User Approval Status message is "Timed out"
* - The "Request Type" signal of the Retail User Approval Status message is "Add Key"
* - The "NFC Fleet Management Active" configuration parameter of the Display System is False

then the Display System shall show a pop-up indicating that the user's requested NFC card pairing was not approved because the retail owner did not reply to the request.

**Rationale**: This notification is shown in the error case where the vehicle owner has not approved a request to pair a key and the request has expired. The card is not usable to enter and start the vehicle.

**Acceptance Criteria:**

A request timeout resulting in an NFC Key not being able to be added to the vehicle will result in an in-vehilce pop-up indicating that the request has timed out

REQ-NFC-ES-217 Show pop-up on key delete request expiration

When the Display System receives an Retail User Approval Status message and all of the following are true:

* The "Request Status" signal of the Retail User Approval Status message is "Timed out"
* The "Request Type" signal of the Retail User Approval Status message is "Delete Key"
* The "NFC Fleet Management Active" configuration parameter of the Display System is False

then the Display System shall show a pop-up indicating that the user's requested NFC card unpairing was not approved because the retail owner did not reply to the request.

**Rationale**: This notification is shown in the error case where the vehicle owner has not approved a request to unpair a key and the request has expired. The card is still usable to enter and start the vehicle.

**Acceptance Criteria:**

A request timeout resulting in an NFC Key not being able to be deleted from the vehicle will result in an in-vehilce pop-up indicating that the request has timed out

REQ-NFC-ES-236 Unified Key Management Screen for Fleet vehicles

The Display system shall update its Unified Key Management Screen to only display a list of (NFC) keys programmed to the vehicle and hide all the "Add NFC Device" related soft buttons while the following conditions are true:

- Display System configuration parameter "NFC Fleet Management active" == True

**Rationale**: Fleet vehicles cannot (aren't allowed) to use the in-vehicle HMI to add or delete NFC devices.

**Acceptance Criteria:**

REQ-NFC-ES-237 Unified Key Management Screen while MyKey in-use

The Display system shall update its Unified Key Management Screen to "grey out" the "Add NFC Device" related soft buttons while the following conditions are true:

- Current MyKey Level == MyKey

**Rationale**: MyKey user is not allowed to Add or Remove NFC Devices from the vehicle

**Acceptance Criteria:**

REQ-NFC-ES-240 Key Info Screen for NFC Device used to start the vehicle

The Display system shall update its "Key Info Screen" to "grey out" the "Delete NFC Device" related soft buttons, for the NFC Key used to start the vehicle. while the following conditions are true:

- Ignition status == Run

**Rationale**: User cannot delete the NFC key they used to start the vehicle

**Acceptance Criteria:**

REQ-NFC-ES-302 Request active and pending NFC Device list

When the user selects to enter the Unified Key Management Screen within the HMI, the Display System shall transmit a "Request NFC Devices List" message to the NFC system requesting for a list of the Active and Pending NFC Devices on the vehicle.

**Acceptance Criteria:**

In-vehicle HMI shall have a key management screen for NFC Keys under vehicle settings menu

REQ-NFC-ES-337 NFC key management screen only available while in RUN and motive state

The NFC key management screen and its functions shall only be accessible when the ignition state is RUN and motive state..

**Acceptance Criteria:**

NFC Key Management menu is under "Vehicle Settings" menu and accessible only in RUN

## MyKey Management Inner STM

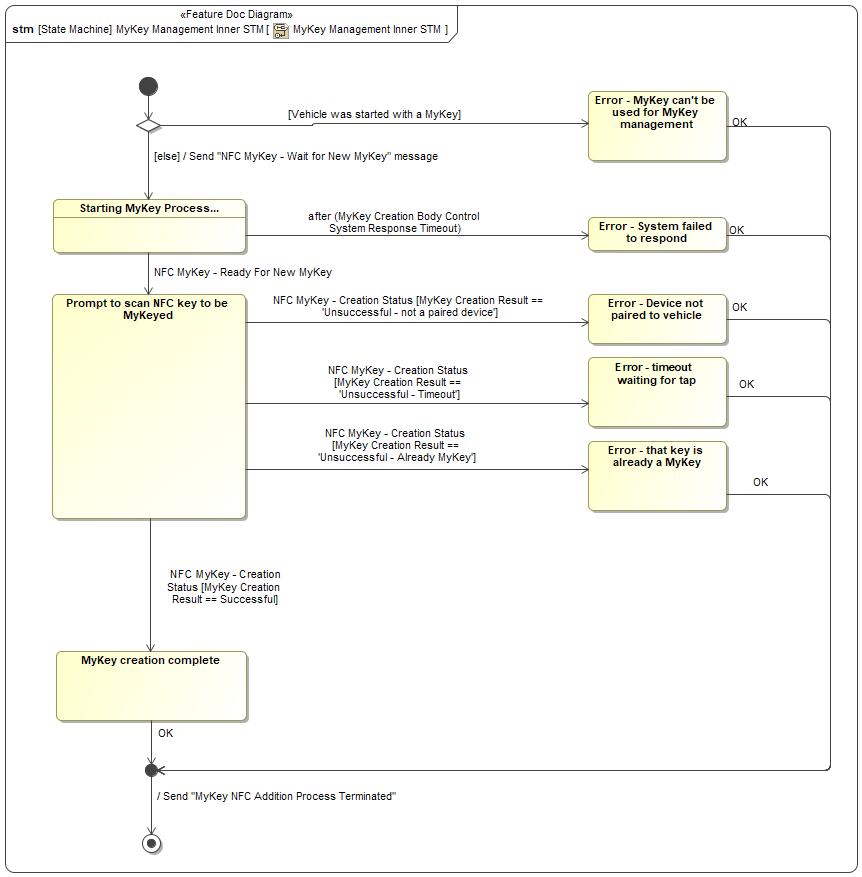


Figure 3: MyKey Management Inner STM

### MyKey Management Inner STM states

|  |  |
| --- | --- |
| **State** | **Requirements Reference** (optional) |
| Error - Device not paired to vehicle | 575039769.jpg [REQ-NFC-ES-195](#_504f18f67a8b863b082d15fe72f7a42d): NFC MyKey Creation Device not paired error |
| Error - MyKey can't be used for MyKey management | 575039769.jpg [REQ-NFC-ES-244](#_4120f3223514e9e03733de9838a20c36): NFC MyKey Creation not allowed while MyKey in use |
| Error - System failed to respond | 575039769.jpg [REQ-NFC-ES-193](#_cc112807442b7cb4afa208b810d45268): NFC MyKey Creation System Error timeout |
| Error - that key is already a MyKey | 575039769.jpg [REQ-NFC-ES-194](#_d044f4ec26c6be1a7f07ac7c2c85c82a): NFC MyKey Creation Already a MyKey error |
| Error - timeout waiting for tap | 575039769.jpg [REQ-NFC-ES-196](#_f05e8f56e984956a18f0abf2cd0ba0b7): NFC MyKey Creation waiting for Tap timeout |
| MyKey creation complete | 575039769.jpg [REQ-NFC-ES-192](#_af702b5fb5c45f7edb2324b6caeb2ea4): NFC MyKey Creation Flow Success |
| Prompt to scan NFC key to be MyKeyed |  |
| Starting MyKey Process... | 575039769.jpg [REQ-NFC-ES-180](#_be35243527d8e15e83eebb93c2e7ff4f): Initiate NFC MyKey Creation Flow |

Table 3: Operation Modes and States on MyKey Management Inner STM

### MyKey Management Inner STM requirements

REQ-NFC-ES-180 Initiate NFC MyKey Creation Flow

When the user presses the “Create an NFC MyKey” soft button, the Display System shall initiate the “Create an NFC MyKey” flow by:

- Transmitting an "NFC MyKey – Wait for New MyKey" Request Signal

**Rationale**: Pressing the "Create an NFC MyKey" Softbutton should initiate the creation flow

**Acceptance Criteria:**

REQ-NFC-ES-192 NFC MyKey Creation Flow Success

When the The Display System receives "NFC MyKey Creation Result" Status signal == “Successful” it shall display an NFC Feature related center-stack pop-up which includes:

- Reason text: "MyKey Creation Flow Successful"

**Rationale**: Notify the user after an NFC Device was successfully updated to be a MyKey

**Acceptance Criteria:**

In-vehicle HMI shall display "MyKey Creation Flow Successful" pop-up when an NFC MyKey is successfully created

REQ-NFC-ES-193 NFC MyKey Creation System Error timeout

If after Starting the MyKey Creation process the Display System does not receive a "NFC MyKey - Ready for New MyKey" signal within "Display MyKey Creation Time" configuration parameter timer of the Display System, it shall exit the “Create an NFC MyKey” flow and

display an NFC Feature related center-stack pop-up which includes:

- Reason text: "Error - System Failed to Respond"

**Rationale**: MyKey Creation exit path for if there is a system error after initiating the create flow

**Acceptance Criteria:**

Initiating the MyKey Creation process, and inhibiting a response back from the Body Control System will result in cancelling the MyKey Creation flow and displaying a pop-up indicating a system after Creation Time timer has expired

REQ-NFC-ES-194 NFC MyKey Creation Already a MyKey error

If after Starting the MyKey Creation process and having received "NFC MyKey - Ready for New MyKey" signal == "True", the Display System receives an "NFC MyKey - Creation Status" Message with "Mykey Creation Result" signal == "Unsuccessful - already a MyKey" it shall exit the “Create an NFC MyKey” flow and display an NFC Feature related center-stack pop-up which includes:

- Reason text: "Error - Already a MyKey"

**Rationale**: MyKey Creation should exit if the user scans an existing NFC MyKey during the creation flow

**Acceptance Criteria:**

Scanning an NFC Device that is already a MyKey during the MyKey creation process will terminate the process and display a pop-up indicating key is already a MyKey

REQ-NFC-ES-195 NFC MyKey Creation Device not paired error

If after Starting the MyKey Creation process and having received "NFC MyKey - Ready for New MyKey" signal == "True", the Display System receives an "NFC MyKey - Creation Status" Message with "Mykey Creation Result" signal == "Unsuccessful - Not a paired device" it shall exit the “Create an NFC MyKey” flow and display an NFC Feature related center-stack pop-up which includes:

- Reason text: "Error - Device not paired to vehicle"

**Rationale**: MyKey Creation should exit if the user scans a device that wasn't previously paired to the vehicle

**Acceptance Criteria:**

Scanning/selecting an unpaired NFC Device during the MyKey flow shall cause the flow to exit and the HMI to display a pop-up stating "Device not paired to vehicle"

REQ-NFC-ES-196 NFC MyKey Creation waiting for Tap timeout

If after Starting the MyKey Creation process and having received "NFC MyKey - Ready for New MyKey" signal == "True", the Display System receives an "NFC MyKey - Creation Status" Message with "Mykey Creation Result" signal == "Unsuccessful – Timeout" it shall exit the “Create an NFC MyKey” flow and display an NFC Feature related center-stack pop-up which includes:

- Reason text: "Error - Timeout waiting for tap"

**Rationale**: MyKey Creation should exit if the user does not take an action within a specified timeframe after initiating the create flow

**Acceptance Criteria:**

Initiating the MyKey creation process and not scanning an NFC device within MyKey Creation Timer, it shall exit the MyKey create flow and display "error - timeout waiting for tap" message

REQ-NFC-ES-244 NFC MyKey Creation not allowed while MyKey in use

When a user presses the greyed out "Create NFC MyKey" Soft button while the following conditions are true:

- Current MyKey Level == MyKey

The Display System shall not initiate the “Create an NFC MyKey” flow and momentarily indicate that the Create NFC MyKey operation isn't allowed while a MyKey device is in use

\*HMI to determine exact verbiage of momentary pop-up

**Rationale**: MyKey user is not allowed to create additional MyKey devices

**Acceptance Criteria:**

## Personal Profiles Linking STM

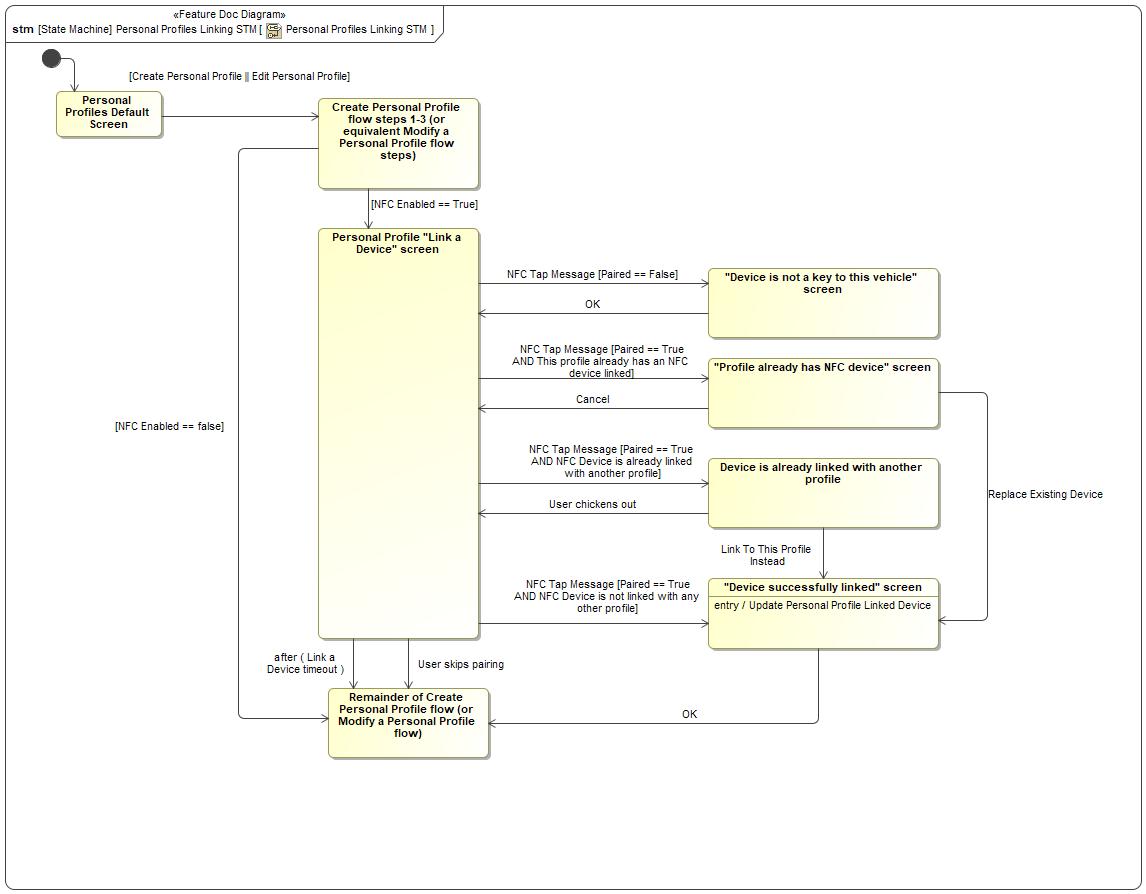


Figure 4: Personal Profiles Linking STM

### Personal Profiles Linking STM states

|  |  |
| --- | --- |
| **State** | **Requirements Reference** (optional) |
| "Device is not a key to this vehicle" screen | 575039769.jpg [REQ-NFC-ES-181](#_a8cbd88f9fbc4d4548a80738cc2cce71): invalid NFC device used |
| "Device successfully linked" screen | 575039769.jpg [REQ-NFC-ES-190](#_61515ad606035cff2c105b3e2d02e5b8): NFC device already linked to another Personal Profile -ON LINK current NFC to current Personal Profile option  575039769.jpg [REQ-NFC-ES-220](#_4222f117bb4a5e070a5715e68e908e07): Successful NFC Device link to current Personal Profile |
| "Profile already has NFC device" screen | 575039769.jpg [REQ-NFC-ES-199](#_ac2ad4407b471a9e2db07bc097967e14): Personal Profile already has NFC device Paired  575039769.jpg [REQ-NFC-ES-200](#_be74789896bc3a2dcaeff086852fdcfd): NFC Feature enabled on Display system  575039769.jpg [REQ-NFC-ES-202](#_fe4c66a9b44cd1acd2fb5b78cda3de82): Personal Profile already has NFC device Paired ON LINK current NFC to current Personal Profile option  575039769.jpg [REQ-NFC-ES-203](#_1d44824b786d66879cf37838411211a3): Personal Profile already has NFC device Paired ON LINK current NFC to different Personal Profile option |
| Create Personal Profile flow steps 1-3 (or equivalent Modify a Personal Profile flow steps) |  |
| Device is already linked with another profile | 575039769.jpg [REQ-NFC-ES-187](#_e14c9a4901d6ab98b5c34a3ebd741ccd): NFC device already linked to another Personal Profile  575039769.jpg [REQ-NFC-ES-191](#_2d08bbc308b8c3ee2c4f938350a50a78): NFC device already linked to another Personal Profile -ON LINK current NFC to different Personal Profile option |
| Personal Profile "Link a Device" screen |  |
| Personal Profiles Default Screen |  |
| Remainder of Create Personal Profile flow (or Modify a Personal Profile flow) |  |

Table 4: Operation Modes and States on Personal Profiles Linking STM

### Personal Profiles Linking STM requirements

REQ-NFC-ES-181 invalid NFC device used

If after the user has initiated the "Link a device" flow within the Personal Profiles menu, the display system receives an "NFC Tap" message with "Paired" status == False, the Display system shall skip the Profile to NFC Device pairing process and display an NFC Feature related center-stack pop-up which includes:

- Reason text: "Device is not a key to this vehicle"

**Rationale**: informs user that an invalid NFC device was used to link to a Personal Profile

**Acceptance Criteria:**

HMI exits profile pairing flow and displays dismiss-able pop-up indicating "Device is not a key to this vehicle"

REQ-NFC-ES-187 NFC device already linked to another Personal Profile

If after the user has initiated the "Link a device" flow within the Personal Profiles menu, the display system receives an "NFC Tap" message with "Paired" status == True, and "FESN" value that is already paired to a profile the Display system shall display an NFC Feature related center-stack pop-up which includes:

- Reason text: "Device is paired to another profile"

- Option to overwrite previous pairing

- Option to skip pairing

**Rationale**: inform USER that another Personal Profile already has the current NFC device linked to it.

**Acceptance Criteria:**

If during the profile pairing flow, an NFC Device that is already paired to a different profile is scanned/selected for pairing, the in-vehicle HMI shall inform the customer and then let them chose to either cancel the flow or overwrite the pairing

REQ-NFC-ES-190 NFC device already linked to another Personal Profile -ON LINK current NFC to current Personal Profile option

When if the user selects to "overwrite previous pairing" while in the "Link a device" flow within the Personal Profiles Menu, the Display System shall associte the selected profile with the "NFC Tap" message "FESN" value and display an NFC Feature related center-stack pop-up which includes:

- Reason text: "Device successfully paired to profile"

**Rationale**: Allow USER to link current NFC device to current profile.

**Acceptance Criteria:**

HMI exits profile pairing flow and displays dismiss-able pop-up indicating "Device successfully paired to profile"Target profile updated to indicate new device pairing

REQ-NFC-ES-191 NFC device already linked to another Personal Profile -ON LINK current NFC to different Personal Profile option

When the option "Link a different NFC device to current Personal Profile" is selected in the "Device is already linked with another profile" screen, the Display System shall transition back to "Personal Profile "Link a Device" screen.

Note: the "Personal Profile "Link a Device" screen wording or instructions may differ slightly from original screen, prioritizing requirements detailed in REQ. NFC Personal Profile Pairing process consistency

**Rationale**: Allow USER to link a different NFC device to current profile.

**Acceptance Criteria:**

Selecting to pair an NFC Device to a different profile shall enable the "Link a device" screen

REQ-NFC-ES-199 Personal Profile already has NFC device Paired

If the user has initiated the "Link a device" flow within the Personal Profiles menu for a Profile that already has an NFC Device associated to it, the Display system shall display an NFC Feature related center-stack pop-up which includes:

- Reason text: "Profile already associated to NFC Device"

- Option to overwrite previous pairing

- Option to skip pairing

**Rationale**: inform USER that this Personal Profile already has a NFC device linked to it.

**Acceptance Criteria:**

HMI displays dismissable pop-up indication "Profile already associated to NFC Device" with following options:- Option to overwrite previous pairing - Option to skip pairing

REQ-NFC-ES-200 NFC Feature enabled on Display system

The Display System shall support all of the NFC Feature specific functionality while the "NFC Enabled" configuration parameter of the Display System is set to "Enabled"

**Acceptance Criteria:**

NFC related Key Management Menu, MyKey selections, Profile Device Selections, and Centerstack Pop-ups enabled when NFC Enabled is true

REQ-NFC-ES-202 Personal Profile already has NFC device Paired ON LINK current NFC to current Personal Profile option

When the option "Link current NFC Device to current Personal Profile" is selected in the "Profile already has NFC device" screen, the Display System shall sequentially complete the following:

- Remove linkage of the current Personal Profile NFC device value property ESN

- Link the NFC tap message value property ESN to the current selected Personal Profile.

- transition to "Device successfully linked" screen.

**Rationale**: Allow USER to link current NFC device to current profile.

**Acceptance Criteria:**

HMI exits profile pairing flow and displays dismiss-able pop-up indicating "Device successfully paired to profile"Target profile updated to indicate new device pairing

REQ-NFC-ES-203 Personal Profile already has NFC device Paired ON LINK current NFC to different Personal Profile option

When the option "Link NFC Device to different Personal Profile" is selected in the "Profile already has NFC device" screen, the Display System shall transition back to "Personal Profile "Link a Device" screen.

Note: the "Personal Profile "Link a Device" screen wording or instructions may differ slightly from original screen, prioritizing requirements detailed in REQ. NFC Personal Profile Pairing process consistency

**Rationale**: Allow USER to link a different NFC device to current profile.

**Acceptance Criteria:** HMI returns to profile selection screen

REQ-NFC-ES-220 Successful NFC Device link to current Personal Profile

When the CONDITIONS below are met, the Display System shall display the "Device successfully linked " screen after completing the following sequential ACTIONS:

CONDITIONS:

- current screen == "Personal Profile "Link a Device" , AND

- NFC tap message signal "Paired" == True, AND

- NFC Tap Message "FESN" signal value not currently paired to any other Personal Profile AND

- Selected Personal Profile not already associated to an NFC device

ACTIONS:

- Link the current NFC tap message value property ESN to the current selected Personal Profile.

**Rationale**: Allow USER to link current NFC device to current profile.

**Acceptance Criteria:**

HMI exits profile pairing flow and displays dismiss-able pop-up indicating "Device successfully paired to profile"Target profile updated to indicate new device pairing

## Remove NFC Key Inner STM

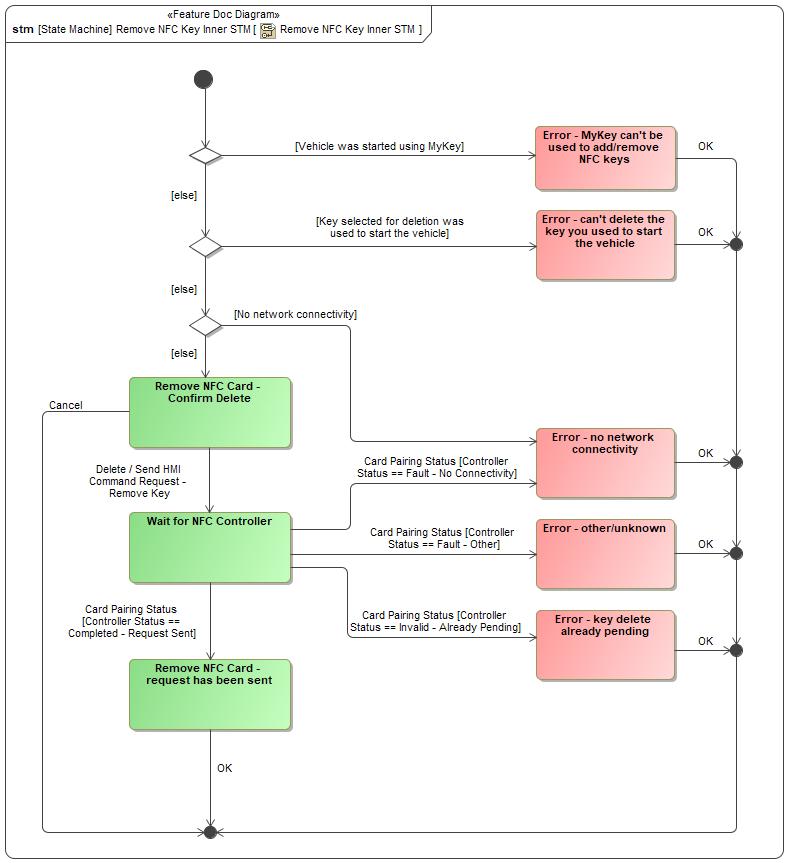


Figure 5: Remove NFC Key Inner STM

### Remove NFC Key Inner STM states

|  |  |
| --- | --- |
| **State** | **Requirements Reference** (optional) |
| Error - can't delete the key you used to start the vehicle | 575039769.jpg [REQ-NFC-ES-243](#_6d35e99dc7257d83cd569cccf2bb3886): Error Screen: Selecting "Delete Key" Button for key used to start the vehicle |
| Error - key delete already pending | 575039769.jpg [REQ-NFC-ES-351](#_3f5b1750a45223f0a290a9371af6a0d5): Error screen: Key delete already pending |
| Error - MyKey can't be used to add/remove NFC keys | 575039769.jpg [REQ-NFC-ES-175](#_b2861a1bc3b70e07b60de7db6da03d61): Error Screen: Attempting to add or delete a key when MyKey restrictions are active  575039769.jpg [REQ-NFC-ES-234](#_cf7c1cfd6f01cb1d417095b2f4ed0c9e): Error Screen: Selecting "Delete Key" Button When MyKey is Active |
| Error - no network connectivity | 575039769.jpg [REQ-NFC-ES-168](#_e4adc88a52b070e96d193dd37ca898b7): Display System: Error screen after user confirms NFC Key Card Delete request  575039769.jpg [REQ-NFC-ES-178](#_62c3cc488fd850b001dcc587679bbe59): Error Screen: Attempting to Add or Delete Keys When There Is No Network Connectivity |
| Error - other/unknown | 575039769.jpg [REQ-NFC-ES-352](#_b3239e0b260c81e5785736575c929bec): Error screen: Other Error during NFC Card Delete |
| Remove NFC Card - Confirm Delete | 575039769.jpg [REQ-NFC-ES-166](#_b289f99117f574e88f3f1f45e55329bd): Display System: Confirmation Screen when NFC Key Deletion is requested  575039769.jpg [REQ-NFC-ES-353](#_bf3a6b9e14c88f7644d603ac8963fc7f): Prompt screen: confirm NFC card pairing deletion - cancel action |
| Remove NFC Card - request has been sent | 575039769.jpg [REQ-NFC-ES-170](#_7cd59591ab363de44900b80ca99b61f2): Display System: Success screen after user confirms NFC Key Card Delete request |
| Wait for NFC Controller | 575039769.jpg [REQ-NFC-ES-169](#_4f197e865416cb787356c933792c1753): Prompt screen: confirm NFC card pairing deletion - actions when confirmed |

Table 5: Operation Modes and States on Remove NFC Key Inner STM

### Remove NFC Key Inner STM requirements

REQ-NFC-ES-166 Display System: Confirmation Screen when NFC Key Deletion is requested

When the user presses any of the "delete NFC card pairing" buttons/controls in the NFC key management interface, and all of the following are true:

* The vehicle has network connectivity
* The vehicle's modem is authorized
* The key selected for deletion is not the key that started the vehicle
* The key selected for deletion is not a factory key
* The vehicle's ignition is in RUN
* The key that started the vehicle is not a MyKey
* The "NFC Fleet Management Active" configuration parameter of the Center Stack Display System is False

then the Display System shall display a message asking the user to confirm deletion of the NFC card pairing.

The message should contain the friendly name and the card FESN of the pairing to be deleted.

**Rationale**: Requires user to confirm they really wanted to delete an NFC Key Card

**Acceptance Criteria:** Pressing delete button when preconditions are satisfied results in a confirmation prompt being displayed

REQ-NFC-ES-168 Display System: Error screen after user confirms NFC Key Card Delete request

If either of the following occurs:

* The user presses the "delete key" button for a paired NFC device while the vehicle does not have network connectivity
* While the Display System is displaying the "Wait for NFC Controller" screen in the NFC card delete flow, it receives a Card Pairing Status message with the "Controller Status" value set to "Fault - No Connectivity"

then the Display System shall display a message indicating that there is no network connectivity, and NFC keys can only be deleted from the vehicle when there is network connectivity.Dismissing this message shall return to the Unified Key Management Screen or the key information screen where the user pressed the delete button.

**Rationale**: Informs user that request to delete key has failed due to lack of network connectivity or because of a system timeout

**Acceptance Criteria:**

In-vehicle HMI shall not initiate NFC Device Delete request if there is no vehicle connectivity at the time of request

REQ-NFC-ES-169 Prompt screen: confirm NFC card pairing deletion - actions when confirmed

If the Display System is displaying the Remove NFC Card - Confirm Delete screen in the NFC card delete flow, and the user presses the Confirm button (or equivalent), the Display System shall:

* Transmit an HMI Command Request message with:
  + the FESN value set to the FESN of the card pairing the user has selected for deletion
  + the Friendly Name value empty/null
  + the Command Type value set to "Delete Pairing"
* Transition to the "Wait for NFC Controller" screen

**Rationale**: Informs user that request to delete key has been processed

**Acceptance Criteria:**

REQ-NFC-ES-170 Display System: Success screen after user confirms NFC Key Card Delete request

When the Display System is displaying the "Wait for NFC Controller" screen in the NFC key delete flow and it receives a Card Pairing Status message with the "Controller Status" value set to "Completed - Request Sent", it shall display a message indicating that a request to delete an NFC card pairing has been sent to the owner's phone for approval.

The message should indicate that the card is still usable to start and drive the vehicle until the deletion is approved by the owner.

Dismissing the message shall return the Display System to the Unified Key Management screen.

**Rationale**: Informs user that request to delete key has been sent successfully

**Acceptance Criteria:** Display System passes through "Wait for NFC Controller" state and displays a success message as above when the vehicle has connectivity

REQ-NFC-ES-175 Error Screen: Attempting to add or delete a key when MyKey restrictions are active

When the key that started the vehicle is a MyKey, and either of the following occurs:

A user presses the disabled "Add NFC Card" button on the Unified Key Management Screen

A user presses the disabled "Remove NFC Card" button (or equivalent) on the Unified Key Management Screen or a key info screen

the Display System shall display a message indicating that NFC card pairings and unpairings are not allowed while MyKey restrictions are active.

The message should inform the user that they need to shut off the vehicle and start it with a key that is not a MyKey in order to manage NFC card pairings.

Dismissing the message shall return the Display System to the Unified Key Management Screen.

**Rationale**: This screen informs the user that NFC cards cannot be added to the vehicle when MyKey is active.

**Acceptance Criteria:**

In-vehicle HMI will grey out "Add a Key" and key delete buttons when MyKey is in use; pressing the disabled buttons causes a message to display

REQ-NFC-ES-178 Error Screen: Attempting to Add or Delete Keys When There Is No Network Connectivity

When any of the following occurs:

* The user presses the "Add NFC Card" button on the Unified Key Management Screen and the vehicle has no network connectivity
* The user presses the "Delete NFC Card" button (or equivalent) on the Unified Key Management Screen or a NFC key info screen
* While the HMI is displaying the "Waiting for NFC Controller" screen in the NFC key add or NFC key delete flows, or the "Prompt for NFC card scan" screen in the NFC key add flow, it receives a Card Pairing Status message with the "Controller Status" value == "Fault - No Connectivity"

then the Display System shall display a message to the user indicating that there is no network connectivity, and NFC cards cannot be added or deleted when there is no network connectivity.

Dismissing this message shall return a user to the Unified Key Management Screen.

**Rationale**: User guidance when key adds are not allowed

**Acceptance Criteria:**

Pressing "Add a Key" button or any NFC key delete button within in-vehicle HMI shall not start the key pairing process and display a pop-up indicating vehicle has no connectivity

REQ-NFC-ES-234 Error Screen: Selecting "Delete Key" Button When MyKey is Active

When a user presses the greyed out "Delete NFC Key" Soft button while the following conditions are true:

- Current MyKey Level == MyKey

The Display system shall display a momentary pop-up to indicate the NFC Delete operation isnt allowed while a MyKey device is in use

**Rationale**: This screen informs the user that NFC cards cannot be deleted from the vehicle when MyKey is active.

**Acceptance Criteria:**

REQ-NFC-ES-243 Error Screen: Selecting "Delete Key" Button for key used to start the vehicle

When a user presses the "Delete Key" button for the key that was used to start the vehicle, the display system shall display a message indicating that the key that was used to start the vehicle cannot be deleted.

The message should instruct the user to start the vehicle with a different key in order to delete the key they are trying to delete.

Dismissing the message shall return the user to the Unified Key Management Screen or the key info screen that was displayed prior to pressing the delete button.

**Rationale**: This screen informs the user that NFC cards cannot be deleted from the vehicle when MyKey is active.

**Acceptance Criteria:** Pressing the delete button for the starting key causes this message to be displayed; delete flow does not proceed

REQ-NFC-ES-351 Error screen: Key delete already pending

When the Display System is displaying the "Wait for NFC Controller" screen in the NFC key delete flow and it receives a Card Pairing Status message with the "Controller Status" value set to "Invalid - Already Pending", it shall display a message indicating that a request to delete the card in question has already been sent.

The message should indicate that the user should check the owner's FordPass or Lincoln Way app to approve the deletion request.

Dismissing the message shall return the Display System to the Unified Key Management screen.

**Acceptance Criteria:** Attempting to delete the same key twice results in this message being displayed the second time

REQ-NFC-ES-352 Error screen: Other Error during NFC Card Delete

When the Display System is displaying the "Wait for NFC Controller" screen in the NFC key delete flow and it receives a Card Pairing Status message with the "Controller Status" value set to "Fault - Other", it shall display a message indicating that an unknown error prevented the NFC card deletion request from being sent.

Dismissing the message shall return the Display System to the Unified Key Management screen.

**Acceptance Criteria:**

REQ-NFC-ES-353 Prompt screen: confirm NFC card pairing deletion - cancel action

When the Display System is displaying the "Remove NFC Card - Confirm Delete" screen, and the user presses the "Cancel" button, the Display System shall return to the Unified Key Management Screen, or the screen that the user was on prior to pressing the delete button, and shall not send an HMI Command Request message.

**Acceptance Criteria:** Pressing "cancel" in key delete confirmation dialog returns to previous screen without delete request being sent

# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Revision | Date | Description | Responsible |
| 2020-05-22 | 5/22/2020 | Initial Functional Specification release for P708 UPV0 | abonnel1, fehsan2, ekarpins |
| 2020-08-24 | 8/24/2020 | Updated release for P708 UPV1 | abonnel1, fehsan2,  ekarpins |
| 2020-12-09 | 12/9/2020 | Section 2: Updated "Function Group Description" definition  Section 2.1: Added "Center Stack Display System Logical System Behavior" diagram  Section 2.2: Logical Properties, previously section 2.1.  Section 2.2.1.1: Config Parameters, previously 2.1.1.1. Updated list of Config parameters  Section 2.2.1.2: Added list of Runtime Variables  Section 2.3: Created Logical System Required. Added requirements to capture feedback align with UX and HMI teams feedback  Section 3.1: "Add NFC Key InnerSTM", previously "Display System". Updated State machine diagram for NFC Add flow, require user to scan after entering in friendly name  Section 3.1.1: "Add NFC Key InnerSTM States" table added  Section 3.1.2: "Add NFC Key InnetSTM Requirements" updated to match NFC Add Flow state machine  Section 3.2: "HMI" previously section 3.1 "Display System"  Section 3.2.1: "HMI States" table, updated state to requirements mapping  Section 3.2.2: "HMI Requirements" previously section 3.2.1 "Display System Requirements", modified/updated requirements for tie-in to Personal Profiles, MyKey, and NFC related HMI screens/pop-ups. Deleted requirements that were pulled in from other systems  Section 3.4.1: "Personal Profiles Linking STM States", updated States to requirements mapping  Section 3.4.2: "Personal Profiles Linking STM Requirements", requirements cleaned up  Section 3.5: "Remove NFC Key Inner STM". Updated State machine diagram for NFC Delete Flow, added missing states/errors  Section 3.5.1: "Remove NFC Key Inner STM states", updated States to requirements mapping  Section 3.5.2: "Remove NFC Key Inner STM Requirements", requirements updated to match NFC Delete Flow state machine  Section 5.1: "Data Dictionary" updated to capture more details and link to implementation level signals/messages | abonnel1, fehsan2,  ekarpins |

## Template Revisions

*#Important: Do not change this section*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version | Rev. | Date | Description | Responsible |
| *1* | *0* | *2016-02-26* | *Initial version, derived from FDS* | *Jbaden1* |
| *1* | *1* | *2016-02-26* | *Word properties corrected* | *Jbaden1* |
| *1* | *2* | *2016-03-10* | *Clean up of document meta data (Word properties)* | *Jbaden1* |
| *1* | *3* | *2016-03-22* | * *Footer formatting corrected (Issue 19)* * *“Constraints” chapter renamed to “Input Requirements” (Issue 20)* | *Jbaden1* |
| *1* | *4* | *2016-04-20* | * *Broken Wiki links repaired* | *Jbaden1* |
| *2* | *0* | *2016-06-10* | * *Document metadata adapted. Prepared for new macros* * *DTC table removed* * *HMI function added as a chapter (details still to be refined)* * *Signal / Parameter IDs column deleted interface tables* | *Jbaden1* |
| *2* | *1* | *2016-07-14* | * *Converted to SysML diagrams* * *HMI section further elaborated* * *Template version added to footer* * *Dedicated Startup / Shutdown sections removed (only hints added)* * *Data Dictionary reworked and Signal / Parameter IDs column re-introduced* | *Jbaden1* |
| *2* | *2* | *2016-12-07* | * *Minor formatting changes* | *Jbaden1* |
| *3* |  |  | *Skipped to synchronize with Specification\_Macros.dotm* |  |
| *4* |  |
| *5* | *0* | *2017-01-13* | * *Meta data updated for specification macros, version 3.1* * *SW Unit chapter removed for the time being* * *Green boxes added for user hints* | *Jbaden1* |
| *5* | *1* | *2017-01-18* | * *Some additional hints.* * *Hyperlinks highlighted in hints* | *Jbaden1* |
| *6* | *0* | *2017-04-28* | * *Editorial change. Hints added to chapter 4.1.4* * *Chapter “Traceability Matrix” removed* | *Jbaden1* |
| *6* | *0* | *2018-04-28* | * *CR69/63: New chapters added for Functional Safety (FTTI and Technical Safety Requirements)* * *CR53: New coversheet + additional meta-data* * *CR76: merge sections for configuration and for calibration parameters into one on Function Level* | *Jbaden1* |
| *6* | *0* | *2018-08-06* | * *CR66: Fix version numbering in footer of Function Spec* | *Jbaden1* |
| *6* | *0* | *2018-09-28* | * *Broken links to RE Wiki repaired* | *Jbaden1* |
| *6* | *0* | *2018-10-31* | * *Minor corrections on cover sheet and in footer to be more GIS compliant and VSEM aligned* * *“Overview” and “Description” exchanged in headings (following common sense)* | *Jbaden1* |
| *6* | *0* | *2018-11-12* | * *Explanatory text in Variants” section revised* * *Functional Safety modifications as agreed with FuSa core team (Baseline: November 2018 Dearborn On-Site)* | *Jbaden1* |
| *M* |  | *2019-04-02* | * *Initial version of SysML report template* | *snuesch* |
| *M* |  | *2019-04-05* | * *Improved dialog boxes to select function group* | *snuesch* |

# Appendix

## Data Dictionary

### Logical Messages

Device Entered Field

|  |  |
| --- | --- |
| **Name** | **Device Entered Field** |
| **Description** | To indicate that a device has entered within the detection range of an NFC Reader Antenna |
| **Realized by** | 203568040.jpg [Ext1\_Card\_Infield\_D\_Stat](#_779c7e28d1d2d017a1af869f259f9d9a) |

**Parameters/Owned Signals**

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| -1112196026.jpg Location | 588295951.jpg [NFC Location](#_04f138937398626aa163961575564324) | Whether a device was detected at an interior or exterior reader antenna's field |

Device Exited Field

|  |  |
| --- | --- |
| **Name** | **Device Exited Field** |
| **Description** | To indicate that a device has exited the detection range of an NFC Reader after being detected. |
| **Realized by** | 203568040.jpg [Ext1\_Card\_Infield\_D\_Stat](#_779c7e28d1d2d017a1af869f259f9d9a) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Location | 588295951.jpg [NFC Location](#_04f138937398626aa163961575564324) | Whether a device has exited the detection range of an interior or exterior reader antenna's field | -1901142228.jpg [Int1\_Card\_Infield\_D\_Stat](#_f233669323e458391a6bbd0fedae5f97) |

Enable/Disable NFC Feature

|  |  |
| --- | --- |
| **Name** | **Enable/Disable NFC Feature** |
| **Description** | This signal is a command to devices in the vehicle to either enable or disable that device's behavior related to the NFC Entry and Starting feature.  The device should enable or disable the feature behavior based on the value of the "Enable/Disable" property. |
| **Realized by** | -1901142228.jpg [EnableDisableFeature](#_2f4cb91a21290d756d359584b6e9cd9a) |

**Parameters/Owned Signals**

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| -1112196026.jpg Enable/Disable | 588295951.jpg [Enable/Disable](#_06469a52e99f70e843de2fa24844ca7c) | Whether the feature should be enabled or disabled on the target module |

HMI Command Request

|  |  |
| --- | --- |
| **Name** | **HMI Command Request** |
| **Description** | The message that is sent from the vehicle's Display System to the vehicle's NFC System when a retail user requests an NFC command using the in-vehicle HMI. Causes an "NFC Command Request - Retail" message to be sent to the Cloud Backend System by the NFC System. |
| **Realized by** | 798335834.jpg [NfcHmiCommandRequest](#_b7b0cfb7ecb6b4b3bbe1f173a5f6f80a) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Friendly Name | -838613092.jpg [String](#_4b6af07ce29fb6cdb5873c0376c54ad2) | In the case of a card add, the user-entered name for the NFC card to be added.  In the case of a card delete or a cancel command, null/unpopulated. | 798335834.jpg [NfcHmiCommandRequest](#_b7b0cfb7ecb6b4b3bbe1f173a5f6f80a) |
| -1112196026.jpg Requested Command Type | -391670801.jpg [HMI Card Request](#_0e01d1923f49c29c88302f67ce158275) | The action being requested (add, delete, cancel). | 798335834.jpg [NfcHmiCommandRequest](#_b7b0cfb7ecb6b4b3bbe1f173a5f6f80a) |
| -1112196026.jpg FESN | 588295951.jpg [FESN](#_078d7bcfb6a6e694cca749314bba989c) | If the Requested Command Type is Delete Key, the FESN of the NFC access card to be deleted. Otherwise, null. | 798335834.jpg [NfcHmiCommandRequest](#_b7b0cfb7ecb6b4b3bbe1f173a5f6f80a) |

Key Search Request

|  |  |
| --- | --- |
| **Name** | **Key Search Request** |
| **Description** | A message sent from the Body Control System to the NFC System to determine whether the NFC system is in the "starting authorized" state. This message is triggered by a number of user actions (pressing brake pedal, opening door, etc). |
| **Realized by** | -284636355.jpg [NfcKeySearchMessage\_ASIL](#_643e181a9243f4ba63d99f07b9439458) |

Key Search Response

|  |  |
| --- | --- |
| **Name** | **Key Search Response** |
| **Description** | The message that is sent by the NFC System to the Body Control System in response to a Key Search Request. This reply is sent whether or not the NFC System is in the starting authorized state. This message constitutes starting authorization when the Authorized runtime variable is True. |
| **Realized by** | -284636355.jpg [NfcKeySearchResponseMessage\_ASIL](#_cbd70a72b0354d4087989d6226b0efa0) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Authorized | -838613092.jpg [Boolean](#_cc312f59de173021fd2ee9302c245859) | Whether the NFC system authorizes starting. | 203568040.jpg [NfcDevcSearchBStat\_No\_Crc](#_9e67d3aa59abc3ec33ba5e18604b94bb)  203568040.jpg [NfcDevcSearchBStat\_No\_Cnt](#_609eba62b5dfc9949089239038862da6)  203568040.jpg [NfcDevcSearch\_B\_Stat](#_e218bcc3465d6b38884ec34665959447)  203568040.jpg [NfcDevcSearch\_No\_Actl\_ASIL](#_e1216f3cf95283e7249337d4d04e5b6d) |
| -1112196026.jpg Authorizing key | -838613092.jpg [Integer](#_45fe3d1dee4c068749b5cd5b2cc6e9c6) | If starting is authorized, the index of the NFC device that authorized starting. If starting is not authorized, undefined. | 203568040.jpg [NfcDevcSearchId\_No\_Actl](#_fafdec9231ed80245bc0c6f75884076e)  203568040.jpg [NfcDevcSearch\_No\_Actl\_QM](#_20d0aba072d95284dd1fee1810545433) |
| -1112196026.jpg Authorizing key type | 588295951.jpg [NFC Key Type](#_1f1f9a2d7e3a6cfcbfd11b447e494022) | The type of the NFC key that authorized starting (factory key, retail user key, fleet user key ). | 203568040.jpg [NfcDevcKeyType\_D\_Stat](#_433ee99325cdaa20b3b78d3d26aafade) |

Manufacturing Pairing Event

|  |  |
| --- | --- |
| **Name** | **Manufacturing Pairing Event** |
| **Description** | A signal emitted by the NFC System each time a manufacturing pairing event occurs. A manufacturing pairing event is when the NFC System attempts to add a new factory card pairing because it is in Factory Pairing Mode and a card is presented. This signal is used to trigger feedback behavior for the assembly technician (e.g., flashing the turn signals, or presenting a message in the cluster). |
| **Realized by** | 203568040.jpg [NfcDevcPair\_D\_Stat](#_1b457950e97944ea71dc6c9c69380de7) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Successful | -838613092.jpg [Boolean](#_cc312f59de173021fd2ee9302c245859) | Whether the detected NFC key card was paired successfully. | 203568040.jpg [NfcDevcPair\_D\_Stat](#_1b457950e97944ea71dc6c9c69380de7) |

Master Reset Command

|  |  |
| --- | --- |
| **Name** | **Master Reset Command** |
| **Description** | The signal that is emitted when a Master Reset event is triggered, whether it was triggered through the in-vehicle HMI or remotely (for fleets). This signal is used by the NFC System to trigger the NFC System's Master Reset behavior. |
| **Realized by** | 203568040.jpg [FactoryReset\_Rq](#_e746b6948430663af0dc5ff5f4a82604) |

Mobile App Approval Response

|  |  |
| --- | --- |
| **Name** | **Mobile App Approval Response** |
| **Description** | The message sent by the Mobile App that contains the user's decision on a specific approval request. |
| **Realized by** | -1901142228.jpg [Approval](#_76d9767d8a49b448b6931dcc00a33cb9) |

**Parameters/Owned Signals**

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| -1112196026.jpg Approval Response | 588295951.jpg [Retail Owner Approval Status](#_eecb029802a3c515da613cd8c5c50bed) | The approval response a Retail admin - user authorized to the vehicle's modem - can provide in response to receiving requests for adding or deleting NFC devices from their vehicle |
| -1112196026.jpg Payload ID | 588295951.jpg [Payload ID](#_34fedfda86b91515e5596927fff79c5a) | The payload ID associated with the specific device that is being either added to or deleted from the vehicle |

Modem Deauthorization

|  |  |
| --- | --- |
| **Name** | **Modem Deauthorization** |
| **Description** | We expect this signal to be sent when the vehicle's modem becomes deauthorized for any reason. |
| **Realized by** | 203568040.jpg [ModemAuthrz\_D\_Stat](#_fe5f5e329e168f5f8e1819ed1652b0a8) |

NFC Cloud Event

|  |  |
| --- | --- |
| **Name** | **NFC Cloud Event** |
| **Description** | This signal is transmitted from the NFC System to the Cloud Backend System when one of a number of different events occur on the vehicle. It is used to update the state of the Cloud Backend System to match the on-vehicle state, confirm the completion of remote commands, and log failure events for later analysis. |
| **Realized by** | 798335834.jpg [NfcSyncPTx](#_6f6397689b97417d4e799b3a2225edb5) |

**Parameters/Owned Signals**

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| -1112196026.jpg Event Type | 588295951.jpg [NFC Event Type](#_d1dd3f00ad6e8c211308d12cd22bc6a2) | The pass or fail status of the specific add/delete/enable/disable/master reset/modem deauth/factory key pairing action the vehicle took |
| -1112196026.jpg Associated FESN | 588295951.jpg [FESN](#_078d7bcfb6a6e694cca749314bba989c) | If there is a specific NFC key card FESN associated with the NFC event that occurred, this field contains that FESN. |
| -1112196026.jpg VIN | 588295951.jpg [VIN](#_7ea8b2b4f132d8365f356fe921250db5) | The Vehicle Identification Number of the originating vehicle |

NFC Cluster Message

|  |  |
| --- | --- |
| **Name** | **NFC Cluster Message** |
| **Description** | Message sent from the Body Control System to the Driver Information System that indicates which NFC-specific driver warning message should be displayed. |
| **Realized by** | 203568040.jpg [NfcDevc\_D\_Dsply](#_51dc0703c599ca301f20eec1a7047b4f) |

**Parameters/Owned Signals**

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| -1112196026.jpg Indication | 588295951.jpg [NFC Cluster Message](#_328cfb2fa25ca96d48b702a53ed7fb81) | Which message should be displayed on the cluster. |

NFC Command

|  |  |
| --- | --- |
| **Name** | **NFC Command** |
| **Description** | This message is transmitted from the Cloud Backend System to the NFC System to cause a command to be executed on the NFC System. |
| **Realized by** | 798335834.jpg [NfcSyncPRx](#_48c6700ef77c1df113f10add3303c059) |

**Parameters/Owned Signals**

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| -1112196026.jpg Command type | 588295951.jpg [NFC Command Type](#_b7f5812ac0dc15385e4b1a141b1feee0) | The specific command that is being issued to the NFC System. Always required. |
| -1112196026.jpg Command data | -466693025.jpg [Command Data](#_d6a2c76f6ef7f920e78a6b5215f87184) | The specific data required to complete the requested add/delete/enable/disable command |
| -1112196026.jpg Command origin | 588295951.jpg [Command Origin](#_5c37f2d4f20ac173c6889b1bd1971f37) | Whether the command originated from the vehicle, the fleet management system or a service tool |

NFC Command Request - Fleet

|  |  |
| --- | --- |
| **Name** | **NFC Command Request - Fleet** |
| **Description** | The message that is sent from the fleet management portal to the NFC Cloud Backend when a fleet manager or other fleet admin requests a command be issued to a fleet-managed NFC vehicle. |
| **Realized by** | -1901142228.jpg [NfcCommandRequest](#_fab17c9509911cf3021f4c29eae49b31) |

**Parameters/Owned Signals**

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| -1112196026.jpg FESN | 588295951.jpg [FESN](#_078d7bcfb6a6e694cca749314bba989c) | The Ford Electronic Serial Number for the NFC Card/Device either being added or deleted. N/A for Enable or Disable requests |
| -1112196026.jpg Friendly Name | 6260704.jpg [String](#_6d5039f98de394b145532000614ce69d) | The Friendly Name of the NFC Card/Device either being added or deleted. N/A for Enable or Disable requests |
| -1112196026.jpg Command type | 588295951.jpg [NFC Command Type](#_b7f5812ac0dc15385e4b1a141b1feee0) | The specific type of action being requested: Adding a Key, Deleting a Key, Disabling NFC feature on target module, Enabling NFC Feature on target module |
| -1112196026.jpg VIN | 588295951.jpg [VIN](#_7ea8b2b4f132d8365f356fe921250db5) | The Vehicle Identification Number of the vehicle the selected command is being requested for |

NFC Command Request - Retail

|  |  |
| --- | --- |
| **Name** | **NFC Command Request - Retail** |
| **Description** | The message that is sent from a vehicle to the NFC Cloud Backend when a retail user requests an NFC command using the in-vehicle HMI. |
| **Realized by** | 798335834.jpg [NfcSyncPTx](#_6f6397689b97417d4e799b3a2225edb5) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Local ID | 588295951.jpg [Local ID](#_15dcd7d11c2adf476a1062d69e3f7fd2) | Vehicle to NFC Device pairing ID that is generated by the vehicle at the time of a Retail NFC Device Add request. It is maintained until either the request is completed, rejected, or timed out. |  |
| -1112196026.jpg VIN | 588295951.jpg [VIN](#_7ea8b2b4f132d8365f356fe921250db5) | The vehicle identification number of the target vehicle |  |
| -1112196026.jpg FESN | 588295951.jpg [FESN](#_078d7bcfb6a6e694cca749314bba989c) | The Ford Electronic Serial Number for the NFC Card/Device either being added or deleted. |  |
| -1112196026.jpg Command type | 588295951.jpg [NFC Command Type](#_b7f5812ac0dc15385e4b1a141b1feee0) | The add, delete, enable or disable command being requested |  |
| -1112196026.jpg Friendly Name | -838613092.jpg [String](#_4b6af07ce29fb6cdb5873c0376c54ad2) | The user selected name for their NFC Device |  |

NFC Command Request - Service

|  |  |
| --- | --- |
| **Name** | **NFC Command Request - Service** |
| **Description** | The message that is sent from the service tool to the NFC Cloud Backend when a technician requests a command be issued to a vehicle's NFC System. |
| **Realized by** | -1901142228.jpg [NfcCommandRequest](#_fab17c9509911cf3021f4c29eae49b31) |

**Parameters/Owned Signals**

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| -1112196026.jpg Key Type | 588295951.jpg [NFC Key Type](#_1f1f9a2d7e3a6cfcbfd11b447e494022) | To identify whether the NFC Key/Device being selected for Add or Delete is a Factory Key, a Retail Key, or Fleet User Key. N/A for Enable or Disable requests |
| -1112196026.jpg FESN | 588295951.jpg [FESN](#_078d7bcfb6a6e694cca749314bba989c) | The Ford Electronic Serial Number for the NFC Card/Device either being added or deleted. N/A for Enable or Disable requests |
| -1112196026.jpg Friendly Name | 6260704.jpg [String](#_6d5039f98de394b145532000614ce69d) | The User friendly name of the NFC Card/Device either being added or deleted. N/A for Enable or Disable requests |
| -1112196026.jpg Command type | 588295951.jpg [NFC Command Type](#_b7f5812ac0dc15385e4b1a141b1feee0) | The specific type of action being requested: Adding a Key, Deleting a Key, Disabling NFC feature on target module, Enabling NFC Feature on target module |
| -1112196026.jpg VIN | 588295951.jpg [VIN](#_7ea8b2b4f132d8365f356fe921250db5) | The Vehicle Identification Number of the vehicle the selected command is being requested for |
| -1112196026.jpg Credentials |  | The Credential information tied to the specific service technician making the requests. |

NFC Device Detected

|  |  |
| --- | --- |
| **Name** | **NFC Device Detected** |
| **Description** | Updated and sent when an NFC Device is detected at a Reader |
| **Realized by** | 203568040.jpg [Ext1\_Card\_Infield\_D\_Stat](#_779c7e28d1d2d017a1af869f259f9d9a) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Location | 588295951.jpg [NFC Location](#_04f138937398626aa163961575564324) | Whether an NFC Device was detected at an interior or exterior reader | 203568040.jpg [Ext1\_Card\_Infield\_D\_Stat](#_779c7e28d1d2d017a1af869f259f9d9a) |
| -1112196026.jpg Device Type | 588295951.jpg [NFC Device Type](#_f5fee1cc2a20dbcb555c2ea2b4812e03) | The device type is defined by the authentication protocol supported by the device. Ford NFC Cards are devices that support the Ford-specific NFC authentication protocol. | 203568040.jpg [Ext1\_AID](#_606c2da1b320d77d6630ef5bb8230a21) |

NFC Devices List

|  |  |
| --- | --- |
| **Name** | **NFC Devices List** |
| **Description** | Carries the information used to populate the in-vehicle key management screens from the NFC System to the Display System. Sent upon request from the Display System. |
| **Realized by** | 798335834.jpg [NfcKeyList\_Rsp](#_b0485d6d5ca5c9ad7547b14eb51b1df3) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Pending NFC Devices | 1162323898.jpg [Local Pending Request Record](#_7c85e0eaf6d40f3ae137a88eb49f1b02) | Pairing requests (add or delete) that have been placed through the in-vehicle HMI and transmitted to the cloud backend, but not yet approved. | -1112196026.jpg [NumberOfItems](#_de6e9bfe576809213fc61bd5e0ebe3b8)  -1112196026.jpg [Record](#_e04005206ee78bf3e7737fec5ad87396) |
| -1112196026.jpg Active NFC Devices | 1162323898.jpg [Local Pairing Record](#_a0b7a210fca717b460c4faeb098575f6) | Completed pairings that are active on the vehicle. | -1112196026.jpg [NumberOfItems](#_de6e9bfe576809213fc61bd5e0ebe3b8)  -1112196026.jpg [Record](#_e04005206ee78bf3e7737fec5ad87396) |
| -1112196026.jpg Additional Key Storage Available | -838613092.jpg [Boolean](#_cc312f59de173021fd2ee9302c245859) | Whether or not the NFC Controller has capacity to store one or more additional NFC device pairings. | -1112196026.jpg [AdditionalKeyStorageAvailable](#_d0df9d2fe814020bc4bdcfff04063e1b) |
| -1112196026.jpg Maximum Pairings | -838613092.jpg [Integer](#_45fe3d1dee4c068749b5cd5b2cc6e9c6) | The value of the "Maximum Pairings" runtime variable on the NFC Controller. | -1112196026.jpg [MaximumPairings](#_aafa98ab55bdf9311a1fa68b4e8158a8) |
| -1112196026.jpg Fleet Management Active | -838613092.jpg [Boolean](#_cc312f59de173021fd2ee9302c245859) | Whether the NFC system is currently subscribed to (and being managed by) the fleet NFC management feature. | -1112196026.jpg [NfcFeatureMode](#_bdfc822a55f4cb07552b2fcd1847040f) |

NFC Local Event

|  |  |
| --- | --- |
| **Name** | **NFC Local Event** |
| **Description** | This is emitted by the NFC system whenever a valid command is received by the system, after the NFC System finishes executing the command. A valid command is one that is syntactically correct and has a valid signature from Ford.  For example, this signal is emitted during the process for creating a new NFC key card pairing, when the actual pairing command is received and executed by the NFC system.  Multiple systems on the vehicle consume this message to trigger behaviors when key changes occur: for example, when a key is added to the vehicle, the HMI system uses this signal to trigger a confirmation pop-up, and the Body Control System uses this signal as a trigger to clear the associated MyKey table entry. |
| **Realized by** | -284636355.jpg [NfcLocalEventMessage](#_ad8bce586c518412615e0f8635633913) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Command Type | 588295951.jpg [NFC Command Type](#_b7f5812ac0dc15385e4b1a141b1feee0) | The type of command that was completed (or not completed). | 203568040.jpg [NfcDevc\_D\_Cmd](#_e2b1229dbea424d177db3a4c82e10532)  -1112196026.jpg [CommandType](#_1fc5af7a63012ac8819aca3bd0659988) |
| -1112196026.jpg Successful | -838613092.jpg [Boolean](#_cc312f59de173021fd2ee9302c245859) | Whether the command in question was executed successfully by the NFC system. | 203568040.jpg [NfcDevc\_D\_Stat](#_2ed1fc89d3498a9780c01f42ccd6c36c)  -1112196026.jpg [Successful](#_4728ced2c7771f9ac37b2c96c273f27c) |
| -1112196026.jpg Key Index | -838613092.jpg [Integer](#_45fe3d1dee4c068749b5cd5b2cc6e9c6) | If the command relates to a specific key in the NFC system, this property indicates the NFC key index of that key. | 203568040.jpg [NfcDevcCmd\_No\_Actl](#_cdb5f16f41e835362e8eac9f9ce1d70b)  -1112196026.jpg [KeyIndex](#_c65a5a12fafef7a66fe8a66cc742aece) |
| -1112196026.jpg FESN | 588295951.jpg [FESN](#_078d7bcfb6a6e694cca749314bba989c) | If the command relates to a specific NFC key card, the FESN of that key card. Undefined otherwise. | -1112196026.jpg [CardFesn](#_864e995089e5a70e3f914c297f516546) |

NFC MyKey - Creation Status

|  |  |
| --- | --- |
| **Name** | **NFC MyKey - Creation Status** |
| **Description** | Transmitted from the Body Control System to the Display System to provide feedback on the state of the Body Control System during a MyKey creation operation. |
| **Realized by** | 203568040.jpg [NfcMyKeyCreate\_D\_Stat](#_c69fffb73a88fcdd4fa3be0f5313db72) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg NFC MyKey Creation Status | 588295951.jpg [NFC MyKey Creation Result](#_1f830bfa3b3919be73d531a9190335d2) | A signal from the Body Control System indicating the status of a MyKey creation operation. | 203568040.jpg [NfcMyKeyCreate\_D\_Stat](#_c69fffb73a88fcdd4fa3be0f5313db72) |

NFC MyKey - Ready For New MyKey

|  |  |
| --- | --- |
| **Name** | **NFC MyKey - Ready For New MyKey** |
| **Description** | This signal is sent from the Body Control System to the HMI system to indicate that the request for MyKey creation was received, and the Body Control System will make the next scanned NFC device a MyKey. |
| **Realized by** | 203568040.jpg [NfcMyKeyCreate\_D\_Stat](#_c69fffb73a88fcdd4fa3be0f5313db72) |

NFC MyKey - Wait for New MyKey

|  |  |
| --- | --- |
| **Name** | **NFC MyKey - Wait for New MyKey** |
| **Description** | This signal is sent from the HMI system to the Body Control System when the user requests MyKey creation. The signal indicates that the Body Control System should make the next NFC device scanned a MyKey. |
| **Realized by** | 203568040.jpg [NfcMyKeyCreate\_D\_Rq](#_4221a5d7ad216fd9a8b902f42a976794) |

NFC Tap Message

|  |  |
| --- | --- |
| **Name** | **NFC Tap Message** |
| **Description** | This message is emitted by the NFC system every time a transaction is completed with any compatible NFC device (Ford NFC key card or CCC-compliant smart device). This includes non-authorized devices - scanning a device that is not paired with the vehicle will still generate an NFC Tap.  This message is consumed by multiple systems in the vehicle to trigger behaviors when an NFC device is tapped. For example, the Body Control System uses this message to trigger vehicle locking/unlocking on an exterior device tap. |
| **Realized by** | 203568040.jpg [NfcDevcTap\_No\_Rq\_ASIL](#_3bc8636a3fa04f4e5a8b80a131301ff6) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Paired | -838613092.jpg [Boolean](#_cc312f59de173021fd2ee9302c245859) | Whether the device that was scanned is authorized to this vehicle (i.e., it is paired). True if the device was authorized. | 203568040.jpg [NfcDevcTapPard\_B\_Stat](#_9bde2362728b1f96f1741ae2cf94a48b)  203568040.jpg [NfcTapMessage\_ASIL\_No\_Crc](#_7f221299da751e77a4c5f8a23fd5de0a)  203568040.jpg [NfcTapMessage\_ASIL\_No\_Cnt](#_798a55bb334341f2d8a4ddb980b31ffd) |
| -1112196026.jpg Tap Duration | 588295951.jpg [NFC Tap Duration](#_326b501484014816e2087999dfff6ee9) | Whether the user performed a short tap or a long tap. A short tap occurs whenever an NFC device was held at the reader for any duration long enough to perform a transaction. A separate NFC Tap message is emitted with Tap Duration = Long Tap if the user continues to hold the device at the reader for longer than the long tap threshold (a second or two). | 203568040.jpg [NfcDevcTapDur\_D\_Stat](#_8297bb1e903fad1daa143bb39ad37c5f) |
| -1112196026.jpg Location | 588295951.jpg [NFC Location](#_04f138937398626aa163961575564324) | The location of the NFC reader where the tap event occurred. | 203568040.jpg [NfcDevcDetct\_D\_Stat](#_630b9597afb514aac1a6553f4db6067a) |
| -1112196026.jpg Key Index | -838613092.jpg [Integer](#_45fe3d1dee4c068749b5cd5b2cc6e9c6) | The internal index of the NFC key that was tapped, if that key was authorized to the vehicle. If the key was not authorized, this value is undefined. | 203568040.jpg [NfcDevcTapId\_No\_Actl](#_b4b202ffdde2cb915ce0394386d2e206) |

Provisioning Alert

|  |  |
| --- | --- |
| **Name** | **Provisioning Alert** |
| **Description** | Alert that is sent up from the vehicle through its modem at the time of manufacturing or module swap, used to associated the NFC System with the vehicle within the cloud |
| **Realized by** | 798335834.jpg [PeripheralProvisioningData\_St](#_a9333219994cb56b8db5af5fc6e40cfd) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Module FESN | 588295951.jpg [FESN](#_078d7bcfb6a6e694cca749314bba989c) | The NFC System's Module specific Ford Electronic Serial Number | -1112196026.jpg [SyncPPacket](#_ed84bbedb8e037d261850402a23dfa44)  798335834.jpg [PeripheralProvisioningData\_St](#_a9333219994cb56b8db5af5fc6e40cfd) |
| -1112196026.jpg VIN | 588295951.jpg [VIN](#_7ea8b2b4f132d8365f356fe921250db5) | The VIN of the vehicle that is sending the provisioning alert. |  |
| -1112196026.jpg Paired Card FESN | 588295951.jpg [FESN](#_078d7bcfb6a6e694cca749314bba989c) | The FESN(s) of any NFC cards that were paired with the NFC Controller during Factory Pairing Mode. | -1112196026.jpg [SyncPPacket](#_ed84bbedb8e037d261850402a23dfa44)  798335834.jpg [PeripheralProvisioningData\_St](#_a9333219994cb56b8db5af5fc6e40cfd) |

Request NFC Devices List

|  |  |
| --- | --- |
| **Name** | **Request NFC Devices List** |
| **Description** | A message sent from the Display System to the NFC Controller to request that the NFC Controller transmit a list of active and pending key pairings. |
| **Realized by** | 798335834.jpg [NfcKeyList\_B\_Rq](#_2a3fd95c2d00cf1c5cecca95684a2c29) |

Retail User Approval Request

|  |  |
| --- | --- |
| **Name** | **Retail User Approval Request** |
| **Description** | The message that is transmitted from the Cloud Backend System to the Mobile App to prompt the retail owner to approve or deny a request that was created using the in-vehicle HMI. |
| **Realized by** | -1901142228.jpg [RetailUserApprovalRequest](#_21cdfe32f9e0dd70460ab00ccae364b9) |

**Parameters/Owned Signals**

|  |  |  |
| --- | --- | --- |
| **Name** | **Type** | **Description** |
| -1112196026.jpg VIN | 588295951.jpg [VIN](#_7ea8b2b4f132d8365f356fe921250db5) | The Vehicle Identification Number of the vehicle the selected command is being requested for |
| -1112196026.jpg Card FESN | 588295951.jpg [FESN](#_078d7bcfb6a6e694cca749314bba989c) | The Ford Electronic Serial Number for the NFC Card/Device either being added or deleted. |
| -1112196026.jpg Request Type | 588295951.jpg [NFC Command Type](#_b7f5812ac0dc15385e4b1a141b1feee0) | The specific type of action being requested: Adding a Key, Deleting a Key |
| -1112196026.jpg Key Friendly Name | -838613092.jpg [String](#_4b6af07ce29fb6cdb5873c0376c54ad2) | The user friendly name of the NFC Card/Device either being added or deleted. |
| -1112196026.jpg Payload ID | 588295951.jpg [Payload ID](#_34fedfda86b91515e5596927fff79c5a) | Unique pairing ID that is created and maintained on the cloud side to keep track of vehicle to NFC Device pairings. |

Retail User Approval Result

|  |  |
| --- | --- |
| **Name** | **Retail User Approval Result** |
| **Description** | This message is sent from the Cloud Backend System to the vehicle to notify the vehicle of the result of a previously requested NFC command. The message is only transmitted if the request has failed, timed out, or been denied -- if the request is approved, the vehicle is notified with an NFC Command Message. |
| **Realized by** | 798335834.jpg [NfcSyncPRx](#_48c6700ef77c1df113f10add3303c059) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Request Status | 588295951.jpg [Retail Owner Approval Status](#_eecb029802a3c515da613cd8c5c50bed) | The state of the specified approval request. | -1112196026.jpg [NfcSyncPRxPacket](#_3a6ae346100787312464f4264310e2f0)  798335834.jpg [NfcSyncPRx](#_48c6700ef77c1df113f10add3303c059)  -1112196026.jpg [Opcode](#_dde0016853320c6e5c7ea22e98859f2d) |
| -1112196026.jpg Payload ID | 588295951.jpg [Payload ID](#_34fedfda86b91515e5596927fff79c5a) | The payload ID associated with the specific device that is being either added to or deleted from the vehicle | -1112196026.jpg [NfcSyncPRxPacket](#_3a6ae346100787312464f4264310e2f0)  798335834.jpg [NfcSyncPRx](#_48c6700ef77c1df113f10add3303c059) |
| -1112196026.jpg Local ID | 588295951.jpg [Local ID](#_15dcd7d11c2adf476a1062d69e3f7fd2) | The Local ID originally generated by the vehicle and sent with the original command request. Used by the vehicle to correlate requests with replies. | -1112196026.jpg [NfcSyncPRxPacket](#_3a6ae346100787312464f4264310e2f0)  798335834.jpg [NfcSyncPRx](#_48c6700ef77c1df113f10add3303c059) |

Service Tool Event

|  |  |
| --- | --- |
| **Name** | **Service Tool Event** |
| **Description** | A message sent by the service tool to the cloud backend, indicating that a vehicle has completed a command that was given to it by the service tool. |
| **Realized by** | -1901142228.jpg [EventType](#_9765104746d3a81b7515c91df7d0fb0a) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Event Type | 588295951.jpg [NFC Event Type](#_d1dd3f00ad6e8c211308d12cd22bc6a2) | The type and outcome of the event that the service tool is reporting. |  |

Start Button Press

|  |  |
| --- | --- |
| **Name** | **Start Button Press** |
| **Description** | This signal is emitted by some part of the vehicle whenever the START/STOP button is pressed by a user. |
| **Realized by** | 203568040.jpg [Ignition\_Status](#_62cb5c224771d1640f9e7846cc2d6042) |

Starting Authorized Status Indication

|  |  |
| --- | --- |
| **Name** | **Starting Authorized Status Indication** |
| **Description** | This message is continuously emitted by the NFC system, and indicates the current starting authorization status of the NFC system. It is consumed by the Body System in order to determine whether the "key not found" or "ready to start" cluster messages should be displayed. |
| **Realized by** | 203568040.jpg [NfcDevcAuthrz\_B\_Stat](#_7a79721caca0c008b72504325d5c2add) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Indication | -838613092.jpg [Boolean](#_cc312f59de173021fd2ee9302c245859) | True if the NFC system is currently in the "starting authorized" state. | 203568040.jpg [NfcDevcAuthrz\_B\_Stat](#_7a79721caca0c008b72504325d5c2add) |

Trigger Deauthorization

|  |  |
| --- | --- |
| **Name** | **Trigger Deauthorization** |
| **Description** | Trigger Deauthorization is a signal sent from the Body Control System to the NFC System to cause the NFC System to exit the Starting Authorized state when either of the follow conditions occur:  - A vehicle is started  - An exterior door lock occurs |
| **Realized by** | 203568040.jpg [NfcDevcAuthrzT\_B\_Rq](#_35bed76a2985cdf925d90787339f391b) |

Trigger Reauthorization

|  |  |
| --- | --- |
| **Name** | **Trigger Reauthorization** |
| **Description** | Message is updated and sent to reauthorize a device on system wake-up, if it had been left on the reader prior to wake-up |
| **Realized by** | -1901142228.jpg [TriggerReauthorization](#_480af2d8311e878f0975aa5498da27fb) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Location | 588295951.jpg [NFC Location](#_04f138937398626aa163961575564324) | Whether the device was detected at an Interior or Exterior reader | -1901142228.jpg [TriggerReauthorization](#_480af2d8311e878f0975aa5498da27fb) |

Vehicle Cluster Message

|  |  |
| --- | --- |
| **Name** | **Vehicle Cluster Message** |
| **Description** | Existing message sent from the Body Control System to the Driver Information System that causes specific warning messages to be displayed on the cluster. |
| **Realized by** | 203568040.jpg [ImmoMsgTxt\_D\_Rq](#_ba5038243cec7ab82d9db246c275f945) |

**Parameters/Owned Signals**

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Type** | **Description** | **Realized By** |
| -1112196026.jpg Indication |  | Which message should be displayed on the cluster. | 203568040.jpg [ImmoMsgTxt\_D\_Rq](#_ba5038243cec7ab82d9db246c275f945) |

### Logical Parameters

MyKey Creation Body Control System Response Timeout

|  |  |
| --- | --- |
| **Parameter Name** | **MyKey Creation Body Control System Response Timeout** |
| **Description** | The duration that the Display System will wait to receive a response from the Body Control System indicating that it is ready/allowing for MyKey creation  Default value = 30 seconds |
| **Owner** | -1109846592.jpg  Center Stack Display System |
| **Type** | period duration |
| **Implementation Element** |  |

NFC Card Add NFC Controller Response Timeout

|  |  |
| --- | --- |
| **Parameter Name** | **NFC Card Add NFC Controller Response Timeout** |
| **Description** | The maximum duration that the Center Stack Display System will wait for a response from the NFC Controller after it sends an HMI Command Request. If no response is received, the Center Stack Display System will display an error. |
| **Owner** | -1109846592.jpg  Center Stack Display System |
| **Type** | period duration |
| **Implementation Element** | -1206630552.jpg [NfcControllerResponseTimeout](#_3cb895d5b7e605722e0a964d7e76d808) |

### Logical Data Types (encodings)

588295951.jpg Build config

Whether a particular vehicle was ordered by a fleet using their FIN code ("fleet" value).

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Retail | The vehicle was not built with a FIN code. |
| Fleet | The vehicle was built with a FIN code assigned to it. |

-391670801.jpg Card Pairing Status

The possible values of the "Controller Status" value in the Card Pairing Status message sent from the NFC System to the Display System during card pairing request creation.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Waiting for Card Tap | The add request has been received, and NFAM is waiting for the user to scan the card that they want to pair. |
| Fault - No Connectivity | The add or delete request cannot be accepted because there is no network connectivity. |
| Completed - Request Sent | The NFC Controller has received the user input and successfully transmitted the request to the cloud. |
| Fault - Timed Out | The add request is rejected because no NFC card was scanned before the timeout expired. |
| Idle | The NFC Controller is not in any pairing request creation process. |
| Fault - No Capacity | The add request cannot be accepted because there is not capacity on the NFC Controller to store another card pairing. (For the purposes of this determination, pending pairing requests count against the maximum number of pairings.) |
| Fault - Other | The add or delete request cannot be accepted or completed because of some error that does not fall into another category. |
| Invalid - Already Pending | The last scanned card cannot be the subject of the add request because an add request is already outstanding for this card. NFAM will continue listening for unpaired card scans. |
| Invalid - Already Paired | The last scanned card cannot be the subject of the add request because it is already paired with the vehicle. NFAM will continue listening for unpaired card scans. |

588295951.jpg Command Origin

The entity that caused an NFC command to be issued.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Service tool | A service tool with NFC service functions. |
| Fleet management service | The fleet web management interface, or a 3rd-party interface that has been granted API access to the fleet web management interface. |
| Retail user | A retail user, through the vehicle's built-in HMI. |

-838613092.jpg Credentials

The identifying credentials that a service technician uses to log in to the Ford service tool.

-838613092.jpg Door Lock Status

The status of a vehicle's door locks.

*Realized by implementation element:*

203568040.jpg [Veh\_Lock\_Status](#_d771c278124825c9e9b38c7367ded52e)

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| All Locked | All vehicle doors are locked |
| Driver Door Unlocked | The last command issued to the vehicle's power door locks was to unlock the driver door. |
| All Double Locked | The last command sent to the vehicle's electric door locks was to double-lock all of the doors. |
| All Unlocked | All vehicle doors are unlocked |

588295951.jpg Enable/Disable

Whether the feature should be enabled or disabled.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Enable | The feature should be enabled. |
| Disable | The feature should be disabled. |

588295951.jpg FESN

A Ford Electronic Serial Number.

-391670801.jpg HMI Card Request

Type for command requests made from the Display System to the NFC Controller.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Add Card |  |
| Delete Card | Requests an NFC pairing be deleted. |
| Cancel Request | Exits the add-card flow before the request is sent to the backend. Not applicable to card delete operation. |

-391670801.jpg Ignition Status

The state of the vehicle's ignition.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Off | Vehicle ignition is OFF |
| Run/Start | Vehicle ignition is in Run/Start (Run position after engine has been started) |
| Accessory | Vehicle ignition is in Accessory (or Run position without engine started) |

588295951.jpg Local ID

The identifier generated by an NFC-enabled vehicle locally when an NFC command request is created using the onboard HMI.

This value is returned by the cloud backend system in traffic that corresponds to that particular command request, along with the cloud-generated Payload ID, in order to allow the vehicle to correlate the Local ID and Payload ID.

-838613092.jpg Locking Request

A request issued to the Body Control System's Power Locks Arbitrator, requesting a lock or unlock of the vehicle's doors. The exact behavior that this request triggers may vary based on the vehicle's configuration parameter and state.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Unlock | To indicate when a central unlock command is transmitted |
| Lock | To indicate when a central lock command is transmitted |

-838613092.jpg Locking Requestor

Status of how the vehicle was previously locked

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Interior trim switch | Vehicle was locked using the interior trim switch |
| Else | Vehicle was locked not using the interior trim switch |

-838613092.jpg Locking Source

The originator of a locking request.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| NFC Tap | Locked the vehicle using an exterior nfc reader |
| Interior Trim Switch | Locked the vehicle using the interior trim switch |
| Phone as a Key | Locked the vehicle from the exterior using a Phone as a key device |
| Keyfob | Locked from the exterior using a passive KeyFob |
| Door Cylinder | Locked from the exterior using a mechanical key |

-838613092.jpg MyKey Level

The active MyKey Level of a specific vehicle starting device while it is in use

*Realized by implementation element:*

203568040.jpg [AdminMyKeyTot\_No\_Actl](#_ec2268a228ddfefb4c79482325b3ee61)

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| MyKey | A vehicle was started with a device that has MyKey restrictions in place |
| Standard Key | A vehicle was started with a device that does not have MyKey restrictions in place |
| N/A | MyKey Level cannot be determined |

588295951.jpg NFC Cluster Message

The NFC feature-related messages that can be displayed in the vehicle's cluster.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Scan Digital Key To Drive | Cluster message prompting the user to scan an authorized NFC device in order to start or drive the vehicle |
| To Drive Press Brake And Start Button | Cluster message prompting the user to start the vehicle after they have scanned their NFC device |
| Null | No NFC feature-related indication requested. |
| Scan Digital Key And Press Brake To Shift Gear | Cluster message prompting the user to scan an NFC device in order to exit Secure Idle or Remote Start |
| Digital Key Programming Successful | Cluster message indicating that an attempt to pair an NFC device while in Factory Pairing Mode was successful |
| Digital Key Programming Fault | Cluster message indicating that an attempt to pair an NFC device while in Factory Pairing Mode has failed |

588295951.jpg NFC Command Type

The types of commands that can be issued by the NFC Cloud Backend System to the NFC System.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Add Key | Create a new pairing on a vehicle with the specified NFC key. |
| Delete Key | Remove a specific NFC key pairing. |
| Disable NFC Feature | Completely disable the NFC feature on the NFC system and related functionality on other systems. |
| Enable NFC Feature | Enable the NFC feature on the NFC system and related functionality on other systems. |
| Request Key List | Transmit the list of paired and pending NFC keys to the cloud backend. |

588295951.jpg NFC Device Type

The device type is defined by the authentication protocol supported by the device. Ford NFC Cards are devices that support the Ford-specific NFC authentication protocol.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Ford NFC Card | A Ford provided NFC Card |
| CCC Smart Device | A smart device i.e. mobile phone or wearable |

588295951.jpg NFC Event Type

The NFC System's response to completing or attempting a specific device management, or configuration related request

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Key Pair - Success | The NFC System has received a key pairing command and executed it successfully. The key in question can now be used to access the vehicle. |
| Key Pair - Failure | The NFC System has received a key pairing command, but could not execute it successfully for some reason. The key in question may, but likely cannot, be used to access the vehicle. |
| Key Unpair - Success | The NFC System has received a key unpairing command and executed it successfully. The key in question can no longer be used to access the vehicle. |
| Key Unpair - Failure | The NFC System has received a key unpairing command but could not execute it successfully for some reason. The key in question can likely still be used to access the vehicle, but is not guaranteed to. |
| Enable Feature - Success | The NFC System received a command to enable the NFC feature behavior, and it was executed successfully. |
| Disable Feature - Failure | The NFC System received a command to disable the NFC feature behavior, but it could not be executed successfully for some reason. The NFC System is in an undefined state. |
| Enable Feature - Failure | The NFC System received a command to enable the NFC feature behavior, but it could not be executed successfully for some reason. The NFC System is in an undefined state. |
| Disable Feature - Success | The NFC System received a command to disable the NFC feature behavior, and it was executed successfully. |
| Master Reset - Success | The NFC System received a Master Reset signal locally on the vehicle, and successfully performed all of the appropriate actions in response (e.g., deleting keys). |
| Master Reset - Failure | The NFC System received a Master Reset signal locally on the vehicle, but one or more of the actions performed in response to the Master Reset event did not complete successfully. The NFC system is in an undefined state. |
| Modem Deauthorization - Success | The NFC System received a modem deauthorization event signal locally on the vehicle, and successfully performed all of the appropriate actions in response (e.g., deleting keys). |
| Modem Deauthorization - Failure | The NFC System received a modem deauthorization event signal locally on the vehicle, but one or more of the actions performed in response to the modem deauthorization event event did not complete successfully. The NFC system is in an undefined state. |
| Manufacturing Key Pairing - Success | The NFC System has successfully paired an NFC Device to the vehicle while it was in the "Factory programming allowed" state, during assembly. |

588295951.jpg NFC Key Type

The categories of keys that can exist in the NFC System.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Factory Key | NFC Card/device that was paired to the vehicle during assembly |
| Retail User Key | NFC Card/device that was programmed to the vehicle using the in-vehicle controls, (fleet management feature not active) |
| N/A | Key type cannot be determined |
| Fleet User Key | NFC Card/device that was remotely programmed to the vehicle while it was enrolled in the fleet management feature |

588295951.jpg NFC Location

The possible locations where an NFC tap event can occur.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Interior Reader | An NFC reader that can be accessed from the interior of the vehicle. |
| Exterior Reader | An NFC reader that can be accessed from the exterior of the vehicle with the doors locked. |

588295951.jpg NFC MyKey Creation Result

The possible outcomes of an NFC MyKey creation operation.

*Realized by implementation element:*

203568040.jpg [AdminMyKeyTot\_No\_Actl](#_ec2268a228ddfefb4c79482325b3ee61)

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Successful | The MyKey creation was successful. |
| Unsuccessful - Already MyKey | The creation of the specified MyKey was unsuccessful because it is already configured as a MyKey. |
| Unsuccessful - Timeout waiting for tap | The driver did not take any additional actions for a set time (30 seconds by default) after initiating the MyKey creation process |
| Unsuccessful - Device not paired to vehicle | The device targeted for MyKey programming is not programmed to the vehicle |

-838613092.jpg NFC Pairing Status

The possible states that an NFC card pairing can exist in on the Cloud Backend System.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Creation Requested | For a retail pairing, the pairing has been requested by a user from the in-vehicle HMI, but it has not yet been approved by the retail owner. |
| Active | The pairing has been transmitted to the vehicle, and the vehicle has confirmed that the pairing was created successfully. There is no deletion pending. The associated NFC card should be usable to open and start the vehicle. |
| Faulted | An exception occurred during the creation or deletion of this pairing. |
| Deletion Requested | For a retail card pairing, a retail user has requested deletion of this pairing through the in-vehicle HMI, but the retail owner has not yet approved the deletion request.  Fleet and factory pairings never exist in this state, because they do not require approval.  When a pairing is in this state, the associated NFC card should still be usable to unlock and start the vehicle. |
| Pending Creation | The pairing is in the process of being transmitted to the vehicle and created onboard, but the vehicle has not yet confirmed that the pairing was created successfully.  For retail pairings, this implies that the pairing was approved by the retail owner. This is the first state for pairings that are created through the FCS cloud backend or the service tool, because pairings created through these channels do not require approval.  When a pairing is in this state, the associated NFC card may or may not be usable to unlock and start the vehicle. |
| Pending Deletion | The pairing, which was previously active on the vehicle, is in the process of being removed from the vehicle, but the vehicle has not yet confirmed that it successfully removed the pairing. The deletion command may or may not have been transmitted to the vehicle.  For retail user pairings, this state implies that the retail owner has approved the deletion request. Fleet user pairings and factory pairings enter this state as soon as a deletion request is created, because changes to these types of pairings do not require approval.  When a pairing is in this state, it may or may not be usable to unlock and start the vehicle. |

-838613092.jpg NFC System Factory Pairing State

The states that the NFC system can exist in re: factory pairing behavior. When the NFC system is in Factory Pairing Mode, it will pair with any valid card presented, without backend authorization.

*Realized by implementation element:*

203568040.jpg [LifeCycMde\_D\_Actl](#_5537c25172251778e8bc7682648b9a83)

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Factory Pairing Mode | The NFC System is in Factory pairing mode, where it can accept card pairings without requiring Ford Backend authorization |
| Normal Operation Mode | The NFC System is not in Factory pairing mode, and requires vehicle level and Ford Backend authorization in order to add or remove NFC Devices from the vehicle |

588295951.jpg NFC Tap Duration

The logical duration of a detected tap at one of the vehicle's NFC readers.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Short Tap | NFC Device was detected, authenticated, and kept within the readers range for less than 1 second |
| Long Tap | NFC Device was detected, authenticated, and kept within the readers range for 1-2.5 seconds |

588295951.jpg Payload ID

The identifying value of an NFC command generated by the Ford cloud backend system.

588295951.jpg Retail Owner Approval Status

The possible states of a request for approval from a retail owner (such as a request to add a key).

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Pending | The retail owner has not taken an action on the request, and the request timeout has not expired. |
| Timed out | The request timeout expired without the retail owner taking any action. |
| Approved | The retail owner explicitly approved the request. |
| Denied | The retail owner explicitly denied the request. |

-391670801.jpg Secure Idle Status

The state of the vehicle's Secure Idle feature.

**Encoding** **values**

|  |  |  |
| --- | --- | --- |
| **Enumeration Value** | **Enumeration Value Description** | |
| Secure Idle Active | The vehicle is locked in secure idle - cannot shift out of park while vehicle is running |
| Secure Idle Inactive | The vehicle has exited secure idle - vehicle can shift out of Park while vehicle is running |
| Secure Idle Unknown | State of secure idle cannot be determined |

-838613092.jpg UID

The Unique Identifier of an NFC device, as defined in ISO 14443.3.

588295951.jpg VIN

A Vehicle Identification Number in 17-character FMVSS 115 or ISO 3779 format.

### Technical Signals

#### GSDB Signals

AdminMyKeyTot\_No\_Actl

|  |  |
| --- | --- |
| **Signal Name** | **AdminMyKeyTot\_No\_Actl** |
| **Description** | Provides indication status of how many admin keys exist |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg BCM |
| **Receiver** | -1022494400.jpg APIM |

Ext1\_AID

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_AID** |
| **Description** | Indicates the AID that is present and selected on the NFC device (9 bytes in length) |
| **Encoding** | 1565755635.jpg [UnitlessValue9Bytes\_ET](#_8a4d5abcb5fa8d3f797ec8fba6bb1932) |
| **Transmitter** | -1022494400.jpg NFC Reader |
| **Receiver** | -1022494400.jpg NFAM |

Ext1\_APDU\_CLA

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_APDU\_CLA** |
| **Description** | Instruction class - indicates the type of command, e.g. interindustry or proprietary. Part of Command APDU sent from Reader to Device |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg NFC Reader |

Ext1\_APDU\_Data

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_APDU\_Data** |
| **Description** | The actual command data sent over APDU as part of the command |
| **Encoding** | 1565755635.jpg [UnitlessValue255bit\_ET](#_7081dca6e387f8b0b1d3f83b67592ad6) |
| **Transmitter** | -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg NFC Reader |

Ext1\_APDU\_INS

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_APDU\_INS** |
| **Description** | Instruction code - indicates the specific command, e.g. "write data". Part of Command APDU sent from Reader to Device |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg NFC Reader |

Ext1\_APDU\_Len

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_APDU\_Len** |
| **Description** | Indicates length of command data to follow as part of Command APDU sent from Reader to Device |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg NFC Reader |

Ext1\_APDU\_Param

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_APDU\_Param** |
| **Description** | Instruction parameters for the command, e.g. offset into file at which to write the data. Part of Command APDU sent from Reader to Device |
| **Encoding** | 1565755635.jpg [UnitlessValue16bit\_ET](#_eaebd89af027839b99bc4dfe93c7240b) |
| **Transmitter** | -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg NFC Reader |

Ext1\_APDU\_RspLen

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_APDU\_RspLen** |
| **Description** | Indicated length of response data to expect from Device as part of Reponse APDU |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg NFC Reader |

Ext1\_APDU\_Rsp\_Data

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_APDU\_Rsp\_Data** |
| **Description** | Data received from Device as part of Response APDU |
| **Encoding** | 1565755635.jpg [UnitlessValue255bit\_ET](#_7081dca6e387f8b0b1d3f83b67592ad6) |
| **Transmitter** | -1022494400.jpg NFC Reader |
| **Receiver** | -1022494400.jpg NFAM |

Ext1\_APDU\_StatByte

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_APDU\_StatByte** |
| **Description** | Command processing status provided back from device as part of Response APDU |
| **Encoding** | 1565755635.jpg [UnitlessValue16bit\_ET](#_eaebd89af027839b99bc4dfe93c7240b) |
| **Transmitter** | -1022494400.jpg NFC Reader |
| **Receiver** | -1022494400.jpg NFAM |

Ext1\_Card\_Infield\_D\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_Card\_Infield\_D\_Stat** |
| **Description** | Indicated whether an NFC Device is within or has exited the detection range of an NFC Reader |
| **Encoding** | 1565755635.jpg [Ext1\_Card\_Infield\_D\_Stat\_ET](#_21e770ae7d43fd22c9799148451297c6) |
| **Transmitter** | -1022494400.jpg NFC Reader |
| **Receiver** | -1022494400.jpg NFAM |

Ext1\_FaultStatus

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_FaultStatus** |
| **Description** | Indicates whether there is an active fault at the reader or during communication with the device |
| **Encoding** | 1565755635.jpg [Ext1\_FaultStatus\_ET](#_a7247190b4f22f97e1cbb0ea950da497) |
| **Transmitter** | -1022494400.jpg NFC Reader |
| **Receiver** | -1022494400.jpg NFAM |

Ext1\_UID\_Data

|  |  |
| --- | --- |
| **Signal Name** | **Ext1\_UID\_Data** |
| **Description** | Indicated the NFC Devices Unique Identifier |
| **Encoding** | 1565755635.jpg [UnitlessValue256bit\_ET](#_718ef33cd286f3f2127b8dc4741744ba) |
| **Transmitter** | -1022494400.jpg NFC Reader |
| **Receiver** | -1022494400.jpg NFAM |

FactoryReset\_Rq

|  |  |
| --- | --- |
| **Signal Name** | **FactoryReset\_Rq** |
| **Description** | Request to reset back to factory defaults |
| **Encoding** | 1565755635.jpg [ModemResetDRq\_ET](#_519cccc0570c7b0fcbd8d311db62c31f) |
| **Transmitter** | -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg NFAM |

Ignition\_Status

|  |  |
| --- | --- |
| **Signal Name** | **Ignition\_Status** |
| **Description** | Ignition status of the vehicle |
| **Encoding** | 1565755635.jpg [Ignition\_Status\_ET](#_278c16cdc9117ab01767e55932a93261) |
| **Transmitter** |  |
| **Receiver** |  |

ImmoMsgTxt\_D\_Rq

|  |  |
| --- | --- |
| **Signal Name** | **ImmoMsgTxt\_D\_Rq** |
| **Description** | Provides a trigger indication to IPC after BCM system performs key search |
| **Encoding** | 1565755635.jpg [immoMsgTxt\_D\_Rq\_ET](#_ee23943e17c0f1205b6b6e8668d19fbe) |
| **Size** | Not set |
| **Transmitter** | -1022494400.jpg BCM |
| **Receiver** | -1022494400.jpg IPC |

KeyMykeysTot\_No\_Actl

|  |  |
| --- | --- |
| **Signal Name** | **KeyMykeysTot\_No\_Actl** |
| **Description** | Provides indication of total count for how many mykeys exist |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg BCM |
| **Receiver** | -1022494400.jpg APIM |

LifeCycMde\_D\_Actl

|  |  |
| --- | --- |
| **Signal Name** | **LifeCycMde\_D\_Actl** |
| **Description** | Indicates the status of the vehicle mode (Factory, Transport, Normal) |
| **Encoding** | 1565755635.jpg [LifeCycMdeDActl\_ET](#_40a0bdd83af45ae4834809e8e873ae30) |
| **Transmitter** |  |
| **Receiver** |  |

LocationServices\_3

|  |  |
| --- | --- |
| **Signal Name** | **LocationServices\_3** |
| **Description** | Provides network time from GNSS to vehicle |
| **Encoding** | 1565755635.jpg [Unitless64bit\_ET](#_02e7adff984d4d5fa179aee3290eb882) |
| **Transmitter** |  |
| **Receiver** |  |

ModemAuthrz\_D\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **ModemAuthrz\_D\_Stat** |
| **Description** | Provides modem authorization status |
| **Encoding** | 1565755635.jpg [ModemAuthrzDStat\_ET](#_2c3d6edeba71e8dc9abddbbda8cdd3af) |
| **Transmitter** |  |
| **Receiver** |  |

ModemReset\_D\_Rq

|  |  |
| --- | --- |
| **Signal Name** | **ModemReset\_D\_Rq** |
| **Description** | Instructs specific components to perform a reset |
| **Encoding** | 1565755635.jpg [ModemResetDRq\_ET](#_519cccc0570c7b0fcbd8d311db62c31f) |
| **Transmitter** |  |
| **Receiver** |  |

NFC\_Enable\_Status

|  |  |
| --- | --- |
| **Signal Name** | **NFC\_Enable\_Status** |
| **Description** | Whether the NFC Feature is "Enabled" or "Disabled" on the NFC System |
| **Encoding** | 1565755635.jpg [DisableEnable\_ET](#_adcb81e38576495daed2f39bf2cccd66) |
| **Transmitter** |  |
| **Receiver** |  |

NFC\_FaultDisable\_Status

|  |  |
| --- | --- |
| **Signal Name** | **NFC\_FaultDisable\_Status** |
| **Description** | If a fault has caused the NFC System to "Disable" the NFC feature on the NFC System |
| **Encoding** | 1565755635.jpg [DisableEnable\_ET](#_adcb81e38576495daed2f39bf2cccd66) |
| **Transmitter** |  |
| **Receiver** |  |

NFC\_Polling\_Freq

|  |  |
| --- | --- |
| **Signal Name** | **NFC\_Polling\_Freq** |
| **Description** | Frequency of polling. 10Hz by default |
| **Encoding** | -838613092.jpg [frequency[hertz]](#_918b61d90dcb53207855ff61f100ab67) |
| **Transmitter** |  |
| **Receiver** |  |

NfcDevcAuthrzT\_B\_Rq

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcAuthrzT\_B\_Rq** |
| **Description** | This signal is responsible for sending a request to cancel authorization when exterior lock status = lock |
| **Encoding** | 1565755635.jpg [NullValid\_ET](#_04b7f7eebdf540b2f7f62c26d6cf4d88) |
| **Transmitter** | -1022494400.jpg BCM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg NFAM |

NfcDevcAuthrz\_B\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcAuthrz\_B\_Stat** |
| **Description** | Provides the seconds of time left in the authorization window. |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcCmd\_No\_Actl

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcCmd\_No\_Actl** |
| **Description** | The key index of the key related to this event, if any |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcDetct\_D\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcDetct\_D\_Stat** |
| **Description** | Indicates the location of the detected device |
| **Encoding** | 1565755635.jpg [NFCDevcDetct\_D\_Stat](#_02e0756921c88be8630b9583693facf4) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcKeyType\_D\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcKeyType\_D\_Stat** |
| **Description** | Provides Indication for the type of the Near Field Communication (NFC) device - Factory or User. |
| **Encoding** | 1565755635.jpg [UserFactoryNull\_D\_ET](#_6a6f79342b44465ddd135d151d984f33) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcPair\_D\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcPair\_D\_Stat** |
| **Description** | Provides indication when a device is paired so vehicle can blink the lights, lock/unlock doors, display cluster popups. |
| **Encoding** | 1565755635.jpg [SuccessFailNull\_D\_ET](#_ebdb6bab62bc4115605b0ed080bf9152) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcSearchBStat\_No\_Cnt

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcSearchBStat\_No\_Cnt** |
| **Description** | Counter for dependability evaluation of NfcDevcSearch\_B\_Stat signal. |
| **Encoding** | 1565755635.jpg [UnitlessValue4bit\_ET](#_93016c9229789bddd57866fa06070e1f) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcSearchBStat\_No\_Crc

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcSearchBStat\_No\_Crc** |
| **Description** | Cyclic Redundancy Check (CRC) for dependability evaluation of NfcDevcSearch\_B\_Stat signal. |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcSearchId\_No\_Actl

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcSearchId\_No\_Actl** |
| **Description** | The Near Field Communication (NFC) key index of the key that is authorizing vehicle start, if starting is authorized. |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcSearch\_B\_Rq

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcSearch\_B\_Rq** |
| **Description** | Key Search request from the vehicle control function |
| **Encoding** | 1565755635.jpg [ActiveInactive\_ET](#_e6a5106c855bb9f6c0c196c9bbe16e2e) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg BCM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg NFAM |

NfcDevcSearch\_B\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcSearch\_B\_Stat** |
| **Description** | Search request result |
| **Encoding** | 1565755635.jpg [ValidInvalidNull\_ET](#_33598434101b1aee6719ba263d15dfb0) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcSearch\_No\_Actl\_ASIL

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcSearch\_No\_Actl\_ASIL** |
| **Description** | Signal that includes rolling count transmitted by the Near Field Authorization Module (NFAM) and used to align a search request with the corresponding search result, synchronized with NfcDevcSearch\_No\_Actl\_QM. |
| **Encoding** | 1565755635.jpg [UnitlessValue3bit\_ET](#_64468bb5a0a50c7797926c8ea4df891e) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcSearch\_No\_Actl\_QM

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcSearch\_No\_Actl\_QM** |
| **Description** | Signal that includes rolling count transmitted by the Near Field Authorization Module (NFAM) and used to align a search request with the corresponding search result, synchronized with NfcDevcSearch\_No\_Actl\_ASIL. |
| **Encoding** | 1565755635.jpg [UnitlessValue3bit\_ET](#_64468bb5a0a50c7797926c8ea4df891e) |
| **Transmitter** | -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcSearch\_No\_Rq

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcSearch\_No\_Rq** |
| **Description** | Signal that includes rolling count transmitted by the Body Control Module (BCM) and used to synchronize specific signals with corresponding specific event. |
| **Encoding** | 1565755635.jpg [UnitlessValue3bit\_ET](#_64468bb5a0a50c7797926c8ea4df891e) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg BCM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg NFAM |

NfcDevcTapDur\_D\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcTapDur\_D\_Stat** |
| **Description** | Provides Indication for the Tap duration, short or long; used by the Body Control Module (BCM) logic to understand what action to take. |
| **Encoding** | 1565755635.jpg [LongShortNull\_D\_ET](#_49ea3b5734108a666c26eac0dd238d3d) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcTapId\_No\_Actl

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcTapId\_No\_Actl** |
| **Description** | Indicates keyindex of 1 of up to 255 Near Field Communication (NFC) enabled devices and corresponds to the device found. |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcTapPard\_B\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcTapPard\_B\_Stat** |
| **Description** | Provides Indication when the Tap Event is authorized or not authorized |
| **Encoding** | 1565755635.jpg [YesNo\_ET](#_b88e8b2bff32160be5ae07eca8f65275) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcTap\_No\_Rq\_ASIL

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcTap\_No\_Rq\_ASIL** |
| **Description** | Event counter transmitted during "tap" event, synchronized with NfcDevcTap\_No\_Rq\_QM |
| **Encoding** | 1565755635.jpg [UnitlessValue3bit\_ET](#_64468bb5a0a50c7797926c8ea4df891e) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcDevcTap\_No\_Rq\_QM

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevcTap\_No\_Rq\_QM** |
| **Description** | Event counter transmitted during "tap" event, synchronized with NfcDevcTap\_No\_Rq\_ASIL |
| **Encoding** | 1565755635.jpg [UnitlessValue3bit\_ET](#_64468bb5a0a50c7797926c8ea4df891e) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg NFAM |
| **Receiver** | -1022494400.jpg BCM  -1022494400.jpg ECG |

NfcDevc\_D\_Cmd

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevc\_D\_Cmd** |
| **Description** | Indicates what kind of command was requested |
| **Encoding** | 1565755635.jpg [NfcDevcCmd\_D\_Rq\_ET](#_410e9923ebab3defe93fc9bdb1b56b6c) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg BCM  -1022494400.jpg ECG |

NfcDevc\_D\_Dsply

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevc\_D\_Dsply** |
| **Description** | This signal is transmitted by Body Control Module (BCM) as a result of key search to trigger Near Field Communication (NFC) related warnings in cluster. |
| **Encoding** | 1565755635.jpg [NfcDevcDsply\_D\_Rq\_ET](#_71e5de2b54904acb29e6f6c3e2ecf28e) |
| **Transmitter** | -1022494400.jpg BCM |
| **Receiver** | -1022494400.jpg IPC |

NfcDevc\_D\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **NfcDevc\_D\_Stat** |
| **Description** | Indicates the status of Near Field Communication (NFC) Command. |
| **Encoding** | 1565755635.jpg [SuccessFailNull\_D\_ET](#_ebdb6bab62bc4115605b0ed080bf9152) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg BCM  -1022494400.jpg ECG |

NfcKeySearchMessage\_No\_Cnt

|  |  |
| --- | --- |
| **Signal Name** | **NfcKeySearchMessage\_No\_Cnt** |
| **Description** | Counter for dependability evaluation of NfcKeySearchMessage message. |
| **Encoding** | 1565755635.jpg [UnitlessValue4bit\_ET](#_93016c9229789bddd57866fa06070e1f) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg BCM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg NFAM |

NfcKeySearchMessage\_No\_Crc

|  |  |
| --- | --- |
| **Signal Name** | **NfcKeySearchMessage\_No\_Crc** |
| **Description** | Cyclic Redundancy Check (CRC) for dependability evaluation of NfcKeySearchMessage message. |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg ECG  -1022494400.jpg BCM |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg NFAM |

NfcMyKeyCreate\_D\_Rq

|  |  |
| --- | --- |
| **Signal Name** | **NfcMyKeyCreate\_D\_Rq** |
| **Description** | A request to create a new MyKey from an NFC device |
| **Encoding** | 1565755635.jpg [RequestNull\_ET](#_23223749c15689d80659a124619fbc0d) |
| **Transmitter** | -1022494400.jpg APIM |
| **Receiver** | -1022494400.jpg BCM |

NfcMyKeyCreate\_D\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **NfcMyKeyCreate\_D\_Stat** |
| **Description** | Provides indication status when mykey has been created |
| **Encoding** | 1565755635.jpg [NfcMyKeyCreate\_D\_Stat\_ET](#_526998a7e30b25d6c75e2af8e8153bef) |
| **Transmitter** | -1022494400.jpg BCM |
| **Receiver** | -1022494400.jpg APIM |

NfcSerial\_D\_Rq

|  |  |
| --- | --- |
| **Signal Name** | **NfcSerial\_D\_Rq** |
| **Description** | Signal used to as part of initiating NFAM module provisioning process |
| **Encoding** | 1565755635.jpg [NFCProvDID\_ET](#_41c8ee7c30ff3d5b399bd2867e2da979) |
| **Transmitter** | -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg NFAM |

NfcTapMessage\_ASIL\_No\_Cnt

|  |  |
| --- | --- |
| **Signal Name** | **NfcTapMessage\_ASIL\_No\_Cnt** |
| **Description** | Counter for dependability evaluation of NfcTapMessage\_ASIL message. |
| **Encoding** | 1565755635.jpg [UnitlessValue4bit\_ET](#_93016c9229789bddd57866fa06070e1f) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

NfcTapMessage\_ASIL\_No\_Crc

|  |  |
| --- | --- |
| **Signal Name** | **NfcTapMessage\_ASIL\_No\_Crc** |
| **Description** | Cyclic Redundancy Check (CRC) for dependability evaluation of NfcTapMessage\_ASIL messagel. |
| **Encoding** | 1565755635.jpg [UnitlessValue8bit\_ET](#_933f74f9c481c77f021a6aa066d15403) |
| **Transmitter** | -1022494400.jpg NFAM  -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg ECG  -1022494400.jpg BCM |

PwPckTq\_D\_Stat

|  |  |
| --- | --- |
| **Signal Name** | **PwPckTq\_D\_Stat** |
| **Description** | Provides indication if the vehicle is in motive or non-motive mode: PwPckTq\_D\_Stat = 0x0 (PwPckOff\_TqNotAvailable) e.g. engine is not running  PwPckTq\_D\_Stat = 0x1 (PwPckOn\_TqNotAvailable) e.g. engine is running in NonMotive mode  PwPckTq\_D\_Stat = 0x2 (StartInprgrss\_TqNotAvail) e.g. engine is cranking  PwPckTq\_D\_Stat = 0x3 (PwPckOn\_TqAvailable) e.g. engine is running in Motive mode |
| **Encoding** | 1565755635.jpg [PwPckTqDStat\_ET](#_55fa4324d498236d36661656c12d331d) |
| **Transmitter** | -1022494400.jpg ECG |
| **Receiver** | -1022494400.jpg NFAM |

Remote\_Start\_Status

|  |  |
| --- | --- |
| **Signal Name** | **Remote\_Start\_Status** |
| **Description** | Provides indication if vehicle is in Remote start mode |
| **Encoding** | 1565755635.jpg [RemoteStartStatus\_ET](#_68cc8a1b8b52e80d5d6299882503b693) |
| **Transmitter** |  |
| **Receiver** |  |

Veh\_Lock\_Status

|  |  |
| --- | --- |
| **Signal Name** | **Veh\_Lock\_Status** |
| **Description** | Provides indication of vehicle lock status |
| **Encoding** | 1565755635.jpg [Veh\_Lock\_Status\_ET](#_1c9e769345df1eda83e96b6639c68065) |
| **Transmitter** |  |
| **Receiver** |  |

### Technical Parameters

NfcFeatureMode

|  |  |
| --- | --- |
| **Name** | NfcFeatureMode |
| **Description** | The operation mode of the feature (fleet or retail).  This is configured to "Fleet" when the vehicle is enrolled in a fleet and subscribed to the fleet NFC management feature. Otherwise, it is "Retail". |
| **Encoding Type** |  |
| **ECU** | NFAM |

StartingAuthorizationTimeout

|  |  |
| --- | --- |
| **Name** | StartingAuthorizationTimeout |
| **Description** |  |
| **Encoding Type** |  |
| **ECU** | NFAM |

Local Pending expiration duration

|  |  |
| --- | --- |
| **Name** | Local Pending expiration duration |
| **Description** |  |
| **Encoding Type** |  |
| **ECU** | NFAM |

Vehicle Start to Notification Display delay

|  |  |
| --- | --- |
| **Name** | Vehicle Start to Notification Display delay |
| **Description** |  |
| **Encoding Type** |  |
| **ECU** | NFAM |

NumberOfFactoryCards

|  |  |
| --- | --- |
| **Name** | NumberOfFactoryCards |
| **Description** | The number of NFC factory cards that should be present on the vehicle.  The number of paired factory cards is checked against this value. If the two do not match, a DTC is set, unless the NFC feature is being managed by a fleet. |
| **Encoding Type** |  |
| **ECU** | NFAM |

NfcLongTapDelay

|  |  |
| --- | --- |
| **Name** | NfcLongTapDelay |
| **Description** | Configuration time delay between transmitting a "short" tap event and a "long" tap event while the NFC Device is kept within the field |
| **Encoding Type** |  |
| **ECU** | NFAM |

NfcControllerResponseTimeout

|  |  |
| --- | --- |
| **Name** | NfcControllerResponseTimeout |
| **Description** |  |
| **Encoding Type** |  |
| **ECU** | APIM |

FESN

|  |  |
| --- | --- |
| **Name** | FESN |
| **Description** |  |
| **Encoding Type** |  |
| **ECU** | NFAM |

Document ends here.