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# Introduction

## Document Purpose

The Feature Implementation Specification (FIS) specifies the deployment of the logical functions of a feature to an electrical architecture. The FIS specifies all interactions between the ECUs of the electrical architecture required for the feature including the technical signals and the interfaces. It also gives interface and integration requirements, which are specific to the feature for the electrical architecture.

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 Scope

This FIS describes the deployment of the feature <Drive Video Record> to the following electrical architecture(s):

| **Electrical Architecture Name** | **Owner** | **Reference** |
| --- | --- | --- |
| FNV2.1 | YNIU6 | / |
|  |  |  |

Table 1‑1: Electrical Architecture(s) referenced in this document

## Document Audience

The FIS is authored by <Emma Chen / Feature Owner Supervisor>. All Stakeholders, i.e., all people who have a valid interest in the feature implementation should read and, if possible, review the FIS. It needs to be guaranteed, that all stakeholders have access to the currently valid version of the FIS.

### Stakeholder List

For the latest list of the function stakeholders and their roles & responsibilities refer to <TBD>.

## Document Organization

### Document Context

Refer to the [Specification Structure page](http://wiki.ford.com/display/RequirementsEngineering/Specification+templates) in the [Ford RE Wiki](http://wiki.ford.com/display/RequirementsEngineering/Requirements+Engineering+for+SW+Enabled+Features) to understand how the FIS relates to other Ford Requirements Documents and Specifications.

### Document Structure

The structure of this document is explained below:

**Section 1** – Introduction – Giving an explanation how to use this document including responsibilities and the scope of the document. Additionally it contains the revision history and a list of unsettled but known issues that have to be consolidated in future versions. It explains the terminology and gives a clarification of the definitions, concepts and abbreviations used in the document.

**Section 2** – Feature Implementation Description – Giving an overview of the platform and listing assumptions, constraints or dependencies

**Section 3** – Feature Implementation Architecture – Describing 3 Architecture Views:

* Functional Architecture – Showing the logical architecture of functions
* Physical Architecture – Showing the physical architecture (first of all the E/E Architecture), which the Logical Functions get allocated to.
* Software Architecture – Showing the software architecture relevant for the feature (for features with in-house development only)
* Function Deployment – Presenting the allocation of logical functions and signals to the electrical and other components

**Section 4** – Deployment Specific Modeling –Modeling techniques providing additional detail on e.g. interface behavior

**Section 5** – Deployment Specific Requirements – Deployment specific requirements for ECUs, Network Communication, and Process

**Section 6** – List of Open Concerns

**Section 7** – Revision History

**Section 8** – Appendix - Presenting additional data mainly in a tabular form, e.g., a data dictionary

## References

### Ford Documents

The list of all Ford internal documents, which are directly related.

| **Reference #** | **Title** | **Doc. ID** | **Revision** | **Document Location** |
| --- | --- | --- | --- | --- |
| 1 | Drive Video Record Feature B-Diagram | / | V1.0 | / |
| 2 | Drive Video Record Feature Level Specification | / | V1.5 | / |
| 3 | Drive Video Record UART Protocol | / | V1.1 | / |
|  |  |  |  |  |

Table 1‑2: Ford internal Documents

### External Documents and Publications

The list of external documents could include books, reports and online sources.

| **Reference #** | **Document / Publication** |
| --- | --- |
| 1 | GBT 38892-2020 |
|  |  |

Table 1‑3: External documents and publications

## Glossary

### Definitions

| **Definition** | **Description** |
| --- | --- |
|  |  |

Table 1‑4: Definitions used in this document

### Abbreviations

| **Abbr.** | **Stands for** | **Description** |
| --- | --- | --- |
| DVR | Drive Video Record |  |
| APIM | Auxiliary Protocol Interface Module | DVROnboardClient in DVR system |
| ECG | Enhanced Central Gateway |  |
| FNV X.X | Fully Networked Vehicle Architecture X.X |  |
| HMI | Human Machine Interface |  |
| IDCM | Integrated Dash Camera Module | DVRServer in DVR system |
| POC | Powered On Cable |  |

Table 1‑5: Abbreviations used in this document.

# Feature Implementation Overview

## Description

The DVR system is designed for FNV2.1 and SYNC+ platform, it could support to capture the video of exterior environment automatically, and when collision happens, will capture/save a special video labeled as “emergency”, user could also trigger the video/image record manually to save the beautiful view or important scene, at the same time, the necessary information like VIN, date, time will be saved. Users could also preview/playback the video/image and config the system via the center stack or Ford APP, DVR will also provide vehicle monitor ability after ignition off. DVR user could save the data on an external TF card or download to a smart phone via Wi-Fi.

## Input Requirements/Documents

|  |  |  |  |
| --- | --- | --- | --- |
| **Reference** | **Section/Requirement** | **Description** | **Derived Requirement** |
| **Feature/Function Requirements** | | | |
| 1 | Drive Video Record Feature B-Diagram | B Diagram of DVR feature | / |
| 2 | Drive Video Record Feature Level Specification | Feature & Function spec | / |
| 3 | Drive Video Record UART Protocol | DVR related ECU communication interface protocol | / |
| **Ford Engineering Standards** | | | |
|  |  |  |  |
| **Legal Regulations** | | | |
| 1 | GBT 38892-2020 |  | / |
| **Industry Standards** | | | |
|  |  |  |  |
| **Other Sources** | | | |
|  |  |  |  |

Table 6: Input Requirements/Documents

## Lessons Learned

DVR is a lead feature in Ford, so no lesson learned exist, benchmark study to other OEM is the reference for L&L.

## Assumptions

Key DVR assumptions below:

1. IDCM and APIM communication relays on an internal connection, for DVR it’s UART over LVDS cable.
2. All DVR video or photo data saved by IDCM, should not be able to upload to Ford backend or any 3rd party cloud.

# Feature Implementation Architecture

## Functional Architecture

### Description

DVR feature contains several functions list below

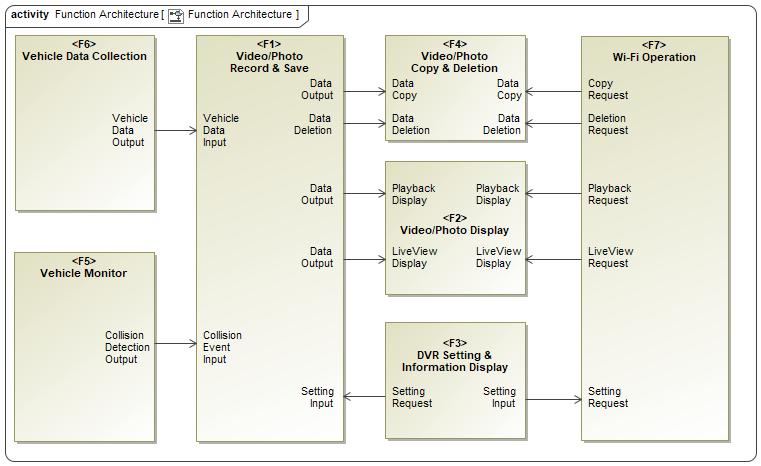


Figure 3‑1: Functional Architecture

### Function List

The following functions from the [Global Feature & Function List](https://www.vsemweb.ford.com:443/tc/launchapp?-attach=true&-s=226TCSession&-o=ZmZNi0JHx3NrTDAAAAAAAAAAAAA) are referenced in this Feature Implementation Specification:

|  |  |  |
| --- | --- | --- |
| **Function ID** | **Function Name** | **Function Description** |
| / | Video & Photo Record and Saving | DVR video and photo data record and saving when event triggered like normal/emergency/manual record request. |
| / | Video & Photo Display | DVR video and photo display in APIM or Ford APP, include live view and playback. |
| / | DVR Setting and Information Display | DVR function setting via APIM or Ford APP, and key information display. |
| / | Video & Photo Copy and Deletion | Copy DVR data from IDCM internal memory to TF card, or delete DVR data from TF card. |
| / | Vehicle Monitoring | Monitor vehicle collision event and record video when IGN off. |
| / | Vehicle Data Collection | Collect key vehicle data for video water mark and support emergency event detection. |
| / | Wi-Fi Connection & Communication | Support Wi-Fi connection to DVR user’s smart phone, and communication between IDCM and Ford APP. |

Table 3‑1: List of Functions

### Signal List

Refer to < Drive Video Record UART Protocol >.

## Physical Architecture

### E/E Architecture

#### E/E Architecture Variants

|  |  |  |
| --- | --- | --- |
| E/E Architecture Variant Name | Variant Description | Variant Condition (optional) |
| FNV 2.1 | Work on FNV2.1 platform | Network Topology = FNV2.1 |

##### E/E Architecture FNV2.1

This E/E Architecture variant FN2.1 supports APIM and APP works as HMI for DVR feature, APIM will collect DVR water mark information from ECG, IDCM outputs video to APIM and APP.

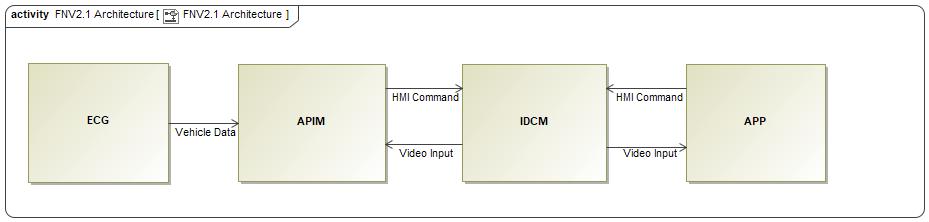


Figure 3‑2 E/E Architecture (SysML Style)

#### E/E Components

|  |  |
| --- | --- |
| Component Name | **Description** |
| APIM | Auxiliary Protocol Interface Module |
| ECG | Enhanced Center Gateway |
| IDCM | Integrated Dash Camera Module |
| Ford APP | Ford APP like FordPass/LinclonWay on Smart Phone |

Table 3‑2: Electrical Components

#### E/E Connections

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Connection Name | **Connection Type** | **Protocol**  Only if ‘Connection Type’ is “Network”/”RF-Digital” | **Description** | **Allocated Messages**  Only if ‘Connection Type’ is “Network”/”RF-Digital” | **Connected Nodes** |
| UART | Digital | n/a | UART connection between IDCM and APIM over FPD-Link | n/a | IDCM & APIM |
| WIFI | RF-Digital | n/a | WIFI connection between IDCM and smart phone | n/a | IDCM |
| LVDS | Analog | n/a | Event Notification Signal | n/a |  |
|  |  |  |  |  |  |

Table 3‑3: E/E Connections

#### Signal List

Refer to < Drive Video Record UART Protocol >.

## Function Deployment

### Deployment Variants

|  |  |  |
| --- | --- | --- |
| **Deployment Variant Name** | Variant Description | Variant Condition (optional) |
| FNV 2.1 | Work on FNV2.1 platform | Network Topology = FNV2.1 |

### Function Allocation

| Component | Logical Function Name | Technology Function Name |
| --- | --- | --- |
|
| IDCM  DVRServer | Video Record and Save | Save Location Allocation |
| Video Data Naming |
| Video Watermark | Mandatory Data Collection |
| Optional Data collection |
| GPS Date Synchronization |
| Normal Video Record | Normal Video Saving |
| Memory Check and Overwrite |
| Error Handling |
| Emergency Video Record | Collision Detection |
| Emergency Video Saving |
| Error Handling |
| Manual Video Record | Manual Command Receive |
| Manual Video Saving |
| Error Handling |
| Video Liveview | Liveview Command Receive |
| Liveview Data Transfer |
| Video/Photo Playback | Playback Command Receive |
| Playback List Creation |
| Playback Data Transfer |
| Video Stop |
| Video Play |
| Video Forward & Backward |
| Gear Position Protection |
| DVR Setting | Setting Value Receive |
| Setting Value Take Effect |
| Wi-Fi Setting | Wi-Fi SSID Receive |
| Wi-Fi SSID Take Effect |
| Wi-Fi Password Receive |
| Wi-Fi Password Take Effect |
| DVR Data Copy to TF Card | TF Card Status Check |
| Copy File List Receive |
| Data Move from eMMC to TF Card |
| Data Move from eMMC to Smartphone |
| Smart Copy Command Receive |
| DVR Data Delete from TF Card | Delete File Receive |
| Data Delete from TF Card |
| Vehicle Monitoring | Collision Detection |
| Emergency Video Saving |
| Notification to APIM |
| Wi-Fi Connection | Connection Setup & Reconnection |
| Liveview Data send |
| Playback List Data Send |
| Playback Control |
| DVR Data Download |
| DVR System Error Handling | Camera Sensor Error Handling |
| Internal Memory Error Handling |
| TF Card Error Handling |
| Wi-Fi Error Handling |
| APIM  DVROnboardClient | AR Feature Adaptation | AR Feature Work Status Judgement |
| Vehicle Data Collection | GPS Date and Time Package |
| Internal Data Collection |
| CAN Data Collection |
| Vehicle Data Send to IDCM |
| Normal Video Record Switch | Normal Video Record On/Off control Logic |
| Request Switch HMI |
| DVR Launcher Interface | Main Page Launcher |
| Quick Panel Launcher |
| Local APP Launcher |
| Voice Control Launcher |
| Video Liveview | Enter Liveview |
| Video Receive |
| Video display |
| Video/Photo Playback | Enter Playback |
| Playback List Receive and Display |
| Video/Photo Playback Display |
| Screenshot Command |
| Last/Next File Command |
| Forward & Backward Command |
| Play/Stop Command |
| Gear Position Pretection |
| DVR Setting | Setting Value Command |
| Back to Default Value |
| IDCM Information Update & Display |
| Format TF Card Command |
| DVR Data Copy to TF Card | Smart Copy Command |
| Copy List Create |
| Copy Status Display |
| Background Copy |
| Cancel Copy |
| ~~DVR Data Copy to Smart Phone~~ | ~~Copy List Create~~ |
| ~~Copy Status Display~~ |
| ~~Background Copy~~ |
| ~~Cancel Copy~~ |
| DVR Data Delete from TF Card | Delete List Create |
| Delete Status Display |
| Vehicle Monitoring | Vehicle Monitoring Status Display |
| DVR Status Display | DVR Status Icon Update |
| DVR Dash Card Image Update |
| Manual Photo Record | Manual Photo Command – Soft Button |
| Manual Photo Command – Voice Control |
| Manual Photo Status Display |
| Manual Video Record | Manual Video Command – Soft Button |
| Manual Video Command – Voice Control |
| Manual Video Stop Control |
| Manual Video Status Display |
| Other DVR Interface Disable |
| Emergency Video Record | Emergency Video Status Display |
| Other DVR Interface Disable |
| DVR Error Display | DVR Error Status Display |
| APP  DVROffboardClient | Wi-Fi Connection | Connection Setup & Reconnection |
| Wi-Fi Error Handling |
| Video Liveview | Liveview Launcher |
| Liveview Display |
| Video Playback | Playback List Display |
| Video Playback Control |
| Video Download | DVR Data Download Receive and Save |
| Download Status Display |

Table 3‑4: Function Allocation Table (Basic)

# Feature Implementation Modeling

## Component Interaction Diagrams

### Scenario: “System Startup / Shutdown”

### Scenario: “Video Record and Saving”

### Scenario:



**Figure 12:** Sample Scenario “Normal Operation”

## Component Interface Behavior Diagrams

*#Hint: For complex (application level) interface protocols a protocol state machine would be more appropriate than a bunch of sequence diagrams to illustrate the interactions between components. So, this section would typically show a (protocol) state machine.*

# Feature Implementation Requirements

## Functional Safety

Feature is not Function Safety critical – QM level. NA.

## Requirements on Components

High level functions breakdown:



### IDCM & APIM – DVRServer and DVROnboardClient

#### Technology Function Normal Video Recording

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Normal\_Record\_Setting | Normal Video Record Switch | **UART msg**: APIM\_NormalVideoSwitch\_Enum [Type:0x14] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑1: Input Signal mappings of Function Normal Video Record

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Video\_Record\_Status | Video Record Status | **UART msg**: IDCM\_Heartbeat\_Int [Type:0x01] [Subtype:0x01]  **Data ID**: #3 | NA. | NA. |
|  |  |  |  |  |

Table 5‑2: Output Signal mappings of Function Normal Video Record

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Normal Video Record Start

IDCM should start normal video record when:

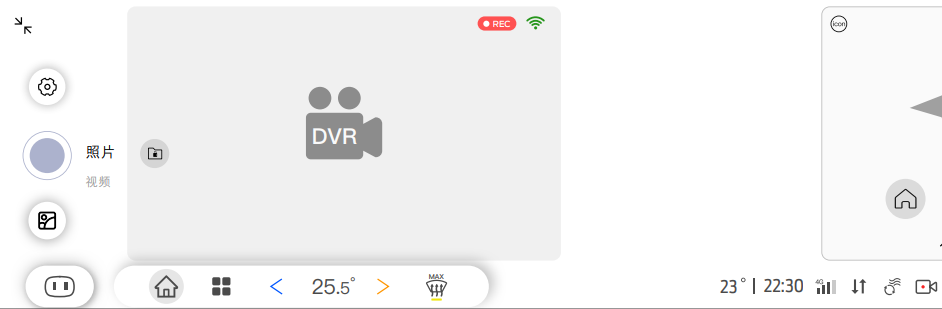
* *Normal Video Record Switch* is set to *Enabled*

During recording, IDCM should send below msg to APIM:

* *Video Record Status == Normal Recording*

APIM HMI control:

* The video recording icon – “REC” on live view page should be highlight.
* The DVR status icon on APIM status bar should be set to recording status.



###### Normal Video Record End

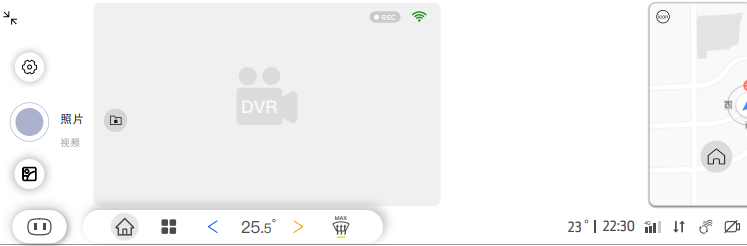
IDCM should stop normal video record when:

* *Normal Video Record Switch* is set to *Disabled*

And *Video Record Status* should be set to *No Recording*.

APIM HMI updates:

* The video recording icon – “REC” on live view page should be disabled.
* The DVR status icon on APIM status bar should be set to no recording status.



###### Normal Video Record Attributes

* According to GB/T 38892, all normal video must be saved into eMMC and could not be modified or deleted.
* Normal video duration is 3 minutes and should be saved into eMMC “Normal Data” folder.
* Naming rule: NOR-<Year-Month-Day Hour-Minute-Second>.mp4.

#### Technology Function Emergency Video Record

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details** *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Veh\_Speed | Vehicle Speed | **UART msg**: APIM\_VehicleSpeed\_Int [Type:0x12] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Veh\_Brake\_Status | Vehicle Brake Pedal Status | **UART msg**: APIM\_Brake\_Enum [Type:0x12] [Subtype:0x02]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑3: Input Signal mappings of Function Emergency Video Record

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Video\_Record\_Status | Video Record Status | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #3 | NA. | NA. |
| Video\_Recording\_Timestamp | Video Recording Timer | **UART msg**: IDCM\_RecordProgress\_Int [Type:0x02] [Subtype:0x02]  **Data ID**: #1 | NA. | NA. |
| Video\_Recording\_Type | Type of Video | **UART msg**: IDCM\_EmergencyVideoInfo\_Int [Type:0x03] [Subtype:0x01]  Data ID: #2 | NA. | NA. |
| Video\_Recording\_Qty | Qty of Video | **UART msg**: IDCM\_EmergencyVideoInfo\_Int [Type:0x03] [Subtype:0x01]  Data ID: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑4: Output Signal mappings of Function Emergency Video Record

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Emergency Video Record Start

IDCM should has the ability to detect the vehicle collision base on below input and starts emergency video recording:

* IDCM Internal G-Sensor detection
* *Vehicle Speed* received from APIM periodically
* *Vehicle Brake Pedal Status* received from APIM

During emergency recording, IDCM should send below msg to APIM:

* *Video Record Status == Emergency Recording*

At the same time, IDCM should synchronize the recording timer to APIM periodically:

* *Video Recording Timer == “Corresponding recording timestamp” starts from 1*

APIM HMI updates:

* The live view page on APIM should be set to emergency recording status:
  1. A recording timer should be displayed, value should be same as *Video Recording Timer.*
  2. A reminder should be popup to customer that all other buttons on DVR live view page should be disabled.
* The DVR status icon on APIM status bar should be set to recording status.



###### Emergency Video Record End

After video recording complete, IDCM should send below message to APIM:

* *Video Record Status == “last available value”*
* *Qty of Video == 1*
* *Type of Video == Emergency Video*

APIM HMI updates:

* The live view page on APIM should be recovered to normal status.
* The DVR status icon on APIM status bar should be set to no recording status.
* APIM should popup a reminder to customer.

###### Emergency Video Record Attributes

* If normal video record is enabled, emergency video duration should contain 15 seconds collision detected and 30 seconds (default value) after collision detected. If normal video record is disabled, emergency video should only contain 30 seconds (default value) after collision detected.
* The “30 seconds” is configurable through DVR setting interface.
* Emergency video should be saved into eMMC “Key Data” folder.
* Video naming rule: EVT-<Year-Month-Day Hour-Minute-Second>.mp4
* When emergency video recording, both manual video and photo record function should be disabled.

#### Technology Function Manual Photo Record

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Manual\_Photo\_Cmd | HMI Command | **UART msg**: APIM\_HMICommand\_Enum [Type:0x13] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑5: Input Signal mappings of Function Manual Photo Record

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Manual\_Photo\_Rsp | DVR Command Response | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Manual\_Photo\_Rst | DVR Command Result | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
|  |  |  |  |  |

Table 5‑6: Output Signal mappings of Function Manual Photo Record

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Manual Photo Record Process

Once manual photo is triggered, APIM shall send below msg to IDCM:

* *HMI Command == Photo Capture*

Command Reception:

When IDCM receives the command, should response below msg:

* *DVR Command Response == Photo Capture*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

All the other command control logic in this FIS should follow the same command reception strategy: If *DVR Command Result == Command Reception Failed* or APIM could not receive this response in 2 seconds (reception timeout), APIM should try to send the command another 3 times, and if still get *DVR Command Result == Command Reception Failed or* reception timeout*,* APIM should pop up a command failure result to customer.

Command Execution:

If photo capture completes, IDCM should response command result:

* *DVR Command Response == Photo Capture*
* *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:

* APIM should play a “photo capture” sound when *DVR Command Result == Execution Succeed.*
* APIM should pop up command success result to customer if *Execution Succeed*.
* APIM should pop up command failure result to customer if *Execution Failed*.

###### Manual Photo Record Attributes

* Photos should be saved into eMMC “Key Data” folder
* Naming rule: PHO-<Year-Month-Day Hour-Minute-Second>.jpg
* Manual photo command delay protection:
  + If the second command triggered before APIM receive the first command execution result, APIM should disable the manual photo button temporary, and give reminder to customer.



* + And once APIM receives the last command execution result or command execution result is 2 seconds timeout, APIM should enable the manual photo button.

#### Technology Function Manual Video Record

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Manual\_Video\_Cmd | HMI Command | **UART msg**: APIM\_HMICommand\_Enum [Type:0x13] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑7: Input Signal mappings of Function Manual Video Record

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Manual\_Video\_Rsp | DVR Command Response | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Manual\_Video\_Rst | DVR Command Result | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| Video\_Record\_Status | Video Record Status | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #3 | NA. | NA. |
| Video\_Recording\_Timestamp | Video Recording Timer | **UART msg**: IDCM\_RecordProgress\_Int [Type:0x02] [Subtype:0x02]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑8: Output Signal mappings of Function Manual Video Record

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Manual Video Record Start

Once manual video is triggered, APIM shall send below msg to IDCM:

* *HMI Command == Video Capture*

Command Reception:

When IDCM receives the command, should response below msg:

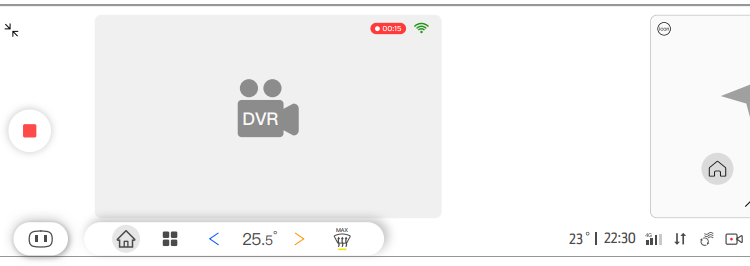
* *DVR Command Response == Video Capture*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Once IDCM receives the command successfully, IDCM should start manual video recording, and synchronize the recording timestamp to APIM periodically:

* *Video Record Status == Manual Recording*
* *Video Recording Timer == “Corresponding recording timestamp” starts from 1*

APIM HMI control:

* The live view page on APIM should be set to manual recording status:
  1. A recording timer should be displayed, value should be same as *Video Recording Timer.*
* The DVR status icon on APIM status bar should be set to recording status.



###### Manual Video Record End

Command Execution:

If manual video recording completes with a defined timer (default value is 45s), IDCM should response command result:

* *DVR Command Response == Video Capture*
* *DVR Command Result == Execution Succeed or Execution Failed*
* *Video Record Status == “last available value”*

APIM HMI control:

* The live view page on APIM should be recovered to normal status.
* The DVR status icon on APIM status bar should be set to no recording status.
* APIM should pop up command success result to customer if *Execution Succeed*.
* APIM should pop up command failure result to customer if *Execution Failed*.

###### Manual Video Record Stop

Once manual video stop is triggered before a manual video recording event goes to the end, APIM shall input below msg:

* *HMI Command ==* *Stop Video Capture*

Command Reception:

Once IDCM receives the command, and responses below msg:

* *DVR Command Response == Stop Video Capture*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Once IDCM receives the command successfully, IDCM shall try to stop manual video recording and send out command result:

* *DVR Command Response == Stop Video Capture*
* *DVR Command Result == Execution Succeed or Execution Failed*
* *Video Record Status == “last available value”*

APIM HMI control when *Execution Succeed*:

* The live view page on APIM should be recovered to normal status.
* The DVR status icon on APIM status bar should be set to no recording status.
* APIM should pop up command success result to customer if *Execution Succeed*.
* APIM should pop up command failure result to customer if *Execution Failed*.

If customer stops video recording manually, IDCM does not need to feedback *Video Capture* command execution result anymore.

###### Manual Video Record Attributes

* Manual video should be saved into eMMC “Key Data” folder.
* Naming rule: MAN-<Year-Month-Day Hour-Minute-Second>.mp4.

#### Technology Function Video Watermark

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Veh\_Speed | Vehicle Speed | **UART msg**: APIM\_VehicleSpeed\_Int [Type:0x12] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Veh\_VIN\_Rsp | VIN Code | **UART msg**: APIM\_VIN\_ASCII [Type:0x12] [Subtype:0x03]  **Data ID**: #1 | NA. | NA. |
| Veh\_Gear | Vehicle Gear Position | **UART msg**: APIM\_Watermark\_Enum [Type:0x12] [Subtype:0x04]  **Data ID**: #1 | NA. | NA. |
| Veh\_Corenering\_Lamp | Cluster Cornering Lamp Status | **UART msg**: APIM\_Watermark\_Enum [Type:0x12] [Subtype:0x04]  **Data ID**: #2 | NA. | NA. |
| Veh\_Seatbelt | Cluster Seatbelt Lamp Status | **UART msg**: APIM\_Watermark\_Enum [Type:0x12] [Subtype:0x04]  **Data ID**: #3 | NA. | NA. |
| GPS\_Year | Year Data | **UART msg**: APIM\_Heartbeat\_Enum [Type:0x11] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| GPS\_Month | Month Data | **UART msg**: APIM\_Heartbeat\_Enum [Type:0x11] [Subtype:0x01]  **Data ID**: #3 | NA. | NA. |
| GPS\_Day | Day Data | **UART msg**: APIM\_Heartbeat\_Enum [Type:0x11] [Subtype:0x01]  **Data ID**: #4 | NA. | NA. |
| GPS\_Hour | Hour Data | **UART msg**: APIM\_Heartbeat\_Enum [Type:0x11] [Subtype:0x01]  **Data ID**: #5 | NA. | NA. |
| GPS\_Min | Minute Data | **UART msg**: APIM\_Heartbeat\_Enum [Type:0x11] [Subtype:0x01]  **Data ID**: #6 | NA. | NA. |
| GPS\_Second | Second Data | **UART msg**: APIM\_Heartbeat\_Enum [Type:0x11] [Subtype:0x01]  **Data ID**: #7 | NA. | NA. |
|  |  |  |  |  |

Table 5‑9: Input Signal mappings of Function Manual Video Record

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Veh\_VIN\_Req | Request VIN | **UART msg**: IDCM\_VINCodeReq\_Int [Type:0x08] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑10: Output Signal mappings of Function Manual Video Record

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### VIN Code Request

Whenever IGN on and IDCM goes into Full Power Mode (refer to < F006930\_Drive Video Record Feature Level Specification> for the definition of Full Power Mode), IDCM should send below message to APIM to request VIN code update:

* *Request VIN == Request*

Once APIM receives the request, it should feedback the VIN code in ASCII format:

* *VIN Code == “Corresponding VIN number of the vehicle”*

###### Video Watermark Attributes

* Except VIN code, all other watermark data should send out by APIM periodically to IDCM:
* IDCM shall save the input data list in this section and label them onto all video data, the latency between data input and label onto video should less than 100ms.
* Default display and UART timeout value definition:
  + Vehicle Speed: 0
  + VIN Code: AAAAAAAAAAAAAAAAA or last available value if ever got
  + Vehicle Gear Position: NA. 
  + Cluster Cornering Lamp Status: Off
  + Cluster Seatbelt Lamp Status: Off
  + Year Data: 2000
  + Month Data: 01
  + Day Data: 01
  + Hour Data: 00
  + Minute Data: 00
  + Second Data: 00
* For GPS data:
  + APIM should get GPS data from CAN bus as IVI system timer.
  + APIM should send IVI system timer to IDCM, if APIM failed to get GPS data from CAN bus, APIM should send IVI setting timer to IDCM.

#### Technology Function Video Liveview

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Liveview\_Page\_Cmd | HMI Command | **UART msg**: APIM\_HMICommand\_Enum [Type:0x13] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑11: Input Signal mappings of Function Video Liveview

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Enter\_Liveview\_Rsp | DVR Command Response | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Enter\_Liveview\_Rst | DVR Command Result | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| Video\_Output\_Page | Video Output Page | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
|  |  |  |  |  |

Table 5‑12: Output Signal mappings of Function Video Liveview

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Liveview Page Enter Process

Liveview page is the default image of LVDS output from IDCM to APIM.

Once enter DVR Liveview page (DVR main page) is triggered, APIM shall input below msg:

* *HMI Command == Enter Live View Page*

Once IDCM receives the command, IDCM should response below msg:

* *DVR Command Response == Enter Live View Page*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*
* *Video Output Page == “last available value”*

APIM HMI control:

* The live view page on APIM should be displayed.
* APIM should display a loading animation:



After LVDS output switches to Liveview page, IDCM should feedback below command result:

* *DVR Command Response == Enter Live View Page*
* *DVR Command Result == Execution Succeed*
* *Video Output Page == Liveview Page*

Or

* *DVR Command Result == Execution Failed*
* *Video Output Page == “last available value”*

APIM HMI control:

* APIM should hide the loading animation.
* APIM should pop up command failure result to customer if *Execution Failed* or if APIM detects any LVDS input error:



#### Technology Function TF Card Detection

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| TF\_Format\_Cmd | HMI Command | **UART msg**: APIM\_HMICommand\_Enum [Type:0x13] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑13: Input Signal mappings of Function TF Card Detection

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| TF\_Card\_Status | TF Card Status | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #10 | NA. | NA. |
| TF\_Format\_Rsp | DVR Command Response | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| TF\_Format\_Rst | DVR Command Result | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
|  |  |  |  |  |

Table 5‑14: Output Signal mappings of Function TF Card Detection

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### TF Card Detection

APIM should keep monitoring TF card status in UART heartbeat message, before insert TF card, *TF Card Status should be TF Pull Out,* When a new TF Card is inserted:

* If *TF Card Status == TF Error:*
  + APIM should show a “TF error” reminder to customer:



* If *TF Card Status == TF Need Format:*
  + APIM should ask customer to format the TF card.



* If *TF Card Status == TF Inserted*:
  + APIM should give reminder to customer that new card detected.



###### TF Card Format

When customer chooses to format TF card, APIM should send below message to IDCM:

* *HMI Command == Format TF Card*

Command Reception:

When IDCM receives the command, should response below msg:

* *DVR Command Response == Format TF Card*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*
* *TF Card Status == TF Format Ongoing*

APIM HMI control:

* APIM should display a “formatting” reminder to customer*:*



Command Execution:

After format complete, IDCM should response command result:

* *DVR Command Response == Format TF Card*
* *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:

* APIM should pop up command success result to customer if *Execution Succeed*.
* APIM should pop up command failure result to customer if *Execution Failed*.

#### Technology Function Playback List Display

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Playback\_List\_Cmd | HMI Command | **UART msg**: APIM\_HMICommand\_Enum [Type:0x13] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Finger\_Operation\_Type | Finger Action Type | **UART msg**: APIM\_HMICoordinate\_Enum [Type:0x13] [Subtype:0x02]  Data ID: #1 | NA. | NA. |
| Coordinate\_X | X-Axis Coordinate | **UART msg**: APIM\_HMICoordinate\_Enum [Type:0x13] [Subtype:0x02]  Data ID: #2 | NA. | NA. |
| Coordinate\_Y | Y-Axis Coordinate | **UART msg**: APIM\_HMICoordinate\_Enum [Type:0x13] [Subtype:0x02]  Data ID: #3 | NA. | NA. |
|  |  |  |  |  |

Table 5‑15: Input Signal mappings of Function Playback List Display

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Playback\_List\_Rsp | DVR Command Response | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Playback\_List\_Rst | DVR Command Result | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| Video\_Output\_Page | Video Output Page | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| TF\_Status | TF Card Status | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #10 | NA. | NA. |
| List\_Mode | File List Mode | **UART msg**: IDCM\_BrowseLocation\_Int [Type:0x02] [Subtype:0x04]  **Data ID**: #1 | NA. | NA. |
| Folder\_Empty\_Status | File Folder Status | **UART msg**: IDCM\_BrowseLocation\_Int [Type:0x02] [Subtype:0x04]  **Data ID**: #2 | NA. | NA. |
| Folder\_Selected\_Status | File Selected Status | **UART msg**: IDCM\_BrowseLocation\_Int [Type:0x02] [Subtype:0x04]  **Data ID**: #3 | NA. | NA. |
| File\_Selected\_Qty | Qty of Files Selected | **UART msg**: IDCM\_BrowseLocation\_Int [Type:0x02] [Subtype:0x04]  **Data ID**: #4 | NA. | NA. |
|  |  |  |  |  |

Table 5‑16: Output Signal mappings of Function Playback List Display

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Enter Normal Data Playback List Page

When customer wants to enter normal data playback list page, APIM shall input below msg:

* *HMI Command == Enter Normal Data Page*

Command Reception:

Once IDCM receives the command, should response below msg:

* *DVR Command Response == Enter Normal Data Page*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

APIM HMI control if *Command Reception Succeed*:

* APIM should enter the normal data playback list page.
* APIM should display a loading animation*.*



Command Execution:

After switch to normal data playback list page, IDCM should feedback below command result:

* *DVR Command Response == Enter Normal Data Page*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically until customer leaves this page:

* *Video Output Page == Normal Data List Page*
* *File List Mode == List Mode*
* *File Folder Status == Empty or Not Empty*
* *File Selected Status == All Unselected*
* *Qty of Files Selected == 0x00*

APIM HMI control:

* If *File Folder Status == Empty:*
  + APIM should show empty folder reminder to customer:



* If *File Folder Status == Not Empty*
  + APIM should directly show the LVDS image*:*



###### Enter Key Data Playback List Page

When customer wants to enter key data playback list page, APIM shall input below msg:

* *HMI Command == Enter Key Data Page*

Command Reception:

Once IDCM receives the command, should response below msg:

* *DVR Command Response == Enter Key Data Page*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

APIM HMI control if *Command Reception Succeed*:

* APIM should enter the key data playback list page.
* APIM should display a loading animation*.*

Command Execution:

After switch to key data playback list page, IDCM should feedback below command result:

* *DVR Command Response == Enter Key Data Page*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

* *Video Output Page == Key Data List Page*
* *File List Mode == List Mode*
* *File Folder Status == Empty or Not Empty*
* *File Selected Status == All Unselected*
* *Qty of Files Selected == 0x00*

APIM HMI control:

* If *File Folder Status == Empty:*
  + APIM should show empty folder reminder to customer.
* If *File Folder Status == Not Empty*
  + APIM should directly show the LVDS image input*.*

###### Enter TF Data Playback List Page

TF card status confirmation:

When customer wants to enter TF data playback list page, APIM should keep monitoring the TF card status:

If *TF Card Status == TF Pull Out:*

* APIM should show a “No TF Card” reminder to customer:



If *TF Card Status == TF Error:*

* APIM should stay in previous playback list page.
* APIM should show a “TF error” reminder to customer:

If *TF Card Status == TF Need Format:*

* APIM should stay in previous playback list page.
* APIM should ask customer to format the TF card, refer to “TF Card Format” section for the definition of TF card format process.

If *TF Card Status == TF Inserted*, APIM should send below msg to IDCM:

* *HMI Command == Enter TF Data Page*

Command Reception:

Once IDCM receives the command, and responses below msg:

* *DVR Command Response == Enter TF Data Page*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

APIM HMI control if *Command Reception Succeed*:

* APIM should enter the TF data playback list page.
* APIM should display a loading animation*.*

Command Execution:

After switch to TF data playback list page, IDCM should feedback below command result:

* *DVR Command Response == Enter TF Data Page*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

* *Video Output Page == TF Data List Page*
* *File List Mode == List Mode*
* *File Folder Status == Empty or Not Empty*
* *File Selected Status == All Unselected*
* *Qty of Files Selected == 0x00*

APIM HMI control:

* If *File Folder Status == Empty:*
  + APIM should show empty folder reminder to customer.
* If *File Folder Status == Not Empty*
  + APIM should directly show the LVDS image input*.*

###### Playback List Scroll

When customer try to finger scroll up or down in the playback list page area, APIM shall send below msg to IDCM:

* *HMI Command == Scroll to Previous Page or Scroll to Next Page*

Once IDCM receives the command, should response below msg:

* *DVR Command Response == Scroll to Previous Page or Scroll to Next Page*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After list page update complete, IDCM should feedback below command result:

* *DVR Command Response == Scroll to Previous Page or Scroll to Next Page*
* *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:

* APIM should directly show the LVDS image input*.*

###### Enter Edit Mode

When customer chooses Edit Mode, APIM shall send below msg to IDCM:

* *HMI Command == File Edit Mode*

Once IDCM receives the command, should response below msg:

* *DVR Command Response == File Edit Mode*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After enter Edit Mode, IDCM should feedback below command result:

* *DVR Command Response == File Edit Mode*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

* *File List Mode == Edit Mode*
* *File Folder Status == Not Empty*
* *File Selected Status == All Unselected*
* *Qty of Files Selected == 0x00*

APIM HMI control:

* APIM HMI should enter Edit Mode status:



* APIM should highlight the *Qty of Files Selected* to customer to identify how many files already be selected.
* The file in list should be selectable by single file or by date or by whole folder

###### Exit Edit Mode

When customer chooses to exit Edit Mode, APIM shall send below msg to IDCM:

* *HMI Command == File List Mode*

Once IDCM receives the command, should response below msg:

* *DVR Command Response == File List Mode*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After exit Edit Mode, IDCM should feedback below command result:

* *DVR Command Response == File List Mode*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

* *File List Mode == List Mode*
* *File Folder Status == Not Empty*
* *File Selected Status == All Unselected*
* *Qty of Files Selected == 0x00*

APIM HMI control:

* APIM HMI should exit Edit Mode status.

###### Select All Files

When customer pressed “select all” button, APIM shall send below msg to IDCM:

* *HMI Command == Select All File*

Once IDCM receives the command, should response below msg:

* *DVR Command Response == Select All File*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After files selected, IDCM should feedback below command result:

* *DVR Command Response == Select All File*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

* *File List Mode == Edit Mode*
* *File Folder Status == Not Empty*
* *File Selected Status == All Selected*
* *Qty of Files Selected == corresponding numbers of file selected*

APIM HMI control:

* APIM HMI should change the corresponding HMI button to “unselect all” button:



* APIM should highlight the *Qty of Files Selected* to customer to identify how many files already be selected.

###### Unselect All Files

When customer pressed “unselect all” button, APIM shall send below msg to IDCM:

* *HMI Command == Unselect All File*

Once IDCM receives the command, should response below msg:

* *DVR Command Response == Unselect All File*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

After files unselected, IDCM should feedback below command result:

* *DVR Command Response == Unselect All File*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM periodically:

* *File List Mode == Edit Mode*
* *File Folder Status == Not Empty*
* *File Selected Status == All Unselected*
* *Qty of Files Selected == 0x00*

APIM HMI control:

* APIM HMI should change the corresponding HMI button to “select all” button.
* APIM should highlight the *Qty of Files Selected* to customer as 0 file is selected.

###### Select or Unselect One File

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on playback list page area:

* *Finger Action Type == Pressed* or *Released*

Finger touch process should contain: *Pressed 🡪 Released,* APIM should send out the status separately to IDCM.

* *X-Axis Coordinate == “Finger X Coordinate”*
* *Y-Axis Coordinate == “Finger Y Coordinate”*

IDCM should set corresponding file to be selected or unselected status according to the X and Y coordinates, and keep updating below information to APIM:

* *File List Mode == Edit Mode*
* *File Folder Status == Not Empty*
* *File Selected Status:*
  + *== All Selected* if all files in currently folder are selected.

APIM should change the corresponding HMI button to “unselect all” status.

* + *== All Unselected* if all files in currently folder are unselected.

APIM should keep the corresponding HMI button as “select all” status.

* + *== 0xFF* for other cases.

APIM should keep the corresponding HMI button as “select all” status.

* *Qty of Files Selected == corresponding numbers of file selected*

APIM should highlight the *Qty of Files Selected* to customer after selection.

###### Select Files By Date

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on any of the playback list page:

* *Finger Action Type == Pressed* or *Released*

Finger touch process should contain: *Pressed 🡪 Released,* APIM should send out the status separately to IDCM.

* *X-Axis Coordinate == “Finger X Coordinate”*
* *Y-Axis Coordinate == “Finger Y Coordinate”*

IDCM should set corresponding files to selected or unselected status according to the files recording date, and keep updating below information to APIM:

* *File List Mode == Edit Mode*
* *File Folder Status == Not Empty*
* *File Selected Status:*
  + *== All Selected* if all files in currently folder are selected.

APIM should change the corresponding HMI button to “unselect all” status.

* + *== All Unselected* if all files in currently folder are unselected.

APIM should keep the corresponding HMI button as “select all” status.

* + *== 0xFF* for other cases.

APIM should keep the corresponding HMI button as “select all” status.

* *Qty of Files Selected == corresponding numbers of file selected*

APIM should highlight the *Qty of Files Selected* to customer after selection.

###### Playback List Display Attributes

* Normal data playback list page should only contain normal video.
* Key data playback list page should contain manual photo / manual video or emergency video, and there should be labels to distinguish different data types.
* TF data playback list will only contain data copied from Normal data or Key data folder.
* All above data should be sorted by time in reverse order.
* Playback list should update automatically if new data created.
* Playback list should not contain the files which could not be replayed.
* If customer leaves current playback list page, the file chosen list should be cleared automatically:
  + *File List Mode == List Mode*
  + *File Folder Status == Not Empty*
  + *File Selected Status == All Unselected*
  + *Qty of Files Selected == 0x00*

#### Technology Function Data Copy to TF

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Data\_Copy\_Cmd | HMI Command | **UART msg**: APIM\_HMICommand\_Enum [Type:0x13] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑17: Input Signal mappings of Function Data Copy to TF

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Data\_Copy\_Rsp | DVR Command Response | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Data\_Copy\_Rst | DVR Command Result | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| File\_Operation\_Type | Operation Type | **UART msg**: IDCM\_FileOptProgress\_Int[Type:0x02] [Subtype:0x03]  **Data ID**: #1 | NA. | NA. |
| Total\_File\_Number | Total Files Selected | **UART msg**: IDCM\_FileOptProgress\_Int[Type:0x02] [Subtype:0x03]  **Data ID**: #2 | NA. | NA. |
| Qty\_Completed | Qty of Complete | **UART msg**: IDCM\_FileOptProgress\_Int[Type:0x02] [Subtype:0x03]  **Data ID**: #3 | NA. | NA. |
| Percent\_Completed | Operation Progress | **UART msg**: IDCM\_FileOptProgress\_Int[Type:0x02] [Subtype:0x03]  **Data ID**: #4 | NA. | NA. |
| Video\_Output\_Page | Video Output Page | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| TF\_Card\_Status | TF Card Status | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #10 | NA. | NA. |
|  |  |  |  |  |

Table 5‑18: Output Signal mappings of Function Data Copy to TF

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Copy Start

Pre-condition:

When APIM HMI is in Edit Mode at normal data or key data playback list page:

* *Video Output Page == Normal Data List Page or Key Data List Page*
* *File List Mode == Edit Mode*
* *File Folder Status == Not Empty*
* *File Selected Status:*
  + *== All Selected* if all files in currently folder are selected.
  + *== All Unselected* if all files in currently folder are unselected.
  + *== 0xFF* for other cases.
* *Qty of Files Selected == corresponding numbers of file selected*

If customer presses “copy” button and triggers data copy to TF card process, APIM HMI should go back to List Mode:

* *Video Output Page == Normal Data List Page or Key Data List Page*
* *File List Mode == List Mode*
* *File Folder Status == Not Empty*
* *File Selected Status == All Unselected*
* *Qty of Files Selected == 0x00*

TF card status confirmation:

APIM should keep monitoring the TF card status before send TF copy command to IDCM:

If *TF Card Status == TF Pull Out:*

* APIM should show a “No TF Card” reminder to customer and stop copy process.



If *TF Card Status == TF Error:*

* APIM should show a “TF error” reminder to customer and stop copy process.



If *TF Card Status == TF Need Format:*

* APIM should ask customer to format the TF card, refer to “TF Card Format” section for the definition of TF card format process, and APIM should stop copy process.

If *TF Card Status == TF Inserted*, APIM should send below msg to IDCM:

* *HMI Command == TF Card Copy*

Command Reception:

Once IDCM receives the command, should response below msg:

* *DVR Command Response == TF Card Copy*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Once IDCM receives the command successfully, IDCM should start data copy process, and synchronize the status to APIM periodically:

* *Operation Type == File Copy*
* *Total Files Selected == Total files number which are selected to copy in Edit Mode*
* *Qty of Complete == Files number which are already copied to TF card successfully*
* *Operation Progress == Files copying progress*

APIM HMI control:

* During copy process, the DVR status icon on APIM status bar should be set to copying status. 
* APIM should display a copying reminder to customer *according to above information.*



###### Copy End

Command Execution:

After IDCM completes the whole copy process, IDCM should feedback below command result:

* *DVR Command Response == TF Card Copy*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM:

* *Operation Type == File Copy*
* *Total Files Selected == Total files number which are selected to copy in Edit Mode*
* *Qty of Complete == Total Files Selected*
* *Operation Progress == 0x64(100%)*

APIM HMI control:

* The DVR status icon on APIM status bar should be set to previous status.
* APIM should pop up command success result to customer if *Execution Succeed*, also need to highlight how many files copied to TF card successfully:



* APIM should pop up command failure result to customer if *Execution Failed*, also need to highlight how many files failed to copy:



###### Copy Stop

Customer could stop copy process by press the “cancellation” button, APIM shall send below message to IDCM:

* *HMI Command == TF Card Copy Stop*

Command Reception:

Once IDCM receives the command, should response below msg:

* *DVR Command Response == TF Card Copy Stop*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Command Execution:

After IDCM stops the copy process, IDCM should feedback below command result:

* *DVR Command Response == TF Card Copy Stop*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM:

* *Operation Type == File Copy*
* *Total Files Selected == Total files number which are selected to copy in Edit Mode*
* *Qty of Complete == Files number which are already copied to TF card successfully*
* *Operation Progress == Files copying progress*

APIM HMI control:

* The DVR status icon on APIM status bar should be set to previous status.
* APIM should pop up command success result to customer if *Execution Succeed*, also need to highlight how many files copied to TF card successfully:



If customer stops copy process manually, IDCM does not need to feedback TF Card Copy command execution result anymore.

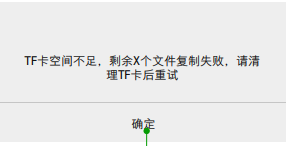
###### TF Card Memory Full

IDCM should keep monitoring the TF card memory status to confirm if enough space to continue the copy operation, if TF memory full, IDCM should feedback below message to APIM during copying:

* *DVR Command Response == TF Card Copy*
* *DVR Command Result == Execution Failed*
* *Operation Type == File Copy*
* *Total Files Selected == Total files number which are selected to copy in Edit Mode*
* *Qty of Complete == Files number which are already copied to TF card successfully*
* *Operation Progress == Files copying progress*
* *TF Card Status == TF Full*

APIM HMI control:

* APIM should give reminder to customer, also need to highlight how many files failed to copy to TF card.



* Then APIM should stop the copy process and go back to playback list page.

###### Smart Copy

Refer to “Copy Start” , “Copy End” , “Copy Stop” and “TF Card Memory Full” sections for Smart Copy function implementation.

The differences of smart copy:

* The *HMI Command* and *DVR Command Response* should be *Smart Copy.*
* Smart Copy function will directly copy the newest two normal videos to TF card, so the *Total Files Selected* is 2.

###### Data Copy Attributes

* If a data copy event is not completed, APIM should not trigger another copy request to IDCM again.

#### Technology Function Data Deletion from TF

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Data\_Delete\_Cmd | HMI Command | **UART msg**: APIM\_HMICommand\_Enum [Type:0x13] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |
|  |  |  |  |  |

Table 5‑19: Input Signal mappings of Function Data Deletion from TF

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Data\_Delete\_Rsp | DVR Command Response | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Data\_Delete\_Rst | DVR Command Result | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| File\_Operation\_Type | Operation Type | **UART msg**: IDCM\_FileOptProgress\_Int[Type:0x02] [Subtype:0x03]  **Data ID**: #1 | NA. | NA. |
| Total\_File\_Number | Total Files Selected | **UART msg**: IDCM\_FileOptProgress\_Int[Type:0x02] [Subtype:0x03]  **Data ID**: #2 | NA. | NA. |
| Qty\_Completed | Qty of Complete | **UART msg**: IDCM\_FileOptProgress\_Int[Type:0x02] [Subtype:0x03]  **Data ID**: #3 | NA. | NA. |
| Percent\_Completed | Operation Progress | **UART msg**: IDCM\_FileOptProgress\_Int[Type:0x02] [Subtype:0x03]  **Data ID**: #4 | NA. | NA. |
| Video\_Output\_Page | Video Output Page | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| TF\_Card\_Status | TF Card Status | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #10 | NA. | NA. |
|  |  |  |  |  |

Table 5‑20: Output Signal mappings of Function Data Deletion from TF

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Deletion Start

Pre-condition:

When APIM HMI is in Edit Mode at TF data playback list page:

* *Video Output Page == TF Data List Page*
* *File List Mode == Edit Mode*
* *File Folder Status == Not Empty*
* *File Selected Status:*
  + *== All Selected* if all files in currently folder are selected.
  + *== All Unselected* if all files in currently folder are unselected.
  + *== 0xFF* for other cases.
* *Qty of Files Selected == corresponding numbers of file selected*

If customer presses “delete” button and triggers data deletion from TF card process, APIM HMI should go back to List Mode:

* *Video Output Page == TF Data List Page*
* *File List Mode == List Mode*
* *File Folder Status == Not Empty*
* *File Selected Status == All Unselected*
* *Qty of Files Selected == 0x00*

Command Reception:

Once IDCM receives the command, should response below msg:

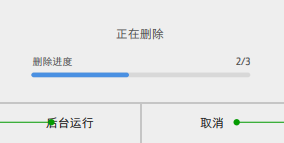
* *DVR Command Response == TF Card Delete*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Once IDCM receives the command successfully, IDCM should start data deletion process, and synchronize the status to APIM periodically:

* *Operation Type == File Deletion*
* *Total Files Selected == Total files number which are selected to delete in Edit Mode*
* *Qty of Complete == Files number which are already deleted from TF card successfully*
* *Operation Progress == Files deleting progress*

APIM HMI control:

* During deletion process, the DVR status icon on APIM status bar should be set to deleting status. 
* APIM should display a deleting reminder to customer *according to above information.*



###### Deletion End

Command Execution:

After IDCM completes the whole deletion process, IDCM should feedback below command result:

* *DVR Command Response == TF Card Delete*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM:

* *Operation Type == File Deletion*
* *Total Files Selected == Total files number which are selected to delete in Edit Mode*
* *Qty of Complete == Total Files Selected*
* *Operation Progress == 0x64(100%)*

APIM HMI control:

* The DVR status icon on APIM status bar should be set to previous status.
* APIM should pop up command success result to customer if *Execution Succeed*, also need to highlight how many files deleted from TF card successfully:



* APIM should pop up command failure result to customer if *Execution Failed*:



###### Deletion Stop

Customer could stop deletion process by press the “cancellation” button, APIM shall send below message to IDCM:

* *HMI Command == TF Card Delete Stop*

Command Reception:

Once IDCM receives the command, should response below msg:

* *DVR Command Response == TF Card Delete Stop*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

Command Execution:

After IDCM stops the deletion process, IDCM should feedback below command result:

* *DVR Command Response == TF Card Delete Stop*
* *DVR Command Result == Execution Succeed or Execution Failed*

If *Execution Succeed*, IDCM should update below information to APIM:

* *Operation Type == File Deletion*
* *Total Files Selected == Total files number which are selected to delete in Edit Mode*
* *Qty of Complete == Files number which are already deleted from TF card successfully*
* *Operation Progress == Files deleting progress*

APIM HMI control:

* The DVR status icon on APIM status bar should be set to previous status.
* APIM should pop up command success result to customer if *Execution Succeed*, also need to highlight how many files deleted from TF card.

If customer stops deletion process manually, IDCM does not need to feedback TF Card Delete command execution result anymore.

###### Data Deletion Attributes

* If a data deletion event is not completed, APIM should not trigger another deletion request to IDCM again.

#### Technology Function Data Playback Control

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Data\_Playback\_Cmd | HMI Command | **UART msg**: APIM\_HMICommand\_Enum [Type:0x13] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Finger\_Operation\_Type | Finger Action Type | **UART msg**: APIM\_HMICoordinate\_Enum [Type:0x13] [Subtype:0x02]  Data ID: #1 | NA. | NA. |
| Coordinate\_X | X-Axis Coordinate | **UART msg**: APIM\_HMICoordinate\_Enum [Type:0x13] [Subtype:0x02]  Data ID: #2 | NA. | NA. |
| Coordinate\_Y | Y-Axis Coordinate | **UART msg**: APIM\_HMICoordinate\_Enum [Type:0x13] [Subtype:0x02]  Data ID: #3 | NA. | NA. |
|  |  |  |  |  |

Table 5‑21: Input Signal mappings of Function Playback Control

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Data\_Playback\_Rsp | DVR Command Response | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Data\_Playback\_Rst | DVR Command Result | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| Video\_Output\_Page | Video Output Page | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| TF\_Status | TF Card Status | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #10 | NA. | NA. |
| List\_Mode | File List Mode | **UART msg**: IDCM\_BrowseLocation\_Int [Type:0x02] [Subtype:0x04]  **Data ID**: #1 | NA. | NA. |
| Folder\_Empty\_Status | File Folder Status | **UART msg**: IDCM\_BrowseLocation\_Int [Type:0x02] [Subtype:0x04]  **Data ID**: #2 | NA. | NA. |
|  |  |  |  |  |

Table 5‑22: Output Signal mappings of Function Playback Control

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Select File to Play

Pre-condition:

When APIM HMI is in List Mode at one of the data playback list page:

* *Video Output Page == Normal Data List Page* or *Key Data List Page* or *TF Data List Page*
* *File List Mode == List Mode*
* *File Folder Status == Not Empty*

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on playback list page area:

* *Finger Action Type == Pressed* or *Released*

Finger touch process should contain: *Pressed 🡪 Released,* APIM should send out the status separately to IDCM.

* *X-Axis Coordinate == “Finger X Coordinate”*
* *Y-Axis Coordinate == “Finger Y Coordinate”*

Command Reception:

IDCM should start to play the selected file if the X and Y coordinates match to a file area, and should update below status to APIM:

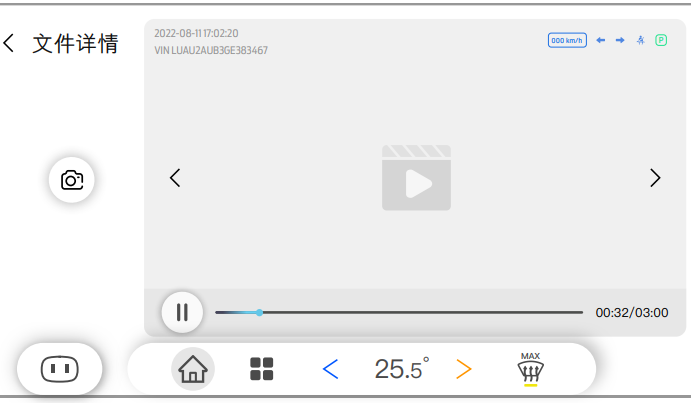
* *Video Output Page == Video Playing Page* or *Photo Playing Page*

APIM HMI control:

* APIM should display a playback loading reminder for a few seconds, the reminder duration depends on how long does IDCM start to play the file.



* APIM HMI should change to video playback page if *Video Output Page == Video Playing Page*



* APIM HMI should change to photo replay page if *Video Output Page == Video Playing Page*

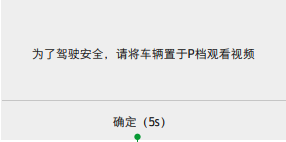


* If APIM detects any LVDS input error, it should display an error reminder to customer:



And request IDCM go back to previous playback list page, refer to “Playback List Display” section for details.

* Anytime during replaying, if vehicle gear position is not at “P” position (for display at driver side only), APIM should pop up a “Gear Position Protection” reminder to customer:



If customer does not switch the gear position to “P”, APIM should request IDCM go back to previous playback list page, refer to “Playback List Display” section for details.

* If data in TF card is under playback, and TF card is pulled out:
  + *TF Card Status == TF Pull Out*

APIM should display a reminder to customer, and request IDCM go back to normal data playback list page, refer to “Playback List Display” section for details



###### Start or Pause Video Play

Pre-condition:

When APIM HMI is at video playback page:

* *Video Output Page == Video Playing Page*

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on video playback page area:

* *Finger Action Type == Pressed* or *Released*

Finger touch process should contain: *Pressed 🡪 Released,* APIM should send out the status separately to IDCM.

* *X-Axis Coordinate == “Finger X Coordinate”*
* *Y-Axis Coordinate == “Finger Y Coordinate”*

Command Reception:

IDCM should start or pause the video playback if the X and Y coordinates match to the “Play” button area.

###### Video Forward or Backward

Pre-condition:

When APIM HMI is at video playback page:

* *Video Output Page == Video Playing Page*

APIM should send the corresponding HMI coordinate value to IDCM when customer’s finger sliding on video playback page area:

* *Finger Action Type == Pressed* or *Moving* or *Released*

Finger touch process should contain: *Pressed 🡪 Moving 🡪 Released,* APIM should send out the status separately to IDCM.

* *X-Axis Coordinate == “Finger X Coordinate”*
* *Y-Axis Coordinate == “Finger Y Coordinate”*

Command Reception:

IDCM should relocate the video playing timestamp if the X and Y coordinates match to the video playing progress bar area.

###### Play Last or Next Data

Pre-condition:

When APIM HMI is at video or photo playback page:

* *Video Output Page == Video Playing Page* or *Photo Playing Page*

APIM should send the corresponding HMI coordinate value to IDCM when customer clicking on video playback page area:

* *Finger Action Type == Pressed* or *Released*

Finger touch process should contain: *Pressed 🡪 Released,* APIM should send out the status separately to IDCM.

* *X-Axis Coordinate == “Finger X Coordinate”*
* *Y-Axis Coordinate == “Finger Y Coordinate”*

Command Reception:

IDCM should play the previous or next data if the X and Y coordinates match to the last or next button area.

###### Screenshot

Pre-condition:

When APIM HMI is at video playback page:

* *Video Output Page == Video Playing Page*

APIM should send below command to IDCM when customer try to screenshot:

* *HMI Command == Video Screenshot*

Command Reception:

When IDCM receives the command, should response below msg:

* *DVR Command Response == Video Screenshot*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

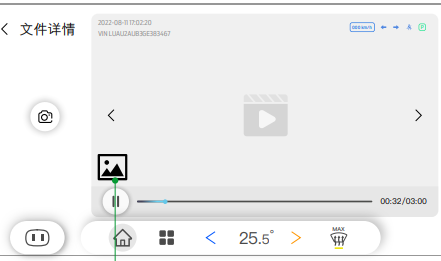
Command Execution:

If screenshot completes, IDCM should response command result:

* *DVR Command Response == Video Screenshot*
* *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:

* APIM should play a “photo capture” sound when *DVR Command Result == Execution Succeed.*
* APIM should pop up command success result to customer if *Execution Succeed*.



* APIM should pop up command failure result to customer if *Execution Failed*.
* If customer wants to check the screenshot photo, APIM should request IDCM go back to key data playback list page, refer to “Playback List Display” section for details

###### Data Playback Display Attributes

* When launched to playback page, video should start to play automatically.
* Watermark information should be displayed when playback.

#### Technology Function DVR Parameter Setting

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Normal\_Video\_Switch | Normal Video Record Switch | **UART msg**: APIM\_NormalVideoSwitch\_Enum [Type:0x14] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Vehicle\_Monitor\_Switch | Vehicle Monitor Function Switch | **UART msg**: APIM\_VehicleMonitorSwitch\_Enum [Type:0x14] [Subtype:0x02]  **Data ID**: #1 | NA. | NA. |
| Emergency\_Video\_Duration | Emergency Video Duration | **UART msg**: APIM\_SetEmergencyDuration\_Enum [Type:0x14] [Subtype:0x03]  **Data ID**: #1 | NA. | NA. |
| G-Sensor Sensitive | G-Sensor Collide Sensitive | **UART msg**: APIM\_SetCollideSensitive\_Enum [Type:0x14] [Subtype:0x04]  **Data ID**: #1 | NA. | NA. |
| Setting\_Reset\_Cmd | HMI Command | **UART msg**: APIM\_HMICommand\_Enum [Type:0x13] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Request\_DVR\_Parameter | Request Type | **UART msg**: APIM\_ReqDVRInformation\_Enum [Type:0x14] [Subtype:0x08]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑23: Input Signal mappings of Function DVR Parameter Setting

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Normal\_Video\_Switch\_Rsp | Normal Video Switch Response | **UART msg**: IDCM\_NormalVideoSwitch\_Enum [Type:0x04] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Vehicle\_Monitor\_Switch\_Rsp | Vehicle Monitor Switch Response | **UART msg**: IDCM\_VehicleMonitorSwitch\_Enum [Type:0x04] [Subtype:0x02]  **Data ID**: #1 | NA. | NA. |
| Emergency\_Video\_Duration\_Rsp | Emergency Video Duration Response | **UART msg**: IDCM\_SetEmergencyDuration\_Enum [Type:0x04] [Subtype:0x03]  **Data ID**: #1 | NA. | NA. |
| Gsensor\_Sensitive\_Rsp | Collision Detection Sensitive Level | **UART msg**: IDCM\_SetCollideSensitive\_Enum [Type:0x04] [Subtype:0x04]  **Data ID**: #1 | NA. | NA. |
| Setting\_Reset\_Rsp | DVR Command Response | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Setting\_Reset\_Rst | DVR Command Result | **UART msg**: IDCM\_CommandRsp\_Enum [Type:0x02] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| Video\_Record\_Status | Video Record Status | **UART msg**: IDCM\_Heartbeat\_Int [Type:0x01] [Subtype:0x01]  **Data ID**: #3 | NA. | NA. |
|  |  |  |  |  |

Table 5‑24: Output Signal mappings of Function DVR Parameter Setting

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### DVR Parameter Update

Pre-condition:

When APIM HMI changes to DVR Parameter setting page, APIM should send below command to IDCM to request newest setting value:

* *Request Type == Request DVR Parameter*

Command Feedback:

When IDCM receives the command, should response below msg:

* *Normal Video Switch Response == “Currently saved value”*
* *Vehicle Monitor Switch Response == “Currently saved value”*
* *Vehicle Monitor Switch Response == “Currently saved value”*
* *Collision Detection Sensitive Level == “Currently saved value”*

APIM HMI control:

* APIM should update all the setting value on HMI.

###### Normal Video Switch Setting

Once setting value is changed, APIM shall send below msg to IDCM:

* *Normal Video Record Switch == “New setting value”*

IDCM should update the setting data and response below msg:

* *Normal Video Switch Response == “New setting value”*
* *Video Record Status == Normal Recording*

APIM HMI control:

* APIM should display a reminder to customer that normal recording is enabled if *“New setting value”* is *“Enable”.*
* The DVR status icon on APIM status bar should be set to recording status if *“New setting value”* is *“Enable”.*

###### Vehicle Monitor Switch Setting

Once setting value is changed, APIM shall input below msg:

* *Vehicle Monitor Function Switch == “New setting value”*

IDCM should update the setting data and response below msg:

* *Vehicle Monitor Switch Response == “New setting value”*

###### Emergency Video Duration Setting

Once setting value is changed, APIM shall input below msg:

* *Emergency Video Duration == “New setting value”*

IDCM should update the setting data and response below msg:

* *Emergency Video Duration Response == “New setting value”*

###### Collision Detection Sensitive Setting

Once setting value is changed, APIM shall input below msg:

* *G-Sensor Collide Sensitive == “New setting value”*

IDCM should update the setting data and response below msg:

* *Collision Detection Sensitive Level == “New setting value”*

###### Setting Value Reset

When setting reset is triggered by customer, APIM shall input below msg:

* *HMI Command == DVR Setting Reset*

Command Reception:

When IDCM receives the command, should response below msg:

* *DVR Command Response == DVR Setting Reset*
* *DVR Command Result == Command Reception Succeed* or *Command Reception Failed*

APIM HMI control:

* APIM should display a resetting animation:



Command Execution:

If setting reset completes, IDCM should response command result:

* *DVR Command Response == DVR Setting Reset*
* *DVR Command Result == Execution Succeed or Execution Failed*

APIM HMI control:

* APIM should pop up command success result to customer if *Execution Succeed*.
* APIM should pop up command failure result to customer if *Execution Failed*.

###### DVR Parameter Setting Attributes

* If setting value feedback from IDCM is not same as APIM input, APIM should update the setting value to the feedback value from IDCM which means failed to change the DVR parameter setting.

#### Technology Function DVR Wi-Fi Setting

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| WIFI\_Hotspot\_Switch | Wi-Fi Hotspot Switch | **UART msg**: APIM\_WiFiHotspotSwitch\_Enum [Type:0x14] [Subtype:0x05]  **Data ID**: #1 | NA. | NA. |
| WIFI\_SSID\_Setting | DVR Wi-Fi SSID | **UART msg**: APIM\_SetWiFiSSID\_Enum [Type:0x14] [Subtype:0x06]  **Data ID**: #1 | NA. | NA. |
| WIFI\_PWD\_Setting | DVR Wi-Fi Password | **UART msg**: APIM\_SetEmergencyDuration\_Enum [Type:0x14] [Subtype:0x07]  **Data ID**: #1 | NA. | NA. |
| Request\_WiFi\_Parameter | Request Type | **UART msg**: APIM\_ReqDVRInformation\_Enum [Type:0x14] [Subtype:0x08]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑25: Input Signal mappings of Function DVR Wi-Fi Setting

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| WIFI\_Hotspot\_Switch\_Rsp | Wi-Fi Hotspot Switch Response | **UART msg**: IDCM\_WiFiHotspotSwitch\_Enum [Type:0x05] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| WIFI\_SSID\_Setting\_ Rsp | DVR Wi-Fi SSID Response | **UART msg**: IDCM\_SetWiFiSSID\_Enum [Type:0x05] [Subtype:0x02]  **Data ID**: #1 | NA. | NA. |
| WIFI\_PWD\_Setting\_Rsp | DVR Wi-Fi Password Response | **UART msg**: IDCM\_SetWiFiPSWD\_Enum [Type:0x05] [Subtype:0x03]  **Data ID**: #1 | NA. | NA. |
| WIFI\_Connect\_Status | Wi-Fi Connection Status | **UART msg**: IDCM\_Heartbeat\_Enum [Type:0x01] [Subtype:0x01]  **Data ID**: #5 | NA. | NA. |
|  |  |  |  |  |

Table 5‑26: Output Signal mappings of Function DVR Wi-Fi Setting

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### DVR Wi-Fi Information Update

Pre-condition:

When APIM HMI changes to DVR Wi-Fi setting page, APIM should send below command to IDCM to request newest setting value:

* *Request Type == Request DVR WiFi Information*

Command Feedback:

When IDCM receives the command, should response below msg:

* *Wi-Fi Hotspot Switch Response == “Currently saved value”*
* *DVR Wi-Fi SSID Response == “Currently saved value”*
* *DVR Wi-Fi Password Response == “Currently saved value”*

APIM HMI control:

* APIM should update all the setting value on HMI.

###### DVR Wi-Fi Switch Setting Process

Once setting value is changed, APIM shall input below msg:

* *Wi-Fi Hotspot Switch == “New setting value”*

IDCM should update the setting data and response below msg:

* *Wi-Fi Hotspot Switch Response == “New setting value”*

APIM HMI control:

* If *“New setting value”* is *Enable*, IDCM should update the Wi-Fi connection status in heartbeat msg:
  + *Wi-Fi Connection Status == No Connection* or *Connection Successful* or *Initializing*
* If *“New setting value”* is *Disable*, IDCM should update the Wi-Fi connection status in heartbeat msg:
  + *Wi-Fi Connection Status == Hotspot Disabled*

###### DVR Wi-Fi SSID Setting Process

Once setting value is changed and customer wants to save the setting, APIM shall input below msg:

* *DVR Wi-Fi SSID == “New setting value”*

IDCM should update the setting data and response below msg:

* *DVR Wi-Fi SSID Response == “New setting value”*

APIM HMI control:

* If setting value feedback from IDCM is not same as APIM input, APIM should update the setting value according to the feedback value from IDCM, and display a “saving failed” reminder to customer:



* If setting value feedback from IDCM is not same as APIM input, APIM should display a “saving ok” reminder.

###### DVR Wi-Fi Password Setting Process

Once setting value is changed and customer wants to save the setting, APIM shall input below msg:

* *DVR Wi-Fi Password == “New setting value”*

IDCM should update the setting data and response below msg:

* *DVR Wi-Fi Password Response == “New setting value”*

APIM HMI control:

* If setting value feedback from IDCM is not same as APIM input, APIM should update the setting value according to the feedback value from IDCM, and display a “saving failed” reminder to customer:
* If setting value feedback from IDCM is not same as APIM input, APIM should display a “saving ok” reminder.

###### DVR Wi-Fi Connection Reminder

APIM should keep monitoring the DVR Wi-Fi connection status, if:

* *Wi-Fi Connection Status == Connection Successful*

APIM should display a connection reminder to customer:



###### DVR Wi-Fi Setting Attributes

* DVR Wi-Fi hotspot should be disabled whenever IDCM change to Full Power Mode after IGN on.
* The SSID and password of DVR Wi-Fi hotspot should be created randomly by IDCM.

#### Technology Function DVR System Setting

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Request\_System\_Information | Request Type | **UART msg**: APIM\_ReqDVRInformation\_Enum [Type:0x14] [Subtype:0x08]  **Data ID**: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑27: Input Signal mappings of Function DVR System Setting

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| IDCM\_SW\_Version | IDCM SW Version | **UART msg**: IDCM\_SystemInfoRsp\_Int [Type:0x06] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| EMMC\_Storage | IDCM eMMC Storage | **UART msg**: IDCM\_SystemInfoRsp\_Int [Type:0x06] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| TF\_Storage | IDCM TF Card Storage | **UART msg**: IDCM\_SystemInfoRsp\_Int [Type:0x06] [Subtype:0x01]  **Data ID**: #3 | NA. | NA. |
| TF\_Size | TF Card Size | **UART msg**: IDCM\_SystemInfoRsp\_Int [Type:0x06] [Subtype:0x01]  **Data ID**: #4 | NA. | NA. |
|  |  |  |  |  |

Table 5‑28: Output Signal mappings of Function DVR System Setting

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### DVR System Information Update

Pre-condition:

When APIM HMI changes to DVR system information page, APIM should send below command to IDCM to request newest setting value:

* *Request Type == Request System Information*

Command Feedback:

When IDCM receives the command, should response below msg:

* *IDCM SW Version == “Currently SW version”*
* *IDCM eMMC Storage== “Currently eMMC storage status”*
* *IDCM TF Card Storage == “Currently TF Card storage status”*
* *TF Card Size == “Currently TF Card Size”*

APIM HMI control:

* APIM should calculate the memory margin according to IDCM feedback and update the system information to customer.

###### DVR System Information Attributes

* TBD

#### Technology Function Vehicle Monitor

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| NA. | NA. | NA. | NA. | NA. |
|  |  |  |  |  |

Table 5‑29: Input Signal mappings of Function Vehicle Monitor

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Video\_Recording\_Type | Type of Video | **UART msg**: IDCM\_EmergencyVideoInfo\_Int [Type:0x03] [Subtype:0x01]  Data ID: #2 | NA. | NA. |
| Video\_Recording\_Qty | Qty of Video | **UART msg**: IDCM\_EmergencyVideoInfo\_Int [Type:0x03] [Subtype:0x01]  Data ID: #1 | NA. | NA. |
|  |  |  |  |  |

Table 5‑30: Output Signal mappings of Function Vehicle Monitor

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Video Capture Reminder

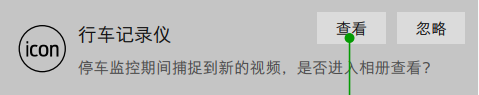
When IDCM is in standby power mode and vehicle monitor function is enabled, it should keep monitor the vehicle status via G-Sensor, if collision happening, IDCM should wakeup itself for video recording.

If any emergency videos were captured during last ignition off cycle, IDCM should send the video number to APIM when enter full power mode next time:

* *Type of Video == Vehicle Monitor Video*
* *Qty of Video == “corresponding video number which were capture during vehicle monitor”*

APIM HMI control:

* APIM should display a reminder to customer to highlight how many videos were captured during IGN off.



* Customer could enter key data playback list to review the vehicle monitor video.

###### Vehicle Monitor Attributes

* DVR user could disable vehicle monitor function via DVR setting.
* The video duration should be same as emergency video (default 30s) and configurable via DVR setting.
* All vehicle monitor videos should be save into IDCM local memory key folder and follow same emergency video naming rule.

#### Technology Function DVR Backdoor Command

##### Function Interfaces

###### Inputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Subscriber Interface** | **Connection**  (*Optional)* |
| Engineering\_Mode | Engineering Mode Request | **UART** msg: APIM\_BackDoorReq\_Enum [Type:0x15] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Clear\_EMMC\_Data | Clear Data Request | **UART** msg: APIM\_BackDoorReq\_Enum [Type:0x15] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| Veh\_Monitor\_Timer\_Change | Veh\_Monitor Timer Request | **UART** msg: APIM\_BackDoorReq\_Enum [Type:0x15] [Subtype:0x01]  **Data ID**: #3 | NA. | NA. |
| Veh\_Monitor\_Counter\_Change | Veh\_Monitor Counter Request | **UART** msg: APIM\_BackDoorReq\_Enum [Type:0x15] [Subtype:0x01]  **Data ID**: #4 | NA. | NA. |
|  |  |  |  |  |

Table 5‑23: Input Signal mappings of Function DVR Backdoor Command

###### Outputs

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | **Technical Signal Name** | **Mapping Details**  *(Conditional)* | **Publisher Interface** | **Connection**  *(Optional)* |
| Engineering\_Mode\_Rsp | Engineering Mode Response | **UART msg**: IDCM\_BackDoorRsp\_Enum [Type:0x09] [Subtype:0x01]  **Data ID**: #1 | NA. | NA. |
| Clear\_EMMC\_Data\_Rsp | Clear Data Response | **UART msg**: IDCM\_BackDoorRsp\_Enum [Type:0x09] [Subtype:0x01]  **Data ID**: #2 | NA. | NA. |
| Veh\_Monitor\_Timer\_Change\_Rsp | Veh\_Monitor Timer Response | **UART msg**: IDCM\_BackDoorRsp\_Enum [Type:0x09] [Subtype:0x01]  **Data ID**: #3 | NA. | NA. |
| Veh\_Monitor\_Counter\_Change\_Rsp | Veh\_Monitor Counter Response | **UART msg**: IDCM\_BackDoorRsp\_Enum [Type:0x09] [Subtype:0x01]  **Data ID**: #4 | NA. | NA. |
| Engineering\_Mode | Engineering Mode Status | **UART msg**: IDCM\_Heartbeat\_Int [Type:0x01] [Subtype:0x01]  **Data ID**: #4 | NA. | NA. |
|  |  |  |  |  |

Table 5‑24: Output Signal mappings of Function DVR Backdoor Command

###### Parameters

NA.

###### Interface Requirements

Refer to DVR UART protocol.

##### Function Requirements

###### Engineering Mode Control

DVR Engineering Mode definition:

* In this mode, IDCM should not support any video recording function, and it’s mainly used at Ford plant.

APIM shall send below msg to IDCM to enable Engineering Mode:

* *Engineering Mode Request == Enable*

IDCM should enter Engineering Mode and response below msg:

* *Engineering Mode Response == Enable*
* *Engineering Mode Status == Enabled*

###### Clear DVR Data Control

When Ford engineer or dealer wants to clear the data saved in IDCM eMMC, APIM shall send below msg to IDCM:

* *Clear Data Request == Request*

IDCM should clear the data and response below msg:

* *Clear Data Response == Succeed*

###### Change Vehicle Monitor Timer & Counter

When Ford engineer wants to change the vehicle monitor duration via APIM M2 config, APIM shall send below msg to IDCM:

* *Veh\_Monitor Timer Request == “New vehicle monitor days value”*
* *Veh\_Monitor Counter Request == “New vehicle monitor video counter value”*

IDCM should change the value and response below msg:

* *Veh\_Monitor Timer Response == “New vehicle monitor days value”*
* *Veh\_Monitor Counter Response == “New vehicle monitor video counter value”*

### APP – DVROffboardClient

#### Technology Function Video Liveview

TBD

#### Technology Function Data Playback

TBD

#### Technology Function Data Copy to Smartphone

TBD

## Requirements on Connections

### Networks

#### “CAN Bus xxx”

***NA.***

##### Protocol Requirements

**NA.**

##### Electrical Requirements

**NA.**

#### “LIN Bus xxx”

**NA.**

##### Protocol Requirements

###### Schedule Table

***NA.***

##### Electrical Requirements

***NA.***

#### “Ethernet xxx”

***NA.***

### HW I/Os

POC interface over FPD-Link will support DVR(IDCM) power management, the detail pin definition should follow APIM HW design.

#### “HW I/O xxx”

## Requirements on Development Process

# Open Concerns

| ID | Concern Description | e-Tracker Reference | Status | Solution |
| --- | --- | --- | --- | --- |
| 1 | How to support IDCM diagnostic? What event should be record via APIM diagnostic? |  | Open | TBD |
| 2 | How to support IDCM SWDL via APIM? Will need to support OTA via APIM? |  | Open | TBD |
| 3 | How to support DVR data analytics? What event should be record? |  | Open | TBD |
| 4 |  |  |  |  |

Table 6‑1: Open Concerns

# Revision History

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Revision | Date | Description | Approved by | Responsible |
| A |  | Initial version |  | YNIU6 |
|  |  |  |  |  |

## Template Revisions

*#Important: Do not change this section*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Version | Rev. | Date | Description | Responsible |
| 0 | 2 | 2015-08-05 | * TOC corrected * Document Properties adapted to match needs of VBA macros | Awegman1 |
| 1 | 0 | 2015-11-16 | * Revision History moved to chapter 7 * Table-Styles removed | Awegman1 |
| 1 | 1 | 2016-03-02 | * Rework according to PCL example | Jbaden1 |
| 1 | 2 | 2016-03-22 | * V1.3: Footer formating corrected (Issue 19) * “Constraints” chapter renamed to “Input Requirements” (Issue 20) | Jbaden1 |
| 1 | 3 | 2016-04-20 | * Broken Wiki links repaired | Jbaden1 |
| 2 | 0 | 2016-05-23 | * Prepared for Specification\_Macros.dotm v2.0 * Additional explanations added to ch. 2.2 “Input Requirements” (ARL and SDS requirements often go here) | Jbaden1 |
| 2 | 1 | 2016-07-08 | * Template version added to footer | Jbaden1 |
| 2 | 2 | 2016-07-15 | * Sample SysML diagrams added * Data Dictionary reworked * Alignment with relevant sections in SRD templated | Jbaden1 |
| 3 | 0 | 2016-09-05 | * Lessons learned from IPRB incorporated | Jbaden1 |
| 4 | 0 | 2016-09-27 | * Alignment with QPIP Feature Function Ownership workstream. Platform Spec renamed to Feature Implementation Spec | Jbaden1 |
| 4 | 1 | 2016-11-04 | * Chapters “Purpose” and “Scope” reworked. | Jbaden1 |
| 4 | 1 | 2016-11-10 | * Subsection for “Logical Service Interfaces” added. | Jbaden1 |
| 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 | * Minor editorial changes (e.g. hyperlinks highlighted in comments) | Jbaden1 |
| 5 | 1b | 2017-01-20 | * Some editorial corrections * Substructure of old Network Communication (now Connections) moved to Requirements on Connections | Jbaden1 |
| 6 | 0 | 2018-07-24 | * CR53: * Add new cover sheet * Add disclaimer section * Add the following meta-data to the doc properties for the the new cover sheet   + DocGis1ItemNumber   + DocGis2Classification   + DocType   + DocStatus   + DocIssueDate   + DocReleaseDate * CR63: Update FuSa sharepoint references in templates | Jbaden1 |
| 6 | 0 | 2018-08-06 | * CR81: Incorporate lessons learned from System Service Spec pilot (Vehicle Speed) into AFS and FIS | 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 | 2018-11-30 | * Update of Functional Safety sections after review by Functional Safety Team * Initial support for variant handling | Jbaden1 |
| 6 | 0 | 2018-12-01 | * Variant condition fields added consistently * Links updated | Jbaden1 |
| 6 | 0 | 2018-12-11 | * Variant condition fields removed from mapping/allocation tables * Mapping tables simplified * Explanatory text for “Variants” sections revised | Jbaden1 |
| 6 | 0a | 2019-01-04 | * Chapter heading “Inherited Function Requirements” removed. Corresponding table renamed to “Requirements not cascaded”. * E/E Connection table got another column for allocated messages * Naming conventions for Implemented Functions corrected (FncName\_CmpName instead of FncName\_on\_CmpName) * Editorial corrections on the cover sheet * Explanatory text added to “Ethernet” section in chapter “Requirements on Connections” * AIS templates updated. Linked to Wiki page | Jbaden1 |
| 6 | 0a | 2019-01-04 | * Minor restructuring in FuSa chapter – after aligning with ECU Functional Spec * Bugfix: table 13 renamed from FTTI table to FHT table, includes a bug fix: each FSR is allocated to only one ECU/component | Jbaden1 |
| 6 | 0b | 2019-02-04 | * Change: Chapter “Interface Requirements” added to “Implemented Function xxx” section (to have a single chapter for to collect subscriber/publisher interface and mapping requirements which to not conform to the corresponding Data Dictionary objects) * Change: “CAN Interface” subsection renamed to “AIS Interfaces” again. Although several Subscriber/Publisher interface attributes are probably CAN bus specific, other attributes seem to be well suited for other networks than CAN. * Change: Chapter “ECU Specific Requirements” renamed to “Component Specific Requirements” in chapter “Implemented Function xxx”. Table “Requirements not cascaded” renamed to “Component Specific Requirements” and refined to describe changes from Logical Function requirements set more formally. This is also to help during VSEM import to identify those requirements of the Logical Function which cannot be simply carried over to the ECU. * Change: Explanatory text in section “Implemented Function xxx” improved. | Jbaden1 |
| 6 | 0c | 2019-02-05 | * Change: Layout of AIS Interfaces in Data Dictionary reworked to enable Excel Import | Jbaden1 |
| 6 | 0c | 2019-02-20 | * Bugfix: In AIS Interfaces none-picklist fields formatted as invisible | Jbaden1 |
| 6 | 1a | 2019-02-05 | Functional Safety related changes:   * Table “Architectural Redundancy Summary” updated * Section “Functional Flows for FTTI ‘xyz’” added to chapter “Component Interaction Diagrams” * Fault Tolerant Time Summary section added to Functional Safety chapter * Chapter “HW Metrics” added | Jbaden1 |
| 6 | 1a | 2019-04-02 | Headings of “Architectural Redundancy Summary” table clarified | Jbaden1 |
| 6 | 1a | 2019-04-10 | * ASIL Decomposition table moved from Function Spec into the Feature Implementation Spec (ASIL Decomposition of Technical Safety Requirements) * 2 alternative versions of the Function Allocation Table (Standard variant vs. Functional Safety variant) placed next to each other. | Jbaden1 |
| 6 | 1a | 2019-05-31 | * Function Allocation Table split into a base (non FuSa) part and a FuSa part to allow a more flexible mapping of MBSE functions (Logical and Technology) to RE functions (Atomic Logical and Implemented). | Jbaden1 |
| 6 | 1a | 2019-05-31 | * “Input Requirement” section reworked (symmetrically to all other templates). * Sections “Functional Flows for FTTI xyz” and “Fault Tolerant Time Summary” removed, because guidance is not available yet. * “Reference” and “Glossary” section moved back to introduction, i.e., to the very beginning of the document (such that also section 2 can already rely on it). * Some mostly editorial changes per request from FuSa team. | Jbaden1 |
| 6 | 1a | 2019-07-02 | * "Important" box added on cover sheet which points to the macros * “Input Requirements” section renamed to Input Information (after discussion with FuSa team) | Jbaden1 |
| 6 | 1a | 2019-07-17 | * Chapter “Message List” removed from CAN and LIN specific chapters of section “Requirements on Connections” | Jbaden1 |
| 6 | 1a | 2019-10-08 | * Chapter “ASIL Decomposition of Technical Safety Requirements”: Input TSRs are specified in the chapter right above the decomposition table. | Jbaden1 |
| 6 | 1a | 2019-10-09 | * Chapter “Service Oriented Communication” moved to section “Messages” in the Data Dictionary. Details from Central SW Wiki about FNV2 SOA added | Jbaden1 |
| 6 | 1a | 2019-10-25 | * Minor updates for HW IOs/Signals * Subsection “Functional Safety” removed from chapter “Feature Implementation Modeling”. Per requrest from FuSa team since no guidance is available how to model e.g. FHT timing diagram. | Jbaden1 |
| 6 | 1a | 2019-05-11 | * Copyright notice shortened and moved to cover sheet and added to footer (to be compliant [with Ford copyright guidelines](http://www.fgti.ford.com/client/NewFGTI/CopyrightNotice.html)) * Term “Disclaimer” no longer used for what is actually only a copyright notice | Jbaden1 |
| 6 | 1a | 2019-22-11 | * Some minor modifications for the SOA APIs/MQTT Messages in the section “Messages” of the Data Dictionary (section references Service Contracts via the API name) * Some minor updates of the Input/Output mapping tables in section “Requirements on Components” for mappings to SOA APIs and EDAS signals. | Jbaden1 |
| 6 | 1a | 2019-12-05 | * Upstream Documents section added to “Input Requirements/Documents” table * Custom style table formatting removed | Jbaden1 |
| 6 | 1a | 2020-01-07 | * Some fine tuning for naming conventions of E/E components and connections. * List of HW I/O signal types reduced to RF-A, RF-D, D, A, Networked and PWM. * Protocol column added to the E/E connection table | Jbaden1 |
| 6 | 1a | 2020-01-07 | * “HW Metric” and “Architecture Redundancy Summary” sections removed per request from the Functional Architecture Team (based on Governance Board decision [FSTGB-97](mailto:TrackLite%20%23%20FSTGB-97:%20https://www.tracklite.ford.com/prweb/PRAuth/TrackLiteSSO?pyActivity=@baseclass.RedirectAndRunWraper&ThreadName=WorkLinkThread&bPurgeTargetThread=true&AccessGroupName=FSTGB:ProjectAdministrators&Location=pyActivity%3DWork-.Open%26Action%3DReview%26HarnessPurpose%3DReview%26InsHandle%3DFORD-FSTGB-WORK+FSTGB-97)) * “Functional Safety” chapter moved to “Feature Implementation Requirements” section. “Function Allocation” chapter seemed no longer appropriate. | Jbaden1 |
| 6 | 1a | 2020-01-07 | * Ordering of fields in AIS interfaces tables modified to conform with the Macro Template and the Importer Sheet * Page Header: no longer in bold letters | Jbaden1 |
| 6 | 1a | 2020-03-09 | * Missing doc property “LatestSigMappingID” and “LatestAisInterfaceID” added * doc property “CopyrightDate” re-formatted to text and copyright date field in footer corrected * Version numbering re-initialized as 0.1 * Init value of version/revision date set to “yyyy/mm/dd” instead of “yyyy-mm-dd” to be in line with the “Edit Document Property” dialog * Type of “Latest….ID” doc properties changed from Text to Number | Jbaden1 |
| 6 | 1a | 2020-03-11 | * “Mapping” table removed from template. Has been migrated to macro. | Jbaden1 |
| 6 | 1a | 2020-03-13 | * Separate chapter “Technical Safety Requirements” removed. Content already covered by Allocation Table in chapter Function Allocation. * “Implemented Function” replaced by term “Technology Function” | Jbaden1 |

# Appendix

## Data Dictionary

### Logical Signals

**#Hint:** Logical Signals are managed in VSEM in the [*RE Data Dictionary*](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=SoYl_k7px3NrTD&servername=Production_Server).

**#Link**: [*RE Wiki – Adding a Logical Signal or Parameter*](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Logical+Signal+or+Parameter)

**#Macro**: Add Ins -> Add Requirement macro (select “Logical Signal” as type)

### Logical Parameters

**#Hint:** Logical Parameters are managed in VSEM in the [*RE Data Dictionary*](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=SoYl_k7px3NrTD&servername=Production_Server).

**#Link**: [*RE Wiki – Adding a Logical Signal or Parameter*](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Logical+Signal+or+Parameter)

**#Macro:** Add Ins -> Add Requirement macro (select “Logical Parameter” as type)

### Technical Signals

**#Hint:** This section lists all GSDB + GDT + SW signals relevant for the feature deployment.

**#Link**: [*RE Wiki – Adding a Technical Signal or Parameter*](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Technical+Signal+or+Parameter)

**#Macro:** Add Ins -> Add Requirement macro (select “Technical Signal” as type)

#### GSDB Signals

**#Hint:** This part of the Data Dictionary lists signals, which should go to the GSDB in VSEM, but do not exist in the GSDB in VSEM yet, but are or will be requested for the GSDB. Those would go temporarily to this section in the [*RE Data Dictionary*](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=SoYl_k7px3NrTD&servername=Production_Server) in VSEM.

#### HW I/Os

**#Hint:** This chapter lists signals, which will be mapped to hardwired I/Os. Those get typically refer to VSEM EDAS signals (or input/output signals of device transmittals in VSEM GDT).

#### Diagnostic Interfaces

**#Hint:** This chapter lists Diagnostic Interfaces (DTCs and DIDs), which get mapped to Logical Parameters in context of the Technology Functions in chapter “Parameters” of the Function Interfaces. Those DTC/DID names should match the names in the diagnostics specification (Part 2).

**#ToDo:** Currently the template below is just a proposal. A macro still needs to be created

##### DTCs

###<DTC\_<ID>>### <DTC Name>

<Some Description of the DTC.

Refer to VSEM document “[Diagnostic Fault Coverage and DTC Numbers](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=yAUtrNhnx3NrTDAAAAAAAAAAAAA&servername=Production_Server)

[Design Consideration](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=yAUtrNhnx3NrTDAAAAAAAAAAAAA&servername=Production_Server)”, what to fill into the attributes below>

|  |  |
| --- | --- |
| **Test Period Time** |  |
| **Test Run Criteria,** |  |
| **Enable Criteria (EC)** |  |
| **Applicable** |  |
| **FailureTypeBytes** |  |
| **Test Period Time** |  |
| **Test Run Criteria,** |  |

##### DIDs

**#Hint**: This section lists diagnostic DID which Technical Parameters get mapped to.

**#Todo**: A proper template derived from the Part 2 spec still needs to be created.

### Technical Parameters

**#Hint:** This section lists all Method 2, Method 3 and calibration parameters relevant for the feature deployment.

**#Link**: [*RE Wiki – Adding a Technical Signal or Parameter*](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Technical+Signal+or+Parameter)

**#Macro:** [Add Ins -> Add Requirement macro](http://wiki.ford.com/display/RequirementsEngineering/How+to+use+the+Specification+Templates#HowtousetheSpecificationTemplates-AddNewRequirement) (select “Technical Parameter” as type)

### Mappings

**#Hint**: This section lists mapping objects for Logical Signals / Parameters to their GSDB + GDT + SW counterparts (1:N mapping is supported). Mapping objects are managed in VSEM in the [*RE Data Dictionary*](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=SoYl_k7px3NrTD&servername=Production_Server).

**#Link:** [RE Wiki – Adding a Signal or Parameter Mapping](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Signal+or+Parameter+Mapping)

**#Macro:** Add Ins -> Add Requirement macro (select “Mapping” as type)

### Technical Interfaces

Defines in DVR UART protocol spec.

#### AIS Interfaces

**#Hint:** This chapter lists the AIS subscriber and publisher interface objects (managed in VSEM), which are needed to deploy the feature to the E/E architecture. If AIS interfaces do not yet exist in VSEM, those may temporarily be managed as a workaround in the [*RE Data Dictionary*](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=SoYl_k7px3NrTD&servername=Production_Server).

**#Link:** [System Engineering Portal – AIS Release 3.2](https://pd3.spt.ford.com/sites/fede/vsem-spls/Shared%20Documents/02-ais/methods/AIS%20Methods%20Document.pptx?web=1)  
[RE Wiki - AIS Interfaces](http://wiki.ford.com/display/RequirementsEngineering/Adding+a+Technical+Interface#AddingaTechnicalInterface-AisInterfaces)

[*Publisher Interface AIS in VSEM*](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=zjYtY3Jcx3NrTDAAAAAAAAAAAAA&servername=Production_Server)

[*Subscriber Interface AIS in VSEM*](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=LSYtewY7x3NrTDAAAAAAAAAAAAA&servername=Production_Server)

**#Macro:** Add Ins -> Add Requirement macro (select “AIS Subscriber If” or “AIS Publisher If” as type)

##### Publisher Interfaces

##### Subscriber Interfaces

#### AUTOSAR Ports

**NA.**

### Messages/APIs

#### CAN Bus “<Bus Name>”

**#Hint:** This section gives the relevant extract from the [Central Message Database (CMDB) in VSEM](https://www.vsemweb.ford.com/tc/launchapp?-attach=true&-s=226TCSession&-o=jXfpx2PHx3NrTDAAAAAAAAAAAAA&servername=Production_Server) .

###<MSG\_MessageID### MessageName

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CAN ID** | **Transmission Mode** | **Period** | **Signal Names** | **Transmitter(s)** | **Receiver(s)** |
|  |  |  |  |  |  |
|  |
|  |
|  |

#### LIN Bus “<Bus Name>”

#### AUTOSAR Interfaces

**#Hint:** Those AUTOSAR Classic (Sender/Receiver and Client/Server) Interfaces, which are used by the feature but not managed in a central repository yet, should be listed here.

#### SOA Service Contracts

**#Hint:** This part of the Data Dictionary lists Service APIs/MQTT messages and embedded data elements, which are used for the Service Oriented Architecture (SOA). If those APIs/MQTT messages already exist e.g. in the [*Central SW Service Catalog*](http://wiki.ford.com/display/CS/Service+Catalog), simply add a reference to those yet.

Information on FNV2 SOA can be found in the ECG wiki page

* MQTT Topic Naming: [*FNV2-SOA: MQTT Topic and Message Structure*](https://www.eesewiki.ford.com/display/ecg/FNV2-SOA%3A+MQTT+Topic+and+Message+Structure?src=sidebar)
* message syntax and proper naming can be found [*SOA API Messaging Guidelines*](https://www.eesewiki.ford.com/x/Q7rKAg)

For examples what to fill into the table fields below refer to [*Central SW Service Catalog*](http://wiki.ford.com/display/CS/Service+Catalog)

###<ServiceContractID>### Service Contract Name

<Service contract purpose/behavior>

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Messaging Pattern | Frequency  (For Data Broadcast Only) | Message Data Element(s)  (Must Match GPB) or applicable CAN signal | Description of Data Element(s) | Topic Name |
| Choose an item. |  | GBP Data element / CAN Signal name 1 | Detailed encoding of data element 1 |  |
| … |  |  |
| GBP Data element / CAN Signal name 1 | Detailed encoding of data element 3 |  |

### Encoding Types

**#Link:** [*RE Wiki – Adding Encoding Types*](http://wiki.ford.com/display/RequirementsEngineering/Adding+an+Encoding+Type)

**#Macro:** Add Ins -> Add Requirement macro (select “Encoding Type” as type)

Document ends here.