# Rear Camera Delay Control Function – CGEA1.3 - P473

## Functional Description

The Rear Camera Delay (RCD) feature provides control of the rear camera located in the rearview mirror. The delay allows the camera to remain on even after the customer exits reverse either for a certain amount of time, or until the vehicle forward speed exceeds a certain threshold. The RCD feature is enabled and disabled by the customer from the message center.

The P473 cluster supports only the Delay feature of the Rear Camera. There is a separate STSS for clusters supporting all the Rear Camera features, refer to Rear Camera Control Function STSS.

The Rear Video Camera is an ignition switched module (powered in RUN and START). The settings for the RV Delay are stored in the mirror. To prevent a race condition for the settings, the RVC and mirror shall ignore the CMD signal from the cluster for 2 seconds on transition to R/S. During that time, the cluster shall sync the CMD signal up with the received STAT signal.

RCD Control Function is displayed only in the Message Center while it is in the appropriate SETUP display. See Message Center X Display\_Y Button Interface Section, where X and Y are appropriate values in this document for details on when this display is active. This feature is only available in clusters with a 4.3” TFT display.

## Interfaces

### Interface Context Diagram (I/O Block Diagram)

Figure 1 Rear Camera Delay Control Function Context Diagram



### Inputs

#### IR-REQ-344143/A-INTERNAL:

* Operational\_Mode
* RESET Switch Event
* Rear\_Camera\_Delay\_Cfg
* M/C\_Display\_Status

#### MUX message on the CAN Bus from BCM

##### SIG-REQ-344130/A-RearCameraDelayStat Signal

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Signal Name** | **Size (bits)** | **Detail** | **Units** | **Res.** | **Offset** | **State Encoded** | **Min** | **Max** |
| RearCameraDelayStat | 2 |  | SED | 1 | 0 |  | 0 (0x0) | 3 (0x3) |
|  |  | Invalid |  |  |  | 0x0 |  |  |
|  |  | Active |  |  |  | 0x1 |  |  |
|  |  | Inactive |  |  |  | 0x2 |  |  |
|  |  | Not\_Used |  |  |  | 0x3 |  |  |

### Outputs

#### IR-REQ-344144/A-INTERNAL:

* RCD\_Delay\_MC

#### MUX message on the CAN Bus

##### SIG-REQ-344131/A-RearCameraDelayCmd Signal

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Signal Name** | **Size (bits)** | **Detail** | **Units** | **Res.** | **Offset** | **State Encoded** | **Min** | **Max** |
| RearCameraDelayCmd | 1 |  | SED | 1 | 0 |  | 0x0 | 0x1 |
|  |  | Enabled |  |  |  | 0x0 |  |  |
|  |  | Disabled |  |  |  | 0x1 |  |  |

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## Function/Performance

### F-REQ-344148/A-Operational Modes

|  |  |
| --- | --- |
| **Mode** | **Differentiating Vehicle Conditions** |
| Sleep Mode | RCD Text Message Disabled |
| Limited Mode | RCD Text Message Disabled |
| Normal Mode | RCD Text Message Enabled / Disabled  - ability to change the Rear Camera Delay setting |
| Crank Mode | RCD Text Message Disabled |

### Voltage Levels

Refer to the Cluster Features table located in the Operational Modes and Voltage Range Strategies Section in this SPSS.

### Human-Machine Interface

#### Visual

#### Indicator Graphics / Display Format

Refer to TFT display graphics document for the appropriate program

##### Indicator Color Coordinates

Reference section COLOR & ILLUMINATION REQUIREMENTS (GRAPHICS)

##### Indicator Characteristics

Refer to Message Center X Display\_Y Button Interface Section, where X and Y are appropriate values in this document.

#### Audio

None

#### Switch Control Logic

Consumer access to the RCD Control Configuration shall be as specified in the message center basic functionality display as specified in Message Center X Display\_Y Button Interface Section, where X and Y are appropriate values in this document.

### PFM-REQ-344149/A-System Accuracy

Within a 100msec of receiving a message that results in a change of state the cluster will update the display to the proper status.

### Operation: Performance and Functional

#### Subsystem Algorithm Flowchart / State Diagram

##### F-REQ-344132/A-RCD Diagnostic Configuration Flowcharts



##### F-REQ-344133/A-RCD input request Flowcharts



##### F-REQ-344134/A-RCD\_MC and RearCameraDelayCmd Signal based on RearCameraDelayStat

|  |  |  |
| --- | --- | --- |
| **RearCameraDelayStat** | **RCD\_MC** | **RearCameraDelayCmd** |
| Invalid (0x0) | Error (0x0) | Enabled (0x0) |
| Active (0x1) | Active (0x1) | Disabled (0x1) |
| Inactive (0x2) | Inactive (0x2) | Enabled (0x0) |
| Not\_Used (0x3) | Not\_Used (0x3) | Enabled (0x0) |
| Missing per section 1.4.1 | Error (0x0) | Enabled (0x0) |

##### F-REQ-344135/A- RCD output commands Flowcharts



**NOTE:** In the Rear Camera Delay Function Flowchart, the definition of "RESET Switch Event" is defined in Message Center X Display\_Y Button Interface Section, where X and Y are appropriate values in this document.

#### Operation Description (supports algorithm flowchart /state diagram)

##### F-REQ-344136/A-Message Center Display and Next RearCameraDelayCmd State based upon RCD\_MC

|  |  |  |
| --- | --- | --- |
| **RCD\_MC** | **Message Center Display** | **Next RearCameraDelayCmd** |
| Error (0x0)  On selected | Rear Camera Delay  On  Off | Disabled (0x1) / Display Confirmation Text |
| Active (0x1)  On selected | Rear Camera Delay  On  √  Off | Disabled (0x1) /  Do NOT display Confirmation Text |
| Inactive (0x2)  On selected | Rear Camera Delay  On  Off  √ | Disabled (0x1) / Display Confirmation Text |
| Not\_Used (0x3)  On selected | Rear Camera Delay  On  Off | Disabled (0x1) / Display Confirmation Text |
| Error (0x0)  Off selected | Rear Camera Delay  On  Off | Enabled (0x0) / Display Confirmation Text |
| Active (0x1)  Off selected | Rear Camera Delay  √  On  Off | Enabled (0x0) / Display Confirmation Text |
| Inactive (0x2)  Off selected | Rear Camera Delay  On  Off  √ | Enabled (0x0) /  Do NOT display Confirmation Text |
| Not\_Used (0x3)  Off selected | Rear Camera Delay  On  Off | Enabled (0x0) / Display Confirmation Text |

##### F-REQ-344137/A-Message Center Display Confirmation Text based on Next RearCameraDelayCmd State

|  |  |
| --- | --- |
| **Next RearCameraDelayCmd State** | **Message Center Display** |
| Enabled (0x0) / Display Confirmation Text | Rear Camera Delay  OFF |
| Disabled (0x1) / Display Confirmation Text | Rear Camera Delay  ON |

##### F-REQ-344138/A-Default Setting

* This feature will be set to DISABLED at the instrument cluster manufacturing plant. It will be set via diagnostic at Vehicle Operations using DID DE00. Rear\_Camera\_Delay\_Cfg is set equal to the last value received in the diagnostic routine.

##### F-REQ-344139/A-User Interface

* The customer will have the ability to change the Rear Camera Delay setting when the Instrument Cluster Message Center (IC) is enabled (Operational Mode is Normal).

##### F-REQ-344140/A-Control Module

* There are 2 distinct settings for Rear Camera Delay. The BCM will retain this setting as a two bit value.

##### F-REQ-344141/A-Example Display Graphics

* Displays shown above are for representative purposes only. Refer to the graphics document for the appropriate program.

#### FS-REQ-344150/A-Function Safety Classification (EMC)

Class B

#### Memory Storage

##### NVM-REQ-344142/A-Function Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter Name** | **Description** | **Value at**  **Battery Connect** | **Value at**  **Module Wake-up** |
| RCD\_MC | Output displayed in the M/C | Off (0x0) | Do Not Init |
| RearCameraDelayCmd Signal | Output command signal sent from the IPC. Note that on Base clusters, the default value is sent always. | Disabled (0x1) | Do Not Init |
| RearCameraDelayStat Signal | Input signal sent from the BCM | Inactive (0x0) | Do Not init |
| Rear\_Camera\_Delay\_Cfg | State indicator for feature presence controlled via CAN at EOL at VO plant. Set to disabled at Cluster Supplier Manufacturing Plant | Use Stored Value | Use Stored Value |
| M/C\_Display\_Status | State Indicator to identify which text is currently being displayed on Message Center display. See \* | See \* | See\* |
| OK Switch Event | Event that is indicated as per the switch interface for the Message Center. See \* | See \* | See\* |
| Operational\_Mode | 4 state indicator for cluster operational mode | Limited | Limited, Normal or Crank |

\* Refer to Message Center X Display\_Y Button Interface Section, where X and Y are appropriate values in this document.

#### Reconfigurable Telltale

Not Applicable

#### Prove Out

Not applicable

#### Message Center Msg

Refer to TFT Graphics document for the appropriate program

## Error Handling

### Missing Message Strategy

The signals will be declared missing as per the Diagnostics section of this SPSS.

DTCs states and history will be determined as per the Diagnostics section of this SPSS.

#### SR-REQ-344145/A-Config

If Rear\_Camera\_Delay\_Cfg = Disabled, the cluster shall never log a missing message DTC due to this feature.

## Diagnostics

### Self Test

None

### Engineering Test Mode

Reference section “Dealer / Engineering Test Mode (ETM)”

### Part II Performance

#### DTC-REQ-344146/A-Supported Diagnostic Trouble Codes (DTCs)

|  |  |
| --- | --- |
| **DTC** | **Description** |
| C14000 | Lost of Communication with CGEA\_HS\_BCM |

#### DCR-REQ-344147/A-DID DE00

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Block**  **Num** | **Block Description** | **Size (bits)** | **Type** | **Byte(s)** | **Bits** | **State: Description** | **"0"** | **"1"** | **Default** | **Comments/**  **Information** |
| PACKETED BLOCKS | |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
| $00 | Option Content (B&A) | X | 1 | \* | \* | Rear Camera Delay | Disabled | Enabled | Disabled |  |
|  |  |  |  |  |  |  |  |  |  |  |
| \*Byte and bit location to be identified in Part II Specification for this cluster | | | | | | | | | | |

## Reference Specification

None

## Revision History

**SPSS Module Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Revision Level** | **Name** | **Change Description** | **Date** |
| 1.0 | V. Patel | Updated for CGEA 1.3 based on CGEA STSS v1.1  Section 1.2.2 – Removed table referencing the HS-CAN message that contains the input signal.  Section 1.2.3 – Removed table referencing the HS-CAN message that contains the output signal.  Section 1.4 – Rewritten. Deleted references of specific missing message flags and timer.  Section 1.5.3 – Deleted DTC logging criteria from the table. | 4/21/2010 |
| 1.1 | V. Patel | Initial release for VSEM requirements migration | 2/27/2019 |
|  |  |  |  |
|  |  |  |  |