

**Research & Vehicle Technology**

**“Infotainment Systems Product Development”**

**Feature – Bezel Diagnostics**

**APIM Infotainment Subsystem Part Specific Specification (SPSS)**

Version 1.7

**UNCONTROLLED COPY IF PRINTED**

**Version Date: February 13, 2019**

**FORD CONFIDENTIALF**

**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Version** | **Notes** | |
| **May 30, 2013** | **1.0** | **Initial Release** |  |
|  |  |  |  |
| **October 15, 2013** | **1.1** |  | |
|  | DIAG-GREQ-304169-1-AAM module | | <jmyslin2 Oct 10, 2013> Added requirement for when AAM module present |
|  |  |  |  |
| **December 10, 2014** | **1.2** |  | |
|  | DIAG-FRD-REQ-016476/B-Bezel Diagnostics (TcSE ROIN-291321-1) | | <jmyslin2 / Hans-Christian Zubert> Update Bezel Diagnostics SPSS to include LIN ICP part number interface |
|  | DIAG-SR-REQ-103696/A-LIN ICP Part Number during Bezel Diagnostics | | <jmsylin2> New Bezel Diagnostic requirement when have a LIN ICP for displaying part numbers |
|  |  |  |  |
| **June 4, 2015** | **1.3** |  | |
|  | DIAG-SR-REQ-115757/A-Request and Response of HWPN (PCB) | | hzubert - modified SupplierID and FunctionID in example to wildcard values. |
|  | DIAG-SR-REQ-115758/A-Request and Response of SWPN | | hzubert - modified SupplierID and FunctionID in example to wildcard values. |
|  | DIAG-FUN-REQ-164015/A-Bezel Diagnostics - I2C over LVDS+ | | <Jason Myslinski / Hans-Christian Zubert> New Bezel Diagnostics function for I2C over LVDS |
| |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | | |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | | | |  |  |  |  | | --- | --- | --- | --- | |  |  |  |  | |
| **May 7, 2018** | **1.4** |  | |
|  | DIAG-FUN-REQ-273205/A-Bezel Diagnostics - SOA (Ethernet) | | <jmyslin2> Initial release of SOA / Ethernet Bezel Diagnostics. New function for FNV2 SYNC, TCU and ECG Bezel Diagnostics over SOA / Ethernet. All requirements in this function are new for this initial release of SOA Bezel Diagnostics. |
| 473234/A-Interface Requirements - SOA Bezel Diagnostics | | 473234/A-Interface Requirements - SOA Bezel Diagnostics |
| MD-REQ-275119/F-getTcuBezelDiagnosticData | | <jmyslin2> Logical API MD for TCU SOA Bezel Diagnostics |
| MD-REQ-275359/F-getEcgBezelDiagnosticData | | <jmyslin2> Logical API MD for ECG SOA Bezel Diagnostics |
| MD-REQ-277459/A-Bezel\_Diagnostic.Rq | | <jmyslin2> Put interface table description in MD form. Not requirement content change and only a clarification and formatting update |
| MD-REQ-277675/A-AHU\_Bezel\_Diag.St+ | | <jmyslin2> Put interface table description in MD form. Not requirement content change and only a clarification and formatting update |
|  | MD-REQ-277746/A-DSP\_Bezel\_Diag.St+ | | <jmyslin2> Put interface table description in MD form. Not requirement content change and only a clarification and formatting update |
|  | MD-REQ-277747/A-EFP\_Bezel\_Diag.St+ | | <jmyslin2> Put interface table description in MD form. Not requirement content change and only a clarification and formatting update |
|  | MD-REQ-278042/A-AHU\_Bezel\_Diag\_Data+ | | <jmyslin2> Put interface table description in MD form. Not requirement content change and only a clarification and formatting update |
|  | MD-REQ-278042/B-AHU\_Bezel\_Diag\_Data | | <jmyslin2> Grammar update only. No content change |
|  | MD-REQ-278043/A-DSP\_Bezel\_Diag\_Data | | <jmyslin2> Put interface table description in MD form. Not requirement content change and only a clarification and formatting update |
|  | MD-REQ-278044/A-EFP\_Bezel\_Diag\_Data | | <jmyslin2> Put interface table description in MD form. Not requirement content change and only a clarification and formatting update |
|  | MD-REQ-276458/A-Vehicle\_Speed.St+ | | <jmyslin2> created MD |
|  | MD-REQ-276458/B-Vehicle\_Speed.St | | <jmyslin2> MD clarification |
|  | MD-REQ-276459/A-Vehicle\_Speed\_QF | | <jmyslin2> created MD |
|  | DIAG-FUN-REQ-016450/B-Bezel Diagnostic Session Entry Conditions (TcSE ROIN-291280-1) | | <jmyslin2> No update, revision number accidently revised with no changes |
|  | IFS-MMI2C-SR-REQ-140624/B-0x31 Core Assembly FPN+ | | "<joravec4> |
|  | IFS-MMI2C-SR-REQ-140624/C-0x31 Core Assembly FPN | | <hzubert> Generalized wording |
|  | IFS-MMI2C-SR-REQ-140625/B-0x32 Delivery Assembly FPN+ | | "<joravec4> |
|  | IFS-MMI2C-SR-REQ-140625/C-0x32 Delivery Assembly FPN | | <hzubert> Generalized wording |
|  | IFS-MMI2C-SR-REQ-140626/B-0x33 Software FPN+ | | "<joravec4> |
|  | IFS-MMI2C-SR-REQ-140626/C-0x33 Software FPN | | <hzubert> Generalized wording |
|  | IFS-MMI2C-SR-REQ-140627/B-0x34 Serial Number+ | | "<joravec4> |
|  | IFS-MMI2C-SR-REQ-140627/C-0x34 Serial Number | | <hzubert> Generalized wording |
|  | IFS-MMI2C-SR-REQ-140628/B-0x35 Main Calibration Data FPN+ | | "<joravec4> |
|  | IFS-MMI2C-SR-REQ-140628/C-0x35 Main Calibration Data FPN | | <hzubert> Generalized wording |
|  |  |  |  |
| **September 7, 2018** | **1.5** |  | |
|  | DIAG-CLD-REQ-311960/A-Bezel Diagnostic Server - AHU (APIM V2) | | <jmyslin2> Requirements apply only to SYNC 4.1 when AHU functionality is integrated into SYNC |
|  | DIAG-FUR-REQ-311961/A-Diagnostics - integrated AHU functionality (APIM v2) | | <jmyslin2> Applies to SYNC 4.1 when AHU functionality is integrated into SYNC. |
|  | 481093/B-Bezel Diagnostics Interface Requirements - SOA | | <jmyslin2> added class descriptions, no content change |
|  | STR-055943/C-Appendix: Reference Documents (TcSE ROIN-291330) | | <jmyslin2> added a couple additional references. No content change |
|  |  |  |  |
| **January 31, 2019** | **1.6** |  | |
|  | DIAG-UC-REQ-016451/B-Bezel Diagnostics – Enter Bezel Diagnostics (TcSE ROIN-291319-1) | | <jmyslin2> Updated use case to move pre-condition that a media source is active to enter bezel diagnostics |
|  | DIAG-UC-REQ-016452/B-Bezel Diagnostics – Cannot enter Bezel Diagnostics (TcSE ROIN-291320-1) | | <jmyslin2> updated to remove requirement on active media source |
|  | DIAG-SR-REQ-015060/B-Entry Conditions for user initiated bezel diagnostic session (TcSE ROIN-129519-2) | | <jmyslin2> Per a request by the Bezel Diagnostics Client team I updated the requirement to include flexability so a Media Source does not always have to be active to enter bezel diagnostics |
|  |  |  |  |
| **February 13, 2019** | **1.7** |  | |
|  | DIAG-UC-REQ-016454/C-Bezel Diagnostics – Exit Bezel Diagnostics (TcSE ROIN-291079-1) | | <jmyslin2> Updated to include higher priority feature in use case |
|  | DIAG-SR-REQ-015063/C-Exit Conditions for Bezel Diagnostics (TcSE ROIN-129521-3) | | <jmyslin2> updated to include higher priority feature |
|  | DIAG-UC-REQ-016454/C-Bezel Diagnostics – Exit Bezel Diagnostics (TcSE ROIN-291079-1) | | <jmyslin2> Updated to include higher priority feature in use case |

**Table of Contents**

[Revision History 2](#_Toc957345)

[1 Architectural Design - CAN 7](#_Toc957346)

[1.1 DIAG-CLD-REQ-015050/A-Bezel Diagnostic Client (TcSE ROIN-202564-1) 7](#_Toc957347)

[1.2 DIAG-CLD-REQ-016469/A-Bezel Diagnostic Server (TcSE ROIN-202563-1) 7](#_Toc957348)

[1.3 DIAG-CLD-REQ-311960/A-Bezel Diagnostic Server - AHU (APIM V2) 7](#_Toc957349)

[1.3.1 DIAG-FUR-REQ-311961/A-Diagnostics - integrated AHU functionality (APIM v2) 7](#_Toc957350)

[1.4 Bezel Diagnostics Interface Requirements 8](#_Toc957351)

[1.4.1 DIAG-IIR-REQ-015049/B-Bezel Diagnostics Interface Requirements (TcSE ROIN-129515-3) 8](#_Toc957352)

[1.5 Bezel Diagnostics Interface Requirements - SOA 12](#_Toc957353)

[1.5.1 DIAG-CLD-REQ-273355/A-Bezel Diagnostic Server - SOA (TCU) 12](#_Toc957354)

[1.5.2 DIAG-CLD-REQ-278463/A-Bezel Diagnostic Client - SOA 12](#_Toc957355)

[1.5.3 DIAG-CLD-REQ-278390/A-Bezel Diagnostic Server - SOA (ECG) 12](#_Toc957356)

[1.5.4 MD-REQ-275119/F-getTcuBezelDiagnosticData 12](#_Toc957357)

[1.5.5 MD-REQ-275359/F-getEcgBezelDiagnosticData 14](#_Toc957358)

[2 Architectural Design - LIN 16](#_Toc957359)

[2.1 DIAGv2-CLD-REQ-117487/A-LIN Bezel Diagnostic Client 16](#_Toc957360)

[2.2 DIAGv2-CLD-REQ-117488/A-LIN Bezel Diagnostic Server 16](#_Toc957361)

[2.3 LIN Serial Number Interface 16](#_Toc957362)

[2.3.1 DIAG-SR-REQ-117486/A-LIN Serial Number Interface 16](#_Toc957363)

[2.4 LIN Extended Part Numbers Interface 19](#_Toc957364)

[2.4.1 DIAG-IIR-REQ-115763/A-LIN MasterReqXx 19](#_Toc957365)

[2.4.2 DIAG-IIR-REQ-115764/A-LIN SlaveRespXx 19](#_Toc957366)

[3 Architectural Design - I2C over LVDS 20](#_Toc957367)

[3.1 DIAG-CLD-REQ-163996/A-I2C Bezel Diagnostic Client 20](#_Toc957368)

[3.2 DIAG-CLD-REQ-163997/A-I2C Bezel Diagnostic Server 20](#_Toc957369)

[4 Architectural Design - SOA\_Ethernet 21](#_Toc957370)

[4.1 DIAG-CLD-REQ-278463/A-Bezel Diagnostic Client - SOA 21](#_Toc957371)

[4.2 DIAG-CLD-REQ-278390/A-Bezel Diagnostic Server - SOA (ECG) 21](#_Toc957372)

[4.3 DIAG-CLD-REQ-273355/A-Bezel Diagnostic Server - SOA (TCU) 21](#_Toc957373)

[4.4 Interface Requirements - SOA Bezel Diagnostics 21](#_Toc957374)

[4.4.1 MD-REQ-275119/F-getTcuBezelDiagnosticData 21](#_Toc957375)

[4.4.2 MD-REQ-275359/F-getEcgBezelDiagnosticData 22](#_Toc957376)

[5 General Requirements 25](#_Toc957377)

[5.1 DIAG-SR-REQ-103696/A-LIN ICP Part Number during Bezel Diagnostics 25](#_Toc957378)

[6 Functional Definition 26](#_Toc957379)

[6.1 DIAG-FUN-REQ-016449/A-Bezel Diagnostic Get All Background Diagnostic Request during Initialization (TcSE ROIN-291276-1) 26](#_Toc957380)

[6.1.1 DIAG-SR-REQ-015054/B-Bezel Diagnostic Client Get All Background Diagnostic Request initialization (TcSE ROIN-129499-1) 26](#_Toc957381)

[6.1.2 DIAG-SR-REQ-015055/A-Bezel Diagnostic Client storing Bezel Diagnostic Background Diagnostic Request data (TcSE ROIN-129516-1) 26](#_Toc957382)

[6.1.3 DIAG-SR-REQ-015056/A-Bezel Diagnostic Server response during a Get All Background Diagnostic request (TcSE ROIN-205229-1) 26](#_Toc957383)

[6.1.4 DIAG-TMR-REQ-015057/B-T\_Diagnostic\_Request (TcSE ROIN-129518-1) 26](#_Toc957384)

[6.1.5 DIAG-SD-REQ-015058/A-Bezel Diagnostics - Get All Background Diagnostic Request during Initialization (TcSE ROIN-129508-1) 26](#_Toc957385)

[6.2 DIAG-FUN-REQ-016450/B-Bezel Diagnostic Session Entry Conditions (TcSE ROIN-291280-1) 28](#_Toc957386)

[6.2.1 DIAG-UC-REQ-016451/B-Bezel Diagnostics – Enter Bezel Diagnostics (TcSE ROIN-291319-1) 28](#_Toc957387)

[6.2.2 DIAG-UC-REQ-016452/B-Bezel Diagnostics – Cannot enter Bezel Diagnostics (TcSE ROIN-291320-1) 28](#_Toc957388)

[6.2.3 DIAG-SR-REQ-015060/B-Entry Conditions for user initiated bezel diagnostic session (TcSE ROIN-129519-2) 28](#_Toc957389)

[6.2.4 DIAG-SR-REQ-015061/B-Bezel Diagnostic entered in Single Play (TcSE ROIN-129520-1) 29](#_Toc957390)

[6.3 DIAG-FUN-REQ-016453/A-Bezel Diagnostic Session Exit Conditions (TcSE ROIN-291277-1) 30](#_Toc957391)

[6.3.1 DIAG-UC-REQ-016454/C-Bezel Diagnostics – Exit Bezel Diagnostics (TcSE ROIN-291079-1) 30](#_Toc957392)

[6.3.2 DIAG-SR-REQ-015063/C-Exit Conditions for Bezel Diagnostics (TcSE ROIN-129521-3) 30](#_Toc957393)

[6.4 DIAG-FUN-REQ-016455/A-Bezel Diagnostic Speaker Walk-Around (TcSE ROIN-291278-1) 31](#_Toc957394)

[6.4.1 DIAG-UC-REQ-016456/A-Bezel Diagnostics – Entry Bezel Diagnostic and Speaker Walkaround (TcSE ROIN-291069-1) 31](#_Toc957395)

[6.4.2 DIAG-UC-REQ-016457/A-Bezel Diagnostics – Speaker Walk Around – Entry from within Bezel Diagnostics (TcSE ROIN-291075-1) 31](#_Toc957396)

[6.4.3 DIAG-UC-REQ-016458/A-Bezel Diagnostics – Vehicle speed above 5kph during speaker walk around (TcSE ROIN-291076-1) 32](#_Toc957397)

[6.4.4 DIAG-UC-REQ-016459/A-Bezel Diagnostics – Internal Bezel Diagnostics Speaker Walk Around Completed (TcSE ROIN-291077-1) 32](#_Toc957398)

[6.4.5 DIAG-SR-REQ-015065/A-Speaker Walk-Around initiation at entry of Bezel Diagnostic session (TcSE ROIN-129523-2) 32](#_Toc957399)

[6.4.6 DIAG-SR-REQ-015066/A-Chime operation during Speaker Walk-Around (TcSE ROIN-129524-1) 33](#_Toc957400)

[6.4.7 DIAG-SR-REQ-015067/B-Module controlling the Speaker Walk-Around function (TcSE ROIN-129525-2) 33](#_Toc957401)

[6.4.8 DIAG-SR-REQ-015068/A-Cancelling Speaker Walk-Around because vehicle in motion (TcSE ROIN-129526-1) 33](#_Toc957402)

[6.5 DIAG-FUN-REQ-016460/A-Bezel Diagnostic Activation Events (TcSE ROIN-291279-1) 34](#_Toc957403)

[6.5.1 DIAG-UC-REQ-016461/A-Bezel Diagnostics – Main Menu (TcSE ROIN-291070-1) 34](#_Toc957404)

[6.5.2 DIAG-UC-REQ-016462/A-Bezel Diagnostics – Module Specific Sub menu (TcSE ROIN-291071-1) 34](#_Toc957405)

[6.5.3 DIAG-UC-REQ-016463/B-Bezel Diagnostics – Component Part Numbers (TcSE ROIN-291072-1) 34](#_Toc957406)

[6.5.4 DIAG-UC-REQ-016464/A-Bezel Diagnostics – SDARS ESN (TcSE ROIN-291073-1) 35](#_Toc957407)

[6.5.5 DIAG-UC-REQ-016465/A-Bezel Diagnostics – AM/FM Signal Strength (TcSE ROIN-291074-1) 35](#_Toc957408)

[6.5.6 DIAG-SR-REQ-015070/A-Signals to enter a Bezel Diagnostic session (TcSE ROIN-129527-1) 35](#_Toc957409)

[6.5.7 DIAG-SR-REQ-015071/A-Signals to identify what Bezel Diagnostic operation to perform (TcSE ROIN-129528-1) 35](#_Toc957410)

[6.5.8 DIAG-SR-REQ-015072/A-Identification of the module to perform the Bezel Diagnostic operation (TcSE ROIN-129529-1) 36](#_Toc957411)

[6.5.9 DIAG-SR-REQ-015073/A-Initiation of Speaker Walk-Around (TcSE ROIN-129530-1) 36](#_Toc957412)

[6.5.10 DIAG-SR-REQ-015074/A-Signal to cancel a Bezel Diagnostic session (TcSE ROIN-129531-1) 36](#_Toc957413)

[6.5.11 DIAG-SR-REQ-015075/A-Bezel Diagnostic HMI Output (TcSE ROIN-129532-1) 36](#_Toc957414)

[6.5.12 DIAG-SR-REQ-015076/A-Bezel Diagnostic Default Session (TcSE ROIN-129533-1) 36](#_Toc957415)

[6.5.13 DIAG-REQ-015077/A-AAM module (TcSE ROIN-304169-1) 36](#_Toc957416)

[6.5.14 Sequence Diagrams 36](#_Toc957417)

[6.6 DIAG-FUN-REQ-115753/A-Bezel Diagnostics LIN Extended Part Number Readout 38](#_Toc957418)

[6.6.1 DIAG-SR-REQ-115754/A-Signal Flow 38](#_Toc957419)

[6.6.2 DIAG-SR-REQ-115755/A-Coding of PCI 38](#_Toc957420)

[6.6.3 Examples 38](#_Toc957421)

[6.7 DIAG-FUN-REQ-164015/B-Bezel Diagnostics - I2C over LVDS 41](#_Toc957422)

[6.7.1 ECU Core Assembly Number 41](#_Toc957423)

[6.7.2 ECU Delivery Assembly Number 41](#_Toc957424)

[6.7.3 ECU Software Part Number 42](#_Toc957425)

[6.7.4 ECU Serial Number 43](#_Toc957426)

[6.7.5 ECU Main Calibration Data Number 44](#_Toc957427)

[6.8 DIAG-FUN-REQ-273205/A-Bezel Diagnostics - SOA (Ethernet) 46](#_Toc957428)

[6.8.1 Disclaimer 46](#_Toc957429)

[6.8.2 Use Cases 47](#_Toc957430)

[6.8.3 General Requirements 49](#_Toc957431)

[6.8.4 Requirements TCU 49](#_Toc957432)

[6.8.5 Requirements ECG 52](#_Toc957433)

[7 Appendix: Reference Documents 53](#_Toc957434)

# Architectural Design - CAN

All Infotainment components shall support module diagnostics as defined in the Global Diagnostic Specification (Part I) and Infotainment Diagnostic Specification (IDS). This section only covers Bezel Diagnostics.

Definitions:

Bezel Diagnostic Default Session: Bezel Diagnostic display for selecting specific component Bezel Diagnostic tests.

## DIAG-CLD-REQ-015050/A-Bezel Diagnostic Client (TcSE ROIN-202564-1)

The Bezel Diagnostic Client is the interface and control for the Bezel Diagnostic function

## DIAG-CLD-REQ-016469/A-Bezel Diagnostic Server (TcSE ROIN-202563-1)

The Bezel Diagnostic Server is responsible for performing the requested Bezel Diagnostic operation

## DIAG-CLD-REQ-311960/A-Bezel Diagnostic Server - AHU (APIM V2)

The Bezel Diagnostic Server is responsible for performing the requested Bezel Diagnostic operation

### DIAG-FUR-REQ-311961/A-Diagnostics - integrated AHU functionality (APIM v2)

**AHU Diagnostics**

The AHU shall support the following diagnostic routines when requested:

1. Speaker Walk Around

2. Signal Strength

3. Software Part Number

4. Hardware Part Number

5. Calibration Part Number

6. SDARS ESN

**Speaker Walk Around**

This function shall execute vehicle speaker walk around test utilizing an internally generated tones on the main, center image channels, and subwoofer channels. Refer to the applicable Infotainment Diagnostic Specification for the frequencies of the tones used to test each channel.

Speaker walk around test sequence LF, RF, RR, LR, Aux1 (if applicable), Aux2 (if applicable) for 1.5 seconds each and shall display the speaker being tested on the display. The volume shall be defaulted to volume step 8 and the volume knob shall adjust the volume in speaker walk around.

The AHU shall transmit the name of each speaker to the proper display device(s) as its being tested during the speaker walk-around test. The following table outlines the text that shall be transmitted when the associated output channel is tested.

|  |  |
| --- | --- |
| **Channel Under Test** | **Display Text** |
| LF Door | **LF DOOR** |
| LF Tweeter | **LF TWEETER** |
| RF Door | **RF DOOR** |
| RF Tweeter | **RF TWEETER** |
| RR Door | **RR DOOR** |
| LR Door | **LR DOOR** |
| Aux 1 | **AUX 1** |
| Aux 2 | **AUX 2** |

**Signal Strength**

This function shall enable the viewing of the AHU signal strength via the vehicle display. The display shall be updated every 5 seconds with the 5 second average. The range is 0 to 255 in the units dBuv.

The AHU shall display the current station’s radio signal strength.

**Software Part Number**

This function shall enable the viewing AHU software part number via the vehicle display.

**Hardware Part Number**

This function shall enable the viewing AHU hardware part number via the vehicle display.

**Calibration Part Number**

This function shall enable the viewing AHU calibration part number via the vehicle display.

**SDARS ESN**

This function shall enable the viewing AHU SDARS ESN via the vehicle display.

## Bezel Diagnostics Interface Requirements

### DIAG-IIR-REQ-015049/B-Bezel Diagnostics Interface Requirements (TcSE ROIN-129515-3)

#### MD-REQ-277459/A-Bezel\_Diagnostic.Rq

**Message Type**: Request

Request signal from the Diagnostic Client to the Diagnostic Server indicating if Bezel Diagnostics is active and what function to perform

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | | **Literals** | **Value** | **Description** |
| Bezel\_Diagnostic.Rq | Bezel\_Diag\_State\_Rq | Inactive | 0x0 |  |
| Active | 0x1 |  |
| Bezel\_Diag\_Module\_Rq | Inactive | 0x0 |  |
| AHU | 0x1 |  |
| DSP AMP | 0x2 | Note: could be DSP AMP or AAM |
| EFP |  |  |
| cont. | … |  |
| Reserved | 0xF |  |
| Diagnostic\_Operation\_Rq | Inactive | 0x0 |  |
| Get All Background Diagnostic Request | 0x1 |  |
| Software Part Number | 0x2 |  |
| Hardware Part Number | 0x3 |  |
| Calibration Part Number | 0x4 |  |
| Speaker Walk-Around | 0x5 |  |
| SDARS ESN number | 0x6 |  |
| Signal Strength | 0x7 |  |
| Cont. | … |  |
| Reserved | 0xF |  |

#### MD-REQ-277675/B-AHU\_Bezel\_Diag.St

**Message Type**: Status/Response

Signal from the Bezel Diagnostic Server to the Bezel Diagnostic Client indicating what function is active

|  |  |  |  |
| --- | --- | --- | --- |
| **Logical Signal Name** | **Literals** | **Value** | **Description** |
| AHU\_Bezel\_Diag.St | Inactive / No Data Exists | 0x0 |  |
| Software Part Number | 0x1 |  |
| Hardware Part Number | 0x2 |  |
| Calibration Part Number | 0x3 |  |
| Speaker Walk-Around | 0x4 |  |
| SDARS ESN Number | 0x5 |  |
| Signal Strength | 0x6 |  |

#### MD-REQ-277746/B-DSP\_Bezel\_Diag.St

**Message Type**: Status/Response

Signal from the Bezel Diagnostic Server to the Bezel Diagnostic Client indicating what function is active

|  |  |  |  |
| --- | --- | --- | --- |
| **Logical Signal Name** | **Literals** | **Value** | **Description** |
| DSP\_Bezel\_Diag.St | Inactive / No Data Exists | 0x0 |  |
| Software Part Number | 0x1 |  |
| Hardware Part Number | 0x2 |  |
| Calibration Part Number | 0x3 |  |
| Speaker Walk-Around | 0x4 |  |

#### MD-REQ-277747/B-EFP\_Bezel\_Diag.St

**Message Type**: Status/Response

Signal from the Bezel Diagnostic Server to the Bezel Diagnostic Client indicating what function is active

|  |  |  |  |
| --- | --- | --- | --- |
| **Logical Signal Name** | **Literals** | **Value** | **Description** |
| EFP\_Bezel\_Diag.St | Inactive / No Data Exists | 0x0 |  |
| Software Part Number | 0x1 |  |
| Hardware Part Number | 0x2 |  |
| Calibration Part Number | 0x3 |  |

#### MD-REQ-278042/B-AHU\_Bezel\_Diag\_Data

**Message Type**: Response

A Transport Protocol Bezel Diagnostic response from the AHU Diagnostic Server to the Diagnostic Client with the information for display on the HMI output

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | | **Literals** | **Value** | **Description** |
| AHU\_Bezel\_Diag\_Data | Bezel\_Diag\_Operation | Inactive | 0x0 |  |
| Get All Background Request | 0x1 |  |
| Software Part Number | 0x2 |  |
| Hardware Part Number | 0x3 |  |
| Calibration Part Number | 0x4 |  |
| Speaker Walk-Around | 0x5 |  |
| SDARS ESN Number | 0x6 |  |
| Signal Strength | 0x7 |  |
| Reserved | 0x8 – 0xF |  |
| Bezel Diagnostic Data | N/A | N/A | Max 16 characters + 1 EOS for any Bezel Diagnostic Operation |

Notes:

See TP SPSS to map AHU\_Bezel\_Diag\_Data to a CAN message

When Bezel\_Diag\_Operation = 0x1 Get All Background Request then the following diagnostic operation data will be sent in this order:

1. Software Part Number (max 16 char + 1 EOS)

2. Hardware Part Number (max 16 char + 1 EOS)

3. Calibration Part Number (max 16 char + 1 EOS)

4. SDARS ESN Number (max 16 char + 1 EOS)

When Bezel\_Diag\_Operation = 0x2 then the ASCII data will be for the Software Part Number

When Bezel\_Diag\_Operation = 0x3 then the ASCII data will be for the Hardware Part Number

When Bezel\_Diag\_Operation = 0x4 then the ASCII data will be for the Calibration Part Number

When Bezel\_Diag\_Operation = 0x5 then the ASCII data will be for the Speaker Walk-Around test

When Bezel\_Diag\_Operation = 0x6 then the ASCII data will be for the SDARS ESN Number

When Bezel\_Diag\_Operation = 0x7 then the ASCII data will be for the radio signal strength test

#### MD-REQ-278043/A-DSP\_Bezel\_Diag\_Data

**Message Type**: Response

A Transport Protocol Bezel Diagnostic response from the DSP Diagnostic Server to the Diagnostic Client with the information for display on the HMI output

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | | **Literals** | **Value** | **Description** |
| DSP\_Bezel\_Diag\_Data | Bezel\_Diag\_Operation | Inactive | 0x0 |  |
| Get All Background Request | 0x1 |  |
| Software Part Number | 0x2 |  |
| Hardware Part Number | 0x3 |  |
| Calibration Part Number | 0x4 |  |
| Speaker Walk-Around | 0x5 |  |
| Reserved | 0x6 – 0xF |  |
| Bezel Diagnostic Data | N/A | N/A | Max 16 characters + 1 EOS for any Bezel Diagnostic Operation |

Notes:

See TP SPSS to map DSP\_Bezel\_Diag\_Data to a CAN message

When Bezel\_Diag\_Operation = 0x1 Get All Background Request then the following diagnostic operation data will be sent in this order:

1. Software Part Number (max 16 char + 1 EOS)

2. Hardware Part Number (max 16 char + 1 EOS)

3. Calibration Part Number (max 16 char + 1 EOS)

When Bezel\_Diag\_Operation = 0x2 then the ASCII data will be for the Software Part Number

When Bezel\_Diag\_Operation = 0x3 then the ASCII data will be for the Hardware Part Number

When Bezel\_Diag\_Operation = 0x4 then the ASCII data will be for the Calibration Part Number

When Bezel\_Diag\_Operation = 0x5 then the ASCII data will be for the Speaker Walk-Around test

#### MD-REQ-278044/A-EFP\_Bezel\_Diag\_Data

**Message Type**: Response

A Transport Protocol Bezel Diagnostic response from the EFP Diagnostic Server to the Diagnostic Client with the information for display on the HMI output

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Logical Signal Name** | | **Literals** | **Value** | **Description** |
| EFP\_Bezel\_Diag\_Data | Bezel\_Diag\_Operation | Inactive | 0x0 |  |
| Get All Background Request | 0x1 |  |
| Software Part Number | 0x2 |  |
| Hardware Part Number | 0x3 |  |
| Calibration Part Number | 0x4 |  |
| Reserved | 0x5 – 0xF |  |
| Bezel Diagnostic Data | N/A | N/A | Max 16 characters + 1 EOS for any Bezel Diagnostic Operation |

Notes:

See TP SPSS to map EFP\_Bezel\_Diag\_Data to a CAN message

When Bezel\_Diag\_Operation = 0x1 Get All Background Request then the following diagnostic operation data will be sent in this order:

1. Software Part Number (max 16 char + 1 EOS)

2. Hardware Part Number (max 16 char + 1 EOS)

3. Calibration Part Number (max 16 char + 1 EOS)

When Bezel\_Diag\_Operation = 0x2 then the ASCII data will be for the Software Part Number

When Bezel\_Diag\_Operation = 0x3 then the ASCII data will be for the Hardware Part Number

When Bezel\_Diag\_Operation = 0x4 then the ASCII data will be for the Calibration Part Number

#### MD-REQ-276458/B-Vehicle\_Speed.St

**Message Type**: Status

Signal with the current status of the Vehicle Speed

|  |  |  |  |
| --- | --- | --- | --- |
| **Logical Signal Name** | **Literals** | **Value** | **Description** |
| Vehicle\_Speed.St | See info-CAN database for signal details | See info-CAN database for signal details |  |

#### MD-REQ-276459/A-Vehicle\_Speed\_QF

**Message Type**: Status

Signal with the Vehicle Speed Quality Factor

|  |  |  |  |
| --- | --- | --- | --- |
| **Logical Signal Name** | **Literals** | **Value** | **Description** |
| Vehicle\_Speed\_QF | Faulty | 0x0 |  |
| No\_Data\_Exists | 0x1 |
| Not\_Within\_Specifications | 0x2 |
| OK | 0x3 |

## Bezel Diagnostics Interface Requirements - SOA

### DIAG-CLD-REQ-273355/A-Bezel Diagnostic Server - SOA (TCU)

The Bezel Diagnostic Server is responsible for performing the requested Bezel Diagnostic operation

### DIAG-CLD-REQ-278463/A-Bezel Diagnostic Client - SOA

The Bezel Diagnostic Client is the interface and control for the Bezel Diagnostic function

### DIAG-CLD-REQ-278390/A-Bezel Diagnostic Server - SOA (ECG)

The Bezel Diagnostic Server is responsible for performing the requested Bezel Diagnostic operation

### MD-REQ-275119/F-getTcuBezelDiagnosticData

This logical API is used to get the TCU Bezel Diagnostics data during a bezel diagnostic session.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | | | | |
|  | **Subscr. Type** | OnChange | | | |
|  | **QoS Level** | 0 | | | |
|  | **Retained** | No | | | |
|  |  | | | | |
| **R/O** | **Name** | **Type** | **Literals** | **Value** | **Description** |
| **Request** | | | | | |
|  |  |  |  |  |  |
| **Response** | | | | | |
|  |  |  |  |  |  |
| R | TcuProvisioningStatus | Enum |  |  | Show TCU provisioning status |
|  |  |  | NoDataExists / Invalid | 0x0 |  |
|  |  |  | Factory Mode | 0x1 |  |
|  |  |  | Unprovisioned | 0x2 |  |
|  |  |  | Provisioned | 0x3 |  |
|  |  |  |  |  |  |
| R | TcuServingCellIInfoRat | Enum |  |  | Show network technology that is being used for connecting |
|  |  |  | NoDataExists | 0x0 |  |
|  |  |  | LTE | 0x1 |  |
|  |  |  | UMTS | 0x2 |  |
|  |  |  | GSM | 0x3 |  |
|  |  |  | No Service | 0x4 |  |
| R | tcuServingCellIInfoNasStatus | String | - | 50 chars | Show TCU registration status with circuit switched and packet switch include error codes where applicable |
| R | tcuServingCellIInfoCellID | String | - | 22 chars | Show the unique number used to identify base station that TCU is connected to |
| R | tcuVmcuSoftwareNumber | String | - | 20 chars | Show the CAN VMCU SW version |
| R | tcuModemSoftwareNumber | String | - | 20 chars | Show the modem SW version |
| R | tcuHardwarePartNumber | String | - | 20 chars | Show the modem hardware part number |
| R | tcuEsn | String | - | 20 chars | Show the Electronic Serial Number for the TCU |
| R | tcuIccId | String | - | 20 chars | Show the unique serial number that represents the SIM |
| R | tcuImeiSv | String | - | 20 chars | Show the International Mobile Equipment Identity software version. It’s usually unique to identify the modem |
| R | tcuPdpStateC&cApn | String | - | 20 chars | Show command and control APN status (Active or Inactive) with error code where applicable |
| R | tcuPdpStateWhsApn | String | - | 20 chars | Show Wireless hotspot APN status (Active or Inactive) with error code where applicable |
| R | tcuAdditionalInfo | String | - | 1200 chars | Show any additional info that is not included in the other data/primitives in this MD and TCU decides that needs to be displayed. |
| R | tcuConfigurationStatus | String | - | 3000 chars | Show the architecture type, Sync version, Radio version, and other systems within the vehicle that the TCU has. |
| R | tcuViewDtcs | String | - | 4800 chars | Show a list of TCU DTCs and their functions. |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| O | ErrorCode | Enum |  |  | To indicate a feature specific error code (see IVI-SOA-FUR-REQ-277456) |
|  |  |  | No Error | 0x000 |  |
|  |  |  | Response Time Error | 0x001 |  |
|  |  |  | Cancel Time Error | 0x002 |  |
|  |  |  |  | … |  |
|  |  |  |  | 0xFFF |  |

### MD-REQ-275359/F-getEcgBezelDiagnosticData

This logical API is used to get the ECG Bezel Diagnostic data during a bezel diagnostic session

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | | | | | |
|  | **Subscr. Type** | OnChange | | | | |
|  | **QoS Level** | 0 | | | | |
|  | **Retained** | No | | | | |
|  |  | | | | | |
| **R/O** | **Name** | **Type** | **Literals** | **Value** | | **Description** |
| **Request** | | | | | | |
|  |  |  |  | |  |  |
| **Response** | | | | | | |
|  |  |  |  | |  |  |
| R | EcgProvisioningStatus | Enum |  | |  |  |
|  |  |  | NoDataExists | | 0x0 | No entry from ECG |
|  |  |  | Factory | | 0x1 | Provisioning process has not started- ECG not configured |
|  |  |  | Unprovisioned | | 0x2 | ECG is configured and about to start provisioning process |
|  |  |  | Waiting for ECG provisioning response | | 0x3 | ECG has sent the first provisioning message and waiting for cloud ACK |
|  |  |  | Waiting for TCU provisioning response | | 0x4 | ECG has send the second provisioning alert and waiting for cloud ACK |
|  |  |  | Waiting for Home URL | | 0x5 | ECG has received all ACKs and waiting for to receive Home URL |
|  |  |  | Connecting to Home URL | | 0x6 | ECG is connecting to Home URL |
|  |  |  | Waiting for Auth | | 0x7 | ECG is waiting to be authorized (ECG, TCU provisioned and OK to be released) |
|  |  |  | Authorized | | 0x8 | ECG is customer authorized |
| R | ecgESN | String | - | | 10 chars | ECG Electronic Serial Number |
| R | ecgHardwarePartNumber | String | - | | 20 chars | ECG Hardware Assembly number |
| R | ecgApSoftwarePartNumber | String | - | | 20 chars | ECG Application Processor Part Number |
| R | ecgVmcuConfigPartNumber | String | - | | 20 chars | ECG CAN Processor Part Number |
| R | ecgAPConfigPartNumber | String | - | | 20 chars | ECG Application Processor Configuration Number |
| R | ecgVmcuSoftwarePartNumber | String | - | | 20 chars | ECG CAN processor Configuration Number |
| R | ecgApplicationPartNumber | String | - | | 1000  chars | List of all installed applications on the ECG |
| R | ecgConnectionStatus | String | - | | 20 chars | ECG-SDN connection status |
| R | ecgProcessorUsage | String | - | | 6 chars | % usage of AP processor |
| R | ecgFlashMemoryUsage | String | - | | 6 chars | % usage of flash memory |
|  |  |  |  | |  |  |
|  |  |  |  | |  |  |
|  | ErrorCode | Enum |  | |  | To indicate a feature specific error code (see IVI-SOA-FUR-REQ-277456) |
|  |  |  | No Error | | 0x000 |  |
|  |  |  | Response Time Error | | 0x001 |  |
|  |  |  | Cancel Time Error | | 0x002 |  |
|  |  |  |  | | … |  |
|  |  |  |  | | 0xFFF |  |

# Architectural Design - LIN

## DIAGv2-CLD-REQ-117487/A-LIN Bezel Diagnostic Client

The Bezel Diagnostic Client is the interface and control for the Bezel Diagnostic function

## DIAGv2-CLD-REQ-117488/A-LIN Bezel Diagnostic Server

The Bezel Diagnostic Server is responsible for performing the requested Bezel Diagnostic operation

## LIN Serial Number Interface

This interface shall be used in parallel and equivalent to LIN part number readout described in LIN Data Link and Physical Layer specification.

Each digit of the serial number is transferred in hex format in one signal and is not ASCII coded.

### DIAG-SR-REQ-117486/A-LIN Serial Number Interface

|  |  |  |
| --- | --- | --- |
| LINStatus (ICPLINStatus) | Method for error reporting | See LIN Data Link and Physical Layer for further information (Chapter “Ford Standard Error Reporting”) |

|  |  |  |
| --- | --- | --- |
| SerialNumber00 (ICPSrNrDigit00) | Method for transferring 1st digit of the year  e.g. “2” of year 2014 | 0x0: not used  0x1: 1  0x2: 2  0x3 – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber01 (ICPSrNrDigit01) | Method for transferring 2nd digit of the year  e.g. “0” of year 2014 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6: 6  0x7: 7  0x8: 8  0x9: 9  0xA – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber02 (ICPSrNrDigit02) | Method for transferring 3rd digit of the year  e.g. “1” of year 2014 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6: 6  0x7: 7  0x8: 8  0x9: 9  0xA – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber03 (ICPSrNrDigit03) | Method for transferring 4th digit of the year  e.g. “4” of year 2014 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6: 6  0x7: 7  0x8: 8  0x9: 9  0xA – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber04 (ICPSrNrDigit04) | Method for transferring 1st digit of the month  e.g. “1” of month December (->12) | 0x0: 0  0x1: 1  0x2 – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber05 (ICPSrNrDigit05) | Method for transferring 2nd digit of the month  e.g. “2” of month December (->12) | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6: 6  0x7: 7  0x8: 8  0x9: 9  0xA – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber06 (ICPSrNrDigit06) | Method for transferring 1st digit of the day  e.g. “0” of day 05 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4 – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber07 (ICPSrNrDigit07) | Method for transferring 2nd digit of the day  e.g. “5” of day 05 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6: 6  0x7: 7  0x8: 8  0x9: 9  0xA – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber08 (ICPSrNrDigit08) | Method for transferring 1st digit of the hour  e.g. “1” of time 13:40:52 | 0x0: 0  0x1: 1  0x2: 2  0x3 – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber09 (ICPSrNrDigit09) | Method for transferring 2nd digit of the hour  e.g. “3” of time 13:40:52 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6: 6  0x7: 7  0x8: 8  0x9: 9  0xA – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber10 (ICPSrNrDigit10) | Method for transferring 1st digit of the minute  e.g. “4” of time 13:40:52 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6 – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber11 (ICPSrNrDigit11) | Method for transferring 2nd digit of the minute  e.g. “0” of time 13:40:52 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6: 6  0x7: 7  0x8: 8  0x9: 9  0xA – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber12 (ICPSrNrDigit12) | Method for transferring 1st digit of the second  e.g. “5” of time 13:40:52 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6 – 0xF: not used |

|  |  |  |
| --- | --- | --- |
| SerialNumber13 (ICPSrNrDigit13) | Method for transferring 2nd digit of the second  e.g. “2” of time 13:40:52 | 0x0: 0  0x1: 1  0x2: 2  0x3: 3  0x4: 4  0x5: 5  0x6: 6  0x7: 7  0x8: 8  0x9: 9  0xA – 0xF: not used |

## LIN Extended Part Numbers Interface

### DIAG-IIR-REQ-115763/A-LIN MasterReqXx

|  |  |  |
| --- | --- | --- |
| MasterReqXx (MasterReqXx)  Ex. MasterReqB0, MasterReqB1,… | Method for transferring data like hardware part number and software part number. | See “DIAG-FUN-REQ-115753/A-Bezel Diagnostics LIN Extended Part Number Readout” in this specification |

### DIAG-IIR-REQ-115764/A-LIN SlaveRespXx

|  |  |  |
| --- | --- | --- |
| SlaveRespXx (SlaveRespXx)  Ex. SlaveRespB0, SlaveRespB1,… | Method for transferring data like hardware part number and software part number. | See “DIAG-FUN-REQ-115753/A-Bezel Diagnostics LIN Extended Part Number Readout” in this specification |

# Architectural Design - I2C over LVDS

## DIAG-CLD-REQ-163996/A-I2C Bezel Diagnostic Client

The Bezel Diagnostic Client is the interface and control for the Bezel Diagnostic function and is located in the I2C Master.

## DIAG-CLD-REQ-163997/A-I2C Bezel Diagnostic Server

The Bezel Diagnostic Server is responsible for performing the requested Bezel Diagnostic operation and is located in the I2C Slave.

# Architectural Design - SOA\_Ethernet

## DIAG-CLD-REQ-278463/A-Bezel Diagnostic Client - SOA

The Bezel Diagnostic Client is the interface and control for the Bezel Diagnostic function

## DIAG-CLD-REQ-278390/A-Bezel Diagnostic Server - SOA (ECG)

The Bezel Diagnostic Server is responsible for performing the requested Bezel Diagnostic operation

## DIAG-CLD-REQ-273355/A-Bezel Diagnostic Server - SOA (TCU)

The Bezel Diagnostic Server is responsible for performing the requested Bezel Diagnostic operation

## Interface Requirements - SOA Bezel Diagnostics

### MD-REQ-275119/F-getTcuBezelDiagnosticData

This logical API is used to get the TCU Bezel Diagnostics data during a bezel diagnostic session.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | | | | |
|  | **Subscr. Type** | OnChange | | | |
|  | **QoS Level** | 0 | | | |
|  | **Retained** | No | | | |
|  |  | | | | |
| **R/O** | **Name** | **Type** | **Literals** | **Value** | **Description** |
| **Request** | | | | | |
|  |  |  |  |  |  |
| **Response** | | | | | |
|  |  |  |  |  |  |
| R | TcuProvisioningStatus | Enum |  |  | Show TCU provisioning status |
|  |  |  | NoDataExists / Invalid | 0x0 |  |
|  |  |  | Factory Mode | 0x1 |  |
|  |  |  | Unprovisioned | 0x2 |  |
|  |  |  | Provisioned | 0x3 |  |
|  |  |  |  |  |  |
| R | TcuServingCellIInfoRat | Enum |  |  | Show network technology that is being used for connecting |
|  |  |  | NoDataExists | 0x0 |  |
|  |  |  | LTE | 0x1 |  |
|  |  |  | UMTS | 0x2 |  |
|  |  |  | GSM | 0x3 |  |
|  |  |  | No Service | 0x4 |  |
| R | tcuServingCellIInfoNasStatus | String | - | 50 chars | Show TCU registration status with circuit switched and packet switch include error codes where applicable |
| R | tcuServingCellIInfoCellID | String | - | 22 chars | Show the unique number used to identify base station that TCU is connected to |
| R | tcuVmcuSoftwareNumber | String | - | 20 chars | Show the CAN VMCU SW version |
| R | tcuModemSoftwareNumber | String | - | 20 chars | Show the modem SW version |
| R | tcuHardwarePartNumber | String | - | 20 chars | Show the modem hardware part number |
| R | tcuEsn | String | - | 20 chars | Show the Electronic Serial Number for the TCU |
| R | tcuIccId | String | - | 20 chars | Show the unique serial number that represents the SIM |
| R | tcuImeiSv | String | - | 20 chars | Show the International Mobile Equipment Identity software version. It’s usually unique to identify the modem |
| R | tcuPdpStateC&cApn | String | - | 20 chars | Show command and control APN status (Active or Inactive) with error code where applicable |
| R | tcuPdpStateWhsApn | String | - | 20 chars | Show Wireless hotspot APN status (Active or Inactive) with error code where applicable |
| R | tcuAdditionalInfo | String | - | 1200 chars | Show any additional info that is not included in the other data/primitives in this MD and TCU decides that needs to be displayed. |
| R | tcuConfigurationStatus | String | - | 3000 chars | Show the architecture type, Sync version, Radio version, and other systems within the vehicle that the TCU has. |
| R | tcuViewDtcs | String | - | 4800 chars | Show a list of TCU DTCs and their functions. |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| O | ErrorCode | Enum |  |  | To indicate a feature specific error code (see IVI-SOA-FUR-REQ-277456) |
|  |  |  | No Error | 0x000 |  |
|  |  |  | Response Time Error | 0x001 |  |
|  |  |  | Cancel Time Error | 0x002 |  |
|  |  |  |  | … |  |
|  |  |  |  | 0xFFF |  |

### MD-REQ-275359/F-getEcgBezelDiagnosticData

This logical API is used to get the ECG Bezel Diagnostic data during a bezel diagnostic session

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | | | | | |
|  | **Subscr. Type** | OnChange | | | | |
|  | **QoS Level** | 0 | | | | |
|  | **Retained** | No | | | | |
|  |  | | | | | |
| **R/O** | **Name** | **Type** | **Literals** | **Value** | | **Description** |
| **Request** | | | | | | |
|  |  |  |  | |  |  |
| **Response** | | | | | | |
|  |  |  |  | |  |  |
| R | EcgProvisioningStatus | Enum |  | |  |  |
|  |  |  | NoDataExists | | 0x0 | No entry from ECG |
|  |  |  | Factory | | 0x1 | Provisioning process has not started- ECG not configured |
|  |  |  | Unprovisioned | | 0x2 | ECG is configured and about to start provisioning process |
|  |  |  | Waiting for ECG provisioning response | | 0x3 | ECG has sent the first provisioning message and waiting for cloud ACK |
|  |  |  | Waiting for TCU provisioning response | | 0x4 | ECG has send the second provisioning alert and waiting for cloud ACK |
|  |  |  | Waiting for Home URL | | 0x5 | ECG has received all ACKs and waiting for to receive Home URL |
|  |  |  | Connecting to Home URL | | 0x6 | ECG is connecting to Home URL |
|  |  |  | Waiting for Auth | | 0x7 | ECG is waiting to be authorized (ECG, TCU provisioned and OK to be released) |
|  |  |  | Authorized | | 0x8 | ECG is customer authorized |
| R | ecgESN | String | - | | 10 chars | ECG Electronic Serial Number |
| R | ecgHardwarePartNumber | String | - | | 20 chars | ECG Hardware Assembly number |
| R | ecgApSoftwarePartNumber | String | - | | 20 chars | ECG Application Processor Part Number |
| R | ecgVmcuConfigPartNumber | String | - | | 20 chars | ECG CAN Processor Part Number |
| R | ecgAPConfigPartNumber | String | - | | 20 chars | ECG Application Processor Configuration Number |
| R | ecgVmcuSoftwarePartNumber | String | - | | 20 chars | ECG CAN processor Configuration Number |
| R | ecgApplicationPartNumber | String | - | | 1000  chars | List of all installed applications on the ECG |
| R | ecgConnectionStatus | String | - | | 20 chars | ECG-SDN connection status |
| R | ecgProcessorUsage | String | - | | 6 chars | % usage of AP processor |
| R | ecgFlashMemoryUsage | String | - | | 6 chars | % usage of flash memory |
|  |  |  |  | |  |  |
|  |  |  |  | |  |  |
|  | ErrorCode | Enum |  | |  | To indicate a feature specific error code (see IVI-SOA-FUR-REQ-277456) |
|  |  |  | No Error | | 0x000 |  |
|  |  |  | Response Time Error | | 0x001 |  |
|  |  |  | Cancel Time Error | | 0x002 |  |
|  |  |  |  | | … |  |
|  |  |  |  | | 0xFFF |  |

# General Requirements

## DIAG-SR-REQ-103696/A-LIN ICP Part Number during Bezel Diagnostics

ICP Assembly, Hardware, Software and Serial Number part number(s) are sent over LIN to the Bezel Diagnostics Client.

If ICP button panel is LIN based then:

* the LIN protocol supports sending the Assembly part number and the Serial Number using SAE standard (See “LIN Data Link and Physical Layer” spec), and
* sending the Software and Hardware part number as described in this Bezel Diagnostics SPSS function “DIAG-FUN-REQ-115753-Bezel Diagnostics LIN Extended Part Number Readout”

The Bezel Diagnostic Client shall display the LIN ICP part numbers when showing the ICP part number(s) screen in bezel diagnostics (can use the EFP part number HMI screen if needed).

If the Bezel Diagnostic HMI just has 3 slots that displays the Software Part Number, Hardware Part Number and Calibration Part Number then the following ICP LIN part numbers shall be used for those Bezel Diagnostics HMI display:

1. Software Part Number HMI displays ICP Software part number
2. Hardware Part Number HMI displays the ICP Hardware part number
3. Calibration Part Number HMI displays the ICP Assembly part number

Note: it is preferred if all 4 part numbers could be shown in bezel diagnostics HMI but if not the 3 above shall be used.

# Functional Definition

## DIAG-FUN-REQ-016449/A-Bezel Diagnostic Get All Background Diagnostic Request during Initialization (TcSE ROIN-291276-1)

### DIAG-SR-REQ-015054/B-Bezel Diagnostic Client Get All Background Diagnostic Request initialization (TcSE ROIN-129499-1)

Upon system start-up the Bezel Diagnostic Client shall set the signal \_Bezel\_Diagnostic.Rq : Diagnostic\_Operation.Rq == "Get All Background Diagnostic Request" and request from the Bezel Diagnostic Servers the following information:

1. Software Part Number

2. Hardware Part Number

3. Calibration Part Number

4. SDARS ESN Number (applicable only to SDARS server)

Note:

user initiated Bezel Diagnostic events shall take priority over non-user activated events. For example at start-up if the user initiates a speaker walk-around event with Bezel\_Diag\_State\_Rq = Active then the Bezel Diagnostic Client wouldn't initiate a request for "Get All Background Diagnostic Request" while speaker walk-around was occurring.

### DIAG-SR-REQ-015055/A-Bezel Diagnostic Client storing Bezel Diagnostic Background Diagnostic Request data (TcSE ROIN-129516-1)

Upon the Bezel Diagnostic Client receiving the diagnostic information (TP data) the Bezel Diagnostic Client shall store this information to be displayed during a Bezel Diagnostics session.

### DIAG-SR-REQ-015056/A-Bezel Diagnostic Server response during a Get All Background Diagnostic request (TcSE ROIN-205229-1)

The Bezel Diagnostic Servers will provide the "Get All Background Diagnostic Request" data when \_Bezel\_Diagnostic.Rq : Diagnostic\_Operation.Rq == "Get All Background Diagnostic Request".

The \_Bezel\_Diag.St periodic signal from the Bezel Diagnostic Servers remain set as inactive during a Get All Background Diagnostic Request.

The Bezel Diagnostic Client can send a Get All Background Diagnostic Request whether Bezel\_Diag\_State\_Rq = Active or Inactive.

### DIAG-TMR-REQ-015057/B-T\_Diagnostic\_Request (TcSE ROIN-129518-1)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Description** | **Units** | **Range** | **Resolution** | **Default** |
| T\_Diagnostic\_Request | While getting the bezel diagnostic background data T\_Diagnostic\_Request is the max time from the Bezel Diagnostic Client receiving previous bezel diagnostic data from one Bezel Diagnostic Server until the Bezel Diagnostic Client request data from the next Bezel Diagnostic Server.  Note: Use the default value | msec | 0-1000 | 5 | 75 |

### DIAG-SD-REQ-015058/A-Bezel Diagnostics - Get All Background Diagnostic Request during Initialization (TcSE ROIN-129508-1)

Scenarios

Scenario

The Infotainment System starts up (HMIAudioMode turns ON) and the Bezel Diagnostic Client then requests the bezel diagnostic data

Note:

When a Get All Background Request is sent while a Bezel Diagnostic session is not active (such as system start-up) the Bezel\_Diag\_State\_Rq equals Inactive.

Constraints

Pre-condition

Infotainment System is OFF

Post-condition

Diagnostic Client has the Bezel Diagnostic ASCII data saved

Sequence Diagram



## DIAG-FUN-REQ-016450/B-Bezel Diagnostic Session Entry Conditions (TcSE ROIN-291280-1)

There may be further Bezel Diagnostic Entry Conditions restrictions defined in the Use Cases, Functional Requirements and HMI for each specific diagnostic operation then what is defined below. At a minimum the following shall be met:

### DIAG-UC-REQ-016451/B-Bezel Diagnostics – Enter Bezel Diagnostics (TcSE ROIN-291319-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  A phone call is not active  No other higher priority feature preventing bezel diagnostics from being entered |
| **Scenario Description** | User presses two designated buttons as defined by the HMI |
| **Post-conditions** | Bezel Diagnostics is entered.  Bezel diagnostics will start speaker walk-around and if conditions not met for speaker walk-around then will enter the main bezel diagnostics screen. |
| **List of Exception Use Cases** | E1–[DIAG-GUC-291320-1-Bezel Diagnostics – Cannot enter Bezel Diagnostics](http://ivs02.pd3.ford.com:8080/tcr/controller/ObjLauncher?wolf_objectid=19.0.79575461&LID=19.0.79575461&tcr_symbolic_target_id=19.0.79575461&tcr_symbolic_property_id=2.0.4153) |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch)  Audio OUT |

### DIAG-UC-REQ-016452/B-Bezel Diagnostics – Cannot enter Bezel Diagnostics (TcSE ROIN-291320-1)

**Linked Elements**

DIAG-UC-REQ-016451/B-Bezel Diagnostics – Enter Bezel Diagnostics (TcSE ROIN-291319-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  There is an Active Phone Call |
| **Scenario Description** | User presses two designated buttons as defined by the HMI |
| **Post-conditions** | Bezel Diagnostics is NOT entered. |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch)  Audio OUT |

### DIAG-SR-REQ-015060/B-Entry Conditions for user initiated bezel diagnostic session (TcSE ROIN-129519-2)

Bezel Diagnostics can only be entered by the Bezel Diagnostic Client when the user selects <Bezel Diagnostics> via HMI and there is no Phone call or other higher priority features that are active.

* An example of higher priority feature could be Rear View Camera or any other feature the Bezel Diagnostic Client team determines is higher priority.

If no priority table for “other higher priority features” the Bezel Diagnostic Client could limit entering Bezel Diagnostic to while there is an Active Media Audio Source (ie AM/FM, CD, SDARS, Aux...) or Audio Off condition (empty audio stack). At a minimum Bezel Diagnostics shall be able to be entered whenever there is an Active Media Audio Source.

### DIAG-SR-REQ-015061/B-Bezel Diagnostic entered in Single Play (TcSE ROIN-129520-1)

A Bezel Diagnostic session can only be entered by the Bezel Diagnostic Client when the infotainment system is in Single Play.

* Note: dual play might not even be supported by the infotainment system (ie dual play for bezel diagnostics is an audio source out of the front speakers and another rear audio source out of the rear speakers at the same time).

## DIAG-FUN-REQ-016453/A-Bezel Diagnostic Session Exit Conditions (TcSE ROIN-291277-1)

### DIAG-UC-REQ-016454/C-Bezel Diagnostics – Exit Bezel Diagnostics (TcSE ROIN-291079-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Battery voltage between 10 and 16 volts.  Bezel Diagnostics is Active |
| **Scenario Description** | Exit Bezel Diagnostics is selected by:  -- Pressing the power button.  -- Pressing the <Exit Bezel Diagnostics> HMI button  -- The ignition status changes  -- There is a higher priority feature active (ex place a phone call) |
| **Post-conditions** | Bezel Diagnostics is exited |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

### DIAG-SR-REQ-015063/C-Exit Conditions for Bezel Diagnostics (TcSE ROIN-129521-3)

Bezel Diagnostics shall be exited by the Bezel Diagonstic Client when the user selects <Exit Bezel Diagnostics> via the HMI, when the ignition status changes, power button press, there is a higher priority feature active (ex phone call), there is a battery disconnect or there is a Diagnostic reset via Linked based Diagnostics.

## DIAG-FUN-REQ-016455/A-Bezel Diagnostic Speaker Walk-Around (TcSE ROIN-291278-1)

### DIAG-UC-REQ-016456/A-Bezel Diagnostics – Entry Bezel Diagnostic and Speaker Walkaround (TcSE ROIN-291069-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Vehicle Speed is below 5KPH.  Battery voltage between 10 and 16 volts. |
| **Scenario Description** | User presses two designated buttons as defined by the HMI and the display switches to Speaker Walkaround screen. |
| **Post-conditions** | Infotainment system speakers plays a tone for a defined period of time (covered in IDS functional specification) in a clockwise transition starting with the Driver’s seat to individual speakers.  The speaker names are displayed which are playing the audio.  Display goes to main Bezel Diagnostics screen if no operator interaction or End Test is selected via HMI. |
| **List of Exception Use Cases** | E1- [DIAG-GUC-291076-1-Bezel Diagnostics – Vehicle speed above 5kph during speaker walk around](http://ivs02.pd3.ford.com:8080/tcr/controller/ObjLauncher?wolf_objectid=19.0.79466069&LID=19.0.79466069&tcr_symbolic_target_id=19.0.79466069&tcr_symbolic_property_id=2.0.4153) |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch)  Audio OUT |

### DIAG-UC-REQ-016457/A-Bezel Diagnostics – Speaker Walk Around – Entry from within Bezel Diagnostics (TcSE ROIN-291075-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Vehicle Speed is below 5KPH.  Battery voltage between 10 and 16 volts.  Bezel Diagnostic is active |
| **Scenario Description** | User selects speaker walk-around in the component bezel diagnostics submenu. |
| **Post-conditions** | Infotainment system speakers plays a tone for a defined period (covered in the IDS functional specification) in a clockwise transition starting with the Driver’s seat to individual speakers.  The speaker names are displayed which are playing the audio. |
| **List of Exception Use Cases** | E1-[DIAG-GUC-291076-1-Bezel Diagnostics – Vehicle speed above 5kph during speaker walk around](http://ivs02.pd3.ford.com:8080/tcr/controller/ObjLauncher?wolf_objectid=19.0.79466069&LID=19.0.79466069&tcr_symbolic_target_id=19.0.79466069&tcr_symbolic_property_id=2.0.4153) |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch)  Audio OUT |

### DIAG-UC-REQ-016458/A-Bezel Diagnostics – Vehicle speed above 5kph during speaker walk around (TcSE ROIN-291076-1)

**Linked Elements**

DIAG-UC-REQ-016456/A-Bezel Diagnostics – Entry Bezel Diagnostic and Speaker Walkaround (TcSE ROIN-291069-1)

DIAG-UC-REQ-016457/A-Bezel Diagnostics – Speaker Walk Around – Entry from within Bezel Diagnostics (TcSE ROIN-291075-1)

DIAG-UC-REQ-016451/B-Bezel Diagnostics – Enter Bezel Diagnostics (TcSE ROIN-291319-1)

DIAG-UC-REQ-016452/B-Bezel Diagnostics – Cannot enter Bezel Diagnostics (TcSE ROIN-291320-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Speaker Walkaround Active  Vehicle speed is less than 5kph.  Infotainment System Powered On  Battery voltage between 10 and 16 volts. |
| **Scenario Description** | Vehicle speed increases above 5kph. |
| **Post-conditions** | Speaker Walkaround is exited |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

### DIAG-UC-REQ-016459/A-Bezel Diagnostics – Internal Bezel Diagnostics Speaker Walk Around Completed (TcSE ROIN-291077-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Speaker Walkaround Active  Vehicle speed is less than 5kph.  Infotainment System Powered On  Battery voltage between 10 and 16 volts. |
| **Scenario Description** | User selects HMI to end speaker walkaround.  Speaker Walkaround is exited |
| **Post-conditions** | Enter Bezel Diagnostic Component Submenu. |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

### DIAG-SR-REQ-015065/A-Speaker Walk-Around initiation at entry of Bezel Diagnostic session (TcSE ROIN-129523-2)

Speaker Walk-Around shall be the initial test requested by the Bezel Diagnostic Client when entering Bezel Diagnostics as long as the vehicle speed is below 5kph. After the Speaker Walk-Around test is completed the Bezel Diagnostic Default Session shall be entered.

If the vehicle speed is equal to or above 5kph when Bezel Diagnostics session is entered than the Bezel Diagnostic Client does not request from the Bezel Diagnostic Server the speaker walk-around test but instead the Bezel Diagnostic Default Session shall be entered.

### DIAG-SR-REQ-015066/A-Chime operation during Speaker Walk-Around (TcSE ROIN-129524-1)

Chimes are not operable during the speaker walk-around test when the infotainment system is the Chime Audio Source. The infotainment components shall not transfer control of the chimes back to the Cluster during speaker walk-around.

After the speaker walk-around test has ended the Chimes shall return to the Infotainment System.

### DIAG-SR-REQ-015067/B-Module controlling the Speaker Walk-Around function (TcSE ROIN-129525-2)

For the speaker walk-around test if there is both an AHU and DSP AMP on the vehicle at the same time then the DSP AMP shall perform the speaker walk around test.

For the speaker walk-around test if there is both an AHU and AAM (Audio Amp Module) on the vehicle at the same time then the AHU shall perform the speaker walk around test.

The Bezel Diagnostic Client shall request the proper module to perform the speaker walk-around operation.

### DIAG-SR-REQ-015068/A-Cancelling Speaker Walk-Around because vehicle in motion (TcSE ROIN-129526-1)

During the speaker walk-around test (or any test that requires audio) if the vehicle speed becomes greater than 5kph then the speaker walk-around session (or other diagnostic audio session) shall be ended by the Bezel Diagnostic Client.

The Bezel Diagnostic Client ends the test by changing the "Diagnostic\_Operation.Rq" signal so that it does not equal "Speaker Walk-Around". See requirement [DIAG-GREQ-129533-1-Bezel Diagnostic Default Session](http://ivs02.pd3.ford.com:8080/tcr/controller/ObjLauncher?wolf_objectid=16.0.4596528&LID=16.0.4632285) for entering the Bezel Diagnostic Default Session.

## DIAG-FUN-REQ-016460/A-Bezel Diagnostic Activation Events (TcSE ROIN-291279-1)

### DIAG-UC-REQ-016461/A-Bezel Diagnostics – Main Menu (TcSE ROIN-291070-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered ON  Battery voltage between 10 and 16 volts.  Bezel Diagnostics is active |
| **Scenario Description** | Speaker Walkaround complete or exited, or  Speaker Walkaround entry conditions not met when bezel diagnostics entered, or  While in bezel diagnostic submenu exit out of the submenu |
| **Post-conditions** | Enter main menu of Bezel Diagnostics with all bezel diagnostic components listed as separate menu picks. (ex. APIM Diagnostics, Audio Diagnostics, EFP Diagnostics) |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

### DIAG-UC-REQ-016462/A-Bezel Diagnostics – Module Specific Sub menu (TcSE ROIN-291071-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Battery voltage between 10 and 16 volts.  Bezel Diagnostics is active |
| **Scenario Description** | Module Component Diagnostic Submenu is selected by User. |
| **Post-conditions** | Module component submenu HMI is displayed (i.e. Part Numbers, SDARS ESN, Signal Strength, Speaker Walkaround) |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

### DIAG-UC-REQ-016463/B-Bezel Diagnostics – Component Part Numbers (TcSE ROIN-291072-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Battery voltage between 10 and 16 volts.  Bezel Diagnostics is active |
| **Scenario Description** | Component Part Numbers Menu selected by User in Component Bezel Diag Submenu. |
| **Post-conditions** | HMI displays individual component Part Numbers. |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

### DIAG-UC-REQ-016464/A-Bezel Diagnostics – SDARS ESN (TcSE ROIN-291073-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Battery voltage between 10 and 16 volts.  Bezel Diagnostic is active |
| **Scenario Description** | The menu pick for displaying the SDARS ESN is selected by User |
| **Post-conditions** | HMI displays SDARS ESN |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

### DIAG-UC-REQ-016465/A-Bezel Diagnostics – AM/FM Signal Strength (TcSE ROIN-291074-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Battery voltage between 10 and 16 volts.  Bezel Diagnostics is Active  Current audio mode is AM or FM. |
| **Scenario Description** | Signal Strength Menu selected by user |
| **Post-conditions** | Display value of signal strength in unit dBuV. |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

### DIAG-SR-REQ-015070/A-Signals to enter a Bezel Diagnostic session (TcSE ROIN-129527-1)

When a Bezel Diagnostic Entry event occurs the Bezel Diagnostic Client shall tell Bezel Diagnostic Server(s) to enter Bezel Diagnostics mode with the signal 'Bezel\_Diag\_State\_Rq' equal to 'Active'. The default shall be set to 'Inactive' when not in Bezel Diagnostics.

### DIAG-SR-REQ-015071/A-Signals to identify what Bezel Diagnostic operation to perform (TcSE ROIN-129528-1)

The Diagnostic Client Tx the Diagnostic\_Operation.Rq signal to the Diagnostic Server to identify the diagnostic operation is to be performed.

Note: if the Diagnostic Client has the user requested information stored from initialization then no request is necessary from the Diagnostic Server.

### DIAG-SR-REQ-015072/A-Identification of the module to perform the Bezel Diagnostic operation (TcSE ROIN-129529-1)

The Bezel Diagnostic Client Tx the Bezel\_Diag\_Module\_Rq signal to the infotainment modules to identify the module that will be the Bezel Diagnostic Server performing the Diagnostic operation.

### DIAG-SR-REQ-015073/A-Initiation of Speaker Walk-Around (TcSE ROIN-129530-1)

Upon entry into a Bezel Diagnostics session the Bezel Diagnostic Client shall set the signal Diagnostic\_Operation\_Rq equal to 'Speaker Walk-Around' if the speaker walk-around entry conditions are met. If the speaker walkaround entry conditions are not met then the Bezel Diagnostic Default Session shall be entered.

### DIAG-SR-REQ-015074/A-Signal to cancel a Bezel Diagnostic session (TcSE ROIN-129531-1)

The Bezel Diagnostic Client can cancel the Bezel Diagnostic session at any time by setting the 'Bezel\_Diag\_State\_Rq' signal equal to 'Inactive'.

### DIAG-SR-REQ-015075/A-Bezel Diagnostic HMI Output (TcSE ROIN-129532-1)

The Bezel Diagnostic Client shall update the HMI Output using the Transport Protocol (TP) data from the method "\_Bezel\_Diagnostic\_Data" sent from the Diagnostic Server(s).

### DIAG-SR-REQ-015076/A-Bezel Diagnostic Default Session (TcSE ROIN-129533-1)

The Bezel Diagnostic Default Session shall be entered when the Diagnostic Client signals are set as follows:

1. Bezel\_Diag\_State\_Rq = Active, and

2. Diagnostic\_Operation\_Rq = Inactive, and

3. Bezel\_Diag\_Module\_Rq = Inactive

### DIAG-REQ-015077/A-AAM module (TcSE ROIN-304169-1)

The AAM and DSP AMP are mutually exclusive but both support Bezel Diagnostics. The AAM uses some of the same CAN signals as the DSP AMP as defined in the CAN dB. The AAM bezel diagnostic information shall be displayed on the HMI output.

### Sequence Diagrams

#### DIAG-SD-REQ-015078/A-Bezel Diagnostics - Normal Operation (TcSE ROIN-129501-2)

Scenarios

Scenario

User initiates a Bezel Diagnostics session

Constraints

Pre-condition

Bezel Diagnostics is not active

Post-condition

Bezel Diagnostics session ends and return to normal operation

Sequence Diagram



## DIAG-FUN-REQ-115753/A-Bezel Diagnostics LIN Extended Part Number Readout

### DIAG-SR-REQ-115754/A-Signal Flow

Due to the fact that part number readout is not used very often on request and due to the need to reduce cycle timing for the states of the buttons an extra schedule table has been added. For activating this the Master has to switch the schedule table. While this is active no buttons, states or errors can be transmitted from the ICP to the Master but this will only occur for a short time while activating the diagnosis session on CAN.

To see an overview of how the schedule tables are defined see actual LDF-File.

If the Master requests a part number it sends this request in a SF with the ID-Field 0x3C, the NAD 0x10, the PCI 0x06; the SID 0xB2 followed by an Identifier dependent on the number (e.g. software number) it wants to have. This is followed by the Supplier and the Function IDs. These are determined by the consortium for LIN 2.x and for the ICP have to be set to 0x3B for the supplier ID LSB and to 0x00 for the MSB. The Function ID must be set to 0x08 for the LSB and 0x00 for the MSB.

If User-Defined information is requested the slave must respond in multi-frame format.

The answer frames always begin with 0x7D as ID-Field.

If the frame contains User-Defined information the first frame is of type FF followed by frames of type CF.

Frame type FF begins with a NAD of 0x10, followed by the PCI of 0x10, as only data length lower than 256 bytes is needed for this time. The next byte shows the lower 8 bytes of the length of all bytes to transfer including the RSID. The RSID itself also has a value of 0xF2. At least the first four bytes of the requested number will be coded in ASCII.

After the FF Frame only frames of type CF will follow. These begin with a NAD of 0x10, too. The next byte is the PCI. This includes a frame counter, too. So the first CF has a value of 0x21, the second 0x22 and so on. The last six bytes are only data bytes. This means the characters of the requested part numbers can be found coded in ASCII.

The total number of frames depends on the count of characters that should be transferred. Usually it will be one FF Frame followed by one or two CF-Frames.

Additional information for clarification:

The Service Identifier (SID) specifies the request that shall be performed by the slave node addressed. Here it is every time 0xB2 (Read by Identifier) as defined in the LIN consortium spec. Means we are using only 0xB2 for SID.

The Response Service Identifier (RSID) specifies the contents of the response. The RSID for a positive response is always SID + 0x40. This means we are using only 0xF2 for RSID.

### DIAG-SR-REQ-115755/A-Coding of PCI

The PCI contains data described below. Examples can be found later in this document.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Type** | **PCI Type** | | | | **Additional information** | | | |
| **B7** | **B6** | **B5** | **B4** | **B3** | **B2** | **B1** | **B0** |
| SF | 0 | 0 | 0 | 0 | Length | | | |
| FF | 0 | 0 | 0 | 1 | Length/256 | | | |
| CF | 0 | 0 | 1 | 0 | Frame counter | | | |

Structure of the PCI byte

### Examples

In the following requirements are examples for each type of request with an example of an answer from the slave.

#### DIAG-SR-REQ-115757/A-Request and Response of HWPN (PCB)

This is an example for the SF request of a HWPN (hardware part number) of the master.

Protected ID-Field has 0x3C:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MasterReqB0 | MasterReqB1 | MasterReqB2 | MasterReqB3 | MasterReqB4 | MasterReqB5 | MasterReqB6 | MasterReqB7 |
| NAD | PCI | SID | Identifier | Supplier ID LSB | Supplier ID MSB | Function ID LSB | Function ID MSB |
| 0x10 | 0x06 | 0xB2 | 0x21 | 0xFF\* | 0x7F\* | 0xFF\* | 0xFF\* |

Example for request frame of HWPN

\*Supplier ID is supplier dependent but wildcards shall be used.

\*Function ID is supplier dependent but wildcards shall be used.

Related to this an ICP with the hardware number "F1ET-14F571-HA001" (no EOS!) will response with following answer (data of part number is ASCII coded):

The 1st Frame is of type FF with the protected ID 0x7D and looks like this:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SlaveRespB0 | SlaveRespB1 | SlaveRespB2 | SlaveRespB3 | SlaveRespB4 | SlaveRespB5 | SlaveRespB6 | SlaveRespB7 |
| NAD | PCI | LEN | RSID | D1 | D2 | D3 | D4 |
| 0x10 | 0x10 | 0x12 | 0xF2 | 0x46 | 0x31 | 0x45 | 0x54 |

Example for 1st response frame of HWPN

The 2nd Frame is of type CF with the protected ID 0x7D and looks like this:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SlaveRespB0 | SlaveRespB1 | SlaveRespB2 | SlaveRespB3 | SlaveRespB4 | SlaveRespB5 | SlaveRespB6 | SlaveRespB7 |
| NAD | PCI | D1 | D2 | D3 | D4 | D5 | D6 |
| 0x10 | 0x21 | 0x2D | 0x31 | 0x34 | 0x46 | 0x35 | 0x37 |

Example for 2nd response frame of HWPN

The 3rd Frame is also of type CF with the protected ID 0x7D and looks like this:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SlaveRespB0 | SlaveRespB1 | SlaveRespB2 | SlaveRespB3 | SlaveRespB4 | SlaveRespB5 | SlaveRespB6 | SlaveRespB7 |
| NAD | PCI | D1 | D2 | D3 | D4 | D5 | D6 |
| 0x10 | 0x22 | 0x31 | 0x2D | 0x48 | 0x41 | 0x30 | 0x30 |

Example for 3rd response frame of HWPN

The 4th Frame is also of type CF with the protected ID 0x7D and looks like this:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SlaveRespB0 | SlaveRespB1 | SlaveRespB2 | SlaveRespB3 | SlaveRespB4 | SlaveRespB5 | SlaveRespB6 | SlaveRespB7 |
| NAD | PCI | D1 | D2 | D3 | D4 | D5 | D6 |
| 0x10 | 0x23 | 0x31 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 |

Example for 3rd response frame of HWPN

#### DIAG-SR-REQ-115758/A-Request and Response of SWPN

The following is an example for the SF request of a SWPN (software part number) of the master.

Protected ID-Field has 0x3C:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| MasterReqB0 | MasterReqB1 | MasterReqB2 | MasterReqB3 | MasterReqB4 | MasterReqB5 | MasterReqB6 | MasterReqB7 |
| NAD | PCI | SID | Identifier | Supplier ID LSB | Supplier ID MSB | Function ID LSB | Function ID MSB |
| 0x10 | 0x06 | 0xB2 | 0x22 | 0xFF\* | 0x7F\* | 0xFF\* | 0xFF\* |

Example for request frame of SWPN

\*Supplier ID is supplier dependent but wildcards shall be used.

\*Function ID is supplier dependent but wildcards shall be used.

Related to this an ICP with the software number "F1ET-14F565-HA001" (no EOS!) will response with following answer (data of part number is ASCII coded):

The 1st Frame is of type FF with the protected ID 0x7D and looks like this:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SlaveRespB0 | SlaveRespB1 | SlaveRespB2 | SlaveRespB3 | SlaveRespB4 | SlaveRespB5 | SlaveRespB6 | SlaveRespB7 |
| NAD | PCI | LEN | RSID | D1 | D2 | D3 | D4 |
| 0x10 | 0x10 | 0x12 | 0xF2 | 0x46 | 0x31 | 0x45 | 0x54 |

Example for 1st response frame of SWPN

The 2nd Frame is also of type CF with the protected ID 0x7D and looks like this:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SlaveRespB0 | SlaveRespB1 | SlaveRespB2 | SlaveRespB3 | SlaveRespB4 | SlaveRespB5 | SlaveRespB6 | SlaveRespB7 |
| NAD | PCI | D1 | D2 | D3 | D4 | D5 | D6 |
| 0x10 | 0x21 | 0x2D | 0x31 | 0x34 | 0x46 | 0x35 | 0x36 |

Example for 2nd response frame of SWPN

The 3rd Frame is also of type CF with the protected ID 0x7D and looks like this:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SlaveRespB0 | SlaveRespB1 | SlaveRespB2 | SlaveRespB3 | SlaveRespB4 | SlaveRespB5 | SlaveRespB6 | SlaveRespB7 |
| NAD | PCI | D1 | D2 | D3 | D4 | D5 | D6 |
| 0x10 | 0x22 | 0x35 | 0x2D | 0x48 | 0x41 | 0x30 | 0x30 |

Example for 3rd response frame of SWPN

The 4th Frame is also of type CF with the protected ID 0x7D and looks like this:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SlaveRespB0 | SlaveRespB1 | SlaveRespB2 | SlaveRespB3 | SlaveRespB4 | SlaveRespB5 | SlaveRespB6 | SlaveRespB7 |
| NAD | PCI | D1 | D2 | D3 | D4 | D5 | D6 |
| 0x10 | 0x23 | 0x31 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 |

Example for 4th response frame of SWPN

## DIAG-FUN-REQ-164015/B-Bezel Diagnostics - I2C over LVDS

### ECU Core Assembly Number

#### IFS-MMI2C-SR-REQ-140624/C-0x31 Core Assembly FPN

The I2C Slave Core Assembly message provides a mechanism to transmit a Ford Part Number back to the I2C Master.

Subaddress: 0x31

Access: Read-Only

Default: n/a

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| [0] | Core Assembly character[0] | | | | | | | |
| … | … | | | | | | | |
| [24] | Core Assembly character[24] | | | | | | | |

* Core Assembly: Released (or prototype) Ford Part Number  
  Null-terminated string. For example “H1BT-14F180-FA”.  
  Maximum length 24 characters plus NULL.

The I2C Master shall read a maximum of 25 bytes, be robust to receiving non-ASCII bytes, and be robust to receiving non-NULL terminated data.

If the I2C Slave is not released with this kind of Ford Part Number, the I2C Slave shall indicate that the subaddress is unsupported as described in REQ-140565. In this case the I2C Slave would leave SDA undriven resulting in Data = 0xFF.

#### DIAG-SD-REQ-164017/B-Sequence example showing a core assembly part number readout in principle

Reference requirement TBD



### ECU Delivery Assembly Number

#### IFS-MMI2C-SR-REQ-140625/C-0x32 Delivery Assembly FPN

The Delivery Assembly message provides a mechanism to transmit a Ford Part Number back to the I2C Master.

Subaddress: 0x32

Access: Read-Only

Default: n/a

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| [0] | Delivery Assembly FPN character[0] | | | | | | | |
| … | … | | | | | | | |
| [24] | Delivery Assembly FPN character[24] | | | | | | | |

* Delivery Assembly FPN: Released (or prototype) Ford Part Number  
  Null-terminated string. . For example “H1BT-18B955-FA”  
  Maximum length 24 characters plus NULL.

The I2C Master shall read a maximum of 25 bytes, be robust to receiving non-ASCII bytes, and be robust to receiving non-NULL terminated data.

If the I2C Slave is not released with this kind of Ford Part Number, the I2C Slave shall indicate that the subaddress is unsupported as described in REQ-140565. In this case the I2C Slave would leave SDA undriven resulting in Data = 0xFF.

#### DIAG-SD-REQ-164016/A-Sequence example for showing delivery assembly part number readout in principle



### ECU Software Part Number

#### IFS-MMI2C-SR-REQ-140626/C-0x33 Software FPN

The Software Part Number message provides a mechanism to transmit a Ford Part Number back to the I2C Master.

Subaddress: 0x33

Access: Read-Only

Default: n/a

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| [0] | Software FPN character[0] | | | | | | | |
| … | … | | | | | | | |
| [24] | Software FPN character[24] | | | | | | | |

* Software FPN: Released (or prototype) Ford Part Number  
  Null-terminated string. For example “H1BT-14D358-FA”  
  Maximum length 24 characters plus NULL.

The I2C Master shall read a maximum of 25 bytes, be robust to receiving non-ASCII bytes, and be robust to receiving non-NULL terminated data.

If the I2C Slave is not released with this kind of Ford Part Number, the I2C Slave shall indicate that the subaddress is unsupported as described in REQ-140565. In this case the I2C Slave would leave SDA undriven resulting in Data = 0xFF.

#### DIAG-SD-REQ-164018/A-Sequence example showing a software part number readout in principle



### ECU Serial Number

#### IFS-MMI2C-SR-REQ-140627/C-0x34 Serial Number

The Serial Number message provides a mechanism to transmit an electronic serial number back to the I2C Master.

Subaddress: 0x34

Access: Read-Only

Default Value: n/a

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| [0] | Serial Number character[0] | | | | | | | |
| … | … | | | | | | | |
| [25] | Serial Number character[25] | | | | | | | |

* Serial Number:   
  Null-terminated string.  
  Maximum length 24 characters plus NULL.

**Note**: This specification contains no functional requirement about the format of the serial number.

The I2C Master shall read a maximum of 25 bytes, be robust to receiving non-ASCII bytes, and be robust to receiving non-NULL terminated data.

If the I2C Slave contains no serial number, the I2C Slave shall indicate that the subaddress is unsupported as described in REQ-140565. In this case the I2C Slave would leave SDA undriven resulting in Data = 0xFF.

#### DIAG-SD-REQ-164019/A-Sequence example showing a serial part number readout in principle



### ECU Main Calibration Data Number

#### IFS-MMI2C-SR-REQ-140628/C-0x35 Main Calibration Data FPN

The Main Calibration Data message provides a mechanism to transmit a Ford Part Number back to the I2C Master.

Subaddress: 0x35

Access: Read-Only

Default Value: n/a

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| [0] | Main Calibration Data FPN character[0] | | | | | | | |
| … | … | | | | | | | |
| [24] | Main Calibration Data FPN character[24] | | | | | | | |

* Main Calibration Data FPN: Released (or prototype) Ford Part Number  
  Null-terminated string. No example provided.  
  Maximum length 24 characters plus NULL.

The I2C Master shall read a maximum of 25 bytes, be robust to receiving non-ASCII bytes, and be robust to receiving non-NULL terminated data.

If the I2C Slave is not released with this kind of Ford Part Number, the I2C Slave shall indicate that the subaddress is unsupported as described in REQ-140565. In this case the I2C Slave would leave SDA undriven resulting in Data = 0xFF.

#### DIAG-SD-REQ-164293/A-Sequence example showing ECU main calibration data number in principle



## DIAG-FUN-REQ-273205/A-Bezel Diagnostics - SOA (Ethernet)

Note: for details of the Bezel Diagnostic Client entering and exiting bezel diagnostic reference the CAN based bezel diagnostics SPSS feature/section.

### Disclaimer

Note what is in this release of the SOA Bezel Diagnostics SPSS between the TCU, ECG and SYNC is not necessarily what the SOA Platform team is going to implement in the final product. The API table has everything that needs to be sent over Ethernet between the ECG/TCU and SYNC and the requirements have additional information that needs to be included. This current version is not testable by ISDV.

* For example, the TCU (or ECG) API table in this SPSS may be broken down into multiple API’s in the final implementation so that they can be used for different services and not limited to Bezel Diagnostics.

Once the final version is complete, then working with the SOA Platform team the SPSS will be updated so that this SPSS will reflect what was actually implemented and can then be tested by ISDV. This disclaimer will be removed in the final completed version that reflects the actual implementation.

### Use Cases

#### DIAG-UC-REQ-016451/B-Bezel Diagnostics – Enter Bezel Diagnostics (TcSE ROIN-291319-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  A phone call is not active  No other higher priority feature preventing bezel diagnostics from being entered |
| **Scenario Description** | User presses two designated buttons as defined by the HMI |
| **Post-conditions** | Bezel Diagnostics is entered.  Bezel diagnostics will start speaker walk-around and if conditions not met for speaker walk-around then will enter the main bezel diagnostics screen. |
| **List of Exception Use Cases** | E1–[DIAG-GUC-291320-1-Bezel Diagnostics – Cannot enter Bezel Diagnostics](http://ivs02.pd3.ford.com:8080/tcr/controller/ObjLauncher?wolf_objectid=19.0.79575461&LID=19.0.79575461&tcr_symbolic_target_id=19.0.79575461&tcr_symbolic_property_id=2.0.4153) |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch)  Audio OUT |

#### DIAG-UC-REQ-016454/C-Bezel Diagnostics – Exit Bezel Diagnostics (TcSE ROIN-291079-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Battery voltage between 10 and 16 volts.  Bezel Diagnostics is Active |
| **Scenario Description** | Exit Bezel Diagnostics is selected by:  -- Pressing the power button.  -- Pressing the <Exit Bezel Diagnostics> HMI button  -- The ignition status changes  -- There is a higher priority feature active (ex place a phone call) |
| **Post-conditions** | Bezel Diagnostics is exited |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

#### DIAG-UC-REQ-016461/A-Bezel Diagnostics – Main Menu (TcSE ROIN-291070-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered ON  Battery voltage between 10 and 16 volts.  Bezel Diagnostics is active |
| **Scenario Description** | Speaker Walkaround complete or exited, or  Speaker Walkaround entry conditions not met when bezel diagnostics entered, or  While in bezel diagnostic submenu exit out of the submenu |
| **Post-conditions** | Enter main menu of Bezel Diagnostics with all bezel diagnostic components listed as separate menu picks. (ex. APIM Diagnostics, Audio Diagnostics, EFP Diagnostics) |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

#### DIAG-UC-REQ-016462/A-Bezel Diagnostics – Module Specific Sub menu (TcSE ROIN-291071-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Battery voltage between 10 and 16 volts.  Bezel Diagnostics is active |
| **Scenario Description** | Module Component Diagnostic Submenu is selected by User. |
| **Post-conditions** | Module component submenu HMI is displayed (i.e. Part Numbers, SDARS ESN, Signal Strength, Speaker Walkaround) |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

#### DIAG-UC-REQ-016463/B-Bezel Diagnostics – Component Part Numbers (TcSE ROIN-291072-1)

|  |  |
| --- | --- |
| **Actors** | User |
| **Pre-conditions** | Infotainment System Powered On  Battery voltage between 10 and 16 volts.  Bezel Diagnostics is active |
| **Scenario Description** | Component Part Numbers Menu selected by User in Component Bezel Diag Submenu. |
| **Post-conditions** | HMI displays individual component Part Numbers. |
| **List of Exception Use Cases** |  |
| **Interfaces** | G-HMI (Graphic HMI)  CBI (Center Stack Button Interface – Touch/Non Touch) |

### General Requirements

#### DIAG-SR-REQ-273206/A-Security protections and Bezel Diagnostics - SOA

There are no security protections for Bezel Diagnostics (ie press and hold a button combination to access bezel diagnostics mode) and anything with security implications shall not use Bezel Diagnostics.

#### DIAG-SR-REQ-292123/A-Sting data transmission - SOA

A SOA string of data for Bezel Diagnostics shall contain UTF-8 encoded ASCII text.

### Requirements TCU

#### DIAG-SR-REQ-278396/B-Bezel Diagnostics Activation Event - TCU SOA

When Bezel Diagnostics is activated the Bezel Diagnostic Client shall make the API call “getTCUBezelDiagnoticData” to the TCU Bezel Diagnostic Server and the TCU Bezel Diagnostic Server shall send the current Bezel Diagnostic data/primitives within 75 msec of receiving the API call and then send the data/primitives OnChange after that.

The Bezel Diagnostics Client shall store the primitive data for the Bezel Diagnostic session.

The Bezel Diagnostic Client shall use the data/primitives call out in requirement “MD-REQ-275119-getTcuBezelDiagnosticData” to update the Bezel Diagnostics HMI.

#### DIAG-SR-REQ-278397/A-Bezel Diagnostics Cancellation Event - TCU SOA

When Bezel Diagnostics is cancelled the Bezel Diagnostic Client shall cancel the getTcuBezelDiagnoticsData API call to end Bezel Diagnostics for the TCU.

#### DIAG-FUR-REQ-292080/A-TCU NAS/Service Status

This requirement defines the data string that can be sent by the TCU for NAS/Service Status HMI. The Bezel Diagnostic Client will display whatever is sent by the TCU Bezel Diagnostic Server.

The TCU shall send one of the following:

1. No Service
2. Limited Service
3. CS: Registered, PS: Not Registered
4. CS: Not Registered, PS: Registered
5. CS and PS Registered

In addition to above, the TCU shall send GMM/MM/EMM reject code in parenthesis where applicable in case of No Service, Limited Service, or Not Registered. For example, the TCU shall send: CS: Registered, PS: Not-Registered (14); where 14 = GPRS services not allowed in this PLMN.

The finally display on HMI should be in the following format:

NAS/Service Status: (with only one of the below lines at a time)

1. No Service (error code)
2. Limited Service (error code)
3. CS: Registered, PS: Not Registered (error code)
4. CS: Not Registered (error code), PS: Registered
5. CS and PS Registered

#### DIAG-FUR-REQ-292079/A-PDP State - C&C APN

This requirement defines the data string that can be sent by the TCU for PDP State – C&C APN HMI. The Bezel Diagnostic Client will display whatever is sent by the TCU Bezel Diagnostic Server.

The TCU shall send one of the following:

1. the word “Active”, OR
2. “Inactive (error code)” with the reject error code in parenthesis where applicable in case of Inactive. For example, the TCU shall send “Inactive (33)”; where 33 = requested service option not subscribed.

#### DIAG-FUR-REQ-292095/A-PDP State - WHS APN

This requirement defines the data string that can be sent by the TCU for PDP State – WHS APN HMI. The Bezel Diagnostic Client will display whatever is sent by the TCU Bezel Diagnostic Server.

The TCU shall send one of the following:

1. The word “active, OR
2. “Inactive (error code)” with the reject error code in parenthesis where applicable in case of Inactive. For example, the TCU shall send “Inactive (33)”; where 33 = requested service option not subscribed.

#### DIAG-SR-REQ-292096/A-TCU Additional Information

The HMI for the data/primitive “tcuAdditionalInfo” shall be displayed on a page with up to 20 lines/rows. The TCU data can be up to 60 characters per row and the HMI team would determine how to display the characters if extend beyond the HMI screen (example an arrow to display additional text information not fitting on the screen or however HMI team decides to handle).

For each row the Bezel Diagnostic Client does not need to pre-display any hardcoded items in those rows. The TCU will send all the text needed to be displayed in each of these 20 rows.

How to send the data for each row:

When the TCU sends the data for each row the data to go on a particular row shall be separated by a comma used as a delimiter (the comma should not be displayed in the HMI when used as a delimiter). After the comma the new TCU data shall be displayed on the next row in the HMI.

If the comma needs to be used in the text for a particular row then then a “\” shall be used as an escape delimiter.

Example:

* TCU sends “data1\, data2,data3” would be displayed as:
  + Row 1) data1, data2
  + Row 2) data3
* TCU sends “Hello World, TCU data1\, TCU data2, dataForNextRow” would be displayed as:
  + Row 1) Hello World
  + Row 2) TCU data1, TCU data2
  + Row 3) dataForNextRow
* TCU sends “data1\\data2\,data3, dataForNextRow
  + Row 1) data1\data2,data3
  + Row 2) dataForNextRow

#### DIAG-SR-REQ-292097/A-TCU Configuration Status

The HMI for the data/primitive “tcuConfigurationStatus” shall be displayed on a page with up to 50 lines/rows. The TCU data can be up to 60 characters per row and the HMI team would determine how to display the characters if extend beyond the HMI screen (example an arrow to display additional text information not fitting on the screen or however HMI team decides to handle).

For each row the Bezel Diagnostic Client does not need to pre-display any hardcoded items in those rows. The TCU will send all the text needed to be displayed in each of these 50 rows.

How to send the data for each row:

When the TCU sends the data for each row the data to go on a particular row shall be separated by a comma used as a delimiter (the comma should not be displayed in the HMI when used as a delimiter). After the comma the new TCU data shall be displayed on the next row in the HMI.

If the comma needs to be used in the text for a particular row then then a “\” shall be used as an escape delimiter.

Example:

* TCU sends “data1\, data2,data3” would be displayed as:
  + Row 1) data1, data2
  + Row 2) data3
* TCU sends “Hello World, TCU data1\, TCU data2, dataForNextRow” would be displayed as:
  + Row 1) Hello World
  + Row 2) TCU data1, TCU data2
  + Row 3) dataForNextRow
* TCU sends “data1\\data2\,data3, dataForNextRow
  + Row 1) data1\data2,data3
  + Row 2) dataForNextRow

#### DIAG-SR-REQ-292098/A-TCU View DTC's

The HMI for the data/primitive “tcuViewDtcs” shall be displayed on a page with up to 80 lines/rows. The TCU data can be up to 60 characters per row and the HMI team would determine how to display the characters if extend beyond the HMI screen (example an arrow to display additional text information not fitting on the screen or however HMI team decides to handle).

For each row the Bezel Diagnostic Client does not need to pre-display any hardcoded items in those rows. The TCU will send all the text needed to be displayed in each of these 80 rows.

How to send the data for each row:

When the TCU sends the data for each row the data to go on a particular row shall be separated by a comma used as a delimiter (the comma should not be displayed in the HMI when used as a delimiter). After the comma the new TCU data shall be displayed on the next row in the HMI.

If the comma needs to be used in the text for a particular row then then a “\” shall be used as an escape delimiter.

Example:

* TCU sends “data1\, data2,data3” would be displayed as:
  + Row 1) data1, data2
  + Row 2) data3
* TCU sends “Hello World, TCU data1\, TCU data2, dataForNextRow” would be displayed as:
  + Row 1) Hello World
  + Row 2) TCU data1, TCU data2
  + Row 3) dataForNextRow
* TCU sends “data1\\data2\,data3, dataForNextRow
  + Row 1) data1\data2,data3
  + Row 2) dataForNextRow

### Requirements ECG

#### DIAG-SR-REQ-278398/A-Bezel Diagnostics Activation Event - ECG SOA

When Bezel Diagnostics is activated the Bezel Diagnostic Client shall make the API call “getECGBezelDiagnoticData” to the ECG Bezel Diagnostic Server and the ECG Bezel Diagnostic Server shall send the current Bezel Diagnostic data/primitives within 75 msec of receiving the API call and then send the data/primitives OnChange after that.

The Bezel Diagnostics Client shall store the primitive data for the Bezel Diagnostic session.

The Bezel Diagnostic Client shall use the data/primitives call out in requirement “MD-REQ-275359-getEcgBezelDiagnosticData” to update the Bezel Diagnostics HMI.

#### DIAG-SR-REQ-278399/A-Bezel Diagnostics Cancellation Event - ECG SOA

When Bezel Diagnostics is cancelled the Bezel Diagnostic Client shall cancel the getECGBezelDiagnoticData API call to end Bezel Diagnostics for the ECG.

#### DIAG-SR-REQ-282257/B-HMI for ecgApplicationPartNumber - ECG SOA

The HMI for the data/primitive “ecgApplicationPartNumber” will be broken up into as many as 50 rows (up to 50 application part numbers) with each row containing up to 20 characters for an individual part number.

When the ECG sends the part number data each part number shall be separated by a comma used as a delimiter (the comma should not be displayed in the HMI when used as a delimiter). After the comma the new part number shall be displayed on a new row in the HMI.

If the comma needs to be used in the text for a particular row then then a “\” shall be used as an escape delimiter.

Example:

* ECG sends “data1\, data2,data3” would be displayed as:
  + Row 1) data1, data2
  + Row 2) data3
* ECG sends “Hello World, TCU data1\, TCU data2, dataForNextRow” would be displayed as:
  + Row 1) Hello World
  + Row 2) TCU data1, TCU data2
  + Row 3) dataForNextRow
* ECG sends “data1\\data2\,data3, dataForNextRow
  + Row 1) data1\data2,data3
  + Row 2) dataForNextRow

# Appendix: Reference Documents

|  |  |
| --- | --- |
| Reference # | Document Title |
| 1 | Reference APIM IDS (infotainment diagnostic spec) for additional ways to initiate speaker walk-around with the test tool |
| 2 | H39 Bezel Diagnostics HMI spec |
| 3 | A65 Button HMI spec – contains button combination for entering bezel diagnostics |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |
| 11 |  |
| 12 |  |
| 13 |  |
| 14 |  |
|  |  |
|  |  |
|  |  |