

**Research & Vehicle Technology**

**“Infotainment Systems Product Development”**

**Feature – Electrical Sound Enhancement**

**Infotainment Subsystem Part**

**Specific Specification (SPSS)**

Version 1.2

**UNCONTROLLED COPY IF PRINTED**

**Version Date: October 27, 2017**

**FORD CONFIDENTIALF**

**Revision History**

|  |  |  |  |
| --- | --- | --- | --- |
| **Date** | **Ver** | **Notes** | |
| **April 8, 2016** | **1.0** | **Draft Release** |  |
|  |  |  |  |
| **June 13, 2016** | **1.1** | **Release** |  |
|  | ESE-FRD-REQ-093362/C-Electrical Sound Enhancement | | sberg15: updated structure to BOA4.0 feature based structure. No content change! |
|  | ESE-FUR-REQ-166857/B-ESE CAN input signals (BoA4.0) | | 2016-05-24 OKIRSTEI: "MD-REQ-166843/A-EngineTorqueOut\_Qf","MD-REQ-166844/A-EngineTorqueOut\_St" removed, not available on NON-HYBRIDS; 2016-05-31 OKIRSTEI: added DriveMode2\_St to follow the new strategy, DirveMode\_St removed; 2016-06-02 OKIRSTEI: MD-REQ-223030/A-VehicleSpeed\_St added, MD-REQ-223031/A-VehicleLongitudialAcceleration\_St added; 2016-06-06 OKIRSTEI: added MD-REQ-224894-ExhaustMode\_St |
|  | REQ-114748/D-Byte 1 - Bodystyle | | "2016-06-01 OKIRSTE: added 0x3B |
|  | REQ-114751/D-Byte 4 - Steering Wheel Position | | 2016-05-25 OKIRSTEI: added 0xFF = ANY to allow undependet SWP EQs |
|  |  |  |  |
| **October 27, 2017** | **1.2** | **Release** |  |
| ESE-REQ-205832/B-ESE Boundary View (BoA4.0) | | 2017-01-16 OKIRSTEI: added RCM with Vehicle\_Longitunal Accelaration, added Accelatration Server and its connection to the AudioDSP , added signal name to diagram |
| REQ-128322/C-E01B - Control Module Calibration Data #2 (ANC/ESE) | | 2017-05-03 KJACK174: add "& ESE/ANC = activated" to associated configuration |
| REQ-114769/C-C100 - LostCom 0x167, 0x204, 0x3B2 (CRANK) (Engine)+ | | 2016-10-25 OKIRSTEI: added Signal Reference for 0x167, added 0x3B2-Ignition\_Status, added 0x204-EngAout\_N\_Actl and 0x167-TrnAin\_Tq\_Actl for ESE & ANC |
| REQ-114769/D-C100 - LostCom 0x167, 0x204 (CRANK) (Engine) | | 2017-05-22 KJACK174: remove 0x3B2 as it is now part of DTC C142 |
| ESE-IR-REQ-018086/C-ROUTINE 0x601C "Transfer Function Test tone" (TcSE ROIN-293182) | | 2017-04-20 KJACK174: updated Maximum Routine Run Time from 30000(ms) to 65000 (ms) |
| REQ-203862/B-ESE Error Status (DID EE00) | | 2016-06-23 OKIRSTEI: added "Selected ANC profile incompatible reported by ANC component"; 2016-09-15 OKIRSTEI: Byte 0 renamed to Init/Runtine Status, add "0x03 ANC hard clip resolved" to Byte 0 |
| ESE-IR-REQ-018081/E-DID EE02 "ESE Profile Data" (TcSE ROIN-298086) | | 2017-05-23 KJACK174: Clarified Data Type for ESE Profile Name to ASCII; Changed CCC to DE06 for parameter "Active ESE Profile." |
| REQ-115749/B-ECU Software #3 Part Number (DID F121) (Dirana3 firmware) | | 2016-09-01 OKIRSTEI: renamed to Dirana3 Firmware, Hifi2 core now in Part Number #5 |
| REQ-127205/C-ECU Cal-Config #2 Part Number (DID F16B) ESE profile | | 2017-04-20 KJACK174: add DTC link information |
| MD-REQ-223031/B-VehicleLongitudialAcceleration\_St | | 2016-08-16 OKIRSTEI: correct MAX value, -41.890 to +41.890 |
| REQ-114731/D-DE06 - DSP Config | | 2016-06-23 OKIRSTEI: added 32 bytes for SelectableDriveModes |
| REQ-114747/C-Byte 0 - Carline+ | | 2016-10-06 OKIRSTEI: removed "other value are rejected" |
| REQ-114747/D-Byte 0 - Carline | | 2016-12-08 OKIRSTEI: added D0=BX726, D1=CX482, "All not listed values shall also be accepted." |
| REQ-114748/E-Byte 1 - Bodystyle+ | | 2016-09-30 OKIRSTEI: added 0xF1, 0xF2, 0xF3 for C519 4dr, 5dr & Wagon with Pano Roof; 2016-10-06 OKIRSTEI: removed "all other values reject" |
| REQ-114748/F-Byte 1 - Bodystyle+ | | 2016-12-08 OKIRSTEI: added "All not listed values shall also be accepted." |
| REQ-114748/G-Byte 1 - Bodystyle | | 2017-04-20 KJACK174: added 0x0A Shuttle Bus M1 CA-LP |
| REQ-114749/C-Byte 2 - Speaker Config | | 2017-05-05 OKIRSTEI: added 0xFF ANY as wildcard: to allow e.g. 4 Front and 6 (4Front+2Rear) to use same EQ |
| REQ-114750/D-Byte 3 - Branding | | 2017-05-04 OKIRSTEI: added 0xFF ANY as wildcard to allow using same Sound EQ but different ESE profiles for e.g. ST or Vignale |
| REQ-114752/D-Byte 5 - EQ Special Modes+ | | 2016-12-08 OKIRSTEI: renamed "Flashed EQ File used" to "Force flashed file, DTC will not be set", added DTC will be set on missmatch; 2016-12-09 OKIRSTEI: added linked DTC information, added DTC will never be set where applicable |
| REQ-114752/E-Byte 5 - EQ Special Modes | | 2017-04-19 KJACK174: correct typo E10A to E01A (4x) |
| REQ-114753/F-Byte 6 - Engine+ | | 2016-07-26 OKIRSTEI: added 0xA1 1.5L DV NEO TC DI DSL C (EN-BE); 2016-08-19 OKIRSTEI: added 0xA2 2.0L TIVCT GTDI T/C (ST275 only); 2016-08-23 OKIRSTEI: added 0xA3 2.3L DOHC DISI T/C GAS (RS370 engine) |
| REQ-114753/G-Byte 6 - Engine+ | | 2016-11-08 OKIRSTEI: 0x3A removed EN-YY, add 0xDA for 1.0L 12V DI TC I3 GAS FOX B <140PS> EN-YY , add 0xDB for 1.1L FOX 12V TI-VCT I3 GAS B <85PS> EN-XY, add 0xDC for 1.1L FOX 12V TI-VCT I3 GAS <70PS> EN-XP; 2016-12-08 OKIRSTEI: added "All not listed values shall also be accepted." |
| REQ-114753/H-Byte 6 - Engine | | 2017-05-05 OKIRSTEI: MFC corrected 0x64 2.3L 4V TIVCT DI TC 350 PS GAS EN-YU ---> EN-YV; Add Engine 0x11 EN-N3 "2.3L 4V TIVCT DI TC 270 HP GAS<2.3L GTDI 280 PS Gasoline>" ST , 0xDF EN-BC "2.0L CR TC DSL PANTHER D<2.0L Panther190PS>" ST Diesel , 0xDD EN-M0 "1.0L TC GAS NEW FOX C" to DE06 0x7D EN-S7 - 2.5L DOHC PFI 4 CYL GAS 0xD7 EN-Y2 1.5L DRAGON I3 TIVCT PFI GAS C <Dragon I3 1.5L PFI 120 PS> --> 0x4B EN-Y2 1.5L DRAGON I3 PFI GAS C (see CCC list 21) |
| REQ-114754/E-Byte 7 - Gearbox+ | | 2016-09-23 OKIRSTEI: added 0x13 9 SPD AUTO TRANS 9F35 (TR-EZ) |
| REQ-114754/F-Byte 7 - Gearbox+ | | 2016-11-08 OKIRSTEI: add 0xD0 5 SPD MAN TRANS GETRAG-5MX65 EN-EV; 2016-12-08 OKIRSTEI: added "All not listed values shall also be accepted." |
| REQ-114754/G-Byte 7 - Gearbox | | 2017-05-05 OKIRSTEI: improve value naming: 0x01 6 SPD MAN TRANS - VOLVO M66, 0x06 5SPD MAN TR/AX VOLVO M56, 0x07 5 SPD MAN TRANS A EAO MTX75, 0x10 6 SP MAN TRANS - MMT6 3 SHAFT / 6 SPD MAN TR/AX - MMT6, 0x11 5 SPD MAN TRANS A EAO B5/IB5; Add Transmission:TR-GM 0x73 "8 SPD AUTOMATIC TRANS 8F35", TR-PA 0x74 "AUTO TRANS - 8F40" , move: TR-E7 0x71 8 SPD AUTOMATIC TRANS 8F24 ---> TR-E7 0x14 "8 SPD AUTOMATIC TRANS 8F24" (see CCC list 21) |
| REQ-227101/A-Byte 8 - SelDrvMde1 | | Initial Version |
| REQ-227102/A-Byte 9 - SelDrvMde2 | | Initial Version |
| REQ-227103/A-Byte 10 - SelDrvMde3 | | Initial Version |
| REQ-227104/A-Byte 11 - SelDrvMde4 | | Initial Version |
| REQ-227105/A-Byte 12 - SelDrvMde5 | | Initial Version |
| REQ-227106/A-Byte 13 - SelDrvMde6 | | Initial Version |
| REQ-227107/A-Byte 14 - SelDrvMde7 | | Initial Version |
| REQ-227108/A-Byte 15 - SelDrvMde8 | | Initial Version |
| REQ-227118/A-Byte 16 - SelDrvMde9 | | Initial Version |
| REQ-227117/A-Byte 17 - SelDrvMde10 | | Initial Version |
| REQ-227116/A-Byte 18 - SelDrvMde11 | | Initial Version |
| REQ-227115/A-Byte 19 - SelDrvMde12 | | Initial Version |
| REQ-227114/A-Byte 20 - SelDrvMde13 | | Initial Version |
| REQ-227113/A-Byte 21 - SelDrvMde14 | | Initial Version |
| REQ-227112/A-Byte 22 - SelDrvMde15 | | Initial Version |
| REQ-227110/A-Byte 23 - SelDrvMde16 | | Initial Version |
| REQ-227135/A-Byte 24 - SelDrvMde17 | | Initial Version |
| REQ-227134/A-Byte 25 - SelDrvMde18 | | Initial Version |
| REQ-227133/A-Byte 26 - SelDrvMde19 | | Initial Version |
| REQ-227132/A-Byte 27 - SelDrvMde20 | | Initial Version |
| REQ-227131/A-Byte 28 - SelDrvMde21 | | Initial Version |
| REQ-227130/A-Byte 29 - SelDrvMde22 | | Initial Version |
| REQ-227129/A-Byte 30 - SelDrvMde23 | | Initial Version |
| REQ-227128/A-Byte 31 - SelDrvMde24 | | Initial Version |
| REQ-227127/A-Byte 32 - SelDrvMde25 | | Initial Version |
| REQ-227126/A-Byte 33 - SelDrvMde26 | | Initial Version |
| REQ-227125/A-Byte 34 - SelDrvMde27 | | Initial Version |
| REQ-227124/A-Byte 35 - SelDrvMde28 | | Initial Version |
| REQ-227123/A-Byte 36 - SelDrvMde29 | | Initial Version |
| REQ-227122/A-Byte 37 - SelDrvMde30 | | Initial Version |
| REQ-227121/A-Byte 38 - SelDrvMde31 | | Initial Version |
|  | REQ-123454/B-Byte 7 - ANC | | 2016-08-11 OKIRSTEI: added clarification of state when unconfigured, DTC reference added; 2016-09-30 OKIRSTEI: added heading for Bit7-5 "ANC - General", Microphone X renamed to ANC Microphone X |
|  | ESE-FUN-REQ-092666/B-ESE/ANC VBF-Structure | | OKIRSTEI: update structure to reflect real usage: VBF-blocks usage, Profile/Config Database seperated from Profile data, as the profile data needs to be loaded in the Algorithm without any additional headers, Num Channels (nOut) removed |

**Table of Contents**

[Revision History 2](#_Toc496880531)

[1 Purpose of this section 6](#_Toc496880532)

[2 Architectural Design 7](#_Toc496880533)

[2.1 Static Views 7](#_Toc496880534)

[2.1.1 ESE-BD-REQ-092443/B-ESE Boundary View (C1MCA) 7](#_Toc496880535)

[2.1.2 ESE-SV-REQ-092428/B-Class View 8](#_Toc496880536)

[2.1.3 ESE-REQ-205832/B-ESE Boundary View (BoA4.0) 9](#_Toc496880537)

[2.2 Interface Requirements 9](#_Toc496880538)

[2.2.1 Diagnostics 9](#_Toc496880539)

[2.2.2 Powertrain CAN 15](#_Toc496880540)

[2.2.3 Infotainment CAN 15](#_Toc496880541)

[2.2.4 Vehicle Configuration 20](#_Toc496880542)

[3 General Requirements 36](#_Toc496880543)

[4 Functional Definition 37](#_Toc496880544)

[4.1 ESE-FUN-REQ-018060/C-ESE General (TcSE ROIN-292993) 37](#_Toc496880545)

[4.1.1 Requirements 37](#_Toc496880546)

[4.1.2 Use Cases 38](#_Toc496880547)

[4.1.3 State Machines 46](#_Toc496880548)

[4.1.4 Sequence Diagrams 46](#_Toc496880549)

[4.2 ESE-FUN-REQ-093365/A-ESE BoA4.0 specifics 46](#_Toc496880550)

[4.2.1 Requirements 46](#_Toc496880551)

[4.2.2 Sequence Diagrams 46](#_Toc496880552)

[4.2.3 State Machines 46](#_Toc496880553)

[4.2.4 Use Cases 51](#_Toc496880554)

[4.3 ESE-FUN-REQ-018073/A-ESE Diagnostics (TcSE ROIN-292967) 51](#_Toc496880555)

[4.3.1 Use Cases 51](#_Toc496880556)

[4.3.2 Requirements 51](#_Toc496880557)

[4.3.3 State Machines 51](#_Toc496880558)

[4.3.4 Sequence Diagrams 51](#_Toc496880559)

[4.4 ESE-FUN-REQ-092666/B-ESE/ANC VBF-Structure 51](#_Toc496880560)

[4.5 ESE-FUN-REQ-092665/A-ESE/ANC VBF-Builder 53](#_Toc496880561)

[5 Appendix: Reference Documents 54](#_Toc496880562)

# Purpose of this section

Main use cases in the context of

* ESE profile selection
* ESE profile handling
* ESE profile diagnostics
* ESE diagnostic interface

# Architectural Design

## Static Views

### ESE-BD-REQ-092443/B-ESE Boundary View (C1MCA)

ESE Boundary View (C1MCA)



### ESE-SV-REQ-092428/B-Class View

Class View



### ESE-REQ-205832/B-ESE Boundary View (BoA4.0)

ESE Boundary View (BoA4.0)



## Interface Requirements

### Diagnostics

#### Fault Codes

##### REQ-128322/C-E01B - Control Module Calibration Data #2 (ANC/ESE)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DTC** | **Condition** | **DTC Trigger** | **Fault Action** | **Configuration Associated** |
| E01B54  Missing Calibration | Key in Run. Voltage is between 10 and 16 volts. | ESE/ANC is missing configuration file or file is corrupted. | ESE/ANC functionality will be disabled. | ESE/ANC = present & ESE/ANC = activated |
| E01B57  Data Invalid/ Incompatible Software Component | Key in Run. Voltage is between 10 and 16 volts. | The installed ESE/ANC configuration is not compatible with config | ESE/ANC functionality will be disabled. | ESE/ANC = present & ESE/ANC = activated |
| E01B04  Data System Internal Failure | Key in Run. Voltage is between 10 and 16 volts. | Internal fault detected which prevents initializing ESE/ANC | ESE/ANC functionality will be disabled. | ESE/ANC = present & ESE/ANC = activated |

##### REQ-114769/D-C100 - LostCom 0x167, 0x204 (CRANK) (Engine)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DTC** | **Condition** | **DTC Trigger** | **Fault Action** | **Configuration Associated** |
| C10000 | Last known Key in RUN. Voltage is between 10 and 16 volts. Last Known Ignition Stable Bit is Active. | Set when 0x167 is missing for more than five (5) seconds.  (PwPackTq\_D\_Stat) | Radio will stop logging DTCs. |  |
| C10000 | Last known Key in RUN. Voltage is between 10 and 16 volts. Last Known Ignition Stable Bit is Active. | Set when 0x204 is missing for more than five (5) seconds.  (EngAout\_N\_Actl) | ESE/ANC will be muted. | ESE present or ANC present |
| C10000 | Last known Key in RUN. Voltage is between 10 and 16 volts. Last Known Ignition Stable Bit is Active. | Set when 0x167 is missing for more than five (5) seconds.  (TrnAin\_Tq\_Actl) | ESE/ANC will be muted. | ESE present or ANC present |

##### REQ-114761/B-9A01 - Left Front speaker

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DTC** | **Condition** | **DTC Trigger** | **Fault Action** | **Configuration Associated** |
| 9A0111 – Short to Ground  9A0112 – Short to Battery  9A0113 – open  9A0101 – short across | Key in Run, ACC, or Delayed Acc. Voltage is between 10 and 16 volts. | ACM amp chip registers short to ground or short to battery. | ACM shuts down faulted Left Front speaker. Chimes will be unavailable in ACM. | Front Speaker = Internal Amp or Speaker1A2B = Speaker or Speaker and Tweeter |

##### REQ-114762/B-9A02 - Right Front speaker

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DTC** | **Condition** | **DTC Trigger** | **Fault Action** | **Configuration Associated** |
| 9A0211 – Short to Ground  9A0212 – Short to Battery  9A0213 – open  9A0201 – short across | Key in Run, ACC, or Delayed Acc. Voltage is between 10 and 16 volts. | ACM amp chip registers short to ground or short to battery. | ACM shuts down faulted Right Front speaker. Chimes will be unavailable in ACM. | Front Speaker = Internal Amp or Speaker2 A2B = Speaker or Speaker and Tweeter |

##### REQ-114763/B-9A03 - Right Rear speaker

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DTC** | **Condition** | **DTC Trigger** | **Fault Action** | **Configuration Associated** |
| 9A0311 – Short to Ground  9A0312 – Short to Battery  9A0313 – open  9A0301 – short across | Key in Run, ACC, or Delayed Acc. Voltage is between 10 and 16 volts. | ACM amp chip registers short to ground or short to battery. | ACM shuts down faulted Right Rear speaker. Chimes will be unavailable in ACM. | Rear Speaker = Internal Amp or Speaker3 A2B = Speaker or Speaker and Tweeter |

##### REQ-114764/B-9A04 - Left Rear speaker

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DTC** | **Condition** | **DTC Trigger** | **Fault Action** | **Configuration Associated** |
| 9A0411 – Short to Ground  9A0412 – Short to Battery  9A0413 – open  9A0401 – short across | Key in Run, ACC, or Delayed Acc. Voltage is between 10 and 16 volts. | ACM amp chip registers short to ground or short to battery. | ACM shuts down faulted Left Rear speaker. Chimes will be unavailable in ACM. | Rear Speaker = Internal Amp or Speaker1 A2B = Speaker or Speaker and Tweeter |

#### Routines

##### ESE-IR-REQ-092301/B-ROUTINE 0x3008 "Trigger process to select calibration"

|  |  |
| --- | --- |
| Control Routine | 0x3008 |
| Control Routine Name | Trigger process to select calibration |
| Executable in Sessions | 0x03 |
| Security Levels Required to Run | 0x03, |
| Routine Entry Criteria | ACU must be powered and in extended diag session.  Level 3 security must be unlocked. |
| Routine Exit Criteria | Routine completes |
| Maximum Routine Run Time | 200 (ms) |
| Can Restart While Running | no |
| Supported Sub Functions | 0x01 |
| Dependencies | ESE |

This enables ESE and/or ANC feature, depends of module configuration.

##### ESE-IR-REQ-018086/C-ROUTINE 0x601C "Transfer Function Test tone" (TcSE ROIN-293182)

|  |  |
| --- | --- |
| Control Routine | 0x601C |
| Control Routine Name | Tones Test |
| Control Routine Description | Generates ESE calibration tones. |
| Executable in Sessions | 0x03 |
| Security Levels Required to Run |  |
| Routine Entry Criteria | ACU must be powered and switched on or in Idle Mode (HMI switched off, CAN active).  Notes: The radio can be switched on/off by writing with service 2E to PID $7215. |
| Routine Exit Criteria | Tones Test Completes.  Receipt of RoutineControl with RoutineControlType = StopRoutine.  Switch Radio Off |
| Maximum Routine Run Time | 65000 (ms) |
| Can Restart While Running | no |
| Supported Sub Functions | 0x01 0x02 0x03 |
| Dependencies | ESE |

Routine continues until completed as signaled by MBBM library.

#### Identifiers

##### REQ-128316/A-Engine RPM (F40C)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DID Number (Hex)** | **DID Description** | **DID Short Name** | **DID Size (Bytes)** | **Datatype** |
| F40C | Engine RPM |  | 2 | Unsigned Numeric |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DID Number (Hex)** | **Parameter Number** | **Parameter Description** | **Size (Bits)** | **Resolution** | **Offset** | **Minimum** | **Maximum** | **Units** |
| F40C | 0 | Engine RPM | 16 | 0.25 | 0 | 0 | 16383.75 | Rpm |

##### REQ-128317/A-Absolute Throttle Position (F411)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **DID Number (Hex)** | **DID Description** | **DID Short Name** | **DID Size (Bytes)** | **Datatype** |
| F411 | Absolute Throttle Position |  | 1 | Unsigned Numeric |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DID Number (Hex)** | **Parameter Number** | **Parameter Description** | **Size (Bits)** | **Resolution** | **Offset** | **Minimum** | **Maximum** | **Units** |
| F411 | 0 | Absolute Throttle Position | 8 | 0.392156862745 | 0 | 0 | 100 | % |

##### REQ-203862/B-ESE Error Status (DID EE00)

|  |
| --- |
| Core DataIdentifier Information |

|  |  |
| --- | --- |
| DataIdentifier Value | 0xEE00 |
| DataIdentifier Name | ESE Error Status |
| DataIdentifier Size (bytes) | 3 |
| DataIdentifier Type | packeted |
| Dependencies | ESE |
| DataIdentifier Comments | If DTC E01B04 is set, the cause is shown in "Initialisation Status" OR in "Powertrain CAN status", if there is an internal error.  If DTC E01B57 is set, the cause is shown in "Configuration Status"  If DTC C100 is set, the cause is shown in "Powertrain CAN status".  Error status may be shown if DTCs are not set, e.g. if ESE is not activated, or if ESE is muted due to a resolved CAN error this drive cycle. |

|  |
| --- |
| Read Information (Service 0x22 - ReadDataByIdentifier) |

|  |  |
| --- | --- |
| Readable in Sessions | 0x01,0x03 |

|  |
| --- |
| DataIdentifier Format Information |

|  |  |  |  |
| --- | --- | --- | --- |
| **Byte** | **Parameter** | **Description/Format** | **R/W** |
| 0 | Init/Runtime Status | 0x00 No Initialisation Error  0x01 Internal DSP Error  0x02 Internal ESE Algorithm Error  0x03 ANC hard clip resolved | R |
| 1 | Configuration Status | 0x00 No ESE Configuration Error  0x01 No ESE Profiles Installed  0x02 ESE Profile Manually Selected  0x03 No ESE Profiles compatible with Vehicle Configuration  0x04 Selected ESE profile has CRC error  0x05 Selected ESE profile has wrong data version  0x06 Selected ESE profile has wrong HW/SW Version  0x07 Selected ANC profile incompatible reported by ANC component | R |
| 2 | Powertrain CAN Status | 0x00 No CAN Error  0x01 Internal CAN error detected  0x02 Excessive missed messages  0x03 Resolved External CAN Error, but ESE still muted until conditions to unmute ESE are satisfied. | R |

##### ESE-IR-REQ-092308/B-DID EE01 "ESE Last Received Data"

|  |
| --- |
| Core DataIdentifier Information |

|  |  |
| --- | --- |
| DataIdentifier Value | 0xEE01 |
| DataIdentifier Name | ESE Last Received Data |
| DataIdentifier Size (bytes) | 6 |
| DataIdentifier Type | packeted |
| DataIdentifier Comments | Reports the raw values most recently received on powertrain CAN  Engine speed is in steps of 2 RPM  Torque has +500NM Offset  Pedal position 0x0 = 0%, 0x3FF = 102.3% |

|  |
| --- |
| Read Information (Service 0x22 - ReadDataByIdentifier) |

|  |  |
| --- | --- |
| Readable in Sessions | 0x01,0x03 |

|  |
| --- |
| DataIdentifier Format Information |

|  |  |  |  |
| --- | --- | --- | --- |
| **Byte** | **Parameter** | **Description/Format** | **R/W** |
| 0-1 | Engine Speed | Offset Resolution Units Min Scaled Value Max Scaled Value  0 2 RPM 0 131070 | R |
| 2-3 | Engine Torque | Offset Resolution Units Min Scaled Value Max Scaled Value  -500 1 NM -500 65035 | R |
| 4-5 | Pedal Position | Offset Resolution Units Min Scaled Value Max Scaled Value  0 0.1 (1/10) % 0 6553.5 | R |

Note: This date is linked to the received frames on the PowerTrain CAN.

##### ESE-IR-REQ-018081/E-DID EE02 "ESE Profile Data" (TcSE ROIN-298086)

|  |
| --- |
| Core DataIdentifier Information |

|  |  |
| --- | --- |
| DataIdentifier Value | 0xEE02 |
| DataIdentifier Name | ESE Profile Data |
| DataIdentifier Size (bytes) | 53 |
| DataIdentifier Type | packeted |
| DataIdentifier Comments | DID EE02 reports active ESE configuration data and allows manual override.  Only Active ESE profile parameter is writeable, to manually select a profile number or mute for development/test purposes. restart required to apply change in profile or mute. Change is persistant across cold starts.  ESE configuration info is shown even when ESE is not activated. |

|  |
| --- |
| Read Information (Service 0x22 - ReadDataByIdentifier) |

|  |  |
| --- | --- |
| Readable in Sessions | 0x01,0x03 |

|  |
| --- |
| Write Information (Service 0x2E - WriteDataByIdentifier) |

|  |  |
| --- | --- |
| Writeable in Sessions | 0x03 |
| Security Levels Required to Write | 0x03 |

|  |
| --- |
| DataIdentifier Format Information |

|  |  |  |  |
| --- | --- | --- | --- |
| **Byte** | **Parameter** | **Description/Format** | **R/W** |
| 0 | Max ESE Profile | Amount of profile found in the flashed Profile file. | R |
| 1 | Active ESE Profile | Write 0x01...max - manually select profile.  Write 0x00 - mute  Write 0xFF - Restore DE06 selection | R/W |
| 2-17 | ESE Profile Name | ESE sound design project name (ASCII) | R |
| 18-37 | ESE Profile GUID | GUID of ESE sound design project name | R |
| 38-41 | ESE Profile Dataset Version |  | R |
| 42 | Profile HW Version for ESE | Property of the active profile | R |
| 43 | AHU HW Version for ESE | Property of the AHU. Add this value to STP measurement data | R |
| 44-52 | Reserved |  | R |

##### REQ-203863/A-ESE activation status (DID EE03)

|  |
| --- |
| Core DataIdentifier Information |

|  |  |
| --- | --- |
| DataIdentifier Value | 0xEE03 |
| DataIdentifier Name | ESE Activation Status |
| DataIdentifier Size (bytes) | 1 |
| DataIdentifier Type | State Encoded |
| Dependencies | ESE |
| DataIdentifier Comments | This DID reports activation status of the ESE feature and allows deactivation of the feature.  Activation is supported,but it is recommended to use the Activation Routine 3008. |

|  |
| --- |
| Read Information (Service 0x22 - ReadDataByIdentifier) |

|  |  |
| --- | --- |
| Readable in Sessions | 0x01,0x03 |

|  |
| --- |
| Write Information (Service 0x2E - WriteDataByIdentifier) |

|  |  |
| --- | --- |
| Writeable in Sessions | 0x03 |
| Security Levels Required to Write | 0x03 |

|  |
| --- |
| DataIdentifier Format Information |

|  |  |  |  |
| --- | --- | --- | --- |
| **Byte** | **Parameter** | **Description/Format** | **R/W** |
| 0 | ESE Activation Status | 0x00 -    Deactivated  0x01 -    Activated | R/W |

(Write is Security Level 3 protected)

If activation does fail DTC 0xE01B "Control Module Main Calibration Data" ALIAS "ESE calibration DTC" is raised.

##### REQ-115749/B-ECU Software #3 Part Number (DID F121) (Dirana3 firmware)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PID Number (Hex)** | **PID Description** | **PID Short Name** | **PID Size (Bytes)** | **Type** |
| F121 | ECU Software #3 Part Number |  | 24 | ASCII |

##### REQ-127205/C-ECU Cal-Config #2 Part Number (DID F16B) ESE profile

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **PID Number (Hex)** | **PID Description** | **PID Short Name** | **PID Size (Bytes)** | **Type** |
| F16B | ECU Cal-Config #2 Part Number |  | 24 | ASCII |

Configuration Part Number stored in the standalone configuration file.

The following DTCs

|  |
| --- |
| REQ-128322-E01B - Control Module Calibration Data #2 (ANC/ESE) |

are linked to this Cal-Config.

### Powertrain CAN

### Infotainment CAN

Infotainment CAN

#### ESE-FUR-REQ-166857/B-ESE CAN input signals (BoA4.0)

##### MD-REQ-166834/A-EngineStatus\_St

Message Type: Status

This method is used to indicate the Engine Status.

| **Name** | **Literals** | **Values** | **Description** |
| --- | --- | --- | --- |
| int Status | **-** | - | - |
|  | EngOff | 0x0 |  |
|  | EngOn | 0x1 |  |
|  | EngAutoStopped | 0x2 |  |
|  | NotUsed | 0x3 |  |

##### MD-REQ-166835/A-PowerPack\_St

Message Type: Status

This method is used to indicate the Power Pack Status.

| **Name** | **Literals** | **Values** | **Description** |
| --- | --- | --- | --- |
| int Status | **-** | - | - |
|  | Off Tq Not Available | 0x0 |  |
|  | On Tq Not Available | 0x1 |  |
|  | Strt In Prg No Tq | 0x2 |  |
|  | On Tq Available | 0x3 |  |

##### MD-REQ-166836/A-EngineTorqueIn\_St

Message Type: Status

This method is used to indicate the Nm.

| **Name** | **Literals** | **Resolution** | **Values** | **Description** |
| --- | --- | --- | --- | --- |
| int Status | - | 1 |  |  |
| -500 | 0x000 | Min (physic) Offset |
| .. | .. | .. |
| 1547 | 0x7FF | Max (physic) Offset |

##### MD-REQ-166837/A-EngineTorqueIn\_Qf

Message Type: Quality Factor

This method is used to indicate the quality factor of the EngineTorque signal.

| **Name** | **Literals** | **Values** | **Description** |
| --- | --- | --- | --- |
| int Status | - | - |  |
| Fault | 0x00 |  |
| No\_Data\_Exists | 0x01 |  |
| Not\_Wothin\_Specifications | 0x02 |  |
| OK | 0x03 |  |

##### MD-REQ-166839/A-GearPosition\_St

Message Type: Status

This method is used to transmit the information from TCM about which gear is going to be engaged (target gear) by the automatic gear box. Variability point: used only in automatic transmission.

| **Name** | **Literals** | **Values** | **Description** |
| --- | --- | --- | --- |
| int Status | - | - |  |
| Neutral | 0x00 |  |
| First | 0x01 |  |
| Second | 0x02 |  |
| Third | 0x03 |  |
|  | Fourth | 0x04 |  |
|  | Fifth | 0x05 |  |
|  | Sixth | 0x06 |  |
|  | Seventh | 0x07 |  |
|  | Eighth | 0x08 |  |
|  | Ninth | 0x09 |  |
|  | Tenth | 0xA |  |
|  | Undefined\_3 | 0xB |  |
|  | Undefined\_4 | 0xC |  |
|  | Undefined\_5 | 0xD |  |
|  | Reverse | 0xE |  |
|  | Unknown | 0xF |  |

##### MD-REQ-166860/A-AutoGearPosition\_St

Message Type: Status

This method is used to transmit the auto gear position status

| **Name** | **Literals** | **Values** | **Description** |
| --- | --- | --- | --- |
| int Status | - | - |  |
| Park | 0x00 |  |
| Reverse | 0x01 |  |
| Neutral | 0x02 |  |
| Drive | 0x03 |  |
|  | Sport\_DriveSport | 0x04 |  |
|  | Low | 0x05 |  |
|  | First | 0x06 |  |
|  | Second | 0x07 |  |
|  | Third | 0x08 |  |
|  | Fourth | 0x09 |  |
|  | Fifth | 0xA |  |
|  | Sixth | 0xB |  |
|  | Undefined\_Treat\_as\_Fault | 0xC |  |
|  | Undefined\_Treat\_as\_Fault1 | 0xD |  |
|  | Unknown\_Position | 0xE |  |
|  | Fault | 0xF |  |

##### MD-REQ-166840/A-PedalPosition\_Qf

Message Type: Quality Factor

This method is used to indicate the quality factor of the PedalPosition signal.

| **Name** | **Literals** | **Values** | **Description** |
| --- | --- | --- | --- |
| int Status | - | - | - |
| Fault | 0x00 |  |
| No\_Data\_Exists | 0x01 |  |
| Not\_Within\_Specifications | 0x02 |  |
| OK | 0x03 |  |

##### MD-REQ-166841/A-PedalPosition\_St

Message Type: Status

This method is used to indicate

| **Name** | **Literals** | **Resolution** | **Values** | **Description** |
| --- | --- | --- | --- | --- |
| int Status | % | 0,1 |  | The pedal position is given in %. |
| 0 | 0x000 | Min (physic) Offset |
| .. | .. | .. |
| 102,3 | 0x3FF | Max (physic) Offset |

##### MD-REQ-166842/A-EngineOut\_St

Message Type: Status

This method is used to indicate rotations per minute (RPM).

| **Name** | **Literals** | **Resolution** | **Values** | **Description** |
| --- | --- | --- | --- | --- |
| int Status |  | 2 |  |  |
| 0 | 0x0000 | Min (physic) Offset |
| .. | .. | .. |
| 16382 | 0x1FFF | Max (physic) Offset |

##### MD-REQ-222870/A-DriveMode2\_St

Message Type: Status

This method is used to indicate the Drive Mode 2 status.

| **Name** | **Literals** | **Values** | **Description** |
| --- | --- | --- | --- |
| int Status | - | - |  |
| SelDrvMde01 | 0x0 |  |
| SelDrvMde02 | 0x1 |  |
| SelDrvMde03 | 0x2 |  |
| SelDrvMde04 | 0x3 |  |
|  | SelDrvMde05 | 0x4 |  |
|  | SelDrvMde06 | 0x5 |  |
|  | SelDrvMde07 | 0x6 |  |
|  | SelDrvMde08 | 0x7 |  |
|  | SelDrvMde09 | 0x8 |  |
|  | SelDrvMde10 | 0x9 |  |
|  | SelDrvMde11 | 0xA |  |
|  | SelDrvMde12 | 0xB |  |
|  | SelDrvMde13 | 0xC |  |
|  | SelDrvMde14 | 0xD |  |
|  | SelDrvMde15 | 0xE |  |
|  | SelDrvMde16 | 0xF |  |
|  | SelDrvMde17 | 0x10 |  |
|  | SelDrvMde18 | 0x11 |  |
|  | SelDrvMde19 | 0x12 |  |
|  | SelDrvMde20 | 0x13 |  |
|  | SelDrvMde21 | 0x14 |  |
|  | SelDrvMde22 | 0x15 |  |
|  | SelDrvMde23 | 0x16 |  |
|  | SelDrvMde24 | 0x17 |  |
|  | SelDrvMde25 | 0x18 |  |
|  | SelDrvMde26 | 0x19 |  |
|  | SelDrvMde27 | 0x1A |  |
|  | SelDrvMde28 | 0x1B |  |
|  | SelDrvMde29 | 0x1C |  |
|  | SelDrvMde30 | 0x1D |  |
|  | SelDrvMde31 | 0x1E |  |
|  | Faulty | 0x1F |  |

##### MD-REQ-223030/A-VehicleSpeed\_St

Message Type: Status

This method is used to indicate vehicle speed (kph).

| **Name** | **Literals** | **Resolution** | **Values** | **Description** |
| --- | --- | --- | --- | --- |
| int Status |  | 0.01 |  |  |
| 0.00 | 0x0000 | Min (physic) |
| .. | .. | .. |
| 655.35 | 0xFFFF | Max (physic) |

##### MD-REQ-223031/B-VehicleLongitudialAcceleration\_St

Message Type: Status

This method is used to indicate longitudinal acceleration in m/s².

| **Name** | **Literals** | **Resolution** | **Values** | **Description** |
| --- | --- | --- | --- | --- |
| int Status | - | 0.01 |  |  |
| -40.00 | 0x000 | Min (physic) + Offset |
| .. | .. | .. |
| +41.89 | 0x1FFD | Max (physic) + Offset |
|  | NoDataExists |  | 0x1FFE | NoDataExists |
|  | Faulty |  | 0x1FFF | Faulty |

Offset = -40.00

##### MD-REQ-224894/A-ExhaustMode\_St

Message Type: Status

This method is used to indicate the exhaust status.

| **Name** | **Literals** | **Values** | **Description** |
| --- | --- | --- | --- |
| int Status | - | - | - |
|  | Null | 0x0 |  |
|  | LoudExhaust | 0x1 |  |
|  | QuietExhaust | 0x2 |  |
|  | Faulty | 0x3 |  |
|  |  |  |  |
|  |  |  |  |

### Vehicle Configuration

Vehicle Configuration

#### REQ-114731/D-DE06 - DSP Config

|  |  |  |
| --- | --- | --- |
| Byte | DE06 – DSP Config |  |
| 0 | Carline |  |
| 1 | Body Style |  |
| 2 | Speaker config |  |
| 3 | Branding |  |
| 4 | SWP |  |
| 5 | EQ Special Modes |  |
| 6 | Engine |  |
| 7 | Gearbox |  |
| 8 | SelDrvMde1=(0x0) | This shall be used to directly feed in the mapping table between SelDrvMode CAN signal to Sub-Profile of the ESE-Dataset. Each of these bytes is defining which of the 4 sub-profile is chosen. |
| 9 | SelDrvMde2=(0x1) |
| 10 | SelDrvMde3=(0x2) |
| 11 | SelDrvMde4=(0x3) |
| 12 | SelDrvMde5=(0x4) |
| 13 | SelDrvMde6=(0x5) |
| 14 | SelDrvMde7=(0x6) |
| 15 | SelDrvMde8=(0x7) |
| 16 | SelDrvMde9=(0x8) |
| 17 | SelDrvMde10=(0x9) |
| 18 | SelDrvMde11=(0xA) |
| 19 | SelDrvMde12=(0xB) |
| 20 | SelDrvMde13=(0xC) |
| 21 | SelDrvMde14=(0xD) |
| 22 | SelDrvMde15=(0xE) |
| 23 | SelDrvMde16=(0xF) |
| 24 | SelDrvMde17=(0x10) |
| 25 | SelDrvMde18=(0x11) |
| 26 | SelDrvMde19=(0x12) |
| 27 | SelDrvMde20=(0x13) |
| 28 | SelDrvMde21=(0x14) |
| 29 | SelDrvMde22=(0x15) |
| 30 | SelDrvMde23=(0x16) |
| 31 | SelDrvMde24=(0x17) |
| 32 | SelDrvMde25=(0x18) |
| 33 | SelDrvMde26=(0x19) |
| 34 | SelDrvMde27=(0x1A) |
| 35 | SelDrvMde28=(0x1B) |
| 36 | SelDrvMde29=(0x1C) |
| 37 | SelDrvMde30=(0x1D) |
| 38 | SelDrvMde31=(0x1E) |
| 39 | SelDrvMde-Faulty=(0x1F) |
| 40…49 | Reserved |  |

This shall be used to validate the Sound EQ - and ESE/ANC profiles - header information against the local config. If more that on profile is available in flashed data, this will be used to select it. The first one will be selected (top – down), if none is found the DTC is set.

For reference see:

* AHU-SWR-REQ-093326-Generic Global EQ Tool
* Ford General Global EQ Tool File Structure Spec (SWR-REQ-128741-Generic Configuration File Structure)

##### REQ-114747/D-Byte 0 - Carline

|  |  |  |
| --- | --- | --- |
| **DE06 byte 0** | **Meaning** | **Effect (all variants)** |
| 0x00 | Unconfigured | Default - Flat EQ. |
| 0x01 | **B479** |  |
| 0x02 | **C519** |  |
| 0x03 | **B500** |  |
| 0x0A | **C520 MCA** / C489 |  |
| 0x0B | **B515 MCA** "Ford EcoSport" |  |
| 0x0C | B460 |  |
| 0x17 | B299 "Ford Fiesta" |  |
| 0x18 | B232 "Ford Fusion" |  |
| 0x32 | C344 "Ford C-Max" |  |
| 0x45 | C346 "Ford Focus" |  |
| 0x64 | **V363 MCA** 'Ford Transit' |  |
| 0x66 | **V362 MCA** 'Ford Transit' |  |
| 0x72 | **V408 MCA** |  |
| 0xD0 | **BX726** |  |
| 0xD1 | **CX482** |  |
| 0xE0 | **B562 MCA** |  |

All not listed values shall also be accepted.

##### REQ-114748/G-Byte 1 - Bodystyle

|  |  |  |  |
| --- | --- | --- | --- |
| **DE06 byte 1** | **Meaning** | **Effect (all variants)** | **MFC** |
| 0x00 | Unconfigured | Default - Flat EQ. |  |
| 0x01 | Single CAB |  | CA-BB |
| 0x02 | Double CAB |  | CA-BF |
| 0x03 | Bus M2 |  | CA-KA |
| 0x04 | Kombi M1 |  | CA-KD |
| 0x05 | Kombi van M1 |  | CA-KG |
| 0x09 | Bus M1 Lrf |  | CA-LM |
| 0x0A | Shuttle Bus M1 |  | CA-LP |
| 0x10 | Regular cargo van |  | CA-VA |
| 0x11 | 4 door sedan |  | BS-FA, BS-FC |
| 0x12 | 4 door station wagon |  | BS-FF |
| 0x13 | 5 door sedan |  | BS-HA, BS-HC |
| 0x16 | 3 door sedan |  | BS-DA, BS-DD |
| 0x17 | Convertible |  | BS-BH |
| 0x18 | Coupe |  | BS-BJ |
| 0x19 | Kombi N1 |  | CA-KF |
| 0x21 | Kombi Van N1 |  | CA-KI |
| 0x23 | Double Cab In Van |  | CA-XA |
| 0x29 | Compact MAV |  | BS-UA |
| 0x30 | Grand MAV |  | BS-UD |
| 0x31 | Back to Back Cab |  | CA-AP |
| 0x32 | Cutaway |  | CA-CD |
| 0x35 | SPORT UTILITY VEHICLE |  | BS-SA, CA-WE |
| 0x37 | SWB VAN |  | BS-AE |
| 0x38 | LWB VAN |  | BS-AF |
| 0x39 | SWB KOMBI |  | BS-AG, BS-AR |
| 0x3A | LWB KOMBI |  | BS-AH, BS-AS |
| 0x3B | 5 DOOR UAV - HEAVY PLATFORM |  | BS-VG |
| 0x3C | Skeletal Chassis |  | CA-CA |
| 0x3D | SWB DOUBLE CAB IN VAN |  | BS-AK |
| 0x3E | LWB DOUBLE CAB IN VAN |  | BS-AL |
| 0x41 | 4 DOOR KOMBI |  | BS-VE, BS-AM, BS-AP |
| 0x43 | 4 DOOR KOMBI N1 |  | BS-NB, BS-AN, BS-AQ |
|  |  |  |  |
| 0xF1 | 4 door sedan PANOROOF |  |  |
| 0xF2 | 4 door station wagon PANOROOF |  |  |
| 0xF3 | 5 door sedan PANOROOF |  |  |
| 0xFF | ANY |  |  |

All not listed values shall also be accepted.

##### REQ-114749/C-Byte 2 - Speaker Config

|  |  |  |  |
| --- | --- | --- | --- |
| **DE06 byte 2** | **Meaning** | **Effect (all variants)** | **MFC** |
| 0x00 | Unconfigured | Default - Flat EQ. |  |
| 0x01 | 2 Speakers | Used for EQ selection | IDBAB |
| 0x02 | 6 Speakers | Used for EQ selection | IDBAD |
| 0x03 | 8 Speakers |  |  |
| 0x04 | 4 Speakers | Used for EQ selection | IDBAC, IDBAY |
| 0x05 | 10 Speakers |  | IDBAT |
| 0x06 | 12 Speakers |  |  |
| 0x07 | Less Speakers |  | IDBAA |
| 0x08 | 4 Speakers Front Only | Used for EQ selection | IDBAW, IDBA3 |
| 0x09 | 9 Speakers |  | IDBAG, IDBA7 |
| 0x0A | 9 RADIO SPEAKERS LOW |  |  |
| 0x0B | 7 Speakers | Used for EQ selection | IDBAL |
| 0x10 | 11 High Speakers (High Speaker Set) |  |  |
| 0x11 | 11 High Speakers (8 Channel Audiophile) |  |  |
| 0x12 | 13 High Speakers (8 Channel Audiophile LMV) |  |  |
| 0x13 | 4 front speaker & 2 coaxial rear speaker |  | IDBA5 |
| 0x14 | 10 High Series Speakers with Subwoofer |  | IDBA6 |
| 0x15 | 9 Speakers ST |  | IDBBB |
| 0xFF | ANY |  |  |
| Other | All other values | Other values are rejected at write; no relevant EQ |  |

##### REQ-114750/D-Byte 3 - Branding

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 3** | **Meaning** | **Effect** |
| 0x00 | unconfigured | Default - Flat EQ |
| 0x01 | Ford Type 1 | Used for EQ selection |
| 0x02 | Ford Type 2 |  |
| 0x03 | Ford Type 3 |  |
| 0x04 | Ford Type 4 |  |
| 0x05 | Ford Type 5 |  |
| 0x06 | Ford 2Ohm |  |
| 0x07 | SONY |  |
| 0x08 | SONY 2Ohm |  |
| 0x09 | Lincoln |  |
| 0x0A..0xFE | reserved |  |
| 0xFF | ANY | Ignore this parameter |

##### REQ-114751/D-Byte 4 - Steering Wheel Position

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 4** | **Meaning** | **Effect** |
| 0x00 | unconfigured | Default - Flat EQ |
| 0x01 | LHD | Used for EQ selection |
| 0x02 | RHD | Used for EQ selection |
| 0x03..0xFE | reserved |  |
| 0xFF | ANY | Used for EQ selection |

##### REQ-114752/E-Byte 5 - EQ Special Modes

The AHU shall support a DID to override EQ configuration to select a special output mode

|  |  |  |
| --- | --- | --- |
| **DE06 byte 5** | **Meaning** | **Effect** |
| 0x00 | Not configured | Default – Flat EQ |
| 0x01 | No Special Mode | Use either a single EQ file or a mutli EQ file which is flashed to the unit and validate the DE06 other parameters against the value in the EQ file. Set DTC E01A-57 (incompatible) on missmatch |
| 0x02 | Flat EQ | Flat EQ is selected,  DTC E01A-57 (incompatible) will never be set.  DTC E01A-54 (missing) will never be set. |
| 0x05 | Force flashed file mode | No DE06 checking against EQ File. DTC E01A-57 (incompatible) will never be set. |

The following DTCs

|  |
| --- |
| REQ-114781-E01A - Calibration (Configuration) file (Sound EQ/APB) |

are linked to this configuration.

##### REQ-114753/H-Byte 6 - Engine

|  |  |  |  |
| --- | --- | --- | --- |
| **DE06 byte 6** | **Meaning** | **Effect (all variants)** | **MFC** |
| 0x00 | Unconfigured |  |  |
| 0xFF | any | Don’t care |  |
| 0x0C | 2.0L GDI |  | EN-MG, EN-U4, EN-XQ |
| 0x11 | 2.3L 4V TIVCT DI TC 270 HP GAS<2.3L GTDI 280 PS Gasoline> |  | EN-N3 |
| 0x21 | 1.5L 16V DI TC SIGMA B |  | EN-BN |
| 0x25 | Sigma 1.6L I4 Ti-VCT 123PS |  | EN-PN, EN-RV |
| 0x3A | 1,0L GTDI Fox 120PS Not for Volvo |  | EN-M1, EN-B7 |
| 0x3B | 1,0L GTDI Fox 105PS Not for Volvo |  | EN-M2, EN-B3 |
| 0x3C | 1.5L 16V DI TC SIGMA |  | EN-M8 |
| 0x3D | 1.5L 16V DI TC SIGMA A |  | EN-M9 |
| 0x4B | 1.5L DRAGON I3 TIVCT PFI GAS C <Dragon I3 1.5L PFI 120 PS> |  | EN-Y2 |
| 0x64 | 2.3L 4V TIVCT DI TC 350 PS GAS |  | EN-YV |
| 0x6F | 1.0L 12V DI TC I3 GAS 95PS FOX |  | EN-SF |
| 0x7D | 2.5L DOHC PFI 4 CYL GAS |  | EN-S7 |
| 0x7E | PSA 2.0L DOHC CR DSL 150PS MID  <DW10> |  | EN-T7 |
| 0x7F | PSA 2.0L DOHC CR DSL 180PS MID  <DW10> |  | EN-T8 |
| 0x8D | 2.0L TIVCT GTDI T/C (ST only) |  | EN-R9 |
| 0x92 | 1.6L Sigma TI-VCT 105PS, 85PS |  | EN-IQ, EN-XT |
| 0x94 | 1.6L DV6C 95PS |  | EN-T3 |
| 0x9A | 1.5L SOHC DI TC DSL DV5FC |  | EN-XW |
| 0x9B | 1.5L SOHC DI TC DSL DV5F A |  | EN-XX, EN-AB |
| 0x9C | 1.5L SOHC DI TC DSL DV5FD A |  | EN-XU, EN-AE |
| 0x9D | 1.5L SOHC DI TC DSL DV5FD B |  | EN-XV |
| 0x9E | 1.5L DV NEO TC DI DSL A  <1.5L DV Neo 120 PS> |  | EN-ZT |
| 0x9F | 1.5L DV NEO TC DI DSL B  <1.5L DV Neo 95 PS> |  | EN-Z2 |
| 0xA1 | 1.5L DV NEO TC DI DSL C |  | EN-BE |
| 0xA2 | 2.0L TIVCT GTDI T/C (ST275 only) |  |  |
| 0xA3 | 2.3L DOHC DISI T/C GAS (RS370 engine) |  | EN-QT |
| 0xB0 | 1.6L PFI N/A 115PS SIGMA FFV |  | EN-MU |
|  |  |  |  |
| 0xD0 | 2.0L CR TC DSL PANTHER <2.0L Panther 150 PS> |  | EN-YL |
| 0xD1 | 2.0L CR TC DSL PANTHER B <2.0L Panther 180 PS> |  | EN-YM |
| 0xD2 | 2.0L CR TC DSL PANTHER C |  | EN-YN |
| 0xD3 | 1.5L DRAGON I3 DI TC GAS A <Dragon I3 1.5L GTDI 150 PS> |  | EN-YZ |
| 0xD4 | 1.5L DRAGON I3 DI TC GAS B <Dragon I3 1.5L GTDI 180 PS> |  | EN-Y1 |
| 0xD5 | 1.5L DRAGON I3 DI TC E100 A <Dragon I3 1.5L GTDI E100 180 PS> |  | EN-Y6 |
| 0xD6 | 1.5L DRGN MILLR I3 DI TC GAS A <Dragon 1.5L GTDI Miller 160 PS> |  | EN-AM |
| 0xD7 | RESERVED – do not use anymore, no it is 0x4B |  |  |
| 0xD8 | 1.5L DRAGON I3 TIVCT PFI GAS B <Dragon I3 1.5L PFI 105 PS> |  | EN-YD |
| 0xD9 | 1.5L DV NEO ECO TC DI DSL <1.5L DV Neo 95 PS><Econetic> |  | EN-Y9 |
| 0xDA | 1.0L 12V DI TC I3 GAS FOX B <140PS> |  | EN-YY |
| 0xDB | 1.1L FOX 12V TI-VCT I3 GAS B <85PS> |  | EN-XY |
| 0xDC | 1.1L FOX 12V TI-VCT I3 GAS <70PS> |  | EN-XP |
| 0xDD | 1.0L TC GAS NEW FOX C |  | EN-M0 |
| 0xDF | 2.0L CR TC DSL PANTHER D<2.0L Panther190PS> |  | EN-BC |

All not listed values shall also be accepted.

##### REQ-114754/G-Byte 7 - Gearbox

|  |  |  |  |
| --- | --- | --- | --- |
| **DE06 byte 7** | **Meaning** | **Effect (all variants)** | **MFC** |
| 0x00 | Unconfigured |  |  |
| 0xFF | any | Don’t care |  |
| 0x01 | Manual 6-speed FWD 6 SPD MAN TRANS - VOLVO M66 |  | TR-VS |
| 0x02 | Manual 6-speed AWD |  | TR-VU |
| 0x03 | Automatic 6-speed FWD |  | TR-A8 |
| 0x04 | Automatic 6-speed AWD |  | TR-A9 |
| 0x05 | Continuous variable gearbox CFT23 |  | TR-WE |
| 0x06 | Manual 5-speed  5SPD MAN TR/AX VOLVO M56 |  | TR-SL |
| 0x07 | Manual 5-speed FWD  5 SPD MAN TRANS A EAO MTX75 |  | TR-RP |
| 0x08 | Powershift, 6-speed, FWD |  | TR-A6 |
| 0x09 | 6 SPD AUTO TRANS DCPS |  | TR-CW, TR-CQ, TR-EK |
| 0x0A | 1 SPD AUTO TRANS |  | TR-WA |
| 0x0B | 6 SPD AUTO TRANS 6F MID-RANGE (6F35) |  | TR-W6 |
| 0x0C | Automatic 8-speed FWD |  |  |
| 0x0D | Automatic 8-speed AWD |  |  |
| 0x0E | HF35 |  | TR-EJ |
| 0x0F | 6 SPD AUTO TRANS 6F15 |  | TR-W7 |
| 0x10 | Manual, 6-speed, FWD  6 SP MAN TRANS - MMT6 3 SHAFT  6 SPD MAN TR/AX - MMT6 |  | TR-VT, TR-VY |
| 0x11 | Manual, 5-speed, FWD  5 SPD MAN TRANS A EAO B5/IB5 |  | TR-RN |
| 0x12 | 6 SPD AUTO TRANS 6F55 |  | TR-CG |
| 0x13 | 9 SPD AUTO TRANS 9F35 |  | TR-EZ |
| 0x14 | 8 SPD AUTOMATIC TRANS 8F24 |  | TR-E7 |
| 0x30 | 6 SPD MAN TRANS-MT82 |  | TR-AX |
| 0x31 | 6 SP MAN TRANS-VMT6 |  | TR-A7 |
| 0x32 | 5 SPD MAN TRANS VXT75 |  | TR-RV |
| 0x33 | 5 SPD MAN TRANS EAO MT75 |  | TR-RG |
| 0x34 | Cft26 Cvt Auto Transaxle Zf |  | TR-WF |
| 0x35 | Automatic 6-speed Aisin F21 |  | TR-VA, RE-EE |
| 0x36 | CVT Auto Transaxle, FWD |  | TR-CJ |
| 0x37 | IB5 ASM 5-Speed Auto Shift Manual Transmission |  | TR-TK |
| 0x38 | FN Auto 4-Speed Automatic Transmission |  | TR-D2, TR-CE |
| 0x39 | FN Auto 5-Speed Automatic Transmission |  | TR-CX |
| 0x40 | G4E Auto 4-Speed Automatic Transmission |  | TR-CY |
| 0x44 | B6, Manual, 6-speed, FWD |  | TR-BT |
| 0x47 | 6 SPD AUTO TRANS-HP26(not for Volvo) |  | TR-VQ |
| 0x48 | 6 SPD AUTO TRANS-HP28(not for Volvo) |  | TR-CF |
| 0x49 | 6R80 Gearbox, type |  | TR-C3 |
| 0x50 | 5 SPD MANUAL TRANS GFT - IB5 |  | TR-BW |
| 0x51 | 5 SPD MAN TRANS GETRAG-B5A |  | TR-CH |
| 0x52 | 6 SPD MAN TRANS GETRAG-6MX65 |  | TR-EW |
|  |  |  |  |
| 0x70 | 6 SPD MAN TRANS GFT B6 PLUS |  | TR-E8 |
| 0x71 | RESERVED – do not use anymore, now 0x14 |  |  |
| 0x72 | 9 SPD AUTO TRANS 9F40 |  | TR-EY |
| 0x73 | 8 SPD AUTOMATIC TRANS 8F35 |  | TR-GM |
| 0x74 | AUTO TRANS - 8F40 |  | TR-PA |
|  |  |  |  |
| 0xD0 | 5 SPD MAN TRANS GETRAG-5MX65 |  | EN-EV |

All not listed values shall also be accepted.

##### REQ-227101/A-Byte 8 - SelDrvMde1

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 8** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227102/A-Byte 9 - SelDrvMde2

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 9** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227103/A-Byte 10 - SelDrvMde3

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 10** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227104/A-Byte 11 - SelDrvMde4

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 11** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227105/A-Byte 12 - SelDrvMde5

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 12** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227106/A-Byte 13 - SelDrvMde6

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 13** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227107/A-Byte 14 - SelDrvMde7

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 14** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227108/A-Byte 15 - SelDrvMde8

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 15** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227118/A-Byte 16 - SelDrvMde9

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 16** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227117/A-Byte 17 - SelDrvMde10

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 17** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227116/A-Byte 18 - SelDrvMde11

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 18** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227115/A-Byte 19 - SelDrvMde12

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 19** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227114/A-Byte 20 - SelDrvMde13

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 20** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227113/A-Byte 21 - SelDrvMde14

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 21** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227112/A-Byte 22 - SelDrvMde15

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 22** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227110/A-Byte 23 - SelDrvMde16

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 23** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227135/A-Byte 24 - SelDrvMde17

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 24** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227134/A-Byte 25 - SelDrvMde18

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 25** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227133/A-Byte 26 - SelDrvMde19

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 26** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227132/A-Byte 27 - SelDrvMde20

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 27** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227131/A-Byte 28 - SelDrvMde21

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 28** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227130/A-Byte 29 - SelDrvMde22

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 29** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227129/A-Byte 30 - SelDrvMde23

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 30** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227128/A-Byte 31 - SelDrvMde24

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 31** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227127/A-Byte 32 - SelDrvMde25

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 32** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227126/A-Byte 33 - SelDrvMde26

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 33** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227125/A-Byte 34 - SelDrvMde27

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 34** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227124/A-Byte 35 - SelDrvMde28

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 35** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227123/A-Byte 36 - SelDrvMde29

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 36** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227122/A-Byte 37 - SelDrvMde30

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 37** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227121/A-Byte 38 - SelDrvMde31

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 38** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

##### REQ-227120/A-Byte 39 - SelDrvMde-Faulty

|  |  |  |
| --- | --- | --- |
| **DE06**  **byte 39** | **Meaning** | **Effect** |
| 0x00 | Sub-Profile 0 | Default |
| 0x01 | Sub-Profile 1 |  |
| 0x02 | Sub-Profile 2 |  |
| 0x03 | Sub-Profile 3 |  |
| 0x04..0xFF | reserved | Not allowed |

#### REQ-166872/A-DE08 - Hardware

##### REQ-123454/B-Byte 7 - ANC

|  |  |  |
| --- | --- | --- |
| **DE08 Byte 7** | **Meaning** | **Effect** |
| **ANC - General** | | |
| 0x?0 | not configured |  |
| 0x?1 | Not Present | set DTC if hardware present |
| 0x?2 | ANC/ESE Present | Enable ESE/ANC. |
| 0x?3 | ESE Only | Enable ESE. Disable ANC. |
| 0x?4 | ANC giveaway | Set no DTC if hardware present. Disable ESE/ANC. |
| 0x?5-0x?F | Reserved |  |
|  |  |  |
| Bit4 | ANC Microphone 1 | 0 – Not Present  1 – Present |
| Bit5 | ANC Microphone 2 | 0 – Not Present  1 – Present |
| Bit6 | ANC Microphone 3 | 0 – Not Present  1 – Present |
| Bit7 | Reserved |  |
| The Feature is default OFF if Hardware is available until it is configured ON or OFF. | | |

The following DTCs

|  |
| --- |
| REQ-115742-9D79 - Microphone Input |
| REQ-115743-917A - Backup Microphone |
| REQ-115744-93F5 - Microphone 3 |

are linked to this configuration.

# General Requirements

# Functional Definition

## ESE-FUN-REQ-018060/C-ESE General (TcSE ROIN-292993)

### Requirements

#### ESE-FUR-REQ-018061/A-ESE algorithm (TcSE ROIN-293166)

The ESE algorithm shall run indepent to anything on the ACM.

(e.g. Loos of ESE function shall not cause a function loss or degradation of other ACM functions.)

#### ESE-FUR-REQ-018062/B-ESE watchdog (TcSE ROIN-293167)

Standard recovery strategy shall be applied.

The ESE algorithm shall continuously be monitored by a watchdog and deactivated if a fault is detected.

#### ESE-FUR-REQ-018063/A-ESE fault detection (TcSE ROIN-293168)

It shall be possible to automatically diagnose the following faults and set one or more DTCs on the infotainment HS CAN:  
• Signals not received on Powertrain CAN (DTC: 0xC100 Lost connection with ECM)  
• Signals not received at algorithm  
• Problem with ESE core/card (e.g. initialization problem)  
• ESE configuration/data-set problem (invalid calibration file, incompatible vehicle parameters) (DTC 0xE01A "Control Module Main Calibration Data")  
• Speaker short or open circuit detected at run time (constraints may apply, depending on speaker type and audio output)

#### ESE-FUR-REQ-018064/A-ESE audio path (TcSE ROIN-293170)

ESE audio, generated by the ESE algorithm, will be separate from and not affected by any audio processing steps which are applied to non-ESE audio; such as volume, fader, balance, tone, vehicle EQ.

#### ESE-FUR-REQ-018065/A-ESE crank behaviour (TcSE ROIN-293171)

ESE-enabled ACMs shall mute during crank. Therefore, there will be no ESE during crank.  
There shall be no change to the high/low voltage thresholds. Therefore, ESE will be muted at below 9.5V and above 16.2V.

#### ESE-FUR-REQ-018066/A-ESE power modes (TcSE ROIN-293172)

It shall be no change to power modes, startup and shutdown triggers. Powertrain HS-CAN will not trigger wake/sleep; this will be controlled solely by infotainment CAN. ESE shall not be affected by vehicle operating mode signals. Torque and rpm signal values will be sufficient to determine whether the engine is running.

#### ESE-FUR-REQ-018067/A-ESE startup time (TcSE ROIN-293173)

It is anticipated that the ESE sound will be ready no later than 1 second following a reset, LVI and power up condition. ESE error handling, ESE reconfiguration and other audio functions will be initialised separately.

#### ESE-FUR-REQ-018068/A-Loading ESE Configuration Data (TcSE ROIN-293175)

On startup, the AHU will identify the ESE configuration data, within the installed calibration file, which is compatible with the received vehicle configuration.  
On subsequent start-ups, the last-used ESE configuration data will be loaded, to optimise start-up time  
To apply updated ESE configuration (e.g. changed vehicle body style), a reset will be required.  
Note: ESE configuration dataset will be in VBF format, by using the Ford-provided hex to VBF converter.

#### ESE-FUR-REQ-018069/A-Default ESE Configuration (TcSE ROIN-293176)

It is assumed that there will be no default ESE configuration.  
In the absence of an ESE calibration file, or a compatible ESE configuration, ESE will be disabled.

#### ESE-REQ-018070/A-Volume Limiter not applied (TcSE ROIN-298090)

Volume Limiter shall not be applied to ESE sound.

#### ESE-FUR-REQ-092636/A-Audio Drive Mode

*Audio Drive Mode* information shall be routed to the ESE Algorithm to select different look-up tables.

### Use Cases

#### ESE-UC-REQ-092333/B-Overview



|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

#### ESE-UC-REQ-092302/B-FORD plant Use Cases



|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092304/C-Activate ESE

**Linked Elements**

ACT-167515/B-Activation Flow

ESE-ACT-REQ-092423/B-Activation Flow



|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092305/B-Read Out ESE profile data



|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

#### ESE-UC-REQ-092303/C-FORD Engineering Use Cases



|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092327/B-measure Transfer Function

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092328/B-select different compatible ESE profile

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092329/B-select different not compatible ESE profile

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092330/B-read out all available ESE profiles and its name and GUID

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092331/B-check last recieved data from ECM

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092332/B-read out error status details

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

#### ESE-UC-REQ-092307/C-Service Use Cases



|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092323/B-ESE not working

**Linked Elements**

ACT-167516/B-ESE not working correctly

ESE-ACT-REQ-092424/B-ESE not working correctly

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092324/B-Profile upgrade

**Linked Elements**

ESE-ACT-REQ-092425/B-ESE profile upgrade

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092325/B-upgrade ESE software

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

##### ESE-UC-REQ-092326/B-change ESE profile

**Linked Elements**

ESE-ACT-REQ-092426/B-change ESE profile

ACT-167518/B-change ESE profile

|  |  |
| --- | --- |
| **Actors** |  |
| **Pre-conditions** |  |
| **Scenario Description** |  |
| **Post-conditions** |  |
| **List of Exception Use Cases** |  |
| **Interfaces** |  |

### State Machines

### Sequence Diagrams

## ESE-FUN-REQ-093365/A-ESE BoA4.0 specifics

ESE CGEA1.3 specifics

### Requirements

Requirements

#### ESE-REQ-093366/A-ESE CGEA1.3 specifics

ESE Algorithm configuration:

Number of used channel = 4

Additional protected channel = 2

Classification:

Functional importance class = A

### Sequence Diagrams

Sequence Diagrams

### State Machines

State Machines

Activation Flow



ESE not working correctly



ESE profile upgrade



change ESE profile



### Use Cases

Use Cases

## ESE-FUN-REQ-018073/A-ESE Diagnostics (TcSE ROIN-292967)

### Use Cases

### Requirements

#### ESE-IR-REQ-018074/C-Enabling/Disabling ESE (TcSE ROIN-293174)

ESE will be disabled by default. A unit shall enabled by successfully running the ESE Activation ROUTINE 0x3008 “Trigger process to select calibration” via diagnostics.

The status could be read via diagnostics DID EE03 "ESE Activate status".

#### ESE-IR-REQ-018075/B-ESE Configuration Diagnostics (TcSE ROIN-293177)

The installed ESE Calibration File part number will be reported via DID ID F10A “ECU Cal-Config Part Number” (24 Byte ASCII).  
It shall be possible to report via diagnostics the details of each ESE configuration data set included in the calibration file. (DID EE02)

#### ESE-IR-REQ-018076/A-ESE Reflash and Diagnostics (TcSE ROIN-293178)

SWDL will only be supported via infotainment CAN.  
The Algorithm shall be indepented of the ESE calibration/data set and the main ACM(host micro) application.  
The installed Dirana3/HiFi2 core File part number will be reported via DID ID F121 “ECU Software #3 Part Number” (24 Byte ASCII) with included the ESE Algorithm.

#### ESE-IR-REQ-018077/A-ESE Transfer Function Measurement (TcSE ROIN-293179)

The ACM shall be able to pass the request to play the Transfer Function Test tone to the ESE Algorithm.  
This will be started by using diagnostic routine 0x601C "Transfer Function Test tone".

### State Machines

### Sequence Diagrams

## ESE-FUN-REQ-092666/B-ESE/ANC VBF-Structure

The ESE profiles VBF shall be arranged:

|  |  |  |  |
| --- | --- | --- | --- |
| **File Structure** |  |  |  |
|  |  |  |  |
| **Name** | **Size** | **Type** | **VBF Block** |
| VBF Part Num | 24 | Ascii | 1 |
| Number of ESE Profiles (n) | 1 | Int | 1 |
| Profile Info Array | n | Profile INFO | 1 |
| Profile Data Array | n | Profile DATA | 2..n+1 |
|  |  |  |  |
|  |  |  |  |
| **Profile INFO Structure** |  |  |  |
|  |  |  |  |
| **Name** | **Size** | **Type** |  |
| Profile Index | 1 | Int | 1 |
| Title | 16 | Ascii | 1 |
| GUID | 36 | Ascii | 1 |
| Dataset Ver (dataSetVersion) | 4 | Hex | 1 |
| AHU (HW) Ver (hwRevision) | 1 | Hex | 1 |
| Num CCC Sets linked to Profile | 1 | Int | 1 |
| Num Params in CCC PARAM array \* | 1 | Int | 1 |
| CCC PARAM array |  | CCC PARAM | 1 |
|  |  |  |  |
| \* Num Params in CCC PARAM array | This is fixed to 7, with the order of  DE06:Byte 0  DE06:Byte 1  DE06:Byte 2  DE06:Byte 3  DE06:Byte 4  DE06:Byte 6  DE06:Byte 7 | | |
|  |  |  |  |
| **Profile DATA Structure** |  |  |  |
|  |  |  |  |
| **Name** | **Size** | **Type** |  |
| Müller-BBM m|klang RAW data |  | Hex | 2..n+1 |
|  |  |  |  |
| Every Profile will have its own VBF block. | | | |
|  |  |  |  |
| **CCC PARAM Structure** |  |  |  |
|  |  |  |  |
| **Name** | **Size** | **Type** |  |
| Param ID  0x00 | 1 | Hex | 1 |
| Param VAL  DE06:Byte 0 – Carline | 1 | Hex | 1 |
| Param ID  0x01 | 1 | Hex | 1 |
| Param VAL  DE06:Byte 1 – Bodystyle | 1 | Hex | 1 |
| Param ID  0x02 | 1 | Hex | 1 |
| Param VAL  DE06:Byte 2 – Speaker System | 1 | Hex | 1 |
| Param ID  0x03 | 1 | Hex | 1 |
| Param VAL  DE06:Byte 3 – Speaker  Branding | 1 | Hex | 1 |
| Param ID  0x04 | 1 | Hex | 1 |
| Param VAL  DE06:Byte 4 – SWP | 1 | Hex | 1 |
| Param ID  0x06 | 1 | Hex | 1 |
| Param VAL  DE06:Byte 6 – Engine | 1 | Hex | 1 |
| Param ID  0x07 | 1 | Hex | 1 |
| Param VAL  DE06:Byte 7 – Gearbox | 1 | Hex | 1 |

## ESE-FUN-REQ-092665/A-ESE/ANC VBF-Builder

Supplier shall provide a “VBF tool” which converts one or more ESE/ANC datasets into a single File in VBF format. The VBF file can be used to flash the dataset(s) to the AHU via CAN, and will include additional information required by the AHU to interpret data and store it in Dirana 3 External Flash memory.

The tool shall be designed to run on windows XP and Windows 7 OS.

Tool GUI design to be finalized & agreed prior to development.

CCC parameters shall be selectable via GUI, and the options available (parameters, values, names) will be configurable via a program data file (e.g. INI, XML).

To create a Release ESE/ANC Calibration VBF, the user must:

a. Select ESE profile images (image details e.g. GUID will be loaded and displayed)

b. Select valid CCC values for each ESE/ANC profile image

c. Enter VBF Part number

d. Export to VBF

The tool will not be able to load or edit existing ESE/ANC profile VBF files.

The tool shall be able to SAVE and LOAD a project file, containing all vehicle configurations and ESE/ANC profiles and their connections.

The tool shall also allow exchanging an already connected ESE/ANC profile with a new one, without losing the vehicle configuration connections.

The tool shall also allow exchanging an already vehicle configuration connected with a new one, without losing the ESE/ANC profile connections.

The tool shall support as well a basic consistency check, to issue a warning if a NO vehicle config is connected to one or more of the ESE/ANC profiles.

The tool shall create a VBF file, where the payload includes

a. VBF header (includes user-configurable part number, and content information added as comments)

b. Single or Multiple ESE/ANC dataset images (as exported from MKlang)

c. Information and CCC parameters for each ESE/ANC dataset image

d. Any additional data as required by the SBL to successfully flash the images

# Appendix: Reference Documents

|  |  |
| --- | --- |
| Reference # | Document Title |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |