



Research & Vehicle Technology
“Infotainment Systems Product Development”

Feature – Bezel Diagnostics

**LIN ICP Infotainment Subsystem Part
Specific Specification (SPSS)**

Version 1.1

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FORD CONFIDENTIAL



Revision History

Date	Ver	Notes	
December 10, 2014	1.0	Initial Release	
May 18, 2015	1.1	Updated Release	
	DIAG-SR-REQ-115757/A-Request and Response of HWPB (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.	



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1 Architectural Design - LIN

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

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

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

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

1.3 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.

1.3.1 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 1 st 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 2 nd 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 3 rd 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 4 th 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 1 st digit of the month e.g. "1" of month December (->12)	0x0: 0 0x1: 1 0x2 – 0xF: not used
SerialNumber05 (ICPSrNrDigit05)	Method for transferring 2 nd 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 1 st 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 2 nd 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 1 st 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 2 nd 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 1 st 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 2 nd 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 1 st 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 2 nd 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



1.4 LIN Extended Part Numbers Interface

1.4.1 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
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1.4.2 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
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2 General Requirements

2.1 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.



3 Functional Definition

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

3.1.1 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.

3.1.2 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

3.1.3 Examples

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

3.1.3.1 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:



MasterReq B0	MasterReq B1	MasterReq B2	MasterReq B3	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:

SlaveRespB 0	SlaveRespB 1	SlaveRespB 2	SlaveRespB 3	SlaveRespB 4	SlaveRespB 5	SlaveRespB 6	SlaveRespB 7
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:

SlaveRespB 0	SlaveRespB 1	SlaveRespB 2	SlaveRespB 3	SlaveRespB 4	SlaveRespB 5	SlaveRespB 6	SlaveRespB 7
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:

SlaveRespB 0	SlaveRespB 1	SlaveRespB 2	SlaveRespB 3	SlaveRespB 4	SlaveRespB 5	SlaveRespB 6	SlaveRespB 7
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:

SlaveRespB 0	SlaveRespB 1	SlaveRespB 2	SlaveRespB 3	SlaveRespB 4	SlaveRespB 5	SlaveRespB 6	SlaveRespB 7
NAD	PCI	D1	D2	D3	D4	D5	D6
0x10	0x23	0x31	0x00	0x00	0x00	0x00	0x00

Example for 3rd response frame of HWPn

3.1.3.2 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:

MasterReq B0	MasterReq B1	MasterReq B2	MasterReq B3	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:

SlaveRespB 0	SlaveRespB 1	SlaveRespB 2	SlaveRespB 3	SlaveRespB 4	SlaveRespB 5	SlaveRespB 6	SlaveRespB 7
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:

SlaveRespB 0	SlaveRespB 1	SlaveRespB 2	SlaveRespB 3	SlaveRespB 4	SlaveRespB 5	SlaveRespB 6	SlaveRespB 7
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:

SlaveRespB 0	SlaveRespB 1	SlaveRespB 2	SlaveRespB 3	SlaveRespB 4	SlaveRespB 5	SlaveRespB 6	SlaveRespB 7
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:

SlaveRespB 0	SlaveRespB 1	SlaveRespB 2	SlaveRespB 3	SlaveRespB 4	SlaveRespB 5	SlaveRespB 6	SlaveRespB 7
NAD	PCI	D1	D2	D3	D4	D5	D6
0x10	0x23	0x31	0x00	0x00	0x00	0x00	0x00

Example for 4th response frame of SWPN



4 Appendix: Reference Documents

Reference #	Document Title
1	
2	
3	
4	
5	
6	
7	
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12	
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