

BUSMASTER – FlexRay Add-On

BUSMASTER © - FlexRay Overview

❖ Introduction

BUSMASTER Add-On for FlexRay can be used to monitor, analyse and simulate FlexRay bus

❖ Features Supported

- Hardware Support
 - ETAS BOA (ES595, ES583)
 - Vector XL (VN3600, VN7600, VN8900)
- Channel Configuration
- Controller Configuration
- Transmission of Messages
- Monitoring Messages
- Network Statistics
- Filters
- Logging
- Signal watch
- Node Simulation

❖ Installation

FlexRay support in BusMaster is available as a Commercial Add-On

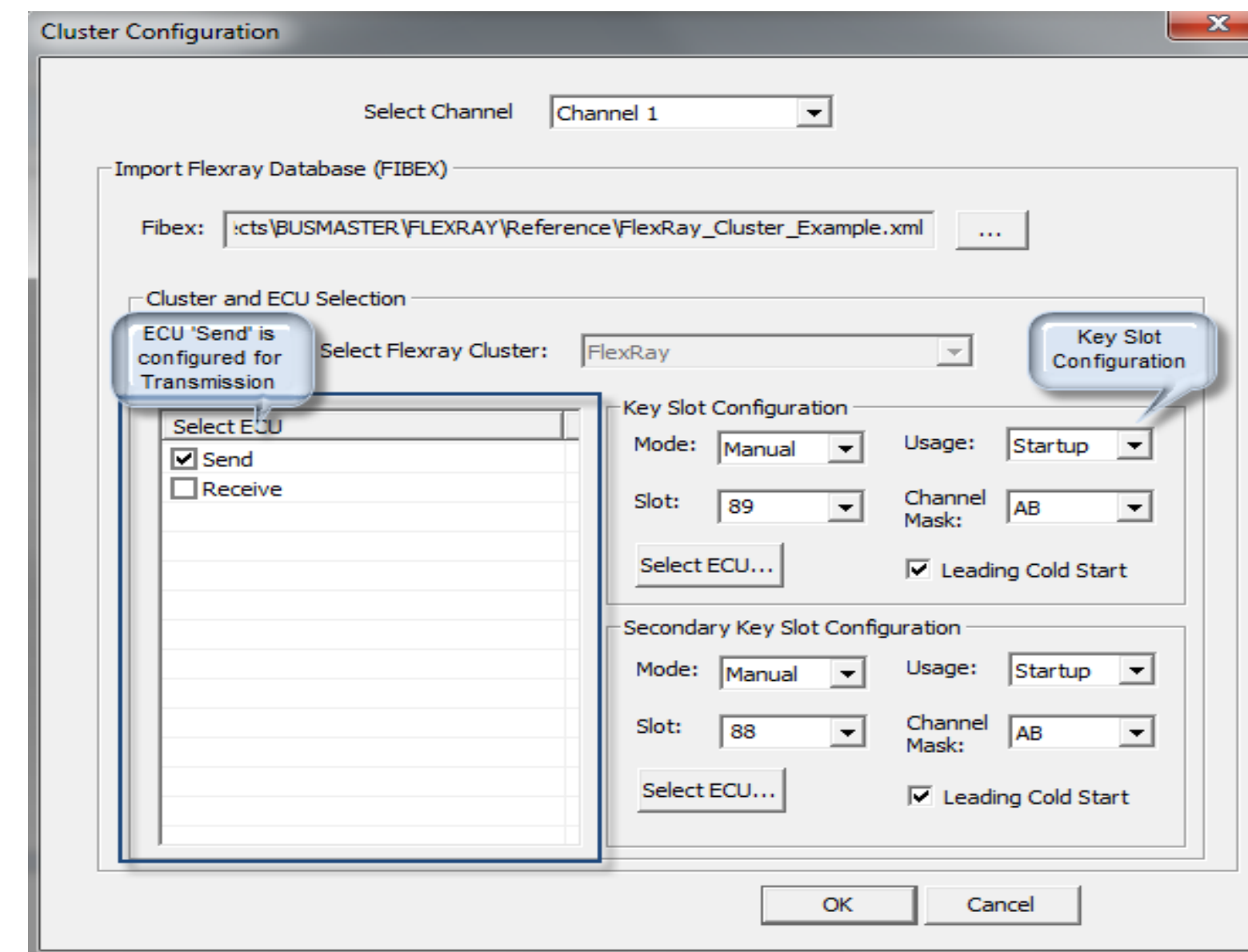
FlexRay Add-On works on top of open source version

For further details, please contact E-mail: BUSMASTER@in.bosch.com

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❖ Channel Configuration

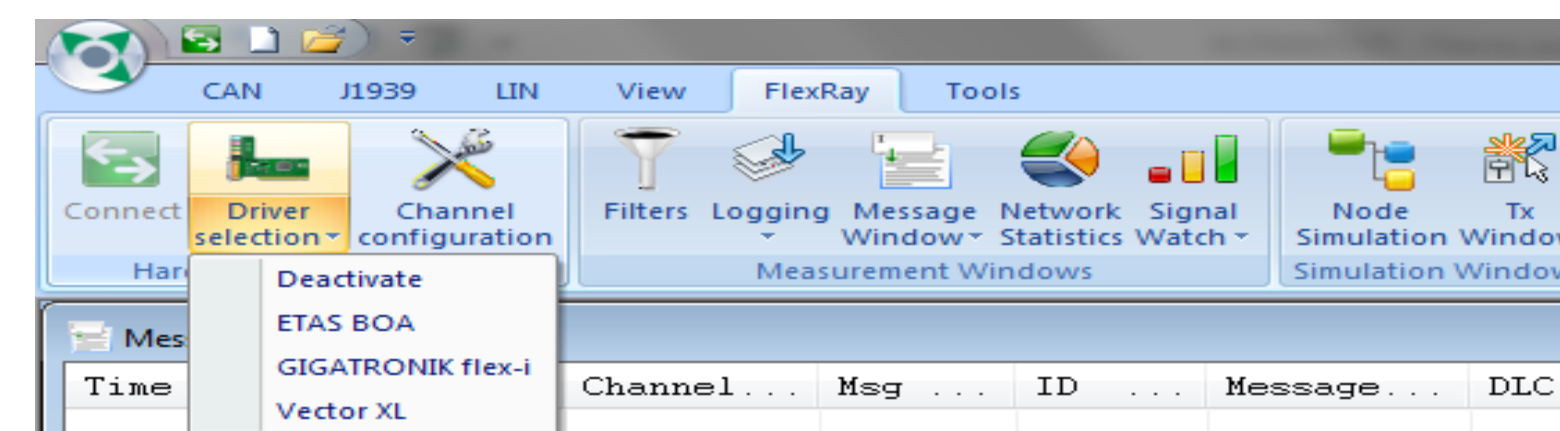
Cluster configuration is used to associate FIBEX file to a FlexRay channel



❖ Controller Configuration

BUSMASTER can be connected to FlexRay physical channel using FlexRay Controller

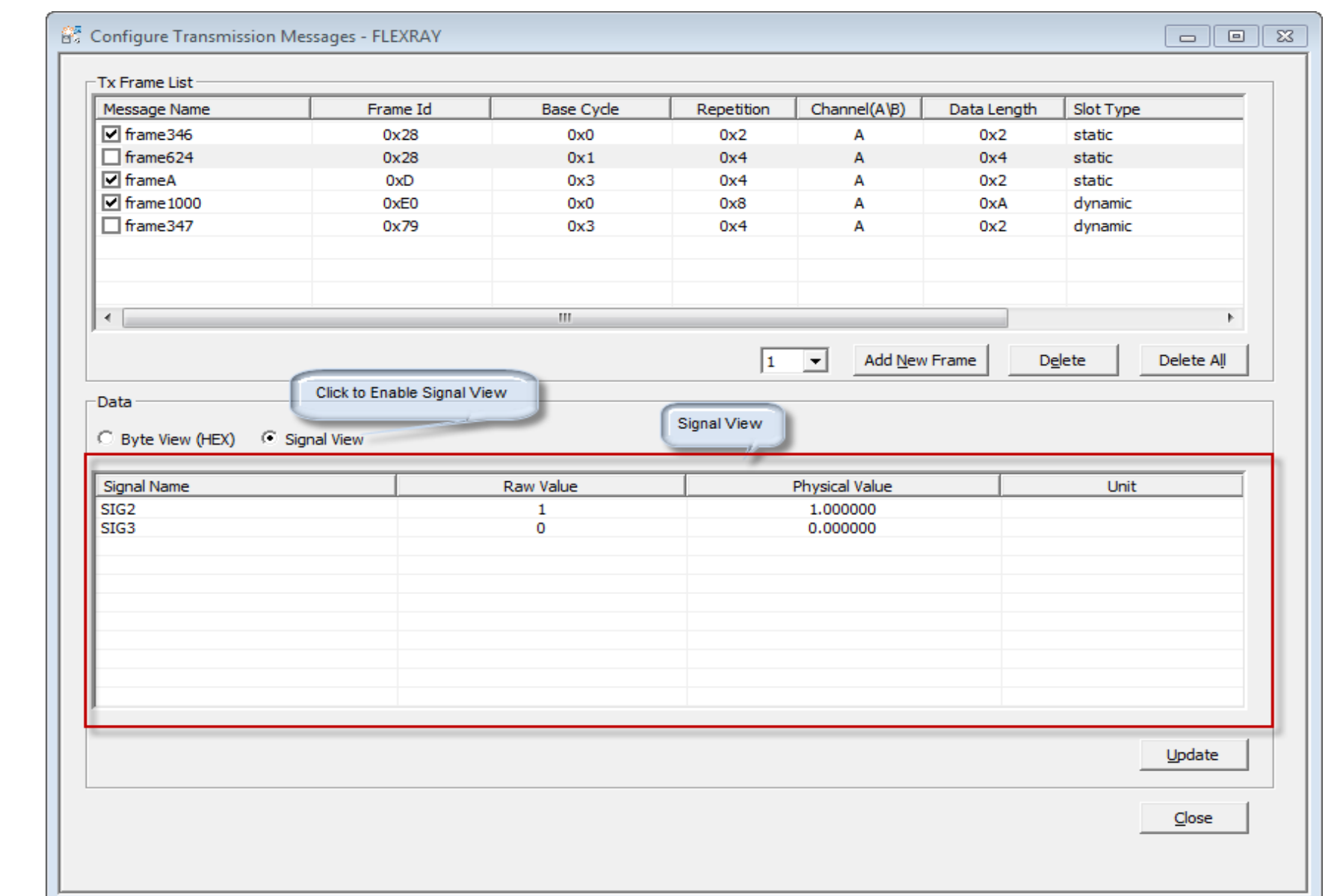
- ETAS and Vector FlexRay controllers are supported



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❖ Transmission of Messages

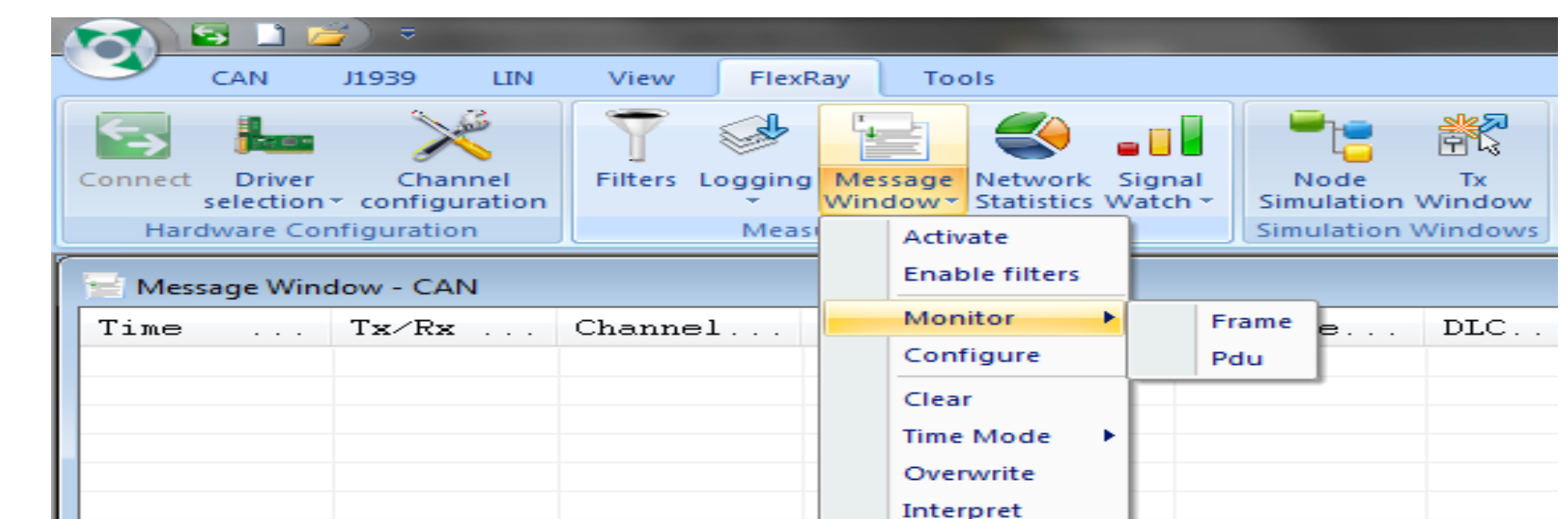
Configure FlexRay messages for transmission



❖ Monitoring Messages

On-line FlexRay Network Monitoring can be done using FlexRay Message window

- Frame Monitoring
- PDU Monitoring
- Frame and PDU Monitoring



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❖ Frame Monitoring

Message Window - FLEXRAY											
	Time	Tx...	Id	Type	Frame Ty...	Slot T...	Description	Cycle...	Cha...	D...	Data Byte(s)
+	15:50:28:2907	Tx	0001 [0, 1]	Frame	Data	static	New_Frame_1	51	A	16	000 000 000 0
+	15:50:28:2907	Tx	0002 [0, 1]	Frame	Data	static	New_Frame_2	51	A	16	000 000 000 0
	15:50:28:2907	Tx	0003 [0, 1]	Frame	Data	static	New_Frame_3	51	A	16	000 000 000 0
+	15:50:28:2907	Tx	0004 [0, 1]	Frame	Data	static	New_Frame_4	51	A	16	000 000 000 0
	15:50:28:2907	Tx	0005 [0, 1]	Frame	Data	static	New_Frame_5	51	A	16	000 000 000 0
	15:50:28:2907	Tx	0006 [0, 1]	Frame	Data	static	New_Frame_6	51	A	16	000 000 000 0
	15:50:28:2907	Tx	0007 [0, 1]	Frame	Data	static	New_Frame_7	51	A	16	000 000 000 0

❖ PDU Monitoring

Message Window - FLEXRAY											
	Time	Tx	Id	Type	Frame Ty	Slot T	Description	Cycle	Cha	D	Data B
	15:49:40:5771	Tx	0001	PDU			New_PDU_2	18	A	1	000
+	15:49:40:5771	Tx	0001	PDU			New_PDU_1	18	A	1	000
	15:49:40:5771	Tx	0002	PDU			New_PDU_3	18	A	1	000
+	15:49:40:5771	Tx	0002	PDU			New_PDU_1	18	A	1	000
	15:49:40:5771	Tx	0003	PDU			New_PDU_2	18	A	1	000
	15:49:40:5771	Tx	0004	PDU			New_PDU_2	18	A	1	000
+	15:49:40:5771	Tx	0004	PDU			New_PDU_1	18	A	1	000
	15:49:40:5771	Tx	0004	PDU			New_PDU_5	18	A	1	000
	15:49:40:5771	Tx	0004	PDU			New_PDU_4	18	A	1	000
	15:49:40:5771	Tx	0007	PDU			New_PDU_6	18	A	1	000
	15:49:40:5771	Tx	0007	PDU			New_PDU_7	18	A	1	000
	15:49:40:5771	Tx	0007	PDU			New_PDU_8	18	A	1	000
	15:49:40:5771	Tx	0007	PDU			New_PDU_9	18	A	1	000

❖ Frame and PDU Monitoring

Message Window - FLEXRAY											
	Time	Tx...	Id	Type	Frame Ty...	Slot T...	Description	Cycle...	Cha...	D...	Data Byte...
+	15:43:54:3590	Tx	0001 [0, 1]	Frame	Data	static	New_Frame_1	29	A	16	000 000
	15:43:54:3590	Tx	0001	PDU			New_PDU_2	29	A	1	000
+	15:43:54:3590	Tx	0001	PDU			New_PDU_1	29	A	1	000
+	15:43:54:3590	Tx	0002 [0, 1]	Frame	Data	static	New_Frame_2	29	A	16	000 000
	15:43:54:3590	Tx	0002	PDU			New_PDU_3	29	A	1	000
+	15:43:54:3590	Tx	0002	PDU			New_PDU_1	29	A	1	000
	15:43:54:3590	Tx	0003 [0, 1]	Frame	Data	static	New_Frame_3	29	A	16	000 000
	15:43:54:3590	Tx	0003	PDU			New_PDU_2	29	A	1	000
+	15:43:54:3590	Tx	0004 [0, 1]	Frame	Data	static	New_Frame_4	29	A	16	000 000
	15:43:54:3590	Tx	0004	PDU			New_PDU_2	29	A	1	000
+	15:43:54:3590	Tx	0004	PDU			New_PDU_1	29	A	1	000
	15:43:54:3590	Tx	0004	PDU			New_PDU_5	29	A	1	000
	15:43:54:3590	Tx	0004	PDU			New_PDU_4	29	A	1	000
	15:43:54:3590	Tx	0005 [0, 1]	Frame	Data	static	New_Frame_5	29	A	16	000 000
	15:43:54:3590	Tx	0006 [0, 1]	Frame	Data	static	New_Frame_6	29	A	16	000 000
	15:43:54:3590	Tx	0007 [0, 1]	Frame	Data	static	New_Frame_7	29	A	16	000 000
	15:43:54:3590	Tx	0007	PDU			New_PDU_6	29	A	1	000
	15:43:54:3590	Tx	0007	PDU			New_PDU_7	29	A	1	000
	15:43:54:3590	Tx	0007	PDU			New_PDU_8	29	A	1	000
	15:43:54:3590	Tx	0007	PDU			New_PDU_9	29	A	1	000

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❖ Network Statistics

Displays FlexRay bus statistics like number of frames, PDU’s transmitted and received, error frames, static segment load etc.,

Network Statistics		
CAN FlexRay LIN		
Parameters	Channel A	Channel B
Frames Total	1113667	0
Frames [fr/s]	4245	0
Null Frames Total	434017	0
Null Frames [fr/s]	1662	0
PDU Total	1305261	0
PDU [pdus/s]	4970	0
Errors Total	0	0
Errors [fr/s]	0	0
Static Segment Load(Data+Null)	49.784314	0.000000
Transmitted		
Frames Total	0	0
Frames [fr/s]	0	0
Null Frames Total	0	0
Null Frames [fr/s]	0	0
PDU Total	0	0
PDU [pdus/s]	0	0
Errors Total		
Errors [fr/s]	0	0
Received		
Frames Total	1113667	0
Frames [fr/s]	4245	0
Null Frames Total	434017	0
Null Frames [fr/s]	1662	0
PDU Total	1305261	0
PDU [pdus/s]	4970	0
Errors Total		
Errors [fr/s]	0	0

❖ Filters

Configure Stop or Pass filters for FlexRay Frame’s/PDU’s

❖ Logging

Configure log files to log FlexRay Frame’s/PDU’s transmitted or received on the FlexRay bus

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❖ Signal Watch

Analyze selected signal’s Raw and Physical values

Message	Signal	Physical Value	Raw Value
frame_25	signal_25	2312.000000	2312
frame397	SIG1	34952.000000	34952
frame397	SIG10	34952.000000	34952
frameAB	signalA	0.000000	0

❖ Node Simulation

FlexRay Node functionality can be simulated with following handlers

- Bus Events
 - Message Handlers
 - PDU Handlers
 - POC Handlers
- Start Cycle Handlers
 - Timer Handlers
 - Key Handlers
 - DLL Handlers

ECU1.cpp	
<div><div>ECU1.cpp</div><div><div>D:\Demo\ECU1.cpp</div><div><div>Include Headers</div><div><div>#include <Windows.h></div><div>#include <FlexRayIncludes.h></div></div><div><div>Bus Events</div><div><div>void OnBus_Connect()</div></div></div><div><div>Message Handlers</div><div><div>void OnMsgCh1_1_0_1(STFLX_MSG RxMsg)</div></div></div><div><div>PDU Handlers</div><div><div>void OnPDUName_New_PDU_1(New_PDU_1 RxPDU)</div></div></div><div><div>POC Handlers</div><div><div>void OnPOCState(STFLX_POCSTATUS stcPOCStatus)</div></div></div><div><div>Start Cycle Handlers</div><div><div>void OnStartCycle_0_1(STFLX_STARTCYCLE stcStartCycle)</div></div></div><div><div>Timer Handlers</div><div><div>void OnTimer_T1_1()</div></div></div><div><div>Key Handlers</div><div><div>void OnKey_a(unsigned char KeyValue)</div></div></div><div><div>DLL Handlers</div><div><div>void OnDLL_Load()</div></div></div><div><div>Utility Functions</div><div><div>Global Variables</div></div></div></div></div></div>	<div><div>37: {</div><div>38: /* TODO */</div><div>39: }/* End FlexRay generated function - OnBus_Connect */</div><div>40: /* Start FlexRay generated function - OnMsgCh1_1_0_1 */</div><div>41: void OnMsgCh1_1_0_1(STFLX_MSG RxMsg)</div><div>42: {</div><div>43: /* TODO */</div><div>44: }/* End FlexRay generated function - OnMsgCh1_1_0_1 */</div><div>45: /* Start FlexRay generated function - OnPDUName_New_PDU_1 */</div><div>46: void OnPDUName_New_PDU_1(New_PDU_1 RxPDU)</div><div>47: {</div><div>48: /* TODO */</div><div>49: }/* End FlexRay generated function - OnPDUName_New_PDU_1 */</div><div>50: /* Start FlexRay generated function - OnPOCState */</div><div>51: void OnPOCState(STFLX_POCSTATUS stcPOCStatus)</div><div>52: {</div><div>53: /* TODO */</div><div>54: }/* End FlexRay generated function - OnPOCState */</div><div>55: /* Start FlexRay generated function - OnStartCycle_0_1 */</div><div>56: void OnStartCycle_0_1(STFLX_STARTCYCLE stcStartCycle)</div><div>57: {</div><div>58: /* TODO */</div><div>59: }/* End FlexRay generated function - OnStartCycle_0_1 */</div><div>60: /* Start FlexRay generated function - OnTimer_T1_1 */</div><div>61: void OnTimer_T1_1()</div><div>62: {</div><div>63: /* TODO */</div><div>64: }/* End FlexRay generated function - OnTimer_T1_1 */</div><div>65: /* Start FlexRay generated function - OnKey_a */</div><div>66: void OnKey_a(unsigned char KeyValue)</div><div>67: {</div><div>68: /* TODO */</div><div>69: }/* End FlexRay generated function - OnKey_a */</div><div>70: /* Start FlexRay generated function - OnDLL_Load */</div><div>71: void OnDLL_Load()</div><div>72: {</div><div>73: /* TODO */</div></div>