VECTOR

CANalyzer.LIN

Product Information

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V8.0 2023-04

Valid for CANalyzer.LIN as of version 17

This document presents the CANalyzer.LIN application areas of analysis and stimulation and enumerates their individual functions. The document contains a brief overview of supplemental programs and hardware interfaces.

Product information and **technical data** on CAnalyzer options are available in separate documents.

1 Introduction CANalyzer.LIN

LIN (Local Interconnect Network) is a cost-effective and deterministic communication system for connecting ECUs with smart sensors, actuators and controls. The popular Vector software tool CANalyzer.LIN provides you with professional measurement and analysis features for the specifications LIN1.x, LIN2.0, LIN2.x, SAE-J2602 (US-LIN) and Cooling-Bus.

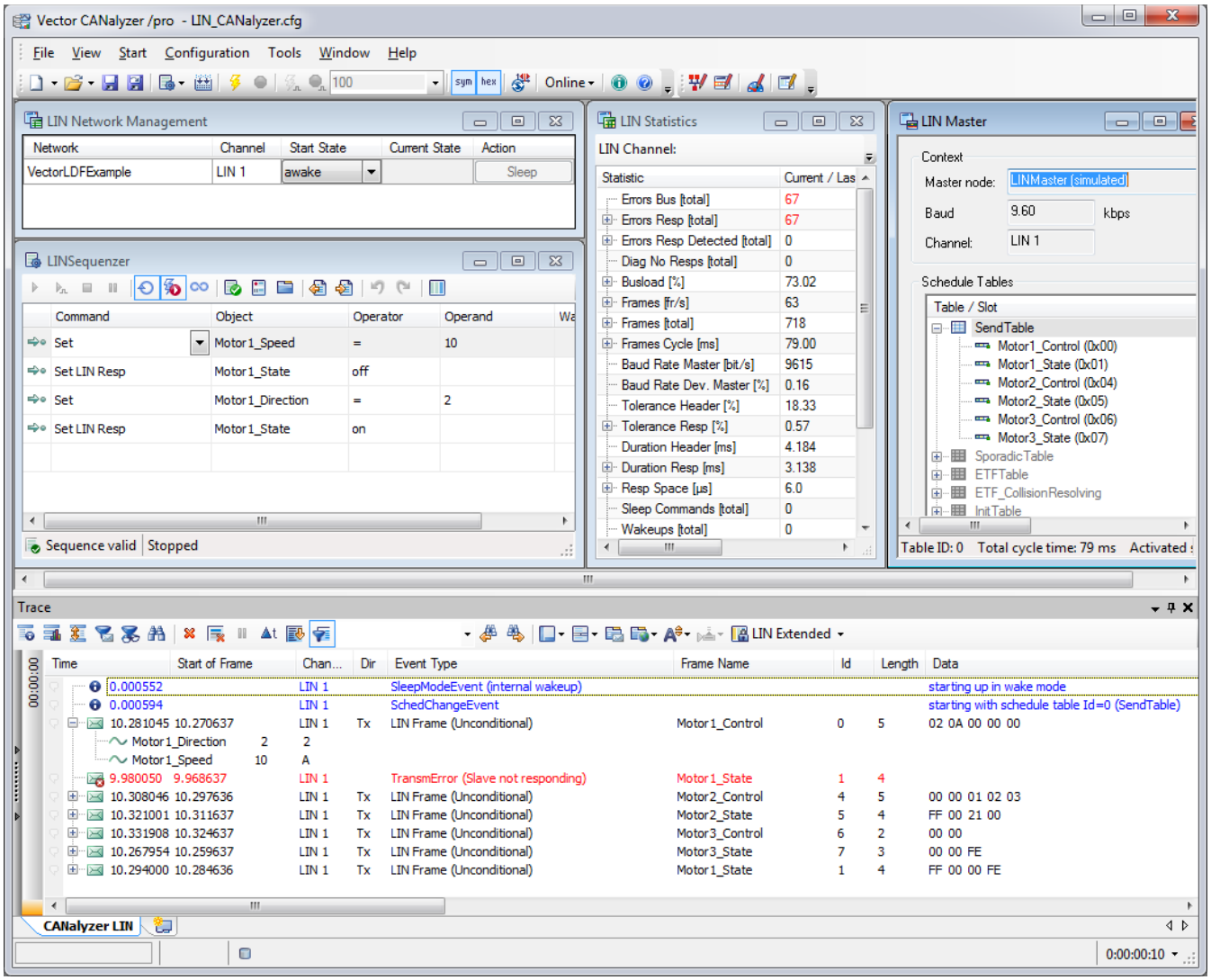

Figure 1: User interface

1.1 Highlights

- LIN support of CANalyzer Option SCOPE
- Visual Sequence editor to create stimulus and test sequences
- Easy sending of self-defined services via basic diagnostics

1.2 Application Areas

CANalyzer.LIN is capable of analyzing up to 32 LIN networks in parallel. Together with its integrated CAN features, it is the ideal tool for developing LIN Slave nodes and for analyzing LIN networks, CAN-LIN gateways and CAN-LIN diagnostics.

2 Analysis

CANalyzer.LIN offers you professional LIN analysis features:

- Network analysis according to LDF

- Interpretation of LIN2.x configuration commands
- Interpretation of diagnostics according to ODX/MDX/CANdela files
- Detailed error and event detection
- Numerical and graphical visualization of signals
- Configurable display panels
- Network Management window
- Network and node statistics with LIN Statistics window
- Logging, Replay, Filter and Trigger blocks

2.1 Timing Analysis

The LIN Analysis Feature Set gives you easy access to LIN timing information either via trace columns or script functions, e. g.:

- Header, response and total frame transmission time
- Schedule slot delay time, interframe space and bus idle time
- Sync break, sync delimiter and inter-byte space
- Header and response tolerance
- Wake-up signal length
- Baud rate of header and response

2.2 Trace Window for LIN

The Trace window for LIN not only displays LIN frames, errors and events, but also shows all relevant LIN timings. The following information can be displayed for LIN:

- Unconditional frames and their raw/encoded signals values
- Event-triggered frames, i.e. no response, single response, collision and collision resolution
- LIN2.0/2.1 configuration commands and their interpretation
- All types of errors, e.g. no response, illegal header/response, checksum error, synch error, long dominant signal, spikes
- Network management commands: go-to-sleep, wake-up
- Special events for network management, schedule table change, baud rate change, frame length detection, checksum model detection, etc.
- LIN diagnostic frames interpreted at TP level, i.e. Single Frame, First Frame, Consecutive Frame
- LIN timing information such as: start of frame, slot delay, interframe space, bus idle time, sync break/delimiter length, response/inter-byte space, wake-up signal length, etc.

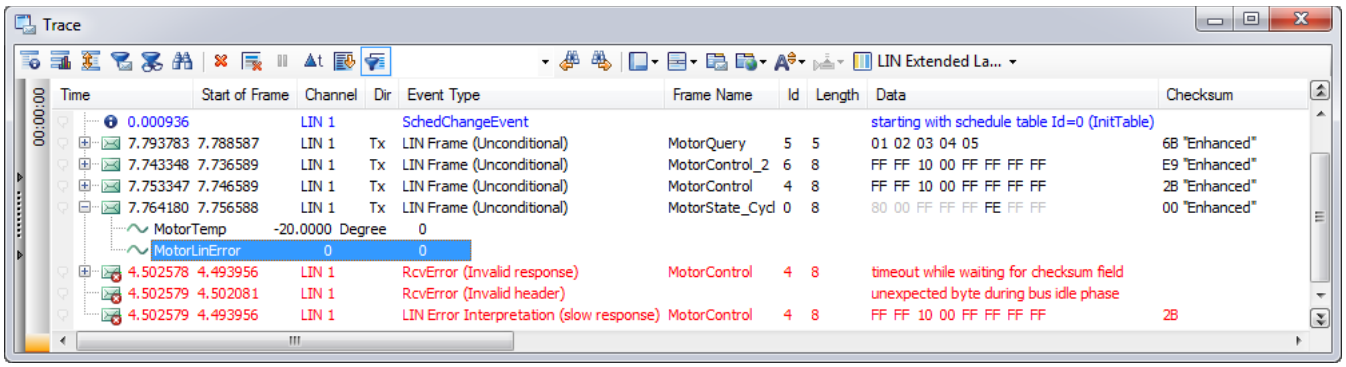

Figure 2: Trace Window with enhanced interpretation of LIN protocol errors

2.3 LIN Network Management Window

This window displays the network management state for all configured LIN networks and allows you to modify the state of each network either before or after measurement start.

2.4 LIN Statistics Window

This feature displays useful network/node statistics, e.g.:

- Detailed error statistics with color highlighting
- Relevant node timings, e.g. response space, response tolerance
- Statistics for event-triggered and diagnostic frames
- Statistics for network management

2.5 Support of Option SCOPE

Option SCOPE is an integrated oscilloscope solution for CANalyzer based on oscilloscope hardware with a USB power supply. This new CANalyzer option appears in the program as a further analysis window with views for configuration, bus level and protocol decoding. The supported hardware PicoScope 4227 has 2 input channels for 1 CAN channel or 2 LIN channels and is triggered using the Sync line of Vector's interface hardware. Up to 4 USB scopes can be used in parallel. Option SCOPE is available for all CANalyzer variants and can be used offline without an option license, e.g. to view measurements from colleagues.

This very powerful combination of USB scope and CAN/LIN tool offers many new possibilities for the analysis of protocol errors. A representation of the physical layer is particularly during the execution of conformity tests, often indispensable. With bus-specific trigger conditions and CANalyzer time synchronization, you can find the causes of protocol errors much quicker than with a traditional oscilloscope. Multi-hardware support lets you monitor up to 4 CAN or 8 LIN networks in parallel for errors.

For more details please see separate product information for CANalyzer.

3 Stimulation/Simulation

A Master (or Slave node) can be easily simulated according to LDF. You can control a Master's scheduler either interactively using the LIN Interactive Master block or by programming a CAPL script.

3.1 LIN Replay Block

The following LIN events can be replayed from a logging file:

- Unconditional frames and no responses
- Event-trigged frames: no response, single response
- Configuration requests and responses
- Diagnostic requests and responses
- Sleep commands and wake-up requests

You can also configure which responses shall be sent:

- All responses
- Only responses published by the Master
- No responses

4 Further Programs

- The LDF Explorer is a GUI-based utility for easy viewing, editing and creation of LIN Description Files (LDFs)
- The LIN File Editor is a text-based editor for LDFs/NCFs with an integrated consistency checker

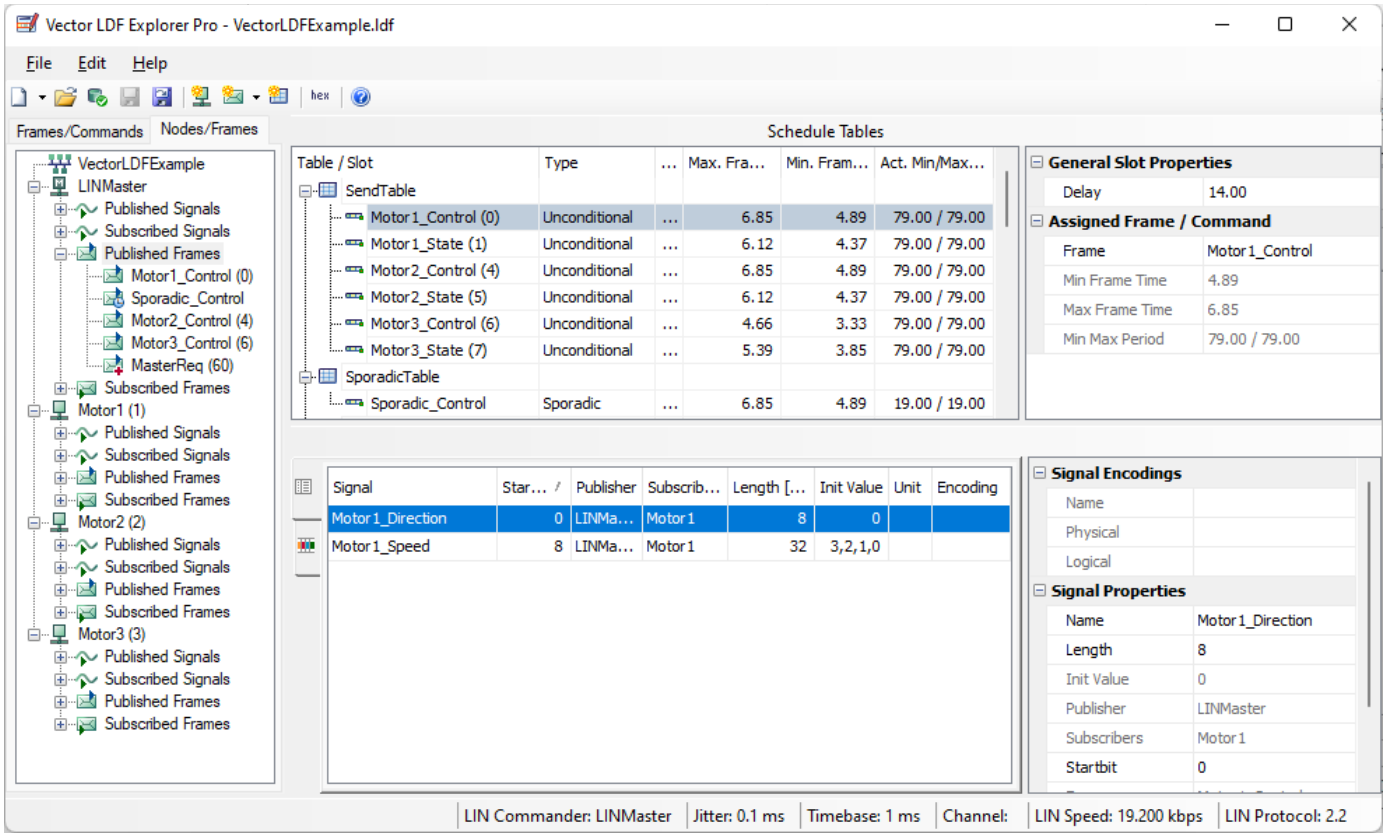

Figure 3: LDF Explorer for viewing and editing LIN Description Files

5 Hardware Interfaces

CANalyzer.LIN supports Vector's XL and VN interface families of high performance and flexible PC-interfaces for CAN and LIN. For detailed information, please see the data sheet "Hardware Interfaces for CAN, LIN and J1708".

6 Development and Test Tool for LIN

CANoe.LIN is a separate product offering well known analysis features of CANalyzer.LIN as well as development, stress and test features for LIN and J2602. For detailed information please see CANoe.LIN product information.

For more information about Vector's LIN solutions please visit www.vector.com/lin

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