



FlexRay-Monitoring, from Bits to Signals

The need to monitor and control not only the bits and bytes but also to interpret the physical signal exchange on the bus requires new solutions in the area of monitoring tools. One of these Flexray monitoring tools is the CRST FRAnalyzer-Pro.

- Graphic y/t display of car signals/units
- Import of car data bases in different formats (e.g. FIBEX, XML, XCDEF)
- Logging the FlexRay data traffic into log files
- Transmission of Flexray frames
- Filter/Trigger/Trace functionality

The offline mode allows the data previously captured on the PC to be analyzed and visualized far away of the real flexray bus, e.g. in the office.

Functions available in offline mode:

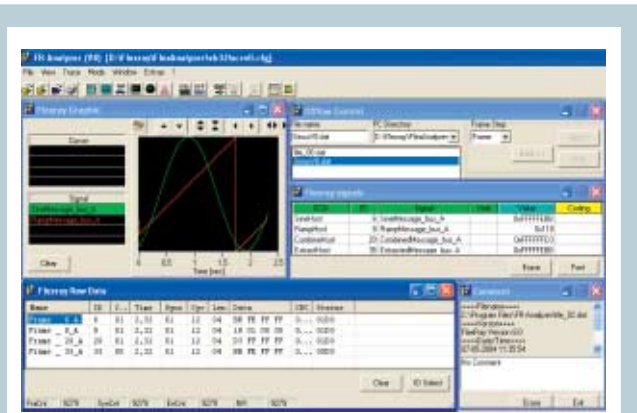
- Offline analysis of previously captured log files
- Identical display possibilities as in online mode
- Single step (forward, backward) and "Run" mode
- Data export into several file formats (Excel, Matlab o.ä.) with filtering particular IDs
- GUI switchable between English, German and other languages

Because the FR-AnalyzerPro has not only functions which are commonly used for monitoring purposes (display of

Beneath well established automotive communication paths like CAN, MOST, LIN and others the need for higher data rates, deterministic data transfer and fault tolerance has driven the Flexray bus-system to become a new standard in the communication between different ECUs inside modern cars. The FR-AnalyzerPro is a universal monitoring tool for the FlexRay bus and serves as an online and offline analysis tool for evaluation of FlexRay bus traffic. The FR-Analyzer-Pro works together with the TZM Flexcard or with the Decomsys Busdoctor as HW-Interface to the Flexray bus. The HW-Interface is automatically recognized by the FRAnalyzerPro (**Figure 1**). In online mode a PC running the FR-AnalyzerPro software is connected via the actual HW-Interface to the Flexray bus and transmits the flexray datastream to the PC.

Functions available in online mode:

- ID-Preview of all active bus nodes
- Display of FlexRay® frames (name, ID, channel, size, data) in decimal or hexadecimal form with additional visualization of the current bus status.
- Alphanumeric/Statistic (min., max., standard deviation values) display of physical car signals
- Bus statistic (e.g. bus load, number of IDs occurred, ID cycle times)



The FR-AnalyzerPro, currently available in Version 2.0, can be used in online and in offline mode.

raw/physical/graphic data), we will focus here only on some special (new in Version 2.1) implemented features:

- FIBEX Import
- FIBEX Editor Plugin
- Remote Control API
- Standalone Mode for manufacturing test

FIBEX Import

In the past, the most car manufacturers preserved their own car data base format. To come to a more suitable solution some of the main car manufacturers and suppliers defined a more "exchangeable" data base standard for the physical description of the bussystem and the signals, the Fibex (Field Bus Exchange Format) Standard was born. FIBEX is a XML based exchange format to be used for data exchange between tools that deal with message-oriented bus communication systems, e.g. Flexray, CAN and others. The FRAnalyzerPro can import one or more FIBEX car databases and display the physical signals based on the values from the FIBEX database. **Figure 2** shows an example of a FIBEX database used for signal selection in the FRAnalyzerPro. In addition the FRAnalyzerPro extracts the Flexray-Cluster Parameter contained in the FIBEX databa-

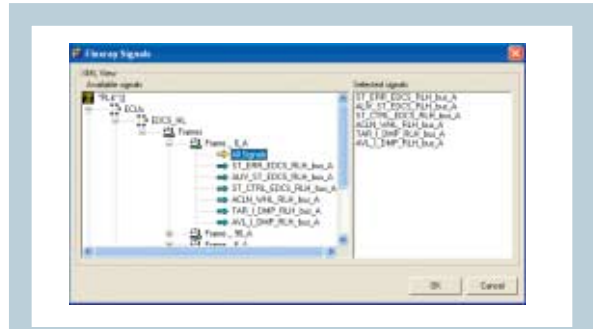


Figure 2: Example of a FIBEX database used for signal selection.

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a small database for converting Flexray frames to physical-scaled signals with e.g. value, min./max. limits and physical unit. **Figure 3** shows the new FIBEX Editor Plugin of the FRAnalyzerPro.

Remote Control API

For the use of Flexray monitoring tools not only in the lab but also in the car manufacturing process its often necessary, to control and use the features of the monitoring tool as server for a client based control application. For this purpose the FRAnalyzerPro has a built-in WIN32 COM-API which can be used to remote control all of the main FRAnalyzerPro features from a Windows-based client application. This allows e.g. the automatic start and stop of measurements with generating/exporting trace files for the particular test scenario.

Test of ECUs with the FRAnalyzerPro

The test of ECUs (Electronic Control Units) often requires a point-to-point Flexray network between the ECU to be tested and a second module, which is used as a sync partner sending/receiving signals from/to the ECU.

Using a PC with the FR AnalyzerPro and the TZM FlexCard as a so called

"sync master" is a preferable solution for such a purpose.

Conclusion

The FRAnalyzerPro is a versatile tool for monitoring and control of Flexray systems. Powerful functions and user definable configurations fulfill all requirements for the analysis of modern and complex FlexRay bus systems. Enhanced features are available to solve specific customer requirements occurring during development AND manufacturing process.

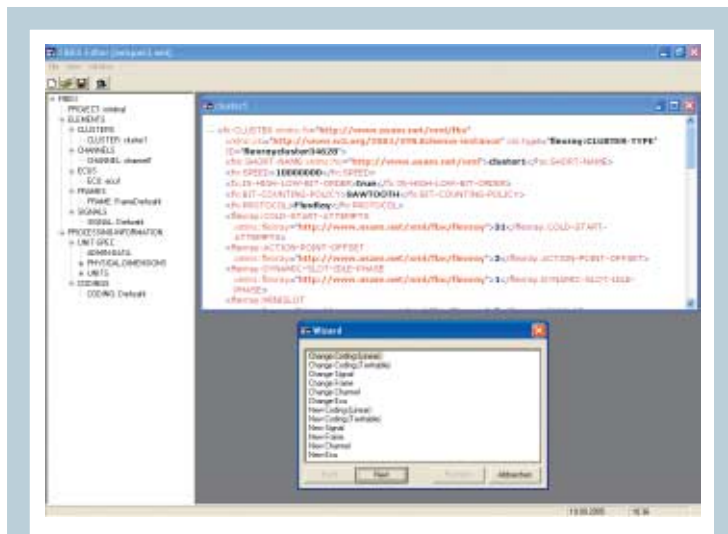


Figure 3: The new FIBEX Editor Plugin of the FRAnalyzerPro.

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se and configures the HW-Interface depending on the cluster parameters found. Adapting and fine-tuning those parameters (e.g. network idle time) is also possible with the tool.

FIBEX Editor Plugin

Because the FIBEX databases are often blown up to several MBs its not quite easy, to modify frames, signals, codings, references etc. in an existing FIBEX database. The FRAnalyzerPro FIBEX Editor Plugin not only allows to change, delete or add some signals in an existing FIBEX database. The FIBEX Editor Plugin allows also the creation of a new simple FIBEX database, which can be used to become familiar with the new FIBEX standard or to define



Dipl. Ing. Thomas Criegee is General Manager at CRST GmbH, Gauting.