CANoe .AFDX

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1   Introduction

AFDX® (Avionics Full Duplex Switched Ethernet) is a communication network based on Ethernet. This system has primarily been used in the aerospace industry to fulfill its increasing bandwidth requirements.

1.1   Overview of Advantages

> Reliable testing of data communications – from simple interactive tests to systematic automated testing

> Automatic generation of test reports

> Easy observation of the data traffic and comprehensive network analysis

> Access to CAN, AFDX and digital or analog I/O with the one and the same tool

1.2   Application Areas

CANoe .AFDX is ideal for testing and analysis of entire AFDX networks as well as individual devices. Regardless of whether raw frames or payload contents are needed – CANoe .AFDX offers powerful analysis functions on all levels. Users quickly reach their goals and always have a clear picture of even complex network topologies.
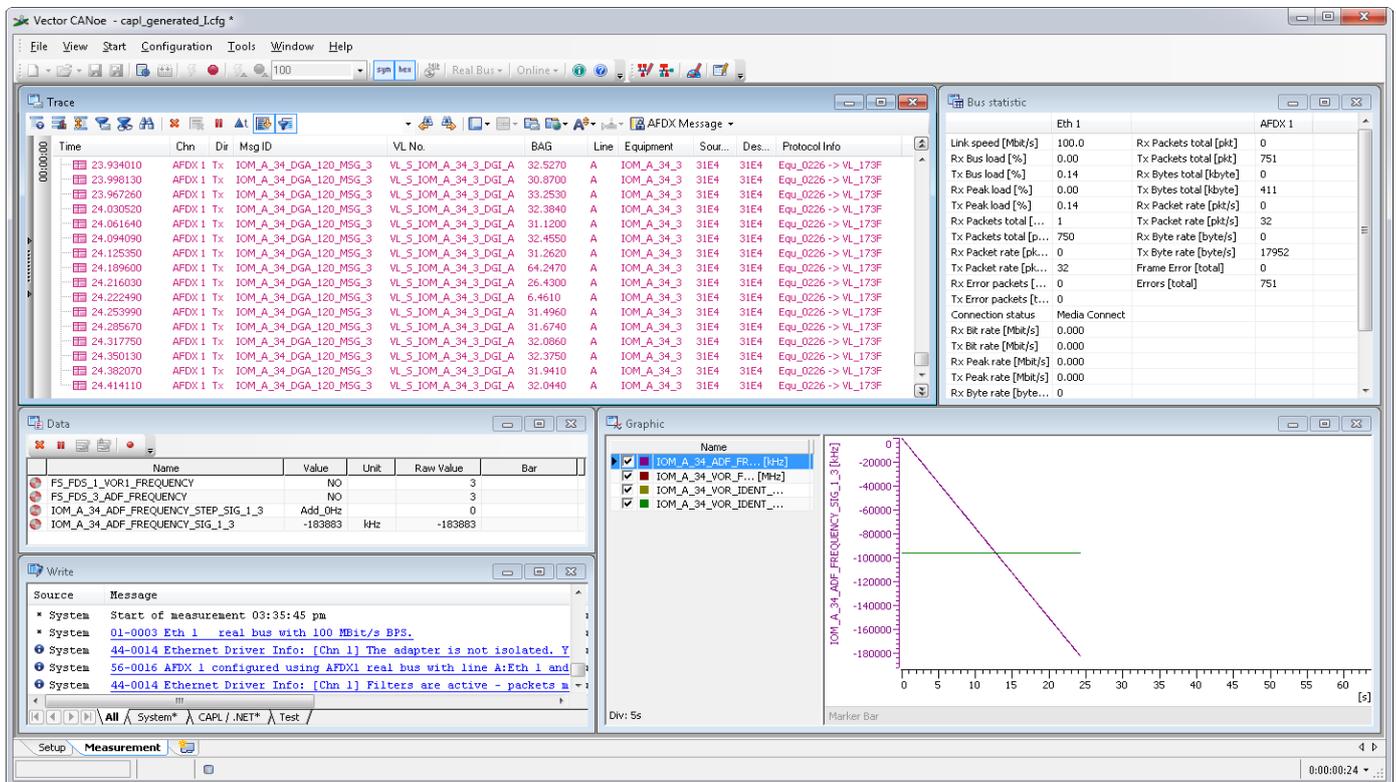

Figure 1: CANoe .AFDX offers detailed access to the exchanged data down to the level of an individual Ethernet frame.

1.3   Further Information

> **Vector Download-Center**
Various documents related to CANoe are available on the Internet. In the Demo version, for example, you get sample configurations for the various use areas and detailed online Help texts, in which all CANoe functions are described. In addition, you benefit from our valuable know-how in the form of technical articles, product videos and application notes.

> **CANoe Feature Matrix**
More information on variants, channels and bus system support is presented in the feature matrix.

2   Hardware Interfaces

CANoe .AFDX utilizes built-in PC interfaces to access AFDX. In addition, a system driver is installed that makes the selected interface exclusively available to CANoe .AFDX. This interface is removed from access by the operating system, and Windows-generated network accesses are prevented.

The compact and high-performance VN5610 Vector hardware is also supported by a 2-channel Ethernet/CAN interface that is connected over USB. This now makes highly precise time stamps available when messages are received.

3   Symbolic Display via Databases

The AFDX communication is described in ICD format. The aircraft manufacturer generally provides its suppliers with relevant description files. To ensure that this information is also usable in CANoe .AFDX, a converter is supplied that converts the ICD files into DBC files. The user adds these DBC files to a CANoe .AFDX configuration, which then enables access to symbolic information.

4   Message Display

The current AFDX message traffic is shown in the Trace window. If databases are available, the display is symbolic and is based on information from the converted ICD files. A Virtual Link is then no longer visualized numerically by its ID, but instead by its name. The display of columns is user configurable, and three preconfigurable column layouts are available for quick switchover. Refined search functions ensure that the user does not lose sight of key information among the large number of messages.
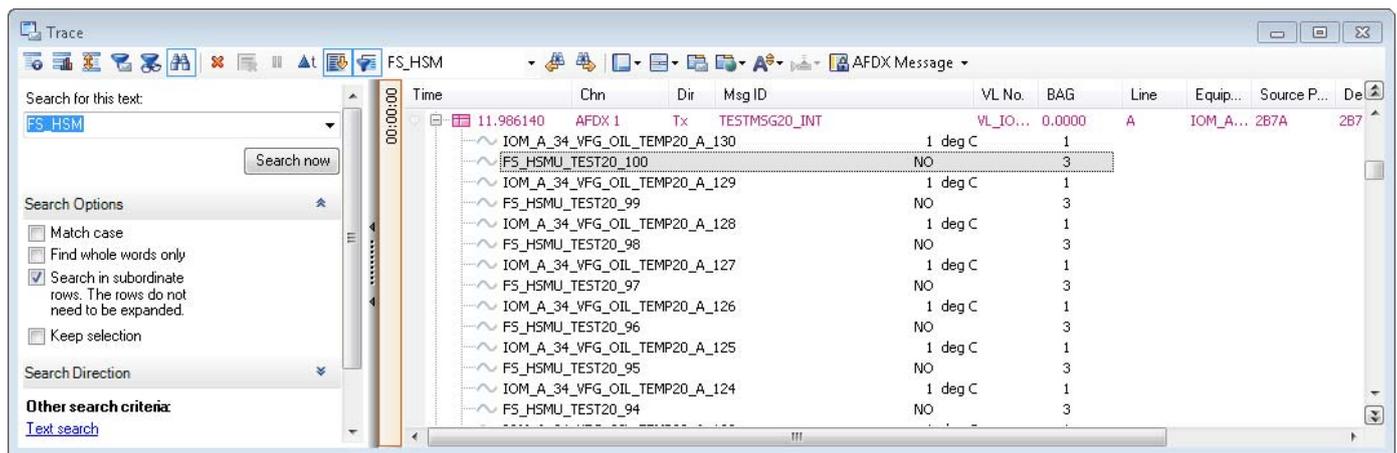

Figure 2: Display of AFDX-specific data in the Trace window. Virtual Links are not only shown as numeric values, for example, but also by their names as specified in the ICD file.

5   Display of Frame Data Sets (FDS)

Signals are transmitted within a Frame Data Set. Also transmitted for each signal is status information that indicates whether the signal is valid. This relationship is also mapped in the conversion of ICD files to DBC format. The signals are only displayed in the Trace window if the Frame Status has the value Normal Operation (NO).

6   Data and Graphic Windows

Of course, signal information can also be displayed in the data and graphic windows. In these windows, signals may be combined into a bar chart or be shown as a signal response over time. That is why CANoe .AFDX considers the relationships within a Frame Data Set.

7   Logging and Replay

Specific data traffic can be logged and saved to files. Complex trigger conditions may be configured to log specific scenarios. It is also possible to play back logged messages via a Replay block.

8   Sending via CAPL

AFDX messages may also be triggered via the integrated CAPL programming language. This gives the user full control over message contents, and it can be used to specifically affect the payload, MAC addresses, IP addresses or ports.

9   Sending via Generator Block

All messages that are defined in an ICD file can be added to a Tx list. Messages are transmitted based on the specified BAG value or when requested. Of course, the data contained in the Frame Data Sets may also be modified in specific ways. To keep the configuration of such a Tx message as simple as possible, you can easily copy it from the Trace window. This gives you an easy and convenient way to stimulate an end system (ES) with different messages.

10   Training

As part of our training program, we offer various classes and workshops on CANoe in our classrooms at Vector and on-site at our customers.

You will find more information on individual training courses and a schedule online at: **www.vector-academy.com**

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