IXXAT®

canAnalyser 3

The powerful tool for testing, development and service of CAN networks

HMS Connecting Devices™

Highlights

- Online viewing of all bus traffic
- Sending of one-off messages or message sequences
- Simultaneous access to up to 64 CAN networks
- Recording of CAN messages with miscellaneous trigger conditions
- Multi-start of modules allows the simultaneous analysis of different functions
- Statistical analysis of message traffic, such as bus load
- Generation of command-controlled sequences
- Easily expandable by including .NET extensions
- Support of CANdb, FIBEX 3 and DIM databases for interpretation and sending of process parameters
- Graphical representation of message content

The canAnalyser is a powerful, multi-purpose analysis tool for the development, test and maintenance of CAN networks. The software package is modular, open and expandable.

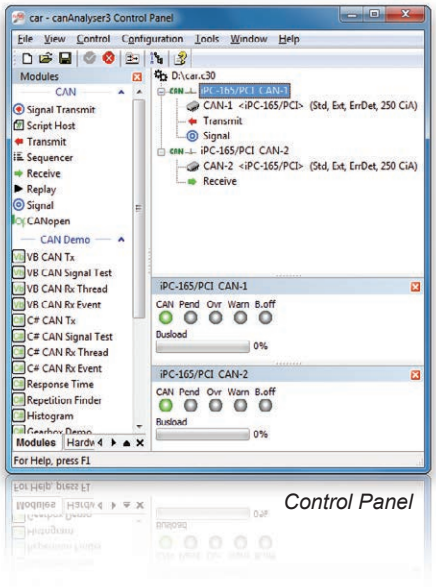
Even the standard configuration of the canAnalyser includes functions that address many applications. Additional application areas are accessible with the optional modules for CANopen, DeviceNet and SAE J1939, or with custom .NET extensions.

Using the powerful IXXAT CAN interfaces, the canAnalyser is able to reliably receive and process in a timely manner CAN messages even when bus loads and baud rates are high.

The flexible configuration, and the ability to multi-start and individually position modules, enable ideal adaptation to the respective analysis tasks of users.

CANopen DeviceNet SAE J1939

canAnalyser 3: The powerful CAN test suite!



Control Panel

The central element of the canAnalyser is the control panel, that presents the comprehensive functions of the canAnalyser in a simple and clearly arranged manner.

Measurement configurations are prepared with drag&drop or with key commands, and shown in a clearly laid out tree structure.

The function modules of the canAnalyser are connected to virtual buses that are assigned to a real CAN controller (IXXAT PC/CAN interface). The virtual buses mean the measurement configuration is independent of the measurement computer and can therefore be copied directly to other measurement computers.

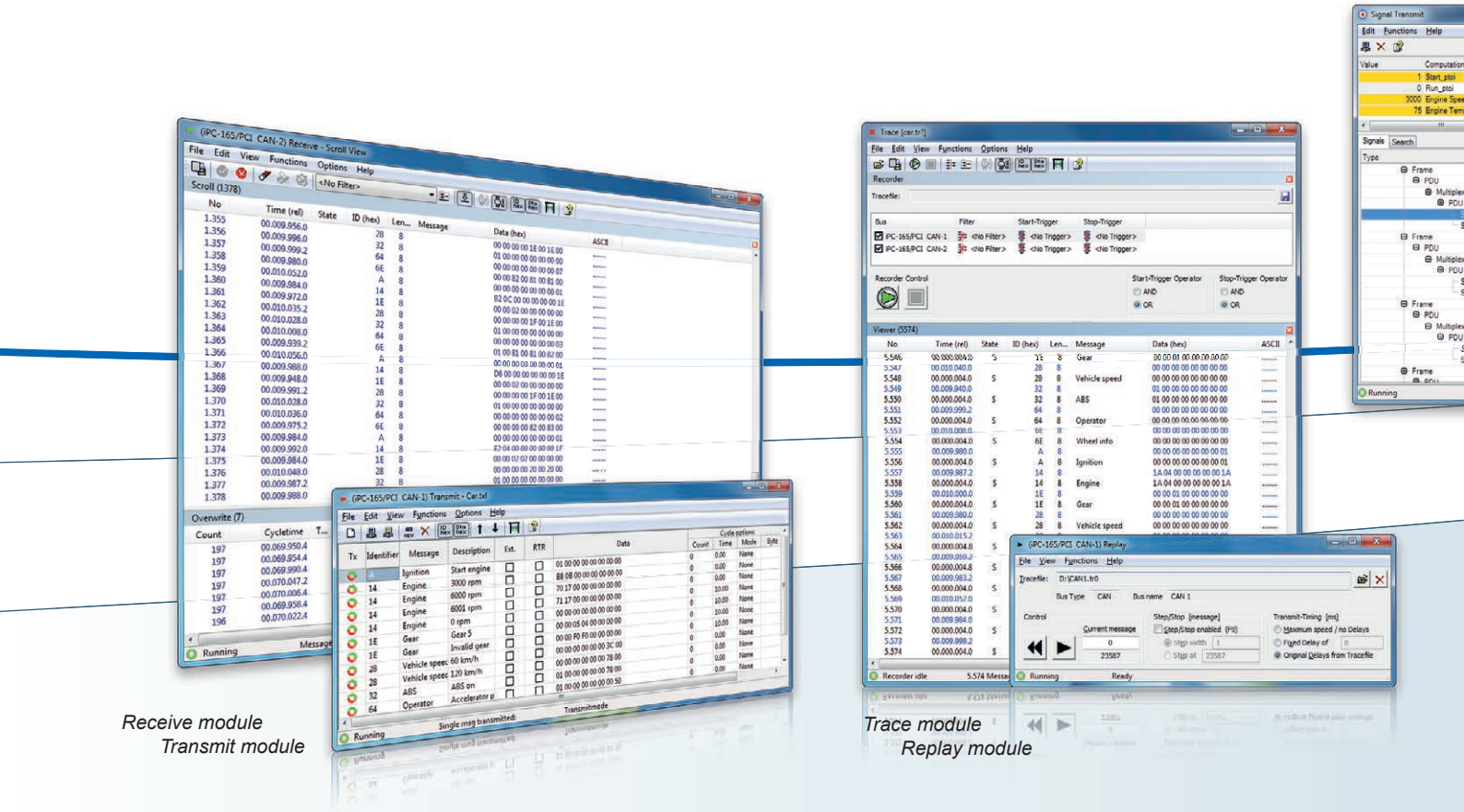
There is complete freedom in arranging function modules on the screen. Adaptation to different analysis tasks is made possible by saving window and module arrangements as layouts. Shortcut keys can be used to switch between the layouts. The generation of layouts is simplified with dockable windows.

Every virtual CAN bus can be assigned one or more databases in CANdb, FIBEX 3 or DIM format. The signal descriptions originating from the databases are used in the receipt direction for interpretation of the process parameters in CAN messages. This renders possible speedy insight into the system status and hence also simple monitoring or error detection. The canAnalyser also uses the databases for the direct sending of signals. Working on more complex networks in particular is simplified greatly because the user needs only to send the signal, and conversion to the relevant CAN telegrams is performed fully automatically by the canAnalyser.

The support of multiple CAN interfaces (multi-board support) means simultaneous, parallel access to up to 64 independent CAN channels is possible.

Variations and functions

Functions	Module	canAnalyser Lite 3	canAnalyser Standard 3
Measurement configuration			
Supported CAN controllers		1	64
Number of function modules per CAN controller (multi-start)		each one module per function	unlimited
Transmission			
Transmitting messages in CAN layer 2 format via broadcasting lists (one-off/cyclic)	Transmit	X	X
Transmitting signals based on underlayed databases	Signal-Transmit	-	X
Transmitting sequences in CAN layer 2 format using simple commands for transmission control	Sequencer	X	X
Reception and display			
Receive messages and online display in CAN layer 2 format (overwrite/scroll)	Receive	X	X
Signal reception and interpreted online display based on underlayed databases (overwrite/scroll)	Signal	up to 5 signals	X
Graphical display of received signals over the time axis	Signal	up to 5 signals	X
Display of statistical values (e.g. bus load, number of error frames)	Signal	X	X
Logging of value range overflows	Signal	X	X
Graphical display of frequency distribution of received messages	Histogram	X	X
Recording/Playback			
Recording on hard disk for later analysis, including filter and trigger functions	Trace	X	X
Playback of recordings on the CAN bus and/or modules for analyzing	Replay	X	X
Adaptation and Extension			
Easy development of own measurement and analysis functions using C# and Visual-Basic .NET scripts	Scripting-Host	X	X
Open interface for expansion by customer-specific modules (.NET modules)	customized	X	X
Higher Layer Protocols			
Interpretation and display of received messages according to the CANopen standard (overwrite/scroll)	CANopen	optional	optional
Interpretation and display of received messages according to the DeviceNet standard (scroll)	DeviceNet	optional	optional
Interpretation and display of received messages according to the J1939 standard (overwrite/scroll)	SAE J1939	optional	optional



canAnalyser function modules

The function modules of the canAnalyser 3 have been aligned to the most diverse of application scenarios with many new functions:

Different analysis functions are combined in the Signal module for example – meaning network data (such as bus loads and fault telegrams) can be analysed at a glance with process parameters or other signals. The statistics functions have been extended further and complimented with the addition of new modules for the provision of even more detailed information (such as the Histogram module).

The flexibility of the software package as a whole is unique – it enables different function modules to be modified directly in the integrated Scripting Host, and to be aligned exactly to the respective application scenario.

Transmit module

Online stimulation

The Transmit module enables simple sending of CAN messages from a freely definable message table. The messages can be sent as one-off messages or cyclically. Flexible definition of cycle times is possible for cyclic messages. As an option, identifiers or data content can be incremented automatically on every transmit process.

Receive module

Online analysis

The Receive module is used to display Layer 2 CAN messages being sent over a CAN bus. Messages for display can be selected with filters. Either a scroll or overwrite view is displayed. Cycle times and other statistical information are captured and displayed in a clearly laid out manner.

Trace module

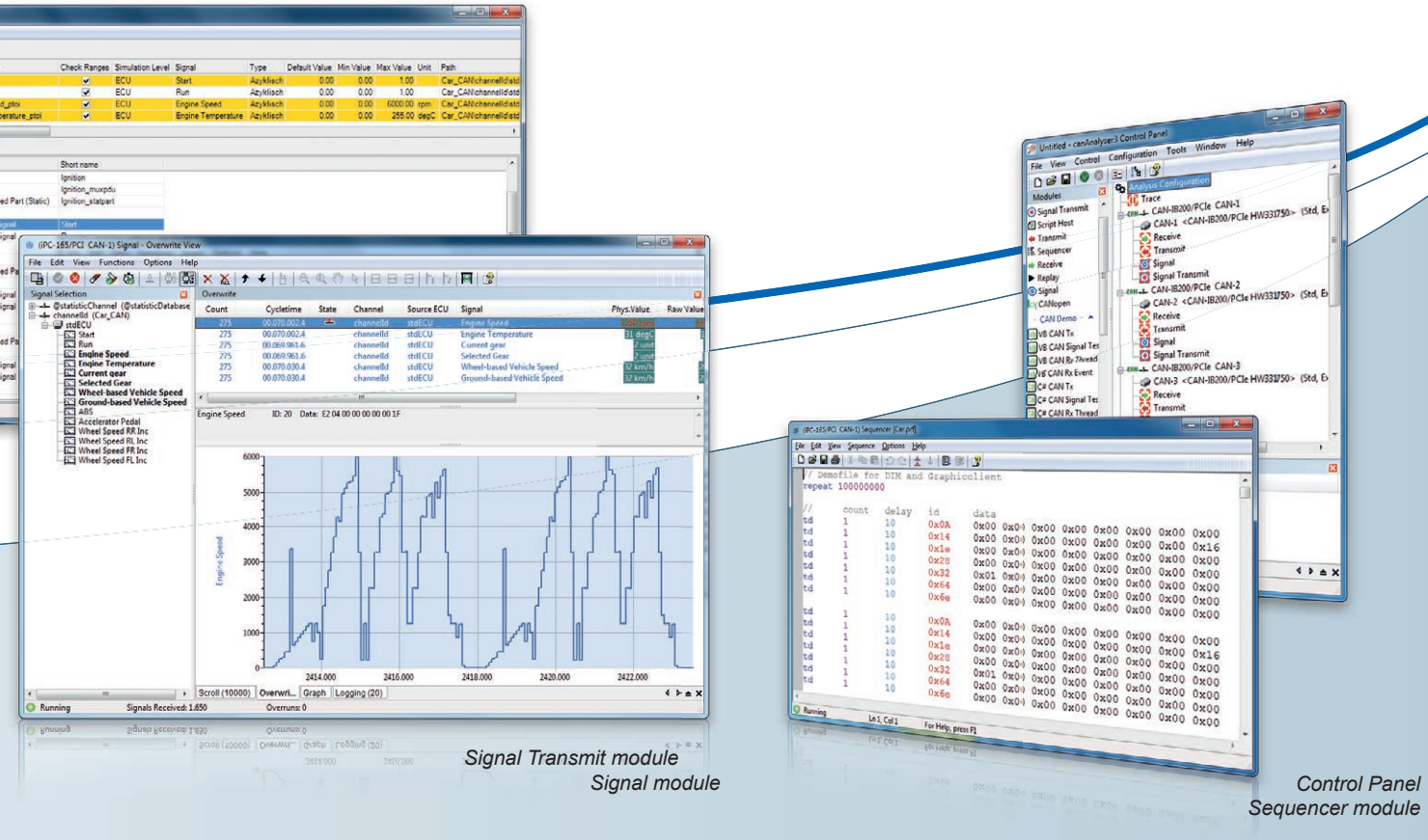
Offline analysis and data recording

The Trace module enables offline analysis of your system by recording all messages and error frames received on up to 64 independent CAN buses. The start and stop times for a recording can be set with trigger conditions and the messages to be recorded can be selected easily using filters.

Replay module

Online and offline analysis

The Replay module can be used in online and offline mode. In online mode, CAN messages recorded in a trace file are output to the CAN network connected. In offline mode, messages recorded in the trace file are distributed to all virtual CAN bus modules. This renders possible detailed analysis of recordings without the need for a real CAN network.



Signal Transmit module
Signal module

Control Panel
Sequencer module

Signal module

Online analysis of signals and statistics

The Signal module is used for the symbolic and graphical interpretation and display of process parameters and statistical values sent. CAN messages are interpreted on the basis of the database defined. Information can be displayed in Text mode or in a graph view.

In the graph view, information is shown on a time axis. Information is shown in real-time, with a maximum of 15 signals distributed to up to 4 time axes for each graph window. The current value of a signal is also shown numerically. Specific values can be determined using measurement bars. The integrated display of process parameters and statistical values (such as bus load and number of fault telegrams) simplifies the analysis of complex networks, for faultfinding in particular.

Signal Transmit module

Online stimulation on signal level

An experimental set-up can be stimulated online with process parameters using the Signal Transmit module. For this, one or more signals stored in a database are sent over the bus. Signals are selected from a user-friendly database view with powerful filter options. Signals are changed from a signal table, with defined thresholds and interpretation rules taken into account.

Sequencer module

Online stimulation

During the development of equipment, the Sequencer module enables protocols and entire system scenarios to be tested by sending message sequences. Equipment not available can also be simulated. With just a few simple commands, message sequences are created quickly using an integrated Editor, and are run at the press of a button.

Scripting Host module

Dynamic online stimulation and analysis

In addition to the development of autonomous .NET modules, C# and VB scripts can be integrated directly into the canAnalyser. In the Scripting Host, a powerful interface is available that marries the benefits of graphical Windows programs and the flexibility of scripts. The canAnalyser can be adapted quickly and easily to specific measurement and analysis tasks with the Scripting Host, enabling equipment and protocols to be simulated and existing devices to be tested in the dynamically simulated Restbus.

Statistics scripts

Advanced online statistics

The canAnalyser includes various statistics modules that are available as compiled module variants and source code, and that can therefore be adapted quickly to the respective measurement configuration. The Statistics modules and scripts include functions for determining frequency distributions, repeat times and information on response/run-times.

.NET

Programmability

The .NET interface provides users the ability to extend the canAnalyser with the addition of their own modules.

User interfaces with system-specific analysis functions can be created for example. Alternatively, other tools can also be linked in, with the canAnalyser serving as the basis for a comprehensive system test tool.

To make the creation of in-house modules as simple as possible, the canAnalyser includes different descriptive examples – in the form of source code and directly executable modules.

If you do not have at your disposal at short notice the development capacity for your own function modules, we would be glad to realise them as part of a customer project.

Application areas

Device development

The following steps are important in the development of a controller:

- Coding of functionality
- Start-up and initial tests
- Simulation and automated tests

The canAnalyser offers valuable benefits in start-up, simulation, testing and faultfinding in particular – in the implementation of a controller for connecting two CAN networks, the canAnalyser is used for example for the testing of implementation rules.

Implementation and start-up
A working network is simulated by the canAnalyser during start-up of the controller. For this, IXXAT CAN interfaces are used to connect two defined virtual CAN controllers to the controller to be tested.
To test message routing, Transmit modules are started that send cyclically messages that are then transferred to the „other“ bus by the controller. Messages with ascending IDs can be sent with Identifier mode. This enables implementation rules to be tested easily.
A system-wide timestamp is used for the correlation of messages belonging to each another.

To test signal transmission by sensors and actuators, the signals and associated CAN telegrams used in the system are combined into a database.

Signal-processing modules are used for further investigations:

- The Signal module shows the decoded signals – also graphically depending on view.
- The Signal Transmit module enables messages to be grouped together, to easily test the signal processing of the controller.

Simulation and automated tests
If a network is to be operated without all controllers being available, simulation of the missing bus traffic is required. Cyclic messages sent via the Transmit module are adequate for this in the simplest case. More complex processes can be simulated using the Sequencer module. A .NET module can be used for simulation if the functional scope available is not adequate.
This means exchange of messages is possible, as is reaction to relevant messages. This also renders possible automated testing of the controller communication interface (conformance test).

Apart from its use for analysis and error detection, the canAnalyser 3 provides enormous benefits in the simulation of network components with the new, extended signal support.

Thomas Waggershauser
IXXAT, Product Marketing Manager

Network analysis

The canAnalyser enables detailed information on systems networked via CAN to be gained very quickly – this is particularly important when systems are not working as they should.

No system influence
The transmit path of the IXXAT CAN interfaces can be disabled to prevent the network under investigation being influenced by the canAnalyser. This also prevents the sending of Acknowledgement bits.

Locating fault sources
The canAnalyser provides the appropriate function blocks for locating different fault causes. The Receive modules show all messages and fault telegrams sent over the CAN, and provide access to the data content and fault codes of messages received. Highly accurate timestamps are useful in the analysis for investigating the behaviour over time of the network – such as when ascertaining whether cyclic messages are sent regularly and at the correct time. Timestamp synchronisation and the filter functions enable quick access to a range of system statuses at a defined point in time.

The combining of bus load and number of fault telegrams, together with process parameters relevant to the system, enables quick checking of whether a system is proving problematic due to external factors. Fault telegrams occurring under certain operating conditions can point towards the fault cause – such as inadequately secured data cables ultimately resulting in contact problems, causing CAN faults due to vibration at a certain drive speed.

Sporadic faults
Problems do not always occur often enough for them to be reproduced reliably. In many scenarios, the only solution is to capture all of the bus traffic up to the point of the problem occurring, and then to determine the cause using offline analysis. The Trace module enables already prefiltered bus traffic recordings to be run. These can then be sent to the modules with the Replay module online over an existing bus, or offline.

Extensions for higher-layer protocols

DeviceNet module (optional)
Online analysis of DeviceNet networks

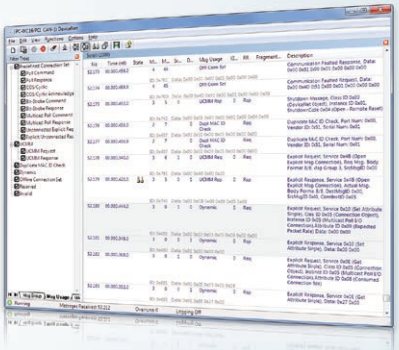
Together with the DeviceNet module, the canAnalyser becomes a powerful tool for the interpretation and display of CAN messages in line with the DeviceNet standard.

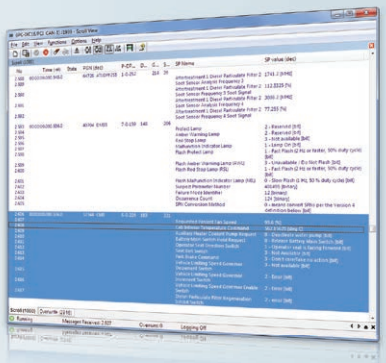
J1939 module (optional)
Online analysis of SAE J1939 networks

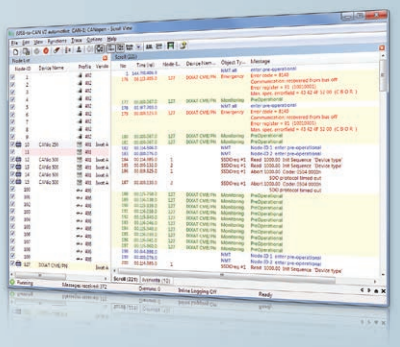
The J1939 module supports all definitions specified in the SAE J1939 standards. It is also possible to add your own signal definitions. This enables comprehensive analysis of SAE J1939 networks and the standards built upon them.

CANopen module (optional)
Online analysis of CANopen networks

The CANopen module represents received Layer 2 messages in line with the CANopen standard. Layer 2 messages are interpreted by importing device description files (EDS, DCF and XDD files), with profile assignment, with an integrated online network scan or manually.







HMS Industrial Networks

The canAnalyser 3 from HMS Industrial Networks enables simple analysis of CAN networks as well as stimulation of equipment and entire systems. Together with the IXXAT CAN interfaces, it therefore lends itself perfectly to the development of CAN devices, faultfinding in CAN systems and mobile access for maintenance and configuration work. HMS' knowledgeable staff along with distributors and partners in over 50 countries worldwide, are there to help you and your business increase productivity and performance while lowering cost and time to market.

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