Product Information
CANalyzer.CANopen
# Table of Contents

1. Introduction ........................................................................................................................................... 3  
1.1 Overview of Advantages .......................................................................................................................... 3  
1.2 Features .............................................................................................................................................. 3  
1.3 Hardware Interfaces ............................................................................................................................... 4  
1.4 Further Information ............................................................................................................................... 4  
2. Supplied Components and Functions ............................................................................................................ 4  
2.1 Differences to CANoe.CANopen ................................................................................................................. 5  
3. EDS Formats ........................................................................................................................................... 5  
4. Communication Monitoring ........................................................................................................................ 5  
5. Analysis ................................................................................................................................................. 5  
6. Interactive Generator Block CANopen ........................................................................................................... 6  
6.1 Graphical Representation ........................................................................................................................ 6  
7. Object Directory ....................................................................................................................................... 6  
7.1 Creating and Changing Objects ................................................................................................................. 6  
7.2 Checking of EDS files and configured PDOs: ................................................................................................. 7  
7.3 SDO Accesses ........................................................................................................................................ 7  
8. Network Management ............................................................................................................................... 7  
9. Configuration Saving in the Network ............................................................................................................ 7  
10. Training ................................................................................................................................................. 7

---

**Documentation Note**

Valid for CANalyzer.CANopen from Version 8.1.

This document presents application areas and functions of Option .CANopen for CANalyzer.

CANalyzer.CANopen expands standard CANalyzer functionality. You will find product information and technical data on basic CANalyzer functions in separate documents.

Please consider the environment before printing this document.

V1.0 May/2013
1 Introduction

CANopen® is an open, CAN-based communication protocol. Its wide range of application includes areas such as transport and control technology, measurement systems, medical technology, railway technology, maritime applications, and much more – in short everywhere a great amount of flexibility and rapid data transmission are in demand. The specification drew from the experience of several component manufacturers and users, resulting in a well established standard that is maintained by the CAN in Automation (CiA®) user organization.

The primary application for the CANopen Option for CANalyzer is the development of CANopen systems. In this environment the tool is primarily used to analyze and stimulate the CANopen-specific message traffic on one or more CAN buses.

1.1 Overview of Advantages

> Integrated configuration, analysis, simulation and test tool from a single source
> Support of commonly used CANopen standards
> Convenient interpretation of the bus traffic by protocol descriptions and color differentiation of CANopen services
> Automatic generation of a CAN database using EDS files
> Abstracted configuration of PDOs by graphically linking process data
> Easy dialog-based access to CANopen device parameters
> Logging of the CANopen bus traffic with later offline analysis

1.2 Features

CANalyzer’s powerful functionality together with the functional expansions for CANopen gives you a tool that can be used both in the development of CANopen systems as well as their startup and maintenance. CANalyzer.CANopen Option makes high-performance, CANopen-specific functions for analysis and configuration available to the developer. This is a prerequisite for reliable and efficient interaction with CANopen networks.
1.3 Hardware Interfaces

CANalyzer.CANopen is available for all current hardware platforms of Vector.

1.4 Further Information

- **Vector Download Center**
  Various documents related to CANalyzer 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 CANalyzer functions are described. In addition, you benefit from our valuable know-how in the form of technical articles and application notes.

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

- **CANopen Forum**
  In the CANopen Forum, general questions are discussed that relate to the theme of CANopen and the free CANeds EDS editor tool that is available.

2 Supplied Components and Functions

Along with the base tool CANalyzer, CANalyzer.CANopen also contains the ProCANopen configuration tool and the CANeds EDS editor. CANalyzer.CANopen extends basic CANalyzer functionality as described in the following.

- Configuration of CANopen devices
- Interactive access to CANopen devices
- Interpretation of CANopen messages
- Interactive generation of CANopen messages
- Creation and testing of EDS files
> Protocol-specific representation in the Trace window  
> Protocol monitoring  
> Graphical representation of devices  
> Network management, guarding, heartbeat  
> Setting the baud rate and node ID via Layer Setting Services  
> Use of the CiA standard file formats EDS/DCF

2.1 Differences to CANoe.CANopen

CANalyzer.CANopen offers the same analysis functions as CANoe.CANopen. However, you can also use CANoe.CANopen to create CANopen simulation models or generate them at the press of a button based on the device descriptions (EDS files). In addition, CANoe.CANopen lets you create and execute CANopen-specific tests. For more information on CANoe.CANopen, please refer to the separate product description.

3 EDS Formats

CANalyzer.CANopen uses the standardized file formats EDS and DCF to store and to exchange data. Both the conventional INI format and XML format specified in CiA311 are supported.

4 Communication Monitoring

In a Trace window the CAN message traffic is displayed while simultaneously interpreting the protocol information it contains. The user not only sees the service that is currently being executed, but can also see all relevant service parameters at a glance. This information is displayed in clear text. To simplify analysis, CANopen services are distinguished by different font and background colors. It gives the user a quick overview of the chronological order of individual protocol sequences for the observed CANopen services thereby making it significantly easier to localize errors in a real system.

CANalyzer.CANopen also monitors for the correctness of individual protocol sequences. This involves detection of whether the protocol information contained within a protocol sequence is properly entered in the CAN message. To ensure that the described device information is also available in CANalyzer.CANopen, ProCANopen automatically converts the standardized EDS files into a CAN database. All you need to do is add the desired EDS files to a ProCANopen project and, at the press of a button, you generate a CAN database and link it in a CANalyzer.CANopen configuration. Messages or process data can then be accessed symbolically in CANalyzer.CANopen.

5 Analysis

Not only is the Trace window provided for the analysis of CANopen data traffic, but also the familiar Data and Statistics windows of the standard version of CANalyzer. The CANopen Scanner evaluates CAN messages and shows the active nodes in a list. Other node-specific information is also output, such as the node state and device name.

Figure 2: Color highlighting of CANopen services in the new Trace window accelerates bus analysis.
6 Interactive Generator Block CANopen

Dialog-based creation of CANopen-specific message sequences is offered. From a project-specific list of existing messages, you select and configure the desired messages (PDOs, SDOs, etc.) and assemble them into a sequence. The sequence can be replayed once or periodically. This means that message sequences can be sent to the connected devices as often as desired.

![Image Description](image_url)

Figure 3: Convenient and clear module configuration with the aid of interactive device access.

6.1 Graphical Representation

The individual devices of a CANopen network are shown in a summary graphic that shows each device’s name, Node-ID, and optionally a bitmap. They can be combined into groups, for example to represent their functional relationship to one another.

It is easy to read-in a network that already exists. This involves reading objects from the object dictionary and comparing them to existing EDS files. The assignment of an EDS file in a real device in the network is performed automatically. If no EDS is available the objects existing in the object dictionary are found and displayed according to their device type. Modular devices are also supported.

7 Object Directory

The object directory for an individual device is shown in a tree structure that is structured as a function of user inputs. The objects to be shown are taken from the EDS file for the relevant device. Attributes are shown for each individual object in an easy to read format. It is easy to read-out and modify device parameters that are mapped into a device by object dictionary entries. This is how the user can configure necessary settings in a device. In the modification of PDO parameters the access dialog considers the access order specified by the DS301 communications profile.

If no EDS file exists for a device, it is still possible to access the object dictionary by a special dialog. Changes to device parameters are stored separately for each device in a Device Configuration File (DCF).

7.1 Creating and Changing Objects

Unfortunately it is often the case in practice that existing EDS files for devices are incomplete. CANalyzer.CANopen therefore makes it possible to create new objects or to assign the correct attributes to existing objects. However such changes do not modify the original EDS file, rather only the DCF.
7.2 Checking of EDS files and configured PDOs:
EDS files can be tested with the built-in EDS Checker. This is the same test program that is also used for the CANopen Conformance Test. Additionally, a check is also made to determine whether PDOs can be configured as they are specified by attributes in the object dictionary.

7.3 SDO Accesses
Access to the object dictionary is generally performed by the SDO (Service Data Object). Besides the “Expedited” transfer mode, CANalyzer.CANopen also supports “Segmented” and “Block” modes. Objects of any size can be transmitted by SDO.

8 Network Management
The communication states of connected devices can be influenced by certain NMT commands. Guarding or Heartbeat messages are used to evaluate a node’s state.

9 Configuration Saving in the Network
CANalyzer.CANopen supports central saving of all configuration data in a CANopen Manager. This involves sending the configuration data from the individual DCFs to the object dictionary of the CANopen Manager. The “Concise Format” defined by CiA is used for this. When the CANopen system is started the CANopen Manager then uses these configuration data to configure each individually connected node.

For CANopen devices that save changes internally in the object dictionary, it is possible to work with the predefined memory commands “Store” and “Restore”. These commands cause a CANopen device to save the configuration and restore default values, respectively.

10 Training
As part of our training program, we offer a range of classes and workshops on CANalyzer and CANopen in our classrooms and on-site at our customers.

For more information and the dates of our training courses, please visit our website www.vector-academy.com
Get more Information!

Visit our Website for:

> News
> Products
> Demo Software
> Support
> Training and Classes
> Addresses

www.vector.com