

ProCANopen 6.0

Project Planning Tool for CANopen Networks

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

Features and Advantages

ProCANopen enables the efficient and quick planning of complete CANopen networks as well as devices. The user is supported in all project phases, including planning, development, start-up, and service. Through the extensive functions, combined with an intuitive user interface, the user can concentrate immediately on the definition of the system parameters. ProCANopen executes the concrete and CANopen-conforming implementation of projects automatically. This significantly reduces the configuration effort required for extensive systems. The quality of the configuration thus created is increased, which in turn increases security on the system.

Functions

ProCANopen offers many functions. It is oriented towards the process of planning CANopen networks. Specifically, its tasks are:

- > Structuring the task
- > Device selection/Device design
- > Definition of process data
- > Definition of communication parameters
- > Definition of device parameters in the object directory
- > Comparison of the data with programming environment for programmable devices and masters, IEC61131, ASAM-GDI
- > Generation of additional export formats
- > Download of project data and start-up
- > System analysis and customer service
- > Documentation

The most important functions will be described in detail below.

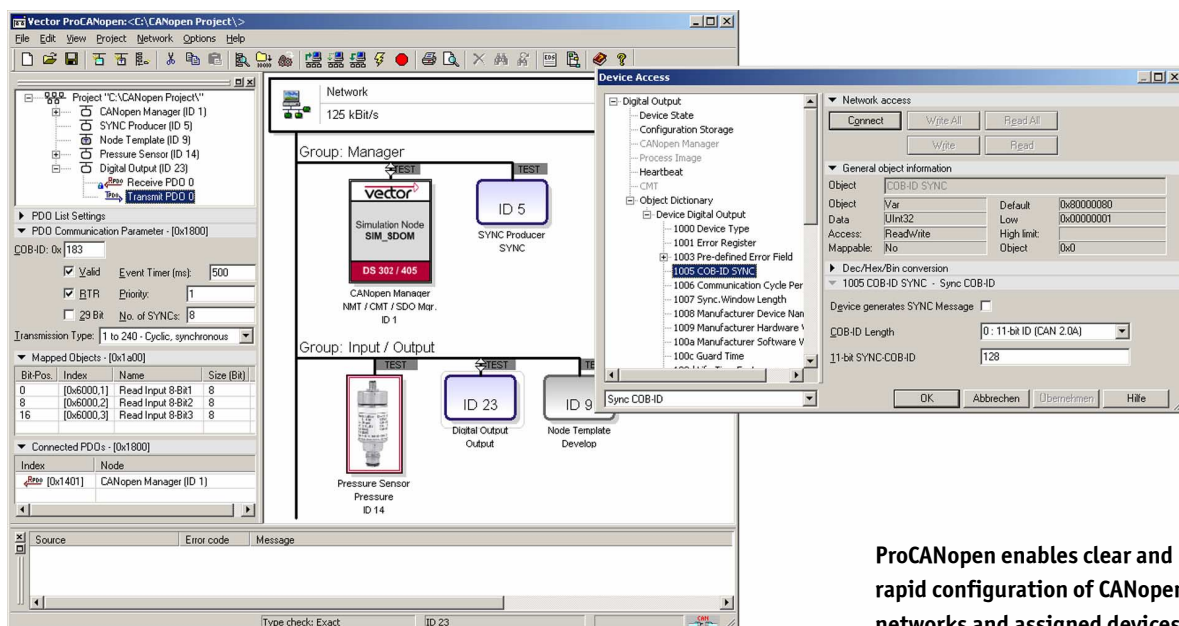
Application Areas

ProCANopen is used for the planning of CANopen networks. Additional areas of application are:

- > Test tool during development: With interactive configuration and setting of parameters, the functionality of devices can be tested.
- > Start-up and programming of devices
- > Start-up of CANopen networks and diagnostics

Hardware Interfaces

ProCANopen contains an open CAN interface for connecting to CANopen networks. Drivers are available for all current Vector cards.



ProCANopen enables clear and rapid configuration of CANopen networks and assigned devices

Structuring the Task

After analysis of the automation task the system can be structured from different perspectives. At that point the question of system architecture must be answered. For example, is the system to be set up as a simple master slave system, or would a multi-master architecture with decentralized intelligence offer advantages? ProCANopen lets the user organize a system by supporting the formation of groups. These groups can be used to display function groups, but also to view topological features.

Device Selection

In the next step, the devices necessary in the system are selected, taking into consideration their function in the system and displayed graphically.

Devices are always selected by their EDS file. The user can expand the list of available EDS files as desired. Using these standardized device descriptions in CANopen (in ASCII) guarantees independence of manufacturer-specific formats.

Names, node ID, and a textual description can be assigned to the selected nodes. The task of the respective node is thus defined and documented exactly. The use of modular devices is also supported, this makes it easy to insert or remove modules. The comparison of the corresponding object directories is performed automatically. In addition, it is possible to assign a bitmap file to each node. These bitmaps are then displayed in the topology window

Device Design

Devices that do not exist yet and therefore must first be developed are already considered in the system design. ProCANopen represents the devices as node templates. Such a template can be understood as a CANopen device with the maximum number of PDOs. The system developer now defines which data of the device to be developed should be made available to other devices via the PDOs. This just requires specifying the device's object directory using CANeds, the EDS editor that is supplied with the ProCANopen product.

Definition of Process Data

ProCANopen supports the assignment of symbolic names to process data. Incomprehensible designations such as "Node 3, Object Index 6000H, Subindex 3" can thus be replaced by easily understood names such as "Emergency Off" or "Contact Pressure". This makes it significantly easier for the user to work with the process data and greatly reduces the danger that the user will connect devices incorrectly.

Symbolic variable names can be used throughout ProCANopen. The variable names can be administered precisely as they have been declared in an external program, for example an IEC1131 programming environment.

New Features of Version 6.0:

Reworked interface for device access

> In device access a detailed view is now available for all objects with substructures. This simplifies the input of configuration information considerably. If limit values are specified for an object in the EDS, the input value is compared to these limits.

Configuration of CANopen Safety

> ProCANopen now offers a dialog used to help configure communication per DS 304 (Framework for Safety-Relevant Communication). If a device has SRDOs (Safety Relevant PDOs), they can be configured.

Definition of Communication Parameters

Network-wide parameters such as the baud rate or settings for SYNC messages are administered centrally.

One of the main tasks of ProCANopen is the convenient generation and clear display of communication channels. Network nodes can be controlled by dialog or linked graphically. In the case of a graphical link, the desired nodes are selected with the mouse. A graphical display appears of all process data for these devices. They can be connected directly with the mouse (see figure).

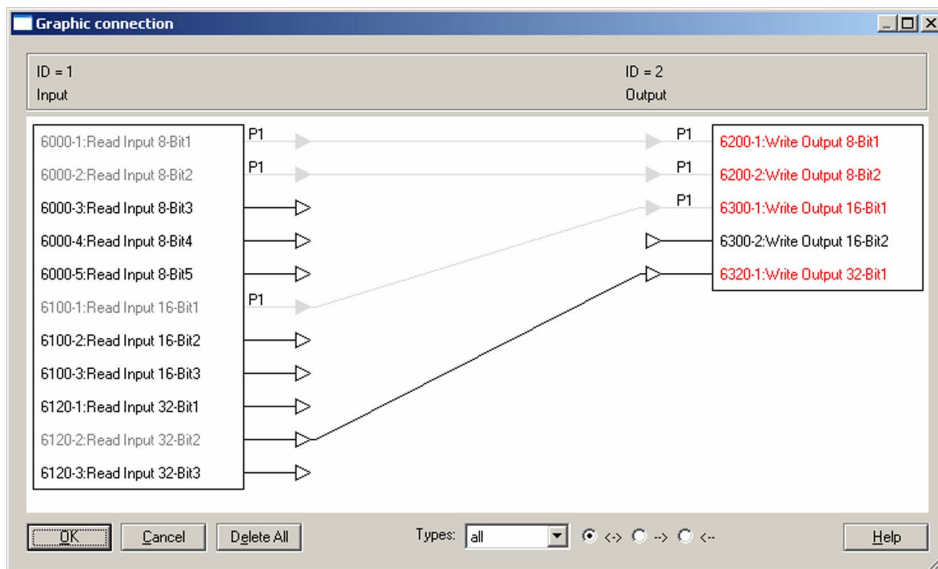
ProCANopen automatically performs the implementation of these links to the corresponding CANopen mapping tables. There is no need for the user to become involved in the complex interconnections and details of these tables. ProCANopen generally makes standard settings that can be used universally for attributes and connections such as priority and transmission type. If necessary, these settings can be conveniently changed.

Configuration of Parameters

Many devices offer the configurability of a series of application parameters – for example limit values for analog I/Os or edge parameters for drives. ProCANopen allows for direct access to all device parameters via the CANopen network. The parameters can be read, modified, or written back.

A tree structure that is laid out according to user inputs represents the object directory for an individual device. The EDS file specifies the objects for the specific device. ProCANopen displays the attributes of each individual object in an easy to read format. Device parameters that are mapped to a device by object directory entries can easily be read-out and modified here. This enables the user to configure necessary settings in a device. In the modification of PDO parameters the access dialog considers the access sequence defined by the DS301 communication profile.

If no EDS file exists for a device, it is still possible to access the object directory by a special dialog. Changes to device parameters are saved separately for each device in a Device Configuration File (DCF). Unfortunately, in practice it is often the case that the EDS files for devices are incomplete. Therefore ProCANopen lets the user create new objects or assign the proper attributes to existing objects using CANeds that is supplied with the product. EDS files can be checked by the integrated EDS Checker. This is the same test program that is also used for conformity testing of a CANopen device.



The linking of process variables is easy to realize with the aid of drag & drop and is displayed clearly

Training

As part of our training program, we offer a range of classes and workshops on CANopen in our classrooms and on-site at our customers. For more information and the dates of our training courses, please visit our homepage on the Internet at:

www.vector-academy.com

Generation of Additional Export Formats

In particular, generating a concise data format for the Configuration Manager (CMT) is supported both in ASCII and in binary format and by generating ANSI-C source code.

Network Management

Configuring and testing the error control capabilities of the device: Guarding can be started and stopped at any point, or it can even be run in parallel for multiple nodes. NMT commands can be executed to monitor the device status. This makes it possible in turn to set device states. Guarding is then used to obtain a return message indicating the state that was actually achieved. Certainly the heartbeat message can be controlled instead of the guarding.

Download of Project Data and Start-up

ProCANopen saves all project planning data in standardized file formats (DCF). This ensures compatibility with other software packages. In addition, ProCANopen allows for direct download of all data onto the individual devices of the network.

Master functions integrated into ProCANopen such as starting individual nodes and booting the entire network make it possible for the user to start up a system quickly and reliably.

System Analysis and Customer Service

High-performance export features make it possible to export all important data from ProCANopen. In external programs such as CANoe.CANopen, network-wide system analyses and simulations can be carried out. Customer service can thus gain access to all important information such as the current process values.

Documentation

Complete documentation is an extremely important component of project planning. ProCANopen offers a print function for printing out documentation on paper. Export functions make it possible to transfer project planning data to other programs, for example text processing or spreadsheets, where it can be further processed.

Add-on Functions

ProCANopen contains a wealth of functions that relieve the user of workload. In particular, existing networks can be read, reconfigured, or compared with a scan function.