CANopen Architect EDS
User Manual

Manual Revision 1.00

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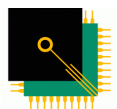
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About This Manual

This manual follows some set conventions with the aim of making it easier to read. The following conventions are used:

0x	Hexadecimal (base 16) values are prefixed with "0x".
italictext	Replace the text with the item it represents
[ ]	Items inside [and] are optional
a | b	a OR b may be used
…	One or more items may go here.

This manual frequently uses CANopen terminology as defined by the CANopen standard DS301 (see www.can-cia.org for more info). Readers that are not yet familiar with all the CANopen terms may want to consider reading a book like www.canopenbook.com or the official standard to update their knowledge on CANopen technology and terminology.

Chapter 1 – Introduction

1.1 About CANopen

CANopen is a higher layer protocol that runs on a CAN network. The CAN specification defines only the physical and data link layers in the ISO/OSI 7-layer Reference Model. This means that only the physical bus and the CAN message format is defined, but not how the CAN messages should be used. CANopen provides an open and standardized but customizable description of how to transfer data of different types between different CAN nodes. This allows off the shelf CANopen compliant nodes to be purchased and plugged into a network with the minimum of effort. It also can be used in place of an in-house proprietary higher layer protocol development.

The development of CANopen is supervised by the CAN in Automation User's Group and is being turned into an international standard. Use of CANopen does not require the payment of any royalties and the specification may be expanded or altered to suit if closed networks are being developed.

Typical applications for CANopen include:

- Commercial Vehicles
- Medical Equipment
- Maritime Electronics
- Building Automation
- Light Rail Systems

1.2 About CANopen Architect EDS

Electronic Datasheets (EDS) are files which describe the capabilities of CANopen nodes, and are therefore central to CANopen. EDS files are most commonly used when CANopen modules are sold or made available to third parties. They provide a standardized and easy to use format for describing how CANopen nodes can be integrated into networks. They can also serve as an in-house documentation of the node.

CANopen Architect EDS allows quick and easy generation and editing of EDS files. Files can be built from scratch or based on one of the versions in the included library. The user interface presents the contents of the EDS file in a tree view, allowing quick and easy editing of any aspect.

CANopen Architect EDS also supports the creation and editing of Device Configuration Files (DCF). DCFs are the same as EDS files but contain real settings from a specific node. Unlike many other EDS editors, CANopen Architect EDS supports the editing of data that is specific to DCFs.

CANopen Architect EDS supports the use of third party EDS checkers, including a free checker available from the CAN in Automation Users Group. EDS checkers validate the EDS files and provide error and warning information.

1.3 CANopen Architect EDS Features

The following is a list of features in CANopen Architect EDS. The list is not exhaustive by any means, but does give a good overview of the abilities of CANopen Architect EDS.

- Add, edit and delete entries
    - Add a single entry or an entry with multiple subentries in one step
    - Automatic generation of subentry zero for entries with more than one subentry
    - Specify names for the entry and subentries
- Support for compact subentries
    - Can be easily toggled on or off for entries with no subentries
- Cut, copy and paste any data to the window clipboard
    - Allows quick copy of data between multiple EDS or DCFs
    - Can copy non-entry data, such as device information
    - Paste As allows pasting of clipboard data to specific entry indexes, using specific names, allowing duplicates of entries to be quickly created
- Specify file information
    - Device information, file information, etc.
    - Supports the configuration of device commissioning
- Smart save
    - Analyses data and determines if it should be saved as EDS or DCF
    - Force save into a specific file format
- Supports third party EDS checkers
    - Customizable command line provides flexibility
    - Compatible with free EDS checker from CAN in Automation
    - Outputs to a window which supports copying to clipboard for use in reports
    - EDS checkers inform of warnings or errors in data

CANopen Architect EDS also has some limitations

- No support for compact subentry names
- No support for object links
- No support for modules

Chapter 2 – Installation and Setup

2.1 Installation

Minimum Requirements

The following is a list of the recommended minimum requirements for running CANopen Architect EDS.

- Pentium II 400MHz
- Windows 98
- Pointing device (mouse, trackball, etc.)
- 3Mb of disk space
- 64Mb of RAM

Install CANopen Architect EDS

To install CANopen Architect EDS, simply run the installation executable. An installation wizard will guide you through the steps necessary to install the software.

2.3 Example EDS Files

A set of example EDS files are supplied with the installation, and are available from the start menu in Windows or the help menu in the application, under the name "EDS Library". To open a file simple double-click on the file or choose Open from the File menu.

Chapter 3 – Overview

3.1 User Interface Tour

Upon starting the application the main window will be displayed. The layout is very straightforward.
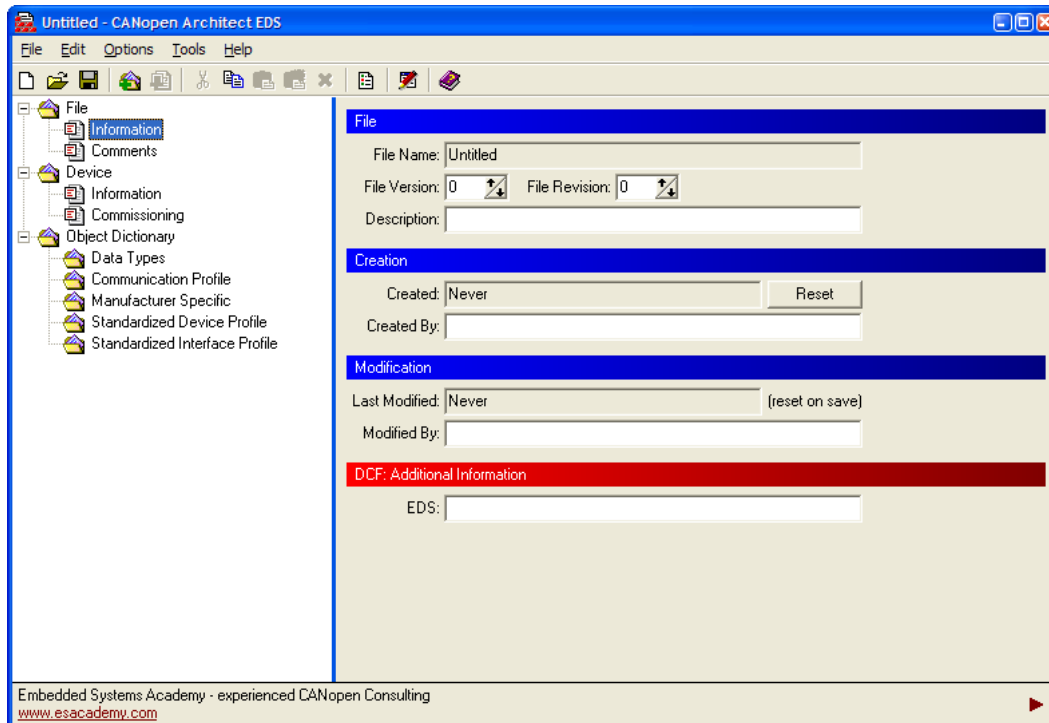
Across the top are the menus and the toolbar. The toolbar provides access to the most commonly used features of the software.

On the left is a tree view of the current data, similar to the tree view of a collection of folders and files. Folder icons indicate a collection of pieces of data and file icons indicate the data itself.

On the right is the area where the data is edited. As different items are selected in the tree view, the options on the right change to match the currently selected item. For example, if the Information item in the File folder is selected, then the options for the file information are displayed. If the Comments item in the File folder is selected then the options for the file comments are displayed.

As data is entered into the right side it is automatically stored. There is no need to click on any confirmation buttons.

Sections on the right that have headings in red indicate that the data in that section is only used in DCFs, and is not included in EDS files. For example, in the File Information section, the EDS field under the Additional Information heading is only present in a DCF.

If any DCF only data is entered and an attempt is made to save the data as an EDS file, a warning is given that not all the data will be saved. When saving as an EDS file, DCF only data is ignored. No warning is given if nothing has been entered in any of the DCF sections.

3.2 The Tree View

A minimal tree is always present, even in new files with no data. This is because some items are mandatory and always included in EDS files and DCFs. For example, there is always a File Information and Comments section, and always a Device Information and Commissioning section.

For new files the Object Dictionary section of the tree will be empty, except folders which divide the tree up into groups. As entries are created they will automatically appear under the correct group.
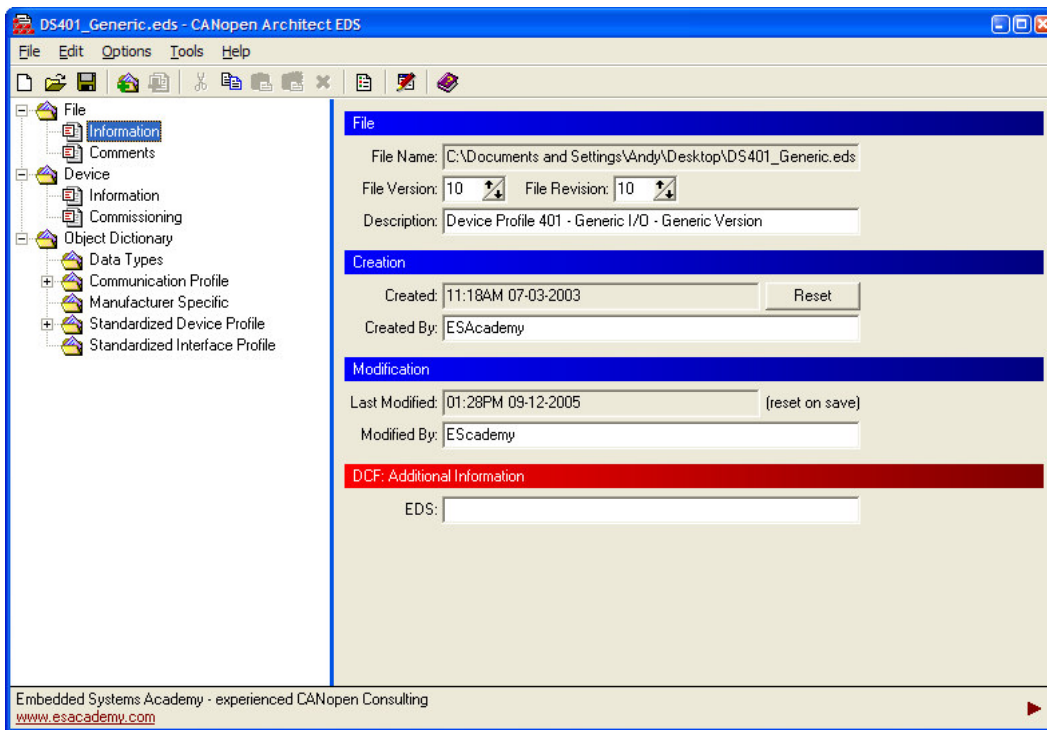
Chapter 4 – Adding, Editing, Deleting

Self explanatory sections are not described here. Instead please refer to the EDS specification, available for free from CAN in Automation.

4.1 File Information

Editing

Click on the Information item in the File folder in the tree view to edit the data.

The creation date and time is when the file was first created. If this field shows "Never" then the current date and time will be inserted when the file is saved. To ensure this happens on the next save, click on Reset, otherwise the creation date and time will be preserved.

The modification date and time shown is the date and time when the file was last modified. On every save this is updated to the current date and time.
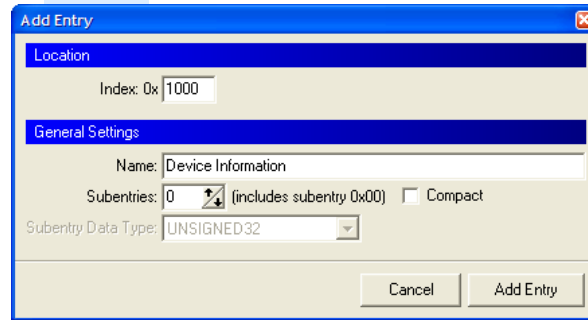
4.2 Entries

Adding

Methods for adding a new entry:

- Choose Add Entry from the Edit menu.
- Click on the Add Entry toolbar button.
- Right click over the tree view and choose Add Entry from the menu.

The Add Entry dialog window will be displayed.

Enter the index of the new entry in hexadecimal, followed by the name of the entry. If the entry has subentries, enter the number of subentries. If the subentries are compact subentries, then check the Compact box. Select the data type for the subentries.

Note that entries with two or more subentries will automatically have a data type of UNSIGNED8 for subentry zero.

Click on Add Entry to add the entry, and it will appear in the tree view under the appropriate group for the index.

Editing with no Subentries/Compact Subentries

To edit an entry simply select it in the tree view. Depending on whether the entry has subentries or not, the options will be different.

If an entry does not have any subentries (or has one subentry or compact subentries) then the options for the entry will be displayed.
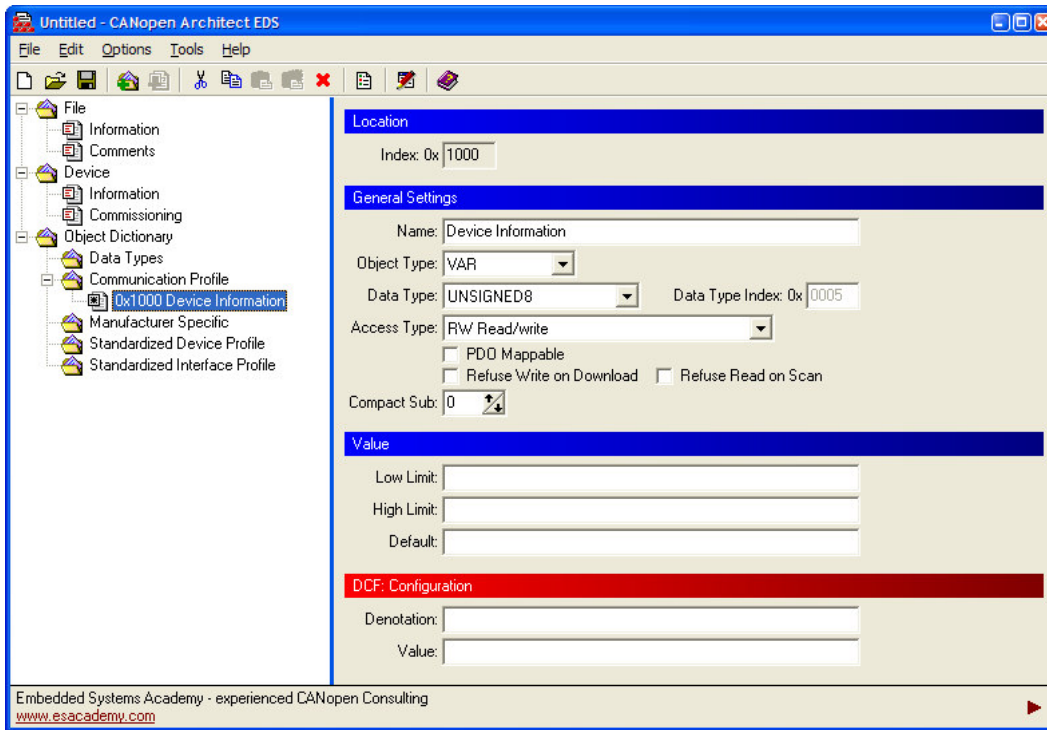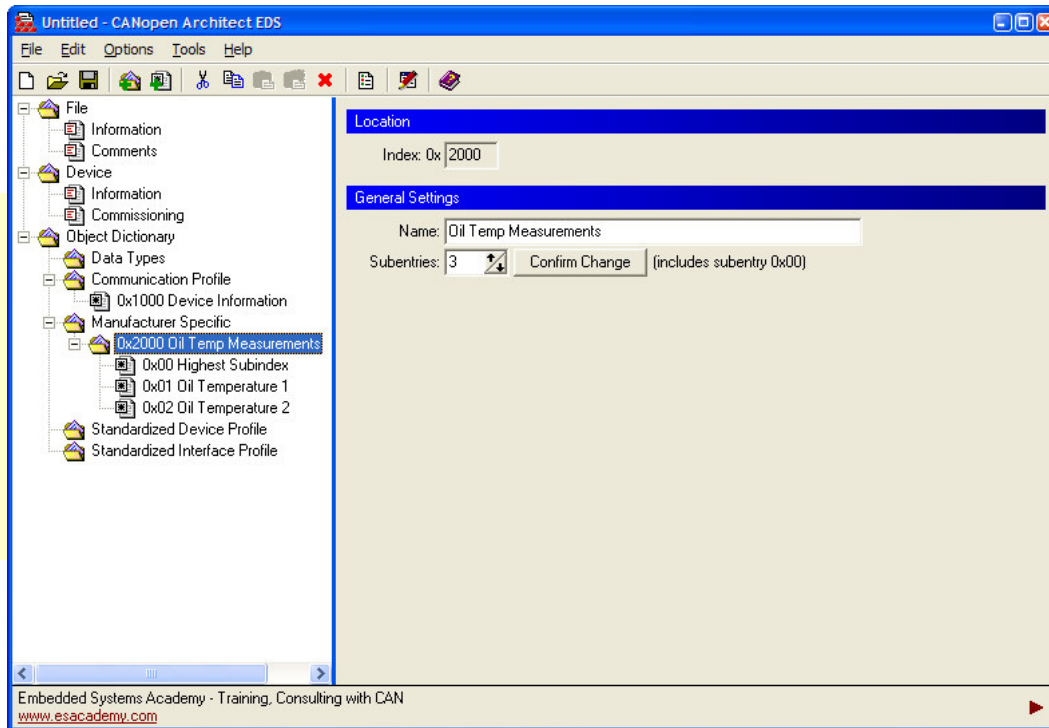
Enter the appropriate settings for the entry. As they are entered they are automatically stored.

Editing – Subentries

To edit an entry simply select it in the tree view. Depending on whether the entry has subentries or not, the options will be different.

If an entry has subentries then the options for the entry will be displayed.

To change the number of subentries, enter the new value. Because this setting can cause the deletion of data it does not automatically take effect. Instead it must be confirmed by clicking on the Confirm Change button. Deleted subentries cannot be undeleted.

Deleting

To delete an entry first select it then use one of the following methods:

- Choose Delete from the Edit menu.
- Click on the Delete toolbar button.
- Right click over the entry and choose Delete from the menu.

4.3 Subentries

Adding

To add a new subentry, first select the entry to be added to. Methods for adding a new subentry:

- Increase the number of subentries on the right side by one and click on Confirm Change. The new subentries will be duplicates of the last subentry.
- Choose Add Subentries from the Edit menu. The Add Subentries dialog window will open.
- Click on the Add Subentry toolbar button. The Add Subentries dialog window will open.
- Right click over the entry and choose Add Subentries from the menu.

The Add Subentries dialog window allows configuration of the subentries to be added.

Enter the subindex of the entry to add, along with the subentry name. It is possible to add multiple subentries starting at the specified subindex by increasing the number of subentries to be added. All subentries will have the same name.

Editing

To edit a subentry simply select it in the tree view. The options will be displayed on the right side.
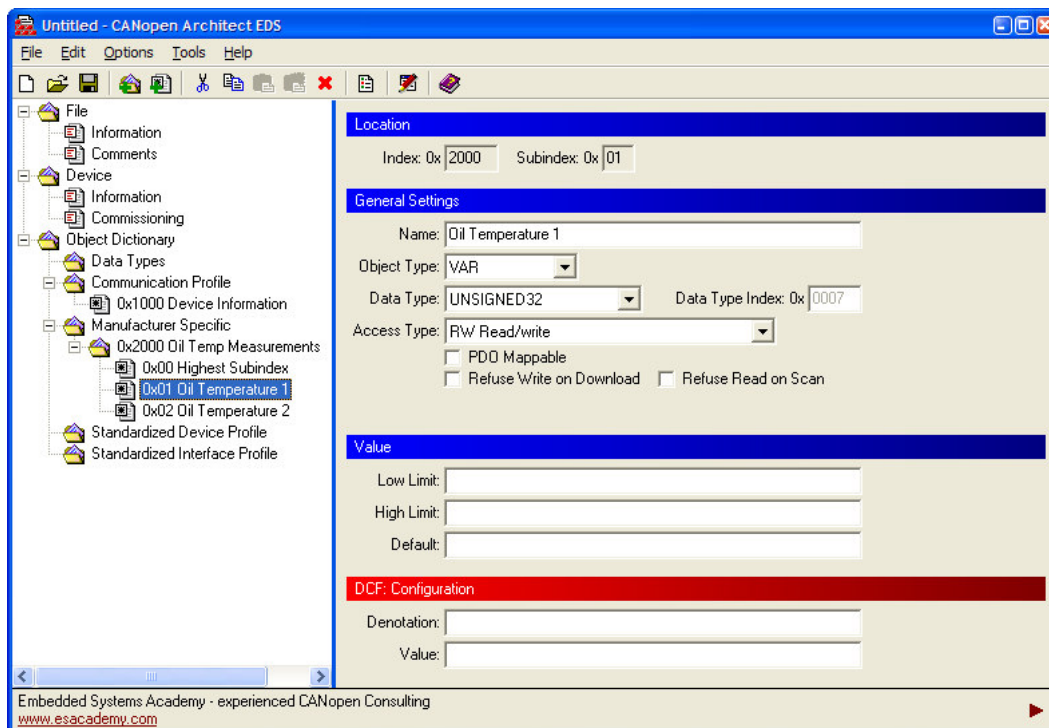
Enter the appropriate settings for the subentry. As they are entered they are automatically stored.

Deleting

To delete a subentry, first select the subentry then use one of the following methods:

- Choose Delete from the Edit menu.
- Click on the Delete toolbar button.
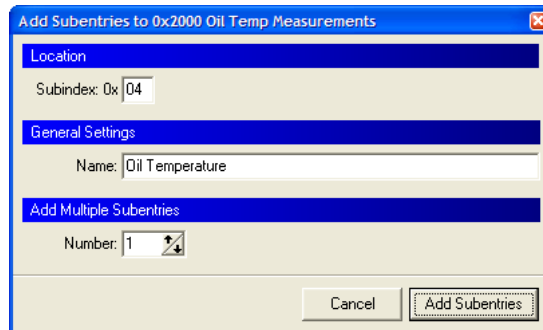- Right click over the entry and choose Delete from the menu.
- Select the entry for the subentry then edit the number of subentries on the right side.

4.4 Cut, Copy and Paste

All data may be copied to and pasted from the Windows clipboard. This allows data to be transferred between multiple copies of CANopen Architect EDS. Entries and subentries can also be cut to the clipboard.

Cut and Copy

To place an item on the clipboard simply select in the tree view and use one of the following methods:

- Choose Cut or Copy from the Edit menu.
- Click on the Cut or Copy toolbar buttons.
- Right click over the item and choose Cut or Copy for the menu.

Paste

To paste any data except for subentries, use one of the following:

- Choose Paste from the Edit menu.
- Click on the Paste toolbar button.
- Right click anywhere over the tree view and choose Paste from the menu.

To paste a subentry, first select an entry to paste to. Then the same methods as just listed may be used to paste the subentry.

Paste As

Choosing Paste As instead of Paste allows a customized copy of the clipboard data to be pasted. Not all data can use Paste As, for example File Information. Paste As does not modify the data on the clipboard, it only modifies the pasted copy.

Choosing Paste As opens the dialog for configuring the pasted copy.
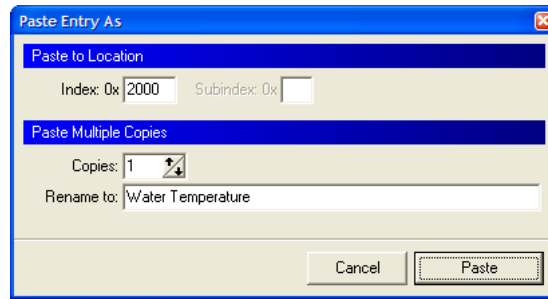
Enter the new index (for entries) or subindex (for subentries), along with a new name and the number of consecutive copies starting at the index or subindex to paste.

Leaving the rename field blank will result in the name of the item on the clipboard being used, i.e. no change.

Chapter 5 – Loading and Saving

5.1 Loading

To load an EDS file or DCF simply choose Open from the File menu, or click on the Open toolbar button.

Select the file to open. Only valid EDS files and DCFs are supported.

5.2 Saving

There are three options to save the current data.

Choosing Save from the File menu, or clicking on the Save toolbar button will overwrite the file currently being edited. If the current data has never been saved, then a save dialog window will appear, prompting for a location and name to save to.

The Save option is a smart save. If the current data can be saved as an EDS file, then that file format will be chosen. However if the current data contains any DCF only items, then the data will be saved as a DCF.

To force saving of the data in a specific file format, choose Save as Electronic Datasheet or Save as Device Configuration File from the File menu. If the data contains any DCF only items and Save as Electronic Datasheet is chosen, then a warning will be given indicating that not all the data will be saved.

Chapter 6 – EDS Checking

6.1 Overview

An EDS checker can check that an EDS file is correct, which helps to confirm that the file will be understood by other CANopen tools.

CANopen Architect EDS does not come with an EDS checker, instead third party checkers can be used. The rest of this section describes a free EDS checker available from CAN in Automation.

6.2 Installation and Configuration

The following steps will install a free EDS checker and configure CANopen Architect EDS to use it.

- Open the Preferences window by choosing Preferences from the Options menu, or clicking on the Preferences toolbar button.
- Download the EDS checker zip file from http://www.can-cia.org/downloads/files/?1119 by clicking on the link.
- Open the zip file.
- Copy the contents of ChkEDS.zip into the EDSChecker subfolder. The subfolder may be opened by clicking on Open Subfolder.
- Click on the Reset button to ensure the preferences are correct for this configuration.
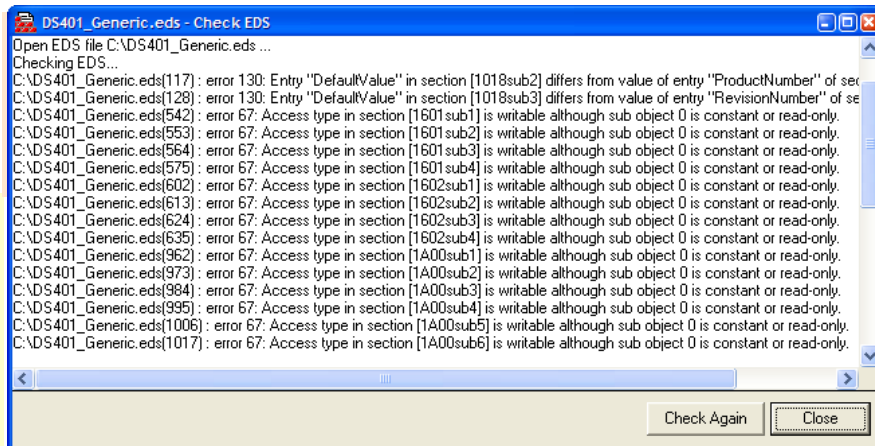- Click on OK.

It is possible to extract the EDS checker to any folder desired, simply change the path in the Preferences dialog window to match.

The EDS checker allows several options on the command line, which can be entered into the Preferences window. Whenever "#E" is encountered, the full path and name of the current EDS file is inserted.

Using any options that redirect the output to a file will result in no output in the CANopen Architect EDS user interface.

6.3 Running the EDS Checker

The current EDS file must first be saved. Once saved start the checking by either choosing Check Current Electronic Datasheet from the Tools menu, or click on the Check EDS toolbar button. An output window will open showing the results of the check.

To run the check again, click on Check Again. To cancel the current check, simply close the window.

To copy the results to the clipboard, right click over the results and choose Select All. Next, right click over the results again and choose Copy.