User Manual

CANinterpreter

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1 Introduction

Thank your for using the CANinterpreter. The CANinterpreter is a versatile tool to test, configure and monitor CANopen devices. The following manual explains the installation and use of the program.
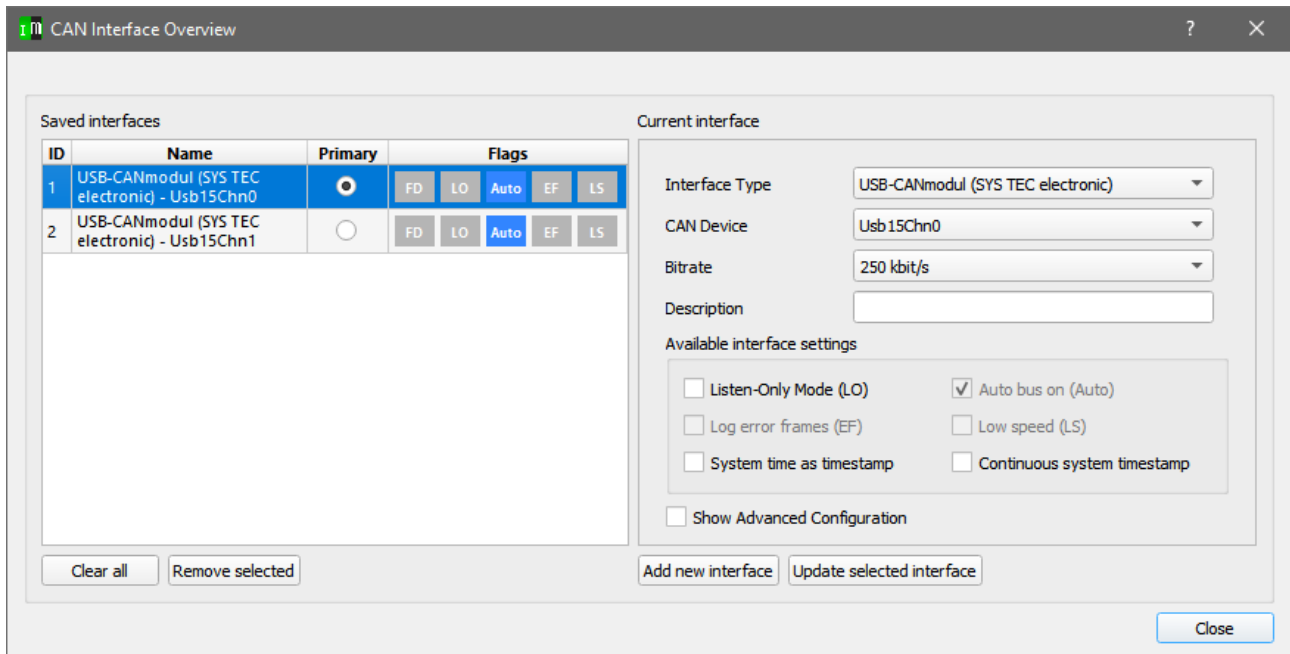
2 Installation

2.1 Windows

To install the tool on Windows start the setup setup_caninterpreter.exe and follow the instructions of the setup. The setup creates a shortcut to start the program.

2.2 Linux

To install the tool in Linux just unzip the ZIP file setup_caninterpreter.zip into a directory. To start the program run the script CANinterpreter.sh in this directory.

3 First steps

The first step at the very first start of the tool is the configuration of the CAN interface. Open CAN interface settings at the menu entry "Connection → CAN Interface Settings". The following mask appears.

Choose the type of the CAN interface, the name of the CAN device and the bit rate in the CANopen network and confirm the settings with "Add new interface" before closing the dialog.

Connect now the CANinterpreter with the CAN interface via "Connection → Connect".

In the status bar you can see now "Connected to " and the name of the CAN device and the current bitrate.
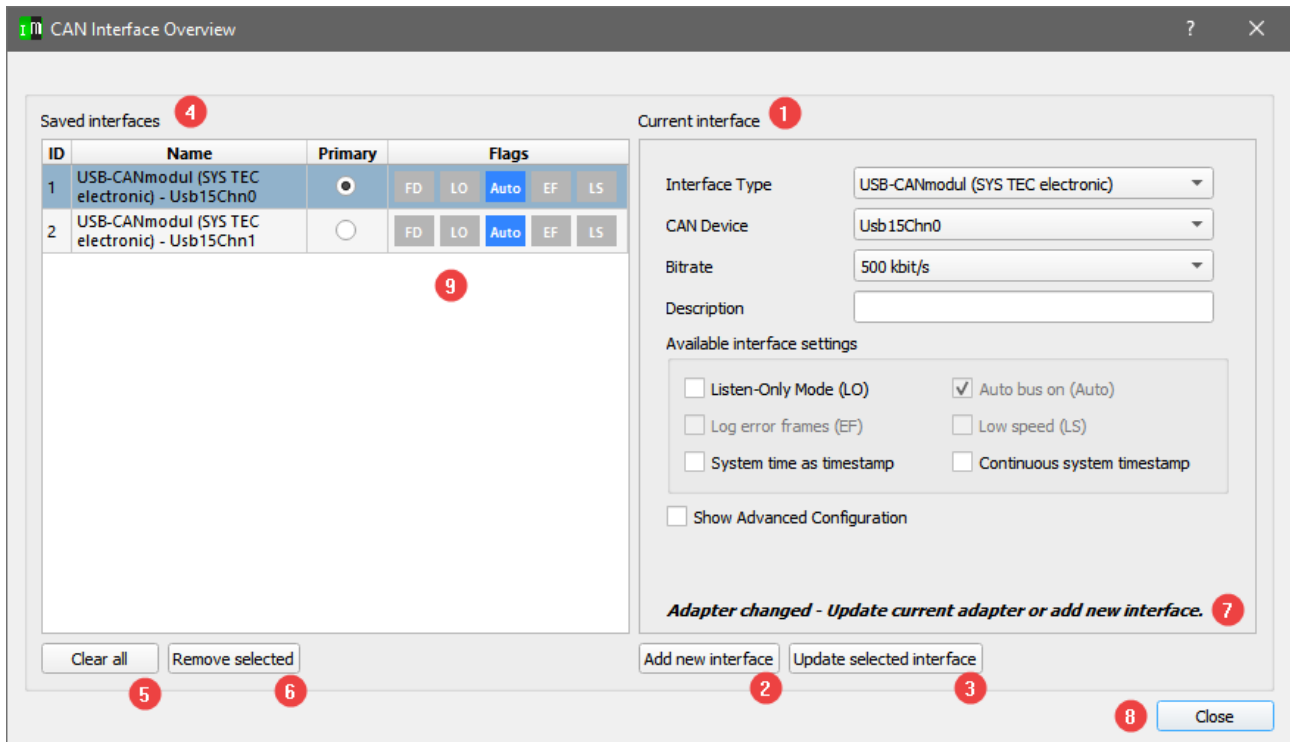
4   CAN Interface handling

4.1   General

The tool has the ability to save certains interface and those configuration.

Each adapter has its unique ID. See the screenshot below. This ID can be found in the column "IF" in the individual CAN analyzers.

4.2 Configuration

The configuration of several CAN lines is done via the "CAN Interface Overview" dialog.

1. The "Current Interface" area contains all information about the currently selected adapter or possible new adapter.

2. "Add new interface" adds a new adapter with settings from "Current Interface" to the list.

3. "Update selected interface" updates the currently selected adapter in the left list to the new settings.

4. The "Saved Interfaces" overview shows the currently saved interfaces. In this list, one adapter is always the primary and therefore active. Additionally, several adapters can be set to active if the corresponding license is available.

5. "Clear all" deletes all set interfaces from the list.

6. „Remove selected" deletes the currently selected interface.

7. The message "Adapter changed - Update current adapter or add new interface" appears as soon as an adapter is selected and the input mask has been changed by the user. It is then necessary to apply the changes to the current adapter or add it as a new adapter.

8. "Close" closes the dialog.

9. The Flags column highlights the flags set for the adapter. The following abbreviations are used:
   FD - CAN FD   LO - Listen-Only Mode   Auto - Auto bus on
   EF - Error frames   LS - Low Speed

4.3 Usage in CAN Analyzer

Each supported analyzer shows the ID of the adapter in the column "IF" and has the possibility to display, hide and color the CAN messages of the different adapters. The tooltip of the column shows the name of the currently set adapter of the ID.

	IF	Time	CAN-ID	Type	Len	0	1
0	1	45.176400	0x123	EXT	0		
1	1	USB-CANmodul (SYS TEC electronic) - Usb15Chn0					

Note that only the ID and not the corresponding adapter is saved when importing and exporting data. So there could be a mismatch when importing datafiles.

Quick filter

In the individual views, each active adapter can be quickly hidden by right-clicking on the title of the "IF" column. At this point a menu with all active adapters opens, which can be deselected by a simple click. (1)

Since it can happen that the current list of active adapters does not match the displayed data, for example, after importing old data, each adapter can be filtered with its unique ID by entering this ID in the comma-separated list and confirming with Enter. (2)
The IDs of the adapters are shown in the column "IF".

	IF	Time	CAN-ID	Type	Len	0	1	2	3	
0	Show all									
1	Enter comma separated IDs to filter it.									
2	✓ 1 - USB-CANmodul (SYS TEC electronic) - Usb15Chn0									
3	1	48.886700	0x123	EXT	0					

5 Program components and Plugins

CAN View

The CAN View shows received and transmitted CAN messages. To send a CAN message the Transmit table below can be used. The values for CAN-IDs, DLC and data can be specified as decimal values or as hexadecimal values with leading 0x.

Up to 16 transmit messages can be defined. The selected one is sent by clicking on the Transmit button. Cyclic messages can be sent automatically by the tool, if the value in the column 'Interval(ms)' is larger than 0.

In the menu of the CAN View windows a filter for distinct CAN IDs can be defined. A list of CAN IDs can be defined, which either can be displayed or ignored. The list can be a list of single values like (100,200,0x400,0x500) or a range (0x100-0x200) or a combination of both e.g. 1,2,0x300-0x400,720.

The filter type defines the behavior of the filter:

- PASS – only the CAN IDs in the filter list are displayed
- REJCECT – the CAN IDs in the filter list are ignored, all other CAN IDs are displayed

CAN View

| Autoscroll | Relative time | Filter enabled | Refresh | HEX ∨ | | 436/2000000 | Clear view |

CAN Rx

Search …

	IF	Time	CAN-ID	Type	Len	0	1	2	3	4	5	6	7	Notes
299	1	0.002682	1535/0x5ff	EXT RTR	8	0x60	0x00	0x1a	0x02	0x00	0x00	0x00	0x00	
300	1	0.001257	1663/0x67f	EXT RTR	8	0x2f	0x00	0x1a	0x00	0x02	0x00	0x00	0x00	
301	1	0.002652	1535/0x5ff	EXT RTR	8	0x60	0x00	0x1a	0x00	0x00	0x00	0x00	0x00	
302	1	0.001213	1663/0x67f	EXT RTR	8	0x23	0x00	0x18	0x01	0xff	0x01	0x00	0x00	
303	1	0.002654	1535/0x5ff	EXT RTR	8	0x60	0x00	0x18	0x01	0x00	0x00	0x00	0x00	

. . . .

CAN Tx

	∞	Interval (ms)	CAN-ID	Type	Len	0	1	2	3	4	5	6	7	Name
1	☐	1000	0xc	EXT RTR	1	0x1								
2	☐	1000	0xd	EXT RTR	2	0x1	0x2							
3	☐	1	0xe	EXT RTR	3	0x1	0x2	0x3						
4	☐	1	0xf	EXT RTR	4	0x1	0x2	0x3	0x4					
5	☐	1	0x7ff	EXT RTR	8	0xff	0xff	0xff	0xff	0xff	0xff	0xff	0xff	

Transmit

The time stamp of the CAN message can be absolute or relative values and the accuracy depends on the used CAN interfaces and the operation system. For most CAN interfaces no TX time stamp is available.

The recorded CAN messages can be exported into text files by CAN View → Export CAN-Logging.
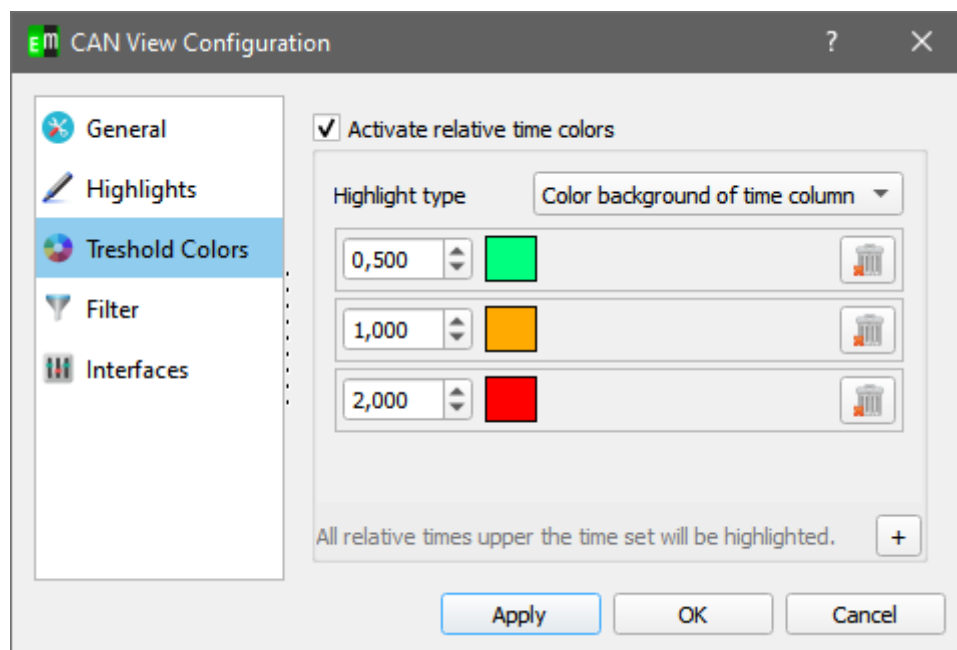
The format of the save text is explained below:

```
3.653302 0x5a0/1440 (8): 43 18 10 03 00 00 00 00
time stamp
          CAN-ID
                    DLC
                        Data in hexadecimal notation
```

The CAN View PlugIn is part of the standard scope of delivery of the CANopen DeviceExplorer.

Relative times

If "relative time" is set, each message could be used as time reference by right-clicking on it and select "Use messages as time reference". The relative times of each other message is now calculated to this messages.

Furthermore if "relative time" is set, the messages could be highlighted. To setup the thresholds and colors select "Configuration" in the "CAN View" menu.

In this dialog you could add new thresholds and add a color. If the relative time of one message is higher than the threshold, the message is highlighted in the chosen color.

5.1 CAN Object View

The CAN Object View shows all received CAN messages in the so called 'Object View'. That means all received CAN IDs are shown in a table with the last data and the number of receptions.

Count	IF	Time	CAN-ID	Type	Len	0	1	2	3	4	5	6	7
518	1	468.267...	511/0x1ff	EXT RTR	6	0x04	0x00	0x00	0x00	0x00	0x00		
297	1	468.866...	1919/0x...	EXT RTR	1	0x05							
16	1	197.385...	1663/0x...	EXT RTR	8	0x23	0x00	0x18	0x01	0xff	0x01	0x00	0x00
16	1	197.388...	1535/0x...	EXT RTR	8	0x60	0x00	0x18	0x01	0x00	0x00	0x00	0x00

The table can be sorted by the number, the time stamp of the CAN ID. A filter can be configured in the same way as in the CAN View PlugIn. The CAN Object View is included in the standard scope of delivery of the CANopen DeviceExplorer.

CAN Object View Configuration

At the CAN Object View you could highlight changed bytes or highlight the whole row if a CAN ID was not received within a certain time. You will find those settings via the "CAN Object View"- menu at "Configuration".

General

- Refresh interval

  This time determine the refresh rate of the view. The lower this time, the more computing time is required.
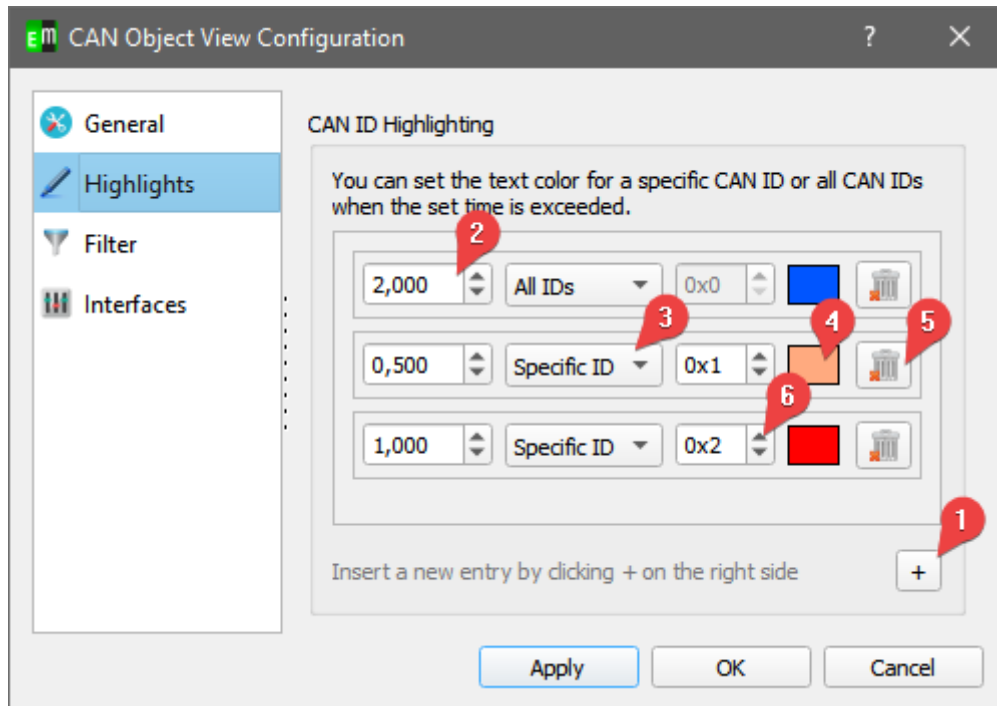
- Highlight changed bytes

  If this option is enabled changed bytes will be printed bold, if they changed from message to message.

Filter

Please refer to the description of the CAN View filtering.

Highlighting

With the Highlighting-Tab you could set a textcolor for the case a special CAN ID or all CAN IDs were not received within a certain time.

1. Add a new entry for the highlighting.

2. The time in seconds after which the CAN ID should be highlighted if they was not received.

3. Select "Specific ID" if you want to highlight only a specific CAN ID or select "All IDs" to highlight all CAN IDs.

4. Select the color for the text if the CAN ID was not received within the time.

5. Deletes the entry

6. Set the specific CAN ID

5.2 CAN message handling

The received messages are stored as message package to the hard disc drive if the "Maximal message count" (configurable in the options) is reached and removed from the internal buffer.

The saved messages could be viewed via the menu in the upper right corner of the window.

Each message package holds the timestamp of the first and of the last message as name.

If a message package is selected newly received message are still being processed in the background and could be viewed by switching back to "Live".

6 Menu

The menu provides access to various functions and settings of the CANinterpreter.

File

- **Export CAN Logging**

  Export of CAN messages as text file. Import and interpretation in the PlugIns at a later point of time is possible.

- **Quit**

  Quit the application.

Connection

- **CAN Interface Settings**

  Dialog to configure CAN interface and bit rate

- **Connect**

  Connect to CAN using the configured interface

- **Disconnect**

  Disconnect from CAN

Settings

- **Filter Settings**

  Filter configuration for CAN messages. Only valid for the main part of the program. There are separate filters for all PlugIns.

- **Options**

  Opens the options dialog to configure various settings of the program.

- **Save**

  Saves the current settings. Enabled "Settings $\rightarrow$ Options $\rightarrow$ Save settings automatically at exit" saves the settings automatically when the program is quit.

- **Export Settings**

  Export of the current settings into a configuration file. Can be used to store various settings of different use cases.

- **Import Settings**

  Import of settings from a configuration file. import. transmitted.

PlugIns

- **CanView**

  Shows or hide the CAN view

- **CanObjectView**
- Shows or hide the CAN object view

Help

- **Manual**

  Shows the complete manual as PDF file.

- **About**

  Shows 'about' dialog including license information.

- **About Qt**

  Information about the Qt framework and license information for the used Qt components.

7 Settings

7.1 Program Settings

The option dialog provides access to various settings of the CANinterpreter.

General Settings

- Warning when exit with active CAN connection
- Save Settings automatically at exit
- Auto Connect to CAN after startup

  Automatic setup of a connection to CAN interface with program start

Scripting

- Autostart Script at connect

  Autostart Script starts automatically with active Sripting Interpreter and connection to CAN. In combination with the "Auto Connect to Can after startup" the script startst automatically after starting the program

8 Support & Contact

On all questions and upcoming problems on CANinterpreter you may contact us via email (support@emotas.de) or by phone +49(0)3461/794160. If a CANopen device does not react as expected, a logging of the CAN communication is useful for the analysis. Please send us your current CAN logging by email, ideally also before you contact us by phone.