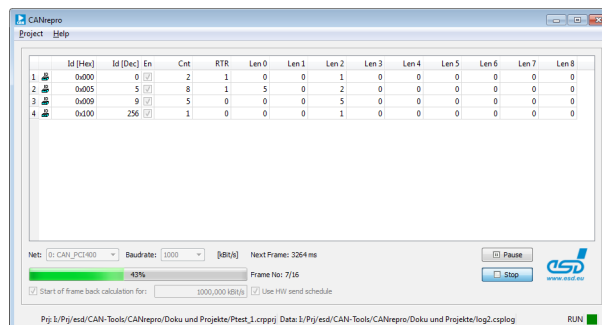




# CANrepro

## CANopen-Tool for the Reproduction of Recorded CAN-Frames



## Software Manual

to Product C.1109.01

## NOTE

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This manual contains important information and instructions on safe and efficient handling of the CANrepro. Carefully read this manual before commencing any work and follow the instructions.  
The manual is a product component, please retain it for future use.

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## Document History

The changes in the document listed below affect changes in the hardware as well as changes in the description of the facts, only.

Rev.	Chapter	Changes versus previous version	Date
1.2	-	First English manual	2017-09-05
	1.1	Start Window and description inserted	
	2.1	Functions Frame Back Calculation and HW Send Schedule inserted	
	2.2, 2.3	Figure and description updated	
	2.4	Figure new, description of Frame Back Calculation and HW Send Schedule inserted	
	3.	Figure new	
	5.	New chapter: "References"	
	6.	New chapter: "Order Information"	

Technical details are subject to change without further notice.

## Classification of Notes

This manual contains noticeable descriptions for a safe use of the CANrepro and important or useful information.

### NOTICE

Notice statements are used to notify people on hazards that could result in things other than personal injury, like property damage.



#### NOTICE

This NOTICE statement contains the general mandatory sign and gives information that must be heeded and complied with for a safe use.

### INFORMATION



#### INFORMATION

Notes to point out something important or useful.

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### Typographical Conventions

Throughout this manual the following typographical conventions are used to distinguish technical terms.

Convention	Example
File and path names	<code>/dev/null</code> or <code>&lt;stdio.h&gt;</code>
Function names	<code><i>open()</i></code>
Programming constants	<code>NULL</code>
Programming data types	<code>uint32_t</code>
Variable names	<code><i>Count</i></code>

### Number Representation

All numbers in this document are base 10 unless designated otherwise. Hexadecimal numbers have a prefix of 0x. For example, 42 is represented as 0x2A in hexadecimal format.

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# 1. Introduction

This manual describes the program CANrepro. CANrepro is a CAN Tool for reproducing data which has been recorded by the monitor program CANreal.

The program offers:

- replay of pre-recorded CAN-message frames via esd CAN interface
- data is reproduced with original timing and sequence
- selection of individual data

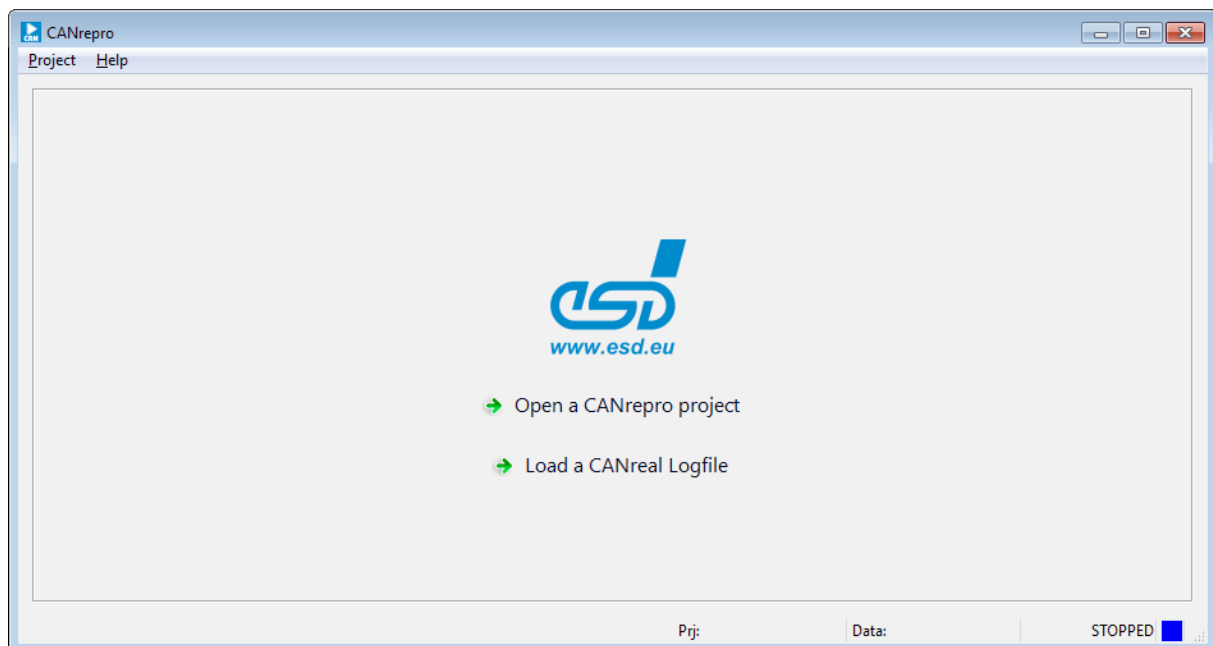
## 1.1 Installation and Program Window

The tool CANrepro is contained in the CAN SDK, which is distributed with the esd-CAN-CD or can be downloaded from the esd-homepage ([www.esd.eu](http://www.esd.eu)). At the installation of the SDK (Software Development Kit) the program CANrepro is automatically installed.

Start the SDK-installation file `can_sdk\setup.exe` and carry out the installation. If not defined at the installation differently, after successful installation the program CANrepro can be started under Windows by selecting the menu items *Start / Program files / CAN / CANrepro*.

You can open the program window more than once in order to display various CAN-data simultaneously.

After the start the following program window is opened:



**Figure 1:** CANrepro

Click on *Open a CANrepro project* to open a project (see page 12).

If you want to open a CANreal log file, click on *Load a CANreal Logfile* (see page 13).

## 2. Functions of the Interface Elements

### 2.1 Display of the CANrepro-Program Window

Menu bar

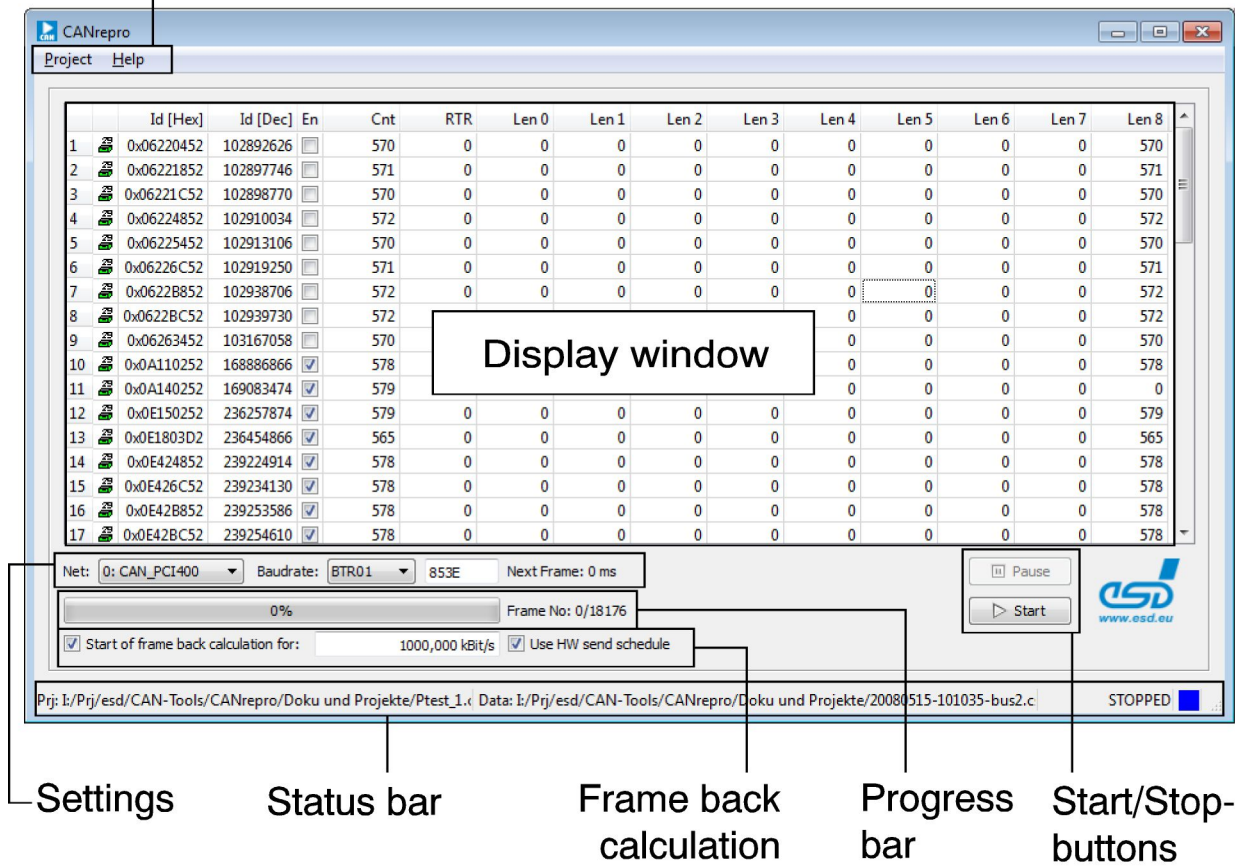


Figure 2: CANrepro user interface

## Functions of the Interface Elements

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The screen is split into the following windows:

<b>Menu bar</b>	This contains the main menu. It is divided into categories and contains a number of commands and options for various program functions (see page 12).
<b>Display window</b>	This table represents the identifiers and data which were found in the text file (see page 9).
<b>Settings</b>	Here you can select a new CAN-network (see page 10).
<b>Progress bar</b>	This bar shows the progress of reproducing the CAN-message frames (see page 10).
<b>Frame Back Calculation</b>	Via these checkboxes the <i>Frame Back Calculation</i> and the <i>HW Send Schedule</i> can be enabled (see page 10).
<b>Start/Stop</b>	The <i>Start/Stop</i> button starts or stops the replay of recorded CAN-message frames (see page 10). <i>Pause</i> halts the reproduction of CAN-message frames.
<b>Status bar</b>	The status bar contains current information about the program status (see page 11)




## 2.2 Display Window


The table in the display window represents the evaluation of the text file.

	Id [Hex]	Id [Dec]	En	Cnt	RTR	Len 0	Len 1	Len 2	Len 3	Len 4	Len 5	Len 6	Len 7	Len 8
1 	0x000	0	<input checked="" type="checkbox"/>	2	1	0	0	1	0	0	0	0	0	0
2 	0x005	5	<input checked="" type="checkbox"/>	8	1	5	0	2	0	0	0	0	0	0
3 	0x009	9	<input checked="" type="checkbox"/>	5	0	0	0	5	0	0	0	0	0	0
4 	0x100	256	<input checked="" type="checkbox"/>	1	0	0	0	1	0	0	0	0	0	0

**Figure 3:** Display window (Example)

The individual lines of the table each contain the data for an identifier. The lines are consecutively numbered. The second column of the table shows whether the identifier is an 11-bit or a 29-bit identifier:

 11-bit Identifier

 29-bit Identifier

**Id (Hex)** Represents the identifier of the message in hexadecimal form.

**Id(Dec)** Represents the identifier of the message in decimal form.

**En** Via the checkbox the reproduction of frames can be activated or deactivated.

activates the replay of frames

deactivates the replay of frames

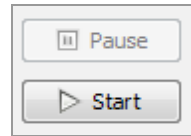
**Cnt** Number of telegrams found with identifier Id

**RTR** Number of RTR-frames found

**Len 0-8** These columns show the telegrams found for the identifier, listed according to the respective number of valid data bytes in the frame (Len 0-8).

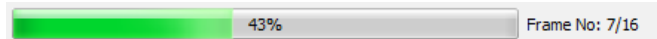
### 2.3 Program Run

**Start, Stop** Via the *Start/Stop* button the reproduction of recorded CAN-message frames can be started or stopped. Select *Start* to start the transmission of frames on the CAN-bus. During the program run the transmission of frames can be stopped with *Stop* via the same button.



**Pause** Via *Pause* the reproduction of CAN-message frames can be halted. By clicking the *Pause* button again after the pause, the reproduction of CAN-message frames will be continued.

**Progress bar** This bar shows the progress of the transmission of



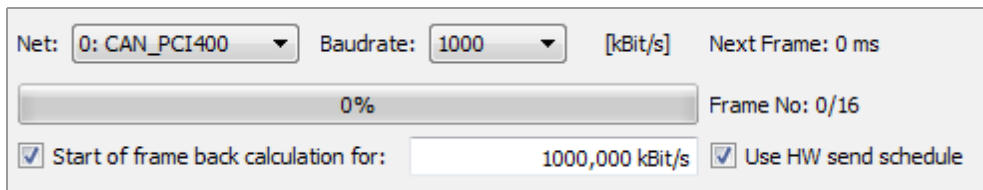
CAN message frames. It is shown in percent based on the number of total frames.

*Frame No: XX/YY* (in the example 7/16)

XX is the number of the currently transmitted frame from the imported text file of the recorded data.

YY is the highest number of the frames of the imported text file of the recorded data.

### 2.4 Settings and Frame Back Calculation



**Figure 4:** Detail of CANrepro program window

**Net:** In this selection box the CAN-network can be selected in which the data is to be transmitted. The list shows the network numbers as well as the hardware designations of the available channels. In the example: Net No: 0, CAN-PCI/400 board

**Baudrate:** In this selection box you select the baud rate with which the CAN-data is to be transmitted. In the example: 1000 kBit/s

**Next Frame:** Shows the remaining time until the next scheduled frame is transmitted.

**Progress bar** See chapter „Program Run“

**Start of frame back calculation for:**

The frame back calculation can be used for the correction of the recorded End-of-Frame (EOF) timestamps.

- enables the frame back calculation.
- disables the frame back calculation

This function improves the accuracy of the replay of the frames. In the input field the same bit rate has to be used which has been used for the recording. The bit rate is automatically inserted as default value.

The TS-sample-point can be set to SOF for several esd boards. Further information about the Timestamp-Sample-Point can be taken from the chapter „Standard Settings“ of the Manual: „NTCAN-API-Manual Part 2: Installation Guide“ [2].

If Start-of-Frame (SOF) timestamps have been used for the recording, the frame back calculation must not be enabled!

**Use HW send schedule:**

Improves the temporal accuracy of the replay of the frames.

- enables the HW send schedule.
- disables the HW send schedule

The temporal accuracy of the reproduction is improved from the accuracy in millisecond range to accuracy in microsecond range if the CAN board supports the Tx-timestamp.

The Tx-timestamp can be set for several esd CAN boards. Please refer to chapter „Standard Settings“ of the manual: „NTCAN-API-Manual Part 2: Installation Guide“ for further information about the Tx-timestamp.

**2.5 Status Bar**



**Figure 5:** Status bar

- Prj:** File name and path of the project
- Data:** File name and path of the displayed data
- Mode** indicates the mode of the program. The following modes are supported:

- *RUN* (green), program runs
- *PAUSE* (yellow), program is paused
- *STOPPED* (blue), program is stopped

### 3. Menu Bar

The menu bar contains the menu items *Project* and *Help*.  
The menu items are opened by a single click or the key combination shown.

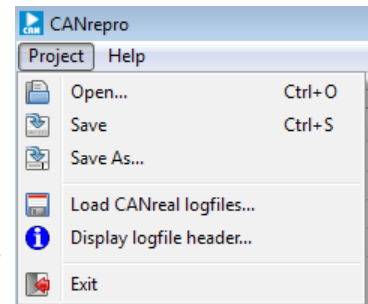


Figure 6: Menu *Project*

#### 3.1 Menu Item *Project*

In a project the selected identifiers are linked with the text file which was converted from a log file. The path of the text file is saved in the project.

##### 3.1.1 Open an Existing Project

**Open...** This menu item opens an existing project.  
An existing project can also be started with using the key combination *Ctrl + O*.  
The dialogue window *Open Project* is also opened.

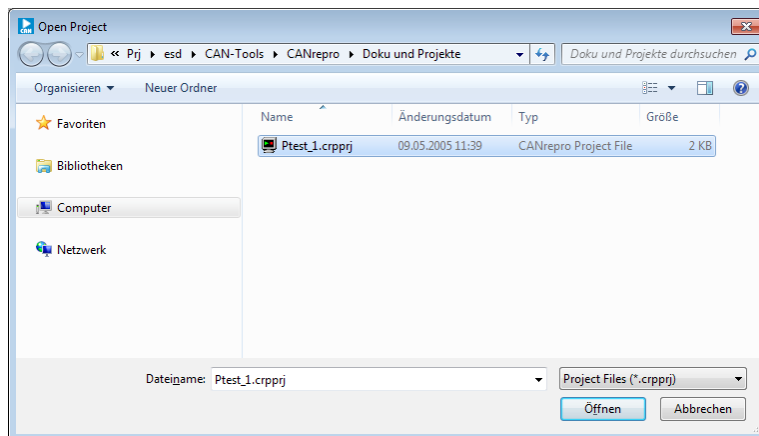


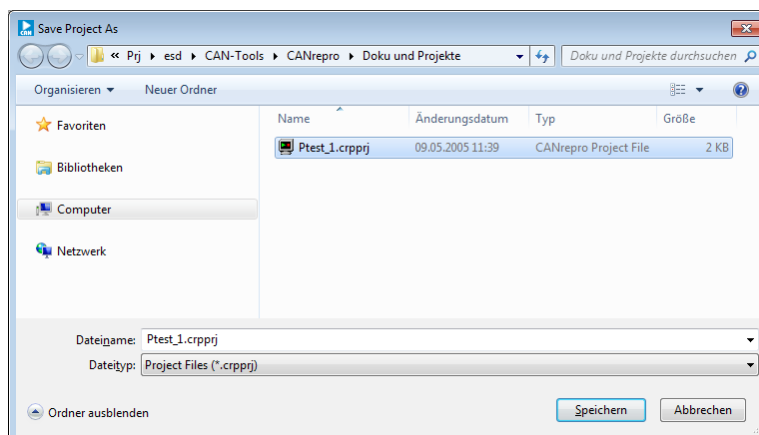
Figure 7: *Open Project* dialogue window

Here you can select an existing project. The project files have got the extension *\*.crpprj*.  
After opening the selected project the information window *Logfile Header Info* is opened. This contains the header of the log file (see page 14).  
Close the window via *Close* in order to return to the program window.  
The program window now contains a table with the results of the evaluation.

### 3.1.2 Save a Project

**Save** Saves the current project.  
An existing project can also be saved via the key combination *Ctrl* + *S*.

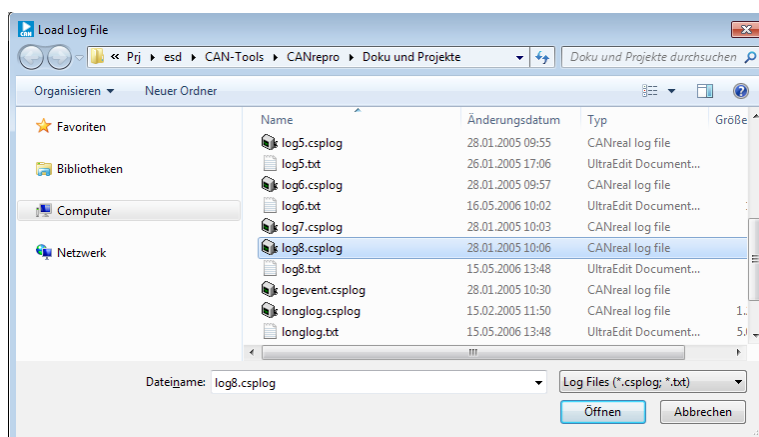
**Save As...** Saves a current project under a new name. The following dialogue window is opened. Here an existing project can be saved under a selected or a new name. Project files have got the extension *\*.crpprj*



**Figure 8:** *Save Project As* dialogue window

### 3.1.3 Loading a Text File

**Load CANreal Logfiles** This menu item loads a text file which was converted from a log file. In order to do this select a file with the extension *\*.txt* from *Load Log File*. The text file must be generated before from the log file with the extension *\*.csplog*, generated by means of the software tool CANreal (please refer to the CANreal manual [3], menu item 'Convert logfiles to text...'). Files with the extension *\*.csplog* cannot be opened directly.



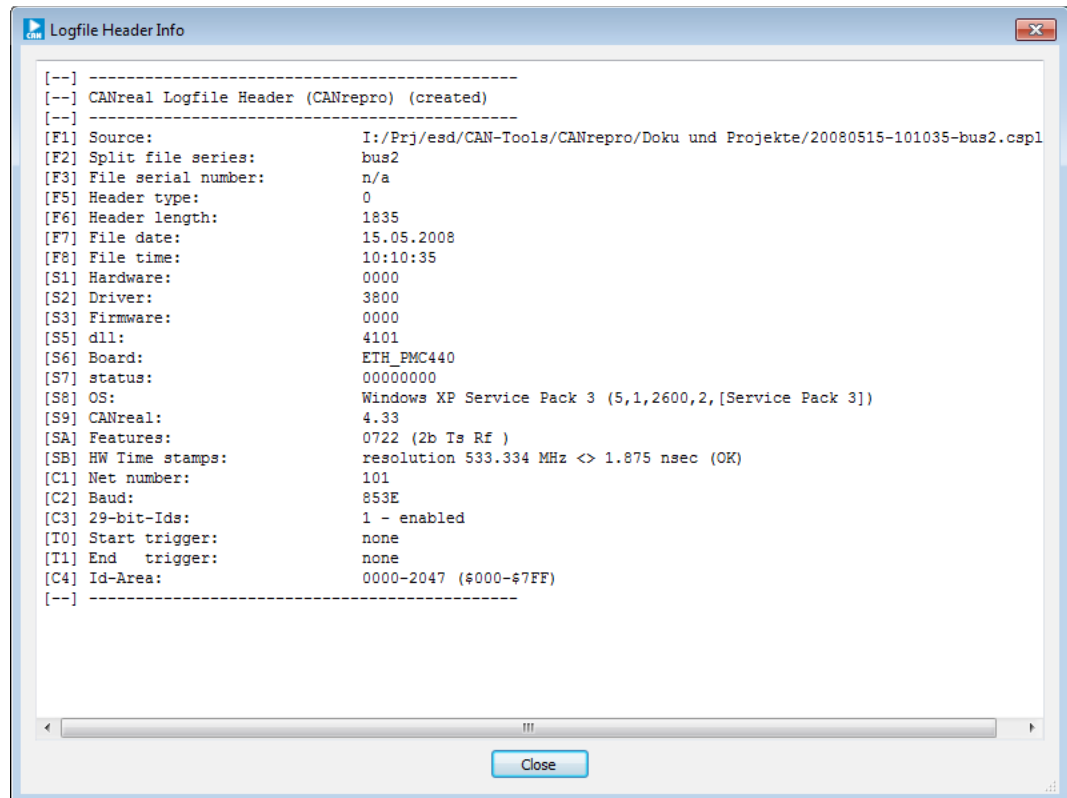
**Figure 9:** *Load Log File* dialogue window

After opening the selected file the information window *Logfile Header Info* is opened. This contains the header of the log file (see page 14). Close the information window via *Close* in order to return to the program window. The program window now contains a table with data from the text file.

### 3.1.4 View of Logfile Header

#### **Display logfile header...**

Opens the information window *Logfile Header Info* which contains the header of the currently displayed log file.



**Figure 10:** *Logfile Header Info* window

Close the window *Logfile Header Info* via *Close* in order to return to the program window.

### 3.1.5 Exit the Program CANrepro

#### **Exit**

Click the menu item *Exit* to close the program CANrepro.

### 3.2 Menu Item *Help*

Under the menu item *Help* the functions *Contents..* and *About* are listed.

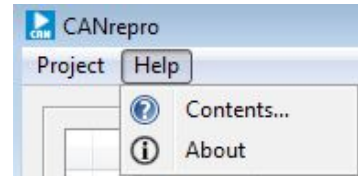


Figure 11: *Help* menu

**Contents...** Has not been implemented yet

**About** Opens the information window *About CANrepro* on the right, which contains links to esd information about the current program version of CANrepro. Confirm with *OK* in order to close the window.



Figure 12: *About* window

# 4. Quick Start

Please follow the steps below for executing the program:

1. Install the CAN SDK on your computer. CANrepro is installed with the SDK as one of the CAN Tools.
2. Start the program CANrepro under Windows after successful installation.
3. Click *Project / Load CANreal Logfiles* to open a logfile (see page 13).
4. Select the CAN-baud rate and the CAN-network in which the telegrams are to be transmitted.
5. Start reproducing CAN-message frames via *Start*.
6. Data is being transmitted on the CAN-bus. The progress of transmitting CAN-message frames is represented by the progress bar.
7. You can halt the transmission of CAN-message frames via *Pause* or stop it via *Stop*.



## 5. References

- [1] NTCAN Part 1: Application Developers Manual, Rev. 5.1, esd Order No.: C.2001.21  
2017-06-08, esd electronics gmbh
- [2] NTCAN Part 2: Installation Guide, Rev. 4.4, esd Order No.: C.2001.21  
2017-06-08, esd electronics gmbh
- [3] CANreal Software-Handbuch, Rev. 3.2, Order No.: C.1107.20  
2017-08-16, esd electronics gmbh

## 6. Order Information

CANrepro is contained in the scope of delivery of the CAN-SDK and can be downloaded from our website [www.esd.eu](http://www.esd.eu).

### PDF Manuals

Manuals are available in English and usually in German as well. For availability of the manuals see table below.

Please download the manuals as PDF documents from our esd website [www.esd.eu](http://www.esd.eu) for free.

Manuals		Order No.
CANrepro-ME	Software manual in English	C.1109.21
CANrepro-MD	Software manual in German	C.1109.20
CAN-API-ME	NTCAN-API Part 1: Application Developers Manual (Englisch) NTCAN-API Part 2: Driver Installation Guide (Englisch)	C.2001.21

**Table 1:** Available manuals

### Printed Manuals

If you need a printout of the manual additionally, please contact our sales team: [sales@esd.eu](mailto:sales@esd.eu) for a quotation. Printed manuals may be ordered for a fee.