

## **User Manual**

# Protocol Monitor



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## **User Manual**

## **CANvision<sup>®</sup> - Protocol monitor**

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## **Revision Overview**

Date	Revision	Change(s)	
2015-10-29	0	First version	
2015-11-06	1	Pictures corrected	
2016-05-26	2	New client SAE J1939	
2017-08-09	4	Spelling error correction, new company name, logo without claim	
2017-10-23	5	CAN/CANopen FD support, renewed CANvision client "CAN Transmit"	
2018-01-26	6	Ordering information	
2018-04-24	7	Licensing, Trial mode	
2019-02-08	8	Changes to scope of delivery	
2019-03-29	9	Support Kvaser CAN interfaces, minor improvements	

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Our policy is one of continuous improvement, and consequently the equipment may vary slightly from the description and specifications in this publication. The specifications, illustrations and descriptions provided in this documentation are not binding in detail.

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#### Note:

To use the CANvision<sup>®</sup> - Protocol Monitor, and for proper understanding of this manual, general knowledge of the field bus systems CAN, CANopen, DeviceNet and/or SAE J1939 are required.



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## 1 Overview

The CANvision<sup>®</sup> - Protocol Monitor is a high-performance tool for the development, start-up, monitoring and service of CAN networks. Due to its modular basic concept according to the client/server principle this tool enables easy handling and can simply be expanded.

Therefore, the CAN interface must not necessarily be locally available – remote controlled servers provide the CAN interfaces for all clients. Thereby, the CANvision<sup>®</sup> - Protocol Monitor is not coupled to interfaces of a specific manufacturer, but supports the CAN hardware of GEMAC, IXXAT, PEAK, Vector and Kvaser.

Licensing is carried out via a USB copy protection dongle. The software can be installed at numerous PCs. To use the software, easily plug the copy protection dongle into a free USB port.

#### CANvision<sup>®</sup> - Protocol Monitor

- Support of various CAN interfaces (GEMAC, IXXAT, PEAK, Vector, Kvaser)
- Simultaneous use of numerous CAN interfaces possible
- Display of bus load, as well as transmission, reception and error conditions
- Adjustable filter and trigger conditions
- Single and cyclic transmission of CAN messages as well as sequences (transmission lists)
- Storage and export of recorded CAN messages
- Share CAN interfaces on the network (automatic detection via Bonjour service)
- Integrated symbolic decoding of CAN messages
- Import of DBC files via free of charge CAN symbol editor

A CANopen-Module, which is available optionally, supports the analysis of CANopen based systems. This module interprets all received telegrams according to the CANopen specification.

#### **Optional CANvision Client: "CANopen Receive"**

- Interpretation of all received messages as SDO, PDO, NMT, Sync, Timestamp, Heartbeat and Emergency objects, as well as display of the PDO contents
- Filtering according to object types and Node-IDs
- Standards: CiA 301, 302, 1301 (CANopen FD)
- Profiles: 401, 402, 404, 405, 406, 408, 410, expandable
- Import of EDS and DCF files
- Configurable formatting and display color
- Message display in "Scroll" or "Overwrite" mode

#### Optional CANvision Client: "SAE J1939 Receive"

- Interpretation of all received messages with source address, parameter group (PGN) and the individual signals (SPN)
- Support for transport protocol and diagnostic messages
- Additional decoding of the extensions used by ISOBUS and NMEA 2000
- Filtering according to source address, PGN and SPN
- Configurable formatting and display color

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### 2 Start-up

#### 2.1 System requirements

To ensure the correct installation of the CANvision<sup>®</sup> application software, your PC or notebook should meet the following minimum requirements and possess one of the operating systems listed below:

#### Hardware:

- Processor: at least 2,0 GHz (2,4 GHz dual core recommended)
- At least 512 MB RAM (1 GB recommended)
- Graphics card with 24-bit color depth (32-bit recommended)
- Resolution: 1,024x768 pixels or higher
- CD/DVD ROM drive
- Free USB port (for USB dongle)

#### Supported operating systems<sup>1</sup>:

- Microsoft Windows<sup>®</sup> Vista (32 bit and 64 bit)
- Microsoft Windows<sup>®</sup> 7 (32 bit and 64 bit)
- Microsoft Windows<sup>®</sup> 8.1 (32 bit and 64 bit)
- Microsoft Windows<sup>®</sup> 10 (32 bit and 64 bit)

#### Supported CAN hardware / interfaces

- GEMAC CAN-Bus Tester 2
- IXXAT VCI (e.g. USB-to-CAN, PC-I 04/PCI)
- PEAK PCAN (e.g. PCAN-USB, PCAN-PCI)
- Vector XL (e.g. VN1600, CANboardXL)
- Kvaser (e.g. USBcan Light, Pro)

<sup>1</sup> Microsoft and Windows® are registered trade marks of Microsoft Corporation in the USA and in other countries.



#### 2.2 Installing the software

The PC software is available in German and English and can be downloaded from our website <u>www.gemac-fieldbus.com</u>. The installation sets up the CANvision<sup>®</sup> application software on your system and installs the USB driver required by the CAN-Bus Tester 2.

#### Note:

To install the USB driver, you must possess administrator rights. Only the device driver for the operation of the GEMAC CAN-Bus Tester 2 is included. For any other drivers of supported CAN hardware, contact the appropriate manufacturer.

## GEMAC

## **3 Functions and Operation**

#### 3.1 General notes on operation



Figure 1: Software structure

As to be seen in Fig. 1 the CANvision<sup>®</sup> Protocol Monitor is a modular-designed software package with *CANvision Server* as the central element. In addition to management and configuration of the devices connected to the PC, this server switches the data traffic between the client applications and the Common CAN Interface (CCI).

The CCI itself is a driver layer that provides a standard software interface for a number of the CAN interfaces currently available on the market from different manufacturers. Client applications can be started for the send and receive directions for CAN interfaces recognized by the server as connected.

#### Help

When designing the CANvision<sup>®</sup> Protocol Monitor, special attention was devoted to a clear structure and a self-explanatory graphical user interface. For many elements of the user interface, a detailed explanation is displayed when the mouse pointer is moved over the control element concerned ("tool tip" or status text).

This manual is also supplied in electronic form and can be called up both via the help function and with the F1 key.

#### 3.1.1 Data storage

All settings of *CANvision Server* are saved in a document with the file extension ".cms". The document can be opened either by double-clicking on the file in the Windows<sup>®</sup> Explorer or by dragging the file to the program window (drag & drop). The client applications each possess their own file format.



#### 3.2 CANvision Server



Figure 2: CANvision Server user interface

The graphical user interface of *CANvision Server* (Fig. 2) provides both a menu bar and a toolbar and is divided into the views *"Interface Selection"* and *"Interface Status"*. Using drag & drop, the toolbar and all views can be arranged freely in the program window or else undocked and displayed as separate windows. The current layout of the window is saved automatically and is restored when the program is next started.

#### 3.2.1 Menu bar

The menu bar comprises the main menus "*File*", "*View*", "*Hardware*", "*Tools*" and "*Help*". The "*File*" menu can be used to open and save configuration data. The "*View*" menu can be used to modify the layout of the window. The "*Hardware*" menu provides functions for controlling the selected CAN controller (start, stop and setup). The setting dialog for network functionality can be found in the menu "*Tools*". The last menu item "*Help*" provides access to the electronic manual, as well as program and driver information and the licensing.

#### 3.2.2 Toolbar

For convenient operation, *CANvision Server* possesses a toolbar at the top of the program window (Fig. 3). The toolbar provides quick access to the most important menu functions.



Figure 3: Toolbar



	lew	Opens a new document (Ctrl+N).
	Open	Opens an existing document (Ctrl+O).
le s	Save	Saves the current document with its existing name or - if the document has not yet been given a name - with a new name (Ctrl+S).
S S	Start	Activates the CAN controller
🔞 S	Stop	Deactivates the CAN controller
s s	Settings	Opens a dialog for configuring the selected CAN controller
	Network	Opens a dialog for changing the Network Settings
? "	nfo	Displays program, manufacturers and driver information

#### 3.2.3 View "Interface Selection"

This view displays all detected CAN interfaces and the related CAN controllers in a hierarchical list. If you right-click on a CAN controller, this displays a context menu from which the selected CAN controller can be

started or stopped and configured. After changing the configuration settings, any active configurations are automatically stopped for a short moment and subsequently restarted with updated settings.

Each CAN controller in the list possesses several entries for client applications (Section 3.3 "CANvision Clients"). These entries can be called by double-clicking with the left mouse button or by way of a further context menu.



Figure 4: "Interface Selection" with context menu



#### 3.2.4 View "Interface Status"

This view displays the status of the selected CAN controller. An online analysis is only possible after the CAN hardware has been started. In addition to the bus traffic load, the transmit, receive and error states are displayed here by way of status LEDs.

Each status window displays the following information:

Error Type	LED State	Description	
Transmit pending	off	All messages sent, the transmit buffer is empty.	
(TxPen)	yellow	There are unacknowledged messages in the send buffer of the CAN controller.	
Data overrun	off	No error	
(Ovr)	yellow	A data overflow in the receive buffer of the CAN controller has occurred.	
Warning level	off	No error	
(Warn)	yellow	The overflow of an error counter of the CAN controller has occurred .	
Bus Off state	off	No error	
(B.Off)	red	The CAN controller is in the state "Bus off".	

#### Table 1: Transmission, reception and error conditions

When a data overrun occurs for the first time, the appropriate LED lights up permanently; it only goes out when the CAN controller is reset. If the "Bus Off" LED is lit, the CAN controller is no longer participating in the network communication. In this case, the CAN hardware must be stopped and restarted to reset this state. The bus traffic load is only displayed if this is supported by the CAN interface.

#### 3.2.5 Network

The CANvision<sup>®</sup> Protocol Monitor provides remote network access to the CAN hardware connected to a different PC. To this end, CANvision Server must be started on the other PC, network detection must be activated, and the CAN hardware must be released for the network. The released interfaces will then be available on all the other CANvision servers started on the network. The receive client may be started as often as desired, whereas the transmit clients may only be opened once.

To enable network detection, check the appropriate box in the "*Network*" window under "*Tools*" (Fig. 5). CAN interfaces available to the network are detected automatically by way of the "*Bonjour*" service which is installed together with the program.

🛓 Network	
Options	
Port number (Server):	12346
Port number (Bonjour):	12347
Enable automatic det (Bonjour service)	ection of network nodes
Connections	
Host name	IP address
V PC-DOST	172.20.11.6
Add	elete

Figure 5: Network configuration

Should the functions of this service be deactivated by your administrator or otherwise not be possible due to your particular network configuration (e.g. exceeding of subnet limits), the desired connections may also be



established manually. To this end, click on the "Add" button in the network dialog and specify the IP address of the node to which you wish to establish a connection. To remove a selected entry from the list, click on "Delete".

Once the connection to a CANvision server has been established successfully, its name and IP address are displayed in the interface selection. To allow access to the CAN hardware which is managed by this server, it must be released for the network. This can be done either by way of the context menu or in the setup dialog of the appropriate CAN controller.

Fig. 6 shows an example configuration where the CAN interface no. 3 is visible to the network by way of IP address 192.168.0.1. This network includes another PC (address: 192.168.0.2) with a CANvision server started. This server will find the server with the shared interface no. 3 at 192.168.0.1 and will display it in its own interface selection. Now the user of this PC may open and use a transmit and receive window for the CAN interface.



#### Figure 6: Access to shared CAN interfaces on the network



#### 3.2.6 Licensing

To be able to use the software completely, a USB license dongle must be connected to a free USB port of the PC. This dongle is provided with the starter set.

To activate clients, load a corresponding license file of type *.cmslic* onto the USB license dongle in the info dialog (Fig. 7). This dialog can be found under the menu item "*Help*  $\rightarrow$  *Info...*".

To purchase additional program licenses, please contact your dealer.

License Management							
Server Module							
Serial number:	22570-00/00006						
Support end:	Mai 31, 2019						
Client Modules	Client Modules						
License							
CAN Transmit / Receive							
CANopen Receive							
🔒 SAE J1939 Receive							
-							
	Load license file						

Figure 7: License information within the info dialog

#### 3.2.7 Support extension

In addition, the USB license dongle defines a support period within which software updates can be obtained free of charge. Once this period has expired, no newer program versions with the current license can be used. Program versions that were created prior to the end of the support period can continue to be used without limitations.

For information on extension of the support period, contact your dealer.

#### 3.2.8 Trial versions

It is possible to test all not licensed client modules during the first **5 minutes** after each start of the program. Only in the receive clients a hint is inserted every ten lines and the saving of documents is disabled.

After the trial time has expired, the client modules are locked and you need an appropriate license to use them permanently.

License Management							
Server Module							
Serial number:	22570-00/00006						
Support end:	Mai 31, 2019						
Client Modules	Client Modules						
License							
CAN Transmit /	CAN Transmit / Receive						
CANopen Receiv	re internet interne						
T SAE J1939 Receive							
Trial - 04min 09s re	maining Load license file						

Figure 8: Trial-Modus

#### 3.3 CANvision Clients

For each detected CAN controller multiple clients for sending and receiving are available. For easy identification of the client window open the associated CAN controller is displayed in the status bar. The position and size of all windows is automatically saved and restored at the next program start.

The following functions are available in all clients:

#### Status LED on the CAN controller:

0	00		The CAN controller is activated; transmit and receive are possible. The CAN controller has reached or exceeded its warning limit. The CAN controller has been turned off (is in "Bus Off"). The CAN controller is deactivated.
Starti	ng/stopping the CA	N contr	oller, Stop/continue receiving:
	Start CAN Controller	Activates the CAN controller (F5).	
8	Stop CAN Controller	Deactiv	ates the CAN controller (F6)
0	Stop / Continue Receiving	•	on of frames in the receive clients can be paused and continued re- ely. The CAN controller remains active.



#### 3.3.1 CANvision Client "CAN Transmit"

The CANvision client "CAN Transmit" serves to transmit CAN messages either once or cyclically. For this purpose, you can define your own CAN messages in a list. The client can be called via the CANvision server for every listed CAN controller.

152DW	w-Protocol-Manu	al.cmt - CAN vision Client - CAN Transmit					-	🔵 IS2Dww-Protocol-Manual.cmt - CAN vision Client - CAN Transmit 📃 🗖 🗙						
Elle Functions View														
0 📬 🛙	<u>,</u> 🔿 📀 6	3 🍄 🕸 🗙 🍃 🕾 🗙 🛧 🌲	A											
						Cycle time (ms)	Count							
	C Transmit	Start Node (Node-ID 10)		000	2	01 OA	-	-						
	C Transmit	Preop Node (Node-ID 10)		000	2	80 OA	-	-						
	🔿 Transmit	Stop Node (Node-ID 10)		000	2	02 OA	-	-						
	🔿 Transmit	Reset Communication		000	2	82 OA	-	-						
👈	C Transmit	Reset Application		000	2	81 OA	-	-						
👈	C Transmit	Restore All Default Parameters		60A	8	23 11 10 01 6C 6F 61 64	-	-						
👈	C Transmit	Save All Parameters		60A	8	23 10 10 01 73 61 76 65	-	-						
Þ. 🐒	C Transmit	Read Identity Object					Transmit Delay	(ms)						
🃦	C Transmit	Read Vendor ID		60A	8	40 18 10 01 00 00 00 00	0							
🣦	🔿 Transmit	Read Product Code		60A	8	40 18 10 02 00 00 00 00	0							
🥥	🔿 Transmit	Read Revision Number		60A	8	40 18 10 03 00 00 00 00	0							
	🔿 Transmit	Read Serial Number		60A	8	40 18 10 04 00 00 00 00	0							
🗉 🛣	🔿 Transmit	Start - 3s - Stop Device					-	-						
🗉 🛣	C Transmit	Start - 1s - Stop Device					-	-						
🍫	🔘 Transmit	Sync		080	0		100	0						
👈	🔿 Transmit	Remote request TPDO	Ext FD RTR	18Å	4		-	-						
🤏	C Transmit	Node Guard Request	Ext FD RTR	70A	1		500	0						
👈	C Transmit	Read Error Reg		60A	8	40 01 10 00 00 00 00 00	-	-						
🍫	🔘 Transmit	Seriennummer + SW-Version 1	Ext FD BRS	300	2	04 00	500	0						
🍄	C Transmit	Seriennummer + SW-Version 1	Ext FD BRS	300	2	04 00	500	0						
🤏	🔿 Transmit	Reset	Ext FD BRS	300	6	FF 52 45 53 45 54	500	1000						
🤏	C Transmit	CAN NS GetStatus	Ext FD BRS	00000300	1	00	1000	10000						
	C Transmit	CAN NS GetStatus		300	1	00	-	-						
🔒 No CAN controller available NUM 🤧														

Figure 9: Client "CAN Transmit"

#### 3.3.1.1 Functions

X

The following functions are provided by the menu and by the toolbar of the "CAN Transmit" menu:

		New	Opens a new "CAN Transmit" document (Ctrl+N).			
	2	Open	Opens an existing "CAN Transmit" document (Ctrl+O).			
		Save	Saves the current "CAN Transmit" document with its existing name or - if the document has not yet been given a name - with a new name (Ctrl+S).			
	*) *3	Create Message or Sequence	Creates a new CAN message or a sequence at the current position (Ins).			
	6) Es	Duplicate Message or Sequence	Duplicates a selected CAN message or a selected sequence (Ctrl + Ins).			
Ì	×	Delete Message	Deletes the selected CAN message (Del).			





Message Move Up Moves a selected CAN message in the list one place up (Shift+Arrow Up).



Moves a selected CAN message in the list one place down (Shift+Ar-row Down).

ID hex	Switch ID display	enabled: disabled:	display hexadecimal display decimal		
		uisabieu.	display decimal		
Data hex	Switch data display	enabled: disabled:	display hexadecimal display decimal		
		disabled.	display decimal		
А	Font	Opens a dialog to setup the font in the view "Messages".			

#### 3.3.1.2 Messages

The following properties can be used to define a CAN message:

Cycle	💱 The CAN message is transmitted once.
	$\Im$ The CAN message is transmitted cyclically with the set cycle time (10 ms
	60,000 ms). Up to max. 16 CAN messages can be defined as "cyclically".
Description	Additional description of a CAN message.
Туре	Set the properties of the message
	Ext CAN ID according to standard protocol, 11-bit (0x0000x7FF)
	Ext CAN ID according to extended protocol, 29-bit (0x00000000x1FFFFFF)
	RTR Sets the frame type as "Data frame"
	RTR Sets the frame type as "Remote frame"
	FD CAN FD message (only with supported hardware)
	BR5 CAN FD message with set bitrate switch
CAN ID	Identifier of the CAN message to be transmitted
ID-Name	Name of the CAN ID. This name can be used by all other CAN messages with the same CAN ID.
DLC	Number of data bytes to be sent
Data	Used to enter the data to be transmitted. The number of bytes entered is used for the data length code (DLC), irrespective of the selected frame type (RTR).
Cycle time	Interval in ms with which a CAN message is transmitted repeatedly. (only at $\Im$ )
Cycle count	Number of cyclically transmitted messages. 0 for unlimited transmission. (only at $\Im$ )

Selecting the "*Transmit*" button transmits the appropriate CAN message either once or repeatedly. Selecting the button once more deactivates the cyclic transmission of a CAN message.



#### 3.3.1.3 Sequences

With the aid of sequences, it is possible to send several CAN messages with a defined time interval once or cyclically. A sequence can contain a maximum number of 100 CAN messages.

The following properties are available for the definition of a sequence:

Cycle	<ul> <li>The sequence is transmitted once.</li> <li>The sequence is transmitted cyclically with the set cycle time (10 ms 60,000 ms).</li> <li>A maximum of one sequence can be sent at a time.</li> </ul>
Description	Additional description of a sequence.
Cycle time	Interval in ms with which a sequence is transmitted repeatedly. (only at S) If the cycle time is less than the duration of all messages in this sequence, including the transmission delay, the sequence is canceled and starts from the beginning.
Cycle count	Number of counts for the cyclically transmitted sequence. 0 for unlimited transmission. (only at 💁)
Transmit delay	When the sequence is opened, a transmission delay in ms can be entered for each message within a sequence.

Selecting the "*Transmit*" button transmits the appropriate sequence either once or repeatedly. Selecting the button once more deactivates the cyclic transmission of a sequence.



#### 3.3.2 CANvision Receive Clients

The both CANvision receive clients "CAN Receive", "CANopen Receive" and "SAE J1939 Receive" can be started via the CANvision server.

#### 3.3.2.1 Functions of both clients

The following functions are provided by the menu and the toolbar:

	New	Opens a "Receive clients" document (Ctrl+N).
6	Open	Opens an existing "Receive clients" document (Ctrl+O).
	Save	Saves the current "Receive clients" document with its existing name (Ctrl+S).
4	Delete list	Deletes all received messages from the list
Y	Filter	Sets a filter for the CAN messages to be received ("Hide/unhide CAN messages)
	Trigger	Activation of a trigger on the CAN-ID or data fields with adjustable amount of telegrams after trigger (F10)
F	Scroll	Displays the messages in the order in which they were received
	Overwrite	Displays the received messages sorted by their CAN ID/Object type/PGN.
6	Time stamp, relative	Displays the time stamp relative to the time stamp of the message received previously
<u>↓</u>	Most recent	Shows the most recent message in the list.
А	Font	Opens a dialog to setup the font for the receive windows.
<i>8</i> 4	Search	Opens the "Search" dialog. Allows searching the ID- or the data field (Ctrl+F)
#4↓	Continue search	Searches for the next term specified by "Search" (F3)
<i>8</i> Ơ	Search backwards	Searches for the previous term specified by "Search" (Shift+F3)



#### 3.3.2.2 Filter

The "Filter..." command in the "Settings" dialog enables the configuration of a filter<sup>2</sup> for CAN messages. There are two lists for filtered and accepted identifiers. You can choose a complete identifier group by way of the masks or else perform a direct selection of the identifiers to be filtered.

CAN Monitor Receive - Settings		x
Constraints Constraint Const	Filter Filter Configuration SOB0000000X OR NXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	Mask         Value           0x         3 FC         0x         0 00           Mask         Value         0x         0 00
	IDs filtered           0 04           0 05           0 06           0 07           0 08           0 09           0 0A           0 0B           0 0C           0 0D	0x 0 00 0x 0 00 1Ds accepted 0 00 0 01 0 02 0 03 4 00 4 01 4 02 4 03
	ОК	Cancel <u>A</u> pply

Figure 10: Receive clients - Filter dialog

A maximum of two OR'd masks is provided to select an identifier group. Each bit in the identifier masks can be assigned to one of the following values:

- X Bit is not relevant
- 0 Bit is relevant and must be "0"
- 1 Bit is relevant and must be "1"

The selection can be performed either using the appropriate buttons or by entering the appropriate hexadecimal values for Mask and Value. The bit value "1" in the Mask field means that this bit is relevant, while bit value "0" means that this bit need not be used for filtering. In the Value field, you specify the bit value

which the relevant bits in the Mask field must assume to be accepted by the filter.

For the direct selection, the relevant identifiers can be highlighted in the lists and moved between the groups of filtered or accepted IDs. Direct selection will deactivate the filtering of identifier groups.

<sup>2</sup> The filter is available for 11 bit identifier only



#### 3.3.2.3 Trigger

The command "Trigger..." can be found in the "Settings" dialog and allows the user to configure a trigger on CAN-IDs (standard or extended) or on any data field.

Parts of the data field can be masked. Parts with "X" are irrelevant for the trigger function. In Figure 12 all messages containing a 02hex as the second data byte are being triggered.

Additionally, the user can configure the number of frame messages after the trigger point and the behavior after their reception:

- "stop receiving" stops the recording of the message frames in the receive window
- "stop CAN controller" deactivates the CAN controller. All sending action in the client "CAN Transmit" will be stopped.

CAN Monitor Receive - Settings				х
Settings General Filter Trigger	Trigger Configuration Trigger what: Trigger in: Behavior on Trigger After 10 tel	XX 02 XXXXX         Data (hex)         Format         Image: mail to be a constrained of the c	ID type standard extended ceiving	
		OK Cano	el <u>A</u> pply	

Figure 11: Receive clients - Trigger options



#### 3.3.3 CANvision Client "CAN Receive"

The following additional functions are provided by the menu and the toolbar:

⊞	Symbolic Decoding	Activates symbolic decoding for all received CAN messages.		
	Switch ID display	enabled: disabled:	display hexadecimal display decimal	
Data hex	Switch data display	enabled: disabled:	display hexadecimal display decimal	

The following message property (type) is additional available to the transmit client:

Туре

**E**R Identification of self-transmitted messages

The CANvision client "CAN Receive" serves to receive and display CAN messages. There are two modes of display:

"Scroll" mode: Presentation of the CAN messages in the order in which they are received (Figure 12)

) is2dwv	w-receive.cmr - CANvis	sion Client - CAN Receive			_ = X			
<u>F</u> ile F <u>u</u>	<u>File Functions View Iools</u>							
D 🞽	🖃 📀 📀 🔕 🤇	) 🖉 🏹 🖬 🔳	🗄 👌 🛃 📙	Data A AA AA AA AA				
No	Time stamp (absolu	te)	Туре	CAN ID (hex) Data (hex) Da	ita (ASCII)			
🕜 CAN	controller st	tarted (26.01.201	1 12:34:48)					
0	26.01.2011	12:34:48,704,018		701 00 .				
1	26.01.2011	12:35:51,707,018	RTR	70Å Remote frame (length = 1)				
2	26.01.2011	12:35:51,707,018		70A 7F 🗆				
3	26.01.2011	12:35:52,207,018	RTR	70Å Remote frame (length = 1)				
4	26.01.2011	12:35:52,207,018		70A FF ÿ				
5	26.01.2011	12:35:52,708,018	RTR	70A Remote frame (length = 1)				
6	26.01.2011	12:35:52,709,018		70A 7F 🛛				
🕕 Rece	eive stopped	(26.01.201	1 12:36:06)					
🕕 Rece	eive continued	d (26.01.201	1 12:36:08)					
7	26.01.2011	12:36:12,515,018		60A 40 18 10 01 00 00 00 00 0				
8	26.01.2011	12:36:12,516,018		58Å 43 18 10 01 59 01 00 00 C	ү			
9	26.01.2011	12:36:13,313,018		60à 40 18 10 01 00 00 00 00 00				
10	26.01.2011	12:36:13,314,018		58% 43 18 10 01 59 01 00 00 C	Y			
🔇 CAN	controller st	topped (26.01.201	1 12:36:15)		~			
🔒 No CAI	N controller available				NUM .;;			





"Overwrite" mode: Presentation of the received CAN messages sorted by their CAN ID. (Figure 13)

) is2c	lww-receive.cmr - CANvision	Client - CAN Red	ceive				-	x
<u>F</u> ile	Functions $\underline{V}iew \underline{I}ools$							
	j 🛃 📀 🧭 😫 🔟	🥒 🍸 🖬	H H H 5	Hex bex	A   #A #A↓ #A↑			
No	Time stamp (relative)	Count	Туре	CAN ID (hex)	Data (hex)	Data (ASCII)		
1	0,151,45672	12		300	02			
2	0,798,45672	2		58A	43 18 10 01 59 01 00 00	СҮ		
3	0,798,45672	2		60A	40 18 10 01 00 00 00 00	0		
4	0,502,45672	4		70A	7 <b>F</b>			
5	0,501,45672	3	RTR	70A	Remote frame (length = 1	.)		
🔒 No	CAN controller available						NUM	.::

Figure 13: Client: CAN Receive - "Overwrite" mode

#### Symbolic Decoding:

CAN messages can be displayed as a symbol to relieve their interpretation. Their representation is adapted via a symbol file. If symbolic representation is selected, the CAN IDs are displayed by their symbolic names. The sequences of bits of a CAN message are marked as signals with names. These signals can display the raw data transmitted by CAN either in decimal or hexadecimal format or - if requested - convert them automatically and show them as a physical value with its unit. With the descriptions of the values (Enums) certain variables can be displayed alphanumerically. Different definitions of the data can be determined in a CAN ID by multiplexers.

For decoding the messages, the CAN-Bus Tester 2 uses a symbol file. Symbol files can be created by using the free of charge symbol editor **CANsymEdit**. Select one symbol file to be used for the representation.

A detailed description of the creation of symbol files is available in the user manual of the symbol editor.

O CANMonitorRcv_Sym.cmr - CAN-Bus Te	ester 2 ·	- CAN Receive				-	x
<u>File Functions View Tools</u>							
🗅 🚅 🛃 🌔 🖉 🕄 🕕 🧳 🕯	7 🖬		JD hex	hex A A	284; 284†		
Symbolic Decoding	No	Time stamp (relative)	Info	Name	Data (decoded)	Data (ASCII)	^
Messekoffer.symx 💽 📄 🝷	0	AN controller :	started	l (14.06.	2015 22:00:39)		
🗹 CAN telegrams (RAW)	1	50,137,000		_	ID:100		
····· V CAN telegrams (undefined)	2	0,268,000		Sync	ID:303 00 02 EC 00 14 01	2	
🗹 🖂 0x100 (Sync) 🗹 🖂 0x303 (ReplyNS1)	4	0,200,000		ReplyNS1			
-M, FSC					Status = 0x02		
🔨 Status					<pre>InclinationValue_X = 2,36°</pre>		
···· <sup>m</sup> ∕ 0x0 - InclinationValue_X					InclinationValue_Y = $2,76^{\circ}$		
	3	0,408,000			ID:305 00 02 D9 00 0B 01		
Im M FSC				ReplyNS2	FSC = Read Inclination Value Status = 0x02		
					InclinationValue $X = 2,17^{\circ}$		
"\ 0x0 - InclinationValue_X 💽					InclinationValue_Y = 2,67°		~
🔒 No CAN controller available							.::

Figure 14: Client: CAN Receive - Symbolic decoding



#### 3.3.4 CANvision Client "CANopen Receive"

#### License note:

Receiving of CANopen messages is only available if the corresponding software license is supported by the connected USB dongle. (see Section 3.2.6 "Licensing").

The CANvision client "CANopen Receive" serves as a monitoring tool for the analysis of CANopen-based systems. It interprets all received messages according to the CANopen specification. The messages are recognized as SDO, PDO, NMT, Sync, Time stamp, heartbeat and emergency objects and interpreted accordingly.

The following additional function is provided by the menu and the toolbar:

Raw data	Raw data	Shows the undecoded CAN messages.
Unde	Undefined data	Shows undecodable messages according to the CANopen specification mes- sage. (mixed bus systems)
<b>≠</b> 000	Buffered SDO transfer	Shows the multi-part SDO transfer as overall access or as single messages. (CANopen only)

There are two modes of display:

Mode Scroll:	Presentation of the CANopen mess. in the order in which they are received
Mode Overwrite:	Presentation of the received CANopen messages sorted by object type.

👬 CANopen - Screenshot.cmr - CAN-Bus Tester 2 - CANopen	Receiv	e			- = x
Eile Functions View Node-IDs					
🗅 🗃 🖬 🌕 🥝 🔀 🕕 🖉 🎦 🔚 🖽	3	<mark>↓</mark> <sup>≠</sup> ∭ A			
- Object Types	No	Time stamp (relative)	Node-ID	Object	Data
CAN telegrams		CAN-Controller	gesta	rtet (25.0	4.2012 15:14:20,819)
Undefined	1	-			ID:70A 00
MMT			10	Boot-up	-
	2	00:00:00,001			ID:08A 10 50 21 00 01 00 00 00
Emergency			10	Emerg	Error code = 5010h
PDO					CANopen device hardware: Longitudinal value out of range
SDO					Error register = 21h
Guarding/Heartbeat					Manspec. error code = 00 01 00 00 00
LSS Protocol	3	00:00:00,057			ID:60A 40 55 55 03 00 00 00 00
- Node-IDs	4	00:00:00,002			ID:58A 43 55 55 03 A1 21 A1 21
🐁 🗙 🛱 💩 cia - 🗒 🥔			10	SSDO	Read 5555/03 -> RIV = 21A121A1h
	5	00:00:01,729			ID:000 80 00
Node-ID Device Name Device Profile EDS/DC				NMT	Enter pre-operational
✓ 008 ✓ 009	6	00:00:00,100			ID:080
✓ 009 ✓ 010 IS2D 90 P21 EDS File PR-23				Sync	
▼ 011	7	00:00:00,001			ID:18A OF OO
012			10	TPD01	Slope Long16 = 15
013					Slope Lateral16 = unknown
014	8	00:00:00,001			ID:080
015				Sync	
016	9	00:00:00,100			ID:18A OF CO
017			10	TPD01	Slope Long16 = 15
<ul> <li>✓ 018</li> <li>✓ 019</li> </ul>					Slope Lateral16 = unknown
	10	00:01:01,669			ID:58A 43 55 55 03 A1 21 A1 21
			10	SSDO	Not initiated SDO-Transfer
🔒 No CAN controller available					NUM .

Figure 15: Client: CANopen Receive



#### Filter configuration:

The filtering of the CANopen messages can be done for object types and node number (Node-ID) by checking the appropriate checkboxes.

#### Node configuration:

The basis for the interpretation of CAN messages is the device description of the individual CANopen nodes. This description can be done for each device/node (Node-ID) by loading the corresponding EDS / DCF file. If no file is available, the device description can be made by selecting the device profile. In addition a manual configuration of each node number is also possible. (Figure 16)





#### 3.3.5 CANvision Client "SAE J1939 Receive"

#### License note:

Receiving of SAE J1939 messages is only available if the corresponding software license is supported by the connected USB dongle. (see Section 3.2.6 "Licensing").

The module "SAE J1939 Receive" serves as a monitoring tool for the analysis of SAE J1939-based systems. It interprets all received messages according to the SAE J1939 specification. The messages are decoded and displayed with there source address, Parameter Group and the individual signals (Suspect Parameter) with name, value and unit. A comprehensive filter function limits the representation a to the desired information. The complete deposited SAE J1939 database is also available via a search engine, so that PGN and SPN can be looked up at any time.

The following additional functions are provided by the menu and the toolbar:

Raw data	Raw data	Shows the undecoded CAN messages.
Unde fined	Undefined data	Shows undecodable messages according to the SAE J1939 specification message. (mixed bus systems)

There are two modes of display:

Mode Scroll: Presentation of the SAE J1939 messages in the order in which they are received
 Mode Overwrite: Presentation of the received SAE J1939 messages sorted by object type.

e F <u>u</u> nctio	ns <u>V</u> iew <u>T</u> ools							
🚔 🔒 (	🔊 🥝 🛛 🛈 🌽 🤇	7 🖬 🖽	E 🛃 🛃 Raw Under	A A A A A A	No filter active		•	
Filter	Source Address	No	Time stamp (relative)	SA PGN		SPN	SPN Description	SPN Value
Activate	🎭 🗙 🕰	6345	0,002,986	ID:18FF5000			Data:FF FF 28 03 2E 42 0A 1F	
	Data Fo Color	6346	0,000,470	ID:0000160			Data:00 00 00 00 00 00 00 00	
0	hex			96 0 (Torque/Spee	d Control 1)	695	Engine Override Control Mode	0 - Override disabled - Di
84	hex			- PF: 0		696	Engine Requested Sp Control Conditions	0 - Transient Optimized fo
96	hex			- Destinatio	n Address: 1	897	Override Control Mode Priority	0 - Highest priority
						898	Engine Requested Speed/Speed Limit	0.000 rpm
						518	Engine Requested Torque/Torque Limit	-125%
						3349	TSC1 Transmission Rate	0 - 1000 ms transmission
						3350	TSC1 Control Purpose	0 - P1 = Accelerator Peda
	ilter PGN's					4191	Engine Requested Torque (Fractional)	0.000%
ctivate	🎭 🗙 😤					4206	Message Counter	0 count
	Label					4207	Message Checksum	0 count
)	Torque/Speed Cont	6347	0,000,512	ID:0000154			Data:00 00 00 64 90 07 00 00	
				84 0 (Torque/Spee	d Control 1)	695	Engine Override Control Mode	0 - Override disabled - D
				- PF: 0		696	Engine Requested Sp Control Conditions	0 - Transient Optimized f
				- Destinatio	n Address: 1	897	Override Control Mode Priority	0 - Highest priority
						898	Engine Requested Speed/Speed Limit	0.000 rpm
						518	Engine Requested Torque/Torque Limit	-25%
						3349	TSC1 Transmission Rate	0 - 1000 ms transmission
	ilter SPN's					3350	TSC1 Control Purpose	18 - P6-P31 = Reserved fo
ctivate	🐁 🗙 🛱 👘					4191	Engine Requested Torque (Fractional)	0.875%
						4206	Message Counter	0 count
						4207	Message Checksum	0 count
		6348	0,000,469	ID:0000150			Data:00 00 45 01 00 00 00 00	
all SI	PN's allowed	6349	0,000,597	ID:18E00001			Data:00 00 00 00 00 00 00 00	
		6350	0,000,598	ID:18FF5301			Data:00 00 00 00 00 00 00 00	
		6351	0,000,554	ID:1CFEC301			Data:00 04 00 00 00 00 00 00	
		6352	0,000,598	TD:18FEF101			Data:04 00 00 00 00 00 00 00	

Figure 17: Client: SAE J1939 Receive



Filter configuration:

The filtering of the SAE J1939 messages can be done for Source address, Parameter Group (PGN) and the individual signals (Suspect Parameter - SPN) by checking the appropriate checkboxes.

	Browse list
PGN	Label
0	Torque/Speed Control 1
256	Transmission Control 1
512	Electronic Brake System #1/1
768	Electronic Brake System #2/1
1024	External Brake Request
1280	CANopen Application Message #1/1
1536	CANopen Application Message #2/1
1792	General Purpose Valve Pressure
2048	Auxiliary Input/Output Status 5
2304	Static Roll Angle Sensor Information
2560	Cruise Control / Vehicle Speed 2
2816	Advanced Emergency Braking System 2
3072	Electronic Engine Controller 16
limit of 0° retarder be used limit is re	n: etarder may be disabled by commanding a torque %. Use of the limit mode allows the use of the only up to the limit specified in the request. This can to permit retarding of up to 50%, for example, if that quired by some device such as an EBS, or it can ne use of the retarder by others, as when an ABS
	Add Cancel

earch:	engine	
SPN	Name	-
20	Engine Coolant Pressure 1 (Extended Range)	
22	Engine Extended Crankcase Blow-by Press	
27	Engine Exhaust Gas Recirculation 1 Valve P	
51	Engine Throttle Valve 1 Position 1	
52	Engine Intercooler Temperature	
72	Engine Blower Bypass Valve Position	
82	Engine Air Start Pressure	
92	Engine Percent Load At Current Speed	
94	Engine Fuel Delivery Pressure	
95	Engine Fuel Filter Differential Pressure	
98	Engine Oil Level	
99	Engine Oil Filter Differential Pressure	
100	Engine Oil Pressure	-
escriptio	n:	
The posi	tion of the valve used to regulate the supply of a	
fluid, usu	ually air or fuel/air mixture, to an engine. 0%	
represer	its no supply and 100% is full supply.	
		-

Figure 18: SAE J1939 filter configuration (PGN, SPN)



## **4** Ordering Information

Product	Description	Article number
CANvision <sup>®</sup> - Protocol Monitor Starter set	CANvision <sup>®</sup> - Protocol Monitor USB license dongle User manual (German/English) 1 Year Support extension	PR-22570-00
Support extension 1 Year	Entitles you to install / use of all published software updates within the support period. (included with the purchase of PR-22570-00 for the first year)	SW-22570-00
CANvision Client "CAN Transmit/Receive"	License key for • CANvision Client CAN Transmit/Receive	SW-22570-10
CANvision Client "CANopen Receive"	License key for • CANvision Client CANopen Receive	SW-22570-11
CANvision Client "SAE J1939 Receive"	License key for • CANvision Client SAE J1939 Receive	SW-22570-12

Table 2: Ordering information

## GEMAC

## 5 Notes


