KNORR-BREMSE

Service Terminal ST03A

General information and functions

(GD19841/ESRA)

User's Guide

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1 Introduction

ST03A – Service Terminal for Windows

ST03A (STN30440) is a railway brake and door system diagnostic and maintenance software. Supported systems are:

- ESRA brake systems of Knorr-Bremse
- Door systems of IFE (member of Knorr-Bremse Group)

The software is designed for Microsoft Windows platforms. It is able to communicate with ESRA electronics via Ethernet, RS-232 or CAN connection. ST03A connects to DCU systems using Ethernet or RS232 connection.

ST03A is a general tool so it has to be customized for a specific railway project via the project file. Knorr-Bremse always delivers the project files (`*.prj, *.project, *.prz, *.eprz, *.mpz, *.empz`) directly to the customer.

Support (Hotline Service Terminal)

Website of ST03A: http://st03a.knorr-bremse.com/

Hotline Service Terminal e-mail: esraterm@knorr-bremse.com

Hotline Service Terminal phone: +36 1 289-45-00

Hotline Service Terminal fax: +36 1 289-45-04

Content of ST03A help

For new users to Service Terminal we recommend reading the Introduction section of the help to find out how to connect to the target system, what is a project for or how to use the GUI. New operators of brake and door systems may also read the Glossary to get familiar with the terms used in Service Terminal. In case any unexpected error occurs, the easiest ways of error reporting are also described.

Experienced users may find it useful to read the section Hotkeys for easier handling of the GUI.

After installing Service Terminal you will need a license to get full access rights to its functionality. The way you can get a license is described in the topic Licensing. This help shows in the description of each feature which license level is needed for usage. These license levels are marked with the following labels:

Default   Operator   OEM

The detailed functionality of Service Terminal is described in four topics.

- Project: This topic contains the project-related features. A project file makes the Service Terminal able to be used with a specific ESRA/DCU system.
- Services: This topic contains the description of the features not related to measurement or data logging.
- Measurement: Measuring and visualizing previously measured data, printing and saving are described here.
- Data Logging: Data logging is a measurement performed by the ESRA system without connected Service Terminal or user interaction. You will find here how to set up data logs and how to read out and visualize saved data.

1.1 New Features in ST03A V3.10

In this page you can find a list of new features of ST03A V3.10 compared to V3.7. The minimum license level needed for the service is also displayed.

Description	Reference	License ESRA	License DCU
New in V3.10			
ESRA and DCU			
Manual zoom	Measurement	Operator	Operator
New in V3.9			
ESRA			
Event Channels and I/O Channels measuring	Events Properties I/O Channels Properties	Operator	
ESRA and DCU			
Absolute or relative time is used for measurement	Measurement	Operator	Operator
New in V3.8			
New measurement (with multiple connections)	Measurement	Operator	
New Data Log	Data Log Configuration	Operator	
New in V3.7			
Data Log via CAN connection	Advanced Data Log Manager	Operator	
Offline Data Log	Offline Data Log	Operator	
Bulk Data Log via Ethernet connection	Bulk Data Log Download Downloaded Data Log Browser	Operator	
Project defined IP address support	Device selection	Default	
HCM2 support		Default	
Extended Unit Information - Detail View	Unit Information	Default	
IPS measurement support	Default		
I/O Channel and Process Data custom groups	I/O Channel Process Data Custom Group Import	Default	Default
DCU			
DCU_V3 protocol support in I/O Channels			Default

1.2 ESRA and DCU Projects

ST03A supports both ESRA brake systems and IFE DCUs (Door Control Units). To access full functionality of Service Terminal with both systems you need

- A system-specific project file that defines the accessible features of the connected system.
- A license for the appropriate system type.

Project file

Service Terminal is a general tool that needs to be customized for each connected system configuration. Some of the most important content of the project files are:

- Type of system described by the project file.
- What boards/components are in the BCU/DCU and at which address (node number)?
- What inputs and outputs does each component have?
- What application should be running on each board?
- What kind of information can be retrieved from the application and how?
- Who can access any information in the application (at which license level)?

To get full access to the features depending on the project, load the project file into Service Terminal using the menu item *File / Open...*. If you find either in the menu disabled features or in the tool bar disabled buttons, this means either the project does not support the given feature or that you simply haven't loaded a project file yet.

Project files are always delivered to the customer directly by Knorr-Bremse. One project file can only be used with the BCU/DCU it is designed for. For any questions about your project file content please contact your Knorr-Bremse contact person.

Operation mode (ESRA mode and DCU mode)
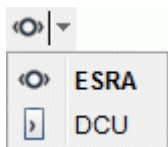
The opened project defines automatically the operating mode (ESRA/DCU). Without project the operating mode is selectable, you can choose ESRA or DCU mode from the toolbar. The System Mode Icon in the bottom right corner of the main window shows the current mode of ST03A. When a project file is open the project file type (DCU)/(ESRA) is displayed in the title row too.

ESRA Mode

If an ESRA project file is loaded then ESRA Mode is active.

Only the licenses of type ESRA influence the accessibility of features.

DCU related features are not accessible and a connection to a DCU is not possible.

The online help contains the description of all ESRA features and basic information about DCU mode. Full DCU help is available while ST03A is in DCU mode.

DCU Mode

If a DCU project file is loaded then DCU Mode is active.

Only the licenses of type DCU influence the accessibility of features.

ESRA related features are not accessible and a connection to a BCU is not possible.

The online help contains the description of DCU features only. ESRA related features are available when switching back to ESRA mode.

When switching between the two modes (by opening a project file of different type then the previous) the connection to the connected system may be dropped and access rights reinitialized based on the licenses for the new system type. The content of the online help will comply with the current mode.

Help content in ESRA mode and DCU mode

Even if the most services have the same name in both modes there are smaller differences in the usage and in the GUI in the two modes. Therefore when you are changing the mode then the help content also changes. Basic information is common but the description of services appears according to the current mode. A service not existing for a mode will not be listed in the help while that mode is active.

1.3 Communication

In this topic the indicators of communication between ST03A and any supported device are described. The settings of communication are discussed in the topic Communication Settings. The installation of the communication devices are described in the topic Device Driver Installation.

The ST03A communication indicators appear in the bottom-right corner of the main window and also in the open measurement windows. Following indicators are used:

Communication icon
　　Shows the connection state to the ESRA or DCU system.

Interface icon
　　Shows the type of connection used to connect to the ESRA or DCU system.

System mode icon
　　Shows the type connected system (ESRA or DCU).

Measurement device icon
　　Shows the connection state of the SU06A measurement device.

Communication icons

In the lower right corner of the main window of ST03A there are two communication icons.

The icon contained in the box on the right indicates the **communication state** of the ESRA or DCU unit:

	Communication OK	The communication connection is available but not being used.
	Communicating	Communication is running. The arrows indicate the direction of communication.
	Collision	Both direct CAN and CB12A Ethernet communication are active. Remove direct CAN connection.
	No communication	Communication is turned off or can not be established.

Interface Icon

The icon contained in the box directly to the left of the communication state symbol indicates the type of **communication interface**:

	Ethernet			Vector CANcaseXL
	Ethernet over USB			IXXAT CAN-to-USB compact
	Softing CANPROusb *(preferred)*			Softing CANusb
	Serial Interface			Softing CAN-AC2 PCI *(obsolete)*

When the communication interface icon is double-clicked the dialog window **Options** appears, where the communication settings can be selected. This dialog window can also be opened using the **Tools / Options... / Devices** menu item.

Some communication interfaces work only with installed device driver. A description of the installation processes can be found in the topic Device Driver Installation.

System Mode Icon

Next to the interface icon (third box) the type of connected system is indicated.

	ESRA BCU connected
	DCU connected
	Cannot connect to ESRA BCU (DCU project file open)
	Cannot connect to DCU (no project file open, ESRA project file open, or required license missing)

The two system modes support different communication devices. For further details please see the topic Communication Settings.

Measurement Device Connection Indicator Icon

SU06A

If SU06A is properly installed (see Device Driver Installation) and connected then the SU06A connection indicator icon ( ) will appear in the bottom of the ST03A main window.

	SU06A is connected
	SU06A is not connected
	SU06A has been manually disabled

If more instances of ST03A are running parallelly, the SU06A can only be connected to one instance. You can decide which instance should be connected to SU06A if you enable/disable the communication by clicking the SU06A communication indicator.

DGH03

If DGH03 is properly installed (see <u>Device Driver Installation</u>) and connected then the DGH03 connection indicator icon () will appear in the bottom of the ST03A main window.

	DGH03 is connected
	DGH03 is not connected
	DGH03 has been manually disabled

If more instances of ST03A are running parallelly, the DGH03 can only be connected to one instance. You can decide which instance should be connected to DGH03 if you enable/disable the communication by clicking the DGH03 communication indicator.

1.4 Communication Devices

Access:

Menu	Tools / Options...
Hotkey	Ctrl + Shift + T
Mouse	double click on communication device icon
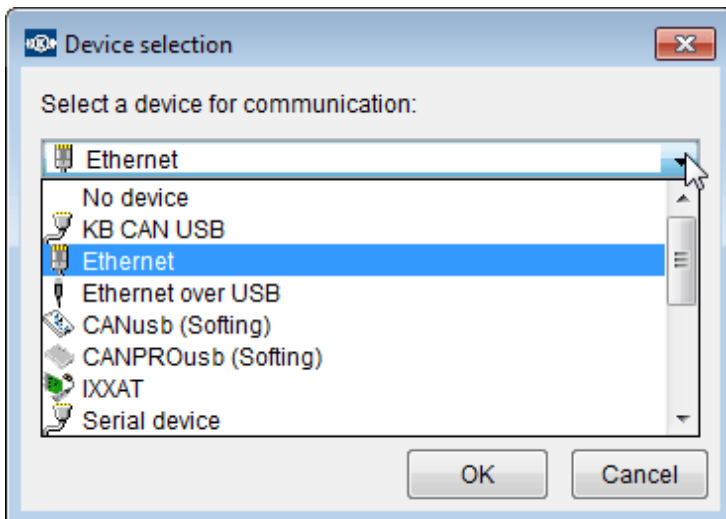
In general there are three ways to connect ST03A to ESRA and two ways to connect to a DCU:

Ethernet

    ESRA: A board that supports Ethernet connection (e.g. CB12A) is needed. This is the most flexible way to connect to ESRA systems in an Ethernet network.

    DCU: A DCU that supports Ethernet connection and a corresponding DCU-type project file that supports TCH protocol is needed.

Serial

ESRA: A serial cable can connect the MMI of the ESRA to the PC where ST03A runs.

DCU: A DCU-type project file that supports TCH protocol is needed.

CAN device

ESRA: A CAN device can connect a Service Board (SB) in the ESRA-System with a given port of the PC depending on the device (USB is most commonly used nowadays). CAN devices grant a faster connection to ESRA then serial connections do.

DCU: -

In this menu you can select the device you would like to use for communication. You can choose your device from the drop down. If you connect or disconnect a device and you want the list to be refreshed, please click the

(scan for device changes) button.

⚠️ **Warning!** Before removing a device from your USB port, always turn off the device using the device selection menu otherwise the operating system may crash or the expected lifetime of the device may be shorter. The easiest way to close down a device is:

- Double click on the device icon in the bottom-right corner of the window.
- Select No device in the Options window.
- Click OK to close the Options window.
- Wait until Service Terminal loses connection to ESRA (Connection indicator: 🔴).

Restrictions on available connection modes

The list of available connection modes depend on the active license types and the type of open project. The restrictions are listed below (license types refer to the highest available license level):

1. *Default* or *Temporary Operator* license: No Ethernet connection available.
2. DCU project file loaded: DCU can be connected by Serial (any license and any DCU project type) and Ethernet (*Operator license* or higher and only with that project type which contains DCU TCH protocol) communication.
3. DCU project file loaded, ESRA system connected: connection is disabled.
4. ESRA project file loaded, DCU system connected: connection is disabled.
5. No project file loaded: ESRA or DCU mode can be selectable without project.

If a device in the list appears in gray despite the above limitations then the driver of the device may not be installed properly (see topic Device driver installation).

Communication devices in DCU mode

There are different protocols that can be used to connect to a DCU. The project file describes which protocols can be used to communicate with the DCU.

Category	Protocol	Connection	Comment
Ethernet	TCH	Ethernet	Available if supported by project.
Serial	TCH	Serial / RS232	Available if supported by project.
	V1	-	*Not yet supported by ST03A.*
	V3	Serial / RS232	Available if supported by project.

Supported devices in ESRA mode

Category	Device	Company	ESRA	PC	Comment
Ethernet		-	CB12A(Ethernet)	Ethernet	most flexible way to connect to ESRA, preferred
Ethernet over USB	(USB cable)	-	CB12A(USB)	USB	direct connection to CB12A (see installation notes below)
Serial	(serial cable)	-	MMI(RS232)	RS232	slow, cable should be short otherwise SW installation may fail
	SB06	-	Service board	USB	fast
CAN device	CANusb	Softing	Service Board	USB	fast, preferred
	CANPROusb	Softing	Service Board	USB	fast
	CANcaseXL	Vector	Service Board	USB	fast, preferred
CAN device	USB-to-CAN compact	IXXAT	Service Board	USB	fast (see installation notes below)
	CAN-AC2 PCI	Softing	Service Board	PCI slot in PC	fast, needs the same driver as CANusb

Communication settings

Some connection configurations require additional parameters:

Ethernet
> The IP address of the target can be set directly or from a predefined list.

Serial (Communication Port COMx) - Baud rate
> The baud rate of connection can be set for different board types (MMI-RTC, Simple MMI, HCM).

Configuration of Ethernet connection

The ST03A provides the following options to configure the Ethernet connection:

- Custom target definition
- Custom target list
- Target definition from project

Note: It is not needed to define the port for Ethernet connection. In case of missing Ethernet port definition the ST03A will use automatically the project defined port if exist, else the default port (51002)

Custom target definition
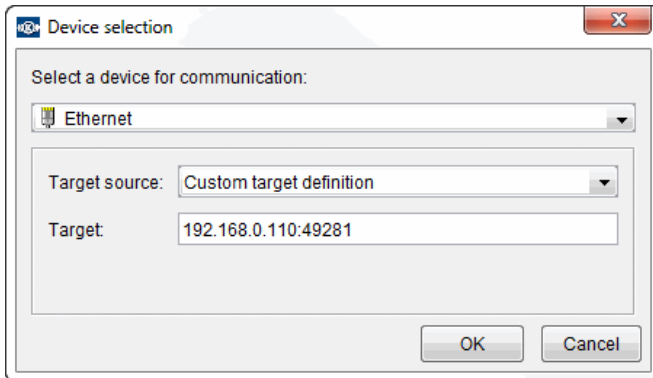
The Ethernet connection can be configured by IP address or host name with an additional port definition.

Custom target list
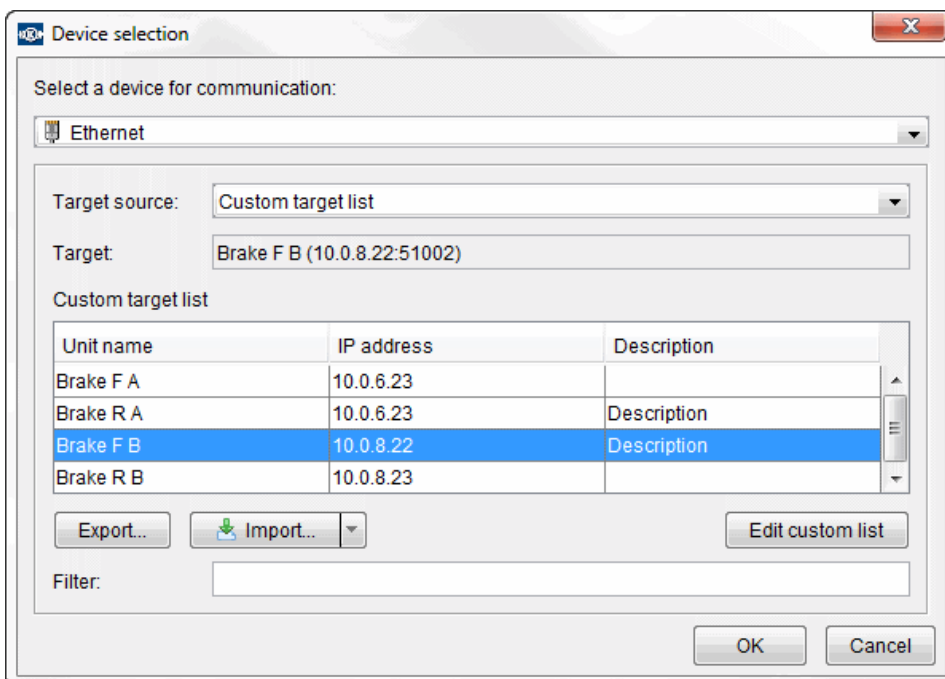
In this case the target to be connected can be selected from a list. The target definitions are stored in a local ST03A version independent file, which means a new ST03A will be able to use your already defined targets.

This option provides some additional functions:

Export...
> This function makes it possible to transfer or share your target definitions. It will display a Save window where you can select the target folder where the target definitions file will be saved to. The result file can be imported in any ST03A version which supports this function.

Import...
> This function provides option to import target definition from external files. It is possible to replace or extend your target definitions by the imported ones.

Edit

It will open a separated window where you can edit your target definitions, add a new one or delete an existing target definition.

Unit name	IP address	Description	
Brake F A	10.0.6.22		✖
Brake R A	10.0.6.23	Description	✖
Brake F B	10.0.8.22	Description	✖
Brake R B	10.0.8.23		✖
Breq	11.1.1.1		✖
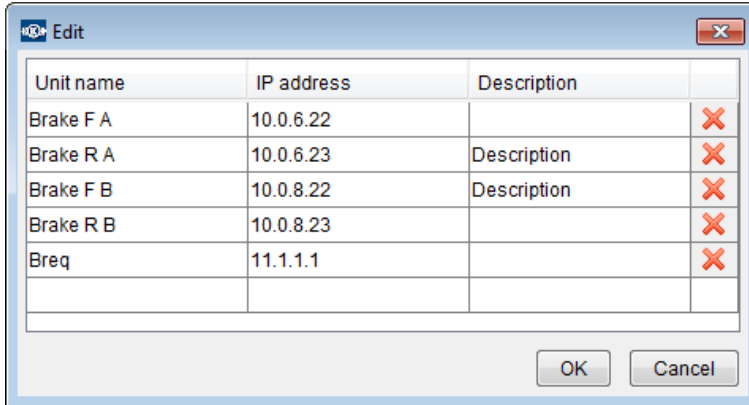
To edit a target definition just click in a cell. Type the properties of target definition to add a new one. Use the button in the last column in the table to delete the target definition. The changes will be saved by closing the Edit window by OK. The ST03A will ask for a confirmation from the user before committing the changes in the target definition file.

Filter

It filters the targets in the list according to finding the defined filter text in their any properties.

Note: The Export, Import and Edit function may be disabled in some project specific version according to the project requirements.

Target definition from project

This option is available only if the opened project contains target definitions. In this case the target to be connected can be selected from a list.

Select a device for communication:

Ethernet

| Target source: | Target definition from project |
| Target: | CB09D (192.168.0.112:51002) |

Project list

Unit name	IP address	Description
CB09D	192.168.0.110	
CB09D	192.168.0.111	
CB09D	192.168.0.112	
CB09D	192.168.0.112	

Filter:
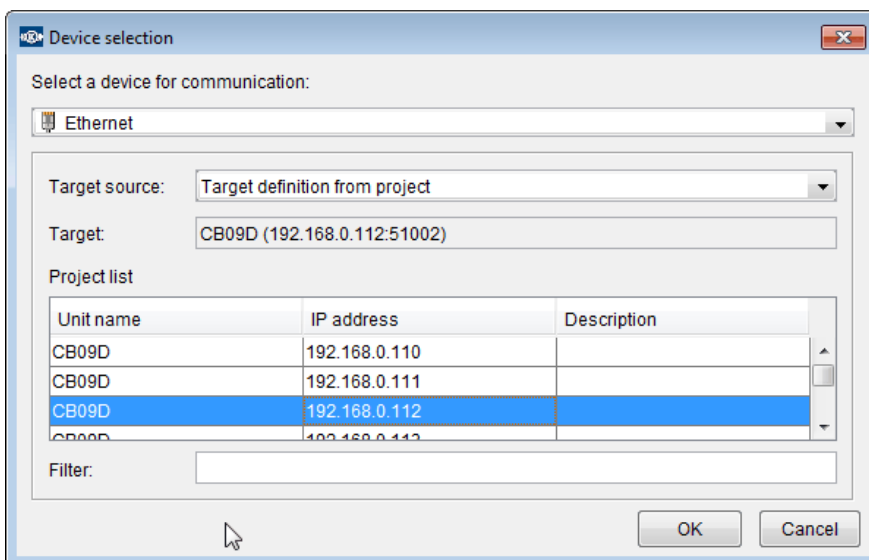
1.5 Device Driver Installation

Most of the communication devices and the measurement instruments (SU06A and DGH03) needs to be installed separately in addition to the installation of ST03A. In this page you can find some short overview about the installation packages delivered with Service Terminal and some advice about the installation process. If a device in the device selection list appears in gray in the ST03A, the driver of the device has not been installed yet.

1.5.1 SU06A, DGH03 and Ethernet over USB

Supported version
2.12.36.4

Driver
https://ftdichip.com/drivers/

Ethernet over USB (CB12) boards as well as SU06A and DGH03 measurement devices require the installation of the FTDI device driver.

To install the FTDI device driver please follow these steps:

1. Uninstall all earlier installations of FTDI driver by running CDMuninstallerGUI.
   Please click Add to add devices to the list, and click the list items to select devices to be uninstalled.
   Please click Remove Devices to uninstall the selected devices.
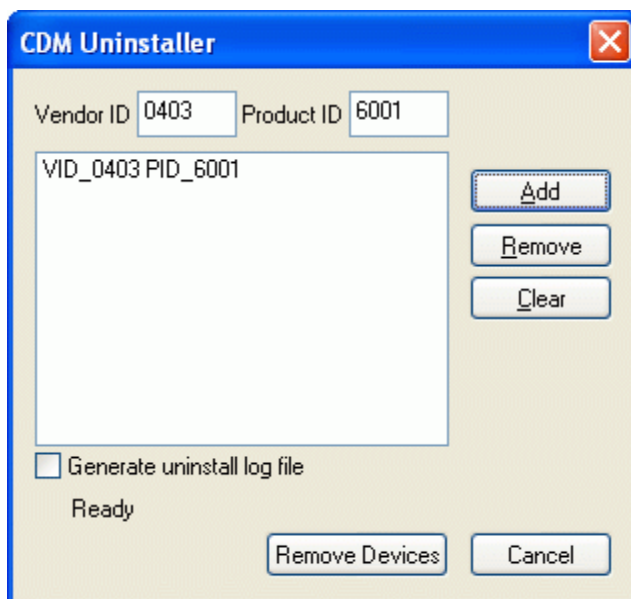
2. Disconnect all connected FTDI devices.
3. Close all opened instances of Service Terminal.
4. Run **CDM212364_Setup.exe** to install the driver.
5. Plugin SU06A, DGH03 or CB12A into a free USB port of the computer.
6. Start Service Terminal and check if you can use the device connected to USB port.

1.5.2 Softing CANPROusb (or Softing CANusb) device

Supported version
5.21

Driver
https://industrial.softing.com/

⚠️ **Compatibility warning!**
Previous versions of Service Terminal used device driver version 4.0 or 5.16 but the API of the two driver versions are not compatible with each other. There is no possibility to have two different versions of this driver installed on the same computer. ST03A from V3.5 will not work with the device driver installed for an earlier version of ST03A.

To use the CANusb with ST03A you must uninstall the previous device driver (***Start Menu / Settings / Control Panel / Add or remove programs***).

ℹ️ **Performance information**
From Softing interface version 5 Softing increased the process priority of the USB driver within windows systems. This increases CPU load while Service Terminal is running with a Softing device. During a measurement a CPU load even greater than 30% is also possible.

To install this adapter device driver properly:

1. Uninstall previous versions of Softing driver (4.0 and lower).
2. Start ***CANSetup.exe*** to install the device driver (default settings can be applied).
3. Connect the CANPROusb / CANusb adapter to the USB port. The "New Hardware Found Wizard" should appear.
4. Let the wizard automatically search for the driver program. It should recognize the correct Softing driver.
5. Select the ***Tools > Options...*** menu item.
6. Choose the *Devices* node on the left side of the window.
7. Select *CANPROusb / Softing CANusb* in the drop down.
8. Click ***OK*** on the ***Options*** dialog window.

ℹ️ **Troubleshooting for CANpro USB:**
1. Plugin CANpro USB into a free USB port of the computer and check if it has appeared in ***Softing CAN Interface manager V 2.71***.
2. Start **Softing CAN Interface manager V 2.71** in the Control Panel (***Start Menu / Settings / Control Panel / All Control Panel Items***)
3. If the baudrate of CANpro is **not defined** in Softing CAN Interface manager V 2.71. then press the Edit button and open the ***Layer2 configuration*** and press its OK button and press Next in the Channel configuration panel and close this panel with Finish button. The baudrate is filled after this settings and the Softing CANpro is suitable for using.

1.5.3 IXXAT USB-to-CAN V2 (or IXXAT USB-to-CAN) device

Supported version
4.0.939.0

Driver
https://www.ixxat.com/

⚠️ **Compatibility warning!**
Previous versions of Service Terminal used device driver version 3.5 but the API of the two driver versions are not compatible with each other. There is no possibility to have two different versions of this driver installed on the same computer. ST03A from V3.8 will not work with the device driver installed for ST03A Versions up to V3.9.

To use the IXXAT device with ST03A you must uninstall the previous device driver (***Start Menu / Settings / Control Panel / Add or remove programs***) and install the new driver.

To install this adapter device driver properly:

1. Uninstall previous versions of IXXAT VCI driver (3.5 and lower).
2. Start the `Ixxat VCI Setup 4.0.939.0.exe` file to install the VCI 4 device driver.
3. Connect the USB-to-CAN Compact / USB-to-CAN V2 Compact adapter to the USB port and follow the appearing instructions.
4. Start ST03A.
5. Select the ***Tools > Options...*** menu item.
6. Choose the *Devices* node on the left side of the window.
7. Select *IXXAT* in the drop down.
8. Click **OK** on the **Options** dialog window.

1.5.4 Vector XL, VN1610 or VN1630

Supported version
21.10.2

Driver
https://www.vector.com/

1.6 System Requirements

ST03A performance and reliability is the best if your computer is equipped with at least the following:

Hardware

- Computer: PC compatible
- CPU: Intel Pentium IV 2.6 GHz
- RAM: 1 GB
- Hard disk: 250 MB free space during installation (200 MB for normal operation)
- Screen resolution: 1024 X 768 with 16-bit color depth

Supported Operating System

- MS Windows 10 64 bit

User right needs

Service Terminal requires different user rights in the operating system for different tasks.

For installation you will need **Administrator** user rights. For normal operation **User** rights are needed.

1.7 User Interface of ST03A

The main elements of the ST03A user interface:
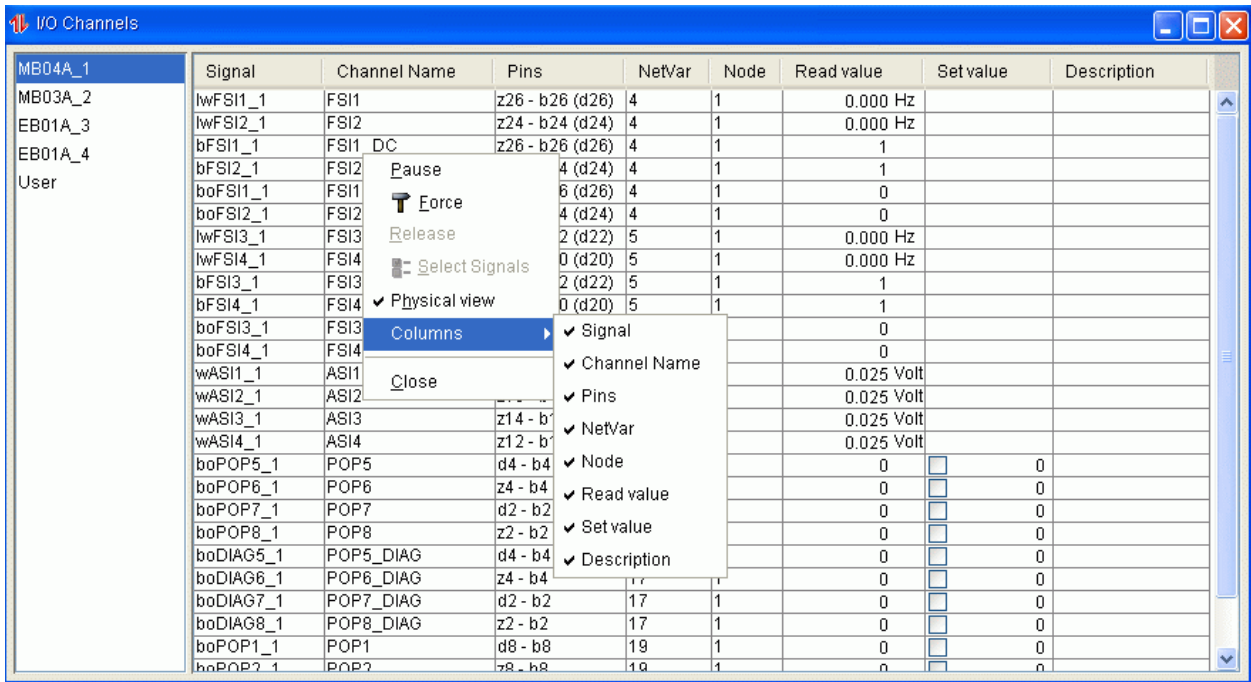
Menu bar and toolbar
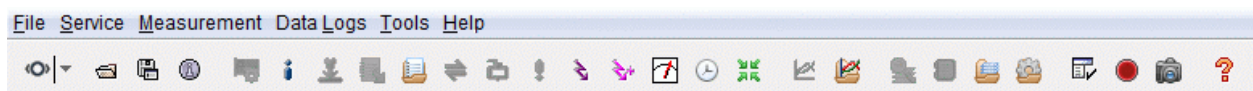
Menus and menu items can be reached by the keyboard combination `Alt + underlined letter`. Certain menu items are also accessible via the toolbar. If a service is invoked then the appropriate menu appears in the menu bar as well as on the toolbar.

Pop-up menus

Many of the ST03A services have context (pop-up) menus which can be activated by right clicking on the active area of the running service. The ST03A context menu options are also available from the appropriate menu item in the main menu.

Log panel

The Log panel in the bottom of the ST03A main window is used for displaying informative messages from ST03A and its services. The tabs of the Log panel show service specific information from some of started services (there are also services which do not write messages in the Log panel). The *Default* tab contains general information and cannot be closed. The * sign after the tab name indicates that the tab contains new unread message.
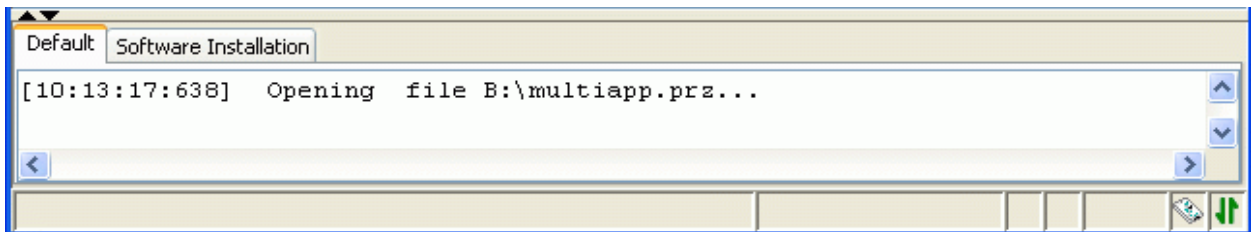
Pop-up menu of the log panel:

Autoscroll
> The automatic scrolling of messages in the log panel is turned on by default, but the user can always turn it off/on by selecting this menu item.

Clear
> Clears all messages from the actual log panel.

Close
> Closes the actual panel (the *Default* panel cannot be closed).

1.8 Supported Languages

You can find below a detailed list on the versions of ST03A which language is supported by which versions.

To switch between languages open the menu *Tools / Options / User Interface / Language settings*.

If you choose a language in Service Terminal and you find untranslated strings, the most likely reason for this is the following. In ST03A User Interface a part of the strings originate from the project files which can not be translated by the developers of Service Terminal. However, a translation of project file content is still possible. For further information, please contact the Hotline Service Terminal.

ST03A Version	🇨🇳	🇬🇧	🇫🇷	🇩🇪	🇭🇺	🇵🇱	🇷🇺	🇪🇸	🇹🇷	🇯🇵
V3.10		X	X	X	X	X	X			
V3.9		X	X	X	X	X	X			
V3.8.01		X	X	X	X	X	X			
V3.7.32		X	X	X	X	X	X		X	X
V3.6.47		X	X	X	X	X	X		X	
V3.5.45		X	X	X	X	X	X			
V3.4.29		X	X	X	X	X	X			
V3.3.45		X	X	X	X	X	X			
V3.2.11		X	X	X	X	X	X			
V3.1.24		X	X	X	X	X	X			
V3.0.72		X	X	X	X	X	X			
V2.7.34 (V2.7.31)		X		X	X		X			
V2.6.14	X	X	X	X						
V2.5.19	X	X	X	X				X		
V2.4.07	X	X	X	X			X			

Note: If your preferred language is not supported please ask your Knorr-Bremse contact person or the Hotline Service Terminal about the possibilities.

1.9 Hotkeys

ST03A supports the following functions through hotkeys.

ESC	Close opened menu.
Tab	Move focus between table columns or component.
Ctrl+Tab	Move focus to the first component of the next group (in a text field or in a table).
Left/Right /Up/Down	Move from element to element within units (e.g. between menus or from character to character in a text field).
Ctrl+F4	Close tabular services.
F1	Open context-oriented help topics.

Accessing and using menus and toolbars

The menu items of *File* and *Services* menus can also be invoked with hotkeys. Features located in *File* menu can be reached using the key combination **Ctrl+...**. The items of *Services* menu can be reached with the key combination **Ctrl+Alt+...**.
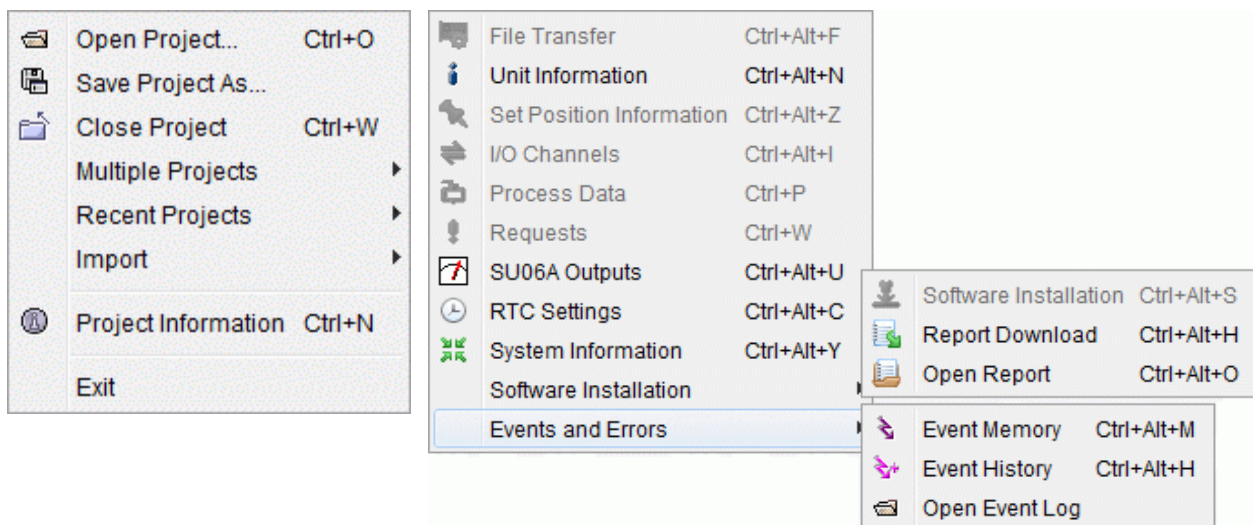
Note: Some hotkeys may be unavailable on some computers because the OS has its own hotkeys that have precedence over ST03A defined hotkeys.

Hotkeys in the Graphic Area

	Function	Available at
TAB	Moves focus to the next button/plot	Overall
SHIFT + TAB	Moves focus to the previous button/plot	
F12	Shows overview	On a plot
HOME	Fits graphic area to window	
PAGE UP	Zooms into the graphic area	
PAGE DOWN	Zooms out of the graphic area	
ALT + ARROW KEYS	Moves time cursor	
CTRL + PAGE UP	Decreases the size of a graphic area	
CTRL + PAGE DOWN	Increases the size of a graphic area	

1.10 Options

Access: Default Operator OEM

Menu	Tools / Options...
Hotkey	CTRL + Shift + T
Mouse	

Following options can be set:

Devices

Select device and properties as described here: Communication devices.

User interface

Language settings

Messages, texts labels, and help topics of ST03A are displayed in the selected language. You can change language without leaving the program. Please note that also project-specific items appear in the user interface that is not translated by default, especially table contents. Project content needs to be translated separately. If you need the project to be translated please contact your Knorr-Bremse contact person or the Hotline Service Terminal.

Font

You can change the character size to facilitate seeing the tables of *Project Information*, *Event Memory*, *Internal Errors*, *Unit Information*, *I/O Channels* and *Process Data* services better.

Time format

With this option it is possible to set the time format to use when displaying time in the feature *Measurement*. The two time formats supported are GMT (Greenwich Mean Time) and local time. The default is the GMT time.

Project information
> This option enables or disables displaying of the *Project Information* window when a new project is opened. The default setting for this option is enabled (checked).

Measurement
> *Show warning before discarding measurement data* controls whether a warning is automatically displayed when unsaved data from a previous measurement is about to be overwritten or lost. The default setting for this option is 'On'.

> *Show warning if the measured file does not belong to the currently opened project* controls whether a warning is automatically displayed when the measurement and the currently opened project are mismatch. The default setting for this option is 'On'.

> *Automatic project synchronization if possible* controls the measurement project synchronization.

Advanced / Miscellaneous

Board Configuration Check
> Board configuration check searches for boards to be replaced. This check is automatically performed in the Unit Information and the Software Installation services. The check is based on the board configuration check database, described in a .db file. This file is versioned and can be updated manually or online from a Knorr-Bremse site.

> *Check for updates upon ST03A launch* controls whether ST03A automatically checks on startup if a new version of the database is available online and downloads it if found. Actually this check is performed only on the first ST03A start every day. On further ST03A launches it is repeated only if the previous checks failed e.g. due to lack of internet connection.

1.11 Snapshot and Data Recording

Access:

Menu	Tools / Snapshot	
Hotkey	CTRL+Q	Create a snapshot
Mouse	📷	
Menu	Tools / Data Recording	
Hotkey	CTRL+D	Start / stop data recording
Mouse	🔴	

These two features can be used to export data that appears in the windows of the open Service Terminal. Data is exported into CSV files. The delimiter of the values can be defined by the user (";" or ","). If it matches the list separator character of the operating system then the files can be opened and displayed with MS Excel.

Snapshot

Snapshot creates one set of files containing data of open windows. After taking the snapshot you will be asked where to save recorded data.

Data Recording

After starting data recording the Service Terminal saves current data in the background. Whenever some data is updated Service Terminal appends them to the recorded data. When you stop data recording you will be asked for a location where to save recorded data.

Output files

In the file save dialog you can set the folder where to save the files. If you define a suffix, the file names will be extended by this name. The files will be collected into a folder that contains the date and time of recording. In the files, the first column shows normally the time elapsed (in milliseconds) since the start of the recording. At the end of the file you can find the time of recording.

File name	Service	Content
unit_information.csv	Unit Information	BCU/DCU status.
project_information.csv	Project Information	Representation of project file.
log_panel.csv	Log panel	The tabs of the Log panel show service specific information from some of started services.
measurement.csv	Measurement	Measured data. We recommend using the feature Export.
event_memory.csv	Event Memory	Events occurring during recording.
event_history.csv	Event History	Representation of event history contents.
signals.csv	I/O Channels, Process Data	Each channel is in separate columns.
triggers.csv	I/O Channels, Process Data	The file contains the time stamps when triggers where sent by Service Terminal to ESRA in order to keep the board in Service Mode
dlg.csv	Standard Data Log	Collect the standard data log during recording.

1.12 Collect ST03A Log Files

Access:

Default | Operator | OEM

Menu	Tools / Collect ST03A Log Files

This function saves all error and event log files into an archive ZIP file. By default, Service Terminal creates a new log file for each ST03A startup. Log files contain a list of events that are logged by the functions of Service Terminal, as well as information about functions, events, device changes, errors and more.

Log files are needed for troubleshooting and finding out where exactly the problem or the event occurred. The saved ZIP file can be sent to Hotline Service Terminal for further investigation.

1.13 Supported File Types

File Type	File Name	Description	Related Function
*.csv	Recorded data file	Used for data recording and can be opened with Microsoft Excel.	Measurement
*.dcc	Advanced data log configuration file	Used for configuration of data log service on data log supported board. Obsolete; ST03A can save because the backward compatibility of ST03A V3.7 please save in *.edc file format.	Data Logging
*.dlg	Advanced data log file	Recorded during data logging with *.dcc configurations on data log supported boards. Obsolete; ST03A can only read these files; please save in *.edlg file format.	Data Logging
*.edc	Data log configuration file	Used for configuration of data log service on data log supported board.	Data Logging
*.edlg	Data log file	Recorded during data logging with *.edc configurations on data log supported boards.	Data Logging
*.ehl	Event history data file	Saves the content of the event history with comments.	Event History
*.emc	Encrypted measurement configuration file	Complete configuration of the Measurement function. Encrypted. Obsolete; ST03A can save because the backward compatibility of ST03A V3.7 please save in *.mmc file format.	Measurement
*.emd	Encrypted configuration measurement data files	Contains saved data measured with *.emc files. Encrypted. Obsolete; ST03A can only read these files; please save in *.emd file format.	Measurement
*.empz	Encrypted multiple project file	File type containing encrypted project data for more than one BCU/DCU.	Project
*.eprz	Encrypted compact project file	All-in one encrypted project file. Project files of this type can be opened with ST03A Versions 3.5 and higher.	Project
*.gtm	Generic text-based measurement file	Special CSV file format that can be imported into ST03A and displayed as measured data.	Measurement
*.kbr	Knorr-Bremse Request file	File generated by the Service Terminal to request user privileges.	License Request
*.kbu	Knorr-Bremse unregistration file	File generated at uninstallation of Service Terminal prove the uninstallation process. Needed when moving a license to another computer.	License Moving
*.license	License file	Contains a license key and its activation information.	ST03A General
*.mmc	Multiple measurement configuration file	Complete configuration of the Measurement function. Encrypted.	Measurement

`*.mmd`	Multiple configuration measurement data files	Contains saved data measured with *.mmc files. Encrypted.	Measurement
`*.mpz`	Multiple project file	File type containing project data for more than one BCU/DCU.	Project
`*.prj`	Project file	ST01 and ST02 project file format (open only).	Project
`*.project`	Project file	Saved project file in XML format. Project files of this type can be opened with ST03A Versions 2.1 and higher.	Project
`*.prz`	Compact Project file	All-in one project file. Project files of this type can be opened with ST03A Versions 2.4 and higher.	Project
`*.settings`	Settings file	Saved settings of the ST03A (e.g. window position, window size). If deleted then all settings are reset to the state at installation.	ST03A General
`*.xdc`	Data Log configuration file in XML format	Contains configuration information regarding the displaying of data recorded in the ESRA system with the Standard Data Log function.	Standard Data Logs
`*.xdl`	Data Log read from ESRA in XML format	File type for saving a standard data log from ESRA in XML format.	Standard Data Logs
`*.xmc`	Measurement configuration file in XML format	Complete configuration of the Measurement function (obsolete; ST03A can only read these files; please save in *.mmc file format).	Measurement
`*.xmd`	Measurement data files in XML format	Contains saved measurement data (obsolete, ST03A can only read these files; please save in *.mmd file format).	Measurement
`*.zip`	System Information file	Contains a compilation of project dependent and independent information.	System Information

1.14 Error Reporting

Access:

Default Operator OEM

Error reporting ZIP file can be sent to Hotline Service Terminal for further investigation. Engineers can use these logged reports to track and fix problems.

Whenever an error message occurs, the user is able to save the error and all available information about the error into a ZIP file. This contains a warning for the user or an unexpected error.
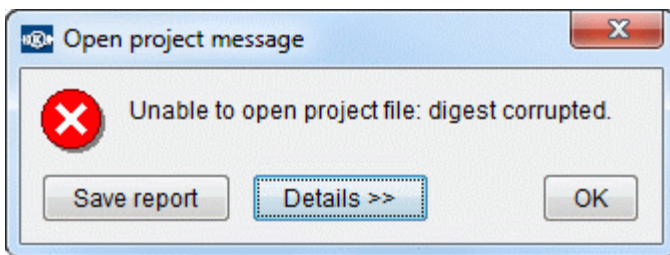
The **Save report** buttons will generate a ZIP file about the circumstances. Error report does not collect any personal data from your computer. The stack trace is available with the **Details** button.

1.15 Safety Instructions

It is requested to restart the connected unit (power off/on) at the end of ST03A usage to ensure that the unit is in the defined state.

1.16 Glossary

Abbreviations

BCU
Brake Control Unit

CB
Communication Board

DCU
Door Control Unit

EB
Extension Board

MB
Main Board

MMI
Man Machine Interface

NV
Net Variable

NN
Node Number

RB
Remote Board

1.16.1 Application

All main and extension boards have base software performing various basic functions. In addition main boards have a project specific application.

Base Software

The basic functionality is stored in the base software. It controls hardware like the I/Os of the boards and the communication over CAN bus. It contains some project-independent features of the ESRA system.

Application Software

The application software implements the logic in the given ESRA system. Its tasks are for example data management and evaluation. It also commands the hardware upon the evaluation results. It uses the general services of the base software.

1.16.2 Application states

The application states can be read out opening the service Software Installation. The states are evaluated at opening the service before software installation and after software installation had finished.

OK
> The version of the application stored in the project matches the application software is present on the board.

Different Application
> The name or STN number of the application software on the board differs from the one in the project.

Older Application is on the Board
> The application software present on the board has an older version than the one in the project.

Newer Application is on the Board
> The application software present on the board has a newer version than the one in the project.

Missing Board
> Target board on the addressed node is missing or fails to answer.

Board is on the Default Node or Missing
> ST03A cannot find this or any boards on the defined node number. However, there are boards on the default node but ST03A cannot differentiate between them. It is possible one of those is the sought board.

Board is on the Default Node
> ST03A cannot find this or any boards on the defined node number. However, there is a board on the default node ST03A cannot identify and it could be the sought board.

Wrong Board Type
> There is a bad board type on one of the node numbers defined in the project. E.g. instead of a main board an extension board is on the addressed node.

Downloaded
> Download was successful.

Waiting for Download
> Either there is no application on the board or the download has been aborted and the board is waiting for an application.

Download Failed
> Download has been aborted or failed.

Download Skipped
> Download to a board has been skipped.

N/A
> The application state sent by the board is not defined in the protocol.

1.16.3 Board

The most common representation of ESRA systems is a set of boards, mounted into an ESRA rack. However some boards and control units may be located outside a rack.

There are various board types in the ESRA system. The two most common types are main boards and extension boards. They are normally applied together. The number of main and extension boards in the project varies depending on the complexity of the task they serve.

Main Board
> Project related application software can be installed on main boards. The main board runs application software that is able to configure itself and to perform additional configuration of other boards in the ESRA system. These application softwares contain the logic of the BCU braking mechanism.
> The main boards have several input and output signals.

Extension Board
> The purpose of the extension board is to extend the input and output signals of a main board. Extension boards do not have an application; its signals are processed by a main board.
> These boards are configured by their master boards. The extension board cannot act alone as it depends on its master.

Additional Boards

The following board types can also be used as part of the ESRA control system:

MMI - Man Machine Interface
> The MMI is a user interface to the ESRA system. It contains a 4 character LED display, 4 pushbuttons and an RS232 connector. The MMI display is able to show current event codes and overall system status. The functionality of the 4 pushbuttons depends on project file content. The MMI is usually integrated into the front panel of a main board but can be utilized separately.

Communication Board
> Communication boards represent an interface to various external bus systems. For example, CAN, MVB and Ethernet. The main purpose is to connect ESRA to the vehicle bus systems.

Power Board
> This is the main power supply for the ESRA system. It supplies the ESRA system with all internal voltages from a single external supply source.

Service Board
> This provides a high speed interface for the Knorr-Bremse Service Terminal.

Remote Board
> This board provides a distributed control feature for ESRA control system.

1.16.4 Board state

Possible board states during operation:

Normal	The board is working properly.
Download	There is no application on the board or the present application is corrupted.
Terminal	Only on MMI-51. The ST03A communicates with ESRA through the serial port of the MMI-51.
Config Prepared	Only on CU01 and Remote Boards. The board is prepared to accept a configuration from the master. After successful configuration the board switches to the Normal state.
Critical	A permanent critical software error occurred. Please contact your contact person at Knorr-Bremse.

1.16.5 Hotline Service Terminal

Hotline Service Terminal provides general support for usage of ST03A.

If you have any questions, opinion or new feature requests, please feel free to contact us.

- e-mail: esraterm@knorr-bremse.com
- Phone: +36 1 289-45-00
- Fax: +36 1 289-45-04

Phone calls are accepted generally Monday to Friday from 9 a.m. to 5 p.m. Central European Time except Hungarian National holidays. E-mails are being answered within 72 hours, but if sent during Hungarian office hours we do our best to answer your mail ASAP. Phones are answered in English and German languages.

Hotline Service Terminal offers following services to our customers.

- Licensing of Service Terminal
- Help on usage of Service Terminal
- Handling bug reports and feature requests. In case of bug report please send also an error reporting ZIP file.
- Holding Service Terminal usage trainings for internal and external users

Note: Our Hotline can only give limited support to project-related problems - in these cases please contact your Knorr-Bremse contact person. However, if we can not help you, we are pleased to help you finding the right person to talk to.

1.16.6 Net Variable

A net variable is a data package that is transmitted either on the ESRA system bus between boards or within one board.

A net variable contains the following information:

- Identifier of the transmitter
- Identifier of the data record
- An attribute defining whether the net variable is to be sent locally (within one bus segment) or globally (on the whole CAN-bus).
- Data

The difference between local and global net variables is with regards to their transmission through bus coupling boards. These boards serve to couple two CAN-buses. Local net variables are delivered by bus couplers in order to optimize bus traffic.

Some net variables are predefined. These are used to:

- Transmit I/O signal data
- Transmit event messages and statuses
- Access board memory
- Configure extension boards

1.16.7 Node number

For addressing the individual boards in the ESRA system, each board has its own node number uniquely defined in the system.

The node numbers of the individual boards are coded into the front-panel connector. Node numbers of relevant boards are stored in the project file.

Node numbers can have a value between 0 and 31. However, some there are some limitations which combinations of boards and node numbers are valid.

1.16.8 Service mode

Service Mode is an operational mode of the brake control unit in which the ST03A system temporarily overwrites some of the outputs or other parameters of the brake system. In Service Mode the normal operation of the brake system is suspended. In Service Mode it is possible to test system components (e.g. valves) during system installation and maintenance. Both the I/O Channels feature and the Process Data service of ST03A support Service Mode. The Service Mode feature can be activated by selecting the corresponding service's *Force* menu item. Service Mode is indicated in the bottom right corner of the main window of ST03A through a wrench icon ( ). Service Mode of a specific feature (*I/O channels* or *Process Data*) can be deactivated either via the corresponding *Release* menu item or via the wrench toolbar button.

ℹ️ **Note:** if the wrench icon is visible in the bottom right corner of the main window of ST03A then Service Mode is active and the brake system does not operate according to its specification. You must deactivate Service Mode in order to switch back the brake system into normal operation. Service Mode is automatically deactivated if ST03A hardware has been disconnected from the brake system for more than 5 seconds or if the ST03A user interface is inactive for more than 20 minutes.

2 Project

For the general idea behind the project concept please see the topic Project in the section Introduction.

The ways projects can be opened, closed and saved are described in the topic Handling project files, were you can also find a description of Service Terminal project file types.

The service Project Information shows the content of the project file focusing on the boards in the project. You can use this feature to compare the planned situation (Project Information) with the current situation (Unit Information).

Users can update the project files with their own comments to events in the service Event Memory. Event comments can also be imported from another project file. This feature is described in the topic Event Comment Import.

2.1 Handling Project Files

To use Service Terminal with a BCU/DCU you will need to open the project assigned to the given connected system. If you add any changes or new content to the project file you may want to save the changes. If the open project file has changed, you will find a * in the title row of the ST03A main window next to the project name.

Below you can find a description of the supported project file types

Opening a project

Access: Default Operator OEM

Menu	File / Open...	Opens any project of any type
Hotkey	Ctrl+O	
Mouse		
Menu	File / Recent Projects / *	Quick launcher for the last used projects
Menu	File / Multiple Projects / Open Subproject...	Open a subproject in an `*.mpz`, `*.empz` file
Auto	At program start up	Opens the last used project

Saving a project

Access: Default Operator OEM

Menu	File / Save As...	Saves the project - name and file type definable
Mouse		

Multiple Projects

Access: Default Operator OEM

Menu	File / Multiple Projects / Open Subproject...	Open a subproject in an `*.mpz`, `*.empz` file

The multiple project files (`.mpz`) and the encrypted multiple project files (`.empz`) are the most convenient way to store the entire information about all projects for all control systems in the train. Multiple projects contain .prz subproject(s) and encrypted multiple projects contain .eprz subproject(s).
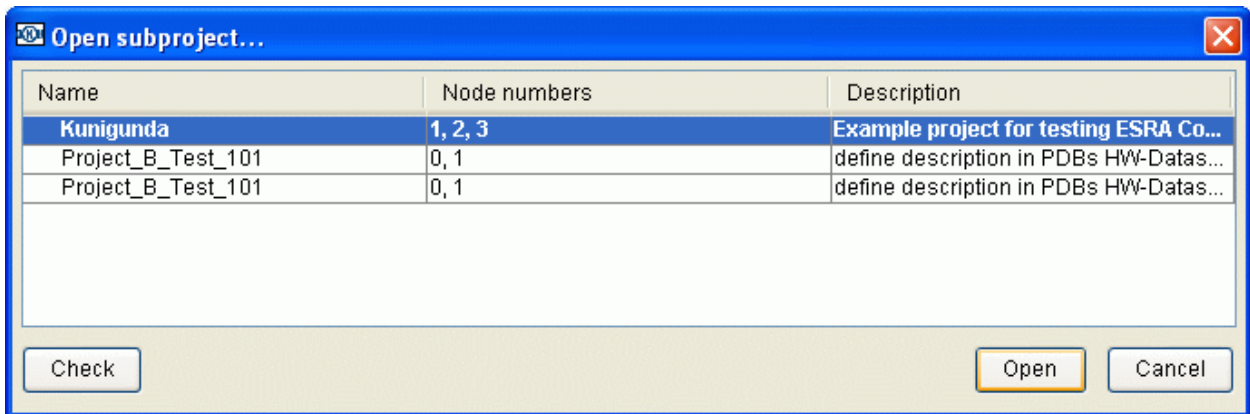
Opening a subproject

All projects added to a multiple project are called subprojects. A subproject can be opened using either the *File / Multiple Projects / Open subproject...* menu option.

Name
    Name of the subproject.

Node numbers
    Node numbers used for the boards in the subproject. It is advisable to use at least one unique node number in each subproject to make the result of the automatic detection (Check) more determined.

Description
    Description of the subproject.

Check

    Starts the automatic detection of the matching subproject according to the node numbers used for the boards in the connected ESRA system. The detected subproject will be marked with a green symbol preceding the name of the project. If more subprojects are marked with yellow symbol then the project can not be identified. DCU projects can not be detected since they do not differ in node numbers.

Open

    Opens the selected subproject.

Cancel

    Cancels the subproject opening.

Supported Project Files

`*.eprz`: Encrypted Compact Project Files (the preferred type of project file to be used with ST03A V3.5 and later)
These files are the encrypted type of Compact Project Files containing the same information.

`*.prz`: Compact Project Files (the preferred type of project file to be used with V3.4 and earlier versions of ST03A)
These files are the recent type of project file format containing all relevant information for a project including the XML based project file, application software, measurement and data log configurations, project translation files, operating data descriptor file and background picture.

`*.empz`: Encrypted Multiple Projects Files
Project file containing more *.eprz files in one component. See details in the previous section.

`*.mpz`: Multiple Projects Files
Project file containing more *.prz files in one component. See details in the previous section.

`*.project`: XML Based Project Files
These XML Based Project Files contain the same information as the `*.prj` files as well as additional user defined information (e.g. user comments).

`*.prj`: Original Project Files

The Service Terminal can open a project file created with the DOS base Service Terminal version 1.4x or higher. It is recommended that a project file of this type has been baselined under the DOS Service Terminal application.

Files of this older format can be saved from the menu item ***File / Save as...*** into the newer project file format.

This type of project file describes the configuration of an ESRA system. It contains all information regarding the structure of ESRA racks, boards, software applications, system events, requests and process data.
During loading, these older project files are automatically converted to an XML Based Project File format via the Project Converter function:

Reason for using a Project Converter
For the ST03A only project file created by a DOS Service Terminal Version 1.4x or higher can be used. Knorr-Bremse has also released project files created with the older (V1.38) Service Terminal. The most significant difference is that V1.47 HEX files are integrated into the project file but in earlier versions they are stored separate from the project file.

Preconditions of the conversion
In order to perform an automatic project file conversion all necessary files must be immediately available to the Service Terminal computer. For pre V1.47 project files, HEX files are stored in the project file sub-directory. Thus, to facilitate project file conversion process, project file and hex files must be contained in the same folder.

Example:
If the name of the project file is `BREMSE.PRJ` and the name of the HEX file is `TEST.HEX`, project files created with older DOS Service Terminals (version 1.38 or older) have the HEX file in a project directory called `BREMSE`.

Project file - `...BREMSE.PRJ`
HEX file - `...BREMSE/TEST.HEX`

Thus to facilitate the conversion process both the project and hex files should be in the same folder.

2.2 Project Information

Access:

Menu	File / Project Information
Mouse	

This feature displays information relevant to the boards and software configured in the current project file. By default the **Project information** window is displayed when the project file is opened, however this action can be turned on/off under the **Tools / _Options..._** menu item.

The state of currently connected control system is displayed with the **Service / _Unit Information_** menu item. Simultaneous use of **Project Information** and **Unit Information** allows the comparison of the current opened project file parameters to the parameters of the currently connected system.

Hardware

Rack
Name of a rack holding a set of boards.

Board
Board name identification contained in the current project file.

Node number
Node number for the individual boards contained in the project file.

Position
The board's backplane position in the rack (if present).

STN
Knorr-Bremse product identification number contained in the project file.

Initial level
Minimum hardware revision needed for running applications.

Application

Name, STN
Identification of the application software contained in the project file.

Version number
The version of the application software contained in the project file.

Creation date
Creation date of the software version contained in the project file.

Description
Informative description of the application software contained in the project file.

Graphical Rack View

If all necessary information is available in the project file, a graphical view of the described control system will appear below the table. Select a board in the table to highlight it in the graphical view.

Click the black arrows on the separator between the two views to hide or unhide one of them.

2.3 Event Comment Import

Access:

| Default | Operator | OEM |

Menu	File / Import / Event Comment Import
Hotkey	Ctrl+M

The event comments for the feature Event Memory can be imported from any PRZ, EPRZ or PROJECT project file into the currently open project file.

Steps:

1. Open a project (see: Handling project files).
2. Select *File / Import / Event Comment Import* menu item.
3. Choose a PRZ, EPRZ or PROJECT project file from which you would like to apply the event comments.

2.4 Custom Group Import

Access:

Default	Operator	OEM

Menu	File / Import / Custom Group Import
Hotkey	Ctrl+G

I/O Channel and Process Data custom groups can be imported from any PRZ or EPRZ project file into the currently open project file.

Steps:

1. Open a project (see: Handling project files).
2. Select *File / Import / Custom Group Import* menu item.
3. Choose a PRZ or EPRZ project file from which you would like to apply the I/O Channel and Process Data custom groups.

3 Services

In this chapter you can find the description of the services of ST03A. Here you can find a list with a short description of each feature.

|	
Unit Information	Display current state of the connected system.
Set Position Information	Read out and set identifiers of position among trains and within the train.
I/O Channel	Display and set the I/Os of the connected system.
Process Data	Display and set the process data in the connected system.
Requests	Send application function calls.
SU06A Outputs	Drive the outputs of the connected measurement device.
RTC Settings	Display and set the Real Time Clock information on the connected system.
System Information	Collect and export information about the connected system to *.csv files.
Software Installation / Software Installation	Install new application on the connected system.
Software Installation / Report Download	Downloads a report of Software Installation History.
Software Installation / Open Report	Opens a saved report of Software Installation History.
Events And Errors / Event Memory	Reads out the event memory of the connected system.
Events And Errors / Event History	Reads out the event history of the connected system.
Snapshot, Data Recording (in the *Tools* menu)	Export data from the open windows into *.csv files.

3.1 File Transfer

Access: Operator OEM

Menu	Service / File Transfer
Hotkey	CTRL+ALT+F
Mouse	

This feature makes it possible to upload (to the connected system) or download (to local computer) over Ethernet files defined in the project file. All files in a specific directory on the connected system can be downloaded at once if specified in project file.

File Transfer is only available when Ethernet connection is alive.

The uploadable file size may be limited by the project file. If you need to upload a file grater than the limit, please ask your Knorr-Bremse contact person for support.
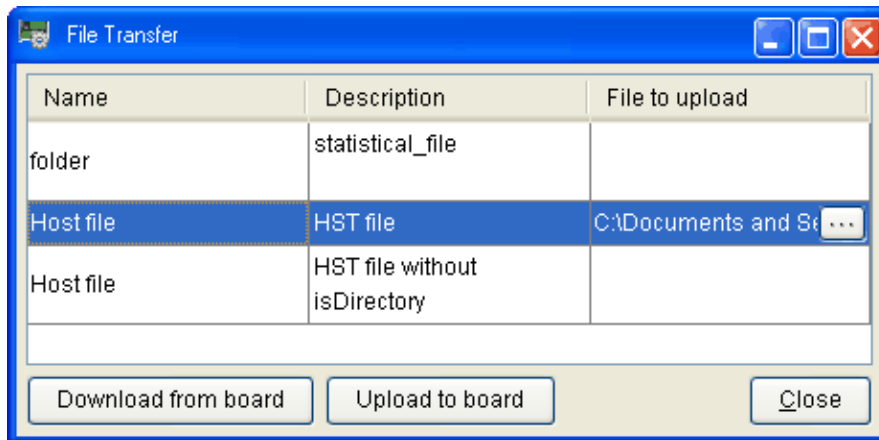
Name
> Name of the file that should be uploaded.

Description
> Additional information on the file.

File to upload
> Click **...** to open the file chooser and select a file to upload on your local computer.

Upload to board
> Uploads the selected file to the connected system.

Download from board
> Downloads the selected file located on the board to the local computer. After clicking the button a file chooser will open to define where to save the file.

3.2 Unit Information

Access:

Menu	Service / Unit Information
Hotkey	CTRL+ALT+N
Mouse	

This service identifies the boards and the corresponding applications on particular node numbers in the connected system and displays the current state of boards and applications.

By means of **Project Information** service data defined in the loaded project can be compared with the current data of the attached control unit.

Board configuration check is executed during unit information. If a board to be replaced is found then it will be highlighted and the replacement message is displayed in tooltip and in Detail View in the details panel.
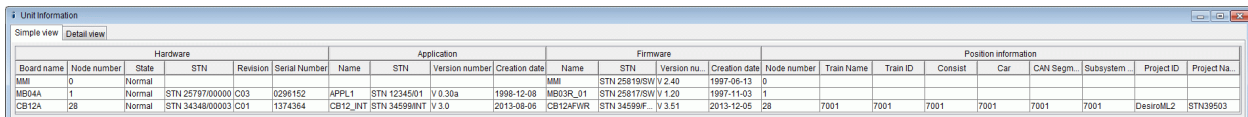
The tabs of the Unit information window:

Simple view
> The information about the connected target system.

Detail view
The information about the connected target system and the loaded project file (the differences are shown with red and yellow icons).

3.2.1 Simple view

Hardware

Board
Name of the board.

Node number
Node number of the board.

State
Current state of the board.

STN
Identification number of the board. STN is a unique identification number used by Knorr-Bremse.

Revision
Hardware revision number.

Serial Number
Serial number of the board.

Application

Name
Name of the application software running on the board.

STN
Project specific identification of the applications. STN is a unique identification number used by Knorr-Bremse.

Version number
Version number of the application.

Creation date
Creation date of the application.

Firmware

Name
Name of the base software running on the board.

STN
Identification of the base software version. STN is a unique identification number used by Knorr-Bremse.

Version number
Version number of the base software.

Creation date
Creation date of the base software.

If the board does not fulfill the minimum hardware revision, the board will be highlighted in the table and the detailed information is provided in the tooltip.
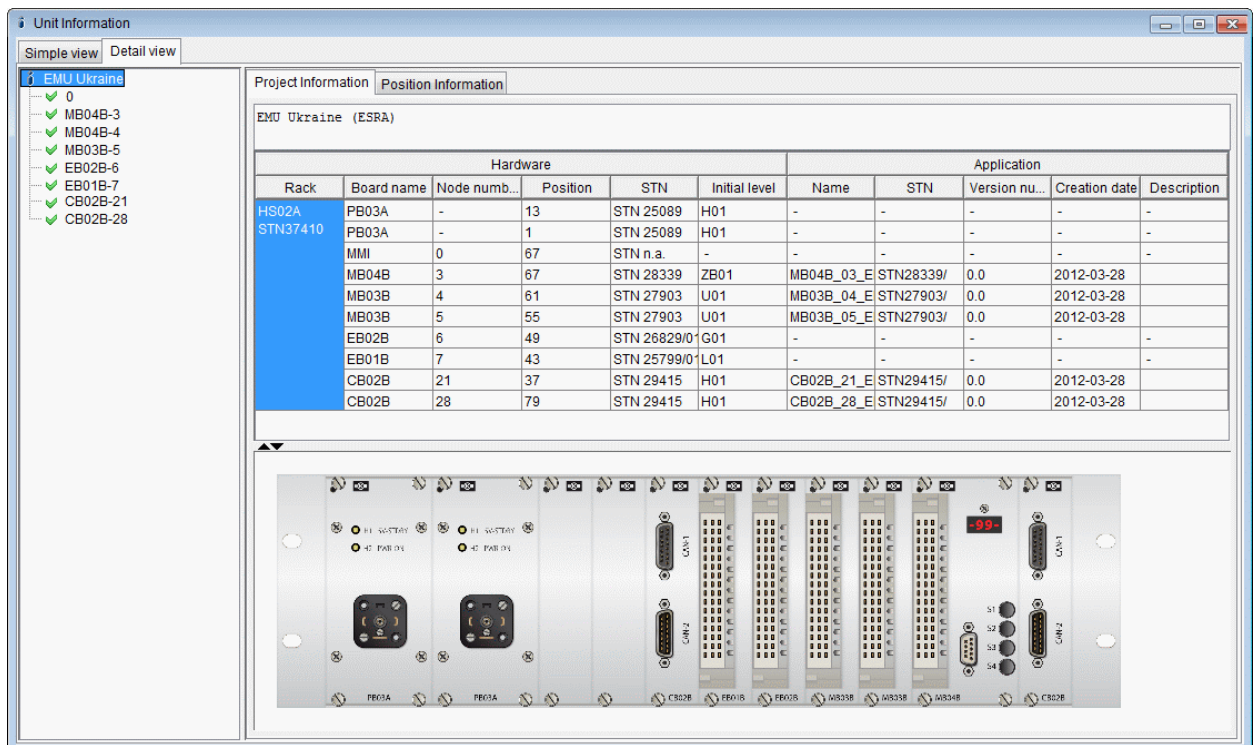
EB01B	9	Normal	STN 25799/01	S01	497539				EB01	STN 25820/SW
EB03A	11	Normal	STN 26509	J01	4189426				EB03	STN 27004/SW
CB09D	26	Normal	STN 36996	E01	KB14050055	CB09D 26 STN 37244/26	V 0.00.0001	2019-05-28	cb09dfwr	STN 38928/FW

The board does not fulfill the mimumum hardware revision requirement (X01).

Position Information

These attributes help to identify the location of the target within the fleet of trains. The set of used attributes and their meaning are project-dependent.

In some projects the position information can be set manually using the service Setting Position Information.

3.2.2 Detail view

After the Unit information is read (the progress is shown with ⟳ icon) the differences between the loaded project file and connected unit - if any - are shown with red or yellow icons:

Green icon (no difference)
　　✔ Board is up to date or not application board (e.g. EB board or MMI).
Yellow icons (difference problems repairable with **Software Installation**)
　　⬆ Newer application on the board.
　　⬇ Older application on the board.
　　😐 Different application with OEM / Service-Engineer / Developer license.

Red icons (unrepairable problems, especially hardware differences)

⊘ Different application or different board:

different board is found - the STN numbers aren't matched or in case of not application board the board names are different.

hardware revision conflict - the board does not fullfill the minimum hardware revision according to the project file.

board has different application - the application STN numbers aren't matched or in case of HCM2 the parameter data file STNs are different.

▬ Missing board: the appropriate board is not available on the connected target system.

✚ Addition board: new board is available on the connected target system in relation to the project file.

The Position Information tab of the right panel contains the position information of all boards which provide it.

To see the project data and unit information data for each board please click on the board's name in the tree in the left panel. The result differenses will be shown with red color in the right panel:

Different application is found on the board.

Component	Project Information	Unit Information
Hardware		
Board	MB04A	MB04A
Node number	1	1
State	-	Normal
STN	STN 25797	STN 25797
Revision	-	C03
Serial number	-	9023282
Application		
Name	APPL1	APPL1
STN	STN 12345/01	STN 04711
Version number	V 0.30a	V 0.10n
Creation date	1998-12-08	1997-12-02

Component	Project Information	Unit Information
Firmware		
Name	-	MB03R_01
STN	-	STN 25817/SW
Version number	-	V 1.20
Creation date	-	1997-11-03
Manufacture Data: General		
STN	-	2579700000
Board revision	-	C03
Serial number	-	9023282

3.3 I/O Channels

Read Access:

Default Operator OEM

Write Access:

Operator OEM

Menu	Services / I/O Channels
Hotkey	CTRL+ALT+I
Mouse	

This function allows access to the I/O signals of the boards of the control system. The user can monitor the values of all the inputs and outputs for each board. The user also has the option to force certain output signal values. The display is periodically updated.

It is a fault-tolerant service which means that the ST03A will continue to read the values of channels even if there is an error channel. Channels where reading the values fails are shown with pink background.

The I/O channels are collected into groups. You can switch between groups in the left column.

Note: Read/Write access to I/O channels may also be delimited by project file content not only the absence of a license level.
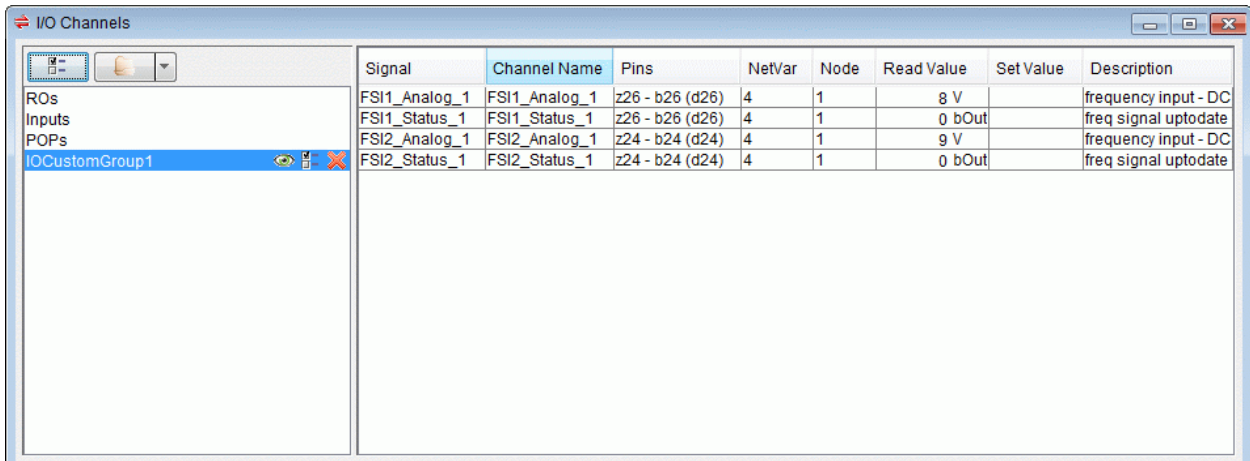
The list in the left panel contains project defined channel groups followed - if there are any - by user defined (custom) groups. To filter the list click [ ] [ ].

Custom groups

To create a custom group click [ ]. User can select a set of channels from different groups that he can see at once.
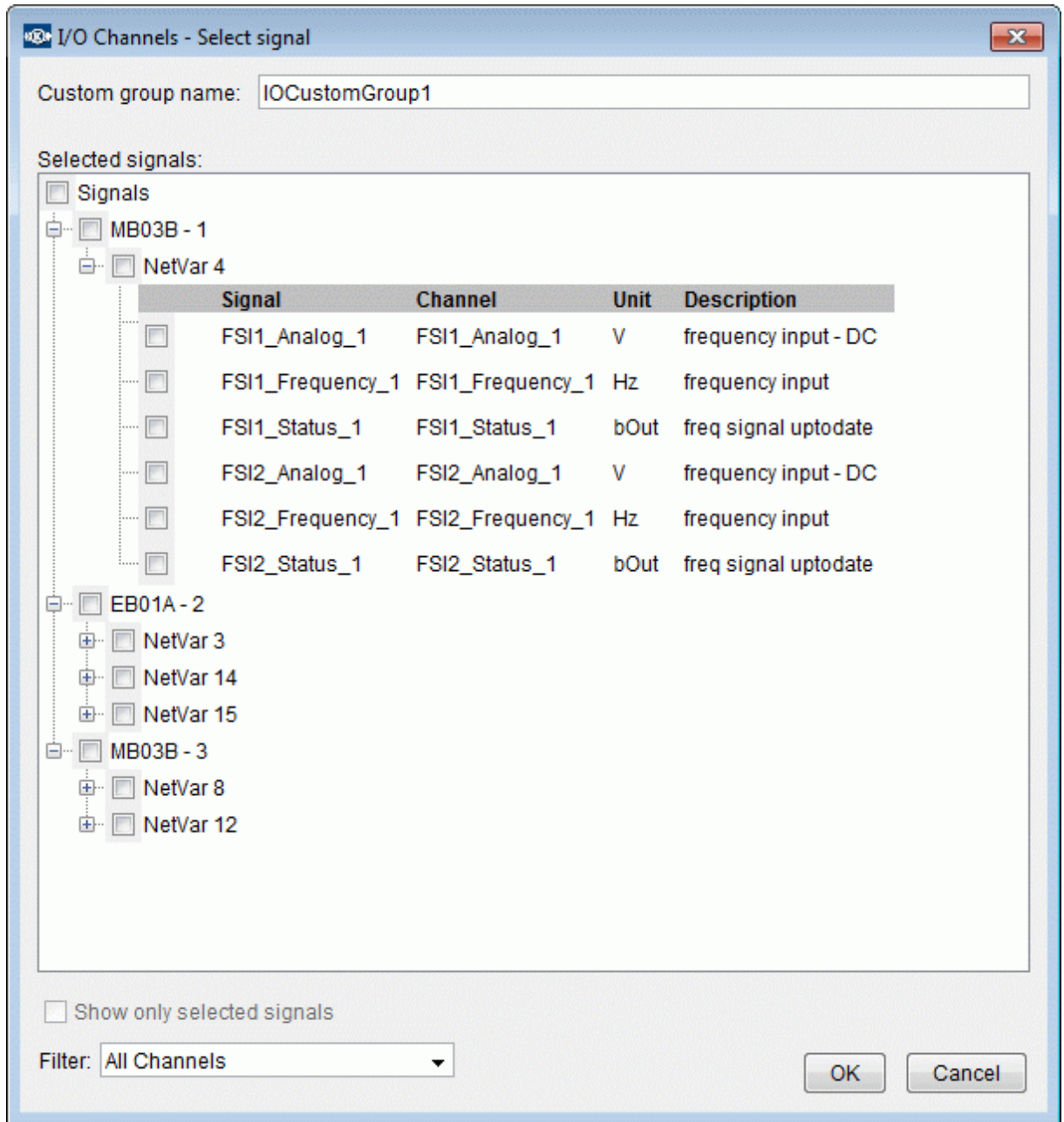
Use the following icons near the name of the group to

👁 hide this custom group

⊟ modify the content of the custom group

✖ delete the custom group.

To preserve the custom group creation or modification the project file must be saved.

Columns of table

Signal
Name of the I/O signal defined in the application.

Channel Name
Standard name of the I/O channel as defined in the ESRA catalog.

Pins
Pin positions on the I/O connector on the board.

NetVar
Identification number of the net variables in which the particular channels are transported on the CAN bus.

Node
Node number containing the identified I/O signals.

Read value
Values of input signals received by the Service Terminal. Units of measurement are added to certain signals.

Set value
If you want to modify an output signal value enter the new value and select the check box next to it.

Displayed values can be sent to the ESRA boards by menu item ***I/O Channels / Force*** or by button ⊤ after

filling in the values button 🔧 is active which means the board is in Service Mode.
Output channels combined into a single net variable can be selected only together. The reason is that net variables can be transmitted only as a unit thus only a whole net variable can be changed.

Description
Short description of the I/O channel.

Features

⚠ **Changing physical/electrical view**
If **physical view** is turned on then measured values are shown in their physical meanings like speed, pressure. Otherwise, **logical view** is displayed; this is the measured signal on the sensor that is later converted to binary for transmission over CAN (e.g. frequency, voltage, current)

Also accessible from local pop-up menu or menu: *Physical view*

Hide / unhide columns
In the local pop-up menu *Columns* you can switch the visibility of each column on/off

Enlarge table content
In the menu item *Tools / Options / User Interface / Font* you can set a larger font size for this window so that values are readable even further away from the screen.

3.4 Process Data

Read Access:

Default | Operator | OEM

Write Access:

Operator | OEM
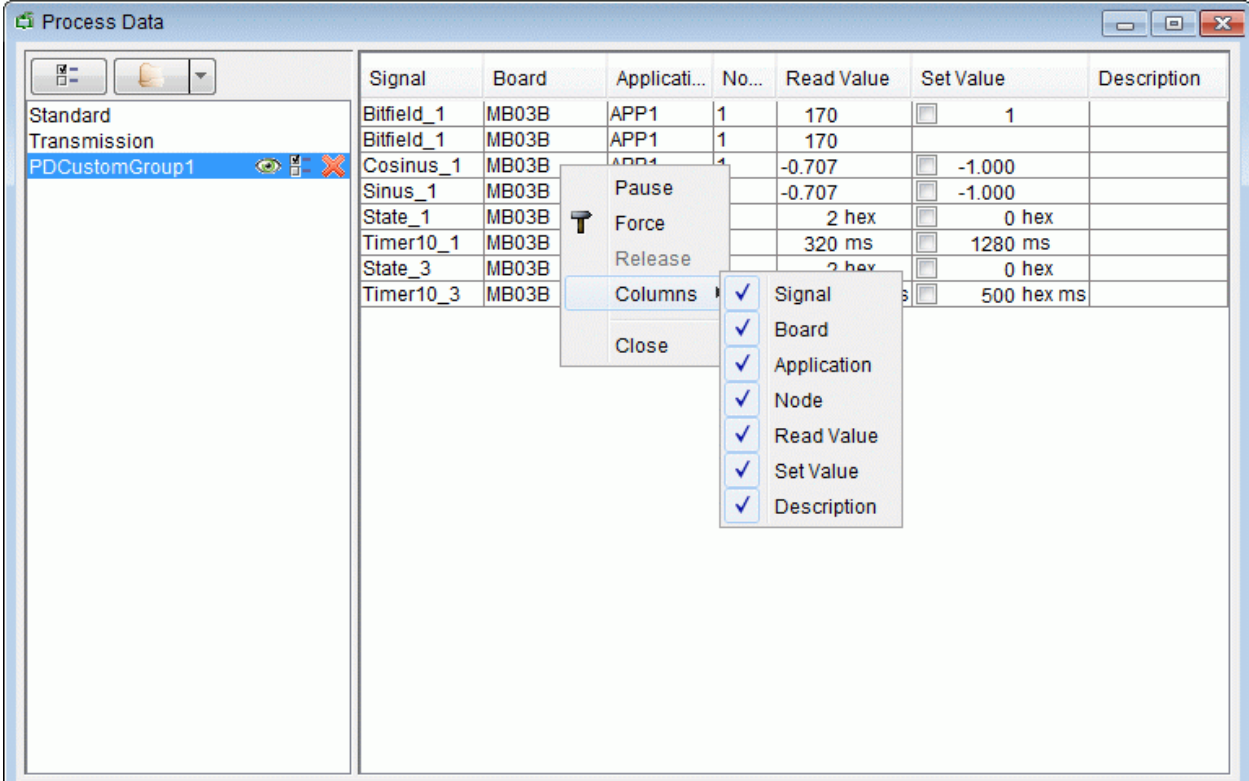
Menu	Service / Process Data
Hotkey	CTRL+P
Mouse	

This function allows continuous observation of individual pre-selected internal system variables without using the data measurement function. Data is periodically updated.

It is a fault-tolerant service which means that the ST03A will continue to read the values of channels even if there is an error channel. Channels where reading the values fails are shown with pink background.

Process Data are collected into groups. You can switch between groups in the left column.

ⓘ **Note:** Read/Write access to Process Data may also be delimited by project file content not only the absence of a license level.

The list in the left panel contains project defined channel groups followed - if there are any - by user defined (custom) groups. To filter the list click [icon] [icon] .

Custom groups

To create a custom group click [icon] . User can select a set of channels from different groups that he can see at once.

Use the following icons near the name of the group to

[icon] hide this custom group

[icon] modify the content of the custom group

[icon] delete the custom group.

To preserve the custom group creation or modification the project file must be saved.

Columns of table

Signal
Variable name of the process data.

Board
Destination of the board from which the process data originate.

Application
Name of application software running on the associated board.

Node
Node number of the board to which the process data associated board.

Read value
Data values read by ST03A from the connected system. The appropriate units of the process data are also shown.

Set value
Using the set value you can temporary overwrite the value of the proccess data in the target system. Enter a value and select the checkbox. The process data values are sent to the target system by selecting the menu item *Process Data / Force* or by pressing the [icon] button. You can stop forcing the process data using the [icon] button. Forcing will also stop if you switch to another process data group or if forcing has been active for 20 minutes.

Description
Short description of the process data.

Features

Hide / unhide columns
In the local pop-up menu *Columns* you can switch the visibility of each column on/off

Enlarge table content
In the menu item *Tools / Options / User Interface / Font* you can set a larger font size for this window so that values are readable even further away from the screen.

Graphical View
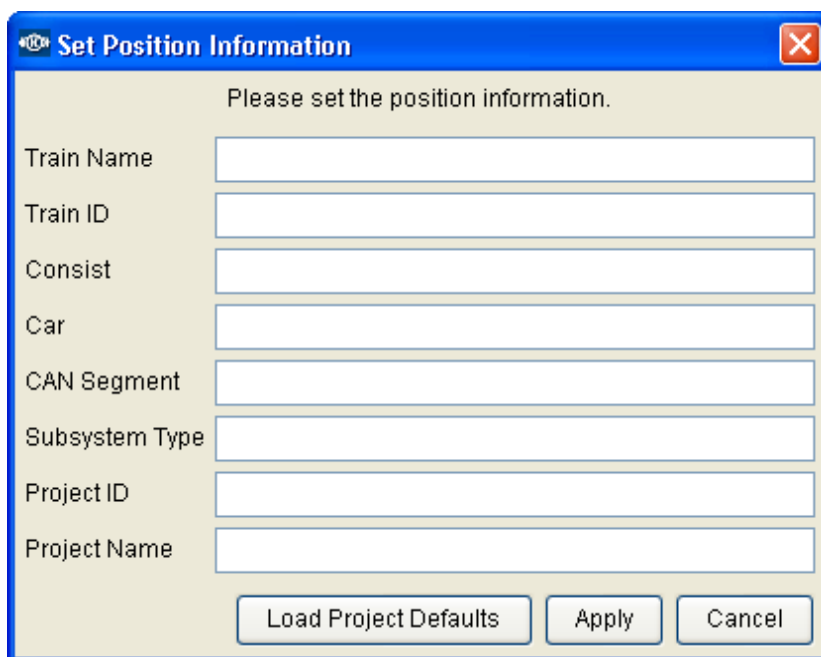
If the project file supports it, then the Process Data can be displayed in a graphical view.

3.5 Setting Position Information

Access:

Menu	Service / Set Position Information
Mouse	

Position information serves as identifier of the BCU/DCU within the fleet of trains. All entries of this feature can be any ASCII character sequence of maximum 17 characters. Since the information stored in this feature represents custom user data with no effects on the behavior of the system, only a proposal for usage can be found below; content and format of the entries have to be defined by the train operator companies. The position information set in this service will appear in Unit Information
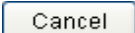
Proposed Usage

Name	Proposal
Train name	Given name of the train type or user project
Train ID	E.g. UIC code of the train.
Consist	Multiple unit with a fixed car configuration (in normal operation). Any identifier if needed.
Car	Any ID of the car e.g. UIC number.
CAN segment	E.g. index of control unit if more than one are present in the car.
Subsystem type	E.g. ESRA, DCU or any other identifier.
Project ID	Can be filled out by default with the STN number in the project file.

Project Name	Can be filled out by default with the name in the project file.

Actions

Button	Description
Load Project Defaults	Loads the Project ID and Project Name from project file.
Apply	Closes the dialog and sends the entered data to the CB12A board.
Cancel	Closes the dialog without updating position information on the CB12A board.

3.6 Request

Access: Default | Operator | OEM

Menu	Service / Requests
Hotkey	CTRL+ALT+Q
Mouse	🔧

This function makes it possible to initiate certain actions (e.g. parameter entry) by sending a request to the ESRA system. The request is a data unit of 64 bytes. It consists of a header to identify the request and optionally some bytes of additional data that can hold parameter values to be sent to or read from the application.

To send a request you must select the request and push button 🔧 or right click on the table and select *Send*. When the request has been sent a message coming from the ESRA system shows whether the process was successful.

ℹ️ **Note:** In some projects access to Requests may be delimited by project file content for some license levels.
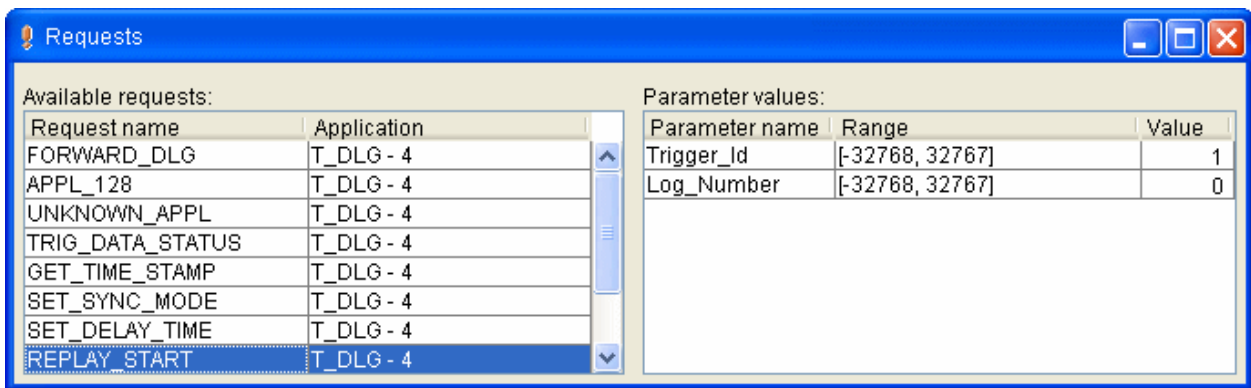
The Requests window contains the following information:

Request name
    An unique name to identify the request.

Application
    The request is processed by this application.

Parameter Name
    This column lists all the parameters of the currently selected request on the left side.

Range
    The range of the accepted parameter values.

Value
    This field displays the parameter value read from the application. Here you can also enter new values to be sent to the application.

Parameters displayed in bold had their predefined values queried directly from the BCU. Parameters displayed in normal font had their values obtained from the project.

3.7 SU06A Outputs

Access:

Operator   OEM

Menu	Service / SU06A Outputs
Hotkey	CTRL+ALT+U
Mouse	
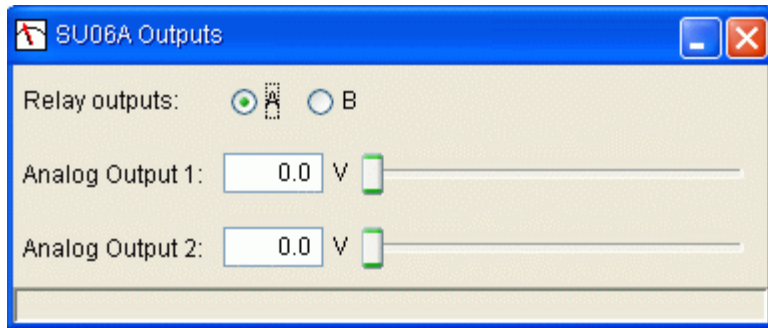
Relay outputs
The state of the relay switch (max 50V/ 1A).
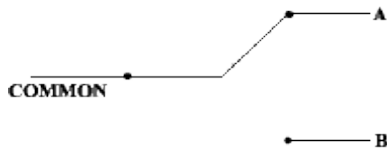
Analog Outputs
Output voltage can be adjusted between 0-10V (max 10mA load).

The *SU06A* outputs functionality offers two different modes:

Set mode
Force of combination of output values.

The configured output value combination is sent to the outputs when the *Set* ( ) button is pressed. This means that the changes we made within the SU06A outputs dialog will not appear on the outputs automatically.

Cyclic setting mode
Continuous forcing of output values.
The output values are changed immediately after any of the output value fields have been changed in the SU06A outputs dialog. You can enter or terminate this mode by pressing the *Cyclic setting* ( ) button.

3.8 RTC Settings

Menu	Service / RTC Settings
Hotkey	CTRL + ALT + C
Mouse	

The Real Time Clock window displays the current time of the real time clock of the connected system. If more boards in the project have RTC capabilities you can read them out or set the time on them one by one. The displayed values and the set-values are only valid for the selected source.

 Note: If the project does not support this feature then in this service system time is only displayed but not settable.
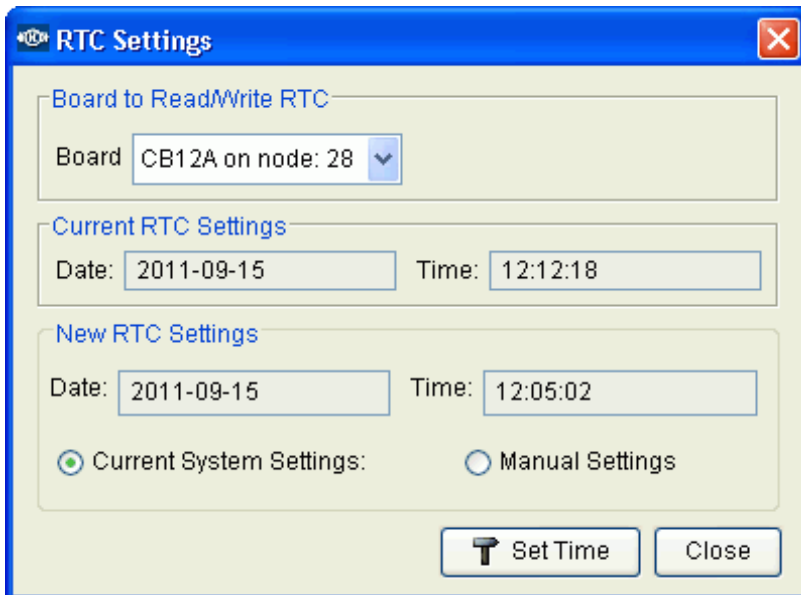
Board to Read/Write RTC
> Select a node number to define which device's RTC you would like to read out/set.

Current RTC Settings
> Current time on the selected source of the connected system.

New RTC Settings
> Define the new time that should be set on the RTC of the selected source.
>
> If *Current System Settings* is selected then the current time of the PC is being displayed in GMT (not editable). Time offset is calculated based on your Windows local settings.

Manual Settings
> The time can be edited manually.
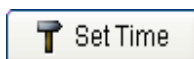
> Sets the real time clock on the selected device of the connected system using the current date and time defined in *New RTC Settings*.

3.9 Software Installation

Access:

| Operator | OEM |

Menu	Service / Software Installation
Hotkey	CTRL+ALT+S
Mouse	

This feature allows comparison and updating of the application software version which is currently downloaded to the ESRA system with the versions loaded in the Service Terminal.

Board configuration check is executed during the comparison phase of software installaton. If a board to be replaced is found then the replacement message is displayed in the status field.

This feature is available with following restrictions depending on the license level.

Operator

Only Installation of newer or older versions of the same application is possible. Software-Installation is not permitted if the application on the board has a different STN-number than the application in the project file.

OEM

Software Installation possible without any restrictions.

In case of version mismatch, automatic software download can be carried out. During this process only those boards are checked where it is possible to download application software (e.g. main boards). The Service Terminal checks the state of application boards.
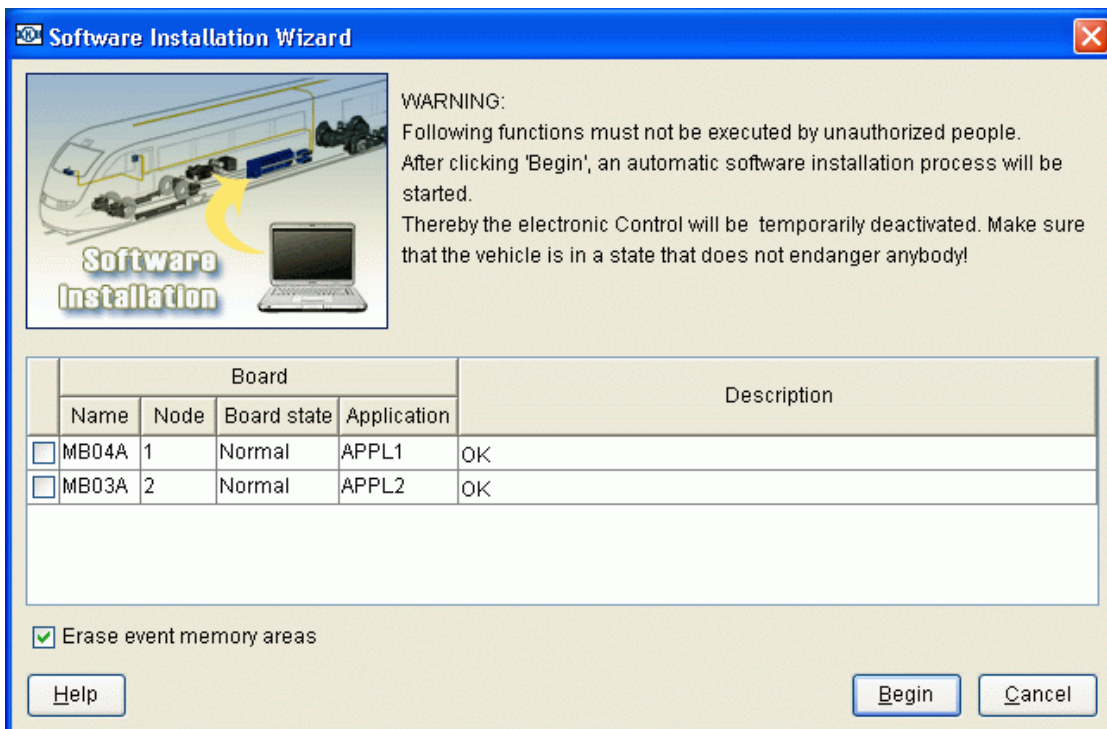
Board Name
        Name of the board retrieved from the current project.

Node
        Node number of the board.

Board state
        Describes the status of the board.

Application
        The application running on the corresponding board.

Description (Application states)
        Result of comparison between the application on the board and the application defined in the project.

Erase event memory areas
        If the check-box is checked, the event memory will be deleted after the software is successfully installed.
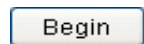
    `Begin`
        Starts the program download.
        In this step the Service Terminal checks if the target boards are available on the specified nodes. If not, a warning message appears and, if required, instructions are provided to the user to assist in correcting the error.
        After displaying the instructions the program loads the application software. Loading is performed automatically for all boards containing application software.

Setting Position Information

If the connected system stores position information then after clicking *Begin* the dialog to set position information will appear.

Application Compatibility

If ST03A reports incompatible connection type please change connection mode or exchange the project file.

3.10 Software Installation History

Access:

Operator OEM

Menu	Service / Software Installation / Report Download
Hotkey	CTRL+ALT+R
Mouse	

Note: This feature is only accessible if ST03A is connected to the ESRA system over Ethernet.

This feature displays information on previous software installation processes and offers the possibility to release the installed software if certain conditions are given. Using this feature it is possible to prove who performed the software installation using which Service Terminal instance and what applications. The shown information can be saved into `*.sih` files that can be opened for later evaluation with Service Terminal.

Software Release

The release process serves a second check of the already installed software by authorized people. ST03A serves the release process by comparing the attached ESRA system with the project file content and the state of the system at the time of the last software installation.

A finished software installation can only be released if the following preconditions are met:
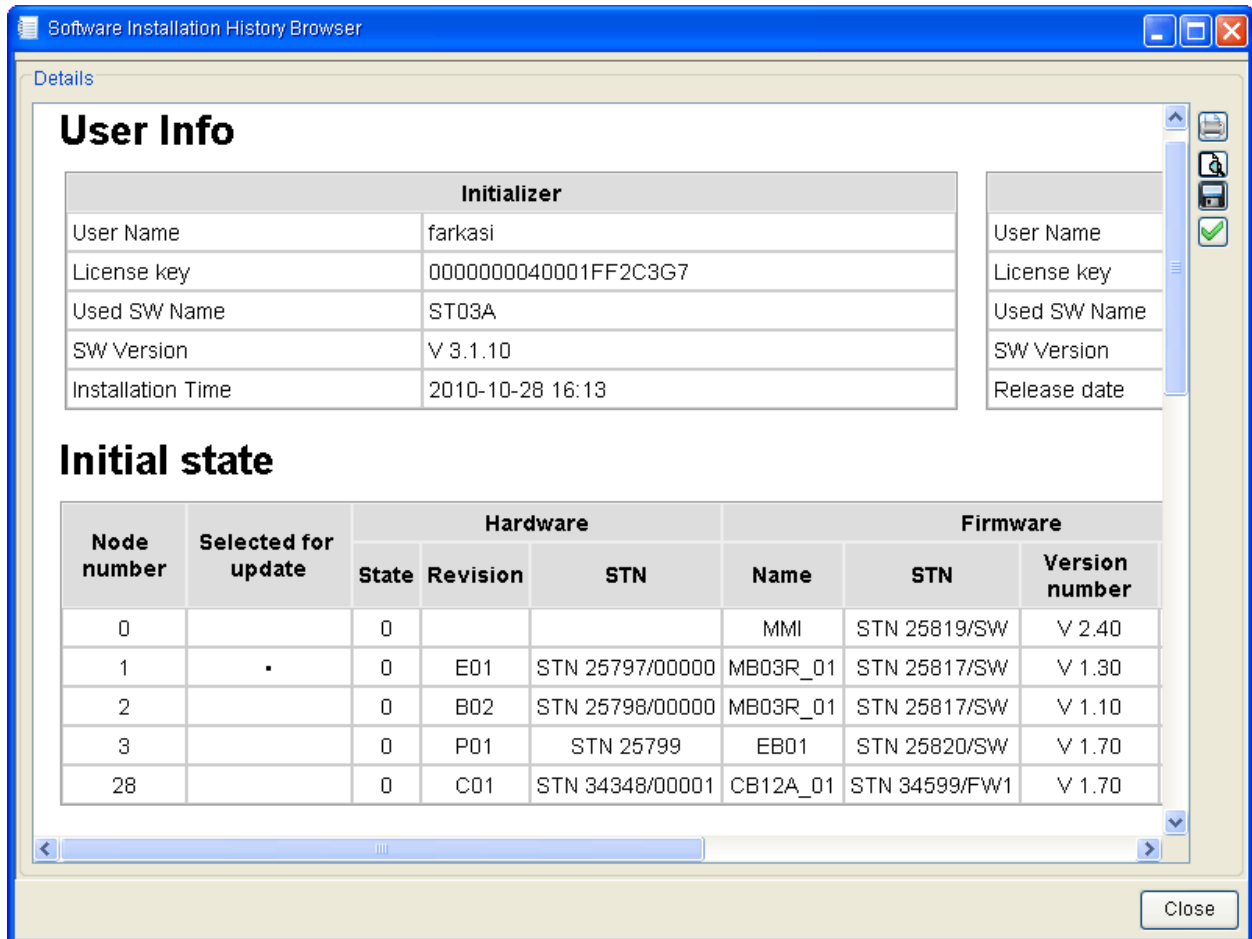
- Unit Information and Project information match, all boards are present in the ESRA rack where application can be found.
- Board reports that software can be released (software installation finished successfully).

A software installation can be released only if the release button is active. Clicking the button will release the software and adds information on the releaser to the report.

The software installation release can neither be revoked nor repeated. However, a new software installation, will make the last release out-of-date.

In this page only the description of the last software installation is visible, even if not successful. Therefore it is advisable to save or print the report if it is needed in future.

Displayed information in the report

Software Installation History Browser

Details

User Info

Initializer

User Name	farkasi
License key	0000000040001FF2C3G7
Used SW Name	ST03A
SW Version	V 3.1.10
Installation Time	2010-10-28 16:13

User Name
License key
Used SW Name
SW Version
Release date

Initial state

Node number	Selected for update	Hardware			Firmware		
		State	Revision	STN	Name	STN	Version number
0		0			MMI	STN 25819/SW	V 2.40
1	.	0	E01	STN 25797/00000	MB03R_01	STN 25817/SW	V 1.30
2		0	B02	STN 25798/00000	MB03R_01	STN 25817/SW	V 1.10
3		0	P01	STN 25799	EB01	STN 25820/SW	V 1.70
28		0	C01	STN 34348/00001	CB12A_01	STN 34599/FW1	V 1.70

Close

User Info

Information on the user who installed the software (left table) and the one who released the installation (right table).

User name
Windows login name of the person who did the installation (left table) or released the installation (right table).

License key
The active license key of the service terminal instance that performed the action.

Used SW name
ST03A

SW Version
ST03A version

Installation date/Release date
Date and time of the action.

Initial state

The state of the ESRA system as it could be seen in [Unit Information](#) before the software installation.

Selected for update

If marked with a point then its row was checked in the [Software Installation](#) window.

(Other columns)

For the description of the other columns please see the topic [Unit Information](#).

SWI process

This table shows the final state of the software installation after finishing or breaking down.

Software installation phase

The last activity that had been performed during Software installation. Successful installations ended with unit information (final check).

Node number

[Node number](#) of the board.

SW Download state

[Application state](#) on the board after the software installation process.

Result

The state of the ESRA system as it could be seen in [Unit Information](#) after the software installation.

Erase state

Displays if erasing was foreseen and if it succeeded.

(Other columns)

For the description of the other columns please see the topic [Unit Information](#).

Saving report

Click ![save icon] to save the report into file or click ![print icon] to print the report. You may check the preview using the ![preview icon] button.

Opening saved reports

Access:

| Operator | OEM |

Menu	Service / Software Installation / Open Report
Hotkey	CTRL+ALT+O
Mouse	![mouse icon]

You can open any saved software installation history report file (`*.sih`) for visualization. Even though the page looks similar to recently downloaded reports be aware that this does not show current system information and so no releasing is possible.

3.11 System Information

Access:

Default	Operator	OEM

Menu	Service / System Information
Hotkey	CTRL+ALT+Y
Mouse	

This function collects information about the connected system and the current project file. The information is stored in a `*.zip` file. You should use *System Information* if you detect an error during program operation and need external assistance. In this case start the *System Information* service, save the collected information in one of the existing folders, and then send the generated files to an appropriate person.

Two types of system information are available:

Project-independent system information
Only the content of the ESRA system is stored. Only BCU information is read (state information about the boards in the ESRA system). Project-independent system information can be stored only if no project file is opened.

Project-dependent system information
If a project file is opened additional information (e.g. the content of different event memories) will be stored as well.

3.12 Event Memory

Access:

| Default | Operator | OEM |

Menu	Service / Events and Errors / Event Memory
Hotkey	CTRL+ALT+M
Mouse	

With this function the current and temporary events of the boards and applications in the connected system can be displayed.

The events of the control unit are read and displayed periodically. This can be suspended by the ⏸ *Pause* command.

The user interface of Event Memory consists of three parts. The upper table summarizes the state of all event sources. The lower table lists the events that are not filtered out by the user. On the right of the window details of a selected event can be found as long as *details view* is selected.

Summary table content

Board

Name of the different sources of events.

Node

Address of the event source

Status

Current state of the source as listed in the table below.

Status	Definition	Comment
OK	The board is responding and there are no events on the board.	
Events occurred (current)	Some events of the source are in current state.	These events are listed in the event table.
Events occurred (gone)	Some events occurred, but they are not in current state anymore	These events are listed in the event table.
Events filtered (current)	Some events of the source are in current state. Additionally, some events are in current or temporary state but still not listed in the event table due to *Event Filter* settings.	Open the *Event Filter* and enable all events of this source to show the hidden events in the event table.
Events filtered (gone)	Some events occurred, but they are not in current state anymore. Additionally, some events are in temporary state but still not listed in the event table due to *Event Filter* settings.	Open the *Event Filter* and enable all events of this source to show the hidden events in the event table.
Board is not responding	The source did not answer the query for its events.	In some projects this is the regular behavior when in specific BCUs only a subset of the boards defined in the project should be present.
Cannot read events	The responsible board for sending the events of this source to ST03A is not available.	In most cases this status indicates that the extension board is found but the main board to handle its events does not respond.
No events defined	The board does not support the service *Event Memory*.	
All events filtered, board not queried	No information on the events of the source available since all events of the source are filtered out.	Open the *Event Filter* and enable at least one event of the source to start reading out the events.
Loading	Event states are being loaded.	Please wait while loading the events.

Event Table content

MMI Code

This text will be showed on the MMI.

Event Name

Name of the event defined by the application programmer.

Board / Node

Name of the board. This board handles this event.

Event status

Current status of the event as listed below.

Status	Definition	Comment
Current	This event is active.	This event can be erased but may appear again after erasing.
Temporary	This event occurred but is not active any more.	This event can be erased.

Counter

Counter of the specified event. Click right mouse button and select *Read Event Counter* to activate reading out the event counter from the target.

The counter is limited to 15. This value is displayed even if the event occurred more then 15 times.

Priority

Priority of the event. Events of different priority levels may need different actions (defined for the project).

Details View Content

These information are only displayed while *Detail View* is activated.

Description

Description of the event in the project file.

Instruction

Actions to perform when the event occurs. Predefined in the project file.

Customer Comment

Any user defined comments. Can be edited in the *Event Filter* panel (see below).

Available functionality

The following functions are accessible in the *Event Memory* service:

Show Description As Name

If this option is checked the service will show events in human readable format. Show Description As Name can be turned on by selecting the *Event Memory / Show Description As Name* menu item.

Read Event Counter

If this option is checked the service will read the counter of events. Events counter can be read by selecting the *Event Memory / Read events counter* menu item.

Detail View

If this option is checked the service will show detailed description of an event. Detail view can be turned on by selecting the *Event Memory / Detail View* menu item.

Pause ▐▐

If this function is checked the service will be suspended, otherwise it will be started. Service can be started or suspended by pressing the ▐▐ button or by selecting the *Event Memory / Pause* menu item.

Clear 🔖

Deletes all current and temporary events of all displayed boards and applications. Events can be deleted by pressing the 🔖 button or by selecting the *Event Memory / Clear* menu item.

Event Filter ▤

The user can see all possible events of the project grouped by boards. The user may select a subset of events, for example all events of one board.

These functions above are also available in the pop-up menu of *Event Memory* window.

Event Filter

Access:

Menu if *Event Memory* window is open	Event Memory / Event Filter
Pop-up menu in *Event Memory* window	CTRL+ALT+M
Mouse in *Event Memory* window	
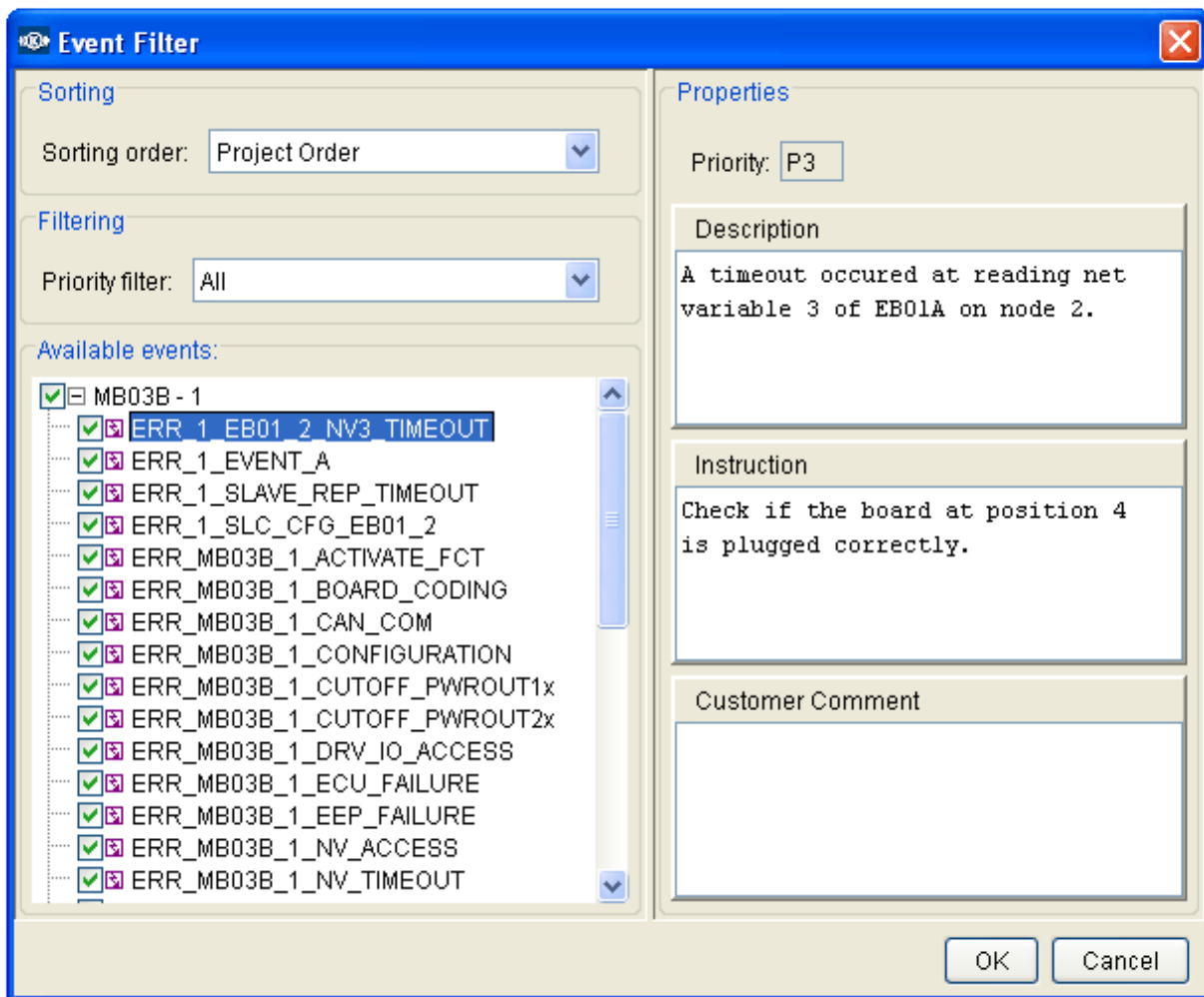
Using the event filter panel you can hide events from the event table to keep overview. The number of hidden channels is displayed in the title row of the Event Memory window. The boards that contain hidden channels are marked as "Filtered" in the *Event Name* column.

Sorting order:
The events in the selection tree can be ordered within the folder of the board either by alphabetical order or the order defined in the project file.

Priority filter:
You can select to list only the events of one priority level in the selection tree.

Event Comments
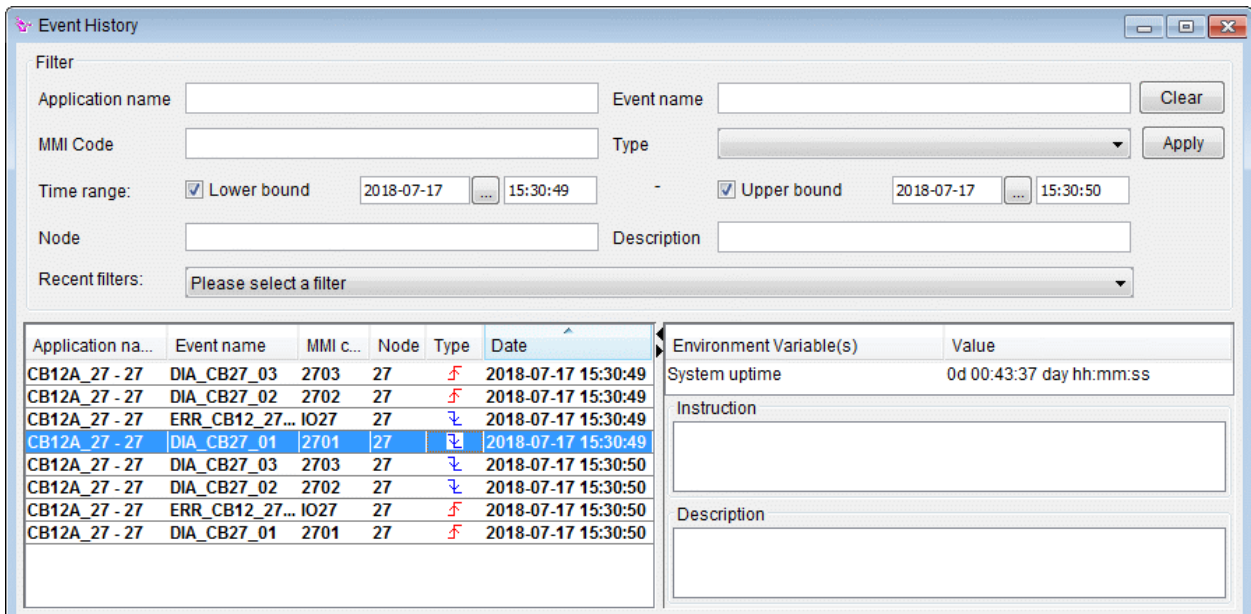
If you select an event you can see the properties of the event as contained in the project file. ***Description*** and ***Instruction*** are predefined in the project but the event comments can be edited by the user and saved into the project file (***File / Save as ...***). If you created your own comments to events and you would like to use these comments in other project files (e.g. newer version of the same project) then you can import the event comments of another project file into the currently open project using the menu feature Event Comment Import.

3.13 Event History

Access:

Menu	Service / Events and Errors / Event History
Hotkey	CTRL+ALT+H
Mouse	

This function makes it possible to read, save, open and display the actual event history content. The menu item is disabled if there is no event history in the opened project.

Filterable items:
- Application name
- Event name
- MMI Code
- Node
- Description

Time range:
Date-time picker helps set lower and upper bound.

Recent filters:
> Service Terminal saves the last 10 most recently used filter. That can be selected by using combo box. It will fill the filter form, click Apply button will list selected recent filter.

Application name
> Name of the application.

Event Name
> Name of the event.

MMI Code
> Code of the event.

Node
> The node number of the board where the event occurred.

Type
> ⚡- The event is currently active.
> ⚡- The event is not active anymore.

Date
> Last time the event was read as active.

Environment Variable(s), Value
> This table describes the state of the connected system when the event occurred; it can include values of zero or more environment variables.
> The environment variable can have one of the following three types:

- State: It defines a state. E.g. the door is open.
- Bit field: In this case each bit of the variable has a separate value and a separate meaning.
- Normal: It is a number e.g. value of speed sensor.

Description
> Description of the selected event.

Instruction
> Advice about how to fix the error.

The events in the *Event History* window are shown normally in **black**. If an event is shown in gray it means that the event is marked as cleared.
The order of the events can be arranged according to name, event code, node, type, application name and time stamp.

Event History menu

Erase
> Deletes the events.

Save

> Opens the *Save* dialog window to save all events in XML Event History (`*.ehl`) file format. The upper field in the dialog window is a comment field where an optional comment can be added. The comment is stored with the saved file and is displayed when browsing the Event History Log files to open. The Event History Log files can be opened through the *Services / Events / Open events log* menu item.

Refresh
> Refreshes the content of the *Event History* window.

Show Description As Name
> If this option is checked the service will show events in human readable format. In this case the *Description* field in the right panel will disappear.

4 Licensing

Service Terminal is a general tool that supports all possible ESRA services and most of the DCU services for development, maintenance and operation. Even though only a subset of features are available at once, depending on two parameters:

Project
> Only those features are active that are supported by the connected system.
>
> The list of supported features is described in the project file.

User group
> Service Terminal users belong to different groups having different tasks and different responsibilities.
>
> Different user groups are identified by different license levels.

Getting a license

For registering your installation of ST03A you will need the ID on the label of your CD cover. You will need to fill in the license request form and either activate your license on-line or send a Knorr-Bremse license request file to the Hotline Service Terminal.

Please click **here** to read detailed steps of getting a license.

Activating a license key

After you have sent a license request file to Hotline Service Terminal you will receive a license key.

Please click **here** to find out how to activate your license key.

Moving your Service Terminal license to another computer

As Service Terminal licenses are hardware-bound, you may only use this license with a new computer in case you prove to have uninstalled your previous Service Terminal installation.

Please click **here** to find out how to move your license to another computer.

Having problems with your license?

Please check our topic **Trouble Shooting** for your problem, and if you haven't found the answer to your question, please feel free to contact the Hotline Service Terminal.
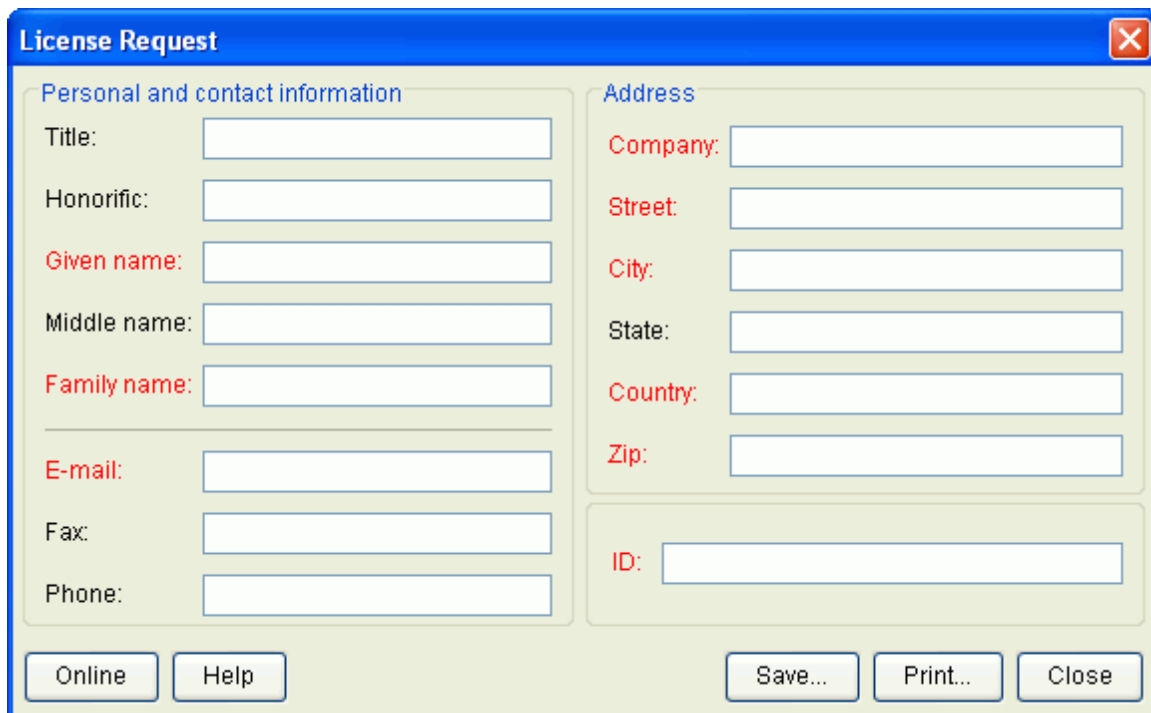
4.1 License Request

There are two ways to get a license key. You can use the first solution if your computer is directly connected to the Internet.

1. Fill in the license request form (*Tools / Licensing / Request*).
2. Press *Online* to send the content of the form to the license server.
3. A dialog will appear asking if you would like to add the license key now. Click *Yes*.

You can follow the steps below in case your computer is not directly connected to the Internet or if the automatic licensing process failed due to any reason.

1. Fill in the license request form (*Tools / Licensing / Request*).
2. Press *Save*. A file dialog will appear and you can save a `*.kbr` license request file on your local computer.
3. Send this saved file in an e-mail to the Hotline Service Terminal.
4. You will receive your license key in e-mail within 3 days.
5. You can add your license key to your Service Terminal in the menu item *Tools / Licensing / Answer*.

Content of the license request form

Personal and contact Information
Personal and contact information must be provided here.

Address
The complete address of the user (company data) must be provided here.

ID
The ID field must contain a valid product installation ID (serial number). Customers will not get a license without entering a valid ID.

ℹ️ **Notes:**
- The ID is printed on the label stuck onto the cover of the official CD. The official CD can be ordered via SAP system with the STN30440 article number.
- Only one license request per ID is approved. Please make sure you provide an ID that has not been used before.

[Online]
Applies for a license automatically on the Internet.

[💾]
Saves the entered data in a license request file (`*.kbr`). The created file should be sent to the Hotline.

[Print...]*(not recommended)*
Prints a copy of the registration data. (It is not recommended to use this functionality as processing the printed license requests last longer then licensing with saved `*.kbr` files.)

4.2 License Answer

If a request is approved by Knorr-Bremse, you will receive a 20-digit-license-key, which should be activated in the *Tools / Licensing / Answer...* panel:
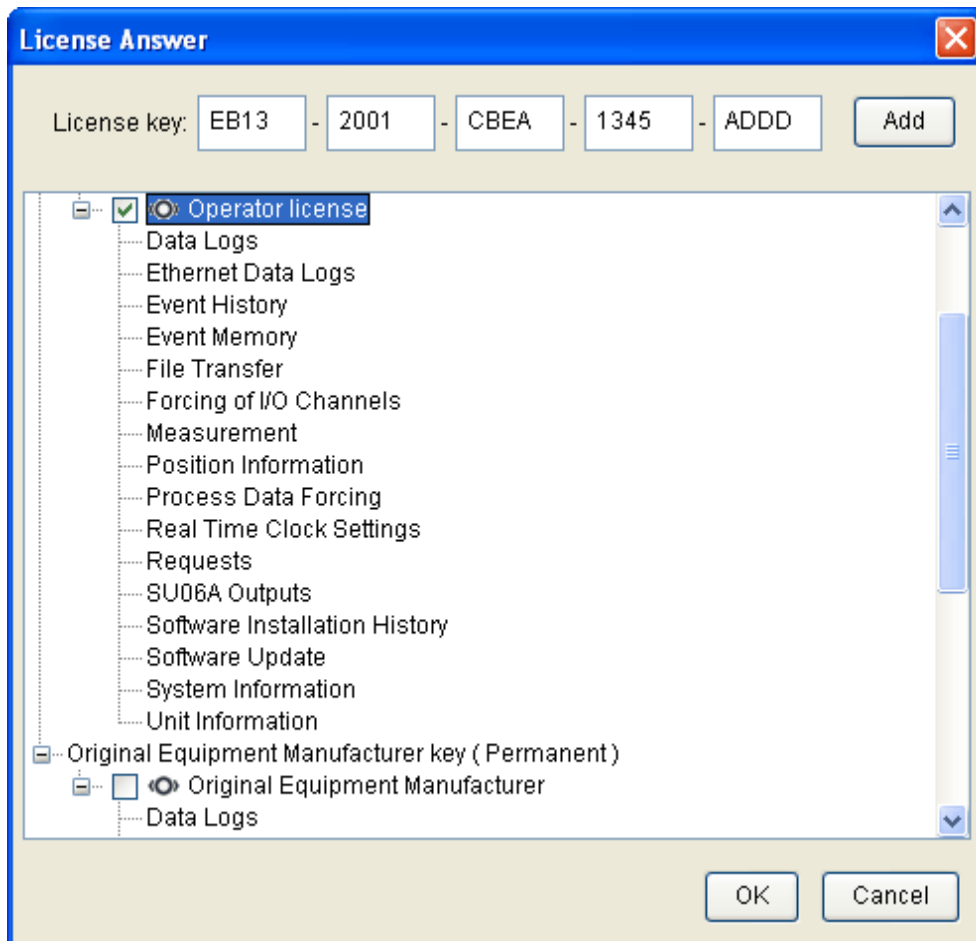
To activate the license key copy and paste it into the *License key* field, then click the [Add] button.

To have full access to the features of Service Terminal please do not forget to load the project file belonging to the connected ESRA system or DCU.

Notes:

- If you have more than one license, you can activate/deactivate them by selecting/unselecting the appropriate check-boxes and clicking the [OK] button.
- You can always check your currently available licenses in this window.
- If you would like to see which plug-ins are available with your licenses, just click on the **+** sign in front of the appropriate license.

4.3 Moving Licenses to another PC

Sometimes it is necessary to move a license from a computer to another one. The license revoking mechanism makes it possible to permanently remove a license from a computer and prove this to Knorr-Bremse. Afterwards Hotline Service Terminal support accepts a new registration with the same ID.

Both steps (revoking the old license key(s) and providing a new one(s)) can be done at once if you send to the Hotline Service Terminal e-mail address (esraterm@knorr-bremse.com) both:

- the .kbu file created during the uninstallation process described below,
- the new license request file (.kbr) created on the new PC (see *License Request*).

To remove permanently your current licenses start the ST03A uninstaller (*Start / Programs / ST03A V(N) / Uninstall ST03A*) and check in the *Revoke license* check-box.

During the license removal ST03A generates a .kbu file that has to be sent to the Hotline Service Terminal e-mail address in order to prove the removal of the license. The .kbu file will be created into the directory which name depends on the version of ST03A and where other license files are stored. If you choose the *Revoke license*, the information about the storage directory will appear in the last panel of uninstallation process.

Note: After the license key has been removed from the computer it cannot be used on the same PC.

4.4 License types

ST03A supports two different platforms that require individual licenses:

- Door Control Units (DCU) of IFE. Marked with ▸ in the License Answer panel.
- ESRA brake systems of Knorr-Bremse. Marked with ◐ in the License Answer panel.

All license types listed below are available for both system types (even though the accessible features are different). Combined licenses for both systems can also be delivered.

Available services in ESRA systems

The following license types and related features are available to ST03A users in ESRA systems. For the available features in DCU mode please open a DCU project file and open this help topic again.

User Group	License Name	Available Services
Any user This license level is available immediately after installation	**Default**	Project Information Event Comment Import Unit Information I/O Channels (Reading) Process Data (Reading) Request Real Time Clock Settings System Information Export Event Memory Event History Open Event Log Standard Data Log Data Recording, Snapshot
Any user This license level can be selected only during installation. Use this if you need to measure urgently before your license key arrives	*TEMPORARY* **Operator**	Services of **Default** access rights + SU06A outputs Advanced Data Log (Offline) Measurement Measurement Configuration
Train operator companies	**Operator**	Services of **Default** access rights + File Transfer I/O Channels (Forcing) Process Data (Forcing) Setting Position Information Software Installation (Update) Software Installation History SU06A outputs Advanced Data Log Measurement Measurement Configuration
Original Equipment Manufacturers (OEM)	**OEM**	Services of **Operator** access rights + Software Installation (Any SW)

Note: If a specific project does not support a specific feature then the menu items belonging to that feature will be disabled even if the user possesses the necessary access level. For example: the *Data Log Browser* tool-bar button will be disabled if the opened project file does not contain a data log configuration.

4.5 Trouble-shooting (Licensing)

Here you can find the most frequently asked questions (FAQ). If you don't find the answer to your question here please contact the Hotline Service Terminal.

Registration - License request

How can I get a license ID?

To get a license ID please contact your Knorr-Bremse contact person who will order it for you in SAP. For Original Equipment Manufacturers the order number should be STN30440/OEM-ED, and STN30440/OP-ED for Train Operator Companies. Both licenses provides
access to both ESRA and DCU systems.

How can I upgrade my Service Terminal to the newest version?

If the official release date of the new version is not later then 1 year after the first registration of your ID then you can update ST03A for free. You simply download the newest version on the same computer and send a new license request file to the Hotline using the same ID.

If you first registered your ID more then 1 year before the official release of the new version you will need an update for your license ID that your Knorr-Bremse contact person can order for you in SAP. After the upgrade you can register the newest version of Service Terminal on the same computer where the old version was registered.

I will get a new computer from the IT. Can I use ST03A with my old ID on the new computer?
You can move your license if you follow the steps described here.

I am having Operator access rights but I need OEM. How can I get my license updated?

Under special conditions your Knorr-Bremse contact person can order an upgrade for you in SAP. After the upgrade you can receive an OEM license key for your existing ST03A installation.

Activating licenses, active licenses, license answers

Where can I see my currently active licenses?

In the menu item *Tools / Licensing / Answer* your active licenses are listed.

How can I distinguish my ESRA licenses from my DCU licenses?

The icon ▶ indicates DCU licenses and the ◎ mark ESRA licenses in the license answer panel.

When adding the license key I get an error message "invalid digest".

There may have been any hardware change between generation of license request file and adding the generated key.

Please send a new license request file to the Hotline in order to investigate the possible reasons and generate a new key.

When activating a license I get an error message "License already added".

The license has already been added or it has been revoked from the computer. If the problem can not be solved in another way you will need a new license key.

My license key does not work on another computer.

Licenses are hardware-bound so they will only work on the computer where the license request form was filled out.

To get a license key for your other computer please send a new license request file to the Hotline from the other machine with an unused ID

My license key used to work on this computer but now it doesn't.

A license key may not be working if any hardware has been changed on the computer.

Please send a new license request file to the Hotline in order to investigate the possible reasons and generate a new key.

My license is not working - License answer window writes: "No licensing information available."
The service ST03A may not be running. To correct this, please follow the steps below

1. Open **Start** menu **/ Settings / Control Panel / Administrative Tools / Services**
2. Search the item **ST03A Service of Knorr-Bremse** and check if it is running.
3. If it is not running, start it with right clicking on it and selecting "Start".
4. If you do not find this service in the list then uninstall Service Terminal (do not check **"Revoke license"** !!!) and install it again.

My license is not working - License answer window marks my licenses as "expired"
Either your license has been revoked from the computer or you have not enough user rights to use Service Terminal.

Temporary licenses, after they had lost validity, are also displayed this way.

Some features do not work...

I can not find a service in the menu.
In the menu item *Tools / Licensing / Answer* your active licenses are listed.

Please check which licenses are active. Please click here to find out what services should be available at your license level.

If you see the menu *Measurement* then you are having at least *Operator* rights.

I can see a service in the menu but it is not active (gray).
If you can see a menu item in the menu this means that you have the correct license type to access this menu item but your currently open project file does not support it or you may have no project file open at the moment.

5 Measurement

Access:

Operator   OEM

Introduction to measurement

During measurement data is being read out cyclically from the ESRA/DCU system and from external measurement devices. Service Terminal stores the read values together with the time of reading and visualizes them in graphical plots.

The data flow during measurement consists of channels. One channel represents the values of one variable in the application or one input/output value of a measurement device including the time information belonging to each value. So each channel can be regarded as a function of time containing values of a variable and this is also the way how ST03A displays them.

The amount and size of channels that can be measured at once is limited by base software. So the user may define configurations where he can decide which variables he wants to measure at once and at what cycle time.

The output of measurement is measured data. The user may save the measured data in the own format of ST03A or export it into `csv` files that can be opened by other programs like MS-Excel. As new feature the user may also import general measured data files e.g. to use Service Terminal visualization functionality on data measured with other tools.

The plots of measured data can be individually redesigned (e.g. zooming, hiding channels, changing colors, etc.) for optimal visualization and printed out or copied into documents. You may also place notes at different locations of the plot.

Navigation in the Measurement help topic

Configuration
Selecting channels for measurement, setting cycle times on measured boards

Channel
Description of all types of channels, configuring measurement on external measurement devices

Measuring
Step-by-step description of measurement process. Saving, exporting data, adding notes, printing, displaying measured data of DOS-Service Terminal.

Data displaying
Customization of the plots containing measured data for optimal visualization.

Measurement Devices
Detailed description of inputs and outputs of external measurement devices.

Generic Measurement Files
External source measured data imported into Service Terminal for further processing. Detailed description of input format.

5.1 Configuration

A measurement configuration file (`*.mmc`, `*.emc`) includes all data settings for starting a measurement. It contains:

- A list of channels which are to be measured
- Cycle times with that a board should be measured
- Calibration information to the channels (factor, offset and unit) so that the digital data gets its real meaning
- Visualization information to the channels like color

Opening a Configuration

Access:

Operator OEM

Menu	Measurement / Open	Open any configuration or measured data file
Mouse		
Menu	Measurement / Last Configuration	
Mouse		Opens the last configuration
Hotkey	CTRL+ALT+L	

Opening a measurement configuration an empty measurement window will appear ready for starting a measurement

Selecting Channels

Menu in graphical window	Display / Configuration
Mouse	

If you open a configuration you can change the set of channels you would like to measure in this dialog. In the right column you can find the original name of the channels while the left column shows the names that are unique identifiers in the project (so called alias names).

ℹ **Note:** There are some limitations for what channels can be selected at once and what channels can not be selected without another. For further details please check the topic Channel. There you can also find the description and properties of each channel type.
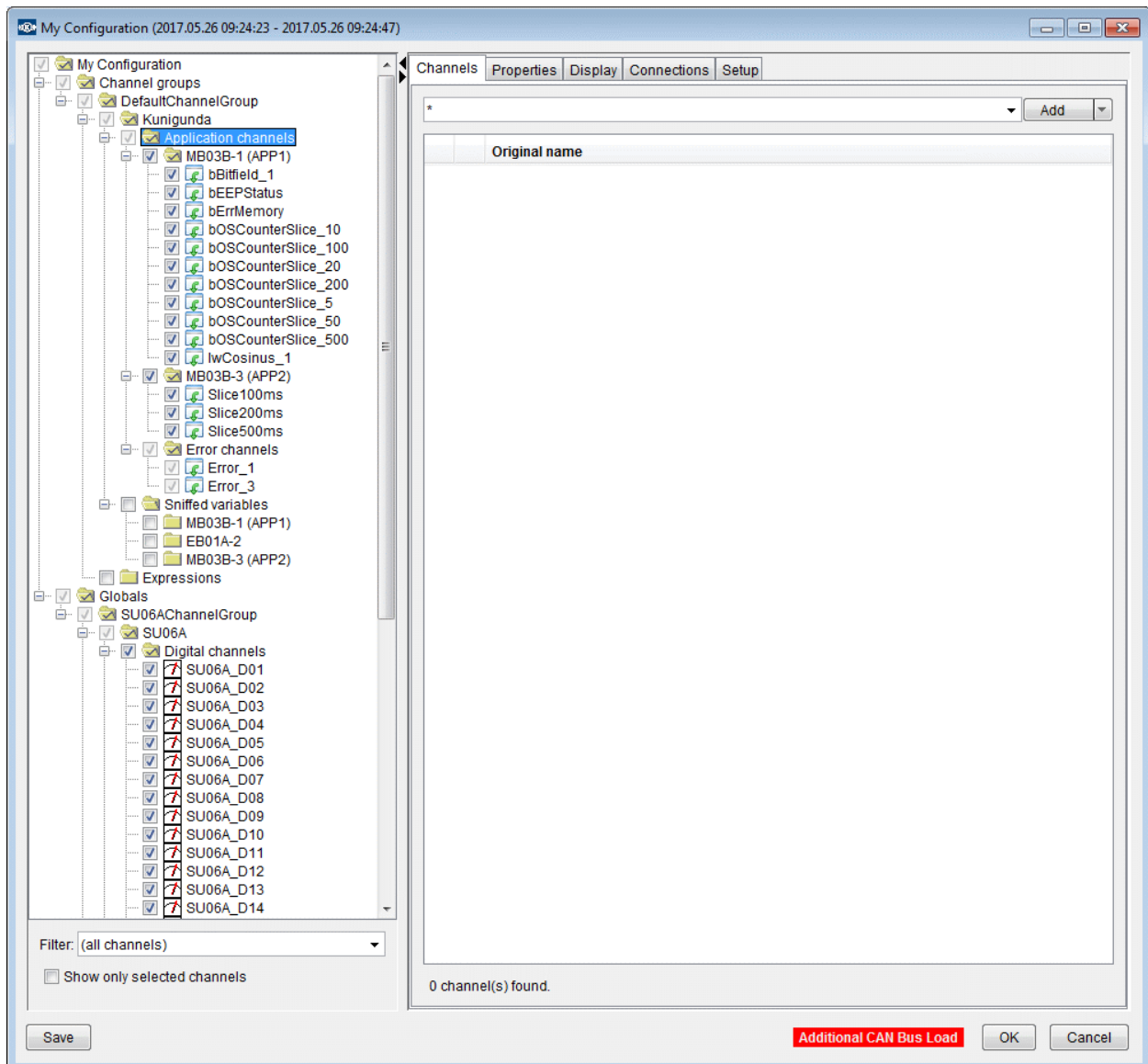
Resource Panel

The user can manage the channels on this panel. The channels are organized in a tree. In case of some data sources (projects, DBC, SU06A, DGH03) channels can be added to the tree from the list of data source channels on the Channels tab. Once a channel is added to the tree, it becomes a *managed channel*. Other types of channels (expressions, triggers, sniffed) can be created on the Properties tab. They become automatically managed and will be inserted into the tree.

The root of the tree is the configuration. The second level contains Channel groups and the Globals nodes.

The Channel groups node contains those channel groups which can be measured via a connection. They contain channels from

- an ESRA or DCU project data source (application channels, I/O channels and events, sniffed variables),
- DBC data sources (sniffed CAN net variable channels),
- an expression data source (expressions using channels within the channel group).

Channels in these channel groups will be measured on a connection if the channel is selected and the connection is activated and assigned to the channel group. See *Connections* tab.

Channel groups under the Globals node do not require a connection. They can contain channels from

- Special device data sources (SU06A, DGH03)
- Global expressions data source (expressions using channels within the channel group and measured channels)

Channels in these channel groups will be measured if they are selected.

Configuration Tabs

Channels
The user can search for channels on this tab. The search is executed on a subset of channels defined by the selection in the tree (preselection). Wild cards can be used (e.g. '?' or '*').

Properties
The selected tree node's properties are displayed here. Some properties can be edited depending on the selected tree node.

Display
The user can define the display properties here Measurement Windows, Measurement Tabs and individual channels.

Connections
Connections can be created, deleted and edited here. Channel groups can be assigned to connections.

Setup
The user can set general measurement properties on this tab.

Saving Configurations

Access:

Operator   OEM

Menu	Measurement / Save	Saves the current open configuration to the last location for saving.
Mouse	💾	
Menu	Measurement / Save As...	Opens the file open dialog for saving the current configuration.
Mouse	💾	

The 💾 button saves the configuration to the location where the configuration was last saved. If you open a measurement configuration from the project file this button will open the **Save As...** dialog.

Using the 💾 button you can save the configuration to a different location to your local file system in *.mmc or *.emc format.

The conversion will only affect the saved file. The currently open configuration will remain the supported format of the current ST03A version.

5.1.1 Channels Tab

Project, DBC, SU06A and DGH03 channels are not added to the resource tree automatically; they can be added to the tree from the list of data source channels on the Channels tab. Once a channel is added to the tree, it becomes a *managed channel.*
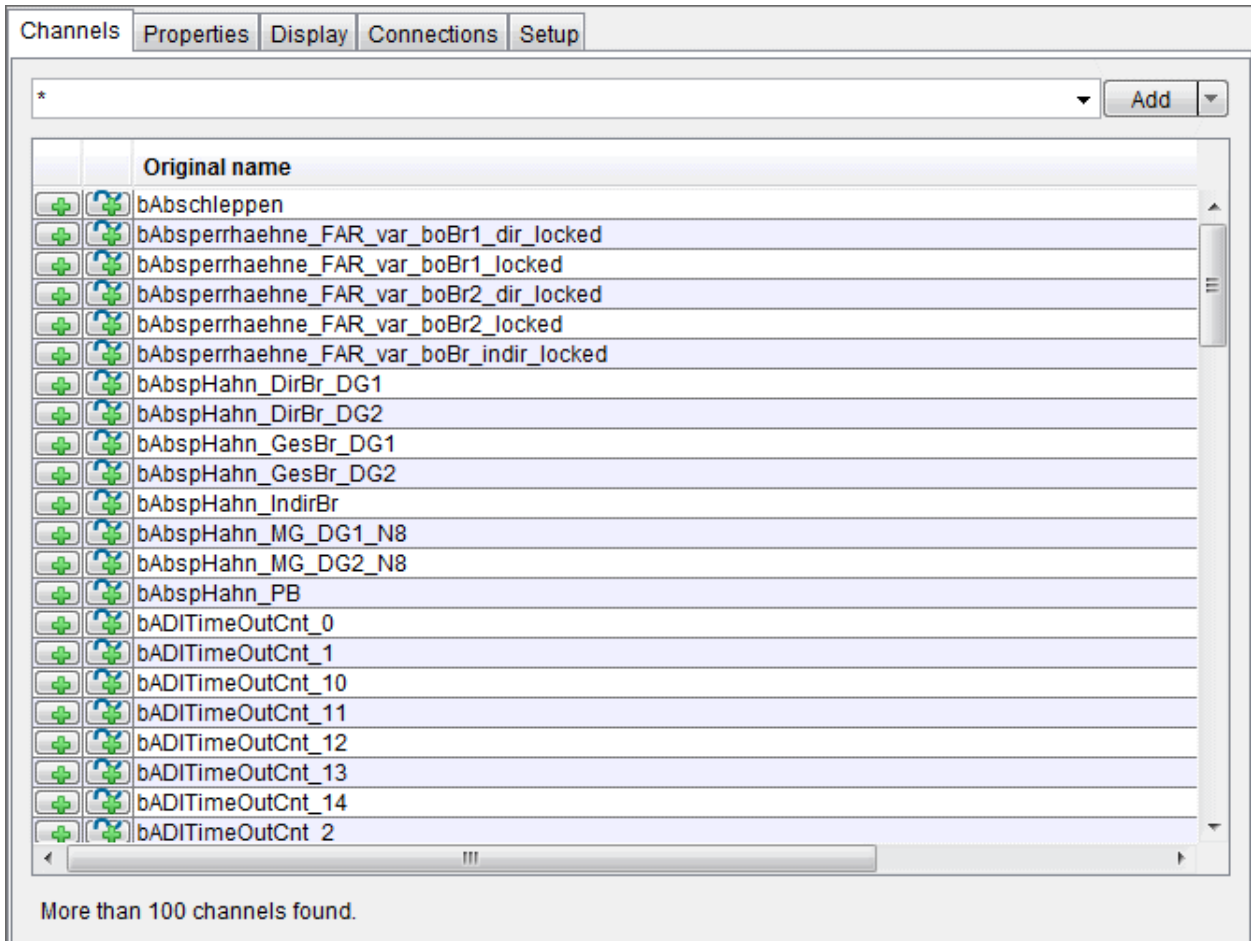
The user can search for channels on this tab. The search is executed on a subset of channels defined by the selection in the tree (preselection). Wild cards can be used.

Functions:

Search combo box

The user can type the search text here. There are 2 wild cards for the search text, * (asterisk) is used for any string and ? (question mark) is used for a single character. Also it can contain the last 10 searches.

Add buttons

The user can select a single channel or multiple channels from the results. These channels can be added to the managed channels with this button. There are two options: add the channel(s) without selecting them or with selection.

Channel table

The resulted channels will be displayed here. Only the first 100 results will be added to the table. There are two icons at the first two columns, the first one is adding the channel to the managed channels without selecting it for measurement and the second one is adding them with selecting for measurement.

Status

The number of found channels is displayed here and a message when a search is in progress. If the search results in more than 100 channels, then this will be indicated here too. After pressing a key a 500 ms interval should elapse before search would start, each key press resets this interval. The search works on channels defined by the selection on the Resource Panel.

5.1.2 Properties Tab

The selected tree node's properties are displayed here. Some properties can be edited depending on the selected tree node.

5.1.2.1 Configuration Properties

The Configuration Properties is displayed on the right side if the configuration node is selected in the Resource Panel tree.

Initially a data source is generated from the project file and the Expression data source is enabled by default which allows you to create custom expression definitions.
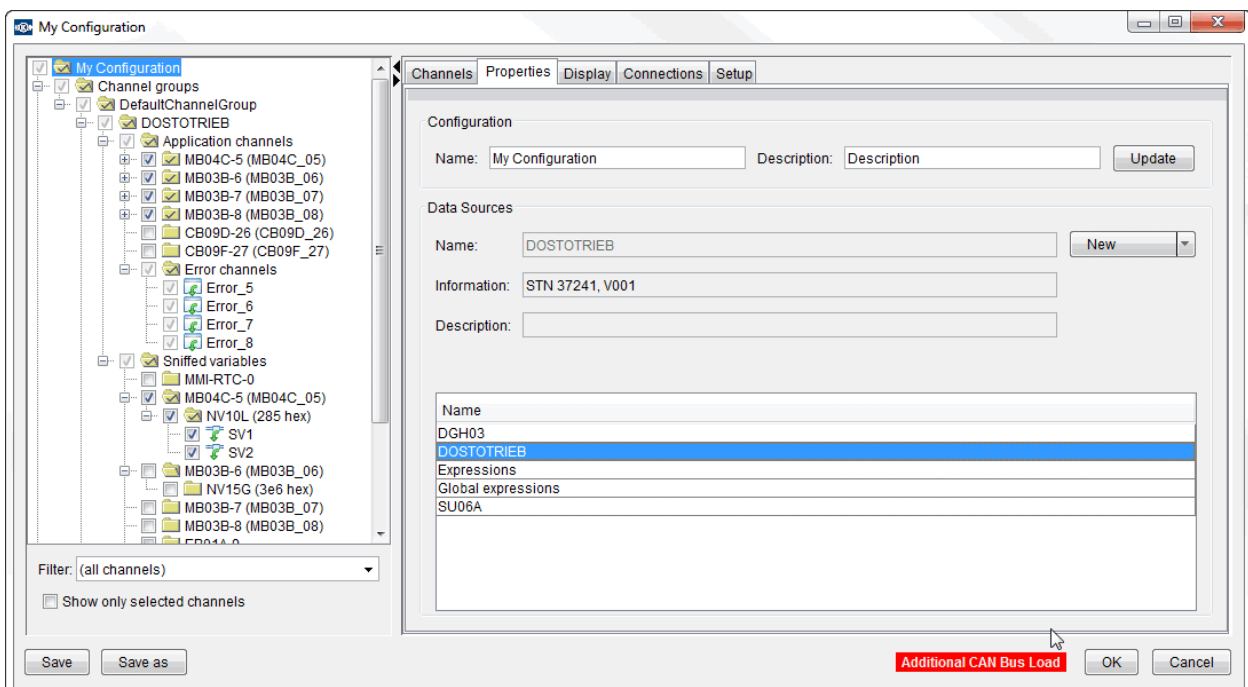
Rename the current configuration

Modify the Configuration name (My Configuration is the default) or Description with the *Update* button at the top of the Configuration Properties panel.

Add a new Data Source

It is possible to use more data sources in a channel group.

If you want to add a predefined Data Source (e.g. global expression, SU06A, DGH03) then you can select that with pressing the *New* button.

5.1.2.2 Channel Group Properties

The Channel Group Properties is displayed on the right side if the configuration node / Channel groups node is selected in the Resource Panel tree.

![KNORR-BREMSE logo]
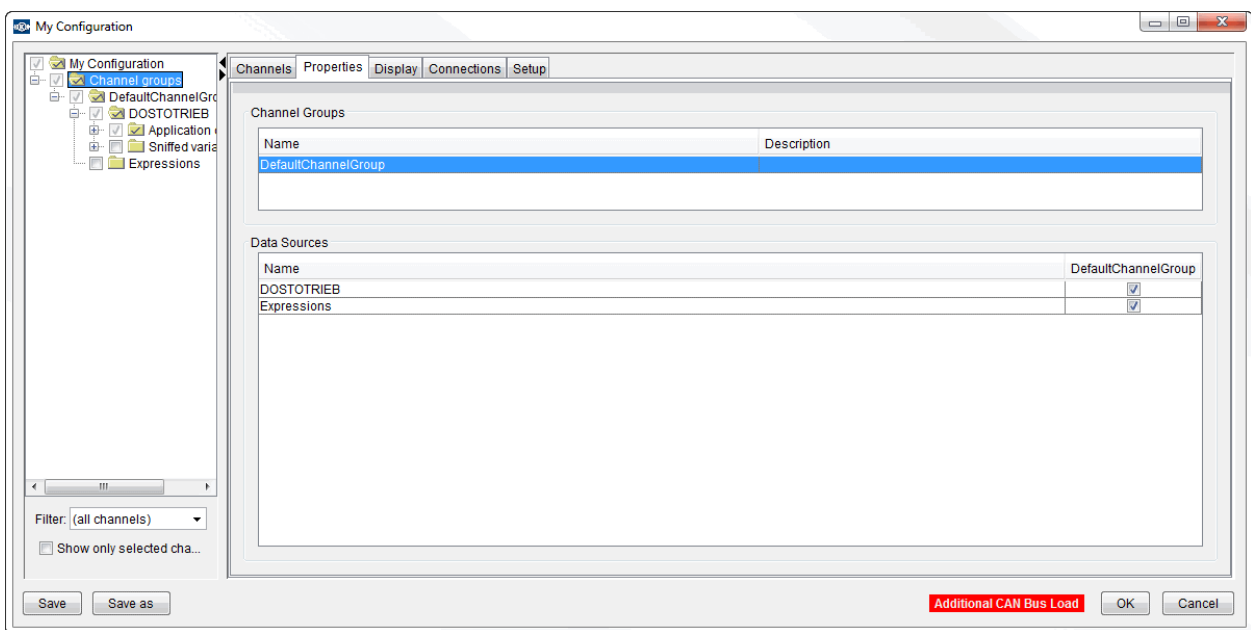
5.1.2.3   Project Properties

The Project Properties panel is displayed on the right side if the configuration node / Channel groups node / a channel group node / a project node is selected in the Resource Panel tree. The Project Properties panel displays information relevant to the boards and the software items configured in the project file.

5.1.2.4 Application Channel Properties

The application channel properties tab is displayed on the right side if the configuration node / Channel groups node / a channel group node / a project data source node / Application Channels folder / a board folder or one of its application channel child nodes is selected in the Resource Panel tree.

The user can modify or delete application channels on this panel.

The name, transformation (factor, offset) and unit columns are editable. All other properties are defined in the project.

Description of properties:

Name
Unique name in the configuration - editable.

Unit
This unit will be dispayed on the value table.

5.1.2.5 Events Properties

The Event Properties Tab is displayed on the right side if the configuration node / Channel groups node / a channel group node / a project data source node / Events folder / a board folder or one of its event channel child nodes is selected in the Resource Panel tree.
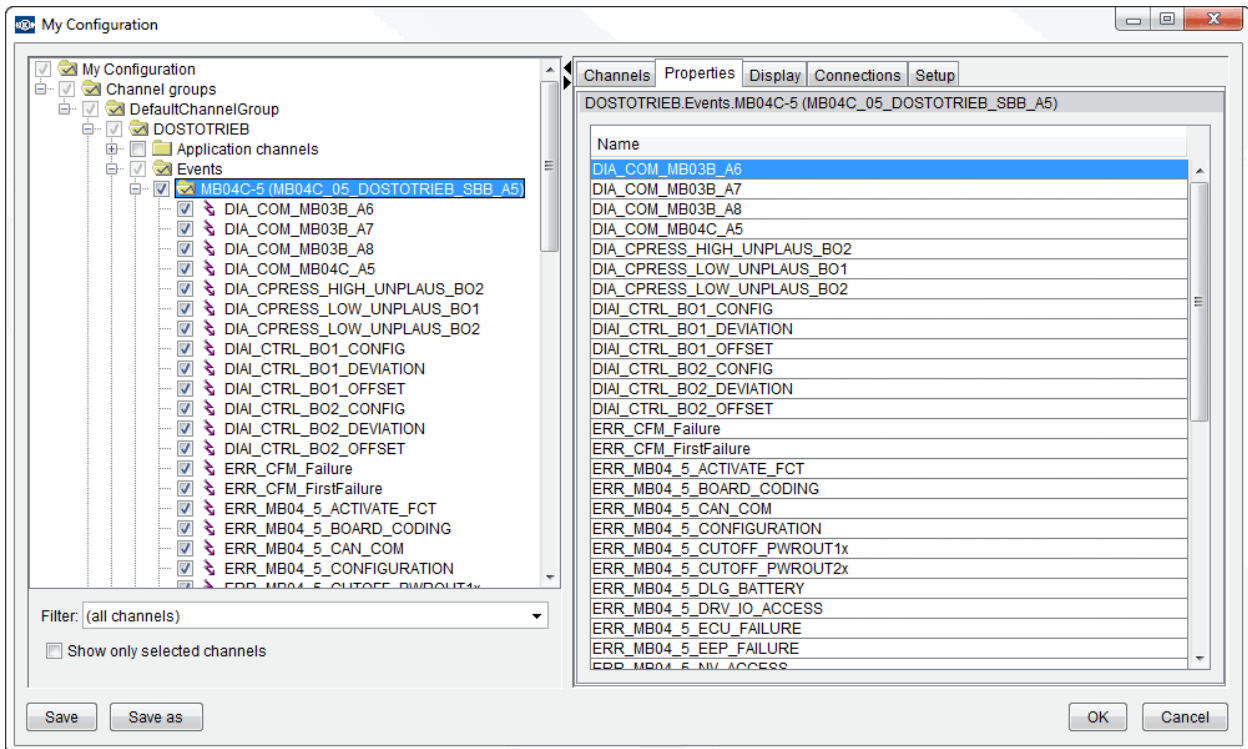
Description of properties:

Name
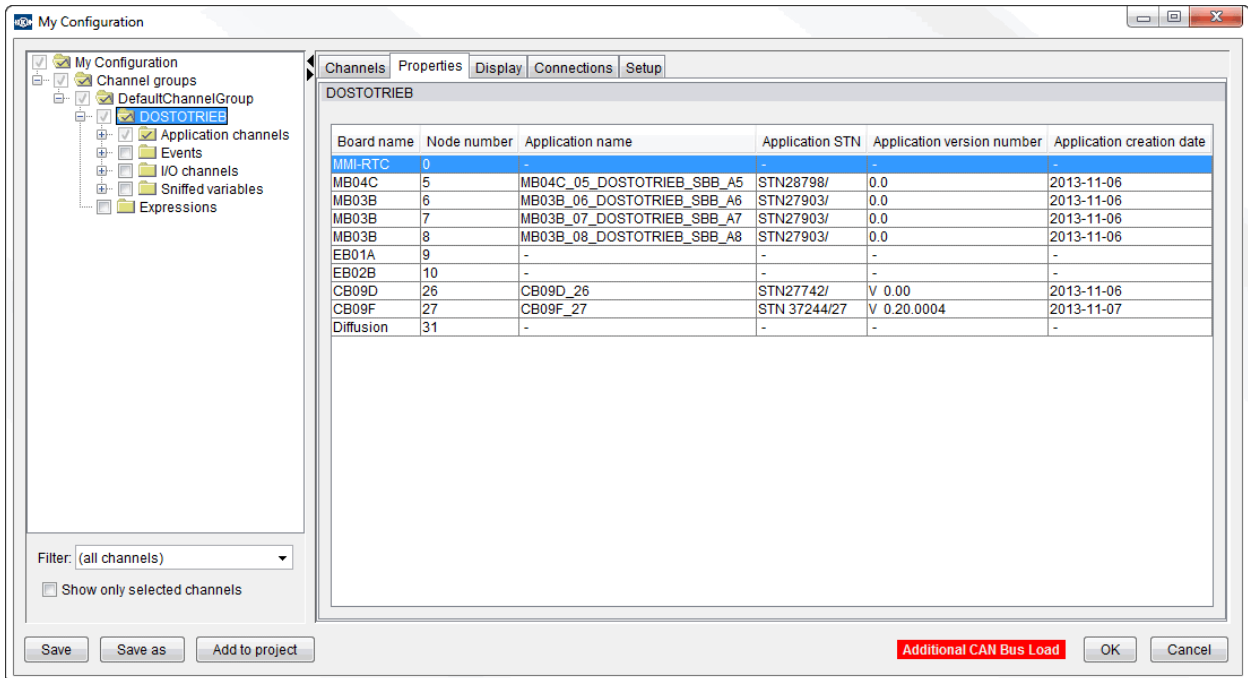Unique name in the configuration - editable.

5.1.2.6   I/O Channels Properties

The I/O Channel Properties Tab is displayed on the right side if the configuration node / Channel groups node / a channel group node / a project data source node / I/O Channels folder / a board folder or one of its I/O channel child nodes is selected in the Resource Panel tree.

Description of properties:

Name
    Unique name in the configuration - editable.

Unit
    This unit will be dispayed on the value table; either of physical and electrical units, depending on view type.

5.1.2.7 Sniffed variable properties

The Sniffed variable Properties Tab is displayed on the right side if the configuration node / Channel groups node / a channel group node / a project data source node / Sniffed variables folder / a net variable folder or one of its Sniffed variable child nodes is selected in the Resource Panel tree.
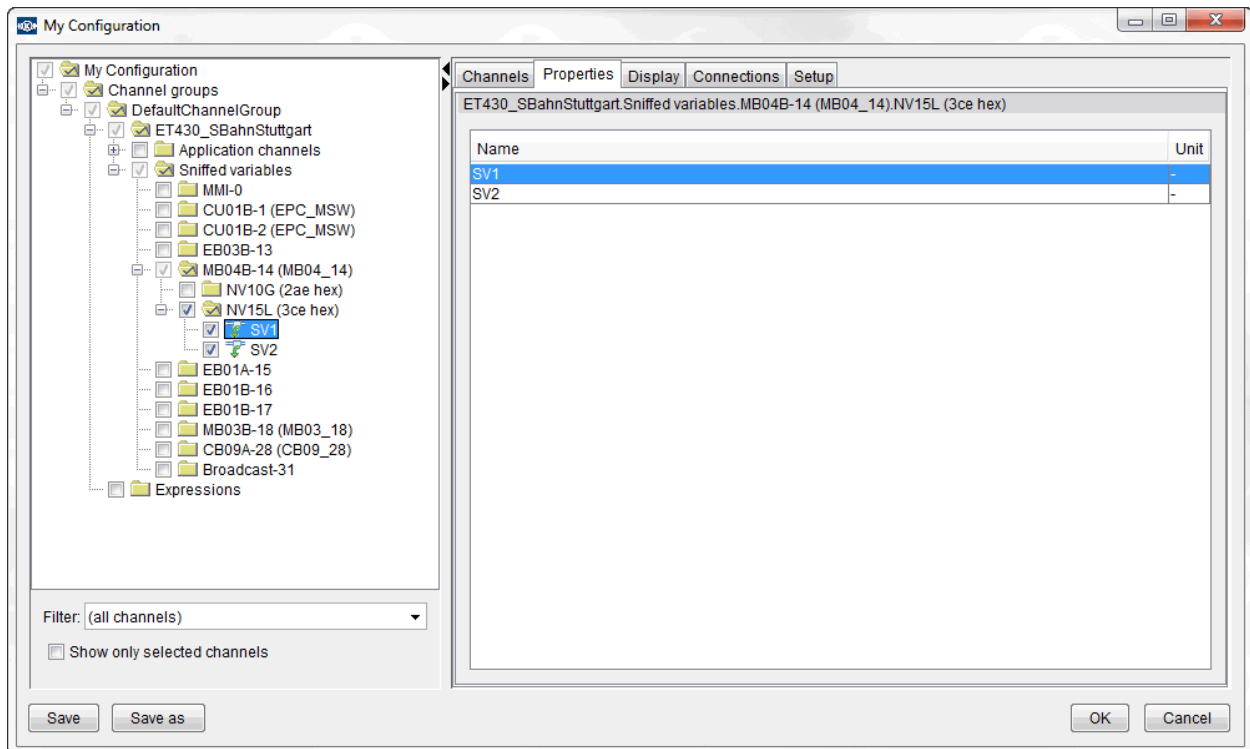
5.1.2.8 DBC Properties

The DBC Properties Tab is displayed on the right side if the configuration node / Channel groups node / a channel group node / a DBC data source node or one of its DBC folder child nodes or one of its DBC channel child nodes is selected in the Resource Panel tree.
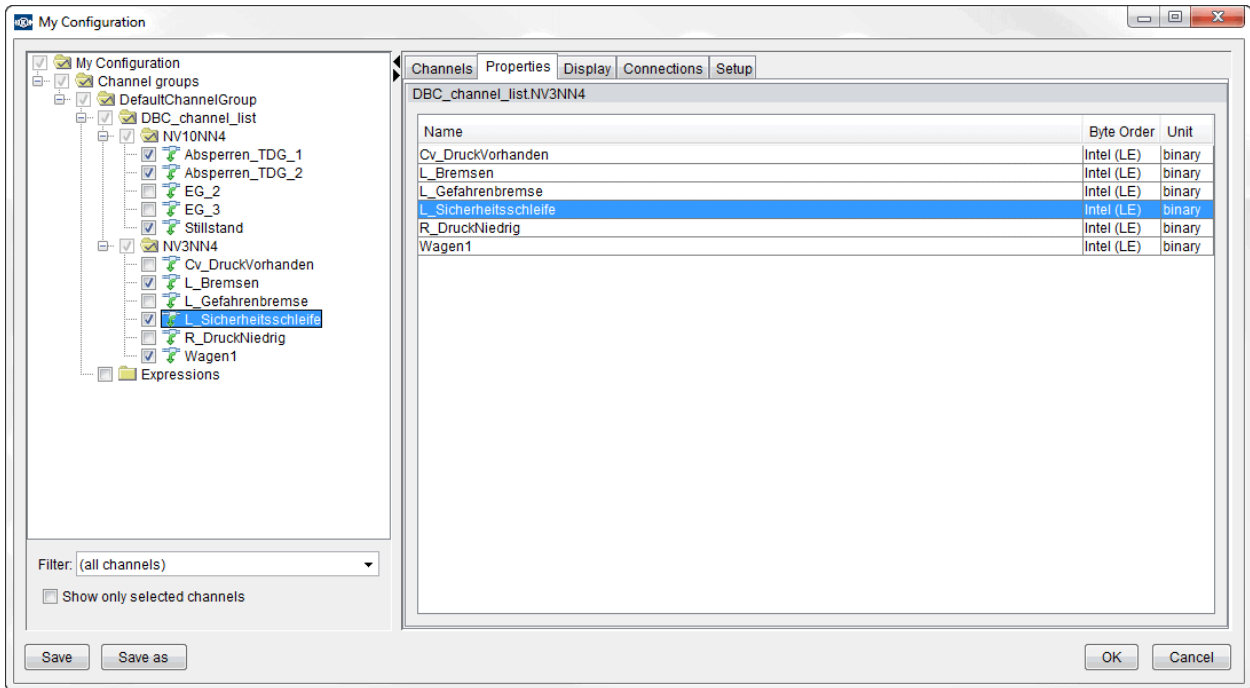
Description of properties:

Folder

    Name of the folder containing the channel - visible only if the DBC data source node is selected, not editable.

Name

    Unique name in the configuration - editable.

Byte Order, Unit

    This editable items will be displayed on the value table.

5.1.2.9   SU06A Properties

To reach the SU06A data source press the **Add SU06A data source** in the Properties tab of the **My Configuration**.
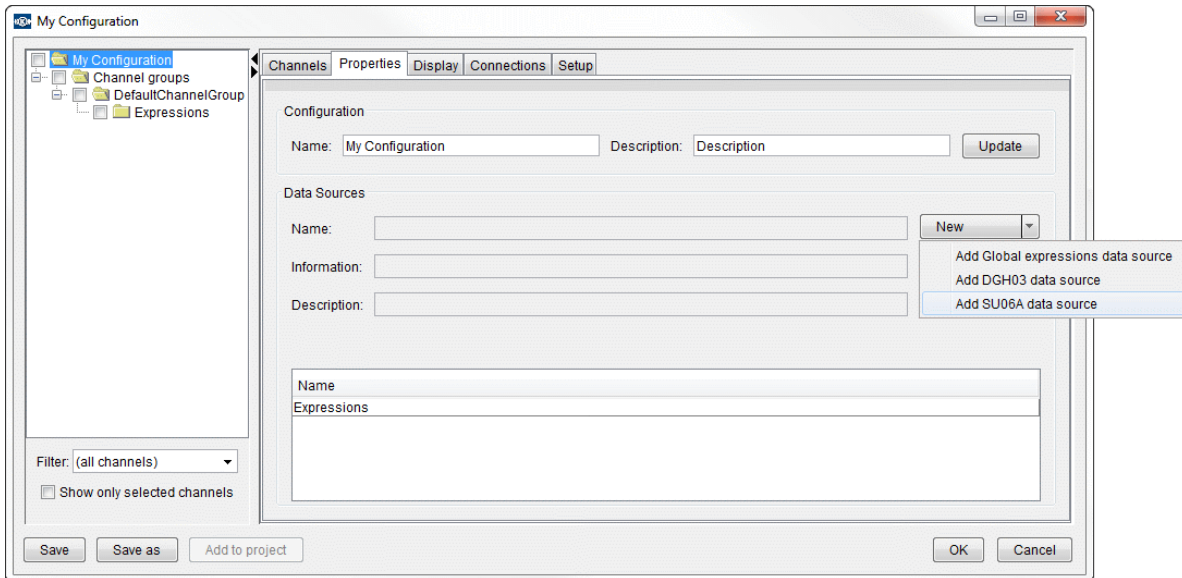
The SU06A Properties Tab is displayed on the right side if the configuration node / Globals node / SU06AChannelGroup node / SU06A folder is selected in the Resource Panel tree.
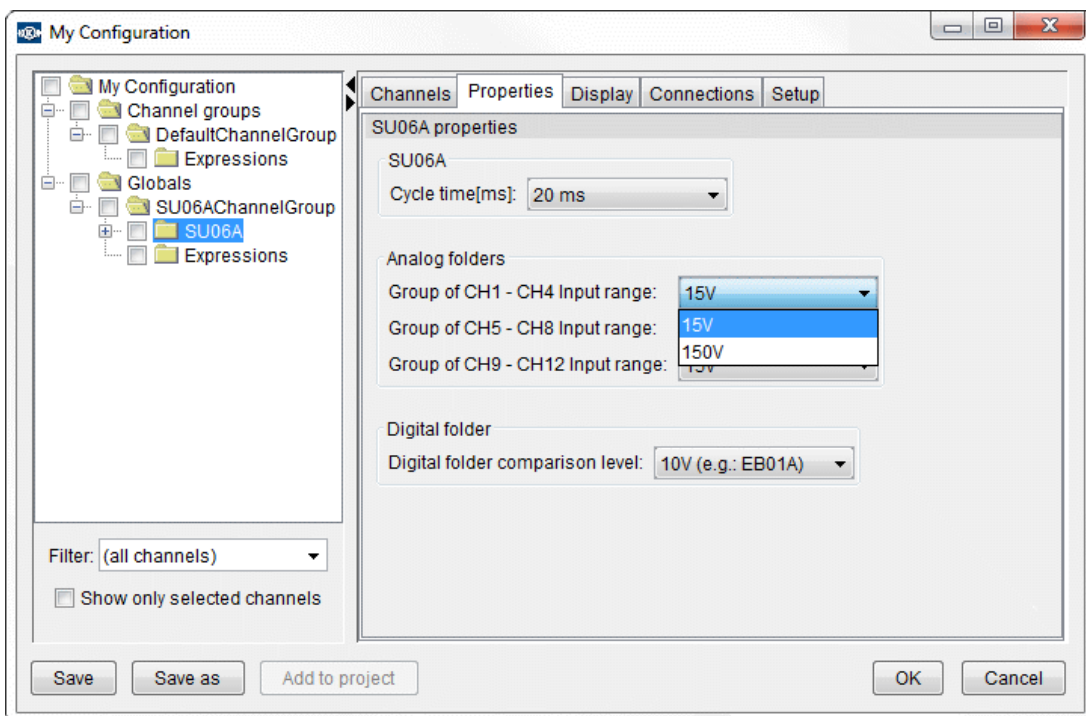
SU06A - Cycle time

The time between two samples in milliseconds.

Analog folders - Input range

Selects the allowed input voltage range for each group of analog channels.

Digital folders - Comparision level

If the input voltage level is greater than the selected comparison level, the digital input value will be TRUE. Otherwise it is FALSE.

All SU06A digital channels have only name, original name and description fields.

SU06A Analog Channel Properties

The SU06A Analog Channel Properties Tab is displayed on the right side if the configuration node / Globals node / SU06AChannelGroup node / SU06A folder / SU06A Analog channel or Analog folder (e.g. Group of CH5-CH8) is selected in the Resource Panel tree.
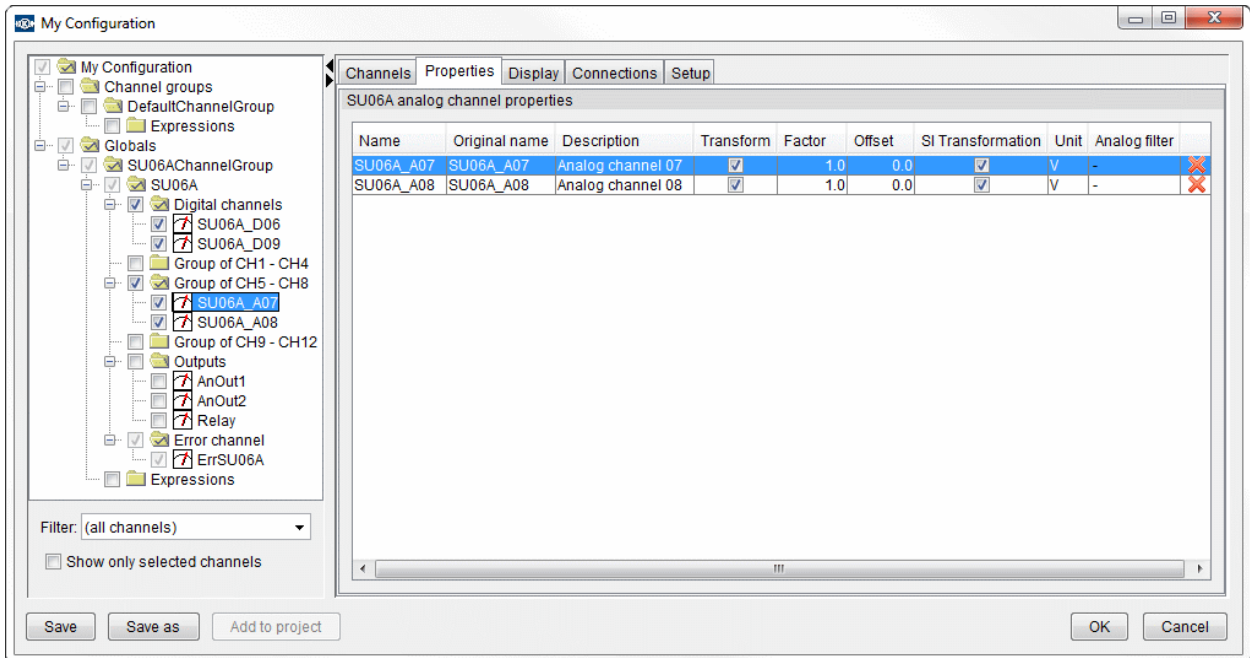
Name

A name is a unique name for a channel. In mathematical expressions this name has to be used - editable.

Original name

This name is used to identify the channel - not editable.

Description

The description of the analog input channel - not editable.

Transform

The signal can be transformed into other units. If the value of Transform is 'Yes' then Factor and Offset can be modified.

Factor

Scaling factor to use when transforming values of the variable. It can be used to increase, decrease or invert the original values of the channel.

Offset

Offset to use when transforming values of the variable. It can be used to shift the original values of the channel.

SI Transformation

The following figure shows the process of transformations. Each transformation can be omitted.
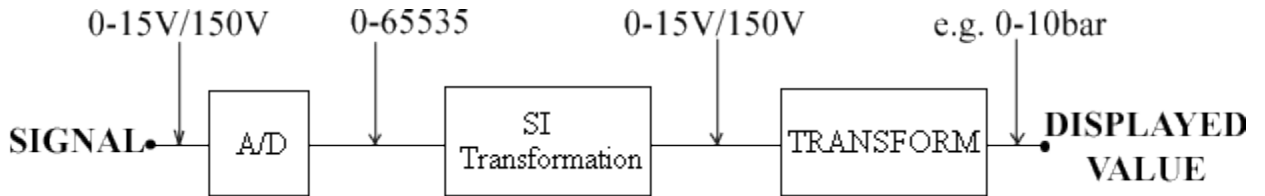
Following options can be selected:

SI Transformation	Transform	Displayed value
No	No	0-65535
Yes	No	0-15V/150V
No	Yes	e.g. 0-10bar
Yes	Yes	e.g. 0-10bar

Unit
Unit of represented value (e.g. bar, V).

Analog filter
Analog filter can be set to Off/2Hz/5Hz for Accelerator sensor (SU06A_AC) only.

X button
Delete the actual row in the properties tab.

SU06A Output Channel Properties

The SU06A Analog Channel Properties Tab is displayed on the right side if the configuration node / Globals node / SU06AChannelGroup node / SU06A folder / SU06A Outputs channel or Outputs folder is selected in the Resource Panel tree.
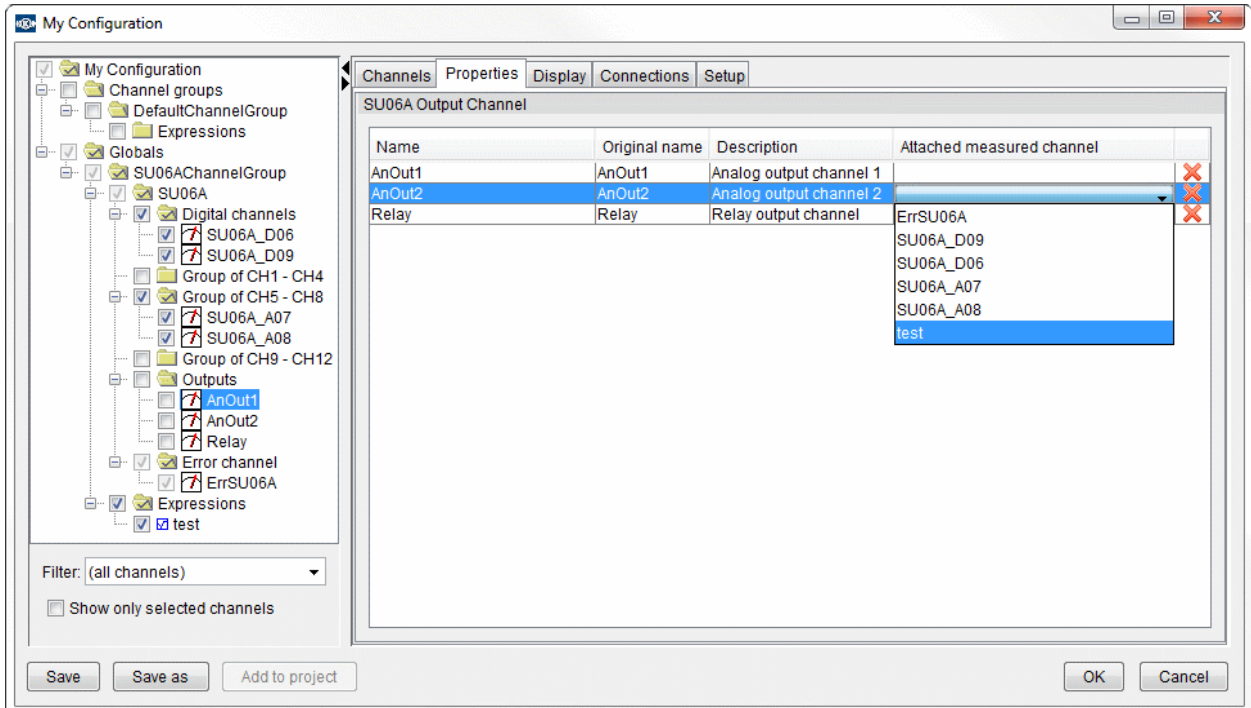
The **Attached measured channel** field can contain expressions or measured channels for controlling output channels (analog and relay) depending on values of running measurement. The result of expressions for analog outputs should be between 0 and 10 V (if the result value is greater than 10, it will be rounded down to 10), whereas the result for relay should be logical (TRUE or FALSE, 0 or 1 etc.).

To measure and force outputs create an expression channel in Expression Properties panel.

5.1.2.10 DGH03 Properties

To reach the DGH03A data source press the **Add DGH03A data source** in the Properties tab of the **My Configuration**.
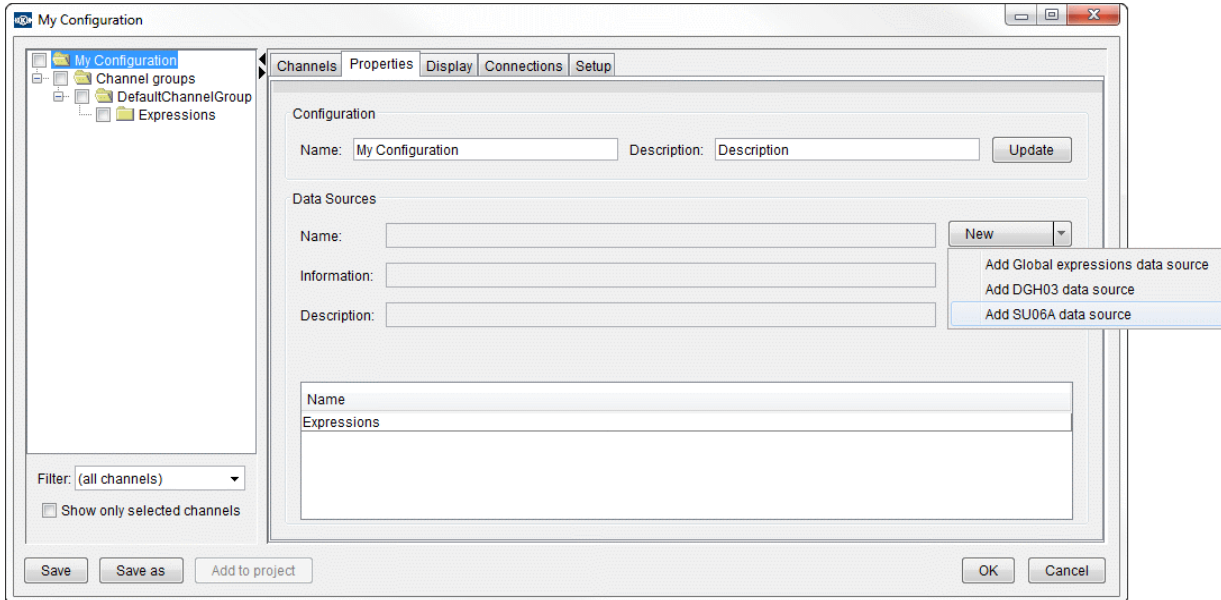
DGH03 general properties

The DGH03 general Properties Tab is displayed on the right side if the configuration node / Globals node / DGH03ChannelGroup channel group node / DGH03 data source node is selected in the Resource Panel tree.
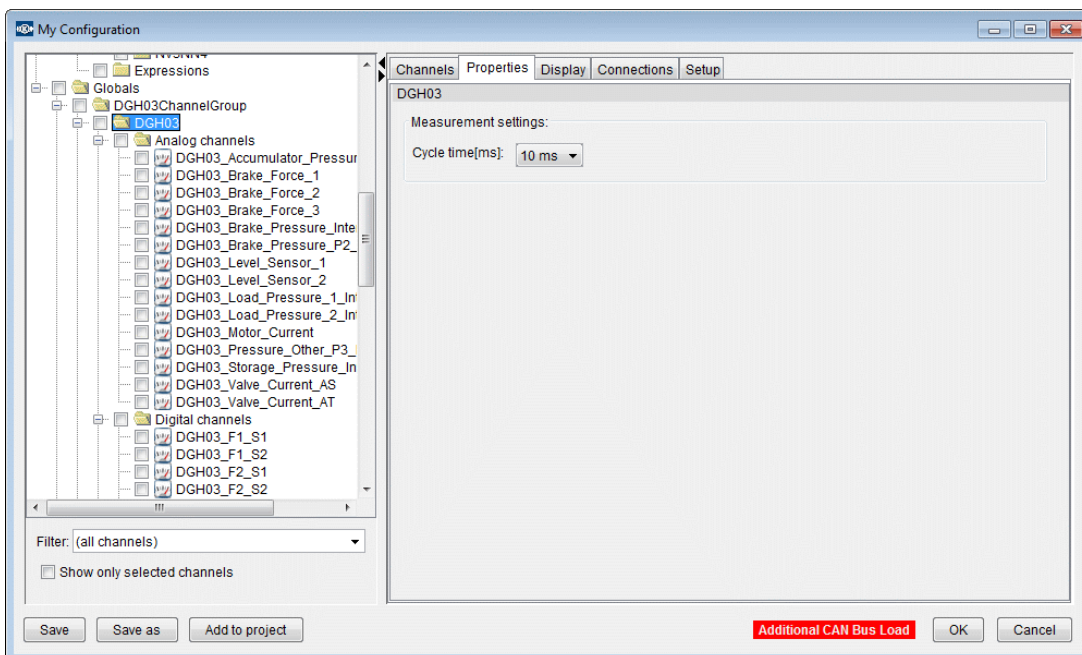
DGH03 analog channel properties

The DGH03 analog channel Properties Tab is displayed on the right side if the configuration node / Globals node / DGH03ChannelGroup channel group node / DGH03 data source node / Analog channels folder or one of its analog channel child nodes is selected in the Resource Panel tree.
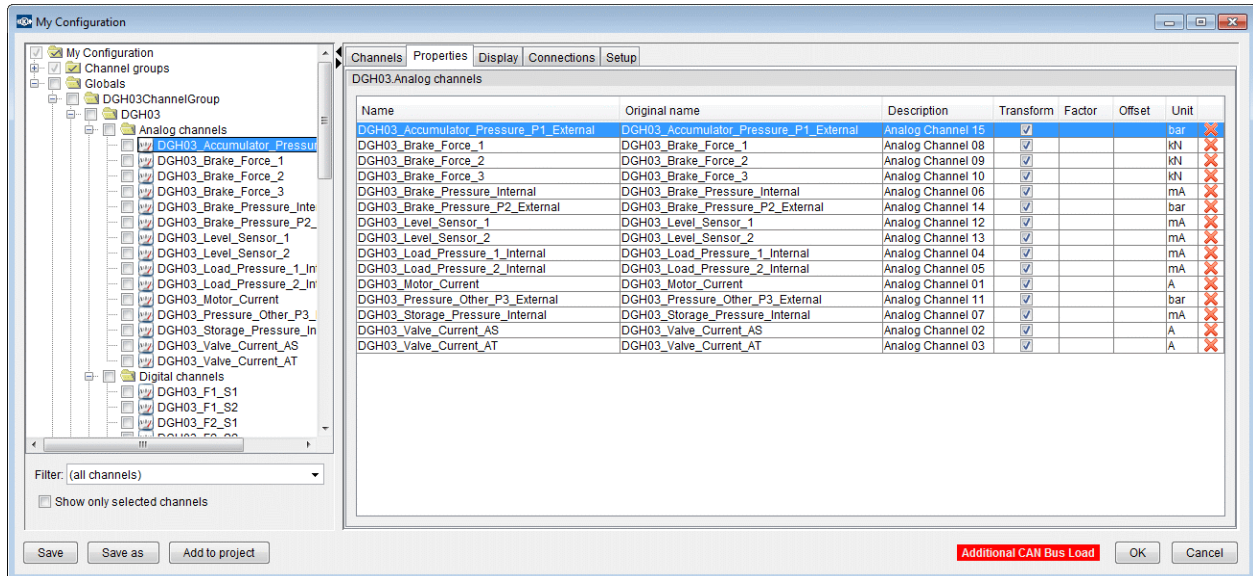
The user can modify or delete DGH03 analog channels on this panel.

Description of properties:

Name
Unique name in the configuration - editable.

Original name
Standard name of the channel - not editable.

Description
Description of the channel - not editable.

Transform, factor, offset
Transformation data; factor and offset is applied if transform flag is set - not editable.

Unit
This unit will be dispayed on the value table - not editable.

DGH03 digital channel properties

The DGH03 digital channel Properties Tab is displayed on the right side if the configuration node / Globals node / DGH03ChannelGroup channel group node / DGH03 data source node / Digital channels folder or one of its digital channel child nodes is selected in the Resource Panel tree.
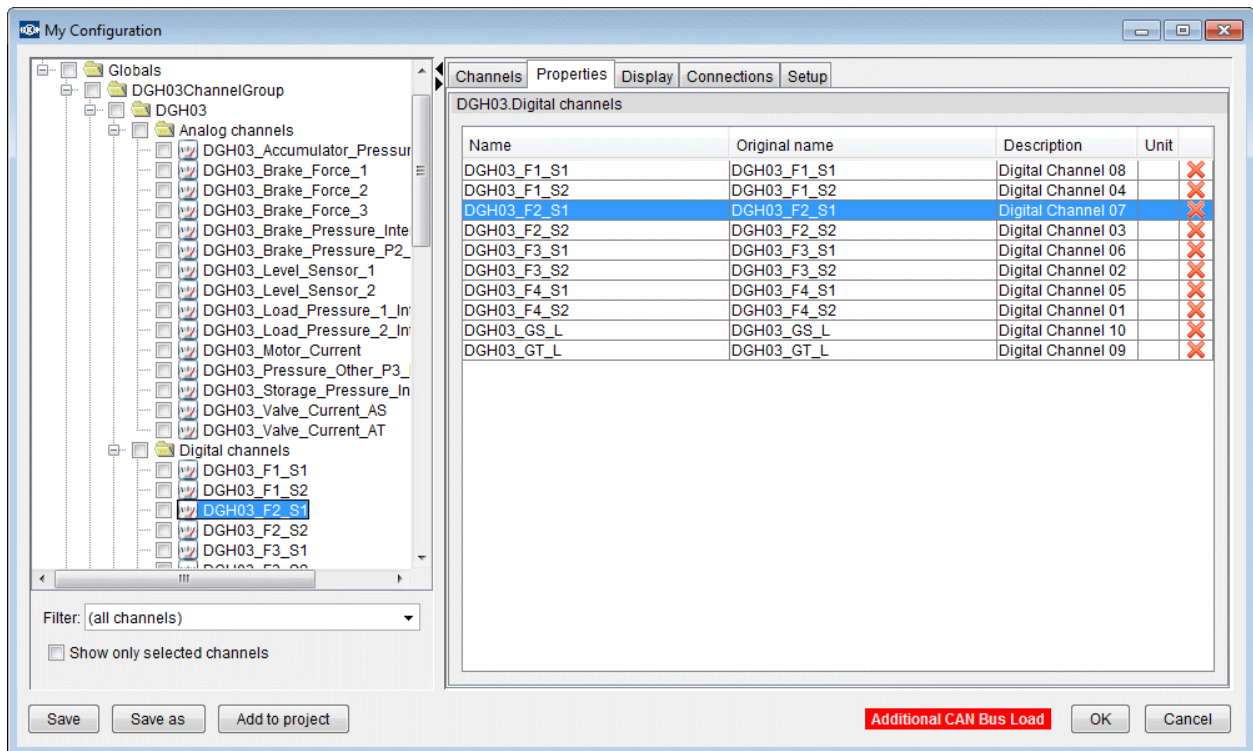
The user can modify or delete DGH03 digital channels on this panel.

Description of properties:

Name
Unique name in the configuration - editable.

Original name
Standard name of the channel - not editable.

Description
Description of the channel - not editable.

5.1.2.11 Expression Properties

The Expression Properties Tab is displayed on the right side if the configuration node / Channel groups node / a channel group node / Expressions node or one of its expression child nodes is selected in the Resource Panel tree.
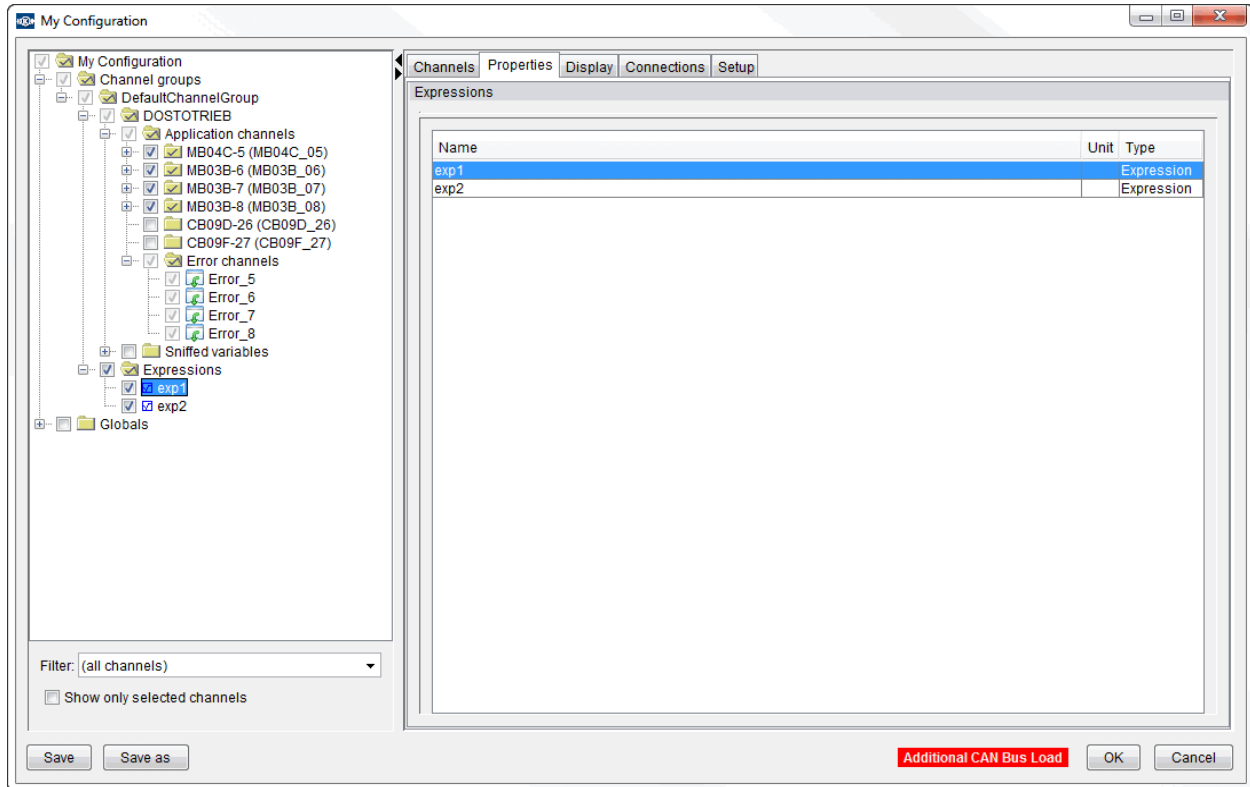
1) $bPressure1 \mathrel{>=} bPressure2 \mathrel{\&\&} shaft1speed = shaft2speed$

2) $\sin WheelAngle < e * 1.0e\text{-}2 \mathbin{||} (SSWheel1 + SSWheel2) \; div \; 2 \mathrel{<=} SSWheel3$

3) $bSpeedSensor \mathrel{\&} 0b00001000 = 0$

5.1.2.12 Global Expressions

The global expression is special type of expression. It is used to work with channels, measured from different connections, in one the same expression. The global expressions are advanced function of the measurement.

Global Expressions Properties

The properties of global expressions are displayed on the Properties Tab. Select the Global expression node or any already defined global expressions on the left side of the configuration dialog to display the properties.
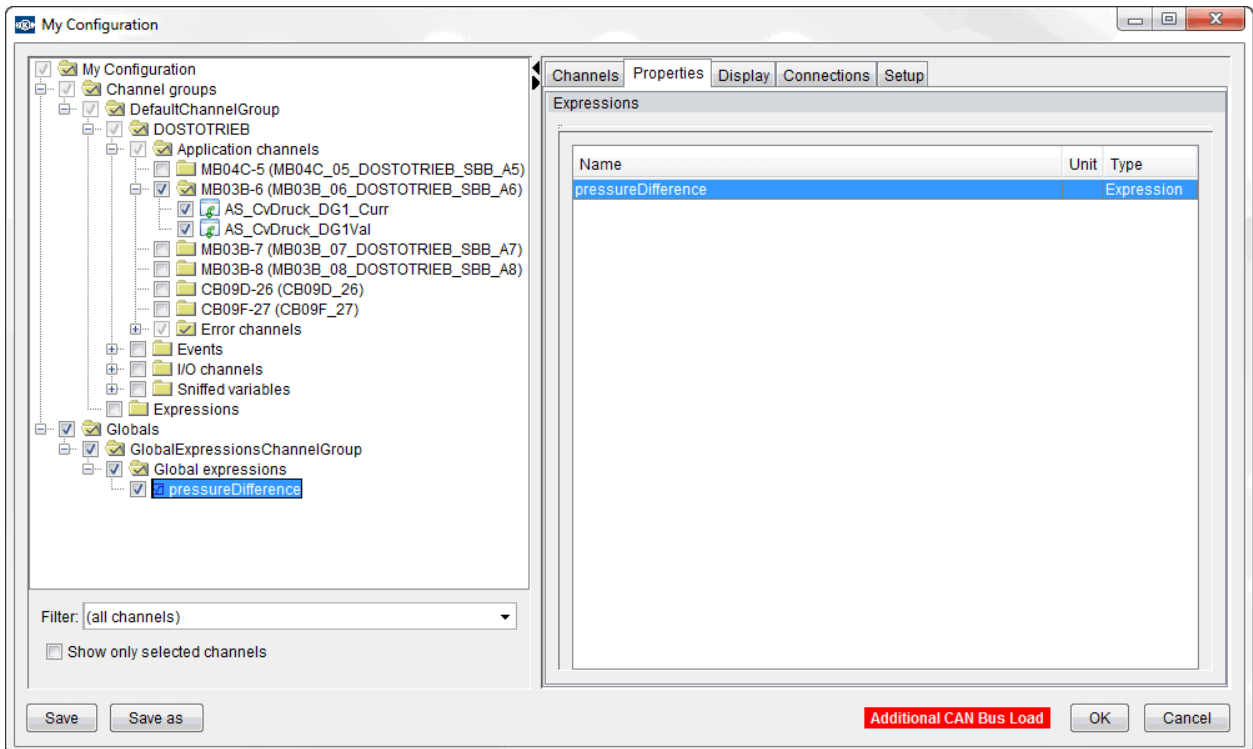
5.1.3 Display Tab

The Display Tab collects all possible graphical settings.
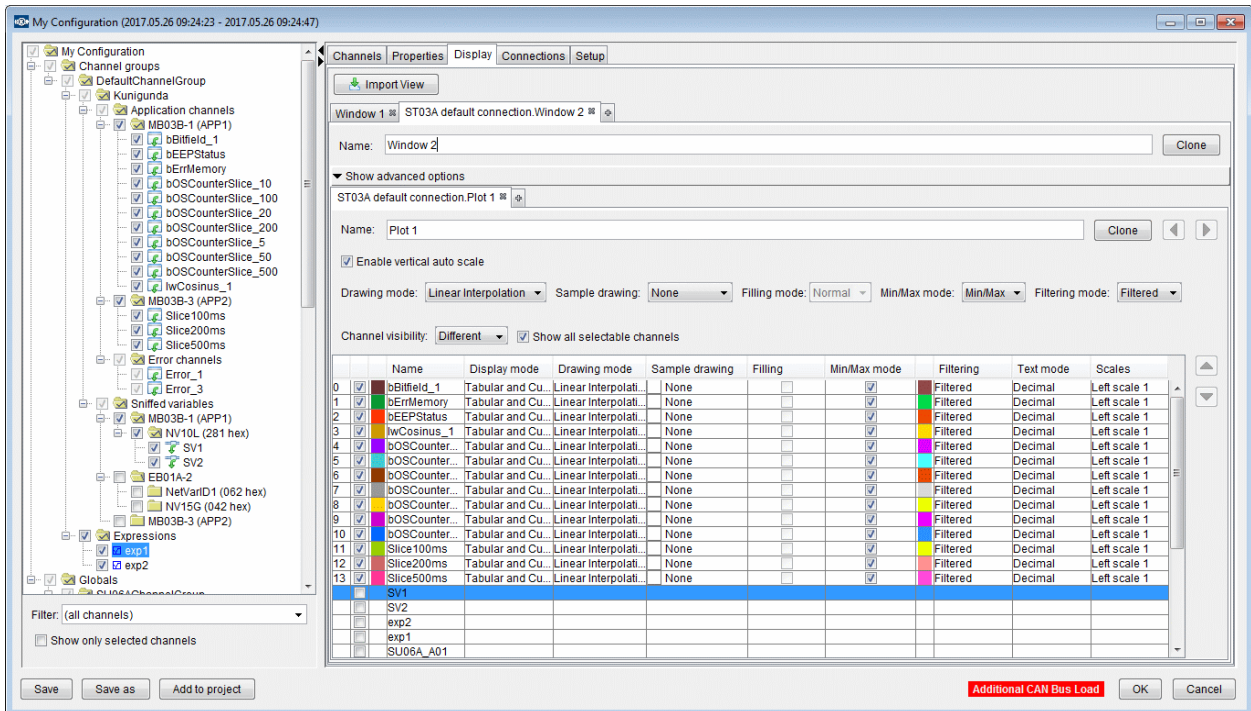
The user is able to add, clone or remove windows/plots. All plots and windows can be renamed.

The 'Advanced options' panel is hidden by default. These settings are applied to all plots of the selected window e.g. Filtering mode is 'Filtered' so in this case the 'Plot 1' and the 'Plot 2' contain only 'Filtered' channels.

The position of channel list shall be able to set for each window. Default value is Top and the other possible position is Right.

The position of the plot can be changed by drag-and-drop and with the cursors buttons. This position modification changes the order of the plots in the graphical window. A plot can be deleted by clicking the small 'x' next to the plot or window name. New plot or window can be created by clicking the '+' sign on the plot or window tab. One window can contain 1 to 4 plots. The drawing options can be set for each channel separately but you can also set a common option for all channels of a plot by using the combo boxes above the table.

All measured channels are displayed on the first possible plot - which has the same type - by default.

The user can see all the measured channels on the plot with the selected Show all selectable channels option. If the plot has undefined type than all possible measured channels can be displayed. If the plot has specific type (analog/logical) then only measured channels of the same type can be displayed.

On each plot you can select with the Channel visibility check box, if all measured channels appear in the table, which can be put on the plot, or only the displayed channels, which are already placed on the plot.

Displayed Channels

Order

This defines the drawing order of the channels on the chart. The ordering can be modified by the up and down buttons on the right side of the table.

Displayed

If the check-box is set then the channel is displayed on the chart.

Color

Displayed channel color which will help you identify the specific channel in the table or on the graphical plots.

Display mode

- Tabular and curve: the displayed channel displays in the channel list table and on the curve also.
- Tabular: the displayed channel displays in only the channel list table - to see the current values only.
- Curve: the displayed channel displays on only the curve to decrease the size of the channel list table.
- None: the displayed channel is currently hidden but the user can define display settings to be used later.

Drawing mode

- Hold interpolation: the previous sample value is applied, and a horizontal line is drawn until the next sample.
- Linear interpolation: the previous and the next samples are connected with a line.

Sample drawing

- None: the samples are not marked on the chart or if the channel is a trigger then the activation of a trigger is shown in the graphic display with "T".
- X: the samples are marked with 'X'.
- Full circle: the samples are marked with filled circle.
- Empty circle: the samples are marked with empty circle.

Filling

- Normal (default): the logical samples are marked with line.
- Filling: the logical samples are marked with filled area.

Min/max mode

- Normal mode (default): if there are too many samples in a given pixel column, random values are displayed.
- Min/max mode: minimum and maximum are calculated and displayed for each pixel column.

Filtering

- Filtered (default): filtering within time range.
- Average: calculating average for the time range.

Text mode

- Logical values: true/false (default), 1/0, on/off.
- Long values: Decimal (default), Hexadecimal, Date, Binary.
- Double values: Fixed point (default), Standard, Engineering.

Scales

It is a possible to defined 3 left and 3 right vertical scales for each graphical plot.

Import View

With Import View function it is possible to import display configurations (colors, factors, offsets etc.) from measurement files into the actual display.

The channels are matched according to their original names. If there are channels that cannot be matched automatically, a dialog window appears where the user can adjust which channels' settings from the opened file should be used for channels in the actual data log:
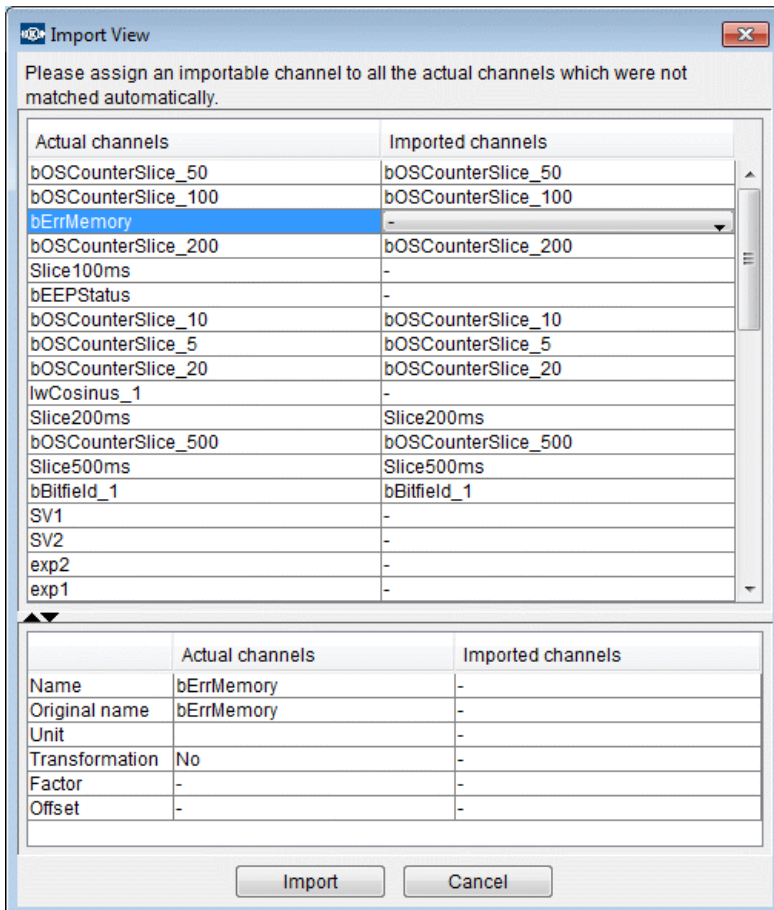
5.1.4 Connections Tab

It is possible to simultaneously measure multiple connections together. The connections tab where the user can create, modify, delete, activate and deactivate connetions and assign connections to channel groups.
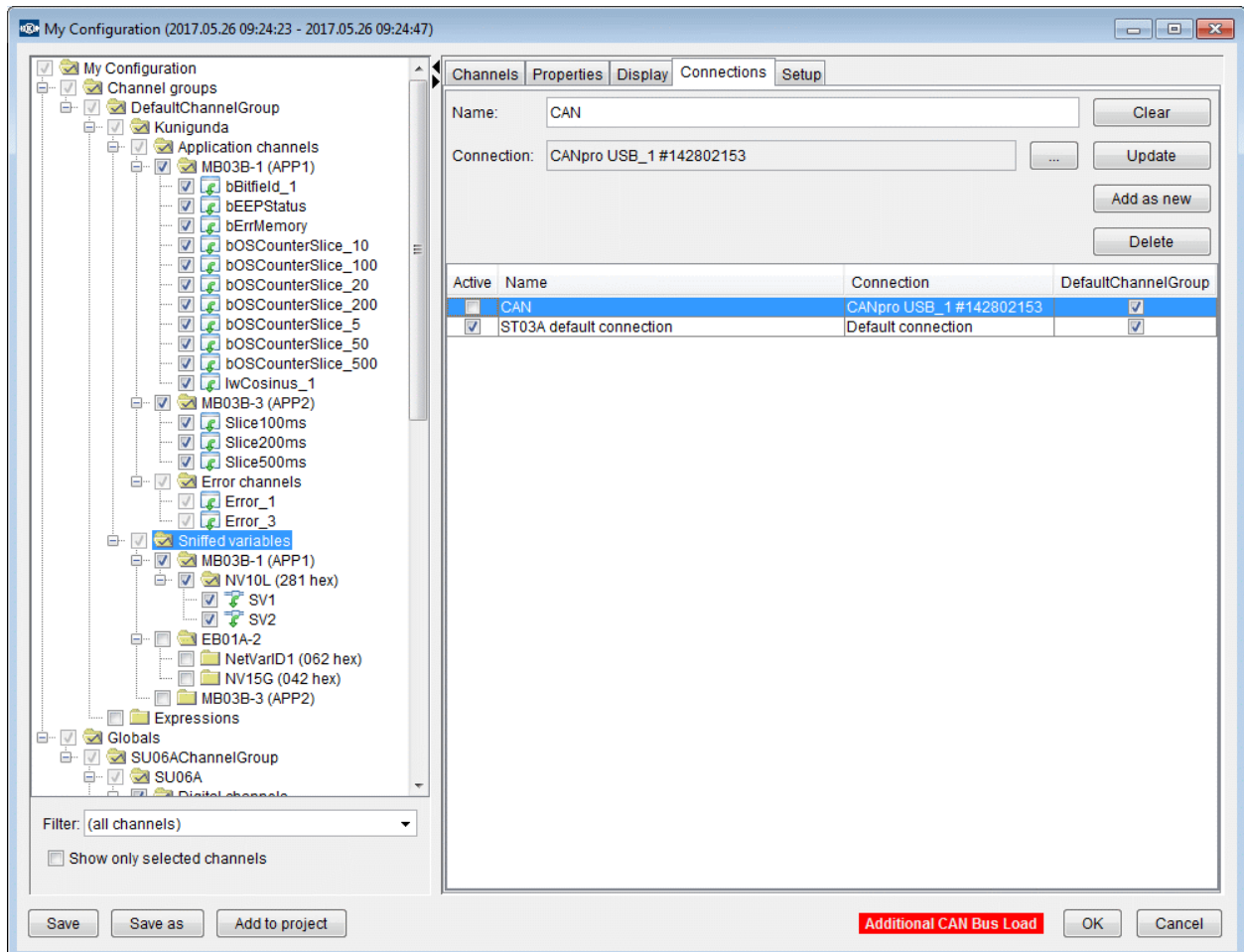
Connection devices can be defined by pressing the ... button.

5.1.5 Setup Tab

You can set some miscellaneous behavior of measurement on this tab.
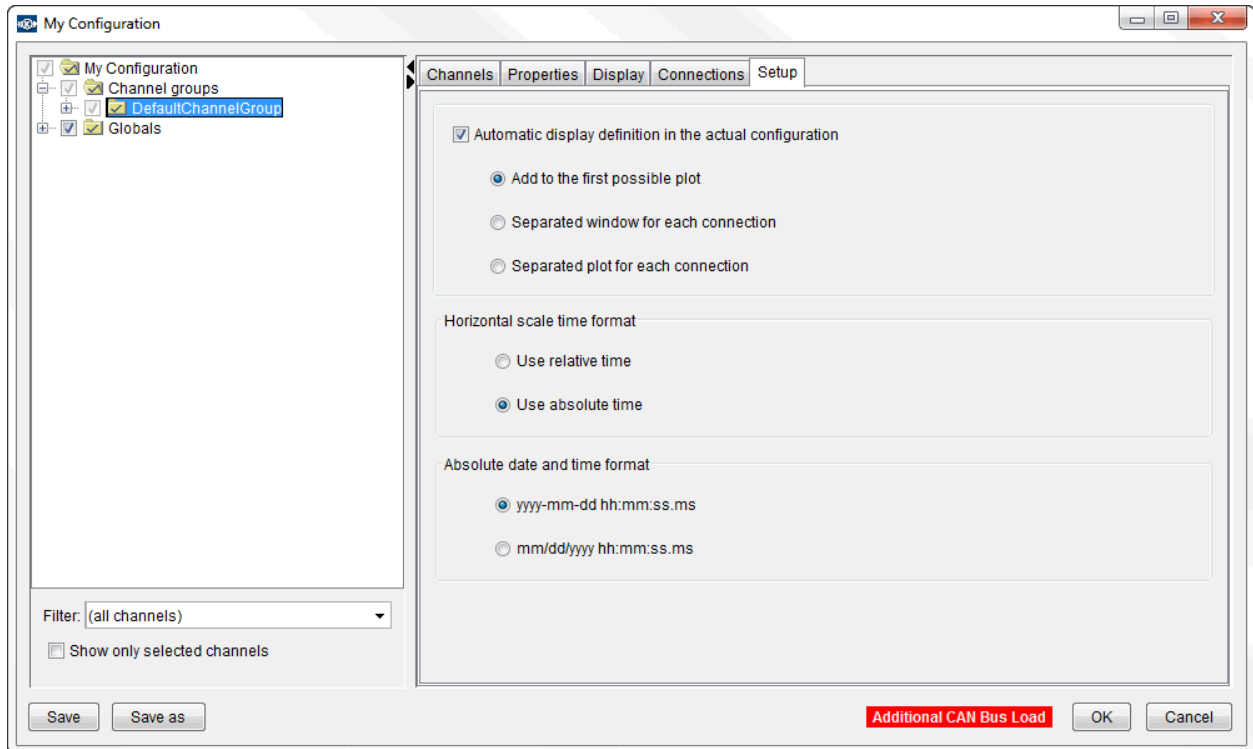
If **Automatic display definition in the actual configuration** is set, then each measured channel will automatically be placed on a measurement window as soon as the measured channel is created by selecting the channel in the tree or by activating a connection or by assigning an active connection to a channel group. The method of placing the channel on a window can be defined by the radio button options.

You can also define the time scale of the horizontal scale. If you select **Use relative time**, then measurements will start at time zero, and you will see the time elapsed since the start of the measurement on the horizontal scale. If you select **Use absolute time**, then you will see calendar date and time on the horizontal scale. The format of the calendar date and time can be defined in the bottom block.
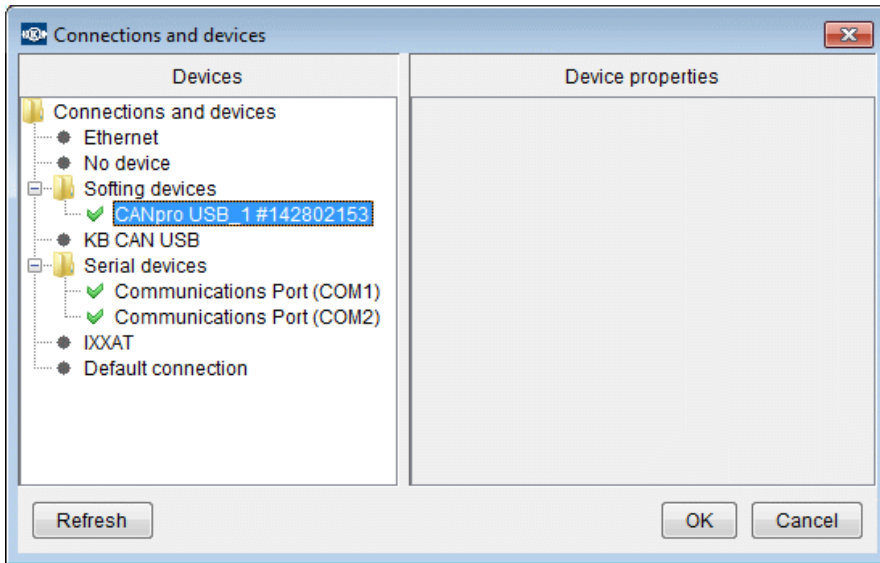
"Default connection" is a special "device"; it refers to the device actually set as ST03A connection.

By pressing the Refresh button the tree of currently available devices can be refreshed.

5.2 Channel

Channels are storing the values of a variable / input / output etc. together with the time the value appeared. Before measurement you need to decide which channels you would like to measure. This you can do in the **Measurement Configuration** panel.
In the following you can find the detailed description of each channel type.

Project And Application Folders

The project folder contains folders with the name of the applications contained by the project in the format *<Board_name>(<application_name>)*.

Each application folder contains the application variables of the board. There are some limitations in ESRA system on the amount of variables measured from one board. The number of measured channels can not be larger than 14 or 19 (depending on board type) and the sum of the size of all selected variables can not be larger than 21 Bytes.

Note: Channels from this folder may be selected automatically when you select an expression. If you unselect a channel which has dependent expression channels then those can not be measured and will be unselected too.

Application channels

Every application has variables that are read from the corresponding filter file. These variables have properties like address, size and cycle time. The data is read with the help of these parameters from the control unit.

Expression channels

The term Expression is the short form for Mathematical expression. Expressions enable calculations on other channels' values. The result is also represented as a channel.

Example: The acceleration can be calculated as the first derivative of a speed signal. A measurement may contain the expression to calculate acceleration from a speed signal. In this case only speed needs to be measured from the connected system and ST03A calculates the values for the acceleration channel.

Features of expression channels

- Expressions can be evaluated online (during measurement) and offline (on existing measured data).
- Expression channel data is also saved in measured data files.
- Expression channels depend on the channels on which they do calculations. Example for illustration: acc (acceleration, expression) depends on v_ref (application channel measured from a board). In this case:
    1. If you select `acc` for measurement then `v_ref` will be selected automatically.
    2. If you unselect `v_ref` then `acc` will also be unselected automatically
- Expression channels may also include calculations on other expression values. This results in a dependency chain that is visible to the user during selecting or unselecting channels.
- Expression channels are designed by Knorr-Bremse application developers and delivered to the customers in the configuration files.

Sniffed Variables

Sniffed Variables are channels that are read directly from the CAN bus and not from a board. Data is transmitted on the CAN bus messages. When you define a sniffed variable you have to set:

- The CAN-ID of the message (node number, scope and net var)
- The location of the requested data within the message (byte and bit position)
- The name (and a unique alias) of the new channel ST03A should reference to.

After the sniffed variable had been set up you can select this channel for measurement. The amount of sniffed variables that are measured is not limited by the ESRA system (a reasonable limitation may come from computer performance boundaries). Sniffed variables do not influence the number of channels measured directly from a board.

Some examples for variables that do appear on the CAN bus:

- I/O channels of extension boards
- Application channels (any data exchanged between two main boards)

Some examples for variables that generally *do not* appear on the CAN bus:

- I/O channels of a main board
- Process data in a main board unless it does not send it to another main board in an application channel.

Error Channels

Error channels are boolean channels that indicate the connection state to any measurement data source, e.g. one board, one measurement device. At time ranges where the error channel value is `true` the values measured from that source should not be evaluated.

Error channels can not be selected for measurement in the Configuration window, as they are being measured automatically to any source that contains channels to be measured.

To show error channels in the configuration:

1. Close Configuration window.
2. Open a new plot in measurement window (Display / New Graphic Plot).
3. In the open dialog select *boolean channels*.
4. Select the error channels appearing in the list by checking the check-boxes in the first column of the table.
5. Close open dialog.

Measurement device folders

ST03A supports two different external measurement devices. You can measure variables from boards and from external measurement devices at the same time.

The elements in the folder represent the inputs and outputs of the measurement device. You can read the description of the settable properties if you click any of the following links:

- SU06A measurement properties
- DGH03 measurement properties

A description of the inputs and outputs of each measurement device can be found in the topics below:

- SU06A
- DGH03

5.3 Measuring

Access:

Operator   OEM

Measuring summary

To perform a full measurement please follows the steps below;

Before measurement

1. Open the project file that belongs to the system where you want to measure.
2. Set the communication device in *Tools / Options* and check if the connection is established to the system (connection indicator in the bottom-right corner of the window is green).
3. Open Software Installation and check the state of the boards in the project. If any of the boards is not in *OK* state then perform a software installation. Close the service Software Installation.

Measurement

1. Open a configuration that belongs to the opened project.
2. Start the measurement.
3. Stop the measurement.
4. Save the measurement.

After measurement

- You may add notes to different points of the plots.
- You may print your measurement.
- You may export your measurement into a format legible by other programs or a format of earlier ST03A versions (e.g. V2.7.34).
- You may customize the data displaying of your measurement.

Opening a Configuration

Access:

Menu	Measurement / Open	Opens any measurement configuration or measured data file
Mouse		
Menu	Measurement / Last Configuration	Opens the last used configuration
Mouse		
Hotkey	CTRL+ALT+L	

Since measured data files also contain the full measurement configuration, you can open any configuration file (mmc, emc, xmc) or measured data file (mmd, emd, xmd) for starting a new measurement.

Starting Measurement

Access:

Menu	Measurement / Start
Hotkey	CTRL+R
Menu of Measurement window	Display / Start
Mouse	▶

The *Start* menu item starts the measurement immediately after the communication is established (successfully or not). If there is any problem during connecting then error is displayed on the status bar.

Stopping Measurement

Access:

Menu	Measurement / Stop
Hotkey	CTRL+T
Menu of Measurement window	Display / Stop
Mouse	■

Saving Measured Data

Access:

Menu	Measurement / Save	Save to the last save location
Menu of Measurement window	Display / Save	
Mouse	💾	
Menu	Measurement / Save As...	Save to a different location
Menu of Measurement window	Display / Save As...	
Mouse	💾	
Menu	Measurement / Export...	Save the current view content Save into CSV file
Menu of Measurement window	Display / Export...	
Mouse	⬆	

You may save your measured data in the internal format of Service Terminal for later evaluations or you may export your measured data into `.csv` files which can be read by other softwares.

The internal measured data format of ST03A is the *Multiple Measured Data* format (`*.mmd`) or *Encrypted Measured Data* format (`*.emd`) which is supported in ST03A V3.7.

If you only want to save the values measured in the time range the plots currently display then please use the export feature.

5.3.1 Export

Access:

Operator	OEM

Menu	Measurement / Export...
Menu in Measurement window	Display / Export...
Mouse	🔼

Using the **_Export_** feature of the graphical window, you can export the measured data into different file formats. You can export into comma-separated values files (*.csv) or into ST03A files but keeping the current working copy.

For both formats you can select if you export the complete measured data or only the content of the current graphical view. All channels values will be stored that were measured in the time range that the plots display.

Export file formats

In the following table the possible export file formats and contents are listed

File format	Comment
CSV Export	
CSV – Measured Data, With Filling, Complete Measurement (*.csv)	Full measurement, no empty cells
CSV – Measured Data, With Filling, Current View (*.csv)	Displayed values, no empty cells
CSV – Measured Data, Without Filling, Complete Measurement (*.csv)	Full measurement, empty cells possible
CSV – Measured Data, Without Filling, Current View (*.csv)	Displayed values, empty cells possible

CSV Export Properties

With the **_Export_** function it is possible to export data of displayed curves into a text file (`.csv`) that can be opened by other programs, e.g. Microsoft Excel.

The exported file contains a table of all measured data as comma separated values. The first column contains the time stamp, all other columns contain a channel each. When measured from different sources, e.g. different boards, especially at different cycle times then most of the channels will contain empty cells. This happens because at this time (represented by a row in the table) only measured data from other sources arrived, not from the source where the channel is measured from. These empty cells can be handled in two different ways:

1. The empty cells remain empty, the table only contains the measured values at that time when a value was really measured.
2. The empty cells will be filled up with the last measured value of the channel.

The tables below illustrate these two solutions. The first table contains only measured data, the second also the filled in cells (in blue).

Measured data *without* filling

Time stamp	Board1 Cycle time=50ms		Board2 Cycle time=20ms	
	Channel1	Channel2	Channel3	Channel4
1000	1.0	1.0	3.3	5.6
1020			3.4	5.5
1040			3.5	5.4
1050	1.1	0.8		
1060			3.4	5.3
1080			3.4	5.2
1100	1.2	0.8	3.5	5.2

Measured data *with* filling

Time stamp	Board1 Cycle time=50ms		Board2 Cycle time=20ms	
	Channel1	Channel2	Channel3	Channel4
1000	1.0	1.0	3.3	5.6
1020	1.0	1.0	3.4	5.5
1040	1.0	1.0	3.5	5.4
1050	1.1	0.8	3.5	5.4
1060	1.1	0.8	3.4	5.3
1080	1.1	0.8	3.4	5.2
1100	1.2	0.8	3.5	5.2

5.3.2 Note

Pop-up menu in Graphical area	New Note

The user can add time-tagged informational notes to any displayed channel.

If you open the menu item **New Note** from the menu then the insertion point of the note will be one of the channels at the cursor position. You may select the appropriate channel in the opening dialog. The note will be bound to the nearest point of the chart of the selected channel.
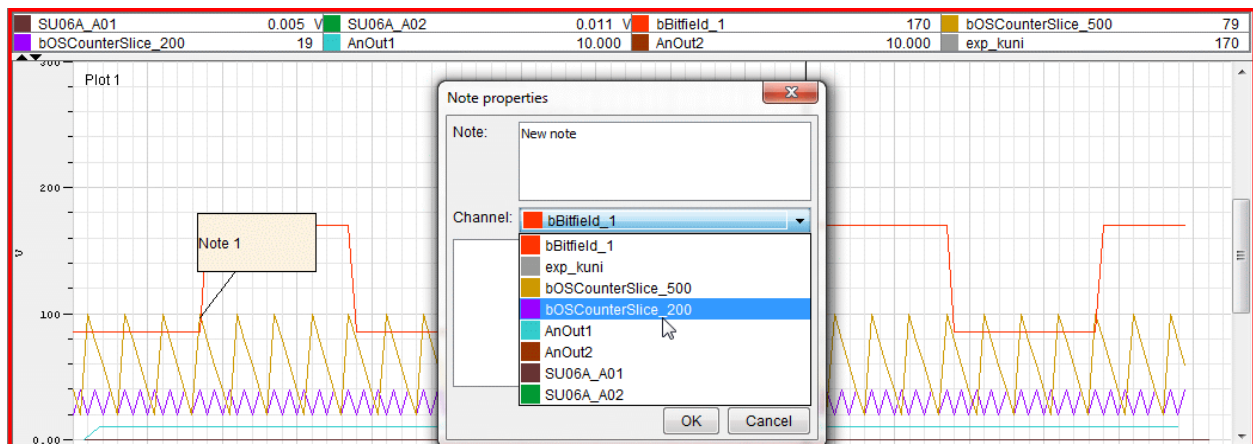
Note
   Text to be displayed in the window next to the curve.

Channel

Drop down box with a list of available channels. The channel selected will be the channel to receive the new note.

The text box in the ***Note properties*** dialog window can be used for any additional information associated with the new note. This additional information can only be viewed by double-clicking on the note.

When you print out a measurement that contains a note then the note will be visible in the measurement in the same way as in the plot and an additional table will contain the description of the note that you edited.

When you move the channel to another plot or window by drag-and-drop, notes are also moved with channel.

The note can be deleted from the context menu of the note.

All notes can be hidden by the ***Hide notes*** item of the ***Display menu***.

5.3.3 Print

The content of the graphical window can be printed. The document will consist of 2 pages. The first page contains the content of the graphical window and data for the measurement or the data log, and the second page contains the channels by plots.

Menu	Display / Print	Open an ST03A measured data/data log file
Mouse	🖶	

Page setup

The printed document is generated by a template file where various parameters can be given. These parameters can be set here.

Menu	Display / Page Setup	Open an ST03A measured data/data log file
Mouse	-	

5.4 Data Displaying

ST03A supports displaying of measured values in the graphic plots. Graphic plots are positioned on graphic windows. One window can contain 1 to 4 graphic plots and the usage of up to 4 graphic windows is supported.

ST03A has a huge variety of transformations that can be applied on the curves representing a channel each. These reorganizations of the curves (individually for each plot) enable easy evaluation of the measured values. A special kind of channel named error channel indicates eventually appearing error during communication.
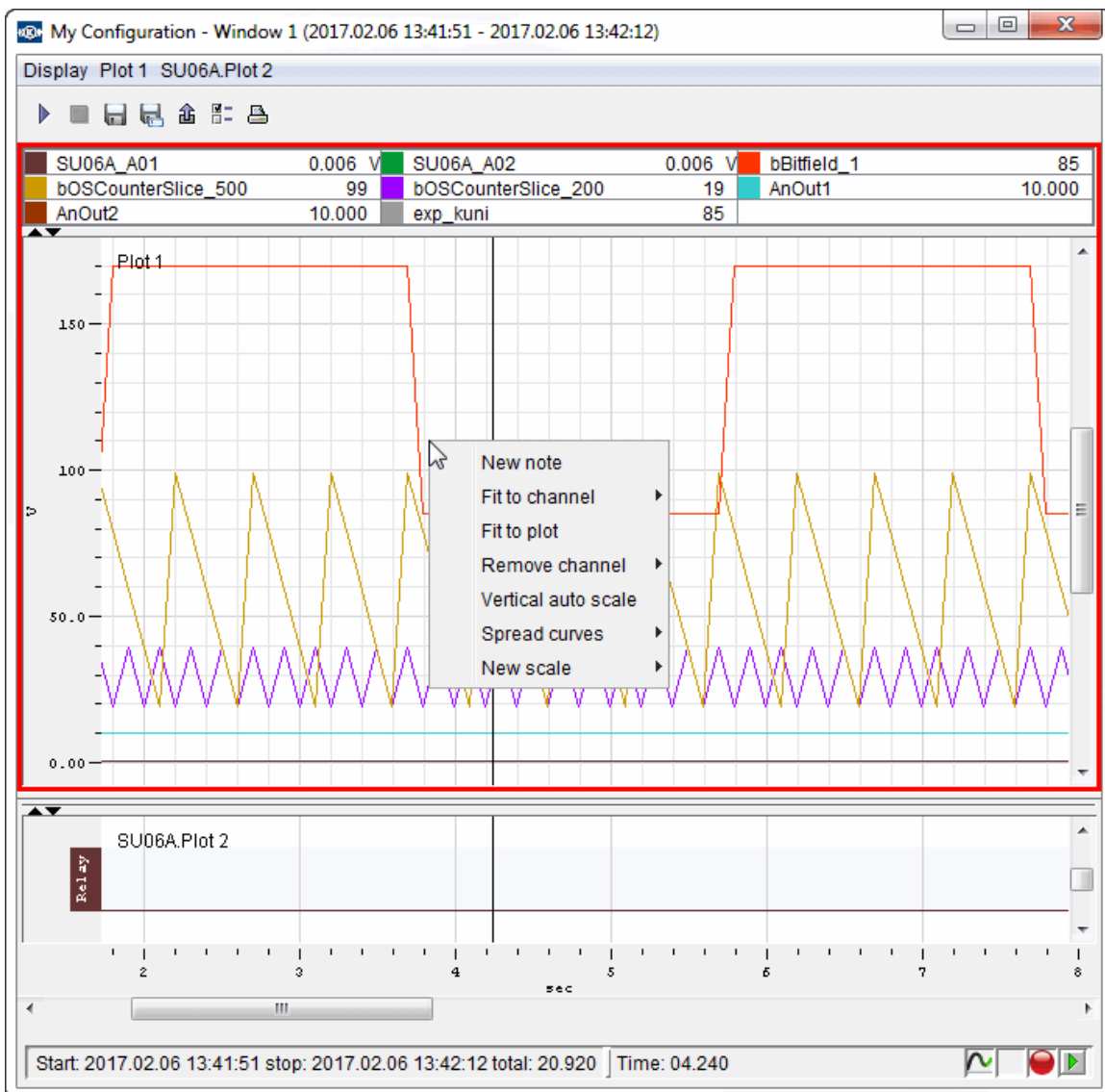
Graphic plots may contain channels of the same type - either analog or digital ones. A plot may contain all the measured channels or a subset of them. Plots can be configured independently from each other regarding selected channels and visualization but the data behind belongs always to the same measurement, even if the plots are in different windows.

Each graphical plot has a context-dependent pop-up menu which describe the currently available functions e.g.: new note, fit to channel or plot, remove channel, vertical auto scale which is described in detail in the Display tab part. Chart window displays the start time of the measurement (or date and time of the beginning of the data log recording) and the end time of the measurement (or date and time of the end of the data log recording) and the time elapsed (day-hh:mm:sec.millisec) during the measurement recording (or the data log recording if start time is logged).

Starting Measurement

The **Start** ▷ menu item starts the measurement immediately after the communication is established (successfully or not). If there is any problem during connecting then error is displayed on the status bar.

Stopping Measurement

The **Stop** ☐ menu item stops the measurement.

Saving Measured Data

Saving Data

You can 💾 save your measured data in the internal format of ST03A for later evaluations or you may ⬆ export your measured/data log data into `.csv` files which can be read by other software.

Configuration

The actual configuration can be modified or shown with the **Configuration** ⊞ menu item.

Printing Measured Data

The content of the measurement/data log window can be printed 🖨.

Status bar

The status bar can be found at the bottom of the Measurement Chart window.

The status bar can be found at the bottom of the Data Log Chart window.

Time information

The left side of the status bar contains time information.

Start time
date and time of the beginning of the measurement recording.
date and time of the beginning of the data log recording.

End time
date and time of the end of the measurement recording.
date and time of the end of the data log recording.

Time elapsed
during the measurement recording - days-hh:mm:sec.millisec.
during the data log recording - days-hh:mm:sec.millisec.

The right side of the status bar is a list of icons. Following icons may appear in the Status bar:

Drawing indicator icon

Animated icon displays if any redraw event occurs.

Error indicator icon

Red exclamation mark (!) is displayed if any errors occurred. In case of error the last error description can be seen in tooltip if you move the mouse cursor over the icon.

Connection status icon

The previously defined connection state is shown during the measurement.

Drawing Modes

Online drawing mode
Drawing mode during measurement. Can not be set.

Offline drawing mode
Drawing mode after measurement has stopped or after opening measured data files. Can be set for each plot.

In this section you can read about following topics:

Graphical plots
Opening windows, plots, online and offline visualization.

Channels table
Channels handling, moving channels between tables.

Measured channels window
For adding channels to a plot by dragging it from the list and dropping it in a graphical window.

Data Visualization
Changing view within a plot. Scrolling, Zooming

Data Evaluation
Different methods of reading and calculating values of the curves.

5.4.1 Graphical Plots

Access:

Plot types

Measured data is displayed on graphical plots. Charts of analog and logical channels are displayed on different plots.

Analog plot

Analog channels are displayed on analog plot. The charts of the individual channels share the whole plot area. Channels of comparable dimensions can be grouped in scales.
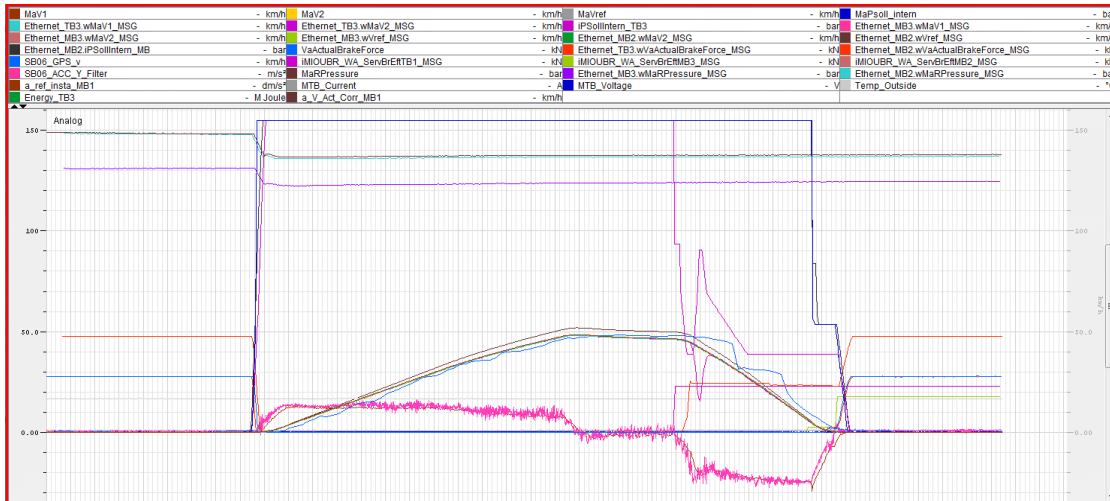
Logical plot

Logical channels are displayed on Logical plot. The charts of the individual channels are drawn in separated areas.
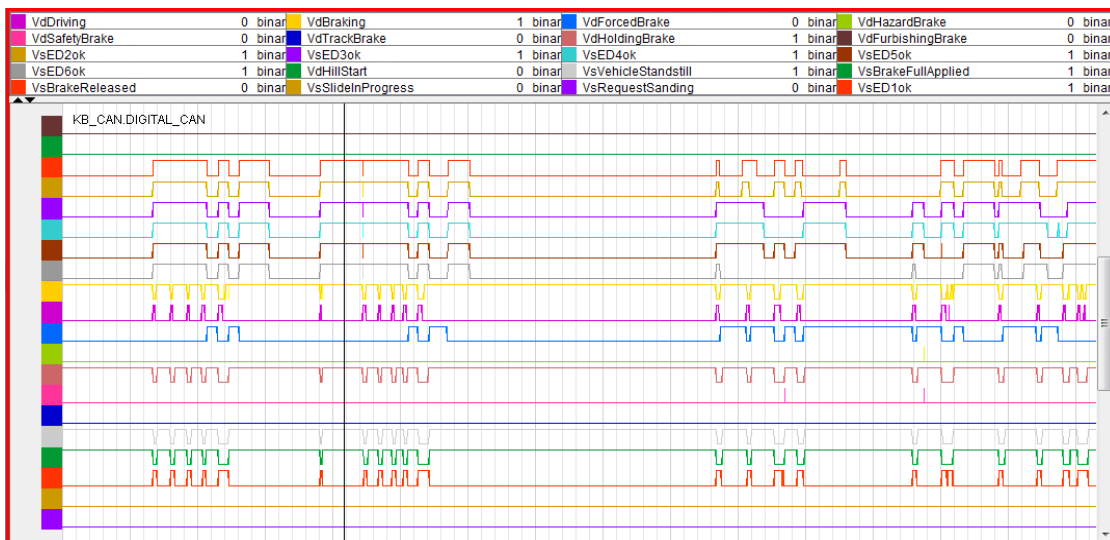
Plot elements

Table of channels
The chart color of the channel is shown in the table. If you click in the chart area, a time cursor is shown and the corresponding channel values are shown in the table.

Scale(s)
If there are several scales, then one of them is the current scale. The current scale is drawn with black color, the other ones are gray.

Chart area

Horizontal grids are drawn based on the current grid.

Drawing modes

There are two interpolation methods to for drawing values between sample values.

Hold interpolation

The previous sample value is applied, and a horizontal line is drawn until the next sample.

Linear interpolation

The previous and the next sample s are connected with a line.
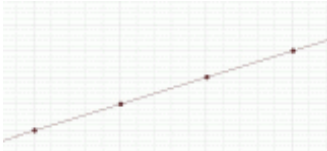
If you move the mouse cursor over the chart area, then the values of the nearby channels are shown in tool tip.

Charts may also contain [textual notes](#).

5.4.2 Channels Table

The Channels Table gives various information about the measured channels on a single plot. It can be shown at the top of the plot or on the right side next to the plot defined by the Measurement Window.

The placing of the table (top or right) is common for all plots on a window. If the top position is selected, then the Channels Table organizes the number of channels in a row depending on the height of the channels table. The channel table can be switched on and off with the icons on the divider.

Channels Table on the top
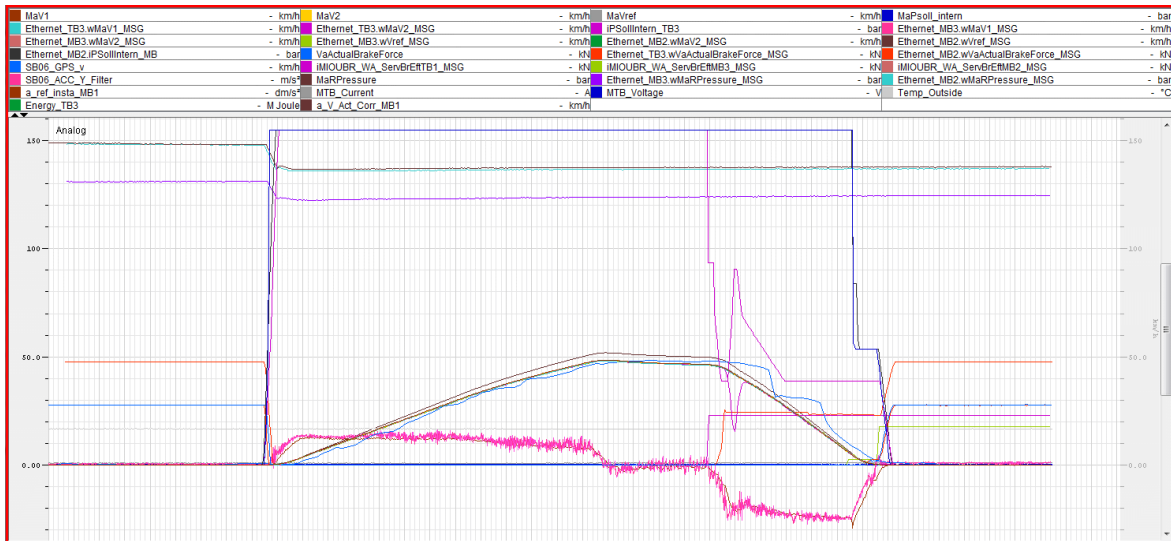
Channels Table on the right
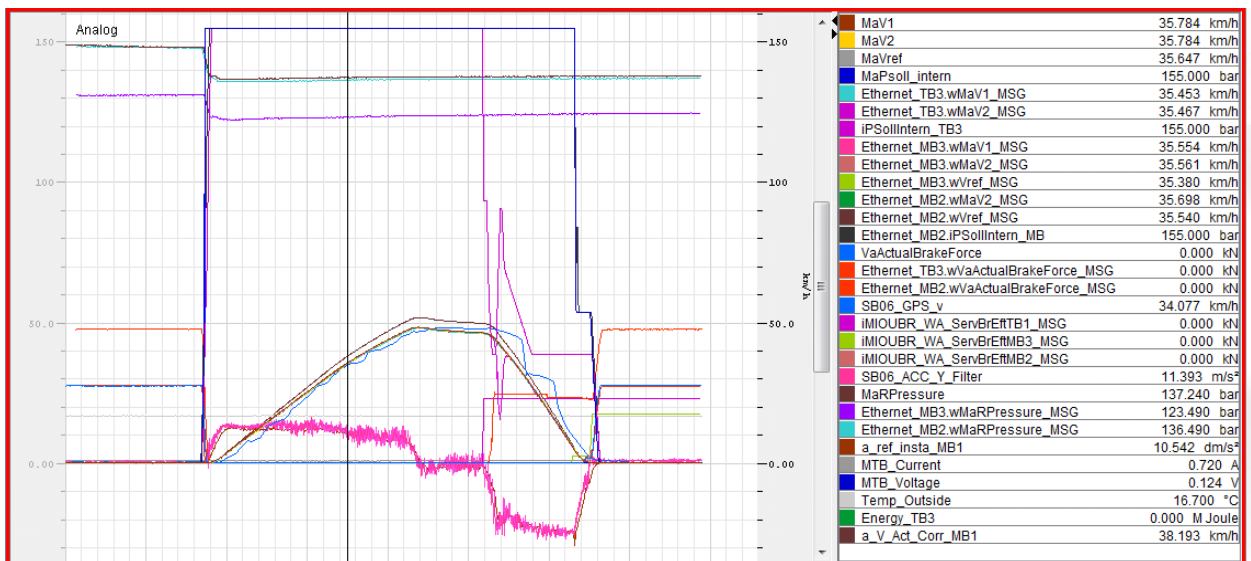
The following information is shown for a measured channel:

Color
　　The color of channel on the chart. It can be changed by double clicking on the color.

Name
　　The name of channel qualified by the connection name if necessary.

Value
　　The value of the channel. If the measurement is in online mode then it is the actual (most recent) measured value, in offline mode the value at the time cursor.
　　The value of the channel at the time cursor.

Unit
　　If the channels have a unit defined then it is displayed here.

The channels can be dragged from the channel table and can be dropped on any appropriate Drop Target.

5.4.3 Measured Channels Window
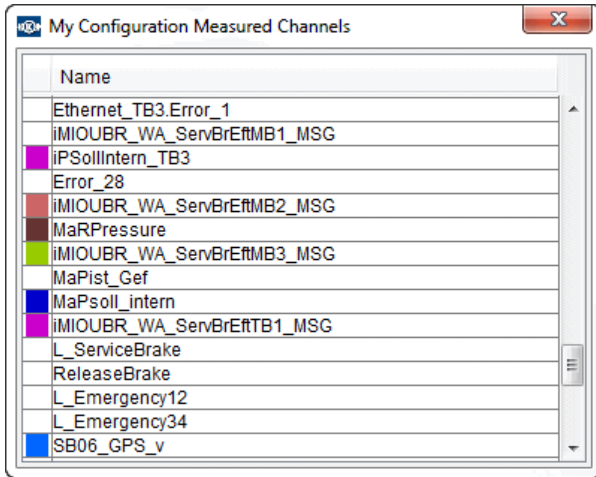
Measured Channels window lists all the channels that are selected for measurement. Only the colour and name of the channels is listed.

This window can be used for adding channels to a plot by dragging it from the list and dropping it in a graphical window.

Toggle Measured Channels window visibility

Menu in graphical window	Display / Measured Channels
Hotkey	Ctrl + M (with opened graphical window(s))

Drop targets

- Graphical area of a plot
- Channels table of a plot
- Vertical scale of a plot
- Horizontal scale of graphical window

Target	Effect
Graphical area of a plot	Channel shall be added to the selected scale of the plot ("grid scale")
Channels table of a plot	Channel shall be added to the selected scale of the plot ("grid scale")
Vertical scale of a plot	Channel shall be added to the scale on which the drop happened
Horizontal scale of graphical window	New plot shall be created with the channel

ⓘ **Note:** The following restrictions are applied:

- There can be only one instance of Measured Channels window, independently from the number of graphical windows. The window will preserve its position and size.
- Only one channel can be dragged at a time.
- Only analog channels can be dropped on an analog plot, and only logical channels can be dropped on a logical plot.
- Drop is not enabled if the plot already contains the dragged channel.
- Cursor indicates if drop is enabled over the hovered area.

5.4.4 Data Visualization

Access: **Operator** **OEM**

The purpose of the display functions is to reach the desired visualization of displayed data.

Undo / redo

Most of the display functions are reversible. The performed actions are remembered, so previous state of the display can be easily restored.

Availability:

Menu in chart window	Display / Undo, Display / Redo
Hotkey	CTRL + Z, and CTRL + Y

Zooming

Zoom actions modify the displayed horizontal and vertical ranges. In *Single Scale Adjustment Mode*, only the selected scales vertical range will be modified, otherwise all scales are zoomed. This applies for all of the zoom types below.

- Zoom actions are undoable.
- Horizontal scale (time) can only display non-negative ranges, and has a minimum range of 100 ms. Zoom cannot lead to shorter time range.

Mouse wheel zoom
Rotating the mouse wheel performs a zoom action around the mouse pointer position. Scrolling the wheel up or down should zoom in or out respectively.
Modifiers can be applied:

- CTRL + mouse wheel: only perform vertical zoom on selected / all scales
- ALT + mouse wheel: only perform horizontal zoom

Box zoom
A rectangle can be defined on the plot by moving the mouse while holding down the left mouse button. After releasing the button, the selected area shall be zoomed.

Keyboard zoom
Keyboard zoom is similar to mouse wheel zoom. Mouse pointer position is not taken into consideration, zoom is performed around the center of the graphical area of the selected plot.
Page Up performs a zoom in, *Page Down* zooms out.
Modifiers might be applied:

- CTRL + Page Up/Down: only perform vertical zoom on selected / all scales
- ALT + Page Up/Down: only perform horizontal zoom

Scrolling

The purpose of scrolling is to have the ability to make all channels visible, even if it is out of the currently displayed range.
Each plot has a vertical scrollbar, and there is one horizontal scrollbar for each window. All the scroll actions are undoable.

Horizontal
The displayed time range can be modified with the horizontal scrollbar. Horizontal scroll affects all plots on the window.

Vertical
Vertical scroll shifts the displayed range of the vertical scale(s).
In *Single Scale Adjustment Mode*, only the channels belonging to the selected scale fill the graphical area, otherwise all scales are adjusted.

Other functions

Fit to plot
This function aims to adjust horizontal and vertical ranges in a way to make the displayed data fill the whole graphical area.
In *Single Scale Adjustment Mode*, only the selected scales channels will fill the graphical area, otherwise all scales might be adjusted.
Availability:

Menu in graphical window	Plot / Fit To Plot
Popup menu on graphical area	Fit To Plot
Popup menu on channels table	Fit To Plot

ⓘ **Note:** Fit to plot function is disabled if there is no displayed data on the plot.

Fit to channel
This function aims to adjust horizontal and vertical ranges in a way to make the selected channel fill the whole graphical area.
In *Single Scale Adjustment Mode*, only the channels of the selected scale will be adjusted, otherwise all channels and scales are affected.
Availability:

Popup menu on graphical area	Fit to channel / *<select channel>*
Popup menu on channels table	Fit to: *<channel>*

ⓘ **Note:** Fit to channel function is disabled if the channel has no displayed data, or in *Single Scale Adjustment Mode*, if the channel is not assigned to the selected scale.
Also note, that only those channels are listed in the plot popup menu which has a displayed curve near the click point.

Vertical auto scale
Vertical auto scale can be turned on or off for each plot. This is an online measurement function that prevents curves from going out of the displayed area during measurement by expanding all scales on the plot if needed. Vertical scroll and zoom actions automatically turn this feature off.
Availability:

Menu in chart window	Plot / Vertical auto scale
Popup menu on graphical area	Vertical auto scale

![Knorr-Bremse logo]

5.4.5 Data Evaluation

Access:

Operator   OEM

ST03A supports different methods for data evaluation within a measurement plot:

Single Cursor Mode
One cursor is used. The *Channel Table* contains the value of each channel at the cursor position. (This mode is active when difference mode is not turned on.)

Difference Mode
Two cursors are used. The *Channel Table* contains the difference of the channel values measured at the two cursor positions.

Single Cursor Mode

By default Service Terminal is in single cursor mode as far as *Difference mode* is not turned on. You can evaluate channel values while positioning the cursor to different places in the plot. The time belonging to the current cursor position is shown in the bottom right corner of the graphical window. The time cursor is common for all the plots of the window so a comparison of channels from different plots is also possible.

Difference Mode

If you choose difference mode then you have two cursors that you can position in the measurement. One cursor is selected (marked with red triangle in the bottom of the window) and one not (black triangle). You can move the selected cursor by clicking at any place in a plot. You can toggle, which cursor is the selected one, by clicking on the grey rectangle of the currently not selected cursor.

You can see the time difference between the two cursors in the left bottom corner of the window after *total*. The time shown by the selected cursor can be read from the bottom right corner of the window. The channel table (in difference mode it is painted in green) shows the difference of the channel values at the two cursor positions.

Access:

Menu in Measurement Window	Display / Difference mode	Start / end different mode
Hotkey in Measurement Window	CTRL+D	

Scales

Chart windows have a horizontal (time) scale and each plot can have one or more vertical scales.

If the plots have different number of vertical scales then the chart areas are placed below each other, so that the common time scale can be applied.

Create new scale

You can create a new vertical scale by the ***New scale*** item of the chart area context menu. Three scales can be created both on the left and the right sides of the chart area.

After selecting the place of the scale you can assign channels to the new scale.
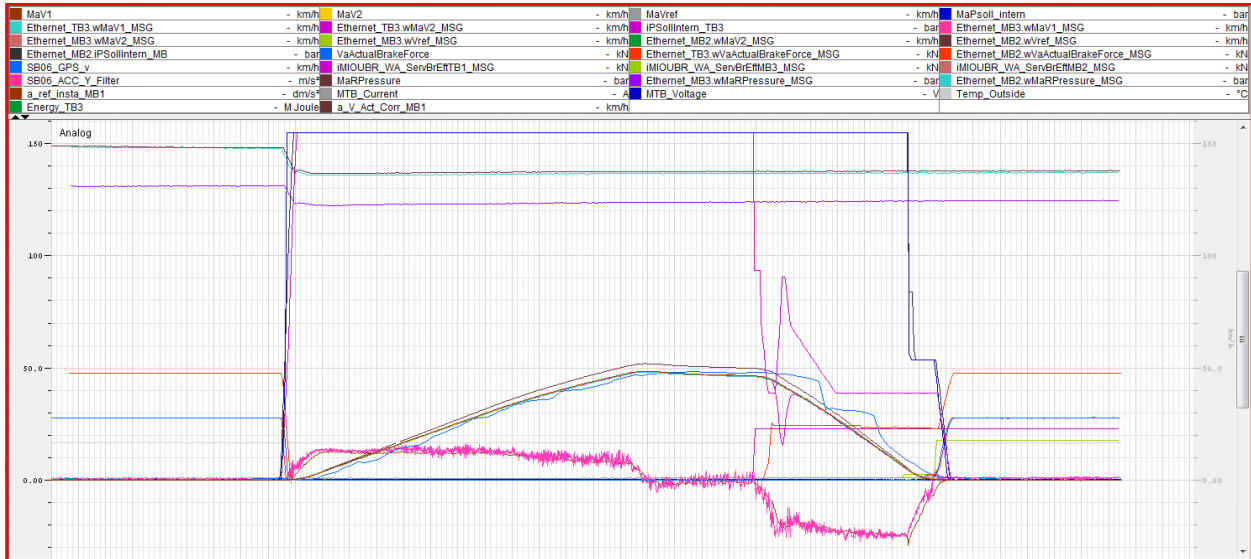
Scale Drag and drop

- You can drag a channel from the channels table to a vertical scale. The channel will be removed from its previous scale and added to the new scale. If all the channels are removed from the scale then the scale will be removed.
- You can drag a channel from the channels table to the horizontal scale. The channel will be removed from its previous plot and a new plot will be created with the channel.
- You can drag a vertical scale to another vertical scale on the same plot. Then the order of the plots will change. If you press the ***CTRL*** key while dragging, then the source and the target scales will be joined.
- You can drag a vertical scale to the other side of the chart area.

Current scale

If there are several scales, then one of them is the current scale. The current scale is drawn with black color, the other ones are gray. You can set a scale current by clicking on the scale.

Single scale adjustment mode

If there are several scales on a plot and you move the mouse over a scale then a button is shown, by which you can select the ***single scale adjustment mode***.

In this mode all vertical scaling and scrolling is applied only to the channels belonging to this scale.

You can leave this mode by clicking on another scale or by clicking the button again.

Spread curves

Spread curves function rearranges all the curves on the scale. Each curve has a dedicated area on the scale with the channels drawing color. The channels name is printed if there is enough space on the scale.

In spread curves mode the scale can be moved with drag and drop and can be zoomed like normal analog vertical scale. Also, channels can be added and removed with drag and drop as on a normal analog vertical scale. The scale will return to normal mode if only one curve remained on the scale.

In spread curves mode the scales popup menu has two actions: return to normal scale mode and reset curves to default layout (default ordering and equal sizes for curves).
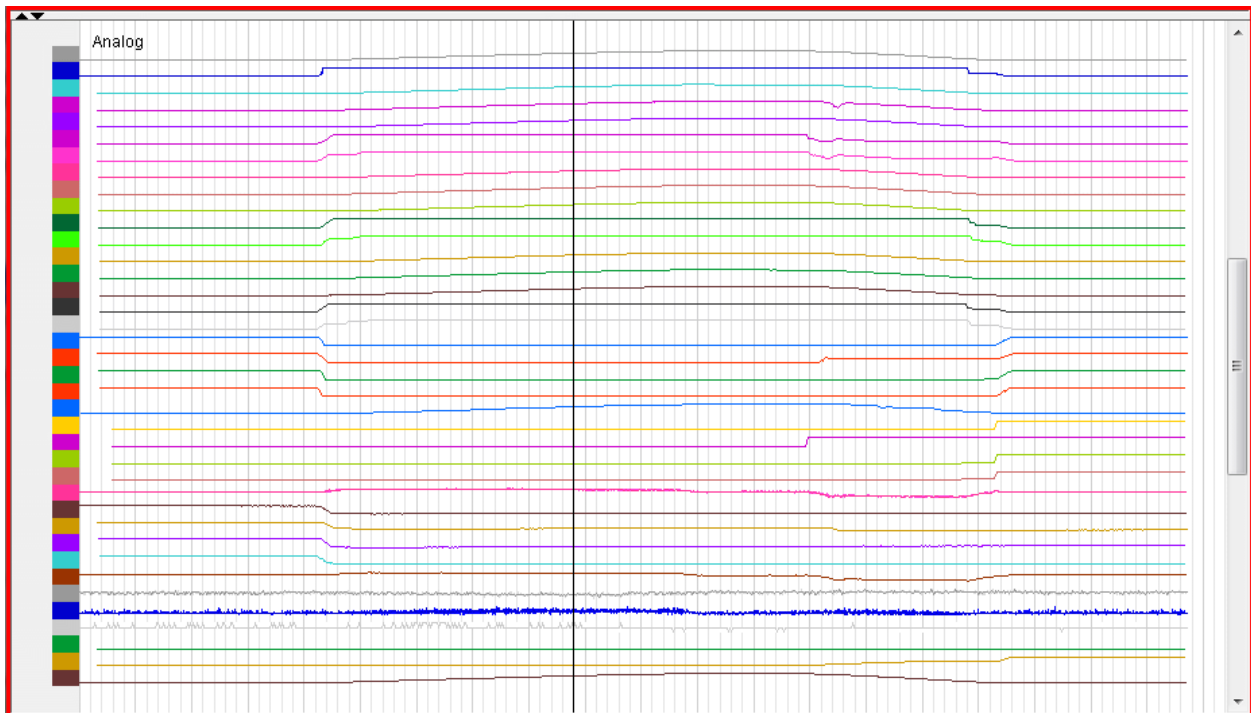
5.5 Measurement devices

Besides supporting the measurement of ESRA/DCU signals ST03A provides possibilities to measure signals of the following external measurement devices:

5.5.1 DGH03

The Diagnostic Tool for Hydraulic Brakes (DGH03) is an auxiliary component to piloting the components of a hydraulic brake system. It also provides the opportunity to show states of signals and measured data, or forward these values to the ST03A recording and analyzing software. (see also: DGH03 Properties).

To use DGH03 needs to be installed FTDI driver separately in addition to the installation of ST03A.

Following inputs and measurement configurations are possible:

- Control of the pump motor for hydro units with AC/DC propulsion engine. Measurement with the possibility to record the motor current (for DC motors).
- Control of the pump motor for hydro units with AC propulsion engine, no measurement of voltage or current on the motor.
- Control of one or two proportional current regulating valves with current measurement between 0 and 2A and possibility of recording the measured values (Circuit1 or Circuit2 alternatively).
- Measurement, highlighting and recording of pressure sensors (4-20mA): Accumulator pressure, brake pressure (Circuit1 or Circuit2 alternatively), three extern pressure sensors, two extern load pressure sensors, and two level regulation sensors, with recording possibility.
- Force measurement with three DMS Force sensors as one sum result with recording possibility.
- Control of 4 auxiliary functions and 4 additional options with 12VDC and 24VDC valves respectively, short-circuit-proof with alarms on short-circuit, polarity reversal of the free-wheeling diode, and wire brake.
- Display of 8 digital inputs with LEDs with recording possibility.

The transport of the Data is realized via the USB port on DGH03. Beforehand selectable sample rates: 100, 10, 1 measurement/second.
For more details see the manual and other associated documents of the DGH03.

Plug of the DGH03

Plug interface to the Hydro engine
> All the plugs needed for the control of the hydro engine, are realized over an electric connection assembly. For measurement of force and external sensors, specific connection assemblies are installed.

Test item Power / Signal connection plug arrangement:
> (see the table)

2-pole deployment (f)	1	DC+	
	2	DC-	
6-pole deployment (e)	1	L1	AC motor Phase R
	2	L2	DC motor Phase S
	3	L3	AC motor Phase T
	4	N	AC motor NULL
	5	PE	ground line
	6	NC	
12-pole deployment (d)		1	GND/LED's
	DC bridge	3-5	

	AC bridge	2-4	
		6	Auxiliary release off
		7	Parking brakes released
		8	Emergency brakes released
		9	Emergency brakes engaged
		10	Parking brakes engaged
		11	Auxiliary releases engaged
		12	+24V
12-pole Deployment (c)	1	12V+	Emergency brakes / braking level 1
	2	24V+	
	3	GND	
	4	12V+	Parking brakes / braking level 2
	5	24V+	
	6	GND	
	7	12V+	Auxiliary releases / braking level 3
	8	24V+	
	9	GND	
	10	GND	Motor Power DC-
12-pole deployment (b)	1	AT1+	
	2	AT2+	
	3	AT1-	
	4	AT2-	
	5	AS1+	
	6	AS2+	
	7	AS1-	
	8	AS2-	
	A23	Motor ON/OFF externally	+24VDC applied to C10
	A24	Encoding	Bridge for internal motor control
	A25	Encoding	Bridge for internal motor control

Connector pin assignment

25-pole deployment (a)	1	24V+
	2	Pressure sensor 1

	3	24V+
	4	Pressure sensor 2
	5	24V+
	6	Pressure sensor 3
	7	Pressure intern out
	8	Pressure intern in

5.5.2 SU06A

To use SU06A (STN 31977) needs to be installed [FTDI driver](#) separately in addition to the installation of ST03A.

The measured data can be displayed with the [Measurement](#) function. SU06A measured channel's properties can be changed in the *Configuration* panel under the folder *SU06A* (see also: [SU06A Properties](#) and *Service / SU06A Outputs*).

Scope of supply:

- USB connection to the computer.
- 2 Plug power supply 115VAC - 230VAC/24VDC - 110VDC

Supported functions of SU06A:

- 12x16 bit analog input channels with ESRA compatible input ranges organized into 3 isolated channel groups of 4 channels.
- 8 pressure sensor inputs with power supply on LEMO connectors.
- 16 optically decoupled digital input channels with ESRA compatible selectable input ranges.
- 1 acceleration sensor input.
- 1 ms to 1s sample rates.
- 1 digital output relay (150V / 1A).
- 2 analog outputs for lever simulation (0-10V / 10mA).

Plug of the SU06A

Analog inputs SUB-D25 female connector pin assignment:

pin	SUB-D25 female	connector
1	ACh1(+)	PrM1 (LEMO)
2	ACh2(+)	PrM2 (LEMO)
3	ACh3(+)	PrM3 (LEMO)
4	ACh4(+)	PrM4 (LEMO)
5	ACh5(+)	banana, PrM5 (LEMO)
6	ACh6(+)	banana, PrM6 (LEMO)
7	ACh7(+)	banana, PrM7 (LEMO)
8	ACh8(+)	banana, PrM8 (LEMO)
9	ACh9(+)	banana
10	ACh10(+)	banana
11	ACh11(+)	banana
12	ACh12(+)	banana, ACCELEROMETER
13	n.c.	n.c.
14	ACh1(-) GND1	PrM1 (LEMO)
15	ACh2(-) GND1	PrM2 (LEMO)
16	ACh3(-) GND1	PrM3 (LEMO)
17	ACh4(-) GND1	PrM4 (LEMO)
18	ACh5(-) GND2	banana, PrM5 (LEMO)
19	ACh6(-) GND2	banana, PrM6 (LEMO)

20	ACh7(-) GND2	banana, PrM7 (LEMO)
21	ACh8(-) GND2	banana, PrM8 (LEMO)
22	ACh9(-) GND3	banana
23	ACh10(-) GND3	banana
24	ACh11(-) GND3	banana
25	ACh12(-) GND3	banana, ACCELEROMETER

Pin assignment of LEMO pressure sensor input (**PrM**) connectors:

pin	description
1	signal GND(-)
2	signal input(+)
3	+24VDC supply voltage output
4	power GND

Pin assignment of LEMO acceleration sensor input (**ACCELEROMETER**) connector:

pin	description
1	+5VDC supply voltage output
2	power GND
3	signal input (2.5V +/- 2V)
4	signal GND(-)

Pin assignment of digital input connectors (**D**):

pin	SUB-D9 female			
	D1-D4 connector	D5-D8 connector	D9-D12 connector	D13-D16 connector
1	Ch1 (+)	D1 (banana)	Ch5 (+)	Ch9 (+)	Ch13 (+)
2	Ch2 (+)	D2 (banana)	Ch6 (+)	Ch10 (+)	Ch14 (+)
3	Ch3 (+)	D3 (banana)	Ch7 (+)	Ch11 (+)	Ch15 (+)
4	Ch4 (+)	D4 (banana)	Ch8 (+)	Ch12 (+)	Ch17 (+)
5	n.c.	n.c.	n.c.	n.c.
6	Ch1 (-)	D1 (banana)	Ch5 (-)	Ch9 (-)	Ch13 (-)
7	Ch2 (-)	D2 (banana)	Ch6 (-)	Ch10 (-)	Ch14(-)
8	Ch3 (-)	D3 (banana)	Ch7 (-)	Ch11 (-)	Ch15 (-)
9	Ch4 (-)	D4 (banana)	Ch8 (-)	Ch12 (-)	Ch16 (-)

Special cables

With a separate order of KB adapter cable STN41896 (0,5m length) and KB pressure sensor DG10-S (STN29890) an electronic pressure measurement system can be realized. The cable includes the 500 Ohm load resistor. One system is able to measure not more than 8 pressure sensors.

STN29890

STN41896

The connection to the pneumatic system requires an additional adapter I87308 (KB T2 adapter) or C105707/1 (System Staubli) depending on the installed test point.

To avoid any electrical influence to the sensor there has to be an insulator between car and sensor/measurement device SU06A!

A 15m extension cable (STN41902) gives the possibility to place the SU06A distant from the test points.

The overall accuracy includes deviation of load resistor, SU06A and sensor in a temperature range from -25°C to 70°C is better than +/- 2.2% F.S.

Settings for factor: 1.25

Settings for offset: -2.5

Unit: bar

STN41902

5.6 Generic Measurement Files

Access:

Operator OEM

Service Terminal can process measured data measured with any foreign source if the input file matches the *GTM (Generic Textual Measured data)* format of Service Terminal. Files of this type are easy to create or generate; a description of the format can be found in this topic. Imported GTM files are converted to EMD files and can treated the same way as ST03A measurement files only new measurements can not be started due to the lack of some configuration information. Following features are accessible on EMD file created with GMT files:

- Displaying in plots and windows, setting any plot properties.
- Data evaluation and visualization (difference mode, Zoom to...).
- Printing, adding notes and exporting parts of the plots into CSV files.

The GTM file format

Below, you can find a list of applicable tags including usage advice. After, you can see an example file where you can also see the type of white space characters as in MS Word. Finally the result of the file is shown in an image.

Tags of the file

Please keep the rows and separators between the tags as shown in the example and described below. In general each tag starts a new row. Data may follow up in the same row or in the next row depending on the tag.

[comment]
> Comment of the measurement file. This will be visible in the file open dialog when opening the converted EMD file with Service Terminal. (optional)

[creationdate]
> Please use the format yyyy.MM.dd HH:mm (e.g.: 2010.08.27 12:58) (optional)

[measconfig]
> One tag of this type introduces a window. After this, **[plot]** tags should follow.

[plot]
> In the next line after the [plot] tag the channels are listed by name, separated by tab.
>
> In the line below the channels, colors are set for each channel, separated by tab. The color is set in the following format:RRRGGGBBB where RRR is the red component 0..255, GGG is the green component 0..255 and BBB is the blue component 0..255.
>
> Example

255000000	red
000255000	green
000000255	blue
255255000	yellow

> ⚠ One plot may contain either only boolean or only analog channels.
>
> The [plot] tag is optional but if used then both channel names and colors have to bew declared.

[header]
> This tag is obligatory. This is the beginning of the data table.

[name]

This tag is also obligatory. After the name (in the same row) the channel names have to be enumerated (separated by tab). The data of one channel is organized in columns and the channel name is the top header of the column.

[unit]

Set the unit for each channel in the kind of the tag. The units are separated by tab. This line is optional.

[type]

Set the type for each channel in the line of the tag. The types are separated by tab. The type attribute can have two different values:

- ANALOG
- LOGICAL

LOGICAL channels can only have two values: 0 and 1.
This line is optional. If this line is is missing then all channels will be treated as ANALOG channels.

[data]

This tag is also obligatory. In the rows after [data] the values of the channels are listed. The first column contains the time stamp in milliseconds. The other columns contain the data of the channels measured at the given time stamp. The order of the channels should be the same as defined by the channel names.

Example GTM file

The extension of this file is `*.gtm`. The result of the loaded file is shown below.

```
[comment]¶
This·is·a·GTM·file·created·as·example·file·for·ST03A·help.¶
[creationdate]¶
2010.08.27·12:58¶
[measconfig]¶
[plot]¶
v1      →      v2      →      tem¶
255000000255255000→000000255¶
[plot]¶
b1      →      b2      →      err¶
255111255111255111→255000000¶
[header]¶
[name]  →  v1    →    v2    →    b1    →    b2    →    err    →    tem¶
[unit]  →  km/h  →    km/h  →    -     →    -     →    -      →    C¶
[type]  →  ANALOG  →  ANALOG  →  LOGICAL  →  LOGICAL  →  LOGICAL  →  ANALOG¶
[data]¶
```

	v1		v2		b1		b2		err		tem
0	→	55	→	56	→	0	→	0	→	0	→	26¶
100	→	55	→	55	→	0	→	0	→	0	→	26¶
200	→	55	→	55	→	0	→	0	→	0	→	26¶
300	→	55	→	54	→	0	→	0	→	0	→	26¶
400	→	55	→	54	→	0	→	0	→	0	→	26¶
500	→	55	→	55	→	0	→	0	→	0	→	26¶
600	→	0	→	0	→	0	→	0	→	1	→	0¶
700	→	0	→	0	→	0	→	0	→	1	→	0¶
800	→	55	→	55	→	0	→	0	→	0	→	26¶
900	→	55	→	55	→	0	→	0	→	0	→	26¶
1000	→	55	→	56	→	0	→	0	→	0	→	26¶
1100	→	53	→	55	→	1	→	0	→	0	→	26¶
1200	→	53	→	55	→	1	→	0	→	0	→	26¶
1300	→	52	→	54	→	1	→	1	→	0	→	26¶
1400	→	50	→	51	→	1	→	1	→	0	→	26¶
1500	→	49	→	40	→	1	→	1	→	0	→	26¶
1600	→	48	→	45	→	1	→	0	→	0	→	26¶
1700	→	47	→	51	→	1	→	0	→	0	→	26¶
1800	→	46	→	48	→	1	→	0	→	0	→	26¶
1900	→	45	→	46	→	1	→	0	→	0	→	26¶

6 Data Log

Access:

Operator OEM

Data logging is a special kind of measurement that is executed automatically on a board of the ESRA system. Service Terminal is not needed during logging; only for downloading the saved data from the boards and for further evaluations on the saved data.

Logs are identified by their trigger. A trigger is a description of events that make logging start. One event can be e.g. the sinking of pressure below a given value or activating magnetic brakes.

In the table below you can read about the main differences between Data Logging and Measurement service.

	Measurement	Data Logging
Connection to ST03A during measurement	Yes	No
Data storing after measurement	On the computer that runs ST03A	On the board that logs data
Visualization of measured data	Immediately	After downloaded from the board by ST03A
Start/end of measurement	On user's command	Automatically when a predefined event occurs
Length of measurement	Depends on user interaction	Predefined by user before logging

Types of Data Log

Service Terminal supports two different types of data log. For a short overview on their features please check the table below.

	Standard	Advanced
Location of logging	Any main board	CB12A or CB09D/F board
Trigger events	Hard coded in application	Different configurations possible. Select/unselect trigger.
Logged channels	Hard coded in application	Different configurations can be loaded.
Visualization	Configurable using configuration files	Trigger events, logged channels visualization
Upload/change active configuration	Only with application in SW Installation	Data Log Manager dialog
Load recorded logs into Service Terminal	Standard Data Log Browser dialog	Advanced Data Log Browser dialog accessible from Data Log Manager dialog or Bulk Data Log Download

Opening logs

Access:

Menu	Data Logs / Open log...
Mouse	

Logs that have been created on any of the boards and loaded into Service Terminal then saved on the computer can be opened for viewing using ST03A. All operations of visualization, evaluation and exporting, printing data are available as discussed in the measurement section. The only difference is, that in comparison to measured data files, data log files do not contain the configuration data that would be needed to start a measurement.

Downloading Data Logs

Standard data logs can be downloaded using the Standard Data Log Browser.

Advanced data logs can be downloaded using the Advanced Data Log Browser or Bulk Data Log Download. Please note that advanced data logs can only be downloaded when the communication to the DLG supported board is active.

Set Up Advanced Data Log Configuration

Please follow the steps below to set up an Advanced Data Log Configuration in order to enable logging on the CB12A or CB09D/F board.

1. Check if the connection to the BCU is alive (green communication indicator).
2. Make sure that the connected BCU content and the project content match.
3. Open an Advanced Data Log Configuration.
4. In the configuration dialog, select the triggers for logging or use the default settings of the configuration.
5. Click the "Upload configuration" button in the configuration dialog.
6. Open the Data Log Manager dialog.
7. Select the recently uploaded configuration and click "Activate Configuration".
8. If the data log service is not running, click "Start" button to activate Data Log service.
9. When data log service is running then logs can be recorded. Please note that the logging only takes place when the trigger conditions defined in the configuration are met.

6.1 Standard Data Log Browser

Access:

Menu	Data Logs / Standard / Data Log Browser
Hotkey	CTRL+B
Mouse	

In this dialog you can manage log data recorded by the application of main boards. You can load the logs onto your computer or read one log from the board and open it for visualization. You can also delete logs stored on the boards one-by-one or more logs at a time. In this dialog the buttons and the content of the table change when you change your selection in the tree on the left side of the window. The tables below give a reference on the applicable functionalities and the content of the table.
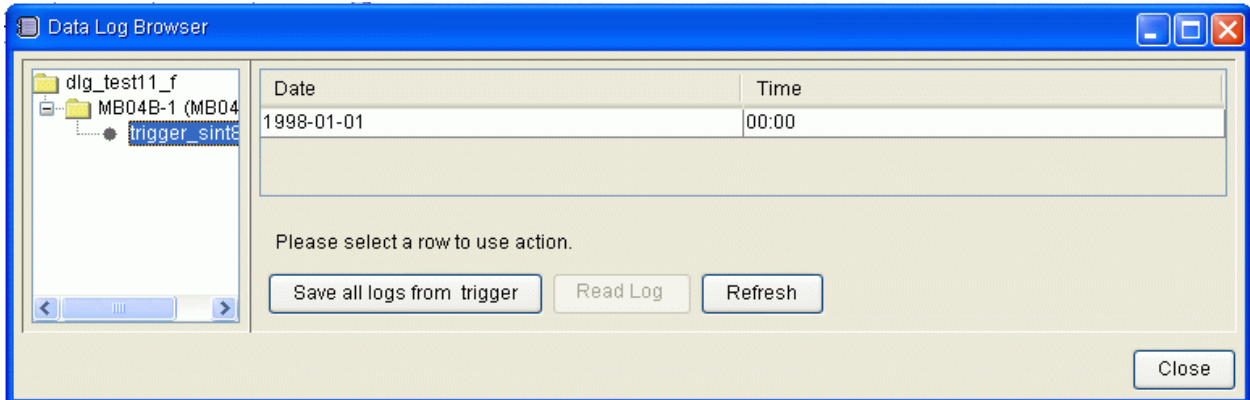
Actions

Feature	Description	Active when selection on
Save all logs from project	Browse a folder to save all logs from all boards to your computer.	Project name (tree on the left)
Save all logs from a board	Browse a folder to save all logs from the selected board to your computer.	Board in the project (tree on the left)
Save all logs from a trigger	Browse a folder to save all logs from a trigger to your computer.	Trigger name in the tree on the left
Clear logs	Deletes all the logs of the project or the selected board.	Project, board (tree on the left)
Refresh	Reads again log information from the board in case new logs are created.	Project, board or trigger (tree on the left)
Read log	Reads the log out from the board and displays it in a graphic window.	Trigger (tree on the left) and then one row in the table

Table contents

Column	Description	Active when selection on
Board	Name of the boards in the project.	Project name (tree on the left)
Node number	Node Number of the board.	Project name (tree on the left)
Application	Name of the Application on the board.	Project name (tree on the left)
Trigger name	Name of the trigger. This identifies the type of log.	Board in the project (tree on the left)
Description	Description of the log (if included in project file).	Board in the project (tree on the left)
Number of logs	Amount of logs recorded for this trigger.	Board in the project (tree on the left)
Date	Date of recording.	Trigger name (tree on the left)
Time	Time of recording.	Trigger name (tree on the left)

After downloading the logs' content all operations of visualization, evaluation and exporting, printing data are available as discussed in the Measurement section. The only difference is, that in comparison to measured data files, data log files do not contain the configuration data that would be needed to start a measurement.

6.2 Advanced Data Log Manager

Access:

| Operator | OEM |

Menu	Data Logs / Advanced / Data Log Manager
Mouse	

In this dialog you can manage data log configurations of the CB12A boards. You can modify, save and upload the configuration on the connected board. You can select which configuration should be the active one (only the active configuration will be processed on the board even though you can store more configurations at the same time). You can also open the Data Log Browser to manage recorded data on the board. The steps of setting up a data log configuration are described here.

Data Log Manager via Ethernet connection
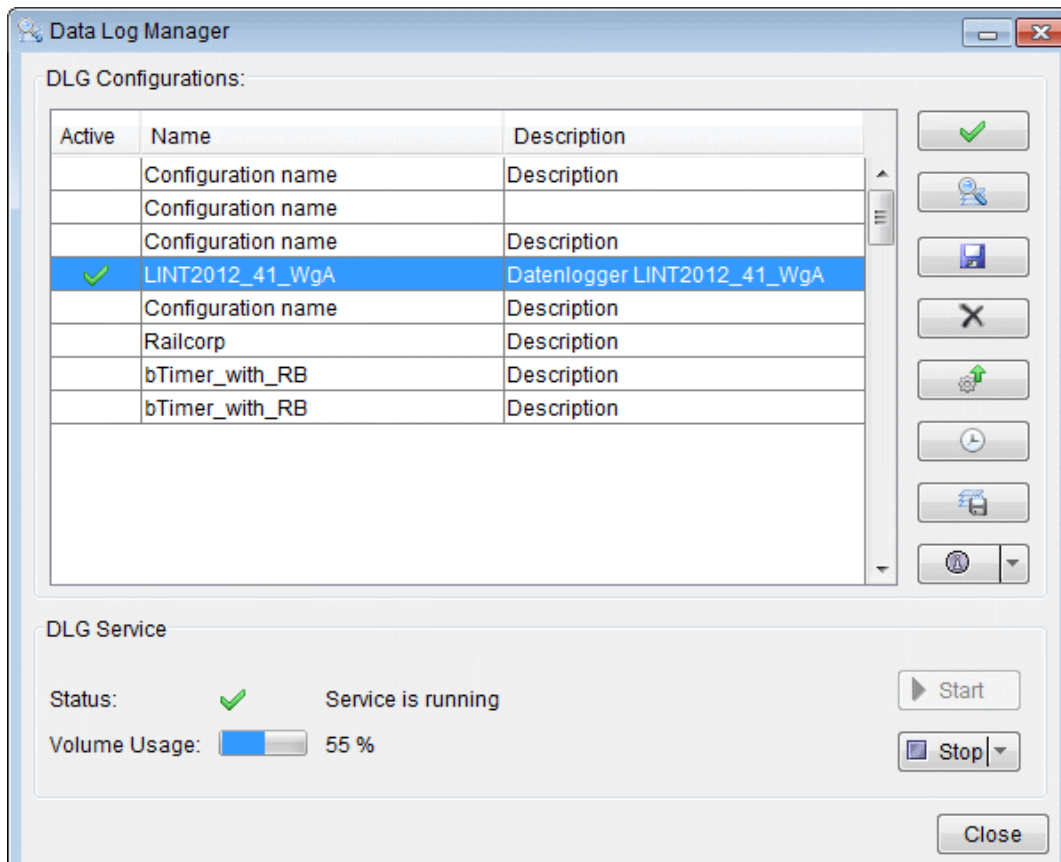
Data Log Manager via CAN connection

In some project there is Data Log function in the system without Ethernet interface. To support Data Log function in these cases the ST03A makes it possible to manage Data Log via CAN. The Data Log function via CAN is slower than via Ethernet, by this reason some functions are user driven, requiring user interaction and does not happen automatically. To use Data Log Manager via CAN connection you need to open the proper project file also.

To load the data log configurations press the **List Configurations** button.
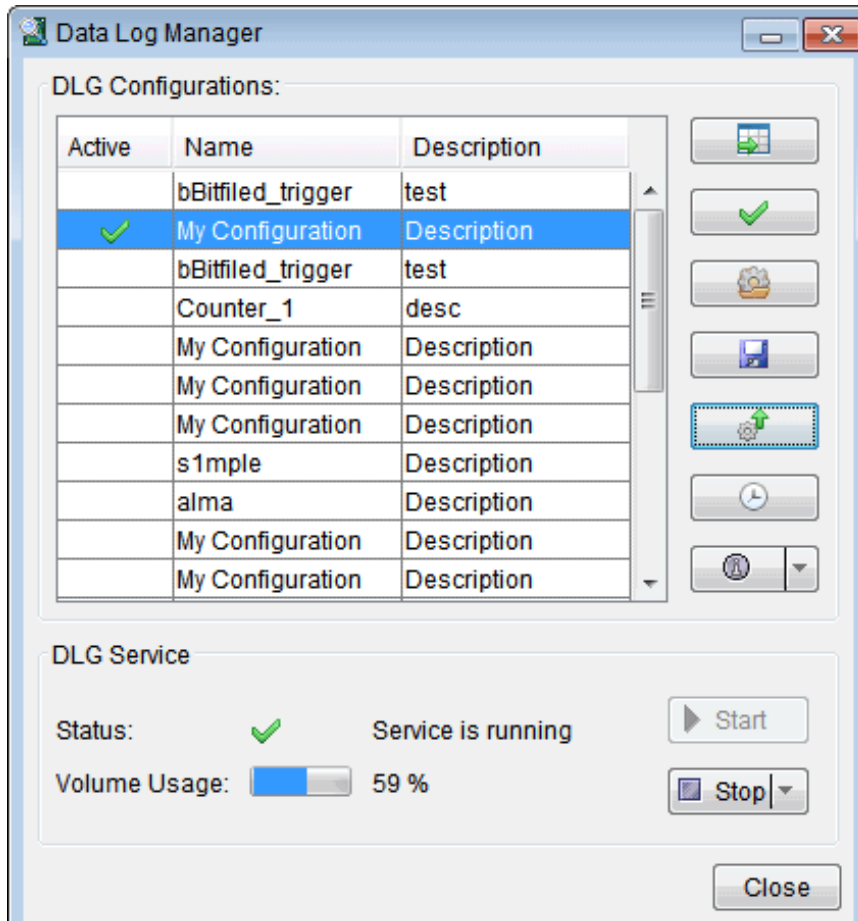
Table content

Active
✔ marks the active configuration. The selected triggers in the active configuration will be recorded if data log service is running (see status below the table)
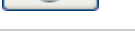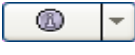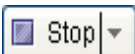
Name
Name of the configuration. It can only be set in the top of the [Data Log Configuration](#) dialog. It can differ from the name of the `*.edc,  *.dcc` file that contains it.

Description
Short description of the configuration. It can be set in the [Data Log Configuration](#) dialog.

Features overview

	Feature	Description
	List Configurations	Load the data log configurations via CAN connection.
	Activate Configuration	Sets the selected configuration to active and starts data log service. All other configurations will be deactivated.
	Open Data Log Browser	In the data log browser you can download, open and delete logs.
	Save configuration	Saves the selected configuration into a file with `*.edc, *.dcc` extension.
	Delete configuration and logs	Deletes the configuration and all logs recorded using this configuration from the data log supported board.
	Upload configuration	Uploads configuration onto CB12A, CB09D/F board. Upload is only possible if project file content and the configuration of connected ESRA system (see Project Information and Unit Information) match.
	Set Real Time Clock	Opens the Real Time Clock service. You can read out and set the system time that will be saved during logging.
	Save into archive	Saves all the logs and related files into an archive file (*.zip). A dialog will appear where the time range can be selected. Those files will be downloaded that were created within this time interval.
	Show Project Information From Configuration	Shows the Project Information of the project the configuration was created with. (Default action)
	Compare Configuration's Project Information With Opened Project	Compares some important attributes of the Project Information of the project the configuration was created with and the Project Information of the currently opened project.
	Compare Configuration's Project Information With System	Compares some important attributes of the Project Information of the project the configuration was created with and the Unit Info of the currently connected unit.
	Start data logging	Runs DLG service using the active DLG configuration. Data logs are only recorded while DLG service is running.
	Stop data logging	Stops DLG service. Data logs are only recorded while DLG service is running. ⚠️ **Warning!** After a restart of the data log supported board the service will start.
	Stop permanently	DLG service is stopped and an invalid configuration is created to avoid restarting data log service caused by the restart of the CB12 board. The DLG status becomes "Invalid configuration". (Click the right side of the button and choose the second option)
	Status	Displays the current status of the DLG service on the data logger board.
	Volume usage	Displays the size used for logs relative to the full capacity of the storage on the CB12A/CB09D/F.

6.3 Advanced Data Log Browser

Access:

| Mouse in Data Log Manager dialog | |

In this dialog you can manage recorded log data. You can load the logs onto your computer, open the logs for visualization and delete logs stored on the board. The log date in the table refers to the time of the trigger event that made the log start.
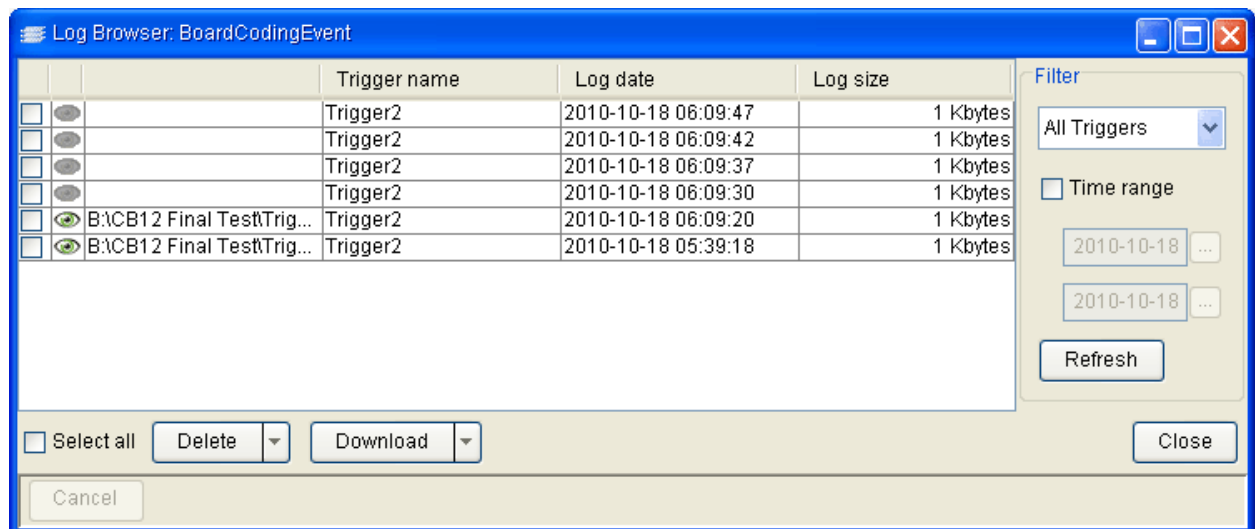
In the table you can find all the logs that have been recorded with the selected configuration. The applicable functionality depends on where the logs are present.

Table content	Description	Possible actions
	Log is located on BCU, not yet downloaded.	Download Delete from BCU
C:\Documents and Sett...	Log is present both on BCU, and on the computer. Local file location is shown.	Open log (click), Delete from BCU Delete from BCU and PC
C:\Documents and Sett...	Log is not any more present on the BCU but still on the computer. Local file location is shown.	Open log (click), *Refresh* removes these logs from the table.

Downloading and deleting logs

Both *Download* and *Delete* buttons are multiple buttons and they take effect only on the selected logs in the table. To access additional functionality click the right side of the button (drop down). In the list below these functionalities are referred in the format *<button name>/<sub function>*.

Delete
> Deletes the selected logs from the board but not from the PC.

Delete / Delete file from the BCU
> Deletes the selected logs from the board but not from the PC.

Delete / Delete file from the BCU and the PC
> Deletes the selected logs from both the board and the PC.

Download
> Downloads the selected logs from the board. At first download you will be asked for the download location. All other logs will be saved here unless you use *Download...* .

Download / Download...
> Downloads the selected logs from the board. You will be asked each time for the download location.

Download / Download and delete
> Downloads the selected logs from the board. At first download you will be asked for the download location. All other logs will be saved here unless you use *Download...* . After download the selected logs will be deleted from the BCU.

Download / Download and delete...
> Downloads the selected logs from the board. You will be asked each time for the download location. After download the selected logs will be deleted from the BCU.

Filtering table content

You can reduce the size of the table applying the filters in the right side of the dialog. Select a trigger or check *Time range* and set a start date and an end date for the logs that should be shown in the table. Finally click *Refresh*. This will also remove those logs from the table that have been downloaded and deleted from the BCU even if they are saved on the computer.

6.4 Offline Data Log Manager

Access:

| Operator | OEM |

Menu	Data Logs / Advanced / Offline Data Log Manager
Mouse	

Offline Data Log Manager allows displaying the advanced data configurations and log files directly from the CompactFlash card or which have been copied by manually from the CompactFlash card.

⚠️ **Warning:** To use the CompactFlash card content of ESRA system you have to unplug the ESRA rack and remove the CF card from the board.

Select the proper folder or the data log files contained drive with a connected CF card reader in the *Browse for folder* dialog then the Offline Data Log Manager panel displays the copied data log configurations.
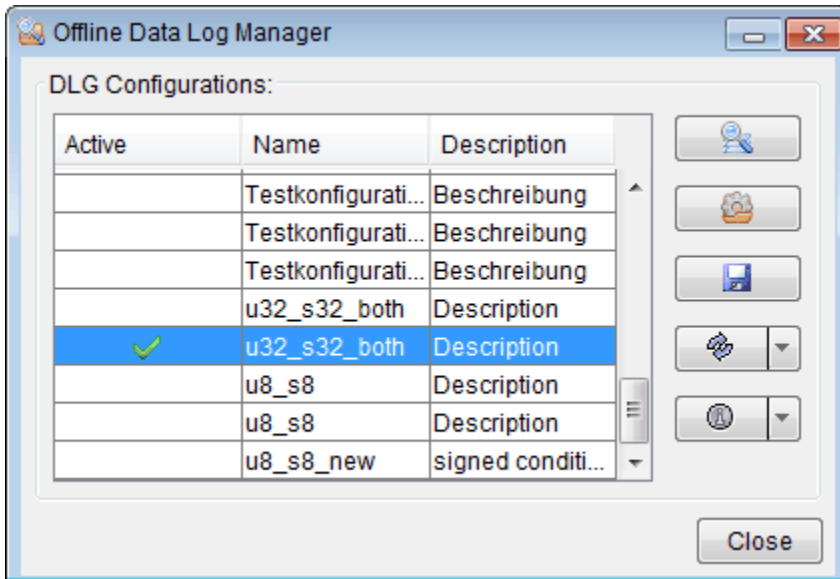
Table content
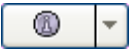
Active

 marks the active configuration.

Name

Name of the configuration. It can only be set in the top of the [Data Log Configuration](#) dialog. It can differ from the name of the `*.dcc` file that contains it.

Description

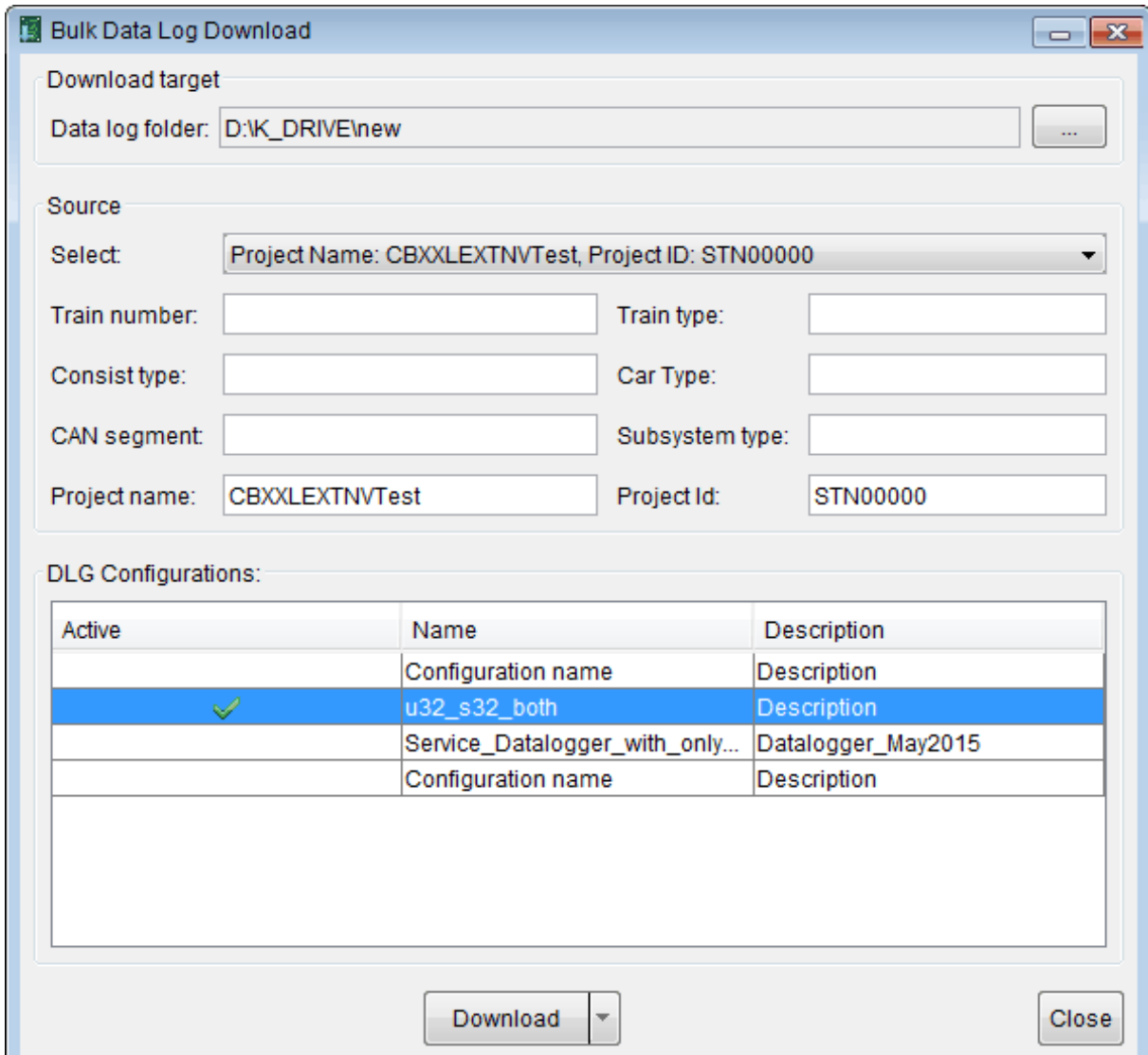Short description of the configuration. It can be set in the [Data Log Configuration](#) dialog.

Features overview

	Feature	Description
	Open [Data Log Browser](#)	In the data log browser you can download, open and delete logs.
	Save configuration	Saves the selected configuration into a file with `*.edc, *.dcc` extension.
	Show Project Information From Configuration	Shows the [Project Information](#) of the project the configuration was created with. (Default action)
	Compare Configuration's Project Information With Opened Project	Compares some important attributes of the [Project Information](#) of the project the configuration was created with and the [Project Information](#) of the currently opened project.
	Compare Configuration's Project Information With System	Compares some important attributes of the [Project Information](#) of the project the configuration was created with and the [Unit Info](#) of the currently connected unit.

6.5 Bulk Data Log Download

Access:

| Operator | OEM |

Menu	Data Logs / Bulk / Bulk Data Log Download
Mouse	

Bulk Data Log Download provides fast download of the recorded data via only Ethernet connection. This feature is recommended to download huge amount of data. It downloads all not downloaded files of the selected configuration automatically. Since it requires restarting the target board it adds about 1 minute restart time for whole download process. By this reason to download a few files the normal Data Log Manager function is recommended. The Bulk Data Log Download is only available if the board supports this mode. You can download multiple configurations and their log files at the same time. You can also open the saved configurations with the Downloaded Data Log Browser to display recorded data. The steps of setting up a data log configuration are described here.

⚠️ **Warning:** By using the Bulk Data Log Download the board is restarted.

The Data Log record files are managed in the special, user defined folder structure as a database to make it easy to query or find the relevant record within the downloaded files. The log files are organized according to the target device where those were downloaded.

Please follow the steps to download Data Log files from the target unit:

1. Select the download target folder where you want to download the files.
2. Select a source which comes from the position information but you can fill the empty fields before the downloading but not necessary. These fields do not modify the position information but just makes it easier to identify the recorded data.
3. Select configurations to be downloaded, by multi-selecting more configuration file can be selected.
4. Download the selected configuration with the *Download* multiple button. To access *Download and delete* functionality click the right side of the button (drop down).

Table content

Active

✔ marks the active configuration.

Name

Name of the configuration. It can only be set in the top of the Data Log Configuration dialog. It can differ from the name of the `*.dcc` file that contains it.

Description

Short description of the configuration. It can be set in the Data Log Configuration dialog.
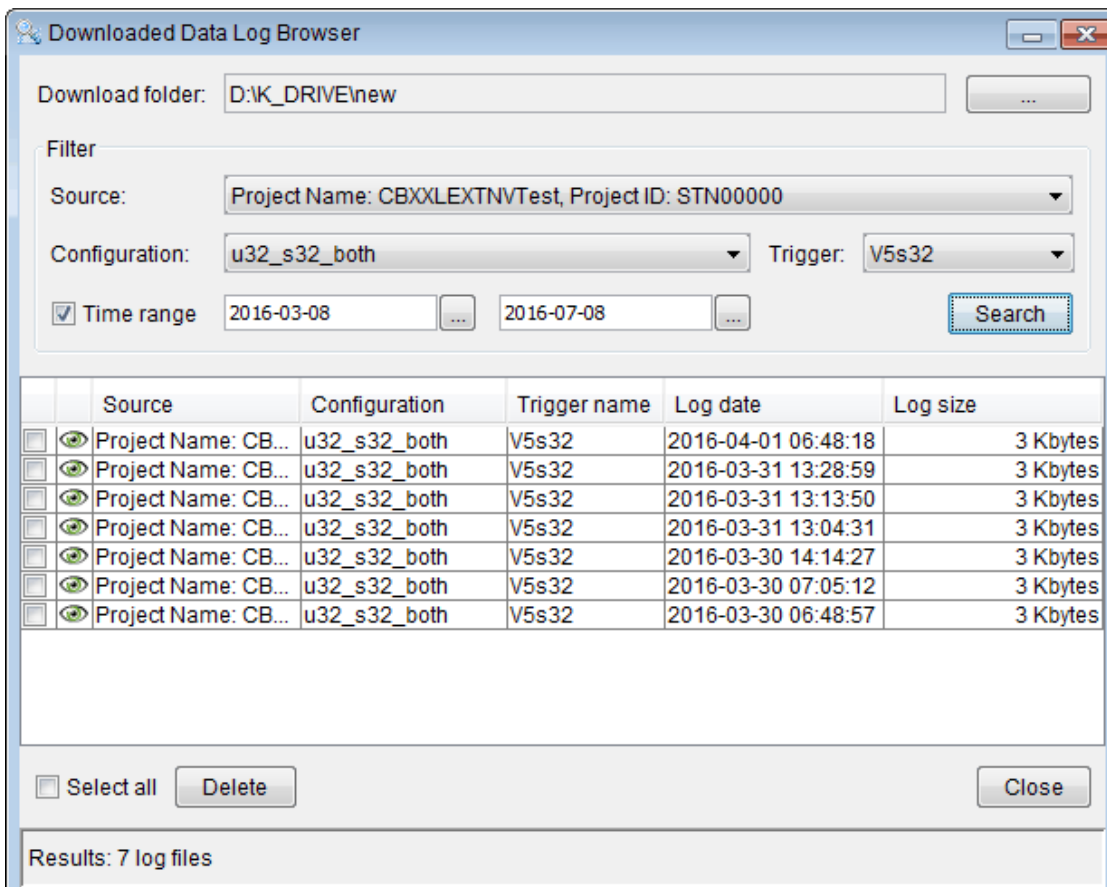
6.6 Downloaded Data Log Browser

Access:

Operator **OEM**

Menu	Data Logs / Bulk / Downloaded Data Log Browser
Mouse	

In this dialog you can manage the downloaded recorded data logs after you have downloaded the data logs onto your computer with Bulk Data Log Downloader. You can open the logs for visualization and delete logs from your computer.

1. First select the downloaded folder with ... button.
2. Set the filter if you like.
3. Finally press the *Search* button.

In the table you can find the filtered logs that have been recorded with the downloaded board. The log date in the table refers to the time of the trigger event that made the log start.

Opening log

To open log (click).

Deleting logs

Delete button takes effect only on the selected logs in the table.

Filtering table content

You can reduce the size of the table applying the filters. Select a source then you can select configuration and after you can select a trigger also or check *Time range* and set a start date and an end date for the logs that should be shown in the table. You cannot set the configuration or trigger filter without selected Source. Finally click *Search*.

6.7 DLG Configuration

A data log configuration file (`*.edc`, `*.dcc`) includes all data settings for configuring data logging and displaying logged data. It contains:

- A list of data log triggers which are to be measured
- A list of channels which are to be measured
- Cycle times with that a board should be measured
- Assignment of channels to triggers
- Calibration information to the channels (factor, offset and unit) so that the digital data gets its real meaning
- Visualization information to the channels like color

In Advanced Data Log configurations you may define which triggers you would like to enable or disable. The meaning of these properties are described in the topic DLG Trigger Channel Properties.

You can change the name and the description of the configuration that will appear in the Data Log Manager.

The steps of setting up an Advanced Data Log Configuration are listed here.

Opening an existing configuration

Access:

Operator   OEM

Menu	Data Logs / Open Configuration...	Opens an existing DLG configuration
Mouse		
Menu	Data Logs / Advanced / <configuration_name>	Opens a configuration from the project file (if present)

If you open a configuration you can activate or deactivate data log triggers.

Opening Configuration Dialog from Graphical Window

Menu in graphical window	Display / Configuration
Mouse	

ℹ **Note:** There are some limitations for what channels can be measured at once and what channels can not be selected without another. This may affect, which triggers may be activated concurrently. For further details please check the topic Channel. There you can also find the description and properties of each channel type.

DLG Trigger

Each trigger identifies one kind of log. During operation more logs of the same type (belonging to the same trigger) may be recorded.
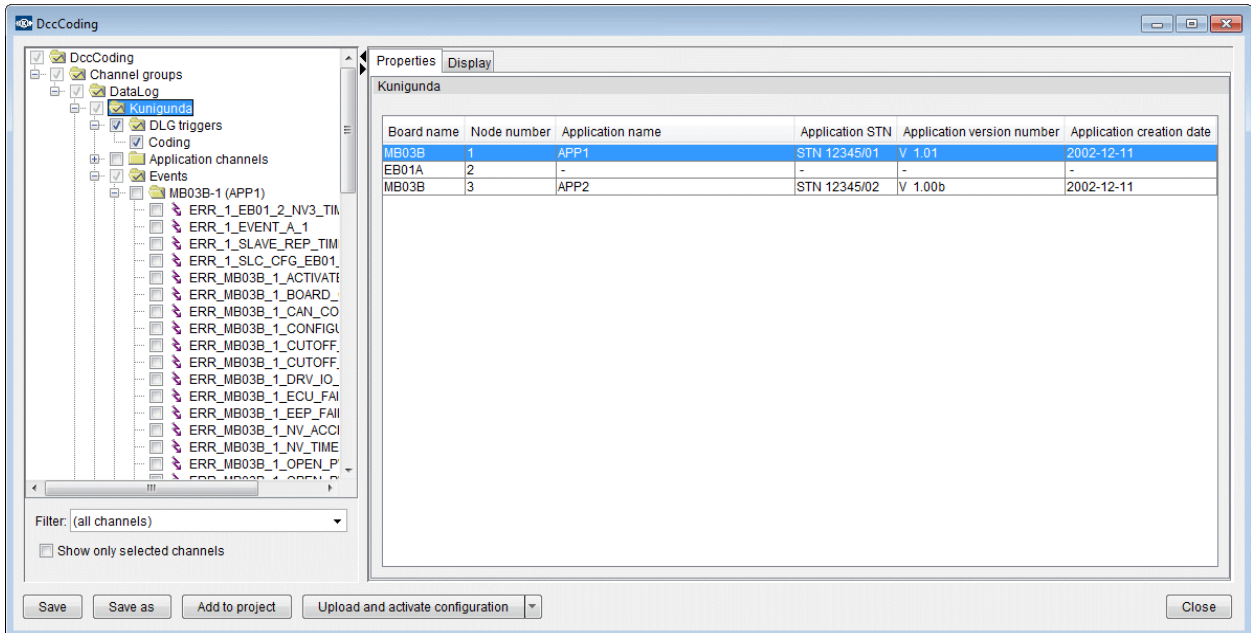
Resource Panel

The user can manage the channels on this panel. The channels are organized in a tree. Project channels (application, event and I/O channels) can be added to the tree from the list of data source channels on the Channels tab. Once a channel is added to the tree, it becomes a *managed channel*. Other types of channels (expressions, data log triggers) can be created on the Properties tab. They become automatically managed and will be inserted into the tree.

The root of the tree is the configuration. The second level contains Channel groups node. The third level is the *DataLog* node. It contains the project node containing the triggers and the project channels, and the Expressions node which contains the expression channels.

Trigger channels can be selected for measurement (activated) by clicking on the check box in the tree. Project and expression become selected if they are assigned to a trigger and the trigger is activated.

6.7.1 Configuration Tabs

6.7.1.1   Properties

The selected tree node's properties are displayed here. Some properties can be edited depending on the selected tree node.

6.7.1.2   DLG Trigger Channel Properties

The DLG Trigger Channel Properties Tab is displayed on the right side if the configuration node / Channel groups node / DataLog node / project data source node / DLG triggers folder or one of its DLG Trigger channel child nodes is selected in the Resource Panel tree.
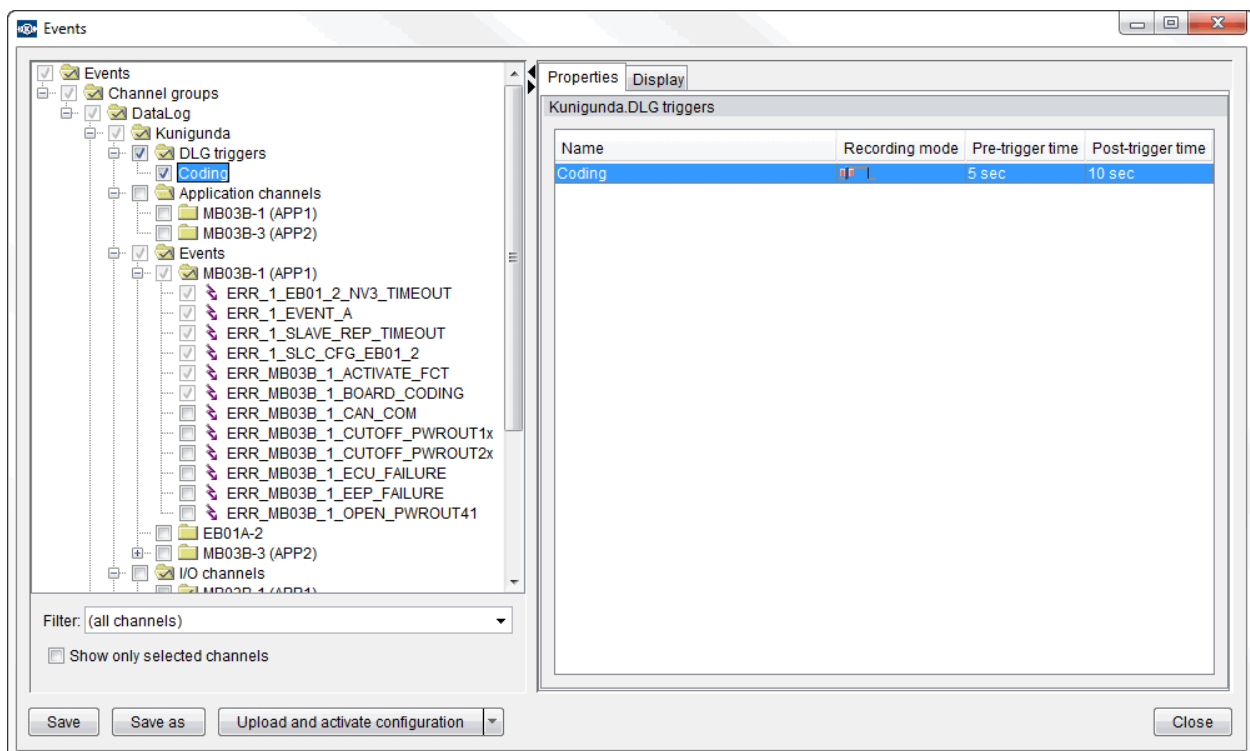
Description of properties:

Name
    Unique name in the configuration.

Recording mode
    Defines the activation and deactivation mode of the logging. In the table Tpre means pre-trigger time, Tpost means post-trigger time; Ttrue means the time the event is in true state between the rising and the falling edge.

	Mode	Description	Duration of logging
	Level-sensitive	Data recording starts at pre-time before before the trigger condition becomes true and ends at post-time after the trigger condition becomes false again.	Tpre + Ttrue + Tpost
	Rising Edge Triggered	Data recording starts at pre-time before before the trigger condition becomes true and ends at post-time after the the trigger condition becomes true.	Tpre + Tpost
	Falling Edge Triggered	Data recording starts at pre-time before before the trigger condition becomes false and ends at post-time after the the trigger condition becomes false.	Tpre + Tpost
	Rising And Falling Edge Triggered	Starts Tpre before and ends Tpost after the rising edge or starts Tpre before and ends Tpost after the falling edge.	Tpre + Tpost

Pre-trigger and post-trigger time and unit

The length of logging is defined by these values. Their usage is defined by the recording mode.

6.7.1.3 Application Channel properties

The application channel properties tab is displayed on the right side if the configuration node / Channel groups node / DataLog node / project data source node / Application Channels folder / a board folder or one of its application channel child nodes is selected in the Resource Panel tree.
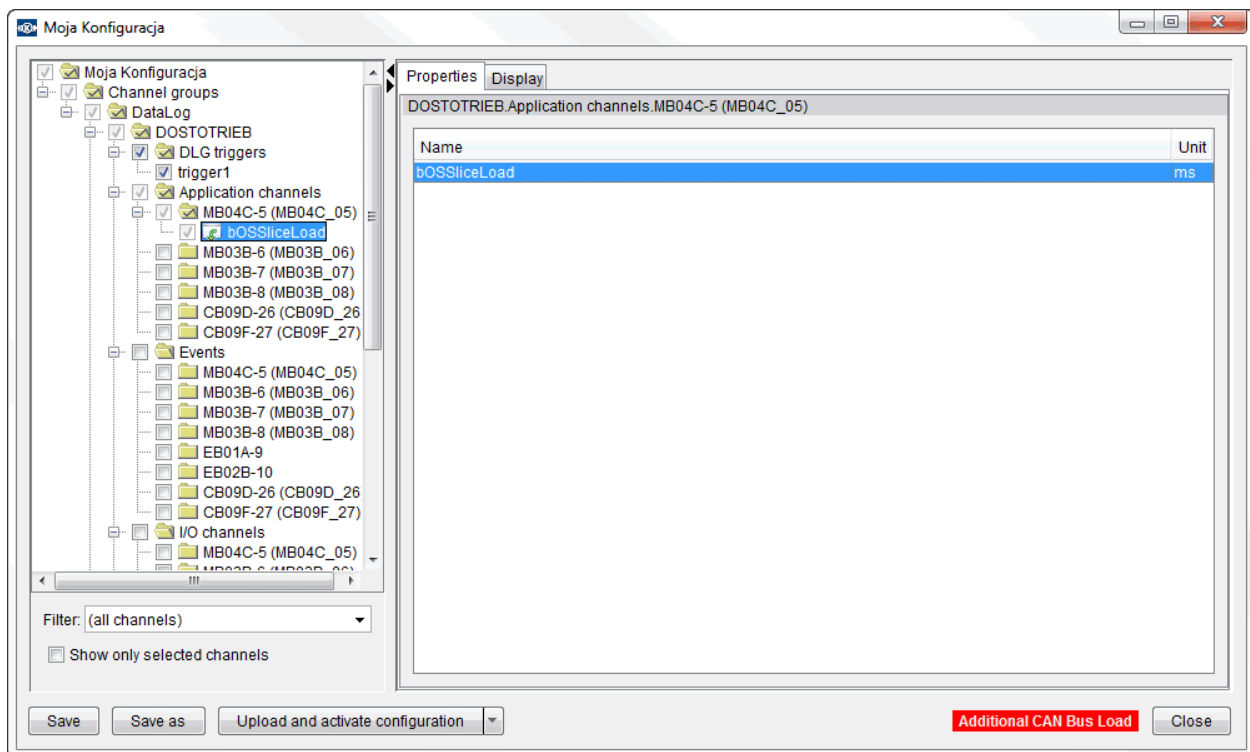

The user can modify or delete application channels on this panel. The name, transformation (factor, offset) and unit columns are editable. All other properties are defined in the project.

See the descriptions of additional, not mentioned properties in the description Application Properties.

6.7.1.4   I/O Channel properties

The I/O Channel Properties Tab is displayed on the right side if the configuration node / Channel groups node / DataLog node / project data source node / I/O Channels folder / a board folder or one of its I/O channel child nodes is selected in the Resource Panel tree.
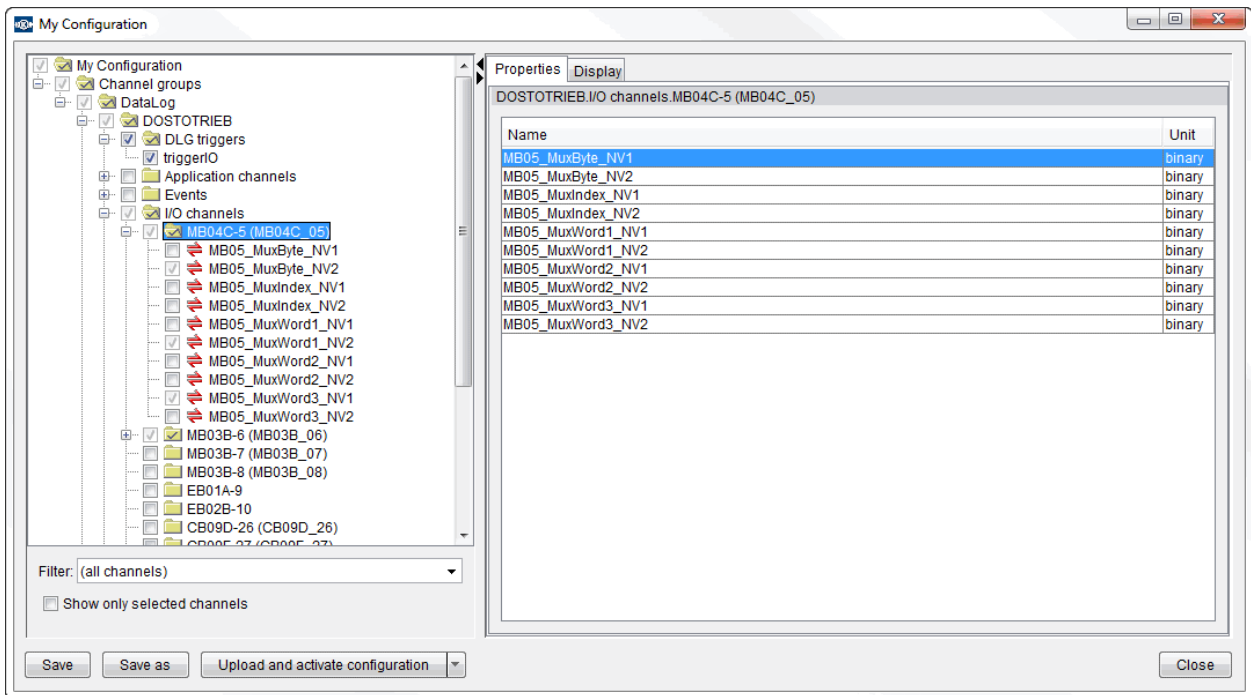
Descriptions of additional properties see the not mentioned properties in [I/O Channels Properties](#) description.
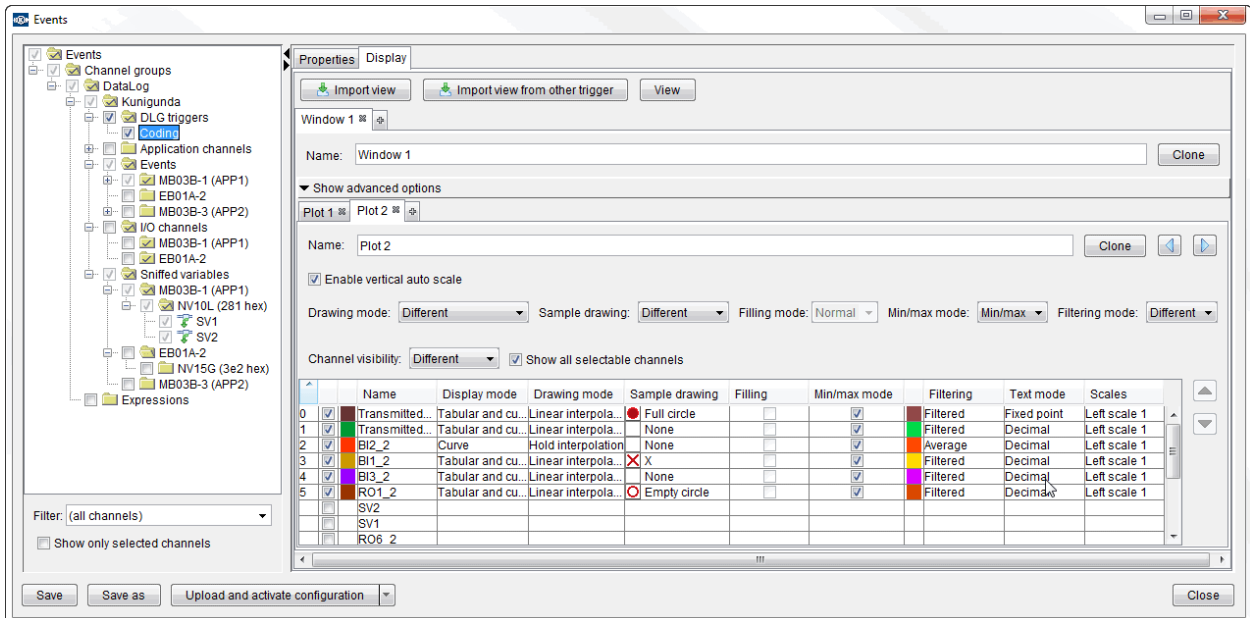
6.7.1.5 Event properties

The Event Properties Tab is displayed on the right side if the configuration node / Channel groups node / DataLog node / project data source node / Events folder / a board folder or one of its event channel child nodes is selected in the Resource Panel tree.
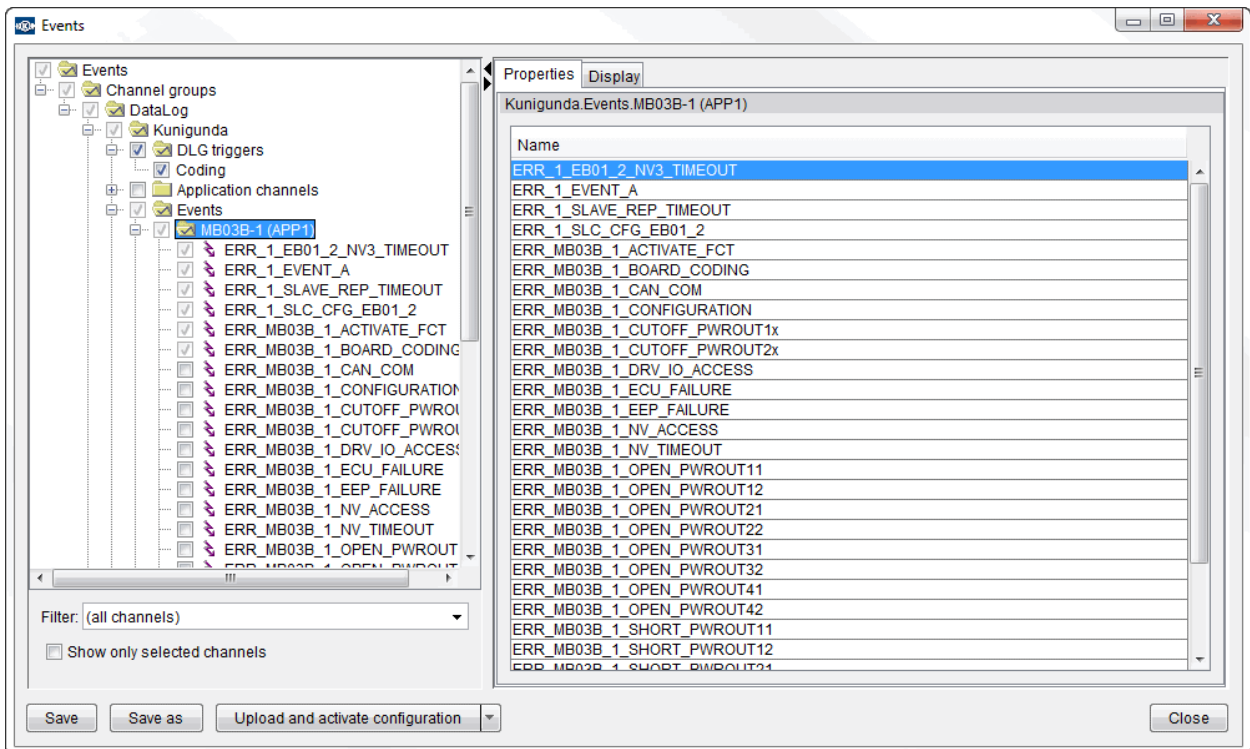
Descriptions of additional properties see the not mentioned properties in Events Properties description.

6.7.1.6   Display

The Display Tab collects all possible chart settings. Here is only listed the differences.

Import view

With **Import view** function it is possible to import display configurations (colors, factors, offsets etc.) from data log files into the actual display, while the **Import view from other trigger** function imports the display configuration from other existing trigger from the current data log configuration.

The channels are identified by their original names. If there are channels that cannot be matched automatically, a dialog window appears where the user can adjust which channels' settings from the opened file should be used for channels in the actual data log:
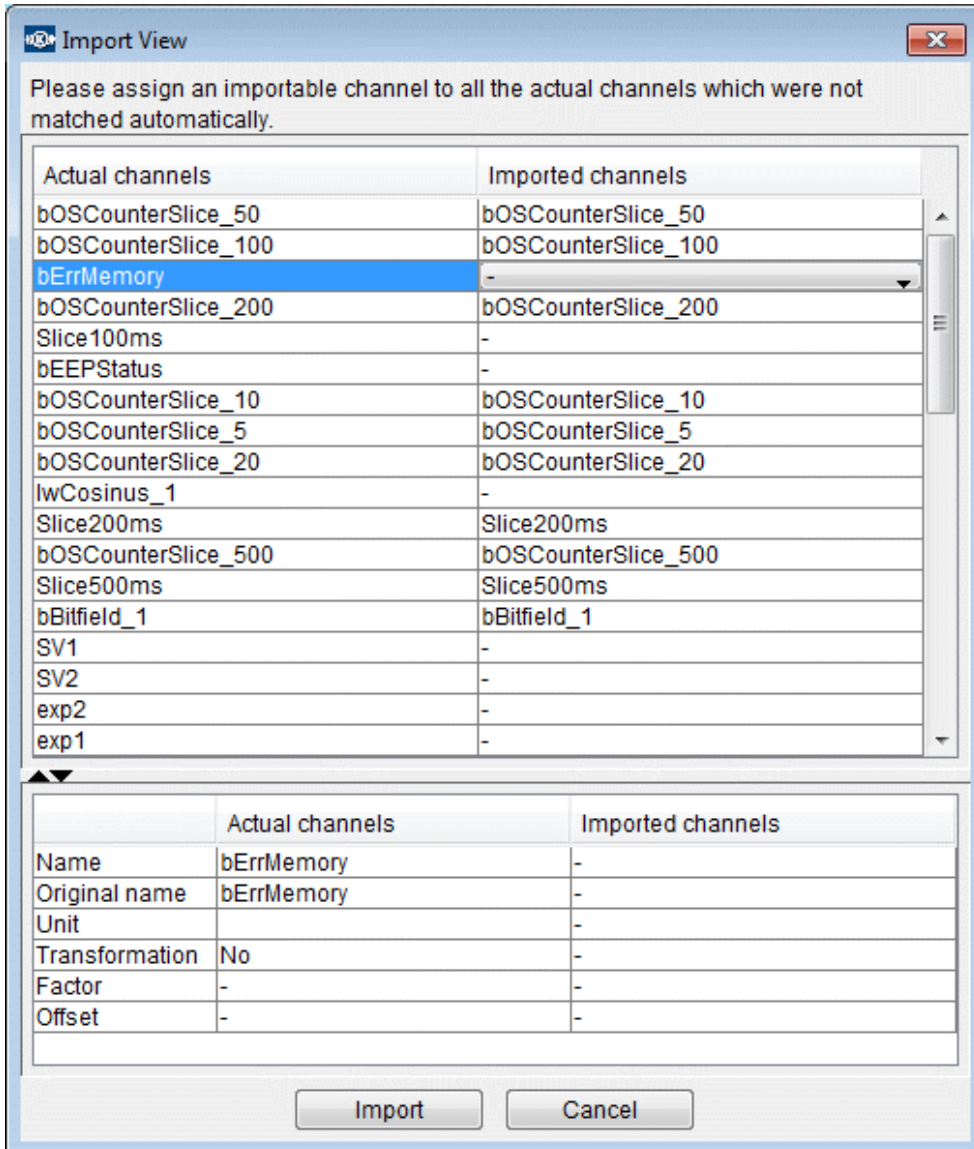
View

With selected DLG trigger node it is possible to define size and position of the graphical windows before the data log configuration uploading.

6.8 Advanced Data Log System Information

Access:

| Operator | OEM |

Menu in Advanced DLG window	Display / System Information
Mouse	🛈

This feature shows the circumstances of logging:

The Position Information identifies the location of the Unit where the log was captured.

The tables Expected System State and Current System State make it possible to verify that the Data Log Configuration was created for exactly the same configuration as present during logging.

The description of each table can be found in the topics Project Information (Expected System State), Unit Information (System State During Logging) and Position Information.

System Information

Position information

Node number	Position information							
	Train Name	Train ID	Consist	Car	CAN Segment	Subsystem Type	Project ID	Project Name
28	1	2	3	4	5	6	RailCorp_EDI	STN00000

System State During Logging

Node number	Hardware			Firmware				Application			
	State	Revision	STN	Name	STN	Version number	Creation date	Name	STN	Version number	Creation date
0	Normal			MMI	STN 25819/SW	V 2.40	1997-06-13				
1	Normal	C03	STN 25797/00000	MB03R_01	STN 25817/SW	V 1.20	1997-11-03	APPL1	STN 12345/01	V 0.30a	1998-12-08
28	Normal			CB12A_01	STN 34599/FW1	V 2.10	2011-06-15	ESRA-MTA	STN 34599/MTA	V 37.63	2011-10-19

Expected system state

Node number	Hardware		Application			
	Name	STN	Name	STN	Version number	Creation date
0	MMI	STN null				1970-01-01
1	MB04A	STN null	APPL1	STN 12345/01	V 0.30a	1998-12-08
2	MB03A	STN null	APPL2	STN 12345/02	V 0.3	1998-11-30
3	EB01A	STN null				1970-01-01
4	EB01A	STN null				1970-01-01

Close

7 Command line interface

ST03A provides a command line interface according to the following functions.

CSV Converter	It is used to convert measurement and data log files to CSV format.
Famos Converter	It is used to convert measurement and data log files to Famos format.

7.1 CSV converter

Access: **Operator** **OEM**

It can be used to convert measurement (*.emd, *.mmd) or data log (*.dlg, *.edlg) files to CSV format according to the following command line interface:

```
ST03A.exe -convertToCSV input [output] [-fill]
```

input	It is a mandatory parameter. It can be a file or a folder path. If the input is a folder path, then ST03A will convert all files with supported file type from that folder.
output	It is an optional parameter. It shall be the same type (file or folder path) as the input parameter. If this parameter is missing, then ST03A will convert input file(s) with the same name but with CSV file extension into the same folder.
-fill	It is an optional parameter to set if the converter shall fill empty value cells with their previous values.

7.2 Famos converter

Access: **Operator** **OEM**

It can be used to convert measurement (*.emd, *.mmd) or data log (*.dlg, *.edlg) files to Famos format according to the following command line interface:

```
ST03A.exe -convertToFamos input [output]
```

input	It is a mandatory parameter. It can be a file or folder path. If the input is a folder path, then ST03A will convert all files with supported file type from that folder.
output	It is an optional parameter. It shall be the same type (file or folder path) as the input parameter. If this parameter is missing, then ST03A will convert input file(s) with the same name but DAT file extension into the same folder.