blue PiraT2 / 5E / Mini / Remote
Measurements with CCP/XCP User Guide

Version 2.4.1 / 22.09.2016

Telemotive AG
a company of Magna

**blue PiraT2 / 5E / Mini
Measurements with CCP/XCP User Guide**

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3 Overview

This user guide describes the feature of the license **CAN Calibration Protocol (CCP)** and **Extended Calibration Protocol** {Universal Measurement and Calibration Protocol} **(XCP)** for the data loggers:

- blue PiraT2
- blue PiraT2 5E
- blue PiraT Mini
- blue PiraT Remote

 of Telemotive AG.

This user guide describes the configuration and usage of this feature. The general configuration is described in the user guides of the used data logger as well as the Telemotive System Client, which is valid together.

The client software was only tested with Microsoft® Windows® 7.

This document refers to **firmware version 02.04.01** and the **Telemotive System Client** from **version 2.4.1.** Some features depending on model and feature license or may not be available in older versions.

Software updates and user guides for other, optional, licensed enhancements are available in the Telemotive ServiceCenter. *(Please find the address under Contact at the last page.)*

To ensure the most reliable operation of your system as possible, please make sure to use always current firmware and software versions.

4   System requirements

Control Unit
A Windows based Laptop or PC is needed to configure the devices of Telemotive AG by **Telemotive System Client**. It also allows to save the recorded data and to use them offline later.

Telemotive System Client
The software client is used for configuring the data logger as well as downloading the recorded data or convert these into your needed file format. An firmware update can be performed by the **Telemotive System Client** too to ensure that your devices are always up to date.

blue PiraT2 / blue PiraT2 5E / blue PiraT Mini
The communication between bus systems and control units is monitored and relevant data can be recorded very precisely with the data logger of Telemotive AG. The collected data are stored to the logger and can be downloaded via Ethernet to a PC.

The **blue PiraT2** is our top-class all-in-one data logger. Seven models cover a wide range of interfaces.

Additionally, the **blue PiraT2 5E** offers improved power management and power backup, five integrated Ethernet ports and super-fast start-up behavior. The blue PiraT2 can be flexibly expanded via Telemotive System Link.

The **blue PiraT Mini** is smallest data logger in the world with an outstanding functional scope. It offers a wide range of interfaces, stable temperature behavior, very low energy consumption, four GBit Ethernet ports, and much more. Different blue PiraT Mini can be flexibly expanded to one cluster and therefore handled very easily by using Telemotive System Link.

Remote Control Touch
Operate your blue PiraT Mini or blue PiraT2 data loggers safely and comfortably from the driver's or passenger seat. Via Telemotive System Link our new remote control becomes part of your logger network. One remote control can handle all connected loggers.

blue PiraT Remote
While Remote Control Touch is just a control unit for handling unique devices or a TSL network, the blue PiraT Remote additional has logger functionality by offering internal storage and some interfaces.

A2L file
This file defines parameters which are necessary to set up a CCP/XCP communication between the Telemotive data logger and an ECU. Each ECU has its own A2L file, so it cannot be provided by Telemotive AG. Please contact the respective ECU manufacturer to get a valid file.

License
For the additional feature **Logging CCP / XCP** an installed license is required. Settings for licensed features can be performed with a valid license only.

If you need a license for your logger, please contact our sales department (please find the address under contact at the last page).

4.1   Further manuals

Beside this user guide we offer the main manuals for our client as well as for the different data logger generations in our ServiceCenter at https://sc.telemotive.de/bluepirat.

User manual for the Telemotive System Client
https://sc.telemotive.de/4/uploads/media/TelemotiveSystemClient_UserManual.pdf

User manual for blue PiraT2 / blue PiraT2 5E
https://www.telemotive.de/4/uploads/media/blue_PiraT2_UserManual.pdf

User manual for blue PiraT Mini
https://www.telemotive.de/4/uploads/media/blue_PiraT_Mini_UserManual.pdf

User manual for Remote Control Touch
https://sc.telemotive.de/4/uploads/media/RCTouch_UserGuide.pdf

User manual for blue PiraT Remote
https://sc.telemotive.de/4/uploads/media/blue_PiraT_Remote_UserGuide.pdf

For having an easy access if necessary, the most important manuals are linked in the client under the menu item **[Help]** and are reachable easily from there.
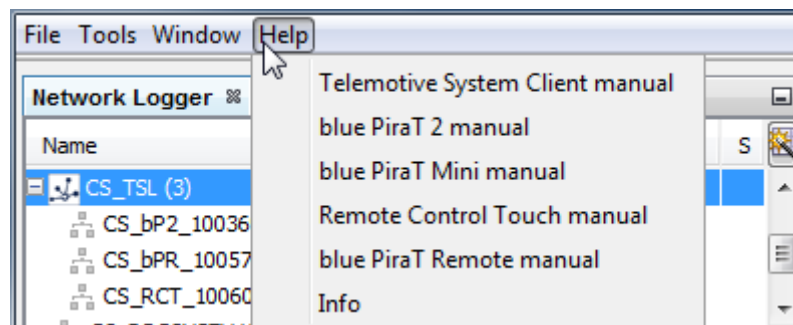
Figure 4.1: links to the manuals

Our licensed enhancements have own manuals which are stored in the ServiceCenter too. You will find a list of these enhancements in the user manuals in the chapter **Additional features by optional licenses**.

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5 System overview / description

For an easy system overview, we can separate the system into three basic parts:

1. Setup and configuration
2. Operating and data recording
3. Download and conversion

In general, the system is used to get a Telemotive Trace File or MDF file v3.3 / v4.1 that includes the CCP/XCP communication.

5.1 Setup and configuration

The A2L file (delivered by the ECU supplier) is loaded into the Telemotive System Client. If necessary, connection and communication settings can be modified. When the configuration is finished, the Telemotive System Client can upload the configuration to the data logger.

Client

A2L file

Telemotive data logger

ECU.a2l
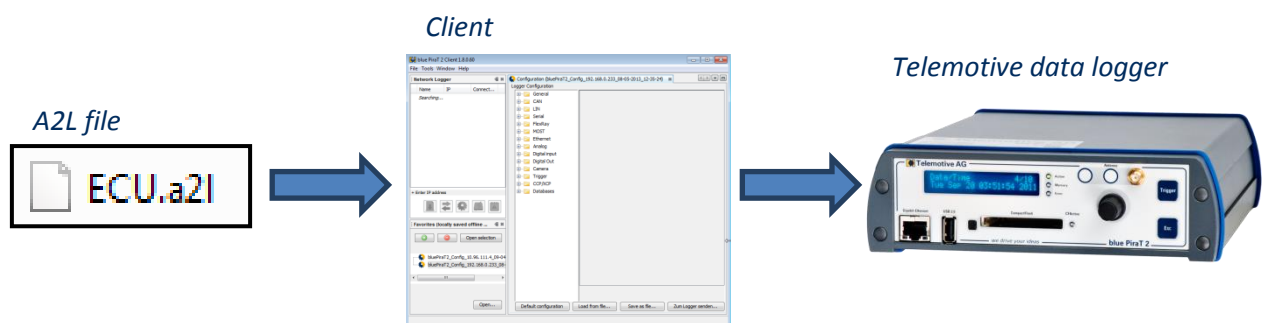
Figure 5.1: Setup and configuration

5.2 Operating and data recording

The data logger and the ECU work as configured. The CCP/XCP protocol is running. The data logger records the data.

Telemotive data logger

ECU
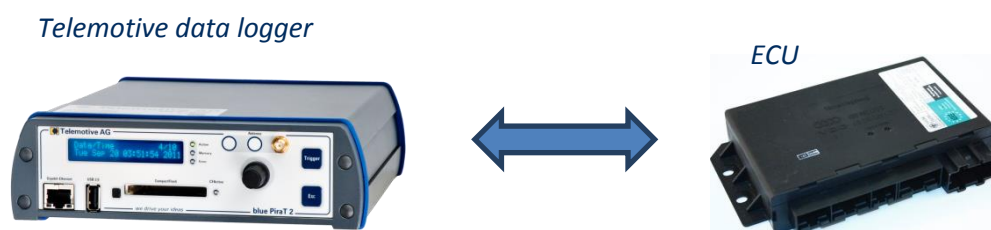
Figure 5.2: Operating and data recording

5.3 Download and conversion

After recording, the data can be downloaded from the data logger or converted directly into the target data format by the Telemotive System Client.
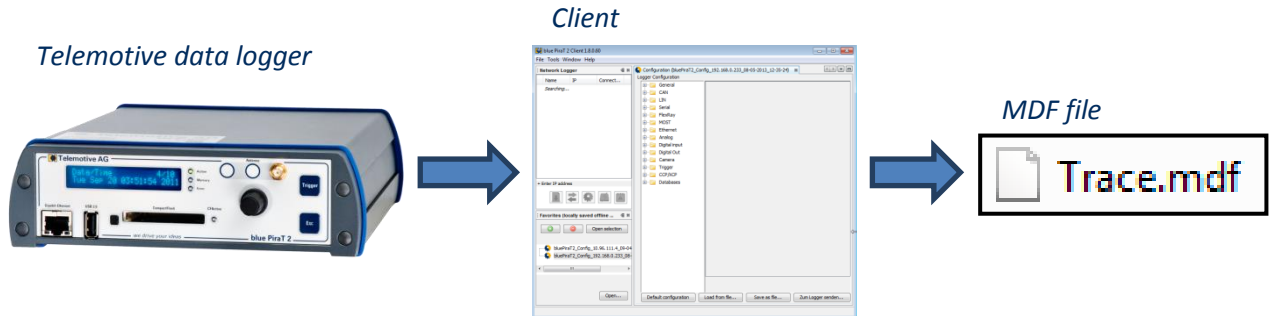
Figure 5.3: Download and conversion

6 Setup and configuration

6.1 Creating a new ECU

At first connect the data logger to your computer and start the Telemotive System Client.

Click on the application **[Open configuration]** in the Telemotive System Client.
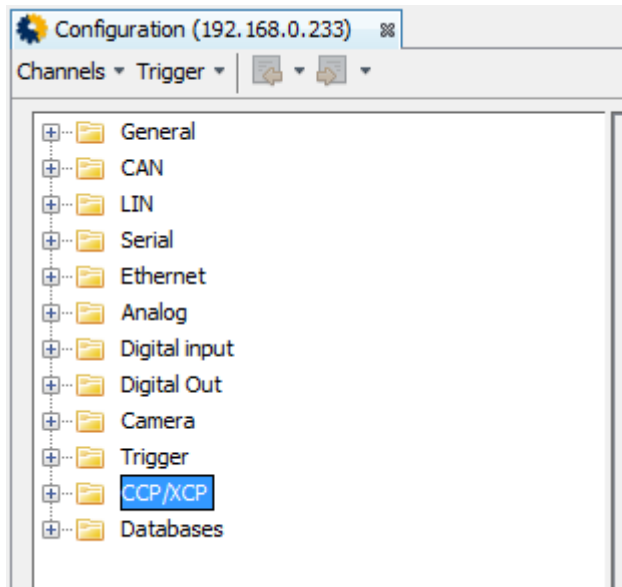
Figure 6.1: Folder in configuration tree

Expand the folder **[CCP/XCP]** in the configuration tree.

Note:
If you only installed the CCP license, the folder is just named "CCP".
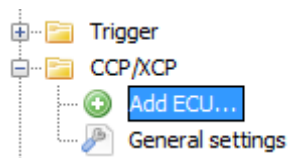
Figure 6.2: Add ECU

By double-clicking the button **[Add ECU…]** the **A2L Loading wizard** appears, where you can select the A2L file with the configuration data of the ECU and an INCA file with signal /DAQ selection.

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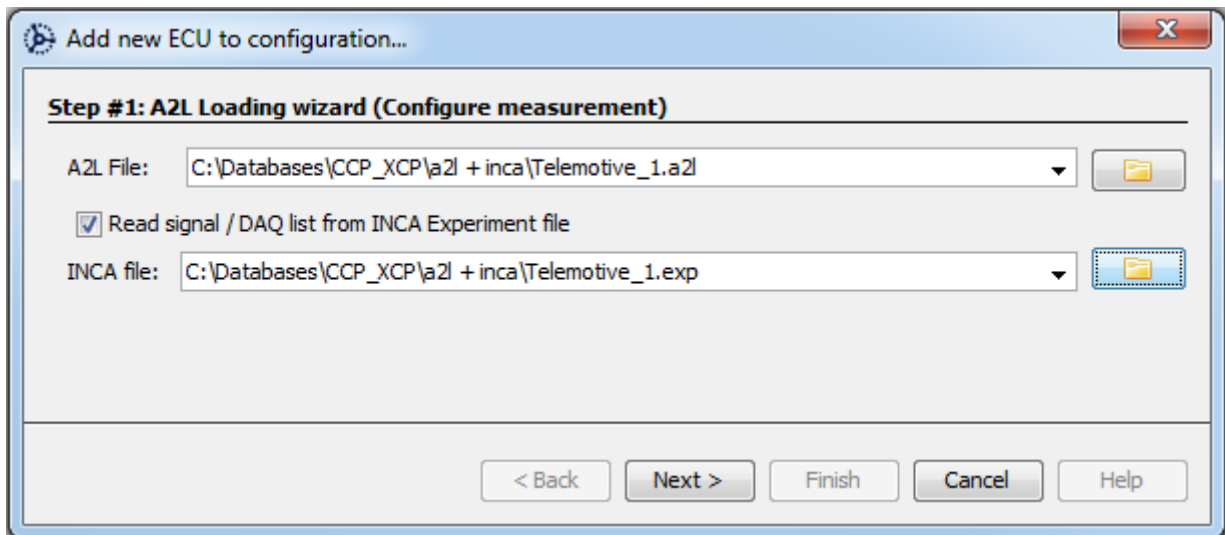
Figure 6.3: A2L Loading wizard

Attention:
The A2L file has to match the ECU and its hard- and software version. Otherwise the read or write addresses can be wrong and the CCP/XCP communication does not work correctly. Please contact the respective ECU manufacturer to get a valid file.

By clicking on the button **[Next>]** the A2L file and / or the INCA file will be improved and loaded on the logger.

If the file is not correct or has wrong settings, an error message is shown and the import is stopped..

Next, you get to the **Select Transport Protocol Wizard**.
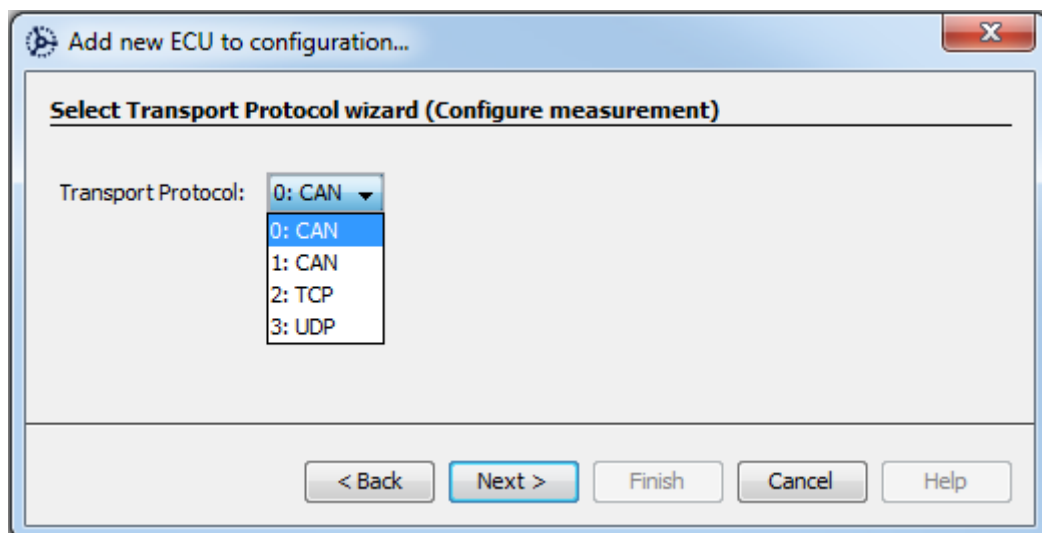
Figure 6.4: Select Transport Protocol wizard

With this wizard, you are able to select the ECU-specific connection.

If no INCA file was specified earlier in the **A2L Loading wizard,** the **Signal selection wizard** appears.
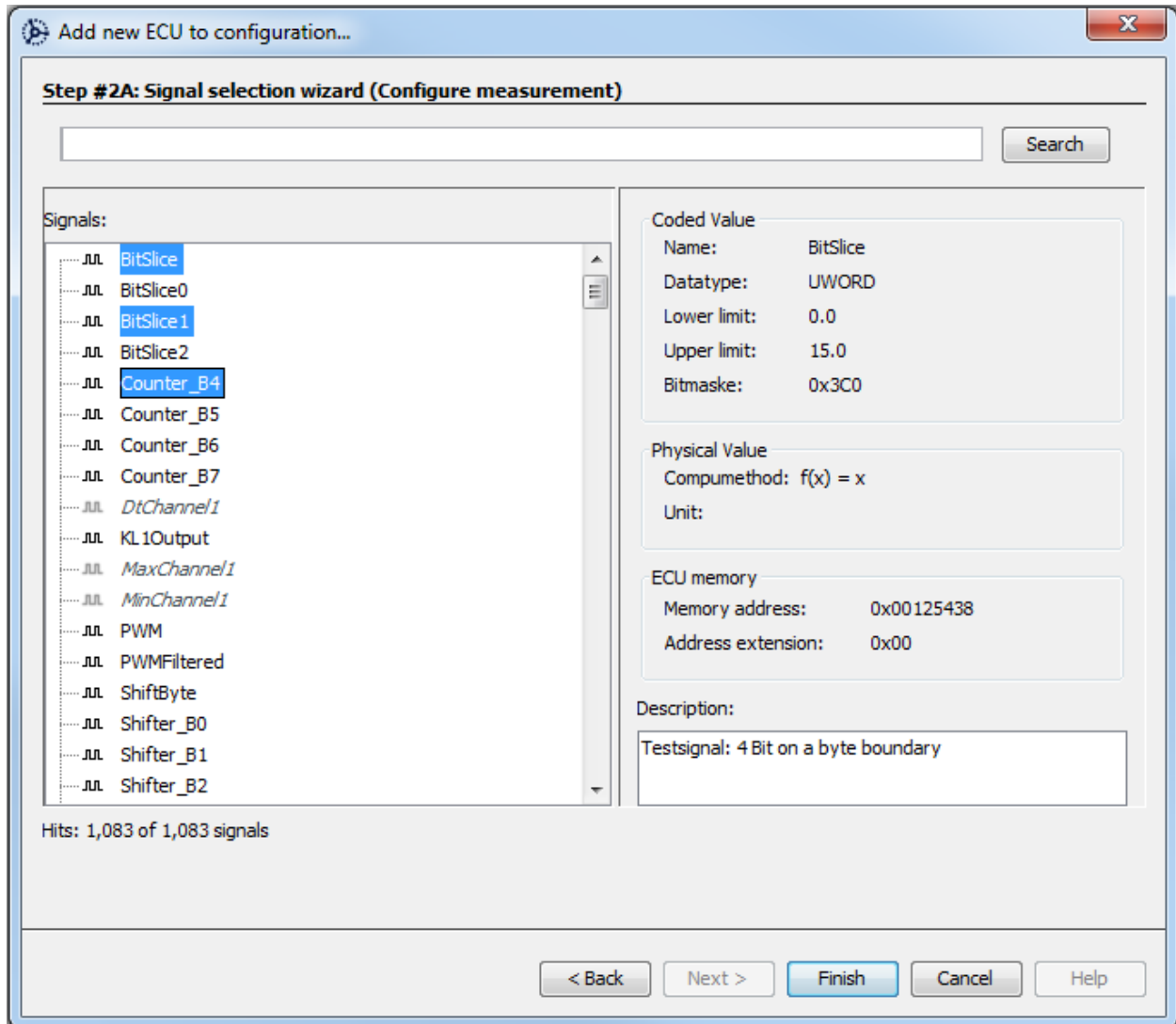
Figure 6.5: Signal selection wizard

With this wizard, it is possible to select one or more signals for the measurement.
The measurement can contain up to 1,000 signals.

With the button **[Search],** the signals can be specifically selected from the A2l database:
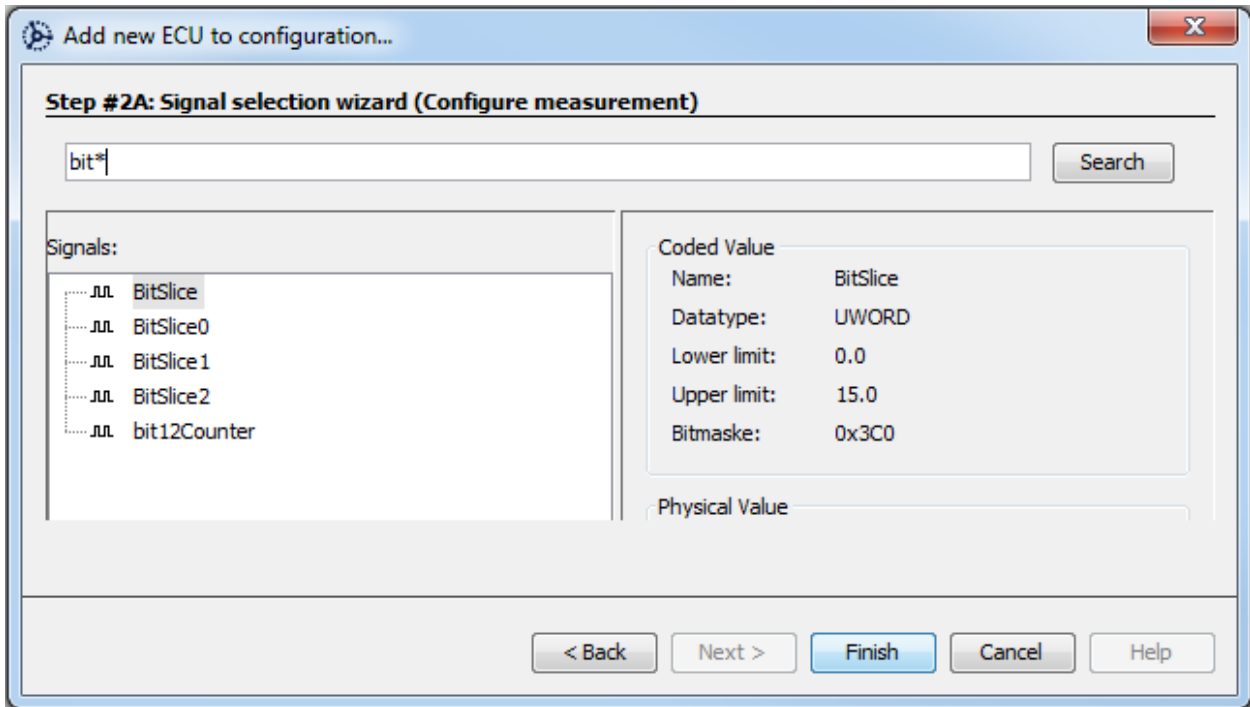
Figure 6.6: Select signals via the search function

If an INCA-file was specified earlier in the **A2L Loading wizard,** the **Choose device wizard** appears.
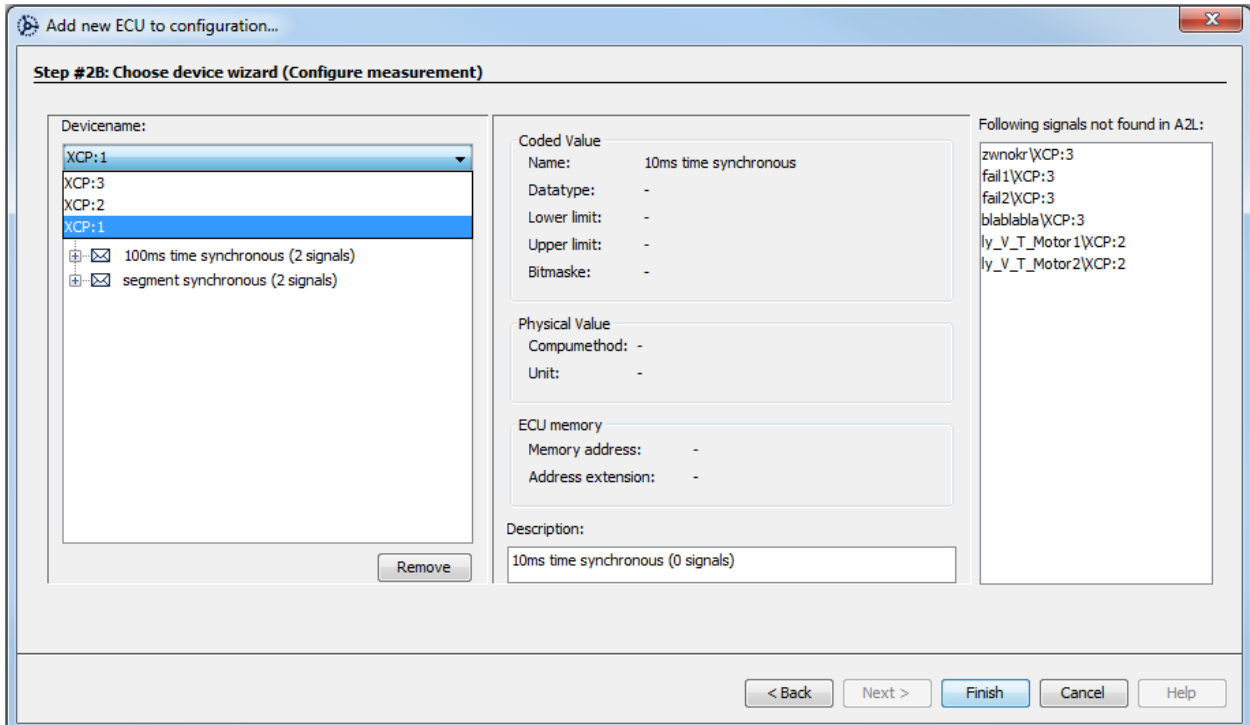
Figure 6.7: Choose device wizard

With the **Choose device wizard** you can select your device over the selection window **Device-name**.

According to the selection of the device, specific signals are added for measurement.
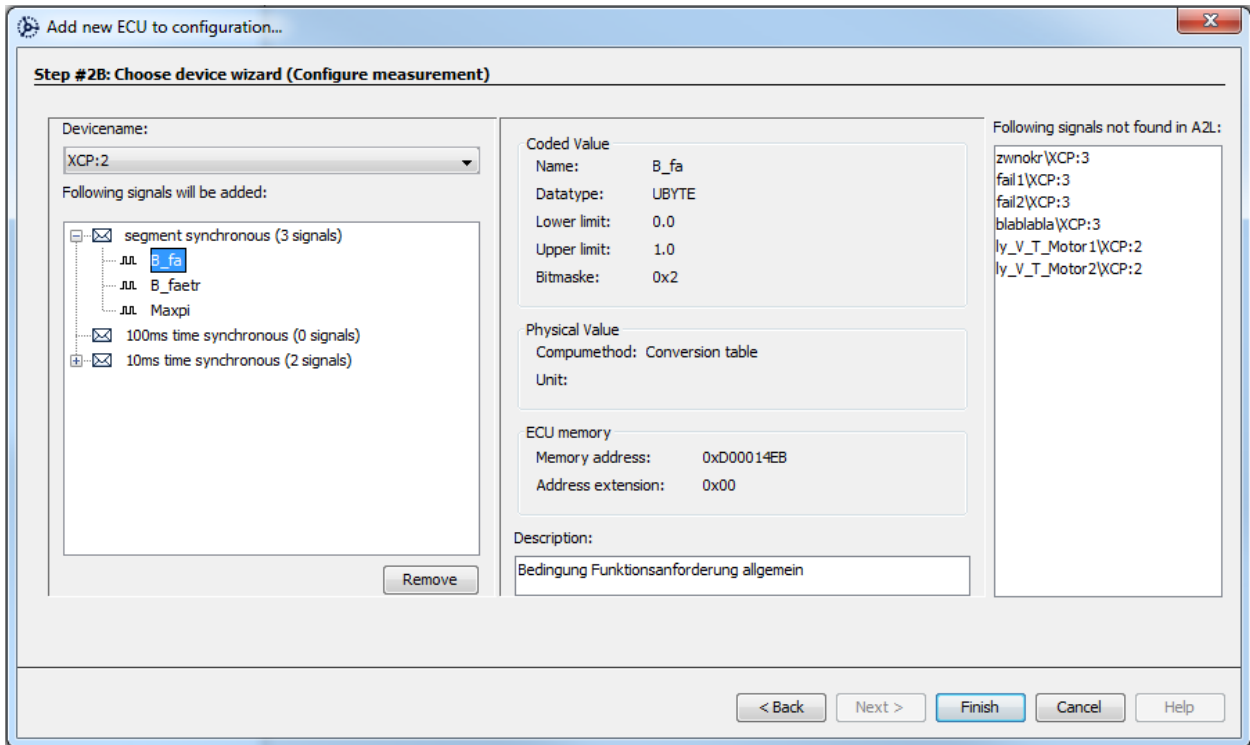
Figure 6.8: selected signals by INCA-file

By clicking on a signal its details are displayed in the middle window.
You can change the preselection using the button [Remove]. You can remove whole signal groups as well as single signals within the group.

After clicking **[Finish]**, a new ECU is displayed in the configuration tree (e.g. ECU # 1). Up to four controllers can be created.
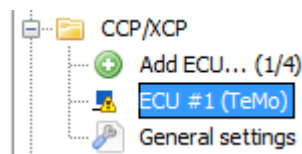
Figure 6.9: Newly added ECU

Note:
The parameters are predefined by the A2L file. Please change these parameters only if you exactly know their importance and the effects that follow it.

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6.2   Tab [Configuration]
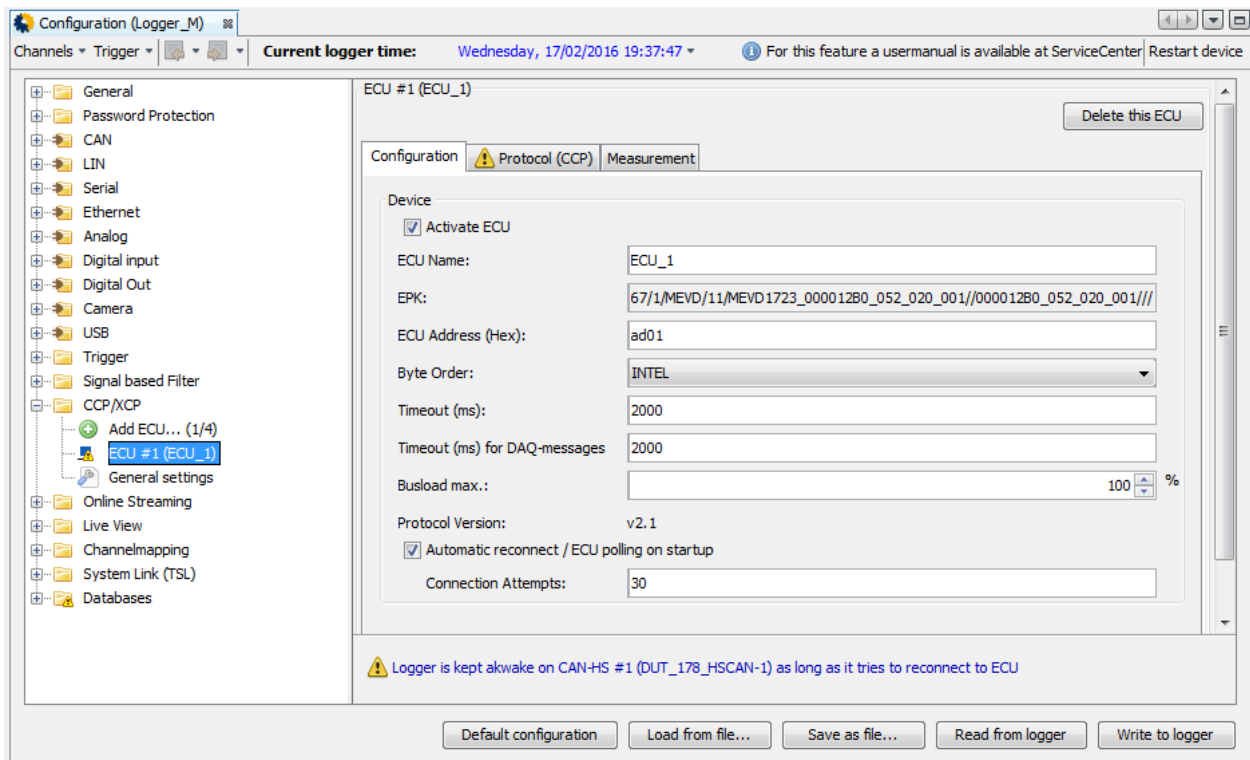
Figure 6.10: Example ECU configuration

6.2.1 Status

Delete and disable over the context menu (right mouse button) in the configuration tree:
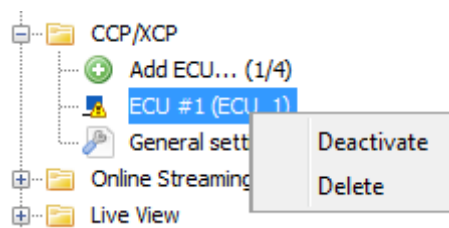
Figure 6.11: Deleting and deactivating the ECU

Each ECU can be enabled or disabled by the right mouse button in the configuration tree and via the checkbox **Activate ECU**.
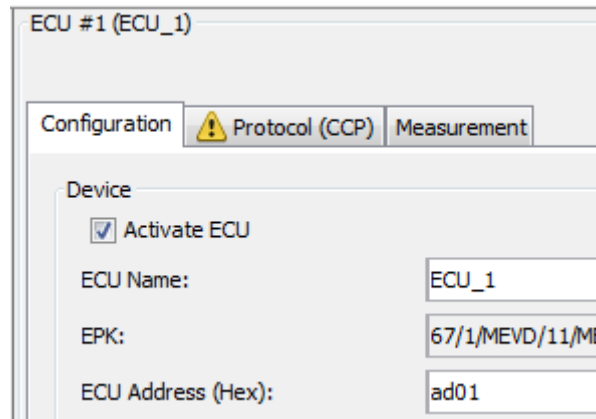
Figure 6.12: Checkbox "Activate ECU"

If an ECU is inactive, its parameters are still kept in the configuration, but there is no CCP/XCP communication between data logger and ECU.

6.2.2 Delete this ECU

The button **[Delete this ECU]** deletes the marked ECU. It is also possible to delete via the right mouse button in the configuration tree.
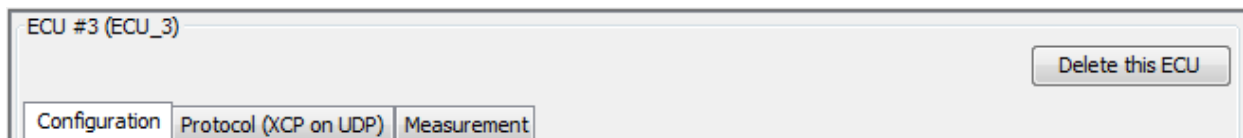
Figure 6.13: Delete this ECU

6.2.3 ECU Name

Figure 6.14: Textbox "ECU Name"

In the text field **[ECU Name]** you can change the ECUs name. This option is only for an easy identification by the user and has no influence on the measurement or connection.

6.2.4 EPK
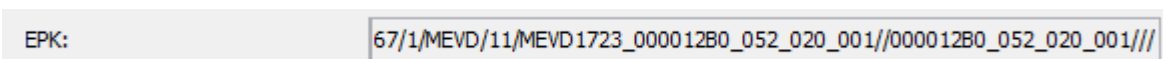
Figure 6.15: Box "EPK"

The version identifier of the A2L-file is presented here if available.

6.2.5 ECU Address (Hex)

ECU Address (Hex):	01

Figure 6.16: Box "ECU Address (Hex)"

Note:
The field [ECU Address (Hex)] is only needed for CCP ECUs. It is not displayed for XCP measurements.

In the text field <ECU Name> the ECU station address is indicated which is needed for establishing the communication to the ECU. It always has to be defined in Intel Byte Order although the following communication is in Motorola Byte Order.

When this address is wrong, the ECU does not establish the communication to the logger. The ECU station address is defined by the manufacturer of the ECU and is received only from him, if it's not noticed in the A2L file.

6.2.6 Byte Order

Byte Order:	INTEL ▼
Timeout (ms):	INTEL
	MOTOROLA

Figure 6.17: Box "Byte Order"

In the dropdown menu next to **[Byte Order]** you can choose one of the following settings for the communication:

- Motorola (Big Endian)
- Intel (Little Endian)

6.2.7 Timeout (ms)

Timeout (ms):	2000
Timeout (ms) for DAQ-messages	2000

Figure 6.18: Box "Timeout (ms)"

In the text fields **[Timeout (ms)]** and **[Timeout (ms) for DAQ-mesages]** you can define the time in milliseconds the logger waits for an answer from the ECU. When this time ends without an answer from the ECU the communication between the ECU and the logger will be stopped.

Note:
If the connection fails increase the value of the timeout.

6.2.8 Busload max.

Figure 6.19: Box "Busload max."

With the setting [**Busload max.**] you can limit the whole CCP/XCP communication on the selected CAN channel to a defined value. If the CCP/XCP busload reaches this value, additional messages get lost.

6.2.9 Protocol Version

Figure 6.20: Protocol Version

The protocol version is taken from the A2L file.
The supported protocol versions are XCP 1.0, 1.1 and 1.2 and the CCP version 2.1.

6.2.10   ECU connection

If the connection gets lost or the ECU has not yet started up to link time, a continuous query **all 10 seconds** can be realized with the lower checkbox **Automatic reconnect / ECU polling on startup**.

Figure 6.21: Connection Attempts

Note:

In the standard configuration [Automatic reconnect / ECU polling on startup] is selected and the connection attempts are set to 30.

With this configuration the logger transmits one CAN message every ten seconds on the chosen CAN channel.
For the case that the options [Wakeup system] or [Keep awake on busload] are active, the data logger won't switch to standby mode, as long as connection requests persist. To avoid this the number of connection requests may be configured on an individual basis.

Therefore various warnings in the client are displayed in the standard configuration:
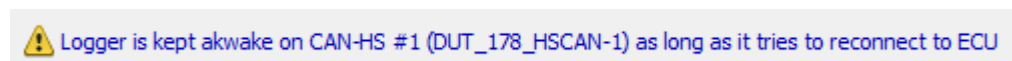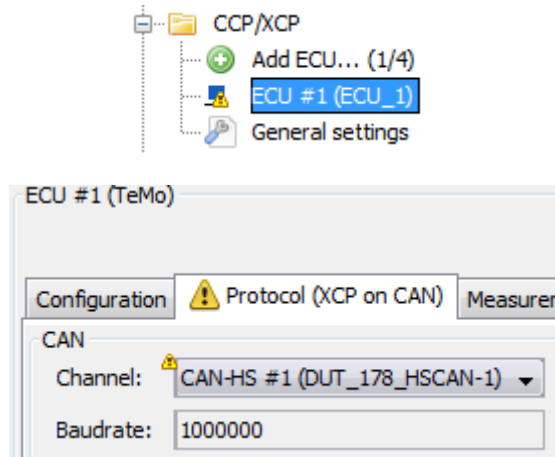
Also if you want to send this configuration to the logger, a warning message appears:
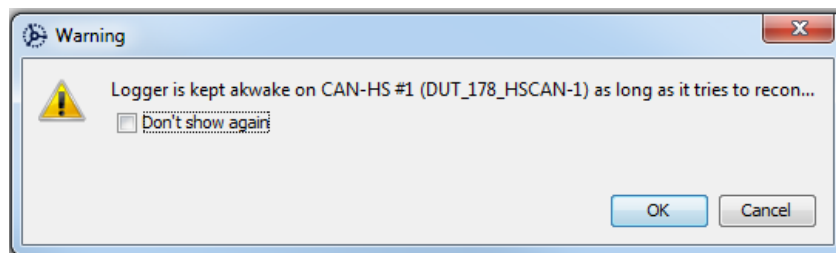
Figure 6.22: Warning notice in case of the chosen option "automatic reconnection"

6.3 Tab [Protocol]

On the [**Protocol**] tab sheet you can define some settings depending on your used bus and ECU protocol (CCP/XCP).
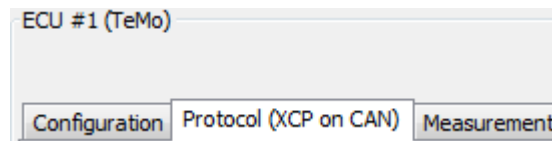
Figure 6.23: Protocol tab

The logger supports the transport layers CAN and Ethernet (TCP and UDP) for XCP.
Please find the protocol and, if available, the bus system in brackets:
- CCP (Note: vehicle bus is always CAN)
- XCP over CAN
- XCP over TCP (Ethernet)
- XCP over UDP (Ethernet)

6.3.1 Protocol CCP/XCP on CAN
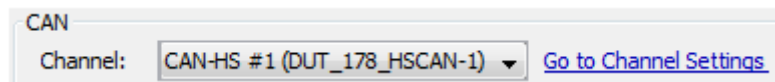
Figure 6.24: CAN Channel selection field

Please select the required CAN channel.

By clicking on the link **[Go to channel Settings]** you'll be forwarded to CAN channel setup.
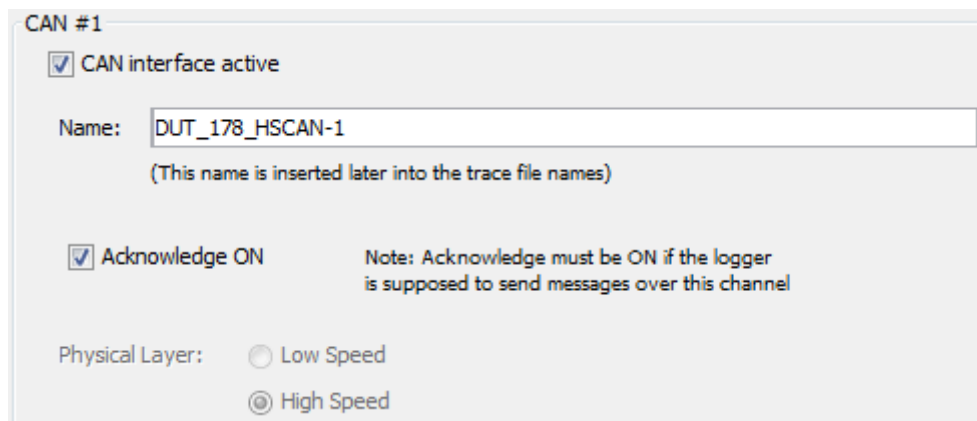
Figure 6.25: CAN interface active and Acknowledge On

The selected CAN channel has to be activated in the CAN settings as well as the checkbox **Acknowledge ON**.
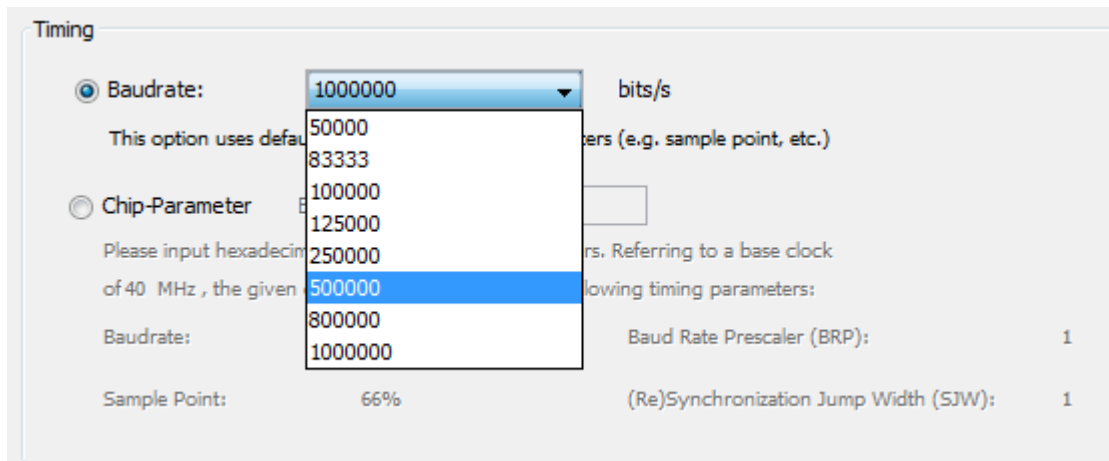
Figure 6.26: Set Baudrate

The [Baudrate] of the ECU is read out from the A2L file. If the value does not match to the configured baud rate of the channel (in this case "CAN-HS #1") the Telemotive System Client shows an error message in red at the bottom of the window.
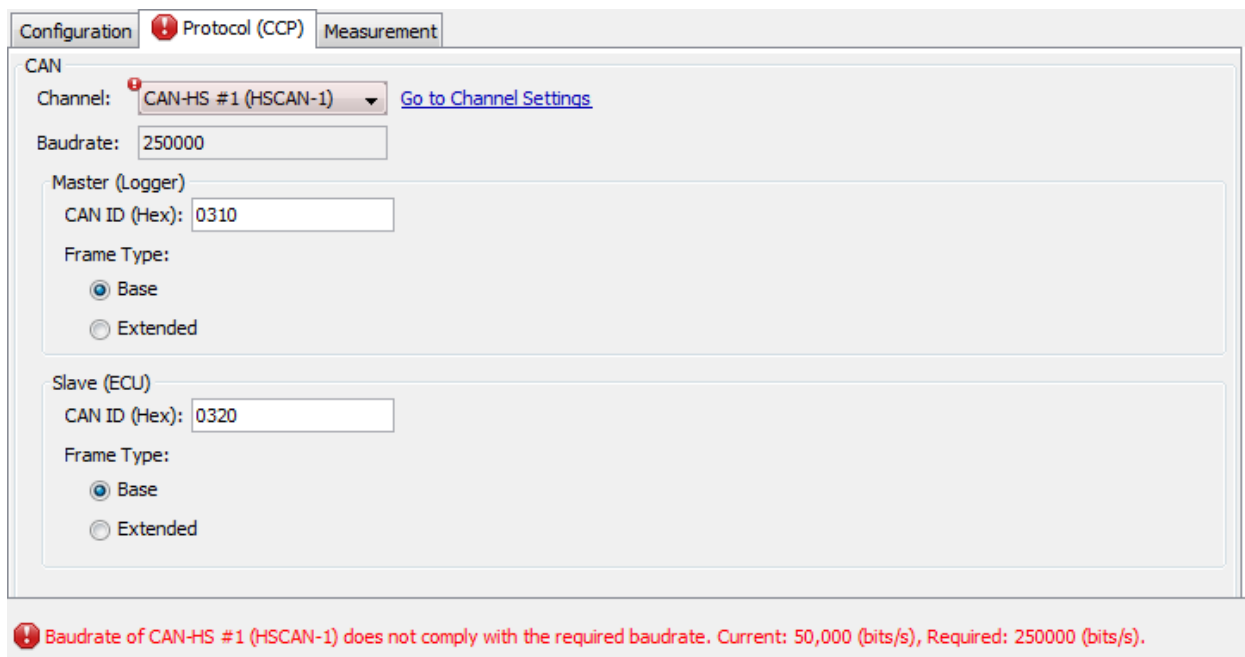
Figure 6.27: Error message due to different baud rates

To correct these settings you can directly use the link nearby to go to the according CAN channel settings (in this case "CAN-HS #1") and there set the [**Baudrate**] to the value of the respective CCP/XCP ECU which is defined in the A2L file (see Figure 6.26: Set Baudrate).

Figure 6.28: Setting group "Master and Slave"

In the settings for [**Master (Logger)**] and [**Slave (ECU)**] you can set the [**CAN ID (Hex)**] and the [**Frame Type**] of the communication.
For 11 bit CAN ID activate **Base**.
For 29 bit CAN ID activate **Extended**.

All CAN messages between ECU and logger have these CAN IDs. All other CAN messages on the bus will be ignored. When the CAN-IDs are wrong, the ECU doesn't answer.

Figure 6.29: Message Size

When using XCP on CAN the [**Message Size**] is another option in the [**Protocol**] tab sheet.
If the messages shall contain only the user data, activate [**Optimal size**].
If fill-bytes shall be added too, activate [**Maximal size**].

6.3.2 Protocol XCP on TCP/UDP

Figure 6.30: Transport Protocol selection

Whether TCP or UDP is used is predefined either by the A2L-File or can be chosen with [**Select Transport Protocol wizard (Configure measurement)**].

See also chapter 6.1 Creating a new ECU

The configuration of XCP on TCP and XCP on UDP are not different. Communication with the ECU via TCP/UDP does not take place via an Ethernet channel. A new set of communication endpoint is responsible only for the ECU communication.

For this a new IP-alias of the logger is determined in the protocol. The IP address and port of the ECU have to be entered in the fields **[Target IP address]** and **[Port].** The **[IP Address of data logger]** has to be at the same subnet as that of the ECU. With the dropdown menu of the **[Connector]** you can select the interface of the logger ("Front" or "Back").

Figure 6.31: XCP on UDP

6.4   Tab [Measurement]

6.4.1 Start and Stopevent

For each ECU a start and stop event can be defined on the tab sheet **[Measurement]**. As events startup/shutdown of the logger and trigger can be selected.
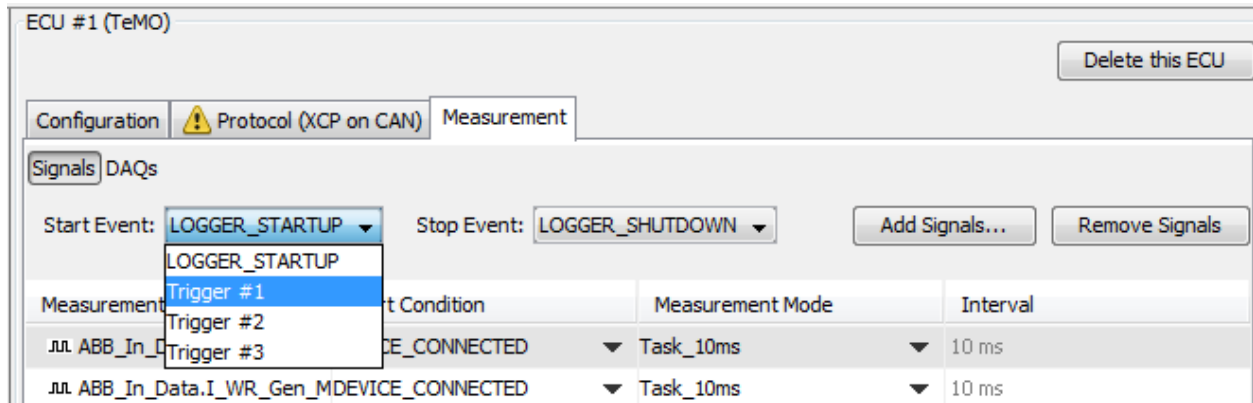
Figure 6.32: Select event

Attention:
To define a trigger as start or stop event, maybe the license "Complex triggers" is necessary. You have two triggers for free by default. If you need more, you have to install the license.

To use a trigger for CCP/XCP, the trigger has to be defined in the settings for trigger at first.

In the settings of this trigger **[Execute CCP/XCP action]** must be selected.
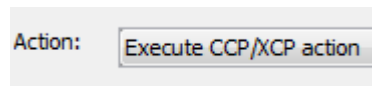
Figure 6.33: Trigger selection: "Excecute CCP/XCP action"

For more information refer to the "**TelemotiveSystemClient_UserManual**".

6.4.2 Signals and DAQs

In the tab sheet **[Measurement]** the view can be changed between **[Signals]** and **[DAQs]** (DAQ lists). The DAQ lists are already predefined by the A2L file. Some of these lists allow editing the parameters.

Some A2L files contain static DAQ lists which can be filled with signals. Otherwise dynamic DAQ lists are generated from the added signals (with the same **[Start Condition]** and **[Measurement Mode]**).

| | separate start events for individual measurement | mode for individual measurement | time- or event-triggered interval |

Figure 6.34: Static DAQ lists

6.4.2.1 Adding Signals

To add individual signals to the current measurement you can:

- click **[Add Signals…]** or
- Right-click in the DAQ list and click **[Add Signals…]** in its shortcut menu.
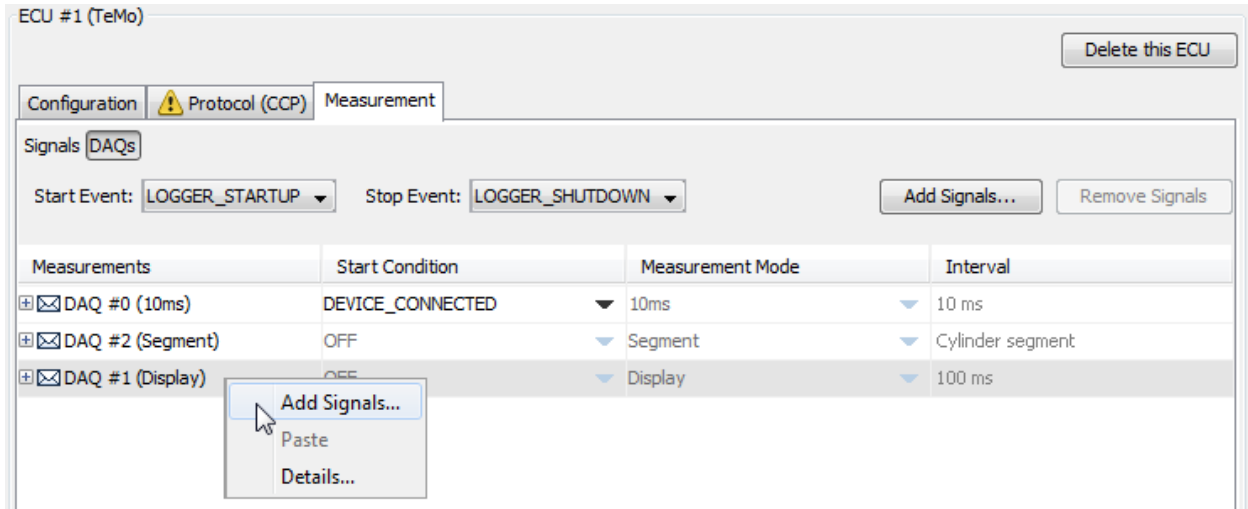
Figure 6.35: Add Signals

A new window will be opened for selecting the signal.

A double-click on the required signal will automatically add it to the measurement. It is also possible to select multiple signals by marking them and clicking **[Finish]**.
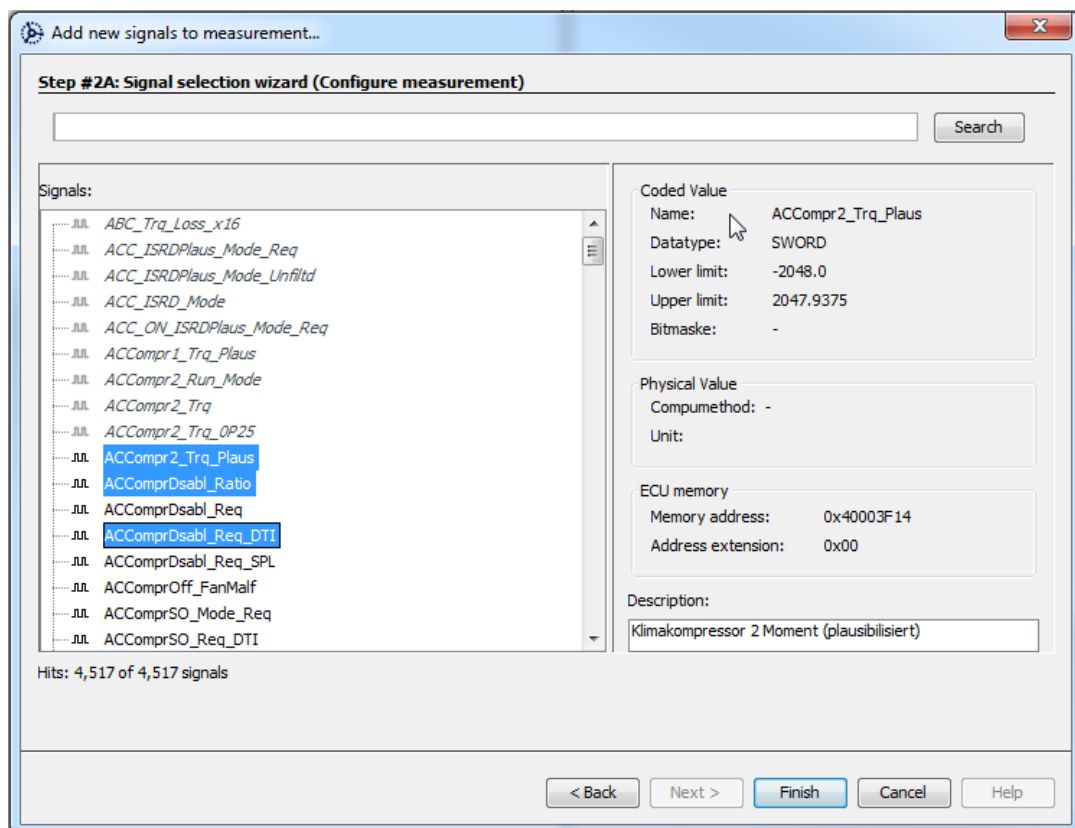
Figure 6.36: Selecting Signals

Signals can be moved per "drag and drop" between the DAQ lists or they can be placed outside the DAQ lists.

6.4.2.2 Defining start conditions

For each signal which is not in a DAQ list a separate start condition can be defined. Likewise a start condition can be defined for a whole "DAQ" list .
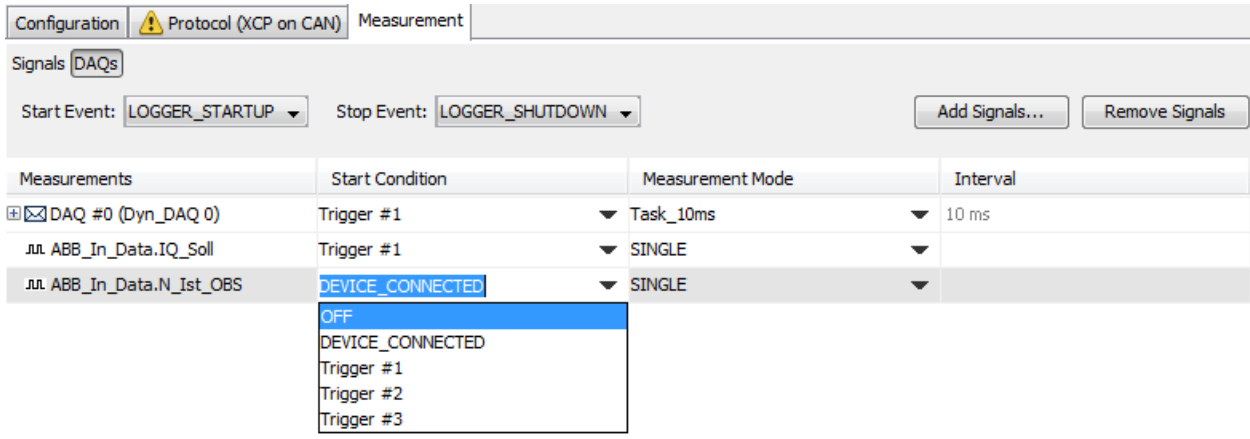
Figure 6.37: Defining different start conditions

If the start condition of a signal from a DAQ list is changed in the **[Signals]** view, the start condition of the other signals from that DAQ list will be changed accordingly.
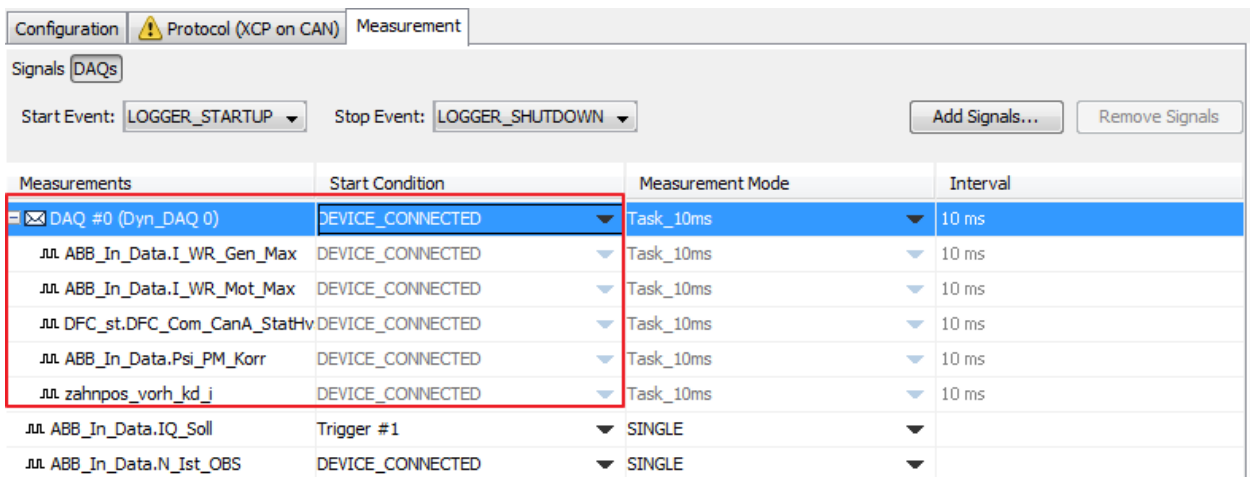
Figure 6.38: Information window after changing the start condition

As this is not recognizable in the "**Signals**" overview, a correspondent notification message box will appear in case a change should occur.
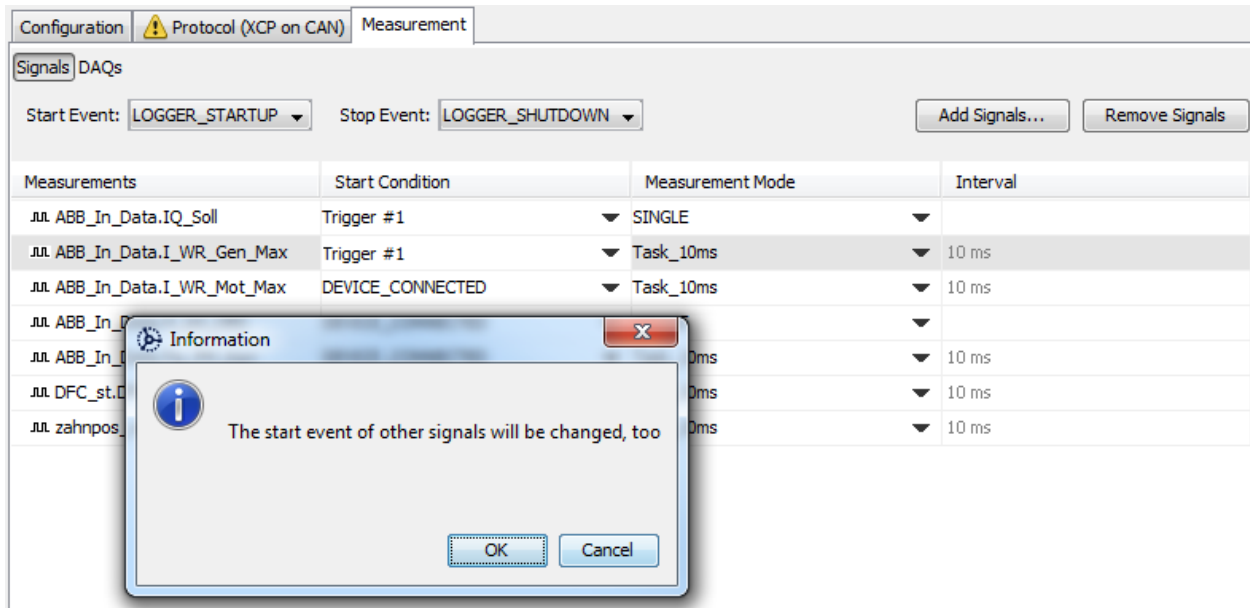
Figure 6.39: Message box after changing start condition

6.4.2.3 Set measuring mode

For signals and DAQ lists a Measurement Mode can be defined.
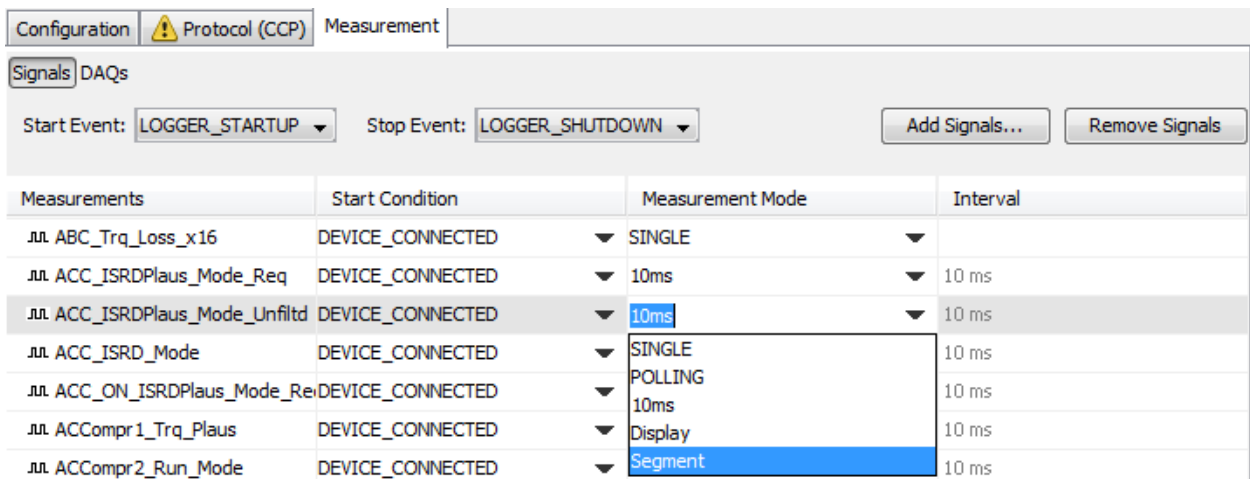
Figure 6.40: Select Measurement Mode

The dropdown content is usually defined in the A2L file. If options cannot be selected or changed, this is also defined in the A2L file.

In general three different measurement modes are distinguished, whereas in the "single" and "polling" modes, the data logger individually requests measurement data from the ECU. This measurement mode is only adjustable, if the signal is outside the scope of the "DAQ list". In the so-called DAQ-mode however, the ECU transmits the data to the logger in a specified cycle,

that is predetermined in the A2L file. Both the measurement modes "single" and "polling" cannot be adjusted for signals being within the scope of the "DAQ" list.

DAQ-mode: this measurement mode is not adjustable, only signals specified in the DAQ list are referred to as that.

In principle, three different types of measurement can be distinguished:

Name	Bedeutung
SINGLE	The data will be requested once.
POLLING	The data will be requested in cycle. This happens after a defined time interval.
DAQ	The data is configured once from the data logger within the ECU. The ECU will send the required data after an ECU internal defined event. (e.g., "10_ms" see figure above)

Table 6.1: Possible measuring modes

Note:
In some cases the ECU software does not support all the Measurement Modes defined in the A2L file. If more than one Measurement Mode is configured for the same ECU and the CCP/XCP communication does not run, please try to configure only one Measurement Mode first. So you can isolate the problem and may have at least one or two working Measurement Modes.

A signal or more can be deleted by marking it/them and clicking the button **[Remove Signals]**.

6.4.2.4   Detailview

Over the context menu (right mouse button) you get to the detailed view of the signals and DAQ list.

Figure 6.41: DAQ-Details

	blue PiraT2 / 5E / Mini	Datum: 22.09.2016
Telemotive AG	Measurements with CCP/XCP User Guide	Seite 30 von 47
a company of Magna		
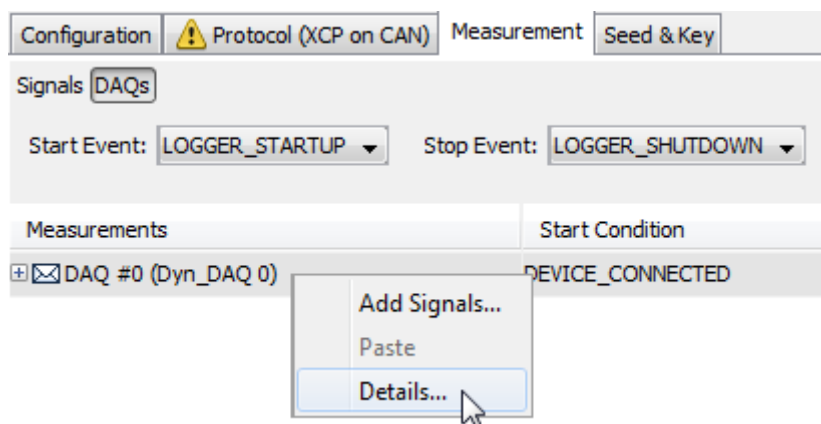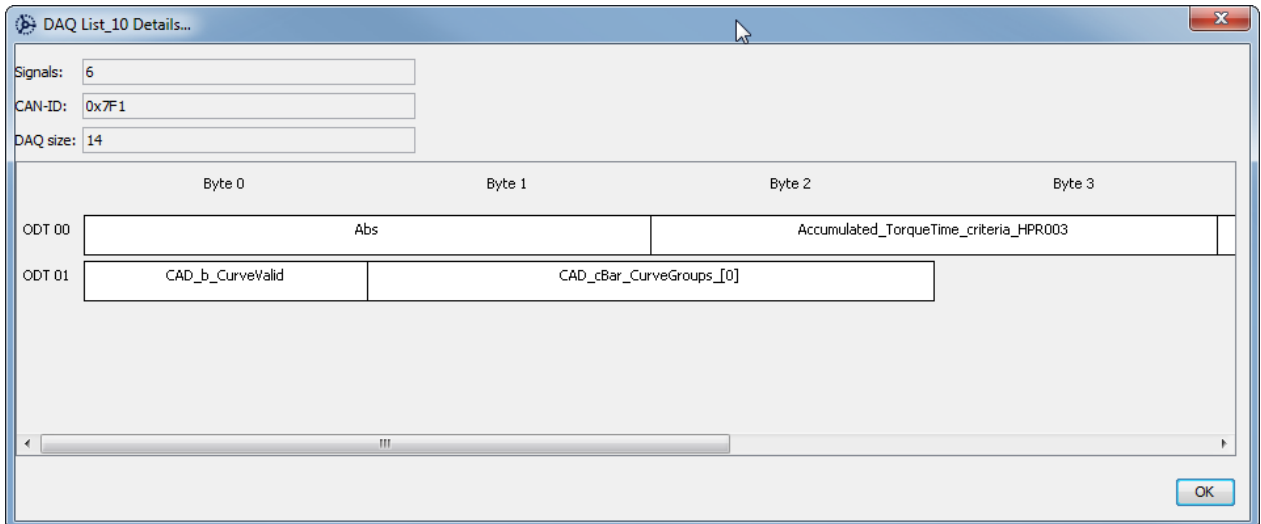
Figure 6.42: Detail view of a DAQ list

In this view, you can see the individual ODTs and their contents from which the DAQ list is composed.

6.5 Tab [Seed & Key]

Note:
In the moment, Seed & Key is supported only by blue PiraT2 and only at CCP.

6.5.1 Functionality

With the feature "seed & key" the data logger supports an authorization check, which ensures that only legitimate persons can access the ECU through the CCP protocol. The data logger requests a so-called "seed" from the ECU. In combination with the preliminarily installed "seed & key" dll file, a so-called key is being generated. This is key is sent by the data logger to the ECU for examination. In the event of a successful verification, the data logger can communicate with the ECU through the CCP protocol.

6.5.2 Settings

If the ECU supports **[Seed & Key]** at CCP, please check the settings in the corresponding tab.

These settings are taken from the A2L-file.

Figure 6.43: Seed & Key Configuration

Now the ECU specific Seed & Key DLL has to be upload to the logger.
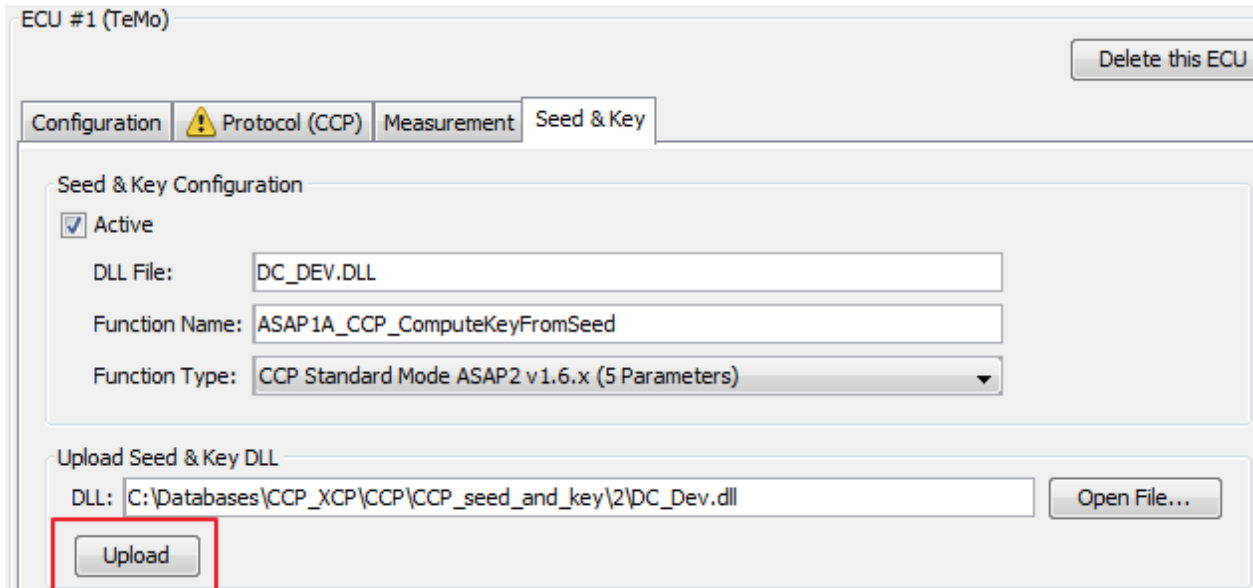
Figure 6.44: Seed & Key DLL

If all configurations have been done, you may save the configuration via **[Save as file…]** or/and send it to the data logger via **[Write to logger]**.
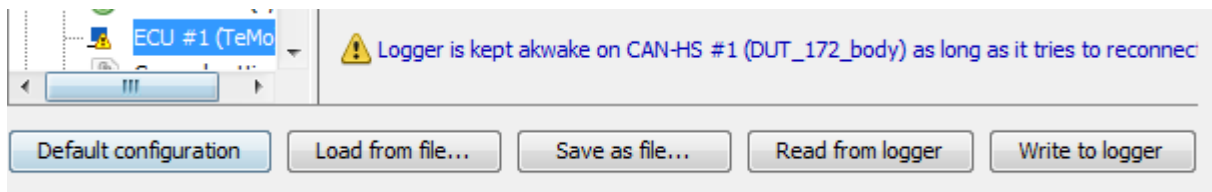
Figure 6.45: button bar below the ECU-settings

A saved configuration can always be opened by the Telemotive System Client via **[Load from file…]**.

After writing the configuration to the data logger, the CCP/XCP communication should be working.

6.6 General settings

You can configure the settings for the optional DBC file generation under **[General settings]**.

The DBC-file generation is supported for CCP and XCP. The DBC file is needed for Live View, complex triggers and for signal based actions.
For more information and settings please refer to the **TelemotiveSystemClient_UserManual**.

Note:
There is the following restriction: Only DAQ measurements can be supported (as multiplexed CAN signals). Single/polling measurements cannot be mapped in the DBC. In the response messages of the ECU only data is delivered and therefore the data cannot be assigned clearly to a signal in the DBC, as the data in principle could belong to different signals.
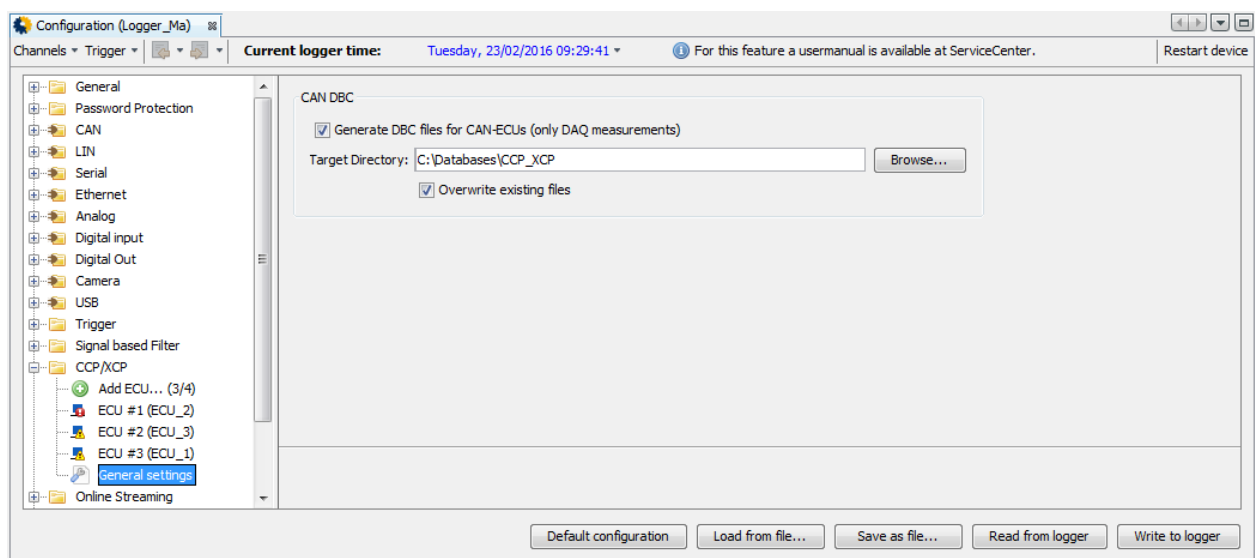
Figure 6.46: General settings

With the upper checkbox the data logger will create ".dbc" files. These files include details about the CCP/XCP data fields which are measured by using the DAQ lists.

With the lower checkbox you define, that new ".dbc" files overwrite the ones already existing in the target directory. The file name is generated by the Telemotive System Client.

Note:
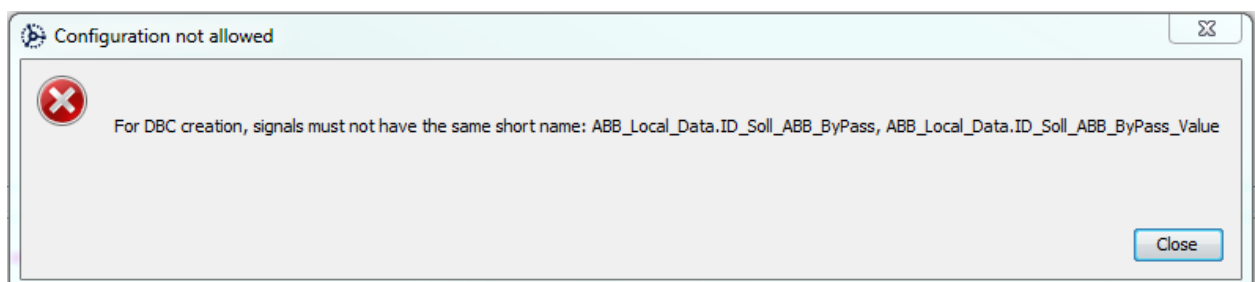
Figure 6.47 : Warning at the same signal-shortnames

The "virtual" signal shortnames may only be 32 characters long and must distinguish.
By right-clicking on the signal the shortname can be adjust accordingly.
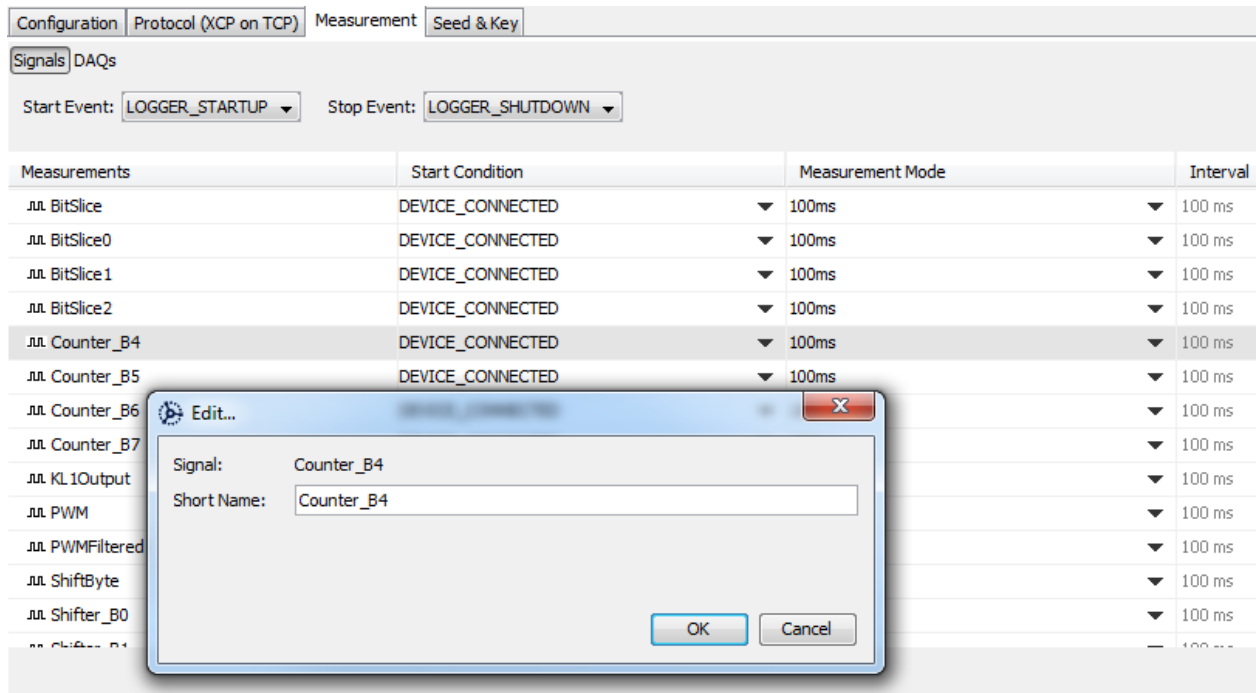
Figure 6.48: Edit Signal Short Name

To start the DBC Generation please click on the Button **[Write to Logger]**.

7 Data recording

If the configuration has been written to the data logger and the device is working without errors, the CCP/XCP data are recorded continuously or event controlled, depending on the configuration.

7.1 Display of the RCTouch / blue PiraT Remote

Home-Button

Figure 7.1: Remote Control Touch / blue PiraT Remote

If an RCTouch / bP Remote is connected to the logger, you can display all available busses and their channels over the button **[Busload]** in the <Home>-View.

Id	Name	Busload
#1	DUT_178_HSCAN-1	0 %
#2	DUT_178_HSCAN-2	0 %
#3	DUT_178_HSCAN-3	OFF
#4	DUT_178_HSCAN-4	OFF

TSL: TSL_2_3 (2)   Busload   22.02.2016 - 17:36:44

CAN   Serial   LIN   Ethernet   Camera   CCP_XCP

Figure 7.2: Busload view

Press the button **[CCP XCP]** to display the CCP / XCP communication.

Figure 7.3: View "CCP_XCP busload"

7.2 Display of the Remote Control (Voice)

If a Remote Control (Voice) is connected, a state message can be seen in the display. To get at this view press the Status button and use the Menu buttons to get to the page <CCP/XCP – CAN>. XCP on TCP/UDP is located under <XCP – ETH>. The display shows the states of up to four ECUs.
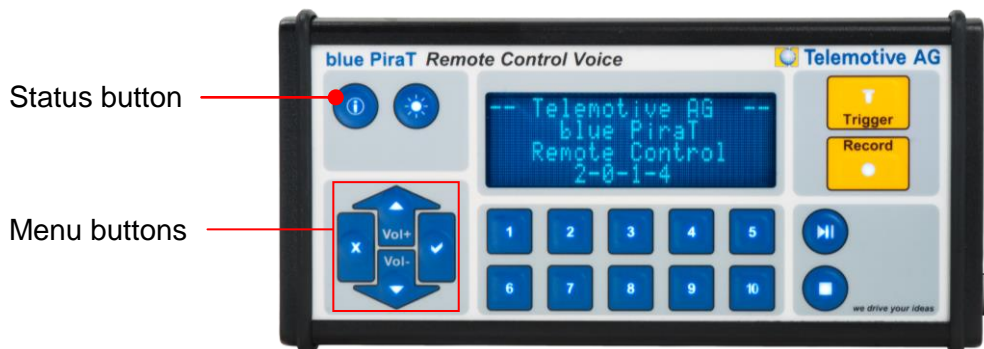
Figure 7.4: blue PiraT Remote Control Voice

Figure 7.5: CCP/XCP on CAN

The number indicates the delta busload in percent (load in addition created by the CCP/XCP communication).
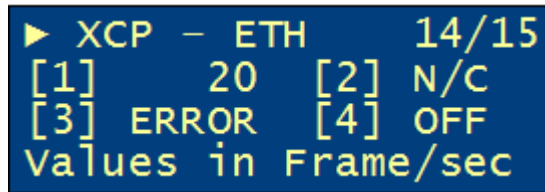
Figure 7.6: XCP on TCP/UDP

The number shows the incoming XCP frames per second.

Status	Meaning
OFF	ECU deactivated
N/C	ECU not connected
ERROR	Connection Error

ECU numbers that are configured with XCP on TCP/UDP will be marked as "OFF" on the <CCP/XCP – CAN> page and vice versa.

Table 7.1: Other statuses at the display of the Remote Control (Voice)

7.3   Display of the blue PiraT2 / 5E

The display of the **blue PiraT2 / 5E** also shows information about the CCP/XCP communication. The display can only show two lines. Please use the rotating knob until the CCP/XCP menu is shown. There are 4 characters showing the state of the ECUs. Each of the four letters displayed represents an ECU and displays its status.

Status	Meaning
–	not configured
X	not connected
T	Traffic
N	no traffic, connected
E	Connection Error

Table 7.2: Status information at the display of the blue PiraT2 / 5E

Figure 7.7: Display of the blue PiraT2 / 5E

7.4 Online Monitor

The online monitor enables the user to observe the measured data directly

7.4.1 Starting Online Monitor

To start the Online Monitor you have to activate the checkbox **Online Streaming active** in the sub-category **[Online Streaming]** and write it to the logger.
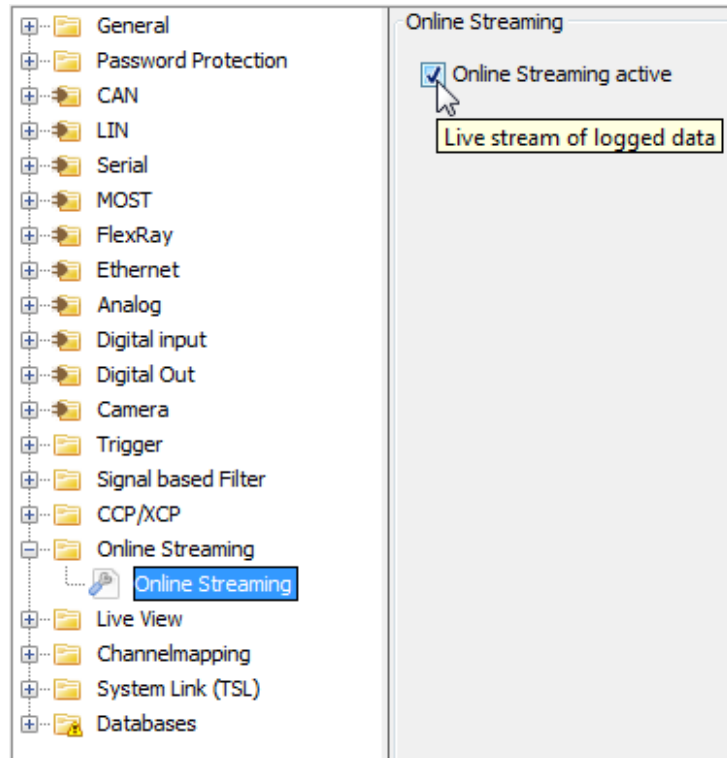
Figure 7.8: Activating Online Streaming

The tab <Online Monitor> can be opened by clicking the button **[Online Monitor]** **(2)**.
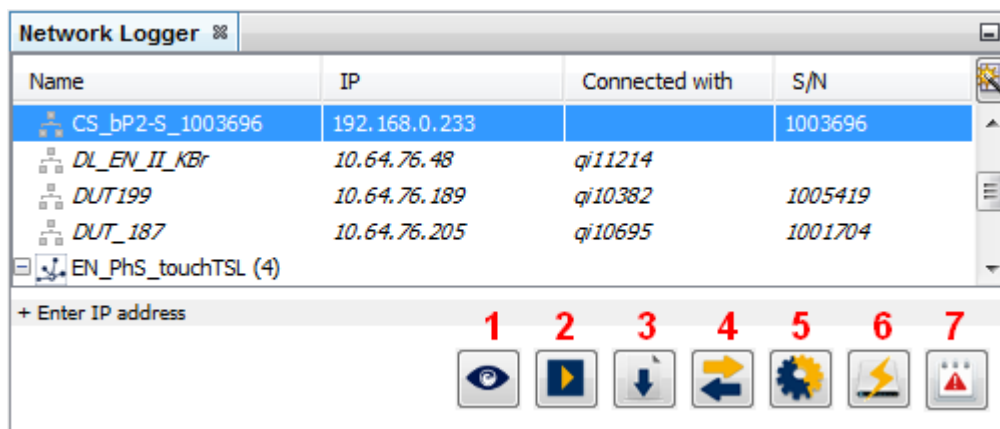
Figure 7.9: Tab "Network Logger"

There you can define which interfaces and channels you want to see in the Online Monitor and start the streaming by clicking the button **[Start streaming]**. You can choose interface groups e.g all ECU's or individual ECU's.
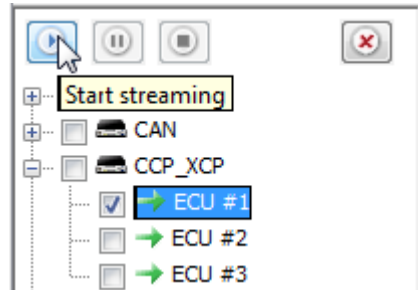
Figure 7.10: Starting online streaming

Online streaming can be paused by the button **[Streaming pause]**
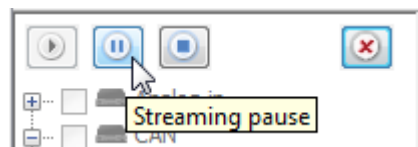
Figure 7.11: Pausing online streaming

There's no possibility to change the streamed channels when streaming is active. If you want to change some interfaces or channels you have to stop streaming before. To stop the streaming, please push the button **[Stop streaming]**. After changing the required settings you can start streaming again.
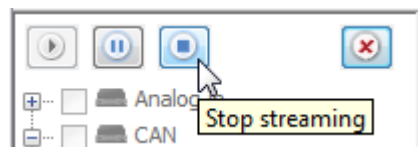
Figure 7.12: Stopping online streaming

For more information and settings of the online monitor, see the **TelemotiveSystemClient_UserManual**.

8   Download and conversion

The download application allows saving internal data (in Telemotive format) from the logger on the computers disk.

The conversion application allows saving internal data from the logger or an offline data set on the computers disk in a chosen format.

Connect the data logger to your computer and start the Telemotive System Client.

Select the corresponding data logger in the window <Network Logger> and click either the button:

- **[Download data] (3)**,   to generate an offline data set from the logger's data, or
- **[Convert data] (4)**,   to convert an offline data set or directly the logger's data to another format.
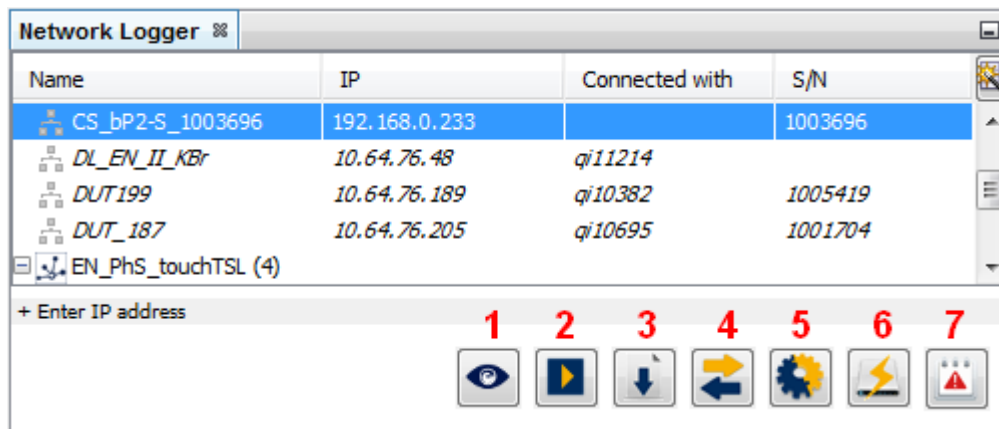
Figure 8.1: Selecting logger

Please find a detailed description for downloading and converting data in the manual of the Telemotive System Client:

User manual for the Telemotive System Client
https://sc.telemotive.de/4/uploads/media/TelemotiveSystemClient_UserManual.pdf

8.1 Conversion

CCP/XCP data also can be converted directly without DBC file in MDF, Telemotive ASCII Format or Extended Telemotive Trace File.

Select in the channel list under **[CCP_XCP]** the needed controller (using the unit number). Double clicking adds the channel directly to the output list (on the right side).

Select in the dropdown menu the output format:
- **[Telemotive ASCII Format (*.txt)]**,
- **[MDF CCP XCP Signal Format v3.3 (*.mdf)]**,
- **[MDF CCP XCP Signal Format v4.1 (*.mf4)]** or
- **[Extended Telemotive Trace File (*.xtmt)]**.

Please repeat this for all required channels.
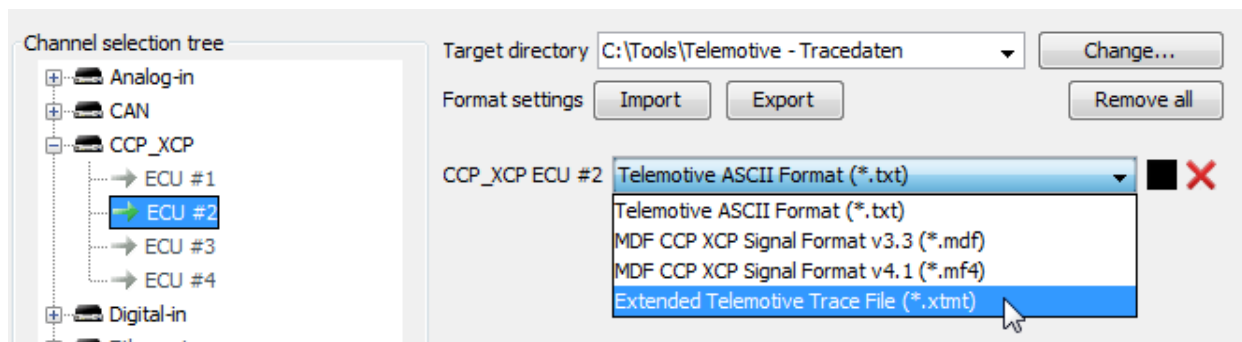
Figure 8.2: Set output format

The target directory combo box allows entering the name of the directory in which the converted data will be saved. Either you choose an entry from the dropdown menu or you open the dialog <Choose target directory> by clicking **[Change…]**.
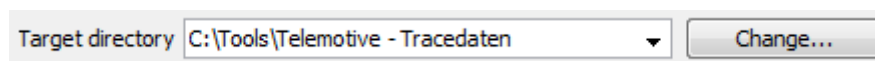
Figure 8.3: Selecting target directory

By pressing the **[Convert]** button at the lower button bar the conversion can be started. All channels in the area for format settings will be written into the target directory in the selected format.

Figure 8.4: Convert button

Note:
From version 2.1.1 onwards ECU log messages (warnings, errors, notes) of MDF conversions are additionally written as TMASCII in a text file in the target directory.

9   Abbreviations

abbreviation	meaning
blue PiraT	**P**rocessing **I**nformation **R**ecording **A**nalyzing **T**ool
bP	**b**lue **P**iraT
bP2	**b**lue **P**iraT**2**
bP2 5E	**b**lue **P**iraT**2** 5E
bPMini	**b**lue **P**iraT Mini
A2L	**A**SAM MCD-**2** MC **L**anguage
AE	**A**utomotive **E**lectronics
ACK	**ACK**nowledged
CAN	**C**ontroller **A**rea **N**etwork
CCP	**C**AN **C**alibration **P**rotocol
CF	**C**ompact **F**lash
CRO	**C**ommand **R**eceive **O**bject
DAQ	**D**ata **A**cquisition
DTO	**D**ata **T**ransmission **O**bject
ECL	**E**lectrical **C**ontrol **L**ine
ECU	**E**lectronic **C**ontrol **U**nit
FIBEX	**FI**eld **B**us **Ex**change Format
FW	**F**irm**w**are
GMT	**G**reenwich **M**ean **T**ime
INCA	**IN**tegrated **C**alibration and **A**pplication Tool
LAN	**L**ocal **A**rea **N**etwork = Netzwerk
LIN	**L**ocal **I**nterconnect **N**etwork
MAC	**M**edia **A**ccess **C**ontrol
MCD	**M**easure **C**alibrate **D**iagnose
MDX	**M**eta **D**ata **EX**change Format
MEP	**M**OST **E**thernet **P**acket
MOST	**M**edia **O**riented **S**ystems **T**ransport (www.mostnet.de)
ODT	**O**bject **D**escriptor **T**able
ODX	**O**pen **D**ata **EX**change
OEM	**O**riginal **E**quipment **M**anufacturer

PHY	**PHY**sical Bus Connect
PW	**P**ass**w**ort
RX	**R**eceiver Data
SD	**S**ecure **D**igital
SFTP	**S**ecure **F**ile **T**ransfer **P**rotocol
SHA	**S**ecure **Ha**sh
SSL	**S**ecure **S**ockets **L**ayer
TCP/IP	**T**ransmission **C**ontrol **P**rotocol/**I**nternet **P**rotocol
TLS	**T**ransport **L**ayer **S**ecurity
TMP	**T**ele**m**otive **P**acketformat
TSC	**T**elemotive **S**ystem **C**lient
TSL	**T**elemotive **S**ystem **L**ink
UDP	**U**ser **D**atagram **P**rotocol
USB	**U**niversal **S**erial **B**us
UTC	**U**niversal **T**ime, **C**oordinated
Wi-Fi	**Wi**reless **Fi**delity
WLAN	**Wi**reless **L**ocal **A**rea **N**etwork
XCP	Universal Measurement and **C**alibration **P**rotocol

Table 9.1: Abbreviations

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