



COPADATA
do it your way

zenon driver manual

Masterbus32

v.7.50





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1. Welcome to COPA-DATA help

GENERAL HELP

If you cannot find any information you require in this help chapter or can think of anything that you would like added, please send an email to documentation@copadata.com (<mailto:documentation@copadata.com>).

PROJECT SUPPORT

You can receive support for any real project you may have from our Support Team, who you can contact via email at support@copadata.com (<mailto:support@copadata.com>).

LICENSES AND MODULES

If you find that you need other modules or licenses, our staff will be happy to help you. Email sales@copadata.com (<mailto:sales@copadata.com>).

2. Masterbus32

The **Masterbus32** driver is for communication with components of Mastervolt using the Masterbus. The Modbus RTU protocol is used for communication.

Examples of this are:

- ▶ I/O blocks
- ▶ Charging device
- ▶ Batteries
- ▶ Inverter

- Sensors

3. MASTERBUS32 - Data sheet

General:	
Driver file name	MASTERBUS32.exe
Driver name	MasterBus driver
PLC types	MasterBus supporting devices
PLC manufacturer	Mastervolt;

Driver supports:	
Protocol	Modbus RTU - serial;
Addressing: Address-based	X
Addressing: Name-based	--
Spontaneous communication	--
Polling communication	X
Online browsing	--
Offline browsing	--
Real-time capable	--
Blockwrite	--
Modem capable	--
Serial logging	--
RDA numerical	--
RDA String	--

Requirements:	
Hardware PC	RS-485 adapter
Software PC	MasterAdjust (free to download from www.mastervolt.com)
Hardware PLC	MasterBus - Modbus Interface; Article-ID.: 77030800
Software PLC	--
Requires v-dll	X

Platforms:	
Operating systems	Windows 7, 8, 8.1, 10, Server 2008R2, Server 2012, Server 2012R2;
CE platforms	-;

4. Driver history

Date	Build number	Change
21.09.15	22358	Created driver documentation

5. Requirements

This chapter contains information on the requirements that are necessary for use of this driver.

5.1 PC

The computer must have an RS-485 interface or support an RS-485 converter.

5.2 PLC

The Mastervolt "MasterBus Modbus Interface" is required for communication with the Masterbus.

6. Configuration

In this chapter you will learn how to use the driver in a project and which settings you can change.



Information

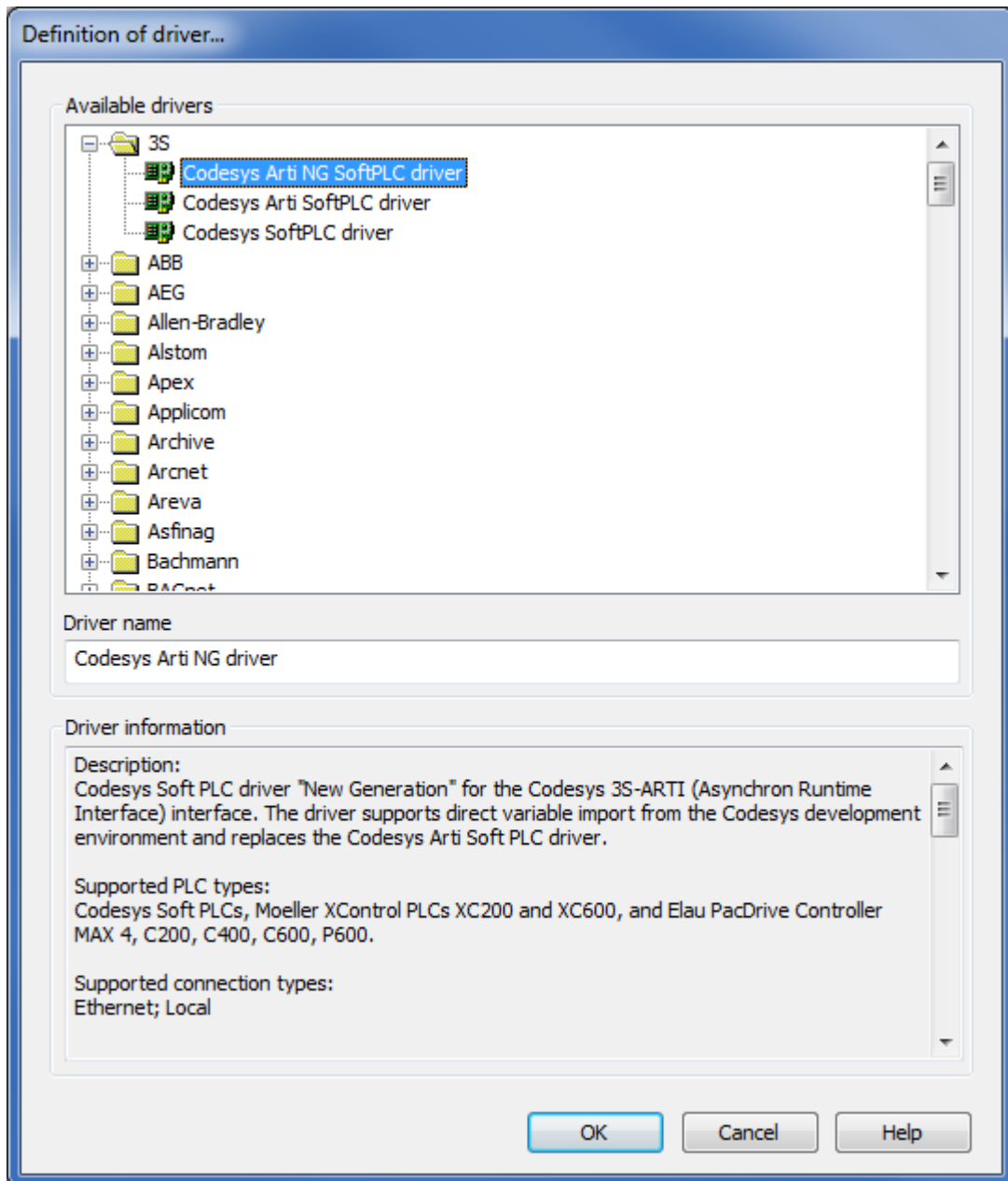
Find out more about further settings for zenon variables in the chapter Variables (main.chm::/15247.htm) of the online manual.

6.1 Creating a driver

In order to create a new driver:

1. Right-click on **Driver** in the Project Manage and select **Driver new** in the context menu.

2. In the following dialog the control system offers a list of all available drivers.



3. Select the desired driver and give it a name:
 - The driver name has to be unique, i.e. if one and the same driver is to be used several times in one project, a new name has to be given each time.
 - The driver name is part of the file name. Therefore it may only contain characters which are supported by the operating system. Invalid characters are replaced by an underscore (_).
 - Attention: This name cannot be changed later on.

4. Confirm the dialog with **OK**. In the following dialog the single configurations of the drivers are defined.

Only the respective required drivers need to be loaded for a project. Later loading of an additional driver is possible without problems.



Information

For new projects and for existing projects which are converted to version 6.21 or higher, the following drivers are created automatically:

- ▶ Internal
- ▶ MathDr32
- ▶ SysDrv.

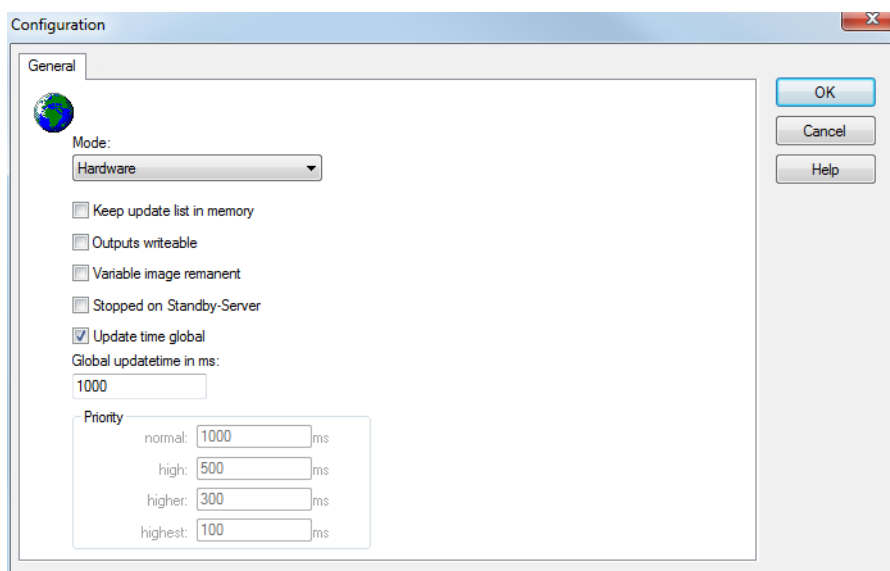
▶

6.2 Settings in the driver dialog

You can change the following settings of the driver:

6.2.1 General

The configuration dialog is opened when a driver is created. In order to be able to open the dialog later for editing, double click on the driver in the list or click on the **Configuration** property.



Parameters	Description
Mode	<p>Allows to switch between hardware mode and simulation mode</p> <ul style="list-style-type: none"> ▶ Hardware: <p>A connection to the control is established.</p> ▶ Simulation static <p>No communication between to the control is established, the values are simulated by the driver. In this modus the values remain constant or the variables keep the values which were set by zenon Logic. Each variable has its own memory area. E.g. two variables of the type marker with offset 79 can have different values in the Runtime and do not influence each other. Exception: The simulator driver.</p> ▶ Simulation - counting <p>No communication between to the control is established, the values are simulated by the driver. In this modus the driver increments the values within a value range automatically.</p> ▶ Simulation - programmed <p>N communication is established to the PLC. The values are calculated by a freely programmable simulation project. The simulation project is created with the help of the zenon Logic Workbench and runs in a zenon Logic Runtime which is integrated in the driver. For details see chapter Driver simulation (main.chm::/25206.htm).</p>
Keep update list in the memory	<p>Variables which were requested once are still requested from the control even if they are currently not needed. This has the advantage that e.g. multiple screen switches after the screen was opened for the first time are executed faster because the variables need not be requested again. The disadvantage is a higher load for the communication to the control.</p>
Output can be written	<p>Active: Outputs can be written.</p> <p>Inactive: Writing of outputs is prevented.</p> <p>Note: Not available for every driver.</p>
Variable image remanent	<p>This option saves and restores the current value, time stamp and the states of a data point.</p> <p>Fundamental requirement: The variable must have a valid value and time stamp.</p>

	<p>The variable image is saved in mode hardware if:</p> <ul style="list-style-type: none"> ▶ one of the states S_MERKER_1(0) up to S_MERKER8(7), REVISION(9), AUS(20) or ERSATZWERT(27) is active <p>The variable image is always saved if:</p> <ul style="list-style-type: none"> ▶ the variable is of the object type Driver variable ▶ the driver runs in simulation mode. (not programmed simulation) <p>The following states are not restored at the start of the Runtime:</p> <ul style="list-style-type: none"> ▶ SELECT(8) ▶ WR-ACK(40) ▶ WR-SUC(41) <p>The mode Simulation - programmed at the driver start is not a criterion in order to restore the remanent variable image.</p>
Stop on Standby Server	<p>Setting for redundancy at drivers which allow only on communication connection. For this the driver is stopped at the Standby Server and only started at the upgrade.</p> <p>Attention: If this option is active, the gapless archiving is no longer guaranteed.</p> <p>Active: Sets the driver at the not-process-leading Server automatically in a stop-like state. In contrast to stopping via driver command, the variable does not receive status switched off (statusverarbeitung.chm::/24150.htm) but an empty value. This prevents that at the upgrade to the Server irrelevant values are created in the AML, CEL and Historian.</p> <p>Note: Not available if the CE terminal serves as a data server. You can find further information in the zenon Operator manual in the CE terminal as a data server chapter.</p>
Global Update time	<p>Active: The set Global update time in ms is used for all variables in the project. The priority set at the variables is not used.</p> <p>Inactive: The set priorities are used for the individual variables.</p>
Priority	<p>The polling times for the individual priority classes are set here. All variables with the according priority are polled in the set time.</p> <p>The allocation to the variables takes place separately in the settings of the variable properties.</p> <p>The communication of the individual variables are graduated in respect of importance or necessary topicality using the priorities.</p>

	<p>Thus the communication load is distributed better.</p> <p>Attention: Priority classes are not supported by each driver For example, drivers that communicate spontaneously do not support it.</p>
--	--

CLOSE DIALOG

Parameters	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

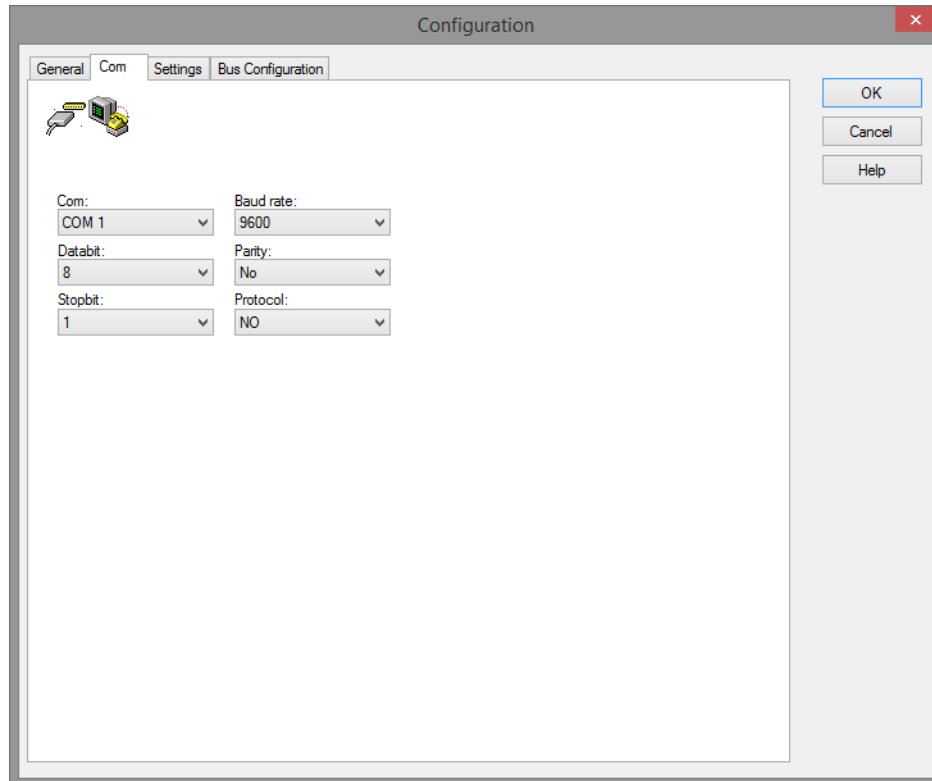
UPDATE TIME FOR CYCLICAL DRIVERS

The following applies for cyclical drivers:

For **Set value**, **Advising** of variables and **Requests**, a read cycle is immediately triggered for all drivers - regardless of the set update time. This ensures that the value is immediately available for visualization after writing. Update times can therefore be shorter than pre-set for cyclical drivers.

6.2.2 COM

In this dialog, you configure the connection parameters for serial communication.



Parameters	Description
Com	Selection Com port. Select from drop-down list: COM 1 to COM 64 Default: 1
Baud rate	Selection baud rate. Amend to PLC. Select from drop-down list: 110 to 256000 Default: 9600
Data bit	Number of data bits. Amend to PLC. Select from drop-down list: 5, 6, 7, 8 Default: 8
Stop bit	Selection of stop bit. Amend to PLC. Select from drop-down list: <ul style="list-style-type: none"> ▶ 1 ▶ 1.5 ▶ 2 Default: 1
Parity	Selection of the parity. Amend to PLC. Select from drop-down list: <ul style="list-style-type: none"> ▶ No ▶ Odd ▶ Even Default: No
Protocol	Selection protocol. Amend to PLC. Select from drop-down list: <ul style="list-style-type: none"> ▶ No ▶ Xon/Xoff ▶ Rts/CTS ▶ DTR/DSR Default: No

CLOSE DIALOG

Parameters	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.

Help	Opens online help.
-------------	--------------------

6.2.3 Settings

In this dialog, you configure the connection parameters to the PLC.

Configuration

GeneralComSettingsBus Configuration

Connection

Modbus Address

1

Error handling

Connection timeout

3000 ms

Connection retries

6

Reconnection delay

20000 ms

Send delay

10 ms

OK

Cancel

Help

CONNECTION

Parameters	Description
Modbus address	Address of the Masterbus Modbus Interface . Note: The address of the interface can be read with the help of the MasterAdjust manufacturer.

ERROR HANDLING

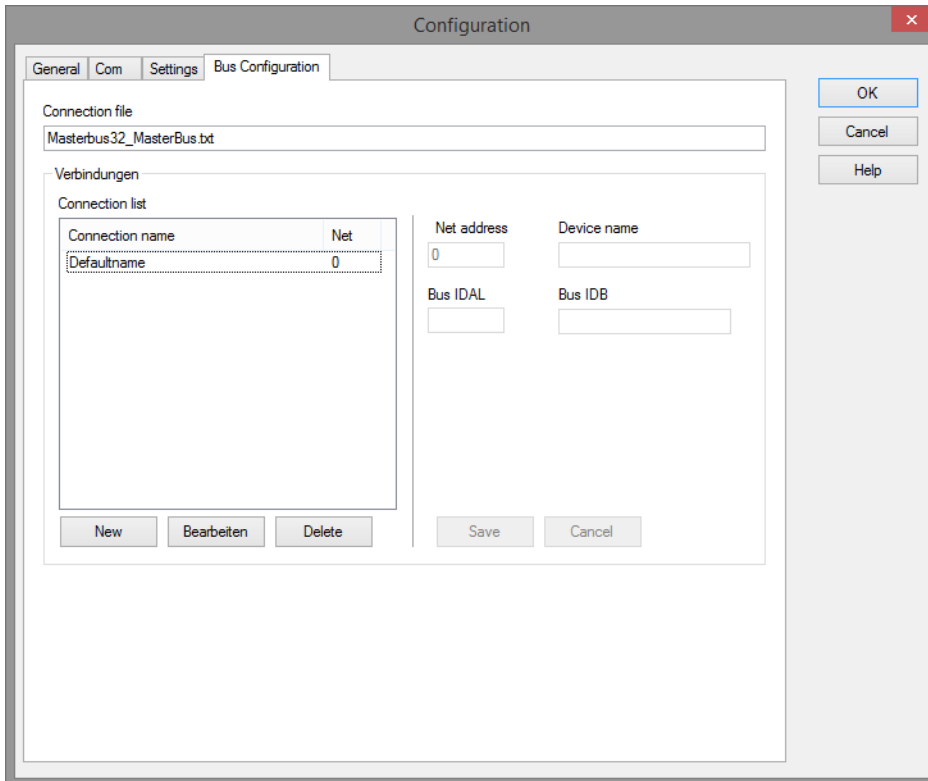
Parameters	Description
Connection timeout	Time in milliseconds to wait for a response from Masterbus Modbus Interface . A communication error will be displayed if there is no response within this time. Default: 3000 ms
Retries on error	Number of send repetitions when there is no answer from the slave after the set connection timeout . <ul style="list-style-type: none"> ▶ 1: a connection attempt, no repetitions ▶ 0: constant repetition Default: 6
Delay after connection termination	Time in milliseconds to wait after a communication error has occurred before trying to re-establish the connection. Default: 20000 ms
Send delay	Default: 10 ms

CLOSE DIALOG

Parameters	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

6.2.4 Bus configuration

In this dialog, you configure the individual connections to Masterbus devices.



CONNECTION FILE

Parameters	Description
Connection file	<p>Name of the file in which the settings for the individual Masterbus components are saved. This field is for information only and cannot be changed.</p> <p>Note: The file is automatically created in the project folder when the driver is created.</p> <p>Default: Masterbus32_MasterBus.txt</p>

CONNECTIONS

Connection settings.

Parameters	Description
Connection list	<p>List of the already configured connections.</p> <ul style="list-style-type: none"> ▶ Connection name Connection name, as configured in the device name. ▶ Net Reference for variables, as configured.
New	<p>Creates a new connection and unlocks the input fields of the connection parameters for editing.</p> <p>Not active if a connection is open for editing.</p>
Edit	<p>Opens the selected connection and unlocks the input fields of the connection parameters for editing.</p> <p>Not active if a connection is open for editing. Not active if no connection from the list of pre-configured connections is selected.</p>
Delete	<p>Deletes the selected connection from the connection list without requesting confirmation.</p> <p>Not active if a connection is open for editing.</p>

CONNECTION PARAMETERS

Parameters	Description
Net address	<p>Each connection is assigned a unique net address. This must correspond to the settings in the net address property of the variable definition.</p> <p>Entry range: 0 - 255</p> <p>Note: A warning dialog is shown if the net address is already issued.</p>
Device name	<p>Name of the connection as it is displayed in the connection list.</p> <p>Default: Defaultname</p>
Bus IDAL Bus IDB	<p>The MasterBus device address consists of 2 Variables:</p> <ul style="list-style-type: none"> ▶ IDAL (5-bit value) ▶ IDB (18-bit value) <p>Both variables are read by MasterAdjust and are to be entered as a HEX value.</p>
Save	Accepts all settings for the edited connection and closes

	editing. Not active if no connection is open for editing.
Cancel	Discards all changes for the edited connection and closes editing. Attention: All changes are discarded without requesting confirmation.

CLOSE DIALOG

Parameters	Description
OK	Applies all changes in all tabs and closes the dialog.
Cancel	Discards all changes in all tabs and closes the dialog.
Help	Opens online help.

CREATE NEW CONNECTION

1. Click on the **New** button.
The area to enter the connection parameters is unlocked for editing.
2. Enter the connection details.
3. Click on **Save**.
The configured connection is incorporated into the list of connections.

EDIT CONNECTION

1. Select the connection in the connection list.
2. Click on the **Edit** button.
The area to enter the connection parameters is unlocked for editing.
3. Change the connection parameters.
4. Finish with **Save**.

DELETE CONNECTION

1. Select the connection in the connection list.
2. Click the **Delete** button
3. The connection will be deleted from the list of connections without requesting confirmation.

7. Creating variables

This is how you can create variables in the zenon Editor:

7.1 Creating variables in the Editor

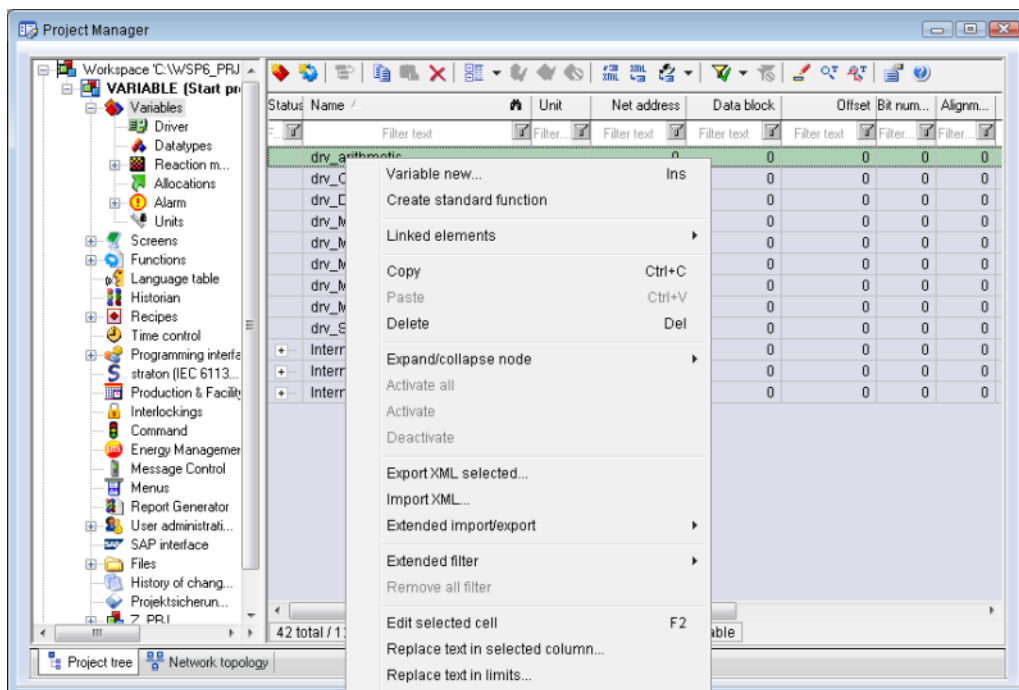
Variables can be created:

- ▶ as simple variables
- ▶ in arrays (main.chm::/15262.htm)
- ▶ as structure variables (main.chm::/15278.htm)

VARIABLE DIALOG

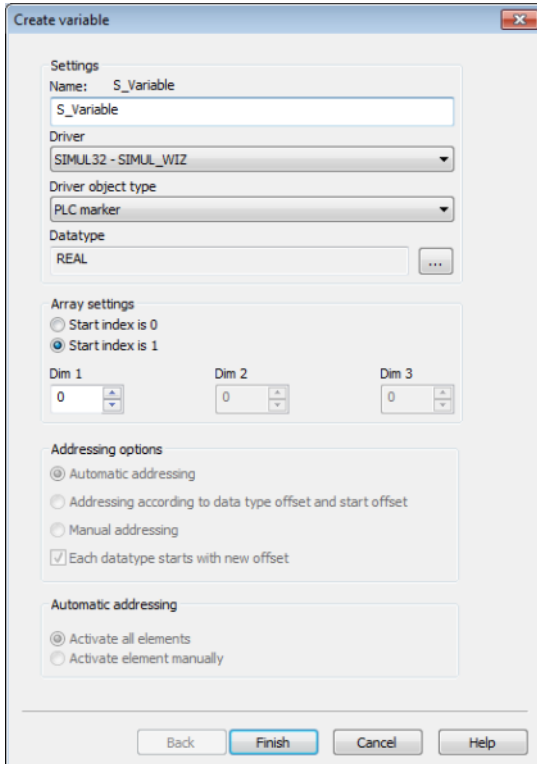
To create a new variable, regardless of which type:

1. Select the **New variable** command in the **Variables** node in the context menu



2. The dialog for configuring variables is opened
3. configure the variable

4. The settings that are possible depends on the type of variables



The screenshot shows the 'Create variable' dialog box with the following settings:

- Settings**
 - Name: S_Variable
 - Driver: SIMUL32 - SIMUL_WIZ
 - Driver object type: PLC marker
 - Datatype: REAL
- Array settings**
 - ☐ Start index is 0
 - ☒ Start index is 1
 - Dim 1: 0
 - Dim 2: 0
 - Dim 3: 0
- Addressing options**
 - ☒ Automatic addressing
 - ☐ Addressing according to data type offset and start offset
 - ☐ Manual addressing
 - ☒ Each datatype starts with new offset
- Automatic addressing**
 - ☒ Activate all elements
 - ☐ Activate element manually

Buttons at the bottom: Back, Finish, Cancel, Help.

Property	Description
Name	Distinct name of the variable. If a variable with the same name already exists in the project, no additional variable can be created with this name. Maximum length: 128 character Attention: The characters # and @ are not permitted in variable names. If non-permitted characters are used, creation of variables cannot be completed and the Finish button remains inactive. Note: For some drivers, the addressing is possible over the property Symbolic address , as well.
Drivers	Select the desired driver from the drop-down list. Note: If no driver has been opened in the project, the driver for internal variables (Intern.exe (Main.chm::/Intern.chm::/Intern.htm)) is automatically loaded.
Driver object type (cti.chm::/28685.htm)	Select the appropriate driver object type from the drop-down list.
Data type	Select the desired data type. Click on the ... button to open the selection dialog.
Array settings	Expanded settings for array variables. You can find details in the Arrays chapter.
Addressing options	Expanded settings for arrays and structure variables. You can find details in the respective section.
Automatic element activation	Expanded settings for arrays and structure variables. You can find details in the respective section.

SYMBOLIC ADDRESS

The **Symbolic address** property can be used for addressing as an alternative to the **Name** or **Identification** of the variables. Selection is made in the driver dialog; configuration is carried out in the variable property. When importing variables of supported drivers, the property is entered automatically.

Maximum length: 1024 characters.

INHERITANCE FROM DATA TYPE

Measuring range, **Signal range** and **Set value** are always:

- ▶ derived from the datatype
- ▶ Automatically adapted if the data type is changed

Note for signal range: If a change is made to a data type that does not support the set **signal range**, the **signal range** is amended automatically. For example, for a change from **INT** to **SINT**, the **signal range** is changed to 127. The amendment is also carried out if the **signal range** was not inherited from the data type. In this case, the **measuring range** must be adapted manually.

7.2 Addressing

Group/Property	Description
General	MasterBus driver for Mastervolt MasterBus Modbus interface
Name	MasterBus32
Identification	Freely assignable identification, e.g. for resources label, comment ...
Addressing	
Net address	<p>The net address is determined by the network participant:</p> <p>The network participant is created and administered in the "Bus Configuration" page.</p>
Data block	<p>The data block number determines the tab of the address:</p> <ul style="list-style-type: none"> 0 .. Monitoring 1 .. Alarm 2 .. Historic 3 .. Configuration <p>You can also get further information in the Mastervolt documentation (ManualModbus).</p>
Offset	<p>The offset corresponds to the index in the <code>MasterAdjust</code> software. The index is displayed as a tool tip of the respective data point.</p> <p>You can also get further information in the Mastervolt documentation (ManualModbus).</p>
Alignment	not used for this driver
Bit number	not used for this driver
String length	Only available for String variables: Maximum number of characters that the variable can take.
Driver connection/Driver Object Type	Object type of the variables. Depending on the driver used, is selected when the variable is created and can be changed here.
Driver connection/Data Type	<p>Data type of the variable. Is selected during the creation of the variable; the type can be changed here.</p> <p>Attention: If you change the data type later, all other properties of the variable must be checked and adjusted, if necessary.</p>

7.3 Driver objects and datatypes

Driver objects are areas available in the PLC, such as markers, data blocks etc. Here you can find out which driver objects are provided by the driver and which IEC data types can be assigned to the respective driver objects.

7.3.1 Driver objects

The following object types are available in this driver:

Driver object type	Channel type	Read	Write	Supported data types	Description
MasterBus Value	70	X	X	BOOL, DINT, REAL	
Driver variable	35	X	X	BOOL, SINT, USINT, INT, UINT, DINT, UDINT, REAL, STRING	<p>Variables for the static analysis of the communication; is transferred between driver and Runtime (not to the PLC).</p> <p>Note: The addressing and the behavior is the same for most zenon drivers.</p> <p>Find out more in the chapter about the Driver variables (on page 32)</p>

7.3.2 Mapping of the data types

All variables in zenon are derived from IEC data types. The following table compares the IEC datatypes with the datatypes of the PLC.

PLC	zenon	Data type
BOOL	BOOL	8
	USINT	9
	SINT	10
	UINT	2
	INT	1
	UDINT	4
DINT	DINT	3
	ULINT	27
	LINT	26
REAL	REAL	5
	LREAL	6
	STRING	12
	WSTRING	21
	DATE	18
	TIME	17
	DATE_AND_TIME	20
	TOD (Time of Day)	19

Data type: The property **Data type** is the internal numerical name of the data type. It is also used for the extended DBF import/export of the variables.

7.4 Creating variables by importing

Variables can also be imported by importing them. The XML and DBF import is available for every driver.



Information

You can find details on the import and export of variables in the Import-Export (main.chm::/13028.htm) manual in the Variables (main.chm::/13045.htm) section.

7.4.1 XML import

For the import/export of variables the following is true:

- ▶ The import/export must not be started from the global project.
- ▶ The start takes place via:
 - Context menu of variables or data typ in the project tree
 - or context menu of a variable or a data type
 - or symbol in the symbol bar variables



Attention

When importing/overwriting an existing data type, all variables based on the existing data type are changed.

Example:

There is a data type XYZ derived from the type `INT` with variables based on this data type. The XML file to be imported also contains a data type with the name XYZ but derived from type `STRING`. If this data type is imported, the existing data type is overwritten and the type of all variables based on it is adjusted. I.e. the variables are now no longer `INT` variables, but `STRING` variables.

7.4.2 DBF Import/Export

Data can be exported to and imported from dBase.



Information

Import and Export via CSV or dBase supported; no driver specific variable settings, such as formulas. Use export/import via XML for this.

IMPORT DBF FILE

To start the import:

1. right-click on the variable list
2. in the drop-down list of **Extended export/import...** select the **Import dBase** command
3. follow the import assistant

The format of the file is described in the chapter File structure.



Information

Note:

- ▶ Driver object type and data type must be amended to the target driver in the DBF file in order for variables to be imported.
- ▶ dBase does not support structures or arrays (complex variables) at import.

EXPORT DBF FILE

To start the export:

1. right-click on the variable list
2. in the drop-down list of **Extended export/import...** select the **Export dBase...** command
3. follow the export assistant



Attention

DBF files:

- ▶ must correspond to the 8.3 DOS format for filenames (8 alphanumeric characters for name, 3 character suffix, no spaces)
- ▶ must not have dots (.) in the path name.
e.g. the path C:\users\John.Smith\test.dbf is invalid.
Valid: C:\users\JohnSmith\test.dbf
- ▶ must be stored close to the root directory in order to fulfill the limit for file name length including path: maximum 255 characters

The format of the file is described in the chapter File structure.



Information

dBase does not support structures or arrays (complex variables) at export.

File structure of the dBase export file

The dBaseIV file must have the following structure and contents for variable import and export:



Attention

dBase does not support structures or arrays (complex variables) at export.

DBF files must:

- ▶ conform with their name to the 8.3 DOS format (8 alphanumeric characters for name, 3 characters for extension, no space)
- ▶ Be stored close to the root directory (Root)

STRUCTURE

Identification	Type	Field size	Comment
KANALNAME	Char	128	Variable name. The length can be limited using the MAX_LAENGE entry in project.ini .
KANAL_R	C	128	The original name of a variable that is to be replaced by the new name entered under "VARIABLENNAME" (field/column must be entered manually). The length can be limited using the MAX_LAENGE entry in project.ini .
KANAL_D	Log	1	The variable is deleted with the 1 entry (field/column has to be created by hand).
TAGNR	C	128	Identification. The length can be limited using the MAX_LAENGE entry in project.ini .
EINHEIT	C	11	Technical unit
DATENART	C	3	Data type (e.g. bit, byte, word, ...) corresponds to the data type.
KANALTYP	C	3	Memory area in the PLC (e.g. marker area, data area, ...) corresponds to the driver object type.
HWKANAL	Num	3	Bus address
BAUSTEIN	N	3	Datablock address (only for variables from the data area of the PLC)
ADRESSE	N	5	Offset
BITADR	N	2	For bit variables: bit address For byte variables: 0=lower, 8=higher byte For string variables: Length of string (max. 63 characters)
ARRAYSIZE	N	16	Number of variables in the array for index variables ATTENTION: Only the first variable is fully available. All others are only available for VBA or the Recipegroup Manager

LES_SCHR	L	1	Write-Read-Authorization 0: Not allowed to set value. 1: Allowed to set value.
MIT_ZEIT	L	1	time stamp in zenon (only if supported by the driver)
OBJEKT	N	2	Driver-specific ID number of the primitive object comprises TREIBER-OBJEKTYP and DATENTYP
SIGMIN	Float	16	Non-linearized signal - minimum (signal resolution)
SIGMAX	F	16	Non-linearized signal - maximum (signal resolution)
ANZMIN	F	16	Technical value - minimum (measuring range)
ANZMAX	F	16	Technical value - maximum (measuring range)
ANZKOMMA	N	1	Number of decimal places for the display of the values (measuring range)
UPDATERATE	F	19	Update rate for mathematics variables (in sec, one decimal possible) not used for all other variables
MEMTIEFE	N	7	Only for compatibility reasons
HDRATE	F	19	HD update rate for historical values (in sec, one decimal possible)
HDTIEFE	N	7	HD entry depth for historical values (number)
NACHSORT	L	1	HD data as postsorted values
DRRATE	F	19	Updating to the output (for zenon DDE server, in [s], one decimal possible)
HYST_PLUS	F	16	Positive hysteresis, from measuring range
HYST_MINUS	F	16	Negative hysteresis, from measuring range
PRIOR	N	16	Priority of the variable
REAMATRIZE	C	32	Allocated reaction matrix
ERSATZWERT	F	16	Substitute value, from measuring range
SOLLMIN	F	16	Minimum for set value actions, from measuring range
SOLLMAX	F	16	Maximum for set value actions, from measuring range
VOMSTANDBY	L	1	Get value from standby server; the value of the variable is not requested from the server but from the Standby Server in redundant networks
RESOURCE	C	128	Resources label. Free string for export and display in lists. The length can be limited using the MAX_LAENGE entry in project.ini .
ADJWVBA	L	1	Non-linear value adaption: 0: Non-linear value adaption is used 1: Non-linear value adaption is not used

ADJZENON	C	128	Linked VBA macro for reading the variable value for non-linear value adjustment.
ADJWVBA	C	128	ed VBA macro for writing the variable value for non-linear value adjustment.
ZWREMA	N	16	Linked counter REMA.
MAXGRAD	N	16	Gradient overflow for counter REMA.



Attention

When importing, the driver object type and data type must be amended to the target driver in the DBF file in order for variables to be imported.

LIMIT VALUE DEFINITION

Limit definition for limit values 1 to 4, or status 1 to 4:

Identification	Type	Field size	Comment
AKTIV1	L	1	Limit value active (per limit value available)
GRENZWERT1	F	20	technical value or ID number of a linked variable for a dynamic limit value (see VARIABLEx) (if VARIABLEx is 1 and here it is -1, the existing variable linkage is not overwritten)
SCHWWERT1	F	16	Threshold value for limit value
HYSTERESE1	F	14	Is not used
BLINKEN1	L	1	Set blink attribute
BTB1	L	1	Logging in CEL
ALARM1	L	1	Alarm
DRUCKEN1	L	1	Printer output (for CEL or Alarm)
QUITTIER1	L	1	Must be acknowledged
LOESCHE1	L	1	Must be deleted
VARIABLE1	L	1	Dyn. limit value linking the limit is defined by an absolute value (see field GRENZWERTx).
FUNC1	L	1	Functions linking
ASK_FUNC1	L	1	Execution via Alarm Message List
FUNC_NR1	N	10	ID number of the linked function (if "-1" is entered here, the existing function is not overwritten during import)
A_GRUPPE1	N	10	Alarm/Event Group
A_KLASSE1	N	10	Alarm/Event Class
MIN_MAX1	C	3	Minimum, Maximum
FARBE1	N	10	Color as Windows coding
GRENZTXT1	C	66	Limit value text
A_DELAY1	N	10	Time delay
INVISIBLE1	L	1	Invisible

Expressions in the column "Comment" refer to the expressions used in the dialog boxes for the definition of variables. For more information, see chapter Variable definition.

7.5 Driver variables

The driver kit implements a number of driver variables. These are divided into:

- ▶ Information
- ▶ Configuration
- ▶ Statistics and
- ▶ Error message

The definitions of the variables implemented in the driver kit are available in the import file **drvvar.dbf** (on the installation medium in the \Predefined\Variables folder) and can be imported from there.

Note: Variable names must be unique in zenon. If driver variables are to be imported from **drvvar.dbf** again, the variables that were imported beforehand must be renamed.



Information

Not every driver supports all driver variants.

For example:

- ▶ Variables for modem information are only supported by modem-compatible drivers
- ▶ Driver variables for the polling cycle only for pure polling drivers
- ▶ Connection-related information such as ErrorMessage only for drivers that only edit one connection at a time

INFORMATION

Name from import	Type	Offset	Description
MainVersion	UINT	0	Main version number of the driver.
SubVersion	UINT	1	Sub version number of the driver.
BuildVersion	UINT	29	Build version number of the driver.
RTMajor	UINT	49	zenon main version number
RTMinor	UINT	50	zenon sub version number
RTSp	UINT	51	zenon Service Pack number
RTBuild	UINT	52	zenon build number
LineStateIdle	BOOL	24.0	TRUE, if the modem connection is idle
LineStateOffering	BOOL	24.1	TRUE, if a call is received
LineStateAccepted	BOOL	24.2	The call is accepted
LineStateDialtone	BOOL	24.3	Dialtone recognized
LineStateDialing	BOOL	24.4	Dialing active
LineStateRingBack	BOOL	24.5	While establishing the connection
LineStateBusy	BOOL	24.6	Target station is busy

LineStateSpecialInfo	BOOL	24.7	Special status information received
LineStateConnected	BOOL	24.8	Connection established
LineStateProceeding	BOOL	24.9	Dialing completed
LineStateOnHold	BOOL	24.10	Connection in hold
LineStateConferenced	BOOL	24.11	Connection in conference mode.
LineStateOnHoldPendConf	BOOL	24.12	Connection in hold for conference
LineStateOnHoldPendTransfer	BOOL	24.13	Connection in hold for transfer
LineStateDisconnected	BOOL	24.14	Connection terminated.
LineStateUnknow	BOOL	24.15	Connection status unknown
ModemStatus	UDINT	24	Current modem status
TreiberStop	BOOL	28	Driver stopped For <code>driver stop</code> , the variable has the value <code>TRUE</code> and an OFF bit. After the driver has started, the variable has the value <code>FALSE</code> and no OFF bit.
SimulRTState	UDINT	60	Informes the status of Runtime for driver simulation.

CONFIGURATION

Name from import	Type	Offset	Description
ReconnectInRead	BOOL	27	If <code>TRUE</code> , the modem is automatically reconnected for reading
ApplyCom	BOOL	36	Apply changes in the settings of the serial interface. Writing to this variable immediately results in the method <code>SrvDrvVarApplyCom</code> being called (which currently has no further function).
ApplyModem	BOOL	37	Apply changes in the settings of the modem. Writing this variable immediately calls the method <code>SrvDrvVarApplyModem</code> . This closes the current connection and opens a new one according to the settings PhoneNumberSet and ModemHwAdrSet .

PhoneNumberSet	STRING	38	Telephone number, that should be used
ModemHwAdrSet	DINT	39	Hardware address for the telephone number
GlobalUpdate	UDINT	3	Update time in milliseconds (ms).
BGlobalUpdaten	BOOL	4	TRUE, if update time is global
TreiberSimul	BOOL	5	TRUE, if driver in sin simulation mode
TreiberProzab	BOOL	6	TRUE, if the variables update list should be kept in the memory
ModemActive	BOOL	7	TRUE, if the modem is active for the driver
Device	STRING	8	Name of the serial interface or name of the modem
ComPort	UINT	9	Number of the serial interface.
Baudrate	UDINT	10	Baud rate of the serial interface.
Parity	SINT	11	Parity of the serial interface
ByteSize	USINT	14	Number of bits per character of the serial interface Value = 0 if the driver cannot establish any serial connection.
StopBit	USINT	13	Number of stop bits of the serial interface.
Autoconnect	BOOL	16	TRUE, if the modem connection should be established automatically for reading/writing
PhoneNumber	STRING	17	Current telephone number
ModemHwAdr	DINT	21	Hardware address of current telephone number
RxIdleTime	UINT	18	Modem is disconnected, if no data transfer occurs for this time in seconds (s)

WriteTimeout	UDINT	19	Maximum write duration for a modem connection in milliseconds (ms).
RingCountSet	UDINT	20	Number of ringing tones before a call is accepted
ReCallIdleTime	UINT	53	Waiting time between calls in seconds (s).
ConnectTimeout	UINT	54	Time in seconds (s) to establish a connection.

STATISTICS

Name from import	Type	Offset	Description
MaxWriteTime	UDINT	31	The longest time in milliseconds (ms) that is required for writing.
MinWriteTime	UDINT	32	The shortest time in milliseconds (ms) that is required for writing.
MaxBlkReadTime	UDINT	40	Longest time in milliseconds (ms) that is required to read a data block.
MinBlkReadTime	UDINT	41	Shortest time in milliseconds (ms) that is required to read a data block.
WriteErrorCount	UDINT	33	Number of writing errors
ReadSucceedCount	UDINT	35	Number of successful reading attempts

MaxCycleTime	UDINT	22	Longest time in milliseconds (ms) required to read all requested data.
MinCycleTime	UDINT	23	Shortest time in milliseconds (ms) required to read all requested data.
WriteCount	UDINT	26	Number of writing attempts
ReadErrorCount	UDINT	34	Number of reading errors
MaxUpdateTimeNormal	UDINT	56	Time since the last update of the priority group Normal in milliseconds (ms).
MaxUpdateTimeHigher	UDINT	57	Time since the last update of the priority group Higher in milliseconds (ms).
MaxUpdateTimeHigh	UDINT	58	Time since the last update of the priority group High in milliseconds (ms).
MaxUpdateTimeHighest	UDINT	59	Time since the last update of the priority group Highest in milliseconds (ms).
PokeFinish	BOOL	55	Goes to 1 for a query, if all current pokes were executed

ERROR MESSAGE

Name from import	Type	Offset	Description
ErrorTimeDW	UDINT	2	Time (in seconds since 1.1.1970), when the last error occurred.
ErrorTimeS	STRING	2	Time (in seconds since 1.1.1970), when the last error occurred.
RdErrPrimObj	UDINT	42	Number of the PrimObject, when the last reading error occurred.
RdErrStationsName	STRING	43	Name of the station, when the last reading error occurred.
RdErrBlockCount	UINT	44	Number of blocks to read when the last reading error occurred.

RdErrHwAdresse	DINT	45	Hardware address when the last reading error occurred.
RdErrDatablockNo	UDINT	46	Block number when the last reading error occurred.
RdErrMarkerNo	UDINT	47	Marker number when the last reading error occurred.
RdErrSize	UDINT	48	Block size when the last reading error occurred.
DrvError	USINT	25	Error message as number
DrvErrorMsg	STRING	30	Error message as text
ErrorFile	STRING	15	Name of error log file

8. Driver-specific functions

The driver supports the following functions:

Reading and writing of values on the Masterbus.

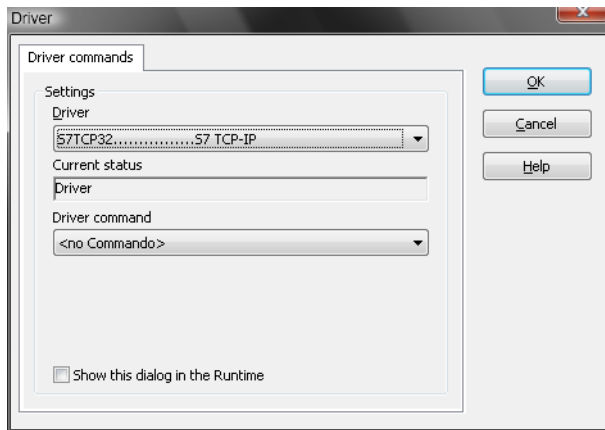
9. Driver commands

This chapter describes standard functions that are valid for most zenon drivers. Not all functions described here are available for every driver. For example, a driver that does not, according to the data sheet, support a modem connection also does not have any modem functions.

Driver commands are used to influence drivers using zenon; start and stop for example. The engineering is implemented with the help of function **Driver commands**. To do this:

- ▶ create a new function
- ▶ select Variables -> Driver commands

- The dialog for configuration is opened



Parameter	Description
Drivers	Drop-down list with all drivers which are loaded in the project.
Current status	Fixed entry which has no function in the current version.
Driver command	Drop-down list for the selection of the command.
▶ Start driver (online mode)	Driver is reinitialized and started.
▶ Stop driver (offline mode)	Driver is stopped. No new data is accepted. Note: If the driver is in offline mode, all variables that were created for this driver receive the status <code>switched off (OFF; Bit 20)</code> .
▶ Driver in simulation mode	Driver is set into simulation mode. The values of all variables of the driver are simulated by the driver. No values from the connected hardware (e.g. PLC, bus system, ...) are displayed.
▶ Driver in hardware mode	Driver is set into hardware mode. For the variables of the driver the values from the connected hardware (e.g. PLC, bus system, ...) are displayed.
▶ Driver-specific command	Enter driver-specific commands. Opens input field in order to enter a command.
▶ Driver - activate set setpoint value	Write set value to a driver is allowed.
▶ Driver - deactivate set setpoint value	Write set value to a driver is prohibited.
▶ Establish connecton with modem	Establish connection (for modem drivers) Opens the input fields for the hardware address and for the telephone number.
▶ Disconnect from modem	Terminate connection (for modem drivers)
Show this dialog in the Runtime	The dialog is shown in Runtime so that changes can be made.

DRIVER COMMANDS IN THE NETWORK

If the computer, on which the **driver command** function is executed, is part of the zenon network, additional actions are carried out. A special network command is sent from the computer to the project server, which then executes the desired action on its driver. In addition, the Server sends the same driver command to the project standby. The standby also carries out the action on its driver.

This makes sure that Server and Standby are synchronized. This only works if the Server and the Standby both have a working and independent connection to the hardware.

10. Error analysis

Should there be communication problems, this chapter will assist you in finding out the error.

10.1 Analysis tool

All zenon modules such as Editor, Runtime, drivers, etc. write messages to a joint log file. To display them correctly and clearly, use the Diagnosis Viewer (main.chm::/12464.htm) program that was also installed with zenon. You can find it under Start/All programs/zenon/Tools 7.50 -> Diagviewer.

zenon driver log all errors in the LOG files. The default folder for the LOG files is subfolder **LOG** in directory `ProgramData`, example:

`%ProgramData%\COPA-DATA\LOG`. LOG files are text files with a special structure.

Attention: With the default settings, a driver only logs error information. With the **Diagnosis Viewer** you can enhance the diagnosis level for most of the drivers to "Debug" and "Deep Debug". With this the driver also logs all other important tasks and events.

In the Diagnosis Viewer you can also:

- ▶ Follow newly-created entries in real time
- ▶ customize the logging settings
- ▶ change the folder in which the LOG files are saved

Note:

1. The Diagnosis Viewer displays all entries in UTC (coordinated world time) and not in local time.
2. The Diagnosis Viewer does not display all columns of a LOG file per default. To display more columns activate property **Add all columns with entry** in the context menu of the column header.
3. If you only use **Error-Logging**, the problem description is in the column **Error text**. For other diagnosis level the description is in the column **General text**.
4. For communication problems many drivers also log error numbers which the PLC assigns to them. They are displayed in **Error text** or **Error code** or **Driver error parameter (1 and 2)**. Hints on the meaning of error codes can be found in the driver documentation and the protocol/PLC description.
5. At the end of your test set back the diagnosis level from **Debug** or **Deep Debug**. At **Debug** and **Deep Debug** there are a great deal of data for logging which are saved to the hard drive and which can influence your system performance. They are still logged even after you close the **Diagnosis Viewer**.



Attention

In Windows CE errors are not logged per default due to performance reasons.

You can find further information on the Diagnosis Viewer in the Diagnose Viewer (main.chm::/12464.htm) manual.

10.2 Check list

Questions and hints for fault isolation:

Problem	Diagnostics	Reason
Values can be read or written by the controller.	The PLC is connected serially	<ul style="list-style-type: none"> ▶ The PLC is not connected to the power supply or the bus system. ▶ The serial cable is not connected to the correct interface (COM1...64). ▶ Do the communication parameters match (Baud rate, parity, start/stop bits,...)? ▶ The serial interface is blocked by another application. ▶ The network address in the addressing of the variable does not correspond to the configuration of the connection. ▶ The cable is assigned incorrectly or defective.
Certain values cannot be read or written by the controller.	Has an analysis with the Diagnosis Viewer been carried out to see which errors have occurred?	<ul style="list-style-type: none"> ▶ Are the variables correctly addressed? ▶ Are the correct object types used in the variable? Note: Variables of the driver variable object type do not communicate with the hardware. These only serve for internal driver monitoring.
Incorrect values are displayed.	Has an analysis with the Diagnosis Viewer been carried out to see which errors have occurred?	<ul style="list-style-type: none"> ▶ Are the variables correctly addressed? ▶ Are the correct data types used? ▶ Is the value calculation correct?

GENERAL TROUBLESHOOTING

- ▶ Analysis with the **Diagnosis Viewer** (on page 42):
-> Which messages are displayed?
- ▶ Are you using the correct cable which is recommended by the manufacturer for the connection between the PLC and the PC?
- ▶ Did you configure the Net address in the address properties of the variable correctly?

- Does the addressing match with the configuration in the driver dialog?
- Does the net address match the address of the target station?
- ▶ Does the offset addressing of the variable match the one in the PLC?

SOME VARIABLES REPORT INVALID.

- ▶ INVALID bits always refer to a net address.
- ▶ At least one variable of the net address is faulty.

VALUES ARE NOT DISPLAYED, NUMERIC VALUES REMAIN EMPTY

Driver is not working. Check the:

- ▶ Installation of zenon
- ▶ the driver installation
- ▶ The installation of all components
-> Pay attention to error messages during the start of the Runtime.

VARIABLES ARE DISPLAYED WITH A BLUE DOT

The communication in the network is faulty:

- ▶ With a network project:
Is the network project also running on the server?
- ▶ With a stand-alone project or a network project which is also running on the server:
Deactivate the property **Only read from Standby Server** in node **Driver connection/Addressing**.

VALUES ARE DISPLAYED INCORRECTLY

Check the information for the calculation in node **Value calculation** of the variable properties.

DRIVER FAILS OCCASIONALLY

Analysis with the **Diagnosis Viewer** (on page 42):

-> Which messages are displayed?