zenon driver manual

Futurit32

v.7.50

Contents

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

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2. Futurit32

3. FUTURIT32 - Data sheet

General:	
Driver file name	FUTURIT32.exe
Driver name	Swarco Futurit
PLC types	Futurit ACADA 70
PLC manufacturer	Swarco Futurit;

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

Requirements:	
Hardware PC	--
Software PC	--
Hardware PLC	--
Software PLC	--
Requires v-dll	--

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

4. Driver history

Date	Driver version	Change
07.07.08	100	Created driver documentation

DRIVER VERSIONING

The versioning of the drivers was changed with zenon 7.10. There is a cross-version build number as of this version. This is the number in the 4th position of the file version,
For example: **7.10.0.4228** means: The driver is for version **7.10** service pack **0**, and has the build number **4228**.

Expansions or error rectifications will be incorporated into a build in the future and are then available form the next consecutive build number.

Example

*A driver extension was implemented in build **4228**. The driver that you are using is build number **8322**. Because the build number of your driver is higher than the build number of the extension, the extension is included. The version number of the driver (the first three digits of the file version) do not have any significance in relation to this. The drivers are version-agnostic*

5. Requirements

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

5.1 PC

HARDWARE

Serial interface, modem

Protocol: FuturitCom

SOFTWARE

Copy the driver file Futurit32.exe into the current installation directory (if it does not already exist there) and enter it into TREIBER_EN.XML with the tool driverinfo.exe.

CONNECTION

Connection between the serial interface of the PC to the COM1 interface of Futurit ACADA 70. For a modem connection a modem supporting TAPI has to be installed on the PC. Refer to the operating system documentation or to the documentation of your modem manufacturer for more information.

5.2 Control

Futurit ACADA 70

Protocol: FuturitCom

6. Configuration

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

Information

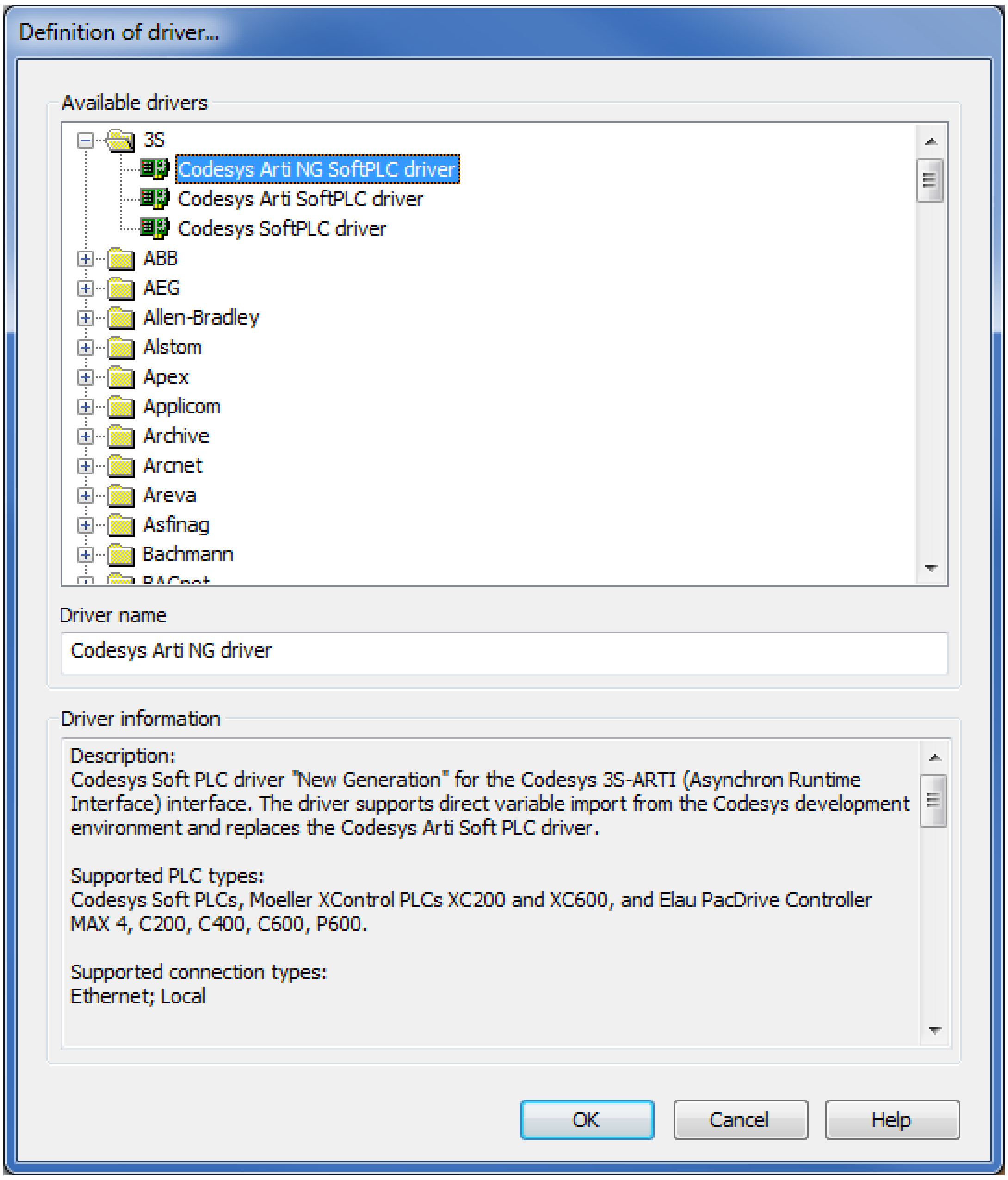
Find out more about further settings for zenon variables in the chapter Variables (main.chm::/15247.htm) of the online manual.

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.



Definition of driver...

Available drivers

- 3S
  - Codesys Arti NG SoftPLC driver
  - Codesys Arti SoftPLC driver
  - Codesys SoftPLC driver
- ABB
- AEG
- Allen-Bradley
- Alstom
- Apex
- Applicom
- Archive
- Arcnet
- Areva
- Asfinag
- Bachmann

Driver name: Codesys Arti NG driver

Driver information

Description:
Codesys Soft PLC driver "New Generation" for the Codesys 3S-ARTI (Asynchron Runtime Interface) interface. The driver supports direct variable import from the Codesys development environment and replaces the Codesys Arti Soft PLC driver.

Supported PLC types:
Codesys Soft PLCs, Moeller XControl PLCs XC200 and XC600, and Elau PacDrive Controller MAX 4, C200, C400, C600, P600.

Supported connection types:
Ethernet; Local

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:

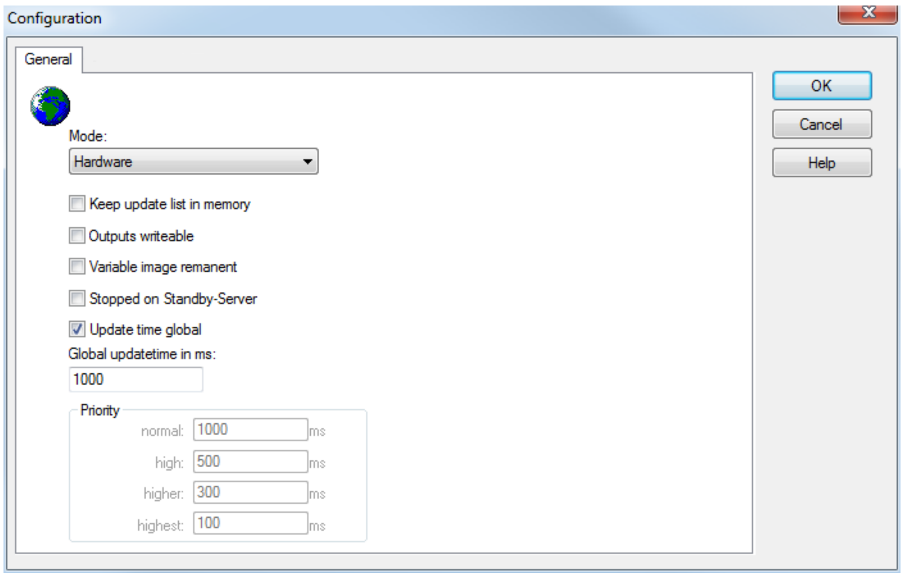
- Internal
- MathDr32
- SysDrv.

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.



Mode: Hardware

- [ ] Keep update list in memory
- [ ] Outputs writeable
- [ ] Variable image remanent
- [ ] Stopped on Standby-Server
- [x] Update time global

Global updatetime in ms: 1000

Priority

normal:	1000	ms
high:	500	ms
higher:	300	ms
highest:	100	ms

Parameters	Description
Mode	Allows to switch between hardware mode and simulation mode - Hardware: A connection to the control is established. - Simulation static 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. - Simulation - counting 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. - Simulation - programmed 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).
Keep update list in the memory	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.
Output can be written	`Active`: Outputs can be written. `Inactive`: Writing of outputs is prevented. Note: Not available for every driver.
Variable image remanent	This option saves and restores the current value, time stamp and the states of a data point. Fundamental requirement: The variable must have a valid value and time stamp.

	The variable image is saved in mode hardware if: - one of the states S_MERKER_1(0) up to S_MERKER8(7), REVISION(9), AUS(20) or ERSATZWERT(27) is active The variable image is always saved if: - the variable is of the object type **Driver variable** - the driver runs in simulation mode. (not programmed simulation) The following states are not restored at the start of the Runtime: - SELECT(8) - WR-ACK(40) - WR-SUC(41) The mode **Simulation - programmed** at the driver start is not a criterion in order to restore the remanent variable image.
Stop on Standby Server	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. Attention: If this option is active, the gapless archiving is no longer guaranteed. `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. 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.
Global Update time	`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. `Inactive`: The set priorities are used for the individual variables.
Priority	The polling times for the individual priority classes are set here. All variables with the according priority are polled in the set time. The allocation to the variables takes place separately in the settings of the variable properties. The communication of the individual variables are graduated in respect of importance or necessary topicality using the priorities.

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

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.

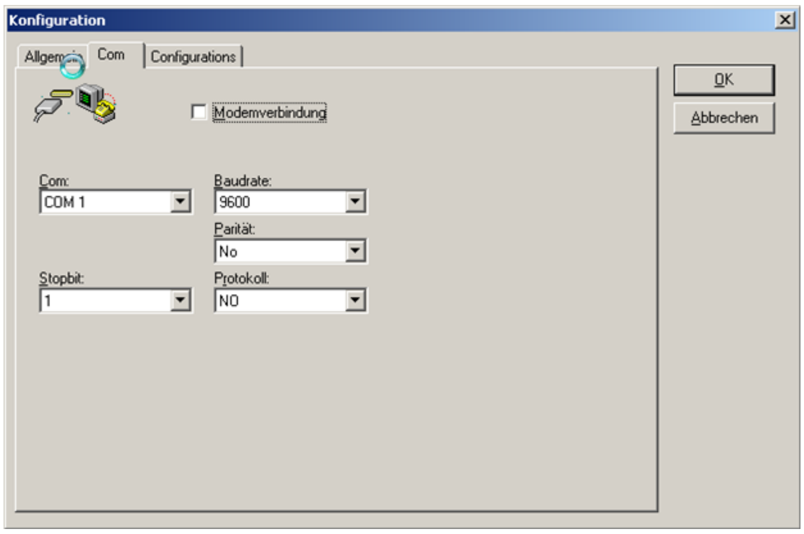
UPDATE TIME FOR CYCLICAL DRIVERS

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

OPTIONS



☐ Modemverbindung

Com: COM 1

Baudrate: 9600

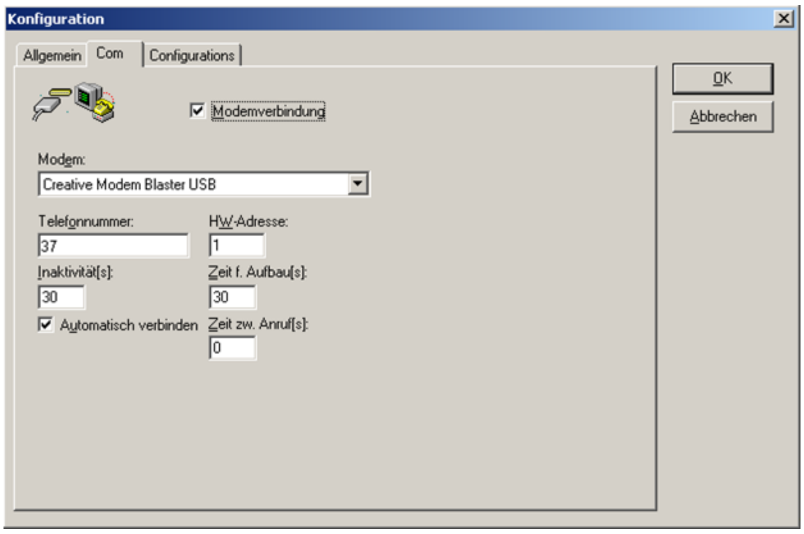
Parität: No

Stopbit: 1

Protokoll: NO

Parameters	Description
Modem connection	Shows the fields for the modem settings (see below).
Com	Select the serial interface, to which the PLC is connected.
Baud rate	Baud rate of the connection (Default: 9600).
Parity	Settings for the parity of the connection (Default: No).
Stop bit	Number of stopbits for the connection (Default: 1).
Protocol	Protocol of the connection (Default: NO).

SETTINGS – MODEM CONNECTION



☑ Modemverbindung

Modem: Creative Modem Blaster USB

Telefonnummer: 37

HW-Adresse: 1

Inaktivität[s]: 30

Zeit f. Aufbau[s]: 30

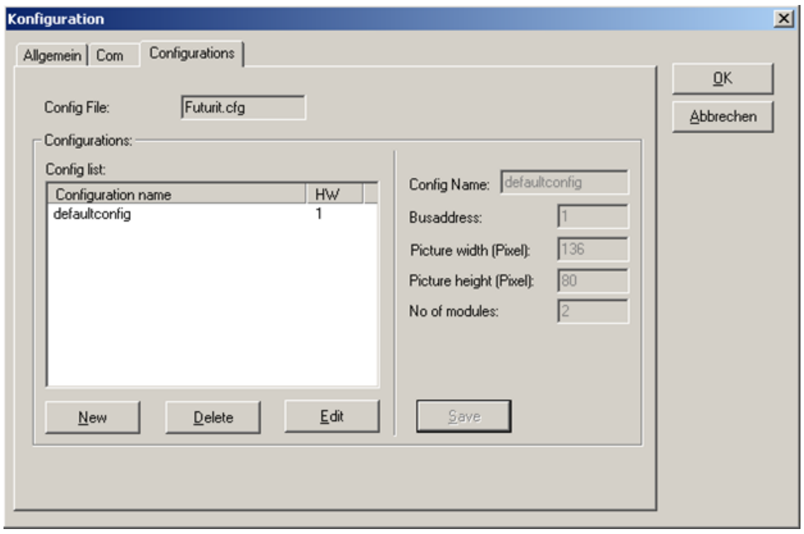
☑ Automatisch verbinden

Zeit zw. Anruf[s]: 0

TAGs	Description
Modem	Select the desired TAPI modem here.
Telephone number	The telephone number for the connection.
HW address	The hardware address for the telephone number. Only variables for the defined hardware address are polled.
Inactive(s)	The connection is closed, if there is no valid data exchange within this time [s].
Time to connect	Within this time [s] a connection has to be established, otherwise the connection establishment is stopped with an error.
Time between calls	The modem waits this time [s] between two calls. Mail-certificated modems cannot make calls immediately one after the other.
Automatic connection	If this setting is activated an a telephone number is defined, the connection establishment is started immediately on starting the Runtime.

6.2.3 Configurations

On this page any number of configurations for PLCs on different hardware addresses can be saved.



Config File: Futurit.cfg

Configurations:

Config list:

Configuration name	HW
defaultconfig	1

Config Name: defaultconfig

Busaddress: 1

Picture width (Pixel): 136

Picture height (Pixel): 80

No of modules: 2

Parameters	Description
Config file	Configuration file, in which the configuration should be saved (only for information).
Config List	Displays the connection name with the corresponding hardware address. By selecting the connection name with the mouse the configuration parameters are displayed.
Config Name	Freely definable name of the configuration.
Net address	Corresponds to the net address of the variable definition.
Screen Width (Pixel)	Width of a screen in pixels.
Screen Height (Pixel)	Height of a screen in pixels.
No. of modules	Number of modules.
Save	Save connection settings.
New	Create new connection. Enter connection parameters and close with "Save".
Delete	Delete existing connection.
Edit	Edit existing connection. Change connection parameters and close with "Save".

7. Creating variables

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

7.1 Creating variables in the Editor

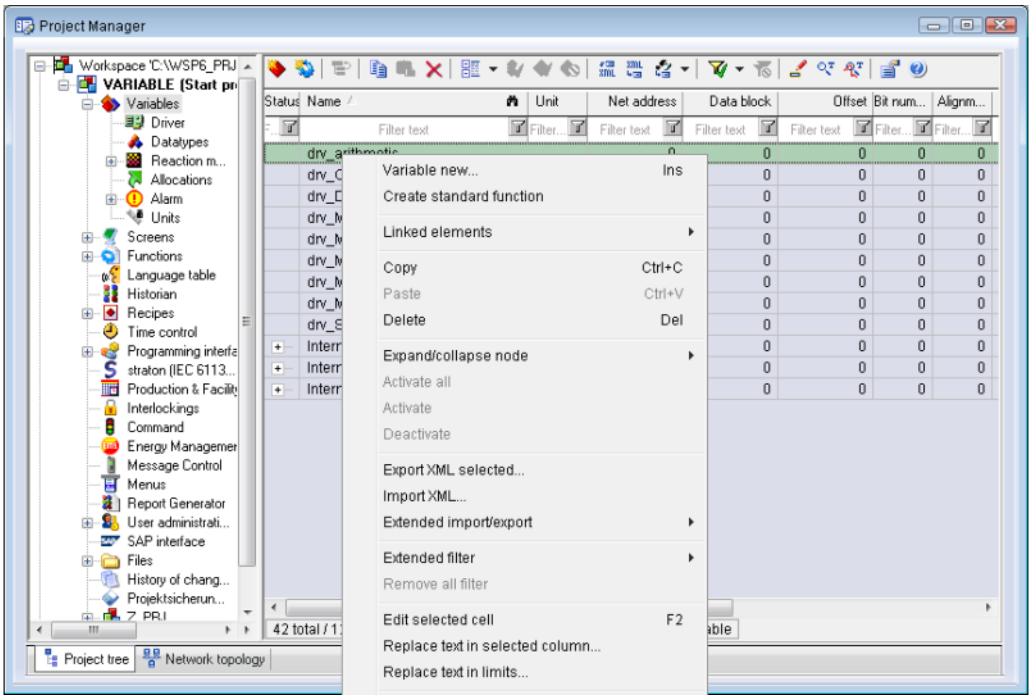
Variables can be created:

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

VARIABLE DIALOG

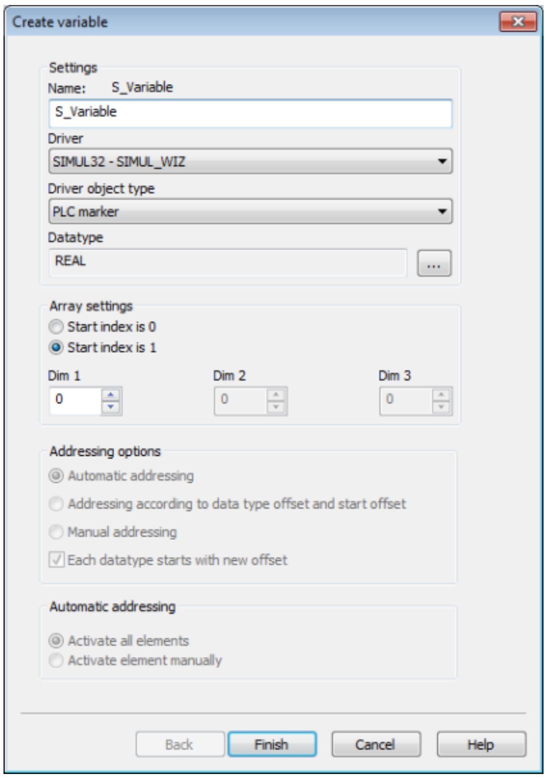
To create a new variable, regardless of which type:

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


Create variable

Settings
Name: S_Variable
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	Dim 2	Dim 3
0	0	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

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

Property	Description
Name	Freely definable name Attention: the name must be unique within each control system project.
Identification	Any text can be entered here, e.g. for resource labels, comments ...
Net address	Bus address or net address of the variable. This address refers to the bus address in the connection configuration of the driver. This defines the PLC, on which the variable resides.
Data block	For variables of object type Extended data block, enter the datablock number here. Configurable [0.. 4294967295]. Please look up the exact maximum range for data blocks in the manual of the PLC.
Offset	Offset of the variable; the memory address of the variable in the PLC. Configurable [0.. 4294967295].
Alignment	not used for this driver
Bit number	Number of the bit within the configured offset. Allowed entry [0.. 65535], Working range [0..7]
String length	Only available for String variables: Maximum number of characters that the variable can take.
Driver connection/Driver Object Type	Depending on the employed driver, an object type is selected during the creation of the variable; the type can be changed here later.
Driver connection/Data Type	Data type of the variable, which is selected during the creation of the variable; the type can be changed here later. Attention: If you change the data type later, all other properties of the variable must be checked and adjusted, if necessary.
Driver connection/Priority	

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:

OBJECTS FOR PROCESS VARIABLES IN ZENON

Object	Read	Write	Comment
Configuration			Opens the driver configuration menu
`BOOL`	X	X	numerical variables with 1 Bit
`BYTE`	X	X	numerical variables with 8 Bit
`INT`	X	X	numerical variables with 16 Bit
`LINT`	X	X	numerical variables with 32 Bit
`FLOAT`	X	X	numerical variables with IEEE format
`STRING`	X	X	alphanumerical variable with up to 255 characters

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`	8
	`USINT`	9
	`SINT`	10
	`UINT`	2
	`INT`	1
	`UDINT`	4
	`DINT`	3
	`ULINT`	27
	`LINT`	26
	`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-OBJEKTTYP 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 ErrorMSG only for drivers that only edit one connection at a 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 `driver stop`, the variable has the value `TRUE` and an **OFF** bit. After the driver has started, the variable has the value `FALSE` and no **OFF** bit.
SimulRTState	UDINT	60	Informs the status of Runtime for driver simulation.

CONFIGURATION

Name from import	Type	Offset	Description
ReconnectInRead	BOOL	27	If TRUE, 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 SrvDrvVarApplyCom 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 SrvDrvVarApplyModem. 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:

INI ENTRIES

ZENON6.INI

None

PROJECT.INI

None

SENDING COMMANDS TO THE PLC

STEP 1: CREATE DATABLOCK

The commands are defined in the control system by creating a datablock (sending block) with the according number for each command.

STEP 2: FILL DATABLOCK WITH DATA TO SEND

Then the datapoints of the datablock have to be filled with the data for the command.

STEP 3: SEND COMMAND TO THE PLC

In order to send the command to the PLC, the length of the command (incl. command number) has to be sent to the byte with the offset 255 of the datablock. In the offset 255 of the according ex-datablock (read datablock) a 0 is entered, while the command is sent to the PLC and the driver for a response.

STEP 4: EVALUATE RESULT

If sending the command has been successful, the value of the byte on offset 255 is reset to 0 and in the ex-datablock (read datablock) with the same number as the command offset 0 gets status 1 and offset 1 gets status 2. Starting with offset 2 probably received data are entered.

The value 1 is written to offset 255, if the command has been executed successfully. In case of an error offset 255 contains an error code (see below).

If an error occurred, the value of the byte with offset 255 is not reset. Additionally an entry in the error file (see below) of the driver is generated and the last occurring error is entered in the driver variable with offset 1000.

EXAMPLE

E.g. in order to send the command “Start mess” to the PLC the following steps have to be executed:

Create a byte variable in datablock (sending block) $12, decimal 18, offset 0 – here the screen number is entered.

Create a byte variable in datablock (sending block) $12, decimal 18, offset 255 – here the length of the command is entered to transmit the command.

Link the variables to dynamic elements, so that values can be sent to the variables.

In the Runtime first send a value to the variable with offset 0 (e.g. 1 for screen 1).

Then set the value of the variable with the offset 255 to 2 (the command is 2 bytes long).

If this worked, the value of the variable with offset 255 is set to 0; in case of an error the values stays 2.

Additionally in offset 255 of the according ex-datablock (read datablock) the error code can be read, or 1 if successful.

SPECIAL COMMANDS

The following commands are treated especially: Send screen, Get screen, Get mess, Led status

SEND SCREEN

If Send screen is executed, it is tried to load the file [hardware address]_[screen number].TX from the directory ‘[project directory]\\Bitmaps\\’. The screen number is read from offset 0 of the datablock (send datablock) $11 (decimal 17), which has to be defined accordingly. Then this is sent to the PLC line by line. The width and height of the screen is taken from the driver configuration. The command also is not executed, before the length is entered in the offset 255 of datablock 17.

If the file does not exist, the command is sent normally, i.e. with the information from the datablock.

GET SCREEN

Get screen also uses the screen number from offset 0 of the datablock (send datablock) $1E (decimal 30). The screen then is read line by line, the number of lines again taken from the driver configuration, and stored in a file with the name [hardware address]_[screen number].TX in the directory '[project directory]\\Bitmaps\\Upload'.

GET MESS

With Get mess the screen is read line by line, the number of lines again comes from the driver configuration. Then a file with the name [hardware address]_ACT.TX is created in the directory '[project directory]\\Bitmaps\\Upload'.

LED STATUS

With Led status the screen again is read line by line, the number of lines again comes from the driver configuration. Then a file with the name [hardware address]_ERR.TX is created in the directory '[project directory]\\Bitmaps\\Upload'.

CYCLIC EXECUTION OF COMMANDS

In order to execute commands cyclically the update time in seconds has to be entered in offset 254 of the datablock (send datablock) of the according command. With 0 it is normally read (see below). With a time not 0 then the length of the command has to be defined correctly. From now on the command is executed in the seconds interval entered in offset 254.

EXAMPLE

E.g. to execute the command “Start mess” cyclically the following steps have to be executed:

Create a byte variable in datablock (sending block) $12, decimal 18, offset 0 – here the screen number is entered.

Create a byte variable in datablock (sending block) $12, decimal 18, offset 254 – here the update interval in seconds is entered.

Create a byte variable in datablock (sending block) $12, decimal 18, offset 255 – here the length of the command is entered to transmit the command.

Link the variables to dynamic elements, so that values can be sent to the variables.

In the Runtime first send a value to the variable with offset 0 (e.g. 1 for screen 1).

Then set the variable with offset 254 e.g. to 5 (for 5 seconds update interval).

Then set the value of the variable with the offset 255 to 2 (the command is 2 bytes long).

The length of the command on offset 255 is never reset.

In offset 255 of the according ex-datablock (read datablock) the error code can be read, or 1 if successful.

The special command work in cyclic execution just as they do in normal mode.

DATABLOCK $10 (DECIMAL 16) – THE COMMAND POLL

If a command is sent to the PLC, the response contains two status bytes. These are always copied to the offsets 0 and 1 of the ex-datablock (read datablock) $10.

TOTAL STATUS

The total status of the commands is set in the ex-datablock (read datablock) 0 on offset 255.

The status is 0, as long as at least one command has not yet been executed successfully.

The total status is set to 1 not before all commands have been successful.

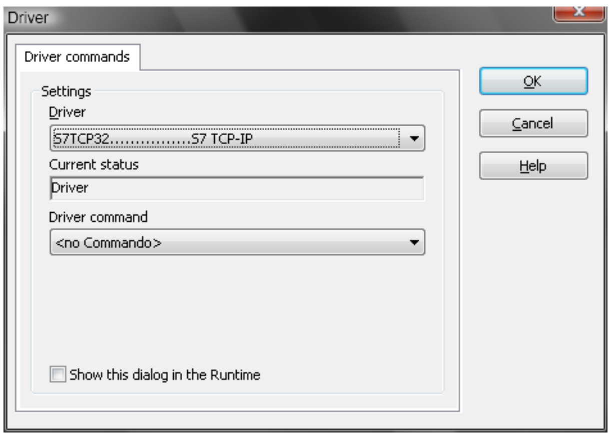
This regards all commands, which have been defined for a hardware address, i.e. each command, for which a datablock has been created, i.e. a variable nas been created in the datablock and this variable has been requested in the Runtime. This status for the current modem hardware address is also stored in the driver variable 1001.

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



Settings

Driver: S7TCP32...............S7 TCP-IP

Current status: Driver

Driver command: <no Commando>

☐ Show this dialog in the Runtime

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 `switched off` (`OFF`; Bit 20).
▸ `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 Error numbers

ERROR CODES

Error code	Description
-1	General error:
-10	Received data: wrong sync. bytes
-11	Received data: wrong target address
-12	wrong tag (not corresponding with command)
-13	Received data: NACK has been returned
-14	Received data: wrong checksum in header
-15	Received data: wrong checksum in data
-40	Driver has been closed
-41	No response

10.3 Check list

Is the device (PLC) that you are trying to communicate with connected to the power supply?

Are the PC or the PLC connected with a nullmodem cable?

Are the used datablocks defined correctly in the PLC?

Does the file [driver name].cfg exist on the target computer?

Have you analyzed the "driver communication error file" (which errors have occured)?

In case of communication problems, the driver writes a detailed problem analysis into the driver communication error file. This file is stored in the project directory (RT\\FILES\\zenon\\custom\\log).

The name of the file is _<drivername>.txt.
The file can be opened with any text editor, e.g. Notepad.

For additional error analyses, please send a project backup and the "error text file" to the support team responsible for you