



**COPADATA**  
do it your way

# zenon driver manual

## SAIA2ND32

v.7.11





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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) (<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) (<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) (<mailto:sales@copadata.com>).

## 2. SAIA2ND32

## 3. SAIA2ND32 - Data sheet

General:	
Driver file name	SAIA2ND32.exe
Driver name	SAIA2ND32 driver
PLC types	SBUS: PCD1.MXXX; PCD2.MXXX; PCD4.MXXX; PCD3MXXX; PCD6.MXXX; PCS1.CXXX TCP/IP: PCD1.M130 with PCD7.F650 module; PCD2.M150 with PCD7.F650 module; PCD2.M170 with PCD7.F650 module; PCD4.M170 with PCD7.F650 module; PCD6.M300 with PCD7.F651 module
PLC manufacturer	Saia;

Driver supports:	
Protocol	TCP/IP; SAIA S-Bus; SAIA P800;
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	x
RDA String	-

Requirements:	
Hardware PC	RS 232 serial interface; converter cable; standard network card
Software PC	The following files from Saia-Burgess: *SCommDll.dll, *SCommDlg.dll, *SCommCom.dll, *SCommUsr.dll, *SCommDrv.exe SCommDrv.hlp, SCommDrv.Cnt, SCommDlg.hlp and SCommDlg.Cnt. *must only be installed once per PC. The files are components of PG5
Hardware PLC	-
Software PLC	-
Requires v-dll	-

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

## 4. Driver history

Date	Driver version	Change
07.07.08	1400	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 from 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 RS232

Cable: Converter cable

Protocol: SAIAP 800/SAIA SBUS

### SOFTWARE

The following files must be in the zenon directory:

The driver SAIA2nd32.EXE

The following files of Saia-Burgess:

\*SCommDll.dll, \*SCommDlg.dll, \*SCommCom.dll, \*SCommUsr.dll, \*SCommDrv.exe SCommDrv.hlp, SCommDrv.Cnt, SCommDlg.hlp und SCommDlg.Cnt.

The driver requires these DLLs in the version 1.3.121 or newer.

These files must not exist more than once on the PC! If programs of Saia-Burgess are installed that contain these files as well, the files must not exist in the zenon directory twice.

### CONNECTION

Direct connection of serial PC interface via serial interface of PLC

## 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*

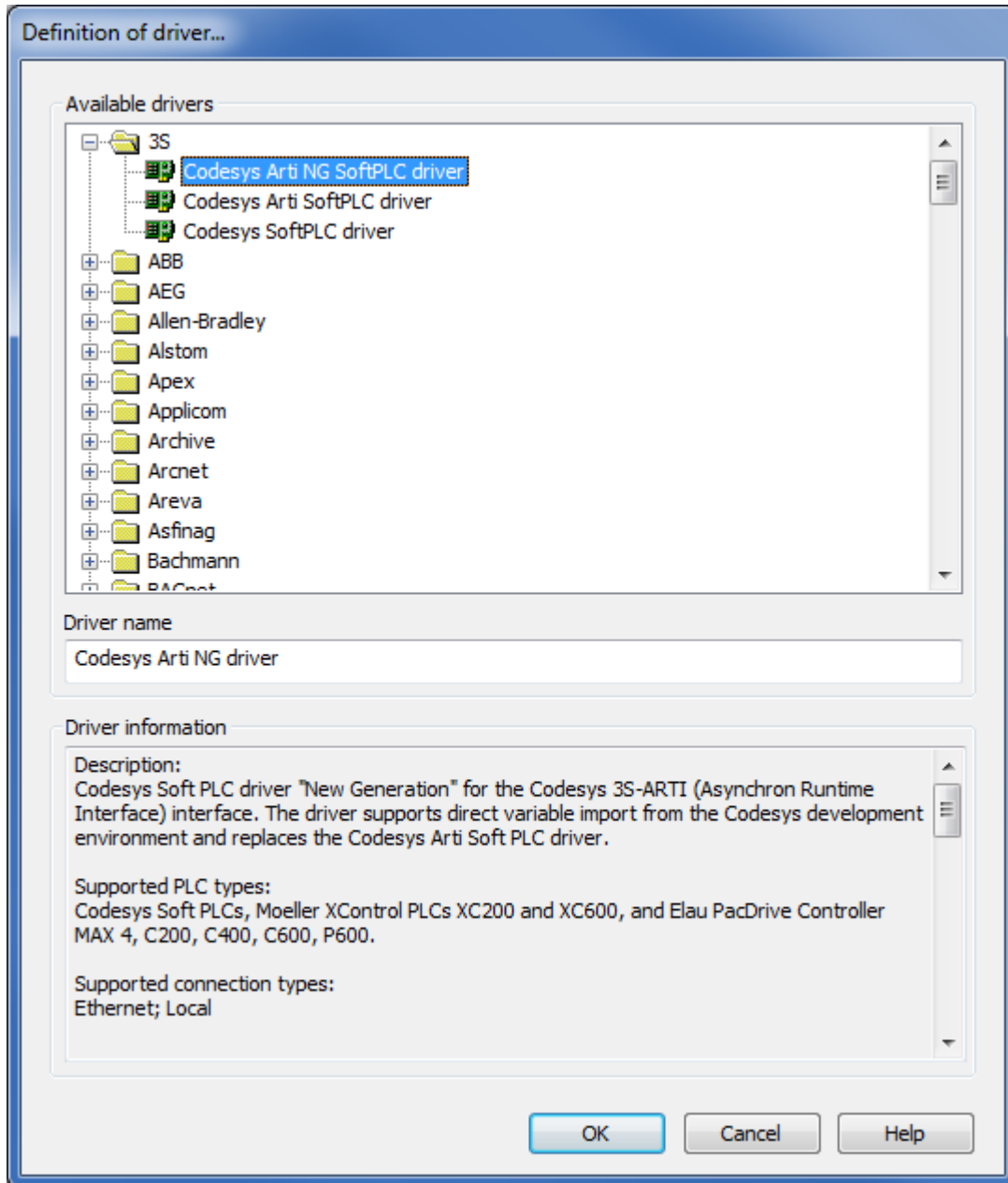
*(main.chm::/15247.htm) of the online manual.*

## 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:*

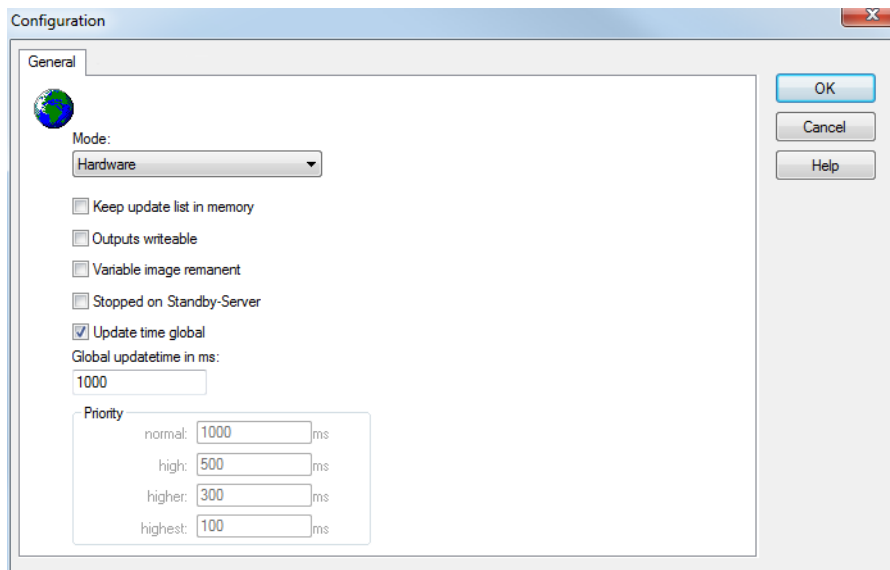
- ▶ Internal
- ▶ MathDr32
- ▶ SysDrv.

▶

## 6.2 Settings in the driver dialog

You can change the following settings of the driver:

## 6.2.1 General



Parameters	Description
Mode	<p>Allows to switch between hardware mode and simulation mode</p> <ul style="list-style-type: none"> <li>▶ Hardware: <p>A connection to the control is established.</p> </li> <li>▶ 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 straton. 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> </li> <li>▶ 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> </li> <li>▶ 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 straton Workbench and runs in a straton Runtime which is integrated in the driver. For details see chapter Driver simulation (main.chm::/25206.htm).</p> </li> </ul>
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.</p> <p>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>
Outputs writeable	<p>Active: Outputs can be written.</p> <p>Inactive: Writing of outputs is prevented.</p> <p><b>Note:</b> 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"> <li>▶ one of the states <code>S_MERKER_1(0)</code> up to <code>S_MERKER8(7)</code>, <code>REVISION(9)</code>, <code>AUS(20)</code> or <code>ERSATZWERT(27)</code> is active</li> </ul> <p>The variable image is always saved if:</p> <ul style="list-style-type: none"> <li>▶ the variable is of the object type <code>Driver variable</code></li> <li>▶ the driver runs in simulation mode. (not programmed simulation)</li> </ul> <p>The following states are not restored at the start of the Runtime:</p> <ul style="list-style-type: none"> <li>▶ <code>SELECT(8)</code></li> <li>▶ <code>WR-ACK(40)</code></li> <li>▶ <code>WR-SUC(41)</code></li> </ul> <p>The mode <b>Simulation - programmed</b> at the driver start is not a criterion in order to restore the remanent variable image.</p>
Stopped 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><b>Attention:</b> If this option is active, the gapless archiving is no longer guaranteed.</p> <p><b>Active:</b> 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 <b>switched off</b> (<code>statusverarbeitung.chm: :/24150.htm</code>) but an empty value. This prevents that at the upgrade to the Server irrelevant values are created in the AML, CEL and Historian.</p>
Update time global	<p><b>Active:</b> The set <code>Update time global</code> in ms is used for all variables in the project. The priority set at the variables is not used.</p> <p><b>Inactive:</b> The set priorities are used for the individual variables.</p>
Priority	<p>Here you set the polling times for the individual priorities. All variables with the according priority are polled in the set time. The allocation is taken</p>

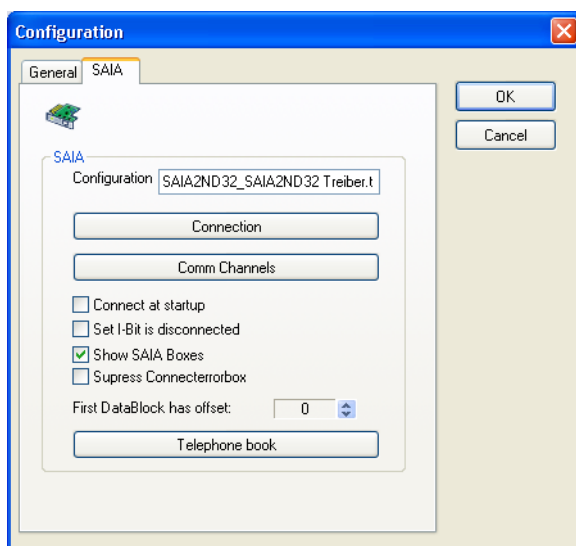
	place for each variable separately in the settings of the variable properties. The communication of the individual variables are graduated in respect of importance or necessary topicality using the priorities. Thus the communication load is distributed better.
<b>OK</b>	Accepts settings in all tabs and closes dialog.
<b>Cancel</b>	Discards all changes and closes the dialog.
<b>Help</b>	Opens online help.

## UPDATE TIME FOR CYCLICAL DRIVER

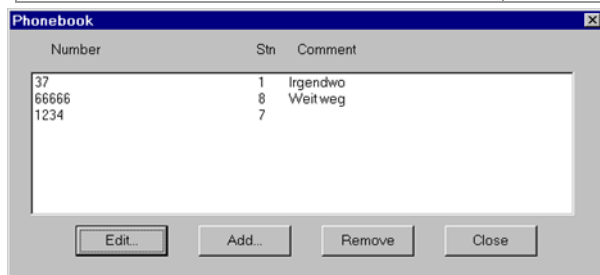
The following applies for cyclical drivers:

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 Driver dialog SAIA



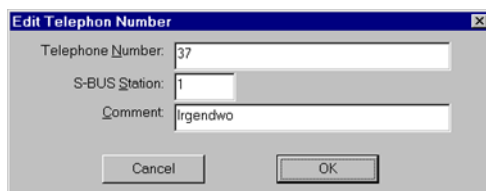
Parameters	Description
Connection	Opens a dialog to select the canal that should be currently used
Comm Channels	Opens a dialog to create and edit the canals
Connect at startup	If this option is activated, the driver creates a connection directly after the start.
Set I-Bit is disconnected	Activated: At status 5 0 the INVALID bit is set.
Show SAIA Boxes	If activated, the SAIA-Dialog-Window is opened.
Suppress connect error box	The message for connection error is not shown.
Telephone book	Opens the dialog with the telephone book.



In this dialog the currently defined telephone-book-entries are shown.

Parameters	Description
Number	Telephone number of entry
Stn	S-Bus-Number for the telephone numbers. If this is "0", then the bus address of the variable will be used.
Comment	Comment

## DIALOG TO EDIT THE ENTRY



## 7. Creating variables

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

### 7.1 Creating variables in the Editor

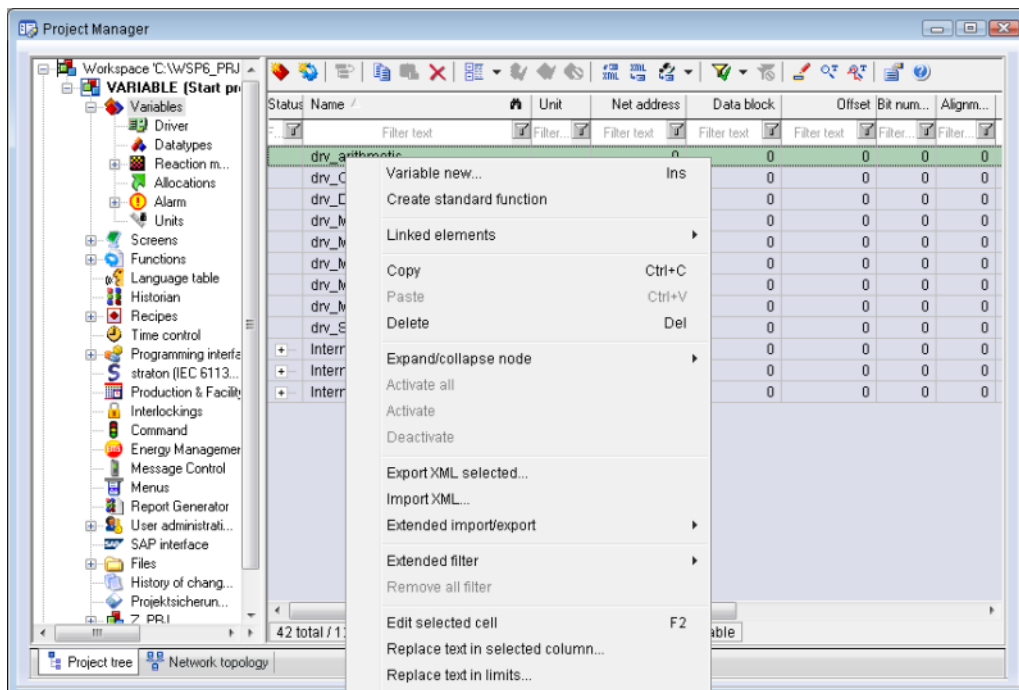
Variables can be created:

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

#### VARIABLE DIALOG

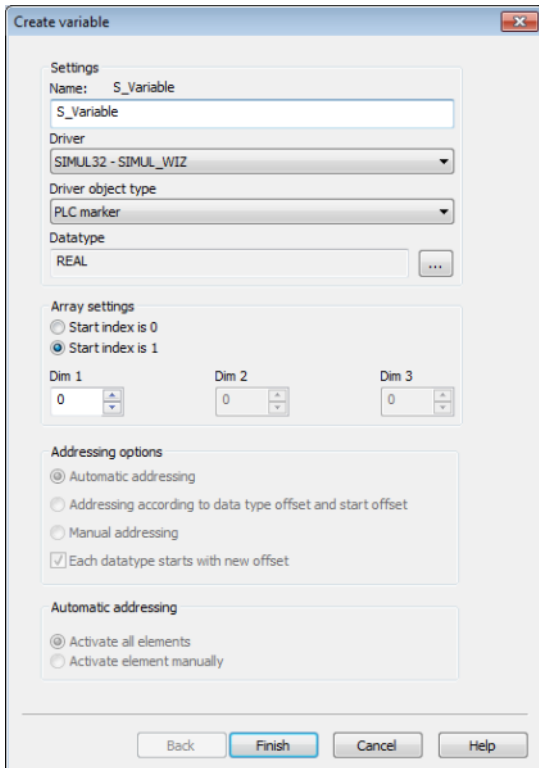
To create a new variable, regardless of which type:

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



Parameters	Description
Name	<p>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.</p> <p>Maximum length: 128 characters</p> <p><b>Attention:</b> The characters # and @ are not permitted in variable names. If non-permitted characters are used, creation of variables cannot be completed and the <b>Finish</b> button remains inactive.</p>
Drivers	<p>Select the desired driver from the drop-down list.</p> <p><b>Note:</b> 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.</p>
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.

## 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	<p>Freely definable name</p> <p><b>Attention:</b> the name must be unique within each control system project.</p>
Identification	Any text can be entered here, e.g. for resource labels, comments ...
Net address	<p>Bus address or net address of the variable.</p> <p>This address refers to the bus address in the connection configuration of the driver. This defines the PLC, on which the variable resides.</p>
Data block	<p>For variables of object type Extended data block, enter the datablock number here.</p> <p>Configurable [0.. 4294967295] . Please look up the exact maximum range for data blocks in the manual of the PLC.</p>
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	<p>Number of the bit within the configured offset.</p> <p>Valid input [0.. 65535], Working range [0..7]</p>
String length	Only available for String variables: Maximum number of characters that the variable can take.
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.
Data type	<p>Data type of the variable, which is selected during the creation of the variable; the type can be changed here later.</p> <p><b>ATTENTION:</b> 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	Comment
Output	11	R / W	BOOL	
Ext. Data block	34	R / W	UDINT, DINT, REAL, STRING, BOOL	
Input	10	R	BOOL	
Flags	21	R / W	BOOL	
HW Status	64	R	UDINT, UINT	
Register	8	R / W	UDINT, DINT, REAL, STRING, BOOL	
Counters	23	R / W	UDINT	
Time	22	R / W	UDINT	
Driver variable	35	R / W	BOOL, SINT, USINT, INT, UINT, DINT, UDINT, REAL, STRING	Variables for the statistical analysis of communication.  Find out more in the chapter about the Driver variables (on page 36)

## OBJECTS FOR PROCESS VARIABLES IN ZENON

Object	Read	Write	Comment
Configuration			
Bit-Register	y	y	bit one-step addressing (linear)  Addressing: one-step via OFFSET
DWord-Register	y	y	32 bit double word one-step addressing (linear)
DataBit	y	y	Bit, is created in the data area of SAIA
data doubleword	y	y	
Input bit	y		Bit, directly accesses to the inputs  Addressing: one-step via OFFSET
Output Bit	y		Bit, directly accesses to the outputs

			Addressing: one-step via OFFSET
Timer	y		32 bit double word
Counter	y		32 bit double word
Flags	y	y	Bit, directly accesses to the flags Addressing: one-step via OFFSET
Status	y		16 bit word

### PREDEFINED VARIABLES

The variables, which the driver supports are defined in the Variable- import- file SAIA2nd32.DBF.

### VARIABLES OF TYPE STATUS:

These are all data type WORD. It is recommended to use corresponding driver variables with zenon Version 5.2 and higher.

Variable	Offset	Write	Comment
ST_ERROR	0	N	Is 65535 in case of error. Is 0 if there is not error.
ST_COMMTIMEOUT	1	N	Is 1 in case of interface timeout.
ST_ERRORCODE	2	N	Contains an error code according to SAIA and the driver errors.
ST_CSCOMMERROR	3	N	Is 1 in case of error. Is 0 if there is not error.
ST_ERRORCNT	4	Y	Counts the failed transfers.
ST_CONNECT	5	Y	If this is $\neq 0$ , then the connection will be established. If 0 the connection is cut.
ST_CONNECTDLG	6	Y	Writing a value on this offset activates a dialog for connection settings.
ST_TELBOOK_NO	7	Y	The content of this table element selects the telephone book entry. The 1st entry has the value 0. A value of 65535 denotes that no telephone book entry is to be used.
ST_SPSCLOCK	8	Y	Is of type Status long. The number of seconds since 1.1. 1970 0:0

## DRIVER VARIABLES

The driver supports the following driver variables:

Variable	Type	Offset	Write	Comment
SaiaERROR	Bit	1000	N	Is 1 in case of error.
SaiaCOMMTIMEOUT	Bit	1001	N	IS 1 in case of interface timeout.
SaiaErrorCode	DWORD	1002	N	The error code of driver and PCD-Connection. The error codes are moved to offset 128. In order to prevent an overlapping of internal error codes.
SaiaCSCOMMERROR	Bit	1003	N	IS 1 in case of interface error.
SaiaERRORCNT	DWORD	1004	Y	Number of errors.
SaiaVERBIND	Bit	1005	Y	If 1 the connection is established.
SaiaCONNECTDLG	Bit	1006	Y	Writing on this address activates the connection dialog.
SaiaTELBOOK_NO	DWORD	1007	Y	Selects the telephone book entry.
SaiaConnected	Bit	1008	N	1 if a connection exists.
SaiaPhoneNo	String	1009	Y	Telephone number for selection.
SaiaBusNo	DWORD	1010	Y	Bus number for selection.
SaiaApply	Bit	1011	Y	If 1 the done settings of variable SaiaPhoneNo and SaiaBusNo are activated. This variable is automatically set back to 0.
SaiaConnetedStation	DWORD	1014	N	Contains the S-Bus address of the PLC that the connection was established with.
SaiaOnOff	STRING	1015	Y	<p>Specifies the S-Bus addresses that are not read.</p> <p>Data points with this net address will not be modified and are therefore frozen.</p> <p>If you enter several addresses, you must separate them with a semicolon (;). The value ALL locks these addresses.</p>

For this driver variable, an import description is defined in the file Saia2nd32.dbf.

## DRIVER COMMANDS:

The driver supports the driver commands "Connect driver modem" and "Hang up driver modem". These commands are not restricted to one special modem connection but also establish a connection to S-bus and PGU.

For S-Bus Connection:

Net Address:

The used net address is put together as follows:

If the net address of a variable is set to another value than 0, this address will be used.

If in the driver variable SaiaBusno has a value that is not 0, this value is used. The content of this variable is changed by the "Connect driver modem" driver command.

If a telephone book entry is selected and the station number is unequal 0, this setting is used by the telephone book.

For PGU Connection:

Net Address = 0

The objects consist of data from the SAIA PLC that are usually created in zenon. The properties of the objects are defined by the used PLC.

Statusobject

With the statusobject with address 5 it is possible to select via zenon . If the value 1 is written to a status object, the connection is established, write 0 to the status word to cancel the modem connection.



### Information

Also with normal serial connection the status object with the address 5 must be set to 1. This results in the establishment of the connection from zenon to the Saia PLC. If the status is not set to 1, no connection is established.

Modem plug by SAIA PCD2 to 9-pin. Sub. D Connector

Exeption: Error counter can be set back only via set value.

*Also with normal serial connection the status object with the address 5 must be set to 1.  
This causes the connection between zenon and the SAIA PLC.*

### 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.

Control	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 type 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 there 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

Description	Type	Field size	Comment
KANALNAME	Char	128	Variable name.  The length can be limited using the MAX_LAENGE entry in <b>project.ini</b> .
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 <b>project.ini</b> .
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 <b>project.ini</b> .
Unit	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)
ADDRESS	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 Recipe Group Manager
LES_SCHR	R	1	Write-Read-Authorization 0: Not allowed to set value. 1: Allowed to set value.
MIT_ZEIT	R	1	time stamp in zenon 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
MENTIEFE	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	R	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	R	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 <b>project.ini</b> .
ADJWVBA	R	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 DEFINITION

Limit definition for limit values 1 to 4, and status 1 bis 4:

Description	Type	Field size	Comment
AKTIV1	R	1	Limit value active (per limit value available)
GRENZWERT1	F	20	hnical value or ID number of a linked variable for a dynamic limit (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
HYSTERESE1	F	14	Is not used
BLINKEN1	R	1	Set blink attribute
BTB1	R	1	Logging in CEL
ALARM1	R	1	Alarm
DRUCKEN1	R	1	Printer output (for CEL or Alarm)
QUITTIER1	R	1	Must be acknowledged
LOESCHE1	R	1	Must be deleted
VARIABLE1	R	1	Dyn. limit value linking the limit is defined by an absolute value (see field GRENZWERTx).
FUNC1	R	1	Functions linking
ASK_FUNC1	R	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	R	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 messages

The definitions of the variables defined in the driver kit are available in the import file `drvvar.dbf` (on the CD in the directory: `CD_Drive:/Predefined/Variables`) 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	12:00 AM	Connection in hold
LineStateConferenced	BOOL	12:00 AM	Connection in conference mode.
LineStateOnHoldPendConf	BOOL	12:00 AM	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 <code>OFF</code> bit. After the driver has started, the variable has the value <code>FALSE</code> and no <code>OFF</code> bit.
SimulRTState	UDINT	60	Informs 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 <code>PhoneNumberSet</code> and <code>ModemHwAdrSet</code> .
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	<code>TRUE</code> , if update time is global
TreiberSimul	BOOL	5	<code>TRUE</code> , if driver in sin simulation mode
TreiberProzab	BOOL	6	<code>TRUE</code> , 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.
Baud rate	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 <b>Normal</b> in milliseconds (ms).
MaxUpdateTimeHigher	UDINT	57	Time since the last update of the priority group <b>Higher</b> in milliseconds (ms).
MaxUpdateTimeHigh	UDINT	58	Time since the last update of the priority group <b>High</b> in milliseconds (ms).
MaxUpdateTimeHighest	UDINT	59	Time since the last update of the priority group <b>Highest</b> in milliseconds (ms).
PokeFinish	BOOL	55	Goes to 1 for a query, if all current pokes were executed

## ERROR MESSAGES

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:

## MODEM COMMUNICATION

### HARDWARE

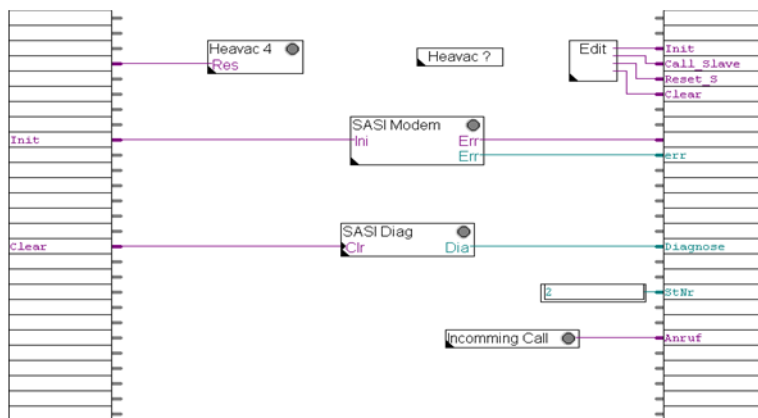
Parameters	Description
PCD1 M1xx	Function module interface RS 232 (Modem) PCD7 F120 for channel 1
PCD2 M1xx	Function module interface RS 232 (Modem) PCD7 F120 for channel 1

This PLC only offers channel 1 for modem communication. The connection of the modem is explained in the according manuals.

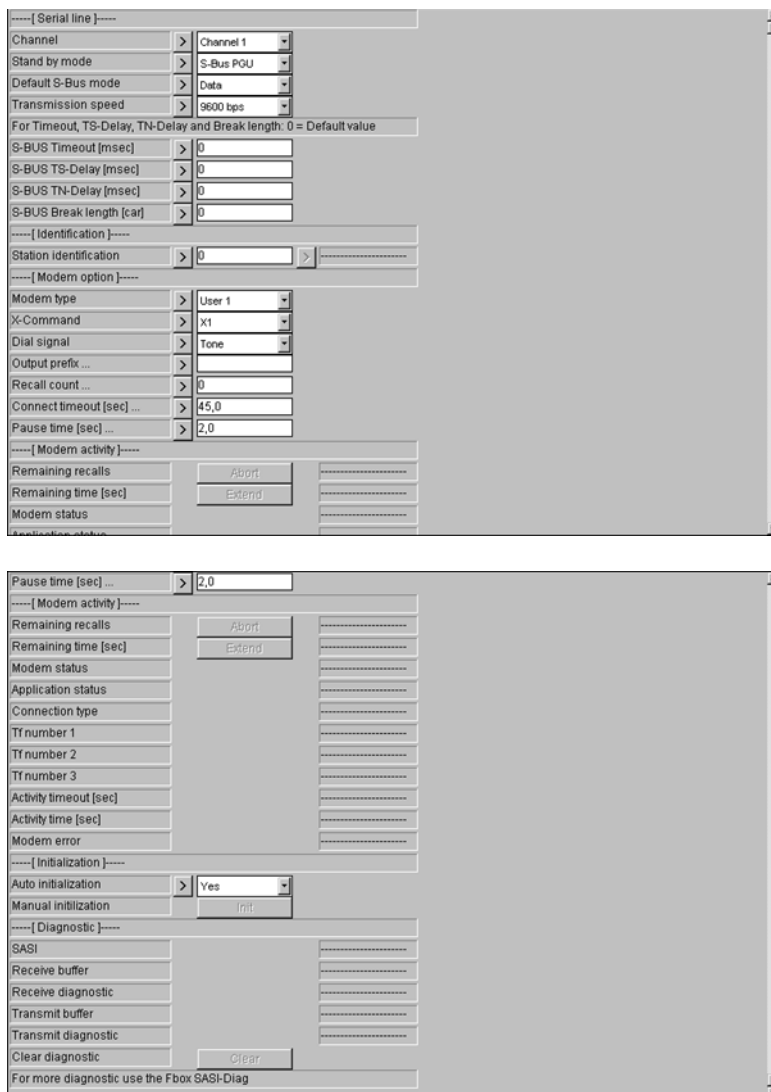
### SOFTWARE

## COMMUNICATION SAIA PCD TO ZENON

Initialization of interface



The illustration shows an example program, in which a communication from SAIA PCD to zenon can be established. The settings concerning initialization of interface (always canal 1) are done in „SASI Modem“ data block. The „SASI Diag“ component provides a diagnosis for possible errors. In this component only the canal is selected. The single settings and assignment of Fupla-components are explained in the Online Help and SAIA-handbooks. The most important settings of the „SASI Modem“ component are shown in the following figure.



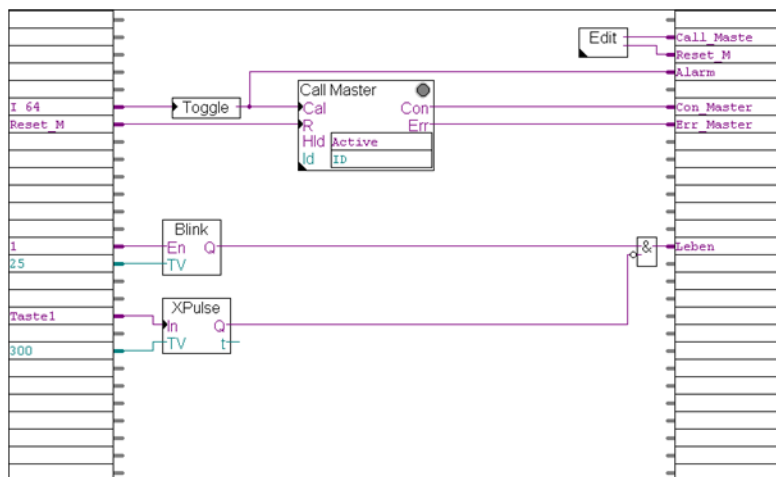
The image shows two screenshots of the SASI Modem configuration interface. The top screenshot displays the main configuration window with the following settings:

- Serial line:** Channel 1, Stand by mode: S-Bus PGU, Default S-Bus mode: Data, Transmission speed: 9600 bps.
- For Timeout, TS-Delay, TN-Delay and Break length: 0 = Default value:** S-BUS Timeout [msec]: 0, S-BUS TS-Delay [msec]: 0, S-BUS TN-Delay [msec]: 0, S-BUS Break length [car]: 0.
- Identification:** Station identification: 0.
- Modem option:** Modem type: User 1, X-Command: X1, Dial signal: Tone, Output prefix: 0, Recall count: 0, Connect timeout [sec]: 45.0, Pause time [sec]: 2.0.
- Modem activity:** Remaining recalls, Remaining time [sec], Modem status, Application status.

The bottom screenshot shows the same window with the 'Pause time [sec]' set to 2.0 and the 'Modem activity' section expanded, showing fields for Tr number 1, Tr number 2, Tr number 3, Activity timeout [sec], Activity time [sec], and Modem error. The 'Initialization' section shows 'Auto initialization' set to 'Yes' and a 'Manual initialization' button. The 'Diagnostic' section shows 'SASI', 'Receive buffer', 'Receive diagnostic', 'Transmit buffer', 'Transmit diagnostic', and 'Clear diagnostic' buttons.

The settings of the Modem depends on the Modem manufacturer. The settings are saved in „modsms.def“ in the folder \*\\SAIA\\FBox\\\*. How the settings have to be done is explained in the SAIA handbooks.

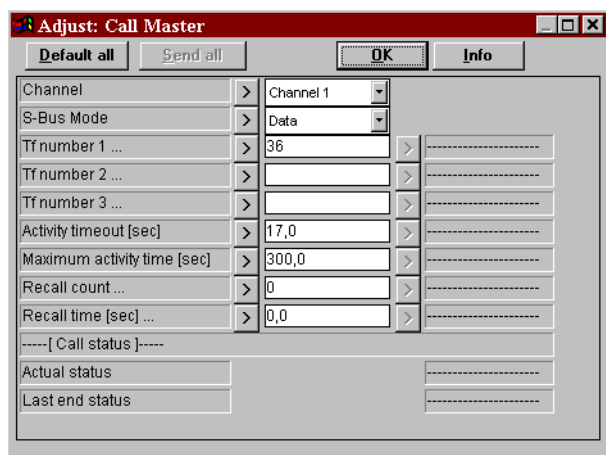
## CALL-MASTER COMPONENT



The illustration shows another example program, in which a communication from SAIA PCD to zenon can be established. In the „Call Master“ Component the selection settings are done.

The single settings and assignment of Fupla-components are explained in the Online Help and SAIA-handbooks.

The most important settings of the „Call Master“ component are shown in the following figure.

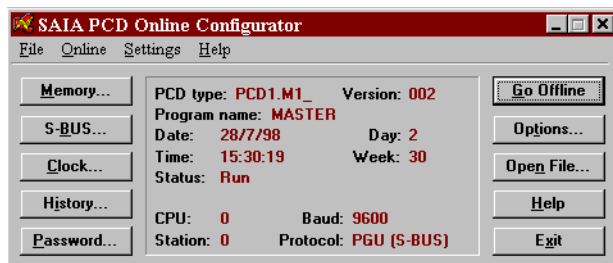


## COMMUNICATION ZENON TO SAIA PCD

The SAIA PCE is configured in the "PCD Configurator". In the following figure the necessary steps are described.

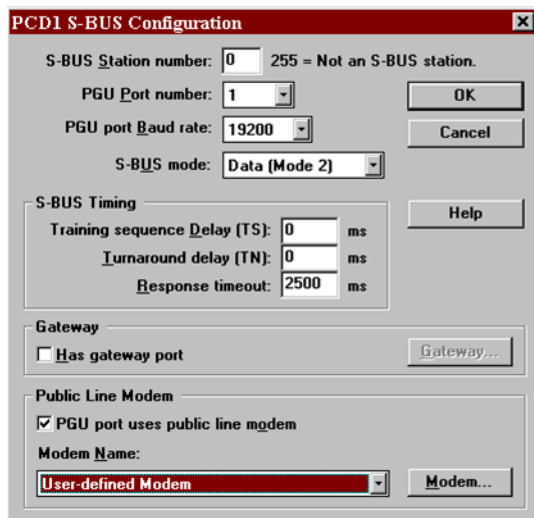


In the „Project manger“ under „Tools“ the „PCD Configurator“ is started.



The settings for the modem-communication are done in this „PCD Configurator“. Notice: Settings can only be changed, if an online connection to PCD exists.

Click „S-BUS“ and the dialog for „S-Bus“-definition opens.



In this dialog, the settings are done analogically. Configuration of the modem type depends on the manufacturer. Click on the Button „Modem“ to insert the Modem string. To access further S-Bus-Stations, activate the “Gateway”. The exact configuration is described in the SAIA handbooks. The settings are stored in the „Spg4modm.ini“ file. This file must be stored in the Windows directory.

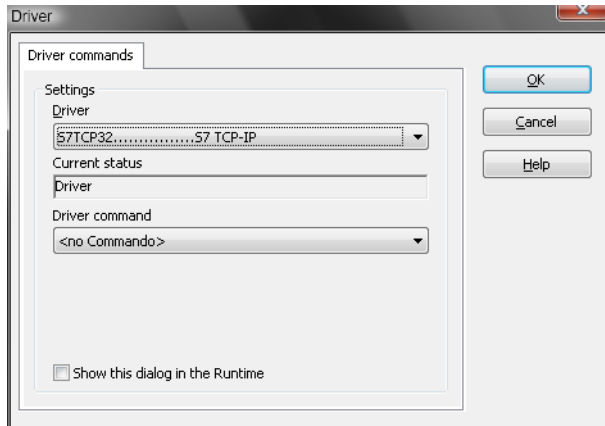
## 9. Driver commands

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



Parameters	Description
Drivers	Drop-down list with all drivers which are loaded in the project.
Current state	Fixed entry which has no function in the current version.
<b>Driver commands</b>	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.  <b>Note:</b> 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.
► Activate driver write set value	Write set value to a driver is allowed.
► Deactivate driver	Write set value to a driver is prohibited.

write set value	
► Establish connection 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 7.11 -> Diagviewer*.

zenon driver log all errors in the log files. The default folder for the log files is subfolder **log** in directory **ProgramData**, example:  
 C:\ProgramData\zenon\zenon7.11\LOG for zenon Version 7.11. 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 currently created entries live
- ▶ customize the logging settings
- ▶ change the folder in which the log files are saved

#### Hints:

1. In Windows CE even errors are not logged per default due to performance reasons.
2. The Diagnosis Viewer displays all entries in UTC (coordinated world time) and not in local time.
3. 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.
4. If you only use **Error logging**, the problem description is in column **Error text**. For other diagnosis level the description is in column **General text**.
5. For communication problems many drivers also log error numbers which the PLC assigns to them. They are displayed in **Error text** and/or **Error code** and/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.
6. 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**.



#### Information

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

## 10.2 Error numbers

In case of an error, the Errorlogfile SAIA2nd32\_xxx.txt is created. In this file the source of error is logged,

Error code	Description
1 to 100 / 129...228	SAIA internal error codes.
110/238	No connection.
111/239	Connection not possible.
112/240	Number of objects for bits more than one object.
113/241	Number of objects for Uchar more than one object.
114/242	Type is not supported.
115/243	Writing on input not possible.
116/244	Writing on output not possible.
117/245	Error code out of range.

## 10.3 Check list

Cable disconnected?

Wrong network parameters in the CP or PC?

Data block does not exist

Wrong data block size (too short)?

Too slow: Scattered data areas - increase update time.

For error analysis please send a project backup and the „error text file“ (in the project path RT\\FILES\\zenon\\custom\\log) to the responsible Support department.