zenon driver manual

BUR20032

v.7.00

Contents

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2. BUR20032

Driver for B&R PLCs. Based on the PVI interface software by B&R. The driver supports spontaneous operation with hysteresis.

LIMITATIONS

At the moment, RDA is not possible. (Realtime Data Acquisition)Commissioning

3. BUR20032 - Data sheet

General:	
Driver file name	BUR20032.exe
Driver description	BR-PVI based driver (replaced)
PLC types	All Bernecker and Rainer PLCs which can use the PVI communication like System 2000 family (2003, 2005 etc), Acopos, X20 System, AutomationPC, PowerPanel and others.
PLC manufacturer	Bernecker + Rainer;

Driver supports:	
Protocol	PVI;
Addressing: address based	-
Addressing: name based	x
Spontaneous communication	x
Polling communication	x
Online browsing	x
Offline browsing	-
Real-time capable	-
Blockwrite	-
Modem capable	-
Serial logging	-
RDA numerical	-

RDA String	-

Prerequisites:	
Hardware PC	RS 232 interface or Standard network card
Software PC	PVI software necessary, also under Windows CE. PC setup can be found on installation DVD.
Hardware PLC	-
Software PLC	-
Requires v-dll	-

Platforms:	
Operating systems	Windows CE 5.0, CE 6.0; Windows XP, Vista, 7, Server 2003, Server 2008/R2;
CE platforms	x86;

4. Driver history

Date	Driver version	Change
07.07.08	1300	Created driver documentation

5. Requirements

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

5.1 PC

HARDWARE

All devices supported by PVI, e.g. serial interface RS232
or standard network card

SOFTWARE

Copy the driver file BuR20032.EXE into the current program directory (if they do not already exist there) and enter it into the file TREIBER_EN.XML with the tool DriverInfo.exe.

WINDOWS CE

Driver BUR20032.dll will automatically be transmitted via Remote Transport. The file DEFAULT.BUR also has to be transferred to the project directory on the CE device. For that this file has to be entered in the Remote Transport explicitly.

6. Configuration

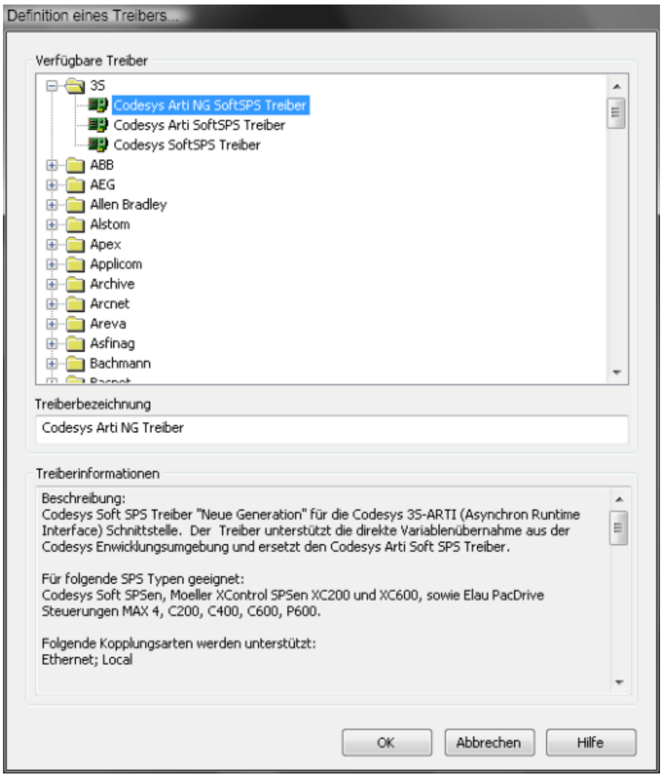
In this chapter you will learn how to use the driver in a project and which settings you can change.

> **Info**
>
> *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:

- Right-click on `Driver` in the Project Manage and select `Driver new` in the context menu.
- In the following dialog the control system offers a list of all available drivers.



Treiberbezeichnung

Codesys Arti NG Treiber

Treiberinformationen

Beschreibung:
Codesys Soft SPS Treiber "Neue Generation" für die Codesys 3S-ARTI (Asynchron Runtime Interface) Schnittstelle. Der Treiber unterstützt die direkte Variablenübernahme aus der Codesys Enwicklungsumgebung und ersetzt den Codesys Arti Soft SPS Treiber.

Für folgende SPS Typen geeignet:
Codesys Soft SPSen, Moeller XControl SPSen XC200 und XC600, sowie Elau PacDrive Steuerungen MAX 4, C200, C400, C600, P600.

Folgende Kopplungsarten werden unterstützt:
Ethernet; Local

- 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, every time 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.
- 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.

Info

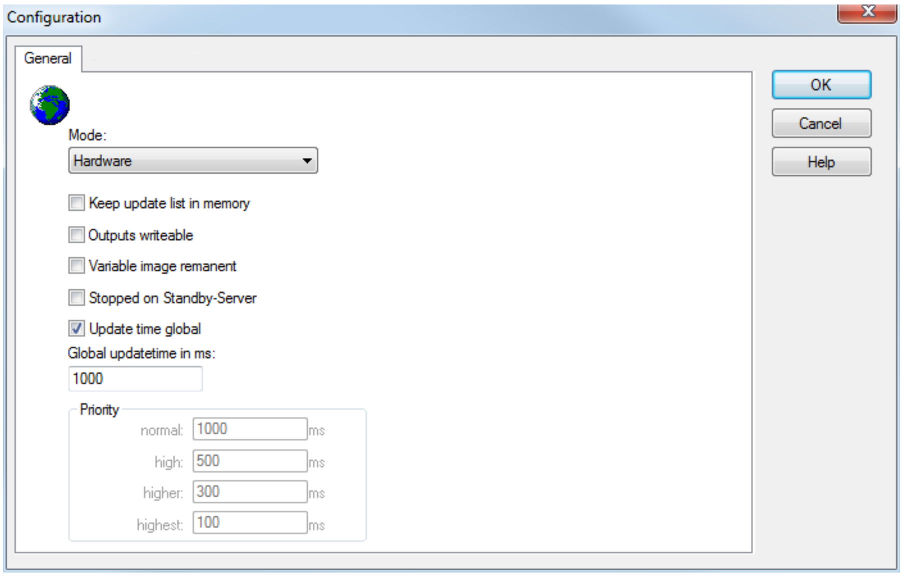
For new projects and for existing projects which are converted to version 6.21 or higher, the following drivers are created automatically:

- Internal
- MathDr32
- SysDrv.

6.2 Settings in the driver dialog

You can change the following settings of the driver:

6.2.1 General



Mode: Hardware

☐ Keep update list in memory

☐ Outputs writeable

☐ Variable image remanent

☐ Stopped on Standby-Server

☑ 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 at the 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.
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	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

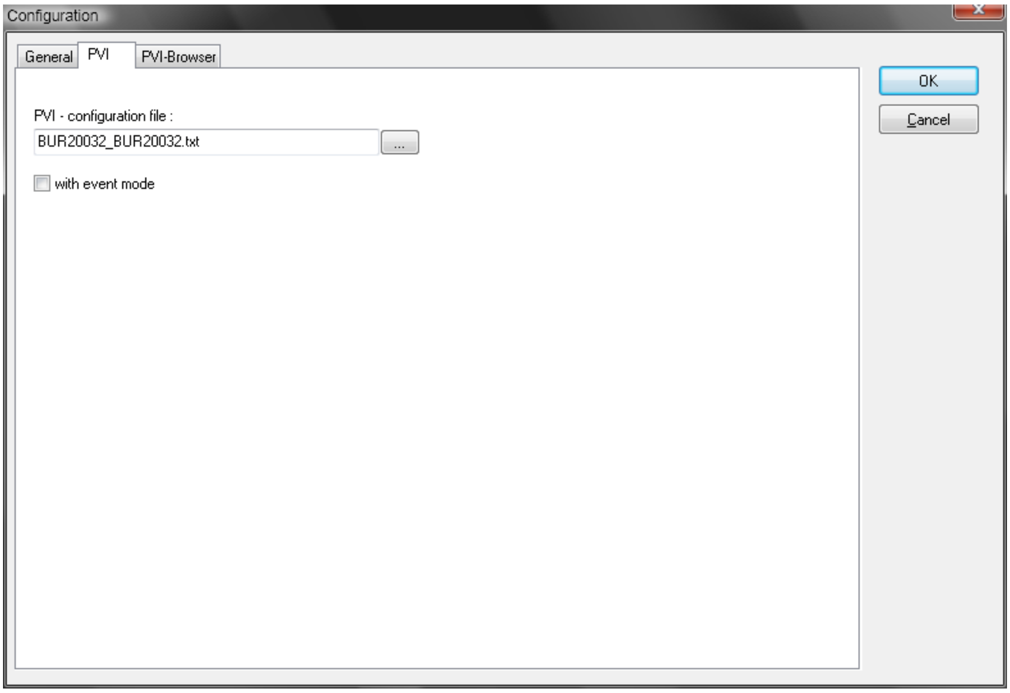
	place for each variable separately in the settings of the variable properties. The communication of the individual variables are graduated in respect of importance or necessary topicality using the priorities. Thus the communication load is distributed better.

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 PVI

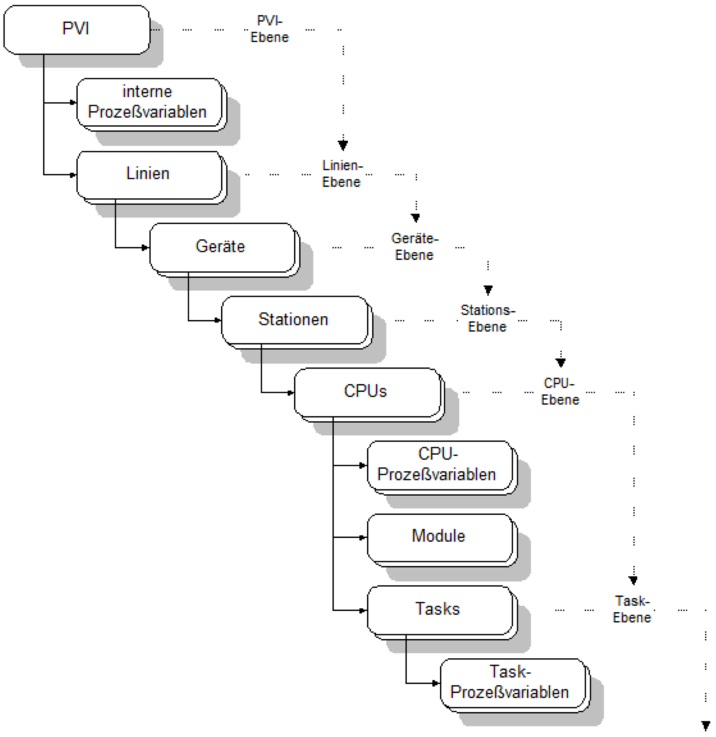


PVI - configuration file : BUR20032_BUR20032.txt

□ with event mode

The checkbox "with Eventmode" allows to switch the driver from polling mode to spontaneous mode. The driver always communicates spontaneously with PVI ! The checkbox has the effect, that the data transfer between PLC and PVI is also spontaneous (the PLC will only send a value to PVI if the value has changed). Attention - this has to be supported by the PLC. You may need a new firmware for that. If you are not sure, please contact Bernecker & Rainer. If you want to use hysteresis, you have to switch to Eventmode.

PROCESS OBJECTS OF PVI



This file has to be created with the following structure:

It corresponds with the process objects of PVI.

6.2.3 Driver dialog PVI browser

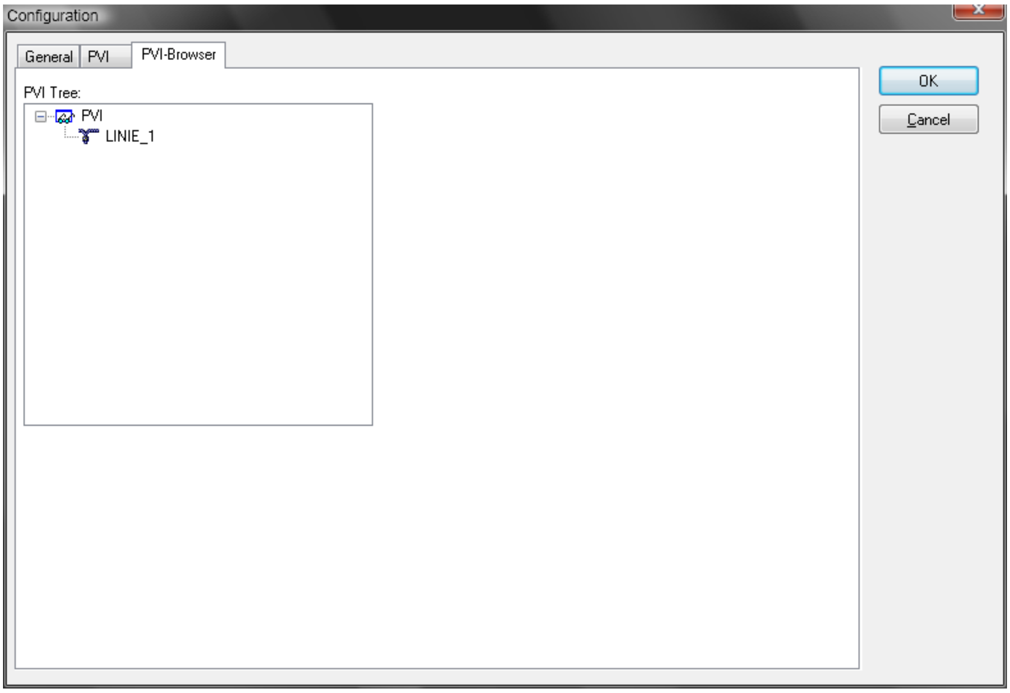
STRUCTURE

The numbering of PARENT, NAME and TYPE is ascending and without gaps. If entries are no longer used, the name has to be changed to e.g. reserve.

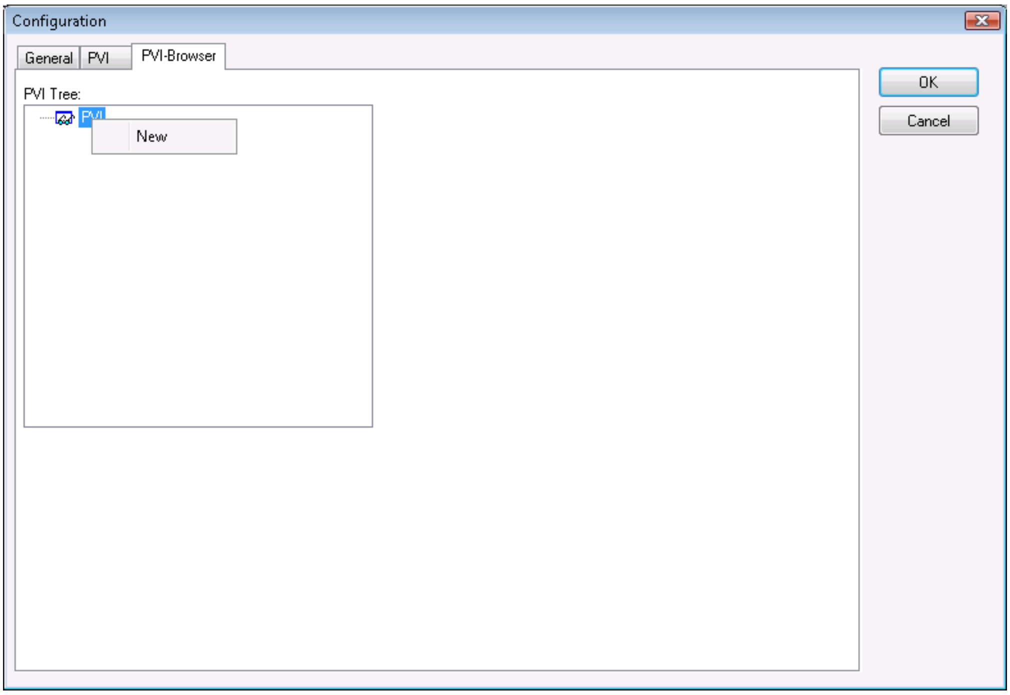
Variables created in zenon refer to the numbers of the variables created here, so deleting or re-numbering of variables here would result in incorrect online values.

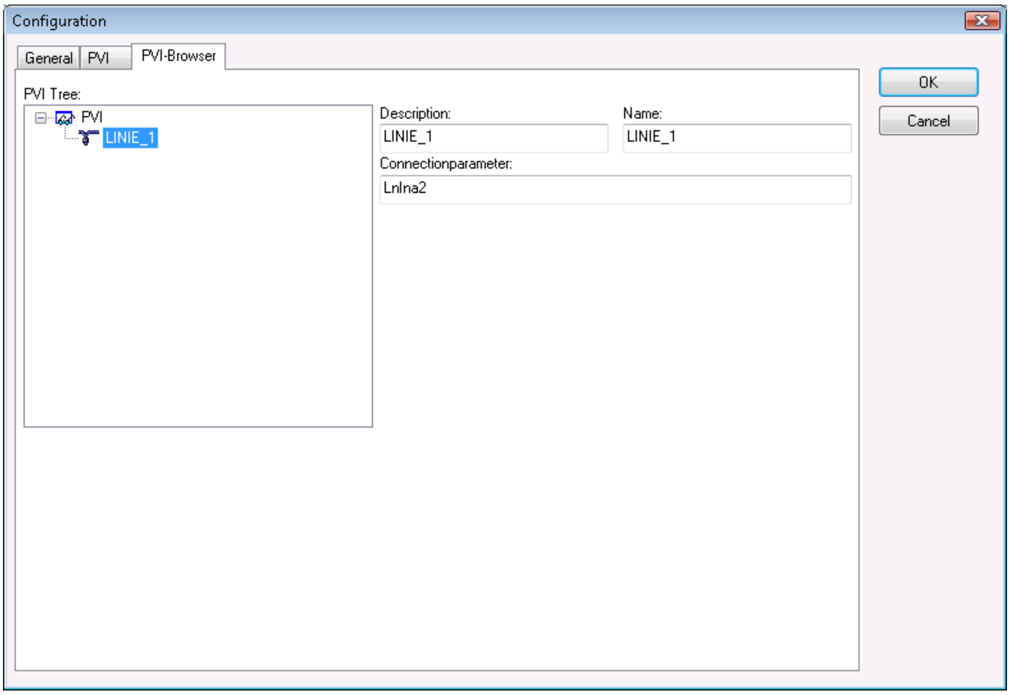
The use of arrays and structures is recommended for better performance.

The variable names have to be entered according to the B&R RPS configuration.



Right-click on `PVI` to add a "Line".



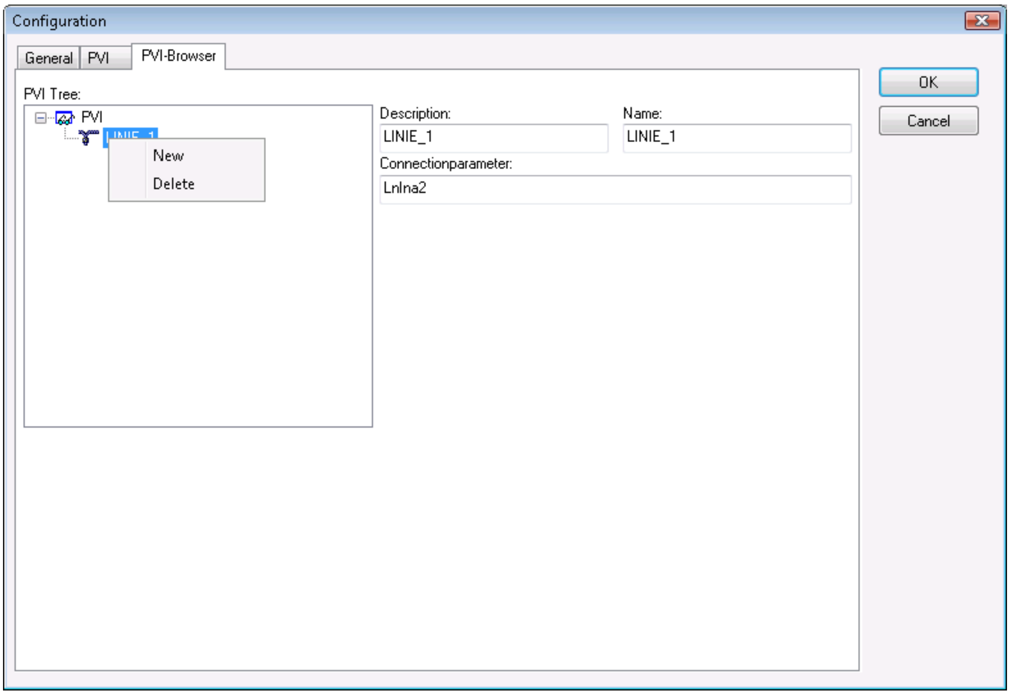


Description: LINIE_1

Name: LINIE_1

Connectionparameter: LnIna2

Freely definable name - according to B&R



Description: LINIE_1

Name: LINIE_1

Connectionparameter: LnIna2

Right-click on **LINIE_1** to add a "Device".

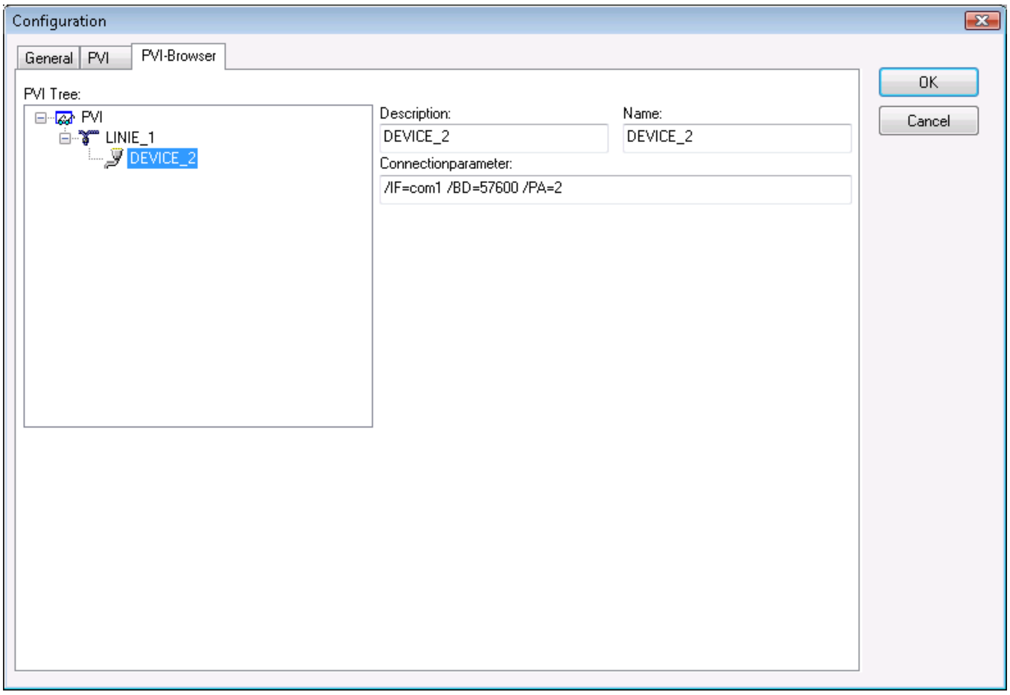
COM

The definition of the COM interface is done in the file *.BUR.

Sampe string for port description:
CD_1=/IF=com1 /BD=57600 /PA=2

Parameters	Description
`CD`	Port name
`/IF`	Device name „com1"....."com4"
`/BD`	Baudrate 9600 / 19200 / 38400 / 57600 / 115200
`/PA`	Parity 2=EVENPARITY (1-7)

For the parameters to be set here please refer to the B&R documentation

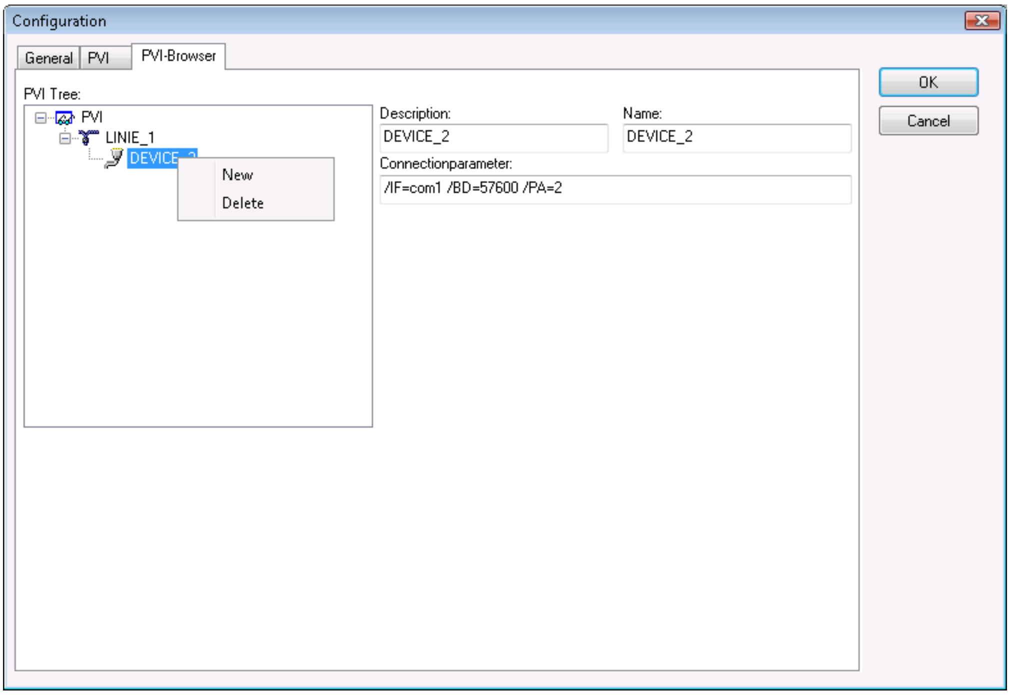


Description: DEVICE_2

Name: DEVICE_2

Connectionparameter: /IF=com1 /BD=57600 /PA=2

Freely definable name - name of the higher-level line - according to B&R

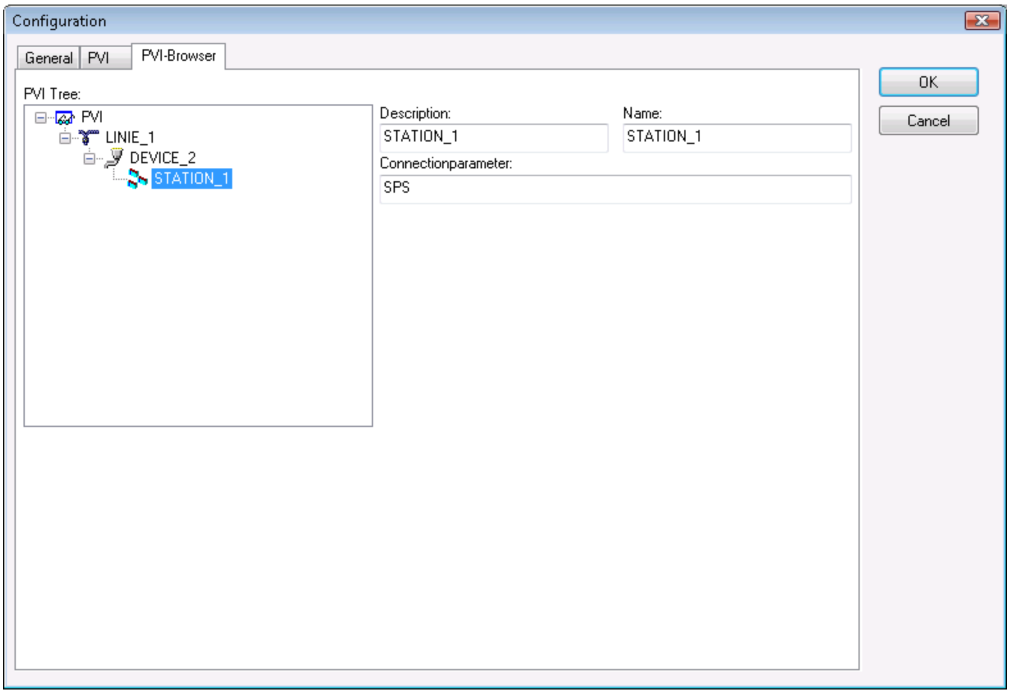


Description: DEVICE_2

Name: DEVICE_2

Connectionparameter: /IF=com1 /BD=57600 /PA=2

Right-click on **DEVICE_1** to add a "Station".

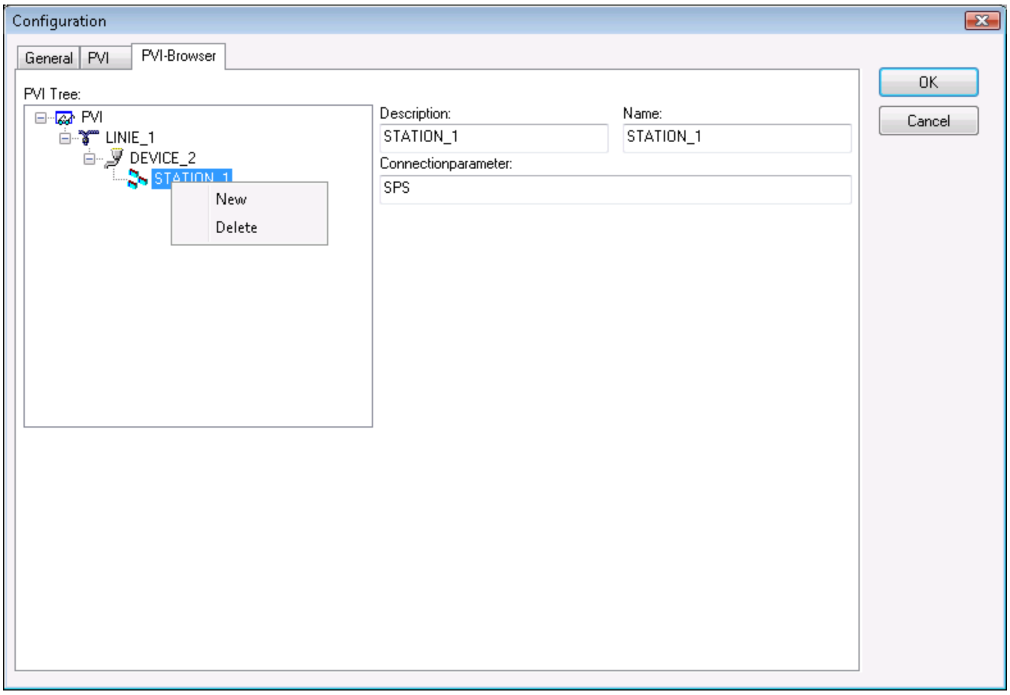


Description: STATION_1

Name: STATION_1

Connectionparameter: SPS

Freely definable name - name of the higher-level device - according to B&R

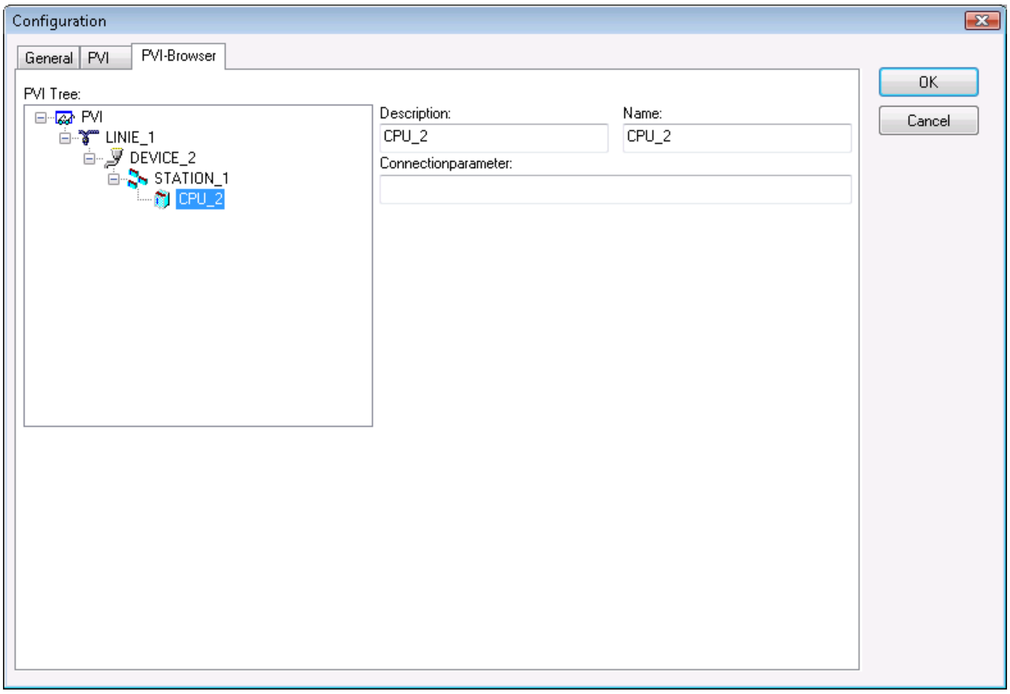


Description: STATION_1

Name: STATION_1

Connectionparameter: SPS

Right-click on **STATION_1** to add a "CPU".

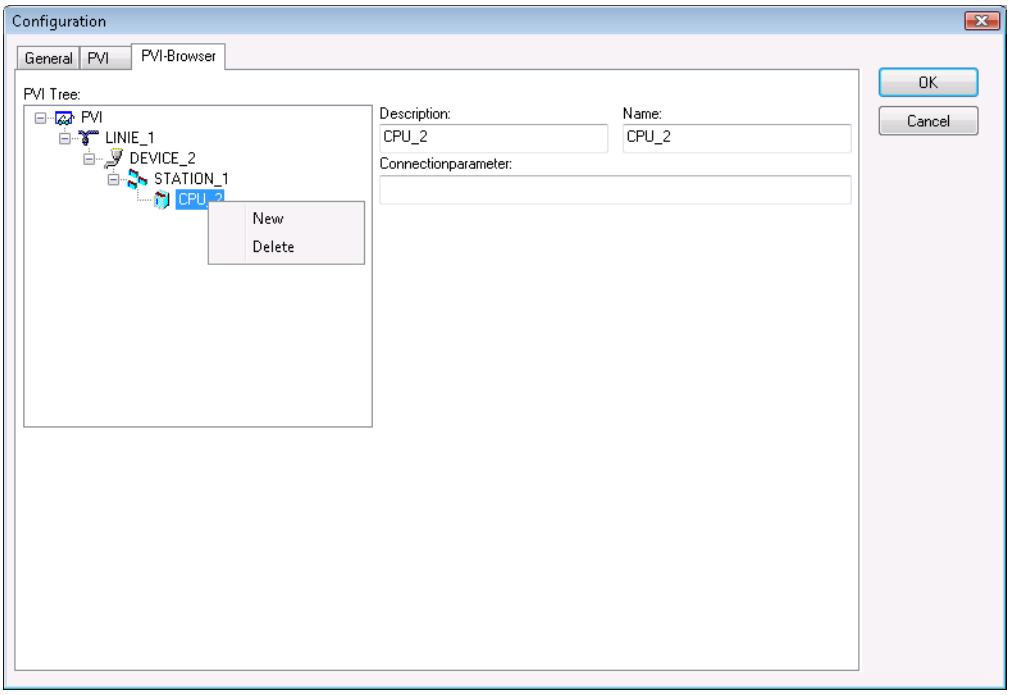


Description: CPU_2

Name: CPU_2

Connectionparameter:

Freely definable name - name of the higher-level station

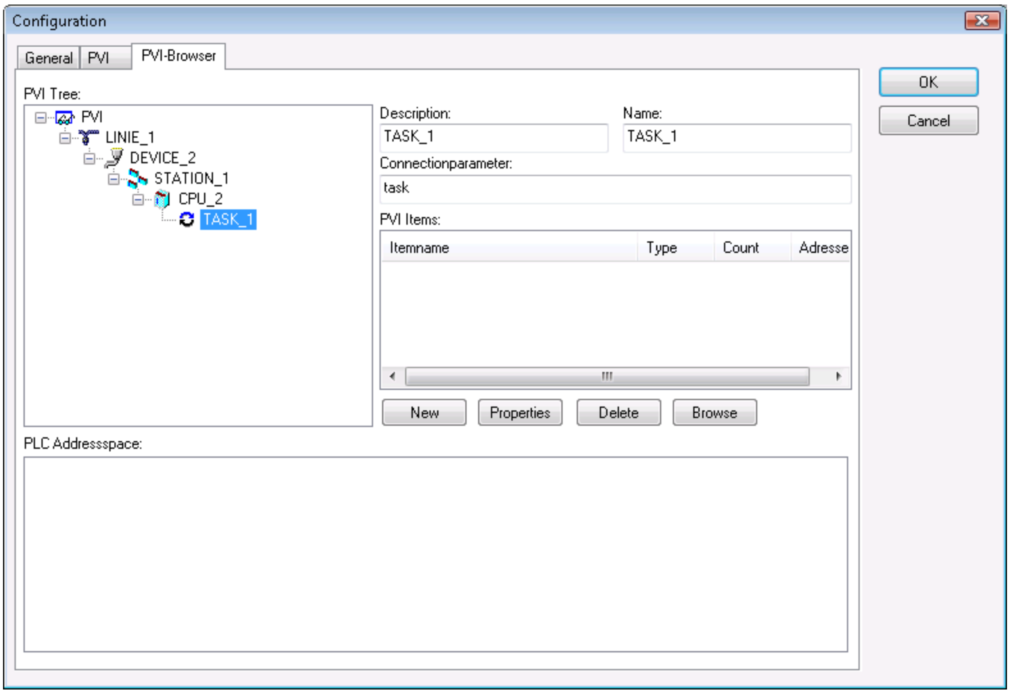


Description: CPU_2

Name: CPU_2

Connectionparameter:

Right-click on CPU_1 to add a "Task".



Description: TASK_1

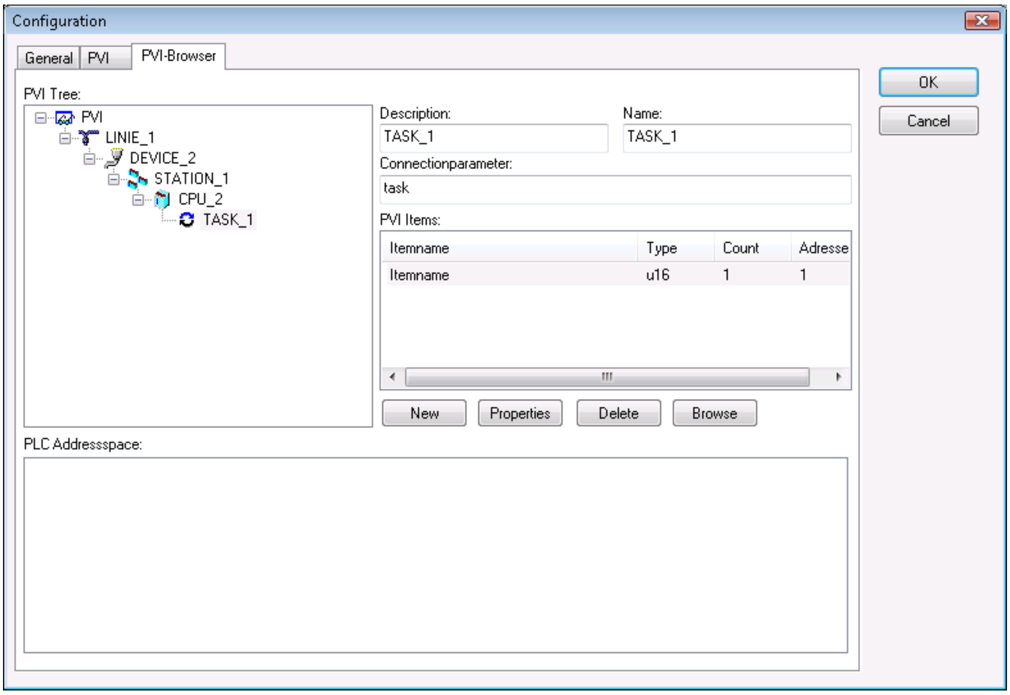
Name: TASK_1

Connectionparameter: task

PVI Items:

Itemname	Type	Count	Adresse

Freely definable name - name of the higher-level CPU - according to B&R



PVI Tree:

- PVI
  - LINIE_1
    - DEVICE_2
      - STATION_1
        - CPU_2
          - TASK_1

Description: TASK_1

Name: TASK_1

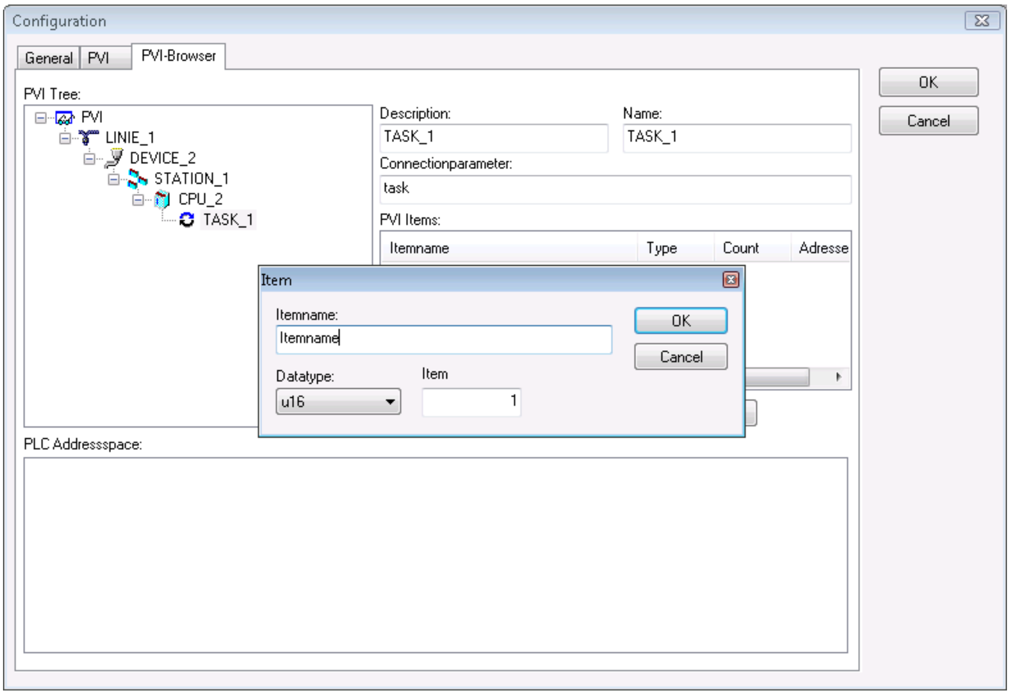
Connectionparameter: task

PVI Items:

Itemname	Type	Count	Adresse
Itemname	u16	1	1

Use the buttons **New** and **Properties** to create and edit each of the PVI items.

This is done in the below dialog. Additionally the variables created in the PLC can be read directly as described below.



PVI Tree:

- PVI
  - LINIE_1
    - DEVICE_2
      - STATION_1
        - CPU_2
          - TASK_1

Description: TASK_1

Name: TASK_1

Connectionparameter: task

PVI Items:

Itemname	Type	Count	Adresse

Itemname: Itemname

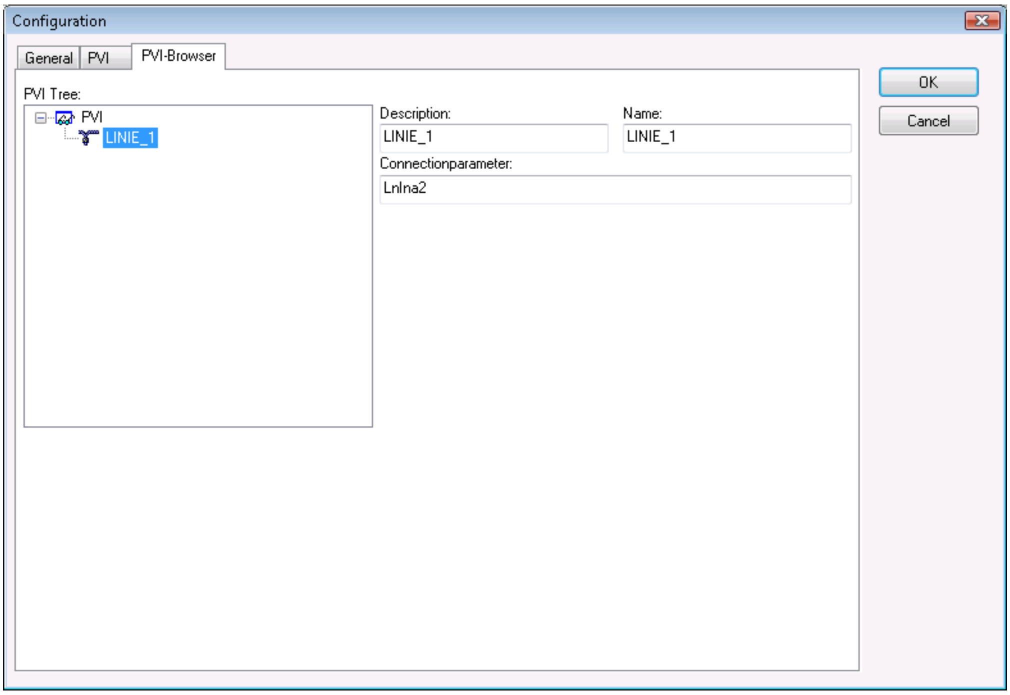
Datatype: u16

Item: 1

With the button "Browse" the list window PLC Addressspace is filled with the data from the PLC. In order to create single PVI items they can be imported by doubleclicking them.

ETHERNET

Structure of the Ethernet configuration

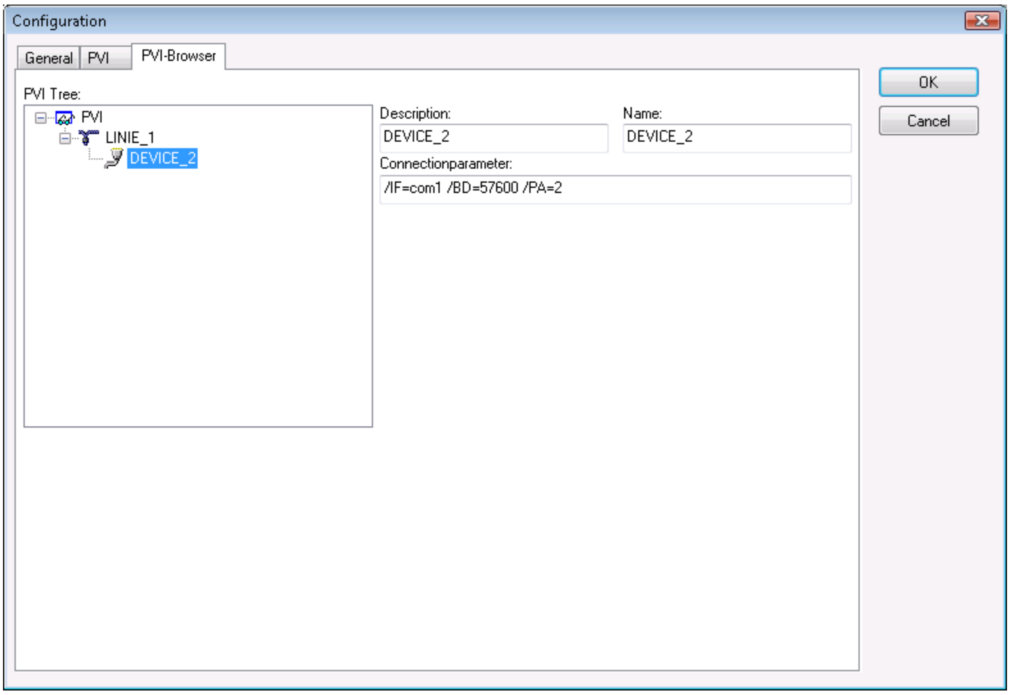


Description: LINIE_1

Name: LINIE_1

Connectionparameter: LnIna2

Communication via INA2000



Description: DEVICE_2

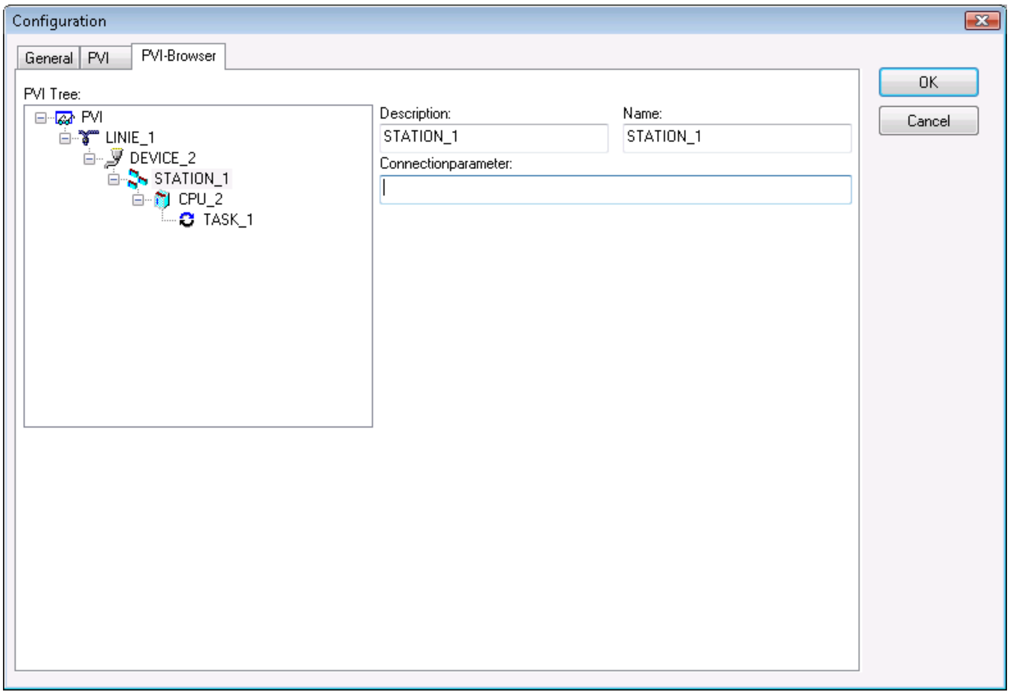
Name: DEVICE_2

Connectionparameter: /IF=com1 /BD=57600 /PA=2

Use the following settings for Ethernet communication:

- /IF=tcpip ...Ethernet communication
- /lopo = 20000 … for the used port
- /SA=1 ...Address of the source station (Own station)

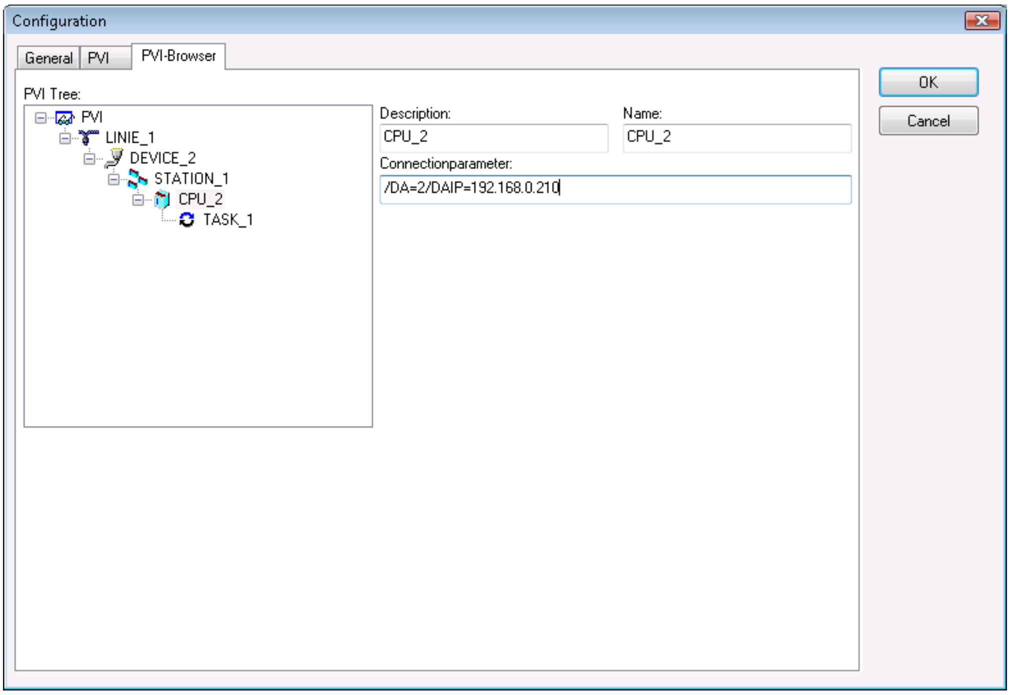
You must use a unique station address for every computer.



Description: STATION_1

Name: STATION_1

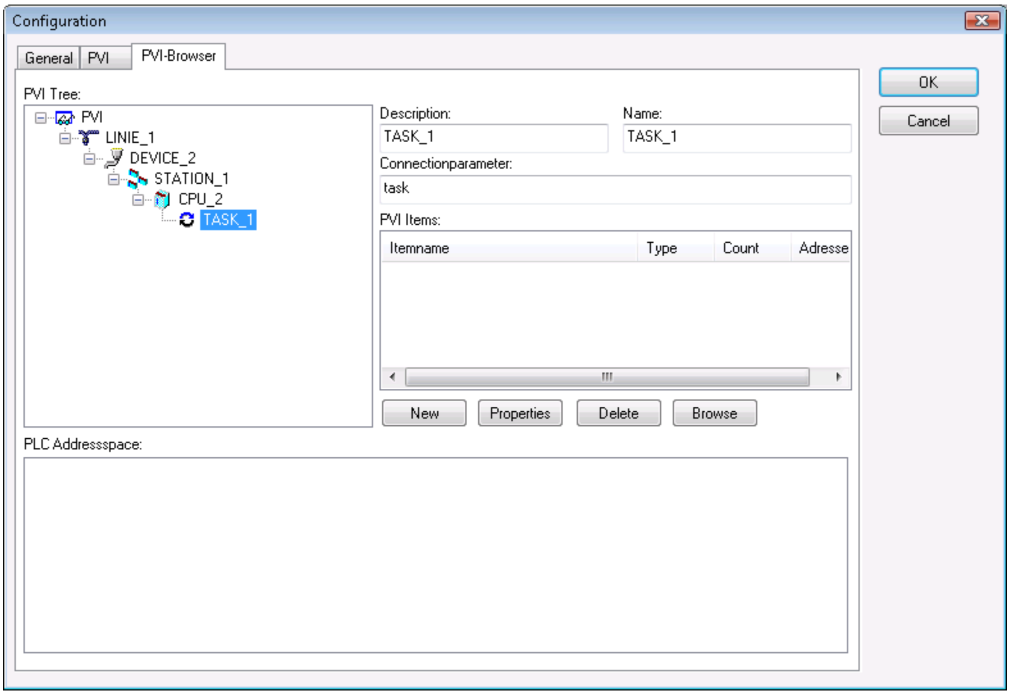
Connectionparameter:



Description: CPU_2

Name: CPU_2

Connectionparameter: /DA=2/DAIP=192.168.0.210



Description: TASK_1

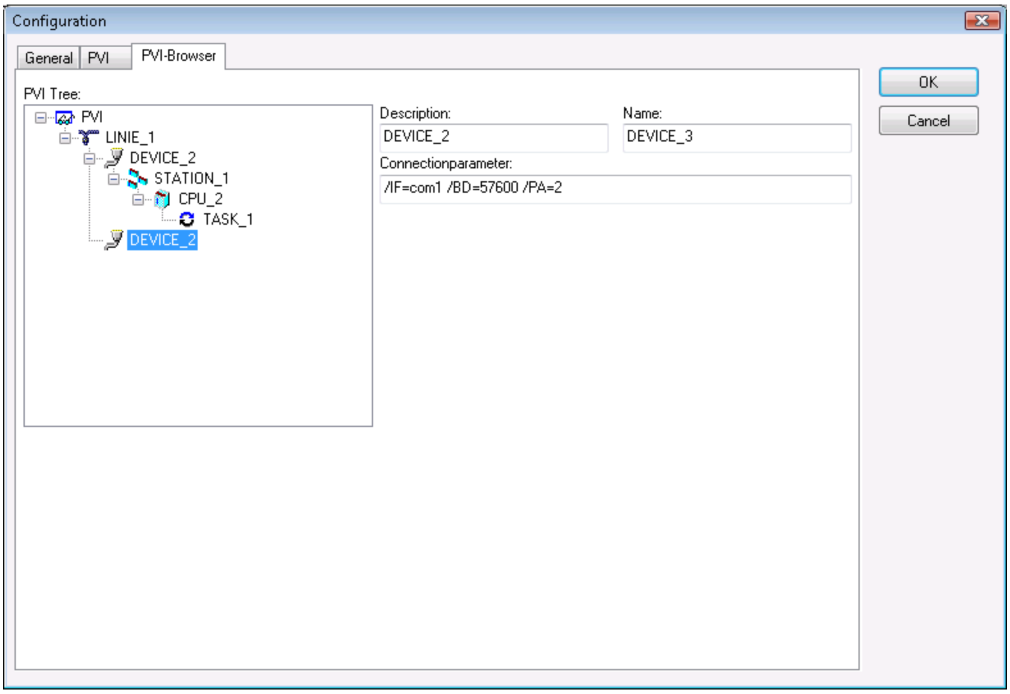
Name: TASK_1

Connectionparameter: task

Name of the task on the PLC, from which you want to request variables. (User defined)

SPECIAL CASE OF IDENTICAL PLC HARDWARE AND SOFTWARE:

If you want to access two (identical) PLCs, you will have to add another 'device' (DEVICE_"). The PLC must be configured in one line, so the PVI will be able to identify them correctly.



Description: DEVICE_2

Name: DEVICE_3

Connectionparameter: /IF=com1 /BD=57600 /PA=2

Adjust the connection parameters accordingly.

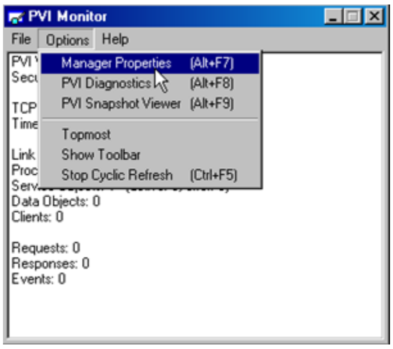
SPECIAL CASE OF A REMOTE PVI:

The PVI does not have to run on the local PC. It can also run on a remote PC in the network.

This requires the following settings:

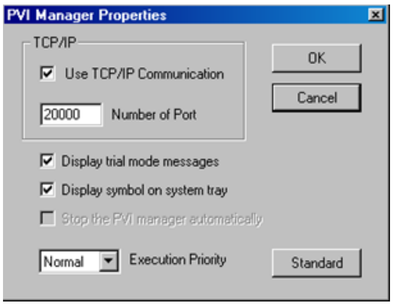
PVI MONITOR:

Check "Use TCP/IP communication" in the manager properties of the PVI monitor. You can choose any port. The standard port is 20000


PVI Monitor
File
Options
Help
Manager Properties (Alt+F7)
PVI Diagnostics (Alt+F8)
PVI Snapshot Viewer (Alt+F9)
Topmost
Show Toolbar
Stop Cyclic Refresh (Ctrl+F5)

PVI \
Secu
TCP
Time
Link
Proc
Serv
Data Objects: 0
Clients: 0

Requests: 0
Responses: 0
Events: 0



☑ Use TCP/IP Communication

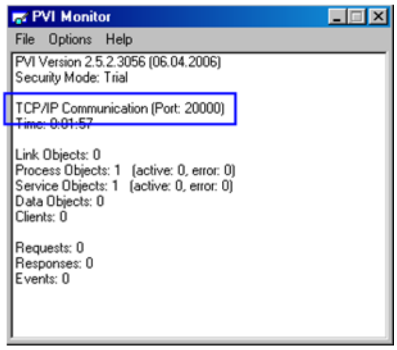
20000 Number of Port

☑ Display trial mode messages

☑ Display symbol on system tray

□ Stop the PVI manager automatically

Normal Execution Priority



PVI Version 2.5.2.3056 (06.04.2006)
Security Mode: Trial

TCP/IP Communication (Port: 20000)
Time: 0:01:57

Link Objects: 0
Process Objects: 1 (active: 0, error: 0)
Service Objects: 1 (active: 0, error: 0)
Data Objects: 0
Clients: 0

Requests: 0
Responses: 0
Events: 0

After starting the PVI manager, you will see the entry "TCP/IP communication (port: 20000)" in the output window.

Configuration file of the B&R driver:

Add another entry to the configuration file *.BUR (Access via 'Files'/'Drivers' in the project tree of the Editor).

Add the following String in the section [INIT] :

PARAM=IP=IP address PN=20000

For "IP address", enter the IP address of the computer which runs the PVI manager. For PN, enter the port that the PVI manager uses. The standard port is 20000.

7. Creating variables

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

7.1 Creating variables in the Editor

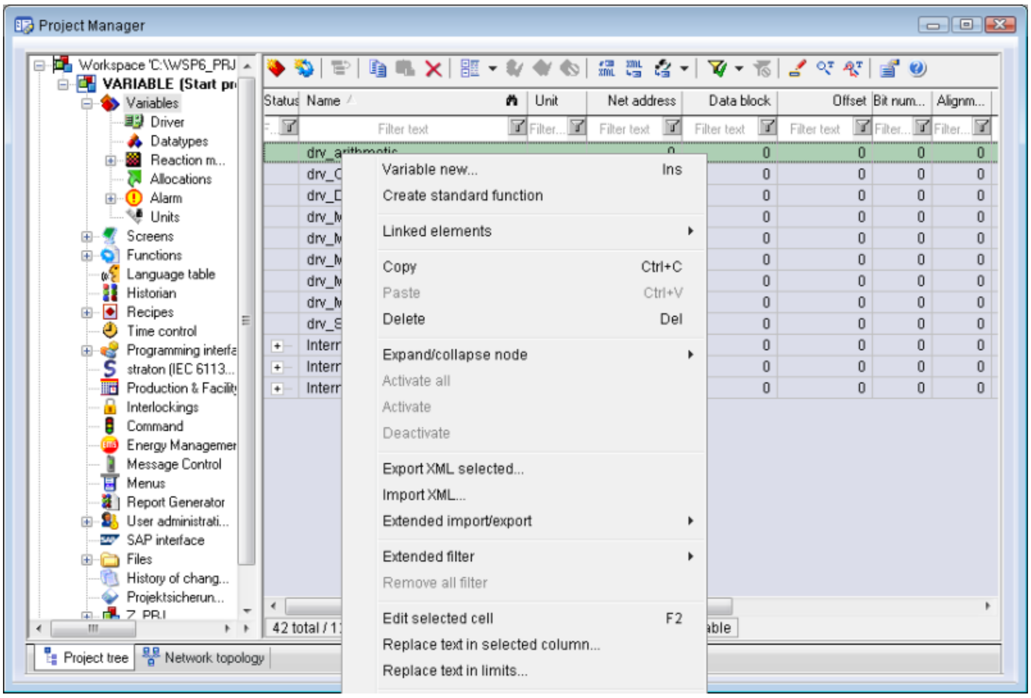
Variables can be created:

- 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:

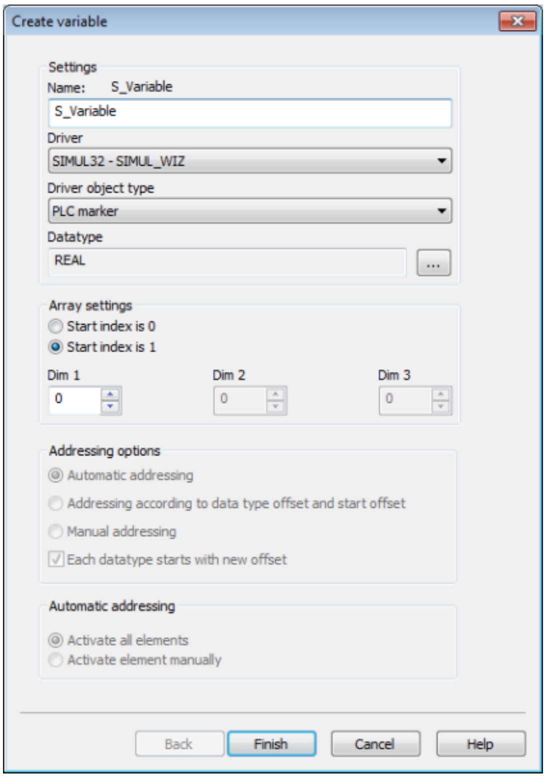
1. Select the **`New variable`** command in the **`Variables`** node in the context menu



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: 0 Dim 2: 0 Dim 3: 0

Addressing options

● Automatic addressing

○ Addressing according to data type offset and start offset

○ Manual addressing

☑ Each datatype starts with new offset

Automatic addressing

● Activate all elements

○ Activate element manually

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. **Attention:** The **#** character is not permitted in variable names. If non-permitted characters are used, creation of variables cannot be completed and the **`Finish`** button remains inactive.
`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.

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	not used for this driver
Data block	not used for this driver
Offset	Offset of the variable; the memory address of the variable in the allocation file. When online importing a variable, the offset will be configured automatically. Configurable [0.. 4294967295]
Alignment	not used for this driver
Bit number	Number of the bit within the configured offset. Valid input [0.. 65535], Working range [0..7]
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	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.

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
`CPU status`	9	R / W	INT, UINT	
`PLC marker`	8	R / W	REAL, BOOL, DINT, UDINT, USINT, INT, UINT, SINT, STRING	
`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 42)

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.

EXAMPLES FOR ALL POSSIBLE ZENON DATA TYPES

PLC	zenon
I8	i/u8Bit (signed)
I16	i/u16Bit (signed)
I32	i/u32Bit (signed)
U8	i/u8Bit
U16	i/u16Bit
U32	i/u32Bit
F32	float32
Boolean	Boolean
string	String
CPU status	i/u16Bit

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.

7.4.1 XML import of variables from another zenon project

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.

IMPORT DBF FILE

To start the import:

1. right-click on the variable list
2. in the drop-down menu 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.

Info

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 menu 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.

> **Info**
>
> *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) when exporting.

DBF files must:

- correspond to the 8.3 DOS format for filenames (8 alphanumeric characters for name, 3 character suffix, no spaces)
- Be stored close to the root directory (Root)

DESIGN

Description	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 "KANALNAME" (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 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 (only if supported by the driver)
OBJEKT	N	2	Driver-specific ID number of the primitive object comprises KANALTYP and DATENART
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	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	Resource label. Free string for export and display in lists. The length can be limited using the MAX_LAENGE entry in **project.ini** .
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	Linked 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 to 4:

Description	Type	Field size	Comment
AKTIV1	R	1	Limit value active (per limit value available)
GRENZWERT1	F	20	Technical 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	Hysteresis in %
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	Function linking
ASK_FUNC1	R	1	With interrogation before execution
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.

Hint: 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.

Info

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 stopped
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.
Baud rate	UDINT	10	Baud rate of the serial interface.
Parity	SINT	11	Parity of the serial interface
ByteSize	SINT	14	Number of bits per character of the serial interface Value = 0 if the driver cannot establish any serial connection.
StopBit	SINT	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	UDINT	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 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	UDINT	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	SINT	25	Error message as number
DrvErrorMsg	STRING	30	Error message as text
ErrorFile	STRING	15	Name of error log file

7.6 Array variables in zenon

An array variable in zenon represents a memory area (arrays or structures) of the B&R PLC.

You have read and write access to the array variable via the Recipe Manager and VBA modules. One advantage of the B&R PLC is that block reading and block writing is very efficient. Supported driver objects for array variables are (boolean, i/u8Bit, i/u16Bit, i/u32Bit, float).

An array variable is created via the variable dialog. Enter the size of the array in the input field "Indices" (dimension). If you have the same data type as you have on the B&R PLC, you also have to enter the same dimension in the input field "Indices".

7.7 Examples

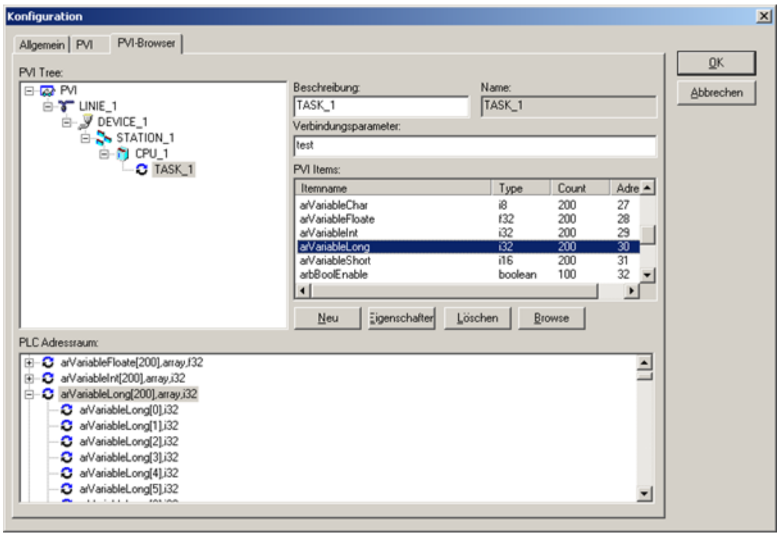
EXAMPLE 1: WITH A B&R PLC ARRAY

There is a global variable on the B&R PLC

```
long _GLOBAL arVariableLong[200];
```

see the illustration below for the definition on the control system side.

1. Creating the mapping variable in the configuration file:



Konfiguration

Allgemein | PVI | PVI-Browser

PVI Tree:

- PVI
  - LINIE_1
    - DEVICE_1
      - STATION_1
        - CPU_1
          - TASK_1

Beschreibung: TASK_1

Name: TASK_1

Verbindungsparameter: test

PVI Items:

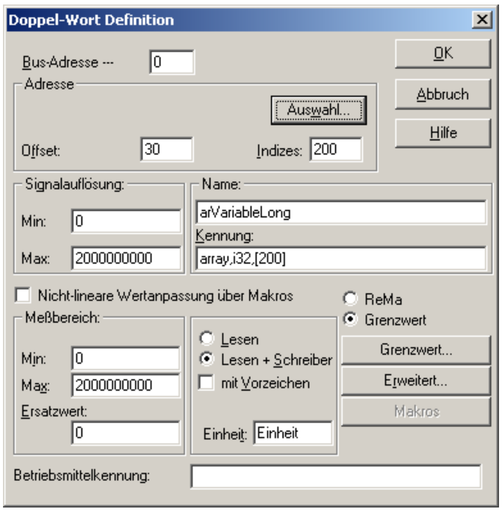
Itemname	Type	Count	Adre
arVariableChar	i8	200	27
arVariableFloate	f32	200	28
arVariableInt	i32	200	29
arVariableLong	i32	200	30
arVariableShort	i16	200	31
arbBoolEnable	boolean	100	32

PLC Adressraum:

```
arVariableFloate[200],array,f32
arVariableInt[200],array,i32
arVariableLong[200],array,i32
    arVariableLong[0],i32
    arVariableLong[1],i32
    arVariableLong[2],i32
    arVariableLong[3],i32
    arVariableLong[4],i32
    arVariableLong[5],i32
```

2. Creating the control system variable: by clicking the Select button, you can select the mapping variable created above from a list.

Attention: the value in the input field 'Indices:' must be entered manually !



Doppel-Wort Definition

Bus-Adresse --- 0

Adresse

Offset: 30

Indizes: 200

Signalauflösung:

Min: 0

Max: 2000000000

Name: arVariableLong

Kennung: array,i32,[200]

□ Nicht-lineare Wertanpassung über Makros

○ ReMa

● Grenzwert

Meßbereich:

Min: 0

Max: 2000000000

Ersatzwert: 0

○ Lesen

● Lesen + Schreiber

□ mit Vorzeichen

Einheit: Einheit

Betriebsmittelkennung:

You can also place an array variable in the control system over a B&R PLC structure. This means that an unformatted binary dump of the structure will be read and written.

An array variable is created via the variable dialog in the control system. Enter the size of the structure in the input field "Indices" (dimension).

If it is an "i/u8Bit" array, you have to enter the size of the structure in Bytes in the input field "Indices".

If it is an "i/u16Bit" array, you have to enter the size of the structure in Bytes/2 in the input field "Indices".

If it is an "i/u32Bit" array, you have to enter the size of the structure in Bytes/4 in the input field "Indices".

If it is a "float" array, you have to enter the size of the structure in Bytes/4 in the input field "Indices".

Example: if you want to read out a structure that has a size of 20 Bytes in the PLC with a double word array in the control system, you have to enter the value '5' in the "Indices" field.

!The number of Bytes contained in a structure or an array can be found out in the PVI browser in the driver configuration (Column: Count).

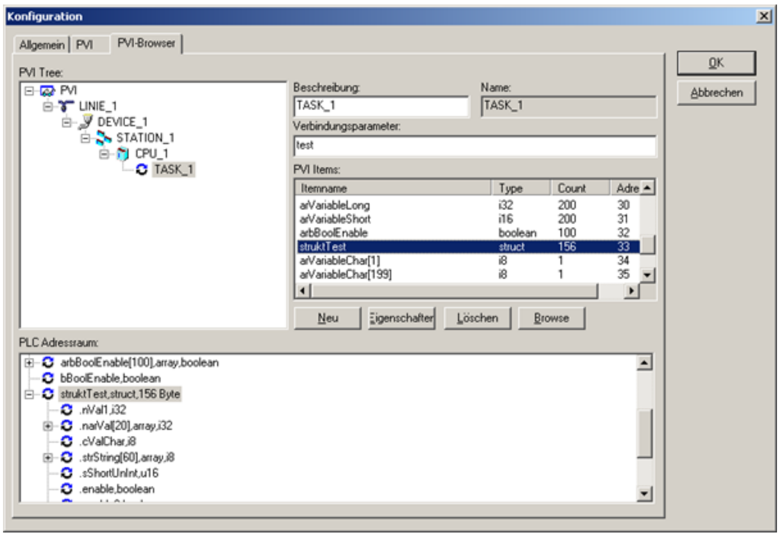
EXAMPLE2: WITH A B&R PLC STRUCTURE

There is a global variable on the B&R PLC

```
struct strukt1 _GLOBAL struktTest;
```

its size is 156 Bytes. See the illustration below for the definition on the control system side.

1. Creating the mapping variable in the configuration file:



PVI Tree:

- PVI
  - LINIE_1
    - DEVICE_1
      - STATION_1
        - CPU_1
          - TASK_1

Beschreibung: TASK_1

Name: TASK_1

Verbindungsparameter: test

PVI Items:

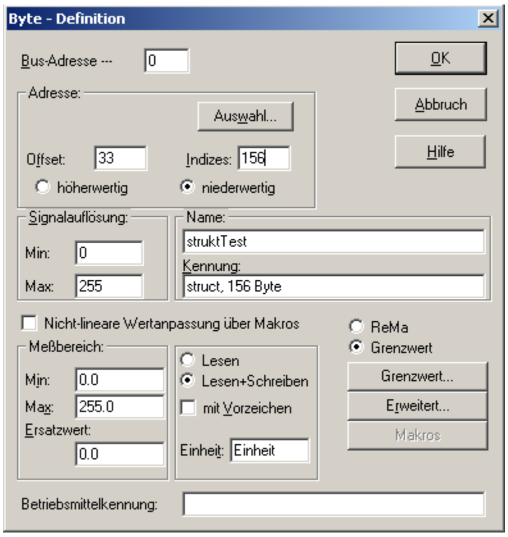
Itemname	Type	Count	Adre
arVariableLong	i32	200	30
arVariableShort	i16	200	31
arbBoolEnable	boolean	100	32
struktTest	struct	156	33
arVariableChar[1]	i8	1	34
arVariableChar[199]	i8	1	35

PLC Adressraum:

- arbBoolEnable[100],array,boolean
- bBoolEnable,boolean
- struktTest,struct,156 Byte
  - .nVal1,i32
  - .narVal[20],array,i32
  - .cValChar,i8
  - .strString[60],array,i8
  - .sShortUnInt,u16
  - .enable,boolean

2. Creating the variable in the control system: by clicking the Select button, you can select the mapping variable created above from a list (only works for type i8/u8).

ATTENTION: you have to manually enter the value in the input field 'Indices'!



Bus-Adresse --- 0

Adresse:

Offset: 33 Indizes: 156

○ höherwertig ● niederwertig

Signalauflösung: Min: 0 Max: 255

Name: struktTest

Kennung: struct, 156 Byte

□ Nicht-lineare Wertanpassung über Makros

○ ReMa
● Grenzwert

Meßbereich: Min: 0.0 Max: 255.0 Ersatzwert: 0.0

○ Lesen
● Lesen+Schreiben
□ mit Vorzeichen

Einheit: Einheit

Betriebsmittelkennung:

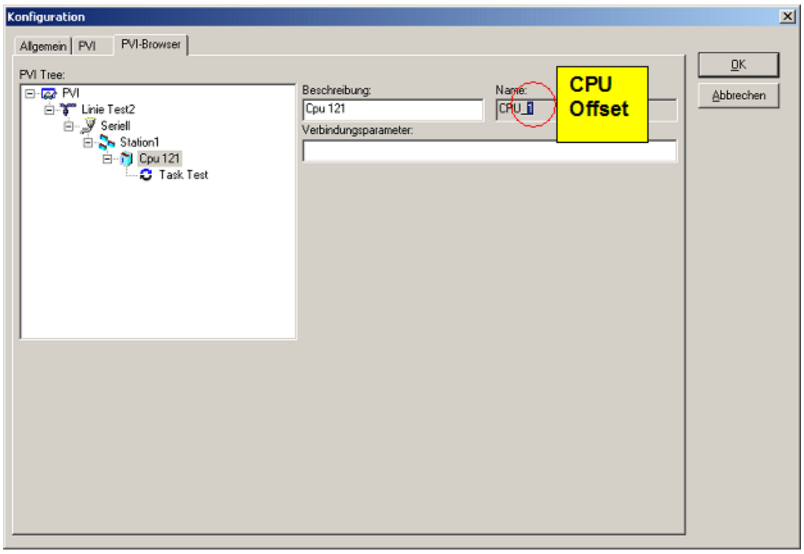
USING THE DATATYPE CPU STATUS

The datatype "CPU status" determines the last valid CPU status and returns it as a value.

Possible CPU status values:

Status name	Status value
WarmStart	0: Status of B&R: OK
ColdStart	1: Status of B&R: OK
Reset	=2: Status of B&R: Error
Reconfiguration	3: Status of B&R: Error
NMI	=4: Status of B&R: Error
Diagnostics	5: Status of B&R: Error
Error	=6: Status of B&R: Error
ConnectionError	7: Status of COPALP: Error
Unknown Status	65535: Status of COPALP: Error

Info: for each CPU only one status variable can be created.

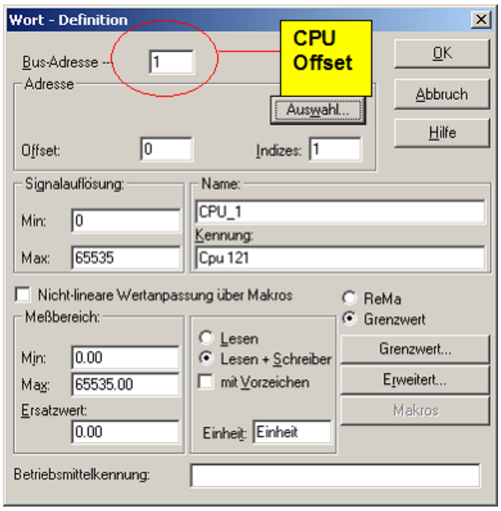


Beschreibung: Cpu 121

Name: CPU_1

Verbindungsparameter:

CPU Offset



Bus-Adresse 1
Adresse
Offset: 0
Indizes: 1
Signalauflösung:
Min: 0
Max: 65535
Name:
CPU_1
Kennung:
Cpu 121
☐ Nicht-lineare Wertanpassung über Makros
○ ReMa
● Grenzwert
Meßbereich:
Min: 0.00
Max: 65535.00
Ersatzwert:
0.00
○ Lesen
● Lesen + Schreiber
☐ mit Vorzeichen
Einheit: Einheit
Betriebsmittelkennung:

8. Driver-specific functions

This driver supports the following functions:

LIMITATIONS

At the moment, RDA is not possible. (Realtime Data Acquisition)Commissioning

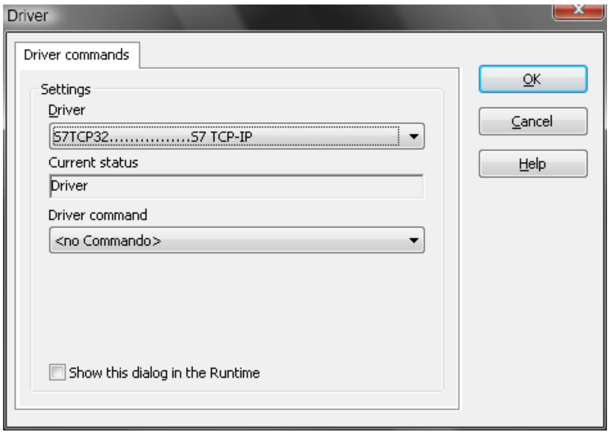
9. Driver commands

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



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

Current status: Driver

Driver command: <no Commando>

□ Show this dialog in the Runtime

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.
Driver commands	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.
▸ Activate driver write set value	Write set value to a driver is allowed.

▸ Deactivate driver write set value	Write set value to a driver is prohibited.
▸ 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 7.00 -> 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 \zenon700\LOG` for zenon version 7.00 SP0. 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**.

Info

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

10.2 Error numbers

Error numbers from the PVI are forwarded directly by the driver.

You can find the corresponding error numbers in the documentation of the PVI.

10.3 Check list

- Is the COM port in use by another application or are the settings incorrect?
- Is the device (PLC) that you are trying to communicate with connected to the power supply?
- Is the cable between PLC and PC/IPC connected correctly?
- Are the used variables correctly defined in the PLC?
- Has the file DEFAULT.BUR be transferred?
- If you use hysteresis the option "Eventmode" has to be activated.
- Two identical systems are accessed, with one driver being used per connection. (see: special case of identical PLC hardware and software)
- 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 file" to the support team responsible for you.