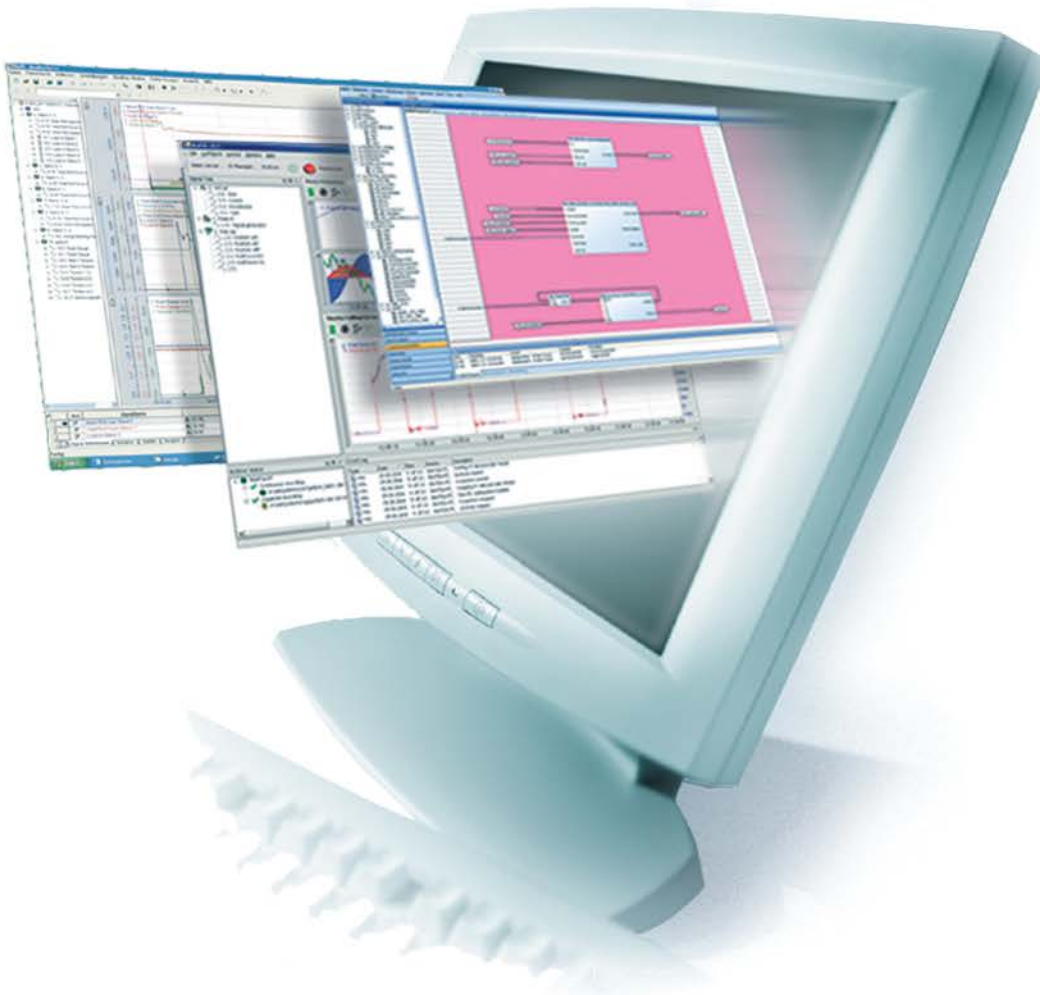


# ibaPDA-Interface-B&R-Xplorer

## PLC-Xplorer Data Interface to B&R Systems



## Manual

Issue 1.0

Measurement and Automation Systems



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The current version is available for download on our web site <http://www.iba-ag.com>.

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# 1 About this Manual

This documentation contains a comprehensive description of the *ibaPDA-Interface-B&R-Xplorer* individual PLC-Xplorer data interface.

This documentation is a supplement to the *ibaPDA* manual. Information about all the other characteristics and functions of *ibaPDA* may be found in the *ibaPDA* manual or in the online help.

## 1.1 Target group and previous knowledge

This documentation addresses qualified professionals, who are familiar with handling electrical and electronic modules as well as communication and measurement technology. A person is regarded as a professional if he/she is capable of assessing the work assigned to him/her and recognizing possible risks on the basis of his/her specialist training, knowledge and experience and knowledge of the standard regulations.

This documentation in particular addresses persons, who are concerned with the configuration, test, commissioning or maintenance of Programmable Logic Controllers of the supported products. For the handling of *ibaPDA-Interface-B&R-Xplorer* the following basic knowledge is required and/or useful:

- Windows operating system
- Basic knowledge of *ibaPDA*
- Knowledge of configuration and operation of the relevant control system

## 1.2 Notations

In this manual, the following notations are used:

Action	Notation
Menu command	Menu <i>Logic diagram</i>
Calling the menu command	<i>Step 1 – Step 2 – Step 3 – Step x</i> Example: Select the menu <i>Logic diagram - Add - New function block</i> .
Keys	<Key name> Example: <Alt>; <F1>
Press the keys simultaneously	<Key name> + <Key name> Example: <Alt> + <Ctrl>
Buttons	<Key name> Example: <OK>; <Cancel>
File names, paths	"Filename", "Path" Example: "Test.doc"

## 1.3 Used symbols

If safety instructions or other notes are used in this manual, they mean:

---

### **DANGER**

The non-observance of this safety information may result in an imminent risk of death or severe injury:

- From an electric shock!
  - Due to the improper handling of software products which are coupled to input and output procedures with control function!
- 

---

### **WARNING**

The non-observance of this safety information may result in a potential risk of death or severe injury!

---

---

### **CAUTION**

The non-observance of this safety information may result in a potential risk of injury or material damage!

---



---

#### **Note**

A note specifies special requirements or actions to be observed.

---



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#### **Important note**

Note if some special features must be observed, for example exceptions from the rule.

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#### **Tip**

Tip or example as a helpful note or insider tip to make the work a little bit easier.

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#### **Other documentation**

Reference to additional documentation or further reading.

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#### **Example**

Configuration and application examples for a better understanding

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## 2 System requirements

The following system requirements are necessary for the use of the B&R-Xplorer data interface:

- ibaPDA* V6.36 or more recent
- ibaPDA* base license + license for *ibaPDA-Interface-PLC-Xplorer* or *ibaPDA-Interface-B&R-Xplorer*
- If you need more than 16 connections, you will require additional one-step-up-Interface-B&R-Xplorer licenses for each additional 16 connections.



### Note

The *ibaPDA-Interface-PLC-Xplorer* license contains, among others, the license for the interface B&R-Xplorer.

- The B&R PVI library must be installed on the *ibaPDA* computer. This library is not included in the *ibaPDA* installation. If B&R Automation Studio is installed on the PC where the *ibaPDA* service is running then the library will be available. If B&R Automation Studio is not installed then you will have to download the B&R PVI runtime (PVI Manager) from the B&R website <http://www.br-automation.com>. Navigate to *Downloads – Software - Automation NET/PVI - PVI Development Setup*. Start the installer and use the default settings.
- Using B&R PVI Manager on non-B&R hardware requires a separate license from B&R.

For further requirements for the used computer hardware and the supported operating systems, please refer to the *ibaPDA* documentation.

### License information

Order no.	Product name	Description
31.001.042	ibaPDA Interface PLC-Xplorer	Extension license for an ibaPDA system adding all available Xplorer data interfaces. (Full specification under <a href="http://www.iba-ag.com">www.iba-ag.com</a> )
31.000.006	ibaPDA-Interface-B&R-Xplorer	Extension license for an ibaPDA system adding the data interface: + B&R-Xplorer (interface to B&R-PCs)
31.100.006	one-step-up-Interface-B&R-Xplorer	Extension license for 16 further B&R-Xplorer connections, a maximum of 14 is permissible

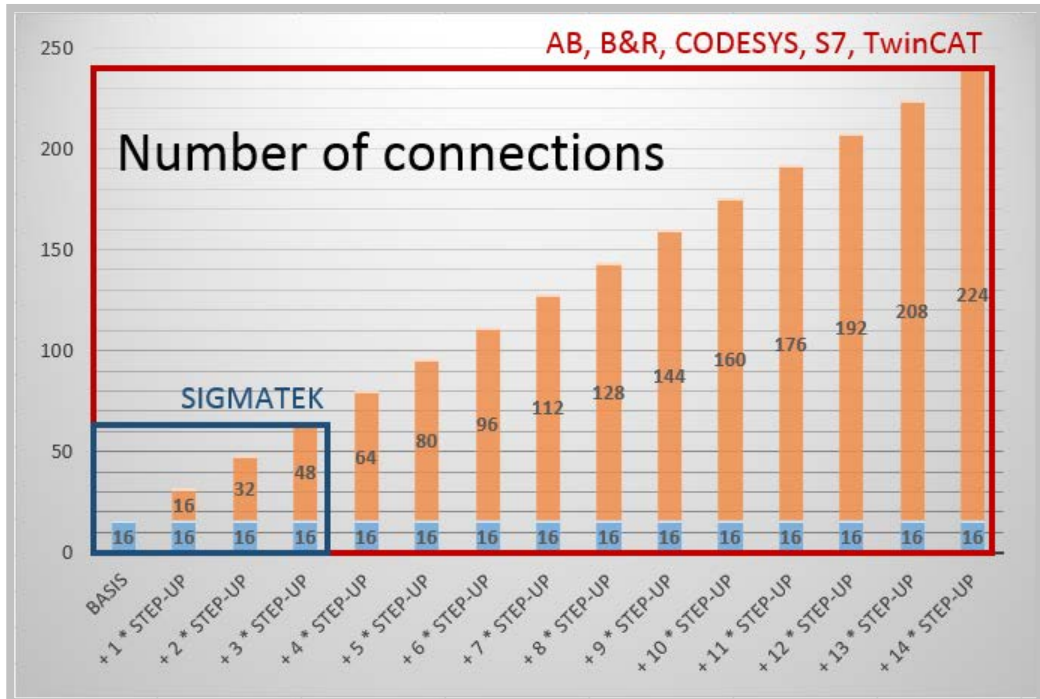
Table 1: Available B&R-Xplorer licenses, as at ibaPDA-V6.36.0



**Note**

The license for individual data interfaces can be enabled multiple times on one dongle, so that it is possible to use more than 16 connections per interface. To this end, you can purchase the *one-step-up-...* extension licenses separately for each interface. Up to 16 further connections to PLCs can be established on each *one-step-up*-license. Up to 240 connections can be configured and used per data interface with the multiple purchase or multiple release of these licenses (up to 15 in total).

Exception of SIGMATEK: here, only up to 4 licenses (64 connections) can be activated.



You have to take into consideration the limitation of the number of signals by the *ibaPDA* base license.

## 3 PLC-Xplorer data interface to B&R PLCs

### 3.1 General information

The B&R-Xplorer data interface is suitable for the recording of measured data on B&R Industrial PCs and control systems like the X20 system. The communication between *ibaPDA* and the B&R system is established over standard network cards. Access is transparent to the controller. It is not necessary to configure or program the controller especially.

Up to 16 connections can be configured with a B&R-Xplorer interface on each license. A total of a maximum of 240 connections can be implemented by the additional purchase of up to 14 further one-step-up-B&R-Xplorer licenses. One connection is required for each B&R PLC.

It is an Xplorer interface, which means that the data is cyclically read by *ibaPDA* instead of being sent by the PLC. *ibaPDA* uses the B&R PVI library (PVI Manager) to communicate with the PLCs. PVI Manager can be used locally or on a remote computer.

The signals to be measured can be conveniently selected using their symbolic names with support from the *ibaPDA* Symbol Browser. This allows access to all measurable symbols, which are stored in the PLC itself.

### 3.2 System topologies

The connections to the controllers can be established via the computer's standard Ethernet ports.

No further software is necessary for operation.



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**Note**

It is recommended carrying out the TCP/IP communication on a separate network segment to exclude a mutual influence by other network components.


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### 3.3 Configuration and engineering B&R

No particular configuration and programming is required on the controller side as a matter of principle. In particular, it is not necessary to call any program modules.



### 3.4 Configuration and engineering ibaPDA

Open the I/O manager, e.g. from the toolbar .

If all system requirements are met (see *System requirements*, page 4), the B&R-Xplorer interface will be displayed in the signal tree.

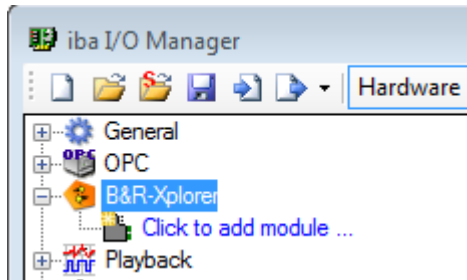


Figure 1: B&R-Xplorer interface in the I/O Manager

#### 3.4.1 General interface settings

The interface itself has the following functions and configuration options:

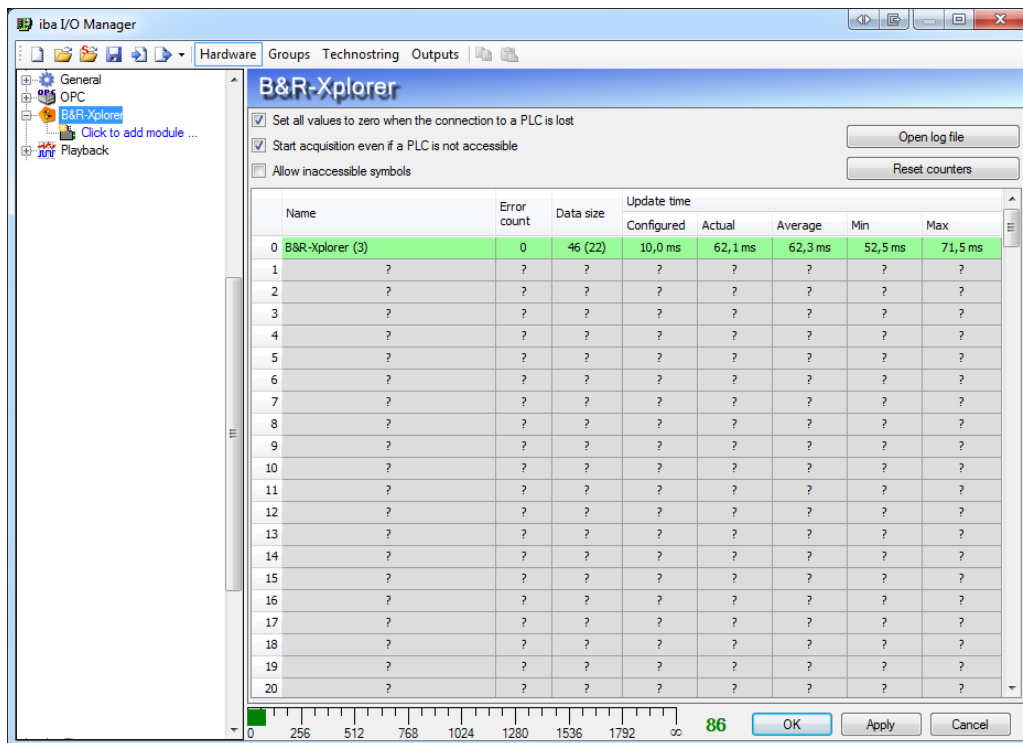


Figure 2: General interface settings

- Set all values to zero when the connection to a PLC is lost  
If enabled, all measured values of the PLC are set to zero as soon as the connection is lost. If this option is disabled, *ibaPDA* will keep the last valid measured data in memory at the time the connection was lost.
- Start acquisition even if a PLC is not accessible  
If this option is enabled, the acquisition will start even if the controller is not accessible. In case of an error, a warning is indicated in the validation dialog. If the system has been started without a connection to the controller, *ibaPDA* will periodically try to connect to the PLC.

Allow inaccessible symbols.

Enable this option if you wish to start acquisition even if symbols are not accessible. The inaccessible symbols are issued as warnings in the validation dialog box. This can only occur if the address book is not up-to-date.

Measurement will not start when inaccessible symbols are present if you do not enable this option.

 Connection table

The table shows the update time values (configured, actual, average, minimum and maximum), the size of the requested data and error counters for the individual connections during data measurement. To reset the calculated times and error counters to zero, simply click on the <Reset counters> button.

➤ See chapter *Connection table*, page 20 in this regard.

The measured data are provided by the PVI Manager, which sends data only when it changes. Thus the update time depends on how fast the data changes in the PLC and on how fast the PVI Manager can read the data from the PLC.

The "Configured update time" determines the polling frequency of the PVI Manager. This value can be set in the general settings of the modules.

The data size column shows how many bytes are required to read all signals. The number in brackets shows how many signals are read.

 <Open log file>

If connections to B&R controllers have been established, all connection-specific actions are logged in a text file. Using this button, you can open and see this file. In the file system on the harddisk, you will find the log file in the program path of the *ibaPDA* server (...\\Programs\\iba\\ibaPDA\\Server\\Log\\). The file name of the current log file is **B&RLog.txt**, the name of the archived log files is **B&RLog\_yyyy\_mm\_dd\_hh\_mm\_ss.txt**.

### 3.4.2 Add module

Add a module by clicking below the interface.

There is one type of modules available, which you can add to the B&R-Xplorer interface:

B&R-Xplorer

Click <OK> to add the module.

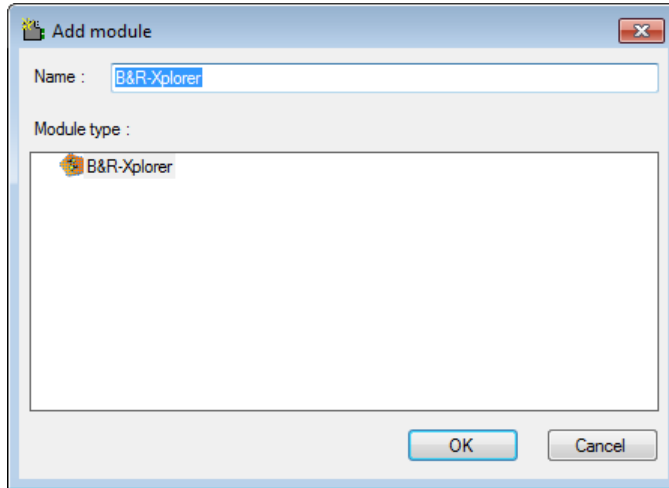


Figure 3: Add modules

One connection is allocated for each module.

### 3.4.3 General module settings

All modules have the following common settings.

<b>Basic</b>	
Module Type	B&R-Xplorer
Locked	False
Enabled	True
Name	<b>B&amp;R-Xplorer</b>
Module No.	<b>7</b>
Timebase	<b>10 ms</b>
Use name as prefix	False
<b>Module Layout</b>	
No. analog signals	<b>32</b>
No. digital signals	<b>32</b>
<b>PLC</b>	
Update time	10 ms
<b>Name</b>	
The name of the module.	
<a href="#">Select symbols</a>	

Figure 4: General module settings

#### Basic settings

Module Type

Indicating the type of the current module (B&R-Xplorer)

Locked

A module can be locked to prevent accidental or unauthorized modification of the module settings.

Enabled

Disabled modules are excluded from signal acquisition.

Name

The plain text name should be entered here as the module designation.

 Module No.

Internal reference number of the module. This number determines the order of the modules in the signal trees of *ibaPDA* client and *ibaAnalyzer*.

 Timebase

All signals of the module will be sampled on this time base.

 Use name as prefix

Puts the module name in front of the signal name.

**Module layout** Number of analog and digital signals

Defines the number of configurable analog and digital signals in the signal tables. The default value is 32 for each. You can change the number. The maximum value is 1000.

**PLC** Update time

This determines how fast the PVI Manager tries to retrieve data from the PLC. During measurement, the actual update time can be higher than the specified value if the PLC needs more time to transmit the data and if the PVI Manager needs more time to retrieve the data. You can check in the connection table how quickly the data is actually updated.

**Link "Select symbols"**

Click on this link after the connection has been successfully established in order to configure the signals to be measured.

➤ For more information see chapter *Signal configuration*, page 12.

### 3.4.4 Connection settings

The connection of the module to the controller is configured in the *Connection* tab. You should enter the required parameters.

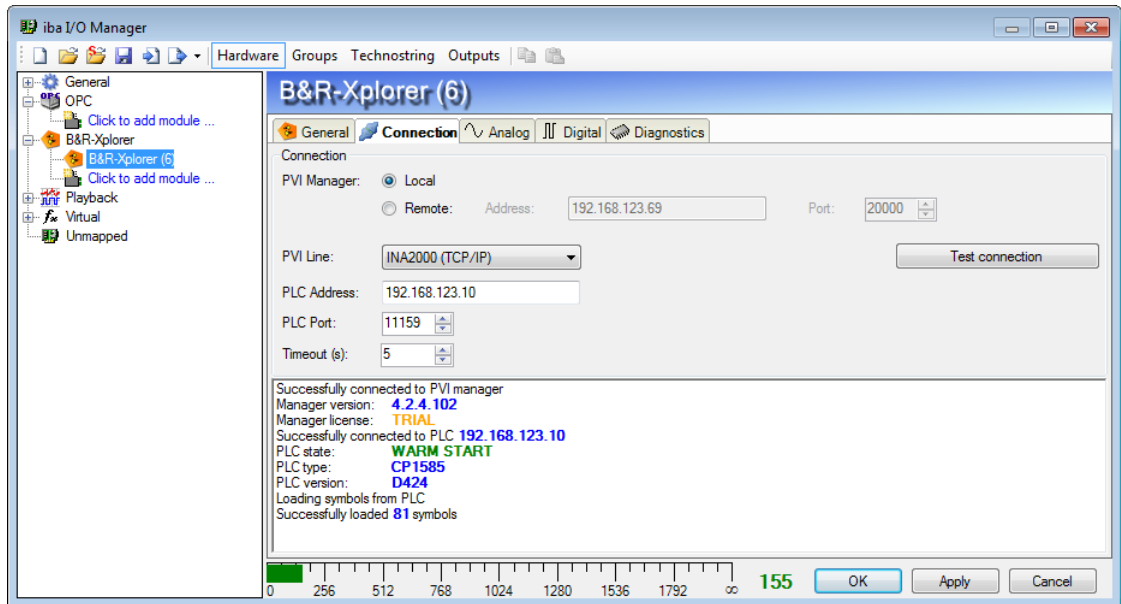


Figure 5: Connection settings

#### □ PVI Manager

Here you have to configure the PVI Manager you want to use to connect to the PLC. You can use a local PVI Manager which is running on the same PC like *ibaPDA* server or a remote one. If the PVI Manager is running on non-B&R hardware then a license from B&R is required in order to use it.

If the PVI Manager is running on a remote computer, you should enter the correct IP address of the remote computer. The default port no. 20000 can remain unchanged in most cases.

#### □ PVI Line

The PVI line determines which protocol the PVI Manager will use to connect to the PLC. There are 3 options:

- **INA2000 (TCP/IP):** This interface uses the INA2000 protocol over TCP and UDP. It is supported by control generations SGC, SG3 and SG4. The automation runtime version needs to be 2.10 or higher.
- **ANSL:** This interface is the successor to the INA2000 protocol. It also uses TCP and UDP. It is only supported by control generations SG4. The automation runtime version needs to be 4.08 or higher.
- **Custom:** In this mode you can configure the PVI line yourself by entering the connection description strings for the line, device and CPU.

PVI Line:	Custom
Line:	CD=LnAnsl
Device:	CD="/IF=TopIp"
CPU:	CD="/IP=192.168.123.10 /PT=11169 /COMT=3000"

In case of the INA2000 and ANSL lines you have to configure the IP address or host name of the PLC. You also have to configure the port number.

Timeout

Here you can specify a value for the timeout in seconds for establishing the connection and for read accesses. Exceeding the time specified here can lead to the controller being declared not accessible or not responsive.

 <Test connection> button

An attempt is made to establish a connection to the PVI Manager using the connection parameters specified. If successful, the information relating to the connected PVI Manager and the PLC will be displayed, such as status, name, runtime version and loaded symbols.

The symbols to be measured are stored on the PLC itself. *ibaPDA* will load the symbols from the PLC during the connection test.

If *ibaPDA* cannot find the PVI library, i.e. the PVI Manager you will get the following error message:

Failed to connect to PVI manager: The PVI Manager is not started or not registered. Please install the PVI communication library. (12050)  
You can download the PVI library from the [B&R website](#)

### 3.4.5 Signal configuration

The variables to be measured are configured in the *Analog* and *Digital* tabs.

The length of the signal tables, i.e. the number of signals per table, is specified in the general module settings, module layout (see *General module settings*, page 9).



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**Note**

Observe the maximum number of signals permitted by your licence.

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**Note**

Take into consideration that the number of signals, which are read by a CPU, influences the minimum achievable update cycle. The more signals acquired, the longer the achievable update time.

---

### Selection of the signals to be measured

You have two options to select the signals to be measured:

1. Click on the *Select symbols* hyperlink in the module's *General* tab.

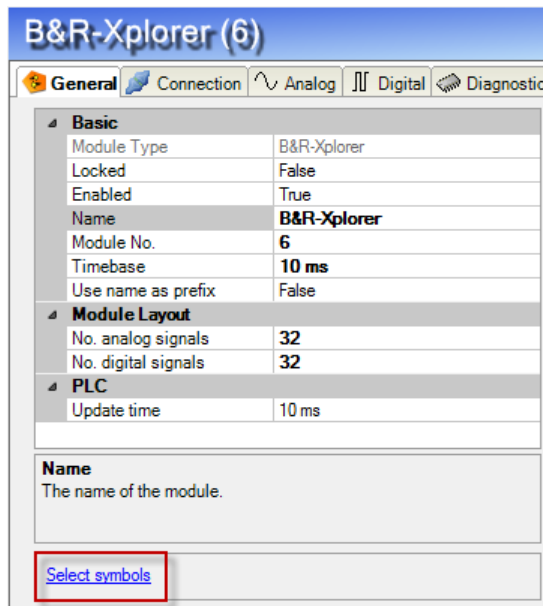



Figure 6: Opening the symbol browser

Clicking on the link opens the B&R symbol browser.

2. Clicking on a field in the Symbol column of the *Analog* or *Digital* tab.

The  icon is displayed. A click on the icon opens the B&R symbol browser.

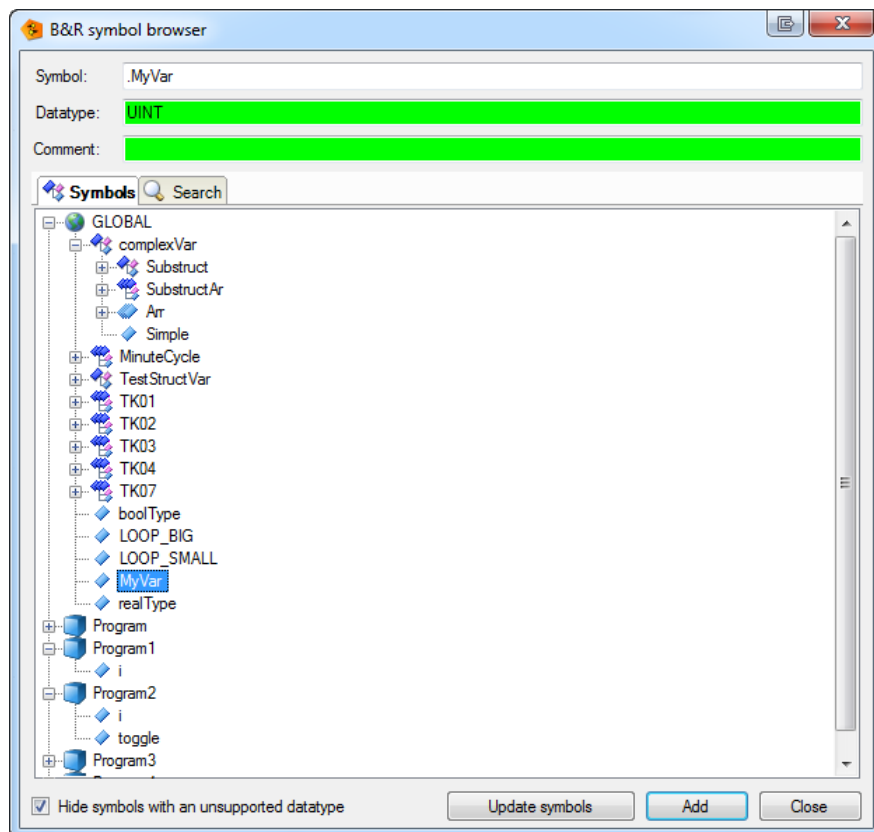


Figure 7: B&R symbol browser, symbol selection

The symbol browser shows all the symbols that were loaded from the PLC. You can select single or multiple symbols in the tree.

Click the <Add> button to add them to the corresponding analog or digital signal table. If you selected a single symbol then the next symbol will be selected after you clicked the <Add> button. This allows you to hit <Add> multiple times in order to add consecutive symbols. You can also double click a symbol to add it to the signal table. Use the <Update symbols> button to read the symbols again from the PLC.

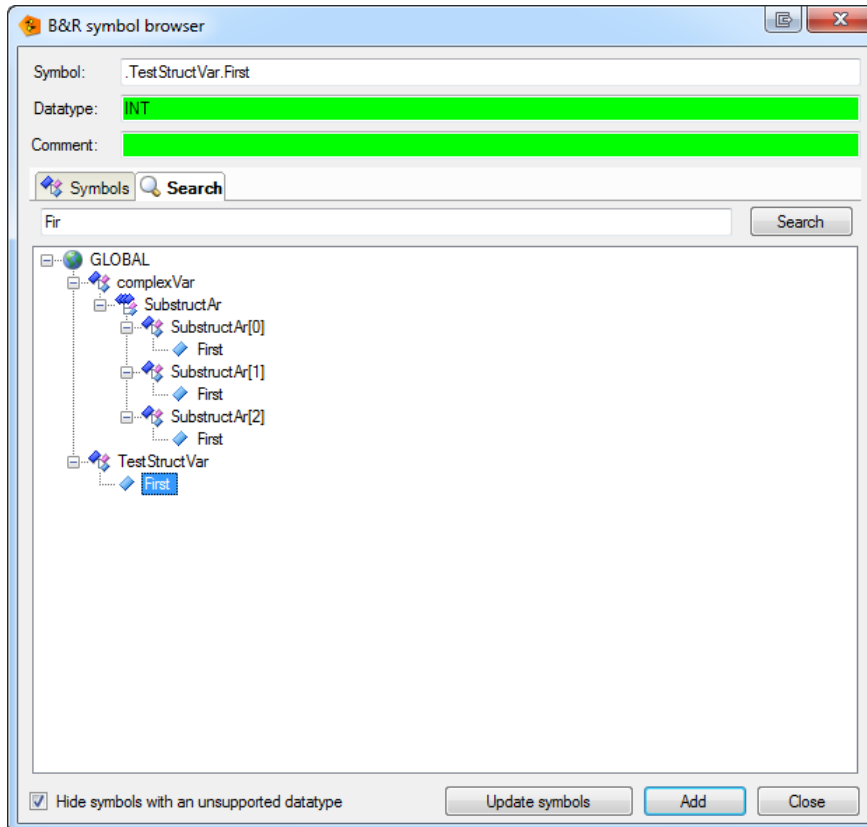


Figure 8: B&R symbol browser, search function

On the *Search* tab, you can search symbols by name. The search result tree works in the same way as the complete symbol tree.



### Note

You can hide all unsupported datatypes by checking the "Hide symbols with an unsupported datatype" checkbox.

The data type and comment of the selected symbol are also shown in the browser.



### 3.4.6 Module diagnostics

After you have applied the configuration, all the configured signals are listed in tabular format with their datatype and current actual value in the *Diagnostics* tab of the B&R-Xplorer module.

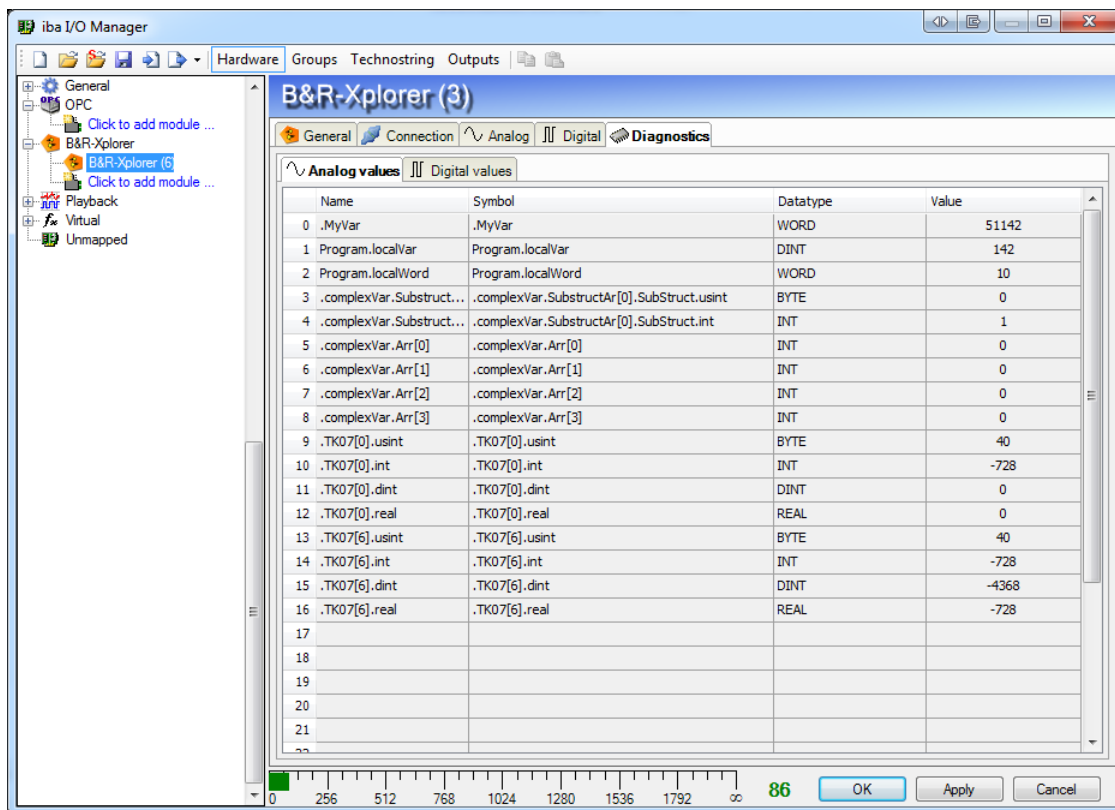


Figure 9: Module diagnostics for analog values

Grey rows in table indicate inactive signals.

### 3.4.7 Module Technostring

Using Technostrings allows the storage of additional (ASCII) data with technological information in the data file. This may be, for example, product information, primary data, reference values, process information or customer data.

The B&R interface supports the processing of symbols of the STRING or WSTRING data type as Technostring. The connection that has been established by one of the configured modules, yet, is used for transferring the strings from the PLC to ibaPDA. You can freely select the module.



#### Further documentation

A detailed description of the Technostring functionality can be found in the *ibaPDA* manual, in the *Technostring* chapter.

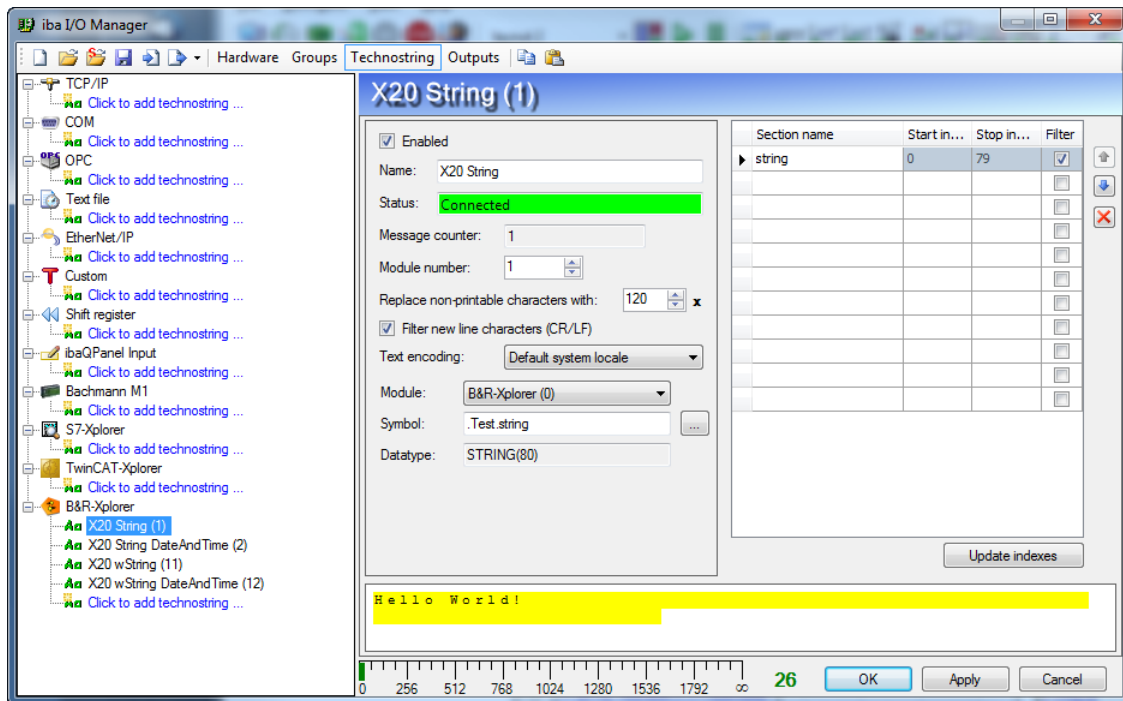


Figure 10: Configuration dialog for Technostrings via the B&R-Xplorer interface, example

The *Technostring* module has the following module-specific setting parameters:

Name

A unique name for this Technostring should be entered, here.

Module number

The Module number is assigned automatically. The Technostring is displayed with this Module No. in the *ibaPDA* signal tree as well as in the signal tree of the data file. You can change the Module number if required.

Replace non-printable characters with...

In case the text contains non-printable characters, these are replaced by a character you can select freely. The default value is 'x' (= 120 ASCII).

Filter new line characters (CR/LF)

If there are new lines in the text, these are ignored when reading the text, in case this option is enabled.

Text encoding

For a correct representation of the text, this setting can be adapted for the locale. "Default system locale" is the default setting.

Module

Here, select the module you want to use for transferring the string. Previously, you have to configure the module under the category *Hardware* in the I/O manager. The module can contain optionally analog and digital values.

The default setting is "None". It is compulsory to select a module.




### Note

The Technostrings are read with the update time of the selected module. Conversely, this means that the response time of the module is influenced by the Technostrings to which it is connected.

### ❑ Symbol

Selected symbol with text information (data type STRING or WSTRING)

For selecting the symbols, open the symbol browser with a click on the button . In the symbol browser, only the appropriate symbols are displayed.

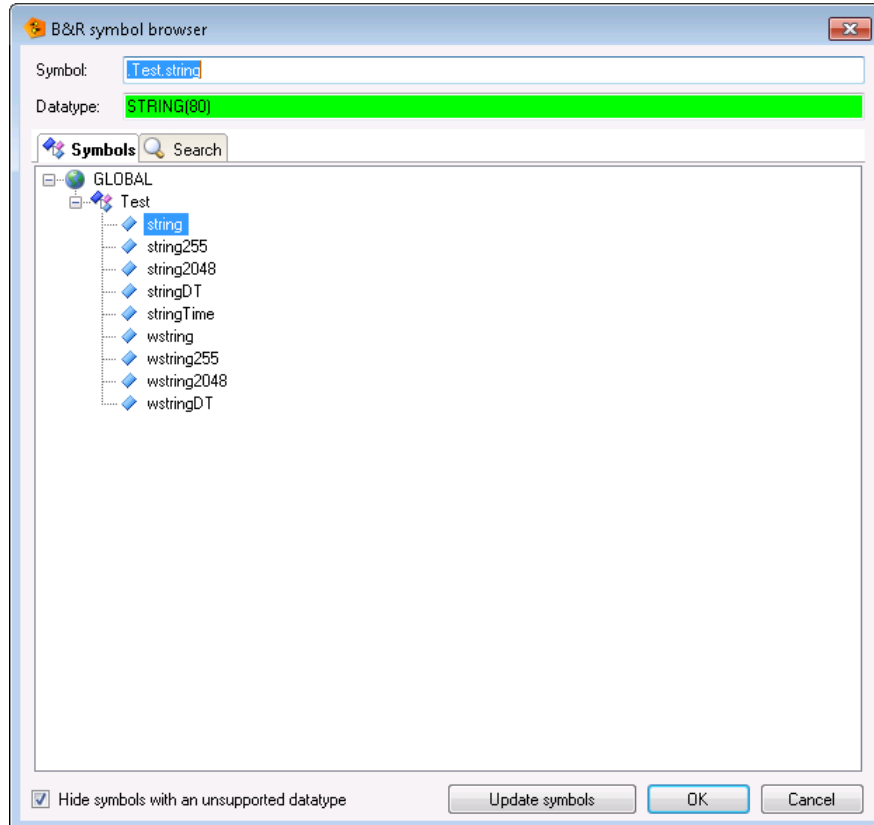


Figure 11: Selecting text symbols with the symbol browser.

When selecting a symbol, a Technostring section with the symbol name and the full length of the symbol is created automatically. Then, you can define more sections with parts of the string, if required.

### ❑ Data type

Data type of the selected symbol



### Note

Technostrings are only read when the data acquisition is running. In case you add a Technostring when the data acquisition is not running, no preview is shown in the configuration dialog.

## 4 Diagnostics

### 4.1 License

If the "B&R-Xplorer" interface is not displayed in the signal tree, you can either check in *ibaPDA* under *General - Settings - License info* in the I/O manager, in the *ibaPDA* service status application or by means of *ibaDongleViewer*, whether your license "Interface B&R-Xplorer" has been properly recognised. The number of licensed connections is indicated in brackets.

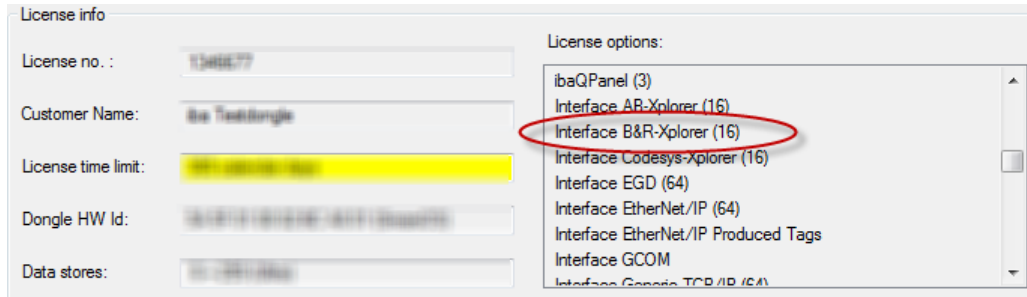


Figure 12: License displayed in the ibaPDA I/O manager, example of the B&R-Xplorer license.

### 4.2 Log files

For many interfaces, there is an <Open log file> button in the specific interface overview in the I/O Manager.

If connections to target platforms have been established, all connection-specific actions are logged in a text file. Using this button, you can open this (current) file and, e.g., scan it for indications of possible connection problems.

In the file system on the harddisk, you will find the log files in the program path of the *ibaPDA* server (...\\Programs\\iba\\ibaPDA\\ServerLog\\). The file names of the log files include the name or abbreviation of the interface type.

Files named **interface.txt** are always the current log files. Files named **interface\_yyyy\_mm\_dd\_hh\_mm\_ss.txt** are archived log files.

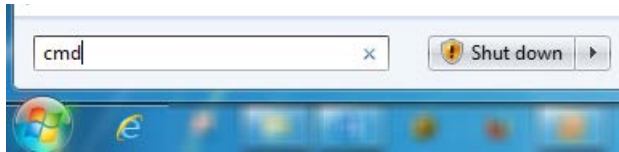
Examples:

- **ethernetipLog.txt** (EtherNet/IP connections log)
- **AbEthLog.txt** (log of Allen-Bradley Ethernet connections)

### 4.3 Connection diagnostics with PING

PING is a system command with which you can check if a certain communication partner can be reached in an IP network.

Open a Windows command prompt.



Enter the command "ping" followed by the IP address of the communication partner and press <ENTER>.

With an existing connection you receive several replies.

```
Administrator: C:\Windows\system32\cmd.exe
C:\Users>ping 192.168.21.120
Pinging 192.168.21.120 with 32 bytes of data:
Reply from 192.168.21.120: bytes=32 time<1ms TTL=128
Reply from 192.168.21.120: bytes=32 time<1ms TTL=128
Reply from 192.168.21.120: bytes=32 time<1ms TTL=128
Reply from 192.168.21.120: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.21.120:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\Users>
```

Figure 13: PING successful

With not existing connection you receive error messages.

```
Administrator: C:\Windows\system32\cmd.exe
C:\Users>ping 192.168.21.121
Pinging 192.168.21.121 with 32 bytes of data:
Reply from 192.168.21.104: Destination host unreachable.
Reply from 192.168.21.104: Destination host unreachable.
Reply from 192.168.21.104: Destination host unreachable.
Reply from 192.168.21.104: Destination host unreachable.

Ping statistics for 192.168.21.121:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
C:\Users>_
```

Figure 14: PING unsuccessful.

## 4.4 Connection table

For every Ethernet-based interface there is a table available in the I/O manager which shows the status of each connection. Each line represents one connection.

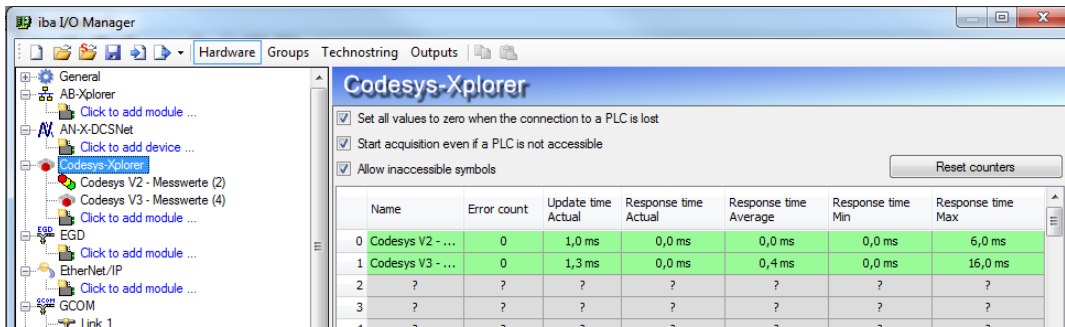


Figure 15: Connection table, example for Codesys-Xplorer

The connected target systems (controllers) are identified by their name or IP address in the first (left) column.

The table shows the cycle times of the different connections during the data acquisition. Click the <Reset counters> button to reset the error counters and the calculation of the response times.

Additional information is provided by the background color of the table rows:

Color	Meaning
Green	The connection is OK and the data are read.
Yellow	The connection is OK, however the data update is slower than the configured update time.
Red	The connection has failed.
Grey	No connection configured.

Table 2: Meaning of background colors

## 4.5 Module diagnostics

You will find another diagnostic aid with a tabular display of the actual analog and digital values and the data types on the *Diagnostics* tab of each Xplorer module.

➤ For further information, see chapter *Module diagnostics*, page 15.

## 5 Support and contact

### Support

Phone: +49 911 97282-14  
Fax: +49 911 97282-33  
Email: support@iba-ag.com



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### Note

If you require support, indicate the serial number (iba-S/N) of the product.

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### Contact

#### Headquarters

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For contact data of your regional iba office or representative please refer to our web site

**[www.iba-ag.com](http://www.iba-ag.com)**.