ibaPDA-Interface-Bachmann-Xplorer
PLC-Xplorer data interface to Bachmann systems

Manual
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1 About this Manual

This document describes the function and application of the software interface ibaPDA-Interface-Bachmann-Xplorer

This documentation is a supplement to the ibaPDA manual. Information about all the other characteristics and functions of ibaPDA can 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 ibaPDA-Interface-Bachmann-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:

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

- Observe the specified measures.

Warning!

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

- Observe the specified measures.

Caution!

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

- Observe the specified measures.

Note

A note specifies special requirements or actions to be observed.

Tip

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

Other documentation

Reference to additional documentation or further reading.
2 System requirements

The following system requirements are necessary for the use of the Bachmann-Xplorer data interface:

- *ibaPDA v7.1.0 or higher*
- License for *ibaPDA-Interface-PLC-Xplorer* or *ibaPDA-Interface-Bachmann-Xplorer*
- With more than 16 connections you need additional *one-step-up-Interface-Bachmann-Xplorer* licenses for each additional 16 connections.
- Bachmann M1 controllers

**Note**

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

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

**License information**

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Product name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.001042</td>
<td>ibaPDA-Interface-PLC-Xplorer</td>
<td>Extension license for <em>ibaPDA</em>-System. All additional Xplorer-data interfaces are added. (Complete specifications under <a href="http://www.iba-ag.com">www.iba-ag.com</a>)</td>
</tr>
<tr>
<td>31.000034</td>
<td>ibaPDA-Interface-Bachmann-Xplorer</td>
<td>Extension license for an ibaPDA system adding the data interface: + Bachmann-Xplorer (interface to Bachmann M1 systems)</td>
</tr>
<tr>
<td>31.100034</td>
<td>one-step-up-Interface-Bachmann-Xplorer</td>
<td>Extension license for 16 further Bachmann-Xplorer connections (a maximum of 14 permissible)</td>
</tr>
</tbody>
</table>

Table 1: Available Bachmann-Xplorer licenses
**Note**

To use more than 16 data connections per interface, 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.

Consider the limitation of the number of signals given by the ibaPDA base license.
3 PLC-Xplorer data interface to Bachmann systems

3.1 General information

The Bachmann-Xplorer interface is suitable for the acquisition of measured data with ibaPDA from a Bachmann M1 system via an Ethernet connection.

The data is cyclically read by ibaPDA instead of being sent by the PLC.

In the M1 controller, no programming and configuration is necessary for establishing a connection between ibaPDA and a controller with defined IP address and for sending the respective signals. For transferring measurement data, no additional software of Bachmann is necessary.

The M1 variables to be measured can conveniently be selected in the M1 address book browser.

Note

Depending on the number of signals to be recorded and the configured update time, the CPU load on the M1 controller always increases accordingly. The CPU load is also dependent on other factors, such as the CPU module type and other running applications.

3.2 System topology

The connections to the controllers can be established via standard Ethernet connections of the computer.

No special software is needed.

Note

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

3.3 Configuration and engineering M1 controller

In principle, no specific configuration and programming is necessary on the controller side. 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 the system requirements are met, the “Bachmann-Xplorer” interface is displayed in the signal tree.

![Bachmann-Xplorer interface in I/O Manager](image)

**Fig. 2: Bachmann-Xplorer interface in I/O Manager**

3.4.1 General Interface Settings

The interface has the following functions and configuration options:

![Overview of the Bachmann-Xplorer interface](image)

**Fig. 3: Overview of the Bachmann-Xplorer interface**

- **Set all values to zero when the connection to a PLC is lost**
  If this option is 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 value at the time the connection was lost in the memory.

- **Start acquisition even if a PLC is not accessible**
  If this option is enabled, the acquisition will start even if an M1 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 M1 controller, ibaPDA will periodically try to connect to the PLC. The measured values stay at zero as long as the PLC is disconnected.

- **Allow inaccessible parameters**
  Enable this option to start the acquisition even if no parameters are accessible. The inaccessible parameters are indicated as warnings in the validation dialog.

  This can only occur if the address book is not up-to-date.
If this option is not enabled and inaccessible parameters are present, then the acquisition will not start.

**Connection table**
The table shows the current values for the update and response time (actual, average, min. and max.) as well as the data size. In addition, you will find an error counter here for the individual connections during the acquisition.

Also see the chapter ➔ *Connection table*, page 20

**Manage address books**
Clicking on the <Manage address books> button takes you to the address book management of *ibaPDA*.

The table shows a list of all of the address books currently present in the system with IP address of the PLC from which the address book was created, as well as the creation time, size and modules that were configured for the respective CPU. Use the <Delete selected address books> button to delete selected address books.

![Address book dialog in the I/O Manager](image)

**<Open log file> button**
If connections to M1 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 hard disc, 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 BachmannLog.txt, the name of the archived log files is BachmannLog_yyy_mm_dd_hh_mm_ss.txt.

**Button <Reset counters>**
To reset the calculated times and error counters in the table to zero, click on the <Reset counters> button.
3.4.2 Add module

Add a module by clicking below the interface.

Select the desired module type and click <OK>.

3.4.3 General module settings

All modules have the following common settings:
Basic settings

Module Type (information only)
Indicates the type of the current module.

Locked
A module can be locked in order to prevent change of module settings by accident or unauthorized users.

Enabled
Disabled modules are excluded from the 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 tree of ibaPDA client and ibaAnalyzer.

Time base
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 names.

M1

Update time
The update time is the time in ms between two reading operations. You can set the value. The update time specifies how quickly the data is called up from the M1 controller.

Module Layout

No. analog / 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.

Link Select M1 variables
Clicking on the Link Select M1 variables opens the M1 address book browser. With the M1 address book browser, you can easily add analog or digital signals to the M1-Xplorer module by double clicking on any variable or selecting several variables and then clicking “Add”.

See chapter ➔ Signal configuration, page 14
3.4.4 Connection settings

In the Connection tab of the module settings, you configure the connection to the PLC, generate address books and test the connection.

![Connection settings](image)

**Connection mode**
Either select TCP/IP, QSOAP or SSL. Note that some PLC types only support TCP/IP. You can find additional information in the manual for your PLC.

**Timeout (s)**
Time span after which a connection attempt is aborted.

**Address**
The IP address of the PLC

**User name/Password**
The user name and password needed to access the PLC according to the PLC configuration.

**<Test connection> button**
A connection test to the PLC is executed and available diagnostic data is issued.

**<Get address book> button**
By clicking on this button, ibaPDA establishes a connection to the PLC, reads the address book and saves it on the ibaPDA server. In the process, all previous address books relating to the selected IP address are overwritten.

The address book is only updated by manual request via the <Get address book> button.
3.4.5 Signal configuration

The selection of the signals to be measured is carried out in the I/O Manager by means of the symbol name supported by the address book browser. The configuration of the signals to be measured is made in the signal tables in the Analog or Digital tab.

The length of the signal tables or the number of signals per table is defined for each table in the general module settings, under Module Layout. See chapter General module settings, page 11

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**Note**

Observe the maximum number of signals permitted by your license.

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**Note**

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

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Selection of measuring signals

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

1. Click on the Select M1 variables hyperlink in the General tab of the module.
Click on the link and open the M1 address book browser:

- Both the analog values as well as the digital values can be seen.
- Double click to apply the selected variables in the current row of the analog or digital table. Or select several variables and click <Add>.
- Close the browser by pressing <Close>.

2. In the Analog or Digital tab, click on the small browser button (...) in a field of the Symbol column.

A click on the icon opens the M1 address book browser.

- Only the analog values or digital values can be seen, depending on in which tab the browser is called up.
- Double click or click <Add> to apply the selected variable in the signal table and the browser is closed.
On the *Search* tab, you can search variables by name. The search result tree works in the same way as the complete variable tree.

By means of the checkbox “Show only supported variables” you can hide all not supported variables.
3.4.6 Module diagnostics

During measurement, the actual values of the analog and digital signals can be seen in the Diagnostics tab of the relevant module.

![Fig. 12: Module diagnostics](image-url)
4 Diagnostics

4.1 License

If the "Bachmann-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 or in the ibaPDA service status application whether your license “Interface-Bachmann-Xplorer” has been properly recognized. The number of licensed connections is indicated in brackets.

![Image of License display in ibaPDA I/O Manager]

Fig. 13: License display in the ibaPDA I/O Manager

4.2 Log files

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

The log file can be opened via the button <Open log file>. The button is available in the I/O Manager:

- for many interfaces in the respective interface overview
- for integrated servers (e.g. OPC UA server) in the Diagnostics tab.

In the file system on the hard drive, you will find the log files in the program path of the ibaPDA server (...\Programs\iba\ibaPDA\Server\Log\). 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_yyyyMMdd_hh_mm_ss.txt are archived log files.

Examples:

- ethernetipLog.txt (log of EtherNet/IP connections)
- AbEthLog.txt (log of Allen-Bradley Ethernet connections)
- OpcUAServerLog.txt (log of OPC UA server 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.

![Fig. 14: PING successful](image)

With no existing connection you receive error messages.

![Fig. 15: PING unsuccessful](image)
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. The following figure shows, as an example, the connection table of the Codesys-Xplorer interface:

![Connection table, example Codesys-Xplorer](image)

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

Depending on the interface type the table shows error counters, read counters and/or data sizes, as well as the cycle times, refresh times and/or update 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:

<table>
<thead>
<tr>
<th>Color</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>The connection is OK and the data are read.</td>
</tr>
<tr>
<td>Yellow</td>
<td>The connection is OK, however the data update is slower than the configured update time.</td>
</tr>
<tr>
<td>Red</td>
<td>The connection has failed.</td>
</tr>
<tr>
<td>Gray</td>
<td>No connection configured.</td>
</tr>
</tbody>
</table>

Table 2: Meaning of background colors
4.5 Diagnostic modules

Diagnostic modules are available for most Ethernet based interfaces and Xplorer interfaces. Using a diagnostic module, information from the diagnostic displays (e.g. diagnostic tabs and connection tables of an interface) can be acquired as signals.

A diagnostic module is always assigned to a data acquisition module of the same interface and supplies its connection information. By using a diagnostic module you can record and analyze the diagnostic information continuously in the ibaPDA system.

Diagnostic modules do not consume any license connections, since they do not establish their own connection, but refer to another module.

Example for the use of diagnostic modules:

- A notification can be generated, whenever the error counter of a communication connection exceeds a certain value or the connection gets lost.
- In case of a disturbance, the current response times in the telegram traffic may be documented in an incident report.
- The connection status can be visualized in ibaQPanel.
- You can forward diagnostic information via the SNMP server integrated in ibaPDA or via OPC DA/UA server to superordinate monitoring systems like network management tools.

In case the diagnostic module is available for an interface, a "Diagnostics" module type is shown in the "Add module" dialog.

![Fig. 17: Add diagnostic module, example Generic TCP](image)

Module settings diagnostic module

For a diagnostic module, you can make the following settings:
The basic settings of a diagnostic module equal those of other modules.

There is only one setting which is specific for the diagnostic module: the target module.

By selecting the target module, you assign the diagnostic module to the module on which you want to acquire information about the connection. You can select the supported modules of this interface in the drop down list of the setting. You can assign exactly one data acquisition module to each diagnostic module. When having selected a module, the available diagnostic signals are immediately added to the Analog and Digital tabs. It depends on the type of interface, which signals exactly are added.

For example, the IP (v4-) address of a TCP Generic module (see fig. above) will always be split into 4 parts derived from the dot-decimal notation, for better reading. Also other values are being determined, as there are port number, counters for telegrams and errors, data sizes and telegram cycle times.
Fig. 20: Example: Digital values of a diagnostic module for a TCP Generic module
5  Support and contact

Support

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

Note

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

Contact

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