ibaPDA-Interface-Generic-UDP
Data Interface Generic-UDP

Manual
Issue 1.6

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The current version is available for download on our web site www.iba-ag.com.

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1 About this Manual

This document describes the function and application of the software interface
ibaPDA-Interface-Generic-UDP

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 standard regulations.

This documentation in particular addresses persons, who are concerned with the configura-
tion, test, commissioning or maintenance of Programmable Logic Controllers of the supported
products. For the handling of ibaPDA-Interface-Generic-UDP the following basic knowledge is
required and/or useful:

- Windows operating system
- Basic knowledge of ibaPDA
- Knowledge of configuration and operation of the relevant measuring device/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>
</tbody>
</table>
| Calling the menu command      | Step 1 – Step 2 – Step 3 – Step x  
Example: Select the menu Logic diagram - Add - New function block. |
| 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:

- 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**

ℹ️ 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 data interface Generic-UDP:

- *ibaPDA* version 6.33.2 or higher
- License for *ibaPDA-Interface-Generic-UDP*
- Network connection 10/100 Mbits

For more requirements on the PC hardware used and the supported operating systems, see the *ibaPDA* documentation.

**Note**

It is highly recommended to operate the Generic-UDP communication on a separate network segment in order to exclude a mutual influence by other network components.

## Licenses

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Product designation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.001075</td>
<td><em>ibaPDA-Interface-Generic-UDP</em></td>
<td>Extension license for an ibaPDA system providing an additional Generic-UDP interface Number of connections: 64</td>
</tr>
<tr>
<td>31.101075</td>
<td><em>one-step-up-Interface-Generic-UDP</em></td>
<td>Extension license for the extension of an existing interface by another 64 Generic-UDP connections, max. 3 permitted</td>
</tr>
</tbody>
</table>
3 Data Interface Generic-UDP

3.1 General information

The Generic-UDP interface can be used by any controller capable of sending UDP/IP messages. The User Datagram Protocol (UDP) is one of the core protocols of the Internet protocol suite. Using UDP, programs on networked computers can send messages to one another. These messages are also called datagrams.

As the sender does not get any confirmation that the data have been received, UDP is in contrast to TCP not connection oriented and not reliable. However, one advantage resulting from this are the higher data rates that can be transferred with UDP.

UDP is explained in chapter 6 of RFC1180 and in RFC768 (see references).

The Generic-UDP messages are IP Unicast messages sent from one or several controllers to the ibaPDA system using a defined port number.

The following drawing gives an overview of a possible configuration scenario where three controllers are sending UDP messages to one ibaPDA system.

Fig. 1: Possible UDP configuration
Properties:

■ The messages sent over each connection must have a fixed layout.

■ You can define a port range on the Generic-UDP interface in the ibaPDA I/O manager. In the above example, the ibaPDA driver is listening on port 5010 to port 5017 for incoming UDP messages.

■ Each UDP connection is uniquely identified within ibaPDA by the destination port number and the source IP address.

Thus, in ibaPDA, data from different controllers can be received, which use the same destination port. It is also possible to send messages from one controller to ibaPDA over different ports. This is shown clearly in the above example: Controller 1 and 2 use the same port 5010, but have different IP addresses. Controller 1 sends several messages and uses different ports for sending (5010 and 5011).

ibaPDA specific limitations

■ The maximum length of the UDP message is limited to 4096 bytes.

■ The number of the supported connections in ibaPDA depends on the Generic-UDP license (64, 128, 192 or 256).

The following controllers apply:

■ Any system capable of sending UDP/IP messages

Other documentation

Reference to additional documentation or further literature.

ibaPDA-V6 manual ( http://www.iba-ag.com/de/support/downloads/)

3.2 Configuration of the controller

For the controller that is intended to send data to ibaPDA, a UDP communication has to be set up. The destination address is the IP address of the ibaPDA server. The destination port should be declared within the defined port range in ibaPDA (see General interface settings, page 10).

The default destination port range defined in ibaPDA is 5010 - 5017. The maximum supported length of the UDP data is 4096 bytes. Longer messages will be rejected by ibaPDA.

The controller should cyclically send a message with a fixed layout to the ibaPDA system using a fixed destination port. If more than one message with a different content is needed, the same destination IP address must be used, but to another destination port within the defined range.

Each UDP connection will be uniquely identified on the ibaPDA side by the “Destination port number” and “Source IP address”. This means that one controller can send several messages to the same ibaPDA even using a destination port already used by other controllers.
3.3  Configuration and engineering ibaPDA

Subsequently, the engineering for ibaPDA is described. If all system requirements are satisfied, the interface "Generic UDP" is displayed in the signal tree. There is no need to add the interface manually.

3.3.1  General settings

The "Alive timeout" is configured jointly for all TCP/IP and UDP protocols supported by ibaPDA.

Disconnected connection after x seconds of inactivity
Behavior and timeout duration can be specified.

Set signal values to zero when a connection is lost
If this option is disabled, the value read last will be kept.
3.3.2  General interface settings

The interface is displayed in the tree structure of the *ibaPDA* I/O manager, in case all system prerequisites are met (see *System requirements*, page 6).

The interface provides the following functions and configuration options:

**UDP port list**
Ports on which *ibaPDA* is waiting for incoming UDP messages. You can enter the ports as port range, as list of individual ports or as a combination of both. If you enter a range, please separate it by a hyphen. Do not separate successive port numbers by commas. The default setting is the range 5010-5017. The identical port number has to be used in the controller (see *Configuration of the controller*, page 8).

**Note**

In *ibaPDA* versions up to 6.23.x, the range is defined by a UDP port number (default 5010) and the port depth (default 8).

**Allow ports through firewall**
When installing *ibaPDA*, the default port numbers of the used protocols are automatically entered in the firewall. If the port number is changed or if the interface was subsequently enabled, this port has to be enabled in the firewall here by clicking on this button.

**Counter for invalid telegrams**
see *Checking the connection for messages received*, page 21.

**Connection table**
see *Checking the connection for messages received*, page 21.

**Adding a module**
To add a module, click below the interface and select the desired module type.
Fig. 4: Add Generic UDP module

The following module types are available:

- Generic unicast UDP: description see below
- Generic multicast UDP: description see below
- HiPAC Request: see description in the "HiPAC Request" manual
Tip

Cyclic unicast UDP messages, that have their destination port in the UDP port range of the interface are displayed automatically in the connection table, even if no corresponding modules have been defined and ibaPDA was not started before. You can create modules for these links easily with a right click on the "Generic UDP" interface icon in the tree view and select "Autodetect" in the context menu.

By applying "Autodetect", a Generic Unicast UDP module with 32 analog (data type FLOAT) and 32 digital signals is created for each link.

Note

The “Autodetect” functionality will only work with UDP unicast messages.
3.3.3 General module settings

If you want to configure a module, mark the module in the tree structure and do the following settings in the dialog:

![Generic multicast UDP (3)](image)

Fig. 5: General module settings

**Note**

If you mark a field in the dialog, the parameter is described in the text field below the table.

### Basic settings

**Module Type (information only)**

Indicates the type of the current module.

**Locked**

A module can be locked to avoid unintentional or unauthorized changing 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 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.

Advanced

Swap analog signals, Swap digital signals
Option to change the order of the byte evaluation

Source address, Destination port
With these two values the connection to a certain controller can be clearly identified. The port has to be within the port range defined for the interface and has to be enabled for the firewall (see General interface settings, page 10).

Multicast IP address (only for module type "Generic Multicast UDP")
Specify here the multicast address used by the controller to send data to ibaPDA using Multicast. The multicast addresses are in the range from 224.0.0.0 through 239.255.255.255.

Note
The only difference between the multicast and unicast modules is the destination IP address on side of the sending controller. For the unicast modules this is the IP address of the ibaPDA server PC. For the multicast modules, this is a multicast address.

There are the following limitations: The combination of source address and destination port number of a multicast module must be different than that combination of all the other unicast and multicast modules. So, you cannot have one sender sending to different multicast addresses with the same port number. You also cannot have a sender that is sending both unicast and multicast messages to the same port number.

No. analog signals, No. digital signals
Here, you can increase or decrease the number of the signals for this module (default setting 32). You can enter any number between 0 and 4096. The signal tables are adjusted accordingly. Note that the total amount of data must not exceed 4096 bytes for analog and digital signals together.

For a detailed description of the parameters, see the ibaPDA manual.
### 3.3.4 Signal configuration

The data to be measured are selected on the controller side by mapping the signals in the datagram, which is cyclically sent to *ibaPDA*.

#### Analog signals

![Signal configuration of analog signals](image)

You can assign name, unit, scale factor, address and data type to the analog signals. Moreover, you can enable or disable the signals.

#### Other documentation

For a description of the columns, please see the *ibaPDA* manual or the online help.

Specific columns for Generic UDP modules:

#### Address

The address indicates the offset of the first byte of this value within the user data telegram. The offset can be entered as hexadecimal or decimal value by selecting the desired setting in the context menu.

#### Data Type

The following data types are supported: BYTE, WORD, DWORD, INT, DINT, FLOAT and STRING[32].

The address range is depending on the data type. Hence, an adjustment of address entries may be necessary after a change of data types.
Digital signals

Fig. 7: Configuration of the digital signals

You can assign name and address to the digital signals. Moreover, you can enable or disable the signals.

The digital signals are addressed via the address and Bit no. 0-31 columns.

Tip

You can use the automatic fill function in the columns (see ibaPDA manual or online help).

Other documentation

For a detailed description of additional options, see the ibaPDA manual.
3.3.5 Module diagnostics

The tables *Analog* and *Digital* of the UDP Generic modules show the telegram contents (actual values).

![Generic unicast UDP (1)](image)

Fig. 8: Display of actual values

The following errors may occur:

- **No data are displayed:**
  - The telegram buffer on the controller side is not filled
  - The connectors of the send block are connected incorrectly

- **Incorrect values are displayed:**
  - The telegram buffer on the controller side is not filled correctly (offset error)
  - The byte order is set incorrectly, see *General module settings*, page 13.

- **The digital signals are sorted incorrectly.**
  - The byte order is set incorrectly, see *General module settings*, page 13.
4 Diagnostics

4.1 License check

If the "Generic UDP" interface is not displayed in the tree structure of the ibaPDA I/O Manager, you can check in the I/O Manager under General - Settings - License info whether your license is recognized properly. The number of licensed connections is shown in brackets.

![Fig. 9: Display of the licenses](image)

4.2 Visibility of the interface

If the interface is not visible despite a valid license, it may be hidden. Click on the tab Interfaces and activate the “Generic UDP” interface.

![Fig. 10: Enabling the interface](image)
### 4.3 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_yyyy_mm_dd_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)
4.4 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. 11: PING successful](image1)

With no existing connection you receive error messages.

![Fig. 12: PING unsuccessful](image2)
4.5 Checking the connection for messages received

After the configuration has been accepted, the following data are displayed:

![Connection table]

**Fig. 13: Connection table**

**Message counter**

**Messages received with invalid length**
Counts a received message that is longer than 4096 bytes. The message is rejected.

**Messages received that can not be mapped**
When receiving messages of a new connection, this value is incremented in case all available connection entries are already in use.
Causes: More connections are received than are supported by the license.

**Connection table**

**Display variants:**
- Green background/bold text: The connection is ok and there is a Generic UDP module assigned to it.
- Green background/standard text: The connection is ok, but there is no Generic UDP module assigned to it.
- Gray background/bold text: A Generic Unicast or Multicast TCP module is defined, but no connection has been established with these parameters.

**Connection data:**
- Source IP address
- Destination port
- Receive message counter
- Data length of the received telegrams
- Counter for Incorrect message types, e.g. when Unicast messages are sent to multicast connections and vice versa.
- Counter for Multicast join errors
If the connections are not displayed or only partially, this may have the following causes:

- The controller is not sending
- No Ethernet connection between *ibaPDA* PC and the controller
- Error in the controller configuration:
  - Incorrect remote IP address
  - The port number does not match the *ibaPDA* settings.
  - The port number is blocked by the firewall.

Other errors:

- If the telegram counters do not increment continuously, the messages are not sent cyclically on the controller side.
- In case the values for the data length change, this is an indication of the following error:
  - Different messages with different layout are sent over the same connection.
5 Support and contact

Support

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Note

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

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