ibaPDA-TCPIP-SISTEAM Manual

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Issue 2.0, ibaPDA-TCPIP-SISTEAM

We have checked that the contents of this manual match the hardware and software described here. However, deviations cannot be fully ruled out, so that we cannot assume any warranty should any deviations actually exist. This manual is regularly updated. Necessary revisions are included in future editions, or can be downloaded from the Internet.

The latest version is always available for downloading at http://www.iba-ag.com.

Work is currently underway on an online help function for the PDA program.

We would welcome any suggestions for improvements which you may have.

<table>
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<td>V 2.00_e</td>
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<td>all</td>
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This manual describes in detail the functionality of the software product ibaPDA-TCPIP-SISTEAM. It serves both as a tutorial and a reference document. Please accept our apologies if this manual does not yet contain the latest function upgrades.

The latest version is always available for downloading at http://www.iba-ag.com.

In this manual you may find several symbols which essentially have the following meanings:

- **Important hint or warning in order to avoid hazard against material or life.**
- **A useful tip or clue to make you work easier.**
- **This draws your attention to special features, such as exceptions to rules, etc.**
- **A reference to additional documentation or more in-depth literature.**
- **Software or file name**
  - reference to associated software or sample applications on the CD-ROM.
- **iba training courses**
  - Hint for training courses by iba concerning related products or subjects

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1 Introduction

1.1 Scope

iba has implemented a TCP/IP driver able to read the SISTEAM protocol over TCP/IP. This manual only describes the SISTEAM over TCP/IP interface to ibaPDA-V6. For more detailed information about the ibaPDA software, please refer to the ibaPDA-V6 manual itself.

1.2 SISTEAM over TCP/IP

The TCP/IP SISTEAM interface can be used by any controller capable of sending messages using the SISTEAM protocol especially the SISTEAM controllers of INGELECTRIC S.A. Excerpt from the SISTEAM Communication manual (See References 1.5 doc 4.):

SISTEAM BUS is an Ethernet-type local network, with a bus topology, which implements the TCP / IP protocol.

SISTEAM BUS has a bus topology, which allows serial data transfer up to 10 Mbits/second, using the CSMA/CD access method, in accordance with the IEEE 802.3 standard.

The Transmission Control Protocol (TCP) is one of the core protocols of the Internet protocol suite. IP handles lower-level transmissions from computer to computer as a message makes its way across the internet, TCP operates at a higher level, concerned only with the two end systems. TCP provides reliable, ordered delivery of a stream of bytes from a program on one computer to another program on another computer. TCP is explained in chapter 6 of RFC1180 and in RFC768 (See References).

SISTEAM over TCP/IP is limited to send data packets to target port 8738 (hex: 0x2222). This means that the ibaPDA driver only can receive messages on port 8738. The source port will be randomly generated as expected by any TCP/IP application enabled to establish multiple connections (links). With the TCP/IP driver, ibaPDA works as a connection server and the controllers work as clients. This means that ibaPDA station is listening for sender information and connection requests on port 8738.

It is important to note that the IP addresses should be unique but most controllers can establish multiple connections to the same destination IP address. The SISTEAM Ethernet module however is not able to make multiple connections with the same destination IP address. Hence the network interface card (NIC) in the ibaPDA system has to be configured for multiple IP addresses on the same NIC. From the point of view of each individual PLC, a different IP address has to be specified for each connection which corresponds to a data module.

This method involves assigning multiple IP addresses to a single NIC (Multihoming). This is accomplished through the Network control panel. After opening it, select the Protocols tab, highlight TCP/IP and then select properties. Next, click the Advanced button and a dialog box will appear as shown in Figure 1. Here, all the additional IP addresses can be added to any NIC in your system.
Each data link between the controller and ibaPDA should be considered as a PDA module which needs a unique Module Number ID (0..63). Once a link is established, always the same module number must be send over the link. This means there is a one to one relationship between the TCP/IP link and the module number in the ibaPDA system.

Figure 1: The Advanced IP addressing dialog box
Example:

![Diagram of SISTEAM connection example]

Figure 2: SISTEAM connection example

Figure 2 gives an overview of a configuration where 3 PLCs are connected with one ibaPDA system. The 3 PLCs act as client and each PLC has its own Ethernet module connected to a network switch.

Each PLC establishes 2 connections with the PDA System. (The ibaPDA system has 2 IP-addresses on the same network interface card.)

The following table gives an overview of the connections and the modules transferred to the ibaPDA System

<table>
<thead>
<tr>
<th>Conn.</th>
<th>Module Index</th>
<th>Module Type</th>
<th>Sender</th>
<th>Receiver</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>SISTEAM Real</td>
<td>PLC1 218.0.14.10</td>
<td>PDA 218.0.14.100</td>
</tr>
<tr>
<td>2</td>
<td>100</td>
<td>SISTEAM Integer</td>
<td>PLC1 218.0.14.10</td>
<td>PDA 218.0.14.101</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>SISTEAM Real</td>
<td>PLC1 218.0.14.11</td>
<td>PDA 218.0.14.100</td>
</tr>
<tr>
<td>4</td>
<td>200</td>
<td>SISTEAM Generic</td>
<td>PLC1 218.0.14.11</td>
<td>PDA 218.0.14.101</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>SISTEAM Real</td>
<td>PLC1 218.0.14.12</td>
<td>PDA 218.0.14.100</td>
</tr>
<tr>
<td>6</td>
<td>201</td>
<td>SISTEAM Generic</td>
<td>PLC1 218.0.14.12</td>
<td>PDA 218.0.14.101</td>
</tr>
</tbody>
</table>
1.3 ibaPDA specific limitations

- The maximum length of the SISTEAM TCP/IP message is limited to 1024 bytes. (When using the TCP/IP SISTEAM Generic module)
- ibaPDA supports up to 64 connections (equals 64 modules) in total (from multiple clients)
- Connections to ibaPDA can only be made with as destination port 8738 (hex: 0x2222)

The following controllers apply:

Any system that is capable of sending messages over the SISTEAM protocol as a client over TCP/IP.

1.4 System prerequisites

Windows XP users should have Service Pack 2 installed.

ibaPDA V6.20 or later should be installed when the ibaPDA TCP/IP SISTEAM Generic module will be used.

The TCP/IP SISTEAM license must be available in the ibaPDA Dongle as indicated in the screenshot of the iba I/O Manager below (Figure 3).

![Figure 3: SISTEAM License information](image)

If the license is not available please contact your local iba office to purchase a TCP/IP SISTEAM license.

**NOTE:**

It is highly recommended to operate the SISTEAM TCP/IP communication on a separate network. An additional network interface card may be needed in order to avoid interferences of SISTEAM TCP/IP messages with the Ethernet traffic from the ibaPDA system to other network nodes (file-servers, users consulting data files …).
1.5 References

1. ibaPDA V6 manual (see http://www.iba-ag.com/download/download.php for actual version)


4. Ingelectric DOCUMENT No. AI-6432 1106A: Description of Ethernet Communication
2 ibaPDA driver decoding for SISTEAM over TCP/IP

SISTEAM over TCP/IP supports 3 types of modules:

- **SISTEAM Integer**
  The analog values are integer type and the digital values are bit type.

- **SISTEAM Real**
  The analog values are float type (IEEE Float format) and the digital values are bit type.

- **SISTEAM Generic**
  The values can be a mixture of the following types: Byte, Integer, Word, Double Integer, Double Word and IEEE Float with a maximum of 1024 bytes.

The SISTEAM packet structure is shown below and is encapsulated in the data part from the TCP/IP packet.
2.1 SISTEAM BUS header:

- **Length**
  This word contains the number of bytes of the complete SISTEAM BUS message excluding this word.

- **Message type**
  This byte contains a static value of 02 which indicates the use of an information sending message.

- **Data type**
  This byte contains a non self defined value 0.

- **Communication Type**
  This byte specifies the communication type used for messaging. Since a virtual circuit is used in this message type, the value 0 should be filled in.

- **Message Number**
  The message number indicates the number of messages at the receiving node that interprets this message. The value is non self defined and set to 0x65.
2.2 SISTEAM BUS data:

The data field contains a data structure depending on the module type used.

- **Message length (2 bytes)**
  The message length is the length of all data fields which are encapsulated in the SISTEAM data. This data field contains a header of 8 bytes and a number of bytes used for the analog and digital signals. The number of bytes used for the analog and digital signals depends on the used module type. The length of a SISTEAM Integer and a SISTEAM Real module are fixed but the length of a SISTEAM Generic module can change according to the customers needs.

- **Module type (2 bytes)**
  The SISTEAM interface in ibaPDA supports three kinds of modules. To specify which module is used, ibaPDA uses a specific number for each module. The following module types can be chosen:
  - SISTEAM Real 0
  - SISTEAM Integer 1
  - SISTEAM Generic 2

- **Module number (2 bytes)**
  The module number is a value between 0 and 63. This value needs to be unique for each module of the same module type. This value together with the Module type will be used in ibaPDA to determine the module index.

- **Sequence counter (2 bytes)**
  The sequence counter should increment by one each sending cycle and can contain a value between 0 and 65535. This counter gives ibaPDA the possibility to detect errors in the communication.

- **Module type dependant data**
  The data field contains the actual data that will be measured by ibaPDA. The type of data depends on the used SISTEAM module.

  Each kind of module is restricted to the kind of values that can be sent via the specified module, except the generic module. In this module each data type can be used next to each other. In ibaPDA only the addresses and data types that are used need to be configured for each signal.

![Figure 4: SISTEAM Generic module analog signals configuration](image)
3 TCP/IP data message layout

This chapter explains in detail the message layout of the different module types. The TCP/IP message layout covers the SISTEAM BUS data as explained in 2.2.

3.1 SISTEAM Integer

32 integer values 32 digital values

<table>
<thead>
<tr>
<th>rel. #</th>
<th>Bytes</th>
<th>C - Type</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>2</td>
<td>Short int.</td>
<td>Message Length</td>
<td>= header (8 bytes) + dig (4 bytes) + 2 * number of integers (0 .. 32) = max 76 bytes</td>
</tr>
<tr>
<td>02</td>
<td>2</td>
<td>Short int.</td>
<td>Module Type</td>
<td>1: integer module</td>
</tr>
<tr>
<td>04</td>
<td>2</td>
<td>Short int.</td>
<td>Module Number</td>
<td>00..63</td>
</tr>
<tr>
<td>06</td>
<td>2</td>
<td>Unsigned short</td>
<td>Sequence Counter</td>
<td>0..65535 Incremented every cycle by the sender</td>
</tr>
<tr>
<td>08</td>
<td>4</td>
<td>Unsigned long</td>
<td>32 bit digital values</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Max 64</td>
<td>Short int.</td>
<td>32 Analog Integer Values</td>
<td>Max of 32 analog integer values</td>
</tr>
</tbody>
</table>

3.2 SISTEAM Real

32 float values 32 digital values

<table>
<thead>
<tr>
<th>rel. #</th>
<th>Bytes</th>
<th>C - Type</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>2</td>
<td>Short int.</td>
<td>Message Length</td>
<td>= header (8 bytes) + dig (4 bytes) + 4 * number of reals (0 .. 32) = max 140 bytes</td>
</tr>
<tr>
<td>02</td>
<td>2</td>
<td>Short int.</td>
<td>Module Type</td>
<td>0: float module</td>
</tr>
<tr>
<td>04</td>
<td>2</td>
<td>Short int.</td>
<td>Module Number</td>
<td>00..63</td>
</tr>
<tr>
<td>06</td>
<td>2</td>
<td>Unsigned short</td>
<td>Sequence Counter</td>
<td>0..65535 Incremented every cycle by the sender</td>
</tr>
<tr>
<td>08</td>
<td>4</td>
<td>Unsigned long</td>
<td>32 bit digital values</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Max 128</td>
<td>Float</td>
<td>32 Analog float Values</td>
<td>Max of 32 analog float values</td>
</tr>
</tbody>
</table>
### 3.3 SISTEAM Generic (available from ibaPDA-V6.20)

**Generic**

<table>
<thead>
<tr>
<th>rel. #</th>
<th>Bytes</th>
<th>C - Type</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>2</td>
<td>Short int.</td>
<td>Message Length</td>
<td>= header (8 bytes) + number of bytes used for analog and digital signals = max 1032 bytes</td>
</tr>
<tr>
<td>02</td>
<td>2</td>
<td>Short int.</td>
<td>Module Type</td>
<td>2 : generic</td>
</tr>
<tr>
<td>04</td>
<td>2</td>
<td>Short int</td>
<td>Module Number</td>
<td>00..63</td>
</tr>
<tr>
<td>06</td>
<td>2</td>
<td>Unsigned short</td>
<td>Sequence Counter</td>
<td>0..65535 Incremented every cycle by the sender</td>
</tr>
<tr>
<td>08</td>
<td>Max 1024</td>
<td>Mixture of: Byte, Int, Word, Double Int, Double Word, IEEE Float</td>
<td>Analog/Digital values</td>
<td></td>
</tr>
</tbody>
</table>
4 Configuring your ibaPDA V6 system

ibaPDA-V6 configuration steps:

1. The PC workstation should have networking services configured and running as well as one or more IP addresses assigned.
2. The ibaPDA dongle should be enabled for SISTEAM TCP/IP.
3. There must be at least one FOB (FOB-F, FOB-4i-(S)-PCI) or L2B card installed to generate an accurate interrupt.
4. If not done yet, start the ibaPDA server and then the ibaPDA client. Make sure that the ibaPDA client connects to the right ibaPDA server.
5. Open the I/O manager and check in the branch General, tab Settings, if the interrupt counter counts up. The interrupt source should be an iba FOB or L2B card. Set the interrupt source to master / internal. When a new configuration is started, ibaPDA automatically selects the correct interrupt source.
6. If the interrupt counter is not running then refer to the appropriate FOB/L2B manual.
7. If the interrupt counter works well, check if the data interface TCP/IP SISTEAM is displayed in the signal tree. If not, the license might be missing in your dongle.
8. Configure a module as SISTEAM Integer, SISTEAM Real or SISTEAM Generic, by clicking on the branch "Click to add module...". (64 modules can be configured in total)

Figure 5: TCP/IP SISTEAM module selection

9. Mark the module in the signal tree and make the required general settings and the dedicated TCP/IP settings. The module index should correspond to the module index programmed in the SISTEAM TCP/IP telegram.
10 Enter the signals to be measured in the Analog and Digital signal tables.

11 To test the connection without the use of a PLC, the TcpIpTest program can be used. Otherwise configure the PLC and skip to step 13. In TcpIpTest, configure the corresponding SISTEAM module type and the target IP address. Set the SISTEAM module index to 0 (integer), 100 (real) or 200 (generic).

12 Select the “ramp” radio button and press the Start button.

13 When everything is configured in the correct way, some highlighted green rows should be visible in the TCP/IP SISTEAM connection overview. Each green line indicates an established connection.

14 From the moment a connection is established, live data should be visible in the ibaPDA channels. They are displayed in the last column of the signal tables.

15 Configure a signal monitor to display the channel information.

16 In case you have tested with TcpIpTest and the test is completed. Configure the PLC and return to step 13.

---

Make sure that if a technostring via TCP/IP is used, the technostring does not use port 8738.
4.1 General module settings

The general module settings will be described with the help of a screenshot made from a SISTEAM Integer module. The reason for this is that the SISTEAM Integer module only contains general settings. The Real and Generic module have a few more specific settings that can be applied.

![General Module Settings](image)

Figure 7: General SISTEAM settings (Integer module)

- **Locked**
  
  By selecting one of the options in the drop-down list in the field next to Locked, the decision can be made to lock (True) or unlock (False) the module. A locked module is a module whose configuration cannot be changed. All the modules properties are read-only. All the signals properties like name, scaling, unit etc. are read-only.

- **Enabled**
  
  With selection of one of the options in the drop-down list in the field next to Enabled, the availability of a module can be determined. To enable this module, true has to be selected and false to disable it. If a module is disabled, its signals are excluded from acquisition. Thus, they are not available for display or for recording. Furthermore, the number of signals from a disabled module will not be taken into account in the signal statistics (signal-o-meter).
Name
In the field next to Name enter a comprehensive name for the module.

It is recommended to use an application-specific naming convention for a better clearness and comprehension, particularly with vast numbers of modules. The name may refer to a technological purpose or a special location in the plant, where the module is used or installed.

The number of characters in the name is unlimited. The name of the module is stored in the data file and visible in ibaAnalyzer.

Module No.
In the field next to Module No. a module number can be specified. When adding modules to the configuration, the system gives numbers automatically in chronological order. However, a different order may be preferred later in the data file for analysis. Feel free to change the module number according to your needs. The module number determines the order in the signal tree in ibaAnalyzer.

Timebase
In the field next to Timebase a time value may be entered, given in ms, which is an integer multiple of the general time base as configured in the General branch of the I/O manager tree. All signals of the module will then be sampled on this time base. The ratio between max. and min. time base for all modules is limited to 1000. The time base value is limited to 1000ms.

The time base should be equal to or smaller than the time interval of the task sending the SISTEAM data in the controller.

Module index
The module index is the module type combined with the module number as explained in chapter “2.2 SISTEAM BUS data:

For the different module types the possible module indexes are listed below.

<table>
<thead>
<tr>
<th>Module Type</th>
<th>Module Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>SISTEAM Integer module</td>
<td>00..63 (for module type 1)</td>
</tr>
<tr>
<td>SISTEAM Real module</td>
<td>100..163 (for module type 0)</td>
</tr>
<tr>
<td>SISTEAM Generic module</td>
<td>200..263 (for module type 2)</td>
</tr>
</tbody>
</table>

Please note the contradiction here in the module indexes in the above table (historical reason)!

Module indexes from Module type 1, which is integer type, goes from 0..63

Module indexes from Module type 0, which is real type, goes from 100..163
4.2 SISTEAM Integer module

In the SISTEAM Integer module, no extra settings need to be configuring then the general settings as explained in 4.1.

4.3 SISTEAM Real module

Figure 8: SISTEAM Real module

- **Show gain and offset**
  With selection of one of the options in the drop-down list in the field next to *Show gain and offset*, the gain and offset columns can be shown (True) or hidden (False) in the analog signals grid.

- **Number of analog signals**
  Here the number of analog signals in the module can be increased or decreased. Default 32 signals are available. 1 to 32 signals can be selected. The signal tables will be adjusted accordingly. This number will be subtracted from the total number of licensed signals (signal-o-meter).
4.4 SISTEAM Generic module

The selection of the swap mode depends on the target system or the manner the data is packed.

- **No swap**
  The position of bytes of a value remain unchanged.
- **Depending on datatype**
  32 bit values: ABCD --> DCBA (byte swapping)
  16 bit values: AB --> BA (byte swapping)
- **Swap 16 bit**
  32 bit values: ABCD --> CDAB

- **Swap digital signals**
Digital signals are always transmitted as 32 bit integers. If a byte swapping is required for digitals too (little / big endian conversion) then this option must be set on `True`.

The 32 bit integer will be swapped byte wise: ABCD --> DCBA.

The order of bits changes accordingly as follows:

**no swap**
```
31 30 29 28 27 26 25 24 | 23 22 21 20 19 18 17 16 | ..... | 7 6 5 4 3 2 1 0
```

**with swap**
```
7 6 5 4 3 2 1 0 | 15 14 13 12 11 10 9 8 | ..... | 31 30 29 28 27 26 25 24
```
No. analog signals, No. digital signals

The number of analog and digital signals used in the generic module can be increased or decreased. Default 32 signals are configurable. A value can be entered between 0 and 1000. The signal tables will be adjusted accordingly. The sum of these numbers will be subtracted from the total number of licensed signals (signal-o-meter).

4.5 Signal configuration

In the Name column enter a comprehensive name for each signal.

It is recommended to use an application-specific naming convention for a better clarity and comprehension, particularly with vast numbers of signals. The name may refer to a technological purpose, the module name or a special location in the plant, where the signal comes from.

The number of characters in the name is unlimited. The names of the signals are stored in the data file and visible in ibaAnalyzer.

A useful feature is the automatic fill function: If you enter a signal name and click on the column header as long as the cursor is still in the name field then all empty fields below will be filled with that name. If the name is ending with a number you will get names with an increasing number like an index. You may use this function in any row of the table. Fields which already have names won’t be overwritten.
Unit
Assignment of an engineering unit (such as Ampere, Volt, etc.) for the signal. This entry can be up to 11 characters long and is regarded as a comment field only. It is always displayed in conjunction with a numerical display of the values.

Gain and Offset (available for Real and Generic modules)
The values for gain and offset describe a linear characteristic curve for scaling. If incoming values are given in physical units, gain and offset can be ignored, i.e. set gain = 1 and offset = 0.

However, control applications in the automation systems which supply the signals often use normalized values for analog signals, ranging between 0.0 and 1.0 or -1.0 and +1.0. In order to get a correct scale for display in terms of physical units, ibaPDA must use a normalize factor. This factor can be evaluated by means of gain and offset parameters.

Gain and offset can be entered directly in the corresponding fields or by means of the two-point-scaling dialog with two pairs of applicable values.

You can open the two-point-scaling dialog with a click on the little tool button in the fields gain or offset. (Cursor must be on the fields to see the button.)

Address (Generic module only)
In the Address column, the offset of the first byte of this value within the raw data stream may be specified by the user. The offset can be entered as hexadecimal or decimal values by selecting the desired setting in the context menu.

In order to get some default values just click on the column header. The offset values are filled in automatically starting with the value in the first row, respectively in the field the cursor is currently in, downwards in address steps according to the selected data type.
For digital signals the Bit no. is automatically increased.

- Analog signals (SISTEAM Generic module) as FLOAT-, DINT- or DWORD: 4 Byte-steps
- Analog signals (SISTEAM Generic module) as INT or WORD: 2 Byte steps
- Analog signals (SISTEAM Generic module) as BYTE: 1 Byte steps
- Digital signals (SISTEAM Generic module) increase of Bit no. by 1, from 0 to 31, then increase of address by 4

If you enter all signal definitions with name and data type and click on „Address“, ibaPDA will automatically calculate the correct address offsets, based on the address of the first signal.
Data Type (Generic module only)

In the fields of this column you can select the data type of each signal. Just click in the corresponding field and select the data type from the drop-down list.

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

Active

Activation of signals.

A click on the column heading "Active" enables (checkmark) and disables (no checkmark) all the signals at the same time. Individual signals can be activated in the signal-specific activation box. No acquisition takes place for channels which are not activated, so that such channels are available neither for display nor for storage.

Furthermore, disabled signals will not be taken into account in the signal statistics (signal-o-meter).

Actual (Value)

The fields in this column show the actual value of the signals. Even if the acquisition is not running yet the actual value may be displayed if the hardware is already connected and working (diagnostic feature).

For digital signals only the values 0 and 1 are permitted.

Figure 11: SISTEAM Generic module - Digital signal tab

On the digital tab the options can be specified for each signal. The description of the available columns on this tab can be found in the description above of the analog tab.

For a more detailed description of the system configuration please refer to the ibaPDA-V6 manual or the online help function in ibaPDA-V6.
5 Diagnosis in ibaPDA-V6

There are two ways to check whether the connection to the target system over SISTEAM works well and values are being received.

1. Actual value display in signal tables for analog and digital signals

If measured values are already being sent you may see these values in the Actual column of the signal tables (tabs Analog or Digital) in the ibaPDA I/O manager.

2. Connection overview of the data interface

If you mark the data interface TCP/IP SISTEAM in the signal tree of the I/O manager you'll see a table in the right part of the window which shows all available connections of this interface.
Active connections are marked in green:

- Active connections appear in green as soon as data is received on port 8738. The source IP Address is displayed together with:
  - Module index: module index from the data message. If an invalid module index is received, a “?” is displayed and the incomplete errors counter is incremented at each message.

<table>
<thead>
<tr>
<th>Address</th>
<th>Module index</th>
<th>Message counter</th>
<th>Incomplete errors</th>
<th>Sequence errors</th>
<th>Max packet size</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>192.168.123.59</td>
<td>?</td>
<td>297</td>
<td>297</td>
<td>0</td>
</tr>
</tbody>
</table>

- Message counter: incremented with the reception of each data message
- Incomplete errors: incremented with each invalid message (invalid module index or invalid message length)
- Sequence errors: incremented if a valid message is received but the sequence counter is not incremented by one compared to the previous message. This indicates mostly lost packages.
- Max packet size: the maximum size of the package received over this connection.
6 Performance data

During the system test in the Ingelectric Office in Zamudio – SPAIN, the following performance was achieved. Remark: the test PLC was not loaded with a real-time application.

- The test system was equipped with 1 PLC and 3 Ethernet Cards.
- The one PLC installed was simulating the 3 PLC’s of the final configuration.
- The one PLC was sending 6 SISTEAM_BUS_FLOAT modules using 3 Ethernet Cards. Each card had 2 links to the PDA system.
- The minimum cycle time was 220ms per module. Attempts to make the update cycle faster then 220 ms resulted in a temporary deadlock situation of the Ethernet card, with communication dropouts of more than 1 second as result.

Error explanation:
Sometimes, measurements by ibaPDA of automation devices via TCP/IP don't work for cycle times of < 200ms.

Error manifestation in ibaPDA: sequence error or incomplete error.

Reason:
The TCPIP protocol offers different variants of acknowledge:

The WinSocket standard uses the "delayed acknowledge" method according to RFC1122. This means that an acknowledge is delayed until further messages are received in order to send one acknowledge for all of these together. If no further messages are received the acknowledge (ACK message) will be sent after a maximum delay time of 200 ms (depending on socket).

The data flow is controlled by a "sliding window" (parameter Win = nnnn). The receiver declares how many bytes it can receive without sending an acknowledge.

Some controllers don't accept this method but expecting an acknowledge after each data message instead. If this acknowledge is not received within a specified time (200 ms) the data message is sent again, occasionally filled up with new data to be sent, leading to an error on the receiver's side because the original was already received correctly.

How to fix it:
Switch off the "delayed acknowledge" in Windows. This can be done by setting a parameter in the Windows Registry:

Windows XP: parameter "TcpAckFrequency" REG_DWORD = 1;
Windows 2000: parameter "TcpDelAckTicks" REG_DWORD = 0;

These parameters are not available by default and should be entered in the following path:

"HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\Tcpip\Parameters\Interfaces\{InterfaceGUID}\"

One should select the correct interface. The correct interface can be found by checking the actual IP address, for instance.

See figures below or refer to Microsoft web site.
Windows XP and Window Server 2003:

http://support.microsoft.com/kb/328890

Windows 2000:


After changing the value, a reboot is necessary.
7 Support and contact

7.1 Support
For technical support or sales information, please call the following numbers:

Telephone: +49 911 97282-14
Fax: +49 911 97282-33
email: support@iba-ag.com

For downloads of the latest software versions as well as hardware and software manuals, please use our web-site at: http://www.iba-ag.com

Any feedback, comments or tips on errata in this documentation or suggestions for improvement will be appreciated. Simply send an e-mail or fax to us, thank you for your support.

7.2 Contact

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