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The content of this publication has been checked for compliance with the described hardware and software. Nevertheless, deviations cannot be excluded completely so that the full compliance is not guaranteed. However, the information in this publication is updated regularly. Required corrections are contained in the following issues or can be downloaded on the Internet.

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

<table>
<thead>
<tr>
<th>Issue</th>
<th>Date</th>
<th>Revision</th>
<th>Author</th>
<th>Version SW</th>
</tr>
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<td>1.1</td>
<td>04-19-2017</td>
<td>Licenses</td>
<td>RM</td>
<td>6.37.3</td>
</tr>
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</table>

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# Table of Contents

1 About this Manual .......................................................................................................................... 2  
1.1 Target group and previous knowledge .................................................................................... 2  
1.2 Notations ................................................................................................................................ 2  
1.3 Used symbols ......................................................................................................................... 3  

2 System requirements ................................................................................................................. 4  

3 TC-net interface .......................................................................................................................... 5  
3.1 General information .................................................................................................................. 5  
3.2 System topologies ..................................................................................................................... 6  
3.3 Configuration and engineering ibaPDA ................................................................................... 7  
3.3.1 Interface configuration ......................................................................................................... 7  
3.3.2 Station list tab ....................................................................................................................... 9  
3.3.3 Scan block list tab ................................................................................................................ 10  
3.3.4 Diagnostics tab .................................................................................................................... 11  
3.3.5 TC-net symbol browser ....................................................................................................... 12  
3.3.6 Add module ........................................................................................................................ 14  
3.3.7 Raw scan block module type .............................................................................................. 15  
3.3.7.1 Module settings ............................................................................................................... 15  
3.3.7.2 Signal configuration ......................................................................................................... 17  
3.3.8 Symbolic scan block module type ....................................................................................... 20  
3.3.8.1 Module settings ............................................................................................................... 20  
3.3.8.2 Signal configuration ......................................................................................................... 21  

4 Diagnostics .................................................................................................................................... 22  
4.1 License ..................................................................................................................................... 22  
4.2 Interface diagnostics tab ......................................................................................................... 22  

5 Support and contact ..................................................................................................................... 23
1 About this Manual

This documentation contains a comprehensive description of the ibaPDA-Interface-TC-net software 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 automation systems using Toshiba TC-net communication. For the handling of ibaPDA-Interface-TC-net 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:</td>
</tr>
<tr>
<td></td>
<td>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:</td>
</tr>
<tr>
<td></td>
<td>&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:</td>
</tr>
<tr>
<td></td>
<td>&lt;Alt&gt; + &lt;Ctrl&gt;</td>
</tr>
<tr>
<td>Buttons</td>
<td>&lt;Key name&gt;</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>&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:</td>
</tr>
<tr>
<td></td>
<td>&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:

- 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.

---

**Important note**

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

---

**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.

---

**Example**

Configuration and application examples for a better understanding
2 System requirements

The following system requirements are necessary for the use of the TC-net data interface:

- *ibaPDA* V6.37.0 or more recent
- License for *ibaPDA-Interface-TC-net*
- At least one of the following Toshiba TC-net 100 PCI-/PCIe or TC-net 1G PCIe transmission cards:

<table>
<thead>
<tr>
<th>Board type</th>
<th>Slot</th>
<th>Network type</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>JTNI11/JTNI12</td>
<td>PCI</td>
<td>TC-net 100</td>
<td>Single/double electrical link</td>
</tr>
<tr>
<td>JTNI21/JTNI22</td>
<td>PCI</td>
<td>TC-net 100</td>
<td>Single/double optical link</td>
</tr>
<tr>
<td>JTNI31/JTNI32</td>
<td>PCI</td>
<td>TC-net 100</td>
<td></td>
</tr>
<tr>
<td>JTNI41/JTNI42</td>
<td>PCI</td>
<td>TC-net 100</td>
<td></td>
</tr>
<tr>
<td>JTNI61/JTNI62</td>
<td>PCIe</td>
<td>TC-net 100</td>
<td></td>
</tr>
<tr>
<td>JTGI23</td>
<td>PCIe</td>
<td>TC-net 1G</td>
<td>Giganet</td>
</tr>
</tbody>
</table>

Table 1: Supported TC-net boards

For more prerequisites concerning the used PC hardware and the supported operating systems, please see the *ibaPDA* documentation.

License information

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Product name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.001047</td>
<td>ibaPDA-Interface-TC-net</td>
<td>Extension license for an ibaPDA system for the connection to a Toshiba TC-net network via TC-net 100 or TC-net 1G board. Acquiring of data from max. 64 Scan Blocks (64 words each, max. 8192 bytes in total) is possible.</td>
</tr>
<tr>
<td>31.101047</td>
<td>one-step-up-Interface-TC-net</td>
<td>Extension license to increase the number of scan blocks. Scan Blocks per extension: 64 (64 words each, max. 8192 bytes in total) Max. total number of Scan Blocks per interface: 64+ (127 * 64)= 8192</td>
</tr>
</tbody>
</table>

Table 2: Available TC-net-Interface licenses, as of ibaPDA-V6.37.3

For more information on how the scan block licenses are utilized by the modules in *ibaPDA* please refer to chapter *Add module*, page 14
3 TC-net interface

3.1 General information

TC-net realizes high-speed and real-time transmission between supervisory units, computers and controllers via the Information and control LANs.

It is an information and control network based on the Ethernet, a de-facto standard network, and is available for the message transmission with the use of the TCP/IP and the UDP/IP. However, specialized transmission modules or transmission cards for PC are required.

The TC-net hardware interface for ibiaPDA allows the user to measure values from a TC-net through a Toshiba TC-net 100 or TC-net 1G board.

Faster transfer rates provided by DMA are possible with PCI express boards only. ibiaPDA makes use of the official Toshiba API which supports DMA transfers. For the API to function properly, the official Toshiba device driver supplied with the hardware needs to be installed. ibiaPDA does not install a device driver for TC-net boards.

ibiaPDA supports the Toshiba APIs for all board types, mentioned in Table 1.

Due to limitations of the Toshiba APIs, only up to 2 boards per type can be used in one computer. This implies that the maximum amount of TC-net boards in the ibiaPDA server computer is 6:

- 2 TC-net 100 PCI boards +
- 2 TC-net 100 PCI express boards +
- 2 TC-net 1G PCI express boards

This manual will only focus on setting up the TC-net board in ibiaPDA. For further information on how to install the device driver for the TC-net board or how to setup a TC-net, we refer to the documentation provided by Toshiba.

Other documentation

For information on TC-net 100 please refer to the Toshiba website under the following link:

**URL**  https://www.toshiba.co.jp/sis/en/seigyo/tcnet/download.htm

For information on TC-net 1G please contact your local Toshiba representative or the Toshiba support under the following link:

**URL**  https://www.toshiba.co.jp/sis/en/contact/indust/vseries/index.htm
3.2 System topologies

The following drawing in figure 1 gives a principle overview of a possible configuration where 2 TMACS controllers and one *ibaPDA* server are connected to the TC-net 100 network.

![Possible TC-net network topology](image)

**Figure 1:** Possible TC-net network topology
3.3 Configuration and engineering ibaPDA

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

In case all requirements are met, (see System requirements, page 4), the Toshiba TC-net interface card(s) will be displayed in the signal tree. The board types (100 PCI, 100 PCIe, 1G) are automatically recognized.

![Iba I/O Manager](image)

Figure 2: TC-net 100 PCIe interface card in the I/O manager

3.3.1 Interface configuration

![Toshiba TC-net 100 PCIe](image)

Figure 3: Setup of the interface

When selecting the interface node of a TC-net 100 board, the settings shown in Figure 3 will appear.

**Hardware settings**

This group contains diagnostic information on the TC-net board.

- Card type
  Toshiba-specific card type
Logical ID
Used internally, to distinguish between multiple TC-net boards from the same API type (TC-net 100, TC-net 100 PCI express or TC-net 1G). This is either 0 or 1.

Rotary switch
Value of the two hex switches on the PCI board to identify the board in the TC-net.

DIP switch
Setting of the DIP switch on the TC-net board (only available for PCI express boards)

Driver version
Version of the Toshiba device driver

API version
Version of the Toshiba API that interfaces between the Toshiba driver and ibaPDA

Board version
Version of the hardware

FPGA version
Version of the FPGA firmware on the TC-net board (only available for PCI express boards)

Network settings
This group contains parameters that need to be set correspondingly to the rest of the network in order to enter the TC-net. More information on these settings can be found in the related Toshiba documentation (see chapter General information, page 5).

Symbols

Symbol file path
The full path to a symbol file. The addressbook is generated by ibaPDA, based on the symbol file. For more information on how the symbol file is created, refer to the corresponding Toshiba documentation (see chapter General information).

Structure definitions folder
For structure definitions (*.typ) a separate path to the folder containing these definitions can be assigned here. If this field remains empty ibaPDA automatically searches for structure definitions in the "Symbol file path" directory.

User name
The user name that should be used when trying to access an address book file over a network

Password
The password that should be used when trying to access an address book file over a network

The interface node for a TC-net 1G board looks very similar to that of a TC-net 100 board with the exception of the Network settings group.

Button <View symbols>
Clicking this button the TC-net symbol browser will be opened. To show symbols it is required that an address book file path is available under "Symbol file path".

For more information, see TC-net symbol browser, page 12
3.3.2 Station list tab

The Station list tab shows an array of 256 boxes. Each box represents a station on the TC-net network and shows the status:

- Grey: Station is not connected or inactive.
- Green: Station is connected and active.
- Green + bold border: This is the ibaPDA node (no. 1 in the Fig. below)

![Station list tab example](image)

Figure 4: Station list indicating station node #1 (ibaPDA) and node #22 are active
3.3.3 Scan block list tab

The *Scan block list* tab shows all the scan blocks in the TC-net. There are 2048 boxes for TC-net 100 cards and 4096 boxes for TC-net 1G cards and each box corresponds to a scan block, showing the status of the block.

- Grey: Scan block is unhealthy
- Red + bold border: Scan block is unhealthy while *ibaPDA* is measuring from that block
- Green: Scan block is healthy
- Green + bold border: scan block is healthy while *ibaPDA* is measuring from that block (like nos. 9 and 10 in the Fig. below)

![Scan block list](image)

Figure 5: Active scan blocks #0, 1, 2, 3, 4, 5, 9, 10 and 11, nos. 9 and 10 are configured in *IbaPDA*
3.3.4 Diagnostics tab

The *Diagnostics* tab shows some basic information about how fast data is retrieved from the TC-net board.

![Diagnostics tab](image)

For each different update time value, an entry is shown with the following columns:

- **Update time**
  The time interval between two read operations from the TC-net board

- **Actual**
  The time it took to transfer all data for this update time from the TC-net board to *ibiaPDA* memory

- **Maximum**
  The maximum amount of time it took to transfer all data for this update time from the TC-net board to *ibiaPDA* memory. This value can be reset by clicking the <Reset> button.

- **Minimum**
  The minimum amount of time it took to transfer all data for this update time from the TC-net board to *ibiaPDA* memory. This value can be reset by clicking the <Reset> button.

- **Total size**
  The total amount of bytes that need to be transferred for every update time

- **Scan blocks**
  Scan block IDs linked to TC-net modules with this update time

- **Button <Reset>**
  Clicking this button will reset the *Maximum* and *Minimum* values.
3.3.5 TC-net symbol browser

When clicking <View symbols> in the Configuration tab, the TC-net symbol browser will appear. To show symbols it is required that an address book file path is available under "Symbol file path" in the Configuration tab.

The symbol browser will also appear when clicking <Select symbols> in the General tab of the module or when trying to edit a symbol in the Analog or Digital tab.

Figure 7: The TC-net symbol browser in ibaPDA I/O manager

When opening the TC-net symbol browser from the interface node, it is possible to automatically generate ibaPDA modules.

In the Symbols tab, a tree structure will appear containing all symbols parsed from the TC-net address book file. The top-level node is the TC-net, which contains a number of station nodes which each in turn contain a number of scan blocks. These scan blocks then contain the actual variables that need to be measured.

When selecting a variable, the data type, the address and a comment as supplied by the address book file will be displayed.

The address indicates at which offset (in number of WORDs) the variable is located in the scan block. For digital signals, the position of the bit inside the WORD is added. For example, 4.10 refers to the 10th bit of the 4th WORD in the scan block.

Structures are supported as well. The structure definition files (typically named [StructureName].typ) either need to be located in the same directory as the address book file or you can use the "Structure definitions folder" in case you keep your structure definitions separately.

When selecting a scan block, the scan block speed will be displayed. The value of this can be either "Low", "Middle" or "High".

For TC-net and station nodes, the ID is displayed.
- Option "Use station name as signal name prefix"
  By checking this option, the name of the TC-net station will be added to the signal name as a prefix. Hence, the signal names can be kept short but if needed, the origin of the signal can be recognized, e. g. in the signal legend of a trend view.

- Option "Use scan block number as signal name prefix"
  By checking this option, the number of the hosting scan block will be added to the signal name as a prefix. If needed, the origin of the signal can be recognized, e. g. in the signal legend of a trend view.

- Option "Hide symbols with an unsupported datatype"
  By checking this option, variables with a datatype that could not be parsed properly will not be displayed. Variables with an unsupported datatype are marked with the icon while supported variables are marked with the icon.

In case no symbols appear in the tree structure in the Symbols tab, click <Update symbols>. If still no symbols appear, then there is probably something wrong with the format of the supplied address book file.

Instead of manually looking for a certain variable, it is possible to perform a search.

![TC-net symbol browser, Search tab](image)

**Figure 8:** TC-net symbol browser, Search tab

By using the Search tab, it is possible to look for variables, whose names match a certain pattern.

To search for variables, click the Search tab, enter part of the complete variable name you are looking for and click <Search>. The symbol browser will only list variables that match the supplied pattern. Note, that the complete variable name contains the network name, station name and scan block ID as well. For example, if you were to enter "TC-net" in the search box and click <Search>, the entire symbol tree would be shown since every variable starts its complete name with "TC-net 100 LAN" in this case.

When selecting a scan block, a TC-net station or a TC-net node in the symbol browser, the <Add> button will become available. See next chapter Add module for description.
3.3.6 Add module

Add modules with the symbol browser

You can automatically create ibaPDA TC-net modules by means of the TC-net symbol browser. This provides that you have referenced correctly an address book file.

On the Symbols tab in the TC-net symbol browser, it is possible to automatically generate ibaPDA modules based on the address book. A TC-net module is always one-to-one linked to a certain scan block.

When selecting a scan block in the symbol browser, the <Add> button will become available. When clicking the button, a new TC-net module will be generated containing all variables in that scan block. In case a module already exists linked to the selected scan block, the variables that are not yet present in the existing module are added to the module.

Apart from being able to select multiple scan blocks at once, it is also possible to select TC-net station or TC-net nodes. When mapping a TC-net station node, all scan blocks linked to the station node will be added. When mapping a TC-net node, all scan blocks linked to all stations in the TC-net will be added.

When mapping scan blocks, the update time provided in Module update time will be applied to all newly created modules. For more information on how to define the Module update time, see Module settings, page 15.

Add modules manually

To add a module manually, click on "Click to add module" below the interface node in the interface tree of the I/O manager. The following dialog will open:

Figure 9: Add module

Two module types for the TC-net interface are available:

- Raw scan block
- Symbolic scan block

Select the desired module type and click <OK>.
### Note

**How many scan block licenses of the dongle does a module utilize?**

For each symbolic and raw scan block module used in *ibaPDA* one scan block license from the interface license of the dongle is utilized. This allows you to record signals with a total length of 64 words in one module (64 words is the standard length of a scan block). In case you want to record more data with one module an additional scan block license is required for each additional 64 word range of data.

The interface license *ibaPDA-Interface-TC-net* allows you to use 64 scan block licenses. The maximum length of signals recordable with this license is $64 \times 64 = 4096$ words. In case you need more you can extend your license using the license product *one-step-up-Interface-TC-net*. This will add another 64 scan block licenses. It is possible to use max. 127 step ups which results in a maximum of 8192 scan block licenses.

**Example:**

You want to record data from a scan block which has the size of 256 words (4 times the standard size of 64 words). The total length of the signals in your module is e.g. 226 words. Therefore 4 scan block licenses from the dongle will be required to run this module.

---

### 3.3.7 Raw scan block module type

#### 3.3.7.1 Module settings

When using this module type, no address book information is used and the addresses and datatypes of the requested variables need to be entered manually.

![Scan block module settings](image)

**Figure 10:** General module settings for Raw scan block

**Basic settings**

- **Module type**
  - Displays the module type of the current module.
Locked
A module can be locked for preventing accidental or unauthorized changes of the module settings.

Enabled
Disabled modules are excluded from signal acquisition.

Name
Here, the clear text name of the module designation has to be entered.

Module No.
Internal reference number of the module. The Module No. determines the order of the modules in the ibaPDA and ibaAnalyzer signal trees.

Timebase
All signals of this module are acquired with this timebase.

Use name as prefix
Puts the module name in front of the signal name.

Advanced

Swap analog signals
Set the swap mode according to the signal source. You can choose between four different options:

<table>
<thead>
<tr>
<th>Mode</th>
<th>16 bit</th>
<th>32 bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>No swap</td>
<td>AB</td>
<td>ABCD</td>
</tr>
<tr>
<td>Depending on data type</td>
<td>BA</td>
<td>DCBA</td>
</tr>
<tr>
<td>Swap 16 bit</td>
<td>AB</td>
<td>CDAB</td>
</tr>
<tr>
<td>Swap 8 bit</td>
<td>BA</td>
<td>BADC</td>
</tr>
</tbody>
</table>

Table 3: Swap modes

The swap mode you can select depends on the swap mode of the signal source.

Swap digital signals
Here, you can select if you want to swap the digital signals, which are interpreted as 16-bit WORDs.

- False: No swap (Default)
- True: Changes the byte sequence from AB to BA

Tip
Leave the default setting "Depending on data type" unchanged.

Module Layout

No of analog/digital signals
Here, you can increase or decrease the signal scope of the module. The default setting are 32 signals. You can enter different values:

- For analog signals from 0 to 128
- For digital signals from 0 to 1024

The signal tables are adapted accordingly.
**TC-net**

- **Update time**
  This is the time interval (ms) between two read operations from the TC-net board for this module. Either a constant value can be entered or an expression containing one of the following placeholders:

<table>
<thead>
<tr>
<th>Placeholder</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>{HiScan}</code></td>
<td>High-speed scan cycle time defined for this board (in ms)</td>
</tr>
<tr>
<td><code>{MidScan}</code></td>
<td>Middle-speed scan cycle time defined for this board (in ms)</td>
</tr>
<tr>
<td><code>{LowScan}</code></td>
<td>Low-speed scan cycle time defined for this board (in ms)</td>
</tr>
</tbody>
</table>

Table 4: Update time placeholders

The placeholders `{HiScan}`, `{MidScan}` and `{LowScan}` correspond with the scan cycle settings 'High-speed scan cycle', 'Middle-speed scan cycle' and 'Low-speed scan cycle' on the Configuration tab of the TC-net card node.

**Example:**

Suppose you have a scan block that transmits data using the middle-speed scan cycle time. Instead of setting the update time to exactly that value you might want to set it just a bit lower to make sure you never skip a cycle. To do this, you could set the Update time to $0.9 \times \{\text{MidScan}\}$.

- **Scan block**
  This is the scan block ID, associated with this module

### 3.3.7.2 Signal configuration

When selecting the Analog tab of the module you can define the analog signals to be measured.

- **Name**
  Here, enter a clear text name of the signal.

You can enter two comment lines in the Names column for every signal.

You get to the comments with a mouse-click on the small button ![Comment button](image) in the names field of the respective signal.

**Tip**

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 will not be overwritten.

- **Unit**
  Assigns a physical channel dimension (e.g. °C, Ampere, Volt, N etc.)
Gain and offset
The gradient and the position of a linear scaling characteristic curve are determined using the values gain and offset (signal value in the zero point).
You can enter the values directly or by means of the two-point-scaling with two known pairs of values.
You get to the dialog of the two-point-scaling by clicking in the cell (Gain or Offset). Then, click on the little button .

Address
The address determines the offset of the first byte of this value within the scan block. 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 you may use the automatic fill function (see ibaPDA manual). The addresses will be incremented with regard to the data type.

Data type
You can select the data type used for every signal in the fields of this column. Click in the respective field and choose 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.

Possible data types:

<table>
<thead>
<tr>
<th>Data type</th>
<th>Description</th>
<th>Value range:</th>
</tr>
</thead>
<tbody>
<tr>
<td>BYTE</td>
<td>8-bit without sign</td>
<td>0  ... 255</td>
</tr>
<tr>
<td>INT</td>
<td>16-bit with positive or negative sign</td>
<td>-32768  ... 32767</td>
</tr>
<tr>
<td>WORD</td>
<td>16-bit without sign</td>
<td>0  ... 65535</td>
</tr>
<tr>
<td>DINT</td>
<td>32-bit with positive or negative sign</td>
<td>-2147483648  ... 2147483647</td>
</tr>
<tr>
<td>DWORD</td>
<td>32-bit without sign</td>
<td>0  ... 4294967295</td>
</tr>
<tr>
<td>FLOAT</td>
<td>IEEE754; Single Precision; 32-bit floating point value</td>
<td>1.175·10-38  ... 3.403·1038</td>
</tr>
<tr>
<td>DOUBLE</td>
<td>IEEE754; Double Precision; 64-bit floating point value</td>
<td>2.225E-308  ... 1.798E+308</td>
</tr>
<tr>
<td>FP_REAL</td>
<td>Fixed Point Real; Q15.16; 15 bits in Integer-Format and 16 bits in &quot;fractional&quot; format;</td>
<td>-32768  ... 32767.9999</td>
</tr>
</tbody>
</table>

Table 5: Data types
By clicking on the Address column header you can let \textit{ibaPDA} calculate the addresses based on the data type of the signals.

Figure 12: The analog signal table of a Raw scan block module

The \textit{Actual} column shows the current value of the signal. By clicking on the \textit{Actual} column header you can switch between raw and scaled view of the value.

A similar table is shown for the digital signals on the \textit{Digital} tab.

For a digital signal you have to specify the address (hex or decimal) relative to the start address of the scan block and the bit number. The bit number goes from 0 to 15.
3.3.8 Symbolic scan block module type

3.3.8.1 Module settings

Figure 13: General module settings for Symbolic scan block

- Basic, Advanced and Module layout settings
- See Module settings, page 15

- Update time
  This is the time interval (ms) between two read operations from the TC-net board for this module. Either a constant value can be supplied or an expression containing one of the following placeholders:

<table>
<thead>
<tr>
<th>Placeholder</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>{HiScan}</td>
<td>High-speed scan cycle time defined for this board (in ms)</td>
</tr>
<tr>
<td>{MidScan}</td>
<td>Middle-speed scan cycle time defined for this board (in ms)</td>
</tr>
<tr>
<td>{LowScan}</td>
<td>Low-speed scan cycle time defined for this board (in ms)</td>
</tr>
<tr>
<td>{BlockSpeed}</td>
<td>Speed property of scan block as defined in address book</td>
</tr>
</tbody>
</table>

Table 6: Update time placeholders

The placeholders {HiScan}, {MidScan} and {LowScan} correspond with the scan cycle settings 'High-speed scan cycle', 'Middle-speed scan cycle' and 'Low-speed scan cycle' on the Configuration tab of the TC-net card node.

Example:

Suppose you want to map a number of scan blocks using the symbol browser on the TC-net interface node that operate at different speeds. The provided update time expression in the symbol browser is applied to all scan blocks. However, you would prefer an update time of $0.9\times{\text{MidScan}}$ for middle-speed scan blocks and an update time of...
0.9*{HiScan} for high-speed scan blocks. To do this, you could set the Update time to 0.9*{BlockSpeed} for every module.

- Link "Select symbols"
  At the bottom of the properties table, there is a link Select symbols, which opens the TC-net symbol browser where only variables contained within the scan block associated with this module are shown.

### 3.3.8.2 Signal configuration

Best way to configure the signals in a symbolic scan block module is to use the TC-net symbol browser.

On the Analog tab it looks as follows:

![Analog Signal Grid](image)

Figure 14: The analog signal grid of a Symbolic scan block module

Instead of having to provide an address and datatype for each signal, only the symbolic variable name is required here. The symbol name can either be entered manually or selected using the TC-net symbol browser.

When entering the Symbol column of a signal, a button will appear at the right side of the cell. Clicking this button will open the TC-net symbol browser where the currently selected symbol will be selected if available in the address book.

On the Digital tab it works in the same way.
4 Diagnostics

4.1 License

If the "TC-net" 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 "Hardware TC-net" has been properly recognized.

![License display in ibaPDA](image)

Figure 15: Display of the license in the ibaPDA I/O manager, example TC-net

The number in brackets behind the license name indicates how many scan blocks are licensed.

If the license is not available, please contact your local iba office to purchase a TC-net hardware license.

4.2 Interface diagnostics tab

You will find a diagnostic aid with a tabular display of the update time and data transfer time between the TC-net board and *ibaPDA* on the Diagnostics tab of the TC-net interface.

⚠️ For further information see *Diagnostics tab*, page 11
5 Support and contact

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

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