ibaPDA-Interface-TC-net

Data Interface for Toshiba TC-net

Manual

Issue 1.3

Measurement Systems for Industry and Energy

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

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Content

1 About this Manual

This document describes the function and application of the software interface

ibaPDA-Interface-TC-net

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-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:

Action	Notation
Menu command	Menu *Logic diagram*
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

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 TC-net data interface:

■ *ibaPDA v*6.37.0 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:

Card type	Slot	Network type	Remarks
JTNI11/JTNI12	PCI	TC-net 100	Single/double electrical link
JTNI21/JTNI22	PCI	TC-net 100	Single/double optical link
JTNI31/JTNI32	PCI	TC-net 100	
JTNI41/JTNI42	PCI	TC-net 100	
JTNI61/JNTI62	PCIe	TC-net 100	
JTGI23	PCIe	TC-net 1G	Giganet

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

Order no.	Product name	Description
31.001047	ibaPDA-Interface-TC-net	Extension license for an ibaPDA system for the connection to a Toshiba TC-net network via TC-net 100 or TC-net 1G board. The acquisition of data from max. 64 Scan Blocks (64 words each, max. 4096 words in total) is possible.
31.101047	one-step-up-Interface-TC-net	Extension license to increase the number of scan blocks. Scan Blocks per extension: 64 (64 words each, max. 4096 words in total) Max. total number of Scan Blocks per interface: 64+ (127 * 64)= 8192

For more information on the use of licenses by the *ibaPDA* modules, see ↗ *Add module*, page 15

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 boards for PC are required.

The TC-net hardware interface allows the acquisition of values from a TC-net via Toshiba TC-net 100 or TC-net 1G boards.

Faster transfer rates through DMA are only possible with PCI express boards. *ibaPDA* 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. *ibaPDA* does not install a device driver for TC-net boards.

ibaPDA supports the Toshiba APIs for all board types, mentioned in Table 1. Due to limitations in the 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 *ibaPDA* server computer is 6:

- 2 TC-net 100 PCI boards +

- 2 TC-net 100 PCI express boards +

- 2 TC-net 1G PCI express boards

Note

i	In the BIOS of the used computer deactivate the ASPM function (Active State Power Management) for the PCIe slots used with TC-net boards. Otherwise system instabilities may occur.

This manual will only focus on setting up the TC-net board in *ibaPDA*. For further information on how to install the device driver for the TC-net board or how to setup a TC-net, please 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:

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

Manual Title	Number	Version	File Size
TC-net 100 User's Manual (model 3000)	6F8C0939	2nd	1.19MB
TC-net 100 Optical Shared Hub Unit User's Manual	6F8C0940	2nd	864KB
TC-net 100 PCI Bus Card User's Manual	6F8C0941	1st	475KB
TC-net 100 Installation and Wiring Manual	6F8C0942	1st	1.24KB
TC-net 100 PCI Bus Card Support Software User's Manual	6F8C0945	2nd	703KB
TC-net 100 PCI Bus Card Support Software (Linux version)	6F8C1090	1st	1.77MB
TC-net 100 / TOSLINE-8000 Gateway Station User's Manual	6F8C1004	2nd	9.34MB

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

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 e. g. 2 TMACS controllers and one *ibaPDA* server are connected to the TC-net network.
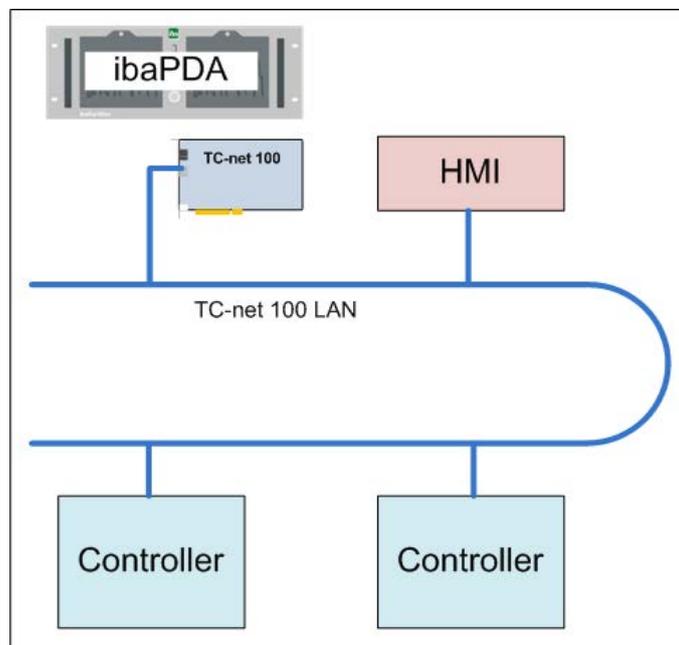
Fig. 1: Possible TC-net network topology

3.3   Configuration and engineering ibaPDA

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

In case all requirements are met (see ↗ *System requirements*, page 6), 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.

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

3.3.1   Interface configuration

Fig. 3: Settings 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). The ID 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 ↗ *General information*, page 7).

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.

Structure definitions folder

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

User name

User name for accessing the address book file via a network.

Password

Password for accessing the address book file via a network.

The interface node for a TC-net 1G board looks very similar to the node of a TC-net 100 board except for the *Network settings*.

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 further information, see ↗ *TC-net symbol browser*, page 13

Automatically update signal comments
If you enable this option, the signal comments from the address book are automatically transferred as signal comments to the signal lists or updated there.

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:

- Gray: 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)

Fig. 4: Station list indicates: 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 blocks for TC-net 100 boards and 4096 blocks for TC-net 1G boards. Each box corresponds to a scan block and shows its status.

- Gray: Scan block is not OK

- Red + bold border: Scan block is not OK while *ibaPDA* is measuring from that block

- Green: Scan block is OK

- Green + bold border: Scan block is OK while *ibaPDA* is measuring from that block (like nos. 9 and 10 in the fig. below)
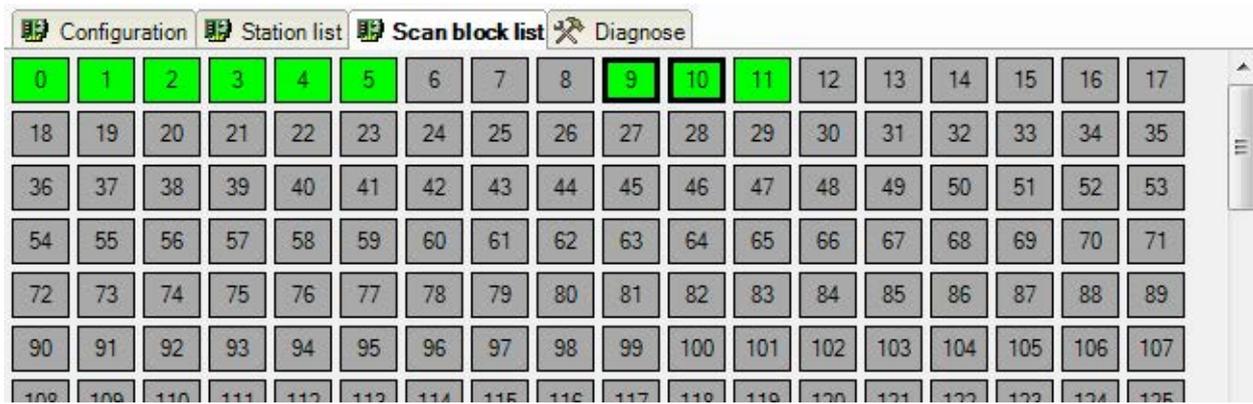
Fig. 5: Active scan blocks #0, 1, 2, 3, 4, 5, 9, 10 and 11, nos. 9 and 10 are configured in ibaPDA

3.3.4 Diagnostics tab

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

Fig. 6: Update and data transfer time between TC-net board and ibaPDA for 2 scan blocks

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 *ibaPDA* memory

Maximum
The maximum amount of time it took to transfer all data for this update time from the TC-net board to *ibaPDA* 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 *ibaPDA* memory. This value can be reset to zero 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.
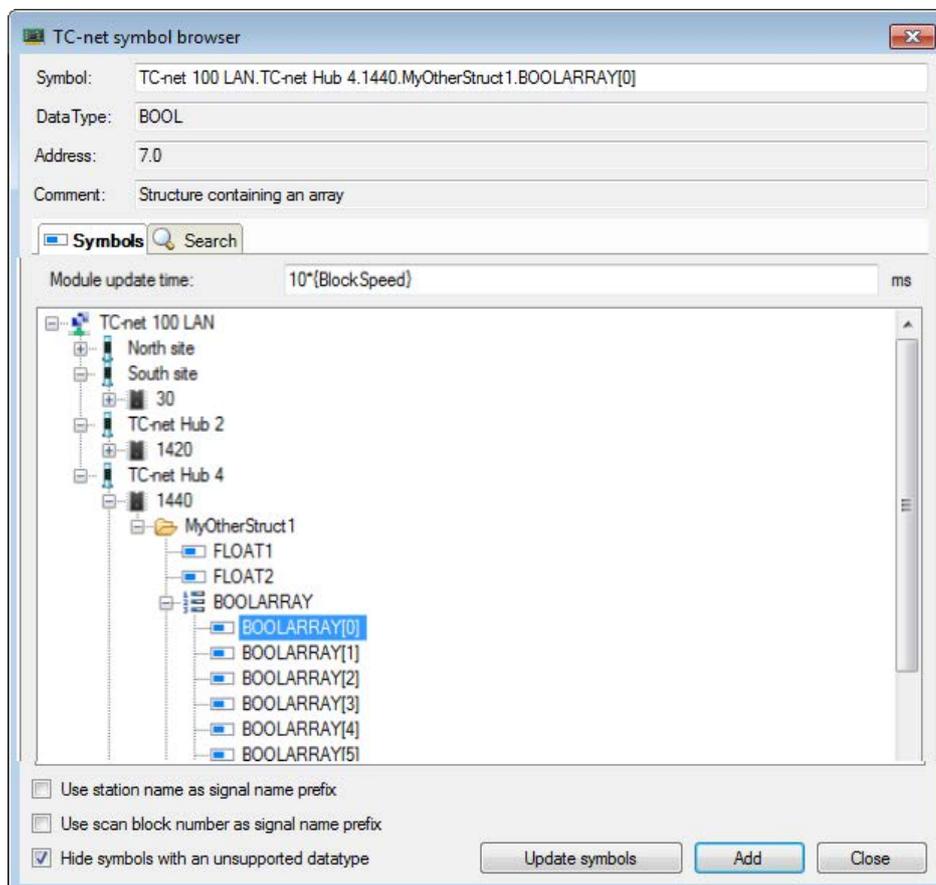
Fig. 7: The TC-net symbol browser in ibaPDA I/O manager

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 finally contain the actual variables 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. The statement 4.10, e. g., refers to the 10th bit in the 4th word in the scan block.

Structures are supported as well. The structure definition files (typically named [Structure-Name].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. This value can be either "Low", "Middle", "High" or a term.

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 original 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 invalid data type are marked with the icon ▭ whereas 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, 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.
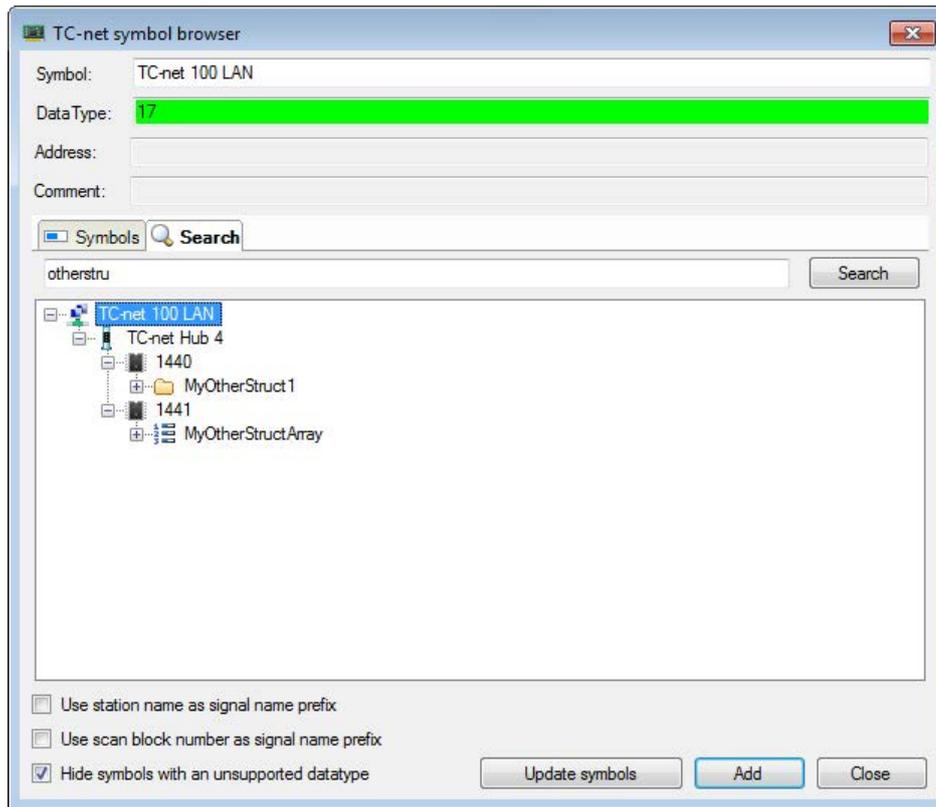
Fig. 8: TC-net symbol browser, Search tab

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 instance, if you enter "TC-net" in the search box and click <Search>, the entire symbol tree will 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 chapter *Add module* for description, ↗ *Add module*, page 15.

3.3.6   Add module

Add modules with the symbol browser

You can automatically create *ibaPDA* TC-net modules with the TC-net symbol browser. This provides that you have correctly referenced an address book file. 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 included in the module are added.

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 module update time provided in "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 17

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:
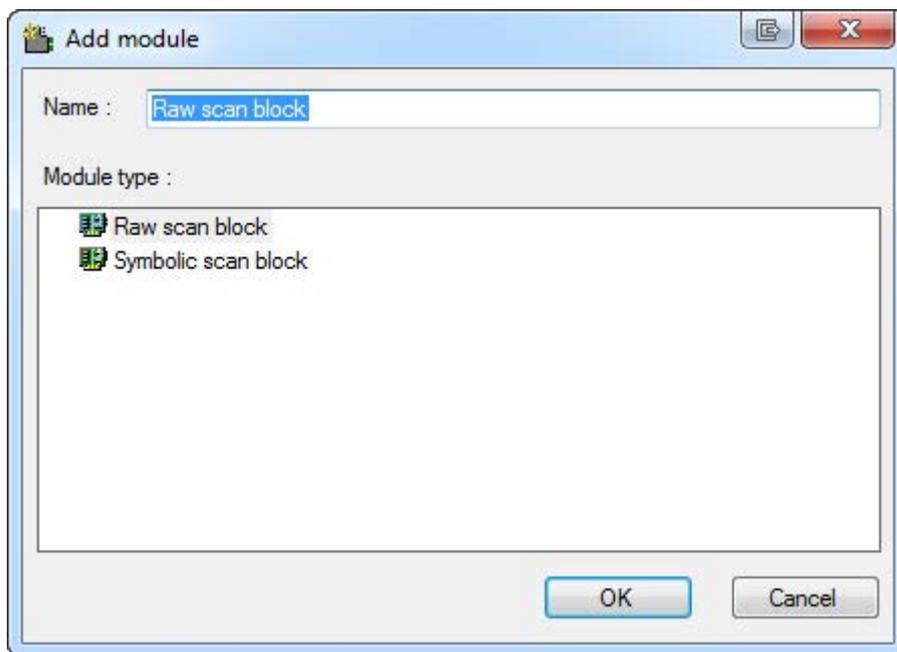
Fig. 9: Add module

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 are used for a module?**
>
> For every symbolic scan block and raw scan block module used in the *ibaPDA* a scan block license is used from the dongle. Hence, you can record signals with a total length of 64 words in a module. If you intend to record more data with the module, then a further scan block license for a data block of 64 words is required.
>
> The interface license *ibaPDA-Interface-TC-net* allows the usage of 64 scan block licenses. The maximum length of signals recordable with this license is 64 x 64 words = 4.096 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 data types of the requested variables need to be entered manually.
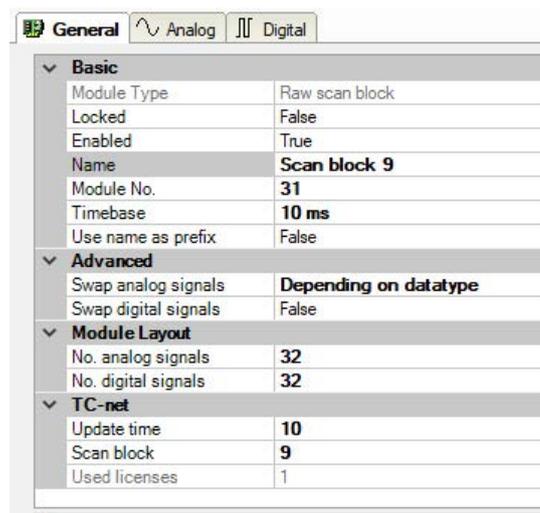
Fig. 10: General module settings for Raw scan block

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*.

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

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

Advanced

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

Mode	16 bit	32 bit
No swap	AB	ABCD
Depending on data type	BA	DCBA
Swap 16 bit	AB	CDAB
Swap 8 bit	BA	BADC

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 supplied or an expression containing one of the following placeholders:

Placeholder	Meaning
{HiScan}	High-speed scan cycle time defined for this board (in ms)
{MidScan}	Middle-speed scan cycle time defined for this board (in ms)
{LowScan}	Low-speed scan cycle time defined for this board (in ms)

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 miss a cycle. To achieve this, you can set the update time e.g. to `0.9*{MidScan}`.

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

Used licenses
The number of scan block licenses used by this module. Display only.

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 in the name 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 last character in the name is a digit, then this number is incremented from line to line. 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.


Fig. 11: Selecting decimal display of addresses

In order to get some default values you may use the automatic fill function (see *ibaPDA* manual). The addresses will be determined 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 depend-

ing on the data type. Hence, an adjustment of address entries may be necessary after change of data types.

Data type	Description	Value range
BYTE	8-Bit without positive sign or negative sign	0 … 255
INT	16-Bit with positive sign or negative sign	-32768 … 32767
WORD	16-Bit without positive sign or negative sign	0 … 65535
DINT	32-Bit with positive sign or negative sign	-2147483648 … 2147483647
DWORD	32-Bit without positive sign or negative sign	0 … 4294967295
FLOAT	IEEE754; Single Precision; 32-bit floating point value	$1{,}175 \cdot 10^{-38} \dots 3{,}403 \cdot 10^{38}$
DOUBLE	IEEE754; Double Precision; 64-bit floating point value	2,225E-308 … 1,798E+308
FP_REAL	Fixed Point Real; Q15.16; 15 bits in Integer format and 16 bits im "fractional" format;	-32768 … 32767,9999

Table 2: Possible data types

If you click on the header of the *Address* column, then *ibaPDA* calculates the addresses, based on the data types of the signals.

	Name	Unit	Gain	Offset	Address	DataType	Active	Actual
0			1	0	1	BYTE	☑	2
1			1	0	2	BYTE	☐	9
2			1	0	3	BYTE	☐	4
3			1	0	4	BYTE	☑	9
4			1	0	5	BYTE	☑	6
5			1	0	6	DWORD	☑	151521546
6			1	0	7	BYTE	☐	8
7			1	0	8	BYTE	☐	9
8			1	0	9	BYTE	☑	10
9			1	0	10	BYTE	☑	9
10			1	0	11	BYTE	☑	12
11			1	0	12	WORD	☑	2318
12			1	0	13	BYTE	☐	14
13			1	0	14	BYTE	☐	9
14			1	0	15	BYTE	☐	16
15			1	0	109	BYTE	☑	110
16			1	0	110	BYTE	☑	9
17			1	0	111	BYTE	☑	112
18			1	0	112	BYTE	☑	9
19			1	0	113	BYTE	☑	114
20			1	0	127	BYTE	☑	128
21			1	0	81	BYTE	☑	82
22			1	0	82	BYTE	☑	9
23			1	0	83	BYTE	☑	84
24			1	0	84	WORD	☑	2390
25			1	0	85	BYTE	☑	86
26			1	0	86	BYTE	☑	9
27			1	0	87	BYTE	☑	88
28			1	0	88	DWORD	☑	156895580
29			1	0	89	BYTE	☑	90
30			1	0	90	BYTE	☑	9
31			1	0	91	DWORD	☑	1544117769

Fig. 12: Analog signal table of a Raw scan block module

The *Actual* column shows the current value of the signal. By clicking on the *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 *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
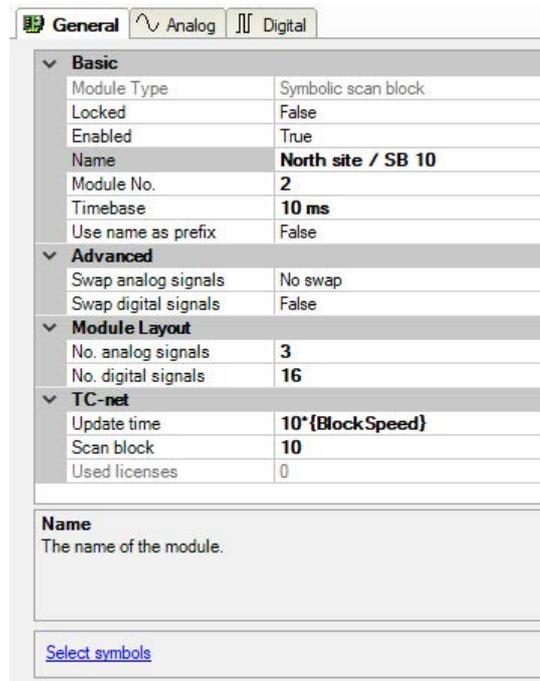
Fig. 13: General module settings for Symbolic scan block

Basic, Advanced and Module Layout settings
See ↗ *Module settings*, page 17

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 a term containing one of the following placeholders:

Placeholder	Meaning
{HiScan}	High-speed scan cycle time defined for this board (in ms)
{MidScan}	Middle-speed scan cycle time defined for this board (in ms)
{LowScan}	Low-speed scan cycle time defined for this board (in ms)
{BlockSpeed}	Speed property of scan block as defined in address book

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 scan cycle speeds. The update time term in the symbol browser is applied to all scan blocks. However, you would prefer an update time of `0.9*{MidScan}` for middle-speed scan blocks and an update time of `0.9*{HiScan}` for high-speed scan blocks. To achieve this, you can set the Update time to `0.9*{BlockSpeed}` for every module.

Used licenses

The number of scan block licenses used by this module. Display only

Link "Select symbols"

The "Select symbols" hyperlink below the *Module settings* table opens the TC-net symbol browser, where only variables contained in the scan block assigned to 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:
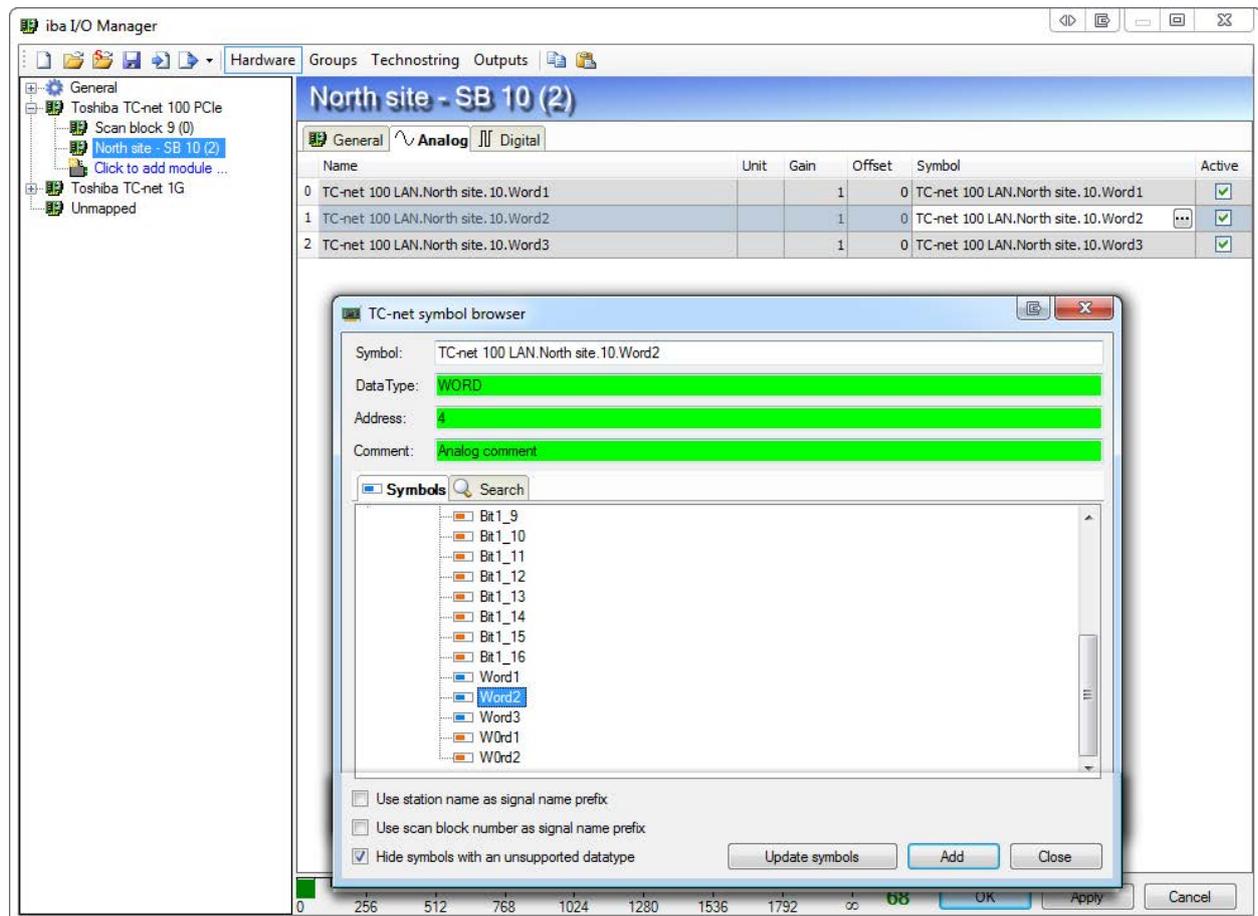
Fig. 14: Analog signal grid of a symbolic scan block module

Instead of having to enter address and data type 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. If the table row is empty, you can select a signal in the symbol browser and insert it into the table with <Add>.

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.

Fig. 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 help 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 12

5   Support and contact

Support

Phone: +49 911 97282-14

Fax: +49 911 97282-33

Email: support@iba-ag.com

Note

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

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