ibaPDA AN-X-DCSNet

AN-X-DCSNet interface to Reliance DCS network

Manual

Issue V 1.0

Measurement and Automation Systems

ibaPDA AN-X-DCSNet Manual

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Edition V 1.0, ibaPDA AN-X-DCSNet

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.

Version	Date	Revision	Chapter	Pages	Author	Version SW
V 1.00_e	28 Jan. 2009		all	all	ng	

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This manual

This manual describes in detail the functionality of the software product ibaPDA AN-X-DCSNet. It serves both as a tutorial and a reference document.

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 youwork easier.

This draws your attention to special features, such as eceptions 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

1 Introduction

1.1 Scope

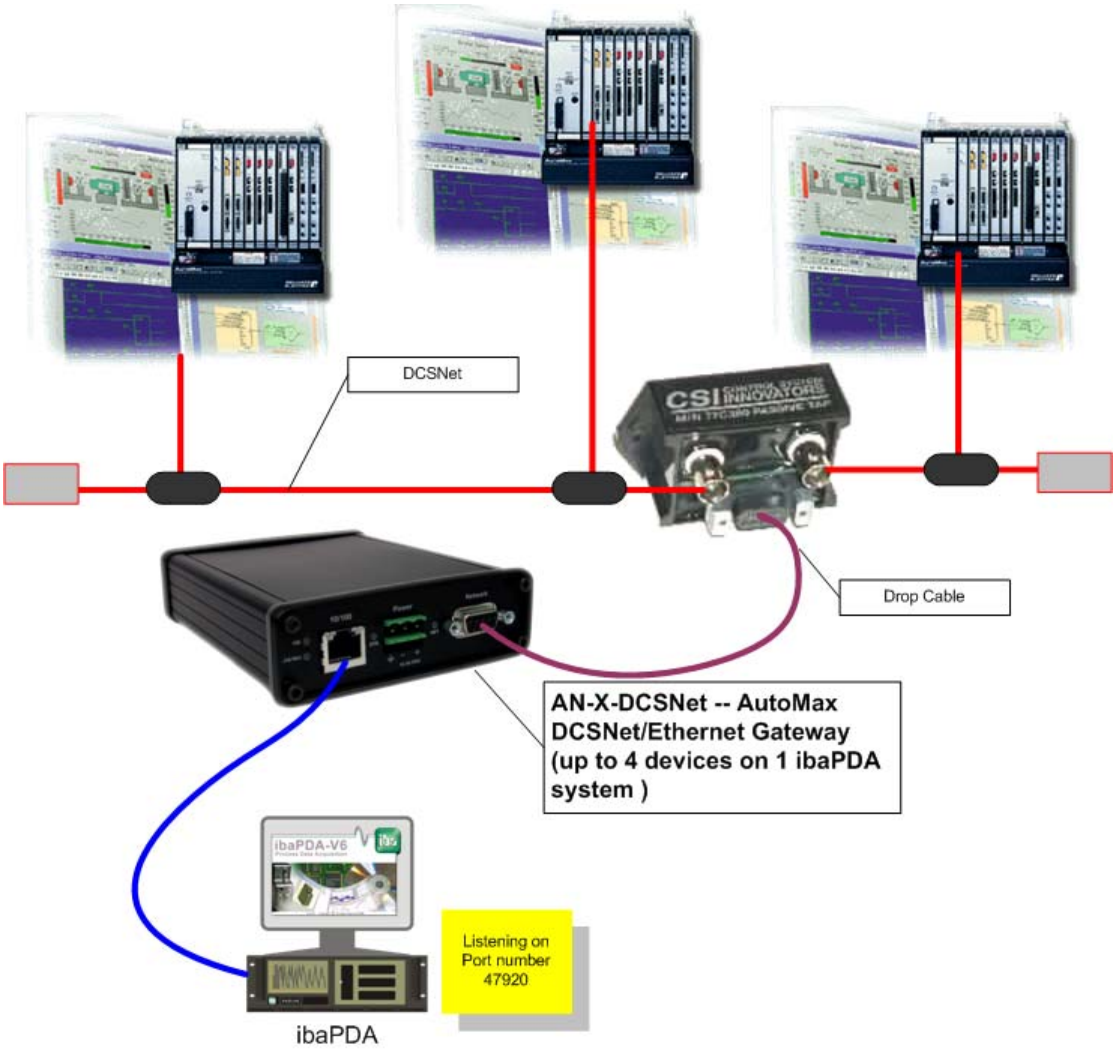
iba has implemented an AN-X-DCSNet interface to measure on a Reliance DCS network.

This manual only describes the AN-X-DCSNet interface of ibaPDA V6.

For more detailed information about the ibaPDA software please refer to the ibaPDA V6 manual itself.

1.2 AN-X-DCSNet interface

The company Quest Technical Solutions has created a device called AN-X-DCSNet. This device connects to the DCS network via a passive tap. It can be configured as a master or as a slave on the DCS network. It monitors the input and output data of all the drops on the network. ibaPDA connects to such an AN-X-DCSNet device via Ethernet and configures it so that it cyclically sends the requested drop data to ibaPDA. ibaPDA supports up to 4 devices.

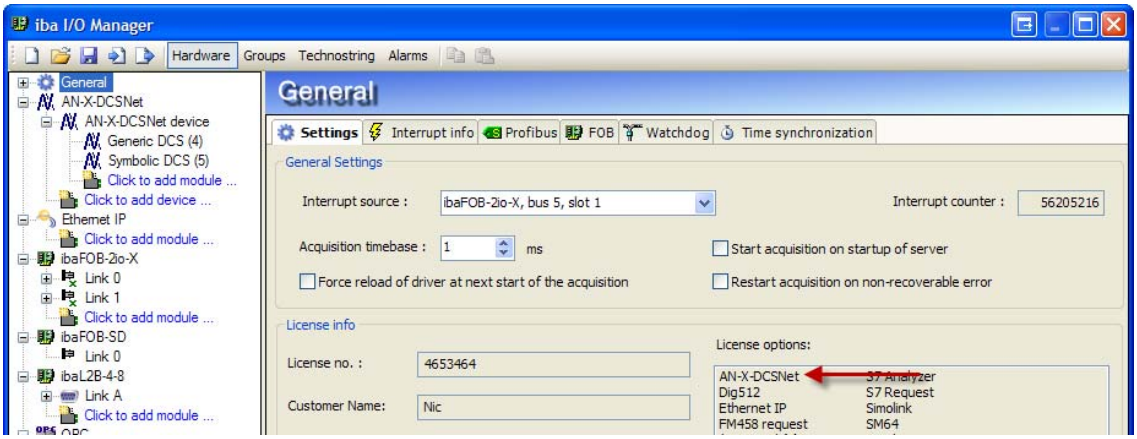


1.3 System Prerequisites

Windows XP users should have Service Pack 2 installed.

ibaPDA V6.20 or later should be installed.

The AN-X-DCSNet license must be available in the ibaPDA Dongle as indicated in the screenshot of the iba I/O Manager below.



If the license is not available please contact your local iba office to purchase a AN-X-DCSNet license .

NOTE:
It is highly recommended to operate the AN-X-DCSNet communication on a separate network.
An additional network interface card may be needed in order to avoid interferences of the AN-X-DCSNet UDP messages with the Ethernet traffic from the ibaPDA system to other network nodes (fileservers, users consulting data files …).

1.4 References

1. ibaPDA V6 manual (see http://www.iba-ag.com/download/download.php for actual version)
2. AN-X-DCSNet manual (http://www.gtsusa.com/DownLoads/Files/Manuals/AN-X-DCSNet_UserManual.pdf)

2 How to configure the AN-X-DCSNet interface

2.1 Step 1: Configuration of an AN-X-DCSNet device

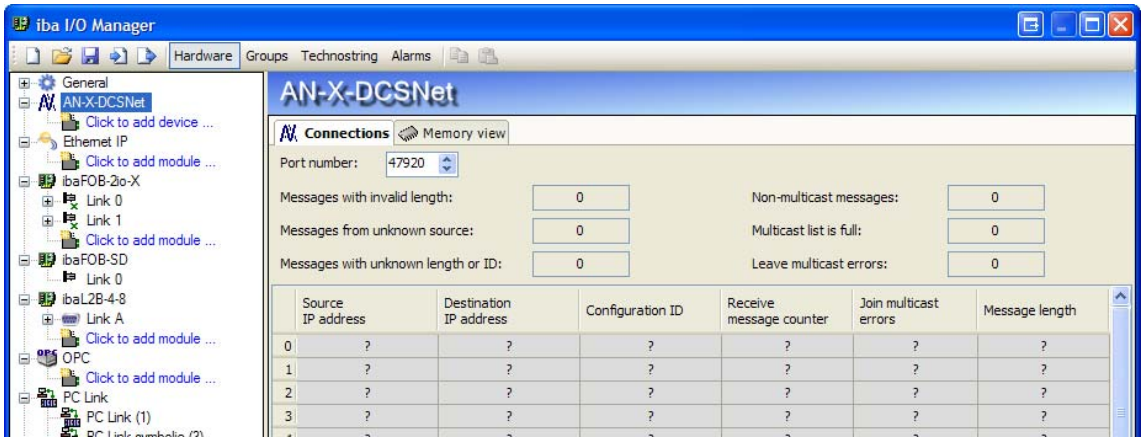
Setup the IP address of the AN-X-DCSNet device. Check out the AN-X-DCSNet manual for details on how to do that. Go to the web interface of the device. Select the DCSNet configuration link.

Here you can setup the mode of the device. If there is no master on the DCS network then put the device in master mode. If there already is a master then put the device in slave mode. When the device is in slave mode you can define drops on the device. You have to specify the start drop number and the drop depth. The drop depth determines how many drops are mapped on the device. The more drops you add the more you will slow down the DCS network. The device can measure data of all drops on the network no matter if they are mapped on the device or not. Click the submit button to write the configuration to the device.

2.2 Step 2: Configuration of ibaPDA

2.2.1 AN-X-DCSNet interface

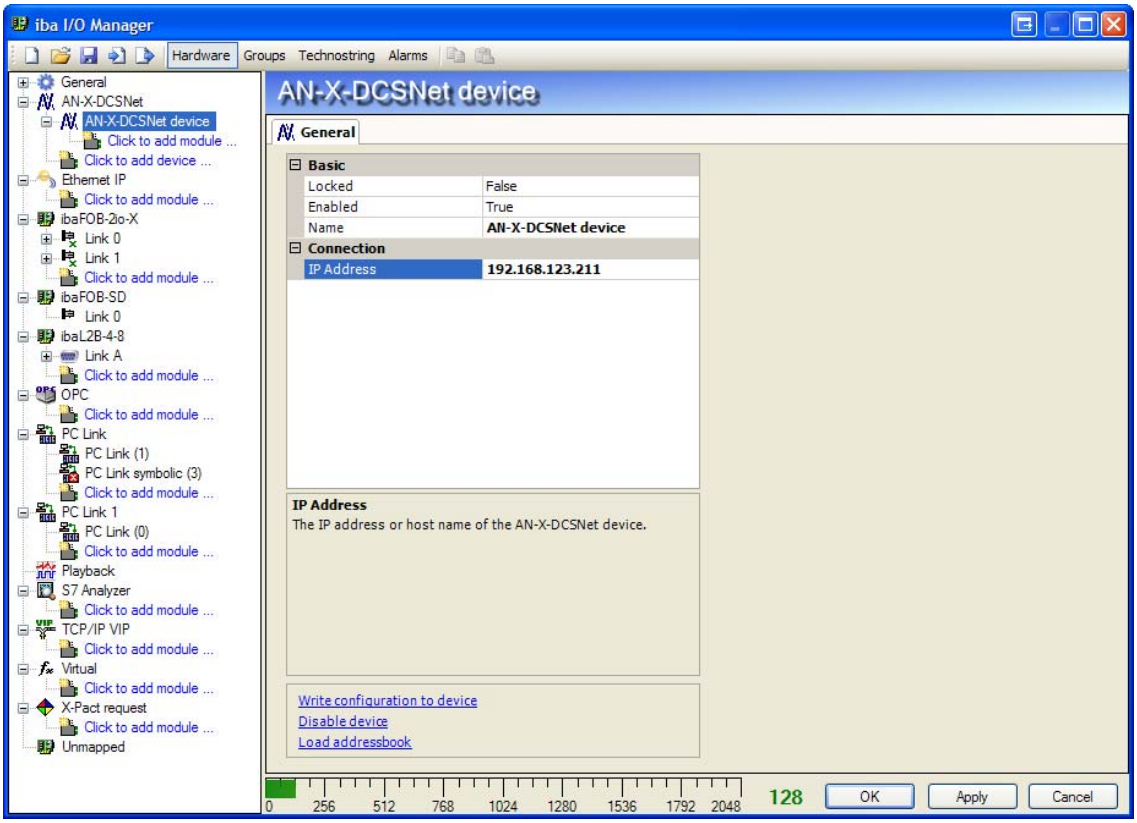
If you have the AN-X-DCSNet license you will see the AN-X-DCSNet interface in the I/O manager of ibaPDA.



On the interface you can setup the UDP port number that ibaPDA listens to for messages from an AN-X-DCSNet device. Normally the default port number of 47920 is ok. The connections grid shows the current connections to AN-X-DCSNet devices. There are also some error counters on the interface. Check out chapter 3 for more information about these counters and the connections grid.

2.2.2 AN-X-DCSNet device

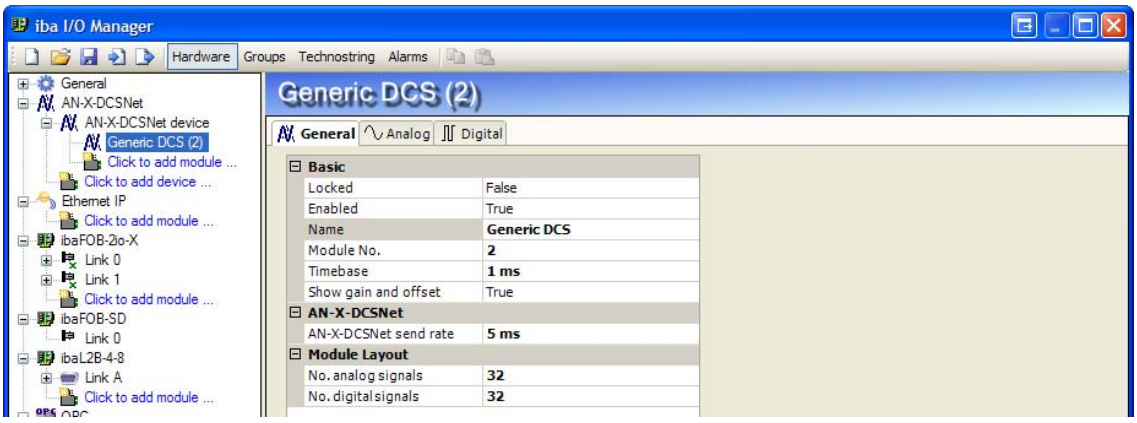
Add an AN-X-DCSNet device to the AN-X-DCSNet interface by clicking the blue *Click to add device…* node.



Enter the IP address of the AN-X-DCSNet device. Click the blue *Click to add module…* node below the AN-X-DCSNet device to add a module. You can add up to 10 modules to this device. Each module will have its own UDP connection to the device. For each module you can specify which data has to be monitored on the DCS network and how fast the AN-X-DCSNet device has to send data messages to ibaPDA. This allows you to optimize the available bandwidth. There are 2 types of modules that you can add to the device: generic DCS and symbolic DCS.

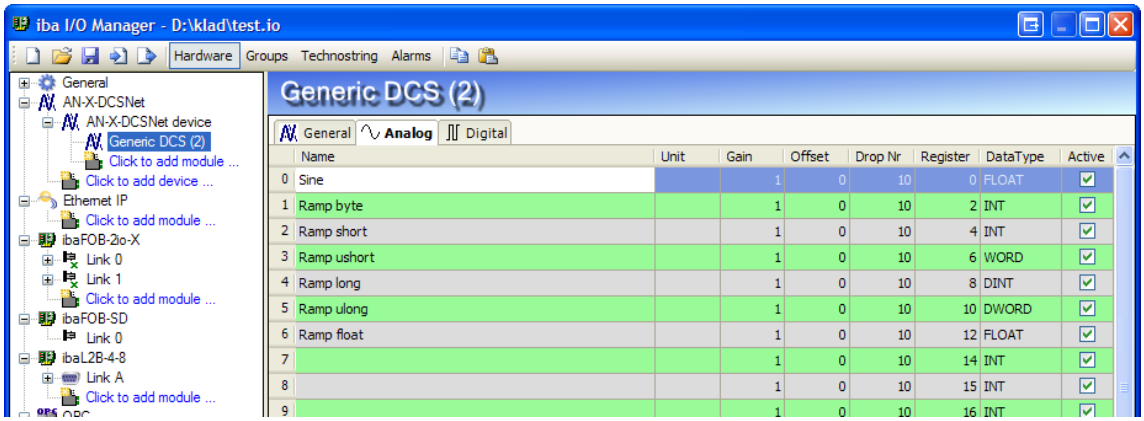
2.2.3 Generic DCS module

On the general tab you can specify the number of analog and digital signals of this module. The AN-X-DCSNet send rate property determines how fast the AN-X-DCSNet device will send the data for this module to ibaPDA.



The DCS network has 1 master and up to 55 slaves called drops. The master has drop number 0 and the slaves have drop numbers 1 to 55. Each drop has 64 registers. The

first 32 registers are inputs for the master and the last 32 registers are outputs of the master. Each register is 2 bytes long.

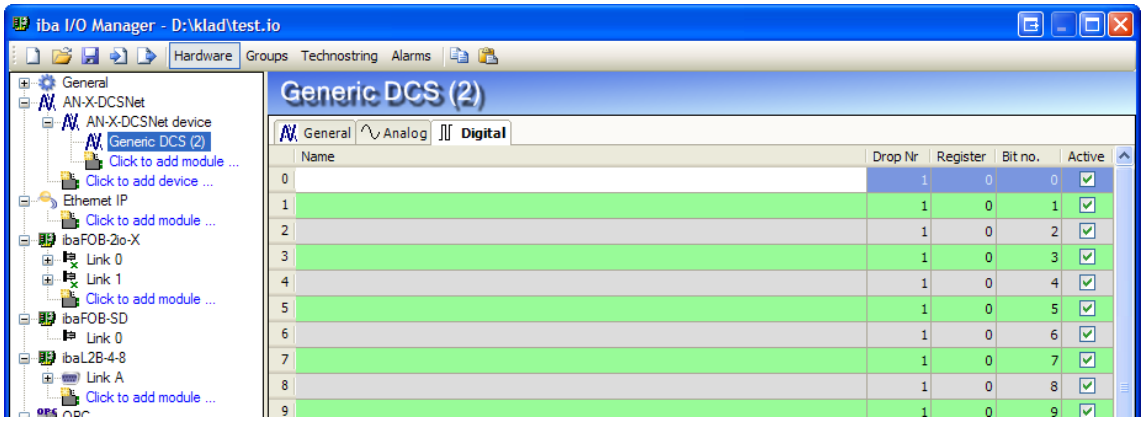


You have to specify the drop number, register number and data type for each analog signal. The supported datatypes are:

- INT: 16 bit signed integer (1 register)
- WORD: 16 bit unsigned integer (1 register)
- DINT: 32 bit signed integer (2 registers)
- DWORD: 32 bit unsigned integer (2 registers)
- FLOAT: 32 bit floating point (2 registers)

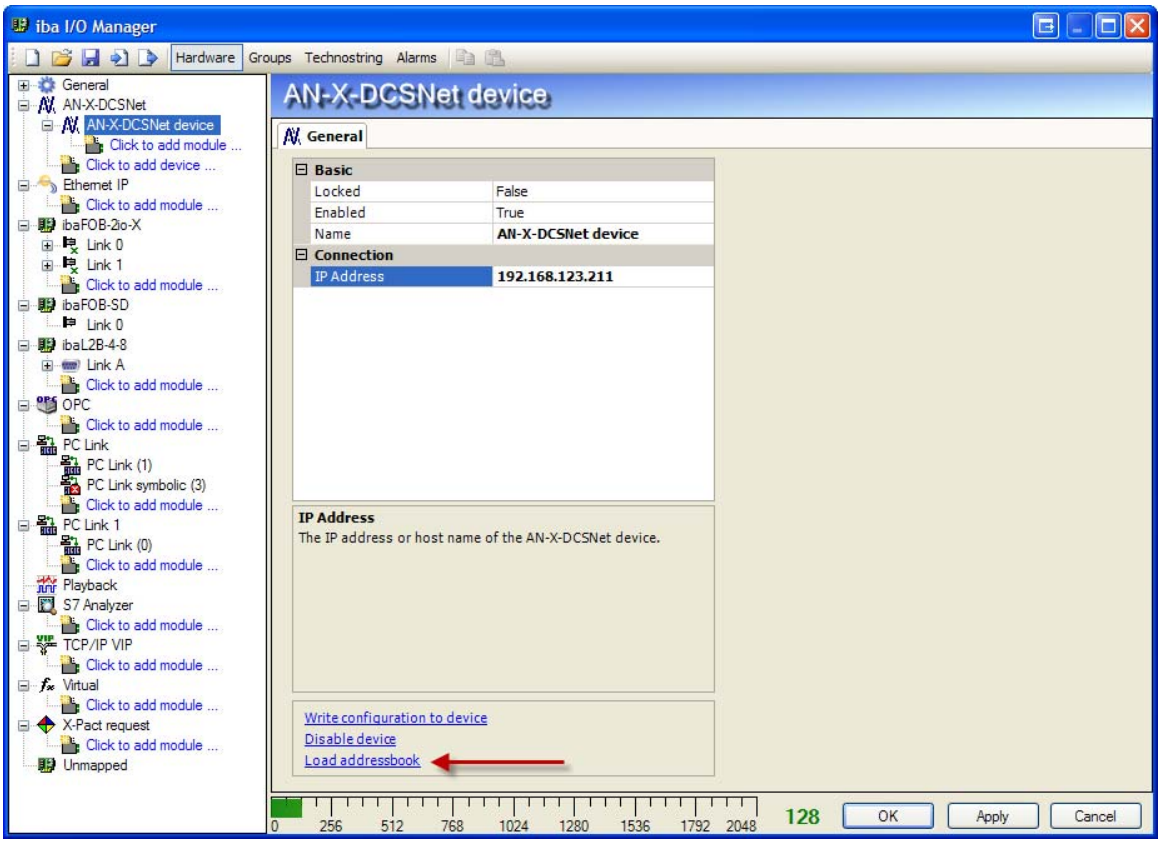
When you click on the drop number or register column header then ibaPDA automatically calculates the correct register and drop number for the signals below the currently selected signal.

Each digital signal requires a drop number, register number and bit number. The bit number can be between 0 and 15. You can click the bit number column header to automatically fill in the bit numbers.

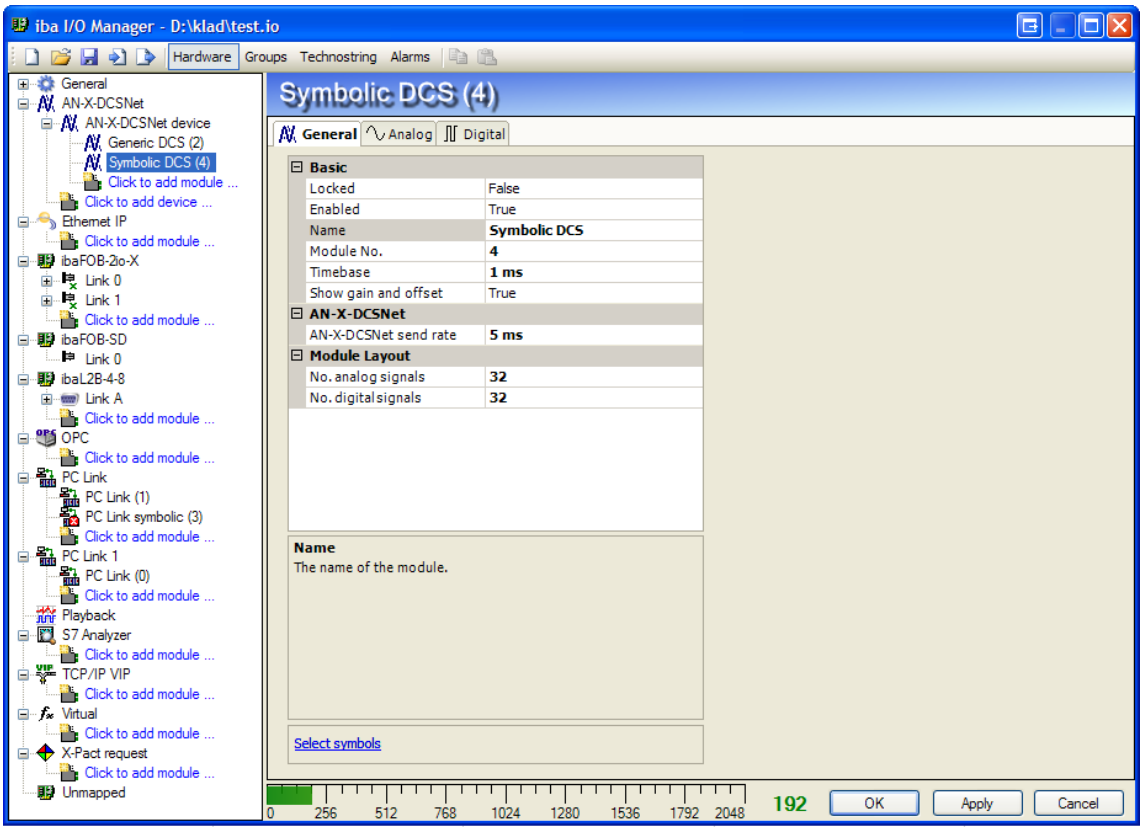


2.2.4 Symbolic DCS module

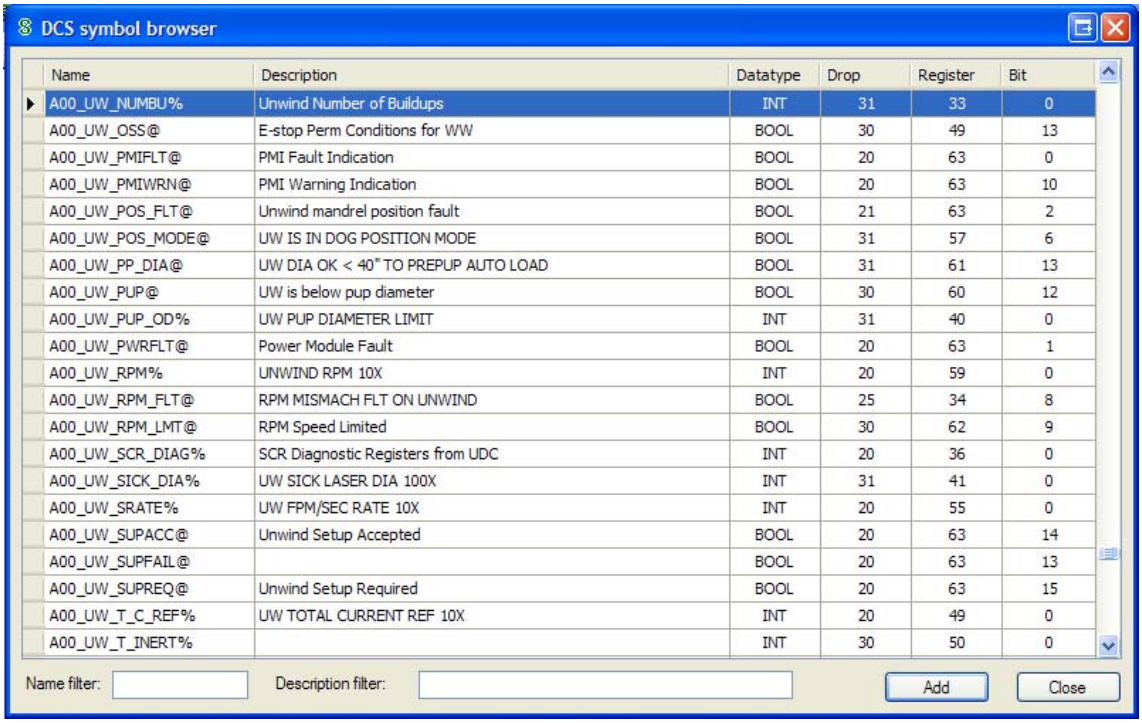
Some systems have a database with all the signals available across the DCS network. This database can be loaded by ibaPDA. Go to the AN-X-DCSNet device and click the *Load addressbook* hyperlink.

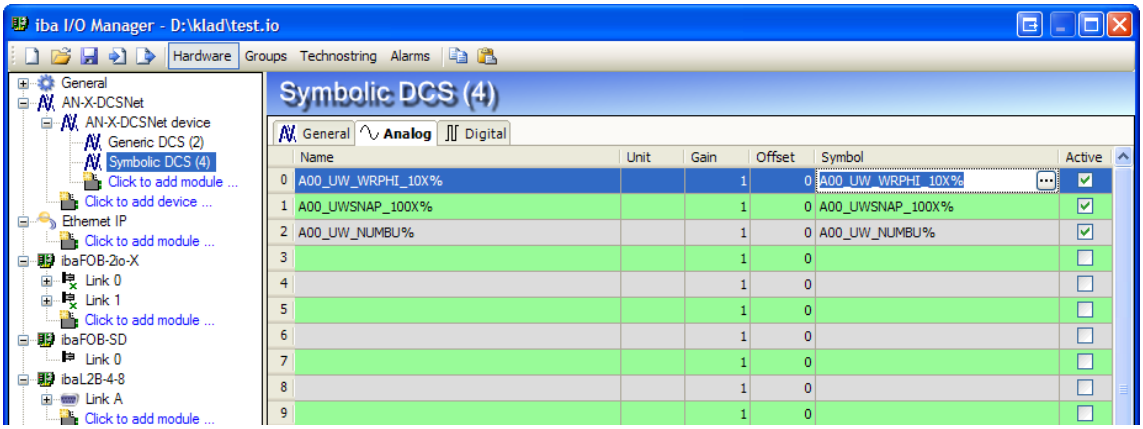


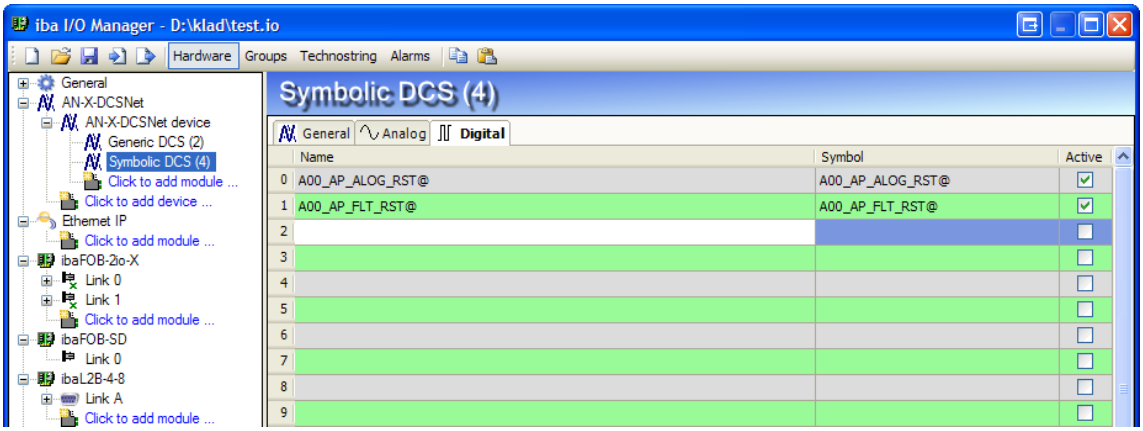
This will open a file browser where you can select the correct database file. This file is typically called $NET.dbf.



Add a Symbolic DCS module. The general tab of the symbolic DCS module has the same properties as the generic DCS module. The only difference is the *Select symbols* hyperlink. When you click this hyperlink the symbol browser will open. The symbol browser lists all the symbols in the addressbook. You can add symbols to the module by doubleclicking them or by selecting them and clicking the add button. The analog symbols will be added to the analog signal grid and the digital symbols to the digital signal grid. You can use the name filter and description filter to search for symbols.



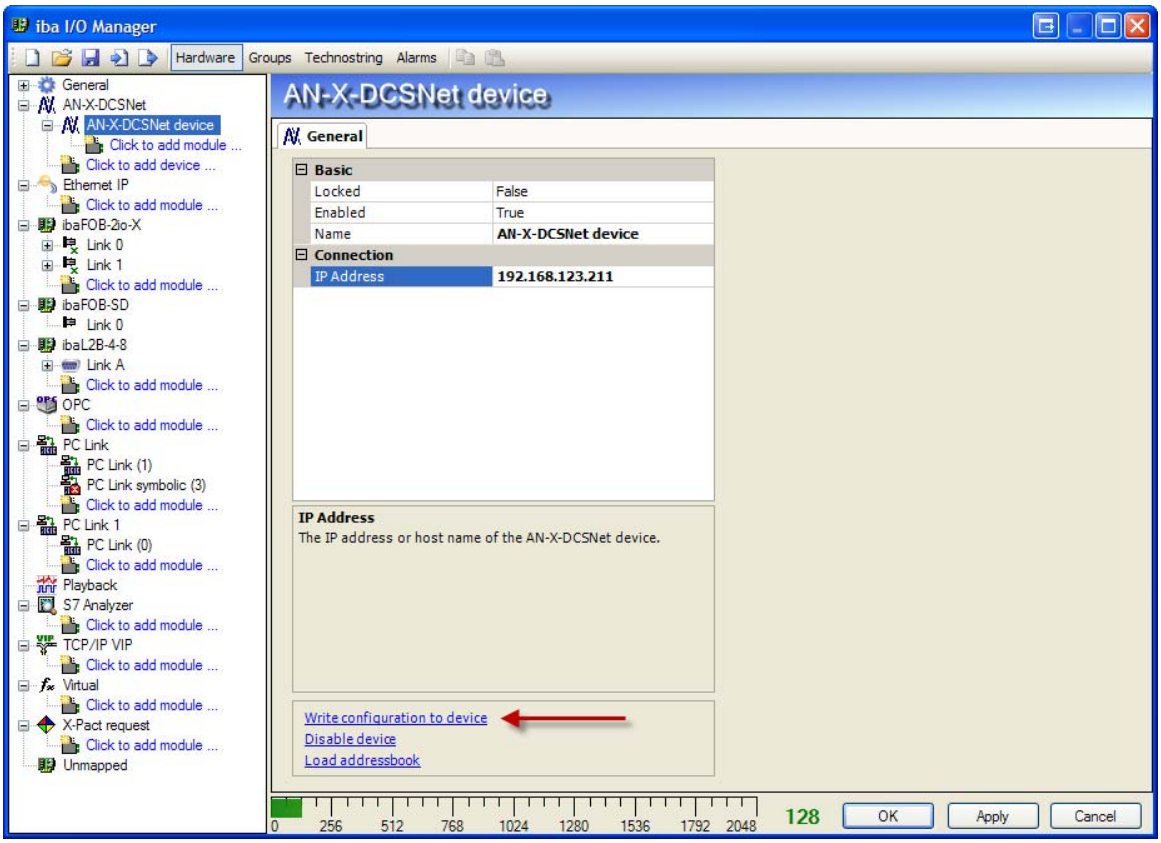




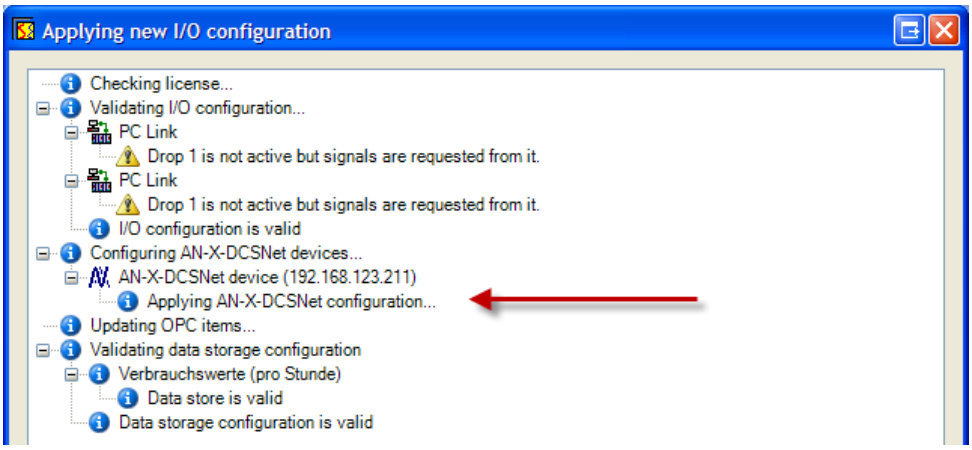
So instead of specifying drop number, register number and bit number like in the generic DCS module you just select the symbol and ibaPDA fills in the address information automatically.

2.2.5 Apply configuration

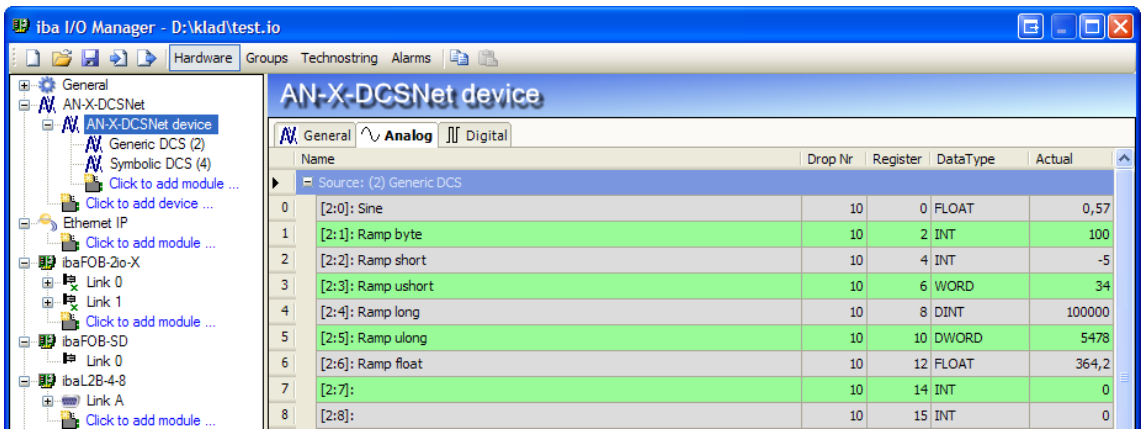
When you have configured the device and all of its modules you can write the configuration to the AN-X-DCSNet device by clicking on the *Write configuration to device* hyperlink in the I/O manager.

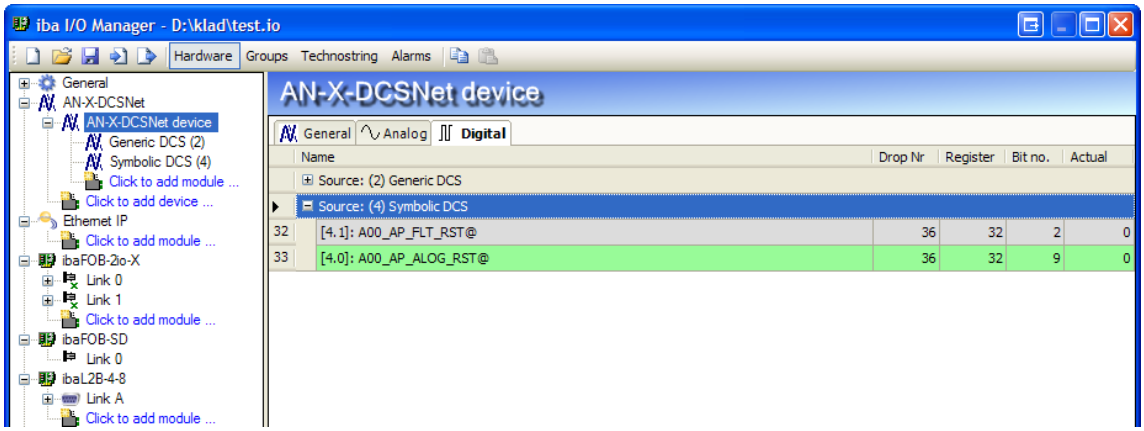


The manual write of the configuration isn't really necessary. ibaPDA will automatically write the new configuration to the device(s) when the acquisition is started.



When the configuration is written to the device the device starts sending data messages to ibaPDA. You can see the actual values of the signals by going to the analog and digital tab of the AN-X-DCSNet device.


iba I/O Manager - D:\klad\test.io
Hardware
Groups
Technostring
Alarms
General
AN-X-DCSNet
AN-X-DCSNet device
Generic DCS (2)
Symbolic DCS (4)
Click to add module ...
Click to add device ...
Ethernet IP
ibaFOB-2io-X
Link 0
Link 1
ibaFOB-SD
ibaL2B-4-8
Link A
AN-X-DCSNet device
General
Analog
Digital
Name
Drop Nr
Register
DataType
Actual
Source: (2) Generic DCS
[2:0]: Sine 10 0 FLOAT 0,57
[2:1]: Ramp byte 10 2 INT 100
[2:2]: Ramp short 10 4 INT -5
[2:3]: Ramp ushort 10 6 WORD 34
[2:4]: Ramp long 10 8 DINT 100000
[2:5]: Ramp ulong 10 10 DWORD 5478
[2:6]: Ramp float 10 12 FLOAT 364,2
[2:7]: 10 14 INT 0
[2:8]: 10 15 INT 0


iba I/O Manager - D:\klad\test.io
Hardware
Groups
Technostring
Alarms
General
AN-X-DCSNet
AN-X-DCSNet device
Generic DCS (2)
Symbolic DCS (4)
Click to add module ...
Click to add device ...
Ethernet IP
ibaFOB-2io-X
Link 0
Link 1
ibaFOB-SD
ibaL2B-4-8
Link A
AN-X-DCSNet device
General
Analog
Digital
Name
Drop Nr
Register
Bit no.
Actual
Source: (2) Generic DCS
Source: (4) Symbolic DCS
[4.1]: A00_AP_FLT_RST@ 36 32 2 0
[4.0]: A00_AP_ALOG_RST@ 36 32 9 0

3 Troubleshooting and additional information

3.1 Protocol information

The data communication between ibaPDA and the AN-X-DCSNet device is done via UDP multicast. Each AN-X-DCSNet device can send up to 10 blocks of data. Each block is sent to a different UDP multicast address. The multicast address has the following form:

224.<block id>.<device ip address byte 1>.<device ip address byte 0>

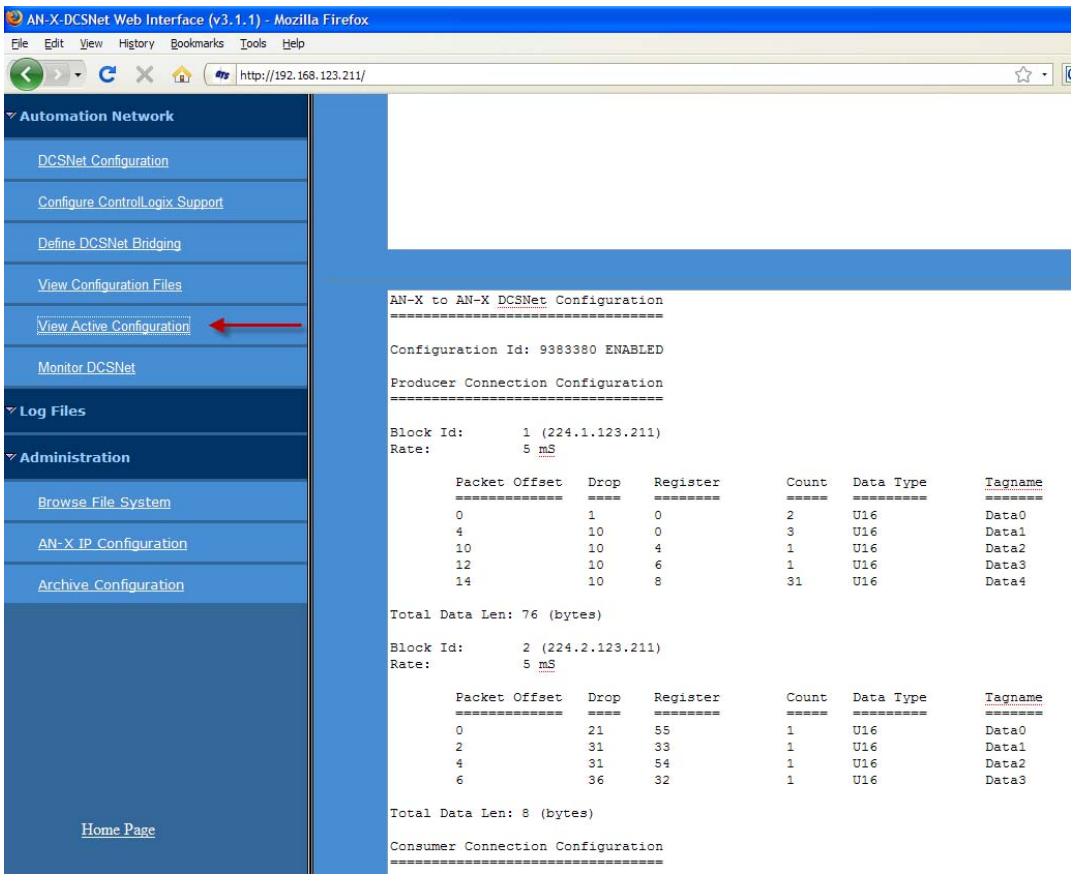
The block id counts from 1 to 10. So the multicast address for block 1 of the device with IP address 192.168.123.211 will be 224.1.123.211.

A block corresponds with a module in ibaPDA and the block id corresponds with the position of the module under the device. The block itself has the following structure:

Datatype	Name	Description
DWORD	Configuration ID	A user defined 32 bit configuration number that identifies the structure of the data.
DWORD	Data length	The length of the data that follows.
BYTE[1400]	Data	The data can be maximum 1400 bytes long which corresponds to 700 word registers.

The block configuration is written by ibaPDA in a text file. This text file is sent to the device via the web interface of the device. At the same time ibaPDA gives a list of expected UDP connections to the driver. The driver will join the required multicast groups and it will start listening for incoming messages.

You can checkout the current configuration in the device by going to the web interface and selecting the *View Active Configuration* link.



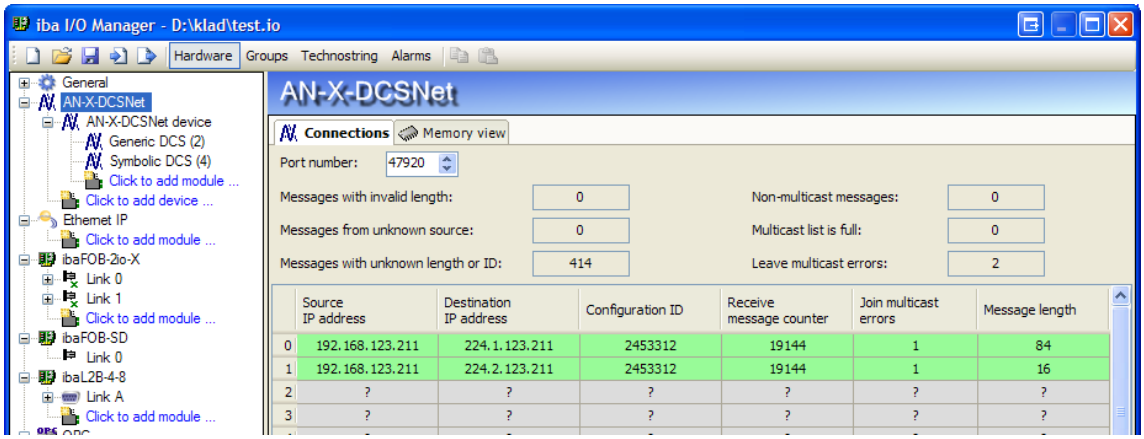
You can consult the AN-X to AN-X communication chapter in the AN-X-DCSNet device user manual for more information about the configuration file and the UDP communication.

3.2 Troubleshooting connection

In case of trouble, first of all check the network settings and verify the IP addresses of both AN-X-DCSNet device and the ibaPDA server PC.

Use ping to check the network functionality.

On the AN-X-DCSNet interface examine the error counters and the connections grid.



There are 6 global error counters:

- Messages with invalid length

This error counter will increment each time an UDP message is received with a size that is either smaller than 8 bytes or larger than 1408 bytes.

- Messages from unknown source

ibaPDA gives the driver a list of expected UDP connections when a new configuration is written to the AN-X-DCSNet device. This error counter will increment each time an UDP message is received from a source address that is not known by the driver.

- Messages with unknown length or ID

This error counter will increment each time an UDP message is received from a known source address but with an unexpected configuration ID or unexpected length. See the protocol information paragraph for more information.

- Non-multicast messages

This error counter will increment each time an UDP message is received that is not sent to a multicast address.

- Multicast list is full

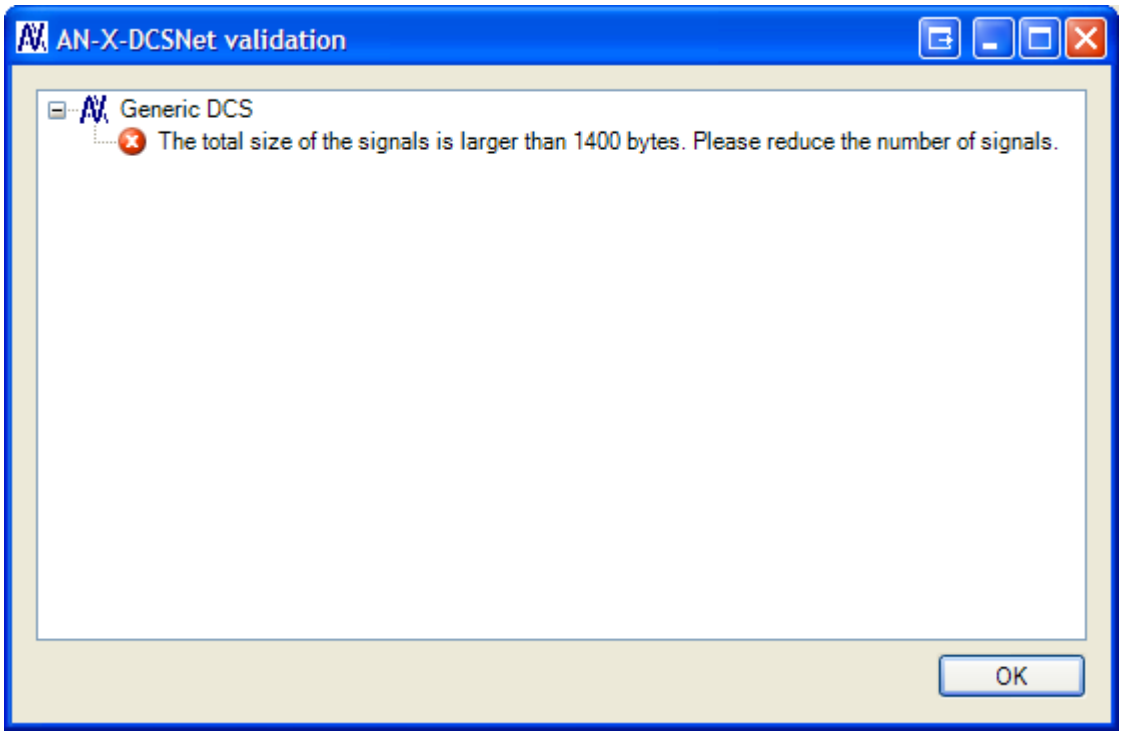
The driver can join a maximum of 40 multicast groups. If the driver is asked to join more than 40 groups then this error counter is incremented. You can solve this situation by just starting the acquisition. If that doesn't work then try reloading the driver. You can reload the driver by setting the *Force reload of driver* checkbox on the general node in the I/O manager.

- Leave multicast errors

This error counter will increment each time an error occurs when the driver tries to leave a multicast group.

The connections grid shows the status of the 40 possible connections (maximum 4 devices and 10 connections per device). An active connection is colored green. You can see the source IP address, destination IP address (multicast!), configuration ID, the receive message counter, the join multicast error counter and the received message length. The join multicast error counter increments each time the driver can't join this multicast group. The driver tries to join the multicast group on every available network interface in the ibaPDA server PC. If one of these network interfaces is not connected then the error counter will increment. This doesn't really matter if that network interface isn't the one used to communicate with the AN-X-DCSNet device. The received message length is the total length of the received message so it includes the 8 byte header.

3.3 Troubleshooting configuration



When ibaPDA creates the AN-X-DCSNet device configuration it checks if the configuration doesn't violate any of the AN-X-DCSNet limitations. If it does then the user gets an error message. These are the possible errors:

- The total size of the signals is larger than 1400 bytes

The AN-X-DCSNet device can only send 1400 bytes of data in a message. If the total size of all the signals in a module is more than 1400 bytes then you get this error. You will have to reduce the number of signals to resolve this error.

- The current configuration requires more than 64 data lines

The AN-X-DCSNet block configuration is made up of data lines. Each data line specifies how many contiguous bytes should be read from a drop starting at a specific register. The block configuration is limited to 64 of those data lines. If you have a module with signals that read data from a lot of drops and from non-contiguous registers in a drop then it is possible that you will need more than 64 data lines. If that happens then you will get this error. To resolve this error you either have to reduce the number of signals or reconfigure the signals so that they read more contiguous registers instead of spread-out registers. Alternatively you can create an extra module and transfer some of the signals to that new module.

4 Support and Contact

For technical support or sales information, please contact your local iba representative or call the following numbers:

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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.

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