How to Configure DeviceNet with Anybus Configuration Manager (ACM) for DeviceNet

APPLICATION NOTE

SCD-7231–017 ENGLISH

Connecting Devices™

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1 Preface

1.1 History

Revision	Date	Description	Responsible
1.00	2006-09-15	Released	Thorbjörn Palm
1.01	2006-11-17	Added section in chapter 3.4	Thorbjörn Palm
1.10	2007-08-16	Added section about Ethernet Transport Provider, Anybus Communicator and X-gateway	Thorbjörn Palm
1.11	2008-03-05	Minor update	Thorbjörn Palm
1.12	2009-06-26	Updated section 3.1 about Driver Selection	Martin Falkman
1.13	2009-06-29	Minor corrections after review	Martin Falkman
1.14	2009-07-09 and 2009-08-27	Minor corrections from HMS Document Issue Tracking System ID717. Some structural changes. Updated pictures to meet version 3.4.1.3.	Lars-Åke Väldesjö
1.15	2009-11-16	Minor updates in chapter 3.1	Martin Falkman
1.16	2011-08-17	Updated picture in chapter 2 to exclude NetTool-DN-D dongle and include direct connection to X-gateway via RS232 and Ethernet.	Martin Falkman
1.20	2016-11-07	Source converted to DOX Change of title	KaD

1.2 Applicable Anybus Products

Description	Name / Type	Version
Anybus-M Scanner	DeviceNet Scanner/ABM-DEV	
Anybus-PCI Scanner	DeviceNet Scanner/AB-PCI-DEV-M	
Anybus X-gateway	DeviceNet Scanner/ABX-DEVM-xxxx and ABX-DEV-EIP	
Anybus Configuration Manager DN-D (USB to CAN dongle)	018020	3.6.1.1 or later
Anybus Configuration Manager DN	018021	3.4.1.3 or later
USB to RS232 COM-port adapter	019570	

1.3 More Information about Networks and Products

The latest manuals and EDS files can be found on the HMS website, www.anybus.com

The DeviceNet user organisation has a website on the Internet, www.odva.org. Several technical guides are available in or via this site.

2 Solution Overview

This document describes how to configure an Anybus DeviceNet Scanner using the Anybus configuration manager for DeviceNet. In this case a small example network consisting of two of HMS products has been put together. Below you can find an overview of the network described in this document. Other nodes may be attached to the system, but are not necessary. In this example an Anybus X-gateway DeviceNet Scanner/Modbus RTU adapter interface together with an Anybus Communicator for DeviceNet is used.

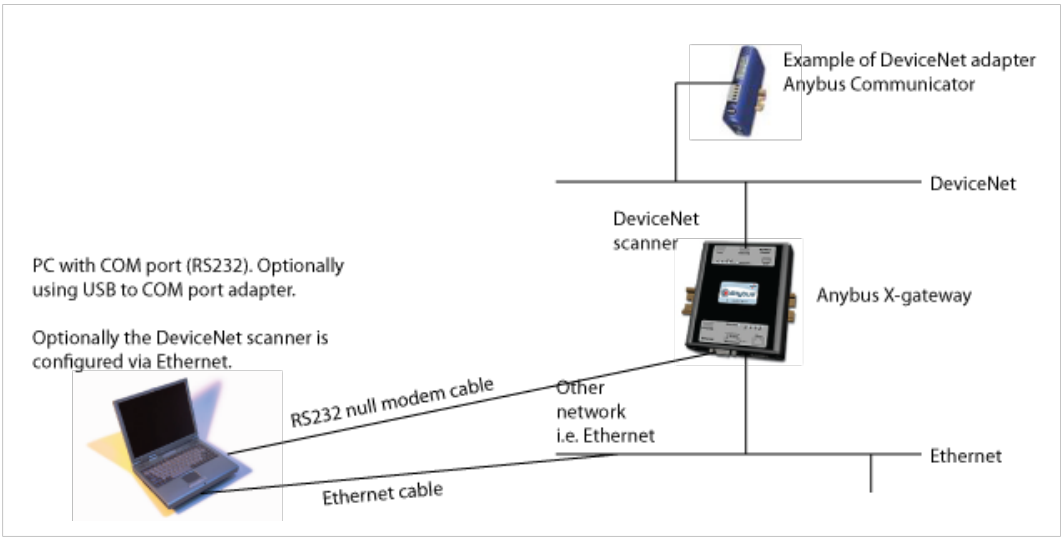

Fig. 1 Hardware connection overview.

To configure the DeviceNet Scanner module in the X-gateway the program Anybus configuration manager for DeviceNet is used. The USB to CAN dongle can be used as a configuration hardware access point for the configuration manager for DeviceNet program but the USB to CAN dongle is only required for the embedded Anybus-M module. The contents describe, step by step, how a configuration is done. This document assumes the reader is familiar with industrial communication, DeviceNet networks and applicable hardware.

2.1 Hardware Settings

Make sure the Mac ID of the adapter and the scanner is not the same. The selected baud rate of the adapter and the scanner is to be set to the same rate. The switches will be found next to the DeviceNet Connector on all the Anybus DeviceNet modules. For further instructions see the Anybus DeviceNet module documentation, available at www.anybus.com.

3 DeviceNet Configuration

To configure the DeviceNet scanner Anybus configuration manager for DeviceNet is used. It is possible to configure the network in offline or online mode. It is recommended to start with online mode and to complement with the modules not recognised by the Anybus configuration manager for DeviceNet. To begin with, the Transport Path (communication line between program and hardware) has to be configured.

3.1 Driver Selection – Configuring the Transport Path and Going Online

There are several different ways to connect to the Anybus DeviceNet scanner to be able to download the configuration. Different hardware needs different driver.

Anybus Transport Providers (chapter 3.1.1)**:** This driver is used with an X-gateway with both an Ethernet module and a DeviceNet scanner module via Ethernet. The hardware is called *Anybus-M DEV* in the *DeviceNet Hardware* tree (see Figure 2 below, be sure to select the correct revision!).

Anybus X-gateway (chapter 3.1.2)**:** This driver is used with an X-gateway (DeviceNet Scanner to another Fieldbus network). Connection is done between the configuration port on the X-gateway to the PC. The hardware is called *Anybus-M DEV* in the *DeviceNet Hardware* tree (see Figure 2 below, be sure to select the correct revision.).

EtherNet/IP to DeviceNet Driver (chapter 3.1.3)**:** This driver is only used with the X-gateway EtherNet/IP adapter to DeviceNet scanner (HMS part number AB7607). The hardware is called Anybus X-gateway EIP to DEV in the DeviceNet Hardware tree (see Figure 3 below).

USB to CAN Driver: This driver is used with a USB to CAN dongle (to connect to DeviceNet). Connection is made from the PC over DeviceNet, to the DeviceNet scanner. See the online help for more information.

Begin with including the DeviceNet scanner hardware at hand in the project; expand the hardware tree to the left and drag-drop the correct hardware item to the right in the network view window.

In the example below an *Anybus-M DEV* is selected (click on the module to be able to configure it).

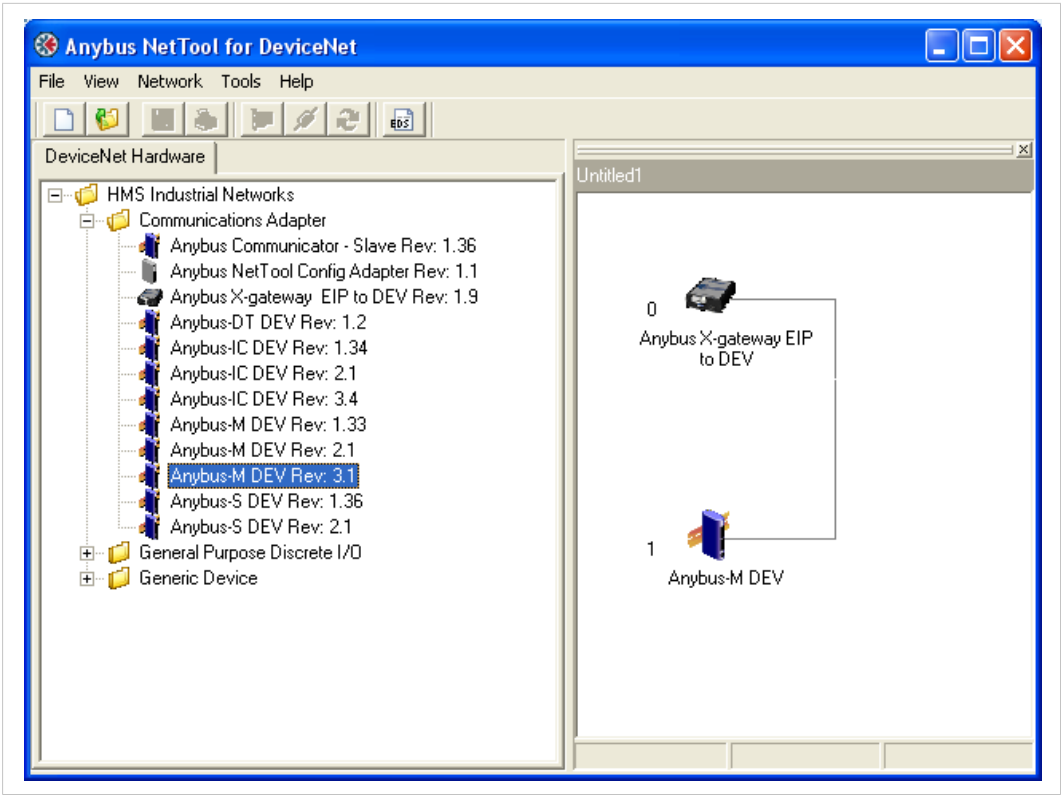

Fig. 2 Dragging in the correct Anybus DeviceNet Master to the right (Anybus-M DEV)

In the example below an *Anybus X-gateway EIP to DEV* with MAC-ID set to zero is selected (click on the module to be able to configure it).

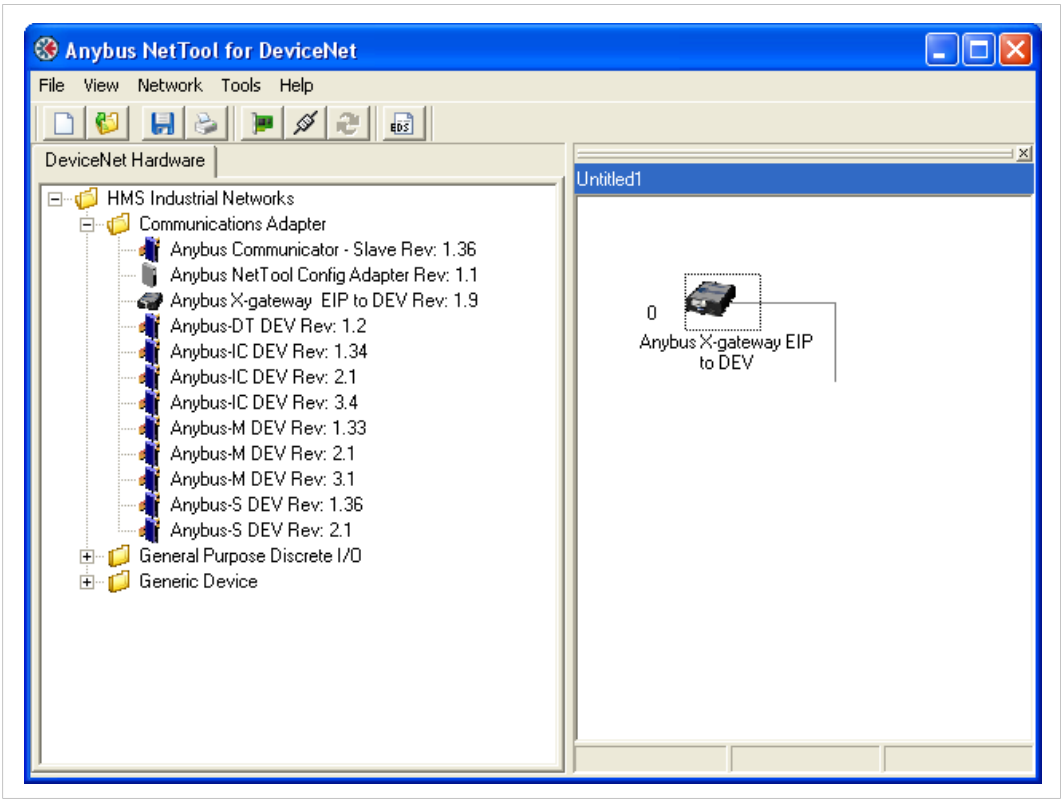

Fig. 3 Dragging in the correct Anybus DeviceNet Master to the right (Anybus X-gateway EIP to DEV).

Then open the *Configure Driver* menu from *Tools*.

Fig. 4 Opening the Configure Driver menu.

3.1.1 Anybus X-gateway Ethernet via Transport Provider

The driver called Anybus Transport Providers should be used together with X-gateway equipped with an Ethernet interface and an Anybus DeviceNet scanner interface. This driver handles the connection to the DeviceNet scanner via the Ethernet interface on the X-gateway.

Note: To be able to use the Ethernet Transport Path the following is required:

- Install Anybus configuration manager for DeviceNet version 3.1.1.1 or later on the PC together with the hardware drivers which are included in the installation package (Anybus Transport Provider package).
- Make sure the X-gateway firmware is version 3.16 or later

Step 1: After opening the Configure Driver dialogue, select the *Anybus Transport Providers* then click O

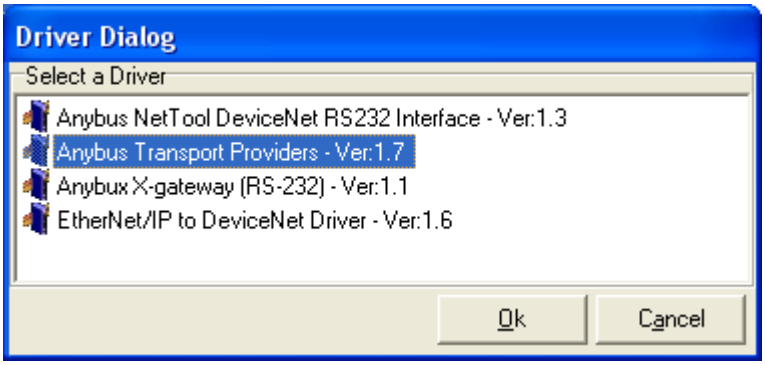

Fig. 5 Selecting the type of driver.

Step 2: Press the *Create* button in the “Transport Paths” dialog.

Fig. 6 Creating the new transport path.

Step 3: Select the *Ethernet Transport Provider* and click on the *Ok* button to make a new Transport Path. Give the path a desired name and click *OK* again.

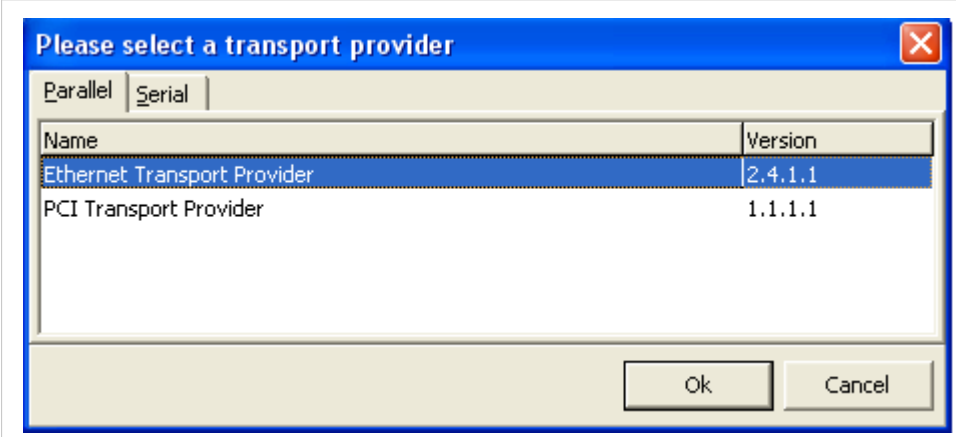

Fig. 7 Selecting the new Ethernet transport path.

Fig. 8 Naming the new Ethernet transport path.

Step 4: If the IP-address of the gateway is in the same subnet-range as your PC, the gateway will automatically appear in the list shown in the “Ethernet Configuration” dialog. If nothing is showed in the list, proceed to Step 5, else proceed to Step 6. Note: You may need to click the + sign to expand the device tree. The *Ethernet interface[X-gateway]* needs to be highlighted before pressing *Ok*.

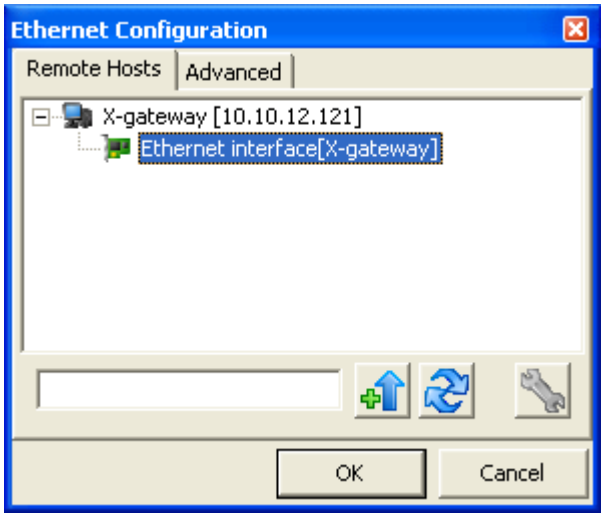

Fig. 9 Browsing the IP address of the connected gateway.

Step 5: This step can be skipped if the device appears as desired in the picture above.

Use the Anybus IPconfig utility to identify or edit the IP address of the X-gateway (started by pressing the wrench button in the toolbar). The Anybus module will appear in the list and the IP settings can be modified by double-clicking the desired IP-address in the list. Click SET to apply the settings. Note that a valid IP-address setting is within the same subnet range as the PC you are using. If your PC has the address 192.168.0.24 and the subnet mask is 255.255.255.0 then the gateway needs to use any free address within 192.168.0.XX.

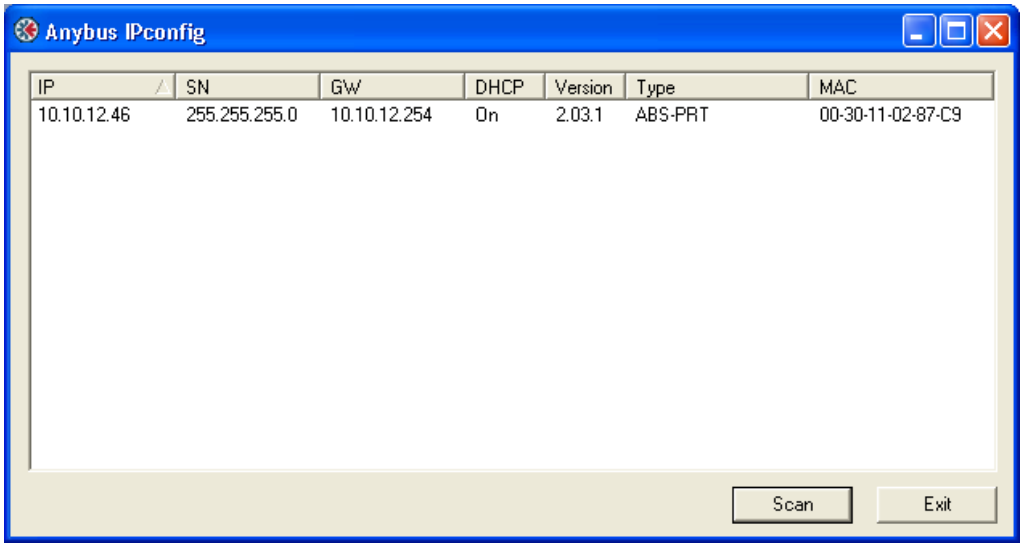

Fig. 10 Scanning for the device.

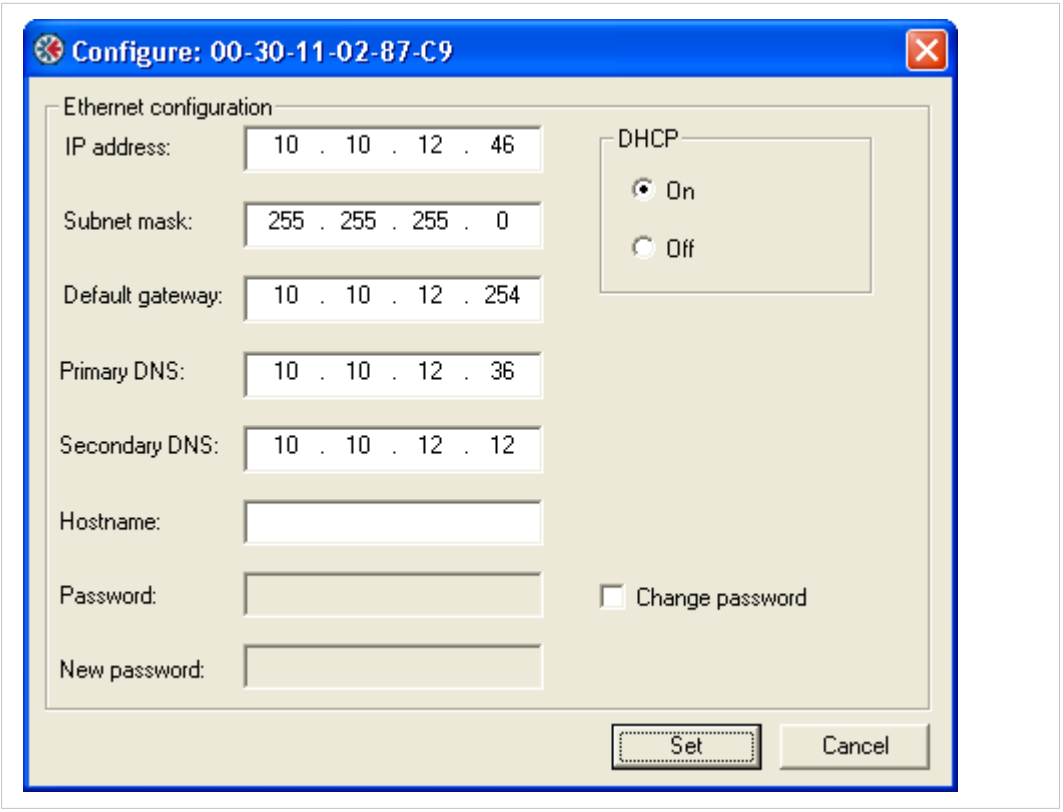

Fig. 11 Configuring the IP address.

Step 6: The X-gateway with its IP address should appear automatically under the *Remote Hosts* tab, if the IP settings were made correctly.

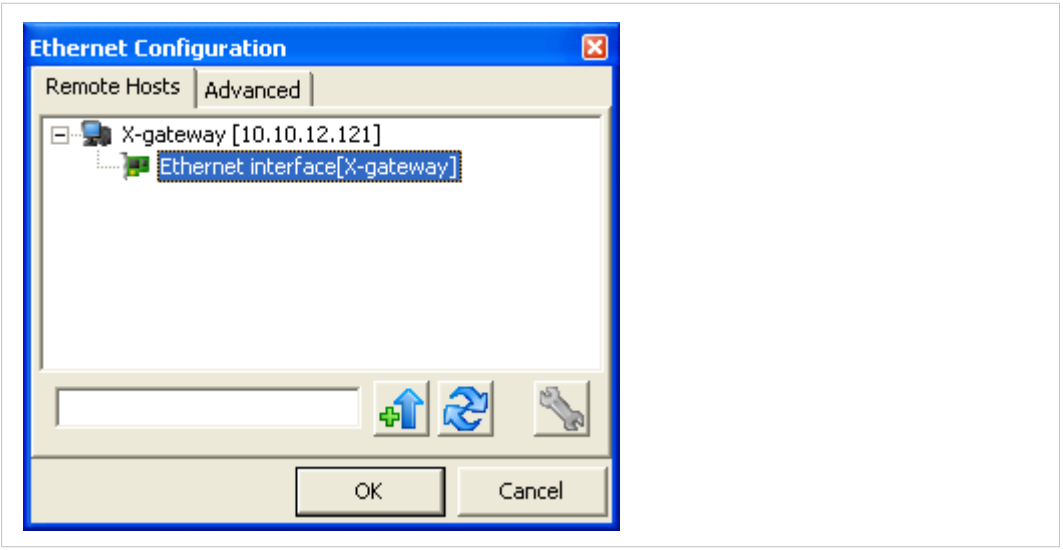

Fig. 12 Selecting the connected gateway.

A network scan can also be forced by entering the X-gateway IP address in the text box to the left of the “Query Host” button, and then pressing the button. Clicking the “Refresh” button will refresh the list under Remote Hosts.

Step 7: The DeviceNet Baudrate and MAC-ID is configured with DIP-Switches. The factory default setting is 500 kbaud and MAC ID 1 with switch setting “1000 0001”. If the network connection is established and goes online, question pops up to update network, click *OK*. Network goes online and network list is updated.

Fig. 13 Question about updating network.

3.1.2 Anybus X-gateway via Transport Provider

The driver called Anybus X-gateway should be used together with X-gateway equipped with an Anybus DeviceNet scanner interface. This driver handles the connection to the DeviceNet scanner via the X-gateway configuration port.

Note: To be able to use the Serial Transport Path the following is required:

- Install NetTool for DeviceNet version 3.1.1.1 or later on the PC together with the hardware drivers which are included in the installation package (Anybus Transport Provider package).
- Make sure the X-gateway firmware is version 3.16 or later

Step 1: Opening the Configure Driver dialogue

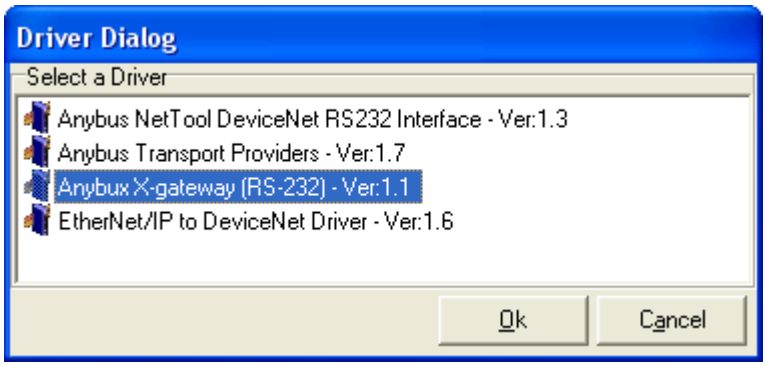

Fig. 14 Selecting the type of driver.

Step 2: After opening the Configure Driver dialogue choose the *Anybus X-gateway (RS-232)* and press *Ok*. The following window will then appear:

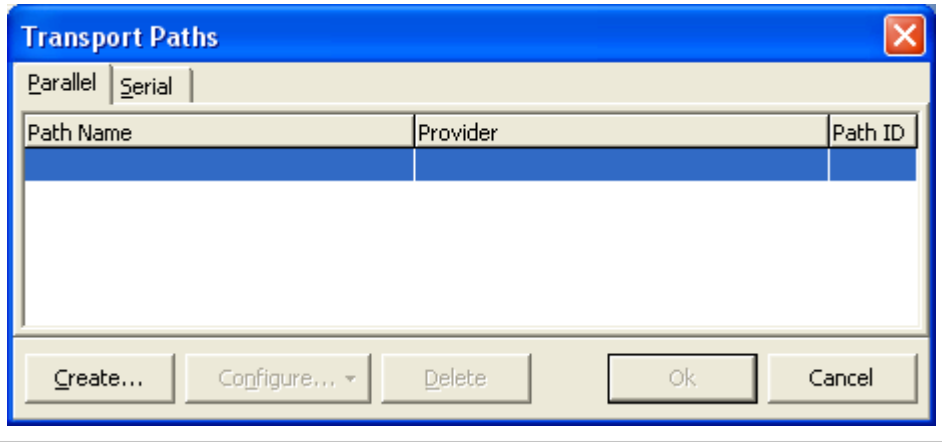

Fig. 15 Configuring the serial transport path.

Step 3: Open the Serial Tab and click “Create”.

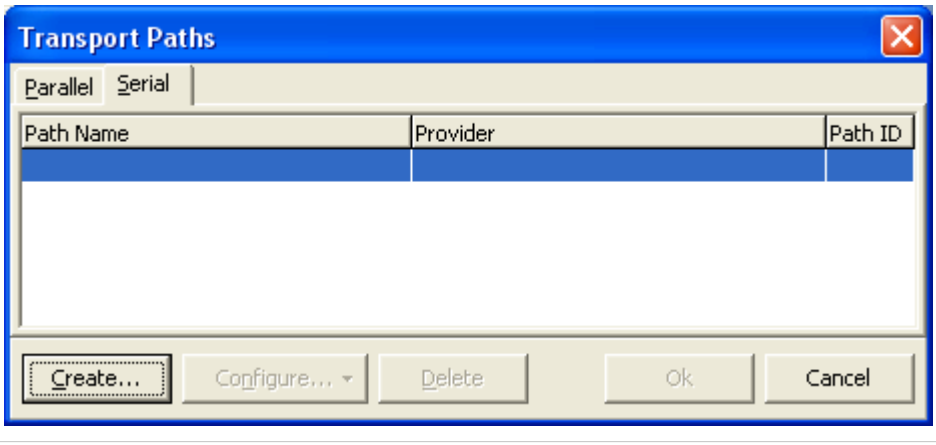

Fig. 16 Selecting the serial tab.

Step 4: Select the COM-port path as shown below and click on the *OK* button to make a new Transport Path. Give the path a desired name and click *OK*.

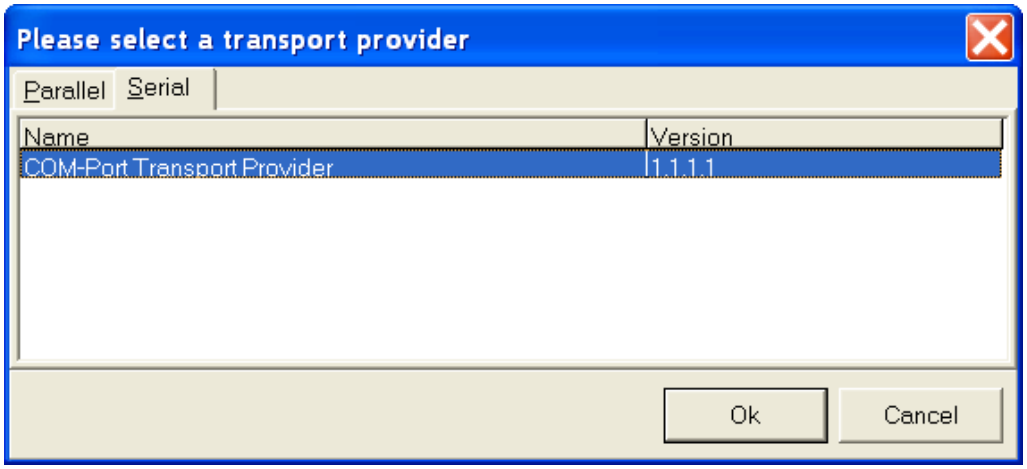

Fig. 17 Selecting the new COM port transport path.

Fig. 18 Naming the new COM port transport path.

Step 5: Select the COM-port, click *Ok*. After configuring these settings the slot in the X-gateway has to be selected. The upper slot is where the power connection is located.

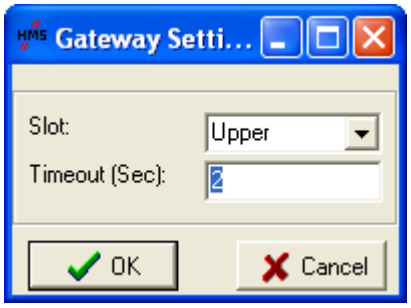

Fig. 19 Configuring the slot and timeout.

Step 6: If connection to X-gateway via COM-port is established, the DeviceNet Baudrate and MAC ID has to be configured the same as on the DIP-Switches. The factory default setting is 500 kbaud and MAC ID 1 with switch setting “1000 0001”.

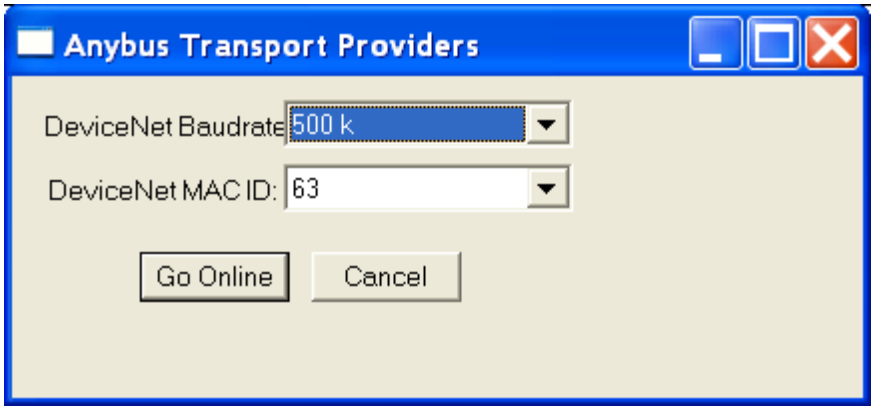

Fig. 20 Configuring the baud rate and MAC ID.

Step 7: If the network connection is established and goes online, question pops up to update network, click *OK*. Network goes online and network list is updated.

Fig. 21 Question about updating network.

If the error-box below appears try again from Step 1 with created Transport path.

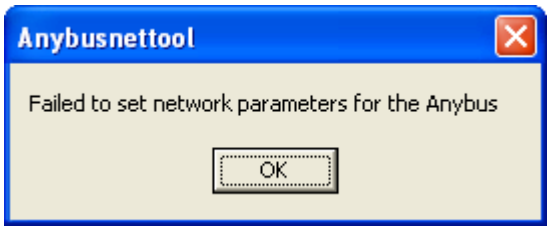

Fig. 22 Error box when trying to set network parameters.

If the error-box below appears, check bus-cable and bus-power and try again from Step 1 with created Transport path.

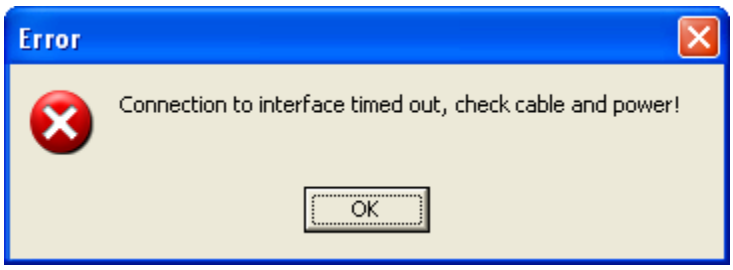

Fig. 23 Error box when trying to connect.

3.1.3 EtherNet/IP to DeviceNet Driver

The driver called EtherNet/IP to DeviceNet Driver should be used together with the product X-gateway EtherNet/IP adapter to DeviceNet scanner (e.g. HMS part number AB7607). This driver handles the DeviceNet scanner connection via EtherNet/IP only.

Step 1: After opening the Configure Driver dialogue choose *EtherNet/IP to DeviceNet Driver* in the Driver Dialog and press *Ok*.

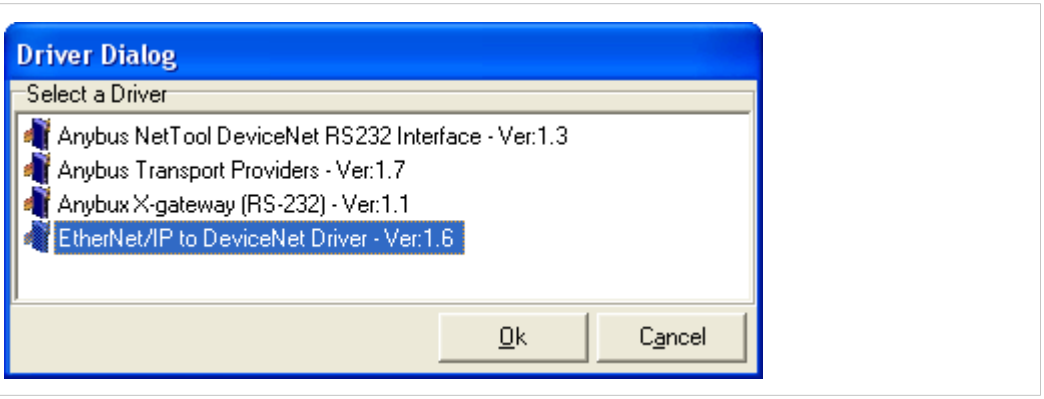

Fig. 24 Selecting the type of driver.

Step 2: The *Browse for network* window will appear like the window below if the X-gateway is properly connected to the EtherNet/IP network. Click the + sign to expand the *Ethernet to DeviceNet Gateway* entry. Then highlight the entry below and click the *OK* button.

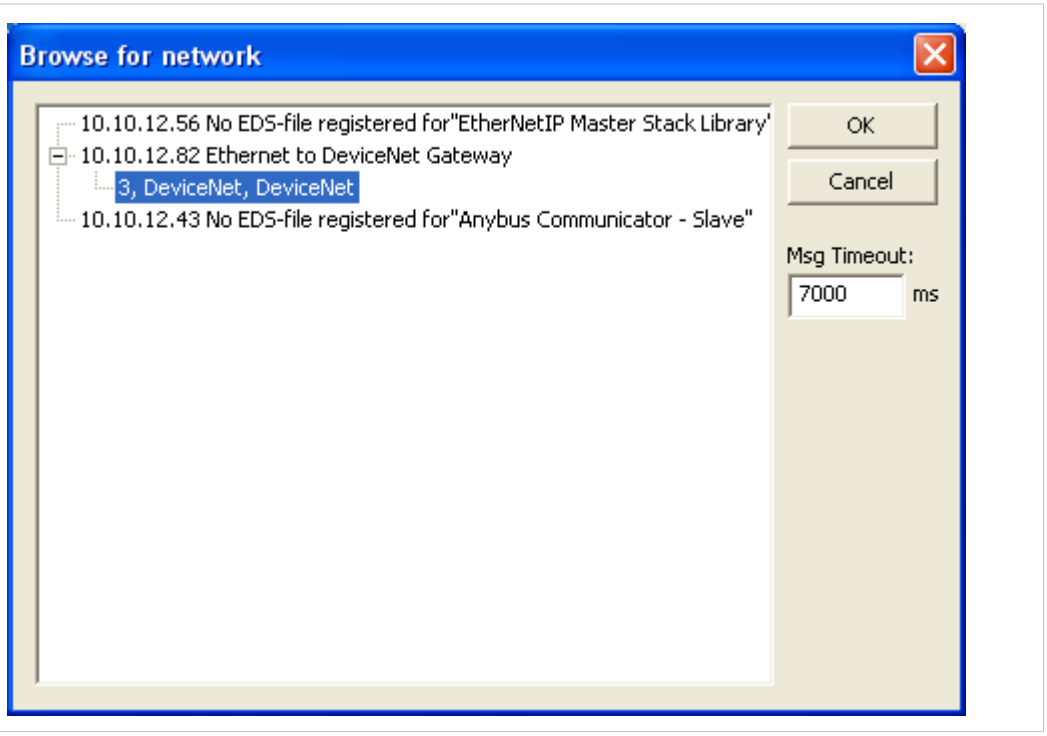

Fig. 25 Selecting the module to configure.

Step 3: If the network connection is established and goes online, question pops up to update network, click *OK*. Network goes online and network list is updated.

Fig. 26 Question about updating network.

3.2 Online Mode

After connecting, as described above, the configuration manager is Online. Else press the “Go Online” button in the toolbar.

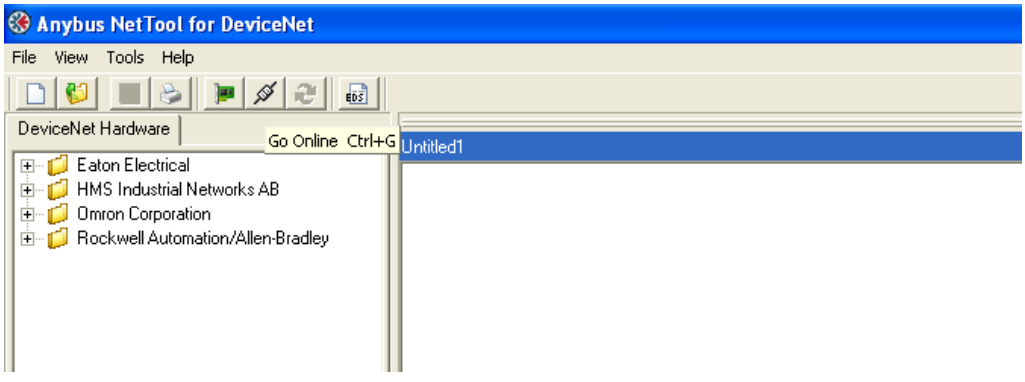

Fig. 27 The online button

To upload the current configuration, update your network as shown below.

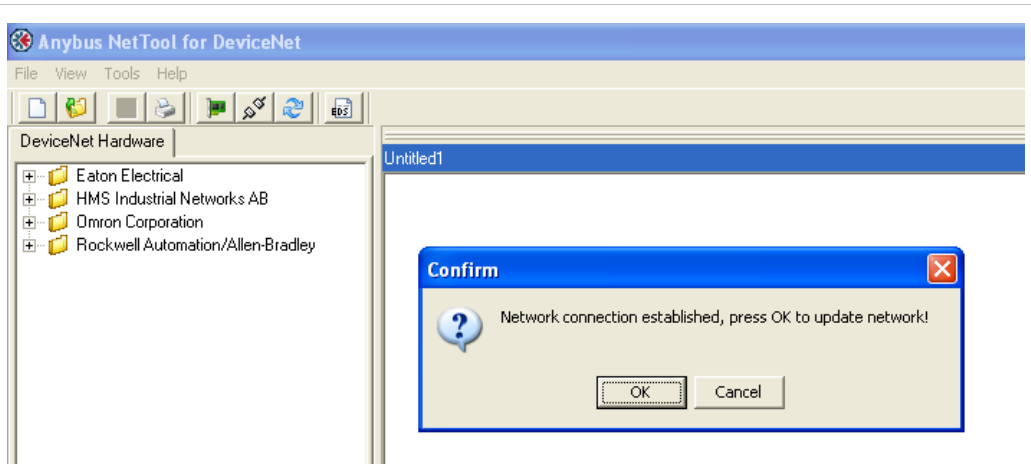

Fig. 28 The update window.

In this example the following network will appear:

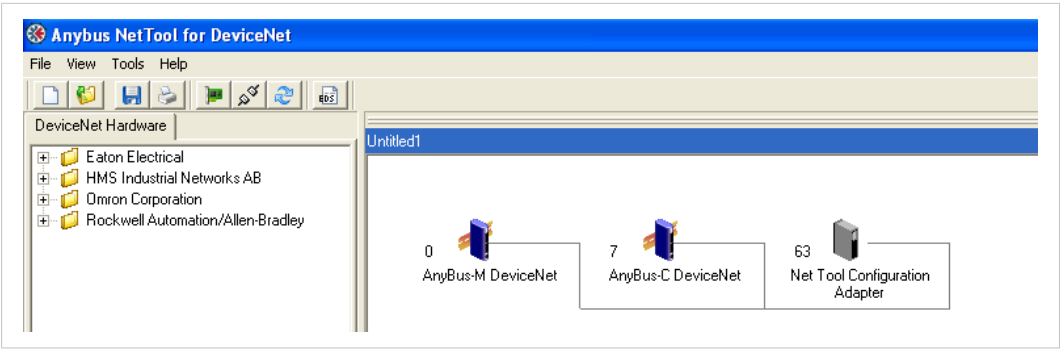

Fig. 29 Online network.

3.3 Offline Mode

For devices not included in the library of the configuration manager, an EDS file has to be imported. If the module is not included in the library the unit will not be recognised by the program. The EDS file is to be provided by the manufacturer of the module. In this case the EDS file for the Anybus Communicator and X-gateway can be downloaded at www.anybus.com. Make sure the program is in offline mode.

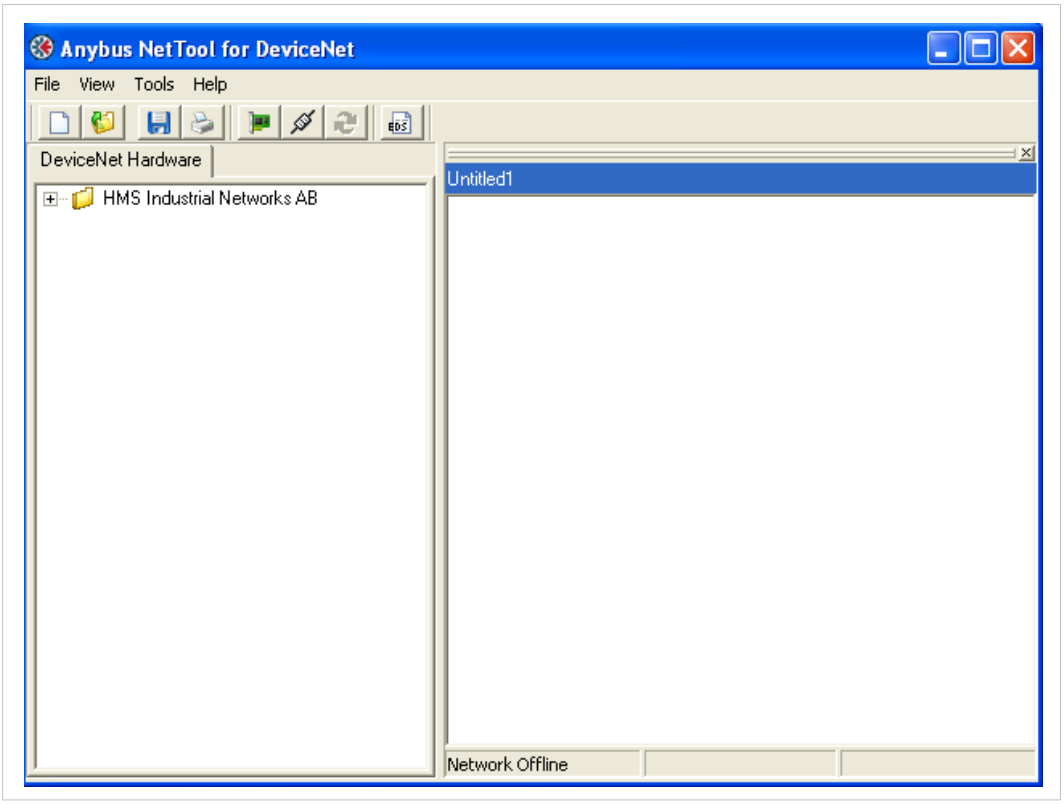

Fig. 30 Offline mode

Press the *EDS file* button and click on *Next* button.

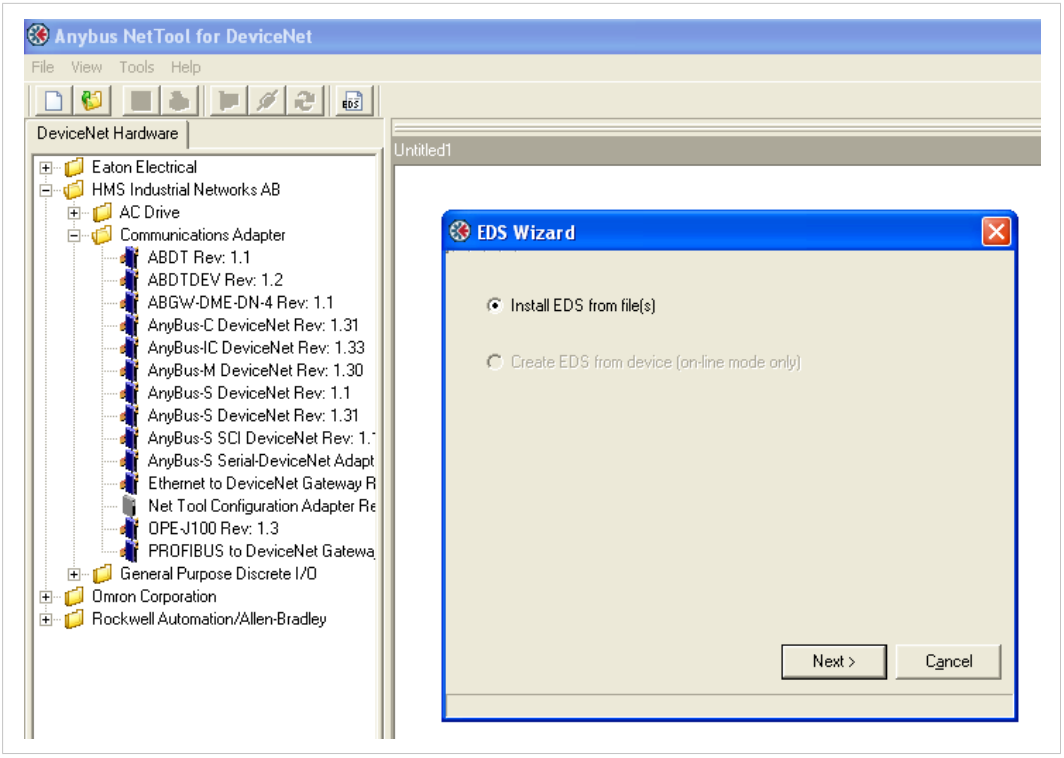

Fig. 31 Install EDS file dialogue.

Locate your EDS file, press *OK* and then press *Finish*.

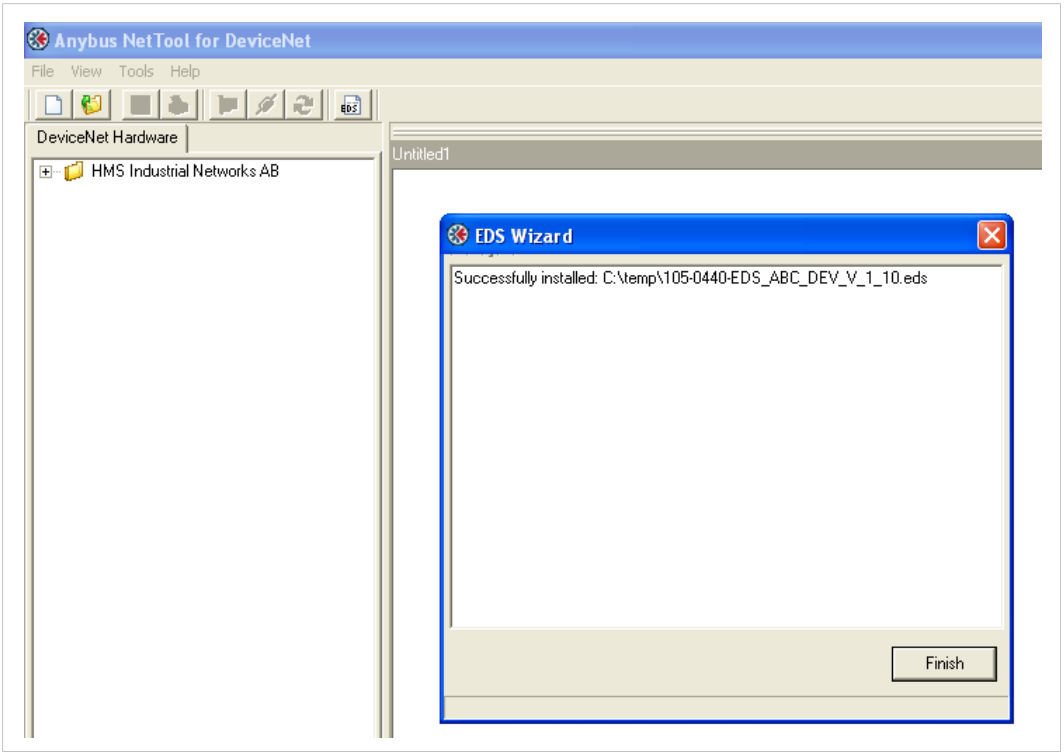

Fig. 32 Installing the EDS file.

The module will now be seen in the library.

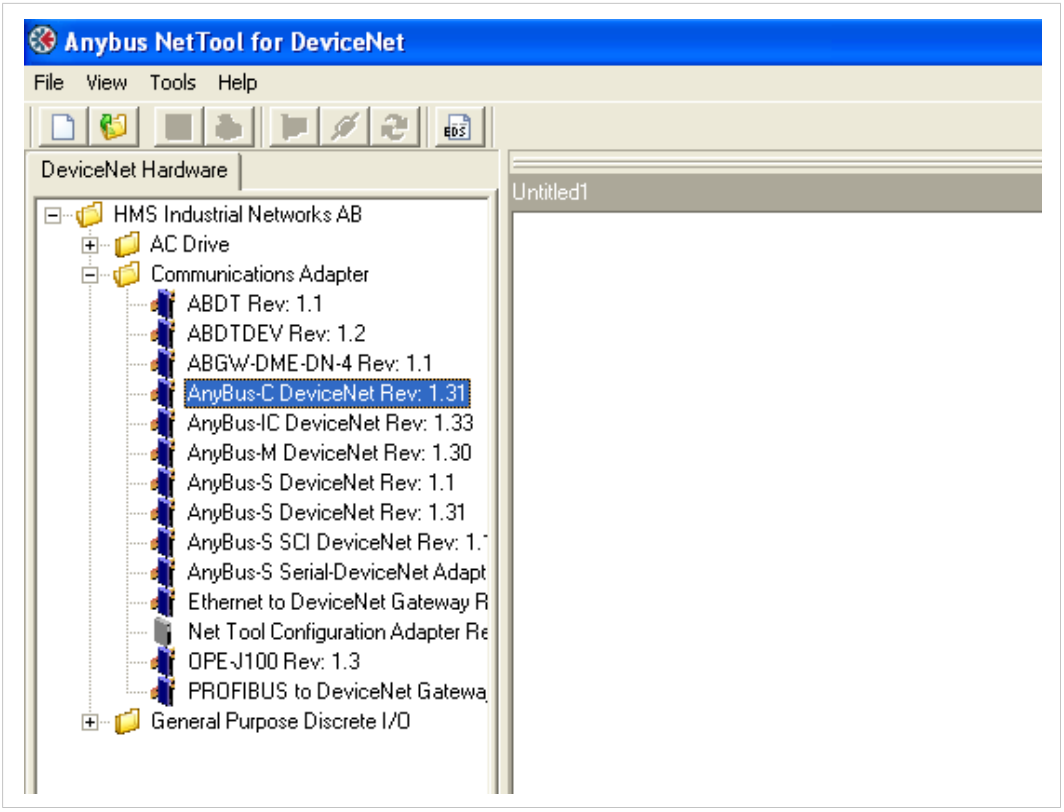

Fig. 33 The NetTool library.

By using drag and drop it is possible to set up the current network. When the network is completed press the *Go Online* button. If the settings are correct none of the selected modules will be red marked.

Fig. 34 The online network.

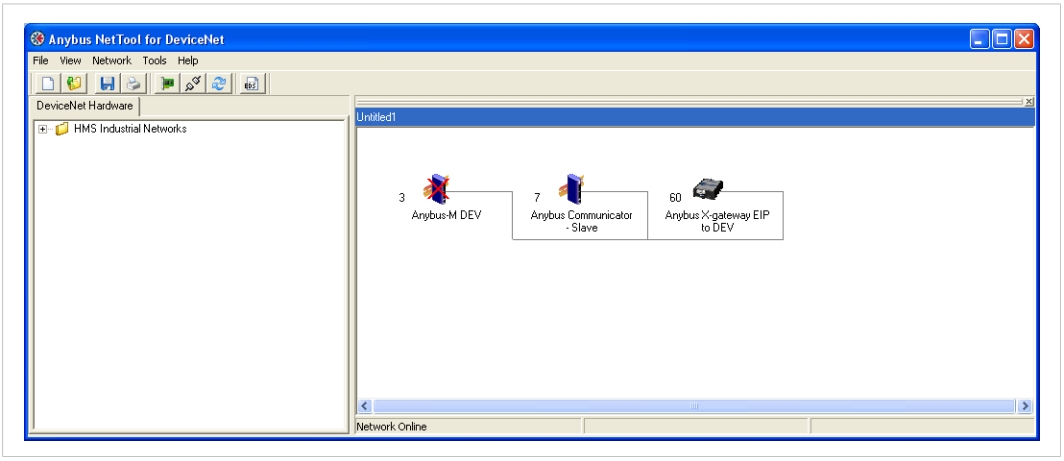

Fig. 35 Anybus-M in configuration is not found at node address 3.

3.4 I/O Configuration

The next step is to configure the amount of I/O data. First the number of bytes to/from the nodes in the network has to be concluded. The second step is to configure the scanner module. Start with double click the Anybus-C DeviceNet icon in the network and press *Yes* in the appearing dialogue.

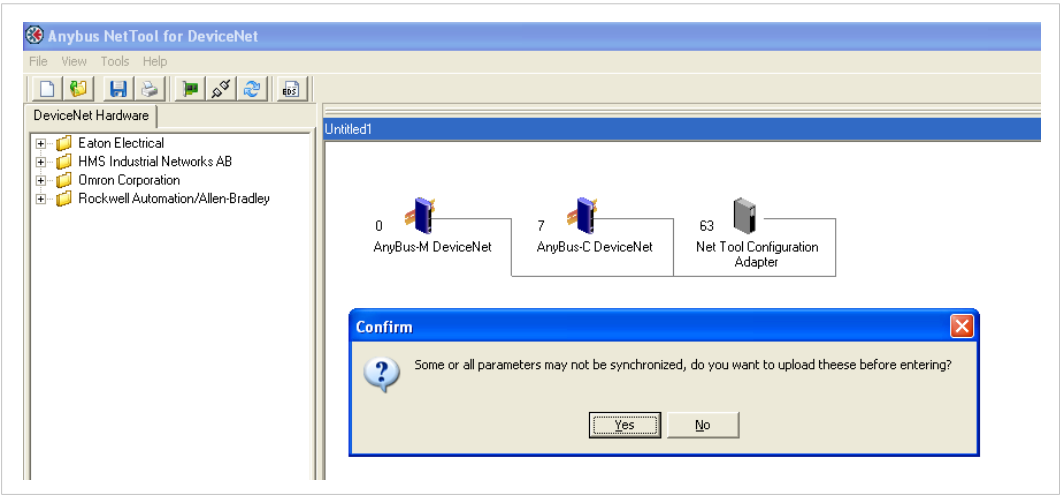

Fig. 36 Uploading the parameters.

The window below will then appear.

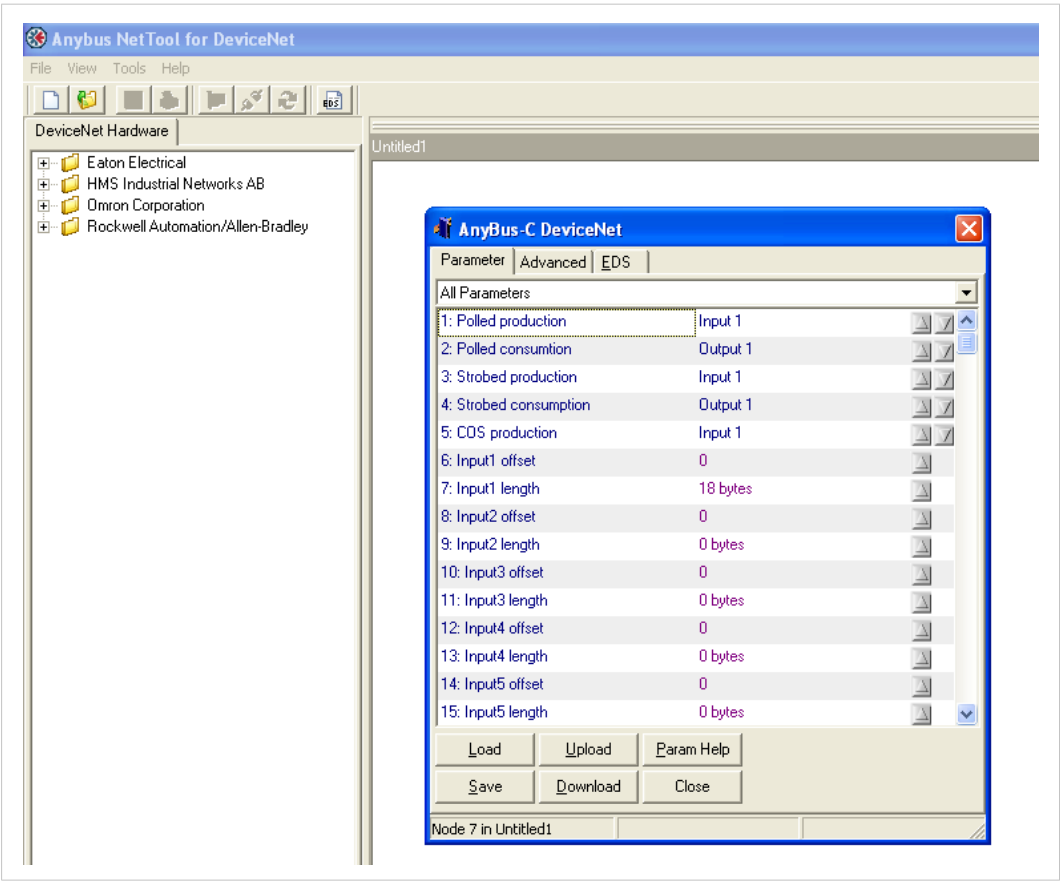

Fig. 37 I/O configuration of the adapter module, in this case the Anybus Communicator.

In this case, the number of input bytes equals 18.

3.4.1 Configuring the Scanner Module

The next step is to configure the scanner module. Double click on the Anybus-M module and press *Yes* to upload parameters in the same way as previously. Open the scanner tile and press *Yes* in the following dialogue to upload the scan list as shown below.

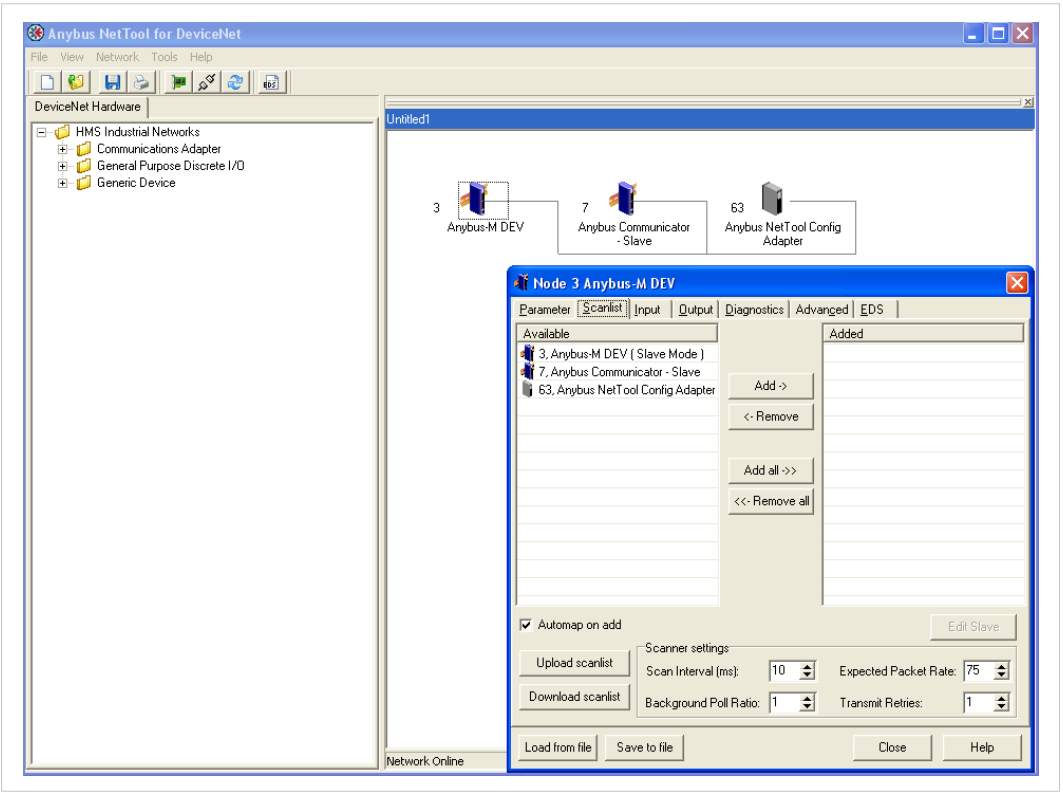

Fig. 38 The scan list.

Mark the Anybus-C DeviceNet and click Add to move the module to the right list.

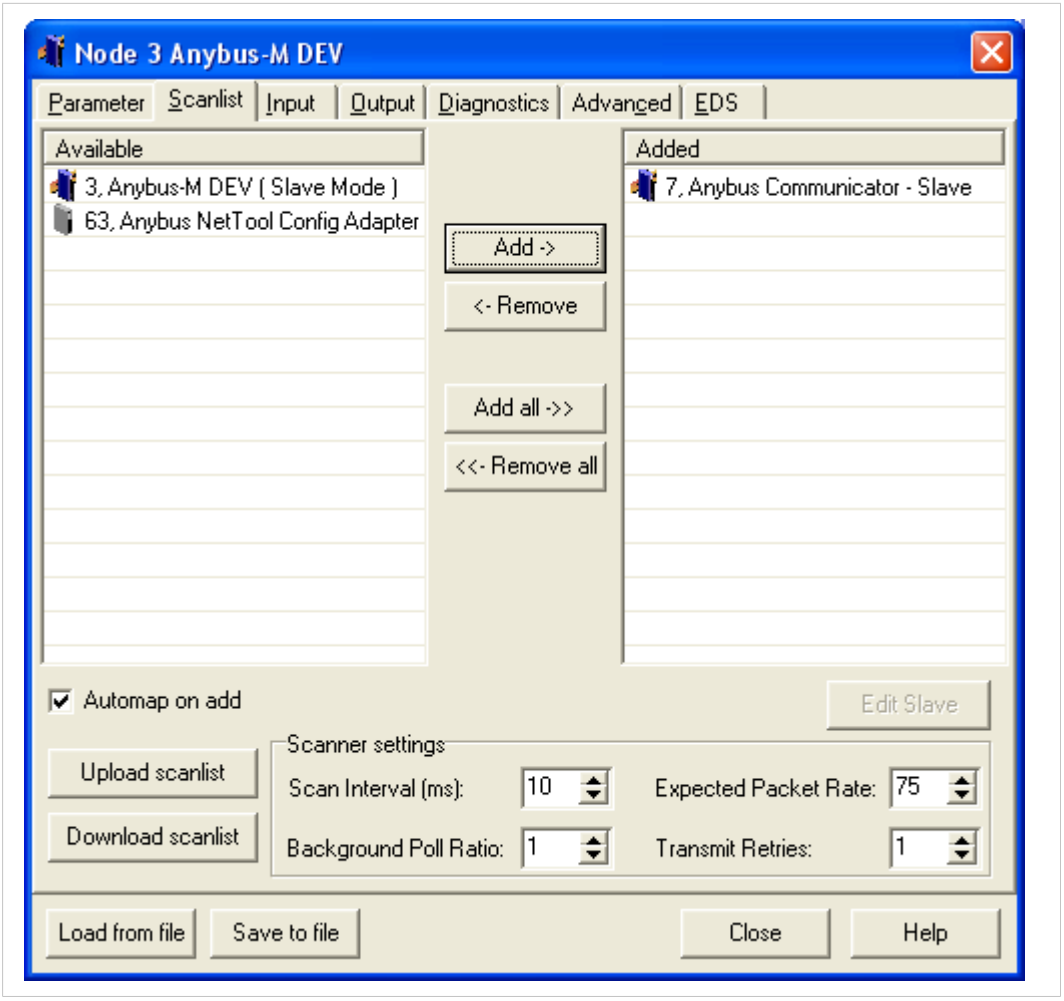

Fig. 39 Configuring the scanner.

The window shown below will be seen (later found by selecting the Anybus-C DeviceNet icon and pushing the *Edit Slave* button). The window shown below will be seen.

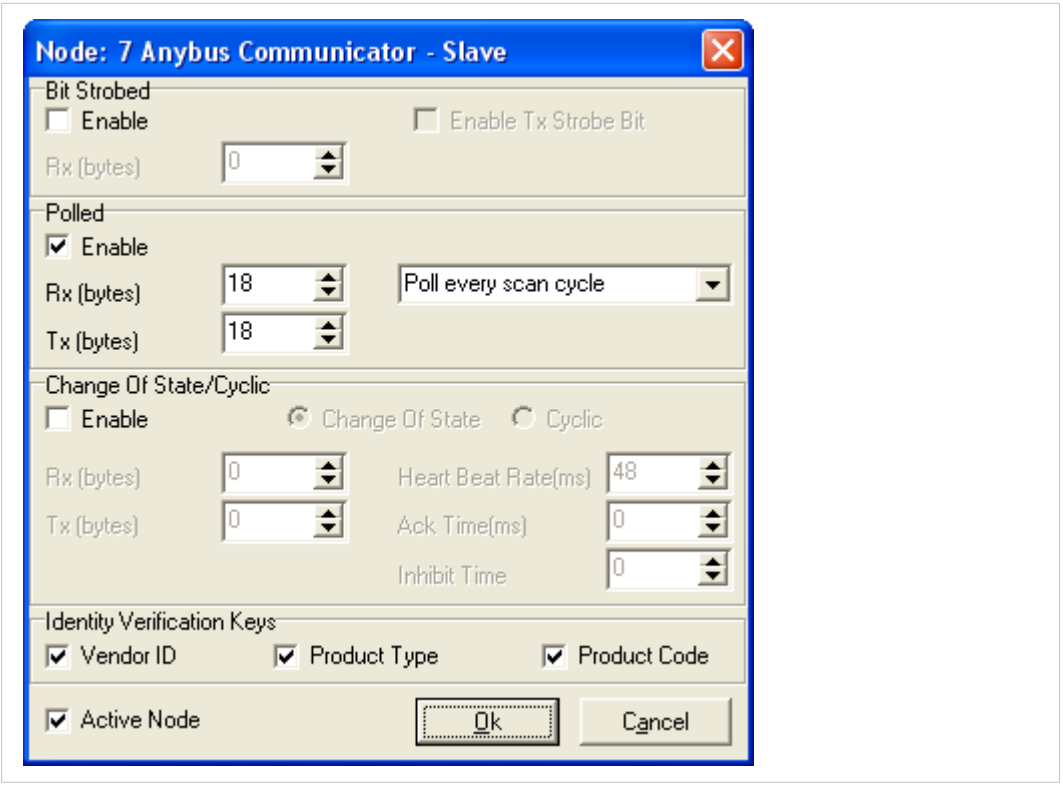

Fig. 40 Configuring the I/O data of the scanner module.

In this case the alternative Polled is selected and 18 bytes Rx (in) and Tx (out) is chosen. The number of bytes and method of communication is depending on the characteristics of the adapter modules in the network. In this case the 18 bytes will match the I/O data size of the Anybus Communicator module. Press *OK* and select the Input tab.

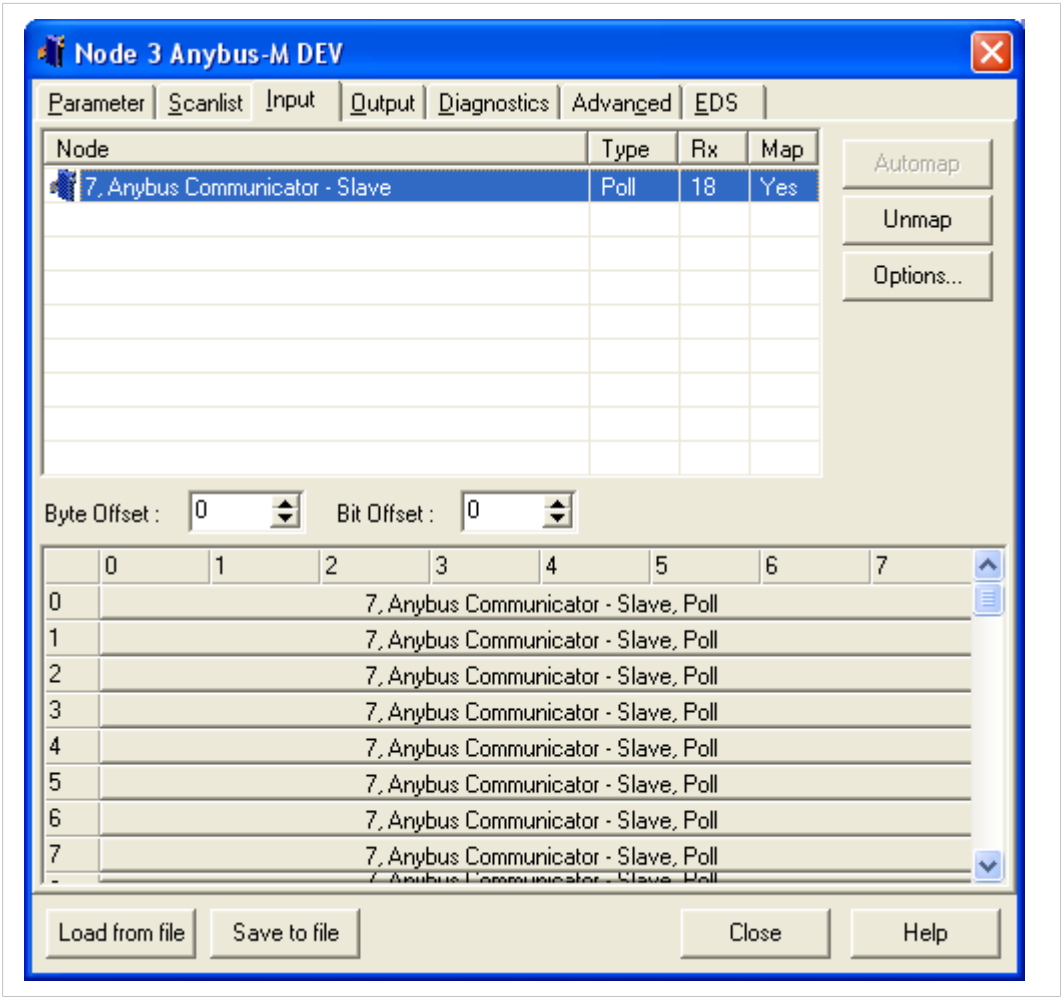

Fig. 41 Configuring the input data.

The Anybus-C module is Automapped. This mode is used when no manual mapping is required. When the *Automap* button is pressed the I/O will be mapped from the first free position after Word Offset + Bit Offset where all the data can be mapped in one chunk. In the same way the output data can be configured.

First Master state has to be set to Idle. Open the Parameter tab, make sure the master is in idle state and press the *Download* button as shown below.

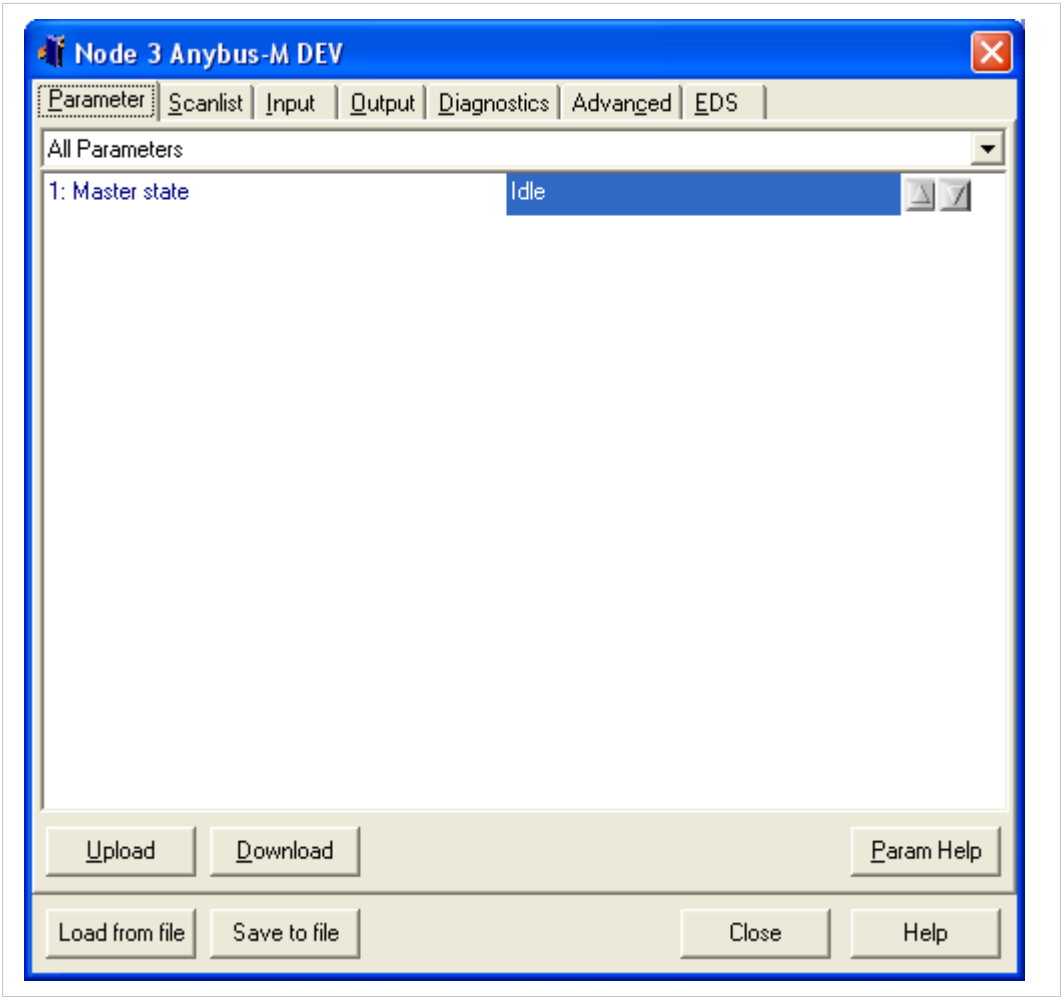

Fig. 42 Downloading parameters to the scanner.

Then the scanlist has to be downloaded to the scanner. Open the tile Scanlist again and press the *Download scanlist* button as shown below.

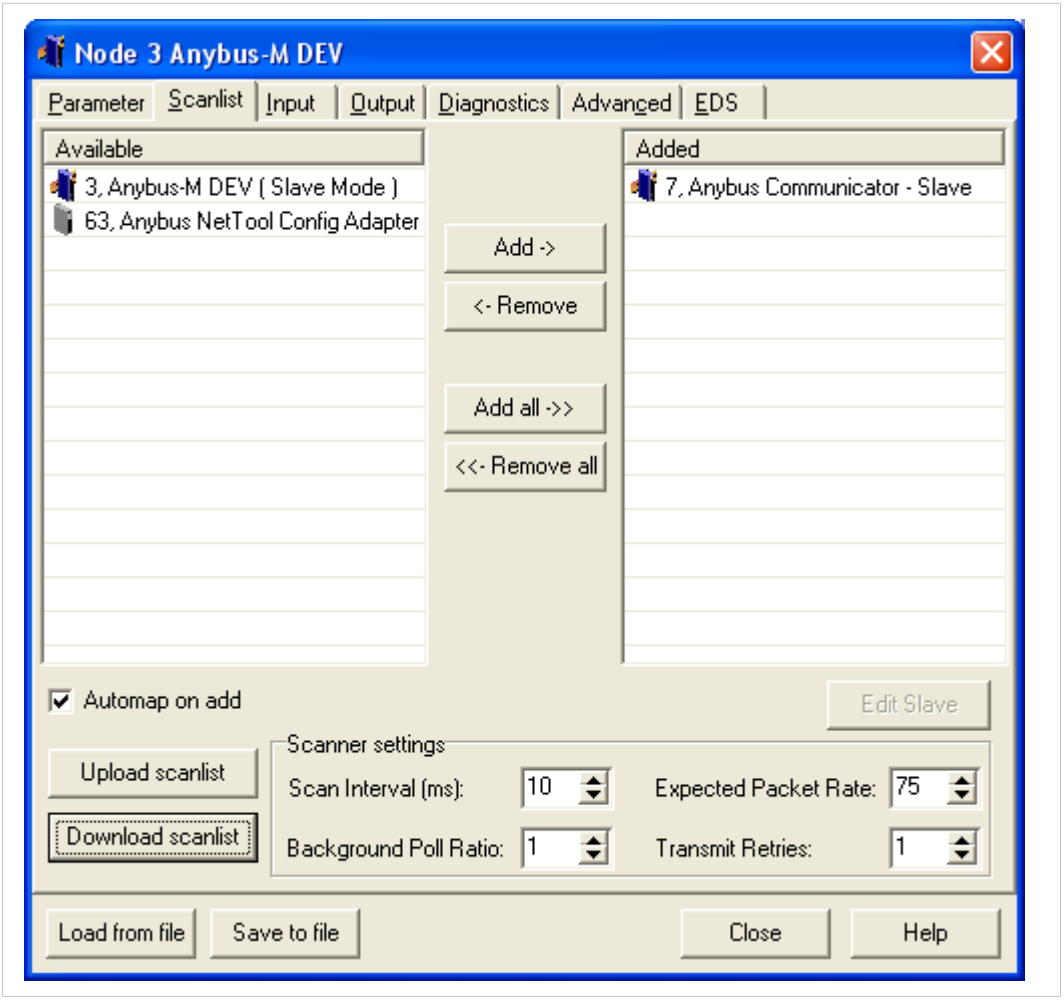

Fig. 43 Downloading the scanlist to the scanner.

The next and final step is to open the diagnostics tab. Press the *Update* button and if the configuration is correct no faults will appear.

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