# How to configure an Anybus LonWorks module with LonMaker for Windows

# More info about the network and products

This document gives a brief description of how to configure an Anybus product for LonWorks. For further information about the products, please consult the HMS homepage, www.anybus.com. The latest manuals etcetera can be downloaded from that location.

For more information concerning the LonWorks network the LonMark International has a webpage. Please visit, www.lonmark.org, for more information about LonWorks.

# Document history

| Revision | Date | Description | Responsible |
|----------|------|-------------|-------------|
| 1.00 | 2008-01-14 | Created | Thorbjörn Palm |
| 1.01 | 2008-01-25 | Minor revision | Thorbjörn Palm |
| 1.02 | 2008-03-13 | Updated layout | Thorbjörn Palm |

# Contents

# 1    Solution overview

This application note describes how to configure an Anybus LonWorks module and how to set up the LonWorks network using the tool LonMaker for Windows. Below you can find an overview of the system described in this document. Other nodes may be attached to the network, but are not necessary.

The configuration is described in two steps.

1.    At first the Anybus module configuration is explained.

2.    Secondly the configuration of the LonWorks network is described.

**Note:** This document is valid for all Anybus LonWorks products, however sections written in *italics* describe the configuration of a specific product.

The contents describe step by step how a configuration is done. This document assumes the reader is familiar with industrial communication, LonWorks networks and HMS Communicator and X-gateway.
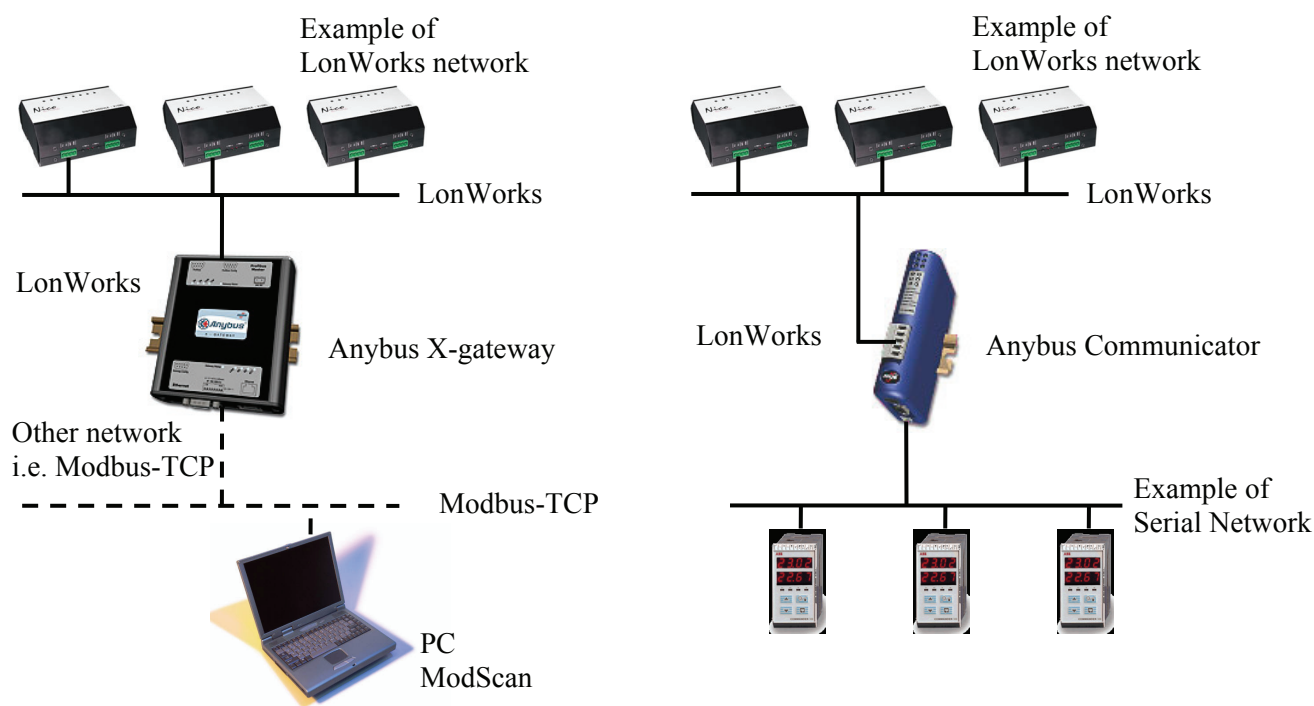


**Figure 1    Hardware connection overview.**

# 2    Applicable Anybus products

The following table specifies the relevant Anybus products for this document.

| Description | Name / Type |
|---|---|
| Anybus Communicator | LonWorks |
| Anybus X-gateway | LonWorks |
| Anybus-S | LonWorks |
| Anybus-S Drive Profile | LonWorks |

# 3    Requirements

The following equipment is needed to setup a successful configuration. Please note that LonMaker for Windows is licensed software from Echelon[1].

| Description | Name / Type | Version |
|---|---|---|
| Communicator configuration software | ABC LWTool | 1.06 Build 39 |
| Communicator configuration download | ABC LWDownload | 1.1 |
| Microsoft Windows terminal software | HyperTerminal | 5.1 |
| Anybus configuration software | Anybus LWTool | 1.06 Build 39 |
| Anybus configuration download | HMS Firmware download TP | 2.8.1.1 |
| LonWorks configuration software | LonMaker for Windows | 3.1 |
| ABC LWTool Manual | ABC LWTool Tutorial Manual | 1.01 |
| Anybus LWTool Manual | Anybus LWTool Tutorial Manual | 1.00 |
| X-gateway Interface Addendum | X-gateway LonWorks Interface Addendum | 1.01 |
| X-gateway User Manual | X-gateway User Manual | 1.11 |
| Anybus-S Fieldbus Appendix | Anybus-S LonWorks Fieldbus Appendix | 1.51 |
| Anybus-S Drive Profile Appendix | Anybus-S Drive Profile LonWorks Fieldbus Appendix | 1.10 |
| Power supply 24VDC | n.a. | n.a |
| Configuration cables | n.a. | n.a. |

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[1] www.echelon.com

# 4 Anybus configuration

In the following chapters the configuration of the Anybus-S, Communicator and X-gateway are explained.

## 4.1 Anybus-S configuration

*The Anybus-S is configured via the host application interface using the mailbox interface. Refer to the Anybus-S Fieldbus Appendix for details.*

*The LonWorks configuration is done by using Anybus LWTool. The procedure using the Anybus LWTool is the same as for the Anybus X-gateway, please see chapter 4.3.2 Anybus LWTool for details.*

*Note: When using an Anybus-S LonWorks module you need an adapter interface for downloading the configuration, please contact HMS for further information.*

## 4.2 Communicator configuration

*The communicator is configured in two steps.*

*1 At first the LonWorks configuration is set up in the ABC LWTool.*

*2 Secondly the configuration is downloaded using the ABC LWDownload.*

### 4.2.1 ABC LWTool configuration

**1 Configuring the node properties**

*Start the ABC LWTool to configure the Anybus Communicator. Enter the desired name of the configuration in the ASCII identification field ❶ as seen below. The additional info field can be used, but this is optional.*
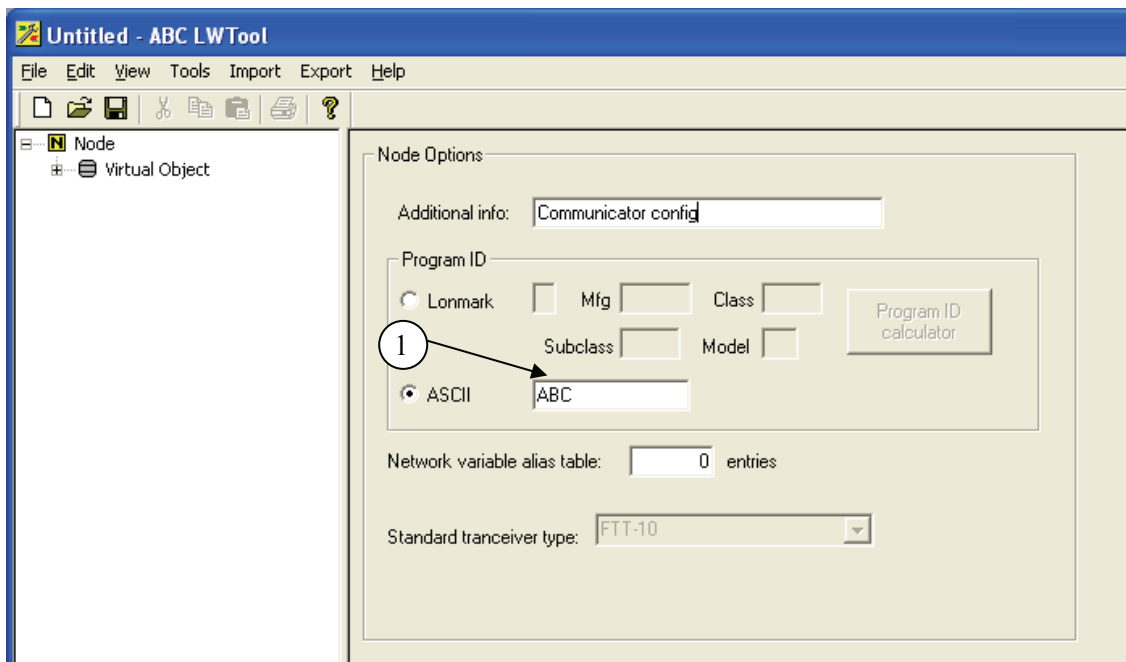


**Figure 2    Configuring the node options.**

*Note: The ProgramID can be set in two different ways, LonMark or ASCII. Select LonMark if you are a member of the LonMark organisation and want the configuration to be LonMark compliant. Normal users are recommended to use an ASCII programID.*

**2 Inserting the variables**

*The next step is to add Network Variables. Right click on Network variables and select Add Network Variable.*
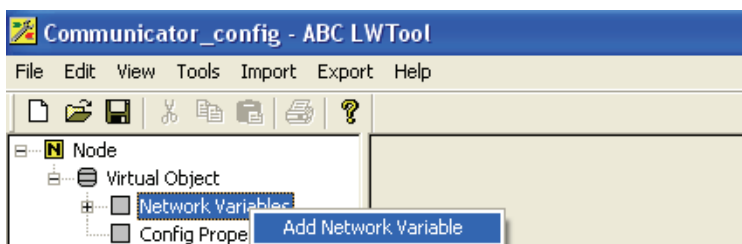


**Figure 3    Adding network variables.**

*First enter the name❶ and type❷ of the variable.*

*Then select the type of direction❸, In or Out. The Class❹ of the variable can be left unchanged as it is only used if the programID is set to LonMark. Finally the Default Service Type❺ has to be set. Using Acknowledged the node awaits an answer of the data sent.*
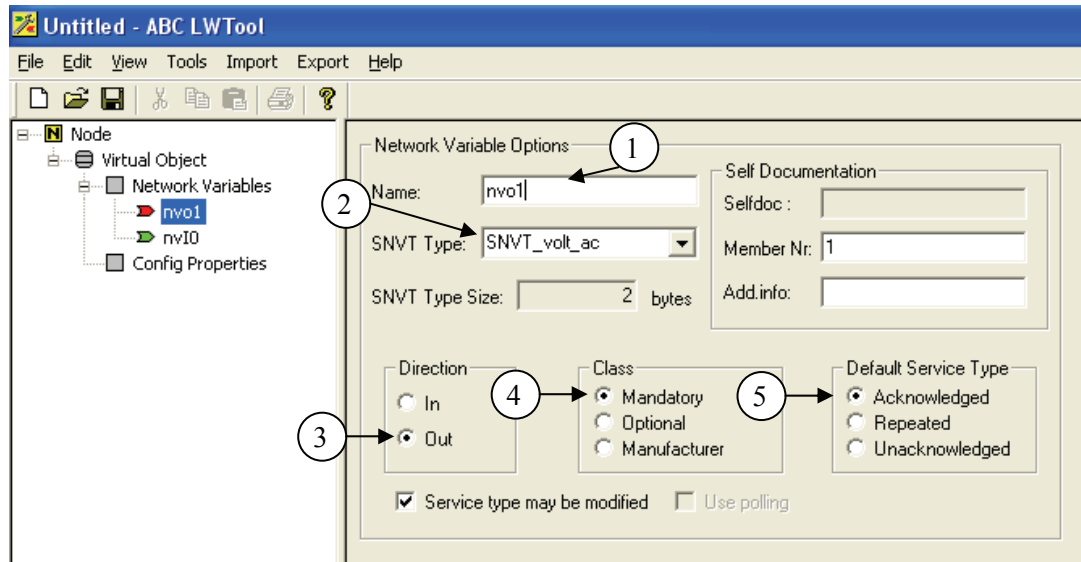
**Figure 4    Configuring the output variable.**

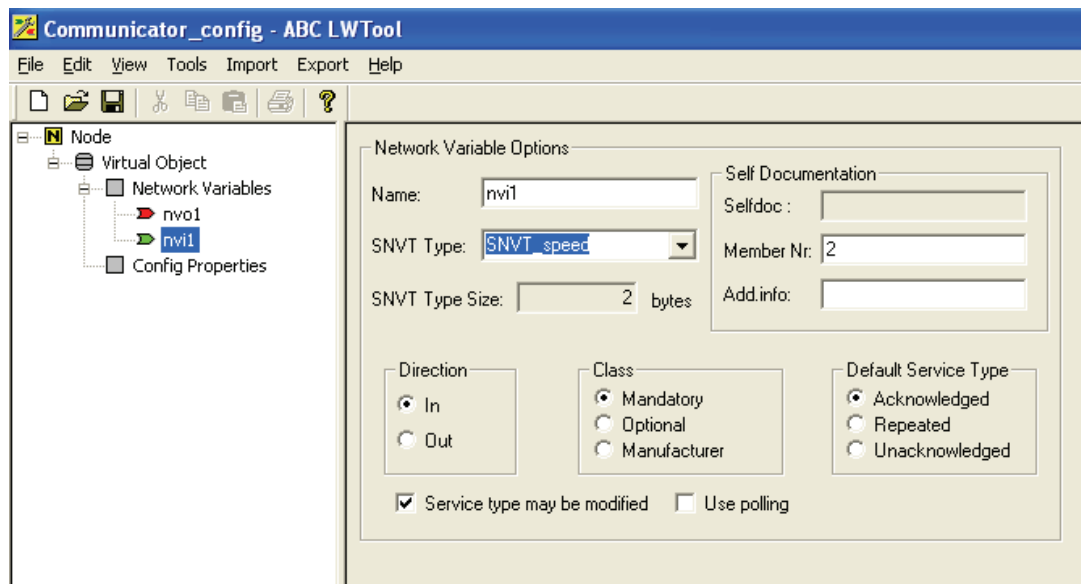*In this case two variables are configured, one input SNVT_speed and one output SNVT_volt_ac are configured.*

**Figure 5    Configuring the input variable.**

## 3 Mapping the Modbus registers

*When using the Communicator the Modbus mapping of the variables is done automatically. To view the Modbus mapping open the export menu and select Node Documentation. This saves the Modbus mapping to an html-file.*
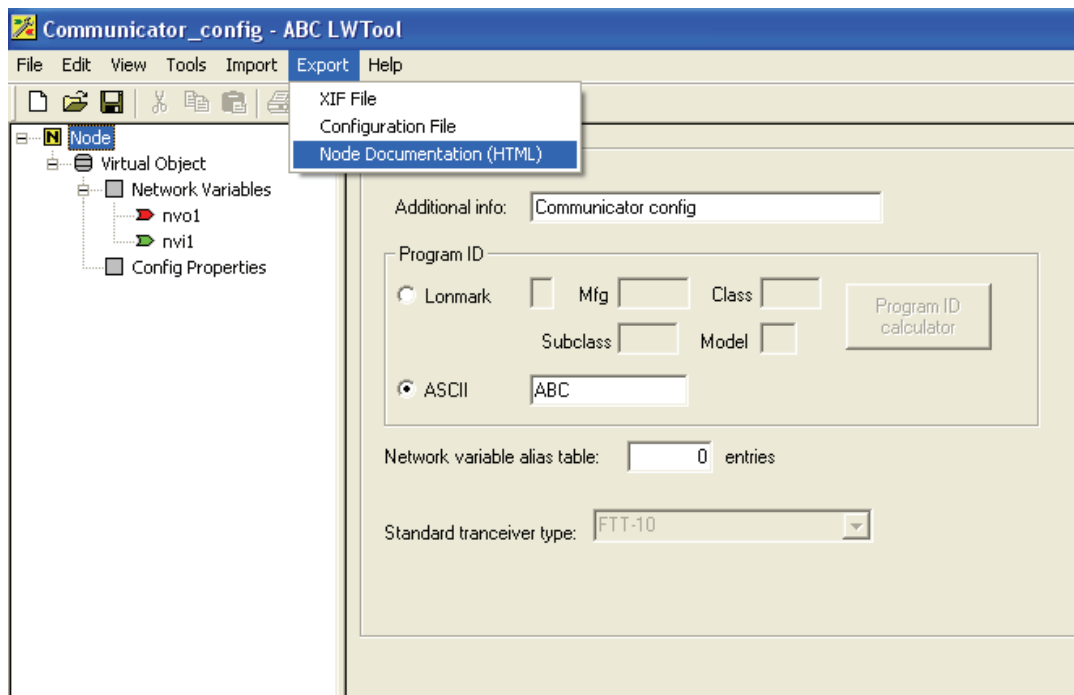


**Figure 6    Exporting the Node Documentation.**
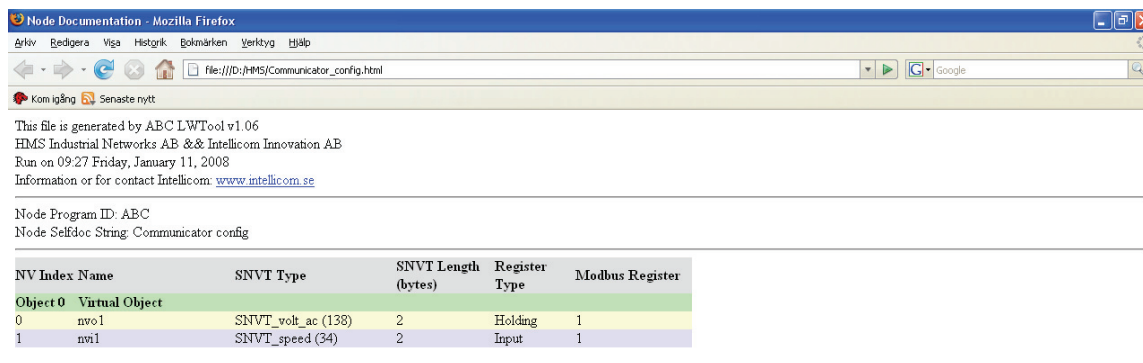


**Figure 7    Viewing the Node Documentation file.**

*The html-file shows the linking between the Variables and the Modbus registers.*

## 4 Exporting the configuration file

*The next step is to export the configuration file. Open the Export menu and select Configuration file.*
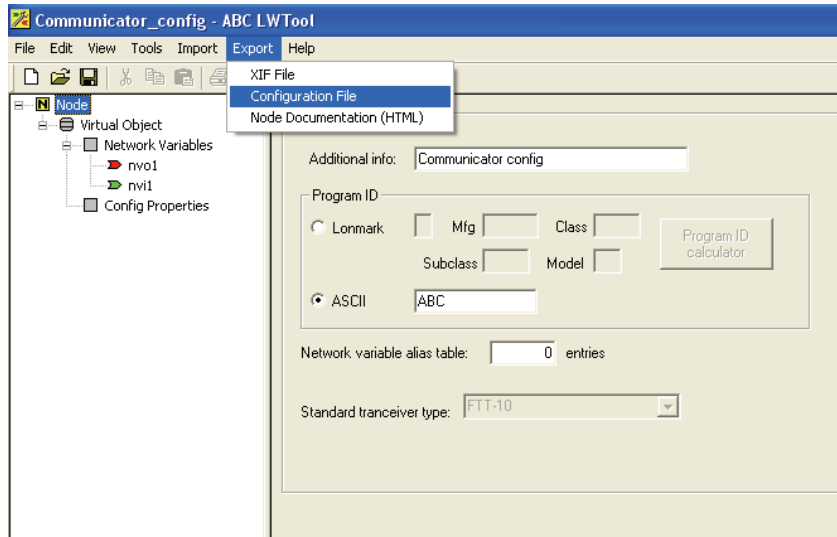


**Figure 8    Exporting the configuration file.**

*Name the configuration file and click on save.*
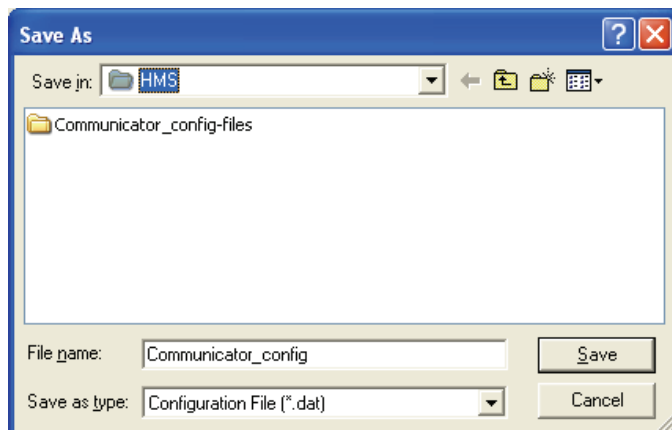


**Figure 9    Saving the configuration file.**

## 4.2.2  Configuration download

*Now the configuration is saved and is to be downloaded to the Anybus module. Firstly, start the ABC LWDownload and use the desired Modbus settings.*
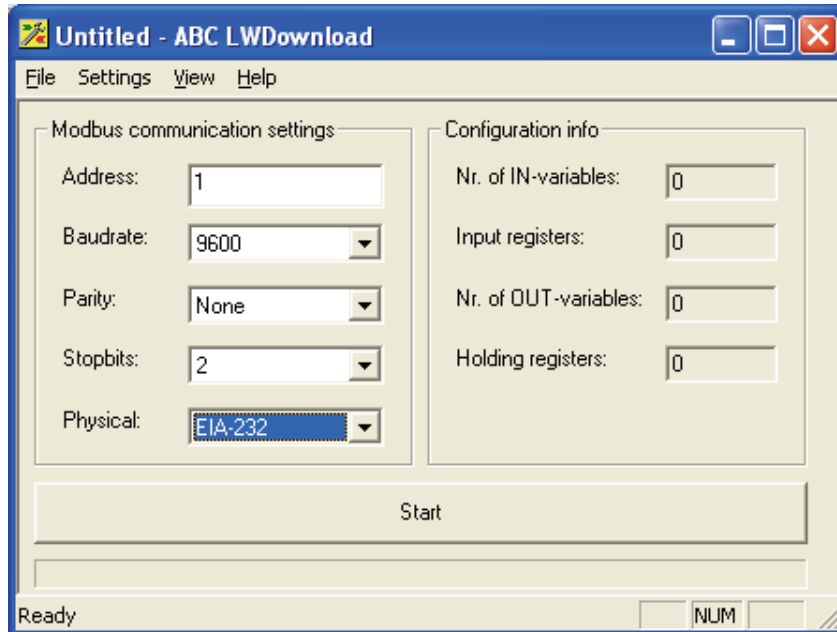


**Figure 10  Configuring the Modbus settings.**

*In this case EIA-232 is used, since ModScan32 is used from a PC to set values to the registers.*

*Secondly open the file menu and select Open.*
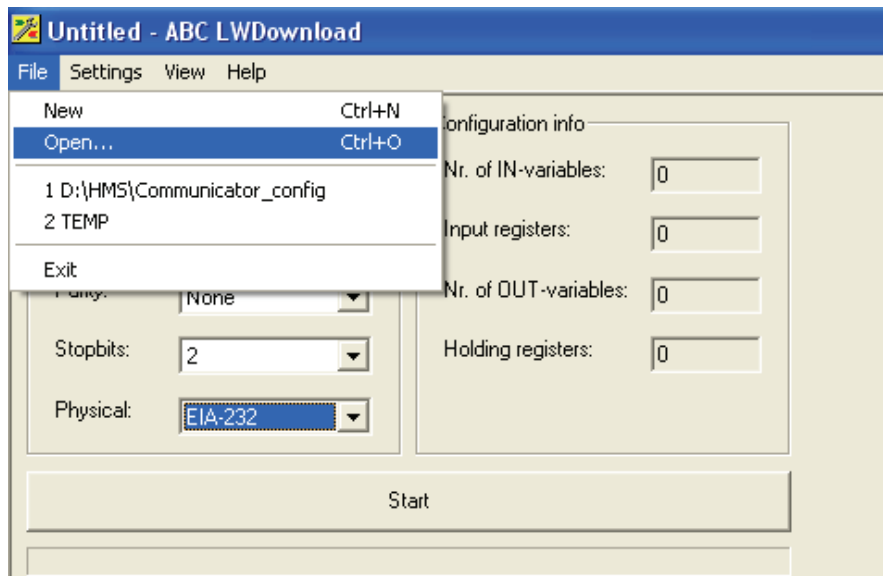


**Figure 11  Opening the file menu.**

*Select the configuration file to be opened.*
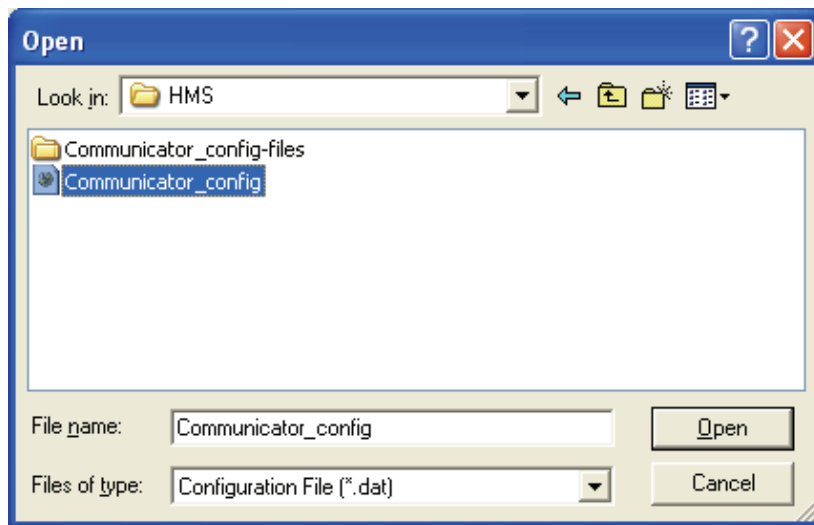


**Figure 12   Selecting the configuration file.**

*Also select which COM port to use.*
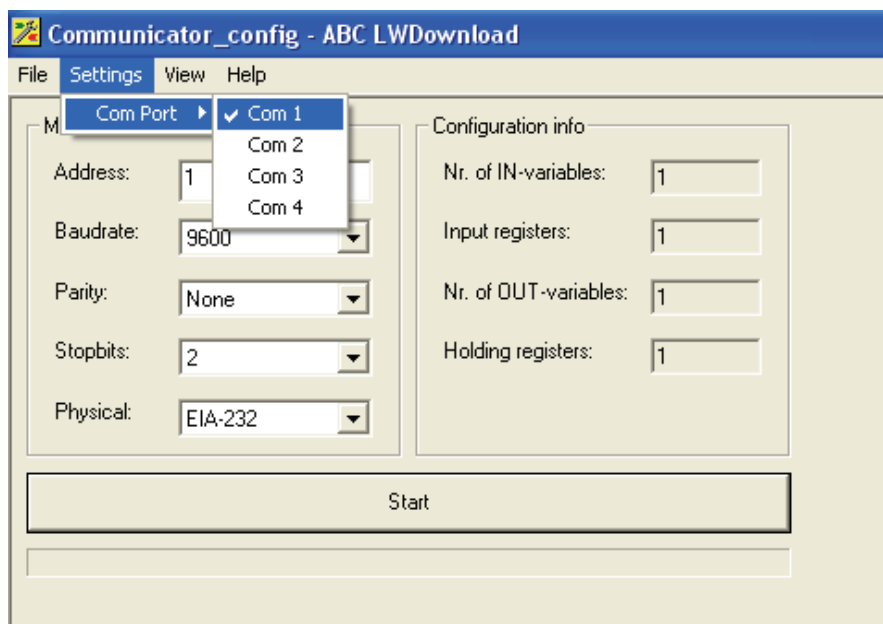


**Figure 13   Selecting the COM port for downloading the configuration file.**

*Then press Start to download the configuration.*

*If the download is successful the dialogue window shown below appears.*
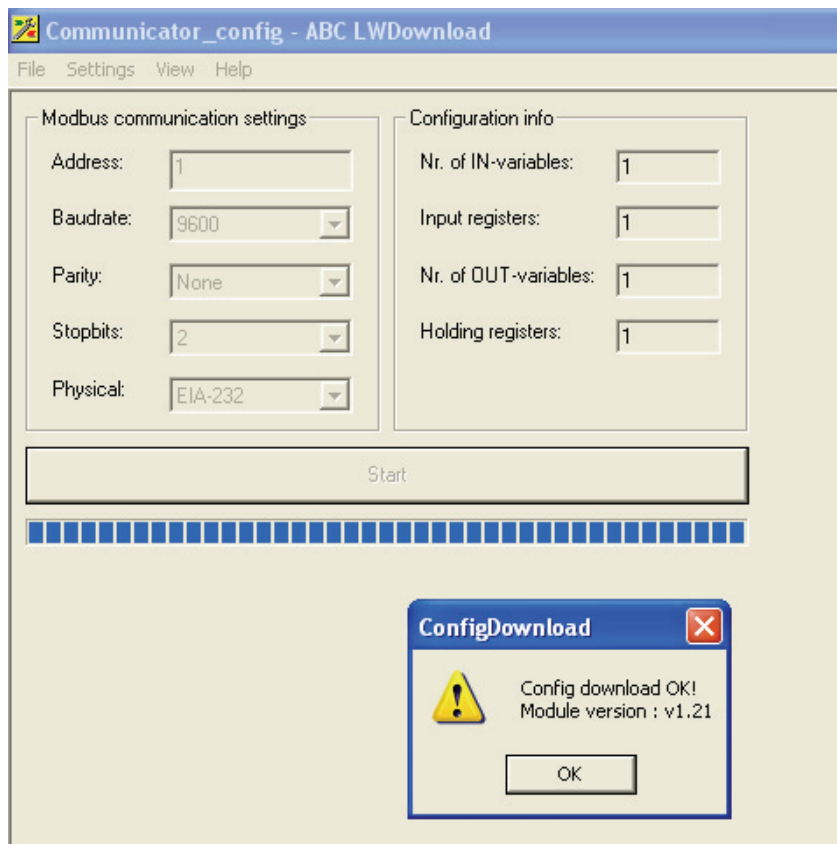


**Figure 14  The download program after successful downloading.**

## 4.3 Anybus X-gateway configuration

*The configuration of the X-gateway is described in three sections.*

1. *Firstly the X-gateway is configured by the Terminal interface.*

2. *Secondly the LonWorks configuration is done using the Anybus LWTool.*

3. *Finally the configuration is downloaded using the HMS Firmware Download TP.*

### 4.3.1 Terminal interface

*Use the HyperTerminal on a PC to configure the X-gateway. Connect a serial cable between the PC and the config port on the X-gateway. Start the HyperTerminal and open the "File" menu and click on new, choose the desired COM port and then click on OK. The following window will appear.*
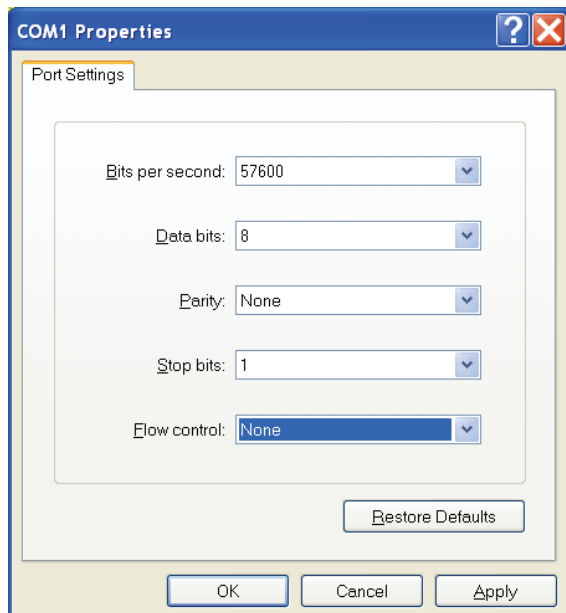
**Figure 15  Configuring the connection in the HyperTerminal.**

*Make sure the settings are identical to those shown in the window above. Alternatively download a HyperTerminal session file from the HMS website[2], double click on it and select COM port.*

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[2] www.anybus.com

*Connect and press ESC and the following menu will appear.*
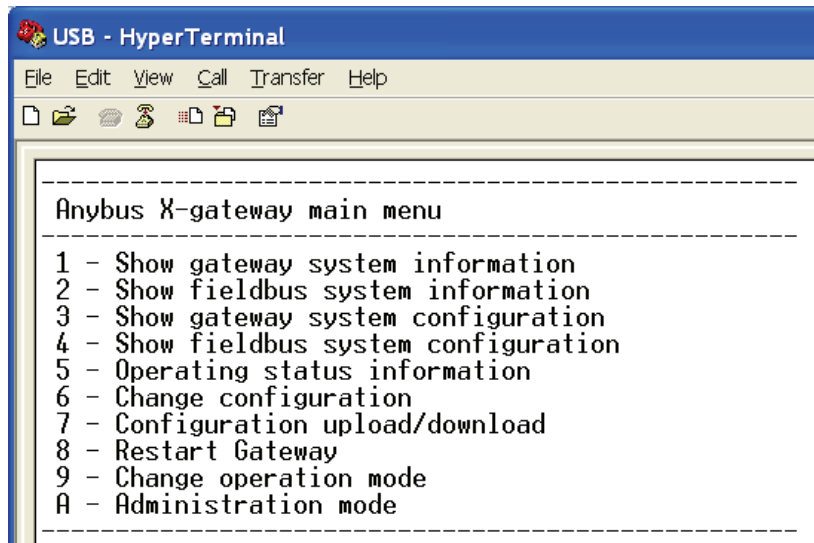


**Figure 16  Anybus X-gateway main menu.**

*Press 6 and enter the desired configuration.*

*The figure below shows an example; in this case a LonWorks Slave to Ethernet IP Slave X-gateway is used. 2 bytes of I/O data on the Ethernet-IP side is configured. The I/O data on the LonWorks side is always configured to the maximum size of 512 bytes.*
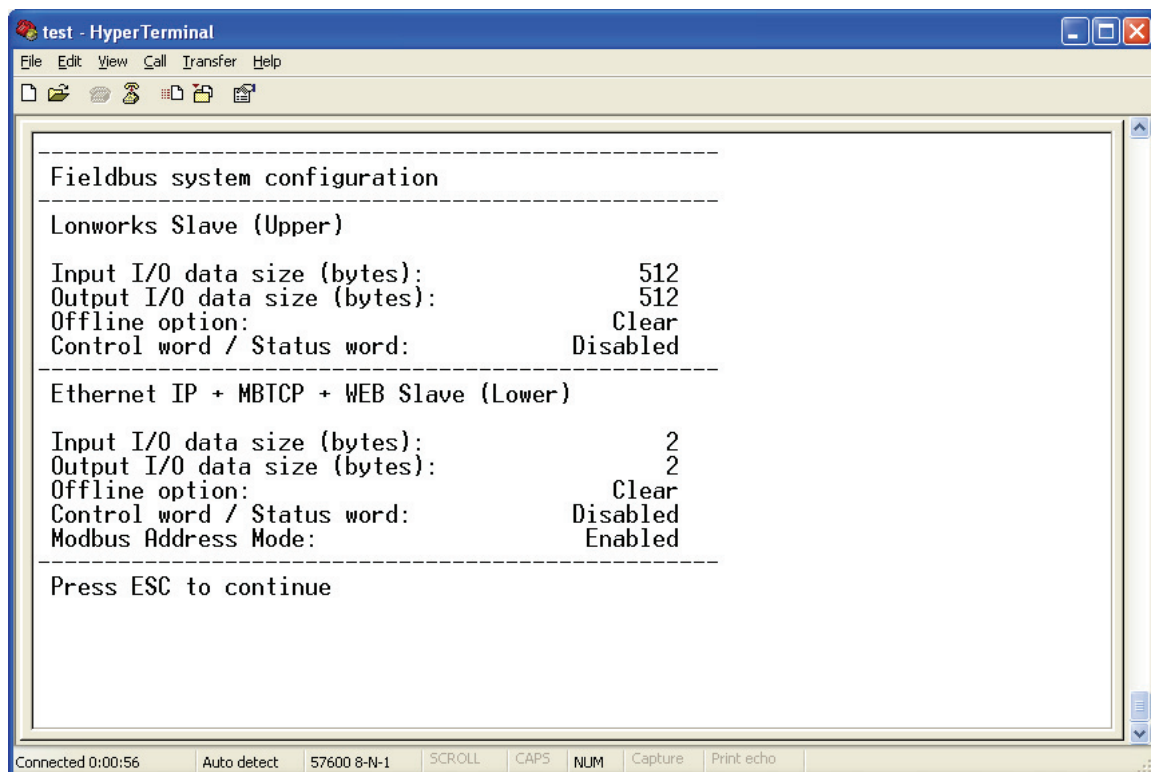


**Figure 17  The X-gateway configuration.**

### 4.3.2 Anybus LWTool

*The LonWorks configuration is done using the Anybus LWTool software.*

**1 Configuring the node properties**

*Start the Anybus LWTool to configure the Anybus X-gateway. Enter the desired name of the configuration in the ASCII identification field ❶ as seen below. The additional info field can be used, but this is optional.*
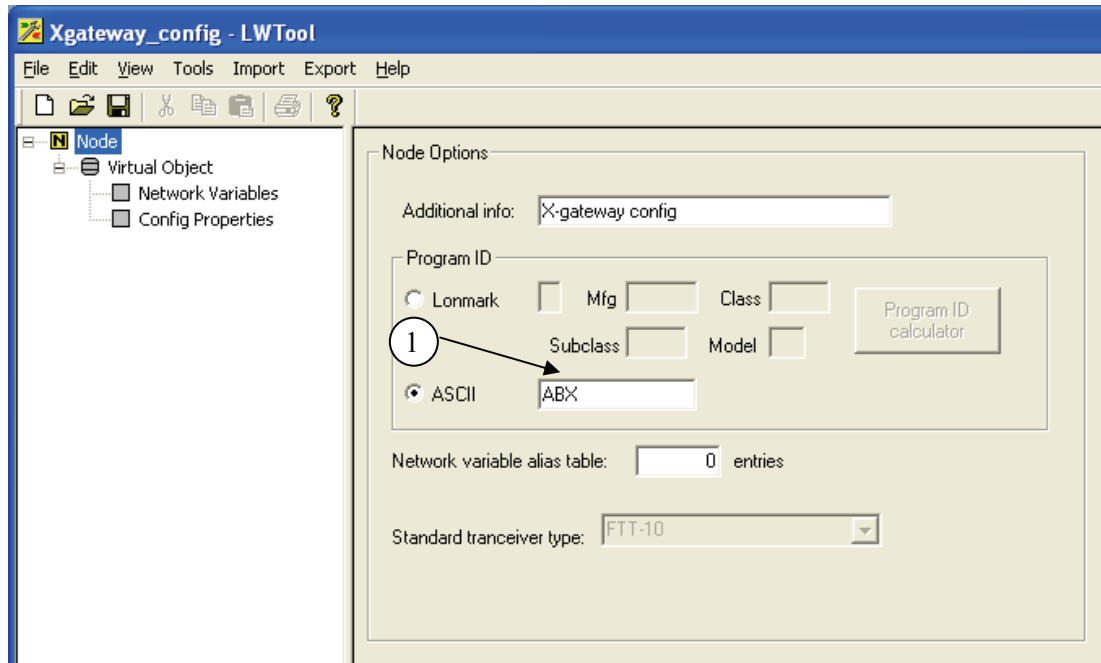


**Figure 18   Configuring the node options.**

**2 Inserting the variables**

*The next step is to add Network Variables. Right click on Network Variables and select Add Network Variable.*
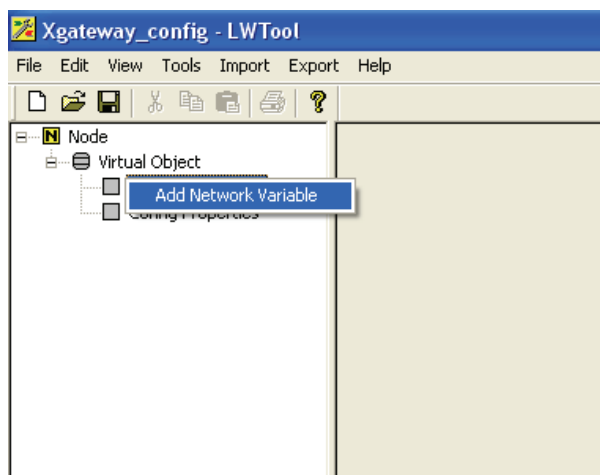


**Figure 19   Adding network variables.**

*First enter the name❶ and type❷ of the variable.*

*Then select the type of direction❸, In or Out. The Class❹ of the variable can be left unchanged as it is only used if the programID is set to LonMark. Finally the Default Service Type❺ has to be set. Using Acknowledged the node awaits an answer of the data sent.*
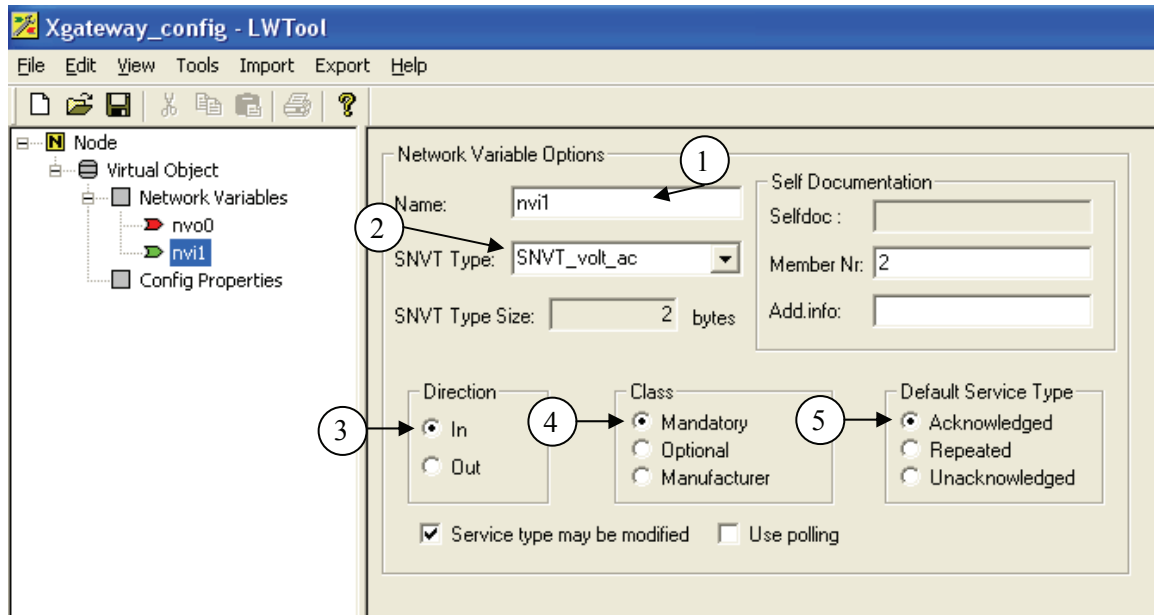


**Figure 20   Configuring the input variable.**

*In this case two variables are configured, one input SNVT_volt_ac and one output SNVT_speed are configured.*

## 3 Mapping the Modbus registers

*When using the X-gateway the Modbus mapping of the variables can be done manually or automatically. Open the Tools menu and select Set Memory Mapping to open the Modbus mapping dialogue.*
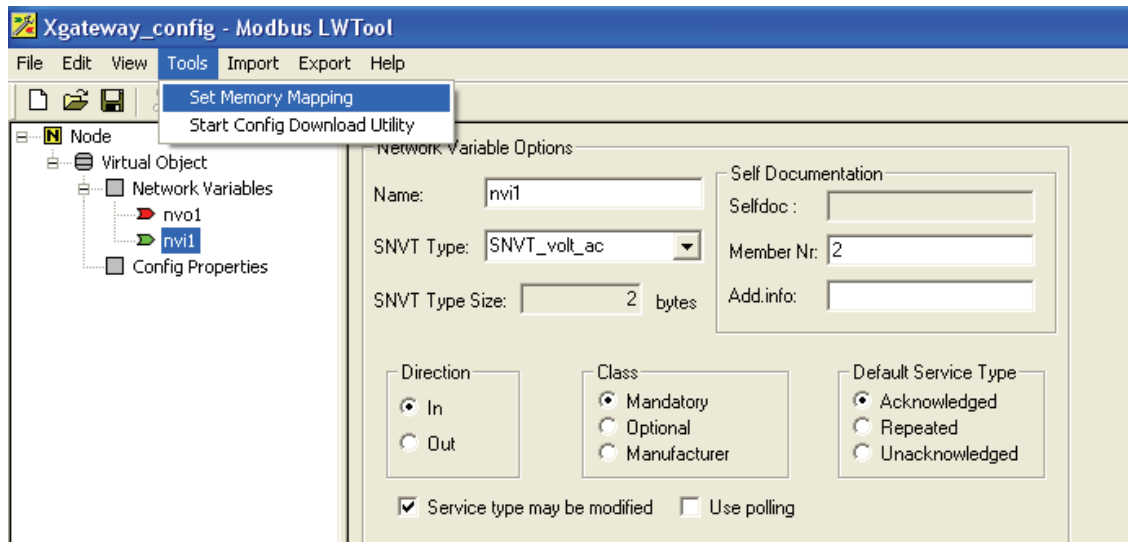


**Figure 21  Opening the Set Memory Mapping dialogue.**

*In this case Autogenerate is used by clicking the Autogenerate Memory Mapping button, but the mapping can be done manually if desired.*
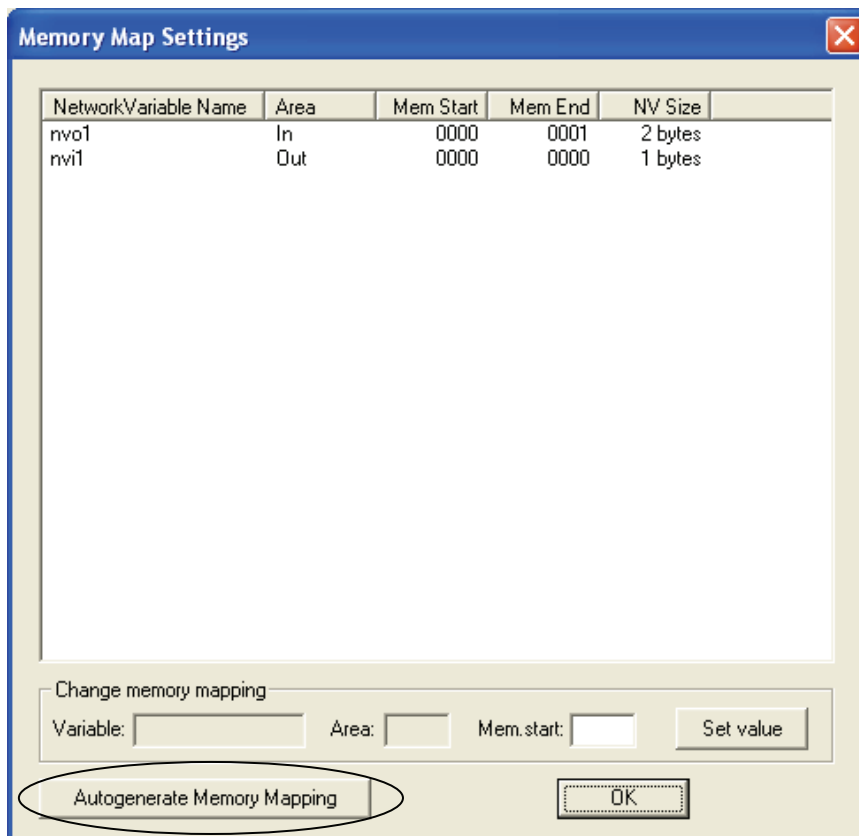


**Figure 22  Setting the Memory Mapping.**

# 4 Exporting the configuration file

*The next step is to export the configuration file. Open the Export menu and select Configuration file.*
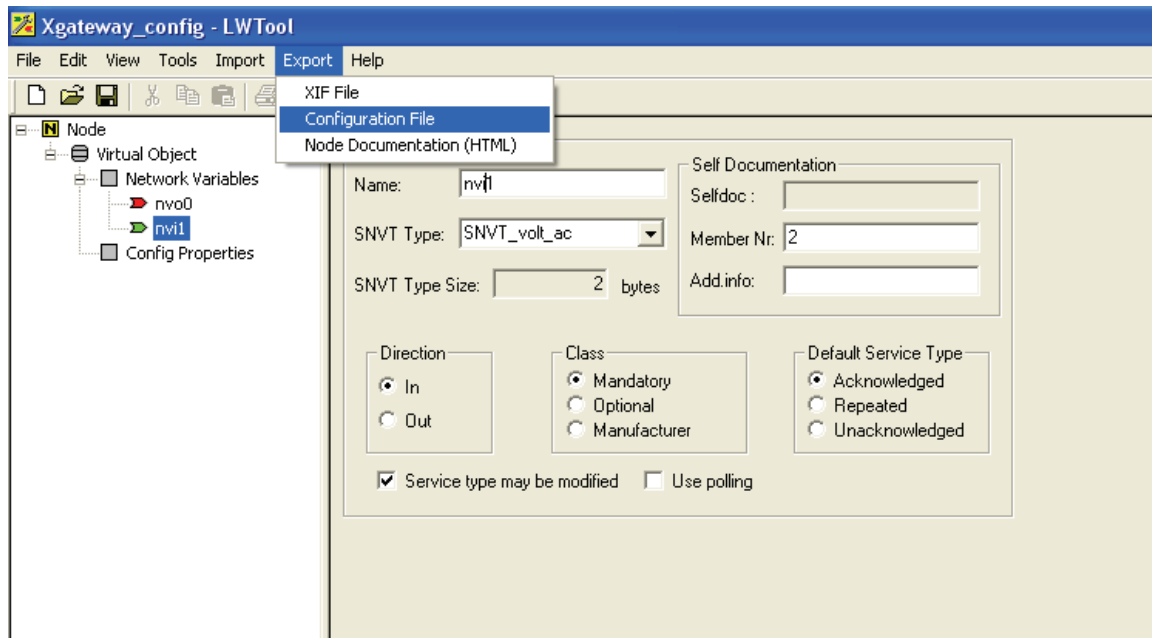


**Figure 23  Exporting the Configuration File.**

*Name the configuration file and click on save.*
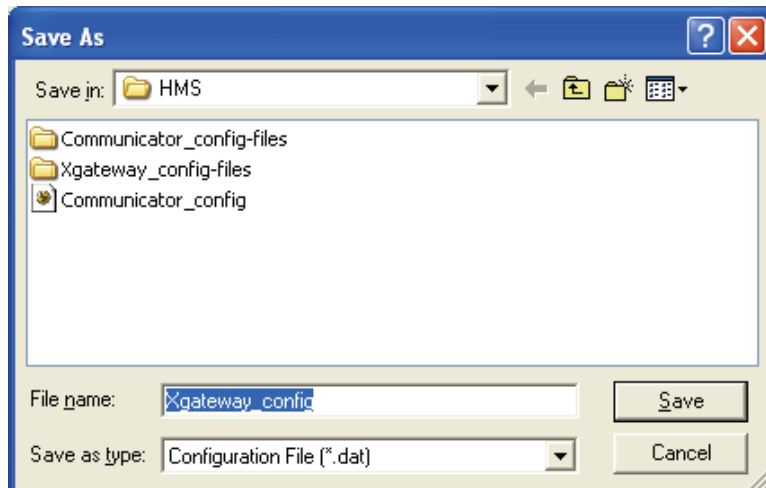


**Figure 24  Saving the configuration file.**

### 4.3.3 Configuration download

*The next step is to download the configuration.*

**1 Starting the Firmware Download program.**

*To download the configuration, start the HMS Firmware Download TP program.*
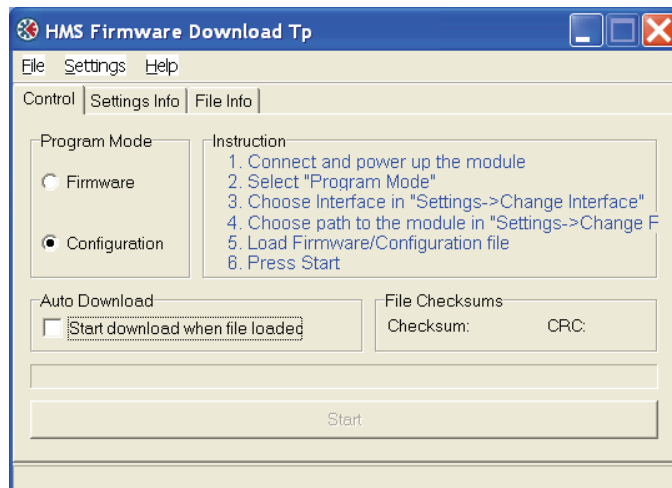


**Figure 25   Viewing the Firmware Download window.**

**2 Setting the Interface**

*Then select the desired Interface. Open the Settings menu and select Change Interface.*
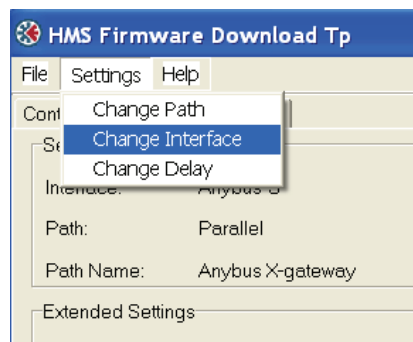


**Figure 26   Opening the Change Interface dialogue.**

*In this case the X-gateway is selected.*
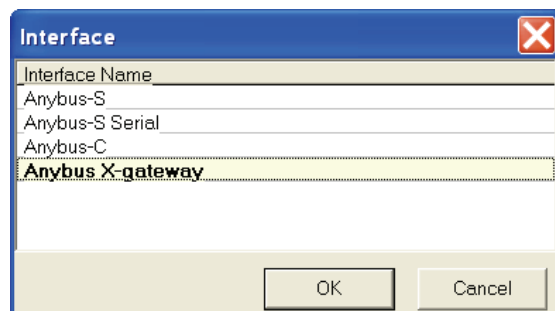


**Figure 27   Selecting the type of Interface.**

## 3 Setting the Path

*Open the settings menu and select Change Path.*
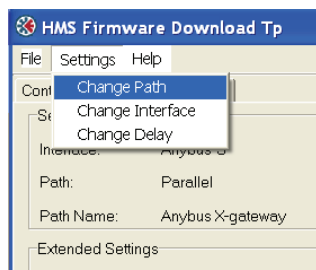


**Figure 28   Opening the Path dialogue.**

*Firstly select the Fieldbus Interface as seen below.*
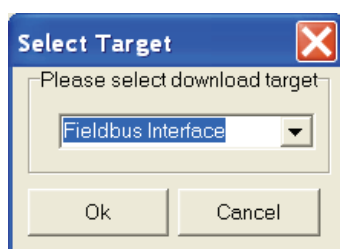


**Figure 29   Selecting the download target.**

*In this case the Ethernet Transport Provider is used since the X-gateway has an Ethernet connection. In other cases you can use the serial transport provider and connect a serial cable to the config port on the X-gateway. If you do not have configured any transport path before click on the Create button and follow the steps in the dialogue windows.*
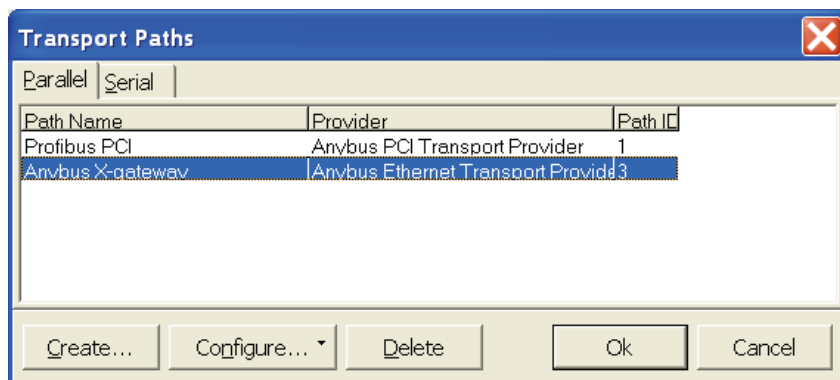


**Figure 30   Selecting the type of transport path.**

*Then open the Settings Info tile and make sure the settings are OK.*



**Figure 31   Checking the download settings.**

## 4 Downloading the configuration file

*After checking the settings, open the File menu and select load to open the configuration file to be downloaded.*
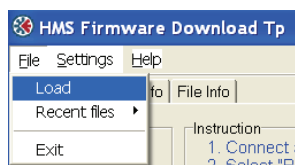


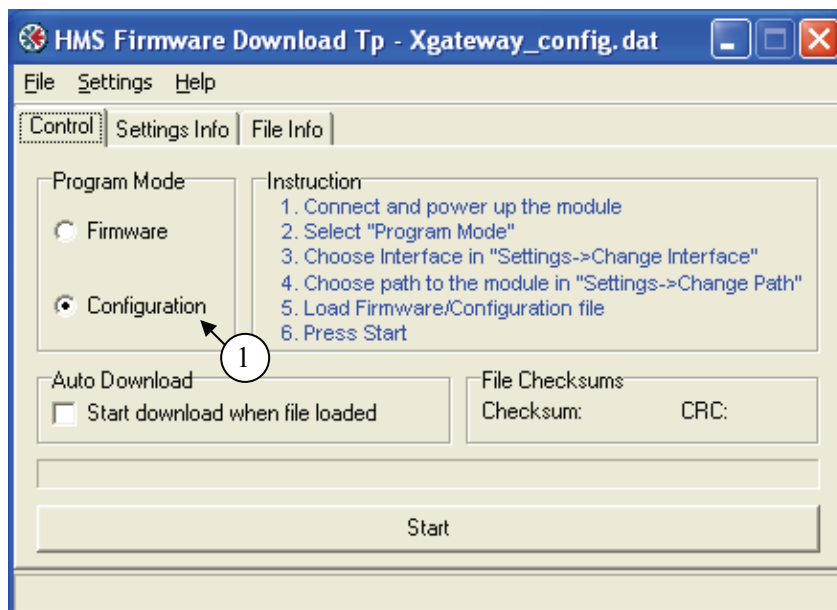**Figure 32   Opening the Load dialogue.**



**Figure 33   Selecting program mode.**

*Make sure the Program Mode is selected to Configuration❶. Then press the Start button. In the dialogue appearing also select the correct slot, the power connector is located at the upper slot.*

# 5 LonWorks configuration

To configure the LonWorks network start the LonMaker for Windows. In this case a test network consisting of the Anybus Communicator and the Anybus X-gateway has been used. Also one input and output variable is configured for both devices.
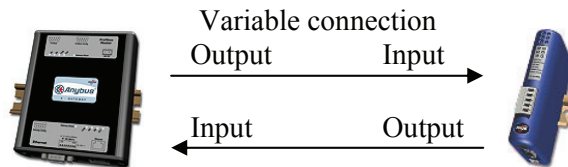


**Figure 34   Variable connection.**

**1 Configuring a new network**
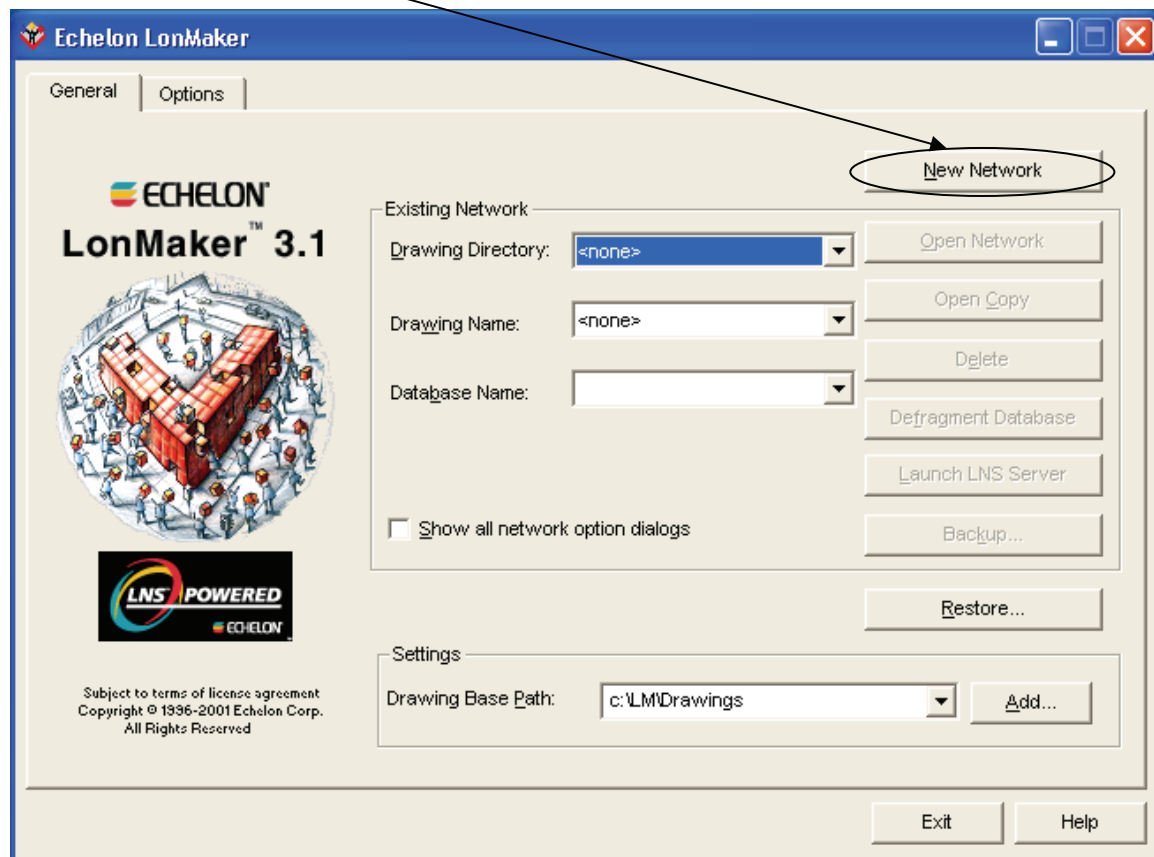
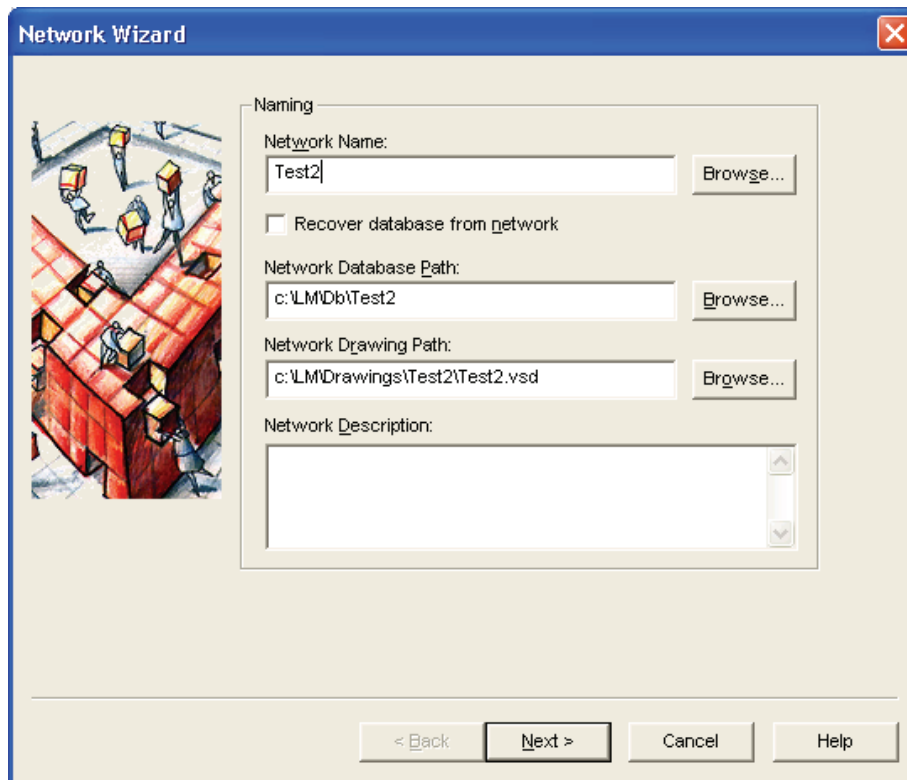Click on the New Network button.



**Figure 35   Creating a new network.**

**Figure 36   Configuring the network properties.**

Enter a name for the network and change the paths if necessary. Then click on next.

## 2 Configuring the network properties
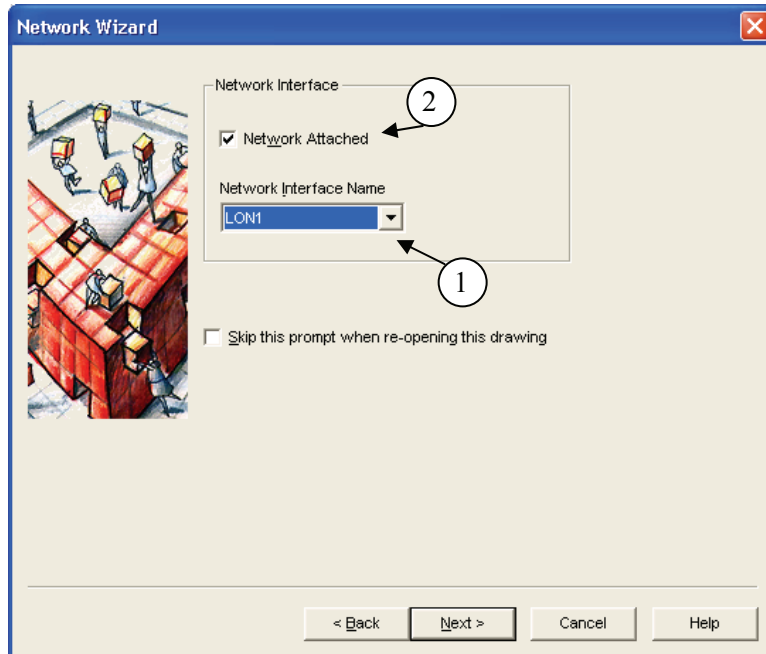


**Figure 37   Configuring the Network Interface.**

Chose the LON Interface❶ to be used. The name is depending on what kind of interface is installed on the PC, for example USB-stick, PCI-card etc. If the PC is connected to the network, mark the box Network Attached❷. Then click on next.
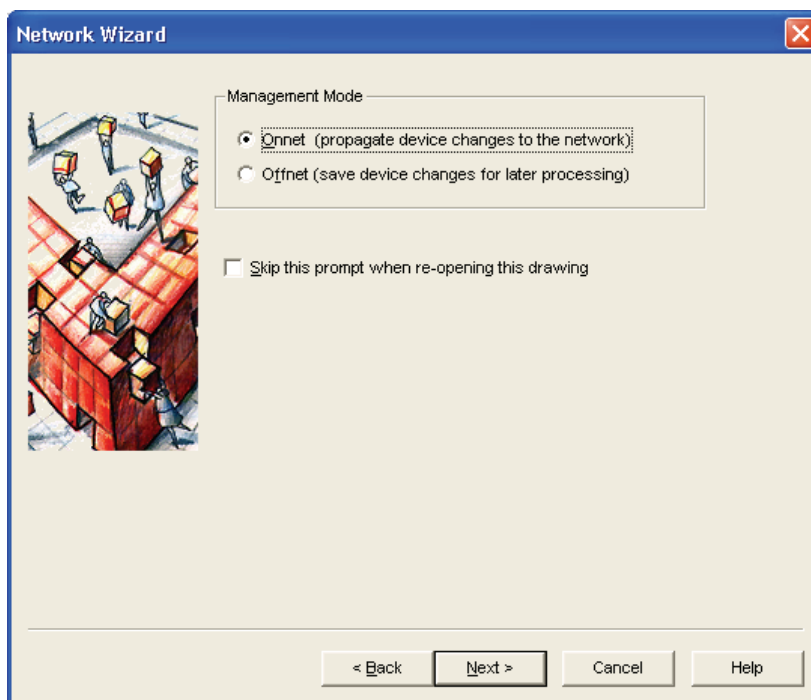


**Figure 38   Selecting Management Mode.**

Select Onnet or Offnet management mode and click on next. Using Onnet changes has have immediate effect on the device.

## 3 Selecting the Plug-Ins
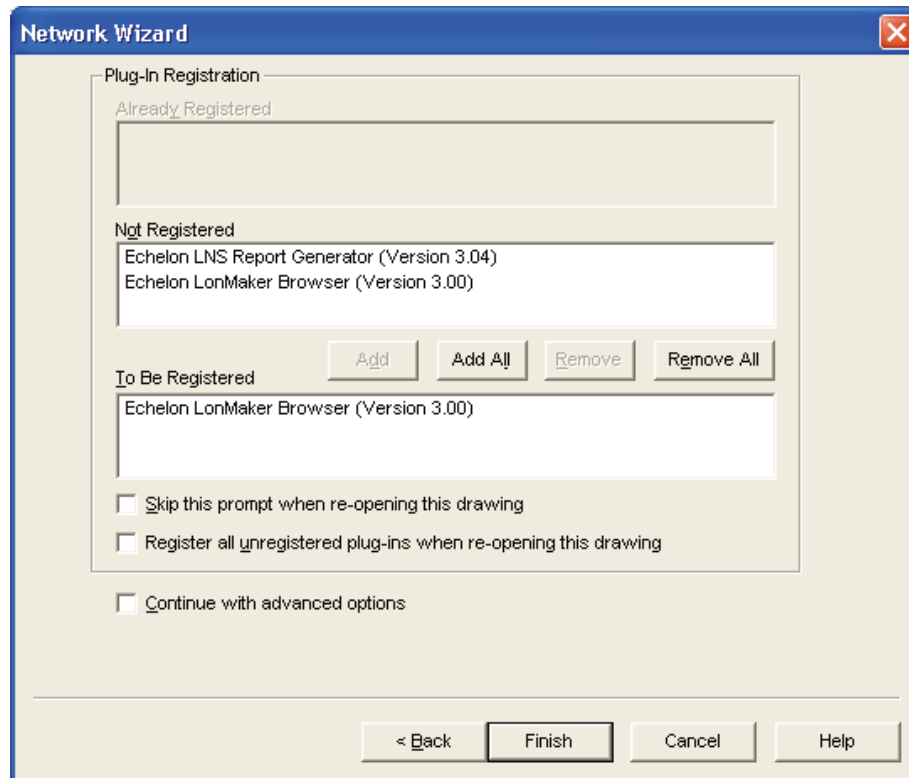


**Figure 39   Selecting Plug-Ins to be used.**

In the dialogue window the Report Generator can be removed if not used. In other cases just click on next.

## 4 Adding devices

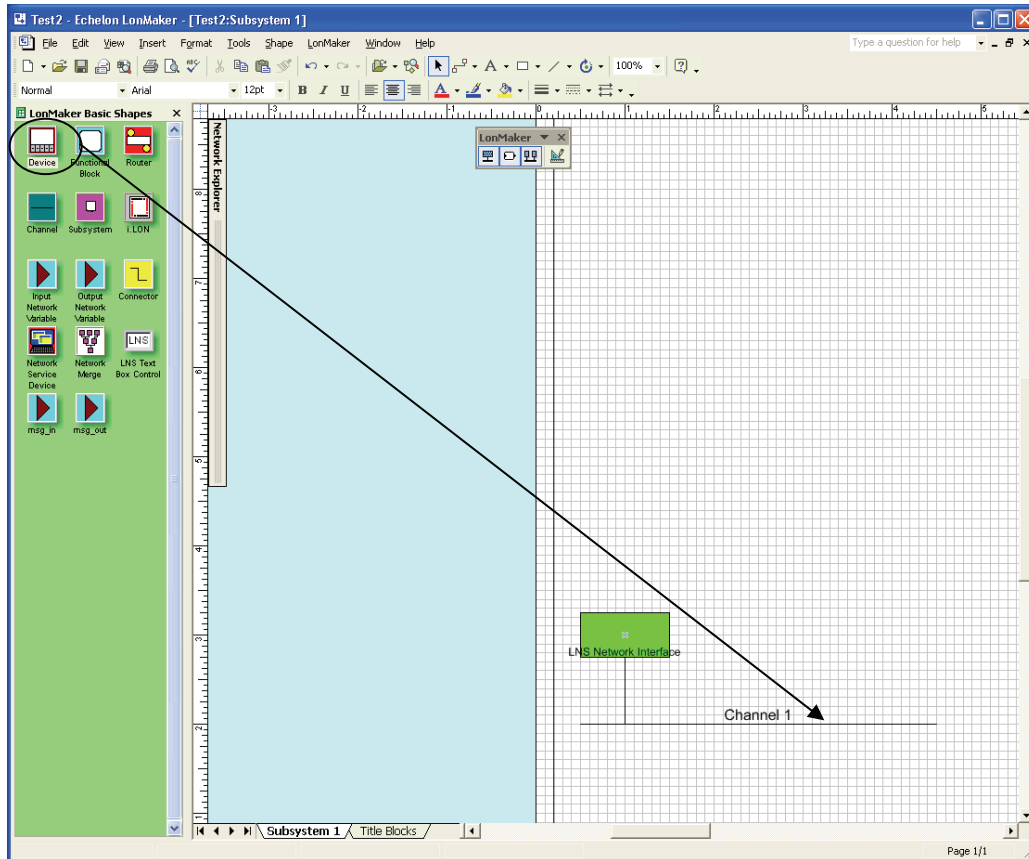The LonMaker window with empty network. Drag and drop the Device icon to add a new device.



**Figure 40   Adding devices.**

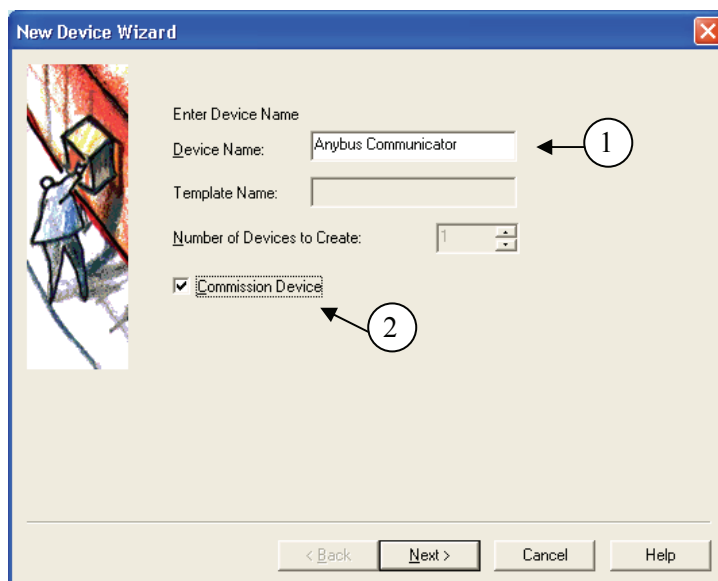In the next dialogue window enter a Device Name❶ and mark the box Commission Device❷.
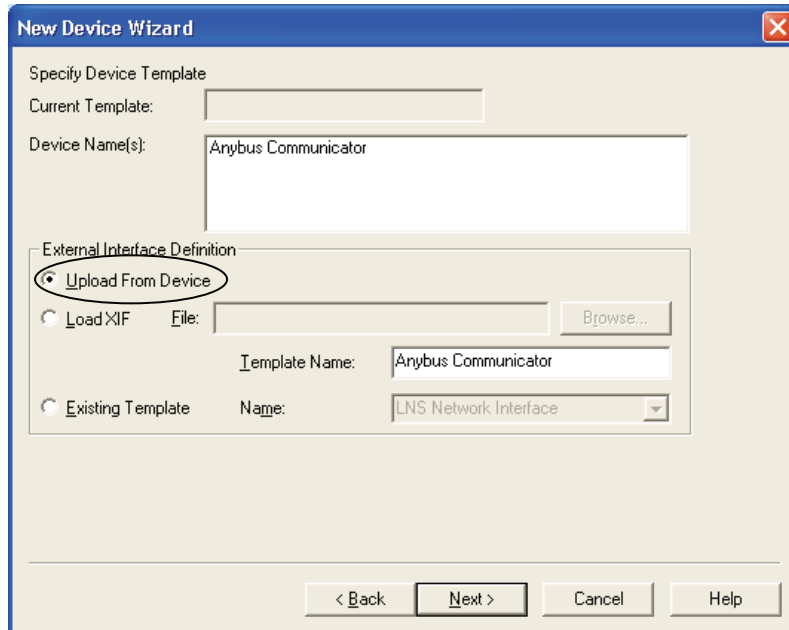


**Figure 41   Naming and Commissioning the device.**

## 5 Device properties



**Figure 42   Setting the Interface Definition.**

Next select how the Interface Definition is to be set up. In this case Upload From Device is used. This loads the definition from the node.

Using Load XIF the definition is retrieved from the selected XIF-file. This alternative can be used when setting up the configuration offline.

Using an existing template can be useful when installing several nodes of the same type. In that case the nodes will be configured for the same variables, but the linking can be made different.
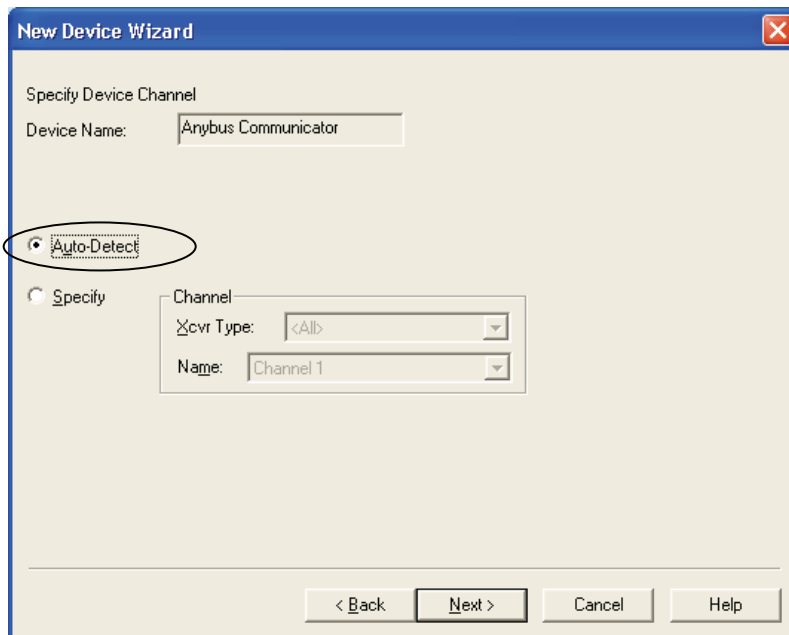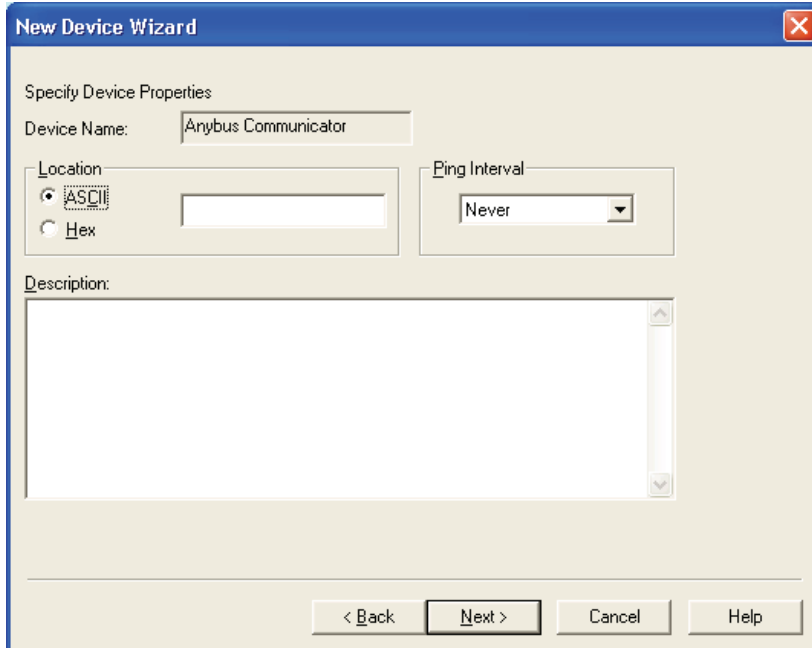


**Figure 43   Specifying the Device Channel.**

In the above dialogue select the Channel the device is to be connected to. Auto-Detect is used in this case.
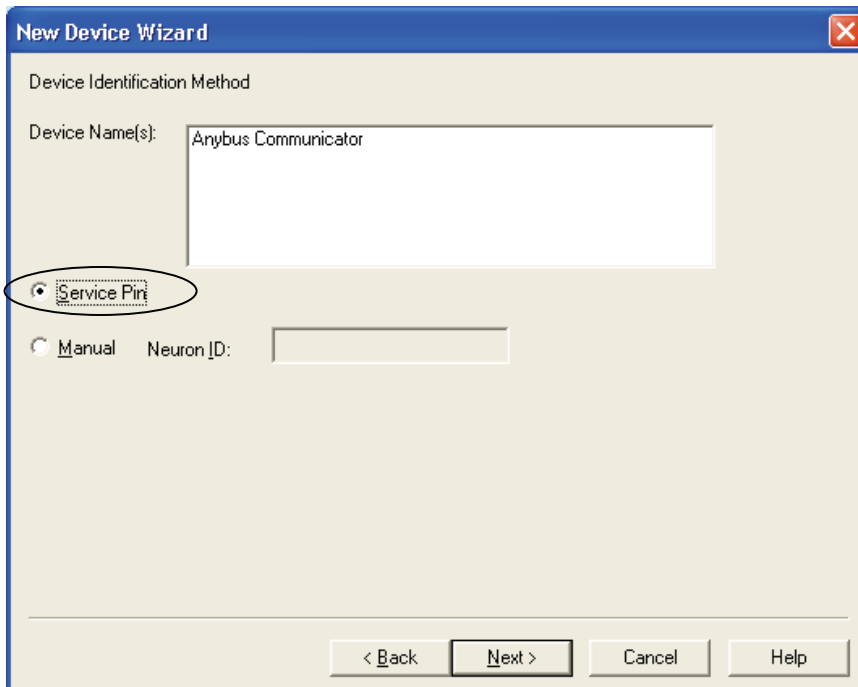
## 6 Specifying identification



**Figure 44   Specifying the Device Properties.**

If you want to specify the physical location for better understanding, it is possible to enter a description in the Location field. In other cases, just click on the next button.



**Figure 45   Selecting the method of  identification.**

Select to identify the device by Service Pin or Manually. It is recommended to use the Service Pin.

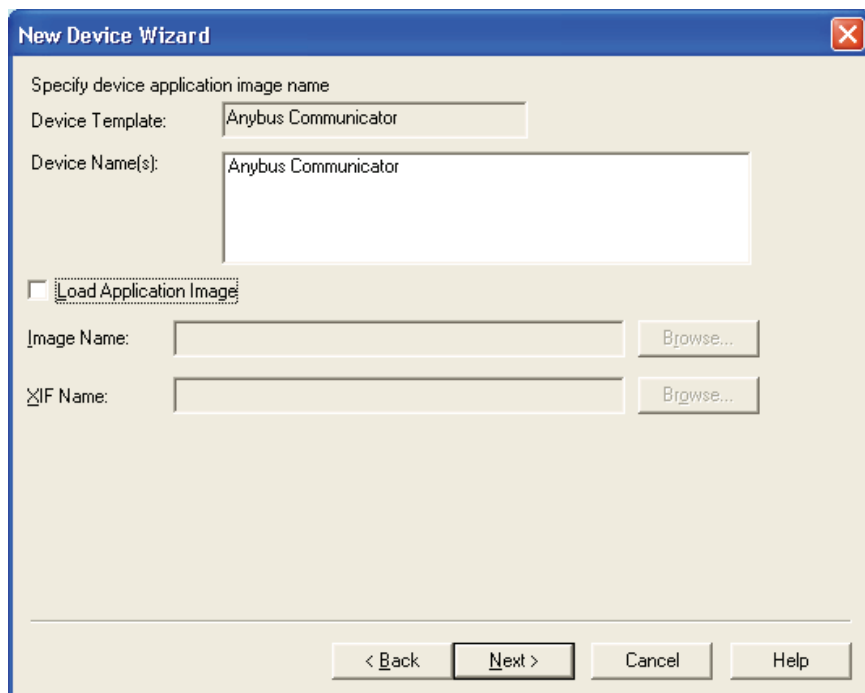# 7 Specifying the initial state



**Figure 46  Loading the Application Image (not applicable using the Anybus device)**
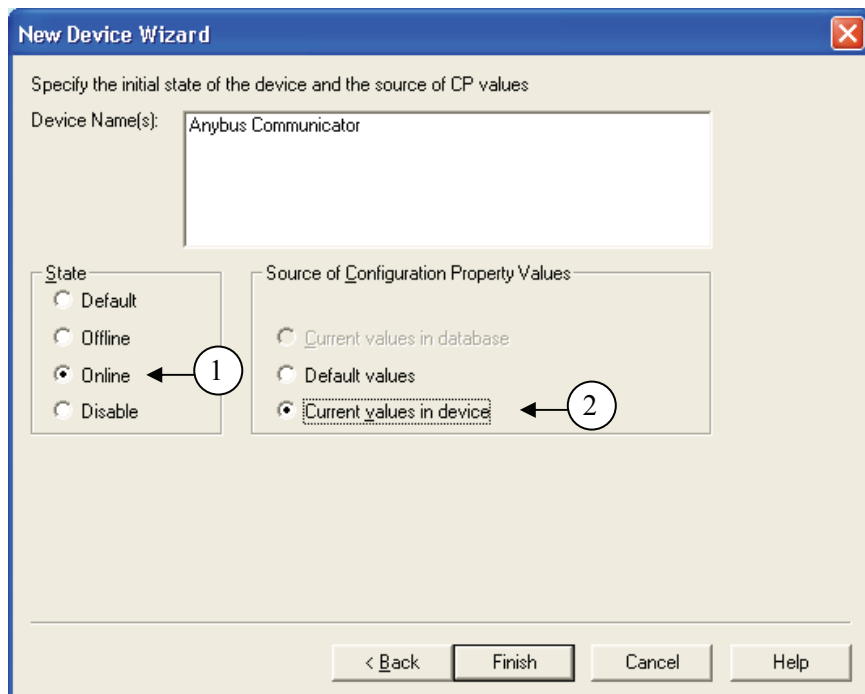
Click on next in this dialogue.



**Figure 47  Specifying the initial state of the Anybus device.**

In this dialogue you can enter the initial State of the Config Properties and the Source of the Configuration Property Values. In this case Online❶ and Current values in the device❷ is used. This means the device will go online after a restart and will use the current values in the device. Then click on Finish.
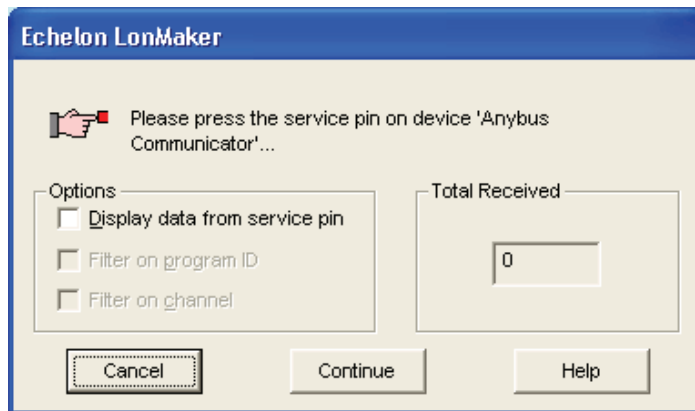
## 8 Identifying the device



**Figure 48  Identifying the device.**

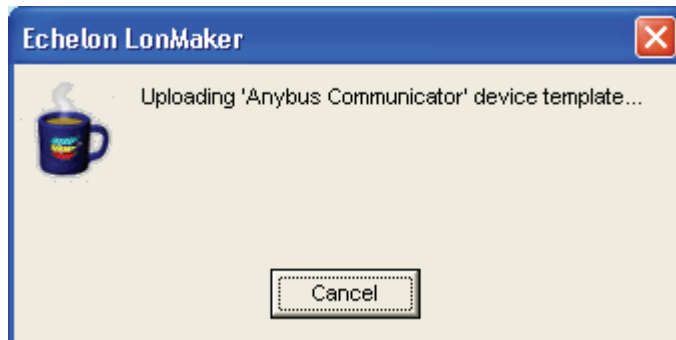Press the service-pin and several windows will appear.



**Figure 49  Uploading the device template.**

The window above is the last window shown in the Service-pin dialogue. After a successful upload the network will be updated.

# 9 Creating graphical shapes for the variables

After adding the Anybus X-gateway as well, the network will now look like below. The next step is now to link the variables.
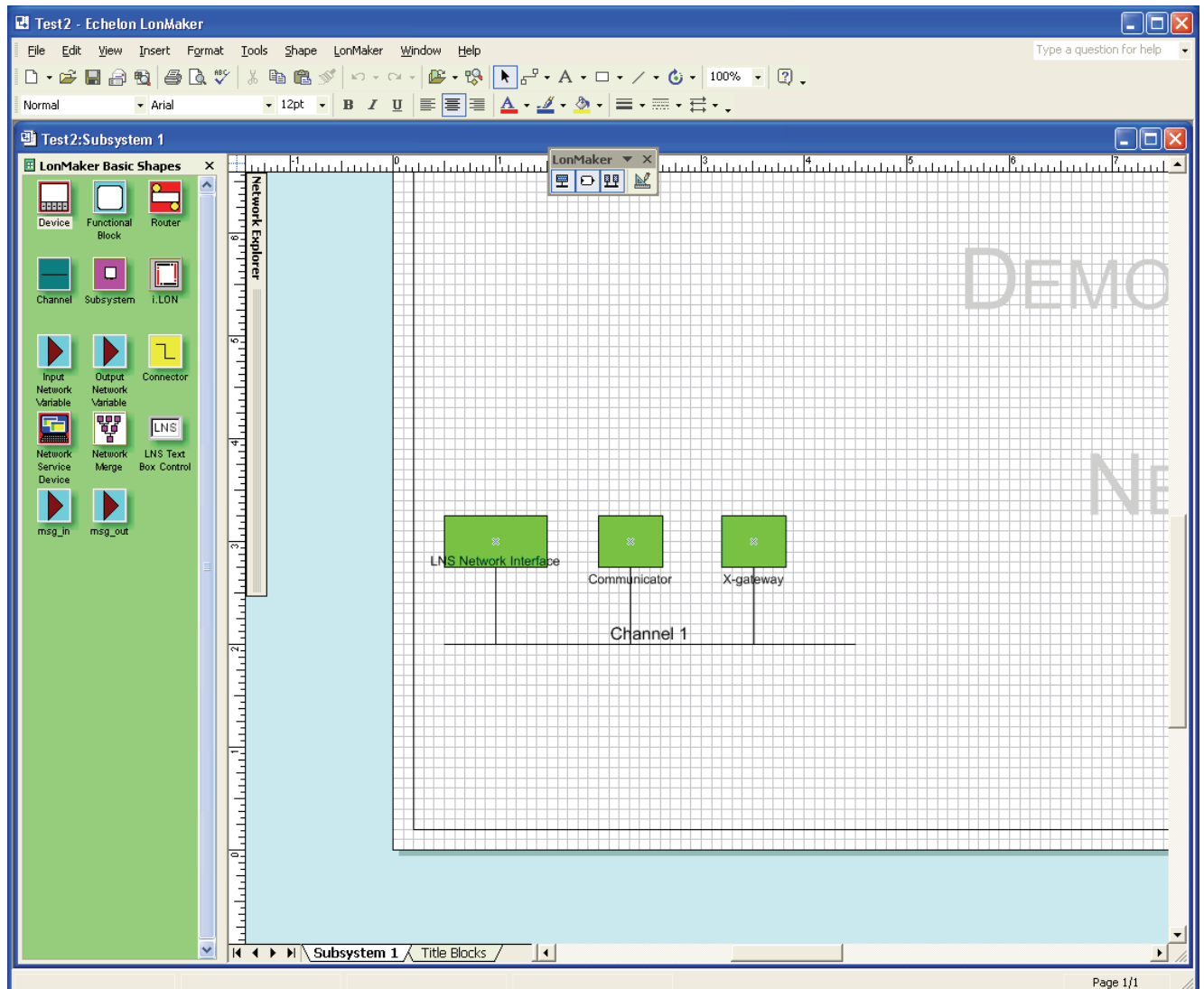


**Figure 50  Viewing the network after the Anybus Communicator and X-gateway has been added.**
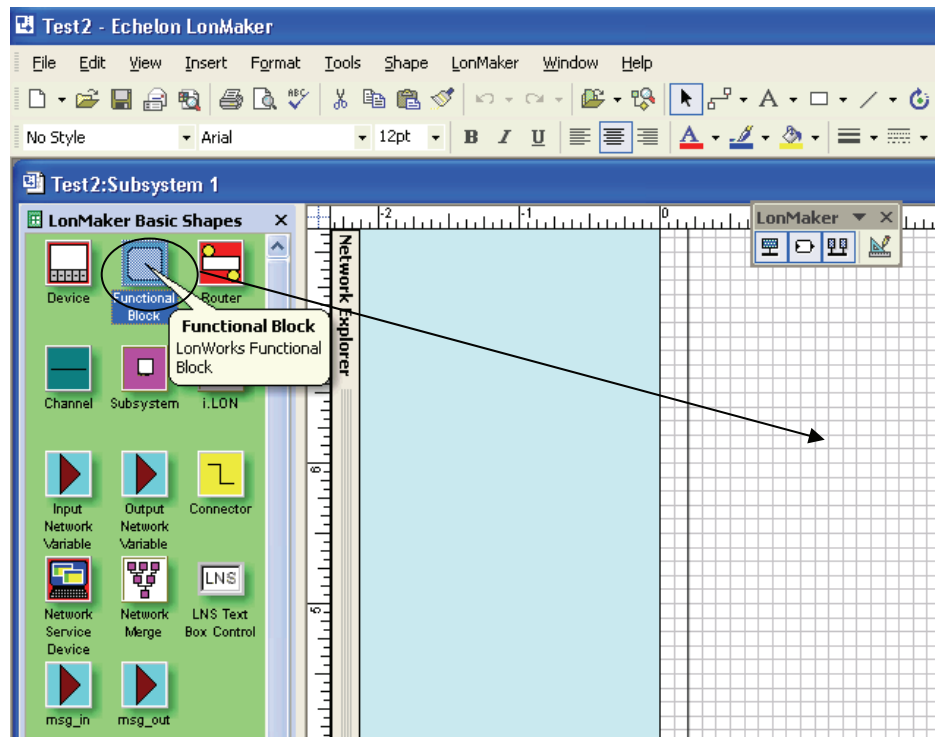
**Figure 51  Inserting the Functional Block.**

Drag and drop the Functional Block to the network. This will show the network variables for the device selected.
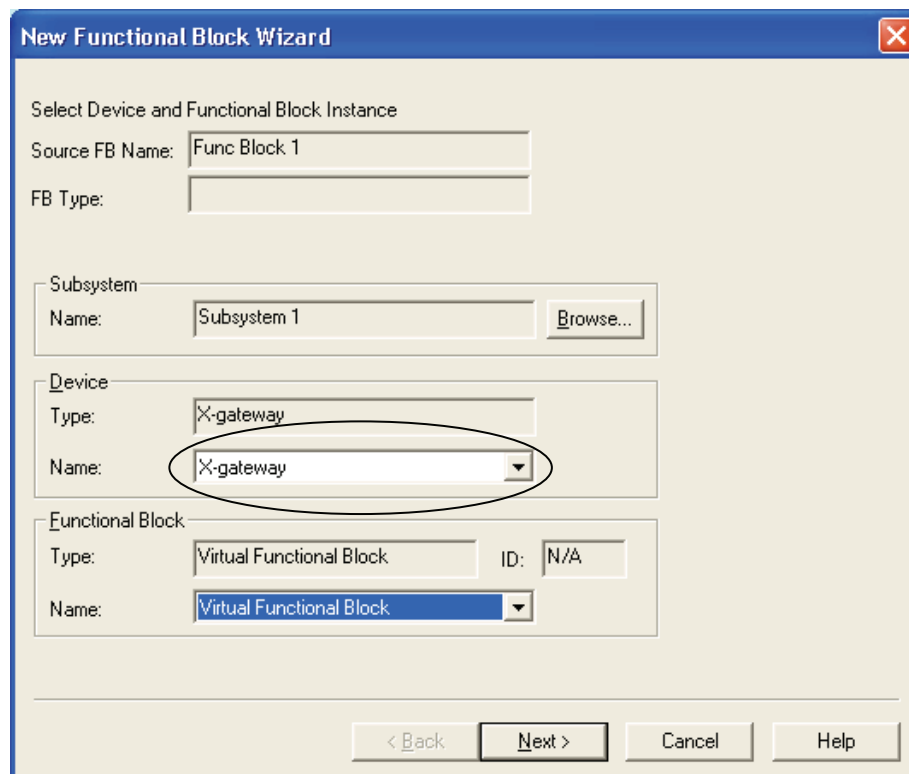


**Figure 52  Selecting the name of the device.**

The window above will then appear. Select the name of the device, in this case X-gateway.

**Figure 53  Configuring the properties of the Functional Block.**

Enter a name for the Function Block❶ and mark the box Create shapes for all network variables❷. The shapes shows the network variables, SNVT:s, graphically. Perform this sequence for all devices on the network.
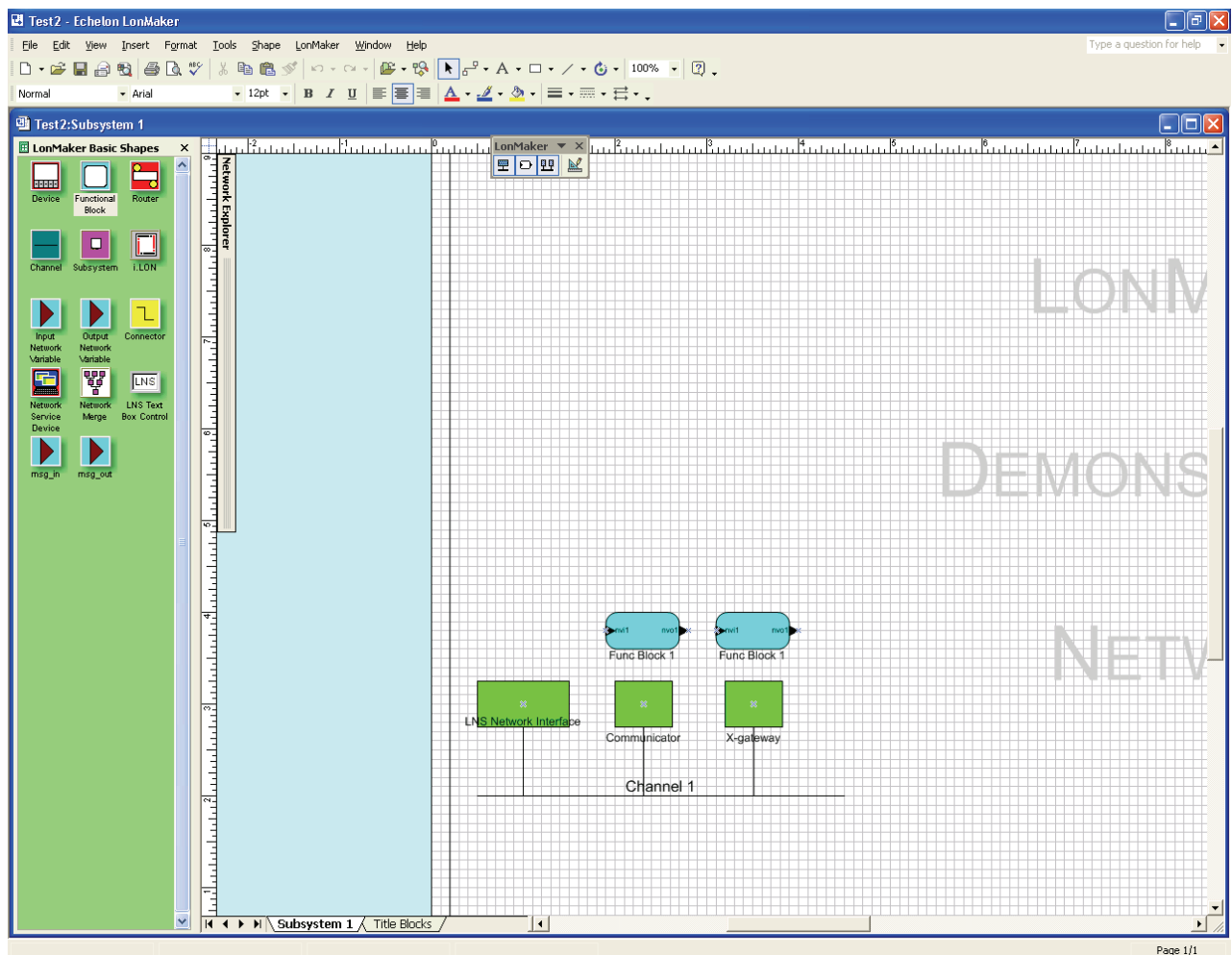
## 10   Linking the variables



**Figure 54   Viewing the network after inserting the Functional Blocks.**

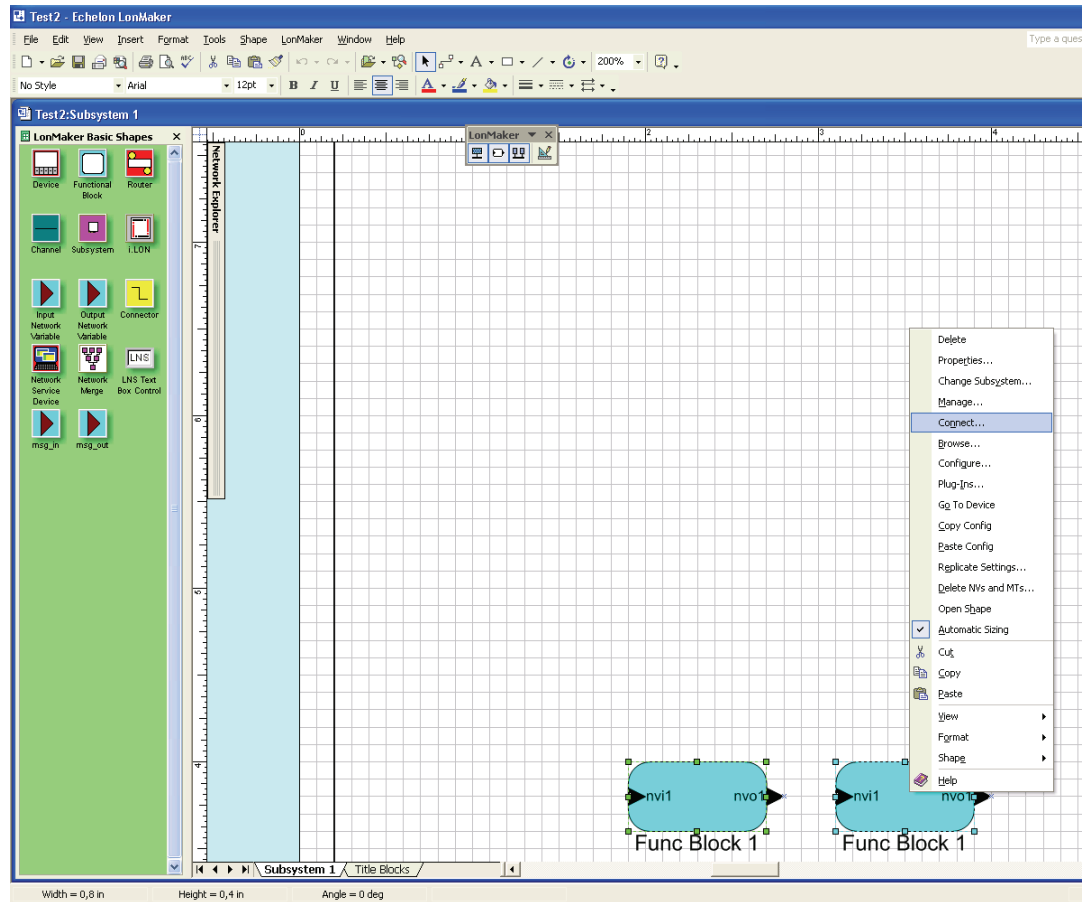The network after both function blocks has been added.

**Figure 55  Opening the Connect dialogue.**

The next step is to connect the variables. Mark the Function Blocks and right click and select Connect. This will make it possible to link the variables associated with the Function Blocks selected.
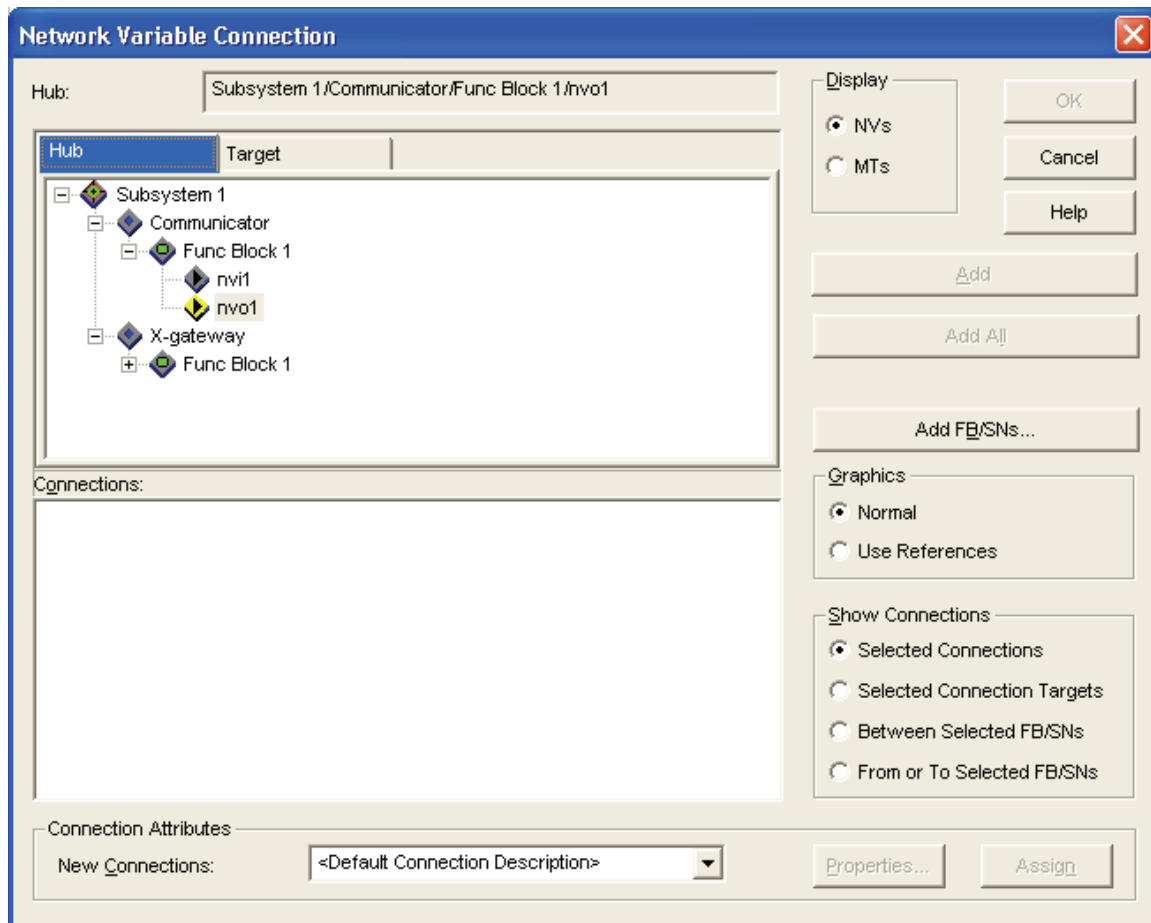
## 11 Configuring the linking



**Figure 56  Configuring the Hub, the source varaible.**

Begin with selecting the hub, the output or if you like the source variable. This will be linked to the selected Target, the input variable.
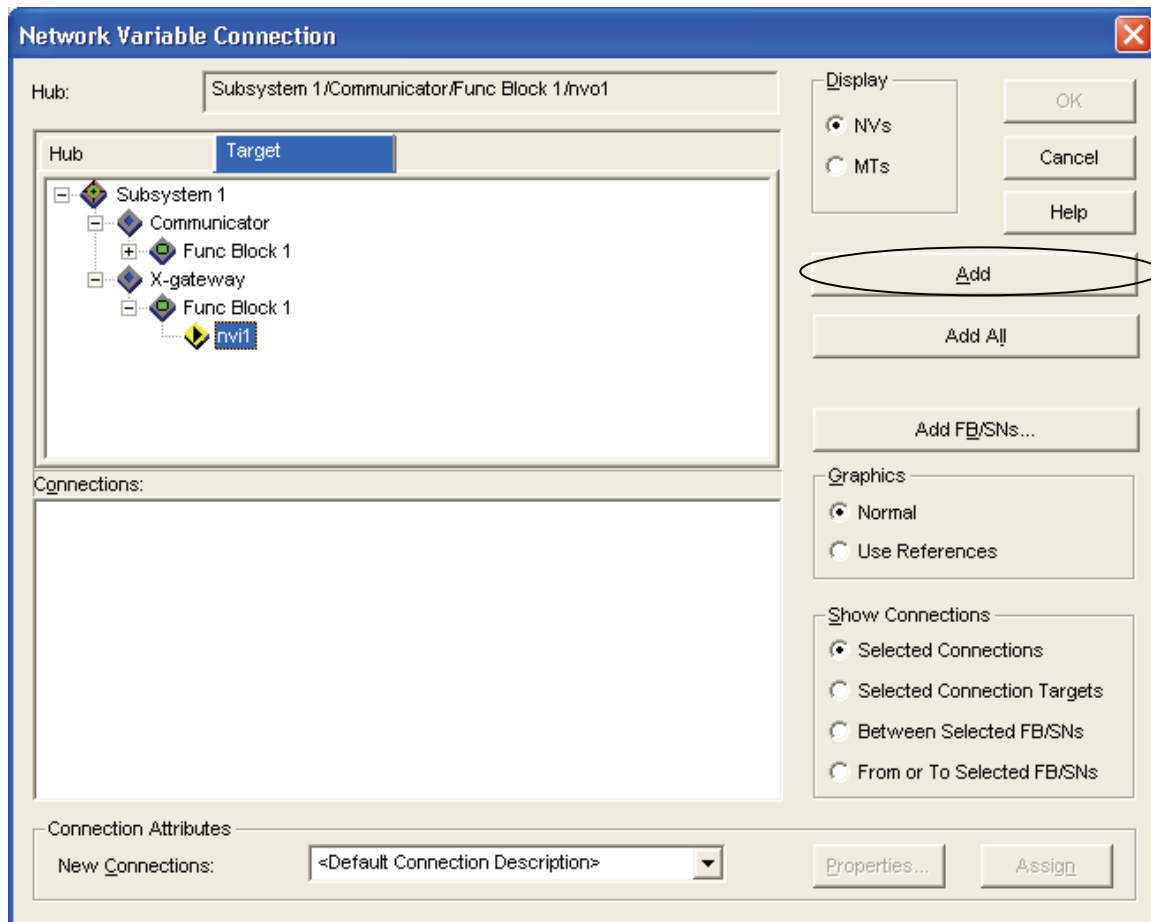
**Figure 57  Configuring the Target, the destination variable.**

Then select the desired Target, the output variable. To execute the linking, click on Add. Repeat the procedure for the rest of the network variables. End by clicking on OK.
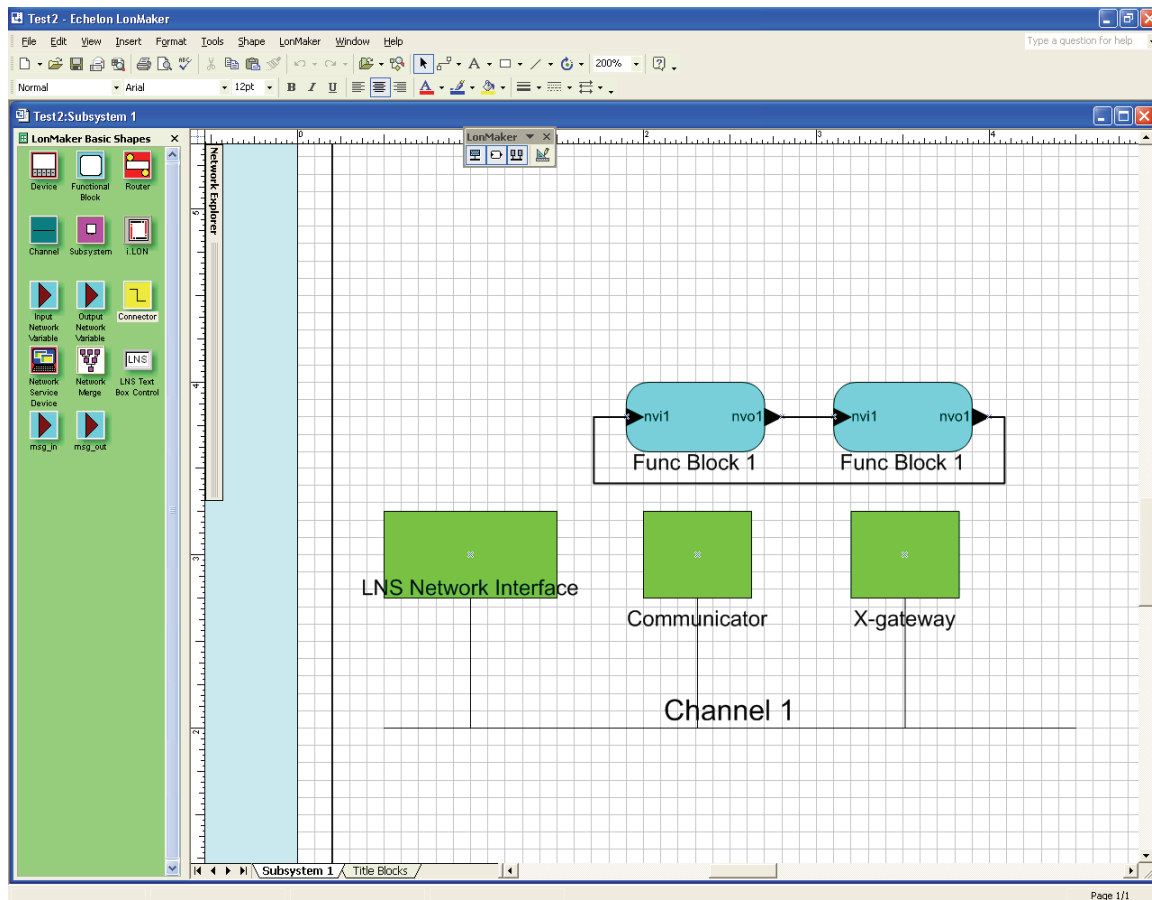
**Figure 58   Viewing the network after the linking has been done.**

The network will now look like above. The network variables are linked according to the figure. The network is now ready to be tested.

**Note:** It is important to make sure the network configuration is saved correctly before commissioning the network. Restart the device or right click on the node in LonMaker for Windows and select Manage. Then press offline and then online. If the configuration is saved correctly the node will go online again, otherwise the node will be red marked.

The LonMaker for Windows saves all changes to the network if using the online mode. The procedure for saving the configuration is going offline, downloading changes then sending an online message. If this online message is missed the configuration will not be saved. When trouble shooting this can in some cases be the problem.

# 6 Testing

The testing of the network can be done after finishing the configuration. In this case the Anybus Communicator connected to the X-gateway is used for test purpose. At first some values are written to the output variables using ModScan32. The input variables are then monitored using the Browse function in LonMaker for Windows.

## 6.1 Writing values using ModScan32

At first some values are to be written to the LonWorks variables in the Anybus X-gateway and the Anybus Communicator. The easiest way to write values is using ModScan32 or a similar program. This assumes the X-gateway supports Modbus on the other network side.
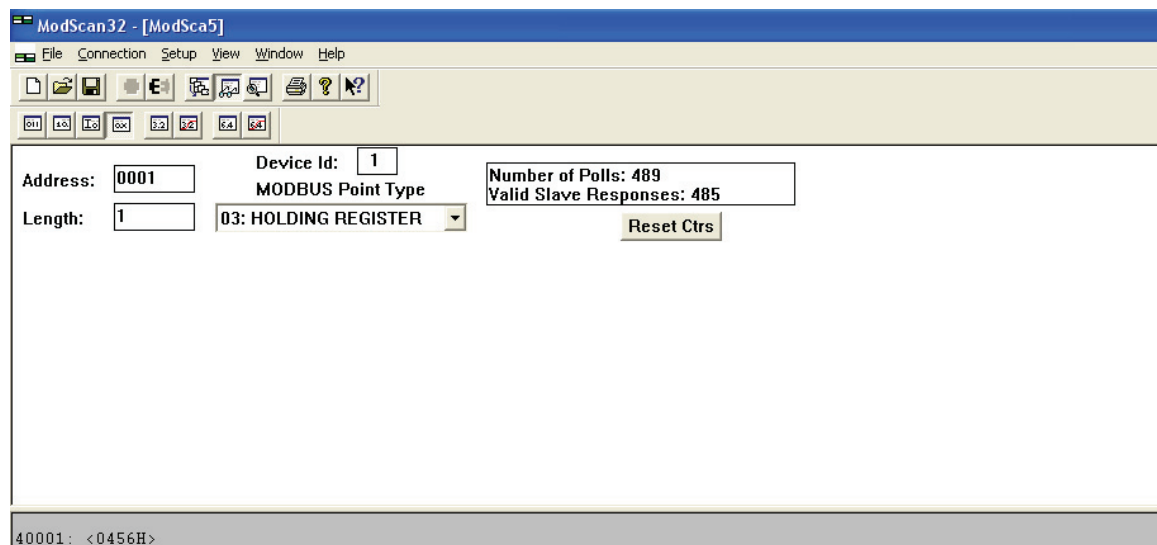


**Figure 59 Writing values to the Modbus holding register of the X-gateway.**

At first the output variable of the X-gateway is written. Open the Connection menu and select connect. Using an X-gateway with Ethernet connection, as in this case, it is possible to connect using the Remote TCP/IP Server. Then write a value to the output variable at holding register 1.
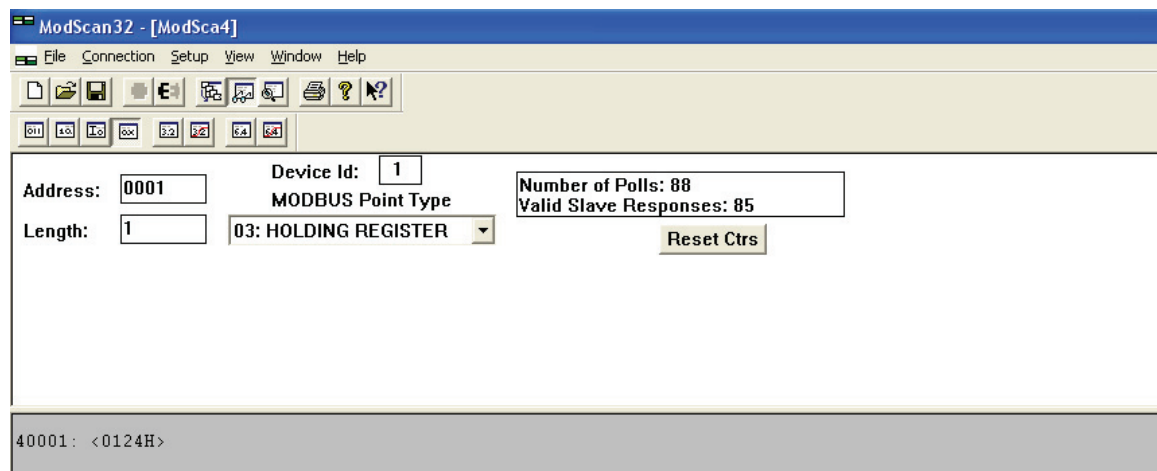


**Figure 60 Writing values to the Modbus holding register of the Communicator.**

Similarly the Anybus Communicator is connected to the ModScan32 software. In this case select the desired COM-port and connect. Then write a value to the output variable at holding register 1.

## 6.2 Monitoring using LonMaker for Windows

Switch to LonMaker for Windows again. Mark the devices of interest, right click on one of them and select Browse. This opens up the monitor function.
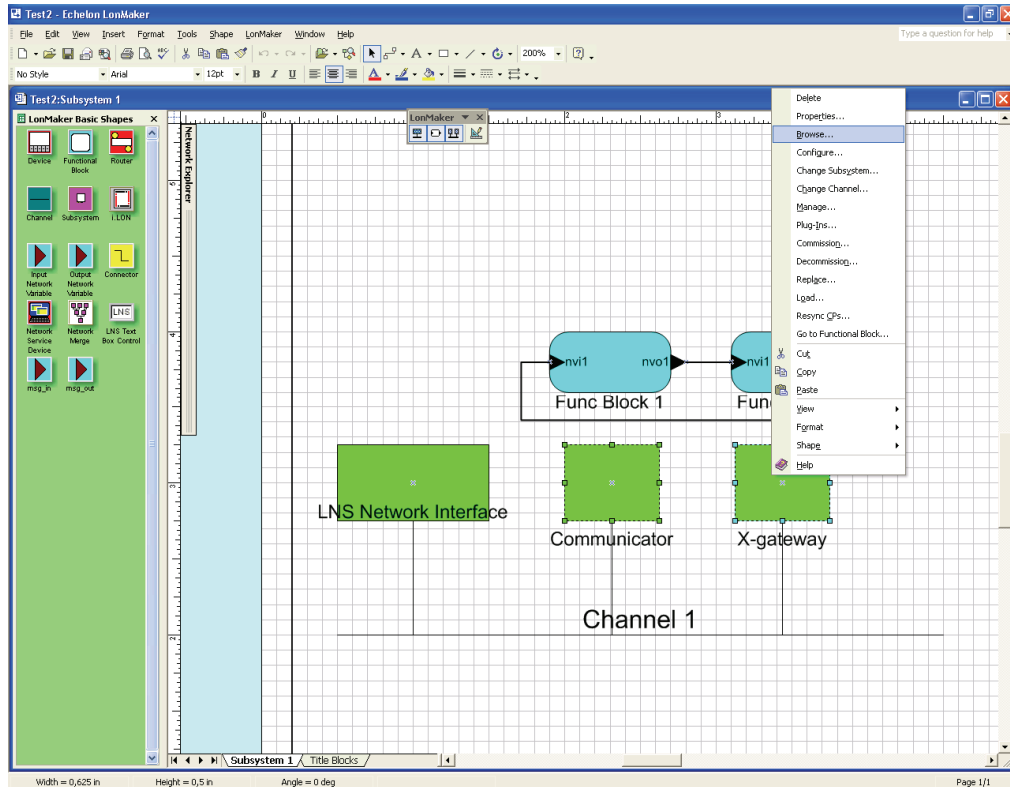


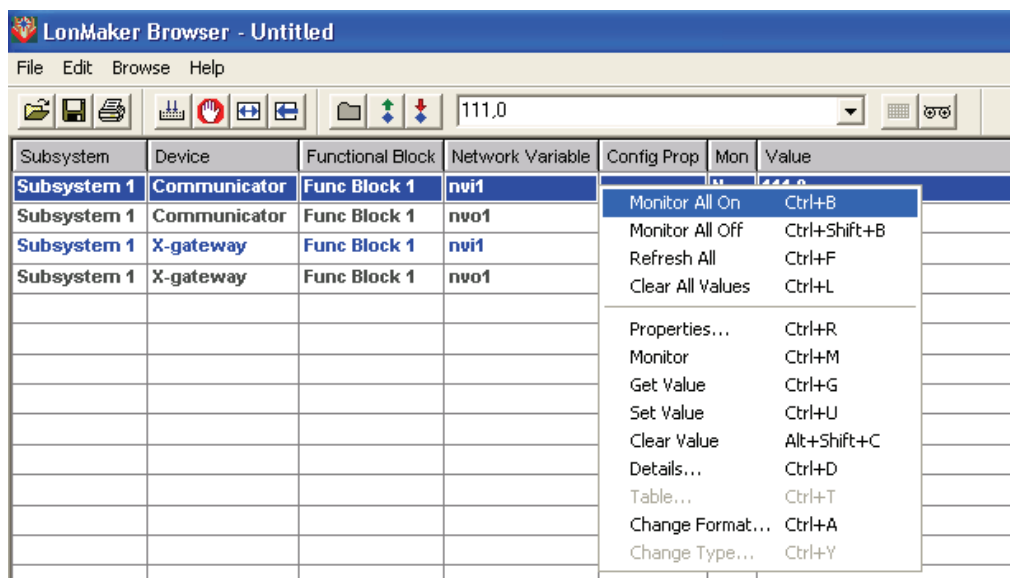**Figure 61   Opening the Browse window.**



**Figure 62   Monitoring all of the variables.**

To monitor, right click in the list and select Monitor All On.

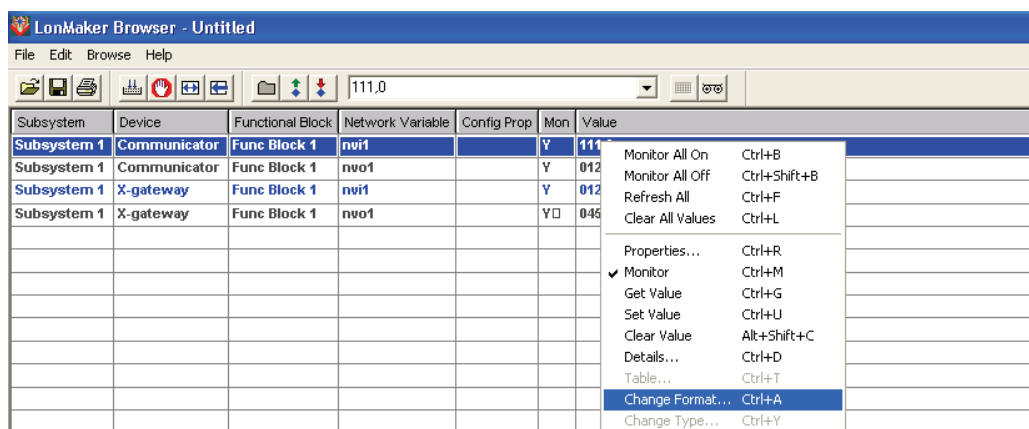To change the format of the value right click in the list and select Change Format.



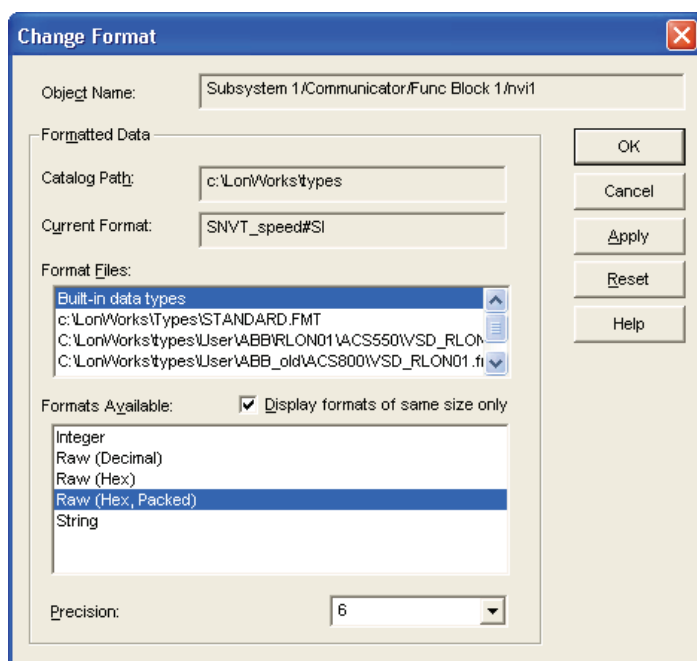**Figure 63   Changing the format of display of the value.**



**Figure 64   Selecting the type of format.**

Select Built-in data types and then the desired type of data. Raw (Hex, Packed) is selected in this case to get the same display format as in ModScan32.
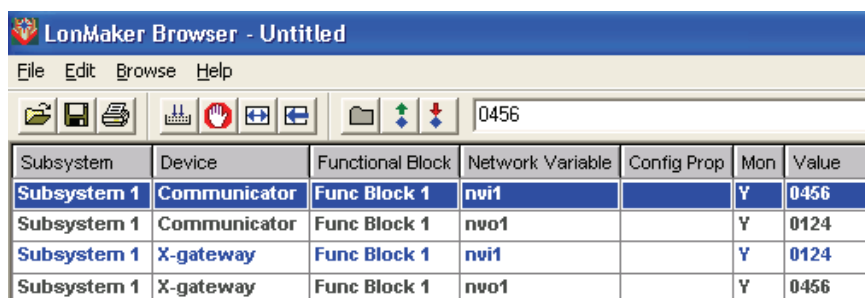
The input variables can now be monitored as seen below.



**Figure 65   Monitoring the input and output variables.**