How to configure a PROFIBUS network with NetTool for PROFIBUS
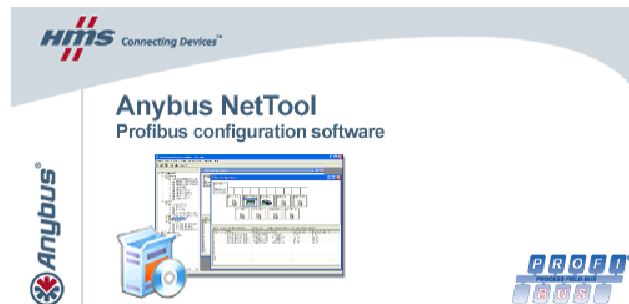
Document history

Revision	Date	Description	Responsible
1.00	2005-04-14	Created	Patrik Lansdorf
1.01	2006-01-30	Changed to new template	Patrik Lansdorf
1.10	2007-08-14	Added section on Ethernet Transport Provider	Thorbjörn Palm
1.11	2008-03-04	Minor update	Thorbjörn Palm
1.20	2011-07-05	Added section about Automatic Network Scan	Martin Falkman

More information about the network and products

The latest manuals, GSD file and HyperTerminal settings can be found on the HMS homepage: www.anybus.com

The Profibus user organisation has a homepage on the Internet: www.profibus.com

Contents

1   Applicable Anybus products

Description	Name / Type
Anybus-M Master	PROFIBUS Master
Anybus X-gateway	PROFIBUS Master
Anybus-PCI Master	PROFIBUS Master

2   Requirements

Description	Name / Type
Siemens ET 200S	Modular I/O unit
Anybus X-gateway Profibus master-EIP slave	AB7800
Anybus Communicator for Profibus	AB7000
GSD file for the Siemens ET 200S module	siem80f3.gsd
Profibus standard cable	n.a.
Profibus D-SUB contacts	n.a.
Power supply 24VDC	n.a.
PC with NetTool for Profibus	1.9.1.4 or later
Null modem cable (Supplied with the Anybus X-gateway)	n.a.
Configuration cable for Anybus Communicator	017620
Anybus Configuration Manager – Communicator RS232/422/485 (previously ABC Config Tool)	2.14 or later

Note: The gsd file for Anybus Communicator is included in the NetTool for Profibus.

3 Solution overview

Below you find an overview of the system configuration that is described in this document.

Other nodes may be attached to the network, but are not necessary. Since this application note is for NetTool for Profibus, only the Profibus configuration will be explained.
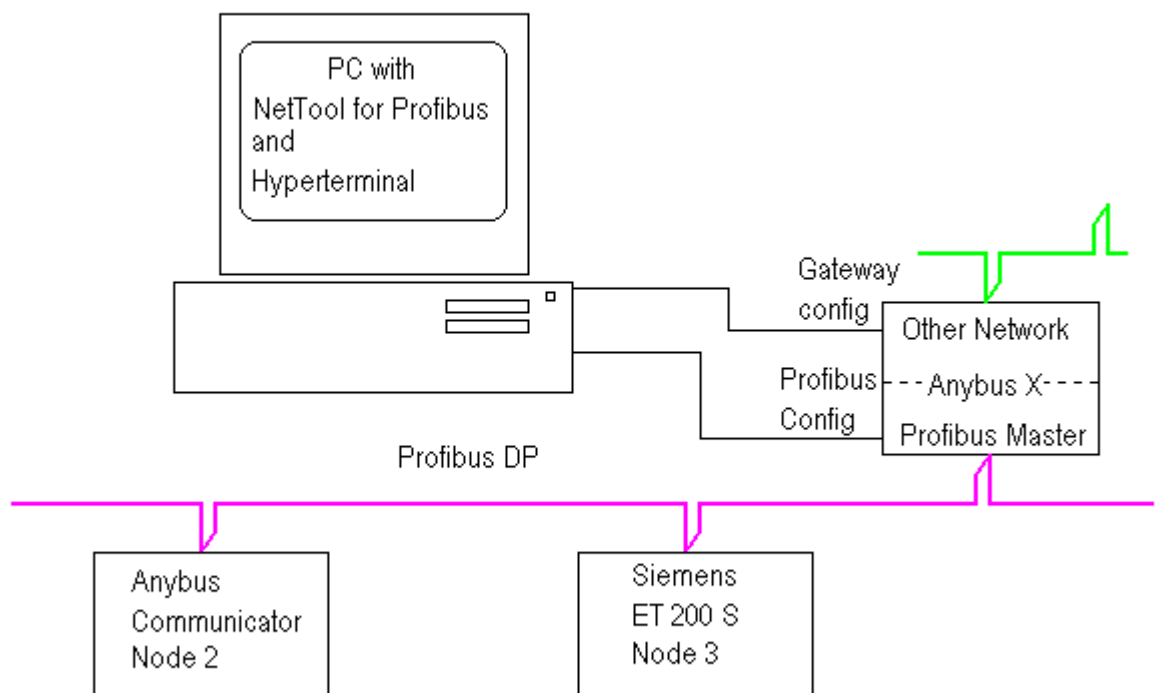

Figure 1 Hardware connection overview

4 Hardware Settings

In this particularly case we are using an X-gateway PROFIBUS-DP Master together with an Anybus PROFIBUS Communicator.

4.1 Slave settings

The address setting is done with the two rotary switches on the Anybus Communicator module and on the Siemens ET 200S on a dip switch.

The address is set to #2 for the Anybus Communicator and to #3 for the Siemens ET 200S in this example.

4.2 Hardware configuration

In order to configure the bus it is necessary to set up the master hardware first. In this example we are using an Anybus X-gateway with Profibus master.

4.2.1 Configuring the master module

Start by creating a new configuration. Drag and drop the Anybus-M DPV to the new configuration.
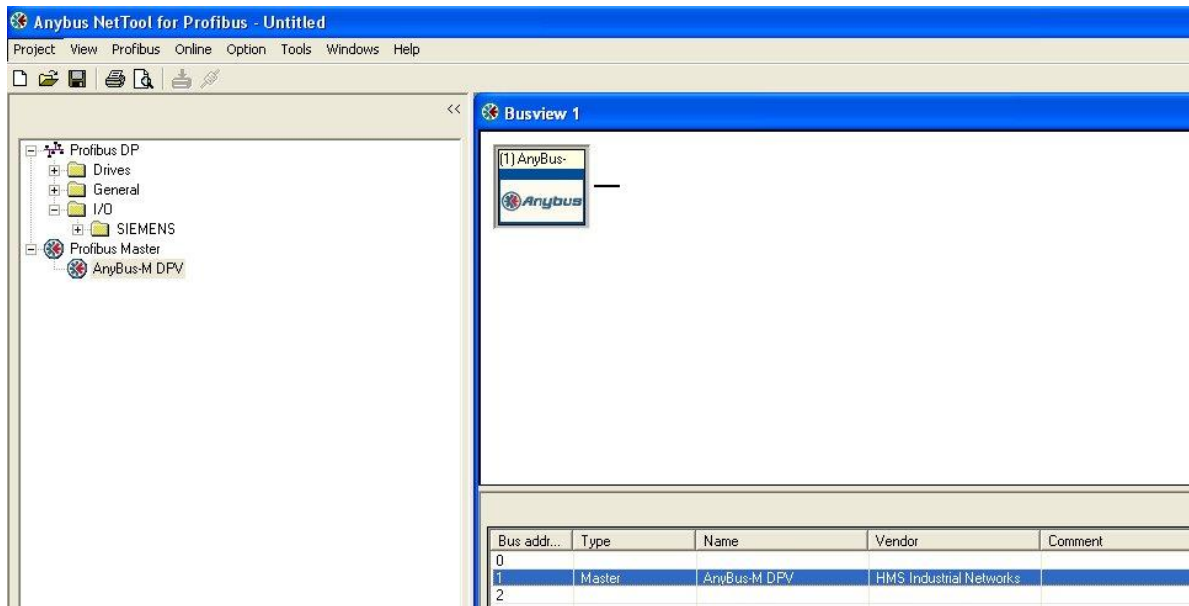

Figure 2 Install the Anybus-M DPV

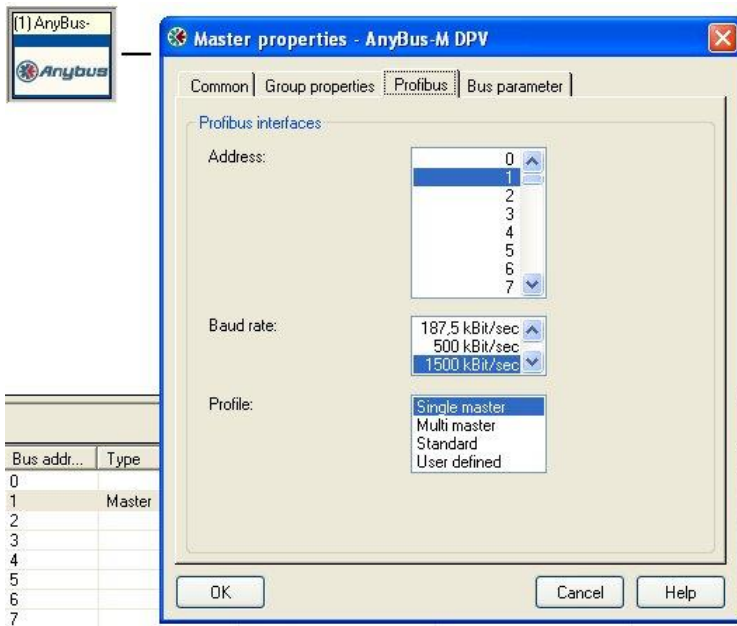Double click on the Anybus-M DPV and select the desired settings.

Figure 3   Master properties

4.2.2   Adding the Anybus Communicator

Next drag and drop the Anybus-C PDP to the configuration. (Drop it on the line next to the master)
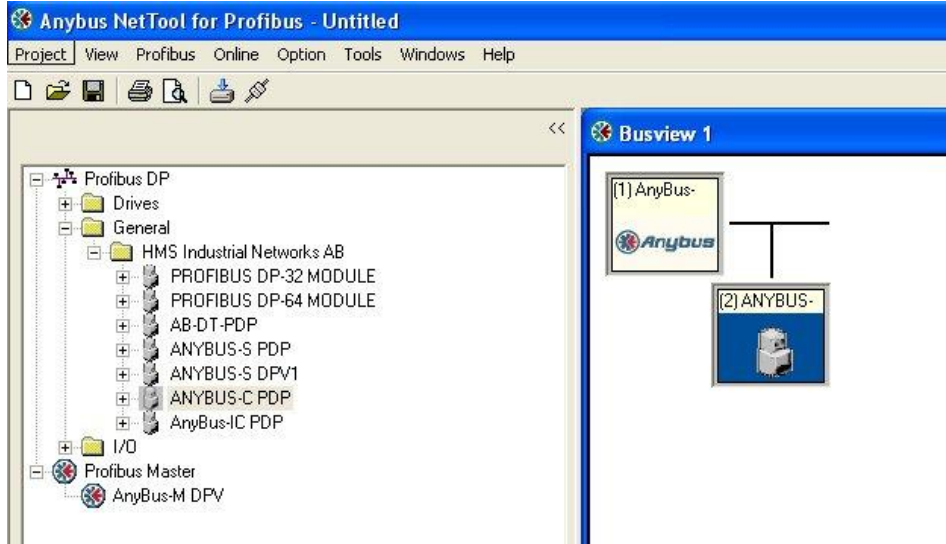

Figure 4 Install the Anybus-C PDP

Double click on the Anybus-C PDP and select the desired settings. (Primarily Profibus address)
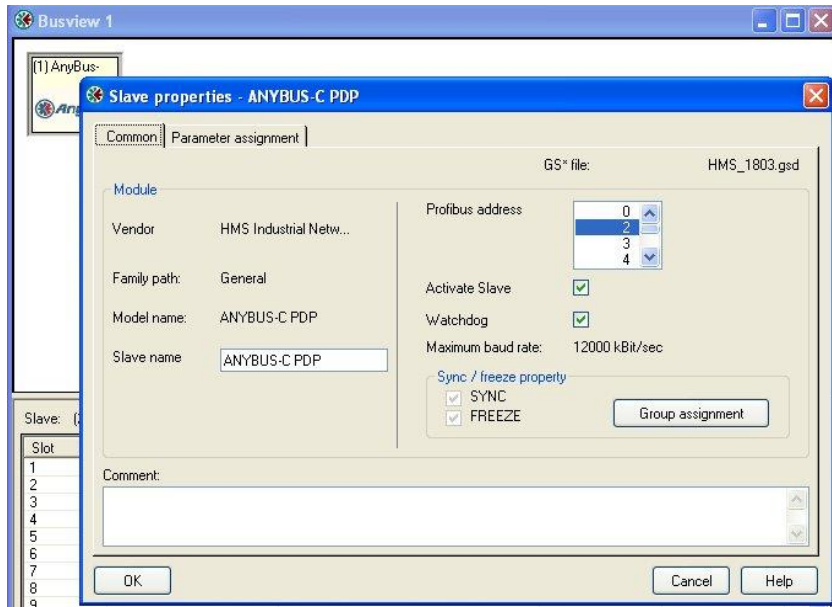

Figure 5 Anybus-C PDP properties

Configure the amount of I/O data for the Anybus Communicator Profibus. Be sure to use the same amount of I/O as used in the configuration made in the ACM - Communicator RS232/42/485 (ABC Config Tool).
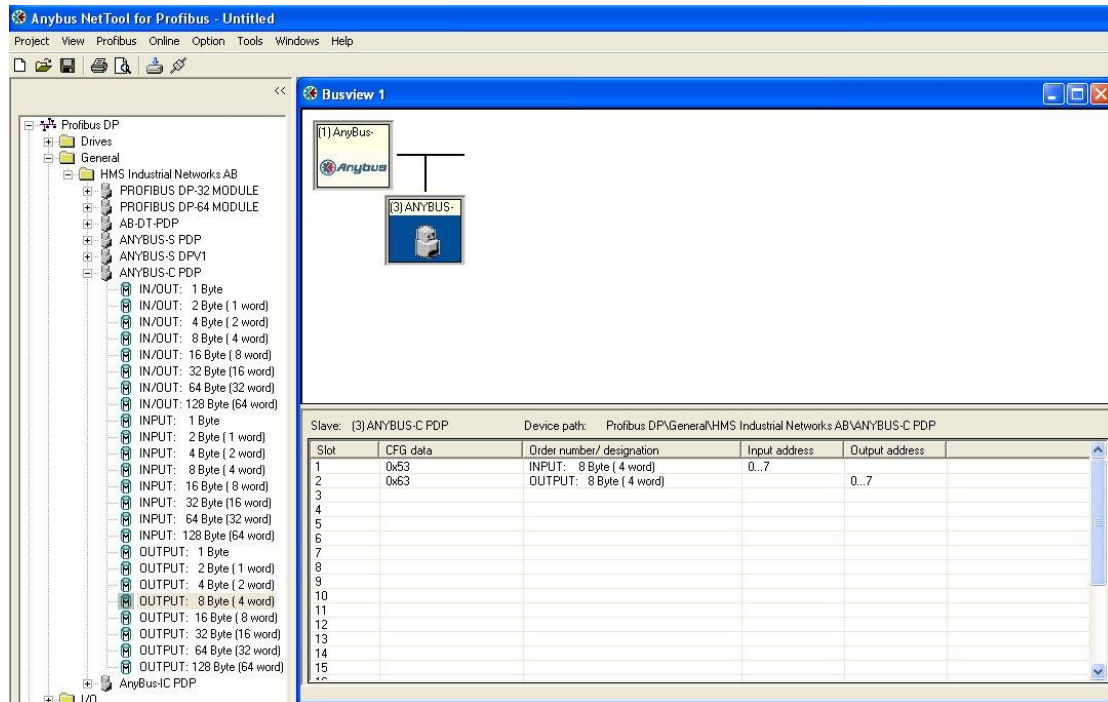

Figure 6 Anybus-C PDP I/O data

It is possible to change Input and Output addresses, by double clicking on the different slots.

It is necessary to import the file siem80f3.gsd to the NetTool in order to include the Siemens ET 200S as a slave in the network. The GSD files for the Anybus modules are already included in NetTool for Profibus.

Figure 7 Install a new GSD file

4.2.3   Adding the ABB ET 200S

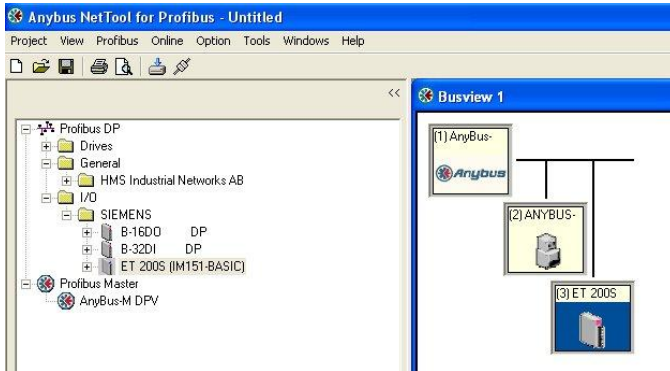Next drag and drop the Siemens ET 200S to the configuration.

Figure 8 Install the Siemens ET 200S

Double click on the ET 200S and select the desired settings. (Primarily Profibus address)
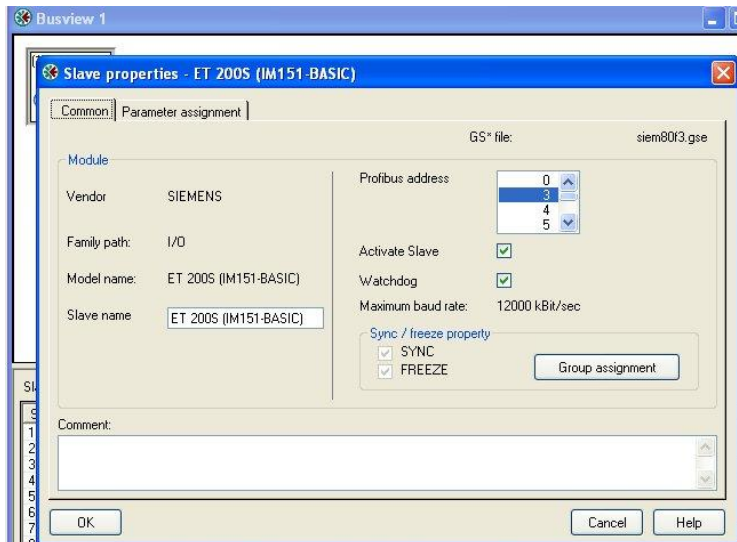

Figure 9 Siemens ET 200S properties

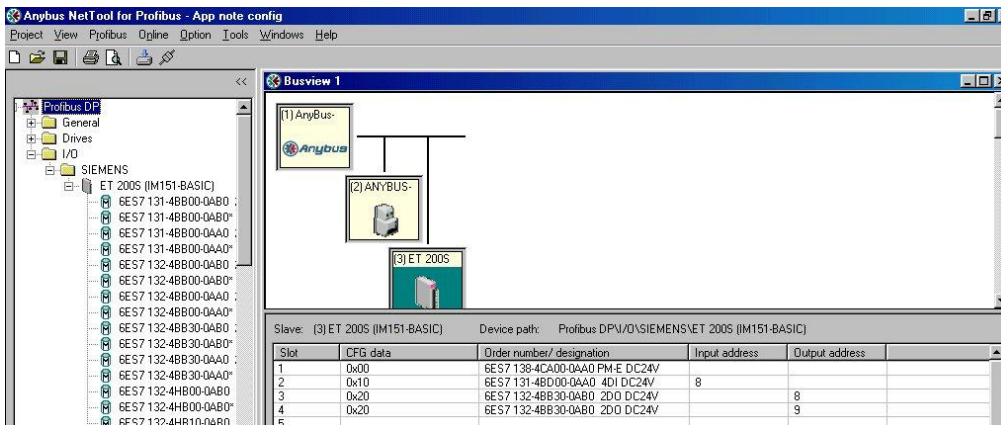Configure the amount of I/O data and type of power supply for the Siemens ET 200S.

Figure 10 Siemens ET 200S power supply and I/O

4.2.4 Configuring the Transport Path

At this point the configuration of the network is completed and ready for download to the master. To do this the Transport Path has to be configured.

Note: To be able to download the configuration using the X-gateway it is necessary to change the operation mode to Stop. Open the configuration menu and select 9 Change operation mode. Set the operation mode to stop.
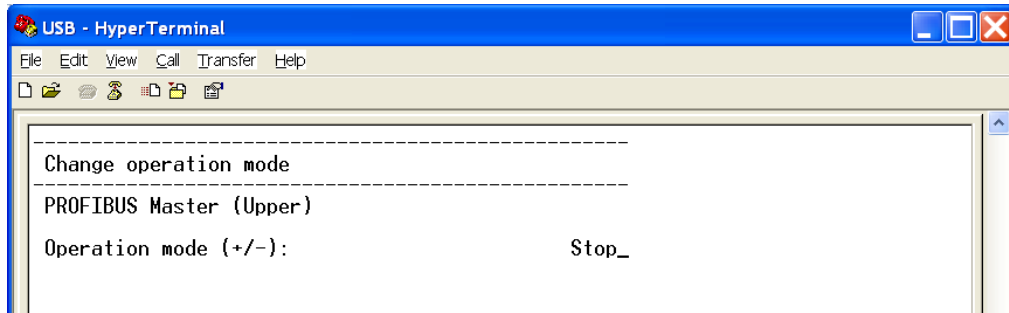

Figure 1   Changing the operation mode to Stop.

There are several ways to download the configuration.

Serial driver: Using the serial port on the Anybus-M the serial driver can be used. The X-gateway can also be configured using the serial driver if connected to the master interface configuration port.

Ethernet driver: In the case with the Anybus X-gateway with Ethernet interface the Ethernet driver can be used.

PCI driver: For the Anybus PCI also the PCI driver can be used.

4.2.5 Serial connection
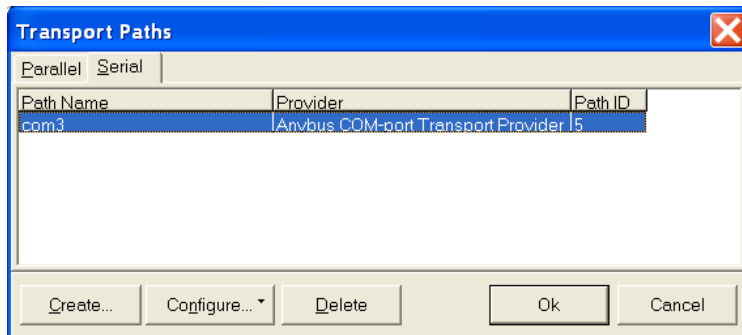

Figure 2   Configuring the Serial Transport path.

Open the Serial tab and click on create. Select the COM-port path as shown below.
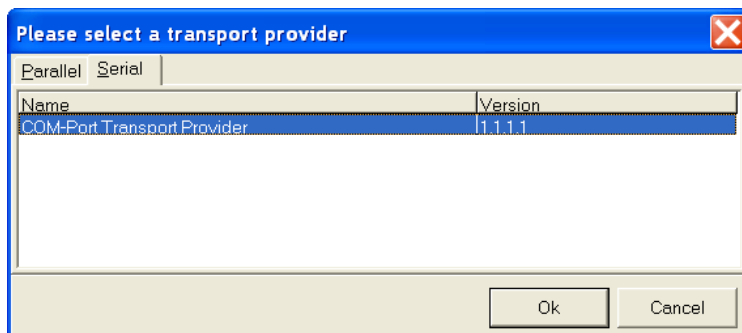

Figure 3   Selecting the COM-port Transport Provider.

In the following dialogue window enter the desired name of the Transport Path and select the COM-port. After configuring these settings the slot in the Anybus X-gateway has to be selected. The upper slot is where the power connection is located.
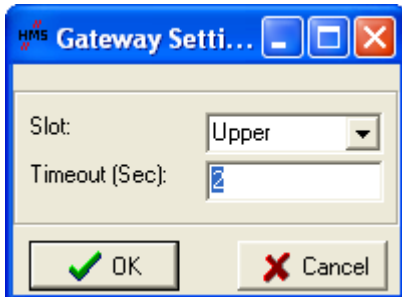

Figure 4   Configuring the Slot and Timeout time.

4.2.6   Ethernet connection

If using the Ethernet connection to configure the gateway use the Parallel Transport Path instead.

Note: To be able to use the Ethernet Transport Path the following is required:
- Install NetTool Profibus version 3.1.1.1 or later on the PC
- Install Anybus Ethernet Transport Provider version 2.1.0.0 or later on the PC
- Make sure that the X-gateway firmware version is 3.02.3 or later

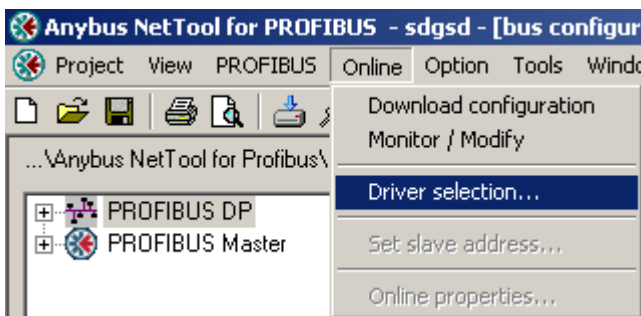**Step 1:** In NetTool Profibus – select Online -> Driver Selection.

Figure 5   Opening the Configure Driver menu.

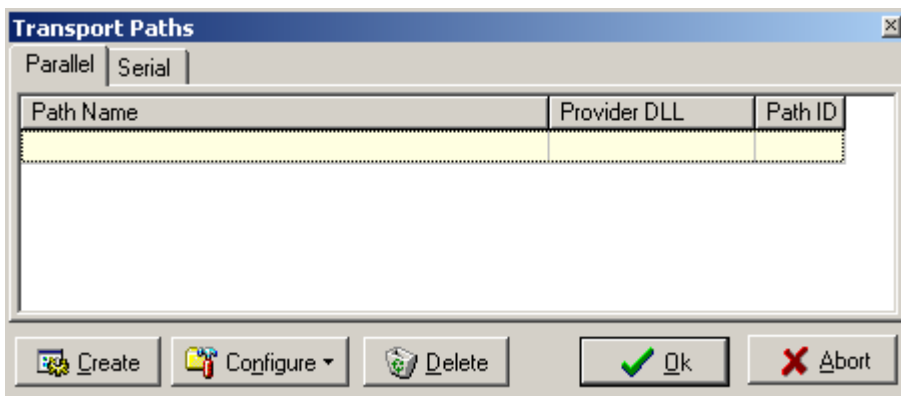**Step 2:** Select Parallel and press the "Create button in the "Transport Paths" dialog.

Figure 6   Creating a new Transport Path.

Step 3: Select the "Ethernet Transport Provider" and press OK. Then give the path a good name, e.g. My Ethernet transport path and press OK again.
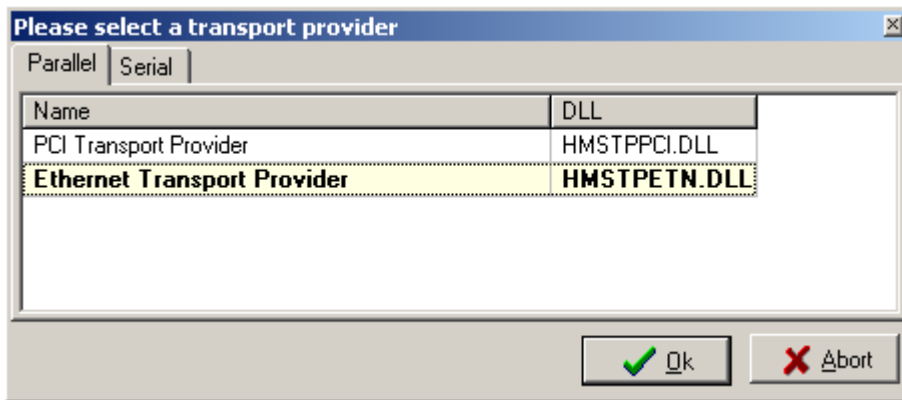
Figure 7   Selecting the Ethernet Transport Provider.
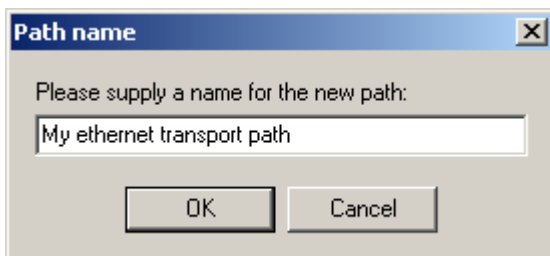
Figure 8   Naming the new Transport Path.

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. Mark the ABX-ETH and press ok. If nothing is shown in the list, proceed to Step 5.
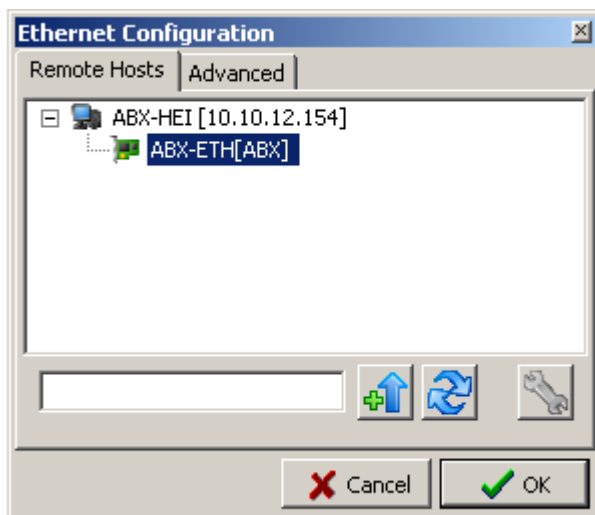
Figure 9   Browsing the IP-address of the connected gateway.

Step 5:

Use the Anybus IPconfig utility to identify or edit the IP address of the X-gateway. Clicking on the button
![wrench icon] will start Anybus IPconfig tool.
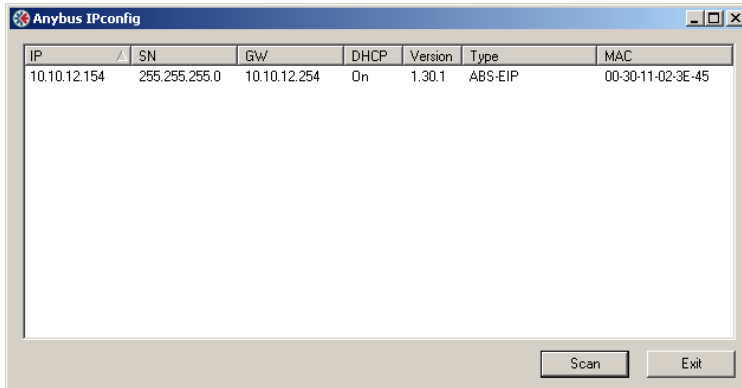
Figure 10   Scanning the network for Anybus modules.

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.
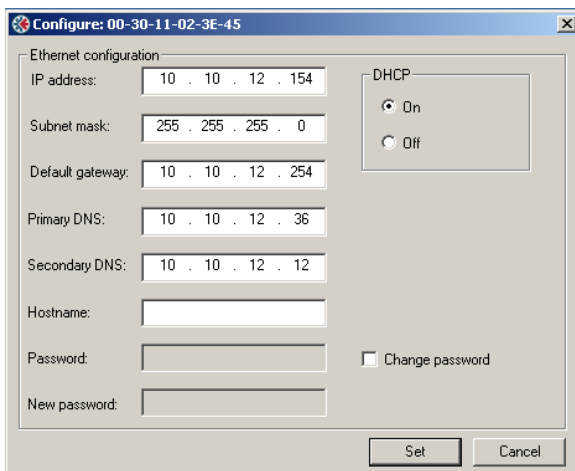
Figure 11   Configuring the IP-address.

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.X.

Step 6: The X-gateway with it's IP address should appear automatically under the "Remote Hosts" tab, if the IP settings were made correctly.
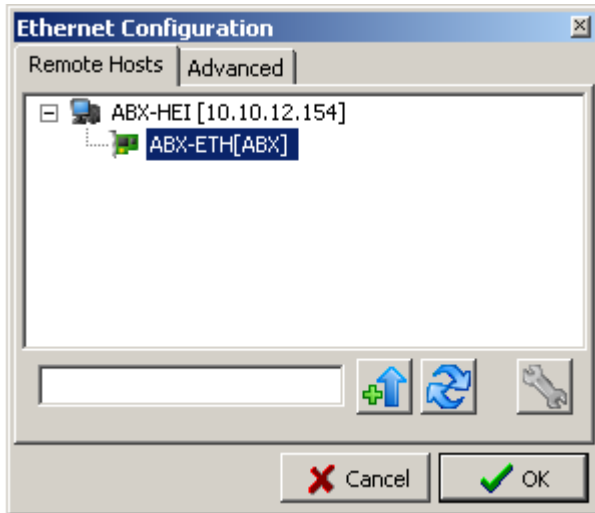
Figure 12   Browsing the connected gateway.

A network scan can also be forced by entering the X-gateway IP address and pressing the button "Query Host". Clicking on the button will refresh the list under Remote Hosts.

4.2.7 PCI driver

When using the Anybus PCI also the PCI driver can be used. Select the Anybus PCI Transport Provider or click on create to make a new Transport Path. Make sure to select the PCI Transport Path if creating a new.

Figure 11 Transport Path selection window

5 Automatic Network Scan

NetTool can automatically scan the PROFIBUS network and gather information about the connected slaves. The user can then select which slaves to adopt to a new bus configuration to be downloaded to the master. This is a quick way to get a network up and running. However, one shall be aware that it is not guaranteed that a slave will enter Data exchange since the User parameter data might mismatch.

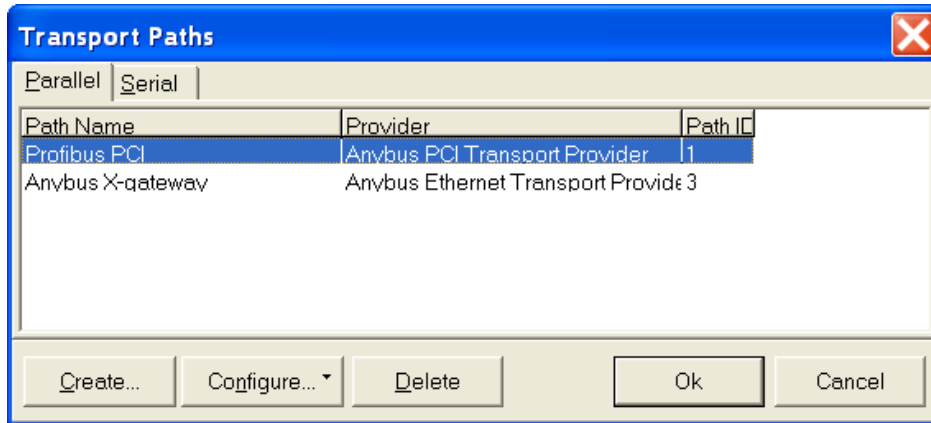The network scan is started either from the Online menu or from the right-click menu for the master icon in the bus configuration window. A master must be added to the bus configuration window to be able to use the network scan function. It is also possible to scan the network with slaves present in the current bus configuration.
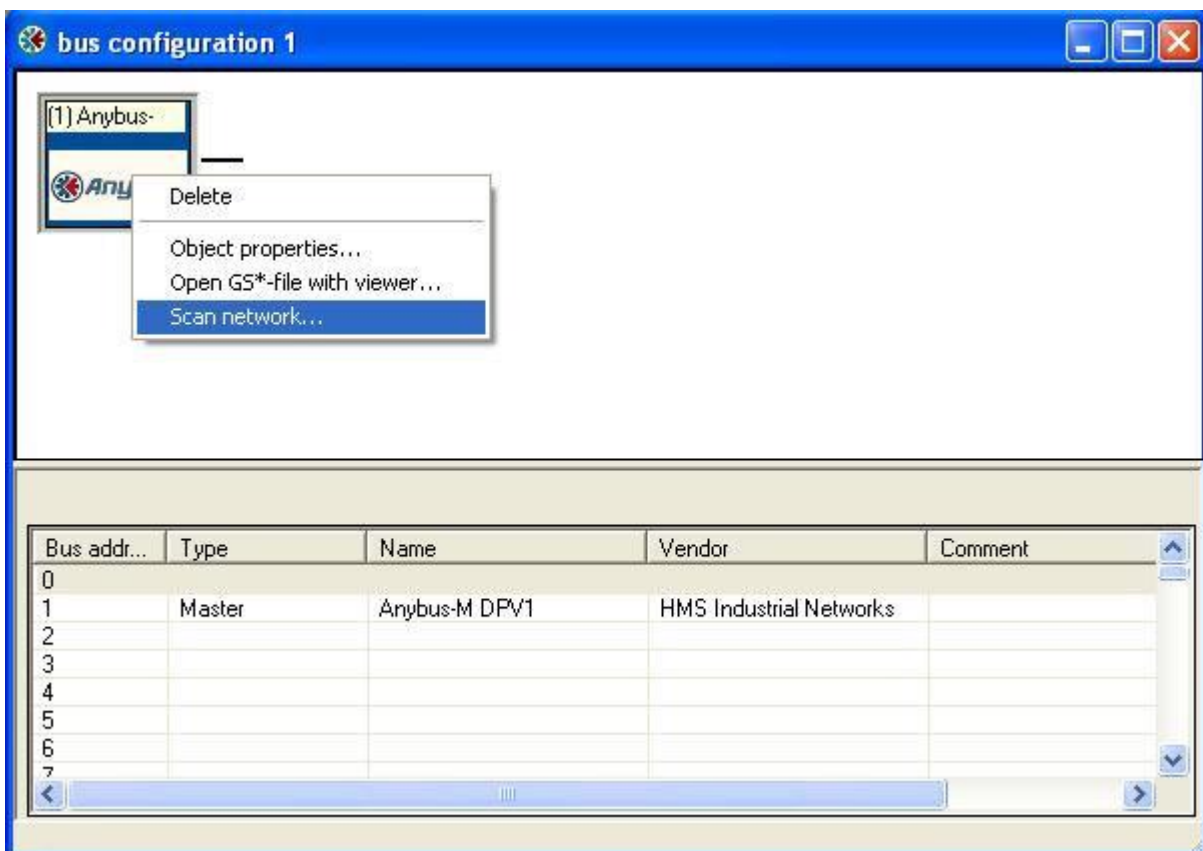

Figure 12 Scan network option in bus configuration window

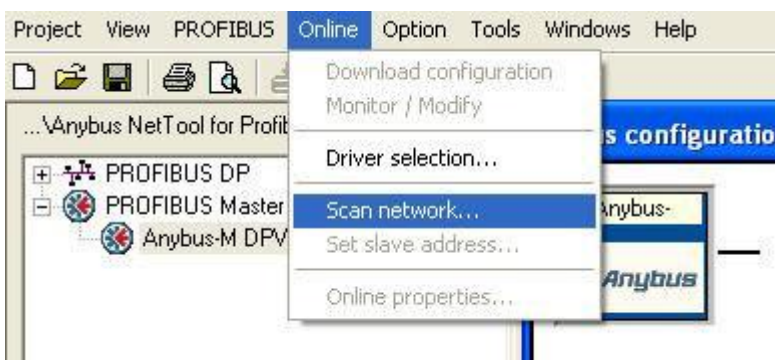The network scan can be started from the right-click menu for the master icon.

Figure 13 Scan network option in Online menu

The network scan can be started from the Online menu.

If the master does not have a valid database downloaded, when the scan is initiated, NetTool will download the master bus parameters (baudrate etc.) given that the user has agreed to the download.
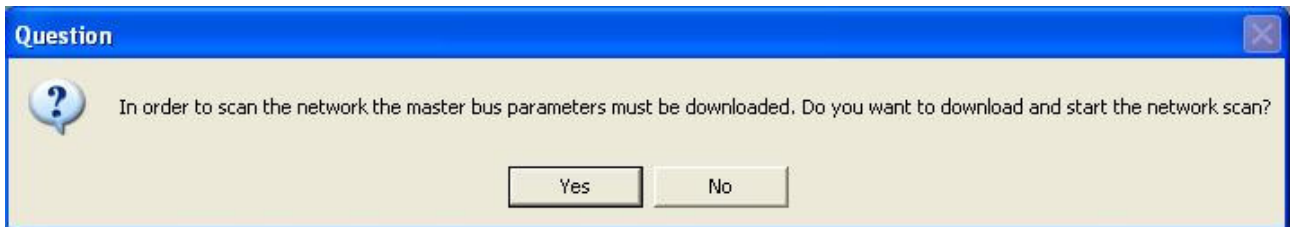
Figure 14 Configuration download acceptance window

If the master already has a valid database downloaded when the network scan is initiated, the master will use the current bus parameter settings. The download will then be skipped. To get the best scan result, make sure the scan master has the same node address as the master in the bus configuration.

If the master already has a valid database downloaded when the network scan is initiated, the master will use the current bus parameter settings. The download will then be skipped. To get the best scan result, make sure the scan master has the same node address as the master in the bus configuration.

5.1 Network Scan Window

When the network scan is completed, a window with all devices found on the network will appear (both slaves and masters). Information extracted from existing GSD-files will be displayed.
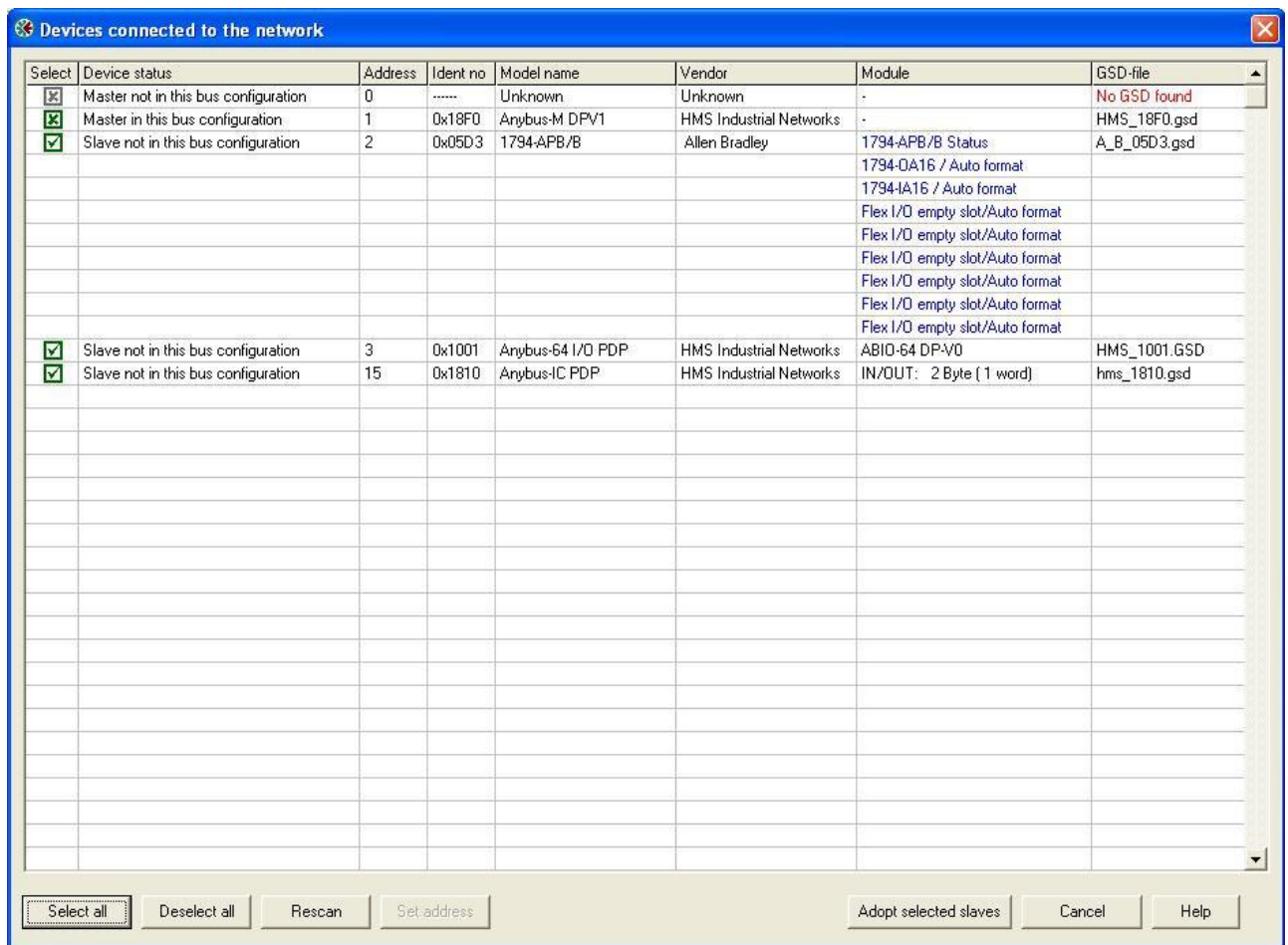
Figure 15 Network Scan Window layout

Select column

Selected slaves will be added to the bus configuration when the button "Adopt selected slaves" is clicked. Most detected devices will be marked as selected by default, except for the following situations:

· Slave is already present in the current bus configuration.

· Slave is locked by another master.

· Slave has address 126 (see description about "Set Slave Address" below).

· All master devices.

· No matching configuration identifier bytes found in the GSD-file.

Symbol description

☒=Slave/Master is already present in the current bus configuration, and will not be affected when adopting slaves.

☒=Slave/Master is not possible to adopt (slave locked by another master, GSD-file missing, slave has address 126 etc.)

☑=Slave is selected for adoption and will be added to the bus configuration when the "Adopt selected slaves" button is clicked.
☐=Slave is not selected for adoption and will not be added to the bus configuration when the "Adopt selected slaves" button is clicked.

Device status column

This column indicates the status of the detected devices.
· "Slave not in this bus configuration"   - No slave with this address exists in the current bus configuration.
· "Slave in this bus configuration"   - Slave identical (Ident number and Identifier bytes matches) to a slave in the current bus configuration.
· "Slave in this bus configuration but differs"   - Slave has different Ident number compared to the one in the configuration.
· "Slave locked by another master"   - Slave is controlled by another master and cannot be added to the bus configuration. Locking master address is displayed within brackets.
· "Master not in this bus configuration"   - No master with this address exists in the current bus configuration.
· "Master in this bus configuration"   - Master identical (Ident number matches) to the one in the current bus configuration.

Address column

In this column the node address of the detected devices is displayed.

Special node address 126 is displayed in red.
If a slave with node address 126 is detected during the network scan the address must be changed by NetTool before it is possible to add the slave to the bus configuration. The address change dialogue is displayed by selecting the address cell and clicking on the "Set Slave Address" button.

Ident no column

The PROFIBUS identification number is displayed in this column.

Model name column

The model name extracted from the GSD-file is displayed in this column. If no matching GSD-file is found, "Unknown" is displayed.

Vendor column

The manufacturer of the device extracted from the GSD-file is displayed in this column. If no matching GSD-file is found, "Unknown" is displayed.

Module column

This column shows the module name, extracted from the GSD-file, which matches the identifier bytes reported from the slave. If no matching GSD-file is found, the identifier bytes are displayed and it will not be possible to adopt the slave. If more than one module in the GSD-file matches the identifier bytes, the first matching module is displayed. A drop-down list contains all other matching modules. If the default module is not correct, the user must manually select the correct module in the drop-down list before adopting the slave.

GSD-file column

This column shows the name of the GSD-file that matches the Ident number of the device. If there are more than one file with the same Ident number in the device catalogue, the first matching GSD-file is displayed. A drop-down list contains all other matching GSD-files. If the default GSD-file is not correct, the user must manually select the correct GSD-file in the drop-down list before adopting the slave. If no matching GSD-files are found, a GSD-file can be manually selected by clicking on the "No GSD found" text in the GSD-cell.

Select all button

This button selects all slaves that are possible to select in the Select column.

Deselect all button

This button deselects all slaves that are possible to deselect in the Select column.

Rescan button

Clicking this button will trigger a new network scan. The function key F5 has the same functionality as the rescan button.

Set Slave Address button

For slaves supporting the "Set Slave Address" service, select the address cell for the slave and click this button to open the address change dialogue.

Adopt selected slaves button

Clicking this button will add all selected slaves to the current bus configuration.

6 Gateway configuration

After the Profibus-DPV1 Master and the Profibus network has been configured in NetTool for Profibus and downloaded, the gateway itself has to be configured. Use the HyperTerminal on the PC and connect a null modem cable between the com port and the gateway's config port. Use the following settings.
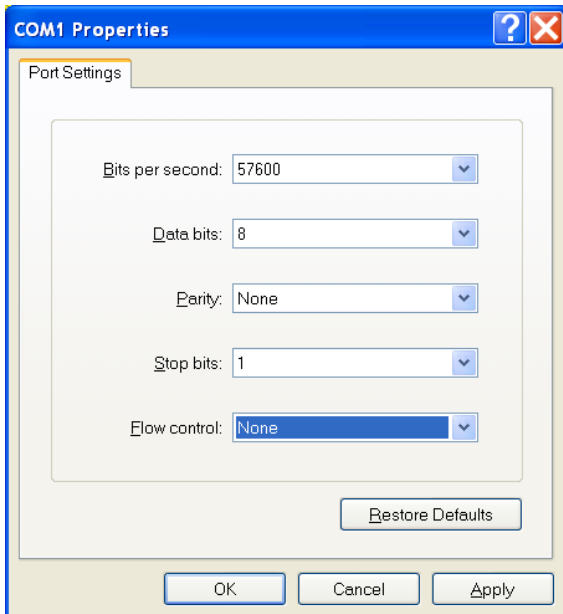

Figure 13   Configuring the connection in the HyperTerminal.
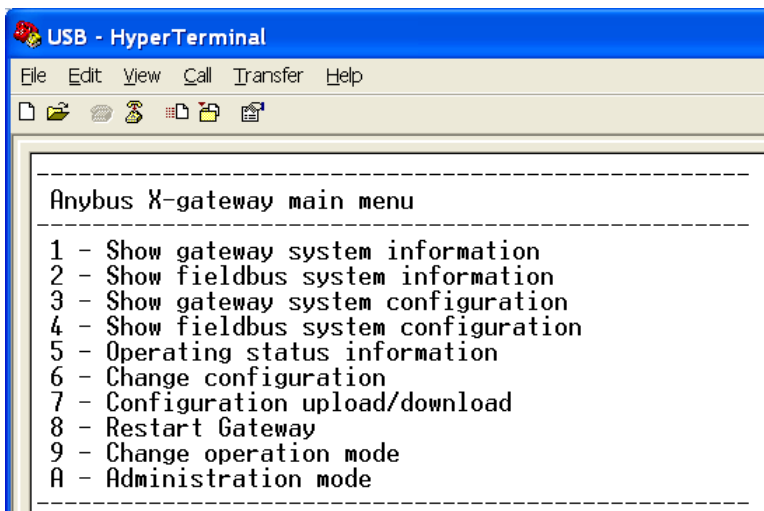
The following menu will appear.

Figure 16 Anybus X-gateway Main menu

Choosing 6 from the main menu will access the configuration of the gateway.

Note: The default setting in the X-gateway is that it will reboot every time the on-line connection over Ethernet is broken. This setting can be changed in the X-gateway configuration interface. Use a null-modem cable and connect the X-gateway config port to the PC. Start a Hyper Terminal session using the settings 57600 Bites per second, 8 Data bits, None Parity, 1 Stop bit and None Flow Control. Connect to the X-gateway and enter the configuration interface. Press 6 to enter the "Change configuration" dialog. Click enter until you get to the "Reboot after disconnection" parameter and then change this setting to

"Disabled". Press Enter and answer Yes to the following questions. The gateway will now continue to run without interruption after an online session in NetTool Profibus.
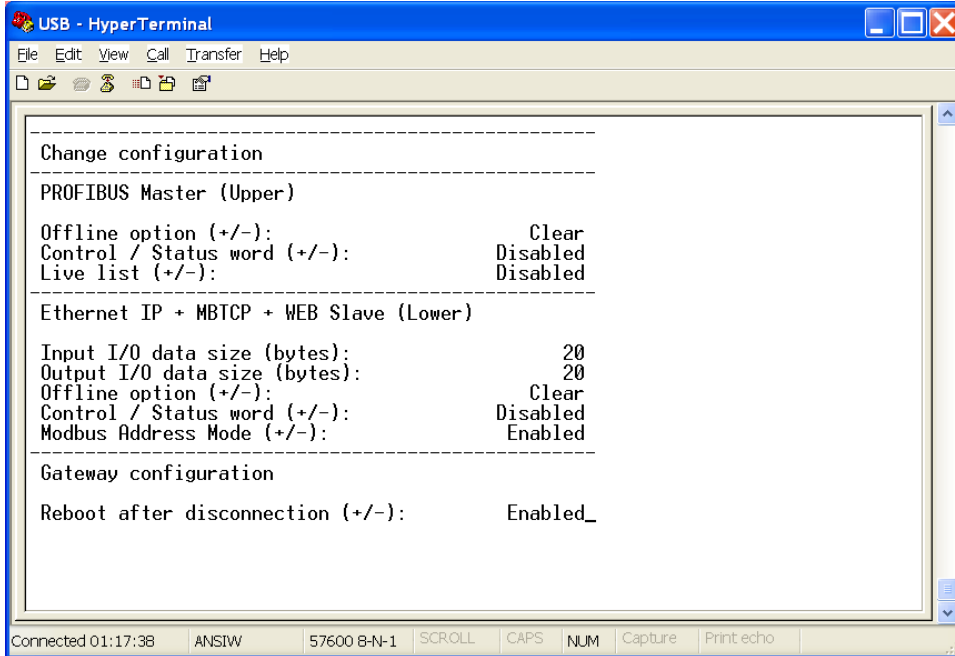

Figure 14   The X-gateway configuration.

7 Testing

Connect the units that should be part of the Profibus network and power up.

When clicking on the on Monitor/modify button, there should be a green frame around the slaves, as shown in the picture below, to indicate that there is communication established with all slaves. **Note:** The Anybus communicator has to have a configuration that corresponds with the NetTool configuration of the Anybus communicator, i.e. the I/O sizes have to match.
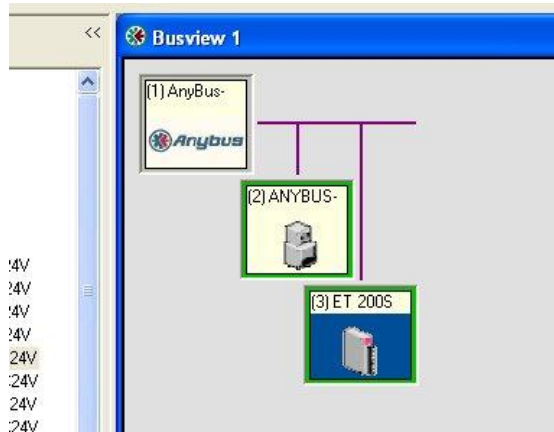

Figure 17 Online

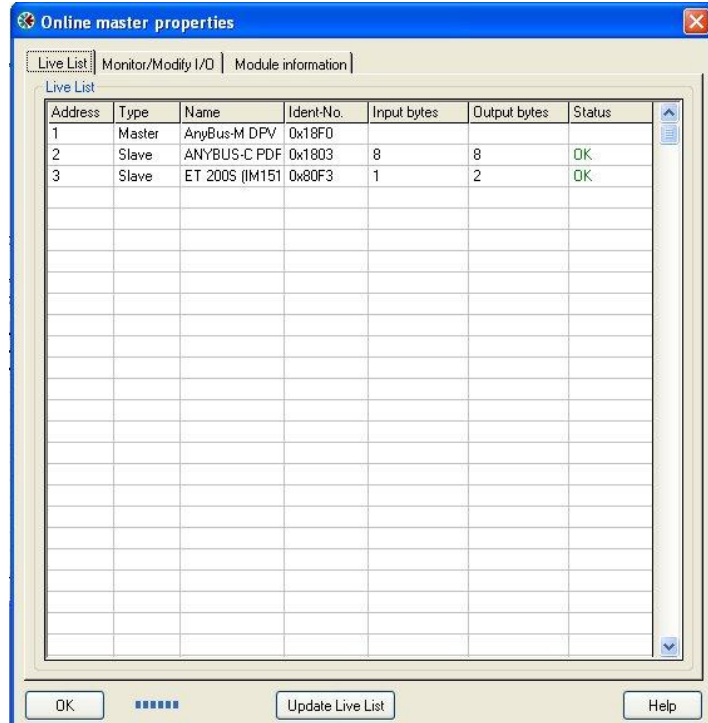It is also possible to double click on the master, to ensure that the slaves are ok. See picture below.

Figure 18 Online master properties

Selecting Monitor/Modify I/O, will give possibility to monitor Inputs and modify Outputs. See picture below.

Figure 19 Monitor/Modfy I/O