

How to configure an Anybus DeviceNet Adapter/Slave module with RSNetWorx for DeviceNet.



Document history

Revision	Date	Description	Author
1.00	2007-06-11	First release	Thorbjörn Palm
1.01	2007-06-20	Minor corrections	Thorbjörn Palm
1.02	2007-06-25	Official release	Thorbjörn Palm
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More information about the network and products

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

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

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1 Applicable Anybus products

Description	Name / Type
Anybus X-gateway	DeviceNet
Anybus Communicator	DeviceNet
Anybus-Slave	DeviceNet
Anybus-CompactCom	DeviceNet
Anybus-IC	DeviceNet
Anybus -PCI	DeviceNet

2 Requirements

Description	Name / Type	Version
Rockwell PLC	Allen Bradley ControlLogix 5000 with 1756-DNB DeviceNet Scanner card,	n.a.
PLC software	RSNetWorx for DeviceNet	1.21
Rockwell communication software	RSLinx	2.41
EDS-file for the Anybus-S DeviceNet interface and the Anybus X-gateway DeviceNet adapter	EDS_ABS_DEV_V_1_35.eds	1.35
EDS file for the Anybus Communicator DeviceNet	EDS_ABC_DEV_V_1_10.eds	1.10
EDS file for the Anybus CompactCom DeviceNet	EDS_ABCC_DEV_V_2_1.eds	2.1
X-gateway Network Interface Addendum	Anybus X-gateway-DeviceNet Adapter Interface, Network Interface Addendum	1.00
X-gateway User Manual	X-gateway Generic , User Manual	1.02
Communicator User Manual	Anybus Communicator for DeviceNet, User Manual	2.50
Adapter Fieldbus Appendix	Anybus-S DeviceNet, Fieldbus Appendix	2.06
IC Fieldbus Appendix	Anybus-IC DeviceNet, Fieldbus Appendix	1.51
PCI Interface Design Guide	Anybus-S Slave & Master, Parallel Interface Design Guide	2.0
Power supply 24VDC	n.a.	n.a.
Configuration cables	n.a.	n.a.
Null modem cable (Supplied with the Anybus X-gateway)	n.a.	n.a.

Note: The EDS files can be downloaded at the website www.anybus.com.

3 Solution overview

This application note describes how to configure an Anybus product with a Rockwell PLC. 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.

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

- Anybus CompactCom for DeviceNet
- Anybus Communicator for DeviceNet
- Anybus X-gateway DeviceNet
- Anybus-IC DeviceNet Adapter Interface
- Anybus-PCI DeviceNet Adapter Interface
- Anybus-S DeviceNet Adapter Interface

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

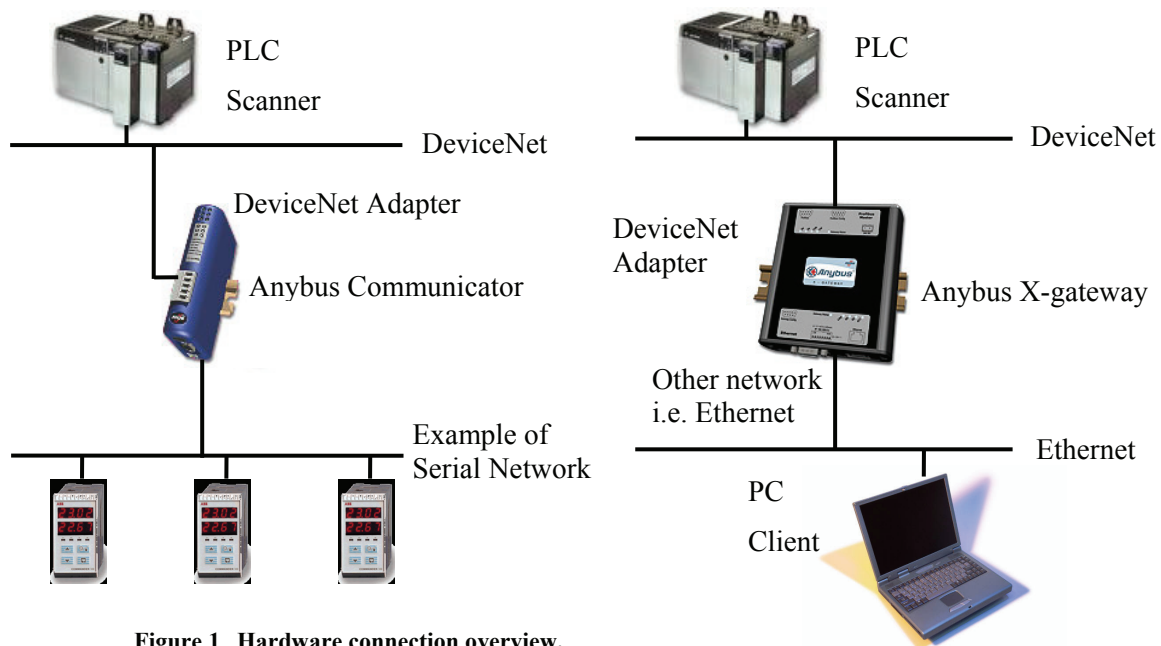


Figure 1 Hardware connection overview.

3.1 Hardware Settings

The selected baud rate of the PLC and the Anybus product is to be set to the same rate. Also make sure the MAC ID of the adapter and the scanner is not the same.

Note for X-gateway and Communicator:

The switches will be found next to the power connection on the X-gateway and next to the indication LEDs on the Communicator. DIP switches 1-2 set the Baud Rate and DIP switches 3-8 set the MAC ID. For further instructions see the Anybus Communicator User Manual, X-gateway Manual Addendum or the Adapter Fieldbus Appendix.

Note for the Anybus-IC:

For the Anybus –IC for DeviceNet the configuration is depending on the application. The MAC ID and baud rate is set by the application process or by switches if mounted.

Note for the Anybus-PCI:

The DeviceNet Adapter PCI card is configured by mailbox commands; refer to the Adapter Fieldbus Appendix.

Note for the Anybus CompactCom and the scanner module:

The scanner module used by the PLC and the Anybus CompactCom can be configured by the RSNetWorx for DeviceNet software. Open the Tools menu and select node commissioning. The following window will be visible.

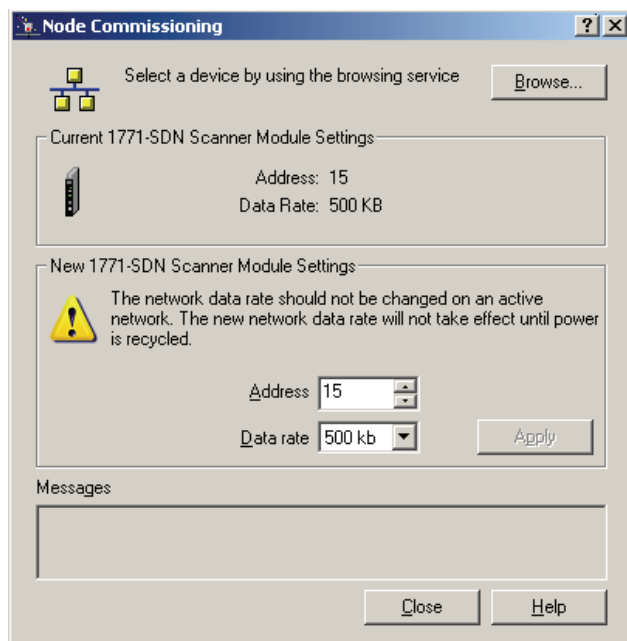


Figure 2 The node commissioning tool in RSNetworx.

Click on the browse button and select the desired module as shown above.

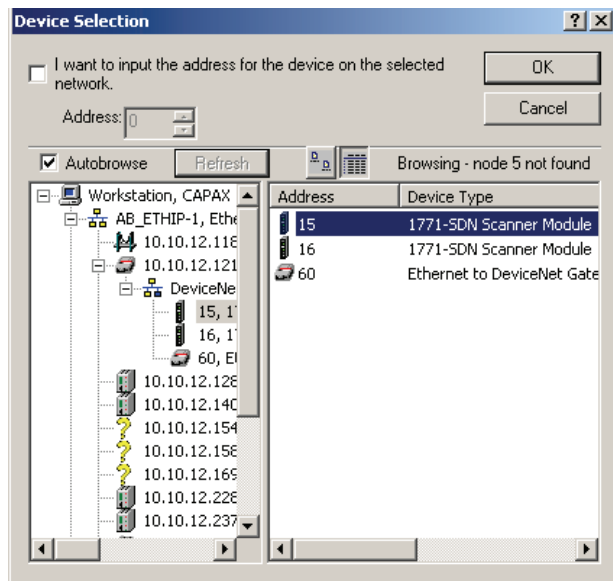


Figure 3 Browsing the network.

The final step is to select the desired baud rate and click on apply as shown in the previous picture.

4 DeviceNet configuration

RSNetworkx for DeviceNet is the tool used to configure the DeviceNet scanner. There are two ways to configure the network. It is possible to configure the network in offline or online mode. It is recommended to start with online mode and to manually complement with the modules not recognised by the RSNetworkx for DeviceNet.

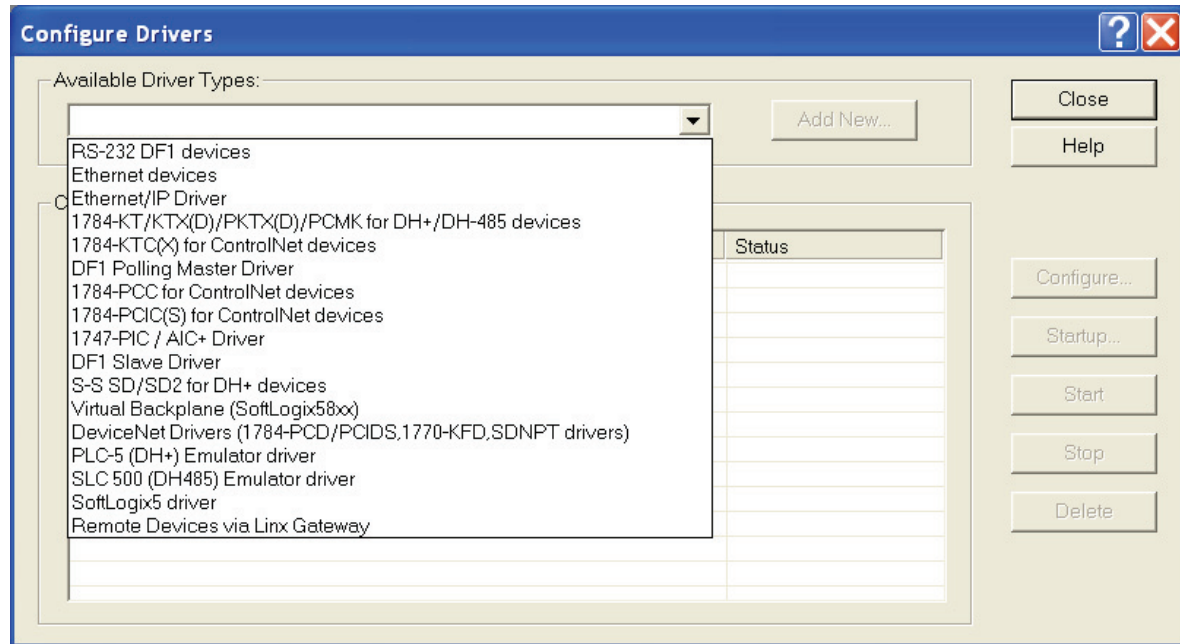


Figure 4 The driver dialogue.

4.1 Online mode

Start the program RSNetworkx for DeviceNet. Verify that the EDS file for the Anybus product has been installed. This can be done by browsing the library in the left window. The EDS file for the Anybus products can be downloaded at HMS website¹. If the Anybus EDS-file has not been installed click on the Tools menu and then on EDS wizard to import the EDS file. Click on next and the following window will appear.

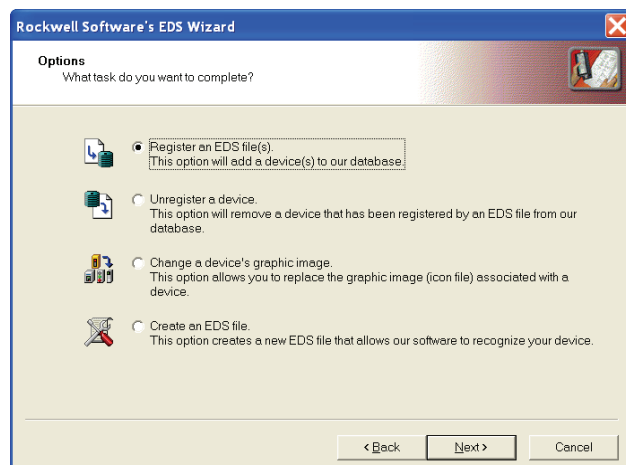


Figure 5 The EDS wizard.

¹ www.anybus.com

Select register an EDS file and select next. Follow the dialogue as shown below.

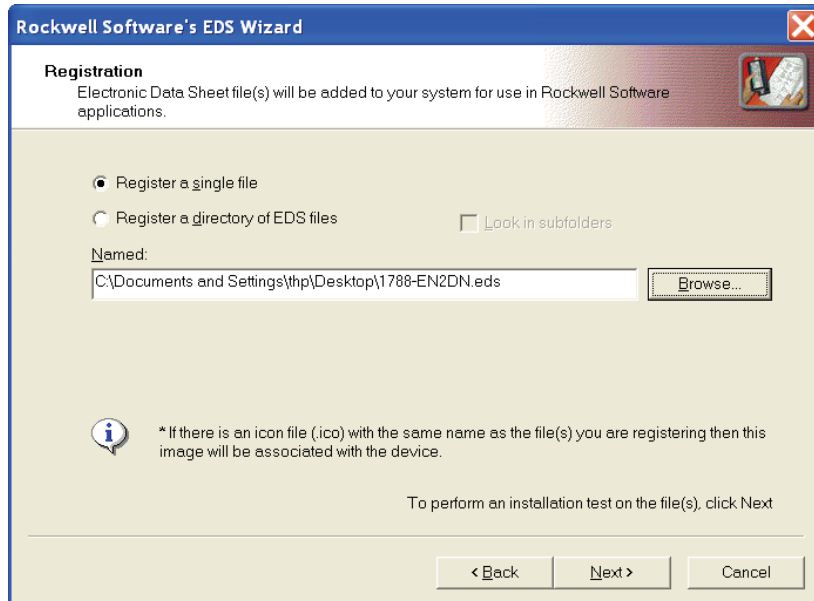


Figure 6 Browsing the EDS file.

The next step is to scan the network for any attached nodes that can be added to the Scanner's scan list. From the Network menu select Online or click on the online button as shown in the figure below. This will scan the entire network at the Baud Rate set up in the scanner and any attached nodes will be listed. You will end up with a diagram of all connected devices as indicated in the figure below.

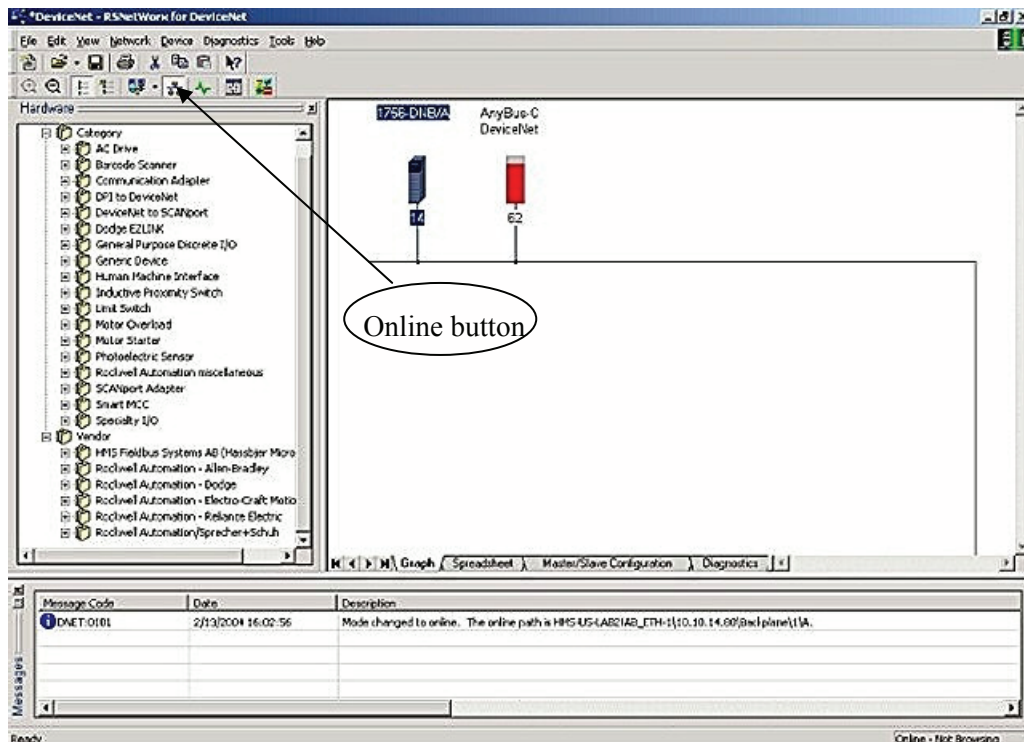


Figure 7 Online network.

4.2 Offline mode

The other way to configure the DeviceNet network is in offline mode. For devices not included in the library of the RSNetWorx for DeviceNet an EDS file has to be imported as described in the previous chapter. If the module is not included in the library the unit will not be recognised by the program. Make sure the program is in offline mode. To build the network, as shown in figure 7 showing the online network, use the navigation list to the left and use drag and drop.

4.3 Scanner configuration

The next step is to configure the Scanner. Double-click on the 1756-DNB/A icon. This will bring up a window with the Scanner's configuration.

Select the Scan list Tab as shown below, you will be prompted whether to download the offline configuration to the Scanner or upload the Scanner's current configuration. Choose upload. After uploading you will have a graphic showing the list of available devices to be added and a list of devices already loaded in the scanner as shown in the figure below.

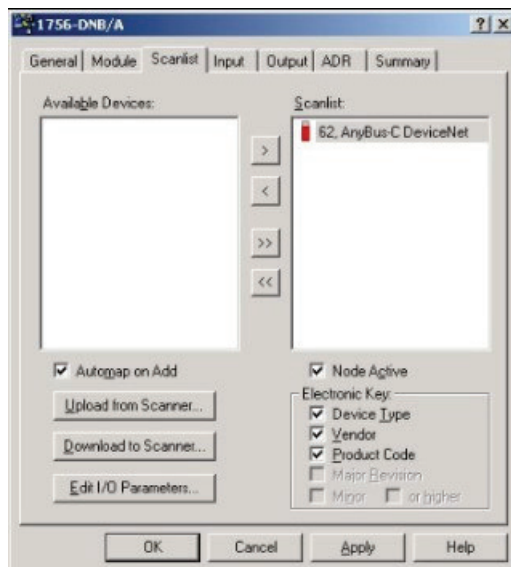
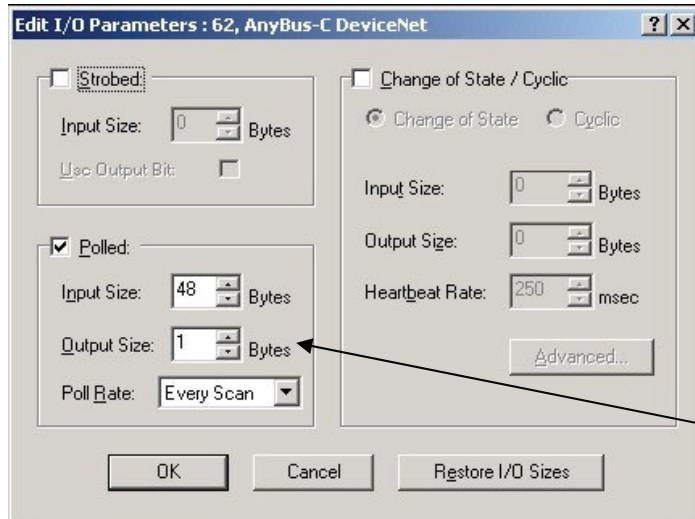


Figure 8 Scanner configuration.

To add devices to the scan list, the Communicator in this case, highlight the Communicator in the list of available devices and click on the right-hand arrow to add to the scan list. The Communicator has now been added and the I/O size needs to be configured.

4.4 Configuring the I/O size and Mapping

From the Scan list window, select Edit I/O Parameters. A window will appear for configuring the I/O type and size. In this example Polled is selected for the I/O type and the size for Inputs and Outputs is based on the data returned by the serial application. The figure below gives an example.



Note: The I/O sizes for your application will not be 48 bytes IN and 1 bytes OUT. The figure is just showing an example. Also remark the Anybus product has to be configured for the same I/O sizes.

Figure 9 Configuring the I/O size.

After setting the I/O size and selecting OK, you will get a warning message as shown in the figure below. This means that the I/O size configured is different than what is designated in the EDS file of the device. In the case of the Communicator whose I/O size will depend on the amount of data transmitted by the serial interface, this warning should be ignored and the values accepted if correct.

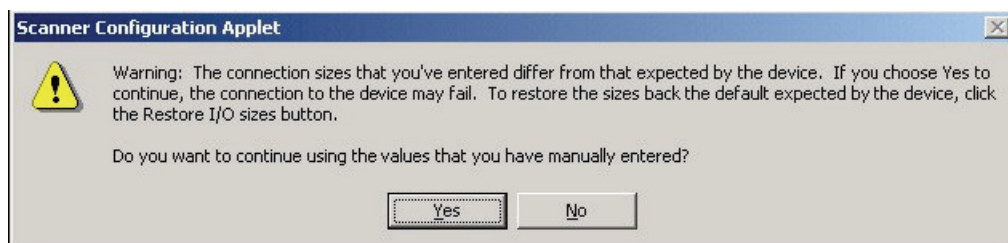


Figure 10 Scanner configuration warning.

Next step is to verify the I/O mapping. Data is normally auto-mapped into continuous 32-bit registers in the ControlLogix designated memory for the 1756-DNB module. To verify the Input, select the tab Input in the Scanner's configuration window. You will get a window as shown in the figure below. Verify that this is the correct memory mapping to be used by the PLC program.

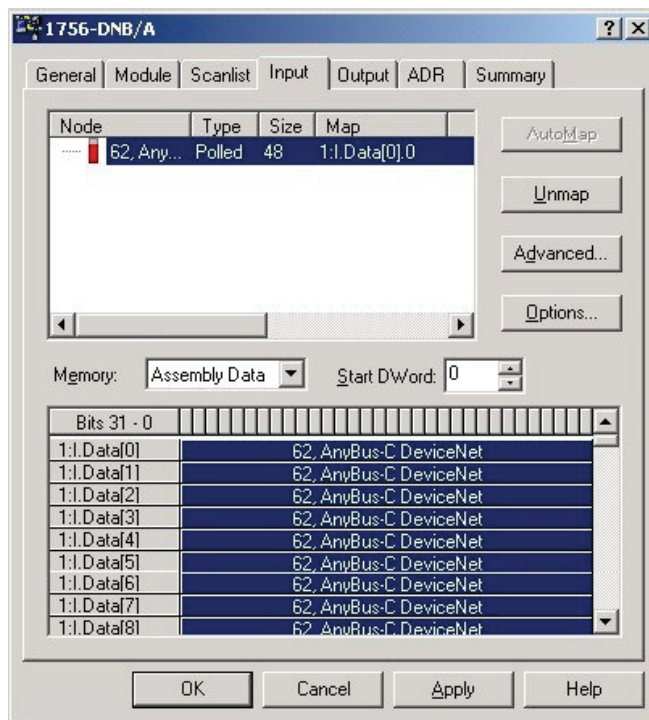


Figure 11 Verifying the Input mapping.

Verify the mapping of the Output by selecting the tab Output in the scanner's configuration window. The figure below gives an example of mapping.

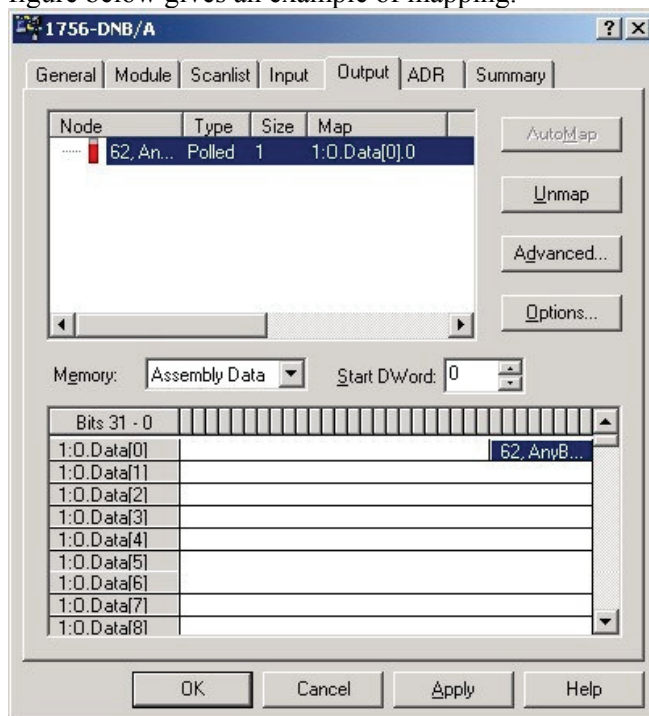


Figure 12 Verifying the Output mapping.

Once the mapping has been verified and the I/O sizes set, the configuration needs to be downloaded to the scanner. Return to the Scan list tab in the scanner's configuration window and select Download to Scanner. This will save the configuration to the scanner. Once the scanner is in Run mode, data should be exchanged. To be in run mode the run bit has to be set, see the chapter on DeviceNet run mode.

4.5 DeviceNet run mode

When using a PLC as a scanner the run bit has to be set, otherwise the DeviceNet Scanner card will remain in idle mode. This can be done in the PLC program by adding an output on the first rung assigned “Local:1:O.CommandRegister.Run”. The picture below shows this in ladder format.

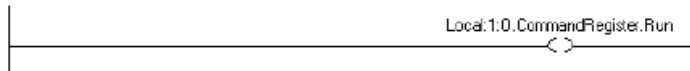


Figure 13 Setting the run bit for the 1756-DNB card in ladder format.

Note for X-gateway:

When using an X-gateway as a scanner the status bit for run mode has to be set, otherwise the module will remain in idle mode. This can for example be done from a PLC program.

5 Anybus configuration

The Anybus product has to be configured for the same I/O sizes as set up in the DeviceNet scanner configuration.

Note: The I/O sizes are depending on the application, the configured I/O sizes in this chapter are just examples.

Anybus Slave Interface and the Anybus PCI card

The Anybus Slave Interface and the Anybus PCI card are configured by mailbox commands. Refer to respective Fieldbus Appendix for details.

Anybus-IC

The Anybus-IC is configured by the User Interface using for example the Windows Hyper Terminal. Refer to the Design Guide for details.

Anybus CompactCom

The Anybus CompactCom is configured by messages send by the application. Refer to the Design Appendix for details.

Anybus Communicator and the Anybus X-gateway

The configuration of the Anybus Communicator and the Anybus X-gateway is described in separate sections below.

5.1 Communicator configuration

To configure the Communicator, start the ABC Config Tool, select the fieldbus DeviceNet and the desired I/O data. If explicit data is used the I/O sizes has to be set to user defined mode, otherwise automatic can be used. For a more detailed description see the Communicator User Manual.

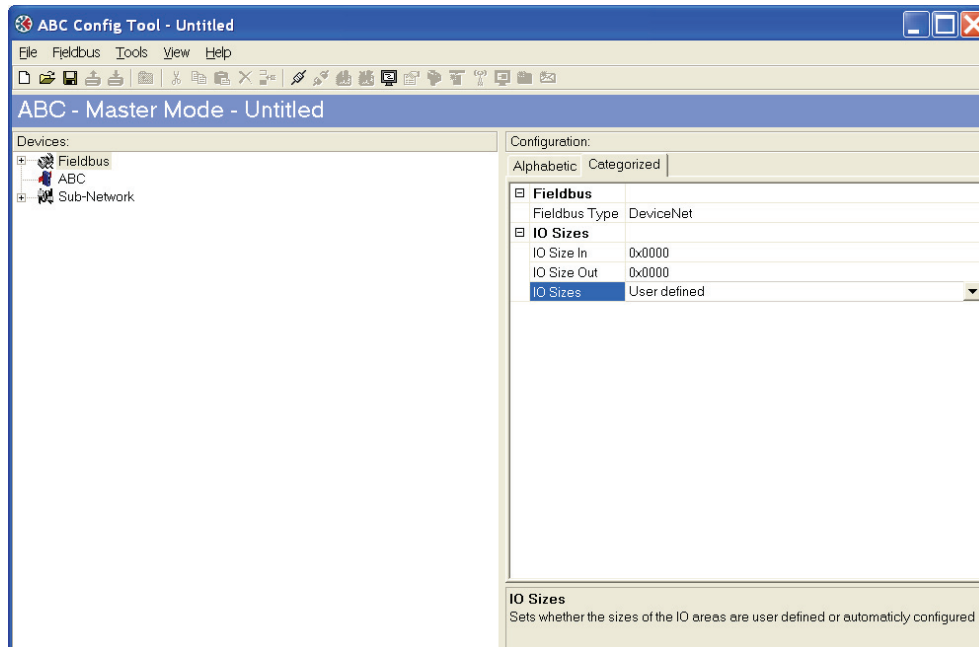


Figure 14 Configuring the Communicator

5.2 X-gateway configuration

Use the HyperTerminal on a PC and configure the X-gateway, connect a serial cable between the PC and the config port on the X-gateway. Open the "File" menu and click on new, choose the desired COM port and click OK. The following window will appear.

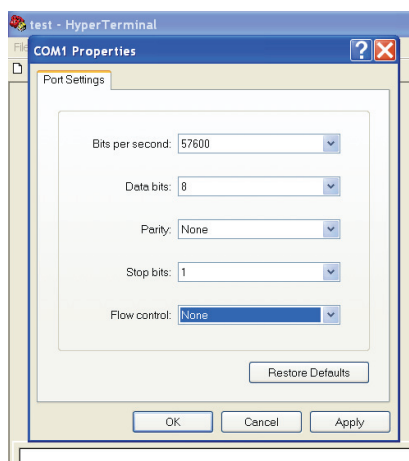


Figure 15 Configuring the connection in the HyperTerminal.

Make sure the settings are identical to those shown in the window above. An alternative method is to download the HyperTerminal session file from HMS website, double click on it and select COM port.

Connect and press ESC and the following menu will appear.

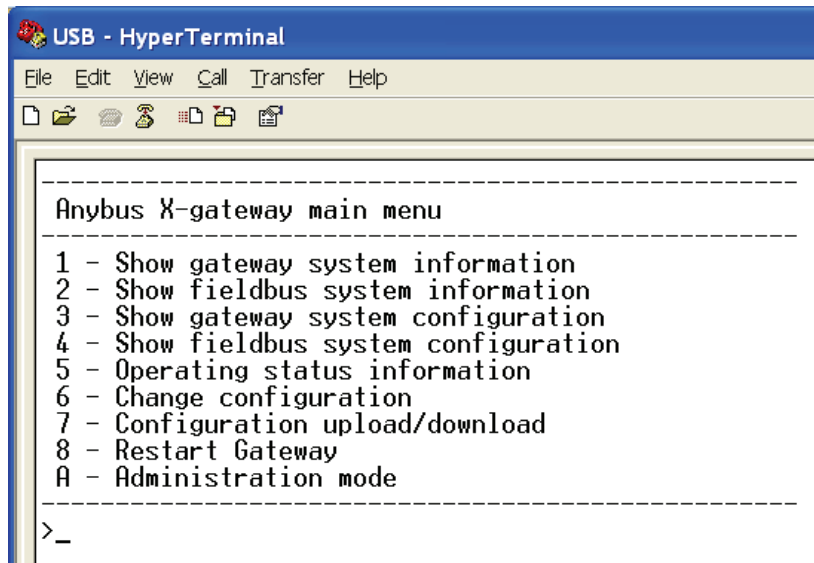


Figure 16 Anybus X-gateway Main menu.

Press 6 and enter the desired configuration. The figure below shows an example; in this case a DeviceNet/Ethernet ModbusTCP X-gateway is used and 20 bytes of I/O data is configured.

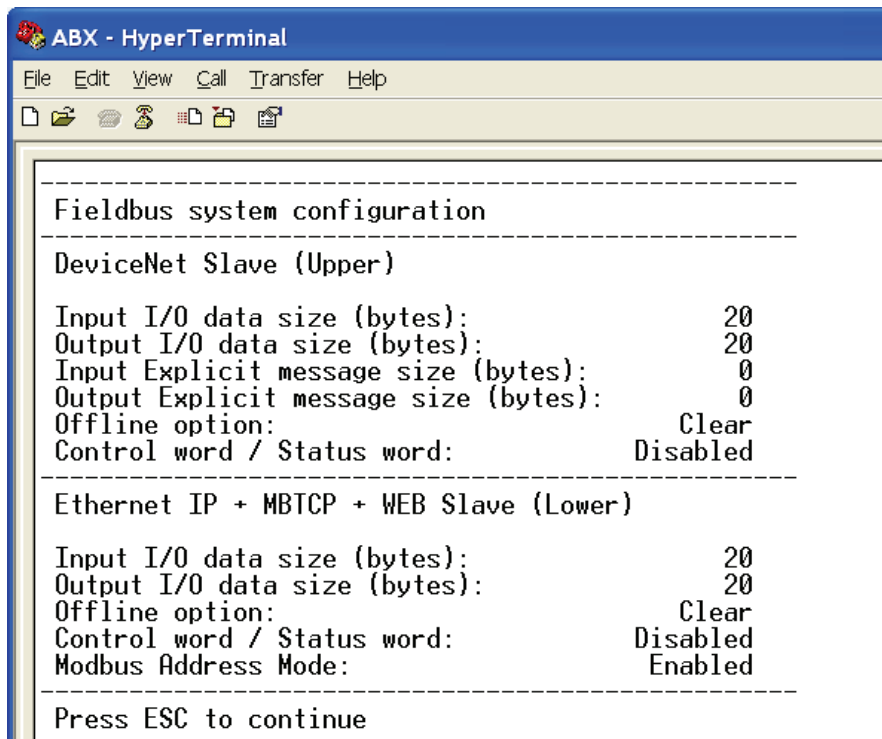


Figure 17 The X-gateway configuration.

The explicit data is used for acyclic parameter data. The parameter data is sent by request of the scanner while the I/O data is sent on a cyclic basis. For a more detailed description see the X-gateway DeviceNet Adapter Interface, Network Interface Addendum.