How to configure an EtherNet/IP adapter module with RSLogix 5000

More info about the network and products

For further information about the Anybus products, please consult the HMS homepage, www.anybus.com. The latest manuals, EDS-files etcetera can be downloaded from that location.

For more information concerning the EtherNet/IP network the Open EtherNet/IP Vendor Organization has a webpage. Please visit, www.odva.org, for more information about EtherNet/IP.

For information concerning the PLC refer to the Rockwell Automation homepage www.automation.rockwell.com

Document history

Revision	Date	Description	Author
0.10	2003-04-16	Document created	Joakim Wiberg
0.20	2003-07-30	Updated layout	Joakim Wiberg
2.00	2007-07-20	Created	Thorbjörn Palm
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Contents

1. Applicable Anybus products

Description	Name / Type
Anybus X-gateway	EtherNet/IP
Anybus Communicator	EtherNet/IP
Anybus-S Slave	EtherNet/IP
Anybus-PCI	EtherNet/IP
Anybus-CompactCom	EtherNet/IP
Anybus-IC	EtherNet/IP

2. Requirements

Description	Name / Type	Version
Rockwell PLC	ControlLogix5000	n.a.
PLC software	RSLogix 5000	13.04.00
Anybus IPconfig tool	Anybus IPconfig	1.3.1.1
X-gateway Network Interface Addendum	Anybus X-gateway Ethernet Slave Interface, Network Interface Addendum	1.02
X-gateway User Manual	X-gateway Generic User Manual	1.02
Communicator User Manual	Anybus Communicator for Ethernet, User Manual	2.01
Slave Fieldbus Appendix	Anybus-S EtherNet/IP, Fieldbus Appendix	1.52
IC Fieldbus Appendix	Anybus-IC EtherNet/IP, Fieldbus Appendix	1.52
CompactCom Network Interface Appendix	CompactCom EtherNet/IP, Network Interface Appendix	2.10
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.

3. Solution overview

This application note describes how to configure an Anybus EtherNet/IP adapter module with a Rockwell PLC using RSLogix 5000. 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 PLC and network configuration is explained.

2. Secondly the configuration of the IP-settings and the I/O data of the Anybus module are described.

Note: This document is valid for all Anybus Slave EtherNet/IP products, however sections marked with *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, EtherNet/IP networks and HMS Communicator and X-gateway.
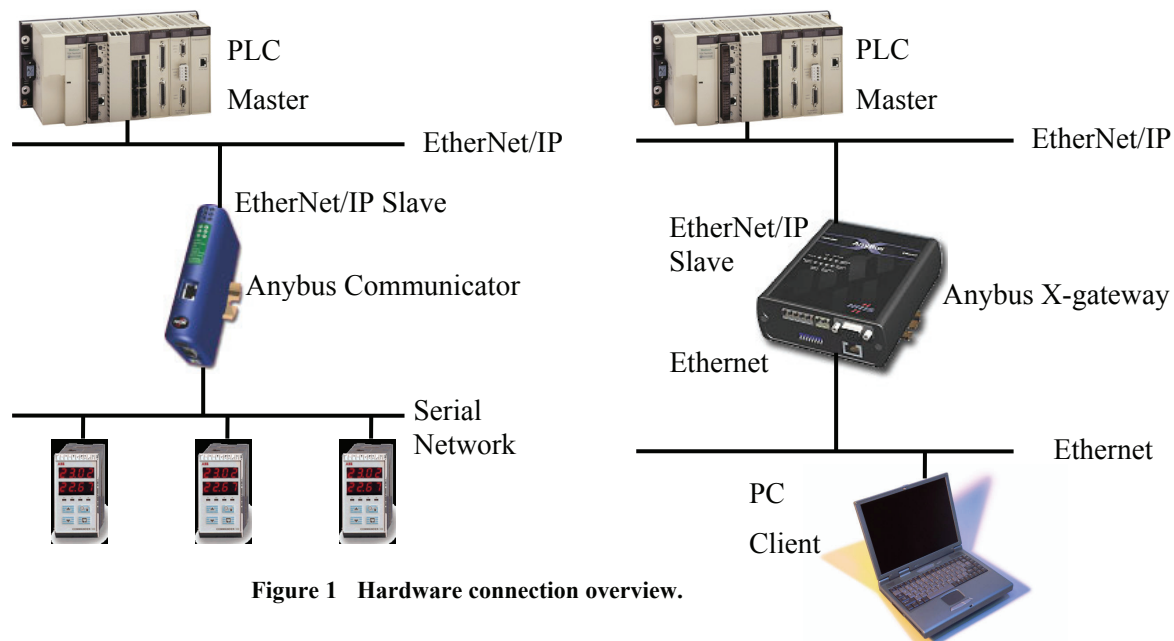

Figure 1   Hardware connection overview.

4. EtherNet/IP configuration

To configure the PLC and the EtherNet/IP network the tool RSLogix 5000 is used. Firstly the PLC needs to be configured and secondly the EtherNet/IP network. Start the RSLogix 5000 program and follow the steps below.

4.1. PLC configuration

Either create a new project or use an existing. To create a new configuration, open the file menu and select new. In the appearing dialogue select the desired type of PLC, in this case the type 1756-L55 is used. Also enter a name for the controller and select chassis type, slot number and project path. To accept the settings press OK.
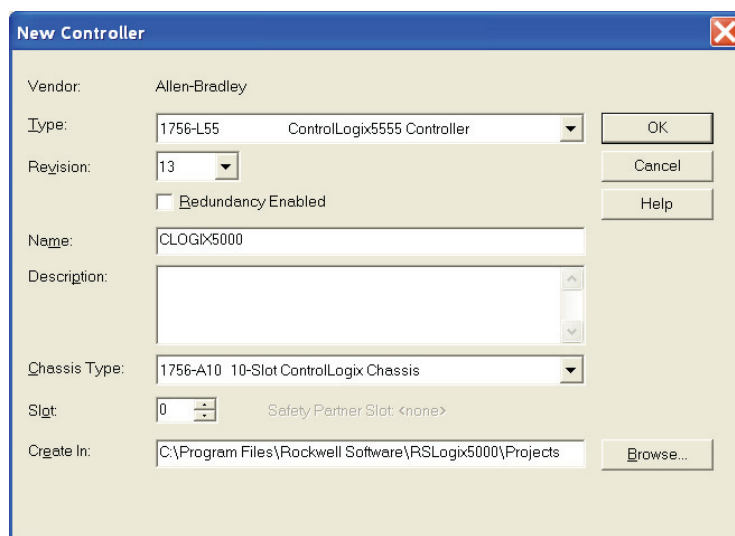

Figure 2   Adding the PLC to the configuration.

Then add the Ethernet I/O module. Right click on the I/O configuration directory in the navigation list to the left as seen below.
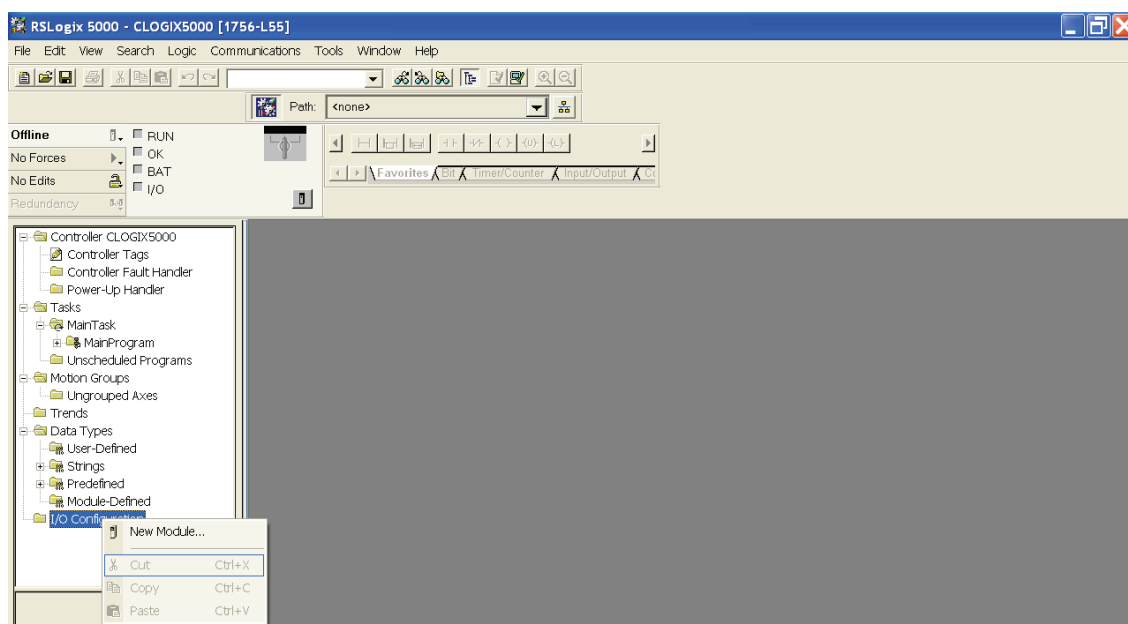

Figure 3   Adding the Ethernet module.

Click on new module and select the desired Ethernet module, in this case the Ethernet Bridge. This module is the scanner module in the PLC.
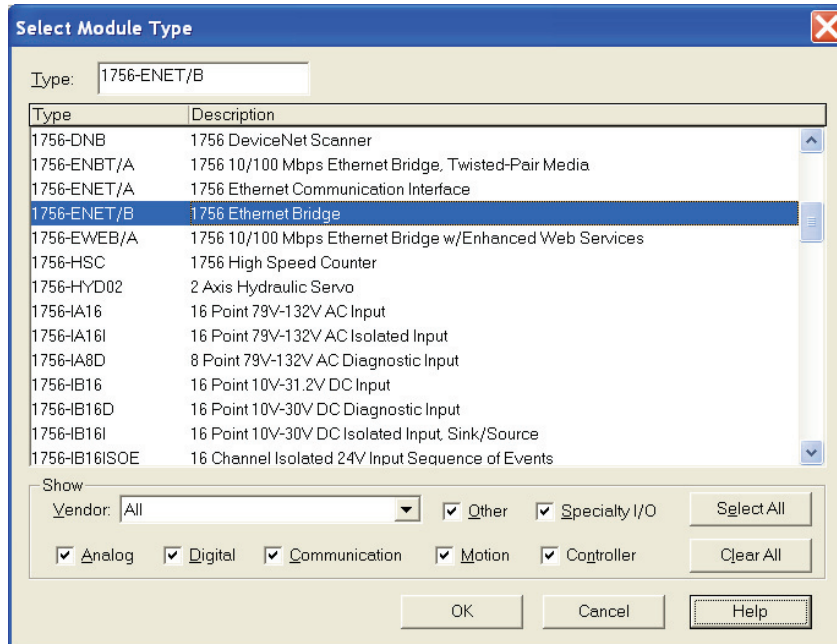

Figure 4   Selecting the type of module.

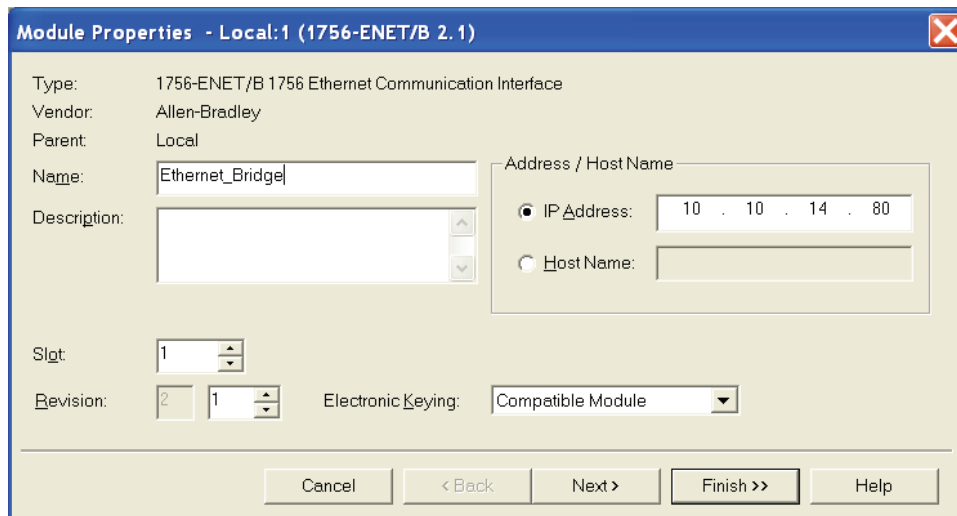Then enter the desired settings and press finish.

Figure 5   Configuring the settings for the Ethernet module.

4.2. EtherNet/IP network configuration

The second step is to configure the EtherNet/IP network and adding the Anybus-S Slave module to the configuration in the PLC. Begin with setting the program in "Offline" mode❶. Then right click on the EtherNet/IP bridge in the I/O configuration, and select "New Module"❷.
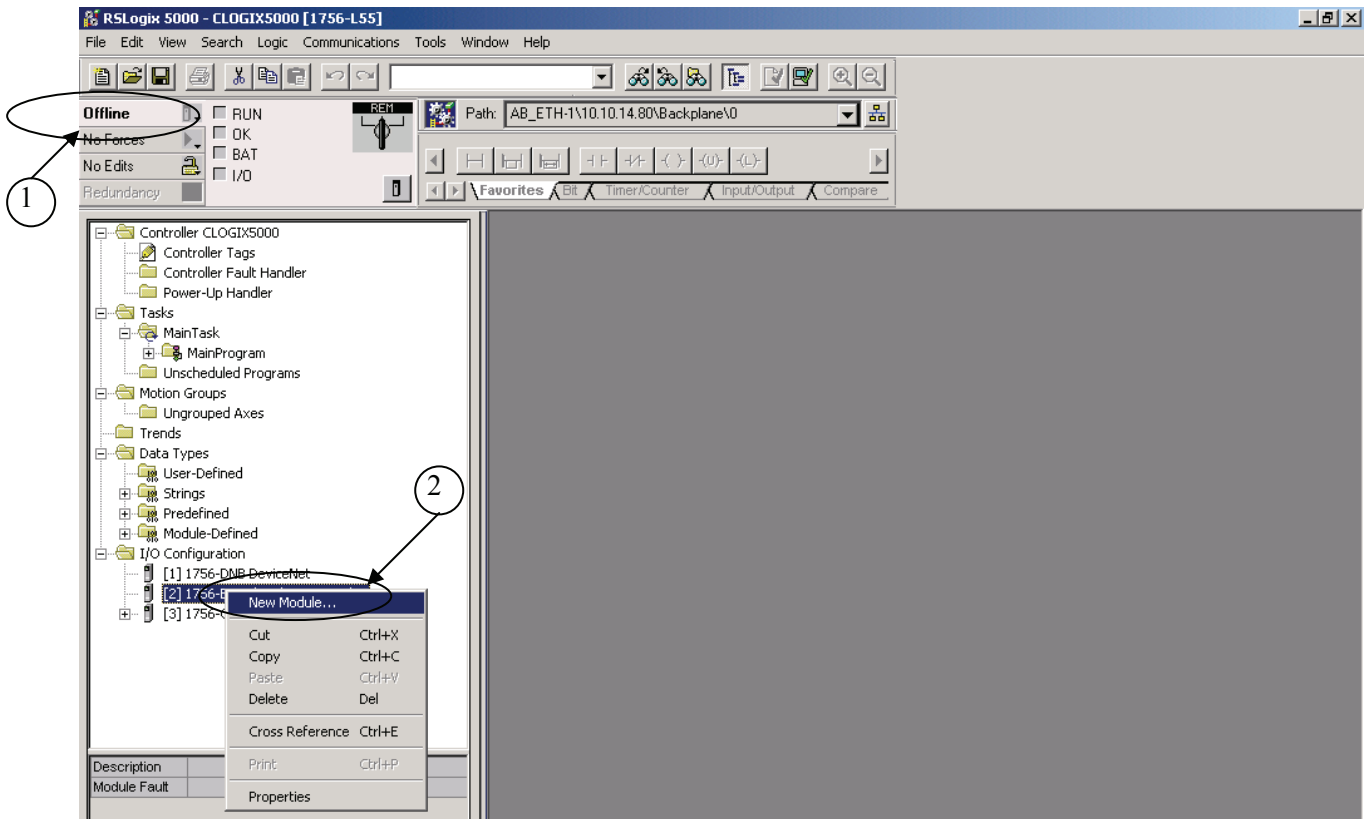

Figure 6   Adding the Anybus module.

Now a dialogue window will appear. In this dialogue window, select "Generic Ethernet module" and press OK.
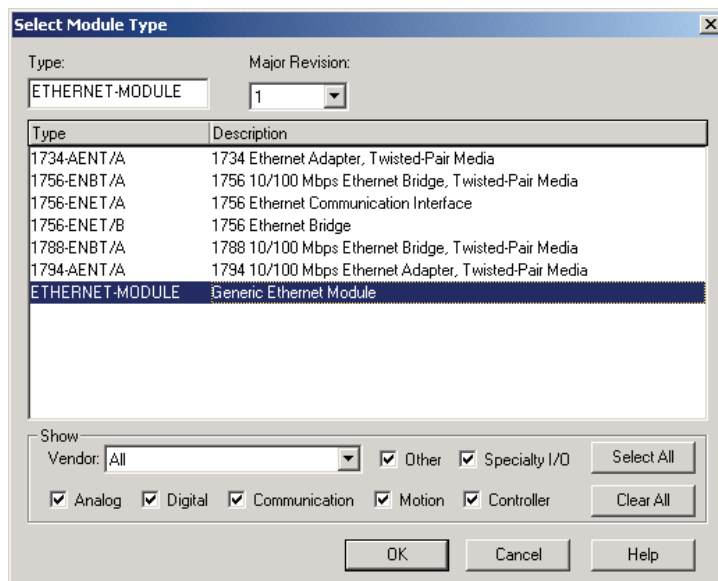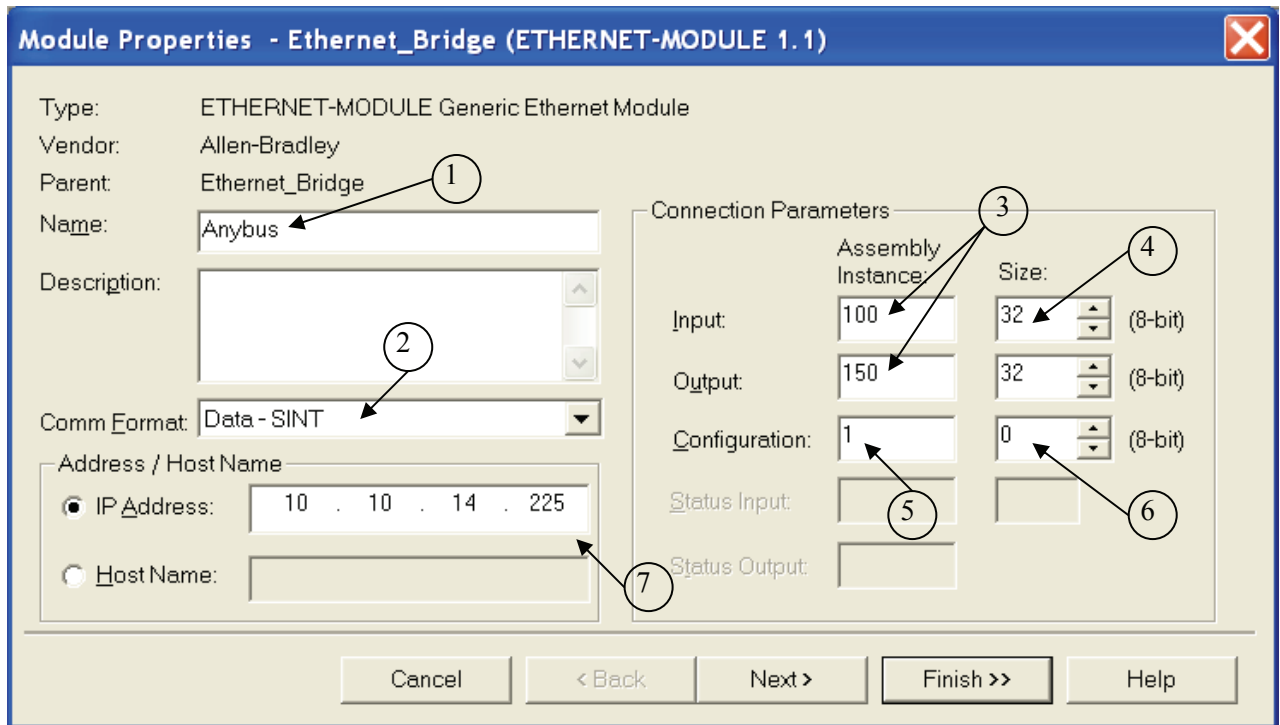

Figure 7   Selecting the Generic Ethernet Module.

In the next dialogue window, RSLogix 5000 will ask for information regarding the communication to the Anybus-S Slave module. First enter a name for the Anybus-S Slave module❶. In the example below we call it "Anybus". This name will create a tag in RSLogix 5000, which can be used to access the memory location in the PLCs memory where the data for the Anybus-S Slave module will be stored. A description can also be added, but that is optional.


Figure 8 Configuring the module properties.

Next step is to select the "Comm Format", which tells RSLogix5000 the format of the data❷. In our example, we have selected Data-SINT, which will represent the data in the Anybus-S Slave module as a field of 8-bit values. It is also possible to select Data-INT, which will represent the data as 16-bit values, and Data-DINT, which will represent it as 32 bit values.

I/O data is accessed in input instance 100 and output instance 150, so these values have to be entered as the instance values for input and output❸. The size of the input connection and the output connection shall correspond to the size that we have configured the Anybus-S Slave module for. In our case we are using 32 8-bit values of input and output data, so that is the size that we enter❹. 32 in this case stands for 32 instances of 8 bits. If we had been using Data-INT or Data-DINT, we would have to recalculate the size to match the data type, so Data-INT would have been 16 16-bit values, and Data-DINT would have been 8 32-bit values.

The Anybus-S Slave module does not have a configuration assembly instance by default, but RSLogix5000 requires a value for this anyway. An instance value of 0 is not a valid instance number, but any non-zero value will work, here we have selected the value 1❺. The data size of the configuration instance has to be set to 0, otherwise the configuration instance will be accessed and the connection will be refused❻. As a final step we enter the IP address that we have configured for the module, here 10.10.14.225❼.

The next step is to press next.
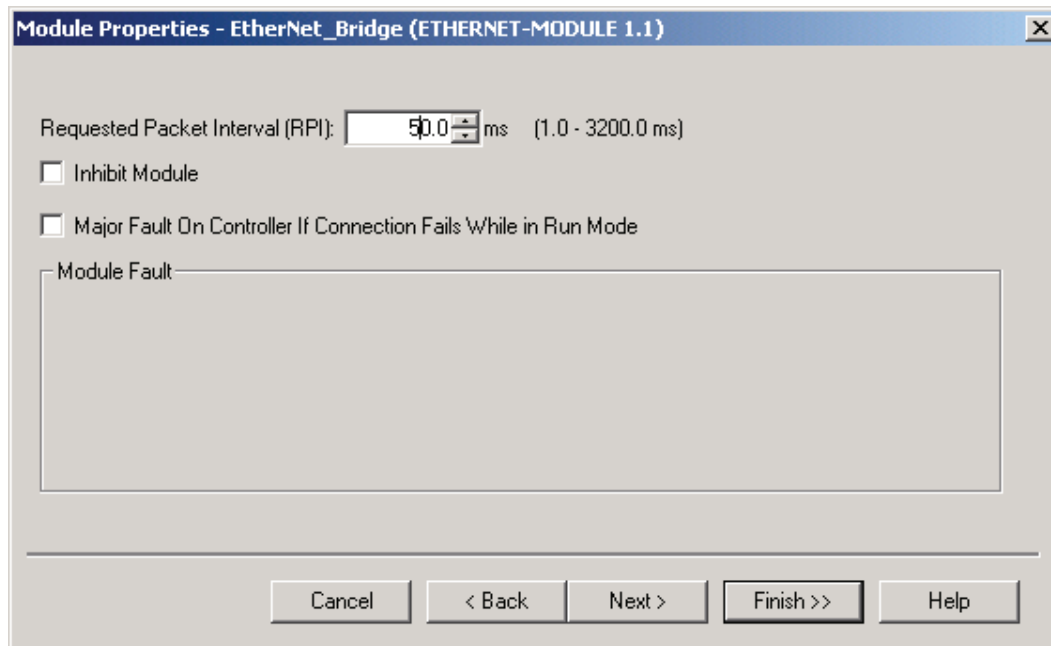
Figure 9   Configuring the scan interval.

In this dialogue we will enter a value for the time between each scan of the module. In this example, we have set the interval to 50 ms to reduce the network load. Make sure that "Inhibit Module" isn't checked. After this, press finish.

Now the Anybus-S Slave has been added to the I/O configuration in RSLogix 5000. The main screen will look as follows.
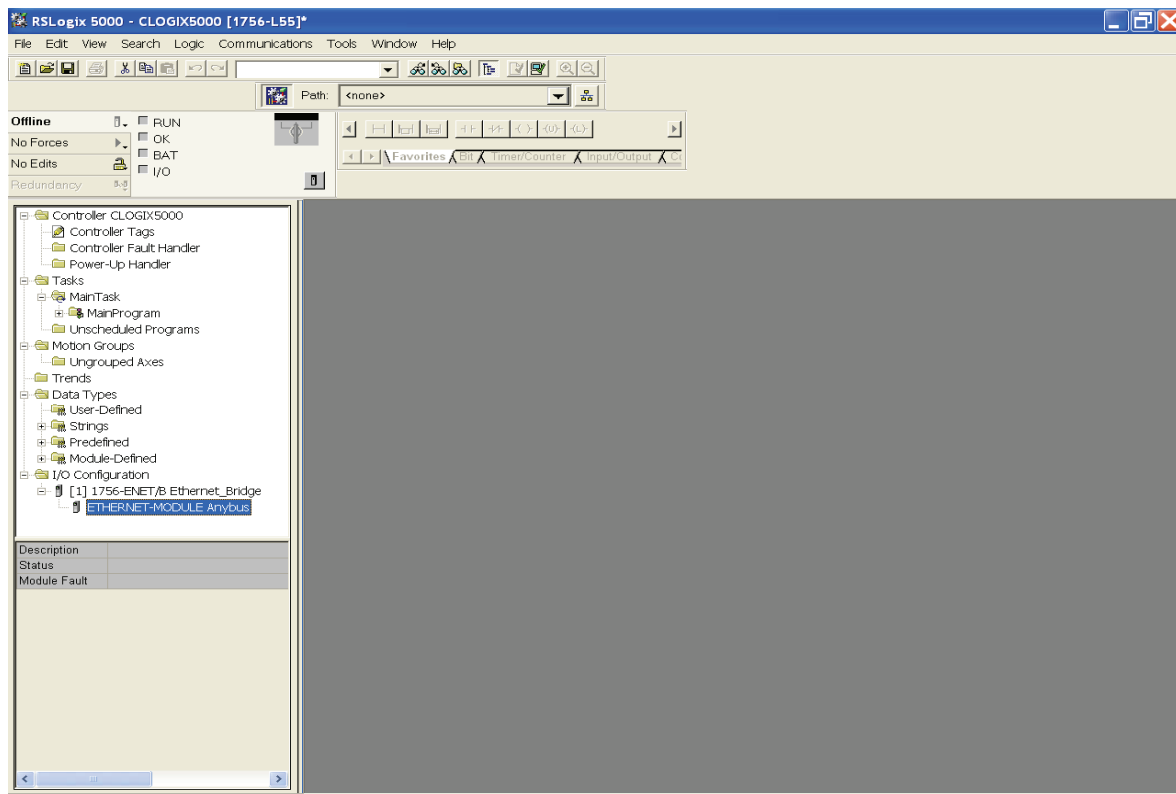
Figure 10 The main screen when the configuration is completed.

4.3. Downloading the configuration to the PLC

First select the communication path. This can be done by opening the Communications menu and selecting the Who Active command. Select the desired communication path as seen below.
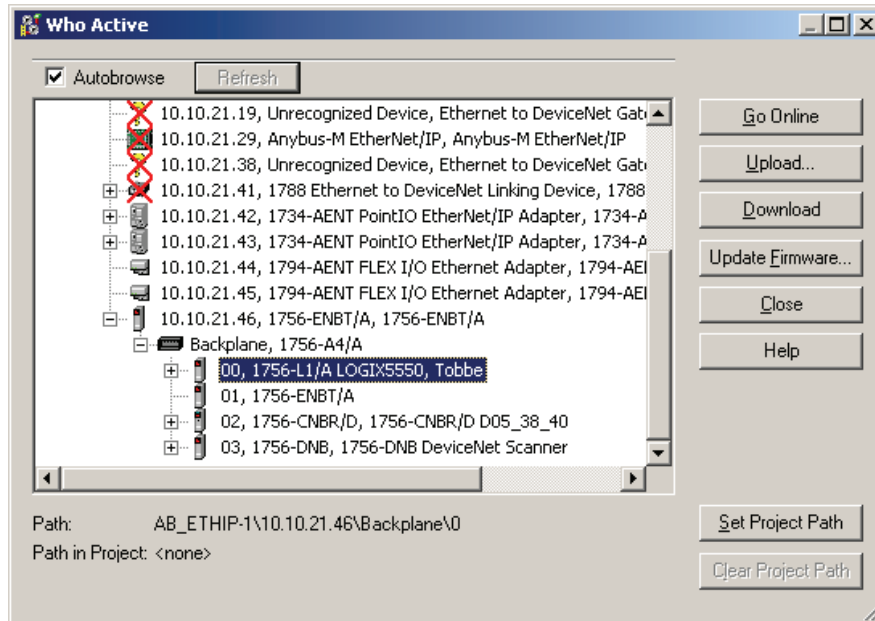

Figure 11 Configuring the communication path.

Select "Go Online" from the "Communications" menu.
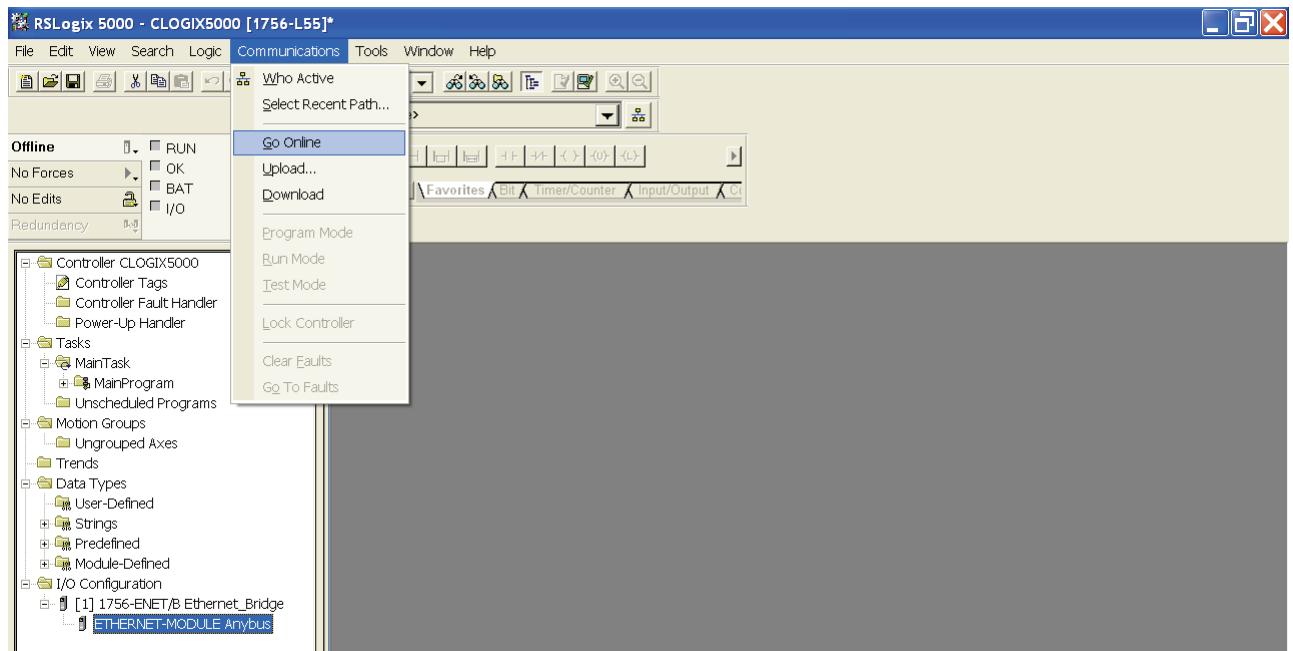

Figure 12 Opening the online window.

A new window appears, select "Download".
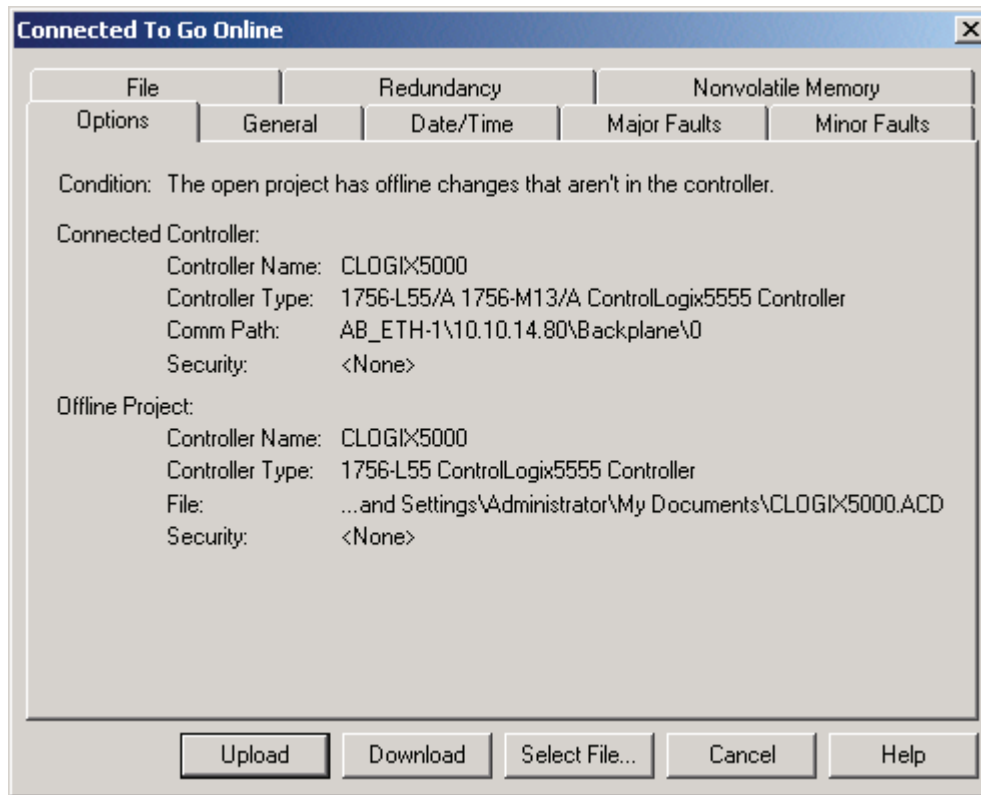
Figure 13 The download window.

A new window will popup with the question if you actually want to download the configuration, select "Download". The configuration will now be downloaded to the PLC.
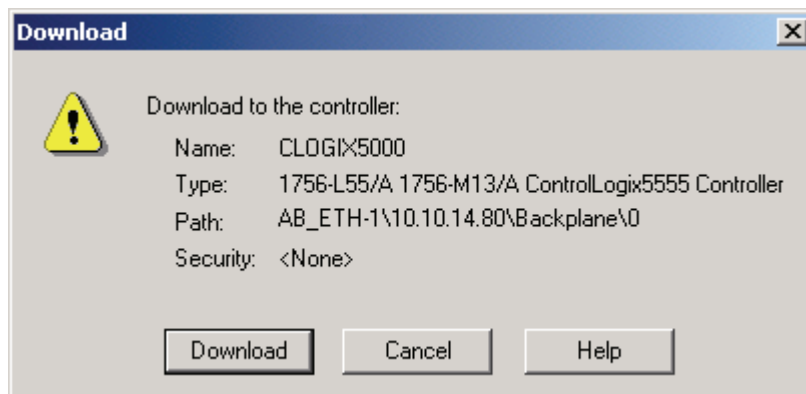
Figure 14 Downloading the configuration to the PLC.

If there are any errors, a warning triangle will be present on the Anybus-S Slave in the I/O configuration listing. Double click the module to view any error that is reported.

5.   Anybus configuration

The Anybus module has to be configured for the same I/O size and IP-settings as in the PLC configuration. The configuration of the IP-settings and the I/O sizes is described in the two following chapters. In the subsequent two chapters the configuration of the Anybus Communicator and Anybus X-gateway is explained in detail.

5.1.   IP settings

Make sure each node on the network has a unique IP address. The IP settings of the Anybus EtherNet/IP modules can be configured in various ways. It is recommended to use the Anybus IPconfig tool for configuring the IP-settings. The Anybus IPconfig tool can be used to configure the IP settings of all Anybus EtherNet/IP modules. The program can be downloaded at HMS website[1]. Start the program and the main window will be opened.
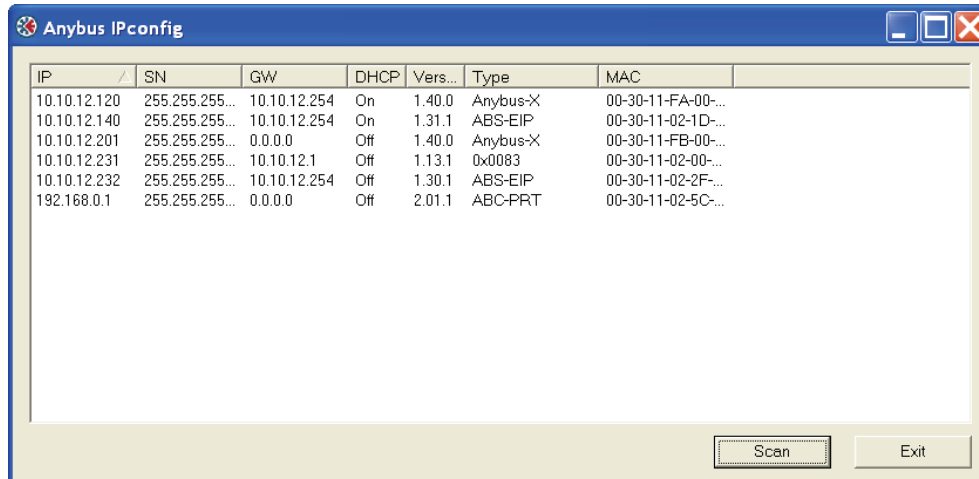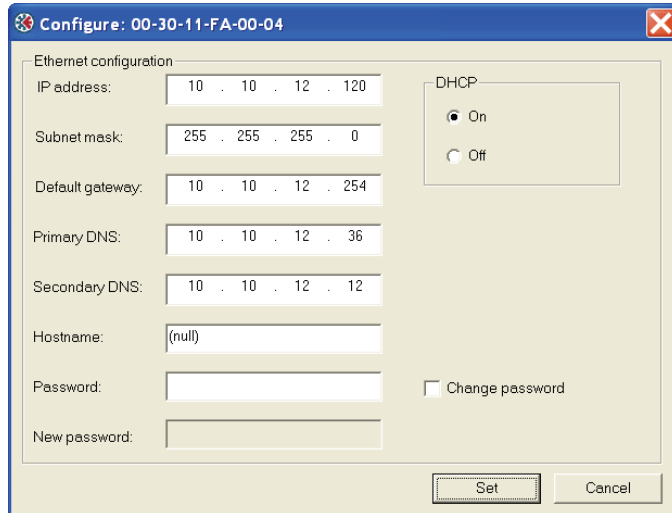

Figure 15 The Anybus IPconfig tool.

The program scans the network for Anybus Ethernet modules.

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[1] www.anybus.com

The settings can be configured manually or the DHCP function can be used. For the Anybus Ethernet modules DHCP is activated by default. To change the settings manually, double click on the desired module and enter the desired IP-settings as seen below.

Figure 16 Configuring the IP settings.

As mentioned before there are other ways to configure the IP settings. The IP settings can also be configured by sending ARP commands or using the web interface in the module, see the Anybus-S Ethernet/IP Fieldbus Appendix for details. See the notes below for more product specific information.

Note for the Anybus-S Slave, and Communicator:
DIP switches 1-8 set the last part of the IP address, 192.168.0.xxx. The switches will be found next to the indication LEDs on the Communicator and the Slave Interface. The modules can also be configured by mailbox commands or by the ethcfg.cfg configuration file.

Note for the X-gateway:
The X-gateway can be configured by the DIP switches as described above or by the ethcfg.cfg configuration file.

Note for the Anybus PCI card:
The module can be configured by mailbox commands or by the ethcfg.cfg configuration file.

Note for the Anybus-IC:
For the Anybus–IC for EtherNet/IP the configuration is depending on the application. The IP address is set by the IP configuration parameters or, if mounted, by switches.

Note for the Anybus CompactCom:

The Anybus CompactCom can be configured by the network configuration object.

For further instructions see the respective manual or appendix.

5.2. I/O configuration

The Anybus product has to be configured for the same I/O sizes as set up in the PLC configuration. The configuration procedure is depending on the type of module. See the notes below.

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

Note for the Anybus-S Slave Interface and the Anybus PCI card:

The Anybus Slave Interface and the Anybus PCI card are configured by the host application interface. Refer to the Fieldbus Appendix for details.

Note for the Anybus CompactCom and the Anybus-IC:

The Anybus CompactCom and the Anybus-IC are configured by messages sent by the application. Refer to the Anybus-IC Fieldbus Appendix and the Anybus CompactCom Network Interface Appendix for details.

Note for the Anybus Communicator and the Anybus X-gateway:

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

5.3.   Communicator configuration

To configure the Communicator start the ABC Config Tool and start a new project. Select the fieldbus EtherNet/IP and the desired I/O data size. In this case Automatic I/O size is used.

Figure 17 Configuring the Fieldbus.

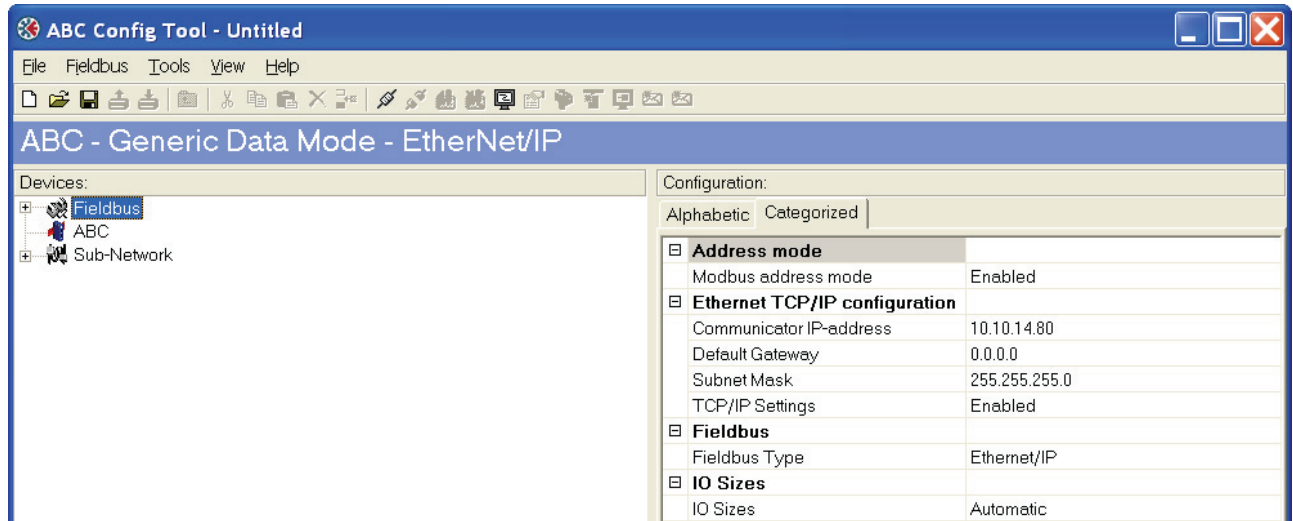*Note: Using the Automatic setting for the IO size, the amount of data configured for the fieldbus is depending on the sub-network configuration. The fieldbus I/O data will in that case be of the same size as configured for the sub-network.*

The Anybus Communicator is configured for generic data mode; all other values are left at their defaults.
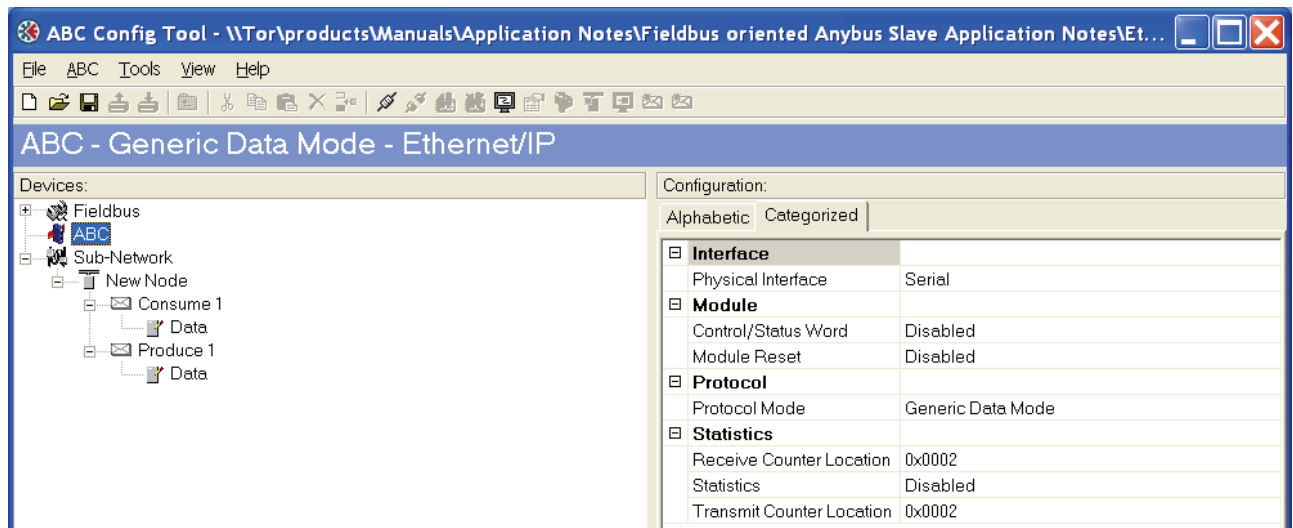

Figure 18 Configuring the Communicator.

The next step is to configure the sub-network.
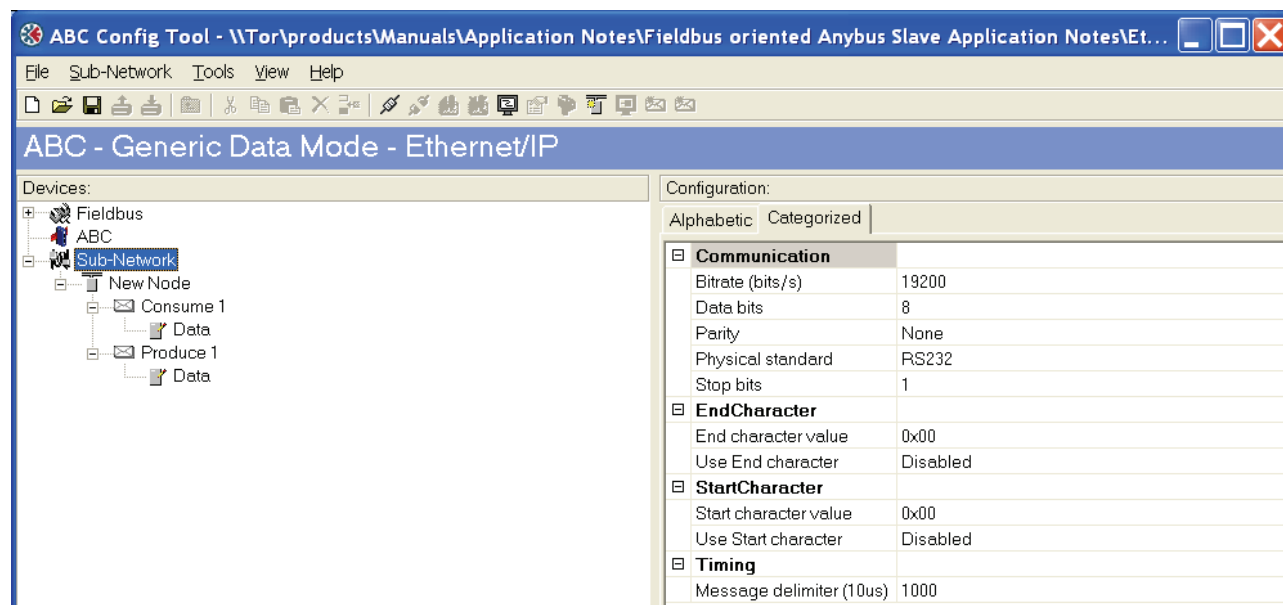
Figure 19 Configuring the sub network.

Right click on new node and add a consume and a produce transaction as shown above. Change the Offline timeout time for the consume transaction to 2000 ms and the update time for the produce transaction to 1000 ms. Right click on the produce and consume transaction respectively and select add data. In this case 32 bytes of data is used.

Note: The update time for the produce transaction is to be set to less than the offline timeout time for the consume transaction; in this case the update time is set to 1000 ms and the offline timeout time to 2000 ms.

5.4.   *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 then click on OK. The following window will appear.
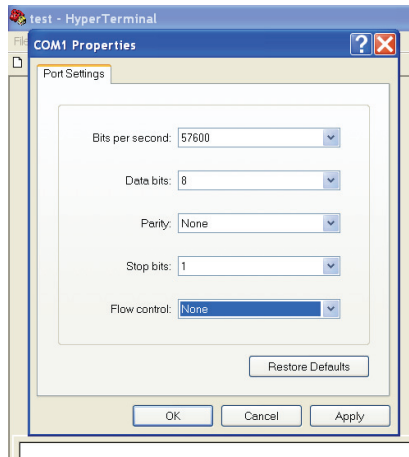
Figure 20 Configuring the connection in the HyperTerminal.

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.

Connect and press ESC and the following menu will appear.

Figure 21 Anybus X-gateway Main menu.

Press 6 and enter the desired configuration. The figure below shows an example; in this case an EtherNet/IP-DeviceNet master X-gateway is used and 32 bytes of I/O data is configured.

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[2] www.anybus.com

```
USB - HyperTerminal
File  Edit  View  Call  Transfer  Help

-------------------------------------------------
 Fieldbus system configuration
-------------------------------------------------
 DeviceNet Master (Upper)

 Input I/O data size (bytes):           512
 Output I/O data size (bytes):          512
 Input Explicit message size (bytes):     0
 Output Explicit message size (bytes):    0
 Offline option:                       Clear
 Control word / Status word:           Disabled
 Live list:                            Disabled
-------------------------------------------------
 Ethernet IP + MBTCP + WEB Slave (Lower)

 Input I/O data size (bytes):            32
 Output I/O data size (bytes):           32
 Offline option:                       Clear
 Control word / Status word:           Disabled
 Modbus Address Mode:                  Enabled
-------------------------------------------------
 Press ESC to continue

-
```
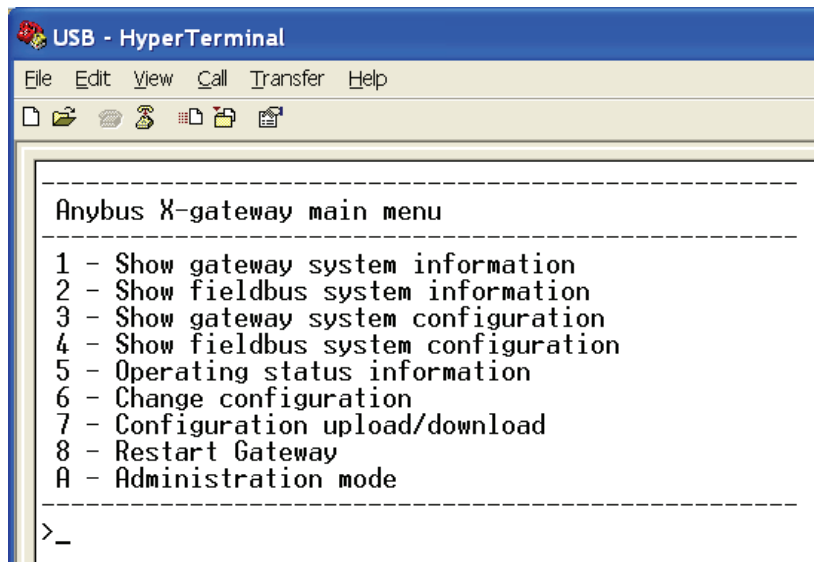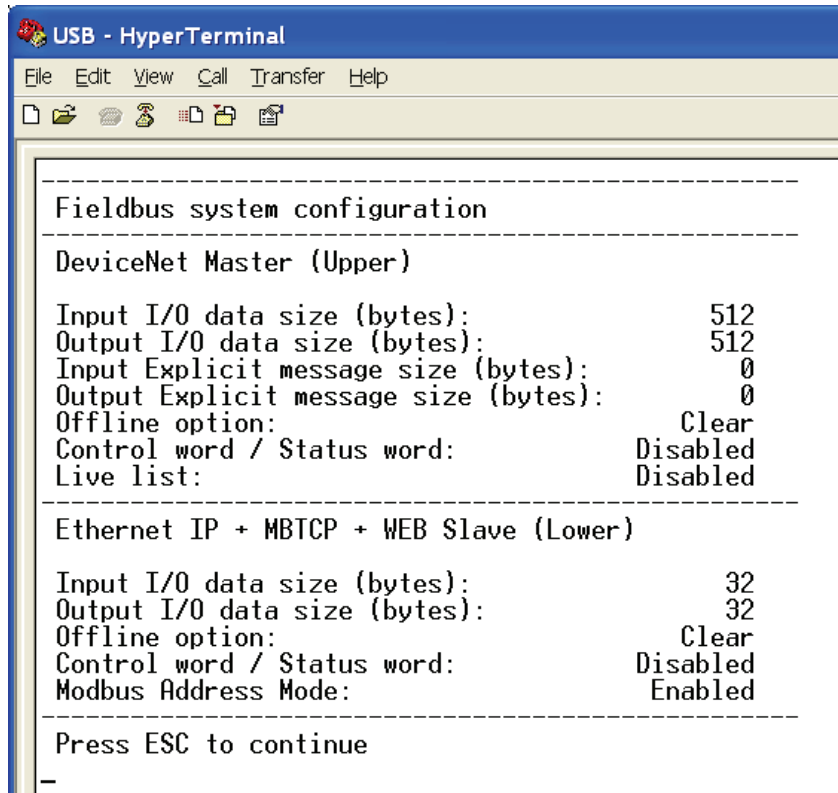
Figure 22 The X-gateway configuration.

6. Testing

Now it is possible to access the data exchanged by the ControlLogix 5000 and the Anybus-S Slave module. In this case the Anybus Communicator with a loop dongle at the serial port for test purpose is used. The following chapters explain the editing of the tags and the monitoring of the tags. By writing and reading data to the tags the communication between the PLC and the Anybus-S Slave module is tested.

6.1. Monitoring the tag

Firstly go online and switch to "Remote Run" on the PLC. To monitor the tags, open the "Controller Tags" window❶ and go to monitor tags❷. Three tags named "Anybus:C", "Anybus:I" and " Anybus:O" is to be visible, representing the three instances configuration, input and output. The configuration instance is created even if we selected its size as zero. The Anybus:I tag is data going from the Anybus-S Slave and Anybus:O tag holds data going to the Anybus-S Slave.
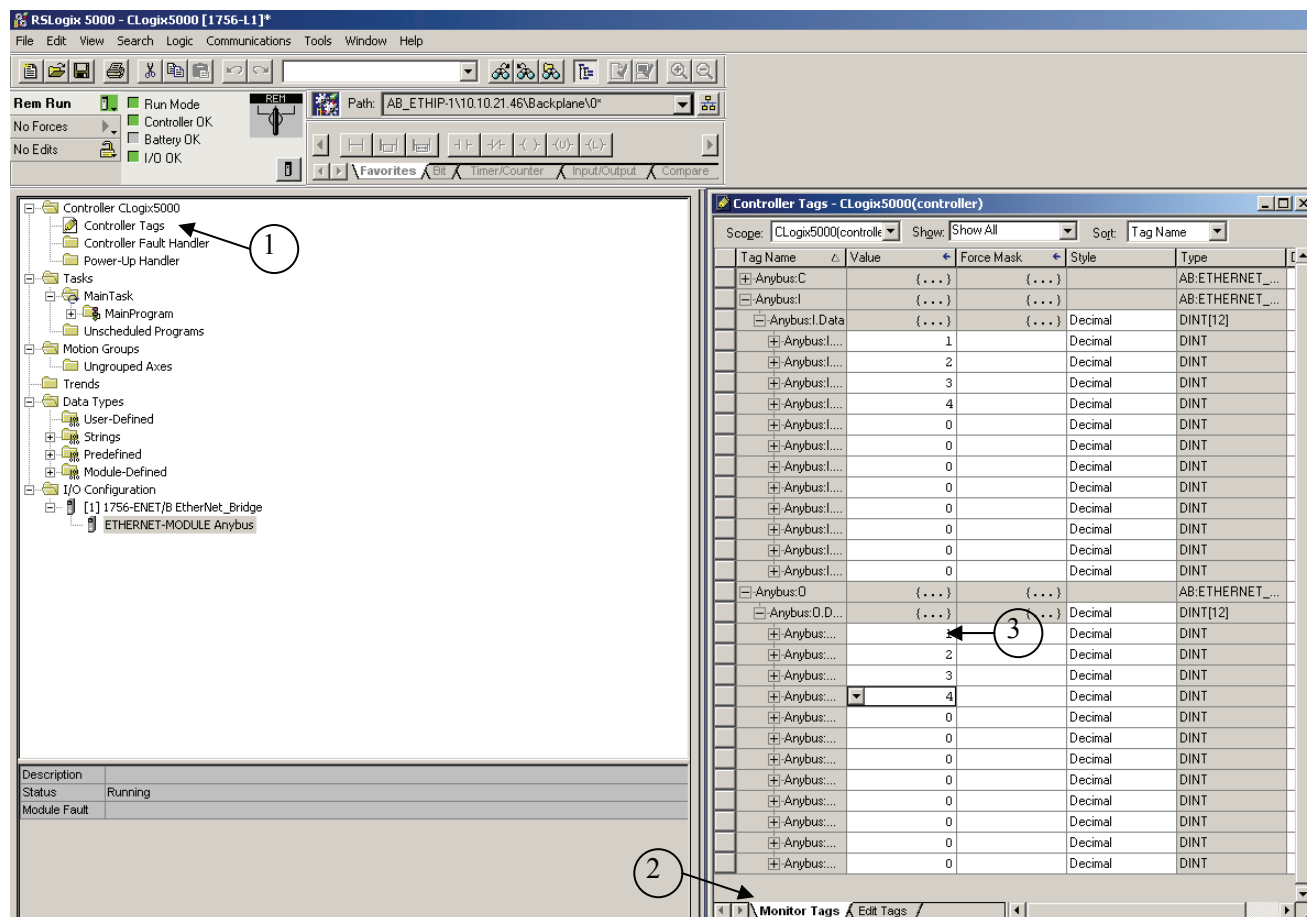
Figure 23 Monitoring the tags.

First enter 01 02 03 04 in the Output Tag, so there is some "data" to read. This can be done just by entering values for the Output tags❸. If the network is correctly configured the corresponding Input Tags will obtain the respective value. The values are depending on the application, in this case the values are just examples.