

Flexi Soft Ethernet IP: Implicit Messaging with Rockwell RSLogix5000



Flexi Soft Gateways



GB

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1 About this Online Help

This Online Help describes the integration from FX0-GENT into a Rockwell PLC by Implicit Messaging

1.1 Software used:

- Rockwell RSLogix 5000

1.2 Hardware Used

- Rockwell PLC ControlLogix 1756 System
- FX0-GENT as of version V2.00.0 (SICK number 1044072)

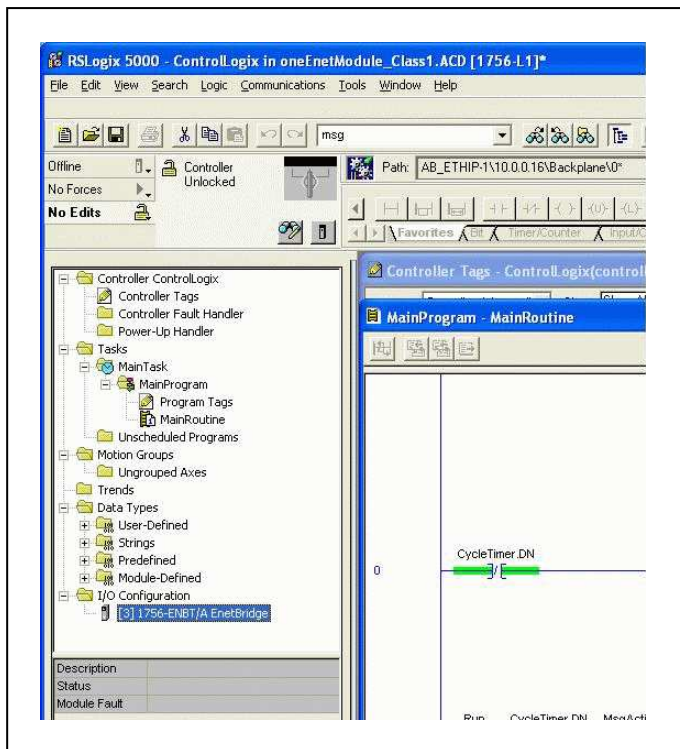
1.2.1 Notes

- RSLogix 5000 only allows one Class 1 connection to an EtherNet/IP device
- For integration with RSLogix no EDS file is needed

2 Configuration

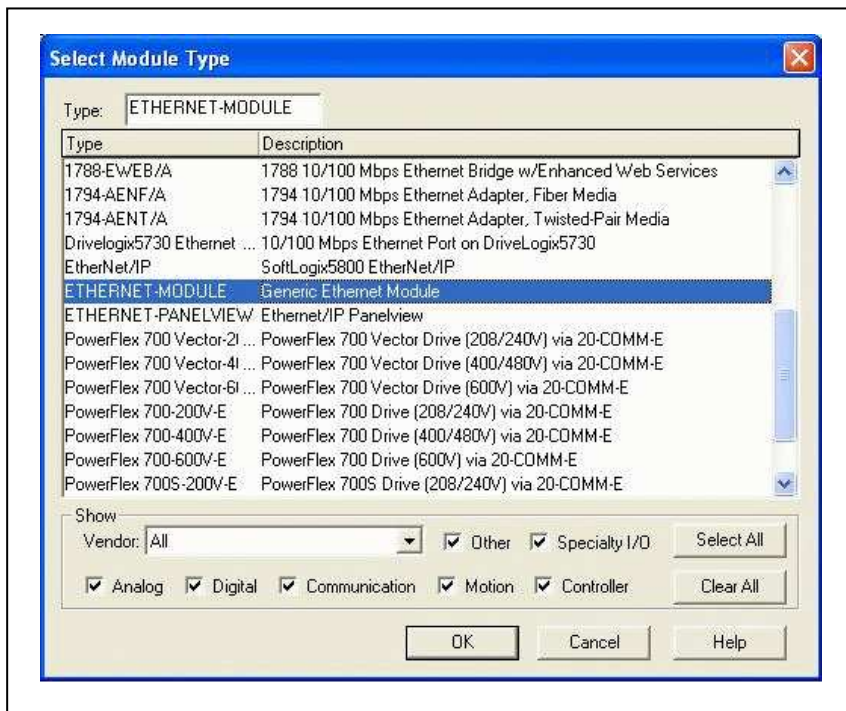
- Right click on the **Ethernet Interface** module
- In the context menu, select **New Module**

Adding a new module in RSLogix 5000



- Select **ETHERNET-MODULE Generic Ethernet Module** from the selection list

RSLogix 5000 module type selection



- Click on **OK**. The Module **Properties dialog** box opens (see e.g. page 10)

- Enter a **Name** for the module
- Enter a **Description** for the module
- Select a **Comm Format** to define the data type

For cyclic two-way connections, valid settings are:

- Data - DINT: 32 bit (long words)
- Data - INT: 16 bit (words)
- Data - SINT: 8 bit (bytes)

For cyclic input only connections, valid settings are:

- Input Data - DINT: 32 bit (long words)
- Input Data - INT: 16 bit (words)
- Input Data - SINT: 8 bit (bytes)

- Enter the **IP Address** of the Flexi Soft EtherNet/IP gateway

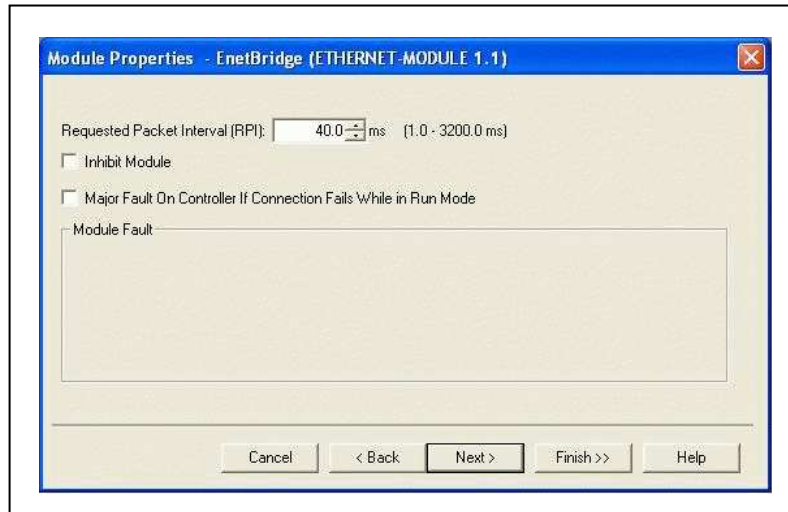
- Enter the **Connection Parameters**:

- Enter the **Input Assembly Instance**.
- Enter the **Input Size** (input data length). Words contain two bytes and long words contain four bytes. Adjust the size according to the required number of bytes
- Enter the **Output Assembly Instance**.
- Enter the **Output Size** (output data length). Words contain two bytes and long words contain four bytes. Adjust the size according to the required number of bytes
- The **Configuration Assembly Instance** is not supported. Set this parameter to any value
- Set the Configuration Size to zero (there are no configuration parameters).

For connection parameter example configurations please see section “Class 1 connection parameter examples” on page 10

- Click on **OK**.
- Enter the Requested Packet Interval

Requested-Packet-Intervall in RSLogix 5000

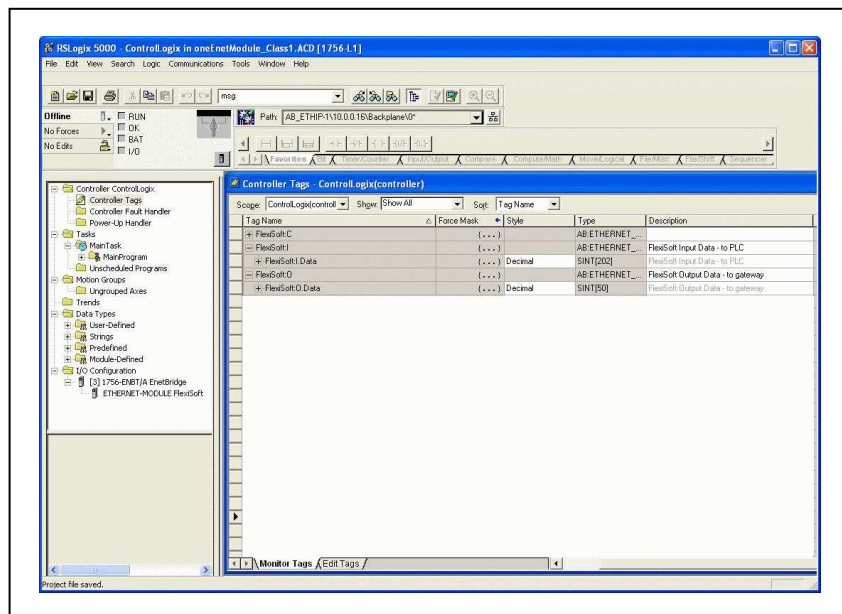


- Enter a value that conforms to the requirements of your system. Please refer to the sections **2.1“Packet update interval”** and **2.2“Bandwidth limitations”** on page 9
- Click on Next >. The Module Information dialog opens

NOTE: The Module Information dialog will not be updated until the program is downloaded to the PLC and the PLC is running.

- Click on **Finish**. The Flexi Soft gateway and the input and output controller tags are now displayed in the main window of RSLogix 5000

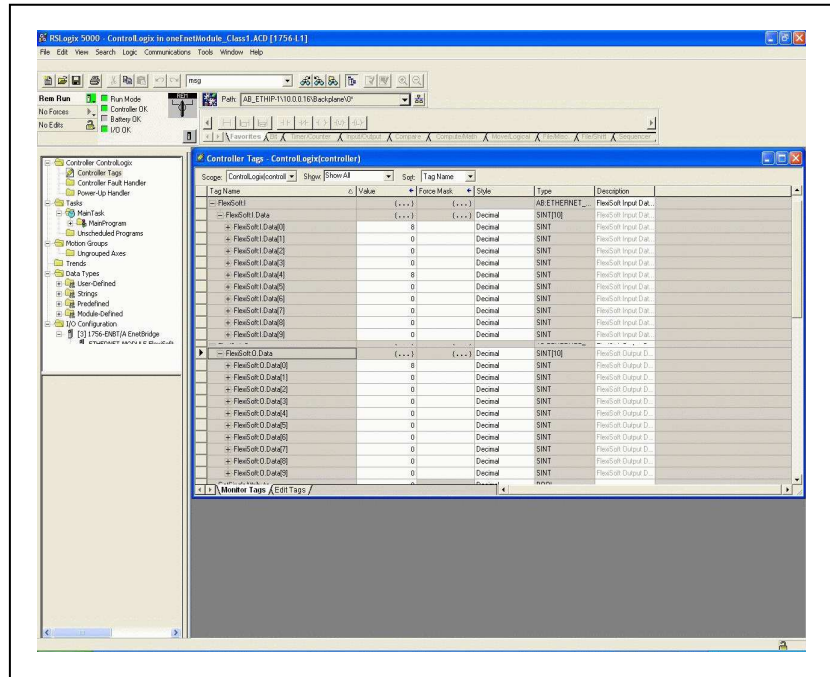
The Flexi Soft EtherNet/IP gateway in the RSLogix 5000 main window while offline



- Save the RSLogix 5000 program
- Download the program to the PLC
- Start the PLC

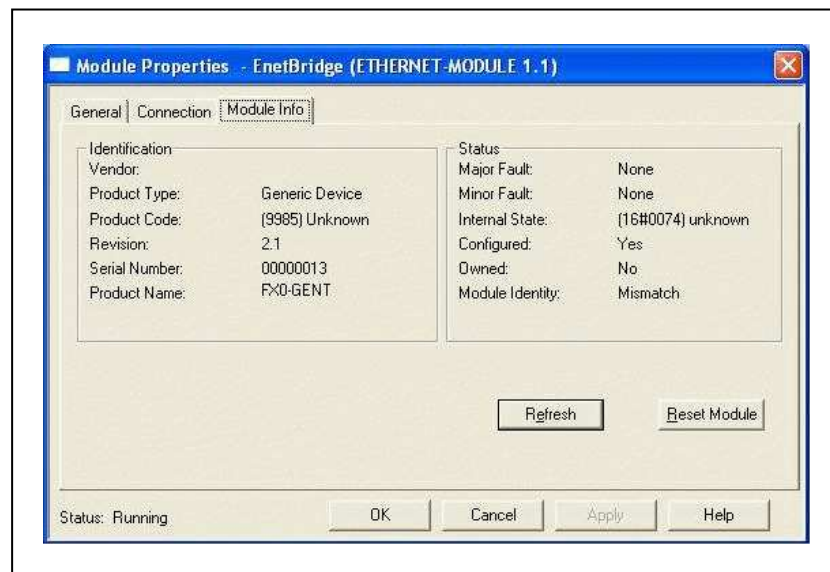
- Click on **Controller Tags** and observe the RSLogix 5000 screen

The Flexi Soft EtherNet/IP gateway in the RSLogix 5000 main window in Run mode



- Right click on the **ETHERNET-MODULE Flexi Soft** in the device tree on the right side of the screen and select the context item **Module Properties** to open the corresponding dialog. Then select the **Module Info** tab

Module Info for the Flexi Soft EtherNet/IP gateway in RSLogix 5000



2.1 Packet update interval

The packet update interval for Class 1 connections that will be returned to the EtherNet/IP PLC in the Forward Open response depends on the following factors:

- the value for the **Requested Packet Interval** received from the EtherNet/IP PLC in the Forward Open message
- the **Maximum PLC Update Rate** as configured in the **Gateway configuration** dialog of the Flexi Soft Designer
- the 10 ms system clock that the EtherNet/IP gateway operates on

If the Requested Packet Interval is less than the Maximum PLC Update Rate, the packet update interval will be set to the Maximum PLC Update Rate. Otherwise, it will be set to the Requested Packet Interval. If the packet update interval is not a multiple of 10 ms (10, 20, 30, 40, etc.), then the packet update interval will be adjusted up to the next multiple of 10 ms.

Examples for the packet update interval

Requested Packet Interval	Maximum PLC Update Rate	Actual packet update interval	Description
5 ms	10 ms	10 ms	Set to Maximum PLC Update Rate
10 ms	10 ms	10 ms	Requested Packet Interval accepted
15 ms	20 ms	20 ms	Set to Maximum PLC Update Rate
15 ms	10 ms	20 ms	Requested Packet Interval adjusted upward to 20 ms
20 ms	25 ms	30 ms	Maximum PLC Update Rate adjusted upward to 30 ms
40 ms	30 ms	40 ms	Requested Packet Interval accepted
32 ms	30 ms	40 ms	Requested Packet Interval adjusted upward to 40 ms
48 ms	40 ms	50 ms	Requested Packet Interval adjusted upward to 50 ms
50 ms	40 ms	50 ms	Requested Packet Interval accepted

2.2 Bandwidth limitations

The maximum number of Class 1 messages per second is limited by the Flexi Soft CPU. At 50% of available CPU bandwidth, this is approximately 200 messages per second or one Class 1 connection at 10 ms I/O update rate (the system clock frequency of the FX0-GENT is 10 ms).

Recommended bandwidths for Class 1 messages

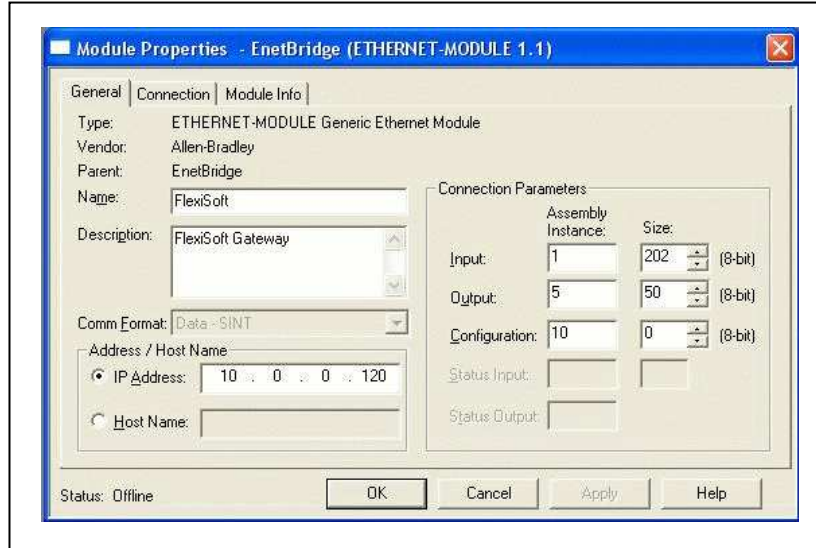
PLC update rate (ms)	Cyclic two-way I/O connections	Cyclic input-only multicast connections
10	1	2
20	2	4
40	Up to 4	Up to 8

NOTE: The gateway will not enforce these bandwidth recommendations. However, if the bandwidth used for Class 1 communication exceeds 200 messages per second, the RS-232 interface and the Ethernet TCP/IP interface will slow down.

3 Class 1 connection parameter examples

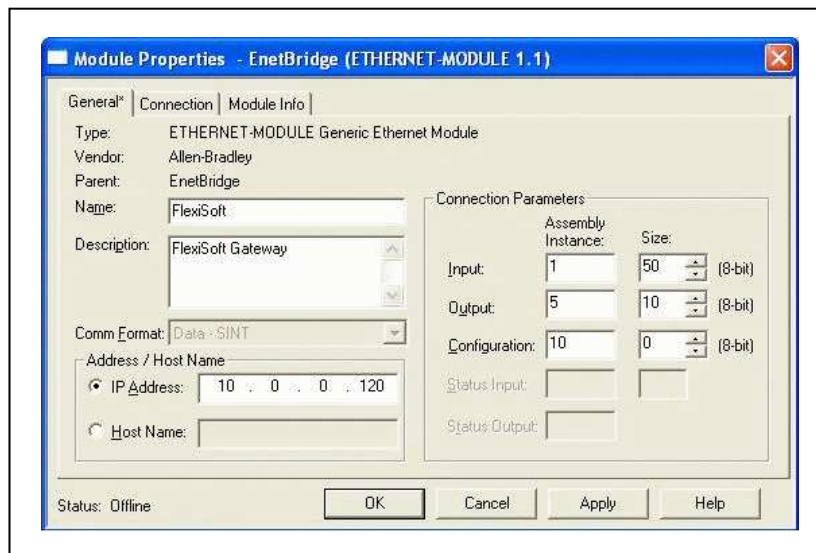
This section shows examples for the required **Connection Parameters** on the **General** tab of the **Module Properties** dialog in RSLogix 5000 in order to get different input data sets and set different output data sets.

Get all input data sets and set all output data sets



This example shows how to select all four input data sets ($50 + 32 + 60 + 60 = 202$ bytes, starting at the beginning of input data set 1 = Assembly Instance 1) and all five output data sets ($10 + 10 + 10 + 10 + 10 = 50$ bytes, starting at the beginning of output data set 1 = Assembly Instance 5). The unit for the size depends on the previously chosen Comm Format (SINT = 8 bit = 1 byte in this case).

Get input data set 1 and set output data set 1

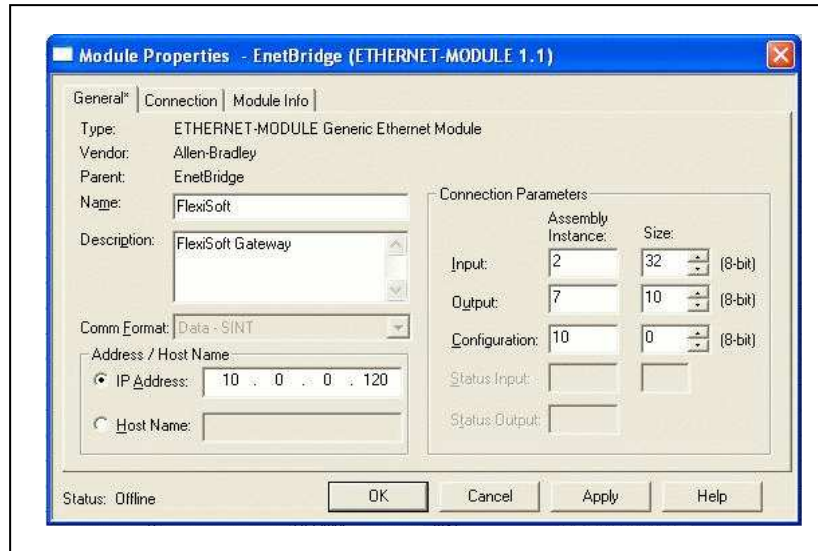


This example shows how to select only input data set 1 (= 50 bytes, starting at the beginning of input data set 1 = Assembly Instance 1) and only output data set 1 (= 10 bytes, starting at the beginning of output data set 1 = Assembly Instance 5). The unit for the size depends on the previously chosen Comm Format (SINT = 8 bit = 1 byte in this case).

Class 1 connection parameter examples

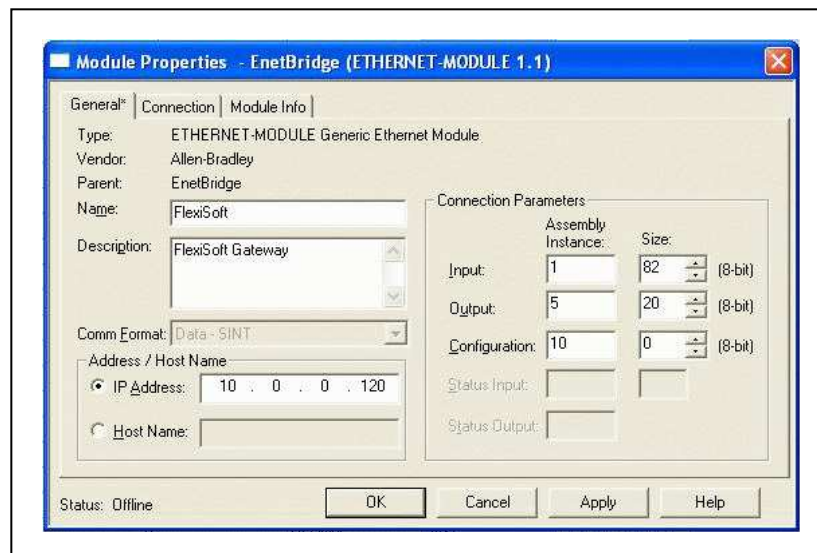
Flexi Soft Gateway

Get input data set 2 and set output data set 3



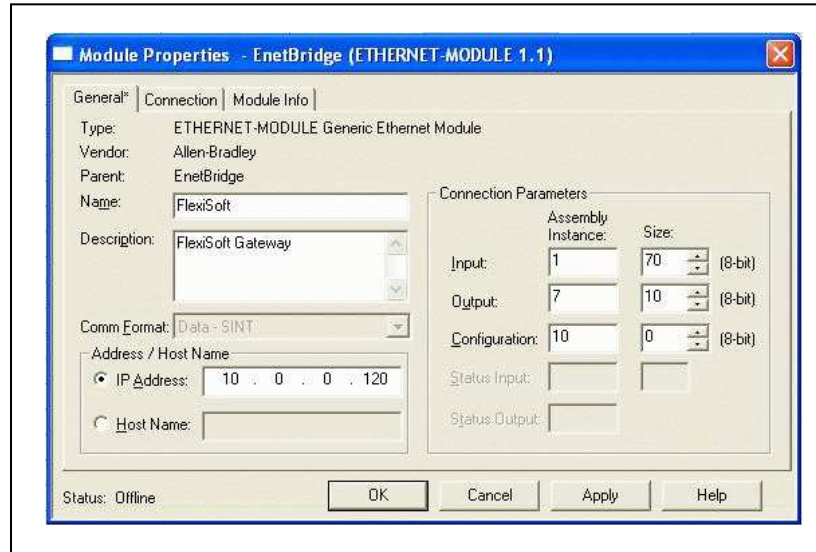
This example shows how to select only input data set 2 (= 32 bytes, starting at the beginning of input data set 2 = Assembly Instance 2) and only output data set 3 (= 10 bytes, starting at the beginning of output data set 3 = Assembly Instance 7). The unit for the size depends on the previously chosen Comm Format (SINT = 8 bit = 1 byte in this case).

Get input data sets 1 and 2 and set output data sets 1 and 2



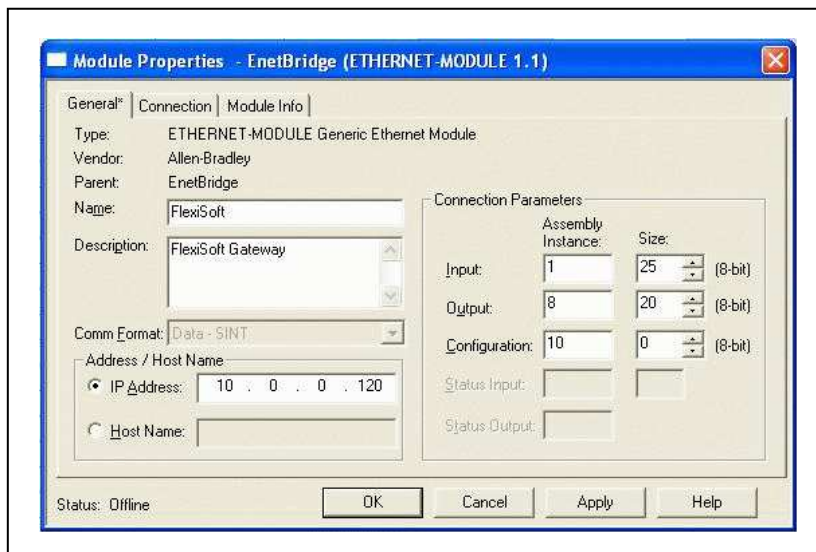
This example shows how to select input data sets 1 and 2 (50 + 32 = 82 bytes, starting at the beginning of input data set 1 = Assembly Instance 1) and output data sets 1 and 2 (10 + 10 = 20 bytes, starting at the beginning of output data set 1 = Assembly Instance 5). The unit for the size depends on the previously chosen Comm Format (SINT = 8 bit = 1 byte in this case).

Get input data set 1 and the first 20 bytes of input data set 2 and set output data set 3



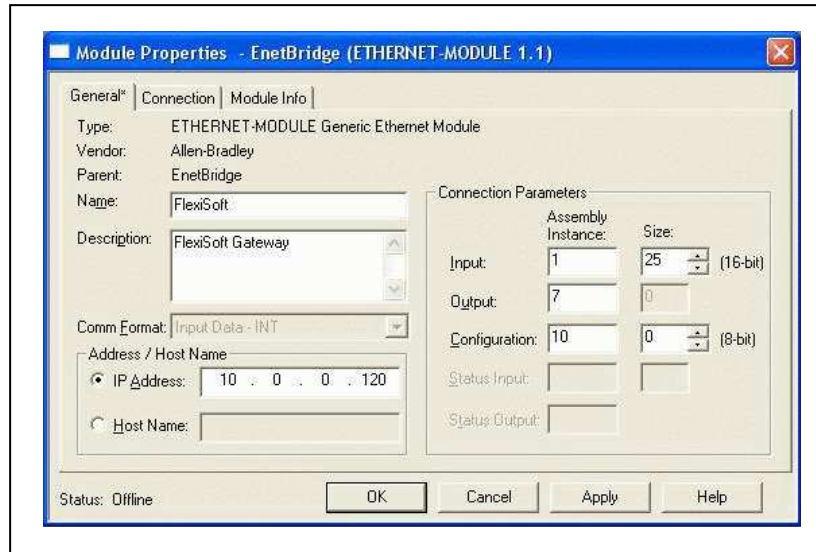
This example shows how to select input data set 1 and the first 20 bytes of input data set 2 (50 + 20 = 70 bytes, starting at the beginning of input data set 1 = Assembly Instance 1) and only output data set 3 (= 10 bytes, starting at the beginning of output data set 3 = Assembly Instance 7). The unit for the size depends on the previously chosen Comm Format (SINT = 8 bit = 1 byte in this case).

Get the first 25 bytes of input data set 1 and set output data sets 4 and 5



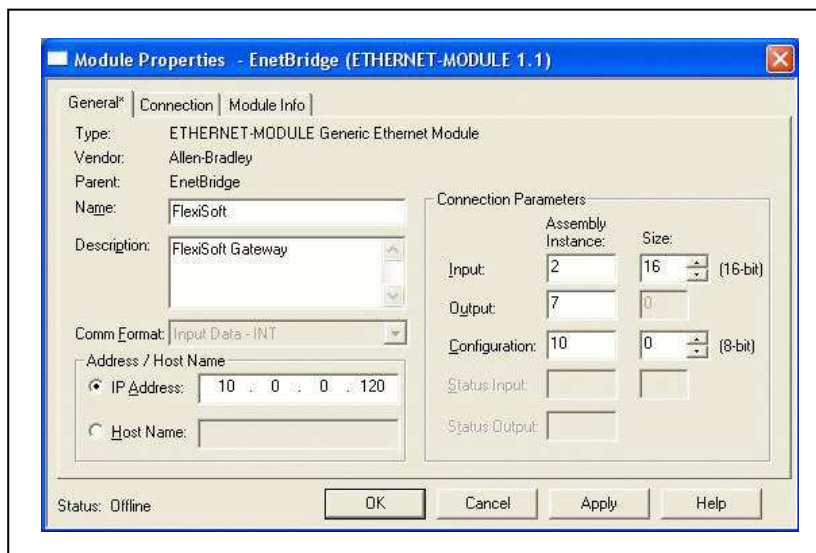
This example shows how to select the first 25 bytes of input data set 1 (= 25 bytes, starting at the beginning of input data set 1 = Assembly Instance 1) and output data sets 4 and 5 (10 + 10 = 20 bytes, starting at the beginning of output data set 4 = Assembly Instance 8). The unit for the size depends on the previously chosen Comm Format (SINT = 8 bit = 1 byte in this case).

Get input only data set 1



This example shows how to select only input data set 1 (50 bytes = 25 words, starting at the beginning of input data set 1 = Assembly Instance 1). The unit for the size depends on the previously chosen Comm Format (INT = 16 bit = 2 bytes or 1 word in this case).

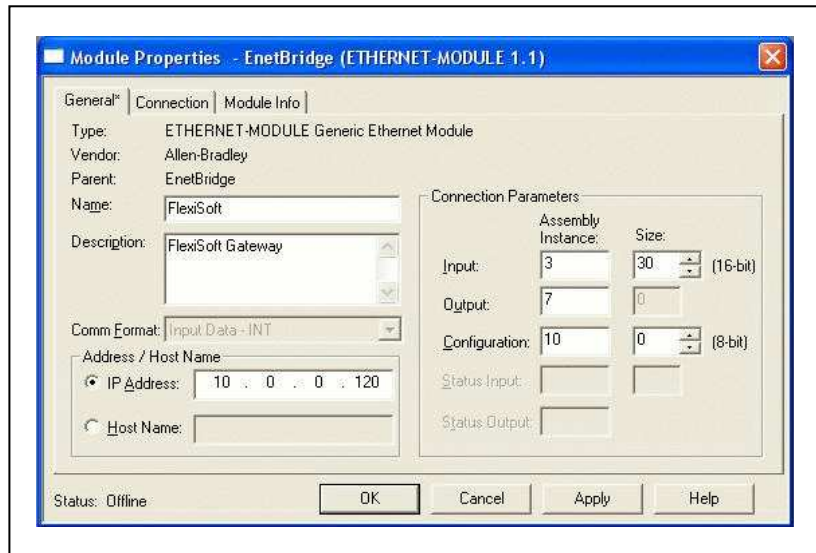
Get input only data set 2



This example shows how to select only input data set 2 (32 bytes = 16 words, starting at the beginning of input data set 2 = Assembly Instance 2). The unit for the size depends on the previously chosen Comm Format (INT = 16 bit = 2 bytes or 1 word in this case).

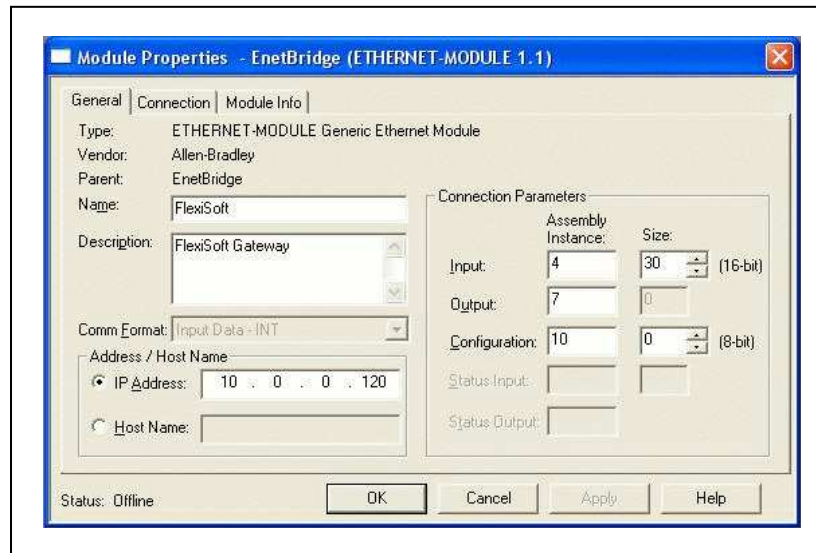
Class 1 connection parameter examples

Get input only data set 3



This example shows how to select only input data set 3 (60 bytes = 30 words, starting at the beginning of input data set 3 = Assembly Instance 3). The unit for the size depends on the previously chosen Comm Format (INT = 16 bit = 2 bytes or 1 word in this case).

Get input only data set 4

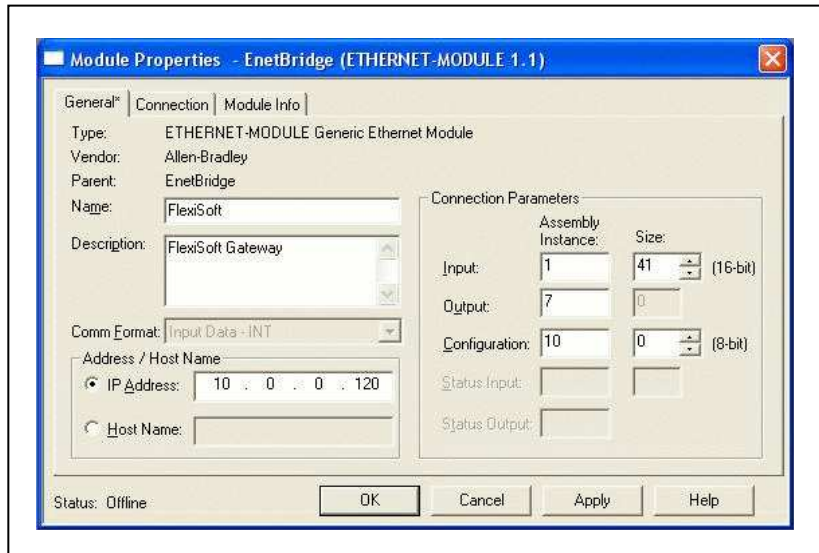


This example shows how to select only input data set 4 (60 bytes = 30 words, starting at the beginning of input data set 4 = Assembly Instance 4). The unit for the size depends on the previously chosen Comm Format (INT = 16 bit = 2 bytes or 1 word in this case).

Class 1 connection parameter examples

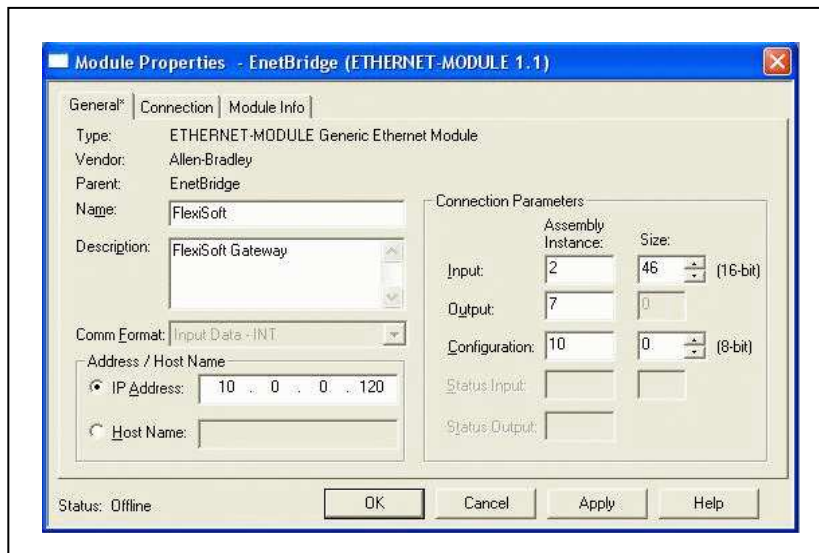
Flexi Soft Gateway

Get input only data sets 1 and 2



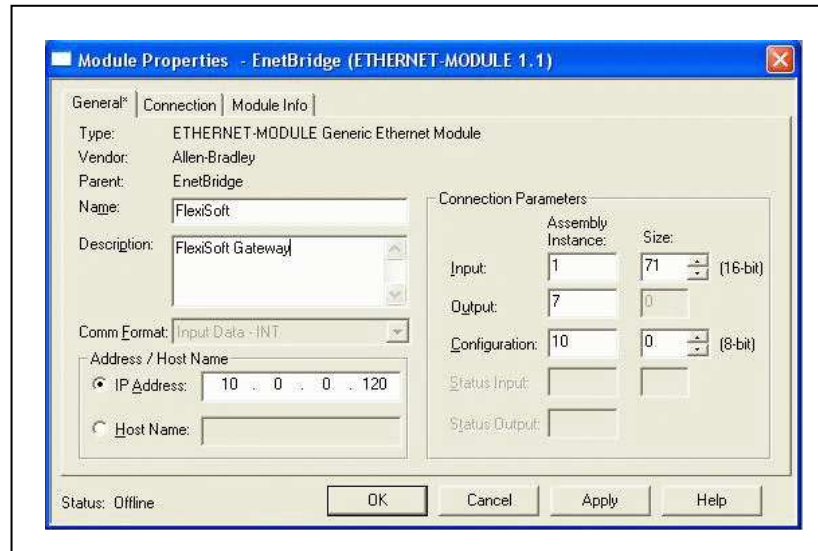
This example shows how to select input data sets 1 and 2 ($50 + 32 = 82$ bytes = 41 words, starting at the beginning of input data set 1 = Assembly Instance 1). The unit for the size depends on the previously chosen Comm Format (INT = 16 bit = 2 bytes or 1 word in this case).

Get input only data sets 2 and 3



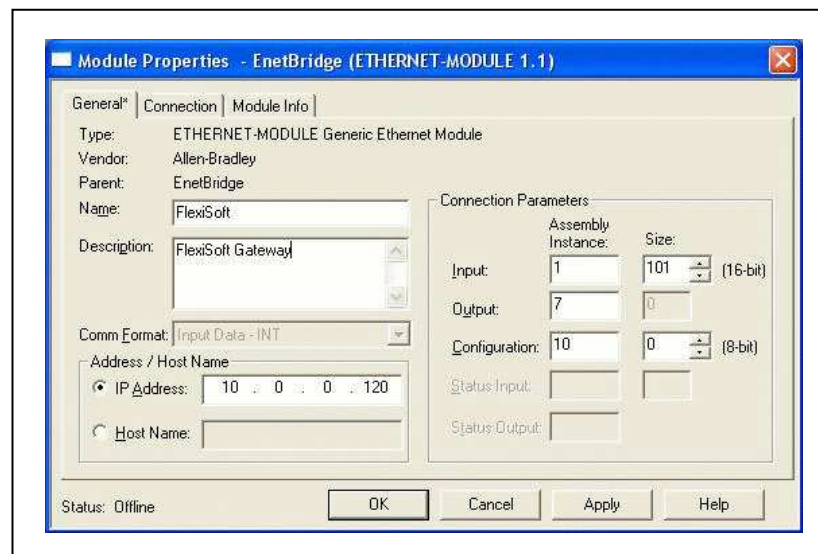
This example shows how to select input data sets 2 and 3 ($32 + 60 = 92$ bytes = 46 words, starting at the beginning of input data set 2 = Assembly Instance 2). The unit for the size depends on the previously chosen Comm Format (INT = 16 bit = 2 bytes or 1 word in this case).

Get input only data set 1, 2 and 3



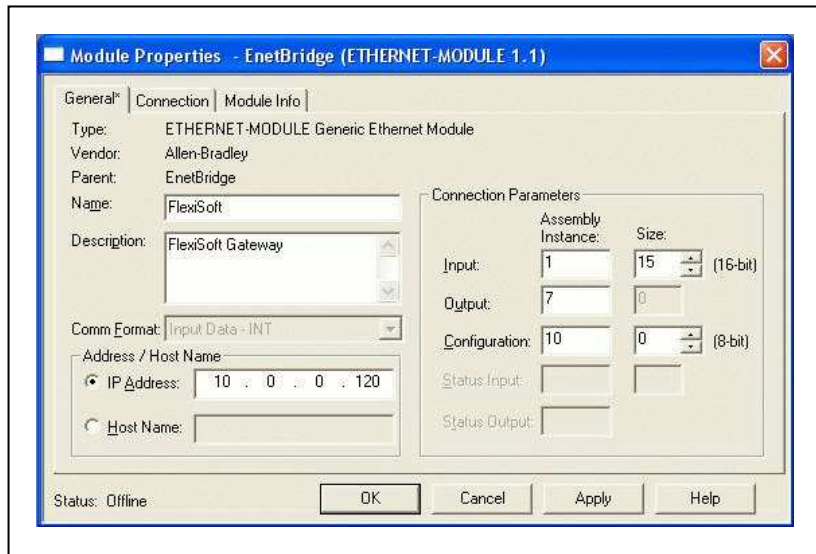
This example shows how to select input data sets 1, 2 and 3 ($50 + 32 + 60 = 142$ bytes = 71 words, starting at the beginning of input data set 1 = Assembly Instance 1). The unit for the size depends on the previously chosen Comm Format (INT = 16 bit = 2 bytes or 1 word in this case).

Get input only data sets 1 to 4



This example shows how to select all four input data sets ($50 + 32 + 60 + 60 = 202$ bytes = 101 words, starting at the beginning of input data set 1 = Assembly Instance 1). The unit for the size depends on the previously chosen Comm Format (INT = 16 bit = 2 bytes or 1 word in this case).

Get the first 30 bytes of input data set 1



This example shows how to select the first 30 bytes of input data set 1 (30 bytes = 15 words, starting at the beginning of input data set 1 = Assembly Instance 1). The unit for the size depends on the previously chosen Comm Format (INT = 16 bit = 2 bytes or 1 word in this case).

4 Diagnostics and troubleshooting

For information how to perform diagnostics on the Flexi Soft system please refer to the operating instructions for the Flexi Soft Designer software (SICK part no. 8012998).

Troubleshooting for
the FXO-GENT

Error	Possible cause	Possible remedy
The Flexi Soft Designer tool does not connect to the Flexi Soft gateway module	FXO-GENT has no power supply. FXO-GENT is not in the same physical network as the PC. The PC is configured to another subnet mask in the TCP/IP settings. FXO-GENT has already been configured once and has a fixed set IP address or an IP address assigned by a DHCP server that is not recognised.	Establish the power supply. Check the Ethernet wiring and network settings on the PC and correct if necessary. Set the subnet mask on the PC to 255.255.0.0 (factory setting of the FXO-GENT). Check the communication settings in the Flexi Soft Designer.
FXO-GENT does not supply any data. LED PWR ● Green LED LINK/ACT ●/● Green LED STATUS ^{§)} ● Red/green	FXO-GENT is configured for data transfer to PLC, but Ethernet communication is not yet established or faulty. Duplicate IP address detected. Another device on the network has the same IP address.	Minimum one Ethernet connection needs to be established. Set up Ethernet connection on PLC side, check Ethernet cabling, check Ethernet connection settings on PLC and in the Flexi Soft Designer. If no Ethernet communication is required, disable the Ethernet connections/PLC interfaces on the FXO-GENT. Adjust IP address and power cycle device.
FXO-GENT does not supply any data. LED PWR ● Green LED LINK/ACT ●/● Green LED STATUS ^{§)} ● Red (1 Hz)	Configuration required. Configuration download is not completed.	Configure the FXO-GENT and download the configuration to the device. Wait until the configuration download has been completed.
FXO-GENT does not supply any data. LED PWR ● Green LED LINK/ACT ●/● Green LED STATUS ^{§)} ● Green	No data set is activated. No Ethernet communication interface is enabled.	Activate at least one data set.
FXO-GENT does not supply any data. LED PWR ● Green LED LINK/ACT ●/● Green LED STATUS ^{§)} ● Green (1 Hz)	FXO-GENT is in Idle mode.	CPU/application is stopped. Start CPU (change into Run mode).
FXO-GENT functioned correctly after configuration, but suddenly no longer supplies data. LED PWR ● Green LED LINK/ACT ●/● Green LED STATUS ^{§)} ● Red/green	FXO-GENT is operated in slave mode, the IP address is assigned from a DHCP server. After the FXO-GENT or the DHCP server has been restarted, a different IP address that is unknown to the PLC has been assigned to the FXO-GENT.	Either assign a fixed IP address to the FXO-GENT, or reserve a fixed IP address for the FXO-GENT in the DHCP server (manual assignment by means of the MAC address of the FXO-GENT).
FXO-GENT/Flexi Soft system is in Critical fault mode. LED PWR ● Green LED LINK/ACT ●/● Green LED STATUS ^{§)} ● Red	FXO-GENT is not plugged properly into the other Flexi Soft module. Module connecting plug is soiled or damaged. Other Flexi Soft module has internal critical error.	Plug the FXO-GENT in correctly. Clean the connecting socket/plug. Repower the system. Check the other Flexi Soft modules.
FXO-GENT is in Critical fault mode. LED PWR ● Green LED LINK/ACT ●/● Green LED STATUS ^{§)} ● Red (2 Hz)	FXO-GENT internal device error CPU firmware version does not support Flexi Soft gateways.	Switch off the power supply of the Flexi Soft system and switch it on again. Check the diagnostics messages with the Flexi Soft Designer. Use a CPU with the required firmware version (see section 2.2 "Correct use" on page 9). If the error remains, replace the gateway.

Symbol description:

O: LED is off. ● Green: LED lights up green. ● Red: LED flashes red.

^{§)} On older versions of the FXO-GENT, the STATUS LED is called MS LED.