

Addendum to Verbatim Gateway Owner's Manual How to configure a Verbatim EtherNet/IP with RSLogix 5000

Addendum 1.1



Verbatim
Gateway

Document history

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Raco Manufacturing and Engineering continually makes improvements in the operation and functionality of its products. This addendum describes Verbatim Gateway Ethernet communication option that allows the Verbatim Gateway to connect directly on the PLC Ethernet networks. This addendum specifically addresses the ModbusTCP and EtherNet/IP protocols.

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Introduction

Are You Familiar with the Operation of the Verbatim Gateway Autodialer Yet?

Changes to a few, very specific features of the Verbatim Gateway are described in this addendum. It is assumed that the reader of this addendum is already familiar with the basic operation and programming method of the Verbatim Gateway product. If this is not the case, please take the time necessary to familiarize yourself with the Verbatim Gateway autodialer by reading the Verbatim Gateway Owner's Manual.

1. More info about the network and products

For further information about the Verbatim Gateway Ethernet Option products, please consult the RACO Mfg and Eng web pages at www.RACOMAN.com. The latest manuals, EDS-files (also included in the CD that is shipped with a new Verbatim Gateway Ethernet) etcetera can be downloaded from the on-line support sections of the web site.

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 more information concerning the ModbusTCP network the Open Modbus Organization has a webpage. Please visit www.modbus.org for more information about ModbusTCP.

For information concerning the Allen Bradley PLC's refer to the Rockwell Automation homepage www.rockwellautomation.com

2. When should you use this addendum?

The information provided in this document helps the user setup the Ethernet communication between the Verbatim Gateway and the Ethernet network. It is assumed that the user has already setup the Verbatim Gateway and is ready to setup the remote channels (section 7.2.1 in the main Verbatim Gateway manual).

Please note that this addendum is in effect a new section (7.2.11 in the main Verbatim Gateway user Manual). Therefore, the content of this addendum covers all the requirements of connecting to the Ethernet network which also includes all testing and diagnostics.

The Verbatim Gateway Ethernet autodialer has the capabilities of connecting two different networks. The Ethernet network is connected to NET 2 of the Verbatim Gateway com card. All functionalities that a normal Verbatim Gateway can perform between different Networks can also be done in this instance. The main purpose of connecting to the Ethernet network is to get the PLC data natively instead of connecting on other external network bridges.

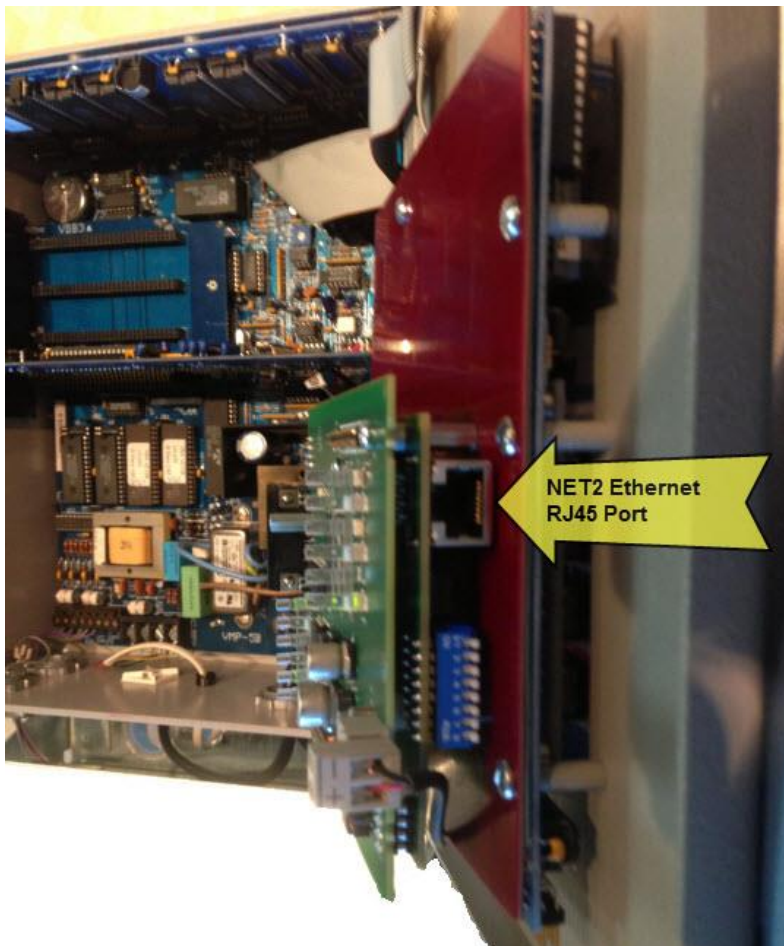
3. Requirements

Description	Name / Type	Version
Rockwell PLC	ControlLogix5000	n.a.
PLC software	RSLogix 5000	13.04.00
RACO IPconfig tool	RACO IPconfig	2.1.1.1
Verbatim Gateway EtherNet/IP Network Interface Addendum	Verbatim Gateway EtherNet/IP Ethernet Network Interface Addendum	2.1
Verbatim Gateway EtherNet/IP User Manual	Verbatim Gateway User Manual	2.0

4. Determining Net Port Number & Protocol Identifier

The Verbatim Gateway Ethernet supports four device ports, named NET 1-4. Connections to any of these ports are completely separate from each other and are configured independently (See the main Verbatim Gateway user manual). In this version of the product, the Ethernet connectivity is found in the door of the module as shown in the image below. Please note that the Ethernet module is connected to NET 2 of the Verbatim Gateway com card. For the rest of this document, all settings to NET 2 are intended to help establish communication with the Ethernet networks.

This Ethernet version of the Verbatim Gateway supports equally the ModbusTCP or the EtherNet/IP networks over the Ethernet port.



5. Communication Registers

The Verbatim Gateway behaves in the same way in all of its programming as indicated in the main Verbatim Gateway user's manual except in the way it addresses the loss of Ethernet communication functions. When addressing the communication behaviors in Ethernet you should observe these guidelines.

The communication health bit is configured with a special logic to monitor network health of connecting PLCs – If Ethernet master loses connection, a health byte in address 40031 will go from 0 to 256 or a bit in address 00488 will go from 0 to 1 indicating that the communication with the network is impaired and if the Verbatim Gateway is programmed to look for this change. A bit flipping from 0 to 1 can report the loss of communication via an alarm to the users.

To program the loss of communication alarm follow the instructions in the main Verbatim Gateway manual and ensure that the register name space is set accordingly.

Program 4532 * 2 * 2 * 00488 * (channel 32 reads address 00488) and 4532 2 (normally 0, alarm on 1).

Note that Normal means actually talking to the PLC. You would get an alarm if you are plugged into the Ethernet, but the PLC is not communicating, or if you are not plugged into the Ethernet.

Note also that this bit will use one of the available channels on the Gateway (in this case channel 32).

6. Additional consideration

It is good to note these differences in looking for the changes in register values, coils, and bits:

- Sometimes different types of registers are mapped to different internal memory locations
 - 30001 will go to a particular read-only input register (e.g. temperature), whereas 40001 will go to a different read/write holding register (e.g. set point).
- Verbatim Gateway autodialers don't work this way. All the different areas are mapped on top of one another.
 - 30001 holds the same value as 40001.
 - Coil 00001 holds the same value as the first bit of 30001 or 40001
 - Registers 1-30 hold read only input data
 - Coils 1-480 (16-bit*30) hold input data
 - Coils 16385 (16-bit*1025) – 16865 (+16*bit*30) hold read/write output data
- This allows flexibility to look at data as input registers, holding registers, coils, etc., as many Modbus masters don't have all functions implemented
- Since Verbatim Gateway channels are completely compatible with the logical and I/O addressing scheme for the file structure of the Allen Bradley controllers (SLC series and newer) processors, the table below should look familiar.

• *TABLE #1*

Identifier	File Type	Example
O	Output	O:1.0/0 (SLC500) O:017/10 (PLC5)

I	Input	I:0.1/0 (SLC500) I:013/07 (PLC5)
S	Status	S:2 (word) S:2/0 (bit)
B	Bit	B:0 (word) B9:0/1 (bit)
T	Timer	T4:0.2 (word) T:0.0/1 (bit)
C	Counter	C5:0.2 (word) C10:0.0/1 (bit)
R	Control	R6:2.1 (word) R:2/15 (bit)
N	Integer	N:1 (word) N:1/0 (bit)
F	Floating Point	F:2 (32-bit word)
NOTE: Cannot specify 16 or 1-bit points with F file type.		
D, G, M1, etc...	All other types	Not Supported

Table #1 shows the Allen-Bradley-supported address types available to link to Verbatim Gateway channels. Indirect, indexed and symbolic addressing schemes are not supported.

• Table #2

Register Address	Description	Size / Limitation
0xxxx	Coil number xxxx	1-bit
1xxxx	Input number xxxx	1-bit
3xxxx	Input register number xxxx	16-bit
4xxxx	Output register number xxxx	16-bit
5xxxx	Floating Point register	32-bit

Table #2 illustrates the Modbus data file convention within the Verbatim Gateway. These Modbus Register Addresses map to the Rockwell Automation controllers registers as per the Modbus Table File numbers, on the Channel Configuration form within RSLogix, illustrated above.

Important:

It should be noted that Output Register (4xxxx) and Holding Register (5xxxx) data types use the same data area at the Verbatim Gateway end. The Holding Register (5xxxx) uses two consecutive 16-bit addresses that are interpreted as a 32-bit floating point number (i.e. 5xxxx & 5xxxx+1). Not unlike the Holding Register, the Output Register (4xxxx) also reserves two consecutive 16 bit words; however the extended word is left blank.

Similarly, when addressing the input register (3xxxx), allow for two consecutive 16 bit words, keeping in mind the word is reserved but not used. Hence, consecutive addressing of both Input

and Output Registers will appear as follows. For example, first Input Register address point 30001, second address point 30003, third address point 30005, etc.

7. Allen Bradley PLCs Solution overview

This application note describes how to configure Verbatim EtherNet/IP 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 Verbatim EtherNet/IP are described.

The contents describe step by step how a configuration is done. This document assumes the reader is familiar with industrial communication, EtherNet/IP networks.

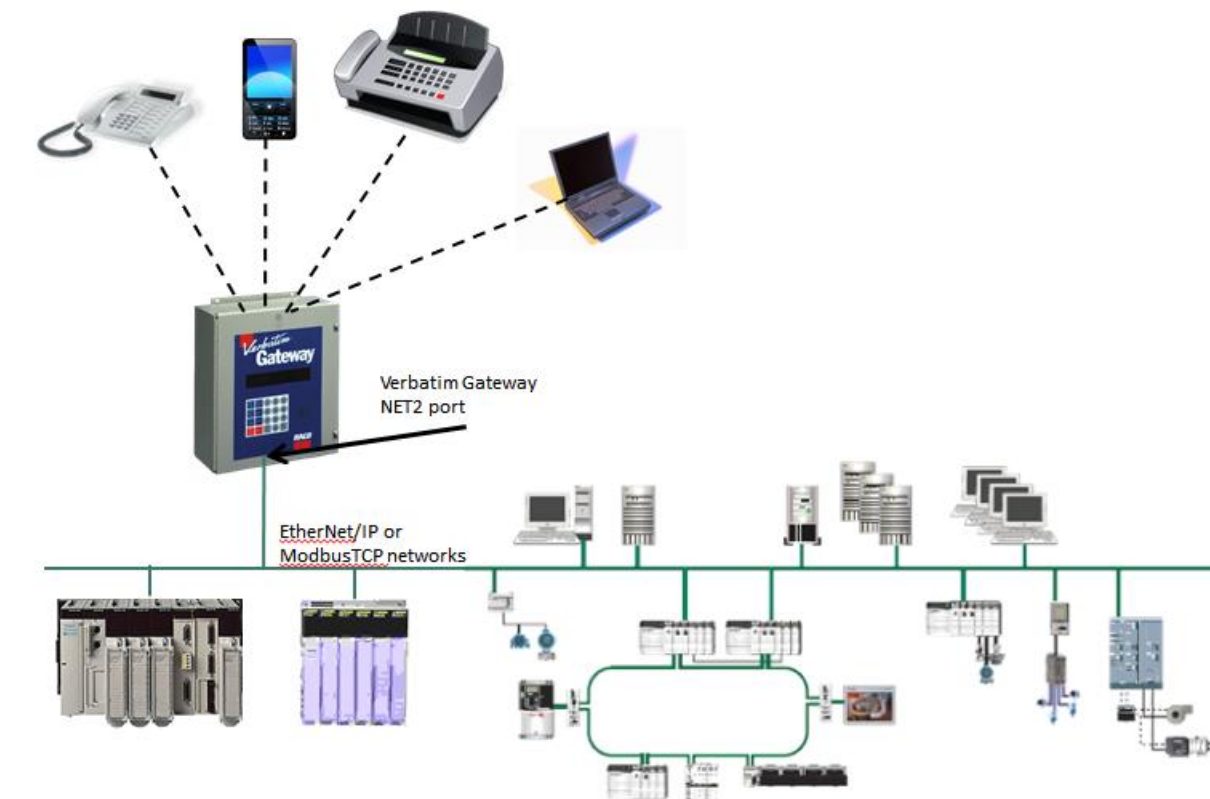


Figure 1 Hardware connection overview.

8. EtherNet/IP configuration

Before you begin: Ensure that the EDS file (Found on the “Ethernet IP Configuration Tools” CD that was shipped with the Verbatim Gateway) is copied to the RSLogix 5000 EDS directory (as indicated by Rockwell Automation Manual). The EDS file insures that the RSLogix controller can identify the RACO Ethernet autodialers in the Ethernet modules and tags.

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.

8.1. 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.

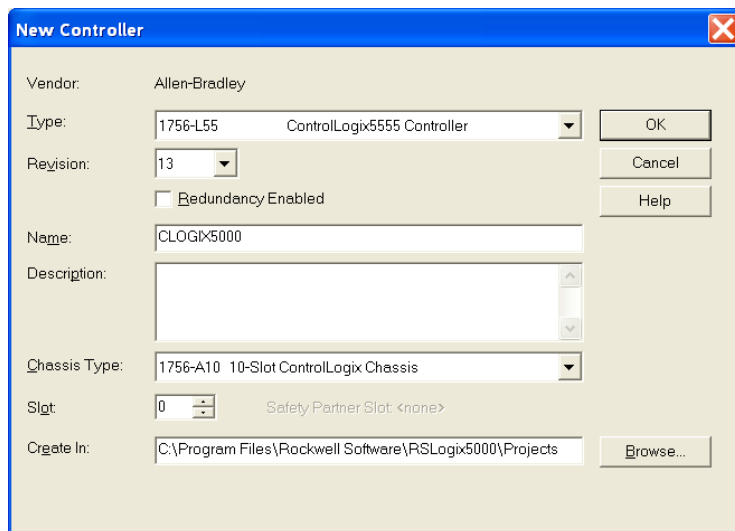


Figure 2 Adding the PLC to the configuration.

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.

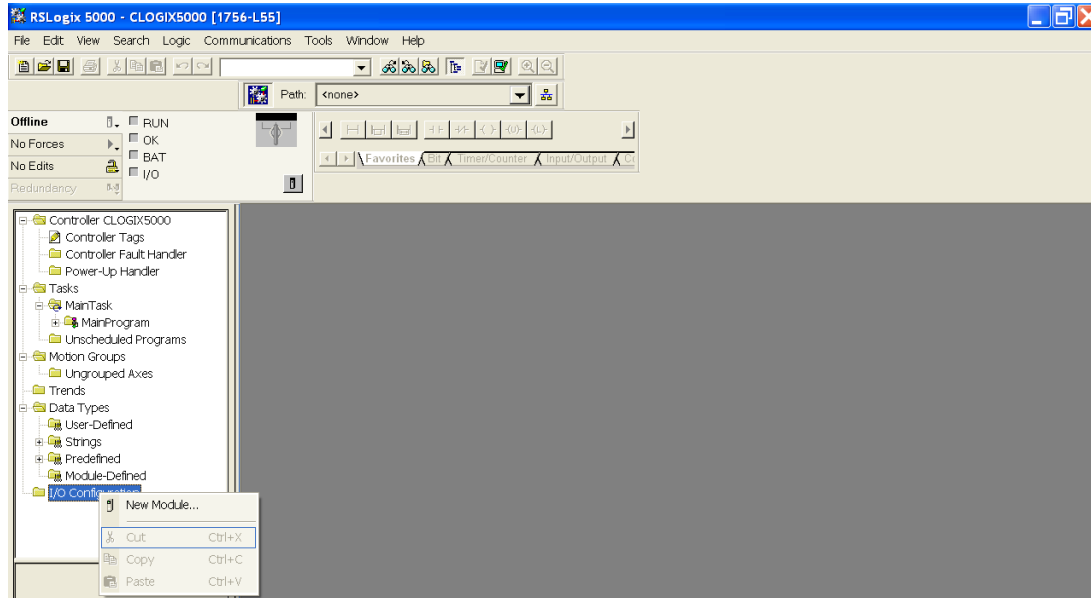


Figure 3 Adding the Ethernet module.

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.

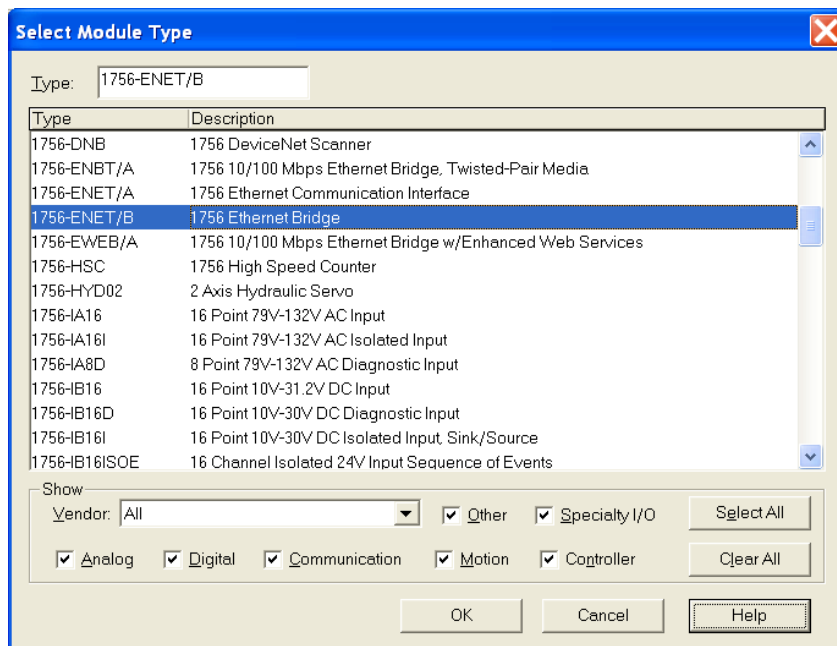


Figure 4 Selecting the type of module.

Then enter the desired settings and press finish.

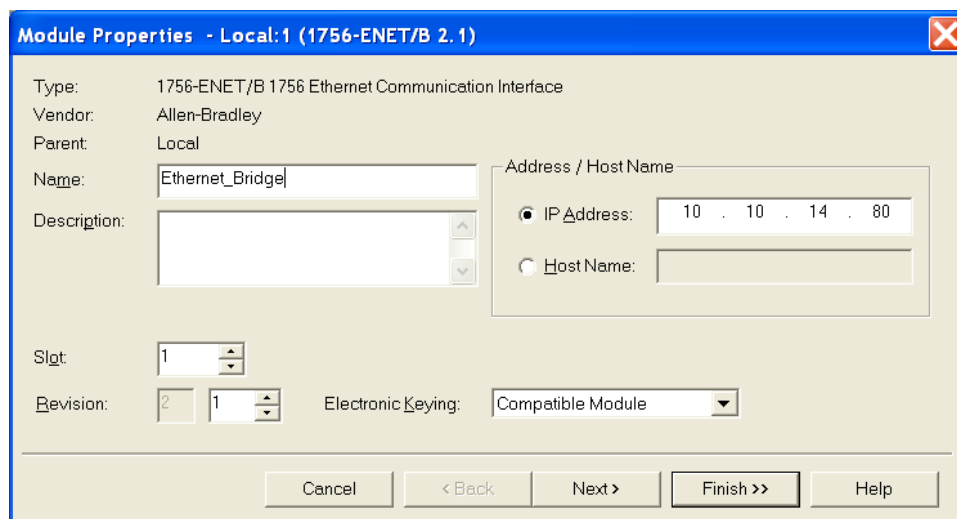


Figure 5 Configuring the settings for the Ethernet module.

8.2. EtherNet/IP network configuration

The second step is to configure the EtherNet/IP network and adding the RACO Verbatim EtherNet/IP module to the configuration in the PLC. Begin with setting the program in “Offline” mode ❶. Then right click on the EtherNet/IP Bridge in the I/O configuration, and select “New Module” ❷.

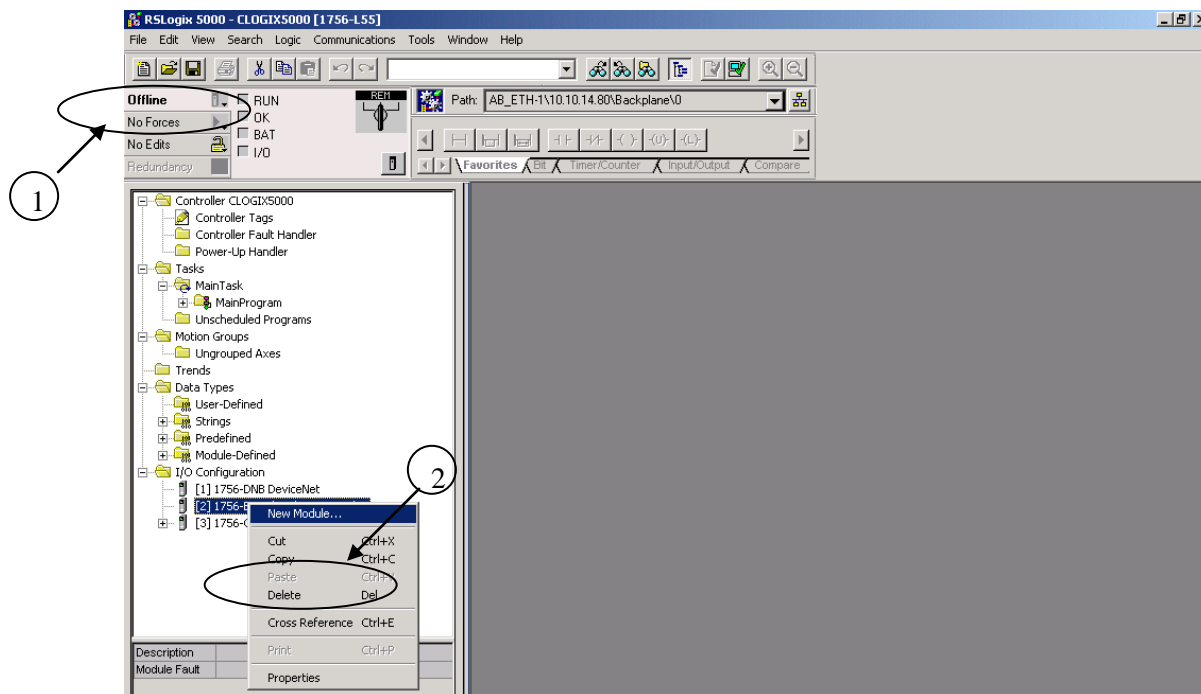


Figure 6 Adding the Verbatim Gateway module.

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

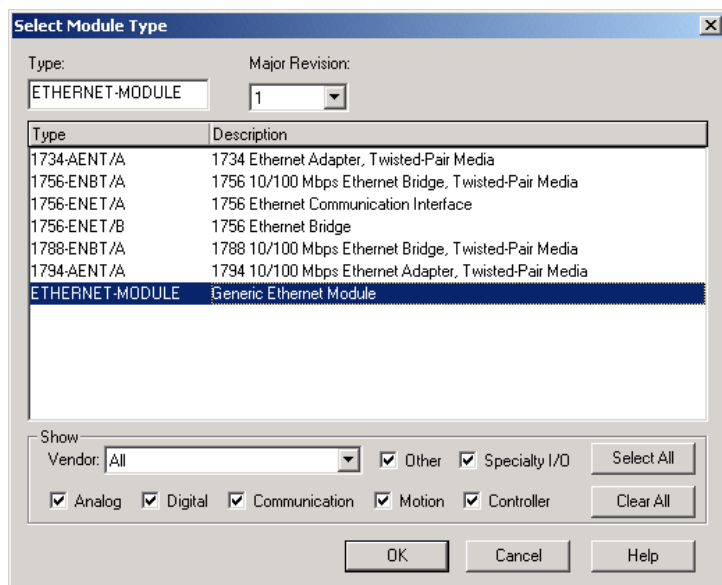


Figure 7 Selecting the Generic Ethernet Module.

In the next dialogue window, RSLogix 5000 will ask for information regarding the communication to the Verbatim Gateway module. First enter a name for the Verbatim Gateway module❶. In the example below we call it “RACO Ethernet”. 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 Verbatim Gateway module will be stored. A description can also be added, but that is optional.

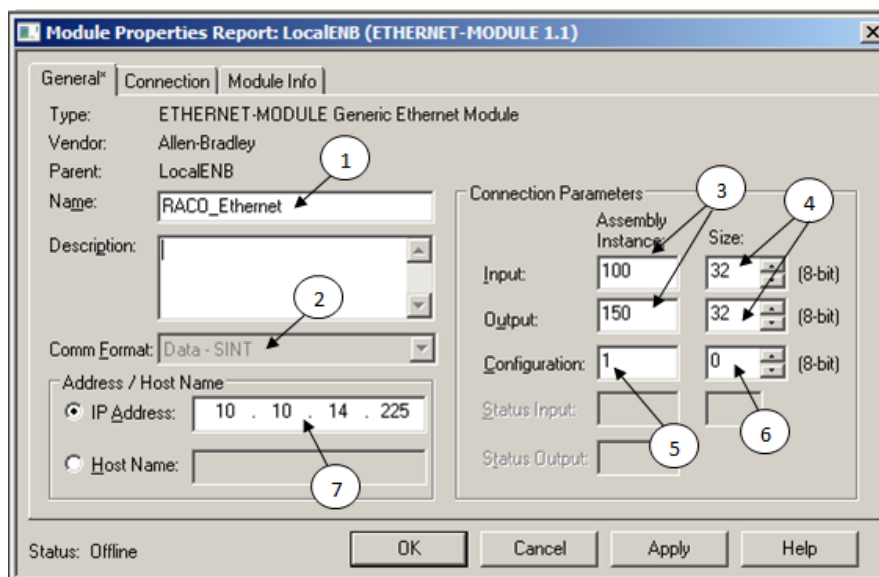


Figure 8 Configuring the module properties.

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 Verbatim Gateway 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 output ❸. The size of the input connection and the output connection shall correspond to the size that we have configured the Verbatim Gateway module for. In our case we are using 32 8-bit values of input and output data, so that is the size that we enter ❹. 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 Verbatim Gateway 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 1 ❺. 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 refused ❻. As a final step we enter the IP address that we have configured for the module, here 10.10.14.225 ❼.

The next step is to press next.

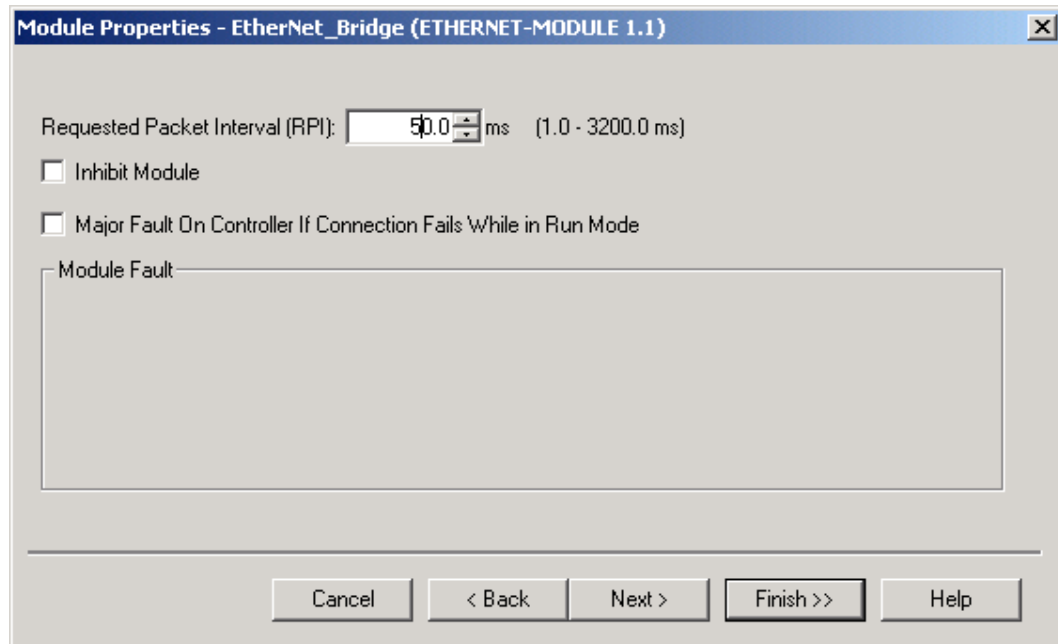


Figure 9 Configuring the scan interval.

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 Verbatim Gateway has been added to the I/O configuration in RSLogix 5000. The main screen will look as follows.

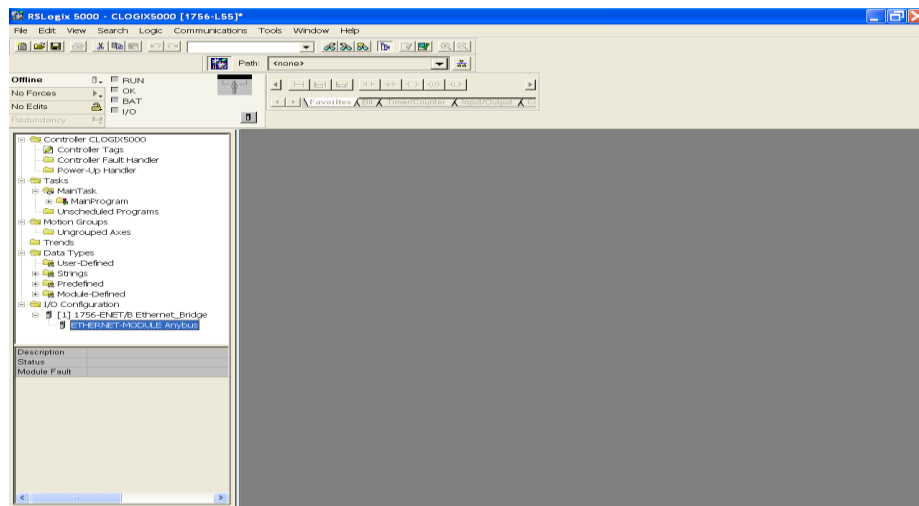


Figure 10 The main screen when the configuration is completed.

8.3. 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.

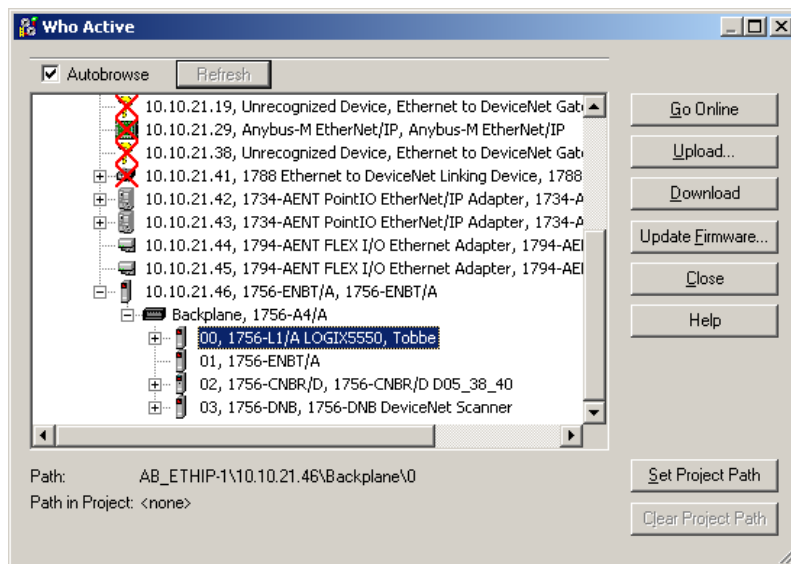


Figure 11 Configuring the communication path.

Select “Go Online” from the “Communications” menu.

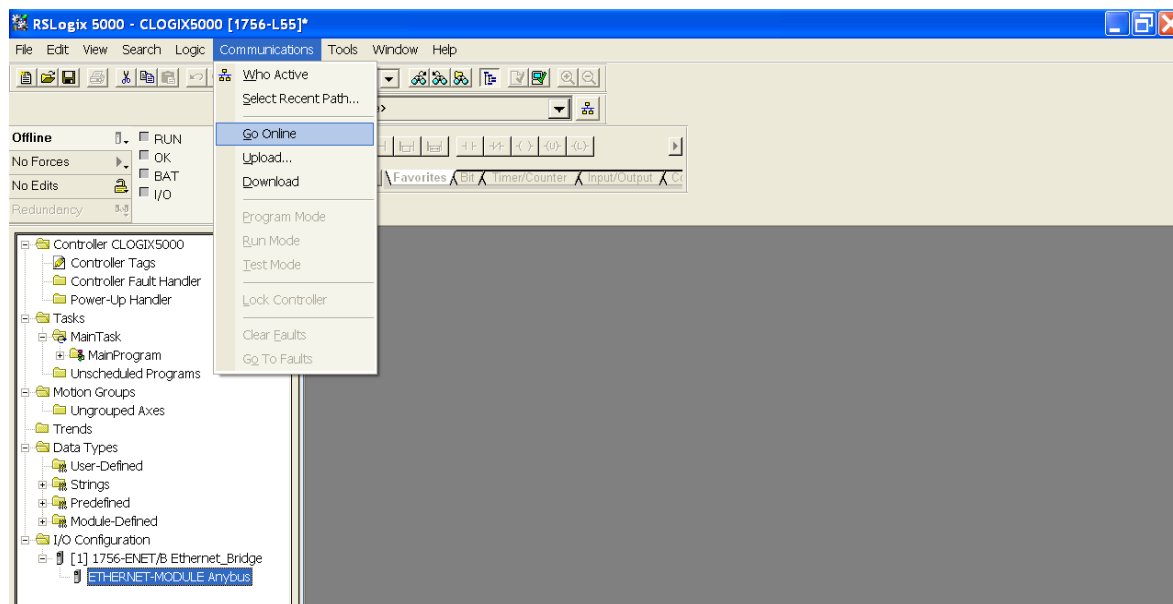


Figure 12 Opening the online window.

A new window appears, select “Download”.

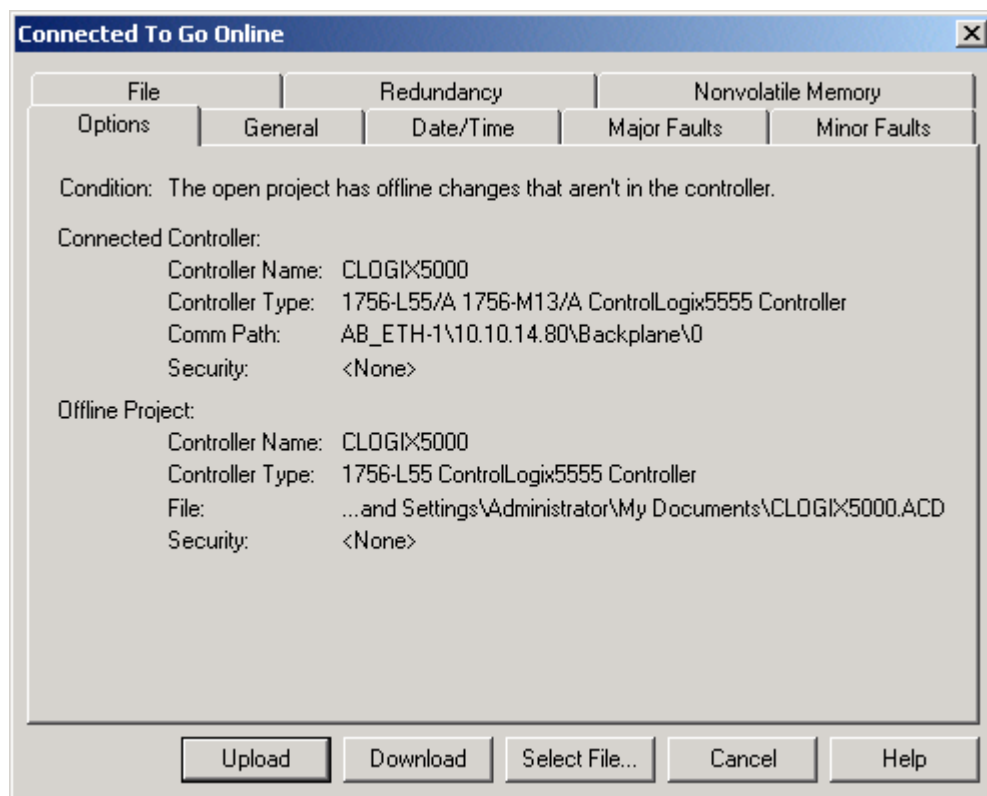


Figure 13 The download window.

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.

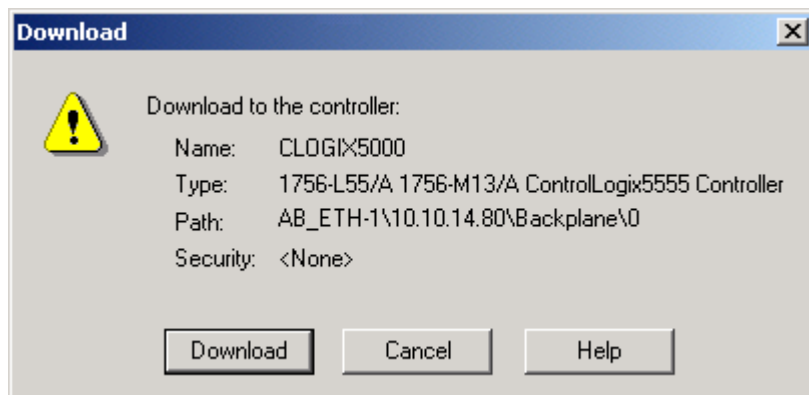


Figure 14 Downloading the configuration to the PLC.

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

9. Verbatim Gateway configuration

The Verbatim Gateway 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 Verbatim Gateway Communicator and Verbatim Gateway EtherNet/IP is explained in detail.

9.1. IP settings

Make sure each node on the network has a unique IP address. The IP settings of the Verbatim Gateway EtherNet/IP modules can be configured in various ways. It is recommended to use the RACO IPconfig tool for configuring the IP-settings. The RACO IPconfig tool can be used to configure the IP settings of all RACO EtherNet/IP modules. The program can be downloaded at RACOMan.com website¹. Start the program and the main window will be opened.

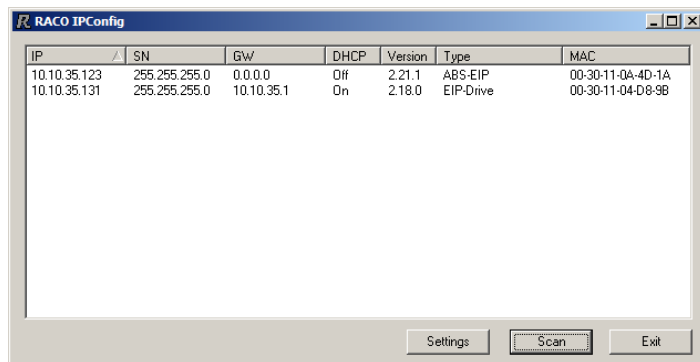


Figure 15 The RACO IPconfig tool.

The program scans the network for RACO Gateway Ethernet modules. The settings can be configured manually or the DHCP function can be used. For the RACO Gateway 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.

Note: The RACO IPconfig tool is able to locate all the RACO Ethernet Autodialers in the network. There is no need to have the autodialers in the same subnet to be discovered. ?capitalize autodialers or not?

Figure 16 Configuring the IP settings.

9.2. Setting Verbatim Gateway Remote Channels

The following procedure will configure your Verbatim Gateway to link its Remote Channels (RC) to your PLC addresses, via the Ethernet network and configure your remote channels

9.2.1. Establish communication with the Ethernet network

When setting the Protocol, Node Address and Communication parameters (i.e. 4906, 4905, 4901, 4903 and 4904), it is good practice to include the NET ID.

STEP #1 – Protocol Driver (4906)

Set the Protocol Driver to Modbus on NET 2 key in 4906 2 * 5 (enter)

To read the Protocol Driver for NET 2 key in 4906 2 (enter)

STEP #2 – Node Address (4905)

The default node address of the Verbatim Gateway on NET 2 is 1

To check Verbatim Gateway NET 2 node address key in 4905 2 (enter)

To set Verbatim Gateway NET 2 node address to 1 key in 4905 2 * 1 (enter)

STEP #3 – Communication Parameters (4901,4903,4904)

The default Verbatim Gateway communication parameters for Modbus are:

9600 baud, 1 stop bit, even parity

These defaults are designed to work with the Ethernet card without modification.

To check NET 2 parameters key in 4900 2 (enter)

To verify successful network communications on NET 2 key in 4930 * 2 (enter)

If needed:

Select the communication parameters. RACO recommends the following (default) communication settings:

BAUD rate = 9600 for “9600” on NET 2 key in 4901 2 * 9600 (enter)

Stop Bits = 1 for “1” on NET 2 key in 4903 2 * 1 (enter)

Parity = Even for “Even” on NET 2 key in 4904 2 * 2 (enter)

DATA Bits cannot be altered and remain at 8.

STEP #4 – Set Defaults Net and Node (4910, 4911)

This step simplifies Channel Configuration .

By setting to Default for both the NET ID and NODE / STATION address, it will no longer be necessary to reference them when setting Channel addresses.

Set the following to DEFAULT.

- 1 NET ID of the net used on the Verbatim Gateway com card, in this example “2”
- 2 NODE address of the Ethernet Interface Card, in this example “2”

To change the NET ID to “2” key in 4910 2 (enter)

To confirm the NET ID key in 4910 (enter)

To reference the NODE address of the Ethernet Interface Card as “2” of NET 2

key in 4911 2*2(enter)

To confirm the NODE address of the Ethernet Interface Card key in 4911 2 (enter)

STEP #5 – 8.2.2. Verify proper network communication

This section is inserted to validate all preceding steps.

To verify successful network communications key in 4930 * 2 (enter)

To read the BAUD rate for NET 2 key in 4901 2 (enter)

To verify communication settings reflect the above, at NET 2 key in 4900 2 1 (enter)

To verify active node addresses on NET 2 key in 4946 2 (enter)

STEP #6 – Configure Health Communications Bit (4532)

To program the Loss of Communication alarm follow these steps:

To setup the health bit monitoring on channel 32 enter 4532 * 2 * 2 * 00488 * (enter)

To make channel 32 normally 0 (to indicate good communication) enter 4532 2 * (enter)

Note: To announce communication interruption alarms; Make sure to record alarm messages by following ‘Message Recording and Reviewing’ Starting on page 7-47 of the main Verbatim Gateway manual

9.2.2. Configure Remote channels

STEP #1 – Assign Addresses to the remote channels

To set up the Gateway to read the tag that has been mapped to Modbus bit address 00001 and assign it to remote channel ZZ (for ZZ = 3):

- 1) Assign the address to remote channel 3 using the default Net and Node (Step 5): 4503 * 00001 * (enter)
- 2) Set remote channel 3 to be normally 0 (alarm when the bit changes to 1): 4503 2 (enter)

STEP #2 – Assign Alarm Conditions to remote channels

You may reference Verbatim Gateway user manual (Starting on page 7-65) to complete this step.

These are examples to assign alarms conditions to channel ZZ

If Channel ZZ is configured as a bit it can have a value of 1 or 0 (Ref Main manual page 7-65)

- To set channel ZZ to normally 0 (alarm on 1) key in 45ZZ 2 (enter)
- To set channel ZZ to normally 1 (alarm on 0) key in 45ZZ 2 (enter)
- To read Alarm condition for Channel ZZ key in 45ZZ(enter).
- To read Alarm status for Channel ZZ key in 40ZZ(enter).

If Channel #ZZ is configured as Analog, and operates within the range from 0 to 65, 535.

Should this channel be linked to a pressure signal in PLC, and the process requires pressure remain within an acceptable level (for example, between 10,000 and 30,000) otherwise ALARM, we would key in the following...

- To alarm when the analog signal falls below a value, for example 10,000; key in 45ZZ 5 10000(enter)
- To read the LOW set point alarm; key in 45ZZ 5(enter)
- To alarm when the analog signal rises above a value, for example 30,000;
 - key in 45ZZ 6 30000(enter)
- To read the HIGH set point alarm; key in 450ZZ 6(enter)

STEP #3 – Assign Alarm messages to Remote channels

Record the alarm messages for remote channels using the built in microphone.

To record the messages for **remote digital channel** follow this step:

41ZZ (enter) “Alarm message” where ZZ = Remote channel number

When recording Alarm messages for **remote analog channels** follow these steps:

Message preamble: 41ZZ (enter) “The start of the message”

Message post-amble: 42ZZ (enter) “The end of the message”

9.2.3. Examples: Remote Channel 7 & 4 Configuration

Here are examples of the entire procedure:

Example #1 Configure a channel to read a bit address

To set up the Gateway to read the tag that has been mapped to Modbus bit address 00001 and assign it to remote channel 7:

- 1) Assign the address to remote channel 7 using the default Net and Node (Step 5): 4507 * 00001 * (enter)
- 2) Set remote channel 7 to be normally 0 (alarm when the bit changes to 1): 4507 2 (enter)
- 3) Record the alarm message for remote channel 7 using the built in microphone: 4107 (enter) “Tank One High Level”

To verify:

4507 * (enter) read address for remote channel 7

4507 (enter) read alarm condition for remote channel 7

4307 (enter) read alarm and normal speech for remote channel 7

4007 * (enter) read the current value for channel 7

Example #2 Configure a channel to read an analog address

To set up the Gateway to read the tag that has been mapped to Modbus analog address 30003 and assign it to remote channel 4:

1) Assign the address to remote channel 4 using the default Net and Node (Step 5): 4504 * 30003 * (enter)

2) Set remote channel 4 high and/or low set points where normal is between 10,000 and 30,000:

Low set point: 4504 5 10000 (enter)

High set point: 4504 6 30000 (enter)

3) Record the message for remote channel 4 using the built in microphone:

Message preamble: 4104 (enter) "Tank One Level is"

Message post-amble: 4204 (enter) "feet"

Result: "Tank One Level is" xxxxx "feet"

Note: Scaling of analog values must be done in the PLC.

To verify:

4504 * (enter) read address for remote channel 4

4504 (enter) read alarm conditions for remote channel 4

4304 (enter) read speech for remote channel 4

4004 * (enter) read the current value for remote channel 4

10. Testing

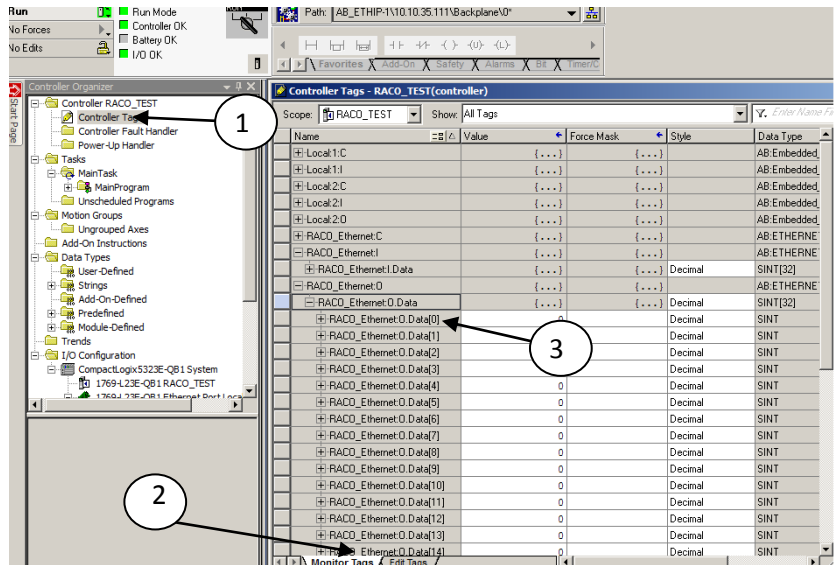
When connected to ControlLogix controller, it is possible to access the data exchanged by the ControlLogix 5000 and the Verbatim Gateway module. By writing data to the tags the communication between the PLC and the Verbatim Gateway it is possible to ensure that the corresponding data bytes have changed on the Modbus RTU side of the network.

10.1. Monitoring the tags

First 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 "RACO_Ethernet:C", "RACO_Ethernet:I" and "RACO_Ethernet:O" should be visible, representing the three instances configuration, input and output. The configuration instance is created even if we selected its size as zero. The RACO_Ethernet:I tag is data going from the Verbatim Gateway and RACO_Ethernet:O tag holds data going to the Verbatim Gateway.

First enter 01 02 03 04 (for the sake of example) in the Output Tag, so there is some “data” to read. This can be done just by entering values for the Output tags ③. If the network is correctly configured the corresponding data bytes will obtain the respective value if polled by the Verbatim Gateway.

Note on the Verbatim Gateway side you should be hearing alarms being announced when the alarm conditions are triggered. Test all the conditions before you complete your deployment...



11. Quick Start

1) Set up Verbatim Gateway:

In Program Mode

- Clear all programming by shorting the pins on JB3 (See (a) reference below)
- 4906 2*5 (enter) / Modbus on Net 2
- 4930 *2 (enter) / check for Communication Normal
- 4910 2 (enter) / make Net 2 default for addressing
- 4911 2 (enter) / make Node 2 default for addressing
- 4532 * 00488 * (enter) / set up communications health check on channel 32
- 4532 2 (enter) / make channel 32 normally 0

2) Set up Ethernet side of Verbatim Gateway

- Plug Ethernet cable into Ethernet outlet
- Use Raco IPConfig tool to determine current IP of Verbatim Gateway Ethernet card, and change it if necessary.

3) Set up PLC

- Use the information to configure the addressing tags and communication in RSLogix (Follow section 7.1 of this addendum)

4) Set up Network remote channels

For a remote digital channel

45ZZ * “address” * (enter) / Assign the address to remote channel ZZ

Example: 4507 * 00001 * (enter) (Where ZZ =7 and Modbus address = 00001)

- 45ZZ N (enter) / Set remote digital channel ZZ alarm condition

Example: 4507 2 (Normally 0)

4507 1 (Normally 1)

- 41ZZ (enter) / Record the alarm message for remote digital channel ZZ

For a remote analog channel

45ZZ * “address” * (enter) / Assign the address to remote channel ZZ

Example: 4504 * 30003 * (enter) (where ZZ = 4 Modbus analog register = 30003)

- 45ZZ 5 “Low set point” (enter) / Set remote channel ZZ low set point
 - Example: 4504 5 10000 (enter) (The Low set point= 10000)
- 45ZZ 6 “High set point” (enter) / Set remote channel ZZ high set point
Example: 4504 6 30000 (enter) (The High set point= 30000)
- Record the message for remote channel ZZ using the built in microphone:
 - Message preamble: 41ZZ(enter) “preamble message”
 - Message post-amble: 42ZZ (enter) “post amble message”
- Result: “preamble message” xxxxx “post amble message”

Now you may continue to the main Verbatim Gateway user manual to program the phone numbers and to complete your setup.

(a) Reset the Verbatim Gateway to Factory Defaults

1. Locate JB5 on the left hand edge of the main board. It will be 3-4 inches up from the bottom of the board.
2. Now locate JB3. JB3 will be one inch to the right of JB5 on main boards VMP5 and below.
3. On main boards VMP 6 and above, JB3 will be about one inch above JB5, or about halfway from top to bottom.
4. With the unit on, short the two pins of JB3 for 3-4 seconds.
5. You should hear a rushing sound in the speaker as you do this. Release the short and allow the unit to finish booting.
6. Occasionally, you may need to repeat this operation, If you do, hold the short for about 10 seconds this time.