



TECH NOTES-312

Integrating RACO® Verbatim® Gateway with the Allen-Bradley® MicroLogix™ PLC via DH485

This technical note explains how to interface the RACO Verbatim Gateway system with the Allen-Bradley MicroLogix family of PLCs via DH485. All but the earliest versions of MicroLogix processors that have the 8-pin mini-DIN integrated serial port, contain the DH485 protocol. This port, along with the 1761-NET-AIC, allows the Verbatim Gateway to perform its alarm notifications and monitoring functions using the existing wiring to the Allen-Bradley MicroLogix PLC as inputs via the DH485 protocol. This technical note is applicable for all Verbatim Gateway models.

RACO-supplied components:

Verbatim Gateway (any model)
515VAB-ENI cable

Allen-Bradley-supplied components:

MicroLogix processors with built-in 8-pin mini-DIN serial port
1761-CBL-PM02 (RS232 programming cable)
1761-NET-AIC (DF1 to DH485 protocol converter)
RSLogix™ 500 software

Optional components:

RS232 cable

When utilizing the RS232 port on the MicroLogix PLC, a RS232 cable is required (simple NULL modem — for RSLogix 500 to PLC).

Belden Cable (RS485)

Use #3106 or #9842 to connect to the DH485 connector Port 3 on the 1761-NET-AIC, where required.

Note: Not all MicroLogix processors contain the DH485 protocol. This tech note assumes the user is familiar with the MicroLogix processors that contain the required DH485 protocol.

In order to facilitate DH485 communications, RACO provides a serial cable that connects the Verbatim Gateway to the 1761-NET-AIC. This cable has the RJ-45 connector required at the Verbatim Gateway end, and the 8-pin mini-DIN at the end that connects to Port 2 (RS232) of the 1761-NET-AIC card.



Communication Setup for the 1761-NET-AIC

The 1761-NET-AIC provides DH485 connectivity to the DH485 network.

STEP #1 — Use the 515VAB-ENI cable to connect the Verbatim Gateway to Port 2 (8-pin mini-DIN), on the 1761-NET-AIC.

STEP #2 — To connect to an existing DH485 network, use Port 3, the RS485 (i.e., Phoenix plug) connector.

Connect to the 1761-NET-AIC via MicroLogix family via the 1761-CBL-PM02 cable.

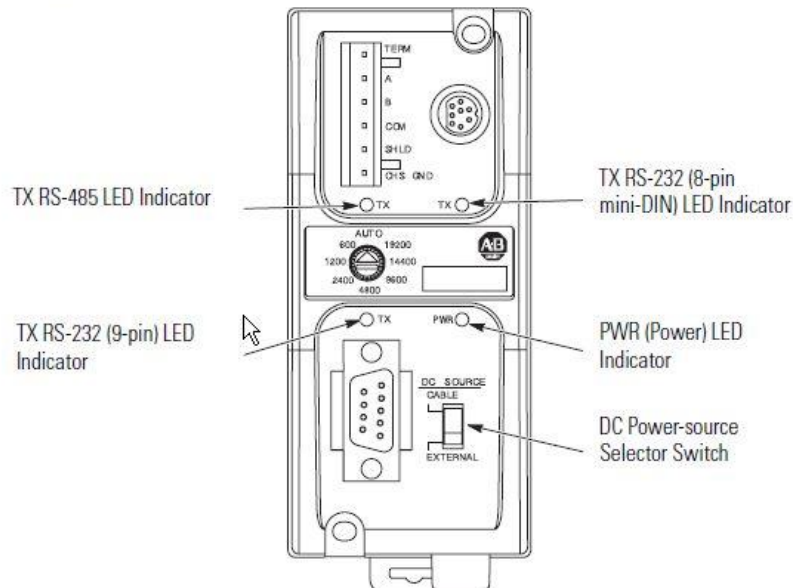
MicroLogix 1400 offers the option to use its additional integrated serial port (9-pin). When utilizing this port, use a RS232 cable (simple NULL modem — for RSLogix 500 to PLC). The DB-9 end plugs into Port 1.

STEP #3 — At the center of the unit is a dial. Use this dial to select your baud rate and utilize the blank label to record this value.

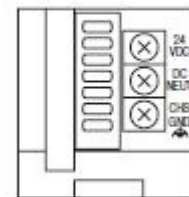
STEP #4 — An external isolated 24-VDC power source should be used and wiring terminals can be found at the bottom of the unit.

STEP #5 — Make sure the switch is in the “external” position. External power is always recommended.

LED Indicators and Selector Switch



IMPORTANT



Bottom View

Configuring the Allen-Bradley MicroLogix Serial Port

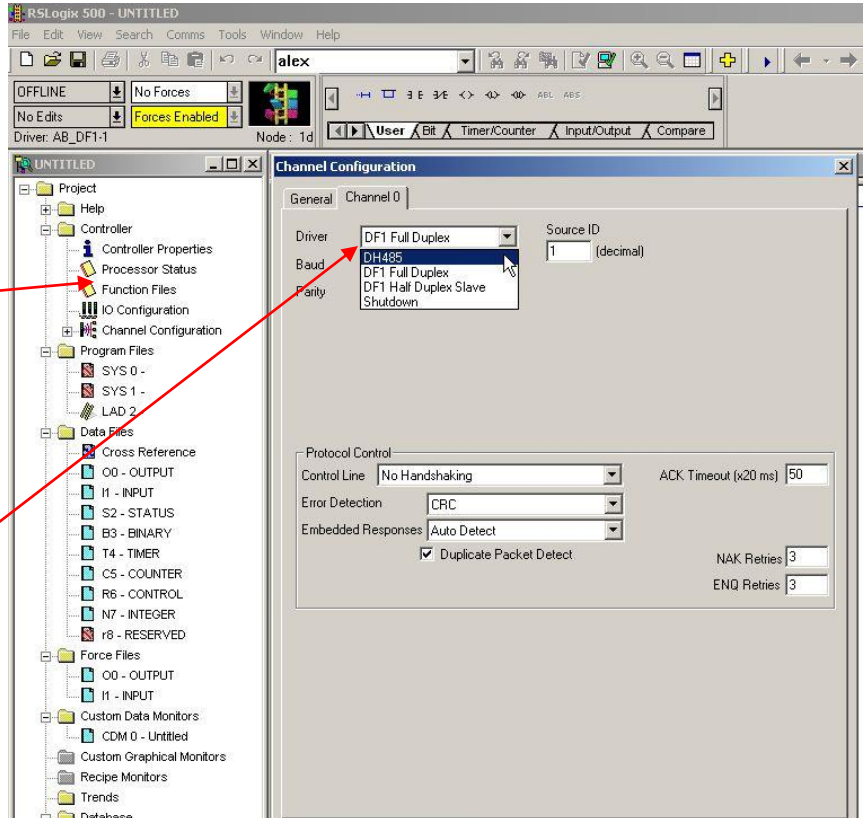
In order to utilize the integrated serial port, setting the port protocol to DH485 is required.

STEP #1 — Launch RSLogix 500 and open your MicroLogix File

Once your RSLogix 500 file is open, select Channel Configuration. This will launch the Channel Configuration form.

STEP #2 — Select DH485 Protocol

To set the serial port protocol to DH485, select the Channel 0 tab and go to the Driver pull-down menu.



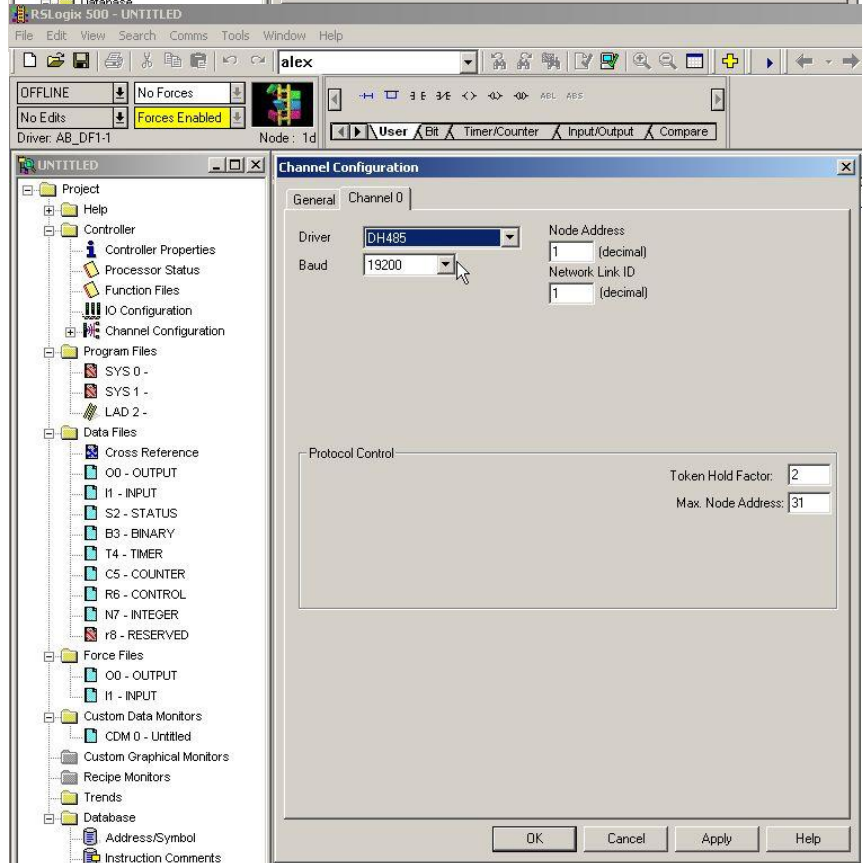
STEP #3 — Configure your DH485 settings

Now that you've selected DH485 as communication protocol for the serial port, set the Station Address for the PLC. For example, set this value to 1.

Set the maximum number of stations within your network. This number should reflect the number of stations on your network to optimize for speed.

Default is 31.

The Token Hold Factor default is 2.



Communication Setup for the Verbatim Gateway

The following seven-step procedure will configure your Verbatim Gateway to link its Remote Channels (RC) to your PLC addresses, via DH485. Once linked, the Verbatim Gateway will monitor RC status and alarms according to your settings.

Connections to the PLC are via the onboard RJ45 port or NET. With the V232/485, two NET/ports are provided. NET ID = 1 is dedicated to the DH485 protocol and NET ID = 2 is configurable for either Modbus RTU Master or DF1 (refer to Table #1).

Table #1

N	Protocol	Reference	Description	Nets
0	NONE		Device disabled	All nets
2	DH485	7.4.2	Allen-Bradley DH485 protocol	Net1 V232/485 only
3	DF1	7.4.1	Allen-Bradley serial interface	Net1 (on VCP only) Net2
4				
5	MODBUSM	7.4.3	Modbus Master	Net1 (on VCP only) Net2
128	LDL	7.4.5	Local data logging may only be used on one device	Net1 (on VCP only) Net2, 4

STEP #1 — Protocol Driver (4906)

When setting the Protocol, Node Address and Communication parameters, it is good practice to include the NET ID (i.e., 4901, 4903, 4904, 4905 or 4906). Insert the NET ID immediately following the parameter number, as defined below.

Per Table #1 above, set the Protocol Driver to DH485 on NET 1.

Key in the following: 4906 1 <point> 2 <enter>

To read the Protocol Driver for NET 1, key in the following: 4906 1 <enter>

STEP #2 — Node Address (4905)

Choose a unique DH485 NODE address for the Verbatim Gateway. As illustrated above, we've already selected NODE / STATION 1 for the PLC. DH485 allows NODE addresses to range from 0–31.

For example, set the Gateway NODE address to "2" by using code 4905.

To set the NODE address of NET 1, key in the following: 4905 1 <point> <2> <enter>

To read the NODE address of NET 1, key in the following: 4905 1 <enter>

STEP #3 — Communication Parameter (4901)

Select the communication parameter. This must match with the driver settings on your PLC. The only communication parameter applicable for the DH485 driver is 4901.

RACO recommends the following communication settings:

BAUD rate = 19200 for "19200" on NET 1, key in the following: 4901 1 <point> 19200 <enter>

Stop Bits, Parity and Data Bits are not applicable when using the DH485 driver.

STEP #4 — Confirmations (4900, 4901, 4930, 4946)

Step #4 will validate all preceding steps.

To verify successful network communications on NET 1, key in the following: 4930 <point> 1 <enter>

To read the BAUD rate for NET 1, key in the following: 4901 1 <enter>

To verify communication settings reflect the above, at NET 1, key in the following: 4900 1 <enter>

To verify active node addresses on NET 1, key in the following: 4946 1 <enter>

STEP #5 — Set Defaults

This step simplifies Channel Configuration (i.e., Step #6).

By setting the NET ID and NODE / STATION address to Default, it is no longer necessary to reference them when setting the Channel Configuration.

Set the following to DEFAULT.

- 1 NET ID, used to communicate via DH485 (i.e., “1”)
- 2 NODE / STATION address of the target PLC

To change the NET ID to “1”, key in the following: 4910 1 <enter>

To confirm the NET ID, key in the following: 4910 <enter>

To change the PLC NODE / STATION address to “1” of NET 1, key in the following: 4911 1 <enter>

To confirm PLC NODE / STATION address, key in the following: 4911 <enter>

STEP #6 — Channel 1 & 2 Configuration (4501) (4502)

Since Verbatim Gateway channels are completely compatible with the logical and I/O addressing scheme for the file structure of the SLC™ series processors, the table below should look familiar.

Table #2

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

The two examples below illustrate the link between the PLC data table (via DH485, Table #2) and the Verbatim Gateway channels.

Example #1

To link B3:0/0 in the PLC to Channel 1 as per the PLC file structure illustrated above, key in the following: 4501 <point> <shift> <3> <shift> <: > <0> <shift> </> <0> <point> <enter>

To verify the current address entered, key in the following: 4501 <point> <enter>

To read address value, key in the following: 4001 <point> <enter>, this will read the actual PLC value assigned to Channel 1.

Example #2

To link the N7:0 register in the MicroLogix PLC to Channel 2 per our PLC file structure illustrated above, key in the following:

4502 <point> <shift> <N> <7> <shift> <: > <0> <point> <enter>

To verify the current address entered, key in the following: 4502 <point> <enter>

To read address value, key in the following: 4002 <point> <enter>. This will read the actual PLC value assigned to Channel 2.

STEP #7 — Assignment of Alarm Conditions

Having created and tested your Remote Channels in Step #6, you are now able to assign alarm conditions.

Channel #1, configured as Discrete, is either ON or OFF.

Should this channel be linked to a "Failsafe" point in the PLC (i.e., ON = NORMAL, OFF = ALARM), we would alarm when OFF. In this case, we would key in 45 01 2.

To alarm when ON (i.e., signal is HIGH), key in the following: 45 01 1

To alarm when OFF (i.e., signal is LOW), key in the following: 45 01 2

To read alarm status for Channel 1, key in the following: 4001 <enter>

Channel #2, configured as Analog, operates within the range from 0–65, 535.

Should this channel be linked to a pressure signal in PLC, and the process requires that pressure remain within an acceptable level, otherwise ALARM (e.g., BELOW 10,000 AND ABOVE 30,000).

We would key in the following:

To alarm when the analog signal falls below a value, (e.g., 10,000), key in: 45 02 5 10000

To read the LOW set point alarm, key in: 45 02 5

To alarm when the analog signal rises above a value, (e.g., 30,000), key in: 45 02 6 30000

To read the HIGH set point alarm, key in: 45 02 6

This document is intended to provide general technical information on a particular subject or subjects and is not an exhaustive treatment of such subjects. Accordingly, the information in this document is not intended to constitute application, design, software or other professional engineering advice or services. Before making any decision or taking any action, which might affect your equipment, you should consult a qualified professional advisor.

RACO Manufacturing and Engineering does not warrant the completeness, timeliness or accuracy of any of the data contained in this document and may make changes thereto at any time in its sole discretion without notice. Further, all information conveyed hereby is provided to users "as is." In no event shall RACO Manufacturing be liable for any damages of any kind including direct, indirect, incidental, consequential, loss profit or damage, even if RACO Manufacturing have been advised on the possibility of such damages.

RACO Manufacturing and Engineering disclaims all warranties whether expressed or implied in respect of the information (including software) provided hereby, including the implied warranties of fitness for a particular purpose, merchantability and non-infringement. Note that certain jurisdictions do not countenance the exclusion of implied warranties; thus, this disclaimer may not apply to you.

Specifications subject to change without notice. Trade names are trademarks or registered trademarks of their respective companies.



RACO MANUFACTURING AND ENGINEERING CO.
1400 62nd Street • Emeryville, CA 94608
(800) 722-6999 • (510) 658-6713
FAX: (510) 658-3153 • racoman.com