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# Industrial Automation BACnet Slave Configuration

## Tech Note 02



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### **Abstract:**

This document describes two BACnet Slave drivers supported by Crimson®.

### **Products:**

Red Lion Controls CR3000 Human Machine Interface (HMI), Data Station Plus (DSP), G3 HMI, Graphite® Controller, Graphite HMI, Modular Controller (MC), and ProductVity Station™ (PTV)

### **Use Case: Configuring the BACnet Slave Drivers**

The BACnet slave drivers differ from most other slave drivers used in Crimson. This document provides step by step instructions for configuring Crimson to support basic BACnet slave applications.

### **Required Software:**

Crimson 2.0, 3.0, or Crimson 3.1

### **Required Operating System:**

Microsoft Windows 2000, or above

## Introduction

This Tech Note describes how to configure Crimson to support:

- BACnet MS/TP: Serial Communications (analog and binary (i.e., digital))
- BACnet UDP/IP or 802.3 (Raw): Ethernet Communications (analog and binary)

**NOTE:** Crimson is required and is only available to Windows 2000 or above users. Please update your version of Crimson to the latest, available online at: [www.redlion.net](http://www.redlion.net).

## BACnet MS/TP: Serial Communications

This section describes how to configure BACnet slave drivers within Crimson to support BACnet MS/TP: Serial Communications, for both analog data transfer and binary (digital) data transfer. Refer to steps 1 thru 16 for configuring drivers for analog data transfer, and to steps 17 thru 26 for configuring drivers for binary data transfer.

### Analog Data Transfer

1. Referring to Figure 1, go to the Navigation Pane and click on the Communications Port to be configured; *RS-485 Comms Port* in this example.
2. Go to the Communications - RS-485 Comms Port window and under the *Driver Selection* heading select the *Pick* button, next to the *Driver:* field.
3. Go to the Driver Picker for Serial Port popup and under the *Manufacturer* heading select *BACnet*, and under the *Driver* heading select *MS/TP Slave*.

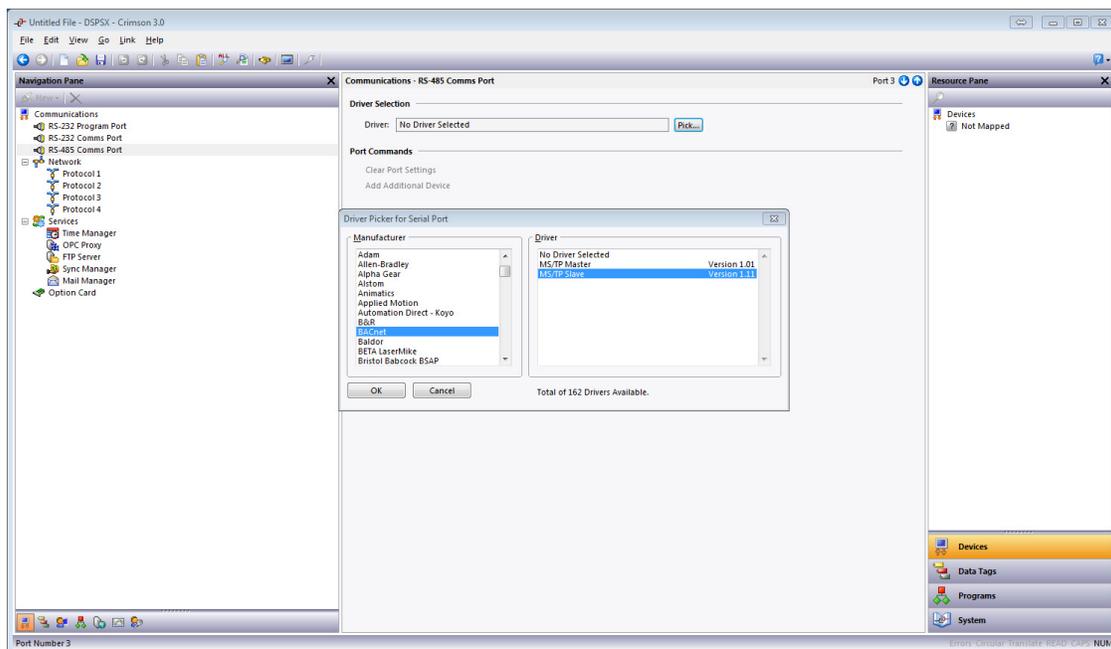


Figure 1.

4. Click *OK*.

5. Referring to Figure 2, configure the port settings to match the device with which the unit will be communicating:
  - a. The **MAC Address:** and **Device ID:** fields under the **Configuration** heading refer to the Red Lion device that is being programmed; **10** and **127**, respectively, in this example.
  - b. The **Max Instance:** field is the number of each data type that can be auto-discovered on the network; **100** in this example.
  - c. The **Object Properties** settings are used to select how the exposed data items will be named during an auto discovery, as well as what extra information will be discovered. See each item's bubble help for further information.
  - d. The **Remote Management** password is used for the BACnet Reinitialize Device commands; both cold start and warm start are supported.

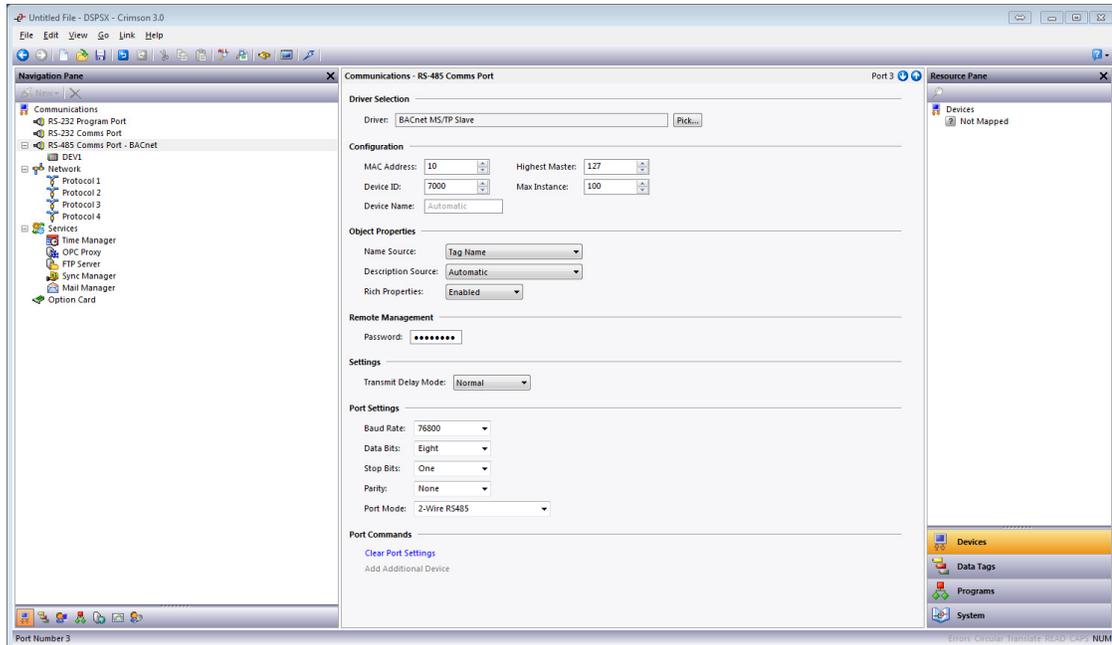


Figure 2.

6. Referring to Figure 3, go to the Navigation Pane and click on the device below the desired port; *DEV1* in this example.
7. Go to the Communications - RS-485 Comms Port - DEV1 popup and click *Add Gateway Block*.

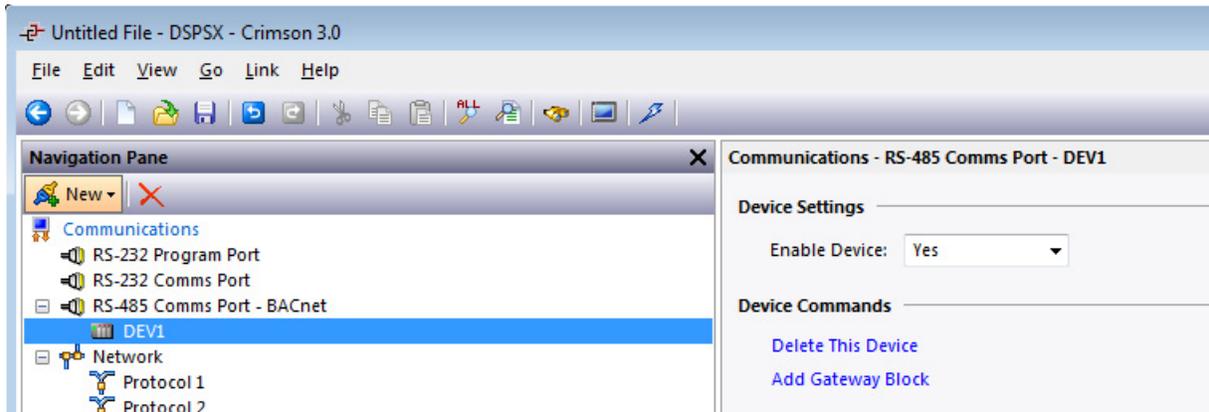


Figure 3.

8. Referring to Figure 4, click on the desired block; *Block1* in this example
9. Click *Pick*, next to the *Start Address* : field. the *Select Address for BACnet* popup appears.
10. Choose the address to expose on the BACnet network; *AV* (for analog values) in this example
11. Select the appropriate *Data Type* and click *OK*:
  - a. Specify *Real as Real* if the source data is floating point
  - b. Specify *Long as Long* if the source data is an integer (as in this example)

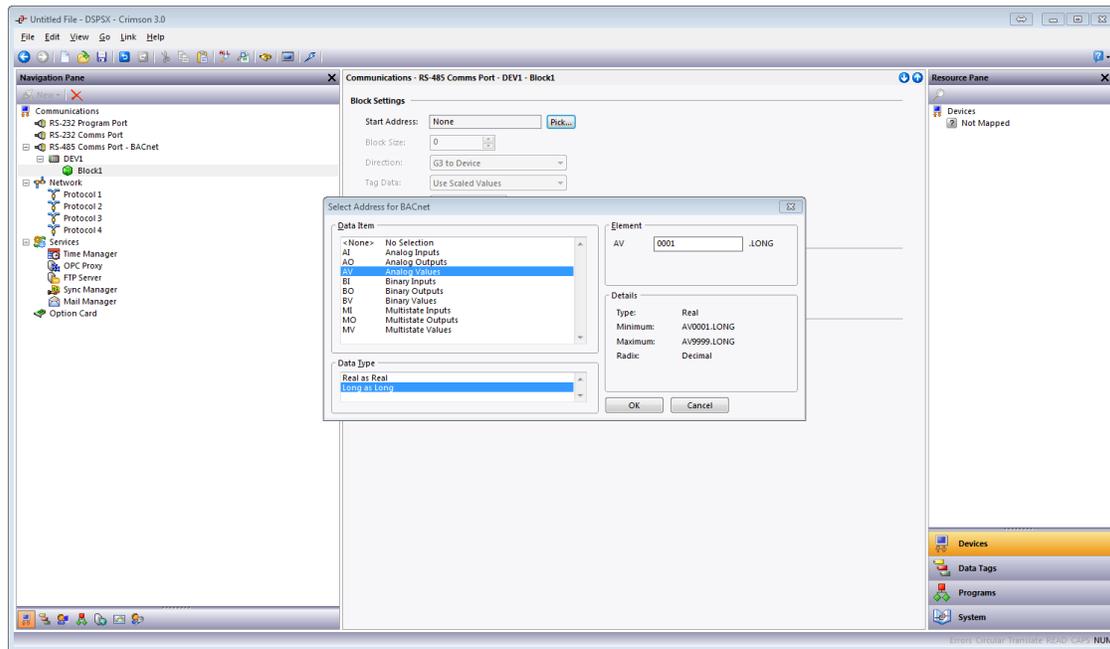


Figure 4.

12. Referring to Figure 5, set the **Block Size:** field to the desired number of data points; *10* in this example.

13. Set the **Direction:** field to specify the direction of data transfer; *Device to G3* in this example:

- a. Specify *G3 to Device* for read only capability from the external device
- b. Specify *Device to G3* for read and write capability from the external device

**NOTE:** In step 13, the device options available for selection in the **Direction:** field must reflect the Red Lion Device actually being configured on the network.

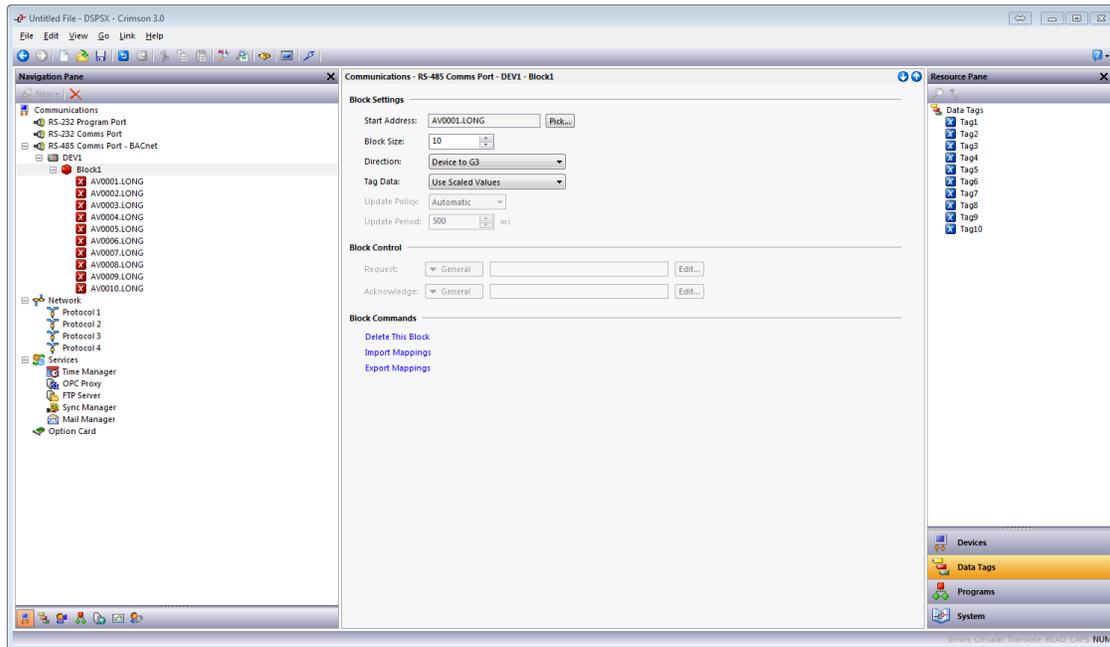


Figure 5.

14. Go to the **Start Address:** field and click on the first address (*AV0001 LONG* in this example) and click the **Pick** button.

15. Referring to Figure 6, click on *Data Tags* in the Resource Pane.

16. Drag each desired tag from the Resource Pane to the Navigation Pane and drop it on the address with which it will be associated.

**NOTE:** The arrow between each BACnet address and its corresponding tag indicates data flow direction.

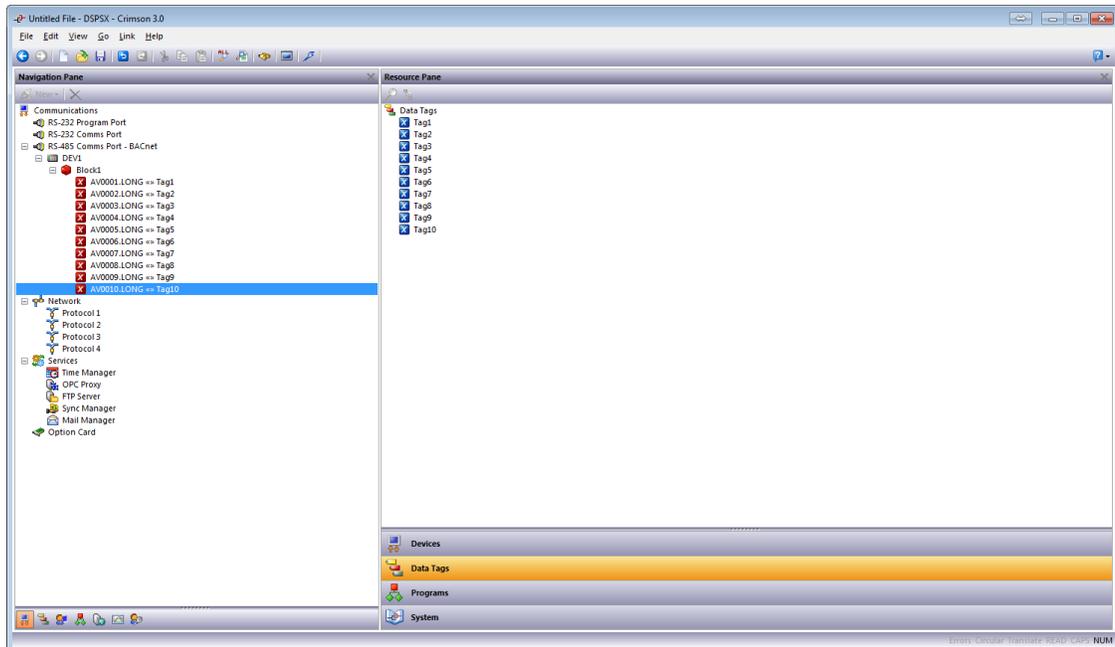


Figure 6.

## Binary Data Transfer

17. Referring to Figure 7, go to the Navigation Pane and click on the device below the port; *DEV 1* in this example.
18. Got to the Communications - RS-485 Comms Port - DEV1 popup and under the *Device Commands* heading, click *Add Gateway Block*.

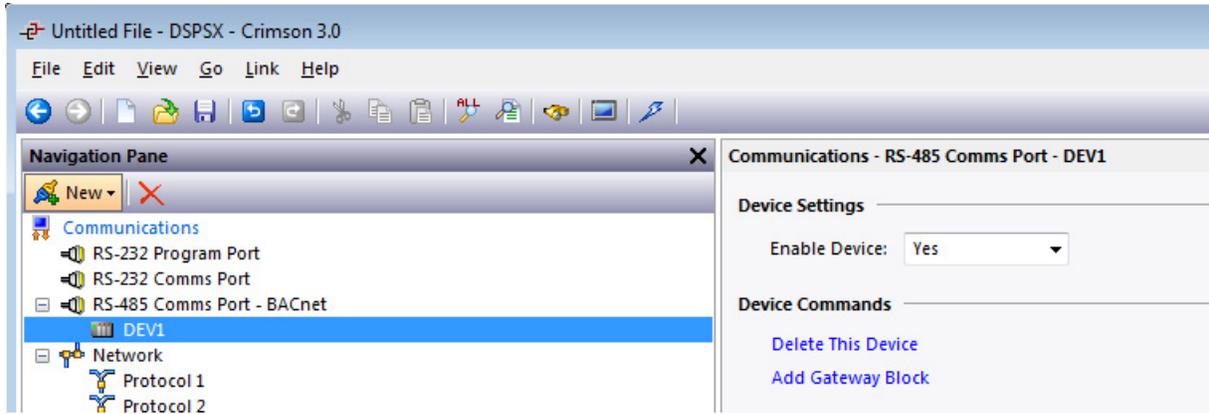


Figure 7.

19. Referring to Figure 8, go to the Navigation Pane and click on the desired block; *Block 2* in this example
20. Click the *Pick* button next to the *Start Address* : field; the Select Address for BACnet popup appears.
21. Under the *Data Item* heading, select the address to expose on the BACnet network, *BV* (for binary values) in this example, and click the *OK* button.

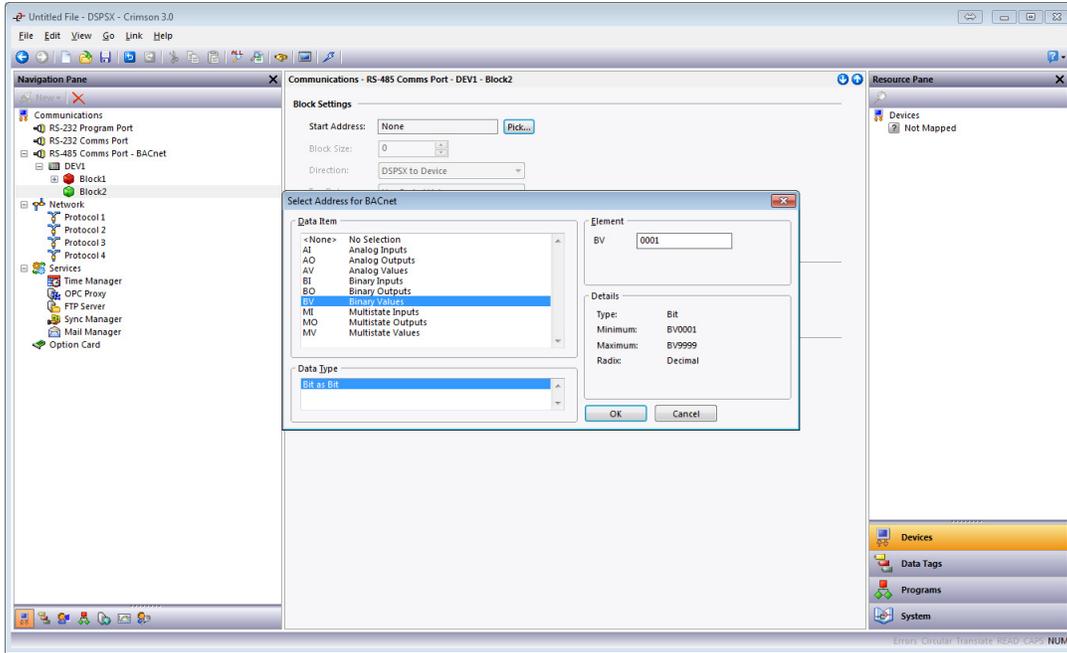


Figure 8.

22. Referring to Figure 9, set the **Block Size**: to the desired number of data points; 5 in this example.
23. Set the **Direction**: field to specify the direction of data transfer; *DSPSX to Device* in this example:
  - a. Specify *DSPX to Device* for read only capability from the external device
  - b. Specify *Device to DSPX* for read and write capability from the external device

**NOTE:** In step 23, the device options available for selection in the **Direction**: field: must reflect the Red Lion Device actually being configured on the network.

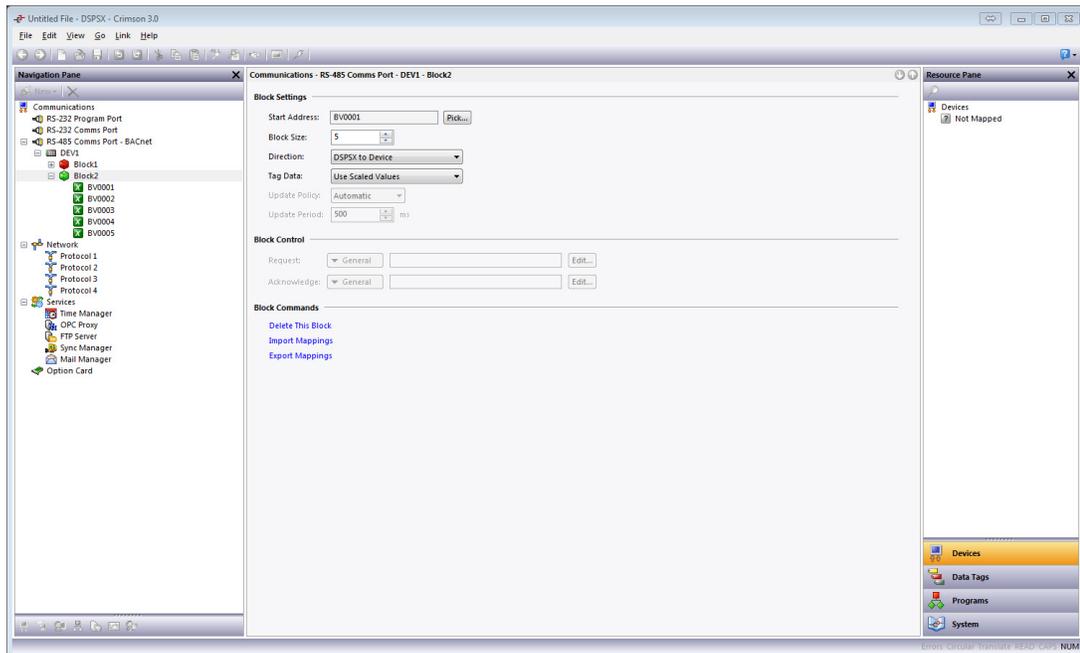


Figure 9.

24. Click on the first address below the block.
25. Click on *Data Tags* in the Resource Pane.

26. Referring to Figure 10, drag each tag from the Resource Pane to the Navigation Pane and drop it on the address with which it will be associated.

**NOTE:** The arrow between each BACnet address and its corresponding tag indicates data flow direction.

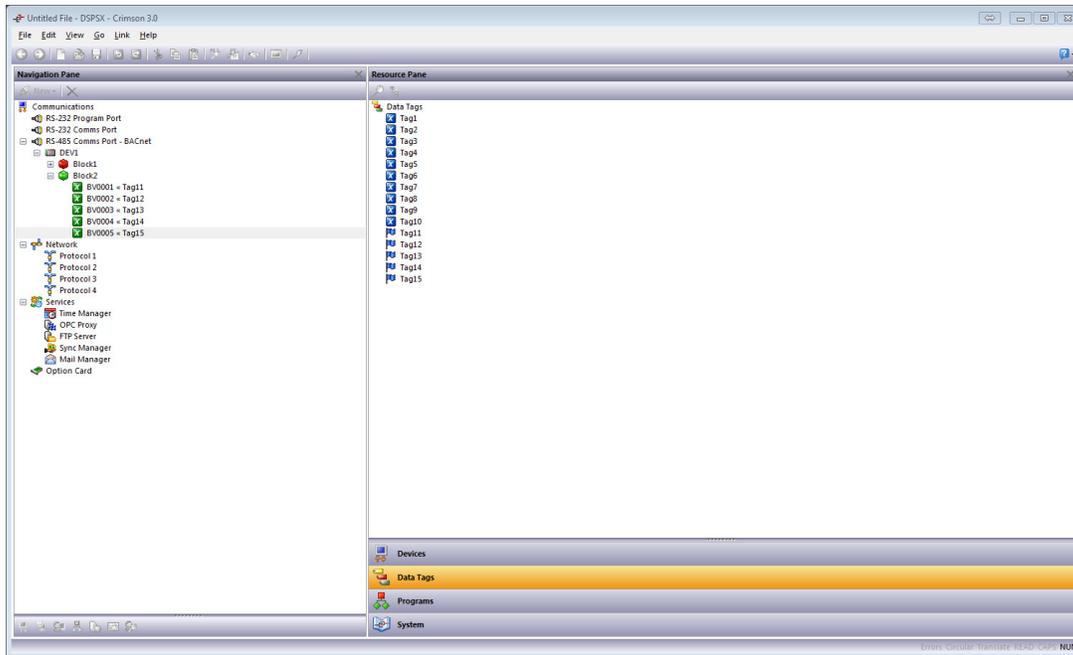


Figure 10.

## BACnet UDP/IP or 802.3 (Raw): Ethernet Communications

This section describes how to configure the BACnet slave drivers in Crimson to support BACnet UDP/IP or 802.3 (Raw): Ethernet Communications. Analog data transfer and binary data transfer options are described. Configuration steps 1 thru 5 are common to both data transfer options.

1. Referring to Figure 11, go to the Navigation Pane and click on the Protocol to be configured; *Protocol 1* in this example.
2. Go to the **Driver Selection** heading and click the *Pick...* button next to the **Driver:** field; the Driver Picker for Ethernet Port popup appears.
3. Under the **Manufacturer** heading select *BACnet*, and under the **Driver:** field select *UDP/IP Slave* or *802.3 Slave* (much less common), as appropriate; *UDP/IP Slave* in this example.

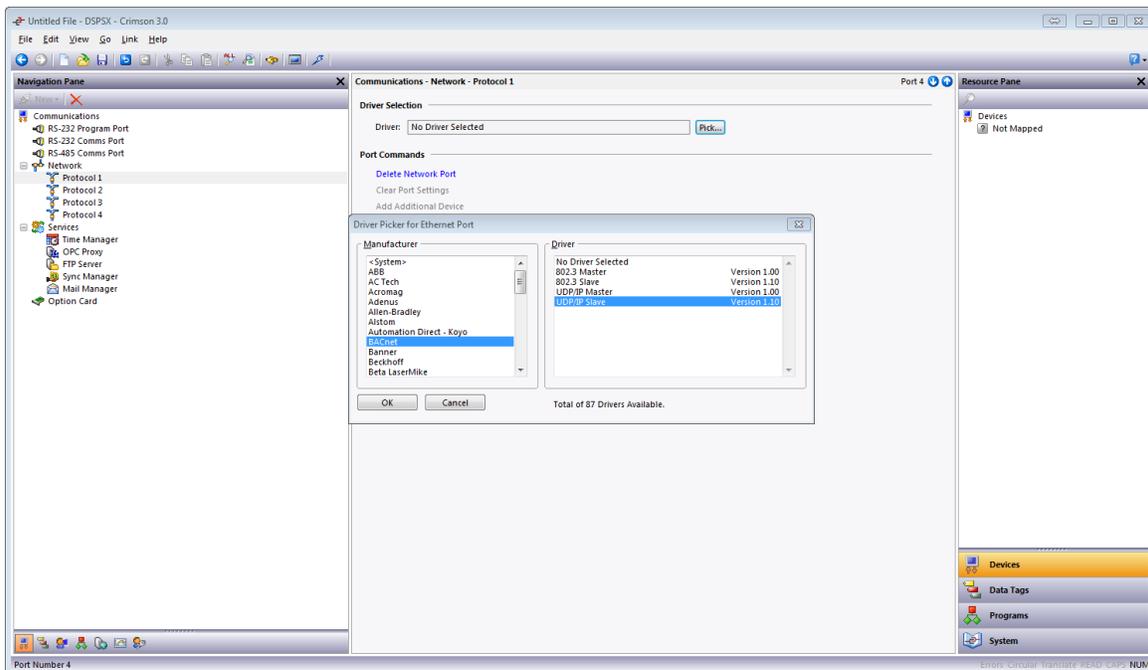


Figure 11.

4. Click *OK*.

5. Referring to Figure 12, configure the device:
  - a. The `Device ID`: setting under the *Configuration* heading refers to the Red Lion device that is being programmed; `7000` in this example.
  - b. The `Max Instance`: setting is the number for each data type that can be auto-discovered on the network; `100` in this example.
  - c. The `Object Properties` settings are used to select how the exposed data items will be named during an auto discovery, as well as what extra information will be discovered. See each item's bubble help for further information.
  - d. The `Remote Management` password is used for the BACnet Reinitialize Device commands; both cold start and warm start are supported.

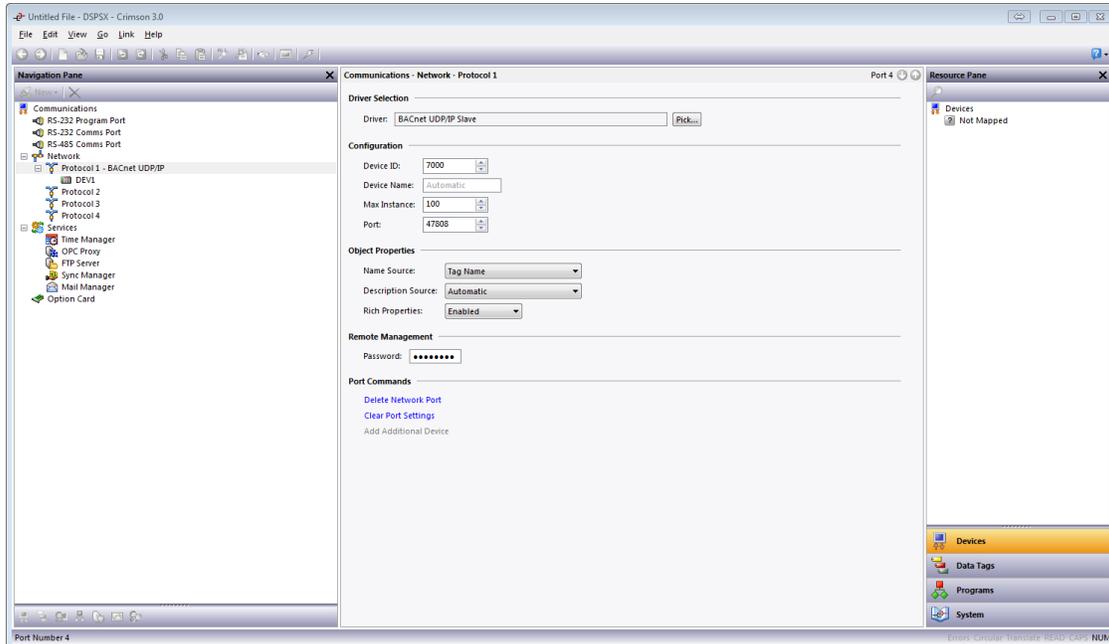


Figure 12.

The initial setup for both analog data transfer and binary data transfer is now complete. To perform final configuration for analog data transfer, perform steps 6 thru 16. To perform final configuration for binary data transfer, perform steps 17 thru 26.

## Analog Data Transfer

6. Referring to Figure 13, go to the Navigation Pane and click on the desired network device below the port; *DEV1* in this example. The associated popup appears; Communications - Network - Protocol 1 - DEV1 in this example.
7. Click *Add Gateway Block*.

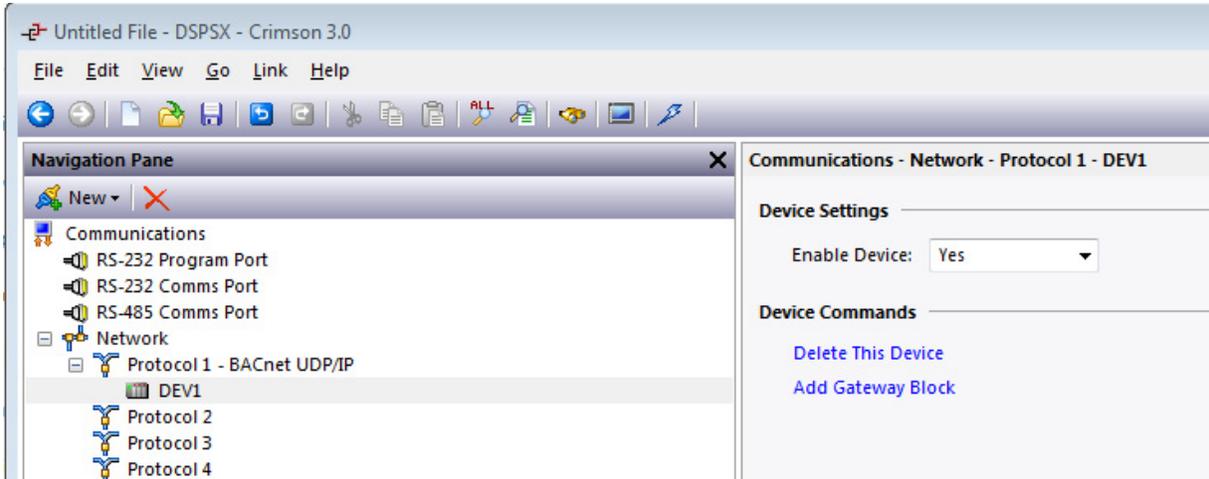


Figure 13.

8. Referring to Figure 14, click on the desired block; *Block 1* in this example.
9. Under the *Block Settings* heading, click the *Pick* button next to the *Start Address*: field; the *Select Address for BACnet UDP/IP* popup appears.
10. Under the *Data Item* heading, choose the address to expose on the BACnet network; *AV* (for analog values) in this example.
11. Set the appropriate *Data Type*, *Long as Long* in this example, and click *OK*.
  - a. Specify *Real as Real* if the source data is floating point
  - b. Specify *Long as Long* if the source data is an integer (used in this example)

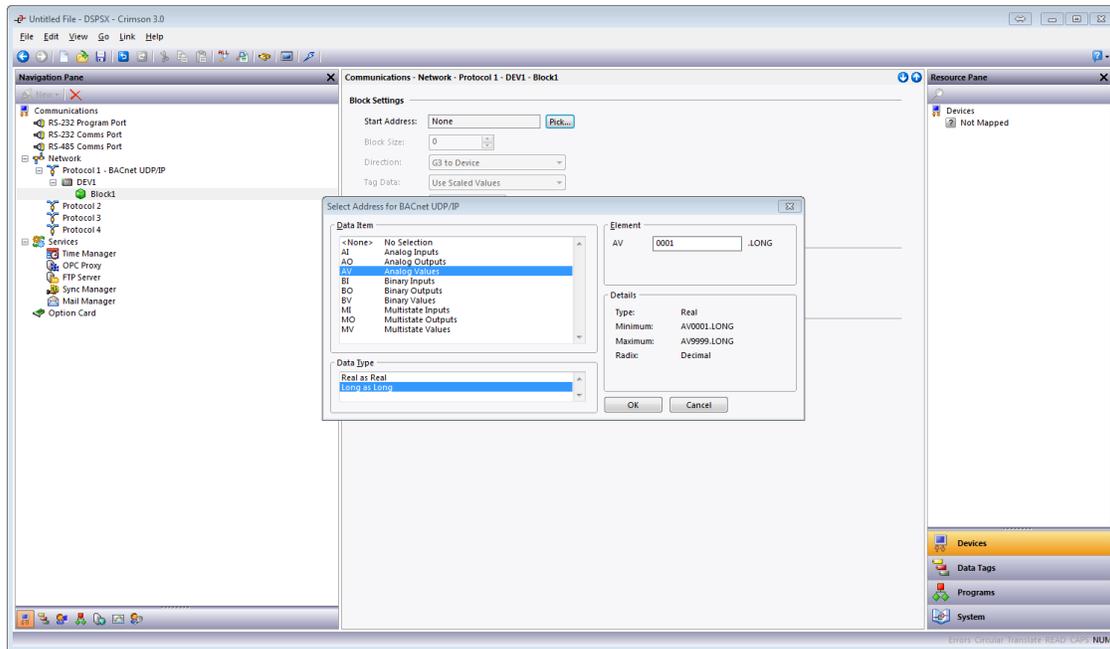


Figure 14.

12. Referring to Figure 15, set the **Block Size:** field to the desired number of data points; *10* in this example.

13. Set the **Direction:** field to specify the direction of data transfer; *Device to G3* in this example:

- a. Specify *G3 to Device* for read only capability from the external device
- b. Specify *Device to G3* for read and write capability from the external device

**NOTE:** In step 13, the device options available for selection in the **Direction:** field must reflect the Red Lion Device actually being configured on the network.

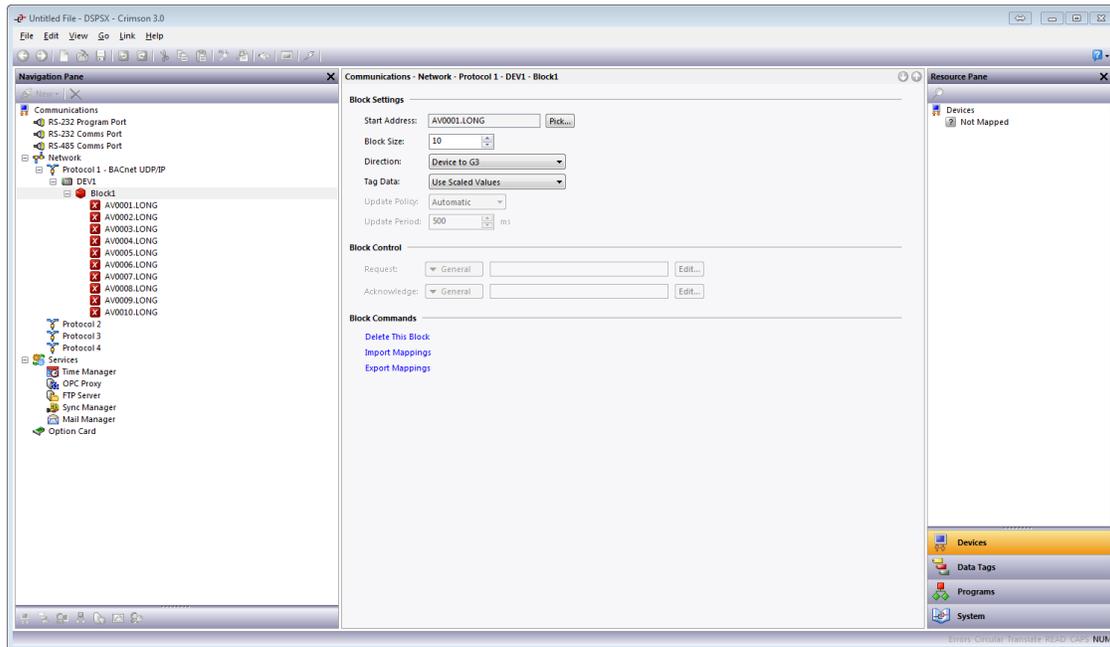


Figure 15.

14. Go to the Navigation Pane and click on the first address below **Block 1**; *AV0001.LONG* in this example.

15. Go to the Resource Pane and click on *Data Tags*.

16. Referring to Figure 16, drag each tag from the Resource Pane to the Navigation Pane and drop it on the address with which it will be associated.

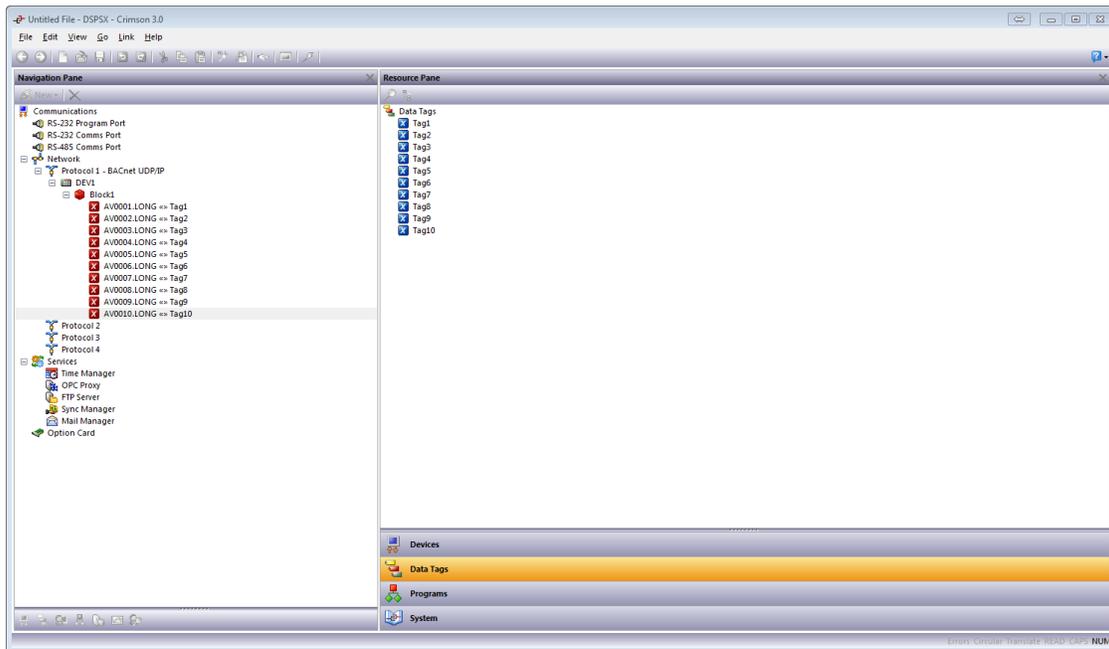


Figure 16.

**NOTE:** The arrow between each BACnet address and its corresponding tag indicates data flow direction.

## Binary Data Transfer

17. Referring to Figure 17, go to the Navigation Pane and click on the device below the desired port; *DEV1* in this example.

18. Click *Add Gateway Block*.

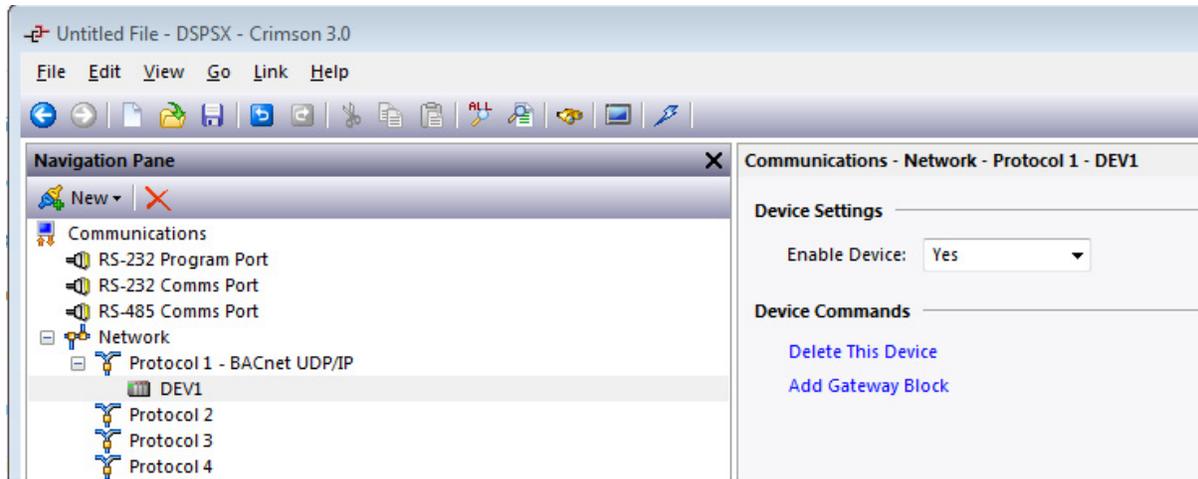


Figure 17.

19. Referring to Figure 18, go to the Navigation Pane and Click on the desired block; *Block 2* in this example. The Communications - Network - Protocol 1 - DEV1 - Block 2 popup appears.

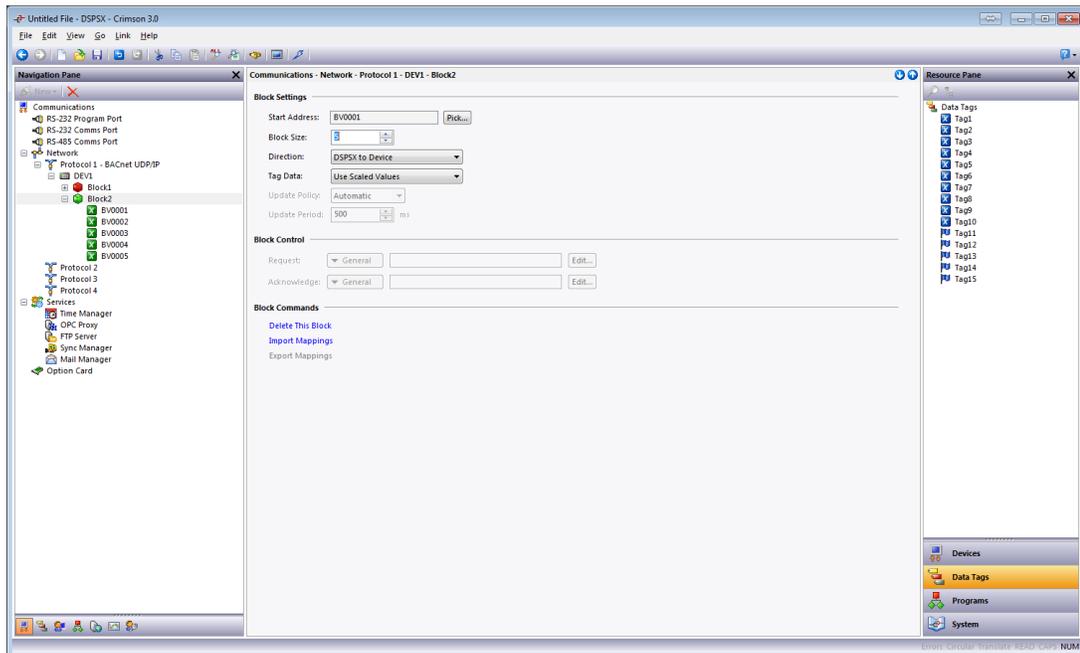


Figure 18.

20. Referring to Figure 19, click the *Pick* button next to the *Start Address* : field; the *Select Address for BACnet UDP/IP* popup appears.

21. Choose the address to expose on the BACnet network; *BV* (for binary values) in this example, and click *OK*.

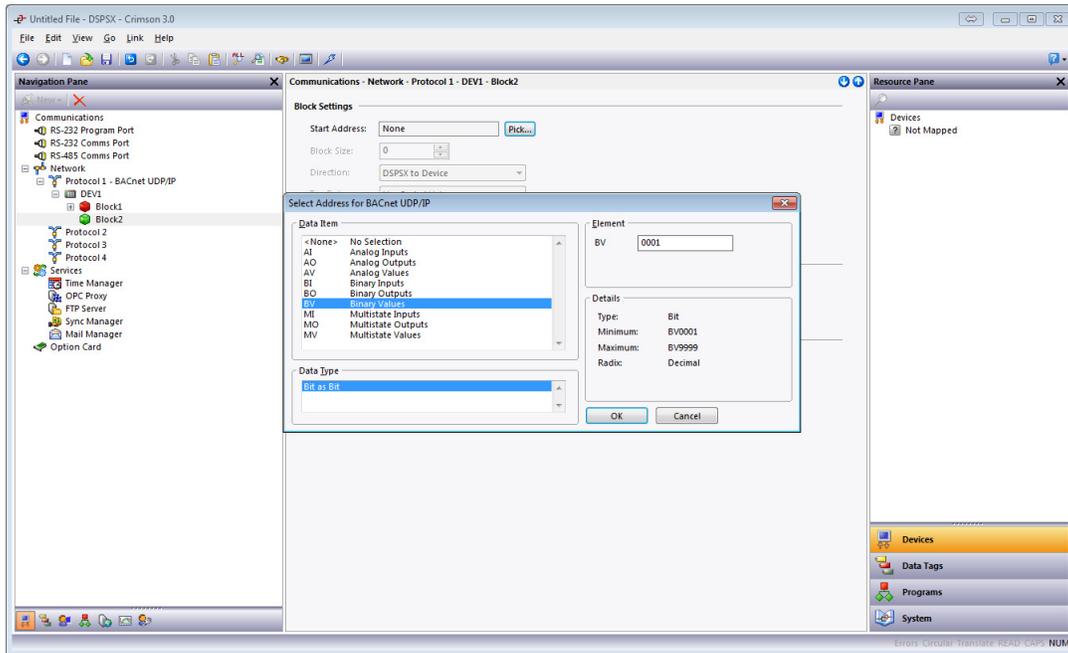


Figure 19.

22. Referring to Figure 20, set the Block Size to the desired number of data points; 5 in this example.

23. Set the Direction field to specify the direction of data transfer; *DSPSX to Device* in this example:

- a. *DSPX to Device* for read only capability from the external device
- b. *Device to DSPX* for read and write capability from the external device

**NOTE:** In step 23, the device options available for selection in the `Direction:` field must reflect the Red Lion Device actually being configured on the network.

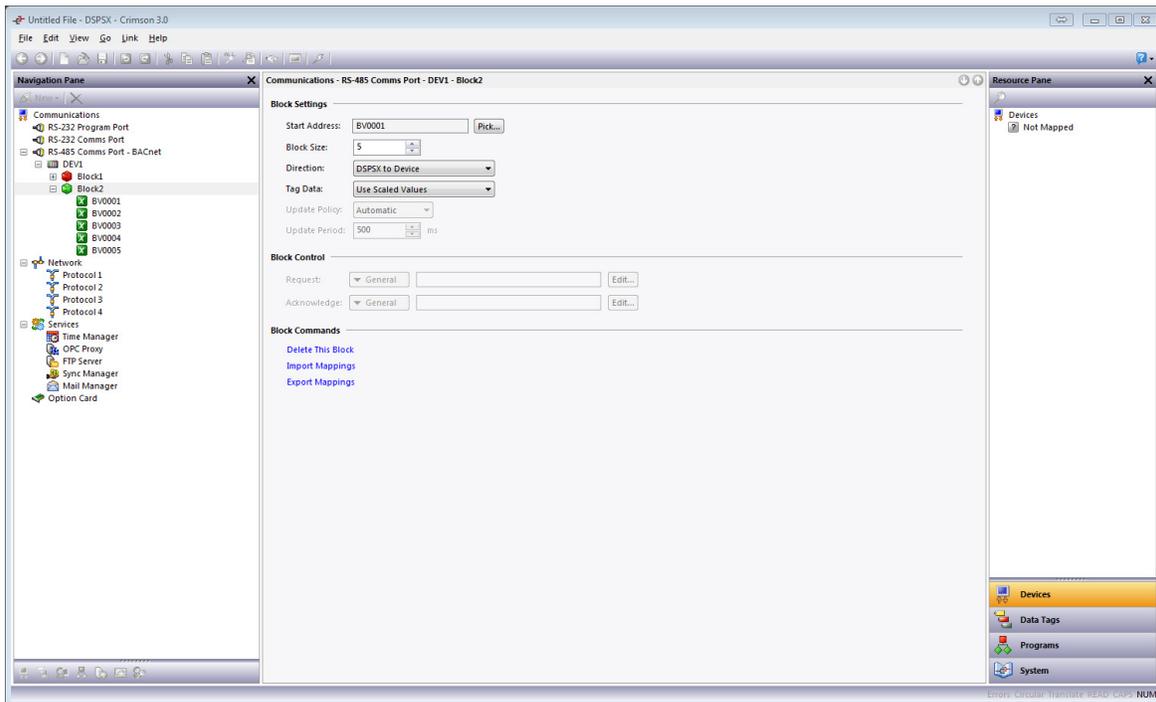


Figure 20.

24. Go to the Navigation Pane and click on the first address below `Block 2`; *BV0001* in this example.

25. Go to the Resource Pane and click on *Data Tags*.

26. Referring to Figure 21, drag each desired tag from the Resource Pane to the Navigation Pane and drop it on the address with which it will be associated.

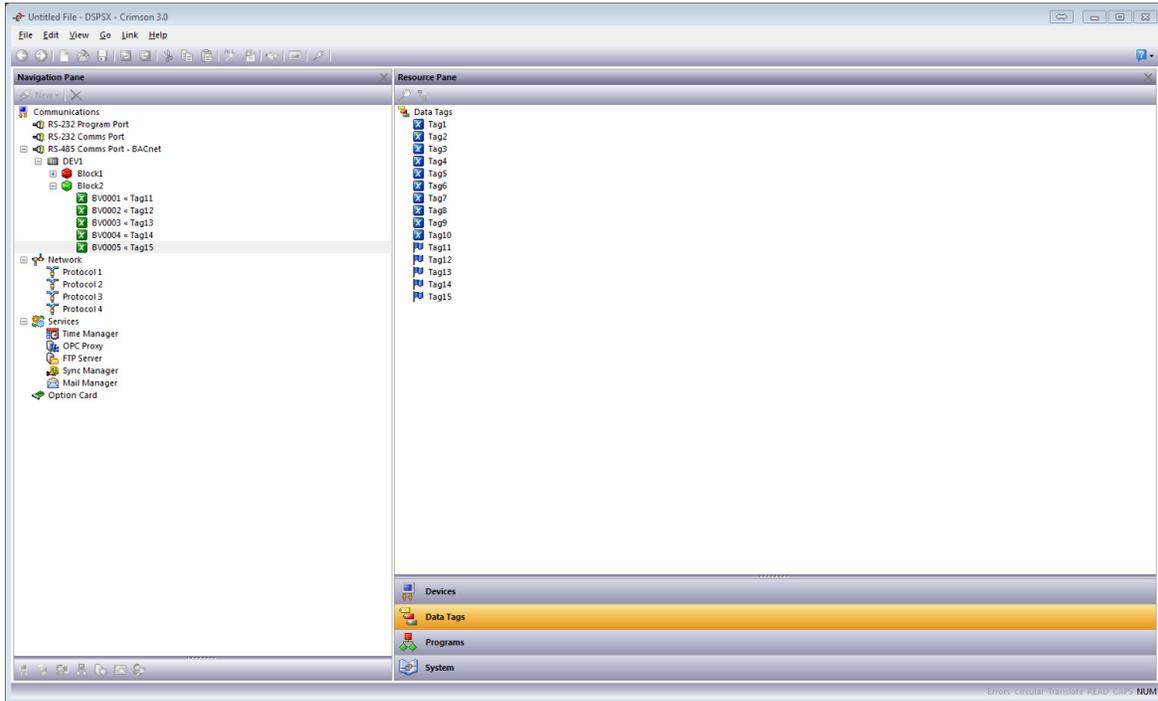


Figure 21.

**NOTE:** The arrow between each BACnet address and its corresponding tag indicates data flow direction.

**Disclaimer**

It is the customer's responsibility to review the advice provided herein and its applicability to the system. Red Lion makes no representation about specific knowledge of the customer's system or the specific performance of the system. Red Lion is not responsible for any damage to equipment or connected systems. The use of this document is at your own risk. Red Lion standard product warranty applies.

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