Industrial Automation   Enhanced Allen Bradley L5K Support

Tech Note 44

Abstract:

This document describes how to use the Native Tags via L5K file Enhanced driver support in Crimson$^®$ 3 to establish communication with Allen Bradley's CompactLogix and ControlLogix Programmable Logic Controllers (PLCs) over Ethernet.

Products:

Red Lion Controls CR1000 Human Machine Interface (HMI), CR3000 HMI, Data Station Plus (DSP), G3 HMI, G3 Kadet HMI, Graphite$^®$ Controller, Graphite HMI, Modular Controller, and ProducTVity Station™ (PTV)

Use Case: Communicating With RSLogix/Studio5000-Based PLCs

This document describes how to use the Native Tags via L5K file Enhanced driver, which is the preferred option for establishing communication with Allen Bradley's CompactLogix and ControlLogix PLCs over Ethernet.

Required Software:

Crimson 3.0 (build 530.000 or higher) or Crimson 3.1

Required Operating System:

Microsoft Windows 2000, or above

Introduction

The L5K driver in Crimson provides a means to access data in Allen Bradley PLCs using direct tag names as reference. This driver can be used:

- With an Allen Bradley CompactLogix PLC CPU
- With an Allen Bradley ControlLogix PLC CPU or Ethernet Communication card
- Over Ethernet only

The driver provides tools to load and access PLC Controller Tags information directly from a PLC program saved as an L5K file. The driver, after L5K import into Crimson, automatically recognizes tag types and formats. The driver supports the following types:

- All factory defined types such as Counters, Timers, Word, Real, Strings, etc.
- User Defined Type (UDT) variables
- Add On Instructions
- Aliases; the driver will try to resolve the initial data type based on its alias

> **NOTE 1:** Direct I/O access is not possible; use an alias to access the I/O in the PLC. If the driver cannot resolve the alias type, it will assume the tag is a double word.

> **NOTE 2:** Crimson 3.0 (build 530.000 or higher) or 3.1 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.

Generating The L5K File

In RSLogix/Studio 5000, open the PLC program and click *File > Save As* from the menu bar; the Save As popup appears, as shown in Figure 1. Perform the following:

1. Go to the `Save in:` field and specify the folder in which the file should be saved; *L5Ks* in this example.

2. Go to the `File name:` field and specify the file name; *CtrLogix.L5K* in this example.

3. Go to the `Save as type:` field and select *RsLogix 5000 Import/Export File (*.L5K)* from the drop down menu.
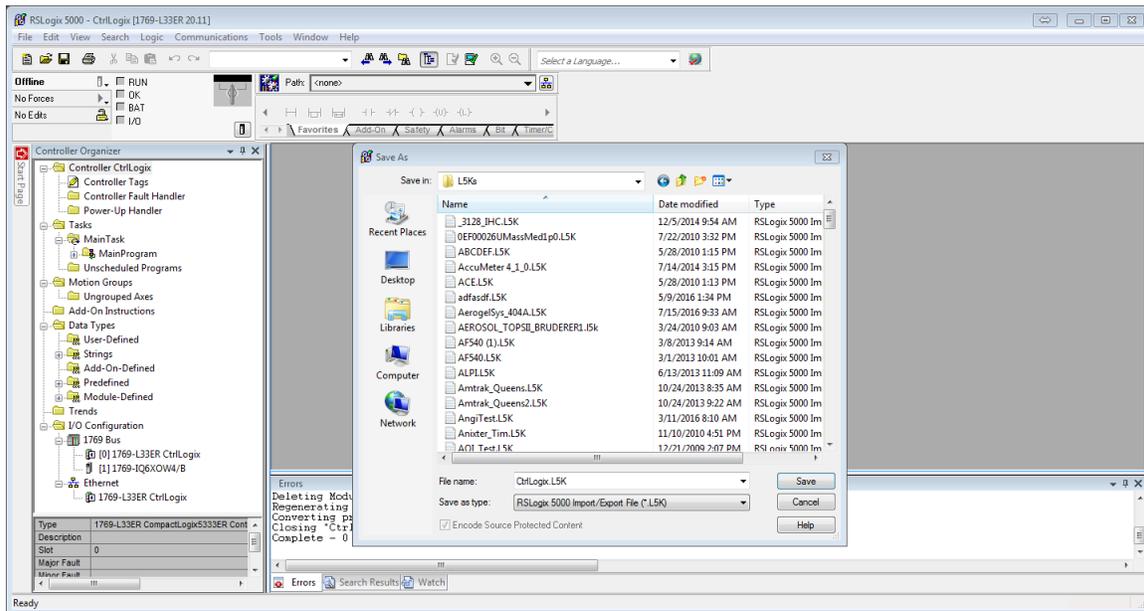
Figure 1.

4. Click the *Save* button to save the program as an L5K file. The L5K file that is generated contains all required information about the Controller tags.

Crimson Configuration

Configuring The Ethernet Port

Referring to Figure 2, perform the following:

1. Go to the Navigation Pane and under Communications, select *Network*; the Communications - Networks popup appears.

2. Select the `Ethernet 1` or `Ethernet 2 tab,` as applicable; *Ethernet 1* in this example.

3. Configure the port as required, saving the configuration settings when done.
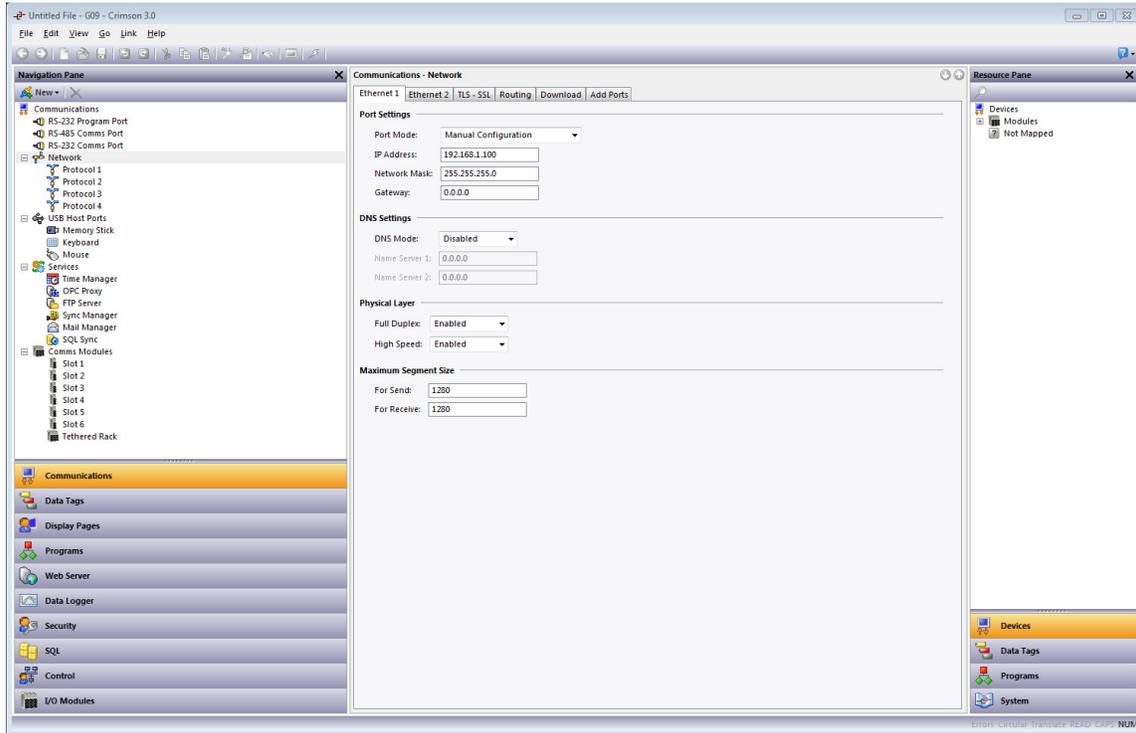
Figure 2.

Selecting The Driver

Referring to Figure 3, perform the following:

1. Go to the Navigation Pane and select the first available Protocol under Network; *Protocol 1* in this example. The Communications - Network - Protocol 1 popup appears.

2. Under Driver Selection, go to the `Driver:` field and click the *Pick* button; the Driver Picker for Ethernet Port popup appears.

3. Under the `Manufacturer` column, select *Allen-Bradley*.

4. Under the `Driver` column, select *Native Tags via L5K file Enhanced*.

5. Click the *OK* button.
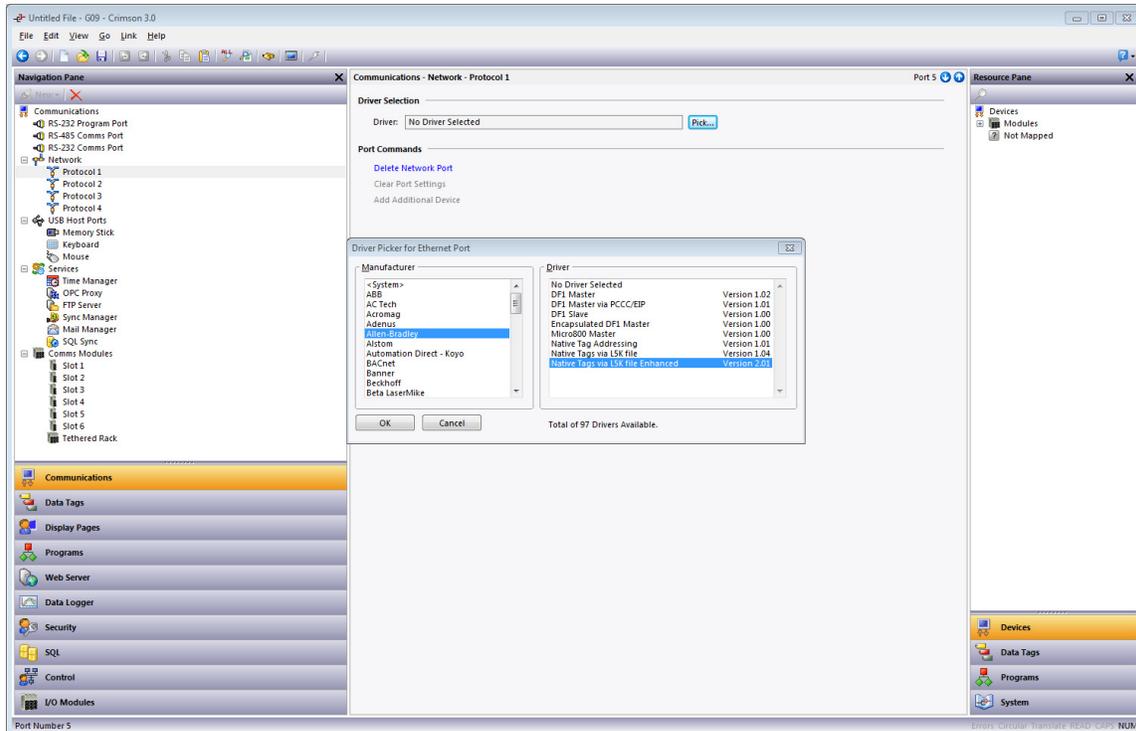
Figure 3.

Configuring The Driver

Referring to Figure 4, perform the following:

1. Go to the Navigations Pane and select the new device that appeared under Protocol 1; *PLC1* in this example. This device represents the Allen Bradley PLC.

2. Set the `IP address:` field to match the PLC configuration; *192.169.15.51* in this example.

3. Leave the `TCP Port:` field set to *44818*, unless instructed otherwise.

4. Set the `Enable Routing:` field to *No* only if the PLC does **NOT** have a backplane. (Some newer Compact-Logix models do not have a backplane)

5. Refer to the Routing Path section of this document if the CPU is not in Slot 0 of the rack that contains the Ethernet card.
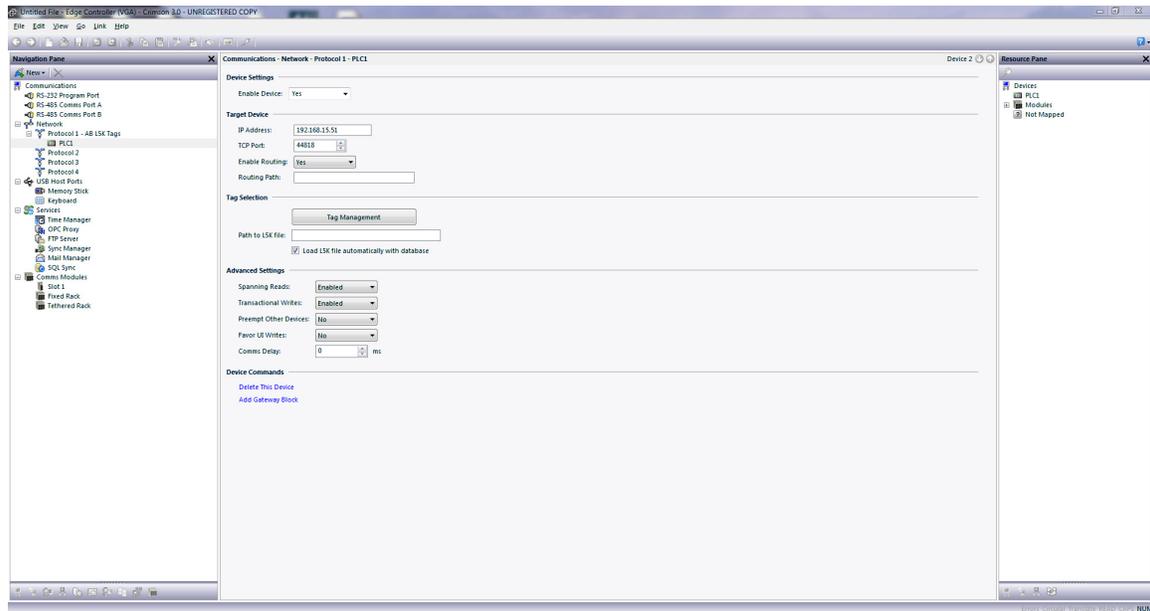
Figure 4.

Importing The PLC's Tag List

Referring to Figure 5, perform the following:

1. Click the *Tag Management* button; the Manage Addresses for All Native Tags popup appears.

2. Click the *Import L5K* button; the Open File popup appears.

3. Navigate to the L5K file associated with the PLC that was previously saved in the Generating the L5K File section; *CtrLogix.L5K* in this example.

4. Click the *Open* button; PLC tag data is imported.

5. Click the *Close* button; PLC tag data is saved.
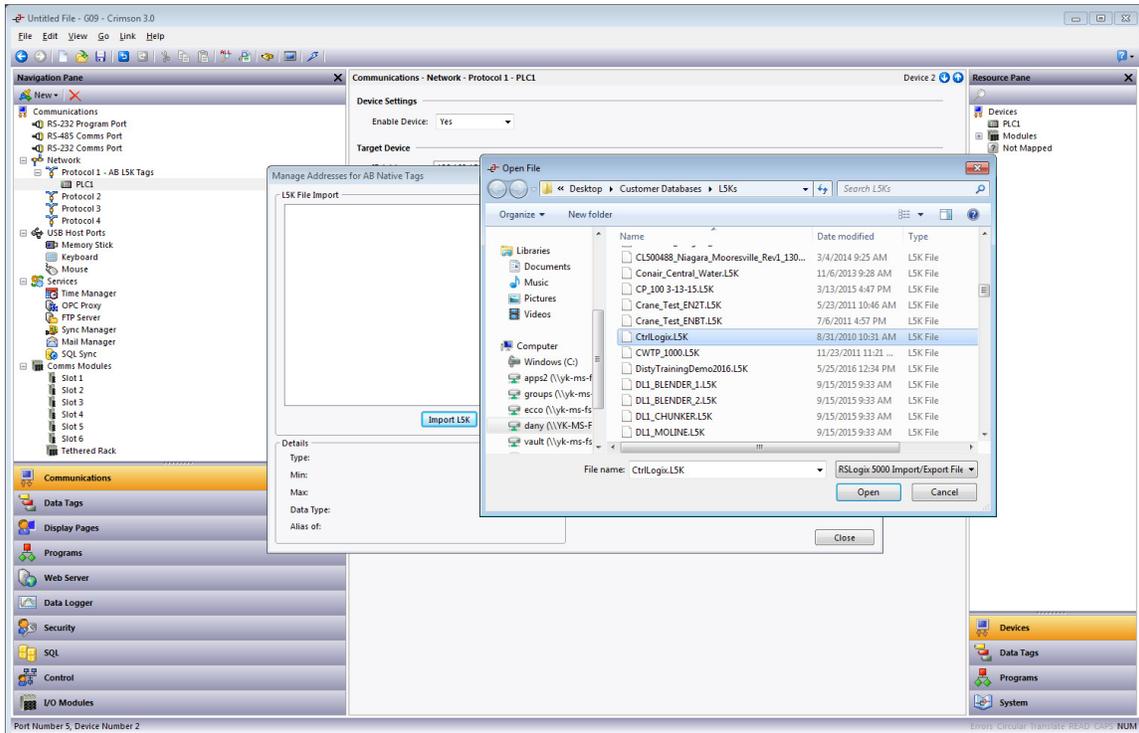
Figure 5.

Creating and Mapping Crimson Tags

Referring to Figure 6, perform the following:

1. Go to the Navigation Pane and navigate to the Data Tags section.
2. Click *New* to create a new Numeric tag.
3. Select *Tag1* (created in step #2); the Data Tags - Tag1 popup appears.
4. Change the `Source:` field from *Internal* to *PLC1*; the Select Address for AB Native Tags popup appears.
5. Select the tag's source from the L5K File Tree; *CounterA.ACC* in this example.
6. Click the *OK* button.
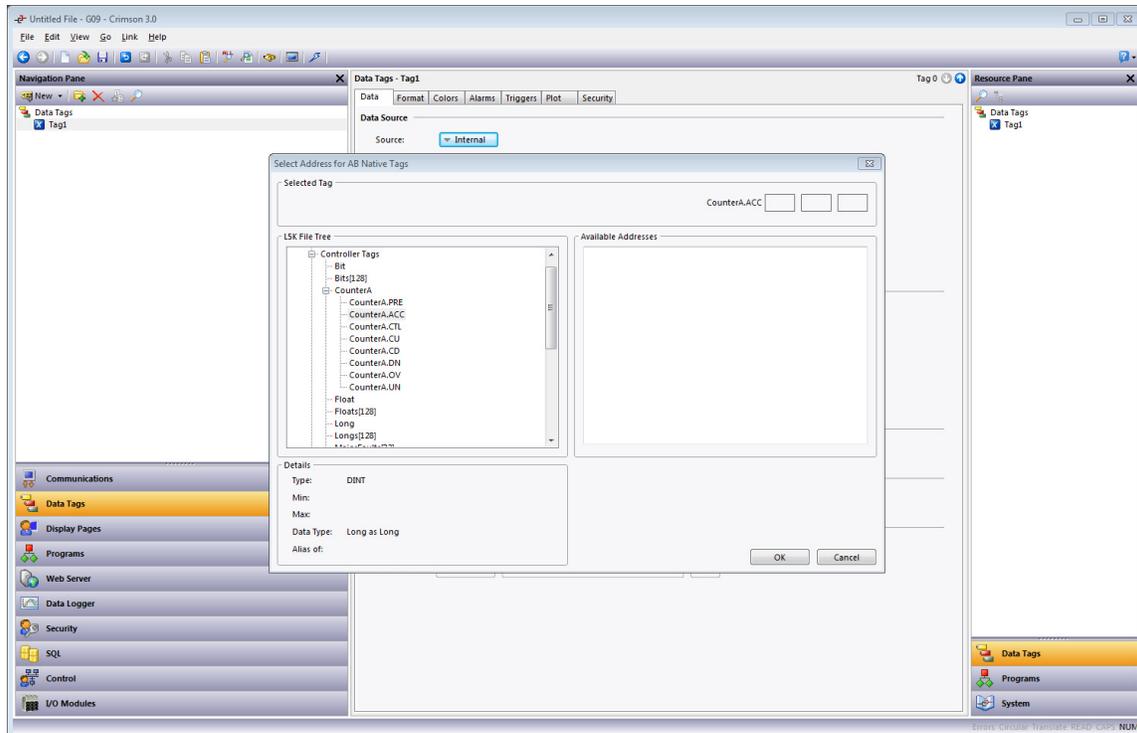
Figure 6.

Note: If an array is selected, the array element (or index) can be entered in a field under the name section. For example, Tag1 could be mapped to Longs[4].

Creating and Mapping Crimson Array Tags

Referring to Figure 7, perform the following:

1. Go to the Navigation Pane and navigate to the Data Tags section.
2. Click *New* to create a new Numeric tag.
3. Select *Tag2* (created in step #2); the Data Tags - Tag2 popup appears.
4. Change the `Source:` field from *Internal* to *PLC1*.
5. Select the tag's source from the L5K File Tree; *CounterA/Longs[128]* in this example.
6. Click the *OK* button
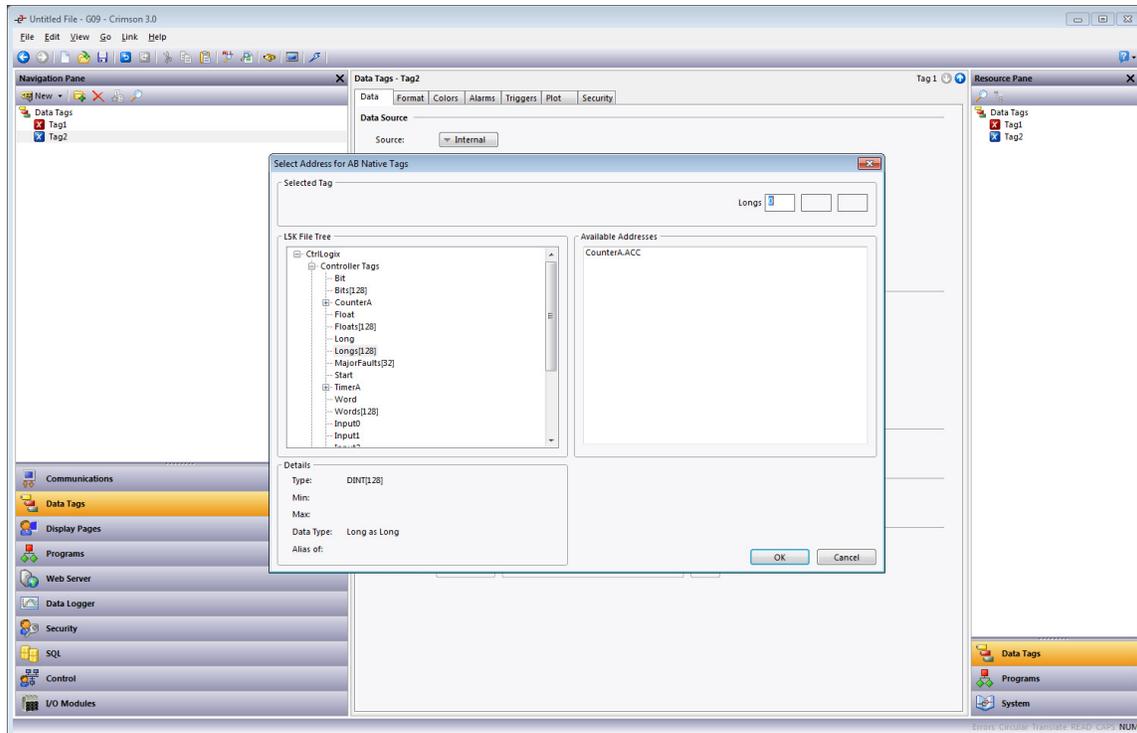
Figure 7.

> **Note**: If an array is selected, the array element (or index) can be entered in a field under the name section. For example, Tag1 could be mapped to Longs[4].

7. Change the `Extent:` field from *Single Item* to *Array*.
8. Enter the number of elements to include.

Routing Path

By default, the Native Tags via L5K File Enhanced driver communicates to a processor in slot 0 of the same chassis which contains the Ethernet module. The Routing Path facilitates connecting to a processor in a different slot or even in a different chassis. It consists of a series of comma delimited numbers, and potentially IP addresses, that directs the data from port to port between the communication modules from the Ethernet module and the target processor.

How it Works

The numbers represent module ports, slot locations, as well as node or IP addresses. This comma delimited string is sent after the IP address, of the Ethernet module that the Red Lion will connect to, thereby indicating the final destination of the packet.

Application: CPU in the Same Rack, Not in Slot 0

The data sent from the unit running Crimson needs to be sent to the Ethernet module's IP address (**10.10.4.120**), to the backplane of the rack (which is port **1** of all modules), to the CPU in slot **6**. The Crimson Routing Path should be set to: **1,6**

Application: CPU in a Different Rack

Figure 8 represents a 2-rack system where the Ethernet module and CPU are installed in separate racks; the two racks are connected via ControlNet. The data sent from the unit running Crimson needs to be sent to the Ethernet module's IP address (**10.10.4.120**), to the backplane of the rack (which is port **1** of all modules), to the ControlNet module in slot **6**, out of port **2** (the ControlNet port) to ControlNet node **10**, to the backplane (port **1** again), to the CPU in slot **2**. The Crimson Routing Path should be set to: **1,6,2,10,1,2**.

Figure 8.

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.

Red Lion Technical Support

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For more information: http://www.redlion.net/support/policies-statements/warranty-statement