TECHNICAL NOTE   TNOI39

Title: Allen Bradley L5K Support

Product(s): G3, Data Station Plus and Modular Controller series

ABSTRACT

This document describes how to use the L5K driver support in Crimson 2.0 to establish communication with Allen Bradley's CompactLogix and ControlLogix PLCs over Ethernet.

INTRODUCTION

The L5K driver in Crimson 2.0 provides a means to access data in Allen Bradley PLCs using direct tag names as reference. This driver can be used under the following conditions:

- 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, upon the L5K import in Crimson, will automatically recognize tag types and formats. The following types are supported:

- All factory defined types such as Counters, Timers, Word, Real, Strings, etc.

- User Defined Type (UDT) variables

- Aliases, the driver will try to resolve the initial data type based on the alias

Note: Direct I/O access is therefore not possible, however it can be accessed using an Alias in the PLC. The driver won't be able to resolve the alias type and will assume the tag is a double word.

Note: The tags imported using the import tool will only be the Controller Tags. There is no access available to the Program tags.

GENERAL NOTES ON THIS DRIVER

Data Access and Protocol Conversion

This driver is using PLC tag names to access the data/value hold within PLC tags. These types of drivers are called "Named Data Driver" in Crimson. Gateway blocks in Crimson cannot directly be used with single tags on Named Data Drivers to achieve protocol conversion. Two solutions are available to the user.

The easiest solution is to create a Gateway block located under the target device you want to exchange data with, not the AB PLC. Using this method, it is possible to drag and drop named data item (PLC tags) to the Gateway block addresses. The other solution is to create a Gateway Block under the AB PLC, however, the block has to be addressed to a tag array. If the PLC has a tag array containing 10 elements, it is therefore possible to have a Gateway block of size 10 elements. Data from other devices can be dragged and dropped to the block addresses.
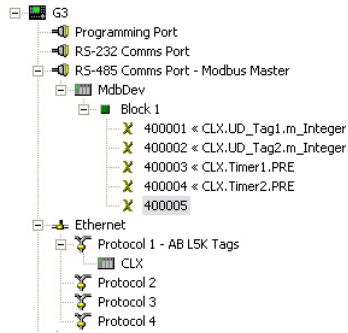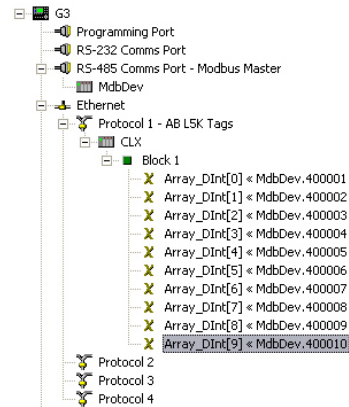
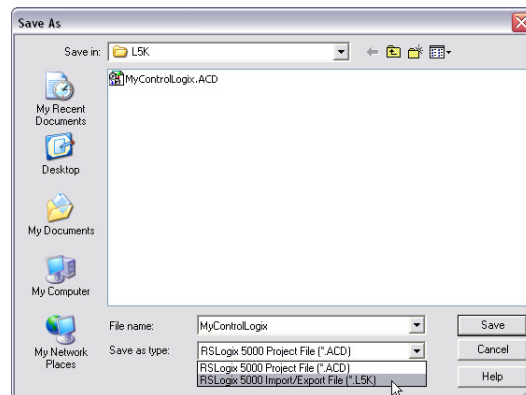**Solution 1**   **Solution 2**

GENERATING THE L5K FILE

In RSLogix 5000, open the PLC program and select File > Save As. A window pops up asking for the filename and location to save the program at.

Change the Save As type to L5K as shown below.

Click Save to save the program as an L5K file. The L5K file generated contains all the information about the Controller tags.

SELECTING THE DRIVER

In Crimson, open the communication window and select the Ethernet port. Change the Port Mode to Manual Configuration and enter the Red Lion device IP address. In this example; 192.168.1.10.

1. Select Protocol 1
2. Click the Edit button to select the driver

3. Select Allen Bradley under Manufacturers

4. Select Native Tags via L5K for the driver.
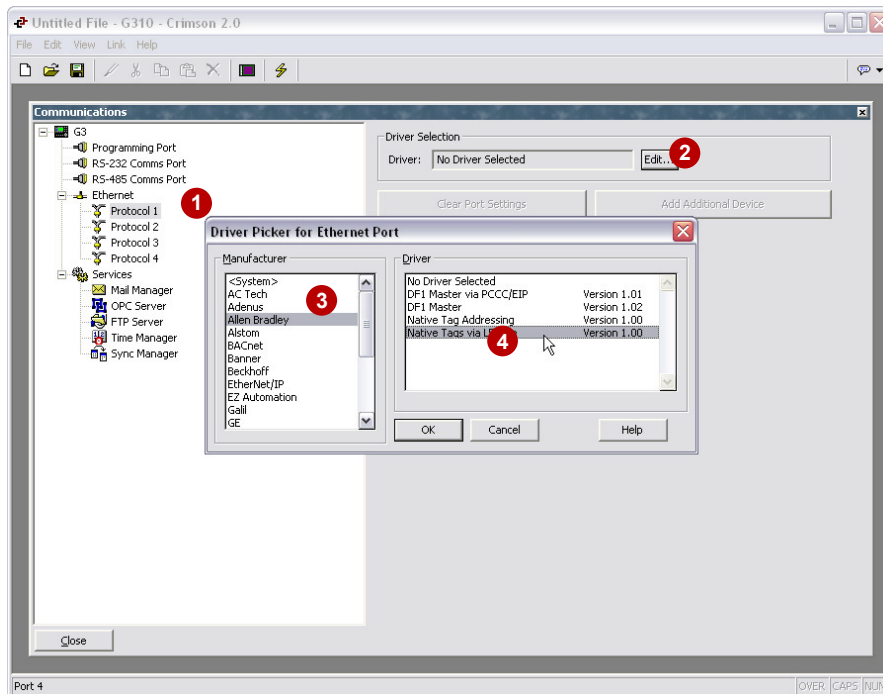
Once the driver is selected, click on the new PLC1 device that appeared under Protocol 1. This device represents the Allen Bradley PLC. Change the settings on the right hand pane to match your PLC configuration. In this example, the PLC IP address is 192.168.1.20 and the slot number 0.
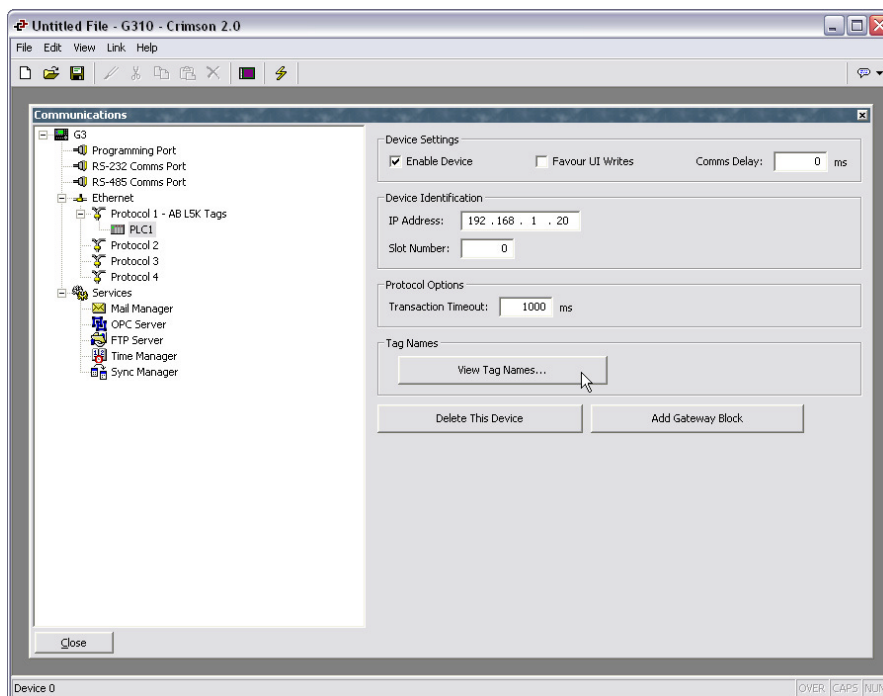
The View Tag Names button provides a window to visualize all the tags available in the PLC. This tag list is compiled when the L5K file is imported in Crimson. The import is also done using this window.
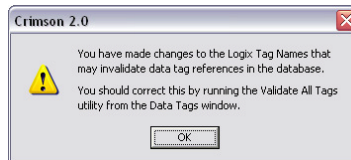
LOADING PLC TAGS IN CRIMSON

Click on the View Tag Names button (as shown on the image above) to access the PLC tag list window.
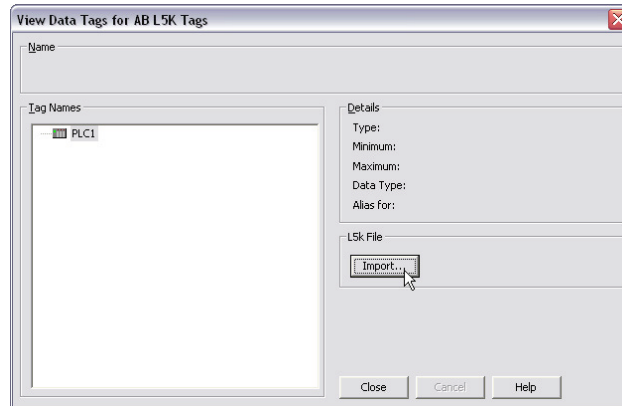

Click the Import button and browse to the L5K file you saved from RSLogix 5000. Select the file and click ok to import all the tags in Crimson. If any error occurs while importing, Crimson will inform on the origin of the error in the L5K file with the line number.

The following popup will also inform you that if any Crimson tags were mapped to PLC tags in the current database, some PLC tag names might have changed, thus breaking the mapping. Pressing the Validate All Tags button in the Data Tags window will verify the mapping for each tag and mark any broken one with a red question mark in the Data Tags window.

All the PLC tags imported will appear in the window. These tags are PLC tags only and this tool does not create any tags in Crimson software Data Tags window.
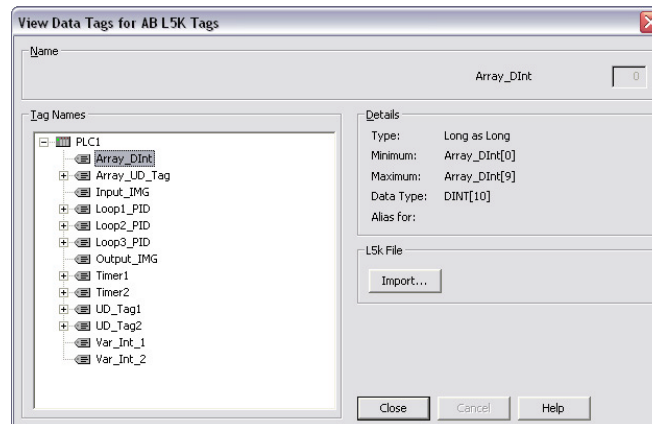
User defined type and system tags, such as counters, timers, etc. can be expanded to view the tag content and their available data. The details section on the right hand side provides information on the tag type and array size in case of an array.

ACCESSING AND MAPPING PLC TAGS IN CRIMSON

Once the driver is set up correctly, the usual mapping process can take place to access PLC Tags.

Mapping Variables

In this example, some integer, Boolean and array tags are available for mapping. Each element can be mapped to the equivalent data type. Thus, to access an integer PLC tag, create an Integer Tag in Crimson as shown below.

1. Create a new Integer Variable

2. Click on the Internal button next to Mapping. The PLC1 device created in Communications is available.
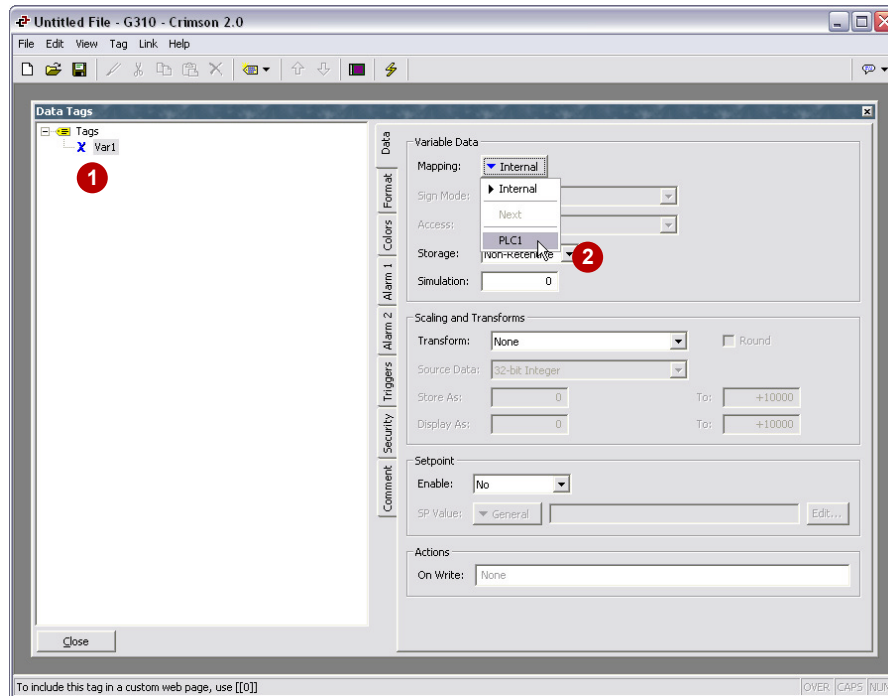
The PLC tags window opens up enquiring for the PLC tag Var1 should be linked to.

3. Select the tag (Expand the tags or enter the array index if required)

4. Click OK.
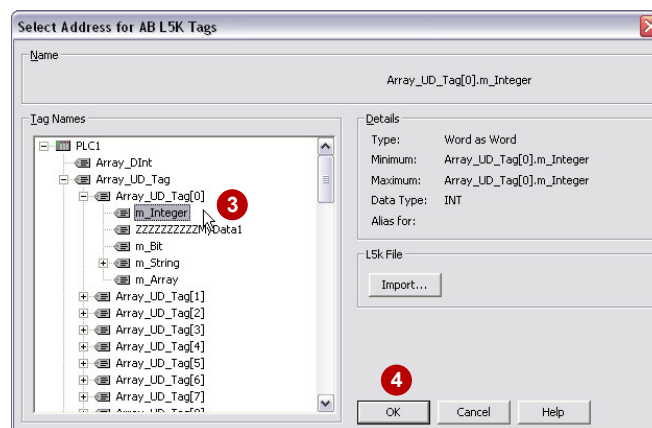
Note: If an array is selected, the array element (or index) can be entered in a field under the name section. For example, Var1 could be mapped to Array_DInt[4].

Mapping Arrays

One way to access array data is by mapping an array element to a tag in Crimson as shown above. However, Crimson also supports direct mapping of a PLC array tag to a Data Tag array in Crimson.

1. Create an Integer Array

2. Select the PLC array tag to map it to

3. Select the starting index. This index represents the first element to transfer in the PLC array. This element value will be transferred in the Integer Array index 0

4. Click OK to validate the mapping

5. Change the Integer Array size (Number of elements) so the last index does not go over the last PLC array element.
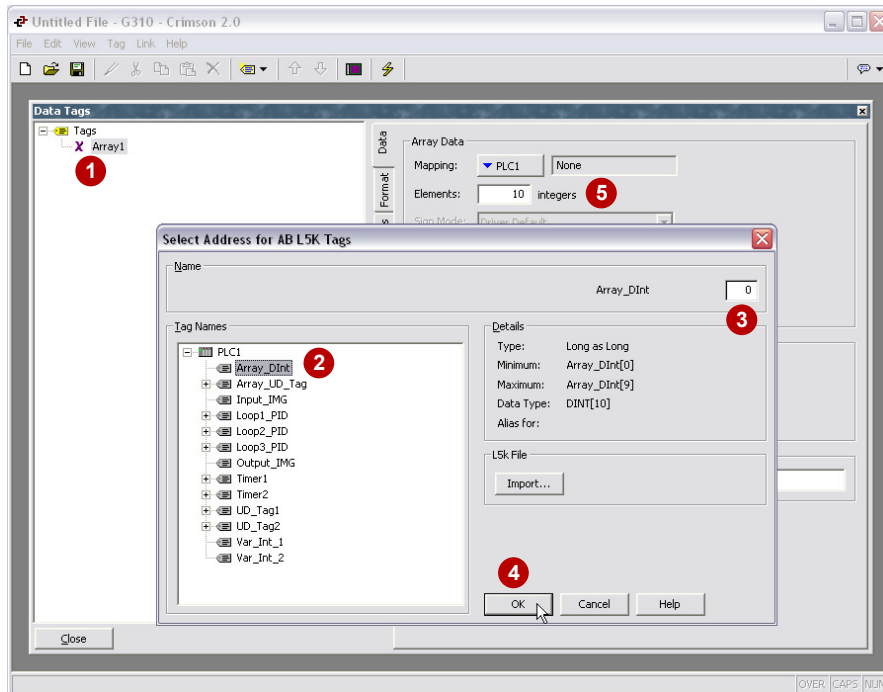
Elements examples:

- An array tag "`Array1`" mapped to a PLC array tag "`PLCArray[10]`" at index 0, the maximum element size of "`Array1`" will be 10. The whole array is transferred.

- An array tag "`Array2`" mapped to a PLC array tag "`PLCArray[10]`" at index 6, the maximum element size of "`Array2`" will be 4. Only the last 4 elements of the PLC array are transferred.

NOTES ON SPECIAL TAGS

String tags are displayed as arrays in the PLC tag window. These tags can however be mapped directly to a string variable in Crimson.

User Defined Type variable will show an extra tag under the form "ZZZZZZZZZZMy_Data1" where My_Data1 can be a different tag reference. This tag is a hidden tag that is part of the UDT and can be disregarded.