

## Bristol Babcock BSAP Serial & UDP Communications Drivers Information Sheet for Crimson v3.0+

### Compatible Devices

Bristol Babcock Control Wave Micro controllers using BSAP communications.

### Verified Device

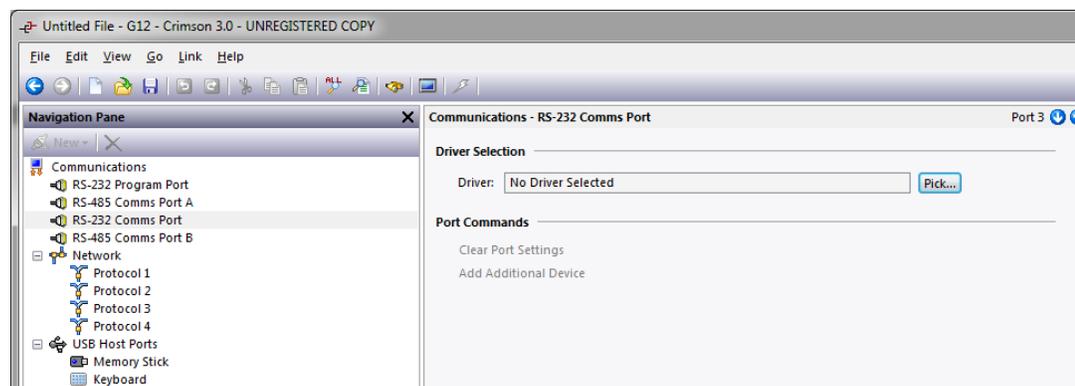
Control Wave Micro

### Overview

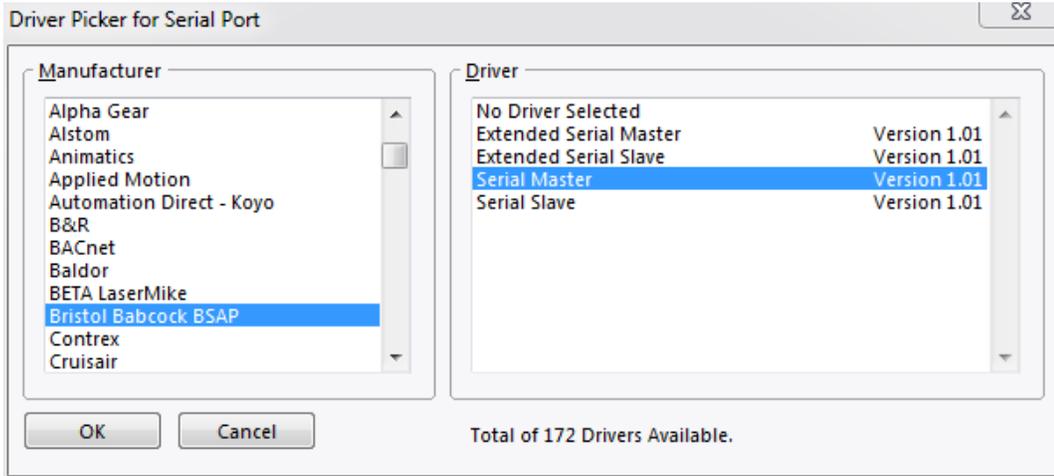
Red Lion's communication drivers for the BSAP communication protocol are available in both master and slave drivers (accessible on serial and Ethernet ports) providing access to Control Wave Micro data as described within. If this is your first Control Wave Micro application, the ControlWave® Micro Quick Setup Guide available on emerson.com will be helpful.

### Serial Port Configuration

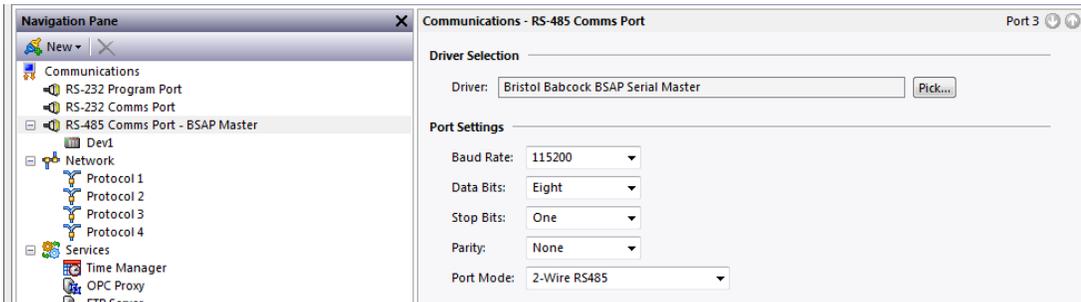
In Crimson's Communications category select the desired serial port in the Communications tree and click on the Pick... button.



Find the Bristol Babcock BSAP Serial Master or Serial Slave communications driver as shown below and click OK.



Modify the Baud Rate, Data Bits, Stop Bits and Parity settings such that it mirrors the port settings on the Port tab shown in the Flash Configuration tool for the Control Wave Micro RTU. The Bristol Babcock Flash Configuration tool can be ran from LocalView within Emerson’s OpenBSI Tools software suite by loading the flash configuration from the Control Wave Micro RTU device.



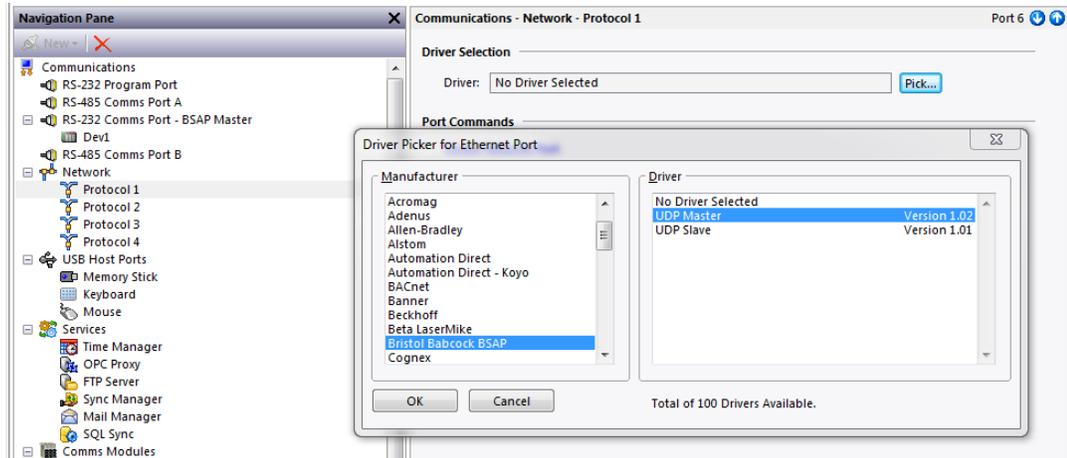
Next select the RTU device and set the Device Identification number to the same value as shown in the Bristol Babcock flash configuration tool.



## Ethernet Port Configuration

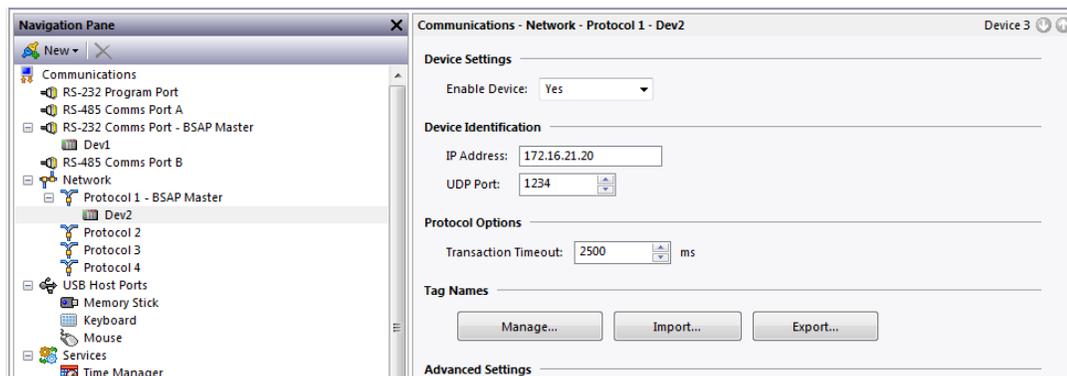
In Bristol Babcock's Flash Configuration Utility access the IP configuration in the IP Parameters tab. Confirm an appropriate IPv4 address is configured according to the network requirements. Please consult your IT department for assistance if needed.

In Crimson's Communications category select an available protocol in the Network element of the Communications tree and click on the Pick... button.



Find the Bristol Babcock BSAP UDP Master or UDP Slave communications driver as shown above and click OK.

Next, select the PLC device and configure the IP Address and the UDP Port such that it matches the IPv4 address and the UDP port number respectively in the Flash Configuration Utility.



Use multiple protocols when communicating to multiple BSAP devices on unique UDP ports.

Please refer to the **NETWORK CONFIGURATION** section within the Crimson manual for configuration of the Red Lion device's Ethernet Port Settings.

## Ethernet User Access

Ethernet configuration access is provided to the Red Lion device's UI by using the DevCtrl function:

INT **DEVCTRL**(DEVICE, FUNCTION, DATA)

For DEVICE use the Device Number shown in Crimson's lower Toolbar when the BSAP Dev is selected in the Communications tree.



For FUNCTION reference the codes below.

Function Code	Operation Performed
1	Set Primary IP Address
2	Set UDP Port
4	Get Primary IP Address

DATA is defined as a string containing write data.

Note returned data is always a number.

For demonstration purposes consider the following functions within a user program accessing Device Number 1:

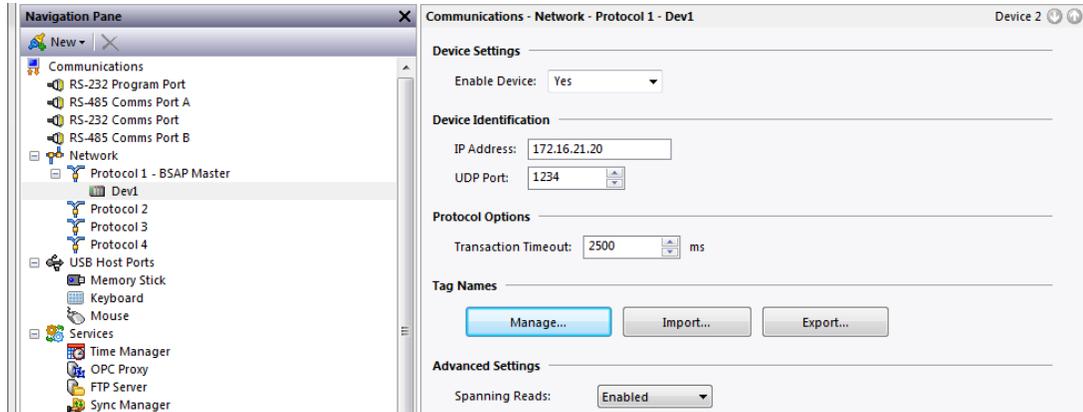
```
Programs - EthernetConfig_2
Source Properties
Data Types
  Prototype: void EthernetConfig_2(void) Edit...
Program Code
  // Set IP Address to 10.10.0.5
  DevCtrl(1, 1, "10.10.0.5");
  // Set UDP Port to 32769
  DevCtrl(1, 2, "32769");
  // Get IP
  PrimaryIP = DevCtrl(1, 4, "");
```

## Data Access

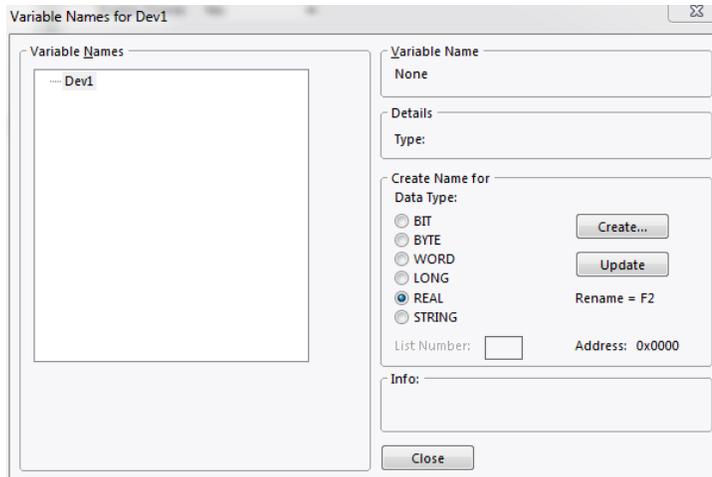
Create Control Wave Micro variables in Crimson manually or by import/export operations.

### Manual

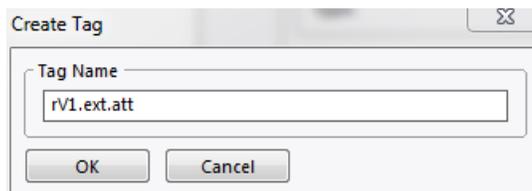
Select the Manage... button located in the BSAP device options in Crimson.



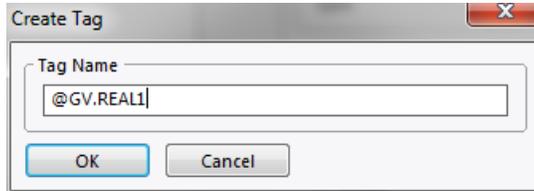
Select the desired Data Type.



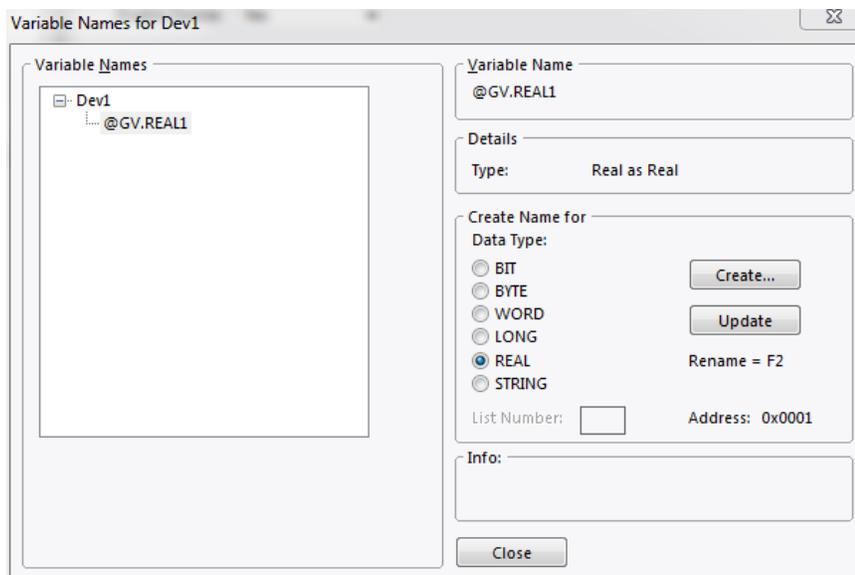
Click the Create... button.



Enter the variable name. Global variables should begin with "@GV." while non-global variables should begin with "P." where P represents the name of the Program Instance in Emerson's ControlWave Designer software. Names must be less than 25 characters.



Click OK.



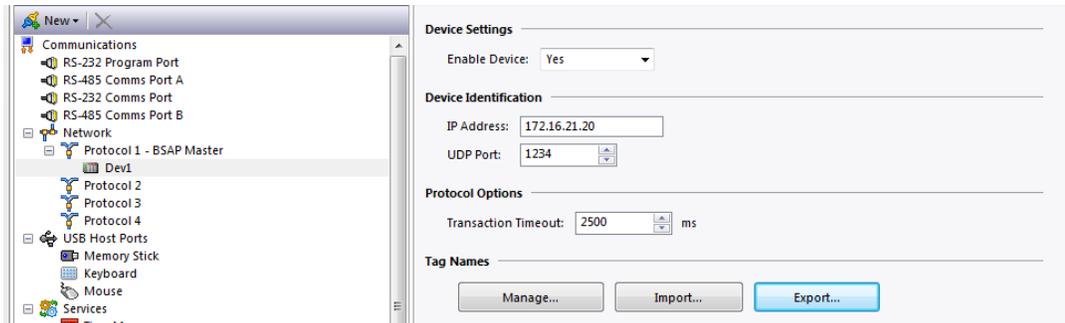
Continue creating each variable in this manner.

Variables may be deleted with the shift and delete keys when the variable to be deleted is highlighted in the Variable Names tree.

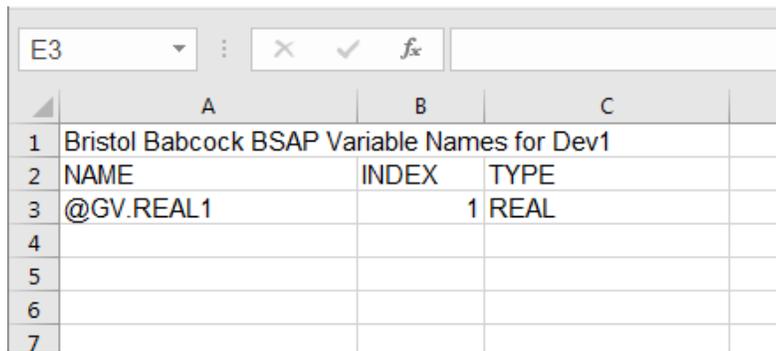
For optimized communications, create in order of like Data Types and Crimson page access. Alternatively, the export/import operations in conjunction with Excel editing may also assist in communication optimization.

## Import/Export

Click on the Export... button.

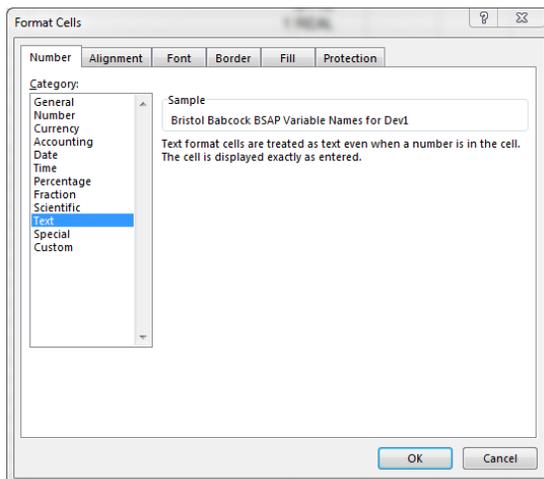


In the Export Tags dialog box enter a File name for the new CSV file and click on the Save button. Open the CSV file in Excel.



	A	B	C
1	Bristol Babcock BSAP Variable Names for Dev1		
2	NAME	INDEX	TYPE
3	@GV.REAL1	1	REAL
4			
5			
6			
7			

Click on column A to select the column then right click on column A and select Format Cells...



Select "Text" in the Category list box on the Number tab and click the OK button.

Use Excel tools to populate the CSV file with the desired variables for data access purposes in the NAME (Column A) and TYPE (Column C).

Names for global variables should begin with "@GV." while non-global variables should begin with "P." where P represents the name of the Program Instance in Emerson's ControlWave Designer software. Names must be less than 25 characters.

Valid types are as follows: BIT, BYTE, WORD, DWORD, REAL, STRING.

It is also possible to copy/paste between the ControlWave Designer spreadsheets and Excel.

	A	B	C
1	Bristol Babcock BSAP Variable Names for Dev1		
2	NAME	INDEX	TYPE
3	@GV.REAL1	1	REAL
4	@GV.BOOL1		BIT
5	@GV.BOOL2		BIT
6	@GV.BYTE1		BYTE
7	@GV.BYTE2		BYTE
8	@GV.WORD1		WORD
9	@GV.WORD2		WORD
10	@GV.DWORD1		DWORD
11	@GV.DWORD2		DWORD
12	@GV.STRING1		STRING
13	@GV.STRING2		STRING
14	P2.FLOAT1		REAL
15	P2.FLOAT2		REAL
16			

After the NAME and TYPE columns are complete for all variables right click on the TYPE cell (column C, row 2) and select Sort -> Sort A to Z. This will group variables by type necessary for optimized communications.

	A	B	C
1	Bristol Babcock BSAP Variable Names for Dev1		
2	NAME	INDEX	TYPE
3	@GV.BOOL1		BIT
4	@GV.BOOL2		BIT
5	@GV.BYTE1		BYTE
6	@GV.BYTE2		BYTE
7	@GV.DWORD1		DWORD
8	@GV.DWORD2		DWORD
9	@GV.REAL1	1	REAL
10	P2.FLOAT1		REAL
11	P2.FLOAT2		REAL
12	@GV.STRING1		STRING
13	@GV.STRING2		STRING
14	@GV.WORD1		WORD
15	@GV.WORD2		WORD
16			

For further optimization imagine that @GV.REAL1 AND P2.FLOAT2 are accessed on a Crimson database Page 1 while P2.FLOAT1 will be accessed on Page 2. Click on row 11 to select the row then right click and select Cut. Click on row 10 to select the row then right click and choose Insert Cut Cells.

	A	B	C
1	Bristol Babcock BSAP Variable Names for Dev1		
2	NAME	INDEX	TYPE
3	@GV.BOOL1		BIT
4	@GV.BOOL2		BIT
5	@GV.BYTE1		BYTE
6	@GV.BYTE2		BYTE
7	@GV.DWORD1		DWORD
8	@GV.DWORD2		DWORD
9	@GV.REAL1	1	REAL
10	P2.FLOAT2		REAL
11	P2.FLOAT1		REAL
12	@GV.STRING1		STRING
13	@GV.STRING2		STRING
14	@GV.WORD1		WORD
15	@GV.WORD2		WORD
16			

When all modification for page access within each data type is complete, set the first cell in the Index column (column B, row 3) to a value of 1 then set the second cell in the Index column (column B, row 4) to “=B3+1”.

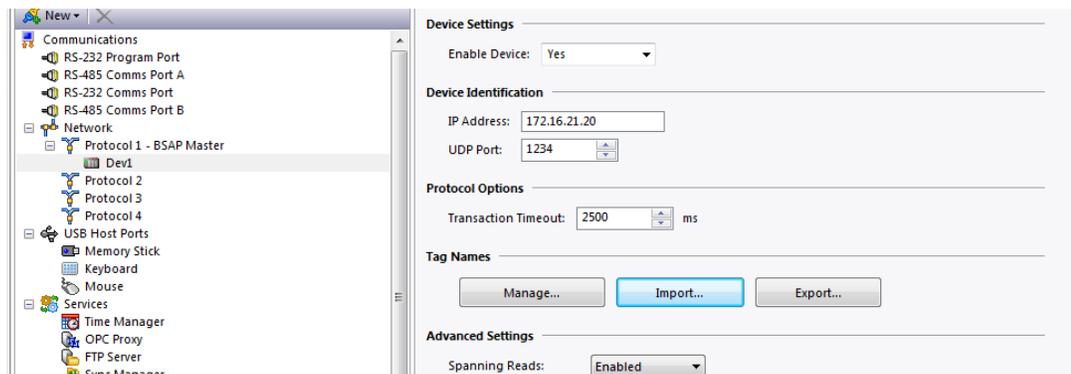
	A	B	C
1	Bristol Babcock BSAP Variable Names for Dev1		
2	NAME	INDEX	TYPE
3	@GV.BOOL1	1	BIT
4	@GV.BOOL2	2	BIT
5	@GV.BYTE1		BYTE
6	@GV.BYTE2		BYTE
7	@GV.DWORD1		DWORD
8	@GV.DWORD2		DWORD
9	@GV.REAL1	1	REAL
10	P2.FLOAT2		REAL
11	P2.FLOAT1		REAL
12	@GV.STRING1		STRING
13	@GV.STRING2		STRING
14	@GV.WORD1		WORD
15	@GV.WORD2		WORD
16			

Perform the copy/paste operation from Column B Row 4 to the remaining cells of the Index column. INDEX values must be unique and consecutive.

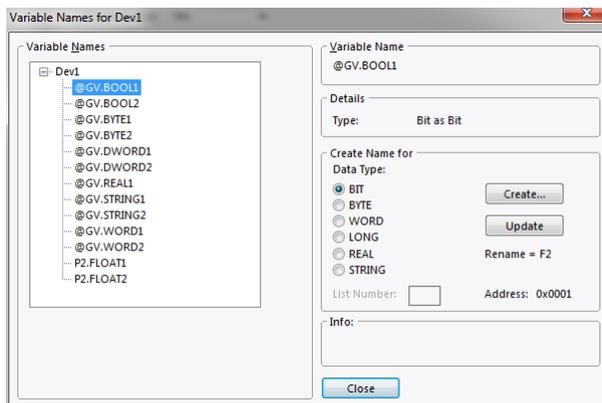
	A	B	C
1	Bristol Babcock BSAP Variable Names for Dev1		
2	NAME	INDEX	TYPE
3	@GV.BOOL1	1	BIT
4	@GV.BOOL2	2	BIT
5	@GV.BYTE1	3	BYTE
6	@GV.BYTE2	4	BYTE
7	@GV.DWORD1	5	DWORD
8	@GV.DWORD2	6	DWORD
9	@GV.REAL1	7	REAL
10	P2.FLOAT2	8	REAL
11	P2.FLOAT1	9	REAL
12	@GV.STRING1	10	STRING
13	@GV.STRING2	11	STRING
14	@GV.WORD1	12	WORD
15	@GV.WORD2	13	WORD
16			

Save the file in CSV format.

In Crimson click on the Import... button.



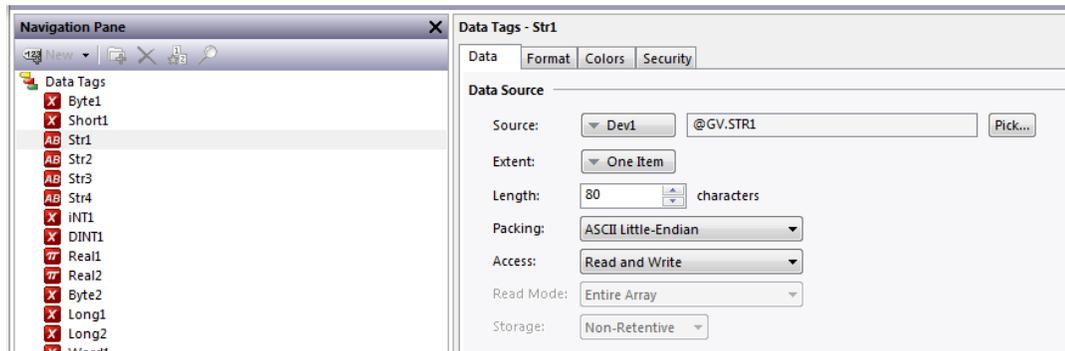
Select the saved CSV file in the Import Tags dialog and click on the Open button. Click on the Manage... button to verify successful import.



## Variable Mapping

After using either Manual or Export/Import operations, ControlWave Micro variables are now available for Crimson tag mapping.

Tags mapped to string data types should be set to a Length of 80 characters with a Packing setting of ASCII Little-Endian.



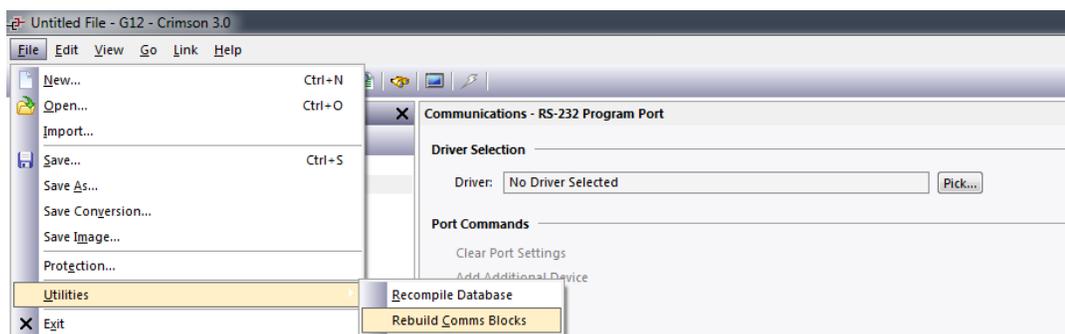
For more information on Crimson tags please refer to the **WORKING WITH TAGS** section within the Crimson manual.

## Communications Troubleshooting

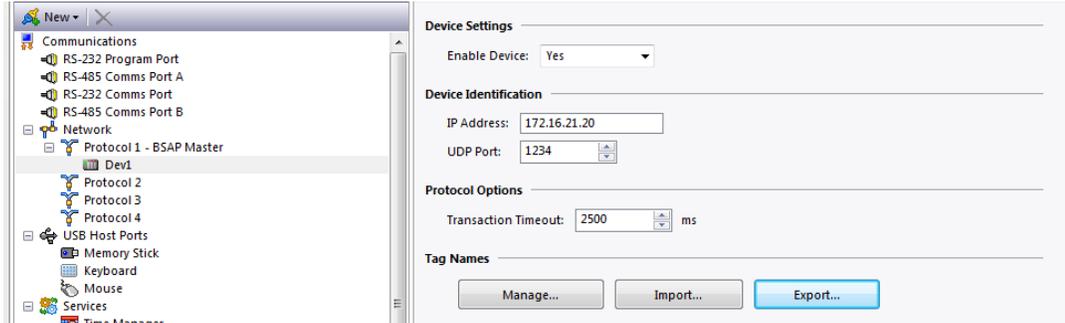
If no communications occurs after a Crimson download perform the following:

Verify that all communications settings and wiring are correct.

Rebuild Crimson's communication blocks. This can be accomplished by running the Rebuild Comms Blocks utility available in Crimson's File->Utility menu.



Export the Control Wave Micro variables in Crimson.



Open the exported CSV file.

	A	B	C
1	Bristol Babcock BSAP Variable Names for Dev1		
2	NAME	INDEX	TYPE
3	@GV.BOOL1	1	BIT
4	@GV.BOOL2	2	BIT
5	@GV.BYTE1	3	BYTE
6	@GV.BYTE2	4	BYTE
7	@GV.DWORD1	5	DWORD
8	@GV.DWORD2	6	DWORD
9	@GV.REAL1	7	REAL
10	P2.FLOAT2	8	REAL
11	P2.FLOAT1	9	REAL
12	@GV.STRING1	10	STRING
13	@GV.STRING2	11	STRING
14	@GV.WORD1	12	WORD

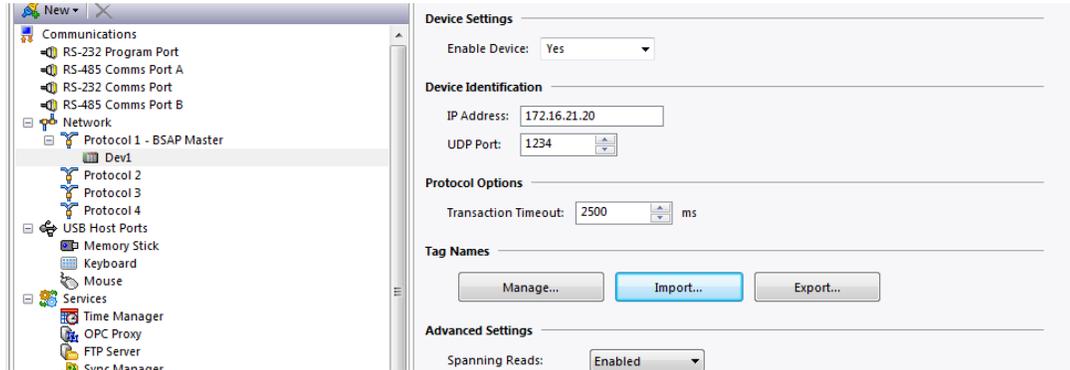
Verify that the TYPE column contains a valid entry. Valid entries are as follows: BIT, BYTE, WORD, DWORD, REAL, STRING

Ensure the first INDEX is a value of 1 and that all following indexes are consecutive.

Confirm that all entries in the NAME column are valid names. Names for global variables should begin with "@GV." while non-global variables should begin with "P." where P represents the name of the Program Instance in Emerson's ControlWave Designer software. Names must be less than 25 characters.

For export CSV file editing tips please refer to the Import/Export section in this information sheet.

If the Export file requires modifications, save the updated file and perform the Import operation.



After downloading if communications issues continue to exist, please contact the Red Lion Technical Support team.

## Serial Cable Information

Red Lion RS232 RJ12 Port	BSAP RS232 Port
Pin 2 - Rx	2 - RXD
Pin 5 - Tx	3 - TXD
Pin 3 - COMM	5 - GND

In addition, a jumper may be necessary between pins 1 and 4 and pins 7 and 8 on the Control Wave Micro.

Red Lion RS485 RJ45 Port	BSAP RS485 Port
Pin 1 - TxB	6 - RXD+
Pin 2 - TxA	2 - RXD -
Pin 3 - RxA	3 - TXD -
Pin 4 - RxB	4 - TXD +
Pin 6 - COMM	5 - GND

## Ethernet Cable Information

Standard Ethernet Cable

## **Revision History**

07/05/18 – Created.

07/12/18 – Updated variable delete and string notes in the Data Access section.

07/13/18 – Added Communications Troubleshooting section.

07/24/18 – Added Ethernet User Access section.