

# **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.

-eP- Untitled File - G12 - Crimson 3.0 - UNREGISTERED COPY						
Eile Edit View Go Link Help						
G ○ [ ] ☆ ↓ [ ] ⊂ [ ] % ↓ [ ] ♥ A   ∞	S 🗇 🗅 👌 🔒 🖸 🖻 🛸 🔓 🚏 🖓 🐼 💷 🖉					
Navigation Pane X	Communications - RS-232 Comms Port	Port 3 🕚 🕜				
🔊 New - 🗙	Driver Selection					
Communications  Communication	Driver: No Driver Selected Pick Port Commands Clear Port Settings					
Protocol 1 Protocol 2 Protocol 3 Protocol 4 CISB Host Ports Memory Stick Keyboard	Add Additional Device					

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

Driver Picker for Serial Port		
<u>Manufacturer</u>	<u> </u>	
Alpha Gear Alstom Animatics Applied Motion Automation Direct - Koyo B&R BACnet Baldor BETA LaserMike Bristol Babcock BSAP Contrex Cruisair	No Driver Selected Extended Serial Master Extended Serial Slave Serial Master Serial Slave	Version 1.01 Version 1.01 Version 1.01
OK Cancel	Total of 172 Drivers Available.	

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.

Navigation Pane X	Communications - RS-485 Comms Port	Port 3 🕐 🕜
🔏 New 🗸 📉	Driver Selection	
<ul> <li>              € Communications              </li> <li>             ¶ RS-232 Program Port             </li> <li>             ¶ RS-232 Comms Port         </li> </ul>	Driver: Bristol Babcock BSAP Serial Master Pick	
RS-485 Comms Port - BSAP Master	Port Settings	
Protocol 1	Baud Rate: 115200 Data Bits: Eight	
Protocol 2     Protocol 3     Protocol 4	Stop Bits: One	
E Services	Parity: None 🔻	
OPC Proxy	Port Mode: 2-Wire RS485	

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

Navigation Pane X	Communications - RS-485 Comms Port - Dev1	Device 2 🕐 🕜
🙈 New 🗸 📉	Device Settings	
<ul> <li>Communications</li> <li>(1) RS-232 Program Port</li> <li>(1) RS-232 Comms Port</li> </ul>	Enable Device: Yes -	
RS-485 Comms Port - BSAP Master	Device Identification	
Potecol 1	Address: 1	
Protocol 2	Tag Names	
Protocol 3 Protocol 4	Manage Import Export	
Services     Time Manager     OPC Proxy	Advanced Settings	
FTP Server	Spanning Reads:  Enabled	
월 Sync Manager 🚔 Mail Manager	Transactional Writes: Enabled 💌	
Option Card	Preempt Other Devices: No	
	Favor UI Writes:	

# **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.

Navigation Pane X	Communications - Network - Protocol 1 Port 6 🕐 🕢
New -      New -      Communications     -0 RS-232 Program Port     -0 RS-435 Comms Port A     -0 RS-232 Comms Port - BSAP Master     ID Dev1     Driver	Driver Selection Driver: No Driver Selected Port Commands Picker for Ethernet Port
	Diriver       indicaturer       indindicaturer <tr< td=""></tr<>
C FTP Server B Sync Manager Mail Manager S SQL Sync □ Im Comms Modules	OK Cancel Total of 100 Drivers Available.

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.

Navigation Pane	×	Communications - Network - Protocol 1 - Dev2 Dev	ice 3 🕐 🕢
🙈 New 🗸 📉		Device Settings	
Communications =() RS-232 Program Port =() RS-232 Comme Port		Enable Device: Yes	
■ ■ R5-232 Comms Port - BSAP Master ■ ■ Dev1 ■ Dev1 ■ Dev1 ■ Dev1		Device Identification IP Address: 172.16.21.20	
Protocol 1 - BSAP Master		UDP Port: 1234	
Protocol 2 Protocol 3		Protocol Options Transaction Timeout: 2500 ms	
♀ Protocol 4 ♥ USB Host Ports ● Memory Stick		Tag Names	
Kryourd     Mouse     Services     Time Manager	ш	Manage Import Export	

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	<b>Operation Performed</b>
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 - Ether	rnetConfig_2
Source Prope	rties
Data Types —	
Prototype:	void EthernetConfig_2(void)
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
Primary	<pre>/IP = DevCtrl(1, 4, "");</pre>

# **Data Access**

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

### <u>Manual</u>

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

Navigation Pane	×	Communications - Network - Protocol 1 - Dev1	Device 2 🕐 🕜
🙈 New 🗸 📉		Device Settings	
Communications			
RS-232 Program Port		Enable Device: Yes 👻	
RS-485 Comms Port A			
RS-232 Comms Port		Device Identification	
RS-485 Comms Port B			
🖃 🐢 Network		IP Address: 172.16.21.20	
🖃 🍞 Protocol 1 - BSAP Master		UDP Port: 1234	
III Dev1			
🚏 Protocol 2		Protocol Ontions	
🚏 Protocol 3			
💡 Protocol 4		Transaction Timeout: 2500 ms	
😑 🖨 USB Host Ports			
Memory Stick		Tag Names	
E Keyboard			
Mouse 🖔		Manage Import Export	
🖃 🎇 Services	=		
Time Manager			
OPC Proxy		Advanced Settings	
ETP Server		Spanning Reads:	
월 Sync Manager		LINDICA /	

Select the desired Data Type.

Variable Names for Dev1		23
Variable Names for Dev1	✓ariable Name         None         Details         Type:         Create Name for         Data Type:         BIT         BYTE         WORD         LONG         © REAL         OSTRING         List Number:         Info:	Create Update Rename = F2 Address: 0x0000
	Close	

Click the Create... button.

Create Tag	-	23
Tag Name		
OK Cancel		

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.

Create Tag	X
Tag Name	
OK Cancel	

#### Click OK.

riable <u>N</u> ames	<u>V</u> ariable Name	
⊡- Dev1 <sup>I</sup> @GV.REAL1	© GV.REAL1 Details Type: Re Create Name for	al as Real Create Update Rename = F2
	List Number:	Address: 0x0001

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.

🙈 New 🕶 🔀	Device Settings
Communications	Device Settings
RS-232 Program Port	Enable Device: Yes 👻
C RS-485 Comms Port A	
=() RS-232 Comms Port	Device Identification
RS-485 Comms Port B	
🖃 🐢 Network	IP Address: 172.16.21.20
🖃 🍟 Protocol 1 - BSAP Master	LIDP Port: 1234
III Dev1	
🍞 Protocol 2	Protocol Ontions
🍸 Protocol 3	Fiotocol opuolis
🍸 Protocol 4	Transaction Timeout: 2500 ms
🖃 🖨 USB Host Ports	
Memory Stick	Tag Names
I Keyboard	
o Mouse	Manage Import Export
🖃 🍔 Services 🗧	
Time Manager	

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.

E3	• • • × •	f <sub>x</sub>		
	А	В	с	
1	Bristol Babcock BSAP V	ariable Nam	es 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...

Number         Alignment         Font         Border         Fill         Protection           Category:         Sample         Sample	rmat Cells				1.00	18.	8 2
Category: General Number Currency Accounting Date Time Percentage Fraction Scientific Text Special Custom	Number	Alignment	Font	Border	Fill	Protection	
	Category: General Number Currency Accountin Date Time Percenta Fraction Scientific Text Special Custom	ng ge	Sample Bristol Text forr The cell	Babcock B mat cells arr	SAP Variat	ble Names for Dev1 s text even when a ni entered.	umber is in the cell.

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.

	А	В	с
1	Bristol Babcock BSAP Va	riable Name	es for Dev1
2	NAME	INDEX	TYPE
З	@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			
4.7			

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	В	С	
1	Bristol Babcock BSAP Va	riable Nam	es 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.

	А	В	С
1	Bristol Babcock BSAP Va	riable Name	es 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''.

I				
	B4		<i>f<sub>x</sub></i> =	B3+1
		А	В	с
	1	Bristol Babcock BSAP Va	riable Nam	es 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			
l	17			

.

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	В	с	
	1	Bristol Babcock BSAP Va	riable Name	es for Dev1	ī
	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				
1.					

Save the file in CSV format.

In Crimson click on the Import... button.

🔏 New 🔻 🔀	Device Settings
Communications	A
=() RS-232 Program Port	Enable Device: Yes -
RS-485 Comms Port A	
RS-232 Comms Port	Device Identification
■ d) RS-485 Comms Port B	IP Address: 172.16.21.20
🖃 🍞 Protocol 1 - BSAP Master	UDP Port: 1234
Dev1	
🍹 Protocol 2	Protocol Ontions
🏹 Protocol 3	
🚏 Protocol 4	Transaction Timeout: 2500 🚔 ms
😑 🖨 USB Host Ports	
Memory Stick	Tag Names
E Keyboard	
Mouse 🖏	- Manage Import Export
E Services	
Time Manager	
OPC Proxy	Advanced Settings
6 FTP Server	Spanning Reads: Enabled
Supe Manager	chabled -

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 Names for Dev1           Variable Names           @GV.BOOL2           @GV.BOOL2           @GV.BV0E1           @GV.DWORD1           @GV.REAL1           @GV.STRING2           @	Variable Name     @GV.BOOL1     Details     Type: Bit as Bit     Create Name for     Data Type:     @ BIT     Create     @ BIT     @ BIT     Create     @ WORD     Update     @ REAL     Rename = F2     @ STRING     List Number: Address: 0x00	
	Close	

#### 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.

Navigation Pane 🗙	Data Tags - Str1
🥶 New 🔹 🛱 🗙 💑 🔎	Data Format Colors Security
Data Tags	Data Source
Short	Source: v Dev1 @GV.STR1 Pick
AB Str1 AB Str2	Extent:
AB Str3 AB Str4	Length: 80 characters
	Packing: ASCII Little-Endian
Real1	Access: Read and Write
Byte2	Read Mode: Entire Array
X Long1 X Long2	Storage: Non-Retentive 🔻
Word1	

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.

-@- (	2 <sup>e</sup> Untitled File - G12 - Crimson 3.0						
Eile	Eile Edit View Go Link Help						
	<u>N</u> ew Cf	rl+N 🖹 🛛 🍕	Þ 🗖 🎜				
	Open Ct	rl+O	Communications - RS-232 Program Port				
	Import		Discription in a second s				
	<u>S</u> ave C	rl+S					
	Save <u>A</u> s		Driver: No Driver Selected Pick				
	Save Con <u>v</u> ersion		Port Commands				
	Save I <u>m</u> age		Class Bath Cathlana				
	Prot <u>e</u> ction		Add Additional Device				
	<u>U</u> tilities	P R	ecompile Database				
×	E <u>x</u> it	R	Rebuild <u>Comms Blocks</u>				

Export the Control Wave Micro variables in Crimson.

🙈 New 🗸 📉	Device Settings
E Communications	
C RS-232 Program Port	Enable Device: Yes 👻
RS-485 Comms Port A	
RS-232 Comms Port	Device Identification
=() RS-485 Comms Port B	
🖃 📌 Network	IP Address: 1/2.16.21.20
🖃 🍞 Protocol 1 - BSAP Master	UDP Port: 1234
III Dev1	
🚏 Protocol 2	Protocol Ontions
💡 Protocol 3	
👸 Protocol 4	Transaction Timeout: 2500 ms
🖃 🖨 USB Host Ports	
Memory Stick	Tag Names
E Keyboard	
to Mouse	Manage Import Export
E Services	
Time Manager	

Open the exported CSV file.

	А	В	С		
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.

🙈 New 🗸 📉	Device Settings
Communications	
RS-232 Program Port	Enable Device: Yes 👻
RS-485 Comms Port A	
RS-232 Comms Port	Device Identification
RS-485 Comms Port B	
🖃 🐢 Network	IP Address: 172.16.21.20
🖃 🍟 Protocol 1 - BSAP Master	UDP Port: 1234
Dev1	
Frotocol 2	Protocol Ontions
🍸 Protocol 3	
Frotocol 4	Transaction Timeout: 2500 ms
🖃 🖨 USB Host Ports	
E Memory Stick	Tag Names
E Keyboard	
Mouse =	Manage Import Export
E Services	
Time Manager	
OPC Proxy	Advanced Settings
ETP Server	Spanning Reads: Enabled
- B Sync Manager	chapter -

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.