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Technical Note



Migration Application Sample for the AN-X2-AB-DHRIO RIO Scanner

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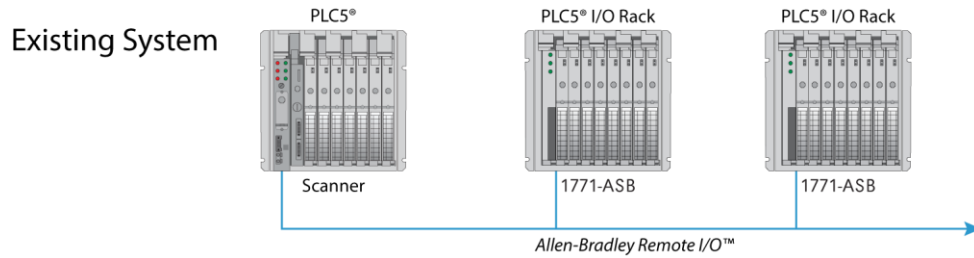
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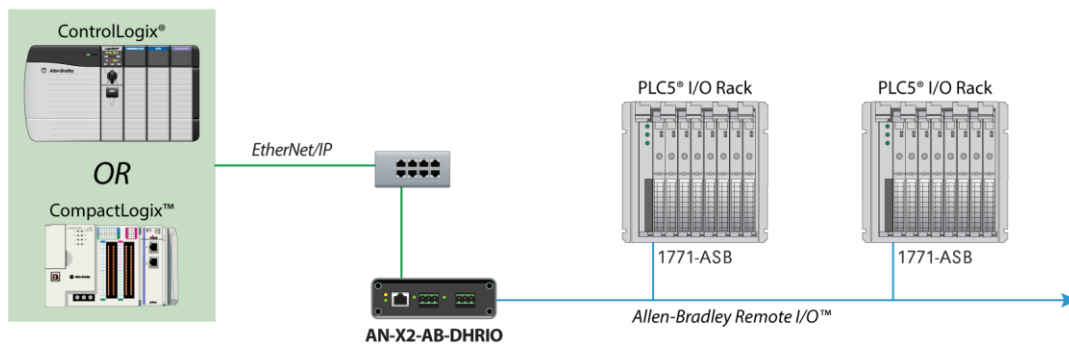
June 19, 2013

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This Technical Note will illustrate how to migrate a simple PLC5 Remote I/O Application to a CompactLogix or ControlLogix application using the AN-X2-AB-DHRIO gateway with the Remote I/O Scanner firmware loaded.

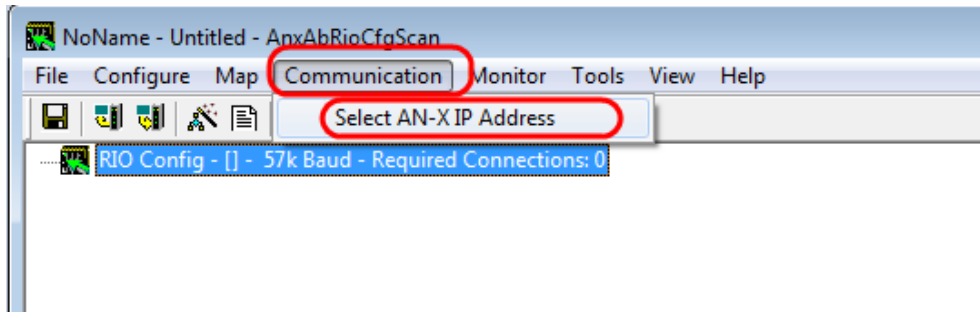


Processor Migration

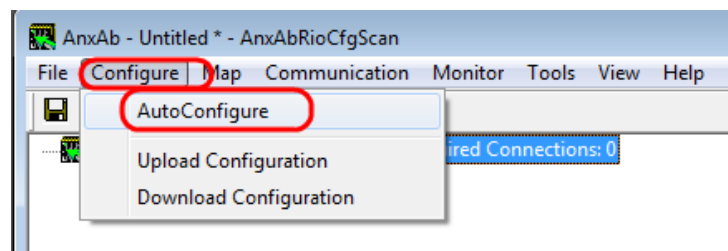


Step 1: Connect the Gateway to the Ethernet and the Remote I/O networks, and then launch AnxAbRioCfgScan.exe.

Step 2: Specify the IP Address of the Gateway

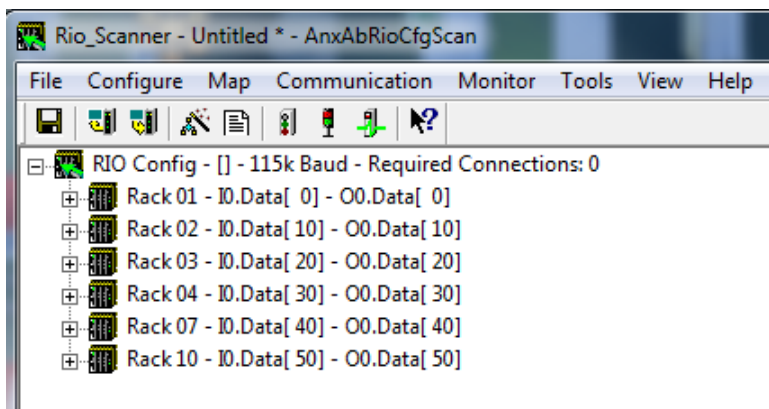


Step 3: Auto-configure the gateway



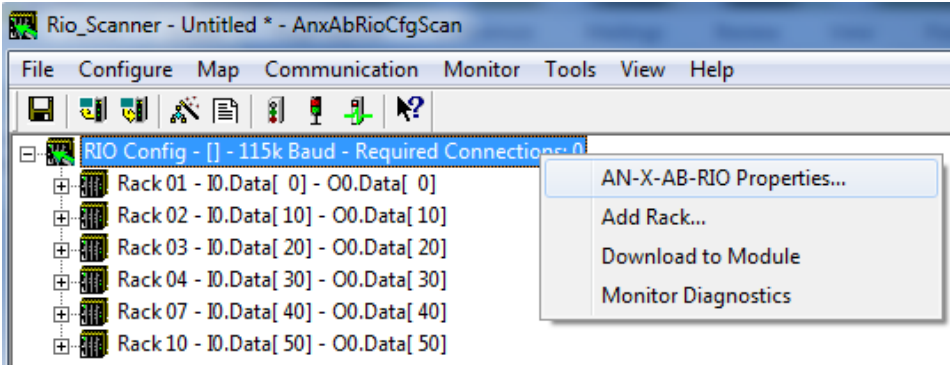
NOTE: The gateway will automatically detect the baud rate of the Remote I/O network in addition to detecting any remote racks of I/O that are present on the network.

Step 4: Review the Racks and modules discovered to ensure that all are present

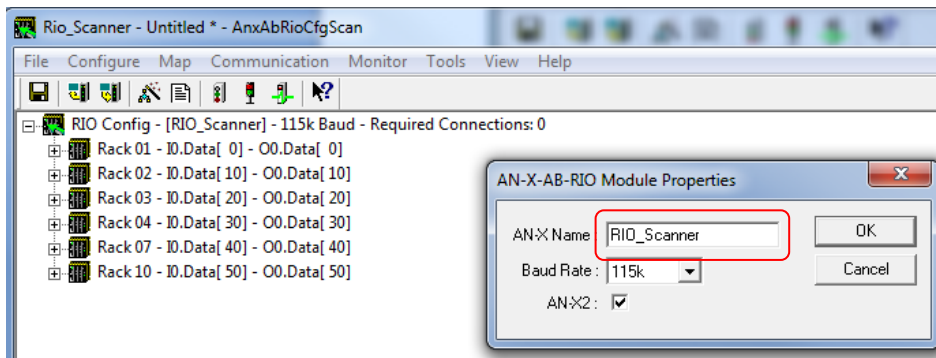


Step 5: Specify the Name of the gateway

Right click on the top line and select properties



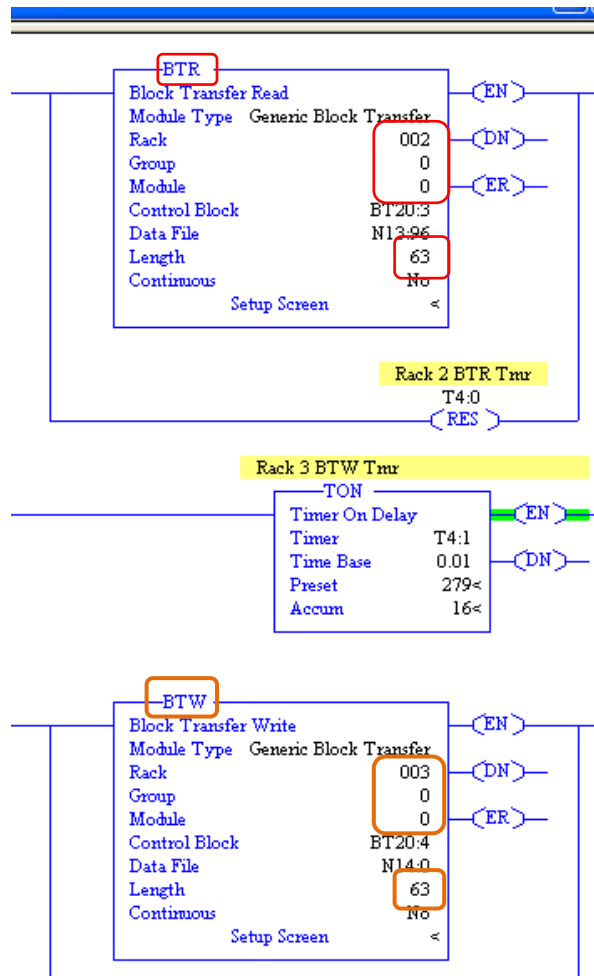
Enter the name

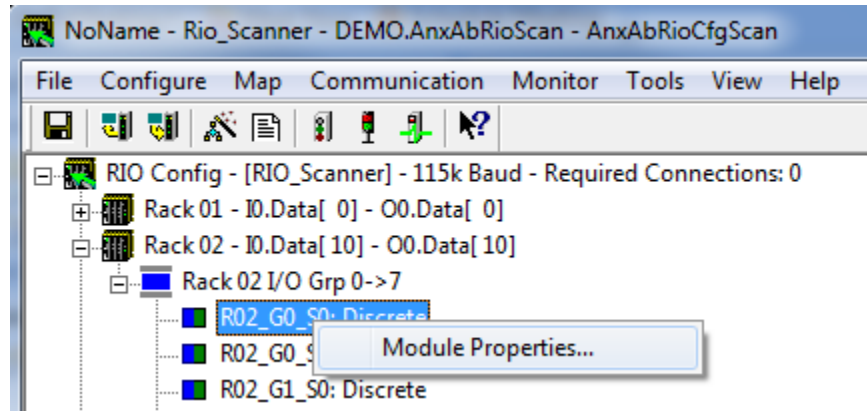


Step 6: Configuring Block Transfers (Not all devices or applications require these)

It is important to note that Block Transfers must be manually configured, and are most easily configured by referencing the existing BTR and BTW instructions that exist in the legacy PLC.

Step 6A: Examine old ladder and then navigate to the Rack / Group / Slot where a BTR or BTW is needed Right Click and select properties





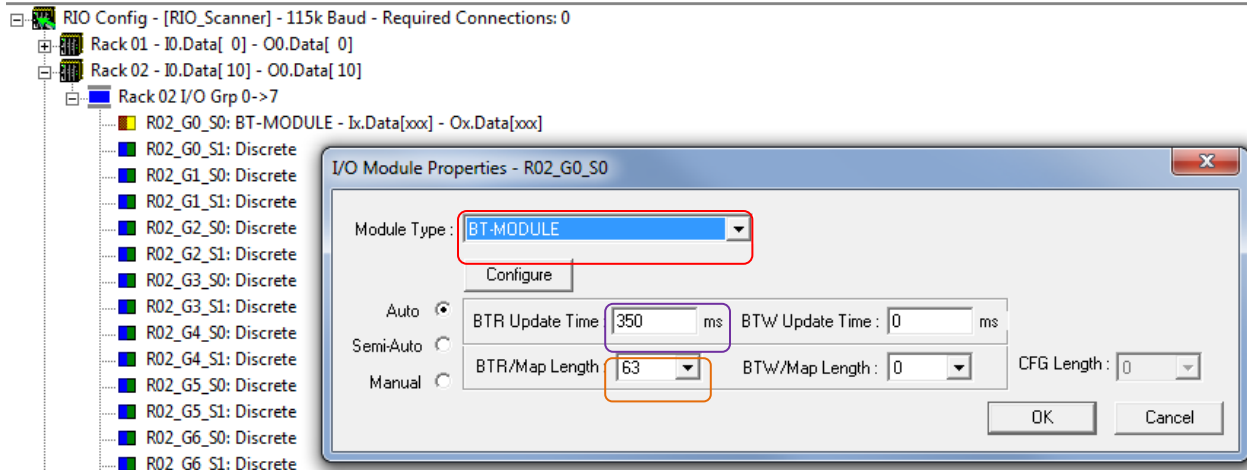
Step 6B: Configure a BTR

Select BT-Module in the Module Type drop down list

Enter correct Length in the BTR Length drop down list

Specify BTR Update Time

See *BT-Module Update Modes*



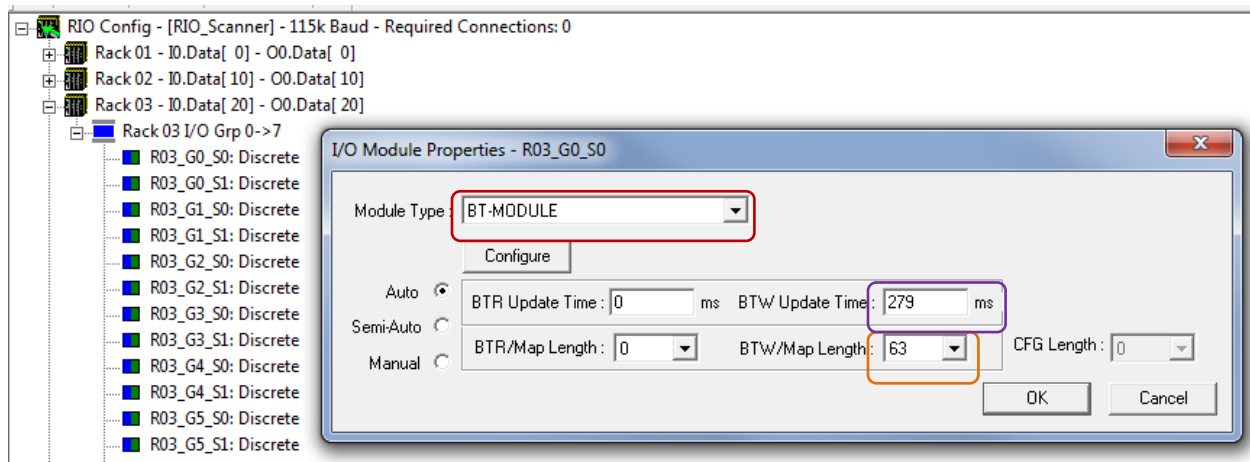
Step 6C: Configure a BTW

Select BT-Module in the Module Type drop down list

Enter correct Length in the BTW Length drop down list

Specify BTW Update Time

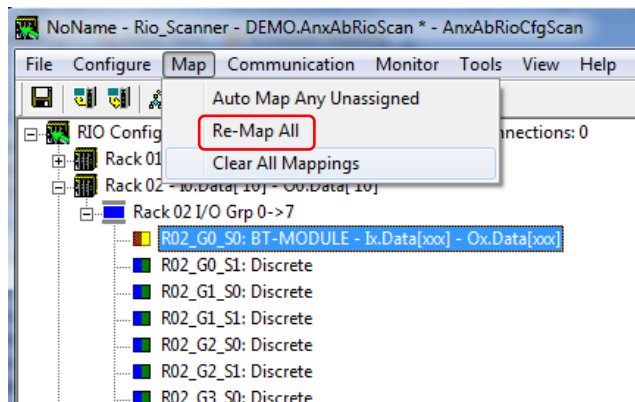
See *BT-Module Update Modes*



NOTE: If a specific Rack, Group, and Slot has both a BTR and a BTW you can enter them at the same time since this is done in the same I/O Module Properties window.

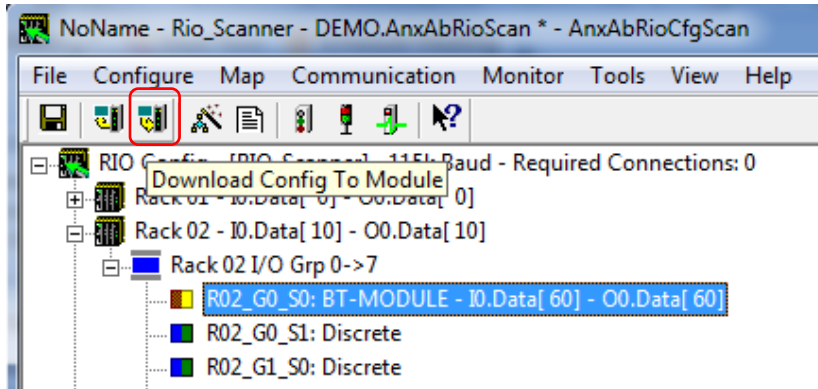
Step 7: Reconfigure Mappings to include All BTRs and BTWs

Select Re-Map All

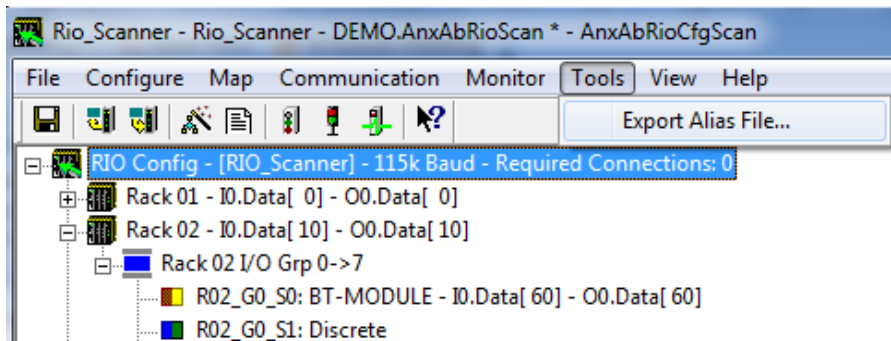


Step 8: Download Configuration to the Gateway

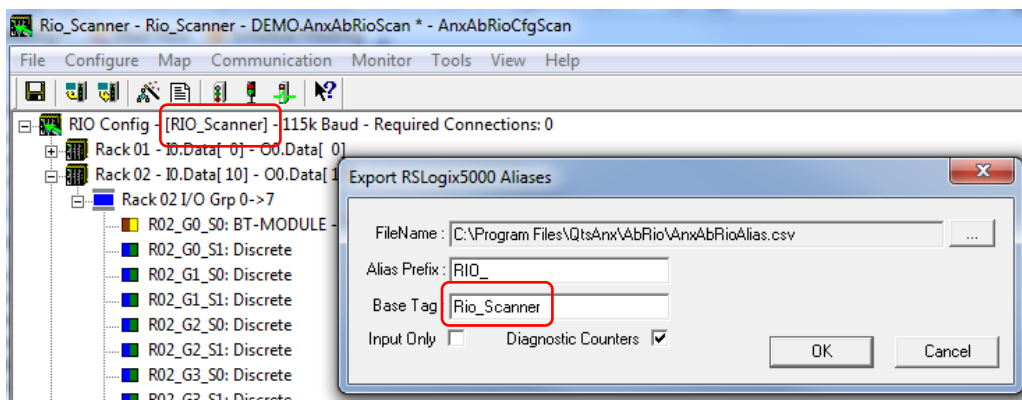
Click the download icon



Step 9: Export Alias tags



Step 9A: Validate Base Tag Name = AN-X2 Name and click OK



Step 10: RSLogix 5000 Configuration

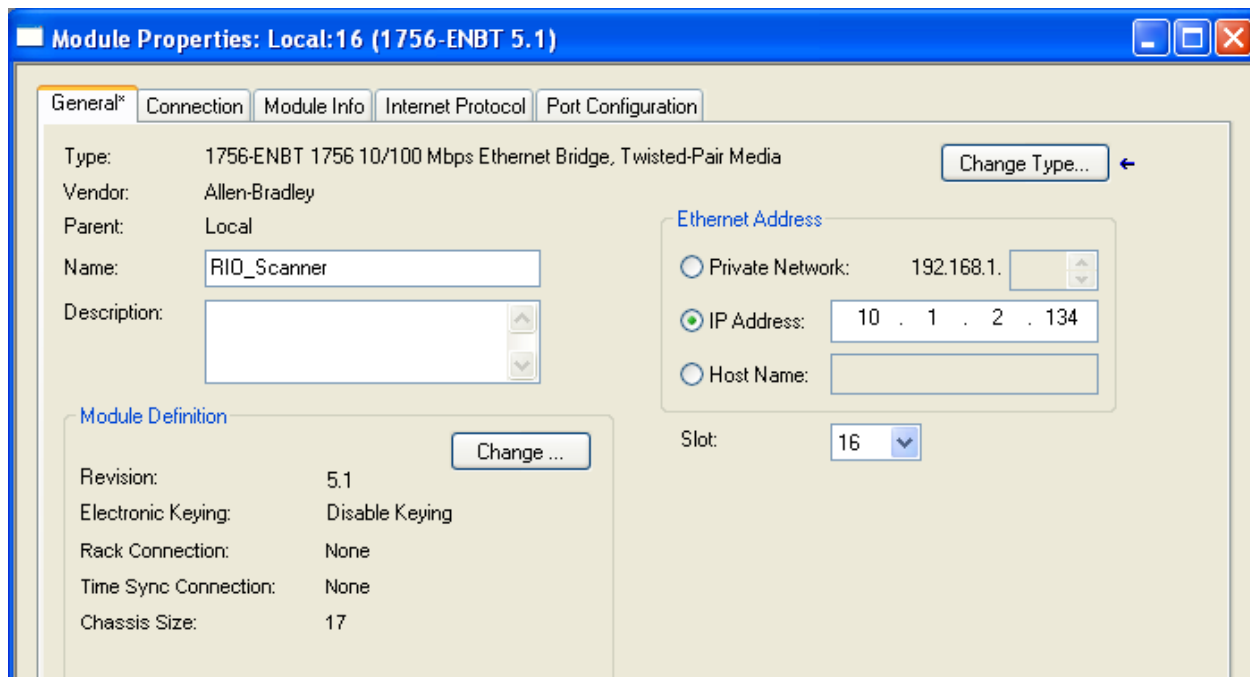
Step 10A: Adding the remote rack of I/O into the application

In the I/O tree in the Ethernet segment right click and add a 1756-ENBT

Set the IP Address to that of the AN-X2 Gateway

Name the Module the same name of the AN-X2 Gateway

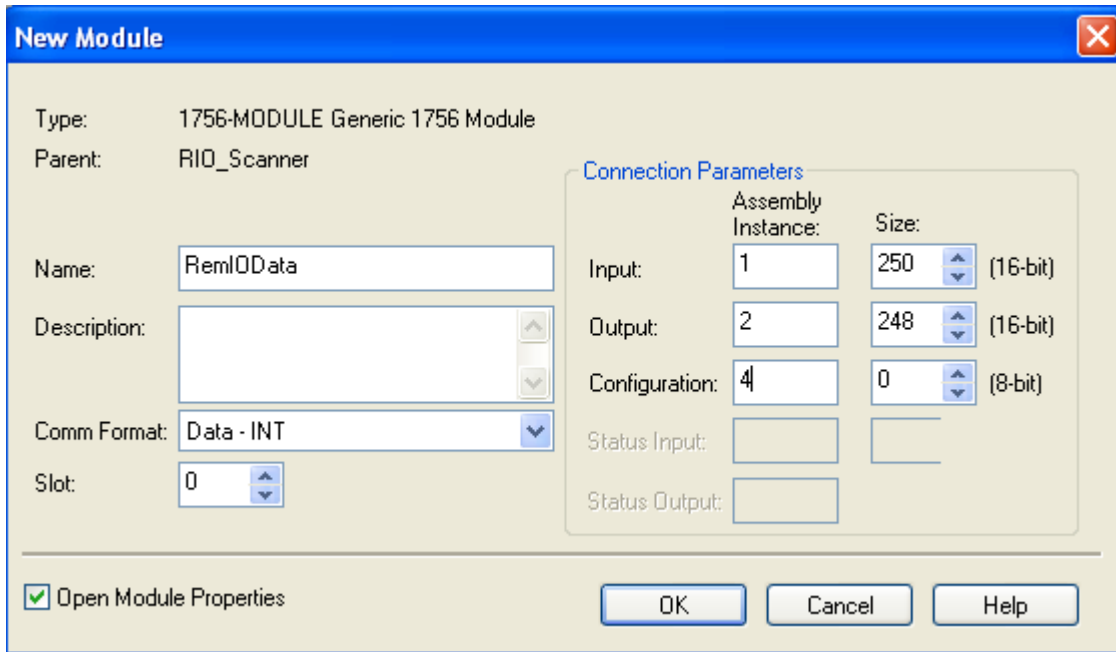
Set the Module Definition and Slot Number to match the settings below:



Step 10B: Adding in the Remote I/O Data

Add a 1756-MODULE module into slot 0 of the I/O Rack

Set RPI no faster than 5 mSec (Recommended > 20mSec)



New Module

Type: 1756-MODULE Generic 1756 Module
Parent: RIO_Scanner

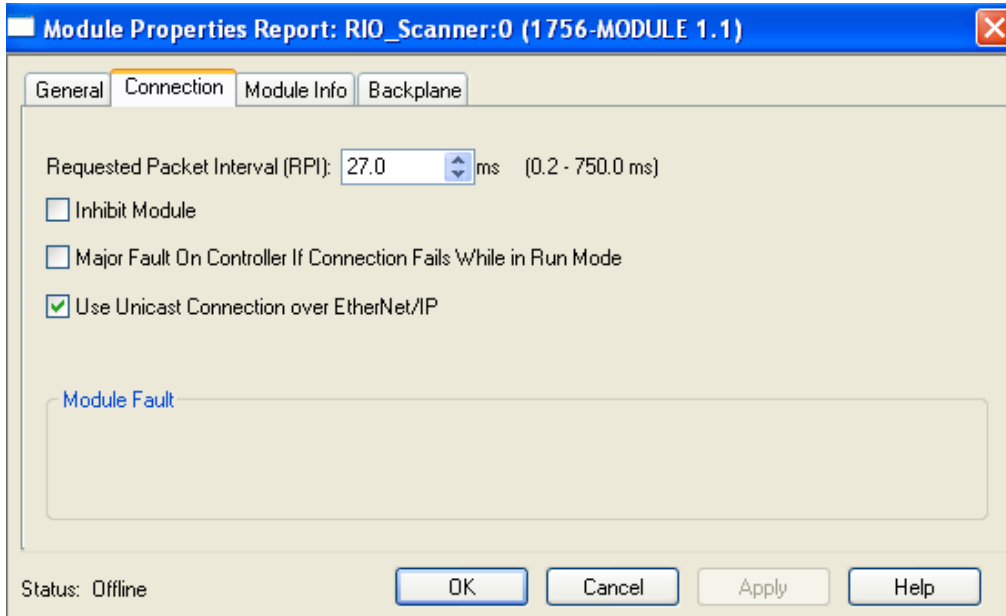
Name: RemIOData
Description:
Comm Format: Data - INT
Slot: 0

Connection Parameters

	Assembly Instance:	Size:	
Input:	1	250	(16-bit)
Output:	2	248	(16-bit)
Configuration:	4	0	(8-bit)
Status Input:			
Status Output:			

Open Module Properties

OK Cancel Help



Module Properties Report: RIO_Scanner:0 (1756-MODULE 1.1)

General Connection Module Info Backplane

Requested Packet Interval (RPI): 27.0 ms (0.2 - 750.0 ms)

Inhibit Module
 Major Fault On Controller If Connection Fails While in Run Mode
 Use Unicast Connection over EtherNet/IP

Module Fault

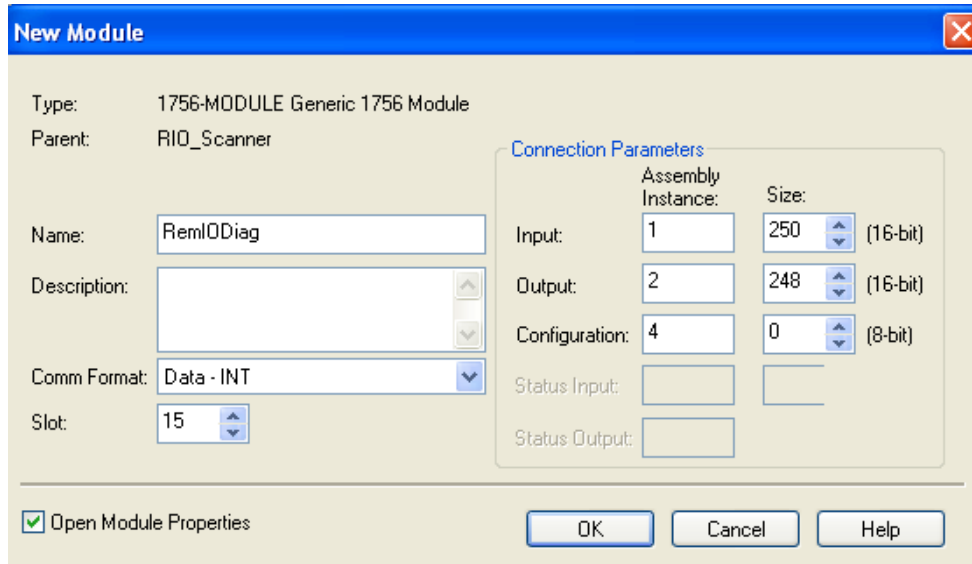
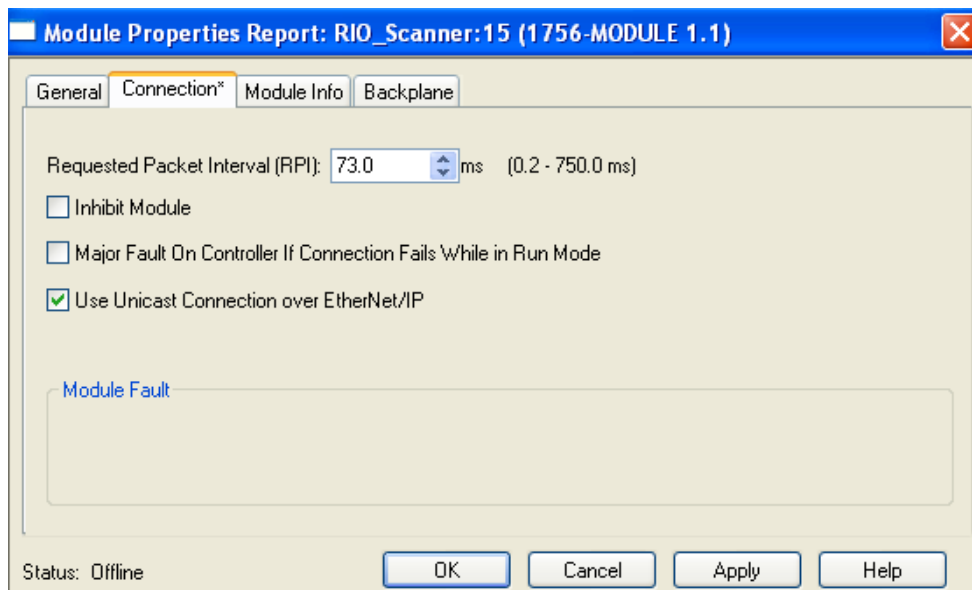
Status: Offline

OK Cancel Apply Help

Step 10C: Adding in Remote I/O Diagnostic Data

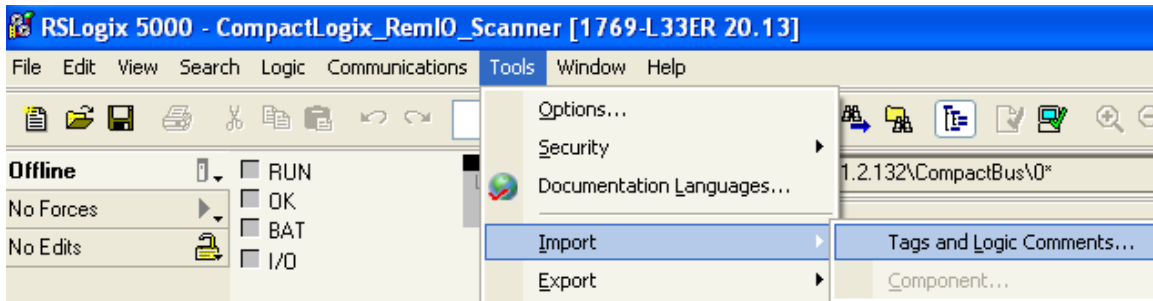
Add another 1756-Module into slot 15 of the I/O Rack

Configure slower RPI since it is only diagnostic data

Step 10D: Importing Alias tags that the AN-X2 gateway generated

Select Import Tags and Logic Comments and then browse to where the Alias file was saved (default location: c:\Program Files\QtsAnx\AbRio\AnxAbRioAlias.csv)



Imported Tag Samples

Name	Value	Style	Data Type	Description
+ RIO_I011	0	Decimal	INT	Rack-01 Grp-1 Discrete Input
+ RIO_I012	0	Decimal	INT	Rack-01 Grp-2 Discrete Input
+ RIO_I013	0	Decimal	INT	Rack-01 Grp-3 Discrete Input
+ RIO_I014	135	Decimal	INT	Rack-01 Grp-4 Discrete Input
+ RIO_I015	0	Decimal	INT	Rack-01 Grp-5 Discrete Input
+ RIO_I016	0	Decimal	INT	Rack-01 Grp-6 Discrete Input
+ RIO_I017	0	Decimal	INT	Rack-01 Grp-7 Discrete Input
+ RIO_I018	0	Decimal	INT	Rack-01 Grp-8 Discrete Input
+ RIO_I019	0	Decimal	INT	Rack-01 Grp-9 Discrete Input
+ RIO_I020	0	Decimal	INT	Rack-01 Grp-10 Discrete Input
+ RIO_R02_CTL	0	Decimal	INT	Rack-02 Control
+ RIO_R02_STS	0	Decimal	INT	Rack-02 Status
RIO_r02g0s0_BT_INH	0	Decimal	BOOL	BT Inhibit
+ RIO_r02g0s0_BTR_00	1	Decimal	INT	Generic BTR Data 00
+ RIO_r02g0s0_BTR_01	0	Decimal	INT	Generic BTR Data 01
+ RIO_r02g0s0_BTR_02	3	Decimal	INT	Generic BTR Data 02
+ RIO_r02g0s0_BTR_03	0	Decimal	INT	Generic BTR Data 03

Step 11: Write your control program using the Alias Tags to make future I/O and control Program migration activities simpler.

More information is available in the products user manual and/or in training videos which can be found at:

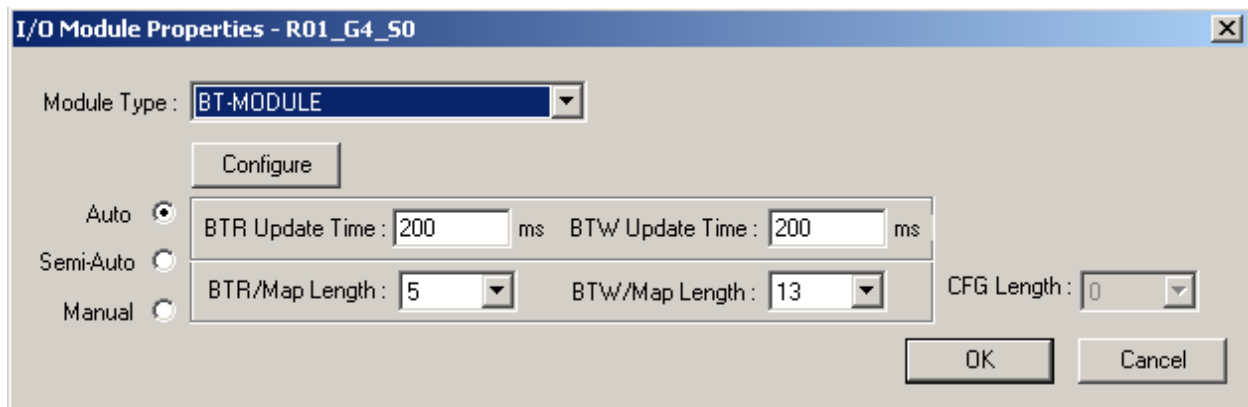
<http://www.prosoft-technology.com/SERVICES-SUPPORT/Training>

BT-Module Update Modes

Block transfers can be triggered automatically by the AN-X2, or they can be triggered manually in the controller. For automatic trigger, the timing is set in the AnxAbRioCfgScan.exe utility. For manual trigger, controller tags are provided.

Block transfers can be fixed length, or the length can be adjusted manually in the controller. The fixed length is specified in the AnxAbRioCfgScan.exe utility. For adjustable lengths, controller tags are provided (and maximum lengths can be specified in AnxAbRioCfgScan.exe).

There are three modes of operation combining Auto/Manual trigger and fixed/adjustable length.



In Auto mode,

- The automatic BT update times and fixed BT lengths are specified in AnxAbRioCfgScan. The block transfers are triggered automatically by the AN-X2 module.
- Controller tags are provided to inhibit the automatic block transfers (xxBT_INH).

In Semi-Auto mode,

- The automatic BT update times are specified in AnxAbRioCfgScan. The block transfers are triggered automatically by the AN-X2 module.
- Controller tags are provided to specify BT lengths (xxBTR_CTL and xxBTW_CTL). (The *maximum* length used by ladder logic is specified in AnxAbRioCfgScan.)
- Controller tags are provided to inhibit the automatic block transfers (xxBT_INH).

In Manual mode,

- Controller tags are provided to trigger BT updates (xxBTR_EN and xxBTW_EN).
- Controller tags are provided to enable continuous BT updates (xxBTR_CC and xxBTW_CC).
- Controller tags are provided to specify BT lengths (xxBTR_CTL and xxBTW_CTL). (The *maximum* length used by ladder logic is specified in AnxAbRioCfgScan.)

Example controller tags exported by AnxAbRioCfgScan for use in **Auto** and **Semi-auto** modes:

Controller Tags - Scan(controller)				
Scope: <input type="button" value="Scan"/>		Show: All Tags		
Name	Value	Description		
⊕ RIO_R01_STS	0	Rack-01 Status		
RIO_r01g4s0_BT_INH	0	BT Inhibit	Auto and Semi-Auto	
⊕ RIO_r01g4s0_BTR_00	0	Generic BTR Data 00		
⊕ RIO_r01g4s0_BTR_01	0	Generic BTR Data 01		
⊕ RIO_r01g4s0_BTR_02	0	Generic BTR Data 02		
⊕ RIO_r01g4s0_BTR_03	0	Generic BTR Data 03		
⊕ RIO_r01g4s0_BTR_04	79	Generic BTR Data 04		
RIO_r01g4s0_BTR_CTL	0	0-5:BtrLen, 8:BTR.EN, 9:BTR.CONT/AutoInh	Semi-Auto	
RIO_r01g4s0_BTR_ER	0	BTR Error Bit		
⊕ RIO_r01g4s0_BTR_STS	4320	0-7:BtrCtr, 8-10:BtrErrCde, 11:BTR.ER, 12:BTR.DN		

Example controller tags exported by AnxAbRioCfgScan for use in **Manual** mode:

Controller Tags - Scan(controller)				
Scope: <input type="button" value="Scan"/>		Show: All Tags		
Name	Value	Description		
⊕ RIO_R01_STS	0	Rack-01 Status		
⊕ RIO_r01g4s0_BTR_00	0	Generic BTR Data 00		
⊕ RIO_r01g4s0_BTR_01	0	Generic BTR Data 01		
⊕ RIO_r01g4s0_BTR_02	0	Generic BTR Data 02		
⊕ RIO_r01g4s0_BTR_03	0	Generic BTR Data 03		
⊕ RIO_r01g4s0_BTR_04	79	Generic BTR Data 04		
RIO_r01g4s0_BTR_CC	0	BTR Continuous	Manual	
⊕ RIO_r01g4s0_BTR_CTL	0	0-5:BtrLen, 8:BTR.EN, 9:BTR.CONT/AutoInh		
RIO_r01g4s0_BTR_DN	0	BTR Done Bit		
RIO_r01g4s0_BTR_EN	0	BTR Enable		
RIO_r01g4s0_BTR_ER	0	BTR Error Bit		
⊕ RIO_r01g4s0_BTR_STS	8	0-7:BtrCtr, 8-10:BtrErrCde, 11:BTR.ER, 12:BTR.DN		

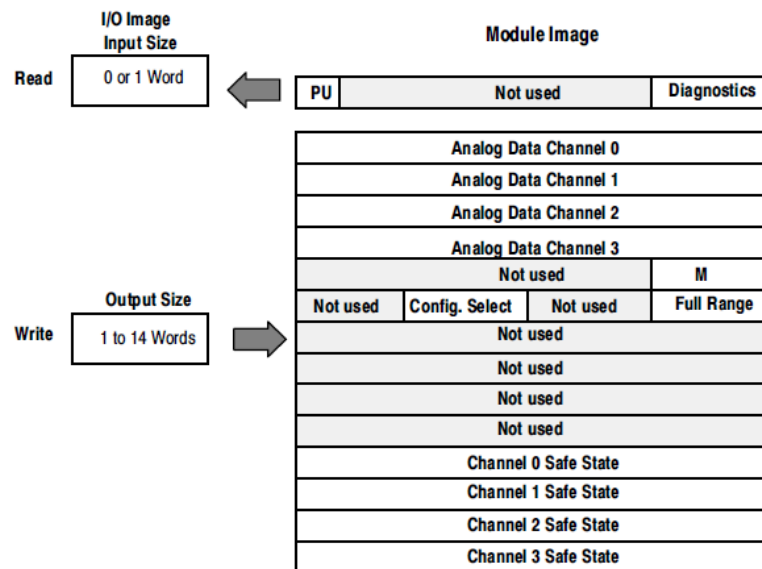
(Although exported in all modes, the BTx_CTL tag works in Semi-auto and Manual modes only.)

Analog Modules and Block Transfers

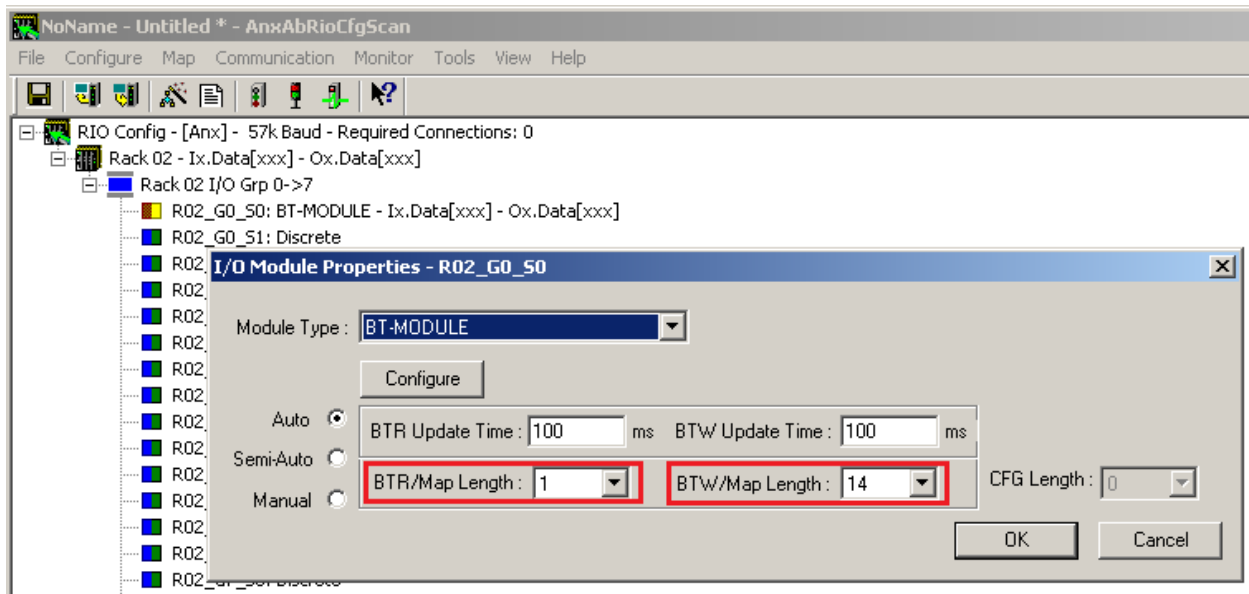
For details on controlling analog modules, consult the user manual for that module.

We show here an example with a 1794-OE4 Output Analog module. The user manual notes the word count and descriptions:

4 Output Analog Module (Cat. No. 1794-OE4 Series B)



We enter the word counts in the AnxAbRioCfgScan.exe utility.



The user manual notes the detailed word usage:

Analog Output Module (1794-OE4/B) Read

Word/Dec. Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Word/Octal Bit	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00
Read Word 0	PU	Not used - set to 0											W3	W2	W1	W0
Where: W = Diagnostic bits for current output wire broken or load resistance high. (Not used on voltage outputs.) PU = Power up bit																

Analog Output Module (1794-OE4/B) Write Configuration Block

Word/Dec. Bit	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Word/Octal Bit	17	16	15	14	13	12	11	10	07	06	05	04	03	02	01	00
Write Word 0	S	Analog Data - Channel 0														
Word 1	S	Analog Data - Channel 1														
Word 2	S	Analog Data - Channel 2														
Word 3	S	Analog Data - Channel 3														
Word 4	0	Not used - set to 0											M3	M2	M1	M0
Word 5	0	Not used - set to 0			C3	C2	C1	C0	Not used - set to 0				F3	F2	F1	F0
Word 6 thru 9	Not used - set to 0															
Word 10	S	Safe State Value - Channel 0														
Word 11	S	Safe State Value - Channel 1														
Word 12	S	Safe State Value - Channel 2														
Word 13	S	Safe State Value - Channel 3														
Where: S = Sign bit (in 2's complement) M = Multiplex control C = Configure select bit F = Full range bit																

Ranges	Bit Settings	
	Configure Select	Full Range
0-10V dc/0-20mA	0	1
4-20mA	1	0
-10 to +10V dc	1	1
Off	0	0

¹ When configured to Off, individual output channels will drive 0V/0mA.

Word	Decimal Bit (Octal Bit)	Definition
Word 4	Bits 00-03	Multiplex control bits (M) for individual channels. These bits control the safe state analog outputs. - Bit 00 corresponds to output channel 0, bit 01 corresponds to output channel 1, and so on. 1 = use words 0, 1, 2 or 3 as directed by channel number n 0 = use words 10, 11, 12 or 13 as directed by channel number n When bits 00-03 are all cleared (0) simultaneously by a communication error or user choice thru the programmable controller program, word 5 full range and configure select bits are preserved at their last setting.
	Bits 04-15 (04-17)	Not used - set to 0.
Word 5	Bits 00-03	Full range bits (F) for individual channels - Bit 00 corresponds to output channel 0, bit 01 corresponds to output channel 1, and so on.
	Bits 04-07	Not used - set to 0.
	Bits 08-11 (10-13)	Configure select bits (C) for individual channels - Bit 08 corresponds to output channel 0, bit 09 corresponds to output channel 1, and so on.
	Bits 12-15 (14-17)	Not used - set to 0.

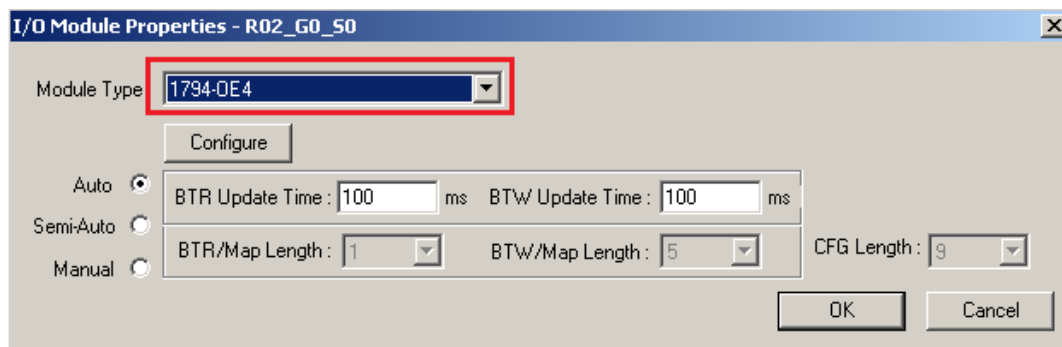
The AnxAbRioCfgScan.exe utility exports the module tags to be imported into a controller. From the detailed word usage in the user manual, we can determine which controller tags output to the 1794-OE4:

Name	Value	Style	Description
RIO_r02g0s0_BTW_00	Ch. 0 Out	0 Decimal	Generic BTW Data 00
RIO_r02g0s0_BTW_01	Ch. 1 Out	0 Decimal	Generic BTW Data 01
RIO_r02g0s0_BTW_02	Ch. 2 Out	0 Decimal	Generic BTW Data 02
RIO_r02g0s0_BTW_03	Ch. 3 Out	0 Decimal	Generic BTW Data 03
RIO_r02g0s0_BTW_04	2#0000_0000_0000_1111	Binary	Generic BTW Data 04
RIO_r02g0s0_BTW_05	2#0000_1111_0000_0000	Binary	Generic BTW Data 05
RIO_r02g0s0_BTW_06	Config Bits	0 Decimal	Generic BTW Data 06
RIO_r02g0s0_BTW_07		0 Decimal	Generic BTW Data 07
RIO_r02g0s0_BTW_08		0 Decimal	Generic BTW Data 08
RIO_r02g0s0_BTW_09		0 Decimal	Generic BTW Data 09
RIO_r02g0s0_BTW_10	Ch. 0 Safe	0 Decimal	Generic BTW Data 10
RIO_r02g0s0_BTW_11	Ch. 1 Safe	0 Decimal	Generic BTW Data 11
RIO_r02g0s0_BTW_12	Ch. 2 Safe	0 Decimal	Generic BTW Data 12
RIO_r02g0s0_BTW_13	Ch. 3 Safe	0 Decimal	Generic BTW Data 13

The 1794-OE4 module will not write the channel outputs until the MUX bits are set.

The output will be zero until the Configure and Range bits are set.

Note: The AnxAbRioCfgScan.exe utility contains some predefined modules with limited tag sets. You can use either the predefined module or the BT-MODULE.



Conclusion

This document shows a sample on how to develop the Remote I/O configuration using the AnxAbRioCfgScan configuration tool and RSLogix 5000. If you have any additional questions please contact us.

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