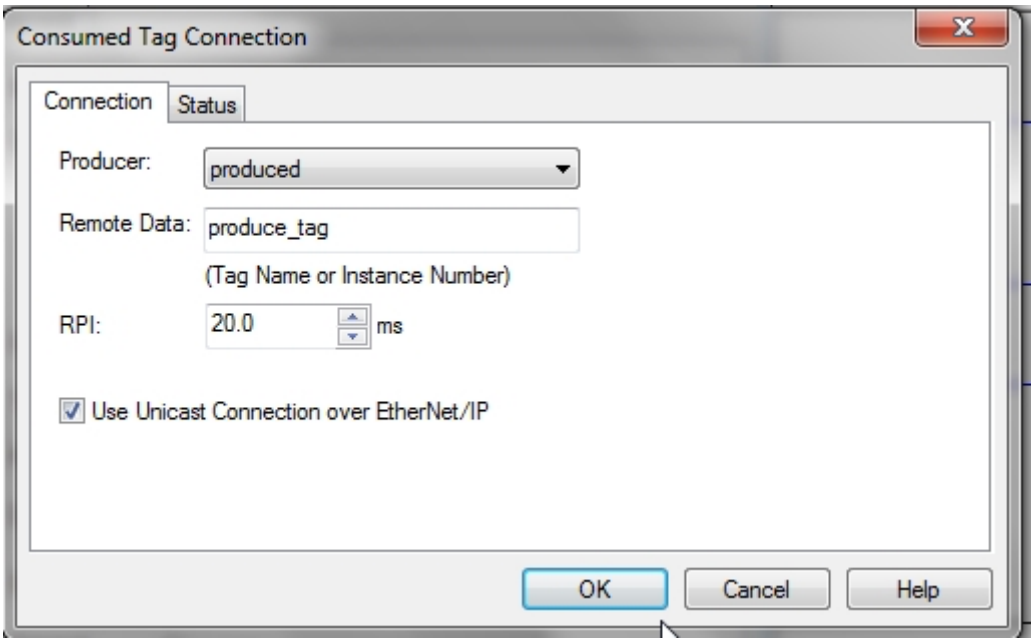
Lab Exercise 8



Producer / Consumer Tags

using ControlLogix Ethernet Modules

Student Materials for Lab Exercise 8: Producer Consumer Tags

Lesson Objective

By the end of this session, students should be able to:

1. Explain basic configuration of a Produced / Consumed Tags
2. Understand ControlLogix set-up for Produced / Consumed Tags.
3. Program Produced /Consumed Tags .

Page

Project Files Requiured for Lab Exercise

PLC220 Lab Exercise_8_M3_Producer_Tags.L5K

PLC220 Lab Exercise_8_M3_Consumer_Tags.L5K

Introduction:

Producer / Consumer Tags are a way Allen Bradley ControlLogix PLCs can send and receive data from other ControlLogix processors over Ethernet or ControlNet communication networks.

Note: ControlNet can be used with SLC 500, PLC 5 and certain CompactLogix to exchange values using Producer / Consumer Tags.

Producer (Produced) / Consumer (Consumed) Tags can also exchange data across the ControlLogix chassis backplane – ControlBus.

Produced Tags –broadcast (produce) tags values
Consumed Tags – receive (consume) values of Produced tags.

Produced / Consumed Tags are controller – scoped tags.

Processors can have both Produced and Consumed tags

This lesson will cover the basic set-up of a ControlLogix Producer / Consumer Tags..

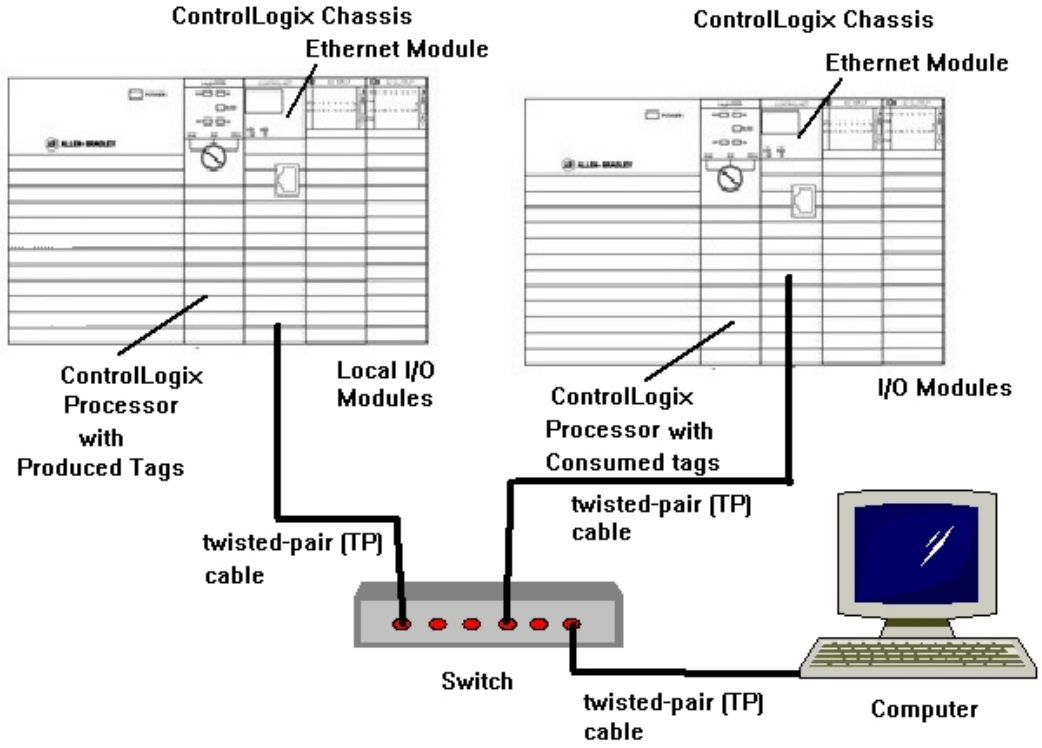


Figure 1-A
Basic Configuration – Producer/Consumer Tags

Processor with Produced Tags – Produced Tags send data to Consumed Tags

Processor with Consumed Tags – Consumed tags receive data from Produced tags
Note: Processors can have a mixture of multiple Produced / Consumed tags

Switch – Ethernet connection point for Computer, Local Ethernet Module and Remote Ethernet Module.

Computer – Studio 5000 software, RSLinx software, Ethernet Port, Windows 7 OS

Cabling - twisted-pair

Note: Computer and the 2 Ethernet modules must have the same Network ID
Computer and the 2 Ethernet modules must have different Device (Host) IDs

2 Demo units - 1756-L71 processors version 24
1756-EN2TR or 1756-ENBT Ethernet communication modules
Discrete I/O Modules

Note: Hardware set-up for Producer/ Consumer is similar to Module 2 configuration for Messaging

Produced / Consumed Tags exchange data without the use of Ladder Logic instructions.

Multiple Consumed Tags can receive data from a single Produced Tags.

Produced / Consumed tags use a processor connection.
ControlLogix Processors have a limited number of connections.

- 1756-L5x – Controllers – 250 connections
- 1756-L7x – Controllers – 500 connections

Produced / Consumed Tags can be a maximum of 500 bytes (125 DINT or Real Tags)

Produced / Consumed Tags can be DINT or REAL Data Types
Produced / Consumed Tags can be DINT or REAL Data Types Arrays
Produced / Consumed Tags can be Used-Defined Data Types

Produced Tag Configuration

1. Determine the IP Address and Subnet Mask information for the computer
   IP Address:_____
   Subnet Mask: _____

2. With RSLinx - verify that there is a connection to each of the Ethernet Modules

Note: Both Ethernet modules must have the same Network ID as the computer
Both Ethernet modules must have the same Network (Subnet) Mask as the computer

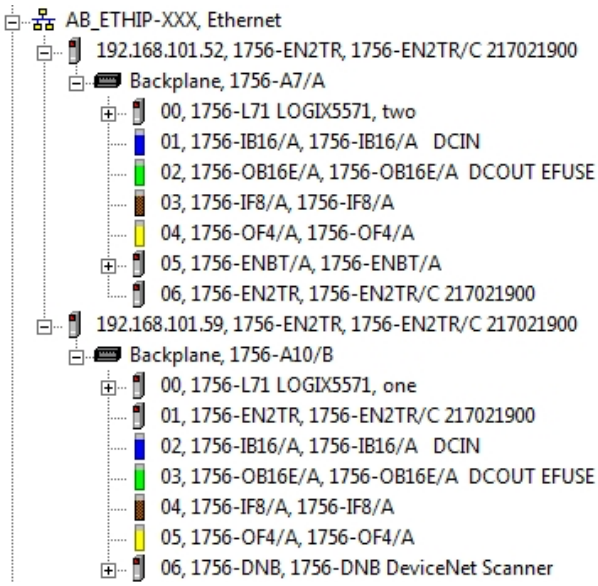


Figure 2-A - RSLinx RSWho Screen
Ethernet Connection

In this example the chassis that contain the 1756-EN2TR module with the IP address of 192.168.101.59 will have the 1756-L71 processor with Produced tags.
1756-L71 processor located in slot 0.

In this example the chassis that contain the 1756-EN2TR module with the IP address of 192.168.101.52 will have the 1756-L71 processor with Consumed tags.
1756-L71 processor located in slot 0..

Produced Chassis – Chassis with Processor containing Produced Tags

3. Open the Project File - Module_3_Produced_Tags.L5K, Import in to Studio 5000.

4. Navigate to and expand the I/O Configuration folder.

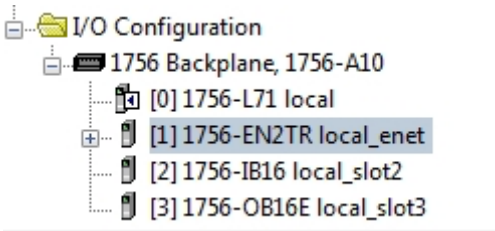


Figure 3-A
I/ O Configuration Folder

5. Open the Properties window for the 1756-EN2TR Ethernet module.
   This is the Ethernet Module in the Produced Chassis.

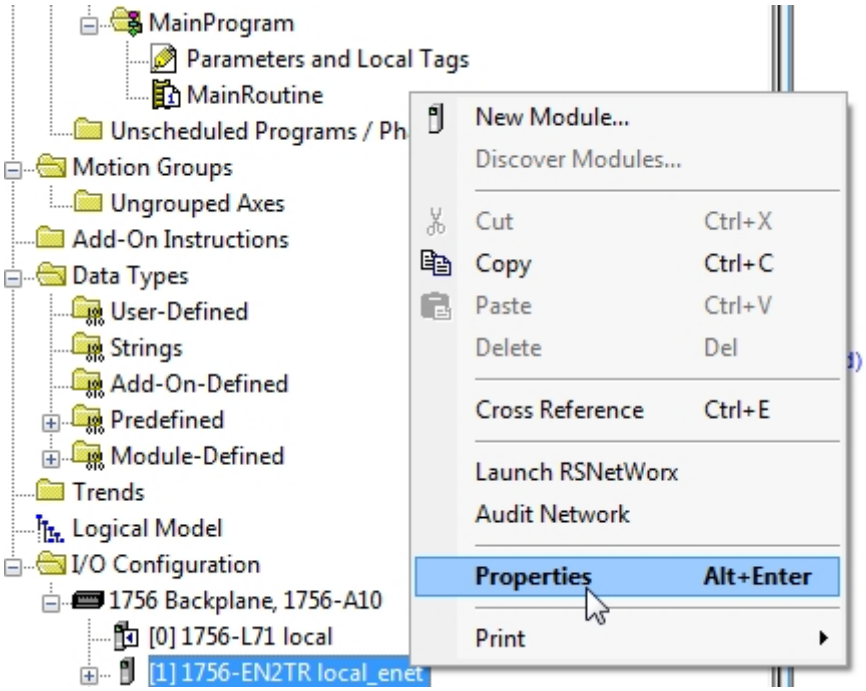


Figure 4-A
Navigate to 1756-EN2TR Properties

6. View General tab Information

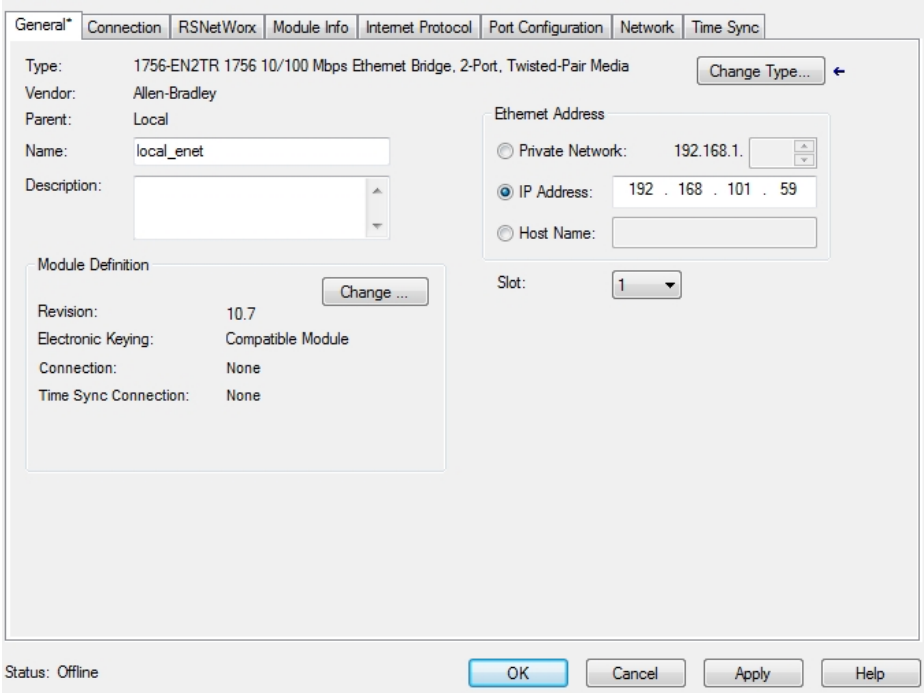


Figure 5-A
1756-EN2TR Properties – General Tab

Verify the following configuration settings:
Type: Match actual module's Part Number
Parent: Local – Module in the same chassis as processor
Name: Module name – user defined
IP Address: Must match to module's actual IP address
If address does not match change either module's IP address to match the IP Address setting on General tab or change the IP Address setting on the General tab to match the actual IP address of the module.
Slot: Must match the actual slot location of module
Electronic Keying: Based in module's revision

7. Navigate to the Ladder Logic window

Figure 6-A
Produced Processor – Ladder Logic

8. Right click produce_tag - View produce_tag Properties

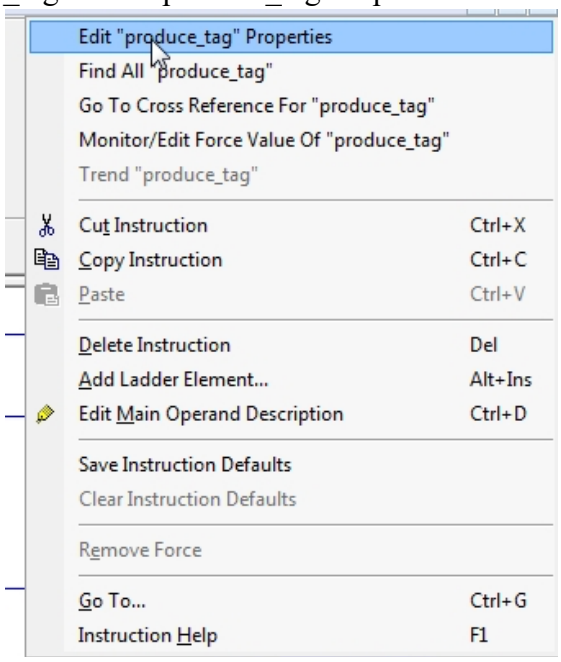


Figure 7-A
Right mouse click on the tag produce_tag - MOV instruction Rung 2 - and choose Edit "produce_tag" Properties

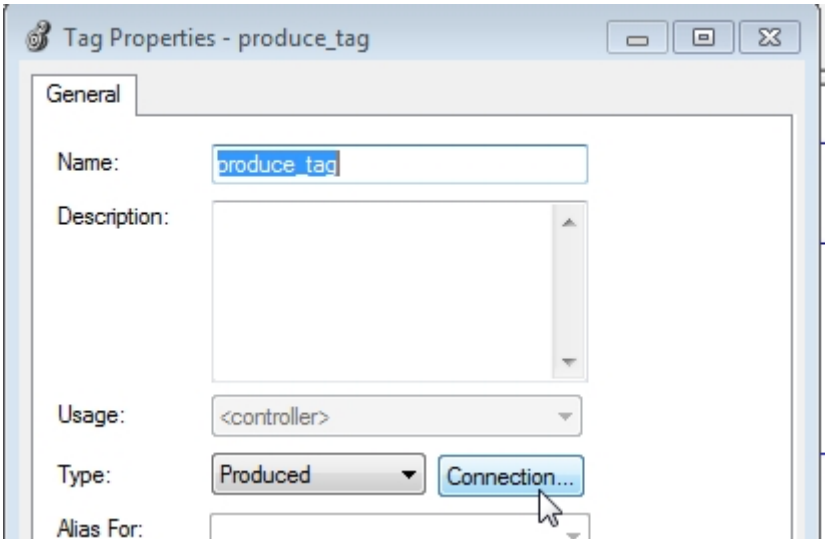


Figure 8-A
Tag Properties Window

Note: Type Produced

Click the Connection button to show the Produced Tag Connection window

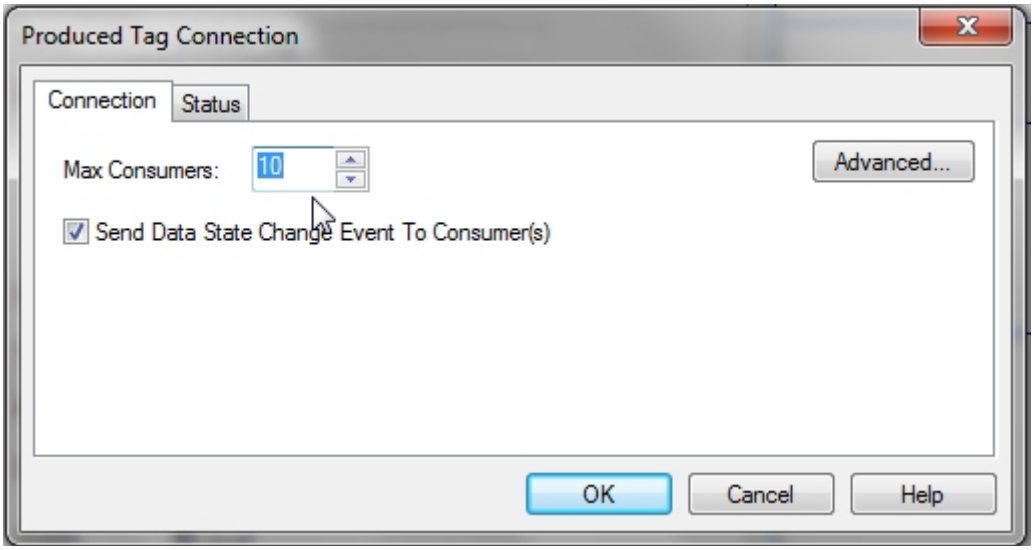


Figure 9-A
Produced Tag Connection Window

Max Consumers: value shown in dialog box determines how many Consumer Tags can receive data from this Produced tag.
Default fault value 1
10 shown in Figure 9-A

Click OK button on Produced Tag Connection window to close window.
Click OK button on Tag Properties window to close window.

9. Navigate to Controller Tag window

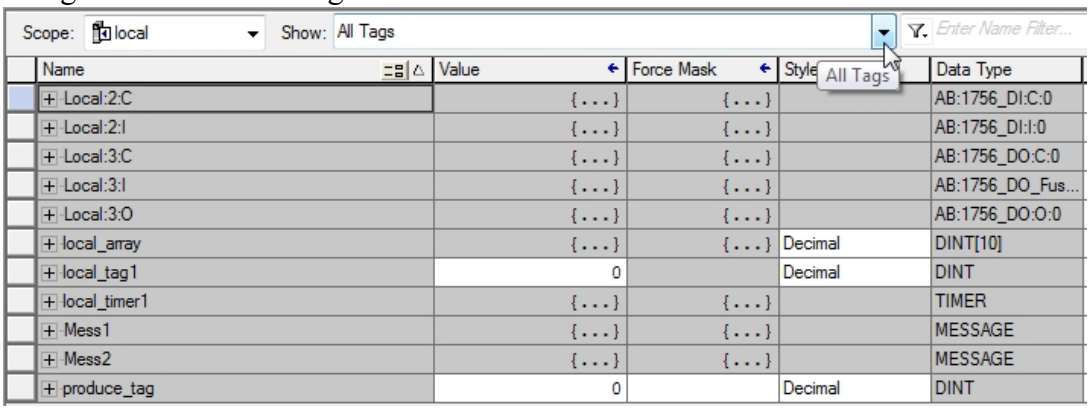


Figure 10-A-Controller Scoped Tag Window

10. Click the down arrow on the Show: drop-down selection box

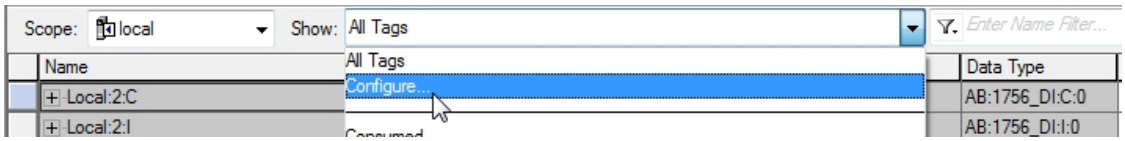


Figure 11-A-Show Selection Box

Choose Configure

11. On the Define Tag Filter – Click Produced from Filter On: selection box.

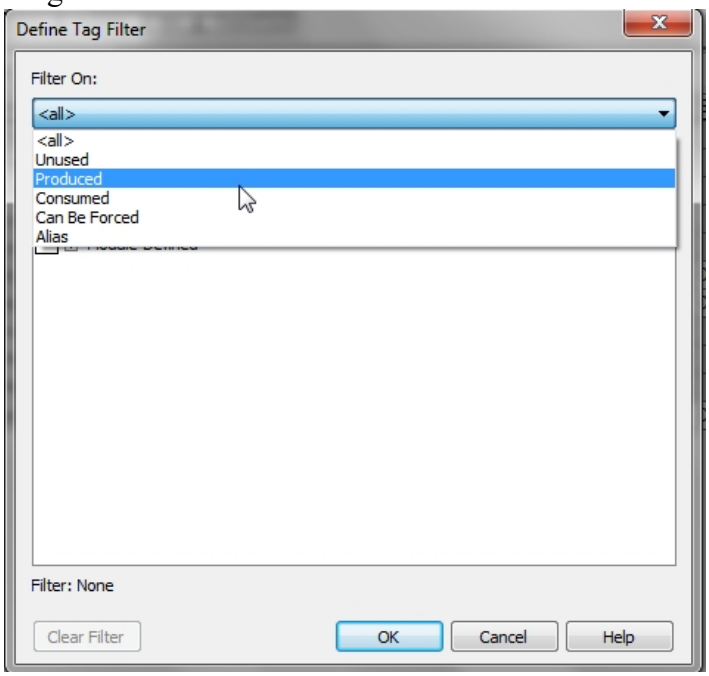


Figure 12-A -Define Filter Window

Click the OK button on the Define Tag Filter Window

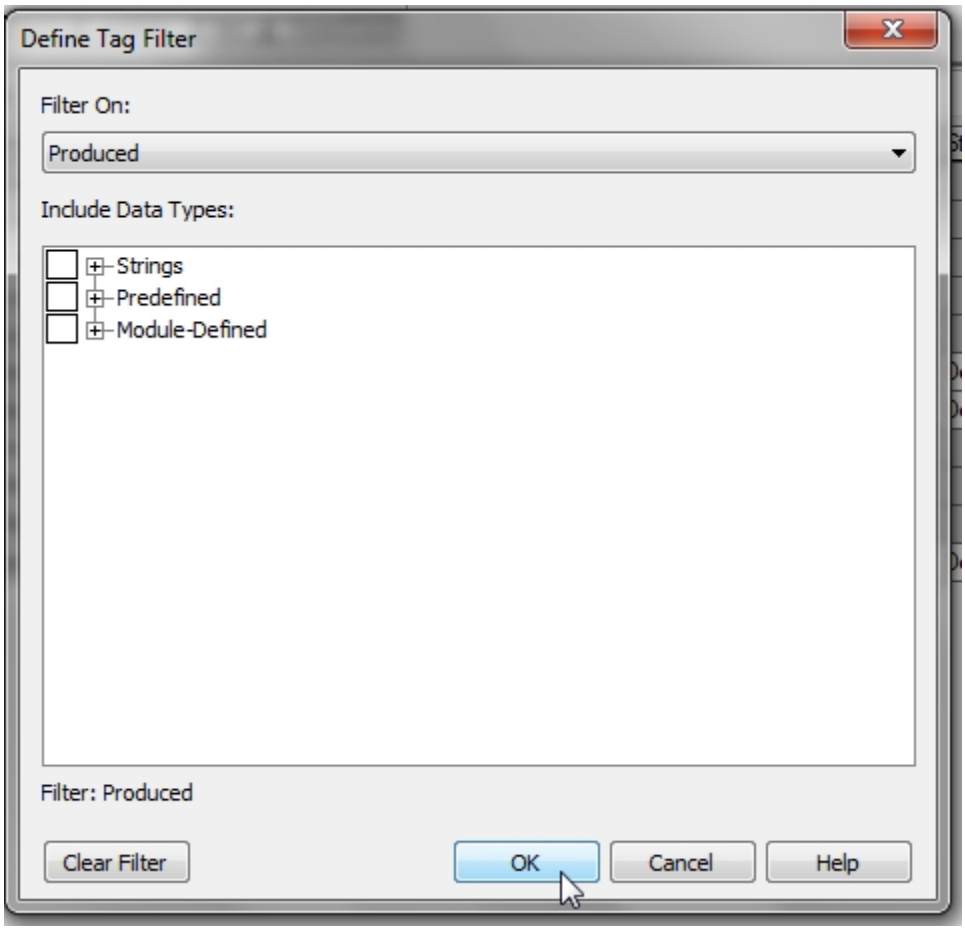


Figure 13-A
Define Tag Filter

12. The Controller Scoped Tag window opens – Showing only Produced Tags

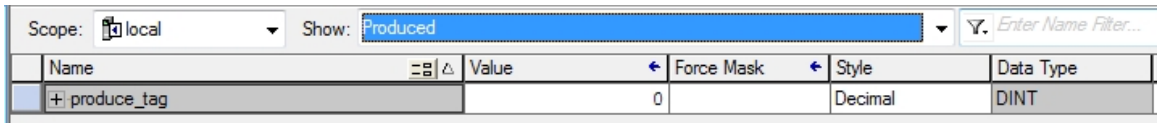


Figure 14-A
Produced Tags Controller Scope Window

13. Click the down arrow on the Show: drop-down selection box – Choose All Tags

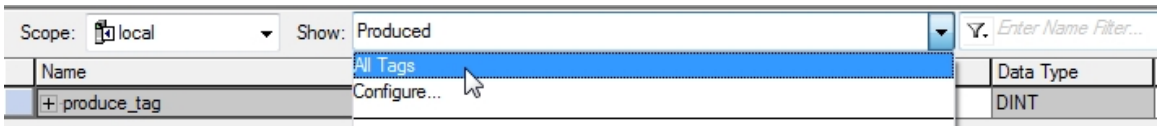


Figure 15-A
Show Selection Box

The Controller Scoped Tag will display all the Controller Scope Tags for the Project

Scope: local Show: All Tags Enter Name Filter...

Name	Value	Force Mask	Style	Data Type
Local:2:C	{...}	{...}		AB:1756_DI:C:0
Local:2:I	{...}	{...}		AB:1756_DI:I:0
Local:3:C	{...}	{...}		AB:1756_DO:C:0
Local:3:I	{...}	{...}		AB:1756_DO_Fus...
Local:3:O	{...}	{...}		AB:1756_DO:O:0
local_array	{...}	{...}	Decimal	DINT[10]
local_tag1	0		Decimal	DINT
local_timer1	{...}	{...}		TIMER
Mess1	{...}	{...}		MESSAGE
Mess2	{...}	{...}		MESSAGE
produce_tag	0		Decimal	DINT

Figure 15-A
Controller Scoped Tags – All Tags

Consumed Chassis – Chassis with Processor containing Consumed Tags

14. Open the Project File - Module_3_Consumed_Tags.L5K, Import in to Studio 5000.

15. Navigate to and expand the I/O Configuration folder.

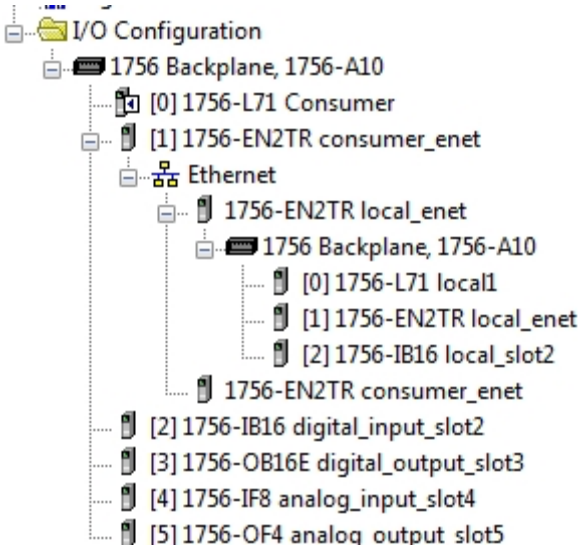


Figure 16-A
I/ O Configuration Folder Consumed Chassis

16. Open the Properties window for the 1756-EN2TR Ethernet module.
This is the Ethernet Module in the Consumed Chassis.

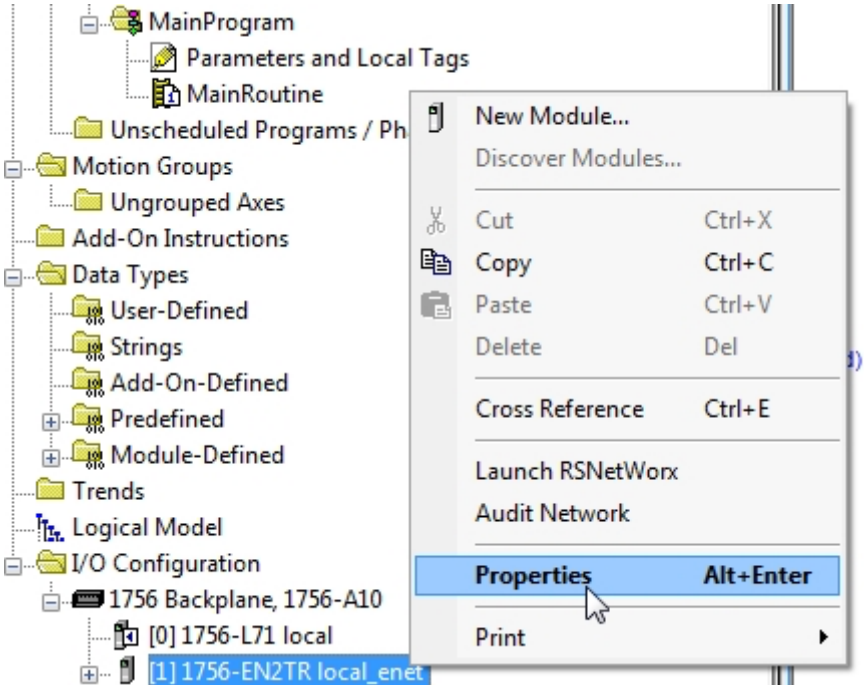


Figure 17-A
Navigate to 1756-EN2TR Properties

17. View General tab Information

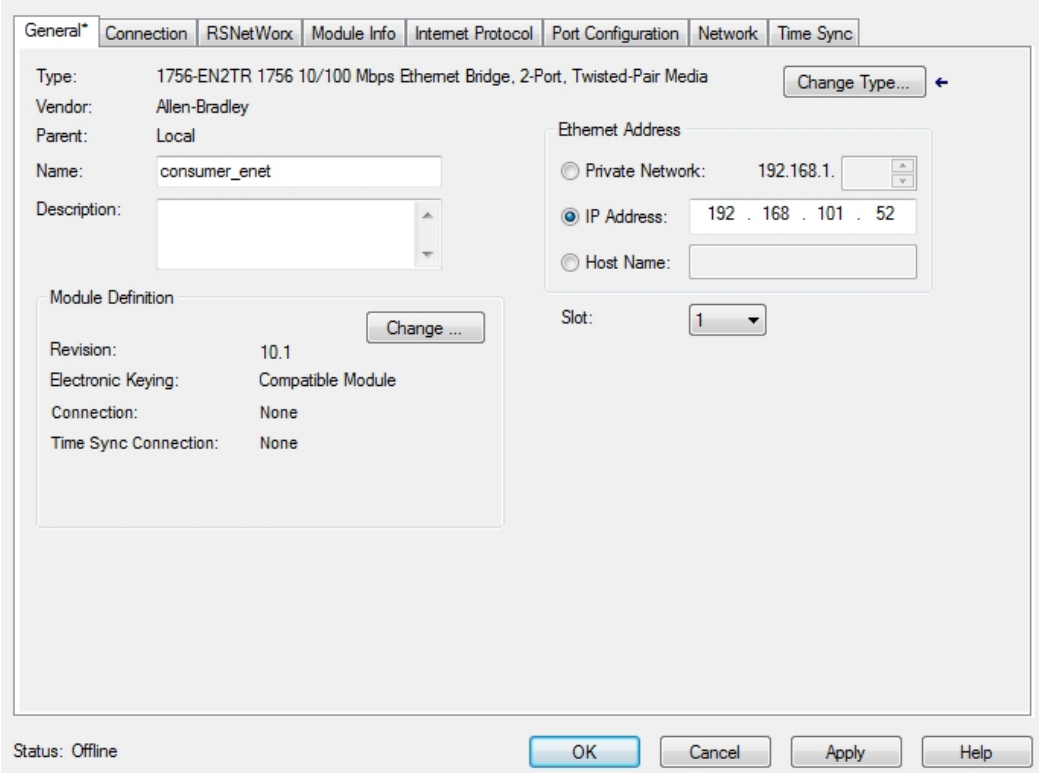


Figure 16-A
1756-EN2TR Properties – General Tab- Consumed Chassis

Verify the following configuration settings:
Type: Match actual module's Part Number
Parent: Local – Module in the same chassis as processor
Name: Module name – user defined
IP Address: Must match to module's actual IP address
If address does not match change either module's IP address to match the IP Address setting on General tab or change the IP Address setting on the General tab to match the actual IP address of the module.
Slot: Must match the actual slot location of module
Electronic Keying: Based in module's revision

18. Return to I/O Configuration

The information listed under [1] 1756-EN2TR consumer_enet is the configuration information for the Produced Tag chassis modules.

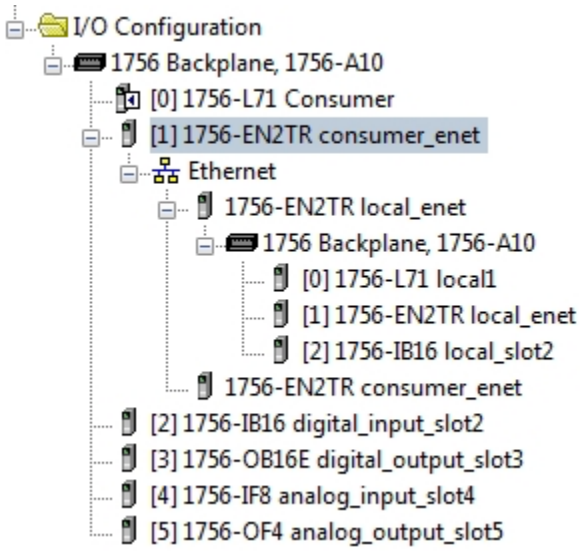


Figure 17-A
I/O Configuration Consumed Chassis

Destination Chassis (Backplane) is a 10 slot chassis – 1756-A10

In slot 0 of the Produced chassis is a 1756-L71 processor –
[0] 1756-L71 local1 – this is the processor that contains the Produced Tags.

In slot 1 of the Produced chassis is the communication module –
[1] 1756-EN2TR local_chassis

In slot 2 of the Produced chassis is a 16 point input module –
[2] 1756-IB16 local-slot2 – optional (not required)

This information must match the modules' location in the Produced chassis.

9. Right click [1] 1756-EN2TR local_enet to open its Properties window

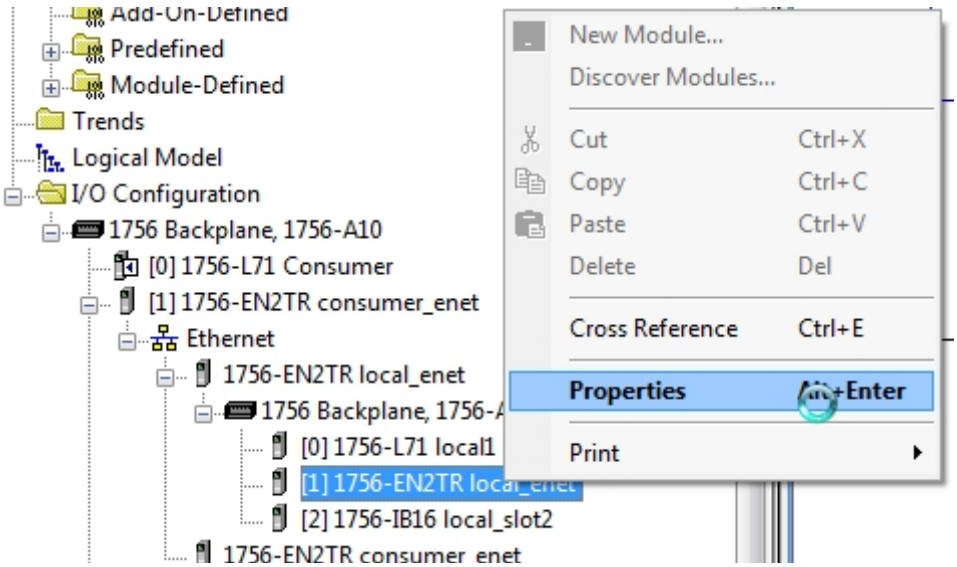


Figure 18-A. Properties of the Ethernet module.

10. Navigate to General tab for [1] 1756-EN2TR local_enet module.

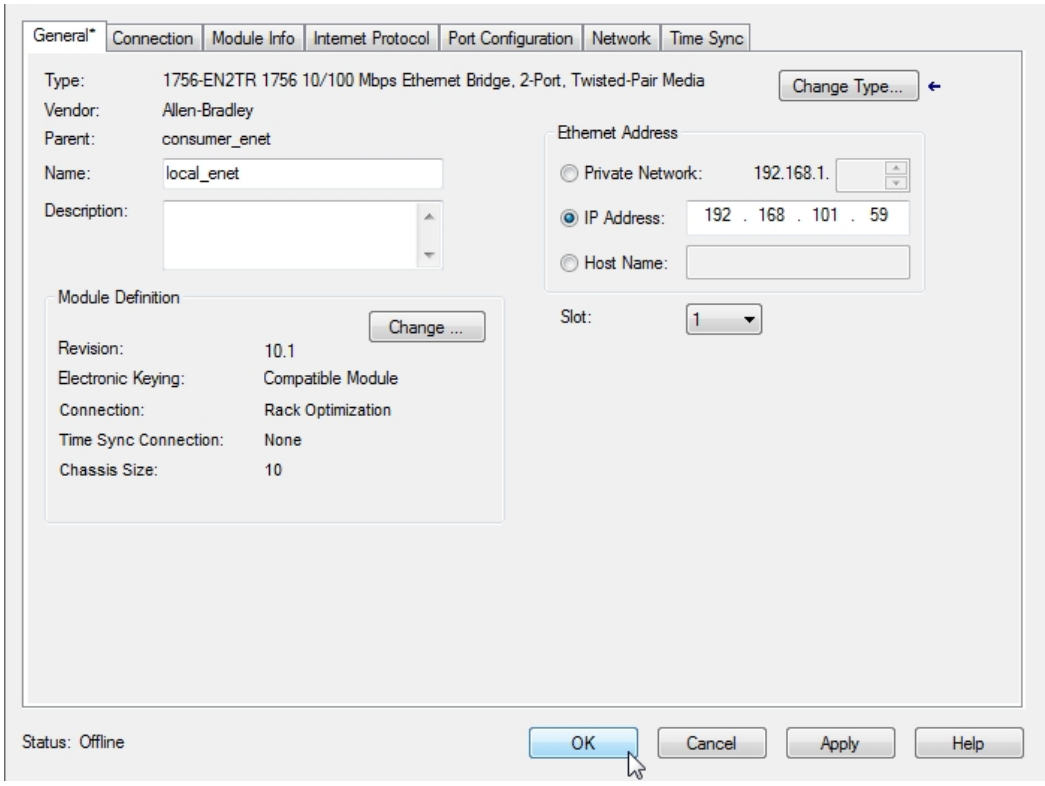


Figure 19-A Produced Chassis Ethernet Module's Properties Window – General Tab

Verify the following configuration settings:

Type: Match actual module's Part Number
Parent: consumer_enet – Name of the Ethernet Communication module in the Consumed chassis
Name: Module name – user defined
IP Address: Must match to module's actual IP address
If address does not match change either module's IP address to match the IP Address setting on General tab or change the IP Address setting on the General tab to match the actual IP address of the module.
Slot: Must match the actual slot location of module
Electronic Keying: Based in module's revision
Chassis Size: Number of Slots in Produced Chassis – must match to actual chassis size
Use Change button to modify Chassis Size, Revision and Electronic Keying settings

11. Navigate to Consumed Tag processor's Ladder Logic window - MainRoutine.

Figure 20-A – MainRoutine – Ladder Logic Window

12. Right click consumed_tag, Rung 2 - View consume_tag Properties

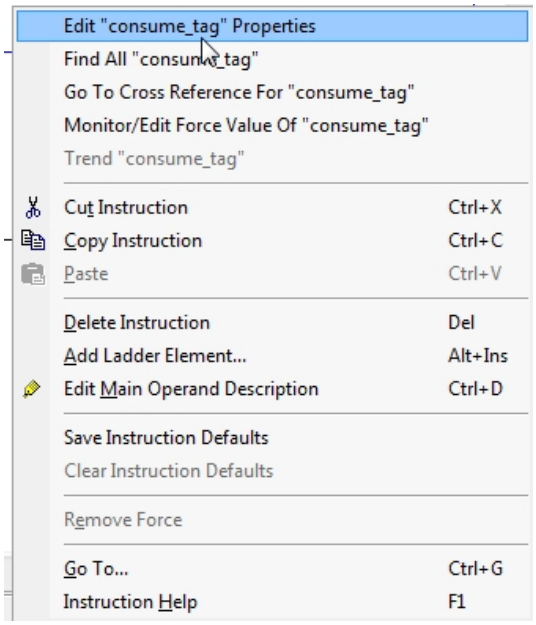


Figure 21-A

Right mouse click on the tag consume_tag - MOV instruction Rung 2 - and choose Edit "consume_tag" Properties

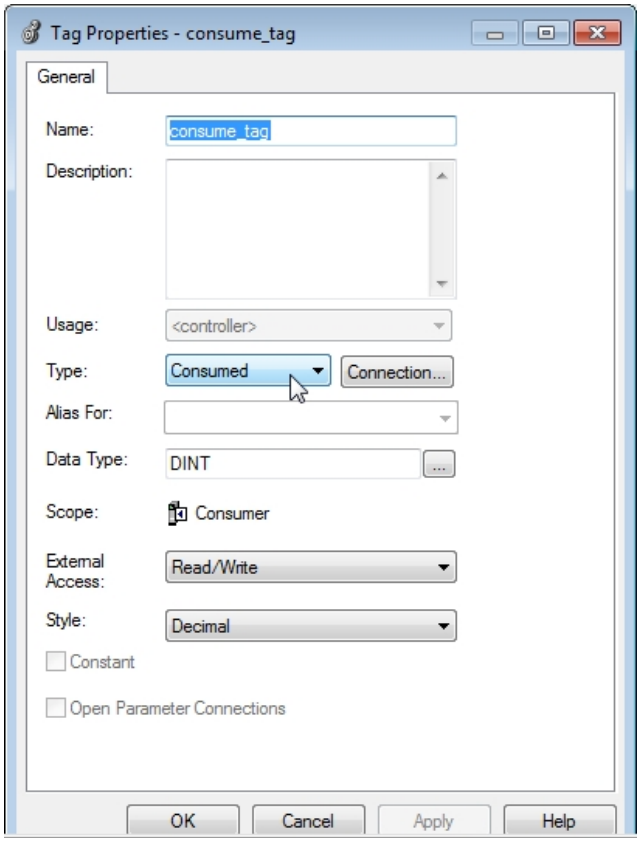


Figure 22-A -Tag Properties Window

Note: Type Consumed

Click the Connection button to show the Consumed Tag Connection window

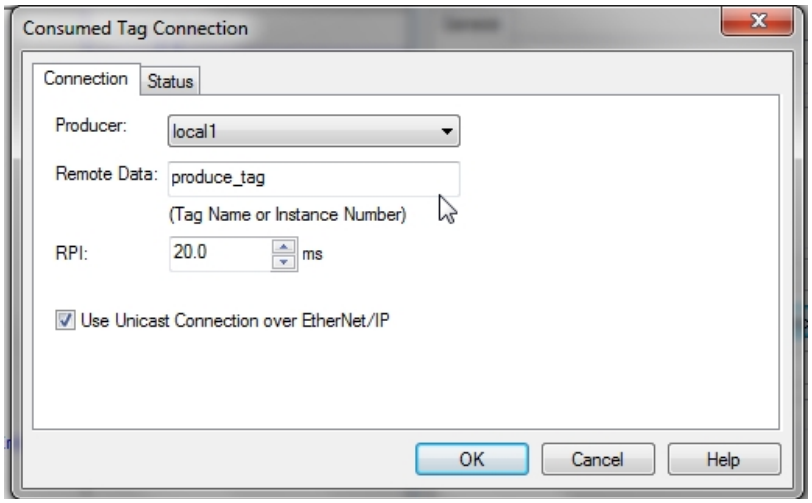


Figure 23-A
Consumed Tag Connection Window

Producer: Name of the Produced Tag processor from Consumed I/O Configuration List
Note: Name not need to be the same as actual processor name.

Remote Data: Produced Tag in the Produced Tag processor

RPI: Tag update time - 20ms default setting

Click OK button on Consumed Tag Connection window to close window.
Click OK button on Tag Properties window to close window.

13. Navigate to Controller Tag window
Note: Produced / Consumed tags must be Controller Scoped Tags

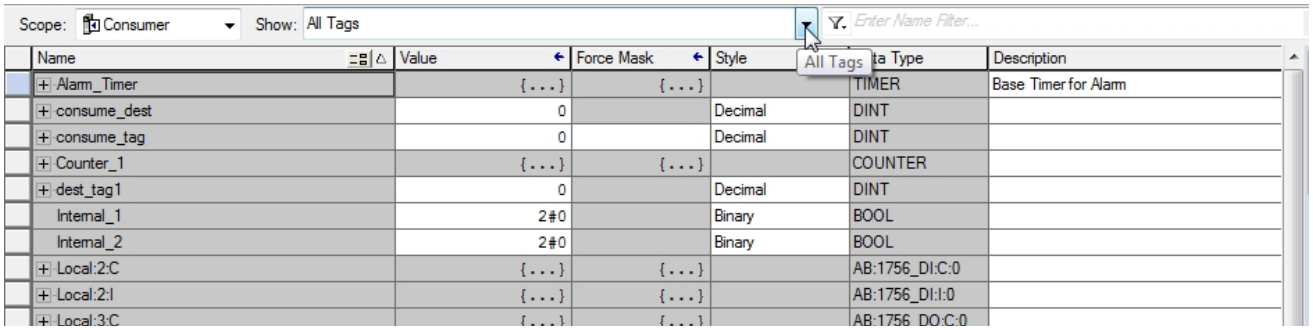


Figure 24-A-
Controller Scoped Tag Window – Consumed Processor

14. Click the down arrow on the Show: drop-down selection box

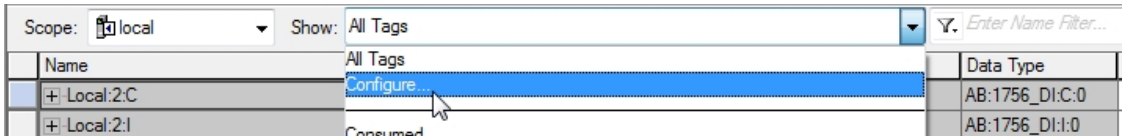


Figure 25-A
Show Selection Box

Choose Configure

15. On the Define Tag Filter – Click Consumed from Filter On: selection box.

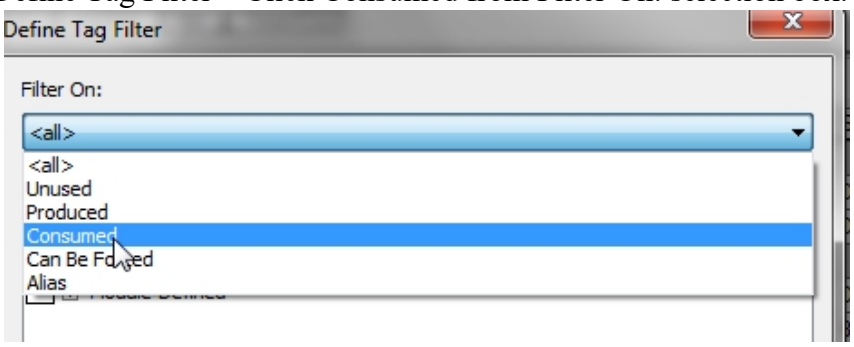


Figure 26-A -Define Filter Window

Click the OK button on the Define Tag Filter Window

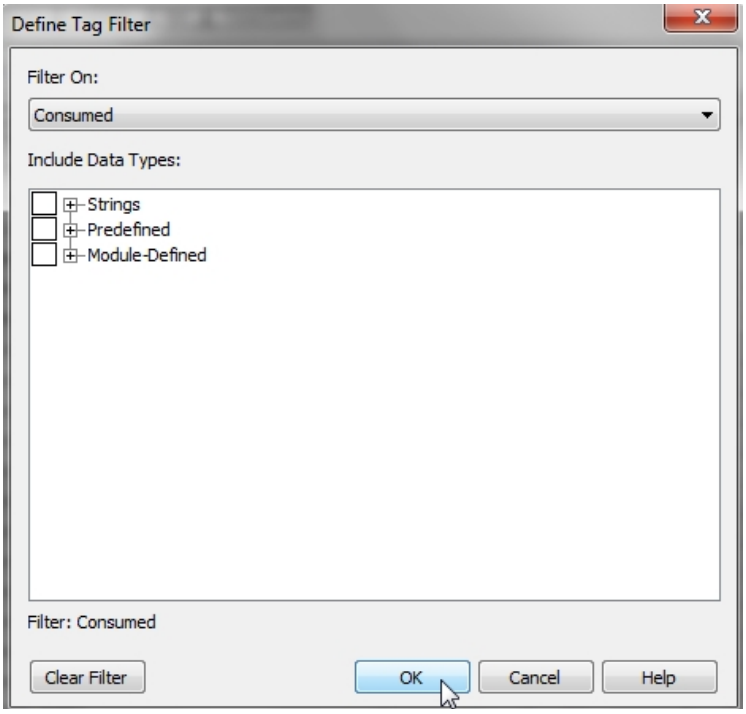


Figure 27-A

Define Tag Filter

16. The Controller Scoped Tag window opens – Showing only Consumed Tags

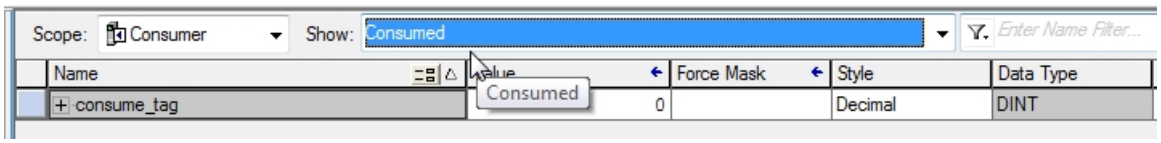


Figure 26-A
Consumed Tags Controller Scope Window

17. Click the down arrow on the Show: drop-down selection box – Choose All Tags

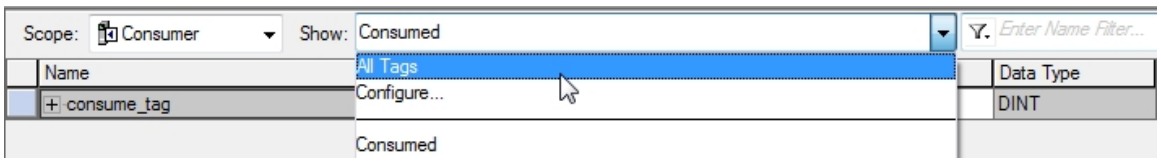


Figure 27-A
Show Selection Box

The Controller Scoped Tag will display all the Controller Scope Tags for the Project
See Figure 28-A

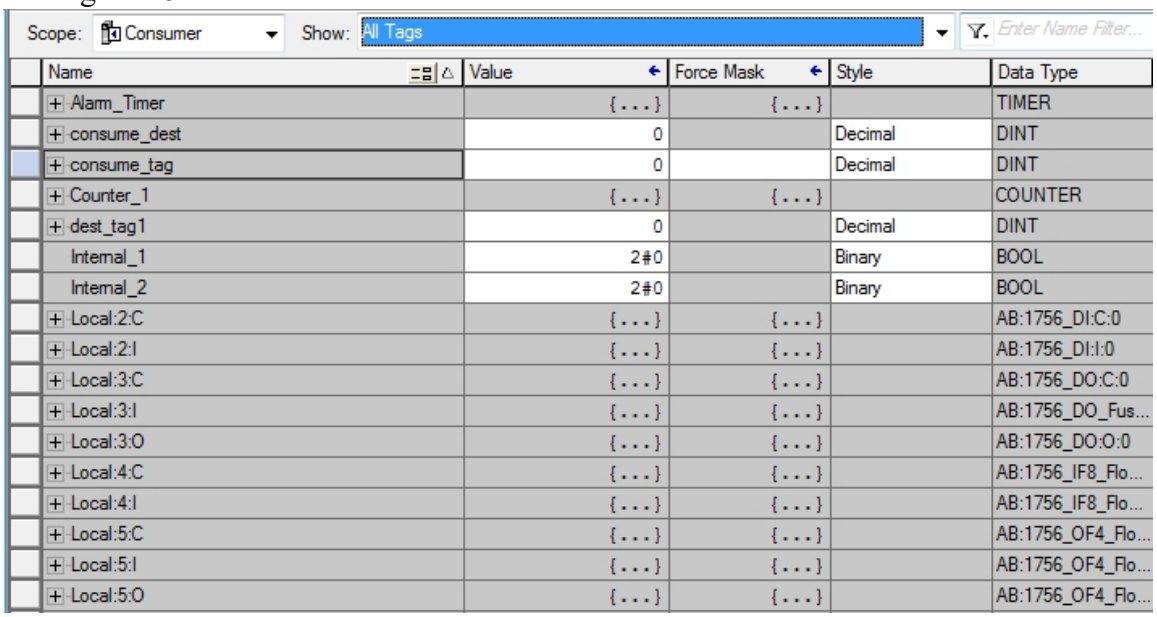


Figure 28-A
Controller Scoped Tags – All Tags

Create New Produced / Consumed Tags

18. Open the Project file Module_3_Producer_Tags.ACD

Add a new Rung as shown in Figure 29-A to the Produced Tag processor

Figure 29 – A
Create New Source Tag - Produced Processor

19. Create a Source Tag for MOV Instruction.

Right click on the ? for Source tag.

Select New Tag from the context menu.

See Figure 30 - A

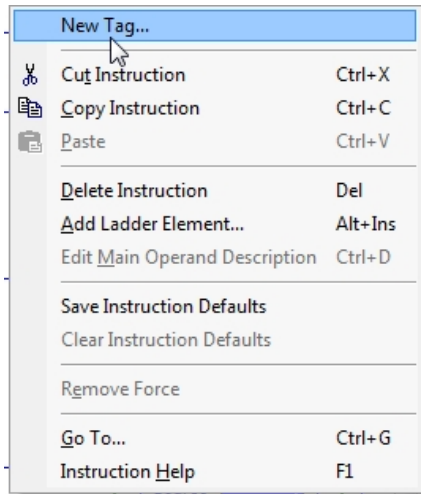


Figure 30 – A
Create New Tag

Create a tag called new_tag – Use information as shown in Figure 31-A

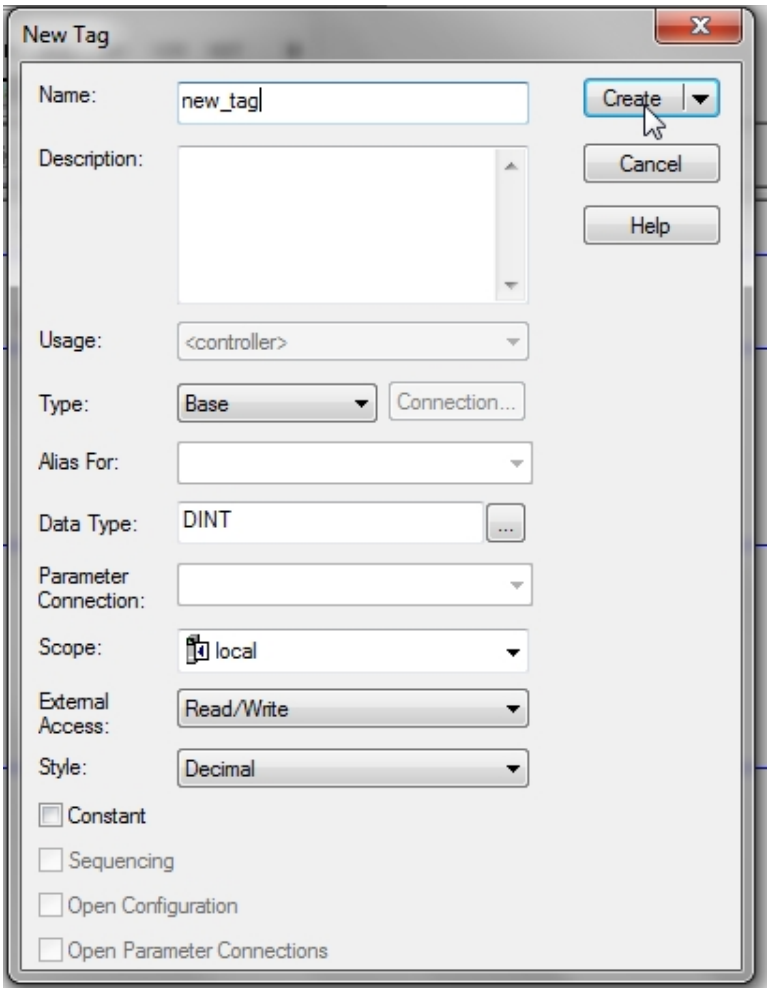


Figure 31 – A
Create New Tag

Click the Create button.

20. Create a Dest tag

Figure 32 – A
Create New Dest Tag – Produced Processor

Right click on the ? for Dest tag.

Select New Tag from the context menu.

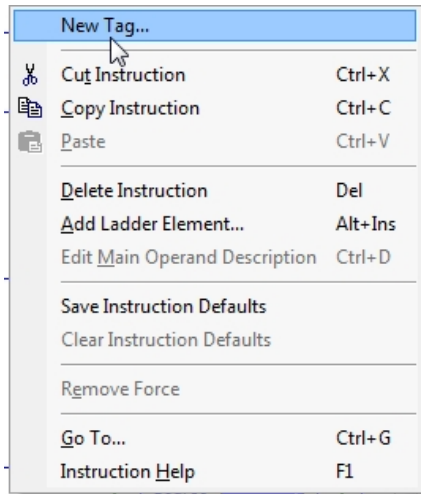


Figure 33 – A
Create New Tag

On the New Tag window – Configure tag Properties as follows

Name: new_produced_tag

Type: Produced

Data Type: DINT

Scope: local, Controller Scoped Tag

Note: local is the name of the processor for the Module_3_Producer_Tags.ACD Project File.

See Figure 34 - A

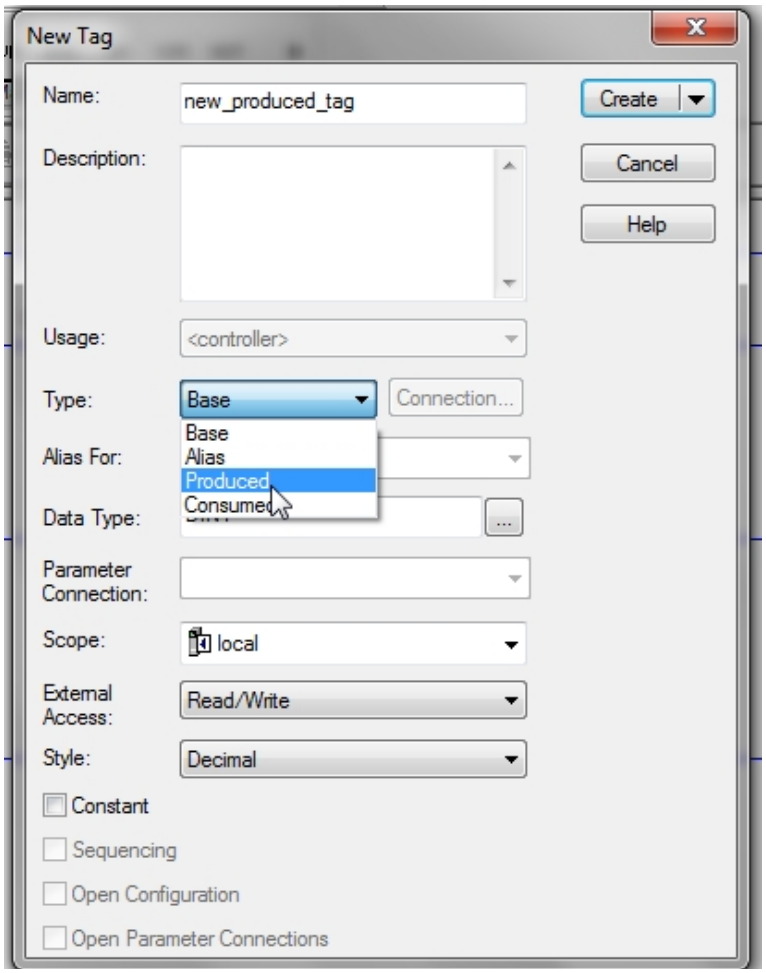


Figure 34-A
New Tag Window

Click the Connection Button to open the Produced Tag Connection Window

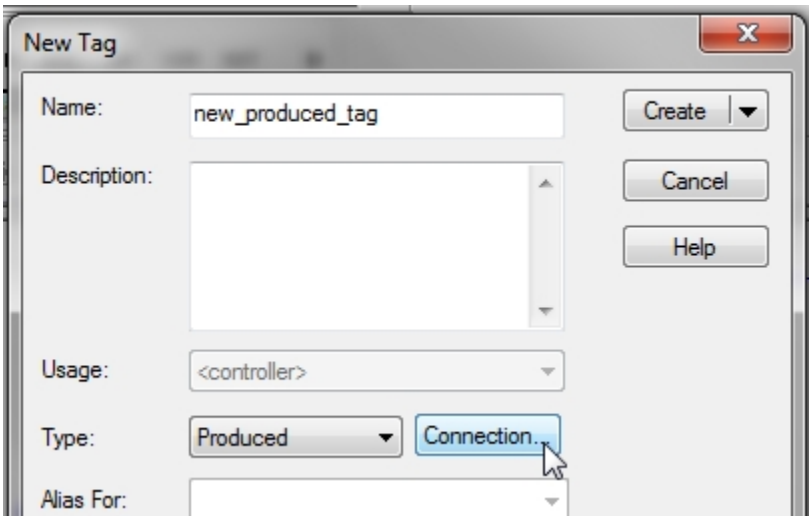


Figure 35 – A

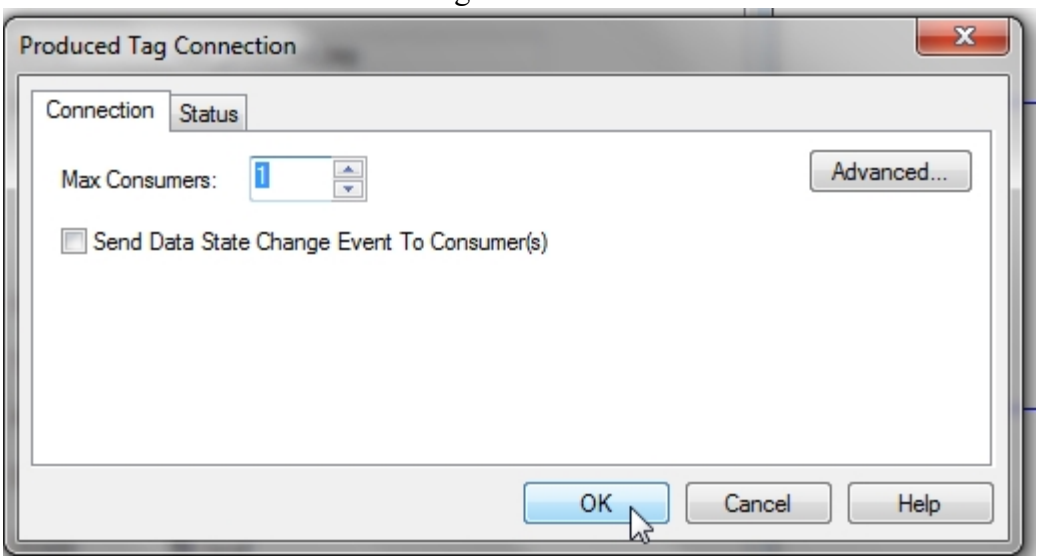


Figure 36 – A
Produced Tag Connection Window
Max Consumers: number of Consumed Tags that can receive Produced data.
Leave as 1

Click the OK button to close the Produced Tag Connection window

Click the Create button on the New Tags window to create the Produced tag - new-produced-tag

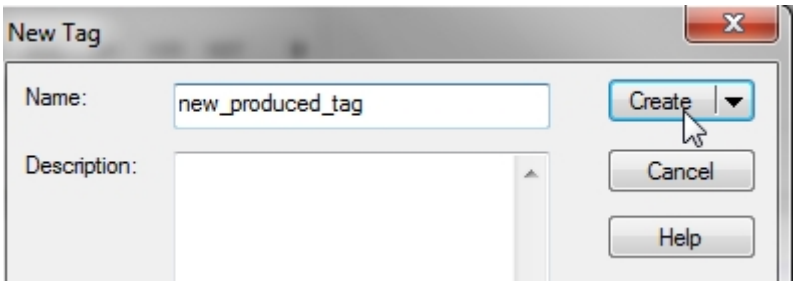


Figure 37 – A
Create Tag

New Ladder Rung should appear as shown:

Figure 38 – A
New Ladder Rung

Save the modified Project File - Download modified Project file to Produced processor. Put processor in RUN mode.

21. Open the Project file Module_3_Consumer_Tags.ACD

Navigate to the Ladder Logic window

Add a new rung with a MOV instruction as shown in Figure 39 - A

Figure 39 – A. Adding a new MOV instruction.

Create a new Source tag for the MOV instruction.
Right click on the ? for Source tag.

Select New Tag from the context menu.

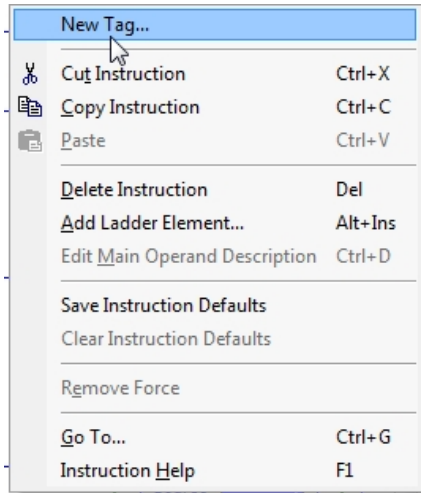


Figure 40 – A
Create New Tag

Create a tag called new_consumed_tag – Use information as shown in Figure 41-A

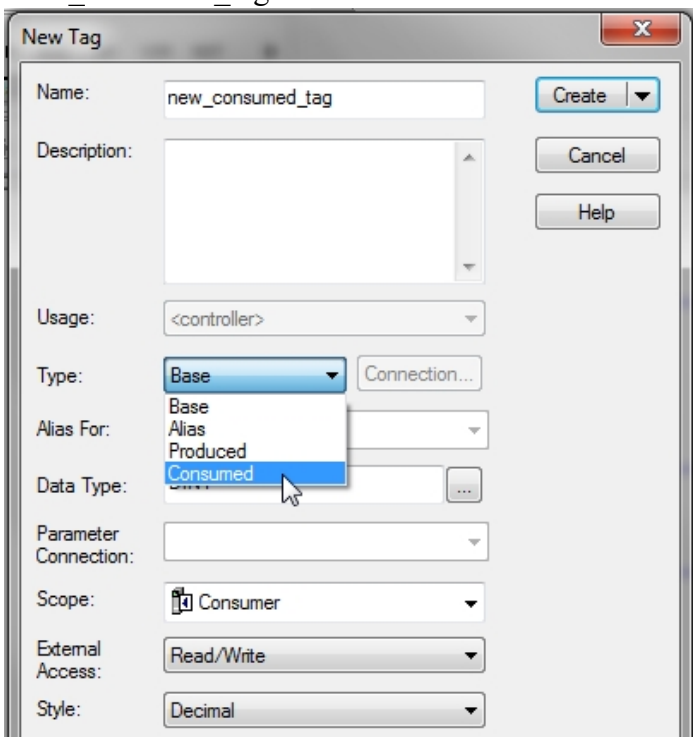


Figure 41 – A

Create New Consumed Tag

Type: Consumed
Data Type: DINT
Scope: Consumer
Note: Consumer is the name of the processor
Scope is Controller Scoped tag

Click the Connection button to open the Consumed Tag Connection window

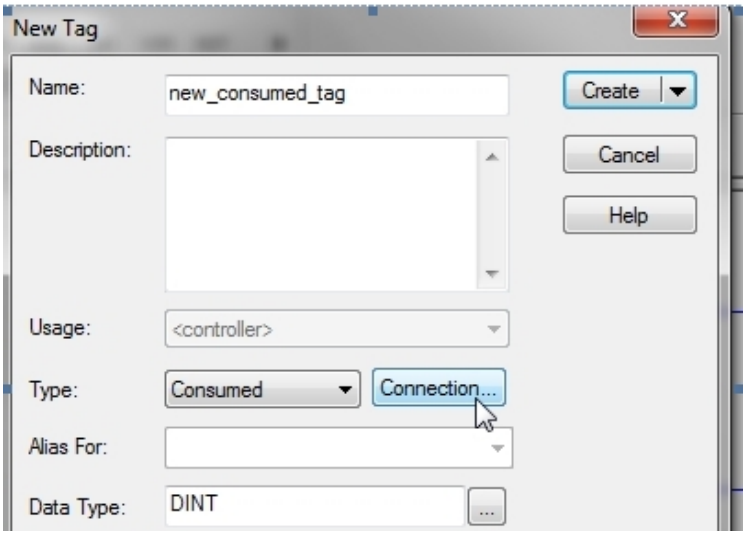


Figure 42-A

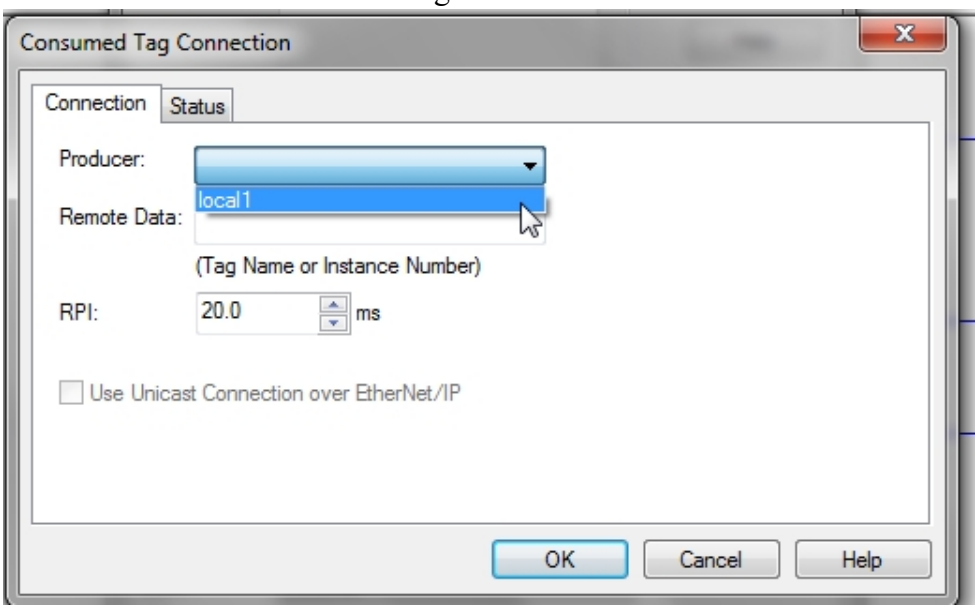


Figure 43-A
Consumed Tag Connection Window

Producer: Select local1

Note: This is the name of the Produced processor as list in the I/O Configuration of the Consumed processor.

Does not need to be the same name as the actual processor

Remote Data: new_ produced_tag

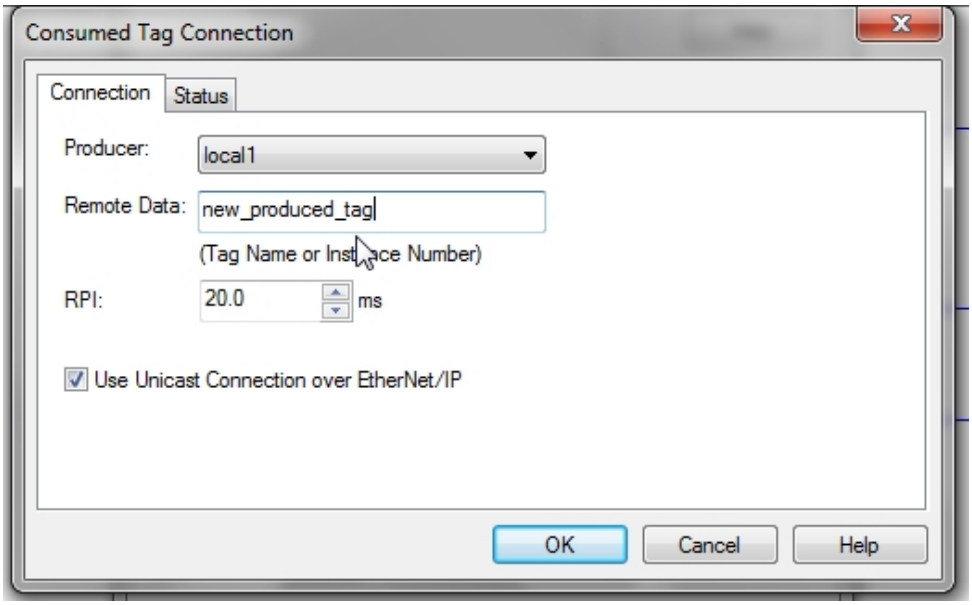


Figure 43-A
Consumed Tag Connection Window

This is the name of the Produced Tag created in the Produced processor –
See pages 21 - 23
RPI: speed of connection - leave as default of 20 ms

Use Unicast Connection over EtherNet/IP –leave box checked

Click the OK button to close the Consumed Tag Connection window.

Click the Create button on the New Tag window to create the Consumed tags – new_consumed_tag

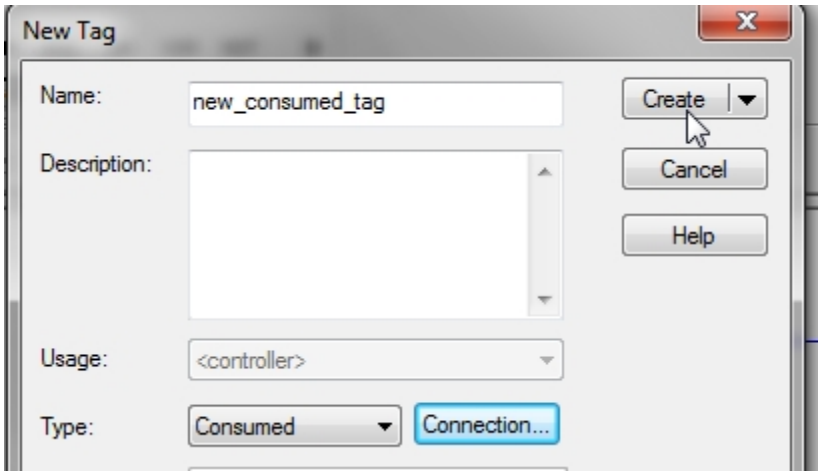


Figure 44-A
Create Consumed Tag

View modified rung

Figure 45-A
New Consumed Tag

For the Dest create a tag named tag1

Use the information as shown on the New Tag window.

See Figure 46-A

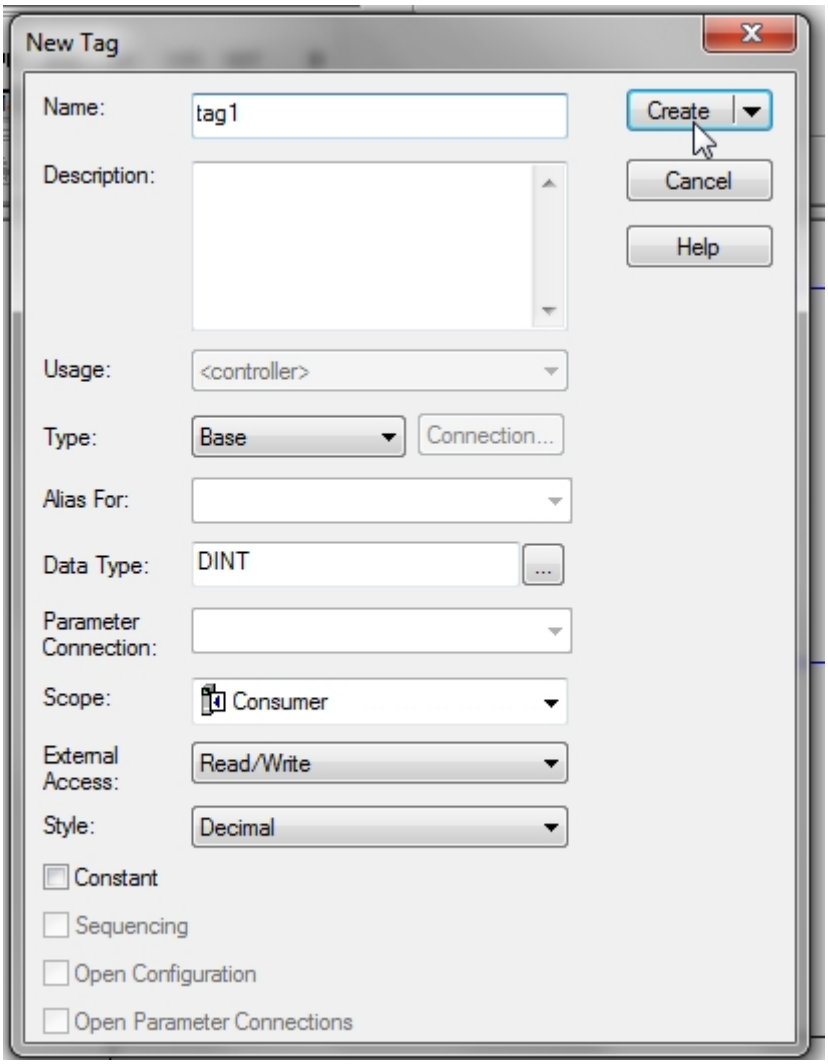


Figure 46 – A
New Dest Tag

Click the Create button to create tag1.

View modified rung

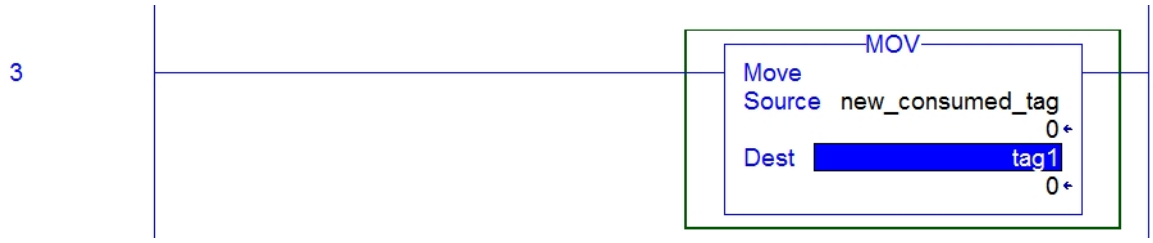


Figure 47-A
New Dest Tag

Save the modified Project File - Download modified Project file to Consumed processor. Put both processors in RUN mode.

22. Navigate to the Produced processor – online and enter a value of 45 for the Source new-tag on MOV instruction Rung 3. 45 is moved to new_produced_tag

Figure 48 – A
Produced Tag Value 45

23. Navigate to the Consumed processor – online.
The new_consumed_tag on Rung 3 should have a value of 45

Figure 49 – A
Consumed Tag Value 45

Is the new_produced_tag sending (broadcasting) its value to the new_consumed_tag?

_____

Enter additional values in new_produced_tag to verify operation

Review Questions

1. T F Produced / Consumed must be of the same Data Types

2. Produced Tags are of which Scope?

   a) Program

   b) Controller

   c) Local Tags

   d) User-defined

3. Maximum number of bytes for a Produced tag is:

   a) 125

   b) 500

   c) 32

   d) 32767

4. Produced / Consumed tags can be used with which type of processors over Ethernet/ IP?

   a) SLC 500

   b) CompactLogix

   c) PLC 5

   d) ControlLogix

5. Data Types for Produced / Consumed tags can be:

   a) CONTROL

   b) MESSAGE

   c) DINT

   d) REAL

6. T F A Produced / Consumed tag uses a processor connection.

7. Produced / Consumed tags use which type of networks

   a) ControlNet

   b) DH+

   c) Remote I/O

   d) Ethernet

8. Produced / Consumed tags require ladder instructions to broadcast and receive data

   a) True

   b) False

Review Question Answers

1) T

2) b

3) b

4) b, d

5) c, d

6) T

7) a, d

8) F