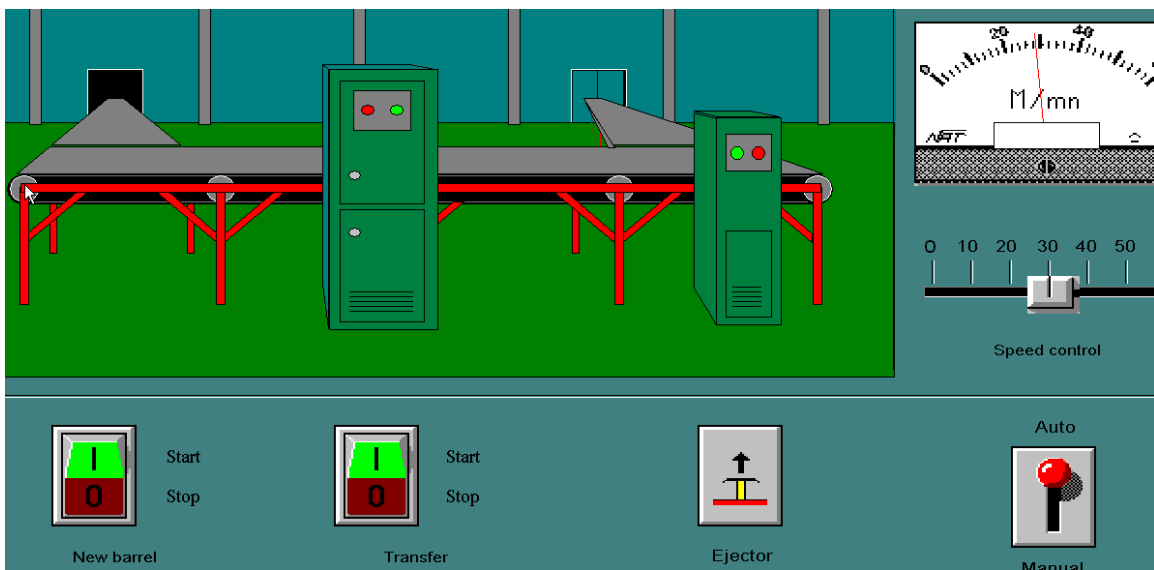


## PLC220 Lab Exercise 23



## I/O Communications using RSLinx

## I/O Communications with RSLinx

### Lesson Objective

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

1. Set-up DDE Topics in RSLinx
2. Linking items in Wonderware InTouch applications to RSLinx.
3. View active Topics in RSLinx.

### Page

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Create RSLinx Topic.....	4
Create InTouch Appliaction .....	7
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## I/O Communications for Wonderware Applications Using RSLinx

1. The following Lab exercise will set-up a DDE (Dynamic Data Exchange) I/O link from a Wonderware InTouch application to an Allen-Bradley ControlLogix PLC.
2. RSLinx will be used as the application for the communication driver. DDE – Dynamic Data Exchange – will be the communication protocol used to exchange information between the Wonderware application and the PLC.

Note: RSLinx Lite does not support DDE configuration.

RSLinx OEM, Professional and Gateway support DDE configurations

### Hardware Setup

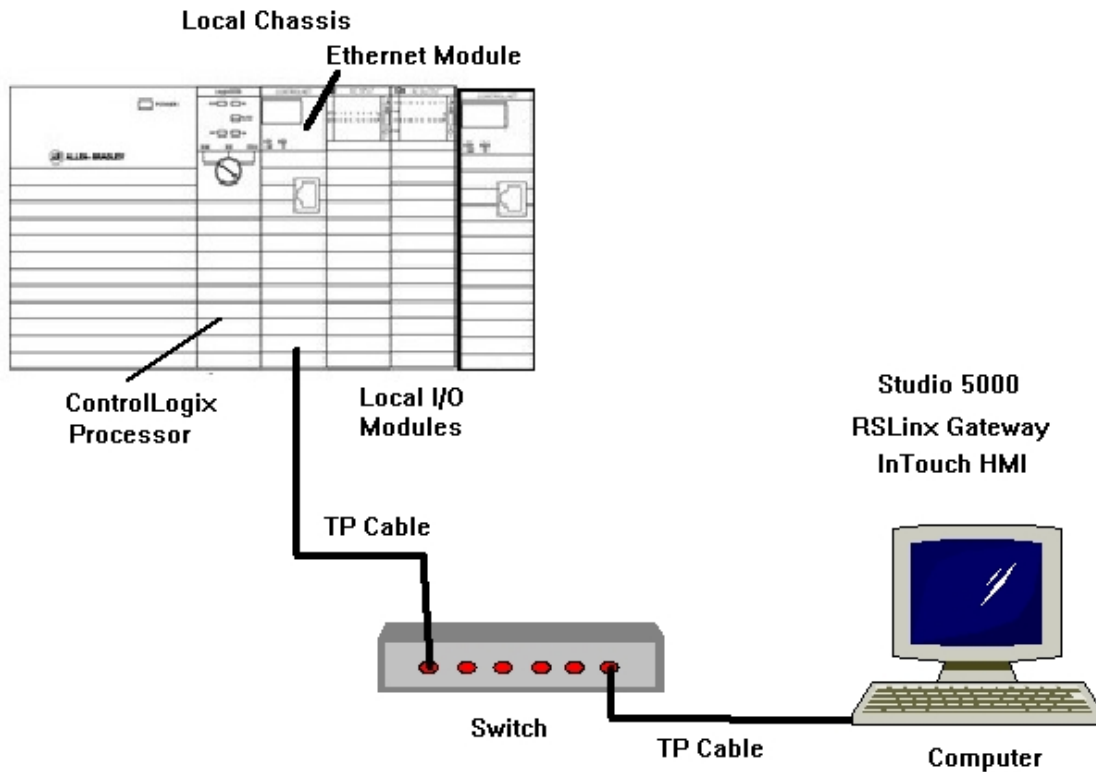


Figure 1-A. Hardware configuration for this lab exercise.

3. Using RSLogix / Studio 5000 software configure a Ladder Logic file as shown in Figure 2-A - Save File as Module8.ACD - Download the file to the ControlLogix processor – Place the ControlLogix processor in RUN mode

Note: Rung 0 input tag– Data Type – Bool –internal bit  
Timer tag – Data Type – Timer

Rung 1 – PL7 tag – Alias tag for Local:3:O.Data.7  
Timer.DN – Timer Done Bit

All tags must be Controller Scoped for data exchange with an InTouch application.

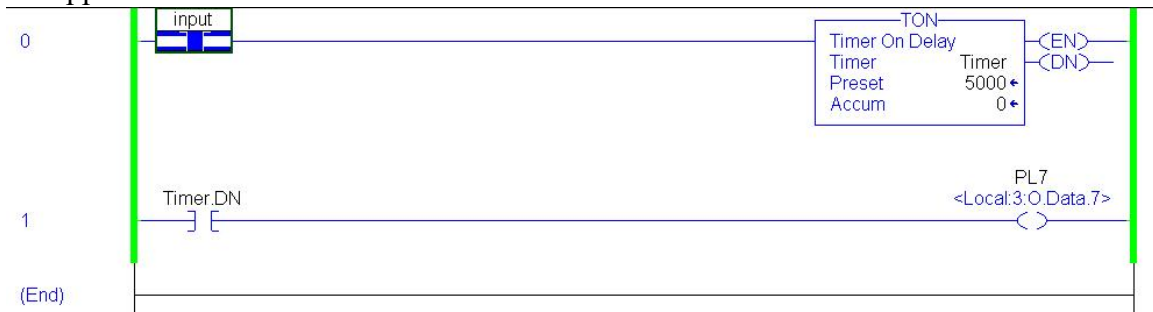


Figure 2-A. Ladder program.

#### 4. Configure a Topic in RSLinx

DDE requires three (3) pieces of information to establish a link.

- a. Application – name of the application providing data (i.e. server)  
RSLinx uses an Application Name of RSLinx.
- b. Topic – name of a topic within an Application that contains the data.  
The example uses InTouch as the Topic. – User Defined
- c. Item – the specific data to access.  
In a ControlLogix PLCs, the item is the tag in a PLC program.  
ControlLogix / CompactLogix tags must be Controller Scoped Tags

On the RSLinx RSWho window – Navigate to the processor running the sample Project.

Right click on the processor – Select Configure New DDE/OPC Topic from context menu..

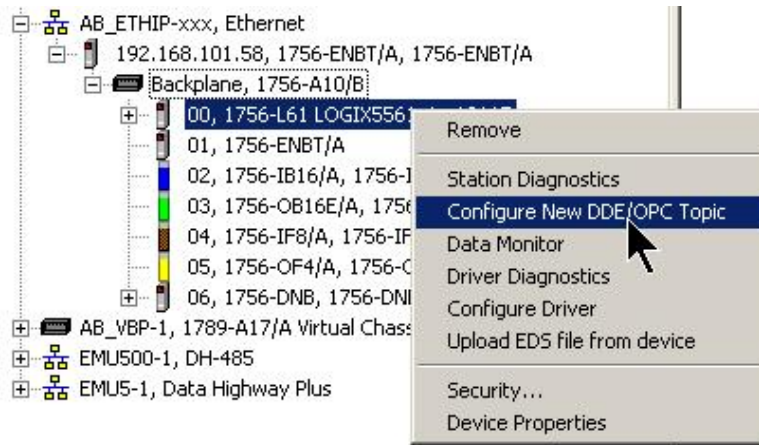


Figure 3-A  
RSWho Window - Configure New DDE/OPC Topic

5. From the Topic List on the DDE/OPC Topic Configuration window find the highlighted Topic.

Verify the ControlLogix processor running the Project file is highlighted in the right window –Data Source tab.

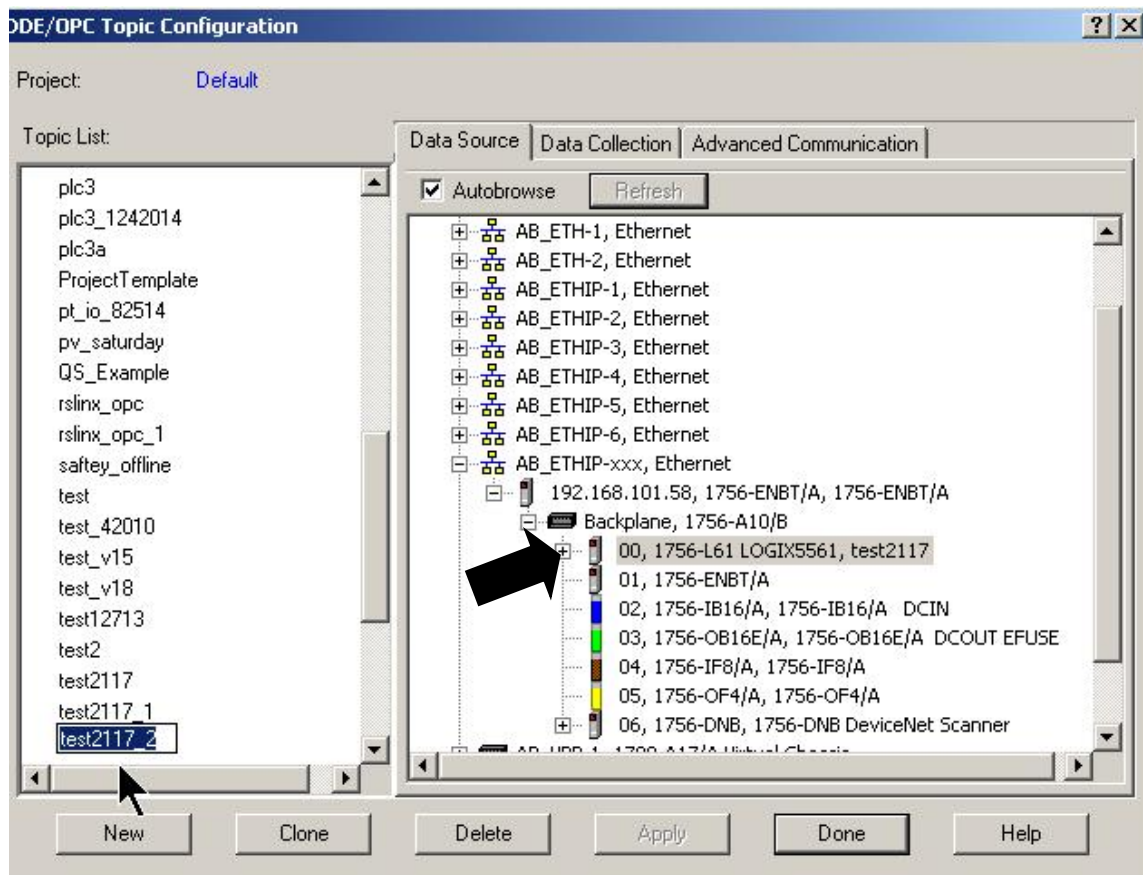


Figure 4-A

DDE/OPC Topic Configuration Window - Configure New DDE/OPC Topic

6. Rename the highlighted Topic in the Topic List (left window) to InTouch

See Figure 5-A – next page.

A topic called InTouch will be configured to the ControlLogix processor highlighted in the right window –Data Source tab.

This will be the name of the Topic when configuring the Access Name window in the Wonderware InTouch application.

Note: The Topic name is user-defined – the Topic name of InTouch was randomly chosen. – Do Not use a Topic name already in the Topic List.

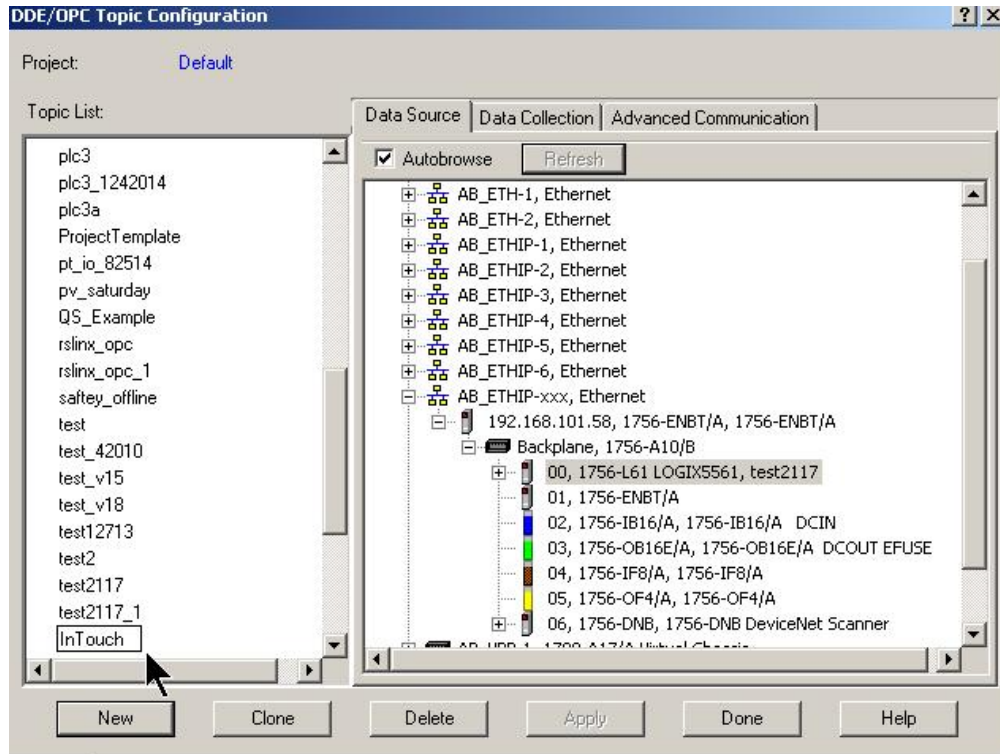


Figure 5-A  
DDE/OPC Topic Configuration Window – Topic InTouch

Press Enter to confirm new Topic name

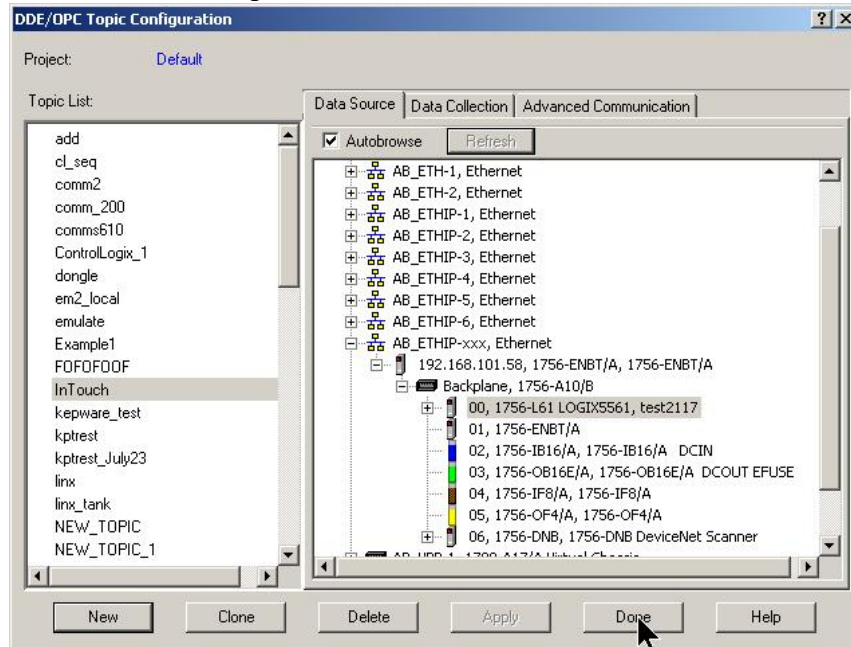


Figure 6-A  
DDE/OPC Topic Configuration Window – Topic InTouch After Enter

Click the Done button at the bottom of the DDE/OPC Topic Configuration Window  
Click Yes to confirm updating InTouch Topic

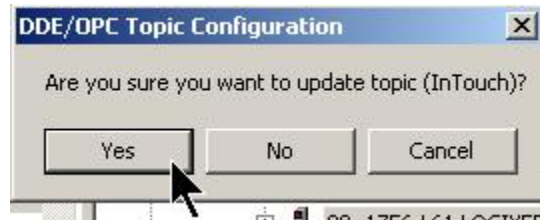


Figure 7-A  
Confirming Topic Update

7. Using InTouch create a Wonderware InTouch application called Linx\_InTouch
8. Open the application in WindowMaker
9. Create an application window named - one
10. Add a Rocker Switch Wizard object to the application window.
11. Configure the Rocker Switch Properties as shown:  
Tagname: Input

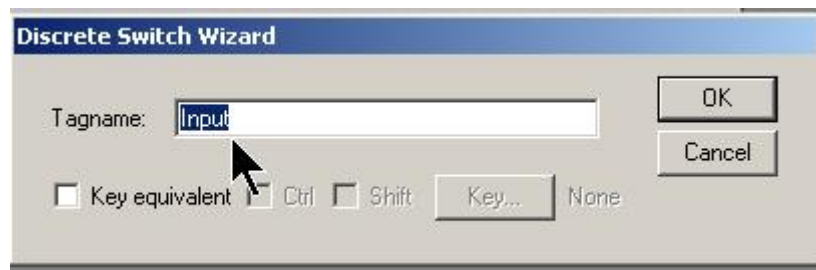


Figure 8-A  
Rocker Switch Tagname

Click OK to Define Input tag

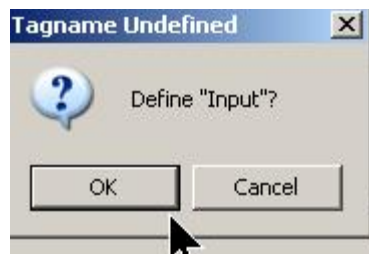


Figure 9-A  
Rocker Switch Tagname

Note: Tagname for Rocker Switch is the same as tag for Normally Opened (XIC) instruction Rung 0 of Ladder Logic Program.



Configure tag Type as I/O Discrete this tag will send bit data to the input tag in the ControlLogix processor  
On the Tagname Dictionary window – click Type button

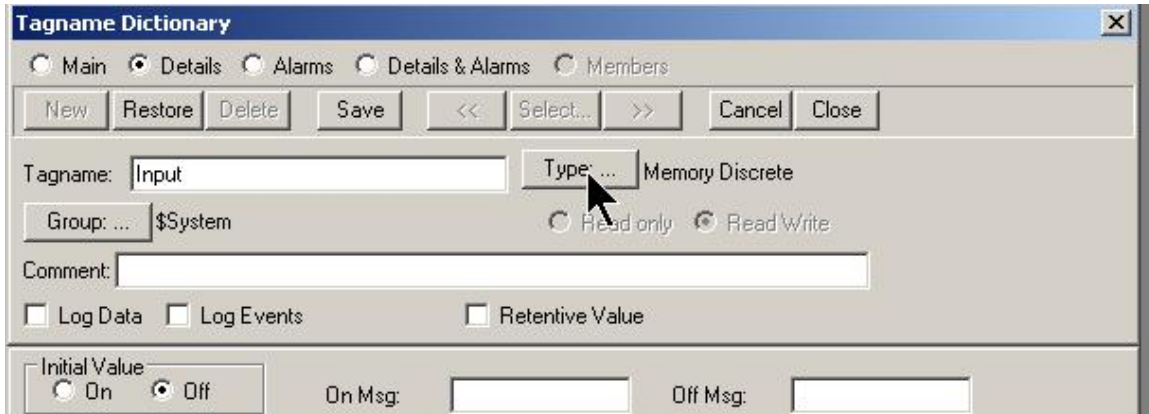


Figure 10-A  
Configure Tagname Type

On the Tag Types window select I/O Discrete.

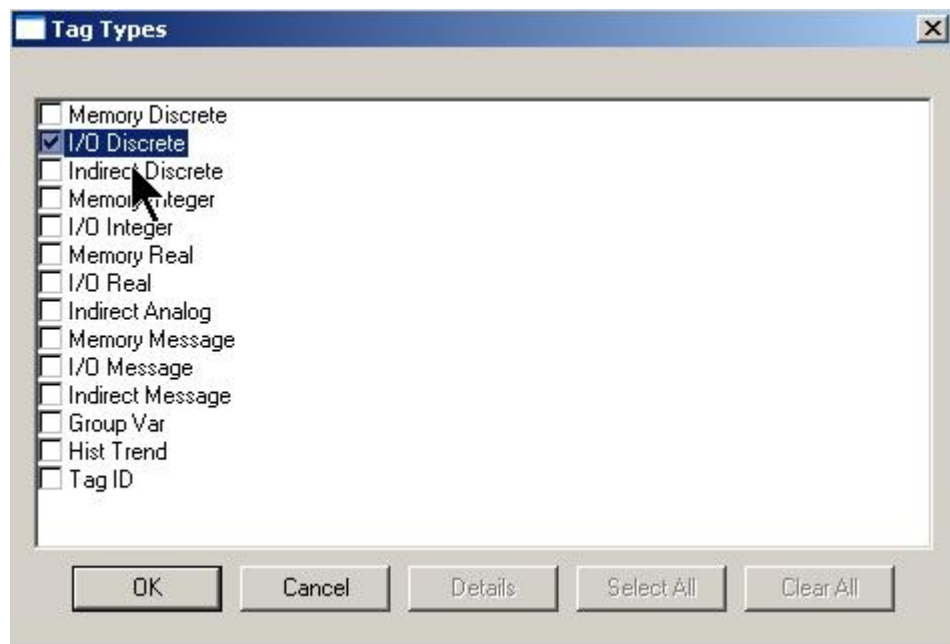


Figure 11-A  
I/O Discrete Tag Type

Note: I/O tag types send and receive data from devices external to the InTouch application.

RSLinx and the InTouch application will be exchanging data using DDE protocol.

RSLinx exchanging data with ControlLogix PLC

On the Tagname Dictionary window – Click the Access Name button – lower left corner of Tagname Dictionary window

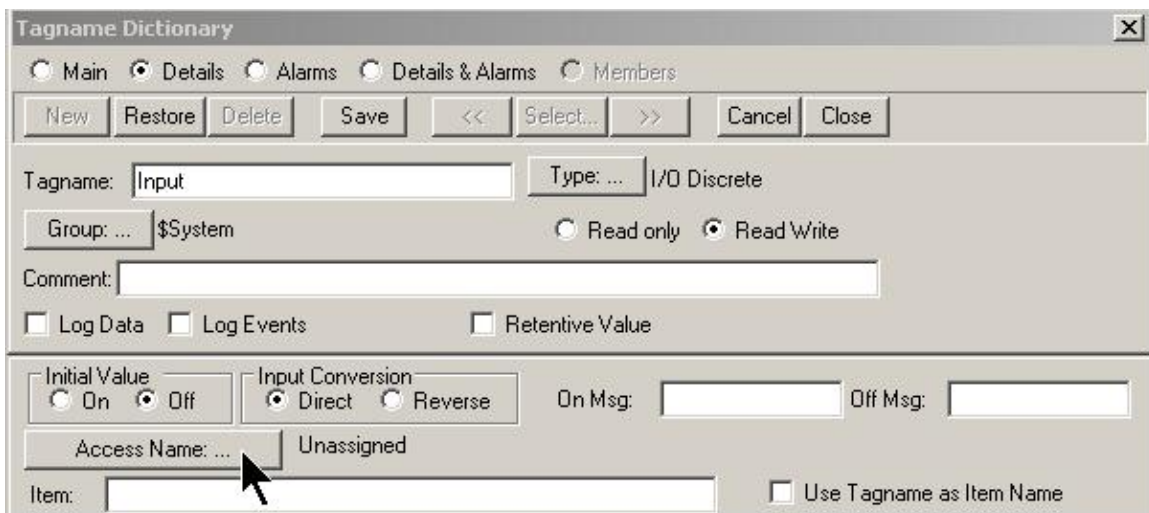


Figure 12-A  
Access Name Button - Tagname Dictionary Window

Note: Access Name Unassigned

Access Names window opens

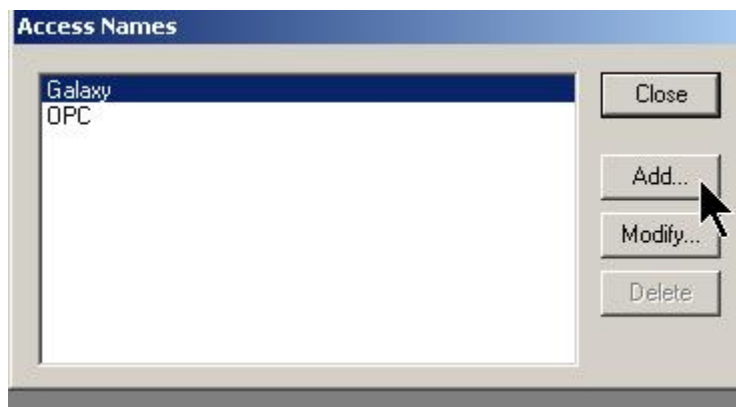


Figure 13-A  
Access Name Window

Note: Two default Accesses – Galaxy and OPC – are shown on Access Names window

Click the Add button to configure a new Access

Configure Add Access Name window as shown in Figure 14-A

Access – PLC – user defined

Application Name – rslinx – must be rslinx when using RSLinx

Topic Name: InTouch – topic that was configured pages 4-6.

Which protocol to use – DDE

When to advise server – Advise only active items

The screenshot shows a dialog box titled "Add Access Name". It contains several input fields and radio button options. The "Access" field is set to "PLC". The "Application Name" field is set to "rslinx". The "Topic Name" field is set to "InTouch". There are three radio button options for "Which protocol to use": "DDE" (selected), "SuiteLink", and "Message Exchange". There are two radio button options for "When to advise server": "Advise all items" and "Advise only active items" (selected). There is an unchecked checkbox for "Enable Secondary Source". On the right side, there are three buttons: "OK", "Cancel", and "Failover".

Figure 14-A  
Add Access Name Window

Click Close button to return to the Tagname Dictionary window



Figure 15-A  
Close Access Names Window

Note: Two (2) of the three (3) pieces of information were configured on Add Access Name window.

Application

Topic

The third element of a DDE link – Item – is configured on Tagname Dictionary window.

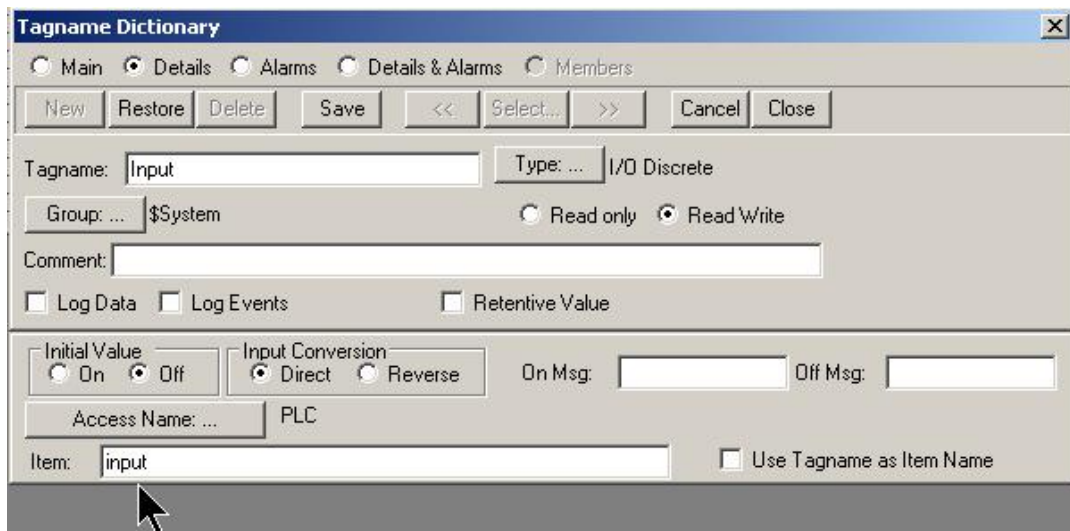


Figure 16-A  
Tagname Dictionary Window- Item Configuration

Enter - input (tag in ControlLogix processor) - in the Item Entry Box on the lower left corner of the Tagname Dictionary window

If the Wonderware InTouch tagname (Input) is the same as the tag (input) in the ControlLogix processor – Checking the Use Tagname as Item Name Check Box will also add Item (tag input) to Item Entry Box.



Figure 17-A  
Use Tagname as Item Name Check Box

Input tag in the InTouch application is configured to exchange data with input tag in the ControlLogix processor

Click Save – Click Close buttons on Tagname Dictionary window

12. Test the application – Click Runtime button –

Click Rocker Switch object – verify Timer in ControlLogix Link processor is running.

input contact at Rung 0 will change states when toggling the Rocker Switch object on InTouch application window.

Click Development button to return to Window Maker window.

13. Add a Number field to InTouch application window – See Figure 18-A

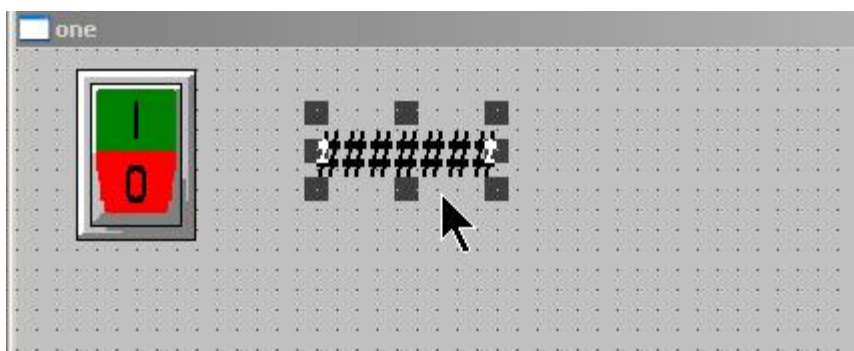


Figure 18-A  
Number Field – InTouch Application Window

Double click the Number Field object to open the Text Animation Link window.

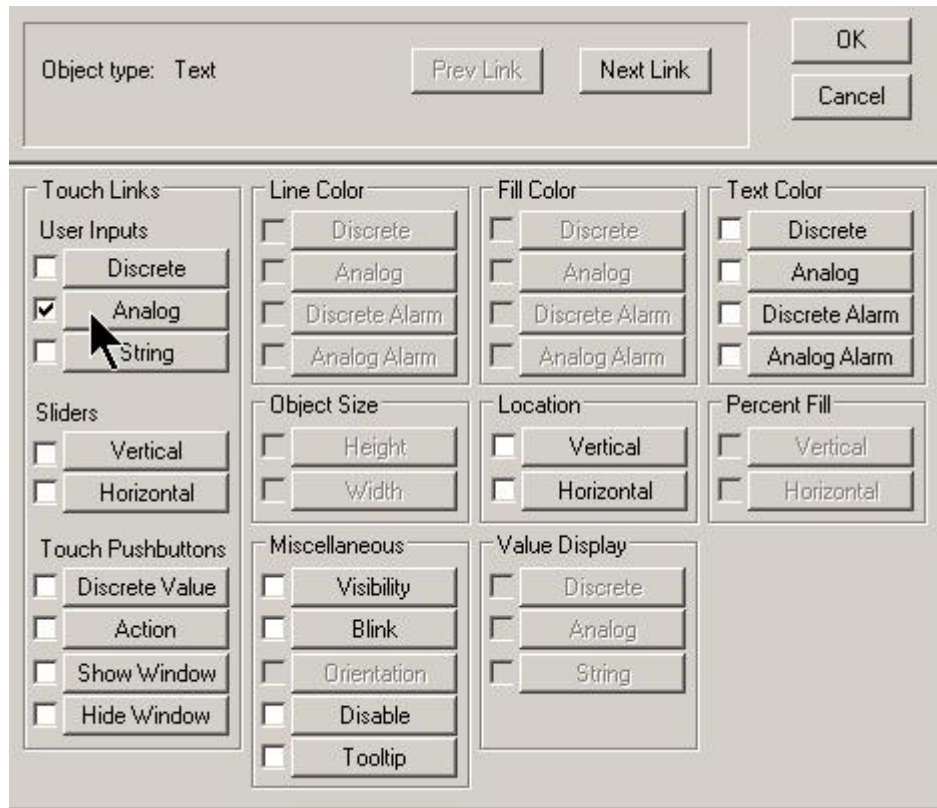


Figure 19-A  
Text Animation Link Window

In the Touch Links -> User Inputs region check the Check Box to the left of Analog.

This object will be configured to change the Timer Preset value in the PLC Project file.

Click the Analog button listed under User Inputs to open Input -> Analog Tagname window. - See Figure 20-A

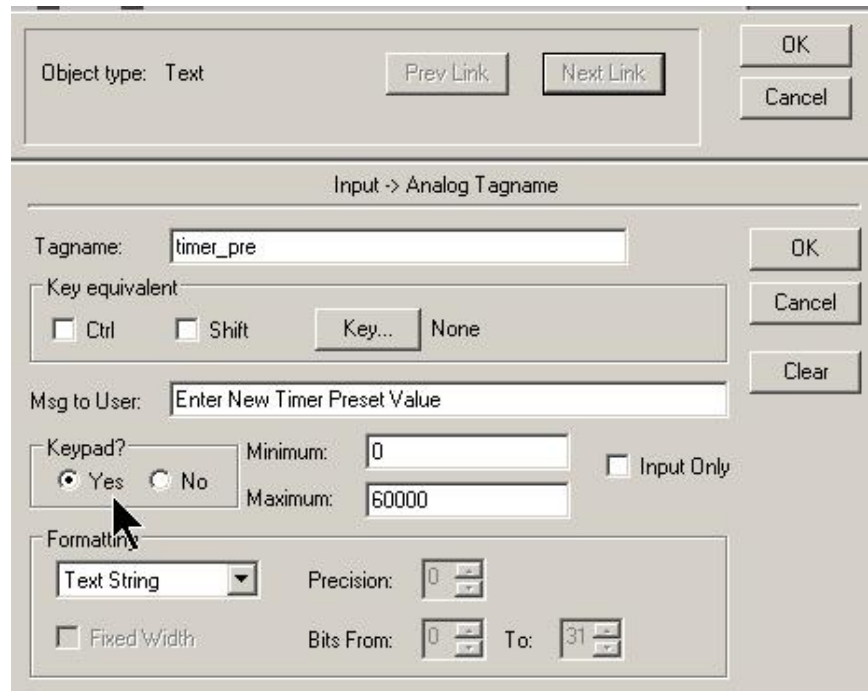


Figure 20-A  
Input -> Analog Tagname Window

Enter Tagname timer\_pre

Note: InTouch tagnames cannot contain period character (.).

Keypad? - click Yes radio button

Modify Minimum and Maximum as shown

Msg to User: Enter message as shown

Click either of the OK buttons on Input -> Analog Tagname Window.

Click OK button on Tagname Undefined window to define the timer\_pre tag

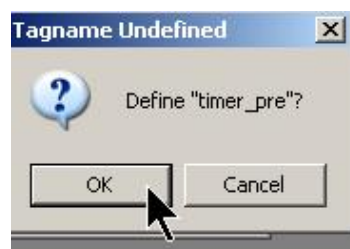


Figure 21-A  
Tagname Undefined Window

Change the tag Type to I/O Integer

Note: Currently Memory Real

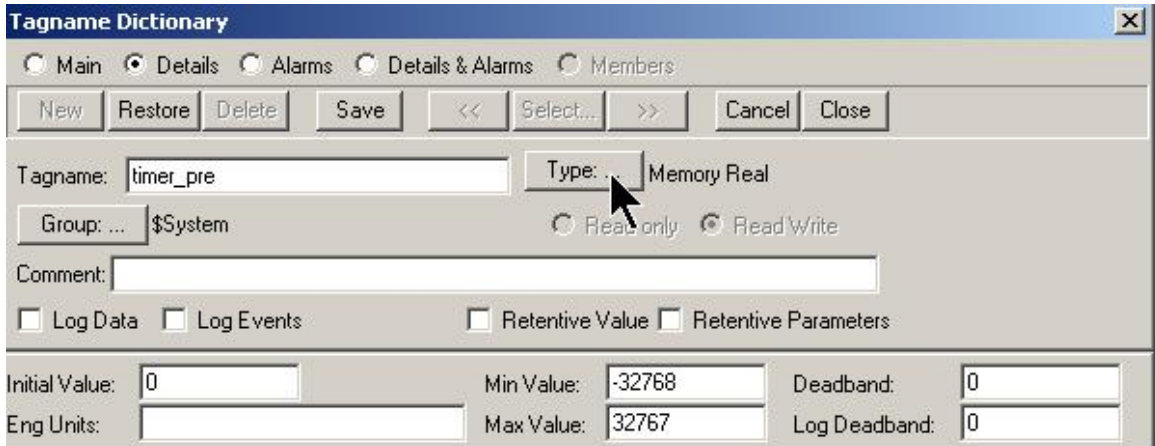


Figure 22-A  
Tagname Dictionary Window

Select I/O Integer on Tag Types window.

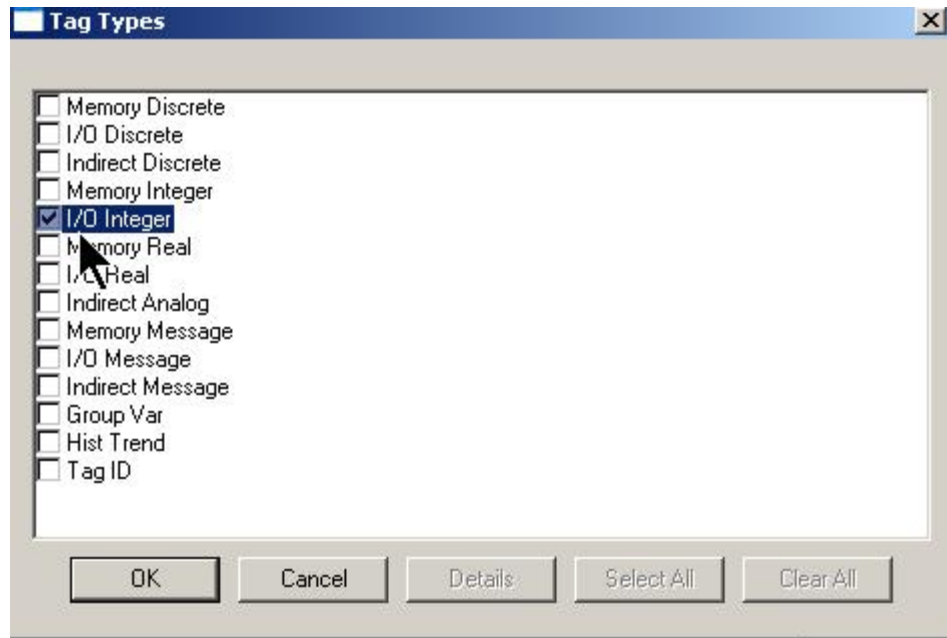


Figure 23-A  
Tag Types Window

Click the OK button on Tag Types window



Returns to Tagname Dictionary window.

Click the Access Name button on Tagname Dictionary window.  
Select PLC from Access Names window.

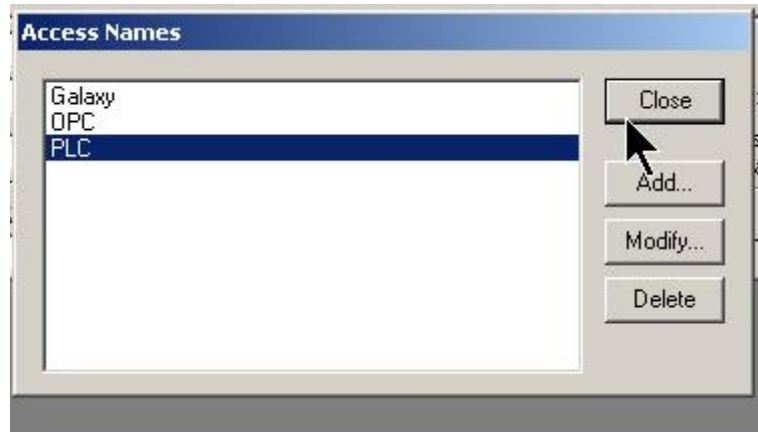


Figure 24-A  
Access Names Window – Select PLC

Click the Close button to return to Tagname Dictionary window.

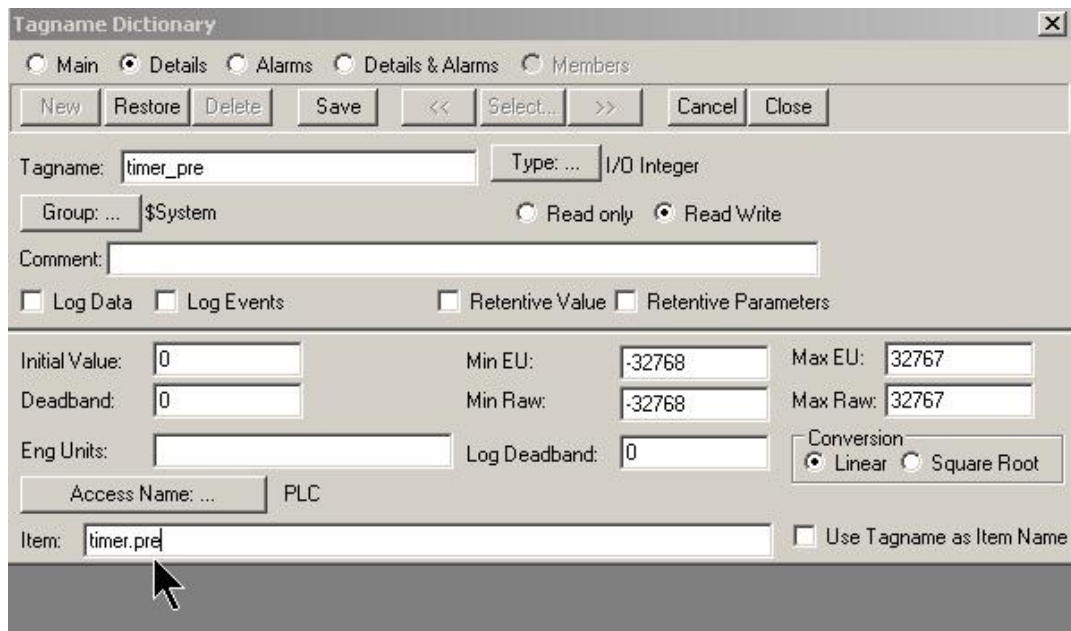


Figure 25-A  
Tagname Dictionary Window – Enter Item

In the Item Entry Box type timer.pre

timer.pre is the tag in the ControlLogix processor that will exchange data with the timer\_pre in the InTouch application.

Click Save – Click Close buttons on Tagname Dictionary window

timer\_pre tag in the InTouch application is configured to exchange data with timer.pre tag in the ControlLogix processor

14. Add a second Number field to InTouch application window.

Double click the second Number field to open the Text Animation Link window.

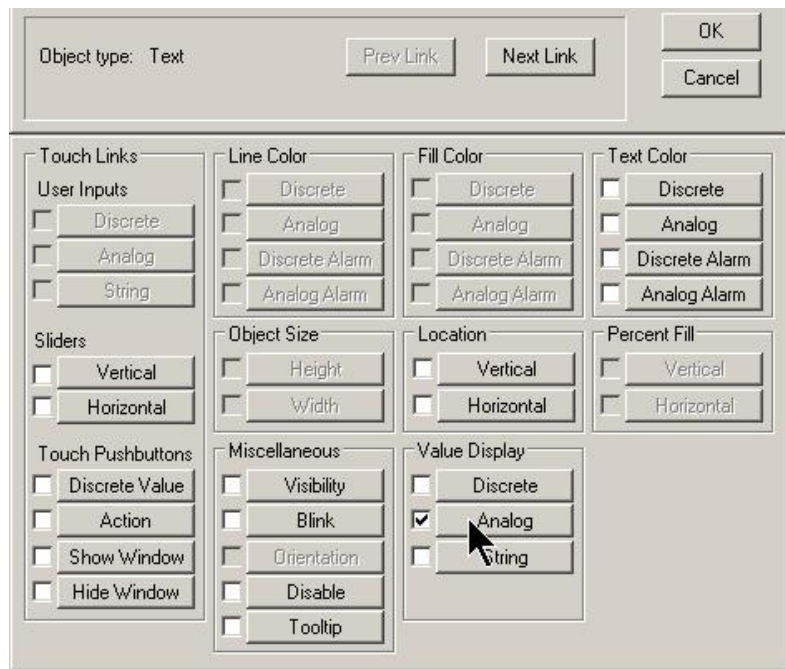


Figure 26-A  
Animation Links Second Number Field Object

In the Value Display region – select Analog

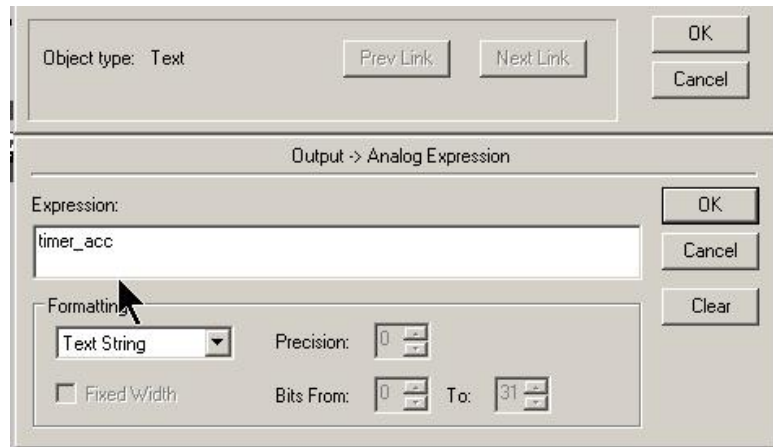


Figure 27-A  
Animation Links Second Number Field Object

In the Expression Entry box – enter timer\_acc – Click either of the OK buttons.

This Number field object will monitor the ControlLogix’s timer’s accumulated value tag –timer.acc

Click OK on Tagname Undefined window to define the timer\_acc tag.

Configure the timer\_acc tag as shown in Tagname Dictionary window.

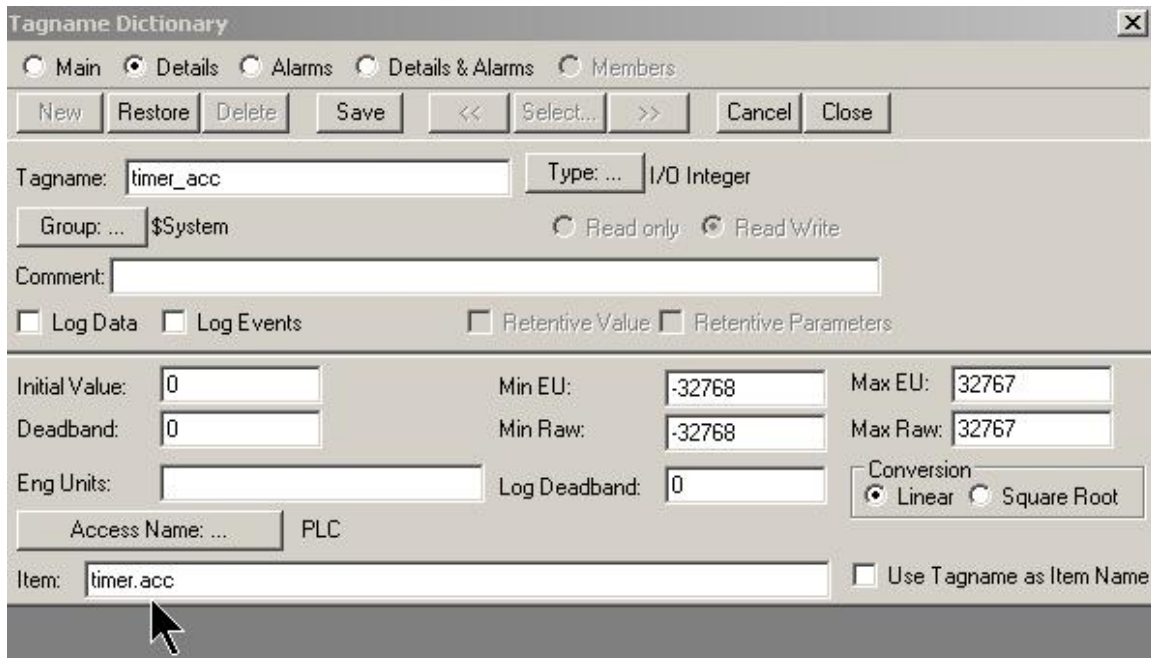


Figure 28-A  
Tagname Dictionary Window – timer\_acc Tag

timer\_acc tag in the InTouch application is configured to exchange data with timer.acc tag in the ControlLogix processor

Click Save – Click Close buttons on Tagname Dictionary window

15. Add two (2) wizard Light Panel objects to the InTouch application window.

One of the Light Panel objects will monitor the status of the PL7 pilot light on the ControlLogix Demo Board

The other Light Panel object will monitor the status of the Timer Timing Bit of the Timer.

Double click on one of the Light Panel objects to view Properties

Configure the Light Panels Properties' as shown in Figure 29-A

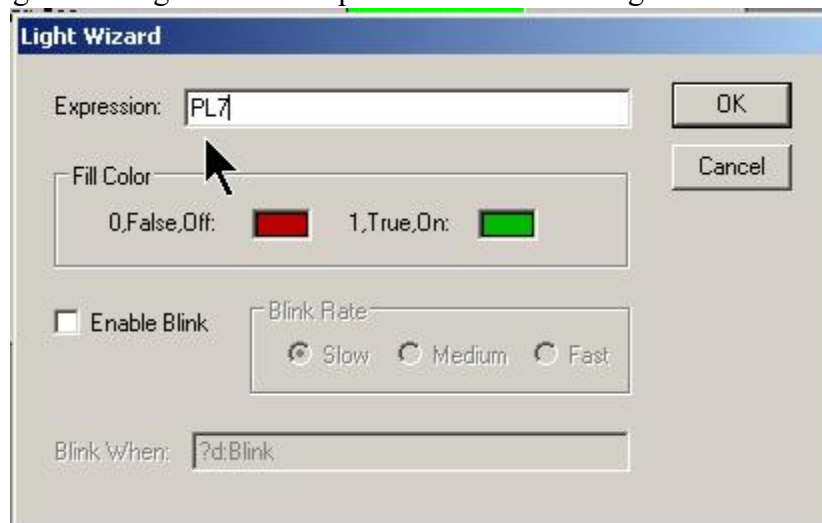


Figure 29-A  
Light Panel Properties Window

Enter PL7 in Expression Entry Box

Note: PL7 is tag for ControlLogix output on Rung 1.

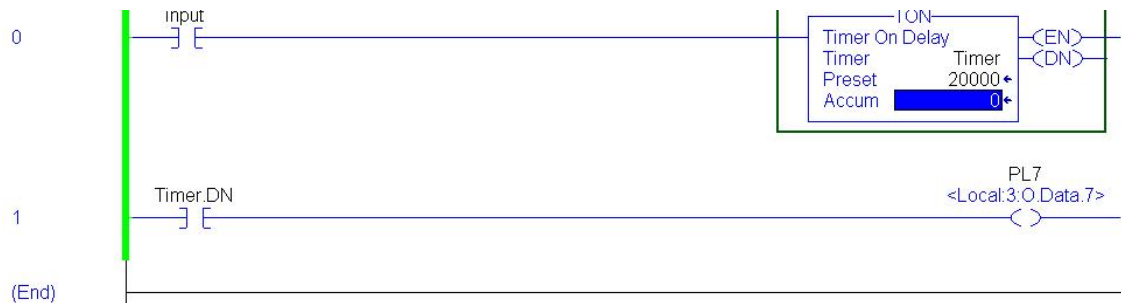


Figure 30-A  
ControlLogix Ladder Logic

Click OK on the Light Wizard window.

Click OK on Tagname Undefined window to define the PL7 tag.

Configure the PL7 tag as shown in Tagname Dictionary window

See Figure 31- A

Note: PL7 is an alias tag – Its base tag is Local:3:0.Data.7  
Local:3:0.Data.7 could be monitored in place of PL7

All tags in the ControlLogix processor that are exchanging data with InTouch tags are required to be Controller Scoped tags

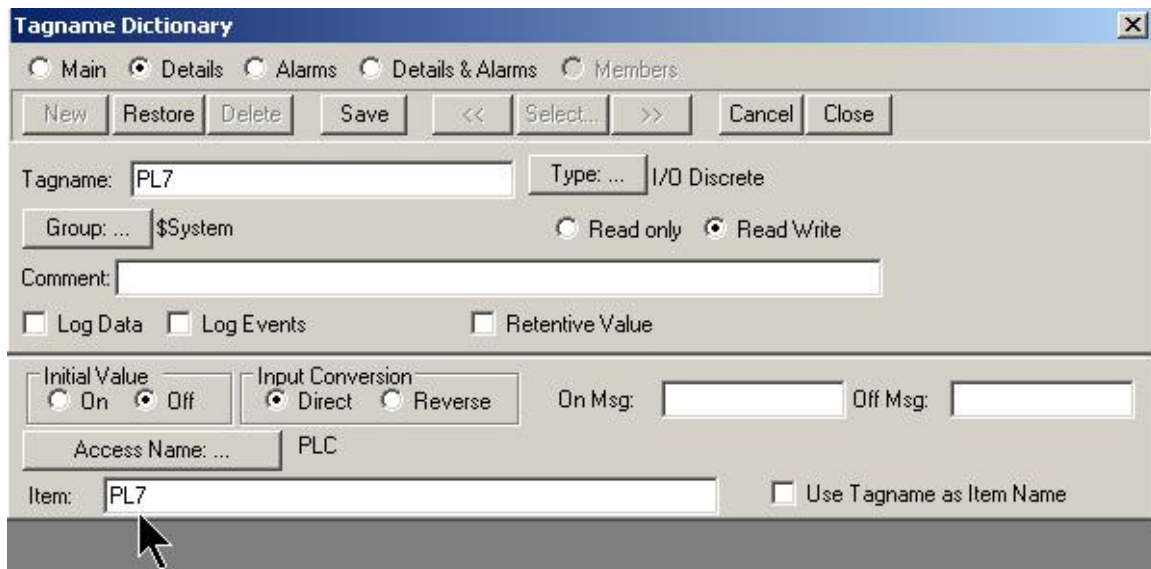


Figure 31-A  
PL7 Tag – Tagname Dictionary

Click Save – Click Close buttons on Tagname Dictionary window

Double click the second Light Panel object to view Properties

Configure the Light Panels Properties' as shown in Figure 32-A

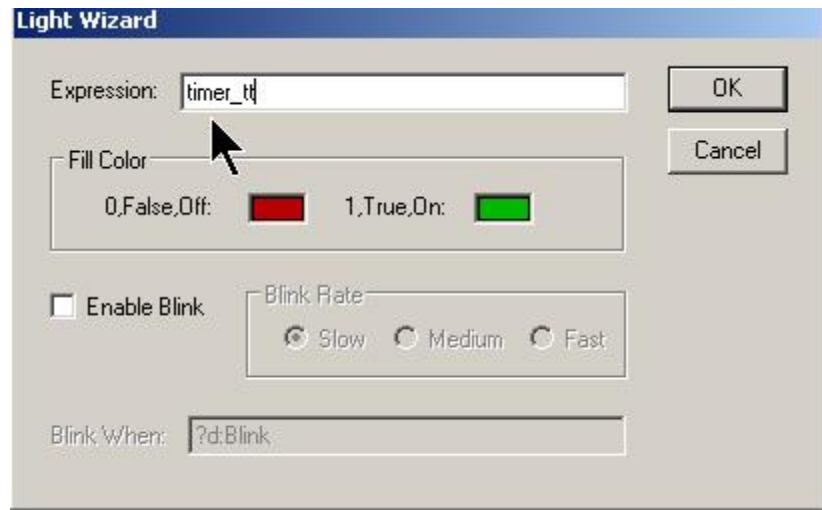


Figure 32-A  
Second Light Panel Properties Window

This Light Panel object will monitor the Timer Timing Bit of the Timer on Rung 0 of The ControlLogix's Ladder File

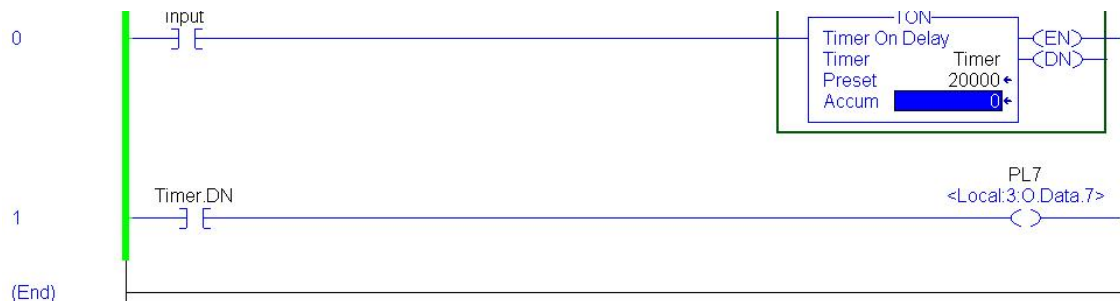


Figure 33-A  
ControlLogix Ladder Logic

Even though the timer.tt tag does not appear in the Ladder Logic file, it is listed the ControlLogix's Controller Tags

Scope: test2117		Show...	Show All		
Name	Alias For	Base Tag	Data Type	Style	
input			BOOL	Decimal	
+ 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		
PL7	Local:3:O.Data.7	Local:3:O.Data.7	BOOL	Decimal	
- Timer			TIMER		
+ Timer.PRE			DINT	Decimal	
+ Timer.ACC			DINT	Decimal	
- Timer.EN			BOOL	Decimal	
- Timer.TT			BOOL	Decimal	
- Timer.DN			BOOL	Decimal	

Figure 34-A  
ControlLogix – Controller Tags

Click OK on the Light Wizard window – See Figure 32-A.

Click OK on Tagname Undefined window to define the timer\_tt tag.

Note: InTouch tagnames cannot contain period character (.).

Configure the timer\_tt tag as shown in Tagname Dictionary window

See Figure 35- A

The screenshot shows the 'Tagname Dictionary' window with the following configuration for the 'timer\_tt' tag:

- Tagname: timer\_tt
- Type: I/O Discrete
- Group: \$System
- Read/Write: Read Write (selected)
- Log Data:  Log Events:  Retentive Value:
- Initial Value: Off (selected)
- Input Conversion: Direct (selected)
- On Msg: [ ] Off Msg: [ ]
- Access Name: PLC
- Item: timer.tt
- Use Tagname as Item Name:

Figure 35-A  
timer\_tt Tag – Tagname Dictionary

Click Save – Click Close buttons on Tagname Dictionary window

Add Text Labels to identify application window objects

Finished window one should look similar to Figure 36-A

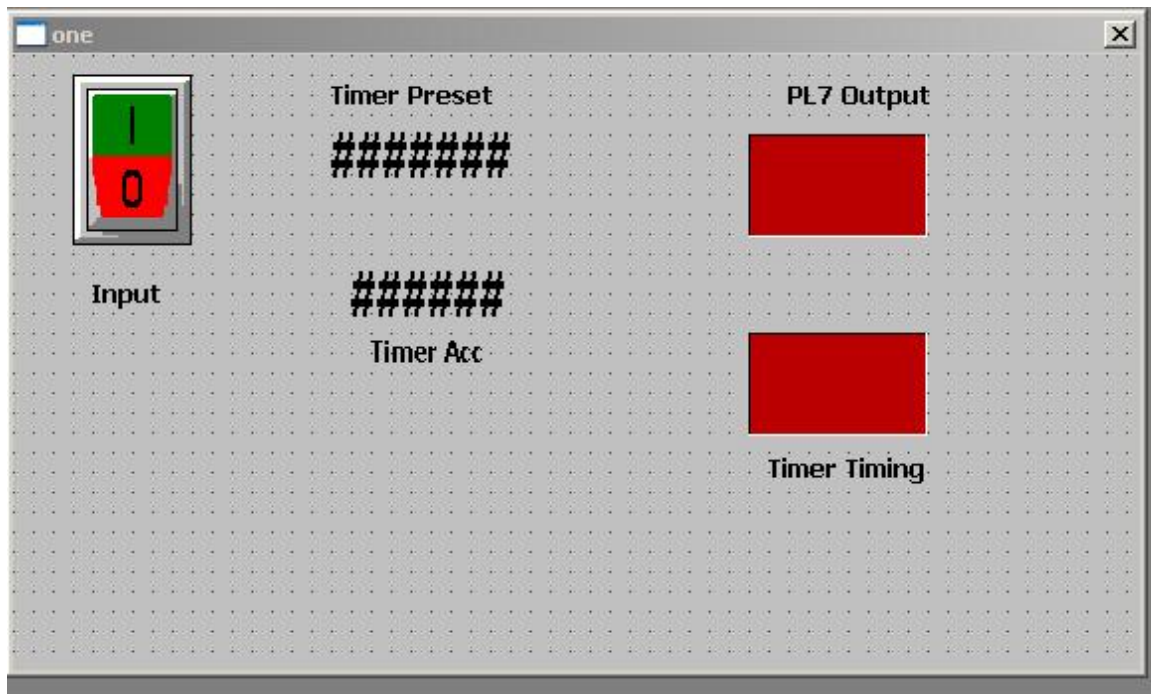


Figure 36-A  
Completed Window one

16. Test the application – Click Runtime button –



Figure 37-A  
WindowMaker Runtime Button

Click Rocker Switch object – verify Timer in ControlLogix processor is running.

input contact at Rung 0 will change states when toggling the Rocker Switch object on InTouch application window.



Number fields should show values of ControlLogix's Timer instruction at Rung 0.

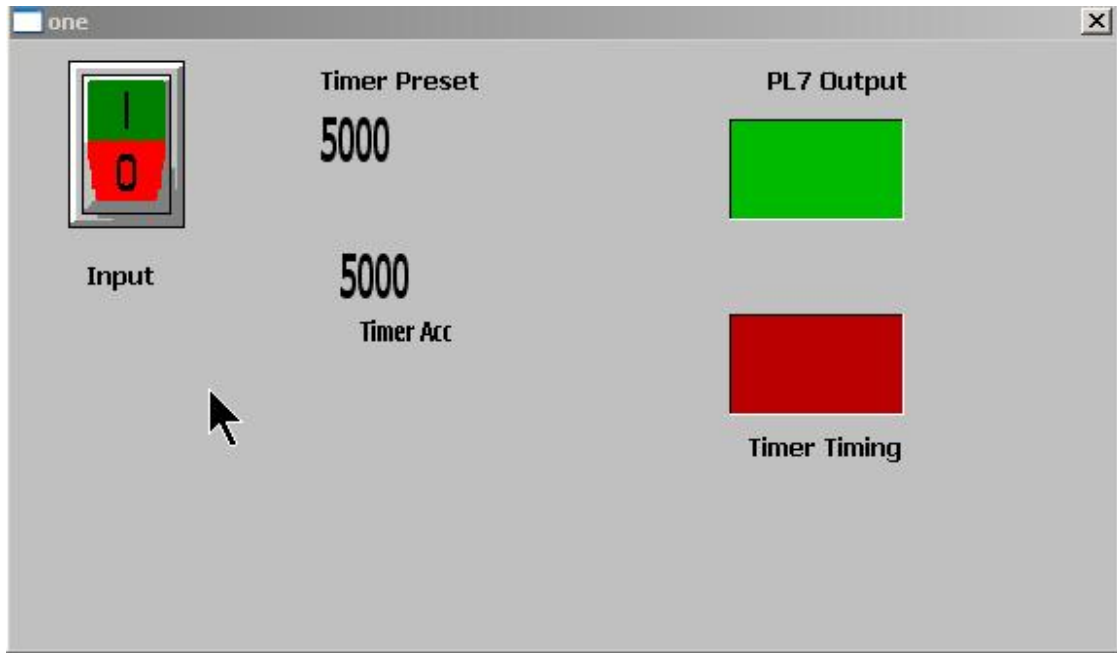


Figure 38-A  
WindowViewer – Application Window

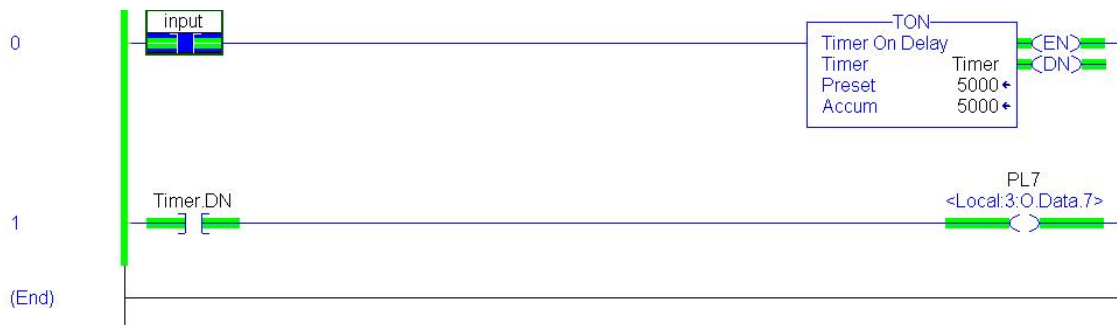


Figure 39-A  
ControlLogix Ladder File

Click the Number field object for the Timer Preset value  
Data Entry Keypad shows on the window.

The image shows a software dialog box titled "Enter New Timer Preset Value". It contains several fields and a keypad. The "Current Value" is 5000, "Minimum Value" is 0, and "Maximum Value" is 60000. A "New Value" input field contains the number 20000. Below the input field is a numeric keypad with buttons for digits 0-9, a decimal point, and a left arrow. At the bottom are "OK" and "Cancel" buttons. A mouse cursor is pointing at the "OK" button.

Enter New Timer Preset Value			
Current Value:	5000		
Minimum Value:	0		
Maximum Value:	60000		
New Value:	<input type="text" value="20000"/>		
7	8	9	<---
4	5	6	
1	2	3	
.	0	.	
OK		Cancel	

Figure 40-A  
Data Entry Keypad

Msg to User on top of Keypad window

Note: Minimum / Maximum Value Limits

Type in the value of 20000

Click the OK button on bottom of Keypad

Timer Preset value on application window changes value

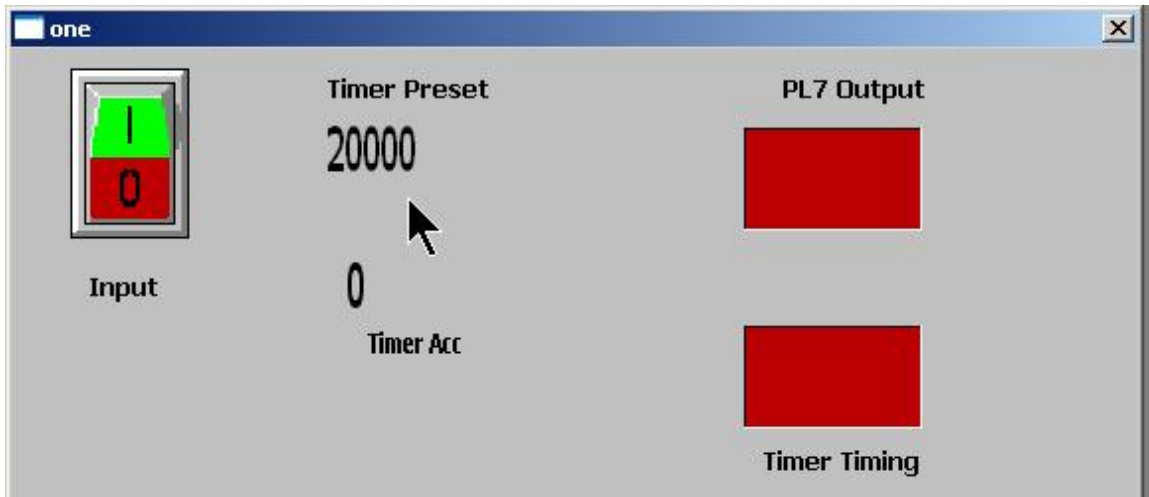


Figure 41-A  
Modified Timer Preset Value

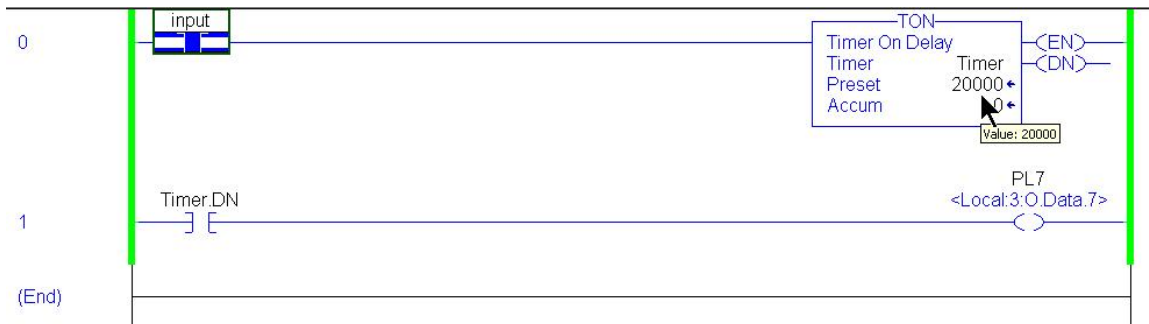


Figure 42-A  
ControlLogix Ladder File

Note: At Rung 0 - TON Preset value = 20000

Note: If a value is enter from the Keypad that is out-of-range the following WindowViewer window appears.



Figure 43-A  
Out-Of-Range Value Entered

Out-Of-Range value not sent to PLC - Click OK button to close Window.  
Navigate to RSLinx

From RSLinx menu Toolbar – Click DDE/OPC

Select Active Topics/Items



Figure 44-A  
RSLinx DDE/OPC -> Active Topics/Items

Active DDE/OPC -> Active Topics/Items List window shows

Topic – InTouch

ControlLogix Items exchanging data

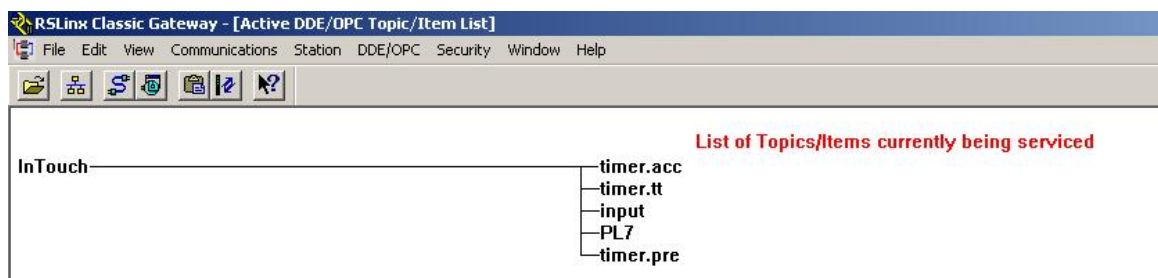


Figure 45-A  
Active DDE/OPC -> Active Topics/Items List Window

Return to WindowViewer

Click Development button to return to Window Maker window

Save application window.

## Review Questions

1. T F Topics are configured in InTouch .
2. Which version of RSLinx will not work with Wonderware
  - a) Linc Lite
  - b) Linc Gateway
  - c) Linc Professional
  - d) Linc OEM.
3. DDE topic configuration are set-up in
  - a) RSLogix / Studio 5000.
  - b) RSLinx.
  - c) InTouch
  - d) Wonderware
4. T F Timer.dn is a valid InTouch tag
5. To access information from a PLC, the Wonderware InTouch tag type is:
  - a) Memory Discrete
  - b) Indirect Analog.
  - c) Memory Integer
  - d) All the Above
  - e) None of the Above

6.    T    F    The application name in the Access Name Screen will be rslinx when using RSLinx to connect Wonderware InTouch to a ControlLogix processor.
7.    T    F    ControlLogix tags can be Program / Local Scoped to exchange data to a Wonderware InTouch application .
8.    T    F    The item in the InTouch Tag Name Dictionary matches the tag Name in the ControlLogix's Controller Tag Database.
9.    T    F    Wonderware InTouch can monitor a ControlLogix output tag
10.   A DDE link consists of which components :
  - a)   Application .
  - b)   Topic
  - c)   Item
  - d)   All the above.

## Review Questions Answers

- 1) F
- 2) a
- 3) b
- 4) F
- 5) e
- 6) T
- 7) F
- 8) T
- 9) T
- 10) d

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