This document covers the installation and use of an Add on Instruction (AOI) for the Logix Designer software package from Rockwell Automation. This AOI handles gathers and displays the data from a site survey from a Banner Wireless radio system. The Banner wireless system continues to handle IO while a site survey is running.

**NOTE:** The default program has to be installed in the DXM units (209068.xml for DXM700 or 194730.xml for DXM100).

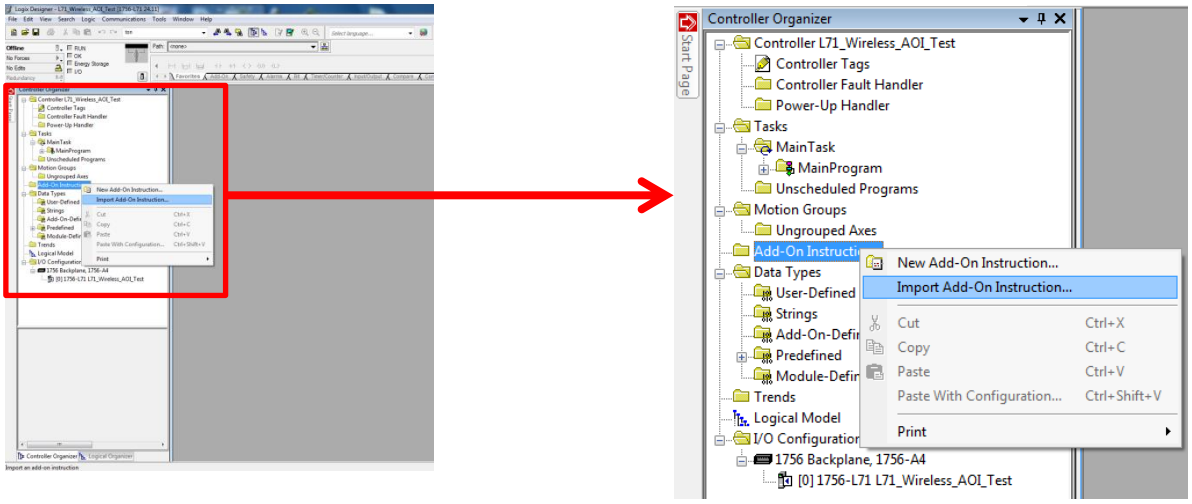
## Components

Banner Wireless Site Survey v1_2.L5X

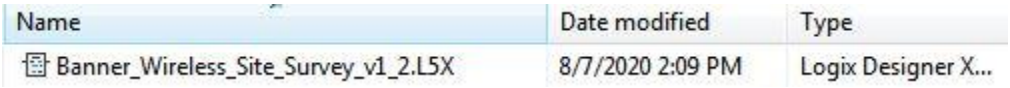
## Installation Process

This section describes how to install the Input and Output AOIs into Logix Designer software.

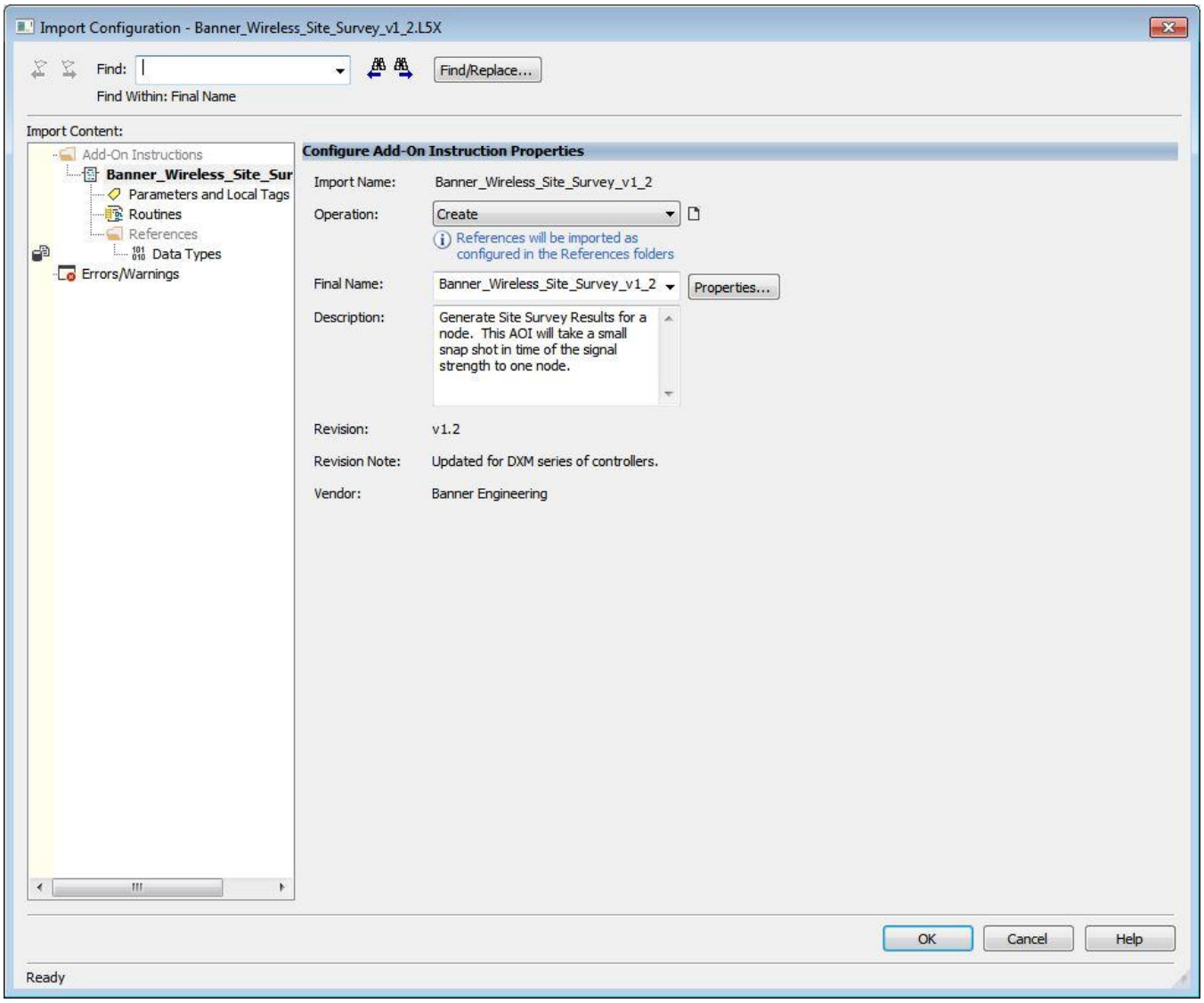
1. Open up a project.
2. Right click on the Add-On Instruction folder in the Controller Organizer window. Select the Import Add-On Instruction option.



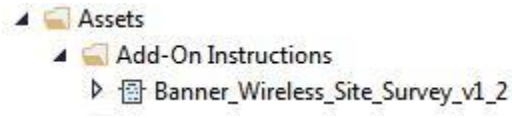

3. A standard windows selection box will appear. Navigate to the correct file location. Two L5X files should be present. One is for the Input and the other is the Output AOI. Select the Banner_Wireless_Site_Survey_v1_2.L5X file. Then click the Ok button. This is for the Input AOI.



4. The Import Configuration window will pop up. The default selection will create all of the necessary items for the AOI. Press the OK button to complete the import process.




5. The following items should appear in the associated areas. Example shows the location in Version 32 of Logix.



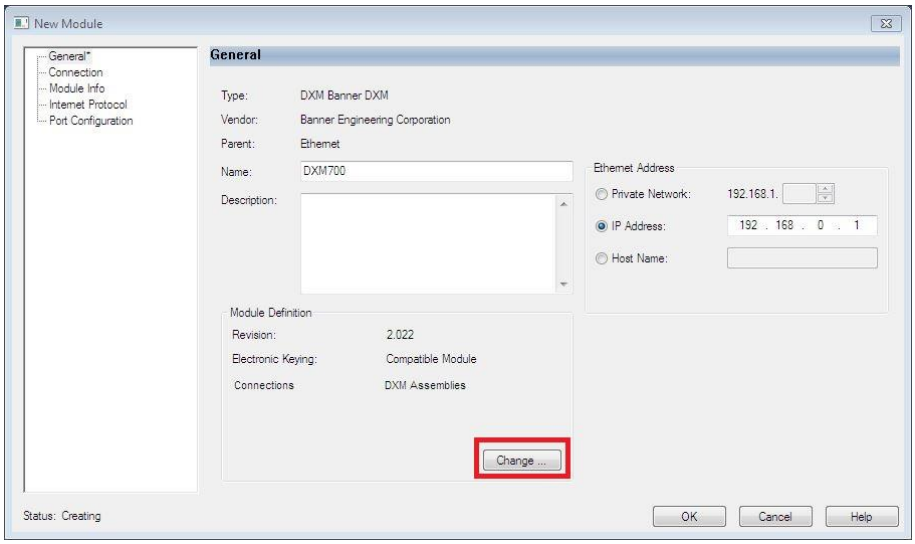
## Site Survey AOI – Create an EtherNet/IP Connection

First create an EtherNet/IP Class 1 (cyclic I/O) connection to a DXM device.

1. Download the EDS file from the Banner website and install it in the Logix Designer software.

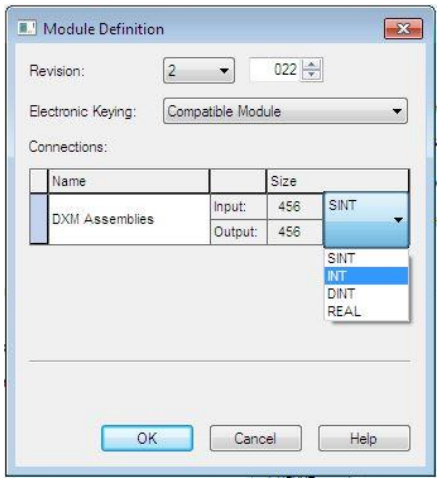
2. Right click on the Ethernet adapter in the PLC and choose “Add New Module”. Search for ‘DXM’ in the Select Module Type window.

3. Give the module and name (this example uses DXM700) and enter the IP address of the device (192.168.0.1 is the default IP address for DXMs).




4. Click on the “Change” button in the Module Definition area of the New Module window (see box above, in red).

5. Select “INT” as the data type. Then click “Ok”, then “Yes”, then “Ok”.

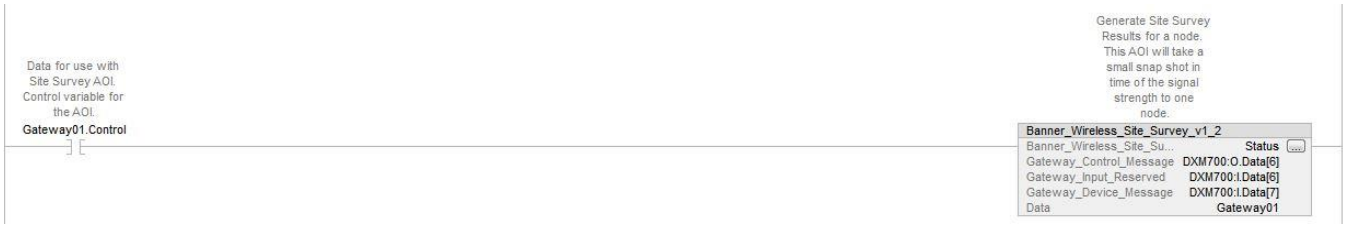


6. If you look in the controller tags you should see an input and output data array associated with the name selected in step 3, above. Here the name DXM700 was used, and the tag arrays appear as seen below.

| Name | Value | Force Mask | Style | Data Type |
|---|---|---|---|---|
| DXM700:I | {...} | {...} | | _000C:DXM_6E42DE20:I:0 |
| DXM700:O | {...} | {...} | | _000C:DXM_4FD940B9:O:0 |

## Site Survey AOI – How to Configure

1. Now add an instance of the Banner Site Survey AOI to your ladder logic program.




2. Tags need to be associated with each of the five question marks in the AOI.
    a. **Banner_Wireless_Site_Survey** is linked to a new variable that will store the status of the AOI. Right click on the question mark, select New Tag, and give it a name. This example uses the name “Status”.
    b. **Gateway_Control_Message** is linked to the portion of the EIP Output Assembly associated with the Gateway’s Control Message Register. Assuming the default XML program is loaded on the DXM, this should be linked to word 6 of the EIP Output Assembly (DXM700:O.Data[6]).
    c. **Gateway_Input_Reserved** is linked to the portion of the EIP Input Assembly associated with the Gateway’s Reserved Register. Assuming the default XML program is loaded on the DXM, this should be linked to word 6 of the EIP Input Assembly (DXM700:I.Data[6]). Red and Retry totals are stored in this location.
    d. **Gateway_Device_Message** is linked to the portion of the EIP Input Assembly associated with the Gateway’s Device Message Register. Assuming the default XML program is loaded on the DXM, this should be linked to word 7 of the EIP Input Assembly (DXM700:I.Data[7]). Green and Yellow totals are stored in this location.
    e. **Data** is linked to a new variable that will use a UDT to display the results of the site survey as well as some control tags for the AOI. Right click on the question mark, select New Tag, and give it a name. This example uses the name “Gateway01”.

3. Add an Examine On instruction before the AOI, on the same rung. Link this to the Control tag located inside of the Data element. In this example the Examine On should be linked to Gateway01.Control. This bit is activated when the AOI is running. After the data is collected the AOI will turn this bit off automatically.

4. AOI configuration is now complete. Download the program to the PLC and go to Run mode to continue.

## Site Survey AOI – How to Use

1. The AOI is controlled via the Control bit inside the **Data** tag array of the AOI.

2. In this example, the **Data** tag array was given the name “Gateway01”, so the Control bit is Gateway01.Control.

| Gateway01 | {...} |
|---|---|
| Gateway01.Node | 0 |
| Gateway01.Node_Type | 0 |
| Gateway01.Result_Green | 0 |
| Gateway01.Result_Yellow | 0 |
| Gateway01.Result_Red | 0 |
| Gateway01.Result_Retry | 0 |
| Gateway01.Control | 0 |

3. Enter in the Node number (1 through 47) and the Node Type (0 for a line powered unit and 1 for a battery powered unit) for the node to be examined in the Site Survey.

4. Set the Control tag to 1 to activate the routine. After the routine is complete the Control tag will automatically be set back to 0.

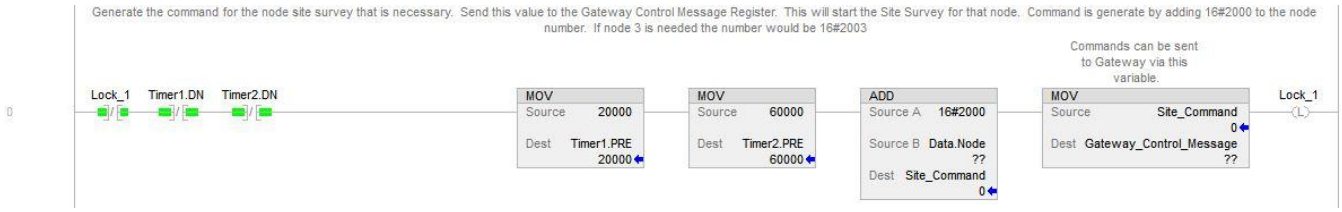
5. Check out the Result tags. As seen below, Node 1 (line powered) generated a Site Survey result of Green: 92, Yellow: 0, Red: 0, Retry: 8. The site survey results display as green, yellow, red, and missed packets. Green indicates the highest signal strength, then yellow, and red. Missed packets were not received.

| Name | Value | Force Mask | Style | Data Type |
|---|---|---|---|---|
| DXM700:I | {...} | {...} | | _000C:DXM_6E42DE20:I:0 |
| DXM700:O | {...} | {...} | | _000C:DXM_4FD940B9:O:0 |
| Gateway01 | {...} | {...} | | Banner_Site_UDT |
| Gateway01.Node | 1 | | Decimal | INT |
| Gateway01.Node_Type | 0 | | Decimal | INT |
| Gateway01.Result_Green | 92 | | Decimal | INT |
| Gateway01.Result_Yellow | 0 | | Decimal | INT |
| Gateway01.Result_Red | 0 | | Decimal | INT |
| Gateway01.Result_Retry | 8 | | Decimal | INT |
| Gateway01.Control | 0 | | Decimal | BOOL |

6. Repeat steps 3 through 5 for all nodes, as necessary.

# Appendix A

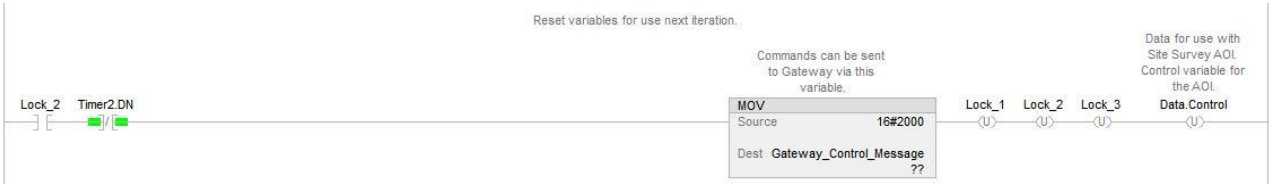
1. This section will go over the AOI one rung at a time.
    a. Rung 0 calculates the number needed to activate the site survey result for a particular node. This is moved into the Gateway's Control Message register. As soon as this happens the gateway will start doing a site survey to the requested node.




    b. The next run starts a timer. This timer is used to delay the rest of the routine 10 or 60 seconds. It 10 second timer is for line powered units, while the 60 seconds is for battery powered units.


    c. This rung waits until 10 or 60 seconds have expired. Next all of the data is converted from the Gateway Reserved and Device Message registers. This information is than stored in the Results tags.


d. The last rung resets the variables used for the routine and turns off the completed tag. This is an optional tag to control when the routine is active.




e. Explanation of AOI complete.