FieldServer

Technologies

SlotServer Supplement

LonWorks Open Profile

APPLICABILITY & EFFECTIVITY

This manual is a supplement to the SlotServer Startup Guide and Configuration Manual and provides instructions for the following FieldServer products:

<u>Description</u>

PS56-LON-000   FieldServer

Effective for all systems manufactured after January 2011

Kernel Version:	5.21
Document Revision:	1

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ProSoft Technology, Inc. is the exclusive provider of FieldServer SlotServers.

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1   INTRODUCTION

1.1   About this product

The SlotServer Start-Up Guide covers information for installing the SlotServer. Depending on the SlotServer Module ordered, supplementary Driver manuals provide information on how to configure the third party protocols residing in the SlotServer.

The SlotServer Configuration Manual provides the information necessary to configure the SlotServer, allowing an Allen Bradley ControlLogix platform to pass data between a ControlLogix CPU and other third party communications protocols supported by the SlotServer.

This manual is a supplement to the general Configuration Manual and describes the parameters needed for LonWorks configuration as well as the Open Profile supplied with this product.

1.2   About LonWorks™ and Profiling

Inherent to the design of LonWorks is the intention that all nodes residing on a LonWorks network possess a profile which accurately describes the network variables available to the LonWorks network. This profile is declared to the LonWorks network by means of an External Interface File (XIF). This XIF remains unchanged for any particular profile. In other words, a change in the XIF is by definition a new profile.

The SlotServer LonWorks Open Profile provides a generic list of SNVT's that can be used to bind the most common LonWorks data types to the SlotServer for data transfer. This document describes this fixed Open Interface profile for the SlotServer. Note that as a LonMark compatible product, the SlotServer platform is also capable of supporting other profiles. For further information, please contact FieldServer Technologies.

1.3   Connection Capability

SlotServer Mode	LonWorks Nodes	Comments
Implicit	15	As an implicitly bound object in LonWorks, the LonWorks protocol supports the binding of active variables in this deviceto a maximum of 15 other Nodes.

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2   PRE-STARTUP CHECKLIST

2.1   Accessories supplied with the SlotServer

Refer to the SlotServer Start-up Guide.

The required XIF file is located on the supplied USB drive in the Property Files folder.

There are 2 ACD files, one for the simple example, and one for the Multiplexing example on the supplied USB drive in the Property Files folder .

2.2   Third party components (not supplied by FieldServer Technologies)

The following minimum componentry is required to achieve a LonWorks/ControlLogix integration.
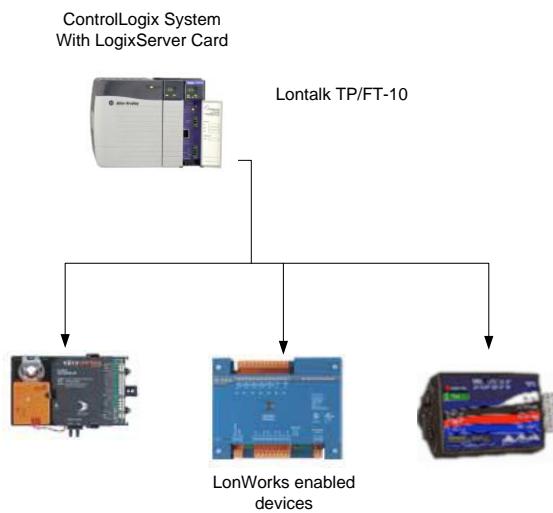
- LonWorks NetWork Manager (e.g: LonMaker)
- LonWorks Network components.

2.3   Required configuration for the SlotServer

In order to achieve data transfer between CPU tags and LonWorks network variables, the SlotServer will need to be commissioned into a LonWorks network using a LonWorks Network Manager. Once commissioned and bound, data from the LonWorks network is accessed by I/O image transfer in the ControlLogix CPU.

3   SLOTSERVER TOPOLOGY

The diagram below shows a typical implementation of the SlotServer LonWorks Open Profile

ControlLogix System
With LogixServer Card

Lontalk TP/FT-10

LonWorks enabled
devices

3.1   Hardware Connection Tips / Hints
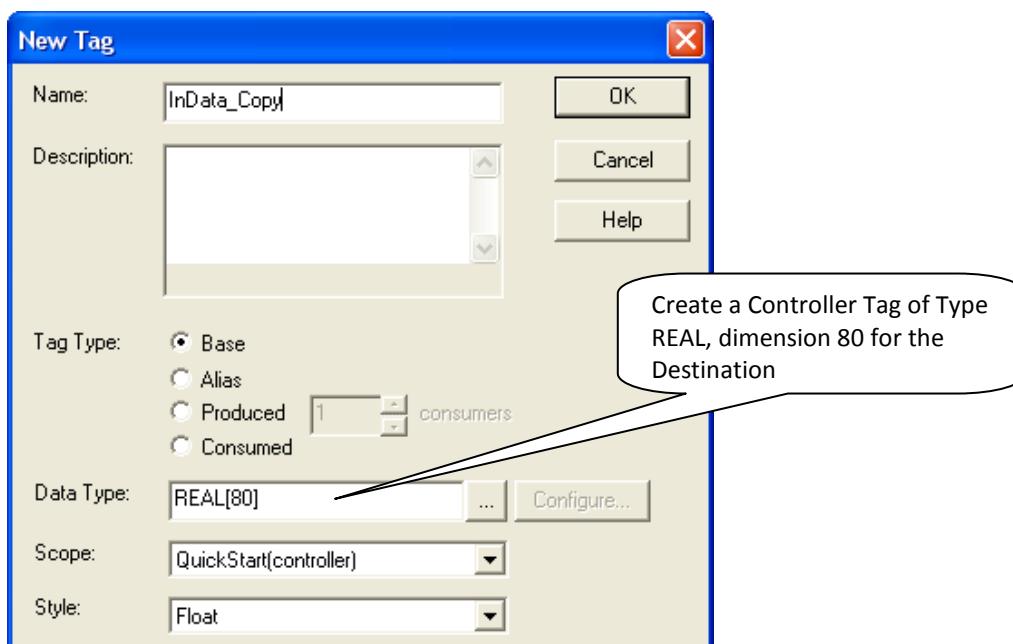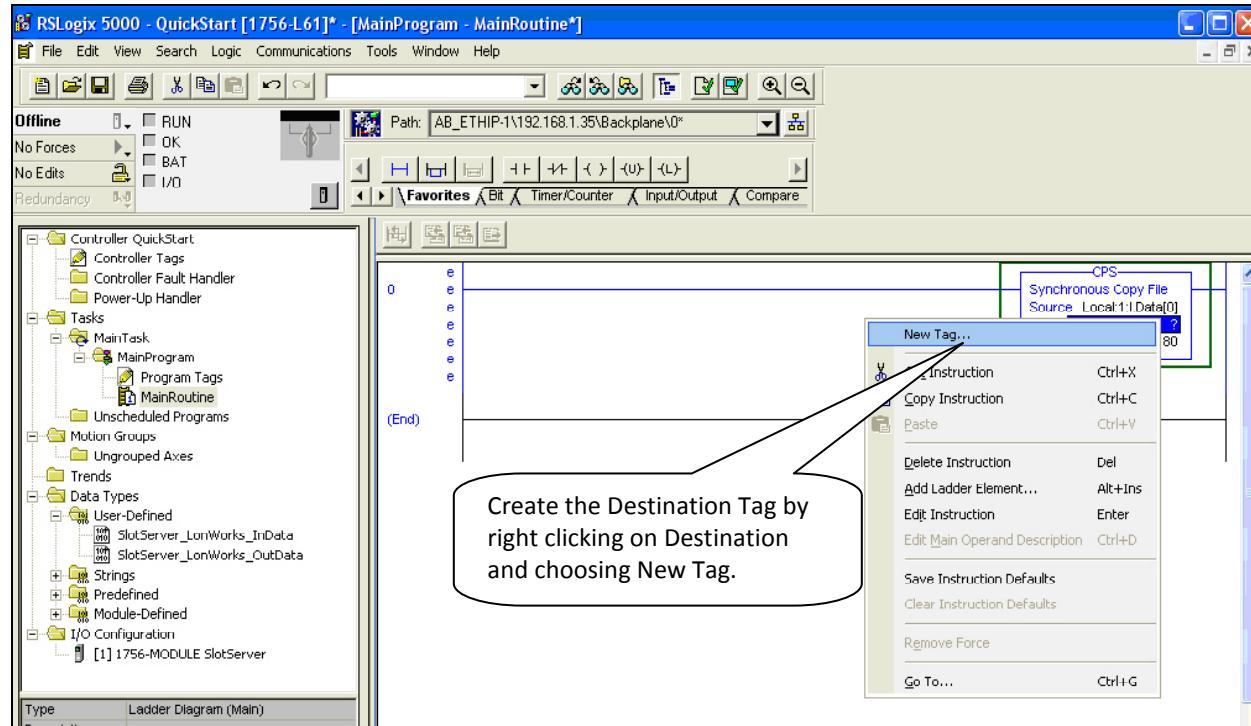
The LonWorks TP/FT-10 medium is polarity insensitive and does not require attention to connection orientation on the pins.

4   COMMISSIONING THE OPEN PROFILE ON THE SLOTSERVER
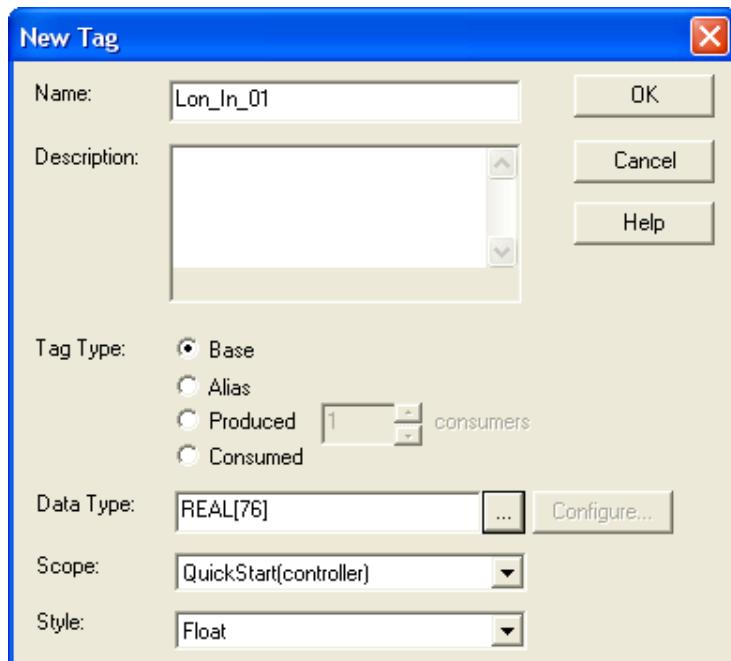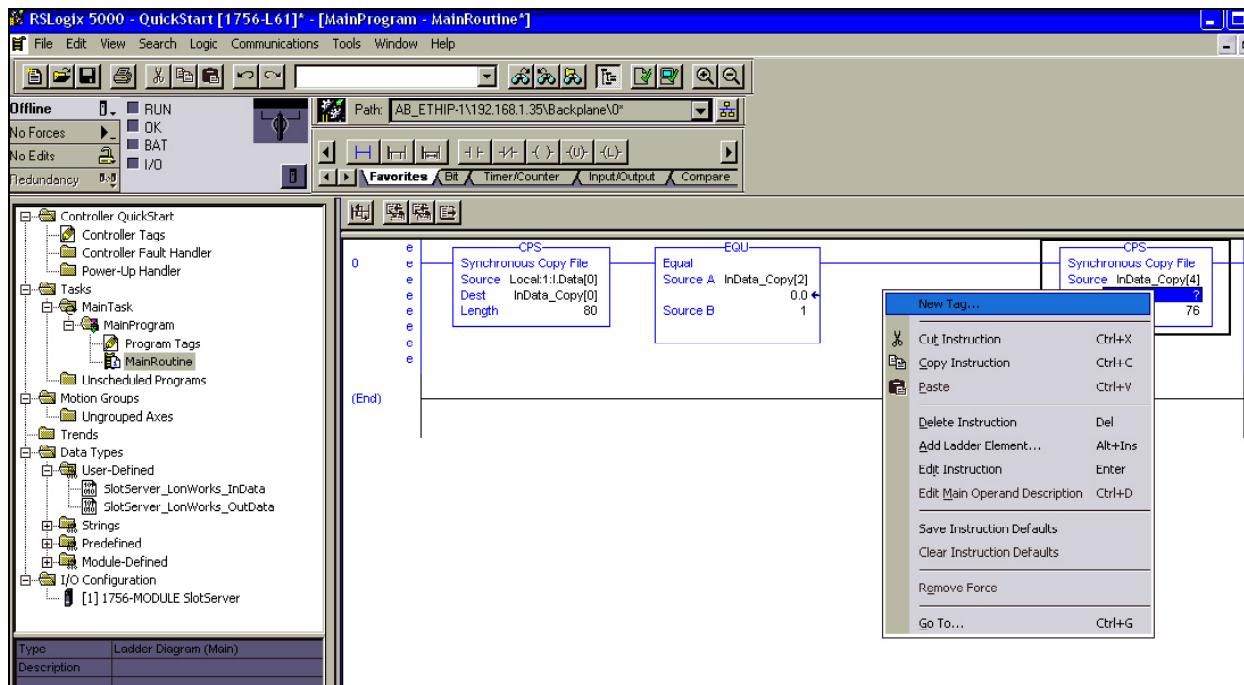
The following steps are necessary to connect LonWorks Data to the PLC CPU via the SlotServer.

4.1   Write Ladder Program to Get LonWorks Input Data
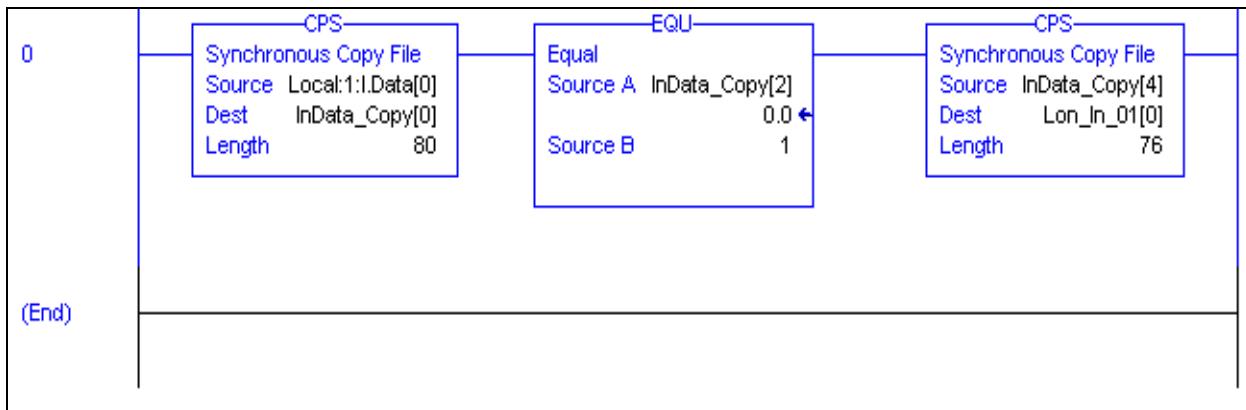
- Add a CPS (Synchronous Copy File) Ladder element to synchronize the incoming Data from the LonWorks network. Use the Input Image Data as Source.

- Add an EQU (Compare if equal) ladder element to check when the first LonWorks data block has been received. The block number is at offset 2 of the input image.

- Finally, add another CPS ladder element to copy the LonWorks Data from the InData_Copy Tag to a new Controller Tag, called Lon_In_01. Also create the Tag by right clicking on Destination and choosing New Tag. The New Tag must be of type REAL and a dimension of 76.

The final ladder program to access data from LonWorks Function Block In[0] is depicted below
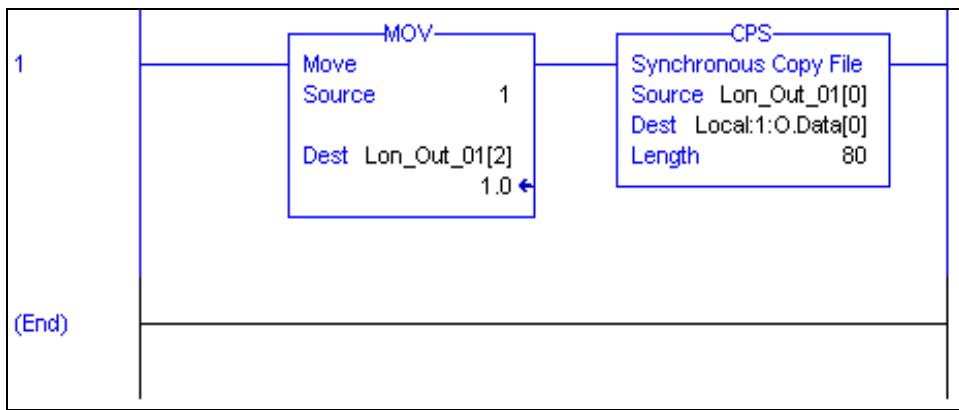
Very Important Note!

To ensure that the input data is from a specific LonWorks Function Block, make a synchronous copy of the input image data before using it.

4.2   Write Ladder Program to Send LonWorks Output Data

This step is only necessary if you need to write data to the LonWorks Network on Function Block Out[0]

- Create a Controller Tag called Lon_Out_01 of type REAL[80].

- Add a new rung to the Ladder program and add a MOV element to move a block number value of 1 into Lon_Out_01[2].

- Finally add a CPS (Synchronous Copy File) element to copy the full Lon_Out_01 tag into the Output Image Tag.

The LonWorks Data are present from Lon_Out_01[4] to Lon_Out_01[79]

A User Defined Data Type can be created to replace the type of Lon_Out_01 mapping the points to LonWorks point names.

Very Important Note!

All Output Image Tag data must be updated once using a Synchronous File Copy element. Attempting to update the block number into the Output Image Tag folowed by the data will cause an asynchronous transfer of data.

4.3   Download the RSLogix Program and Run

Use the Who Active or Communications Path directly to Download and Run the Program on the Controller / CPU.

4.4   Bind LonWorks Variables

The SlotServer's LonWorks Network Variables must be bound to other devices using a Network Management Tool e.g. LonMaker. See Appendix B for more details on the use of a Network Management Tool to make the bindings.

4.5   Interpret the Network Variable Data

LonWorks Input Variable Values can be found in the Lon_In_01 Tag.

Offset	Network Variable Name	SNVT_Type	Offset	Network Variable Name	SNVT_Type
0	nviAmp1	SNVT_amp	35 - 40	nviSetpt1	SNVT_temp_setpt
1	nviAmp2	SNVT_amp	41	nviState1	SNVT_state
2 - 4	nviChlr1	SNVT_chlr_status	42	nviState2	SNVT_state
5	nviCount1	SNVT_count_f	43	nviState3	SNVT_state
6	nviCount2	SNVT_count_f	44	nviState4	SNVT_state
7	nviCtInc1	SNVT_count_inc_f	45 - 46	nviSw1	SNVT_switch
8	nviCtInc2	SNVT_count_inc_f	47 - 48	nviSw2	SNVT_switch
9	nviFlow1	SNVT_flow_f	49 - 50	nviSw3	SNVT_switch
10	nviFreq1	SNVT_freq_hz	51 - 52	nviSw4	SNVT_switch
11	nviHVMod1	SNVT_hvac_mode	53 - 54	nviSw5	SNVT_switch
12 - 18	nviHVSts1	SNVT_hvac_status	55 - 56	nviSw6	SNVT_switch
19	nviLev1	SNVT_lev_cont	57 - 58	nviSw7	SNVT_switch
20 - 21	nviObj1	SNVT_obj_status	59 - 60	nviSw8	SNVT_switch
22	nviOcc1	SNVT_occupancy	61	nviTemp1	SNVT_temp_p
23	nviOcc2	SNVT_occupancy	62	nviTemp2	SNVT_temp_p
24	nviPerc1	SNVT_lev_percent	63	nviTemp3	SNVT_temp_p
25	nviPerc2	SNVT_lev_percent	64	nviTemp4	SNVT_temp_p
26	nviPerc3	SNVT_lev_percent	65	nviTemp5	SNVT_temp_p
27	nviPerc4	SNVT_lev_percent	66	nviTemp6	SNVT_temp_p
28	nviPerc5	SNVT_lev_percent	67	nviTemp7	SNVT_temp_p
29	nviPerc6	SNVT_lev_percent	68	nviTemp8	SNVT_temp_p
30	nviPerc7	SNVT_lev_percent	69 - 71	nviTodEv1	SNVT_tod_event
31	nviPerc8	SNVT_lev_percent	72	nviVltAC1	SNVT_volt_ac
32	nviPPM1	SNVT_ppm	73	nviVltAC2	SNVT_volt_ac
33	nviPress1	SNVT_press	74	nviVolt1	SNVT_volt
34	nviPress2	SNVT_press	75	nviVolt2	SNVT_volt

Table 1: Lon_In_01 Tag Layout.

LonWorks Output Variable Values can be found in the Lon_Out_01 Tag from Offset 4

Offset	Network Variable Name	SNVT_Type	Offset	Network Variable Name	SNVT_Type
0	Protocol Type	Not applicable	37	nviPress1	SNVT_press
1	Node Status	Not applicable	38	nviPress2	SNVT_press
2	Lon Block Number [1-25]	Not applicable	39 - 44	nviSetpt1	SNVT_temp_setpt
			45	nviState1	SNVT_state
3	Reserved	Not applicable	46	nviState2	SNVT_state
4	nviAmp1	SNVT_amp	47	nviState3	SNVT_state
5	nviAmp2	SNVT_amp	48	nviState4	SNVT_state
6 - 8	nviChlr1	SNVT_chlr_status	49 - 50	nviSw1	SNVT_switch
9	nviCount1	SNVT_count_f	51 - 52	nviSw2	SNVT_switch
10	nviCount2	SNVT_count_f	53 - 54	nviSw3	SNVT_switch
11	nviCtInc1	SNVT_count_inc_f	55 - 56	nviSw4	SNVT_switch
12	nviCtInc2	SNVT_count_inc_f	57 - 58	nviSw5	SNVT_switch
13	nviFlow1	SNVT_flow_f	59 - 60	nviSw6	SNVT_switch
14	nviFreq1	SNVT_freq_hz	61 - 62	nviSw7	SNVT_switch
15	nviHVMod1	SNVT_hvac_mode	63 - 64	nviSw8	SNVT_switch
16 - 22	nviHVSts1	SNVT_hvac_status	65	nviTemp1	SNVT_temp_p
23	nviLev1	SNVT_lev_cont	66	nviTemp2	SNVT_temp_p
24 - 25	nviObj1	SNVT_obj_status	67	nviTemp3	SNVT_temp_p
26	nviOcc1	SNVT_occupancy	68	nviTemp4	SNVT_temp_p
27	nviOcc2	SNVT_occupancy	69	nviTemp5	SNVT_temp_p
28	nviPerc1	SNVT_lev_percent	70	nviTemp6	SNVT_temp_p
29	nviPerc2	SNVT_lev_percent	71	nviTemp7	SNVT_temp_p
30	nviPerc3	SNVT_lev_percent	72	nviTemp8	SNVT_temp_p
31	nviPerc4	SNVT_lev_percent	73 - 75	nviTodEv1	SNVT_tod_event
32	nviPerc5	SNVT_lev_percent	76	nviVltAC1	SNVT_volt_ac
33	nviPerc6	SNVT_lev_percent	77	nviVltAC2	SNVT_volt_ac
34	nviPerc7	SNVT_lev_percent	78	nviVolt1	SNVT_volt
35	nviPerc8	SNVT_lev_percent	79	nviVolt2	SNVT_volt
36	nviPPM1	SNVT_ppm			

Table 2: Lon_Out_01 Tag Layout

5   ACCESSING ALL LONWORKS FUNCTION BLOCK DATA

The Quickstart example is for accessing only LonWorks Data in Functional blocks:
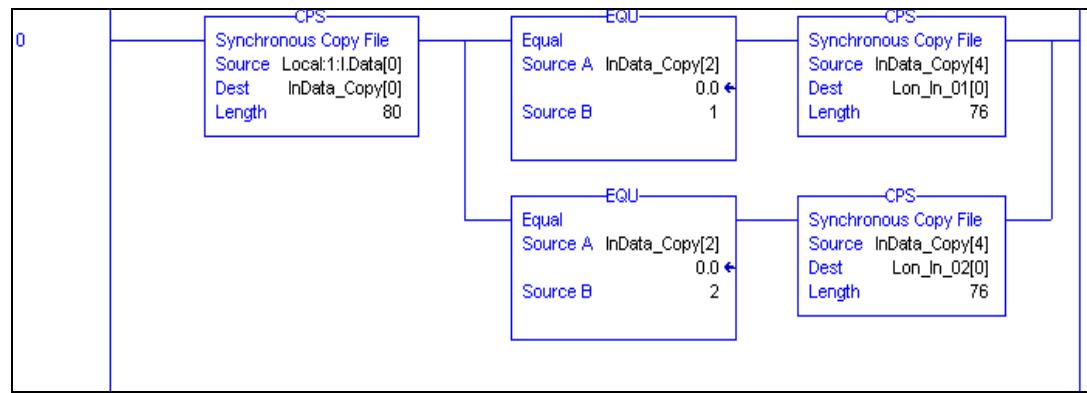
In[0]   and   Out[0]

5.1   Input Data from Function Blocks In[1] to In[24]

To access Input Data Blocks In[1] up to In[24] simply add to the existing ladder program as shown in the Quickstart example.

- Add a branch after the CPS element that copies the input image Tag and copy and paste EQU and CPS elements from the first rung.

- Create a new Input Tag for Lon_In_02 of type REAL and dimension 76.

- Finally, remember to set the EQU Source B value to 2 to compare for incoming data from the 2nd LonWorks functional block which is In[1].

See the ladder program below how to add In[1].

Very Important Note!

To ensure that the input data is from a specific LonWorks Function Block, make a synchronous copy of the input image data before using it.

5.2   Output Data from Function Blocks Out[1] to Out[24]

To access more output blocks it is necessary to create a Multiplexer in Ladder. The Flash Drive supplied with the product includes an ACD file with an example of multiplexing use.

The basic steps are:

- Create a Counter which counts up every 100ms.

- Place the counter value into the Lon_Out_xx Tag at offset 2.

- Copy the whole Tag into the output Data Image Tag for transferring to the LonWorks network.

The example program below shows an output counter that can count up to 25 which allows the transfer of data into all 25 Output Function Blocks. Only 2 rungs are shown to transfer data for blocks 1 and 2. Add more rungs with more Lon_Out_xx tags to transfer data to other output Function Blocks.

<u>Very Important Note!</u>

All Output Image Tag data must be updated once using a Synchronous File Copy element. Attempting to update the block number into the Output Image Tag folowed by the data will cause an asynchronous transfer of data.

5.3   Optimizing performance for smaller applications

If less than the full number of Function Blocks is needed, it is advisable to trim the Preset value in the CTU element in the full SlotServer RSLogix project to the maximum block value. The blocks should be used starting from 1 upwards. This will ensure that update rate is kept as short as possible - e.g, if only block 25 is used and all the other points are left unbound and the project is untrimmed, when the data updates, the LonWorks driver will scan all the Map Descriptors for all blocks which will be unnecessarily time consuming.

Appendix A. Troubleshooting

Appendix A.1. Things to check when communications has failed.

- Check for loose cabling on the LonWorks network

- Verify that the bindings in the LonWorks network have not been broken by checking the variable status' with the LonWorks Network Manager.

- Verify that the correct program is loaded to the CPU

- Verify that the correct data types for the tags have been used.

- Verify with FieldServer that the newest version of the firmware version is being used.

Appendix B. Vendor Information

Appendix B.1. Using LonMaker to Commission a SlotServer

- Ensure that the SlotServer and the LonMaker PC are on the same LonWorks network.

- Open the existing Network in LonMaker, or create a new Network

  - Click on "Create New Network" and follow the network wizard, making the following selections:

Network Interface	Network Attached
Management Mode	Onnet (unless you are working offline)
Register Plug-ins required	None

- Once Visio is open with the Network showing, drag a new device onto the drawing from the toolbox.

- Follow the Device prompts, making the following selections

Enter Device Name	Commission device
Specify Device Template	Upload from device
Specify Device Channel	Auto Detect
Specify Device Properties	Leave as is (Ping is optional)
Identify Device	Service pin
Device Application Image	Leave unchecked
Initial State	Online

- Press the service pin on the SlotServer when asked to do so, and the SlotServer will be commissioned.

- Drag a new function block onto the drawing from the toolbox. Give the function block a name and ensure that it is allocated to the SlotServer device.

- Once the function block is on the drawing, drag input and output variables onto the function block. LonMaker will show the variables available for binding. Click on the required variables (or use the select all option), and they will be commissioned onto the function block.

- Connect these variables to other devices by dragging connections from the toolbox and connecting the variables.

Additional LonWorks information for other Network Managers can be found in the FieldServer LonWorks Driver Manual.

Appendix C. Reference

Appendix C.1. Network Variables List – SlotServer LonWorks Open Profile

The SlotServer LonWorks Open Interface Profile contains 50 Functional Blocks containing a total of 2,600 Network Variables of different SNVT Types.

Input Data Function Blocks:

In[0] - In[24]

Output Data Function Blocks:

Out[0] - Out[24]

Each Function Block contains the following Network Variables:

(nvi for Input Data Function Blocks, and nvo for Output Data Function Blocks)

Network Variable Name	SNVT_Type	Network Variable Name	SNVT_Type
nv(i)(o)Amp1	SNVT_amp	nv(i)(o)Setpt1	SNVT_temp_setpt
nv(i)(o)Amp2	SNVT_amp	nv(i)(o)State1	SNVT_state
nv(i)(o)Chlr1	SNVT_chlr_status	nv(i)(o)State2	SNVT_state
nv(i)(o)Count1	SNVT_count_f	nv(i)(o)State3	SNVT_state
nv(i)(o)Count2	SNVT_count_f	nv(i)(o)State4	SNVT_state
nv(i)(o)CtInc1	SNVT_count_inc_f	nv(i)(o)Sw1	SNVT_switch
nv(i)(o)CtInc2	SNVT_count_inc_f	nv(i)(o)Sw2	SNVT_switch
nv(i)(o)Flow1	SNVT_flow_f	nv(i)(o)Sw3	SNVT_switch
nv(i)(o)Freq1	SNVT_freq_hz	nv(i)(o)Sw4	SNVT_switch
nv(i)(o)HVMod1	SNVT_hvac_mode	nv(i)(o)Sw5	SNVT_switch
nv(i)(o)HVSts1	SNVT_hvac_status	nv(i)(o)Sw6	SNVT_switch
nv(i)(o)Lev1	SNVT_lev_cont	nv(i)(o)Sw7	SNVT_switch
nv(i)(o)Obj1	SNVT_obj_status	nv(i)(o)Sw8	SNVT_switch
nv(i)(o)Occ1	SNVT_occupancy	nv(i)(o)Temp1	SNVT_temp_p
nv(i)(o)Occ2	SNVT_occupancy	nv(i)(o)Temp2	SNVT_temp_p
nv(i)(o)Perc1	SNVT_lev_percent	nv(i)(o)Temp3	SNVT_temp_p
nv(i)(o)Perc2	SNVT_lev_percent	nv(i)(o)Temp4	SNVT_temp_p
nv(i)(o)Perc3	SNVT_lev_percent	nv(i)(o)Temp5	SNVT_temp_p
nv(i)(o)Perc4	SNVT_lev_percent	nv(i)(o)Temp6	SNVT_temp_p
nv(i)(o)Perc5	SNVT_lev_percent	nv(i)(o)Temp7	SNVT_temp_p
nv(i)(o)Perc6	SNVT_lev_percent	nv(i)(o)Temp8	SNVT_temp_p
nv(i)(o)Perc7	SNVT_lev_percent	nv(i)(o)TodEv1	SNVT_tod_event
nv(i)(o)Perc8	SNVT_lev_percent	nv(i)(o)VltAC1	SNVT_volt_ac
nv(i)(o)PPM1	SNVT_ppm	nv(i)(o)VltAC2	SNVT_volt_ac
nv(i)(o)Press1	SNVT_press	nv(i)(o)Volt1	SNVT_volt
nv(i)(o)Press2	SNVT_press	nv(i)(o)Volt2	SNVT_volt

Appendix C.2. Other Resources

- FieldServer LonWorks Driver Manual. (Available on the supplied USB drive).

- www.**lonmark**.org