Specialists in Information Displays

Electronic Displays, Inc.
EDV111 Series LED Signs
Allen Bradley
AOI (Add on Instruction)
Software Manual

Version Control

Version	Date	Author	Change Description
2.0	07/21/2019	c.elston	Updated for EDI ED-3500 Gateway
1.0	12/01/2012	c.elston	Initial release

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1 INTRODUCTION

This manual is provided as a guide for using EVD111 series LED Signs with RS Logix 5000 software by Allen Bradley. This manual provides detailed configuration instructions to configure Ethernet/IP and importing AOIs (add-on-instructions) to RS Logix 5000 software projects.

1.1 Supported PLC Controllers

At this time only Allen Bradley CompactLogix and ControlLogix PLC CPUs that use RS Logix 5000 software are supported. Sample projects can be downloaded from the Electronic Displays, Inc. website.

Allen Bradley Micrologix, SLC500 or PLC5 PLC CPUs are **NOT supported** using RS Logix 500 software. Please refer to the ASCII protocol manual for examples. Typically, you will need to connect the serial port from the PLC directly to the LED sign using the DF1 channel 0 port with these types of PLCs.

1.2 Add-On Instructions

Add-on instructions provided in this manual are used to make ladder logic based programming very easy. These set of AOIs can be imported into your project and reused in ladder flow.

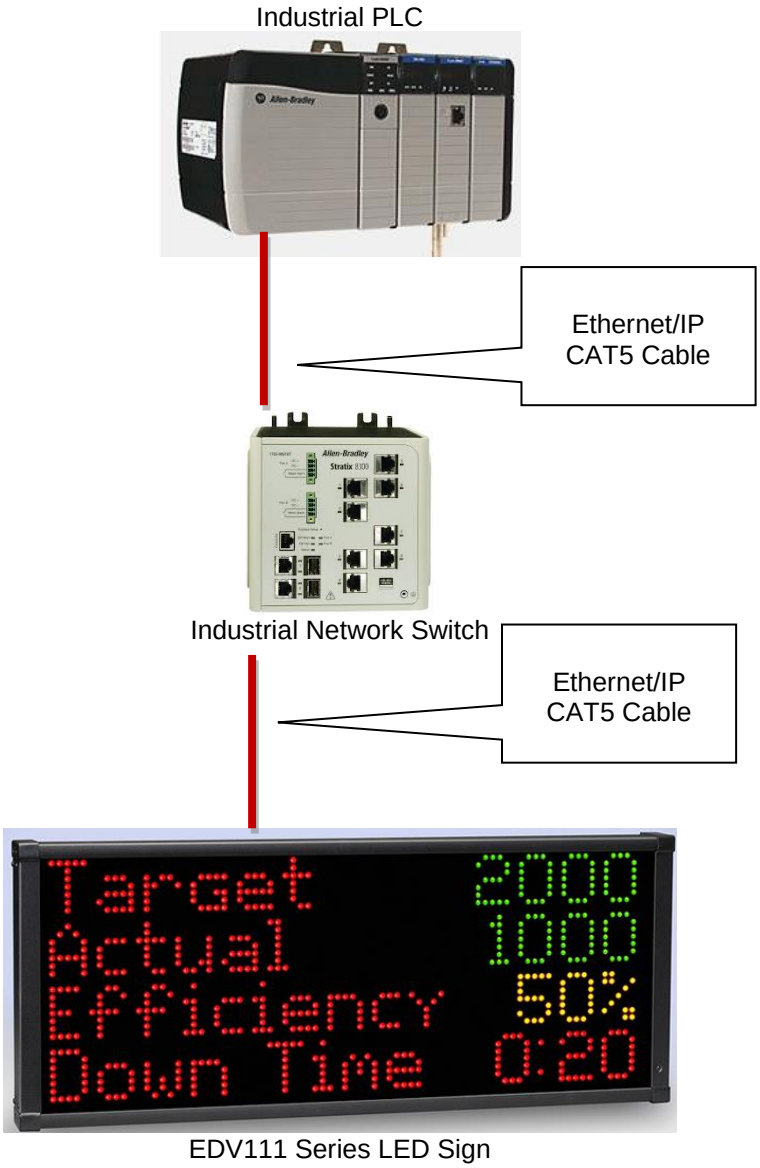
1.3 Supported LED Signs

- EDV111-3280-IND, EDV111-16160-IND, EDV111-16128-IND
- EDV111-1680-IND, EDV11132340-IND, EDV111-16240-IND
- EDV111-24160-IND

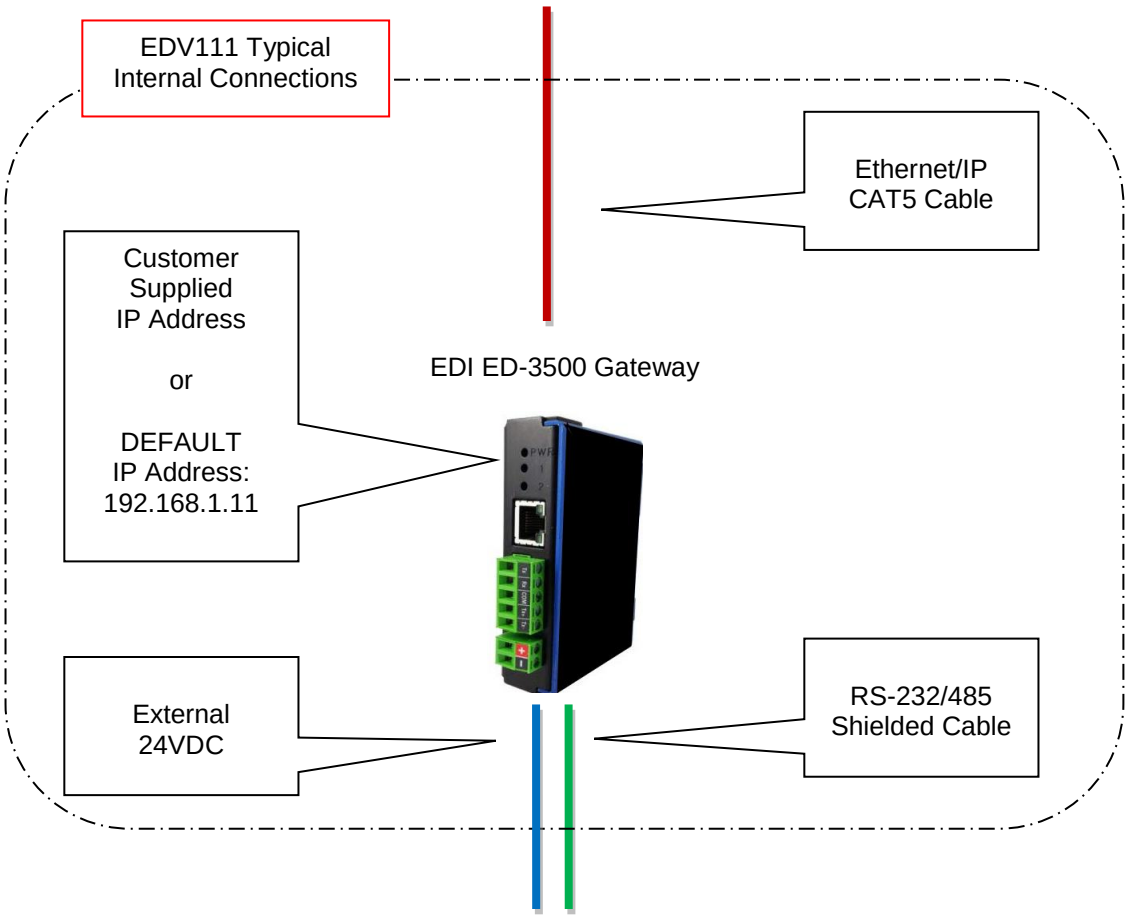
2 SYSTEM BLOCK DIAGRAM

EDV111 LED signs come equipped with an Electronic Displays ED-3500 gateway device that exchanges the Ethernet/IP protocol into ASCII serial strings compatible with the LED signs. This allows for the LED signs to be connected via an Ethernet CAT5 cable and not limited to a short distance RS-232 cable typically connected to traditional LED signs displays.

2.1 Typical Connection Diagram



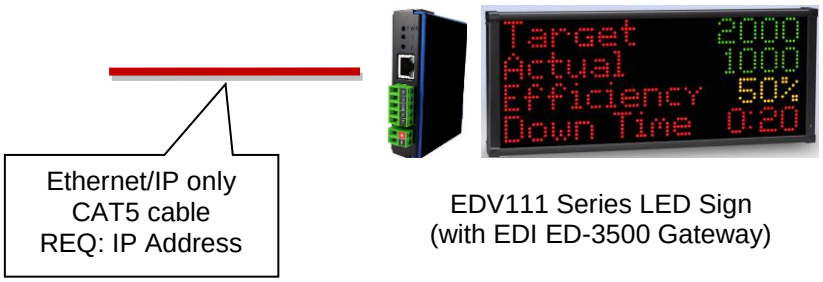
2.2 Internal EDV111 Connection Diagram



EDV111 Series LED Sign

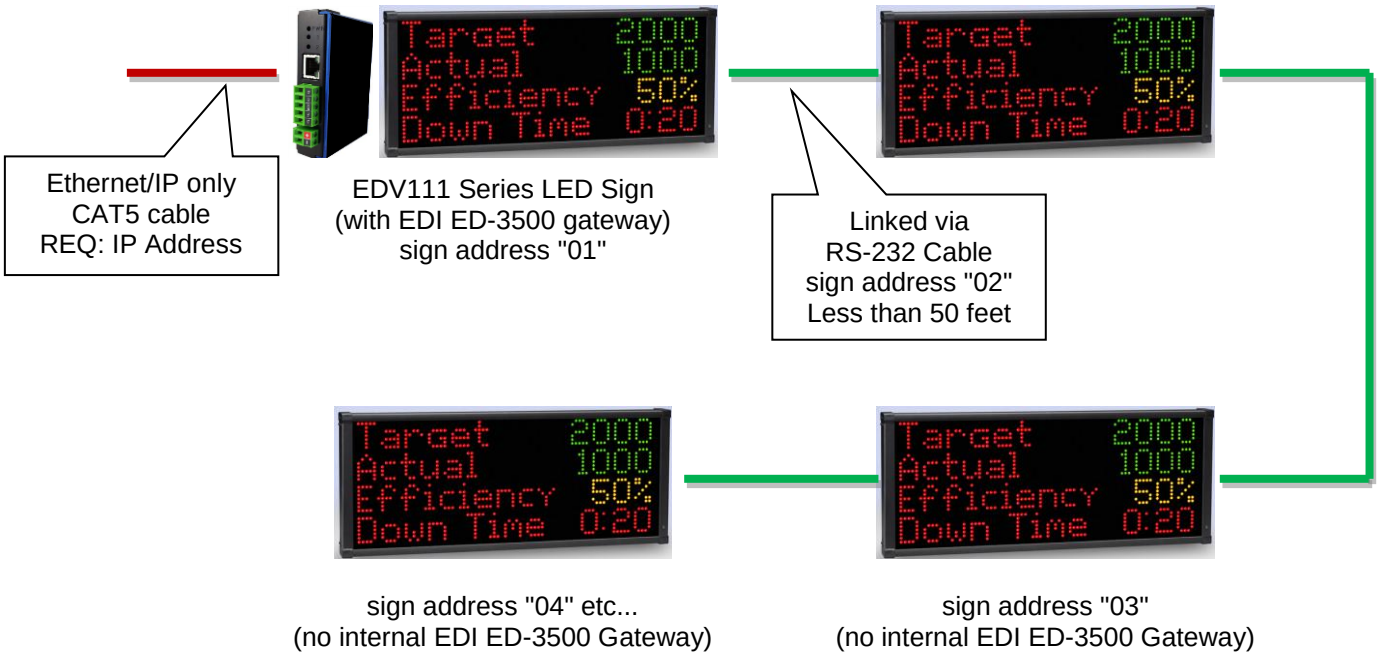
2.3 Single Sign Connection

Single sign connection must have an installed "Master" EDI ED-3500 gateway device.



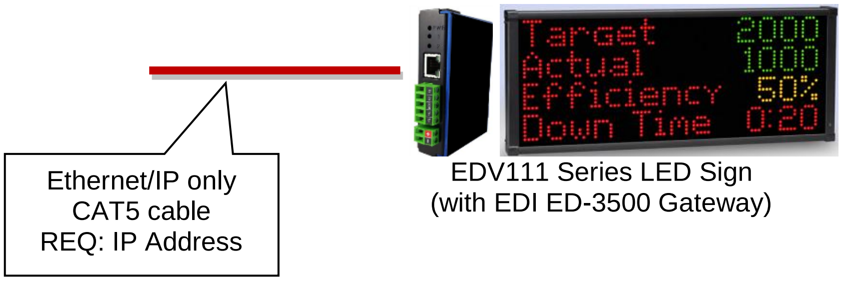
2.4 Multiple Sign Connection (Less than 50 Feet apart)

At least one EDV111 sign must have an installed "Master" EDI ED-3500 Gateway device. This master can reproduce RS-232 signals in a repeater fashion to slave signs by linking multiple EDV111 series signs together using a standard RS-232 cable. Signs must not be mounted more than 50 feet apart. Downstream "slave" signs will not require internal EDI ED-3500 Gateway.

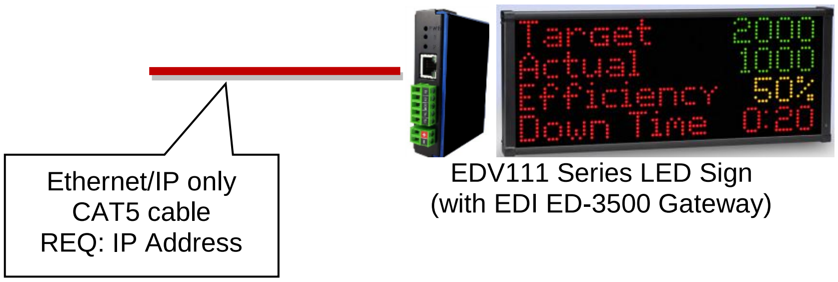


2.5 Multiple Sign Connection (More than 50 Feet apart)

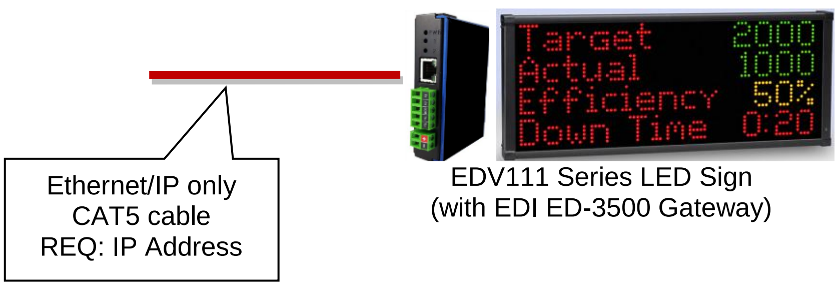
Each sign will require an EDV111 to be internally installed as a "Master" EDI ED-3500 Gateway device.



EDV111 Series LED Sign
(with EDI ED-3500 Gateway)



EDV111 Series LED Sign
(with EDI ED-3500 Gateway)

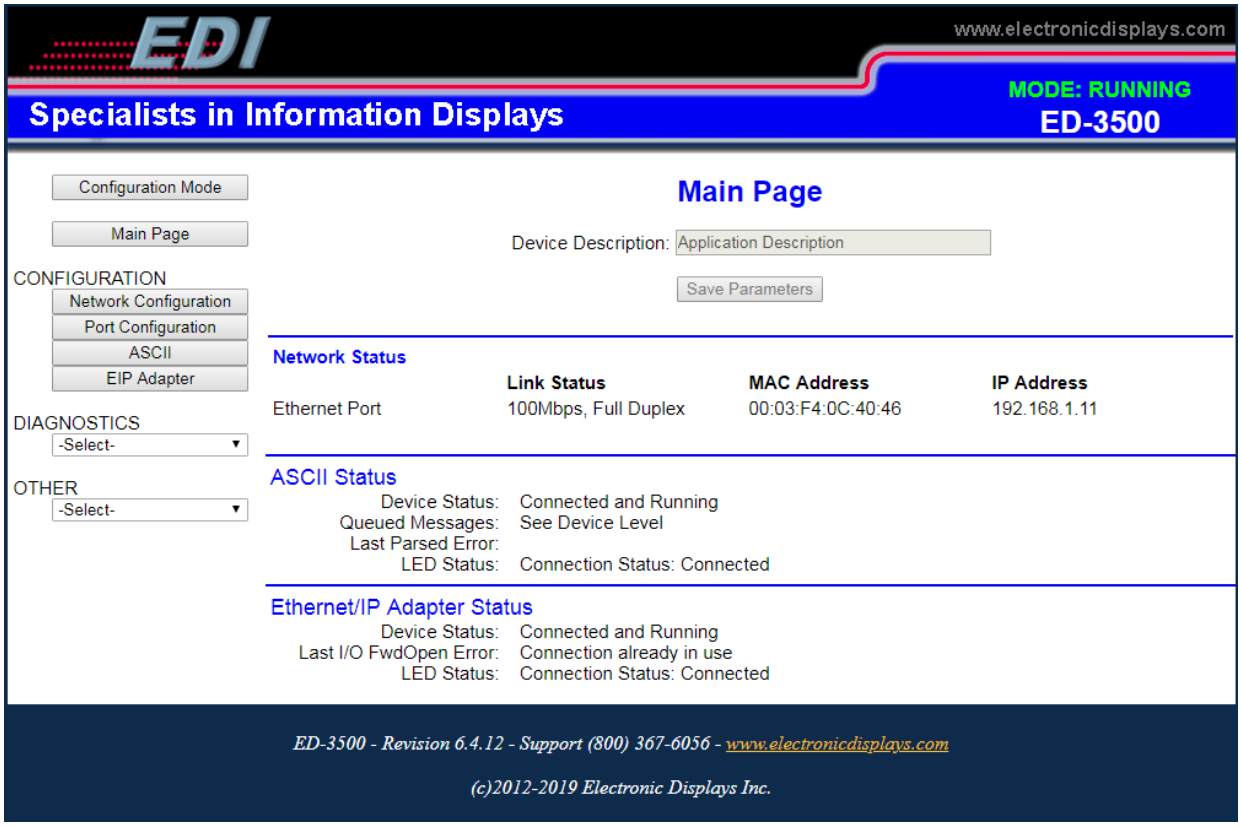


EDV111 Series LED Sign
(with EDI ED-3500 Gateway)

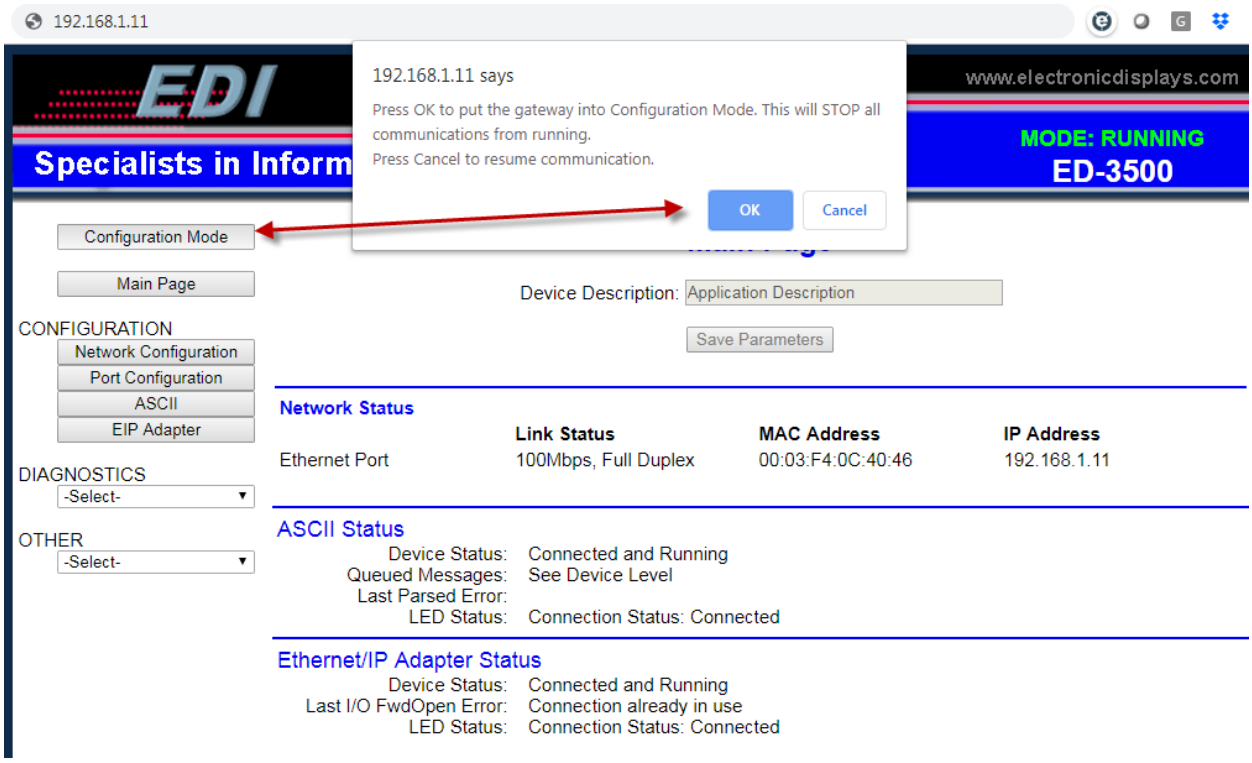
3 CUSTOMIZE THE IP ADDRESS EDI ED-3500 Gateway

Using Google Chrome or web browser. Type in ED-3500 IP address into URL bar.

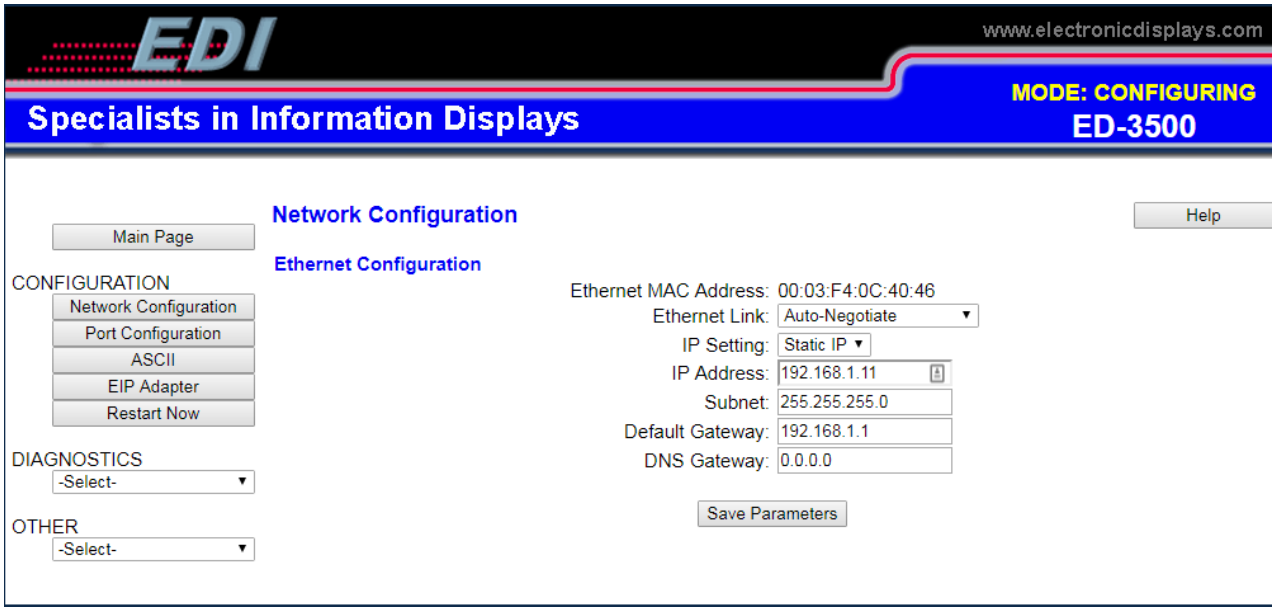
192.168.1.11 (default IP)



Press “Configuration Mode” to stop the Gateway.



Click on Network Configuration and change the IP Setting. “Restart Now” the Gateway.



3.1 CUSTOMIZE SIGN COMMUNICATION SETTING RS232/485

Click on Port Configuration

Verify Serial Port is Enable

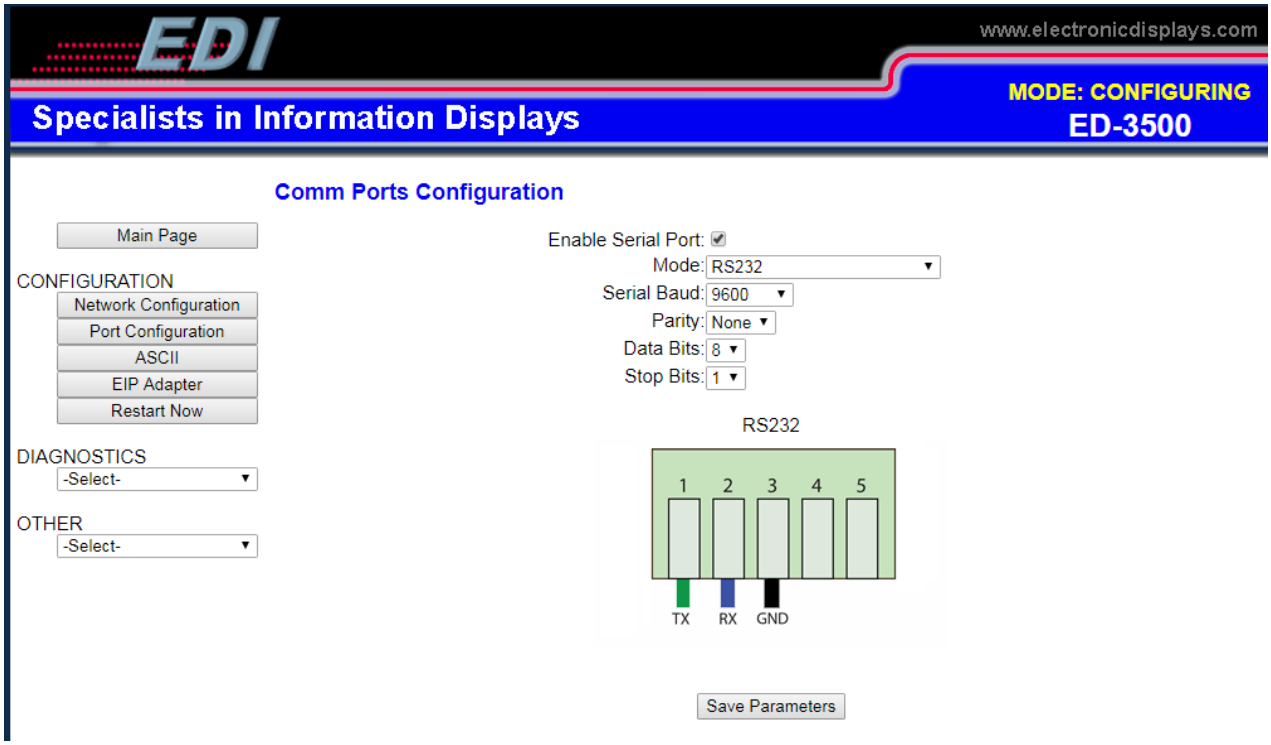
Verify RS-232 or RS485

Verify Serial Settings

Verify wiring on correct terminals as pictured.

Consult with Electronic Display Technical Support to confirm your sign model number serial settings.

Default setting for EV111 series signs are shown below



3.2 CUSTOMIZE ASCII SETTING

Click on ASCII

Verify Port “Serial Port”

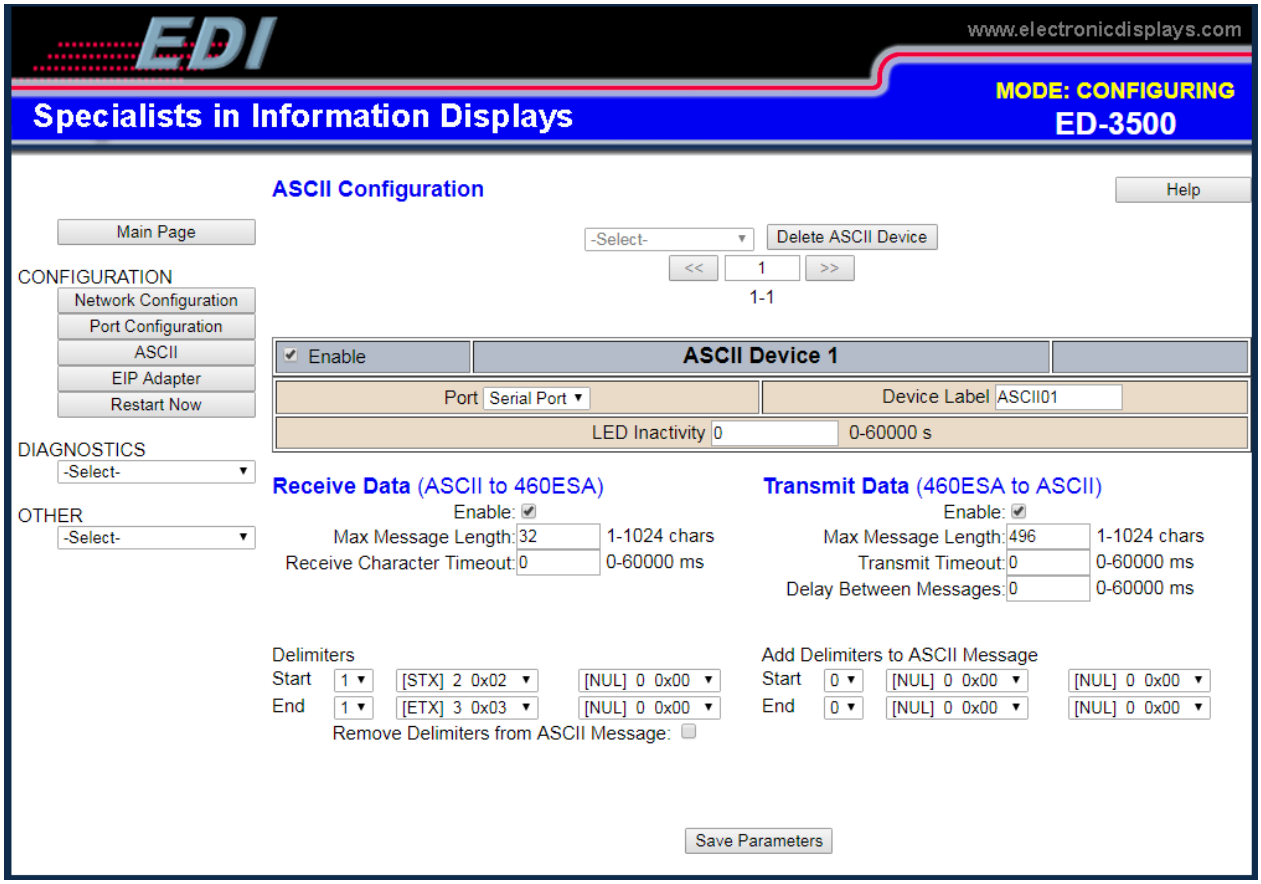
Verify Receive Data is Enabled and 32 chars (default)

Verify Transmit Data is Enable and 496 chars (default)

IMPORTANT: To make sure sign is updating as fast as possible, confirm delimiters as shown in picture below.

Start “1” and STX 2

End “1” and EXT 3

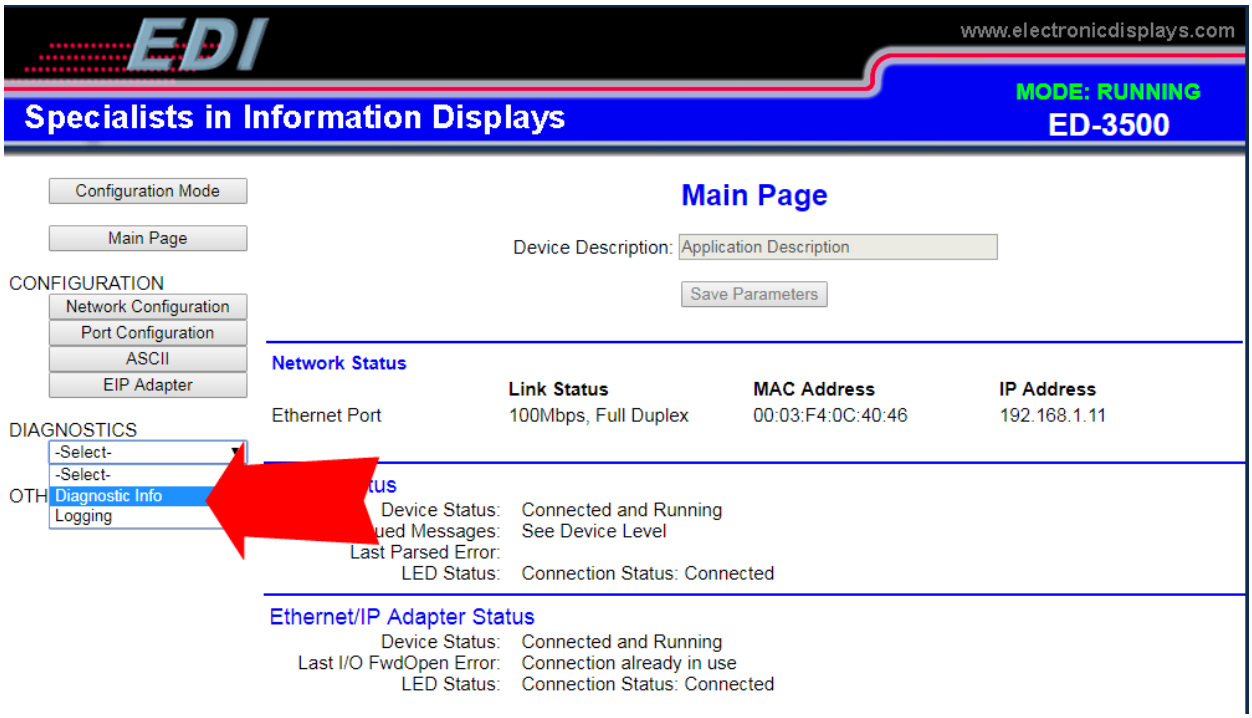


3.3 VERIFY COMMUNICATION WITH SIGN (WITHOUT PLC LADDER)

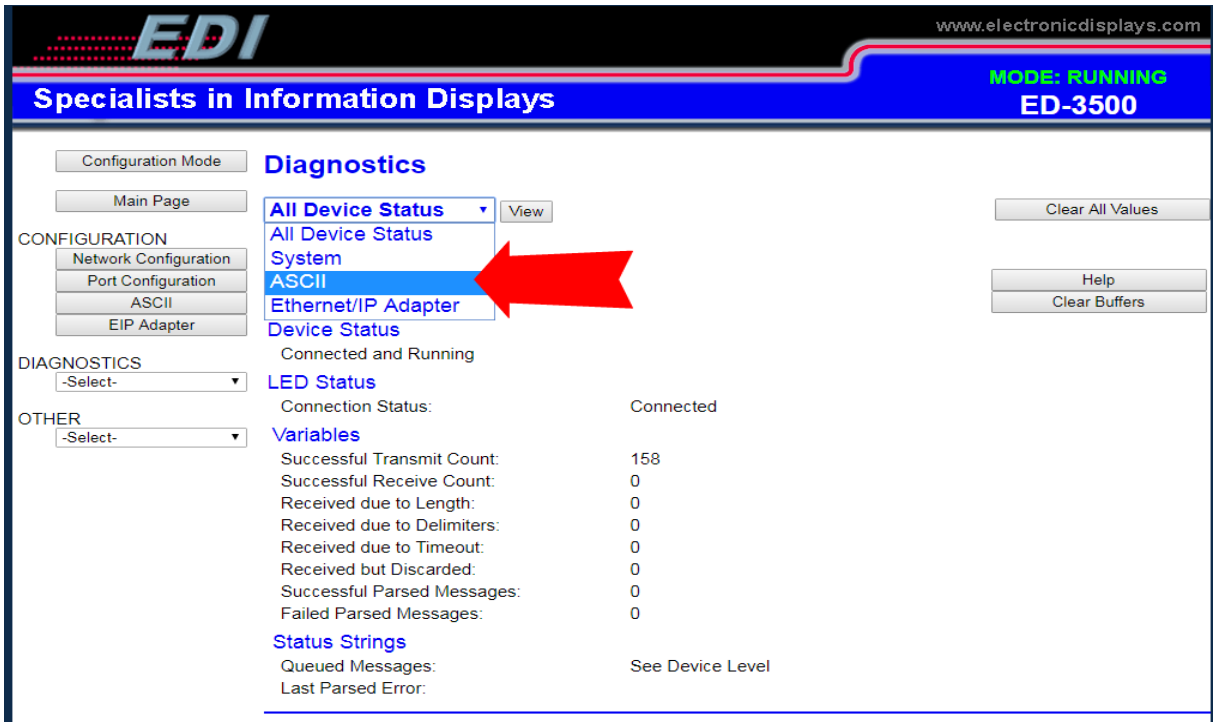
The ED-3500 supports an easy troubleshooting method to confirm communication and wiring without using a PLC

After configuration of IP Address Configuration, Port Configuration and ASCII Configuration, while the Gateway is in run mode, confirm “Mode: Running” in upper right corner.

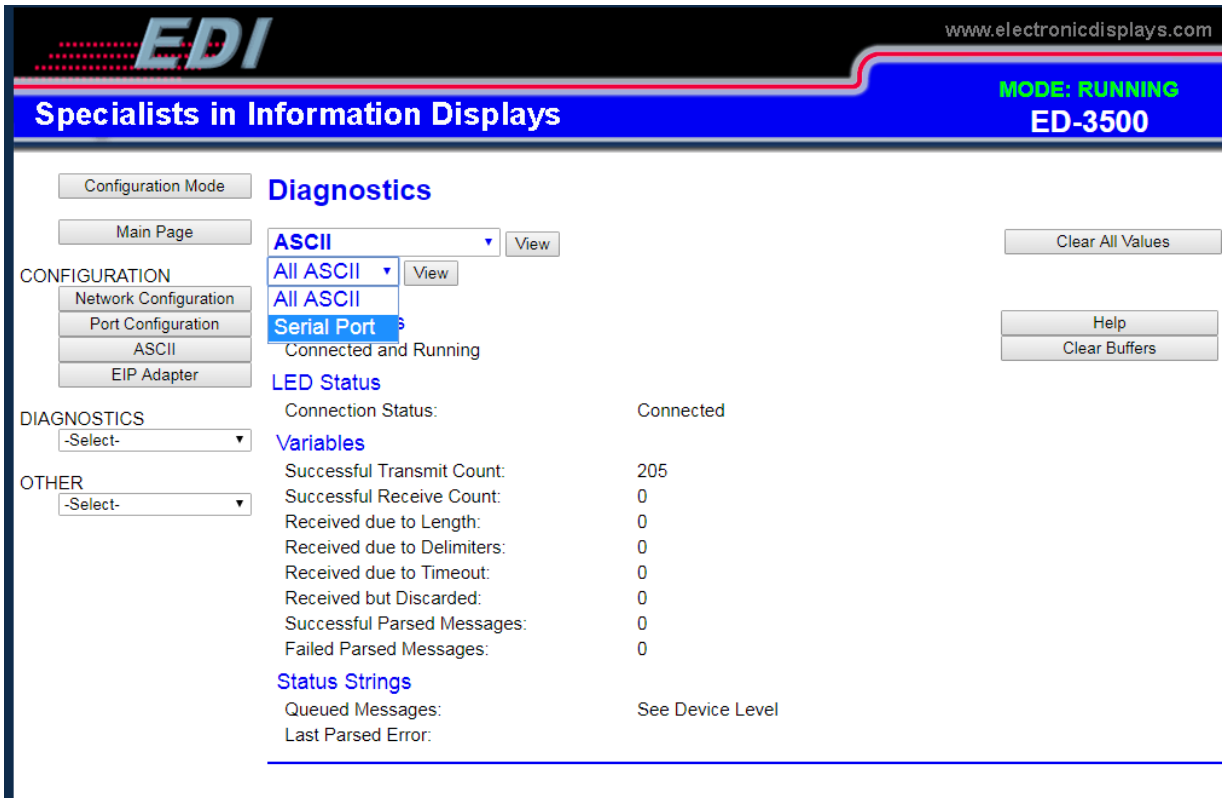
Choose Diagnostics, then Diagnostic Info



Choose ASCII then View

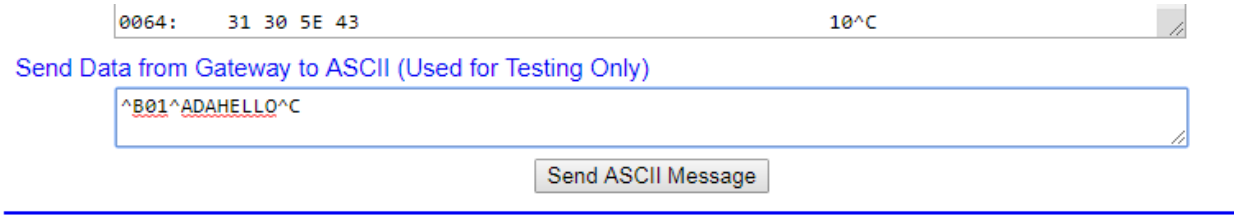


Next Choose Serial Port then View



At the bottom copy and paste this ASCII command:

^B01^ADAHELLO^C



Confirm sign says “HELLO” on the display

Sign should be ready for PLC ladder logic.

4 QUICK START USING TEMPLATE PLC PROGRAM

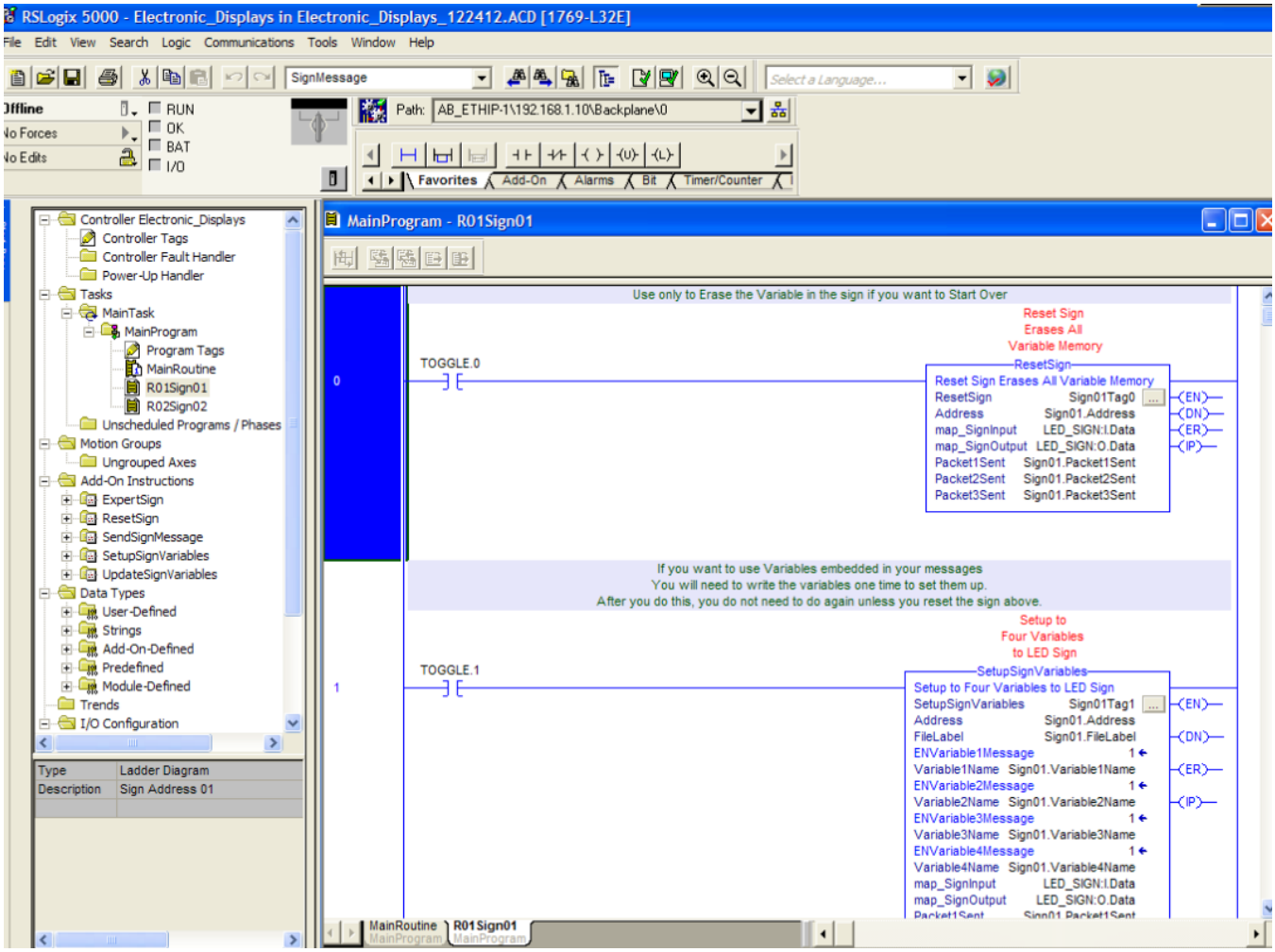
Download the sample PLC program from the Electric Displays website.

Electronic_Displays_122412.acd
(or latest version supplied in ZIP file)

4.1 Quick Start with Template PLC Program

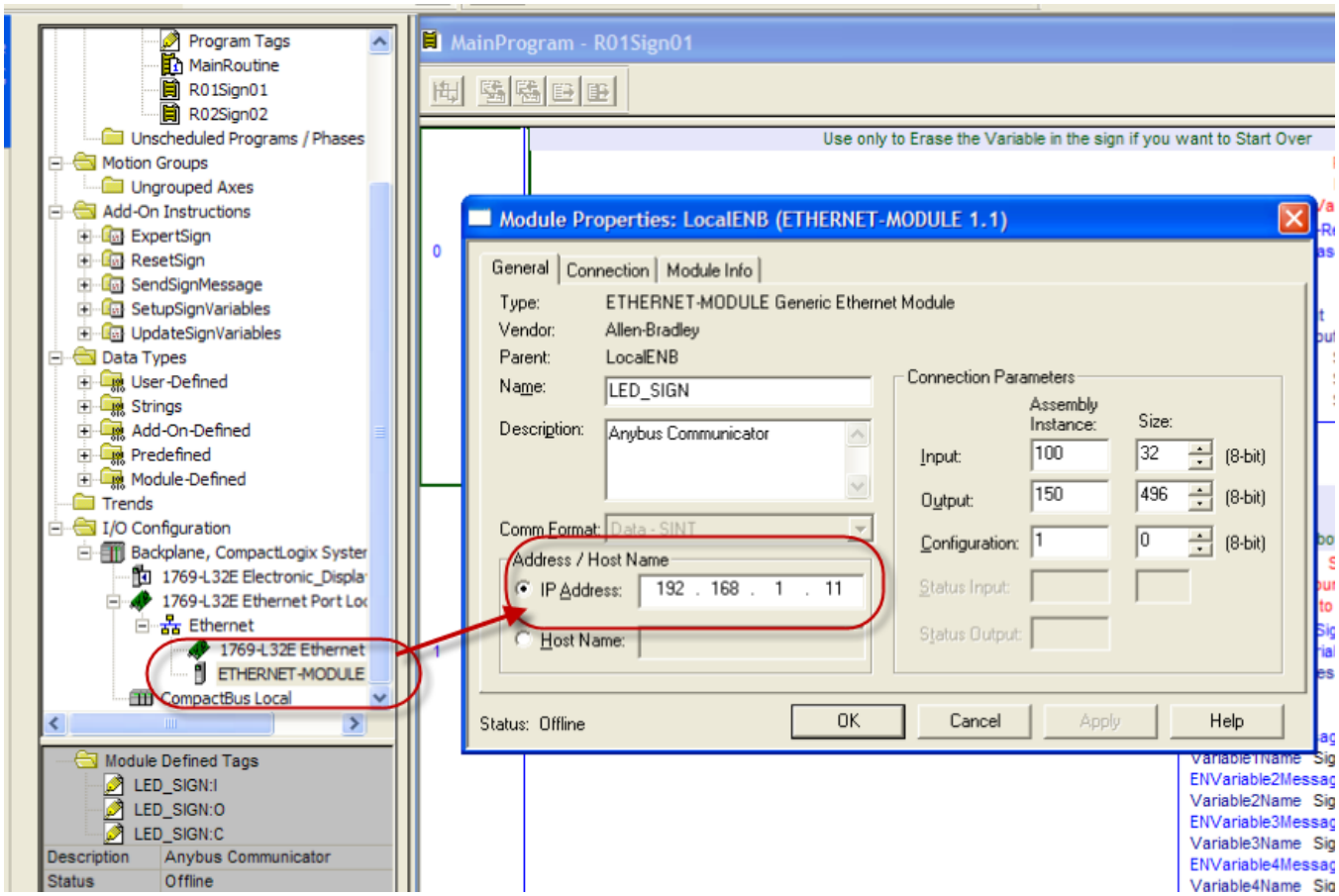
The purpose of the template sample program is provide a bases of settings and tags that are setup in the PLC along with sample ladder logic that can be written to send messages to the sign.

This template file is design to communicate with two signs. Sign #1 is a master sign which is connected via an RS-232 cable daisy chained to Sign #2.



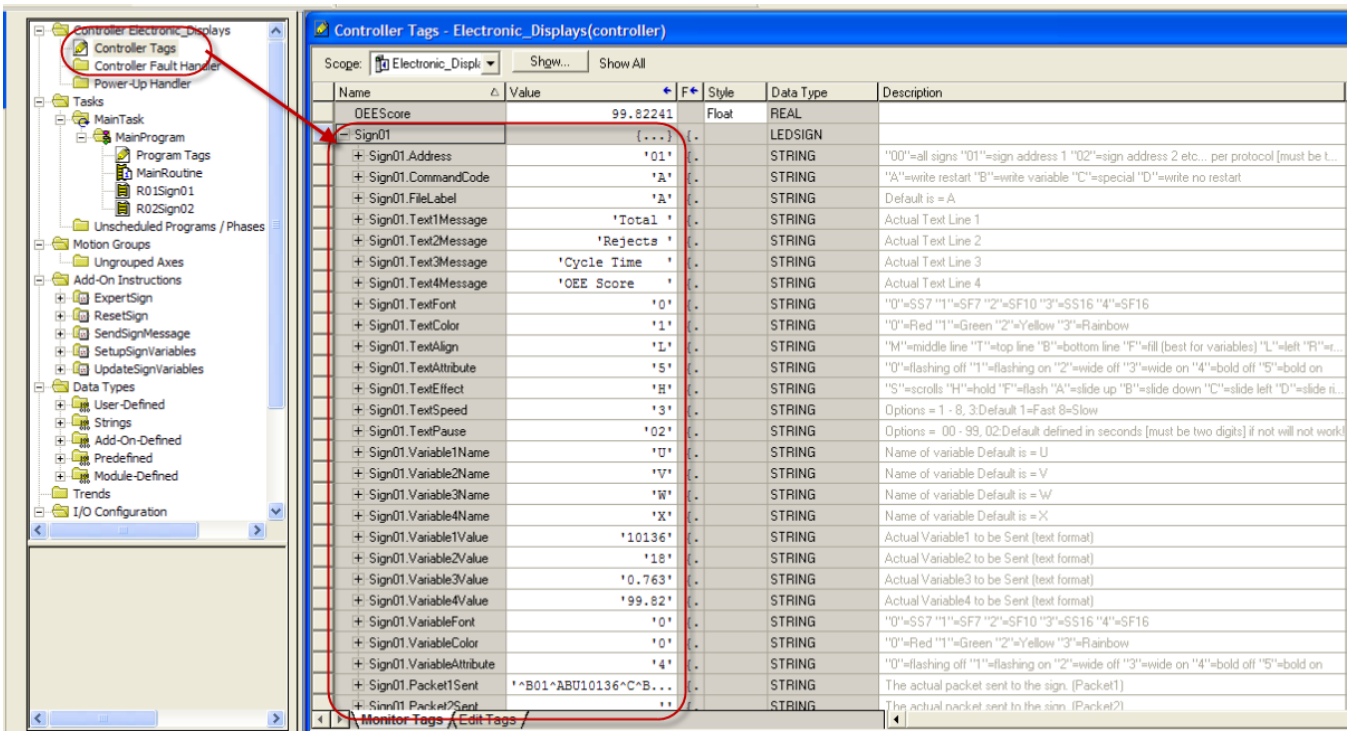
4.2 Update Sign IP Address in Sample PLC Program

Open the Ethernet Module setting and update the IP Address of the sample program. The sample program is setup with the default sign IP address of 192.168.1.11. If you customized your IP, you will need to update this target address below.



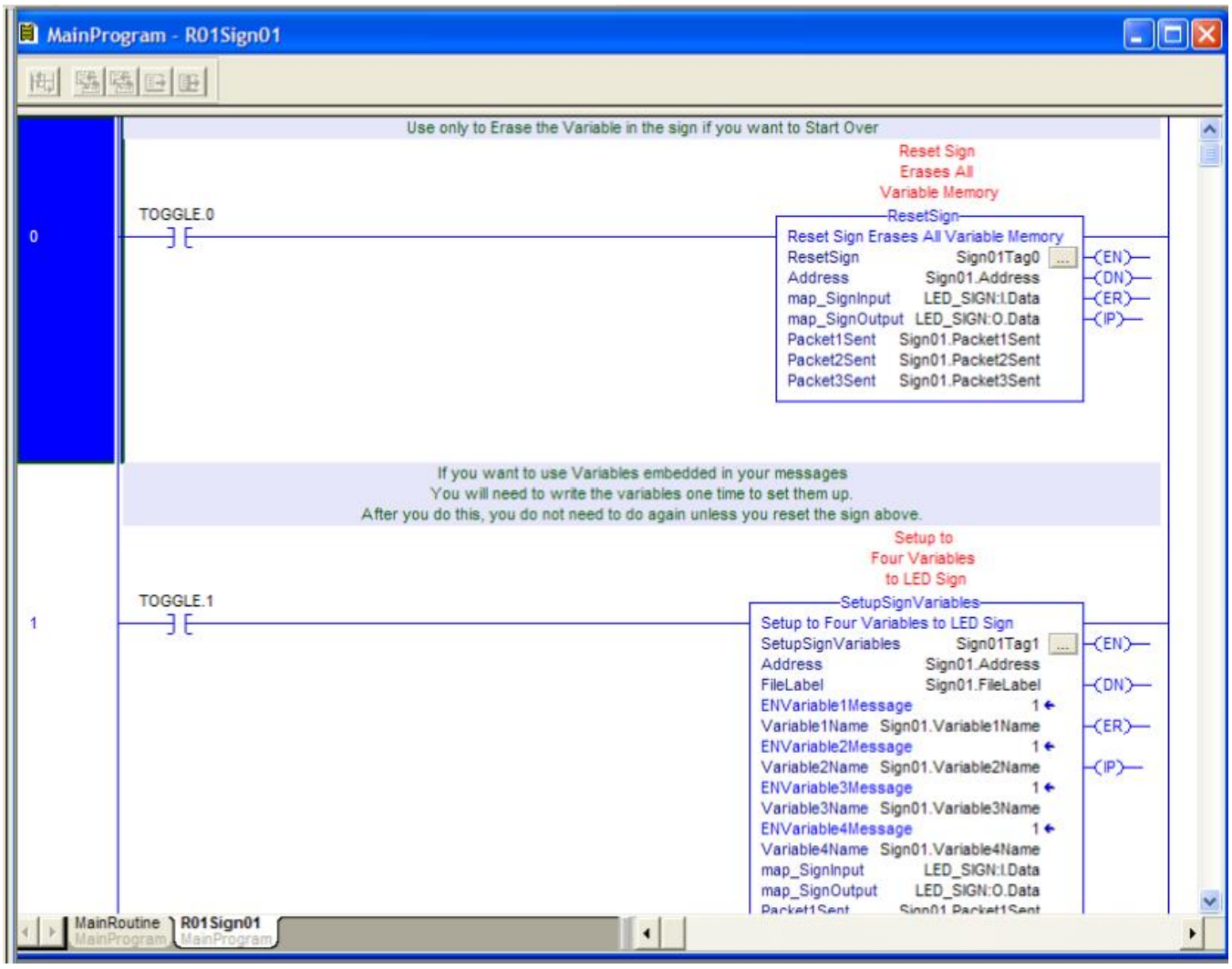
4.3 Update Messages and Sign Format Tags

Open the Controller Tags and update the Sign01 and Sign02 tags with the message and formatting you desire. See the description or AOI help file to determine which options are available.



4.4 Create and Customize Ladder Logic

Create ladder logic to enable the rungs in sequence to send message to the sign. If this is the first time you have connect the PLC to the sign, enable the Reset Sign function block, which erases all variable date allocated in the sign, then enable the SetupSignVaribles which will allocated memory space in the sign to accept dynamic variables that can be written to the sign using the UpdateSignVarible AOI. Send message to the sign by enabling the SendSignMessage AOI.



5 IMPORTING WITH NEW PROGRAM OR EXISITING PLC PROGRAM

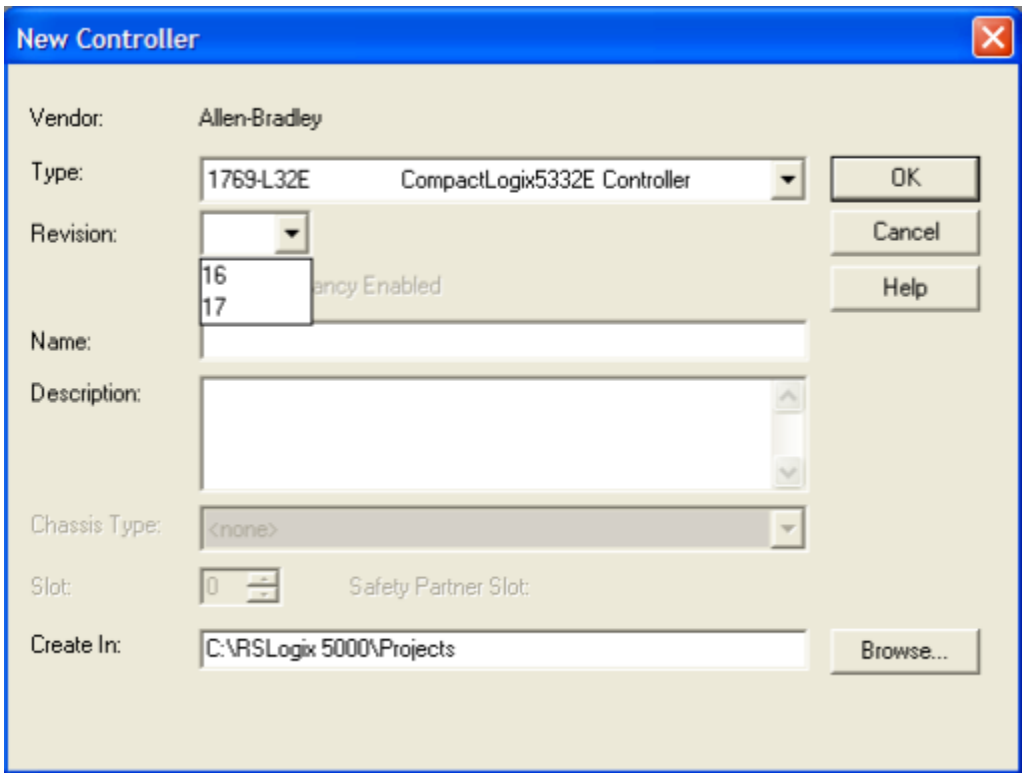
5.1 Start a new project with RS Logix 5000

Click File, New Project to start a new PLC project.

Choose PLC Type.

Choose PLC firmware revision.

Name your PLC Project.

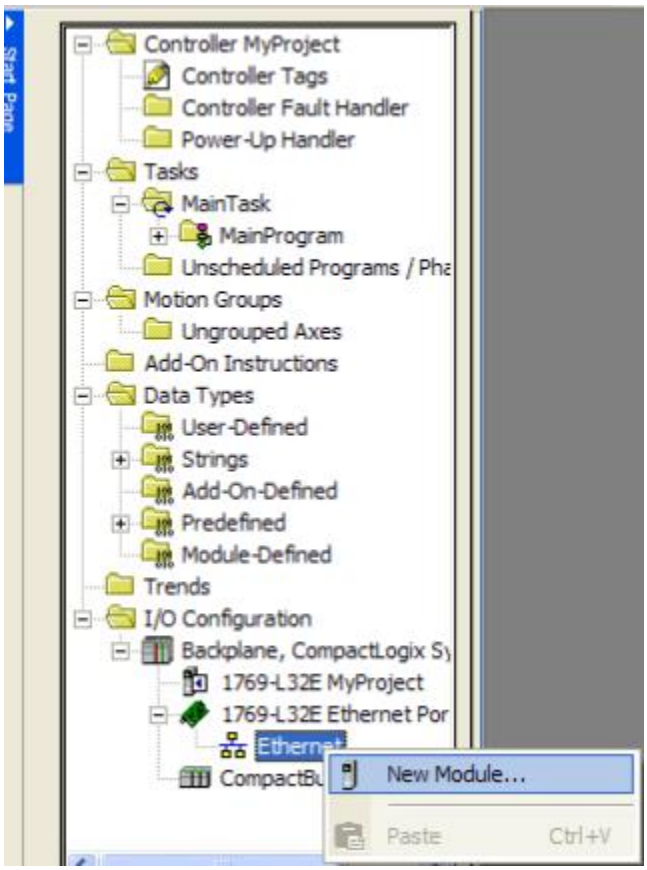


5.2 Create a New Ethernet Connection

In the controller tree view.

Right click the Ethernet ICON

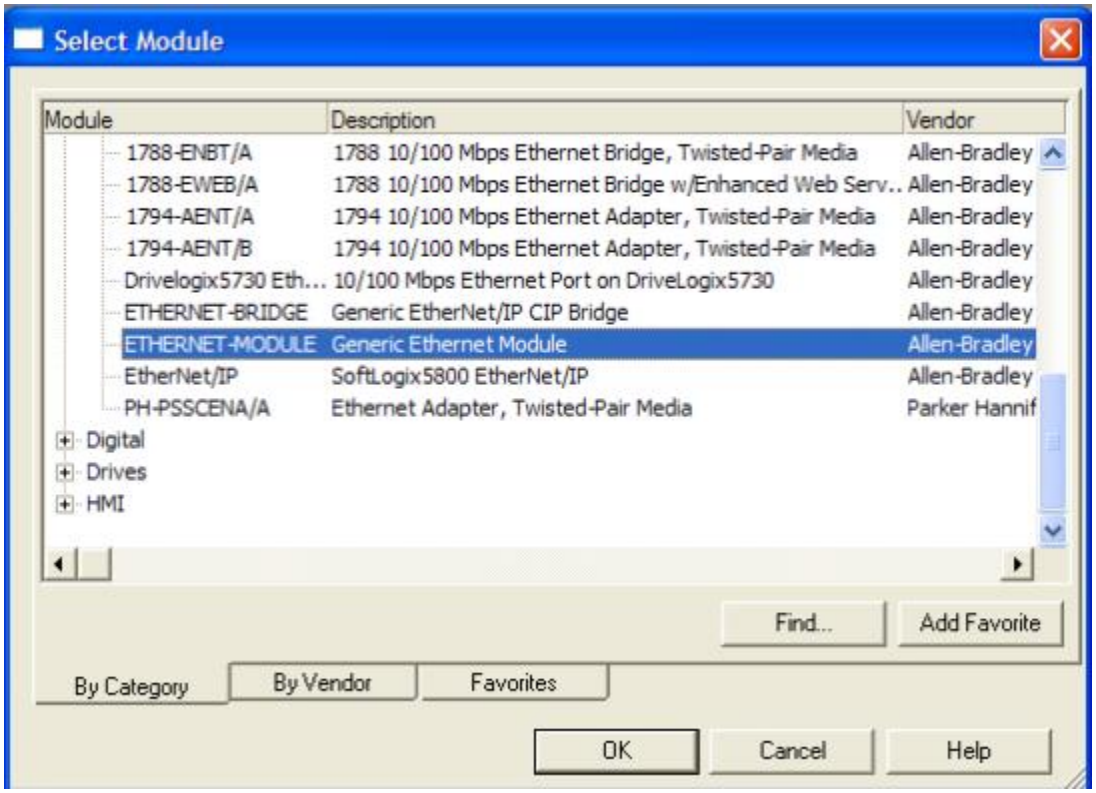
Choose New Module



Choose Communication.

Choose ETHERNET-MODULE (Generic Ethernet Module)

Click OK



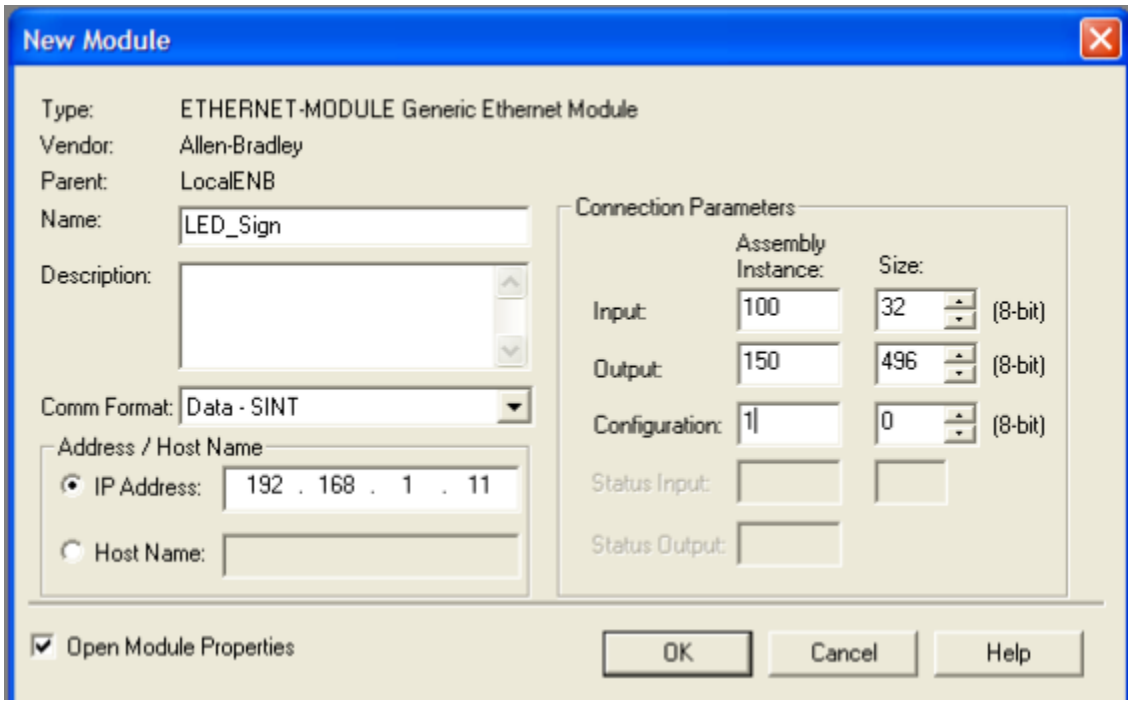
Name the Ethernet Connection:
LED_SIGN
(This will be the prefix name of the tags in the controller.)

Enter the Anybus Communicator Default IP address or your custom IP address:
192.168.1.11
or
custom IP address
(xxx.xxx.xxx.xxx)

Choose Comm Format
Data-SINT
(Important)

Enter Required Assembly Instance
Input: 100 and 32 bytes
Output: 150 and 496 bytes
Configuration: 1 and 0 bytes

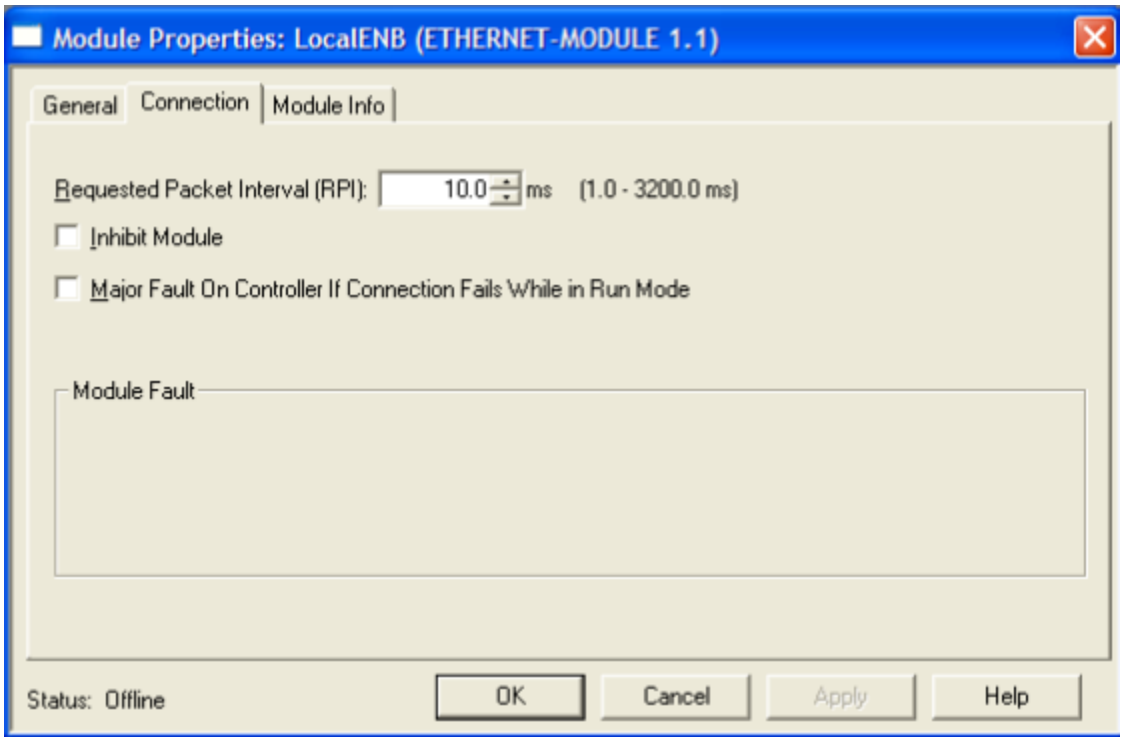
Click OK



Choose RPI interval:

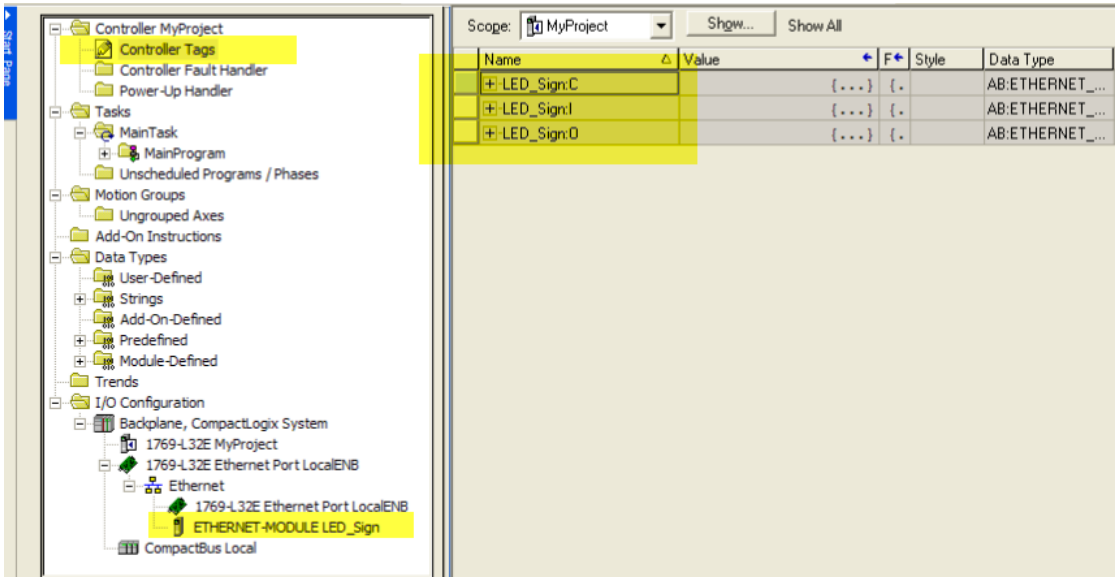
Default 10.0 ms is ok

Click OK



Confirm Controller Tags

Confirm Ethernet Module is configured

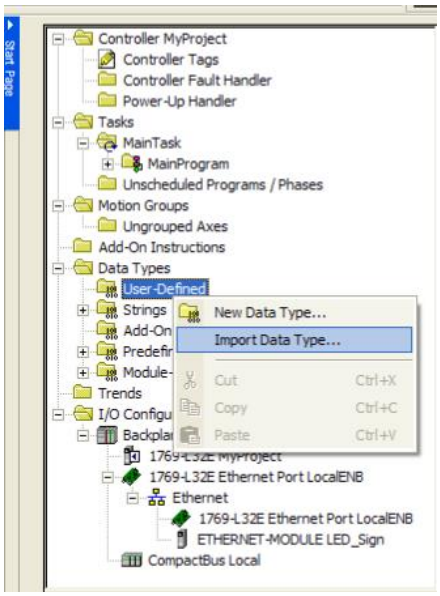


5.3 Importing Data-Types

In the controller tree view

Right click User-Defined under "Data Types"

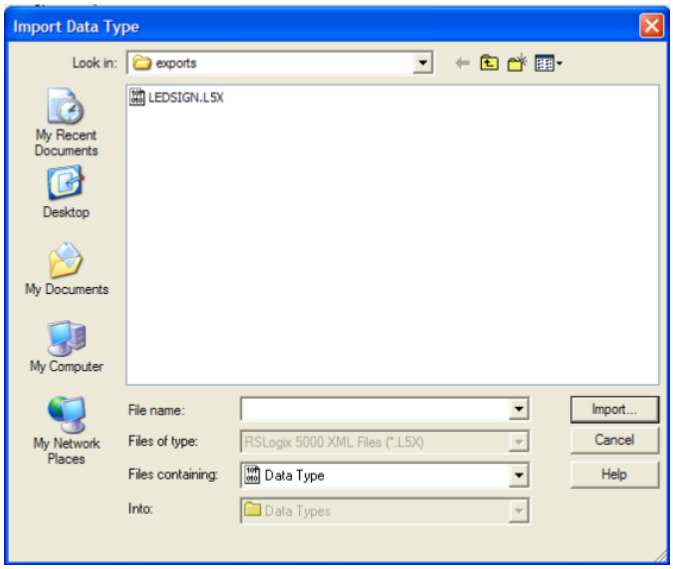
Choose Import Data Type



Browse to the folder containing Data Type

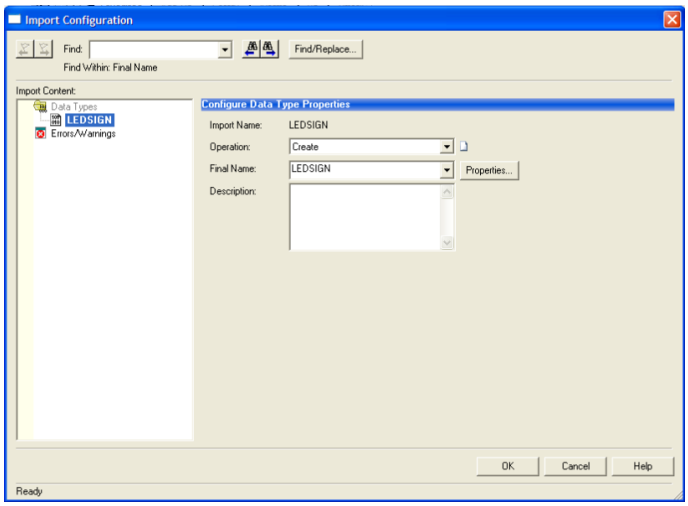
Import LEDSIGN.L5X file

Click OK

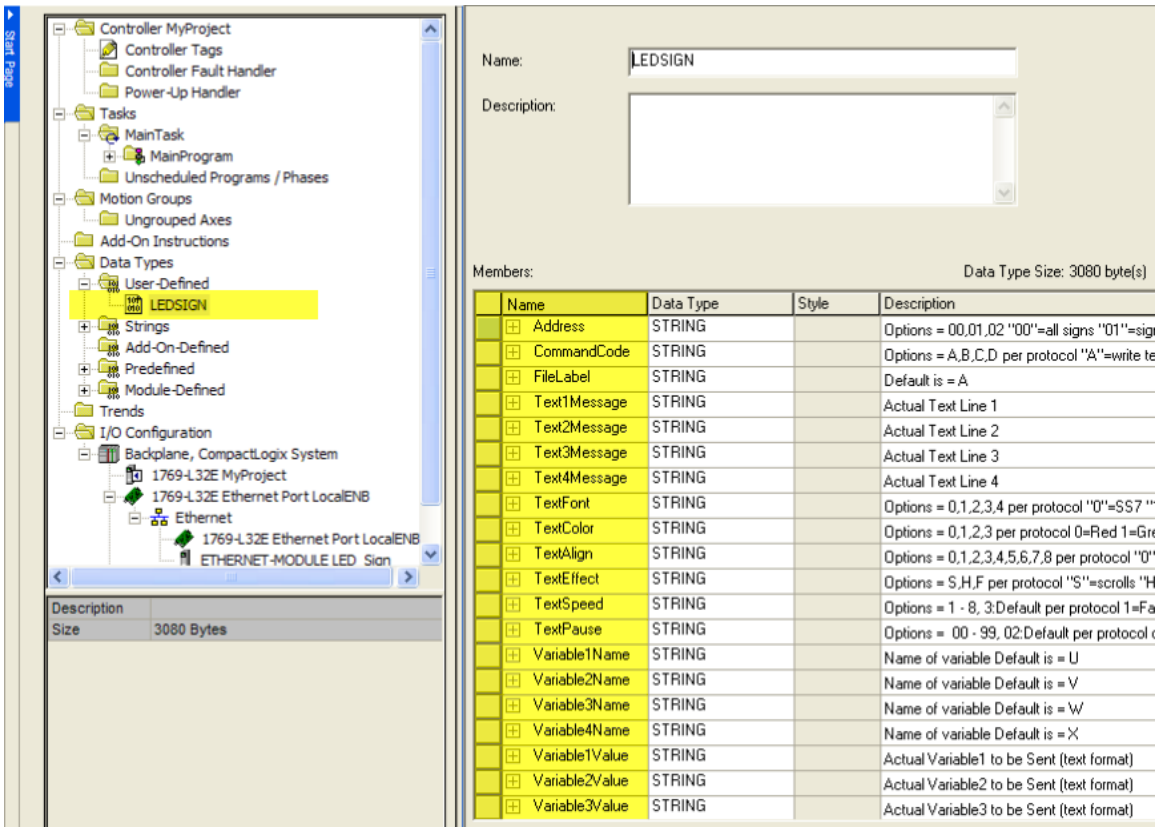


Confirm no version conflicts

Click OK



Confirm Data Type "LEDSIGN"

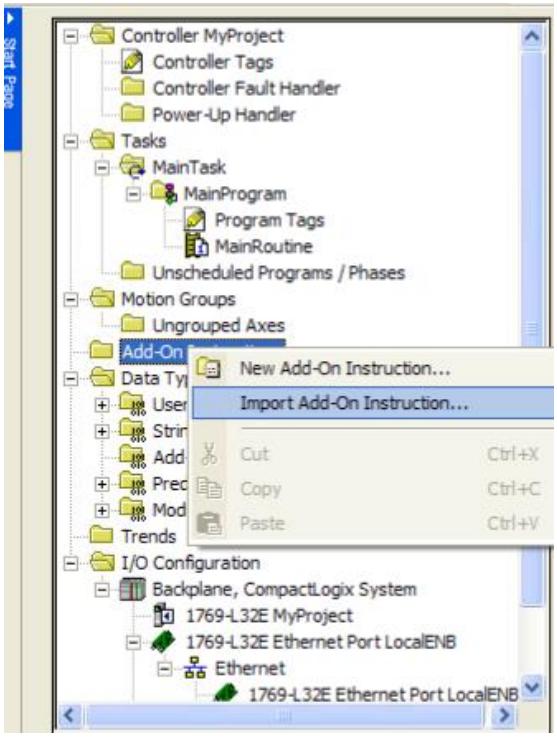


5.4 Importing Add-on Instructions

In the controller tree view

Right click Add-On Instruction

Choose Import Add-On Instruction

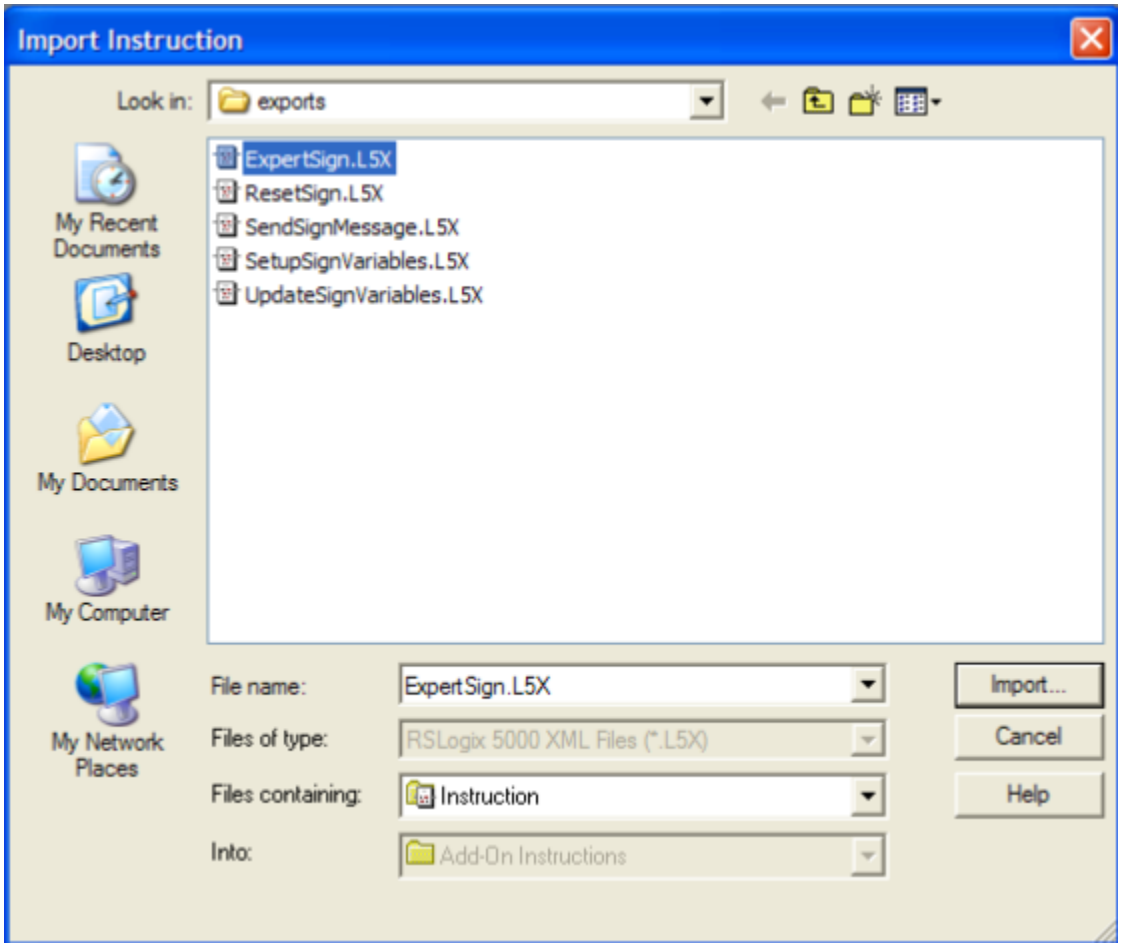


Browse to the folder containing Add-On Instructions

Import all files with .L5X extension.

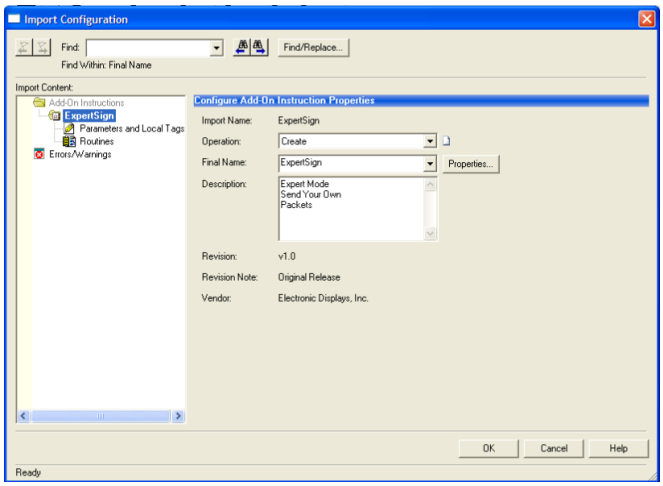
Do this process until all add-on instructions are imported.

Click OK

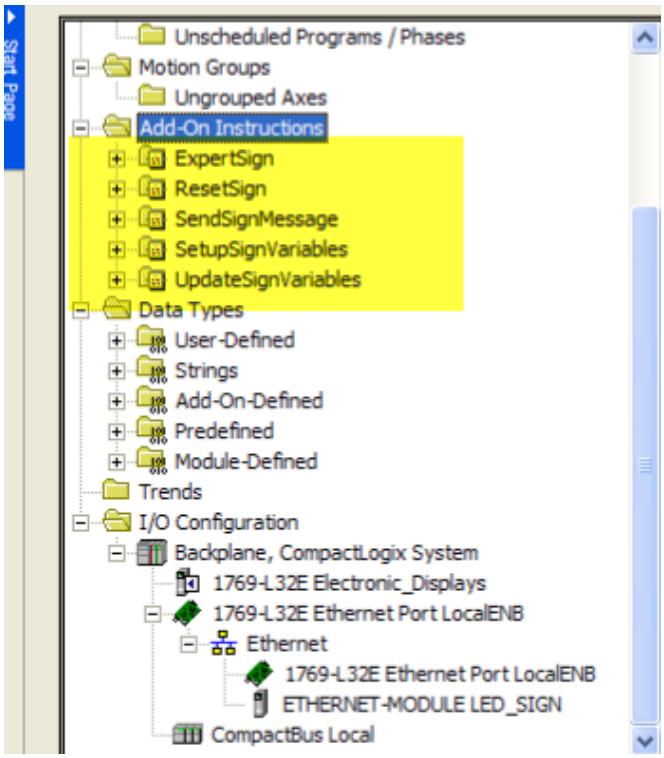


Confirm no version conflicts

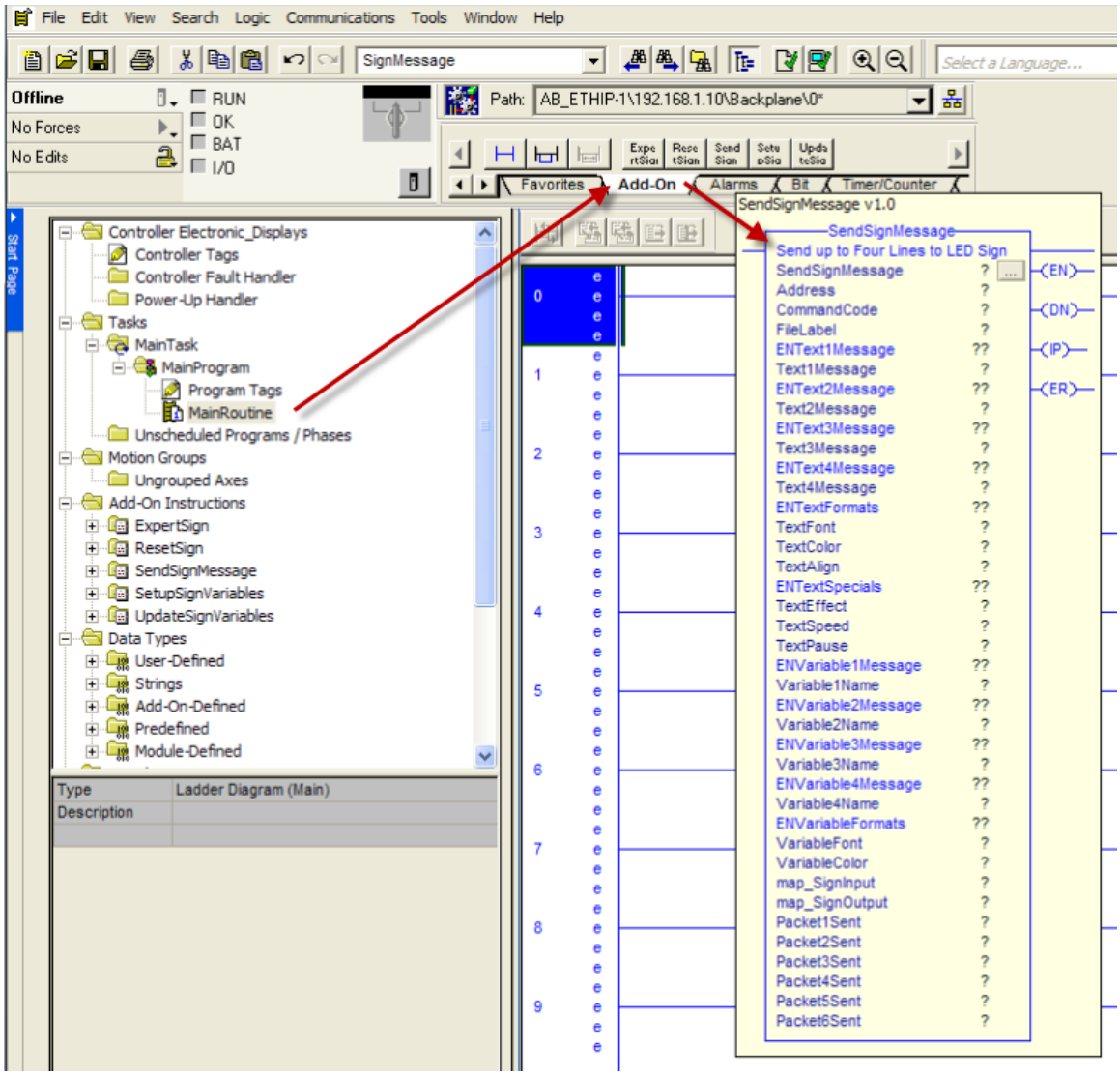
Click OK



Confirm all Add-on Instructions are imported



Confirm AOIs are added to Toolbar in RS Logix 5000



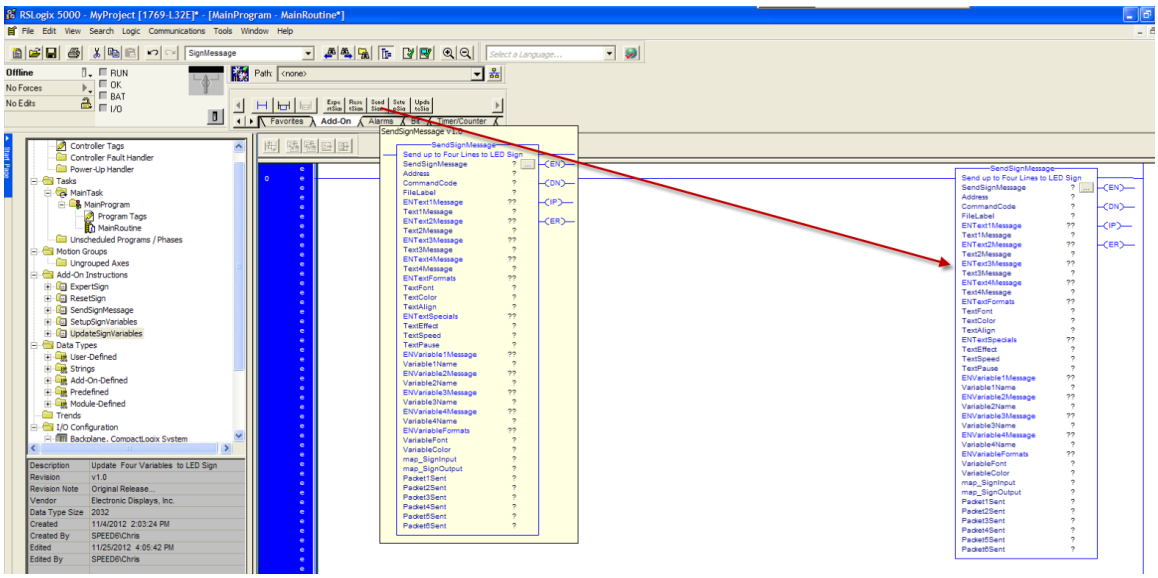
6 USING THE AOI INSTRUCTIONS IN THE PROJECT

6.1 Add AOIs to Ladder Programming via Drag and Drop

Click on the Add-On Toolbar

Drag and Drop the desired control AOI block to a new rung

TIP: You can also drag and drop from the Add-On Menu Tree on the left as well

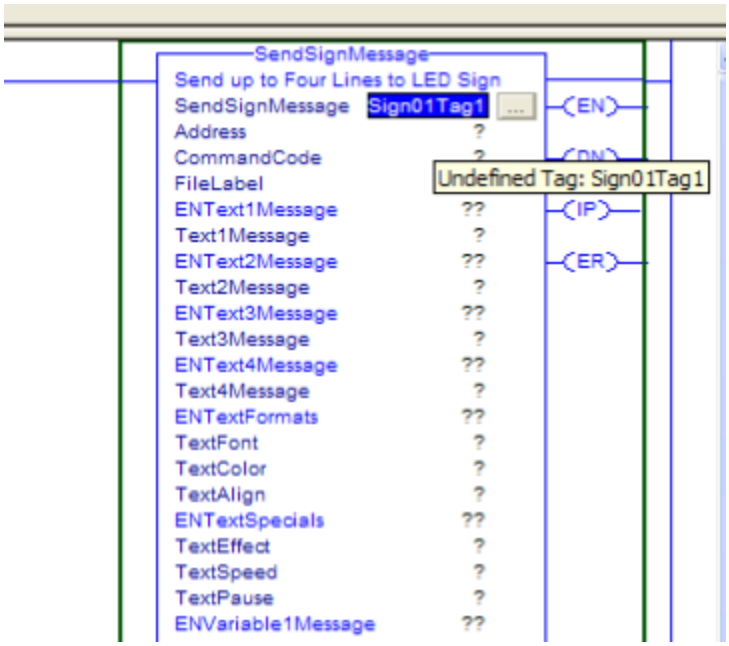


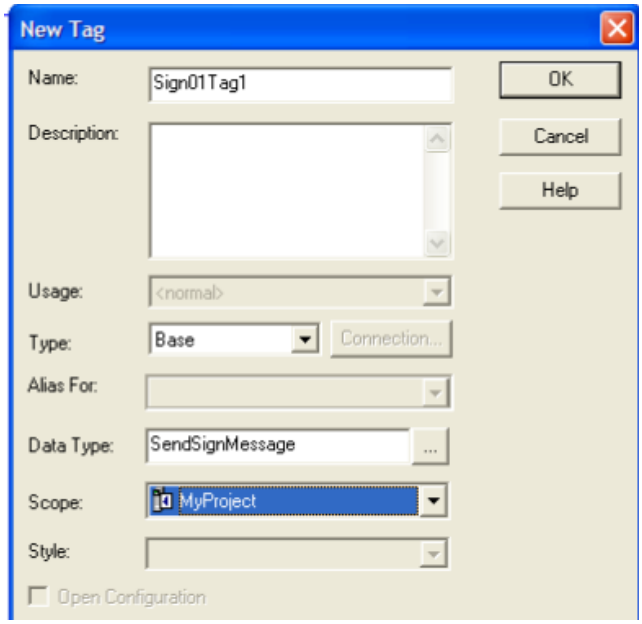
6.2 Creating Unique Tags for AOI

Under the AOI "Tag" parameter, begin to type a desired tag name.

Best Practice here might be to name the tag with the sign address. In this case, the default sign address is "01". Sign01Tag1 might be an example.

Be sure you scope your tag properly.



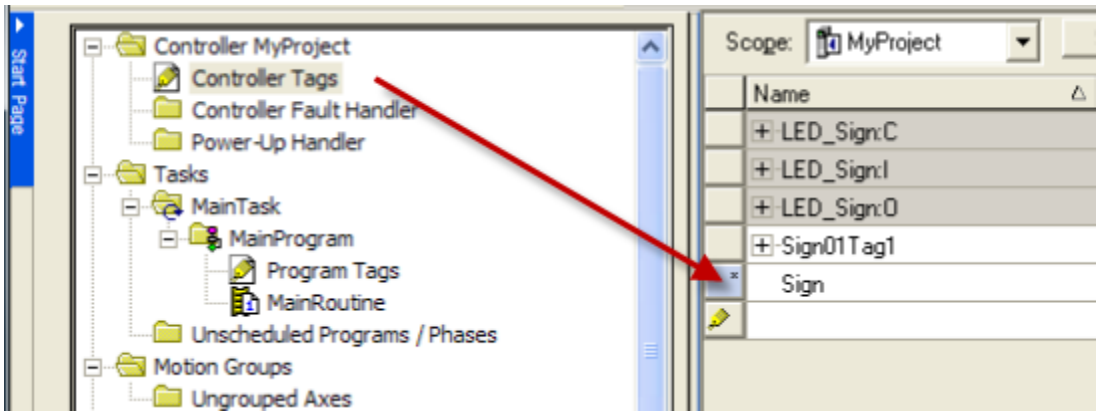


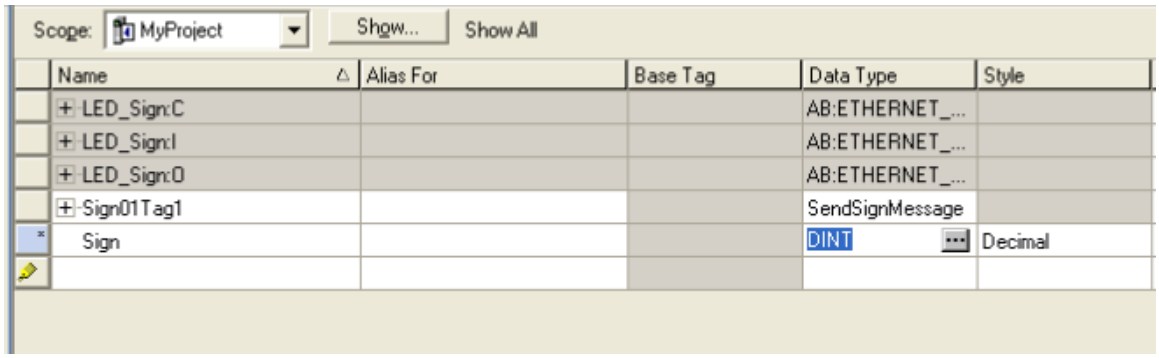
6.3 Creating Unique Tags for Sign Parameters

Each sign, needs a "parameter" file which it retrieves all information and settings from the PLC to the sign.

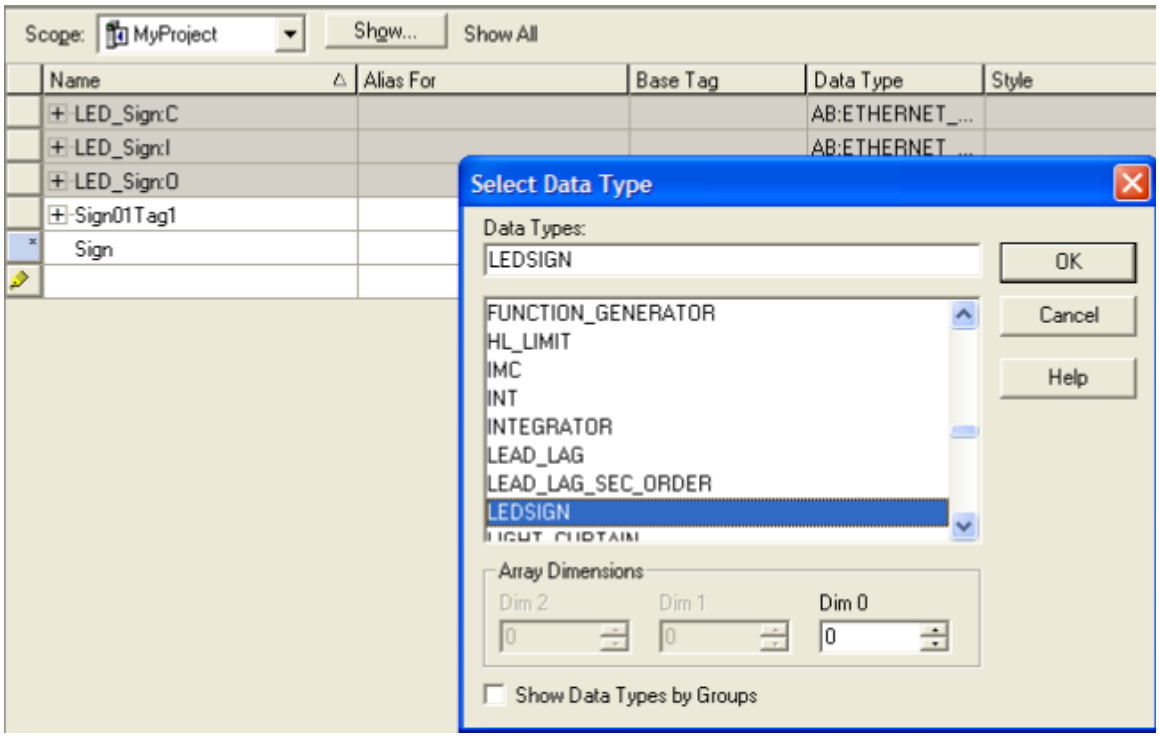
Best practice would be to create a tag with the name of your sign.

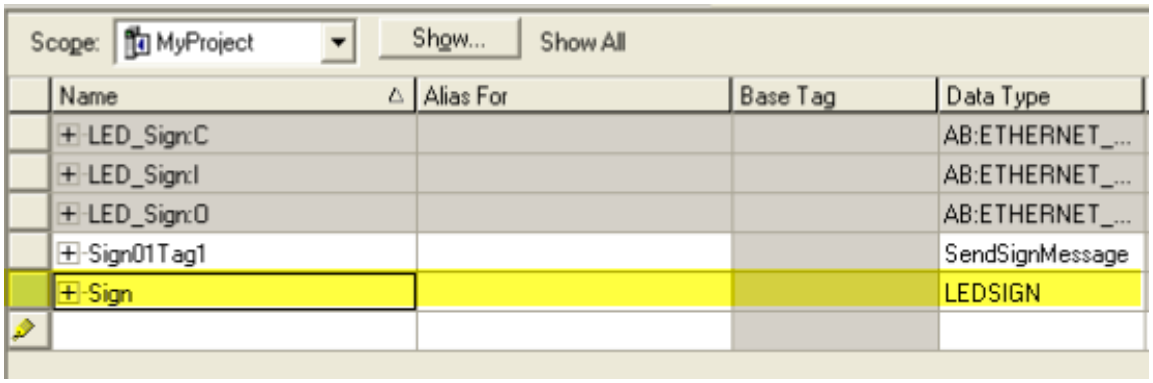
Choose LEDSIGN as the





Map the DATA TYPE of your "Sign" tag to the LEDSIGN data type.
(This data type was imported earlier)





6.4 Setting up the Sign Tag

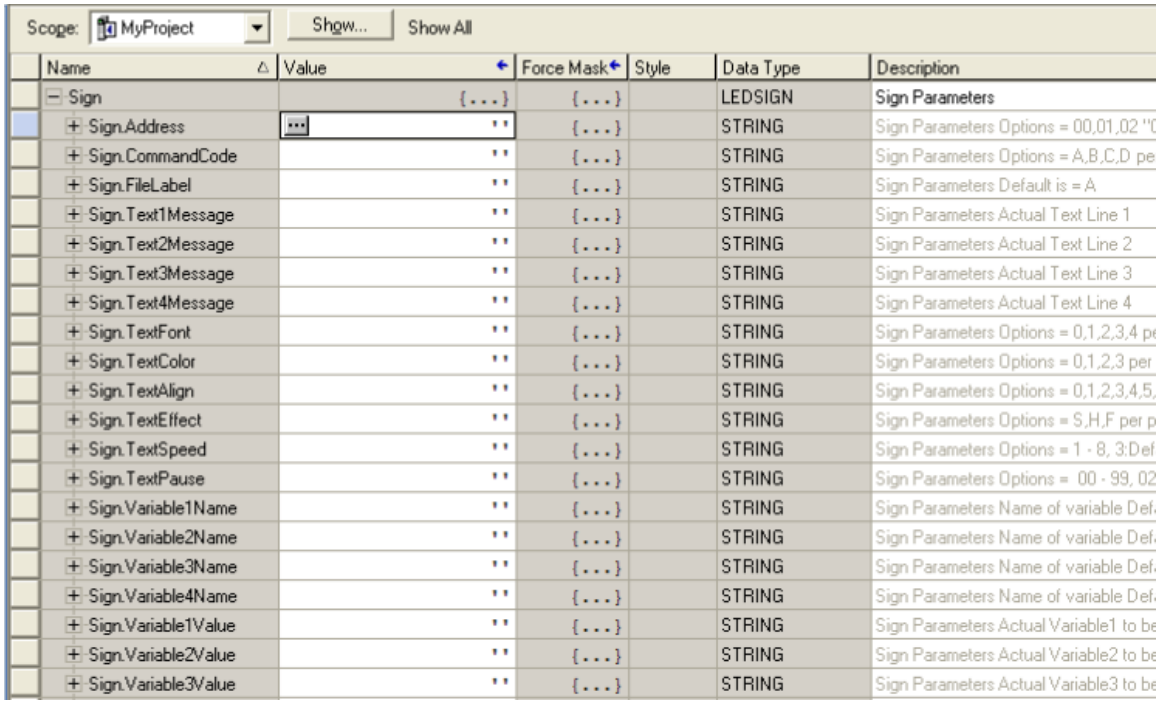
Sign tag will now need parameter information filled out.

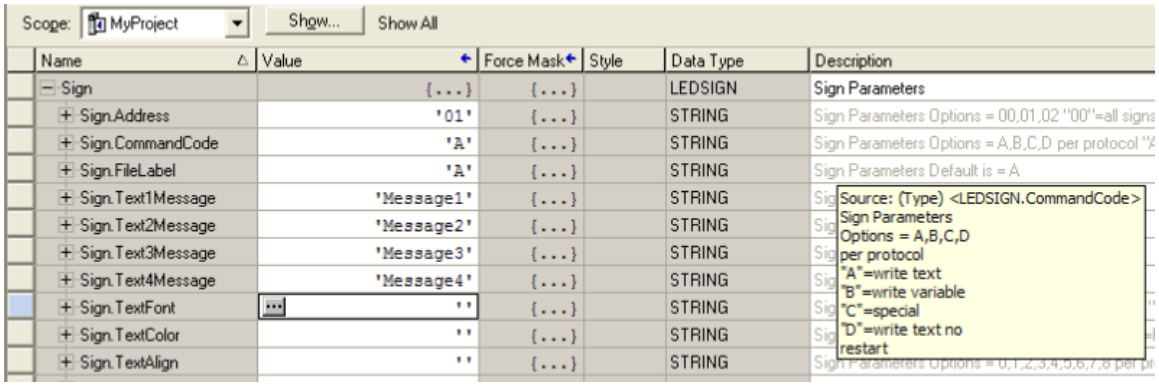
Click the ▪▪▪ ICON to begin filling in initial information.

Use the description column for "help".

Several of the parameters have "defaults" that can be used.

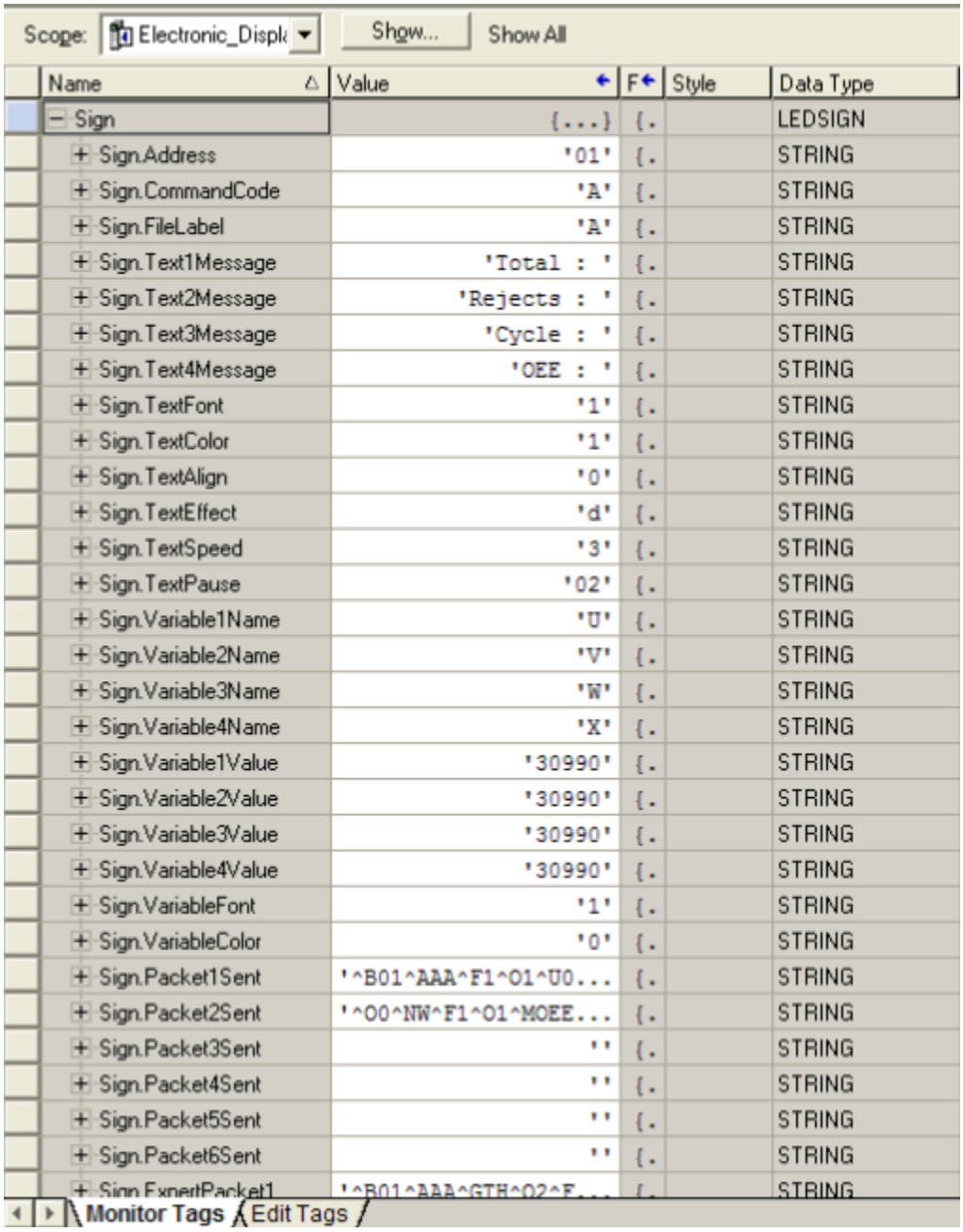
Hover mouse over description column to see details.





Example shown below of Sign Tag with all parameters filled in.

Sign "01" will receive all these parameters when AOI instruction is executed.



Scope: Electronic_Displ | Show... | Show All

Name	Value	F	Style	Data Type
Sign	{...}	{.		LEDSIGN
Sign.Address	'01'	{.		STRING
Sign.CommandCode	'A'	{.		STRING
Sign.FileLabel	'A'	{.		STRING
Sign.Text1Message	'Total : '	{.		STRING
Sign.Text2Message	'Rejects : '	{.		STRING
Sign.Text3Message	'Cycle : '	{.		STRING
Sign.Text4Message	'OEE : '	{.		STRING
Sign.TextFont	'1'	{.		STRING
Sign.TextColor	'1'	{.		STRING
Sign.TextAlign	'0'	{.		STRING
Sign.TextEffect	'd'	{.		STRING
Sign.TextSpeed	'3'	{.		STRING
Sign.TextPause	'02'	{.		STRING
Sign.Variable1Name	'U'	{.		STRING
Sign.Variable2Name	'V'	{.		STRING
Sign.Variable3Name	'W'	{.		STRING
Sign.Variable4Name	'X'	{.		STRING
Sign.Variable1Value	'30990'	{.		STRING
Sign.Variable2Value	'30990'	{.		STRING
Sign.Variable3Value	'30990'	{.		STRING
Sign.Variable4Value	'30990'	{.		STRING
Sign.VariableFont	'1'	{.		STRING
Sign.VariableColor	'0'	{.		STRING
Sign.Packet1Sent	'^B01^AAA^F1^O1^U0...	{.		STRING
Sign.Packet2Sent	'^O0^NW^F1^O1^MOEE...	{.		STRING
Sign.Packet3Sent	''	{.		STRING
Sign.Packet4Sent	''	{.		STRING
Sign.Packet5Sent	''	{.		STRING
Sign.Packet6Sent	''	{.		STRING
Sign.ExpertPacket1	'^B01^AAA^GTH^O2^F...	{.		STRING

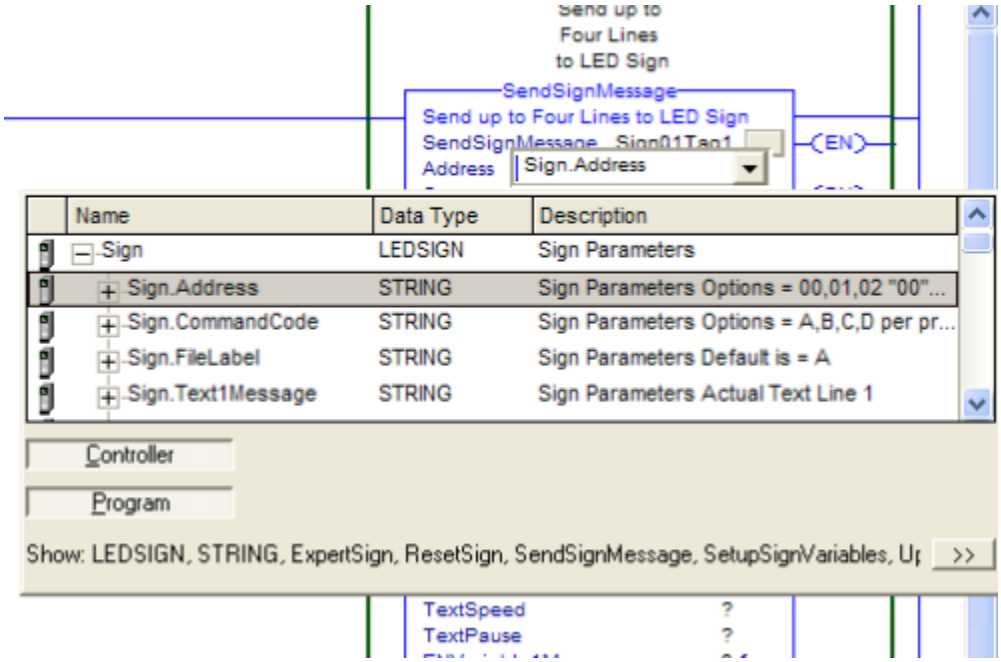
Monitor Tags | Edit Tags

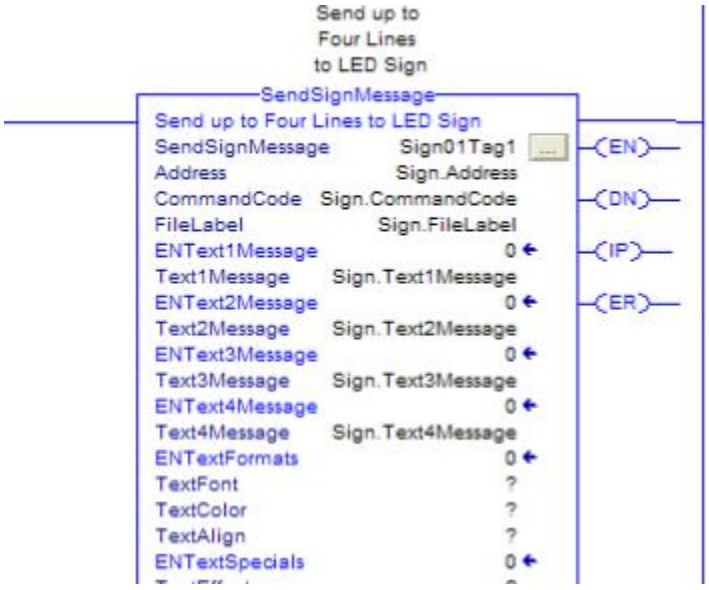
6.5 Mapping Sign Tag to AOI Function Block in Ladder Logic

Begin mapping all the sign tags to the fields in the AOI function blocks.

Sign tag parameters are word for word matched.

Map all parameters.

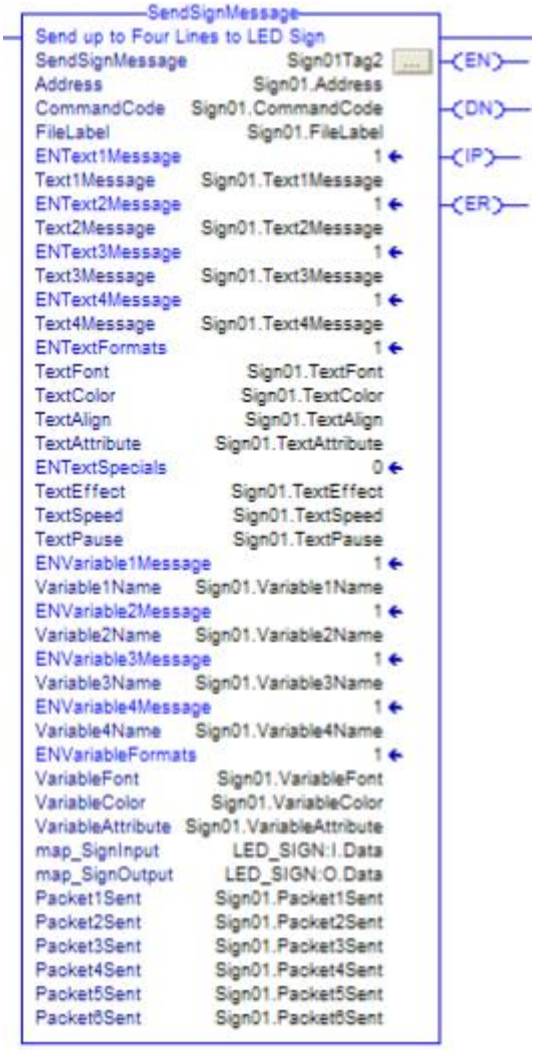




7 ELECTRONIC DISPLAY AOI INSTRUCTIONS

7.1 Send Sign Message AOI

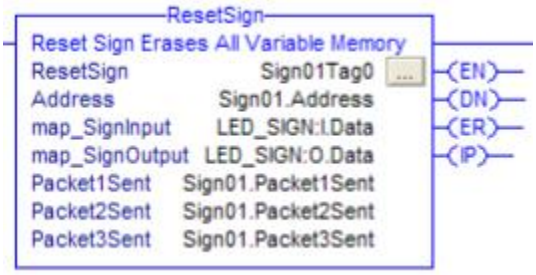
Instruction used to send up to four messages to a sign. (see video tutorials)



Operand	Type	Description
SendSignMessage	Tag	Unique Tag
Address	String	Two character sign address "00"
CommandCode	String	Protocol Command "A,B,C,D"
Filelabel	String	Protocol Command "A" typically
ENText1Message	Bool	Flag to send message 1=send 0=no
Text1Message	String	Actual message in string to send
ENText2Message	Bool	Flag to send message 1=send 0=no
Text2Message	String	Actual message in string to send
ENText3Message	Bool	Flag to send message 1=send 0=no
Text3Message	String	Actual message in string to send
ENText4Message	Bool	Flag to send message 1=send 0=no
Text3Message	String	Actual message in string to send
ENtextFormats	Bool	Flag to format message 1=yes 0=no
TextFont	String	Protocol Command Font Size
TextColor	String	Protocol Command Color
Text Align	String	Protocol Command Text Align
TextAttribute	String	Protocol Command Text Styling
ENTextSpecials	Bool	Flag to format effects 1=yes 0=no
TextEffect	String	Protocol Command Text Special
TextSpeed	String	Protocol Command Text Speed
TextPause	String	Protocol Command Text Pause
ENVariable1Message	Bool	Flag to send variable 1=send 0 =no
Variable1Name	String	Protocol Command Variable Name
ENVariable2Message	Bool	Flag to send variable 1=send 0 =no
Variable2Name	String	Protocol Command Variable Name
ENVariable3Message	Bool	Flag to send variable 1=send 0 =no
Variable3Name	String	Protocol Command Variable Name
ENVariable4Message	Bool	Flag to send variable 1=send 0 =no
Variable4Name	String	Protocol Command Variable Name
ENVariableFormats	Bool	Flag to format variable 1=yes 0=no
VariableFont	String	Protocol Command Font Size
VariableColor	String	Protocol Command Color
VariableAtrribute	String	Protocol Command Text Styling
map_SignInput	I:Data	Ethernet/IP Input Data Mapping
map_SignOutput	O:Data	Ethernet/IP Output Data Mapping
Packet1Sent	String	82 Length String Debug of Packet
Packet2Sent	String	82 Length String Debug of Packet
Packet3Sent	String	82 Length String Debug of Packet
Packet4Sent	String	82 Length String Debug of Packet
Packet5Sent	String	82 Length String Debug of Packet
Packet6Sent	String	82 Length String Debug of Packet
EN	Bool	Instruction is enabled
DN	Bool	Instruction is done sending message
IP	Bool	Instruction is in progress sending
ER	Bool	Instruction failed to send message

7.2 Reset Sign AOI

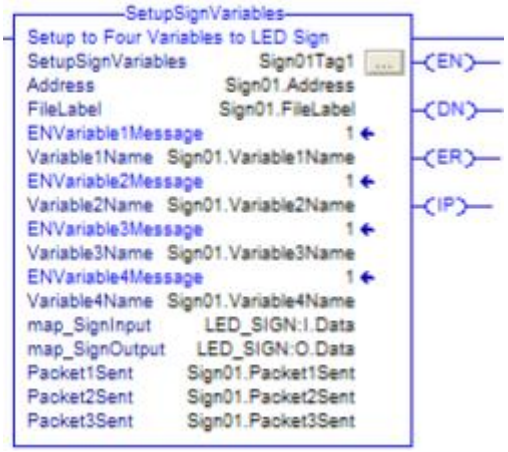
Instruction used to clean all variable data previously stored in sign. (see video tutorials)



Operand	Type	Description
ResetSign	Tag	Unique Tag
Address	String	Two character sign address "00"
map_SignInput	I:Data	Ethernet/IP Input Data Mapping
map_SignOutput	O:Data	Ethernet/IP Output Data Mapping
Packet1Sent	String	82 Length String Debug of Packet
Packet2Sent	String	82 Length String Debug of Packet
Packet3Sent	String	82 Length String Debug of Packet
EN	Bool	Instruction is enabled
DN	Bool	Instruction is done sending message
IP	Bool	Instruction is in progress sending
ER	Bool	Instruction failed to send message

7.3 Setup Sign Variables AOI

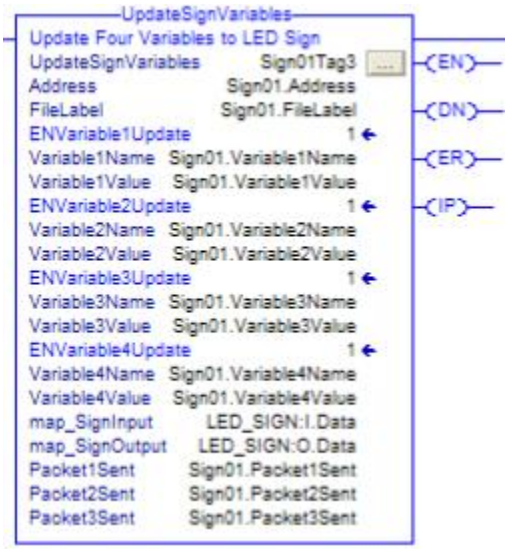
Instruction to write the memory area in the sign for variables up to 4 memory spots. (see video tutorials)



Operand	Type	Description
SendSignMessage	Tag	Unique Tag
Address	String	Two character sign address "00"
Filelabel	String	Protocol Command "A" typically
ENVariable1Message	Bool	Flag to send variable 1=send 0 =no
Variable1Name	String	Protocol Command Variable Name
ENVariable2Message	Bool	Flag to send variable 1=send 0 =no
Variable2Name	String	Protocol Command Variable Name
ENVariable3Message	Bool	Flag to send variable 1=send 0 =no
Variable3Name	String	Protocol Command Variable Name
ENVariable4Message	Bool	Flag to send variable 1=send 0 =no
Variable4Name	String	Protocol Command Variable Name
map_SignInput	I:Data	Ethernet/IP Input Data Mapping
map_SignOutput	O:Data	Ethernet/IP Output Data Mapping
Packet1Sent	String	82 Length String Debug of Packet
Packet2Sent	String	82 Length String Debug of Packet
Packet3Sent	String	82 Length String Debug of Packet
EN	Bool	Instruction is enabled
DN	Bool	Instruction is done sending message
IP	Bool	Instruction is in progress sending
ER	Bool	Instruction failed to send message

7.4 Update Sign Variables AOI

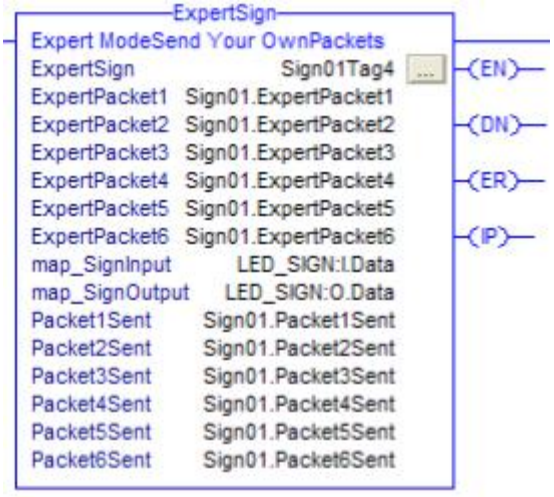
Instruction to update variable memory space in the sign (see video tutorials)



Operand	Type	Description
UpdateSignVariables	Tag	Unique Tag
Address	String	Two character sign address "00"
Filelabel	String	Protocol Command "A" typically
ENVariable1Update	Bool	Flag to update variable 1=send 0 =no
Variable1Name	String	Protocol Command Variable Name
Variable1Value	String	Actual variable data to send
ENVariable1Update	Bool	Flag to update variable 1=send 0 =no
Variable2Name	String	Protocol Command Variable Name
Variable2Value	String	Actual variable data to send
ENVariable1Update	Bool	Flag to update variable 1=send 0 =no
Variable3Name	String	Protocol Command Variable Name
Variable3Value	String	Actual variable data to send
ENVariable1Update	Bool	Flag to update variable 1=send 0 =no
Variable4Name	String	Protocol Command Variable Name
Variable4Value	String	Actual variable data to send
map_SignInput	I:Data	Ethernet/IP Input Data Mapping
map_SignOutput	O:Data	Ethernet/IP Output Data Mapping
Packet1Sent	String	82 Length String Debug of Packet
Packet2Sent	String	82 Length String Debug of Packet
Packet3Sent	String	82 Length String Debug of Packet
EN	Bool	Instruction is enabled
DN	Bool	Instruction is done sending message
IP	Bool	Instruction is in progress sending
ER	Bool	Instruction failed to send message

7.5 Expert Sign AOI

Instruction to make your own packets and send to the sign. (see video tutorials)



Operand	Type	Description
ExpertSign	Tag	Unique Tag
ExpertPacket1	String	82 Length String of Your Commands
ExpertPacket2	String	82 Length String of Your Commands
ExpertPacket3	String	82 Length String of Your Commands
ExpertPacket4	String	82 Length String of Your Commands
ExpertPacket5	String	82 Length String of Your Commands
ExpertPacket6	String	82 Length String of Your Commands
map_SignInput	I:Data	Ethernet/IP Input Data Mapping
map_SignOutput	O:Data	Ethernet/IP Output Data Mapping
Packet1Sent	String	82 Length String Debug of Packet
Packet2Sent	String	82 Length String Debug of Packet
Packet3Sent	String	82 Length String Debug of Packet
Packet4Sent	String	82 Length String Debug of Packet
Packet5Sent	String	82 Length String Debug of Packet
Packet6Sent	String	82 Length String Debug of Packet
EN	Bool	Instruction is enabled
DN	Bool	Instruction is done sending message
IP	Bool	Instruction is in progress sending
ER	Bool	Instruction failed to send message