AS-Interface with a Micrologix 1400 Controller

Introduction:

Are you looking for a simple PLC connection that is topologically flexible and easily expandable because the application I/O count and sensor count may change? Are you faced with configuration, reliability, training, and topology obstacles posed by more sophisticated networks? AS-Interface was developed with three goals in mind: to be easy, flexible, and economical.

With direct EtherNet/IP support, Pepperl+Fuchs AS-Interface gateways are easy to integrate into Rockwell Automation Micrologix 1400 controllers. Although these controllers do not support implicit CIP I/O connections, users can still easily exchange I/O with an AS-Interface gateway using message instructions—one to read inputs and one to set outputs.

Important Hardware Considerations:

- AS-Interface Ethernet gateway - VBG-ENX-K30-DMD-S16 understands **both** connected and unconnected explicit messages that get transmitted from the Micrologix1400 Controller.
- Micrologix 1400 – series A or B controllers can be considered for this data exchange.

- AS-Interface Ethernet gateway - VBG-ENX-K30-DMD-S16-EV currently only understands unconnected explicit messages that get transmitted from the Micrologix1400 Controller.
- Micrologix 1400 – series B controllers **must be used** to send unconnected explicit messages.
- Micrologix 1400 – series A controllers only support connected explicit messages and thus cannot be understood by the AS-Interface Ethernet gateway - VBG-ENX-K30-DMD-S16-EV.

Software used:

- RSLogix 500 Software (version 8.40.00)
- ASIMON+ Software

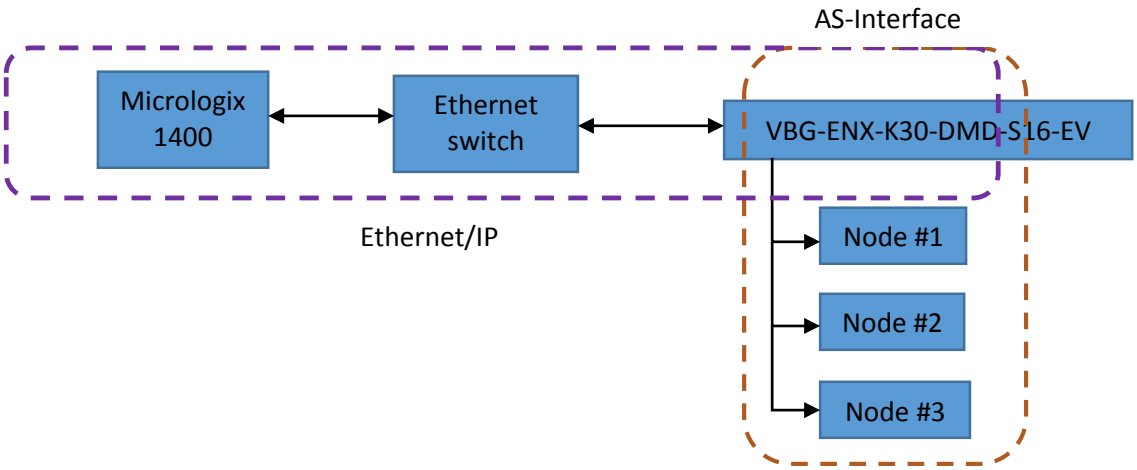


Figure 1

Assumptions:

- This document assumes the reader has prior knowledge of working with RSLogix500 Software and the PLC Instruction Set.

Configuring IP Addresses of Ethernet Devices

Since our intent is for the Micrologix 1400 controller to communicate via Ethernet to the Pepperl+Fuchs safety controller with Ethernet gateway - VBG-ENX-K30-DMD-S16, we need to configure IP addresses for both devices.

1. Use RSLogix500 Software to configure an IP address in the Micrologix 1400 controller.

   NOTE: In order to successfully communicate, the IP address of the Micrologix 1400 controller must reside on the same subnet as the IP address of the AS-Interface gateway.

2. In this document example, we have chosen 172.18.10.87 for the Micrologix 1400 (channel 1).

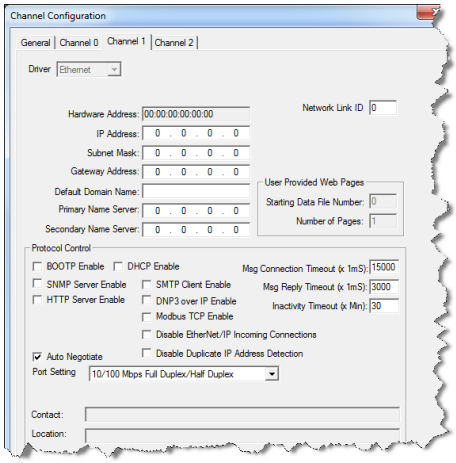


Figure 2

3. On the AS-Interface gateway display, select OK > Ethernet > EtherNet/IP > TCP/Object > TCP/IP Configuration.
4. Configure a fixed IP address and subnet mask on the Ethernet network.
5. In the document example, we have chosen 172.18.10.70 for the AS-Interface gateway.

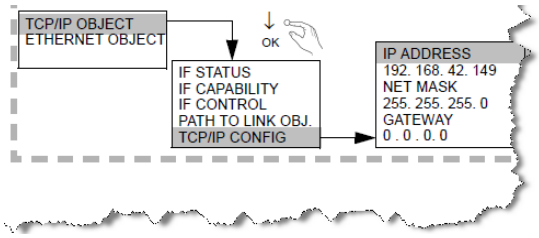


Figure 3

NOTE: At this point, both Micrologix1400 and the AS-Interface gateway have IP addresses assigned to them.

6. Go to RSLinx Classic.
7. Double-click AB_ETHIP-1
8. Confirm both Micro1400 & VBG-ENX …. gateway icons appear with successful connection.
9. Minimize RSLinx Classic.

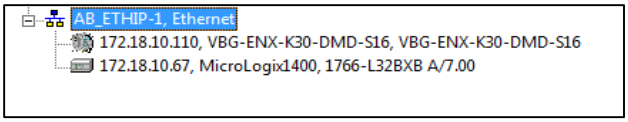


Figure 4

Configuring the MSG Instruction (Write assembly function)

The write assembly function enables the user to turn on/off any discrete outputs of AS-Interface devices connected to the network at various active nodes.

1. Insert the following ladder instruction (MSG instruction) into the LAD2 routine.

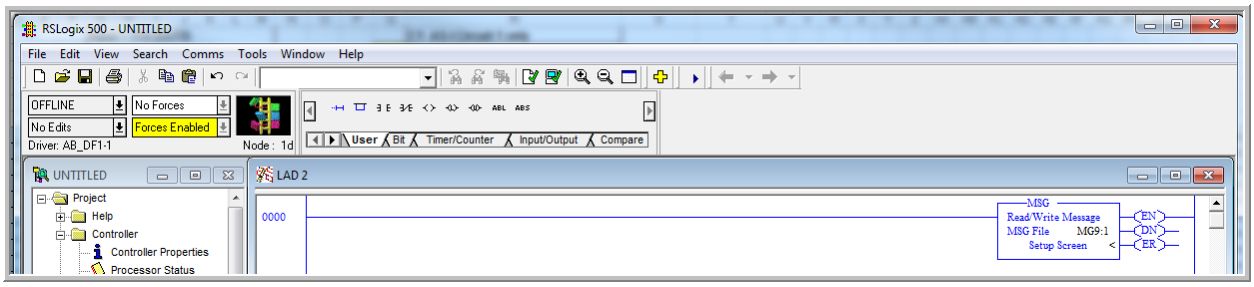


Figure 5

2. The following screen capture shows the MSG setup screen. The MSG instruction is transmitted out of channel 1 (Ethernet). Therefore, the Communication Command to transmit the MSG is CIP Generic.

NOTE: Make sure to set the following parameters as shown in Figure 6.

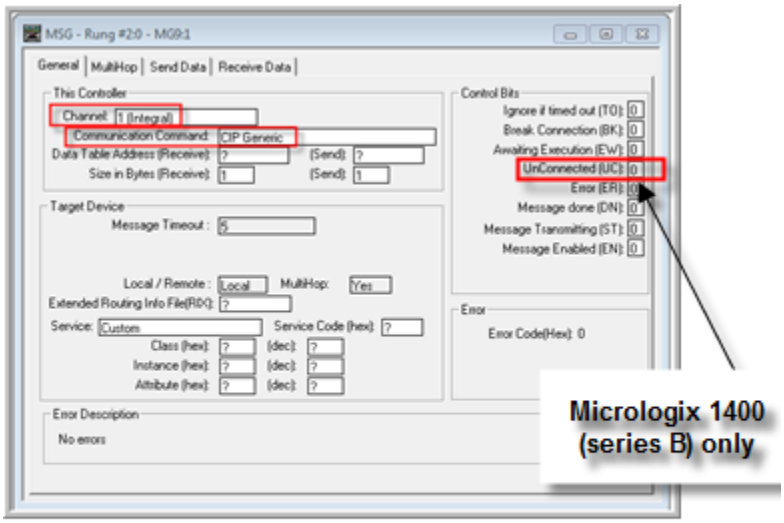


Figure 6

The next important parameter to configure in the **MSG setup screen** is the **Service.**

3. Set the Service > Write Assembly
   NOTE: After making this selection, the following fields are automatically populated.
   - *Service Code (HEX)*
   - *Class (HEX),*
   - *Attribute (HEX)*

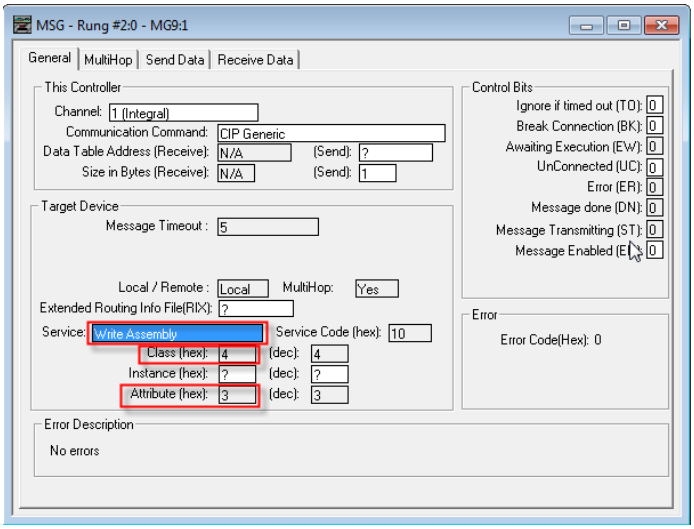


Figure 7

At this point, the user must decide the appropriate **assembly object** for the VBG-ENX-K30-DMD-S16. This is determined by the size of nodes on the AS-Interface network.

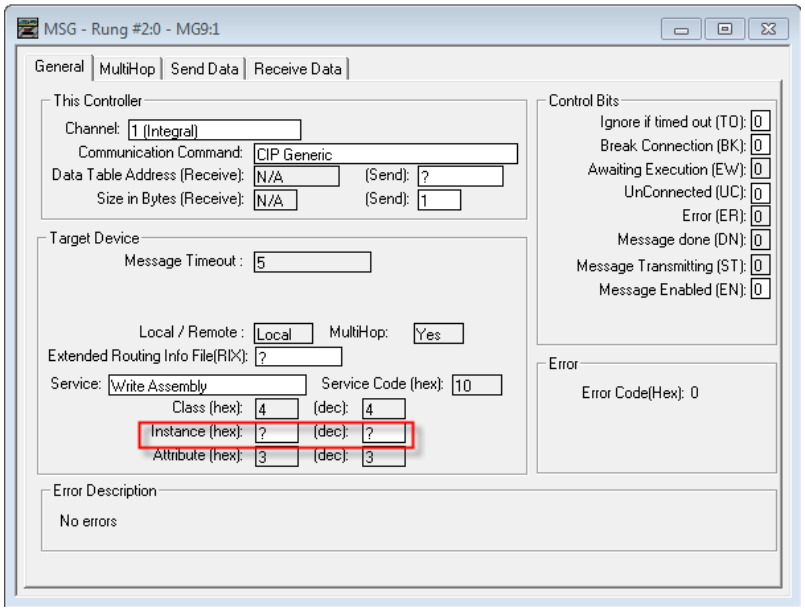


Figure 8

Determining Assembly Objects for VBG-ENX-K30-DMD-S16

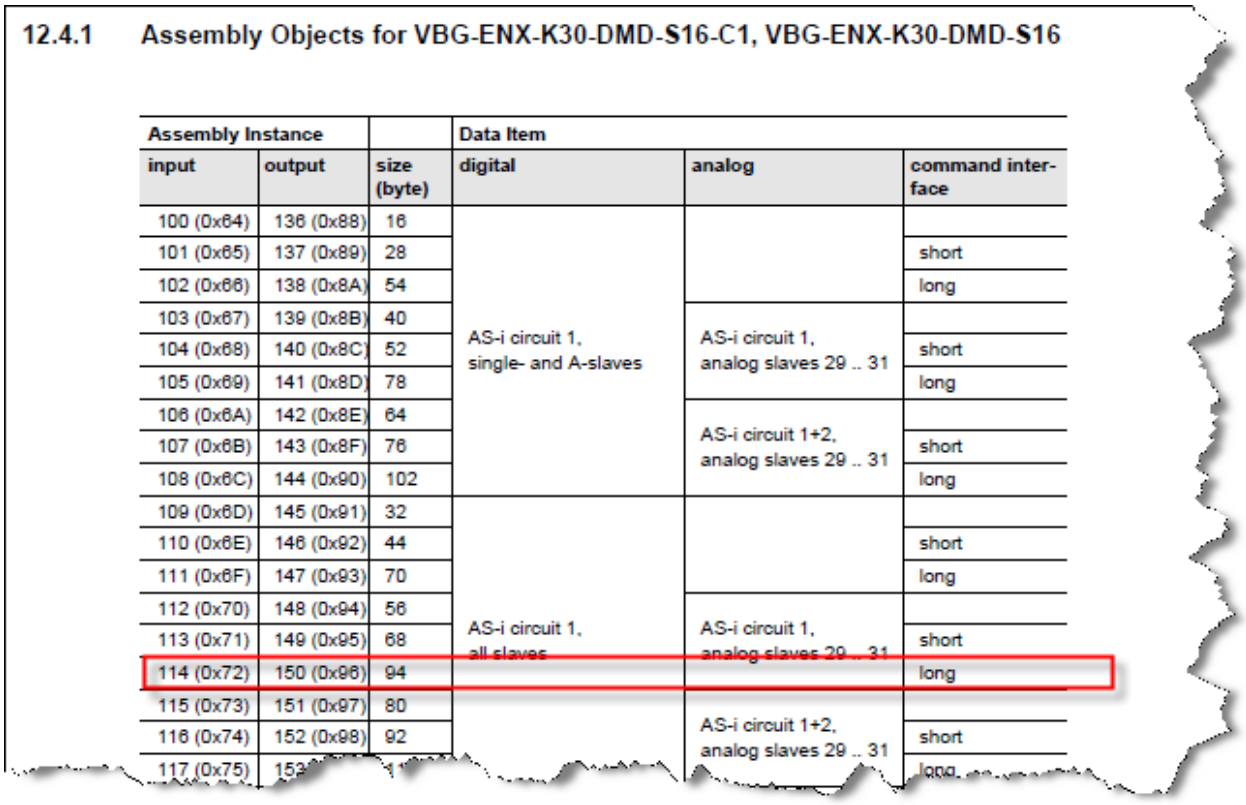
A list of assembly objects are provided in the AS-I 3.0 EtherNet/IP+Modbus TCP Gateway with Integrated Safety Monitor User Manual on p. 85.

NOTE: This list **only applies** to a VBG-ENX-K30-DMD-S16 gateway.

The size of the AS-Interface network dictates which **output assembly and input assembly instance** value will be used.

In this example, we chose ….

- Input instance = 114 (0x72)
- Size = 94 bytes → 47 integer words
- Output instance = 150 (0x96)
- Size = 94 bytes → 47 integer words



12.4.1 Assembly Objects for VBG-ENX-K30-DMD-S16-C1, VBG-ENX-K30-DMD-S16

Assembly Instance			Data Item		
input	output	size (byte)	digital	analog	command inter-face
100 (0x64)	136 (0x88)	16	AS-i circuit 1, single- and A-slaves		
101 (0x65)	137 (0x89)	28			short
102 (0x66)	138 (0x8A)	54			long
103 (0x67)	139 (0x8B)	40		AS-i circuit 1, analog slaves 29 .. 31	
104 (0x68)	140 (0x8C)	52			short
105 (0x69)	141 (0x8D)	78			long
106 (0x6A)	142 (0x8E)	64		AS-i circuit 1+2, analog slaves 29 .. 31	
107 (0x6B)	143 (0x8F)	76			short
108 (0x6C)	144 (0x90)	102			long
109 (0x6D)	145 (0x91)	32	AS-i circuit 1, all slaves		
110 (0x6E)	146 (0x92)	44			short
111 (0x6F)	147 (0x93)	70			long
112 (0x70)	148 (0x94)	56		AS-i circuit 1, analog slaves 29 .. 31	
113 (0x71)	149 (0x95)	68			short
114 (0x72)	150 (0x96)	94			long
115 (0x73)	151 (0x97)	80		AS-i circuit 1+2, analog slaves 29 .. 31	
116 (0x74)	152 (0x98)	92			short
117 (0x75)	153				long

Figure 9

Based on this selection, the AS-Interface network connected to the AS-Interface gateway can consist of:

- Single AS-Interface network only
- Up to 62 slaves -- 0-31A, 0-31B digital slaves
- (6) analog slaves 29A, 30A, 31A; 29B, 30B, 31B
- Long mailbox

Assigning Assembly Object in MSG Setup Screen

4. From the chart above, set the
    - Output Instance = 96 HEX (150 dec).
    - Size in bytes = 94.

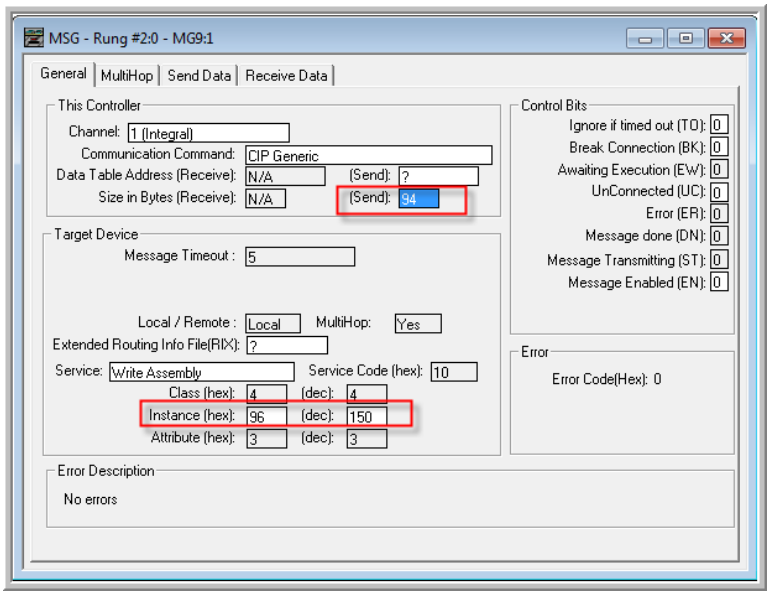


Figure 10

Assigning Data Files

At this point, we are ready to assign the **data file** from where the data will be sent from the Micrologix1400 to the VBG-ENX-K30-DMD-S16.

5. Assign the Send Data from: N11:0
6. Assign the Extending Routing Info File (RIX) = RIX18:0

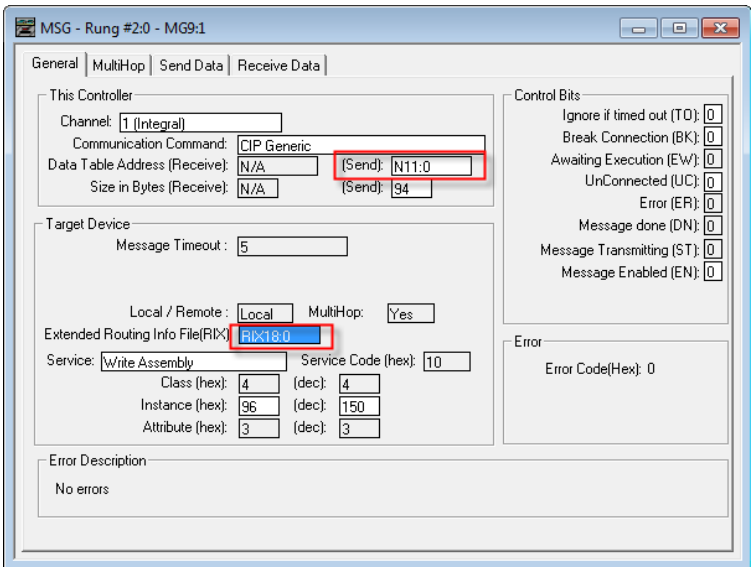


Figure 11

Understanding where discrete/analog data gets mapped in Micrologix 1400 based on assembly object selection:

Having assigned the **N11 data file** in the MSG Setup screen, the following chart shows

a. how discrete outputs for A or B nodes get mapped in the first 16 integer words of the N11:0 data file.
b. how analog outputs for A & B nodes get mapped for slaves 29, 30, 31.

NOTE: This is only a portion of the output image. Recall the full size of the input image is 47 integer words and output image is 47 integer words.

Output Image	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
word 0	slave 2/2A				slave 3/3A				flags				slave1/1A				Outputs for Network 1 - A Nodes
word 1	slave 6/6A				slave 7/7A				slave 4/4A				slave 5/5A				
word 2	slave 10/10A				slave 11/11A				slave 8/8A				slave 9/9A				
word 3	slave 14/14A				slave 15/15A				slave 12/12A				slave 13/13A				
word 4	slave 18/18A				slave 19/19A				slave 16/16A				slave 17/17A				
word 5	slave 22/22A				slave 23/23A				slave 20/20A				slave 21/21A				
word 6	slave 26/26A				slave 27/27A				slave 24/24A				slave 25/25A				
word 7	slave 30/30A				slave 31/31A				slave 28/28A				slave 29/29A				
word 8	slave 2/2B				slave 3/3B				reserved				slave1/1B				Outputs for Network 1 - B Nodes
word 9	slave 6/6B				slave 7/7B				slave 4/4B				slave 5/5B				
word 10	slave 10/10B				slave 11/11B				slave 8/8B				slave 9/9B				
word 11	slave 14/14B				slave 15/15B				slave 12/12B				slave 13/13B				
word 12	slave 18/18B				slave 19/19B				slave 16/16B				slave 17/17B				
word 13	slave 22/22B				slave 23/23B				slave 20/20B				slave 21/21B				
word 14	slave 26/26B				slave 27/27B				slave 24/24B				slave 25/25B				
word 15	slave 30/30B				slave 31/31B				slave 28/28B				slave 29/29B				
word 16	slave 31 ch1																Analog Output 1 address 31
word 17	slave 31 ch2																Analog Output 2 address 31
word 18	slave 31 ch3																Analog Output 3 address 31or Analog Output 1 address 31B
word 19	slave 31 ch4																Analog Output 4 address 31or Analog Output 2 address 31B
word 20	slave 30 ch1																Analog Output 1 address 30
word 21	slave 30 ch2																Analog Output 2 address 30
word 22	slave 30 ch3																Analog Output 3 address 30 or Analog Output 1 address 30B
word 23	slave 30 ch4																Analog Output 4 address 30 or Analog Output 2 address 30B
word 24	slave 29 ch1																Analog Output 1 address 29
word 25	slave 29 ch2																Analog Output 2 address 29
word 26	slave 29 ch3																Analog Output 3 address 29 or Analog Output 1 address 29B
word 27	slave 29 ch4																Analog Output 4 address 29 or Analog Output 2 address 29B

Figure 12

Multi-hop Tab:

7. One final step to complete the MSG configuration is the Multi-hop tab. Since the MSG instruction is transmitted from Channel 1, we need to be sure to assign the target IP Address of the AS-Interface gateway.

   NOTE: The target address will vary based on the configuration of your AS-Interface gateway IP address.

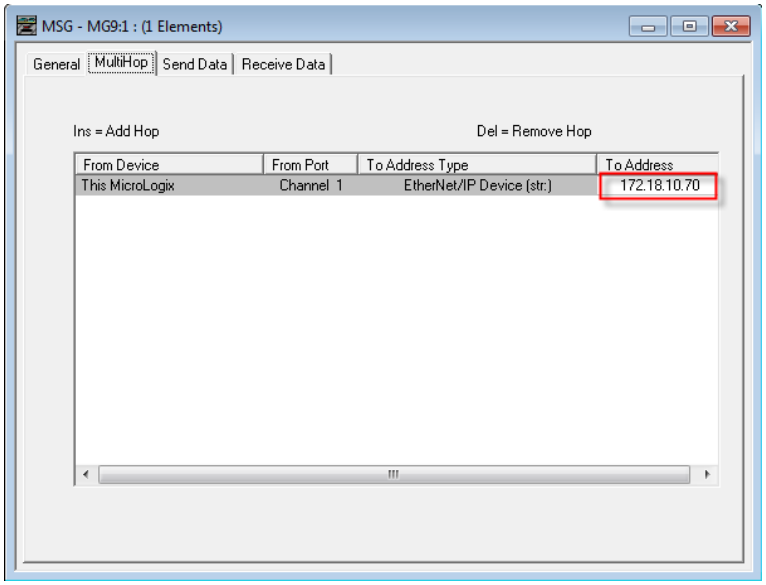


Figure 13

Taking Advantage of the Mailbox:

NOTE: While the first set of 28 words provides input and output status on the AS-Interface networks, users typically need more diagnostics. The mailbox enables customizing what additional diagnostic information can be retrieved on the AS-Interface network.

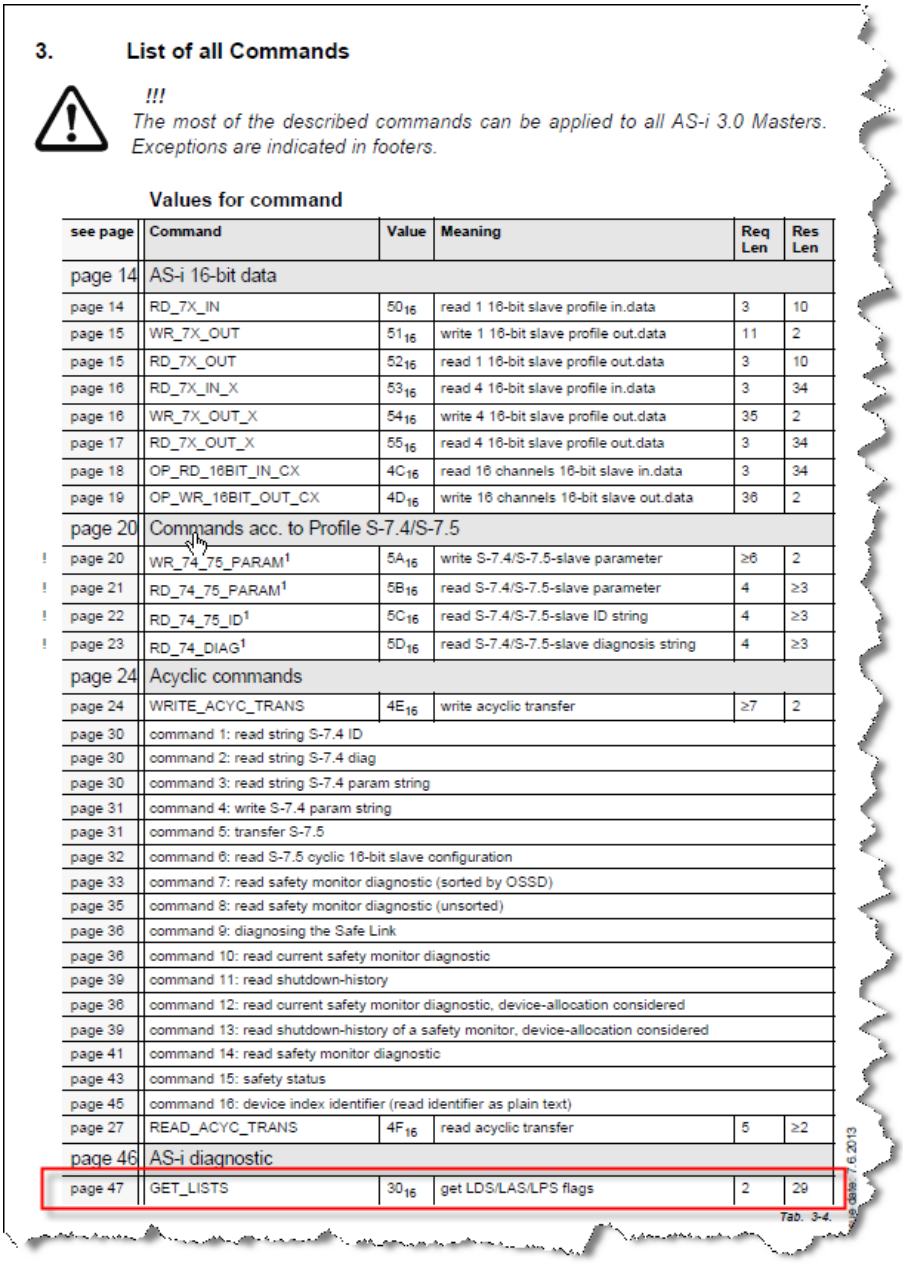
Based on our selection of the assembly object, we discussed how the first 27 words are mapped for the AS-Interface gateway. Words 28 – 46 are allocated for a mailbox. The mailbox enables the user to initiate a list of commands via command interface.

Output Image		
word 28		Mailbox
word 29		Mailbox
word 30		Mailbox
word 31		Mailbox
word 32		Mailbox
word 33		Mailbox
word 34		Mailbox
word 35		Mailbox
word 36		Mailbox
word 37		Mailbox
word 38		Mailbox
word 39		Mailbox
word 40		Mailbox
word 41		Mailbox
word 42		Mailbox
word 43		Mailbox
word 44		Mailbox
word 45		Mailbox
word 46		Mailbox

Figure 14

List of AS-I 3.0 Command Interface Commands

A list of available command interface commands is listed in AS-I 3.0 Command Interface Manual starting on p. 3.



3. List of all Commands

!!!
The most of the described commands can be applied to all AS-i 3.0 Masters. Exceptions are indicated in footers.

Values for command

see page	Command	Value	Meaning	Req Len	Res Len
page 14	AS-i 16-bit data				
page 14	RD_7X_IN	50_{16}	read 1 16-bit slave profile in.data	3	10
page 15	WR_7X_OUT	51_{16}	write 1 16-bit slave profile out.data	11	2
page 15	RD_7X_OUT	52_{16}	read 1 16-bit slave profile out.data	3	10
page 16	RD_7X_IN_X	53_{16}	read 4 16-bit slave profile in.data	3	34
page 16	WR_7X_OUT_X	54_{16}	write 4 16-bit slave profile out.data	35	2
page 17	RD_7X_OUT_X	55_{16}	read 4 16-bit slave profile out.data	3	34
page 18	OP_RD_16BIT_IN_CX	$4C_{16}$	read 16 channels 16-bit slave in.data	3	34
page 19	OP_WR_16BIT_OUT_CX	$4D_{16}$	write 16 channels 16-bit slave out.data	36	2
page 20	Commands acc. to Profile S-7.4/S-7.5				
page 20	WR_74_75_PARAM[1]	$5A_{16}$	write S-7.4/S-7.5-slave parameter	≥6	2
page 21	RD_74_75_PARAM[1]	$5B_{16}$	read S-7.4/S-7.5-slave parameter	4	≥3
page 22	RD_74_75_ID[1]	$5C_{16}$	read S-7.4/S-7.5-slave ID string	4	≥3
page 23	RD_74_DIAG[1]	$5D_{16}$	read S-7.4/S-7.5-slave diagnosis string	4	≥3
page 24	Acyclic commands				
page 24	WRITE_ACYC_TRANS	$4E_{16}$	write acyclic transfer	≥7	2
page 30	command 1: read string S-7.4 ID				
page 30	command 2: read string S-7.4 diag				
page 30	command 3: read string S-7.4 param string				
page 31	command 4: write S-7.4 param string				
page 31	command 5: transfer S-7.5				
page 32	command 6: read S-7.5 cyclic 16-bit slave configuration				
page 33	command 7: read safety monitor diagnostic (sorted by OSSD)				
page 35	command 8: read safety monitor diagnostic (unsorted)				
page 36	command 9: diagnosing the Safe Link				
page 36	command 10: read current safety monitor diagnostic				
page 39	command 11: read shutdown-history				
page 36	command 12: read current safety monitor diagnostic, device-allocation considered				
page 39	command 13: read shutdown-history of a safety monitor, device-allocation considered				
page 41	command 14: read safety monitor diagnostic				
page 43	command 15: safety status				
page 45	command 16: device index identifier (read identifier as plain text)				
page 27	READ_ACYC_TRANS	$4F_{16}$	read acyclic transfer	5	≥2
page 46	AS-i diagnostic				
page 47	GET_LISTS	30_{16}	get LDS/LAS/LPS flags	2	29

Tab. 3-4.

Figure 15

Structure of Command Interface – command request

In this example, we will trigger a **GET_LISTS (30 HEX) command interface** to collect additional diagnostics on the AS-Interface network**.**

With this command, the following entries of the AS-i Master will be read:

- The list of active AS-i slaves (LAS)
- The list of detected AS-i slaves (LDS)
- The list of projected AS-i slaves (LPS)
- The flags according to the AS-i slave specification

Before reading this data, we must first send a command request to the AS-Interface gateway. The following chart shown in Figure 16 was taken from the AS-I 3.0 Command Interface Manual p. 47. The chart is represented in bytes and shows how to initiate the desired **GET_LIST command.**

command request								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	command							
2	T	O	circuit					
3	request parameter byte 1							
...	...							
36	request parameter byte 34							

Figure 16

For easier comparison, the chart above was converted to a 16-bit unsigned integer format.

NOTE: Only one word needs to be sent to the AS-Interface gateway to trigger this command.

Output Image					
word 28	T	O	circuit	command	Mailbox

Figure 17

- N11:28 (bits 0-7) are used for the command interface command
- N11:28 (bits 8-13) are used to define the AS-Interface circuit (1 or 2)
- N11:28 (bit 14) is used to define the schema
- = 0 selects standard schema
- N11:28 (bit 15) is a toggle bit available, needed to transfer data cyclically.

Configure the N11:28 word as follows.

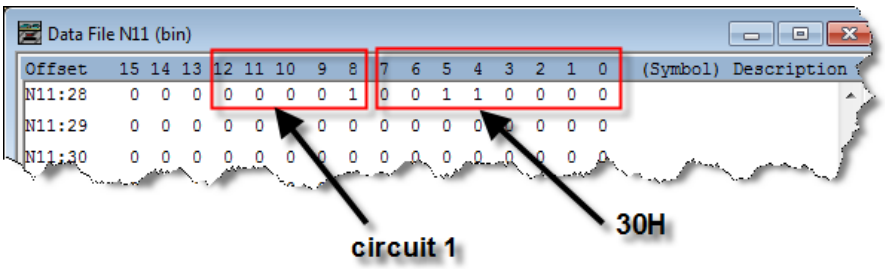


Figure 18

Final Verification of Program:

8. Add a rung #1 of the following logic after the MSG instruction. This rung ensures the information is transmitted continuously.

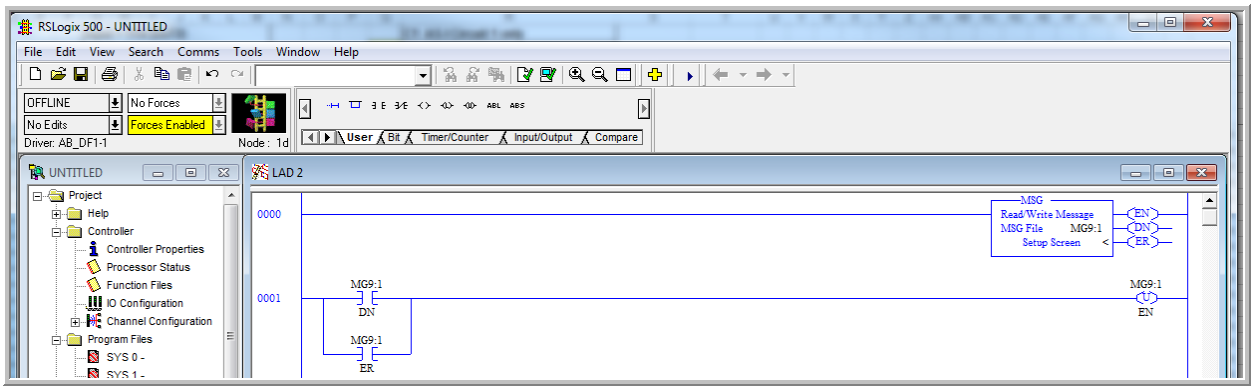


Figure 19

9. Finally, verify the project in RSLogix500 to ensure there are no errors with the rung of logic that was just programmed.

Configuring the MSG instruction (Read assembly function)

The read assembly function enables the user to monitor the status of any discrete inputs of AS-Interface devices connected to the network at various active nodes.

10. Add an additional rung of logic for the MSG read instruction into the LAD2 routine.

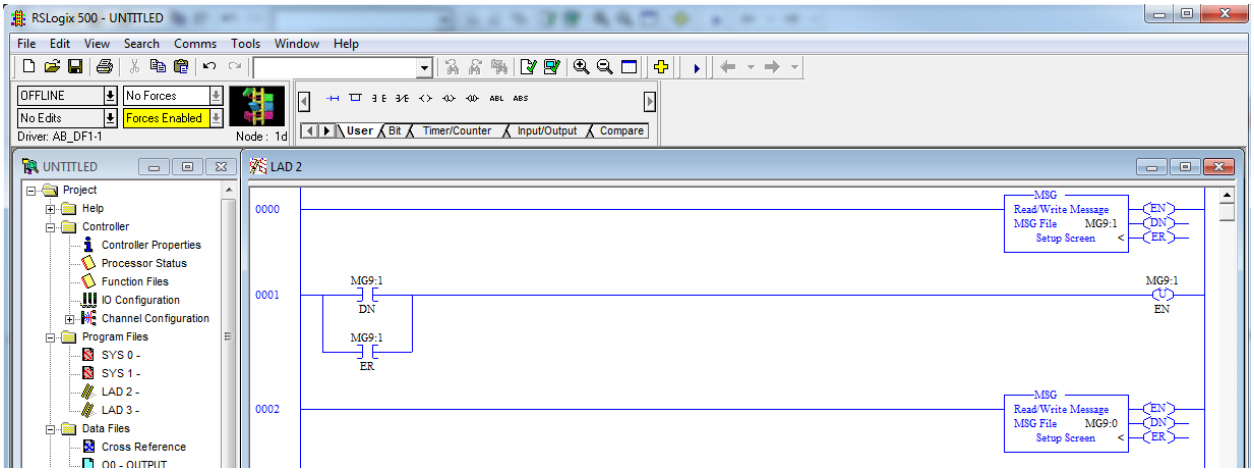


Figure 20

The following screen capture shows the MSG setup screen. Again, the MSG instruction is transmitted out of channel 1 (Ethernet). Therefore, the Communication Command to receive the MSG is CIP Generic.

NOTE: Make sure to set the following parameters as shown in Figure 21.

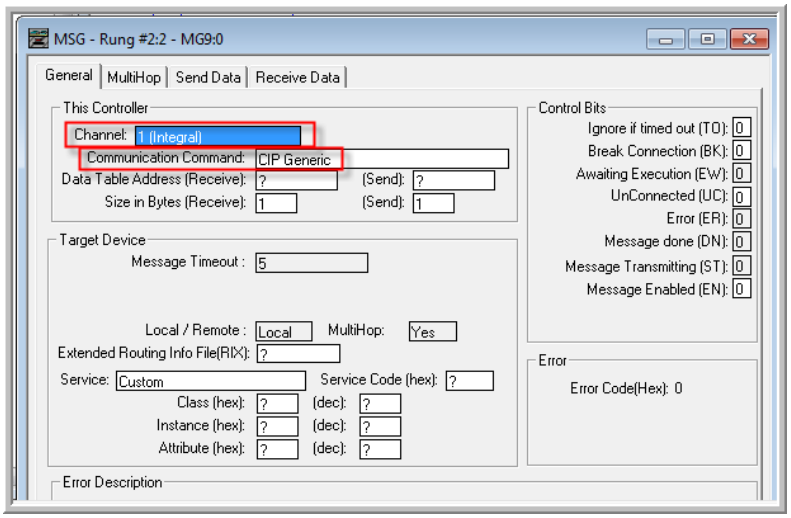


Figure 21

The next important parameter to configure in the MSG setup screen is the Service.

11. Set the Service > Read Assembly
    NOTE: After making this selection, the following fields are automatically populated.
    - *Service Code (HEX)*
    - *Class (HEX)*
    - *Attribute (HEX)*

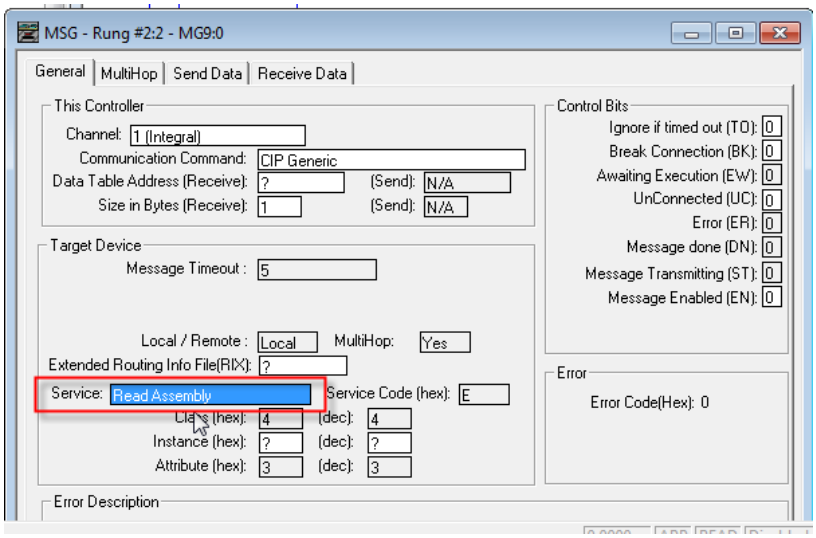


Figure 22

At this point, the user must configure the appropriate **Instance for the Read Assembly**.

Assigning Assembly Object in MSG Setup Screen

A list of assembly objects are provided in AS-I 3.0 EtherNet/IP+Modbus TCP Gateway with Integrated Safety Monitor User Manual on p. 85.

12. From the chart on p. 86 of the user manual, set the….
    - Input Instance = 72 HEX (114 dec).
    - Size in bytes = 94.

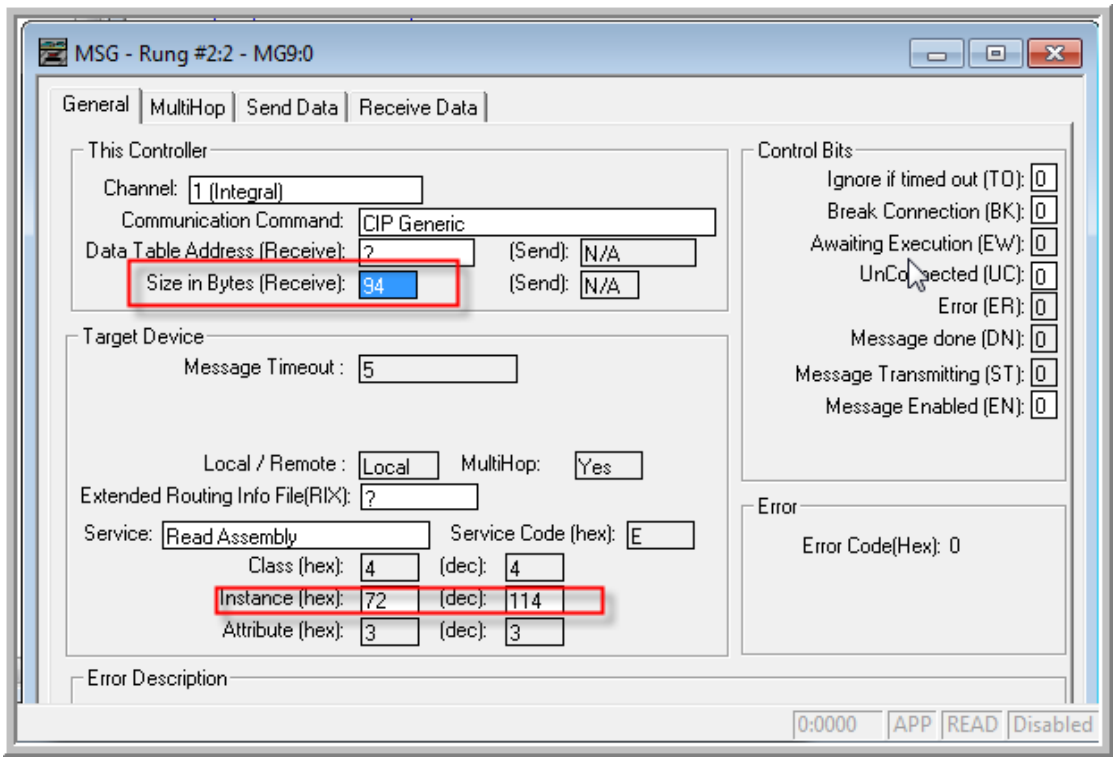


Figure 23

Assigning Data Files

At this point, we are ready to assign the data file where the data will be received in the Micrologix1400 from the VBG-ENX-K30-DMD-S16-EV.

13. Assign the Receive Data Table Address as: N10:0
14. Assign the Extending Routing Info File (RIX) = RIX18:1

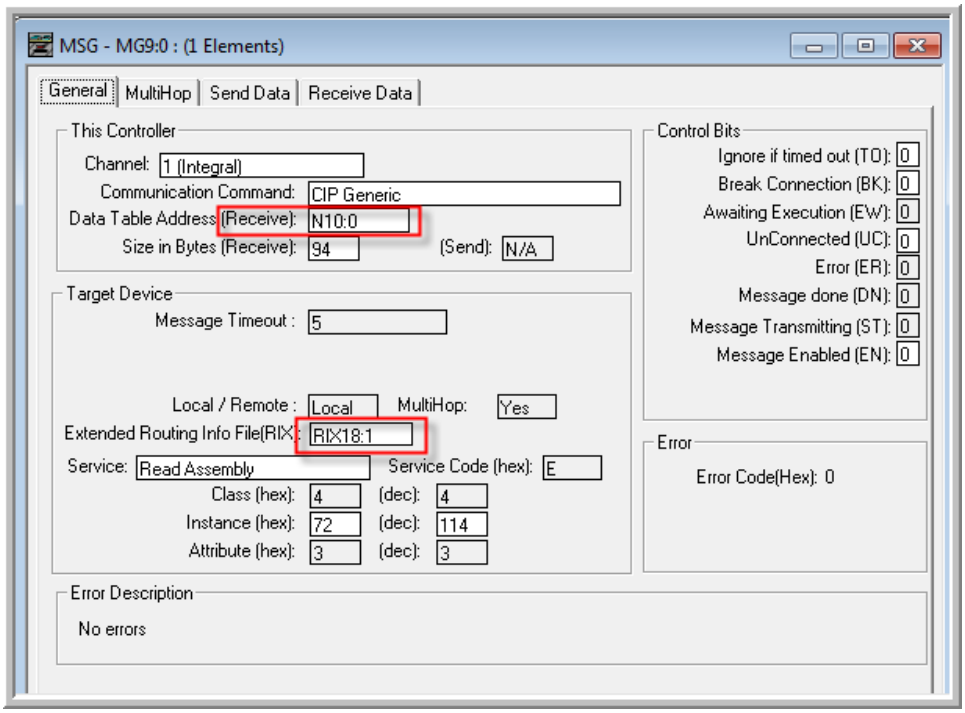


Figure 24

Understanding where the discrete/analog input data gets mapped in Micrologix1400 based on assembly object selection

Having assigned the N10 data file in the MSG Setup screen, the following chart shows

a. how discrete inputs for A and B nodes get mapped in the first 16 integer words of the N10 data file.
b. how analog inputs for A & B nodes get mapped for slaves 29, 30, 31.

NOTE: This is only a portion of the input image. Recall the full size of the input image is 47 integer words, and the output image is 47 integer words.

Input Image	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
word 0	slave 2/2A				slave 3/3A				flags				slave1/1A				Inputs for Network 1 - A Nodes
word 1	slave 6/6A				slave 7/7A				slave 4/4A				slave 5/5A				
word 2	slave 10/10A				slave 11/11A				slave 8/8A				slave 9/9A				
word 3	slave 14/14A				slave 15/15A				slave 12/12A				slave 13/13A				
word 4	slave 18/18A				slave 19/19A				slave 16/16A				slave 17/17A				
word 5	slave 22/22A				slave 23/23A				slave 20/20A				slave 21/21A				
word 6	slave 26/26A				slave 27/27A				slave 24/24A				slave 25/25A				
word 7	slave 30/30A				slave 31/31A				slave 28/28A				slave 29/29A				
word 8	slave 2/2B				slave 3/3B				reserved				slave1/1B				Inputs for Network 1 - B Nodes
word 9	slave 6/6B				slave 7/7B				slave 4/4B				slave 5/5B				
word 10	slave 10/10B				slave 11/11B				slave 8/8B				slave 9/9B				
word 11	slave 14/14B				slave 15/15B				slave 12/12B				slave 13/13B				
word 12	slave 18/18B				slave 19/19B				slave 16/16B				slave 17/17B				
word 13	slave 22/22B				slave 23/23B				slave 20/20B				slave 21/21B				
word 14	slave 26/26B				slave 27/27B				slave 24/24B				slave 25/25B				
word 15	slave 30/30B				slave 31/31B				slave 28/28B				slave 29/29B				
word 16	slave 31 ch1																Analog Input 1 address 31
word 17	slave 31 ch2																Analog Input 2 address 31
word 18	slave 31 ch3																Analog Input 3 address 31, Analog Input 1 address 31B
word 19	slave 31 ch4																Analog Input 4 address 31, Analog Input 2 address 31B
word 20	slave 30 ch1																Analog Input 1 address 30
word 21	slave 30 ch2																Analog Input 2 address 30
word 22	slave 30 ch3																Analog Input 3 address 30, Analog Input 1 address 30B
word 23	slave 30 ch4																Analog Input 4 address 30, Analog Input 2 address 30B
word 24	slave 29 ch1																Analog Input 1 address 29
word 25	slave 29 ch2																Analog Input 2 address 29
word 26	slave 29 ch3																Analog Input 3 address 29, Analog Input 1 address 29B
word 27	slave 29 ch4																Analog Input 4 address 29, Analog Input 2 address 29B

Figure 25

Multi-hop Tab:

One final step to complete in the configuration is the Multi-hop tab. Since the MSG instruction is transmitted from Channel 1, we need to be sure to assign the target IP address of the AS-Interface gateway.

NOTE: The target address varies based on your AS-Interface gateway IP address configuration.

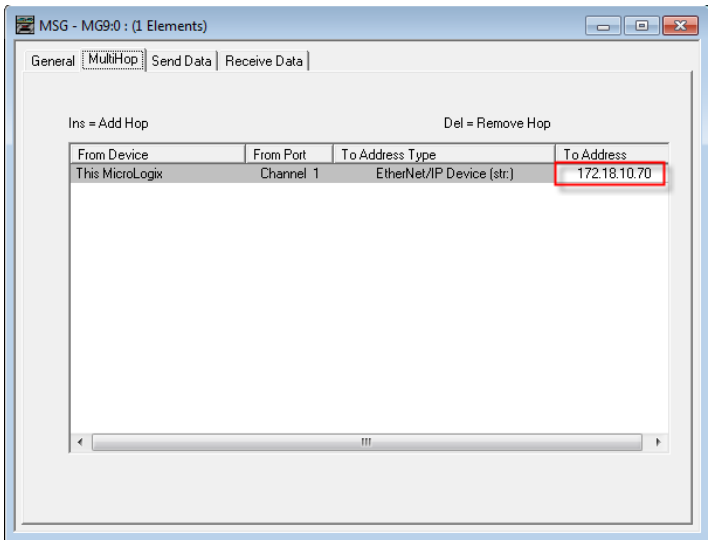


Figure 26

Taking Advantage of the Mailbox:

In this example, we will once again be using the mailbox to collect the additional diagnostics information available for the AS-Interface network.

Input Image		
word 28		Mailbox
word 29		Mailbox
word 30		Mailbox
word 31		Mailbox
word 32		Mailbox
word 33		Mailbox
word 34		Mailbox
word 35		Mailbox
word 36		Mailbox
word 37		Mailbox
word 38		Mailbox
word 39		Mailbox
word 40		Mailbox
word 41		Mailbox
word 42		Mailbox
word 43		Mailbox
word 44		Mailbox
word 45		Mailbox
word 46		Mailbox

Figure 27

Structure of Command Interface – command response

At this point, the MSG Write command has initiated the GET_LISTS (30 HEX) command interface. The following chart represents in bytes how this command collects the additional diagnostics.

command response								
byte	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
1	command (mirrored)							
2	T	result						
3	response byte 1							
...	...							
36	response byte 34							

Figure 28

NOTE: For easier comparison, the chart below was converted to a 16-bit unsigned integer format.

NOTE: The MSG Read instruction will collect the AS-Interface diagnostics at words 28 – 40 as shown below

Response Read																	
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
word 28	T	O	circuit						30 (hex)								
word 29	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	0A	LAS
word 30	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A	LAS
word 31	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	0B	LAS
word 32	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B	LAS
word 33	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	0A	LDS
word 34	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A	LDS
word 35	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	0B	LDS
word 36	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B	LDS
word 37	15A	14A	13A	12A	11A	10A	9A	8A	7A	6A	5A	4A	3A	2A	1A	0A	LPS
word 38	31A	30A	29A	28A	27A	26A	25A	24A	23A	22A	21A	20A	19A	18A	17A	16A	LPS
word 39	15B	14B	13B	12B	11B	10B	9B	8B	7B	6B	5B	4B	3B	2B	1B	0B	LPS
word 40	31B	30B	29B	28B	27B	26B	25B	24B	23B	22B	21B	20B	19B	18B	17B	16B	LPS

Figure 29

- N10:28 (bits 0-7) display the command interface command received
- N10:28 (bits 8-13) define the AS-I circuit (1 or 2)
- N10:28 (bit 14) display the schema
  0 selects standard schema
- N10:28 (bit 15) displays the toggle bit status
- N10:29 – N10:40 displays
  - The list of active AS-i slaves (LAS)
  - The list of detected AS-i slaves (LDS)
  - The list of projected AS-i slaves (LPS)
  - The flags according to the AS-i slave specification

Final Verification of Program:

15. Add a rung #3 of the following logic after the MSG instruction. This rung ensures the information is transmitted continuously.

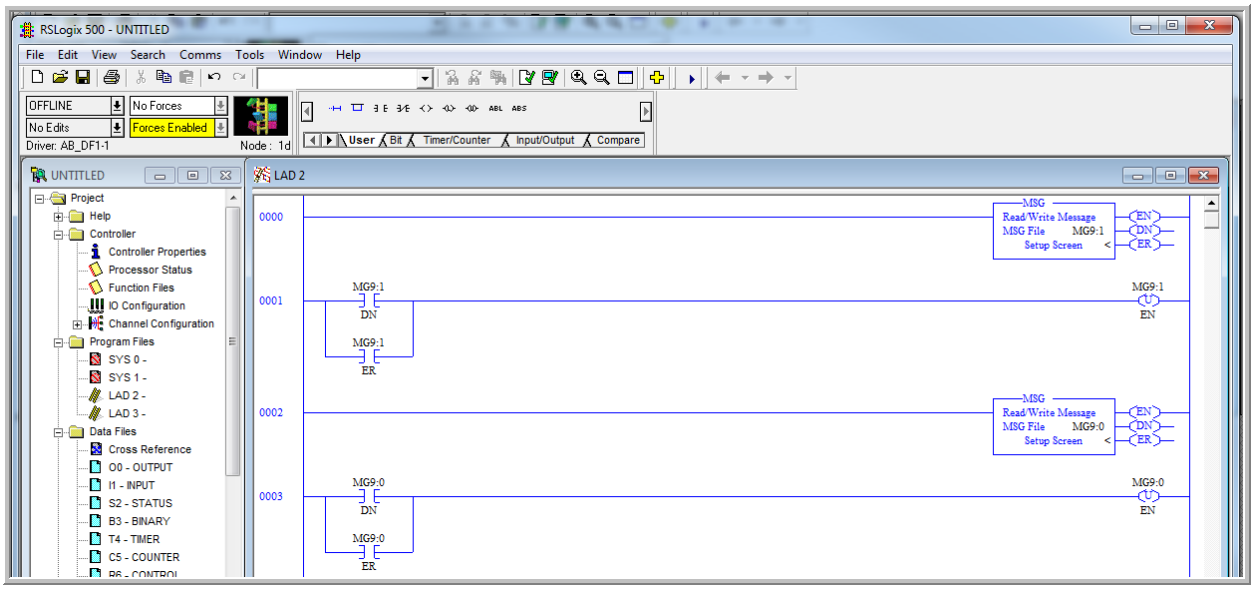


Figure 30

16. Finally, verify the project in RSLogix500. This ensures there are no errors with the rung of logic that was just programmed.

At this point, the configuration of the Read Assembly MSG instruction is complete. We can view the additional diagnostics collected by the GET_LISTS command at the following address locations.

- N10:28 (bits 0-7) displays the command interface command received (30 HEX)
- N10:28 (bits 8-13) defines the AS-I circuit = 1
- N10:28 (bit 14) display the schema defined = 0
- N10:28 (bit 15) displays the status of the toggle bit
- N10:29 – N10:40 data file locations display
    - The **list of active AS-i slaves** (LAS) = N10:29 – N10:32
    - The **list of detected AS-i slaves** (LDS) = N10:33 – N10:36
    - The **list of projected AS-i slaves** (LPS) = N10:37 – N10:40
    - The flags according to the AS-i slave specification