Sentry Series Ethernet IP Configuration

The Sentry unit supports the following data for communication with an Allen-Bradley controller using Ethernet IP:
Boolean: Digital Inputs, Digital Outputs, and "B" Registers (for internal Boolean storage).
Analog: Universal/Analog Inputs, Analog Outputs, and "I" Registers (for internal Integer storage).

The Sentry does not support real/floating point type values. However, it can be configured to display an integer (16 or 32 bit) with an implied decimal point to represent a real value.

Configuring the Sentry as the Ethernet IP Master:
The Sentry as a Master can:
Read B3:x bits into its Digital Outputs.
Read B3:x bits into its "B" Registers.
Read N7:x values into its Analog Outputs.
Read N7:x values into its "I" Registers
Note that remote values cannot be read into the Sentry's analog inputs or digital inputs.

Write its Digital Inputs to B3:x bits.
Write its Digital Outputs to B3:x bits.
Write its "B" Registers to B3:x bits.
Write its Universal / Analog Inputs to N7:x registers.
Write its Analog Output values to N7:x registers.
Write its "I" Registers to N7:x registers.

The AB PLC as slave:
The AB PLC may need some configuration to act as a slave. Older AB controllers such as the SLC types that use file numbers for data should map all Boolean values to the B3:x file and all Integer values to the N7:x file so that the Sentry can read them. Real/Floating Point values should be converted to an Integer and stored in the N7:x file.
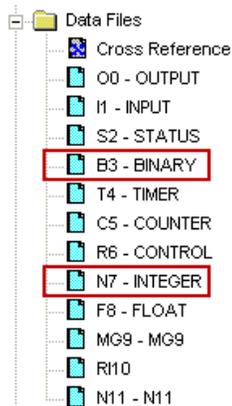
Sentry Series Ethernet IP Configuration

Newer AB controllers such as the Logix types should map data arrays to a file number of 3 or 7 under the "Logic/Map PLC-SLC Messages" menu in RSLogix 5000.
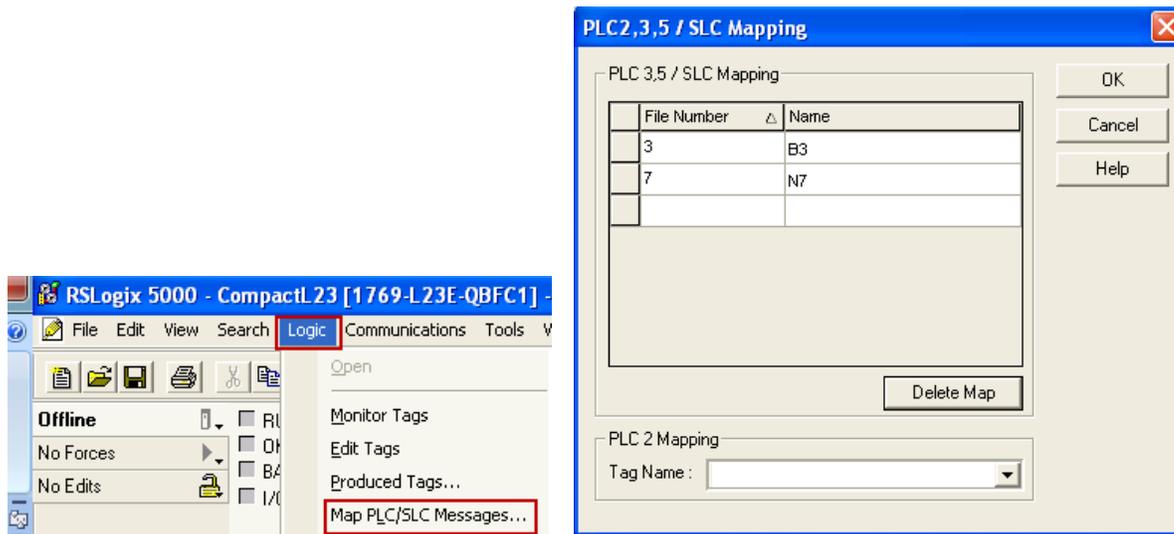
Displaying the Sentry's IO Points:

It's useful to watch the Boolean and Analog values in both the master and slave units to verify that comm. is working. The Sentry allows you to see the physical IO points (UI/AI, AO, DI, and DO) values by default, but seeing the "I" and "B" (Concentrator) registers requires some configuration.

To see the Sentry's Concentrator Registers, log into the units web page and go to "Configuration" then "Concentrator". There are two page links here, one for "Numbers" and one for "Bits". The Numbers page is for the "I" registers, and the Bits page is for the "B" registers. Simply make the ones that you are working with to be visible and writable. The "format" column allows you to have an implied decimal point to mimic a real/float value. You can set them to be retained also if you want their values to come back after a reset or power cycle of the unit. Go back to the user home page and then to the Concentrator Numbers and Concentrator Bits pages to see the values.

Sentry Master Configuration

Log into the units web page and go to "Configuration" then "Mastering" then "Ethernet". Keep the default settings on this page, but note that the "Polling time" will be the rate that the Sentry communicates (reading or writing). The polling time is in 100ms units, so a value of 10 in the setting will communicate at 1 second intervals. If any "trigger" or "on change" events are configured, then the poll rate will still be active in parallel with those events. You can set the poll rate to a high value if desired when using triggered or on event communications and only wish to use those for timing. The poll rate will still kick in, but only at the slow rate you have specified.

Next, go to the "Destinations" page. This is where every slave unit that the Sentry will communicate with, are configured. Note that if Ethernet IP is selected as the protocol, there is no ID number. This is because AB PLCs normally default to ID of 0 on their Ethernet IP port, so we always use an ID of 0.

2015 Industrial Control Links Incorporated

Sentry Series Ethernet IP Configuration

Next, go to the Polling Events page. Enable the first Destination and the message type will pop up. The entries with "from" in them are reads, and the entries with "to" in them are writes. The "AI" here is actually a "UI" (universal input), if the Sentry is a type that has only UIs. The Index values are the starting points, and the Block Size is the number of bits or words in total to read from or write to. The first point in the Sentry is always 1, and the first point in the AB PLC is always 0.

For example, this will poll the AB B3:0 bits, starting at bit 8, into the Sentry's 4 digital outputs:

	Destination	Message Type	Index Local	Remote	Block Size
1	Micro1400	Local DO from B3	1	8	4

The AB PLC bits will come from here:

Data File B3 (bin) -- BINARY																
Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
B3:0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1

And in this case (with bit 8 being on), would turn on digital output 1 in the Sentry:

DO1	Digital_Out_1
DO2	Digital_Out_2
DO3	Digital_Out_3
DO4	Digital_Out_4

This example will write 2 of the Sentry's UIs/AIs into the AB PLCs N7:0 and N7:1 registers:

	Destination	Message Type	Index Local	Remote	Block Size
1	Micro1400	Local AI to N7	1	0	2

Check the "User Home / Comm Stats" page for the Sentry to verify that communication is working. The name of the Destination should appear here, and the transmit and receive counts should be going up. Then go to the Local IO or Concentrator pages to verify that data is coming across.

Clear Stats	Xmits	Rcvs	Fail	Last	Status	Max (S)	Last (S)	Src	Dst
Ethernet	0	0	0	0	OK	0.0	0.0	0	0
Serial	0	0	0	0	OK	0.0	0.0	0	0
Micro1400	8	8	0		OK	0.016	0.013		

2015 Industrial Control Links Incorporated

Sentry Series Ethernet IP Configuration

The AB PLC as Master

When the AB PLC is acting as the Master, there are 4 file numbers to work with (3, 13, 7, and 17).

File 3 – To read the Sentry's digital inputs.

File 13 – To read or write to the Sentry's digital outputs or "B" registers.

File 7 – To read the Sentry's analog inputs (UI/AI).

File 17 – To read or write to the Sentry's analog outputs or "I" registers.

If the Sentry is acting as the slave, then no configuration is necessary (for the Sentry) other than the slave statistics, which is optional.

The Sentry as a Slave can respond with the following data.

Digital Inputs: (file 3, starting at element 0).

Digital Outputs: (file 13, starting at element 0).

"B" Registers: (file 13, starting at element 8).

Universal/Analog Inputs: (file 7, starting at element 0).

Analog Outputs: (file 17, starting at element 0).

"I" Registers: (file 17, starting at element 8).

Reading from and writing to Booleans:

This example will poll the Sentry's (Sprite in this case) digital inputs 1-4 into B3:0 bits 0-3 *(when either of the bits are turned on and the counter has a value of 1. This is part of a larger program that sequences through multiple events and the counter is incremented to activate the other events).*


2015 Industrial Control Links Incorporated
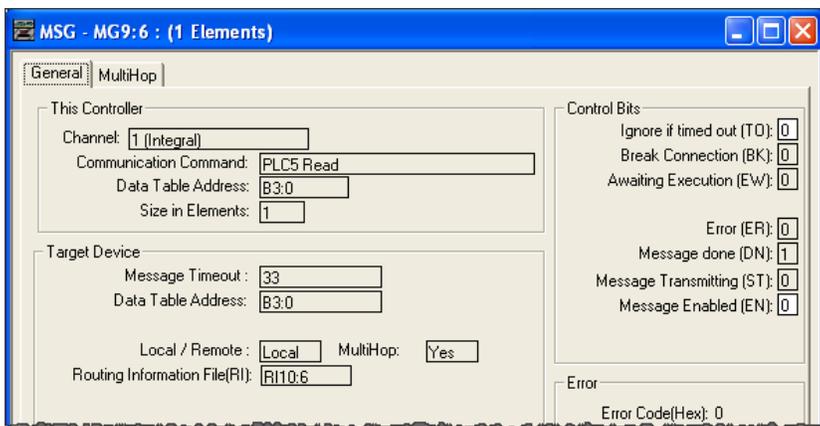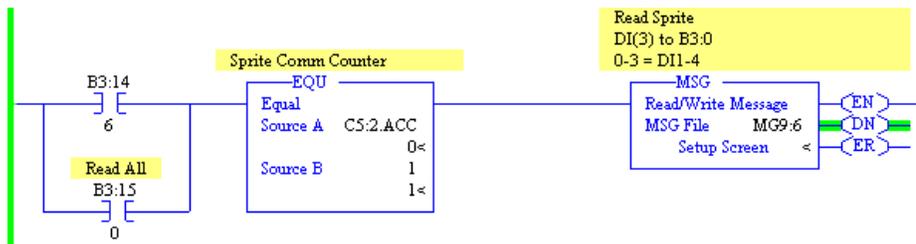
Sentry Series Ethernet IP Configuration
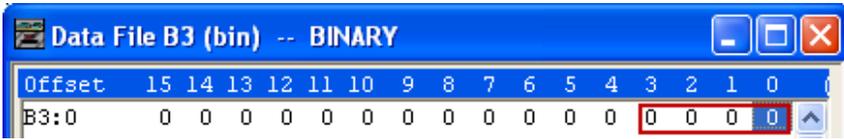
Notice here (previous page) that the first element to poll for is 0, even though the Sentry IO always starts at 1. This is because the AB PLC normally asks for data (in a message event) starting at 0. The Sentry will see the request for word 0 and reply with the data from word 1. The examples below for the AB PLC will work, but are simplified in that they don't handle the error bit coming from the message event. See the documentation for more detail on how to properly program a read event in the AB PLC

Also (and very important), notice that the Size in Elements is set to 1. This setting is at the word level and will read an entire word (16 bits) at a time into B3:0. This means that the other bits in B3:0 should not be used for other purposes since they will get written over with the other 12 bits from the Sentry. For example if the Sentry is a Sprite which has 4 digital inputs, then the other 12 bits in B3:0 will also get written to on every poll.

This example will read the Sentry's 4 digital outputs into B3:0 bits 0-3. Note the "B13:0" in the target configuration, which applies to digital outputs and "B" bits.

2015 Industrial Control Links Incorporated
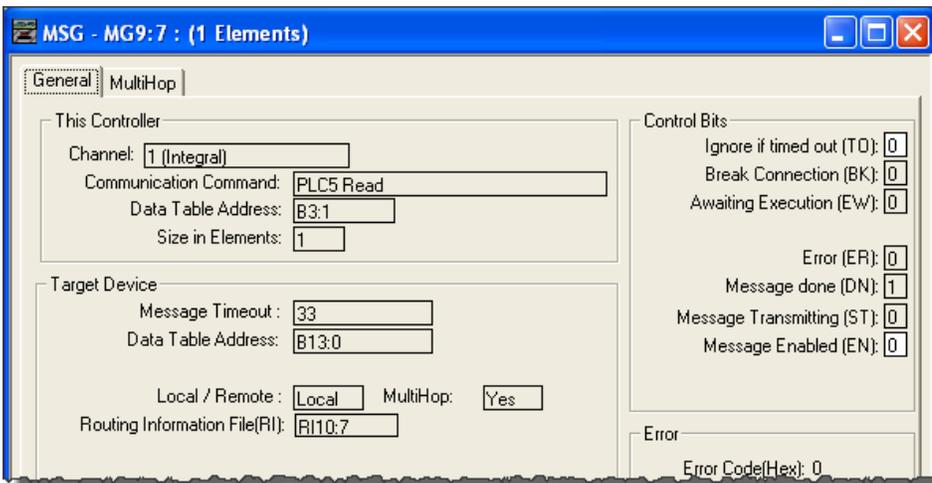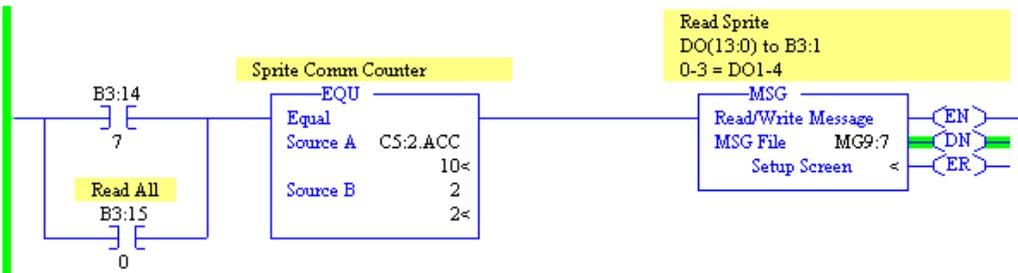
Sentry Series Ethernet IP Configuration

The same rule applies here, where all 16 bits in B3:0 will get written to. In this case there are two sets of bits that are useful, the digital outputs and the first 8 "B" registers. This is a common type of grouping that is used in the Sentry for values that can be written to (digital outputs and B registers, analog outputs and I registers):

File 13 – bits 0-x are digital outputs (up to 8), and bits 8-16 are the first 8 "B" registers.
File 17 – Integers 0-x are for analog outputs (up to 8), and integers 8-16 are the first 8 "I" registers.

So you could look at the first word as being both Sentry DOs and "B" bits:
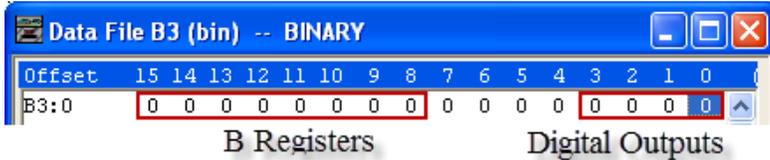
Reading from and writing to Integers:
This example will poll the Sentry's (Sprite in this case) universal inputs 1-2 into N7:0 & N7:1.
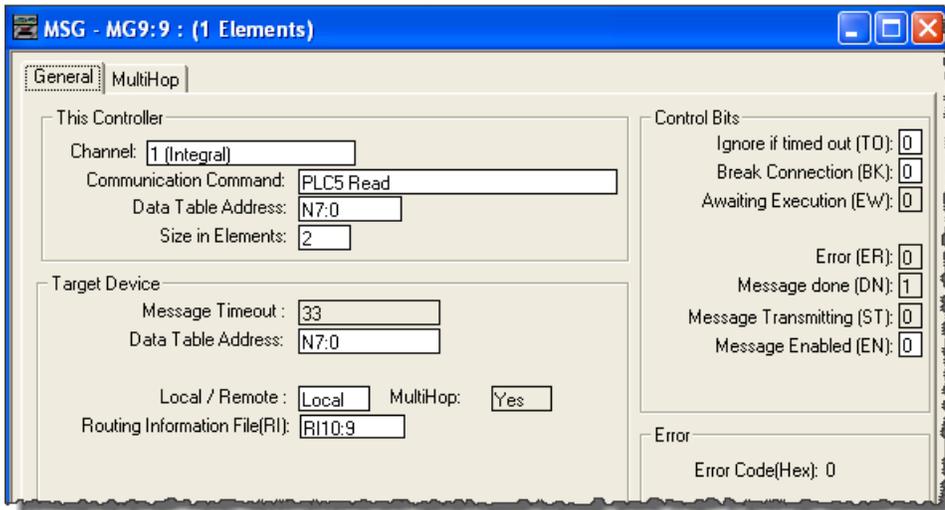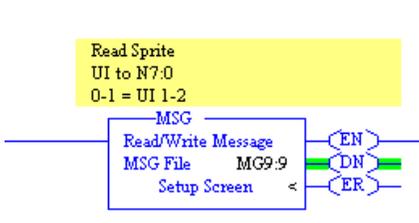
This example will write the AB PLCs N7:0 & N7:1 into the Sentry's (Sprite in this case) Analog Outputs 1-2.

2015 Industrial Control Links Incorporated

Sentry Series Ethernet IP Configuration

Please contact ICL Support if there are any questions.

530-888-1800 ext. 3

support@iclinks.com

2015 Industrial Control Links Incorporated