

# **DNP3 Slave Communications Drivers v1.01+**

## **Information Sheet for Crimson v3.0+**

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### **Compatible Devices**

DNP3 Serial or Ethernet master device.

### **Verified Device**

Invensys/Foxboro SCD5200

### **Required Devices**

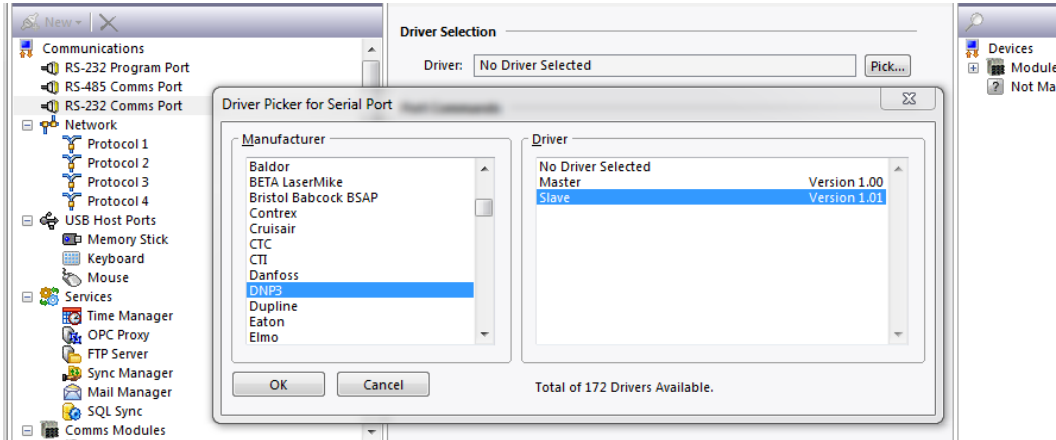
A Red Lion Graphite HMI or Graphite Controller device is mandatory when using a DNP3 communications driver.

### **Overview**

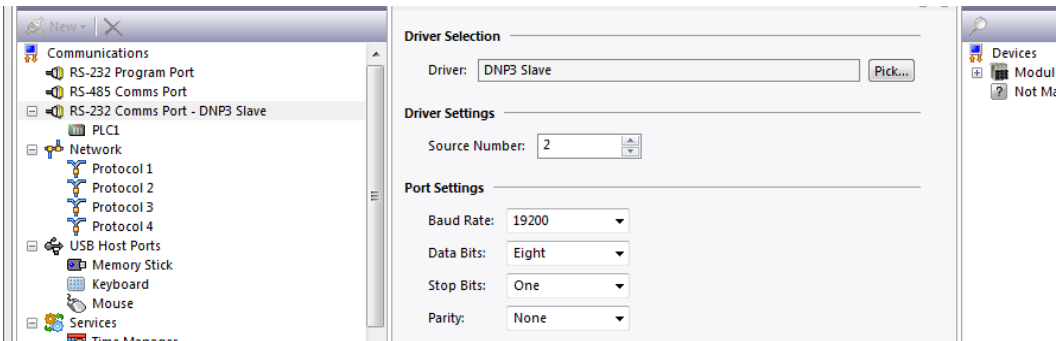
Red Lion provides serial and Ethernet DNP3 slave communications drivers to participate on a DNP3 network as a slave device. DNP3 support includes solicited and unsolicited events. Each event buffer is configurable for up to 32000 events.

## Serial Port Configuration

In Crimson's Communications category select the desired serial port in the Communications tree and click on the Pick... button.



Select the DNP3 Slave communications driver as shown above and click OK.

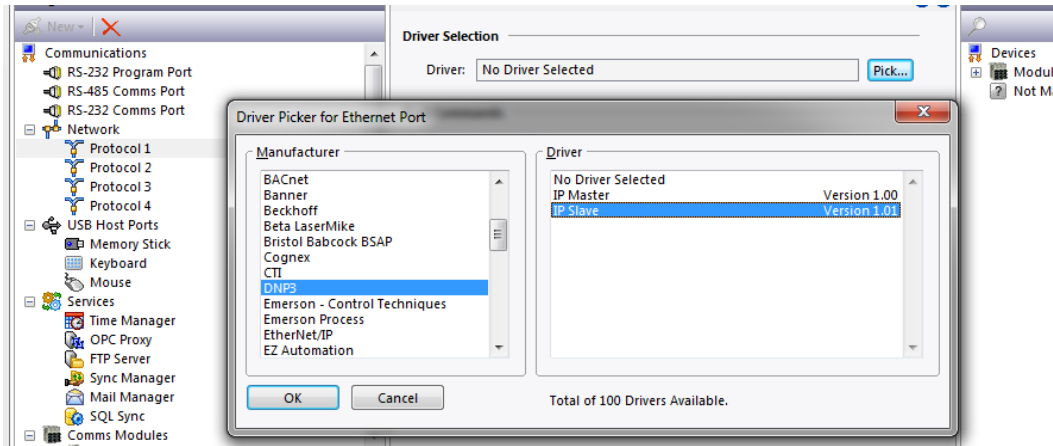


The Source Number setting will serve as an identifier for the Red Lion device on the DNP3 network. Set the Source Number to a number that does not currently exist on the network.

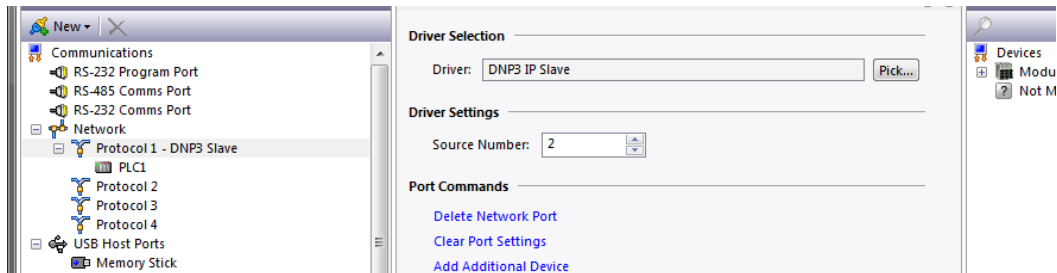
Modify the Baud Rate, Data Bits, Stop Bits and Parity as necessary to match the current settings of the DNP3 network.

## Ethernet Port Configuration

In Crimson's Communications category select an available Protocol in the Network element of the Communications tree and click on the Pick... button.

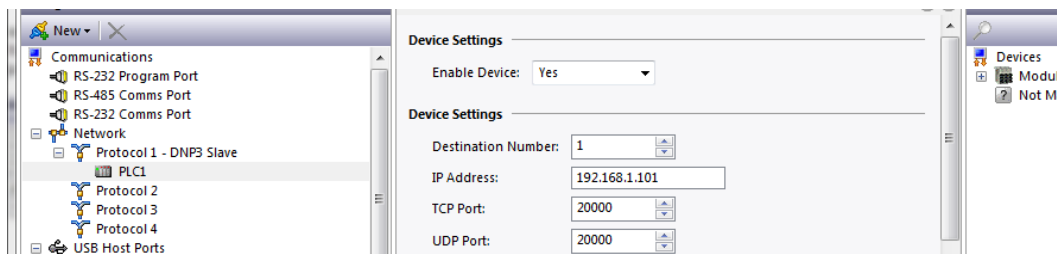


Select the DNP3 IP Slave communications driver as shown above and click OK.



The Source Number setting will serve as an identifier for the Red Lion device on the DNP3 network. Set the Source Number to a number that does not currently exist on the network.

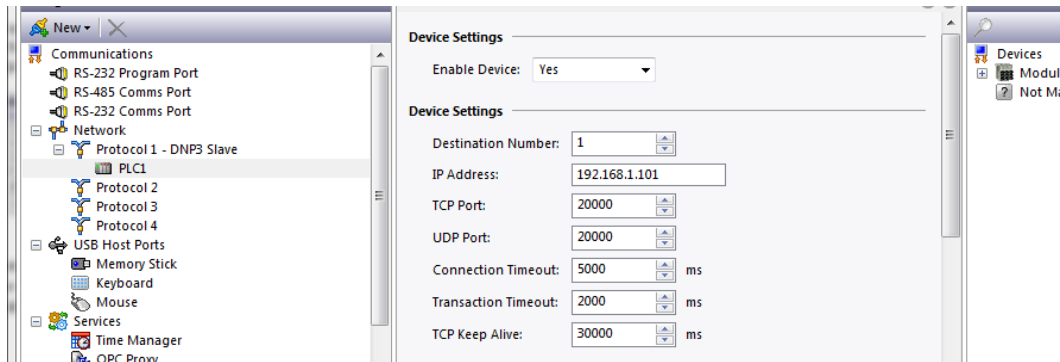
Next, select the PLC device and configure the IP Address, TCP Port and UDP Port as needed for the target DNP3 network.



Also, ensure that the Red Lion device's Ethernet Port Settings are configured - please refer to the **NETWORK CONFIGURATION** section within the Crimson manual.

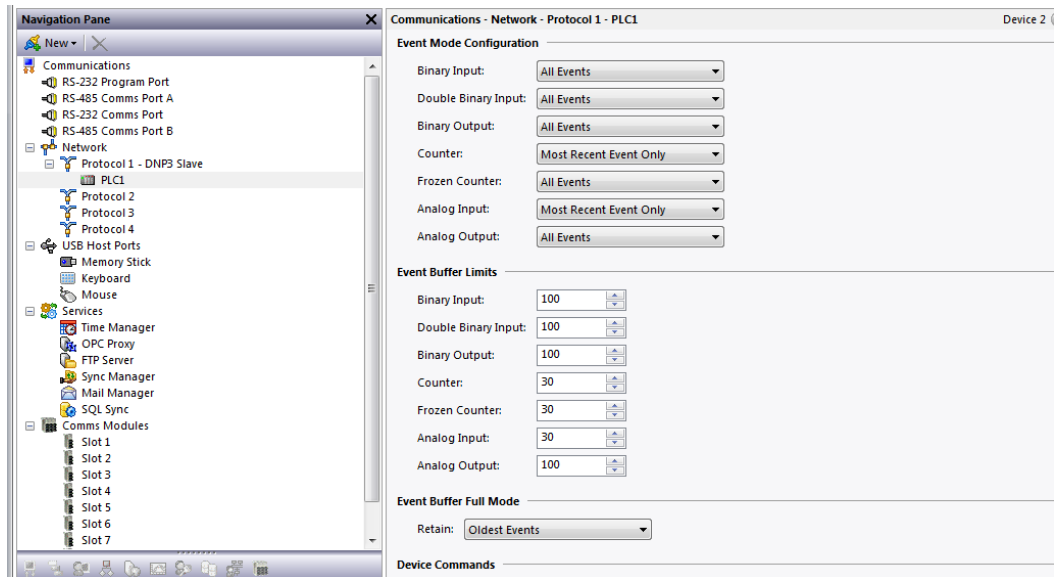
## Device Settings

Select the PLC device in the Communications tree as shown below.



Set the Destination Number according to the DNP3 station number of the target device.

Crimson allows selection of Event Modes and Event Buffer Limits for each available data item associated with solicited events.



Since Analog Input events can be “filtered” when coupled with an Analog Input Deadband value, Analog Input Events includes a “Current Value Only” mode setting.

Red Lion supports Event Buffer sizes up to 32000 events for each data item.

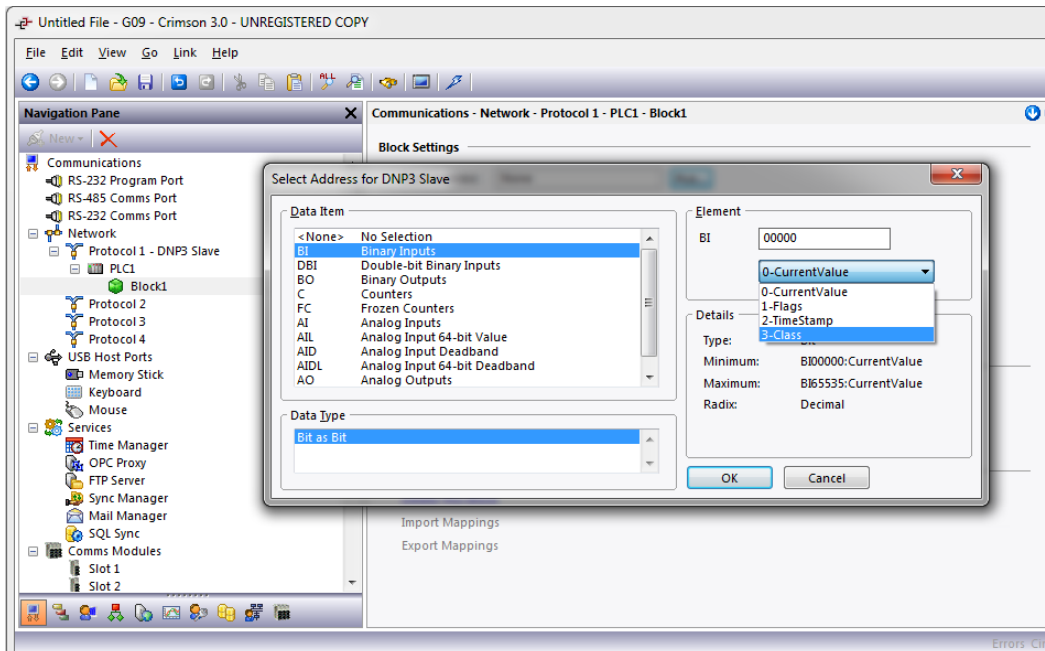
Lastly, the Retain option (Crimson 3.1+) allows the user to determine which events the event buffer will keep after exceeding the event buffer limit.

## Data Access

Red Lion provides data access to the following items:

Data Item	DNP3 Object Group	DNP3 Event Group
Binary Inputs	1	2
Double-bit Inputs	3	4
Binary Outputs	10	11
Binary Outputs	12 – Latch ON/OFF only*	13
Counters	20	22
Frozen Counters	21	23
Analog Inputs	30	32
Analog Input Deadband	34	-
Analog Outputs	40	42
Analog Outputs	41	43

\*Complementary latch point model only supported in Crimson 3.1+.



The following attributes and action items are available as indicated:

**Current Value** or **Control** – Represents the present value.

**Flags** – Bit mask indicating status. Bit 0 indicates online status and will automatically be sent to the master device. The remaining bit mask definition is as follows:

- Binary items: Bit 1 – Restart
- Bit 2 – Communications Lost
- Bit 3 – Remote Forced
- Bit 4 – Local Forced
- Bit 5 – Chatter

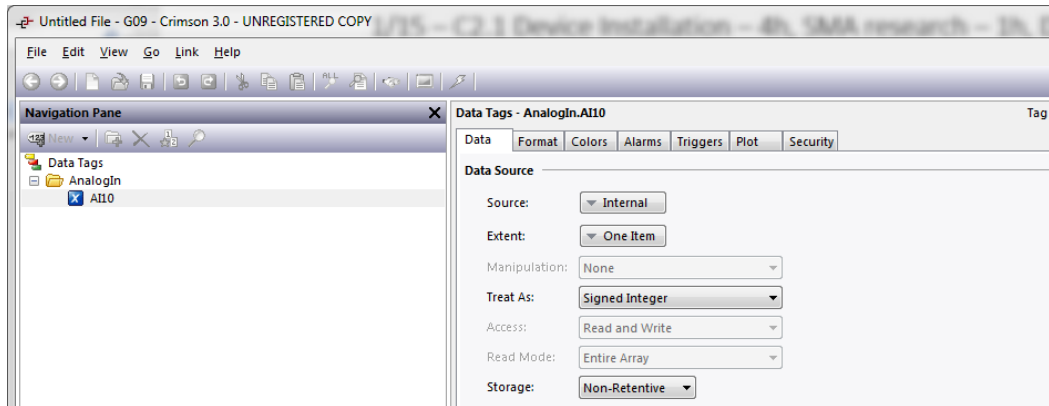
Counters: Bit 1 – Restart  
 Bit 2 – Communications Lost  
 Bit 3 – Remote Forced  
 Bit 4 – Local Forced  
 Bit 5 – Rollover

Analog: Bit 1 – Restart  
 Bit 2 – Communications Lost  
 Bit 3 – Remote Forced  
 Bit 4 – Local Forced  
 Bit 5 – Check Reference

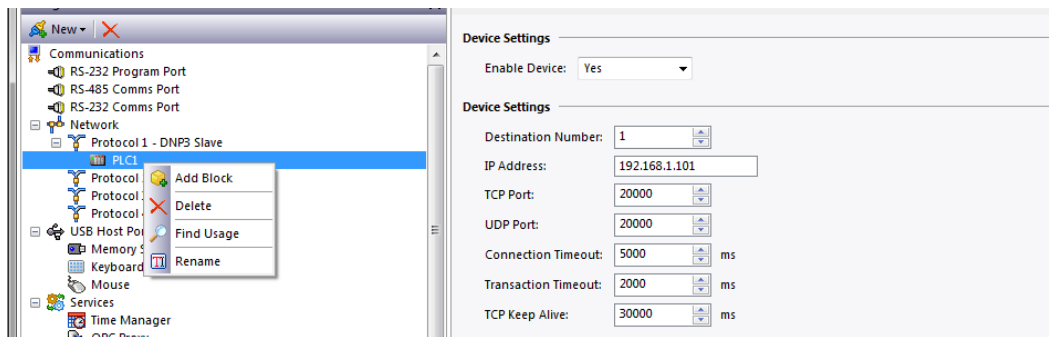
**Timestamp** – The date and time associated with the last value change. Please use Crimson 3.0+ Time and Date format option using a Data Type of addrLongAsLong. Timestamps are read-only.

**Class** – Item used to assign the desired DNP3 class 0, 1, 2 or 3 for data items associated with events.

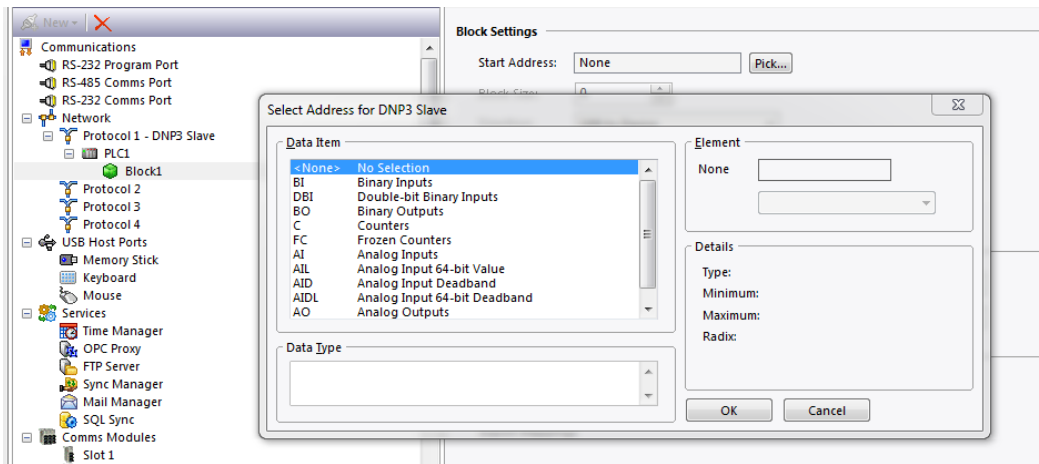
To access an attribute first create a tag within the Data Tags category.



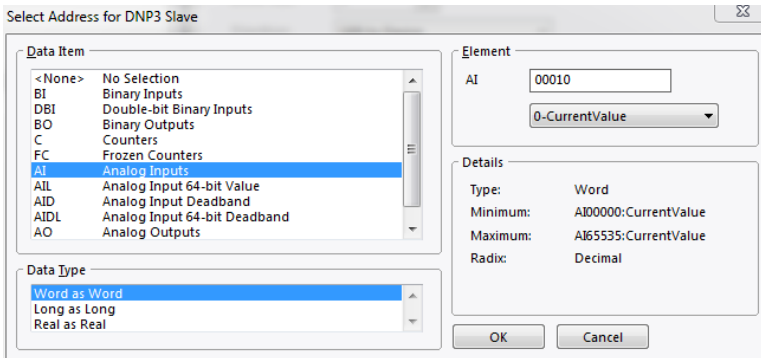
Next, create a gateway block. Right click on the PLC device and select Add Block.



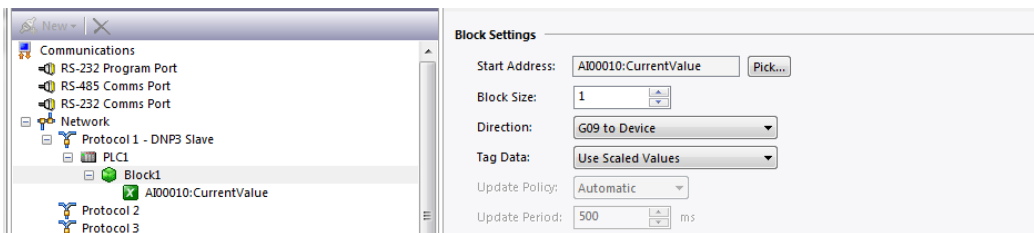
Now select the newly added block and click the Pick... button in Block Settings.



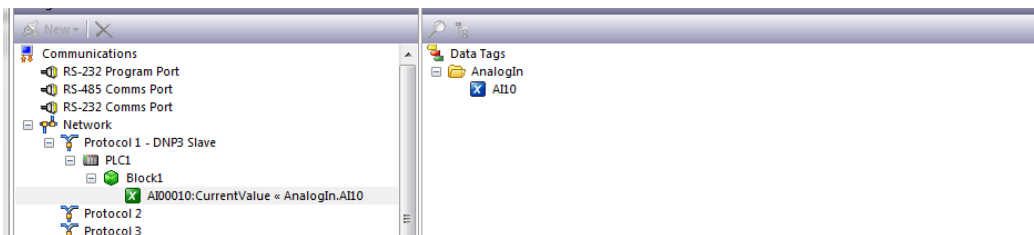
Select the desired Data Item, Data Type and Element then click OK.



Set the Block Size in Block Settings to the desired size.



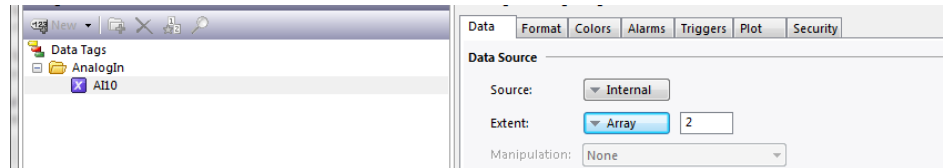
Map the created tag to the block element.



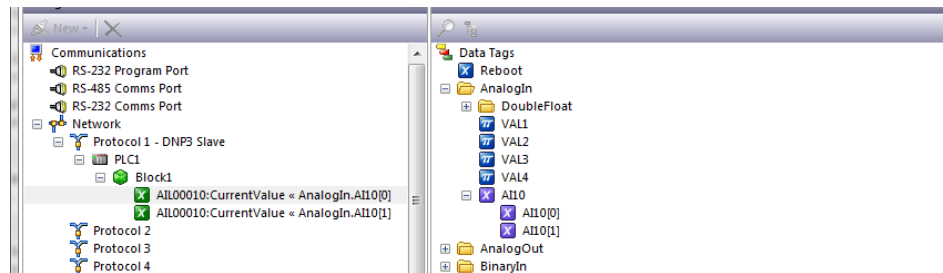
## Accessing 64-bit Values:

Access to 64-bit double values is possible by using data arrays in conjunction with user functions provided in Crimson 3.0+.

The array selection is available in each tag.



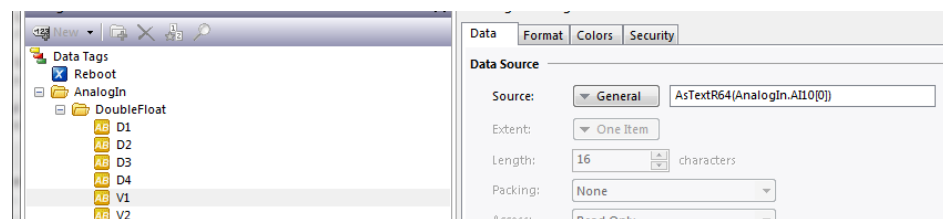
Simply map each parameter of type double to a numeric tag array.



Then use the following user functions to get and set double values, respectively.

```
cstring AsTextR64(Data)
```

Where Data is the first element in the array of the double value that will be passed as a string.



```
void TextToR64(Input, Output)
```

Where Input is a string representing a double value and Output is the first element in the array of the double value to be set.

Note: Other 64-bit math functions are also available. Please review the Crimson 3.0 Reference Manual.



## Events

**Unsolicited Events** will be sent upon a change in value of a data item provided:

- 1) The master device has enabled unsolicited messages.
- 2) Either the master or the user has assigned a non-zero class to that data item.

**Solicited Events** will be sent upon a Report By Exception (RBE) or a Change Event request from the master device for DNP3 data items set to a non-zero class according to the mode and buffer limit configured in the Device Settings. The event buffer is cleared or reset upon each response to an event request. If the number of events have reached the Event Buffer Limit prior to an event request events are lost according to the Retain device setting and the master device will be notified in the response to the next event request.

### Analog Input Events

Analog Input Events may be “filtered” or reduced by using an Analog Input Deadband value. The Analog Input Deadband must be of the same index and type as the Analog Input producing the event. When the Analog Input Deadband is set to a non-zero value the associated Analog Input will only report an event when the change in value is greater than the deadband value.

## Revision History

02/12/18 – Created

01/28/19 – Added Retain device option notes, Object 12 Latch ON/OFF support only.

01/28/19 – Added DNP3 Event Group info.