



# Editing the Change-of-State (COS) Mask for Inline DeviceNet™ Bus Couplers IL DN BK 2 and IL DN BK 3

Application Note 1597A

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## Background

The bus coupler receives data in a Change-of-State (COS) type scan. By default any transition of any bit for the Inline Status Word or any digital input point transition will generate a COS scan.

This application note will explain how to mask your produced data to set up the COS trigger on a per bit (event) basis. This information will allow the user to customize their COS trigger event(s) as opposed to allowing any Inline Status or digital input bit to generate a COS state.

### Note

If an analog or fault event needs to generate a trigger for a COS, refer to the "COS Mask Object" in Appendix A of the Inline DeviceNet™ IL DN BK2 or IL DN BK3 manuals.

## Introduction

The COS mask can be viewed or modified by sending explicit messages to the COS Mask Object (Class Code 104 dec, 0x68 hex) or by using the EDS file. If the EDS file is used, information in this application note can be adapted to accomplish the same results.

Figure 1 shows how the mask bit value coupled with an input transition may or may not generate a COS scan on the DeviceNet™ network. The actual mask bit value is the user selectable enable that determines whether or not the transition will generate the COS trigger.

To set the mask bit value Attributes 4 (COS Mask Index) and 5 (COS Mask Byte Value) will be used in this document.

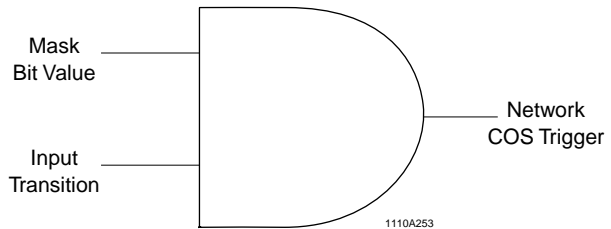


Figure 1. Logic Behind Generating a COS Event

Figure 2 shows the example system that will be discussed. This system has 3 bytes of produced data. 2 bytes for the Inline Status word and 1 byte for the (2) DI-4's. By default in this example all bits associated to the produced data will generate a COS scan.

This example will show how to set the 3rd bit of the 2nd DI-4 to be the only bit capable of generating a COS scan.

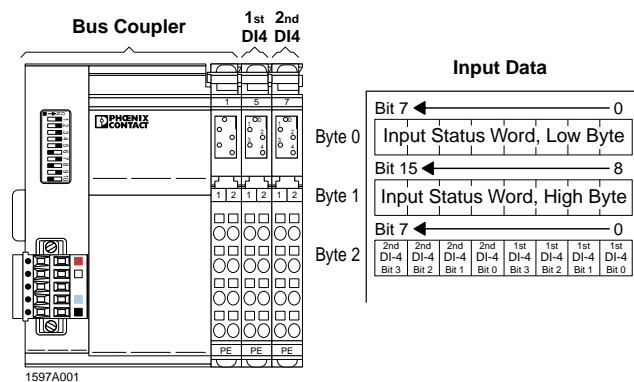



Figure 2. Example System

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## Getting Started

Figure 3 shows the Mask Index's and Mask Byte Value's that would be default for our example system shown in Figure 2. The Mask index works like a pointer that can be moved up or down to access the Mask Byte Value data that is located at the specified Mask Index. The following steps need to be taken to program the desired mask values.



Mask Index	Mask Byte Value	
	Binary	Hex
0	1111 1111	FF
1	1111 1111	FF
2	1111 1111	FF

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Figure 3. COS Mask Index 0, Default COS Mask Byte Value

**Step 1.** By default the Mask Index is pointing towards zero but to ensure this position a Set Single Attribute should be done by send the following explicit message:


Message 1. Set pointer to COS Mask Index 0

Service Code: 16 Set Single Attribute  
 Class Code: 0x68 (COS Mask Object)  
 Instance: 1  
 Attribute: 4 (COS Mask Index)  
 Data: 0 (word)

Message 2. Write 0x00 to the COS Mask Byte Value

This message will write 0x00 to the first byte of data that is the mask for the low byte of the Inline Status word. 0x00 will disable all of these bits from generating a COS scan as shown in figure 4. This can be done with the following explicit message:

Service Code: 16 Set Single Attribute  
 Class Code: 0x68 (COS Mask Object)  
 Instance: 1  
 Attribute: 5 (COS Mask Byte Value)  
 Data: 0 (word) (This value is 0xFF by default)



Mask Index	Mask Byte Value	
	Binary	Hex
0	0000 0000	00
1	1111 1111	FF
2	1111 1111	FF

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Figure 4. COS Mask Index 0, New COS Mask Byte Value


**Step 2.** Move the pointer to the second index and write 0x00 as the COS Mask Value by using the following 2 explicit messages. Results are shown in Figure 5.

Message 1. Set pointer to COS Mask Index 1 (being moved from 0).

Service Code: 16 Set Single Attribute  
 Class Code: 0x68 (COS Mask Object)  
 Instance: 1  
 Attribute: 4 (COS Mask Index)  
 Data: 1 (word).

Message 2. Write 0x00 to the COS Mask Byte Value (This byte is the mask for the upper byte of the Inline Status word.)

Service Code: 16 Set Single Attribute  
 Class Code: 0x68 (COS Mask Object)  
 Instance: 1  
 Attribute: 5 (COS Mask Byte Value)  
 Data: 0 (word) (This value is 0xFF by default)



Mask Index	Mask Byte Value	
	Binary	Hex
0	0000 0000	00
1	0000 0000	00
2	1111 1111	FF

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Figure 5. COS Mask Index 1, New Mask Byte Value

**Step 3.** Move the pointer to the second index and write 0x40 as the COS Mask Value by using the following 2 explicit messages. Results are shown in Figure 6. The 0x40 will enable the 3rd bit of the second DI-4 to be the only bit enabled to trigger a COS scan on the DeviceNet™ network.

**Message 1.** Set pointer to COS Mask Index 2 (being moved from 1).

Service Code: 16 Set Single Attribute  
 Class Code: 0x68 (COS Mask Object)  
 Instance: 1  
 Attribute: 4 (COS Mask Index)  
 Data: 2 (word).

**Message 2.** Write 0x40 to the COS Mask Byte Value (This byte is the mask for the 3rd byte of produced data occupied by the 1st and 2nd DI-4 modules.)

Service Code: 16 Set Single Attribute  
 Class Code: 0x68 (COS Mask Object)  
 Instance: 1  
 Attribute: 5 (COS Mask Byte Value)  
 Data: 0x40h (word) (This value is 0xFF by default)

Mask Index	Mask Byte Value	
	Binary	Hex
0	0000 0000	00
1	0000 0000	00
2	0100 0000	40

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Figure 6. COS Mask Index 2, New COS Mask Byte Value

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