



| OpenLCB Standard | |
|-----------------------------|-------------|
| OpenLCB-CAN Event Transport | |
| Nov 1, 2012 | Preliminary |

1 Introduction (Informative)

This specification describes the protocol for transporting OpenLCB events via CAN segments.

2 Intended Use (Informative)

- Event messages are meant to implement a general and flexible messaging between nodes, following the principles of the Producer-Consumer model as used in Control System Design¹. This information is carried by an event number, which in of itself does not have any explicit information. Instead the event number is assigned by the user to one specific concept, such as a specific LED lighting, or a more abstract concept, such as the “start of the day” or “global stop”. This concept can then be implemented by a number of nodes, called consumer nodes, and triggered by a number of other nodes called producer nodes.

3 References and Context (Normative)

This specification is in the context of the following OpenLCB-CAN Specifications:

The OpenLCB Message Network Specification, which defines the basic messages and how they interact. Higher-level protocols are based on this message network, but are defined elsewhere.

- The OpenLCB Node Identifier Specification, which specifies ...

The OpenLCB Event Identifier Specification, which specifies ...

“CAN” refers to the electrical and protocol specifications as defined in ISO 11898-1:2003 and ISO 11898-2:2003 and their successors.

- External certification of parts shall be accepted for conformance to these standards. Conformance with a later version of a standard shall be accepted as conformance with the referenced versions.

For more information on format and presentation, see:

- OpenLCB Common Information Technical Note

4 Message Formats (Normative)

“EventID with mask” relies on low order 0 or 1 bits to specify the active sense of the effective masking operation. If the lowest bit is a '0', then all low order contiguous '0' bits will form a mask, while if the lowest bit is a '1', then the low order contiguous '1' bits will form the mask.

- 30 *[[[To TN: For example, the event-mask 0xABCD0000 would form the range 0xABCD0000-ABCDFFFF, since the first significant '1' bit is the first low bit of the 'D' hexdigit. Similarly, the event-mask 0xFEDCBFFF would form the range 0xFEDC8000-FEDCBFFF, since 0xB = 0b1011, and the lowest significant '0' bit is in the 3rd digit. The smallest ranges are specified by 0xyyyyyyyE, which specifies a range of 0xyyyyyyyE-0xyyyyyyyF, and 0xyyyyyyyD which specifies 0xyyyyyyyC-0xyyyyyyyF. 0X00000001 gives 0x00000000-0x00000001, and 0x00000002 gives 0x00000000-0x00000002,*
- 35 *0x00000003 gives 0x00000000-0x00000003*

| Event-Mask | Effective Mask | Bits | # | Resulting Range |
|------------|----------------|------|-----|-----------------------|
| 0x00000001 | 0xFFFFFFFFE | 1 | 2 | 0x00000000-0x00000001 |
| 0x00000002 | 0xFFFFFFFFE | 1 | 2 | 0x00000002-0x00000003 |
| 0x00000003 | 0xFFFFFFF0C | 2 | 4 | 0x00000000-0x00000003 |
| 0x00000004 | 0xFFFFFFF0C | 2 | 4 | 0x00000004-0x00000007 |
| 0x00000005 | 0xFFFFFFFFE | 2 | 4 | 0x00000004-0x00000005 |
| 0x00ABCDEF | 0xFFFFFFF0 | 4 | 16 | 0x00ABCDE0-0x00ABCDEF |
| 0x00ABCDF0 | 0xFFFFFFF0 | 4 | 16 | 0x00ABCDF0-0x00ABCDF0 |
| 0x00ABCDE0 | 0xFFFFFFF0 | 5 | 32 | 0x00ABCDE0-0x00ABCDF0 |
| 0x0000FFFF | 0xFFFF0000 | 16 | 65k | 0x00000000-0x0000FFFF |
| 0xABCD0000 | 0xFFFF0000 | 16 | 65k | 0xABCD0000-0xABCDFFFF |
| 0xFFFF0000 | 0xFFFF0000 | 16 | 65k | 0xFFFF0000-0xFFFFFFFF |

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5 Producer/Consumer Event Report (PCER)

- 40 This message transports an Event-number from one or more producer node(s) to zero or more unspecified consumer nodes. Gateways can route this to segments with nodes expressing interest by processing the other event messages.

| Name | Dest ID | Event ID | Simple Node | Common MTI | CAN format | Data Content |
|--------------------------------|---------|----------|-------------|------------|-------------|--------------|
| Producer/Consumer Event Report | N | Y | N | 0x0000 | 0x1800,0sss | EventID |

6 Identify Consumer

This message is broadcast and requests every node to report if they consume this event ID.

| Name | Dest ID | Event ID | Simple Node | Common MTI | CAN format | Data Content |
|-------------------|---------|----------|-------------|------------|-------------|--------------|
| Identify Consumer | N | Y | N | 0x0000 | 0x1800,0sss | Event ID |

7 Consumer Identified

- 45 This message is broadcast, in response to a received Identify Consumer message, from each node that consumes the included event ID. This is one of the messages that allows bridges to do automatic routing of event messages.

| Name | Dest ID | Event ID | Simple Node | Common MTI | CAN format | Data Content |
|---------------------|---------|----------|-------------|------------|-------------|--------------|
| Consumer Identified | N | Y | N | 0x0000 | 0x1800,0sss | Event ID |

8 Consumer Range Identified

- 50 This message broadcasts, in response to a received Identify Consumer message, from each node that consumes event is in the range specified by the included event-ID-with-mask.. This is one of the messages that allows bridges to do automatic routing of event messages.

| Name | Dest ID | Event ID | Simple Node | Common MTI | CAN format | Data Content |
|---------------------------|---------|----------|-------------|------------|-------------|--------------------|
| Consumer Range Identified | N | Y | N | 0x0000 | 0x1800,0sss | Event ID with mask |

9 Identify Producer

- 55 This message is broadcast and requests every node to report whether they produce this event ID.

| Name | Dest ID | Event ID | Simple Node | Common MTI | CAN format | Data Content |
|-------------------|---------|----------|-------------|------------|-------------|--------------|
| Identify Producer | N | Y | N | 0x0000 | 0x1800,0sss | Event ID |

10 Producer Identified

60 This message is broadcast, in response to a received Identify Producer message, from each node that produces the included event ID. This is one of the messages that allows bridges to do automatic routing of event messages.

| Name | Dest ID | Event ID | Simple Node | Common MTI | CAN format | Data Content |
|---------------------|---------|----------|-------------|------------|-------------|--------------|
| Producer Identified | N | Y | N | 0x0000 | 0x1800,0sss | Event ID |

11 Producer Range Identified

65 This message broadcasts, in response to a received Identify Producer message, from each node that produces events in the range specified by the included event-ID-with-mask. This is one of the messages that allows bridges to do automatic routing of event messages.

| Name | Dest ID | Event ID | Simple Node | Common MTI | CAN format | Data Content |
|---------------------------|---------|----------|-------------|------------|-------------|--------------------|
| Producer Identified Range | N | Y | N | 0x0000 | 0x1800,0sss | Event ID with mask |

12 Identify Events

70 The two forms of this message are sent to request that the specified nodes report all the events they produce or consume. These reports can be either Identified messages specifying individual event IDs or ranges of events. One form is an unaddressed message sent globally to all nodes, and the other is an addressed message to a specific node

| Name | Dest ID | Event ID | Simple Node | Common MTI | CAN format | Data Content |
|-----------------|---------|----------|-------------|------------|----------------|--------------|
| Identify Events | N | N | N | 0x2AB7 | 0x18AB,7sss | |
| | Y | N | | 0x32B0 | 0x1Edd,dsss 2B | |

70 Coverage of status bits...

Two forms of identify events; recommendation on uses for global form

13 Interactions (Normative)

75 After the IC message is sent, and before any corresponding Producer/Consumer Event Report messages are sent, the node must identify all events produced or consumed on the board via zero or more Identify Consumers, Identify Consumed Range, Identify Producers and Identify Consumed Range messages. These are not required to be in any particular order.

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iThe Producer/Consumer Model and Control System Design ControlLogix 1999 https://cours.etsmtl.ca/gpa774/Cours/old-24-03-04/Documentations/Rockwell/articles/Producer_Consumer.html