OpenLCB Standard	
Event Identifiers	
Mar 30, 2023	Draft

1 Introduction (Informative)

This standard describes the format and allocation of OpenLCB Event Identifiers (Event IDs). It is not specific to any wire protocol.

2 Intended use (Informative)

This standard defines the format and allocation of Event Identifiers. Event Identifiers are typically used with the Event Transport protocol and are globally unique.

3 References and Context (Normative)

This Standard is in the context of the following OpenLCB Standards:

- The CAN Physical Layer Standard, which specifies the physical layer for transporting OpenLCB-CAN frames
- The Message Network Standard, which defines the basic messages and how they interact. Higher-level protocols are based on this message network, but are defined elsewhere.
- The Event Transport Standard, which defines the protocol for transporting events.
- The Unique Identifiers Standard which defines the format and allocation of unique 48-bit identifiers.

4 Format (Normative)

An OpenLCB event identifier shall be eight bytes of eight bits each. Except as specifically noted within this document, the upper 6-bytes are represented by a uniquely assigned Node ID.

The order of bytes in an OpenLCB Event Identifier shall be considered significant. The most-significant byte shall be transmitted first during communication operations. The most-significant byte shall be written first (left-most in Western format) in any human-readable representation. Within the tables below, byte 1 is considered the most-significant byte, while byte 8 is considered the least significant byte.

5 Allocation (Normative)

5.1 Node ID Based

Value						Suffix		Description
Byte 1	**Byte 2**	**Byte 3**	**Byte 4**	**Byte 5**	**Byte 6**	**Byte 7**	**Byte 8**	
6-byte Uniquely Assigned Node ID						*	*	Assigned Node ID event

5.2 Well-Known Automatically-Routed

The following Event Identifiers are automatically routed between OpenLCB segments through gateways.

Value						Suffix		Description
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	
01	00	*	*	*	*	*	*	Well-Known Automatically-Routed Event Identifiers
		00	00	00	00	FF	FF	Emergency off (de-energize)
						FF	FE	Clear emergency off (energize)
						FF	FD	Emergency stop of all operations
						FF	FC	Clear emergency stop of all operations
						FF	F8	Node recorded a new log entry
						FF	F1	Power supply brownout detected below minimum required by node
						FF	F0	Power supply brownout detected below minimum required by standard
						FE	00	Ident button combination pressed
						FD	01	Link error code 1 – the specific meaning is link wire protocol specific
						FD	02	Link error code 2

Value						Suffix		Description
Byte 1	**Byte 2**	**Byte 3**	**Byte 4**	**Byte 5**	**Byte 6**	**Byte 7**	**Byte 8**	
01	00	*	*	*	*	*	*	Well-Known Automatically-Routed Event Identifiers
						FD	03	Link error code 3
						FD	04	Link error code 4

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5.3 Well-Known

The following Event Identifiers are not automatically routed.

Value						Suffix		Description
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	
01	01	*	*	*	*	*	*	Well-Known Event Identifiers
		00	00	00	00	02	01	Duplicate Node ID Detected
						03	*	Reserved for Traction Protocol
						03	01	Reserved
						03	02	Reserved
						03	03	This node is a Train
						03	04	This node is a Traction Proxy
						06	*	Reserved for Firmware Upgrade Protocol
						06	01	Firmware Corrupted
						06	02	Firmware Upgrade Request by Hardware Switch
				01	00	*		Default Fast Clock

Value						Suffix		Description
Byte 1	**Byte 2**	**Byte 3**	**Byte 4**	**Byte 5**	**Byte 6**	**Byte 7**	**Byte 8**	
01	01	*	*	*	*	*	*	Well-Known Event Identifiers
		00	00	01	01	*		Default Real-Time Clock
					02	*		Alternate Clock 1
					03	*		Alternate Clock 2
		01	00	CBUS Node ID		CBUS Event ID		Subset of the assigned Node ID space for CBUS mapped nodes. Node ID is 00.00 for short events. This range is an ON request.
		01	01	CBUS Node ID		CBUS Event ID		Subset of the assigned Node ID space for CBUS mapped nodes. Node ID is 00.00 for short events. This range is an OFF request.
		02	00	00	FF	12-bit DCC Basic Accessory Address		Activate basic DCC accessory decoder address. Bytes 7 and 8 are the DCC accessory decoder address (0 – 4087)[1]. 4088 – 4095 are utilized in the DCC standard as broadcast addresses. All other values for bytes 7 and 8 are reserved for future uses.
					FE	12-bit DCC Basic Accessory Address		Deactivate basic DCC accessory decoder address. Bytes 7 and 8 are the DCC accessory decoder address (0 – 4087)[1]. 4088 – 4095 are utilized in the DCC standard as broadcast addresses. All other values for bytes 7 and 8 are reserved for future uses.

[1]For information on the different methods of how these 2 x 4088 addresses map to the commonly used turnout addresses of 1..2040, please see the OpenLCB Event Identifiers Technical Note.

Value						Suffix		Description
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	
01	01	*	*	*	*	*	*	Well-Known Event Identifiers
					FD	12-bit DCC Accessory Address		DCC turnout feedback active/on/high. Bytes 7 and 8 contain the DCC accessory decoder address (0 – 4095). All other values for bytes 7 and 8 are reserved for future uses.
					FC	12-bit DCC Accessory Address		DCC turnout feedback inactive/off/low. Bytes 7 and 8 contain the DCC accessory decoder address (0 – 4095). All other values for bytes 7 and 8 are reserved for future uses.
					FB	12-bit DCC Sensor Address		DCC system sensor feedback active/on/high. Bytes 7 and 8 contain the sensor address (0 – 4095). All other values for bytes 7 and 8 are reserved for future uses.
					FA	12-bit DCC Sensor Address		DCC system sensor feedback inactive/off/low. Bytes 7 and 8 contain the DCC sensor address (0 – 4095). All other values for bytes 7 and 8 are reserved for future uses.
				01	07	FF	00	Extended DCC accessory decoder emergency stop.[2]

[2] This corresponds to extended DCC accessory decoder address 2047.

Value						Suffix		Description
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	
01	01	*	*	*	*	*	*	Well-Known Event Identifiers
					~~00 - 1F~~ 11-bit DCC Extended Accessory Address 00.04 - 07.FE		00 - FF	Send ~~aspect~~command to extended DCC accessory decoder address. Please refer to NMRA S-9.2.1 for the definitions of Byte 8~~6~~, which corresponds to the 3rd byte of a DCC extended accessory decoder packet~~is the aspect, only values between 0 and 31 are allowed~~. Bytes 6~~7~~ and 7~~8~~ are the DCC accessory decoder address. Valid values are from 4 to 2046. By convention, user addresses are from 1 to 2043, with user address 1 corresponding to value 4 at bytes 6 and 7. ~~(0 — 2046). 2047 is utilized in the DCC standard as the broadcast addresses.~~ All other values for bytes 6~~7~~ and 7~~8~~ not separately defined are reserved for future uses.

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