



| OpenLCB Standard | |
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| OpenLCB Unique Identifiers | |
| Jul 23, 2011 | Preliminary |

1 Introduction (Informative)

This specification describes the format and allocation of OpenLCB 48-bit unique identifiers. It is not specific to any wire protocol.

For more information on format and presentation, see:

- 5 • OpenLCB Common Information Technical Note

2 Intended Use (Informative)

- Many OpenLCB protocols rely on each node having a node ID, and those node IDs being absolutely unique between nodes. OpenLCB defines 48-bit unique identifiers for this purpose. Unique identifiers are also used to ensure that Event Identifiers are uniquely specified, and for other purposes. This Standard is intended to ensure these unique IDs are available. It applies to all OpenLCB uses of 48-bit unique identifiers, including as node identifiers.
- 10

3 References and Context (Normative)

(Intentionally left blank)

4 Content and Format (Normative)

- 15 An OpenLCB unique identifier (unique ID) shall be six bytes of eight bits each.
- The order of bytes in an OpenLCB unique ID 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.
- An OpenLCB unique ID shall include one or more 1 bits.
- 20 Every OpenLCB node shall have a unique identifier to use as a node identifier (node ID).

5 Allocation (Normative)

Unique identifiers shall be allocated using one of the mechanisms in this section.

- When additional allocation methods are defined, those the unique IDs defined by those additional methods shall only provide allocation ranges that do no overlap with existing allocation ranges.
- 25

Allocated ranges shall not be reused for other allocations.

30 **5.1 Unique identifiers assigned by manufacturers**

Manufacturers who have been assigned a manufacturer ID number by the NMRA may, but are not required to, use their NMRA manufacturer ID number to self-assign unique identifiers within a range defined by:

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|--------|--------|-------------|---------------|--------|--------|
| 0x02 | 0x01 | Mfg ID byte | self-assigned | | |

Manufacturers shall ensure uniqueness for identifiers they assign.

35 **5.2 Unique identifiers assigned by members of organized groups**

An NMRA member may, but is not required to, use their NMRA membership number to self-assign unique identifiers within the range defined by:

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|--------|--------|--------------------|--------|--------|---------------|
| 0x03 | 0x00 | NMRA Member Number | | | Self-assigned |

40 A MERG member may, but is not required to, use their MERG membership number to self-assign unique identifiers within the range defined by:

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|--------|--------|--------------------|--------|--------|---------------|
| 0x03 | 0x04 | MERG Member Number | | | Self-assigned |

Individuals using these assignment patterns shall ensure uniqueness for identifiers they assign.

45 MERG CBUS has a defined method for specifying a unique 16-bit Node Number (NN) for CBUS use, along with an optional 16-bit Layout Number (LN). People may, but are not required to, use a unique CBUS node number to generate an OpenLCB unique identifier as follows:

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|--------|--------|--------------|-------------|--------------|-------------|
| 0x03 | 0x08 | LN High Byte | LN Low Byte | NN High Byte | NN Low Byte |

Future definition of ranges for additional groups will use unique values in Byte 2.

5.3 Unique identifiers assigned by software at run-time

- 50 A program running in a computer with an IP address must not use that address to directly formulate a unique identifier. The program may use an IP connection to request a unique identifier from openlcb.org, or from another organization that is distributing unique identifiers from a range distributed to it. The openlcb.org mechanism will allocate individual unique identifiers from the following range:

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|--------|--------|--------|------------------------------|--------|--------|
| 0x04 | 0x00 | 0x00 | Sequentially Assigned Values | | |

5.4 Globally defined unique identifiers

- 55 OpenLCB defines specific well-known identification numbers and number ranges for specific uses. The details of these ranges are defined in other Standards and/or have been reserved for future use.

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Use |
|--------|--------|--------|--------|--------|--------|--------------------------|
| 0x01 | 1 | 0x00 | 0x00 | 0x00 | 0x00 | Well-known Event IDs |
| 0x01 | 1 | 0x01 | 0x00 | | | CBUS mapped Event IDs |
| 0x01 | 99 | | | | | XpressNet translation |
| 0x01 | 129 | | | | | LocoNet packet transport |
| 0x01 | 238 | | | | | DCC translation |

5.5 Unique identifiers assigned for use with locomotive control systems

- 60 OpenLCB defines specific well-known identification numbers and number ranges for interoperation with existing locomotive control systems. The details of these ranges are defined in other Standards and/or have been reserved for future use.

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 | Use |
|--------|--------|--------|--------|--------|--------|------------------|
| 0x06 | 0x00 | | | | | DC (block) |
| 0x06 | 0x01 | | | | | DCC |
| 0x06 | 0x02 | | | | | TMCC |
| 0x06 | 0x03 | | | | | Marklin/Motorola |
| 0x06 | 0x04 | | | | | MTH DCS |

5.6 Unique identifier ranges assigned by request

Any individual or corporation shall be able to obtain permanent allocations of blocks of 2^8 , 2^{16} and 2^{24} node identification numbers via the <http://www.openlcb.org> web site.

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|--------|--------|----------------------|--------|--------|---------------|
| 0x05 | 0x01 | Assigned by web site | | | Self-assigned |

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|--------|--------|----------------------|--------|---------------|--------|
| 0x05 | 0x02 | Assigned by web site | | Self-assigned | |

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|--------|--------|----------------------|---------------|--------|--------|
| 0x05 | 0x03 | Assigned by web site | Self-assigned | | |

5.7 Reserved unique identifiers

All other unique identifiers not specifically discussed in this Standard shall not be used until the Standard is revised to permit their use.

Unique identifiers in the following ranges shall not be used at any point:

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|--------|--------|--------|--------|--------|--------|
| 0x00 | Any | | | | |
| 0xFF | Any | | | | |

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