



LAYOUT COMMAND CONTROL

EMERGING NMRA STANDARD OF THE FUTURE

At this point, it's safe to assume that you may have heard of LCC. Layout Command Control is an emerging NMRA standard that is slowly gaining traction in the model railroad community. TCS' Universal WiFi Throttle (UWT) (/throttle) is a newcomer on the DCC scene and a pioneer in the LCC space. The UWT-100 has an LCC connection mode that allows this throttle to interface directly with LCC nodes and devices on your network directly out of the box.

The UWT will also integrate flawlessly with the upcoming DCC/LCC command station from TCS, which will be the first commercially available, stand-alone, LCC command station. LCC's robust command bus and future-proof considerations will make it a great choice for modelers who are serious about operations and have a ton of signals passing through their command bus. LCC can keep track of all the locomotive and accessory decoders you need to control - without breaking a sweat.

Want to learn more about LCC? Check out this FAQ below:

What is LCC?

LCC stands for "Layout Command Control". It is a protocol for controlling all the functions on your layout - things like detection, signals, building lighting, as well as the traditional layout control functions.

Will LCC work with my DCC layout?

Yes, DCC and LCC complement one another. LCC does not make DCC obsolete. The LCC bus takes accessory traffic off of the DCC bus. Only locomotive control needs to remain on the rails.

Will LCC work on my DC layout?

Yes, and also with any other train control method.

Is LCC bi-directional?

Yes. Unlike DCC decoders, LCC nodes can both send and receive data over the LCC bus. This allows detectors, turnout feedback, local fascia controls, etc., to each talk to one another. Additional features such as status reporting, intelligent configuration, initialization, and upgrades of the products are now possible.

DCC (Digital Command Control), the existing NMRA standard for train control, is essentially a one-way bus that allows a single master command station to control mobile and stationary decoders over the rails.

Is the LCC High Speed?

The currently available LCC products operate an order of magnitude faster than DCC by using the automotive CAN bus. There is plenty of room for extra traffic. LCC may also be operated over other, even faster networks, such as Ethernet or WiFi.

Do I need a new LCC Master unit?

No! LCC is a peer-peer network. This means that any two (or more) LCC devices may communicate directly with one another without going through a central command station such as DCC or many legacy control systems require. A computer does make things easier to configure, but it is not a requirement for operation.

The NMRA and LCC?

Just like the NMRA set the standards for DCC over 20 years ago, they have now set the standards for LCC. A group of independent volunteers, both modelers and experts in electronics, have together developed the concepts, protocols, interface standards, and documents, for LCC. This OpenLCB group established the standards which the NMRA has approved as LCC.

The NMRA has no vested interest in any manufacturer or product. They simply set the standards that all manufacturers may use license-free.

Why is LCC so special?

Like people, each LCC product is unique. No more need for the user to assign and keep track of device addresses to prevent conflicts. New nodes may be added to any existing system with no data collisions... ever! The protocol is also expandable for adding functions that we have not even thought of yet.

Is LCC inter-operable?

Yes, that is why having standards is important. Any manufacturer's LCC products will interoperate with the LCC products from any others.

Is anyone making LCC products?

Several manufacturers are already providing LCC related products, or will be shortly.

TCS Train Control Systems (<http://www.tcsdcc.com/>) | RR-CirKits (<http://www.rr-cirkits.com>) | Deepwoods Software (MRS) (<https://www.deepsoft.com/home/products/modelrailroadsystem/>)

Special thanks to Dick Bronson at RR-CirKits for providing this LCC overview.

Find more technical information at: <https://www.nmra.org/lcc> (<https://www.nmra.org/lcc>)

NMRA FAQ Page (PDF) (https://www.nmra.org/sites/default/files/standards/lcc_faq_handout) Top

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Layout Command Control® (LCC)

Layout Command Control

Model railroaders expect a lot from the electronics on their layouts. They want to automate accessories, simplify operation of their staging yards, have fine control over layout lighting, and build realistic dispatcher panels. Home and club layouts are getting more detailed and complicated, and existing electronics for control systems are having a hard time keeping up.

Layout Command Control Development

The process of developing networks and protocols for layout control are not trivial. No small group of individuals are able to fully develop the necessary code, protocols and the like to successfully implement the concept of having complete, integrated control of a layout, be it a simple 4 by 8 foot sheet of plywood to a large complex, multi-deck masterpiece. Using the current open source development process, a group named OpenLCB has stepped up to take on this task. You can find the details of their work, process, organization and even how to participate on their development process at their website located at: <https://openlcb.org/>. OpenLCB is developing the Standards and providing Technical Notes to support those Standards that will be used in the development of hardware to control a layout.

Memorandum of Understanding

The NMRA and OpenLCB have entered a Memorandum of Understanding that provides the details of the relationship between the two organizations and states the responsibilities for

each organization.

[View the Memorandum of Understanding \(MOU\)](#)

Standards

The NMRA, in its standards and recommended practices, addresses only the specific standards and recommended practices for model railroads. These standards and recommended practices do not address any legal requirements. It is the responsibility of the manufacturer to determine if their product conforms to all applicable governmental laws and regulations.

The Standards for LCC[®] are organized so that each Standard has a corresponding Technical Note. The Technical Notes provide additional information and reasoning about what was and was not included in the Standard. These Standards, developed by OpenLCB, are submitted to the NMRA for review and comment by the membership. Once the reviews are complete, the NMRA Board of Directors adopts the Standards as the official NMRA Standard for Layout Command Control.

Layout Command Control Standards

Standard	Tech Note	NMRA Status
	TN-9.7.0.1 Glossary	
	TN-9.7.0.2 Common Information	
S-9.7.0.3 Unique Identifiers	TN-9.7.0.3 Unique Identifiers	Adopted 20-Feb-16
S-9.7.0.4 Event Identifiers	TN-9.7.0.4 Event Identifiers	Adopted 20-Feb-16
PHYSICAL LAYER		
S-9.7.1.1 CAN Physical	TN-9.7.1.1 CAN Physical	Adopted 20-Feb-16
DATA LINK LAYER		
S-9.7.2.1 CAN Frame Transfer	TN-9.7.2.1 CAN Frame Transfer	Adopted 20-Feb-16
NETWORK & TRANSPORT LAYER		
S-9.7.3 Message Network (CAN + TCP/IP)	TN-9.7.3 Message Network (CAN + TCP/IP)	Adopted 20-Feb-16
S-9.7.3.1 Event Transport	TN-9.7.3.1 Event Transport	Adopted 20-Feb-16