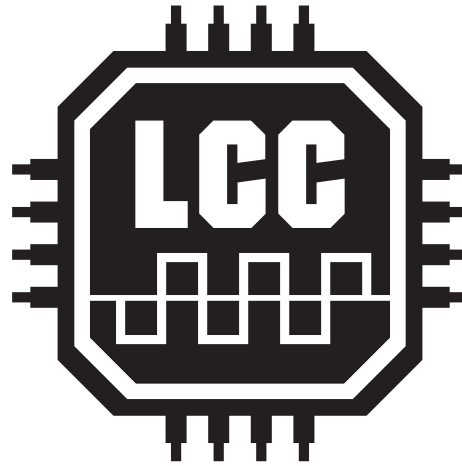# A few FAQs about LCC

Layout Command Control

Maybe you've heard about Layout Command Control, or LCC, and already understand it. Maybe you've seen the ads about it and wondered what it was. Regardless of where you fall on that continuum, here are a few answers to some of the questions you may have about LCC.

Exactly what is LCC?

LCC stands for "Layout Command Control," and it's a system for controlling all the functions on your layout that don't have to do with how fast the locomotive is moving -- things like signals, or sounds, or passenger car lighting.

Some of you may have heard of "NMRANet." LCC is NMRANet, just under a different name.

You probably know what DCC is -- digital command control. DCC allows you to run a "command bus" (in other words, one pair of wires) around your layout and attach your track and stationary decoders to it. So when you push the "bell" button on your DCC throttle, your DCC command station sends a signal through the DCC command bus to the track and your sound decoder generates a "bell" sound.

When DCC was designed 20 years ago, its developers had no idea how many products manufacturers would develop using DCC, so that today, the command bus is really getting crowded carrying DCC commands for multiple engines, sound, lights, stationary decoders, etc. Having all those commands traveling on one wire is like pouring a gallon of water through a funnel -- eventually everything gets backed up and has to wait.

That's what's happening today with DCC. There are so many signals traveling through the command bus that sometimes they don't reach their decoders for several seconds. So, for example, when an operator turns down the speed of his locomotive, it may not respond for several seconds...and that could mean disaster in some cases.

LCC, or Layout Command Control, is designed to take some of the burden off the DCC bus by routing all the non-locomotive commands through a different pair of wires...the LCC bus. Only the locomotive control stays on the DCC bus. And because the LCC command bus is taking the burden off the DCC command bus, there are far fewer signals on the DCC command bus, so locomotives can respond within a split second.

In addition, LCC is a *bi-directional* bus, so that LCC products can both receive commands and reply to them. This allows additional features such as status reporting and easy, intelligent configuration of those products.

What does the NMRA have to do with LCC?

Just like the NMRA set the standard for DCC 20 years ago, we've now set the standard for LCC. A group of independent volunteers who are both model railroaders and experts in electronics got together and developed concepts, protocols, interfaces, and documents for LCC. That group calls itself OpenLCB. And we owe all of those modelers a huge debt of gratitude for the time and effort they've put into LCC.

That group developed the standards, and the NMRA approved them.

The NMRA has no vested interest in any one manufacturer or product, and we certainly aren't going to be making products -- that's up to manufacturers. We just set and approved the standard that manufacturers will use.

Will LCC have the same interoperability as other NMRA standards?

Yes. That's what the "standard" means. When the NMRA approves a standard and distributes it to manufacturers, and when manufacturers follow that standard, all LCC products should be interoperable, meaning, you can mix and match different manufacturers' products in one LCC setup.

What products are available <u>now</u> for LCC?

Because the NMRA just approved and released the LCC Standard to manufacturers, *as of this writing (late June, 2015)* there are currently no products that we know of that are ready for LCC. However, manufacturers have known about LCC for a while, so many have probably come up with some pretty cool ideas that will use it. Some may have already started building and designing products. Now that they have the LCC Standard, the manufacturers can continue developing LCC products.

The best way to get manufacturers interested in making LCC-compatible products is to ask them what they've got planned for LCC. Let the manufacturers know you're excited about LCC and waiting for products!

Will LCC work on my DCC layout?

Absolutely! DCC and LCC are totally compatible. LCC doesn't make DCC obsolete. In fact, it's just the opposite! Because LCC is taking some of the workload off of DCC, DCC can run smarter and faster again.

But no matter what brand of DCC system you currently use, LCC will work with it.

Will LCC work on my DC layout?

Yes. No question about it.

What do I need to get started with LCC?

You'll need LCC-compatible products -- in other words, products designed for LCC, based on the LCC Standard the NMRA just released. However, manufacturers will undoubtedly also develop LCC products to control existing accessories. These will probably be just like today's DCC decoders -- small, compact, and easy to wire.

Will LCC be expensive?

Right now it's impossible to say, since we need to wait for manufacturers to begin developing and pricing products. But the LCC standard was developed to strike a good balance between the cost of materials and the features and performance, and LCC accessory boards are expected to be comparably priced to existing, equivalent products..

Will LCC be easy to use?

In theory, yes. And we say "in theory" because, again, as of this writing there aren't any products out there. But the way the LCC Standard is set up, most LCC-compatible products should be plug-and-play. In most cases and LCC accessory can teach another one how to respond to it, and vice versa. In addition, programs such as JMRI will be able to detect and configure LCC accessories, because LCC products can announce and self-describe themselves.

What kinds of products can we expect from LCC?

LCC is extremely flexible and easy to adapt to a wide variety of products. So virtually anything a manufacturer can dream up can use LCC. Some examples are signal systems, intercoms and phones, structure lighting… even *room lighting* could conceivably be controlled over the LCC bus. Again, it all depends on the demand, and what manufacturers can come up with. *So start talking to manufacturers and asking them for products!*

Why wasn't LCC integrated into current DCC systems?

The DCC command bus (sometimes called "the pipeline") just isn't big enough to carry both DCC commands and LCC commands. LCC needs its own pipeline, and that pipeline was designed to accommodate many more commands (also called "throughput") than the DCC bus.

Why is the LCC command bus so special?

When DCC was first invented, the developers had no idea how many commands would eventually be sent down the command bus, so they didn't think it needed to be very large.

The LCC command bus was just designed recently. Knowing how popular DCC is and envisioning the possibilities of future products, the LCC developers made the LCC command bus much faster. In fact, it has 10 to 1000 times more throughput than the DCC bus. In other words, it's a much bigger pipeline.

Will layouts have to be "programmed" for LCC?

Yes, but the developers learned some valuable lessons from the way DCC was set up for programming. Rather than relying on cryptic CV numbers and binary/hex values, LCC programming was designed to be programmed in plain language. The LCC product itself presents plain language option fields, and you place plain language values into the field...whether it's a decimal number or a selection from a drop-down menu. Plus, descriptive text provides you with a detailed explanation of each field without your having to dig out the user manual.

That's a brief look at LCC, and answers to some of your initial questions about it. Find out more about LCC and LCC products by contacting model railroading manufacturers. Ask them what plans they have for LCC products, and tell them you're interested in getting all the benefits of this great, new standard!