DCC Basics for MRR layouts

By
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Part 1 The DCC System

DCC systems have brought new controls and features to our Model Railroads. Along with being able to control individual locomotives individually on the same piece of track, we can also control the lights, and sounds associated with a particular type of locomotive.

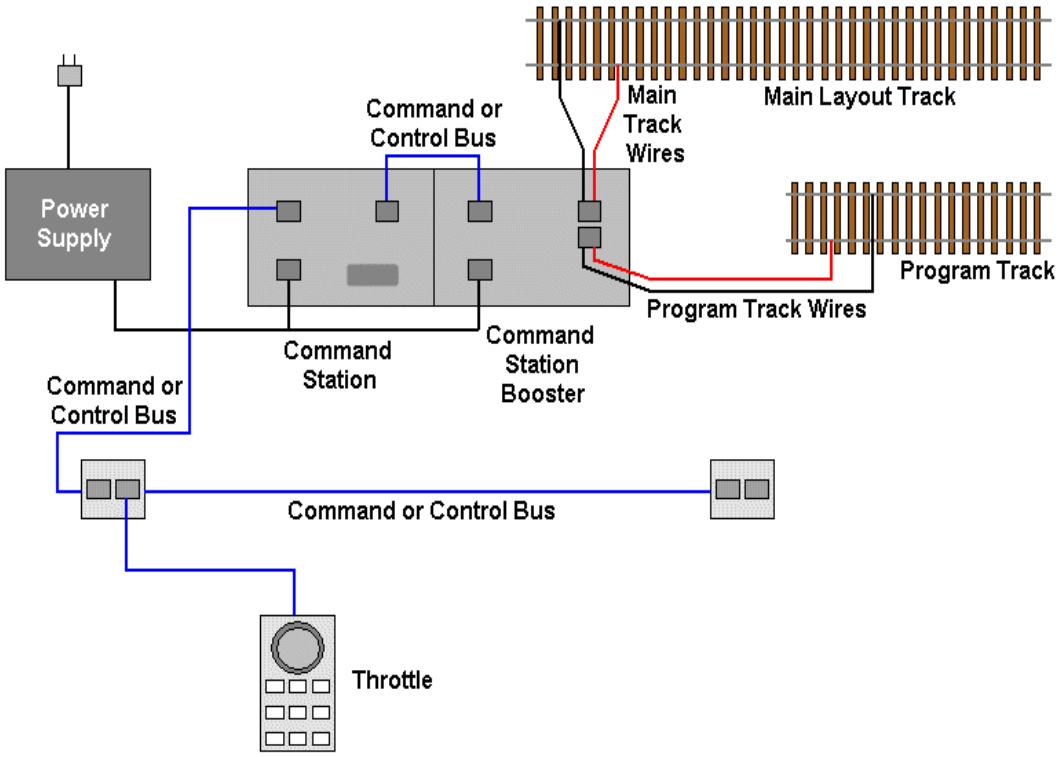
There are many companies that manufacturer DCC systems. Each one has it's own unique internal electrical design and case. Some systems are all in the same "box", and some have all separate components. They all provide the same type signals and power on the rails because the locomotive decoders must be able to use the signals from all NMRA (National Model Railroad Association) compliant systems. The differences between systems can be summed up by saying the user interface and the way they are used to control things are different. The technical differences are in the control bus, the hand-held throttle, and operating the system. Different systems provide user feedback differently. Most use some sort of display on the hand-held throttle, but some throttles do not have displays on them at all. The information presented as well as the size of the icons and characters differ between systems. The buttons and control knobs also vary between systems. Also, the hand-held throttles can not be interchanged between systems.

The basic DCC system that you purchase is the heart of any DCC system, and can consist of several parts, the main one being the Command Station. (DCC systems usually do not come with a locomotive or locomotive decoder.) The basic system or Command Station is the stationary part, just like the Power Pack was the stationary part of a DC layout. All brands of DCC systems vary in one way or another, but they all have one thing in common: If they are NMRA compatible, they can all run the same locomotive with no modification.

The other part of the system is the Decoder. Of these there are two basic types. Mobile decoders that are installed in the Model Locomotive, and Stationary Decoders that control things on the layout, like turnouts and other items. Mobile Decoders vary in the number of functions they are capable of and the motor current they can supply. Depending on the type and brand of decoder, you can have just motor control, or decoders that provide motor control with various lighting functions and sound, or anywhere in between. There are even decoders that provide sound only.

The basic stationary part of the DCC system consists of several components.
- A Command Station: Provides the Electrical signals in digital data form and connects to the Command Station Booster.
- A Command Station Booster: Combines the Digital Data Signals and Power Supply voltage so they can be put on the track to control the locomotives.
- A Power Supply: Provides power to the Command Station, Booster, and ultimately

track power.
- A Controller or Hand Held throttle: Allows the operator to make speed adjustments and send other functions to the Locomotive decoder or Stationary decoder. It connects to the Command Station via the Command bus.
In some DCC systems, two or more of these component parts can be combined into one unit.



A note about selecting a DCC system

When DCC systems were first offered, they were, what I will call Up-Scale systems. That is, they provided about 5 Amps or more of power, most had an interface that could be hooked to a computer, and they could control more than 50 locomotives. They were also expensive. This didn't allow the beginning model railroader with limited funds to enter into the field of DCC very soon. Since then, just about all manufacturers of DCC systems brought out a version of their system for the beginner, at a much lower cost. These entry level systems are usually limited in power, around 2 Amps, and are limited to a small number of locomotive or decoder addresses that they can control. Most of them do not have a computer interface connector built-in. These new systems are both good and bad. They are good from the standpoint that a beginner can now get into DCC control, but bad for expanding the entry level system. Some manufacturers systems can be expanded easily, but others can not. Because of this, there are some people buying entry level systems with the idea of expanding them to be able to operate a large layout in the future. I am sorry to say, but this is not necessarily going to happen. If you haven't purchased a DCC system yet, think about what you ultimately want to do with it. Then

do your research and choose a system that will do everything that you want it to. The other way to go is buy the entry level system, and have in mind to buy a larger system for your ultimate needs later on. When you get the larger system, the entry level system can be set up at the workbench for use as a troubleshooting and decoder programming system that is not connected to the layout. If you plan to do this, do not spend money to expand the entry level system that you initially purchase. Chances are very good that the items you purchase to expand the entry level system will not be able to be used on the better system you plan to purchase later.

The Perfect DCC System
by Mark Gurries
(Used with permission)

What is going to have the longest impact on your happiness with a given DCC system will be more related to how easy it is for YOU (the one buying it) to use it. Another way to look at this is the DCC systems learning curve. How steep is it? That is a decision that only you can make which is why the classic saying goes is: There is no best DCC system, there is only the best DCC system for you.
I think a person may fall into one of 4 categories

1) A person who is NOT intimidated by technology will not have much of a learning curve issue and thus free to choose a system based on it's technical merits alone.

2) A person who is not really technophobic and/or has access to a lot of help and fellow users can often afford to use a less intuitive system but a more powerful one as a good option. Stated another way, you have a local support system to help you.

3) A person who is a casual operator or an isolated operator may find a system that is more intuitive to use is the best one to get. Stated another way, if you buy a DCC system that forces you to constantly read a manual to use, it will not give one much motivation to use it. In fact it may actually discourage your desire to run the layout which would be the worse thing that can happen. The DCC system standing in the way of your happiness as opposed to adding to it!....a crime!

4) A person who is technically challenged (Sign: Has clocks on VCR's that blink 12:00 all day long) may want to go for the simplest or starter DCC systems first. Try DCC out before you make any big investment.

Bottom line is you generally must look at your own abilities relative to the system's "ease of use" factor first, and then look at the DCC systems technical abilities second. Technical abilities will mean nothing if you cannot use the system successfully in the first place.